Tionscadal Soláthair Uisce
Water Supply Project

Environmental Impact Assessment Report (EIAR)

Volume 6 of 6: Appendices

(Appendix 10.7) Lot 1 Treated Water Pipeline TWO WTP - BPT

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Irish Water

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Eastern and Midlands Region WSP Lot 1 Pipeline
- Ground Investigation

Client:	Irish Water
Client's Representative:	Mott MacDonald
Report No.:	21-1682 Pipeline
Date:	13th March 2023
Status:	Final for Issue

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Document Control Sheet

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The works were conducted in accordance with:

UK Specification for Ground Investigation 2nd Edition, published by ICE Publishing (2012)

British Standards Institute (2015) BS 5930:2015+A1:2020, Code of practice for ground investigations.

BS EN 1997-2: 2007: Eurocode 7 - Geotechnical design - Part 2 Ground investigation and testing.

Geotechnical Society of Ireland (2016), Specification & Related Documents for Ground Investigation in Ireland

Laboratory testing was conducted in accordance with:

British Standards Institute BS 1377:1990 parts 2, 4, 5, 7 and 9

METHODS OF DESCRIBING SOILS AND ROCKS

Soil and rock descriptions are based on the guidance in BS5930:2015+A1:2020, The Code of Practice for Ground Investigation.

Abbreviations used on exploratory hole logs	
U	Nominal 100mm diameter undisturbed open tube sample (thick walled sampler).
UT	Nominal 100mm diameter undisturbed open tube sample (thin walled sampler).
P	Nominal 100mm diameter undisturbed piston sample.
B	Bulk disturbed sample.
LB	Large bulk disturbed sample.
D	Small disturbed sample.
C	Core sub-sample (displayed in the Field Records column on the logs).
L	Liner sample from dynamic sampled borehole.
W	Water sample.
ES / EW	Soil sample for environmental testing / Water sample for environmental testing.
SPT (s)	Standard penetration test using a split spoon sampler (small disturbed sample obtained).
SPT (c)	Standard penetration test using 60 degree solid cone.
(x,x/x,x,x,x)	Blows per increment during the standard penetration test. The initial two values relate to the seating drive (150mm) and the remaining four to the 75mm increments of the test length.
(Y for Z/ Y for Z)	Incomplete standard penetration test where the full test length was not achieved. The blows 'X' represent the total blows for the given seating or test length 'Z' (mm).
N=X	SPT blow count 'N' given by the summation of the blows 'X' required to drive the full test length (300mm).
HVP / HVR	In situ hand vane test result (HVP) and vane test residual result (HVR). Results presented in kPa.
V VR	Shear vane test (borehole). Shear strength stated in kPa. V: undisturbed vane shear strength VR: remoulded vane shear strength
Soil consistency description	In cohesive soils, where samples are disturbed and there are no suitable laboratory tests, N values may be used to indicate consistency on borehole logs – a median relationship of Nx5=Cu is used (as set out in Stroud & Butler 1975).
dd-mm-yyyy	Date at the end and start of shifts, shown at the relevant borehole depth. Corresponding casing and water depths shown in the adjacent columns.
▽	Water strike: initial depth of strike.
▼	Water strike: depth water rose to.
Abbreviations relating to rock core – reference Clause 36.4.4 of BS 5930: 2015+A1:2020	
TCR (%)	Total Core Recovery: Ratio of rock/soil core recovered (both solid and non-intact) to the total length of core run.
SCR (%)	Solid Core Recovery: Ratio of solid core to the total length of core run. Solid core has a full diameter, uninterrupted by natural discontinuities, but not necessarily a full circumference and is measured along the core axis between natural fractures.
RQD (%)	Rock Quality Designation: Ratio of total length of solid core pieces greater than 100mm to the total length of core run.
FI	Fracture Index: Number of natural discontinuities per metre over an indicated length of core of similar intensity of fracturing.
NI	Non Intact: Used where the rock material was recovered fragmented, for example as fine to coarse gravel size particles.
AZCL	Assessed zone of core loss: The estimated depth range where core was not recovered.
DIF	Drilling induced fracture: A fracture of non-geological origin brought about by the rock coring.
(xxx/xxx/xxx)	Spacing between discontinuities (minimum/average/maximum) measured in millimetres.

4 Lot 1 – PIPELINE ROUTE – Birdhill to Cloughjordan

4.1 INTRODUCTION

4.1.1 Authority

On the instructions of Mott MacDonald, ("the Client's Representative"), acting on the behalf of Irish Water ("the Client"), a ground investigation was undertaken at the above location. The Lot1 Pipeline works are part of the overall Water Supply Project (WSP) to service the Eastern and Midlands Region.

The Water Supply Project – Eastern and Midlands Region consists of the following:

- a Raw Water Abstraction Point with new Raw Water Intake and Pumping Station (RWIPS), and Raw Water Rising Main (RWRM)
- a new Water Treatment Plant (WTP) connecting up to the Raw Water Rising Main (RWRM)
- a new pressurised pipeline extending from the WTP to a new Break Pressure Tank (BPT)
- A new gravity fed pipeline from the BPT to a Terminal Point Reservoir (TPR).

The proposed scheme extends from Parteen Basin in North Tipperary to Peamount Reservoir in West Dublin. It is proposed to transport the water approximately 170km. The proposed pipeline route will pass through counties Tipperary, Offaly, Kildare and Dublin.

The scheme corridor, termed 'the site', passes through variable ground conditions comprising predominantly glacial till deposits, but also glaciofluvial, glaciolacustrine and alluvial deposits as well as significant areas of peat. Underlying bedrock is anticipated to comprise limestone, sandstone and shale at variable depths along the scheme ranging from several metres below ground level (bgl) to near surface.

The site is largely rural in nature with significant sections of the route in open farmland predominantly used for grazing livestock and crop production. The route also passes through marshy land with wet conditions underfoot. Approximately 28% of the pipeline route is anticipated to be underlain by peat deposits and associated soft ground conditions.

The purpose of the GI Contract (intrusive and non-intrusive) is to adequately characterise the ground conditions in order to inform the next stage design and construction of the scheme. The GI has been designed to identify and investigate geotechnical risks such that adequate mitigation may be implemented to manage those risks in the next stage of works.

This report is specific to the Lot 1 Pipeline Route site undertaken as part of the WSP Ground Investigation Works. This report details the work carried out both on site and in the geotechnical and chemical testing laboratories; it contains a description of the site and the works undertaken, the exploratory hole logs and the laboratory test results.

All information given in this report is based upon the ground conditions encountered during the ground investigation works, and on the results of the laboratory and field tests performed. However, there may be conditions at the site that have not been taken into account, such as unpredictable soil strata, contaminant concentrations, and water conditions between or below exploratory holes. It should be noted that groundwater levels usually vary due to seasonal and/or other effects and may at times differ to those recorded during the investigation. No responsibility can be taken for conditions not encountered through the scope of work commissioned, between exploratory hole points, or beneath termination depths achieved.

This report was prepared by Causeway Geotech Ltd for the use of the Client and the Client's Representative in response to a particular set of instructions. Any other parties using the information contained in this report do so at their own risk and any duty of care to those parties is excluded.

4.1.2 Scope

The extent of the investigation, as instructed by the Client's Representative, included boreholes, dynamic sampling, trial pits, slit trenches, peat probing, Russian peat cores, soil and rock core sampling, groundwater and ground gas monitoring, in-situ and laboratory testing, geophysical surveying, archaeological monitoring and the preparation of a report on the findings.

4.1.3 References

Geotechnical Society of Ireland (2016), Specification & Related Documents for Ground Investigation in Ireland.

IS EN 1997-2: 2007: Eurocode 7 - Geotechnical design - Part 2 Ground investigation and testing. National Standards Authority of Ireland.

BS EN 1997-2: 2007: Eurocode 7 - Geotechnical design - Part 2 Ground investigation and testing. British Standards Institution.

BS 5930: 2015+A1:2020: Code of practice for ground investigations. British Standards Institution.

BS EN ISO 14688-1:2018: Geotechnical investigation and testing. Identification and classification of soil. Part 1 Identification and description.

BS EN ISO 14688-2:2018: Geotechnical investigation and testing. Identification and classification of soil. Part 2 Principles for a classification.

BS 1377: 1990: Methods of test for soils for civil engineering purposes. British Standards Institution.

BS EN ISO 14689-1:2018: Geotechnical investigation and testing. Identification and classification of rock. Identification and description.

BS EN ISO 22476-3:2005+A1:2011: Geotechnical investigation and testing. Field testing. Standard penetration test.

BS EN ISO 22282-2: 2012: Geotechnical investigation and testing. Geohydraulic testing – Part 2: Water permeability tests in a borehole using open systems.

4.2 SITE AND GEOLOGY

4.2.1 Description of the site

As shown on the site location plans in Appendix 4K, the works of Lot 1 were conducted along the proposed route of the pipeline from Birdhill (adjacent to the Shannon River) to Cloughjordan County Tipperary traversing some 37km of agricultural land. The land comprised mostly of dairy grazing with little tillage. The R445 roadway was also investigated with a series of slit trenches as were the minor roadways which the pipeline intends to cross along the route.

4.2.2 General geology of the area

Published geological mapping indicate the superficial deposits underlying the site comprise lacustrine sediments, alluvium, peat, and glacial till. These deposits are underlain by limestone and shale of the Ballysteen Formation, sandstone, limestone and mudstone of the Lower Limestone Shale, greywacke and siltstone of the Hollyford Formation, sandstone of the Keeper Hill Formation, limestone and shale of the Ballynash Member, and limestone and mudstone of the Waulsortian Limestones.

4.2.2.1 Ground types encountered during investigation of the site

A summary of the ground types encountered in the exploratory holes is listed below, in approximate stratigraphic order:

- **Topsoil:** encountered typically in 100-600mm thickness across the site.
- **Recent deposits (peat):** spongy fibrous and pseudo-fibrous peat variants encountered in BH-11594, BH-12406A, and BH-12658.
- **Alluvium:** typically, soft to firm sandy silt or clay frequently with gravel.
- **Lacustrine sediments:** typically, soft silt occasionally with sand and gravel.
- **Glacial Till:** typically, sandy gravelly clay, frequently with low cobble content occasionally with beds of medium dense sand or gravel, firm or stiff in upper horizons, becoming very stiff with increasing depth.
- **Bedrock (Limestone, Sandstone, Mudstone, Siltstone, Greywacke):** Rockhead was encountered at depths ranging from 1.20m in BH-32601 to 21.10m in BH-5530.

4.2.2.2 Groundwater

Groundwater was encountered during percussion boring through soil as water strikes in a large number of boreholes; where encountered the water level was monitored for 20minutes as standard. Groundwater was also encountered as seepage in many trial pits; again, inflow was monitored and any elevation in the final water level recorded. Details of the individual groundwater strikes, along with any relative changes in levels as works proceeded, are presented on the exploratory hole logs for each location.

Groundwater was not noted during drilling at a number of the borehole locations. However, it should be noted that the casing used in supporting the borehole walls during drilling may have sealed out any groundwater strikes and the possibility of encountering groundwater during excavation works should not be ruled out. It should also be noted that any groundwater strikes within bedrock may have been masked by the fluid used as the drilling flush medium.

Continued monitoring of the seven installed standpipes will give an indication of the seasonal variation in groundwater level which should be factored into design considerations.

Details of further groundwater monitoring and results of gas monitoring are presented in Appendix 4J.

4.3 FIELDWORK

4.3.1 Summary of site works

Site operations, which were conducted between 2nd of May and 26th of September 2022, comprised:

- One hundred and thirty-one boreholes
  - Forty light cable percussion boreholes
  - Sixty-nine boreholes by light cable percussive extended by rotary follow-on drilling
  - Nine rotary-only boreholes
  - Thirteen boreholes by dynamic (windowless) sampling
- Standpipe installations in seven boreholes
- Variable head tests in eleven boreholes
- One hundred and thirty-seven machine dug trial pits.
- Forty-four machine dug slit trenches.
- Forty-seven peat probes
- Thirteen Russian peat cores
- Multi-discipline Geophysical Surveying (ERT and SR)
- Ecological monitoring
- Archaeological monitoring

The exploratory holes and in-situ tests were located as instructed by the Client's Representative, as shown on the exploratory hole location plan in Appendix 4K.

4.3.2 Boreholes

A total of one hundred and thirty-one boreholes were put down in a minimum diameter of 150mm through soils and rock strata to their completion depths by a combination of methods, including light percussion boring using Dando Terrier rigs, light cable percussion boring by Dando 2000, 2500, and 3000 rigs, rotary drilling by Comacchio 405, Hanjin D8 and Beretta T44 drilling rigs.

The borehole logs state the methodology and plant used for each location, as well as the appropriate depth ranges.

A summary of the boreholes, subdivided by category in accordance with the methods employed for their completion, is presented in the following sub-sections.

4.3.2.1 Light cable percussion boreholes

Forty boreholes were put down to completion in minimum 200mm diameter using five light cable percussion boring rigs. All boreholes were terminated either at their scheduled completion depths or on instruction from the client's representative whilst encountering virtual refusal on obstructions, including large boulders and weathered bedrock.

Hand dug inspection pits were carried out between ground level and 1.20m depth to ensure boreholes were put down at locations clear of services or subsurface obstructions.

Disturbed (bulk and small bag) samples were taken within the encountered strata. Undisturbed (UT100/U100) were taken where appropriate and as directed within fine soils.

Standard penetration tests were carried out in accordance with BS EN 22476-3:2005+A1:2011 at standard depth intervals using the split spoon sampler ($SPT_{(s)}$) or solid cone attachment ($SPT_{(c)}$). The penetrations are stated for those tests for which the full 150mm seating drive or 300mm test drive was not possible. The N-values provided on the borehole logs are uncorrected and no allowance has been made for energy ratio corrections. All relevant SPT hammer energy measurement reports are provided following the borehole logs in Appendix 4A.

Any water strikes encountered during boring were recorded along with any changes in their levels as the borehole proceeded.

Where water was added to assist with boring, a note has been added to the log to account for same.

Appendix 4A presents the borehole logs.

4.3.2.2 Boreholes by combined percussion boring and rotary follow-on drilling

Sixty-nine boreholes were put down by a combination of light cable percussion boring and rotary follow-on drilling techniques with core recovery in bedrock. Where the cable percussion borehole had not been advanced onto bedrock, rotary percussive methods were employed to advance the borehole to completion/bedrock; symmetrix cased open-hole drilling was used, with SPTs carried out at standard intervals as required.

Hand dug inspection pits were carried out between ground level and 1.20m depth to ensure boreholes were put down at locations clear of services or subsurface obstructions.

Standard penetration tests were carried out in accordance with BS EN 22476-3:2005+A1:2011 at standard depth intervals throughout the overburden using the split spoon sampler ($SPT_{(s)}$) or solid cone attachment ($SPT_{(c)}$). The penetrations are stated for those tests for which the full 150mm seating drive or 300mm test drive was not possible. The N-values provided on the borehole logs are uncorrected and no allowance has been made for energy ratio corrections. All relevant SPT hammer energy measurement reports are provided following the borehole logs in Appendix 4A.

Where coring was carried out within bedrock strata, Geobor-S was used. The core was extracted in up to 1.5m lengths using an SK6L core barrel, which produced core of nominal 102mm diameter, and was placed in single channel wooden core boxes.

The core was subsequently photographed and examined by a qualified and experienced Engineering Geologist, thus enabling the production of an engineering log in accordance with *BS 5930: 2015+A1:2020: Code of practice for ground investigations*.

Appendix 4A presents the borehole logs, with core photographs presented in Appendix 4I.

4.3.2.3 Rotary drilled boreholes

Nine boreholes were put to their completion by rotary drilling techniques only. The boreholes were completed using Comacchio 405, Hanjin D8 and Beretta T44 drilling rigs.

Symmetrix-cased open-hole drilling techniques were employed to advance the boreholes to competent coring material, after which Geobore-S coring was employed to recover core samples of the consolidated cohesive material and bedrock where encountered. SPTs were carried out at standard intervals throughout the overburden, with small and bulk disturbed samples obtained where possible through the soil strata. All relevant SPT hammer energy measurement reports are provided following the borehole logs in Appendix 4A.

Where coring was carried out within bedrock strata, Geobor-S was used. The core was extracted in up to 1.5m lengths using an SK6L core barrel, which produced core of nominal 102mm diameter, and was placed in single channel wooden core boxes.

The core was subsequently photographed and examined by a qualified and experienced Engineering Geologist, thus enabling the production of an engineering log in accordance with *BS 5930: 2015+A1:2020: Code of practice for ground investigations*.

Appendix 4A presents the borehole logs, with core photographs presented in Appendix 4I.

4.3.2.4 Dynamic sampled boreholes

Thirteen boreholes were put down to completion by light percussion boring techniques using a Dando Terrier dynamic sampling rig. The boreholes were put down initially in 150mm diameter, reducing in diameter with depth as required, down to 50mm by use of the smallest sampler.

Hand dug inspection pits were carried out between ground level and 1.20m depth to ensure boreholes were put down clear of services or subsurface obstructions. The boreholes were taken to depths ranging between 0.60m and 4.00m where they were terminated on encountering virtual refusal on obstructions.

Disturbed (bulk and small bag) samples were taken within the encountered strata.

Standard penetration tests were carried out in accordance with BS EN 22476-3:2005+A1:2011 at standard depth intervals using the split spoon sampler ($SPT_{(s)}$) or solid cone attachment ($SPT_{(c)}$). The penetrations are stated for those tests for which the full 150mm seating drive or 300mm test drive was not possible. The *N*-values provided on the borehole logs are uncorrected and no allowance has been made for energy ratio corrections. All relevant SPT hammer energy measurement reports are provided following the dynamic sampling records in Appendix 4B.

Any water strikes encountered during boring were recorded along with any changes in their levels as the borehole proceeded. Details of the water strikes are presented on the individual borehole logs.

Appendix 4B presents the dynamic sampling records.

4.3.2.5 Standpipe installations

During the course of the siteworks, 50mm groundwater monitoring standpipes were installed in boreholes BH-3588, BH-6886, BH-12658, BH-19057A, BH-30066, BH-33000A and BH-34598A.

Details of the installations, including the depth range of the response zone, are provided in Appendix 4A on the individual borehole logs.

4.3.3 Trial Pits

One hundred and thirty-seven trial pits were excavated using either a 14t tracked excavator or an 8t wheeled excavator fitted with a 600mm wide bucket, to depths of 4.50m or refusal on rockhead or boulders.

Disturbed (small jar and bulk bag) samples were taken at standard depth intervals and at change of strata.

Any water strikes encountered during excavation were recorded along with any changes in their levels as the excavation proceeded. The stability of the trial pit walls was noted on completion.

Appendix 4C presents the trial pit records with photographs of the pits and arising provided in Appendix 4I.

4.3.4 Slit trenches

Forty-four slit trenches were excavated by a combination of hand digging and mechanical excavation using a compact 3t tracked excavator fitted with a 300mm wide toothless bucket, to locate and identify buried services at the site.

Drawings of the trenches and locations of services encountered within are shown along with the slit trench logs in Appendix 4C, with photographs of the trenches and arisings presented in Appendix 4I.

4.3.5 Variable head permeability testing

In-situ permeability tests were carried out in eleven boreholes by variable head permeability methods. Testing was carried out in accordance with the guidance as set out in BS EN ISO 22282-2: 2012

The in-situ test results are presented in Appendix 4E.

4.3.6 Peat Probing and Russian Peat Coring

Initially there were 3 distinct areas identified for peat probing and Russian peat coring along the extent of the proposed pipeline route.

Given the prevailing ground conditions at the site the penetration achieved by both the peat probes (0.00-1.70m) and the Russian peat core (0.00-1.50m) were relatively shallow, with many locations having very stiff material at surface precluding any penetration at all.

Appendix L presents both the Russian peat core logs and photographs.

4.3.7 Geophysical surveys

Initially 16 distinct areas were identified by the Client's Representative for geophysical surveys to help confirm a variety of ground conditions: overburden thickness, depth to bedrock, cohesive strength of overburden, bedrock lithology, bedrock excavatability, presence of silt and sand lenses, soft ground and potential backfilled areas.

Apex Geophysics Ltd were appointed and attended site to complete a combination of geophysical surveys; 2D Electrical Resistivity Tomography (ERT) and Seismic Refraction (SR) surveys were conducted as part of the works on this scheme.

The extent of the geophysics surveys on the Lot 1 Pipeline works area covered 15 of the 16 areas and included 49 ERT profiles and 148 SR profiles at specified locations stretching from Birdhill in the west to Cloughjordan in the east of County Tipperary.

The APEX Geophysics Ltd report is presented here in Appendix 4G for review.

4.3.8 Ecological Monitoring

An Ecological Clerk of Works (ECoW) was appointed from MKO Planning and Environmental Consultants to assist with the planning, monitoring and supervision of the ground investigation works. Their brief was to be responsible for overseeing ground investigations into ecologically sensitive locations. This included site visits for pre-start ecological walkovers to highlight any potential issues and feedback to the site crews. During all of the walkovers there was nothing major of note other than advice given to the site crews on proximity of works locations to watercourses and hedgerows.

4.3.9 Archaeological Monitoring

An Archaeological Clerk of Works (ACoW) was appointed from Archaeological Management Solutions to attend site and carryout preliminary archaeological surveys/monitoring/supervision in areas of potential conflict between the proposed works and the historic environment.

The ACoW attendances were coordinated to allow the designated works to be completed under ACoW supervision. No potential archaeological finds, features, or deposits were noted during the archaeological monitoring. No further archaeological mitigation is proposed at this stage of the development.

4.3.10 Surveying

The as-built exploratory hole positions were surveyed following completion of site operations by a Site Engineer from Causeway Geotech. Surveying was carried out using a Trimble R10 GPS system employing VRS and real time kinetic (RTK) techniques.

The plan coordinates (Irish Transverse Mercator) and ground elevation (mOD Malin) at each location are recorded on the individual exploratory hole logs. The exploratory hole location plan presented in Appendix 4K shows these as-built positions.

4.3.11 Groundwater and ground gas monitoring

Following completion of site works, groundwater and ground gas monitoring was conducted over twelve months and seven monitoring rounds. Ground water monitoring was carried out using a water interface probe. Ground water samples where recovered, were via low flow techniques using an Aqua TROLL 500 low flow kit from In-Situ Inc. Ground gas measurements were carried out using a GA5000 gas meter.

Following site works, in-situ groundwater monitoring was completed over a period of 12 months using Van Walt LevelSCOUT dataloggers and a Van Walt BaroSCOUT pressure sensor within standpipes at boreholes BH-3558, BH-6886, BH-12658, BH-19057A, BH-30066 (pending), BH-33000A (pending), and BH-34598A.

The gas and groundwater monitoring records are presented in Appendix 4J, with full datalogger data files submitted electronically to the Investigation Supervisor periodically throughout the monitoring period.

4.4 LABORATORY TESTING

Upon their receipt in the laboratory, all disturbed samples were carefully examined and accurately described, and their descriptions incorporated into the borehole logs.

4.4.1 Geotechnical laboratory testing of soils

Laboratory testing of soils comprised:

- **soil classification:** moisture content measurement, Atterberg Limit tests and particle size distribution analysis, particle density by gas jar
- **compressibility:** one dimensional consolidation (oedometer)
- **shear strength** (total stress): unconsolidated undrained triaxial tests (single and multi-stage)

- **direct shear:** shear box tests
- **compaction related:** dry density/moisture content relationship, Moisture Condition Value, Moisture Condition Value/moisture content relationship, California bearing ratio tests
- **soil chemistry:** pH, water-soluble sulphate content, organic matter content, mass loss on ignition, and BRE SD1 Suite B – Greenfield pyrite present (pH, water-soluble sulphate content, acid-soluble sulphate content, total sulphur)

Laboratory testing of soils samples was carried out in accordance with British Standards Institute: *BS 1377, Methods of test for soils for civil engineering purposes; Part 1 (2016), and Parts 2-9 (1990).*

The geotechnical test results are presented in Appendix 4H.

4.4.2 Geotechnical laboratory testing of rock

Laboratory testing of rock sub-samples comprised:

- LA abrasion
- Indirect tensile strength (Brazilian)
- Slake durability
- Flakiness
- point load index
- unconfined compressive strength (UCS) tests

Test	Test carried out in accordance with
Los Angeles Abrasion	BS EN 1097-2:2020
Indirect tensile strength (Brazilian)	ISRM Suggested Methods – Rock Characterization Testing and Monitoring. Ed. ET Brown – 1981
Slake Durability	ISRM Suggested Method for Rock Characterization, Testing and Monitoring (2007) - Determining Water Content
Flakiness	BS EN 933-3:2012
Point load index	ISRM Commission on Testing Methods. Suggested Method for Determining Point Load Strength 1985
Uniaxial compression strength tests	ASTM D7012-14

The geotechnical rock test results are presented in Appendix 4H.

CAUSEWAY GEOTECH

APPENDIX 4A

BOREHOLE RECORDS



Stratum Legend Key



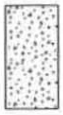
101
TOPSOIL



102
MADE GROUND



103
MADE GROUND



104
CONCRETE



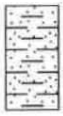
105
WOOD



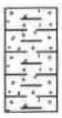
201
CLAY



202
Silty CLAY



203
Sandy CLAY



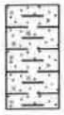
204
Gravelly CLAY



205
Cobbly CLAY



206
Bouldery CLAY



207
Silty sandy CLAY



208
Silty gravelly CLAY



209
Silty cobbly CLAY



210
Silty bouldery CLAY



211
Silty sandy gravelly CLAY



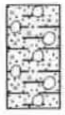
212
Silty sandy cobbly CLAY



213
Silty sandy bouldery CLAY



214
Silty sandy gravelly cobbly CLAY



215
Silty sandy gravelly bouldery CLAY



216
Silty sandy gravelly cobbly bouldery CLAY



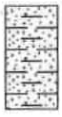
217
Silty sandy peaty CLAY



218
Silty sandy gravelly peaty CLAY



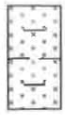
219
Silty peaty CLAY



220
Sandy gravelly CLAY



301
SILT



302
Clayey SILT



303
Sandy SILT



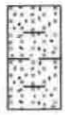
304
Gravelly SILT



305
Peaty SILT



306
Clayey sandy SILT



307
Gravelly clayey SILT



308
Sandy gravelly clayey SILT



309
Clayey bouldery SILT



310
Sandy gravelly SILT



312
Clayey sandy gravelly SILT



313
Clayey sandy gravelly peaty SILT



314
Clayey sandy gravelly peaty cobbly SILT



316
Sandy cobbly SILT



317
Sandy bouldery SILT

CAUSEWAY GEOTECH

Stratum Legend Key


318
Sandy peaty SILT


319
Sandy gravelly peaty SILT


320
Sandy gravelly cobbly SILT


321
Sandy gravelly peaty cobbly SILT


322
Gravelly cobbly SILT


323
Gravelly bouldery SILT


324
Gravelly peaty SILT


325
Gravelly peaty cobbly SILT


326
Cobbly SILT


327
Cobbly bouldery SILT


328
Peaty cobbly SILT


329
Clayey cobbly SILT


330
Clayey peaty SILT

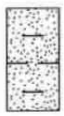

331
Bouldery SILT


332
slightly shelly SILT


333
very shelly SILT


334
Sandy clayey peaty SILT


401
SAND


402
Clayey SAND


403
Silty SAND


404
Gravelly SAND


405
Cobbly SAND


406
Bouldery SAND


407
Clayey silty SAND


408
Clayey silty gravelly SAND


409
Clayey silty gravelly cobbly SAND


410
Clayey gravelly SAND


411
Clayey gravelly cobbly SAND


412
Silty gravelly SAND


413
Silty gravelly cobbly SAND


414
Silty gravelly cobbly bouldery SAND


415
Gravelly cobbly SAND


416
Gravelly cobbly bouldery SAND


417
Gravelly bouldery SAND


418
Cobbly bouldery SAND


430
SAND and GRAVEL


431
Peaty SAND


432
Clayey peaty SAND


433
Silty peaty SAND


434
Gravelly peaty SAND

CAUSEWAY GEOTECH

Stratum Legend Key



435
Cobbly peaty SAND



436
Bouldery peaty SAND



437
Clayey silty peaty SAND



438
Clayey silty gravelly peaty SAND



439
slightly shelly SAND



440
very shelly SAND



441
slightly shelly silty SAND



442
very shelly silty SAND



443
slightly shelly silty gravelly SAND



444
very shelly silty gravelly SAND



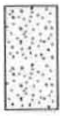
501
GRAVEL



502
Clayey GRAVEL



503
Silty GRAVEL



504
Sandy GRAVEL



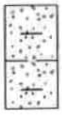
505
Peaty GRAVEL



506
Cobbly GRAVEL



507
Bouldery GRAVEL



508
Clayey silty GRAVEL



509
Clayey sandy GRAVEL



510
Clayey cobbly GRAVEL



511
Clayey bouldery GRAVEL



512
Clayey peaty GRAVEL



513
Clayey silty sandy GRAVEL



514
Clayey silty cobbly GRAVEL



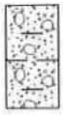
515
Clayey silty bouldery GRAVEL



516
Clayey silty peaty GRAVEL



517
Clayey sandy peaty GRAVEL



518
Clayey silty sandy bouldery GRAVEL



519
Clayey silty sandy peaty GRAVEL



520
Silty sandy GRAVEL



521
Silty cobbly GRAVEL



522
Silty bouldery GRAVEL



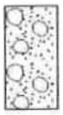
523
Silty peaty GRAVEL



524
Silty peaty sandy GRAVEL



525
Sandy cobbly GRAVEL



526
Sandy bouldery GRAVEL



527
Sandy peaty GRAVEL



528
Silty sandy cobbly GRAVEL



601
PEAT



602
Clayey PEAT

CAUSEWAY GEOTECH

Stratum Legend Key



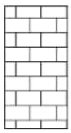
801
Mudstone



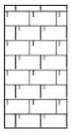
802
Siltstone



803
Sandstone



804
Limestone



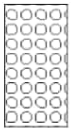
805
Chalk



806
Coal



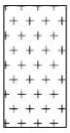
807
Breccia



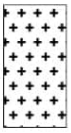
808
Conglomerate



809
Fine grained igneous



810
Medium grained igneous



811
Coarse grained igneous



812
Fine grained metamorphic



813
Medium grained metamorphic



814
Coarse grained metamorphic



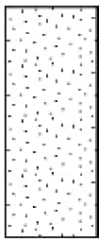
815
Pyroclastic (volcanic ash)



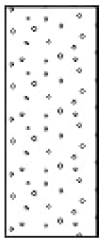
816
Gypsum, rocksalt

CAUSEWAY GEOTECH

Backfill Legend Key



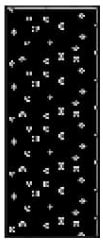
901
Sand backfill



902
Gravel backfill



903
Bentonite



904
Grout



905
Arisings



906
Concrete

CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-199

Client: Irish Water

Client's Rep: Mott MacDonald

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	5.90

Coordinates: 572653.38 E, 670442.44 N

Final Depth: 5.90 m | **Start Date:** 12/09/2022 | **Driller:** CB | **Elevation:** 50.61 mOD | **End Date:** 13/09/2022 | **Logger:** NH

Sheet 1 of 1 | Scale: 1:40 | FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description
0.00 - 1.20	B1				50.41	0.20		TOPSOIL
								Firm brown mottled orangish brown slightly sandy CLAY. Sand is fine to coarse.
					49.81	0.80		
1.00	D5							Stiff becoming very stiff slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.
1.20 - 2.00	B2							
1.20 - 1.65	SPT (S)	N=25 (4,4/5,6,7,7) Hammer SN = 1411	0.00	Dry				
2.00	D6							
2.00 - 2.80	B3							
2.00 - 2.08	SPT (C)	N=50 (25 for 0mm/50 for 75mm) Hammer SN = 1411	2.00	Dry				
2.80	B4				47.81	2.80		Medium dense brownish grey sandy clayey subangular fine to coarse GRAVEL with low cobble content. Sand is fine to coarse.
3.00	D7							
3.00 - 4.00	B8							
3.00 - 3.45	SPT (C)	N=24 (4,4/7,6,6,5) Hammer SN = 1411	3.00	0.50				
					47.01	3.60		Medium dense becoming dense greyish brown very sandy clayey subangular to subrounded fine to coarse GRAVEL with low cobble content. Sand is fine to coarse.
4.00	D11							
4.00 - 5.00	B9							
4.00 - 4.45	SPT (C)	N=24 (4,6/6,5,7,6) Hammer SN = 1411	4.00	1.50				
5.00	D12							
5.00 - 5.70	B10							
5.00 - 5.45	SPT (C)	N=30 (3,3/4,9,8,9) Hammer SN = 1411	5.00	3.50				
					44.91	5.70		Possible BOULDER/BEDROCK
					44.71	5.90		End of Borehole at 5.90m

Water | Backfill

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter
5.90	200

Water Added

From (m)	To (m)
0.00	3.00

Chiselling Details

From (m)	To (m)	Time (hh:mm)
5.70	5.90	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
Falling Head Test completed at 2.80-3.30m
No groundwater encountered

Termination Reason

Terminated on instruction of Engineer

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-533
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth: 6.00 m	Start Date: 13/09/2022	Driller: CB	Sheet 1 of 1
Hand Digging	Hand Tools	0.00	1.20					Scale: 1:40
Cable Percussion	Dando 2000	1.20	6.00	572946.68 E				
				670335.23 N	Elevation: 54.57 mOD	End Date: 15/09/2022	Logger: NH	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.00 - 1.20	B1							TOPSOIL		
					54.07	0.50		Soft to firm brown mottled orangish brown slightly sandy CLAY. Sand is fine to coarse.		
1.00	D5									
1.20 - 1.65	U9	Ublow=47 100% Recovery	0.00	Dry						
1.20 - 2.00	B2				53.27	1.30		Firm to stiff brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subrounded.		
2.00	D6									
2.00 - 3.00	B3									
2.00 - 2.45	SPT (S)	N=11 (3,3/3,3,2,3) Hammer SN = 1411	1.70	Dry						
3.00	D7									
3.00 - 3.45	U10	Ublow=41 0% Recovery	3.00	Dry						
3.00 - 4.00	B4									
4.00	D8									
4.00 - 4.45	SPT (S)	N=19 (4,5/5,4,5,5) Hammer SN = 1411	4.00	Dry						
					50.17	4.40		Greyish brown very sandy subangular to subrounded fine to coarse GRAVEL. Sand is fine to coarse.		
5.00 - 5.80	B11				49.57	5.00		Stiff brown slightly sandy very gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.		
5.00 - 5.45	SPT (C)	N=23 (5,4/5,5,6,7) Hammer SN = 1411								
5.80	D12				48.77	5.80		Possible BOULDER/BEDROCK		
					48.57	6.00		End of Borehole at 6.00m		

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter
6.00	200

Water Added

From (m)	To (m)
0.00	6.00

Chiselling Details

From (m)	To (m)	Time (hh:mm)
5.80	6.00	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Termination Reason

Terminated on instruction of Engineer

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-1886
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Rotary Drilling	Hanjin D8	1.20	5.50
Rotary Coring	Hanjin D8	5.50	25.00

Coordinates: 574168.38 E, 670816.33 N

Final Depth: 25.00 m | Start Date: 27/07/2022 | Driller: RS

Elevation: 66.41 mOD | End Date: 28/08/2022 | Logger: TH

Sheet 1 of 4 | Scale: 1:40 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
								66.21	0.20		TOPSOIL		
											Firm brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.		
								64.31	2.10		Medium dense brown gravelly fine to coarse SAND. (Driller's description)		
2.50 - 2.95	SPT(C) N=15 (3,3/4,3,4,4) Hammer SN = 1376												
								63.11	3.30		Medium dense brown fine to medium SAND. (Driller's description)		
4.00 - 4.45	SPT(C) N=11 (2,2/2,3,3,3) Hammer SN = 1376												
								61.71	4.70		Firm to stiff brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse. (Driller's description based on flush returns)		
5.50 - 5.95	SPT(C) N=19 (4,4/4,5,5,5) Hammer SN = 1376	0			NR						5.50-8.50m: AZCL material washed out with drilling fluid		
7.00 - 7.45	SPT(C) N=12 (2,2/2,3,3,4) Hammer SN = 1376							59.41	7.00		No Recovery: Medium dense brown fine to medium SAND. (Driller's description based on flush returns)		
7.00		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
5.50	200
25.00	150

Core Barrel: SK6L

Flush Type: Polymer

Termination Reason: Terminated at scheduled depth

Last Updated: 13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-1886
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Rotary Drilling	Hanjin D8	1.20	5.50
Rotary Coring	Hanjin D8	5.50	25.00

Coordinates: 574168.38 E, 670816.33 N

Final Depth: 25.00 m | Start Date: 27/07/2022 | Driller: RS | Elevation: 66.41 mOD | End Date: 28/08/2022 | Logger: TH

Sheet 2 of 4 | Scale: 1:40 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
		0									No Recovery: Medium dense brown fine to medium SAND. (Driller's description based on flush returns)		
8.50 - 8.95 8.50	SPT(C) N=33 (5,7/8,8,8,9) Hammer SN = 1376							57.91	8.50		Dense dark grey angular medium to coarse GRAVEL of limestone.		
8.90 - 9.20	C1	93						57.61	8.80		Very stiff brown sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular of predominantly sandstone.		
9.30	C2												
10.00 - 10.45 10.00	SPT(C) N=32 (4,5/7,8,8,9) Hammer SN = 1376				AZCL						10.00-10.50m: AZCL disturbance due to SPT		
		67									10.60-10.70m: Bed of subangular fine to coarse gravel		
											11.30-11.40m: Bed of subangular fine to medium gravel		
11.50 - 11.95 11.50	SPT(C) N=48 (4,7/8,10,15,15) Hammer SN = 1376				AZCL						11.50-12.55m: AZCL disturbance due to SPT/material scrubbed out during drilling		
		30						53.86	12.55		Dark grey subangular to subrounded fine to coarse GRAVEL of limestone with pockets of brown sandy gravelly CLAY.		
13.00 - 13.44 13.00	SPT(C) N=50 (9,10/50 for 290mm) Hammer SN = 1376				AZCL						13.00-13.50m: AZCL disturbance due to SPT/material scrubbed out during drilling		
		67						52.71	13.70		Very stiff brown sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are of sandstone and limestone.		
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)
5.50	200
25.00	150

Core Barrel: SK6L

Flush Type: Polymer

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Termination Reason: Terminated at scheduled depth

Last Updated: 13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-1886
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Rotary Drilling	Hanjin D8	1.20	5.50
Rotary Coring	Hanjin D8	5.50	25.00

Coordinates: 574168.38 E, 670816.33 N

Final Depth: 25.00 m | Start Date: 27/07/2022 | Driller: RS

Elevation: 66.41 mOD | End Date: 28/08/2022 | Logger: TH

Sheet 3 of 4 | Scale: 1:40 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
14.50 - 14.74 14.50	SPT(C) N=50 (25 for 80mm/50 for 165mm) Hammer SN = 1376	100						51.46	14.95		Very stiff brown sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are of sandstone and limestone.		
15.40 - 15.60	C3										Very stiff brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse.		
15.50 - 16.00	C4												
16.00		0									*16.00-19.00m: AZCL material scrubbed out during drilling*		
17.50		0			NR								
19.00 - 19.10 19.00	SPT(C) N=50 (25 for 75mm/50 for 22mm) Hammer SN = 1376	97											
20.50 - 20.59 20.50	SPT(C) N=50 (25 for 75mm/50 for 19mm) Hammer SN = 1376	67			AZCL			45.41	21.00		*20.50-21.00m: AZCL disturbance due to SPT* Very stiff reddish brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of predominantly sandstone and some limestone. *21.60-21.70m: Bed of slightly gravelly very sandy clay*		
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
5.50	200
25.00	150

Core Barrel: SK6L

Flush Type: Polymer

Termination Reason: Terminated at scheduled depth

Last Updated: 13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-1886
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Rotary Drilling	Hanjin D8	1.20	5.50
Rotary Coring	Hanjin D8	5.50	25.00

Coordinates: 574168.38 E, 670816.33 N

Final Depth: 25.00 m | Start Date: 27/07/2022 | Driller: RS | Elevation: 66.41 mOD | End Date: 28/08/2022 | Logger: TH

Sheet 4 of 4 | Scale: 1:40 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
22.00 - 22.10 22.00	SPT(C) N=50 (25 for 75mm/50 for 20mm) Hammer SN = 1376										Very stiff reddish brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of predominantly sandstone and some limestone. *22.00-22.10m: Angular cobble of sandstone*		
22.15 - 22.45	C5	100											
23.50 - 23.60 23.50	SPT(C) N=50 (25 for 75mm/50 for 25mm) Hammer SN = 1376	100											
25.00 - 25.10 25.00	SPT(C) N=50 (25 for 75mm/50 for 25mm) Hammer SN = 1376							41.41	25.00		End of Borehole at 25.00m		
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
5.50	200
25.00	150

Core Barrel: SK6L

Flush Type: Polymer

Termination Reason: Terminated at scheduled depth

Last Updated: 13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-1922
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	
Cable Percussion	Dando 2000	1.20	5.50	574202.02 E
Rotary Coring	Hanjinn D8	5.50	25.00	670769.92 N

Final Depth:	25.00 m	Start Date:	02/06/2022	Driller:	RS+BM	Sheet 1 of 3
Elevation:	67.42 mOD	End Date:	26/07/2022	Logger:	TH	Scale: 1:50
						FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
					67.22	0.20		TOPSOIL		
0.40 - 0.60	B1							Soft to firm brownish grey slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subangular fine to medium of various lithologies.		
0.50	D7									
0.80 - 1.00	B2				66.61	0.80		Firm orangish brown occasionally grey slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies.		
1.00	D8									
1.20 - 1.65	U13	Ublow=10 100% Recovery	1.00							
					65.72	1.70		Soft to firm grey slightly gravelly sandy silty CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium of various lithologies.		
1.80 - 2.00	B3									
2.00	D9									
2.00 - 2.45	SPT (C)	N=5 (1,1/1,1,1,2) Hammer SN = 1386	0.50							
2.80 - 3.00	B4									
3.00	D10								▼	
3.00 - 3.33	SPT (C)	N=50 (10,14/50 for 180mm) Hammer SN = 1386 Slow seepage at 3.00m	3.00							
					64.02	3.40		Stiff to very stiff brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies.		
3.80 - 4.00	B5									
4.00	D11									
4.00 - 4.65	U14	Ublow=50 50% Recovery	4.00							
4.80 - 5.00	B6									
5.00	D12									
5.00 - 5.05	SPT (C)	N=50 (25 for 25mm/50 for 25mm) Hammer SN = 1386	4.50							
					61.92	5.50 (0.20)		Grey slightly clayey fine to medium SAND.		
					61.72	5.70		Very stiff brownish grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies.		
		97				(0.80)				
					60.92	6.50		Very stiff brownish grey slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies.		
7.00			7.00							
7.00 - 7.44	SPT(C) N=50 (9,10/50 for 290mm) Hammer SN = 1376					(1.30)				
								7.50-7.60m: Bed of sandy gravelly clay		
7.80 - 8.25	C3	97			59.62	7.80		Very stiff brownish grey slightly sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse of various lithologies.		
8.25	C4									
8.50			8.50			(1.45)				
8.50 - 8.88	SPT(C) N=50 (10,10/50 for 228mm) Hammer SN = 1376	83								
					58.16	9.25		Very stiff greyish brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subrounded fine to medium of various lithologies.		

TCR | SCR | RQD | FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
3.00	3.00	20	3.00

Chiselling Details

From (m)	To (m)	Time (hh:mm)
4.90	5.10	01:00

Casing Details

To (m)	Diam (mm)
4.90	200
25.00	150

Water Added

From (m)	To (m)

Remarks

Hand dug inspection pit excavated to 1.20m

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-1922
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	5.50
Rotary Coring	Hanjinn D8	5.50	25.00

Coordinates: 574202.02 E, 670769.92 N

Final Depth: 25.00 m | Start Date: 02/06/2022 | Driller: RS+BM | Elevation: 67.42 mOD | End Date: 26/07/2022 | Logger: TH

Sheet 2 of 3 | Scale: 1:50 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
									(1.15)		Very stiff greyish brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subrounded fine to medium of various lithologies.		
10.00						10.0							
10.00 - 10.37	SPT(C) N=50 (25 for 145mm/50 for 227mm) Hammer SN = 1376				AZCL						10.00-10.40m: AZCL disturbance due to SPT		
								57.02	10.40				
10.20 - 10.70	C5	73									Low Recovery: Very stiff brownish grey slightly sandy gravelly CLAY with medium spaced thin beds of subangular fine to coarse GRAVEL of various lithologies. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of various lithologies.		
									(1.90)				
11.50						11.5							
11.50 - 11.87	SPT(C) N=50 (25 for 145mm/50 for 225mm) Hammer SN = 1376	0									11.50-16.70m: AZCL unable to recover sandy material, washed out with drilling fluid		
12.30								55.12	12.30				
		0									No Recovery: Medium dense brown fine to coarse SAND (Driller's description based on flush returns)		
13.00						13.0							
13.00 - 13.45	SPT(C) N=25 (4,5/5,6,7,7) Hammer SN = 1376	0			NR								
14.50						14.5			(4.40)				
14.50 - 14.95	SPT(C) N=23 (3,4/4,6,6,7) Hammer SN = 1376	0											
16.00													
		53			AZCL			50.72	16.70		Low Recovery: Very dense grey subangular fine to coarse GRAVEL of predominately limestone with much brown sandy gravelly clay. Sand is fine to coarse. Gravel is subangular fine to coarse.		
17.50						17.5							
17.50 - 17.59	SPT(C) N=50 (25 for 79mm/50 for 15mm) Hammer SN = 1376	57			AZCL				(2.15)		17.50-18.15m: AZCL disturbance due to SPT		
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
3.00	3.00	20	3.00

Chiselling Details

From (m)	To (m)	Time (hh:mm)
4.90	5.10	01:00

Casing Details

To (m)	Diam (mm)
4.90	200
25.00	150

Water Added

From (m)	To (m)

Remarks

Hand dug inspection pit excavated to 1.20m

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-1922
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	5.50
Rotary Coring	Hanjinn D8	5.50	25.00

Coordinates: 574202.02 E, 670769.92 N

Final Depth: 25.00 m | **Start Date:** 02/06/2022 | **Driller:** RS+BM | Sheet 3 of 3 | Scale: 1:50

Elevation: 67.42 mOD | **End Date:** 26/07/2022 | **Logger:** TH | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
								48.56	18.85		Low Recovery: Very dense grey subangular fine to coarse GRAVEL of predominately limestone with much brown sandy gravelly clay. Sand is fine to coarse. Gravel is subangular fine to coarse.		
19.00						19.0							
19.00 - 19.95	C6										Very stiff brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies.		
19.00 - 19.09	SPT(C) N=50 (25 for 75mm/50 for 18mm) Hammer SN = 1376	87							(1.10)				
								47.46	19.95		Very stiff reddish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse.		
20.50						20.5							
20.50 - 21.00	C7												
20.50 - 20.59	SPT(C) N=50 (25 for 75mm/50 for 18mm) Hammer SN = 1376	100											
22.00						22.0							
22.00 - 22.09	SPT(C) N=50 (25 for 75mm/50 for 18mm) Hammer SN = 1376	100							(5.05)				
23.50						23.5							
23.50 - 23.60	SPT(C) N=50 (25 for 75mm/50 for 20mm) Hammer SN = 1376	100											
25.00						25.0		42.42	25.00		End of Borehole at 25.00m		
25.00 - 25.09	SPT(C) N=50 (25 for 75mm/50 for 18mm) Hammer SN = 1376												
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
3.00	3.00	20	3.00

Chiselling Details

From (m)	To (m)	Time (hh:mm)
4.90	5.10	01:00

Remarks

Hand dug inspection pit excavated to 1.20m

Casing Details

To (m)	Diam (mm)
4.90	200
25.00	150

Water Added

From (m)	To (m)

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-2247
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2500	1.20	6.40
Rotary Drilling	Hanjin 8D	6.40	7.00
Rotary Coring	Hanjin 8D	7.00	10.00

Coordinates: 574533.59 E, 670800.16 N

Final Depth: 10.00 m | Start Date: 27/05/2022 | Driller: RS+RW | Sheet 1 of 2 | Scale: 1:50

Elevation: 49.17 mOD | End Date: 30/06/2022 | Logger: TH | FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
								TOPSOIL		
0.30 - 0.90	B1				48.87	0.30		Soft dark brown slightly sandy slightly gravelly CLAY with occasional rootlets. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies.		
0.90 - 1.50	B2				48.27	0.90		Firm greyish brown mottled orangish brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is angular fine to coarse of various lithologies. Cobbles are angular of sandstone and mudstone.		
1.20	D9									
1.20 - 1.65	SPT (C)	N=14 (2,3/4,4,3,3) Hammer SN = 1410	1.20	Dry	47.67	1.50		Stiff grey slightly gravelly sandy CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies. Cobbles are subangular of predominantly sandstone.		
1.50 - 2.00	B3									
2.00 - 2.50	B4				47.17	2.00		Medium dense dark grey sandy clayey subangular fine to coarse GRAVEL of predominantly mudstone and sandstone and low cobble content. Sand is fine to coarse. Cobbles are subangular of predominantly mudstone and sandstone.		
2.00 - 2.45	SPT (C)	N=28 (4,5/5,7,8,8) Hammer SN = 1410	2.00	1.50						
2.20	D10				46.67	2.50				
2.50 - 3.50	B5							Stiff bluish grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies.		
3.00 - 3.45	SPT (C)	N=23 (3,4/4,5,6,8) Hammer SN = 1410	3.00	1.70						
3.20	D11									
3.50 - 5.00	B6				45.67	3.50		Very stiff bluish grey slightly gravelly sandy CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies. Cobbles are subangular of limestone.		
4.00 - 4.45	SPT (C)	N=32 (5,6/7,7,8,10) Hammer SN = 1410	4.00	2.70						
4.20	D12									
5.00 - 6.00	B7									
5.00 - 5.45	SPT (C)	N=42 (7,10/9,9,12,12) Hammer SN = 1410	5.00	3.80						
5.20	D13									
6.00 - 6.40	B8									
6.00 - 6.28	SPT (C)	N=50 (25 for 145mm/50 for 140mm) Hammer SN = 1410	6.00	5.30						
6.20	D14									
7.00 - 8.50	C1	TCR: 67			7.00	7.00		Very stiff brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies. *7.00m to 7.50m: AZCL disturbance due to SPT*		
7.00 - 7.37	SPT(C) N=50 (9,11/50 for 224mm) Hammer SN = 1376	SCR:		RQD:	FI: AZCL					
						(1.35)				
8.50					8.50	8.35				
8.50 - 10.00	C2	TCR: 43						Very stiff greyish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies. *8.50m to 9.35m: AZCL disturbance due to SPT*		
8.50 - 8.65	SPT(C) N=50 (25 for 130mm/50 for 20mm) Hammer SN = 1376	SCR:		RQD:	FI: AZCL	(1.65)				

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
6.20	6.40	01:00

Casing Details

To (m)	Diam (mm)
6.40	200
10.00	150

Water Added

From (m)	To (m)
1.20	4.00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-2247
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2500	1.20	6.40
Rotary Drilling	Hanjin 8D	6.40	7.00
Rotary Coring	Hanjin 8D	7.00	10.00

Coordinates: 574533.59 E, 670800.16 N

Final Depth: 10.00 m | Start Date: 27/05/2022 | Driller: RS+RW

Elevation: 49.17 mOD | End Date: 30/06/2022 | Logger: TH

Sheet 2 of 2 | Scale: 1:50 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
9.75 - 9.90	C3										Very stiff greyish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies.		
10.00								39.17	10.00		End of Borehole at 10.00m		

TCR	SCR	RQD	FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)
6.40	200
10.00	150

Water Added

From (m)	To (m)
1.20	4.00

Chiselling Details

From (m)	To (m)	Time (hh:mm)
6.20	6.40	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-2461

Client: Irish Water

Client's Rep: Mott MacDonald

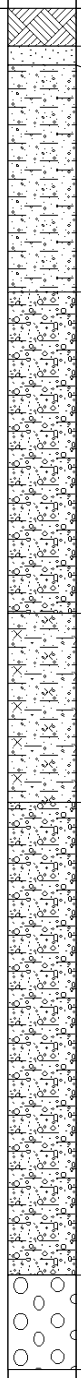
Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 200	1.20	7.20

Coordinates: 574647.15 E, 670863.65 N

Final Depth: 7.20 m | **Start Date:** 24/06/2022 | **Driller:** BM | **Elevation:** 43.26 mOD | **End Date:** 27/06/2022 | **Logger:** NH

Sheet 1 of 1 | Scale: 1:40 | FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Description
					43.06	0.20	TOPSOIL
0.30 - 0.50	B1				42.96	0.30	Grey fine to coarse SAND.
0.50	D3						Soft becoming firm brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.
0.80 - 1.00	B2						
1.00	D4						
1.20 - 1.65	SPT (S)	N=8 (2,2/2,2,2,2) Hammer SN = 1386	1.00	Dry			
					41.76	1.50	Firm brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subrounded.
1.80 - 2.00	B5						
2.00	D10						
2.00 - 2.45	SPT (S)	N=11 (2,2/2,3,3,3) Hammer SN = 1386	1.50	Dry			
2.80 - 3.00	B6						
3.00	D11						
3.00 - 3.24	SPT (S)	N=50 (3,5/50 for 90mm) Hammer SN = 1386 Water strike at 3.20m	3.00	Dry	40.06	3.20	Very stiff brown slightly sandy gravelly silty CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium.
3.80 - 4.00	B7						
4.00	D12						
4.00 - 4.45	SPT (S)	N=32 (5,6/6,8,9,9) Hammer SN = 1386	4.00	3.90	39.06	4.20	Very stiff brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subrounded.
4.80 - 5.00	B8						
5.00	D13						
5.00 - 5.45	U15	Ublow=50 70% Recovery	4.50	Dry			
5.80 - 6.00	B9						
6.00	D14						
6.00 - 6.45	SPT (S)	N=35 (5,6/7,7,10,11) Hammer SN = 1386	4.50	Dry			
					36.56	6.70	BOULDER
					36.06	7.20	End of Borehole at 7.20m



Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
3.20	3.20	20	2.20

Casing Details

To (m)	Diameter
6.70	200

Water Added

From (m)	To (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)

Remarks

Hand dug inspection pit excavated to 1.20m

Termination Reason

Terminated at scheduled depth

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-3263

Client: Irish Water

Client's Rep: Mott MacDonald

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2500	1.20	8.00

Coordinates: 575445.66 E, 671122.63 N

Final Depth: 8.00 m | **Start Date:** 23/05/2022 | **Driller:** RW | **Logger:** TH | **Elevation:** 46.80 mOD | **End Date:** 24/05/2022

Sheet 1 of 2 | Scale: 1:40 | FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description
0.20 - 1.20	B1				46.60	0.20		TOPSOIL
								Soft brown sandy gravelly CLAY with occasional rootlets. Sand is fine to coarse. Gravel is subrounded fine to coarse of various lithologies.
1.20	D5				45.60	1.20		
1.20 - 2.00	B2							Soft brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subrounded fine to medium of various lithologies.
1.20 - 1.65	SPT (S)	N=7 (2,3/2,2,1,2) Hammer SN = 1410	1.20	Dry				
2.00 - 2.40	U9	Ublow=70 0% Recovery	2.00	Dry	44.80	2.00		Medium dense brown very sandy clayey subangular fine to coarse GRAVEL of various lithologies with low cobble content. Sand is fine to coarse. Cobbles are subangular of sandstone.
2.00 - 3.00	B3							
2.20	D6							
3.00 - 4.00	B4							
3.00 - 3.45	SPT (S)	N=19 (3,2/11,3,3,2) Hammer SN = 1410	3.00					
3.20	D7							
4.00 - 4.80	B10							
4.00 - 4.45	SPT (C)	N=16 (3,4/5,3,4,4) Hammer SN = 1410	4.00					
4.20	D8							
4.80 - 6.00	B11				42.00	4.80		Medium dense dark grey slightly sandy slightly clayey subangular fine to coarse GRAVEL of various lithologies with medium cobble content. Cobbles are subangular of sandstone and mudstone.
5.00 - 5.45	SPT (C)	N=12 (5,5/4,3,2,3) Hammer SN = 1410	5.00	4.30				
5.20	D14							
6.00 - 7.00	B12							
6.00 - 6.45	SPT (C)	N=20 (3,5/6,5,5,4) Hammer SN = 1410	6.00	4.40				
6.20	D15							
7.00 - 8.00	B13				39.80	7.00		Medium dense dark greyish brown very sandy slightly clayey subrounded fine to coarse GRAVEL of various lithologies. Sand is fine to coarse.
7.00 - 7.45	SPT (C)	N=19 (5,6/6,6,3,4) Hammer SN = 1410	7.00	6.20				
7.20	D16							

Water | Backfill

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter
8.00	200

Water Added

From (m)	To (m)
4.50	7.00

Chiselling Details

From (m)	To (m)	Time (hh:mm)
8.00	8.00	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Termination Reason

Terminated on instruction of Engineer

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-3263
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	
Cable Percussion	Dando 2500	1.20	8.00	575445.66 E
				671122.63 N

Final Depth:	8.00 m	Start Date:	23/05/2022	Driller:	RW	Sheet 2 of 2
						Scale: 1:40
Elevation:	46.80 mOD	End Date:	24/05/2022	Logger:	TH	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
								Medium dense dark greyish brown very sandy slightly clayey subrounded fine to coarse GRAVEL of various lithologies. Sand is fine to coarse.		
8.00 8.00 - 8.00	D17 SPT (C)	N=50 (25 for 0mm/50 for 0mm) Hammer SN = 1410	8.00		38.80	8.00		End of Borehole at 8.00m		

7.5 8.0 8.5 9.0 9.5 10.0 10.5 11.0 11.5 12.0 12.5 13.0 13.5 14.0 14.5

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter
8.00	200

Water Added

From (m)	To (m)
4.50	7.00

Chiselling Details

From (m)	To (m)	Time (hh:mm)
8.00	8.00	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Termination Reason

Terminated on instruction of Engineer

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-3588
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

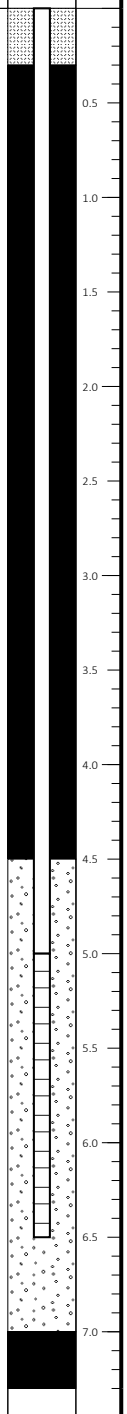
Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	
Cable Percussion	Dando 2500	1.20	5.00	575696.81 E
				671272.45 N

Final Depth:	7.50 m	Start Date:	25/05/2022	Driller:	RW	Sheet 1 of 2
						Scale: 1:40
Elevation:	57.14 mOD	End Date:	26/05/2022	Logger:	NH	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description
								TOPSOIL
0.40 - 1.20	B1				56.74	0.40		Soft to firm brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of mudstone and sandstone.
1.20	D6				55.94	1.20		Firm brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies.
1.20 - 2.00	B2							
1.20 - 1.65	SPT (S)	N=13 (2,3/2,4,3,4) Hammer SN = 1410	1.20	Dry				
2.00 - 3.00	B3							
2.00 - 2.45	SPT (S)	N=10 (2,2/3,3,2,2) Hammer SN = 1410	2.00	1.50				
2.20	D7							
3.00 - 4.00	B4				54.14	3.00		Stiff to very stiff brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies. Cobbles are subangular of greywacke.
3.00 - 3.45	SPT (S)	N=22 (2,1/2,3,7,10) Hammer SN = 1410	3.00	2.20				
3.20	D8							
4.00 - 5.00	B5							
4.00 - 4.45	SPT (C)	N=34 (5,5/5,9,10,10) Hammer SN = 1410	4.00	0.40				
4.20	D9							
5.00 - 6.00	B13				52.14	5.00		Very stiff brown slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies. Cobbles are subangular of greywacke.
5.00 - 5.36	SPT (C)	N=48 (25 for 60mm/25,11,6,6) Hammer SN = 1410	5.00	4.60				
5.20	D10							
6.00 - 7.50	B14							
6.00 - 6.45	SPT (C)	N=32 (4,5/6,9,8,9) Hammer SN = 1410	6.00	3.20				
6.20	D11							
7.00 - 7.44	SPT (C)	N=50 (8,8/50 for 295mm) Hammer SN = 1410	7.00	3.50				
7.20	D12							

Water

Backfill



Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter
5.00	200

Water Added

From (m)	To (m)
1.20	5.00

Chiselling Details

From (m)	To (m)	Time (hh:mm)

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered during drilling
Standpipe installation (response zone 4.50-7.00m)

Termination Reason

Terminated on instruction of Engineer

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-3588
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	
Cable Percussion	Dando 2500	1.20	5.00	575696.81 E
				671272.45 N

Final Depth:	7.50 m	Start Date:	25/05/2022	Driller:	RW	Sheet 2 of 2
Elevation:	57.14 mOD	End Date:	26/05/2022	Logger:	NH	Scale: 1:40
						FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
					49.64	7.50		Very stiff brown slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies. Cobbles are subangular of greywacke.		
								End of Borehole at 7.50m		

7.5 8.0 8.5 9.0 9.5 10.0 10.5 11.0 11.5 12.0 12.5 13.0 13.5 14.0 14.5

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter
5.00	200

Water Added

From (m)	To (m)
1.20	5.00

Chiselling Details

From (m)	To (m)	Time (hh:mm)

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered during drilling
Standpipe installation (response zone 4.50-7.00m)

Termination Reason

Terminated on instruction of Engineer

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-3815
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth: 7.50 m	Start Date: 24/05/2022	Driller: RW	Sheet 1 of 2
Hand Digging	Hand Tools	0.00	1.20					Scale: 1:40
Cable Percussion	Dando 2500	1.20	7.50	575946.50 E				
				671267.35 N	Elevation: 61.83 mOD	End Date: 24/05/2022	Logger: TH	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.30 - 1.00	B1				61.53	0.30		TOPSOIL		
1.00 - 1.60	B2				60.83	1.00		Soft brown occasionally greyish brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subangular fine to medium of various lithologies.		
1.20	D6									
1.20 - 1.65	SPT (S)	N=9 (2,2/3,2,2,2) Hammer SN = 1410	1.20	Dry				Firm orangish brown mottled light grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of mudstone.		
1.60 - 3.00	B3				60.23	1.60		Medium dense dark grey slightly sandy subangular fine to coarse GRAVEL of mudstone and limestone with medium cobble content. Sand is fine to coarse. Cobbles are subangular of mudstone and limestone.		
2.00 - 2.45	SPT (C)	N=12 (2,1/2,4,3,3) Hammer SN = 1410	2.00	1.00						
2.20	D7									
3.00 - 4.00	B4									
3.00 - 3.22	SPT (S)	N=50 (6,25/50 for 70mm) Hammer SN = 1410	3.00	2.60						
3.20	D8									
4.00 - 5.00	B5									
4.00 - 4.45	SPT (C)	N=49 (10,9/10,10,12,17) Hammer SN = 1410	4.00	2.30						
4.20	D9									
5.00 - 6.00	B11				56.83	5.00				
5.00 - 5.45	SPT (C)	N=47 (7,12/12,12,11,12) Hammer SN = 1410	5.00	2.50				Very stiff brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse of various lithologies.		
5.20	D10									
6.00 - 7.50	B12				55.83	6.00				
6.00 - 6.42	SPT (C)	N=44 (7,10/44 for 275mm) Hammer SN = 1410	6.00	4.60				Very stiff brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse of various lithologies. Cobbles are subangular of mudstone.		
6.20	D13									
7.00 - 7.40	SPT (C)	N=50 (10,10/50 for 255mm) Hammer SN = 1410	7.00	5.40						
7.20	D14									

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)

Casing Details

To (m)	Diameter
7.50	200

Water Added

From (m)	To (m)
1.20	4.00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Termination Reason

Terminated on instruction of Engineer

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-3815
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	
Cable Percussion	Dando 2500	1.20	7.50	575946.50 E
				671267.35 N

Final Depth:	7.50 m	Start Date:	24/05/2022	Driller:	RW	Sheet 2 of 2
Elevation:	61.83 mOD	End Date:	24/05/2022	Logger:	TH	Scale: 1:40
						FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
					54.33	7.50		Very stiff brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse of various lithologies. Cobbles are subangular of mudstone. End of Borehole at 7.50m		

7.5 8.0 8.5 9.0 9.5 10.0 10.5 11.0 11.5 12.0 12.5 13.0 13.5 14.0 14.5

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)

Casing Details

To (m)	Diameter
7.50	200

Water Added

From (m)	To (m)
1.20	4.00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Termination Reason

Terminated on instruction of Engineer

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-4110
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	
Cabe Percussion	Dando 2000	1.20	8.50	576212.29 E
Rotary Coring	Hanjin D8	8.50	19.00	671366.79 N

Final Depth:	25.00 m	Start Date:	07/06/2022	Driller:	BM+RS	Sheet 1 of 3
Elevation:	67.50 mOD	End Date:	08/08/2022	Logger:	TH	Scale: 1:50
						FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
								TOPSOIL		
					67.20	0.30		Soft light grey mottled orangish brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subangular fine to medium of various lithologies.		
0.40 - 0.60	B3									
0.50	D10									
0.80 - 1.00	B4				66.70	0.80		Firm orangish brown mottled light grey slightly gravelly sandy CLAY with rootlets. Sand is fine to coarse. Gravel is subangular fine to medium of various lithologies.		
1.00	D11									
1.20 - 1.65	U1	Ublow=25 100% Recovery		Dry						
1.80 - 2.00	B5				65.70	1.80		Stiff greyish brown slightly sandy gravelly silty CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse of various lithologies.		
2.00	D12									
2.00 - 2.45	SPT (C)	N=16 (7,3/3,4,4,5) Hammer SN = 1386	2.00	Dry						
2.80 - 3.00	B6									
3.00	D13									
3.00 - 3.45	SPT (C)	N=24 (10,4/4,6,7,7) Hammer SN = 1386	3.00	Dry						
3.80 - 4.00	B7				63.70	3.80		Stiff to very stiff brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subangular fine to medium of various lithologies.		
4.00	D14									
4.00 - 4.40	U2	Ublow=25 100% Recovery		Dry						
4.80 - 5.00	B8									
5.00	D15									
5.00 - 5.40	SPT (C)	N=50 (9,11/50 for 245mm) Hammer SN = 1386	5.00	Dry						
5.80 - 6.00	B9									
6.00 - 6.28	SPT (C)	N=50 (25 for 130mm/50 for 145mm) Hammer SN = 1386	6.00	Dry						
7.30 - 7.50	B16									
7.50	D17				60.00	7.50		Very stiff dark brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies.		
7.50	U18	Ublow=50 40% Recovery								
					59.40	8.10		Medium dense brown clayey fine to coarse SAND. (Where No Recovery "NR" descriptions based on flush returns)		
								8.50 to 14.50m: AZCL granular material scrubbed out with drilling fluid		

TCR	SCR	RQD	FI
0			

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
6.30	6.50	00:45
7.90	8.10	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No core recovery due to granular material being washed out with drilling fluid
No groundwater encountered

Casing Details

To (m)	Diam (mm)
8.10	200

Water Added

From (m)	To (m)

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-4110
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cabe Percussion	Dando 2000	1.20	8.50
Rotary Coring	Hanjin D8	8.50	19.00

Coordinates: 576212.29 E, 671366.79 N

Final Depth: 25.00 m | Start Date: 07/06/2022 | Driller: BM+RS | Elevation: 67.50 mOD | End Date: 08/08/2022 | Logger: TH

Sheet 2 of 3 | Scale: 1:50 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
											Medium dense brown clayey fine to coarse SAND. (Where No Recovery "NR" descriptions based on flush returns) *8.50 to 14.50m: AZCL granular material scrubbed out with drilling fluid*		
10.00						10.0							
10.00 - 10.45	SPT(C) N=23 (4,4/5,6,6,6) Hammer SN = 1376	0											
11.50						11.5							
11.50 - 11.95	SPT(C) N=18 (3,4/4,4,5,5) Hammer SN = 1376	0			NR				(6.40)				
13.00						13.0							
13.00 - 13.45	SPT(C) N=25 (4,5/6,6,7,6) Hammer SN = 1376	0											
14.50						14.5		53.00	14.50		Dense brown clayey fine to coarse SAND. (Where No Recovery "NR" descriptions based on flush returns) *14.50m to 20.50m: AZCL granular material scrubbed out with drilling fluid*		
14.50 - 14.95	SPT(C) N=34 (5,6/8,8,9,9) Hammer SN = 1376	0											
16.00						16.0							
16.00 - 16.45	SPT(C) N=39 (7,7/9,10,10,10) Hammer SN = 1376	0			NR				(6.00)				
17.50						17.5							
17.50 - 17.95	SPT(C) N=39 (7,8/8,10,10,11) Hammer SN = 1376	0											
		TCR	SCR	RQD	FI								

9.5 10.0 10.5 11.0 11.5 12.0 12.5 13.0 13.5 14.0 14.5 15.0 15.5 16.0 16.5 17.0 17.5 18.0 18.5

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
6.30	6.50	00:45
7.90	8.10	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No core recovery due to granular material being washed out with drilling fluid
No groundwater encountered

Casing Details

To (m)	Diam (mm)
8.10	200

Water Added

From (m)	To (m)

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-4110
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cabe Percussion	Dando 2000	1.20	8.50
Rotary Coring	Hanjin D8	8.50	19.00

Coordinates: 576212.29 E, 671366.79 N

Final Depth: 25.00 m | **Start Date:** 07/06/2022 | **Driller:** BM+RS | Sheet 3 of 3 | Scale: 1:50

Elevation: 67.50 mOD | **End Date:** 08/08/2022 | **Logger:** TH | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
19.00						19.0					Dense brown clayey fine to coarse SAND. (Where No Recovery "NR" descriptions based on flush returns)		
19.00 - 19.45	SPT(C) N=40 (6,7/9,10,10,11) Hammer SN = 1376	0											
20.50						20.5		47.00	20.50		Very stiff reddish brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of various lithologies. (Where No Recovery "NR" descriptions based on flush returns)		
20.50 - 20.95	SPT(C) N=40 (6,8/9,9,10,12) Hammer SN = 1376	0									*20.50m to 25.00m: AZCL fines and granular material washed/scrubbed out with drilling*		
22.00						22.0							
22.00 - 22.45	SPT(C) N=42 (7,8/10,10,11,11) Hammer SN = 1376	0			NR				(4.50)				
23.50						23.5							
23.50 - 23.95	SPT(C) N=47 (6,8/11,11,12,13) Hammer SN = 1376	0											
25.00						25.0		42.50	25.00		End of Borehole at 25.00m		
25.00 - 25.45	SPT(C) N=50 (8,9/10,12,13,15) Hammer SN = 1376												
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
6.30	6.50	00:45
7.90	8.10	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No core recovery due to granular material being washed out with drilling fluid
No groundwater encountered

Casing Details

To (m)	Diam (mm)
8.10	200

Water Added

From (m)	To (m)

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-5260
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	5.20
Rotary Drilling	Comacchio 405	5.20	5.60
Rotary Coring	Comacchio 405	5.60	10.15

Coordinates: 577309.46 E, 671499.77 N

Final Depth:	10.15 m	Start Date:	30/05/2022	Driller:	RC+RW	Sheet 1 of 2
Elevation:	55.45 mOD	End Date:	20/08/2022	Logger:	TH+NH	Scale: 1:50
						FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
								TOPSOIL		
0.30 - 1.20	B1				55.15	0.30		Soft greyish brown mottled orangish brown slightly sandy silty gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to medium of various lithologies.		
1.20	D4				54.25	1.20		Soft brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies.		
1.20 - 2.00	B2									
1.20 - 1.65	SPT (C)	N=9 (2,3/2,2,3,2) Hammer SN = 1410	1.20	Dry						
2.00 - 3.00	B3				53.45	2.00		Stiff reddish brown slightly gravelly sandy CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies. Cobbles are subangular of sandstone and mudstone.		
2.00 - 2.45	SPT (C)	N=20 (6,6/5,5,4,6) Hammer SN = 1410	2.00	1.50						
2.20	D5									
3.00 - 4.00	B9									
3.00 - 3.45	SPT (C)	N=25 (4,5/6,6,7,6) Hammer SN = 1410	3.00	1.90						
3.20	D6									
4.00 - 5.00	B10				51.45	4.00		Very stiff greyish brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is angular fine to coarse. Cobbles are subangular of predominantly sandstone.		
4.00 - 4.17	SPT (C)	N=50 (25 for 120mm/50 for 50mm) Hammer SN = 1410	4.00	1.80						
4.20	D7									
5.00 - 5.14	SPT (C)	N=50 (25 for 65mm/50 for 70mm) Hammer SN = 1410	5.00	3.80						
5.20	D8									
5.60	D11			Dry	49.85	5.60		Dense dark grey and light brown angular medium GRAVEL of limestone and sandstone with some greyish brown slightly sandy slightly gravelly CLAY.		
5.60 - 5.90	SPT(S) N=50 (6,11/50 for 150mm) Hammer SN = 1368	TCR: 24, SCR: , RQD: , FI: AZCL				(1.05)		*5.60-6.40m: AZCL granular material scrubbed out with drilling fluid*		
6.65				Dry	48.80	6.65		Very dense dark grey and light brown subangular GRAVEL and COBBLES of limestone and sandstone with low boulder content. Boulder is of limestone.		
6.65	D12									
6.65 - 6.95	SPT(S) N=50 (3,8/50 for 150mm) Hammer SN = 1368	TCR: 80, SCR: , RQD: , FI:								
6.70	C1							*7.35-10.15m: AZCL unable to recover granular material/scrubbed out with drilling fluid*		
7.15		TCR: 20, SCR: , RQD: , FI: AZCL				(3.50)				
8.15				Dry						
8.15	D13									
8.15 - 8.45	SPT(S) N=50 (3,5/50 for 150mm) Hammer SN = 1368	TCR: 0, SCR: , RQD: , FI: NR								
8.90		TCR: 0, SCR: , RQD: , FI:								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)
5.20	200
5.60	190
10.15	150

Water Added

From (m)	To (m)
1.20	3.00

Chiselling Details

From (m)	To (m)	Time (hh:mm)
5.00	5.00	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-5260
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	5.20
Rotary Drilling	Comacchio 405	5.20	5.60
Rotary Coring	Comacchio 405	5.60	10.15

Coordinates: 577309.46 E, 671499.77 N

Final Depth: 10.15 m | **Start Date:** 30/05/2022 | **Driller:** RC+RW

Elevation: 55.45 mOD | **End Date:** 20/08/2022 | **Logger:** TH+NH

Sheet 2 of 2 | Scale: 1:50 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
9.65 9.65 9.65 - 10.10 10.15	D14 SPT(S) N=46 (4,5/10,10,12,14) Hammer SN = 1368	0				9.65	6.50	45.30	10.15		Very dense dark grey and light brown subangular GRAVEL and COBBLES of limestone and sandstone with low boulder content. Boulder is of limestone. End of Borehole at 10.15m		

TCR	SCR	RQD	FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
5.00	5.00	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
5.20	200
5.60	190
10.15	150

Water Added

From (m)	To (m)
1.20	3.00

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-5440

Client: Irish Water

Client's Rep: Mott MacDonald

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	8.60
Rotary Drilling	Comacchio 405	8.60	10.10
Rotary Coring	Comacchio 405	10.10	25.15

Coordinates: 577476.62 E, 671545.24 N

Final Depth: 25.15 m | **Start Date:** 31/05/2022 | **Driller:** RW+RC

Elevation: 53.49 mOD | **End Date:** 20/08/2022 | **Logger:** TH

Sheet 1 of 3
Scale: 1:50

FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description
								TOPSOIL
0.40 - 1.20	B1				53.09	0.40		Soft greyish brown slightly sandy slightly gravelly CLAY with gravel sized pockets of grey fine sand. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies.
1.20	D8				52.29	1.20		Firm brown slightly gravelly sandy CLAY with low cobble content. Sand is fine to coarse. Gravel is subrounded fine to medium of various lithologies. Cobbles are subangular of greywacke.
1.20 - 2.00	B2							
1.20 - 1.65	SPT (S)	N=13 (3,2/2,4,4,3) Hammer SN = 1410	1.20	Dry				
2.00 - 3.00	B3				51.49	2.00		Soft to firm brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subangular fine to medium of various lithologies.
2.00 - 2.45	SPT (S)	N=4 (1,1/1,1,1,1) Hammer SN = 1410	2.00	Dry				
2.20	D9							
3.00 - 4.00	B4							
3.00 - 3.45	SPT (C)	N=12 (2,2/3,2,3,4) Hammer SN = 1410	3.00	1.50				
3.20	D10							
4.00 - 5.00	B5				49.49	4.00		Stiff to very stiff brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine of various lithologies. Cobbles are angular of greywacke.
4.00 - 4.45	SPT (C)	N=26 (6,6/6,5,6,9) Hammer SN = 1410	4.00	3.20				
4.20	D11							
5.00 - 6.00	B6							
5.00 - 5.45	SPT (C)	N=38 (14,15/18,8,6,6) Hammer SN = 1410	5.00	4.30				
5.20	D12							
6.00 - 6.90	B7							
6.00 - 6.45	SPT (C)	N=25 (4,4/5,7,7,6) Hammer SN = 1410	6.00	4.70				
6.20	D13							
6.90 - 8.00	B15							
7.00 - 7.37	SPT (S)	N=50 (9,14/50 for 220mm) Hammer SN = 1410	7.00	6.50				
7.20	D14							
8.00 - 8.60	B16							
8.00 - 8.28	SPT (C)	N=50 (25 for 140mm/50 for 140mm) Hammer SN = 1410	8.00	7.00				
8.20	D17							
					44.89	8.60		BOULDERS (Driller's description)

Water	Backfill

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
8.50	8.60	01:00

Remarks

Hand dug inspection pit excavated to 1.20m

Casing Details

To (m)	Diam (mm)
8.50	200
10.10	190
25.15	146

Water Added

From (m)	To (m)
2.00	8.00

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-5440
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	8.60
Rotary Drilling	Comacchio 405	8.60	10.10
Rotary Coring	Comacchio 405	10.10	25.15

Coordinates: 577476.62 E, 671545.24 N

Final Depth: 25.15 m | Start Date: 31/05/2022 | Driller: RW+RC | Sheet 2 of 3 | Scale: 1:50

Elevation: 53.49 mOD | End Date: 20/08/2022 | Logger: TH | FINAL

Depth (m)	Sample / Tests	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
												BOULDERS (Driller's description)		
												Dense dark grey subrounded fine to coarse GRAVEL of limestone with low cobble content. Cobbles are subrounded of predominantly limestone and rare sandstone.		
10.10 - 10.12	SPT(C) N=50 (25 for 5mm/50 for 10mm) Hammer SN = 1368								43.39	10.10				
10.70 - 11.10	C1	30												
11.10	C2									(1.90)				
11.15		67												
						AZCL			41.49	12.00		Dense dark grey subangular fine to coarse GRAVEL and COBBLES with low boulder content. Gravel ad cobbles of predominantly limestone and rare siltstone. Boulder is of limestone.		
12.65												*12.15m to 13.50m: AZCL granular material scrubbed out with drilling fluid*		
12.65 - 12.66	SPT(C) N=50 (25 for 0mm/50 for 5mm) Hammer SN = 1368	43								(2.55)				
14.15														
									38.94	14.55		Medium strong dark grey fossiliferous LIMESTONE interbedded with thinly laminated black calcareous MUDSTONE. Slightly weathered: slightly reduced strength, closer fracture spacing, orangish brown discolouration and brown clay infill on some fracture surfaces. Discontinuities: 1. 10 to 30 degree bedding fractures, closely spaced (12/90/320) undulating, smooth, patchy orangish brown staining and brown clay infill on some fracture surfaces (up to 8mm thick). 2. ~45 degree joint, at 16.35m to 16.40m, undulating, smooth. 3. 70 to 90 degree joint, at 18.05m to 18.30m, stepped, smooth.		
15.00 - 15.10	C3	100	61	43	14									
15.65														
15.65	C4													
15.75 - 15.85	C5													
16.15 - 16.25	C6	97	73	53	6					(3.85)				
16.95	C7													
17.15														
17.50	C8											Medium strong dark grey fossiliferous LIMESTONE interbedded with medium strong black calcareous MUDSTONE. Slightly weathered: slightly reduced strength, closer fracture spacing, patchy ornagish brown discolouration on some fracture surfaces. Discontinuities: 1. 5 to 15 degree bedding fractures, closely spaced (20/85/310) undulating, smooth, patchy orangish brown staining on some fracture surfaces.		
		100	80	33	13				35.09	18.40				
		TCR	SCR	RQD	FI									

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)
8.50	200
10.10	190
25.15	146

Water Added

From (m)	To (m)
2.00	8.00

Remarks

Hand dug inspection pit excavated to 1.20m

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-5440
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	8.60
Rotary Drilling	Comacchio 405	8.60	10.10
Rotary Coring	Comacchio 405	10.10	25.15

Coordinates
577476.62 E
671545.24 N

Final Depth: 25.15 m | **Start Date:** 31/05/2022 | **Driller:** RW+RC
Elevation: 53.49 mOD | **End Date:** 20/08/2022 | **Logger:** TH

Sheet 3 of 3
Scale: 1:50
FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
18.65					12				(0.95)		Medium strong dark grey fossiliferous LIMESTONE interbedded with medium strong black calcareous MUDSTONE. Slightly weathered: slightly reduced strength, closer fracture spacing, patchy ornagish brown discolouration on some fracture surfaces. Discontinuities: 1. 5 to 15 degree bedding fractures, closely spaced (20/85/310) undulating, smooth, patchy orangish brown staining on some fracture surfaces.		
		100	97	67				34.14	19.35				
20.15											Strong dark grey fossiliferous LIMESTONE with closely spaced thick laminations of black calcerous MUDSTONE. Slightly weathered: patchy orangish brown discolouration on few fracture surfaces. Discontinuities: 1. 10 to 20 degree bedding fractures, medium spaced (40/255/520) slightly undulating, smooth, patchy orangish brown staining on few fracture surfaces.		
20.15	C9				4				(2.05)				
		97	97	87									
21.20 - 21.40	C10												
								32.09	21.40				
21.65											Medium strong dark grey fossiliferous LIMESTONE interbedded with thinly laminated calcareous MUDSTONE. Slightly weathered: slightly reduced strength, slightly closer fracture spacing. Discontinuities: 1. 10 to 25 degree bedding fractures, closely spaced (20/120/350) slightly undulating, smooth. 2. ~ 40 degree joint, at 24.30m to 24.35m, undulating, smooth.		
		78	78	42	10								
23.15									(3.75)				
		100	98	73									
24.65					6								
		100	100	100									
25.15								28.34	25.15		End of Borehole at 25.15m		

TCR	SCR	RQD	FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
8.50	8.60	01:00

Casing Details

To (m)	Diam (mm)
8.50	200
10.10	190
25.15	146

Water Added

From (m)	To (m)
2.00	8.00

Remarks
Hand dug inspection pit excavated to 1.20m

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-5478
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	13.60
Rotary Drilling	Comacchio 405	13.60	14.60
Rotary Coring	Comacchio 405	14.60	25.15

Coordinates: 577513.20 E, 671561.01 N

Final Depth:	25.15 m	Start Date:	01/06/2022	Driller:	RW+RC	Sheet 1 of 3
Elevation:	53.37 mOD	End Date:	18/08/2022	Logger:	TH	Scale: 1:50
						FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
								TOPSOIL		
0.30 - 1.20	B1				53.06	0.30		Soft light brown mottled grey slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subangular fine to medium of various lithologies.		
1.20 - 1.90	B2				52.16	1.20		Firm brown occasionally dark orangish brown slightly gravelly sandy silty CLAY. Sand is fine to coarse. Gravel is subrounded fine to medium of various lithologies.		
1.20 - 1.65	SPT (S)	N=8 (2,1/2,2,2,2) Hammer SN = 1410	1.20	Dry						
2.00	U9	Ublow=61 0% Recovery								
2.90 - 4.00	B3				50.46	2.90		Stiff greyish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to medium of various lithologies.		
3.00 - 3.44	SPT (C)	N=50 (12,12/50 for 295mm) Hammer SN = 1410	2.00	Dry						
4.00	B4									
4.00	U10	Ublow=64 0% Recovery								
4.20 - 4.65	SPT (C)	N=26 (11,11/10,8,5,3) Hammer SN = 1410	4.20	Dry						
5.00 - 5.45	SPT (C)	N=17 (3,4/4,5,4,4) Hammer SN = 1410	5.00	Dry						
5.40 - 7.00	B5				47.96	5.40		Firm brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subangular fine to medium of various lithologies.		
6.00 - 6.45	SPT (C)	N=14 (3,3/3,3,4,4) Hammer SN = 1410	6.00	Dry						
7.00 - 8.00	B6									
7.00 - 7.45	SPT (C)	N=13 (3,4/3,4,3,3) Hammer SN = 1410	7.00	Dry						
8.00 - 9.00	B7				45.36	8.00		Medium dense brownish grey gravelly clayey fine to coarse SAND with medium cobble content. Gravel is subangular fine to coarse of various lithologies. Cobbles are rounded of greywacke.		
8.00 - 8.45	SPT (C)	N=16 (3,4/4,4,3,5) Hammer SN = 1410	8.00	Dry						
9.00 - 10.00	B8									
9.00 - 9.45	SPT (C)	N=11 (3,3/2,3,3,3) Hammer SN = 1410	9.00	Dry						

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
13.50	13.60	01:00

Remarks

Hand dug inspection pit excavated to 1.20m

Casing Details

To (m)	Diam (mm)
13.60	200
14.60	190
25.15	146

Water Added

From (m)	To (m)
0.00	13.60

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-5478
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	13.60
Rotary Drilling	Comacchio 405	13.60	14.60
Rotary Coring	Comacchio 405	14.60	25.15

Coordinates: 577513.20 E, 671561.01 N

Final Depth: 25.15 m | Start Date: 01/06/2022 | Driller: RW+RC | Elevation: 53.37 mOD | End Date: 18/08/2022 | Logger: TH

Sheet 2 of 3 | Scale: 1:50 | FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
10.00 - 11.50	B11				43.36	10.00				
10.00 - 10.30	SPT (C)	N=50 (14,18/50 for 145mm) Hammer SN = 1410	10.0	4.50				Very dense greyish brown very sandy slightly clayey angular fine to coarse GRAVEL of various lithologies. Sand is fine to coarse.		
10.20	D14									
11.00 - 11.36	SPT (C)	N=50 (6,10/50 for 207mm) Hammer SN = 1410	11.0	1.20						
11.20	D15									
11.50 - 13.00	B12									
12.00 - 12.37	SPT (C)	N=50 (3,6/50 for 224mm) Hammer SN = 1410	12.0	3.00						
12.20	D16									
13.00 - 13.60	B13				40.36	13.00				
13.00 - 13.38	SPT (C)	N=50 (11,11/50 for 230mm) Hammer SN = 1410	13.0	2.40				Bedrock recovered as: Dark grey angular coarse GRAVEL and COBBLES of limestone		
13.10 - 13.55	SPT (S)	N=49 (10,11/12,9,14,14) Hammer SN = 1368	13.1	Dry						
13.20	D17									
14.60	C1				38.76	14.60		Strong (locally medium strong) dark grey fossiliferous LIMESTONE interbedded with black calcareous MUDSTONE. Slightly weathered: closer fracture spacing, dark orangish brown discoloration on some fracture surfaces. Discontinuities: 1. 10 to 20 degree bedding fractures, closely spaced (10/95/300) undulating, smooth dark orangish brown staining on some fracture surfaces. 2. ~40 degree joints, at 15.95m to 16.00m and 16.365m to 16.73m, slightly undulating, smooth, orangish brown staining on joint surfaces. 3. 70 to 80 degree joint, at 14.65m to 14.75, undulating, smooth.		
14.75 - 14.85	C2									
14.90 - 15.00	C3									
15.00 - 15.10	C4	TCR 95, SCR 95, RQD 46								
15.30 - 15.40	C5									
15.65						(2.95)				
16.50 - 16.60	C6	TCR 100, SCR 81, RQD 52								
17.15								Strong (locally medium strong) dark grey fossiliferous LIMESTONE interbedded with medium strong thinly laminated black fossiliferous calcareous MUDSTONE. Slightly weathered: slightly closer fracture spacing, patchy orangish brown discolouration on some fracture surfaces. Discontinuities: 1. 10 to 20 degree bedding fractures, closely spaced (10/105/380) undulating, smooth, patchy orangish brown staining on some fracture surfaces. 2. ~40 degree joint, at 24.65m to 24.73m, slightly undulating, smooth, patchy orangish brown staining n joint surface. 3. 70 to 90 degree joint, at 18.05m to 18.20m, stepped, smooth.		
		TCR 100, SCR 84, RQD 66, FI 12			35.82	17.55				

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
13.50	13.60	01:00

Casing Details

To (m)	Diam (mm)
13.60	200
14.60	190
25.15	146

Water Added

From (m)	To (m)
0.00	13.60

Remarks

Hand dug inspection pit excavated to 1.20m

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-5478
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	13.60
Rotary Drilling	Comacchio 405	13.60	14.60
Rotary Coring	Comacchio 405	14.60	25.15

Coordinates
577513.20 E
671561.01 N

Final Depth: 25.15 m | **Start Date:** 01/06/2022 | **Driller:** RW+RC | Sheet 3 of 3 | Scale: 1:50

Elevation: 53.37 mOD | **End Date:** 18/08/2022 | **Logger:** TH | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
18.65											Strong (locally medium strong) dark grey fossiliferous LIMESTONE interbedded with medium strong thinly laminated black fossiliferous calcareous MUDSTONE. Slightly weathered: slightly closer fracture spacing, patchy orangish brown discolouration on some fracture surfaces. Discontinuities: 1. 10 to 20 degree bedding fractures, closely spaced (10/105/380) undulating, smooth, patchy orangish brown staining on some fracture surfaces. 2. ~40 degree joint, at 24.65m to 24.73m, slightly undulating, smooth, patchy orangish brown staining n joint surface. 3. 70 to 90 degree joint, at 18.05m to 18.20m, stepped, smooth.		
19.40	C7	97	97	71	7								
19.65 - 20.25	C8												
20.15		100	90	60	19								
21.65		100	95	60					(7.60)				
23.15		100	98	67	10								
24.65		80	80	22									
25.15								28.22	25.15		End of Borehole at 25.15m		
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
13.50	13.60	01:00

Remarks
Hand dug inspection pit excavated to 1.20m

Casing Details

To (m)	Diam (mm)
13.60	200
14.60	190
25.15	146

Water Added

From (m)	To (m)
0.00	13.60

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-5530
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	14.20
Rotary Coring	Beretta T44	14.20	24.70

Coordinates: 577581.91 E, 671519.41 N

Final Depth: 24.70 m | Start Date: 23/06/2022 | Driller: RS+PJ

Elevation: 53.55 mOD | End Date: 28/07/2022 | Logger: TH

Sheet 1 of 3
Scale: 1:50
FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
					53.35	0.20		TOPSOIL		
								Medium dense brown gravelly fine SAND with low cobble content. Gravel is subangular to subrounded fine to coarse of various lithologies. Cobbles are subrounded of limestone.		
1.00	D16									
1.00 - 1.20	B1									
1.20 - 1.65	SPT (C)	N=13 (3,3/3,4,3,3) Hammer SN = 1369	1.20		52.25	1.30		Stiff to very stiff brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium of various lithologies.		
1.80 - 2.00	B2									
2.00 - 2.45	U10	Ublow=61 100% Recovery								
2.50	D17									
2.80 - 3.00	B3									
3.00 - 3.45	SPT (C)	N=32 (6,6/7,8,8,9) Hammer SN = 1369	3.00							
3.30 - 3.50	B4				50.25	3.30		Very stiff yellowish brown slightly gravelly sandy CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium of various lithologies. Cobbles are subrounded of limestone.		
3.80 - 4.00	B5									
4.00 - 4.45	SPT (C)	N=44 (8,8/12,10,11,11) Hammer SN = 1369	4.00							
4.80 - 5.00	B6									
5.00 - 5.45	SPT (C)	N=43 (6,9/9,10,12,12) Hammer SN = 1369	5.00							
5.80 - 6.00	B7				47.75	5.80		Very stiff brown slightly sandy CLAY. Sand is fine to coarse.		
6.50 - 6.95	U11	Ublow=76 100% Recovery								
6.80 - 7.00	B8									
6.95	D18									
7.80 - 8.00	B9									
8.00 - 8.45	SPT (S)	N=35 (6,6/6,8,9,12) Hammer SN = 1369	8.00		45.55	8.00		Dense yellow fine to coarse SAND with laminations of firm silt.		

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)
14.00	200
14.20	150
24.70	150

Water Added

From (m)	To (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
14.20	14.30	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-5530
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	
Cable Percussion	Dando 2000	1.20	14.20	577581.91 E
Rotary Coring	Beretta T44	14.20	24.70	671519.41 N

Final Depth:	24.70 m	Start Date:	23/06/2022	Driller:	RS+PJ	Sheet 2 of 3
Elevation:	53.55 mOD	End Date:	28/07/2022	Logger:	TH	Scale: 1:50
						FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
9.30 - 9.50	B12									
9.50 - 9.95	SPT (C)	N=38 (6,7/9,8,12,9) Hammer SN = 1369	9.50		44.05	9.50		Dense grey very gravelly clayey fine to coarse SAND with low cobble content. Gravel is subangular fine to coarse of various lithologies Cobbles are subrounded of limestone.		
10.80 - 11.00	B13									
11.00 - 11.45	SPT (C)	N=34 (8,8/8,8,9,9) Hammer SN = 1369	11.0							
12.30 - 12.50	B14									
12.50 - 12.95	SPT (C)	N=44 (5,7/9,14,12,9) Hammer SN = 1369	12.5							
13.80 - 14.00	B15									
14.00 - 14.28	SPT (C)	N=50 (7,8/50 for 125mm) Hammer SN = 1369	14.0					Very dense dark grey subangular to subrounded fine to coarse GRAVEL of limestone with low cobble content. Cobbles are subangular of limestone.		
14.30		76	14.0	8.30	39.35	14.20				
15.70			15.7			(3.30)		15.70m to 16.50m: AZCL material scrubbed out during drilling		
15.70 - 16.08	SPT(C) N=50 (4,10/50 for 225mm) Hammer SN = 1385	47 AZCL								
16.90m to 17.05m: Brown sandy gravelly clay										
17.20			17.2							
17.20 - 17.58	SPT(C) N=50 (6,11/50 for 225mm) Hammer SN = 1385	100			36.05	17.50		Dark grey subangular COBBLES and BOULDERS of limestone.		
						(1.20)				
		TCR SCR RQD FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
14.20	14.30	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
14.00	200
14.20	150
24.70	150

Water Added

From (m)	To (m)

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-5530
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	14.20
Rotary Coring	Beretta T44	14.20	24.70

Coordinates: 577581.91 E, 671519.41 N

Final Depth: 24.70 m **Start Date:** 23/06/2022 **Driller:** RS+PJ

Elevation: 53.55 mOD **End Date:** 28/07/2022 **Logger:** TH

Sheet 3 of 3 | Scale: 1:50 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
18.70								34.85	18.70 (0.30)		Dark grey subangular COBBLES and BOULDERS of limestone. Dark grey subangular fine GRAVEL of limestone.		
								34.55	19.00		Dark grey subangular COBBLES of limestone.		
		40			AZCL				(1.20)		*19.30m to 20.20m: AZCL material washed out during drilling, possible fault gouge/void. Loss of flush.*		
20.20								33.35	20.20 (0.15)		Dark grey fine to coarse SAND.		
								33.20	20.35 (0.45)		Very stiff orangish brown slightly gravelly very sandy CLAY. Sand is fine to coarse. Gravel is angular fine to coarse of limestone. *20.65m to 20.70m: Bed of clayey fine sand*		
		95						32.75	20.80 (0.30)		Orangish brown gravelly very clayey fine to coarse SAND. Gravel is angular fine to coarse of limestone.		
21.20	C1							32.45	21.10		Weak becoming medium strong massive grey fossiliferous LIMESTONE with frequent orangish white calicte veins of predominantly subvertical orinentation (3-20mm thick). Slightly weathered: slightly reduced strength, penetrative orangish brown discolouration and some clay infill on fracture surfaces. Discontinuities: 1. 20-30 degree joints, medium spaced (90/260/300), undulating, rough, orangish brown staining on joint surfaces, brown sandy clay infill on some joint surfaces up to 5mm thick. 2. 80-90 degree joint, at 21.40-21.70m, undulating, rough, orangish brown staining and clay film on joint surface.		
21.40 - 21.60	C2												
21.70					5				(1.55)				
22.00 - 22.30	C3	100											
22.70	C4							30.90	22.65		Medium strong massive grey LIMESTONE with occasional greyish white calcite veins of predominantly subvertical orientation (1-10mm thick). Slightly weathered: slightly closer fracture spacing, some grey discolouration and orangish brown staining. Discontinuities: 1. 20-30 degree joints, medium spaced (230/340/500), undulating, rough, orangish brown staining on some joint surfaces. 2. 80-90 degree joints, at 23.95-24.26m, 23.95-24.28m, 23.96-24.40m and 24.00-24.20m, undulating, smooth, patchy orangish brown staining on some joint surfaces.		
23.20					5				(2.05)				
		100											
24.70								28.85	24.70		End of Borehole at 24.70m		
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
14.20	14.30	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
14.00	200
14.20	150
24.70	150

Water Added

From (m)	To (m)

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-5573
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 200	1.20	11.20
Rotary Coring	Beretta T44	11.20	24.70

Coordinates: 577633.12 E, 671518.79 N

Final Depth: 24.70 m | Start Date: 28/06/2022 | Driller: PJ+RS | Elevation: 53.00 mOD | End Date: 04/08/2022 | Logger: TH

Sheet 1 of 3 | Scale: 1:50 | FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
								TOPSOIL		
0.30 - 0.60	B1				52.70	0.30		Firm brown slightly gravelly sandy CLAY with low cobble content. Sand is fine to medium. Gravel is subangular fine to coarse.		
0.90 - 1.20	B2				52.20	0.80		Firm to stiff brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subrounded fine to medium.		
1.00	D13									
1.20 - 1.65	SPT (C)	N=9 (2,2/2,3,2,2) Hammer SN = 1369	1.20					1.20-2.00m: Medium dense.		
1.80 - 2.00	B3									
2.00	D14									
2.00 - 2.45	U11	Ublow=32 100% Recovery								
2.80 - 3.00	B4									
3.00 - 3.45	SPT (C)	N=11 (2,2/3,2,3,3) Hammer SN = 1369	3.00							
3.70										
3.80 - 4.00	B5				49.20	3.80		Firm brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.		
4.00 - 4.45	U12	Ublow=24 100% Recovery								
4.80 - 5.00	B6									
5.00 - 5.45	SPT (C)	N=12 (2,3/3,3,3,3) Hammer SN = 1369	5.00							
5.20										
6.30 - 6.50	B7				46.70	6.30		Medium dense brownish grey very sandy clayey subrounded fine to coarse GRAVEL. Sand is fine to coarse.		
6.50 - 6.95	SPT (C)	N=20 (4,5/5,4,6,5) Hammer SN = 1369	6.50							
6.70										
7.70 - 8.00	B8				45.20	7.80		Dense greyish brown sandy slightly clayey subangular fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are subangular.		
8.00 - 8.45	SPT (C)	N=46 (8,9/10,12,12,12) Hammer SN = 1369	8.00							
9.20 - 9.50	B9									

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)
11.20	200
24.70	150

Water Added

From (m)	To (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
12.10	12.10	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-5573

Client: Irish Water

Client's Rep: Mott MacDonald

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 200	1.20	11.20
Rotary Coring	Beretta T44	11.20	24.70

Coordinates: 577633.12 E, 671518.79 N

Final Depth: 24.70 m | **Start Date:** 28/06/2022 | **Driller:** PJ+RS

Elevation: 53.00 mOD | **End Date:** 04/08/2022 | **Logger:** TH

Sheet 2 of 3

Scale: 1:50

FINAL

Depth (m)	Sample / Tests	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description
9.50 - 9.95	SPT (C)	N=47 (7,9/9,12,13,13) Hammer SN = 1369					9.50					
9.70												
10.70 - 11.00	B10								42.40	10.60		Dense grey very gravelly slightly clayey fine to coarse SAND with low cobble content. Gravel is subangular fine to coarse.
11.00 - 11.44	SPT (C)	N=50 (10,10/50 for 285mm) Hammer SN = 1369					11.0					Light brown slightly clayey fine to medium SAND.
11.20		0				NR			41.80	11.20		*11.20-11.70m: AZCL fines possibly washed out with drilling fluid*
						AZCL				(0.55)		
12.10 - 12.16	SPT(C) N=50 (25 for 60mm/50 for 0mm) Hammer SN = 1369	67					12.1		41.25	11.75		Very dense greyish brown slightly sandy subrounded fine to coarse GRAVEL of predominately limestone. Sand is fine to coarse.
12.70							12.7	3.00	40.40	12.60		
12.70 - 13.10	SPT(C) N=50 (9,10/50 for 250mm) Hammer SN = 1385									(0.30)		Very dense brown sandy clayey very angular fine to coarse GRAVEL of sandstone. Sand is fine to coarse
13.50 - 14.20	C1	100							40.10	12.90		Very dense brown occasionally reddish brown very sandy clayey angular fine to coarse GRAVEL of sandstone. Sand is fine to coarse.
										(1.05)		*13.30-13.45m: Bed of greyish brown fine gravel*
14.20							14.2	2.00	39.05	13.95		Stiff greyish black slightly sandy CLAY. Sand is fine to medium.
14.20 - 14.54	SPT(C) N=50 (12,13/50 for 195mm) Hammer SN = 1385								38.85	(0.20) 14.15		Greyish black very gravelly fine to coarse SAND. Gravel is angular fine to coarse of sandstone.
14.30 - 14.42	C2	100	81	70	6				38.70	(0.15) 14.30		Medium strong (locally weak) dark grey medium to coarse grained moderately cemented SANDSTONE with rare greyish white calcite veins, 1-3mm thick. Partially weathered: slightly reduced strength, closer fracture spacing, some discolouration, infill on most fracture surfaces.
14.42 - 14.53	C3											Discontinuities:
14.54	C5											1. 10-15 degree joints, medium spaced (90/350/440), undulating, rough, greyish black clayey fine gravel infill on some joint surfaces, up to 2mm thick.
14.90	C4											2. 25-35 degree joints, medium spaced (40/325/600), slightly undulating, rough, greyish black very gravelly carbonaceous clay infill on most joint surfaces, up to 30mm thick.
15.70							15.7	3.00				3. 70-80 degree joints, at 16.15-16.25m, 16.55-16.65m 16.68-16.80m and 17.90-18.10m, undulating, rough, grey discolouration on some joint surfaces.
15.70	C6											*15.80-15.90m: Greyish black clayey carbonaceous fine to coarse gravel, possibly disturbed/ broken up due to drilling*
15.70	03-08-2022											*16.85-16.95m: Bed of dark grey fine gravel*
16.30 - 16.55	C7	100	60	25	11					(3.90)		
17.20												*17.20-17.95m: AZCL material possibly scrubbed out during drilling*
						AZCL						Weak massive lightly grey coarse grained moderately cemented SANDSTONE. Partially weathered: reduced strength, slightly closer fracture spacing, gravelly clay infill on fracture surfaces.
		70	46	45	5							Discontinuities:
												1. 10-30 degree joints, medium spaced (40/230/450), slightly undulating, rough, clay infill on most joint surfaces.
					7				34.80	18.20		2. 80-90 degree joint, at 18.40-19.30m, undulating, rough, clayey sand infill on joint surface.
												18.25-18.35m: Dark grey very sandy clay infill on approx. 20 degree joint, 100mm thick

Water | Backfill

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
12.10	12.10	01:00

Casing Details

To (m)	Diam (mm)
11.20	200
24.70	150

Water Added

From (m)	To (m)

Remarks

Hand dug inspection pit excavated to 1.20m

No groundwater encountered

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-5573
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 200	1.20	11.20
Rotary Coring	Beretta T44	11.20	24.70

Coordinates: 577633.12 E, 671518.79 N

Final Depth: 24.70 m | Start Date: 28/06/2022 | Driller: PJ+RS | Elevation: 53.00 mOD | End Date: 04/08/2022 | Logger: TH

Sheet 3 of 3 | Scale: 1:50 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
18.70													
		80	31	25	AZCL						Weak massive lightly grey coarse grained moderately cemented SANDSTONE. Partially weathered: reduced strength, slightly closer fracture spacing, gravelly clay infill on fracture surfaces. Discontinuities: 1. 10-30 degree joints, medium spaced (40/230/450), slightly undulating, rough, clay infill on most joint surfaces. 2. 80-90 degree joint, at 18.40-19.30m, undulating, rough, clayey sand infill on joint surface.		
					9				(1.60)				
					NI								
								33.20	19.80		*18.70-19.00m: AZCL possible fault gouge material washed out with drilling fluid* *19.00-19.20m: Dark grey slightly gravelly slightly clayey coarse sand infill on approx. 90 degree joint* *19.35-19.40m: Orangish brown calcite mineralisation (20mm thick) and film of orangish brown sandy clay on approx. 25 degree joint* *19.45-19.80m: Bedrock recovered as: angular fine to coarse gravel with some orangish brown clay*		
20.20													
20.25 - 20.55	C8	100	100	89	4				(2.55)		Moderately weak massive reddish brown medium to coarse grained moderately cemented SANDSTONE. Partially weathered: slightly reduced strength, slightly closer fracture spacing, orangish brown discolouration and some clay infill on fracture surfaces. Discontinuities: 1. 0-10 degree joints, at 21.75m, 21.84m, 21.90m and 22.00m, slightly undulating, rough, orangish brown clayey sand film on some joint surfaces, up to 2mm thick. 2. 35-45 degree, widely spaced (100/640/360), planar, rough, orangish brown staining on most joint surfaces penetrating in up to 100mm, sandy infill on some joint surfaces. 3. Approx. 60 degree joint, at 20.10-20.20m, planar, rough, dark orangish brown staining on joint surface.		
21.70													
		100	95	90				30.65	22.35		Medium strong massive dark grey coarse grained moderately cemented SANDSTONE. Partially weathered: slightly reduced strength, greyish black clay infill on some fracture surfaces. Discontinuities: 1. 10-20 degree joints, at 22.85m and 24.44m, undulating, rough, greyish black clay infill on joint at 24.44m, up to 5mm thick. 2. 20-25 degree joints at, 23.05m and 23.70m, planar, rough.		
22.90 - 23.08	C9												
23.20													
		100	100	100	2				(2.35)				
24.70								28.30	24.70		End of Borehole at 24.70m		
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
12.10	12.10	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
11.20	200
24.70	150

Water Added

From (m)	To (m)

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-6016
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	
Cable Percussion	Dando 2000	1.20	12.70	578006.81 E
Rotary Coring	Beretta T44	12.70	24.70	671735.40 N

Final Depth:	24.70 m	Start Date:	29/06/2022	Driller:	RS+PJ	Sheet 1 of 3
Elevation:	51.55 mOD	End Date:	09/08/2022	Logger:	TH	Scale: 1:50
						FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
					51.25	0.30		TOPSOIL		
					51.05	0.50		Soft brown slightly gravelly very sandy CLAY. Sand is fine to coarse. Gravel is subrounded fine to medium.		
0.90 - 1.20	B1							Medium dense brownish grey very gravelly very silty fine to coarse SAND. with low cobble content. Gravel is subangular fine to coarse. Cobbles are subangular of limestone.		
1.20 - 1.65	SPT (C)	N=11 (2,2/3,2,3,3) Hammer SN = 1369	1.20							
1.80 - 2.00	B2									
2.00 - 2.45	SPT (C)	N=17 (4,4/5,4,4,4) Hammer SN = 1369	2.00							
2.80 - 3.00	B3									
3.00 - 3.45	SPT (C)	N=19 (3,4/4,4,5,6) Hammer SN = 1369	3.00							
3.40 - 3.70	B4				48.15	3.40		Dense dark brownish grey very sandy silty subangular fine to coarse GRAVEL with high cobble content. Sand is fine to coarse. Cobbles are subangular of limestone.		
4.00 - 4.34	SPT (C)	N=50 (8,8/50 for 190mm) Hammer SN = 1369	4.00							
4.70 - 5.00	B5				46.85	4.70		Very stiff greyish brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular of limestone.		
5.00 - 5.10	U11	Ublow=100 0% Recovery								
5.10 - 5.54	SPT (C)	N=42 (25 for 135mm/8,10,12,12) Hammer SN = 1369	5.10							
6.20 - 6.50	B6									
6.50 - 6.85	SPT (C)	N=50 (8,10/50 for 200mm) Hammer SN = 1369	6.50							
7.70 - 8.00	B7									
8.00 - 8.43	SPT (C)	N=50 (6,9/50 for 280mm) Hammer SN = 1369	8.00							
9.20 - 9.50	B8				42.45	9.10		Dense grey sandy slightly clayey subangular fine to coarse GRAVEL with medium cobble content. Sand is fine to coarse. Cobbles are subrounded of limestone.		

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)
12.70	200
24.70	150

Water Added

From (m)	To (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
12.20	12.30	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
Variable head test at 4.20-4.70m
No groundwater encountered

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-6016
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	
Cable Percussion	Dando 2000	1.20	12.70	578006.81 E
Rotary Coring	Beretta T44	12.70	24.70	671735.40 N

Final Depth:	24.70 m	Start Date:	29/06/2022	Driller:	RS+PJ	Sheet 2 of 3
Elevation:	51.55 mOD	End Date:	09/08/2022	Logger:	TH	Scale: 1:50
						FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
9.50 - 9.95	SPT (C)	N=36 (6,7/8,9,9,10) Hammer SN = 1369	9.50							
10.70 - 11.00	B9									
11.00 - 11.45	SPT (C)	N=44 (8,8/9,12,12,11) Hammer SN = 1369	11.0							
11.90 - 12.20	B10									
12.30 - 12.30	SPT (C)	N=50 (25 for 0mm/50 for 0mm) Hammer SN = 1369	12.3		39.35	12.20		BOULDER		
					38.85	12.70		Dense grey and dark grey slightly sandy slightly clayey subrounded fine to coarse GRAVEL of predominately limestone interbedded with brownish grey very gravelly very clayey fine to coarse SAND. Gravel is subangular fine to coarse of various lithologies.		
14.20		TCR 100								
14.20 - 14.70 14.20 - 14.62	C1 SPT(C) N=50 (7,10/50 for 275mm) Hammer SN = 1385	SCR 100				(4.95)				
15.70										
15.70 - 16.04	SPT(C) N=50 (9,13/50 for 190mm) Hammer SN = 1385	87								
17.20								17.20-17.65m: AZCL disturbance due to SPT		
17.20 - 17.54	SPT(C) N=50 (10,14/50 for 185mm) Hammer SN = 1385	70 RQD AZCL FI			33.90	17.65		Dark grey slightly clayey fine GRAVEL		
						(0.40)				
					33.50	18.05		Dark brownish grey slightly clayey fine to medium SAND		
						(0.35)				
					33.15	18.40		Very dense grey and light grey COBBLES of limestone with some subrounded fine to coarse GRAVEL.		

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)
12.70	200
24.70	150

Water Added

From (m)	To (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
12.20	12.30	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
Variable head test at 4.20-4.70m
No groundwater encountered

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-6016
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	12.70
Rotary Coring	Beretta T44	12.70	24.70

Coordinates: 578006.81 E, 671735.40 N

Final Depth: 24.70 m | Start Date: 29/06/2022 | Driller: RS+PJ | Elevation: 51.55 mOD | End Date: 09/08/2022 | Logger: TH

Sheet 3 of 3 | Scale: 1:50 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
18.70													
18.70 - 19.08	SPT(C) N=50 (9,12/50 for 225mm) Hammer SN = 1385							32.65	(0.50) 18.90		Very dense grey and light grey COBBLES of limestone with some subrounded fine to coarse GRAVEL.		
									(0.30)		Very dense greyish brown very gravelly clayey fine to coarse SAND. Gravel is subangular fine to coarse.		
								32.35	19.20		Very stiff brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.		
19.20 - 19.80	C2	87							(0.60)				
								31.75	19.80		Very stiff dark greyish brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.		
20.20									(0.40)				
20.20 - 20.60	SPT(C) N=50 (7,10/50 for 245mm) Hammer SN = 1385							31.35	20.20		Very dense dark grey slightly clayey subangular to subrounded fine GRAVEL.		
									(0.35)				
								31.00	20.55		Very dense dark greyish brown very sandy very clayey subangular fine to coarse GRAVEL with low cobble content. Sand is fine to coarse.		
		100							(0.40)				
								30.60	20.95		Very stiff brown slightly gravelly very sandy CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.		
									(0.75)				
21.70								29.85	21.70		Very dense dark grey COBBLES and BOULDERS of limestone with much orangish brown sandy CLAY		
21.70 - 21.76	SPT(C) N=50 (25 for 25mm/50 for 40mm) Hammer SN = 1385	100											
23.20									(3.00)		*23.20-23.50m: Stiff orangish brown very sandy clay*		
											23.50-23.60: Greyish brown gravelly very clayey sand		
		100									*23.70-23.75m: Greyish brown gravelly very clayey sand*		
											24.50-24.70m: Light grey cobble of limestone		
24.70								26.85	24.70		End of Borehole at 24.70m		
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)
12.70	200
24.70	150

Water Added

From (m)	To (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
12.20	12.30	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
Variable head test at 4.20-4.70m
No groundwater encountered

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-6406
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	4.20
Rotary Coring	Comacchio 405	4.00	10.00

Coordinates: 578263.55 E, 672024.07 N

Final Depth: 10.00 m | Start Date: 28/06/2022 | Driller: BM+RS | Sheet 1 of 2 | Scale: 1:50

Elevation: 57.42 mOD | End Date: 11/08/2022 | Logger: TH | FINAL

Depth (m)	Sample / Tests	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
									57.22	0.20		TOPSOIL		
0.30 - 0.50	B6											Soft brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.		
0.50	D1													
0.80 - 1.00	B7													
1.00	D2													
1.20 - 1.65	U11	Ublow=10 100% Recovery					1.00							
1.80 - 2.00	B8													
2.00	D3													
2.00 - 2.45	SPT (C)	N=19 (3,4/4,5,5,5) Hammer SN = 1386					1.50		55.32	2.10		Stiff to very stiff brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.		
2.80 - 3.00	B9													
3.00	D4													
3.00 - 3.45	SPT (C)	N=46 (5,6/6,8,16,16) Hammer SN = 1386					3.00							
3.80 - 4.00	B10													
4.00	D5								53.42	4.00		Very stiff greyish brown slightly gravelly sandy CLAY with widely spaced medium beds of slightly sandy clayey subangular fine to coarse GRAVEL. Sand is fine to coarse.		
4.00 - 4.06	SPT(C) N=50 (20 for 30mm/50 for 25mm) Hammer SN = 1386													
4.50 - 5.00	C1	97								(1.95)				
5.50							5.50							
5.50	C2													
5.50 - 5.94	SPT(C) N=50 (12,12/50 for 295mm) Hammer SN = 1376	100							51.46	5.95		Grey and dark grey subangular to subrounded fine to coarse GRAVEL of limestone with low cobble content. Cobbles are of limestone.		
										(0.50)				
									50.96	6.45		Greyish brown very sandy CLAY. Sand is fine to coarse.		
7.00							7.00			(0.95)				
7.00 - 7.32	SPT(C) N=50 (25 for 75mm/50 for 245mm) Hammer SN = 1376					AZCL						7.00-7.40m: AZCL disturbance due to SPT		
		73							50.02	7.40		Very stiff light brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.		
8.00 - 8.50	C3													
										(1.90)				
8.50							8.50							
8.50 - 8.86	SPT(C) N=50 (25 for 135mm/50 for 220mm) Hammer SN = 1376	47				AZCL						8.50-9.30m: AZCL disturbance due to SPT/material scrubbed out during drilling		
									48.12	9.30				

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
4.10	4.20	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
4.00	200

Water Added

From (m)	To (m)

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-6406
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	4.20
Rotary Coring	Comacchio 405	4.00	10.00

Coordinates: 578263.55 E, 672024.07 N

Final Depth: 10.00 m | **Start Date:** 28/06/2022 | **Driller:** BM+RS

Elevation: 57.42 mOD | **End Date:** 11/08/2022 | **Logger:** TH

Sheet 2 of 2 | Scale: 1:50 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
									(0.70)		Dark grey subangular fine to coarse GRAVEL of limestone with low cobble content and some greyish brown sandy gravelly CLAY.		
10.00								47.42	10.00		End of Borehole at 10.00m		

TCR	SCR	RQD	FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
4.10	4.20	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
4.00	200

Water Added

From (m)	To (m)

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-6576
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	5.50
Rotary Coring	Comacchio 405	5.50	10.00

Coordinates: 578401.88 E, 672130.41 N

Final Depth: 10.00 m | Start Date: 30/06/2022 | Driller: BM+RS | Sheet 1 of 2 | Scale: 1:50

Elevation: 52.93 mOD | End Date: 17/08/2022 | Logger: TH | FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
								TOPSOIL		
0.30 - 0.50	B1				52.63	0.30		Soft brownish grey sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.		
0.50	D7									
0.50 - 1.00	B2									
1.00	D8					1.20				
1.20 - 1.65	SPT (C)	N=7 (1,2/1,2,2,2) Hammer SN = 1386	1.20	Dry	51.73			Soft to firm becoming firm brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subangular fine to medium.		
1.80 - 2.00	B3									
2.00	D9									
2.00 - 2.45	SPT (C)	N=9 (2,2/2,2,3,2) Hammer SN = 1386	1.50	Dry						
2.80	B14									
3.00	D10				49.93	3.00		Firm to stiff brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subangular fine to medium.		
3.00 - 3.45	SPT (C)	N=13 (2,2/3,3,3,4) Hammer SN = 1386	3.00	Dry						
4.00	D11									
4.00 - 4.45	SPT (C)	N=23 (3,3/4,5,6,8) Hammer SN = 1386	4.00	Dry						
4.80 - 5.00	B5									
5.00	D12				47.93	5.00		Very stiff light brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of limestone and rare sandstone.		
5.00 - 5.45	SPT (C)	N=34 (5,5/7,7,9,11) Hammer SN = 1386	4.50	Dry				5.50-6.10m: AZCL disturbance due to SPT		
5.80 - 6.00	B6	Slow seepage at 5.90m								
6.00	D13	TCR: 60				(1.90)				
6.00 - 6.27	SPT(C) N=50 (25 for 120mm/50 for 150mm) Hammer SN = 1386	SCR:								
6.10 - 6.60	C1	RQD:				6.90		Dense greyish brown sandy clayey subangular fine to coarse GRAVEL of limestone and sandstone with low cobble content. Cobbles are of limestone.		
7.00		FI: AZCL	6.00	5.70	46.03					
7.00 - 7.39	SPT(C) N=50 (9,11/50 for 240mm) Hammer SN = 1376	TCR: 93	7.00							
7.50 - 8.00	C2	SCR:				(1.70)				
8.00	C3	RQD:								
8.50		FI:			44.33	8.60		Dark grey COBBLES and BOULDER with much dark greyish brown gravelly very clayey fine to coarse SAND. Gravel is angular of limestone. Cobbles and boulder are of limestone.		
		TCR: 100				(0.80)				
		SCR:								
		RQD:								
		FI:								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
5.90	5.90	20	5.70

Chiselling Details

From (m)	To (m)	Time (hh:mm)
6.30	6.50	01:00

Casing Details

To (m)	Diam (mm)
5.50	200
10.00	150

Water Added

From (m)	To (m)

Remarks

Hand dug inspection pit excavated to 1.20m

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-6576
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	5.50
Rotary Coring	Comacchio 405	5.50	10.00

Coordinates: 578401.88 E, 672130.41 N

Final Depth: 10.00 m | **Start Date:** 30/06/2022 | **Driller:** BM+RS

Elevation: 52.93 mOD | **End Date:** 17/08/2022 | **Logger:** TH

Sheet 2 of 2 | Scale: 1:50 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
					10			43.53	9.40		Dark grey COBBLES and BOULDER with much dark greyish brown gravelly very clayey fine to coarse SAND. Gravel is angular of limestone. Cobbles and boulder are of limestone.		
									(0.60)				
10.00								42.93	10.00		Moderately weak dark grey fossiliferous LIMESTONE with closely spaced thin laminations of black calcareous mudstone. Slightly weathered: reduced strength, closer fracture spacing, some orangish brown discolouration and clay infill. Discontinuities: 1. 10-25 degree bedding fractures, closely spaced (40/150/180), slightly undulating, smooth. 2. 80-90 degree joint, at 9.50-10.00m, undulating, rough, orangish brown staining and clay film on joint surface. End of Borehole at 10.00m		

TCR	SCR	RQD	FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
5.90	5.90	20	5.70

Chiselling Details

From (m)	To (m)	Time (hh:mm)
6.30	6.50	01:00

Casing Details

To (m)	Diam (mm)
5.50	200
10.00	150

Water Added

From (m)	To (m)

Remarks

Hand dug inspection pit excavated to 1.20m

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-6886
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	
Cable Percussion	Dando 2000	1.20	5.50	578605.29 E
Rotary Coring	Comacchio 405	5.50	10.00	672364.85 N

Final Depth:	10.00 m	Start Date:	29/06/2022	Driller:	RS+BM	Sheet 1 of 2
Elevation:	54.14 mOD	End Date:	16/08/2022	Logger:	TH	Scale: 1:50
						FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description
								TOPSOIL
0.30 - 0.50	B1				53.84	0.30		Soft brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.
0.80 - 1.00	B2				53.34	0.80		Loose dark brown slightly gravelly very clayey fine to coarse SAND. Gravel is subangular fine to medium.
1.20 - 1.65	SPT (C)	N=8 (2,1/2,2,2,2) Hammer SN = 1386	1.00					
1.80 - 2.00	B3				52.44	1.70		Medium dense dark greyish brown very gravelly very clayey subrounded fine to coarse SAND. Gravel is subrounded fine to medium.
2.00 - 2.45	SPT (C)	N=17 (3,3/7,4,3,3) Hammer SN = 1386	1.50					
2.80 - 3.00	B4	Water strike at 2.90m			51.24	2.90		Stiff slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.
3.00 - 3.45	U8	Ublow=20 70% Recovery	3.00					
3.80 - 4.00	B5							
4.00 - 4.24	SPT (C)	N=50 (4,4/50 for 90mm) Hammer SN = 1386	4.00	2.90				
4.80 - 5.00	B6				49.34	4.80		Dense dark greyish brown very sandy clayey subangular fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are subangular.
5.00 - 5.45	SPT (C)	N=34 (5,5/7,9,9,9) Hammer SN = 1386	5.00	4.30				
5.80 - 6.00	B7					(0.60)		Dense dark grey subrounded fine to coarse GRAVEL of predominantly limestone.
6.00 - 6.14	SPT(C)	N=50 (25 for 110mm/50 for 25mm) Hammer SN = 1386	6.00		48.04	6.10		
		TCR 80, SCR 50, RQD 23, FI 20			47.94	6.20		Medium strong (locally strong) black calcareous MUDSTONE thinly interlaminated with dark grey fossiliferous LIMESTONE. Slightly weathered: slightly reduced strength, much closer fracture spacing, dark orangish brown discoloration on some fracture surfaces. Discontinuities: 1. 0-10 degree bedding fractures, very closely spaced (5/52/120), slightly undulating, smooth, dark orangish brown staining on some fracture surfaces. 2. 80-90 degree joints, at 6.30-6.40m and 6.50-6.70m, undulating, rough.
6.50 - 6.60	C1					(1.15)		
6.60	C2							
7.00					46.89	7.25		
7.40 - 7.50	C3							
7.50 - 7.60	C4	TCR 85, SCR 83, RQD 43, FI 9						Strong black calcareous MUDSTONE thinly interlaminated with dark grey fossiliferous LIMESTONE. Slightly weathered: slightly reduced strength, closer fracture spacing. Discontinuities: 1. 0-10 degree bedding fractures, closely spaced (20/115/200), slightly undulating, smooth. 2. Approximately 30 degree joint, at 8.62-8.70m and 9.50-9.55m, undulating, smooth.
8.10 - 8.15	C5					(2.75)		
8.50		TCR 100, SCR 100, RQD 65						

Water | Backfill

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
2.90	2.90	20	2.30

Chiselling Details

From (m)	To (m)	Time (hh:mm)
4.30	4.70	00:30
6.20	6.40	01:00

Casing Details

To (m)	Diam (mm)
5.50	200
10.00	150

Water Added

From (m)	To (m)

Remarks

Hand dug inspection pit excavated to 1.20m
Standpipe installation (response zone 2.50-6.20m)

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-6886
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	5.50
Rotary Coring	Comacchio 405	5.50	10.00

Coordinates: 578605.29 E, 672364.85 N

Final Depth: 10.00 m | Start Date: 29/06/2022 | Driller: RS+BM | Sheet 2 of 2 | Scale: 1:50

Elevation: 54.14 mOD | End Date: 16/08/2022 | Logger: TH | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
10.00								44.14	10.00		Strong black calcareous MUDSTONE thinly interlaminated with dark grey fossiliferous LIMESTONE. Slightly weathered: slightly reduced strength, closer fracture spacing. Discontinuities: 1. 0-10 degree bedding fractures, closely spaced (20/115/200), slightly undulating, smooth. 2. Approximately 30 degree joint, at 8.62-8.70m and 9.50-9.55m, undulating, smooth. End of Borehole at 10.00m		

TCR	SCR	RQD	FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
2.90	2.90	20	2.30

Chiselling Details

From (m)	To (m)	Time (hh:mm)
4.30	4.70	00:30
6.20	6.40	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
Standpipe installation (response zone 2.50-6.20m)

Casing Details

To (m)	Diam (mm)
5.50	200
10.00	150

Water Added

From (m)	To (m)

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-7255
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	
Cable Percussion	Dando 200	1.20	10.00	578853.97 E
				672641.99 N

Final Depth:	10.00 m	Start Date:	09/07/2022	Driller:	CC
Elevation:	54.48 mOD	End Date:	10/07/2022	Logger:	JAC

Sheet 1 of 2
Scale: 1:40
FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.20 - 1.20	B1				54.28	0.20		TOPSOIL		
								Firm greyish brown slightly sandy silty CLAY. Sand is fine to medium.		
1.00	D11									
1.20 - 2.00	B2									
1.20 - 1.65	SPT (S)	N=11 (2,2/2,3,3,3) Hammer SN = 0197	0.00	Dry						
					52.78	1.70		Firm bluish grey CLAY.		
2.00	D12									
2.00 - 2.45	U9	Ublow=51 0% Recovery	2.00	Dry						
2.00 - 3.00	B3				52.18	2.30		Stiff greyish brown slightly gravelly silty CLAY. Gravel is subangular to subrounded fine to medium.		
3.00	D13				51.48	3.00		Medium dense to dense greyish brown sandy silty subangular to subrounded fine to coarse GRAVEL with low cobble content. Sand is fine to coarse.		
3.00 - 4.00	B4									
3.00 - 3.45	SPT (S)	N=16 (3,3/4,3,4,5) Hammer SN = 0197	3.00	Dry						
4.00	D14									
4.00 - 5.00	B5									
4.00 - 4.45	SPT (C)	N=33 (6,6/7,8,9,9) Hammer SN = 0197	4.00	1.50						
5.00	D15									
5.00 - 6.50	B6									
5.00 - 5.45	SPT (C)	N=39 (4,6/8,10,11,10) Hammer SN = 0197	5.00	3.00						
6.00	D16									
6.50 - 8.00	B7									
6.50 - 6.95	SPT (C)	N=36 (5,7/7,8,9,12) Hammer SN = 0197	6.50	1.00	47.78	6.70		Very stiff brown slightly sandy slightly gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium.		
7.00	D17									

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter
10.00	200

Water Added

From (m)	To (m)
0.00	10.00

Chiselling Details

From (m)	To (m)	Time (hh:mm)
1.90	2.30	00:30
4.20	4.80	00:45

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Termination Reason

Terminated at scheduled depth

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-7255
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	
Cable Percussion	Dando 200	1.20	10.00	578853.97 E
				672641.99 N

Final Depth:	10.00 m	Start Date:	09/07/2022	Driller:	CC	Sheet 2 of 2
						Scale: 1:40
Elevation:	54.48 mOD	End Date:	10/07/2022	Logger:	JAC	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
								Very stiff brown slightly sandy slightly gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium.		
8.00	D18									
8.00 - 9.50	B8									
8.00 - 8.45	SPT (S)	N=43 (6,9/10,10,12,11) Hammer SN = 0197	8.00	5.00						
9.00	D19									
9.50	U10	Ublow=100 50% Recovery	9.20	3.00						
10.00	D20				44.48	10.00		End of Borehole at 10.00m		

7.5 8.0 8.5 9.0 9.5 10.0 10.5 11.0 11.5 12.0 12.5 13.0 13.5 14.0 14.5

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter
10.00	200

Water Added

From (m)	To (m)
0.00	10.00

Chiselling Details

From (m)	To (m)	Time (hh:mm)
1.90	2.30	00:30
4.20	4.80	00:45

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Termination Reason

Terminated at scheduled depth

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-7282
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	
Cable Percussion	Dando 2000	1.20	6.80	578883.95 E
Rotary Coring	Beretta T44	6.80	24.80	672677.61 N

Final Depth:	Start Date:	Driller:	Sheet 1 of 3
24.80 m	10/07/2022	PJ+CB	Scale: 1:50
Elevation: 55.40 mOD	**End Date:** 12/08/2022	**Logger:** TH+JAC	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
								TOPSOIL		
0.30 - 1.20	B1				55.10	0.30		Firm bluish grey slightly gravelly sandy silty CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium.		
1.00	D5									
1.20 - 2.00	B2									
1.20 - 1.65	SPT (S)	N=11 (2,3/3,2,3,3) Hammer SN = 1411	0.00	Dry						
2.00	D6									
2.00 - 2.45	U9	Ublow=51 0% Recovery	2.00	Dry	53.30	2.10		Medium dense brown very sandy silty subangular to subrounded fine to coarse GRAVEL. Sand is fine to coarse.		
2.00 - 3.00	B3									
3.00	D7									
3.00 - 4.00	B4									
3.00 - 3.45	SPT (C)	N=24 (4,5/6,6,5,7) Hammer SN = 1411	3.00	Dry						
4.00	D8									
4.00 - 5.00	B10									
4.00 - 4.45	SPT (S)	N=28 (5,7/7,6,7,8) Hammer SN = 1411	4.00	1.00						
5.00	D13									
5.00 - 6.50	B11									
5.00 - 5.45	SPT (C)	N=34 (4,6/7,8,10,9) Hammer SN = 1411	5.00	1.80						
6.00	D14									
6.50 - 7.60	B12									
6.50 - 6.95	SPT(C) N=38 (4,7/7,9,11,11) Hammer SN = 1411	80			6.80	2.00	48.60	6.80 (0.20) 7.00	Dense dark grey subrounded fine to coarse GRAVEL of limestone.		
6.80	10-08-2022						48.40		Stiff brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies. Cobbles are of predominately sandstone.		
7.00	C2							(0.90)			
7.00	D15										
7.00 - 7.50	C1						47.50	7.90	Very stiff dark brown slightly sandy gravelly CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles and boulders are of predominantly sandstone.		
8.30					8.30	3.00					
8.30 - 8.34	SPT(C) N=50 (25 for 25mm/50 for 15mm) Hammer SN = 1385	100									
		TCR	SCR	RQD	FI						

Water Strikes			
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details		
From (m)	To (m)	Time (hh:mm)
7.50	7.60	01:00

Casing Details	
To (m)	Diam (mm)
6.80	200
24.80	150

Water Added	
From (m)	To (m)
0.00	7.60

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-7282
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	6.80
Rotary Coring	Beretta T44	6.80	24.80

Coordinates: 578883.95 E, 672677.61 N

Final Depth: 24.80 m | Start Date: 10/07/2022 | Driller: PJ+CB | Elevation: 55.40 mOD | End Date: 12/08/2022 | Logger: TH+JAC

Sheet 2 of 3 | Scale: 1:50 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description
9.50 - 9.80	C5										Very stiff dark brown slightly sandy gravelly CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles and boulders are of predominantly sandstone.
9.80						9.80	3.00				
9.80 - 10.22	SPT(C) N=50 (9,10/50 for 270mm) Hammer SN = 1385	93							(4.90)		
11.30						11.3	3.00				
11.30 - 11.62	SPT(C) N=50 (10,15/50 for 175mm) Hammer SN = 1385	100									
12.80						12.8	3.00	42.60	12.80		Medium strong indistinctly thinly laminated light grey medium grained well cemented SANDSTONE with medium spaced thick laminations of weak thinly laminated light greenish grey siltstone. Slightly weathered: slightly closer fracture spacing, some orangish brown discolouration and clayey sand infill. Discontinuities: 1. 0-10 degree bedding fractures, closely spaced (10/160/400), planar, rough, patchy orangish brown staining on most fracture surfaces, brown clayey sand infill on some fracture surfaces. 2. 40-50 degree joints, at 13.85-13.95m and 15.50-15.60m, planar, rough, dark brown staining on joint surfaces. 3. 70-90 degree joints, at 14.50-14.75 and 14.55-14.95m, undulating, rough, orangish brown staining on joint surfaces. 4. 80-90 degree joints, at 13.70-13.90m, 14.07-14.25m, 14.15-14.28m and 15.50-15.60m, rough, patchy orangish brown staining on most joint surfaces.
12.80	C6	100	95	78	10						
12.80 - 12.83	SPT(C) N=50 (25 for 10mm/50 for 20mm) Hammer SN = 1385										
13.20 - 13.30	C7										
13.55 - 13.65	C8										
13.65 - 13.80	C9										
13.80 - 14.00	C10										
14.30		100	74	60					(4.20)		
15.80											
16.00 - 16.20	C11	100	78	78	5						16.25-16.40m: Bed of brown very clayey fine to medium sand infill.
17.00 - 17.20	C12							38.40	17.00		Medium strong indistinctly thinly laminated dark grey carbonaceous LIMESTONE. Moderately weathered: slightly reduced strength, dark orangish brown and brown staining throughout, and some sandy clay infill. Discontinuities: 1. 0-10 degree bedding fractures, medium spaced (60/260/300), slightly undulating, rough, dark orangish brown staining penetrating in from fracture surfaces. 2. Approx. 50 degree joint, at 18.10-18.20m, planar, rough, dark brown staining on joint surface.
17.30		67	25	19	NA				(1.80)		
					AZCL						17.30-17.70m: Bed of slightly gravelly very sandy CLAY. Sand is fine to coarse. Gravel is very angular fine to coarse.
		TCR	SCR	RQD	FI						

Water: Backfill

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
7.50	7.60	01:00

Casing Details

To (m)	Diam (mm)
6.80	200
24.80	150

Water Added

From (m)	To (m)
0.00	7.60

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-7282
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	6.80
Rotary Coring	Beretta T44	6.80	24.80

Coordinates: 578883.95 E, 672677.61 N

Final Depth: 24.80 m | **Start Date:** 10/07/2022 | **Driller:** PJ+CB

Elevation: 55.40 mOD | **End Date:** 12/08/2022 | **Logger:** TH+JAC

Sheet 3 of 3 | Scale: 1:50 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
18.80								36.60	18.80		Medium strong indistinctly thinly laminated dark grey carbonaceous LIMESTONE. Moderately weathered: slightly reduced strength, dark orangish brown and brown staining throughout, and some sandy clay infill. Discontinuities: 1. 0-10 degree bedding fractures, medium spaced (60/260/300), slightly undulating, rough, dark orangish brown staining penetrating in from fracture surfaces. 2. Approx. 50 degree joint, at 18.10-18.20m, planar, rough, dark brown staining on joint surface.		
		100	95	75									
20.30					6						Strong thinly laminated light grey medium grained well cemented SANDSTONE with medium spaced thin beds of weak thinly laminated light greenish grey siltstone. Slightly weathered: slightly reduced strength, slightly closer fracture spacing, orangish brown discolouration on most fracture surfaces. Discontinuities: 1. 5-15 degree bedding fractures, closely spaced (30/170/360), planar,. rough, orangish brown staining on most fracture surfaces. 2. 40-50 degree joints, at 18.95-19.05m, 20.75-20.85m and 20.30-20.40m, planar, rough, patchy orangish brown staining on some joint surfaces. 3. 80-90 degree joints, at 19.25-19.87m, 20.60-20.80m and 22.35-23.65m, planar, rough, orangish brown staining on some joint surfaces.		
		97	80	71									
21.80									(6.00)		*21.00-21.20m: Bed of gravelly clayey fine to medium SAND. Gravel is angular fine to coarse.*		
		43	43	43	AZCL								
23.30					9								
		43	36	24	AZCL								
24.80								30.60	24.80		End of Borehole at 24.80m		

Water Strikes			
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details		
From (m)	To (m)	Time (hh:mm)
7.50	7.60	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details	
To (m)	Diam (mm)
6.80	200
24.80	150

Water Added	
From (m)	To (m)
0.00	7.60

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-7320
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	
Cable Percussion	Dando 2000	1.20	5.20	578894.43 E
Rotary Coring	Beretta T44	5.20	24.70	672693.80 N

Final Depth:	24.70 m	Start Date:	11/07/2022	Driller:	PJ+CB	Sheet 1 of 3
Elevation:	55.40 mOD	End Date:	24/08/2022	Logger:	NP+JAC	Scale: 1:50
						FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.20 - 1.20	B1				55.20	0.20		TOPSOIL		
								Firm to stiff brown slightly gravelly sandy silty CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium.		
1.00	D6									
1.20 - 2.00	B2									
1.20 - 1.65	SPT (S)	N=14 (4,3/3,4,3,4) Hammer SN = 1411 Water strike at 1.20m	0.00	Dry						
2.00	D7									
2.00 - 3.00	B3									
2.00 - 2.45	SPT (C)	N=19 (3,4/4,4,5,6) Hammer SN = 1411	2.00	1.00						
3.00	D8									
3.00 - 4.00	B4									
3.00 - 3.45	SPT (C)	N=21 (4,7/6,4,4,7) Hammer SN = 1411	3.00	0.50						
					51.90	3.50		Medium dense to dense brown clayey fine to coarse SAND and subangular to subrounded fine to coarse GRAVEL with high cobble conetent. Cobbles are subangular.		
4.00	D9									
4.00 - 5.00	B5									
4.00 - 4.45	SPT (C)	N=35 (4,6/8,8,10,9) Hammer SN = 1411	4.00	3.00						
5.00	D10									
5.00 - 5.90	B11									
5.00 - 5.00	SPT(C)	N=50 (25 for 0mm/50 for 0mm) Hammer SN = 1411			50.20	5.20		Very stiff brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.		
5.20 - 5.90	C1					(0.90)				
5.90 - 6.20	C2	100			49.30	6.10		Soft brown gravelly slightly sandy CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular.		
6.70			6.70		48.70	(0.60) 6.70		Stiff brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular.		
6.70 - 7.50	C4									
6.70 - 7.15	SPT(C)	N=29 (5,5/6,7,8,8) Hammer SN = 1385				(0.80)				
		96			47.90	7.50		Very stiff brownish grey slightly sandy slightly gravelly CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular.		
8.20			8.20			(3.30)				
8.20 - 8.65	SPT(C)	N=49 (6,10/10,11,13,15) Hammer SN = 1385								
8.50 - 9.00	C5	90								
		TCR / SCR / RQD / FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
1.20	1.20	20	1.20

Chiselling Details

From (m)	To (m)	Time (hh:mm)
5.10	5.90	02:00

Casing Details

To (m)	Diam (mm)
5.20	200
24.20	150

Water Added

From (m)	To (m)
0.00	5.90

Remarks

Hand dug inspection pit excavated to 1.20m

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-7320
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	5.20
Rotary Coring	Beretta T44	5.20	24.70

Coordinates: 578894.43 E, 672693.80 N

Final Depth: 24.70 m | Start Date: 11/07/2022 | Driller: PJ+CB | Logger: NP+JAC | Elevation: 55.40 mOD | End Date: 24/08/2022

Sheet 2 of 3 | Scale: 1:50 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
9.70						9.70					Very stiff brownish grey slightly sandy slightly gravelly CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular.		
9.70 - 10.02	SPT(C) N=50 (10,15/50 for 175mm) Hammer SN = 1385	97											
								44.60	10.80				
11.20						11.2					Very stiff brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular.		
11.20 - 11.50	C6												
11.20 - 11.56	SPT(C) N=50 (9,12/50 for 210mm) Hammer SN = 1385	100							(2.10)				
11.80 - 12.10	C8												
12.70								42.50	12.90		Strong (locally very strong) indistinctly thinly laminated light grey medium grained well cemented SANDSTONE. Slightly weathered: slightly closer fracture spacing, some orangish brown discolouration. Discontinuities: 1. 0 to 10 degree bedding fractures, medium spaced (70/250/580) planar rough. 2. 65 to 75 degree joints, at 14.65m to 14.80m, 14.75m to 14.90m and 15.10m to 15.2m, planar rough, with patchy orangish brown staining on joint surfaces.		
13.70	C9	100	80	72	3								
14.00 - 14.10	C10												
14.10 - 14.20	C11												
14.20									(3.30)				
		100	100	57	8								
15.70					4						Medium strong indistinctly thinly laminated dark grey carbonaceous LIMESTONE. Slightly weathered: slightly closer fracture spacing with occasional light grey clay deposits. Discontinuities: 1. 0 to 10 degree bedding fractures medium spaced (50/240/550) planar, smooth.		
								39.20	16.20		*16.93m to 17.00: Bed of greenish grey siltstone.*		
		100	90	82	4				(1.45)		Strong thinly laminated light grey medium grained well cemented SANDSTONE with closely to very closely spaced thick laminations of greenish grey siltstone. Moderately weathered: slightly closer fracture spacing with orangish brown discolouration. Discontinuities: 1. 0 to 10 degree bedding fractures, medium spaced (55/270/590) planar, rough, with patchy and faint orangish brown staining on fracture surfaces. 2. 70 to 80 degree joints at 19.70m to 19.90m, undulating, rough with strong orangish brown staining on joint surface. 3. 70 to 80 degree joints at 21.05m to 21.25m and 22.50m to 22.70m, undulating, rough with faint and patchy orangish brown staining.		
17.20													
17.70 - 18.00	C12							37.75	17.65				
		100	100	100									
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
1.20	1.20	20	1.20

Chiselling Details

From (m)	To (m)	Time (hh:mm)
5.10	5.90	02:00

Casing Details

To (m)	Diam (mm)
5.20	200
24.20	150

Water Added

From (m)	To (m)
0.00	5.90

Remarks

Hand dug inspection pit excavated to 1.20m

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-7320
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	5.20
Rotary Coring	Beretta T44	5.20	24.70

Coordinates: 578894.43 E, 672693.80 N

Final Depth: 24.70 m | **Start Date:** 11/07/2022 | **Driller:** PJ+CB | Sheet 3 of 3 | Scale: 1:50

Elevation: 55.40 mOD | **End Date:** 24/08/2022 | **Logger:** NP+JAC | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
18.70													
		93	78	64	4						Strong thinly laminated light grey medium grained well cemented SANDSTONE with closely to very closely spaced thick laminations of greenish grey siltstone. Moderately weathered: slightly closer fracture spacing with orangish brown discolouration. Discontinuities: 1. 0 to 10 degree bedding fractures, medium spaced (55/270/590) planar, rough, with patchy and faint orangish brown staining on fracture surfaces. 2. 70 to 80 degree joints at 19.70m to 19.90m, undulating, rough with strong orangish brown staining on joint surface. 3. 70 to 80 degree joints at 21.05m to 21.25m and 22.50m to 22.70m, undulating, rough with faint and patchy orangish brown staining.		
20.20													
		93	71	48	8								
21.70									(7.05)				
		88	79	59	4								
23.20													
		80	80	62									
24.70								30.70	24.70		End of Borehole at 24.70m		
		TCR	SCR	RQD	FI								

At 19.70m to 20.20m: Sandstone fractured during drilling with brown clay infill on fractures

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
1.20	1.20	20	1.20

Chiselling Details

From (m)	To (m)	Time (hh:mm)
5.10	5.90	02:00

Casing Details

To (m)	Diam (mm)
5.20	200
24.20	150

Water Added

From (m)	To (m)
0.00	5.90

Remarks

Hand dug inspection pit excavated to 1.20m

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-7349
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	9.30
Rotary Drilling	Beretta T44	9.30	9.70
Rotary Coring	Beretta T44	9.70	24.70

Coordinates: 578909.11 E, 672746.57 N

Final Depth:	24.70 m	Start Date:	12/07/2022	Driller:	PJ+CB	Sheet 1 of 3
Elevation:	55.57 mOD	End Date:	26/08/2022	Logger:	CM+JAC	Scale: 1:50
						FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
								TOPSOIL		
0.20 - 1.20	B1				55.37	0.20		Loose to medium dense greyish brown sandy silty subangular to subrounded fine to coarse GRAVEL. Sand is fine to coarse.		
1.00	D7									
1.20 - 2.00	B2									
1.20 - 1.65	SPT (C)	N=17 (4,6/4,4,5,4) Hammer SN = 1411	0.00	0.50						
2.00	D8									
2.00 - 2.45	SPT (C)	N=5 (4,4/2,1,1,1) Hammer SN = 1411	2.00	1.00	53.27	2.30		Loose to medium dense brown very sandy clayey subangular to subrounded fine to coarse GRAVEL. Sand is fine to coarse.		
2.30	D9									
2.30 - 2.80	B3									
3.00	D10									
3.00 - 4.00	B4									
3.00 - 3.45	SPT (C)	N=24 (5,5/6,7,6,5) Hammer SN = 1411	3.00	1.50						
4.00	D11				51.57	4.00		Medium dense brown gravelly subangular COBBLES. Gravel is subangular to subrounded fine to coarse.		
4.00 - 5.00	B5									
4.00 - 4.45	SPT (C)	N=27 (6,7/6,7,7,7) Hammer SN = 1411	4.00	0.50						
5.00	D12									
5.00 - 5.45	SPT (C)	N=30 (4,6/8,7,7,8) Hammer SN = 1411	5.00	2.00						
6.00 - 6.50	B6				49.57	6.00		Firm to stiff brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.		
6.50 - 6.95	U13	Ublow=77 50% Recovery	6.50	4.00						
6.50 - 7.30	B14									
					48.77	6.80		Greyish brown subangular COBBLES with some gravel. Gravel is subangular to subrounded fine to coarse.		
7.00	D17									
7.30 - 8.00	B15				48.27	7.30		Very stiff greyish brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.		
8.00	D18									
8.00 - 9.50	B16									
8.00 - 8.45	SPT (S)	N=47 (6,7/10,12,11,14) Hammer SN = 1411	8.00	4.00						
9.00	D19									
								9.10-11.20m: AZCL (Possibly due to gravel and fines being washed out with flush). Logged from flush arisings.		

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
9.30	200
9.70	200
24.70	150

Water Added

From (m)	To (m)
0.00	9.30

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH	Project No. 21-1682	Project Name: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	Borehole ID BH-7349
		Client: Irish Water	
		Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	
Cable Percussion	Dando 2000	1.20	9.30	578909.11 E
Rotary Drilling	Beretta T44	9.30	9.70	672746.57 N
Rotary Coring	Beretta T44	9.70	24.70	

Final Depth: 24.70 m	Start Date: 12/07/2022	Driller: PJ+CB	Sheet 2 of 3 Scale: 1:50
Elevation: 55.57 mOD	End Date: 26/08/2022	Logger: CM+JAC	FINAL

Depth (m)	Sample / Tests	Field Records				Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
9.70	C1	29			AZCL			45.87	9.70 (1.50)		Very stiff brown gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of various lithologies. (Description based on flush returns)		
11.20						11.2		44.37	11.20		Very stiff brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies including sandstone and limestone. Cobbles are angular of sandstone and limestone.		
11.20 - 11.56	SPT(C) N=50 (10,11/50 for 210mm) Hammer SN = 1385												
11.50 - 12.00	C2	86											
12.70						12.7			(3.10)				
12.70 - 13.06	SPT(C) N=50 (9,15/50 for 215mm) Hammer SN = 1385												
13.20 - 14.20	C3	73											
14.20								41.27	14.30 (0.30)		Very dense grey clayey subangular coarse GRAVEL of sandstone. Cobbles are subangular of sandstone (possibly weathered bedrock).		
14.65	C4	87	63	51				40.97	14.60		Medium strong (locally strong) thinly to thickly laminated grey becoming light grey medium to coarse grained well cemented SANDSTONE with rare white quartz veins (up to 30mm thick). Partially weathered: slightly closer fracture spacing, patchy orangish brown staining one some fracture surfaces.		
15.20 - 15.35	C5												
15.70											Discontinuities:		
15.80	C6	100	100	100	5						1. 0-10 degree bedding fractures, medium spaced (50/290/1600), planar, smooth to rough, patchy orangish brown staining on some fracture surfaces.		
											2. 15-35 degree joints, widely spaced (30/745/4900), planar, rough.		
											3. 55-75 degree joints from 15.15-15.25m, 15.70-15.82m, 17.10-17.20m, 17.65-17.80m, 21.70-21.90m and 22.45-22.60m, planar, rough, patchy orangish brown staining on some joint surfaces.		
17.20		97	88	85									
		TCR	SCR	RQD	FI								

Depth scale: 9.5, 10.0, 10.5, 11.0, 11.5, 12.0, 12.5, 13.0, 13.5, 14.0, 14.5, 15.0, 15.5, 16.0, 16.5, 17.0, 17.5, 18.0, 18.5

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details		Water Added	
To (m)	Diam (mm)	From (m)	To (m)
9.30	200	0.00	9.30
9.70	200		
24.70	150		

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-7349
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	9.30
Rotary Drilling	Beretta T44	9.30	9.70
Rotary Coring	Beretta T44	9.70	24.70

Coordinates
578909.11 E
672746.57 N

Final Depth: 24.70 m | **Start Date:** 12/07/2022 | **Driller:** PJ+CB | Sheet 3 of 3 | Scale: 1:50

Elevation: 55.57 mOD | **End Date:** 26/08/2022 | **Logger:** CM+JAC | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
18.70													
		98	92	84							Medium strong (locally strong) thinly to thickly laminated grey becoming light grey medium to coarse grained well cemented SANDSTONE with rare white quartz veins (up to 30mm thick). Partially weathered: slightly closer fracture spacing, patchy orangish brown staining one some fracture surfaces. Discontinuities: 1. 0-10 degree bedding fractures, medium spaced (50/290/1600), planar, smooth to rough, patchy orangish brown staining on some fracture surfaces. 2. 15-35 degree joints, widely spaced (30/745/4900), planar, rough.		
20.20													
		97	89	65	>20				(8.20)		3. 55-75 degree joints from 15.15-15.25m, 15.70-15.82m, 17.10-17.20m, 17.65-17.80m, 21.70-21.90m and 22.45-22.60m, planar, rough, patchy orangish brown staining on some joint surfaces. *20.65-20.75m: Light grey angular to subangular fine to coarse gravel of sandstone (possible fault breccia).*		
21.70					6								
		100	73	47				32.77	22.80		Weak light greenish grey SILTSTONE with widely spaced thin bed of medium strong medium to coarse grained well cemented SANDSTONE. Partially weathered: slightly reduced strength, much closer fracture spacing (recovered as slightly sandy clayey angular to subangular fine to coarse gravel of siltstone and sandstone).		
23.20													
		70	23	8	>20				(1.25)				
					0			31.52	24.05		Medium strong reddish brown fine grained well cemented SANDSTONE. Partially weathered: slightly reduced strength. *24.20-24.70m: AZCL*		
					AZCL				(0.65)				
24.70								30.87	24.70		End of Borehole at 24.70m		
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
9.30	200
9.70	200
24.70	150

Water Added

From (m)	To (m)
0.00	9.30

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-8940

Client: Irish Water

Client's Rep: Mott MacDonald

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	8.20

Coordinates: 580000.40 E, 673856.87 N

Final Depth: 8.20 m | **Start Date:** 26/07/2022 | **Driller:** CC

Elevation: 52.66 mOD | **End Date:** 26/07/2022 | **Logger:** TH

Sheet 1 of 2
Scale: 1:40
FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description
0.20 - 0.70	B1				52.46	0.20		TOPSOIL
0.70 - 1.50	B2				51.96	0.70		Firm orangish brown slightly gravelly sandy silty CLAY. Sand is fine to coarse. Gravel is subangular fine to medium.
1.20 - 1.40	U11	Ublow=50 0% Recovery						Stiff orangish brown mottled grey slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to medium. Cobbles are subangular.
2.00	D3							
2.00 - 2.45	SPT (S)	N=24 (3,4/4,5,7,8) Hammer SN = 0197	2.00	Dry				
2.30 - 3.00	B4	Seepage at 2.30m			50.36	2.30		Medium dense brownish grey gravelly very clayey fine to coarse SAND. Gravel is subangular fine to medium.
3.00	D5							
3.00 - 4.00	B6							
3.00 - 3.45	SPT (S)	N=10 (5,4/4,2,2,2) Hammer SN = 0197	3.00	2.70				
4.00	D7							
4.00 - 4.45	SPT (S)	N=11 (2,2/3,2,3,3) Hammer SN = 0197	4.00	2.30				
5.00	D12							
5.00 - 5.45	SPT (S)	N=22 (1,1/4,5,7,6) Hammer SN = 0197	5.00	1.00	47.56	5.10		Medium dense dark grey and greyish brown sandy clayey subangular to subrounded fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are subrounded.
5.10 - 6.00	B8							
6.40 - 7.50	B10				46.26	6.40		Medium dense brownish grey very gravelly very clayey fine to coarse SAND with low cobble content. Gravel is subangular fine to medium. Cobbles are subrounded.
6.50	D9							
6.50 - 6.95	SPT (S)	N=28 (2,3/5,7,8,8) Hammer SN = 0197	6.50	3.30				

Water

Backfill

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
2.30	2.30	20	2.00

Chiselling Details

From (m)	To (m)	Time (hh:mm)
8.00	8.10	01:00

Casing Details

To (m)	Diameter
8.20	200

Water Added

From (m)	To (m)
3.00	6.40

Remarks

Hand dug inspection pit excavated to 1.20m
Falling head test completed at 4.50-5.00m

Termination Reason

Terminated on instruction of Engineer

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-8940
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth: 8.20 m	Start Date: 26/07/2022	Driller: CC	Sheet 2 of 2
Hand Digging	Hand Tools	0.00	1.20	580000.40 E				Scale: 1:40
Cable Percussion	Dando 2000	1.20	8.20	673856.87 N	Elevation: 52.66 mOD	End Date: 26/07/2022	Logger: TH	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
8.00 8.00 - 8.28	D13 SPT (C)	N=50 (4,5/50 for 130mm) Hammer SN = 0197	8.00	6.10	44.46	8.20		Medium dense brownish grey very gravelly very clayey fine to coarse SAND with low cobble content. Gravel is subangular fine to medium. Cobbles are subrounded. End of Borehole at 8.20m		

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
2.30	2.30	20	2.00

Casing Details

To (m)	Diameter
8.20	200

Water Added

From (m)	To (m)
3.00	6.40

Chiselling Details

From (m)	To (m)	Time (hh:mm)
8.00	8.10	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
Falling head test completed at 4.50-5.00m

Termination Reason

Terminated on instruction of Engineer

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-9368
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Rotary Drilling	Comacchio 405	1.20	2.60
Rotary Coring	Comacchio 405	2.60	10.05

Coordinates: 580246.72 E, 674193.95 N

Final Depth: 10.05 m | Start Date: 20/08/2022 | Driller: RC

Elevation: 54.04 mOD | End Date: 21/08/2022 | Logger: TH

Sheet 1 of 2 | Scale: 1:40 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
								53.74	0.30		TOPSOIL		
											Brown very gravelly clayey fine to coarse SAND. Gravel is subangular fine to coarse.		
2.60 - 3.65	C2					2.60	Dry	51.44	2.60				
2.60 - 2.62	SPT(C) N=50 (25 for 5mm/50 for 10mm) Hammer SN = 1368												
2.70 - 2.85	C1	95	52	37	16						Medium strong (locally strong) indistinctly thinly laminated black calcareous MUDSTONE with rare fossils. Slightly weathered: slightly reduced strength, much closer fracture spacing. Discontinuities: 1. 0-10 degree bedding fractures, closely spaced (5/85/200), planar, rough. 2. 20-30 degree joints, medium spaced (160/280/700), undulating, rough. 3. 50-60 degree joint, at 3.10-3.30m, undulating, rough.		
								50.59	3.45				
3.65	AMAL										Medium strong (locally strong) dark grey fossiliferous LIMESTONE with closely spaced thick laminations of black calcareous MUDSTONE. Slightly weathered: slightly closer fracture spacing. Discontinuities: 1. 10-20 degree bedding fractures, closely spaced (55/125/245), undulating, smooth. *4.05-4.45m: Greyish white calcite vein at approx 70 degrees, 2-3mm thick*		
3.65	C4												
3.65													
3.90 - 4.00	C5				8								
4.18	C3												
		97	97	53									
4.55 - 4.70	C6												
								49.34	4.70				
5.15											Medium strong (locally medium weak) thinly to thickly interlaminated dark grey fossiliferous LIMESTONE and black calcareous MUDSTONE. Slightly weathered: slightly reduced strength, slightly closer fracture spacing. Discontinuities: 1. 10-20 degree bedding fractures, closely spaced (30/130/330), undulating smooth.		
5.40 - 5.55	C7				10								
		93	91	66									
6.65													
6.95 - 7.15	C8												
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
2.60	190
10.05	146

Core Barrel: SK6L

Flush Type: Polymer

Termination Reason: Terminated at scheduled depth

Last Updated: 13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-9368
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Rotary Drilling	Comacchio 405	1.20	2.60
Rotary Coring	Comacchio 405	2.60	10.05

Coordinates: 580246.72 E, 674193.95 N

Final Depth: 10.05 m | Start Date: 20/08/2022 | Driller: RC

Elevation: 54.04 mOD | End Date: 21/08/2022 | Logger: TH

Sheet 2 of 2 | Scale: 1:40 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
		100	100	90	4						Medium strong (locally medium weak) thinly to thickly interlaminated dark grey fossiliferous LIMESTONE and black calcareous MUDSTONE. Slightly weathered: slightly reduced strength, slightly closer fracture spacing. Discontinuities: 1. 10-20 degree bedding fractures, closely spaced (30/130/330), undulating smooth.		
8.15		100	100	83	8								
9.65		70	70	48									
10.05								43.99	10.05		End of Borehole at 10.05m		
		TCR	SCR	RQD	FI								

7.5 8.0 8.5 9.0 9.5 10.0 10.5 11.0 11.5 12.0 12.5 13.0 13.5 14.0 14.5

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
2.60	190
10.05	146

Core Barrel

SK6L

Flush Type

Polymer

Termination Reason

Terminated at scheduled depth

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-9668
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	
Cable Percussion	Dando 3000	1.20	4.00	580481.23 E
Rotary Coring	Comacchio 405	4.00	10.00	674390.74 N

Final Depth:	10.00 m	Start Date:	27/07/2022	Driller:	RS+CC	Sheet 1 of 2
Elevation:	55.17 mOD	End Date:	19/08/2022	Logger:	TH	Scale: 1:50
						FINAL

Depth (m)	Sample / Tests	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description
									54.87	0.30		TOPSOIL
0.30 - 1.50	B1											Firm to stiff grey slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded.
1.20	D5											
1.20 - 1.65	SPT (S)	N=26 (3,4/9,10,4,3) Hammer SN = 1369					1.20	Dry				
2.00	D6											
2.00 - 2.70	B2											
2.00 - 2.45	SPT (S)	N=18 (2,3/4,6,4,4) Hammer SN = 1369					2.00	Dry				
2.70 - 3.30	B3								52.47	2.70		Dense greyish brown very gravelly very silty fine to coarse SAND. Gravel is rounded fine to medium.
3.00	D7											
3.00 - 3.45	SPT (S)	N=36 (2,3/3,4,14,15) Hammer SN = 1369					3.00	Dry				
3.30 - 4.00	B4								51.87	3.30		Possible bedrock recovered as: Dense grey angular fine to coarse GRAVEL
4.00	D8						4.00	Dry	51.17	4.00		
4.00 - 4.14	SPT(S)	N=50 (25 for 65mm/50 for 70mm) Hammer SN = 1369	55	47	7	10						Moderately weak indistinctly thinly laminated greyish black LIMESTONE. Slightly weathered: reduced strength, closer fracture spacing, patchy orangish brown discolouration on most fracture surfaces. Discontinuities: 1. 0-10 degree bedding fractures, closely spaced (20/95/100), planar, rough, patchy orangish brown staining on most fracture surfaces. 2. 25-35 degree joints, at 5.53m and 5.60m, undulating, rough, orangish brown staining on joint surfaces. 3. 70-80 degree joints, at 4.90-5.15m and 5.15-5.25m, undulating, rough, patchy orangish brown staining on joint surfaces.
4.80 - 4.90	C1									(1.70)		
5.50									49.47	5.70		Medium strong (locally strong) indistinctly thinly laminated greyish black LIMESTONE with rare fossil fragments. Slightly weathered: slightly reduced strength, slightly closer fracture spacing. Discontinuities: 1. 0-10 degree bedding fractures, closely spaced (30/140/240), slightly undulating, rough.
6.00 - 6.70	C3		100	100	60	7						
6.10	C2									(1.15)		
7.00									48.32	6.85		Medium strong thinly interlaminated dark grey fossiliferous LIMESTONE and black calcareous MUDSTONE. Slightly weathered: slightly reduced strength, closer fracture spacing. Discontinuities: 1. 0-10 degree bedding fractures, closely spaced (20/115/240), planar, rough. 2. 20-25 degree joints, at 7.35m and 8.03m, slightly undulating, rough.
7.70 - 7.95	C4		100	100	71	8						
8.50										(3.15)		
			84	52	45							
			TCR	SCR	RQD	FI						

Water	Backfill

Water Strikes			
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details		
From (m)	To (m)	Time (hh:mm)
3.80	4.00	01:00

Casing Details	
To (m)	Diam (mm)
4.00	200
10.00	150

Water Added	
From (m)	To (m)
3.00	4.00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-9668
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 3000	1.20	4.00
Rotary Coring	Comacchio 405	4.00	10.00

Coordinates: 580481.23 E, 674390.74 N

Final Depth: 10.00 m | **Start Date:** 27/07/2022 | **Driller:** RS+CC | Sheet 2 of 2 | Scale: 1:50

Elevation: 55.17 mOD | **End Date:** 19/08/2022 | **Logger:** TH | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
					12						Medium strong thinly interlaminated dark grey fossiliferous LIMESTONE and black calcareous MUDSTONE. Slightly weathered: slightly reduced strength, closer fracture spacing. Discontinuities: 1. 0-10 degree bedding fractures, closely spaced (20/115/240), planar, rough. 2. 20-25 degree joints, at 7.35m and 8.03m, slightly undulating, rough.		
10.00								45.17	10.00		End of Borehole at 10.00m		
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
3.80	4.00	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
4.00	200
10.00	150

Water Added

From (m)	To (m)
3.00	4.00

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-10413
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Rotary Drilling	Comacchio 405	1.20	2.60
Rotary Coring	Comacchio 405	2.60	25.00

Coordinates: 580825.97 E, 674949.02 N

Final Depth: 25.00 m | Start Date: 31/08/2022 | Driller: RC

Elevation: 52.17 mOD | End Date: 01/09/2022 | Logger: TH

Sheet 1 of 4 | Scale: 1:40 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description
								51.97	0.20		TOPSOIL
											Soft to firm brownish grey sandy gravelly silty CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies.
2.60	D1					2.60	Dry	49.57	2.60		
2.60 - 3.05	SPT(S) N=8 (1,1/2,2,2,2) Hammer SN = 1368	28			AZCL						Soft to firm thinly laminated dark brown slightly sandy CLAY. Sand is fine.
											2.60-3.35m: AZCL disturbance due to SPT
3.50	C1										
3.60 - 5.00	C2					2.60	0.00				
3.65	D2										3.65-4.15m: AZCL disturbance due to SPT
3.65 - 4.10	SPT(S) N=5 (1,1/1,1,1,2) Hammer SN = 1368	33			AZCL						
4.40											4.40-4.80m: AZCL disturbance due to SPT
		47			AZCL						
5.00 - 5.15	C3										
5.15	D3					2.60	0.00				
5.15 - 5.60	SPT(S) N=8 (1,2/2,2,2,2) Hammer SN = 1368	0			NR						5.15-5.980m: AZCL disturbance due to SPT/material washed out with drilling fluid
5.90								46.22	5.95		Dense light grey and dark grey subrounded fine to coarse GRAVEL of various lithologies with low cobble content. Cobbles are subangular of limestone and sandstone.
		53									
6.65	D4					2.60	1.20				
6.65 - 6.95	SPT(S) N=50 (11,11/50 for 150mm) Hammer SN = 1368	33	9	0	AZCL						6.65-7.15m: AZCL disturbance due to SPT/material scrubbed out with drilling fluid
		TCR	SCR	RQD	FI						

Water | Backfill

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
2.60	190
25.00	146

Core Barrel: SK6L

Flush Type: Polymer

Termination Reason: Terminated at scheduled depth

Last Updated: 13/03/2023

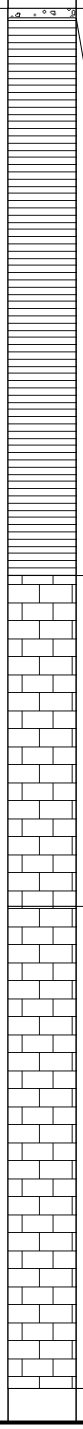
AGS

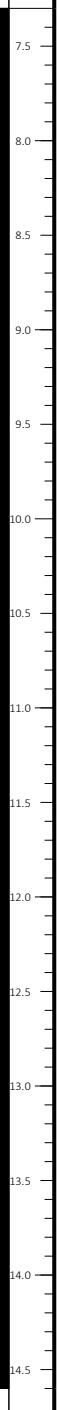
CAUSEWAY GEOTECH	Project No. 21-1682	Project Name: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only Client: Irish Water Client's Rep Mott MacDonald	Borehole ID BH-10413

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth: 25.00 m	Start Date: 31/08/2022	Driller: RC	Sheet 2 of 4 Scale: 1:40
Hand Digging	Hand Tools	0.00	1.20	580825.97 E				
Rotary Drilling	Comacchio 405	1.20	2.60	674949.02 N	Elevation: 52.17 mOD	End Date: 01/09/2022	Logger: TH	FINAL
Rotary Coring	Comacchio 405	2.60	25.00					

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
7.40								44.82	7.35		Dense light grey and dark grey subrounded fine to coarse GRAVEL of various lithologies with low cobble content. Cobbles are subangular of limestone and sandstone.		
7.50 - 7.60	C4										Moderately weak (locally medium strong) thinly laminated black slightly calcareous MUDSTONE with closely spaced thin laminations of greenish grey siltstone. Moderately weathered: Reduced strength, much closer fracture spacing, orangish brown discolouration on some fracture surfaces. Discontinuities: 1. 0-5 degree bedding fractures, very closely spaced (8/55/115), planar, rough. 2. 80-90 degree joints, at 7.50-8.00m, 7.75-8.65m, 8.70-9.30m, 9.40-9.70m and 10.22-10.30m, planar, rough, orangish brown staining on some joint surfaces.		
7.70 - 7.80	C5	100	65	28									
7.80	C6												
8.15		87	52	7	20								
9.65		100	92	36				41.87	10.30		Medium strong (locally strong) thinly laminated greyish black LIMESTONE with occasional fossils. Slightly weathered: Closer fracture spacing. Discontinuities: 1. 0-5 degree bedding fractures, closely spaced (40/125/380), planar, rough. 2. 30-40 degree joint, at 11.80m, planar, rough.		
10.65 - 10.80	C7												
11.15 - 11.25	C8	100	98	81	9								
11.15													
11.25	C9												
11.35	C14												
11.45	C10												
11.85 - 11.95	C11												
12.00	C12							40.12	12.05		Medium strong (locally strong) indistinctly thinly laminated greyish black LIMESTONE with rare fossils. Slightly weathered: Closer fracture spacing, orangish brown discolouration on some fracture surfaces. Discontinuities: 1. 0-5 degree bedding fractures, closely spaced (45/190/460), planar, rough. 2. ~35 degree joint, at 13.15-13.21m, stepped, rough. 3. 80-90 degree joints, at 12.30-12.80m, 13.40-13.60m and 14.35-14.40m, slightly undulating, rough, orangish brown staining on some joint surfaces.		
12.25	C13												
12.65		100	98	82	7								
14.15													
		TCR	SCR	RQD	FI								

Depth scale: 7.5, 8.0, 8.5, 9.0, 9.5, 10.0, 10.5, 11.0, 11.5, 12.0, 12.5, 13.0, 13.5, 14.0, 14.5





Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
2.60	190
25.00	146

Core Barrel

SK6L

Flush Type

Polymer

Termination Reason

Terminated at scheduled depth

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-10413
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Rotary Drilling	Comacchio 405	1.20	2.60
Rotary Coring	Comacchio 405	2.60	25.00

Coordinates: 580825.97 E, 674949.02 N

Final Depth: 25.00 m | Start Date: 31/08/2022 | Driller: RC

Elevation: 52.17 mOD | End Date: 01/09/2022 | Logger: TH

Sheet 3 of 4 | Scale: 1:40 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
		100	98	67				37.47	14.70		Medium strong (locally strong) indistinctly thinly laminated greyish black LIMESTONE with rare fossils. Slightly weathered: Closer fracture spacing, orangish brown discolouration on some fracture surfaces. Discontinuities: 1. 0-5 degree bedding fractures, closely spaced (45/190/460), planar, rough. 2. ~35 degree joint, at 13.15-13.21m, stepped, rough. 3. 80-90 degree joints, at 12.30-12.80m, 13.40-13.60m and 14.35-14.40m, slightly undulating, rough, orangish brown staining on some joint surfaces.		
15.65		100	100	70	9						Strong thinly interlaminated greyish black calcareous MUDSTONE and dark grey fossiliferous LIMESTONE. Slightly weathered: Closer fracture spacing. Discontinuities: 1. 0-5 degree bedding fractures, closely spaced (15/115/330), planar, rough.		
17.15								34.77	17.40				
		100	96	71	10						Strong indistinctly thinly laminated greyish black calcareous MUDSTONE with rare fossils. Slightly weathered: Closer fracture spacing, orangish brown discolouration on some fracture surfaces. Discontinuities: 1. 0-10 degree bedding fractures, closely spaced (25/105/210), planar, rough. 2. ~45 degree joint, at 17.60m, planar, rough, patchy orangish brown staining on joint surface.		
18.65													
		93	93	25				32.87	19.30		Medium strong thinly interlaminated greyish black calcareous MUDSTONE and dark grey fossiliferous LIMESTONE. Slightly weathered: Slightly reduced strength, much closer fracture spacing. Discontinuities: 1. 0-10 degree bedding fractures, closely spaced (20/95/320), planar, rough. 2. 30-40 degree joint, at 22.40m, slightly undulating, smooth.		
20.15					14								
		100	96	45									
21.65													
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
2.60	190
25.00	146

Core Barrel: SK6L

Flush Type: Polymer

Termination Reason: Terminated at scheduled depth

Last Updated: 13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-10413
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Rotary Drilling	Comacchio 405	1.20	2.60
Rotary Coring	Comacchio 405	2.60	25.00

Coordinates: 580825.97 E, 674949.02 N

Final Depth: 25.00 m | Start Date: 31/08/2022 | Driller: RC | Logger: TH | Elevation: 52.17 mOD | End Date: 01/09/2022

Sheet 4 of 4 | Scale: 1:40 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
		100	95	61	6						Medium strong thinly interlaminated greyish black calcareous MUDSTONE and dark grey fossiliferous LIMESTONE. Slightly weathered: Slightly reduced strength, much closer fracture spacing. Discontinuities: 1. 0-10 degree bedding fractures, closely spaced (20/95/320), planar, rough. 2. 30-40 degree joint, at 22.40m, slightly undulating, smooth.		
23.15								29.12	23.05				
		91	83	55	11						Medium strong indistinctly thinly laminated greyish black calcareous MUDSTONE. Slightly weathered: Slightly reduced strength, closer fracture spacing. Discontinuities: 1. 0-5 degree bedding fractures, closely spaced (20/150/500), planar, rough. 2. 30-35 degree joints, medium spaced (55/480/940), slightly undulating, smooth. 3. 80-90 degree joints, at 23.35-23.55m and 24.60-25.00m, undulating, rough.		
					6								
24.65		71	40	28	15								
25.00								27.17	25.00		End of Borehole at 25.00m		
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
2.60	190
25.00	146

Core Barrel: SK6L

Flush Type: Polymer

Termination Reason: Terminated at scheduled depth

Last Updated: 13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-10449

Client: Irish Water

Client's Rep: Mott MacDonald

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	2.60
Rotary Coring	Comacchio 405	2.60	25.00

Coordinates: 581006.17 E, 674997.17 N

Final Depth: 25.00 m | **Start Date:** 06/07/2022 | **Driller:** MK+RC | Sheet 1 of 3 | Scale: 1:50

Elevation: 52.29 mOD | **End Date:** 04/09/2022 | **Logger:** JAC+TH | FINAL

Depth (m)	Sample / Tests	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
									52.19	0.10		TOPSOIL		
0.40 - 0.60	B1											Brown sandy slightly clayey subangular to subrounded fine to coarse GRAVEL of various lithologies. Sand is fine to coarse.		
0.50	D5													
0.80 - 1.10	B2								51.49	0.80		Firm becoming stiff brownish grey sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of various lithologies.		
1.00	D6													
1.20 - 1.65	SPT (C)	N=23 (4,5/5,6,6,6) Hammer SN = 1264					1.20	Dry						
1.50 - 2.10	B3											*1.50-2.10m: Becoming greyish brown.*		
2.00	D7													
2.00 - 2.19	SPT (C)	N=50 (25 for 50mm/50 for 145mm) Hammer SN = 1264					2.00		50.19	2.10		Weathered LIMESTONE recovered as: Very dense greyish brown angular gravel.		
2.10 - 2.40	B4													
2.60 - 3.10	C1						2.60	Dry	49.69			Medium strong (locally strong) thinly to thickly interlaminated black calcareous MUDSTONE and dark grey LIMESTONE with rare fossils. Slightly weathered: Slightly reduced strength, much closer fracture spacing. Discontinuities: 1. 0-10 degree bedding fractures, very closely spaced (8/52/110), planar, rough. 2. 80-90 degree joints, at 2.90-3.10m and 4.80-4.90m, slightly undulating, rough.		
2.60 - 3.05	SPT(S) N=47 (5,10/10,12,12,13) Hammer SN = 1368		43	28	10	>20								
3.25 - 3.35	C2					AZCL								
3.60 - 3.65	C3													
3.65										(2.20)		*3.65-4.10m: Rotary Percussion used to advance casing onto competent rockhead*		
4.60 - 4.70	C5		91	83	29	14								
4.85 - 5.05	C4								47.49	4.80		Strong (locally medium strong) very thinly interbedded black calcareous MUDSTONE and dark grey fossiliferous LIMESTONE. Slightly weathered: Slightly reduced strength, slightly closer fracture spacing, orangish brown discolouration on some fracture surfaces. Discontinuities: 1. 0-20 degree bedding fractures, closely spaced (20/100/220), planar, rough, orangish brown staining on some fracture surfaces.		
5.15														
6.20	C4		100	97	70	10				(2.05)				
6.65														
7.05 - 7.15	C7								45.44	6.85		Medium strong thinly to thickly interlaminated black calcareous MUDSTONE and dark grey LIMESTONE with occasional fossils and rare greyish white calcite veins, up to 10mm thick. Slightly weathered: Slightly reduced strength, much closer fracture spacing, orangish brown discolouration on most fracture surfaces, locally penetrating up to 20mm and clay infill on some fracture surfaces. Discontinuities: 1. 0-20 degree bedding fractures, closely spaced (10/60/120), planar, rough, orangish brown staining on most fracture surfaces, locally penetrating up to 20mm. 2. ~30 degree joint, at 7.82-7.88m, slightly undulating, rough, orangish brown staining and clay infill, up to 6mm thick on joint surface. 3. 80-90 degree joint, at 9.35-10.40m, slightly undulating, rough, orangish brown staining and clay film, up to 2mm thick on joint surface.		
8.15			100	90	20	17				(4.05)				
			100	98	20									

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
2.00	2.50	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered
Rotary Drilling (open hole) used to advance casing from 3.65-4.10m onto competent rockhead

Casing Details

To (m)	Diam (mm)
2.50	200
4.10	190
25.00	146

Water Added

From (m)	To (m)
1.20	2.00

Core Barrel	Flush Type	Termination Reason	Last Updated
	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-10449
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	2.60
Rotary Coring	Comacchio 405	2.60	25.00

Coordinates: 581006.17 E, 674997.17 N

Final Depth: 25.00 m | Start Date: 06/07/2022 | Driller: MK+RC | Sheet 2 of 3 | Scale: 1:50

Elevation: 52.29 mOD | End Date: 04/09/2022 | Logger: JAC+TH | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
9.65											Medium strong thinly to thickly interlaminated black calcareous MUDSTONE and dark grey LIMESTONE with occasional fossils and rare greyish white calcite veins, up to 10mm thick. Slightly weathered: Slightly reduced strength, much closer fracture spacing, orangish brown discolouration on most fracture surfaces, locally penetrating up to 20mm and clay infill on some fracture surfaces. Discontinuities: 1. 0-20 degree bedding fractures, closely spaced (10/60/120), planar, rough, orangish brown staining on most fracture surfaces, locally penetrating up to 20mm. 2. ~30 degree joint, at 7.82-7.88m, slightly undulating, rough, orangish brown staining and clay infill, up to 6mm thick on joint surface. 3. 80-90 degree joint, at 9.35-10.40m, slightly undulating, rough, orangish brown staining and clay film, up to 2mm thick on joint surface.		
		100	91	28									
11.15					6			41.39	10.90				
		87	75	47					(0.85)				
12.65					>20			40.54	11.75		Strong indistinctly thickly laminated dark grey LIMESTONE with rare fossil fragments. Slightly weathered: Patchy orangish brown staining on fracture surfaces. Discontinuities: 1. 0-5 degree bedding fractures, medium spaced (30/210/225), planar, rough, orangish brown staining on some fracture surfaces. 2. ~20 degree joint. at 11.00-11.05m, slightly undulating, rough.		
		100	65	15					(2.60)		Moderately weak thinly laminated greyish black calcareous MUDSTONE with medium spaced thin laminations of greenish grey siltstone and occasional white calcite veins parallel to bedding. Slightly weathered: Reduced strength, much closer fracture spacing. Discontinuities: 1. 0-10 degree bedding fractures, very closely spaced (10/54/130), planar, smooth, greyish white calcite mineralisation on some fracture surfaces, 5-15mm thick. 2. 20-25 degree joints, medium spaced (85/430/800), planar, smooth. 3. 80-90 degree joints, at 12.65-13.05m, 13.40-13.60m and 13.70-13.95m, slightly undulating, smooth.		
14.15					18								
		93	90	60				37.94	14.35		Strong thinly laminated greyish black calcareous MUDSTONE with occasional fossil fragments. Slightly weathered: Slightly closer fracture spacing, orangish brown discolouration on some fracture surfaces. Discontinuities: 1. 0-5 degree bedding fractures, closely spaced (40/185/400), planar, smooth. 2. 80-90 degree joints, at 14.70-14.85m and 15.75-16.15m, slightly undulating, rough, patchy orangish brown staining on some joint surfaces.		
15.65													
		98	97	93	6				(4.45)				
17.15													
		100	100	93									
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
2.00	2.50	01:00

Casing Details

To (m)	Diam (mm)
2.50	200
4.10	190
25.00	146

Water Added

From (m)	To (m)
1.20	2.00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered
Rotary Drilling (open hole) used to advance casing from 3.65-4.10m onto competent rockhead

Core Barrel	Flush Type	Termination Reason	Last Updated
	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-10449
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	2.60
Rotary Coring	Comacchio 405	2.60	25.00

Coordinates
581006.17 E
674997.17 N

Final Depth: 25.00 m | **Start Date:** 06/07/2022 | **Driller:** MK+RC | Sheet 3 of 3 | Scale: 1:50

Elevation: 52.29 mOD | **End Date:** 04/09/2022 | **Logger:** JAC+TH | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
18.65		100	96	64	10			33.49	18.80		Strong thinly laminated greyish black calcareous MUDSTONE with occasional fossil fragments. Slightly weathered: Slightly closer fracture spacing, orangish brown discolouration on some fracture surfaces. Discontinuities: 1. 0-5 degree bedding fractures, closely spaced (40/185/400), planar, smooth. 2. 80-90 degree joints, at 14.70-14.85m and 15.75-16.15m, slightly undulating, rough, patchy orangish brown staining on some joint surfaces.		
20.15		100	98	76					(2.65)		Strong thinly interlaminated black calcareous MUDSTONE and dark grey fossiliferous LIMESTONE. Slightly weathered: Closer fracture spacing, dark orangish brown discolouration on some fracture surfaces. Discontinuities: 1. 0-50 degree bedding fractures, closely spaced (12/106/410), planar, smooth. 2. 70-80 degree joint, at 18.80-19.05m, undulating, rough, dark orangish brown staining on joint surface.		
21.65		92	92	90	5			30.84	21.45		Strong thinly interlaminated black calcareous MUDSTONE and dark grey LIMESTONE with rare fossils. Slightly weathered: Slightly closer fracture spacing. Discontinuities: 1. 0-5 degree bedding fractures, closely spaced (35/210/420), planar, smooth. 2. ~25 degree joint, at 21.50m, planar, rough.		
23.15		100	100	34	14			29.14	23.15		Medium strong thinly to thickly interlaminated black calcareous MUDSTONE and dark grey fossiliferous LIMESTONE. Slightly weathered: Slightly reduced strength, closer fracture spacing, patchy orangish brown discolouration on some fracture surfaces. Discontinuities: 1.0-5 degree bedding fractures, closely spaced (6/70/165), planar, rough, patchy orangish brown staining on some fracture surfaces.		
24.65		63	63	0					(1.85)				
25.00								27.29	25.00		End of Borehole at 25.00m		

TCR	SCR	RQD	FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
2.00	2.50	01:00

Casing Details

To (m)	Diam (mm)
2.50	200
4.10	190
25.00	146

Water Added

From (m)	To (m)
1.20	2.00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered
Rotary Drilling (open hole) used to advance casing from 3.65-4.10m onto competent rockhead

Core Barrel	Flush Type	Termination Reason	Last Updated
	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-10475

Client: Irish Water

Client's Rep: Mott MacDonald

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	5.00
Rotary Coring	Comacchio 405	5.00	23.15

Coordinates: 580981.96 E, 675021.51 N

Final Depth: 23.15 m | **Start Date:** 07/07/2022 | **Driller:** RC+MK

Elevation: 52.15 mOD | **End Date:** 05/09/2022 | **Logger:** CM+JAC

Sheet 1 of 3
Scale: 1:50
FINAL

Depth (m)	Sample / Tests	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description
									51.95	0.20		TOPSOIL
0.40 - 0.60	B1											Medium dense brown slightly sandy slightly clayey subangular to subrounded fine to coarse GRAVEL of various lithologies. Sand is fine to coarse.
0.50	D7											
0.80 - 1.10	B2											
1.00	D8											
1.20 - 1.65	SPT (C)	N=16 (2,3/3,3,4,6) Hammer SN = 1264					1.20	Dry	50.75	1.40		
1.80 - 2.10	B3											Stiff to very stiff greyish brown sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of various lithologies.
2.00	D9											
2.00 - 2.30	U13	Ublow=30 0% Recovery										
2.30 - 2.45	SPT (C)	N=50 (10,15/50 for 0mm) Hammer SN = 1264					2.00	2.30				
2.80 - 3.10	B4											
3.00	D10											
3.00 - 3.45	SPT (C)	N=19 (4,5/5,5,4,5) Hammer SN = 1264					3.00	3.00	48.85	3.30		
3.80 - 4.10	B5											Medium dense brownish grey sandy slightly clayey subangular to subrounded fine to coarse GRAVEL of various lithologies. Sand is fine to coarse.
4.00	D11											
4.00 - 4.45	U14	Ublow=50 0% Recovery										
4.10	C1											
4.80 - 5.10	B6								47.35	4.80		Weathered LIMESTONE recovered as: Very dense dark grey angular fine to coarse GRAVEL.
5.00	D12		29	38	0		5.00	4.50	47.00	5.15		
5.00 - 5.27	SPT(C) N=50 (10,15/50 for 120mm) Hammer SN = 1264											Medium strong (locally moderately weak) thinly to thickly laminated dark grey LIMESTONE. Distinctly weathered: Reduced strength, much closer fracture spacing, orangish brown discolouration on discontinuity surfaces.
5.15			80	20	0	18						
5.65			95	80	14							Discontinuities:
5.95												
6.20 - 6.30	C2		97	73	17							1. 0-10 degree bedding fractures, closely spaced (15/70/150), planar, rough. orangish brown staining on fracture surfaces.
6.65												
6.75 - 6.85	C3		100	27	7	15				(4.50)		2. 75-90 degree joints from 5.15-6.30m, 6.90-7.10m, 7.45-8.15m, 8.30-9.65m, undulating, rough, orangish brown staining on discontinuity surfaces.
8.15			77	27	7							

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
2.30	3.00	01:00
4.80	5.00	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
5.00	200
23.15	150

Water Added

From (m)	To (m)
1.20	3.50

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-10475
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	5.00
Rotary Coring	Comacchio 405	5.00	23.15

Coordinates: 580981.96 E, 675021.51 N

Final Depth:	23.15 m	Start Date:	07/07/2022	Driller:	RC+MK	Sheet 2 of 3
Elevation:	52.15 mOD	End Date:	05/09/2022	Logger:	CM+JAC	Scale: 1:50
						FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
9.65								42.50	9.65		Medium strong (locally moderately weak) thinly to thickly laminated dark grey LIMESTONE. Distinctly weathered: Reduced strength, much closer fracture spacing, orangish brown discolouration on discontinuity surfaces.		
10.00	C4	89	71	8	7				(0.90)		Discontinuities: 1. 0-10 degree bedding fractures, closely spaced (15/70/150), planar, rough. orangish brown staining on fracture surfaces. 2. 75-90 degree joints from 5.15-6.30m, 6.90-7.10m, 7.45-8.15m, 8.30-9.65m, undulating, rough, orangish brown staining on discontinuity surfaces.		
11.15		80	21	0	>20			41.60	10.55		Medium strong thinly to thickly laminated dark grey LIMESTONE. Partially weathered: Slightly reduced strength, closer fracture spacing, orangish brown discolouration on most fracture surfaces. Discontinuities: 1. 0-10 degree bedding fractures, closely spaced (20/80/120), planar, rough to smooth, orangish brown staining on most fracture surfaces. 2. 75-90 degree joints from 9.65-9.85m and 9.90-10.05m, planar, rough, orangish brown staining on joint surfaces.		
12.65		96	85	35				38.85	13.30		Moderately weak thinly laminated dark grey MUDSTONE. Partially weathered: Closer fracture spacing, slightly reduced strength, orangish brown discolouration on some fracture surfaces. Discontinuities: 1. 0-10 degree bedding fractures, very closely spaced (5/55/100), planar, smooth, orangish brown staining on some fracture surfaces. 2. 70-90 degree joints from 10.65-10.85m, 11.25-11.60m, 11.65-12.65m and 12.85-13.05m, undulating, rough, orangish brown staining on fracture surfaces.		
14.15		100	100	97							Medium strong thinly to thickly laminated dark grey to black LIMESTONE. Partially weathered: Slightly reduced strength, slightly closer fracture spacing, orangish brown discolouration on some fracture surfaces. Discontinuities: 1. 0-10 degree bedding fractures, closely spaced (15/145/400), planar, rough to smooth, orangish brown staining on some fracture surfaces. 2. 70-90 degree joints from 18.35-18.50m, 18.60-18.70m, 18.80-18.95m, planar to undulating, rough, orangish brown staining on joint surfaces.		
15.65		100	100	72	7				(9.85)				
17.15		100	93	61									
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
2.30	3.00	01:00
4.80	5.00	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
5.00	200
23.15	150

Water Added

From (m)	To (m)
1.20	3.50

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-10475
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	5.00
Rotary Coring	Comacchio 405	5.00	23.15

Coordinates: 580981.96 E, 675021.51 N

Final Depth:	23.15 m	Start Date:	07/07/2022	Driller:	RC+MK	Sheet 3 of 3
Elevation:	52.15 mOD	End Date:	05/09/2022	Logger:	CM+JAC	Scale: 1:50
						FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
18.65		97	91	63							Medium strong thinly to thickly laminated dark grey to black LIMESTONE. Partially weathered: Slightly reduced strength, slightly closer fracture spacing, orangish brown discolouration on some fracture surfaces. Discontinuities: 1. 0-10 degree bedding fractures, closely spaced (15/145/400), planar, rough to smooth, orangish brown staining on some fracture surfaces. 2. 70-90 degree joints from 18.35-18.50m, 18.60-18.70m, 18.80-18.95m, planar to undulating, rough, orangish brown staining on joint surfaces.		
20.15		99	99	91									
21.65		91	91	85									
23.15								29.00	23.15		End of Borehole at 23.15m		
		TCR	SCR	RQD	FI								

19.0 19.5 20.0 20.5 21.0 21.5 22.0 22.5 23.0 23.5 24.0 24.5 25.0 25.5 26.0 26.5 27.0 27.5

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
2.30	3.00	01:00
4.80	5.00	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
5.00	200
23.15	150

Water Added

From (m)	To (m)
1.20	3.50

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-11377
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	
Cable Percussion	Dando 3000	1.20	4.00	581658.84 E
Rotary Coring	Comacchio 405	4.00	9.50	675603.76 N

Final Depth:	Start Date:	Driller:	Sheet 1 of 2
9.50 m	28/07/2022	CC+RS	Scale: 1:50
Elevation: 50.16 mOD	**End Date:** 24/08/2022	**Logger:** TH	FINAL

Depth (m)	Sample / Tests	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.20 - 0.80	B3								49.96	0.20		TOPSOIL Soft to firm brown sandy silty CLAY. Sand is fine to coarse.		
0.80 - 1.90	B4								49.36	0.80		Firm dark brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to medium of various lithologies.		
1.20	D1													
1.20 - 1.65	SPT (S)	N=13 (2,2/3,3,3,4) Hammer SN = 0197					1.20	Dry						
1.90 - 3.00	B5											*1.90-3.90m: Becoming firm to stiff.*		
2.00 - 2.20	U7	Ublow=50 0% Recovery					2.00	Dry						
3.00	D2													
3.00 - 3.45	SPT (S)	N=16 (3,3/3,4,4,5) Hammer SN = 0197					3.00	Dry						
3.90 - 4.30	B6								46.26	3.90		Weathered SANDSTONE recovered as: Brown angular fine to coarse GRAVEL.		
		Water strike at 3.90m					4.00	3.00	46.16	4.00		Strong thinly laminated brown medium grained well cemented SANDSTONE interbedded with moderately weak thinly laminated dark grey SANDSTONE. Slightly weathered: Slightly reduced strength, closer fracture spacing, dark orangish brown discolouration on most fracture surfaces.		
4.00 - 4.30	C1											Discontinuities:		
4.00 - 4.12	SPT(C) N=50 (25 for 50mm/50 for 65mm) Hammer SN = 0197		90	54	27	18				(1.00)		1. 0-5 degree bedding fractures, closely spaced (10/60/140), planar, smooth to rough, dark orangish brown staining on most fracture surfaces.		
4.05 - 4.20	C2								45.16	5.00		2. 80-90 degree joint, at 4.30-4.85m, slightly undulating, rough, patchy dark orangish brown staining on joint surface.		
4.30 - 4.45	C3					8						Strong indistinctly thinly laminated dark grey LIMESTONE with medium spaced thick laminations of orangish brown SANDSTONE. Slightly weathered: Locally closer fracture spacing, dark orangish brown discolouration on some fracture surfaces.		
5.00										(0.95)		Discontinuities:		
5.20 - 5.50	C4		100	87	70	>20						1. 0-10 degree bedding fractures, closely spaced (10/70/370), planar, rough, patchy dark orangish brown staining on most fracture surfaces.		
6.00	C5								44.21	5.95		*5.75-5.90m: Moderately weathered limestone, further weakened, much closer fracture spacing, some brown clay on fracture surfaces*		
6.40 - 6.50	C6					7				(0.95)		Strong (locally very strong) thinly laminated medium grained well cemented reddish brown SANDSTONE. Slightly weathered: Slightly closer fracture spacing, dark orangish brown discolouration on fracture surfaces.		
6.50									43.26	6.90		Discontinuities:		
			57	41	20	>20						1. 0-5 degree bedding fractures, closely spaced (40/135/280), planar, rough, dark orangish brown staining on some fractures, locally penetrating up to 20mm.		
						AZCL						Weak to moderately weak massive dark grey GREYWACKE. Slightly weathered: Slightly reduced strength, closer fracture spacing, dark orangish brown penetrative discolouration.		
8.00										(2.60)		Discontinuities:		
8.20 - 8.30	C7					13						1. 0-50 degree joints, closely spaced (15/150/250), planar, rough, dark orangish brown staining on joint surfaces.		
			50	50	16	AZCL						2. 20-30 degree joints, at 7.35m and 8.31m, slightly undulating,		

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
3.90	3.90	20	3.30

Casing Details

To (m)	Diam (mm)
4.00	200
9.50	150

Water Added

From (m)	To (m)
3.90	

Chiselling Details

From (m)	To (m)	Time (hh:mm)
4.10	4.30	01:00

Remarks

Hand dug inspection pit excavated to 1.20m

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-11377
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 3000	1.20	4.00
Rotary Coring	Comacchio 405	4.00	9.50

Coordinates: 581658.84 E, 675603.76 N

Final Depth: 9.50 m | Start Date: 28/07/2022 | Driller: CC+RS

Elevation: 50.16 mOD | End Date: 24/08/2022 | Logger: TH

Sheet 2 of 2 | Scale: 1:50 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
9.50								40.66	9.50		Weak to moderately weak massive dark grey GREYWACKE. Slightly weathered: Slightly reduced strength, closer fracture spacing, dark orangish brown penetrative discolouration. Discontinuities: 1. 0-50 degree joints, closely spaced (15/150/250), planar, rough, dark orangish brown staining on joint surfaces. 2. 20-30 degree joints, at 7.35m and 8.31m, slightly undulating, rough, dark orangish brown staining on joint surfaces. 3. Approx. 60 degree joint, at 8.14-8.28m, slightly undulating, rough, dark orangish brown staining on joint surfaces 4. 80-90 degree joint, at 8.55-8.75m, planar, rough, dark brown staining on joint surface. End of Borehole at 9.50m		
		TCR	SCR	RQD	FI								

9.5 10.0 10.5 11.0 11.5 12.0 12.5 13.0 13.5 14.0 14.5 15.0 15.5 16.0 16.5 17.0 17.5 18.0 18.5

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
3.90	3.90	20	3.30

Chiselling Details

From (m)	To (m)	Time (hh:mm)
4.10	4.30	01:00

Remarks

Hand dug inspection pit excavated to 1.20m

Casing Details

To (m)	Diam (mm)
4.00	200
9.50	150

Water Added

From (m)	To (m)
3.90	

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-11594
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	
Cable Percussion	Dando 3000	1.20	5.50	581803.87 E
Rotary Coring	Comacchio 405	5.50	9.50	675770.39 N

Final Depth:	Start Date:	Driller:	Sheet 1 of 2
9.50 m	27/07/2022	CC+RS	Scale: 1:50
Elevation: 50.31 mOD	**End Date:** 22/08/2022	**Logger:** TH	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
								TOPSOIL		
0.30 - 0.50	B1				50.01	0.30		Spongy dark brown slightly sandy gravelly fibrous PEAT. Sand is fine to coarse. Gravel is subangular fine to medium of various lithologies.		
0.50 - 1.20	B2				49.81	0.50		Firm to stiff brownish grey slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is angular fine to medium of various lithologies.		
1.20	D7									
1.20 - 1.65	SPT (S)	N=18 (3,3/4,5,4,5) Hammer SN = 0197	1.20							
1.50 - 2.50	B3									
2.00	U13	Ublow=50 0% Recovery	2.00							
2.50 - 3.50	B4									
3.00	D9									
3.00 - 3.45	SPT (S)	N=23 (4,4/5,6,6,6) Hammer SN = 0197	3.00							
3.60 - 4.50	B5	Seepage at 3.60m			46.71	3.60		Medium dense to dense brownish grey sandy slightly silty subrounded fine to coarse GRAVEL of various lithologies with low cobble content. Sand is fine to coarse. Cobbles are subangular.		
4.00	D10									
4.00 - 4.45	SPT (C)	N=31 (3,6/6,7,8,10) Hammer SN = 0197	4.00	1.90						
5.00	D11									
5.00 - 5.45	SPT (C)	N=26 (4,5/5,5,7,9) Hammer SN = 0197	5.00	3.10						
5.60	C1				44.81	5.50		Medium strong (locally strong) indistinctly thinly laminated dark grey fossiliferous LIMESTONE. Slightly weathered: Patchy orangish brown discolouration on some fracture surfaces. Discontinuities: 1. 0-10 degree bedding fractures, at 5.90m, 6.20m and 6.25m, planar, smooth, patchy orangish brown staining on some fracture surfaces. 2. 80-90 degree joint, at 5.80-5.95m, undulating, smooth, patchy dark orangish brown staining on joint surface.		
5.60 - 6.00	B6					(0.75)				
6.00	D12				44.06	6.25				
6.00 - 6.08	SPT(C) N=50 (25 for 30mm/50 for 50mm) Hammer SN = 0197		6.00	4.40						
6.50										
6.80 - 6.90	C2							Medium weak (locally medium strong) thinly laminated dark grey LIMESTONE with occasional greyish white calcite veins parallel to bedding. Slightly weathered: Reduced strength, much closer fracture spacing, orangish brown discoloration on some fracture surfaces. Discontinuities: 1. 0-5 degree bedding fractures, very closely spaced (5/55/100), planar, smooth, orangish brown staining on some fracture surfaces. 2. 80-90 degree joints, at 6.60-6.75m, 6.90-7.10m, 7.30-7.50m, 8.40-8.70m and 9.10-9.30m, slightly undulating, smooth.		
7.50 - 7.70	C3					(3.25)				
8.00										
9.10 - 9.20	C4									
								9.25-9.50m: Medium strong dark grey fossiliferous LIMESTONE		

TCR	SCR	RQD	FI
			AZCL
70	67	28	9
93	80	7	>20
100	86	36	18

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
3.60	3.60	20	3.30

Chiselling Details

From (m)	To (m)	Time (hh:mm)
2.00	2.30	00:30
5.90	6.00	01:00

Casing Details

To (m)	Diam (mm)
5.50	200
9.50	150

Water Added

From (m)	To (m)
3.60	5.50

Remarks

Hand dug inspection pit excavated to 1.20m

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-11594
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 3000	1.20	5.50
Rotary Coring	Comacchio 405	5.50	9.50

Coordinates: 581803.87 E, 675770.39 N

Final Depth: 9.50 m | **Start Date:** 27/07/2022 | **Driller:** CC+RS

Elevation: 50.31 mOD | **End Date:** 22/08/2022 | **Logger:** TH

Sheet 2 of 2
Scale: 1:50
FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
9.50								40.81	9.50		Medium weak (locally medium strong) thinly laminated dark grey LIMESTONE with occasional greyish white calcite veins parallel to bedding. Slightly weathered: Reduced strength, much closer fracture spacing, orangish brown discoloration on some fracture surfaces. Discontinuities: 1. 0-5 degree bedding fractures, very closely spaced (5/55/100), planar, smooth, orangish brown staining on some fracture surfaces. 2. 80-90 degree joints, at 6.60-6.75m, 6.90-7.10m, 7.30-7.50m, 8.40-8.70m and 9.10-9.30m, slightly undulating, smooth. End of Borehole at 9.50m		

TCR	SCR	RQD	FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
3.60	3.60	20	3.30

Chiselling Details

From (m)	To (m)	Time (hh:mm)
2.00	2.30	00:30
5.90	6.00	01:00

Remarks

Hand dug inspection pit excavated to 1.20m

Casing Details

To (m)	Diam (mm)
5.50	200
9.50	150

Water Added

From (m)	To (m)
3.60	5.50

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-12009

Client: Irish Water

Client's Rep: Mott MacDonald

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	
Cable Percussion	Dando 3000	1.20	7.80	581820.79 E
				676183.01 N

Final Depth: 7.80 m **Start Date:** 28/07/2022 **Driller:** CC

Elevation: 52.02 mOD **End Date:** 28/07/2022 **Logger:** TH

Sheet 1 of 2
Scale: 1:40
FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description
								TOPSOIL
0.25 - 1.20	B1				51.77	0.25		Firm becoming stiff brownish grey slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies.
1.20	D2							
1.20 - 1.65	SPT (S)	N=21 (2,3/5,7,5,4) Hammer SN = 0197	1.20	Dry				
1.50 - 2.50	B3							
2.00	D4							
2.00 - 2.45	SPT (S)	N=17 (6,5/4,4,5,4) Hammer SN = 0197	2.00	Dry				
3.00	D5							
3.00 - 3.45	SPT (S)	N=30 (4,7/7,11,7,5) Hammer SN = 0197	3.00	Dry				
3.40 - 4.00	B6	Water strike at 3.40m			48.62	3.40		Medium dense grey sandy silty subangular fine to coarse GRAVEL of various lithologies with low cobble content. Sand is fine to coarse. Cobbles are subangular.
4.00	D7							
4.00 - 4.45	SPT (C)	N=17 (3,3/4,4,4,5) Hammer SN = 0197	4.00	2.60				
5.00 - 5.45	SPT (C)	N=25 (3,4/5,5,7,8) Hammer SN = 0197	5.00	3.10				
5.70 - 6.50	B9				46.32	5.70		Very stiff brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies. Cobbles are subrounded.
6.50	D8							
6.50 - 6.95	SPT (C)	N=32 (5,6/7,7,8,10) Hammer SN = 0197	6.50	2.50				
7.00 - 7.80	B10							

Water

Backfill

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
3.40	3.40	20	2.90

Chiselling Details

From (m)	To (m)	Time (hh:mm)
7.70	7.80	01:00

Casing Details

To (m)	Diameter
7.80	200

Water Added

From (m)	To (m)
3.40	7.80

Remarks

Hand dug inspection pit excavated to 1.20m

Termination Reason

Terminated on refusal of SPT on boulder and 1 hour of chiselling.

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-12009
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	
Cable Percussion	Dando 3000	1.20	7.80	581820.79 E
				676183.01 N

Final Depth:	7.80 m	**Start Date:**	28/07/2022	**Driller:**	CC	Sheet 2 of 2
						Scale: 1:40
Elevation:	52.02 mOD	**End Date:**	28/07/2022	**Logger:**	TH	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
7.80 - 8.01	SPT (C)	N=50 (25 for 95mm/50 for 110mm) Hammer SN = 0197	7.80	4.70	44.22	7.80		Very stiff brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies. Cobbles are subrounded.		
								End of Borehole at 7.80m		

7.5 8.0 8.5 9.0 9.5 10.0 10.5 11.0 11.5 12.0 12.5 13.0 13.5 14.0 14.5

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
3.40	3.40	20	2.90

Chiselling Details

From (m)	To (m)	Time (hh:mm)
7.70	7.80	01:00

Casing Details

To (m)	Diameter
7.80	200

Water Added

From (m)	To (m)
3.40	7.80

Remarks

Hand dug inspection pit excavated to 1.20m

Termination Reason

Terminated on refusal of SPT on boulder and 1 hour of chiselling.

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-12406
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	
Cable Percussion	Dando 2000	1.20	2.10	582086.55 E
				676452.29 N

Final Depth:	2.10 m	Start Date:	12/07/2022	Driller:	MK	Sheet 1 of 1
Elevation:	49.72 mOD	End Date:	12/07/2022	Logger:	JAC	Scale: 1:40
						FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
					49.52	0.20		TOPSOIL		
0.40 - 0.60	B1							Firm greyish brown slightly sandy slightly gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of various lithologies. Cobbles are subangular.		
0.50	D4									
0.80 - 1.10	B2									
1.00	D5									
1.20	U7	Ublow=50 100% Recovery	1.20	Dry						
1.80 - 2.10	B3									
2.00	D6									
2.00 - 2.08	SPT (C)	N=50 (25 for 80mm/50 for 0mm) Hammer SN = 1264	2.00		47.62	2.10		End of Borehole at 2.10m		

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter
2.10	200

Water Added

From (m)	To (m)
1.20	2.10

Chiselling Details

From (m)	To (m)	Time (hh:mm)
2.00	2.10	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
Rebore attempted at BH-12406A
No groundwater encountered

Termination Reason

Terminated on refusal of SPT on large cobble/possible boulder and 1 hour of chiselling.

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-12406A
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	
Cable Percussion	Dando 2000	1.20	3.00	582088.19 E
Rotary Coring	Comacchio 405	3.00	10.00	676449.22 N

Final Depth:	10.00 m	Start Date:	12/07/2022	Driller:	MK +MW	Sheet 1 of 2 Scale: 1:50
Elevation:	49.71 mOD	End Date:	06/09/2022	Logger:	NH	FINAL

Depth (m)	Sample / Tests	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
									49.41	0.30		Peaty TOPSOIL		
0.40 - 0.60	B1											Stiff to very stiff grey slightly sandy gravelly silty CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of various lithologies. Cobbles are subangular.		
0.50	D5													
0.80 - 1.10	B2													
1.00	D6													
1.20 - 1.64	U9	Ublow=35 100% Recovery					1.20	Dry						
1.80 - 2.10	B3													
2.00	D7													
2.00 - 2.45	SPT (C)	N=42 (5,8/9,10,14,9) Hammer SN = 1264					2.00							
2.80 - 3.10	B4								46.91	2.80		Large BOULDER		
3.00	D8						3.00		46.71	3.00		No recovery: Dense to very dense grey SAND and GRAVEL with cobbles and boulders. (Driller's description based on flush returns)		
3.00 - 3.08	SPT(C) N=50 (25 for 80mm/50 for 0mm) Hammer SN = 1264 Fast seepage at 3.20m		0											
4.50							4.50							
4.50 - 4.95	SPT(C) N=42 (5,5/6,7,13,16) Hammer SN = 0643		0											
6.00							6.00							
6.00 - 6.45	SPT(C) N=32 (6,8/8,8,8,8) Hammer SN = 0643		0			NR				(7.00)				
7.50							7.50							
7.50 - 7.58	SPT(C) N=50 (25 for 50mm/50 for 30mm) Hammer SN = 0643		0											
9.00							9.00							

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
3.20	3.20	20	2.20

Chiselling Details

From (m)	To (m)	Time (hh:mm)
3.00	3.20	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
Rebore of BH-12406; refusal on large cobble/boulder at 2.10m
NR: No Recovery

Casing Details

To (m)	Diam (mm)
3.00	200
3.20	200
10.00	150

Water Added

From (m)	To (m)
1.20	3.20

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-12406A
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	3.00
Rotary Coring	Comacchio 405	3.00	10.00

Coordinates: 582088.19 E, 676449.22 N

Final Depth:	10.00 m	Start Date:	12/07/2022	Driller:	MK +MW	Sheet 2 of 2
Elevation:	49.71 mOD	End Date:	06/09/2022	Logger:	NH	Scale: 1:50
						FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
9.00 - 9.14	SPT(C) N=50 (25 for 125mm/50 for 20mm) Hammer SN = 0643	0									No recovery: Dense to very dense grey SAND and GRAVEL with cobbles and boulders. (Driller's description based on flush returns)		
10.00						10.0		39.71	10.00		End of Borehole at 10.00m		
10.00 - 10.45	SPT(C) N=38 (10,10/4,7,15,12) Hammer SN = 0643												

TCR	SCR	RQD	FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
3.20	3.20	20	2.20

Chiselling Details

From (m)	To (m)	Time (hh:mm)
3.00	3.20	01:00

Casing Details

To (m)	Diam (mm)
3.00	200
3.20	200
10.00	150

Water Added

From (m)	To (m)
1.20	3.20

Remarks

Hand dug inspection pit excavated to 1.20m
Rebore of BH-12406; refusal on large cobble/boulder at 2.10m
NR: No Recovery

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-12580

Client: Irish Water

Client's Rep: Mott MacDonald

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2500	1.20	4.00
Rotary Coring	Beretta T44	4.00	10.00

Coordinates: 582217.19 E, 676590.10 N

Final Depth: 10.00 m | **Start Date:** 26/07/2022 | **Driller:** MW +RW

Elevation: 50.81 mOD | **End Date:** 05/09/2022 | **Logger:** TH

Sheet 1 of 2 | Scale: 1:50 | FINAL

Depth (m)	Sample / Tests	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.20 - 0.50	B1								50.61	0.20		TOPSOIL		
0.50 - 1.50	B2								50.31	0.50		Soft dark brown peaty CLAY with occasional rootlets.		
1.20	D7											Firm to stiff greyish brown mottled orangish brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is angular fine to coarse of various lithologies. Cobbles are angular.		
1.20 - 1.60	U11	Ublow=40 80% Recovery					1.20	Dry						
1.50 - 1.90	B3													
1.90 - 3.00	B4								48.91	1.90		Medium dense grey slightly sandy slightly clayey angular fine to coarse GRAVEL of various lithologies. Sand is fine to coarse.		
2.00 - 2.45	SPT (C)	N=20 (10,4/5,5,5,5) Hammer SN = 1410					2.00							
2.20	D8													
3.00 - 4.00	B5											3.00-4.00m: Becoming very sandy.		
3.00 - 3.45	SPT (C)	N=14 (2,3/4,4,3,3) Hammer SN = 1410					3.00							
3.20	D9													
4.00 - 4.30	B6						4.00		46.81	4.00		Medium dense becoming dense light brown and grey angular to subangular fine to coarse GRAVEL of limestone and sandstone. (Where No Recovery "NR" - descriptions based on flush returns)		
4.00 - 4.45	SPT(C) N=25 (4,4/6,7,6,6) Hammer SN = 1410		33			AZCL	4.30							
4.20	D10													
4.40 - 4.43	SPT(C) N=50 (25 for 20mm/50 for 15mm) Hammer SN = 1410											5.05-7.55m: AZCL granular material scrubbed out with drilling		
5.50							5.50							
5.50 - 5.88	SPT(C) N=50 (3,5/50 for 225mm) Hammer SN = 0643		0			NR				(6.00)				
7.00							7.00							
7.00 - 7.22	SPT(C) N=50 (11,14/50 for 75mm) Hammer SN = 0643		63			AZCL								
8.50							8.50							
8.50 - 8.95	SPT(C) N=39 (7,9/7,9,10,13) Hammer SN = 0643		0			NR						8.50-10.00m: AZCL disturbance due to SPT/material scrubbed out with drilling		

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
4.30	4.40	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
4.00	200
10.00	150

Water Added

From (m)	To (m)
1.90	4.00

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-12580
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2500	1.20	4.00
Rotary Coring	Beretta T44	4.00	10.00

Coordinates: 582217.19 E, 676590.10 N

Final Depth: 10.00 m | **Start Date:** 26/07/2022 | **Driller:** MW +RW

Elevation: 50.81 mOD | **End Date:** 05/09/2022 | **Logger:** TH

Sheet 2 of 2 | Scale: 1:50 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
10.00								40.81	10.00		Medium dense becoming dense light brown and grey angular to subangular fine to coarse GRAVEL of limestone and sandstone. (Where No Recovery "NR" - descriptions based on flush returns)		
											End of Borehole at 10.00m		

TCR	SCR	RQD	FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)
4.00	200
10.00	150

Water Added

From (m)	To (m)
1.90	4.00

Chiselling Details

From (m)	To (m)	Time (hh:mm)
4.30	4.40	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-12608
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	6.80
Rotary Drilling	Beretta T44	6.80	7.00
Rotary Coring	Beretta T44	7.00	20.00

Coordinates: 582184.80 E, 676631.71 N

Final Depth:	20.00 m	Start Date:	08/07/2022	Driller:	MK +MW	Sheet 1 of 3
Elevation:	52.56 mOD	End Date:	04/09/2022	Logger:	JAC+TH	Scale: 1:50
						FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
								TOPSOIL		
0.40 - 0.60	B1				52.16	0.40				
0.50	D6							Firm to stiff greyish brown slightly sandy slightly gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium of various lithologies. Cobbles are subangular.		
0.80 - 1.10	B2									
1.00	D7									
1.20	U11	Ublow=50 50% Recovery	1.20	Dry						
1.80 - 2.10	B3									
2.00	D8									
2.00 - 2.45	SPT (C)	N=26 (3,4/8,5,7,6) Hammer SN = 1264	2.00							
2.80 - 3.10	B4									
3.00	D9				49.56	3.00				
3.00 - 3.05	U12	Ublow=0 0% Recovery	3.00					Medium dense brown sandy slightly clayey subangular to subrounded fine to coarse GRAVEL of various lithologies. Sand is fine to coarse.		
3.50 - 3.95	SPT (C)	N=22 (4,7/5,5,6,6) Hammer SN = 1264	3.50							
3.80 - 4.10	B5									
4.00	D10									
4.00 - 4.45	SPT (C)	N=22 (4,7/5,5,6,6) Hammer SN = 1264	4.00	2.20						
4.80 - 5.10	B13									
5.00	D16									
5.00 - 5.43	SPT (C)	N=50 (6,9/50 for 280mm) Hammer SN = 1264	5.00	2.00	47.36	5.20		Very stiff brown sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of various lithologies.		
5.80 - 6.10	B14									
6.00	D17									
6.00 - 6.30	U19	Ublow=70 0% Recovery	6.00	4.80						
6.50 - 6.65	SPT (C)	N=50 (10,15/50 for 0mm) Hammer SN = 1264	6.50	3.00						
6.70 - 6.80	B15				45.86	6.70		Medium dene to dense grey subangular fine to medium GRAVEL of limestone.		
6.80	D18		7.00					*7.00-7.90m: AZCL disturbance due to SPT/granular material scrubbed out with drilling fluid*		
6.80 - 6.82	SPT(C) N=50 (25 for 10mm/50 for 10mm) Hammer SN = 1264	TCR: 30 / SCR / RQD / FI: AZCL				(1.20)				
7.00 - 7.45	SPT(C) N=24 (3,4/4,6,7,7) Hammer SN = 0643				44.66	7.90		Stiff greyish brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of limestone.		
8.00			8.00					*8.00-8.90m: AZCL disturbance due to SPT/fines washed out with drilling fluid*		
8.00 - 8.45	SPT(C) N=26 (6,6/6,6,6,8) Hammer SN = 0643	TCR: 40 / SCR / RQD / FI: AZCL				(1.25)				
					43.41	9.15		Dark grey subrounded medium to coarse GRAVEL of limestone and rare sandstone with low cobble content. Cobbles are subrounded of limestone.		

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
5.20	6.80	03:00
5.50	6.00	00:40
6.70	8.00	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
Poor recovery due to granular material being washed out with drilling
No groundwater encountered

Casing Details

To (m)	Diam (mm)
6.70	200
7.00	200
20.00	150

Water Added

From (m)	To (m)
1.20	6.80

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated on instruction of Engineer	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-12608
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	6.80
Rotary Drilling	Beretta T44	6.80	7.00
Rotary Coring	Beretta T44	7.00	20.00

Coordinates: 582184.80 E, 676631.71 N

Final Depth:	20.00 m	Start Date:	08/07/2022	Driller:	MK +MW	Sheet 2 of 3
Elevation:	52.56 mOD	End Date:	04/09/2022	Logger:	JAC+TH	Scale: 1:50
						FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
									(0.35)		Dark grey subrounded medium to coarse GRAVEL of limestone and rare sandstone with low cobble content. Cobbles are subrounded of limestone.		
9.50						9.50		43.06	9.50		Medium dense to dense greyish brown fine to coarse SAND. (Where No Recovery "NR" - descriptions based on flush returns)		
9.50	B20												
9.50 - 9.95	SPT(C) N=28 (6,5/6,7,8,7) Hammer SN = 0643	0											
11.00						11.0			(4.50)				
11.00	B21												
11.00 - 11.45	SPT(C) N=25 (4,4/5,6,7,7) Hammer SN = 0643	0											
12.50						12.5							
12.50	B22												
12.50 - 12.95	SPT(C) N=49 (1,3/9,12,15,13) Hammer SN = 0643	0											
14.00					NR	14.0		38.56	14.00		Dense to very dense greyish brown slightly gravelly slightly clayey fine to coarse SAND. Gravel is subrounded fine of limestone. (Where No Recovery "NR" - descriptions based on flush returns)		
14.00	B23												
14.00 - 14.06	SPT(C) N=50 (25 for 50mm/50 for 12mm) Hammer SN = 0643	0											
15.50						15.5			(6.00)				
15.50	B24												
15.50 - 15.72	SPT(C) N=50 (13,12/50 for 75mm) Hammer SN = 0643	0											
17.00						17.0							
17.00	B25												
17.00 - 17.45	SPT(C) N=50 (7,9/11,12,12,15) Hammer SN = 0643	0											
18.50						18.5							
18.50	B26	TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
5.20	6.80	03:00
5.50	6.00	00:40
6.70	8.00	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
Poor recovery due to granular material being washed out with drilling
No groundwater encountered

Casing Details

To (m)	Diam (mm)
6.70	200
7.00	200
20.00	150

Water Added

From (m)	To (m)
1.20	6.80

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated on instruction of Engineer	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-12608
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	6.80
Rotary Drilling	Beretta T44	6.80	7.00
Rotary Coring	Beretta T44	7.00	20.00

Coordinates: 582184.80 E, 676631.71 N

Final Depth:	20.00 m	Start Date:	08/07/2022	Driller:	MK +MW	Sheet 3 of 3
Elevation:	52.56 mOD	End Date:	04/09/2022	Logger:	JAC+TH	Scale: 1:50
						FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
18.50 - 18.68	SPT(C) N=50 (25 for 130mm/50 for 50mm) Hammer SN = 0643	0									Dense to very dense greyish brown slightly gravelly slightly clayey fine to coarse SAND. Gravel is subrounded fine of limestone. (Where No Recovery "NR" - descriptions based on flush returns)		
20.00						20.0		32.56	20.00		End of Borehole at 20.00m		
20.00 - 20.00	SPT(C) N=50 (25 for 5mm/50 for 0mm) Hammer SN = 0643												
		TCR	SCR	RQD	FI								

19.0, 19.5, 20.0, 20.5, 21.0, 21.5, 22.0, 22.5, 23.0, 23.5, 24.0, 24.5, 25.0, 25.5, 26.0, 26.5, 27.0, 27.5

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
5.20	6.80	03:00
5.50	6.00	00:40
6.70	8.00	01:00

Casing Details

To (m)	Diam (mm)
6.70	200
7.00	200
20.00	150

Water Added

From (m)	To (m)
1.20	6.80

Remarks

Hand dug inspection pit excavated to 1.20m
Poor recovery due to granular material being washed out with drilling
No groundwater encountered

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated on instruction of Engineer	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-12658
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 200	1.20	5.10
Rotary Drilling	Comacchio 405	5.10	10.10
Rotary Coring	Comacchio 405	10.10	25.00

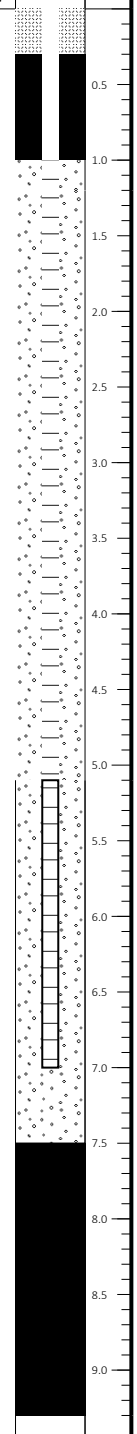
Coordinates: 582166.24 E, 676670.60 N

Final Depth: 25.00 m | Start Date: 04/07/2022 | Driller: MK+RC | Sheet 1 of 3 | Scale: 1:50

Elevation: 54.48 mOD | End Date: 24/08/2022 | Logger: JAC+TH | FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description
					54.28	0.20		TOPSOIL
0.80 - 1.10	B4							Very soft to soft brown slightly gravelly sandy SILT. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium of various lithologies.
					53.38	1.10		Spongy greyish brown pseudo-fibrous PEAT.
1.20 - 1.65	SPT (C)	N=7 (2,2/2,2,1,2) Hammer SN = 1264						
1.80 - 2.10	B5							
2.00 - 2.45	U1	Ublow=30 70% Recovery						
					51.78	2.70		Medium dense brown very sandy silty subangular to subrounded fine to coarse GRAVEL of various lithologies. Sand is fine to coarse
2.80 - 3.10	B6							
3.00 - 3.45	SPT (C)	N=21 (3,4/4,5,6,6) Hammer SN = 1264						
3.80 - 4.10	B7							
4.00 - 4.45	SPT (C)	N=27 (5,4/6,8,6,7) Hammer SN = 1264						
4.80 - 5.10	B2							
5.00	B3							
					49.38	5.10		Very stiff brown sandy CLAY. Sand is fine to coarse.
5.00 - 5.08	SPT (C)	N=50 (35 for 75mm/50 for 0mm) Hammer SN = 1264						
5.10 - 5.10	SPT (C)	N=50 (25 for 0mm/50 for 0mm) Hammer SN = 1264	5.00					
5.60	D8							
5.60 - 6.05	SPT (S)	N=33 (9,12/5,6,9,13) Hammer SN = 1368	5.60	Dry				
8.60	D9				45.88	8.60		Dense dark grey GRAVEL of limestone with high cobble content. Cobbles are of limestone.
8.60 - 9.05	SPT (S)	N=48 (6,13/22,8,9,9) Hammer SN = 1368	8.60	8.40				

Water | Backfill



Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)
5.00	200
10.10	190
25.00	146

Water Added

From (m)	To (m)
1.20	2.50

Chiselling Details

From (m)	To (m)	Time (hh:mm)
5.00	5.10	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered during drilling
Standpipe installation (response zone 1.00-7.50m)

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer/Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-12658
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 200	1.20	5.10
Rotary Drilling	Comacchio 405	5.10	10.10
Rotary Coring	Comacchio 405	10.10	25.00

Coordinates: 582166.24 E, 676670.60 N

Final Depth:	25.00 m	Start Date:	04/07/2022	Driller:	MK+RC	Sheet 2 of 3
Elevation:	54.48 mOD	End Date:	24/08/2022	Logger:	JAC+TH	Scale: 1:50
						FINAL

Depth (m)	Sample / Tests	Field Records: TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
											Dense dark grey GRAVEL of limestone with high cobble content. Cobbles are of limestone.		
											Dark greyish brown slightly sandy slightly clayey subangular fine to coarse GRAVEL of limestone and rare sandstone. Sand is fine to coarse.		
					AZCL			44.38	10.10		10.10-10.45m: AZCL disturbance due to SPT		
									(0.65)				
10.75 - 11.15	C1	67						43.73	10.75		Very stiff light brown slightly gravelly sandy silty CLAY. Sand is fine to coarse. Gravel is angular fine to coarse of sandstone.		
11.15									(0.75)		11.15-11.50m: AZCL disturbance due to SPT/material scrubbed out with drilling fluid		
		53			AZCL			42.98	11.50		Dark brown slightly sandy gravelly angular fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Gravel is angular fine to coarse of sandstone. Cobbles are of sandstone.		
											11.15-11.50m: AZCL disturbance due to SPT/material scrubbed out with drilling fluid		
11.90					AZCL						11.90-12.15m: AZCL disturbance due to SPT/material scrubbed out with drilling fluid		
		67							(1.85)				
12.65					AZCL						12.65-13.00m: AZCL disturbance due to SPT/material scrubbed out with drilling fluid		
		53						41.48	13.00		Brown angular fine to coarse GRAVEL of sandstone with high cobble content. Cobbles are of sandstone.		
13.40					AZCL						13.40-13.75m: AZCL material scrubbed out with drilling fluid		
		53							(1.15)				
14.15		93	59	30	11			40.33	14.15		Strong brownish grey thickly laminated medium to coarse grained well cemented SANDSTONE with medium spaced thin beds of thickly laminated light grey occasionally stained orangish brown medium grained well cemented SANDSTONE. Slightly weathered: Slightly reduced strength, closer fracture spacing, dark reddish brown discolouration on most fracture surfaces. Discontinuities: 1. 5-15 degree bedding fractures, closely spaced (10/130/410), planar, rough, orangish brown staining on most fracture surfaces. 2.60-70 degree joints, at 14.15-14.40m, 14.45-14.75m, 14.60-14.80m and 15.00-15.25m, planar, rough, dark reddish brown staining on joint surfaces. 3. 80-90 degree joints, at 15.40-15.90m (incipient from 15.55-15.65m), 16.00-17.35m, 18.00-19.10m, 18.10-18.53m and 18.15-18.40m, planar, rough, dark reddish brown staining on joint surfaces.		
14.90		100	84	60	8								
15.65		100	94	88	5				(5.55)				
17.15		97	90	57	10								

Water Strikes			
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details		Water Added	
To (m)	Diam (mm)	From (m)	To (m)
5.00	200	1.20	2.50
10.10	190		
25.00	146		

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered during drilling
Standpipe installation (response zone 1.00-7.50m)

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer/Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-12658
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 200	1.20	5.10
Rotary Drilling	Comacchio 405	5.10	10.10
Rotary Coring	Comacchio 405	10.10	25.00

Coordinates
582166.24 E
676670.60 N

Final Depth: 25.00 m | **Start Date:** 04/07/2022 | **Driller:** MK+RC | Sheet 3 of 3 | Scale: 1:50

Elevation: 54.48 mOD | **End Date:** 24/08/2022 | **Logger:** JAC+TH | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
18.65		100	81	60	8			34.78	19.70		Strong brownish grey thickly laminated medium to coarse grained well cemented SANDSTONE with medium spaced thin beds of thickly laminated light grey occasionally stained orangish brown medium grained well cemented SANDSTONE. Slightly weathered: Slightly reduced strength, closer fracture spacing, dark reddish brown discolouration on most fracture surfaces. Discontinuities: 1. 5-15 degree bedding fractures, closely spaced (10/130/410), planar, rough, orangish brown staining on most fracture surfaces. 2.60-70 degree joints, at 14.15-14.40m, 14.45-14.75m, 14.60-14.80m and 15.00-15.25m, planar, rough, dark reddish brown staining on joint surfaces. 3. 80-90 degree joints, at 15.40-15.90m (incipient from 15.55-15.65m), 16.00-17.35m, 18.00-19.10m, 18.10-18.53m and 18.15-18.40m, planar, rough, dark reddish brown staining on joint surfaces. *19.40-19.65m: Moderately weathered sandstone, dark reddish brown staining penetrating throughout*		
20.15		97	83	65				33.33	(1.45) 21.15		Strong thickly laminated light grey occasionally light orangish brown medium to coarse grained well cemented SANDSTONE. Slightly weathered: Slightly closer fracture spacing, some dark reddish brown and orangish brown discolouration. Discontinuities: 1. 10-20 degree bedding fractures, closely spaced (40/80/560), planar, rough, orangish brown staining on most fracture surfaces. 2. 50-60 degree joints at 19.85-20.00m and 20.15-20.25m, undulating, rough, dark reddish brown staining on joint surfaces. 3. 80-90 degree joint, at 19.70-20.00m, planar, rough, dark reddish brown staining on joint surface.		
21.65		100	73	57	9								
23.15		91	63	16	13				(3.85)		Moderately weak thinly laminated purple fine grained moderately cemented SANDSTONE with widely spaced thin beds of very weak to weak purple MUDSTONE. Moderately weathered: Reduced strength, much closer fracture spacing, dark brown staining on most fracture surfaces. Discontinuities: 1. 10-25 degree bedding fractures, closely spaced (10/125/280), planar, smooth, dark brown and orangish brown staining on most fracture surfaces. 2. 50-60 degree joints, widely spaced (600/770/1000), planar, rough, dark brown staining on some joint surfaces. 3. 80-90 degree joints, at 21.95-22.45m, 22.90-23.20m, 23.50-23.75m, 23.70-23.90m and 23.75-23.95m, planar, rough, dark brown staining on most joint surfaces.		
24.65		71	51	29									
25.00								29.48	25.00		End of Borehole at 25.00m		
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
5.00	5.10	01:00

Casing Details

To (m)	Diam (mm)
5.00	200
10.10	190
25.00	146

Water Added

From (m)	To (m)
1.20	2.50

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered during drilling
Standpipe installation (response zone 1.00-7.50m)

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer/Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-13100
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Rotary Drilling	Comacchio 405	1.20	2.50
Rotary Coring	Comacchio 405	2.50	25.00

Coordinates: 582259.33 E, 677128.21 N

Final Depth: 25.00 m | Start Date: 20/09/2022 | Driller: MW

Elevation: 50.50 mOD | End Date: 23/09/2022 | Logger: CM

Sheet 1 of 4 | Scale: 1:40 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description
								50.20	0.30		TOPSOIL
											Medium dense greyish brown SAND and GRAVEL. (Driller's description in geobore run based on flush returns)
3.00 - 3.45	SPT(C) N=25 (4,5/6,6,7,6) Hammer SN = 0643	0			NR	3.00					
4.00								46.50	4.00		Stiff to very stiff brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of various lithologies. Cobbles are subangular of sandstone.
4.30 - 4.55	C1	63			AZCL						*4.95-5.50m: AZCL (Possibly due to fines and gravel being washed out with flush).*
5.50 - 5.90	C2										
5.50											Strong thickly laminated to thinly bedded grey medium to coarse grained SANDSTONE. Slightly weathered: Slightly closer fracture spacing, slight discolouration on fracture surfaces.
5.90 - 6.15	C3										
6.00 - 6.45	SPT(C) N=33 (9,7/7,10,8,8) Hammer SN = 0643	100	70	55	7	6.00		44.55	5.95		Discontinuities: 1. 0-10 degree bedding fractures at 6.15m, 6.60m, 6.65m, 6.80m, 6.85m and 7.25m, planar, rough, orangish brown staining on fracture surfaces. 2. 15-25 degree joint at 6.30m planar, rough, light greenish brown staining on joint surface. 3. 75-85 degree joint from 6.90-7.15m, rough, planar.
6.30	C4										
7.00											
		TCR	SCR	RQD	FI						

Water: Backfill

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)
2.50	200
20.50	127

Core Barrel: SK6L

Flush Type: Polymer

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Termination Reason: Terminated at scheduled depth

Last Updated: 13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-13100
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Rotary Drilling	Comacchio 405	1.20	2.50
Rotary Coring	Comacchio 405	2.50	25.00

Coordinates: 582259.33 E, 677128.21 N

Final Depth: 25.00 m | Start Date: 20/09/2022 | Driller: MW | Elevation: 50.50 mOD | End Date: 23/09/2022 | Logger: CM

Sheet 2 of 4 | Scale: 1:40 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
								43.15	7.35		Strong thickly laminated to thinly bedded grey medium to coarse grained SANDSTONE. Slightly weathered: Slightly closer fracture spacing, slight discolouration on fracture surfaces.		
		100	66	28	>20						Discontinuities:		
								42.55	7.95		1. 0-10 degree bedding fractures at 6.15m, 6.60m, 6.65m, 6.80m, 6.85m and 7.25m, planar, rough, orangish brown staining on fracture surfaces.		
8.20 - 8.30	C6				12						2. 15-25 degree joint at 6.30m planar, rough, light greenish brown staining on joint surface.		
8.50											3. 75-85 degree joint from 6.90-7.15m, rough, planar.		
8.75 - 8.85	C7				NI			41.80	8.70		Very weak reddish brown MUDSTONE. Destructured: Greatly weakened, bedding disturbed, recovered as slightly sandy fine to coarse angular to subangular gravel.		
		100	95	89							Weak (locally moderately weak) indistinctly thinly to thickly laminated fine grained well cemented reddish brown SANDSTONE. Partially weathered: Reduced strength, closer fracture spacing, patchy orangish brown discolouration on fracture surfaces.		
					5						Discontinuities:		
10.00											1. 0-20 degree joints at 8.15m, 8.30m, 8.35m and 8.45m, planar, rough, patchy orangish brown staining on joint surfaces.		
		81	78	73							2. 5-15 degree bedding fractures at 7.95m and 8.55m, smooth, planar.		
					NI						3. 80-85 degree joint from 8.40-8.55, undulating, rough, patchy orangish brown staining on joint surface.		
11.50											Strong (locally medium strong) thinly to medium bedded light brownish grey fine to medium grained moderately well cemented SANDSTONE. Slightly weathered: Slightly closer fracture spacing, patchy orangish brown discolouration on fracture surfaces.		
											Discontinuities:		
12.00	C8										1. 5-25 degree bedding fractures, medium spaced (20/245/800), planar, predominantly smooth, patchy orangish brown staining on fracture surfaces.		
		100	100	93							2. 20-35 degree joints at 14.65m, 15.40m, 19.50m, planar, smooth, patchy orangish brown staining on fracture surfaces.		
					3						3. 85-90 degree joints from 8.75-8.85m, 9.80-10.65m and 11.85-12.05m, planar to undulating, rough, orangish brown staining on fracture surfaces.		
13.00											*8.70-8.75m: Very weak fine grained poorly cemented greenish brown sandstone recovered as sandy slightly clayey angular fine to coarse gravel.*		
											11.00-11.05m: Extremely weak greenish brown mudstone recovered as sandy clayey fine to coarse gravel.		
		83	83	68									
14.50													
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
2.50	200
20.50	127

Core Barrel: SK6L

Flush Type: Polymer

Termination Reason: Terminated at scheduled depth

Last Updated: 13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-13100
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Rotary Drilling	Comacchio 405	1.20	2.50
Rotary Coring	Comacchio 405	2.50	25.00

Coordinates: 582259.33 E, 677128.21 N

Final Depth: 25.00 m | Start Date: 20/09/2022 | Driller: MW

Elevation: 50.50 mOD | End Date: 23/09/2022 | Logger: CM

Sheet 3 of 4 | Scale: 1:40 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
		92	92	88							Strong (locally medium strong) thinly to medium bedded light brownish grey fine to medium grained moderately well cemented SANDSTONE. Slightly weathered: Slightly closer fracture spacing, patchy orangish brown discolouration on fracture surfaces. Discontinuities: 1. 5-25 degree bedding fractures, medium spaced (20/245/800), planar, predominantly smooth, patchy orangish brown staining on fracture surfaces. 2. 20-35 degree joints at 14.65m, 15.40m, 19.50m, planar, smooth, patchy orangish brown staining on fracture surfaces. 3. 85-90 degree joints from 8.75-8.85m, 9.80-10.65m and 11.85-12.05m, planar to undulating, rough, orangish brown staining on fracture surfaces.		
16.00		100	90	81	NI						*16.60-16.70m: Very weak thinly laminated greenish brown mudstone recovered as slightly sandy slightly clayey angular fine to coarse gravel.*		
17.50		97	93	83	6								
19.00		45	45	38	AZCL								
20.50		0	0	0	NR								
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
2.50	200
20.50	127

Core Barrel: SK6L

Flush Type: Polymer

Termination Reason: Terminated at scheduled depth

Last Updated: 13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-13100
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Rotary Drilling	Comacchio 405	1.20	2.50
Rotary Coring	Comacchio 405	2.50	25.00

Coordinates: 582259.33 E, 677128.21 N

Final Depth: 25.00 m | Start Date: 20/09/2022 | Driller: MW

Elevation: 50.50 mOD | End Date: 23/09/2022 | Logger: CM

Sheet 4 of 4 | Scale: 1:40 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
22.00													
		65	54	49	3			27.75	22.75		Strong (locally medium strong) thinly to medium bedded light brownish grey fine to medium grained moderately well cemented SANDSTONE. Slightly weathered: Slightly closer fracture spacing, patchy orangish brown discolouration on fracture surfaces. Discontinuities: 1. 5-25 degree bedding fractures, medium spaced (20/245/800), planar, predominantly smooth, patchy orangish brown staining on fracture surfaces. 2. 20-35 degree joints at 14.65m, 15.40m, 19.50m, planar, smooth, patchy orangish brown staining on fracture surfaces. 3. 85-90 degree joints from 8.75-8.85m, 9.80-10.65m and 11.85-12.05m, planar to undulating, rough, orangish brown staining on fracture surfaces.		
					NI								
23.00													
					AZCL								
		43	34	15	12						Moderately weak indistinctly thinly to thickly laminated reddish brown fine grained moderately well cemented SANDSTONE. Partially weathered: Reduced strength, slightly closer fracture spacing, patchy orangish brown discolouration on fracture surfaces. Discontinuities: 1. 5-25 degree joints, closely spaced (40/65/130), planar, rough, orangish brown staining on joint surfaces.		
					AZCL								
25.00								25.50	25.00		End of Borehole at 25.00m		
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
2.50	200
20.50	127

Core Barrel: SK6L

Flush Type: Polymer

Termination Reason: Terminated at scheduled depth

Last Updated: 13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-13431
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2500	1.20	4.50
Rotary Coring	Beretta T44	4.50	10.00

Coordinates: 582264.05 E, 677438.26 N

Final Depth:	10.00 m	Start Date:	27/07/2022	Driller:	RW +MW	Sheet 1 of 2
Elevation:	54.02 mOD	End Date:	08/09/2022	Logger:	TH	Scale: 1:50
						FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
								TOPSOIL		
0.40 - 0.90	B5				53.62	0.40		Firm greyish brown slightly gravelly sandy CLAY with pockets of bluish grey clay. Sand is fine to coarse. Gravel is angular fine to medium of various lithologies.		
0.90 - 2.00	B6									
1.20	D1				52.82	1.20		Dense reddish brown sandy slightly clayey angular fine to coarse GRAVEL of various lithologies with high cobble content. Sand is fine to coarse. Cobbles are subangular.		
1.20 - 1.65	SPT (S)	N=50 (10,5/11,20,9,10) Hammer SN = 1410	1.20							
2.00 - 3.00	B7									
2.00 - 2.45	SPT (C)	N=50 (5,20/8,22,10,10) Hammer SN = 1410	2.00							
2.20	D2									
3.00 - 3.90	B8									
3.00 - 3.45	SPT (C)	N=43 (9,11/16,9,9,9) Hammer SN = 1410	3.00							
3.20	D3									
3.90 - 4.40	B9				50.12	3.90		Very stiff brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is angular fine to coarse of various lithologies. Cobbles are subangular.		
4.00 - 4.08	SPT (C)	N=50 (25 for 40mm/50 for 35mm) Hammer SN = 1410	4.00							
4.20	D4				49.62	4.40		Grey angular coarse GRAVEL of various lithologies.		
4.40 - 4.50	B10	63			49.52	4.50 (0.30)		Very stiff reddish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies.		
					49.22	4.80 (0.60)		Reddish brown and dark grey COBBLES of mudstone, limestone and sandstone with some gravel. Gravel is subangular fine to coarse of mudstone and limestone.		
		AZCL			48.62	5.40		Stiff to very stiff light brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse of predominantly limestone. (Where No Recovery "NR" - descriptions based on flush returns)		
6.00			6.30					*5.50m to 9.70m: Material scrubbed/washed out with drilling*		
6.00 - 6.45	SPT(C) N=18 (2,3/3,5,5,5) Hammer SN = 1385	0								
7.50		NR	7.50			(4.30)				
7.50 - 7.95	SPT(C) N=39 (4,11/10,10,9,10) Hammer SN = 1385	0								
9.00			9.00							
		TCR / SCR / RQD / FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
4.40	4.50	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
4.50	200
10.00	127

Water Added

From (m)	To (m)
1.20	3.50

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-13431
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2500	1.20	4.50
Rotary Coring	Beretta T44	4.50	10.00

Coordinates: 582264.05 E, 677438.26 N

Final Depth:	10.00 m	Start Date:	27/07/2022	Driller:	RW +MW	Sheet 2 of 2
Elevation:	54.02 mOD	End Date:	08/09/2022	Logger:	TH	Scale: 1:50
						FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
9.00 - 9.45	SPT(C) N=20 (1,3/3,5,6,6) Hammer SN = 1385	30			AZCL			44.32	9.70 (0.30)		Stiff to very stiff light brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse of predominantly limestone. (Where No Recovery "NR" - descriptions based on flush returns)		
10.00						10.0		44.02	10.00		Light brown and reddish brown COBBLES of mudstone and sandstone.		
10.00 - 10.43	SPT(C) N=50 (7,7/50 for 280mm) Hammer SN = 1385										End of Borehole at 10.00m		
		TCR	SCR	RQD	FI								

9.5 10.0 10.5 11.0 11.5 12.0 12.5 13.0 13.5 14.0 14.5 15.0 15.5 16.0 16.5 17.0 17.5 18.0 18.5

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
4.40	4.50	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
4.50	200
10.00	127

Water Added

From (m)	To (m)
1.20	3.50

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-13990

Client: Irish Water

Client's Rep: Mott MacDonald

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	
Cable Percussion	Dando 2500	1.20	7.20	582508.94 E
				677918.14 N

Final Depth: 7.20 m **Start Date:** 17/08/2022 **Driller:** RW

Elevation: 53.66 mOD **End Date:** 18/08/2022 **Logger:** TH

Sheet 1 of 1
Scale: 1:40
FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.30 - 1.20	B1				53.36	0.30		TOPSOIL		
1.20	D9				52.46	1.20		Soft dark greyish brown slightly gravelly very sandy CLAY. Sand is fine to coarse. Gravel is angular fine to coarse of various lithologies.		
1.20 - 2.00	B2									
1.20 - 1.65	SPT (C)	N=9 (2,1/2,2,3,2) Hammer SN = 1410	1.20	Dry				Firm brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies. Cobbles are angular.		
2.00 - 3.00	B3				51.66	2.00				
2.00 - 2.45	SPT (C)	N=34 (3,5/5,7,12,10) Hammer SN = 1410	2.00	0.50				Dense greyish brown very sandy clayey subangular fine to coarse GRAVEL of various lithologies with low cobble content. Sand is fine to coarse. Cobbles are subangular of limestone.		
2.20	D10									
3.00 - 4.00	B4									
3.00 - 3.45	SPT (C)	N=16 (2,2/2,2,6,6) Hammer SN = 1410	3.00	1.70						
3.20	D11									
4.00 - 4.40	U7	Ublow=100 0% Recovery	4.00	3.20	49.66	4.00		Dense becoming very dense greyish brown very sandy clayey subangular fine to coarse GRAVEL of various lithologies with medium cobble content. Sand is fine to coarse. Cobbles are subangular of limestone.		
4.00 - 5.00	B5									
4.20	D12									
5.00 - 6.00	B6									
5.00 - 5.45	SPT (C)	N=38 (7,9/9,8,10,11) Hammer SN = 1410	5.00	4.50						
5.20	D13									
6.00 - 7.20	B8									
6.00 - 6.45	SPT (C)	N=40 (10,14/9,9,10,12) Hammer SN = 1410	6.00	3.70						
6.20	D14									
7.00 - 7.12	SPT (C)	N=50 (25 for 35mm/50 for 80mm) Hammer SN = 1410	7.00	4.50						
7.20	D15				46.46	7.20		End of Borehole at 7.20m		

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter
7.20	200

Water Added

From (m)	To (m)
1.20	7.00

Chiselling Details

From (m)	To (m)	Time (hh:mm)
7.20	7.20	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Termination Reason

Terminated on instruction of Engineer

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-14170
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2500	1.20	4.60
Rotary Drilling	Comacchio 405	4.60	5.60
Rotary Coring	Comacchio 405	5.60	9.65

Coordinates: 582646.40 E, 678023.56 N

Final Depth:	Start Date:	Driller:	Sheet 1 of 2
9.65 m	16/08/2022	RC+RW	Scale: 1:50
Elevation: 51.08 mOD	**End Date:** 24/08/2022	**Logger:** TH	FINAL

Depth (m)	Sample / Tests	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
												TOPSOIL		
0.50 - 1.20	B1								50.58	0.50		Firm dark grey slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies.		
1.20	D5													
1.20 - 1.60	U9	Ublow=56 30% Recovery					1.20	Dry						
1.20 - 2.80	B2													
2.00 - 2.45	SPT (C)	N=11 (2,3/3,2,3,3) Hammer SN = 1410					2.00	1.00						
2.20	D6													
2.80 - 4.00	B3								48.28	2.80		Firm becoming stiff greyish brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is angular fine to coarse of various lithologies. Cobbles are subangular.		
3.00 - 3.40	U10	Ublow=100 0% Recovery					3.00	1.60						
3.20	D7													
4.00 - 4.50	B4													
4.00 - 4.31	SPT (C)	N=50 (6,10/50 for 159mm) Hammer SN = 1410					4.00	3.20						
4.10	D11									4.60				
4.10 - 4.55	SPT (S)	N=49 (5,7/8,12,16,13) Hammer SN = 1368					4.10	Dry	46.48			Very stiff greyish brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular fine to coarse of various lithologies.		
4.20	D8													
5.60	D12						5.60	Dry	45.48	5.60		Very stiff reddish brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular fine to coarse of sandstone.		
5.60 - 6.05	SPT(S) N=48 (3,4/9,13,13,13) Hammer SN = 1368	43				AZCL				(1.05)		*5.60-6.20m: AZCL disturbance due to SPT*		
6.65							6.65	6.20	44.43	6.65		Very dense dark and light grey subangular fine to coarse GRAVEL with low cobble content. Gravel is of limestone and sandstone. Cobbles are of sandstone. (Where No Recovery "NR" - descriptions based on flush returns)		
6.65	D13													
6.65 - 7.10	SPT(S) N=50 (5,10/11,12,14,13) Hammer SN = 1368	47				AZCL								
7.40		0				NR				(2.25)		*7.00-8.90m: AZCL granular material scrubbed out with drilling fluid*		
8.15							8.15	6.20						
8.15	D14													
8.15 - 8.45	SPT(S) N=50 (8,16/50 for 150mm) Hammer SN = 1368	0												
8.90									42.18	8.90		Very stiff light brown thinly laminated slightly sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is subrounded fine to medium.		
8.90 - 9.65	C1	80								(0.75)				

Water Strikes			
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details		
From (m)	To (m)	Time (hh:mm)
4.50	4.60	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details	
To (m)	Diam (mm)
4.60	200
5.60	190
9.65	146

Water Added	
From (m)	To (m)
1.20	4.00

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-14170
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2500	1.20	4.60
Rotary Drilling	Comacchio 405	4.60	5.60
Rotary Coring	Comacchio 405	5.60	9.65

Coordinates: 582646.40 E, 678023.56 N

Final Depth:	9.65 m	Start Date:	16/08/2022	Driller:	RC+RW	Sheet 2 of 2
Elevation:	51.08 mOD	End Date:	24/08/2022	Logger:	TH	Scale: 1:50
						FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
9.65						9.65	6.20	41.43	9.65		Very stiff light brown thinly laminated slightly sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is subrounded fine to medium.		
9.65	D15										End of Borehole at 9.65m		
9.65 - 10.10	SPT(S) N=46 (3,8/46 for 303mm) Hammer SN = 1368												
		TCR	SCR	RQD	FI								

9.5 10.0 10.5 11.0 11.5 12.0 12.5 13.0 13.5 14.0 14.5 15.0 15.5 16.0 16.5 17.0 17.5 18.0 18.5

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)
4.60	200
5.60	190
9.65	146

Water Added

From (m)	To (m)
1.20	4.00

Chiselling Details

From (m)	To (m)	Time (hh:mm)
4.50	4.60	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-14357

Client: Irish Water

Client's Rep: Mott MacDonald

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2500	1.20	7.30

Coordinates: 582759.90 E, 678184.12 N

Final Depth: 7.30 m | **Start Date:** 17/08/2022 | **Driller:** RW

Elevation: 55.73 mOD | **End Date:** 17/08/2022 | **Logger:** TH

Sheet 1 of 1 | Scale: 1:40 | FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Description
0.40 - 1.20	B1				55.33	0.40	TOPSOIL
1.20 - 2.00	B2						Firm brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies. Cobbles are angular.
1.20 - 1.65	SPT (C)	N=9 (2,2/3,2,2,2) Hammer SN = 1410	1.20	Dry			
2.00 - 3.00	B3				53.73	2.00	Medium dense dark greyish brown very sandy slightly clayey subangular fine to coarse GRAVEL of various lithologies. Sand is fine to coarse.
2.00 - 2.45	SPT (C)	N=21 (3,3/6,5,4,6) Hammer SN = 1410	2.00	1.60			
3.00 - 4.00	B4				52.73	3.00	Medium dense becoming dense grey sandy clayey angular fine to coarse GRAVEL of various lithologies. Sand is fine to coarse.
3.00 - 3.45	SPT (C)	N=23 (2,3/3,6,8,6) Hammer SN = 1410	3.00	1.70			
4.00 - 5.00	B5						
4.00 - 4.45	SPT (C)	N=27 (8,11/10,8,5,4) Hammer SN = 1410	4.00	3.20			
5.00 - 6.00	B6						
5.00 - 5.45	SPT (C)	N=37 (3,5/7,7,12,11) Hammer SN = 1410	5.00	3.80			
6.00 - 6.60	B7				49.73	6.00	Dense dark grey sandy clayey subangular fine to coarse GRAVEL of limestone with medium cobble content. Sand is fine to coarse.
6.00 - 6.31	SPT (C)	N=50 (4,6/50 for 160mm) Hammer SN = 1410	6.00	4.30			
6.60 - 7.30	B8						
7.00 - 7.42	SPT (C)	N=50 (6,8/50 for 275mm) Hammer SN = 1410	7.00	5.40			
					48.43	7.30	End of Borehole at 7.30m

Water | Backfill

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
7.30	7.30	01:00

Casing Details

To (m)	Diameter
7.30	200

Water Added

From (m)	To (m)
1.20	6.00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Termination Reason

Terminated on instruction on Engineer

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-16037
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Cable Percussion	Dando 2500	0.00	0.80	583374.36 E 679690.04 N

Final Depth:	Start Date:	Driller:	Sheet 1 of 1
0.80 m	20/07/2022	RW	Scale: 1:40
Elevation: 47.22 mOD	**End Date:** 20/07/2022	**Logger:** JAC	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.50 - 0.80	B1				46.72	0.50		TOPSOIL		
					46.42	0.80		Stiff light greyish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of various lithologies.		
								End of Borehole at 0.80m		

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter

Water Added

From (m)	To (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
0.80	0.90	01:00

Remarks

Hand dug inspection pit excavated to 0.80m
Rebore attempted at BH-16037A
No groundwater encountered

Termination Reason

Terminated on refusal of SPT on large cobble/boulder and 1 hour of chiselling.

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-16037A
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2500	1.20	1.70
Rotary Drilling	Comacchio 405	1.70	2.60
Rotary Coring	Comacchio 405	2.60	9.65

Coordinates: 583370.27 E, 679690.97 N

Final Depth:	9.65 m	Start Date:	20/07/2022	Driller:	RW+RC	Sheet 1 of 2
Elevation:	47.35 mOD	End Date:	30/08/2022	Logger:	JAC+CM	Scale: 1:50
						FINAL

Depth (m)	Sample / Tests	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
												TOPSOIL		
0.40 - 1.00	B1								46.95	0.40		Stiff greyish brown slightly gravelly CLAY with low cobble content. Gravel is subangular to subrounded fine to coarse of various lithologies.		
1.00 - 1.70	B2								46.35	1.00		Very dense grey sandy slightly silty subangular to subrounded fine to coarse GRAVEL of various lithologies with low cobble content. Sand is fine to coarse.		
1.20	D3													
1.20 - 1.34	SPT (C)	N=50 (25 for 70mm/50 for 65mm) Hammer SN = 1410							45.65	1.70		Stiff brown sandy CLAY. Sand is fine to coarse.		
2.60	D4						2.60	Dry	44.75	2.60		Low recovery: Stiff becoming very stiff brownish grey slightly sandy very gravelly CLAY with high cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of sandstone and black limestone. Cobbles are subangular of sandstone and black limestone. (Fines washed out with flush) (Where No Recovery "NR" - descriptions based on flush returns)		
2.60 - 3.05	SPT(S) N=25 (3,3/3,6,6,10) Hammer SN = 1368	40												
3.65							2.60	2.20						
3.65	D5													
3.65 - 4.10	SPT(S) N=47 (1,3/10,11,11,15) Hammer SN = 1368	0				NR								
4.40		45												
5.15							2.60	2.20						
5.15	D6													
5.15 - 5.60	SPT(S) N=45 (3,9/10,11,11,13) Hammer SN = 1368	20												
5.90		45								(7.05)				
6.65							2.60	2.20						
6.65	D7													
6.65 - 7.10	SPT(S) N=47 (3,6/9,12,12,14) Hammer SN = 1368	20												
7.40		45												
8.15							2.60	2.20						
8.15	D8													
8.15 - 8.60	SPT(S) N=43 (4,7/8,11,12,12) Hammer SN = 1368	0				NR								
8.90		0												

Water Strikes			
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details	
To (m)	Diam (mm)
1.70	200
2.60	190
9.65	146

Water Added	
From (m)	To (m)
1.00	1.70

Chiselling Details		
From (m)	To (m)	Time (hh:mm)
1.70	1.70	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
Rebore of BH-16037; virtual refusal on large cobble/boulder at 0.80m
No groundwater encountered

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-16037A
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2500	1.20	1.70
Rotary Drilling	Comacchio 405	1.70	2.60
Rotary Coring	Comacchio 405	2.60	9.65

Coordinates: 583370.27 E, 679690.97 N

Final Depth:	9.65 m	Start Date:	20/07/2022	Driller:	RW+RC	Sheet 2 of 2
Elevation:	47.35 mOD	End Date:	30/08/2022	Logger:	JAC+CM	Scale: 1:50
						FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
9.65						2.60	2.20	37.70	9.65		Low recovery: Stiff becoming very stiff brownish grey slightly sandy very gravelly CLAY with high cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of sandstone and black limestone. Cobbles are subangular of sandstone and black limestone. (Fines washed out with flush) (Where No Recovery "NR" - descriptions based on flush returns)		
9.65 - 10.10	SPT(S) N=49 (4,4/9,13,13,14) Hammer SN = 1368												
9.95	D9										End of Borehole at 9.65m		

TCR	SCR	RQD	FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
1.70	1.70	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
Rebore of BH-16037; virtual refusal on large cobble/boulder at 0.80m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
1.70	200
2.60	190
9.65	146

Water Added

From (m)	To (m)
1.00	1.70

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-16430
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2500	1.20	3.70
Rotary Coring	Beretta T44	3.70	9.70

Coordinates: 583367.94 E, 680065.93 N

Final Depth: 9.70 m | Start Date: 21/07/2022 | Driller: RW+PJ | Sheet 1 of 2 | Scale: 1:50

Elevation: 45.66 mOD | End Date: 15/09/2022 | Logger: JAC+TH | FINAL

Depth (m)	Sample / Tests	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
												TOPSOIL		
0.30 - 0.90	B1								45.36	0.30		Firm grey sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.		
0.90 - 1.50	B2								44.76	0.90		Firm to stiff brown sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.		
1.20	D6													
1.20 - 1.65	SPT (C)	N=13 (3,2/3,3,3,4) Hammer SN = 1410					1.20	0.40						
1.50 - 3.00	B3													
2.00 - 2.45	SPT (C)	N=17 (4,5/6,3,5,3) Hammer SN = 1410					2.00	1.00						
2.20	D7													
3.00 - 4.40	B4								42.66	3.00		Dense greyish brown fine to coarse SAND and subangular to subrounded fine to coarse GRAVEL with low cobble and boulder content.		
3.00 - 3.45	SPT (C)	N=41 (3,6/8,7,12,14) Hammer SN = 1410					3.00	1.50						
3.20	D8													
3.70 - 3.80	C1								41.96	3.70 (0.40)		Very stiff greyish brown slightly sandy gravelly slightly silty CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse.		
4.00 - 4.18	SPT(S) N=50 (25 for 90mm/50 for 90mm) Hammer SN = 1410		90	61	53	7	4.00	3.40	41.56	4.10		Strong (locally medium strong) massive greyish black fossiliferous LIMESTONE. Slightly weathered: slightly closer fracture spacing, patchy orangish brown discolouration on some fracture surfaces. Discontinuities: 1. 0-15 degree joints, medium spaced (30/215/420), slightly undulating, rough, patchy dark orangish brown staining on some joints surfaces. 2. 25-35 degree joints, at 6.75m and 7.95m, undulating, rough. 3. 80-90 degree joints, at 4.15-4.30m and 5.15-5.35m, planar, rough.		
4.20	D9													
4.40 - 4.50	B5													
4.40 - 4.65	C2													
4.65 - 4.75	C3													
4.75	C4													
5.20			100	100	91									
6.70										(5.60)				
6.95 - 7.30	C5		100	98	95	5								
8.20			100	97	91									

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)
4.50	200

Water Added

From (m)	To (m)
1.20	4.00

Chiselling Details

From (m)	To (m)	Time (hh:mm)
4.40	4.50	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-16430
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2500	1.20	3.70
Rotary Coring	Beretta T44	3.70	9.70

Coordinates: 583367.94 E, 680065.93 N

Final Depth:	9.70 m	Start Date:	21/07/2022	Driller:	RW+PJ	Sheet 2 of 2
Elevation:	45.66 mOD	End Date:	15/09/2022	Logger:	JAC+TH	Scale: 1:50
						FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
9.70								35.96	9.70		Strong (locally medium strong) massive greyish black fossiliferous LIMESTONE. Slightly weathered: slightly closer fracture spacing, patchy orangish brown discolouration on some fracture surfaces. Discontinuities: 1. 0-15 degree joints, medium spaced (30/215/420), slightly undulating, rough, patchy dark orangish brown staining on some joints surfaces. 2. 25-35 degree joints, at 6.75m and 7.95m, undulating, rough. 3. 80-90 degree joints, at 4.15-4.30m and 5.15-5.35m, planar, rough. End of Borehole at 9.70m		

TCR	SCR	RQD	FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)
4.50	200

Water Added

From (m)	To (m)
1.20	4.00

Chiselling Details

From (m)	To (m)	Time (hh:mm)
4.40	4.50	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-16610

Client: Irish Water

Client's Rep: Mott MacDonald

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2500	1.20	1.30

Coordinates: 583370.90 E, 680247.91 N

Final Depth: 1.30 m | **Start Date:** 20/07/2022 | **Driller:** RW

Elevation: 46.81 mOD | **End Date:** 21/07/2022 | **Logger:** JAC

Sheet 1 of 1 | Scale: 1:40 | FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
					46.41	0.40		TOPSOIL		
								Firm brown slightly sandy CLAY. Sand is fine.		
1.00 - 1.20	B1				45.81	1.00		Dense grey clayey angular fine to coarse GRAVEL		
1.20	D2									
1.20 - 1.30	SPT (C)	N=50 (25 for 35mm/50 for 60mm) Hammer SN = 1410			45.51	1.30		End of Borehole at 1.30m		

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter

Water Added

From (m)	To (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
1.20	1.20	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
Rebore attempted at BH-16610A
No groundwater encountered.

Termination Reason

Terminated on refusal of SPT on large cobble/possible boulder and 1 hour of chiselling.

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-16610A

Client: Irish Water

Client's Rep: Mott MacDonald

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2500	1.20	2.20
Rotary Coring	Beretta T44	2.20	9.70

Coordinates: 583374.07 E, 680247.65 N

Final Depth: 9.70 m | **Start Date:** 21/07/2022 | **Driller:** RW+PJ | Sheet 1 of 2 | Scale: 1:50

Elevation: 46.81 mOD | **End Date:** 14/09/2022 | **Logger:** JAC+TH | FINAL

Depth (m)	Sample / Tests	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
												TOPSOIL		
0.40 - 0.90	B1								46.41	0.40		Firm brown slightly sandy CLAY. Sand is fine to coarse.		
0.90 - 2.20	B2								45.91	0.90		Very stiff greyish brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular.		
1.20	D3													
1.20 - 1.57	SPT (C)	N=50 (3,7/50 for 220mm) Hammer SN = 1410												
2.00 - 2.12	SPT (C)	N=50 (25 for 50mm/50 for 70mm) Hammer SN = 1410					2.00	Dry						
2.20	D4		20						44.61	2.20		Dense becoming very dense grey angular fine to coarse GRAVEL of limestone with low cobble content. Cobbles are subangular of limestone.		
3.70														
3.70 - 4.15	SPT(C) N=50 (3,8/10,12,13,15) Hammer SN = 1385		30							(3.80)				
5.20														
5.20 - 5.62	SPT(C) N=50 (4,9/50 for 275mm) Hammer SN = 1385		87											
									40.81	6.00		Dark grey COBBLES of limestone with occasional boulders. Boulders are of limestone.		
6.70										(1.30)		6.70-7.30m: AZCL material scrubbed out with drilling		
6.70 - 7.15	SPT(C) N=38 (6,12/6,8,10,14) Hammer SN = 1385		60	33	33	AZCL								
									39.51	7.30		Possible weathered LIMESTONE recovered as: Dark grey angular fine to coarse gravel.		
										(0.35)				
7.65 - 7.75	C1								39.16	7.65		Medium strong massive dark grey LIMESTONE. Slightly weathered: slightly reduced strength, closer fracture spacing, orangish brown discolouration and some clay infill. Discontinuities: 1. 0-10 degree joints, medium spaced (60/255/230), planar, rough, orangish brown staining on joint surface. 2. ~25 degree joint, at 8.00m, planar, rough, orangish brown staining, and grey and orangish brown slightly sandy slightly silty clay infill (up to 20mm thick) on joint surface. 3. 80-90 degree joint, at 8.10-8.70m, slightly undulating, rough, patchy orangish brown staining on joint surface.		
7.75	C2													
8.20			80	80	66	5				(2.05)				
9.20 - 9.40	C3													

Water Strikes			
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details		
From (m)	To (m)	Time (hh:mm)
0.10	2.20	

Casing Details	
To (m)	Diam (mm)
2.20	200
9.70	150

Water Added	
From (m)	To (m)

Remarks

Hand dug inspection pit excavated to 1.20m
Rebore of BH-16610; virtual refusal on large cobble/possible boulder at 1.20m
No groundwater encountered

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-16610A
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2500	1.20	2.20
Rotary Coring	Beretta T44	2.20	9.70

Coordinates: 583374.07 E, 680247.65 N

Final Depth: 9.70 m | Start Date: 21/07/2022 | Driller: RW+PJ

Elevation: 46.81 mOD | End Date: 14/09/2022 | Logger: JAC+TH

Sheet 2 of 2 | Scale: 1:50 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
9.70								37.11	9.70		Medium strong massive dark grey LIMESTONE. Slightly weathered: slightly reduced strength, closer fracture spacing, orangish brown discolouration and some clay infill. Discontinuities: 1. 0-10 degree joints, medium spaced (60/255/230), planar, rough, orangish brown staining on joint surface. 2. ~25 degree joint, at 8.00m, planar, rough, orangish brown staining, and grey and orangish brown slightly sandy slightly silty clay infill (up to 20mm thick) on joint surface. 3. 80-90 degree joint, at 8.10-8.70m, slightly undulating, rough, patchy orangish brown staining on joint surface. End of Borehole at 9.70m		

TCR	SCR	RQD	FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
0.10	2.20	

Remarks

Hand dug inspection pit excavated to 1.20m
Rebore of BH-16610; virtual refusal on large cobble/possible boulder at 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
2.20	200
9.70	150

Water Added

From (m)	To (m)

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-17401
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	1.60
Rotary Drilling	Beretta T44	1.60	2.20
Rotary Coring	Beretta T44	2.20	9.70

Coordinates: 583605.57 E, 680979.78 N

Final Depth:	9.70 m	Start Date:	14/09/2022	Driller:	PJ+CB
Elevation:	47.28 mOD	End Date:	19/09/2022	Logger:	NP

Sheet 1 of 2
Scale: 1:50
FINAL

Depth (m)	Sample / Tests	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.00 - 1.20	B1								47.08	0.20		TOPSOIL		
												Soft to firm brown mottled orangish brown slightly sandy CLAY. Sand is fine to medium.		
1.00	D3													
1.20 - 1.60	B2								45.88	1.40				
1.20 - 1.65	SPT (S)	N=14 (4,4/3,4,4,3) Hammer SN = 1411					1.20	Dry				Firm greyish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium.		
1.60	D4													
2.20 - 2.65	SPT(C) N=28 (2,5/6,6,7,9) Hammer SN = 1385					AZCL	2.20		45.08	2.20		Stiff grey slightly sandy slightly gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of limestone. Cobbles are of limestone.		
2.70	C1											2.20-2.70m: AZCL disturbance due to SPT		
2.80 - 3.30	C2		67							(1.50)				
3.70							3.70		43.58	3.70				
3.70 - 4.70	C3									(0.25)				
3.70 - 4.15	SPT(C) N=45 (4,7/9,11,11,14) Hammer SN = 1385		87						43.33	3.95		Dense grey slightly sandy clayey subangular fine to coarse GRAVEL of limestone with medium cobble content. Sand is fine to coarse. Cobbles are of limestone.		
												Dense grey subangular fine to coarse GRAVEL of limestone with high cobble content. Cobbles are subangular.		
										(1.25)				
5.20							5.20		42.08	5.20				
5.20 - 5.54	SPT(C) N=50 (10,15/50 for 185mm) Hammer SN = 1385		82	43	39					(0.50)		Dense grey gravelly clayey fine to coarse SAND with low cobble content. Gravel is subangular fine to coarse of limestone. Cobbles are subangular of limestone.		
6.05	C4								41.58	5.70		Medium strong (locally strong) dark grey LIMESTONE thinly interbedded with thinly laminated black calcareous MUDSTONE with numerous fossils. Slightly weathered: closer fracture spacing. Discontinuities: 1. 5-15 degree bedding fractures, medium spaced (70/400/660), slightly undulating, rough. 2. ~40 degree joint, at 6..05-6.12m, undulating, rough. 3. ~70 degree joint, at 7.75-7.85m, undulating, smooth.		
6.35 - 6.55	C5													
6.55 - 6.70	C6													
6.70			100	100	83	3				(4.00)				
7.95 - 8.10	C7													
8.10 - 8.20	C8													
8.20			100	100	100									

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
2.20	200
9.70	150

Water Added

From (m)	To (m)

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-17401
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	1.60
Rotary Drilling	Beretta T44	1.60	2.20
Rotary Coring	Beretta T44	2.20	9.70

Coordinates: 583605.57 E, 680979.78 N

Final Depth: 9.70 m | Start Date: 14/09/2022 | Driller: PJ+CB

Elevation: 47.28 mOD | End Date: 19/09/2022 | Logger: NP

Sheet 2 of 2 | Scale: 1:50 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
9.70								37.58	9.70		Medium strong (locally strong) dark grey LIMESTONE thinly interbedded with thinly laminated black calcareous MUDSTONE with numerous fossils. Slightly weathered: closer fracture spacing. Discontinuities: 1. 5-15 degree bedding fractures, medium spaced (70/400/660), slightly undulating, rough. 2. ~40 degree joint, at 6..05-6.12m, undulating, rough. 3. ~70 degree joint, at 7.75-7.85m, undulating, smooth. End of Borehole at 9.70m		

TCR	SCR	RQD	FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)
2.20	200
9.70	150

Water Added

From (m)	To (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-17806
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Rotary Drilling	Comacchio 405	1.20	2.60
Rotary Coring	Comacchio 405	2.60	10.00

Coordinates: 583540.25 E, 681389.34 N

Final Depth: 10.00 m | Start Date: 01/09/2022 | Driller: RC

Elevation: 48.36 mOD | End Date: 02/09/2022 | Logger: TH

Sheet 1 of 2
Scale: 1:40
FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
								48.06	0.30		TOPSOIL		
1.20 - 1.65	SPT(S) N=44 (4,10/7,11,13,13) Hammer SN = 1368					0.00	Dry				Stiff to very stiff brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.		
2.60	C1					2.60	Dry	45.76	2.60				
2.60 - 2.75	SPT(S) N=50 (25 for 75mm/50 for 75mm) Hammer SN = 1368	100	90	60	8						Medium strong (locally moderately weak) very thinly to thinly interbedded dark grey LIMESTONE and thinly laminated black calcareous MUDSTONE with many fossils. Slightly weathered: slightly reduced strength, slightly closer fracture spacing. Discontinuities: 1. 10 to 20 degree bedding fractures closely spaced (50/140/520) slightly undulating rough. 2. ~30 degree joints at 2.60m to 2.65m and 4.30m to 4.35m, planar, rough.		
2.70 - 2.80	C1												
2.90 - 3.00	C3												
3.10	C4												
3.45 - 3.60	C5												
3.65													
4.10 - 4.25	C6	100	100	70									
4.75 - 4.90	C7												
5.15								43.01	5.35				
6.10 - 6.25	C8	100	100	86	5						Strong (locally medium strong) very thinly interbedded dark grey LIMESTONE and black calcareous MUDSTONE with many fossils. Slightly weathered: slightly closer fracture spacing. Discontinuities: 1. 0 to 20 degree bedding fractures, medium spaced (20/275/900) slightly undulating, rough. 2. ~20 degree joint at 7.65m to 7.70m, planar rough. 3. ~45 degree joint, at 6.65m to 6.75m, planar, rough, greyish black clay film on joint surface. 4. 80 to 90 degree joint, at 7.95m to 8.45m, slightly undulating, smooth.		
6.65					2								
		TCR	SCR	RQD	FI								

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
2.60	190
10.00	146

Core Barrel

SK6L

Flush Type

Polymer

Termination Reason

Terminated at scheduled depth

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-17806
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Rotary Drilling	Comacchio 405	1.20	2.60
Rotary Coring	Comacchio 405	2.60	10.00

Coordinates: 583540.25 E, 681389.34 N

Final Depth: 10.00 m | Start Date: 01/09/2022 | Driller: RC

Elevation: 48.36 mOD | End Date: 02/09/2022 | Logger: TH

Sheet 2 of 2 | Scale: 1:40 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
		100	100	90							Strong (locally medium strong) very thinly interbedded dark grey LIMESTONE and black calcareous MUDSTONE with many fossils. Slightly weathered: slightly closer fracture spacing. Discontinuities: 1. 0 to 20 degree bedding fractures, medium spaced (20/275/900) slightly undulating, rough. 2. ~20 degree joint at 7.65m to 7.70m, planar rough. 3. ~45 degree joint, at 6.65m to 6.75m, planar, rough, greyish black clay film on joint surface. 4. 80 to 90 degree joint, at 7.95m to 8.45m, slightly undulating, smooth.		
8.15		93	93	80	4								
9.65		57	57	57									
10.00								38.36	10.00		End of Borehole at 10.00m		
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)
2.60	190
10.00	146

Core Barrel: SK6L

Flush Type: Polymer

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Termination Reason: Terminated at scheduled depth

Last Updated: 13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-18231
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	
Cable Percussion	Dando 2000	1.20	1.30	583763.31 E
				681745.42 N

Final Depth:	1.30 m	Start Date:	13/07/2022	Driller:	CB	Sheet 1 of 1
Elevation:	49.42 mOD	End Date:	13/07/2022	Logger:	NH	Scale: 1:40
						FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.20 - 1.20	B1				49.22	0.20		TOPSOIL		
1.00	D2							Stiff greyish brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.		
1.30 - 1.32	SPT (C)	N=50 (25 for 10mm/50 for 15mm) Hammer SN = 1411			48.12	1.30		End of Borehole at 1.30m		

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter

Water Added

From (m)	To (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
1.20	1.30	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
Rebore attempted at BH-18231A
No groundwater encountered

Termination Reason

Terminated on refusal of SPT on boulder and 1 hour of chiselling.

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-18231A
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	0.60	583770.39 E 681749.41 N

Final Depth:	Start Date:	Driller:	Sheet 1 of 1
0.60 m	14/07/2022	CB	Scale: 1:40
Elevation: 49.17 mOD	**End Date:** 14/07/2022	**Logger:** NH	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
					48.97	0.20		TOPSOIL		
								Stiff brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.		
					48.57	0.60		End of Borehole at 0.60m		

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter

Water Added

From (m)	To (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)

Remarks

Hand dug inspection pit excavated to 0.60m
Rebore of BH-18231; Refusal on boulder a 1.30m
Rebore attempted at BH-18231B
No groundwater encountered

Termination Reason

Terminated on refusal of SPT on boulder and 1 hour of chiselling.

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-18231B
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	0.80	
Rotary Drilling	Comacchio 405	0.80	2.50	583776.34 E
Rotary Coring	Comacchio 405	2.50	10.00	681755.20 N

Final Depth:	10.00 m	Start Date:	14/07/2022	Driller:	CB +M +MW	Sheet 1 of 2 Scale: 1:50
Elevation:	48.81 mOD	End Date:	18/09/2022	Logger:	NH+CM	FINAL

Depth (m)	Sample / Tests	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
									48.61	0.20		TOPSOIL		
												Stiff brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.		
									48.01	0.80		Highly weathered grey LIMESTONE recovered as: Brown and grey angular to subangular fine to coarse GRAVEL of limestone with high cobble content. Cobbles are subangular of limestone.		
3.00	C1		87							(3.45)				
4.00									44.56	4.25		Medium strong (locally strong) grey and cream coloured LIMESTONE with pervasive cream coloured calcite veining/mineralisation throughout. Moderately weathered: reduced strength, closer fracture spacing, abundant karstic voids, orangish brown discolouration on fracture surfaces and within karstic voids.		
4.90 - 5.05	C2		100	81	60									
5.30 - 5.45	C3											Discontinuities:		
5.50												1. 0-20 degree joints, closely spaced (40/115/220), planar, rough, orangish brown staining on joint surfaces.		
5.50 - 5.65	C4		100	96	47	10				(4.25)		2. 70-90 degree joints from 4.00-4.35m, 4.35-4.65m, 5.00-5.10m and 6.10-6.25m, planar to undulating, rough, orangish brown staining on joint surfaces.		
6.80 - 7.00	C5													
7.00			82	82	60									
8.50			81	81	81	3			40.31	8.50		Strong light grey LIMESTONE with occasional white calcite veins (up to 30mm thick). Slightly weathered: patchy orangish brown discolouration on fracture surfaces.		
										(1.50)		Discontinuities:		
												1. 0-20 degree joints at 8.35m, 8.60m and 9.45m, planar, rough, patchy orangish brown discolouration on joint surfaces.		

Water Strikes				Chiselling Details			Remarks
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm)	Hand dug inspection pit excavated to 0.80m Rebore of BH-18231A; refusal on boulder a 0.60m No groundwater encountered.

Casing Details		Water Added	
To (m)	Diam (mm)	From (m)	To (m)
2.50	200		
10.00	150		

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-18231B
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	0.80
Rotary Drilling	Comacchio 405	0.80	2.50
Rotary Coring	Comacchio 405	2.50	10.00

Coordinates: 583776.34 E, 681755.20 N

Final Depth:	10.00 m	Start Date:	14/07/2022	Driller:	CB +M +MW	Sheet 2 of 2
Elevation:	48.81 mOD	End Date:	18/09/2022	Logger:	NH+CM	Scale: 1:50
						FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
10.00								38.81	10.00		Strong light grey LIMESTONE with occasional white calcite veins (up to 30mm thick). Slightly weathered: patchy orangish brown discolouration on fracture surfaces. Discontinuities: 1. 0-20 degree joints at 8.35m, 8.60m and 9.45m, planar, rough, patchy orangish brown discolouration on joint surfaces. End of Borehole at 10.00m		

TCR	SCR	RQD	FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)
2.50	200
10.00	150

Water Added

From (m)	To (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)

Remarks

Hand dug inspection pit excavated to 0.80m
Rebore of BH-18231A; refusal on boulder a 0.60m
No groundwater encountered.

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-18440
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	
Cable Percussion	Dando 2500	1.20	4.10	583875.56 E
Rotary Coring	Comacchio 405	4.10	25.00	681920.30 N

Final Depth:	25.00 m	Start Date:	15/08/2022	Driller:	RC+RW	Sheet 1 of 3
Elevation:	46.79 mOD	End Date:	16/09/2022	Logger:	CM	Scale: 1:50
						FINAL

Depth (m)	Sample / Tests	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
												TOPSOIL		
0.40 - 0.80	B1								46.38	0.40		Firm brown sandy silty CLAY. Sand is fine to medium.		
0.80 - 1.20	B2								45.98	0.80		Firm greyish brown mottled orangish brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.		
1.20	D8													
1.20 - 1.40	B3								45.38	1.40		Very stiff brownish grey slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is angular fine to coarse.		
1.20 - 1.60	U7	Ublow=50 90% Recovery					1.20	Dry						
1.40 - 3.00	B4													
2.00 - 2.45	SPT (C)	N=36 (4,10/10,12,7,7) Hammer SN = 1410					2.00	1.50						
2.20	D9													
3.00 - 3.80	B5													
3.00 - 3.30	SPT (C)	N=50 (25 for 75mm/50 for 230mm) Hammer SN = 1410					3.00	2.50						
3.20	D10													
3.80 - 4.40	B6								42.98	3.80		Dark grey slightly sandy angular fine to coarse GRAVEL of limestone.		
4.00 - 4.40	SPT(C) N=50 (10,10/50 for 255mm) Hammer SN = 1410		0			NR	2.60	Dry	42.68	4.10		Very stiff brown and grey slightly sandy gravelly CLAY with high cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of predominantly limestone and sandstone. Cobbles are subangular of various lithologies including limestone and granite. (Where No Recovery "NR" - descriptions based on flush returns)		
4.10 - 4.55	SPT(S) N=8 (1,3/2,2,2,2) Hammer SN = 1368													
4.20	D11					AZCL	4.10	3.25						
5.15										(2.65)				
5.15 - 5.60	SPT(S) N=49 (3,3/12,12,12,13) Hammer SN = 1368		33									Moderately weak (locally medium strong) light grey LIMESTONE. Moderately weathered: karstic voids throughout the rock, reduced strength, closer fracture spacing, orangish brown discolouration on fracture surfaces and within karstic voids.		
5.90			67									Discontinuities:		
6.65							4.10	3.25				1. 0-15 degree bedding fractures, closely spaced (30/145/330), planar, rough, orangish brown staining on fracture surfaces.		
6.65 - 6.95	SPT(S) N=50 (8,8/50 for 150mm) Hammer SN = 1368		100	68	68				40.03	6.75		2. 70-90 degree joint from 7.10-7.25m, planar, rough.		
7.20 - 7.40	C1											Medium strong light grey LIMESTONE. Moderately weathered: karstic voids throughout the rock, reduced strength, much closer fracture spacing, orangish brown staining penetrating on and penetrating in from fracture surfaces and karstic voids.		
7.40														
7.40	C2											Discontinuities:		
7.75 - 7.95	C3		100	100	100	9				(2.20)		1. 0-15 degree bedding fractures, closely spaced (15/85/140), planar, rough, orangish brown staining on and penetrating in from fracture surfaces.		
8.15														
			100	85	43				37.84	8.95		2. 70-90 degree joints from 9.00-9.25m, 9.45-9.55, 9.70-9.90m, 10.05-10.30m, 10.55-10.95m and 11.05-11.15m, planar, rough, orangish brown staining on and penetrating in from joint surfaces.		

Water Strikes			
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details		
From (m)	To (m)	Time (hh:mm)
4.40	4.40	01:00

Casing Details	
To (m)	Diam (mm)
4.40	200

Water Added	
From (m)	To (m)
1.20	4.00

Remarks

Hand dug inspection pit excavated to 1.20m
Falling Head Test at 4.00-4.40m
No groundwater encountered

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-18440
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2500	1.20	4.10
Rotary Coring	Comacchio 405	4.10	25.00

Coordinates: 583875.56 E, 681920.30 N

Final Depth: 25.00 m | Start Date: 15/08/2022 | Driller: RC+RW | Elevation: 46.79 mOD | End Date: 16/09/2022 | Logger: CM

Sheet 2 of 3 | Scale: 1:50 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
9.65		100	53	24	14			35.64	(2.20)		Medium strong light grey LIMESTONE. Moderately weathered: karstic voids throughout the rock, reduced strength, much closer fracture spacing, orangish brown staining penetrating on and penetrating in from fracture surfaces and karstic voids. Discontinuities: 1. 0-15 degree bedding fractures, closely spaced (15/85/140), planar, rough, orangish brown staining on and penetrating in from fracture surfaces. 2. 70-90 degree joints from 9.00-9.25m, 9.45-9.55, 9.70-9.90m, 10.05-10.30m, 10.55-10.95m and 11.05-11.15m, planar, rough, orangish brown staining on and penetrating in from joint surfaces.		
10.85 - 11.00	C4												
11.15		85	29	21							Stiff brown slightly sandy gravelly CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is subangular fine to coarse of limestone. Cobbles and boulders are of limestone (Possible fault gouge/ breccia or infilled void).		
12.65									(2.80)				
13.00 - 14.15	C5	91	11	0									
13.40		84	21	21									
14.15								32.84	13.95		Medium strong reddish brown LIMESTONE. Moderately weathered: closer fracture spacing, some karstic voids, reduced strength, orangish brown discolouration on fracture surfaces and in karstic voids. Discontinuities: 1. 0-20 degree bedding fractures, closely spaced (50/130/390), rough, planar, orangish brown staining on fracture surfaces. 2. 50-70 degree joints from 13.95-14.05m, 14.15-14.25m, 14.35-14.45m, 14.55-14.65m and 15.70-15.85m, rough, planar, orangish brown staining on joint surfaces.		
14.70 - 14.80	C6	67	50	31	9				(1.90)				
15.65		100	88	57				30.94	15.85		*15.15-15.65m: AZCL (Possibly due to rock recovered as gravel being washed out with flush or due to large karstic void).* Strong becoming medium strong grey and light grey LIMESTONE. Moderately weathered: reduced strength, closer fracture spacing, intense karstification throughout the rock and orangish brown discolouration on fracture surfaces and karstic voids. Discontinuities: 1. 0-15 degree bedding fractures, closely spaced (40/115/280), planar, rough, orangish brown staining on fracture surfaces. 2. 40-55 degree joints from 16.65-16.75m and 17.95-18.05m, planar, rough, orangish brown discolouration on joint surfaces. 3. 70-90 degree joints from 17.75-17.90m, 18.25-18.50m, 18.30-18.65m and 18.70-18.85m, planar, rough, orangish brown staining on joint surfaces.		
16.40		100	100	52									
17.15		100	69	35	11				(3.00)				
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
4.40	4.40	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
Falling Head Test at 4.00-4.40m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
4.40	200

Water Added

From (m)	To (m)
1.20	4.00

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-18440
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2500	1.20	4.10
Rotary Coring	Comacchio 405	4.10	25.00

Coordinates: 583875.56 E, 681920.30 N

Final Depth: 25.00 m | **Start Date:** 15/08/2022 | **Driller:** RC+RW | Sheet 3 of 3 | Scale: 1:50

Elevation: 46.79 mOD | **End Date:** 16/09/2022 | **Logger:** CM | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
18.65								27.94	18.85		Strong becoming medium strong grey and light grey LIMESTONE. Moderately weathered: reduced strength, closer fracture spacing, intense karstification throughout the rock and orangish brown discolouration on fracture surfaces and karstic voids. Discontinuities: 1. 0-15 degree bedding fractures, closely spaced (40/115/280), planar, rough, orangish brown staining on fracture surfaces. 2. 40-55 degree joints from 16.65-16.75m and 17.95-18.05m, planar, rough, orangish brown discolouration on joint surfaces. 3. 70-90 degree joints from 17.75-17.90m, 18.25-18.50m, 18.30-18.65m and 18.70-18.85m, planar, rough, orangish brown staining on joint surfaces.		
		78	58	44	11								
20.15													
		100	81	53	AZCL								
21.65									(6.15)		Strong light greyish brown LIMESTONE. Slightly weathered: slightly reduced strength, slightly closer fracture spacing, some karstic voids, orangish brown staining on fracture surfaces and karstic voids. Discontinuities: 1. 0-20 degree bedding fractures, closely spaced (60/135/200), planar, rough, orangish brown staining on fracture surfaces. 2. 55-75 degree joints from 19.20-19.40m, 19.50-19.65m, 20.30-20.55m, 22.40-22.60m, 22.60-22.70m and 24.50-24.65m, planar, rough, orangish brown discolouration on joint surfaces. 3. 30-40 degree joints from 23.70-23.85m, 24.00-24.10m and 24.65-24.75m, planar, rough, orangish brown discolouration on joint surfaces.		
		80	64	64	11								
22.40													
		56	40	32	AZCL								
23.15													
		80	65	65	10								
23.90													
		100	100	92									
24.65													
		60	60	60	AZCL								
25.00								21.78	25.00		End of Borehole at 25.00m		
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
4.40	4.40	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
Falling Head Test at 4.00-4.40m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
4.40	200

Water Added

From (m)	To (m)
1.20	4.00

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-18804
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	2.20
Rotary Drilling	Comacchio 405	2.20	2.60
Rotary Coring	Comacchio 405	2.60	10.00

Coordinates: 584168.28 E, 682126.16 N

Final Depth:	10.00 m	Start Date:	14/07/2022	Driller:	CB+RC	Sheet 1 of 2
Elevation:	45.35 mOD	End Date:	18/09/2022	Logger:	NH+TH	Scale: 1:50
						FINAL

Depth (m)	Sample / Tests	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.20 - 1.20	B1								45.04	0.30		TOPSOIL		
												Firm brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.		
									44.54	0.80		Stiff light brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium.		
1.00	D3													
1.20 - 2.00	B2													
1.20 - 1.65	SPT (S)	N=15 (3,4/3,4,4,4) Hammer SN = 1411					0.00	Dry						
									43.34	2.00		BOULDER		
2.05 - 2.08	SPT (C)	N=50 (25 for 15mm/50 for 10mm) Hammer SN = 1411							43.14	2.20		Stiff brown sandy CLAY. Sand is fine to coarse.		
2.60 - 3.05	SPT(S) N=35 (4,4/7,9,12,7) Hammer SN = 1368		20				2.60	Dry	42.74	2.60		Weathered LIMESTONE recovered as: Dense grey and dark grey subangular medium to coarse gravel with low cobble content. Cobbles are subrounded.		
3.65							2.60	1.40		(1.40)				
3.65 - 3.95	SPT(S) N=50 (3,9/50 for 150mm) Hammer SN = 1368								41.34	4.00		Medium strong (locally strong) massive grey LIMESTONE. Slightly weathered: slightly closer fracture spacing, patchy orangish brown discolouration on some fracture surfaces. Discontinuities: 1. 0-20 degree joints, closely spaced (20/175/310), planar, rough. 2. 30-40 degree joints, at 5.65-5.75m and 6.70-6.75m, planar, rough, patchy grey calcite mineralisation on joint surfaces. 3. 80-90 degree joint, at 4.00-4.40m, planar, rough, orangish brown staining n joint surface.		
4.35 - 4.45	C1		87	64	45									
4.45 - 4.75	C2													
4.80	C3													
5.15			100	100	73	7				(3.00)				
6.65									38.34	7.00		Strong massive dark grey LIMESTONE. Slightly weathered: grey and dark orangish brown discolouration on some fracture surfaces. Discontinuities: 1. 0-20 degree joints, closely spaced (60/175/300), planar, smooth to rough, patchy greyish white calcite mineralisation on some joint surfaces. 2.80-90 degree joint, at 7.15-7.55m, planar, rough, dark orangish brown staining on joint surface.		
7.45 - 7.60	C4		100	96	81	5				(1.75)				
8.15														
			93	91	91				36.60	8.75		Strong massive grey LIMESTONE. Unweathered. Discontinuities: 1. 0-10 degree joints, medium spaced (40/310/320), planar, smooth to rough.		

Water Strikes			
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details		
From (m)	To (m)	Time (hh:mm)
2.00	2.05	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details	
To (m)	Diam (mm)
2.20	200
2.60	177
10.00	146

Water Added	
From (m)	To (m)

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-18804
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	2.20
Rotary Drilling	Comacchio 405	2.20	2.60
Rotary Coring	Comacchio 405	2.60	10.00

Coordinates: 584168.28 E, 682126.16 N

Final Depth: 10.00 m | Start Date: 14/07/2022 | Driller: CB+RC | Sheet 2 of 2 | Scale: 1:50

Elevation: 45.35 mOD | End Date: 18/09/2022 | Logger: NH+TH | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
9.65					2				(1.25)		Strong massive grey LIMESTONE. Unweathered. Discontinuities: 1. 0-10 degree joints, medium spaced (40/310/320), planar, smooth to rough.		
10.00		43	43	43				35.34	10.00		End of Borehole at 10.00m		

TCR	SCR	RQD	FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
2.00	2.05	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
2.20	200
2.60	177
10.00	146

Water Added

From (m)	To (m)

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-19057
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	0.40	584359.56 E 682293.68 N

Final Depth:	Start Date:	Driller:	Sheet 1 of 1
0.40 m	14/07/2022	CB	Scale: 1:40
Elevation: 38.41 mOD	**End Date:** 14/07/2022	**Logger:** NH	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
					38.31	0.10		TOPSOIL		
								Firm grey sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.		
					38.01	0.40		End of Borehole at 0.40m		

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter

Water Added

From (m)	To (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)

Remarks

Hand dug inspection pit excavated to 0.40m
Rebore attempted at BH-19057A
No groundwater encountered

Termination Reason

Terminated on virtual refusal on large cobble.

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

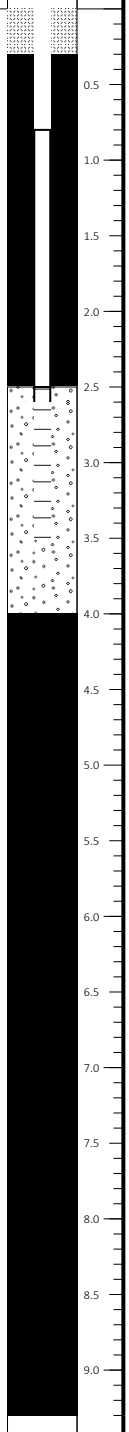
Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-19057A
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	0.80	
Rotary Drilling	Comacchio 405	0.80	2.60	584363.76 E
Rotary Coring	Comacchio 405	2.60	10.00	682295.15 N

Final Depth: 10.00 m	Start Date: 14/07/2022	Driller: CB+RC	Sheet 1 of 2
			Scale: 1:50
Elevation: 38.55 mOD	End Date: 17/09/2022	Logger: NH+TH	FINAL

Depth (m)	Sample / Tests	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description
									38.35	0.20		TOPSOIL Firm grey slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.
2.60 - 3.05	SPT(S) N=32 (3,3/7,7,7,11) Hammer SN = 1368	13				AZCL	2.60	Dry	35.95	2.60		Weathered LIMESTONE recovered as: Dense dark grey angular fine to coarse gravel of limestone. *2.60-3.50m: AZCL disturbance due to SPT/material scrubbed out with drilling*
3.65							2.60	1.20	34.80	(1.15) 3.75		
3.65 - 3.95	SPT(S) N=50 (3,8/50 for 150mm) Hammer SN = 1368											
3.95 - 4.10	C1	100	85	64	11							Medium strong (locally strong) massive light grey LIMESTONE. Slightly weathered: slightly reduced strength, closer fracture spacing, orangish brown discolouration. Discontinuities: 1. 10-15 degree joints, closely spaced (50/155/150), planar, rough, patchy orangish brown staining on some joint surfaces. 2. 30-45 degree joints, medium spaced (25/330/400), planar, rough, orangish brown staining on joint surfaces. 3. 70-90 degree joints, at 4.35-4.75m and 5.35-5.55m, slightly undulating, rough, patchy orangish brown staining on joint surfaces.
5.00 - 5.15	C2									(2.00)		
5.15	C3											
5.80 - 5.95	C4	100	85	81	8				32.80	5.75		Medium strong (locally strong) massive grey LIMESTONE. Slightly weathered: slightly closer fracture spacing, orangish brown discolouration. Discontinuities: 1. 0-5 degree joints, medium spaced (160/440/600), planar, smooth, some grey reduction. 2. 20-35 degree joints, medium spaced (50/220/240), planar, rough, orangish brown staining on joint surface. 3. 80-90 degree joint, at 6.60-6.75m and 6.95-7.07m, slightly undulating, rough, patchy orangish brown staining on joint surface.
6.15 - 6.30	C5											
6.30 - 6.45	C6											
6.65										(1.75)		
7.25 - 7.35	C7	100	87	63	4				31.05	7.50		Strong massive grey LIMESTONE. Slightly weathered: some orangish brown discolouration. Discontinuities: 1. 0-15 degree joints, widely spaced (140/625/700), planar, smooth, some grey reduction. 2. 20-40 degree joints, medium spaced (80/500/550), planar, rough, orangish brown staining on most joint surfaces. 3.~60 degree joint, at 9.65-9.85m, planar, rough, dark orangish brown staining on joint surface.
8.15		93	91	73						(2.50)		

Water | Backfill



Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)

Casing Details

To (m)	Diam (mm)
2.60	177
10.00	146

Water Added

From (m)	To (m)

Remarks

Hand dug inspection pit excavated to 0.80m
Rebore of BH-19057; refusal on large cobble at 0.40m
No groundwater encountered during drilling
Standpipe installation (response zone 2.50-4.00m)

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-19057A
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	0.80
Rotary Drilling	Comacchio 405	0.80	2.60
Rotary Coring	Comacchio 405	2.60	10.00

Coordinates: 584363.76 E, 682295.15 N

Final Depth: 10.00 m | Start Date: 14/07/2022 | Driller: CB+RC | Elevation: 38.55 mOD | End Date: 17/09/2022 | Logger: NH+TH

Sheet 2 of 2 | Scale: 1:50 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
9.65		80	74	30				28.55	10.00		Strong massive grey LIMESTONE. Slightly weathered: some orangish brown discolouration. Discontinuities: 1. 0-15 degree joints, widely spaced (140/625/700), planar, smooth, some grey reduction. 2. 20-40 degree joints, medium spaced (80/500/550), planar, rough, orangish brown staining on most joint surfaces. 3.~60 degree joint, at 9.65-9.85m, planar, rough, dark orangish brown staining on joint surface. End of Borehole at 10.00m		
10.00													

TCR	SCR	RQD	FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)

Remarks

Hand dug inspection pit excavated to 0.80m
Rebore of BH-19057; refusal on large cobble at 0.40m
No groundwater encountered during drilling
Standpipe installation (response zone 2.50-4.00m)

Casing Details

To (m)	Diam (mm)
2.60	177
10.00	146

Water Added

From (m)	To (m)

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-19407

Client: Irish Water

Client's Rep: Mott MacDonald

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2500	1.20	2.20
Rotary Drilling	Comacchio 405	2.20	2.50
Rotary Coring	Comacchio 405	2.50	10.00

Coordinates: 584679.18 E, 682456.50 N

Final Depth: 10.00 m | **Start Date:** 19/07/2022 | **Driller:** MW +RW | Sheet 1 of 2 | Scale: 1:50

Elevation: 39.61 mOD | **End Date:** 17/09/2022 | **Logger:** NP+JAC | FINAL

Depth (m)	Sample / Tests	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
												TOPSOIL		
0.40 - 0.80	B1								39.21	0.40		Firm brown slightly sandy CLAY. Sand is fine.		
0.80 - 1.10	B2								38.81	0.80		Stiff brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium.		
1.10 - 2.00	B3								38.51	1.10		Dense grey sandy subangular to angular fine to coarse GRAVEL with high cobble content. Sand is fine to coarse. Cobbles are subangular.		
1.20	D5													
1.20 - 1.64	SPT (C)	N=50 (4,6/50 for 285mm) Hammer SN = 1410					1.20	0.90						
2.00 - 2.20	B4													
2.00 - 2.00	SPT (C)	N=50 (25 for 0mm/50 for 0mm) Hammer SN = 1410							37.41	2.20		Weathered grey LIMESTONE (Driller's description)		
2.20	D6								37.11	2.50		Medium strong (locally strong) massive light grey LIMESTONE with occasional fossils. lightly weathered: closer fracture spacing with orangish brown discolouration and brown clay infill. Discontinuities: 1. 5 top 20 degree joints, closely spaced (50/135/250) undulating, rough with orangish brown staining and rare brown clay infill. 2. 30 to 40 degree joints, widely spaced (60/675/1200) undulating, rough with orangsih brown staining on joint surfaces. 3. 75 to 85 degree joints at 2.20m to 2.55m, 2.20m to 2.70m and 5.00m and 5.40m, undulating, rough with patchy brown staining on joint surfaces.		
3.00	C1													
3.10 - 3.55	C2													
3.30	C3		92	60	37									
3.65 - 3.85	C4													
4.00						9				(2.90)				
			100	75	35									
5.50									34.21	5.40		Strong (locally medium strong) massive grey LIMESTONE with fossils. Slightly weathered: slightyl clsoer fracture spaicng with orangish brown discolouration. Discontinuities: 1. 5 to 20 joints medium spaced (90/380/700) undulating, smooth, with orangish brown staining on joint surfaces. 2. ~35 degree joint 6.05m to 6.12m, smooth, with patchy orangish brown staining on joint surface. 3. 70 to 80 degree joints at 5.50m to 5.75m, 7.00m to 7.20m, 7.30m to 7.30m, 7.65m to 8.00m, 8.85m to 9.15m, planar, rough with orangish brown staining on joint surfaces.		
5.50	C5													
5.90 - 6.00	C6													
6.00	C10													
6.30 - 6.40	C7		100	100	65									
6.40	C8													
7.00						4				(4.60)				
			100	100	55									
8.50														
			100	100	65									

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
2.20	2.20	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
2.00	200
2.20	200

Water Added

From (m)	To (m)
1.10	2.00

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-19407
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2500	1.20	2.20
Rotary Drilling	Comacchio 405	2.20	2.50
Rotary Coring	Comacchio 405	2.50	10.00

Coordinates: 584679.18 E, 682456.50 N

Final Depth:	10.00 m	**Start Date:**	19/07/2022	**Driller:**	MW +RW	Sheet 2 of 2	
Elevation:	39.61 mOD	**End Date:**	17/09/2022	**Logger:**	NP+JAC	Scale: 1:50	FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
9.50 - 9.80	C9										Strong (locally medium strong) massive grey LIMESTONE with fossils. Slightly weathered: slightyl clsoer fracture spaicng with orangish brown discolouration. Discontinuities: 1. 5 to 20 joints medium spaced (90/380/700) undulating, smooth, with orangish brown staining on joint surfaces. 2. ~35 degree joint 6.05m to 6.12m, smooth, with patchy orangish brown staining on joint surface. 3. 70 to 80 degree joints at 5.50m to 5.75m, 7.00m to 7.20m, 7.30m to 7.30m, 7.65m to 8.00m, 8.85m to 9.15m, planar, rough with orangish brown staining on joint surfaces.		
10.00								29.61	10.00		End of Borehole at 10.00m		

TCR	SCR	RQD	FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)
2.00	200
2.20	200

Water Added

From (m)	To (m)
1.10	2.00

Chiselling Details

From (m)	To (m)	Time (hh:mm)
2.20	2.20	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-19427

Client: Irish Water

Client's Rep: Mott MacDonald

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2500	1.20	1.70

Coordinates: 584687.30 E, 682474.93 N

Final Depth: 1.70 m | **Start Date:** 19/07/2022 | **Driller:** RW

Elevation: 39.43 mOD | **End Date:** 19/07/2022 | **Logger:** JAC

Sheet 1 of 1 | Scale: 1:40 | FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.00 - 0.90	B1							Brown clayey TOPSOIL.		
					38.93	0.50		Firm greyish brown slightly sandy CLAY. Sand is fine to coarse.		
0.90 - 1.70	B2				38.53	0.90		Very dense greyish brown very sandy very clayey subangular to subrounded fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are subangular.		
1.20	D3									
1.20 - 1.25	SPT (S)	N=50 (25 for 25mm/50 for 30mm) Hammer SN = 1410	1.20	Dry						
					37.73	1.70		End of Borehole at 1.70m		

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter
1.70	200

Water Added

From (m)	To (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
1.70	1.70	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
Rebore attempted at BH-19427A
No groundwater encountered

Termination Reason

Terminated on refusal of SPT on boulder/possible bedrock and 1 hour of chiselling.

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-19427A
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2500	1.20	2.00
Rotary Drilling	Comacchio 405	2.00	2.50
Rotary Coring	Comachio 405	2.50	25.00

Coordinates: 584689.17 E, 682472.23 N

Final Depth:	25.00 m	Start Date:	19/07/2022	Driller:	MW +RW	Sheet 1 of 3 Scale: 1:50
Elevation:	39.34 mOD	End Date:	16/09/2022	Logger:	JAC+TH	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
								Brown clayey TOPSOIL.		
0.50 - 0.90	B1				38.84	0.50		Stiff greyish brown slightly sandy CLAY. Sand is fine.		
0.90 - 1.20	B2									
1.20	D4				38.14	1.20		Dense grey sandy subangular to angular fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are subangular.		
1.20 - 2.00	B3									
1.20 - 1.42	SPT (C)	N=50 (25 for 75mm/50 for 140mm) Hammer SN = 1410	1.20	Dry						
2.00	D5				37.34	2.00		Weathered grey LIMESTONE (Driller's description)		
2.00 - 2.00	SPT (C)	N=50 (25 for 0mm/50 for 0mm) Hammer SN = 1410	2.00	1.20						
2.50	C1				36.84	2.50		Medium strong (locally strong) massive grey LIMESTONE. Slightly weathered: slightly reduced strength, slightly closer fracture spacing, orangish brown discolouration on most fracture surfaces. Discontinuities: 1. 15-25 degree joints, closely spaced (20/180/440), slightly undulating, rough, patchy orangish brown staining on some joint surfaces. 2. 80-90 degree joints, at 2.85-3.05m, 3.50-4.35m and 3.55-3.95m, planar, rough, dark orangish brown staining on joint surfaces.		
2.75 - 2.90	C2									
3.10 - 3.50	C3	TCR 100, SCR 93, RQD 63, FI 7				(1.95)				
3.90	C4									
4.00										
4.05	C6									
4.30	C7				34.89	4.45		Strong massive dark grey LIMESTONE. Slightly weathered: orangish brown discolouration and clay film on most fracture surfaces. Discontinuities: 1. 10-20 degree joints, medium spaced (40/250/475), planar, rough, dark orangish brown staining and clay film on most joint surfaces.		
4.60	C8	TCR 82, SCR 82, RQD 67, FI 4				(1.25)				
5.05	C12									
5.40	C9									
5.50		TCR 100, SCR 90, RQD 85, FI 4			33.64	5.70		Strong (locally medium strong) massive grey LIMESTONE with rare white calcite veins of subvertical orientation, 1-2mm thick. Slightly weathered: slightly reduced strength, slightly closer fracture spacing, dark orangish brown discolouration on most fracture surfaces. Discontinuities: 1. 2-25 degree joints, medium spaced (60/390/680), slightly undulating, rough, dark orangish brown staining on some joint surfaces. 2. 70-80 degree joints, at 5.80-6.10m, 6.50-6.85m, 7.85-8.00m, 8.50-8.75m, 9.45-9.80m, 9.60-10.30m and 11.05-11.40m, planar, rough, dark orangish brown staining on joint surfaces. 3. 85-90 degree joint, at 10.40-10.80m, undulating, rough, dark orangish brown staining on joint surface.		
7.00										
7.35 - 7.75	C10	TCR 100, SCR 95, RQD 90, FI 4				(7.00)				
8.50		TCR 100, SCR 92, RQD 85								

Water Strikes			
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details		
From (m)	To (m)	Time (hh:mm)
2.00	2.00	01:00

Casing Details	
To (m)	Diam (mm)
2.00	200
2.50	200
25.00	150

Water Added	
From (m)	To (m)

Remarks

Hand dug inspection pit excavated to 1.20m
Rebore of BH-19427; virtual refusal on boulder/possible bedrock at 1.70m
No groundwater encountered

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-19427A
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2500	1.20	2.00
Rotary Drilling	Comacchio 405	2.00	2.50
Rotary Coring	Comachio 405	2.50	25.00

Coordinates: 584689.17 E, 682472.23 N

Final Depth: 25.00 m | Start Date: 19/07/2022 | Driller: MW +RW | Sheet 2 of 3 | Scale: 1:50

Elevation: 39.34 mOD | End Date: 16/09/2022 | Logger: JAC+TH | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
					7						Strong (locally medium strong) massive grey LIMESTONE with rare white calcite veins of subvertical orientation, 1-2mm thick. Slightly weathered: slightly reduced strength, slightly closer fracture spacing, dark orangish brown discolouration on most fracture surfaces. Discontinuities: 1. 2-25 degree joints, medium spaced (60/390/680), slightly undulating, rough, dark orangish brown staining on some joint surfaces. 2. 70-80 degree joints, at 5.80-6.10m, 6.50-6.85m, 7.85-8.00m, 8.50-8.75m, 9.45-9.80m, 9.60-10.30m and 11.05-11.40m, planar, rough, dark orangish brown staining on joint surfaces. 3. 85-90 degree joint, at 10.40-10.80m, undulating, rough, dark orangish brown staining on joint surface. *9.45-10.00m: Orangish brown clay infill on ~80 degree joint, up to 3mm thick*		
10.00													
11.00 - 11.15	C11	100	94	90	3								
11.50		100	93	91									
								26.64	12.70		Strong massive grey LIMESTONE with rare white calcite veins of subvertical orientation, 1-10mm thick. Fresh: patchy orangish brown discolouration on some fratcure surfaces. Discontinuities: 1. 10-30 degree joints, medium spaced (40/480/810), planar, smooth. 2. ~70 degree joint, at 14.20-14.45m, planar, rough, patchy orangish brown staining on joint surface.		
13.00		100	100	98									
14.50		98	96	90	2				(5.25)				
16.00		100	100	100							Strong massive grey LIMESTONE with occasional white calcite veins of subvertical orientation, 1-3mm thick. Slightly weathered: slightly closer fracture spacing orangish brown discolouration on most fracture surfaces. Discontinuities: 1. 10-20 degree joints, widely spaced (130/780/1200), planar, rough. 2. ~45 degree joint, at 17.95m, undulating, rough, patchy orangish brown staining on joint surface. 3. 60-70 degree joints, at 18.00-18.35m, 18.50-18.75m, 21.05-21.40m, 22.50-22.80m, 23.75-23.90m, 23.85-24.05m and 24.70-25.00m, planar, rough, dark orangish brown staining on joint surfaces. 4. 80-90 degree joints, at 18.60-19.35m, 19.85-20.40m and 20.25-20.55m, slightly undulating, rough, dark orangish brown staining on joint surfaces.		
17.50		100	100	90				21.39	17.95				
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
2.00	2.00	01:00

Casing Details

To (m)	Diam (mm)
2.00	200
2.50	200
25.00	150

Water Added

From (m)	To (m)

Remarks

Hand dug inspection pit excavated to 1.20m
Rebore of BH-19427; virtual refusal on boulder/possible bedrock at 1.70m
No groundwater encountered

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-19427A
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2500	1.20	2.00
Rotary Drilling	Comacchio 405	2.00	2.50
Rotary Coring	Comachio 405	2.50	25.00

Coordinates: 584689.17 E, 682472.23 N

Final Depth: 25.00 m | **Start Date:** 19/07/2022 | **Driller:** MW +RW | Sheet 3 of 3 | Scale: 1:50

Elevation: 39.34 mOD | **End Date:** 16/09/2022 | **Logger:** JAC+TH | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
19.00											Strong massive grey LIMESTONE with occasional white calcite veins of subvertical orientation, 1-3mm thick. Slightly weathered: slightly closer fracture spacing orangish brown discolouration on most fracture surfaces. Discontinuities: 1. 10-20 degree joints, widely spaced (130/780/1200), planar, rough. 2. ~45 degree joint, at 17.95m, undulating, rough, patchy orangish brown staining on joint surface. 3. 60-70 degree joints, at 18.00-18.35m, 18.50-18.75m, 21.05-21.40m, 22.50-22.80m, 23.75-23.90m, 23.85-24.05m and 24.70-25.00m, planar, rough, dark orangish brown staining on joint surfaces. 4. 80-90 degree joints, at 18.60-19.35m, 19.85-20.40m and 20.25-20.55m, slightly undulating, rough, dark orangish brown staining on joint surfaces.		
		100	89	85									
20.50													
		91	91	85									
					3				(7.05)				
22.00													
		100	98	93									
23.50													
		100	100	92									
25.00								14.34	25.00		End of Borehole at 25.00m		
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
2.00	2.00	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
Rebore of BH-19427; virtual refusal on boulder/possible bedrock at 1.70m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
2.00	200
2.50	200
25.00	150

Water Added

From (m)	To (m)

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-19807

Client: Irish Water

Client's Rep: Mott MacDonald

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Rotary Drilling	Beretta T44	1.20	2.20
Rotary Coring	Beretta T44	2.20	8.20

Coordinates: 584855.35 E, 682807.98 N

Final Depth: 9.70 m | **Start Date:** 20/09/2022 | **Driller:** PJ

Elevation: 51.07 mOD | **End Date:** 21/09/2022 | **Logger:** TH

Sheet 1 of 2
Scale: 1:50
FINAL

Depth (m)	Sample / Tests	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
									50.97	0.10		TOPSOIL Firm brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.		
2.20	C1								48.87	2.20				
2.20 - 2.65	SPT(C) N=27 (4,6/6,7,7,7) Hammer SN = 1385	43			AZCL					(1.20)		Low Recovery: Medium dense grey subangular fine to coarse GRAVEL of limestone with frequent pockets of brown slightly sandy silty CLAY. Sand is fine to coarse. *2.20-3.05m: AZCL disturbance due to SPT*		
3.70									47.67	3.40		Dense grey angular medium to coarse GRAVEL of limestone with medium cobble content. Cobbles are angular of limestone.		
3.70 - 4.15	SPT(C) N=50 (5,5/6,10,14,20) Hammer SN = 1385	80	7	7						(1.00)				
									46.67	4.40				
									46.47	(0.20) 4.60		Weathered LIMESTONE recovered as: Grey angular fine to coarse GRAVEL with pockets of brown slightly sandy CLAY. Sand is fine to coarse.		
5.20												Medium strong (locally strong) massive grey LIMESTONE with occasional white calcite veins of subvertical orientation, 1-10mm thick. Slightly weathered: reduced strength, closer fracture spacing, orangish brown discolouration on fracture surfaces, and orangish brown clay film on some fracture surfaces. Discontinuities: 1. 0-10 degree joints, at 5.80m, 5.97m and 6.30m, planar, rough, orangish brown staining on joint surfaces. 2. 40-50 degree joints, at 5.65m and 7.15m, planar, rough, orangish brown staining on joint surfaces. 3. 75-90 degree joints, medium spaced (50/430/450), slightly undulating, rough, orangish brown staining on joint surfaces, orangish brown clay film on some joint surfaces.		
5.40 - 5.55	C2													
5.55 - 5.70	C3													
5.90 - 6.05	C4	97	80	78	5					(2.60)				
6.25 - 6.40	C5													
6.70														
									43.87	7.20		Medium strong (locally moderately weak) massive grey LIMESTONE with frequent orangish white calcite veins of subvertical orientation, 10-50mm thick. Slightly weathered: reduced strength, closer fracture spacing, orangish brown discolouration. Discontinuities: 1. 0-20 degree joints, medium spaced (250/500/660), slightly undulating, rough, orangish brown staining on joint surfaces. 2. 40-50 degree joints, at 7.25m and 7.30m, planar, rough, orangish brown staining on joint surfaces. 3. 70-90 degree joints, at 7.35-7.70m, 7.75-8.15m, 8.50-9.00m, 8.65-8.90m and 9.45-9.65m, slightly undulating, rough, orangish brown staining on joint surfaces, orangish brown clay film on some joint surfaces.		
7.60 - 7.80	C6	100	65	63										
8.20		100	81	80	5					(2.50)				

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
2.20	200
9.70	150

Water Added

From (m)	To (m)

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-19807
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Rotary Drilling	Beretta T44	1.20	2.20
Rotary Coring	Beretta T44	2.20	8.20

Coordinates: 584855.35 E, 682807.98 N

Final Depth:	9.70 m	Start Date:	20/09/2022	Driller:	PJ
Elevation:	51.07 mOD	End Date:	21/09/2022	Logger:	TH

Sheet 2 of 2
Scale: 1:50
FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
9.70								41.37	9.70		Medium strong (locally moderately weak) massive grey LIMESTONE with frequent orangish white calcite veins of subvertical orientation, 10-50mm thick. Slightly weathered: reduced strength, closer fracture spacing, orangish brown discolouration. Discontinuities: 1. 0-20 degree joints, medium spaced (250/500/660), slightly undulating, rough, orangish brown staining on joint surfaces. 2. 40-50 degree joints, at 7.25m and 7.30m, planar, rough, orangish brown staining on joint surfaces. 3. 70-90 degree joints, at 7.35-7.70m, 7.75-8.15m, 8.50-9.00m, 8.65-8.90m and 9.45-9.65m, slightly undulating, rough, orangish brown staining on joint surfaces, orangish brown clay film on some joint surfaces. End of Borehole at 9.70m		
		TCR	SCR	RQD	FI								

9.5 10.0 10.5 11.0 11.5 12.0 12.5 13.0 13.5 14.0 14.5 15.0 15.5 16.0 16.5 17.0 17.5 18.0 18.5

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
2.20	200
9.70	150

Water Added

From (m)	To (m)

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-20326

Client: Irish Water

Client's Rep: Mott MacDonald

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	
Cable Percussion	Dando 2500	1.20	7.50	585107.39 E
				683258.63 N

Final Depth: 7.50 m **Start Date:** 02/08/2022 **Driller:** BM

Elevation: 42.12 mOD **End Date:** 02/08/2022 **Logger:** TH

Sheet 1 of 2
Scale: 1:40
FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
					42.02	0.10		TOPSOIL		
0.30 - 0.50	B1							Soft dark brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular fine to coarse.		
					41.42	0.70				
0.80 - 1.00	B2							Soft dark brown mottled grey slightly sandy slightly gravelly CLAY with low cobble content and pockets of light grey fine to medium sand. Sand is fine to coarse. Gravel is subangular fine to coarse.		
1.20 - 1.65	SPT (C)	N=21 (2,3/5,9,4,3) Hammer SN = 1386	1.00	Dry	40.92	1.20		Stiff light brown slightly sandy slightly gravelly SILT with low cobble content. Sand is fine to coarse. Gravel is angular fine to medium. Cobbles are angular.		
1.80 - 2.00	B3									
2.00 - 2.20	U9	Ublow=50 0% Recovery Slow water ingress at 2.00m	2.00	1.90	40.12	2.00		Stiff becoming very stiff light brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to medium. Cobbles are angular.		
2.80 - 3.00	B4									
3.00 - 3.45	U10	Ublow=25 80% Recovery	3.00							
3.80 - 4.00	B5									
4.00 - 4.45	SPT (S)	N=33 (4,5/7,7,9,10) Hammer SN = 1386	4.00							
4.80 - 5.00	B6									
5.00 - 5.45	SPT (S)	N=49 (5,6/9,11,14,15) Hammer SN = 1386	5.00							
5.50 - 6.00	B7				36.62	5.50		Very stiff dark greyish brown sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular.		
6.00 - 6.40	U11	Ublow=50 0% Recovery	6.00							
6.50 - 7.00	B8									
7.00 - 7.31	SPT (S)	N=50 (25 for 115mm/50 for 195mm) Hammer SN = 1386	6.00							
					34.82	7.30				

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
2.00	2.00	20	1.90

Chiselling Details

From (m)	To (m)	Time (hh:mm)
7.30	7.50	01:30

Casing Details

To (m)	Diameter
7.50	200

Water Added

From (m)	To (m)

Remarks

Hand dug inspection pit excavated to 1.20m

Termination Reason

Terminated on instruction of Engineer

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-20326
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	
Cable Percussion	Dando 2500	1.20	7.50	585107.39 E
				683258.63 N

Final Depth:	Start Date:	Driller:	Sheet 2 of 2
7.50 m	02/08/2022	BM	Scale: 1:40
Elevation: 42.12 mOD	**End Date:** 02/08/2022	**Logger:** TH	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
					34.62	7.50		Possible BOULDER/BEDROCK		
								End of Borehole at 7.50m		

7.5 8.0 8.5 9.0 9.5 10.0 10.5 11.0 11.5 12.0 12.5 13.0 13.5 14.0 14.5

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
2.00	2.00	20	1.90

Chiselling Details

From (m)	To (m)	Time (hh:mm)
7.30	7.50	01:30

Casing Details

To (m)	Diameter
7.50	200

Water Added

From (m)	To (m)

Remarks

Hand dug inspection pit excavated to 1.20m

Termination Reason

Terminated on instruction of Engineer

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-20655
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	3.60
Rotary Drilling	Comacchio 405	3.60	4.00
Rotary Coring	Comacchio 405	4.00	9.50

Coordinates: 585399.53 E, 683412.41 N

Final Depth:	9.50 m	Start Date:	04/08/2022	Driller:	RS+BM	Sheet 1 of 2
Elevation:	45.26 mOD	End Date:	25/08/2022	Logger:	NP+TH	Scale: 1:50
						FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
					45.06	0.20		TOPSOIL		
0.30 - 0.50	B1							Stiff light grey mottled dark brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to medium.		
0.80 - 1.00	B2									
					44.26	1.00		Very stiff brownish grey slightly gravelly sandy silty CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.		
1.20 - 1.65	U7	Ublow=20 70% Recovery	1.00	Dry						
1.80 - 2.00	B3									
2.00	D5									
2.00 - 2.45	SPT (S)	N=33 (2,2/3,2,11,17) Hammer SN = 1386 Slow seepage at 2.50m	2.00	Dry					▼	
2.80 - 3.00	B4				42.46	2.80				
3.00	D6				42.36	2.90		Very stiff grey sandy CLAY. Sand is fine.		
3.00 - 3.38	SPT (S)	N=50 (10,7/50 for 225mm) Hammer SN = 1386	3.00	2.40				Weathered LIMESTONE recovered as: Dense grey angular coarse gravel.		
4.30 - 4.50	C1	TCR 90, SCR 70, RQD 60, FI NI			40.96	4.30		Strong (locally medium strong) massive grey LIMESTONE with frequent orangish white subvertical calcite veins. Moderately weathered: slightly reduced strength, closer fracture spacing with orangish brown discolouration. Discontinuities: 1. 0 to 20 degree joints medium spaced (25/250/450) undulating, smooth with orangish brown staining on some joint surfaces. 2. 30 to 40 degree joints at 4.45m to 4.50m, 6.90m to 6.95m and 8.30m to 8.35m, undulating smooth with orangish brown staining on 4.45m to 4.50m joint surface. 3. 65 to 75 degree joints at 5.35m to 5.45m and 7.10m to 7.20m, undulating rough with orangish brown staining on 5.35m to5.45m joint surface. 4. 85 degree joint at 9.30m to 9.50m, undulating, rough with patchy orangish brown staining on joint surface.		
4.50	C2									
4.75	C3									
5.00		TCR 100, SCR 93, RQD 63, FI 8								
6.50										
6.50 - 7.00	C4					(5.20)				
		TCR 100, SCR 100, RQD 56								
8.00										
		TCR 100, SCR 100, RQD 72, FI 3								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
2.50	2.50	20	2.40

Chiselling Details

From (m)	To (m)	Time (hh:mm)
3.30	3.60	02:00

Casing Details

To (m)	Diam (mm)
4.00	200
9.50	150

Water Added

From (m)	To (m)

Remarks

Hand dug inspection pit excavated to 1.20m

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-20655
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	3.60
Rotary Drilling	Comacchio 405	3.60	4.00
Rotary Coring	Comacchio 405	4.00	9.50

Coordinates: 585399.53 E, 683412.41 N

Final Depth:	9.50 m	Start Date:	04/08/2022	Driller:	RS+BM	Sheet 2 of 2
Elevation:	45.26 mOD	End Date:	25/08/2022	Logger:	NP+TH	Scale: 1:50
						FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
9.50								35.76	9.50		Strong (locally medium strong) massive grey LIMESTONE with frequent orangish white subvertical calcite veins. Moderately weathered: slightly reduced strength, closer fracture spacing with orangish brown discolouration. Discontinuities: 1. 0 to 20 degree joints medium spaced (25/250/450) undulating, smooth with orangish brown staining on some joint surfaces. 2. 30 to 40 degree joints at 4.45m to 4.50m, 6.90m to 6.95m and 8.30m to 8.35m, undulating smooth with orangish brown staining on 4.45m to 4.50m joint surface. 3. 65 to 75 degree joints at 5.35m to 5.45m and 7.10m to 7.20m, undulating rough with orangish brown staining on 5.35m to5.45m joint surface. 4. 85 degree joint at 9.30m to 9.50m, undulating, rough with patchy orangish brown staining on joint surface. End of Borehole at 9.50m		
		TCR	SCR	RQD	FI								

9.5 10.0 10.5 11.0 11.5 12.0 12.5 13.0 13.5 14.0 14.5 15.0 15.5 16.0 16.5 17.0 17.5 18.0 18.5

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
2.50	2.50	20	2.40

Chiselling Details

From (m)	To (m)	Time (hh:mm)
3.30	3.60	02:00

Remarks

Hand dug inspection pit excavated to 1.20m

Casing Details

To (m)	Diam (mm)
4.00	200
9.50	150

Water Added

From (m)	To (m)

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-20939
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2500	1.20	3.20
Rotary Drilling	Beretta T44	3.20	4.20
Rotary Coring	Beretta T44	4.20	7.20

Coordinates: 585500.44 E, 683678.03 N

Final Depth:	10.20 m	Start Date:	09/08/2022	Driller:	MW +RW	Sheet 1 of 2
Elevation:	55.82 mOD	End Date:	31/08/2022	Logger:	TH	Scale: 1:50
						FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
								TOPSOIL		
0.40 - 1.20	B1				55.42	0.40		Firm dark brown slightly sandy very gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.		
1.20	D4									
1.20 - 2.00	B2									
1.20 - 1.65	SPT (C)	N=12 (3,1/2,2,3,5) Hammer SN = 1410	1.20	0.70						
2.00 - 3.00	B3				53.82	2.00				
2.00 - 2.45	SPT (C)	N=18 (8,9/4,5,4,5) Hammer SN = 1410	2.00	1.60				Stiff greyish brown slightly sandy very gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is angular fine to coarse. Cobbles are subangular.		
2.20	D5									
3.00 - 3.10	SPT (C)	N=50 (25 for 60mm/50 for 35mm) Hammer SN = 1410	3.00	1.80						
3.20	D6				52.62	3.20		No recovery: Medium dense to dense grey SAND and GRAVEL. (Driller's description, based on flush returns)		
4.20 - 4.65	SPT(C) N=28 (3,5/7,7,7,7) Hammer SN = 0643	0	4.20	Dry						
5.70		NR	5.70	Dry		(7.00)				
5.70 - 6.15	SPT(C) N=34 (10,12/6,8,9,11) Hammer SN = 0643	0								
			7.20	Dry						
7.20 - 7.65	SPT (C)	N=37 (4,6/7,9,9,12) Hammer SN = 0643	7.20	Dry						
7.20										
8.70 - 8.96	SPT (C)	N=50 (25 for 115mm/50 for 145mm) Hammer SN = 0643	8.70	Dry						

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
2.80	3.20	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
Unable to advance Geobore and recover granular material. Used symmetrix to advance borehole to scheduled depth.
No groundwater encountered

Casing Details

To (m)	Diam (mm)
3.20	200
4.20	200
7.20	150
10.10	200

Water Added

From (m)	To (m)
0.60	3.00

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-20939
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2500	1.20	3.20
Rotary Drilling	Beretta T44	3.20	4.20
Rotary Coring	Beretta T44	4.20	7.20

Coordinates: 585500.44 E, 683678.03 N

Final Depth:	10.20 m	Start Date:	09/08/2022	Driller:	MW +RW	Sheet 2 of 2
Elevation:	55.82 mOD	End Date:	31/08/2022	Logger:	TH	Scale: 1:50
						FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
10.20 - 10.65	SPT (C)	N=43 (7,7/10,9,11,13) Hammer SN = 0643	10.2	Dry	45.62	10.20		End of Borehole at 10.20m		

9.5 10.0 10.5 11.0 11.5 12.0 12.5 13.0 13.5 14.0 14.5 15.0 15.5 16.0 16.5 17.0 17.5 18.0 18.5

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)
3.20	200
4.20	200
7.20	150
10.10	200

Water Added

From (m)	To (m)
0.60	3.00

Remarks

Hand dug inspection pit excavated to 1.20m
Unable to advance Geobore and recover granular material. Used symmetrix to advance borehole to scheduled depth.
No groundwater encountered

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-22776
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	
Cable Percussion	Dando 2000	1.20	2.70	586484.09 E
Rotary Coring	Beretta T44	2.70	10.00	685061.71 N

Final Depth:	10.00 m	Start Date:	04/08/2022	Driller:	BM +MW	Sheet 1 of 2
Elevation:	67.43 mOD	End Date:	02/09/2022	Logger:	TH	Scale: 1:50
						FINAL

Depth (m)	Sample / Tests	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
												TOPSOIL		
0.30 - 0.50	B1								67.13	0.30		Stiff becoming very stiff greyish brown slightly gravelly very sandy CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.		
0.80 - 1.00	B2													
1.20	D5													
1.20 - 1.65	SPT (C)	N=25 (3,4/6,6,6,7) Hammer SN = 1386						Dry						
1.80 - 2.00	B3													
2.00	D6													
2.00 - 2.31	SPT (C)	N=50 (5,7/50 for 160mm) Hammer SN = 1386						Dry						
2.40 - 2.70	B4								65.03	2.40		Very stiff grey sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is angular fine to coarse. Cobbles are angular.		
2.70 - 2.80	C1							Dry	64.73	2.70		Strong (locally medium strong) massive dark grey LIMESTONE. Slightly weathered: closer fracture spacing, light brown discolouration and clay infill on some fracture surfaces. Discontinuities: 1. 0-20 degree joints, closely spaced (50/150/450), planar, rough, grey reduction on some joint surfaces. 2. 30-50 degree joints, medium spaced (80/380/700), planar, smooth, light brown clay infill on some joint surfaces, up to 20mm thick. 3. 70-90 degree joints, at 3.95-4.20m, 4.30-4.44m, 4.50-4.65m and 5.55-5.80m, undulating, rough, patchy light orangish brown staining on some joint surfaces.		
2.70 - 2.72	SPT(C) N=50 (25 for 10mm/50 for 10mm) Hammer SN = 1386		65	40	30									
2.80 - 3.00	C2													
3.70														
3.80 - 3.95	C3		100	72	50	10				(3.45)				
4.80 - 4.95	C4													
5.05 - 5.20	C5													
5.20			98	74	47									
6.20 - 6.40	C6								61.28	6.15		Strong massive dark grey LIMESTONE. Slightly weathered: slightly closer fracture spacing, patchy orangish brown discolouration and clay infill on some fracture surfaces. Discontinuities: 1. 0-10 degree joint, at 6.45m, planar, smooth. 2. 30-50 joints, medium spaced (120/430/1200), planar, smooth, faint and patchy light orangish brown discolouration on some joint surfaces. 3. 60-70 degree joints, widely spaced (80/640/500), planar, smooth, patchy light orangish brown staining an clay film on most joint surfaces.		
6.70			93	93	91	3				(3.85)				
8.20			95	82	73									

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
2.40	2.70	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
2.40	200
10.00	150

Water Added

From (m)	To (m)

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-22776
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	2.70
Rotary Coring	Beretta T44	2.70	10.00

Coordinates: 586484.09 E, 685061.71 N

Final Depth: 10.00 m | Start Date: 04/08/2022 | Driller: BM +MW | Sheet 2 of 2 | Scale: 1:50

Elevation: 67.43 mOD | End Date: 02/09/2022 | Logger: TH | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
9.70					6						Strong massive dark grey LIMESTONE. Slightly weathered: slightly closer fracture spacing, patchy orangish brown discolouration and clay infill on some fracture surfaces. Discontinuities: 1. 0-10 degree joint, at 6.45m, planar, smooth. 2. 30-50 joints, medium spaced (120/430/1200), planar, smooth, faint and patchy light orangish brown discolouration on some joint surfaces. 3. 60-70 degree joints, widely spaced (80/640/500), planar, smooth, patchy light orangish brown staining an clay film on most joint surfaces.		
10.00		100	67	67				57.43	10.00		End of Borehole at 10.00m		
		TCR	SCR	RQD	FI								

Water Strikes			
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details		
From (m)	To (m)	Time (hh:mm)
2.40	2.70	01:00

Casing Details	
To (m)	Diam (mm)
2.40	200
10.00	150

Water Added	
From (m)	To (m)

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-23514

Client: Irish Water

Client's Rep: Mott MacDonald

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	1.40

Coordinates: 586774.00 E, 685687.89 N

Final Depth: 1.40 m | **Start Date:** 03/08/2022 | **Driller:** BM

Elevation: 77.65 mOD | **End Date:** 03/08/2022 | **Logger:** TH

Sheet 1 of 1 | Scale: 1:40 | FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
					77.45	0.20		TOPSOIL		
0.30 - 0.50	B1							Stiff to very stiff brown slightly gravelly sandy CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subrounded.		
0.80 - 1.00	B2									
1.20	D3									
1.20 - 1.48	SPT (S)	N=50 (5,11/50 for 125mm) Hammer SN = 1368	1.20	Dry	76.25	1.40		End of Borehole at 1.40m		

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter

Water Added

From (m)	To (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
1.40	1.50	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
Rebore attempted at BH-23514A
No groundwater encountered

Termination Reason

Terminated on instruction of Engineer

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-23514A
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	1.70
Rotary Drilling	Comacchio 405	1.70	2.60
Rotary Coring	Comacchio 405	2.60	10.00

Coordinates: 586776.62 E, 685687.43 N

Final Depth: 10.00 m | Start Date: 03/08/2022 | Driller: RC+BM | Elevation: 77.61 mOD | End Date: 07/09/2022 | Logger: TH

Sheet 1 of 2 | Scale: 1:50 | FINAL

Depth (m)	Sample / Tests	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
									77.41	0.20		TOPSOIL		
												Very stiff brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subrounded.		
1.20 - 1.46	SPT (S)	N=50 (8,12/50 for 115mm) Hammer SN = 1386												
2.60	D1						2.60	Dry	75.01	2.60		Dense grey angular fine to coarse GRAVEL of limestone with little light brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.		
2.60 - 3.10	C1													
2.60 - 3.05	SPT(S) N=39 (3,6/7,10,11,11) Hammer SN = 1368	24				AZCL				(1.05)				
3.65							2.60	0.80	73.96	3.65		Dense grey and light grey angular fine to coarse GRAVEL of limestone.		
3.65	D2					AZCL								
3.65 - 4.10	SPT(S) N=34 (3,3/6,9,9,10) Hammer SN = 1368	53								(1.10)				
4.40		43				AZCL			72.86	4.75		Very stiff light brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of limestone.		
5.15							2.60	0.80						
5.15	D3													
5.15 - 5.45	SPT(S) N=50 (11,13/50 for 150mm) Hammer SN = 1368	0				NR				(1.25)				
5.90		53							71.61	6.00		Dense grey angular fine to coarse GRAVEL of limestone with low cobble content and little light brown slightly sandy slightly gravelly CLAY. Cobbles are subangular of limestone.		
6.65							2.60	0.80						
6.65	D4													
6.65 - 6.80	SPT(S) N=50 (12,12/50 for 0mm) Hammer SN = 1368	36								(1.40)		Light grey COBBLES of sandstone.		
7.40		35							70.21	7.40		*8.30-8.40m: Dark grey subangular fine to medium GRAVEL of limestone.* Strong massive dark grey LIMESTONE with occasional calcite veins of subvertical orientation, 1-8mm thick. Slightly weathered: slightly reduced strength, closer fracture spacing, some patchy orangish brown discolouration. Discontinuities: 1. 0-15 degree joints, closely spaced (20/180/430), slightly undulating, rough, greyish white calcite mineralisation on some joint surfaces.		
8.15										(1.00)				
8.80 - 8.95	C2	100	56	26		11			69.21	8.40		2. ~30 degree joint, at 8.60-8.65m, undulating, rough. 3. 45-60 degree joints, medium spaced (80/320/770), planar, rough, light orangish brown clay film on some joint surfaces. 4. 70-90 degree joints, at 8.70-9.00m, 8.95-9.30m, 9.65-10.00m, undulating, smooth, patchy orangish brown staining on some joint surfaces.		
										(1.60)				

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
1.50	1.70	01:00

Casing Details

To (m)	Diam (mm)
1.70	200
2.60	190
10.00	146

Water Added

From (m)	To (m)

Remarks

Hand dug inspection pit excavated to 1.20m
Rebore attempt of BH-23514; terminated on refusal at 1.40m
No groundwater encountered

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-23514A
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	1.70
Rotary Drilling	Comacchio 405	1.70	2.60
Rotary Coring	Comacchio 405	2.60	10.00

Coordinates
586776.62 E
685687.43 N

Final Depth: 10.00 m | **Start Date:** 03/08/2022 | **Driller:** RC+BM | Sheet 2 of 2 | Scale: 1:50

Elevation: 77.61 mOD | **End Date:** 07/09/2022 | **Logger:** TH | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
9.65													
		86	50	0							Strong massive dark grey LIMESTONE with occasional calcite veins of subvertical orientation, 1-8mm thick. Slightly weathered: slightly reduced strength, closer fracture spacing, some patchy orangish brown discolouration. Discontinuities: 1. 0-15 degree joints, closely spaced (20/180/430), slightly undulating, rough, greyish white calcite mineralisation on some joint surfaces. 2. ~30 degree joint, at 8.60-8.65m, undulating, rough. 3. 45-60 degree joints, medium spaced (80/320/770), planar, rough, light orangish brown clay film on some joint surfaces. 4. 70-90 degree joints, at 8.70-9.00m, 8.95-9.30m, 9.65-10.00m, undulating, smooth, patchy orangish brown staining on some joint surfaces.		
10.00								67.61	10.00		End of Borehole at 10.00m		
		TCR	SCR	RQD	FI								

9.5 10.0 10.5 11.0 11.5 12.0 12.5 13.0 13.5 14.0 14.5 15.0 15.5 16.0 16.5 17.0 17.5 18.0 18.5

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
1.50	1.70	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
Rebore attempt of BH-23514; terminated on refusal at 1.40m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
1.70	200
2.60	190
10.00	146

Water Added

From (m)	To (m)

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-23898
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Hand Digging	Hand Tools	0.00	1.10
Cable Percussion	Dando 2500	1.20	4.80
Rotary Drilling	Comacchio 405	4.80	5.60

Coordinates: 586925.19 E, 686044.89 N

Final Depth: 10.00 m | Start Date: 28/06/2022 | Driller: MK+RC | Sheet 1 of 2 | Scale: 1:50

Elevation: 73.34 mOD | End Date: 08/09/2022 | Logger: TH | FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
					73.14	0.20		TOPSOIL		
0.40 - 0.60	B6							Stiff to very stiff light brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are of limestone.		
0.50	D1									
0.80 - 1.10	B7									
1.00	D2									
1.20 - 1.65	SPT (S)	N=17 (4,4/3,4,5,5) Hammer SN = 1264	1.20							
1.80 - 2.10	B8									
2.00	D3									
2.00 - 2.45	U12	Ublow=30 100% Recovery	2.00							
2.80 - 3.10	B9									
3.00	D4									
3.00 - 3.45	SPT (S)	N=24 (4,5/5,6,7,6) Hammer SN = 1264	3.00							
3.80 - 4.10	B10									
4.00	D5									
4.00 - 4.45	U13	Ublow=50 0% Recovery	4.00							
4.50 - 4.50	SPT (S)	N=50 (25 for 0mm/50 for 0mm) Hammer SN = 1264	4.50							
					68.64	4.70				
4.70	B11							Weathered LIMESTONE recovered as: Grey angular fine to coarse GRAVEL.		
						5.60				
5.70 - 5.85	C1	TCR 100, SCR 67, RQD 35, FI 11			67.74			Strong (locally medium strong) massive grey LIMESTONE. SLightly weathered: slightly reduced strength, closer fracture spacing, orangish brown clay infill and discolouration on some fracture surfaces. Discontinuities: 1. 0-20 degree joints, closely spaced (20/130/180), slightly undulating, rough, patchy orangish brown staining on most joint surfaces, grey silty film on some joint surfaces. 2. 30-50 degree joints, medium spaced (200/550/850), planar, smooth, orangish brown staining on some joint surfaces. 3. 70-80 degree joints, at 5.85-6.25m and 6.32-6.55m, undulating, rough, orangish brown staining on joint surfaces.		
6.65						(1.65)				
6.65 - 6.85	C2									
					66.09	7.25				
7.50	C3	TCR 100, SCR 92, RQD 87, FI 4						Strong massive grey LIMESTONE with occasional greyish white calcite veins of predominately subhorizontal orientation, 2-10mm thick. Slightly weathered: slightly closer fracture spacing, patchy light orangish brown staining and clay infill on some joint surfaces. Discontinuities: 1. 0-20 degree joints, medium spaced (70/345/470), planar, rough, patchy light orangish brown staining on some joint surfaces. 2. 70-80 degree joints, at 8.15-8.30m and 9.15-9.35m, slightly undulating, rough, patchy light orangish brown staining on joint surfaces.		
8.15		TCR 87, SCR 83, RQD 80				(2.75)		*8.05-8.15m: Stiff light orangish brown silty clay infill on ~15 degree joint* *8.80-8.85m: White calcite mineralisation on ~20 degree joint*		

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
4.00	4.70	01:00
4.70	4.80	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
4.80	200
5.60	190
10.00	146

Water Added

From (m)	To (m)
1.20	4.50

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-23898
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Hand Digging	Hand Tools	0.00	1.10
Cable Percussion	Dando 2500	1.20	4.80
Rotary Drilling	Comacchio 405	4.80	5.60

Coordinates
586925.19 E
686044.89 N

Final Depth: 10.00 m | **Start Date:** 28/06/2022 | **Driller:** MK+RC
Elevation: 73.34 mOD | **End Date:** 08/09/2022 | **Logger:** TH

Sheet 2 of 2
Scale: 1:50
FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
9.65											Strong massive grey LIMESTONE with occasional greyish white calcite veins of predominately subhorizontal orientation, 2-10mm thick. Slightly weathered: slightly closer fracture spacing, patchy light orangish brown staining and clay infill on some joint surfaces. Discontinuities: 1. 0-20 degree joints, medium spaced (70/345/470), planar, rough, patchy light orangish brown staining on some joint surfaces. 2. 70-80 degree joints, at 8.15-8.30m and 9.15-9.35m, slightly undulating, rough, patchy light orangish brown staining on joint surfaces.		
		57	57	57									
10.00								63.34	10.00		End of Borehole at 10.00m		
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
4.00	4.70	01:00
4.70	4.80	01:00

Remarks
Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
4.80	200
5.60	190
10.00	146

Water Added

From (m)	To (m)
1.20	4.50

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-24410
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	586916.73 E 686536.60 N

Final Depth:	Start Date:	Driller:	Sheet 1 of 1
1.20 m	18/08/2022	RW	Scale: 1:40
Elevation: 70.72 mOD	**End Date:** 18/08/2022	**Logger:** TH	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.30 - 1.20	B1				70.42	0.30		TOPSOIL		
								Brown very gravelly slightly clayey fine to coarse SAND. Gravel is subangular fine to coarse.		
1.20	D2				69.52	1.20				
1.20 - 1.21	SPT (C)	N=50 (25 for 5mm/50 for 5mm) Hammer SN = 1410	1.20					End of Borehole at 1.20m		

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter
1.20	200

Water Added

From (m)	To (m)
1.20	

Chiselling Details

From (m)	To (m)	Time (hh:mm)
1.20	1.20	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
Rebore attempted at BH-24410A
No groundwater encountered

Termination Reason

Terminated on refusal of SPT on boulder/possible bedrock and 1 hour of chiselling.

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-24410A
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2500	1.20	1.70
Rotary Drilling	Comacchio 405	1.70	2.60
Rotary Coring	Comacchio 405	2.60	10.00

Coordinates: 586916.75 E, 686536.60 N

Final Depth: 10.00 m | Start Date: 18/08/2022 | Driller: RW+RC | Sheet 1 of 2 | Scale: 1:50

Elevation: 70.73 mOD | End Date: 13/09/2022 | Logger: CM | FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.30 - 1.20	B1				70.43	0.30		TOPSOIL		
								Brown sandy slightly clayey subangular fine to coarse GRAVEL with medium cobble content. Gravel is subangular fine to coarse.		
1.20	D4									
1.20 - 1.50	B2				69.23	1.50				
1.20 - 1.38	SPT (C)	N=50 (25 for 105mm/50 for 70mm) Hammer SN = 1410			69.03	1.70		Dense dark grey slightly sandy very angular fine to coarse GRAVEL of limestone.		
1.50 - 1.70	B3							Stiff brown sandy CLAY. (Driller's description)		
					68.13	2.60		Strong (locally very strong) dark grey indistinctly thickly laminated to thinly bedded LIMESTONE. Slightly weathered: slightly closer fracture spacing, slightly reduced strength, patchy orangish brown discolouration on fracture surfaces.		
3.00	C1	TCR 100, SCR 69, RQD 36, FI 14						Discontinuities:		
3.65								1. 0-15 degree bedding fractures, closely spaced (20/185/560), planar, rough, patchy orangish brown staining on fracture surfaces.		
4.60 - 4.75	C2	TCR 97, SCR 53, RQD 44						2. 40-55 degree joints at 4.50m, 4.10m, 9.25m and 9.35m, planar, rough, orangish brown staining on fracture surfaces.		
5.15								3. 70-90 degree joints from 2.75-2.90m, 3.65-3.80m, 3.95-4.05m, 4.20-4.50m, 4.95-5.15m, 7.40-7.45m, 8.00-8.25m and 9.00-9.45m, planar, rough, patchy orangish brown staining on joint surfaces.		
5.35	C3	TCR 97, SCR 97, RQD 92								
5.85						(7.40)				
6.05 - 6.25	C4	TCR 86, SCR 86, RQD 86								
6.65										
6.85 - 7.05	C5	TCR 100, SCR 95, RQD 85, FI 5								
8.15		TCR 95, SCR 78, RQD 73, FI 15								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
1.70	1.70	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
Rebore of BH-24410; refusal on boulder/possible bedrock at 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
1.70	200
2.60	177
10.00	150

Water Added

From (m)	To (m)
1.20	1.70

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-24410A
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2500	1.20	1.70
Rotary Drilling	Comacchio 405	1.70	2.60
Rotary Coring	Comacchio 405	2.60	10.00

Coordinates
586916.75 E
686536.60 N

Final Depth: 10.00 m | **Start Date:** 18/08/2022 | **Driller:** RW+RC
Elevation: 70.73 mOD | **End Date:** 13/09/2022 | **Logger:** CM

Sheet 2 of 2
Scale: 1:50
FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
9.65					2						Strong (locally very strong) dark grey indistinctly thickly laminated to thinly bedded LIMESTONE. Slightly weathered: slightly closer fracture spacing, slightly reduced strength, patchy orangish brown discolouration on fracture surfaces.		
		100	100	100									
10.00								60.73	10.00		Discontinuities: 1. 0-15 degree bedding fractures, closely spaced (20/185/560), planar, rough, patchy orangish brown staining on fracture surfaces. 2. 40-55 degree joints at 4.50m, 4.10m, 9.25m and 9.35m, planar, rough, orangish brown staining on fracture surfaces. 3. 70-90 degree joints from 2.75-2.90m, 3.65-3.80m, 3.95-4.05m, 4.20-4.50m, 4.95-5.15m, 7.40-7.45m, 8.00-8.25m and 9.00-9.45m, planar, rough, patchy orangish brown staining on joint surfaces. End of Borehole at 10.00m		
		TCR	SCR	RQD	FI								

9.5 10.0 10.5 11.0 11.5 12.0 12.5 13.0 13.5 14.0 14.5 15.0 15.5 16.0 16.5 17.0 17.5 18.0 18.5

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
1.70	1.70	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
Rebore of BH-24410; refusal on boulder/possible bedrock at 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
1.70	200
2.60	177
10.00	150

Water Added

From (m)	To (m)
1.20	1.70

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-25603

Client: Irish Water

Client's Rep: Mott MacDonald

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	587192.53 E
Cable Percussion	Dando 2500	1.20	3.10	687522.95 N

Final Depth: 3.10 m **Start Date:** 29/06/2022 **Driller:** MK

Elevation: 78.17 mOD **End Date:** 29/06/2022 **Logger:** NH

Sheet 1 of 1
Scale: 1:40
FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
					77.87	0.30		TOPSOIL		
0.40 - 0.60	B1							Firm brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.		
0.50	D5									
0.80 - 1.10	B2									
1.00	D6				77.07	1.10				
1.20 - 1.50	U9	Ublow=50 50% Recovery	1.20	Dry				Very stiff brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subrounded.		
1.80 - 2.10	B3									
2.00	D7									
2.00 - 2.30	SPT (S)	N=50 (5,7/50 for 150mm) Hammer SN = 1264	2.00	Dry	76.07	2.10		Very stiff greyish brown sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse.		
2.80 - 3.10	B4									
3.00	D8									
3.00 - 3.10	U10	Ublow=100 0% Recovery	3.00	Dry	75.07	3.10		End of Borehole at 3.10m		
3.10 - 3.12	SPT (S)	N=50 (25 for 10mm/50 for 10mm) Hammer SN = 1264	3.00	Dry						

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter
3.00	200

Water Added

From (m)	To (m)
1.20	3.00

Chiselling Details

From (m)	To (m)	Time (hh:mm)
3.00	3.10	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
Re-bore attempted at BH-25603A
No groundwater encountered

Termination Reason

Terminated on virtual refusal

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-25603A

Client: Irish Water

Client's Rep: Mott MacDonald

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2500	1.20	2.60
Rotary Coring	Comacchio 405	2.60	10.00

Coordinates: 587196.32 E, 687522.35 N

Final Depth: 10.00 m | **Start Date:** 29/06/2022 | **Driller:** RC+MK

Elevation: 78.13 mOD | **End Date:** 13/09/2022 | **Logger:** CM

Sheet 1 of 2 | Scale: 1:50 | FINAL

Depth (m)	Sample / Tests	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
												TOPSOIL		
0.40 - 0.60	B1								77.73	0.40				
0.50	D4											Firm to stiff light brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.		
0.80 - 1.10	B2													
1.00	D5									1.20				
1.20 - 1.50	SPT (S)	N=30 (9,10/30 for 150mm) Hammer SN = 1264					1.20	Dry	76.93			Very stiff brown sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse.		
2.00 - 2.20	U7	Ublow=50 0% Recovery					2.00	Dry	76.13	2.00		Very stiff greyish brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.		
2.50 - 2.50	SPT(S) N=50 (25 for 0mm/50 for 0mm) Hammer SN = 1264						2.60	Dry	75.53			Very stiff brown slightly sandy gravelly CLAY with high cobble content. Sand is fine to coarse of predominantly limestone. Cobbles are subangular of limestone.		
2.60 - 3.05	SPT(S) N=48 (10,13/11,11,13,13) Hammer SN = 1368	38			AZCL		3.00	Dry				*3.00-3.65m: AZCL (possibly due to SPT/fines and gravel being washed out with flush).*		
2.80 - 3.10	B3						2.60	1.45						
3.00	D6													
3.10 - 3.10	SPT(S) N=50 (25 for 0mm/50 for 0mm) Hammer SN = 1264									(2.70)				
3.65		27			AZCL							*3.85-4.40m: AZCL (possibly due to SPT/fines and gravel being washed out with flush).*		
3.65 - 4.10	SPT(S) N=37 (5,14/13,8,8,8) Hammer SN = 1368													
4.40		40			AZCL							*4.70-5.15m: AZCL (possibly due to SPT/fines and gravel being washed out with flush).*		
5.15							2.60	1.45						
5.15 - 5.45	SPT(S) N=50 (3,15/50 for 150mm) Hammer SN = 1368	60	33	33	7				72.83	5.30		Medium strong (locally strong) indistinctly thickly laminated dark grey LIMESTONE. Slightly weathered: slightly closer fracture spacing, slightly reduced strength, patchy orangish brown discolouration on fracture surfaces.		
5.25 - 5.45	C1													
5.90		81	71	44								Discontinuities:		
6.50 - 6.65	C2											1. 0-15 degree bedding fractures, closely spaced (30/155/300), planar, rough, patchy orangish brown staining on most fracture surfaces.		
6.65														
7.25 - 7.40	C3	100	97	43						(4.70)		2. 70-90 degree joints from 5.30-5.50m, 6.30-6.45m and 8.60-8.70m, planar, rough, patchy orangish brown staining on some joint surfaces.		
7.70	C4													
8.15		63	63	58								*9.10-9.65m: AZCL (soft layer recorded by driller - possible infilled void).*		

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)

Remarks

Hand dug inspection pit excavated to 1.20m
Re-bore of BH-25603; virtual refusal at 3.10m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
2.60	177
3.00	200
10.00	146

Water Added

From (m)	To (m)
1.20	2.00

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-25603A
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2500	1.20	2.60
Rotary Coring	Comacchio 405	2.60	10.00

Coordinates: 587196.32 E, 687522.35 N

Final Depth: 10.00 m | **Start Date:** 29/06/2022 | **Driller:** RC+MK

Elevation: 78.13 mOD | **End Date:** 13/09/2022 | **Logger:** CM

Sheet 2 of 2 | Scale: 1:50 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
					AZCL						Medium strong (locally strong) indistinctly thickly laminated dark grey LIMESTONE. Slightly weathered: slightly closer fracture spacing, slightly reduced strength, patchy orangish brown discolouration on fracture surfaces.		
9.65		83	83	83	1								
10.00								68.13	10.00		Discontinuities: 1. 0-15 degree bedding fractures, closely spaced (30/155/300), planar, rough, patchy orangish brown staining on most fracture surfaces. 2. 70-90 degree joints from 5.30-5.50m, 6.30-6.45m and 8.60-8.70m, planar, rough, patchy orangish brown staining on some joint surfaces. End of Borehole at 10.00m		
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)

Remarks

Hand dug inspection pit excavated to 1.20m
Re-bore of BH-25603; virtual refusal at 3.10m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
2.60	177
3.00	200
10.00	146

Water Added

From (m)	To (m)
1.20	2.00

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-26087
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Rotary Drilling	Comacchio 405	1.20	2.50
Rotary Coring	Comacchio 405	2.50	25.00

Coordinates: 587483.96 E, 687859.09 N

Final Depth: 25.00 m | Start Date: 23/09/2022 | Driller: MW

Elevation: 69.97 mOD | End Date: 25/09/2022 | Logger: CM

Sheet 1 of 4 | Scale: 1:40 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
								69.77	0.20		TOPSOIL		
											Medium dense SAND and GRAVEL. (Driller's description)		
1.50 - 1.95	SPT(C) N=27 (7,8/7,7,6,7) Hammer SN = 0643					1.50							
								67.47	2.50		Brown slightly sandy clayey angular to subangular fine to coarse GRAVEL. Sand is fine to coarse.		
								67.02	2.95		Moderately weak (locally medium strong) indistinctly thinly to thickly laminated black LIMESTONE. Moderately weathered: considerably reduced strength, closer fracture spacing, patchy orangish brown discolouration on fracture surfaces.		
3.10	C1	87	47	22							Discontinuities:		
3.35 - 3.45	C2										1. 0-20 degree joints, very closely spaced (20/40/240), planar, smooth to rough, patchy orangish brown staining on joint surfaces.		
3.55 - 3.65	C3				13						2. 75-90 degree joint from 3.45-3.65m, undulating, rough, patchy orangish brown staining and white calcite mineralisation on joint surfaces.		
4.00 - 4.10	C4										*3.20-3.35m: Greyish brown slightly gravelly slightly sandy CLAY (possible fault gouge or highly weathered bedrock). Sand is fine to coarse. Gravel is angular fine to medium of black limestone.*		
4.00											*3.85-3.95m: Greyish brown slightly gravelly slightly sandy CLAY (possible fault gouge or highly weathered bedrock). Sand is fine to coarse. Gravel is angular fine to medium of black limestone.*		
4.20	C5										*4.50-4.60: Greyish brown gravelly sandy CLAY (possible fault gouge or highly weathered bedrock). Sand is fine to coarse. Gravel is angular fine to medium of black limestone.*		
		94	89	69				65.32	4.65		Medium strong (locally strong) thinly to thickly laminated black and dark grey LIMESTONE with rare calcite mineralisation (up to 30mm thick) and frequent speckled brassy yellow pyrite mineralisation throughout. Slightly weathered: slightly reduced strength, slightly closer fracture spacing, patchy orangish brown discolouration on fracture surfaces.		
5.50											Discontinuities:		
					6						1. 0-20 degree bedding fractures (5/290/850), planar, predominantly smooth, patchy orangish brown staining and white calcite mineralisation on some fracture surfaces.		
		100	95	87							2. 35-55 degree joints from 5.50-5.55m, 5.95-6.00m, 5.95-6.05m, 11.00-11.10m, 21.30-21.35m and 24.15-24.25m, planar, smooth, patchy white calcite mineralisation on some joint surfaces.		
6.50 - 6.70	C6												
7.00											3. 70-90 degree joints from 4.65-4.90m, 7.85-8.00m, 9.75-10.15m, 16.95-17.20m, 17.30-17.90m and 21.30-21.40m, undulating, rough, orangish brown staining on joint surfaces.		
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)
2.50	200
25.00	150

Core Barrel: SK6L

Flush Type: Polymer

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Termination Reason: Terminated at scheduled depth

Last Updated: 13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-26087
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Rotary Drilling	Comacchio 405	1.20	2.50
Rotary Coring	Comacchio 405	2.50	25.00

Coordinates: 587483.96 E, 687859.09 N

Final Depth: 25.00 m | Start Date: 23/09/2022 | Driller: MW

Elevation: 69.97 mOD | End Date: 25/09/2022 | Logger: CM

Sheet 2 of 4 | Scale: 1:40 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
		100	93	93							Medium strong (locally strong) thinly to thickly laminated black and dark grey LIMESTONE with rare calcite mineralisation (up to 30mm thick) and frequent speckled brassy yellow pyrite mineralisation throughout. Slightly weathered: slightly reduced strength, slightly closer fracture spacing, patchy orangish brown discolouration on fracture surfaces. Discontinuities: 1. 0-20 degree bedding fractures (5/290/850), planar, predominantly smooth, patchy orangish brown staining and white calcite mineralisation on some fracture surfaces. 2. 35-55 degree joints from 5.50-5.55m, 5.95-6.00m, 5.95-6.05m, 11.00-11.10m, 21.30-21.35m and 24.15-24.25m, planar, smooth, patchy white calcite mineralisation on some joint surfaces. 3. 70-90 degree joints from 4.65-4.90m, 7.85-8.00m, 9.75-10.15m, 16.95-17.20m, 17.30-17.90m and 21.30-21.40m, undulating, rough, orangish brown staining on joint surfaces.		
8.50		100	97	93									
10.00		89	89	76	3								
11.50		98	98	98									
13.00		100	97	97									
14.50													
		TCR	SCR	RQD	FI								

Water Strikes			
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details	
To (m)	Diam (mm)
2.50	200
25.00	150

Core Barrel: SK6L

Flush Type: Polymer

Termination Reason: Terminated at scheduled depth

Last Updated: 13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-26087
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Rotary Drilling	Comacchio 405	1.20	2.50
Rotary Coring	Comacchio 405	2.50	25.00

Coordinates: 587483.96 E, 687859.09 N

Final Depth: 25.00 m | Start Date: 23/09/2022 | Driller: MW

Elevation: 69.97 mOD | End Date: 25/09/2022 | Logger: CM

Sheet 3 of 4 | Scale: 1:40 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
16.00		97	97	77							Medium strong (locally strong) thinly to thickly laminated black and dark grey LIMESTONE with rare calcite mineralisation (up to 30mm thick) and frequent speckled brassy yellow pyrite mineralisation throughout. Slightly weathered: slightly reduced strength, slightly closer fracture spacing, patchy orangish brown discolouration on fracture surfaces. Discontinuities: 1. 0-20 degree bedding fractures (5/290/850), planar, predominantly smooth, patchy orangish brown staining and white calcite mineralisation on some fracture surfaces. 2. 35-55 degree joints from 5.50-5.55m, 5.95-6.00m, 5.95-6.05m, 11.00-11.10m, 21.30-21.35m and 24.15-24.25m, planar, smooth, patchy white calcite mineralisation on some joint surfaces. 3. 70-90 degree joints from 4.65-4.90m, 7.85-8.00m, 9.75-10.15m, 16.95-17.20m, 17.30-17.90m and 21.30-21.40m, undulating, rough, orangish brown staining on joint surfaces.		
17.50		100	100	95									
19.00		100	100	77	5								
20.50		100	100	81									
		100	90	76									
		TCR	SCR	RQD	FI								

15.0, 15.5, 16.0, 16.5, 17.0, 17.5, 18.0, 18.5, 19.0, 19.5, 20.0, 20.5, 21.0, 21.5

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
2.50	200
25.00	150

Core Barrel

SK6L

Flush Type

Polymer

Termination Reason

Terminated at scheduled depth

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-26087
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Rotary Drilling	Comacchio 405	1.20	2.50
Rotary Coring	Comacchio 405	2.50	25.00

Coordinates: 587483.96 E, 687859.09 N

Final Depth: 25.00 m | Start Date: 23/09/2022 | Driller: MW

Elevation: 69.97 mOD | End Date: 25/09/2022 | Logger: CM

Sheet 4 of 4 | Scale: 1:40 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
22.00		100	100	100							Medium strong (locally strong) thinly to thickly laminated black and dark grey LIMESTONE with rare calcite mineralisation (up to 30mm thick) and frequent speckled brassy yellow pyrite mineralisation throughout. Slightly weathered: slightly reduced strength, slightly closer fracture spacing, patchy orangish brown discolouration on fracture surfaces. Discontinuities: 1. 0-20 degree bedding fractures (5/290/850), planar, predominantly smooth, patchy orangish brown staining and white calcite mineralisation on some fracture surfaces.		
23.50		83	83	83							2. 35-55 degree joints from 5.50-5.55m, 5.95-6.00m, 5.95-6.05m, 11.00-11.10m, 21.30-21.35m and 24.15-24.25m, planar, smooth, patchy white calcite mineralisation on some joint surfaces. 3. 70-90 degree joints from 4.65-4.90m, 7.85-8.00m, 9.75-10.15m, 16.95-17.20m, 17.30-17.90m and 21.30-21.40m, undulating, rough, orangish brown staining on joint surfaces.		
25.00								44.97	25.00		End of Borehole at 25.00m		

TCR	SCR	RQD	FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
2.50	200
25.00	150

Core Barrel: SK6L

Flush Type: Polymer

Termination Reason: Terminated at scheduled depth

Last Updated: 13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-26135
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Rotary Drilling	Beretta T44	1.20	2.20
Rotary Coring	Beretta T44	2.20	24.70

Coordinates: 587581.23 E, 687869.77 N

Final Depth: 24.70 m | Start Date: 24/09/2022 | Driller: PJ

Elevation: 70.04 mOD | End Date: 29/09/2022 | Logger: CM

Sheet 1 of 4 | Scale: 1:40 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description
											Firm to stiff brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.
2.20	C1							67.84	2.20		
2.20 - 2.58	SPT(C) N=50 (4,10/50 for 225mm) Hammer SN = 1385	60			AZCL						Very stiff brown slightly sandy very gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of limestone. Cobbles are of limestone. *3.10-3.70m: AZCL (Possibly due to fines and gravel being washed out with flush).*
3.70								66.34	3.70		
3.90 - 4.70	C2	100						65.84	4.20		Very stiff light brownish grey slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of limestone. Cobbles are of limestone.
5.20											Very stiff brown and dark grey slightly sandy very gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of limestone. Cobbles are of limestone.
5.55 - 5.75	C3	97	51	41				64.54	5.50		Medium strong (locally moderately weak) indistinctly thinly to thickly laminated dark grey LIMESTONE. Moderately weathered: reduced strength, closer fracture spacing, orangish brown discolouration and gravelly sandy clay infill on most some fracture surfaces.
5.75 - 5.95	C4										Discontinuities:
5.95 - 6.10	C5										1. 0-20 degree joints at 5.75, 5.95, 6.10 and 6.25m, planar, rough. orangish brown staining and gravelly sandy clay (up to 50mm thick) on most joint surfaces.
											2. 35-55 degree joints from 5.40-5.50m, 6.00-6.05m, planar, rough, orangish brown staining on joint surfaces.
6.70								63.34	6.70		3. 70-85 degree joint from 6.40-6.70m, planar, rough, orangish brown staining on joint surface.
					NI						Medium strong dark grey limestone recovered as: Brown and dark grey slightly sandy clayey angular to subangular fine to coarse GRAVEL of dark grey limestone with medium cobbles content. Sand is fine to coarse . Cobbles are of dark grey limestone.
		TCR	SCR	RQD	FI						

Water | Backfill

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
2.20	200
24.70	150

Core Barrel: SK6L

Flush Type: Polymer

Termination Reason: Terminated at scheduled depth

Last Updated: 13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-26135
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Rotary Drilling	Beretta T44	1.20	2.20
Rotary Coring	Beretta T44	2.20	24.70

Coordinates: 587581.23 E, 687869.77 N

Final Depth: 24.70 m | Start Date: 24/09/2022 | Driller: PJ

Elevation: 70.04 mOD | End Date: 29/09/2022 | Logger: CM

Sheet 2 of 4 | Scale: 1:40 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
		98	20	20				62.34	7.70		Medium strong dark grey limestone recovered as: Brown and dark grey slightly sandy clayey angular to subangular fine to coarse GRAVEL of dark grey limestone with medium cobbles content. Sand is fine to coarse . Cobbles are of dark grey limestone.		
8.20											Medium strong (locally strong) indistinctly thinly to thickly laminated black and dark grey LIMESTONE with occasional white calcite veins (up to 10mm thick) at 80-90 degrees and frequent speckled brassy pyrite mineralisation throughout. Slightly weathered: slightly reduced strength, slightly closer fracture spacing, patchy orangish brown discolouration on most fracture surfaces.		
8.60 - 8.90	C6										Discontinuities:		
		98	98	92							1. 5-15 degree bedding fractures, medium spaced (10/265/830), planar, predominantly smooth, patchy orangish brown staining on some fracture surfaces.		
9.70											2. 10-30 degree joints at 9.55m, 10.60m, 16.20m, 15.60m, 20.75m and 22.80m, planar, rough to smooth, patchy orangish brown staining on some joint surfaces.		
		95	92	89							3. 60-85 degree joints from 7.70-7.85m, 12.15-12.70m, 14.30-14.40m, 14.55-14.70m, 14.70-14.90m, 14.90-15.10m, 17.50-17.65m and 18.55-18.70m, planar to undulating, rough, patchy orangish brown staining and white calcite mineralisation on some joint surfaces.		
11.20					5								
		100	100	100									
12.70													
		100	100	99									
14.20													
		TCR	SCR	RQD	FI								

7.5 8.0 8.5 9.0 9.5 10.0 10.5 11.0 11.5 12.0 12.5 13.0 13.5 14.0 14.5

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
2.20	200
24.70	150

Core Barrel: SK6L

Flush Type: Polymer

Termination Reason: Terminated at scheduled depth

Last Updated: 13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-26135
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Rotary Drilling	Beretta T44	1.20	2.20
Rotary Coring	Beretta T44	2.20	24.70

Coordinates: 587581.23 E, 687869.77 N

Final Depth: 24.70 m | Start Date: 24/09/2022 | Driller: PJ

Elevation: 70.04 mOD | End Date: 29/09/2022 | Logger: CM

Sheet 3 of 4 | Scale: 1:40 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
		100	90	45							Medium strong (locally strong) indistinctly thinly to thickly laminated black and dark grey LIMESTONE with occasional white calcite veins (up to 10mm thick) at 80-90 degrees and frequent speckled brassy pyrite mineralisation throughout. Slightly weathered: slightly reduced strength, slightly closer fracture spacing, patchy orangish brown discolouration on most fracture surfaces. Discontinuities: 1. 5-15 degree bedding fractures, medium spaced (10/265/830), planar, predominantly smooth, patchy orangish brown staining on some fracture surfaces. 2. 10-30 degree joints at 9.55m, 10.60m, 16.20m, 15.60m, 20.75m and 22.80m, planar, rough to smooth, patchy orangish brown staining on some joint surfaces. 3. 60-85 degree joints from 7.70-7.85m, 12.15-12.70m, 14.30-14.40m, 14.55-14.70m, 14.70-14.90m, 14.90-15.10m, 17.50-17.65m and 18.55-18.70m, planar to undulating, rough, patchy orangish brown staining and white calcite mineralisation on some joint surfaces.		
15.70		91	91	66	9								
17.20		100	100	92									
18.70		100	100	92	4								
20.20		99	99	97									
21.70													
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
2.20	200
24.70	150

Core Barrel: SK6L

Flush Type: Polymer

Termination Reason: Terminated at scheduled depth

Last Updated: 13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-26135
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Rotary Drilling	Beretta T44	1.20	2.20
Rotary Coring	Beretta T44	2.20	24.70

Coordinates: 587581.23 E, 687869.77 N

Final Depth: 24.70 m | Start Date: 24/09/2022 | Driller: PJ | Elevation: 70.04 mOD | End Date: 29/09/2022 | Logger: CM

Sheet 4 of 4 | Scale: 1:40 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
		100	100	95							Medium strong (locally strong) indistinctly thinly to thickly laminated black and dark grey LIMESTONE with occasional white calcite veins (up to 10mm thick) at 80-90 degrees and frequent speckled brassy pyrite mineralisation throughout. Slightly weathered: slightly reduced strength, slightly closer fracture spacing, patchy orangish brown discolouration on most fracture surfaces. Discontinuities: 1. 5-15 degree bedding fractures, medium spaced (10/265/830), planar, predominantly smooth, patchy orangish brown staining on some fracture surfaces.		
23.20		97	97	93							2. 10-30 degree joints at 9.55m, 10.60m, 16.20m, 15.60m, 20.75m and 22.80m, planar, rough to smooth, patchy orangish brown staining on some joint surfaces. 3. 60-85 degree joints from 7.70-7.85m, 12.15-12.70m, 14.30-14.40m, 14.55-14.70m, 14.70-14.90m, 14.90-15.10m, 17.50-17.65m and 18.55-18.70m, planar to undulating, rough, patchy orangish brown staining and white calcite mineralisation on some joint surfaces.		
24.70								45.34	24.70		End of Borehole at 24.70m		

TCR	SCR	RQD	FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)
2.20	200
24.70	150

Core Barrel: SK6L

Flush Type: Polymer

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Termination Reason: Terminated at scheduled depth

Last Updated: 13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-26214
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Rotary Drilling	Comacchio 405	1.20	2.50
Rotary Coring	Comacchio 405	2.50	10.00

Coordinates: 587629.53 E, 687864.93 N

Final Depth: 10.00 m | Start Date: 26/09/2022 | Driller: MW+M | Elevation: 70.22 mOD | End Date: 26/09/2022 | Logger: CM

Sheet 1 of 2 | Scale: 1:40 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
											Brownish grey fine to coarse SAND and subangular to subrounded fine to coarse GRAVEL.		
								67.72	2.50		Low Recovery: Very stiff greyish brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of predominantly limestone. *2.50-4.00: AZCL (Possibly due to fines and gravel being washed out with flush).*		
		20			AZCL								
4.00 4.00 - 4.00 4.00	C1 SPT(C) N=50 (25 for 5mm/50 for 0mm) Hammer SN = 0643							66.22	4.00		Very dense slightly sandy slightly clayey subangular fine to coarse GRAVEL of limestone with medium cobble and low boulder content. Sand is fine to coarse. Cobbles are subangular of limestone. Boulders are of limestone.		
		100											
5.50								64.57	5.65		Strong (locally medium strong) grey to dark grey LIMESTONE with occasional white calcite veins (up to 20mm thick) of random orientations. Slightly weathered: slightly reduced strength, slightly closer fracture spacing, orangish brown discolouration on fracture surfaces. Discontinuities: 1. 0-15 degree bedding fractures, medum spaced (30/255/400), planar, rough, orangish brown staining on fracture surfaces. 2. 20-35 degree joints, widely spaced (80/725/1170), planar, rough, orangish brown staining on fracture surfaces. 3. 70-90 degree joints from 5.65-6.25m, 5.80-6.10m, 7.70-8.30m, 7.85-8.30m, 9.05-9.15m and 9.50-9.80m, planar to undulating, orangish brown staining on joint surfaces and calcite mineralisation on some joint surfaces.		
		91	59	39									
6.75 - 6.95	C2												
7.00 - 7.25 7.00	C3												
		TCR	SCR	RQD	FI								

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
2.50	200
10.00	150

Core Barrel: SK6L

Flush Type: Polymer

Termination Reason: Terminated at scheduled depth

Last Updated: 13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-26214
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Rotary Drilling	Comacchio 405	1.20	2.50
Rotary Coring	Comacchio 405	2.50	10.00

Coordinates: 587629.53 E, 687864.93 N

Final Depth: 10.00 m | Start Date: 26/09/2022 | Driller: MW+M | Elevation: 70.22 mOD | End Date: 26/09/2022 | Logger: CM

Sheet 2 of 2 | Scale: 1:40 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
7.35	C5	100	65	63							Strong (locally medium strong) grey to dark grey LIMESTONE with occasional white calcite veins (up to 20mm thick) of random orientations. Slightly weathered: slightly reduced strength, slightly closer fracture spacing, orangish brown discolouration on fracture surfaces. Discontinuities: 1. 0-15 degree bedding fractures, medum spaced (30/255/400), planar, rough, orangish brown staining on fracture surfaces. 2. 20-35 degree joints, widely spaced (80/725/1170), planar, rough, orangish brown staining on fracture surfaces. 3. 70-90 degree joints from 5.65-6.25m, 5.80-6.10m, 7.70-8.30m, 7.85-8.30m, 9.05-9.15m and 9.50-9.80m, planar to undulating, orangish brown staining on joint surfaces and calcite mineralisation on some joint surfaces.		
8.50					7								
9.20 - 9.35	C6	100	77	70									
10.00								60.22	10.00		End of Borehole at 10.00m		

TCR	SCR	RQD	FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)
2.50	200
10.00	150

Core Barrel: SK6L

Flush Type: Polymer

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Termination Reason: Terminated at scheduled depth

Last Updated: 13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-26554

Client: Irish Water

Client's Rep: Mott MacDonald

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2500	1.20	2.80

Coordinates: 587948.49 E, 687742.03 N

Final Depth: 2.80 m | **Start Date:** 28/07/2022 | **Driller:** RW

Elevation: 71.66 mOD | **End Date:** 28/07/2022 | **Logger:** NH

Sheet 1 of 1
Scale: 1:40
FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description
0.30 - 1.20	B1				71.36	0.30		TOPSOIL
1.20	D4				70.46	1.20		Firm brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.
1.20 - 2.00	B2							
1.20 - 1.65	SPT (C)	N=45 (7,7/12,8,11,14) Hammer SN = 1410	1.20	Dry				
2.00 - 2.80	B3							
2.00 - 2.38	SPT (C)	N=50 (12,10/50 for 225mm) Hammer SN = 1410	2.00	1.70				Dense becoming very dense dark grey and brownish grey very sandy clayey angular fine to coarse GRAVEL with low cobble and boulder content. Sand is fine to coarse. Cobbles are angular.
2.20	D5							
2.80 - 2.84	SPT (C)	N=50 (25 for 15mm/50 for 25mm) Hammer SN = 1410			68.86	2.80		End of Borehole at 2.80m

Water | Backfill

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter
2.80	200

Water Added

From (m)	To (m)
1.20	2.80

Chiselling Details

From (m)	To (m)	Time (hh:mm)
2.80	2.80	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
Rebore attempted at BH-26554A
No groundwater encountered

Termination Reason

Terminated on refusal of SPT on boulders and 1 hour of chiselling.

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-26554A
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2500	1.20	1.50
Rotary Drilling	Comacchio 405	1.50	2.60
Rotary Coring	Comacchio 405	2.60	9.65

Coordinates: 587946.49 E, 687744.04 N

Final Depth:	9.65 m	Start Date:	28/07/2022	Driller:	RW+RC	Sheet 1 of 2
Elevation:	71.65 mOD	End Date:	14/09/2022	Logger:	CM	Scale: 1:50
						FINAL

Depth (m)	Sample / Tests	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description
0.30 - 1.20	B1								71.35	0.30		TOPSOIL
1.20	D3											Firm to stiff brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.
1.20 - 1.50	B2											
1.20 - 1.20	SPT (C)	N=50 (25 for 5mm/50 for 0mm) Hammer SN = 1410							70.15	1.50		Dense SAND and GRAVEL. (Driller's description)
2.60 - 3.05	SPT(S) N=30 (9,7/7,7,8,8) Hammer SN = 1368		100				2.60	Dry	69.05	2.60		Stiff to very stiff brown slightly sandy gravelly CLAY with high cobble content. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of various lithologies including limestone, sandstone and calcite. Cobbles are subangular of sandstone and limestone.
3.65							2.60	1.25				
3.65 - 4.10	SPT(S) N=49 (3,8/10,10,11,18) Hammer SN = 1368		87									
4.30	C1											
4.40 - 5.15	C2											
5.15							2.60	1.25				
5.15 - 5.45	SPT(S) N=50 (25 for 75mm/50 for 225mm) Hammer SN = 1368		77							(7.05)		
6.65							2.60	1.25				
6.65 - 7.10	SPT(S) N=28 (3,3/5,7,7,9) Hammer SN = 1368		40									6.95-7.40: AZCL (Possibly due to fines and gravel being washed out with flush)
7.40			88									
8.15							2.60	3.95				
8.15 - 8.45	SPT(S) N=50 (5,5/50 for 150mm) Hammer SN = 1368		53									8.55-8.90: AZCL (Possibly due to fines and gravel being washed out with flush)
8.90												

Water: Backfill

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
1.50	1.50	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
Rebore of BH-26554; refusal on boulders at 2.80m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
1.50	200
2.60	177
9.65	146

Water Added

From (m)	To (m)
1.20	1.50

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-26554A
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2500	1.20	1.50
Rotary Drilling	Comacchio 405	1.50	2.60
Rotary Coring	Comacchio 405	2.60	9.65

Coordinates: 587946.49 E, 687744.04 N

Final Depth: 9.65 m **Start Date:** 28/07/2022 **Driller:** RW+RC

Elevation: 71.65 mOD **End Date:** 14/09/2022 **Logger:** CM

Sheet 2 of 2 | Scale: 1:50 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
9.65						2.60	3.95	62.00	9.65		Stiff to very stiff brown slightly sandy gravelly CLAY with high cobble content. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of various lithologies including limestone, sandstone and calcite. Cobbles are subangular of sandstone and limestone.		
9.65 - 10.10	SPT(S) N=39 (3,3/9,10,10,10) Hammer SN = 1368										*9.35-9.65: AZCL (Possibly due to fines and gravel being washed out with flush)*		
											End of Borehole at 9.65m		

TCR	SCR	RQD	FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
1.50	1.50	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
Rebore of BH-26554; refusal on boulders at 2.80m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
1.50	200
2.60	177
9.65	146

Water Added

From (m)	To (m)
1.20	1.50

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH	Project No. 21-1682	Project Name: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	Borehole ID BH-27000
		Client: Irish Water	
		Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	
Cable Percussion	Dando 2000	1.20	1.80	588386.70 E
Rotary Drilling	Comacchio 405	1.80	2.60	687760.66 N
Rotary Coring	Comacchio 405	2.60	10.00	

Final Depth: 10.00 m	Start Date: 30/05/2022	Driller: R+BM +RC	Sheet 1 of 2 Scale: 1:50
Elevation: 74.15 mOD	End Date: 15/09/2022	Logger: NH+CM	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
								TOPSOIL		
					73.95	0.20		Brown very sandy clayey subangular to subrounded fine to coarse GRAVEL of various lithologies. Sand is fine to coarse.		
0.40 - 0.60	B1									
0.50	D4									
0.80 - 1.00	B2									
1.00	D5									
1.20 - 1.50	U6	Ublow=50 80% Recovery								
					72.55	1.60		Possible weathered LIMESTONE recovered as: Dark grey angular cobbles of limestone. (Driller's description)		
					71.55	2.60		Medium strong grey limestone. Moderately weathered: slightly reduced strength, much closer fracture spacing, orangish brown discolouration on fracture surfaces. Discontinuities: No discernible discontinuity sets.		
3.00	C1	76 10 10								
3.65		>20				(1.95)				
4.20 - 4.30	C2	100 51 37								
					69.60	4.55		Strong (locally medium strong) grey LIMESTONE. Slightly weathered: slightly closer fracture spacing, orangish brown discolouration on fracture surfaces. Discontinuities: 1. 80-90 degree joints from 4.55-4.85m, 5.35-5.65m, 5.75-5.90m, 7.75-8.00m, 8.95-9.45m and 9.45-10.00m, planar, smooth to rough, orangish brown staining on joint surfaces. 2. 40-55 degree joints, medium spaced (70/510/1500), planar, rough, orangish brown staining on joint surfaces. 3. 0-15 degree bedding fractures, closely spaced (20/170/390), planar, smooth to rough, orangish brown staining on some fracture surfaces.		
4.90 - 5.05	C3									
5.15		11								
5.95 - 6.10	C5	92 71 43								
6.20	C4									
6.65										
7.00 - 7.30	C6					(5.45)				
		97 85 70								
		6								
8.15										
		90 67 50								
		TCR SCR RQD FI								

Water Strikes				Chiselling Details		
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm)
				1.60	1.80	01:00

Casing Details		Water Added	
To (m)	Diam (mm)	From (m)	To (m)
1.60	200		
2.60	177		
10.00	146		

Remarks

Hand dug inspection pit excavated to 1.20m
Falling Head Test completed at 1.50m
No groundwater encountered

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-27000
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	1.80
Rotary Drilling	Comacchio 405	1.80	2.60
Rotary Coring	Comacchio 405	2.60	10.00

Coordinates
588386.70 E
687760.66 N

Final Depth: 10.00 m | **Start Date:** 30/05/2022 | **Driller:** R+BM +RC | Sheet 2 of 2 | Scale: 1:50

Elevation: 74.15 mOD | **End Date:** 15/09/2022 | **Logger:** NH+CM | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
9.65											Strong (locally medium strong) grey LIMESTONE. Slightly weathered: slightly closer fracture spacing, orangish brown discolouration on fracture surfaces. Discontinuities: 1. 80-90 degree joints from 4.55-4.85m, 5.35-5.65m, 5.75-5.90m, 7.75-8.00m, 8.95-9.45m and 9.45-10.00m, planar, smooth to rough, orangish brown staining on joint surfaces. 2. 40-55 degree joints, medium spaced (70/510/1500), planar, rough, orangish brown staining on joint surfaces. 3. 0-15 degree bedding fractures, closely spaced (20/170/390), planar, smooth to rough, orangish brown staining on some fracture surfaces.		
10.00		37	0	0	AZCL			64.15	10.00		End of Borehole at 10.00m		

TCR	SCR	RQD	FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
1.60	1.80	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
Falling Head Test completed at 1.50m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
1.60	200
2.60	177
10.00	146

Water Added

From (m)	To (m)

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-27602

Client: Irish Water

Client's Rep: Mott MacDonald

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2500	1.20	3.70
Rotary Coring	Beretta T44	3.70	9.70

Coordinates: 588979.95 E, 687747.44 N

Final Depth: 9.70 m | **Start Date:** 27/05/2022 | **Driller:** PJ+BM

Elevation: 85.27 mOD | **End Date:** 13/09/2022 | **Logger:** CM+TH

Sheet 1 of 2 | Scale: 1:50 | FINAL

Depth (m)	Sample / Tests	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
												TOPSOIL		
0.40 - 0.60	B1								84.97	0.30		Soft dark brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subangular fine to medium of various lithologies.		
0.50	D5								84.67	0.60		Firm dark brown slightly sandy gravelly SILT. Sand is fine to coarse. Gravel is subrounded fine to coarse of various lithologies.		
0.80 - 1.00	B2													
1.00	D6													
1.20	U11	Ublow=30 100% Recovery												
1.80 - 2.00	B3								83.47	1.80		Stiff brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies.		
2.00	D7													
2.00 - 2.45	SPT (C)	N=27 (5,9/10,5,6,6) Hammer SN = 1386					2.00							
2.80 - 3.00	B4								82.47	2.80		Very stiff greyish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to medium of various lithologies.		
3.00	D8													
3.00 - 3.45	SPT (C)	N=36 (7,10/12,7,8,9) Hammer SN = 1386					3.00							
3.80 - 4.00	B5								81.57	3.70		Very stiff brown slightly sandy gravelly CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies. Cobbles and boulders are subangular of sandstone and limestone.		
4.00	D9						4.00							
4.00 - 4.45	SPT(C) N=32 (7,12/10,6,7,9) Hammer SN = 1386		50									4.45-5.20: AZCL (Possibly due to fines and gravel being washed out with flush).		
4.60 - 4.68	SPT(C) N=50 (25 for 25mm/50 for 50mm) Hammer SN = 1386					AZCL	4.60							
5.20														
5.20 - 5.48	SPT(C) N=50 (2,19/50 for 130mm) Hammer SN = 1385		37			AZCL				(6.00)				
6.70														
6.70 - 6.74	SPT(C) N=50 (25 for 15mm/50 for 30mm) Hammer SN = 1385		50			AZCL						7.45-8.20: AZCL (Possibly due to fines being washed out with flush).		
8.20												5.75-6.70: AZCL (Possibly due to fines and gravel being washed out with flush).		
8.20 - 8.50	SPT(C) N=50 (10,15/50 for 150mm) Hammer SN = 1385		70									9.25-9.70: AZCL (Possibly due to fines being washed out with flush).		

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
4.50	4.60	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
3.70	200
4.50	200
9.70	150

Water Added

From (m)	To (m)

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-27602
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2500	1.20	3.70
Rotary Coring	Beretta T44	3.70	9.70

Coordinates: 588979.95 E, 687747.44 N

Final Depth:	9.70 m	Start Date:	27/05/2022	Driller:	PJ+BM	Sheet 2 of 2
Elevation:	85.27 mOD	End Date:	13/09/2022	Logger:	CM+TH	Scale: 1:50
						FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
					AZCL						Very stiff brown slightly sandy gravelly CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies. Cobbles and boulders are subangular of sandstone and limestone.		
9.70 9.70 - 10.02	SPT(C) N=50 (9,16/50 for 165mm) Hammer SN = 1385							75.57	9.70		End of Borehole at 9.70m		
		TCR	SCR	RQD	FI								

9.5, 10.0, 10.5, 11.0, 11.5, 12.0, 12.5, 13.0, 13.5, 14.0, 14.5, 15.0, 15.5, 16.0, 16.5, 17.0, 17.5, 18.0, 18.5

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
4.50	4.60	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
3.70	200
4.50	200
9.70	150

Water Added

From (m)	To (m)

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

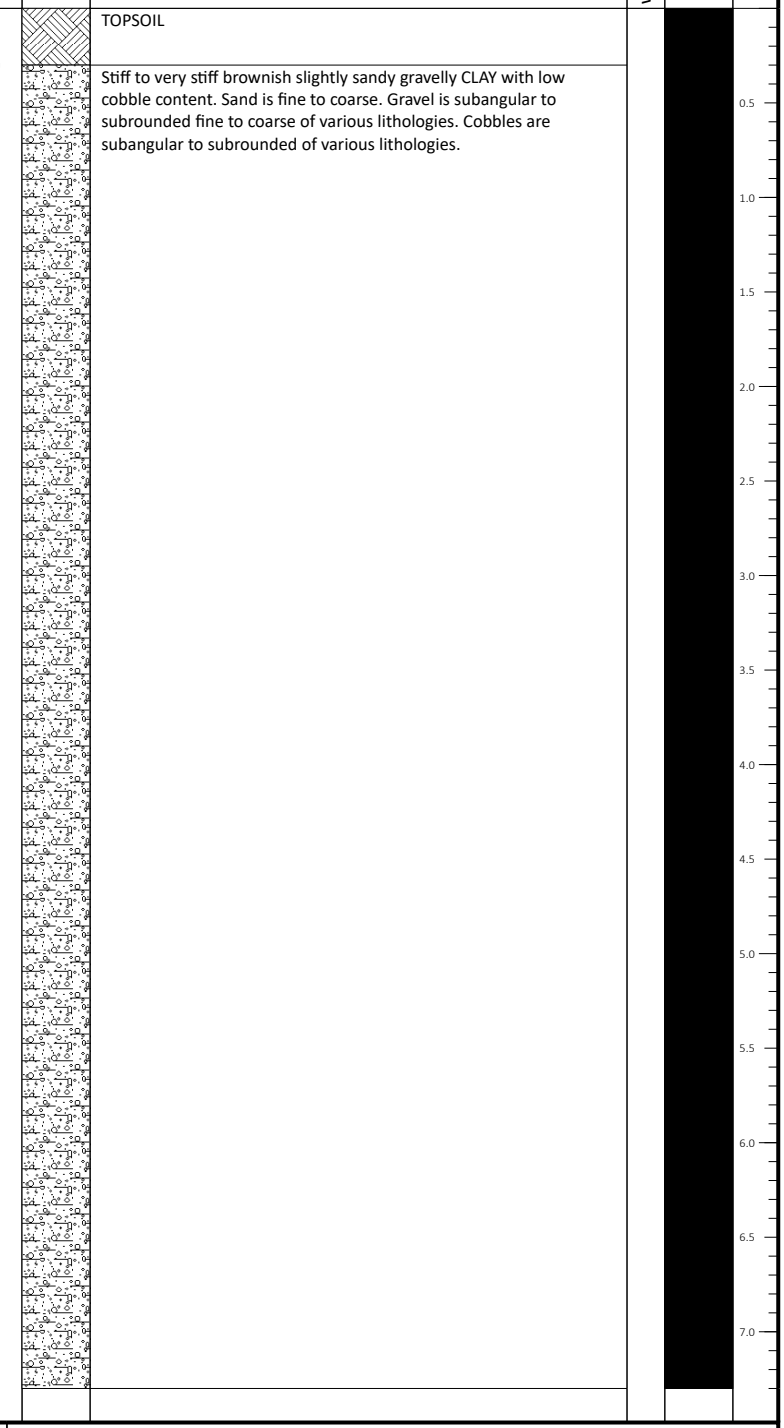
AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-28001
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth: 10.00 m	Start Date: 26/05/2022	Driller: BM	Sheet 1 of 2
Hand Digging	Hand Tools	0.00	1.20					Scale: 1:40
Cable Percussion	Dando 2000	1.20	10.00	589380.36 E				
				687765.26 N	Elevation: 88.56 mOD	End Date: 26/05/2022	Logger: NH	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
					88.26	0.30		TOPSOIL		
0.40 - 0.60	B1							Stiff to very stiff brownish slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of various lithologies. Cobbles are subangular to subrounded of various lithologies.		
0.50	D10									
0.80 - 1.00	B2									
1.00	D11									
1.20 - 1.27	SPT (C)	N=50 (25 for 50mm/50 for 25mm) Hammer SN = 1386	1.00	Dry						
1.80 - 2.00	B3									
2.00	D12									
2.00 - 2.45	SPT (S)	N=26 (10,8/8,8,5,5) Hammer SN = 1386	2.00	Dry						
2.80 - 3.00	B4									
3.00	D13									
3.00 - 3.45	U20	Ublow=30 100% Recovery	3.00	Dry						
3.80 - 4.00	B5									
4.00	D14									
4.00 - 4.45	SPT (S)	N=36 (5,6/8,8,10,10) Hammer SN = 1386	4.00	Dry						
4.80 - 5.00	B6									
5.00	D15									
5.00 - 5.42	SPT (S)	N=50 (7,10/50 for 265mm) Hammer SN = 1386	4.50	Dry						
5.80 - 6.00	B7									
6.00	D16									
6.00 - 6.45	U21	Ublow=50 100% Recovery	4.50	Dry						



Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter
10.00	200

Water Added

From (m)	To (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Termination Reason

Terminated at scheduled depth

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-28001

Client: Irish Water

Client's Rep: Mott MacDonald

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	589380.36 E
Cable Percussion	Dando 2000	1.20	10.00	687765.26 N

Final Depth: 10.00 m **Start Date:** 26/05/2022 **Driller:** BM

Elevation: 88.56 mOD **End Date:** 26/05/2022 **Logger:** NH

Sheet 2 of 2
Scale: 1:40
FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
7.50	D17							Stiff to very stiff brownish slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of various lithologies. Cobbles are subangular to subrounded of various lithologies.		
7.50 - 7.82	SPT (S)	N=50 (25 for 125mm/50 for 190mm) Hammer SN = 1386	4.50	Dry						
8.00 - 8.50	B8									
8.50	D18									
9.00 - 9.40	U22	Ublow=50 50% Recovery	4.50	Dry						
9.50 - 10.00	B9									
10.00	D19				78.56	10.00		End of Borehole at 10.00m		
10.00 - 10.14	SPT (S)	N=50 (25 for 115mm/50 for 25mm) Hammer SN = 1386	4.50	Dry						

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)

Casing Details

To (m)	Diameter
10.00	200

Water Added

From (m)	To (m)

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Termination Reason

Terminated at scheduled depth

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-28362
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	589746.54 E
Cable Percussion	Dando 3000	1.20	1.60	687796.73 N

Final Depth:	1.60 m	Start Date:	23/05/2022	Driller:	CB	Sheet 1 of 1
Elevation:	76.67 mOD	End Date:	24/05/2022	Logger:	NH	Scale: 1:40
						FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
					76.27	0.40		TOPSOIL		
0.40 - 1.20	B1							Firm dark brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies. Cobbles are subangular of greywacke.		
1.00	D2									
					75.47	1.20		Dark grey subangular COBBLES of greywacke.		
					75.07	1.60		End of Borehole at 1.60m		

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter
1.20	200

Water Added

From (m)	To (m)
0.00	1.20

Chiselling Details

From (m)	To (m)	Time (hh:mm)
1.20	1.60	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
Re-bore attempted at BH28362A
No groundwater encountered

Termination Reason

Terminated on refusal of SPT on boulder and 1 hour of chiselling.

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-28362A

Client: Irish Water

Client's Rep: Mott MacDonald

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 3000	1.20	2.60

Coordinates: 589744.79 E, 687786.98 N

Final Depth: 2.60 m | **Start Date:** 24/05/2022 | **Driller:** CB

Elevation: 76.77 mOD | **End Date:** 24/05/2022 | **Logger:** NH

Sheet 1 of 1 | Scale: 1:40 | FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description
					76.37	0.40		TOPSOIL
								Firm to stiff brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of various lithologies. Cobbles are subrounded of greywacke.
2.00 - 2.26	SPT (C)	N=50 (4,4/50 for 105mm) Hammer SN = 1411	2.00					
					74.57	2.20		BOULDER
					74.17	2.60		End of Borehole at 2.60m

Water: Backfill

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter
2.20	200

Water Added

From (m)	To (m)
0.00	2.60

Chiselling Details

From (m)	To (m)	Time (hh:mm)
2.20	2.60	01:30

Remarks

Hand dug inspection pit excavated to 1.20m
Re-bore of BH-28362; refusal on boulder at 1.60m
No groundwater encountered

Termination Reason

Terminated on refusal of SPT on boulder and 1 hour of chiselling.

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-28362B
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 3000	1.20	2.30
Rotary Coring	Beretta T44	2.30	9.80

Coordinates: 589745.10 E, 687792.29 N

Final Depth: 9.80 m | Start Date: 24/05/2022 | Driller: PJ+CB

Elevation: 76.77 mOD | End Date: 08/09/2022 | Logger: CM+NH

Sheet 1 of 2
Scale: 1:50
FINAL

Depth (m)	Sample / Tests	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
									76.37	0.40		TOPSOIL		
												Firm to stiff brown slightly gravelly CLAY with low cobble content. Gravel is subangular to subrounded fine to coarse of various lithologies. Cobbles are subangular of greywacke.		
									74.67	2.10		BOULDER		
									74.47	2.30		Low Recovery: Very stiff slightly gravelly slightly sandy CLAY with high cobble and low boulder conent. Sand is fine to coarse. Gravel is subangular fine to coarse of predominantly limestone. Cobbles are subangular of various lithologies including sandstone, limestone and granite.		
			23			AZCL						*2.65-3.80: AZCL (Possibly due to fines and gravel being washed out with flush).*		
3.80														
3.80 - 4.18	SPT(C) N=50 (10,15/50 for 225mm) Hammer SN = 1385													
			37			AZCL						*4.35-5.30: AZCL (Possibly due to fines and gravel being washed out with flush).*		
5.30														
5.30 - 5.43	SPT(C) N=50 (25 for 30mm/50 for 100mm) Hammer SN = 1385									(7.50)		*5.65-5.95: Brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subangular fine to medium of various lithologies.*		
			43			AZCL						*5.95-6.80: AZCL (Possibly due to fines and gravel being washed out with flush).*		
6.80														
6.80 - 7.18	SPT(C) N=50 (7,11/50 for 225mm) Hammer SN = 1385		0			NR						*6.80-9.80: No recovery (possibly washed away or cobble stuck in shoe scrubbed the core runs). (Description inferred from recovery above 6.80m and flush returns at 6.80-9.80m.)*		
8.30														
8.30 - 8.72	SPT(C) N=50 (5,8/50 for 275mm) Hammer SN = 1385		0											

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
2.10	2.30	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
Re-bore of BH-28362A; refusal on boulder at 2.60m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
2.10	200
2.30	200
9.80	150

Water Added

From (m)	To (m)

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-28362B
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 3000	1.20	2.30
Rotary Coring	Beretta T44	2.30	9.80

Coordinates: 589745.10 E, 687792.29 N

Final Depth: 9.80 m | Start Date: 24/05/2022 | Driller: PJ+CB | Sheet 2 of 2 | Scale: 1:50

Elevation: 76.77 mOD | End Date: 08/09/2022 | Logger: CM+NH | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
9.80 9.80 - 10.25	SPT(C) N=44 (6,9,9,11,11,13) Hammer SN = 1385							66.97	9.80		Low Recovery: Very stiff slightly gravelly slightly sandy CLAY with high cobble and low boulder conent. Sand is fine to coarse. Gravel is subangular fine to coarse of predominantly limestone. Cobbles are subangular of various lithologies including sandstone, limestone and granite. End of Borehole at 9.80m		

TCR	SCR	RQD	FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
2.10	2.30	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
Re-bore of BH-28362A; refusal on boulder at 2.60m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
2.10	200
2.30	200
9.80	150

Water Added

From (m)	To (m)

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-28598
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth: 9.40 m	Start Date: 24/05/2022	Driller: CB	Sheet 1 of 2
Hand Digging	Hand Tools	0.00	1.20					Scale: 1:40
Cable Percussion	Dando 3000	1.20	9.40	589901.25 E				
				687966.52 N	Elevation: 71.03 mOD	End Date: 25/05/2022	Logger: TH	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.00 - 0.50	B1				70.83	0.20		TOPSOIL		
								Soft dark brown slightly sandy slightly gravelly organic CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies.		
0.50 - 1.20	B2				70.53	0.50		Loose greyish brown sandy slightly clayey subangular fine to coarse GRAVEL of various lithologies. Sand is fine to coarse.		
1.00	D5									
1.20 - 2.00	B3									
1.20 - 1.65	SPT (C)	N=8 (5,3/2,2,2,2) Hammer SN = 1411	1.20	0.50						
2.00	D6				69.03	2.00		Medium dense greyish brown sandy clayey subangular fine to coarse GRAVEL of various lithologies with low cobble content. Sand is fine to coarse. Cobbles are subangular to subrounded of greywacke.		
2.00 - 3.00	B4									
2.00 - 2.45	SPT (C)	N=12 (4,3/4,3,2,3) Hammer SN = 1411	2.00	1.00						
3.00	D12									
3.00 - 4.00	B7									
3.00 - 3.45	SPT (C)	N=19 (3,3/4,4,5,6) Hammer SN = 1411	3.00	0.50						
4.00	D13									
4.00 - 5.00	B8									
4.00 - 4.45	SPT (C)	N=18 (2,4/5,5,4,4) Hammer SN = 1411	4.00	1.00						
5.00	D14				66.03	5.00		Dense dark grey subrounded COBBLES of greywacke with some clayey gravelly fine to coarse sand. Gravel is subangular fine to coarse of various lithologies.		
5.00 - 6.50	B9									
5.00 - 5.45	SPT (C)	N=30 (3,6/7,7,7,9) Hammer SN = 1411	5.00	1.50						
6.00	D15									
6.50 - 8.00	B10				64.53	6.50		Stiff to very stiff greyish brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies.		
6.50 - 6.95	SPT (C)	N=18 (2,4/3,4,6,5) Hammer SN = 1411	6.50	4.00						
7.00	D16									

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter
9.20	200

Water Added

From (m)	To (m)
0.00	9.40

Chiselling Details

From (m)	To (m)	Time (hh:mm)
9.20	9.40	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Termination Reason

Terminated at scheduled depth

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-28598
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	
Cable Percussion	Dando 3000	1.20	9.40	589901.25 E
				687966.52 N

Final Depth:	9.40 m	Start Date:	24/05/2022	Driller:	CB	Sheet 2 of 2
Elevation:	71.03 mOD	End Date:	25/05/2022	Logger:	TH	Scale: 1:40
						FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
8.00	D17							Stiff to very stiff greyish brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies.		
8.00 - 8.45	SPT (C)	N=31 (4,6/7,7,8,9) Hammer SN = 1411	8.00	6.50						
8.60 - 9.40	B11				62.43	8.60		Very stiff light brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to medium of various lithologies.		
9.00	D18									
					61.63	9.40		End of Borehole at 9.40m		

7.5 8.0 8.5 9.0 9.5 10.0 10.5 11.0 11.5 12.0 12.5 13.0 13.5 14.0 14.5

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter
9.20	200

Water Added

From (m)	To (m)
0.00	9.40

Chiselling Details

From (m)	To (m)	Time (hh:mm)
9.20	9.40	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Termination Reason

Terminated at scheduled depth

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-28796

Client: Irish Water

Client's Rep: Mott MacDonald

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 3000	1.20	1.50

Coordinates: 589977.40 E, 688006.19 N

Final Depth: 1.50 m | **Start Date:** 26/05/2022 | **Driller:** CB

Elevation: 72.55 mOD | **End Date:** 26/05/2022 | **Logger:** TH

Sheet 1 of 1 | Scale: 1:40 | FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.20 - 1.20	B1				72.35	0.20		TOPSOIL		
								Soft brown slightly sandy slightly gravelly organic CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies.		
1.00	D2				71.65	0.90		Very dense dark grey sandy subangular fine to coarse GRAVEL of various lithologies with high cobble content. Sand is fine to coarse. Cobbles are subangular to subrounded of limestone.		
1.20 - 1.39	SPT (S)	N=50 (4,6/50 for 40mm) Hammer SN = 1411	1.20		71.05	1.50		End of Borehole at 1.50m		

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter
1.50	200

Water Added

From (m)	To (m)
0.00	1.50

Chiselling Details

From (m)	To (m)	Time (hh:mm)

Remarks

Hand dug inspection pit excavated to 1.20m
Re-bore attempted at BH-28796A
No groundwater encountered

Termination Reason

Terminated on refusal of SPT on boulder/possible bedrock

Last Updated

13/03/2023

AGS

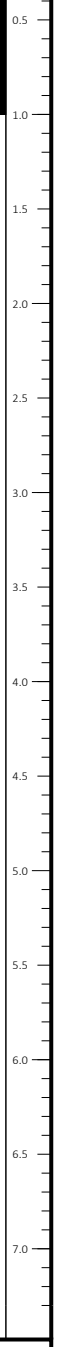
CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-28796A
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.00	589978.35 E 688001.59 N

Final Depth:	Start Date:	Driller:	Sheet 1 of 1
1.00 m	26/05/2022	CB	Scale: 1:40
Elevation: 72.63 mOD	**End Date:** 26/05/2022	**Logger:** SF	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
					72.43	0.20		TOPSOIL		
								Soft brown slightly sandy slightly gravelly organic CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies.		
					71.93	0.70		Dark grey subangular fine to coarse GRAVEL of various lithologies		
					71.63	1.00		End of Borehole at 1.00m		



Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter
1.00	200

Water Added

From (m)	To (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)

Remarks

Hand dug inspection pit excavated to 1.00m
Re-bore of BH-28796; virtual refusal at 1.50m
Re-bore attempted at BH-28796B
No groundwater encountered

Termination Reason

Terminated on refusal of SPT on boulder/possible bedrock

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-28796B
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	0.50
Rotary Drilling	Beretta T44	0.50	2.20
Rotary Coring	Beretta T44	2.20	9.70

Coordinates: 589979.48 E, 688010.27 N

Final Depth:	Start Date:	Driller:	Sheet 1 of 2
9.70 m	26/05/2022	PJ+CB	Scale: 1:50
Elevation: 72.49 mOD	**End Date:** 02/09/2022	**Logger:** NP+NH	FINAL

Depth (m)	Sample / Tests	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
									72.29	0.20		TOPSOIL		
												Soft brown slightly sandy slightly gravelly organic CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies.		
									71.99	0.50		Firm to stiff brown slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse.		
2.20 - 2.65	SPT(C) N=29 (6,10/10,7,8,4) Hammer SN = 1385	10				AZCL	2.20		70.29	2.20		Medium dense grey subangular medium to coarse GRAVEL of limestone with high cobble content. Cobbles are subangular of limestone.		
										(1.50)		*2.20m to 3.55m: AZCL disturbance due to SPT/possible fines washed out with drilling fluid*		
3.70							3.70		68.79	3.70		Dense to very dense grey subangular medium to coarse GRAVEL of limestone with medium cobble content and pockets of brown sandy clay. Cobbles are subangular of limestone.		
3.70 - 4.02	SPT(C) N=50 (10,15/50 for 170mm) Hammer SN = 1385	67				AZCL						*3.70m to 4.70m: AZCL disturbance due to SPT/material scrubbed out with drilling fluid*		
5.20							5.20							
5.20 - 5.32	SPT(C) N=50 (25 for 90mm/50 for 35mm) Hammer SN = 1385	50				AZCL				(4.50)		*5.20m to 5.95m: AZCL disturbance du to SPT/material scrubbed out with drilling fluid*		
6.70							6.70							
6.70 - 6.76	SPT(C) N=50 (25 for 30mm/50 for 25mm) Hammer SN = 1385	70												
8.20							8.20		64.29	8.20		Very stiff brown slightly sandy gravelly SILT. Sand is fine to coarse. Gravel is subangular fine to coarse of limestone.		
8.20 - 8.54	SPT(C) N=50 (9,14/50 for 190mm) Hammer SN = 1385	63				AZCL				(0.85)		*8.20m to 8.75m: AZCL disturbance due to SPT/fines washed out with drilling fluid.*		
									63.44	9.05		Very stiff brown sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.		

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)

Remarks

Hand dug inspection pit excavated to 0.50m
Re-bore of BH-28796A; virtual refusal at 1.00m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
2.20	200
9.70	150

Water Added

From (m)	To (m)

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-28796B
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	0.50
Rotary Drilling	Beretta T44	0.50	2.20
Rotary Coring	Beretta T44	2.20	9.70

Coordinates: 589979.48 E, 688010.27 N

Final Depth: 9.70 m | Start Date: 26/05/2022 | Driller: PJ+CB

Elevation: 72.49 mOD | End Date: 02/09/2022 | Logger: NP+NH

Scale: 1:50

FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
									(0.65)		Very stiff brown sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.		
9.70						9.70		62.79	9.70		End of Borehole at 9.70m		
9.70 - 10.02	SPT(C) N=50 (10,15/50 for 170mm) Hammer SN = 1385												

TCR	SCR	RQD	FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)

Casing Details

To (m)	Diam (mm)
2.20	200
9.70	150

Water Added

From (m)	To (m)

Remarks

Hand dug inspection pit excavated to 0.50m
Re-bore of BH-28796A; virtual refusal at 1.00m
No groundwater encountered

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-28818
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	0.60	590017.16 E 688014.39 N

Final Depth:	Start Date:	Driller:	Sheet 1 of 1
0.60 m	30/05/2022	BM	Scale: 1:40
Elevation: 75.19 mOD	**End Date:** 30/05/2022	**Logger:** NH	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
					74.99	0.20		TOPSOIL		
								BOULDER of limestone		
					74.59	0.60		End of Borehole at 0.60m		

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter

Water Added

From (m)	To (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)

Remarks

Hand dug inspection pit excavated to 0.60m
Re-bore attempted at BH-28818A
No groundwater encountered

Termination Reason

Terminated on virtual refusal on boulder

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-28818A

Client: Irish Water

Client's Rep: Mott MacDonald

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	1.75
Rotary Drilling	Beretta T44	1.75	2.20
Rotary Coring	Beretta T44	2.20	24.70

Coordinates: 590020.57 E, 688014.42 N

Final Depth: 24.70 m | **Start Date:** 30/05/2022 | **Driller:** PJ+BM

Elevation: 75.19 mOD | **End Date:** 31/08/2022 | **Logger:** NP+TH

Sheet 1 of 3

Scale: 1:50

FINAL

Depth (m)	Sample / Tests	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
									74.99	0.20		TOPSOIL		
0.40 - 0.60	B1											Greyish brown very gravelly very clayey fine to coarse SAND with low cobble content. Gravel is subrounded fine to coarse of various lithologies. Cobbles are subangular of limestone.		
0.50	D3								74.59	0.60		Soft light brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to medium of various lithologies.		
0.80 - 1.00	B2													
1.00	D4								74.19	1.00		Firm to stiff brown sandy gravelly CLAY. Sand is fine to coarse. Gravel		
1.20 - 1.60	U5	Ublow=50 70% Recovery										is subangular to subrounded fine to coarse of various lithologies.		
									73.44	1.75		Firm brown sandy gravelly CLAY with low cobble and boulder content. (Driller's description)		
2.20	C1					AZCL	2.20		72.99	2.20		Firm brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.		
2.20 - 2.65	SPT(C) N=25 (4,4/6,6,6,7) Hammer SN = 1385		33							(1.50)		*2.20m to 3.20m: AZCL disturbance due to SPT fines washed out with drilling fluid*		
3.70						AZCL	3.70		71.49	3.70		Very dense grey slightly sandy slightly clayey subangular fine to coarse GRAVEL of limestone with low cobble content. Cobble are subangular of limestone.		
3.70 - 3.97	SPT(C) N=50 (25 for 120mm/50 for 150mm) Hammer SN = 1385		47							(2.25)		*3.70m to 4.50m: AZCL Disturbance due to SPT material scrubbed out with drilling fluid*		
5.20						AZCL	5.20					Grey slightly gravelly fine to coarse SAND. Gravel is subangular fine to coarse.		
5.20 - 5.48	SPT(C) N=50 (1,1/50 for 135mm) Hammer SN = 1385		50						69.24	5.95		Firm brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.		
										(0.30)				
									68.94	6.25		Very dense grey subangular medium to coarse GRAVEL of limestone with low cobble content. Cobbles are subrounded of limestone.		
										(0.40)		*6.70m to 7.65m: AZCL Disturbance due to SPT/material scrubbed out with drilling fluid*		
6.70						AZCL	6.70		68.54	6.65		Stiff light brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of limestone.		
6.70 - 6.88	SPT(C) N=50 (25 for 55mm/50 for 120mm) Hammer SN = 1385		36							(1.00)		Possible weathered LIMESTONE recovered as: Very dense grey angular coarse gravel of limestone.		
									67.54	7.65		Moderately weak (locally medium strong) massive dark grey LIMESTONE. Slightly weathered: reduced strength, closer fracture spacing, orangish brown discolouration and clay infill on most fracture surfaces.		
										(0.55)		Discontinuities:		
8.20							8.20		66.99	8.20		1. 10 to 30 degree joints, closely spaced (45/85/300) slightly undulating, rough, orangish brown staining on most joint surfaces, orangish brown clay infill on some fractures surfaces, up to 10mm thick.		
8.20 - 8.29	SPT(C) N=50 (25 for 25mm/50 for 65mm) Hammer SN = 1385		97	61	50				66.69	(0.30) 8.50		2. 40 to 60 degree joints, widely spaced (80/670/800) planar, rough, orangish brown clay film on some joint surfaces.		
8.65 - 8.85	C2											3. 65 to 85 degree joints, at 9.10m to 9.30m, 10.20m to 10.55m, 10.50m to 10.95m, 10.50m to 10.85m, 11.15m to 11.65m and 11.75m to 11.85m, undulating, rough, light greyish brown clay infill on most joint surfaces.		

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
1.70	1.70	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
Re-bore of BH-28818; refusal on boulder at 0.60m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
1.70	200
2.20	200
24.70	150

Water Added

From (m)	To (m)

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-28818A

Client: Irish Water

Client's Rep: Mott MacDonald

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	1.75
Rotary Drilling	Beretta T44	1.75	2.20
Rotary Coring	Beretta T44	2.20	24.70

Coordinates: 590020.57 E, 688014.42 N

Final Depth: 24.70 m | **Start Date:** 30/05/2022 | **Driller:** PJ+BM

Elevation: 75.19 mOD | **End Date:** 31/08/2022 | **Logger:** NP+TH

Sheet 2 of 3

Scale: 1:50

FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Level mOD	Depth (m)	Description
9.45	C3							
9.70								Moderately weak (locally medium strong) massive dark grey LIMESTONE. Slightly weathered: reduced strength, closer fracture spacing, orangish brown discolouration and clay infill on most fracture surfaces. Discontinuities: 1. 10 to 30 degree joints, closely spaced (45/85/300) slightly undulating, rough, orangish brown staining on most joint surfaces, orangish brown clay infill on some fractures surfaces, up to 10mm thick. 2. 40 to 60 degree joints, widely spaced (80/670/800) planar, rough, orangish brown clay film on some joint surfaces. 3. 65 to 85 degree joints, at 9.10m to 9.30m, 10.20m to 10.55m, 10.50m to 10.95m, 10.50m to 10.85m, 11.15m to 11.65m and 11.75m to 11.85m, undulating, rough, light greyish brown clay infill on most joint surfaces.
10.50 - 10.65	C4	100	70	46	9		(3.35)	
11.20						63.34	11.85	
12.70		100	87	77	5		(2.65)	Medium strong massive dark grey LIMESTONE with rare greyish white calcite veins of subvertical orientation, 1 to 4mm thick. Slightly weathered: slightly reduced strength, closer fracture spacing, orangish brown discolouration on some fracture surfaces. Discontinuities: 1. 10 to 20 degree joints, medium spaced (40/440/470) undulating, rough. 2. 40 to 50 degree joints, at 12.50m and 13.60m, planar rough, orangish brown clay film on joint at 12.50m. 3. 70 to 90 degree joints, at 12.30m to 12.75m, 13.00m to 13.20m, 13.30m to 14.10m, undulating, rough, patchy orangish brown staining and light greyish brown clay infill on some joint surfaces.
14.20		100	74	63				
15.70		100	55	35	10	60.69	14.50	Moderately weak massive dark grey LIMESTONE. Slightly weathered: reduced strength, much closer fracture spacing, orangish brown staining and clay infill on some fracture surfaces. Discontinuities: 1. 0 to 10 degree joint, medium spaced (60/225/460) planar, rough. 2. 40 to 60 degree joints, at 14.95m to 15.00m and 15.15m, planar, rough. 3. 70 to 90 degree joints, at 14.65m to 14.95m, 14.95m to 15.25m and 15.20m to 15.55m, undulating, rough, orangish brown sandy clay infill on most joint surfaces, up to 20mm thick.
		100	47	16	16	59.34	15.85	Moderately weak massive dark grey LIMESTONE with very widely spaced thick beds of weak massive grey micritic limestone. Moderately weathered: considerably weakened, much closer fracture spacing, orangish brown discolouration and clay infill on most fracture surfaces. Discontinuities: 1. 10 to 25 degree joints, medium spaced (30/255/360) slightly undulating, rough, orangish brown staining on most joint surfaces, orangish brown clay infill on some joint surfaces up to 10mm thick. 2. 40 to 60 degree joints, medium spaced (15/205/350) undulating, rough. 3. 70 to 80 degree joints, at 16.85m to 17.25m, 18.10m to 18.25m, 19.25m to 19.60m, 19.65m to 20.30m, 21.35m to 21.85m, and 22.40m to 22.80m, undulating, rough, dark orangish brown staining on joint surfaces.
17.20		100	85	77				
		TCR	SCR	RQD	FI			

Water: | Backfill

9.5 10.0 10.5 11.0 11.5 12.0 12.5 13.0 13.5 14.0 14.5 15.0 15.5 16.0 16.5 17.0 17.5 18.0 18.5

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
1.70	1.70	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
Re-bore of BH-28818; refusal on boulder at 0.60m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
1.70	200
2.20	200
24.70	150

Water Added

From (m)	To (m)

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-28818A
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	1.75
Rotary Drilling	Beretta T44	1.75	2.20
Rotary Coring	Beretta T44	2.20	24.70

Coordinates: 590020.57 E, 688014.42 N

Final Depth: 24.70 m | Start Date: 30/05/2022 | Driller: PJ+BM | Sheet 3 of 3 | Scale: 1:50

Elevation: 75.19 mOD | End Date: 31/08/2022 | Logger: NP+TH | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
18.70													
		100	82	64	8						Moderately weak massive dark grey LIMESTONE with very widely spaced thick beds of weak massive grey micritic limestone. Moderately weathered: considerably weakened, much closer fracture spacing, orangish brown discolouration and clay infill on most fracture surfaces. Discontinuities: 1. 10 to 25 degree joints, medium spaced (30/255/360) slightly undulating, rough, orangish brown staining on most joint surfaces, orangish brown clay infill on some joint surfaces up to 10mm thick. 2. 40 to 60 degree joints, medium spaced (15/205/350) undulating, rough. 3. 70 to 80 degree joints, at 16.85m to 17.25m, 18.10m to 18.25m, 19.25m to 19.60m, 19.65m to 20.30m, 21.35m to 21.85m, and 22.40m to 22.80m, undulating, rough, dark orangish brown staining on joint surfaces.		
20.20													
		100	45	30					(7.45)				
					11						21.20m to 21.30m: Firm grey occasional orangish brown clay infill on ~25 degree joint		
21.70													
		100	40	31									
					5								
23.20								51.89	23.30				
		100	88	80	5				(1.40)		Medium strong massive dark grey LIMESTONE. Slightly weathered: slightly reduced strength, slightly closer fracture spacing, orangish brown discolouration on most fracture surfaces. Discontinuities: 1. 15 to 20 degree joints, medium spaced (90/350/450) slightly undulating, rough, orangish brown staining and grey clay infill on some joint surfaces up to 12mm thick. 2. 40 to 50 degree joints, at 23.355m to 23.60m and 24.20m to 24.25m, undulating, rough, patchy orangish brown staining on some joint surfaces. 3. 80 to 90 degree joint at 24.40m to 24.70m, undulating rough, orangish brown staining on joint surfaces.		
24.70								50.49	24.70		End of Borehole at 24.70m		
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)
1.70	200
2.20	200
24.70	150

Water Added

From (m)	To (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
1.70	1.70	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
Re-bore of BH-28818; refusal on boulder at 0.60m
No groundwater encountered

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-28886
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	
Cable Percussion	Dando 2000	1.20	1.50	590098.94 E
				688007.94 N

Final Depth:	1.50 m	Start Date:	25/05/2022	Driller:	BM	Sheet 1 of 1
Elevation:	78.35 mOD	End Date:	25/05/2022	Logger:	CH	Scale: 1:40
						FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
					78.05	0.30		TOPSOIL		
0.40 - 0.60	B1							Soft dark brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular fine to coarse of various lithologies.		
0.50	D4									
0.80 - 1.00	B2				77.55	0.80		Firm dark orangish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies.		
1.00	D5									
1.20 - 1.36	SPT (S)	N=50 (25 for 115mm/50 for 50mm) Hammer SN = 1386	1.20	Dry	77.05	1.30		Very stiff dark greyish brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is angular fine to coarse of various lithologies. Cobbles are angular of limestone.		
1.50	B3				76.85	1.50		End of Borehole at 1.50m		
1.50	D6									

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter
1.50	200

Water Added

From (m)	To (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)

Remarks

Hand dug inspection pit excavated to 1.20m
Re-bore attempted at BH-28886A
No groundwater encountered

Termination Reason

Terminated on refusal of SPT on boulder/possible bedrock

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-28886A
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	1.30
Rotary Drilling	Beretta T44	1.30	2.20
Rotary Coring	Beretta T44	2.20	24.70

Coordinates: 590101.94 E, 688008.94 N

Final Depth: 24.70 m | Start Date: 25/05/2022 | Driller: PJ+BM | Sheet 1 of 3 | Scale: 1:50

Elevation: 78.58 mOD | End Date: 04/07/2022 | Logger: TH+NH | FINAL

Depth (m)	Sample / Tests	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
									78.28	0.30		TOPSOIL		
												Soft dark brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies.		
									77.78	0.80		Firm dark orangish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies.		
									77.28	1.30		Very stiff brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies.		
2.20 - 3.70 2.20 - 2.65	C1 SPT(C) N=31 (4,6/7,8,9,7) Hammer SN = 1385	87							76.38	2.20		Very stiff greyish brown slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies. Cobbles are subrounded of limestone.		
										(1.30)				
3.70 3.70 - 5.20 3.70 - 4.15	C2 SPT(C) N=33 (9,13/11,7,8,7) Hammer SN = 1385	83							75.08	3.50		Very stiff brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies. Cobbles are subrounded of limestone.		
5.20 5.20 - 5.54	SPT(C) N=50 (25 for 75mm/50 for 260mm) Hammer SN = 1385	83										*5.40m to 5.60m: Bed of medium to coarse gravel and cobble.* *5.80m to 5.90m: Bed of dark greyish brown fine to coarse sand*		
										(4.95)				
6.70 6.70 - 6.94	SPT(C) N=50 (25 for 60mm/50 for 175mm) Hammer SN = 1385	100												
8.20 8.20 - 9.70 8.20 - 8.28	C3 SPT(C) N=50 (25 for 55mm/50 for 20mm) Hammer SN = 1385	100							70.13	8.45		*8.20m to 8.30m: Bed of very sandy clay* Very stiff brown slightly sandy slightly gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse of various lithologies. Cobbles are subrounded of limestone.		
8.75 - 8.95	C4													

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
1.30	1.50	01:00

Casing Details

To (m)	Diam (mm)
1.30	200
2.20	200
24.70	150

Water Added

From (m)	To (m)

Remarks

Hand dug inspection pit excavated to 1.20m
Re-bore of BH-28886; virtual refusal at 1.60m
No groundwater encountered

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-28886A
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	1.30
Rotary Drilling	Beretta T44	1.30	2.20
Rotary Coring	Beretta T44	2.20	24.70

Coordinates: 590101.94 E, 688008.94 N

Final Depth:	24.70 m	Start Date:	25/05/2022	Driller:	PJ+BM	Sheet 2 of 3
Elevation:	78.58 mOD	End Date:	04/07/2022	Logger:	TH+NH	Scale: 1:50
						FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
9.70											Very stiff brown slightly sandy slightly gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse of various lithologies. Cobbles are subrounded of limestone.		
9.70 - 9.80	SPT(C) N=50 (25 for 30mm/50 for 75mm) Hammer SN = 1385	93							(3.25)				
11.20											*11.20m to 11.35m: Bed of sandy clay and subrounded fine to coarse gravel.*		
11.20 - 11.23	SPT(C) N=50 (25 for 20mm/50 for 10mm) Hammer SN = 1385	100						66.88	11.70		Very stiff brown sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies. Cobbles are subangular of limestone.		
									(1.00)				
12.70								65.88	12.70		Weak massive light grey LIMESTONE with frequent white and orangish white calcite veins of subvertical orientations. Moderately weathered: slightly reduced strength, closer fracture spacing, orangish brown discolouration and sandy gravelly clay infill on fracture surfaces. Discontinuities: 1. 0 to 20 degree joints, closely spaced (40/180/320) planar, undulating, orangish brown staining on most joint surfaces, some grey reduction and brown sandy gravelly clay infill on some joints, up to 10mm thick. 2. 50 to 70 degree joints, at 13.30m to 13.40m, 13.37m to 13.50m, 13.48m to 13.60m and 14.92m to 15.10m, planar, rough, orangish brown staining on joint surfaces, light brown clay film on joint at 14.92m to 15.10m. 3. 80 to 90 degree joints, at 14.00m to 14.80m and 15.25m to 16.00m, planar, rough, orangish brown staining on joint surfaces, orangish brown clay and calcite infill on joint at 14.00m to 4.80m, up to 20mm thick.		
12.70	C5												
12.70 - 12.72	SPT(C) N=50 (25 for 10mm/50 for 10mm) Hammer SN = 1385	100	67	38									
13.70	C6												
14.20		97	69	37	7				(3.30)				
15.70					NI			62.58	16.00		Weak to medium strong massive grey LIMESTONE with some greyish white calcite veins of subvertical orientation (1 to 3mm thick), slightly weathered: slightly reduced strength, slightly closer fracture spacing orangish brown discolouration, sand infill on some fracture surfaces. Discontinuities: 1. 0 to 10 degree joints, medium spaced (40/222/385) planar rough, orangish brown staining on joint surfaces, grey reduction and sand infill on some joint surfaces. 2. ~60 degree joint, at 17.410m to 17.55m, undulating rough, orangish brown staining on joint surfaces. 3. 70 to 90 degree joints at 16.00m to 16.20m, 16.60m to 17.00m, 17.40m to 18.00m, 17.7m to 18.25m, 18.70m to 19.20m, 19.35m to 20.00m, slightly undulating, rough, orangish brown staining on joint surfaces		
		100	52	33	8								
					>20								
17.20		70	58	58	6				(4.35)				
					AZCL								
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
1.30	1.50	01:00

Casing Details

To (m)	Diam (mm)
1.30	200
2.20	200
24.70	150

Water Added

From (m)	To (m)

Remarks

Hand dug inspection pit excavated to 1.20m
Re-bore of BH-28886; virtual refusal at 1.60m
No groundwater encountered

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-28886A
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	1.30
Rotary Drilling	Beretta T44	1.30	2.20
Rotary Coring	Beretta T44	2.20	24.70

Coordinates: 590101.94 E, 688008.94 N

Final Depth: 24.70 m | Start Date: 25/05/2022 | Driller: PJ+BM | Sheet 3 of 3 | Scale: 1:50

Elevation: 78.58 mOD | End Date: 04/07/2022 | Logger: TH+NH | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
18.70													
		100	74	55	10						Weak to medium strong massive grey LIMESTONE with some greyish white calcite veins of subvertical orientation (1 to 3mm thick), slightly weathered: slightly reduced strength, slightly closer fracture spacing orangish brown discolouration, sand infill on some fracture surfaces. Discontinuities: 1. 0 to 10 degree joints, medium spaced (40/222/385) planar rough, orangish brown staining on joint surfaces, grey reduction and sand infill on some joint surfaces. 2. ~60 degree joint, at 17.410m to 17.55m, undulating rough, orangish brown staining on joint surfaces. 3. 70 to 90 degree joints at 16.00m to 16.20m, 16.60m to 17.00m, 17.40m to 18.00m, 17.7m to 18.25m, 18.70m to 19.20m, 19.35m to 20.00m, slightly undulating, rough, orangish brown staining on joint surfaces		
					6								
20.20								58.23	20.35				
		98	98	95							Strong massive dark grey argillaceous LIMESTONE with are greyish white calcite veins of subvertical orientation (1 to 4mm thick) slightly weathered: slightly reduced strength, grey reduction, some clay infill. Discontinuities: 1. 0 to 10 degree joints, medium spaced (110/435/600) planar, rough, grey reduction, some dark orangish brown staining. 2. 20 to 30 degree joints, at 21.00m and 22.65m, planar, rough, grey reduction and patchy dark orangish brown staining on joint surfaces.		
21.70													
		100	90	87	5				(4.35)				
23.20													
		100	79	73									
					NI								
					3								
24.70								53.88	24.70		End of Borehole at 24.70m		

TCR	SCR	RQD	FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
1.30	1.50	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
Re-bore of BH-28886; virtual refusal at 1.60m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
1.30	200
2.20	200
24.70	150

Water Added

From (m)	To (m)

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-28924
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.00	590147.90 E 688033.38 N

Final Depth:	1.00 m	Start Date:	25/05/2022	Driller:	BM	Sheet 1 of 1 Scale: 1:40
Elevation:	85.14 mOD	End Date:	25/05/2022	Logger:	NH	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
					84.84	0.30		TOPSOIL		
0.40 - 0.60 0.50	B1 D3							Firm brownish grey slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of various lithologies.		
0.80 - 1.00	B2									
1.00	D4				84.14	1.00		End of Borehole at 1.00m		

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter
1.00	200

Water Added

From (m)	To (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)

Remarks

Hand dug inspection pit excavated to 1.00m
Re-bore attempted at BH-28924A
No groundwater encountered

Termination Reason

Terminated on possible bedrock

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-28924A

Client: Irish Water

Client's Rep: Mott MacDonald

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	0.60
Rotary Percussion	Beretta T44	0.60	2.20
Rotary Coring	Beretta T44	2.20	9.70

Coordinates: 590149.10 E, 688034.58 N

Final Depth: 9.70 m | **Start Date:** 25/05/2022 | **Driller:** PJ+BM | Sheet 1 of 2 | Scale: 1:50

Elevation: 85.21 mOD | **End Date:** 28/06/2022 | **Logger:** TH +CMC | FINAL

Depth (m)	Sample / Tests	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
									85.01	0.20		TOPSOIL		
												Large grey BOULDER. (Drillers Description)		
									84.61	0.60		Firm to stiff brown slightly gravelly sandy CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies. Cobbles are subangular of limestone.		
2.20 - 2.65	SPT(C) N=47 (4,6/8,12,13,14) Hammer SN = 1385	80					2.20		83.01	2.20		Very stiff brownish grey slightly gravelly sandy CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies. Cobbles and boulders are of limestone.		
3.70							3.70			(2.50)				
3.70 - 3.74	SPT(C) N=50 (25 for 15mm/50 for 25mm) Hammer SN = 1385	97							80.51	4.70		Very stiff light brown slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is angular fine to coarse of various lithologies. Cobbles are subangular of limestone.		
5.20							5.20							
5.20 - 5.50	C2													
5.20 - 6.70	C1													
5.20 - 5.42	SPT(C) N=50 (25 for 115mm/50 for 100mm) Hammer SN = 1385	100												
6.30 - 6.60	C3													
6.70							6.70							
6.70 - 6.88	SPT(C) N=50 (25 for 75mm/50 for 105mm) Hammer SN = 1385	100								(4.35)				
8.20							8.20							
8.20 - 9.70	C4													
8.20 - 8.44	SPT(C) N=50 (25 for 115mm/50 for 120mm) Hammer SN = 1385	100												
									76.16	9.05		Very stiff brownish grey slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies. Cobbles are subangular of limestone.		

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)

Remarks

Hand dug inspection pit excavated to 0.60m
Re-bore of BH-28924; virtual refusal at 1.00
No groundwater encountered

Casing Details

To (m)	Diam (mm)
2.20	200
9.70	150

Water Added

From (m)	To (m)

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer/Air	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-28924A
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	0.60
Rotary Percussion	Beretta T44	0.60	2.20
Rotary Coring	Beretta T44	2.20	9.70

Coordinates: 590149.10 E, 688034.58 N

Final Depth: 9.70 m | **Start Date:** 25/05/2022 | **Driller:** PJ+BM | Sheet 2 of 2 | Scale: 1:50

Elevation: 85.21 mOD | **End Date:** 28/06/2022 | **Logger:** TH +CMC | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
									(0.65)		Very stiff brownish grey slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies. Cobbles are subangular of limestone.		
9.70						9.70		75.51	9.70		End of Borehole at 9.70m		
9.70 - 9.96	SPT(C) N=50 (25 for 110mm/50 for 150mm) Hammer SN = 1385												

TCR	SCR	RQD	FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)

Casing Details

To (m)	Diam (mm)
2.20	200
9.70	150

Water Added

From (m)	To (m)

Remarks

Hand dug inspection pit excavated to 0.60m
Re-bore of BH-28924; virtual refusal at 1.00
No groundwater encountered

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer/Air	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-29130
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth:	Start Date:	Driller:	Sheet / Scale
Hand Digging	Hand Tools	0.00	1.20					Sheet 1 of 2
Cable Percussion	Dando 2500	1.20	5.20	590336.67 E	9.70 m	28/07/2022	RW+PJ	Scale: 1:50
Rotary Coring	Beretta T44	5.20	9.70	688256.13 N	Elevation: 74.61 mOD	End Date: 09/09/2022	Logger: CM	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.10 - 0.80	B1				74.51	0.10		TOPSOIL Firm to stiff brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to subangular fine to coarse.		
0.80 - 1.20	B2				73.81	0.80		Medium dense dark grey sandy slightly clayey angular to subangular fine to coarse GRAVEL with high cobble content. Sand is fine to coarse. Cobbles are angular.		
1.20	D6									
1.20 - 2.00	B3									
1.20 - 1.38	SPT (C)	N=50 (4,25/50 for 35mm) Hammer SN = 1410	1.20	Dry						
2.00 - 3.00	B4									
2.00 - 2.45	SPT (C)	N=23 (3,3/8,5,5,5) Hammer SN = 1410	2.00	1.50						
2.20	D7									
3.00 - 4.00	B5				71.71	2.90		Stiff grey slightly sandy slightly gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to medium. Cobbles are subangular.		
3.00 - 3.45	SPT (C)	N=27 (3,4/7,6,7,7) Hammer SN = 1410	3.00	1.70						
3.20	D8									
4.00 - 4.40	U10	Ublow=150 0% Recovery	4.00	3.00						
4.00 - 5.00	B11									
4.00 - 4.42	SPT (C)	N=50 (10,8/50 for 275mm) Hammer SN = 1410	4.00	3.00						
4.20	D9				70.11	4.50		Stiff brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium. Cobbles are subrounded.		
5.00 - 5.70	B12									
5.00 - 5.42	SPT(C) N=50 (14,10/50 for 265mm) Hammer SN = 1410	TCR 73	5.60	3.30	69.41	5.20		Greyish brown sandy clayey subangular fine to coarse GRAVEL of predominantly limestone with high cobble content and pockets of sandy gravelly clay. Sand is fine to coarse. Cobbles are subangular of predominantly limestone.		
5.20	D13									
5.20 - 5.90	C1					(1.70)				
5.70 - 5.72	SPT(C) N=50 (25 for 10mm/50 for 15mm) Hammer SN = 1410	AZCL						6.30-6.70m: AZCL (possibly due to fines and gravel being washed out with flush).		
6.70										
6.70 - 7.14	SPT(C) N=50 (6,9/50 for 290mm) Hammer SN = 1385	TCR 82			67.71	6.90		Very stiff light yellowish brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is angular to subangular of predominantly sandstone and limestone.		
6.80 - 6.90	C2									
6.90 - 7.15	C3							7.60-7.95m: Very stiff orangish brown gravelly slightly sandy CLAY. Gravel is angular to subangular of predominantly sandstone and limestone.		
8.20						(2.80)				
8.20 - 8.65	SPT(C) N=49 (4,7/10,11,13,15) Hammer SN = 1385	TCR 89						8.20-8.40m: Very stiff orangish brown gravelly slightly sandy CLAY. Gravel is angular to subangular of predominantly sandstone and limestone.		
8.60 - 8.75	C4									
8.90 - 9.70	C5							8.90-9.05m: Very stiff orangish brown gravelly slightly sandy CLAY. Gravel is angular to subangular of predominantly sandstone and limestone. 9.15-9.30m: Very stiff orangish brown gravelly slightly sandy CLAY. Gravel is angular to subangular of predominantly sandstone and limestone.		

TCR | SCR | RQD | FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)
5.70	200

Water Added

From (m)	To (m)
1.20	5.70

Chiselling Details

From (m)	To (m)	Time (hh:mm)
5.70	5.70	01:00

Remarks

Hand dug inspection pit excavated to 1.20
No groundwater encountered

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-29130
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2500	1.20	5.20
Rotary Coring	Beretta T44	5.20	9.70

Coordinates: 590336.67 E, 688256.13 N

Final Depth: 9.70 m | Start Date: 28/07/2022 | Driller: RW+PJ | Elevation: 74.61 mOD | End Date: 09/09/2022 | Logger: CM

Sheet 2 of 2 | Scale: 1:50 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
9.70								64.91	9.70		Very stiff light yellowish brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is angular to subangular of predominantly sandstone and limestone.		
9.70 - 10.15	SPT(C) N=50 (5,9/9,12,13,16) Hammer SN = 1385										End of Borehole at 9.70m		

TCR	SCR	RQD	FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)
5.70	200

Water Added

From (m)	To (m)
1.20	5.70

Chiselling Details

From (m)	To (m)	Time (hh:mm)
5.70	5.70	01:00

Remarks

Hand dug inspection pit excavated to 1.20
No groundwater encountered

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-29577
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	
Cable Percussion	Dando 2000	1.20	2.20	590626.80 E
Rotary Coring	Beretta T44	2.20	9.70	688604.84 N

Final Depth:	Start Date:	Driller:	Sheet 1 of 2
9.70 m	03/08/2022	PJ+BM	Scale: 1:50
Elevation: 81.00 mOD	**End Date:** 10/09/2022	**Logger:** CM+TH	FINAL

Depth (m)	Sample / Tests	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
									80.90	0.10		TOPSOIL		
0.30 - 0.50	B1								80.50	0.50		Firm brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is angular fine to coarse. Cobbles are subangular.		
0.80 - 1.00	B2											Stiff to very stiff greyish brown slightly sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is subangular fine to medium.		
1.20	D5													
1.20 - 1.52	SPT (S)	N=50 (4,9/50 for 170mm) Hammer SN = 1386					1.00	Dry						
1.80 - 2.00	B3													
2.00 - 2.45	U6	Ublow=50 50% Recovery					1.50	Dry						
2.40	C1					AZCL			78.80	2.20		Very stiff greyish brown slightly sandy gravelly CLAY with low cobble content and occassional boulders. Sand is fine to coarse. Gravel is subangular fine to coarse of predominantly limestone. Cobbles are subangular of limestone. Boulder is of limestone.		
2.80 - 3.00	B4											*2.20-2.75m: AZCL (possibly due to fines and gravel being washed out with flush).*		
3.00 - 3.07	SPT(S) N=50 (25 for 50mm/50 for 20mm) Hammer SN = 1386		63				3.00	Dry						
3.70										(3.80)				
			53			AZCL						*4.40-5.20m: AZCL (possibly due to fines and gravel being washed out with flush).*		
5.20														
5.20 - 5.50	SPT(C) N=50 (9,14/50 for 150mm) Hammer SN = 1385		93	38	9				75.00	6.00		Medium strong (locally strong) indistinctly thickly laminated to thinly bedded dark grey to grey LIMESTONE. Slightly weathered: slightly reduced strength, closer fracture spacing, patchy orangish brown discolouration on fracture surfaces.		
6.10 - 6.20	C2													
6.70												Discontinuities:		
6.80 - 6.95	C3											1. 0-15 degree bedding fractures, closely spaced (40/140/240), planar, rough, patchy orangish brown staining on fracture surfaces.		
7.50	C4		100	78	65	8				(3.70)		2. 85-90 degree joints from 5.45-5.60m, 5.65-5.75m and 8.20-8.50m, planar, rough, patchy orangish brown staining on joint surfaces.		
8.20												3. 20-35 degree joints at 7.20m and 8.60m, planar, rough, patchy orangish brown staining on joint surfaces.		
8.65 - 8.85	C5		83	61	36							*7.20-7.30m: Limestone recovered as slightly sandy angular fine to coarse gravel. Sand is fine to coarse (possible fault breccia).*		

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)
3.00	200
9.70	150

Water Added

From (m)	To (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
1.40	1.90	00:45
2.70	3.00	00:45
3.10	3.20	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-29577
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	2.20
Rotary Coring	Beretta T44	2.20	9.70

Coordinates: 590626.80 E, 688604.84 N

Final Depth:	9.70 m	Start Date:	03/08/2022	Driller:	PJ+BM	Sheet 2 of 2
Elevation:	81.00 mOD	End Date:	10/09/2022	Logger:	CM+TH	Scale: 1:50
						FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
9.70								71.30	9.70		Medium strong (locally strong) indistinctly thickly laminated to thinly bedded dark grey to grey LIMESTONE. Slightly weathered: slightly reduced strength, closer fracture spacing, patchy orangish brown discolouration on fracture surfaces. Discontinuities: 1. 0-15 degree bedding fractures, closely spaced (40/140/240), planar, rough, patchy orangish brown staining on fracture surfaces. 2. 85-90 degree joints from 5.45-5.60m, 5.65-5.75m and 8.20-8.50m, planar, rough, patchy orangish brown staining on joint surfaces. 3. 20-35 degree joints at 7.20m and 8.60m, planar, rough, patchy orangish brown staining on joint surfaces. End of Borehole at 9.70m		

TCR	SCR	RQD	FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
1.40	1.90	00:45
2.70	3.00	00:45
3.10	3.20	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
3.00	200
9.70	150

Water Added

From (m)	To (m)

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-29923
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	590870.67 E 688850.15 N

Final Depth:	Start Date:	Driller:	Sheet 1 of 1
1.20 m	23/05/2022	CB	Scale: 1:40
Elevation: 77.67 mOD	**End Date:** 23/05/2022	**Logger:** TH	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.20 - 1.20	B1				77.47	0.20		TOPSOIL		
								Firm brown slightly gravelly sandy CLAY with low cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse of various lithologies. Cobbles are subrounded of limestone.		
1.00	D2									
					76.47	1.20		End of Borehole at 1.20m		

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter
1.20	200

Water Added

From (m)	To (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
1.20	1.20	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
Re-bore attempted at BH-29923A
No groundwater encountered

Termination Reason

Terminated on virtual refusal on boulder and 1 hour of chiselling.

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-29923A
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.00	
Rotary Drilling	Beretta T44	1.00	2.20	590873.07 E
Rotary Coring	Beretta T44	2.20	9.70	688853.15 N

Final Depth:	9.70 m	Start Date:	23/05/2022	Driller:	CB+PJ	Sheet 1 of 2
Elevation:	77.87 mOD	End Date:	22/06/2022	Logger:	TMcA +TH	Scale: 1:50
						FINAL

Depth (m)	Sample / Tests	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
									77.67	0.20		TOPSOIL		
												Firm brown slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse of various lithologies.		
									76.87	1.00		BOULDER (Driller's description)		
									76.27	1.60		Stiff brownish grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of limestone.		
2.20 - 2.58	SPT(C) N=50 (10,12/50 for 225mm) Hammer SN = 1385	100					2.20		75.67	2.20		Grey subangular COBBLES and BOULDERS of limestone.		
										(0.65)				
3.05	C2								75.02	2.85		Very stiff brownish grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of limestone.		
3.20	C3													
3.70							3.70			(1.65)				
3.70	C4													
3.70 - 3.88	SPT(C) N=50 (25 for 95mm/50 for 90mm) Hammer SN = 1385	87							73.37	4.50		Very stiff brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to medium of limestone.		
5.20							5.20			(1.30)				
5.20	C5													
5.20 - 5.52	SPT(C) N=50 (4,11/50 for 175mm) Hammer SN = 1385	80							72.07	5.80		Very stiff brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is angular to subangular fine to coarse. Cobbles are subrounded of limestone.		
5.50	C6													
6.70							6.70			(1.60)				
6.70 - 6.80	SPT(C) N=50 (25 for 50mm/50 for 55mm) Hammer SN = 1385	100							70.47	7.40		Very stiff orangish brown slightly sandy slightly gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subrounded of limestone.		
8.20							8.20			(2.30)				
8.20	C7													
8.20 - 8.57	SPT(C) N=50 (8,10/50 for 220mm) Hammer SN = 1385	100												

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)

Casing Details

To (m)	Diam (mm)
1.00	200
2.20	200
9.70	150

Water Added

From (m)	To (m)

Remarks

Hand dug inspection pit excavated to 1.00m
Re-bore of BH-29923; refusal on boulder at 1.20m
No groundwater encountered

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-29923A
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.00
Rotary Drilling	Beretta T44	1.00	2.20
Rotary Coring	Beretta T44	2.20	9.70

Coordinates: 590873.07 E, 688853.15 N

Final Depth:	9.70 m	Start Date:	23/05/2022	Driller:	CB+PJ	Sheet 2 of 2
Elevation:	77.87 mOD	End Date:	22/06/2022	Logger:	TMcA +TH	Scale: 1:50
						FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
9.70						9.70		68.17	9.70		Very stiff orangish brown slightly sandy slightly gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subrounded of limestone.		
9.70 - 10.04	SPT(C) N=50 (10,14/50 for 195mm) Hammer SN = 1385										End of Borehole at 9.70m		

TCR	SCR	RQD	FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)
1.00	200
2.20	200
9.70	150

Water Added

From (m)	To (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)

Remarks

Hand dug inspection pit excavated to 1.00m
Re-bore of BH-29923; refusal on boulder at 1.20m
No groundwater encountered

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-30066

Client: Irish Water

Client's Rep: Mott MacDonald

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percusson	Dando 3000	1.20	5.20
Rotary Coring	Beretta T44	5.20	12.70

Coordinates: 590991.10 E, 688928.20 N

Final Depth: 12.70 m | **Start Date:** 23/05/2022 | **Driller:** PJ+CB

Elevation: 77.47 mOD | **End Date:** 21/06/2022 | **Logger:** TH

Sheet 1 of 2

Scale: 1:50

FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description
0.20 - 1.20	B1				77.27	0.20		TOPSOIL
								Stiff brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subrounded fine to medium of various lithologies. Cobbles are subrounded of mudstone.
1.00	D5							
1.20 - 2.00	B2							
1.20 - 1.65	SPT (S)	N=16 (2,3/4,4,4,4) Hammer SN = 1411	0.00	Dry				
2.00	D6							
2.00 - 3.00	B3							
2.00 - 2.12	SPT (S)	N=50 (25 for 30mm/50 for 95mm) Hammer SN = 1411	2.00	Dry				
3.00	D7				74.47	3.00		
3.00 - 4.00	B4							Stiff brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to medium of various lithologies.
3.00 - 3.45	SPT (S)	N=24 (5,5/5,6,7,6) Hammer SN = 1411	3.00	Dry				
4.00	D8				73.47	4.00		
4.00 - 5.00	B9							Stiff brown slightly sandy slightly gravelly CLAY with low cobble content and lenses of orangish brown fine sand. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies. Cobbles are angular of limestone.
4.00 - 4.45	SPT (S)	N=28 (4,6/6,7,7,8) Hammer SN = 1411	4.00	Dry				
5.00 - 5.90	B10							
5.00 - 5.45	SPT(S) N=28 (4,4/6,7,8,7) Hammer SN = 1411	AZCL			72.27	5.20		Very stiff light brown slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies. Cobbles are subangular of limestone.
5.30	C1	63						*5.20m to 5.75m: AZCL disturbance due to SPT*
								6.00m to 6.20m: Bed of grey subangular fine to coarse gravel
6.70						(2.70)		
6.70	C2	AZCL	6.70					*6.70m to 7.05m: AZCL disturbance due to SPT*
6.70 - 7.05	SPT(C) N=50 (10,12/50 for 200mm) Hammer SN = 1385	77						
					69.57	7.90		Very dense grey subangular COBBLES of limestone with cobble-sized pockets of stiff brown slightly gravelly sandy clay. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies.
8.20			8.20					
8.20 - 8.30	SPT(C) N=50 (25 for 30mm/50 for 75mm) Hammer SN = 1385	AZCL				(2.50)		
		57						

TCR | SCR | RQD | FI

Water | Backfill

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
2.00	2.50	00:45
5.90	6.00	01:00

Casing Details

To (m)	Diam (mm)
5.20	200
5.90	200
12.70	150

Water Added

From (m)	To (m)
0.00	6.00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered during drilling
Standpipe installation (response zone 4.50-7.50m)
Install noted as having been destroyed/removed by farmer during December 2022 monitoring round

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-30066
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percusson	Dando 3000	1.20	5.20
Rotary Coring	Beretta T44	5.20	12.70

Coordinates: 590991.10 E, 688928.20 N

Final Depth: 12.70 m | Start Date: 23/05/2022 | Driller: PJ+CB | Elevation: 77.47 mOD | End Date: 21/06/2022 | Logger: TH

Sheet 2 of 2 | Scale: 1:50 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
9.70						9.70					Very dense grey subangular COBBLES of limestone with cobble-sized pockets of stiff brown slightly gravelly sandy clay. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies. *9.70m to 10.40m: AZCL disturbance due to SPT*		
9.70 - 10.04	SPT(C) N=50 (12,13/50 for 190mm) Hammer SN = 1385	53			AZCL			67.07	10.40		Very stiff brownish grey sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies. Cobbles are subangular of limestone.		
								66.42	11.05 (0.65)				
11.20						11.2		66.27	11.20 (0.15)		Orangish brown gravelly very clayey fine to coarse SAND. Gravel is subangular fine to medium of various lithologies.		
11.20	C5												
11.20 - 11.50	SPT(C) N=50 (25 for 120mm/50 for 175mm) Hammer SN = 1385	93							(1.50)		Very stiff brownish grey slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of various lithologies. Cobbles are subangular to subrounded of limestone.		
11.50	C3												
12.00	C4												
12.70						12.7		64.77	12.70		End of Borehole at 12.70m		
12.70 - 13.06	SPT(C) N=50 (9,15/50 for 210mm) Hammer SN = 1385												
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
2.00	2.50	00:45
5.90	6.00	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered during drilling
Standpipe installation (response zone 4.50-7.50m)
Install noted as having been destroyed/removed by farmer during December 2022 monitoring round

Casing Details

To (m)	Diam (mm)
5.20	200
5.90	200
12.70	150

Water Added

From (m)	To (m)
0.00	6.00

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-30414
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth:	Start Date:	Driller:	Sheet / Scale
Hand Digging	Hand Tools	0.00	1.20	591341.33 E	12.70 m	20/05/2022	CB+PJ	Sheet 1 of 2
Cable Percussion	Dando 3000	1.20	5.20					Scale: 1:50
Rotary Coring	Beretta T44	5.20	12.70	688980.66 N	Elevation: 76.76 mOD	End Date: 23/06/2022	Logger: TH	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.20 - 1.20	B1				76.56	0.20		TOPSOIL		
								Stiff greyish brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subrounded fine to medium of various lithologies. Cobbles are subangular of various lithologies.		
1.00	D6									
1.20 - 2.00	B2									
1.20 - 1.65	SPT (S)	N=19 (4,4/4,6,5,4) Hammer SN = 1411	0.00	Dry						
2.00	D7									
2.00 - 3.00	B3									
2.00 - 2.45	SPT (S)	N=18 (4,4/3,4,5,6) Hammer SN = 1411	2.00	Dry						
3.00	D8									
3.00 - 4.00	B4									
3.00 - 3.45	SPT (S)	N=18 (4,5/5,5,4,4) Hammer SN = 1411	3.00	Dry						
4.00	D9									
4.00 - 4.90	B5									
4.00 - 4.45	SPT (S)	N=21 (4,6/6,6,4,5) Hammer SN = 1411	4.00	Dry						
					71.86	4.90		BOULDER of limestone.		
5.20	C1	TCR 73 AZCL			71.56	5.20		Very stiff brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of limestone.		
								5.20-5.60m: AZCL fines washed out with drilling fluid		
						(1.15)				
6.70					70.41	6.35		Very stiff light brown slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of limestone. Cobbles are of limestone.		
6.70 - 6.84	SPT(C) N=50 (25 for 75mm/50 for 60mm) Hammer SN = 1385	TCR 60 AZCL						6.70-7.30m: AZCL disturbance due to SPT		
								7.30-7.50m: Bed of grey subangular fine to coarse gravel of limestone		
						(4.10)				
8.20								8.20-9.00m: AZCL disturbance due to SPT		
8.20	C3									
8.20 - 8.30	SPT(C) N=50 (25 for 60mm/50 for 40mm) Hammer SN = 1385	TCR 47 AZCL								

Water Strikes				Chiselling Details			Remarks
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm)	Hand dug inspection pit excavated to 1.20m Falling Head Test completed 4.10-5.10m No groundwater encountered

Casing Details		Water Added	
To (m)	Diam (mm)	From (m)	To (m)
5.20	200	0.00	5.10
12.70	150		

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-30414
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 3000	1.20	5.20
Rotary Coring	Beretta T44	5.20	12.70

Coordinates: 591341.33 E, 688980.66 N

Final Depth: 12.70 m | **Start Date:** 20/05/2022 | **Driller:** CB+PJ | **Elevation:** 76.76 mOD | **End Date:** 23/06/2022 | **Logger:** TH

Sheet 2 of 2 | Scale: 1:50 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
9.70											Very stiff light brown slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of limestone. Cobbles are of limestone.		
9.70 - 9.82	SPT(C) N=50 (14 for 75mm/50 for 50mm) Hammer SN = 1385	50			AZCL						*9.70-10.45m: AZCL disturbance due to SPT*		
								66.31	10.45		Very dense grey angular COBBLES of limestone.		
11.20													
11.20 - 11.29	SPT(C) N=50 (25 for 50mm/50 for 40mm) Hammer SN = 1385	83							(1.95)				
								64.36	12.40		Possible BEDROCK: recovered as large angular cobbles of strong limestone.		
12.50	C5								(0.30)				
12.70								64.06	12.70		End of Borehole at 12.70m		

TCR	SCR	RQD	FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)

Remarks

Hand dug inspection pit excavated to 1.20m
Falling Head Test completed 4.10-5.10m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
5.20	200
12.70	150

Water Added

From (m)	To (m)
0.00	5.10

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-30600
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Rotary Drilling	Beretta T44	1.20	2.20
Rotary Coring	Beretta T44	2.20	9.70

Coordinates: 591523.91 E, 688953.37 N

Final Depth: 9.70 m | Start Date: 23/06/2022 | Driller: PJ

Elevation: 73.53 mOD | End Date: 24/06/2022 | Logger: TH

Sheet 1 of 2
Scale: 1:40
FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
								73.33	0.20		TOPSOIL		
											Greyish brown fine to coarse SAND.		
								73.03	0.50		Greyish brown gravelly fine to coarse SAND with low cobble and boulder content. Gravel is subangular fine to coarse.		
								72.73	0.80		Very stiff brownish grey slightly sandy slightly gravelly CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles and boulders are of limestone.		
1.20 - 1.52	SPT(C) N=50 (6,12/50 for 175mm) Hammer SN = 1385					1.20							
2.20	C1					2.20		71.33	2.20		Very stiff brownish grey slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are of limestone.		
2.20 - 2.44	SPT(C) N=50 (25 for 95mm/50 for 150mm) Hammer SN = 1385	100											
3.70 - 3.76	SPT(C) N=50 (25 for 40mm/50 for 25mm) Hammer SN = 1385					3.70							
3.70		100											
5.20 - 5.43	SPT(C) N=50 (25 for 100mm/50 for 130mm) Hammer SN = 1385					5.20							
5.20								68.23	5.30		Very stiff brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of limestone.		
								67.73	5.80		Weak to medium strong massive grey fossiliferous LIMESTONE. Moderately weathered: reduced strength, closer fracture spacing, brown discolouration and clay infill, on some fracture surfaces. Discontinuities: 1. 40 to 60 degree joints, medium spaced (250/360/500) undulating, rough, patchy brown discolouration on some joint surfaces. 2. 80 to 90 degree joints, at 6.05m to 6.35m, 6.05m to 6.40m, 6.50m to 6.90m, 7.05m to 7.35m and 7.50m to 8.20m, undulating, rough, brown clay infill on some joint surfaces.		
		100	35	31	2								
6.20	C5				>20								
6.40	C6												
6.70													
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
2.20	200
9.70	150

Core Barrel

SK6L

Flush Type

Polymer

Termination Reason

Terminated at scheduled depth

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-30600
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Rotary Drilling	Beretta T44	1.20	2.20
Rotary Coring	Beretta T44	2.20	9.70

Coordinates: 591523.91 E, 688953.37 N

Final Depth: 9.70 m | Start Date: 23/06/2022 | Driller: PJ

Elevation: 73.53 mOD | End Date: 24/06/2022 | Logger: TH

Sheet 2 of 2 | Scale: 1:40 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
		93	51	41	12						Weak to medium strong massive grey fossiliferous LIMESTONE. Moderately weathered: reduced strength, closer fracture spacing, brown discolouration and clay infill, on some fracture surfaces. Discontinuities: 1. 40 to 60 degree joints, medium spaced (250/360/500) undulating, rough, patchy brown discolouration on some joint surfaces. 2. 80 to 90 degree joints, at 6.05m to 6.35m, 6.05m to 6.40m, 6.50m to 6.90m, 7.05m to 7.35m and 7.50m to 8.20m, undulating, rough, brown clay infill on some joint surfaces.		
8.20								65.23	8.30				
9.00	C7	100	68	53	7						Medium strong (locally weak) massive grey fossiliferous LIMESTONE with occasional orangish white calcite veins of subvertical orientation, up to 5mm thick, slightly weathered: slightly reduced strength, slightly closer fracture spacing, orangish brown discolouration on most fracture surfaces. Discontinuities: 1. 20 to 25 degree joints, at 9.00m to 9.15m, 9.15m, 9.20m and 9.40m, planar, rough, possibly drilling induced. 2.~60 degree joint at 9.50m to 9.70m, undulating, rough, light brown sandy clay film on joint surface. 3. 70 to 80 degree joints at 8.60m to 8.75m, 8.70m to 8.85m, 9.00m to 9.40m, 9.10m to 9.35m, 9.30m to 9.50m, planar, rough, orangish brown staining on most joint surfaces.		
9.30	C8												
9.70								63.83	9.70		End of Borehole at 9.70m		
		TCR	SCR	RQD	FI								

7.5 8.0 8.5 9.0 9.5 10.0 10.5 11.0 11.5 12.0 12.5 13.0 13.5 14.0 14.5

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
2.20	200
9.70	150

Core Barrel: SK6L

Flush Type: Polymer

Termination Reason: Terminated at scheduled depth

Last Updated: 13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-30722

Client: Irish Water

Client's Rep: Mott MacDonald

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Rotary Drilling	Beretta T44	1.20	2.20
Rotary Coring	Beretta T44	2.20	9.70

Coordinates: 591651.15 E, 688954.71 N

Final Depth: 9.70 m | **Start Date:** 19/05/2022 | **Driller:** CB+PJ

Elevation: 74.08 mOD | **End Date:** 07/06/2022 | **Logger:** TMcA +NP

Sheet 1 of 2 | Scale: 1:50 | FINAL

Depth (m)	Sample / Tests	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.20 - 1.20	B1								73.88	0.20		TOPSOIL		
									73.58	0.50		Firm brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of various lithologies.		
												Grey subangular to subrounded fine to coarse GRAVEL of various lithologies.		
									72.88	1.20		Firm light brown sandy gravelly CLAY. (Driller's description)		
2.20	C1								71.88	2.20		Stiff brown sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of limestone. Cobbles are subangular of limestone.		
2.20 - 2.65	SPT(C) N=41 (5,5/7,9,12,13) Hammer SN = 1385		80							(0.50)				
									71.38	2.70		Grey subangular fine to coarse GRAVEL of limestone.		
3.10	C2									(0.40)				
									70.98	3.10		Very stiff brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of limestone. Cobbles are subangular of limestone.		
3.70										(0.60)				
3.70 - 4.13	SPT(C) N=50 (5,7/50 for 280mm) Hammer SN = 1385		80						70.38	3.70		Very stiff brown slightly sandy slightly gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of limestone. Cobbles are subangular of limestone.		
												3.70-4.00m: AZCL possible bed of sand or gravel, washed out during drilling		
												4.85-4.95m: Bed of clayey gravelly sand		
5.20										(3.00)				
5.20	C3													
5.20 - 5.53	SPT(C) N=50 (12,13/50 for 180mm) Hammer SN = 1385		100											
6.40	C4													
6.70									67.38	6.70		Possible BEDROCK recovered as: Very dense grey angular to subangular medium to coarse GRAVEL of limestone with medium cobble content and lumps of soft brown clay. Cobbles are subangular of limestone.		
6.70 - 6.83	SPT(C) N=50 (25 for 80mm/50 for 50mm) Hammer SN = 1385		100	26	0					(1.10)				
									66.28	7.80		Medium strong massive grey LIMESTONE. Moderately weathered: slightly reduced strength, slightly closer fracture spacing, with orangish brown discolouration and occasional clay infill. Discontinuities: 1. 10-20 degree joints, medium spaced (90/240/310), undulating, rough with orangish brown staining on joint surfaces and firm brown clay infill, up to 37mm between joint surfaces.		
8.20			100	75	0	7				(1.90)		2. 75-90 degree joints at 7.80-8.00m, 7.90-8.40m, 8.40-8.60m, 8.65-9.00m, 8.80-9.30m and 9.40-9.55m, planar, rough and smooth with orangish brown staining on joint surfaces and rare soft brown clay infill, up to 5mm thick		
												8.55-8.58m: Firm brown clay infill between 10 degree joint surface		
												9.05-9.30m: Soft brown clay infill, up to 5mm thick between 80 degree joint surface		

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
1.20	1.20	01:00

Casing Details

To (m)	Diam (mm)
1.20	200
2.20	200
9.70	200

Water Added

From (m)	To (m)

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-30722
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Rotary Drilling	Beretta T44	1.20	2.20
Rotary Coring	Beretta T44	2.20	9.70

Coordinates: 591651.15 E, 688954.71 N

Final Depth:	9.70 m	**Start Date:**	19/05/2022	**Driller:**	CB+PJ	Sheet 2 of 2	Scale: 1:50
Elevation:	74.08 mOD	**End Date:**	07/06/2022	**Logger:**	TMcA +NP	FINAL	

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
9.70								64.38	9.70		Medium strong massive grey LIMESTONE. Moderately weathered: slightly reduced strength, slightly closer fracture spacing, with orangish brown discolouration and occasional clay infill. Discontinuities: 1. 10-20 degree joints, medium spaced (90/240/310), undulating, rough with orangish brown staining on joint surfaces and firm brown clay infill, up to 37mm between joint surfaces. 2. 75-90 degree joints at 7.80-8.00m, 7.90-8.40m, 8.40-8.60m, 8.65-9.00m, 8.80-9.30m and 9.40-9.55m, planar, rough and smooth with orangish brown staining on joint surfaces and rare soft brown clay infill, up to 5mm thick *9.40-9.60m: Incipient 10-15 degree joints, closely spaced* *9.60-9.64m: Firm brown clay infill between 10 degree joint surface* End of Borehole at 9.70m		

TCR	SCR	RQD	FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
1.20	1.20	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
1.20	200
2.20	200
9.70	200

Water Added

From (m)	To (m)

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-31227

Client: Irish Water

Client's Rep: Mott MacDonald

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 3000	1.20	5.20
Rotary Coring	Beretta T44	5.20	9.70

Coordinates: 592137.54 E, 688892.06 N

Final Depth: 9.70 m | **Start Date:** 19/05/2022 | **Driller:** CB+PJ

Elevation: 81.56 mOD | **End Date:** 27/06/2022 | **Logger:** TH

Sheet 1 of 2
Scale: 1:50
FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.20 - 1.20	B1				81.36	0.20		TOPSOIL		
								Firm to stiff greyish brown slightly sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium of various lithologies.		
1.00	D7									
1.20 - 2.00	B2									
1.20 - 1.65	SPT (C)	N=23 (6,6/7,6,5,5) Hammer SN = 1411	0.00	Dry						
2.00	D8				79.56	2.00				
2.00 - 2.45	U12	Ublow=63 20% Recovery	2.00	Dry				Stiff greyish brown slightly sandy slightly gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium of various lithologies. Cobbles are subangular of limestone.		
2.00 - 3.00	B3									
3.00	D9									
3.00 - 4.00	B4									
3.00 - 3.45	SPT (C)	N=18 (4,3/5,4,5,4) Hammer SN = 1411	3.00	Dry						
4.00	D10									
4.00 - 5.00	B5									
4.00 - 4.45	SPT (C)	N=22 (4,6/6,6,5,5) Hammer SN = 1411	4.00	Dry						
5.00	D11									
5.00 - 5.70	B6									
5.00 - 5.45	SPT(C) N=17 (4,5/4,4,4,5) Hammer SN = 1411	30 AZCL			76.36	5.20		Soft to firm light brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies. Cobbles are subangular of limestone.		
								5.20-6.25m: AZCL possibly fines washed out with drilling fluid.		
6.70						(3.00)				
6.70 - 8.20	C1									
6.70 - 7.15	SPT(C) N=5 (1,1/1,1,1,2) Hammer SN = 1385	80								
8.20					73.36	8.20		Very stiff brownish grey slightly sandy slightly gravelly CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies. Cobbles and boulders are subangular of limestone.		
8.20 - 9.70	C2									
8.20 - 8.60	SPT(C) N=50 (5,10/50 for 250mm) Hammer SN = 1385	100				(1.20)				
8.90 - 9.20	C3									
		TCR SCR RQD FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
5.70	5.80	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
5.20	200
5.70	200
9.70	150

Water Added

From (m)	To (m)
0.00	5.70

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-31227
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 3000	1.20	5.20
Rotary Coring	Beretta T44	5.20	9.70

Coordinates: 592137.54 E, 688892.06 N

Final Depth: 9.70 m | **Start Date:** 19/05/2022 | **Driller:** CB+PJ | Sheet 2 of 2 | Scale: 1:50

Elevation: 81.56 mOD | **End Date:** 27/06/2022 | **Logger:** TH | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
								72.16	9.40		Very stiff brownish grey slightly sandy slightly gravelly CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies. Cobbles and boulders are subangular of limestone.		
									(0.30)				
9.70								71.86	9.70		Very stiff light brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to medium of limestone.		
9.70 - 10.03	SPT(C) N=50 (10,15/50 for 180mm) Hammer SN = 1385										End of Borehole at 9.70m		

TCR	SCR	RQD	FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
5.70	5.80	01:00

Casing Details

To (m)	Diam (mm)
5.20	200
5.70	200
9.70	150

Water Added

From (m)	To (m)
0.00	5.70

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-31466

Client: Irish Water

Client's Rep: Mott MacDonald

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 3000	1.20	2.20
Rotary Coring	Beretta T44	2.20	9.70

Coordinates: 592350.96 E, 689014.08 N

Final Depth: 9.70 m | Start Date: 18/05/2022 | Driller: CB+PJ

Elevation: 71.16 mOD | End Date: 11/09/2022 | Logger: TH+CM

Sheet 1 of 2 | Scale: 1:50 | FINAL

Depth (m)	Sample / Tests	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.20 - 1.20	B1								70.96	0.20		TOPSOIL		
												Soft to firm dark brownish grey slightly gravelly sandy silty CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium of various lithologies.		
1.00	D4									1.20				
1.20 - 2.00	B2								69.96			Firm greyish brown slightly gravelly sandy silty CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium of various lithologies. Cobbles are subangular of predominantly greywacke.		
1.20 - 1.65	SPT (C)	N=13 (2,2/4,3,3,3) Hammer SN = 1411					0.00	Dry						
2.00	D5								69.16	2.00		Low recovery: Firm to stiff brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine		
2.00 - 2.80	B3													
2.00 - 2.45	SPT(C) N=18 (4,4/4,4,5,5) Hammer SN = 1411		70									to coarse of predominantly limestone. Cobbles are subangular of limestone.		
2.50	C1													
2.60 - 3.70	C2													
3.70														
3.70 - 4.15	SPT(C) N=7 (1,1/1,2,2,2) Hammer SN = 1385		27			AZCL						4.10-5.20m: AZCL (Possibly due to fines and gravel being washed out with flush).		
3.80 - 5.20	C3													
5.20										(6.20)				
5.20 - 5.65	SPT(C) N=8 (1,1/2,2,2,2) Hammer SN = 1385		47			AZCL						5.90-6.70m: AZCL (Possibly due to fines and gravel being washed out with flush).		
6.70														
6.70 - 7.15	SPT(C) N=14 (2,2/3,3,4,4) Hammer SN = 1385		17			AZCL						6.95-8.20m: AZCL (Possibly due to fines and gravel being washed out with flush).		
8.20									62.96	8.20				
8.20 - 8.56	SPT(C) N=50 (5,10/50 for 205mm) Hammer SN = 1385		53							(1.50)		Very stiff brown gravelly slightly sandy CLAY with high cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of limestone. Cobbles are subangular of limestone.		
												9.00-9.70m: AZCL (Possibly due to fines and gravel being washed out with flush).		

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
2.80	3.00	01:00

Casing Details

To (m)	Diam (mm)
2.80	200

Water Added

From (m)	To (m)

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated on instruction of Engineer	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-31466
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 3000	1.20	2.20
Rotary Coring	Beretta T44	2.20	9.70

Coordinates: 592350.96 E, 689014.08 N

Final Depth: 9.70 m | Start Date: 18/05/2022 | Driller: CB+PJ | Elevation: 71.16 mOD | End Date: 11/09/2022 | Logger: TH+CM

Scale: 1:50
FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
					AZCL						Very stiff brown gravelly slightly sandy CLAY with high cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of limestone. Cobbles are subangular of limestone.		
9.70								61.46	9.70		End of Borehole at 9.70m		
9.70 - 10.03	SPT(C) N=50 (10,15/50 for 180mm) Hammer SN = 1385												

TCR	SCR	RQD	FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)
2.80	200

Water Added

From (m)	To (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
2.80	3.00	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated on instruction of Engineer	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-31910

Client: Irish Water

Client's Rep: Mott MacDonald

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	2.50

Coordinates: 592694.39 E, 689223.67 N

Final Depth: 2.50 m | **Start Date:** 12/05/2022 | **Driller:** CB

Elevation: 78.47 mOD | **End Date:** 12/05/2022 | **Logger:** TMcA

Sheet 1 of 1

Scale: 1:40

FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.00 - 0.30	B1							TOPSOIL		
0.30 - 1.20	B2				78.17	0.30		Firm brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of various lithologies.		
1.00	D4									
1.20 - 2.00	B3									
1.20 - 1.65	SPT (S)	N=15 (3,3/4,4,4,3) Hammer SN = 1411	0.00	Dry						
2.00	D5				76.46	2.00		Very stiff brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of various lithologies. Cobbles are subrounded of limestone.		
2.00 - 2.45	U7	Ublow=71 100% Recovery	2.00	Dry						
2.45 - 2.50	D6				75.96	2.50		End of Borehole at 2.50m		

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)

Casing Details

To (m)	Diameter
2.00	200

Water Added

From (m)	To (m)
0.00	2.00

Remarks

Hand dug inspection pit excavated to 1.20m
Larger rig unable to be set up over same location; moved adjacent and sampling continued from 2.00m
No groundwater encountered

Termination Reason

Terminated to allow rig to be swapped out

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-31910A
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	
Cable Percussion	Dando 3000	1.20	3.60	592698.28 E
				689224.50 N

Final Depth:	3.60 m	Start Date:	12/05/2022	Driller:	CB	Sheet 1 of 1
Elevation:	78.28 mOD	End Date:	16/05/2022	Logger:	TMcA	Scale: 1:40
						FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
					77.98	0.30		TOPSOIL		
								Firm brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of various lithologies.		
2.00	D3									
2.00 - 3.00	B1									
					75.78	2.50		Firm to stiff brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of various lithologies. Cobbles are subrounded of limestone.		
3.00	D4									
3.00 - 3.60	B2									
3.00 - 3.45	SPT (C)	N=25 (4,4/7,8,5,5) Hammer SN = 1411	3.00	Dry						
					74.68	3.60		End of Borehole at 3.60m		

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter
3.60	200

Water Added

From (m)	To (m)
2.00	3.60

Chiselling Details

From (m)	To (m)	Time (hh:mm)
3.50	3.60	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
Continuation of BH-31910 from 2.50m with larger rig
No groundwater encountered

Termination Reason

Terminated on virtual refusal in large cobbles/boulder and 1 hour of chiselling.

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-31910B
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	
Cable Percussion	Dando 3000	1.20	5.20	592695.82 E
Rotary Coring	Beretta T44	5.20	9.70	689226.42 N

Final Depth:	Start Date:	Driller:	Sheet 1 of 2
9.70 m	16/05/2022	PJ+CB	Scale: 1:50
Elevation: 78.13 mOD	**End Date:** 08/06/2022	**Logger:** TH +TMcA	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
					77.82	0.30		TOPSOIL		
								Firm brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subrounded of various lithologies.		
					76.12	2.00		Firm to stiff brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium of various lithologies. Cobbles are subangular to subrounded of limestone.		
3.60 - 4.00	B1									
4.00	D4									
4.00 - 5.00	B2									
4.00 - 4.45	SPT (S)	N=19 (4,6/5,4,5,5) Hammer SN = 1411	4.00	Dry						
5.00	D5									
5.00 - 5.45	U7	Ublow=80 0% Recovery	5.00	Dry						
5.00 - 5.50	B3	93			72.92	5.20		Very stiff greyish brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies. Cobbles are subangular of limestone.		
5.20	C1									
5.30	C2									
5.50	D6									
6.70										
6.70 - 7.15	SPT(C) N=50 (9,9/10,12,14,14) Hammer SN = 1385	100				(4.05)				
7.10	C4									
8.20								8.20-9.25m: AZCL disturbance due to SPT.		
8.20 - 8.57	SPT(C) N=50 (10,12/50 for 225mm) Hammer SN = 1385	47 AZCL								
					68.88	9.25		Very stiff brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse of various lithologies.		

TCR | SCR | RQD | FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
5.50	5.55	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered
Re-bore of BH31910A to desired depth

Casing Details

To (m)	Diam (mm)
5.20	200
5.50	200
9.70	150

Water Added

From (m)	To (m)
0.00	5.50

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-31910B
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 3000	1.20	5.20
Rotary Coring	Beretta T44	5.20	9.70

Coordinates: 592695.82 E, 689226.42 N

Final Depth:	9.70 m	Start Date:	16/05/2022	Driller:	PJ+CB	Sheet 2 of 2
Elevation:	78.13 mOD	End Date:	08/06/2022	Logger:	TH +TMcA	Scale: 1:50
						FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
									(0.45)		Very stiff brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse of various lithologies.		
9.70								68.42	9.70		End of Borehole at 9.70m		
9.70 - 10.06	SPT(C) N=50 (10,13/50 for 210mm) Hammer SN = 1385												

TCR	SCR	RQD	FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)
5.20	200
5.50	200
9.70	150

Water Added

From (m)	To (m)
0.00	5.50

Chiselling Details

From (m)	To (m)	Time (hh:mm)
5.50	5.55	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered
Re-bore of BH31910A to desired depth

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-32020
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	
Cable Percussion	Dando 2000	1.20	1.50	592848.63 E
				689243.36 N

Final Depth:	1.50 m	**Start Date:**	11/05/2022	**Driller:**	CB	Sheet 1 of 1	
Elevation:	72.63 mOD	**End Date:**	11/05/2022	**Logger:**	TMcA	Scale: 1:40	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.00 - 0.30	B1							TOPSOIL		
0.30 - 1.20	B2				72.33	0.30		Firm brown slightly sandy very gravelly clayey SILT with low cobble and boulder content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of various lithologies. Cobbles are subrounded of limestone.		
1.00	D3									
1.20 - 1.38	SPT (S)	N=50 (3,5/50 for 25mm) Hammer SN = 1411	1.20	Dry	71.43	1.20		Large COBBLE/BOULDER.		
					71.13	1.50		End of Borehole at 1.50m		

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter

Water Added

From (m)	To (m)
0.00	1.50

Chiselling Details

From (m)	To (m)	Time (hh:mm)

Remarks

Hand dug inspection pit excavated to 1.00m
Re-bore attempted at BH-32020A
No groundwater encountered

Termination Reason

Terminated on refusal of SPT in large cobbles/boulder

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-32020A
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.00	
Rotary Drilling	Beretta T44	1.00	2.20	592849.90 E
Rotary Coring	Beretta T44	2.20	9.70	689244.62 N

Final Depth:	Start Date:	Driller:	Sheet 1 of 2
9.70 m	12/05/2022	PJ+CB	Scale: 1:50
Elevation: 72.67 mOD	**End Date:** 09/06/2022	**Logger:** TMcA	FINAL

Depth (m)	Sample / Tests	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
									72.37	0.30		TOPSOIL		
												Firm brown slightly sandy gravelly clayey SILT with low cobble content. Sand is fine to coarse. Gravel is subrounded to subangular fine to coarse of various lithologies. Cobbles are subrounded of limestone.		
									71.17	1.50		Firm brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of limestone.		
2.20	C1					AZCL						*2.20-2.65m: AZCL disturbance due to SPT*		
2.20 - 2.65	SPT(C) N=39 (4,6/9,9,10,11) Hammer SN = 1385	70	0	0						(3.30)				
3.70												*3.70-4.05m: AZCL disturbance due to SPT*		
3.70	C2					AZCL								
3.70 - 4.15	SPT(C) N=49 (5,7/11,12,13,13) Hammer SN = 1385	77	0	0										
									67.87	4.80		Weak to medium strong massive grey LIMESTONE. Moderately weathered: slightly reduced strength, closer fracture spacing with brown clay infill. Discontinuities 1. 5-20 degree joints, closely spaced (15/110/600), undulating, smooth with brown clay deposits on joint surfaces. 2. 70-85 degree joints, probably closely spaced, undulating, smooth with soft brown clay infill, up to 27mm between joint surfaces.		
5.20						>20								
5.20 - 5.58	SPT(C) N=50 (7,11/50 for 230mm) Hammer SN = 1385	60	0	0		AZCL						*5.80-6.40m: AZCL possible fines washed out with drilling fluid*		
										(3.00)				
6.70						16								
6.70	C4					NI								
		92	23	0		15						Medium strong (locally weak) massive grey LIMESTONE. Moderately weathered: slightly reduced strength, closer fracture spacing with clay deposits and occasional clay infill. Discontinuities 1. 5-10 degree joints, medium spaced (35/235/270), undulating, smooth with patchy brown clay deposits and soft brown clay infill, up to 10mm thick. 2. 70 degree joint at 7.80-8.05m and 8.88-9.13m, planar, smooth with white calcite mineralisation, up to 10mm thick on joint surface. 3. 80-90 degree joints at 8.30-8.90m, undulating, rough with patchy brown clay deposits on joint surface and 80-90 degree joint at 9.33-9.70m' planar, smooth with patchy brown clay deposits and white calcite mineralisation on joint surface.		
									64.87	7.80				
8.20						10								
		100	46	7						(1.90)				
9.00	C5													

Water Strikes			
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details		
From (m)	To (m)	Time (hh:mm)

Remarks

Hand dug inspection pit excavated to 1.20m
Re-bore of BH-32020; refusal on large cobbles/boulder at 1.50m
No groundwater encountered

Casing Details	
To (m)	Diam (mm)
1.00	200
2.20	200
9.70	150

Water Added	
From (m)	To (m)

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-32020A
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.00
Rotary Drilling	Beretta T44	1.00	2.20
Rotary Coring	Beretta T44	2.20	9.70

Coordinates: 592849.90 E, 689244.62 N

Final Depth: 9.70 m | Start Date: 12/05/2022 | Driller: PJ+CB | Elevation: 72.67 mOD | End Date: 09/06/2022 | Logger: TMcA

Scale: 1:50
FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
9.70								62.97	9.70		Medium strong (locally weak) massive grey LIMESTONE. Moderately weathered: slightly reduced strength, closer fracture spacing with clay deposits and occasional clay infill. Discontinuities 1. 5-10 degree joints, medium spaced (35/235/270), undulating, smooth with patchy brown clay deposits and soft brown clay infill, up to 10mm thick. 2. 70 degree joint at 7.80-8.05m and 8.88-9.13m, planar, smooth with white calcite mineralisation, up to 10mm thick on joint surface. 3. 80-90 degree joints at 8.30-8.90m, undulating, rough with patchy brown clay deposits on joint surface and 80-90 degree joint at 9.33-9.70m' planar, smooth with patchy brown clay deposits and white calcite mineralisation on joint surface. End of Borehole at 9.70m		

TCR	SCR	RQD	FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)
1.00	200
2.20	200
9.70	150

Water Added

From (m)	To (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)

Remarks

Hand dug inspection pit excavated to 1.20m
Re-bore of BH-32020; refusal on large cobbles/boulder at 1.50m
No groundwater encountered

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-32319
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth:	Start Date:	Driller:	Sheet 1 of 2
Hand Digging	Hand Tools	0.00	1.20					Scale: 1:50
Cable Percussion	Dando 3000	1.20	3.70	593122.94 E	9.70 m	17/05/2022	CB+PJ	
Rotary Coring	Beretta T44	3.70	9.70	689350.02 N	Elevation: 76.11 mOD	End Date: 10/06/2022	Logger: TMcA +TH	FINAL

Depth (m)	Sample / Tests	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.00 - 0.30	B1											TOPSOIL		
0.30 - 1.20	B2								75.81	0.30		Firm brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.		
									75.31	0.80		Firm to stiff brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium of various lithologies. Cobbles are subrounded of limestone.		
1.00	D6													
1.20 - 2.00	B3													
1.20 - 1.65	SPT (S)	N=13 (3,3/2,3,4,4) Hammer SN = 1411					0.00	Dry						
2.00	D7													
2.00 - 2.45	U9	Ublow=71 100% Recovery					2.00	Dry						
2.00 - 3.00	B4													
3.00	D8													
3.00 - 3.80	B5													
3.00 - 3.45	SPT (S)	N=18 (4,4/5,5,4,4) Hammer SN = 1411					3.00	Dry						
3.70	C1								72.41	3.70		Stiff light brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of limestone. Cobbles are subangular of limestone.		
3.80	C2													
4.00 - 4.02	SPT(S) N=50 (25 for 5mm/50 for 12mm) Hammer SN = 1411		93	9	7		4.00	Dry		(1.15)				
						9			71.26	4.85		Medium strong to strong (locally very strong) massive greyish black LIMESTONE with occasional greyish white calcite veins of subvertical orientation (1-3mm thick). Slightly weathered: slightly reduced strength, slightly closer fracture spacing, orangish brown discolouration on most fracture surfaces. Discontinuities: 1. 10-20 degree joints, closely spaced (20/180/500), slightly undulating, rough. 2. 70-90 degree joints, at 4.85-5.50m, 5.60-5.85m, 6.10-6.55m, 6.80-7.40m and 9.25-9.70m, undulating, rough, light brown clay film and staining on joint surfaces.		
5.20														
5.20	C3													
5.90	C4		100	84	68									
6.70						4				(4.85)				
			100	91	79									
7.60	C5													
7.75	C6													
7.99	C7													
8.20														
			100	75	58	8								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
3.80	4.00	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
3.70	200
3.80	200
9.70	150

Water Added

From (m)	To (m)
0.00	4.00

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-32319
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 3000	1.20	3.70
Rotary Coring	Beretta T44	3.70	9.70

Coordinates: 593122.94 E, 689350.02 N

Final Depth:	9.70 m	Start Date:	17/05/2022	Driller:	CB+PJ	Sheet 2 of 2
Elevation:	76.11 mOD	End Date:	10/06/2022	Logger:	TMcA +TH	Scale: 1:50
						FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
9.70								66.41	9.70		Medium strong to strong (locally very strong) massive greyish black LIMESTONE with occasional greyish white calcite veins of subvertical orientation (1-3mm thick). Slightly weathered: slightly reduced strength, slightly closer fracture spacing, orangish brown discolouration on most fracture surfaces. Discontinuities: 1. 10-20 degree joints, closely spaced (20/180/500), slightly undulating, rough. 2. 70-90 degree joints, at 4.85-5.50m, 5.60-5.85m, 6.10-6.55m, 6.80-7.40m and 9.25-9.70m, undulating, rough, light brown clay film and staining on joint surfaces. End of Borehole at 9.70m		

TCR	SCR	RQD	FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
3.80	4.00	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
3.70	200
3.80	200
9.70	150

Water Added

From (m)	To (m)
0.00	4.00

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-32601
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	593397.06 E
Rotary Drilling	Beretta T44	1.20	2.20	689364.13 N
Rotary Coring	Beretta T44	2.20	9.70	

Final Depth:	9.70 m	Start Date:	17/05/2022	Driller:	PJ+CB	Sheet 1 of 2
Elevation:	74.95 mOD	End Date:	14/06/2022	Logger:	TMcA +TH	Scale: 1:50
						FINAL

Depth (m)	Sample / Tests	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.00 - 0.40	B1											TOPSOIL		
0.40 - 1.20	B2								74.55	0.40		Firm light brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium of various lithologies.		
1.00	D3													
									73.75	1.20		Grey LIMESTONE. (Driller's description)		
2.20	C1		90	78	53	9			72.75	2.20		Medium strong massive grey fossiliferous LIMESTONE with rare greyish white calcite veins up to 10mm thick. Slightly weathered: closer fracture spacing, some orangish brown discoloration and clay infill on some fracture surfaces. Discontinuities: 1.10-20 degree joints, medium spaced (35/255/330), undulating, rough patchy orangish brown staining on most joint surfaces, orangish brown sandy clay infill on some joint surfaces, up to 15 thick. 2. 30-40 degree joints, medium spaced (100/590/1500), undulating, rough, patchy orangish brown staining on some joint surfaces. 3. 70-90 degree joints, at 3.20-3.35m, 3.70-4.05m and 4.15-4.45m, undulating, rough, orangish brown sandy clay infill on some joint surfaces,1-2mm thick.		
3.10	C2													
3.70			97	75	61	6				(3.55)				
4.60	C3													
5.20														
5.80	C4		93	93	65				69.20	5.75		Medium strong massive grey fossiliferous LIMESTONE with occasional greyish white calcite veins of various orientations, 1-3mm thick. Slightly weathered: patchy orangish brown discoloration on some fracture surfaces. Discontinuities: 1.0-15 degree joints, medium spaced (40/280/410), undulating, rough, patchy orangish brown staining on some joint surfaces. 2. 40-45 degree joint, at 6.20-6.30m, planar, rough. 3. 70-90 degree joints, at 7.50-7.75m and 7.85-8.10m, planar, rough, patchy light brown staining on joint surfaces.		
6.30	C5													
6.70			100	96	95	6				(3.95)				
8.20			100	100	93	4								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
1.20	1.20	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
1.20	200
2.20	200
9.70	150

Water Added

From (m)	To (m)

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-32601
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Rotary Drilling	Beretta T44	1.20	2.20
Rotary Coring	Beretta T44	2.20	9.70

Coordinates: 593397.06 E, 689364.13 N

Final Depth:	9.70 m	**Start Date:**	17/05/2022	**Driller:**	PJ+CB	Sheet 2 of 2	Scale: 1:50
Elevation:	74.95 mOD	**End Date:**	14/06/2022	**Logger:**	TMcA +TH	FINAL	

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
9.70								65.25	9.70		Medium strong massive grey fossiliferous LIMESTONE with occasional greyish white calcite veins of various orientations, 1-3mm thick. Slightly weathered: patchy orangish brown discoloration on some fracture surfaces. Discontinuities: 1.0-15 degree joints, medium spaced (40/280/410), undulating, rough, patchy orangish brown staining on some joint surfaces. 2. 40-45 degree joint, at 6.20-6.30m, planar, rough. 3. 70-90 degree joints, at 7.50-7.75m and 7.85-8.10m, planar, rough, patchy light brown staining on joint surfaces. End of Borehole at 9.70m		

TCR	SCR	RQD	FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
1.20	1.20	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
1.20	200
2.20	200
9.70	150

Water Added

From (m)	To (m)

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-33000
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	
Cable Percussion	Dando 2000	1.20	5.00	593779.11 E
				689274.24 N

Final Depth:	5.00 m	Start Date:	10/05/2022	Driller:	CB	Sheet 1 of 1
Elevation:	70.92 mOD	End Date:	11/05/2022	Logger:	TMcA	Scale: 1:40
						FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.00 - 0.30	B1							TOPSOIL		
0.30 - 1.20	B2				70.62	0.30		Firm mottled greyish brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse of various lithologies.		
1.00	D7				69.92	1.00		Firm brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of various lithologies. Cobbles are subrounded of limestone.	▼	
1.20 - 2.00	B3									
1.20 - 1.65	SPT (S)	N=13 (3,2/3,3,4,3) Hammer SN = 1411	0.00	Dry						
2.00	D8									
2.00 - 2.45	U11	Ublow=100 0% Recovery	2.00	Dry						
2.00 - 3.00	B4									
3.00	D9				67.92	3.00		Medium dense greyish brown sandy slightly silty subangular to subrounded fine to coarse GRAVEL of various lithologies. Sand is fine to coarse.	▽	
3.00 - 4.00	B5									
3.00 - 3.45	SPT (S)	N=28 (4,6/7,6,7,8) Hammer SN = 1411 Water strike at 3.00m	3.00	1.00						
4.00	D10				66.92	4.00		Medium dense grey gravelly COBBLES of limestone. Gravel is subrounded to subangular fine to coarse of various lithologies.		
4.00 - 4.60	B6									
4.00 - 4.45	SPT (C)	N=26 (4,4/6,6,7,7) Hammer SN = 1411	4.00	1.50						
					66.32	4.60		Large BOULDER/COBBLES.		
					65.92	5.00		End of Borehole at 5.00m		

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
3.00	3.00	20	1.00

Casing Details

To (m)	Diameter
5.00	200

Water Added

From (m)	To (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
2.00	2.50	00:30
4.60	5.00	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
Falling Head Test completed 3.50-4.60m

Termination Reason

Terminated on virtual refusal and 1.5 hours of chiselling.

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-33000A

Client: Irish Water

Client's Rep: Mott MacDonald

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Rotary Drilling	Beretta T44	1.20	5.20
Rotary Coring	Beretta T44	5.20	9.70

Coordinates: 593779.43 E, 689270.32 N

Final Depth: 9.70 m | **Start Date:** 31/05/2022 | **Driller:** PJ

Elevation: 70.95 mOD | **End Date:** 02/06/2022 | **Logger:** NP

Sheet 1 of 2
Scale: 1:50
FINAL

Depth (m)	Sample / Tests	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description
									70.35	0.60		TOPSOIL
												Firm brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of various lithologies. Cobbles are subrounded of limestone.
									68.45	2.50		Medium dense greyish brown sandy slightly silty subangular to subrounded fine to coarse GRAVEL of various lithologies. Sand is fine to coarse.
									66.95	4.00		Grey LIMESTONE. (Driller's description)
						AZCL			65.75	5.20		Medium strong (locally very storng) massive light grey LIMESTONE. Moderately weathered: slightly reduced strength, with orangish brown discolouration. Discontinuities: 1. 5-20 degree joints, medium spaced (75/300/640), undulating, rough with orangish brown staining on joint surfaces. 2. 40-50 degree joints at 5.90-6.00m, 6.50-6.60m and 8.65-8.75m, planar and undulating, rough with orangish brown staining on joint surfaces. 3. 70-75 degree joints at 6.25-6.40m and 8.45-8.60m, planar and undulating, rough with orangish brown staining on joint surfaces. 4. 80-90 degree joints at 5.40-5.90m, 6.70-7.35m and 8.20-8.45m, undulating, rough with orangish brown staining on joint surfaces.
5.70	C1		80	53	14							
6.70												
7.30	C2		100	61	49	5				(4.50)		
7.70	C3											
8.20			100	83	49							

5.20-5.50m: AZCL

7.70-7.90m: 80 degree light orange quartz vein, up to 11m thick.

8.80-9.45m: Discontinuous light orange quartz veins, up to 13mm thick.

Water | Backfill

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered during drilling
Standpipe installation (response zone 3.00-5.00m)

Casing Details

To (m)	Diam (mm)
5.20	200
9.70	150

Water Added

From (m)	To (m)

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-33000A
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Rotary Drilling	Beretta T44	1.20	5.20
Rotary Coring	Beretta T44	5.20	9.70

Coordinates: 593779.43 E, 689270.32 N

Final Depth: 9.70 m | Start Date: 31/05/2022 | Driller: PJ | Elevation: 70.95 mOD | End Date: 02/06/2022 | Logger: NP

Sheet 2 of 2 | Scale: 1:50 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
9.60 9.70	C4							61.25	9.70		Medium strong (locally very storng) massive light grey LIMESTONE. Moderately weathered: slightly reduced strength, with orangish brown discolouration. Discontinuities: 1. 5-20 degree joints, medium spaced (75/300/640), undulating, rough with orangish brown staining on joint surfaces. 2. 40-50 degree joints at 5.90-6.00m, 6.50-6.60m and 8.65-8.75m, planar and undulating, rough with orangish brown staining on joint surfaces. 3. 70-75 degree joints at 6.25-6.40m and 8.45-8.60m, planar and undulating, rough with orangish brown staining on joint surfaces. 4. 80-90 degree joints at 5.40-5.90m, 6.70-7.35m and 8.20-8.45m, undulating, rough with orangish brown staining on joint surfaces. End of Borehole at 9.70m		
		TCR	SCR	RQD	FI								

9.5 10.0 10.5 11.0 11.5 12.0 12.5 13.0 13.5 14.0 14.5 15.0 15.5 16.0 16.5 17.0 17.5 18.0 18.5

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered during drilling
Standpipe installation (response zone 3.00-5.00m)

Casing Details

To (m)	Diam (mm)
5.20	200
9.70	150

Water Added

From (m)	To (m)

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-34598
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	
Cable Percussion	Dando 2000	1.20	3.30	595239.81 E
				689638.42 N

Final Depth:	3.30 m	**Start Date:**	05/05/2022	**Driller:**	CB	Sheet 1 of 1	
Elevation:	75.52 mOD	**End Date:**	05/05/2022	**Logger:**	TMcA	Scale: 1:40	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
								TOPSOIL		
0.30 - 0.50	B1				75.22	0.30		Soft light brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to medium of various lithologies.		
0.50 - 1.20	B2				75.02	0.50		Firm light grey slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse of various lithologies. Cobbles are subrounded of limestone.		
1.00	D5									
1.20 - 2.00	B3									
1.20 - 1.65	SPT (S)	N=13 (2,2/3,3,4,3) Hammer SN = 1411	0.00	Dry						
2.00	D6									
2.00 - 2.45	U9	Ublow=36 50% Recovery	2.00	Dry						
2.00 - 3.00	B4									
2.45	D8									
3.00	D7				72.52	3.00		Very dense grey slightly sandy subangular to subrounded fine to coarse GRAVEL of various lithologies with medium cobble content. Sand is fine to coarse. Cobbles are subangular to subrounded of limestone.		
3.00 - 3.02	SPT (C)	N=50 (25 for 5mm/50 for 10mm) Hammer SN = 1411	3.00	Dry						
					72.22	3.30		End of Borehole at 3.30m		

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter
3.00	200

Water Added

From (m)	To (m)
0.00	3.00

Chiselling Details

From (m)	To (m)	Time (hh:mm)
3.00	3.30	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
Re-bore attempted at BH-34598A
No groundwater encountered

Termination Reason

Terminated on virtual refusal in large cobbles

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-34598A
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	
Cable Percussion	Dando 2000	1.20	4.60	595237.42 E
Rotary Coring	Comacchio 405	4.60	25.60	689636.45 N

Final Depth:	Start Date:	Driller:	Sheet 1 of 3
25.60 m	05/05/2022	MW+CB	Scale: 1:50
Elevation: 75.71 mOD	**End Date:** 31/05/2022	**Logger:** NP	FINAL

Depth (m)	Sample / Tests	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description
									75.41	0.30		TOPSOIL
									75.21	0.50		Soft light brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to medium of various lithologies.
												Firm light greyish brown sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse of various lithologies. Cobbles are subrounded of limestone.
3.00 - 4.00	B1								72.71	3.00		Medium dense grey slightly sandy subangular to subrounded coarse GRAVEL of various lithologies with medium cobble content. Sand is fine to coarse. Cobbles are subangular to subrounded of limestone.
4.00	D2											
4.00 - 4.45	SPT (C)	N=29 (7,8/9,7,6,7) Hammer SN = 1411					4.00	3.00				
4.60	C1								71.11	4.60		Very stiff greyish brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse of limestone. Cobbles are subrounded of limestone.
4.60 - 4.61	SPT(C) N=50 (25 for 5mm/50 for 5mm)		100									
5.10	Hammer SN = 0643											
5.50	C2		75									
6.10										(3.10)		*6.10-7.05m: AZCL disturbance due to SPT*
6.10	D3											
6.10 - 6.31	SPT(S) N=50 (7,16/50 for 60mm) Hammer SN = 0643		33			AZCL						Very stiff orangish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to medium of limestone.
7.60							7.60					Moderately weak massive light grey LIMESTONE. Moderately weathered: slightly reduced strength, orangish brown discolouration, clay film on fracture surfaces. Discontinuities: 1. 80-90 degree joints at 7.85-8.35m and 7.90-8.40m, undulating, rough with orangish staining and brown clay film on joint surfaces.
7.60 - 7.61	SPT(C) N=50 (25 for 5mm/50 for 5mm) Hammer SN = 0643								68.01	7.70 (0.15)		
						4			67.86	7.85 (0.55)		Medium strong (locally strong) massive light grey LIMESTONE. Moderately weathered: slightly reduced strength orangish brown staining on fracture surfaces. Discontinuities: 1. 5-15 degree joints, medium spaced (50/450/900), undulating, rough with orangish brown staining on joint surfaces. 2. 30-40 degree joints at 8.85-8.93m and 10.15-10.23m, undulating, rough with orangish brown staining on joint surfaces. 3. 85-90 degree joint at 9.10-9.40m, undulating, rough with orangish brown staining on joint surfaces.
8.45	C3		100	70	64				67.31	8.40		
9.05	C4											
9.10												
			TCR	SCR	RQD	FI						

Water: Backfill

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
3.00	3.60	01:00
4.60	4.60	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
Re-bore of BH-34598; refusal on large cobbles at 3.30m
Standpipe Installation
No groundwater encountered during drilling

Casing Details

To (m)	Diam (mm)
4.60	200
25.60	127

Water Added

From (m)	To (m)
0.00	4.60

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-34598A
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	4.60
Rotary Coring	Comacchio 405	4.60	25.60

Coordinates: 595237.42 E, 689636.45 N

Final Depth: 25.60 m | **Start Date:** 05/05/2022 | **Driller:** MW+CB | Sheet 2 of 3 | Scale: 1:50

Elevation: 75.71 mOD | **End Date:** 31/05/2022 | **Logger:** NP | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
		100	82	68	4						Medium strong (locally strong) massive light grey LIMESTONE. Moderately weathered: slightly reduced strength orangish brown staining on fracture surfaces. Discontinuities: 1. 5-15 degree joints, medium spaced (50/450/900), undulating, rough with orangish brown staining on joint surfaces. 2. 30-40 degree joints at 8.85-8.93m and 10.15-10.23m, undulating, rough with orangish brown staining on joint surfaces. 3. 85-90 degree joint at 9.10-9.40m, undulating, rough with orangish brown staining on joint surfaces.		
10.20	C5												
10.60									(3.60)				
		33	13	13	AZCL						11.05-12.00m: AZCL		
12.10								63.71	12.00				
12.10	C6										Medium strong (locally weak) massive light grey LIMESTONE. Moderately weathered: slightly reduced strength, orangish brown discolouration, rare clay infill on fracture surfaces. Discontinuities: 1. 5-20 degree joints, widely spaced (100/620/1600), undulating, rough with orangish brown staining on joint sufraces and brown clay infill up to 5mm between joint surfaces. 2. 30-40 degree joints, at 19.40-19.47m and 20.19-20.25m, undulating, rough with orangish brown staining on joint surfaces.		
12.85	C7	90	90	90									
13.60													
		100	98	98									
15.10													
		100	100	100									
16.60													
17.20	C8	96	96	91									
18.10													
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
3.00	3.60	01:00
4.60	4.60	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
Re-bore of BH-34598; refusal on large cobbles at 3.30m
Standpipe Installation
No groundwater encountered during drilling

Casing Details

To (m)	Diam (mm)
4.60	200
25.60	127

Water Added

From (m)	To (m)
0.00	4.60

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-34598A
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	4.60
Rotary Coring	Comacchio 405	4.60	25.60

Coordinates: 595237.42 E, 689636.45 N

Final Depth: 25.60 m | **Start Date:** 05/05/2022 | **Driller:** MW+CB | Sheet 3 of 3 | Scale: 1:50

Elevation: 75.71 mOD | **End Date:** 31/05/2022 | **Logger:** NP | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
		100	100	100							Medium strong (locally weak) massive light grey LIMESTONE. Moderately weathered: slightly reduced strength, orangish brown discolouration, rare clay infill on fracture surfaces. Discontinuities: 1. 5-20 degree joints, widely spaced (100/620/1600), undulating, rough with orangish brown staining on joint sufraces and brown clay infill up to 5mm between joint surfaces. 2. 30-40 degree joints, at 19.40-19.47m and 20.19-20.25m, undulating, rough with orangish brown staining on joint surfaces.		
19.60													
		93	93	93									
21.10													
		95	95	95	2				(13.60)				
22.60													
		100	100	100									
24.10													
24.20	C9												
		100	100	100									
25.60								50.11	25.60		End of Borehole at 25.60m		
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
3.00	3.60	01:00
4.60	4.60	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
Re-bore of BH-34598; refusal on large cobbles at 3.30m
Standpipe Installation
No groundwater encountered during drilling

Casing Details

To (m)	Diam (mm)
4.60	200
25.60	127

Water Added

From (m)	To (m)
0.00	4.60

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-34816
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	0.50	595445.88 E 689714.39 N

Final Depth:	Start Date:	Driller:	Sheet 1 of 1
0.50 m	06/05/2022	CB	Scale: 1:40
Elevation: 75.87 mOD	**End Date:** 06/05/2022	**Logger:** TMcA	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.00 - 0.50	B1				75.57	0.30		TOPSOIL		
					75.37	0.50		Firm brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium of various lithologies. Cobbles are subrounded to rounded of limestone.		
								End of Borehole at 0.50m		

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter

Water Added

From (m)	To (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)

Remarks

Hand dug inspection pit excavated to 0.50m
Re-bore attempted at BH-34816A
No groundwater encountered

Termination Reason

Terminated on virtual refusal on boulders

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-34816A
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	0.60	595444.94 E 689718.59 N

Final Depth:	Start Date:	Driller:	Sheet 1 of 1
0.60 m	06/05/2022	CB	Scale: 1:40
Elevation: 75.80 mOD	**End Date:** 02/06/2022	**Logger:** TMcA	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.00 - 0.60	B1				75.50	0.30		TOPSOIL		
					75.19	0.60		Firm brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium of various lithologies. Cobbles are subrounded to rounded of limestone.		
								End of Borehole at 0.60m		

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter

Water Added

From (m)	To (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)

Remarks

Hand dug inspection pit excavated to 0.60m
Re-bore of BH-34816; refusal on large boulders at 0.50m
Re-bore attempted at BH-34816B
No groundwater encountered

Termination Reason

Terminated on virtual refusal on boulders

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-34816B
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth:	Start Date:	Driller:	Sheet 1 of 2
Hand Digging	Hand Tools	0.00	0.70					Scale: 1:50
Rotary Drilling	Comacchio 405	0.70	2.20	595442.18 E	10.00 m	06/05/2022	MJ+CB +AC	
Rotary Coring	Comacchio 405	2.20	10.00	689716.05 N	Elevation: 75.77 mOD	End Date: 06/05/2022	Logger: TH	FINAL

Depth (m)	Sample / Tests	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.00 - 0.70	B1								75.47	0.30		TOPSOIL		
									75.07	0.70		Firm brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium of various lithologies. Cobbles are subrounded to rounded of limestone.		
												Greyish brown sandy subangular fine to coarse GRAVEL of limestone with medium cobble content. Sand is fine to coarse. Cobbles are subrounded of limestone.		
			75	17	14				73.57	2.20		Medium strong massive light grey LIMESTONE with occasional fossils and orangish white calcite veins of various orientations. Moderately weathered: slightly reduced strength, closer fracture spacing, orangish brown discolouration on fracture surfaces, some light brown clay infill.		
3.20							3.20	1.70				Discontinuities:		
3.20	C1											1. 15-25 degree joints, closely spaced (15/140/150), slightly undulating, rough, orangish brown staining on most joint surfaces, light brown clay infill on some joint surfaces, up to 20mm thick.		
3.20 - 3.65	SPT(C) N=16 (3,8/6,1,3,6) Hammer SN = 0643					9				(3.20)		2. 80-90 degree joints, at 2.20-2.90m, 3.80-3.95m and 5.20-5.30m, undulating, rough, orangish brown staining on most joint surfaces.		
			63	47	14									
4.70							3.20	1.90				*4.70-4.75m: Fine gravel size deposit of pyrite*		
4.70 - 4.79	SPT(C) N=50 (25 for 84mm/50 for 7mm) Hammer SN = 0643													
4.85	C2		92	71	52									
5.20	C3								70.37	5.40		Strong to very strong massive light grey LIMESTONE with frequent orangish white calcite veins of predominately subvertical orientation. Slightly weathered: some orangish brown discolouration and some clay infill on joint surfaces.		
5.40	C4											Discontinuities:		
6.00												1. 0-10 degree joints, medium spaced (130/460/570), planar, rough, orangish brown staining on some joint surfaces.		
6.20	C5											2. 20-35 degree joints, widely spaced (240/920/1000), slightly undulating, rough, dark brown staining on some joint surfaces, brown clay infill on some joint surfaces, up to 8mm thick.		
			100	96	91							*5.95-6.00m: Fine gravel size deposit of pyrite*		
7.30	C6					3				(4.60)				
7.50														
			100	100	93									
8.70														
9.20	C7													

Water Strikes				Chiselling Details			Remarks
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm)	Hand dug inspection pit excavated to 1.20m Re-bore of BH-34816A; refusal on large boulders at 0.60m No groundwater encountered

Casing Details		Water Added	
To (m)	Diam (mm)	From (m)	To (m)
0.70	200		
2.20	200		
10.00	150		

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-34816B
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	0.70
Rotary Drilling	Comacchio 405	0.70	2.20
Rotary Coring	Comacchio 405	2.20	10.00

Coordinates: 595442.18 E, 689716.05 N

Final Depth:	10.00 m	Start Date:	06/05/2022	Driller:	MJ+CB +AC	Sheet 2 of 2
Elevation:	75.77 mOD	End Date:	06/05/2022	Logger:	TH	Scale: 1:50
						FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
10.00		100	100	100				65.77	10.00		Strong to very strong massive light grey LIMESTONE with frequent orangish white calcite veins of predominately subvertical orientation. Slightly weathered: some orangish brown discolouration and some clay infill on joint surfaces. Discontinuities: 1. 0-10 degree joints, medium spaced (130/460/570), planar, rough, orangish brown staining on some joint surfaces. 2. 20-35 degree joints, widely spaced (240/920/1000), slightly undulating, rough, dark brown staining on some joint surfaces, brown clay infill on some joint surfaces, up to 8mm thick. End of Borehole at 10.00m		
		TCR	SCR	RQD	FI								

9.5 10.0 10.5 11.0 11.5 12.0 12.5 13.0 13.5 14.0 14.5 15.0 15.5 16.0 16.5 17.0 17.5 18.0 18.5

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)

Remarks

Hand dug inspection pit excavated to 1.20m
Re-bore of BH-34816A; refusal on large boulders at 0.60m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
0.70	200
2.20	200
10.00	150

Water Added

From (m)	To (m)

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-35202
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	5.00
Rotary Drilling	Beretta T44	5.00	5.20
Rotary Coring	Beretta T44	5.20	9.70

Coordinates: 595811.18 E, 689699.25 N

Final Depth:	9.70 m	Start Date:	09/05/2022	Driller:	PJ+CB	Sheet 1 of 2
Elevation:	86.29 mOD	End Date:	30/05/2022	Logger:	TH +TMcA	Scale: 1:50
						FINAL

Depth (m)	Sample / Tests	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.00 - 0.40	B1											TOPSOIL		
0.40 - 1.20	B2								85.89	0.40		Firm light brown slightly sandy slightly gravelly CLAY with low to medium cobble content. Sand is fine to coarse. Gravel is subrounded fine to medium of various lithologies. Cobbles are subrounded of limestone.		
1.00	D7								85.29	1.00		Stiff light grey slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded		
1.20 - 2.00	B3													
1.20 - 1.65	SPT (C)	N=16 (4,4/5,3,4,4) Hammer SN = 1411					0.00	Dry				fine to coarse of various lithologies. Cobbles are subrounded to subangular of limestone.		
2.00	D8													
2.00 - 2.45	U12	Ublow=59 0% Recovery					2.00	Dry						
2.00 - 3.00	B4													
3.00	D9													
3.00 - 4.00	B5													
3.00 - 3.45	SPT (C)	N=17 (5,5/4,4,5,4) Hammer SN = 1411					3.00	Dry						
4.00	D10													
4.00 - 5.00	B6													
4.00 - 4.45	SPT (C)	N=23 (4,6/5,6,6,6) Hammer SN = 1411					4.00	Dry						
5.00	D11													
5.00 - 5.01	SPT(C) N=50 (25 for 3mm/50 for 10mm) Hammer SN = 1411					AZCL			81.09	5.20		Very stiff light brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse of limestone.		
5.20	C1											*5.2-5.45m: AZCL- fines washed out during drilling.*		
5.50	C2		83							(2.40)				
6.70												*6.70-7.60m: AZCL- disturbance due to SPT test*		
6.70 - 7.15	SPT(C) N=42 (5,7/9,9,11,13) Hammer SN = 1385		40			AZCL			78.69	7.60		Very stiff greyish brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse of limestone. Cobbles are subangular of limestone.		
8.20														
8.20 - 8.65	SPT(C) N=49 (7,9/11,11,13,14) Hammer SN = 1385		100							(2.10)				
9.10	C4													

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
2.50	2.70	00:45
4.30	0.50	00:30
5.00	5.00	01:00

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
5.00	200
5.20	200
9.70	150

Water Added

From (m)	To (m)
0.00	5.00

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-35202
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	5.00
Rotary Drilling	Beretta T44	5.00	5.20
Rotary Coring	Beretta T44	5.20	9.70

Coordinates
595811.18 E
689699.25 N

Final Depth: 9.70 m | **Start Date:** 09/05/2022 | **Driller:** PJ+CB
Elevation: 86.29 mOD | **End Date:** 30/05/2022 | **Logger:** TH +TMcA

Sheet 2 of 2
Scale: 1:50
FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
9.70								76.59	9.70		Very stiff greyish brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse of limestone. Cobbles are subangular of limestone. End of Borehole at 9.70m		

TCR	SCR	RQD	FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)
5.00	200
5.20	200
9.70	150

Water Added

From (m)	To (m)
0.00	5.00

Chiselling Details

From (m)	To (m)	Time (hh:mm)
2.50	2.70	00:45
4.30	0.50	00:30
5.00	5.00	01:00

Remarks
Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-35473
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	5.00
Rotary Drilling	Beretta T44	5.00	5.20
Rotary Coring	Beretta T44	5.20	9.70

Coordinates: 596077.22 E, 689684.75 N

Final Depth:	9.70 m	Start Date:	09/05/2022	Driller:	PJ+CB	Sheet 1 of 2 Scale: 1:50
Elevation:	85.10 mOD	End Date:	31/05/2022	Logger:	TH +TMcA	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.00 - 0.50	B1							TOPSOIL		
0.50 - 1.20	B2				84.60	0.50		Firm to stiff light brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of various lithologies. Cobbles are subangular of limestone.		
1.00	D7									
1.20 - 2.00	B3									
1.20 - 1.65	SPT (C)	N=18 (3,3/4,5,4,5) Hammer SN = 1411	0.00	Dry						
2.00	D8									
2.00 - 2.45	U11	Ublow=60 0% Recovery	2.00	Dry						
2.00 - 3.00	B4									
3.00	D9									
3.00 - 4.00	B5									
3.00 - 3.45	SPT (C)	N=18 (3,4/4,4,5,5) Hammer SN = 1411	3.00	Dry						
4.00	D10									
4.00 - 4.80	B6									
4.00 - 4.45	SPT (C)	N=20 (4,4/5,5,5,5) Hammer SN = 1411	4.00	Dry						
					80.30	4.80		Large BOULDER/COBBLES.		
					79.90	5.20		Very stiff greyish brown slightly sandy gravelly CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is subangular fine to coarse of limestone. Cobbles and boulders are subrounded of limestone.		
6.00	C1	98								
6.70						(3.00)		*6.70-7.55m: AZCL disturbance due to SPT*		
6.70 - 7.15	SPT(C) N=46 (7,8/10,10,13,13) Hammer SN = 1385	AZCL								
7.00	C2	43						Moderately weak massive light grey LIMESTONE. Moderately weathered: slightly reduced strength, closer fracture spacing, orangish brown discolouration penetrating in from fracture surfaces (up to 100mm), sandy clay infill on most fracture surfaces. Discontinuities: 1. 10-20 degree joints, closely spaced (40/100/130), planar, rough, orangish brown staining and sandy clay infill on most joint surfaces up to 35mm thick. 2. 50-60 degree joint, at 9.00-9.10m, planar, rough, orangish brown staining on joint surface. 3. 80-90 degree joints, at 8.20-8.40m, 8.55-8.70m, 8.70-8.95m, 9.15-9.50m, 9.30-9.50m and 9.80-9.90m, undulating, rough, orangish brown staining on joint surfaces.		
8.20					76.90	8.20				
8.20 - 8.50	SPT(C) N=50 (10,15/50 for 150mm) Hammer SN = 1385	100 (TCR) 40 (SCR) 9 (RQD) 15 (FI)				(1.50)		*8.50-9.20m: Penetrative orangish brown staining*		

Water Strikes			
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details		
From (m)	To (m)	Time (hh:mm)
4.80	5.00	01:00

Casing Details	
To (m)	Diam (mm)
5.00	200
5.20	200
9.70	150

Water Added	
From (m)	To (m)
0.00	5.00

Remarks

Hand dug inspection pit excavated to 1.20m
Falling Head Test completed 4.50-5.00m
No groundwater encountered

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	BH-35473
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)
Hand Digging	Hand Tools	0.00	1.20
Cable Percussion	Dando 2000	1.20	5.00
Rotary Drilling	Beretta T44	5.00	5.20
Rotary Coring	Beretta T44	5.20	9.70

Coordinates
596077.22 E
689684.75 N

Final Depth: 9.70 m | **Start Date:** 09/05/2022 | **Driller:** PJ+CB
Elevation: 85.10 mOD | **End Date:** 31/05/2022 | **Logger:** TH +TMcA

Sheet 2 of 2
Scale: 1:50
FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
9.70								75.40	9.70		Moderately weak massive light grey LIMESTONE. Moderately weathered: slightly reduced strength, closer fracture spacing, orangish brown discolouration penetrating in from fracture surfaces (up to 100mm), sandy clay infill on most fracture surfaces. Discontinuities: 1. 10-20 degree joints, closely spaced (40/100/130), planar, rough, orangish brown staining and sandy clay infill on most joint surfaces up to 35mm thick. 2. 50-60 degree joint, at 9.00-9.10m, planar, rough, orangish brown staining on joint surface. 3. 80-90 degree joints, at 8.20-8.40m, 8.55-8.70m, 8.70-8.95m, 9.15-9.50m, 9.30-9.50m and 9.80-9.90m, undulating, rough, orangish brown staining on joint surfaces. End of Borehole at 9.70m		
		TCR	SCR	RQD	FI								

9.5 10.0 10.5 11.0 11.5 12.0 12.5 13.0 13.5 14.0 14.5 15.0 15.5 16.0 16.5 17.0 17.5 18.0 18.5

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)
4.80	5.00	01:00

Remarks
Hand dug inspection pit excavated to 1.20m
Falling Head Test completed 4.50-5.00m
No groundwater encountered

Casing Details

To (m)	Diam (mm)
5.00	200
5.20	200
9.70	150

Water Added

From (m)	To (m)
0.00	5.00

Core Barrel	Flush Type	Termination Reason	Last Updated
SK6L	Polymer	Terminated at scheduled depth	13/03/2023

AGS



Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

Hammer Ref:	D123
Test Date:	20/10/2021
Report Date:	
File Name:	D123.spt
Test Operator:	B HUNTER

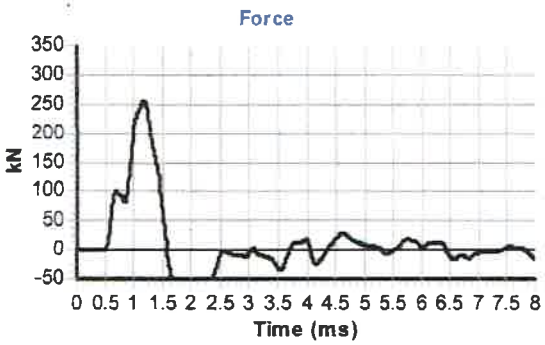
Instrumented Rod Data

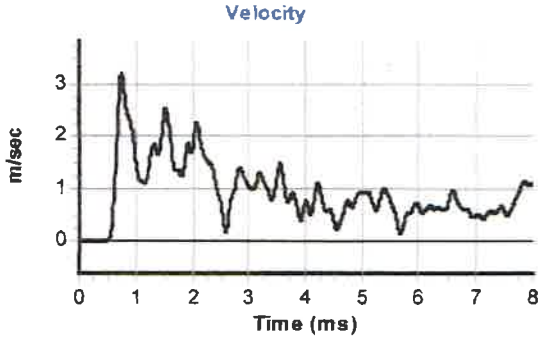
Diameter d_r (mm):	54
Wall Thickness t_r (mm):	6.0
Assumed Modulus E_a (GPa):	208
Accelerometer No.1:	62901
Accelerometer No.2:	62902

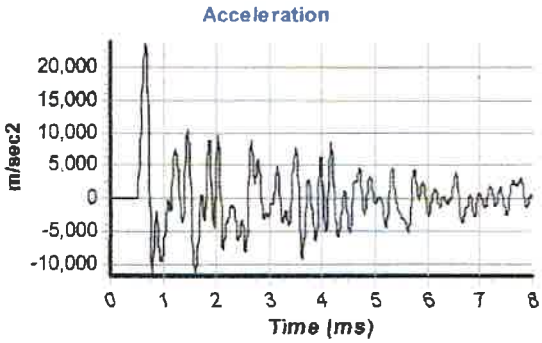
Hammer Information

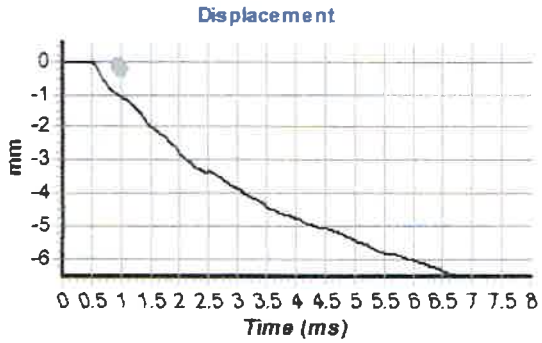
Hammer Mass m (kg):	63.5
Falling Height h (mm):	760
String Length L (m):	10.0

Comments / Location Asset 1383 1385









Calculations

Area of Rod A (mm2):	905
Theoretical Energy E_{theor} (J):	473
Measured Energy E_{meas} (J):	263

Energy Ratio E_r (%): **56**

Signed:

Title: Operations Manager

The recommended calibration interval is 12 months

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Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

Hammer Ref:	D124
Test Date:	20/10/2021
Report Date:	
File Name:	D124.spt
Test Operator:	B HUNTER

Instrumented Rod Data

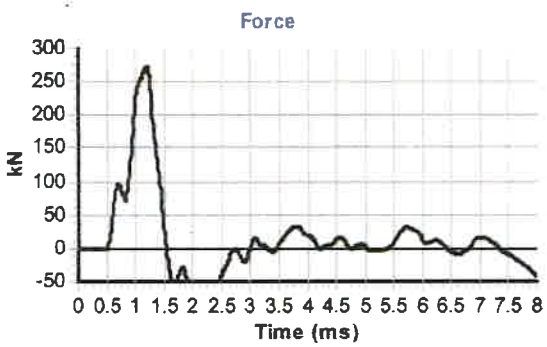
Diameter d_r (mm):	54
Wall Thickness t_r (mm):	6.0
Assumed Modulus E_a (GPa):	208
Accelerometer No.1:	62901
Accelerometer No.2:	62902

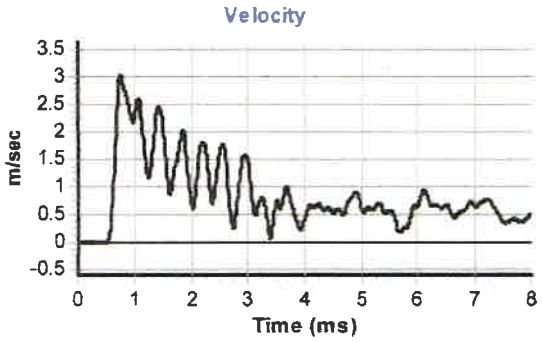
Hammer Information

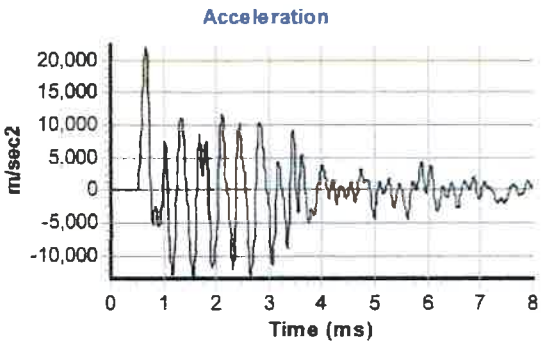
Hammer Mass m (kg):	63.5
Falling Height h (mm):	760
String Length L (m):	10.0

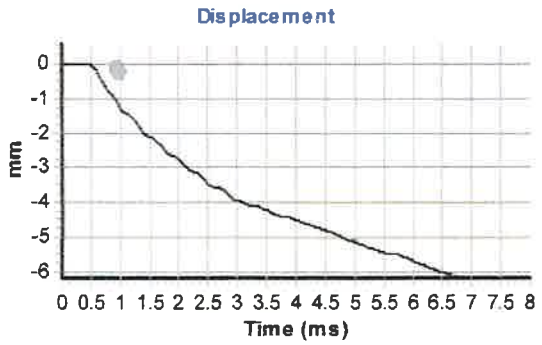
Comments / Location

Asset 1384.
1386.









Calculations

Area of Rod A (mm2):	905
Theoretical Energy E_{theor} (J):	473
Measured Energy E_{meas} (J):	260

Energy Ratio E_r (%): **55**

Signed:

Title: Operations Manager

The recommended calibration interval is 12 months

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Southern Testing
Environmental & Geotechnical

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

Southern Testing
Unit 11
Charlwoods Road
East Grinstead
West Sussex
RH19 2HU

SPT Hammer Ref:	0197
Test Date:	12/02/2022
Report Date:	14/02/2022
File Name:	0197.spt
Test Operator:	NPB

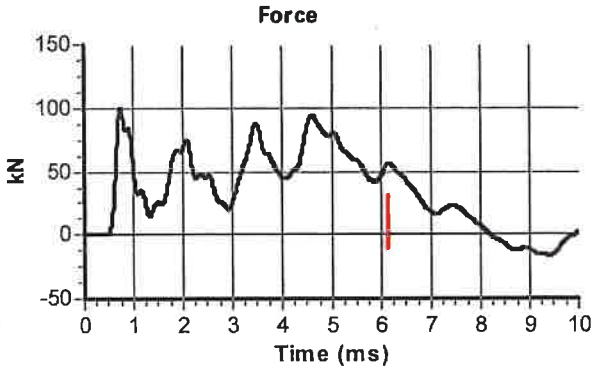
Instrumented Rod Data

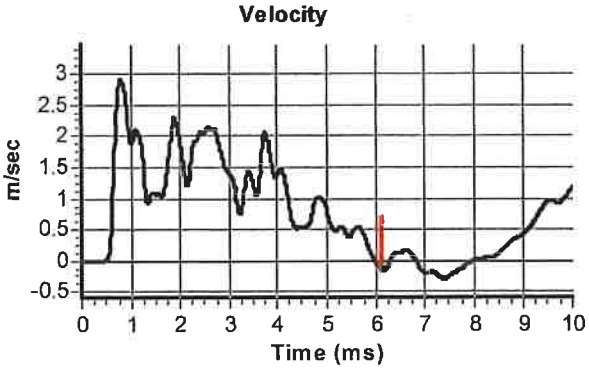
Diameter d_r (mm):	54
Wall Thickness t_r (mm):	6.0
Assumed Modulus E_a (GPa):	200
Accelerometer No.1:	64786
Accelerometer No.2:	64789

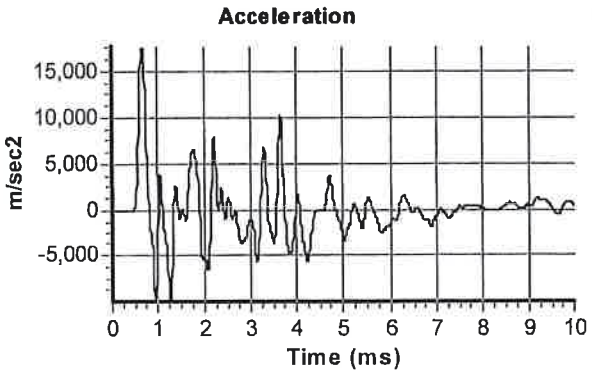
SPT Hammer Information

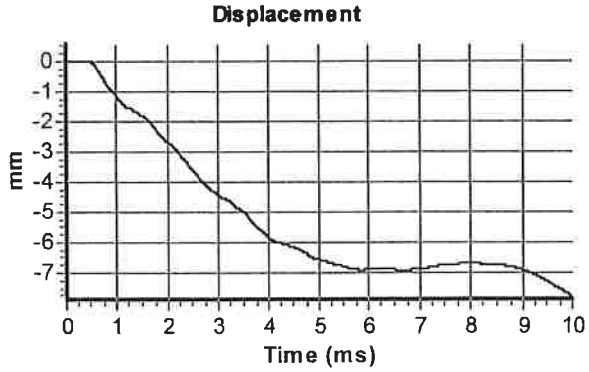
Hammer Mass m (kg):	63.0
Falling Height h (mm):	760
SPT String Length L (m):	12.0

Comments / Location
CAUSEWAY









Calculations

Area of Rod A (mm2):	905
Theoretical Energy E_{theor} (J):	473
Measured Energy E_{meas} (J):	379

Energy Ratio E_r (%): **80**

The recommended calibration interval is 12 months

N Burrows

Signed: N Burrows
Title: FOC Manager

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Southern Testing
Environmental & Geotechnical

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

Southern Testing
Unit 11
Charlwoods Road
East Grinstead
West Sussex
RH19 2HU

SPT Hammer Ref:	0643
Test Date:	12/02/2022
Report Date:	14/02/2022
File Name:	0643.spt
Test Operator:	NPB

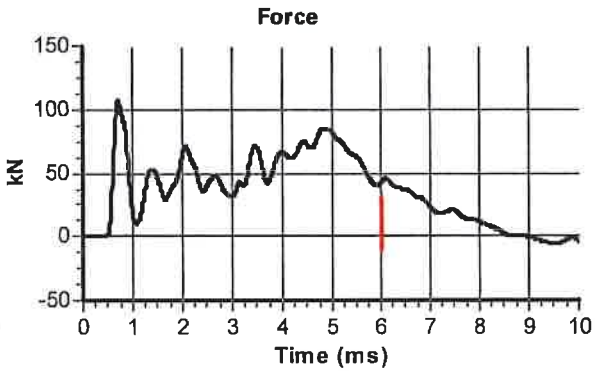
Instrumented Rod Data

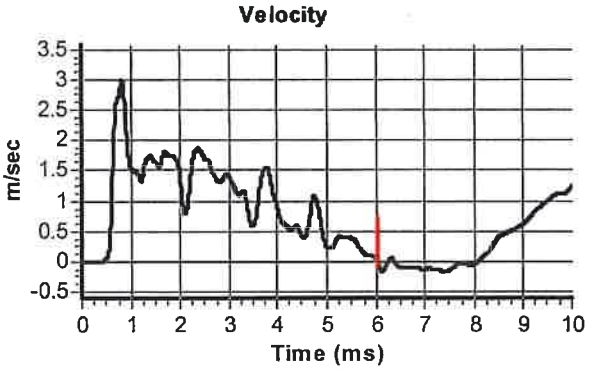
Diameter d_r (mm):	54
Wall Thickness t_r (mm):	6.0
Assumed Modulus E_a (GPa):	200
Accelerometer No.1:	64786
Accelerometer No.2:	64789

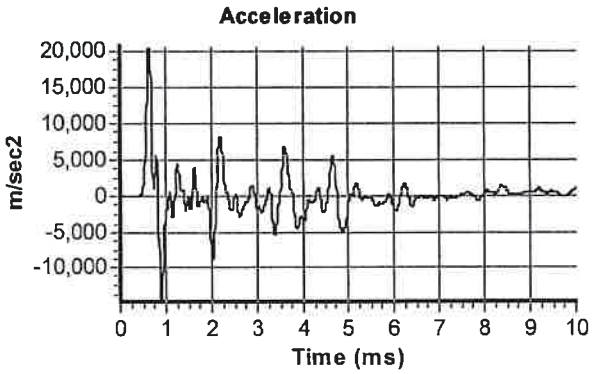
SPT Hammer Information

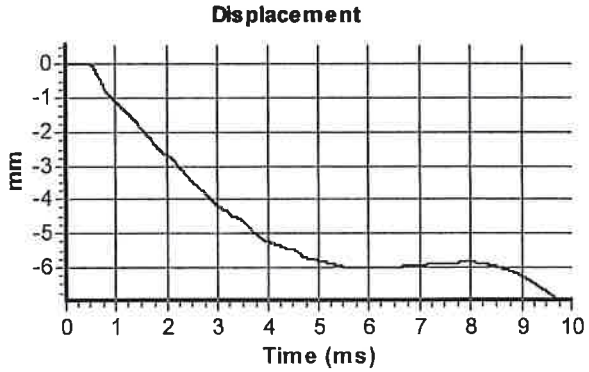
Hammer Mass m (kg):	63.0
Falling Height h (mm):	760
SPT String Length L (m):	12.0

Comments / Location
CAUSEWAY









Calculations

Area of Rod A (mm2):	905
Theoretical Energy E_{theor} (J):	473
Measured Energy E_{meas} (J):	340

Energy Ratio E_r (%): 72

The recommended calibration interval is 12 months

N Burrows

Signed: N Burrows
Title: FOC Manager

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Southern Testing
Environmental & Geotechnical

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

Southern Testing
Unit 11
Charlwoods Road
East Grinstead
West Sussex
RH19 2HU

SPT Hammer Ref:	1264
Test Date:	12/02/2022
Report Date:	14/02/2022
File Name:	1264.spt
Test Operator:	NPB

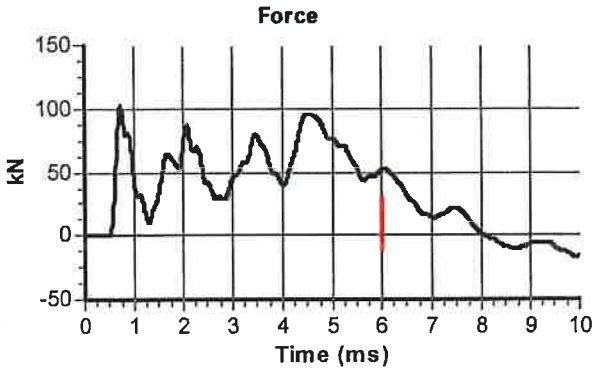
Instrumented Rod Data

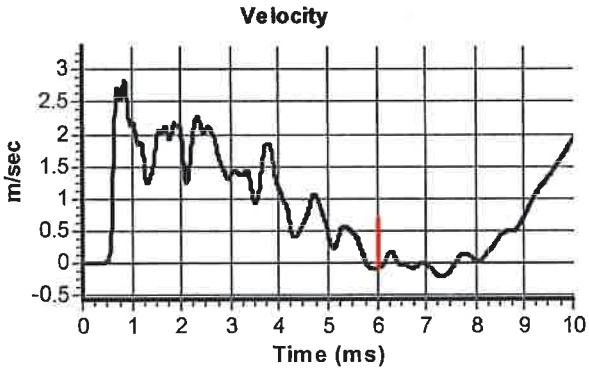
Diameter d_r (mm):	54
Wall Thickness t_r (mm):	6.0
Assumed Modulus E_a (GPa):	200
Accelerometer No.1:	64786
Accelerometer No.2:	64789

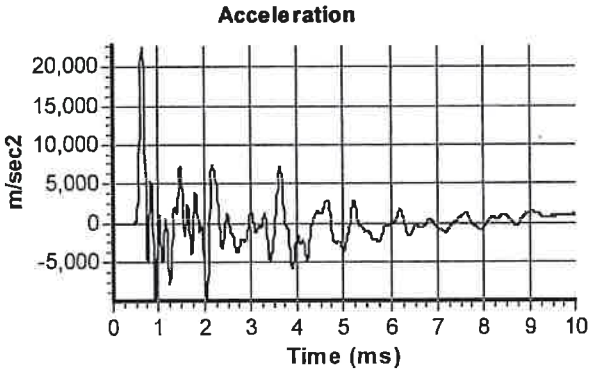
SPT Hammer Information

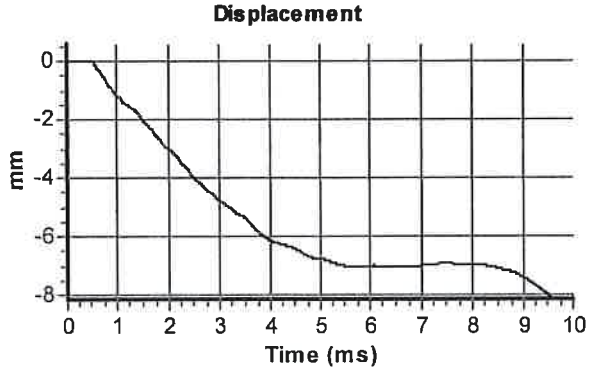
Hammer Mass m (kg):	63.0
Falling Height h (mm):	760
SPT String Length L (m):	12.0

Comments / Location
CAUSEWAY









Calculations

Area of Rod A (mm2):	905
Theoretical Energy E_{theor} (J):	473
Measured Energy E_{meas} (J):	403

Energy Ratio E_r (%): **85**

N Burrows

Signed: N Burrows
Title: FOC Manager

The recommended calibration interval is 12 months

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Southern Testing
Environmental & Geotechnical

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

Southern Testing
Unit 11
Charlwoods Road
East Grinstead
West Sussex
RH19 2HU

SPT Hammer Ref:	1368
Test Date:	12/02/2022
Report Date:	14/02/2022
File Name:	1368.spt
Test Operator:	NPB

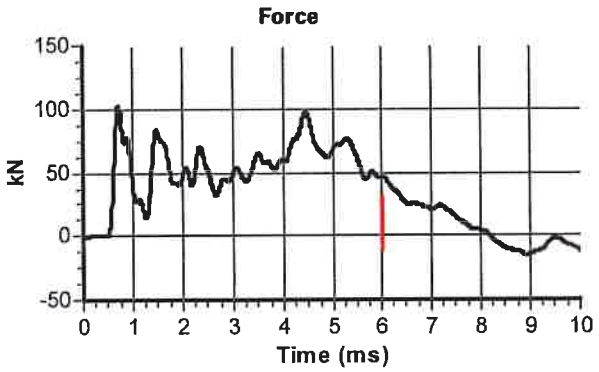
Instrumented Rod Data

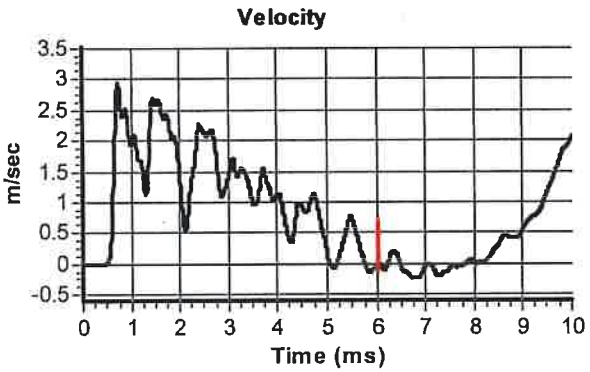
Diameter d_r (mm):	54
Wall Thickness t_r (mm):	6.0
Assumed Modulus E_a (GPa):	200
Accelerpmeter No.1:	64786
Accelerometer No.2:	64789

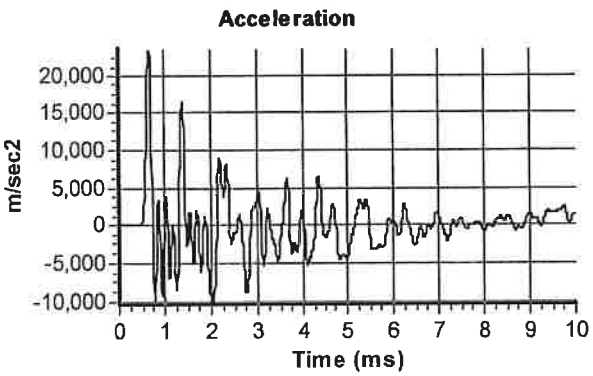
SPT Hammer Information

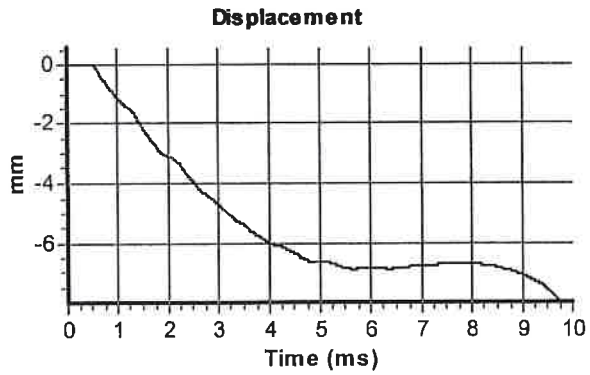
Hammer Mass m (kg):	63.0
Falling Height h (mm):	760
SPT String Length L (m):	12.0

Comments / Location
CAUSEWAY









Calculations

Area of Rod A (mm2):	905
Theoretical Energy E_{theor} (J):	473
Measured Energy E_{meas} (J):	391

Energy Ratio E_r (%): **83**

N Burrows

Signed: N Burrows
Title: FOC Manager

The recommended calibration interval is 12 months

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Southern Testing
Environmental & Geotechnical

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

Southern Testing
Unit 11
Charlwoods Road
East Grinstead
West Sussex
RH19 2HU

SPT Hammer Ref:	1369
Test Date:	12/02/2022
Report Date:	14/02/2022
File Name:	1369.spt
Test Operator:	NPB

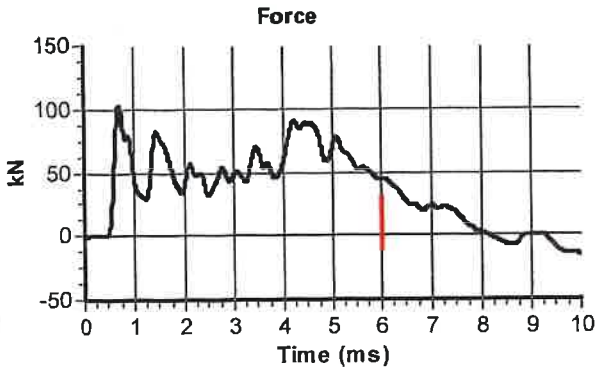
Instrumented Rod Data

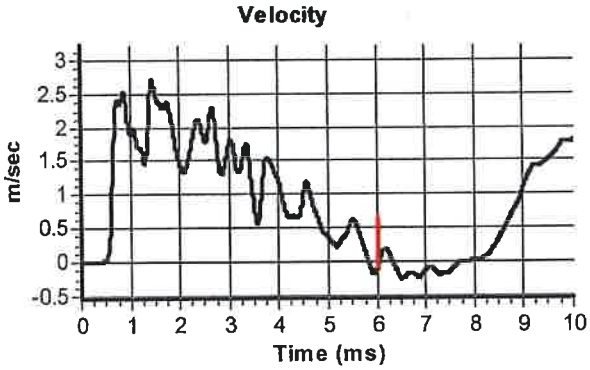
Diameter d_r (mm):	54
Wall Thickness t_r (mm):	6.0
Assumed Modulus E_a (GPa):	200
Accelerometer No.1:	64786
Accelerometer No.2:	64789

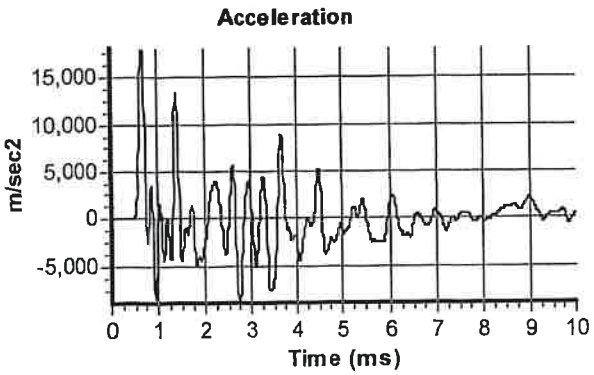
SPT Hammer Information

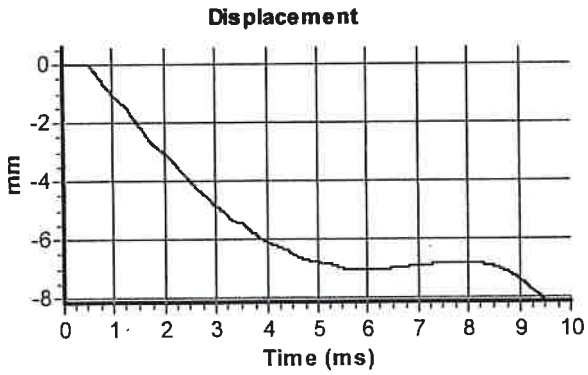
Hammer Mass m (kg):	63.0
Falling Height h (mm):	760
SPT String Length L (m):	12.0

Comments / Location
CAUSEWAY









Calculations

Area of Rod A (mm2):	905
Theoretical Energy E_{theor} (J):	473
Measured Energy E_{meas} (J):	410

Energy Ratio E_r (%): **87**

The recommended calibration interval is 12 months

N Burrows

Signed: N Burrows
Title: FOC Manager

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Southern Testing
Environmental & Geotechnical

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

Southern Testing
Unit 11
Charlwoods Road
East Grinstead
West Sussex
RH19 2HU

SPT Hammer Ref:	1376
Test Date:	14/02/2022
Report Date:	14/02/2022
File Name:	1376.spt
Test Operator:	NPB

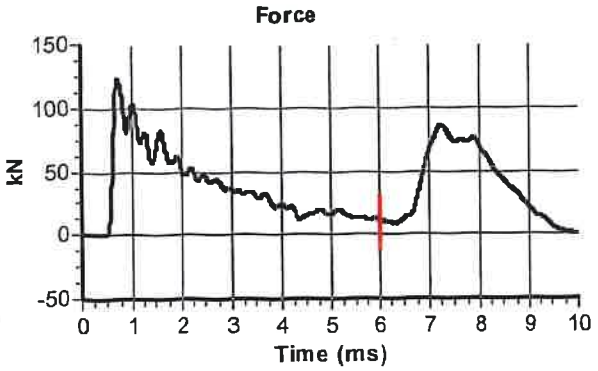
Instrumented Rod Data

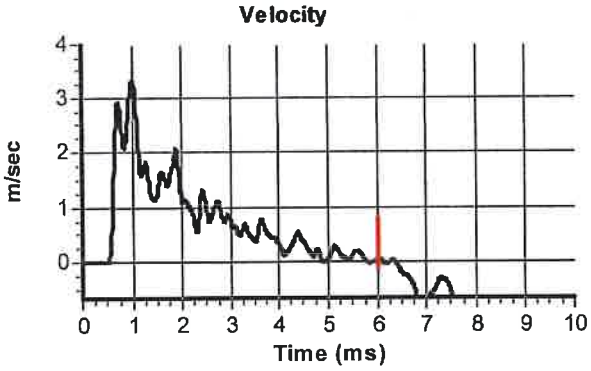
Diameter d_r (mm):	54
Wall Thickness t_r (mm):	6.0
Assumed Modulus E_a (GPa):	200
Accelerometer No.1:	64786
Accelerometer No.2:	64789

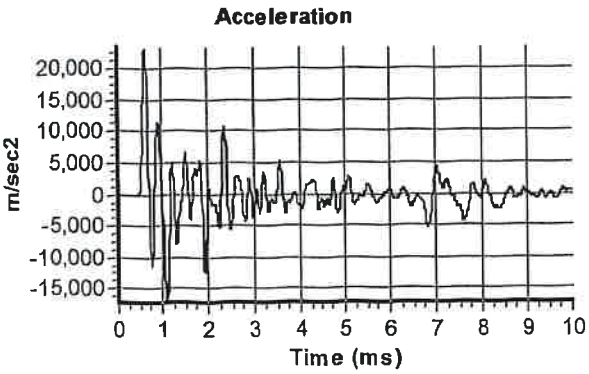
SPT Hammer Information

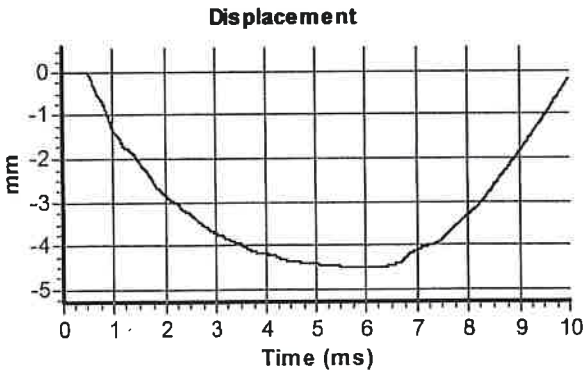
Hammer Mass m (kg):	63.0
Falling Height h (mm):	760
SPT String Length L (m):	12.0

Comments / Location
CAUSEWAY









Calculations

Area of Rod A (mm2):	905
Theoretical Energy E_{theor} (J):	473
Measured Energy E_{meas} (J):	301

Energy Ratio E_r (%): **64**

The recommended calibration interval is 12 months

Signed: N Burrows
Title: FOC Manager

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Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

Dynamic Sampling Uk Ltd
Unit 8 Victory Park
Victory Road
Derby
DE24 8ZF

Hammer Ref:	D129 **(Asset No. 1411)**
Test Date:	25/04/2022
Report Date:	25/04/2022
File Name:	D129.spt
Test Operator:	B.HUNTER

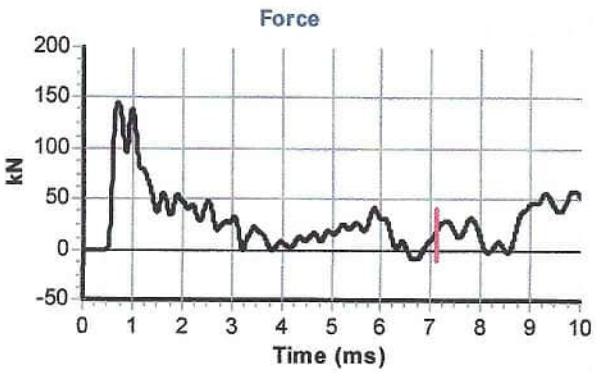
Instrumented Rod Data

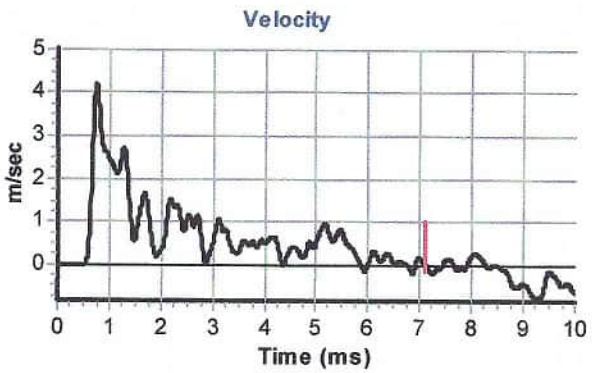
Diameter d_r (mm):	54
Wall Thickness t_r (mm):	6.5
Assumed Modulus E_a (GPa):	208
Accelerometer No.1:	62901
Accelerometer No.2:	62902

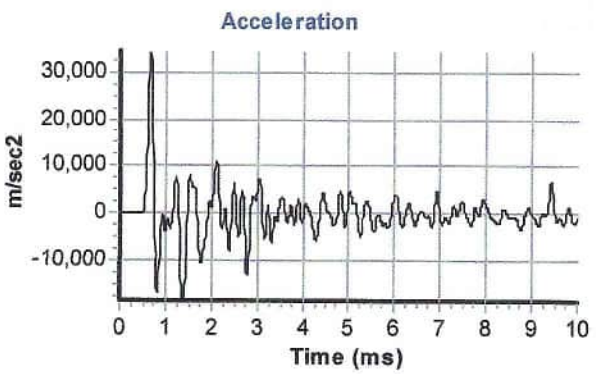
Hammer Information

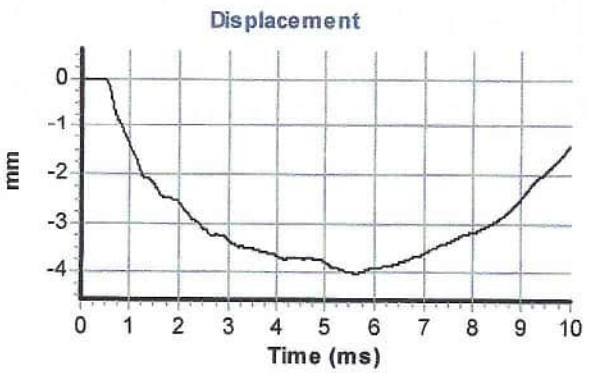
Hammer Mass m (kg):	63.5
Falling Height h (mm):	760
String Length L (m):	10.0

Comments / Location









Calculations

Area of Rod A (mm2):	970
Theoretical Energy E_{theor} (J):	473
Measured Energy E_{meas} (J):	320

Energy Ratio E_r (%): **68**

Signed: B.Hunter

Title: Operations Manager

The recommended calibration interval is 12 months

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Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

Dynamic Sampling Uk Ltd
Unit 8 Victory Park
Victory Road
Derby
DE24 8ZF

Hammer Ref:	D130 **(Asset No. 1411)**
Test Date:	25/04/2022
Report Date:	25/04/2022
File Name:	D130.spt
Test Operator:	B.HUNTER

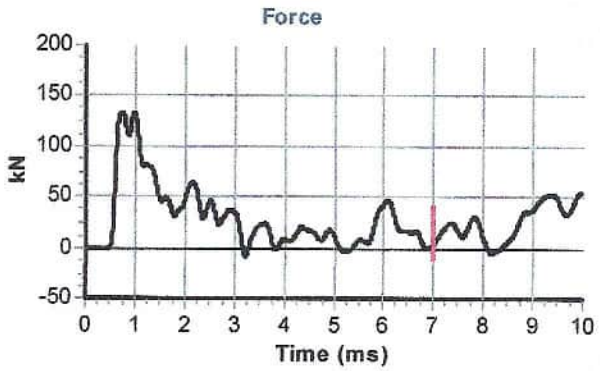
Instrumented Rod Data

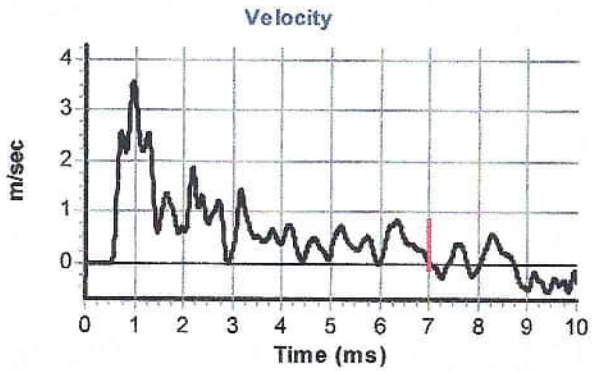
Diameter d_r (mm):	54
Wall Thickness t_r (mm):	6.5
Assumed Modulus E_a (GPa):	208
Accelerometer No.1:	62901
Accelerometer No.2:	62902

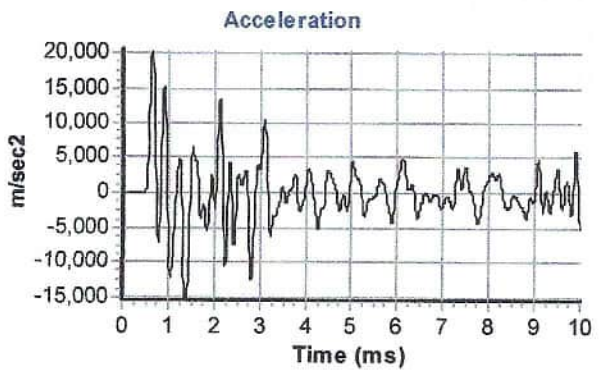
Hammer Information

Hammer Mass m (kg):	63.5
Falling Height h (mm):	760
String Length L (m):	10.0

Comments / Location









Calculations

Area of Rod A (mm2):	970
Theoretical Energy E_{theor} (J):	473
Measured Energy E_{meas} (J):	318

Energy Ratio E_r (%): **67**

Signed: B.Hunter

Title: Operations Manager

The recommended calibration interval is 12 months

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CAUSEWAY GEOTECH

APPENDIX 4B

DYNAMIC SAMPLING RECORDS



Stratum Legend Key



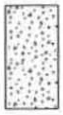
101
TOPSOIL



102
MADE GROUND



103
MADE GROUND



104
CONCRETE



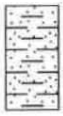
105
WOOD



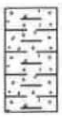
201
CLAY



202
Silty CLAY



203
Sandy CLAY



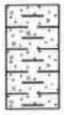
204
Gravelly CLAY



205
Cobbly CLAY



206
Bouldery CLAY



207
Silty sandy CLAY



208
Silty gravelly CLAY



209
Silty cobbly CLAY



210
Silty bouldery CLAY



211
Silty sandy gravelly CLAY



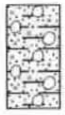
212
Silty sandy cobbly CLAY



213
Silty sandy bouldery CLAY



214
Silty sandy gravelly cobbly CLAY



215
Silty sandy gravelly bouldery CLAY



216
Silty sandy gravelly cobbly bouldery CLAY



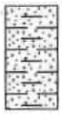
217
Silty sandy peaty CLAY



218
Silty sandy gravelly peaty CLAY



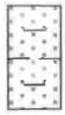
219
Silty peaty CLAY



220
Sandy gravelly CLAY



301
SILT



302
Clayey SILT



303
Sandy SILT



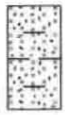
304
Gravelly SILT



305
Peaty SILT



306
Clayey sandy SILT



307
Gravelly clayey SILT



308
Sandy gravelly clayey SILT



309
Clayey bouldery SILT



310
Sandy gravelly SILT



312
Clayey sandy gravelly SILT



313
Clayey sandy gravelly peaty SILT



314
Clayey sandy gravelly peaty cobbly SILT



316
Sandy cobbly SILT



317
Sandy bouldery SILT

CAUSEWAY GEOTECH

Stratum Legend Key


318
Sandy peaty SILT


319
Sandy gravelly peaty SILT


320
Sandy gravelly cobbly SILT


321
Sandy gravelly peaty cobbly SILT


322
Gravelly cobbly SILT


323
Gravelly bouldery SILT


324
Gravelly peaty SILT


325
Gravelly peaty cobbly SILT


326
Cobbly SILT


327
Cobbly bouldery SILT


328
Peaty cobbly SILT


329
Clayey cobbly SILT


330
Clayey peaty SILT

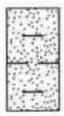

331
Bouldery SILT


332
slightly shelly SILT


333
very shelly SILT


334
Sandy clayey peaty SILT


401
SAND


402
Clayey SAND


403
Silty SAND


404
Gravelly SAND


405
Cobbly SAND


406
Bouldery SAND


407
Clayey silty SAND


408
Clayey silty gravelly SAND


409
Clayey silty gravelly cobbly SAND


410
Clayey gravelly SAND


411
Clayey gravelly cobbly SAND


412
Silty gravelly SAND


413
Silty gravelly cobbly SAND


414
Silty gravelly cobbly bouldery SAND


415
Gravelly cobbly SAND


416
Gravelly cobbly bouldery SAND


417
Gravelly bouldery SAND


418
Cobbly bouldery SAND


430
SAND and GRAVEL


431
Peaty SAND


432
Clayey peaty SAND


433
Silty peaty SAND


434
Gravelly peaty SAND

CAUSEWAY GEOTECH

Stratum Legend Key



435
Cobbly peaty SAND



436
Bouldery peaty SAND



437
Clayey silty peaty SAND



438
Clayey silty gravelly peaty SAND



439
slightly shelly SAND



440
very shelly SAND



441
slightly shelly silty SAND



442
very shelly silty SAND



443
slightly shelly silty gravelly SAND



444
very shelly silty gravelly SAND



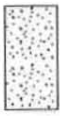
501
GRAVEL



502
Clayey GRAVEL



503
Silty GRAVEL



504
Sandy GRAVEL



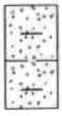
505
Peaty GRAVEL



506
Cobbly GRAVEL



507
Bouldery GRAVEL



508
Clayey silty GRAVEL



509
Clayey sandy GRAVEL



510
Clayey cobbly GRAVEL



511
Clayey bouldery GRAVEL



512
Clayey peaty GRAVEL



513
Clayey silty sandy GRAVEL



514
Clayey silty cobbly GRAVEL



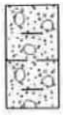
515
Clayey silty bouldery GRAVEL



516
Clayey silty peaty GRAVEL



517
Clayey sandy peaty GRAVEL



518
Clayey silty sandy bouldery GRAVEL



519
Clayey silty sandy peaty GRAVEL



520
Silty sandy GRAVEL



521
Silty cobbly GRAVEL



522
Silty bouldery GRAVEL



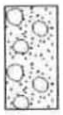
523
Silty peaty GRAVEL



524
Silty peaty sandy GRAVEL



525
Sandy cobbly GRAVEL



526
Sandy bouldery GRAVEL



527
Sandy peaty GRAVEL



528
Silty sandy cobbly GRAVEL



601
PEAT



602
Clayey PEAT

CAUSEWAY GEOTECH

Stratum Legend Key



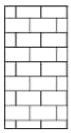
801
Mudstone



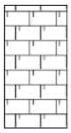
802
Siltstone



803
Sandstone



804
Limestone



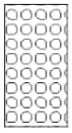
805
Chalk



806
Coal



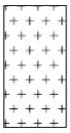
807
Breccia



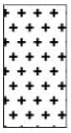
808
Conglomerate



809
Fine grained igneous



810
Medium grained igneous



811
Coarse grained igneous



812
Fine grained metamorphic



813
Medium grained metamorphic



814
Coarse grained metamorphic



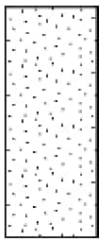
815
Pyroclastic (volcanic ash)



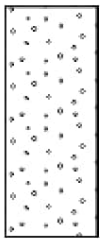
816
Gypsum, rocksalt

CAUSEWAY GEOTECH

Backfill Legend Key



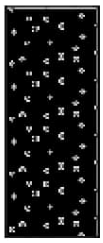
901
Sand backfill



902
Gravel backfill



903
Bentonite



904
Grout



905
Arisings



906
Concrete

CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	DS-999
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	
Dynamic Sampling	Dando Terrier	1.20	3.00	573385.30 E
				670408.06 N

Final Depth:	3.00 m	Start Date:	04/08/2022	Driller:	JD	Sheet 1 of 1
Elevation:	48.97 mOD	End Date:	04/08/2022	Logger:	TH	Scale: 1:50
						FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.10	D1				48.86	0.10		TOPSOIL		
0.30 - 0.80	B3				48.66	0.30		Soft brown very sandy CLAY. Sand is fine to medium.		
								Brown slightly gravelly clayey fine to coarse SAND with pockets of grey clay. Gravel is subangular fine to medium.		
0.80 - 1.10	B4				48.16	0.80		Brown very gravelly fine to coarse SAND. Gravel is subangular fine to coarse.		
1.10 - 1.60	B5				47.86	1.10		Medium dense orangish brown sandy subangular fine to coarse GRAVEL. Sand is fine to coarse.		
1.20 - 1.65	SPT (C)	N=19 (6,7/6,4,4,5) Hammer SN = 0269	1.00							
		Water strike at 1.50m							▼	
1.60	D2				47.36	1.60		Grey slightly gravelly slightly clayey fine to coarse SAND. Gravel is subrounded fine to coarse.		
1.90 - 3.00	B6				47.06	1.90		Medium dense grey very sandy clayey subangular fine to coarse GRAVEL. Sand is fine to coarse.		
2.00 - 2.45	SPT (C)	N=15 (6,6/4,3,4,4) Hammer SN = 0269	2.00	1.50						
					45.96	3.00		End of Borehole at 3.00m		

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
1.50	2.00	20	1.50

Casing Details

To (m)	Diameter
3.00	150

Remarks

Hand dug inspection pit excavated to 1.20m

Termination Reason

Terminated on instruction of Engineer

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	DS-1202
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	
Dynamic Sampling	Dando Terrier	1.20	1.50	573547.98 E
				670541.87 N

Final Depth:	1.50 m	Start Date:	04/08/2022	Driller:	JD	Sheet 1 of 1
						Scale: 1:50
Elevation:	52.19 mOD	End Date:	04/08/2022	Logger:	NH	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.10 - 0.80	B1				52.09	0.10		TOPSOIL Brown slightly gravelly fine to coarse SAND. Gravel is subrounded fine to medium.		
0.50	D3									
0.80 - 1.40	B2				51.39	0.80		Medium dense dark brown slightly clayey fine to coarse SAND.		
1.20 - 1.65	SPT (C)	N=24 (9,9/5,6,7,6) Hammer SN = 0269								
1.30	D4				50.69	1.50		End of Borehole at 1.50m		
1.40 - 1.62	SPT (S)	N=50 (10,12/50 for 70mm) Hammer SN = 0269		0.00						

Water Strikes				Casing Details	
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	To (m)	Diameter

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered.

Termination Reason

Terminated on virtual refusal of sampler

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	DS-3384
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth: 3.20 m	Start Date: 04/08/2022	Driller: JD	Sheet 1 of 1
Hand Digging	Hand Tools	0.00	1.20	575537.90 E				Scale: 1:50
Dynamic Sampling	Dando Terrier	1.20	3.20	671167.95 N	Elevation: 45.30 mOD	End Date: 04/08/2022	Logger: NH	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.10	D3				45.20	0.10		TOPSOIL with roots.		
0.10 - 1.80	B1							Soft brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular fine to coarse.		
1.00	D4									
1.20 - 1.65	SPT (S)	N=7 (2,2/1,2,2,2) Hammer SN = 0269	1.00							
1.80 - 3.20	B2				43.50	1.80		Firm becoming stiff brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to medium.		
2.00	D5									
2.00 - 2.45	SPT (S)	N=14 (2,2/3,3,4,4) Hammer SN = 0269	2.00							
3.00 - 3.20	SPT (C)	N=50 (4,3/50 for 50mm) Hammer SN = 0269	3.00		42.10	3.20		End of Borehole at 3.20m		

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0

Water Strikes				Casing Details	
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	To (m)	Diameter

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered.

Termination Reason

Terminated on virtual refusal of sampler

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	DS-11208
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	
Dynamic Sampling	Dando Terrier	1.20	1.90	581531.47 E
				675502.39 N

Final Depth:	1.90 m	Start Date:	28/07/2022	Driller:	JD	Sheet 1 of 1
Elevation:	51.12 mOD	End Date:	28/07/2022	Logger:	NH	Scale: 1:50
						FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.10	B1				51.02	0.10		TOPSOIL		
0.40	B2				50.72	0.40		Very soft dark brown peaty CLAY with occasional rootlets and pockets of soft bluish grey clay.		
								Firm bluish grey mottled brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.		
0.80	B3				50.32	0.80		Stiff brownish grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.		
1.20	D4									
1.20 - 1.65	SPT (S)	N=16 (2,1/2,3,5,6) Hammer SN = 0269								
1.90	D5				49.22	1.90		End of Borehole at 1.90m		

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter

Remarks

Hand dug inspection pit excavated to 1.20m
Rebore attempted at DS-11208A
No groundwater encountered.

Termination Reason

Terminated on instruction of Engineer

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	DS-11208A
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	
Dynamic Sampling	Dando Terrier	1.20	3.00	581529.66 E
				675501.02 N

Final Depth:	3.00 m	Start Date:	28/07/2022	Driller:	JS	Sheet 1 of 1
Elevation:	51.19 mOD	End Date:	28/07/2022	Logger:	NH	Scale: 1:50
						FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.10	B1				51.09	0.10		TOPSOIL		
0.30	B2				50.89	0.30		Very soft dark brown peaty CLAY with occasional rootlets and pockets of soft bluish grey clay.		
								Firm bluish grey mottled brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.		
0.80	B3				50.39	0.80		Stiff brownish grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.		
1.20	D4									
1.20 - 1.65	SPT (S)	N=30 (1,3/6,8,8,8) Hammer SN = 0269	1.20	Dry						
1.50	B6	Water strike at 1.80m			49.69	1.50		Medium dense brownish grey very gravelly very clayey fine to coarse SAND. Gravel is subangular fine to coarse.		
2.00	D5									
2.00 - 2.45	SPT (S)	N=29 (4,5/6,7,8,8) Hammer SN = 0269	2.00							
					48.19	3.00		End of Borehole at 3.00m		

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
1.80	1.80	60	0.90

Casing Details

To (m)	Diameter
3.00	150

Remarks

Hand dug inspection pit excavated to 1.20m
Rebore of DS-11208; virtual refusal at 1.90m

Termination Reason

Terminated on instruction of Engineer

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	DS-11368
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	
Dynamic Sampling	Dando Terrier	1.20	1.35	581660.18 E
				675568.77 N

Final Depth:	1.35 m	Start Date:	27/07/2022	Driller:	JD	Sheet 1 of 1
Elevation:	50.51 mOD	End Date:	27/07/2022	Logger:	NH	Scale: 1:50
						FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.10	B1				50.41	0.10		TOPSOIL		
								Soft dark brown slightly sandy slightly gravelly CLAY with occasional rootlets. Sand is fine to coarse. Gravel is subangular fine to coarse.		
0.50	B2				50.01	0.50		Grey gravelly very clayey fine to coarse SAND. Gravel is angular fine to coarse.		
1.00	B3				49.51	1.00		Very stiff greyish brown mottled orangish brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular fine to coarse.		
1.20 - 1.48	SPT (S)	N=50 (2,5/50 for 125mm) Hammer SN = 0259			49.16	1.35		End of Borehole at 1.35m		
1.35	D4									

Water Strikes				Casing Details	
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	To (m)	Diameter

Remarks

Hand dug inspection pit excavated to 1.20m
Rebore attempted at DS-11368A
No groundwater encountered.

Termination Reason	Last Updated
Terminated on instruction of Engineer	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	DS-11368A
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	0.60	581658.47 E 675566.43 N

Final Depth:	Start Date:	Driller:	Sheet 1 of 1
0.60 m	27/07/2022	JD	Scale: 1:50
Elevation: 50.53 mOD	**End Date:** 27/07/2022	**Logger:** NH	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.10	B1				50.43	0.10		TOPSOIL		
0.30	B2				50.23	0.30		Dark brown slightly sandy slightly gravelly CLAY with occasional rootlets. Sand is fine to coarse. Gravel is angular fine to coarse.		
0.50 - 0.72	SPT (S)	N=50 (25 for 145mm/50 for 70mm) Hammer SN = 0269			50.03	0.50		Dense grey very gravelly very clayey fine to coarse SAND. Gravel is angular fine to coarse.		
0.60	D3				49.93	0.60		COBBLE/Possible bedrock		
								End of Borehole at 0.60m		

Water Strikes				Casing Details	
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	To (m)	Diameter

Remarks

Hand dug inspection pit excavated to 0.60m
Rebore of DS-11368; virtual refusal on cobble/possible bedrock at 1.35m
No groundwater encountered.

Termination Reason	Last Updated
Terminated on instruction of Engineer	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	DS-17886
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth:	Start Date:	Driller:	Sheet / Scale
Hand Digging	Hand Tools	0.00	1.20	583603.54 E	1.50 m	10/08/2022	JD	Sheet 1 of 1
Dynamic Sampling	Dando Terrier	1.20	1.50	681460.93 N	Elevation: 47.59 mOD	End Date: 10/08/2022	Logger: TH	Scale: 1:50
								FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.30 - 1.20	B1				47.29	0.30		TOPSOIL		
0.50	D2							Stiff to very stiff dark greyish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular fine to medium.		
1.20	D3									
1.20 - 1.63	SPT (S)	N=50 (25 for 130mm/18,15,10,7) Hammer SN = 0269			46.09	1.50		End of Borehole at 1.50m		

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered.

Termination Reason

Terminated on virtual refusal of sampler

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	DS-19007
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	
Dynamic Sampling	Dando Terrier	1.20	1.70	584347.13 E
				682226.17 N

Final Depth:	1.70 m	Start Date:	05/08/2022	Driller:	JD	Sheet 1 of 1
Elevation:	38.23 mOD	End Date:	05/08/2022	Logger:	TH	Scale: 1:50
						FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.10 - 0.80	B1				38.13	0.10		TOPSOIL Dark grey sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular fine to coarse.		
0.80 - 1.70	B2				37.43	0.80		Stiff bluish grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular fine to medium.		
1.20 - 1.65	SPT (C)	N=20 (4,5/5,5,5,5) Hammer SN = 0269								
1.70	D3				36.53	1.70		End of Borehole at 1.70m		
1.70 - 2.07	SPT (S)	N=50 (8,8/50 for 220mm) Hammer SN = 0269								

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered.

Termination Reason

Terminated on virtual refusal on cobbles

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	DS-19160
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth:	Start Date:	Driller:	
Hand Digging	Hand Tools	0.00	1.20		1.70 m	08/08/2022	JD	Sheet 1 of 1
Dynamic Sampling	Dando Terrier	1.20	1.70	584463.67 E				Scale: 1:50
				682323.39 N	Elevation: 38.55 mOD	End Date: 08/08/2022	Logger: TH	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.10	D3				38.45	0.10		TOPSOIL		
0.10 - 0.30	B1				38.25	0.30		Soft dark greyish brown slightly sandy slightly gravelly peaty CLAY. Sand is fine to coarse. Gravel is very angular fine to coarse.		
0.30 - 1.20	B2							Stiff to very stiff greyish brown mottled dark grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular fine to medium.		
0.50	D4									
		Water strike at 1.00m							▼	
1.20 - 1.63	SPT (S)	N=50 (25 for 140mm/50 for 290mm) Hammer SN = 0269								
					36.85	1.70		End of Borehole at 1.70m		

Water Strikes				Casing Details	
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	To (m)	Diameter
1.00	1.00	20	1.00		

Remarks

Hand dug inspection pit excavated to 1.20m
Rebore attempted at DS-19160A

Termination Reason	Last Updated
Terminated on instruction of Engineer	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	DS-19160A
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth:	Start Date:	Driller:	Sheet / Scale
Hand Digging	Hand Tools	0.00	1.20	584460.23 E	1.30 m	08/08/2022	JD	Sheet 1 of 1
Dynamic Sampling	Dando Terrier	1.20	1.30	682325.35 N	Elevation: 38.59 mOD	End Date: 08/08/2022	Logger: TH	Scale: 1:50
								FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.10 - 1.20	B1				38.49	0.10		TOPSOIL		
0.50	D2							Firm to stiff greyish brown mottled dark grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular fine to medium.		
1.20 - 1.41	SPT (S)	N=50 (25 for 145mm/50 for 65mm) Hammer SN = 0269			37.29	1.30		End of Borehole at 1.30m		

Water Strikes				Casing Details	
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	To (m)	Diameter

Remarks

Hand dug inspection pit excavated to 1.20m
Rebore of DS-19160; virtual refusal at 1.70m
No groundwater encountered.

Termination Reason	Last Updated
Terminated on virtual refusal of sampler	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	DS-23898
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth:	Start Date:	Driller:	Sheet 1 of 1
Hand Digging	Hand Tools	0.00	1.20					Scale: 1:50
Dynamic Sampling	Dando Terrier	1.20	2.00	586923.27 E	2.00 m	10/08/2022	JD	
				686043.44 N	Elevation: 73.29 mOD	End Date: 10/08/2022	Logger: NH	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.10 - 1.80	1				73.19	0.10		TOPSOIL Stiff brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to medium.		
0.50	D2									
1.20 - 1.65	SPT (S)	N=18 (2,2/4,4,5,5) Hammer SN = 0269								
1.80 - 2.22	SPT (S)	N=50 (25 for 135mm/50 for 285mm) Hammer SN = 0269			71.29	2.00		End of Borehole at 2.00m		

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0

Water Strikes				Casing Details	
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	To (m)	Diameter

Remarks

Hand dug inspection pit excavated to 1.20m
Completed as CP rig access was not thought possible
CP rig and RC rig both were then able to access the location via alternate route
No groundwater encountered.

Termination Reason

Terminated on virtual refusal of sampler

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	DS-28605
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Hand Digging	Hand Tools	0.00	1.20	
Dynamic Sampling	Dando Terrier	1.20	2.45	589927.12 E
				687938.46 N

Final Depth:	2.45 m	Start Date:	18/08/2022	Driller:	JC	Sheet 1 of 1
Elevation:	71.67 mOD	End Date:	18/08/2022	Logger:	JC	Scale: 1:50
						FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.10 - 1.20	B1				71.57	0.10		TOPSOIL Light reddish brown gravelly fine to coarse SAND with low cobble content and rare rootlets. Gravel is subrounded fine to coarse.		
1.20 - 2.00	B2				70.47	1.20		Medium dense to dense greyish brown very sandy silty subangular fine to coarse GRAVEL with low cobble content. Sand is fine to coarse.		
1.20 - 1.65	SPT (C)	N=24 (2,4/7,6,6,5) Hammer SN = 1367	1.00	Dry						
2.00 - 2.26	SPT (C)	N=50 (25 for 120mm/50 for 140mm) Hammer SN = 1367	2.00	Dry						
					69.22	2.45		End of Borehole at 2.45m		

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter
2.00	150

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered

Termination Reason

Terminated on virtual refusal of sampler

Last Updated

13/03/2023

AGS

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

Southern Testing
Unit 11
Charlwood Road
East Grinstead
West Sussex
RH19 2HU

SPT Hammer Ref:	T4
Test Date:	27/02/2021
Report Date:	01/03/2021
File Name:	T4.spt
Test Operator:	NPB

Instrumented Rod Data

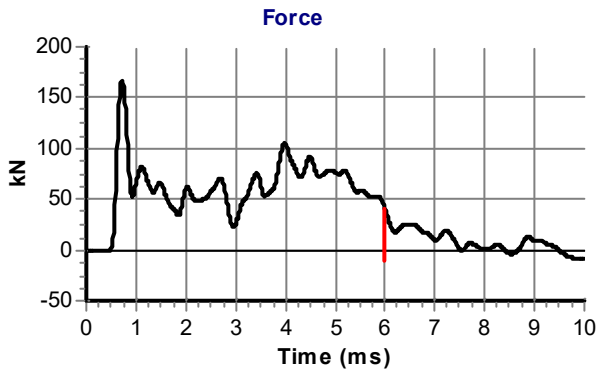
Diameter d_r (mm):	54
Wall Thickness t_r (mm):	6.3
Assumed Modulus E_a (GPa):	208
Accelerometer No.1:	6458
Accelerometer No.2:	9607

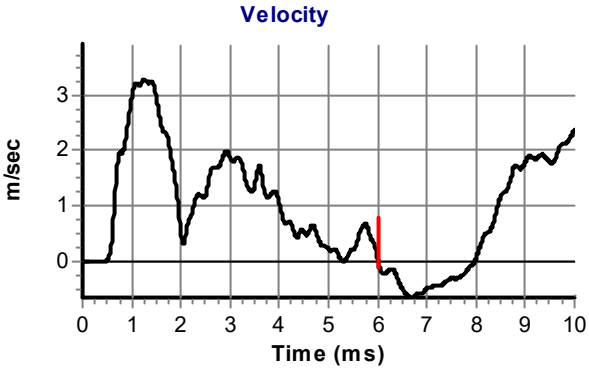
SPT Hammer Information

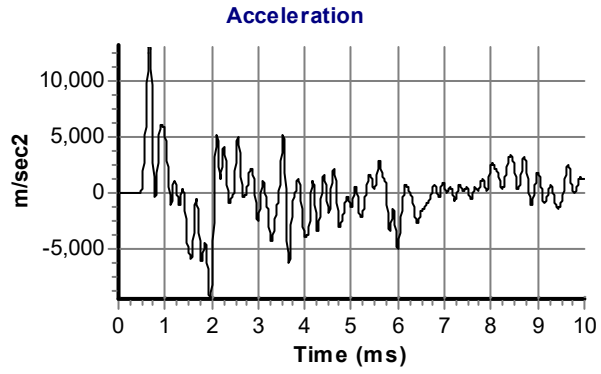
Hammer Mass m (kg):	63.5
Falling Height h (mm):	760
SPT String Length L (m):	11.0

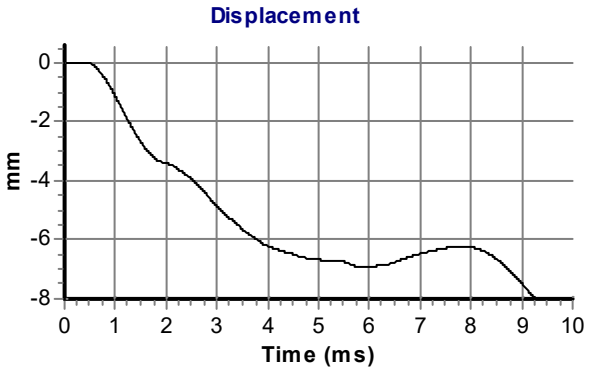
Comments / Location

BALLYMONEY









Calculations

Area of Rod A (mm2):	944
Theoretical Energy E_{theor} (J):	473
Measured Energy E_{meas} (J):	433

Energy Ratio E_r (%): **91**

Signed: N P Burrows

Title: Field Operations Manager

The recommended calibration interval is 12 months

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CAUSEWAY GEOTECH

APPENDIX 4C

TRIAL PIT RECORDS
SLIT TRENCH RECORDS



Stratum Legend Key



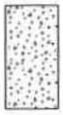
101
TOPSOIL



102
MADE GROUND



103
MADE GROUND



104
CONCRETE



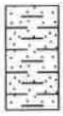
105
WOOD



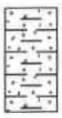
201
CLAY



202
Silty CLAY



203
Sandy CLAY



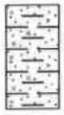
204
Gravelly CLAY



205
Cobbly CLAY



206
Bouldery CLAY



207
Silty sandy CLAY



208
Silty gravelly CLAY



209
Silty cobbly CLAY



210
Silty bouldery CLAY



211
Silty sandy gravelly CLAY



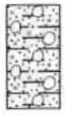
212
Silty sandy cobbly CLAY



213
Silty sandy bouldery CLAY



214
Silty sandy gravelly cobbly CLAY



215
Silty sandy gravelly bouldery CLAY



216
Silty sandy gravelly cobbly bouldery CLAY



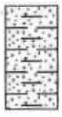
217
Silty sandy peaty CLAY



218
Silty sandy gravelly peaty CLAY



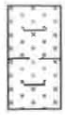
219
Silty peaty CLAY



220
Sandy gravelly CLAY



301
SILT



302
Clayey SILT



303
Sandy SILT



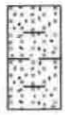
304
Gravelly SILT



305
Peaty SILT



306
Clayey sandy SILT



307
Gravelly clayey SILT



308
Sandy gravelly clayey SILT



309
Clayey bouldery SILT



310
Sandy gravelly SILT



312
Clayey sandy gravelly SILT



313
Clayey sandy gravelly peaty SILT



314
Clayey sandy gravelly peaty cobbly SILT



316
Sandy cobbly SILT



317
Sandy bouldery SILT

CAUSEWAY GEOTECH

Stratum Legend Key


318
Sandy peaty SILT


319
Sandy gravelly peaty SILT


320
Sandy gravelly cobbly SILT


321
Sandy gravelly peaty cobbly SILT


322
Gravelly cobbly SILT


323
Gravelly bouldery SILT


324
Gravelly peaty SILT


325
Gravelly peaty cobbly SILT


326
Cobbly SILT


327
Cobbly bouldery SILT


328
Peaty cobbly SILT


329
Clayey cobbly SILT


330
Clayey peaty SILT

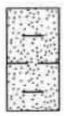

331
Bouldery SILT


332
slightly shelly SILT


333
very shelly SILT


334
Sandy clayey peaty SILT


401
SAND


402
Clayey SAND


403
Silty SAND


404
Gravelly SAND


405
Cobbly SAND


406
Bouldery SAND


407
Clayey silty SAND


408
Clayey silty gravelly SAND


409
Clayey silty gravelly cobbly SAND


410
Clayey gravelly SAND


411
Clayey gravelly cobbly SAND


412
Silty gravelly SAND


413
Silty gravelly cobbly SAND


414
Silty gravelly cobbly bouldery SAND


415
Gravelly cobbly SAND


416
Gravelly cobbly bouldery SAND


417
Gravelly bouldery SAND


418
Cobbly bouldery SAND


430
SAND and GRAVEL


431
Peaty SAND


432
Clayey peaty SAND


433
Silty peaty SAND


434
Gravelly peaty SAND

CAUSEWAY GEOTECH

Stratum Legend Key



435
Cobbly peaty SAND



436
Bouldery peaty SAND



437
Clayey silty peaty SAND



438
Clayey silty gravelly peaty SAND



439
slightly shelly SAND



440
very shelly SAND



441
slightly shelly silty SAND



442
very shelly silty SAND



443
slightly shelly silty gravelly SAND



444
very shelly silty gravelly SAND



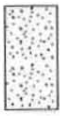
501
GRAVEL



502
Clayey GRAVEL



503
Silty GRAVEL



504
Sandy GRAVEL



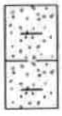
505
Peaty GRAVEL



506
Cobbly GRAVEL



507
Bouldery GRAVEL



508
Clayey silty GRAVEL



509
Clayey sandy GRAVEL



510
Clayey cobbly GRAVEL



511
Clayey bouldery GRAVEL



512
Clayey peaty GRAVEL



513
Clayey silty sandy GRAVEL



514
Clayey silty cobbly GRAVEL



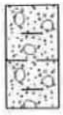
515
Clayey silty bouldery GRAVEL



516
Clayey silty peaty GRAVEL



517
Clayey sandy peaty GRAVEL



518
Clayey silty sandy bouldery GRAVEL



519
Clayey silty sandy peaty GRAVEL



520
Silty sandy GRAVEL



521
Silty cobbly GRAVEL



522
Silty bouldery GRAVEL



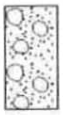
523
Silty peaty GRAVEL



524
Silty peaty sandy GRAVEL



525
Sandy cobbly GRAVEL



526
Sandy bouldery GRAVEL



527
Sandy peaty GRAVEL



528
Silty sandy cobbly GRAVEL



601
PEAT



602
Clayey PEAT

CAUSEWAY GEOTECH

Stratum Legend Key



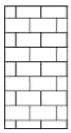
801
Mudstone



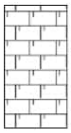
802
Siltstone



803
Sandstone



804
Limestone



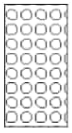
805
Chalk



806
Coal



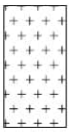
807
Breccia



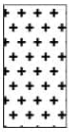
808
Conglomerate



809
Fine grained igneous



810
Medium grained igneous



811
Coarse grained igneous



812
Fine grained metamorphic



813
Medium grained metamorphic



814
Coarse grained metamorphic



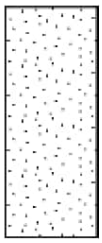
815
Pyroclastic (volcanic ash)



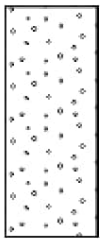
816
Gypsum, rocksalt

CAUSEWAY GEOTECH

Backfill Legend Key



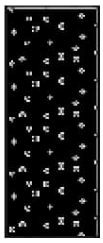
901
Sand backfill



902
Gravel backfill



903
Bentonite



904
Grout



905
Arisings



906
Concrete

CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-2007
Coordinates 574245.89 E 670812.25 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8t Wheeled Excavator	**Elevation** 68.01 mOD	**Date:** 16/08/2022	**Logger:** DC	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.25 - 0.80	B1		67.76	0.25		Firm brownish orangish grey slightly gravelly sandy CLAY with rare rootlets. Sand is fine to coarse. Gravel is subrounded fine to medium.	
0.80 - 1.70	B2		67.20	0.80		Stiff orange and greyish brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.	
1.70 - 2.40	B3		66.31	1.70		Firm light grey slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subrounded fine to medium.	
2.40 - 3.30	B4	Seepage at 2.60m Seepage at 2.80m	65.60	2.40		Firm light brown slightly sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse.	▼ ▼
			64.70	3.30		End of trial pit at 3.30m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes

Struck at (m)	Remarks
2.80	Seepage at 2.80m
2.60	Seepage at 2.60m

Depth: 3.30
Width: 0.55
Length: 2.50

Remarks:
Material unsuitable for hand vane

Stability:
Unstable

Termination Reason
Terminated on instruction of Engineer

Last Updated
13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-2140
Coordinates 574406.56 E 670773.10 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8t Wheeled Excavator	**Elevation** 65.74 mOD	**Date:** 16/08/2022	**Logger:** DC	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.30 - 0.50	B1		65.44	0.30		Soft light orangish brown sandy gravelly silty CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse.	
0.50 - 2.80	B2		65.24	0.50		Light greyish brown very sandy very clayey subrounded fine to coarse GRAVEL with low cobble content. Sand is fine to coarse.	
		Very slight seepage at 2.60m					
2.80 - 3.50	B3		62.94	2.80		Firm light brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subrounded fine to medium.	
		Steady water ingress a 3.50m	62.24	3.50		End of trial pit at 3.50m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes

Struck at (m)	Remarks
2.60	Very slight seepage at 2.60m
3.50	Steady water ingress a 3.50m

Depth: 3.50
Width: 0.50
Length: 2.60

Remarks:
Material unsuitable for hand vane

Stability:
Stable

Termination Reason
Terminated at maximum reach of excavator

Last Updated
13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-2219
Coordinates 574504.05 E 670779.03 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8t Wheeled Excavator	**Elevation** 50.79 mOD	**Date:** 16/08/2022	**Logger:** DC	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			50.49	0.30		TOPSOIL	
			50.29	0.50		Soft brown sandy gravelly silty CLAY with occasional rootlets. Sand is fine to coarse. Gravel is subangular fine to coarse. stone drain going through middle of pit	
						End of trial pit at 0.50m	

0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5

Water Strikes

Struck at (m)	Remarks

Depth: 0.50
Width: 0.50
Length: 1.90

Remarks:
Trial pit relocated to TP-2219A due to encountering land drain
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Stable	Terminated at 0.50m due to encountering a land drain	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-2219A
Coordinates 574506.63 E 670774.86 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8t Wheeled Excavator	**Elevation** 50.04 mOD	**Date:** 16/08/2022	**Logger:** DC	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.00 - 0.30	B1					TOPSOIL	
0.30 - 1.20	B2		49.74	0.30		Soft brown sandy gravelly silty CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse.	
1.20 - 2.50	B3		48.84	1.20		Very soft light grey slightly sandy gravelly CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is subrounded fine to coarse.	
			47.54	2.50		End of trial pit at 2.50m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 2.50
Width: 0.60
Length: 2.30

Remarks:
Re-dig of TP-2219 due to encountering land drain
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Unstable	Terminated on instruction of Engineer	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-2349
Coordinates 574595.26 E 670865.91 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8t Wheeled Excavator	**Elevation** 53.46 mOD	**Date:** 17/08/2022	**Logger:** DC	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			53.46	0.00		TOPSOIL	
0.20 - 0.80	B1		53.26	0.20		Firm greyish brown sandy gravelly silty CLAY. Sand is fine to coarse. Gravel is subrounded fine to medium.	
0.80 - 1.60	B2		52.66	0.80		Firm light greyish brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subrounded fine to medium.	
1.60 - 2.20	B3		51.86	1.60		Stiff light brown slightly gravelly sandy CLAY with low cobble content. Sand is fine to coarse. Gravel is subrounded fine to medium.	
2.20 - 2.90	B4	Slow seepage at 2.60m	51.26	2.20		Soft light orangish brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse.	▼
			50.56	2.90		End of trial pit at 2.90m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks
2.60	Slow seepage at 2.60m

Depth: 2.90
Width: 0.55
Length: 2.40

Remarks:
TP location moved up the hill to a flatter area
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Unstable	Terminated on instruction of Engineer	13/03/2023

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CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-2701
Coordinates 574900.92 E 671019.34 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8t Wheeled Excavator	**Elevation** 52.85 mOD	**Date:** 17/08/2022	**Logger:** DC	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.20 - 2.00	B1		52.65	0.20		Soft light orangish brown slightly gravelly sandy CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is subrounded fine to coarse.	
2.00 - 3.50	B2		50.85	2.00		Firm to stiff light brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse.	
			49.35	3.50		End of trial pit at 3.50m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 3.50
Width: 0.55
Length: 2.70

Remarks:
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Stable	Terminated at maximum reach of excavator	13/03/2023

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CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-3302
Coordinates 575466.08 E 671158.11 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8t Wheeled Excavator	**Elevation** 50.78 mOD	**Date:** 17/08/2022	**Logger:** DC	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.50 - 0.80	B1		50.28	0.50		Soft orangish brown sandy gravelly silty CLAY. Sand is fine to coarse. Gravel is subrounded fine to medium.	
0.80 - 1.35	B2		49.98	0.80		Soft greyish brown sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse.	
1.35 - 3.10	B3		49.43	1.35		Firm brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse.	
3.10 - 3.60	B4		47.68	3.10		Firm light brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.	
			47.18	3.60		End of trial pit at 3.60m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 3.60
Width: 0.60
Length: 2.60

Remarks:
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Stable	Terminated at maximum reach of excavator	13/03/2023

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CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-3504
Coordinates 575651.04 E 671202.98 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8t Wheeled Excavator	**Elevation** 44.98 mOD	**Date:** 17/08/2022	**Logger:** DC	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.35 - 1.00	B5		44.62	0.35		Soft light orangish brown sandy gravelly silty CLAY with occasional rootlets. Sand is fine to coarse. Gravel is subrounded fine to medium.	
1.00 - 2.30	B4		43.98	1.00		Firm greyish brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subrounded fine to medium.	
2.30 - 2.70	B3		42.68	2.30		Firm brownish grey slightly gravelly sandy silty CLAY. Sand is fine to coarse. Gravel is subangular fine.	
2.70 - 3.00	B2		42.28	2.70		Soft dark brownish black slightly gravelly sandy organic SILT. Sand is fine to coarse. Gravel is subangular fine.	
3.00 - 3.60	B1		41.98	3.00		Grey very sandy silty subangular fine to coarse GRAVEL. Sand is fine to coarse.	
		Steady water ingress at 3.60m	41.38	3.60		End of trial pit at 3.60m	▼

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks
3.60	Steady water ingress at 3.60m

Depth: 3.60
Width: 0.60
Length: 2.50

Remarks:
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Unstable	Terminated on instruction of Engineer	13/03/2023

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CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-3978
Coordinates 576089.29 E 671328.78 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8t Wheeled Excavator	**Elevation** 65.33 mOD	**Date:** 22/08/2022	**Logger:** DC	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.30 - 0.60	B1		65.03	0.30		Soft brownish grey slightly sandy slightly gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse.	
0.60 - 1.60	B2		64.72	0.60		Soft brownish grey slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse.	
1.60 - 3.20	B3		63.72	1.60		Stiff greyish grey slightly gravelly sandy silty CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse.	
			62.12	3.20		End of trial pit at 3.20m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 3.20
Width: 0.50
Length: 2.60

Remarks:
No groundwater encountered
Material unsuitable for hand vane

Stability: Moderately stable

Termination Reason: Terminated on instruction of Engineer

Last Updated: 13/03/2023

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CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-4112
Coordinates 576230.19 E 671339.97 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8t Wheeled Excavator	**Elevation** 66.41 mOD	**Date:** 17/08/2022	**Logger:** DC	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.20 - 1.60	B1		66.21	0.20		Soft light orange and greyish brown slightly sandy CLAY. Sand is fine to coarse.	
1.60 - 3.00	B2		64.81	1.60		Soft to firm light brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subangular fine to medium.	
		Steady seepage at 2.90m					▼
			63.41	3.00		End of trial pit at 3.00m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks
2.90	Steady seepage at 2.90m

Depth: 3.00
Width: 0.60
Length: 2.70

Remarks:
Material unsuitable for hand vane

Stability: Unstable

Termination Reason: Terminated on instruction of Engineer

Last Updated: 13/03/2023

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CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-5303
Coordinates 577344.63 E 671519.23 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 9t Wheeled Excavator	**Elevation** 54.69 mOD	**Date:** 22/08/2022	**Logger:** DC	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.20 - 0.80	B1		54.49	0.20		Soft light brown sandy gravelly silty CLAY with occasional rootlets. Sand is fine to coarse. Gravel is subrounded fine to medium.	
0.80 - 1.50	B2		53.89	0.80		Firm orangish brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subrounded fine to medium.	
1.50 - 2.30	B3		53.19	1.50		Soft brown sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse.	
2.30 - 3.50	B4		52.39	2.30		Firm greyish brown slightly gravelly sandy CLAY with low cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse.	
			51.19	3.50		End of trial pit at 3.50m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 3.50
Width: 0.50
Length: 2.20

Remarks:
No groundwater encountered
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Stable	Terminated at maximum reach of excavator	13/03/2023

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CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-5387
Coordinates 577420.32 E 671576.63 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 9t Wheeled Excavator	**Elevation** 54.47 mOD	**Date:** 22/08/2022	**Logger:** DC	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.20 - 1.00	B1		54.22	0.25		TOPSOIL	
						Soft light brown slightly gravelly sandy CLAY with low cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse.	
1.00 - 2.65	B2		53.47	1.00		Firm light brown sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse.	
2.65 - 3.55	B3		51.82	2.65		Firm brown slightly gravelly sandy CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse.	
			50.92	3.55		End of trial pit at 3.55m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 3.55
Width: 0.60
Length: 2.70

Remarks:
No groundwater encountered
Material unsuitable for hand vane

Stability: Stable

Termination Reason: Terminated at maximum reach of excavator

Last Updated: 13/03/2023

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CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-5703
Coordinates 577738.54 E 671590.33 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 9t Wheeled Excavator	**Elevation** 53.56 mOD	**Date:** 23/08/2022	**Logger:** DC	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.20 - 0.90	B1		53.36	0.20		Light orangish brown gravelly clayey fine to coarse SAND with occasional rootlets. Gravel is subrounded fine to medium.	
0.90 - 2.30	B2		52.66	0.90		Light brown slightly gravelly sandy CLAY with with low cobble and boulder content. Sand is fine to coarse. Gravel is subrounded fine to coarse.	
2.30 - 3.50	B3		51.26	2.30		Firm brown slightly gravelly sandy SILT with low cobble and boulder content. Sand is fine to coarse. Gravel is subrounded fine to coarse.	
			50.06	3.50		End of trial pit at 3.50m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 3.50
Width: 0.50
Length: 2.30

Remarks:
No groundwater encountered
Material unsuitable for hand vane

Stability: Stable

Termination Reason: Terminated at maximum reach of excavator

Last Updated: 13/03/2023

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CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-5803
Coordinates 577831.55 E 671625.10 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 9t Wheeled Excavator	**Elevation** 51.56 mOD	**Date:** 23/08/2022	**Logger:** DC	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.30 - 2.50	B1		51.26	0.30		Soft light brown slightly sandy slightly gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse.	
2.50 - 3.50	B2		49.06	2.50		Light brown very gravelly very clayey fine to coarse SAND with low cobble content. Gravel is subangular fine to coarse.	
			48.06	3.50		End of trial pit at 3.50m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 3.50
Width: 0.50
Length: 2.50

Remarks:
No groundwater encountered
Material unsuitable for hand vane

Stability: Moderately stable

Termination Reason: Terminated at maximum reach of excavator

Last Updated: 13/03/2023

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CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-5903
Coordinates 577907.11 E 671690.59 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 9t Wheeled Excavator	**Elevation** 52.44 mOD	**Date:** 23/08/2022	**Logger:** DC	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.30 - 3.00	B1		52.14	0.30		Light brown silty fine to coarse SAND.	
			50.44	2.00		Light brown very sandy silty subrounded fine to coarse GRAVEL with low cobble content. Sand is fine to coarse.	
3.00 - 3.50	B2						
			48.94	3.50		End of trial pit at 3.50m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 3.50
Width: 0.50
Length: 2.20

Remarks:
No groundwater encountered
Material unsuitable for hand vane

Stability: Unstable

Termination Reason: Terminated on instruction of Engineer

Last Updated: 13/03/2023

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CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-6016
Coordinates 577990.39 E 671747.60 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 9t Wheeled Excavator	**Elevation** 52.24 mOD	**Date:** 23/08/2022	**Logger:** DC	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.30 - 1.50	B1		51.94	0.30		Light brown very gravelly very silty fine to coarse SAND with occasional rootlets. Gravel is subrounded fine to coarse.	
1.50 - 2.40	B2		50.74	1.50		Firm brown slightly gravelly sandy SILT with low cobble and boulder content. Sand is fine to coarse. Gravel is subangular fine to coarse.	
2.40 - 3.00	B3		49.84	2.40		Stiff greyish brown slightly sandy gravelly silty CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is subangular fine to coarse.	
			49.24	3.00		End of trial pit at 3.00m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 3.00
Width: 0.60
Length: 2.30

Remarks:
No groundwater encountered
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Stable	Terminated at refusal on boulders/possible bedrock	13/03/2023

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CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-6105
Coordinates 578056.16 E 671805.84 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 9t Wheeled Excavator	**Elevation** 52.98 mOD	**Date:** 23/08/2022	**Logger:** DC	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.30 - 1.00	B1		52.68	0.30		Light brown gravelly silty fine to coarse SAND with low cobble content and rare rootlets.	
1.00 - 2.20	B2		51.98	1.00		Soft brown slightly gravelly sandy CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is subrounded fine to coarse.	
2.20 - 3.00	B3		50.78	2.20		Firm light orangish brown slightly sandy slightly gravelly CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is subangular fine to coarse.	
3.00 - 3.50	B4		49.98	3.00		Firm light grey and orangish brown slightly gravelly sandy CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is subangular fine to coarse.	
			49.48	3.50		End of trial pit at 3.50m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 3.50
Width: 0.55
Length: 2.40

Remarks:
No groundwater encountered
Material unsuitable for hand vane
Trial pit moved approximately 10m north of original location

Stability:	Termination Reason	Last Updated
Stable	Terminated at maximum reach of excavator	13/03/2023

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CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-6207
Coordinates 578155.96 E 671862.49 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 9t Wheeled Excavator	**Elevation** 53.63 mOD	**Date:** 23/08/2022	**Logger:** DC	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.30 - 1.40	B1		53.32	0.30		Light brown silty fine to coarse SAND and subangular fine to coarse GRAVEL with low cobble content.	
1.40 - 2.60	B2		52.22	1.40		Soft greyish brown slightly gravelly sandy CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is subangular fine to coarse.	
			51.02	2.60		End of trial pit at 2.60m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 2.60
Width: 0.50
Length: 2.15

Remarks:
No groundwater encountered
Material unsuitable for hand vane

Stability: Stable

Termination Reason: Terminated at refusal on boulders/possible bedrock

Last Updated: 13/03/2023

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CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-6408
Coordinates 578263.66 E 672040.79 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8t Wheeled Excavator	**Elevation** 58.30 mOD	**Date:** 18/08/2022	**Logger:** DC	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.25 - 1.00	B1		58.05	0.25		Soft light orangish brown slightly gravelly sandy silty CLAY with rare rootlets. Sand is fine to coarse. Gravel is subrounded fine to medium.	
1.00 - 2.60	B2		57.30	1.00		Firm light brown slightly gravelly sandy CLAY with low cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse.	
2.60 - 3.50	B3		55.70	2.60		Firm greyish brown slightly gravelly sandy CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse.	
			54.80	3.50		End of trial pit at 3.50m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 3.50
Width: 0.60
Length: 2.50

Remarks:
No groundwater encountered
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Stable	Terminated at maximum reach of excavator	13/03/2023

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CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-6505
Coordinates 578350.14 E 672090.74 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8t Wheeled Excavator	**Elevation** 53.48 mOD	**Date:** 18/08/2022	**Logger:** DC	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.25 - 1.15	B1		53.23	0.25		Soft light brown slightly gravelly sandy silty CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is subrounded fine to coarse. (Boulder 0.40x0.40x0.17)	
1.15 - 2.75	B2		52.33	1.15		Light brown slightly clayey fine to coarse SAND and subangular fine to coarse GRAVEL with medium cobble content.	
2.75 - 3.50	B3		50.73	2.75		Greyish brown very gravelly very clayey fine to coarse SAND with medium cobble content and low boulder content. Gravel is subrounded fine to coarse.	
			49.98	3.50		End of trial pit at 3.50m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 3.50
Width: 0.70
Length: 2.20

Remarks:
No groundwater encountered
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Stable	Terminated at maximum reach of excavator	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-6575
Coordinates 578417.55 E 672114.19 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8t Wheeled Excavator	**Elevation** 52.87 mOD	**Date:** 18/08/2022	**Logger:** DC	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.20 - 0.90	B1		52.67	0.20		Soft brown slightly sandy slightly gravelly CLAY with low cobble content and low boulder content. Sand is fine to coarse. Gravel is subrounded fine to coarse.	
0.90 - 1.60	B2		51.97	0.90		Firm greyish brown slightly sandy slightly gravelly SILT with low cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse.	
1.60 - 2.40	B3		51.27	1.60		Firm grey slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subangular fine to medium.	
2.40 - 3.30	B4		50.47	2.40		Light orangish brown very gravelly very clayey fine to coarse SAND Gravel is subangular medium to coarse.	
			49.57	3.30		End of trial pit at 3.30m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 3.30
Width: 0.60
Length: 2.40

Remarks:
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Unstable	Terminated on instruction of Engineer	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-6663
Coordinates 578472.81 E 672184.99 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8t Wheeled Excavator	**Elevation** 55.17 mOD	**Date:** 18/08/2022	**Logger:** DC	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.20 - 0.80	B1		54.97	0.20		MADE GROUND: Soft greyish brown slightly gravelly sandy CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is subangular fine to coarse.	
0.80 - 2.90	B2		54.37	0.80		MADE GROUND: Firm brownish grey slightly gravelly sandy silty CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is subangular fine to coarse. (Boulder 1.00x0.80x0.25)	
			52.27	2.90		End of trial pit at 2.90m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 2.90
Width: 0.60
Length: 2.80

Remarks:
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Stable	Terminated at refusal on boulders/possible bedrock.	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-6832
Coordinates 578564.81 E 672328.20 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8t Wheeled Excavator	**Elevation** 55.70 mOD	**Date:** 18/08/2022	**Logger:** DC	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.10 - 0.85	B1		55.60	0.10		TOPSOIL	
						Soft light brown slightly sandy slightly gravelly silty CLAY with medium cobble and boulder content and rare rootlets. Sand is fine to coarse. Gravel is subangular fine to coarse.	
0.85 - 2.20	B2		54.85	0.85		Soft to Firm brownish grey slightly gravelly sandy CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse.	
2.20 - 3.00	B3		53.50	2.20		Light brown very clayey fine to coarse SAND and subangular fine to coarse GRAVEL.	
			52.70	3.00		End of trial pit at 3.00m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 3.00
Width: 0.60
Length: 2.60

Remarks:
Material unsuitable for hand vane

Stability:
Unstable

Termination Reason
Terminated on instruction of Engineer

Last Updated
13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-6906
Coordinates 578624.97 E 672381.96 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8t Wheeled Excavator	**Elevation** 53.03 mOD	**Date:** 19/08/2022	**Logger:** DC	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.20 - 1.20	B1		52.83	0.20		Stiff greyish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine.	
1.20 - 1.30	B2		51.83	1.20		Firm thinly laminated grey and orangish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine.	
1.30 - 2.30	B3	light water seepage at 1.30m	51.73	1.30		Dark greyish brown gravelly clayey fine to coarse SAND. Gravel is subrounded fine to coarse.	▼
			50.73	2.30		End of trial pit at 2.30m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks
1.30	light water seepage at 1.30m

Depth: 2.30
Width: 0.50
Length: 2.20

Remarks: Material unsuitable for hand vane

Stability: Unstable

Termination Reason: Terminated on instruction of Engineer

Last Updated: 13/03/2023

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CAUSEWAY GEOTECH	**Project No.** 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	**Trial Pit ID** TP-6997
	Coordinates 578703.72 E 672427.69 N	**Client:** Irish Water	
Method: Trial Pitting		**Client's Representative:** Mott MacDonald	Sheet 1 of 1 Scale: 1:25
Plant: 8t Wheeled Excavator	**Elevation** 54.11 mOD	**Date:** 19/08/2022	**Logger:** DC — FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.15 - 0.60	B1		53.96	0.15		TOPSOIL	
						Soft light brown slightly sandy slightly gravelly silty CLAY with occasional rootlets. Sand is fine to coarse. Gravel is subangular fine.	
0.60 - 1.70	B2		53.51	0.60		Stiff light grey and orangish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine.	
1.70 - 2.50	B3		52.41	1.70		Light brown clayey fine to coarse SAND and subangular fine to coarse GRAVEL with low cobble content. Gravel is subangular fine to coarse.	
			51.61	2.50		End of trial pit at 2.50m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 2.50
Width: 0.50
Length: 2.50

Remarks:
No groundwater encountered
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Unstable	Terminated on instruction of Engineer	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-7207
Coordinates 578803.04 E 672621.95 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8t Wheeled Excavator	**Elevation** 54.77 mOD	**Date:** 22/08/2022	**Logger:** DC	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.20 - 0.80	B1		54.56	0.20		Soft light brown slightly sandy slightly gravelly CLAY with occasional rootlets. Sand is fine to coarse. Gravel is subangular fine to medium.	
0.80 - 1.60	B2		53.96	0.80		Stiff greyish orangish brown slightly sandy CLAY. Sand is fine to coarse.	
1.60 - 3.50	B3		53.16	1.60		Firm greyish brown sandy gravelly CLAY with low cobble content and low boulder content. Sand is fine to coarse. Gravel is subangular fine to coarse.	
			51.26	3.50		End of trial pit at 3.50m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 3.50
Width: 0.50
Length: 2.60

Remarks:
No groundwater encountered
Material unsuitable for hand vane

Stability: Moderately stable

Termination Reason: Terminated at maximum reach of excavator

Last Updated: 13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-7305
Coordinates 578880.35 E 672683.24 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8t Wheeled Excavator	**Elevation** 55.38 mOD	**Date:** 19/08/2022	**Logger:** DC	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.30 - 0.90	B1		55.08	0.30		Soft light brown slightly gravelly sandy SILT with rare rootlets. Sand is fine to coarse. Gravel is subrounded fine to medium.	
0.90 - 2.00	B2		54.48	0.90		Brownish grey clayey fine to coarse SAND and subangular fine to coarse GRAVEL with low cobble content.	
2.00 - 2.50	B3	Fast water ingress at 2.00m	53.38	2.00		Soft light orange and greyish brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse.	▼
			52.88	2.50		End of trial pit at 2.50m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks
2.00	Fast water ingress at 2.00m

Depth: 2.50
Width: 0.50
Length: 2.40

Remarks:
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Unstable	Terminated on instruction of Engineer	13/03/2023

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CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-7373
Coordinates 578958.90 E 672700.27 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8t Wheeled Excavator	**Elevation** 54.64 mOD	**Date:** 19/08/2022	**Logger:** DC	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.15 - 0.40	B1		54.49	0.15		Brownish grey sandy slightly clayey subangular fine to coarse GRAVEL with occasional rootlets.	
0.70 - 0.80	B2		53.94	0.70		Orange slightly gravelly fine to coarse SAND. Gravel is subangular fine to medium.	
0.80 - 1.25	B3		53.84	0.80		Light brownish grey very sandy clayey fine to coarse GRAVEL with low cobble content. Sand is fine to coarse.	
		Very fast seepage at 1.25m	53.39	1.25		End of trial pit at 1.25m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks
1.25	Very fast seepage at 1.25m

Depth: 1.25
Width: 0.60
Length: 2.20

Remarks: Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Unstable	Terminated on instruction of Engineer	13/03/2023

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CAUSEWAY GEOTECH	**Project No.** 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	**Trial Pit ID** TP-9011
	Coordinates 580094.98 E 673863.77 N	**Client:** Irish Water	
Method: Trial Pitting		**Client's Representative:** Mott MacDonald	Sheet 1 of 1 Scale: 1:25
Plant: 9t Wheeled Excavator	**Elevation** 50.26 mOD	**Date:** 24/08/2022	**Logger:** DC — FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.30 - 0.80	B1		49.96	0.30		Firm greyish orangish brown slightly sandy gravelly silty CLAY. Sand is fine to coarse. Gravel is subangular fine to medium.	
0.80 - 1.50	B2		49.46	0.80		Stiff dark bluish grey slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse.	
1.50 - 2.20	B3		48.76	1.50		Stiff dark grey slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse.	
2.20 - 2.60	B4	Very slight seepage at 2.50m	48.06	2.20		Soft dark greyish brown slightly gravelly sandy CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is subrounded fine to coarse.	▼
			47.66	2.60		End of trial pit at 2.60m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks
2.50	Very slight seepage at 2.50m

Depth: 2.60
Width: 0.60
Length: 2.20

Remarks: Material unsuitable for hand vane

Stability: Stable

Termination Reason: Terminated at refusal on boulders/possible bedrock

Last Updated: 13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-9094
Coordinates 580084.03 E 673986.62 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 9t Wheeled Excavator	**Elevation** 51.66 mOD	**Date:** 24/08/2022	**Logger:** DC	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.30 - 0.80	B1		51.36	0.30		Very stiff light greyish brown slightly gravelly sandy CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse.	
0.80 - 2.70	B2		50.86	0.80		Brownish grey very sandy clayey subrounded fine to coarse GRAVEL with low cobble and boulder content. Gravel is subrounded fine to coarse.	
		Water ingress at 2.70m	48.96	2.70		End of trial pit at 2.70m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks
2.70	Water ingress at 2.70m

Depth: 2.70
Width: 0.50
Length: 2.80

Remarks:
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Unstable	Terminated on instruction of Engineer	13/03/2023

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CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-9115
Coordinates 580112.65 E 673983.30 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 9t Wheeled Excavator	**Elevation** 51.29 mOD	**Date:** 24/08/2022	**Logger:** DC	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.30 - 0.70	B2		50.99	0.30		Very stiff light greyish brown sandy CLAY with occasional rootlets. Sand is fine to coarse.	
0.70 - 2.10	B1		50.59	0.70		Stiff light greyish brown slightly sandy slightly gravelly CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is subangular fine to coarse.	
2.10 - 2.50	B3	Slow steady seepage at 2.10m Rapid water ingress at 2.40m	49.19	2.10		Stiff light brownish grey slightly sandy slightly gravelly CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is subrounded fine to coarse.	▼ ▼
			48.79	2.50		End of trial pit at 2.50m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes

Struck at (m)	Remarks
2.10	Slow steady seepage at 2.10m
2.40	Rapid water ingress at 2.40m

Depth: 2.50
Width: 0.55
Length: 2.30

Remarks:
Material unsuitable for hand vane

Stability:
Unstable

Termination Reason
Terminated at refusal on boulders/possible bedrock

Last Updated
13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Trial Pit ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	TP-9206
Coordinates	**Client:**	
580179.17 E 674067.39 N	Irish Water	
Method:	**Client's Representative:**	Sheet 1 of 1
Trial Pitting	Mott MacDonald	Scale: 1:25
Plant:	**Elevation** / **Date:** / **Logger:**	FINAL
9t Wheeled Excavator	52.64 mOD / 24/08/2022 / DC	

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.30 - 0.70	B1		52.34	0.30		Soft light brown slightly gravelly sandy silty CLAY with low cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse.	
0.70 - 1.60	B2		51.94	0.70		Firm orangish brownish grey slightly gravelly sandy CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is subrounded fine to coarse.	
1.60 - 2.50	B3		51.04	1.60		Brownish dark grey very gravelly very clayey fine to coarse SAND with low cobble and boulder content. Gravel is subangular fine to coarse.	
			50.14	2.50		End of trial pit at 2.50m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 2.50
Width: 0.50
Length: 2.30

Remarks:
No groundwater encountered
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Unstable	Terminated on instruction of Engineer	13/03/2023

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CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-9305
Coordinates 580237.87 E 674128.54 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 9t Wheeled Excavator	**Elevation** 52.17 mOD	**Date:** 24/08/2022	**Logger:** DC	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.30 - 0.80	B1		51.86	0.30		Stiff light greyish brown slightly gravelly sandy CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse.	
0.80 - 1.70	B2		51.36	0.80		Stiff dark greyish brown slightly gravelly sandy CLAY with low cobble and medium boulder content. Sand is fine to coarse. Gravel is angular fine to coarse.	
			50.46	1.70		End of trial pit at 1.70m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.70
Width: 0.50
Length: 2.50

Remarks:
No groundwater encountered
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Stable	Terminated at refusal on boulders/possible bedrock	13/03/2023

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CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-9370
Coordinates 580282.00 E 674174.99 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 9t Wheeled Excavator	**Elevation** 52.71 mOD	**Date:** 24/08/2022	**Logger:** DC	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.30 - 0.80	B1		52.41	0.30		Stiff greyish orangish brown sandy gravelly silty CLAY with occasional rootlets. Sand is fine to coarse. Gravel is subrounded fine to medium.	
0.80 - 2.00	B2		51.91	0.80		Firm brownish grey slightly sandy gravelly silty CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is subrounded fine to coarse.	
			50.71	2.00		End of trial pit at 2.00m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 2.00
Width: 0.50
Length: 2.40

Remarks:
No groundwater encountered
Material unsuitable for hand vane

Stability: Unstable

Termination Reason: Terminated at refusal on boulders/possible bedrock

Last Updated: 13/03/2023

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CAUSEWAY GEOTECH

Project No.	Project Name:	Trial Pit ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	TP-9505
Coordinates	**Client:**	
580357.87 E 674277.68 N	Irish Water	
Method:	**Client's Representative:**	Sheet 1 of 1
Trial Pitting	Mott MacDonald	Scale: 1:25
Plant:	**Elevation** / **Date:** / **Logger:**	FINAL
9t Wheeled Excavator	55.00 mOD / 24/08/2022 / DC	

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.30 - 0.80	B1		54.70	0.30		Stiff brownish orangish grey slightly gravelly sandy CLAY with occasional rootlets. Sand is fine to coarse. Gravel is subangular fine to medium.	
0.80 - 2.10	B2		54.20	0.80		Soft greyish brown slightly gravelly sandy CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is subangular fine to coarse.	
2.10 - 2.70	B3		52.90	2.10		Firm greyish brown slightly sandy slightly gravelly CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is subrounded fine to coarse.	
		Steady water ingress at 2.60m					▼
			52.30	2.70		End of trial pit at 2.70m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes

Struck at (m)	Remarks
2.60	Steady water ingress at 2.60m

Depth: 2.70
Width: 0.50
Length: 2.60

Remarks:
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Unstable	Terminated at refusal on boulders/possible bedrock	13/03/2023

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CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-9603
Coordinates 580464.10 E 674369.99 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 9t Wheeled Excavator	**Elevation** 55.53 mOD	**Date:** 25/08/2022	**Logger:** DC	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.30 - 0.80	B1		55.23	0.30		Stiff bluish greenish grey sandy gravelly silty CLAY. Sand is fine to coarse. Gravel is subrounded fine to medium.	
0.80 - 1.90	B2		54.73	0.80		Firm greyish brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse.	
1.90 - 3.50	B3		53.63	1.90		Firm grey slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse.	
			52.03	3.50		End of trial pit at 3.50m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 3.50
Width: 0.50
Length: 1.90

Remarks:
No groundwater encountered
Material unsuitable for hand vane
60mm clay pipe encountered at 0.80m bgl; Instructed by IW/MMD to repair

Stability:	Termination Reason	Last Updated
Moderately stable	Terminated at maximum reach of excavator	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-9603A
Coordinates 580466.86 E 674371.03 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 9t Wheeled Excavator	**Elevation** 55.39 mOD	**Date:** 25/08/2022	**Logger:** JG	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			55.19	0.20		TOPSOIL	
						Stiff light bluish grey slightly sandy slightly gravelly silty CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is subangular with occasional rootlets.	
			54.49	0.90		End of trial pit at 0.90m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 0.90
Width: 2.00
Length: 3.00

Remarks:
No groundwater encountered
Material unsuitable for hand vane
Instructed by IW/MMD to undertake pit to find possible adjacent pipe found in TP-9603
No samples required.

Stability: Stable

Termination Reason: Terminated on instruction of Engineer

Last Updated: 13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-9705
Coordinates 580505.42 E 674415.07 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 9t Wheeled Excavator	**Elevation** 55.13 mOD	**Date:** 25/08/2022	**Logger:** JG	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.30 - 0.80	B1		54.83	0.30		Stiff light grey mottled orange brown slightly sandy slightly gravelly CLAY with low cobble and boulder content and occasional decayed rootlets. Sand is fine to coarse. Gravel is subangular fine to coarse.	
0.80 - 1.60	B2		54.33	0.80		Stiff light bluish grey mottled light brown slightly sandy slightly gravelly silty CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is subangular with rare decayed rootlets.	
1.60 - 1.80	B3		53.53	1.60		Very stiff Stiff light grey slightly sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.	
		Water strike at 1.80m	53.33	1.80		End of trial pit at 1.80m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes

Struck at (m)	Remarks
1.80	Water strike at 1.80m

Depth: 1.80
Width: 0.70
Length: 2.50

Remarks:
Material unsuitable for hand vane

Stability:
Moderately stable

Termination Reason
Terminated at refusal on bedrock

Last Updated
13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-9830
Coordinates 580607.42 E 674492.56 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 9t Wheeled Excavator	**Elevation** 53.30 mOD	**Date:** 25/08/2022	**Logger:** JG	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.40 - 1.40	B1		52.90	0.40		Firm light bluish grey mottled orangish brown slightly sandy slightly gravelly CLAY with low cobble content and occsaional rootlets. Sand is fine to coarse. Gravel is subangular fine to coarse.	
1.40 - 1.90	B2		51.90	1.40		Firm reddish brown mottled brown sandy gravelly silty CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is subangular	
1.90 - 2.50	B3		51.40	1.90		Firm light brown slightly gravelly sandy CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is subangular fine to coarse.	
		Seepage at 2.40m					▼
			50.80	2.50		End of trial pit at 2.50m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks
2.40	Seepage at 2.40m

Depth: 2.50
Width: 0.70
Length: 2.20

Remarks:
Material unsuitable for hand vane

Stability:
Moderately stable

Termination Reason
Terminated at refusal on boulders/possible bedrock

Last Updated
13/03/2023

AGS

CAUSEWAY GEOTECH	**Project No.** 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	**Trial Pit ID** TP-12107
	Coordinates 581860.07 E 676269.59 N	**Client:** Irish Water	
Method: Trial Pitting		**Client's Representative:** Mott MacDonald	Sheet 1 of 1 Scale: 1:25
Plant: 8t Wheeled Excavator	**Elevation** 51.36 mOD	**Date:** 26/08/2022	**Logger:** JG — FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.30 - 0.70	B1		51.06	0.30		Stiff light grey mottled reddish brown slightly sandy slightly gravelly clayey SILT with low cobble content. Sand is fine to coarse. Gravel is subangular with occasional rootlets.	
0.70 - 1.40	B2		50.66	0.70		Stiff reddish brown mottled orangish brown slightly gravelly sandy CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is subangular fine to coarse.	
1.40 - 2.60	B3		49.96	1.40		Stiff light bluish grey mottled orangish brown slightly sandy gravelly CLAY with medium cobble and boulder content. Sand is fine to medium. Gravel is angular fine to coarse.	
		Slight seepage at 2.40m					▼
			48.76	2.60		End of trial pit at 2.60m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks
2.40	Slight seepage at 2.40m

Depth: 2.60
Width: 0.70
Length: 2.20

Remarks: Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Stable	Terminated at refusal on boulder	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-12203
Coordinates 581941.95 E 676351.84 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8T Wheeled Excavator	**Elevation** 49.63 mOD	**Date:** 30/08/2022	**Logger:** DM	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						Dark brown TOPSOIL with rootlets.	
0.50 - 3.50	B1		49.12	0.50		Very stiff light grey slightly gravelly sandy CLAY with high cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of various lithologies.	
			46.12	3.50		End of trial pit at 3.50m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 3.50
Width: 0.60
Length: 2.50

Remarks:
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Stable	Terminated at maximum reach of excavator	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-12306
Coordinates 582011.26 E 676417.09 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8T Wheeled Excavator	**Elevation** 49.27 mOD	**Date:** 30/08/2022	**Logger:** DM	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			48.77	0.50		Dark brown TOPSOIL with rootlets.	
0.70 - 1.20	B1					Very stiff light grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to medium.	
1.20 - 3.50	B2		48.07	1.20		Light grey very gravelly very clayey fine to coarse SAND with high cobble content. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of various lithologies.	
		Seepage at 3.50m	45.77	3.50		End of trial pit at 3.50m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes

Struck at (m)	Remarks
3.50	Seepage at 3.50m

Depth: 3.50
Width: 0.60
Length: 2.30

Remarks:
Material unsuitable for hand vane

Stability:
Stable

Termination Reason
Terminated at maximum reach of excavator

Last Updated
13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-12507
Coordinates 582170.37 E 676546.04 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8T Wheeled Excavator	**Elevation** 51.77 mOD	**Date:** 30/08/2022	**Logger:** DM	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						Dark brown TOPSOIL	
0.40 - 2.50	B1		51.37	0.40		Greyish brown very sandy clayey subangular to subrounded fine to coarse GRAVEL with high cobble content. Sand is fine to coarse. Cobbles are subangular to subrounded of various lithologies.	
			49.27	2.50		End of trial pit at 2.50m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 2.50
Width: 0.60
Length: 2.50

Remarks:
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Unstable	Terminated due to pit becoming unstable	13/03/2023

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CAUSEWAY GEOTECH	**Project No.** 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	**Trial Pit ID** TP-12569
	Coordinates 582230.10 E 676570.43 N	**Client:** Irish Water	
Method: Trial Pitting		**Client's Representative:** Mott MacDonald	Sheet 1 of 1 Scale: 1:25
Plant: 13t Tracked Excavator	**Elevation** 50.11 mOD	**Date:** 08/07/2022	**Logger:** NP — FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			49.91	0.20		TOPSOIL	
0.30	B1					Spongy dark brown clayey PEAT with occasional rootlets	
			49.51	0.60		Very soft bluish grey slightly sandy slightly gravelly CLAY with pockets of fine to medium sand and low cobble content and occasional boulders. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular. Boulders are subangular (up to 35 x 20 x 16xm).	
1.00	B2						
			48.51	1.60		Bluish grey very gravelly very silty fine to coarse SAND with low cobble content. Gravel is subangular fine to coarse. Cobbles are subangular.	
2.00	B3						
		Seepage at 2.30m					▼
2.90	B4						
			47.11	3.00		End of trial pit at 3.00m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks
2.30	Seepage at 2.30m

Depth: 3.00
Width: 0.80
Length: 3.00

Remarks:
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Unstable	Terminated due to pit walls collapsing	13/03/2023

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CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-12580
Coordinates 582267.59 E 676588.05 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 13t Tracked Excavator	**Elevation** 50.13 mOD	**Date:** 08/07/2022	**Logger:** NP	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			49.93	0.20		TOPSOIL	
0.50	B1					Spongy dark brown clayey PEAT with occasional rootlets	
			49.03	1.10		Soft bluish grey slightly sandy gravelly CLAY with low cobble content and pockets of fine to medium sand. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular.	
1.50	B2						
		Seepage at 1.90m	48.23	1.90			▼
			48.13	2.00		Large BOULDER	
						End of trial pit at 2.00m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks
1.90	Seepage at 1.90m

Depth: 2.00
Width: 0.80
Length: 2.70

Remarks:
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Stable	Terminated on possible bedrock/large boulder	13/03/2023

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CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-12581
Coordinates 582313.28 E 676606.49 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 13t Tracked Excavator	**Elevation** 50.72 mOD	**Date:** 07/07/2022	**Logger:** NP	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			50.57	0.15		TOPSOIL	
0.30	B1					Dark brown spongy clayey PEAT with occasional roots.	
			50.22	0.50		Very soft bluish grey slightly sandy slightly gravelly CLAY with low cobble content Sand is fine to coarse. Gravel is angular to subangular fine to coarse. Cobbles are subangular.	
1.50	B2						
			48.52	2.20		Soft bluish grey sandy gravelly CLAY with low cobble content and occasional boulders. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular. Boulders are subrounded.	
2.30	B3						
			48.12	2.60		End of trial pit at 2.60m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 2.60
Width: 0.80
Length: 3.00

Remarks:
No groundwater encountered
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Stable	Terminated on possible large boulder	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-12582
Coordinates 582369.21 E 676630.04 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 13t Tracked Excavator	**Elevation** 51.56 mOD	**Date:** 07/07/2022	**Logger:** NP	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			51.36	0.20		TOPSOIL	
			51.26	0.30		Spongy dark brown clayey PEAT with occasional root.	
0.50	B1					Very soft brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular.	
			50.16	1.40			
1.50	B2	Seepage at 1.70m				Very soft becoming soft bluish grey slightly sandy gravelly CLAY with low cobble content and occasional boulders. Sand is fine to coarse. Gravel is angular to subangular fine to coarse. Cobbles are subangular. Boulders are subangular (up to 52 x 39 x 20cm).	▼
2.50	B3						
3.50	B4						
4.40	B5						
			47.06	4.50		End of trial pit at 4.50m	

Water Strikes	
Struck at (m)	Remarks
1.70	Seepage at 1.70m

Depth: 4.50
Width: 0.80
Length: 3.10

Remarks:
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Stable	Terminated at scheduled depth	13/03/2023

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CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-12589
Coordinates 582164.58 E 676610.15 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 13t Tracked Excavator	**Elevation** 52.92 mOD	**Date:** 07/07/2022	**Logger:** NP	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			52.72	0.20		TOPSOIL	
0.50	B1					Very soft brown sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular.	
		Water strike at 1.10m	51.82	1.10			▼
1.50	B2					Soft grey slightly sandy slightly gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to medium. Cobbles are subangular.	
			51.02	1.90		End of trial pit at 1.90m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes

Struck at (m)	Remarks
1.10	Water strike at 1.10m

Depth: 1.90
Width: 0.80
Length: 2.50

Remarks:
Material unsuitable for hand vane

Stability: Unstable

Termination Reason: Terminated due to pit walls collapsing

Last Updated: 13/03/2023

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CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-12590
Coordinates 582222.42 E 676626.31 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 13t Tracked Excavator	**Elevation** 51.28 mOD	**Date:** 08/07/2022	**Logger:** NP	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			51.13	0.15		TOPSOIL	
0.30	B1					Spongy dark brown clayey PEAT with occasional rootlets.	
		Seepage at 0.50m	50.78	0.50			▼
0.60	B2					Very soft bluish grey slightly sandy slightly gravelly CLAY with low cobble content and occasional boulders and pockets of fine to medium sand. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular. Boulders are subangular (up to 32 x 29 x 16cm).	
1.60	B3						
			49.18	2.10		Large BOULDER	
			49.08	2.20		End of trial pit at 2.20m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks
0.50	Seepage at 0.50m

Depth: 2.20
Width: 0.80
Length: 2.50

Remarks:
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Stable	Terminated on possible large boulder	13/03/2023

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CAUSEWAY GEOTECH

Project No.	Project Name:	Trial Pit ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	TP-12595
Coordinates 582319.36 E 676645.37 N	**Client:** Irish Water	
Method: Trial Pitting	**Client's Representative:** Mott MacDonald	Sheet 1 of 1 Scale: 1:25
Plant: 13t Tracked Excavator	**Elevation** 51.68 mOD / **Date:** 07/07/2022 / **Logger:** NP	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			51.48	0.20		TOPSOIL	
0.50	B1					Very soft brown slightly sandy gravelly CLAY with low cobble content and occasional boulders. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular. Boulders are subangular (up to 60 x 35 x 30cm).	
1.50	B2						
			49.58	2.10		Very soft brown slightly sandy slightly gravelly CLAY with low cobble content and occasional boulders. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular. Boulders are subangular (up to 46 x 29 x 12cm).	
2.50	B3						
3.50	B4						
			47.98	3.70		End of trial pit at 3.70m	

Water Strikes	
Struck at (m)	Remarks

Depth: 3.70
Width: 0.80
Length: 3.00

Remarks:
No groundwater encountered
Material unsuitable for hand vane

Stability: Unstable

Termination Reason: Terminated on possible large boulder

Last Updated: 13/03/2023

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CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-12601
Coordinates 582262.94 E 676636.65 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 13t Tracked Excavator	**Elevation** 50.74 mOD	**Date:** 07/07/2022	**Logger:** NP	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			50.54	0.20		TOPSOIL	
0.50	B1		50.14	0.60		Dark brown clayey PEAT with occasional rootlets	
1.50	B2	Seepage at 1.60m	49.14	1.60		Very soft bluish grey slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is angular to subangular fine to coarse. Cobbles are subangular.	▼
1.70	B3					Bluish grey very gravelly very silty fine to coarse SAND with low cobble content and pockets of bluish grey clay. Gravel is subangular fine to coarse. Cobbles are subangular. Boulders are subangular (up to 40 x 32 x 19cm).	
2.30	B4		48.34	2.40		Possible ROCKHEAD/BOULDER	
			48.24	2.50		End of trial pit at 2.50m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks
1.60	Seepage at 1.60m

Depth: 2.50
Width: 0.70
Length: 3.00

Remarks:
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Stable	Terminated on possible bedrock/large boulder	13/03/2023

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CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-12638
Coordinates 582172.32 E 676673.90 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 13t Tracked Excavator	**Elevation** 54.42 mOD	**Date:** 04/07/2022	**Logger:** NP	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.50	B1		53.97	0.45		MADE GROUND: Reworked very soft becoming soft grey slightly gravelly sandy slightly clayey SILT with low cobble content. Sand is fine to coarse. Gravel is subangular fine to medium. Cobbles are subangular.	
1.50	B2						
			52.72	1.70		Possible ROCKHEAD/Large BOULDER	
			52.62	1.80		End of trial pit at 1.80m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.80
Width: 0.80
Length: 2.80

Remarks:
No groundwater encountered
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Stable	Terminated on possible bedrock/large boulder	13/03/2023

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CAUSEWAY GEOTECH

Project No.	Project Name:	Trial Pit ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	TP-12639
Coordinates 582232.72 E 676668.90 N	**Client:** Irish Water	
Method: Trial Pitting	**Client's Representative:** Mott MacDonald	Sheet 1 of 1 Scale: 1:25
Plant: 13t Tracked Excavator	**Elevation** 51.89 mOD / **Date:** 08/07/2022 / **Logger:** NP	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			51.89	0.00		TOPSOIL	
0.50	B1		51.59	0.30		Very soft grey slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular.	
1.50	B2		50.69	1.20		Very soft bluish grey slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular.	
2.50	B3	Seepage at 2.30m	49.59	2.30		Bluish grey very sandy silty subangular fine to coarse GRAVEL with medium cobble content and occasional boulders. Sand is fine to coarse. Cobbles are subangular. Boulders are subangular (up to 43 x 35 x 30cm).	▼
			49.09	2.80		End of trial pit at 2.80m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks
2.30	Seepage at 2.30m

Depth: 2.80
Width: 0.80
Length: 3.00

Remarks:
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Stable	Terminated due to pit walls collapsing	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-12650
Coordinates 582267.65 E 676692.74 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 13t Tracked Excavator	**Elevation** 52.45 mOD	**Date:** 07/07/2022	**Logger:** NP	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			52.05	0.40		TOPSOIL	
0.50	B1		51.55	0.90		Possible MADE GROUND: Soft brownish grey slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular.	
1.50	B2					Very soft becoming soft brown with occasional bluish grey mottling slightly sandy slightly gravelly CLAY with low cobble content and occasional boulders. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular. Boulders are subrounded (up to 51 x 45 x 37xm).	
2.50	B3		49.85	2.60		Brown silty gravelly fine to coarse SAND Gravel is subangular fine to coarse.	
2.70	B4		49.65	2.80		End of trial pit at 2.80m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 2.80
Width: 0.70
Length: 3.30

Remarks:
No groundwater encountered
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Unstable	Terminated due to pit walls collapsing	13/03/2023

AGS

CAUSEWAY GEOTECH	**Project No.** 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	**Trial Pit ID** TP-12688
	Coordinates 582220.29 E 676722.16 N	**Client:** Irish Water	
Method: Trial Pitting		**Client's Representative:** Mott MacDonald	Sheet 1 of 1 Scale: 1:25
Plant: 13t Tracked Excavator	**Elevation** 53.78 mOD	**Date:** 04/07/2022	**Logger:** NP — FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			53.38	0.40		TOPSOIL	
0.50	B1		52.88	0.90		MADE GROUND: Reworked spongy dark brown PEAT with roots.	
1.50	B2		51.98	1.80		MADE GROUND: Reworked very soft bluish grey slightly gravelly sandy clayey SILT with low cobble content and pockets of fine to medium sand. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular.	
2.50	B3	Slow water strike at 3.10m	50.58	3.20		Soft becoming firm brown mottled bluish grey slightly gravelly sandy CLAY with low cobble content. Sand is fine to coarse. Gravel is angular to subangular fine to coarse. Cobbles are subangular.	▼
			50.48	3.30		Possible ROCKHEAD/Large BOULDER	
						End of trial pit at 3.30m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks
3.10	Slow water strike at 3.10m

Depth: 3.30
Width: 0.80
Length: 2.40

Remarks:
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Stable	Terminated on possible bedrock/large boulder	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-12689
Coordinates 582169.26 E 676714.15 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 13t Tracked Excavator	**Elevation** 54.68 mOD	**Date:** 05/07/2022	**Logger:** NP	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			54.48	0.20		TOPSOIL	
0.50	B1		54.08	0.60		MADE GROUND: Reworked very soft brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.	
1.00	B2					MADE GROUND: Reworked very soft bluish grey slightly sandy slightly gravelly CLAY with low cobble content and anthropogenic rags Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular.	
1.70	B3		53.08	1.60		MADE GROUND: Reworked soft greenish grey slightly sandy slightly gravelly CLAY with pockets of fine to medium SAND, low cobble content and occasional boulders. Gravel is subangular fine to coarse. Cobbles are subangular. Boulders are subangular (up to 45 x 62 x17cm).	
2.20	B4		52.58	2.10		Brown very sandy silty subangular fine to coarse GRAVEL with low cobble content and occasional boulder. Sand is fine to coarse. Cobbles are subangular. Boulders are subangular (up to 37 x 30 x 21cm).	
3.20	B5		51.18	3.50		End of trial pit at 3.50m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 3.50
Width: 0.80
Length: 2.80

Remarks:
No groundwater encountered
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Unstable	Terminated due to pit walls collapsing	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-12701
Coordinates 582117.22 E 676715.39 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 13t Tracked Excavator	**Elevation** 55.12 mOD	**Date:** 04/07/2022	**Logger:** NP	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.50	B1	Seepage at 0.50m	54.67	0.45		Soft bluish grey slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular.	▼
1.50	B2		53.72	1.40		Soft becoming firm brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse Gravel is subangular fine to coarse. Cobbles are subangular.	
			53.12	2.00		Possible BEDROCK/Large BOULDER	
			53.02	2.10		End of trial pit at 2.10m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes

Struck at (m)	Remarks
0.50	Seepage at 0.50m

Depth: 2.10
Width: 0.70
Length: 3.00

Remarks:
Material unsuitable for hand vane

Stability: Stable

Termination Reason
Terminated on possible bedrock/large boulder

Last Updated
13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-12726
Coordinates 582066.85 E 676730.35 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 13t Tracked Excavator	**Elevation** 55.56 mOD	**Date:** 04/07/2022	**Logger:** NP	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			55.26	0.30		TOPSOIL	
0.50	B1					MADE GROUND: Reworked spongy dark brown PEAT with roots.	
			54.46	1.10		Possible MADE GROUND: Soft bluish grey slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular.	
		Seepage at 1.40m					▼
1.50	B2						
			53.76	1.80		Possible MADE GROUND: Soft to firm sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular.	
			53.36	2.20		Possible ROCKHEAD/large BOULDER	
2.30	B3		53.26	2.30		End of trial pit at 2.30m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks
1.40	Seepage at 1.40m

Depth: 2.30
Width: 0.70
Length: 2.20

Remarks:
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Stable	Terminated on possible rockhead/large boulder	13/03/2023

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CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-12737
Coordinates 582166.19 E 676766.28 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 13t Tracked Excavator	**Elevation** 54.72 mOD	**Date:** 05/07/2022	**Logger:** NP	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			54.52	0.20		TOPSOIL	
0.50	B1		54.12	0.60		MADE GROUND: Very soft brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.	
1.50	B2		52.62	2.10		MADE GROUND: Very soft bluish grey slightly sandy gravelly CLAY with low cobble content and occasional boulders. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular. Boulders are angular to subangular (up to 80 x 35 x 29cm).	
2.50	B3		52.02	2.70		MADE GROUND: Soft bluish grey sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fie to coarse. Cobbles are subangular.	
3.00	B4		51.02	3.70		Brown silty fine to coarse SAND and subangular fine to coarse GRAVEL with low cobble content. Cobbles are subangular.	
						End of trial pit at 3.70m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 3.70
Width: 0.80
Length: 3.00

Remarks:
No groundwater encountered
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Unstable	Terminated due to pit walls collapsing	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-12738
Coordinates 582218.13 E 676772.86 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 13t Tracked Excavator	**Elevation** 53.85 mOD	**Date:** 05/07/2022	**Logger:** TH	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			53.65	0.20		TOPSOIL	
0.50	B1					MADE GROUND: Soft light grey becoming orangish brown mottled grey slightly sandy gravelly CLAY with medium cobble content and rare pockets of yellowish brown fine to medium sand. Cobbles are angular. Boulders are angular (up to 45 x 42 x 35).	
		Seepage at 1.20m	52.65	1.20		MADE GROUND: Soft to firm light brown slightly sandy slightly gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is angular fine to coarse. Cobbles are angular.	
1.50	B2						
		Water strike at 1.60m	52.25	1.60		End of trial pit at 1.60m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes

Struck at (m)	Remarks
1.20	Seepage at 1.20m
1.60	Water strike at 1.60m

Depth: 1.60
Width: 0.80
Length: 2.80

Remarks: Material unsuitable for hand vane

Stability: Unstable

Termination Reason Terminated due to pit walls collapsing

Last Updated 13/03/2023

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CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-12750
Coordinates 582116.16 E 676766.40 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 13t Tracked Excavator	**Elevation** 55.40 mOD	**Date:** 04/07/2022	**Logger:** NP	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
			55.00	0.40		MADE GROUND: Reworked brown spongy PEAT	
0.50	B1						
			54.70	0.70		MADE GROUND: Soft bluish grey slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to medium. Cobbles are subangular.	
1.50	B2						
			53.20	2.20		Possible MADE GROUND: Soft brown sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular.	
2.30	B3						
			52.90	2.50		Possible ROCKHEAD/Large BOULDER	
			52.80	2.60		End of trial pit at 2.60m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 2.60
Width: 0.70
Length: 3.10

Remarks:
No groundwater encountered
Material unsuitable for hand vane

Stability: Stable

Termination Reason: Terminated on possible rockhead/large boulder

Last Updated: 13/03/2023

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CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-12775
Coordinates 582069.52 E 676780.40 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 5t Tracked Excavator	**Elevation** 56.20 mOD	**Date:** 29/06/2022	**Logger:** NP	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
		Seepage at 0.10m	56.10	0.10		TOPSOIL	
						MADE GROUND: Spongy dark brown PEAT with rootlets	
0.30	B1						
		Seepage at 0.40m	55.80	0.40		Bluish grey sandy silty angular to subangular fine to coarse GRAVEL with low cobble content and occasional boulders. Sand is fine to coarse. Cobbles are angular to subangular. Boulders are subangular (up to 51 x 24 x 15cm).	
		Seepage at 0.70m					
0.80	B2						
		Seepage at 1.40m					
1.50	B3						
			54.60	1.60		End of trial pit at 1.60m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks
0.10	Seepage at 0.10m
0.70	Seepage at 0.70m
0.40	Seepage at 0.40m

Depth: 1.60
Width: 0.50
Length: 2.20

Remarks:
Material unsuitable for hand vane

Stability:
Unstable

Termination Reason
Terminated due to pit walls collapsing

Last Updated
13/03/2023

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CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-12786
Coordinates 582162.54 E 676812.59 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 13t Tracked Excavator	**Elevation** 54.26 mOD	**Date:** 05/07/2022	**Logger:** TH	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			54.06	0.20		TOPSOIL	
0.50	B1		53.56	0.70		MADE GROUND: Dark brown slightly gravelly clayey PEAT. Gravel is subangular fine to medium.	
1.50	B2		52.56	1.70		MADE GROUND: Very soft bluish grey slightly gravelly sandy SILT with layers of peat and pockets of grey fine sand and low cobble content. Sand is fine to coarse. Gravel is subangular fine to medium. Cobbles are subangular.	
1.80	B3		52.16	2.10		MADE GROUND: Very soft grey slightly gravelly sandy CLAY with low cobble content. Sand is fine to coarse. Gravel is angular fine to medium. Cobbles are angular.	
2.20	B4		51.76	2.50		Firm brownish grey slightly gravelly sandy CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to medium. Cobbles are angular.	
2.60	B5		51.26	3.00		Light greyish brown very gravelly very silty predominately fine SAND with low cobble content. Gravel is angular fine to coarse. Cobbles are subangular.	
3.10	B6	Seepage at 3.20m	51.06	3.20		Light greyish brown gravelly slightly silty fine to coarse SAND with medium cobble content. Gravel is angular fine to coarse. Cobbles are angular.	▼
						End of trial pit at 3.20m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks
3.20	Seepage at 3.20m

Depth: 3.20
Width: 0.80
Length: 2.70

Remarks:
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Unstable	Terminated due to pit walls collapsing	13/03/2023

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CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-12787
Coordinates 582218.11 E 676823.94 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 13t Tracked Excavator	**Elevation** 54.18 mOD	**Date:** 05/07/2022	**Logger:** TH	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			54.08	0.10		TOPSOIL	
0.40	B1					MADE GROUND: Dark brown slightly gravelly clayey PEAT with occasional rootlets and low cobble content. Gravel is subangular fine to coarse. Cobbles are subangular.	
0.60	B2		53.68	0.50		MADE GROUND: Firm orangish brown mottled grey slightly sandy slightly gravelly CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is angular fine to coarse. Cobbles and boulders are angular (70 x 65 x 180cm).	
1.10	B3		53.18	1.00		MADE GROUND: Very soft brownish grey slightly sandy gravelly CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are angular (40 x 40 x 30cm).	
2.10	B4						
2.50	B5	Seepage at 2.40m	51.78	2.40		Greyish brown very sandy clayey subangular fine to coarse GRAVEL with medium cobble content. Sand is fine to coarse. Cobbles are subangular.	▼
			51.28	2.90		End of trial pit at 2.90m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks
2.40	Seepage at 2.40m

Depth: 2.90
Width: 0.80
Length: 3.20

Remarks:
Material unsuitable for hand vane

Stability:
Unstable

Termination Reason
Terminated due to pit walls collapsing

Last Updated
13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-12800
Coordinates 582019.00 E 676797.98 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 13t Tracked Excavator	**Elevation** 56.44 mOD	**Date:** 04/07/2022	**Logger:** NP	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL with roots.	
			55.94	0.50			
0.60	B1					Stiff bluish grey sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to subangular fine to coarse.	
			55.64	0.80			
0.90	B2					Brownish grey silty fine to coarse SAND and angular to subangular fine to coarse GRAVEL with high cobble content and occasional boulders. Cobbles are angular to subangular. Boulders are subangular to subangular. (up to 31 x 25 x 16cm).	
			55.44	1.00		Possible rockhead/boulder	
			55.34	1.10		End of trial pit at 1.10m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.10
Width: 0.60
Length: 2.30

Remarks:
No groundwater encountered
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Stable	Terminated on possible bedrock/large boulder	13/03/2023

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CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-12801
Coordinates 582118.70 E 676819.28 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 5t Tracked Excavator	**Elevation** 54.99 mOD	**Date:** 29/06/2022	**Logger:** NP	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			54.89	0.10		TOPSOIL	
		Seepage at 0.20m				MADE GROUND: Spongy dark brown PEAT with occasional rootlets	▼
			54.49	0.50		MADE GROUND: Soft brown slightly sandy slightly gravelly CLAY with medium cobble content, roots and metal. Sand is fine to coarse. Gravel is subrounded fine to coarse. Cobbles are subangular.	
0.70	B1						
1.50	B2						
			53.24	1.75		Bluish grey gravelly very clayey fine to coarse SAND with low cobble content. Gravel is subangular fine to medium. Cobbles are subangular.	
2.30	B3						
			52.49	2.50		End of trial pit at 2.50m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks
0.20	Seepage at 0.20m

Depth: 2.50
Width: 0.50
Length: 3.00

Remarks:
Material unsuitable for hand vane

Stability: Stable

Termination Reason: Terminated on possible bedrock/large boulder

Last Updated: 13/03/2023

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CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-12823
Coordinates 582067.34 E 676834.05 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 5t Tracked Excavator	**Elevation** 55.63 mOD	**Date:** 29/06/2022	**Logger:** NP	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			55.53	0.10		TOPSOIL	
						MADE GROUND: Reworked spongy dark brown PEAT with rootlets	
0.50	B1		55.03	0.60		MADE GROUND: Soft to firm brownish grey slightly sandy gravelly CLAY with metal and roots Sand is fine to coarse. Gravel is subrounded fine to coarse.	
0.90	B2						
			53.83	1.80		Bluish grey silty very sandy angular to subangular fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are subangular.	
2.10	B3						
		Water strike at 2.90m	52.73	2.90		Brown gravelly very silty fine to coarse SAND. Gravel is subrounded fine to medium. Cobbles are subrounded.	▼
3.20	D4						
			52.23	3.40		End of trial pit at 3.40m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks
2.90	Water strike at 2.90m

Depth: 3.40
Width: 0.50
Length: 3.00

Remarks:
Material unsuitable for hand vane

Stability:
Unstable

Termination Reason
Terminated on possible large boulder

Last Updated
13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Trial Pit ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	TP-13208
Coordinates 582205.37 E 677226.59 N	**Client:** Irish Water	
Method: Trial Pitting	**Client's Representative:** Mott MacDonald	Sheet 1 of 1 Scale: 1:25
Plant: 13t Tracked Excavator	**Elevation** 55.89 mOD / **Date:** 12/07/2022 / **Logger:** NP	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			55.49	0.40		TOPSOIL	
0.50	B1					Soft brown mottled greenish grey becoming brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular.	
0.50	D4						
			54.49	1.40		Brown very silty fine to coarse SAND and subangular fine to coarse GRAVEL with low cobble content. Cobbles are subangular.	
1.50	B2						
1.50	D5						
2.30	B3						▼
2.30	D6	Seepage at 2.30m	53.49	2.40		Large BOULDER	
			53.39	2.50		End of trial pit at 2.50m	

Water Strikes

Struck at (m)	Remarks
2.30	Seepage at 2.30m

Depth: 2.50
Width: 0.80
Length: 3.40

Remarks:
Material unsuitable for hand vane

Stability:
Stable

Termination Reason
Terminated on possible large boulder

Last Updated
13/03/2023

AGS

CAUSEWAY GEOTECH	**Project No.** 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	**Trial Pit ID** TP-13291
	Coordinates 582258.95 E 677299.51 N	**Client:** Irish Water	
Method: Trial Pitting		**Client's Representative:** Mott MacDonald	Sheet 1 of 1 Scale: 1:25
Plant: 13t Tracked Excavator	**Elevation** 54.70 mOD	**Date:** 12/07/2022	**Logger:** NP — FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			54.50	0.20		TOPSOIL	
0.50 0.50	B1 D3					Firm greenish grey slightly gravelly sandy SILT with low cobble content. Sand is fine to coarse. Gravel is subangular fine to medium. Cobbles are subangular.	
			53.50	1.20			
1.50 1.50	B2 D4					Greyish brown silty fine to coarse SAND and subrounded fine to coarse GRAVEL with low cobble content. Cobbles are subrounded.	
			52.80	1.90		End of trial pit at 1.90m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.90
Width: 0.80
Length: 3.00

Remarks:
No groundwater encountered
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Unstable	Terminated due to pit walls collapsing	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-13433
Coordinates 582256.01 E 677455.99 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 13t Tracked Excavator	**Elevation** 53.82 mOD	**Date:** 12/07/2022	**Logger:** NP	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			53.62	0.20		TOPSOIL	
			53.42	0.40		Dark brown amorphous clayey PEAT with occasional rootlets	
0.50	B1					Brownish grey very gravelly silty fine to coarse SAND. Gravel is subangular fine to coarse.	
0.50	D4						
			52.92	0.90		Brown slightly gravelly very silty fine to coarse SAND. Gravel is subangular fine to medium.	
1.50	B2						
1.50	D5	Seepage at 1.60m					▼
		Seepage at 1.90m	52.02	1.80		Brown silty fine to coarse SAND and subangular fine to coarse GRAVEL with medium cobble content. Cobbles are subangular.	▼
		Seepage at 2.20m					▼
2.50	B3						
2.50	D6						
			51.12	2.70		End of trial pit at 2.70m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks
1.60	Seepage at 1.60m
1.90	Seepage at 1.90m
2.20	Seepage at 2.20m

Depth: 2.70
Width: 0.80
Length: 2.80

Remarks:
Material unsuitable for hand vane

Stability: Unstable

Termination Reason: Terminated due to pit walls collapsing

Last Updated: 13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-13509
Coordinates 582274.08 E 677519.40 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 13t Tracked Excavator	**Elevation** 53.32 mOD	**Date:** 12/07/2022	**Logger:** NP	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			53.02	0.30		TOPSOIL	
0.50 0.50	B1 D3					Greyish brown very sandy silty subangular fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are subangular.	
			52.42	0.90		Brown very sandy silty subangular fine to coarse GRAVEL. Sand is fine to coarse.	
1.50 1.50	B2 D4						
			51.52	1.80		End of trial pit at 1.80m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.80
Width: 0.80
Length: 2.90

Remarks:
No groundwater encountered
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Unstable	Terminated due to pit walls collapsing	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Trial Pit ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	TP-13605
Coordinates 582274.71 E 677615.53 N	**Client:** Irish Water	
Method: Trial Pitting	**Client's Representative:** Mott MacDonald	Sheet 1 of 1 Scale: 1:25
Plant: 13t Tracked Excavator	**Elevation** 52.27 mOD / **Date:** 12/07/2022 / **Logger:** NP	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			52.07	0.20		TOPSOIL	
0.50 0.50	B1 D5					Brown very sandy silty subangular fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are subangular.	
1.50 1.50	B2 D6		50.77	1.50		Soft becoming firm slightly gravelly sandy silty CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to medium. Cobbles are subangular.	
2.50 2.50	B3 D7						
3.50 3.50	B4 D8						
			48.47	3.80		Large BOULDER	
			48.37	3.90		End of trial pit at 3.90m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 3.90
Width: 0.80
Length: 2.80

Remarks:
No groundwater encountered
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Unstable	Terminated on possible large boulder	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-13988
Coordinates 582505.86 E 677918.90 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8T Wheeled Excavator	**Elevation** 53.78 mOD	**Date:** 30/08/2022	**Logger:** DM	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						Dark brown TOPSOIL with rootlets.	
0.40 - 1.50	B1		53.38	0.40		Light brown very sandy clayey subangular to subrounded fine to coarse GRAVEL with high cobble content. Sand is fine to coarse. Cobbles are subangular to subrounded of various lithologies.	
1.50 - 2.50	B2		52.28	1.50		Orangish brown very gravelly very clayey fine to coarse SAND. Gravel is subangular to subrounded fine to coarse.	
			51.28	2.50		End of trial pit at 2.50m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 2.50
Width: 0.60
Length: 2.50

Remarks:
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Unstable	Terminated due to pit becoming unstable	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-14105
Coordinates 582601.49 E 677976.85 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8T Wheeled Excavator	**Elevation** 51.80 mOD	**Date:** 30/08/2022 **Logger:** DM	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						Dark brown TOPSOIL with rootlets.	
0.40 - 2.00	B1		51.40	0.40		Brownish grey very gravelly very clayey fine to coarse SAND with high cobble content. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of various lithologies.	
		Seepage at 2.00m	49.80	2.00		End of trial pit at 2.00m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks
2.00	Seepage at 2.00m

Depth: 2.00
Width: 0.60
Length: 2.50

Remarks:
Material unsuitable for hand vane

Stability:
Stable

Termination Reason
Terminated at refusal on boulder / possible bedrock.

Last Updated
13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-14170
Coordinates 582661.71 E 678006.36 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8T Wheeled Excavator	**Elevation** 50.49 mOD	**Date:** 30/08/2022	**Logger:** DM	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						Dark brown TOPSOIL.	
0.30 - 2.00	B1		50.19	0.30		Greyish brown very gravelly very clayey fine to coarse SAND. Gravel is subangular to subrounded fine to coarse.	
2.00 - 2.40	B2		48.49	2.00		Very stiff greyish brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.	
			48.09	2.40		End of trial pit at 2.40m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 2.40
Width: 0.60
Length: 2.50

Remarks:
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Unstable	Terminated due to pit becoming unstable	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-14307
Coordinates 582724.60 E 678132.07 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8T Wheeled Excavator	**Elevation** 52.91 mOD	**Date:** 31/08/2022	**Logger:** DM	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						Dark brown TOPSOIL with rootlets.	
0.40 - 1.40	B1		52.51	0.40		Stiff light grey slightly gravelly sandy silty CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.	
1.40 - 2.00	B2		51.51	1.40		Orangish light brown very gravelly clayey fine to coarse SAND with high cobble content. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of various lithologies.	
		Seepage at 2.00m	50.91	2.00		End of trial pit at 2.00m	▼

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks
2.00	Seepage at 2.00m

Depth: 2.00
Width: 0.60
Length: 2.50

Remarks:
Material unsuitable for hand vane

Stability:
Stable

Termination Reason
Terminated due to pit becoming unstable when water was struck

Last Updated
13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-14409
Coordinates 582724.93 E 678221.78 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8T Wheeled Excavator	**Elevation** 57.27 mOD	**Date:** 31/08/2022	**Logger:** DM	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						Dark brown TOPSOIL with rootlets.	
0.40 - 3.20	B1		56.87	0.40		Light brown slightly clayey gravelly fine to coarse SAND with low cobble content. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of various lithologies.	
			54.07	3.20		End of trial pit at 3.20m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 3.20
Width: 0.60
Length: 2.60

Remarks:
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Stable	Terminated at maximum reach of excavator	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-16005
Coordinates 583337.49 E 679665.37 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8T Wheeled Excavator	**Elevation** 46.53 mOD	**Date:** 31/08/2022	**Logger:** DM	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						Light brown sandy TOPSOIL.	
0.20 - 0.40	B1		46.33	0.20		Orangish brown gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse.	
0.40 - 2.10	B2		46.13	0.40		Greyish brown very gravelly clayey fine to coarse SAND with low cobble content. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded.	
2.10 - 3.20	B3		44.43	2.10		Grey very gravelly very clayey fine to coarse SAND with high cobble content. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of various lithologies.	
			43.33	3.20		End of trial pit at 3.20m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 3.20
Width: 0.60
Length: 2.90

Remarks: Material unsuitable for hand vane

Stability: Unstable below 2.5m

Termination Reason: Terminated due to pit becoming unstable

Last Updated: 13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Trial Pit ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	TP-16109
Coordinates 583373.58 E 679745.94 N	**Client:** Irish Water	
Method: Trial Pitting	**Client's Representative:** Mott MacDonald	Sheet 1 of 1 Scale: 1:25
Plant: 8T Wheeled Excavator	**Elevation** 47.64 mOD / **Date:** 31/08/2022 / **Logger:** DM	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.20 - 1.10	B1		47.44	0.20		Light brown sandy TOPSOIL.	
1.10 - 3.20	B2		46.54	1.10		Brownish orange slightly gravelly very clayey fine to coarse SAND. Gravel is subangular to subrounded fine to medium.	
			44.44	3.20		Greyish brown very gravelly very clayey fine to coarse SAND with high cobble content. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of various lithologies.	
						End of trial pit at 3.20m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 3.20
Width: 0.60
Length: 2.80

Remarks:
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Stable	Terminated at maximum reach of excavator	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-16208
Coordinates 583398.89 E 679843.26 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8T Wheeled Excavator	**Elevation** 47.13 mOD	**Date:** 31/08/2022	**Logger:** DM	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						Light brown sandy TOPSOIL.	
0.30 - 2.70	B1		46.82	0.30		Brown very gravelly very clayey fine to coarse SAND with high cobble content. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of various lithologies.	
			44.42	2.70		End of trial pit at 2.70m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 2.70
Width: 0.60
Length: 2.80

Remarks: Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Unstable	Terminated due to pit becoming unstable	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-17711
Coordinates 583544.00 E 681286.00 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8T Wheeled Excavator	**Elevation** 48.59 mOD	**Date:** 31/08/2022	**Logger:** DM	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						Light brown sandy TOPSOIL.	
0.20 - 0.80	B1		48.39	0.20		Greyish brown sandy very clayey fine to coarse subangular GRAVEL with high cobble content. Sand is fine to coarse. Cobbles are subangular of mudstone.	
			47.79	0.80		Possible bedrock: Dark grey MUDSTONE	
			47.49	1.10		End of trial pit at 1.10m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.10
Width: 0.60
Length: 2.70

Remarks:
Material unsuitable for hand vane

Stability:
Stable

Termination Reason
Terminated at refusal on boulder / possible bedrock

Last Updated
13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-17894
Coordinates 583606.00 E 681450.86 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8T Wheeled Excavator	**Elevation** 47.63 mOD	**Date:** 01/09/2022	**Logger:** DM	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						Dark brown sandy TOPSOIL with rootlets.	
0.30 - 0.95	B1		47.33	0.30		Stiff light grey mottled brownish orange slightly sandy CLAY. Sand is fine.	
0.95 - 2.30	B2		46.68	0.95		Very stiff light grey slightly sandy CLAY. Sand is fine.	
			45.33	2.30		End of trial pit at 2.30m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 2.30
Width: 0.60
Length: 2.80

Remarks:
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Stable	Terminated at refusal on boulder	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-18187
Coordinates 583746.11 E 681694.36 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8T Wheeled Excavator	**Elevation** 47.56 mOD	**Date:** 01/09/2022	**Logger:** DM	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						Light brown sandy TOPSOIL with rootlets.	
0.30 - 0.95	B1		47.26	0.30		Greyish light brown gravelly very clayey fine to coarse SAND. Gravel is subangular to subrounded fine to medium.	
0.95 - 2.10	B2		46.61	0.95		Stiff light grey mottled orangish brown slightly sandy slighlty gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine.	
			45.46	2.10		End of trial pit at 2.10m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 2.10
Width: 0.60
Length: 2.70

Remarks:
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Stable	Terminated at refusal on boulder / possible bedrock	13/03/2023

AGS

CAUSEWAY GEOTECH	**Project No.** 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	**Trial Pit ID** TP-18307
	Coordinates 583795.64 E 681817.72 N	**Client:** Irish Water	
Method: Trial Pitting		**Client's Representative:** Mott MacDonald	Sheet 1 of 1 Scale: 1:25
Plant: 8T Wheeled Excavator	**Elevation** 48.75 mOD	**Date:** 01/09/2022	**Logger:** DM — FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						Light brown sandy TOPSOIL with rootlets.	
0.20 - 0.65	B1		48.54	0.20		Orangish brown very sandy very clayey subangular to subrounded fine to coarse GRAVEL. Sand is fine to coarse.	
			48.10	0.65		End of trial pit at 0.65m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 0.65
Width: 0.60
Length: 2.60

Remarks: Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Stable	Terminated at refusal on boulder / possible bedrock	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-18411
Coordinates 583822.96 E 681915.07 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8T Wheeled Excavator	**Elevation** 47.74 mOD	**Date:** 01/09/2022	**Logger:** DM	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						Light brown sandy TOPSOIL with rootlets.	
0.20 - 0.50	B1		47.54	0.20		Light brown very sandy very clayey subangular to subrounded fine to coarse GRAVEL. Sand is fine to coarse.	
			47.24	0.50		End of trial pit at 0.50m	

0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 0.50
Width: 0.60
Length: 2.80

Remarks:
Material unsuitable for hand vane

Stability:
Stable

Termination Reason
Terminated at refusal on boulder / possible bedrock

Last Updated
13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-18505
Coordinates 583920.64 E 681959.33 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8T Wheeled Excavator	**Elevation** 49.00 mOD	**Date:** 02/09/2022	**Logger:** DM	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						Light brown sandy TOPSOIL with rootlets.	
0.50 - 3.00	B1		48.50	0.50		Light brown very sandy very clayey subangular to subrounded fine to coarse GRAVEL with high cobble content. Sand is fine to coarse. Cobbles are subangular to subrounded.	
			46.00	3.00		End of trial pit at 3.00m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 3.00
Width: 0.60
Length: 3.10

Remarks:
Material unsuitable for hand vane

Stability:
Stable

Termination Reason
Terminated at refusal on boulder / possible bedrock

Last Updated
13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-18604
Coordinates 584001.12 E 681986.13 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8T Wheeled Excavator	**Elevation** 46.49 mOD	**Date:** 01/09/2022	**Logger:** DM	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.30 - 3.00	B1		46.19	0.30		Light brown sandy TOPSOIL with rootlets.	
						Orangish light brown gravelly very clayey fine to coarse SAND with high cobble content. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded.	
			43.49	3.00		End of trial pit at 3.00m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 3.00
Width: 0.60
Length: 2.90

Remarks:
Material unsuitable for hand vane

Stability:
Stable

Termination Reason
Terminated at refusal on boulder / possible bedrock

Last Updated
13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-18704
Coordinates 584083.67 E 682075.22 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8T Wheeled Excavator	**Elevation** 44.98 mOD	**Date:** 01/09/2022	**Logger:** DM	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						Light brown sandy TOPSOIL with rootlets.	
0.40 - 3.00	B1		44.58	0.40		Light brown very sandy very clayey subangular to subrounded fine to coarse GRAVEL with medium cobble content. Sand is fine to coarse. Cobbles are subangular to subrounded.	
			41.98	3.00		End of trial pit at 3.00m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 3.00
Width: 0.60
Length: 2.90

Remarks:
Material unsuitable for hand vane

Stability:
Stable

Termination Reason
Terminated at refusal on boulder / possible bedrock

Last Updated
13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-18802
Coordinates 584157.20 E 682139.30 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8t Wheeled Excavator	**Elevation** 45.76 mOD	**Date:** 05/09/2022	**Logger:** TMCA	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.25 - 0.70 0.25 - 0.70	B1 D2		45.51	0.25		Stiff light orangish brown slightly sandy slightly gravelly CLAY with low cobble content and boulder content. Sand is fine to coarse. Gravel is subrounded fine to coarse. Cobbles are subrounded small to large. Boulder is subrounded 0.2 X 0.2 X 0.15m.	
			45.06 45.01	0.70 0.75		BOULDER/Possible BEDROCK End of trial pit at 0.75m	

0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 0.75
Width: 0.60
Length: 3.00

Remarks:
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Stable	Terminated at refusal on boulder / possible bedrock	13/03/2023

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CAUSEWAY GEOTECH	**Project No.** 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	**Trial Pit ID** TP-18906
	Coordinates 584253.20 E 682179.10 N	**Client:** Irish Water	
Method: Trial Pitting		**Client's Representative:** Mott MacDonald	Sheet 1 of 1 Scale: 1:25
Plant: 8t Wheeled Excavator	**Elevation** 40.74 mOD	**Date:** 05/09/2022	**Logger:** TMCA — FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.30 - 1.10 0.30 - 1.10	B1 D2		40.44	0.30		Stiff grey mottled orangish brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse.	
			39.64	1.10		Possible BEDROCK	
			39.54	1.20		End of trial pit at 1.20m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.20
Width: 0.60
Length: 3.00

Remarks:
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Stable	Terminated at refusal on boulder / possible bedrock	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-19088
Coordinates 584367.69 E 682290.71 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8t Wheeled Excavator	**Elevation** 38.51 mOD	**Date:** 05/09/2022	**Logger:** TMCA	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.40 - 1.00 0.40 - 1.00	B1 D4		38.11	0.40		Stiff dark brown slightly sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is subrounded fine to medium.	
1.00 - 2.00 1.00 - 2.00	B2 D3		37.51	1.00		Mottled orange and grey very sandy clayey subrounded fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are subrounded.	
2.00 - 2.80 2.00 - 2.80	B5 D6		36.41	2.10		Firm to stiff beige slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse. Cobbles are subrounded.	
		Very slow seepage at 2.60m					▼
			35.71	2.80		End of trial pit at 2.80m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks
2.60	Very slow seepage at 2.60m

Depth: 2.80
Width: 0.60
Length: 3.00

Remarks:
Material unsuitable for hand vane

Stability:
Unstable below 1.0m

Termination Reason
Terminated due to pit walls collapsing

Last Updated
13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-23202
Coordinates 586563.27 E 685459.05 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8t Wheeled Excavator	**Elevation** 71.82 mOD	**Date:** 05/09/2022	**Logger:** TMCA	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.30 - 0.80 0.30 - 0.80	B1 D2		71.52	0.30		Stiff orangish brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subangular fine to medium.	
0.80 - 1.80 0.80 - 1.80	B3 D4		71.02	0.80		Orangish brown very sandy very clayey subrounded fine to coarse GRAVEL with low cobble content. Sand is fine to coarse.	
1.80 - 2.80 1.80 - 2.80	B5 D6						
			69.02	2.80		End of trial pit at 2.80m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 2.80
Width: 0.60
Length: 3.00

Remarks:
Material unsuitable for hand vane

Stability:
Stable

Termination Reason
Terminated at refusal on boulders / possible bedrock

Last Updated
13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-23307
Coordinates 586651.23 E 685522.18 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8T Wheeled Excavator	**Elevation** 73.97 mOD	**Date:** 06/09/2022	**Logger:** DM	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						Light brown sandy TOPSOIL with rootlets.	
0.30 - 3.10 0.30 - 3.10	B1 D2		73.67	0.30		Orangish light brown very sandy very clayey subangular to subrounded fine to coarse GRAVEL with high cobble content. Sand is fine to coarse. Cobbles are subangular to subrounded of various lithologies.	
			70.87	3.10		End of trial pit at 3.10m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 3.10
Width: 0.60
Length: 2.70

Remarks:
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Stable	Terminated at maximum reach of excavator	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-23401
Coordinates 586737.54 E 685580.53 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8T Wheeled Excavator	**Elevation** 75.92 mOD	**Date:** 06/09/2022 **Logger:** DM	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						Brown slightly sandy TOPSOIL with rootlets.	
0.30 - 3.00 0.30 - 3.00	B1 D2		75.62	0.30		Orangish light brown very gravelly very clayey fine to coarse SAND. Gravel is subangular to subrounded fine to medium.	
			72.92	3.00		End of trial pit at 3.00m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 3.00
Width: 0.60
Length: 2.90

Remarks:
Material unsuitable for hand vane

Stability:
Stable

Termination Reason
Terminated at refusal on boulder / possible bedrock

Last Updated
13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-23508
Coordinates 586772.46 E 685674.83 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8T Wheeled Excavator	**Elevation** 77.47 mOD	**Date:** 07/09/2022	**Logger:** DM	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						Dark brown sandy TOPSOIL with rootlets.	
0.30 - 1.80 0.30 - 1.80	B1 D2		77.17	0.30		Orangish brown very sandy very clayey subangular to subrounded fine to coarse GRAVEL with high cobble and medium boulder content. Sand is fine to coarse. Cobbles and boulders are subangular to subrounded.	
			75.67	1.80		End of trial pit at 1.80m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.80
Width: 0.60
Length: 2.50

Remarks:
Material unsuitable for hand vane

Stability:
Moderately stable

Termination Reason
Terminated at refusal on boulder / possible bedrock

Last Updated
13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-23608
Coordinates 586792.61 E 685788.09 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8T Wheeled Excavator	**Elevation** 76.83 mOD	**Date:** 07/09/2022	**Logger:** DM	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						Brown sandy TOPSOIL with rootlets.	
0.30 - 3.20 0.30 - 3.20	B1 D2		76.53	0.30		Orangish light brown very gravelly very clayey fine to coarse SAND with high cobble content. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded.	
			73.63	3.20		End of trial pit at 3.20m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 3.20
Width: 0.60
Length: 2.70

Remarks:
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Stable	Terminated at maximum reach of excavator	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-23707
Coordinates 586853.11 E 685868.68 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8T Tracked Excavator	**Elevation** 74.87 mOD	**Date:** 06/09/2022	**Logger:** DM	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						Dark brown sandy TOPSOIL with rootlets.	
0.30 - 2.80 0.30 - 2.80	B1 D2		74.56	0.30		Orangish light brown very sandy very clayey subangular to subrounded fine to coarse GRAVEL with high cobble content. Sand is fine to coarse. Cobbles are subangular to subrounded.	
			72.06	2.80		End of trial pit at 2.80m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 2.80
Width: 0.60
Length: 2.40

Remarks:
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Moderately stable	Terminated at refusal on boulder / possible bedrock	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-23810
Coordinates 586925.56 E 685943.83 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8T Wheeled Excavator	**Elevation** 74.13 mOD	**Date:** 06/09/2022	**Logger:** DM	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						Brown sandy TOPSOIL with rootlets.	
0.25 - 3.00 0.25 - 3.00	B1 D2		73.88	0.25		Orangish brown very sandy very clayey subangular to subrounded fine to coarse GRAVEL with high cobble content. Sand is fine to coarse. Cobbles are subangular to subrounded.	
			71.13	3.00		End of trial pit at 3.00m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 3.00
Width: 0.60
Length: 2.50

Remarks:
Material unsuitable for hand vane

Stability:
Stable

Termination Reason
Terminated at refusal on boulders / possible bedrock

Last Updated
13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-23910
Coordinates 586911.05 E 686040.52 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8T Wheeled Excavator	**Elevation** 73.74 mOD	**Date:** 07/09/2022	**Logger:** DM	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						Brown sandy TOPSOIL with rootlets.	
0.25 - 3.10 0.25 - 3.10	B1 D2		73.49	0.25		Light brown very sandy very clayey subangular to subrounded fine to coarse GRAVEL with high cobble content. Sand is fine to coarse. Cobbles are subangular to subrounded.	
			70.64	3.10		End of trial pit at 3.10m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 3.10
Width: 0.60
Length: 2.80

Remarks:
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Stable	Terminated at maximum reach of excavator	13/03/2023

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CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-24008
Coordinates 586891.67 E 686152.77 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8T Wheeled Excavator	**Elevation** 72.70 mOD	**Date:** 07/09/2022	**Logger:** DM	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						Brown sandy TOPSOIL with rootlets.	
0.20 - 0.80 0.20 - 0.80	B1 D2		72.50	0.20		Orangish brown slightly clayey gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse.	
0.80 - 3.20 0.80 - 3.20	B3 D4		71.90	0.80		Greyish light brown very gravelly very clayey fine to coarse SAND with high cobble content. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded.	
			69.50	3.20		End of trial pit at 3.20m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 3.20
Width: 0.60
Length: 2.80

Remarks:
Material unsuitable for hand vane

Stability:
Stable

Termination Reason
Terminated at maximum reach of excavator

Last Updated
13/03/2023

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CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-24110
Coordinates 586915.24 E 686253.27 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8T Wheeled Excavator	**Elevation** 71.71 mOD	**Date:** 07/09/2022	**Logger:** DM	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						Brown sandy TOPSOIL with rootlets.	
0.20 - 0.60 0.20 - 0.60	B1 D2		71.50	0.20		Orangish brown slightly clayey gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse.	
0.60 - 2.00 0.60 - 2.00	B3 D4		71.10	0.60		Light brown very sandy clayey subangular to subrounded fine to coarse GRAVEL with high cobble content. Sand is fine to coarse. Cobbles are subangular to subrounded.	
			69.70	2.00		End of trial pit at 2.00m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 2.00
Width: 0.60
Length: 2.60

Remarks:
Material unsuitable for hand vane

Stability:
Stable

Termination Reason
Terminated at refusal on boulder / possible bedrock

Last Updated
13/03/2023

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CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-24209
Coordinates 586945.17 E 686352.04 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8T Wheeled Excavator	**Elevation** 71.60 mOD	**Date:** 07/09/2022	**Logger:** DM	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						Brown sandy TOPSOIL with rootlets.	
0.30 - 3.00 0.30 - 3.00	B1 D2		71.30	0.30		Orangish light brown very sandy very clayey subangular to subrounded fine to coarse GRAVEL with high cobble content. Sand is fine to coarse. Cobbles are subangular to subrounded.	
			68.60	3.00		End of trial pit at 3.00m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 3.00
Width: 0.60
Length: 2.80

Remarks:
Material unsuitable for hand vane

Stability:
Moderately stable

Termination Reason
Terminated at refusal on boulders / possible bedrock

Last Updated
13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-25504
Coordinates 587117.11 E 687477.50 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8T Wheeled Excavator	**Elevation** 81.34 mOD	**Date:** 08/09/2022	**Logger:** DM	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						Dark brown sandy TOPSOIL with rootlets.	
0.40 - 1.30 0.40 - 1.30	B1 D2		80.94	0.40		Firm orangish brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.	
1.30 - 3.30 1.30 - 3.30	B3 D4		80.04	1.30		Light brown very sandy very clayey subangular to subrounded fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are subangular to subrounded.	
			78.04	3.30		End of trial pit at 3.30m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 3.30
Width: 0.60
Length: 2.60

Remarks:
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Moderately stable	Terminated at maximum reach of excavator	13/03/2023

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CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-25604
Coordinates 587214.99 E 687499.89 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8T Tracked Excavator	**Elevation** 78.11 mOD	**Date:** 08/09/2022	**Logger:** DM	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						Dark brown sandy TOPSOIL with rootlets.	
0.40 - 1.20 0.40 - 1.20	B1 D2		77.71	0.40		Orangish brown slightly clayey gravelly fine to coarse SAND with low cobble content. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular.	
			76.91	1.20		End of trial pit at 1.20m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.20
Width: 0.60
Length: 2.50

Remarks:
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Stable	Terminated at refusal on boulder / possible bedrock	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-26512
Coordinates 587908.55 E 687769.90 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8T Wheeled Excavator	**Elevation** 70.85 mOD	**Date:** 08/09/2022	**Logger:** DM	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						Dark brown sandy TOPSOIL with rootlets.	
0.20 - 0.60 0.20 - 0.60	B1 D2		70.65	0.20		Orangish brown very sandy clayey subangular to subrounded fine to coarse GRAVEL with high cobble content. Sand is fine to coarse. Cobbles are angular to subangular of limestone.	
			70.25	0.60		End of trial pit at 0.60m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 0.60
Width: 0.60
Length: 2.40

Remarks:
Material unsuitable for hand vane

Stability:
Stable

Termination Reason
Terminated at refusal on boulder / possible bedrock

Last Updated
13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-26600
Coordinates 587991.86 E 687727.24 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8T Wheeled Excavator	**Elevation** 72.55 mOD	**Date:** 08/09/2022	**Logger:** DM	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						Brown sandy TOPSOIL with rootlets.	
0.20 - 0.55 0.20 - 0.55	B1 D2		72.35	0.20		Orangish brown slightly clayey slightly gravelly fine to coarse SAND with high cobble content. Gravel is subangular to subrounded fine to coarse. Cobbles are angular to subangular of limestone.	
			72.00	0.55		End of trial pit at 0.55m	

0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 0.55
Width: 0.60
Length: 2.40

Remarks:
Material unsuitable for hand vane

Stability:
Stable

Termination Reason
Terminated at refusal on boulder / possible bedrock

Last Updated
13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-26702
Coordinates 588087.60 E 687776.08 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8T Wheeled Excavator	**Elevation** 73.01 mOD	**Date:** 08/09/2022	**Logger:** DM	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.30 - 0.60 0.30 - 0.60	B1 D2		72.71	0.30		Dark brown sandy TOPSOIL with rootlets.	
			72.41	0.60		Orangish brown very sandy clayey subangular to subrounded fine to coarse GRAVEL with high cobble content. Sand is fine to coarse. Cobbles are angular to subangular of limestone. End of trial pit at 0.60m	

0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 0.60
Width: 0.60
Length: 2.10

Remarks:
Material unsuitable for hand vane

Stability:
Stable

Termination Reason
Terminated at refusal on boulder / possible bedrock

Last Updated
13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-26785
Coordinates 588168.08 E 687802.70 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8T Wheeled Excavator	**Elevation** 72.66 mOD	**Date:** 08/09/2022	**Logger:** DM	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						Dark brown sandy TOPSOIL with rootlets.	
0.30 - 1.00 0.30 - 1.00	B1 D2		72.36	0.30		Orangish brown sandy clayey subangular to subrounded fine to coarse GRAVEL with high cobble content. Sand is fine to coarse. Cobbles are angular to subangular of limestone.	
			71.66	1.00		End of trial pit at 1.00m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.00
Width: 0.60
Length: 2.30

Remarks:
Material unsuitable for hand vane

Stability:
Stable

Termination Reason
Terminated at refusal on boulder / possible bedrock

Last Updated
13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-27781
Coordinates 589164.21 E 687745.17 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8T Wheeled Excavator	**Elevation** 88.54 mOD	**Date:** 08/09/2022	**Logger:** DM	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						Dark brown sandy TOPSOIL with rootlets.	
0.30 - 0.90 0.30 - 0.90	B1 D2		88.24	0.30		Orangish brown slightly sandy slightly gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse.	
0.90 - 2.80 0.90 - 2.80	B3 D4		87.64	0.90		Light brown very gravelly very clayey fine to coarse SAND with high cobble content. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of limestone.	
			85.74	2.80		End of trial pit at 2.80m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 2.80
Width: 0.60
Length: 2.50

Remarks:
Material unsuitable for hand vane

Stability:
Moderately stable

Termination Reason
Terminated at refusal on boulder / possible bedrock

Last Updated
13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Trial Pit ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	TP-27901
Coordinates 589272.41 E 687763.69 N	**Client:** Irish Water	
Method: Trial Pitting	**Client's Representative:** Mott MacDonald	Sheet 1 of 1 Scale: 1:25
Plant: 8T Wheeled Excavator	**Elevation** 89.46 mOD / **Date:** 08/09/2022 / **Logger:** DM	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						Brown sandy TOPSOIL with rootlets.	
0.30 - 3.00 0.30 - 3.00	B1 D2		89.16	0.30		Light brown very sandy very clayey subangular to subrounded fine to coarse GRAVEL with high cobble content. Sand is fine to coarse. Cobbles are subangular to subrounded of limestone.	
3.00 - 3.30 3.00 - 3.30	B3 D4		86.46	3.00		Greyish brown very sandy very clayey subangular to subrounded fine to coarse GRAVEL with high cobble content. Sand is fine to coarse. Cobbles are angular to subangular of limestone.	
			86.16	3.30		End of trial pit at 3.30m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 3.30
Width: 0.60
Length: 2.30

Remarks:
Material unsuitable for hand vane

Stability:
Moderately stable

Termination Reason
Terminated at maximum reach of excavator

Last Updated
13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Trial Pit ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	TP-28001
Coordinates 589382.62 E 687767.19 N	**Client:** Irish Water	
Method: Trial Pitting	**Client's Representative:** Mott MacDonald	Sheet 1 of 1 Scale: 1:25
Plant: 8T Wheeled Excavator	**Elevation** 88.71 mOD / **Date:** 08/09/2022 / **Logger:** DM	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						Brown sandy TOPSOIL with rootlets.	
0.30 - 0.90	B1		88.41	0.30			
0.30 - 0.90	D2					Light brown slightly clayey gravelly fine to coarse SAND with high cobble content. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of various lithologies.	
0.90 - 1.00	D3		87.81	0.90			
1.00 - 3.30	B4		87.71	1.00		Greyish mottled black slightly gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse.	
1.00 - 3.30	D5					Greyish brown very gravelly very clayey fine to coarse SAND with high cobble content. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of various lithologies.	
			85.41	3.30		End of trial pit at 3.30m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 3.30
Width: 0.60
Length: 2.70

Remarks:
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Stable	Terminated at maximum reach of excavator	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Trial Pit ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	TP-28102
Coordinates	**Client:**	
589474.99 E	Irish Water	
687765.00 N	**Client's Representative:**	Sheet 1 of 1
	Mott MacDonald	Scale: 1:25
Method: Trial Pitting		
Plant: 8t Wheeled Excavator	**Elevation** 87.99 mOD	**Date:** 09/09/2022 **Logger:** NP
		FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
			87.79	0.20		Grey sandy clayey subrounded fine to coarse GRAVEL with low cobble content. Sand is fine to coarse.	
0.50	B1						
0.50	D4						
			87.19	0.80		Brownish grey gravelly fine to coarse SAND with low cobble content. Gravel is subrounded fine to coarse. Cobbles are subrounded.	
1.00	B2						
1.00	D5		86.89	1.10		Brownish grey very sandy very clayey subrounded fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are subrounded.	
2.20	B3						
2.20	D6						
			85.09	2.90		BOULDER	
			84.99	3.00		End of trial pit at 3.00m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 3.00
Width: 0.60
Length: 2.20

Remarks:
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Stable	Terminated at refusal on boulder / possible bedrock	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-28199
Coordinates 589573.69 E 687742.88 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8t Wheeled Excavator	**Elevation** 87.01 mOD	**Date:** 09/09/2022	**Logger:** NP	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			86.80	0.20		TOPSOIL	
0.50 0.50	B1 D2					Grey sandy subrounded fine to coarse GRAVEL with medium cobble content. Sand is fine to coarse. Cobbles are subrounded. Occasional subrounded boulders (up to 35x27x22).	
			86.10	0.90		End of trial pit at 0.90m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 0.90
Width: 0.60
Length: 2.20

Remarks:
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Unstable	Terminated due to pit collapsing	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Trial Pit ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	TP-28302
Coordinates 589675.84 E 687787.41 N	**Client:** Irish Water	
Method: Trial Pitting	**Client's Representative:** Mott MacDonald	Sheet 1 of 1 Scale: 1:25
Plant: 8t Wheeled Excavator	**Elevation** 79.23 mOD / **Date:** 09/09/2022 / **Logger:** NP	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			79.03	0.20		TOPSOIL	
0.50	B1					Firm orangish brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.	
0.50	D5		78.62	0.60		Greyish brown sandy clayey subrounded fine to coarse GRAVEL with medium cobble and low boulder content. Sand is fine to coarse. Cobbles are subrounded. Boulders are subrounded (up to 27x22x19cm).	
1.20	B2						
1.20	D6		77.92	1.30		Greyish brown gravelly fine to coarse SAND with low cobble and boulder content. Gravel is subrounded fine to coarse. Cobbles are subrounded. Boulders are subangular to subrounded (up to 62x31x15cm).	
1.70	B3						
1.70	D7		77.42	1.80		Brownish grey very sandy very clayey subrounded fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are subrounded.	
2.50	B4						
2.50	D8						
			76.42	2.80		BOULDER	
			76.32	2.90		End of trial pit at 2.90m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 2.90
Width: 0.60
Length: 2.40

Remarks:
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Stable	Terminated at refusal on boulder / possible bedrock	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-28411
Coordinates 589748.60 E 687834.34 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8t Wheeled Excavator	**Elevation** 76.20 mOD	**Date:** 14/09/2022	**Logger:** TH	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.20 0.20 - 1.00	D3 B1		76.00	0.20		Firm light brown sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse.	
1.00 1.00 - 2.40	D4 B2		75.20	1.00		Stiff brown slightly sandy gravelly SILT with medium cobble and boulder content. Sand is fine to coarse. Gravel is subrounded fine to coarse. Cobbles are subangular of limestone.	
			73.80	2.40		End of trial pit at 2.40m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 2.40
Width: 0.70
Length: 2.40

Remarks:
Material unsuitable for hand vane

Stability:
Unstable below 1.80m

Termination Reason
Terminated due to pit walls collapsing

Last Updated
13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Trial Pit ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	TP-28505
Coordinates 589828.71 E 687909.47 N	**Client:** Irish Water	
Method: Trial Pitting	**Client's Representative:** Mott MacDonald	Sheet 1 of 1 Scale: 1:25
Plant: 8t Wheeled Excavator	**Elevation** 73.24 mOD / **Date:** 14/09/2022 / **Logger:** TH	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.50	D3		72.74	0.50		Orangish brown gravelly slightly clayey fine to coarse SAND. Gravel is angular fine to coarse.	
0.50 - 0.70	B1						
0.70	D4		72.54	0.70		Greyish brown sandy clayey subangular fine to coarse GRAVEL of limestone with medium cobble content. Cobbles are subangular of limestone.	
0.70 - 1.20	B2						
			72.04	1.20		End of trial pit at 1.20m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.20
Width: 0.70
Length: 2.40

Remarks:
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Stable	Terminated at refusal on boulder / possible bedrock	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-28709
Coordinates 589957.47 E 687972.99 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8t Wheeled Excavator	**Elevation** 72.23 mOD	**Date:** 14/09/2022	**Logger:** TH	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.50	D3		71.73	0.50		Greyish brown sandy slightly clayey subangular fine to coarse GRAVEL. Sand is fine to coarse.	
0.50 - 0.80	B1						
0.80	D4		71.43	0.80		Brownish grey sandy slightly clayey subangular fine to coarse GRAVEL with medium cobble content. Sand is fine to coarse of limestone. Cobbles are angular of limestone.	
0.80 - 3.80	B2						
			68.43	3.80		End of trial pit at 3.80m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 3.80
Width: 0.60
Length: 2.40

Remarks:
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Stable	Terminated at maximum reach of excavator	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-28752
Coordinates 590006.91 E 687975.11 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8t Wheeled Excavator	**Elevation** 72.65 mOD	**Date:** 14/09/2022	**Logger:** TH	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.45 0.45 - 1.00	D3 B1		72.20	0.45		Possible MADE GROUND: Greyish brown very gravelly fine to coarse SAND with medium cobble and low boulder content. Gravel is subangular fine to coarse. Cobbles are angular of limestone.	
1.00 - 1.90	B2		71.65	1.00		Possible MADE GROUND: Grey sandy slightly clayey angular fine to coarse GRAVEL with high cobble and medium boulder content. Sand is fine to coarse.	
			70.75	1.90		End of trial pit at 1.90m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.90
Width: 0.80
Length: 2.40

Remarks: Material unsuitable for hand vane

Stability: Unstable

Termination Reason: Terminated at refusal on boulder

Last Updated: 13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-30103
Coordinates 591031.45 E 688936.81 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 13t Tracked Excavator	**Elevation** 76.93 mOD	**Date:** 13/07/2022	**Logger:** NP	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			76.53	0.40		TOPSOIL	
0.50 0.50	B1 D5					Soft brown slightly gravelly sandy CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to medium. Cobbles are subangular.	
			75.83	1.10		Soft becoming firm brown slightly sandy gravelly silty CLAY with low cobble content and occasional boulders. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular. Boulders are subangular (up to 42 x 30 x 17cm).	
1.50 1.50	B2 D6						
2.50 2.50	B3 D7						
3.40 3.40	B4 D8		73.53 73.43	3.40 3.50		Large BOULDER/Possible BEDROCK End of trial pit at 3.50m	

Water Strikes

Struck at (m)	Remarks

Depth: 3.50
Width: 0.80
Length: 2.80

Remarks:
No groundwater encountered
Material unsuitable for hand vane

Stability: Stable

Termination Reason: Terminated on possible bedrock/large boulder

Last Updated: 13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-30204
Coordinates 591135.81 E 688928.48 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 13t Tracked Excavator	**Elevation** 76.49 mOD	**Date:** 13/07/2022	**Logger:** NP	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			76.19	0.30		TOPSOIL	
0.50 0.50	B1 D4					Soft brown slightly sandy slightly gravelly SILT with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular.	
			75.69	0.80		Soft brown slightly sandy slightly gravelly CLAY with low cobble content and occasional boulders. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular.	
1.50 1.50	B2 D5						
2.50 2.50	B3 D6		73.99 73.89	2.50 2.60		Large BOULDER/Possible BEDROCK End of trial pit at 2.60m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 2.60
Width: 0.80
Length: 3.00

Remarks:
No groundwater encountered
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Stable	Terminated on possible bedrock/large boulder	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-30303
Coordinates 591229.56 E 688970.81 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 13t Tracked Excavator	**Elevation** 76.67 mOD	**Date:** 15/07/2022	**Logger:** NP	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			76.37	0.30		TOPSOIL	
0.50	B1					Greyish brown very sandy very silty subangular fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are subangular.	
			75.87	0.80		Very soft becoming soft brown slightly sandy gravelly silty CLAY with low cobble content and occasional boulders. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular. Boulders are subangular (up to 46 x 31 x 20cm).	
1.50	B2						
2.50	B3						
			73.67	3.00		Large BOULDER	
			73.57	3.10		End of trial pit at 3.10m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 3.10
Width: 0.80
Length: 3.00

Remarks:
No groundwater encountered
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Stable	Terminated on possible large boulder	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-30417
Coordinates 591339.08 E 688949.63 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 13t Tracked Excavator	**Elevation** 76.19 mOD	**Date:** 15/07/2022	**Logger:** NP	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			75.99	0.20		TOPSOIL	
0.50	B1					Very soft brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular.	
0.50	D4		75.59	0.60		Very soft greyish brown slightly sandy slightgravelly CLAY with medium cobble content and occasional boulders. Sand is fine to coarse. Gravel is subangular fine to coarse Cobbles are subangular. Boulders are subangular (up to 72 x 50 x 30cm).	
1.50	B2						
1.50	D5						
2.50	B3						
2.50	D6		73.59	2.60		Large BOULDER	
			73.49	2.70		End of trial pit at 2.70m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 2.70
Width: 0.80
Length: 2.90

Remarks:
No groundwater encountered
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Stable	Terminated on possible large boulder	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-30501
Coordinates 591426.07 E 688971.13 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 13t Tracked Excavator	**Elevation** 74.44 mOD	**Date:** 13/07/2022	**Logger:** NP	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
			74.14	0.30		Brownish grey very sandy very silty subangular fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are subangular.	
0.50	B1						
0.50	D4						
			73.24	1.20		Very soft brown slightly sandy slightly gravelly CLAY with low cobble content and occasional boulders. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular. Boulders are subangular (up to 45 x 37 x 20cm).	
1.50	B2						
1.50	D5						
2.50	B3		71.94	2.50		Large BOULDER	
2.50	D6		71.84	2.60		End of trial pit at 2.60m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes				
Struck at (m)	Remarks			
		Depth: 2.60	**Remarks:** No groundwater encountered	
		Width: 0.80	Material unsuitable for hand vane	
		Length: 3.00		
		Stability: Stable	**Termination Reason** Terminated on possible large boulder	**Last Updated** 13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-30602
Coordinates 591523.37 E 688925.41 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 13t Tracked Excavator	**Elevation** 73.42 mOD	**Date:** 15/07/2022	**Logger:** NP	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			73.22	0.20		TOPSOIL	
0.50 0.50	B1 D4					Grey very sandy silty subrounded fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are subrounded.	
			72.42	1.00		Soft brown slightly sandy gravelly CLAY with low cobble content and occasional boulders. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular. Boulders are subangular (up to 40 x 27 x 12cm).	
1.50 1.50	B2 D5						
			71.62	1.80		Firm becoming stiff grey sandy gravelly CLAY with medium cobble content and occasional boulders. Sand is fine to coarse. Gravel is subangula fine to coarse. Cobbles are subangular. Boulders are subangular. (up to 35 x 31 x 16cm.	
2.20 2.20	B3 D6						
			71.02	2.40		Large BOULDER	
			70.92	2.50		End of trial pit at 2.50m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 2.50
Width: 0.80
Length: 2.90

Remarks:
No groundwater encountered
Material unsuitable for hand vane

Stability: Stable

Termination Reason: Terminated on possible large boulder

Last Updated: 13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-30818
Coordinates 591748.65 E 688942.56 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8t Wheeled Excavator	**Elevation** 74.86 mOD	**Date:** 14/09/2022	**Logger:** TMCA	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.35 - 1.50 0.35 - 1.50	B1 D2		74.51	0.35		Firm becoming stiff grey mottled brown slightly sandy slightly gravelly CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is subrounded fine to coarse. Cobbles and boulders are subrounded.	
1.50 - 2.50 1.50 - 2.50	B3 D4						
2.50 - 3.20 2.50 - 3.20	B5 D6						
			71.66	3.20		End of trial pit at 3.20m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 3.20
Width: 0.70
Length: 2.70

Remarks:
Material unsuitable for hand vane

Stability:
Stable

Termination Reason
Terminated at refusal on boulders / possible bedrock

Last Updated
13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-30901
Coordinates 591828.69 E 688913.72 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8t Wheeled Excavator	**Elevation** 75.81 mOD	**Date:** 14/09/2022	**Logger:** TMCA	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.25 - 1.40 0.25 - 1.40	B1 D2		75.56	0.25		Stiff light brown sandy gravelly CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is subrounded fine to coarse. Cobbles and boulders are subrounded.	
			74.41	1.40		End of trial pit at 1.40m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.40
Width: 0.70
Length: 3.00

Remarks:
Material unsuitable for hand vane

Stability:
Stable

Termination Reason
Terminated at refusal on boulder / possible bedrock

Last Updated
13/03/2023

AGS

CAUSEWAY GEOTECH	**Project No.** 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	**Trial Pit ID** TP-31002
	Coordinates 591926.24 E 688881.65 N	**Client:** Irish Water	
Method: Trial Pitting		**Client's Representative:** Mott MacDonald	Sheet 1 of 1 Scale: 1:25
Plant: 8t Wheeled Excavator	**Elevation** 76.03 mOD	**Date:** 15/09/2022	**Logger:** TMCA FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.25 - 1.50 0.25 - 1.50	B1 D2		75.78	0.25		Stiff light brown sandy gravelly CLAY with medium cobble content and low boulder content. Sand is fine to coarse. Gravel is subrounded fine to coarse. Cobbles and boulders are subrounded. Boulders up to 250mm in length.	
1.50 - 2.10 1.50 - 2.40	B3 D4		74.53	1.50		Firm becoming stiff light brown slightly sandy slightly gravelly CLAY with low cobble and medium boulder content. Sand is fine to coarse. Gravel is subrounded fine to coarse. Cobbles and boulders are subrounded. Boulders up to 420mm in length.	
			73.63	2.40		End of trial pit at 2.40m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 2.40
Width: 0.70
Length: 3.00

Remarks: Material unsuitable for hand vane

Stability: Stable

Termination Reason: Terminated at refusal on boulders / possible bedrock

Last Updated: 13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-31603
Coordinates 592455.49 E 689117.69 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 5t Tracked Excavator	**Elevation** 75.64 mOD	**Date:** 30/06/2022	**Logger:** NP	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			75.64	0.00		TOPSOIL	
			75.34	0.30		Brown gravelly very silty fine to coarse SAND with low cobble content and occasional boulders. Gravel is subrounded to subangular fine to coarse. Cobbles are subrounded. Boulders are subrounded (up to 25 x 20 x 18cm).	
0.90	B1						
			74.64	1.00		Brown very sandy silty subangular to subrounded fine to coarse GRAVEL with medium cobble content and occasional boulders. Sand is fine to coarse. Cobbles are subrounded. Boulders are subrounded (up to 45 x 35 x 22cm).	
1.50	B2						
2.00	B3						
			73.54	2.10		End of trial pit at 2.10m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 2.10
Width: 0.50
Length: 2.50

Remarks:
No groundwater encountered
Material unsuitable for hand vane

Stability: Unstable

Termination Reason: Terminated on possible bedrock/large boulder

Last Updated: 13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Trial Pit ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	TP-31705
Coordinates 592549.19 E 689150.37 N	**Client:** Irish Water	
Method: Trial Pitting	**Client's Representative:** Mott MacDonald	Sheet 1 of 1 Scale: 1:25
Plant: 5t Tracked Excavator	**Elevation** 79.86 mOD / **Date:** 30/06/2022 / **Logger:** NP	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			79.56	0.30		TOPSOIL	
0.50	B1					Brownish grey very sandy silty angular to subangular fine to coarse GRAVEL of limestone with high cobble content and occasional boulders. Sand is fine to coarse. Cobbles are angular to subangular. Boulders are subangular (up to 30 x 30 x 10cm).	
			79.06	0.80		Possible LIMESTONE bedrock recovered as grey angular to subangular medium to coarse GRAVEL of angular to subangular cobbles.	
			78.96	0.90		End of trial pit at 0.90m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 0.90
Width: 0.50
Length: 2.50

Remarks:
No groundwater encountered
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Unstable	Terminated on possible bedrock/large boulder	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-31805
Coordinates 592643.42 E 689186.93 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 5t Tracked Excavator	**Elevation** 81.34 mOD	**Date:** 30/06/2022	**Logger:** NP	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			81.14	0.20		TOPSOIL	
0.50	B1					Brown very sandy very silty angular to subangular fine to coarse GRAVEL with low cobble content and occasional boulders. Sand is fine to coarse. Cobbles are angular to subangular. Boulders are subangular (up to 42 x 31 x 18cm).	
1.50	B2		79.74	1.60		Firm brown slightly sandy slightly gravelly CLAY with low cobble content and occasional boulders. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular. Boulders are subangular (up to 30 x 25 17cm).	
1.70	B3		79.24	2.10		Possible BEDROCK/Large BOULDER	
			79.14	2.20		End of trial pit at 2.20m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 2.20
Width: 0.50
Length: 2.30

Remarks:
No groundwater encountered
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Stable	Terminated on possible bedrock/large boulder	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-32013
Coordinates 592845.69 E 689258.00 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 5t Tracked Excavator	**Elevation** 71.50 mOD	**Date:** 30/06/2022	**Logger:** NP	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			71.35	0.15		TOPSOIL	
0.50	B1					Brown very sandy silty angular to subangular fine to coarse GRAVEL with medium cobble content. Sand is fine to coarse. Cobbles are angular to subangular.	
			70.60	0.90		Brown silty gravelly fine to coarse SAND with medium cobble content and occasional boulders. Gravel is angular to subangular fine to coarse. Cobbles are angular to subangular. Boulders (up to 25 x 21 x 14cm).	
1.40	B2						
			70.00	1.50		Possible BEDROCK/Large BOULDER	
			69.90	1.60		End of trial pit at 1.60m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.60
Width: 0.50
Length: 2.50

Remarks:
No groundwater encountered
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Stable	Terminated on possible bedrock/large boulder	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-32103
Coordinates 592911.90 E 689267.92 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 5t Tracked Excavator	**Elevation** 71.71 mOD	**Date:** 30/06/2022 **Logger:** NP	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL with numerous rootlets.	
			71.41	0.30		Greyish brown sandy silty angular fine to coarse GRAVEL of limestone with high cobble content and occasional boulders. Sand is fine to coarse. Cobbles are angular. Boulders are angular to subangular (up to 27 x 23 x 14cm).	
0.50	B1						
			70.91	0.80		BEDROCK-LIMESTONE	
			70.81	0.90		End of trial pit at 0.90m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 0.90
Width: 0.50
Length: 2.30

Remarks:
No groundwater encountered
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Unstable	Terminated on possible bedrock	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-32201
Coordinates 593015.94 E 689282.96 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 5t Tracked Excavator	**Elevation** 74.91 mOD	**Date:** 01/07/2022	**Logger:** NP	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			74.71	0.20		TOPSOIL	
0.50	B1					Soft to firm brown slightly sandy slightly gravelly SILT/CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular.	
			73.71	1.20			
1.50	B2					Stiff dark brown slightly sandy slightly gravelly SILT/CLAY with medium cobble content. Sand is fine to coarse. Gravel is angular to subangular fine to coarse. Cobbles are angular to subangular.	
			73.11	1.80		Possible ROCK/Large BOULDER	
			73.01	1.90		End of trial pit at 1.90m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.90
Width: 0.50
Length: 2.30

Remarks:
No groundwater encountered
Material unsuitable for hand vane

Stability: Stable

Termination Reason: Terminated on possible bedrock/large boulder

Last Updated: 13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-32320
Coordinates 593126.97 E 689333.29 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 5t Tracked Excavator	**Elevation** 77.07 mOD	**Date:** 01/07/2022	**Logger:** NP	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			76.87	0.20		TOPSOIL	
0.50	B1					Soft to firm brown slightly sandy slightly gravelly CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular. Boulders are subangular (up to 24 x 20 x 9cm).	
			76.07	1.00		Brown very sandy silty angular to subangular fine to coarse GRAVEL with medium cobble content and occasional boulders. Sand is fine to coarse. Cobbles are angular to subangular. Boulders are subangular (up to 27 x 21 x 12cm.	
1.40	B2						
			75.57	1.50		Possible ROCKHEAD/Large BOULDER	
			75.47	1.60		End of trial pit at 1.60m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.60
Width: 0.50
Length: 2.40

Remarks:
No groundwater encountered
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Stable	Terminated on possible bedrock/large boulder	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-32401
Coordinates 593196.15 E 689380.31 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 5t Tracked Excavator	**Elevation** 76.00 mOD	**Date:** 01/07/2022	**Logger:** NP	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			75.90	0.10		TOPSOIL	
						Soft to firm brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular.	
0.50	B1						
1.40	B2						
			74.50	1.50		Possible ROCKHEAD/Large BOULDER	
			74.40	1.60		End of trial pit at 1.60m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.60
Width: 0.50
Length: 2.30

Remarks:
No groundwater encountered
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Stable	Terminated on possible bedrock/large boulder	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-35302
Coordinates 595911.76 E 689706.55 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8t Wheeled Excavator	**Elevation** 86.11 mOD	**Date:** 15/09/2022	**Logger:** TMCA	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.30 - 1.50 0.30 - 1.50	B1 D2		85.81	0.30		Firm light brown sandy gravelly CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is subrounded fine to coarse. Cobbles and boulders are subrounded. Boulders up to 300mm in length.	
			84.56	1.55		End of trial pit at 1.55m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.55
Width: 0.70
Length: 3.00

Remarks:
Material unsuitable for hand vane

Stability:
Stable

Termination Reason
Terminated at refusal on boulders/possible bedrock

Last Updated
13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** TP-35435
Coordinates 596046.17 E 689670.60 N	**Client:** Irish Water		
Method: Trial Pitting	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8t Wheeled Excavator	**Elevation** 85.38 mOD	**Date:** 15/09/2022	**Logger:** TMCA	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.30 - 1.50 0.30 - 1.50	B1 D2		85.08	0.30		Firm light brown slightly sandy slightly gravelly silty CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is subrounded fine to coarse. Cobbles and boulders are subrounded. Boulders up to 30mm in length.	
1.50 - 2.80 1.50 - 2.80	B3 D4						
			82.58	2.80		End of trial pit at 2.80m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 2.80
Width: 0.70
Length: 3.00

Remarks:
Material unsuitable for hand vane

Stability:	Termination Reason	Last Updated
Stable	Terminated at refusal on boulders/possible bedrock	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** ST-540
Coordinates 572955.46 E 670323.03 N	**Client:** Irish Water		
Method: Slit Trenching	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 53.27 mOD	**Date:** 17/08/2022 **Logger:** JG	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			53.22	0.05		MADE GROUND: BITMAC	
			53.14	0.13		MADE GROUND: Grey slightly sandy angular to subangular fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are angular.	
			53.06	0.20		MADE GROUND: BITMAC	
0.35 - 0.60	B1		52.92	0.35		MADE GROUND: Grey slightly sandy angular to subangular fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are angular.	
0.60 - 1.20	B2		52.66	0.60		Possible MADE GROUND: Firm light bluish grey slightly sandy gravelly silty CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.	
						Firm brown sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse.	
			52.06	1.20		End of trial pit at 1.20m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.20
Width: 0.50
Length: 5.30

Remarks:
No groundwater encountered

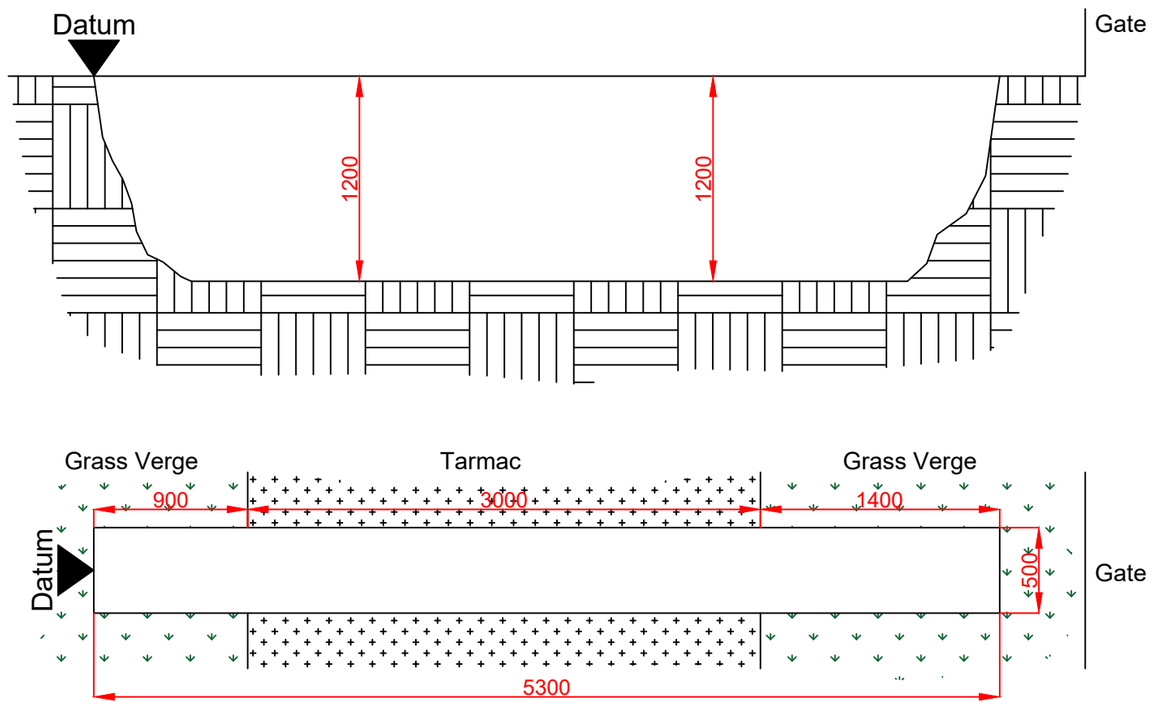
Stability:	Termination Reason	Last Updated
Stable	Terminated at scheduled depth	13/03/2023

AGS

JOB NUMBER: 21-1682	JOB NAME: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	LOCATION: ST-540

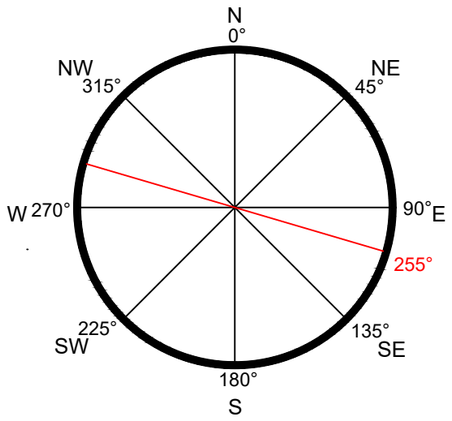
CLIENT: Irish Water	CLIENTS REPRESENTATIVE: Mott MacDonald	CREW: JG	PLANT & EQUIPMENT 3 Tonne Excavator & Hand Tools

TRENCH: (SECTION & PLAN)



No:	Type of Service:	Diameter (in mm)	Depth to Top of Service (m)	Distance to Centre of Service (m)	Details/Comments
01	Unknown	50	0.60	2.10	50mm Steel Pipe
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					

TRENCH - ORIENTATION



TRENCH ORIENTATED : 255° FROM NORTH

COORDINATES: DATUM

EASTING: 572955.46

NORTHING: 670323.03

ELEVATION: 53.27

TRENCH LENGTH (m) : 5.30

TRENCH DEPTH (m) : 1.20

TRENCH WIDTH (m) : 0.50

STABILITY: Stable

GROUNDWATER: Dry

SCALE: NTS@A3

DRAWN: BS

CHECKED: NH

DATE EXCAVATED: 17/08/2022

CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** ST-1900A-HS
Coordinates 574191.69 E 670798.03 N	**Client:** Irish Water		
Method: Stable	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 68.95 mOD	**Date:** 19/08/2022	**Logger:** TMcA	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.30	B1					MADE GROUND: BITMAC	
			68.40	0.55		End of trial pit at 0.55m	

0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 0.55
Width: 0.60
Length: 3.80

Remarks:
No groundwater encountered

Stability: Stable

Termination Reason

Last Updated 13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** ST-1900A-Verge
Coordinates E N	**Client:** Irish Water		
Method: Slit Trenching	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** mOD	**Date:** 19/08/2022	**Logger:** TMcA	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
				0.10		TOPSOIL	
0.30	B1			0.40		TOPSOIL with subangular fine to coarse gravel.	
1.00	B2			1.10		Stiff brown slightly gravelly CLAY. Gravel is subrounded fine to coarse.	
						End of trial pit at 1.10m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.10
Width: 0.60
Length: 3.80

Remarks:
No groundwater encountered

Stability:
Stable

Termination Reason
Terminated at 1.10m due to services encountered

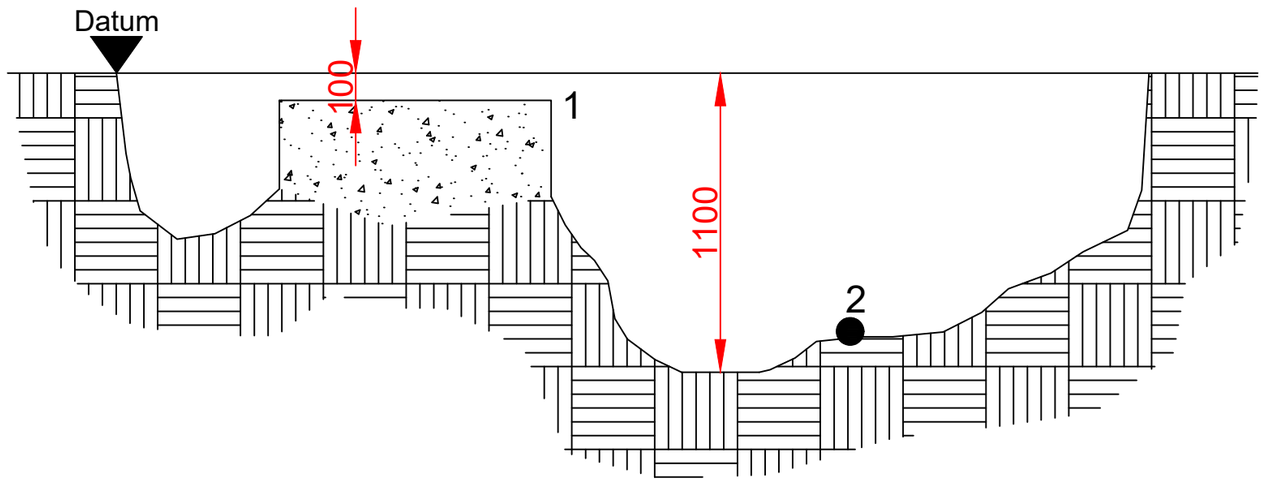
Last Updated
13/03/2023

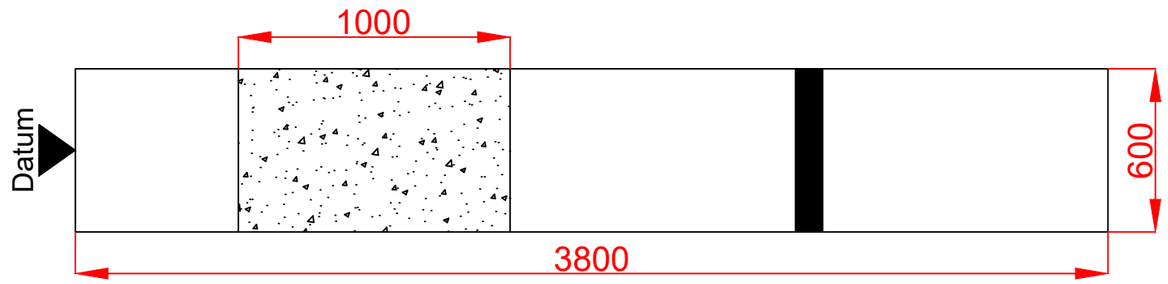
AGS

JOB NUMBER: 21-1682	JOB NAME: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	LOCATION: ST-1900A

CLIENT:	CLIENTS REPRESENTATIVE:	CREW:	PLANT & EQUIPMENT
Irish Water	Mott MacDonald	JG	3 Tonne Excavator & Hand Tools

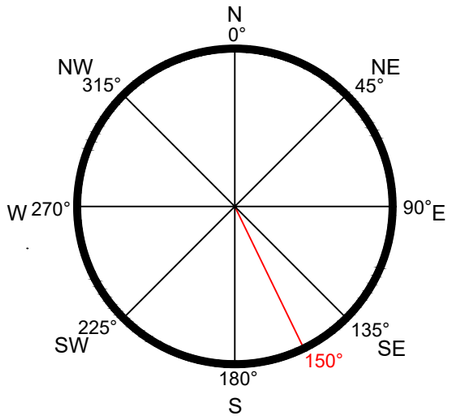
TRENCH: (SECTION & PLAN)





No:	Type of Service:	Diameter (in mm)	Depth to Top of Service (m)	Distance to Centre of Service (m)	Details/Comments
01	Unknown	1000	0.10	0.60	1000mm Leanmix
02	Unknown	100	0.90	2.70	100mm Black Pipe
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					

TRENCH - ORIENTATION



TRENCH ORIENTATED : 150° FROM NORTH

COORDINATES: DATUM

EASTING: 574191.69

NORTHING: 670798.03

ELEVATION: 68.95

TRENCH LENGTH (m) : 3.80

TRENCH DEPTH (m) : 1.10

TRENCH WIDTH (m) : 0.60

STABILITY: Stable

GROUNDWATER: Dry

SCALE: NTS@A3

DRAWN: BS

CHECKED: NH

DATE EXCAVATED: 19/08/2022

CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** ST-1900B
Coordinates 574189.71 E 670801.37 N	**Client:** Irish Water		
Method: Slit Trenching	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8t Wheeled Excavator	**Elevation** 68.92 mOD	**Date:** 21/09/2022	**Logger:** FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						MADE GROUND: BITMAC	
			68.57	0.35			
0.50	B1					MADE GROUND: Stiff to very stiff sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular.	
1.00	B2						
			67.72	1.20		End of trial pit at 1.20m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.20
Width: 1.05
Length: 11.25

Remarks:
No groundwater encountered

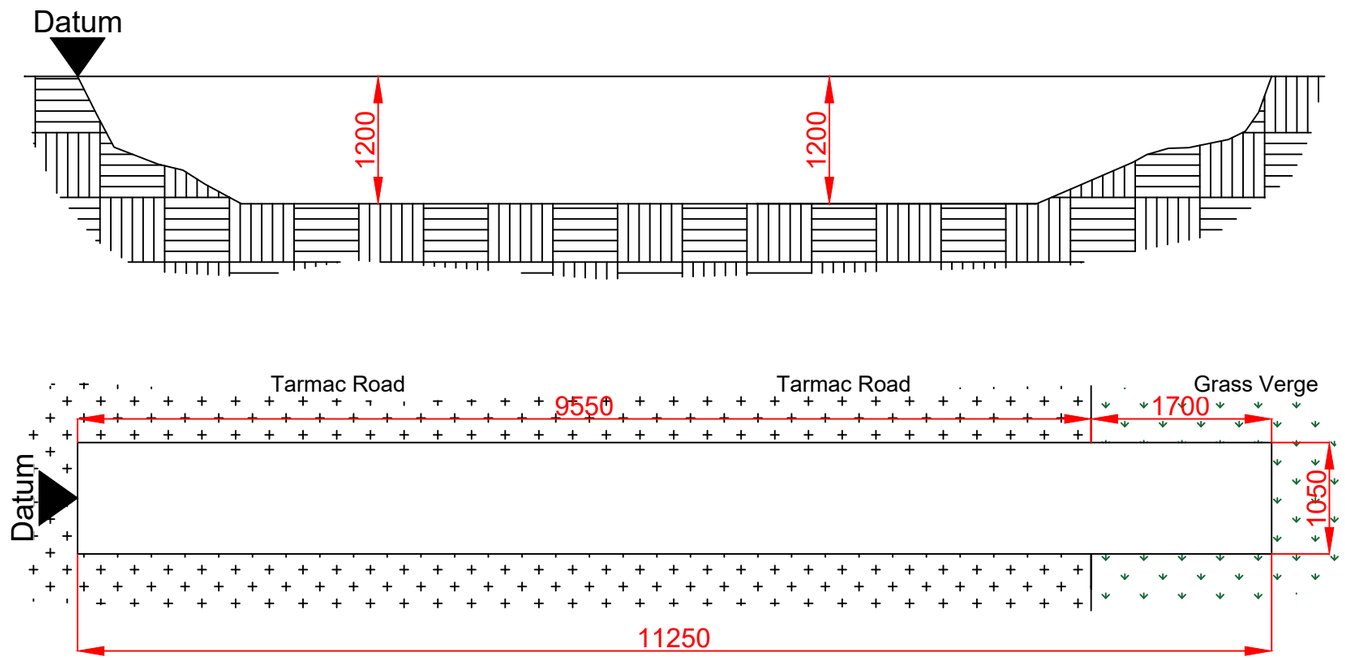
Stability:	Termination Reason	Last Updated
Stable	Terminated at scheduled depth	13/03/2023

AGS

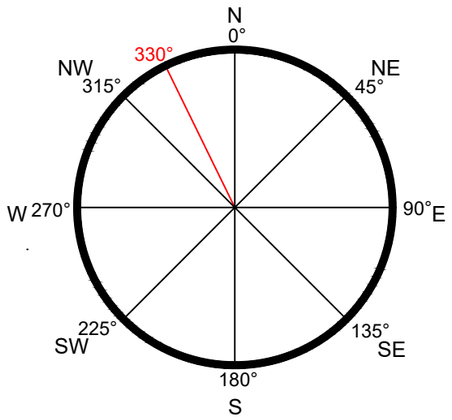
JOB NUMBER: 21-1682	JOB NAME: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	LOCATION: ST-1900B

CLIENT: Irish Water	CLIENTS REPRESENTATIVE: Mott MacDonald	CREW: JG	PLANT & EQUIPMENT 3 Tonne Excavator & Hand Tools

TRENCH: (SECTION & PLAN)



TRENCH - ORIENTATION



TRENCH ORIENTATED : 330° FROM NORTH

COORDINATES: DATUM

EASTING: 574189.71

NORTHING: 670801.37

ELEVATION: 68.92

TRENCH LENGTH (m) : 11.25

TRENCH DEPTH (m) : 1.20

TRENCH WIDTH (m) : 1.05

STABILITY: Stable

GROUNDWATER: Dry

SCALE: NTS@A3

DRAWN: BS

CHECKED: NH

DATE EXCAVATED: 21/09/2022

No:	Type of Service:	Diameter (in mm)	Depth to Top of Service (m)	Distance to Centre of Service (m)	Details/Comments
01	Unknown	1000	0.10	0.60	1000mm Leanmix
02	Unknown	100	0.90	2.70	100mm Black Pipe
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					

CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** ST-6000-Road
Coordinates 577997.73 E 671719.98 N	**Client:** Irish Water		
Method: Slit Trenching	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 49.92 mOD	**Date:** 19/08/2022	**Logger:** JG	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			49.84	0.08		MADE GROUND: BITMAC	
						MADE GROUND: Grey slightly sandy angular to subangular fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are angular.	
			49.57	0.35			
0.50 - 1.30	B1					Firm brown sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse.	
			48.72	1.20		End of trial pit at 1.20m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.20
Width: 0.45
Length: 7.30

Remarks: No groundwater encountered

Stability:	Termination Reason	Last Updated
Stable	Terminated at scheduled depth	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** ST-6000-Verge
Coordinates E N	**Client:** Irish Water		
Method: Slit Trenching	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** mOD	**Date:** 19/08/2022	**Logger:** JG	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
				0.20		TOPSOIL	
						MADE GROUND: Brown sandy clayey subrounded fine to coarse GRAVEL. Sand is fine to coarse.	
				0.85		End of trial pit at 0.85m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 0.85
Width: 0.45
Length: 7.30

Remarks:
No groundwater encountered

Stability:
Stable

Termination Reason
Terminated at 0.85m due to service encoutered

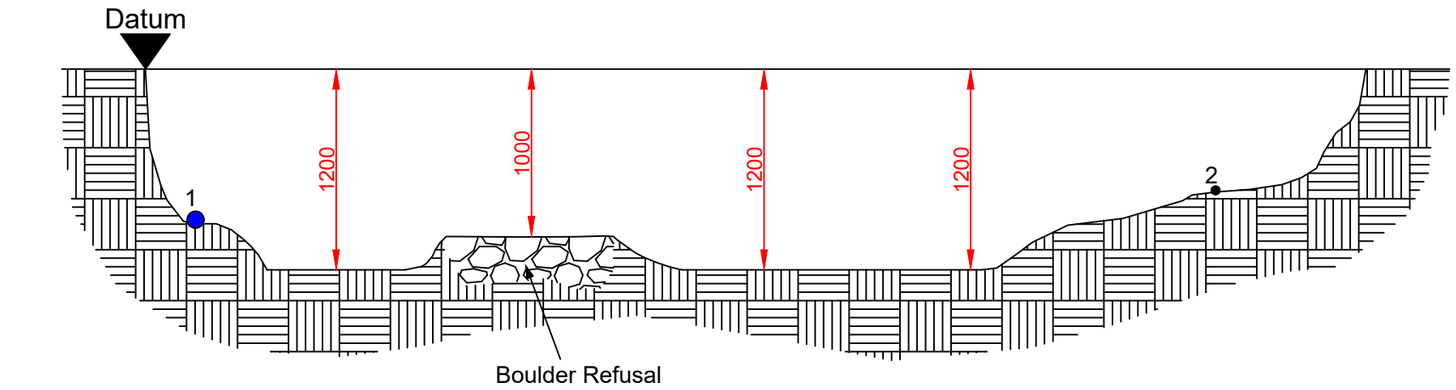
Last Updated
13/03/2023

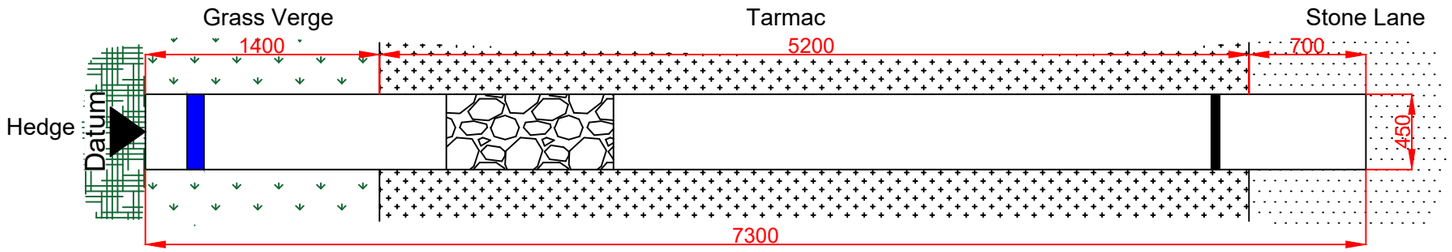
AGS

JOB NUMBER: 21-1682	JOB NAME: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	LOCATION: ST-6000

CLIENT: Irish Water	CLIENTS REPRESENTATIVE: Mott MacDonald	CREW: JG	PLANT & EQUIPMENT: 3 Tonne Excavator & Hand Tools

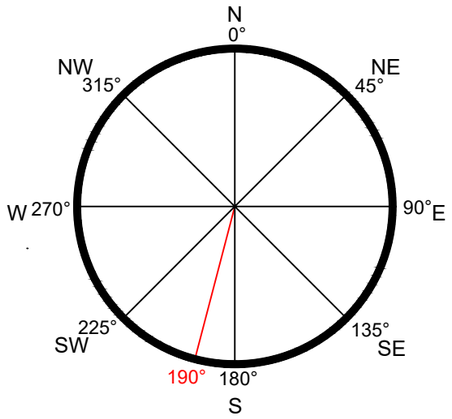
TRENCH: (SECTION & PLAN)





No:	Type of Service:	Diameter (in mm)	Depth to Top of Service (m)	Distance to Centre of Service (m)	Details/Comments
01	Water	100	0.85	0.30	100mm Blue Water Pipe
02	Unknown	50	0.70	6.40	50mm Black Cable
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					

TRENCH - ORIENTATION



TRENCH ORIENTATED : 190° FROM NORTH

COORDINATES: DATUM

EASTING: 577997.73

NORTHING: 671719.98

ELEVATION: 49.92

TRENCH LENGTH (m) : 7.30

TRENCH DEPTH (m) : 1.20

TRENCH WIDTH (m) : 0.60

STABILITY: Stable

GROUNDWATER: Dry

SCALE: NTS@A3

DRAWN: BS

CHECKED: NH

DATE EXCAVATED: 19/08/2022

CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** ST-6600
Coordinates 578384.04 E 672150.42 N	**Client:** Irish Water		
Method: Slit Trenching	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 53.77 mOD	**Date:** 16/08/2022	**Logger:** TH	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			53.76	0.01		MADE GROUND: BITMAC	
						MADE GROUND: Grey slightly sandy angular to subangular fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are angular.	
0.60	B1		53.17	0.60		MADE GROUND: Dark grey subangular fine to coarse GRAVEL with high cobble content. Cobbles are angular.	
1.00	B2		52.77	1.00		Brown slightly gravelly sandy CLAY. Sand is fin to coarse. Gravel is subangular fine to coarse.	
			52.57	1.20		End of trial pit at 1.20m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.20
Width: 0.50
Length: 5.50

Remarks:
No groundwater encountered

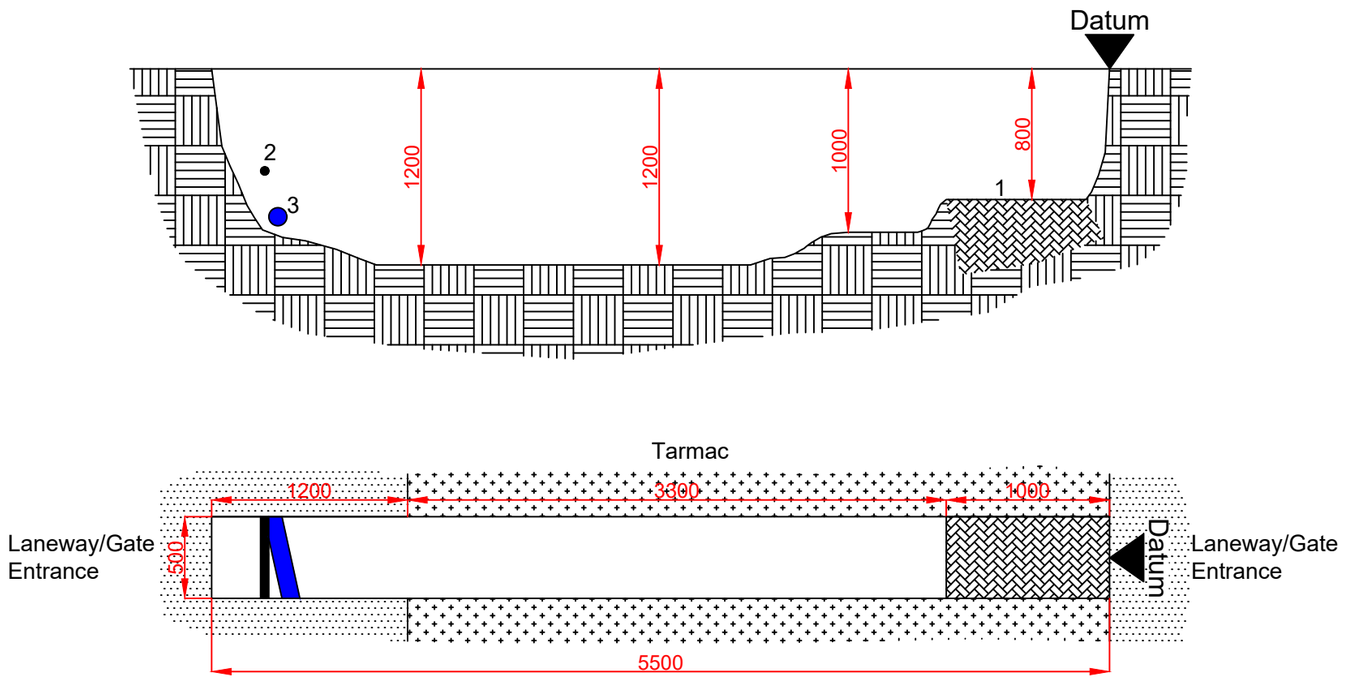
Stability:	Termination Reason	Last Updated
Stable	Terminated at scheduled depth	13/03/2023

AGS

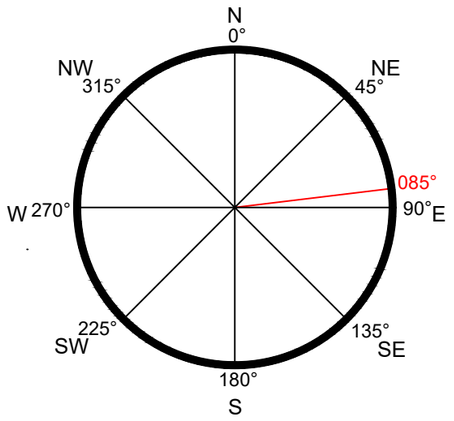
JOB NUMBER: 21-1682	JOB NAME: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	LOCATION: ST-6600

CLIENT: Irish Water	CLIENTS REPRESENTATIVE: Mott MacDonald	CREW: TH	PLANT & EQUIPMENT: 3 Tonne Excavator & Hand Tools

TRENCH: (SECTION & PLAN)



TRENCH - ORIENTATION



TRENCH ORIENTATED : 085° FROM NORTH

COORDINATES: DATUM

EASTING: 578384.04

NORTHING: 672150.42

ELEVATION: 53.77

TRENCH LENGTH (m) : 5.50

TRENCH DEPTH (m) : 1.20

TRENCH WIDTH (m) : 0.50

STABILITY: Stable

GROUNDWATER: Dry

SCALE: NTS@A3

DRAWN: BS

CHECKED: NH

DATE EXCAVATED: 16/08/2022

No:	Type of Service:	Diameter (in mm)	Depth to Top of Service (m)	Distance to Centre of Service (m)	Details/Comments
01	Obstruction	1000	0.80	0.50	1000mm Obstruction
02	Unknown	50	0.60	5.17	50mm Black PVC Black Duct Possible Telecom
03	Water	110	0.85	5.09	110mm Blue PVC Water Pipe Local Supply
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					

CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** ST-8325
Coordinates 579576.11 E 673422.36 N	**Client:** Irish Water		
Method: Slit Trenching	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 55.26 mOD	**Date:** 17/08/2022	**Logger:** JG	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			55.16	0.10		MADE GROUND: BITMAC	
0.30 - 1.00	B1		54.96	0.30		MADE GROUND: Grey slightly sandy angular to subangular fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are angular.	
1.00 - 1.20	B2					Orangish brown slightly gravelly fine to coarse SAND with low cobble content. Gravel is subrounded fine to coarse.	
			54.06	1.20		End of trial pit at 1.20m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.20
Width: 0.45
Length: 4.00

Remarks:
No groundwater encountered

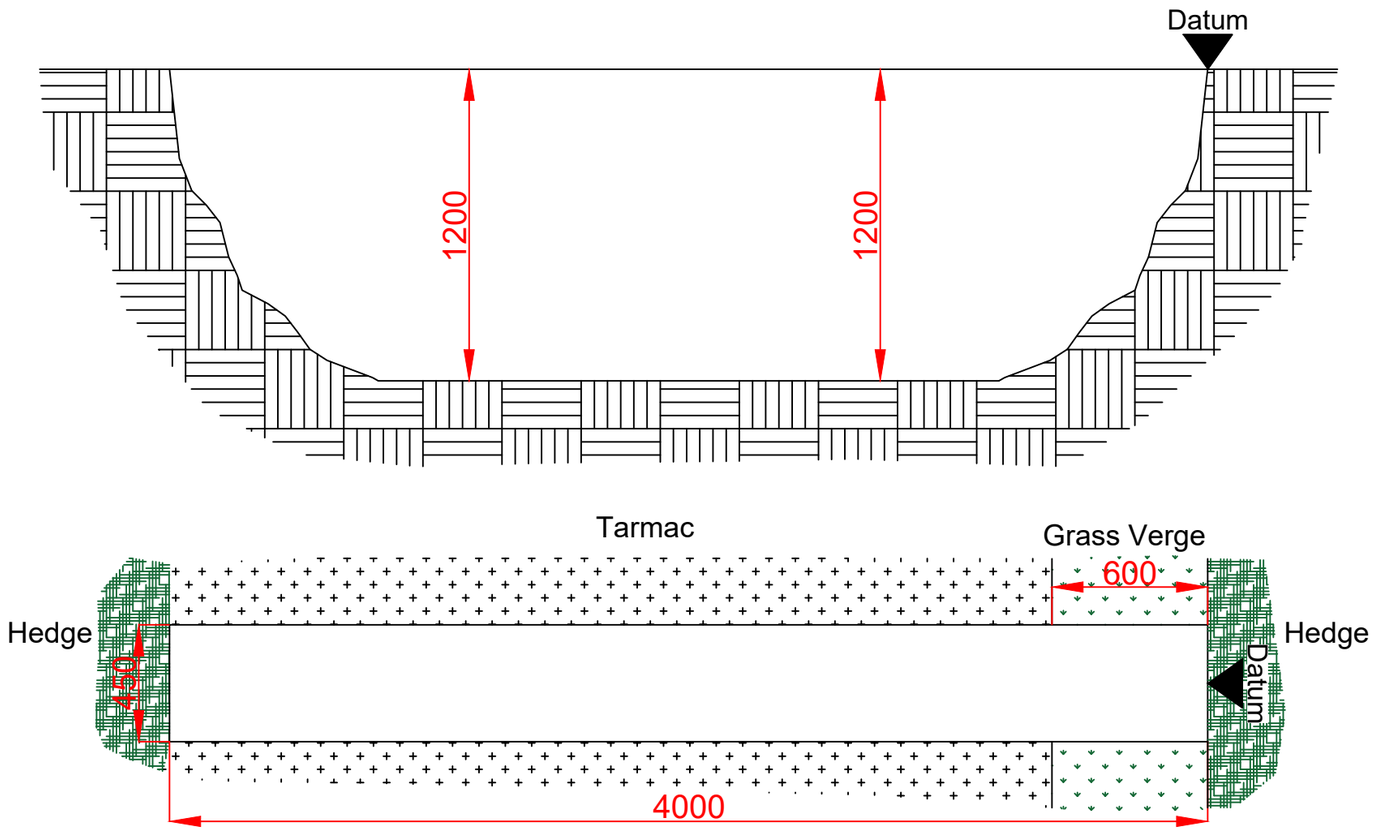
Stability:	Termination Reason	Last Updated
Stable	Terminated at scheduled depth	13/03/2023

AGS

JOB NUMBER: 21-1682	JOB NAME: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	LOCATION: ST-8325

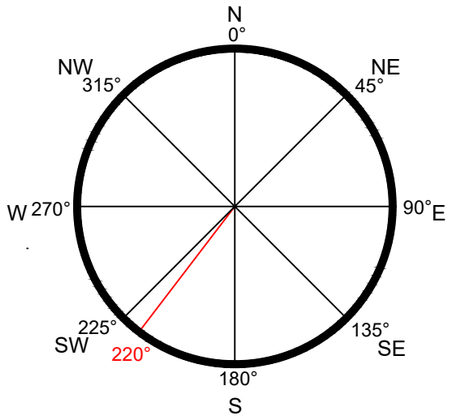
CLIENT:	CLIENTS REPRESENTATIVE:	CREW:	PLANT & EQUIPMENT
Irish Water	Mott MacDonald	TH	3 Tonne Excavator & Hand Tools

TRENCH: (SECTION & PLAN)



No:	Type of Service:	Diameter (in mm)	Depth to Top of Service (m)	Distance to Centre of Service (m)	Details/Comments
01					No services found
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					

TRENCH - ORIENTATION



TRENCH ORIENTATED : 220° FROM NORTH

COORDINATES: DATUM

EASTING: 579576.11

NORTHING: 673422.36

ELEVATION: 55.26

TRENCH LENGTH (m) : 4.00

TRENCH DEPTH (m) : 1.20

TRENCH WIDTH (m) : 0.50

STABILITY: Stable

GROUNDWATER: Dry

SCALE: NTS@A3

DRAWN: BS

CHECKED: NH

DATE EXCAVATED: 16/08/2022

CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

Project No.	Project Name:	Trial Pit ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	ST-9400
Coordinates 580271.79 E 674201.92 N	**Client:** Irish Water	
Method: Slit Trenching	**Client's Representative:** Mott MacDonald	Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 54.00 mOD / **Date:** 16/08/2022 / **Logger:** TH	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			53.95	0.05		MADE GROUND: BITMAC	
						MADE GROUND: Grey slightly sandy angular to subangular fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are angular.	
0.40 - 1.00	B1		53.60	0.40		Firm brown slightly gravelly sandy CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular.	
			52.70	1.30		End of trial pit at 1.30m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.30
Width: 0.50
Length: 2.00

Remarks:
No groundwater encountered

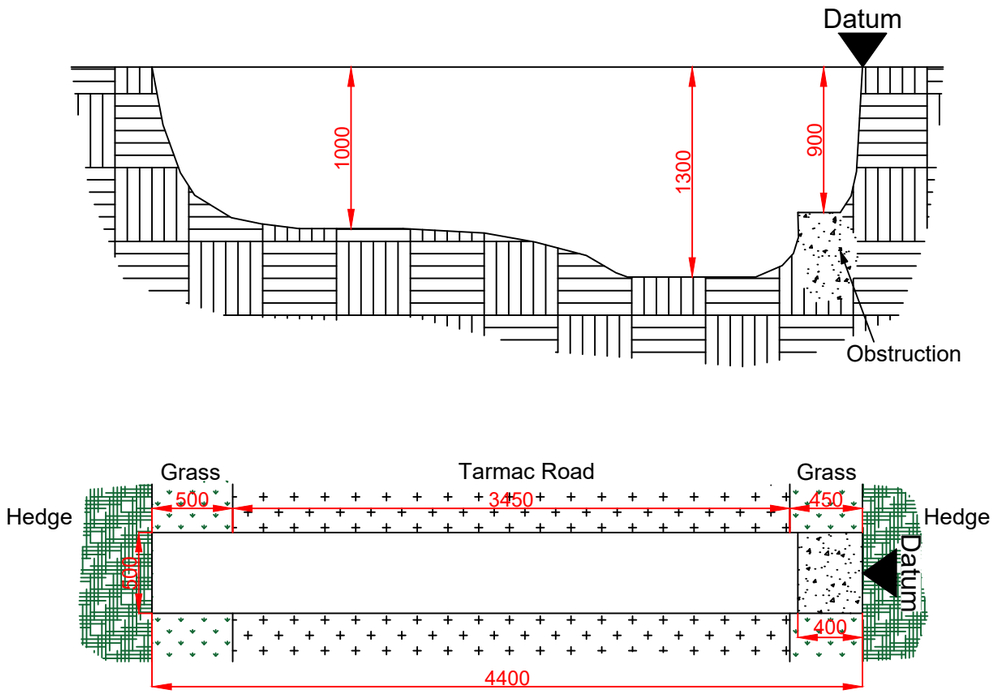
Stability:	Termination Reason	Last Updated
Stable	Terminated at scheduled depth	13/03/2023

AGS

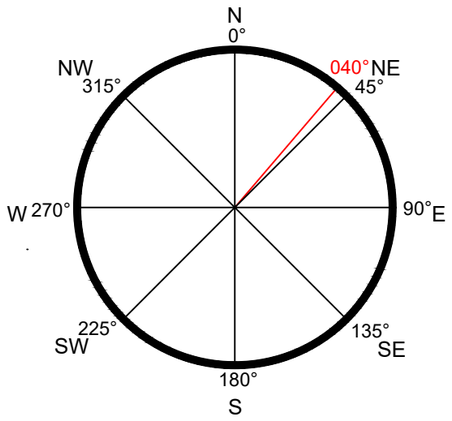
JOB NUMBER: 21-1682	JOB NAME: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	LOCATION: ST-9400

CLIENT: Irish Water	CLIENTS REPRESENTATIVE: Mott MacDonald	CREW: TH	PLANT & EQUIPMENT: 3 Tonne Excavator & Hand Tools

TRENCH: (SECTION & PLAN)



TRENCH - ORIENTATION



TRENCH ORIENTATED : 040° FROM NORTH

COORDINATES: DATUM

EASTING: 580271.79

NORTHING: 674201.92

ELEVATION: 54.00

TRENCH LENGTH (m) : 4.40

TRENCH DEPTH (m) : 1.20

TRENCH WIDTH (m) : 0.50

STABILITY: Stable

GROUNDWATER: Dry

SCALE: NTS@A3

DRAWN: BS

CHECKED: NH

DATE EXCAVATED: 16/08/2022

No:	Type of Service:	Diameter (in mm)	Depth to Top of Service (m)	Distance to Centre of Service (m)	Details/Comments
01					No services found
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					

CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** ST-11650
Coordinates 581782.72 E 675752.99 N	**Client:** Irish Water		
Method: Slit Trenching	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 50.79 mOD	**Date:** 16/08/2022	**Logger:** JG	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			50.71	0.08		MADE GROUND: BITMAC	
			50.49	0.30		MADE GROUND: Grey slightly sandy angular to subangular fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are angular.	
			50.46	0.33		MADE GROUND: BITMAC	
						MADE GROUND: Grey slightly sandy angular to subangular fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are angular.	
0.60 - 0.80	B1		50.19	0.60		MADE GROUND: Greyish brown sandy clayey subangular fine to coarse GRAVEL. Sand is fine to coarse.	
0.80 - 1.20	B2		49.99	0.80		Firm light blue mottled orangish brown slightly sandy slightly gravelly silty CLAY with occasional decayed fine to medium blue grey sand.	
			49.59	1.20		End of trial pit at 1.20m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.20
Width: 0.45
Length: 6.10

Remarks:
No groundwater encountered

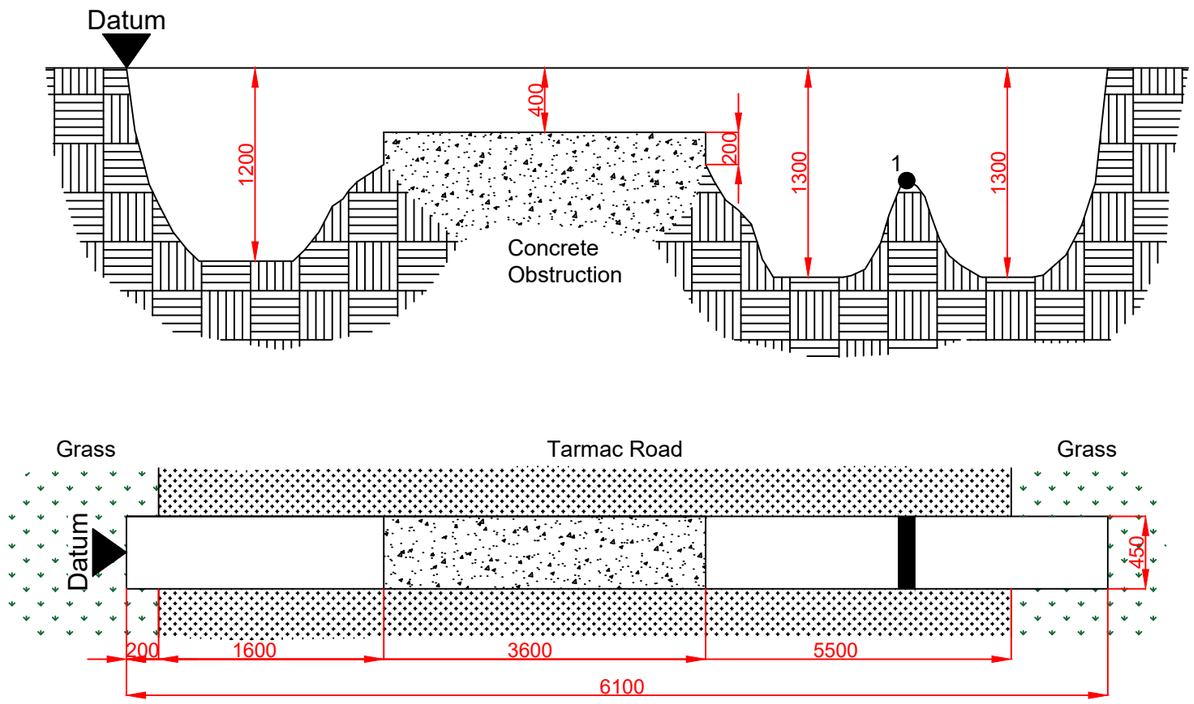
Stability:	Termination Reason	Last Updated
Stable	Terminated at scheduled depth	13/03/2023

AGS

JOB NUMBER: 21-1682	JOB NAME: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	LOCATION: ST-11650

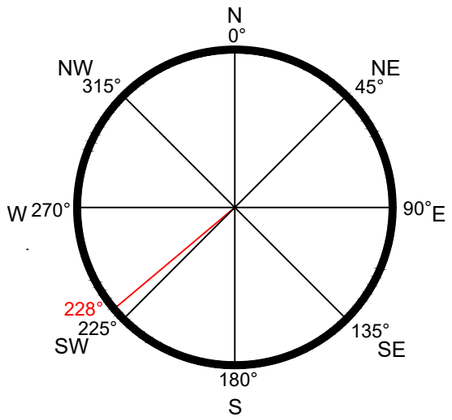
CLIENT:	CLIENTS REPRESENTATIVE:	CREW:	PLANT & EQUIPMENT
Irish Water	Mott MacDonald	TH	3 Tonne Excavator & Hand Tools

TRENCH: (SECTION & PLAN)



No:	Type of Service:	Diameter (in mm)	Depth to Top of Service (m)	Distance to Centre of Service (m)	Details/Comments
01	Unknown	100	0.65	4.85	100mm Black Watermain
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					

TRENCH - ORIENTATION



TRENCH ORIENTATED : 228° FROM NORTH

COORDINATES: DATUM

EASTING: 581782.72

NORTHING: 675752.99

ELEVATION: 50.79

TRENCH LENGTH (m) : 6.10

TRENCH DEPTH (m) : 1.30

TRENCH WIDTH (m) : 0.45

STABILITY: Stable

GROUNDWATER: Dry

SCALE: NTS@A3

DRAWN: BS

CHECKED: NH

DATE EXCAVATED: 16/08/2022

CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** ST-12650A-HS
Coordinates 582215.14 E 676684.77 N	**Client:** Irish Water		
Method: Slit Trenching	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 54.76 mOD	**Date:** 19/08/2022	**Logger:** TMcA	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			54.46	0.30		MADE GROUND: BITMAC	
1.00	B1					MADE GROUND: Brown fine to coarse SAND and subrounded fine to coarse GRAVEL	
			53.26	1.50		End of trial pit at 1.50m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.50
Width: 0.36
Length: 5.40

Remarks: No groundwater encountered

Stability: Stable

Termination Reason: Terminated at scheduled depth

Last Updated: 13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** ST-12650A-Verge
Coordinates 582215.14 E 676684.77 N	**Client:** Irish Water		
Method: Slit Trenching	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 54.76 mOD	**Date:** 19/08/2022	**Logger:** TMcA	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			54.66	0.10		TOPSOIL	
						Stiff brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse.	
0.50	B1						
			53.96	0.80		End of trial pit at 0.80m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 0.80
Width: 0.60
Length: 5.40

Remarks: No groundwater encountered

Stability: Stable

Termination Reason Terminated at 0.80m due to services encountered

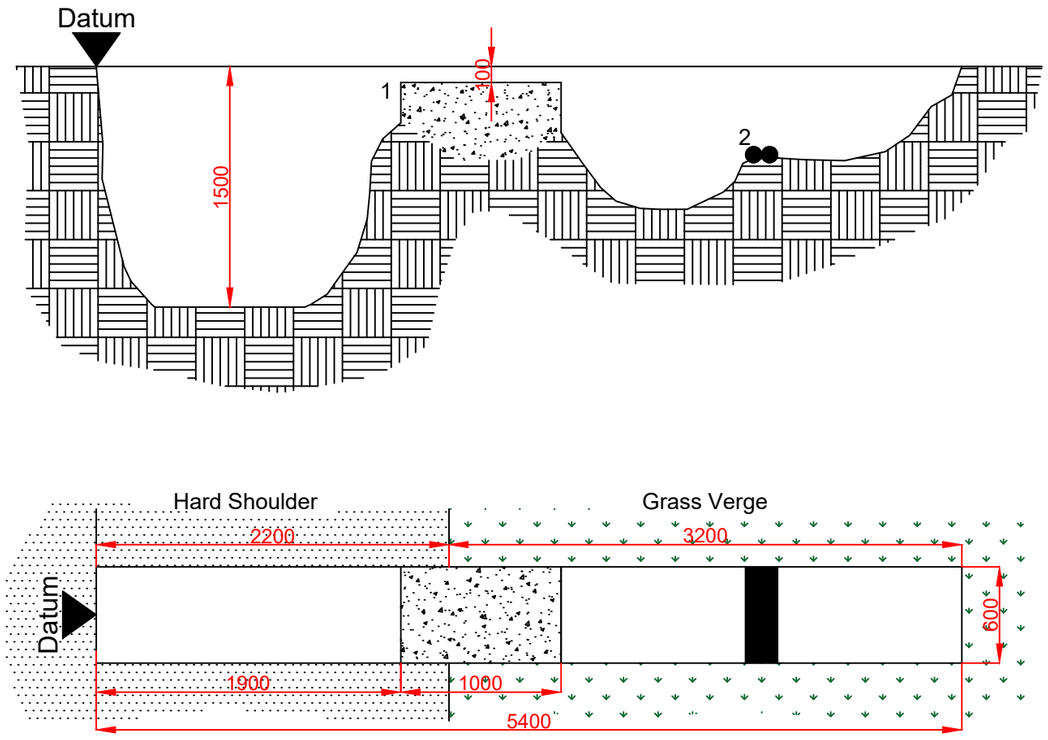
Last Updated 13/03/2023

AGS

JOB NUMBER: 21-1682	JOB NAME: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	LOCATION: ST-12650A

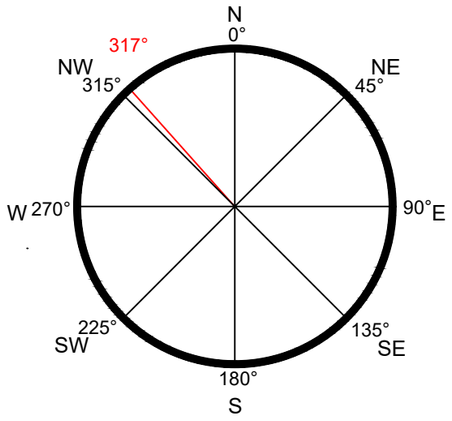
CLIENT:	CLIENTS REPRESENTATIVE:	CREW:	PLANT & EQUIPMENT
Irish Water	Mott MacDonald	TH	3 Tonne Excavator & Hand Tools

TRENCH: (SECTION & PLAN)



No:	Type of Service:	Diameter (in mm)	Depth to Top of Service (m)	Distance to Centre of Service (m)	Details/Comments
01	Gas	1000	0.10	2.90	100mm Black Watermain
02	Eircom	100	0.50	4.10 - 4.20	2x100mm Black Cables Eircom
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					

TRENCH - ORIENTATION



TRENCH ORIENTATED : 317° FROM NORTH

COORDINATES: DATUM

EASTING: 582215.14

NORTHING: 676684.77

ELEVATION: 54.76

TRENCH LENGTH (m) : 5.40

TRENCH DEPTH (m) : 1.50

TRENCH WIDTH (m) : 0.60

STABILITY: Stable

GROUNDWATER: Dry

SCALE: NTS@A3

DRAWN: BS

CHECKED: NH

DATE EXCAVATED: 19/08/2022

CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** ST-12650B
Coordinates 582220.19 E 676679.37 N	**Client:** Irish Water		
Method: Slit Trenching	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8t Wheeled Excavator	**Elevation** 54.95 mOD	**Date:** 21/09/2022	**Logger:** TM	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			54.70	0.25		MADE GROUND: BITMAC	
0.50	B1					MADE GROUND: Brown gravelly slightly clayey fine to coarse SAND with low cobble content. Gravel is subrounded fine to coarse. Cobbles are subrounded.	
1.00	B2						
			53.55	1.40		End of trial pit at 1.40m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

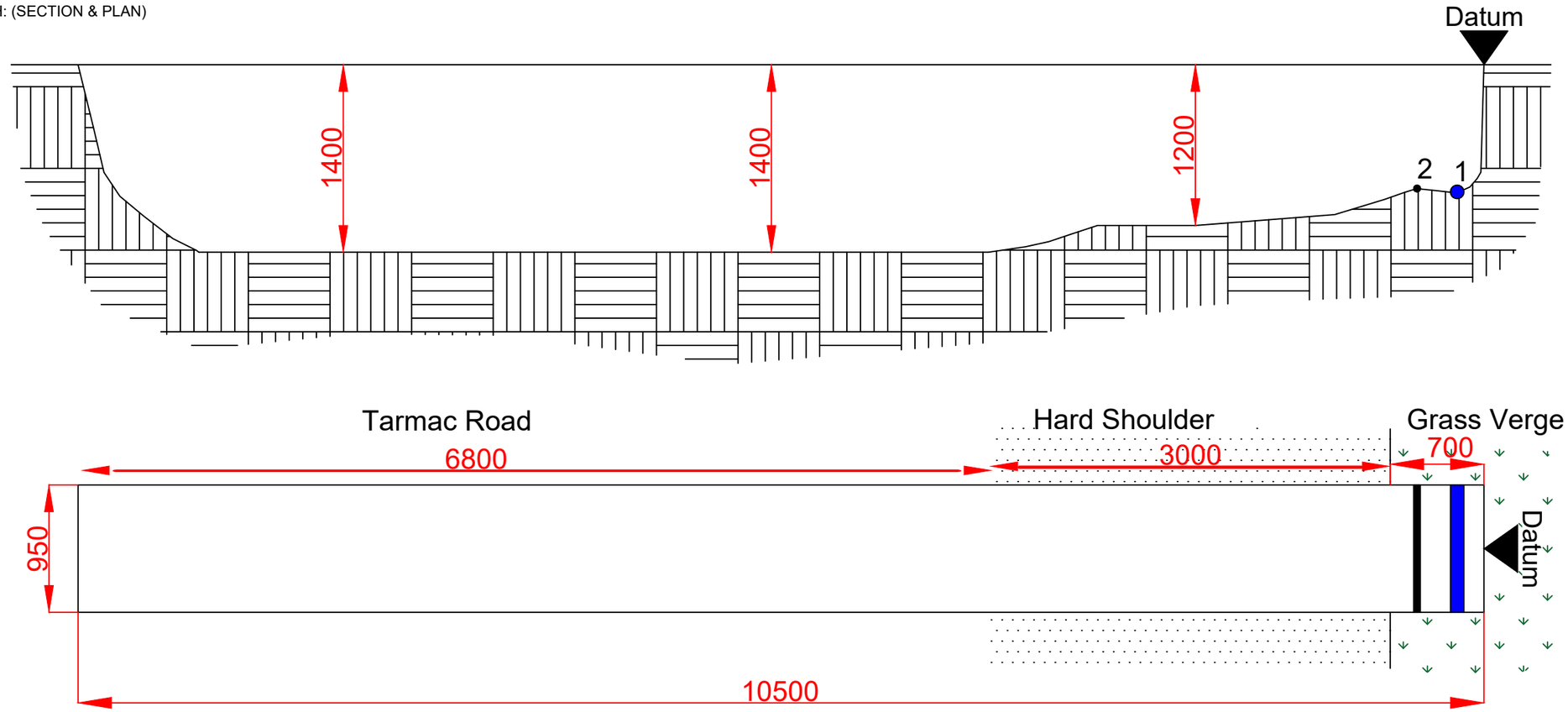
Water Strikes				
Struck at (m)	Remarks			
		Depth: 1.40	**Remarks:** No groundwater encountered	
		Width: 0.95		
		Length: 6.80		
		Stability: Stable	**Termination Reason** Terminated at scheduled depth	**Last Updated** 13/03/2023

AGS

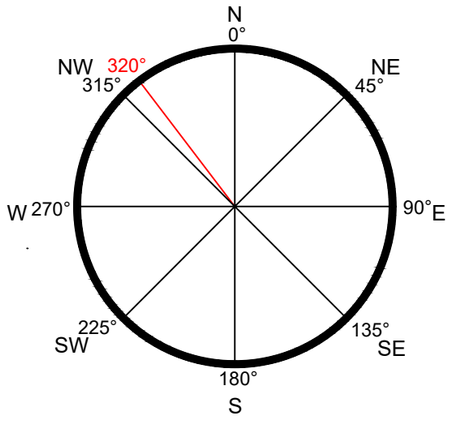
JOB NUMBER: 21-1682	JOB NAME: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	LOCATION: ST-12650B

CLIENT:	CLIENTS REPRESENTATIVE:	CREW:	PLANT & EQUIPMENT
Irish Water	Mott MacDonald	TMcA	3 Tonne Excavator & Hand Tools

TRENCH: (SECTION & PLAN)



TRENCH - ORIENTATION



TRENCH ORIENTATED : 320° FROM NORTH

COORDINATES: DATUM

EASTING: 582220.19

NORTHING: 676679.37

ELEVATION: 54.95

TRENCH LENGTH (m) : 10.50

TRENCH DEPTH (m) : 1.40

TRENCH WIDTH (m) : 0.95

STABILITY: Stable

GROUNDWATER: Dry

SCALE: NTS@A3

DRAWN: BS

CHECKED: NH

DATE EXCAVATED: 21/09/2022

No:	Type of Service:	Diameter (in mm)	Depth to Top of Service (m)	Distance to Centre of Service (m)	Details/Comments
01	Water	100	0.90	0.20	100mm Blue Watermain
02	Unknown	50	0.90	0.50	50mm Black Duct
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					

CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

Project No.	Project Name:	Trial Pit ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	ST-14000
Coordinates 582490.26 E 677918.91 N	**Client:** Irish Water	
Method: Slit Trenching	**Client's Representative:** Mott MacDonald	Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 54.95 mOD / **Date:** 17/08/2022 / **Logger:** JG	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			54.90	0.05		MADE GROUND: BITMAC	
			54.85	0.10		MADE GROUND: Grey angular fine to coarse GRAVEL	
0.20 - 0.80	B1		54.84	0.16		MADE GORUND: BITMAC	
			54.76	0.20		MADE GROUND: Grey angular fine to coarse GRAVEL	
			54.75			MADE GROUND: BITMAC	
						MADE GROUND: Brown sandy clayey subangular fine to coarse GRAVEL with medium cobble content and fragments of concrete. Sand is fine to coarse.	
0.80 - 1.20	B2		54.15	0.80		MADE GROUND: Spongy dark greyish brown and black slightly sandy clayey PEAT. Sand is fine to coarse [Faint organic odour].	
			53.75	1.20		End of trial pit at 1.20m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.20
Width: 0.54
Length: 4.40

Remarks:

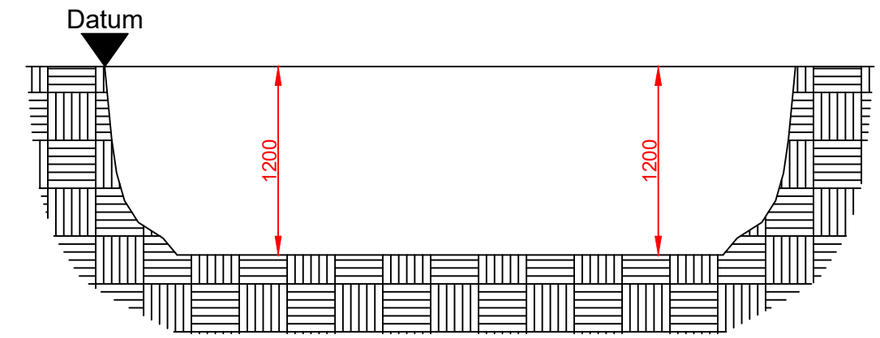
Stability:	Termination Reason	Last Updated
Stable	Terminated at scheduled depth	13/03/2023

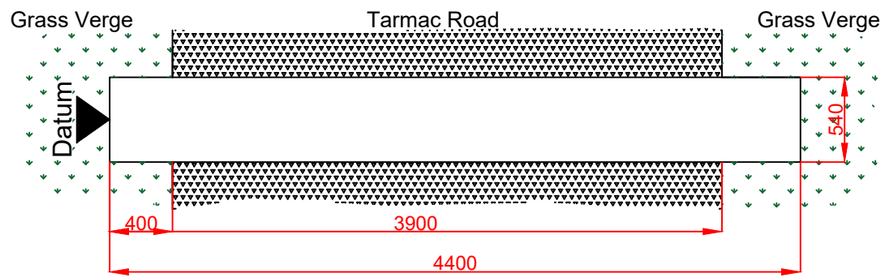
AGS

JOB NUMBER: 21-1682	JOB NAME: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	LOCATION: ST-14000

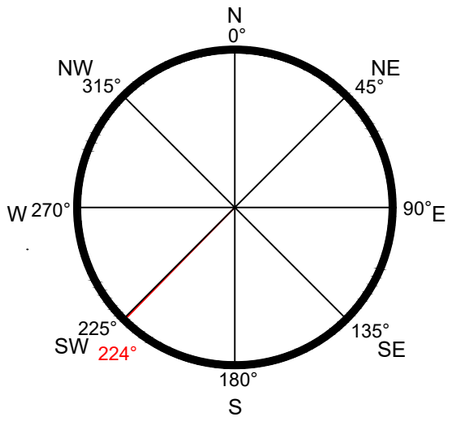
CLIENT: Irish Water	CLIENTS REPRESENTATIVE: Mott MacDonald	CREW: TH	PLANT & EQUIPMENT: 3 Tonne Excavator & Hand Tools

TRENCH: (SECTION & PLAN)





TRENCH - ORIENTATION



TRENCH ORIENTATED : 224° FROM NORTH

COORDINATES: DATUM

EASTING: 582490.26

NORTHING: 677918.91

ELEVATION: 54.95

TRENCH LENGTH (m) : 4.40

TRENCH DEPTH (m) : 1.20

TRENCH WIDTH (m) : 0.54

STABILITY: Stable

GROUNDWATER: Dry

SCALE: NTS@A3

DRAWN: BS

CHECKED: NH

DATE EXCAVATED: 19/08/2022

No:	Type of Service:	Diameter (in mm)	Depth to Top of Service (m)	Distance to Centre of Service (m)	Details/Comments
01					No services found
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					

CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** ST-14550
Coordinates 582750.81 E 678297.39 N	**Client:** Irish Water		
Method: Slit Trenching	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 59.71 mOD	**Date:** 15/08/2022 **Logger:** DC	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			59.59	0.12		MADE GROUND: BITMAC	
						MADE GROUND: Grey angular fine to coarse GRAVEL	
			59.31	0.40			
0.50	B1					Light orangish brown sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.	
1.00	B2						
			58.51	1.20		End of trial pit at 1.20m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.20
Width: 0.50
Length: 5.80

Remarks:
No groundwater encountered

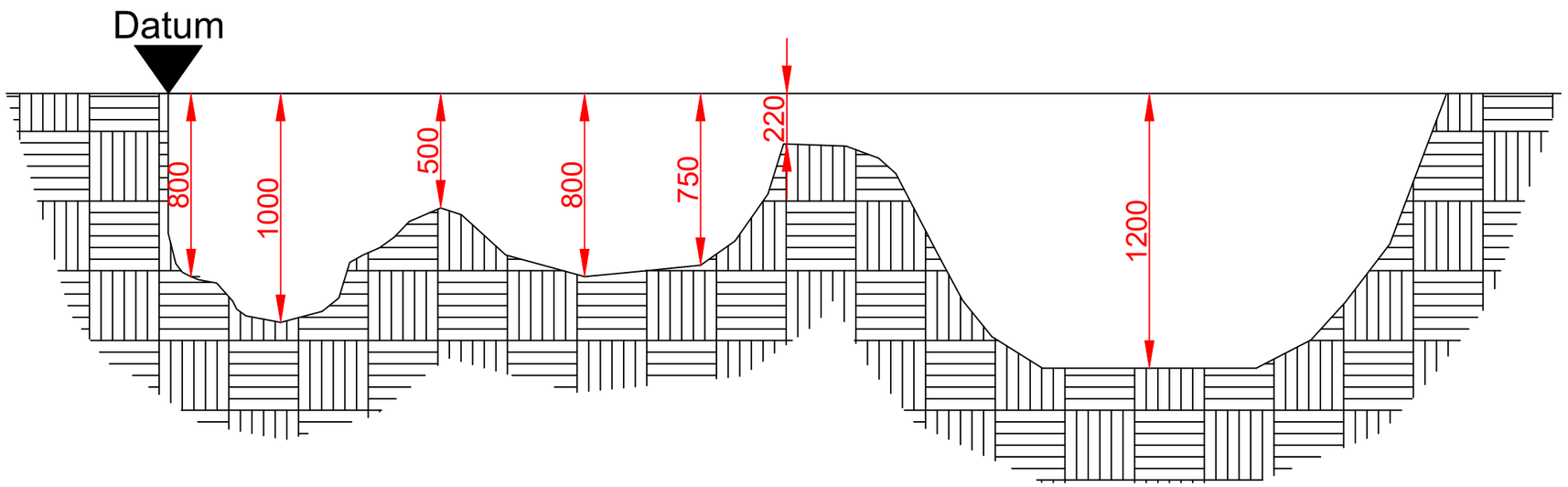
Stability:	Termination Reason	Last Updated
Stable	Terminated at scheduled depth	13/03/2023

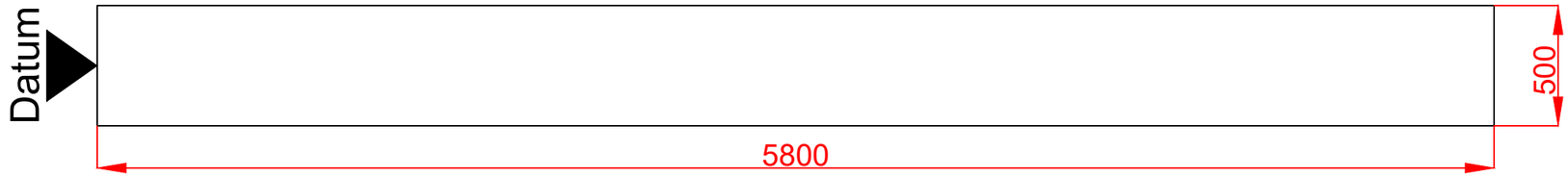
AGS

JOB NUMBER: 21-1682	JOB NAME: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	LOCATION: ST-14550

CLIENT:	CLIENTS REPRESENTATIVE:	CREW:	PLANT & EQUIPMENT
Irish Water	Mott MacDonald	TH	3 Tonne Excavator & Hand Tools

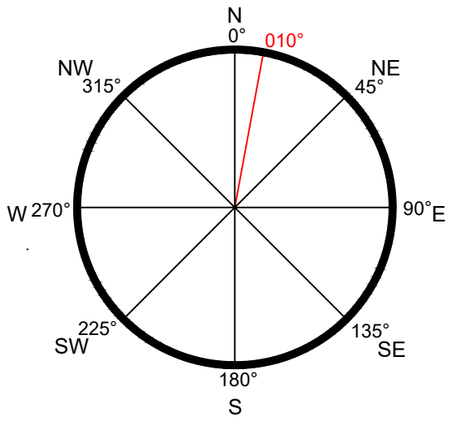
TRENCH: (SECTION & PLAN)





No:	Type of Service:	Diameter (in mm)	Depth to Top of Service (m)	Distance to Centre of Service (m)	Details/Comments
01					No services found
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					

TRENCH - ORIENTATION



TRENCH ORIENTATED : 010° FROM NORTH

COORDINATES: DATUM

EASTING: 582750.81

NORTHING: 678297.39

ELEVATION: 59.71

TRENCH LENGTH (m) : 5.80

TRENCH DEPTH (m) : 1.20

TRENCH WIDTH (m) : 0.50

STABILITY: Stable

GROUNDWATER: Dry

SCALE: NTS@A3

DRAWN: BS

CHECKED: NH

DATE EXCAVATED: 15/08/2022

CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** ST-16850
Coordinates 583359.86 E 680259.91 N	**Client:** Irish Water		
Method: Slit Trenching	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8t Wheeled Excavator	**Elevation** 46.37 mOD	**Date:** 22/09/2022	**Logger:** TM	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			46.07	0.30		MADE GROUND: BITMAC	
			45.77	0.60		MADE GROUND: Stiff orangish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to medium.	
			45.17	1.20		Stiff light brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse.	
						End of trial pit at 1.20m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.20
Width: 1.00
Length: 7.90

Remarks:
No groundwater encountered

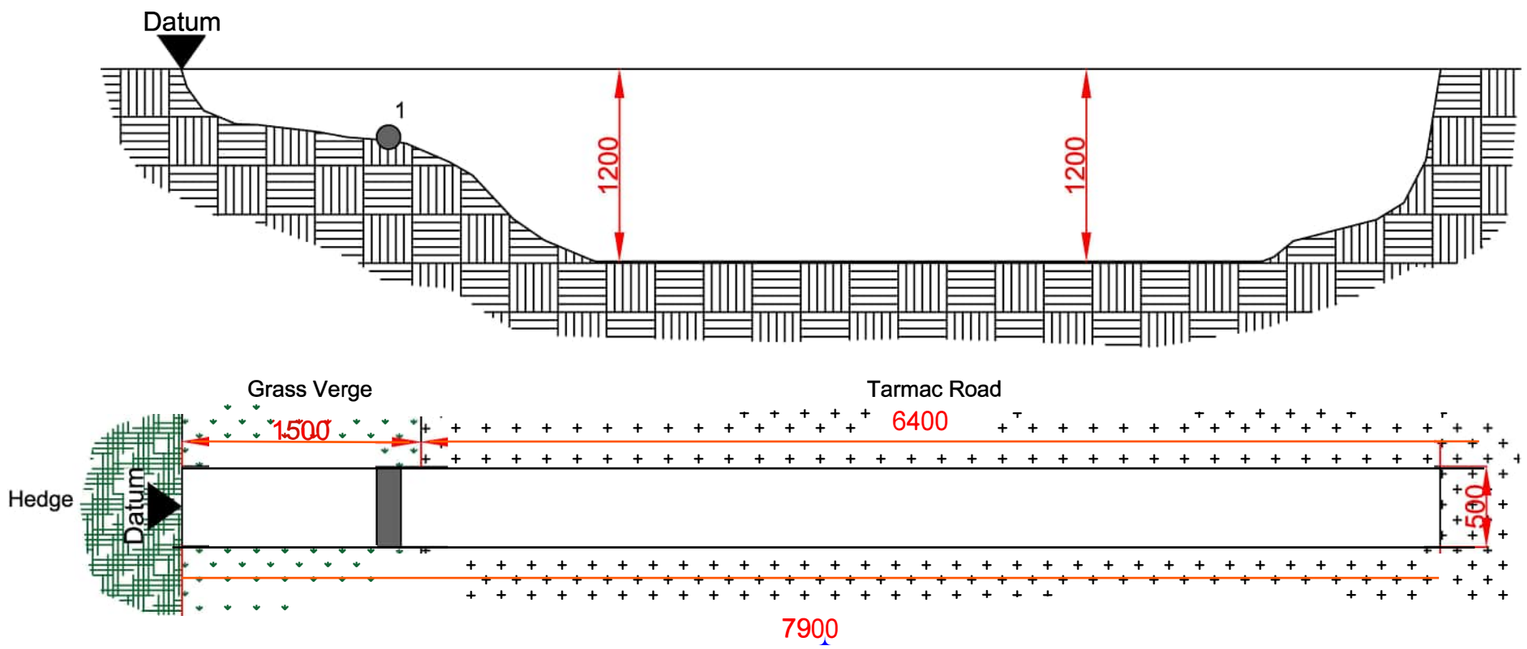
Stability:	Termination Reason	Last Updated
Stable	Terminated at scheduled depth	13/03/2023

AGS

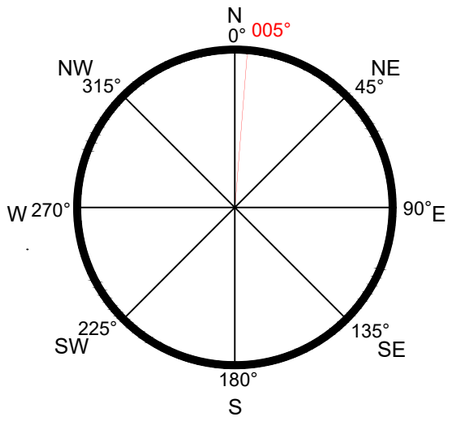
JOB NUMBER: 21-1682	JOB NAME: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	LOCATION: ST-16850

CLIENT: Irish Water	CLIENTS REPRESENTATIVE: Mott MacDonald	CREW: TMcA	PLANT & EQUIPMENT 3 Tonne Excavator & Hand Tools

TRENCH: (SECTION & PLAN)



TRENCH - ORIENTATION



TRENCH ORIENTATED : 005° FROM NORTH

COORDINATES: DATUM

EASTING: 583359.86

NORTHING: 680259.91

ELEVATION: 46.37

TRENCH LENGTH (m) : 7.90

TRENCH DEPTH (m) : 1.20

TRENCH WIDTH (m) : 1.00

STABILITY: Stable

GROUNDWATER: Dry

SCALE: NTS@A3

DRAWN: BS

CHECKED: NH

DATE EXCAVATED: 21/09/2022

No:	Type of Service:	Diameter (in mm)	Depth to Top of Service (m)	Distance to Centre of Service (m)	Details/Comments
01	Water	150	0.35	1.40	6" Watermain
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					

CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** ST-18450
Coordinates 583853.06 E 681917.07 N	**Client:** Irish Water		
Method: Slit Trenching	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 47.61 mOD	**Date:** 16/08/2022	**Logger:** JG	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			47.52	0.08		MADE GROUND: BITMAC	
						MADE GROUND: Grey slightly sandy angular to subangular fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are angular.	
			47.26	0.35		MADE GROUND: BITMAC	
			47.20	0.40		MADE GROUND: Light grey angular fine to coarse GRAVEL with low cobble content.	
0.65 - 0.80	B1		46.96	0.65		Firm brown sandy gravelly silty CLAY with high cobble and boulder content. Sand is fine to coarse. Gravel is subangular fine to coarse.	
			46.40	1.20		End of trial pit at 1.20m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.20
Width: 0.55
Length: 6.90

Remarks:
No groundwater encountered

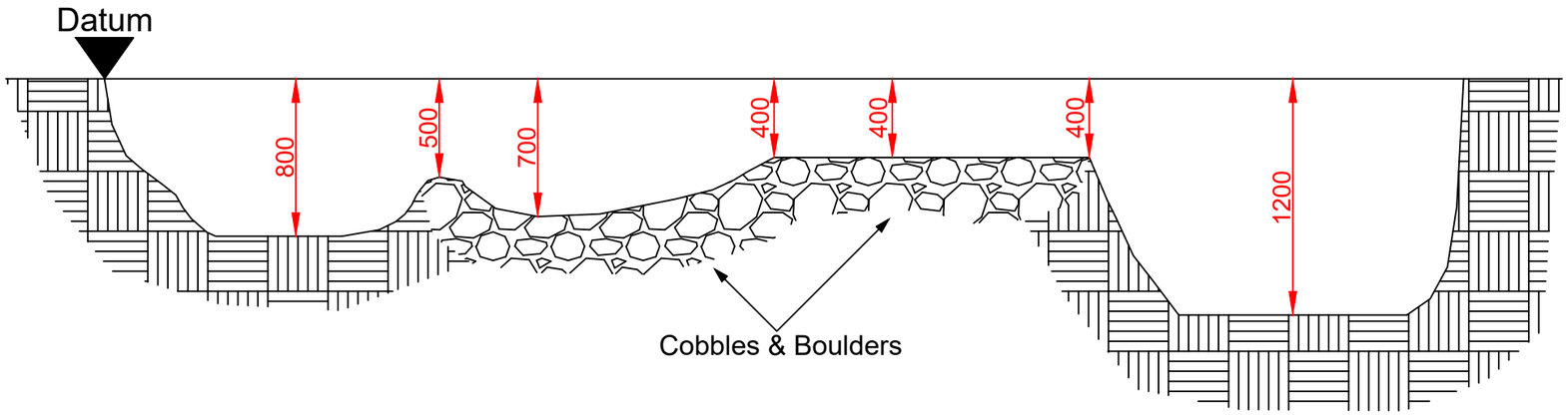
Stability:	Termination Reason	Last Updated
Stable	Terminated at scheduled depth	13/03/2023

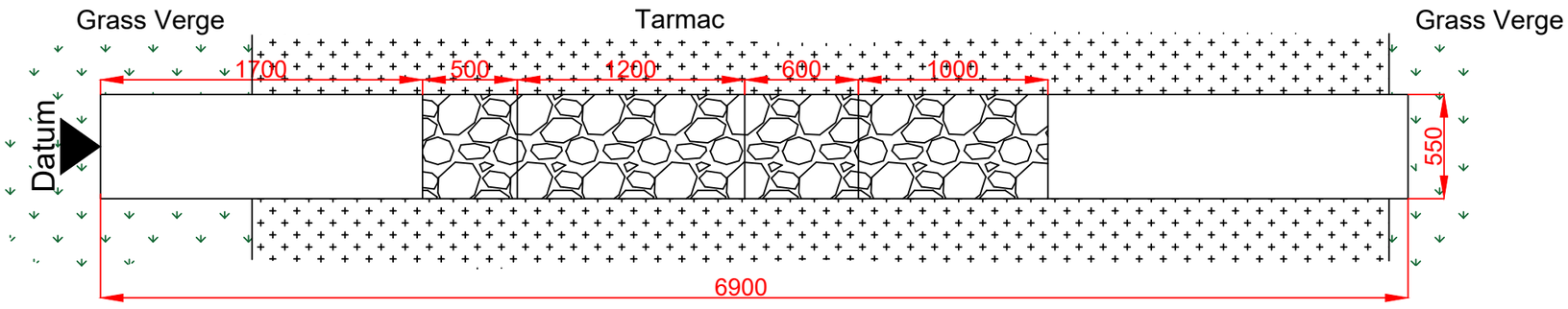
AGS

JOB NUMBER: 21-1682	JOB NAME: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	LOCATION: ST-18450

CLIENT:	CLIENTS REPRESENTATIVE:	CREW:	PLANT & EQUIPMENT
Irish Water	Mott MacDonald	TMcA	3 Tonne Excavator & Hand Tools

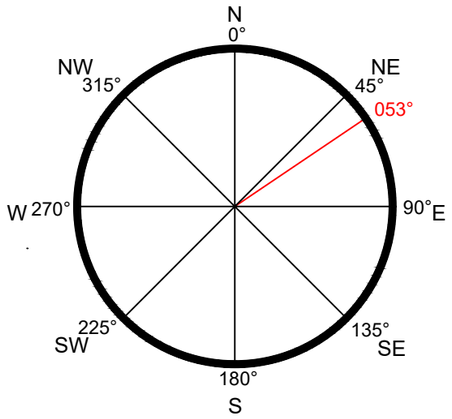
TRENCH: (SECTION & PLAN)





No:	Type of Service:	Diameter (in mm)	Depth to Top of Service (m)	Distance to Centre of Service (m)	Details/Comments
01					No services found
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					

TRENCH - ORIENTATION



TRENCH ORIENTATED : 053° FROM NORTH

COORDINATES: DATUM

EASTING: 583853.06

NORTHING: 681917.07

ELEVATION: 47.61

TRENCH LENGTH (m) : 6.90

TRENCH DEPTH (m) : 1.20

TRENCH WIDTH (m) : 0.55

STABILITY: Stable

GROUNDWATER: Dry

SCALE: NTS@A3

DRAWN: BS

CHECKED: NH

DATE EXCAVATED: 16/08/2022

CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** ST-20650
Coordinates 585396.50 E 683396.94 N	**Client:** Irish Water		
Method: Slit Trenching	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 45.61 mOD	**Date:** 18/08/2022	**Logger:** JG	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			45.56	0.05		MADE GROUND: BITMAC	
			45.41	0.20		MADE GROUND: Grey slightly sandy angular to subangular fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are angular.	
			45.36	0.25		MADE GROUND: BITMAC	
						MADE GROUND: Grey slightly sandy angular to subangular fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are angular.	
0.60 - 1.20	B1		45.01	0.60		Firm brown with orangish brown mottling sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse.	
			44.41	1.20		End of trial pit at 1.20m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.20
Width: 0.45
Length: 4.80

Remarks:
No groundwater encountered

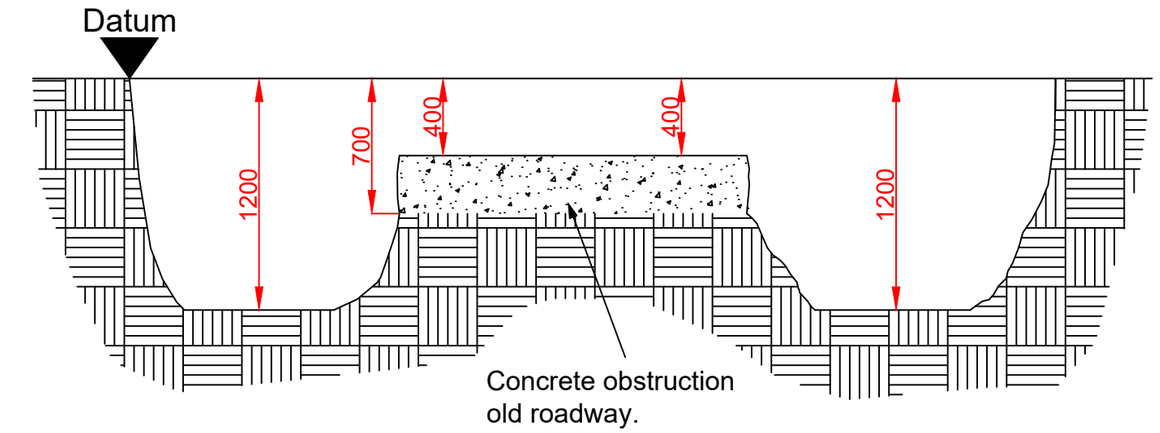
Stability:	Termination Reason	Last Updated
Stable	Terminated at scheduled depth	13/03/2023

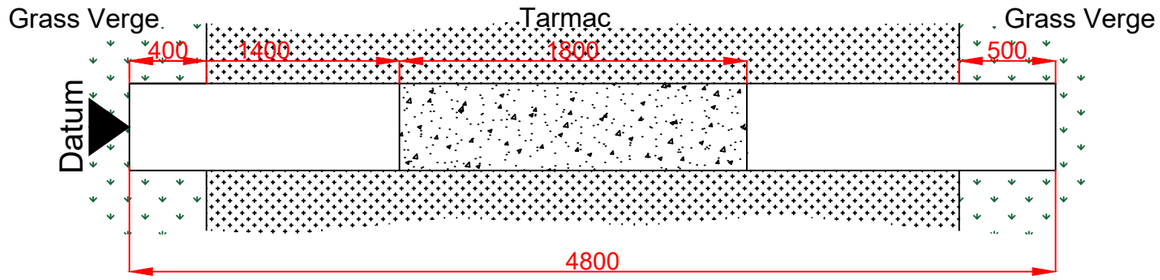
AGS

JOB NUMBER: 21-1682	JOB NAME: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	LOCATION: ST-20650

CLIENT: Irish Water	CLIENTS REPRESENTATIVE: Mott MacDonald	CREW: JG	PLANT & EQUIPMENT: 3 Tonne Excavator & Hand Tools

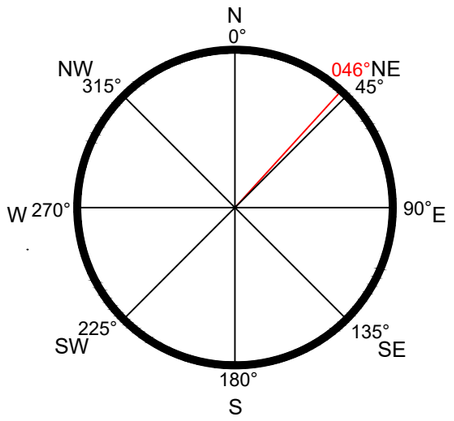
TRENCH: (SECTION & PLAN)





No:	Type of Service:	Diameter (in mm)	Depth to Top of Service (m)	Distance to Centre of Service (m)	Details/Comments
01					No services found
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					

TRENCH - ORIENTATION



TRENCH ORIENTATED : 046° FROM NORTH

COORDINATES: DATUM

EASTING: 585396.50

NORTHING: 683396.94

ELEVATION: 45.61

TRENCH LENGTH (m) : 4.80

TRENCH DEPTH (m) : 1.20

TRENCH WIDTH (m) : 0.45

STABILITY: Stable

GROUNDWATER: Dry

SCALE: NTS@A3

DRAWN: BS

CHECKED: NH

DATE EXCAVATED: 16/08/2022

CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** ST-21400
Coordinates 585792.19 E 684115.11 N	**Client:** Irish Water		
Method: Slit Trenching	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 8t Wheeled Excavator	**Elevation** 61.11 mOD	**Date:** 22/09/2022	**Logger:** TM	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			60.81	0.30		MADE GROUND: BITMAC	
0.50	B1		60.31	0.80		MADE GROUND: Stiff orangish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to medium.	
1.00	B2		59.81	1.30		Stiff brown slightly gravelly very sandy CLAY with medium cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse. Cobbles are subangular.	
						End of trial pit at 1.30m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.30
Width: 1.00
Length: 7.40

Remarks: No groundwater encountered

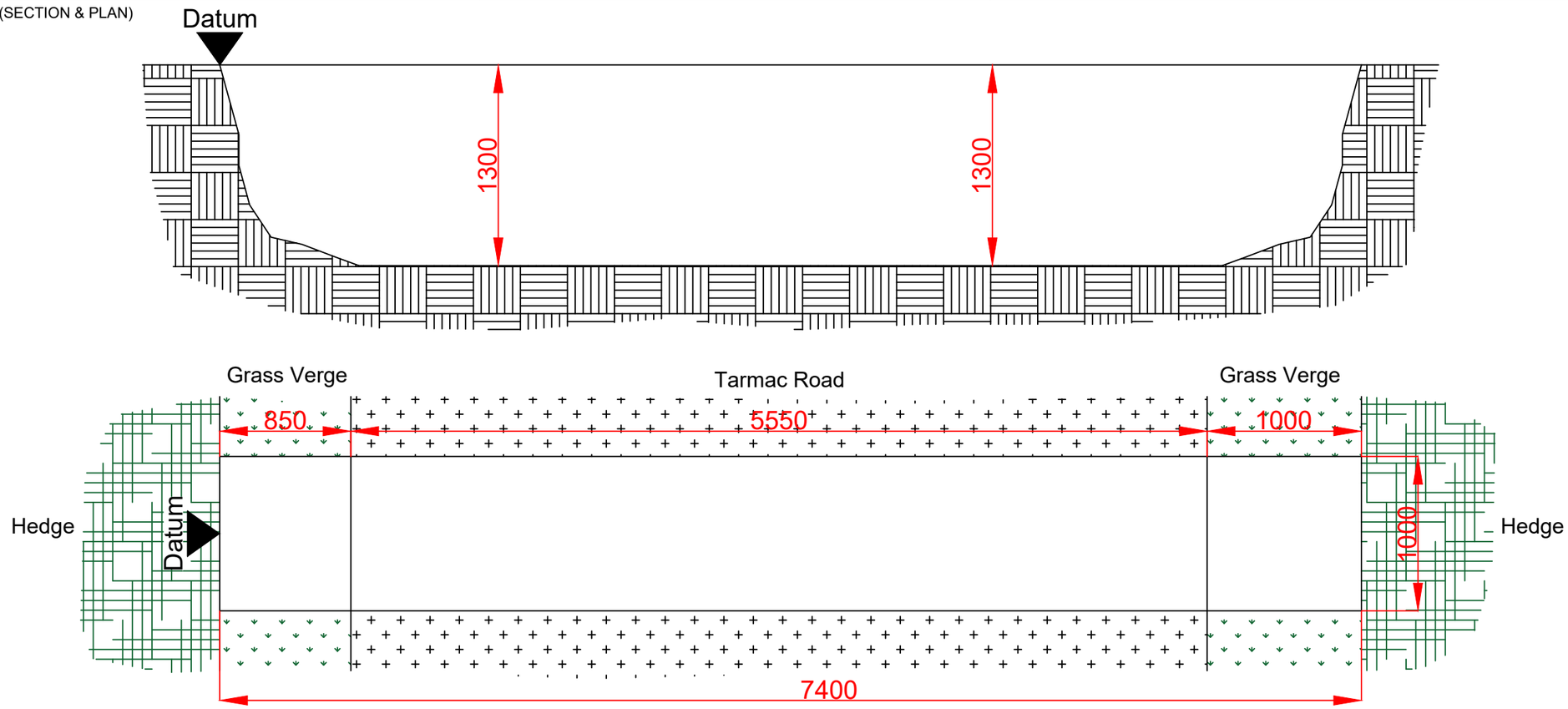
Stability:	Termination Reason	Last Updated
Stable	Terminated at scheduled depth	13/03/2023

AGS

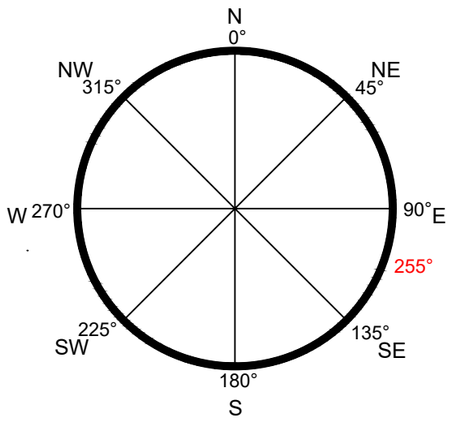
JOB NUMBER: 21-1682	JOB NAME: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	LOCATION: ST-21400

CLIENT:	CLIENTS REPRESENTATIVE:	CREW:	PLANT & EQUIPMENT
Irish Water	Mott MacDonald	TMcA	3 Tonne Excavator & Hand Tools

TRENCH: (SECTION & PLAN)



TRENCH - ORIENTATION



TRENCH ORIENTATED : 255° FROM NORTH

COORDINATES: DATUM

EASTING: 585792.19

NORTHING: 684115.11

ELEVATION: 61.11

TRENCH LENGTH (m) : 7.40

TRENCH DEPTH (m) : 1.30

TRENCH WIDTH (m) : 1.00

STABILITY: Stable

GROUNDWATER: Dry

SCALE: NTS@A3

DRAWN: BS

CHECKED: NH

DATE EXCAVATED: 22/09/2022

No:	Type of Service:	Diameter (in mm)	Depth to Top of Service (m)	Distance to Centre of Service (m)	Details/Comments
01					No services found
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					

CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** ST-22300
Coordinates 586400.16 E 684594.33 N	**Client:** Irish Water		
Method: Slit Trenching	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 66.16 mOD	**Date:** 15/08/2022	**Logger:** JG	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						MADE GROUND: BITMAC	
			65.96	0.20		MADE GROUND: Grey slightly sandy angular to subangular fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are angular.	
0.40 - 0.60	B1		65.76	0.40		Light brown slightly gravelly silty fine to coarse SAND with low cobble content. Gravel is subangular fine to coarse.	
0.60 - 0.90	B2						
			65.26	0.90		End of trial pit at 0.90m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 0.90
Width: 0.45
Length: 6.20

Remarks: No groundwater encountered

Stability: Stable

Termination Reason: Terminated at 0.90m due to service encountered

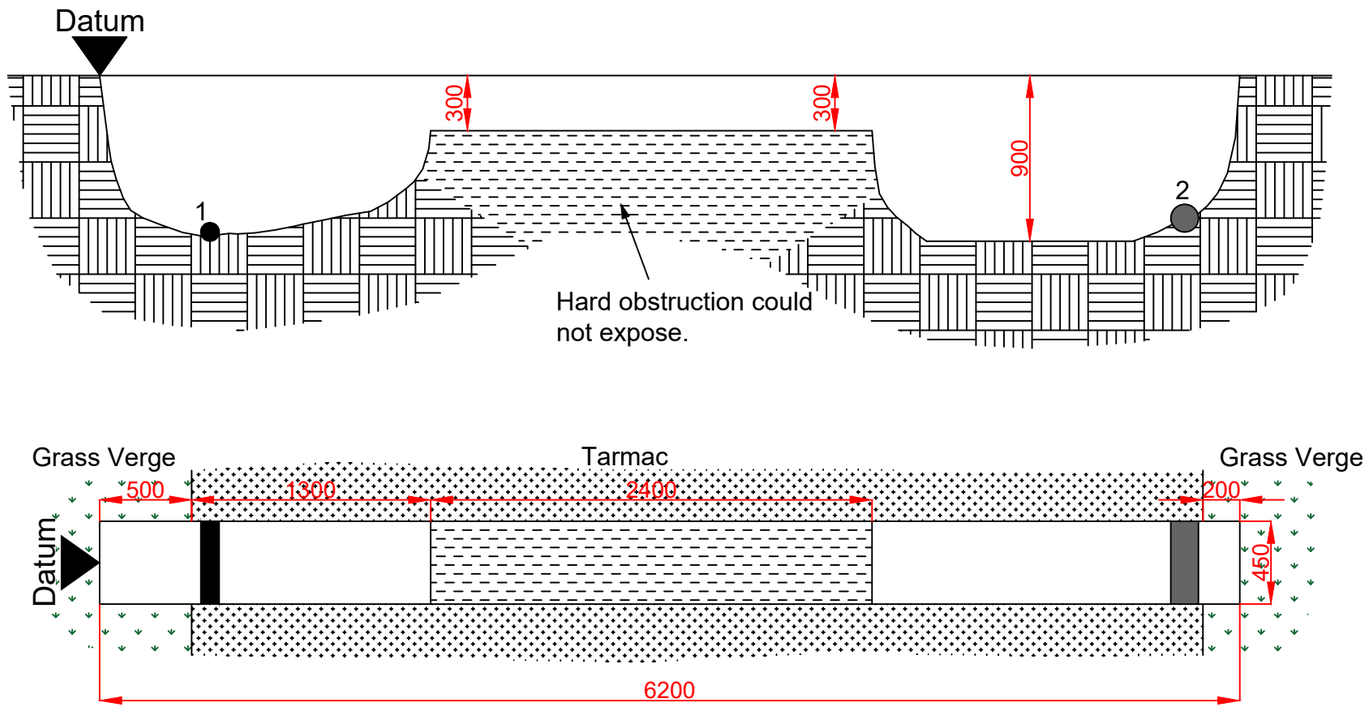
Last Updated: 13/03/2023

AGS

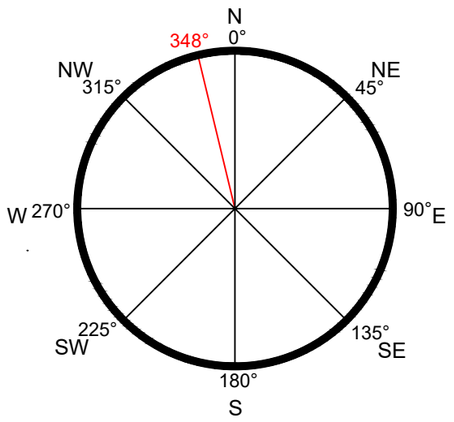
JOB NUMBER: 21-1682	JOB NAME: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	LOCATION: ST-22300

CLIENT: Irish Water	CLIENTS REPRESENTATIVE: Mott MacDonald	CREW: JG	PLANT & EQUIPMENT 3 Tonne Excavator & Hand Tools

TRENCH: (SECTION & PLAN)



TRENCH - ORIENTATION



TRENCH ORIENTATED : 348° FROM NORTH

COORDINATES: DATUM

EASTING: 586400.16

NORTHING: 684594.33

ELEVATION: 66.16

TRENCH LENGTH (m) : 6.20

TRENCH DEPTH (m) : 0.90

TRENCH WIDTH (m) : 0.45

STABILITY: Stable

GROUNDWATER: Dry

SCALE: NTS@A3

DRAWN: BS

CHECKED: NH

DATE EXCAVATED: 15/08/2022

No:	Type of Service:	Diameter (in mm)	Depth to Top of Service (m)	Distance to Centre of Service (m)	Details/Comments
01	Watermain	100	0.80	0.60	100mm Black Watermain
02	Watermain	150	0.70	5.90	150mm Watermain
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					

CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** ST-23880
Coordinates 586893.22 E 686023.31 N	**Client:** Irish Water		
Method: Slit Trenching	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 73.71 mOD	**Date:** 16/08/2022	**Logger:** TMcA	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						Very stiff light brown slightly sandy slightly gravelly CLAY with high cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse.	
0.50	B1		73.21	0.50		Very stiff brown slightly sandy slightly gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse. Cobbles are subrounded.	
1.20	B2		72.51	1.20		End of trial pit at 1.20m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.20
Width: 0.50
Length: 2.80

Remarks: No groundwater encountered

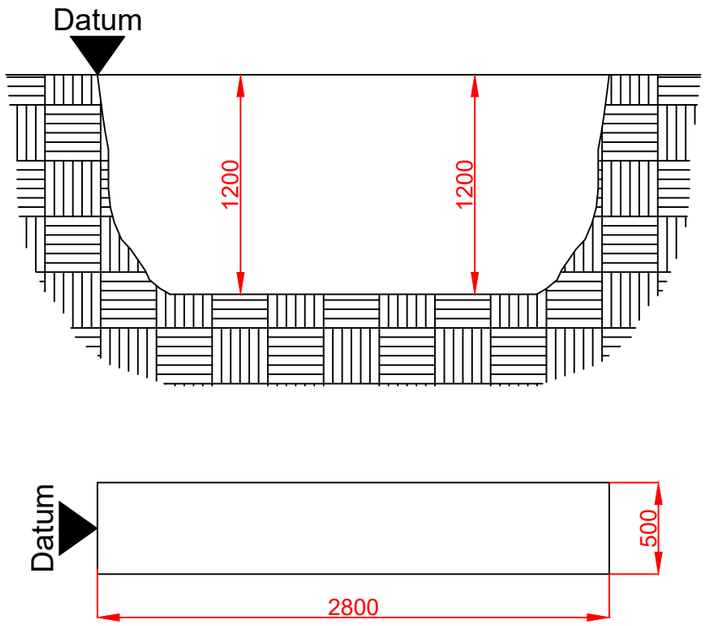
Stability:	Termination Reason	Last Updated
Stable	Terminated at scheduled depth	13/03/2023

AGS

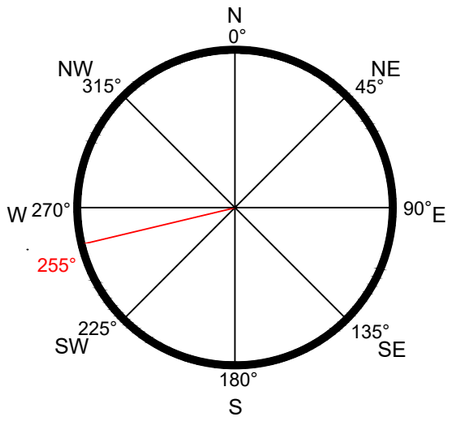
JOB NUMBER: 21-1682	JOB NAME: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	LOCATION: ST-23880

CLIENT: Irish Water	CLIENTS REPRESENTATIVE: Mott MacDonald	CREW: JG	PLANT & EQUIPMENT 3 Tonne Excavator & Hand Tools

TRENCH: (SECTION & PLAN)



TRENCH - ORIENTATION



TRENCH ORIENTATED : 255° FROM NORTH

COORDINATES: DATUM

EASTING: 586893.10

NORTHING: 686023.31

ELEVATION: 73.71

TRENCH LENGTH (m) : 2.80

TRENCH DEPTH (m) : 1.20

TRENCH WIDTH (m) : 0.50

STABILITY: Stable

GROUNDWATER: Dry

SCALE: NTS@A3

DRAWN: BS

CHECKED: NH

DATE EXCAVATED: 16/08/2022

No:	Type of Service:	Diameter (in mm)	Depth to Top of Service (m)	Distance to Centre of Service (m)	Details/Comments
01					No services found
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					

CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** ST-26150
Coordinates 587600.41 E 687865.75 N	**Client:** Irish Water		
Method: Slit Trenching	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 70.40 mOD	**Date:** 16/08/2022	**Logger:** JG	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			70.35	0.05		MADE GROUND: BITMAC	
						MADE GROUND: Grey slightly sandy angular to subangular fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are angular.	
0.50 - 1.20	B1		69.90	0.50		Firm brown sandy gravelly silty CLAY with low cobble content. Sand is fin to coarse. Gravel i subangular fine to coarse.	
			69.20	1.20		End of trial pit at 1.20m	

0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.20
Width: 0.45
Length: 7.50

Remarks:
No groundwater encountered

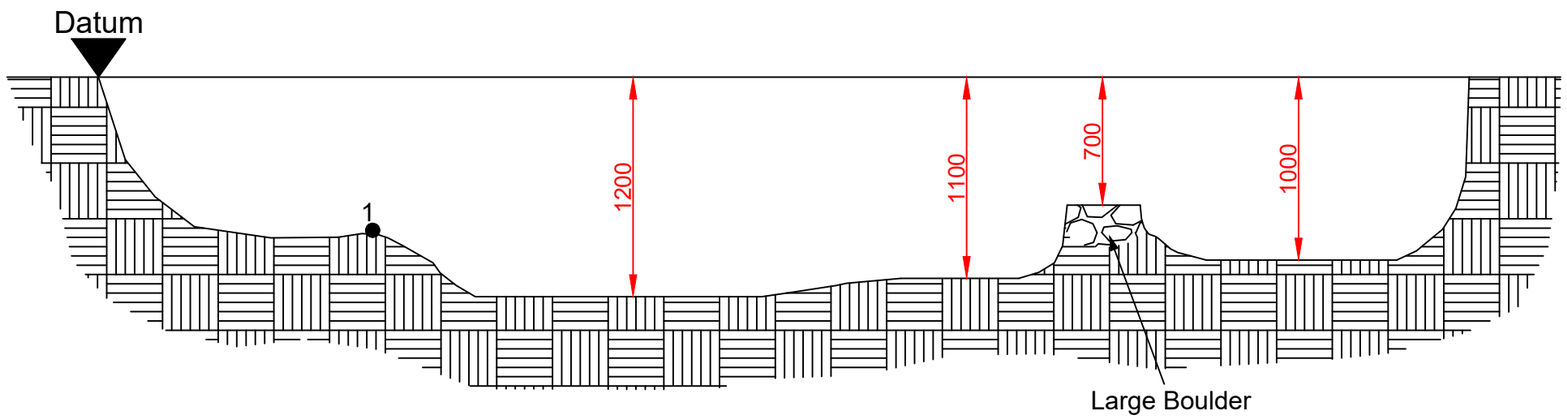
Stability:	Termination Reason	Last Updated
Stable	Terminated at scheduled depth	13/03/2023

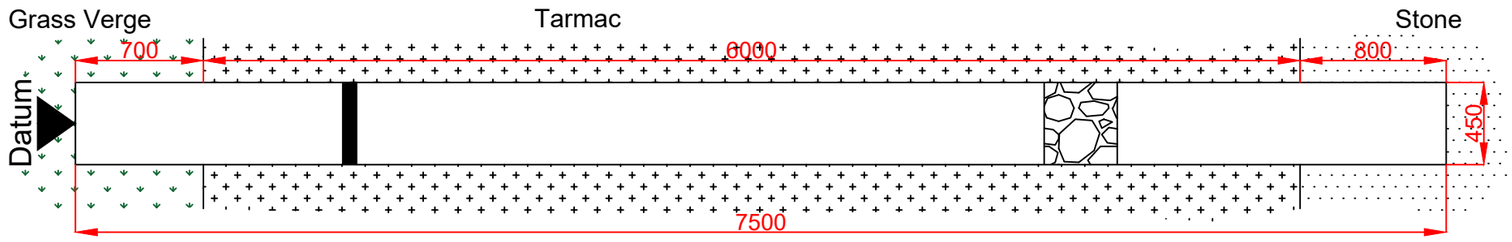
AGS

JOB NUMBER: 21-1682	JOB NAME: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	LOCATION: ST-26150

CLIENT: Irish Water	CLIENTS REPRESENTATIVE: Mott MacDonald	CREW: JG	PLANT & EQUIPMENT 3 Tonne Excavator & Hand Tools

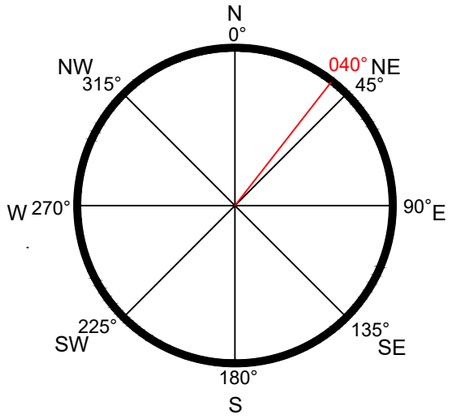
TRENCH: (SECTION & PLAN)





No:	Type of Service:	Diameter (in mm)	Depth to Top of Service (m)	Distance to Centre of Service (m)	Details/Comments
01	Watermain	75	0.80	1.50	75mm Black Watermain
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					

TRENCH - ORIENTATION



TRENCH ORIENTATED : 040° FROM NORTH

COORDINATES: DATUM

EASTING: 587600.41

NORTHING: 687865.75

ELEVATION: 70.40

TRENCH LENGTH (m) : 7.50

TRENCH DEPTH (m) : 1.20

TRENCH WIDTH (m) : 0.45

STABILITY: Stable

GROUNDWATER: Dry

SCALE: NTS@A3

DRAWN: BS

CHECKED: NH

DATE EXCAVATED: 15/08/2022

CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** ST-27700
Coordinates 589101.06 E 687768.60 N	**Client:** Irish Water		
Method: Slit Trenching	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 88.51 mOD	**Date:** 16/08/2022	**Logger:** JG	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.10 - 1.20	B1		88.41	0.10		TOPSOIL	
						Firm brown with orangish brown mottling sandy gravelly silty CLAY with medium cobble and boulder content. Sand is fine to coase. Gravel is subangular fie to coarse.	
			87.31	1.20		End of trial pit at 1.20m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.20
Width: 0.45
Length: 2.10

Remarks:
No groundwater encountered

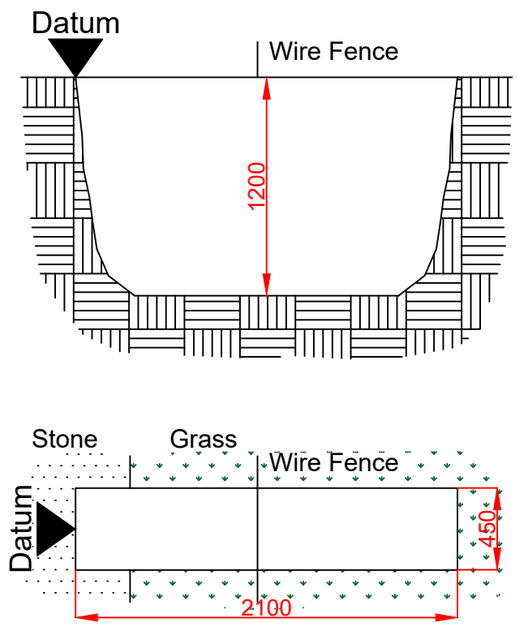
Stability:	Termination Reason	Last Updated
Unstable	Terminated at scheduled depth	13/03/2023

AGS

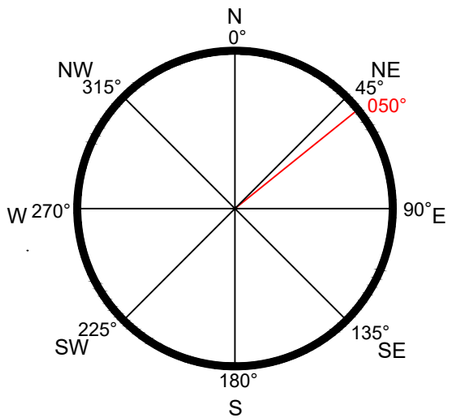
JOB NUMBER: 21-1682	JOB NAME: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	LOCATION: ST-27700

CLIENT: Irish Water	CLIENTS REPRESENTATIVE: Mott MacDonald	CREW: JG	PLANT & EQUIPMENT 3 Tonne Excavator & Hand Tools

TRENCH: (SECTION & PLAN)



TRENCH - ORIENTATION



TRENCH ORIENTATED : 050° FROM NORTH

COORDINATES: DATUM

EASTING: 589101.06

NORTHING: 687768.60

ELEVATION: 88.51

TRENCH LENGTH (m) : 2.10

TRENCH DEPTH (m) : 1.20

TRENCH WIDTH (m) : 0.45

STABILITY: Stable

GROUNDWATER: Dry

SCALE: NTS@A3

DRAWN: BS

CHECKED: NH

DATE EXCAVATED: 15/08/2022

No:	Type of Service:	Diameter (in mm)	Depth to Top of Service (m)	Distance to Centre of Service (m)	Details/Comments
01					No services found
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					

CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** ST-29950
Coordinates 590890.32 E 688821.72 N	**Client:** Irish Water		
Method: Slit Trenching	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 77.76 mOD	**Date:** 15/08/2022	**Logger:** JG	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			77.70	0.05		MADE GROUND: BITMAC	
			77.60	0.15		MADE GROUND: Grey slightly sandy angular to subangular fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are angular.	
			77.56	0.20		MADE GROUND: BITMAC	
0.50 - 1.20	B1		77.26	0.50		MADE GROUND: Grey slightly sandy angular to subangular fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are angular.	
						Brown slightly gravelly clayey fine to coarse SAND with low cobble content. Gravel is subangular fine to coarse.	
			76.56	1.20		End of trial pit at 1.20m	

0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.20
Width: 0.45
Length: 5.20

Remarks:
No groundwater encountered

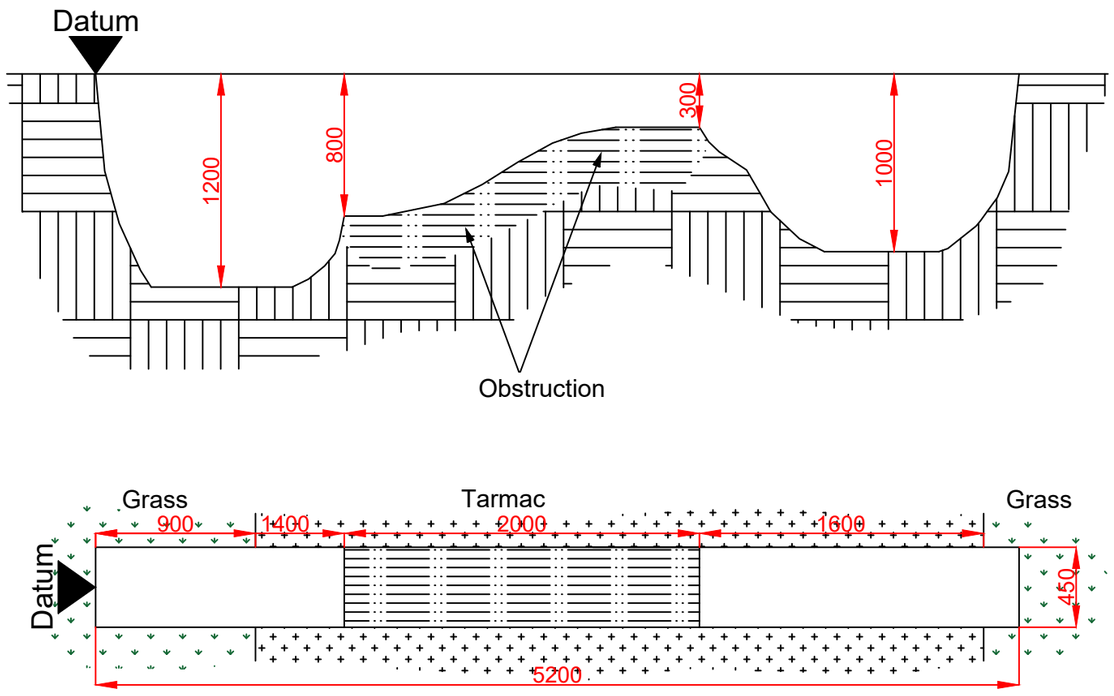
Stability:	Termination Reason	Last Updated
Stable	Terminated at scheduled depth	13/03/2023

AGS

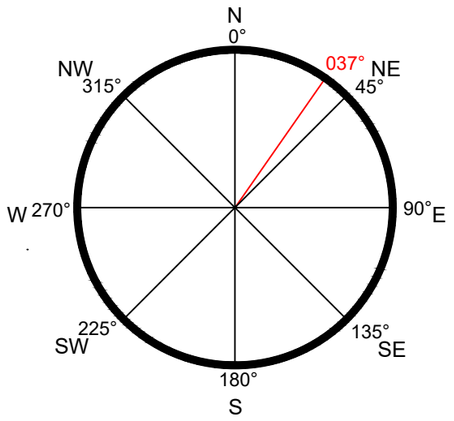
JOB NUMBER: 21-1682	JOB NAME: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	LOCATION: ST-29950

CLIENT: Irish Water	CLIENTS REPRESENTATIVE: Mott MacDonald	CREW: JG	PLANT & EQUIPMENT 3 Tonne Excavator & Hand Tools

TRENCH: (SECTION & PLAN)



TRENCH - ORIENTATION



TRENCH ORIENTATED : 037° FROM NORTH

COORDINATES: DATUM

EASTING: 590890.32

NORTHING: 688821.72

ELEVATION: 77.76

TRENCH LENGTH (m) : 5.20

TRENCH DEPTH (m) : 1.20

TRENCH WIDTH (m) : 0.45

STABILITY: Stable

GROUNDWATER: Dry

SCALE: NTS@A3

DRAWN: BS

CHECKED: NH

DATE EXCAVATED: 15/08/2022

No:	Type of Service:	Diameter (in mm)	Depth to Top of Service (m)	Distance to Centre of Service (m)	Details/Comments
01					No services found
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					

CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** ST-30075
Coordinates 590986.39 E 688901.39 N	**Client:** Irish Water		
Method: Slit Trenching	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 76.66 mOD	**Date:** 15/08/2022	**Logger:** JG	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			76.61	0.05		MADE GROUND: BITMAC	
0.20 - 0.30	B1		76.51	0.15		MADE GROUND: Grey slightly sandy angular to subangular fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are angular.	
0.30 - 1.10	B2		76.46	0.20		MADE GROUND: BITMAC	
			76.36	0.30		MADE GROUND: Grey slightly sandy angular to subangular fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are angular.	
		Water strike at 0.50m				Light brown gravelly clayey fine to coarse SAND with low cobble content. Gravel is subangular fine to coarse.	▼
			75.56	1.10		End of trial pit at 1.10m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes

Struck at (m)	Remarks
0.50	Water strike at 0.50m

Depth: 1.10
Width: 0.45
Length: 4.10

Remarks:

Stability: Unstable

Termination Reason: Terminated at 1.10m due to pit becoming unstable

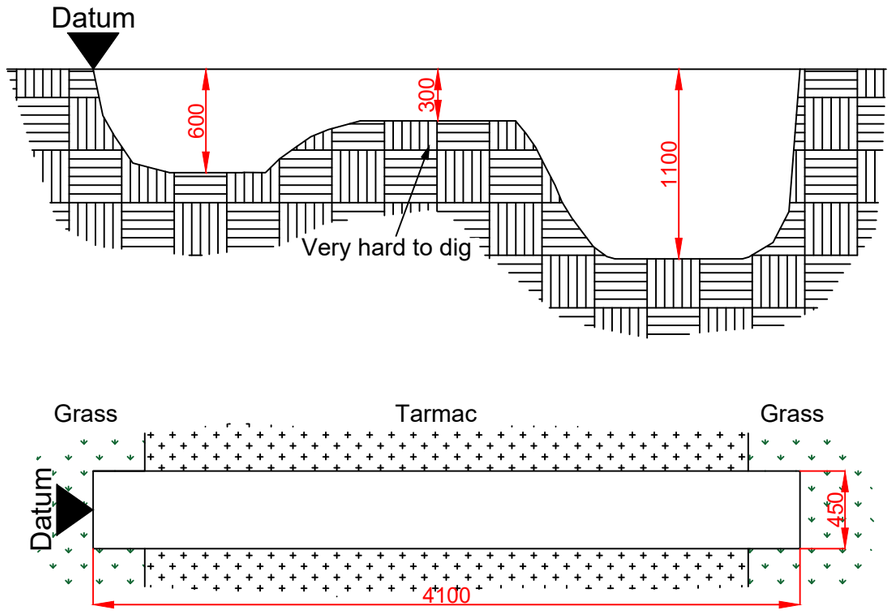
Last Updated: 13/03/2023

AGS

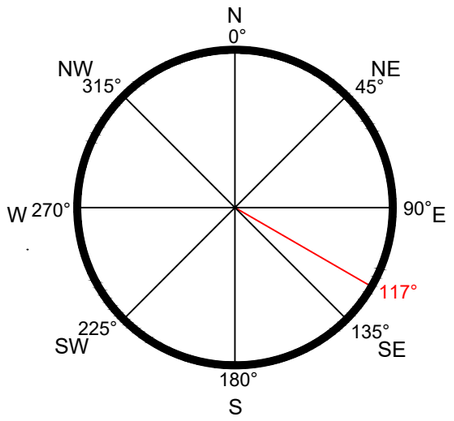
JOB NUMBER: 21-1682	JOB NAME: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	LOCATION: ST-30075

CLIENT: Irish Water	CLIENTS REPRESENTATIVE: Mott MacDonald	CREW: JG	PLANT & EQUIPMENT 3 Tonne Excavator & Hand Tools

TRENCH: (SECTION & PLAN)



TRENCH - ORIENTATION



TRENCH ORIENTATED : 117° FROM NORTH

COORDINATES: DATUM

EASTING: 590986.39

NORTHING: 688901.39

ELEVATION: 76.66

TRENCH LENGTH (m) : 4.10

TRENCH DEPTH (m) : 1.10

TRENCH WIDTH (m) : 0.45

STABILITY: Unstable

GROUNDWATER: 0.50 at West Side
Dry at East Side

SCALE: NTS@A3

DRAWN: BS

CHECKED: NH

DATE EXCAVATED: 15/08/2022

No:	Type of Service:	Diameter (in mm)	Depth to Top of Service (m)	Distance to Centre of Service (m)	Details/Comments
01					No services found
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					

CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** ST-31300
Coordinates 592198.76 E 688915.33 N	**Client:** Irish Water		
Method: Slit Trenching	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 1t Tracked Excavator	**Elevation** 78.07 mOD	**Date:** 15/08/2022	**Logger:** JG	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			77.97	0.10		MADE GROUND: BITMAC	
0.30 - 0.70	B1		77.77	0.30		MADE GROUND: Grey slightly sandy angular to subangular fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are angular.	
0.70 - 1.20	B2					Light brown slightly gravelly clayey fine to coarse SAND with low cobble content, roots and rootlets. Gravel is subrounded fine to coarse.	
			76.87	1.20		End of trial pit at 1.20m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.20
Width: 0.45
Length: 4.40

Remarks:
No groundwater encountred

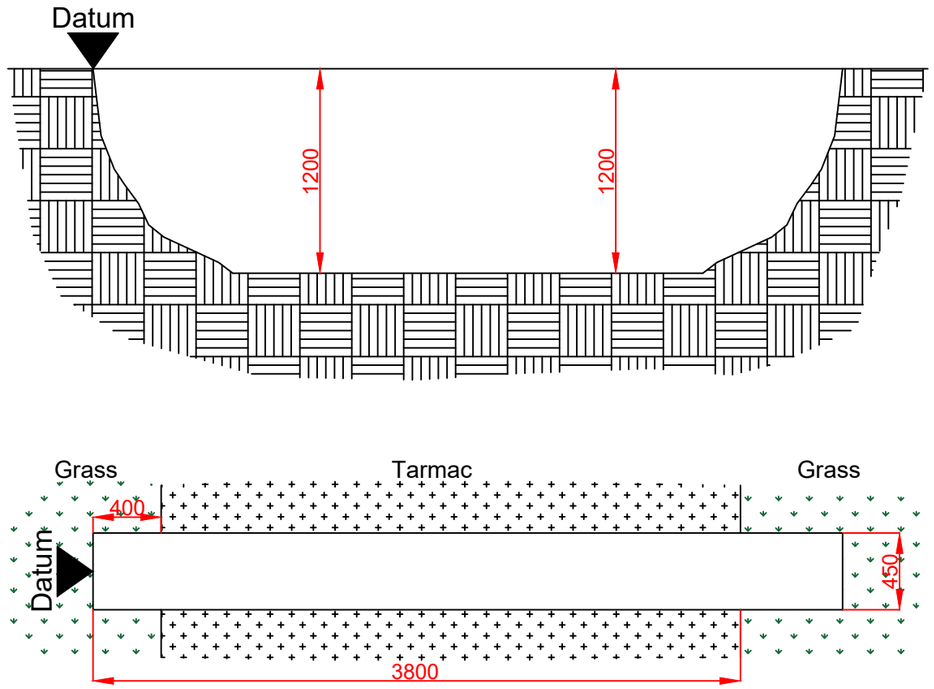
Stability:	Termination Reason	Last Updated
Stable	Terminated at scheduled depth	13/03/2023

AGS

JOB NUMBER: 21-1682	JOB NAME: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	LOCATION: ST-31300

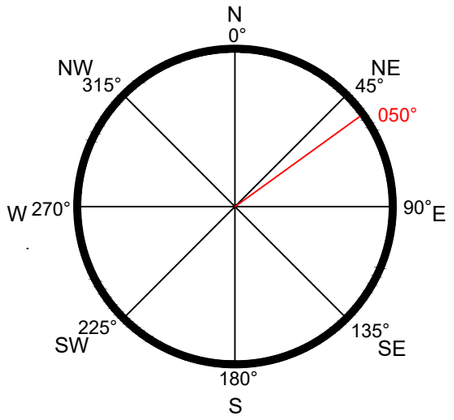
CLIENT:	CLIENTS REPRESENTATIVE:	CREW:	PLANT & EQUIPMENT
Irish Water	Mott MacDonald	JG	3 Tonne Excavator & Hand Tools

TRENCH: (SECTION & PLAN)



No:	Type of Service:	Diameter (in mm)	Depth to Top of Service (m)	Distance to Centre of Service (m)	Details/Comments
01					No services found
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					

TRENCH - ORIENTATION



TRENCH ORIENTATED : 050° FROM NORTH

COORDINATES: DATUM

EASTING: 592198.76

NORTHING: 688915.33

ELEVATION: 78.07

TRENCH LENGTH (m) : 3.80

TRENCH DEPTH (m) : 1.20

TRENCH WIDTH (m) : 0.45

STABILITY: Stable

GROUNDWATER: Dry

SCALE: NTS@A3

DRAWN: BS

CHECKED: NH

DATE EXCAVATED: 15/08/2022

CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

Project No.	Project Name:	Trial Pit ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	ST-33350
Coordinates 594107.08 E 689160.85 N	**Client:** Irish Water	
Method: Slit Trenching	**Client's Representative:** Mott MacDonald	Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 72.78 mOD / **Date:** 15/08/2022 / **Logger:** DC	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			72.68	0.10		MADE GROUND: BITMAC	
			72.58	0.20		MADE GROUND: Grey angular fine to coarse GRAVEL	
0.60	B1					Light greyish brown slightly clayey sandy subrounded fine to coarse GRAVEL with low cobble and boulder content. Sand is fine to coarse.	
1.00	B2						
			71.63	1.15		End of trial pit at 1.15m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.15
Width: 0.60
Length: 4.30

Remarks: No groundwater encountered

Stability: Stable

Termination Reason: Terminated at scheduled depth

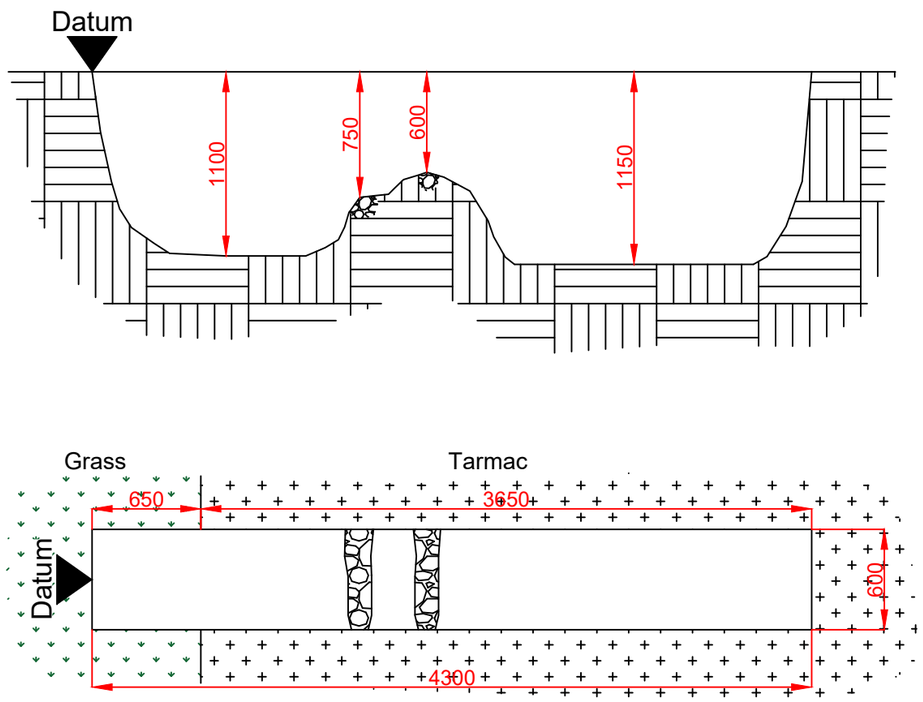
Last Updated: 13/03/2023

AGS

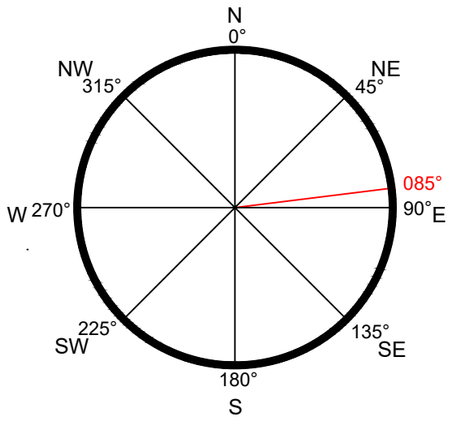
JOB NUMBER: 21-1682	JOB NAME: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	LOCATION: ST-33350

CLIENT: Irish Water	CLIENTS REPRESENTATIVE: Mott MacDonald	CREW: DC	PLANT & EQUIPMENT 3 Tonne Excavator & Hand Tools

TRENCH: (SECTION & PLAN)



TRENCH - ORIENTATION



TRENCH ORIENTATED : 085° FROM NORTH

COORDINATES: DATUM

EASTING: 594107.08

NORTHING: 689160.85

ELEVATION: 72.78

TRENCH LENGTH (m) : 4.30

TRENCH DEPTH (m) : 1.15

TRENCH WIDTH (m) : 0.50

STABILITY: Stable

GROUNDWATER: Dry

SCALE: NTS@A3

DRAWN: BS

CHECKED: NH

DATE EXCAVATED: 15/08/2022

No:	Type of Service:	Diameter (in mm)	Depth to Top of Service (m)	Distance to Centre of Service (m)	Details/Comments
01					No services found
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					

CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** ST-34600
Coordinates 595214.12 E 689633.70 N	**Client:** Irish Water		
Method: Slit Trenching	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 76.70 mOD	**Date:** 16/08/2022 **Logger:** JG	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			76.63	0.07		MADE GROUND: BITMAC	
						MADE GROUND: Grey slightly sandy angular to subangular fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are angular.	
0.40 - 1.00	B1		76.30	0.40		Firm brown with orangish brown mottling slightly sandy slightly gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse.	
1.00 - 1.20	B2		75.70	1.00		Firm greyish brown sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse.	
			75.50	1.20		End of trial pit at 1.20m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

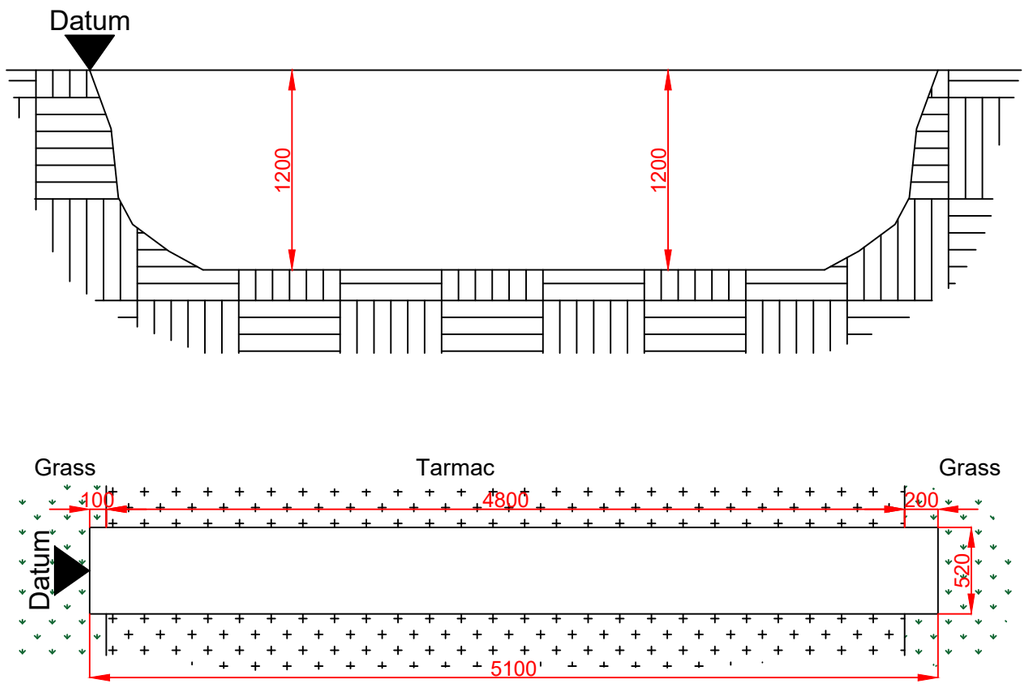
Water Strikes				
Struck at (m)	Remarks			
		Depth: 1.20	**Remarks:** No groundwater encountered	
		Width: 0.52		
		Length:		
		Stability: Stable	**Termination Reason** Terminated at scheduled depth	**Last Updated** 13/03/2023

AGS

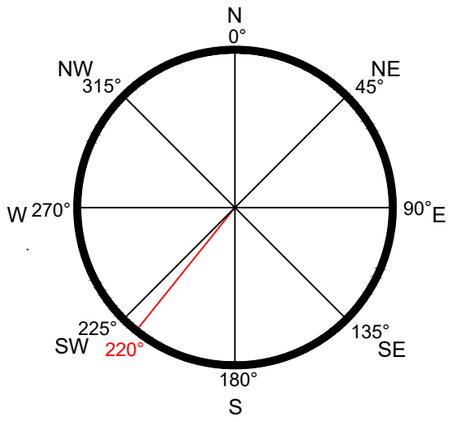
JOB NUMBER: 21-1682	JOB NAME: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	LOCATION: ST-34600

CLIENT: Irish Water	CLIENTS REPRESENTATIVE: Mott MacDonald	CREW: JG	PLANT & EQUIPMENT 3 Tonne Excavator & Hand Tools

TRENCH: (SECTION & PLAN)



TRENCH - ORIENTATION



TRENCH ORIENTATED : 220° FROM NORTH

COORDINATES: DATUM

EASTING: 595214.12

NORTHING: 689633.70

ELEVATION: 76.70

TRENCH LENGTH (m) : 5.10

TRENCH DEPTH (m) : 1.20

TRENCH WIDTH (m) : 0.52

STABILITY: Stable

GROUNDWATER: Dry

SCALE: NTS@A3

DRAWN: BS

CHECKED: NH

DATE EXCAVATED: 16/08/2022

No:	Type of Service:	Diameter (in mm)	Depth to Top of Service (m)	Distance to Centre of Service (m)	Details/Comments
01					No services found
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					

CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** ST-35300
Coordinates 595878.77 E 689708.71 N	**Client:** Irish Water		
Method: Slit Trenching	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 85.92 mOD	**Date:** 15/08/2022	**Logger:** DC	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.22	B1		85.70	0.22		TOPSOIL End of trial pit at 0.22m	

0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 0.22
Width: 0.30
Length: 2.00

Remarks:
No groundwater encountered

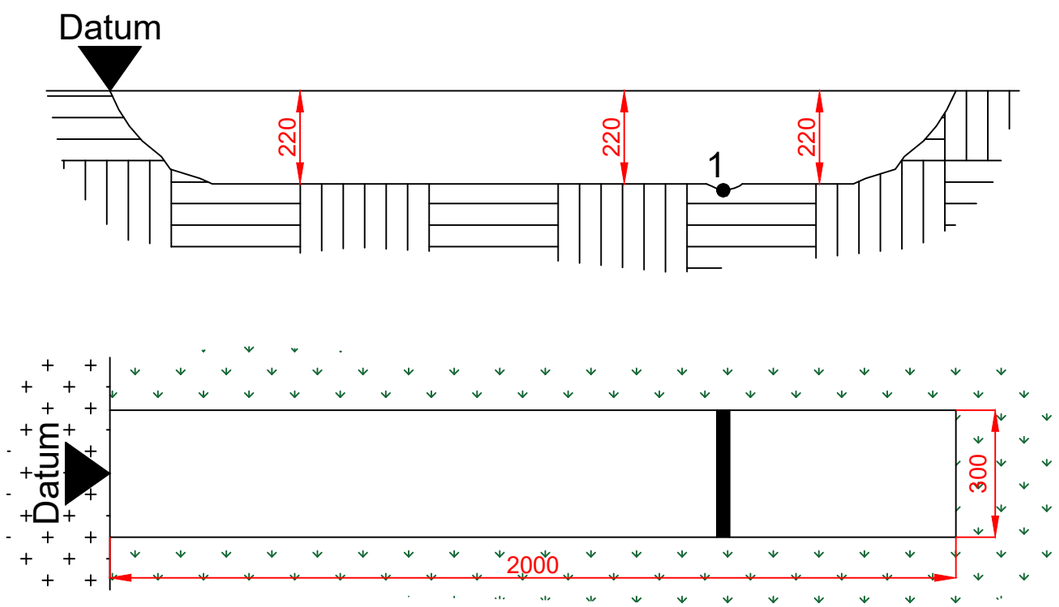
Stability:	Termination Reason	Last Updated
Stable	Terminated at 0.22m due to service encountered	13/03/2023

AGS

JOB NUMBER: 21-1682	JOB NAME: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	LOCATION: ST-35300

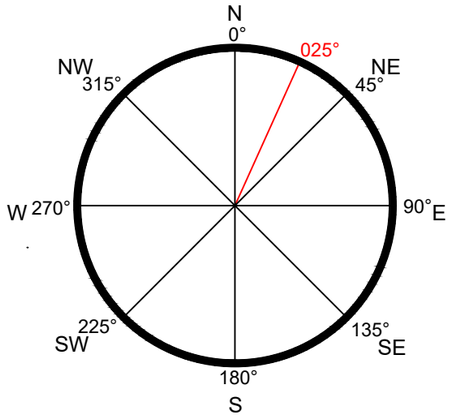
CLIENT: Irish Water	CLIENTS REPRESENTATIVE: Mott MacDonald	CREW: JG	PLANT & EQUIPMENT 3 Tonne Excavator & Hand Tools

TRENCH: (SECTION & PLAN)



No:	Type of Service:	Diameter (in mm)	Depth to Top of Service (m)	Distance to Centre of Service (m)	Details/Comments
01	Watermain	30	0.20	1.45	30mm Black Pipe
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					

TRENCH - ORIENTATION



TRENCH ORIENTATED : 025° FROM NORTH

COORDINATES: DATUM

EASTING: 595878.77

NORTHING: 689708.71

ELEVATION: 85.92

TRENCH LENGTH (m) : 2.00

TRENCH DEPTH (m) : 0.22

TRENCH WIDTH (m) : 0.30

STABILITY: Stable

GROUNDWATER: Dry

SCALE: NTS@A3

DRAWN: BS

CHECKED: NH

DATE EXCAVATED: 15/08/2022

CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** ST-35510
Coordinates 596067.48 E 689697.80 N	**Client:** Irish Water		
Method: Stable	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 84.60 mOD	**Date:** 15/08/2022	**Logger:** JG	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			84.55	0.05		MADE GROUND: BITMAC	
0.20 - 0.50	B1		84.40	0.20		MADE GROUND: Grey slightly sandy angular to subangular fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are angular.	
0.50 - 0.70	B2					MADE GROUND: Brown and greyish brown sandy clayey subangular fine to coarse GRAVEL. Sand is fine to coarse.	
0.70 - 1.20	B3		83.90	0.70		Firm brown sandy gravelly silty CLAY with low cobble content. Sand is fine t coarse. Gravel is subangular fine to coarse.	
			83.40	1.20		End of trial pit at 1.20m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.20
Width: 0.45
Length: 5.90

Remarks: No groundwater encountered

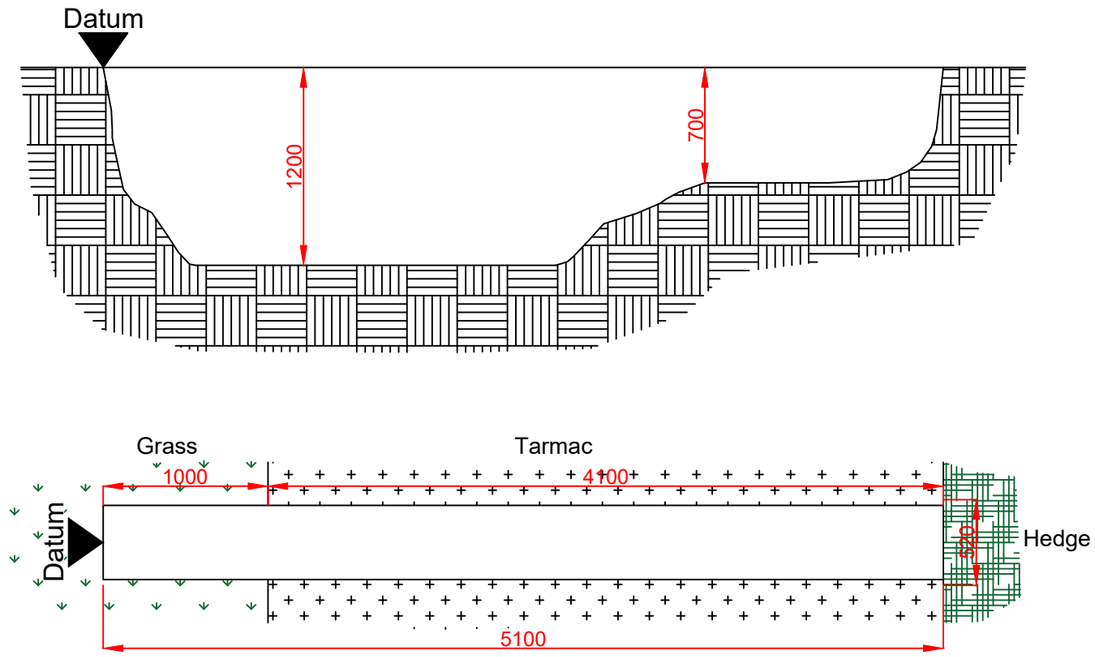
Stability:	Termination Reason	Last Updated
Stable	Terminated at scheduled depth	13/03/2023

AGS

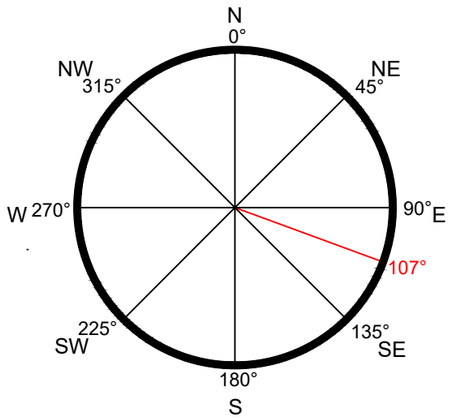
JOB NUMBER: 21-1682	JOB NAME: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	LOCATION: ST-35510

CLIENT: Irish Water	CLIENTS REPRESENTATIVE: Mott MacDonald	CREW: JG	PLANT & EQUIPMENT 3 Tonne Excavator & Hand Tools

TRENCH: (SECTION & PLAN)



TRENCH - ORIENTATION



TRENCH ORIENTATED : 107° FROM NORTH

COORDINATES: DATUM

EASTING: 596067.48

NORTHING: 689697.80

ELEVATION: 84.60

TRENCH LENGTH (m) : 5.10

TRENCH DEPTH (m) : 1.20

TRENCH WIDTH (m) : 0.52

STABILITY: Stable

GROUNDWATER: Dry

SCALE: NTS@A3

DRAWN: BS

CHECKED: NH

DATE EXCAVATED: 16/08/2022

No:	Type of Service:	Diameter (in mm)	Depth to Top of Service (m)	Distance to Centre of Service (m)	Details/Comments
01					No services found
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					

CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** ST-35625
Coordinates 596223.95 E 689659.60 N	**Client:** Irish Water		
Method: Slit Trenching	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: Hand Tools	**Elevation** 86.13 mOD	**Date:** 15/08/2022	**Logger:** JG	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.10	B1		86.03	0.10		TOPSOIL	
			85.98	0.15		MADE GROUND: Brown and greyish brown clayey fine to coarse SAND with numerous roots and rootlets. Gravel is angular fine to coarse.	
						End of trial pit at 0.15m	

0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 0.15
Width: 0.30
Length: 0.45

Remarks:
No groundwater encountered

Stability:
Stable

Termination Reason
Terminated at 0.15m due to service encountered

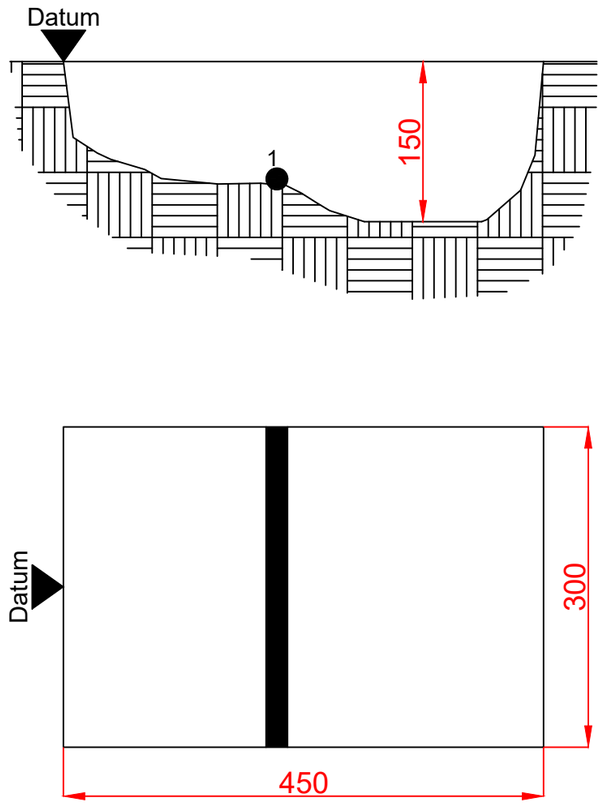
Last Updated
13/03/2023

AGS

JOB NUMBER: 21-1682	JOB NAME: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	LOCATION: ST-35625

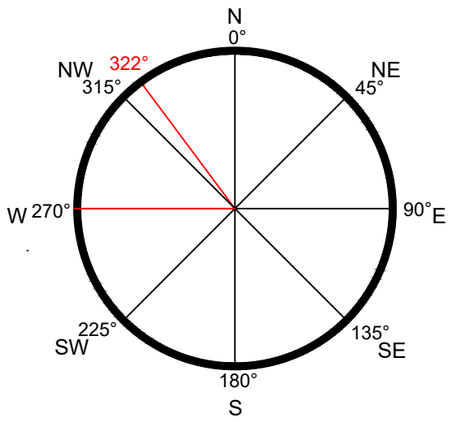
CLIENT: Irish Water	CLIENTS REPRESENTATIVE: Mott MacDonald	CREW: JG	PLANT & EQUIPMENT 3 Tonne Excavator & Hand Tools

TRENCH: (SECTION & PLAN)



No:	Type of Service:	Diameter (in mm)	Depth to Top of Service (m)	Distance to Centre of Service (m)	Details/Comments
01	Water	50	0.10	0.20	20mm Water Pipe
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					

TRENCH - ORIENTATION



TRENCH ORIENTATED : 322° FROM NORTH

COORDINATES: DATUM

EASTING: 596223.95

NORTHING: 689659.60

ELEVATION: 86.13

TRENCH LENGTH (m) : 0.45

TRENCH DEPTH (m) : 0.15

TRENCH WIDTH (m) : 0.30

STABILITY: Stable

GROUNDWATER: Dry

SCALE: NTS@A3

DRAWN: BS

CHECKED: NH

DATE EXCAVATED: 15/08/2022

CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** ST-R445-001
Coordinates 571100.13 E 668804.95 N	**Client:** Irish Water		
Method: Slit Trenching	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 36.14 mOD	**Date:** 18/08/2022	**Logger:** JG	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			36.04	0.10		MADE GROUND: ASPAHLT	
						MADE GROUND: BITMAC	
			35.84	0.30		MADE GROUND: Light grey slightly sandy angular fine to coarse GRAVEL wit low cobble content. Cobbles are angular.	
0.70 - 1.70	B1		35.44	0.70		MADE GROUND: Brown sandy silty angular fine to coarse GAVEL with medium cobble an boulder content. Sand is fine to coarse.	
1.80 - 2.00	B2		34.34	1.80		Firm dark brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subrounded.	
			34.14	2.00		End of trial pit at 2.00m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 2.00
Width: 0.75
Length: 9.20

Remarks:
No groundwater encountered

Stability:
Unstable

Termination Reason
Terminated at scheduled depth

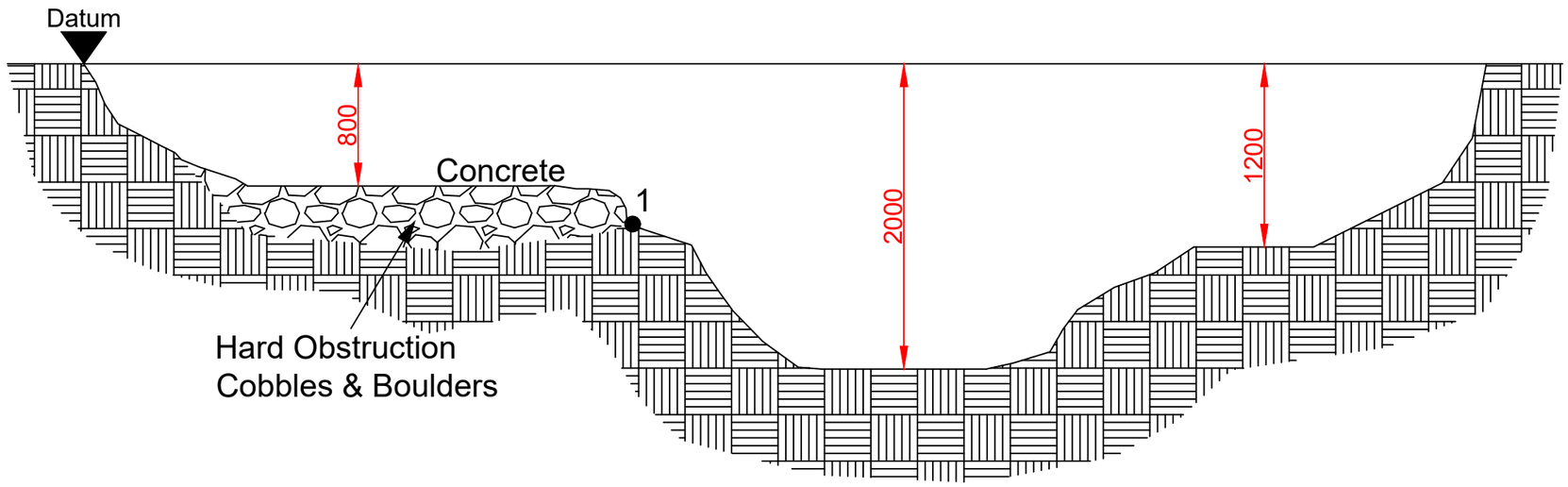
Last Updated
13/03/2023

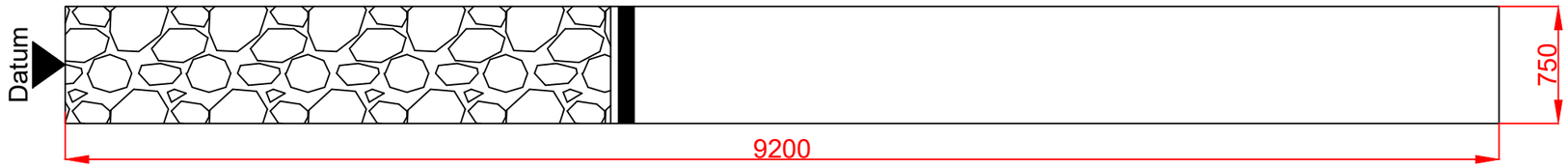
AGS

JOB NUMBER: 21-1682	JOB NAME: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	LOCATION: ST-R445-001

CLIENT: Irish Water	CLIENTS REPRESENTATIVE: Mott MacDonald	CREW: JG	PLANT & EQUIPMENT 3 Tonne Excavator & Hand Tools

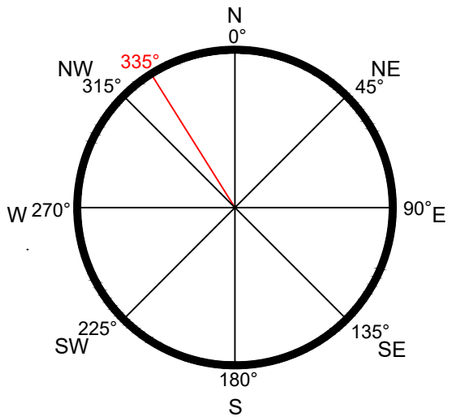
TRENCH: (SECTION & PLAN)





No:	Type of Service:	Diameter (in mm)	Depth to Top of Service (m)	Distance to Centre of Service (m)	Details/Comments
01	Telecom	100	1.00	3.60	100mm Telecom Cable
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					

TRENCH - ORIENTATION



TRENCH ORIENTATED : 335° FROM NORTH

COORDINATES: DATUM

EASTING: 571100.13

NORTHING: 668804.95

ELEVATION: 36.14

TRENCH LENGTH (m) : 9.20

TRENCH DEPTH (m) : 2.00

TRENCH WIDTH (m) : 0.75

STABILITY: UNSTABLE

GROUNDWATER: DRY

SCALE: NTS@A3

DRAWN: BS

CHECKED: NH

DATE EXCAVATED: 18/08/2022

CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** ST-R445-002
Coordinates 571203.60 E 668859.86 N	**Client:** Irish Water		
Method: Slit Trenching	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 35.88 mOD	**Date:** 19/08/2022	**Logger:** TH	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			35.33	0.55		MADE GROUND: BITMAC	
0.65 - 1.70	B1		35.23	0.65		MADE GROUND: Orangish brown sandy clayey angular fine to medium GRAVEL. Sand is fine to coarse.	
						MADE GROUND: Greyish brown becoming brown sandy clayey subrounded fine to coarse GRAVEL with medium cobble and low boulder content. Cobbles and boulders are subangular.	
		Seepage at 1.70m	34.18	1.70		End of trial pit at 1.70m	▼

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks
1.70	Seepage at 1.70m

Depth: 1.70
Width: 0.65
Length: 4.10

Remarks:

Stability: Stable

Termination Reason: Terminated at scheduled depth

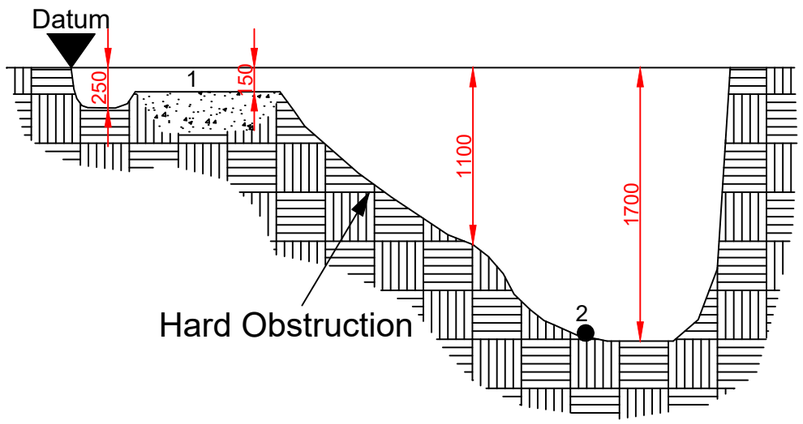
Last Updated: 13/03/2023

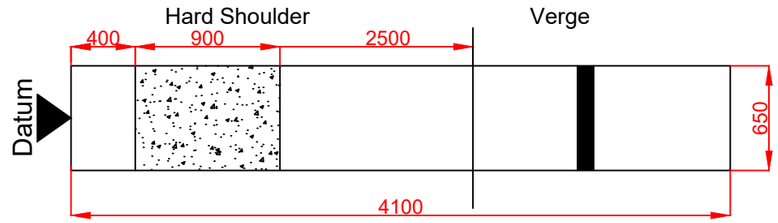
AGS

JOB NUMBER: 21-1682	JOB NAME: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	LOCATION: ST-R445-002

CLIENT:	CLIENTS REPRESENTATIVE:	CREW:	PLANT & EQUIPMENT
Irish Water	Mott MacDonald	JG	3 Tonne Excavator & Hand Tools

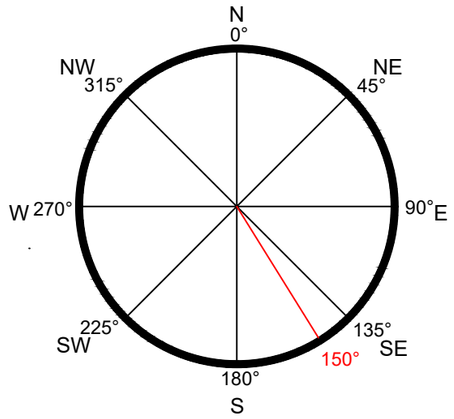
TRENCH: (SECTION & PLAN)





No:	Type of Service:	Diameter (in mm)	Depth to Top of Service (m)	Distance to Centre of Service (m)	Details/Comments
01	Gas	900	0.15	0.85	Leanmix Over Gas Pipe
02	Water	100	1.60	3.20	100mm Black PVC Water Pipe
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					

TRENCH - ORIENTATION



TRENCH ORIENTATED : 150° FROM NORTH

COORDINATES: DATUM

EASTING: 571203.60

NORTHING: 668859.86

ELEVATION: 35.88

TRENCH LENGTH (m) : 4.10

TRENCH DEPTH (m) : 1.70

TRENCH WIDTH (m) : 0.65

STABILITY: Stable

GROUNDWATER: Dry

SCALE: NTS@A3

DRAWN: BS

CHECKED: NH

DATE EXCAVATED: 19/08/2022

CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** ST-R445-003
Coordinates 571285.03 E 668917.25 N	**Client:** Irish Water		
Method: Slit Trenching	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 36.39 mOD	**Date:** 18/08/2022	**Logger:** TMcA	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						MADE GROUND: BITMAC	
			35.79	0.60		MADE GROUND: Subrounded fine to coarse GRAVEL and fine to coarse SAND.	
0.80	B1						
			34.99	1.40		Firm orangish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse.	
1.50	B2						
			34.69	1.70		End of trial pit at 1.70m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.70
Width: 0.60
Length: 5.40

Remarks:

Stability: Stable

Termination Reason: Terminated at scheduled depth

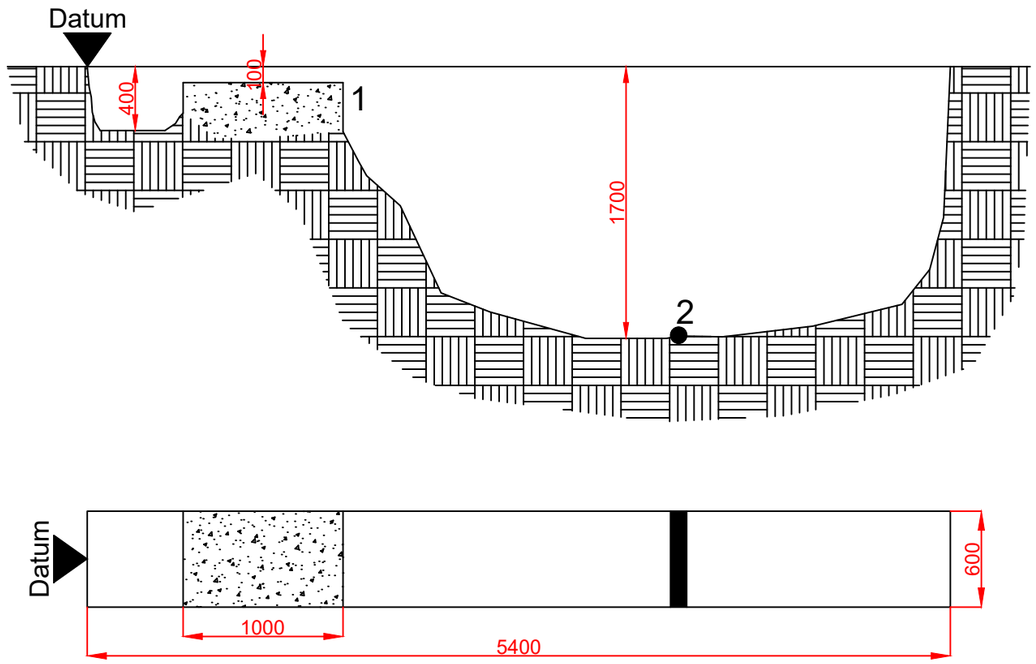
Last Updated: 13/03/2023

AGS

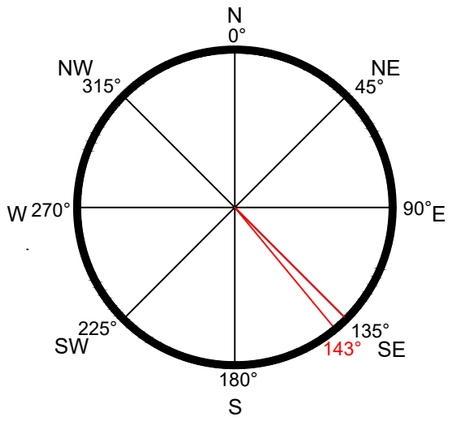
JOB NUMBER: 21-1682	JOB NAME: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	LOCATION: ST-R445-003

CLIENT: Irish Water	CLIENTS REPRESENTATIVE: Mott MacDonald	CREW: JG	PLANT & EQUIPMENT 3 Tonne Excavator & Hand Tools

TRENCH: (SECTION & PLAN)



TRENCH - ORIENTATION



TRENCH ORIENTATED : 143° FROM NORTH

COORDINATES: DATUM

EASTING: 571285.03

NORTHING: 668917.25

ELEVATION: 36.39

TRENCH LENGTH (m) : 5.40

TRENCH DEPTH (m) : 1.70

TRENCH WIDTH (m) : 0.60

STABILITY: Stable

GROUNDWATER: Dry

SCALE: NTS@A3

DRAWN: BS

CHECKED: NH

DATE EXCAVATED: 19/08/2022

No:	Type of Service:	Diameter (in mm)	Depth to Top of Service (m)	Distance to Centre of Service (m)	Details/Comments
01	Gas	1000	0.10	1.10	1000mm Leanmix Over Gas Pipe
02	Water	100	1.63	3.70	100mm Black PVC Water Pipe
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					

CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** ST-R445-004
Coordinates 571363.46 E 668985.39 N	**Client:** Irish Water		
Method: Slit Trenching	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 36.25 mOD	**Date:** 17/08/2022	**Logger:** TMcA	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			35.95	0.30		MADE GROUND: BITMAC	
0.50	B1					MADE GROUND: Subrounded fine to medium GRAVEL and fine to coarse SAND	
			35.05	1.20		Firm greyish brown CLAY	
1.50	B2		34.75	1.50		End of trial pit at 1.50m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.50
Width: 0.60
Length: 5.20

Remarks: No groundwater encountered

Stability: Stable

Termination Reason: Terminated at scheduled depth

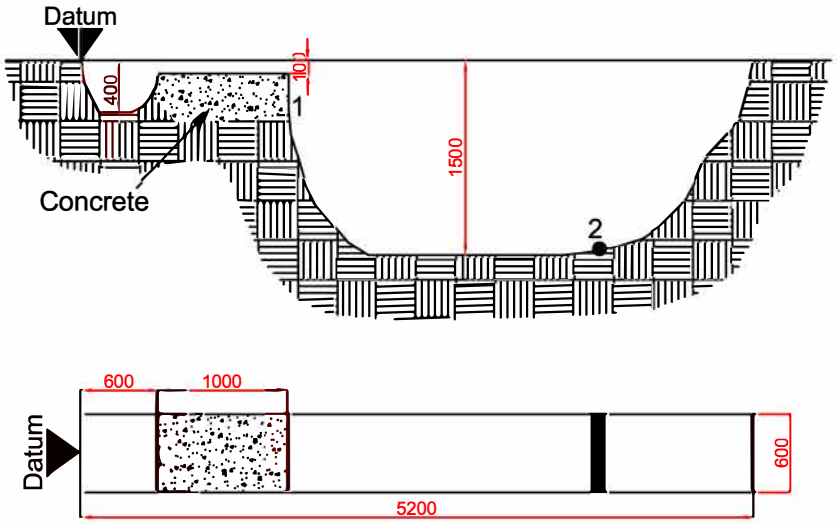
Last Updated: 13/03/2023

AGS

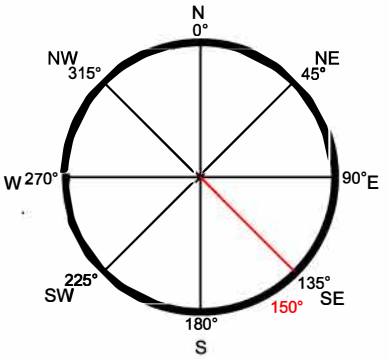
JOB NUMBER: 21-1682	JOB NAME: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	LOCATION: ST-R445-004

CLIENT: Irish Water	CLIENTS REPRESENTATIVE: Mott MacDonald	CREW: JG	PLANT & EQUIPMENT 3 Tonne Excavator & Hand Tools

TRENCH: (SECTION & PLAN)



TRENCH - ORIENTATION



TRENCH ORIENTATED : 150° FROM NORTH

COORDINATES: DATUM

EASTING: 571363.46
NORTHING: 668985.39
ELEVATION: 36.25

TRENCH LENGTH (m) : 5.20
TRENCH DEPTH (m) : 1.50
TRENCH WIDTH (m) : 0.60

STABILITY: Stable
GROUNDWATER: Dry

SCALE: NTS@A3
DRAWN: BS
CHECKED: NH
DATE EXCAVATED: 18/08/2022

No:	Type of Service:	Diameter (in mm)	Depth to Top of Service (m)	Distance to Centre of Service (m)	Details/Comments
01	Gas	1000	0.10	1.10	1000mm Leanmix Over Gas Pipe
02	Water	100	1.40	4.00	100mm Black PVC Water Pipe
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					

CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** ST-R445-005
Coordinates 571440.09 E 669056.76 N	**Client:** Irish Water		
Method: Slit Trenching	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 38.19 mOD	**Date:** 18/08/2022	**Logger:** TMcA	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						MADE GROUND: BITMAC	
			37.79	0.40			
0.50	B1					Brown fine to coarse SAND and subrounded to rounded fine to coarse GRAVEL with low cobble content.	
1.00	B2						
			36.99	1.20		End of trial pit at 1.20m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.20
Width: 0.60
Length: 4.00

Remarks:
No groundwater encountered

Stability:
Stable

Termination Reason
Terminated at scheduled depth

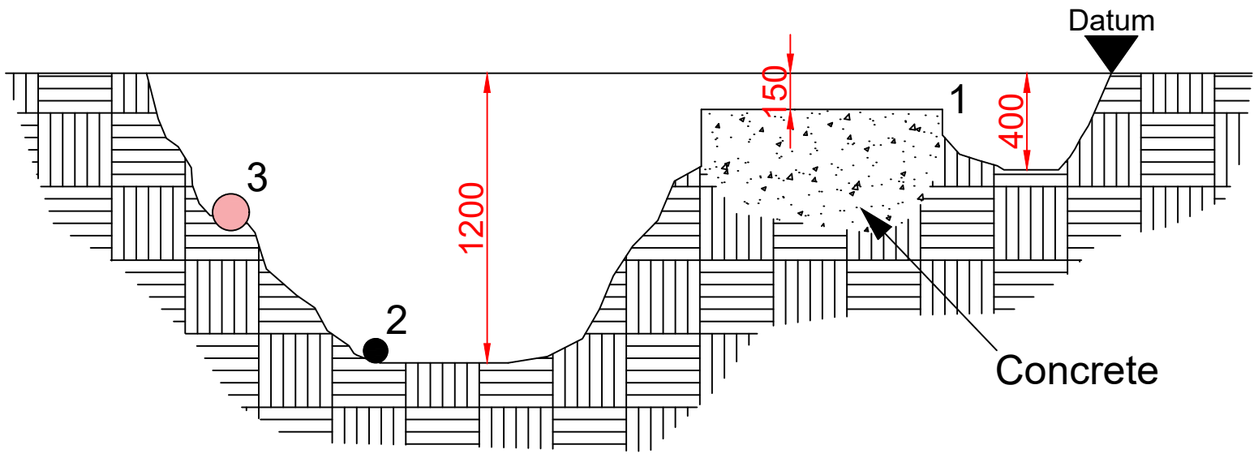
Last Updated
13/03/2023

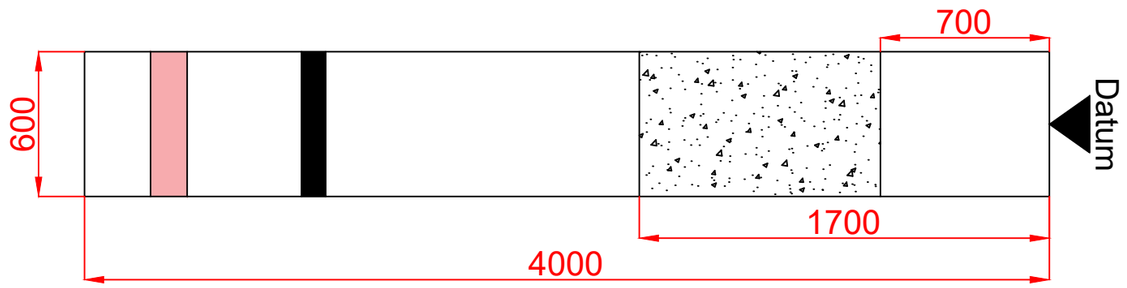
AGS

JOB NUMBER: 21-1682	JOB NAME: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	LOCATION: ST-R445-005

CLIENT:	CLIENTS REPRESENTATIVE:	CREW:	PLANT & EQUIPMENT
Irish Water	Mott MacDonald	TMcA	3 Tonne Excavator & Hand Tools

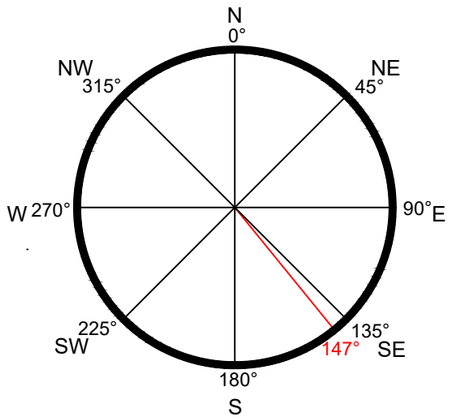
TRENCH: (SECTION & PLAN)





No:	Type of Service:	Diameter (in mm)	Depth to Top of Service (m)	Distance to Centre of Service (m)	Details/Comments
01	Stormwater	150	0.05	3.65	150mm Waven Stormwater
02	Water	100	1.10	3.05	100mm Black PVC Water Pipe
03	Gas	1000	0.15	1.20	1000mm Leanmix Over Gas Pipe
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					

TRENCH - ORIENTATION



TRENCH ORIENTATED : 147° FROM NORTH

COORDINATES: DATUM

EASTING: 571440.09

NORTHING: 669056.76

ELEVATION: 38.19

TRENCH LENGTH (m) : 4.00

TRENCH DEPTH (m) : 1.20

TRENCH WIDTH (m) : 0.60

STABILITY: Stable

GROUNDWATER: Dry

SCALE: NTS@A3

DRAWN: BS

CHECKED: NH

DATE EXCAVATED: 18/08/2022

CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** ST-R445-006
Coordinates 571539.34 E 669139.36 N	**Client:** Irish Water		
Method: Slit Trenching	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 39.02 mOD	**Date:** 18/08/2022	**Logger:** TH	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						MADE GROUND: BITMAC	
0.50 - 1.80	B1		38.52	0.50		MADE GROUND: Brown sandy clayey subangular fine to coarse GRAVEL with medium cobble content. Sand is fine to coarse. Cobbles are subangular.	
			37.22	1.80		End of trial pit at 1.80m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.80
Width: 0.68
Length: 6.20

Remarks: No groundwater encountered

Stability: Stable

Termination Reason: Terminated at scheduled depth

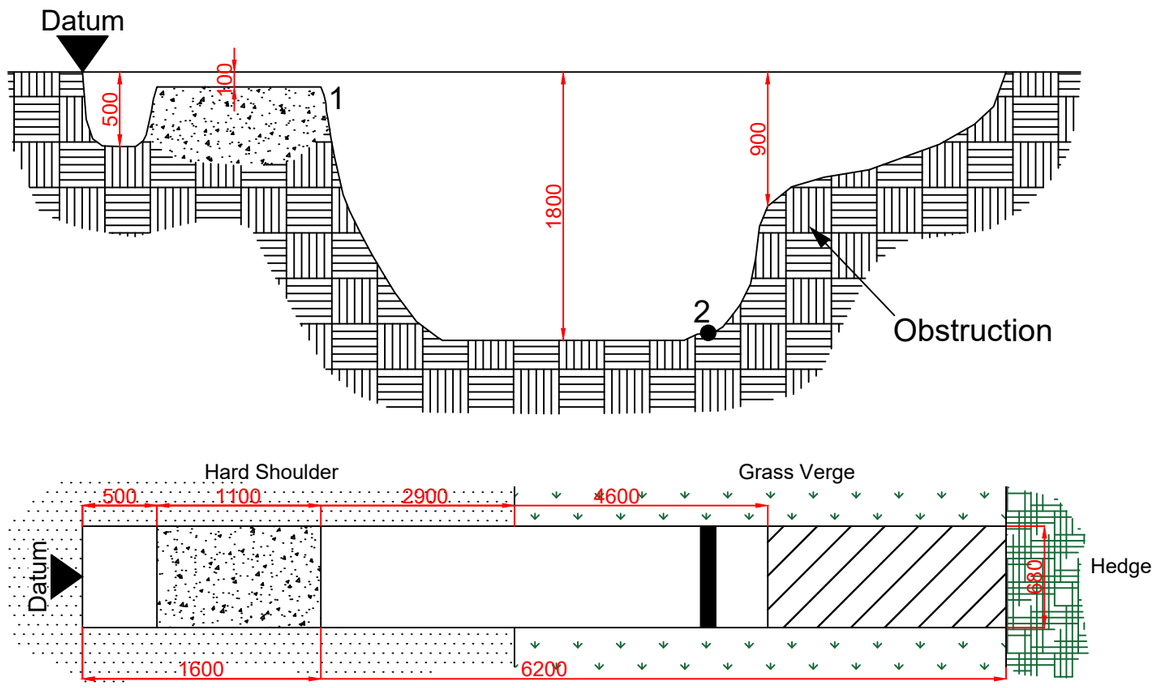
Last Updated: 13/03/2023

AGS

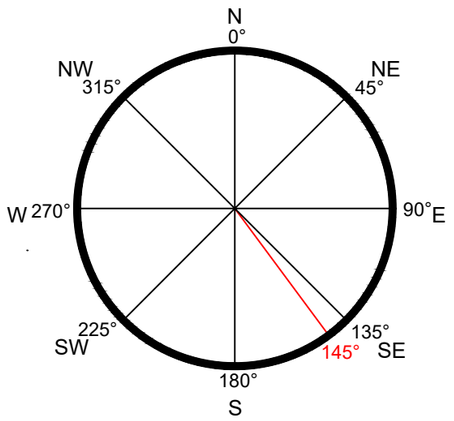
JOB NUMBER: 21-1682	JOB NAME: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	LOCATION: ST-R445-006

CLIENT:	CLIENTS REPRESENTATIVE:	CREW:	PLANT & EQUIPMENT
Irish Water	Mott MacDonald	TH	3 Tonne Excavator & Hand Tools

TRENCH: (SECTION & PLAN)



TRENCH - ORIENTATION



TRENCH ORIENTATED : 145° FROM NORTH

COORDINATES: DATUM

EASTING: 571539.34

NORTHING: 669139.36

ELEVATION: 39.02

TRENCH LENGTH (m) : 6.20

TRENCH DEPTH (m) : 1.80

TRENCH WIDTH (m) : 0.68

STABILITY: Stable

GROUNDWATER: Dry

SCALE: NTS@A3

DRAWN: BS

CHECKED: NH

DATE EXCAVATED: 18/08/2022

No:	Type of Service:	Diameter (in mm)	Depth to Top of Service (m)	Distance to Centre of Service (m)	Details/Comments
01	Gas	1100	0.10	1.05	1100mm Leanmix Covering Gas
02	Water	100	1.70	4.20	100mm Black PVC Water Pipe
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					

CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** ST-R445-007
Coordinates 571622.34 E 669198.96 N	**Client:** Irish Water		
Method: Slit Trenching	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 40.15 mOD	**Date:** 18/08/2022	**Logger:** TH	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						MADE GROUND: BITMAC	
0.50 - 1.80	B1		39.65	0.50		MADE GROUND: Brown sandy clayey subangular fine to coarse GRAVEL with medium cobble content. Sand is fine to coarse. Cobbles are angular.	
			38.35	1.80		End of trial pit at 1.80m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.80
Width: 0.67
Length: 5.50

Remarks: No groundwater encountered

Stability: Unstable

Termination Reason Terminated at scheduled depth

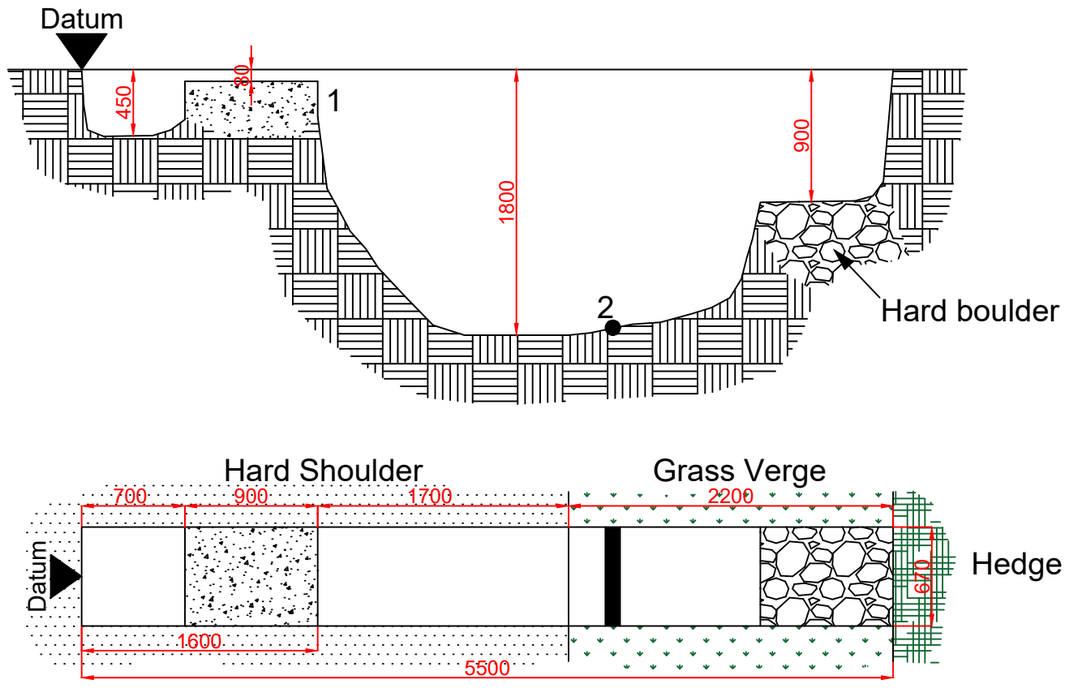
Last Updated 13/03/2023

AGS

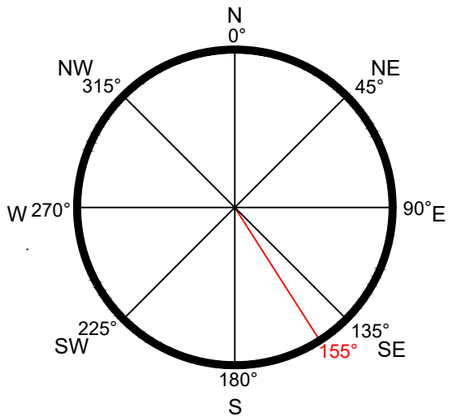
JOB NUMBER: 21-1682	JOB NAME: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	LOCATION: ST-R445-007

CLIENT: Irish Water	CLIENTS REPRESENTATIVE: Mott MacDonald	CREW: TH	PLANT & EQUIPMENT 3 Tonne Excavator & Hand Tools

TRENCH: (SECTION & PLAN)



TRENCH - ORIENTATION



TRENCH ORIENTATED : 155° FROM NORTH

COORDINATES: DATUM

EASTING: 571622.34

NORTHING: 669198.96

ELEVATION: 40.15

TRENCH LENGTH (m) : 5.50

TRENCH DEPTH (m) : 1.80

TRENCH WIDTH (m) : 0.67

STABILITY: Unstable

GROUNDWATER: Dry

SCALE: NTS@A3

DRAWN: BS

CHECKED: NH

DATE EXCAVATED: 18/08/2022

No:	Type of Service:	Diameter (in mm)	Depth to Top of Service (m)	Distance to Centre of Service (m)	Details/Comments
01	Gas	900	0.08	1.15	900mm Leanmix Covering Gas
02	Water	100	1.70	3.60	100mm Black PVC Watermain
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					

CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** ST-R445-008
Coordinates 571699.58 E 669250.96 N	**Client:** Irish Water		
Method: Slit Trenching	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 40.43 mOD	**Date:** 18/08/2022	**Logger:** TMcA	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						MADE GROUND: BITMAC	
0.30 - 1.10	B1		40.13	0.30		Grey slightly clayey sandy subangular fine to medium GRAVEL. Sand is fine to coarse.	
1.10 - 1.70	B2		39.33	1.10		Stiff brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse.	
			38.73	1.70		End of trial pit at 1.70m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.70
Width: 0.60
Length: 5.40

Remarks: No groundwater encountered

Stability: Stable

Termination Reason: Terminated at scheduled depth

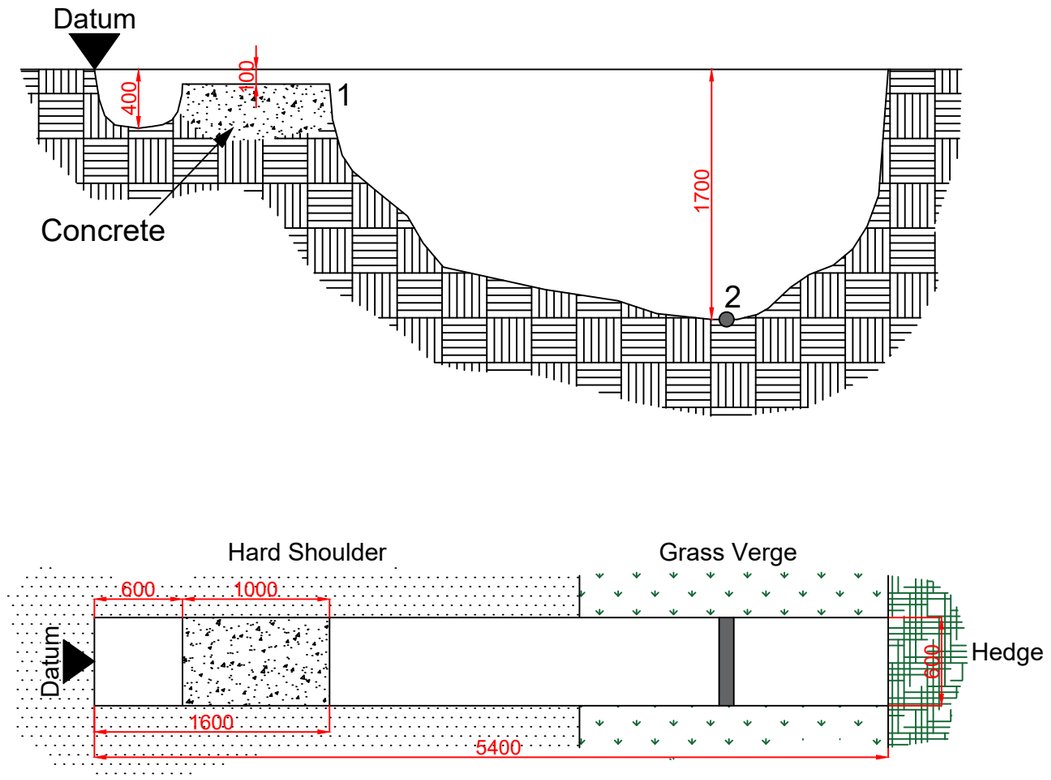
Last Updated: 13/03/2023

AGS

JOB NUMBER: 21-1682	JOB NAME: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	LOCATION: ST-R445-008

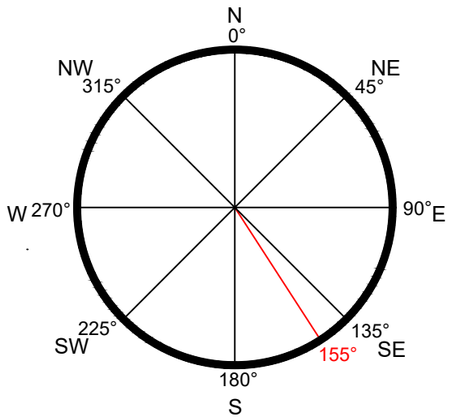
CLIENT:	CLIENTS REPRESENTATIVE:	CREW:	PLANT & EQUIPMENT
Irish Water	Mott MacDonald	TH	3 Tonne Excavator & Hand Tools

TRENCH: (SECTION & PLAN)



No:	Type of Service:	Diameter (in mm)	Depth to Top of Service (m)	Distance to Centre of Service (m)	Details/Comments
01	Gas	1000	0.10	1.15	1000mm Leanmix Covering Gas
02	Water	100	1.65	4.30	100mm Black PVC Watermain
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					

TRENCH - ORIENTATION



TRENCH ORIENTATED : 155° FROM NORTH

COORDINATES: DATUM

EASTING: 571699.58

NORTHING: 669250.96

ELEVATION: 40.43

TRENCH LENGTH (m) : 5.40

TRENCH DEPTH (m) : 1.70

TRENCH WIDTH (m) : 0.60

STABILITY: Stable

GROUNDWATER: Dry

SCALE: NTS@A3

DRAWN: BS

CHECKED: NH

DATE EXCAVATED: 18/08/2022

CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** ST-R445-009
Coordinates 571804.86 E 669316.26 N	**Client:** Irish Water		
Method: Slit Trenching	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 1t Tracked Excavator	**Elevation** 40.56 mOD	**Date:** 18/08/2022	**Logger:** TH	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						MADE GROUND: BITMAC	
0.45 - 1.30	B1		40.11	0.45		MADE GROUND: Brown sandy clayey subrounded fine to coarse GRAVEL. Sand is fine to coarse.	
			39.26	1.30		End of trial pit at 1.30m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.30
Width: 0.60
Length: 4.50

Remarks: No groundwater encountered

Stability: Stable

Termination Reason Terminated at scheduled depth

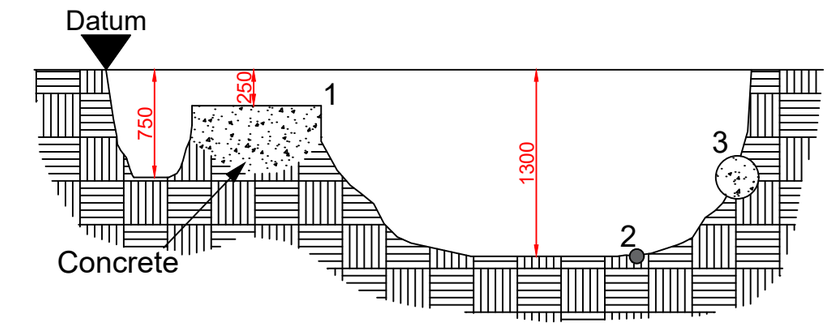
Last Updated 13/03/2023

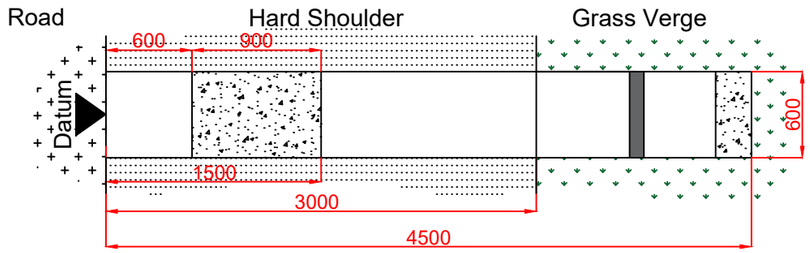
AGS

JOB NUMBER: 21-1682	JOB NAME: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	LOCATION: ST-R445-009

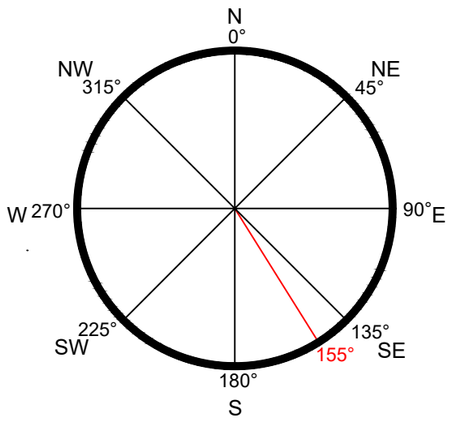
CLIENT: Irish Water	CLIENTS REPRESENTATIVE: Mott MacDonald	CREW: TH	PLANT & EQUIPMENT: 3 Tonne Excavator & Hand Tools

TRENCH: (SECTION & PLAN)





TRENCH - ORIENTATION



TRENCH ORIENTATED : 155° FROM NORTH

COORDINATES: DATUM

EASTING: 571804.86

NORTHING: 669316.26

ELEVATION: 40.56

TRENCH LENGTH (m) : 4.50

TRENCH DEPTH (m) : 1.30

TRENCH WIDTH (m) : 0.60

STABILITY: Stable

GROUNDWATER: Dry

SCALE: NTS@A3

DRAWN: BS

CHECKED: NH

DATE EXCAVATED: 18/08/2022

No:	Type of Service:	Diameter (in mm)	Depth to Top of Service (m)	Distance to Centre of Service (m)	Details/Comments
01	Gas	900	0.25	1.05	1000mm Leanmix Covering Gas
02	Water	100	1.25	3.70	100mm Black PVC Watermain
03	Water	100	0.60	4.40	300mm Concrete Drainage Pipe
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					

CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** ST-R445-010-GRASS
Coordinates E N	**Client:** Irish Water		
Method: Slit Trenching	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 3T Tracked Excavator	**Elevation** mOD	**Date:** 18/08/2022	**Logger:** JG	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
				0.20		TOPSOIL with numerous roots and rootlets.	
0.35 - 0.80	B1					MADE GROUND: Brown sandy subrounded fine to coarse GRAVEL with low cobble content. Sand is fine to coarse.	
				1.20		End of trial pit at 1.20m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.20
Width: 0.60
Length: 5.20

Remarks: No groundwater encountered

Stability: Stable

Termination Reason: Terminated at scheduled depth

Last Updated: 13/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** ST-R445-010-HS
Coordinates 571911.30 E 669379.61 N	**Client:** Irish Water		
Method: Slit Trenching	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 41.18 mOD	**Date:** 18/08/2022	**Logger:** JG	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						MADE GROUND: BITMAC	
0.35 - 0.80	B1		40.83	0.35		MADE GROUND: Brown sandy subrounded fine to coarse GRAVEL Sand is fine to coarse.	
			39.98	1.20		End of trial pit at 1.20m	

0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5

Water Strikes

Struck at (m)	Remarks

Depth: 1.20
Width: 0.60
Length: 5.20

Remarks:
No groundwater encountered

Stability:
Stable

Termination Reason
Terminated at scheduled depth

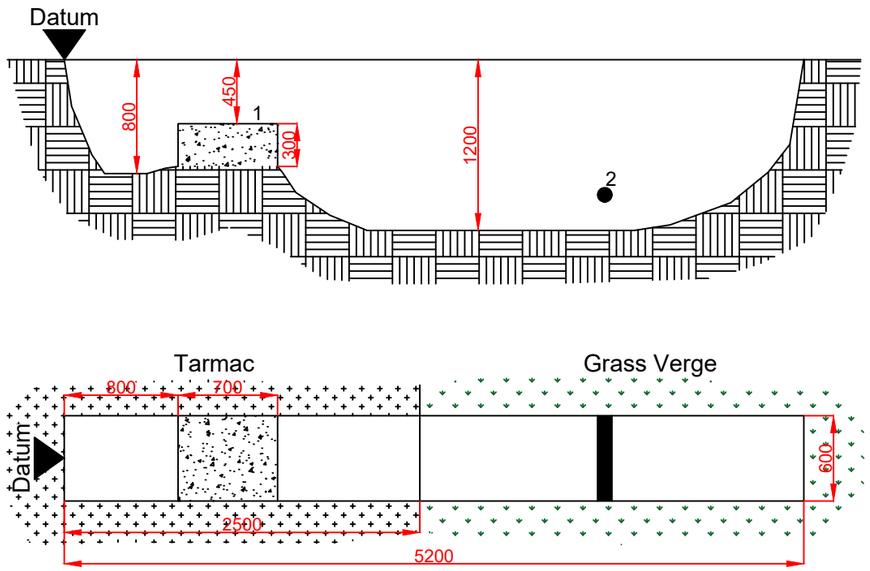
Last Updated
13/03/2023

AGS

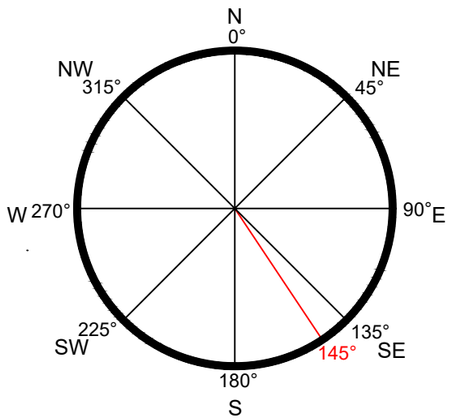
JOB NUMBER: 21-1682	JOB NAME: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	LOCATION: ST-R445-010

CLIENT: Irish Water	CLIENTS REPRESENTATIVE: Mott MacDonald	CREW: TH	PLANT & EQUIPMENT 3 Tonne Excavator & Hand Tools

TRENCH: (SECTION & PLAN)



TRENCH - ORIENTATION



TRENCH ORIENTATED : 145° FROM NORTH

COORDINATES: DATUM

EASTING: 571911.30

NORTHING: 669379.61

ELEVATION: 41.18

TRENCH LENGTH (m) : 5.20

TRENCH DEPTH (m) : 1.20

TRENCH WIDTH (m) : 0.60

STABILITY: Stable

GROUNDWATER: Dry

SCALE: NTS@A3

DRAWN: BS

CHECKED: NH

DATE EXCAVATED: 18/08/2022

No:	Type of Service:	Diameter (in mm)	Depth to Top of Service (m)	Distance to Centre of Service (m)	Details/Comments
01	Gas	700	0.45	1.15	700mm Leanmix Covering Gas
02	Water	100	0.90	3.70	100mm Black PVC Watermain
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					

CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** ST-R445-011
Coordinates 572012.25 E 669439.31 N	**Client:** Irish Water		
Method: Slit Trenching	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 43.24 mOD	**Date:** 18/08/2022	**Logger:** TH	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			43.14	0.10		MADE GROUND: ASPHALT	
						MADE GROUND: BITMAC	
0.50 - 1.20	B1	Seepage at 0.60m	42.74	0.50		MADE GROUND: Brown sandy clayey subrounded fine to coarse GRAVEL with low coble content. Sand is fine to coarse. Cobbles are subrounded.	▼
			42.04	1.20		End of trial pit at 1.20m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks
0.60	Seepage at 0.60m

Depth: 1.20
Width: 0.60
Length: 3.90

Remarks:

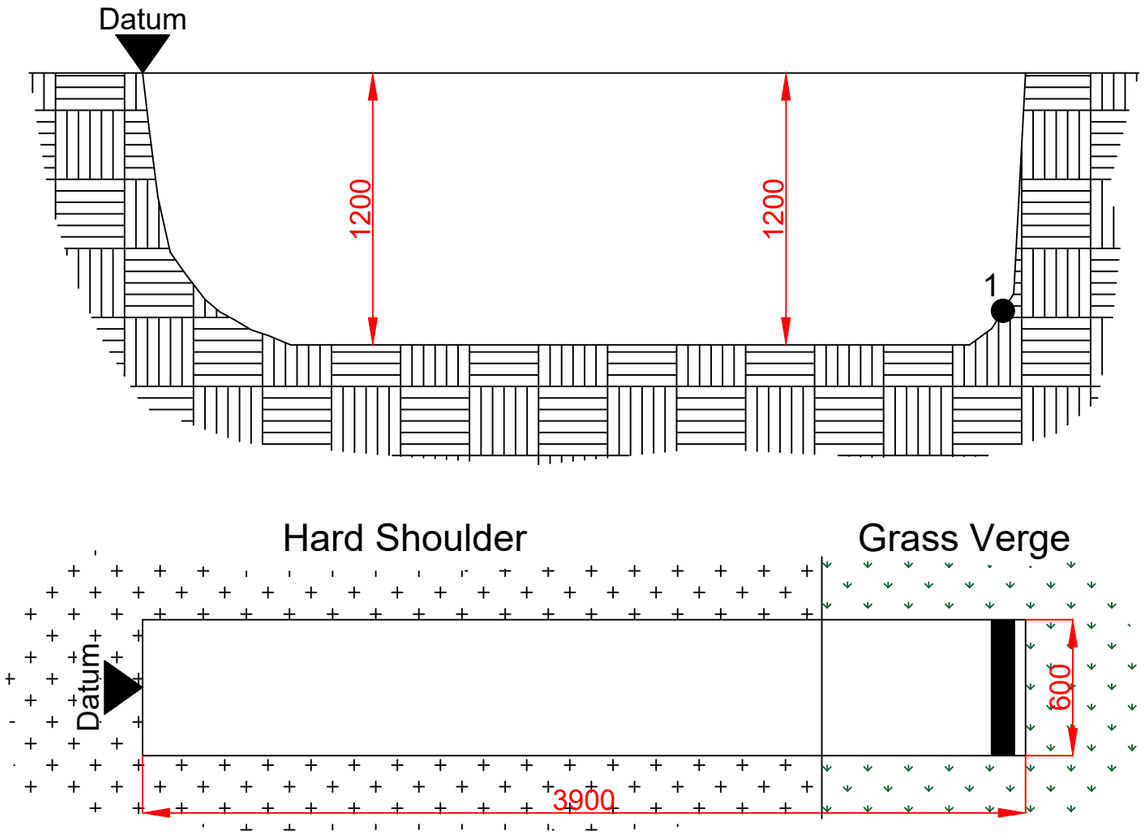
Stability:	Termination Reason	Last Updated
Stable	Terminated at scheduled depth	13/03/2023

AGS

JOB NUMBER: 21-1682	JOB NAME: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	LOCATION: ST-R445-011

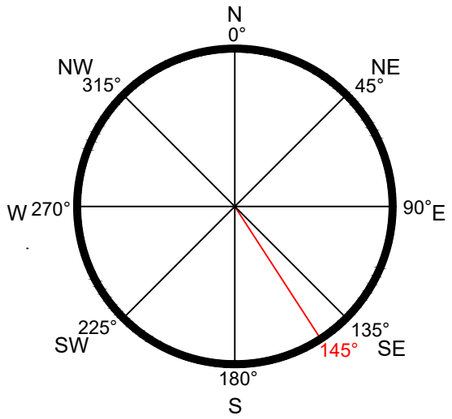
CLIENT:	CLIENTS REPRESENTATIVE:	CREW:	PLANT & EQUIPMENT
Irish Water	Mott MacDonald	TH	3 Tonne Excavator & Hand Tools

TRENCH: (SECTION & PLAN)



No:	Type of Service:	Diameter (in mm)	Depth to Top of Service (m)	Distance to Centre of Service (m)	Details/Comments
01	Water	100	1.00	3.80	100mm Black PVC Water Pipe
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					

TRENCH - ORIENTATION



TRENCH ORIENTATED : 145° FROM NORTH

COORDINATES: DATUM

EASTING: 572012.25

NORTHING: 669439.31

ELEVATION: 43.24

TRENCH LENGTH (m) : 3.90

TRENCH DEPTH (m) : 1.20

TRENCH WIDTH (m) : 0.60

STABILITY: Stable

GROUNDWATER: Dry

SCALE: NTS@A3

DRAWN: BS

CHECKED: NH

DATE EXCAVATED: 18/08/2022

CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** ST-R445-012
Coordinates 572100.62 E 669491.42 N	**Client:** Irish Water		
Method: Slit Trenching	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 44.77 mOD	**Date:** 18/08/2022	**Logger:** TH	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			44.67	0.10		MADE GROUND: ASPHALT	
						MADE GROUND: BITMAC	
0.40 - 1.20	B1		44.37	0.40		MADE GROUND: Brown sandy clayey subrounded fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are subrounded.	
			43.57	1.20		End of trial pit at 1.20m	

0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.20
Width: 0.60
Length: 3.70

Remarks:
No groundwater encountered

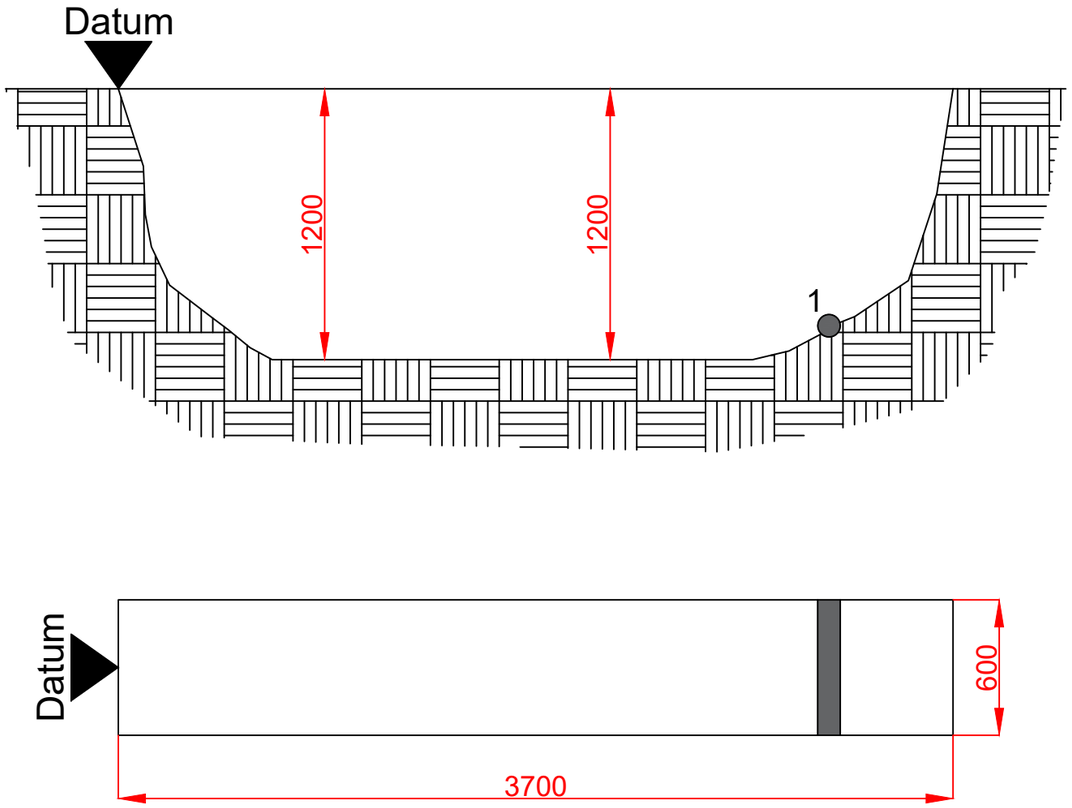
Stability:	Termination Reason	Last Updated
Stable	Terminated at scheduled depth	13/03/2023

AGS

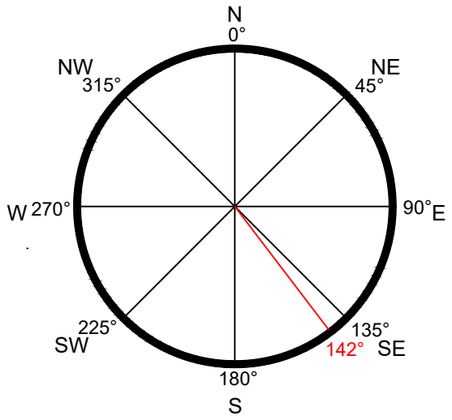
JOB NUMBER: 21-1682	JOB NAME: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	LOCATION: ST-R445-012

CLIENT: Irish Water	CLIENTS REPRESENTATIVE: Mott MacDonald	CREW: TH	PLANT & EQUIPMENT: 3 Tonne Excavator & Hand Tools

TRENCH: (SECTION & PLAN)



TRENCH - ORIENTATION



TRENCH ORIENTATED : 142° FROM NORTH

COORDINATES: DATUM

EASTING: 572100.62

NORTHING: 669491.42

ELEVATION: 44.77

TRENCH LENGTH (m) : 3.70

TRENCH DEPTH (m) : 1.20

TRENCH WIDTH (m) : 0.60

STABILITY: Stable

GROUNDWATER: Dry

SCALE: NTS@A3

DRAWN: BS

CHECKED: NH

DATE EXCAVATED: 18/08/2022

No:	Type of Service:	Diameter (in mm)	Depth to Top of Service (m)	Distance to Centre of Service (m)	Details/Comments
01	Unknown	Unknown	1.00	3.80	Unknown Service
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					

CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** ST-R445-013
Coordinates 572196.12 E 669547.88 N	**Client:** Irish Water		
Method: Slit Trenching	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 44.67 mOD	**Date:** 17/08/2022	**Logger:** JG	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			44.59	0.08		MADE GROUND: ASPHALT	
						MADE GROUND: BITMAC	
0.30	B1		44.37	0.30		MADE GROUND: Brown very sandy silty subrounded fine to coarse GRAVEL with low cobble content. Sand is fine to coarse.	
			43.57	1.10		End of trial pit at 1.10m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.10
Width: 0.60
Length: 17.00

Remarks:
No groundwater encountered

Stability:
Stable

Termination Reason
Terminated at scheduled depth

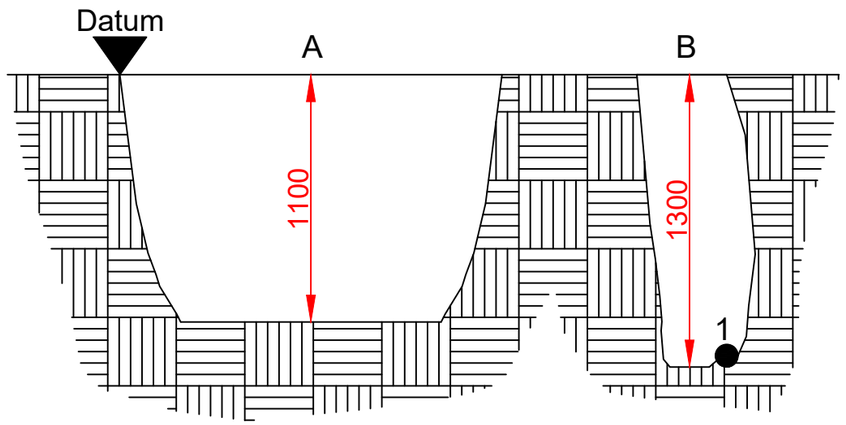
Last Updated
13/03/2023

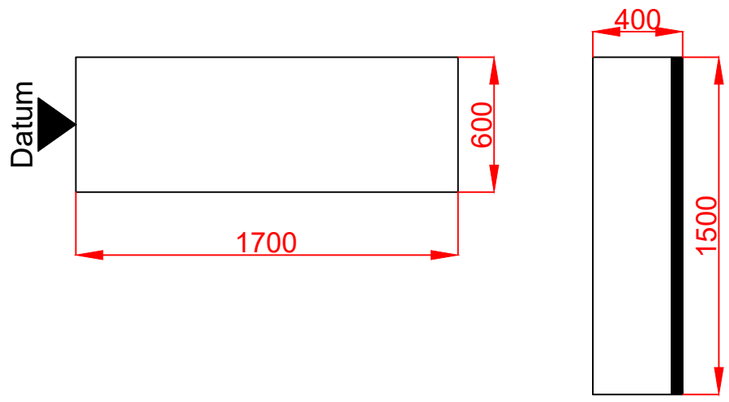
AGS

JOB NUMBER: 21-1682	JOB NAME: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	LOCATION: ST-R445-013

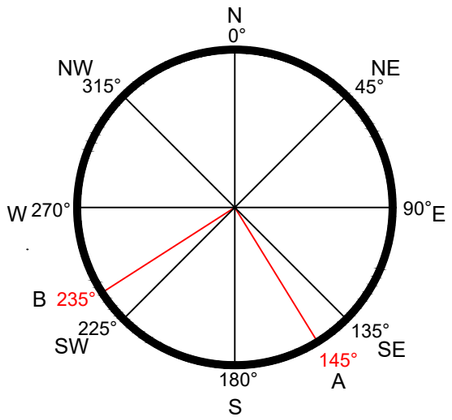
CLIENT:	CLIENTS REPRESENTATIVE:	CREW:	PLANT & EQUIPMENT
Irish Water	Mott MacDonald	JG	3 Tonne Excavator & Hand Tools

TRENCH: (SECTION & PLAN)





TRENCH - ORIENTATION



TRENCH ORIENTATED :145° - 235°FROM NORTH

COORDINATES: DATUM

	A	B
EASTING:	572196.12	572197.53
NORTHING:	669547.88	669545.76
ELEVATION:	44.67	44.62

	A	B
TRENCH LENGTH (m) :	1.70	1.50
TRENCH DEPTH (m) :	0.60	0.50
TRENCH WIDTH (m) :	1.10	1.30

STABILITY: Stable

GROUNDWATER: Dry

SCALE: NTS@A3

DRAWN: BS

CHECKED: NH

DATE EXCAVATED: 17/08/2022

No:	Type of Service:	Diameter (in mm)	Depth to Top of Service (m)	Distance to Centre of Service (m)	Details/Comments
01	Water	Unknown	1.20	2.70	100mm Black Watermain Pipe Plastic
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					

CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** ST-R445-014
Coordinates 572315.39 E 669618.26 N	**Client:** Irish Water		
Method: Slit Trenching	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 41.66 mOD	**Date:** 17/08/2022	**Logger:** JG	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			41.56	0.10		MADE GROUND: ASPHALT	
						MADE GROUND: BITMAC	
			41.36	0.30		MADE GROUND: Grey slightly sandy angular to subangular fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are angular.	
0.60 - 1.20	B1		41.06	0.60		MADE GROUND: Brown and grey gravelly silty fine to coarse SAND with medium cobble and boulder content.	
			40.46	1.20		End of trial pit at 1.20m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.20
Width: 0.52
Length: 3.70

Remarks: No groundwater encountered

Stability: Stable

Termination Reason Terminated at scheduled depth

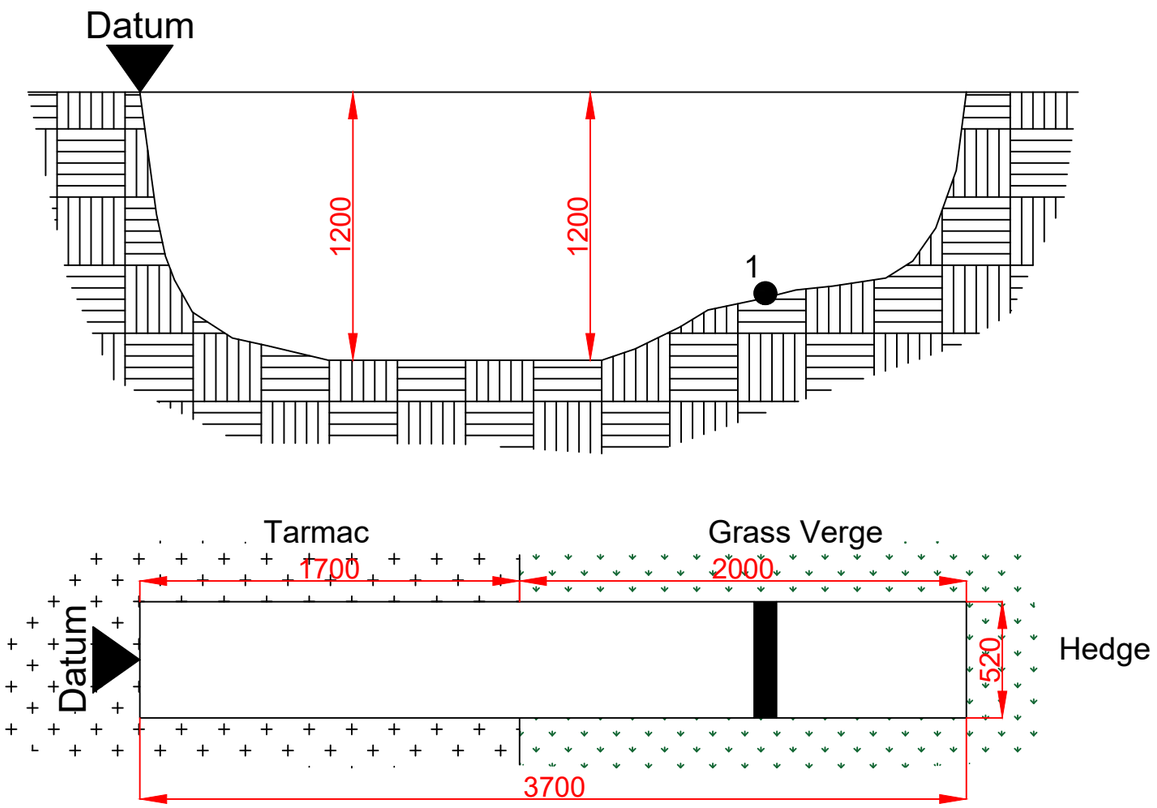
Last Updated 13/03/2023

AGS

JOB NUMBER: 21-1682	JOB NAME: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	LOCATION: ST-R445-014

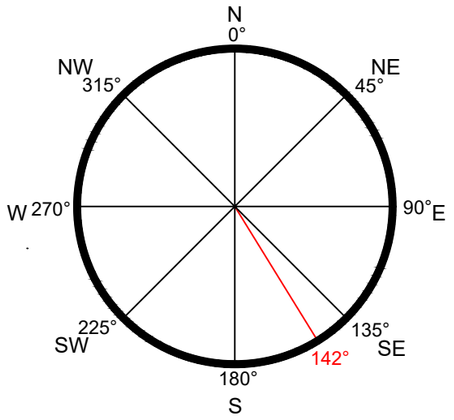
CLIENT:	CLIENTS REPRESENTATIVE:	CREW:	PLANT & EQUIPMENT
Irish Water	Mott MacDonald	JG	3 Tonne Excavator & Hand Tools

TRENCH: (SECTION & PLAN)



No:	Type of Service:	Diameter (in mm)	Depth to Top of Service (m)	Distance to Centre of Service (m)	Details/Comments
01	Water	100	0.85	2.80	100mm Plastic Watermain
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					

TRENCH - ORIENTATION



TRENCH ORIENTATED : 142° FROM NORTH

COORDINATES: DATUM

EASTING: 572315.39

NORTHING: 669618.26

ELEVATION: 41.66

TRENCH LENGTH (m) : 1.70

TRENCH DEPTH (m) : 0.60

TRENCH WIDTH (m) : 1.10

STABILITY: Stable

GROUNDWATER: Dry

SCALE: NTS@A3

DRAWN: BS

CHECKED: NH

DATE EXCAVATED: 17/08/2022

CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** ST-R445-015
Coordinates 572411.13 E 669674.71 N	**Client:** Irish Water		
Method: Slit Trenching	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 39.90 mOD	**Date:** 17/08/2022	**Logger:** JG	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			39.85	0.05		MADE GROUND: ASPHALT MADE GROUND: BITMAC	
0.40 - 0.80	B1		39.50	0.40		MADE GROUND: Brown sandy clayey subrounded fine to coarse GRAVEL with medium cobble content. Sand is fine to coarse.	
0.80 - 1.10	B2		39.10	0.80		Firm brown sandy gravelly silty CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is subrounded fine to coarse.	
			38.70	1.20		End of trial pit at 1.20m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

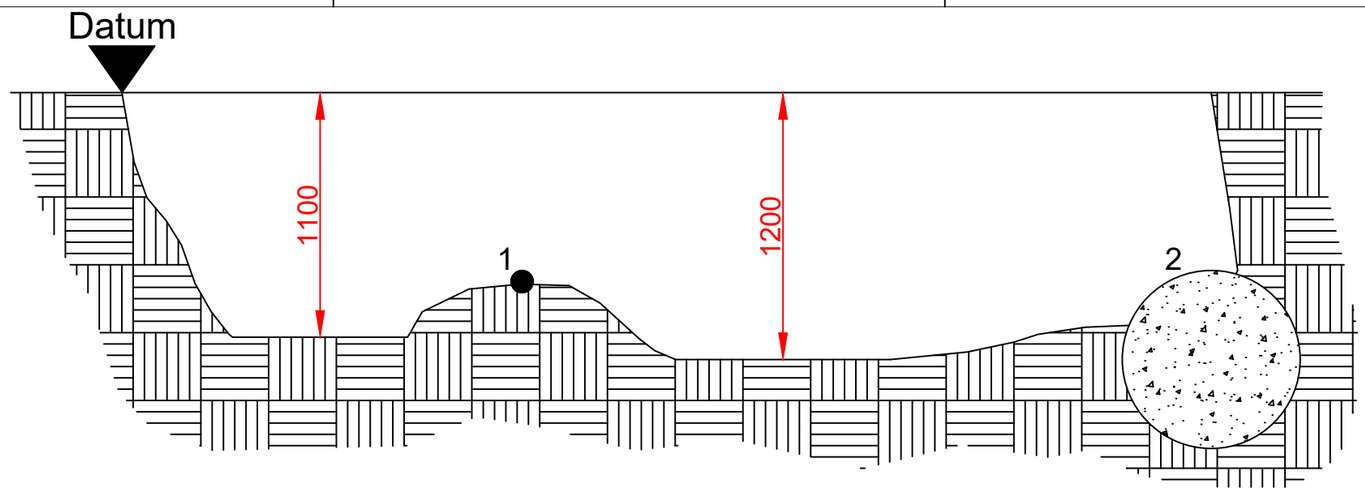
Water Strikes				
Struck at (m)	Remarks			
		Depth: 1.20 **Width:** 0.60 **Length:**	**Remarks:** No groundwater encountered	
		Stability: Stable	**Termination Reason** Terminated at scheduled depth	**Last Updated** 13/03/2023

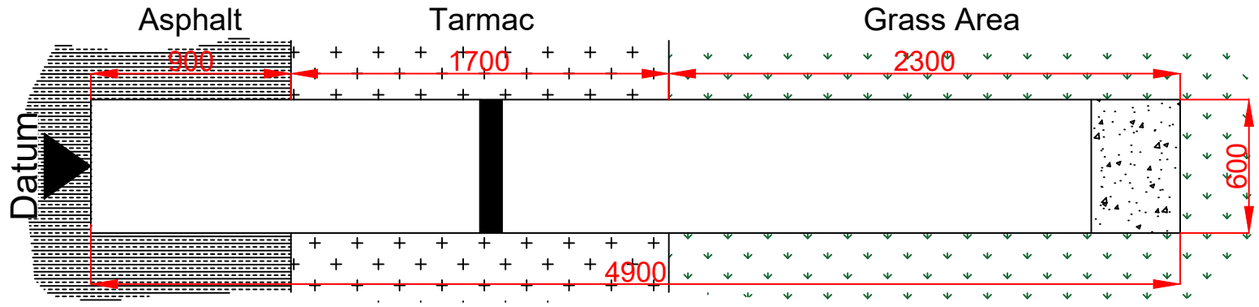
AGS

JOB NUMBER: 21-1682	JOB NAME: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	LOCATION: ST-R445-015

CLIENT: Irish Water	CLIENTS REPRESENTATIVE: Mott MacDonald	CREW: JG	PLANT & EQUIPMENT: 3 Tonne Excavator & Hand Tools

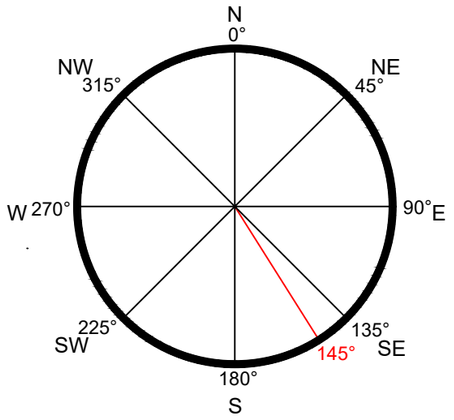
TRENCH: (SECTION & PLAN)





No:	Type of Service:	Diameter (in mm)	Depth to Top of Service (m)	Distance to Centre of Service (m)	Details/Comments
01	Water	100	0.80	1.80	100mm Plastic Watermain
02	Drainage	800	0.40	4.70	800mm Concrete Drainage
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					

TRENCH - ORIENTATION



TRENCH ORIENTATED : 145° FROM NORTH

COORDINATES: DATUM

EASTING: 572411.13

NORTHING: 669674.71

ELEVATION: 39.90

TRENCH LENGTH (m) : 4.90

TRENCH DEPTH (m) : 1.20

TRENCH WIDTH (m) : 0.60

STABILITY: Stable

GROUNDWATER: Dry

SCALE: NTS@A3

DRAWN: BS

CHECKED: NH

DATE EXCAVATED: 17/08/2022

CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

Project No. 21-1682	**Project Name:** Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		**Trial Pit ID** ST-R445-016
Coordinates 572494.68 E 669723.50 N	**Client:** Irish Water		
Method: Slit Trenching	**Client's Representative:** Mott MacDonald		Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 39.95 mOD	**Date:** 17/08/2022	**Logger:** JG	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			39.88	0.07		MADE GROUND: BITMAC	
						MADE GROUND: Grey slightly sandy angular to subangular fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are angular.	
0.40 - 1.20	B1		39.55	0.40		Firm brown sandy gravelly silty CLAY with occasional roots and rootlets. Sand is fine to coarse. Gravel is subangular fine to coarse.	
			38.75	1.20		End of trial pit at 1.20m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.20
Width: 0.60
Length:

Remarks:
No groundwater encountered

Stability:
Stable

Termination Reason
Terminated at scheduled depth

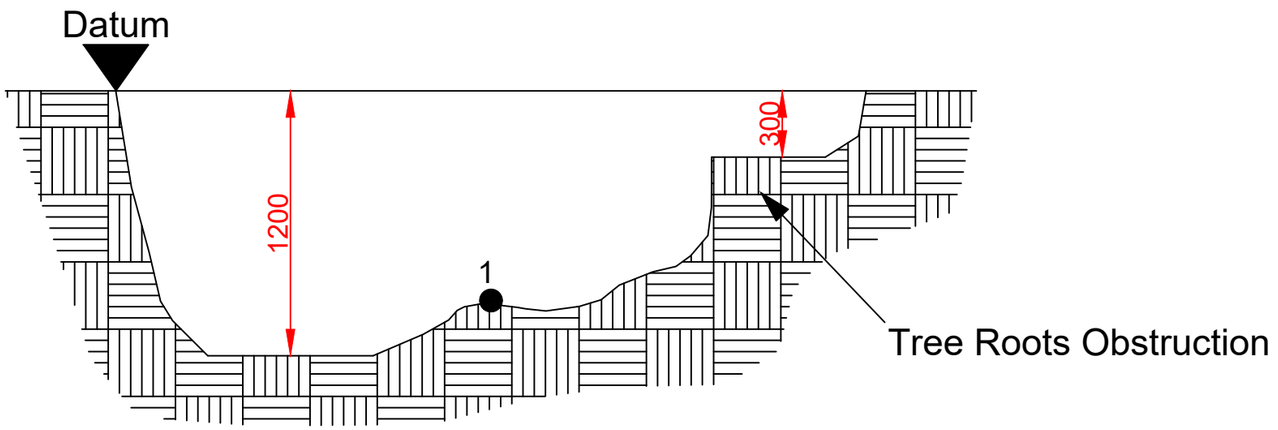
Last Updated
13/03/2023

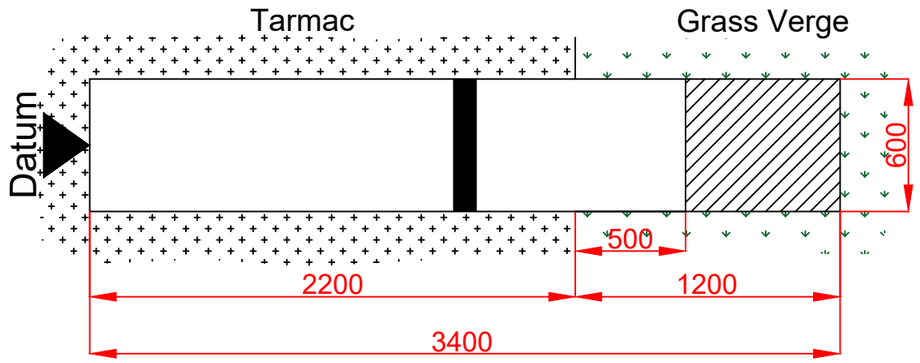
AGS

JOB NUMBER: 21-1682	JOB NAME: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	LOCATION: ST-R445-016

CLIENT:	CLIENTS REPRESENTATIVE:	CREW:	PLANT & EQUIPMENT
Irish Water	Mott MacDonald	JG	3 Tonne Excavator & Hand Tools

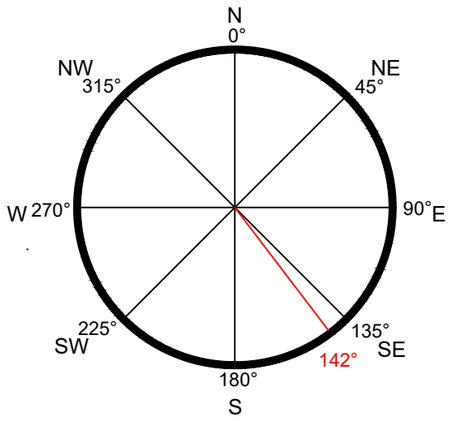
TRENCH: (SECTION & PLAN)





No:	Type of Service:	Diameter (in mm)	Depth to Top of Service (m)	Distance to Centre of Service (m)	Details/Comments
01	Water	100	0.90	1.70	100mm Black Steel Watermain
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					

TRENCH - ORIENTATION



TRENCH ORIENTATED : 142° FROM NORTH

COORDINATES: DATUM

EASTING: 572494.68

NORTHING: 669723.50

ELEVATION: 39.95

TRENCH LENGTH (m) : 3.40

TRENCH DEPTH (m) : 1.20

TRENCH WIDTH (m) : 0.60

STABILITY: Stable

GROUNDWATER: Dry

SCALE: NTS@A3

DRAWN: BS

CHECKED: NH

DATE EXCAVATED: 17/08/2022

CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

APPENDIX 4D

PEAT PROBE RESULTS
RUSSIAN PEAT CORE RECORDS



Stratum Legend Key



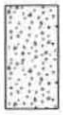
101
TOPSOIL



102
MADE GROUND



103
MADE GROUND



104
CONCRETE



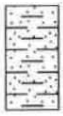
105
WOOD



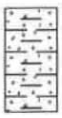
201
CLAY



202
Silty CLAY



203
Sandy CLAY



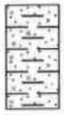
204
Gravelly CLAY



205
Cobbly CLAY



206
Bouldery CLAY



207
Silty sandy CLAY



208
Silty gravelly CLAY



209
Silty cobbly CLAY



210
Silty bouldery CLAY



211
Silty sandy gravelly CLAY



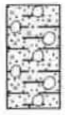
212
Silty sandy cobbly CLAY



213
Silty sandy bouldery CLAY



214
Silty sandy gravelly cobbly CLAY



215
Silty sandy gravelly bouldery CLAY



216
Silty sandy gravelly cobbly bouldery CLAY



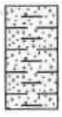
217
Silty sandy peaty CLAY



218
Silty sandy gravelly peaty CLAY



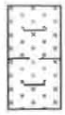
219
Silty peaty CLAY



220
Sandy gravelly CLAY



301
SILT



302
Clayey SILT



303
Sandy SILT



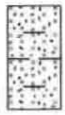
304
Gravelly SILT



305
Peaty SILT



306
Clayey sandy SILT



307
Gravelly clayey SILT



308
Sandy gravelly clayey SILT



309
Clayey bouldery SILT



310
Sandy gravelly SILT



312
Clayey sandy gravelly SILT



313
Clayey sandy gravelly peaty SILT



314
Clayey sandy gravelly peaty cobbly SILT



316
Sandy cobbly SILT



317
Sandy bouldery SILT

CAUSEWAY GEOTECH

Stratum Legend Key


318
Sandy peaty SILT


319
Sandy gravelly peaty SILT


320
Sandy gravelly cobbly SILT


321
Sandy gravelly peaty cobbly SILT


322
Gravelly cobbly SILT


323
Gravelly bouldery SILT


324
Gravelly peaty SILT


325
Gravelly peaty cobbly SILT


326
Cobbly SILT


327
Cobbly bouldery SILT


328
Peaty cobbly SILT


329
Clayey cobbly SILT


330
Clayey peaty SILT

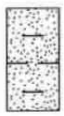

331
Bouldery SILT


332
slightly shelly SILT


333
very shelly SILT


334
Sandy clayey peaty SILT


401
SAND


402
Clayey SAND


403
Silty SAND


404
Gravelly SAND


405
Cobbly SAND


406
Bouldery SAND


407
Clayey silty SAND


408
Clayey silty gravelly SAND


409
Clayey silty gravelly cobbly SAND


410
Clayey gravelly SAND


411
Clayey gravelly cobbly SAND


412
Silty gravelly SAND


413
Silty gravelly cobbly SAND


414
Silty gravelly cobbly bouldery SAND


415
Gravelly cobbly SAND


416
Gravelly cobbly bouldery SAND


417
Gravelly bouldery SAND


418
Cobbly bouldery SAND


430
SAND and GRAVEL


431
Peaty SAND


432
Clayey peaty SAND


433
Silty peaty SAND


434
Gravelly peaty SAND

CAUSEWAY GEOTECH

Stratum Legend Key



435
Cobbly peaty SAND



436
Bouldery peaty SAND



437
Clayey silty peaty SAND



438
Clayey silty gravelly peaty SAND



439
slightly shelly SAND



440
very shelly SAND



441
slightly shelly silty SAND



442
very shelly silty SAND



443
slightly shelly silty gravelly SAND



444
very shelly silty gravelly SAND



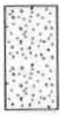
501
GRAVEL



502
Clayey GRAVEL



503
Silty GRAVEL



504
Sandy GRAVEL



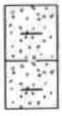
505
Peaty GRAVEL



506
Cobbly GRAVEL



507
Bouldery GRAVEL



508
Clayey silty GRAVEL



509
Clayey sandy GRAVEL



510
Clayey cobbly GRAVEL



511
Clayey bouldery GRAVEL



512
Clayey peaty GRAVEL



513
Clayey silty sandy GRAVEL



514
Clayey silty cobbly GRAVEL



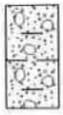
515
Clayey silty bouldery GRAVEL



516
Clayey silty peaty GRAVEL



517
Clayey sandy peaty GRAVEL



518
Clayey silty sandy bouldery GRAVEL



519
Clayey silty sandy peaty GRAVEL



520
Silty sandy GRAVEL



521
Silty cobbly GRAVEL



522
Silty bouldery GRAVEL



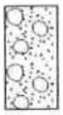
523
Silty peaty GRAVEL



524
Silty peaty sandy GRAVEL



525
Sandy cobbly GRAVEL



526
Sandy bouldery GRAVEL



527
Sandy peaty GRAVEL



528
Silty sandy cobbly GRAVEL



601
PEAT



602
Clayey PEAT

CAUSEWAY GEOTECH

Stratum Legend Key



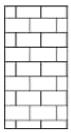
801
Mudstone



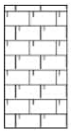
802
Siltstone



803
Sandstone



804
Limestone



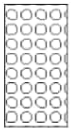
805
Chalk



806
Coal



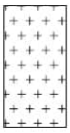
807
Breccia



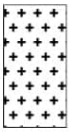
808
Conglomerate



809
Fine grained igneous



810
Medium grained igneous



811
Coarse grained igneous



812
Fine grained metamorphic



813
Medium grained metamorphic



814
Coarse grained metamorphic



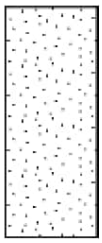
815
Pyroclastic (volcanic ash)



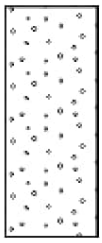
816
Gypsum, rocksalt

CAUSEWAY GEOTECH

Backfill Legend Key



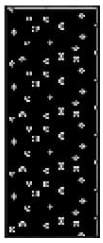
901
Sand backfill



902
Gravel backfill



903
Bentonite



904
Grout



905
Arisings



906
Concrete

CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	RK-10126

Client: Irish Water

Client's Rep: Mott MacDonald

Method	Plant Used	Top (m)	Base (m)	Coordinates
Peat Coring	Russian Peat Corer	0.00	0.40	580777.79 E 674735.70 N

Final Depth: 0.40 m **Start Date:** 26/08/2022 **Driller:**

Elevation: 51.82 mOD **End Date:** **Logger:** JG

Sheet 1 of 1
Scale: 1:11
FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.00 - 0.30	D1							Peaty TOPSOIL.		
0.30 - 0.40	D2				51.52	0.30		Stiff light grey mottled brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to medium.		
					51.42	0.40		End of Borehole at 0.40m		

0.5
1.0
1.5

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter

Remarks

No groundwater encountered

Termination Reason

Refusal of corer at 0.40m

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	RK-10199
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Peat Coring	Russian Peat Corer	0.00	1.00	580813.55 E 674800.71 N

Final Depth:	Start Date:	Driller:	Sheet 1 of 1 Scale: 1:11
1.00 m	26/08/2022		
Elevation: 51.69 mOD	**End Date:**	**Logger:** JG	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.00 - 0.10	D1							Peaty TOPSOIL.		
0.10 - 0.50	D2				51.59	0.10		Soft becoming firm thinly laminated brown mottled grey slightly sandy SILT. Sand is fine to coarse.		
0.50 - 1.00	D3									
					50.69	1.00		End of Borehole at 1.00m		

0.5
1.0
1.5

Water Strikes				Casing Details	
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	To (m)	Diameter

Remarks

No groundwater encountered

Termination Reason

Refusal of corer at 1.00m

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	RK-10288
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Peat Coring	Russian Peat Corer	0.00	1.50	580860.95 E 674876.51 N

Final Depth:	Start Date:	Driller:	Sheet 1 of 1 Scale: 1:11
1.50 m	26/08/2022		
Elevation: 51.67 mOD	**End Date:**	**Logger:** JG	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.00 - 0.20	D1							Peaty TOPSOIL.		
0.20 - 0.50	D2				51.47	0.20		Soft light brown slightly sandy slightly gravelly CLAY with lenses of psuedofibrous dark brown peat and frequent roots and rootlets. Sand is fine to coarse. Gravel is subrounded fine to coarse.		
0.50 - 0.80	D3									
0.80 - 1.30	D4				50.87	0.80		Soft becoming firm thinly laminated light grey slightly sandy SILT. Sand is fine to coarse.		
1.30 - 1.50	D5								▼	
					50.17	1.50		End of Borehole at 1.50m		

0.5
1.0
1.5

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
1.30			

Casing Details

To (m)	Diameter

Remarks

Termination Reason

Refusal of corer at 1.50m

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	RK-10381
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth:	Start Date:	Driller:	
Peat Coring	Russian Peat Corer	0.00	0.40	580916.08 E 674946.74 N	0.40 m	26/08/2022		Sheet 1 of 1 Scale: 1:11
					Elevation: 51.87 mOD	End Date:	Logger: JG	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.00 - 0.10	D1							Peaty TOPSOIL.		
0.10 - 0.40	D2				51.76	0.10		Light grey mottled orangish brown slightly gravelly fine to coarse SAND. Gravel is subrounded fine to coarse.		
					51.46	0.40		End of Borehole at 0.40m		

0.5
1.0
1.5

Water Strikes				Casing Details	
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	To (m)	Diameter

Remarks

No groundwater encountered

Termination Reason	Last Updated
Refusal of corer at 0.40m	13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	RK-31416
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth: 0.00 m	Start Date: 25/08/2022	Driller:	Sheet 1 of 1 Scale: 1:11
				592308.02 E 688993.66 N	Elevation: 71.19 mOD	End Date:	Logger:	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill

0.5

1.0

1.5

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter

Remarks

Russian Peat Core Location - no penetration

Termination Reason

Refusal of corer at GL

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	RK-31488
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth: 0.00 m	Start Date: 25/08/2022	Driller:	Sheet 1 of 1 Scale: 1:11
				592368.14 E 689034.79 N	Elevation: 71.21 mOD	End Date:	Logger:	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill

0.5

1.0

1.5

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter

Remarks

Russian Peat Core Location - no penetration

Termination Reason

Refusal of corer at GL

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	RK-32740
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth:	Start Date:	Driller:	
				593535.69 E 689344.32 N	0.00 m	25/08/2022		Sheet 1 of 1 Scale: 1:11
					Elevation: 72.05 mOD	End Date:	Logger:	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill

0.5
1.0
1.5

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter

Remarks

Russian Peat Core Location - no penetration

Termination Reason

Refusal of corer at GL

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	RK-32842
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth: 0.00 m	Start Date: 25/08/2022	Driller:	Sheet 1 of 1 Scale: 1:11
				593633.38 E 689317.26 N	Elevation: 71.57 mOD	End Date:	Logger:	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill

0.5
1.0
1.5

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter

Remarks

Russian Peat Core Location - no penetration

Termination Reason

Refusal of corer at GL

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	RK-32942
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth:	Start Date:	Driller:	
				593727.23 E 689282.53 N	0.00 m	25/08/2022		Sheet 1 of 1 Scale: 1:11
					Elevation: 70.80 mOD	End Date:	Logger:	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill

0.5
1.0
1.5

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter

Remarks

Russian Peat Core Location - no penetration

Termination Reason

Refusal of corer at GL

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	RK-33039
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth: 0.00 m	Start Date: 25/08/2022	Driller:	Sheet 1 of 1 Scale: 1:11
				593819.82 E 689249.57 N	Elevation: 71.12 mOD	End Date:	Logger:	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill

0.5
1.0
1.5

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter

Remarks

Russian Peat Core Location - no penetration

Termination Reason

Refusal of corer at GL

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	RK-33141
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth: 0.00 m	Start Date: 25/08/2022	Driller:	Sheet 1 of 1 Scale: 1:11
				593913.78 E 689217.37 N	Elevation: 71.01 mOD	End Date:	Logger:	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill

0.5

1.0

1.5

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter

Remarks

Russian Peat Core Location - no penetration

Termination Reason

Refusal of corer at GL

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	RK-33241
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth:	Start Date:	Driller:	
				594012.66 E 689193.25 N	0.00 m	25/08/2022		Sheet 1 of 1 Scale: 1:11
					Elevation: 71.30 mOD	End Date:	Logger:	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill

0.5
1.0
1.5

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter

Remarks

Russian Peat Core Location - no penetration

Termination Reason

Refusal of corer at GL

Last Updated

13/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	RK-33347
	Client: Irish Water	
	Client's Rep: Mott MacDonald	

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth:	Start Date:	Driller:	
				594116.45 E 689175.91 N	0.00 m	25/08/2022		Sheet 1 of 1 Scale: 1:11
					Elevation: 72.79 mOD	End Date:	Logger:	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill

0.5
1.0
1.5

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter

Remarks

Russian Peat Core Location - no penetration

Termination Reason

Refusal of corer at GL

Last Updated

13/03/2023

AGS

Project No.: 21-1682
Project: Eastern and Midlands Region WSP GI - Lot 1 Pipeline

Peat Probe Results

Peat Probe Location	Depth of penetration (m)	Easting	Northing	Elevation
PP-10104	0.00	580792.890	674733.025	51.732
PP-10157	0.80	580811.353	674750.835	52.016
PP-10158	0.50	580775.632	674774.890	51.766
PP-10160	0.70	580794.010	674764.249	51.685
PP-10236	0.80	580803.921	674852.189	51.737
PP-10239	0.80	580795.579	674843.635	51.878
PP-10242	1.20	580814.682	674868.731	51.791
PP-10336	1.70	580869.411	674930.888	51.691
PP-10337	0.00	580883.243	674915.835	51.638
PP-10339	0.00	580902.653	674908.018	52.010
PP-10422	0.50	580925.916	674981.563	51.909
PP-10424	0.50	580943.964	674976.783	52.017
PP-10433	0.30	580957.454	674959.394	52.191
PP-31366	0.00	592254.126	688985.974	72.811
PP-31374	0.00	592272.041	688971.947	72.464
PP-31375	0.00	592286.097	688950.926	72.240
PP-31457	0.10	592332.124	689031.797	71.119
PP-31459	0.20	592344.149	689017.281	71.167
PP-31462	0.10	592358.844	688994.149	71.238
PP-31513	0.00	592377.478	689062.262	71.264
PP-31518	0.00	592394.627	689044.620	71.360
PP-31531	0.00	592422.355	689028.055	71.649
PP-32643	0.00	593443.005	689378.204	72.610
PP-32691	0.00	593488.111	689351.188	72.384
PP-32722	0.00	593515.980	689325.632	73.179
PP-32774	0.00	593571.501	689365.270	71.529
PP-32791	0.00	593586.929	689335.217	72.032
PP-32816	0.00	593604.345	689310.427	71.998
PP-32893	0.00	593690.339	689322.114	70.732
PP-32894	0.00	593683.236	689300.489	71.008
PP-32895	0.00	593675.059	689285.415	71.617
PP-32991	0.00	593777.746	689268.280	71.041
PP-32995	0.00	593785.688	689288.325	70.934
PP-32998	0.00	593770.535	689239.202	71.173
PP-33084	0.00	593869.255	689250.418	70.865
PP-33091	0.00	593865.736	689228.919	71.226
PP-33100	0.00	593863.583	689201.917	71.330
PP-33189	0.00	593964.373	689227.423	70.913
PP-33191	0.00	593962.448	689203.919	71.074
PP-33195	0.10	593962.556	689178.881	71.369
PP-33286	0.00	594057.293	689203.946	71.673
PP-33291	0.00	594059.983	689183.415	71.756
PP-33294	0.00	594058.548	689159.552	71.847
PP-33383	0.00	594146.908	689204.111	74.017
PP-33385	0.00	594155.899	689163.606	74.175
PP-33386	0.00	594153.793	689184.068	74.099

CAUSEWAY GEOTECH

APPENDIX 4E

FIELD / IN-SITU TEST RESULTS



VARIABLE HEAD PERMEABILITY TEST (BOREHOLE)

Project Name: Water Supply Project
Project No.: 21-1682
Test Date: 12/09/2022

Borehole No.: BH-199
Test No.: 1
Type of test: Falling Head

Diameter of casing (D):	0.20m
Height of top of casing above ground level:	1.20m
Depth to bottom of casing below ground level:	2.80m
Depth to bottom of borehole below ground level:	3.30m
Length of the test section (L):	0.50m
Standing ground water level (SWL) below ground level:	Dry

DATUM: Water level measured from top of casing, i.e. SWL is 4.50m below datum

TIME ELAPSED (mins)	WATER LEVEL (m)	HEAD H (m)	HEAD RATIO H/Ho
0	0.00	4.50	1.00
1	0.05	4.45	0.99
2	0.12	4.38	0.97
3	0.20	4.30	0.96
4	0.27	4.23	0.94
5	0.30	4.20	0.93
10	0.40	4.10	0.91
20	0.44	4.06	0.90
30	0.48	4.02	0.89
40	0.50	4.00	0.89
50	0.56	3.94	0.88
60	0.58	3.92	0.87
75	0.61	3.89	0.86
90	0.62	3.88	0.86
105	0.62	3.88	0.86
120	0.63	3.87	0.86

CALCULATION OF PERMEABILITY:

Employing Horslev Method (1951)

$$k = \frac{2.3A}{F(t_2 - t_1)} \log \frac{h_1}{h_2}$$

where: k is the permeability of soil

A is the cross-section area of borehole/standpipe

F is the shape factor (see below)

h_1 and h_2 are the hydraulic heads measured respectively at the times t1 (start of test) and t2 (0.37 head reached)

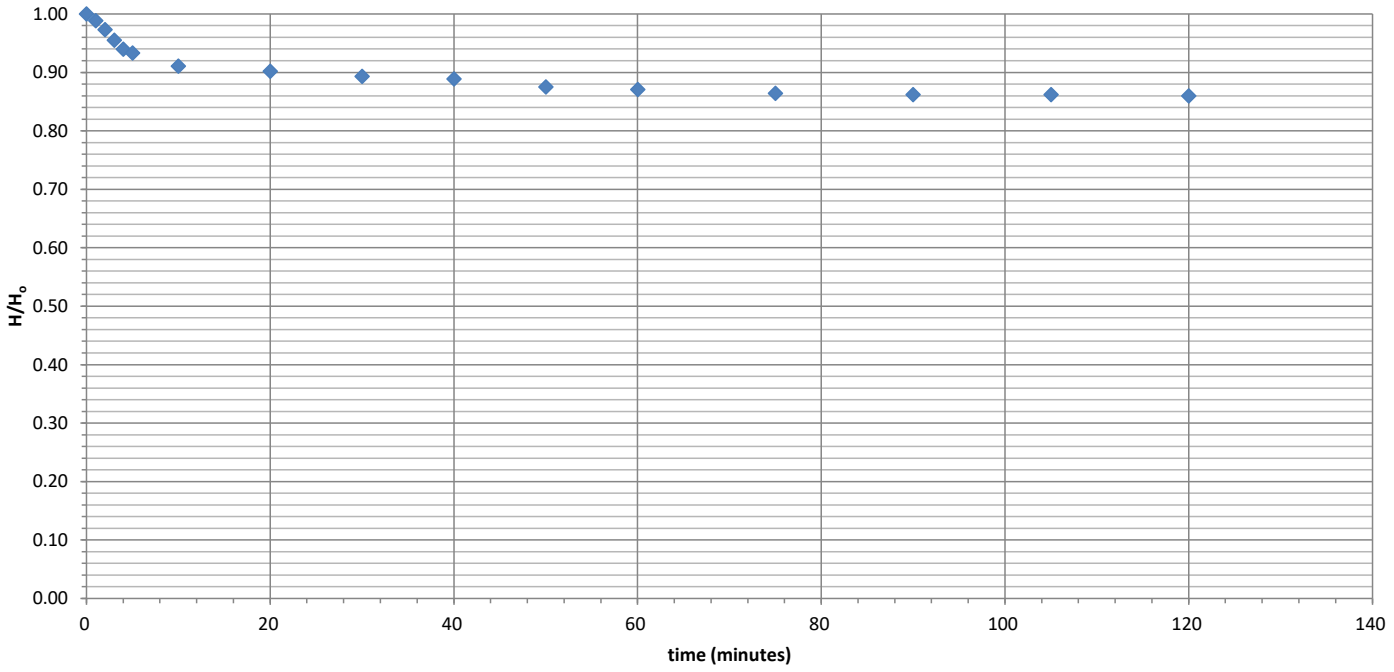
Values for the shape factor (F) are given for various conditions (cases A-E) in Annex B of BS EN ISO 22282-1:2012

L/D is 2.5, so Case D is assumed, therefore:

*F=(2*π*L)/(LN((L/D)+√((L/D)^2)+1))*

i.e. F =	1.91	(m)
A =	0.031	(m^2)
h_1 =	4.50	(m)
h_2 =	1.67	(m)
t_1 =	0	(s)
t_2 =	N/A	(s)

Permeability unable to be calculated due to water not dropping to 37% of initial Head



VARIABLE HEAD PERMEABILITY TEST (BOREHOLE)

Project Name: Water Supply Project
Project No.: 21-1682
Test Date: 26/05/2022

Borehole No.: BH-3588
Test No.: 1
Type of test: Falling Head

Diameter of casing (D):	0.20m
Height of top of casing above ground level:	0.50m
Depth to bottom of casing below ground level:	4.00m
Depth to bottom of borehole below ground level:	5.00m
Length of the test section (L):	1.00m
Standing ground water level (SWL) below ground level:	Dry

DATUM: Water level measured from top of casing, i.e. SWL is 5.50m below datum

TIME ELAPSED (mins)	WATER LEVEL (m)	HEAD H (m)	HEAD RATIO H/Ho
0	0.02	5.48	1.00
3	0.03	5.47	1.00
5	0.05	5.45	0.99
7	0.05	5.45	0.99
10	0.05	5.45	0.99
15	0.05	5.45	0.99
20	0.05	5.45	0.99
30	0.06	5.44	0.99
40	0.06	5.44	0.99
50	0.08	5.42	0.99
60	0.10	5.40	0.99
70	0.14	5.36	0.98
80	0.14	5.36	0.98
90	0.15	5.35	0.98

CALCULATION OF PERMEABILITY:

Employing Horslev Method (1951)

$$k = \frac{2.3A}{F(t_2 - t_1)} \log \frac{h_1}{h_2}$$

where: k is the permeability of soil

A is the cross-section area of borehole/standpipe

F is the shape factor (see below)

h_1 and h_2 are the hydraulic heads measured respectively at the times t1 (start of test) and t2 (0.37 head reached)

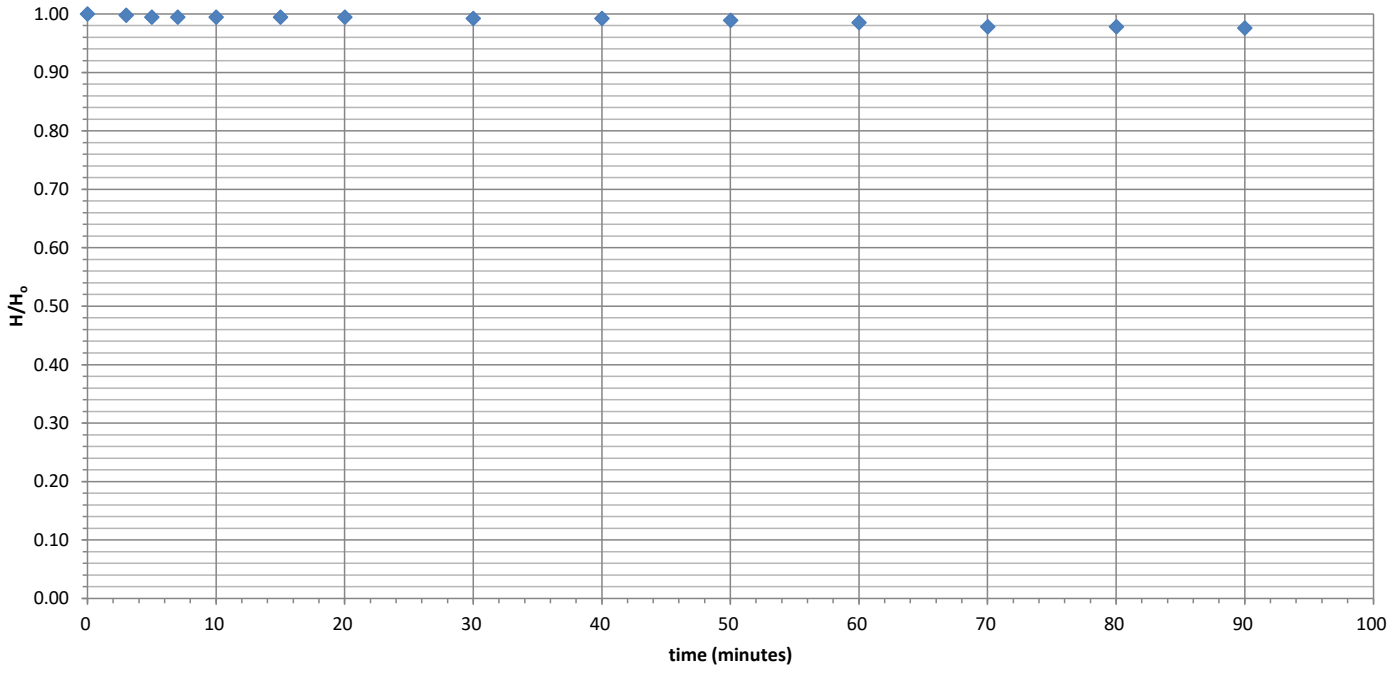
Values for the shape factor (F) are given for various conditions (cases A-E) in Annex B of BS EN ISO 22282-1:2012

L/D is 5.0, so Case D is assumed, therefore:

*F=(2*π*L)/(LN((L/D)+√((L/D)^2)+1))*

i.e. F =	2.72	(m)
A =	0.031	(m^2)
h_1 =	5.48	(m)
h_2 =	2.03	(m)
t_1 =	0	(s)
t_2 =	N/A	(s)

Permeability unable to be calculated due to water not dropping to 37% of initial Head



VARIABLE HEAD PERMEABILITY TEST (BOREHOLE)

Project Name: Water Supply Project
Project No.: 21-1682
Test Date: 31/05/2022

Borehole No.: BH-5260
Test No.: 1
Type of test: Falling Head

Diameter of casing (D):	0.20m
Height of top of casing above ground level:	0.00m
Depth to bottom of casing below ground level:	4.50m
Depth to bottom of borehole below ground level:	5.00m
Length of the test section (L):	0.50m
Standing ground water level (SWL) below ground level:	Dry

DATUM: Water level measured from top of casing, i.e. SWL is 5.00m below datum

TIME ELAPSED (mins)	WATER LEVEL (m)	HEAD H (m)	HEAD RATIO H/Ho
0	0.00	5.00	1.00
1	0.09	4.91	0.98
3	0.12	4.88	0.98
5	0.14	4.86	0.97
10	0.19	4.81	0.96
15	0.23	4.77	0.95
20	0.26	4.74	0.95
25	0.29	4.71	0.94
30	0.33	4.67	0.93
40	0.38	4.62	0.92
50	0.43	4.57	0.91
60	0.48	4.52	0.90
70	0.52	4.48	0.90
80	0.56	4.44	0.89
90	0.59	4.41	0.88
100	0.62	4.38	0.88
120	0.66	4.34	0.87

CALCULATION OF PERMEABILITY:

Employing Horslev Method (1951)

$$k = \frac{2.3A}{F(t_2 - t_1)} \log \frac{h_1}{h_2}$$

where: k is the permeability of soil

A is the cross-section area of borehole/standpipe

F is the shape factor (see below)

h_1 and h_2 are the hydraulic heads measured respectively at the times t1 (start of test) and t2 (0.37 head reached)

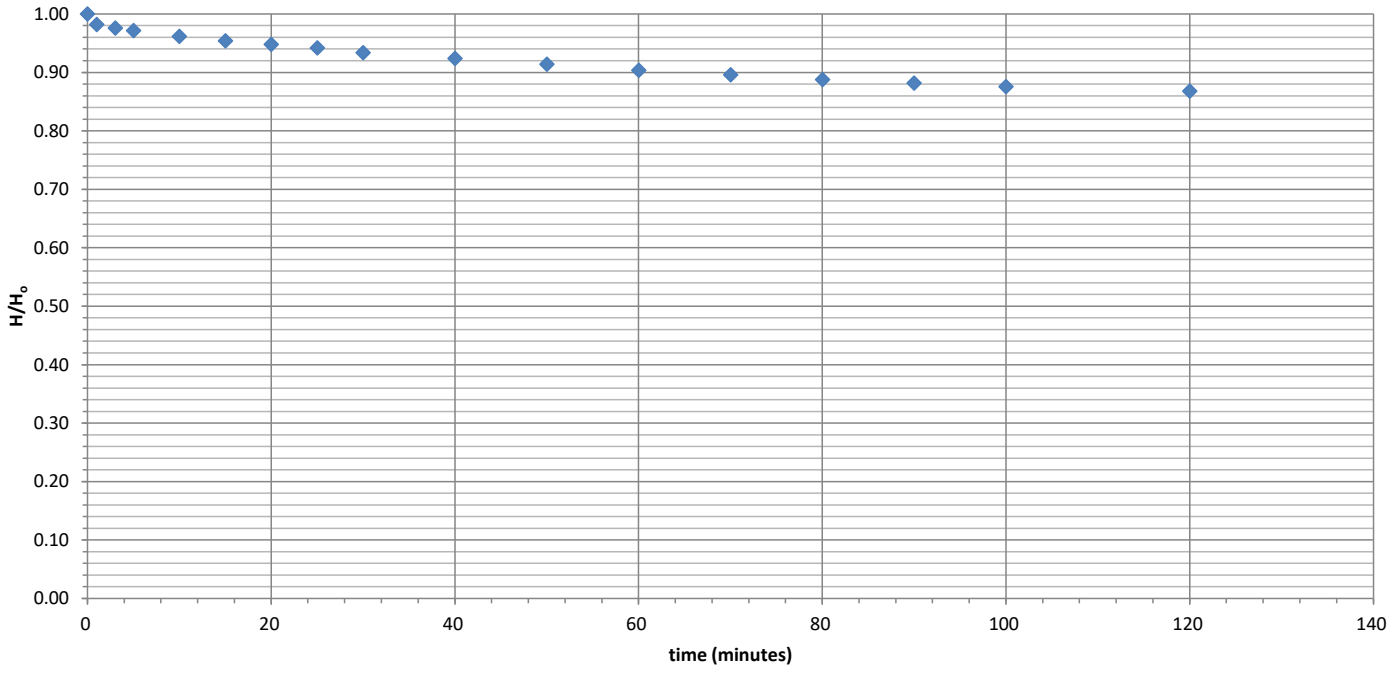
Values for the shape factor (F) are given for various conditions (cases A-E) in Annex B of BS EN ISO 22282-1:2012

L/D is 2.5, so Case D is assumed, therefore:

$F=(2*\pi*L)/(LN((L/D)+\sqrt{((L/D)^2)+1}))$

i.e.	F =	1.91 (m)
	A =	0.031 (m^2)
	h_1 =	5.00 (m)
	h_2 =	1.85 (m)
	t_1 =	0 (s)
	t_2 =	N/A (s)

Permeability unable to be calculated due to water not dropping to 37% of initial Head



VARIABLE HEAD PERMEABILITY TEST (BOREHOLE)

Project Name: Water Supply Project
Project No.: 21-1682
Test Date: 30/06/2022

Borehole No.: BH-6016
Test No.: 1
Type of test: Falling Head

Diameter of casing (D):	0.20m
Height of top of casing above ground level:	0.40m
Depth to bottom of casing below ground level:	4.20m
Depth to bottom of borehole below ground level:	4.70m
Length of the test section (L):	0.50m
Standing ground water level (SWL) below ground level:	Dry

DATUM: Water level measured from top of casing, i.e. SWL is 5.10m below datum

TIME ELAPSED (mins)	WATER LEVEL (m)	HEAD H (m)	HEAD RATIO H/Ho
0	1.27	3.83	1.00
1	1.58	3.52	0.92
2	1.99	3.11	0.81
3	2.29	2.81	0.73
4	2.51	2.59	0.68
5	2.68	2.42	0.63
10	3.02	2.08	0.54
15	3.12	1.98	0.52
20	3.19	1.91	0.50
25	3.24	1.86	0.49
30	3.28	1.82	0.48
45	3.41	1.69	0.44
60	3.52	1.58	0.41
75	3.52	1.58	0.41
90	3.52	1.58	0.41
105	3.52	1.58	0.41
120	3.52	1.58	0.41

CALCULATION OF PERMEABILITY:

Employing Horslev Method (1951)

$$k = \frac{2.3A}{F(t_2 - t_1)} \log \frac{h_1}{h_2}$$

where: k is the permeability of soil

A is the cross-section area of borehole/standpipe

F is the shape factor (see below)

h_1 and h_2 are the hydraulic heads measured respectively at the times t1 (start of test) and t2 (0.37 head reached)

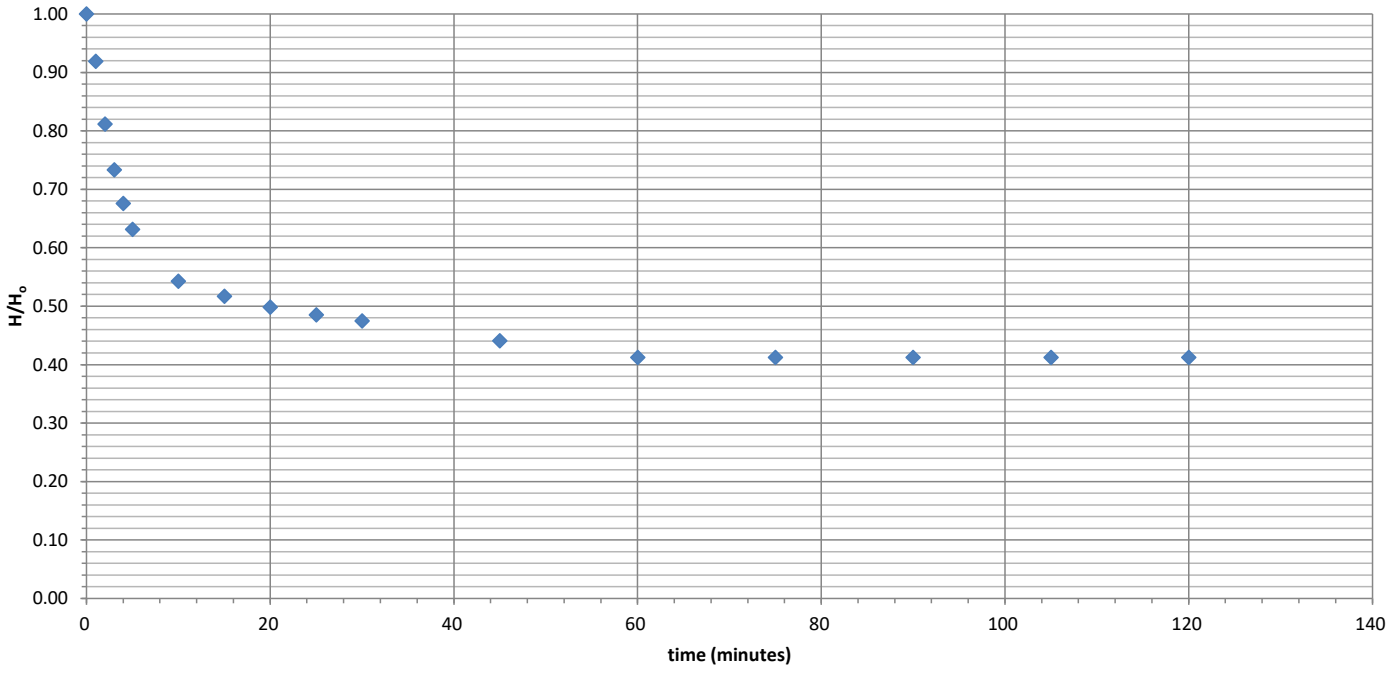
Values for the shape factor (F) are given for various conditions (cases A-E) in Annex B of BS EN ISO 22282-1:2012

L/D is 2.5, so Case D is assumed, therefore:

$F=(2*\pi*L)/(LN((L/D)+\sqrt{((L/D)^2)+1}))$

i.e.	F =	1.91 (m)
	A =	0.031 (m^2)
	h_1 =	3.83 (m)
	h_2 =	1.42 (m)
	t_1 =	0 (s)
	t_2 =	N/A (s)

Permeability unable to be calculated due to water not dropping to 37% of initial Head



VARIABLE HEAD PERMEABILITY TEST (BOREHOLE)

Project Name: Water Supply Project
Project No.: 21-1682
Test Date: 26/07/2022

Borehole No.: BH-8940
Test No.: 1
Type of test: Falling Head

Diameter of casing (D):	0.20m
Height of top of casing above ground level:	1.00m
Depth to bottom of casing below ground level:	4.50m
Depth to bottom of borehole below ground level:	5.00m
Length of the test section (L):	0.50m
Standing ground water level (SWL) below ground level:	4.92m

DATUM: Water level measured from top of casing, i.e. SWL is 5.92m below datum

TIME ELAPSED (mins)	WATER LEVEL (m)	HEAD H (m)	HEAD RATIO H/Ho
0	0.00	5.92	1.00
1	0.06	5.86	0.99
2	0.11	5.81	0.98
3	0.16	5.76	0.97
4	0.19	5.73	0.97
5	0.23	5.69	0.96
10	0.51	5.41	0.91
15	0.60	5.32	0.90
20	0.73	5.19	0.88
25	0.81	5.11	0.86
30	0.96	4.96	0.84
45	1.21	4.71	0.80
60	1.35	4.57	0.77
75	1.45	4.47	0.76
90	1.55	4.37	0.74
105	1.64	4.28	0.72
120	1.72	4.20	0.71

CALCULATION OF PERMEABILITY:

Employing Horslev Method (1951)

$$k = \frac{2.3A}{F(t_2 - t_1)} \log \frac{h_1}{h_2}$$

where: k is the permeability of soil

A is the cross-section area of borehole/standpipe

F is the shape factor (see below)

h_1 and h_2 are the hydraulic heads measured respectively at the times t1 (start of test) and t2 (0.37 head reached)

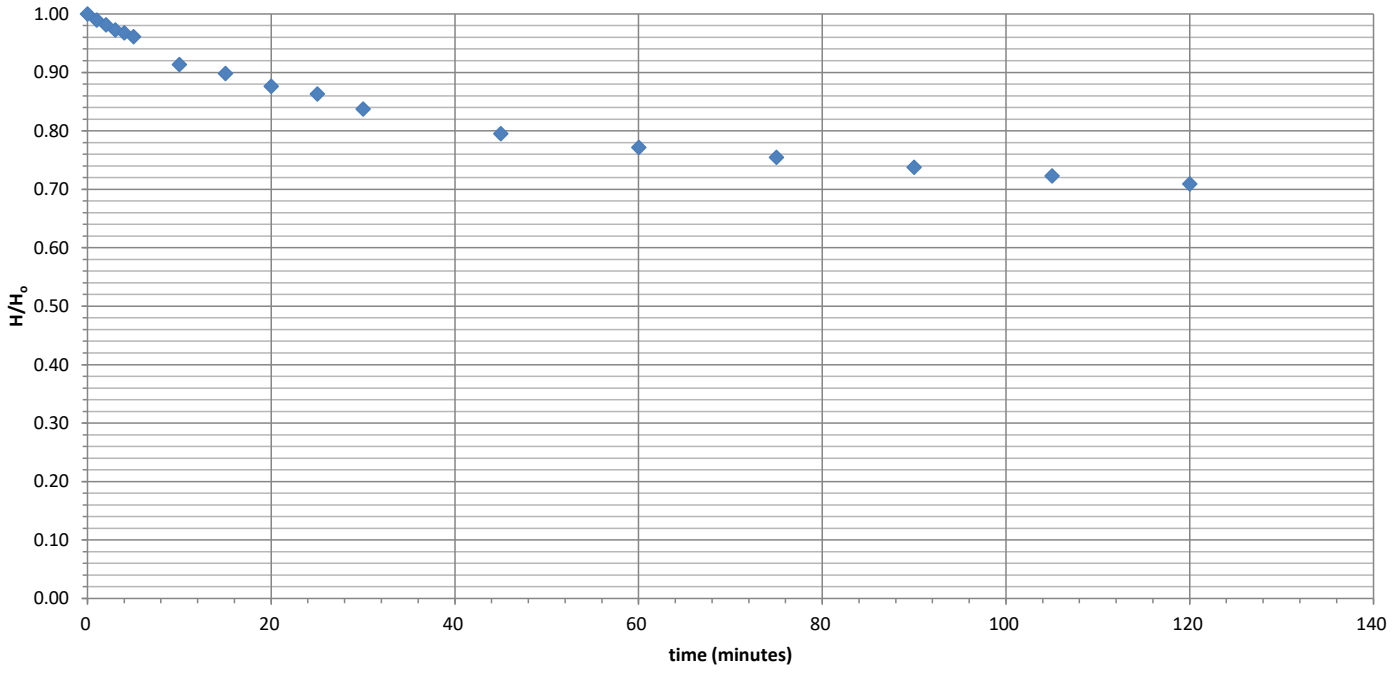
Values for the shape factor (F) are given for various conditions (cases A-E) in Annex B of BS EN ISO 22282-1:2012

L/D is 2.5, so Case D is assumed, therefore:

$F=(2*\pi*L)/(LN((L/D)+\sqrt{((L/D)^2)+1}))$

i.e. F = 1.91 (m)
A = 0.031 (m^2)
h_1 = 5.92 (m)
h_2 = 2.19 (m)
t_1 = 0 (s)
t_2 = N/A (s)

Permeability unable to be calculated due to water not dropping to 37% of initial Head



VARIABLE HEAD PERMEABILITY TEST (BOREHOLE)

Project Name: Water Supply Project
Project No.: 21-1682
Test Date: 15/08/2022

Borehole No.: BH-18440
Test No.: 1
Type of test: Falling Head

Diameter of casing (D):	0.20m
Height of top of casing above ground level:	0.00m
Depth to bottom of casing below ground level:	3.40m
Depth to bottom of borehole below ground level:	4.30m
Length of the test section (L):	0.90m
Standing ground water level (SWL) below ground level:	Dry

DATUM: Water level measured from top of casing, i.e. SWL is 4.30m below datum

TIME ELAPSED (mins)	WATER LEVEL (m)	HEAD H (m)	HEAD RATIO H/Ho
0	0.00	4.30	1.00
1	0.07	4.24	0.98
2	0.07	4.23	0.98
3	0.08	4.23	0.98
4	0.08	4.22	0.98
5	0.09	4.22	0.98
10	0.10	4.20	0.98
15	0.11	4.19	0.97
20	0.12	4.18	0.97
25	0.14	4.17	0.97
30	0.15	4.16	0.97
40	0.17	4.13	0.96
50	0.19	4.11	0.96
60	0.21	4.09	0.95

CALCULATION OF PERMEABILITY:

Employing Horslev Method (1951)

$$k = \frac{2.3A}{F(t_2 - t_1)} \log \frac{h_1}{h_2}$$

where: k is the permeability of soil

A is the cross-section area of borehole/standpipe

F is the shape factor (see below)

h_1 and h_2 are the hydraulic heads measured respectively at the times t1 (start of test) and t2 (0.37 head reached)

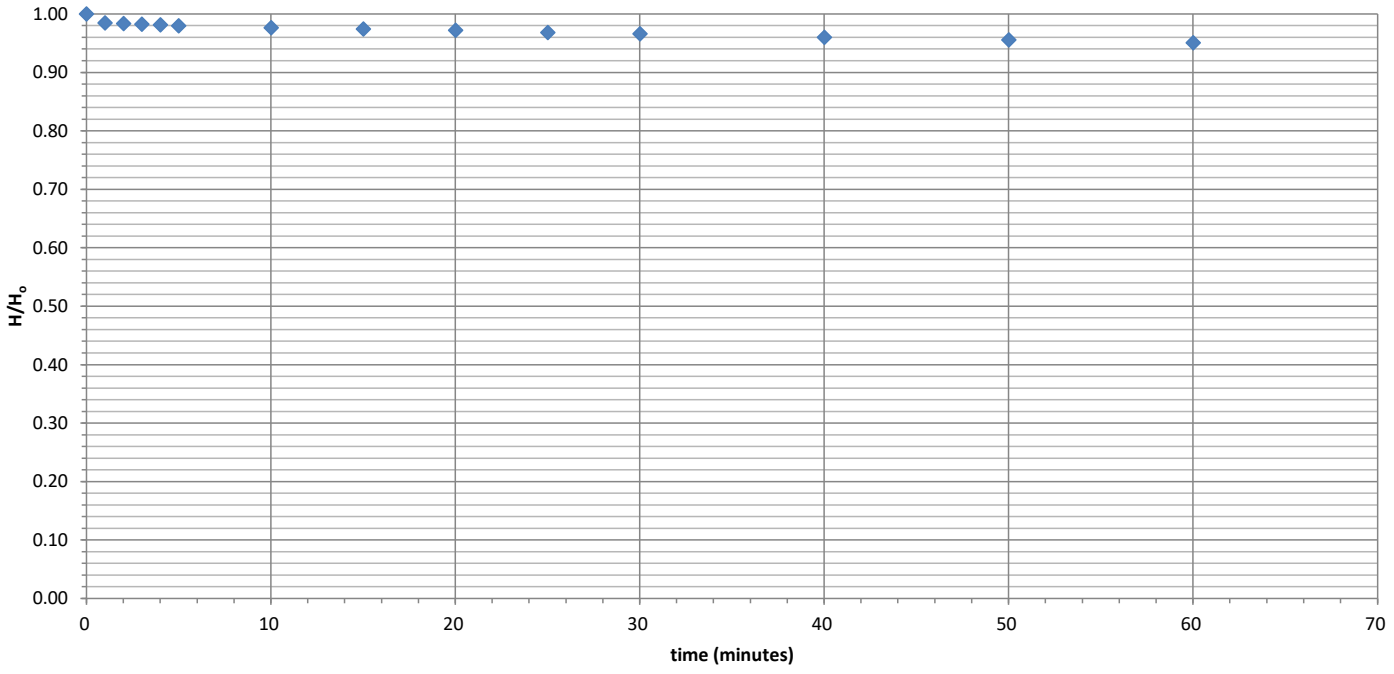
Values for the shape factor (F) are given for various conditions (cases A-E) in Annex B of BS EN ISO 22282-1:2012

L/D is 4.5, so Case D is assumed, therefore:

*F=(2*π*L)/(LN((L/D)+√((L/D)^2)+1))*

i.e. F =	2.56	(m)
A =	0.031	(m^2)
h_1 =	4.30	(m)
h_2 =	1.59	(m)
t_1 =	0	(s)
t_2 =	N/A	(s)

Permeability unable to be calculated due to water not dropping to 37% of initial Head



VARIABLE HEAD PERMEABILITY TEST (BOREHOLE)

Project Name: Water Supply Project
Project No.: 21-1682
Test Date: 31/05/2022

Borehole No.: BH-27000
Test No.: 1
Type of test: Falling Head

Diameter of casing (D):	0.20m
Height of top of casing above ground level:	0.59m
Depth to bottom of casing below ground level:	1.00m
Depth to bottom of borehole below ground level:	1.50m
Length of the test section (L):	0.50m
Standing ground water level (SWL) below ground level:	Dry

DATUM: Water level measured from top of casing, i.e. SWL is 2.09m below datum

TIME ELAPSED (mins)	WATER LEVEL (m)	HEAD H (m)	HEAD RATIO H/Ho
0	0.80	1.29	1.00
1	1.10	0.99	0.77
1.5	1.30	0.79	0.61
2	1.52	0.57	0.44
2.5	1.68	0.41	0.32
3	1.79	0.30	0.23
3.5	1.86	0.23	0.18
4	1.89	0.20	0.16
4.5	1.92	0.17	0.13
5	1.94	0.15	0.12
10	2.02	0.07	0.05
20	2.05	0.04	0.03
30	2.10	0.01	0.01

CALCULATION OF PERMEABILITY:

Employing Horslev Method (1951)

$$k = \frac{2.3A}{F(t_2 - t_1)} \log \frac{h_1}{h_2}$$

where: k is the permeability of soil

A is the cross-section area of borehole/standpipe

F is the shape factor (see below)

h_1 and h_2 are the hydraulic heads measured respectively at the times t1 (start of test) and t2 (0.37 head reached)

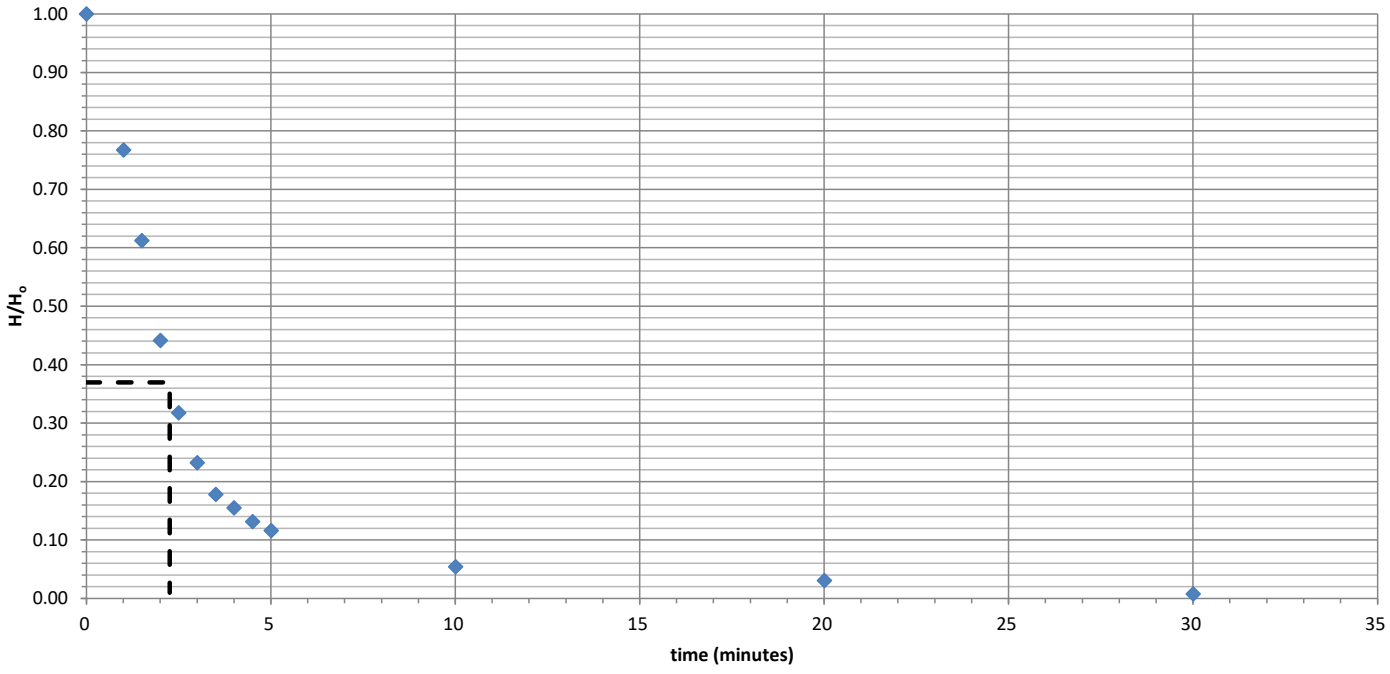
Values for the shape factor (F) are given for various conditions (cases A-E) in Annex B of BS EN ISO 22282-1:2012

L/D is 2.5, so Case D is assumed, therefore:

*F=(2*π*L)/(LN((L/D)+√((L/D)^2)+1))*

i.e.	F =	1.91 (m)
	A =	0.031 (m^2)
	h_1 =	1.29 (m)
	h_2 =	0.48 (m)
	t_1 =	0 (s)
	t_2 =	135 (s)

hence, k = 1.21E-04 m/s



VARIABLE HEAD PERMEABILITY TEST (BOREHOLE)

Project Name: Water Supply Project
Project No.: 21-1682
Test Date: 20/05/2022

Borehole No.: BH-30414
Test No.: 1
Type of test: Falling Head

Diameter of casing (D):	0.20m
Height of top of casing above ground level:	1.00m
Depth to bottom of casing below ground level:	4.10m
Depth to bottom of borehole below ground level:	5.10m
Length of the test section (L):	1.00m
Standing ground water level (SWL) below ground level:	Dry

DATUM: Water level measured from top of casing, i.e. SWL is 6.10m below datum

TIME ELAPSED (mins)	WATER LEVEL (m)	HEAD H (m)	HEAD RATIO H/Ho
0	0.08	6.02	1.00
1	0.13	5.97	0.99
3	0.25	5.85	0.97
5	0.32	5.78	0.96
7	0.40	5.70	0.95
10	0.48	5.62	0.93
15	0.59	5.51	0.92
20	0.68	5.42	0.90
25	0.72	5.38	0.89
30	0.78	5.32	0.88
40	0.89	5.21	0.87
50	1.10	5.00	0.83
60	1.06	5.04	0.84
70	1.11	4.99	0.83
80	1.20	4.90	0.81
90	1.27	4.83	0.80
120	1.39	4.71	0.78

CALCULATION OF PERMEABILITY:

Employing Horslev Method (1951)

$$k = \frac{2.3A}{F(t_2 - t_1)} \log \frac{h_1}{h_2}$$

where: k is the permeability of soil

A is the cross-section area of borehole/standpipe

F is the shape factor (see below)

h_1 and h_2 are the hydraulic heads measured respectively at the times t1 (start of test) and t2 (0.37 head reached)

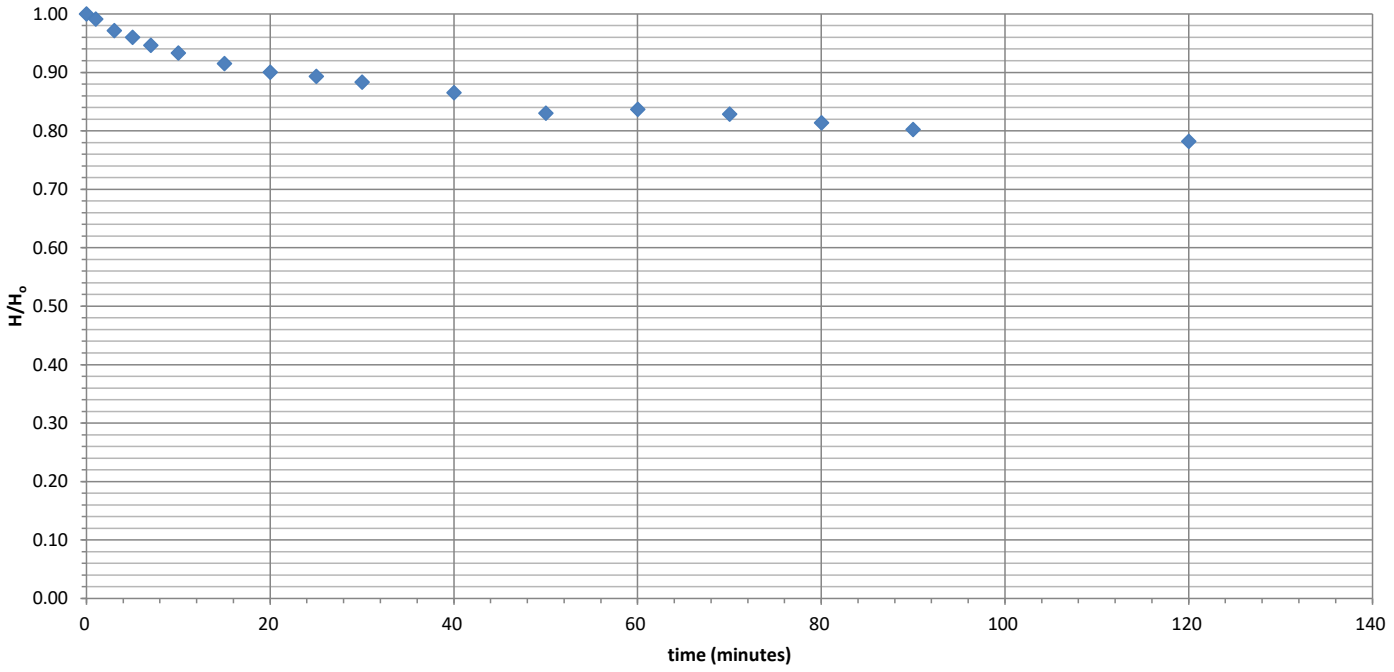
Values for the shape factor (F) are given for various conditions (cases A-E) in Annex B of BS EN ISO 22282-1:2012

L/D is 5.0, so Case D is assumed, therefore:

*F=(2*π*L)/(LN((L/D)+√((L/D)^2)+1))*

i.e.	F =	2.72	(m)
	A =	0.031	(m^2)
	h_1 =	6.02	(m)
	h_2 =	2.23	(m)
	t_1 =	0	(s)
	t_2 =	N/A	(s)

Permeability unable to be calculated due to water not dropping to 37% of initial Head



VARIABLE HEAD PERMEABILITY TEST (BOREHOLE)

Project Name: Water Supply Project
Project No.: 21-1682
Test Date: 16/05/2022

Borehole No.: BH-31910A
Test No.: 1
Type of test: Falling Head

Diameter of casing (D):	0.20m
Height of top of casing above ground level:	1.00m
Depth to bottom of casing below ground level:	5.00m
Depth to bottom of borehole below ground level:	5.50m
Length of the test section (L):	0.50m
Standing ground water level (SWL) below ground level:	Dry

DATUM: Water level measured from top of casing, i.e. SWL is 6.50m below datum

TIME ELAPSED (mins)	WATER LEVEL (m)	HEAD H (m)	HEAD RATIO H/Ho
0	1.30	5.20	1.00
1	1.50	5.00	0.96
3	1.72	4.78	0.92
5	1.81	4.69	0.90
7	1.87	4.63	0.89
10	1.98	4.52	0.87
15	2.09	4.41	0.85
20	2.18	4.32	0.83
25	2.26	4.24	0.82
30	2.31	4.19	0.81
40	2.39	4.11	0.79
50	2.47	4.03	0.78
60	2.54	3.96	0.76
75	2.64	3.86	0.74
90	2.74	3.76	0.72
105	2.83	3.67	0.71
120	2.92	3.58	0.69

CALCULATION OF PERMEABILITY:

Employing Horslev Method (1951)

$$k = \frac{2.3A}{F(t_2 - t_1)} \log \frac{h_1}{h_2}$$

where: k is the permeability of soil

A is the cross-section area of borehole/standpipe

F is the shape factor (see below)

h_1 and h_2 are the hydraulic heads measured respectively at the times t1 (start of test) and t2 (0.37 head reached)

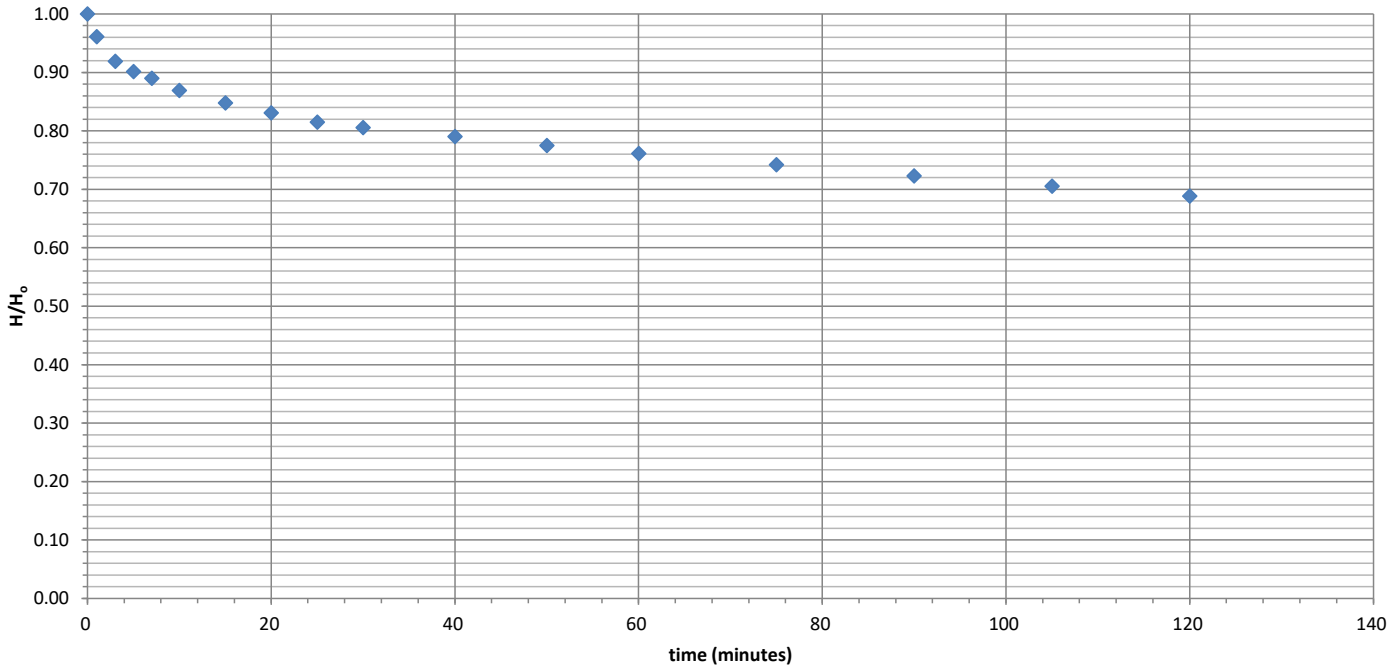
Values for the shape factor (F) are given for various conditions (cases A-E) in Annex B of BS EN ISO 22282-1:2012

L/D is 2.5, so Case D is assumed, therefore:

$F=(2*\pi*L)/(LN((L/D)+\sqrt{((L/D)^2)+1}))$

i.e. F = 1.91 (m)
A = 0.031 (m^2)
h_1 = 5.20 (m)
h_2 = 1.92 (m)
t_1 = 0 (s)
t_2 = N/A (s)

Permeability unable to be calculated due to water not dropping to 37% of initial Head



VARIABLE HEAD PERMEABILITY TEST (BOREHOLE)

Project Name: Water Supply Project
Project No.: 21-1682
Test Date: 11/05/2022

Borehole No.: BH-33000
Test No.: 1
Type of test: Falling Head

Diameter of casing (D):	0.20m
Height of top of casing above ground level:	0.00m
Depth to bottom of casing below ground level:	3.50m
Depth to bottom of borehole below ground level:	4.60m
Length of the test section (L):	1.10m
Standing ground water level (SWL) below ground level:	Dry

DATUM: Water level measured from top of casing, i.e. SWL is 4.60m below datum

TIME ELAPSED (mins)	WATER LEVEL (m)	HEAD H (m)	HEAD RATIO H/Ho
0	2.68	1.92	1.00
1	2.70	1.90	0.99
3	2.71	1.89	0.98
5	2.72	1.88	0.98
7	2.73	1.87	0.97
10	2.74	1.86	0.97
15	2.74	1.86	0.97
20	2.75	1.85	0.96
25	2.77	1.83	0.95
30	2.78	1.82	0.95
40	2.78	1.82	0.95
50	2.79	1.81	0.94
60	2.82	1.79	0.93
70	2.83	1.77	0.92
80	2.84	1.76	0.92
90	2.85	1.75	0.91
120	2.88	1.72	0.90

CALCULATION OF PERMEABILITY:

Employing Horslev Method (1951)

$$k = \frac{2.3A}{F(t_2 - t_1)} \log \frac{h_1}{h_2}$$

where: k is the permeability of soil

A is the cross-section area of borehole/standpipe

F is the shape factor (see below)

h_1 and h_2 are the hydraulic heads measured respectively at the times t1 (start of test) and t2 (0.37 head reached)

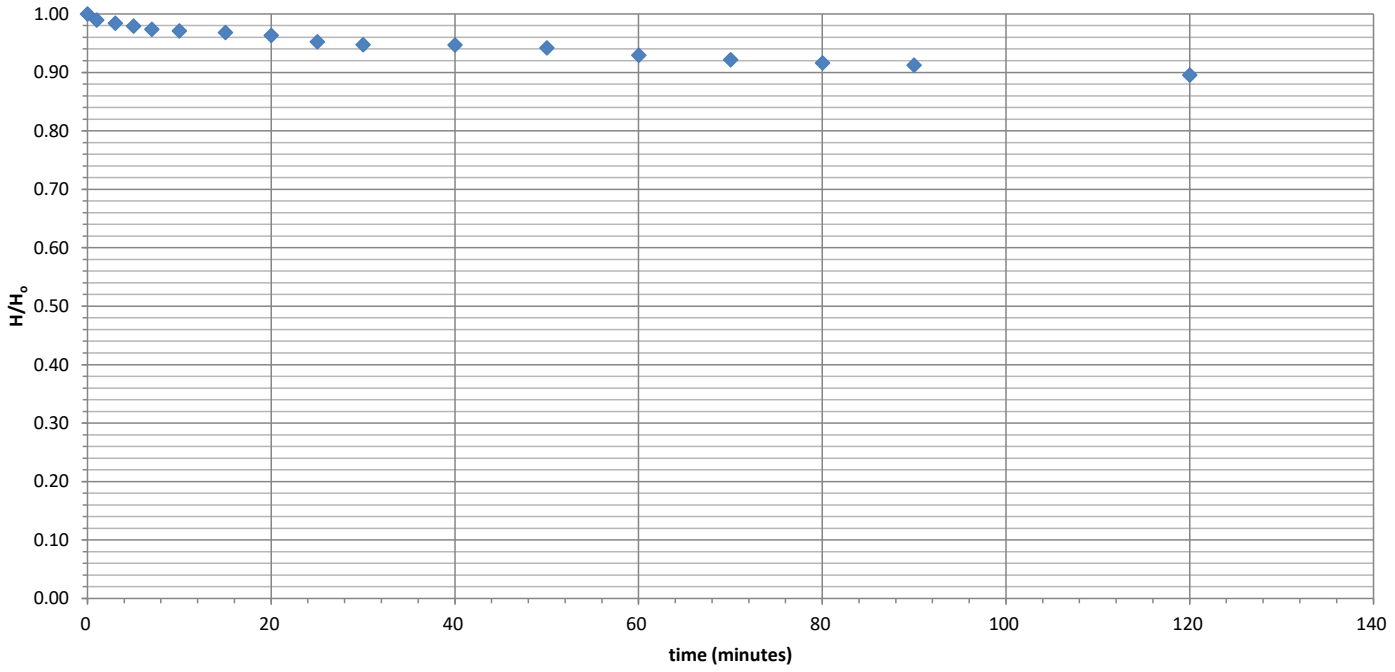
Values for the shape factor (F) are given for various conditions (cases A-E) in Annex B of BS EN ISO 22282-1:2012

L/D is 5.5, so Case D is assumed, therefore:

*F=(2*π*L)/(LN((L/D)+√((L/D)^2)+1))*

i.e. F =	2.87	(m)
A =	0.031	(m^2)
h_1 =	1.92	(m)
h_2 =	0.71	(m)
t_1 =	0	(s)
t_2 =	N/A	(s)

Permeability unable to be calculated due to water not dropping to 37% of initial Head



VARIABLE HEAD PERMEABILITY TEST (BOREHOLE)

Project Name: Water Supply Project
Project No.: 21-1682
Test Date: 10/05/2022

Borehole No.: BH-35473
Test No.: 1
Type of test: Falling Head

Diameter of casing (D):	0.20m
Height of top of casing above ground level:	0.70m
Depth to bottom of casing below ground level:	4.50m
Depth to bottom of borehole below ground level:	5.00m
Length of the test section (L):	0.50m
Standing ground water level (SWL) below ground level:	Dry

DATUM: Water level measured from top of casing, i.e. SWL is 5.70m below datum

TIME ELAPSED (mins)	WATER LEVEL (m)	HEAD H (m)	HEAD RATIO H/Ho
0	0.00	5.70	1.00
1	0.01	5.69	1.00
3	0.06	5.64	0.99
5	0.11	5.59	0.98
7	0.15	5.55	0.97
10	0.20	5.50	0.96
15	0.24	5.46	0.96
20	0.32	5.38	0.94
25	0.38	5.32	0.93
30	0.43	5.27	0.92
40	0.54	5.16	0.91
50	0.63	5.07	0.89
60	0.71	4.99	0.88
70	0.81	4.89	0.86
80	0.88	4.82	0.85
90	0.99	4.71	0.83
120	1.30	4.40	0.77

CALCULATION OF PERMEABILITY:

Employing Horslev Method (1951)

$$k = \frac{2.3A}{F(t_2 - t_1)} \log \frac{h_1}{h_2}$$

where: k is the permeability of soil

A is the cross-section area of borehole/standpipe

F is the shape factor (see below)

h_1 and h_2 are the hydraulic heads measured respectively at the times t1 (start of test) and t2 (0.37 head reached)

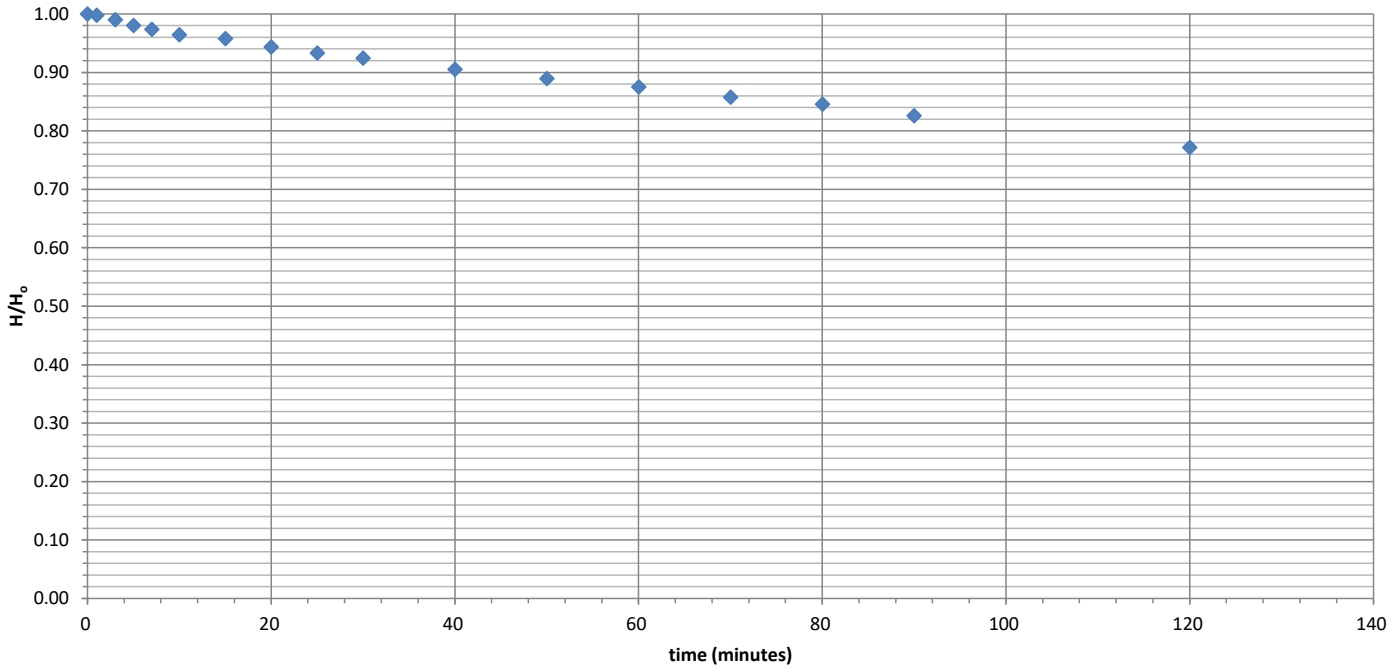
Values for the shape factor (F) are given for various conditions (cases A-E) in Annex B of BS EN ISO 22282-1:2012

L/D is 2.5, so Case D is assumed, therefore:

*F=(2*π*L)/(LN((L/D)+√((L/D)^2)+1))*

i.e.	F =	1.91	(m)
	A =	0.031	(m^2)
	h_1 =	5.70	(m)
	h_2 =	2.11	(m)
	t_1 =	0	(s)
	t_2 =	N/A	(s)

Permeability unable to be calculated due to water not dropping to 37% of initial Head



CAUSEWAY GEOTECH

APPENDIX 4G

GEOPHYSICS REPORT

(Apex Geoservices)



AGP21220_01

Report on the Geophysical Investigation for the Water Supply Project - Eastern & Midlands Region Contract 1 for Causeway Geotech Ltd.

5TH October 2022

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PRIVATE AND CONFIDENTIAL

THE FINDINGS OF THIS REPORT ARE THE RESULT OF A GEOPHYSICAL SURVEY USING NON-INVASIVE SURVEY TECHNIQUES CARRIED OUT AT THE GROUND SURFACE. INTERPRETATIONS CONTAINED IN THIS REPORT ARE DERIVED FROM A KNOWLEDGE OF THE GROUND CONDITIONS, THE GEOPHYSICAL RESPONSES OF GROUND MATERIALS AND THE EXPERIENCE OF THE AUTHOR. APEX GEOPHYSICS LTD. HAS PREPARED THIS REPORT IN LINE WITH BEST CURRENT PRACTICE AND WITH ALL REASONABLE SKILL, CARE AND DILIGENCE IN CONSIDERATION OF THE LIMITS IMPOSED BY THE SURVEY TECHNIQUES USED AND THE RESOURCES DEVOTED TO IT BY AGREEMENT WITH THE CLIENT. THE INTERPRETATIVE BASIS OF THE CONCLUSIONS CONTAINED IN THIS REPORT SHOULD BE TAKEN INTO ACCOUNT IN ANY FUTURE USE OF THIS REPORT.

PROJECT NUMBER	AGP21220		
AUTHOR	**CHECKED**	**REPORT STATUS**	**DATE**
EURGEOL DR. YVONNE O'CONNELL P.GEO, PH.D., M.SC. (GEOPHYSICS)	TONY LOMBARD M.SC (GEOPHYSICS)	V.01	5TH OCTOBER 2022

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1. EXECUTIVE SUMMARY

APEX Geophysics Limited was requested by Causeway Geotech Ltd. on behalf of Ervia to carry out a geophysical survey at selected pipeline locations for the Water Supply Project – Eastern & Midlands Region Contract 1.

The objectives of the geophysical survey are to provide information on the overburden thickness and depth to rock; cohesive strength of the overburden; bedrock lithology; bedrock excavatability; presence of silt and sand lenses; soft ground; and backfilled areas.

The geophysical investigation was carried out between the 24th May and the 5th July 2022 and consisted of 2D Electrical Resistivity Tomography and 2D Seismic Refraction profiling at 16 locations.

The results of the geophysical surveys are detailed in this report and presented on the drawings in Appendix B.

The findings of the geophysical investigation should be reviewed on completion of the direct investigation.

Where bedrock excavation is proposed, a detailed assessment of excavatability should be carried out combining the results of the geophysical survey, any rotary core drilling, strength testing and trial excavation pits using a high-powered excavator such as a CAT 336E or more powerful model. Trial excavations should be attempted down to formation level using a high-powered excavator of similar rating to that to be used during construction. A more detailed discussion of velocity and excavatability is contained in Appendix D.

Foundation design for any structures should take into account the presence of possible open fissures/cavities in the limestone bedrock. Any cavities exposed during stripping of topsoil or excavation of rock should be backfilled in the appropriate manner for karstified limestone areas as advised by a competent geotechnical engineer.

To minimise the risk of subsidence in areas where any karstified limestone is near surface, drains should be sealed, and surface water disposed of away from these areas. Prior to construction a surface water management plan is advised to avoid re-activation of any karst features due to changes in the surface water flow.

2. INTRODUCTION

APEX Geophysics Limited was requested by Causeway Geotech Ltd. on behalf of Ervia to carry out a geophysical survey at selected pipeline locations for the Water Supply Project – Eastern & Midlands Region Contract 1.

The objectives of the geophysical survey are to provide information on the following:

- overburden thickness and depth to rock;
- cohesive strength of the overburden;
- bedrock lithology;
- bedrock excavatability;
- presence of silt and sand lenses;
- soft ground;
- backfilled areas.

2.1 Site Background

The geophysical investigation was carried out at 16 locations between Birdhill and Cloughjordan, Co. Tipperary (Fig 2.1).

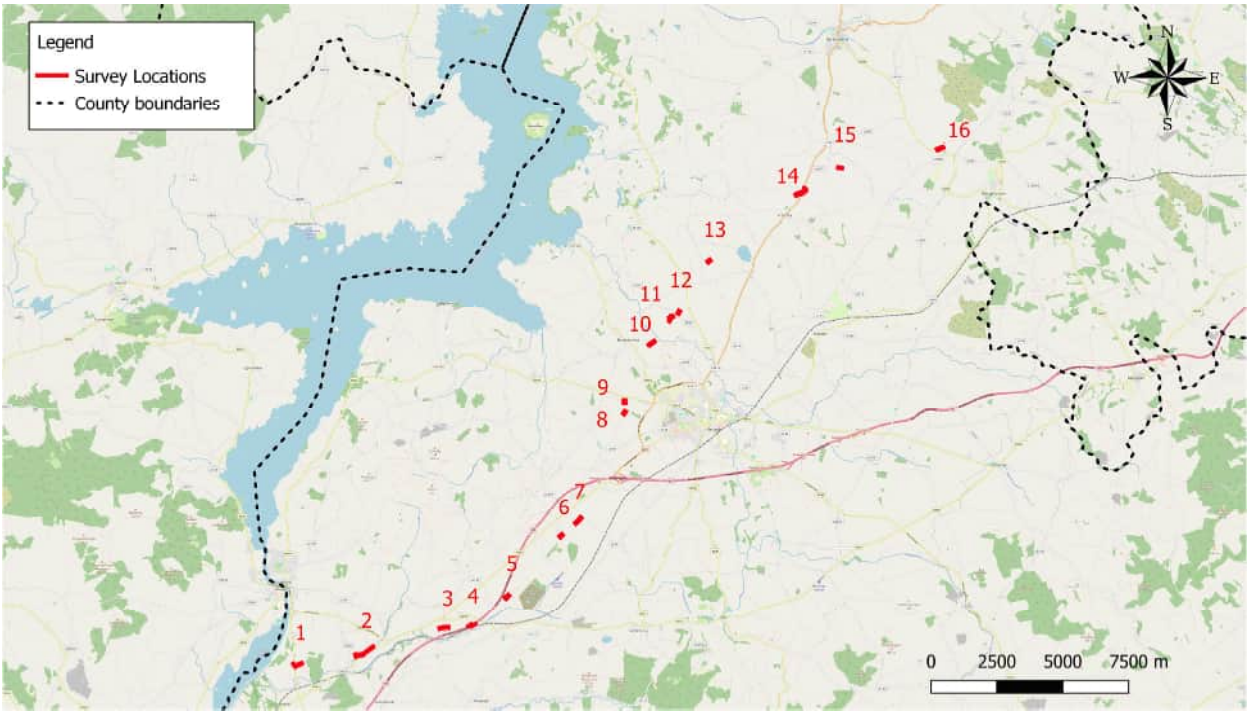

Fig 2.1: Geophysical survey locations 1-16 indicated.

2.1.1 Soils

The Geological Survey of Ireland (GSI) Quaternary soils map for the area (GSIc, 2019) indicates that the survey locations are predominantly centred around areas of alluvium with Locations 1 to 8 in areas of till derived from sandstones and Locations 9 to 16 in areas of till derived from limestone. Some lacustrine sediments and gravels also occur (Fig. 2.2). The soils are listed in the table below. The historical 6 inch sheets for each site were also examined for soil and rock outcrop descriptions.

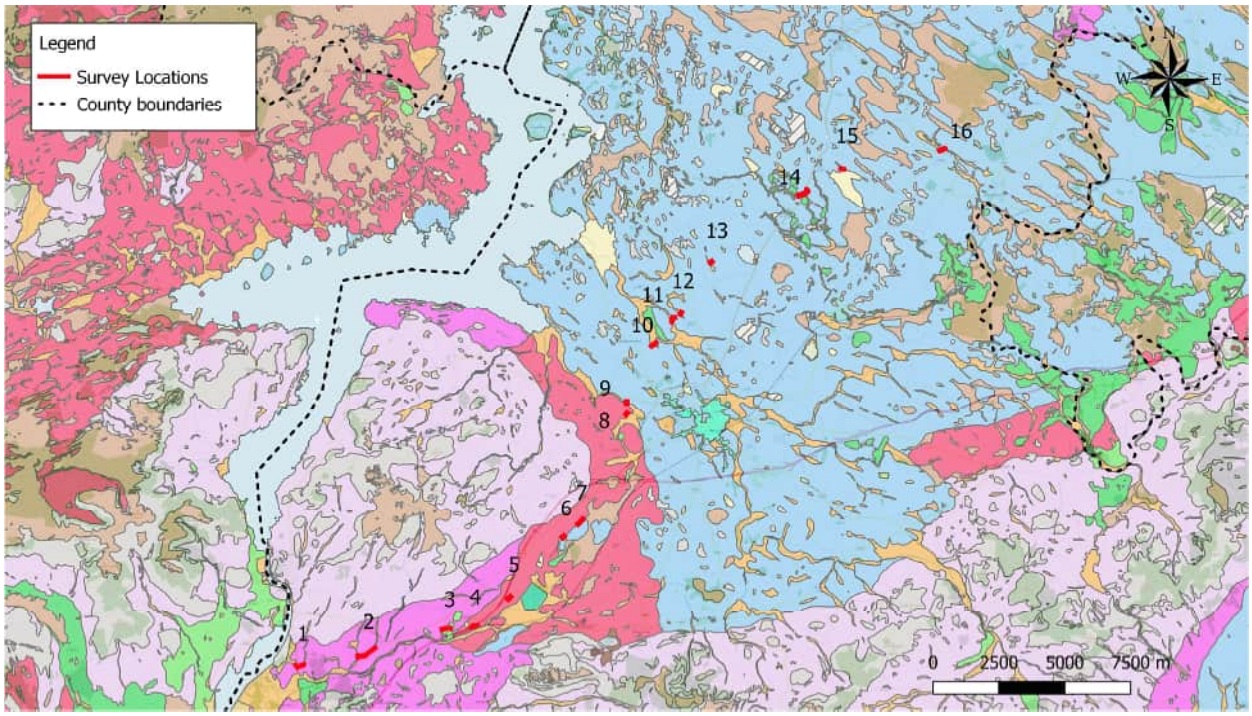

Fig 2.2: The GSI Quaternary sediments map with survey locations marked in red.

Location No.	Location area	Quaternary Sediments
1	Kilmaglasderry	Alluvium & Till derived from Lower Palaeozoic and Devonian sandstones
2	Kilmastulla	Alluvium & Till derived from Lower Palaeozoic and Devonian sandstones
3	Ballinteenoe; Gortnaskehy	Alluvium, Till derived from Devonian sandstones & Gravels derived from Devonian
4	Kilnacranna	Till derived from Devonian sandstones & Lacustrine sediments
5	Castlecranna	Till derived from Devonian sandstones
6	Ballyhisky	Till derived from Devonian sandstones & Peat
7	Carrigatogher (Abbott)	Alluvium & Till derived from Devonian sandstones
8	Tullamore	Alluvium & Till derived from Devonian sandstones
9	Tullamore, Belleen Lower	Alluvium & Till derived from limestones
10	Ballycommon; Ballyhimikin	Alluvium & Till derived from limestones
11	Ballyannymore & Ballyanny Lwr.	Alluvium & Till derived from limestones
12	Ballyanny Lower	Alluvium & Till derived from limestones
13	Loughourna	Alluvium & Till derived from limestones
14	Ardcrony; Lisgarriff	Alluvium, Till derived from limestones & Gravels derived from limestones
15	Ballylusky	Alluvium, Till derived from limestones & Lacustrine sediments
16	Modreeny	Alluvium & Till derived from limestones

2.1.2 Geology

The GSI 1:100k Bedrock Geology map (GSI, 2018) indicates that the survey locations are underlain by 6 lithological formations (Fig. 2.3 and listed in the table below). Faulting in the area is predominantly NE-SW and NNW-SSE.

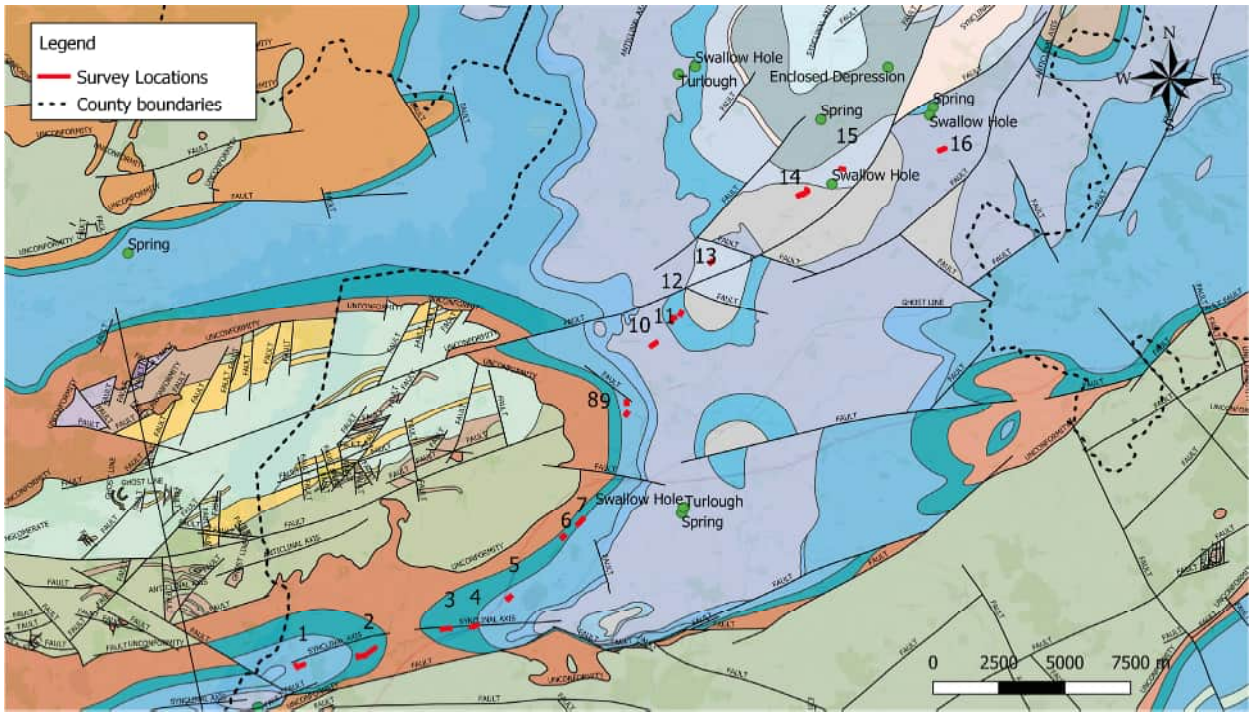

Fig 2.3: The GSI bedrock map with survey locations marked in red.

Loc. No.	Location area	Bedrock Geology
1	Kilmaglasderry	Ballysteen Formation - dark muddy limestone, shale
2	Kilmastulla	Lower Limestone Shale - sandstone, mudstone & thin limestone
3	Ballinteenoe; Gortnaskehy	Lower Limestone Shale - sandstone, mudstone & thin limestone
4	Kilnacranna	Lower Limestone Shale - sandstone, mudstone & thin limestone
5	Castlecranna	Ballysteen Formation - dark muddy limestone, shale
6	Ballyhisky	Lower Limestone Shale - sandstone, mudstone & thin limestone
7	Carrigatogher (Abbott)	Lower Limestone Shale - sandstone, mudstone & thin limestone/Ballysteen Formation - dark muddy limestone, shale
8	Tullamore	Ballysteen Formation - dark muddy limestone, shale
9	Tullamore, Belleen Lower	Ballysteen Formation - dark muddy limestone, shale
10	Ballycommon; Ballyhimikin	Waulsortian Limestones - massive unbedded lime-mudstone
11	Ballyannymore & Ballyanny	Oldcourt cherty Limestone
12	Ballyanny Lower	Oldcourt cherty Limestone
13	Loughourna	Terryglass Formation - grey calcarenitic & oolitic limestone
14	Ardcrony; Lisgarriff	Lucan Formation - dark limestone & shale (`calp)
15	Ballylusky	Terryglass Formation - grey calcarenitic & oolitic limestone
16	Modreeny	Waulsortian Limestones - massive unbedded lime-mudstone

A number of karst features are mapped within the Waulsortian and Terryglass Formations (turloughs, springs and swallow holes) however none are located at any of the survey locations.

2.1.3 Groundwater Vulnerability

The groundwater vulnerability rating across the survey locations (GSIb, 2019) varies from 'Low' to 'High' (Fig. 2.4). The rating at each of the survey locations is listed in the table below.

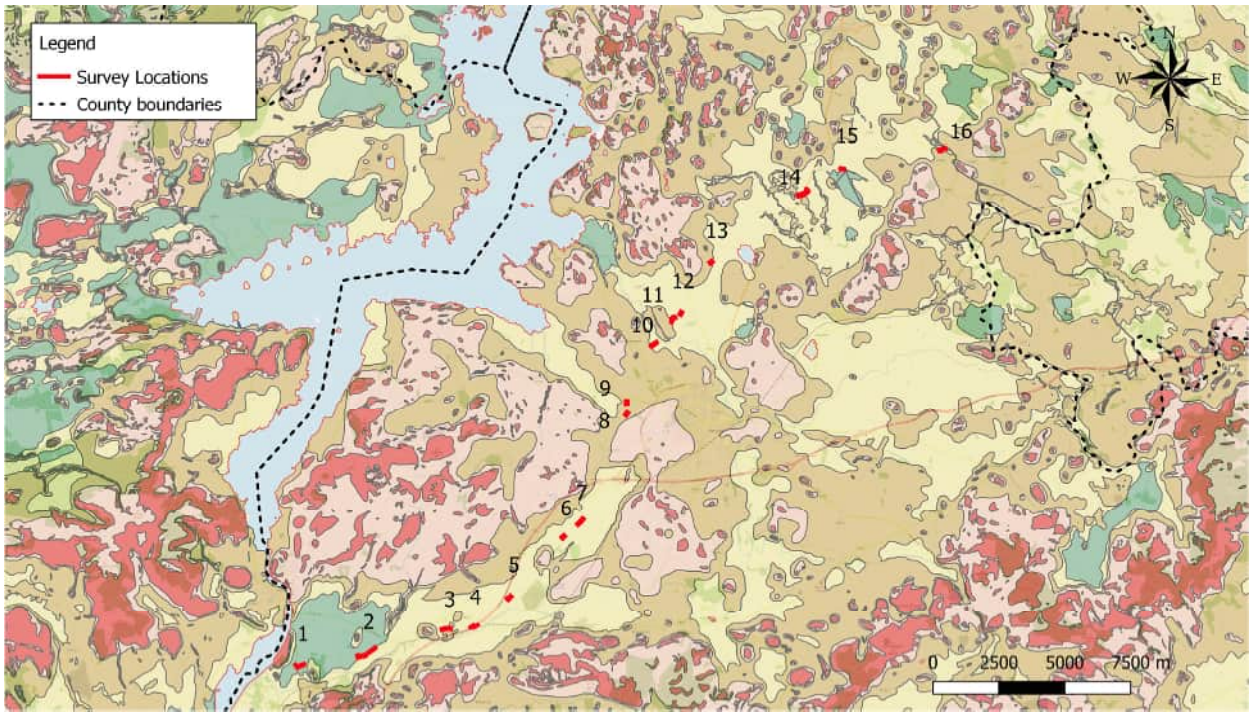

Fig 2.4: The GSI groundwater vulnerability classification map with survey locations marked in red.

Location No.	Location area	Groundwater Vulnerability
1	Kilmaglasderry	Low
2	Kilmastulla	Low - Moderate
3	Ballinteenoe; Gortnaskehy	Moderate
4	Kilnacranna	Moderate
5	Castlecranna	Moderate
6	Ballyhisky	Moderate
7	Carrigatogher (Abbott)	Moderate
8	Tullamore	High
9	Tullamore, Belleen Lower	High
10	Ballycommon; Ballyhimikin	Moderate
11	Ballyannymore & Ballyanny Lwr.	Moderate
12	Ballyanny Lower	Moderate
13	Loughourna	High
14	Ardcrony; Lisgarriff	Moderate - High
15	Ballylusky	Low - Moderate
16	Modreeny	Moderate

2.1.4 Aquifers

The bedrock aquifer classification (GSIa, 2019) indicates 5 bedrock aquifer types across the survey locations (Fig. 2.5). The classification at each of the survey locations is listed in the table below.

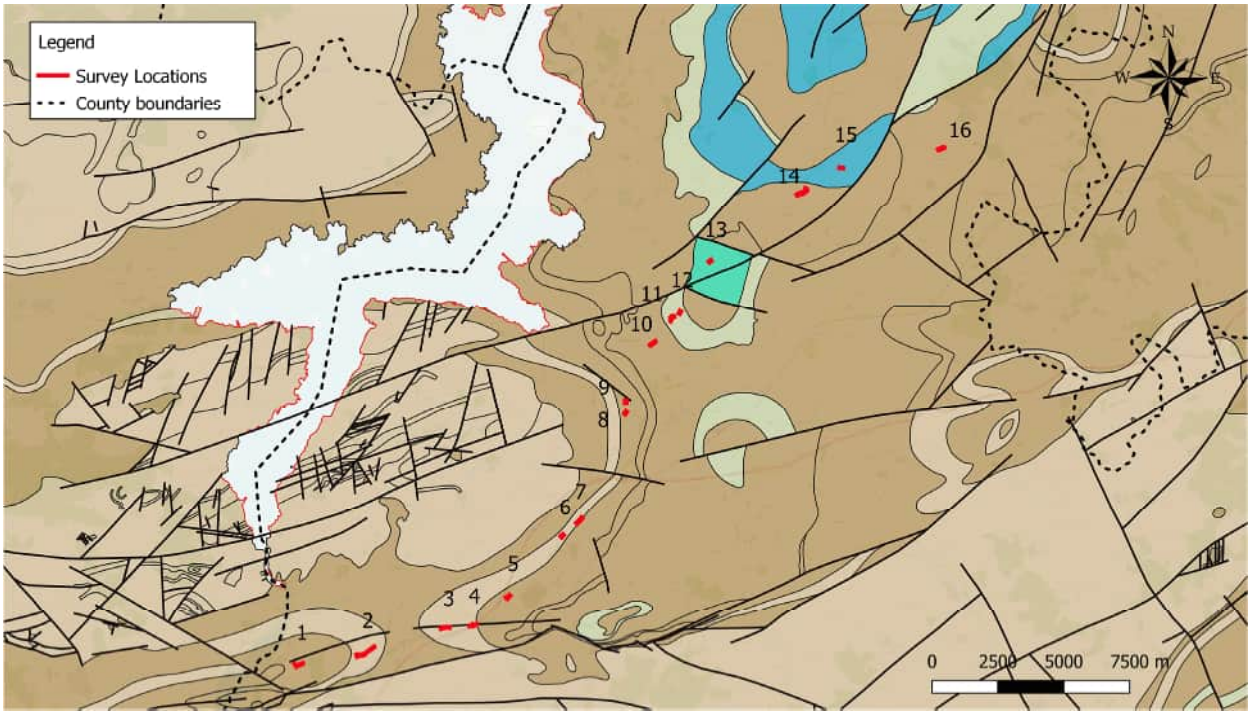

Fig 2.5: The GSI aquifer classification map with survey locations marked in re.

Location No.	Location area	Aquifer Classification
1	Kilmaglasderry	Locally important aquifer - bedrock which is moderately productive only in local zones
2	Kilmastulla	Poor aquifer - bedrock which is generally unproductive except for local zones
3	Ballinteenoe; Gortnaskehy	Poor aquifer - bedrock which is generally unproductive except for local zones
4	Kilnacranna	Poor aquifer - bedrock which is generally unproductive except for local zones
5	Castlecranna	Locally important aquifer - bedrock which is moderately productive only in local zones
6	Ballyhisky	Poor aquifer - bedrock which is generally unproductive except for local zones
7	Carrigatogher (Abbott)	Poor aquifer - bedrock which is generally unproductive except for local zones
8	Tullamore	Locally important aquifer - bedrock which is moderately productive only in local zones
9	Tullamore, Belleen Lower	Locally important aquifer - bedrock which is moderately productive only in local zones
10	Ballycommon; Ballyhimikin	Locally important aquifer - bedrock which is moderately productive only in local zones
11	Ballyannymore & Ballyanny Lwr.	Locally important aquifer - bedrock which is generally moderately productive
12	Ballyanny Lower	Locally important aquifer - bedrock which is generally moderately productive
13	Loughourna	Locally important aquifer - karstified
14	Ardcrony; Lisgarriff	Locally important aquifer - bedrock which is moderately productive only in local zones
15	Ballylusky	Regionally important aquifer - karstified
16	Modreeny	Locally important aquifer - bedrock which is moderately productive only in local zones

2.2 Survey Rationale

The investigation consisted of 2D Electrical Resistivity Tomography (ERT) and Seismic Refraction profiling as set out in the tender documents:

ERT images the resistivity of the materials in the subsurface along a profile to produce a cross-section showing the variation in resistivity with depth, depending on the length of the profile. Each cross-section will be interpreted to determine the material type along the profile at increasing depth, based on the typical resistivities returned for Irish ground materials.

P-wave Seismic Refraction profiling measures the velocity of refracted seismic waves through the overburden and rock material and allows an assessment of the thickness and quality of the materials present to be made. Stiffer and stronger materials usually have higher seismic velocities while soft, loose or fractured materials have lower velocities. This method allows us to profile the depth to the top of the bedrock.

As with all geophysical methods the results are based on indirect readings of the subsurface properties. The effectiveness of the proposed approach will be affected by variations in the ground properties. By combining a number of techniques it is possible to provide a higher quality interpretation and reduce any ambiguities which may otherwise exist. The methods are briefly discussed in Appendix A.

3. RESULTS

The survey was carried out between the 24th May and the 5th July 2022. The geophysical survey locations are indicated on Drawing AGP21220_Overview (Appendix B).

3.1 ERT

ERT Profiles were acquired at 15 of the 16 survey locations (with the exception of Location 6). The resistivity values have been interpreted in conjunction with the seismic refraction data on the following basis:

Resistivity (Ohm-m)	Interpretation
25-50	SILT/CLAY
50-250	Sandy gravelly SILT/CLAY
250-500	Clayey SAND/GRAVEL
500-1000	Silty SAND/GRAVEL
500-1000	SAND/GRAVEL
50-250	MUDSTONE/SHALE (Lucan Formation)
150-400	SANDSTONE/MUDSTONE/LIMESTONE (Lower Limestone Shale Formation)
175-1500	LIMESTONE/SHALE (Ballysteen Formation)
400-4000	LIMESTONE (Ballysteen Formation)
250-3500	LIMESTONE (Terryglass Formation)
175-20000	LIMESTONE (Waulsortian)
150-25000	LIMESTONE (Oldcourt Formation)

Five soil types have been distinguished based on variations in resistivity values; very low resistivity silt/clay; higher resistivity sandy gravelly clay; and high resistivity silty/clayey sand/gravel and sand/gravel.

Variations in bedrock resistivity occur across the different bedrock lithologies from low resistivity mudstone/shale (50-250 Ohm-m) to high resistivity (up to 25,000 Ohm-m) 'clean' limestone.

3.2 Seismic Refraction P-wave Velocity Profiling

P-wave seismic refraction spreads were acquired at all survey locations. The results are contained in Appendix C. The P-wave seismic velocities can broadly be interpreted as follows:

Seismic Velocity (m/s)	Interpretation	Estimated Stiffness/ Rock Quality	Estimated Excavatability
<1000	Soil	Very Soft-Soft-Firm/Very Loose - Loose-Medium Dense	Diggable
	Highly Weathered Rock	Poor	Diggable – *Rippable
1000-1800	Soil	Firm-Stiff/ Medium Dense-Dense	Diggable
	Moderately Weathered Rock	Poor-Fair	*Rippable – Marginally Rippable
1800-2400	Soil	Very Stiff/ Vey Dense	Diggable
	Moderately to Slightly Weathered Rock	Fair-Good	Break/Blast
>2400	Slightly Weathered – Fresh Bedrock	Good	Break/Blast

**the cut-off velocity for excavatability will be lower where it applies to trenches.*

3.3 Results & Interpretation

3.3.1 Location 1

The survey area is located close to the Ballina Road, in the townland of Kilmaglasderry and consists of open agricultural fields (Fig. 3.3.1a). Topography across the surveyed area ranges from 29.5 mOD to 37.7 mOD.



Fig 3.3.1a: Locations marked with red line.

The soils across the survey area are mapped as till derived from Lower Palaeozoic and Devonian sandstones with alluvium in the west (Fig. 3.3.1b) overlying dark muddy limestone and shale of the Ballysteen Formation.



Fig 3.3.1b: The GSI Quaternary sediments map (locations marked in red).

The geophysical data acquired along these sections included 5 ERT profiles (R32 – R36) and 12 SR profiles S82 – S93. The results are presented on **Drawing AGP21220_01** (Appendix B).

Modelled resistivity values in this area have been interpreted as follows:

Resistivity (Ohm-m)	Interpretation
25-50	SILT/CLAY
50-250	Sandy gravelly SILT/CLAY
250-500	Clayey Sand/Gravel
500-1000	Silty Sand/Gravel
175-1500	LIMESTONE/SHALE (Ballysteen Formation)

The seismic data indicated 4 subsurface velocity layers:

Layer	Velocity (m/s)	Ave. (m/s)	Interpretation	Estimated Stiffness/ Rock Quality	Estimated Excavatability
1	139-370	205	Soils	Very Soft-Soft /Very Loose-Loose	Diggable
2	333-1483	805	Soils	Firm-Stiff/ Medium Dense-Dense	Diggable
3	1860-2311	2065	Soils	Very Stiff/ Very Dense	Diggable
			Moderately -Slightly weathered/fractured Bedrock	Fair	Break/Blast
4	3500-4835	4165	Slightly weathered – Fresh Bedrock	Good	Break/Blast

The combined results have been summarised as follows:

Layer	Velocity (m/s)	Resistivity (Ohm-m)	Interpretation	Estimated Stiffness/ Rock Quality	Estimated Excavatability
1	139-370	50-250	Sandy gravelly SILT/CLAY	Very Soft-Soft	Diggable
		250-500	Clayey Sand/Gravel	Very Loose-Loose	
		500-1000	Silty Sand/Gravel		
2	333-1483	50-250	Sandy gravelly SILT/CLAY	Firm-Stiff	Diggable
		250-500	Clayey Sand/Gravel	Medium Dense-Dense	
		500-1000	Silty Sand/Gravel		
3	1860-2311	50-250	Sandy gravelly SILT/CLAY	Very Stiff	Diggable
		50-250	Sandy gravelly SILT/CLAY		
		250-500	Clayey Sand/Gravel	Very Dense	
4	3500-4835	175-1500	Slightly weathered – Fresh LIMESTONE/SHALE	Good	Break/Blast

The subsurface layers have been interpreted as comprising of:

- a thin upper layer (0.4 – 1.5 m, average 0.6 m) of soft sandy gravelly SILT/CLAY with loose clayey and/or silty SAND/GRAVEL.
- underlain by a thicker layer (0.4 – 4.0 m, average 1.8 m) of firm to stiff sandy gravelly SILT/CLAY with medium dense to dense clayey and/or silty SAND/GRAVEL in the southwest of R32 and R35.
- underlain by a thick layer of predominantly very stiff SILT/CLAY and sandy gravelly SILT/CLAY with some very dense clayey and/or silty SAND/GRAVEL in the southwest of R32 and R35.
- underlain by slightly weathered/fractured to fresh limestone/shale at depths > 10.4 m bgl (at levels below 24 mOD).

No weathered rock layer has been defined by the geophysical data however there may be some weathered/fractured rock at the base of the very stiff sandy gravelly SILT/CLAY. The seismic velocities indicate that any weathered rock will be moderately to slightly weathered and any excavation will require breaking/blasting.

The velocities indicate that any excavation of the slightly weathered to fresh rock will require breaking/blasting.

3.3.2 Location 2

The survey area is located in the townland of Kilmastulla, north of the R445 and consists of open agricultural fields (Fig. 3.3.2a). Topography across the surveyed area ranges from 45.8 mOD to 59 mOD.



Fig 3.3.2a: Locations marked with red line.

The soils across the survey area are mapped as predominantly alluvium with some till derived from Lower Palaeozoic and Devonian sandstones to the west and northeast (Fig. 3.3.2b) overlying sandstone, mudstone and thin limestone of the Lower Limestone Shale.



Fig 3.3.2b: The GSI Quaternary sediments map (locations marked in red).

The geophysical data acquired along these sections included 5 ERT profiles (R38 – R42) and 21 SR profiles S94 – S126. The results are presented on **Drawing AGP21220_02A and 02B** (Appendix B).

Modelled resistivity values in this area have been interpreted as follows:

Resistivity (Ohm-m)	Interpretation
50-250	Sandy gravelly SILT/CLAY
250-500	Clayey Sand/Gravel
500-1000	Silty Sand/Gravel
150-400	SANDSTONE/MUDSTONE/LIMESTONE (Lower Limestone Shale Formation)

The seismic data indicated up to 4 subsurface velocity layers:

Layer	Velocity (m/s)	Ave. (m/s)	Interpretation	Estimated Stiffness/ Rock Quality	Estimated Excavatability
1	133-344	205	Soils	Very Soft-Soft /Very Loose-Loose	Diggable
2*	225-471	345	Soils	Soft-Firm/ Loose-Medium Dense	Diggable
3	309-1273	620	Soils	Firm-Stiff/ Medium Dense-Dense	Diggable
4	1775-2367	2025	Soils	Very Stiff/ Very Dense	Diggable
			Moderately -Slightly weathered/fractured Bedrock	Poor-Fair	Break/Blast.

*Layer 2 is only present on S111, S112 & S118

The combined results have been summarised as follows:

Layer	Velocity (m/s)	Resistivity (Ohm-m)	Interpretation	Estimated Stiffness/ Rock Quality	Estimated Excavatability
1	133-344	50-250	Sandy gravelly SILT/CLAY	Very Soft-Soft	Diggable
		250-500	Clayey Sand/Gravel	Very Loose-Loose	
		500-1000	Silty Sand/Gravel		
2	225-471	250-500	Clayey Sand/Gravel	Loose	Diggable
		500-1000	Silty Sand/Gravel		
3	309-1273	50-250	Sandy gravelly SILT/CLAY	Firm-Stiff	Diggable
		250-500	Clayey Sand/Gravel	Medium Dense-Dense	
		500-1000	Silty Sand/Gravel		
4	1775-2367	50-250	Sandy gravelly SILT/CLAY	Very Stiff	Diggable
5	-	150-400	SANDSTONE/MUDSTONE/LIMESTONE		Break/Blast

The subsurface layers have been interpreted as comprising of:

- a thin upper layer (0.2 – 1.5 m, average 0.6 m) of very soft to soft sandy gravelly SILT/CLAY with very loose to loose clayey and/or silty SAND/GRAVEL.
- Layer 2 where present is thin (0.7 – 1.8 m, average 1.2 m) and comprises of loose clayey and/or silty SAND/GRAVEL.
- underlain by a thicker layer (0.2 – 3.7 m, average 1.9 m) of firm to stiff sandy gravelly SILT/CLAY and/or medium dense to dense clayey and/or silty SAND/GRAVEL.
- underlain by a thick layer (generally > 10 m thick) of very stiff sandy gravelly SILT/CLAY.
- underlain by sandstone/mudstone/limestone bedrock at depths > 6.8 m bgl (average depth 8.7 m bgl) (at levels below 42.8 mOD). This layer is beyond the depth of investigation of the seismic survey and as such no rock quality and excavatability has been determined.

In addition, no weathered rock layer has been defined by the geophysical data however there may be some weathered/fractured rock at the base of the very stiff sandy gravelly SILT/CLAY. The seismic velocities of this layer would indicate that any weathered rock will be moderately to slightly weathered and any excavation will require breaking/blasting.

3.3.3 Location 3

The survey area is located in between the townlands of Ballinteenoe and Gortnaskehy, north of the M7 Nenagh-Limerick motorway and consists of open agricultural fields (Fig. 3.3.3a). Topography across the surveyed area ranges from 65.6 mOD to 68.7 mOD.



Fig 3.3.3a: Locations marked with red line.

The soils across the survey area are mapped as predominantly alluvium with till in the west and gravels in the east (Fig. 3.3.3b). The soils are underlain by Lower Limestone Shale sandstone, mudstone and thin limestone.



Fig 3.3.3b: The GSI Quaternary sediments map (locations marked in red).

The geophysical data acquired along these sections included 2 ERT profiles (R12 – R13) and 10 SR profiles S35 – S44. The results are presented on **Drawing AGP21220_03** (Appendix B).

Modelled resistivity values in this area have been interpreted as follows:

Resistivity (Ohm-m)	Interpretation
50-250	Sandy gravelly SILT/CLAY
250-500	Clayey Sand/Gravel
500-1000	Silty Sand/Gravel
150-400	SANDSTONE/MUDSTONE/LIMESTONE (Lower Limestone Shale Formation)

The seismic data indicated 3 subsurface velocity layers:

Layer	Velocity (m/s)	Ave. (m/s)	Interpretation	Estimated Stiffness/ Rock Quality	Estimated Excavatability
1	154-356	220	Soils	Very Soft-Soft /Very Loose-Loose	Diggable
2	367-1570	790	Soils	Firm-Stiff/ Medium Dense-Dense	Diggable
3	1991-2366	2125	Soils	Very Stiff/ Very Dense	Diggable
			Moderately -Slightly weathered/fractured Bedrock	Fair	Break/Blast

The combined results have been summarised as follows:

Layer	Velocity (m/s)	Resistivity (Ohm-m)	Interpretation	Estimated Stiffness/ Rock Quality	Estimated Excavatability
1	154-356	50-250	Sandy gravelly SILT/CLAY	Very Soft-Soft	Diggable
		250-500	Clayey Sand/Gravel	Very Loose-Loose	
		500-1000	Silty Sand/Gravel		
2	367-1570	50-250	Sandy gravelly SILT/CLAY	Firm-Stiff	Diggable
		250-500	Clayey Sand/Gravel	Medium Dense-Dense	
		500-1000	Silty Sand/Gravel		
3	1991-2366	50-250	Sandy gravelly SILT/CLAY	Very Stiff	Diggable
		250-500	Clayey Sand/Gravel	Very Dense	
		500-1000	Silty Sand/Gravel		
4		150-400	SANDSTONE/MUDSTONE/LIMESTONE		Break/Blast

The subsurface layers have been interpreted as comprising of:

- a thin upper layer (0.4 – 0.9 m, average 0.7 m) of predominantly very soft to soft sandy gravelly SILT/CLAY with loose clayey SAND/GRAVEL in the extreme east of both profiles.
- underlain by a thicker layer (1.0 – 3.9 m, average 2.1 m) firm to stiff sandy gravelly SILT/CLAY with medium dense to dense clayey and/or silty SAND/GRAVEL in the extreme east of both profiles.
- underlain by a thick layer of predominantly very stiff sandy gravelly SILT/CLAY with some very dense clayey and/or silty SAND/GRAVEL in the extreme east of both profiles.
- underlain by sandstone/mudstone/limestone bedrock at depths > 8.5 m bgl (at levels below 59.6 mOD). This layer is beyond the depth of investigation of the seismic survey and as such no rock quality and excavatability has been determined.

In addition, no weathered rock layer has been defined by the geophysical data however there may be some weathered/fractured rock at the base of the very stiff sandy gravelly SILT/CLAY. The seismic velocities of this layer would indicate that any weathered rock will be moderately to slightly weathered and any excavation will require breaking/blasting.

3.3.4 Location 4

The survey area is located in the townland of Kilnacranna, with one section north of the M7 Nenagh-Limerick motorway and another south of the motorway. The survey area consists of open agricultural fields (Fig. 3.3.4a) and topography across the surveyed area ranges from 53.3 mOD to 54.4 mOD.



Fig 3.3.4a: Locations marked with red line.

The soils across the survey area are mapped as predominantly till derived from Lower Palaeozoic and Devonian sandstones with lacustrine sediments in the southwest (Fig. 3.3.4b) overlying sandstone, mudstone and thin limestone of the Lower Limestone Shale.

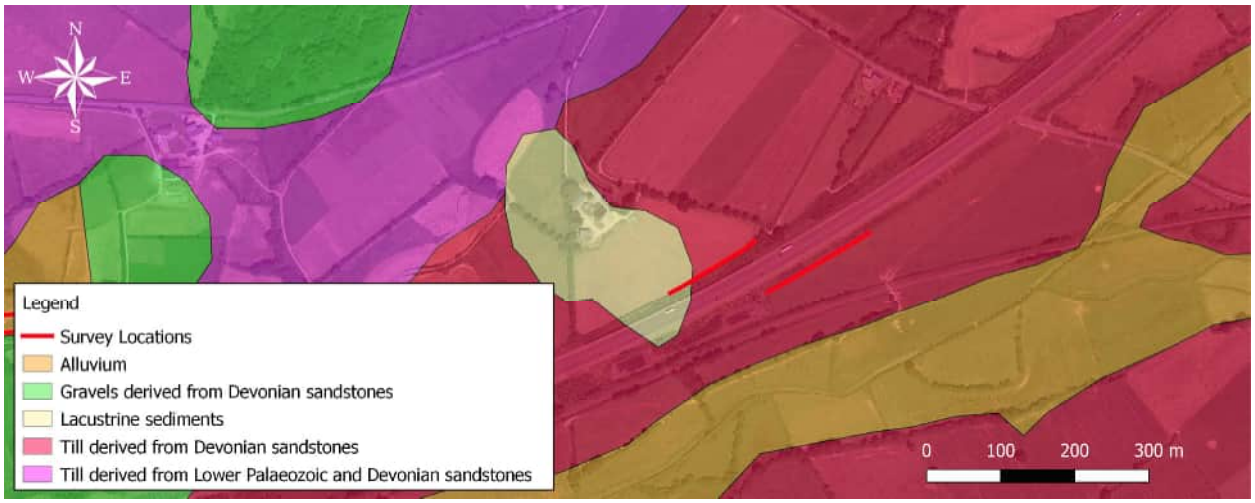

Fig 3.3.4b: The GSI Quaternary sediments map (locations marked in red).

The geophysical data acquired along these sections included 2 ERT profiles (R10 – R11) and 4 SR profiles S33 – S34 and S50 – S51. The results are presented on **Drawing AGP21220_04** (Appendix B).

Modelled resistivity values in this area have been interpreted as follows:

Resistivity (Ohm-m)	Interpretation
25-50	SILT/CLAY
50-250	Sandy gravelly SILT/CLAY
250-500	Clayey Sand/Gravel
500-1000	Silty Sand/Gravel
150-400	SANDSTONE/MUDSTONE/LIMESTONE (Lower Limestone Shale Formation)

The seismic data indicated 4 subsurface velocity layers:

Layer	Velocity (m/s)	Ave. (m/s)	Interpretation	Estimated Stiffness/ Rock Quality	Estimated Excavatability
1	170-236	205	Soils	Very Soft-Soft /Very Loose-Loose	Diggable
2	327-589	410	Soils	Soft-Firm/ Loose-Medium Dense	Diggable
3	606-1517	1080	Soils	Firm-Stiff/ Medium Dense-Dense	Diggable
			Highly-Moderately weathered/fractured Bedrock	Poor-Fair	Marginally Rippable
4	3000-4236	3500	Slightly weathered – Fresh Bedrock	Good	Break/Blast

The combined results have been summarised as follows:

Layer	Velocity (m/s)	Resistivity (Ohm-m)	Interpretation	Estimated Stiffness/ Rock Quality	Estimated Excavatability
1	170-236	250-500	Clayey Sand/Gravel	Very Loose-Loose	Diggable
		500-1000	Silty Sand/Gravel		
2	327-589	250-500	Clayey Sand/Gravel	Loose-Medium Dense	Diggable
		500-1000	Silty Sand/Gravel		
3	606-1517	50-250	SILT/CLAY	Firm-Stiff	Diggable
		50-250	Sandy gravelly SILT/CLAY		
		250-500	Clayey Sand/Gravel	Medium Dense-Dense	
		500-1000	Silty Sand/Gravel		
4	3000-4236	150-400	Slightly weathered – Fresh SANDSTONE/MUDSTONE/LIMESTONE	Good	Break/Blast

The subsurface layers have been interpreted as comprising of:

- a thin upper layer (0.4 – 0.7 m, average 0.5 m) of very loose to loose clayey and/or silty SAND/GRAVEL.
- underlain by a thicker layer (0.9 – 3.0 m, average 2.0 m) of loose to medium dense clayey and/or silty SAND/GRAVEL.
- underlain by a thick layer (6.0 – 11.9 m, average 8.4 m) of medium dense to dense clayey and/or silty SAND/GRAVEL and firm to stiff sandy gravelly SILT/CLAY with some firm to stiff SILT/CLAY interpreted to the southwest of R11.
- underlain by slightly to fresh sandstone/mudstone/limestone bedrock at depths from 8.5 to 14.6 m bgl (average depth 10.9 m bgl). The interpreted bedrock level varies from 39.3 to 45.1 mOD.

No weathered rock layer has been defined by the geophysical data however there may be some weathered/fractured rock at the base of the firm to stiff sandy gravelly SILT/CLAY. The seismic velocities indicate that any weathered rock will be highly to moderately weathered and will be marginally rippable.

The velocities indicate that any excavation of the slightly weathered to fresh rock will require breaking/blasting.

3.3.5 Location 5

The survey area is located in the townland of Castlecranna, east of the M7 Nenagh-Limerick motorway. The survey area consists of open agricultural fields (Fig. 3.3.5a) and topography across the surveyed area ranges from 54.4 mOD to 55.5 mOD.



Fig 3.3.5a: Locations marked with red line.

The soils across the survey area are mapped as till derived from Devonian sandstones (Fig. 3.3.4b) over dark muddy limestone, shale of the Ballysteen Formation.



Fig 3.3.5b: The GSI Quaternary sediments map (locations marked in red).

The geophysical data acquired along these sections included 3 ERT profiles (R45 – R47) and 8 SR profiles S132 – S139. The results are presented on **Drawing AGP21220_05** (Appendix B).

Modelled resistivity values in this area have been interpreted as follows:

Resistivity (Ohm-m)	Interpretation
25-50	SILT/CLAY
50-250	Sandy gravelly SILT/CLAY
250-500	Clayey Sand/Gravel
500-1000	Silty Sand/Gravel
175-1500	LIMESTONE/SHALE (Ballysteen Formation)

The seismic data indicated 4 subsurface velocity layers:

Layer	Velocity (m/s)	Ave. (m/s)	Interpretation	Estimated Stiffness/ Rock Quality	Estimated Excavatability
1	160-500	215	Soils	Very Soft-Firm/Very Loose-Medium Dense	Diggable
2	421-1401	850	Soils	Firm-Stiff/ Medium Dense-Dense	Diggable
3	1000-2399	1970	Soils	Very Stiff/ Very Dense	Diggable
			Moderately-Slightly weathered/fractured Bedrock	Poor-Fair	Break/Blast.
4	2418-3500	3115	Slightly weathered – Fresh Bedrock	Good	Break/Blast

The combined results have been summarised as follows:

Layer	Velocity (m/s)	Resistivity (Ohm-m)	Interpretation	Estimated Stiffness/ Rock Quality	Estimated Excavatability
1	160-500	50-250	Sandy gravelly SILT/CLAY	Very Soft-Firm	Diggable
		250-500	Clayey Sand/Gravel	Very Loose- Medium Dense	
		500-1000	Silty Sand/Gravel		
2	421-1401	50-250	Sandy gravelly SILT/CLAY	Firm-Stiff	Diggable
		250-500	Clayey Sand/Gravel	Medium Dense-Dense	
		500-1000	Silty Sand/Gravel		
3	1000-2399	50-250	Sandy gravelly SILT/CLAY	Very Stiff	Diggable
4	2418-3500	175-1500	Slightly weathered – Fresh LIMESTONE/SHALE	Good	Break/Blast

The subsurface layers have been interpreted as comprising of:

- a thin upper layer (0.5 – 1.6 m, average 0.8 m) of very soft to firm sandy gravelly SILT/CLAY with very loose to medium dense clayey and/or silty SAND/GRAVEL.
- underlain by a layer of firm to stiff sandy gravelly SILT/CLAY with medium dense to dense clayey and/or silty SAND/GRAVEL.
- underlain by a thick layer of very stiff sandy gravelly SILT/CLAY.
- underlain by slightly weathered to fresh limestone/shale at depths > 2.9 m bgl (at levels below 52 mOD).

No weathered rock layer has been defined by the geophysical data however there may be some weathered/fractured rock at the base of the very stiff sandy gravelly SILT/CLAY. The seismic velocities of this layer indicate that any weathered/fractured rock will be moderately to slightly weathered and any excavation will require breaking/blasting.

The velocities indicate that any excavation of the slightly weathered to fresh rock will require breaking/blasting. It should be noted that the cut-off velocity for excavatability will be lower if excavating in trenches.

3.3.6 Location 6

The survey area is located in the townland of Ballyhisky c. 900m east of the M7 Nenagh-Limerick motorway. The survey area consists of open agricultural fields (Fig. 3.3.6a) and topography ranges from 52.0 mOD to 52.9 mOD.



Fig 3.3.6a: Locations marked with red line.

The soils across the survey area are mapped as till derived from Devonian sandstones in the northeast and cut over raised peat in the southwest (Fig. 3.3.6b) overlying sandstone, mudstone & thin limestone of the Lower Limestone Shale.



Fig 3.3.6b: The GSI Quaternary sediments map (locations marked in red).

The geophysical data acquired along these sections included 6 SR profiles S76 – S78 and S170 – S172. The results are presented on **Drawing AGP21220_06** (Appendix B).

The seismic data indicated 4 subsurface velocity layers:

Layer	Velocity (m/s)	Ave. (m/s)	Interpretation	Estimated Stiffness/ Rock Quality	Estimated Excavatability
1	195-433	280	Soils	Soft /Loose	Diggable
2	1000-2206	1580	Soils	Stiff-Very Stiff/ Dense-Very Dense	Diggable
			Moderately -Slightly weathered/fractured Bedrock	Poor-Fair	Break/Blast.
3	2075-5245	3605	Slightly weathered – Fresh Bedrock	Good	Break/Blast

The subsurface layers have been interpreted as comprising of:

- a thin upper layer (0.6 – 1.1 m, average 0.8 m) of soft or loose soils.
- underlain by a thicker layer (0.4 – 8.8 m, average 3.6 m) of stiff to very stiff or dense to very dense soils. This layer may also comprise of weathered/fractured rock. The seismic velocities indicate that any weathered rock will be moderately to slightly weathered and any excavation will require breaking/blasting.
- underlain by slightly weathered/fractured to fresh bedrock at depths from 1.2 to 9.4 m bgl (average depth 4.4 m bgl). Interpreted bedrock level varies from 42.6 to 51.3 mOD. The velocities indicate that any excavation of the slightly weathered to fresh rock will require breaking/blasting.

It should be noted that the cut-off velocity for excavatability will be lower if excavating in trenches.

3.3.7 Location 7

The survey area is located in the townland of Carrigatogher (Abbott), c. 1100 m east of the M7 Nenagh-Limerick motorway. The survey area consists of open agricultural fields (Fig. 3.3.7a) and topography ranges from 49.2 mOD to 53.0 mOD.



Fig 3.3.7a: Locations marked with red line.

The soils across the survey area are mapped as predominantly alluvium with till derived from Devonian sandstones in the northeast (Fig. 3.3.4b) over predominantly sandstone, mudstone and thin limestone of the Lower Limestone Shale with Ballysteen Formation dark muddy limestone, shale underlying the east.

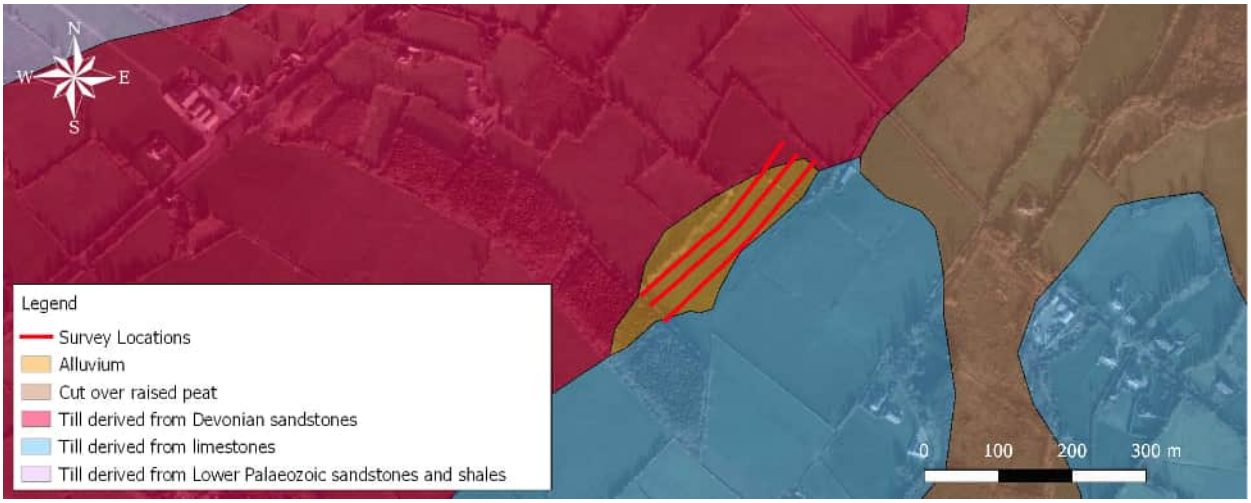

Fig 3.3.7b: The GSI Quaternary sediments map (locations marked in red).

The geophysical data acquired along these sections included 3 ERT profiles (R51 – R53) and 18 SR profiles S146 – S63. The results are presented on **Drawing AGP21220_07A & 07B** (Appendix B).

Modelled resistivity values in this area have been interpreted as follows:

Resistivity (Ohm-m)	Interpretation
25-50	SILT/CLAY
50-250	Sandy gravelly SILT/CLAY
150-400	SANDSTONE/MUDSTONE/LIMESTONE (Lower Limestone Shale Formation)
175-1500	LIMESTONE (Ballysteen Formation)

The seismic data indicated up to 4 subsurface velocity layers:

Layer	Velocity (m/s)	Ave. (m/s)	Interpretation	Estimated Stiffness/ Rock Quality	Estimated Excavatability
1	115-333	185	Soils	Very Soft-Soft /Very Loose-Loose	Diggable
2*	508-1333	1010	Soils	Firm-Stiff/ Medium Dense-Dense	Diggable
3	1000-2164	1605	Soils	Stiff-Very Stiff/ Dense-Very Dense	Diggable
			Moderately -Slightly weathered/fractured Bedrock	Fair	Marginally Rippable-Break/Blast.
4	2690-4245	3635	Slightly weathered – Fresh Bedrock	Good	Break/Blast

*Layer 2 is only present on S152 & S160

The combined results have been summarised as follows:

Layer	Velocity (m/s)	Resistivity (Ohm-m)	Interpretation	Estimated Stiffness/ Rock Quality	Estimated Excavatability
1	115-333	25-50	SILT/CLAY	Very Soft-Soft	Diggable
		50-250	Sandy gravelly SILT/CLAY		
2	508-1333	50-250	Sandy gravelly SILT/CLAY	Firm-Stiff	Diggable
3	1000-2164	25-50	SILT/CLAY	Stiff-Very Stiff	Diggable
		50-250	Sandy gravelly SILT/CLAY		
4	2690-4245	150-400	Slightly weathered – Fresh SANDSTONE/MUDSTONE/LIMESTONE	Good	Break/Blast
		175-1500	Slightly weathered – Fresh LIMESTONE/SHALE		

The subsurface layers have been interpreted as comprising of:

- a thin upper layer (0.6 – 1.0 m, average 0.9 m) of very soft to soft sandy gravelly SILT/CLAY or SILT/CLAY.
- layer 2 has been interpreted only in the southwest of the surveyed area (S152 & S160) and comprises of an average of 1.1 m of firm to stiff sandy gravelly SILT/CLAY.
- underlain by a thicker layer (0.4 – 6.2 m, average 2.8 m) of stiff to very stiff sandy gravelly SILT/CLAY or SILT/CLAY.
- underlain by slightly weathered/fractured to fresh sandstone/mudstone/limestone or limestone/shale bedrock at depths > 2.4 m bgl (at levels below 49.6 mOD).

No weathered rock layer has been defined by the geophysical data however there may be some weathered/fractured rock at the base of the stiff to very stiff sandy gravelly SILT/CLAY. The seismic velocities indicate that any weathered rock will be moderately to slightly weathered and will be marginally rippable to requiring breaking/blasting.

The velocities indicate that any excavation of the slightly weathered to fresh rock will require breaking/blasting. It should be noted that the cut-off velocity for excavatability will be lower if excavating in trenches.

3.3.8 Location 8

The survey area is located in the townland of Tullamore, c. 900 m west of the N52 Nenagh bypass. The survey area consists of open agricultural fields (Fig. 3.3.8a) and topography ranges from 45.2 mOD in the southwest to 47.2 mOD in the northeast.



Fig 3.3.8a: Locations marked with red line.

The soils across the survey area are mapped as predominantly alluvium and till derived from Devonian sandstones (Fig. 3.3.8b) underlain by sandstone, mudstone and thin limestone of the Lower Limestone Shale with dark muddy limestone and shale of the Ballysteen Formation to the east/northeast.

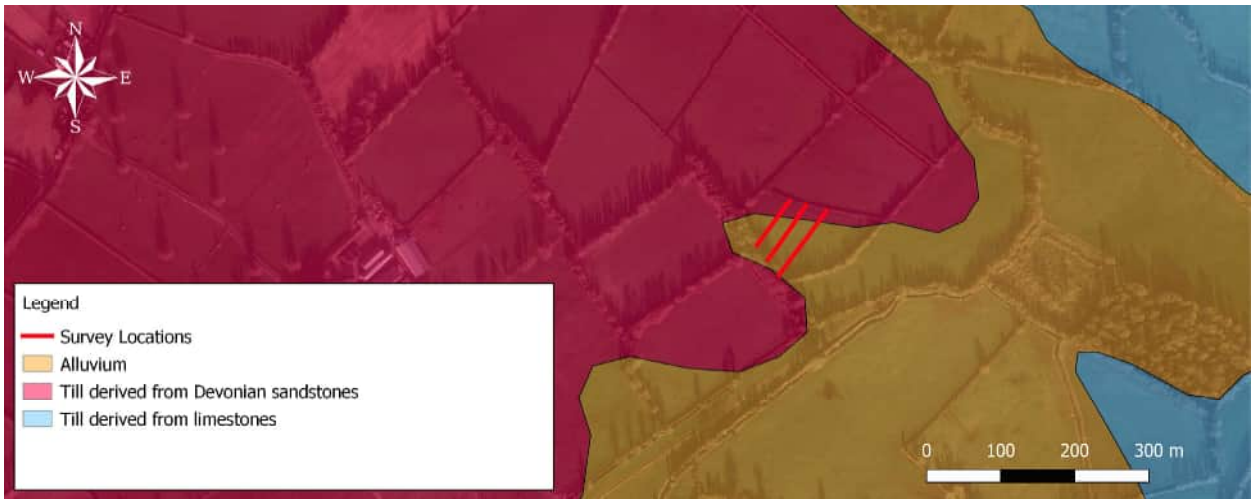

Fig 3.3.8b: The GSI Quaternary sediments map (locations marked in red).

The geophysical data acquired along these sections included 3 ERT profiles (R15 – R17) and 5 SR profiles S45 – S49. The results are presented on **Drawing AGP21220_08** (Appendix B).

Modelled resistivity values in this area have been interpreted as follows:

Resistivity (Ohm-m)	Interpretation
50-250	Sandy gravelly SILT/CLAY
175-1500	LIMESTONE/SHALE (Ballysteen Formation)

The seismic data indicated 4 subsurface velocity layers:

Layer	Velocity (m/s)	Ave. (m/s)	Interpretation	Estimated Stiffness/ Rock Quality	Estimated Excavatability
1	219-444	265	Soils	Soft /Loose	Diggable
2	471-1541	1000	Soils	Firm-Stiff/ Medium Dense-Dense	Diggable
3	1605-2245	2000	Soils	Very Stiff/ Very Dense	Diggable
			Moderately -Slightly weathered/fractured Bedrock	Poor-Fair	Break/Blast
4	3600-4500	4060	Slightly weathered – Fresh Bedrock	Good	Break/Blast

The combined results have been summarised as follows:

Layer	Velocity (m/s)	Resistivity (Ohm-m)	Interpretation	Estimated Stiffness/ Rock Quality	Estimated Excavatability
1	219-444	50-250	Sandy gravelly SILT/CLAY	Soft	Diggable
2	471-1541	50-250	Sandy gravelly SILT/CLAY	Firm-Stiff	Diggable
3	1605-2245	50-250	Sandy gravelly SILT/CLAY	Very Stiff	Diggable
4	3600-4500	175-1500	Slightly weathered – Fresh LIMESTONE/SHALE	Good	Break/Blast

The subsurface layers have been interpreted as comprising of:

- a thin upper layer (0.5 – 1.1 m, average 0.7 m) of soft sandy gravelly SILT/CLAY.
- underlain by a thicker layer (0.2 – 2.6 m, average 1.3 m) firm to stiff sandy gravelly SILT/CLAY.
- underlain by a thick layer (7.3 – 17.8 m, average 12.2m) very stiff sandy gravelly SILT/CLAY.
- underlain by slightly weathered to fresh limestone/shale at depths from 10.5 to 19.3 m bgl (average depth 14.2 m bgl). Interpreted bedrock level varies from 26.2 to 35.9 mOD.

No weathered rock layer has been defined by the geophysical data however there may be some weathered/fractured rock at the base of the very stiff sandy gravelly SILT/CLAY. The seismic velocities for this layer indicate that any weathered rock will be moderately to slightly weathered and any excavation will require breaking/blasting.

The velocities indicate that any excavation of the slightly weathered to fresh rock will require breaking/blasting.

3.3.9 Location 9

The survey area is located in the townlands of Tullamore and Belleen Lower, south of the R494 and c. 940 m west of the N52 Nenagh bypass. The survey area consists of open agricultural fields (Fig. 3.3.9a) and topography ranges from 45.1 mOD to 47.4 mOD.



Fig 3.3.9a: Locations marked with red line.

The soils across the survey area are mapped as alluvium in the south with till derived from limestones in the north (Fig. 3.3.9b) overlying dark muddy limestone and shale of the Ballysteen Formation.

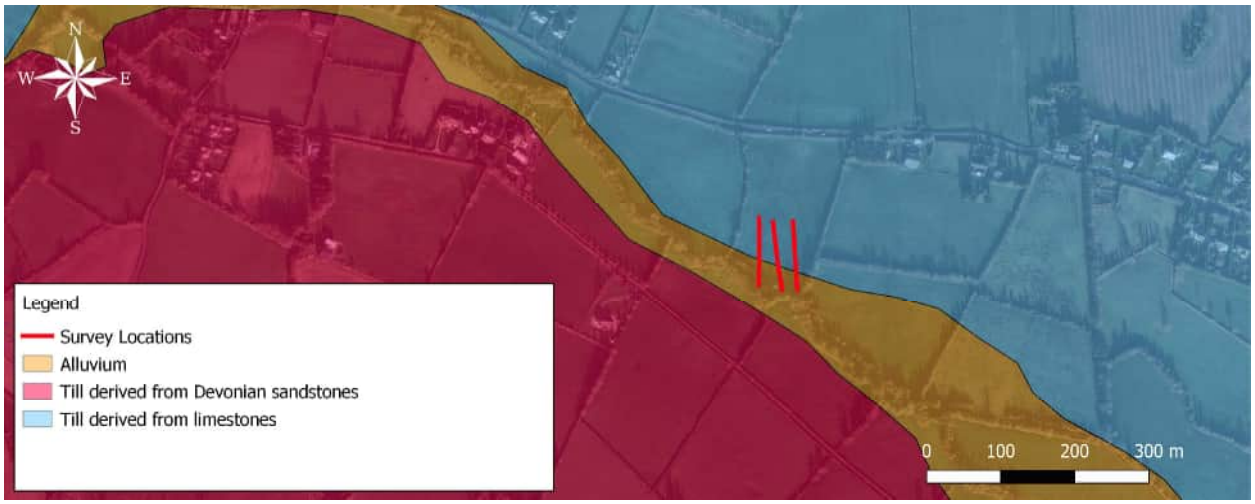

Fig 3.3.9b: The GSI Quaternary sediments map (locations marked in red).

The geophysical data acquired along these sections included 3 ERT profiles (R48 – R50) and 6 SR profiles S140 – S145. The results are presented on **Drawing AGP21220_09** (Appendix B).

Modelled resistivity values in this area have been interpreted as follows:

Resistivity (Ohm-m)	Interpretation
50-250	Sandy gravelly SILT/CLAY
250-500	Clayey Sand/Gravel
175-4000	LIMESTONE (Ballysteen Formation)

The seismic data indicated 4 subsurface velocity layers:

Layer	Velocity (m/s)	Ave. (m/s)	Interpretation	Estimated Stiffness/ Rock Quality	Estimated Excavatability
1	154-265	190	Soils	Very Soft-Soft /Very Loose-Loose	Diggable
2	413-1538	775	Soils	Firm-Stiff/Medium Dense- Dense	Diggable
			Highly-Moderately weathered/fractured Bedrock	Poor-Fair	Rippable-Marginally Ripp.
3	3796-5001	4390	Slightly weathered – Fresh Bedrock	Good	Break/Blast

The combined results have been summarised as follows:

Layer	Velocity (m/s)	Resistivity (Ohm-m)	Interpretation	Estimated Stiffness/ Rock Quality	Estimated Excavatability
1	154-265	50-250	Sandy gravelly SILT/CLAY	Very Soft-Soft	Diggable
		250-500	Clayey Sand/Gravel	Very Loose-Loose	
2	413-1538	50-250	Sandy gravelly SILT/CLAY	Firm-Stiff	Diggable
		250-500	Clayey Sand/Gravel	Medium Dense- Dense	
		400-4000	Highly-Moderately weathered/fractured LIMESTONE	Poor-Fair	Rippable-Marginally Ripp.
3	3796-5001	400-4000	Slightly weathered – Fresh LIMESTONE	Good	Break/Blast

The subsurface layers have been interpreted as comprising of:

- a thin upper layer (0.6 – 1.0 m, average 0.7 m) of very soft to soft sandy gravelly SILT/CLAY with some very loose to loose clayey SAND/GRAVEL in the south of R50.
- underlain by a thicker layer (1.5 – 4.7 m, average 2.7 m) firm to stiff sandy gravelly SILT/CLAY with some medium dense to dense clayey SAND/GRAVEL along R50.
- underlain by slightly weathered to fresh limestone at depths from 2.2 to 5.6 m bgl (average depth 3.4 m bgl). Interpreted bedrock level varies from 39.9 to 44.2 mOD.

No weathered rock layer has been defined by the geophysical data however there may be some weathered/fractured rock at the base of the firm to stiff sandy gravelly SILT/CLAY and medium dense to dense clayey SAND/GRAVEL. The seismic velocities of this layer indicate that any weathered rock will be highly to moderately weathered/fractured and would be rippable to marginally rippable.

The velocities indicate that any excavation of the slightly weathered to fresh rock will require breaking/blasting. It should be noted that the cut-off velocity for excavatability will be lower if excavating in trenches.

The Ballysteen Formation is described (GSI, 2019) as comprising of dark muddy limestone and shale. The bedrock resistivities for the Ballysteen Formation at this location (up to 4000 Ohm-m) are higher than observed for the Ballysteen Formation at Locations 1, 5 and 8 where the limestone was typically in the range (175 – 1500 Ohm-m). This would suggest that the limestone is 'cleaner' and may not include any shale at this location.

3.3.10 Location 10

The survey area is located in the townland of Ballycommon southwest of the Nenagh River. The survey area consists of open agricultural fields (Fig. 3.3.10a) and topography ranges from 38.7 mOD to 39.7 mOD.



Fig 3.3.10a: Locations marked with red line.

The soils across the survey area are mapped as predominantly alluvium with some till derived from limestones in the southwest (Fig. 3.3.10b) overlying massive, unbedded lime-mudstone of the Waulsortian Limestones.

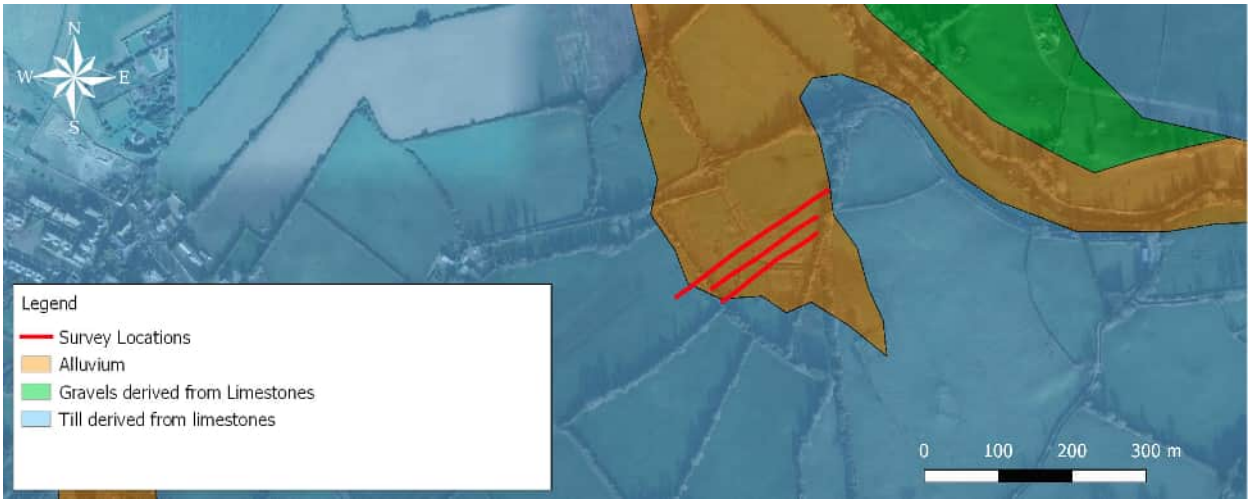

Fig 3.3.10b: The GSI Quaternary sediments map (locations marked in red).

The geophysical data acquired along these sections included 4 ERT profiles (R28 – R31) and 13 SR profiles S66 – S75 and S79 - S81. The results are presented on **Drawings AGP21220_10A and 10B** (Appendix B).

Modelled resistivity values in this area have been interpreted as follows:

Resistivity (Ohm-m)	Interpretation
<50	SILT/CLAY
50-250	Sandy gravelly SILT/CLAY
175-20000	LIMESTONE (Waulsortian)

The seismic data indicated 3 subsurface velocity layers:

Layer	Velocity (m/s)	Ave. (m/s)	Interpretation	Estimated Stiffness/ Rock Quality	Estimated Excavatability
1	162-411	255	Soils	Soft-Firm /Loose- Medium Dense	Diggable
2	667-2160	1500	Soils	Firm-Stiff-Very Stiff/ Medium Dense-Dense-Very Dense	Diggable
			Highly-Moderately weathered/karstified Bedrock	Poor-Fair	Rippable-Break/Blast
3	3706-5703	4510	Slightly weathered – Fresh Bedrock	Good	Break/Blast

The combined results have been summarised as follows:

Layer	Velocity (m/s)	Resistivity (Ohm-m)	Interpretation	Estimated Stiffness/ Rock Quality	Estimated Excavatability
1	162-411	<50	SILT/CLAY	Soft -Firm	Diggable
		50-250	Sandy gravelly SILT/CLAY		
2	667-2160	<50	SILT/CLAY	Firm-Stiff-Very Stiff	Diggable
		50-250	Sandy gravelly SILT/CLAY		
		175 - 250	Highly-Moderately weathered/karstified LIMESTONE	Poor-Fair	Rippable-Break/Blast.
3	3706-5703	250-20000	Slightly weathered – Fresh LIMESTONE	Good	Break/Blast

Three subsurface layers have been interpreted comprising of:

1. a thin upper layer (0.6 – 0.9 m, average 0.8 m) of soft to firm SILT/CLAY or sandy gravelly SILT/CLAY.
2. underlain by a thicker layer (1.2 – 5.0 m, average 2.9 m) of firm to stiff to very stiff SILT/CLAY or sandy gravelly SILT/CLAY.
3. underlain by a thin layer (typically 1 m thick) of highly to moderately weathered/karstified limestone at depths > 1.8 m bgl (at levels below 37.46 mOD).
4. underlain by slightly weathered to fresh limestone at depths 2.8 m bgl (at levels below 37 mOD).

As the bedrock comprises of massive un-bedded limestone, the seismic velocities indicate that the weathered/karstified rock layer will vary from rippable to requiring breaking/blasting.

The velocities indicate that any excavation of the slightly weathered to fresh rock will require breaking/blasting. It should be noted that the cut-off velocity for excavatability will be lower if excavating in trenches.

3.3.11 Locations 11

The survey area is located in the townlands of Ballyannymore and Ballyanny lower, southwest of the L1608 road. The survey area consists of open agricultural fields (Fig. 3.3.11a) and topography slopes from 41.8 mOD in the northeast to 45.5 mOD towards the southwest.



Fig 3.3.11a: Locations marked with red line.

The soils across the survey area are mapped as alluvium with some till derived from limestones in the northeast (Fig. 3.3.11b) overlying grey limestone and dark chert of the Oldcourt Cherty Limestone Formation.



Fig 3.3.11b: The GSI Quaternary sediments map (locations marked in red).

The geophysical data acquired at Location 11 included 7 ERT profiles (R18 – R24) and 11 SR profiles S52 – S62. The results are presented on **Drawings AGP21220_11A and 11B** (Appendix B).

Modelled resistivity values in this area have been interpreted as follows:

Resistivity (Ohm-m)	Interpretation
25-50	SILT/CLAY
50-250	Sandy gravelly SILT/CLAY
250-500	Clayey Sand/Gravel
150-25000	LIMESTONE (Oldcourt Formation)

The seismic data indicated up to 4 subsurface velocity layers:

Layer	Velocity (m/s)	Ave. (m/s)	Interpretation	Estimated Stiffness/ Rock Quality	Estimated Excavatability
1	159-485	255	Soils	Soft-Firm /Loose-Medium Dense	Diggable
2	615-1602	1110	Soils	Firm-Stiff/ Medium Dense-Dense	Diggable
			Highly-Moderately weathered/karstified Bedrock	Poor-Fair	Rippable-Marg. Ripp.-
3	1418-2433	1955	Soils	Stiff- Very Stiff/ Dense-Very Dense	Diggable
			Moderately -Slightly weathered/karstified Bedrock	Fair	Marg. Rippable-Break/Blast
4	2362-5830	3910	Slightly weathered – Fresh Bedrock	Good	Break/Blast

The combined results have been summarised as follows:

Layer	Velocity (m/s)	Resistivity (Ohm-m)	Interpretation	Estimated Stiffness/ Rock Quality	Estimated Excavatability
1	159-485	50-250	Sandy gravelly SILT/CLAY	Soft-Firm	Diggable
		250-500	Clayey Sand/Gravel	Loose-Medium Dense	
		500-1000	Silty Sand/Gravel		
2	615-1602	50-250	Sandy gravelly SILT/CLAY	Firm-Stiff	Diggable
		250-500	Clayey Sand/Gravel	Medium Dense-Dense	
		500-1000	Silty Sand/Gravel		
3	1418-2433	50-250	SILT/CLAY	Stiff-Very Stiff	Diggable
		50-250	Sandy gravelly SILT/CLAY		
4	2362-5830	150-25000	Slightly weathered – Fresh LIMESTONE	Good	Break/Blast

The subsurface layers have been interpreted as comprising of:

- a thin upper layer (0.3 – 1.6 m, average 0.8 m) of predominantly soft SILT/CLAY and sandy gravelly SILT/CLAY with loose clayey and/or silty SAND/GRAVEL in the northeast and southwest.
- Generally underlain by a layer of firm to stiff SILT/CLAY and sandy gravelly SILT/CLAY over stiff to very stiff SILT/CLAY and sandy gravelly SILT/CLAY in the southwest (R19, R23 & R24).
- To the northeast the SILT/CLAY and sandy gravelly SILT/CLAY become stiff to very stiff (R20, R21 & R22).
- Medium dense to dense clayey and/or silty SAND/GRAVEL have been mapped in the northeast and in the southwest (R18). This SAND/GRAVEL layer may also comprise of rippable to marginally rippable, highly to moderately weathered/karstified limestone in the northeast (R20, R21 & R22).
- Slightly weathered/fractured to fresh limestone bedrock has been interpreted at depths from 1.2 to 12.5 m bgl. Interpreted bedrock level varies from 32 to 44 mOD.

No weathered rock layer has been defined however there may be some weathered rock at the base of the stiff to very stiff sandy gravelly SILT/CLAY which the seismic velocities indicate would be moderately to slightly weathered/karstified and any excavation would require breaking/blasting.

The velocities indicate that any excavation of the slightly weathered to fresh rock will require breaking/blasting. It should be noted that the cut-off velocity for excavatability will be lower if excavating in trenches.

3.3.12 Locations 12

The survey area is located in the townland of Ballyanny lower, east of the L1608 road and west of the R493 road. The survey area consists of open agricultural fields (Fig. 3.3.12a) and topography is relatively flat, ranging from 45.1 mOD to 46.6 mOD.



Fig 3.3.12a: Locations marked with red line.

The soils across the survey area are mapped as predominantly alluvium with till derived from limestones in the northeast (Fig. 3.3.12b) overlying grey limestone and dark chert of the Oldcourt Cherty Limestone Formation.



Fig 3.3.12b: The GSI Quaternary sediments map (locations marked in red).

The geophysical data acquired at Location 12 included 3 ERT profiles (R25 – R27) and 3 SR profiles S63 – S65. The results are presented on **Drawing AGP21220_12** (Appendix B).

Modelled resistivity values in this area have been interpreted as follows:

Resistivity (Ohm-m)	Interpretation
50-250	Sandy gravelly SILT/CLAY
250-500	Clayey Sand/Gravel
150-25000	LIMESTONE (Oldcourt Formation)

The seismic data indicated 3 subsurface velocity layers:

Layer	Velocity (m/s)	Ave. (m/s)	Interpretation	Estimated Stiffness/ Rock Quality	Estimated Excavatability
1	195-297	240	Soils	Soft /Loose	Diggable
2	800-1695	1260	Soils	Firm-Stiff/Medium Dense-Dense	Diggable
			Highly - Moderately weathered/fractured Bedrock	Poor-Fair	Marginally Rippable.
3	3766-4989	4515	Slightly weathered – Fresh Bedrock	Good	Break/Blast

The combined results have been summarised as follows:

Layer	Velocity (m/s)	Resistivity (Ohm-m)	Interpretation	Estimated Stiffness/ Rock Quality	Estimated Excavatability
1	195-297	50-250	Sandy gravelly SILT/CLAY	Soft	Diggable
		250-500	Clayey Sand/Gravel	Loose	
2	800-1695	50-250	Sandy gravelly SILT/CLAY	Firm-Stiff	Diggable
		250-500	Clayey Sand/Gravel	Medium Dense-Dense	
3	3766-4989	150-25000	Slightly weathered – Fresh LIMESTONE	Good	Break/Blast

The subsurface layers have been interpreted as comprising of:

- a thin upper layer (0.6 – 0.9 m, average 0.8 m) of soft sandy gravelly SILT/CLAY with loose clayey SAND/GRAVEL in the east.
- underlain by a thicker layer of firm to stiff sandy gravelly SILT/CLAY with medium dense to dense clayey SAND/GRAVEL in the east.
- underlain by slightly weathered/fractured to fresh limestone at depths from 1.7 to 4.9 m bgl). Interpreted bedrock level varies from 40.8 to 44.6 mOD.

No weathered rock layer has been defined by the geophysical data however the resistivity values and seismic velocities indicate that layer 2 may comprise of weathered/fractured limestone which the seismic velocities indicate will be marginally rippable to requiring breaking/blasting. This should be confirmed by trial pitting.

The velocities indicate that any excavation of the slightly weathered to fresh rock will require breaking/blasting. It should be noted that the cut-off velocity for excavatability will be lower if excavating in trenches.

3.3.13 Location 13

The survey area is located in the townland of Loughourna, c. 1 km east of the R493 road. The survey area consists of open agricultural fields (Fig. 3.3.13a) and topography slopes upwards from southwest to northeast ranging from 68.3 mOD to 72.4 mOD.



Fig 3.3.13a: Locations marked with red line.

The soils across the survey area are mapped as predominantly till derived from limestones with alluvium to the southwest (Fig. 3.3.13b) overlying grey calcarenitic and oolitic limestone of the Terryglass Formation.



Fig 3.3.13b: The GSI Quaternary sediments map (locations marked in red).

The geophysical data acquired along these sections included 3 ERT profiles (R54 - R56) and 6 SR profiles S164 – S169. The results are presented on **Drawing AGP21220_13** (Appendix B).

Modelled resistivity values in this area have been interpreted as follows:

Resistivity (Ohm-m)	Interpretation
50-250	Sandy gravelly SILT/CLAY
250-500	Clayey Sand/Gravel
300-3500	LIMESTONE (Terryglass Formation)

The seismic data indicated 4 subsurface velocity layers:

Layer	Velocity (m/s)	Ave. (m/s)	Interpretation	Estimated Stiffness/ Rock Quality	Estimated Excavatability
1	182-286	225	Soils	Very soft-Soft /Very loose-Loose	Diggable
2	333-889	555	Soils	Soft-Firm /Loose- Medium Dense	Diggable
3	821-1564	1215	Soils	Firm-Stiff/ Medium Dense-Dense	Diggable
			Highly-Moderately weathered/karstified Bedrock	Poor-Fair	Rippable-Marginally Ripp.
4	3433-5509	4740	Slightly weathered – Fresh Bedrock	Good	Break/Blast

The combined results have been summarised as follows:

Layer	Velocity (m/s)	Resistivity (Ohm-m)	Interpretation	Estimated Stiffness/ Rock Quality	Estimated Excavatability
1	182-286	50-250	Sandy gravelly SILT/CLAY	Very soft-Soft	Diggable
		250-500	Clayey Sand/Gravel	Very loose-Loose	
2	333-889	50-250	Sandy gravelly SILT/CLAY	Soft-Firm	Diggable
		250-500	Clayey Sand/Gravel	Loose- Medium Dense	
3	821-1564	50-250	Sandy gravelly SILT/CLAY	Firm-Stiff	Diggable
		250-500	Clayey Sand/Gravel	Medium Dense-Dense	
4	3433-5509	300-3500	Slightly weathered – Fresh LIMESTONE	Good	Break/Blast

Five subsurface layers have been interpreted as comprising of:

- a thin upper layer (0.3 – 1.4 m, average 0.6 m) of soft sandy gravelly SILT/CLAY with loose clayey SAND/GRAVEL to the northeast.
- underlain by a thicker layer (0.7 – 2.6 m, average 1.4 m) of soft to firm sandy gravelly SILT/CLAY with loose to medium dense clayey SAND/GRAVEL to the northeast.
- underlain by a thick layer of firm to stiff sandy gravelly SILT/CLAY with medium dense to dense clayey SAND/GRAVEL to the northeast.
- underlain by slightly weathered/fractured to fresh limestone at depths from 5.0 to 9.3 m bgl. Interpreted bedrock level varies from 60.5 to 66.7 mOD.

No weathered rock layer has been defined by the geophysical data however there may be some weathered/karstified rock at the base of the layer 3. The seismic velocities indicate that any weathered rock will be highly to moderately weathered rock ranging from rippable to marginally rippable.

The velocities indicate that any excavation of the slightly weathered to fresh rock will require breaking/blasting. It should be noted that the cut-off velocity for excavatability will be lower if excavating in trenches.

3.3.14 Location 14

The survey area is located in the townlands of Ardcrony, Lisgarriff and Ballylusky, c. 1 km northeast of the village of Ardcrony. The survey area consists of open agricultural fields either side of the N52 (Fig. 3.3.14a) and topography ranges from 70.9 mOD to 87.3 mOD.



Fig 3.3.14a: Locations marked with red lines.

The soils across the survey area are mapped as alluvium and till with gravels derived from limestones towards the southwest (Fig. 3.3.14b). The soils are underlain by dark limestone & shale of the Lucan Formation.

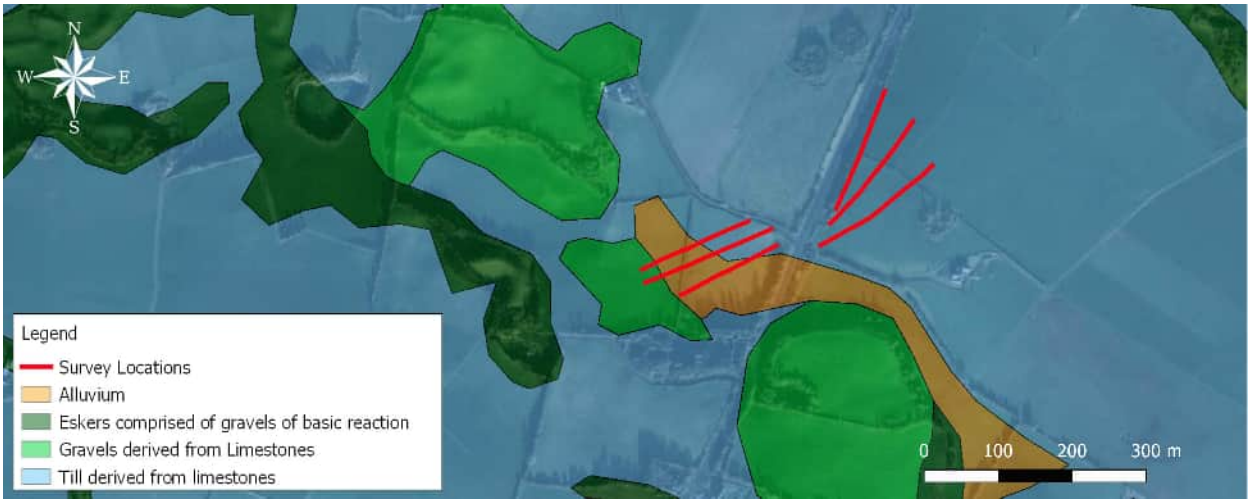

Fig 3.3.14b: The GSI Quaternary sediments map (locations marked in red).

The geophysical data acquired along these sections included 6 ERT profiles (R1 - R6) and 20 SR profiles S1 – S20. The results are presented on **Drawing AGP21220_14A and 14B** (Appendix B).

Modelled resistivity values in this area have been interpreted as follows:

Resistivity (Ohm-m)	Interpretation
50-250	Sandy gravelly SILT/CLAY
250-500	Clayey SAND/GRAVEL
500-1000	Silty SAND/GRAVEL
1000-2000	SAND/GRAVEL
50-250	SHALE (Lucan Formation)

The seismic data indicated 3 subsurface velocity layers:

Layer	Velocity (m/s)	Ave. (m/s)	Interpretation	Estimated Stiffness/ Rock Quality	Estimated Excavatability
1	154-367	240	Soils	Very soft-Soft /Very loose-Loose	Diggable
2	407-1549	915	Soils	Firm-Stiff /Medium Dense-Dense	Diggable
3	1448-2760	2120	Soils	Stiff-Very Stiff/ Dense-Very Dense	Diggable
			Moderately-Slightly weathered/fractured Bedrock	Fair	Marginally Ripp.-Break/Blast

The geophysical data indicates differing subsurface layers either side of the N52 with the surveyed area to the southwest indicating predominantly silty sand/gravel and sand/gravel over sandy gravelly silt/clay deposits. To the northeast the geophysical data indicates predominantly clayey sand/gravel and silty sand/gravel over possible shale bedrock. The combined results have been summarised as follows:

Layer	Velocity (m/s)	Resistivity (Ohm-m)	Interpretation	Estimated Stiffness/ Rock Quality	Estimated Excavatability
1	154-367	50-250	Sandy gravelly SILT/CLAY	Very soft-Soft	Diggable
		250-500	Clayey SAND/GRAVEL	Very loose-Loose	
		500-1000	Silty SAND/GRAVEL		
2	407-1549	50-250	Sandy gravelly SILT/CLAY	Firm-Stiff	Diggable
		250-500	Clayey SAND/GRAVEL	Medium Dense-Dense	
		500-1000	Silty SAND/GRAVEL		
		1000-2000	SAND/GRAVEL		
3	1448-2760	50-250	Sandy gravelly SILT/CLAY	Stiff-Very Stiff	Diggable
		250-500	Clayey SAND/GRAVEL	Dense-Very Dense	
		500-1000	Silty SAND/GRAVEL		
		1000-2000	SAND/GRAVEL		
4	2280-2760	50-250	Slightly weathered/fractured SHALE	Fair-Good	Beak/blast

The subsurface layers in the southwest (R1, R2, R6) have been interpreted as comprising of:

- a thin upper layer (0.3 – 1.7 m, average 0.8 m) of predominantly very loose to loose clayey SAND/GRAVEL or silty SAND/GRAVEL with some very soft to soft sandy gravelly SILT/CLAY,
- underlain by a thicker layer (1.4 – 8.3 m, average 4.3 m) of predominantly medium dense to dense clayey SAND/GRAVEL, silty SAND/GRAVEL and SAND/GRAVEL with some firm to stiff sandy gravelly SILT/CLAY,
- underlain by dense to very dense clayey SAND/GRAVEL, silty SAND/GRAVEL and SAND/GRAVEL,
- underlain by a thick layer of stiff to very stiff sandy gravelly SILT/CLAY.

The geophysical data does not suggest the presence of bedrock within the depth of investigation.

The subsurface layers in the northeast (R3, R4, R5) have been interpreted as comprising of:

- a thin upper layer (0.3 – 0.9 m, average 0.7 m of predominantly very loose to loose clayey SAND/GRAVEL or silty SAND/GRAVEL with some very soft to soft sandy gravelly SILT/CLAY,
- underlain by a thicker layer (1.0 – 4.3 m, average 2.2 m) of predominantly medium dense to dense silty SAND/GRAVEL and clayey SAND/GRAVEL with some localised occurrences of firm to stiff sandy gravelly SILT/CLAY,
- underlain by a thick layer of predominantly dense to very dense clayey SAND/GRAVEL,
- underlain by possible slightly weathered/fractured shale at depths > 10.5 m bgl and bedrock levels below 76.5 mOD.

The seismic velocities indicate that any excavation of slightly weathered/fractured shale will require breaking/blasting.

3.3.15 Location 15

The survey area is located in the townland of Ballylusky, c. 1 km east of the N52 road. The survey area consists of open agricultural fields (Fig. 3.3.15a) and topography ranges from 73.1 to 74.3 mOD.



Fig 3.3.15a: Locations marked with red line.

The soils across the survey area are mapped as predominantly alluvium with till derived from limestones to the west and lacustrine sediments to the southeast (Fig. 3.3.15b). The soils are underlain by grey calcarenitic and oolitic limestone of the Terryglass Formation.



Fig 3.3.15b: The GSI Quaternary sediments map (locations marked in red).

The geophysical data acquired along these sections included 2 ERT profiles (R43 – R44) and 5 SR profiles S127 – S131. The results are presented on **Drawing AGP21220_15** (Appendix B).

Modelled resistivity values in this area have been interpreted as follows:

Resistivity (Ohm-m)	Interpretation
50-250	Sandy gravelly SILT/CLAY
250-500	Clayey Sand/Gravel
150-250	MUDSTONE/SHALE
250-3500	LIMESTONE (Terryglass Formation)

The seismic data indicated 3 subsurface velocity layers:

Layer	Velocity (m/s)	Ave. (m/s)	Interpretation	Estimated Stiffness/ Rock Quality	Estimated Excavatability
1	150-382	230	Soils	Very soft-Soft /Very loose-Loose	Diggable
2	404-1693	1145	Soils	Firm-Stiff/ Medium Dense-Dense	Diggable
			Highly-Moderately weathered/karstified Bedrock	Poor-Fair	Rippable-Marginally Ripp.
3	2468-4134	3050	Slightly weathered – Fresh Bedrock	Good	Break/Blast

The combined results have been summarised as follows:

Layer	Velocity (m/s)	Resistivity (Ohm-m)	Interpretation	Estimated Stiffness/ Rock Quality	Estimated Excavatability
1	150-382	50-250	Sandy gravelly SILT/CLAY	Very soft-Soft	Diggable
		250-500	Clayey Sand/Gravel	Very loose-Loose	
2	404-1693	50-250	Sandy gravelly SILT/CLAY	Firm-Stiff	Diggable
		250-500	Clayey Sand/Gravel	Medium Dense-Dense	
3	2468-4134	150-250	Slightly weathered – Fresh MUDSTONE/SHALE	Good	Break/Blast
		250-3500	Slightly weathered – Fresh LIMESTONE		

Four subsurface layers have been interpreted comprising of:

1. a thin upper layer (0.6 – 0.9 m, average 0.8 m) of very soft to soft sandy gravelly SILT/CLAY or very loose to loose clayey SAND/GRAVEL.
2. underlain by a thicker layer (1.2 – 6.4 m, average 3.1 m) of firm to stiff sandy gravelly SILT/CLAY or medium dense to dense clayey SAND/GRAVEL.
3. underlain by slightly weathered to fresh limestone or mudstone/shale at depths from 2.0 to 7.2 m bgl (average depth 3.9 m bgl). Interpreted bedrock level varies from 66.9 to 71.9 mOD.

No weathered rock layer has been defined by the geophysical data however there may be some weathered/karstified rock at the base of layer 2. The seismic velocities indicate that any weathered rock will be highly to moderately weathered rock ranging from rippable to requiring breaking/blasting.

The velocities indicate that any excavation of the slightly weathered to fresh rock will require breaking/blasting. It should be noted that the cut-off velocity for excavatability will be lower if excavating in trenches.

3.3.16 Location 16

The survey area is located in the townland of Modreeny, c. 2.5 km northwest of Cloughjordan town centre. The survey area consists of open agricultural fields (Fig. 3.3.16a) and topography ranges from 74.2 mOD to 76.3 mOD.



Fig 3.3.16a: Locations marked with red line.

The soils across the survey area are mapped as predominantly alluvium with till derived from limestones to the northeast and southwest (Fig. 3.3.16b) overlying massive, unbedded lime-mudstone of the Waulsortian Limestones.



Fig 3.3.16b: The GSI Quaternary sediments map (locations marked in red).

The geophysical data acquired along these sections included 3 ERT profiles (R7 – R9) and 12 SR profiles S21 – S32. The results are presented on **Drawings AGP21220_16A and 16B** (Appendix B).

Modelled resistivity values in this area have been interpreted as follows:

Resistivity (Ohm-m)	Interpretation
50-250	Sandy gravelly SILT/CLAY
250-500	Clayey Sand/Gravel
175-20000	LIMESTONE (Waulsortian)

The seismic data indicated 3 subsurface velocity layers:

Layer	Velocity (m/s)	Ave. (m/s)	Interpretation	Estimated Stiffness/ Rock Quality	Estimated Excavatability
1	140-324	200	Soils	Very Soft-Soft /Very loose-Loose	Diggable
2	633-2005	1375	Soils	Firm-Stiff/ Medium Dense-Dense	Diggable
			Highly-Moderately weathered/karstified Bedrock	Poor-Fair	Rippable-Break/Blast
3	2419-5725	4215	Slightly weathered – Fresh Bedrock	Good	Break/Blast

The combined results have been summarised as follows:

Layer	Velocity (m/s)	Resistivity (Ohm-m)	Interpretation	Estimated Stiffness/ Rock Quality	Estimated Excavatability
1	140-324	50-250	Sandy gravelly SILT/CLAY	Very Soft-Soft	Diggable
		250-500	Clayey Sand/Gravel	Very loose-Loose	
2	633-2005	50-250	Sandy gravelly SILT/CLAY	Firm-Stiff	Diggable
		250-500	Clayey Sand/Gravel	Medium Dense-Dense	
		175-250	Highly-Moderately weathered/karstified LIMESTONE	Poor-Fair	Rippable-Break/Blast
3	2419-5725	250-10000	Slightly weathered – Fresh LIMESTONE	Good	Break/Blast

Four subsurface layers have been interpreted comprising of:

1. a thin upper layer (0.5 – 1.1 m, average 0.8 m) of very soft to soft sandy gravelly SILT/CLAY or very loose to loose clayey SAND/GRAVEL.
2. underlain by a thicker layer (0.6 – 3.4 m, average 1.9 m) of firm to stiff sandy gravelly SILT/CLAY or medium dense to dense clayey SAND/GRAVEL.
3. underlain by a layer of highly to moderately weathered/karstified limestone (typically 0.9 m thick) at depths from 2.0 to 5.4 m bgl. Interpreted bedrock level varies from 70 to 74 mOD.
4. underlain by slightly weathered to fresh limestone at depths from 2.3 to 6.8 m bgl. Interpreted bedrock level varies from 68.6 to 73.4 mOD.

As the bedrock comprises of massive un-bedded limestone, the seismic velocities indicate that the weathered/karstified rock layer will vary from rippable to requiring breaking/blasting.

The velocities indicate that any excavation of the slightly weathered to fresh rock will require breaking/blasting. It should be noted that the cut-off velocity for excavatability will be lower if excavating in trenches.

Some lower bedrock resistivities coupled with lower bedrock velocities in the southwest of R8 suggest the presence of increased karstification of the bedrock at depths ≥ 6 m bgl. This should be investigated by coring.

4. RECOMMENDATIONS

The findings of the geophysical investigation should be reviewed on completion of the direct investigation.

Where bedrock excavation is proposed, a detailed assessment of excavatability should be carried out combining the results of the geophysical survey, any rotary core drilling, strength testing and trial excavation pits using a high-powered excavator such as a CAT 336E or more powerful model. Trial excavations should be attempted down to formation level using a high-powered excavator of similar rating to that to be used during construction. A more detailed discussion of velocity and excavatability is contained in Appendix D.

Foundation design for any structures should take into account the presence of possible open fissures/cavities in the limestone bedrock. Any cavities exposed during stripping of topsoil or excavation of rock should be backfilled in the appropriate manner for karstified limestone areas as advised by a competent geotechnical engineer.

To minimise the risk of subsidence in areas where any karstified limestone is near surface, drains should be sealed, and surface water disposed of away from these areas. Prior to construction a surface water management plan is advised to avoid re-activation of any karst features due to changes in the surface water flow.

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APPENDIX A: DETAILED METHODOLOGY

A combination of geophysical techniques was used to provide a high quality interpretation and reduce any ambiguities, which may otherwise exist.

Electrical Resistivity Tomography (ERT)

Electrical Resistivity Tomography was carried out to provide information on lateral variations in the overburden material as well as on the underlying overburden and bedrock.

Principles

This surveying technique makes use of the Wenner resistivity array. The 2D-resistivity profiling method records a large number of resistivity readings in order to map lateral and vertical changes in material types. This method involves the use of electrodes connected to a resistivity meter, using computer software to control the process of data collection and storage.

Data Collection

ERT Profiles were recorded using a Campus Tigre resistivity meter, imaging software, two takeout multicore cables and up to 64 stainless steel electrodes. Saline solution was used at the electrode/ground interface in order to gain a good electrical contact required for the technique to work effectively. The recorded data were processed and viewed immediately after surveying.

Data Processing

The field readings were stored in computer files and inverted using the RES2DINV package (Geotomo Software, 2006) with up to 5 iterations of the measured data carried out for each profile to obtain a 2D-depth model of the resistivities.

The inverted 2D resistivity models and corresponding interpreted geology are displayed on the accompanying drawings alongside the processed seismic sections. Profiles have been contoured using the same contour intervals and colour codes. Distance is indicated along the horizontal axis of the profiles.

Seismic Refraction Profiling

Principles

This method measures the velocity of refracted seismic waves through the overburden and rock material and allows an assessment of the thickness and quality of the materials present to be made. Stiffer and stronger materials usually have higher seismic velocities while soft, loose or fractured materials have lower velocities.

Seismic profiling measures the p-wave velocity (Vp) of refracted seismic waves through the overburden and rock material and allows an assessment of the thickness and quality of the materials present to be made. Stiffer and stronger materials usually have higher Vp velocities while soft, loose or fractured materials have lower Vp velocities. Readings are taken using geophones connected via multi-core cable to a seismograph.

Data Collection

A Geode high resolution 24 channel digital seismograph, 24 10HZ vertical geophones and a 10 kg hammer were used to provide first break information, with a 24 take-out cable (2m spacing). Equipment was carried was operated by a two to three person crew.

Readings are taken using geophones connected via multi-core cable to a seismograph. The depth of resolution of soil/bedrock boundaries is determined by the length of the seismic spread, typically the depth of resolution is about one third the length of the profile (e.g. 46m profile ~16m depth). Shots from seven different positions were taken (2 x off-end, 2 x end, 3 x middle) to ensure optimum coverage of all refractors.

Data Processing

First break picking in digital format was carried out using the FIRSTPIX software program to construct traveltime plots for each spread. The recorded data was processed and interpreted using the GREMIX software program to calculate the thickness of individual velocity units. GREMIX interprets seismic refraction data as a laterally varying layered earth structure. It incorporates the slope-intercept method, parts of the Plus-Minus Method of Hagedoorn (1959), Time-Delay Method, and features the Generalized Reciprocal Method (GRM) of Palmer (1980). Up to four layers can be mapped; one deduced from direct arrivals and three deduced from refractions. Phantoming of all possible travel time pairs can be carried out by adjusting reciprocal times of off shots. Material types were assigned and estimation made of material properties, cross-referenced to other geophysical data.

Approximate errors for Vp velocities are estimated to be +/- 10%. Errors for the calculated layer thicknesses are of the order of +/-20%. Possible errors due to the "hidden layer" and "velocity inversion" effects may also occur (Soske, 1959).

Spatial Relocation

All the geophysical investigation locations were acquired using a Trimble Geo 7X high-accuracy GNSS handheld GPS system using the settings listed below. This system allows collection of GPS data with c.20mm accuracy.

Projection:	Irish Transverse Mercator
Datum:	Ordnance
Coordinate units:	Metres
Altitude units:	Metres
Survey altitude reference:	MSL
Geoid model:	Republic of Ireland

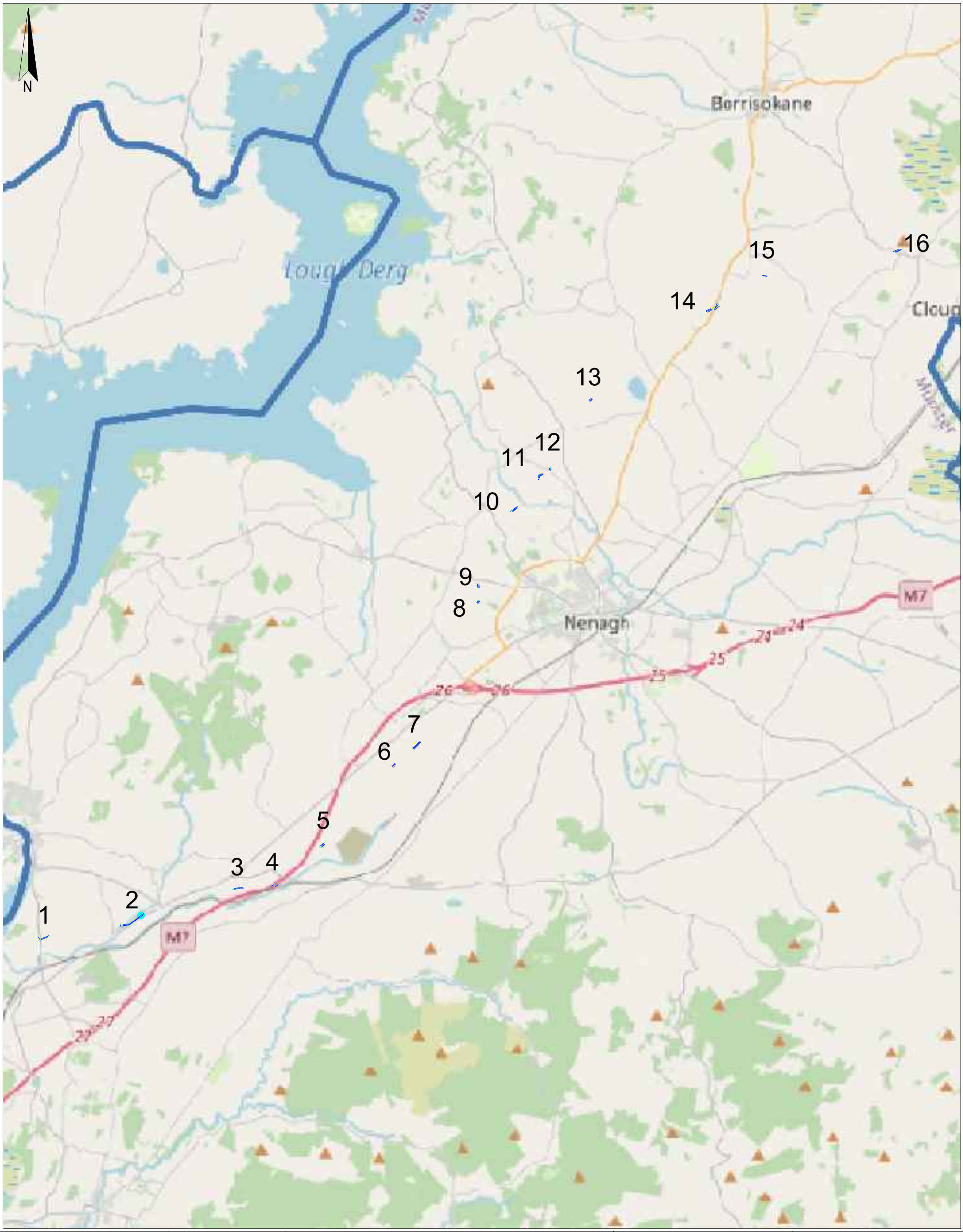
APPENDIX B: DRAWINGS

The information derived from the geophysical investigation is presented in the following drawings:

AGP21220_Overview	Regional Location Map	1:100.000 @ A3
AGP21220_01	Figure 1: Geophysical Locations – Location 1	1:1000 @ A1
	Figure 2: Geophysical Sections – Location 1	1:1000 @ A1
AGP21220_02A	Figure 1: Geophysical Locations – Location 2	1:1250 @ A1
	Figure 2: Geophysical Sections – Location 2	1:1000 @ A1
AGP21220_02B	Figure 1: Geophysical Locations – Location 2	1:1250 @ A1
	Figure 2: Geophysical Sections – Location 2	1:1000 @ A1
AGP21220_03	Figure 1: Geophysical Locations – Location 3	1:1000 @ A1
	Figure 2: Geophysical Sections – Location 3	1:500 @ A1
AGP21220_04	Figure 1: Geophysical Locations – Location 4	1:1000 @ A1
	Figure 2: Geophysical Sections – Location 4	1:500 @ A1
AGP21220_05	Figure 1: Geophysical Locations – Location 5	1:1000 @ A1
	Figure 2: Geophysical Sections – Location 5	1:500 @ A1
AGP21220_06	Figure 1: Geophysical Locations – Location 6	1:1000 @ A1
	Figure 2: Geophysical Sections – Location 6	1:500 @ A1
AGP21220_07A	Figure 1: Geophysical Locations – Location 7	1:1000 @ A1
	Figure 2: Geophysical Sections – Location 7	1:500 @ A1
AGP21220_07B	Figure 1: Geophysical Locations – Location 7	1:1000 @ A1
	Figure 2: Geophysical Sections – Location 7	1:500 @ A1
AGP21220_08	Figure 1: Geophysical Locations – Location 8	1:1000 @ A1
	Figure 2: Geophysical Sections – Location 8	1:500 @ A1
AGP21220_09	Figure 1: Geophysical Locations – Location 9	1:1000 @ A1
	Figure 2: Geophysical Sections – Location 9	1:500 @ A1
AGP21220_10A	Figure 1: Geophysical Locations – Location 10	1:1000 @ A1
	Figure 2: Geophysical Sections – Location 10	1:500 @ A1
AGP21220_10B	Figure 1: Geophysical Locations – Location 10	1:1000 @ A1
	Figure 2: Geophysical Sections – Location 10	1:500 @ A1
AGP21220_11A	Figure 1: Geophysical Locations – Location 11	1:1000 @ A1
	Figure 2: Geophysical Sections – Location 11	1:600 @ A1
AGP21220_11B	Figure 1: Geophysical Locations – Location 11	1:1000 @ A1
	Figure 2: Geophysical Sections – Location 11	1:500 @ A1
AGP21220_12	Figure 1: Geophysical Locations – Location 12	1:1000 @ A1
	Figure 2: Geophysical Sections – Location 12	1:500 @ A1
AGP21220_13	Figure 1: Geophysical Locations – Location 13	1:1000 @ A1
	Figure 2: Geophysical Sections – Location 13	1:500 @ A1
AGP21220_14A	Figure 1: Geophysical Locations – Location 14	1:1000 @ A1
	Figure 2: Geophysical Sections – Location 14	1:600 @ A1
AGP21220_14B	Figure 1: Geophysical Locations – Location 14	1:1000 @ A1
	Figure 2: Geophysical Sections – Location 14	1:600 @ A1
AGP21220_15	Figure 1: Geophysical Locations – Location 15	1:1000 @ A1
	Figure 2: Geophysical Sections – Location 15	1:500 @ A1
AGP21220_16A	Figure 1: Geophysical Locations – Location 16	1:1000 @ A1
	Figure 2: Geophysical Sections – Location 16	1:500 @ A1
AGP21220_16B	Figure 1: Geophysical Locations – Location 16	1:1000 @ A1
	Figure 2: Geophysical Sections – Location 16	1:500 @ A1

GEOPHYSICAL LOCATIONS

SCALE 1:100,000



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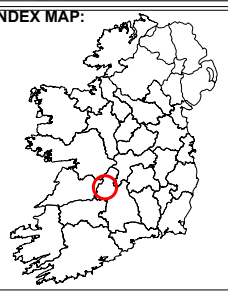
www.apexgeophysics.ie

INDEX MAP:



LEGEND:

R1 — 2D resistivity profile

S1 — Seismic refraction profile

The information displayed here is to be used in conjunction with AGP21220_01 Report on the Geophysical Investigation for the Water Supply Project - Eastern & Midlands Region Contract 1, for Causeway Geotech Ltd., APEX Geophysics Ltd. 5th October 2022

PROJECT:	IRISH WATER SUPPLY SCHEME EASTERN & MIDLANDS REGION - CONTRACT 1
CLIENT.:	CAUSEWAY GEOTECH LIMITED
DRAWING NO:	AGP21220_Overview
SCALE:	AS INDICATED @ A3
DATE:	05-10-2022

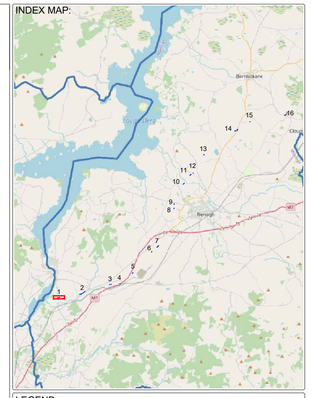
Version:	Date:	Drawn By:	Checked:
01	05-10-2022	YOC	TL

FIGURE 1: Geophysical Locations - Location 1

Scale 1:1000



INDEX MAP:



LEGEND:

R1 — 2D resistivity profile

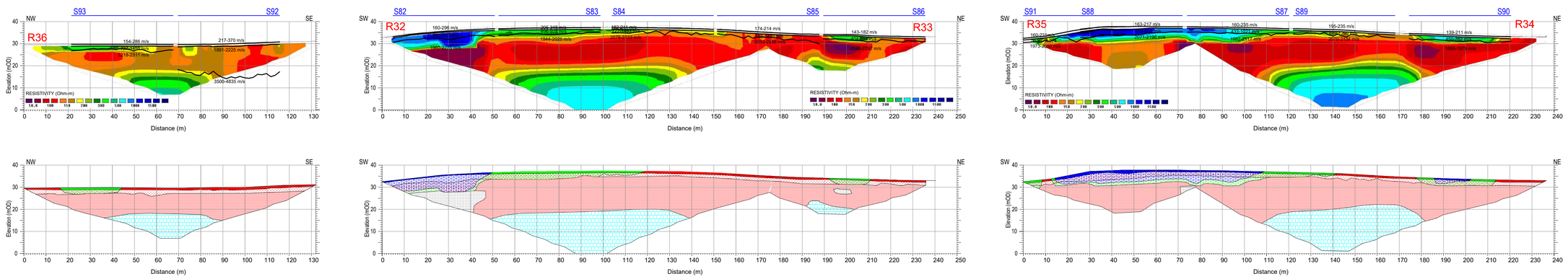
S1 — Seismic refraction profile

Seismic refraction layer with interpreted P-wave velocity

- Very soft-Soft sandy gravelly SILT/CLAY
- Firm-Stiff sandy gravelly SILT/CLAY
- Very Stiff sandy gravelly SILT/CLAY
- Very Stiff SILT/CLAY
- Very Loose-Loose clayey SAND/GRAVEL
- Medium dense - Dense clayey SAND/GRAVEL
- Very Dense clayey SAND/GRAVEL
- Very Loose-Loose silty SAND/GRAVEL
- Medium dense - Dense silty SAND/GRAVEL
- Very Dense silty SAND/GRAVEL
- Slightly Weathered - Fresh LIMESTONE (Ballysteen)

FIGURE 2: Geophysical Sections - Location 1

Scale 1:1000



The information displayed here is to be used in conjunction with AGP21220_01 Report on the Geophysical Investigation for the Water Supply Project - Eastern & Midlands Region Contract 1, for Causeway Geotech Ltd., APEX Geophysics Ltd. 5th October 2022

PROJECT:
IRISH WATER SUPPLY SCHEME
EASTERN & MIDLANDS REGION - CONTRACT 1
GEOPHYSICAL SURVEY

CLIENT:
CAUSEWAY GEOTECH LIMITED

DRAWING NUMBER:
AGP21220_01

SCALE:
AS SHOWN @ A1

DATE:
05-10-2022

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YOC	---

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FIGURE 1: Geophysical Locations - Location 2

Scale 1:1250

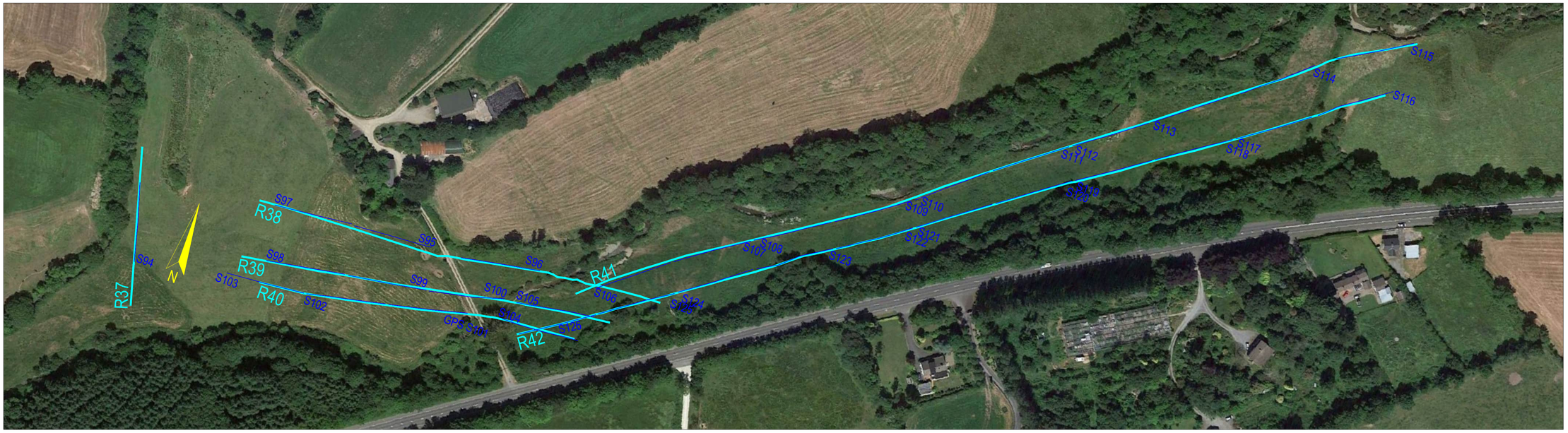
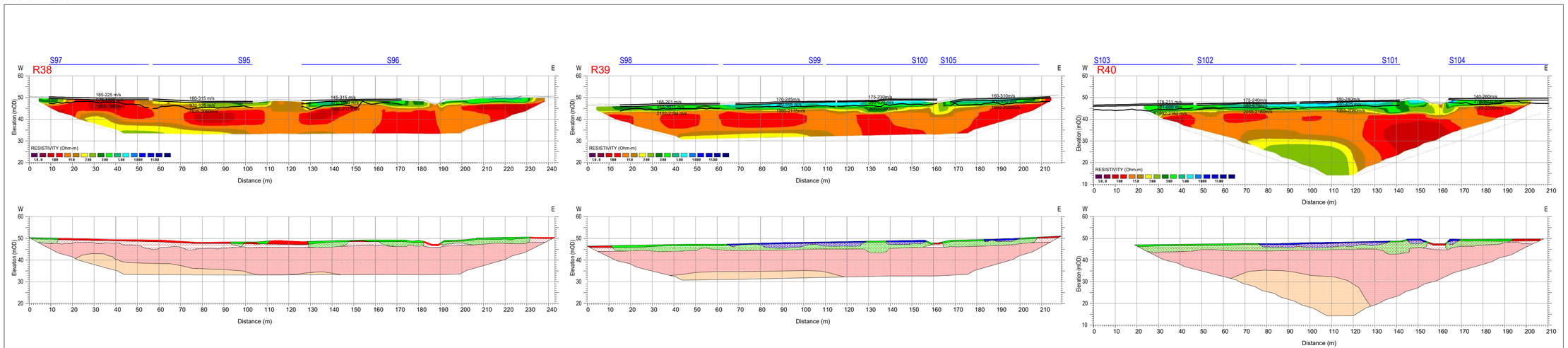
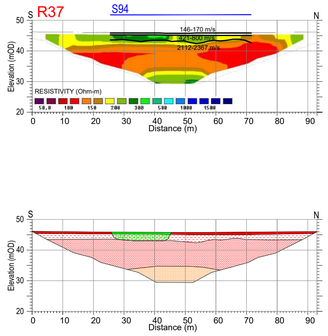


FIGURE 2: Geophysical Sections - Location 2

Scale 1:1000





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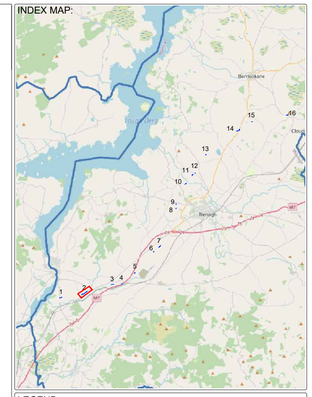

LEGEND:

R1 — 2D resistivity profile

S1 — Seismic refraction profile

Seismic refraction layer with interpreted P-wave velocity

- Very soft-Soft sandy gravelly SILT/CLAY
- Firm-Stiff sandy gravelly SILT/CLAY
- Very Stiff sandy gravelly SILT/CLAY
- Very Loose-Loose clayey SAND/GRAVEL
- Loose clayey SAND/GRAVEL
- Medium dense - Dense clayey SAND/GRAVEL
- Very Loose-Loose silty SAND/GRAVEL
- Loose silty SAND/GRAVEL
- Medium dense-Dense silty SAND/GRAVEL
- SANDSTONE/MUDSTONE/LIMESTONE (Lower Limestone Shale)

The information displayed here is to be used in conjunction with AGP21220_01 Report on the Geophysical Investigation for the Water Supply Project - Eastern & Midlands Region Contract 1, for Causeway Geotech Ltd., APEX Geophysics Ltd. 5th October 2022

PROJECT:
IRISH WATER SUPPLY SCHEME
EASTERN & MIDLANDS REGION - CONTRACT 1
GEOPHYSICAL SURVEY

CLIENT:
CAUSEWAY GEOTECH LIMITED

DRAWING NUMBER:
AGP21220_02A

SCALE:
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FIGURE 1: Geophysical Locations - Location 2

Scale 1:1250

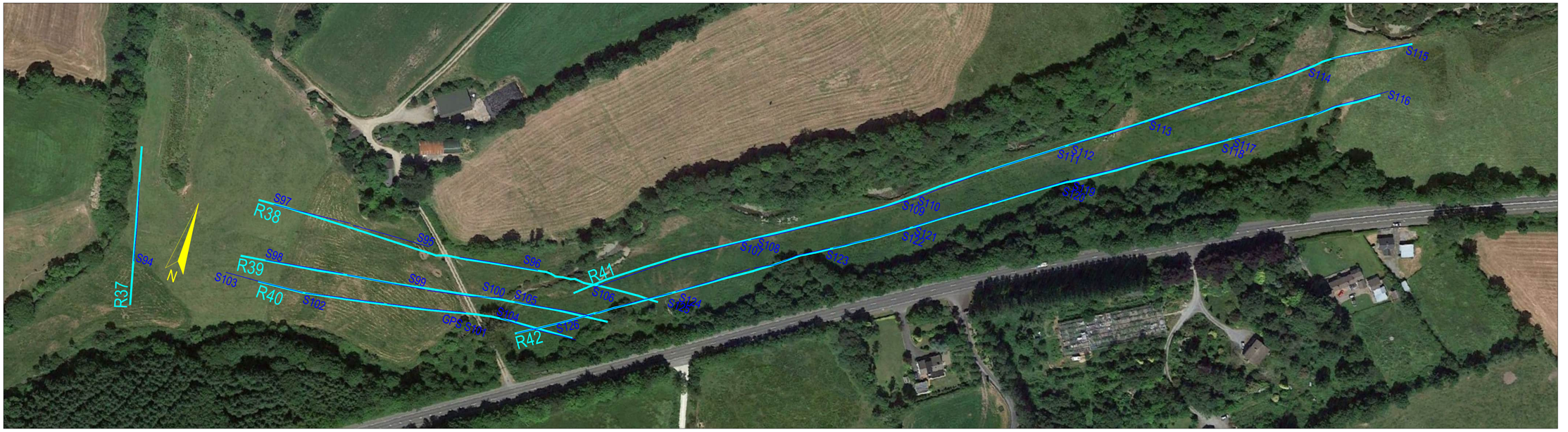
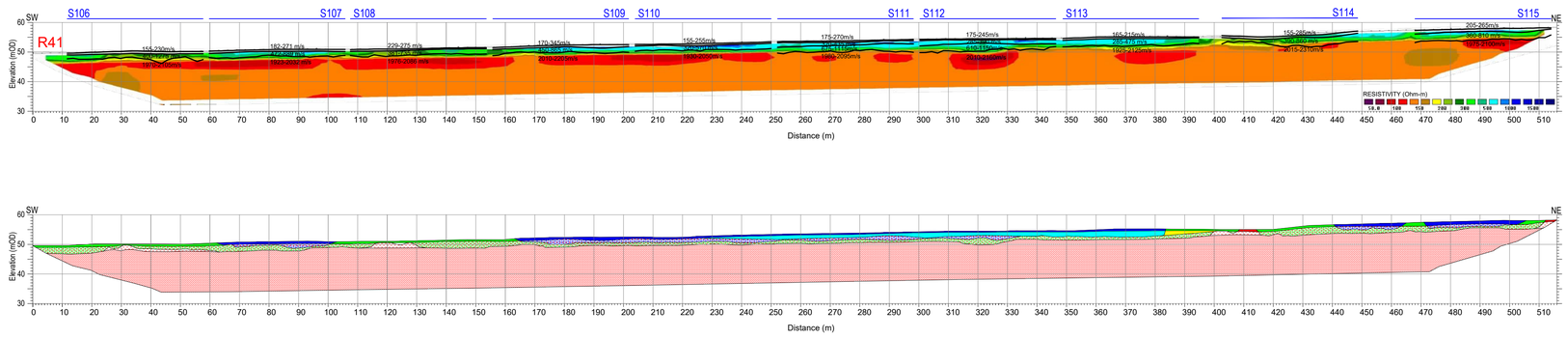
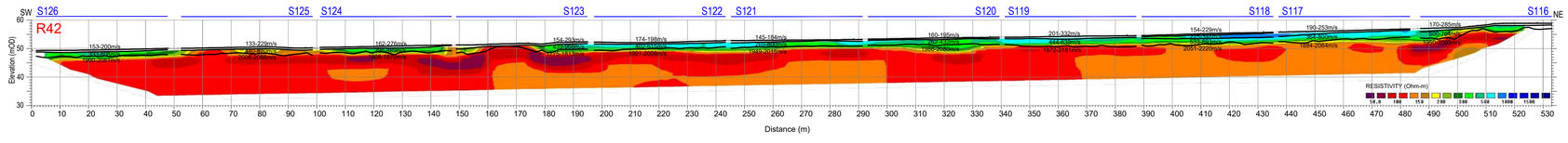
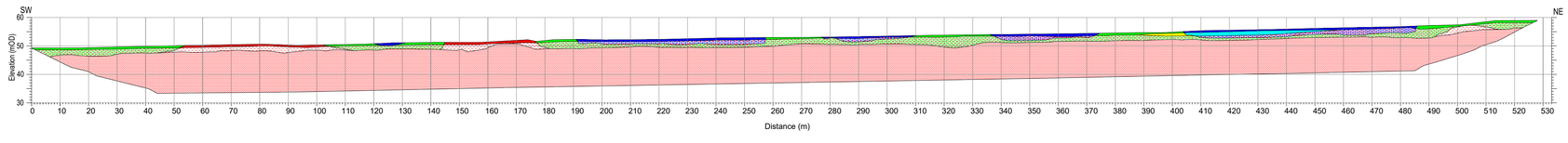


FIGURE 2: Geophysical Sections - Location 2

Scale 1:1000







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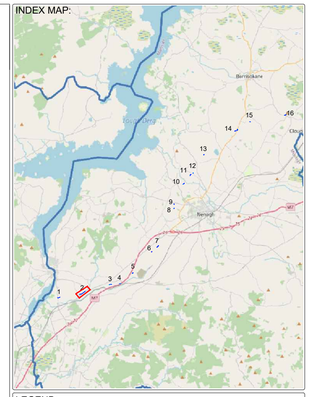

LEGEND:

R1 — 2D resistivity profile

S1 — Seismic refraction profile

Seismic refraction layer with interpreted P-wave velocity

- Very soft-Soft sandy gravelly SILT/CLAY
- Firm-Stiff sandy gravelly SILT/CLAY
- Very Stiff sandy gravelly SILT/CLAY
- Very Loose-Loose clayey SAND/GRAVEL
- Loose clayey SAND/GRAVEL
- Medium dense - Dense clayey SAND/GRAVEL
- Very Loose-Loose silty SAND/GRAVEL
- Loose silty SAND/GRAVEL
- Medium dense-Dense silty SAND/GRAVEL
- SANDSTONE/MUDSTONE/LIMESTONE (Lower Limestone Shale)

The information displayed here is to be used in conjunction with AGP21220_01 Report on the Geophysical Investigation for the Water Supply Project - Eastern & Midlands Region Contract 1, for Causeway Geotech Ltd., APEX Geophysics Ltd. 5th October 2022

PROJECT:
IRISH WATER SUPPLY SCHEME
EASTERN & MIDLANDS REGION - CONTRACT 1
GEOPHYSICAL SURVEY

CLIENT:
CAUSEWAY GEOTECH LIMITED

DRAWING NUMBER:
AGP21220_02B

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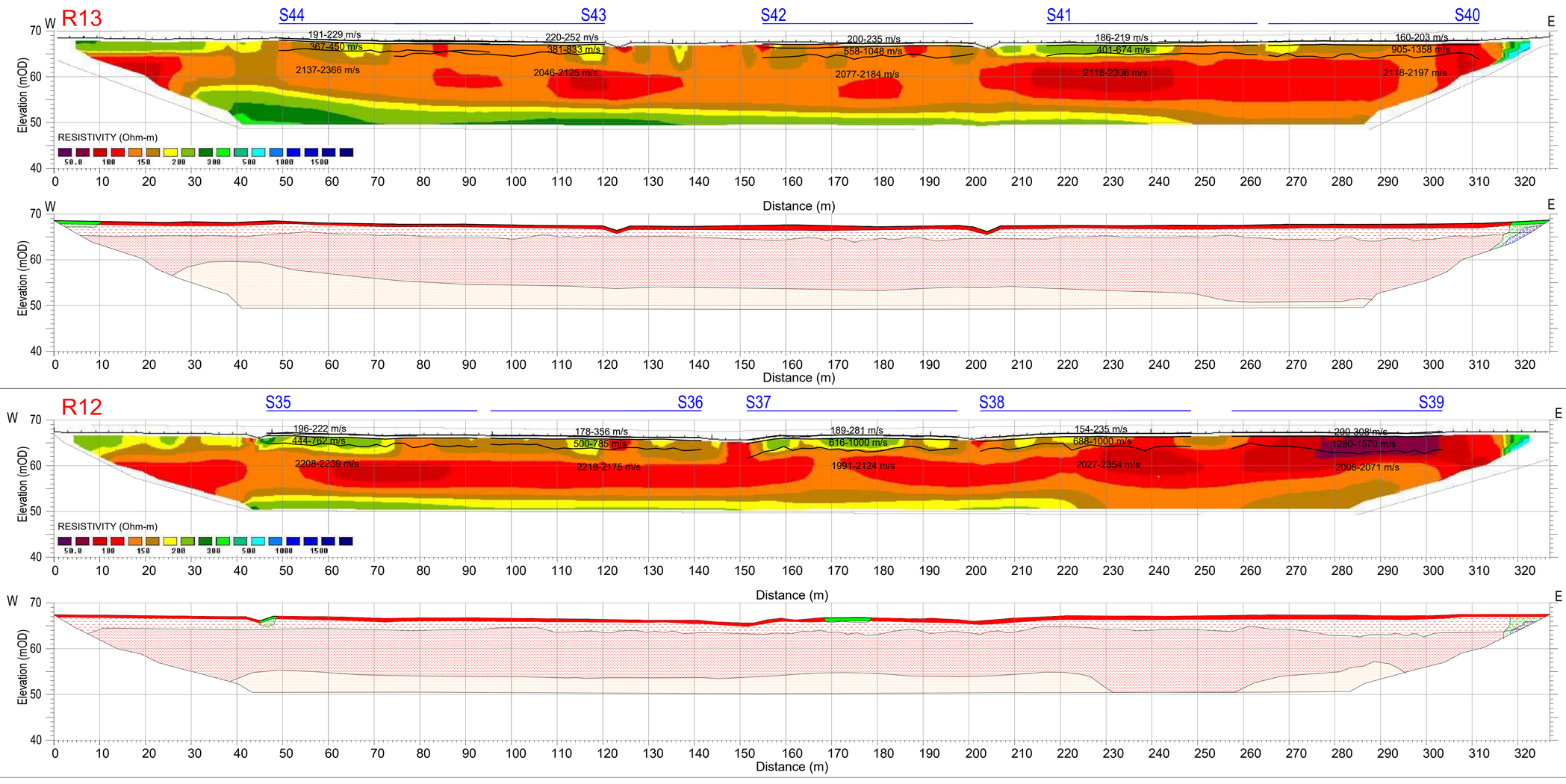
FIGURE 1: Geophysical Locations - Location 3

Scale 1:1000



FIGURE 2: Geophysical Sections - Location 3

Scale 1:500



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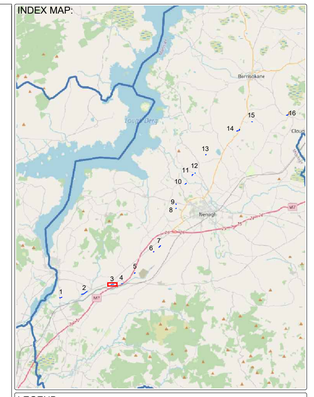

LEGEND:

R1 — 2D resistivity profile

S1 — Seismic refraction profile

Seismic refraction layer with interpreted P-wave velocity

- Very soft-Soft sandy gravelly SILT/CLAY
- Firm-Stiff sandy gravelly SILT/CLAY
- Very Stiff sandy gravelly SILT/CLAY
- Very Loose-Loose clayey SAND/GRAVEL
- Medium dense - Dense clayey SAND/GRAVEL
- Very Dense clayey SAND/GRAVEL
- Medium dense - Dense silty SAND/GRAVEL
- Very Dense silty SAND/GRAVEL
- SANDSTONE/MUDSTONE/LIMESTONE (Lower Limestone Shale)

The information displayed here is to be used in conjunction with AGP21220_01 Report on the Geophysical Investigation for the Water Supply Project - Eastern & Midlands Region Contract 1, for Causeway Geotech Ltd., APEX Geophysics Ltd. 5th October 2022

PROJECT:
IRISH WATER SUPPLY SCHEME
EASTERN & MIDLANDS REGION - CONTRACT 1
GEOPHYSICAL SURVEY

CLIENT:
CAUSEWAY GEOTECH LIMITED

DRAWING NUMBER:
AGP21220_03

SCALE:
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FIGURE 1: Geophysical Locations - Location 4

Scale 1:1000

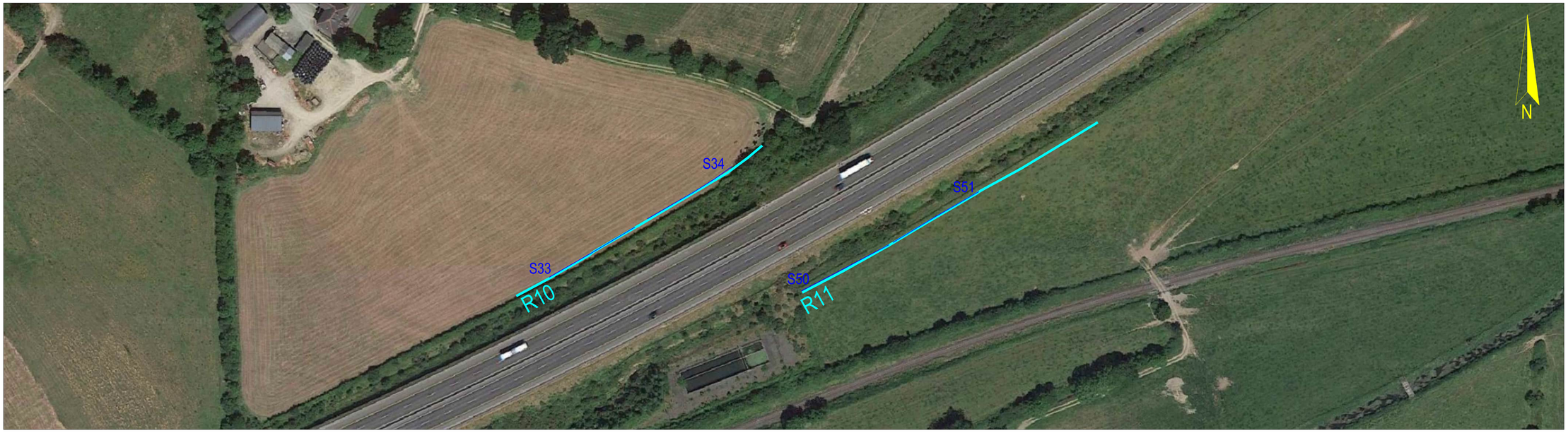
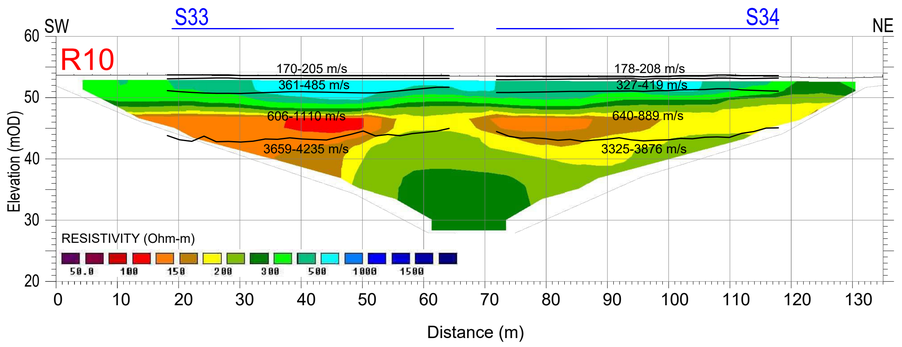
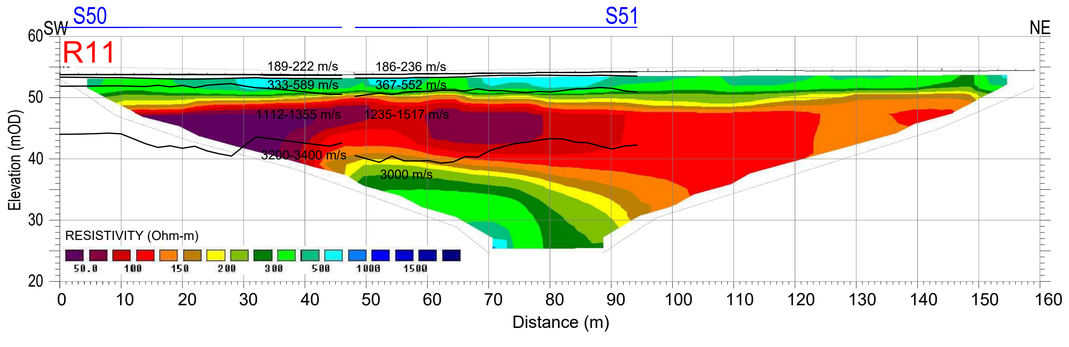
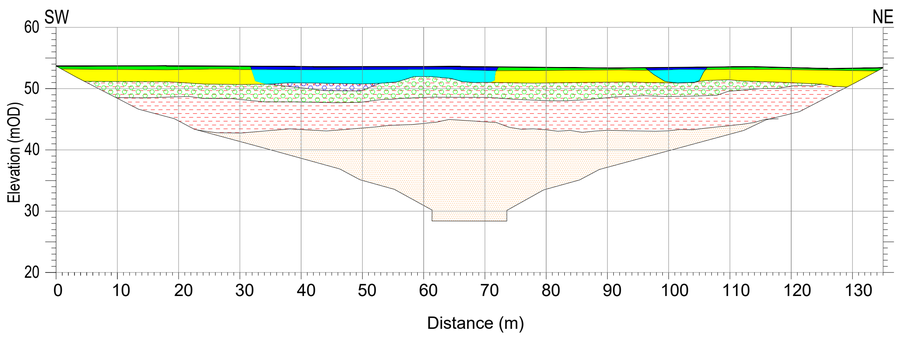


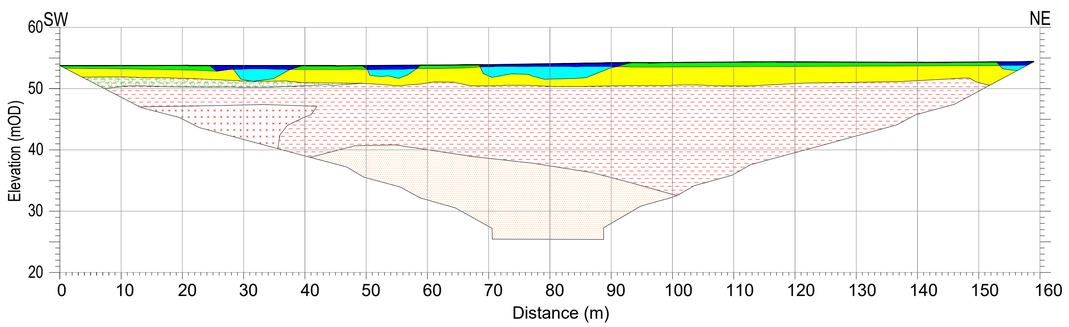
FIGURE 2: Geophysical Sections - Location 4

Scale 1:500









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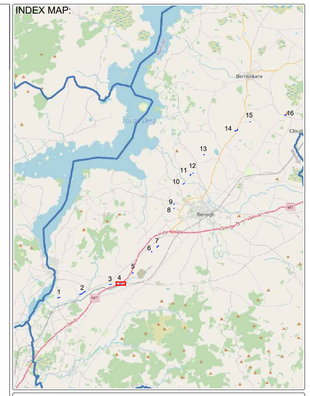

LEGEND:

R1 — 2D resistivity profile

S1 — Seismic refraction profile

Seismic refraction layer with interpreted P-wave velocity

- Very Loose-Loose clayey SAND/GRAVEL
- Loose - Medium dense clayey SAND/GRAVEL
- Medium dense - Dense clayey SAND/GRAVEL
- Very Loose-Loose silty SAND/GRAVEL
- Loose-Medium dense silty SAND/GRAVEL
- Medium dense - Dense silty SAND/GRAVEL
- Firm-Stiff sandy gravelly SILT/CLAY
- Firm-Stiff SILT/CLAY
- Slightly Weathered - Fresh SANDSTONE/MUDSTONE/LIMESTONE (Lower Limestone Shale)

The information displayed here is to be used in conjunction with AGP21220_01 Report on the Geophysical Investigation for the Water Supply Project - Eastern & Midlands Region Contract 1, for Causeway Geotech Ltd., APEX Geophysics Ltd. 5th October 2022

PROJECT:
IRISH WATER SUPPLY SCHEME
EASTERN & MIDLANDS REGION - CONTRACT 1
GEOPHYSICAL SURVEY

CLIENT:
CAUSEWAY GEOTECH LIMITED

DRAWING NUMBER:
AGP21220_04

SCALE:
AS SHOWN @ A1

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05-10-2022

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FIGURE 1: Geophysical Locations - Location 5

Scale 1:1000

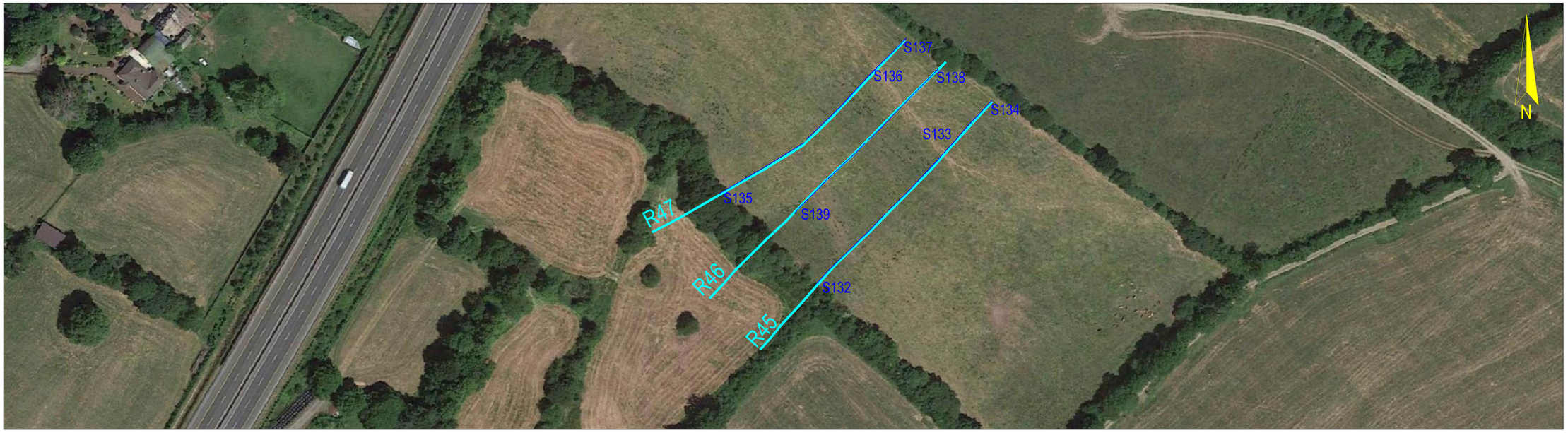
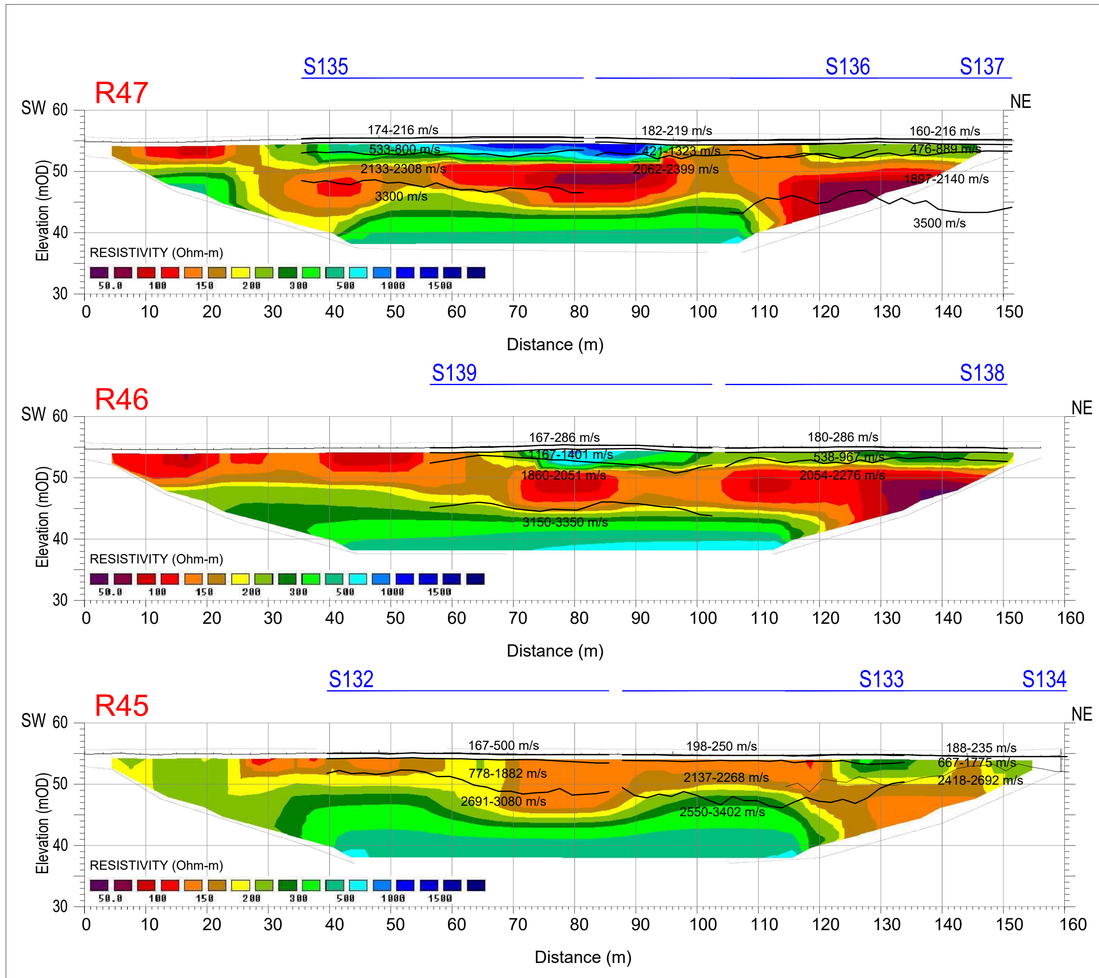
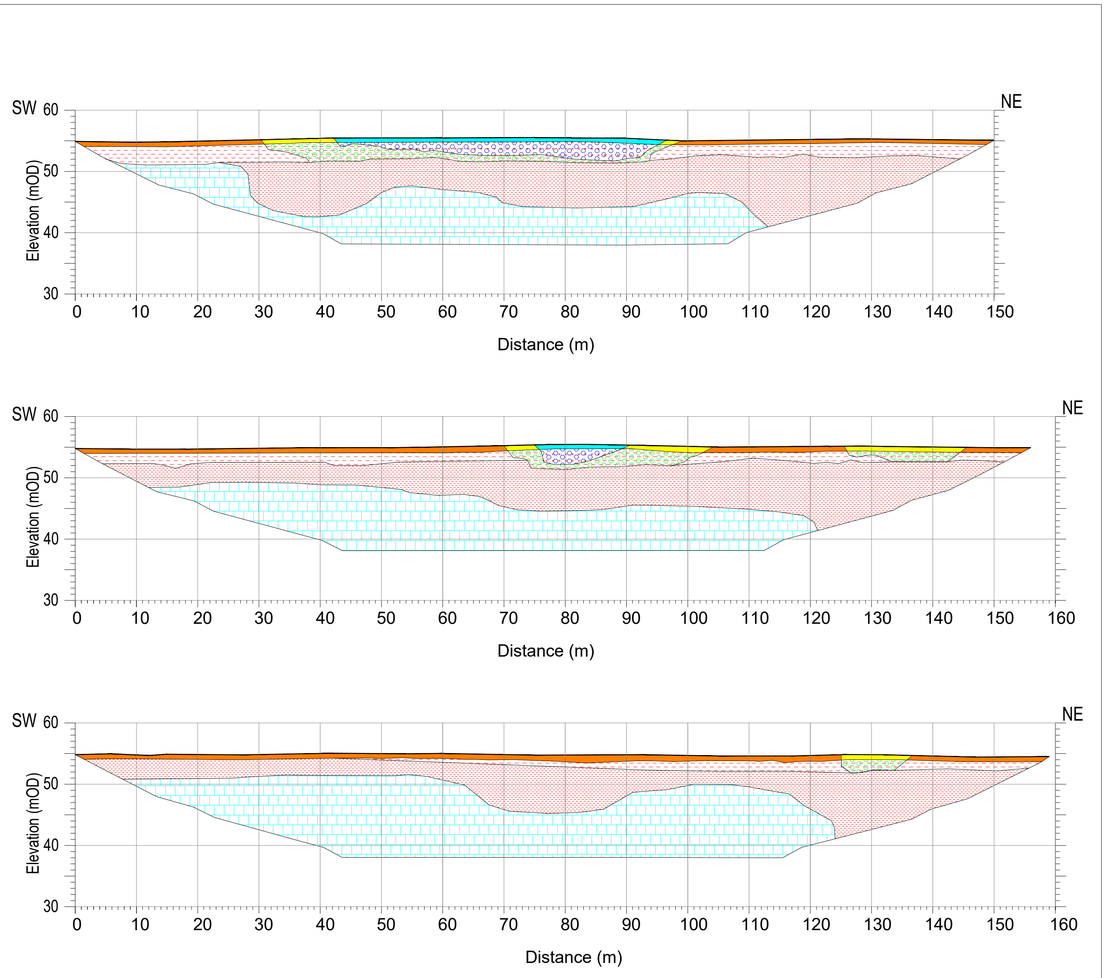
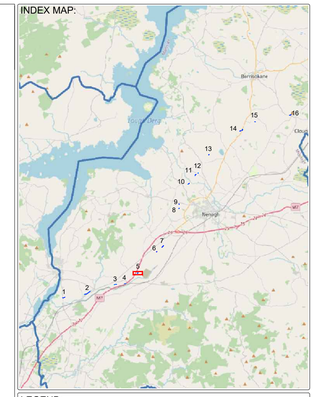


FIGURE 2: Geophysical Sections - Location 5

Scale 1:500







LEGEND:

R1 — 2D resistivity profile

S1 — Seismic refraction profile

Seismic refraction layer with interpreted P-wave velocity

Very soft-Firm sandy gravelly SILT/CLAY

Firm-Stiff sandy gravelly SILT/CLAY

Very Stiff sandy gravelly SILT/CLAY

Very loose - Medium dense clayey SAND/GRAVEL

Medium dense - Dense clayey SAND/GRAVEL

Loose-Medium dense silty SAND/GRAVEL

Medium dense - Dense silty SAND/GRAVEL

Slightly Weathered - Fresh LIMESTONE (Ballysteen)

The information displayed here is to be used in conjunction with AGP21220_01 Report on the Geophysical Investigation for the Water Supply Project - Eastern & Midlands Region Contract 1, for Causeway Geotech Ltd., APEX Geophysics Ltd. 5th October 2022

PROJECT:
IRISH WATER SUPPLY SCHEME
EASTERN & MIDLANDS REGION - CONTRACT 1
GEOPHYSICAL SURVEY

CLIENT:
CAUSEWAY GEOTECH LIMITED

DRAWING NUMBER:
AGP21220_05

SCALE:
AS SHOWN @ A1

DATE:
05-10-2022

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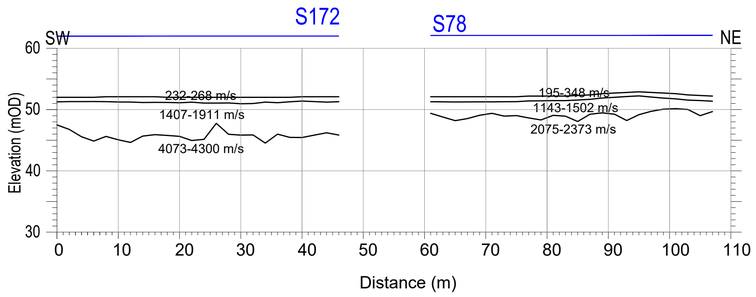
FIGURE 1: Geophysical Locations - Location 6

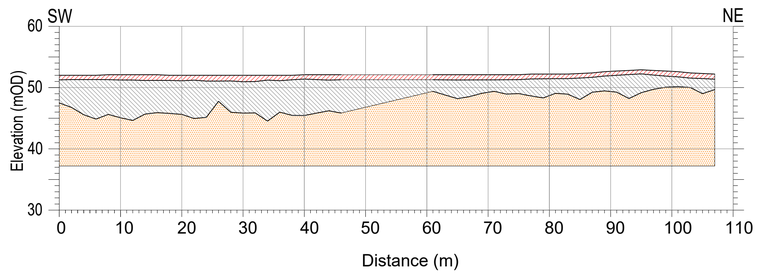
Scale 1:1000

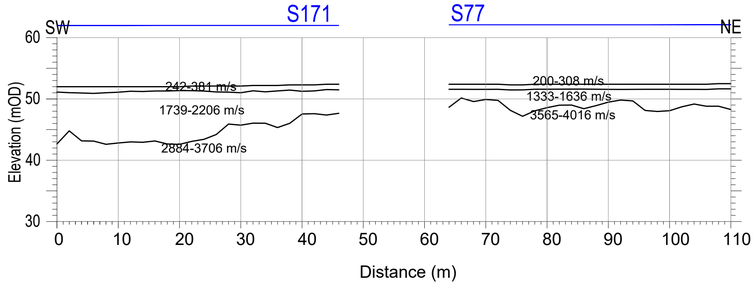


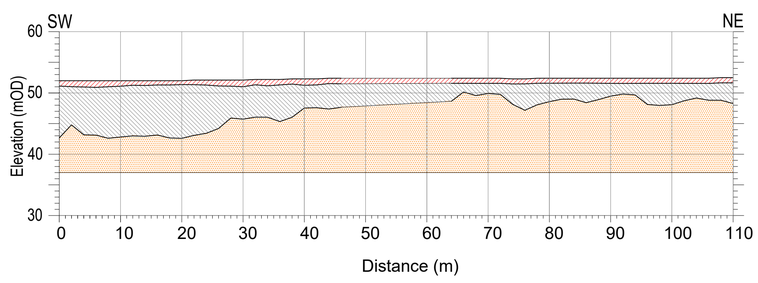
FIGURE 2: Geophysical Sections - Location 6

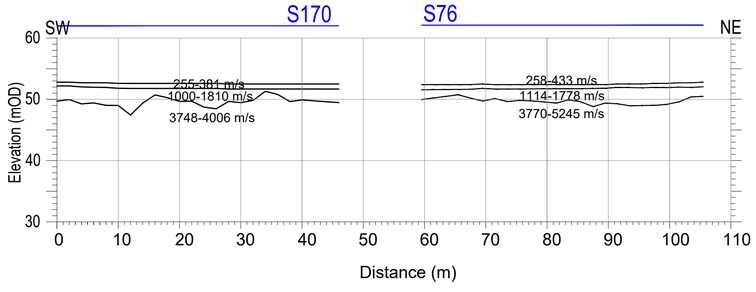
Scale 1:500

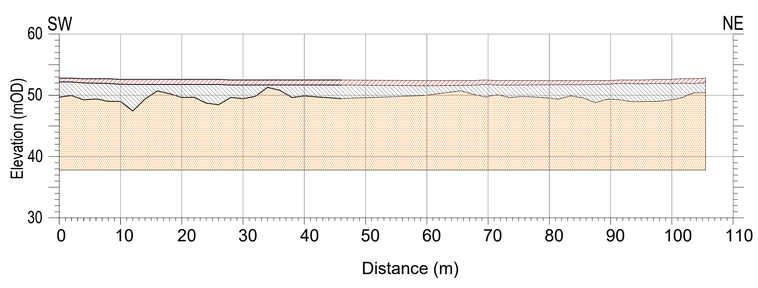




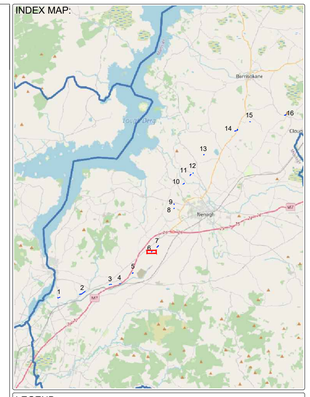








INDEX MAP:



LEGEND:

R1: 2D resistivity profile

S1: Seismic refraction profile

Seismic refraction layer with interpreted P-wave velocity

Soft/Loose SOILS

Stiff-Very Stiff/Dense-Very Dense SOILS and/or Moderately - Slightly Weathered/Fractured SANDSTONE/MUDSTONE/LIMESTONE

Slightly Weathered - Fresh SANDSTONE/MUDSTONE/LIMESTONE (Lower Limestone Shale)

The information displayed here is to be used in conjunction with AGP21220_01 Report on the Geophysical Investigation for the Water Supply Project - Eastern & Midlands Region Contract 1, for Causeway Geotech Ltd., APEX Geophysics Ltd. 5th October 2022

PROJECT:
IRISH WATER SUPPLY SCHEME
EASTERN & MIDLANDS REGION - CONTRACT 1
GEOPHYSICAL SURVEY

CLIENT:
CAUSEWAY GEOTECH LIMITED

DRAWING NUMBER:
AGP21220_06

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FIGURE 1: Geophysical Locations - Location 7

Scale 1:1000

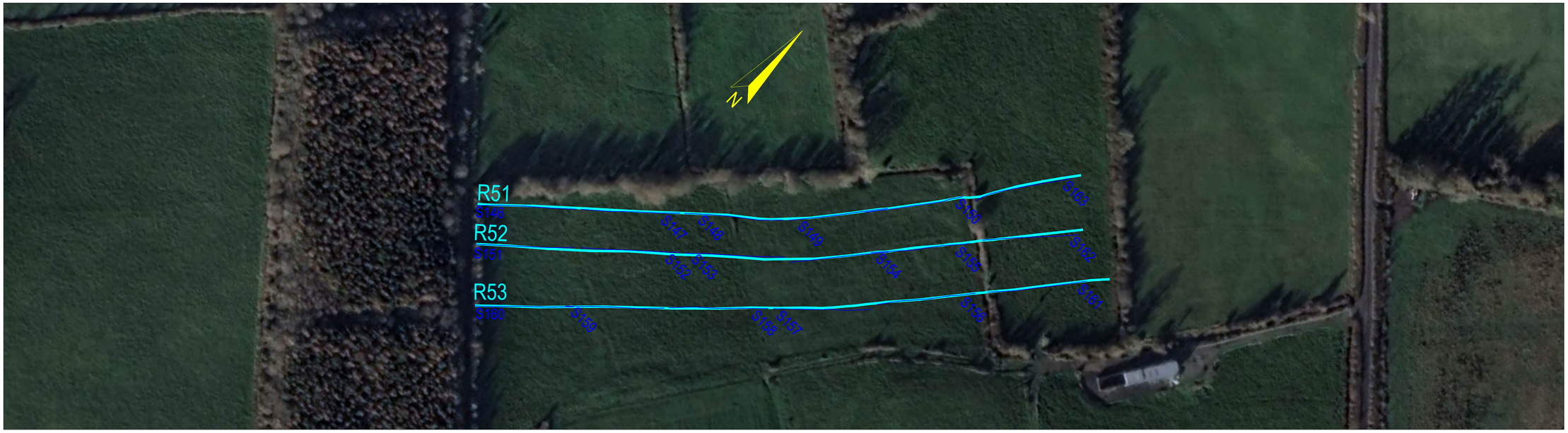
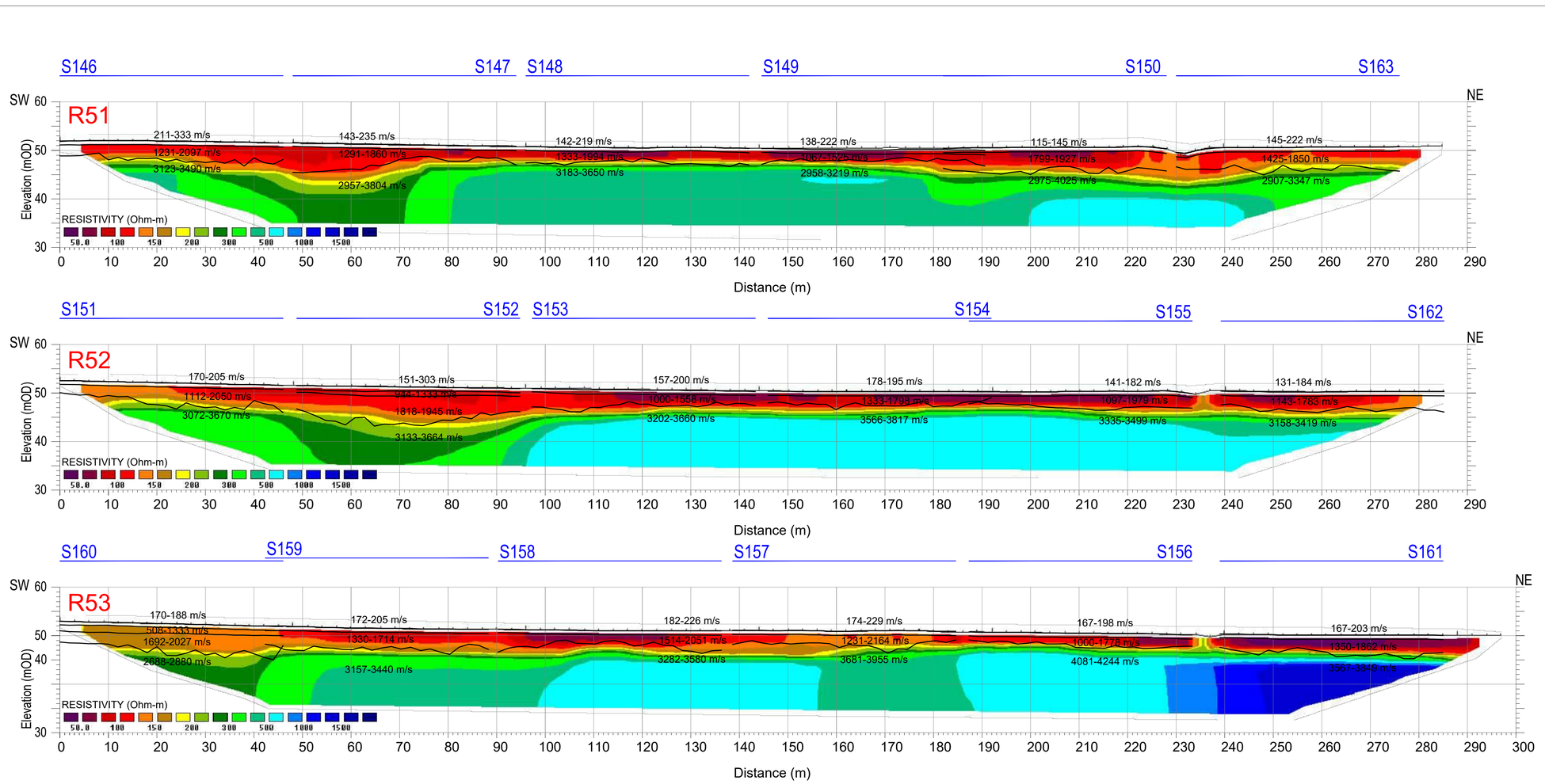


FIGURE 2: Geophysical Sections - Location 7

Scale 1:500



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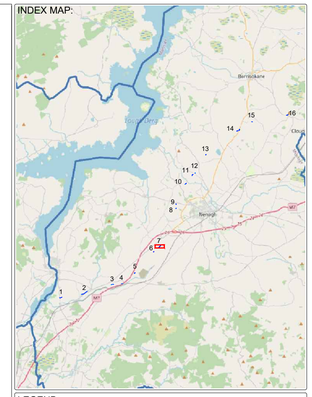

LEGEND:

R1 — 2D resistivity profile

S1 — Seismic refraction profile

Seismic refraction layer with interpreted P-wave velocity

Very soft-Soft SILT/CLAY

Stiff-Very Stiff SILT/CLAY

Very soft-Soft sandy gravelly SILT/CLAY

Firm-Stiff sandy gravelly SILT/CLAY

Stiff-Very Stiff sandy gravelly SILT/CLAY

Slightly Weathered - Fresh SANDSTONE/MUDSTONE/LIMESTONE (Lower Limestone Shale)

Slightly Weathered - Fresh LIMESTONE (Ballysteen)

The information displayed here is to be used in conjunction with AGP21220_01 Report on the Geophysical Investigation for the Water Supply Project - Eastern & Midlands Region Contract 1, for Causeway Geotech Ltd., APEX Geophysics Ltd. 5th October 2022

PROJECT:
IRISH WATER SUPPLY SCHEME
EASTERN & MIDLANDS REGION - CONTRACT 1
GEOPHYSICAL SURVEY

CLIENT:
CAUSEWAY GEOTECH LIMITED

DRAWING NUMBER:
AGP21220_07A

SCALE:
AS SHOWN @ A1

DATE:
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FIGURE 1: Geophysical Locations - Location 7

Scale 1:1000

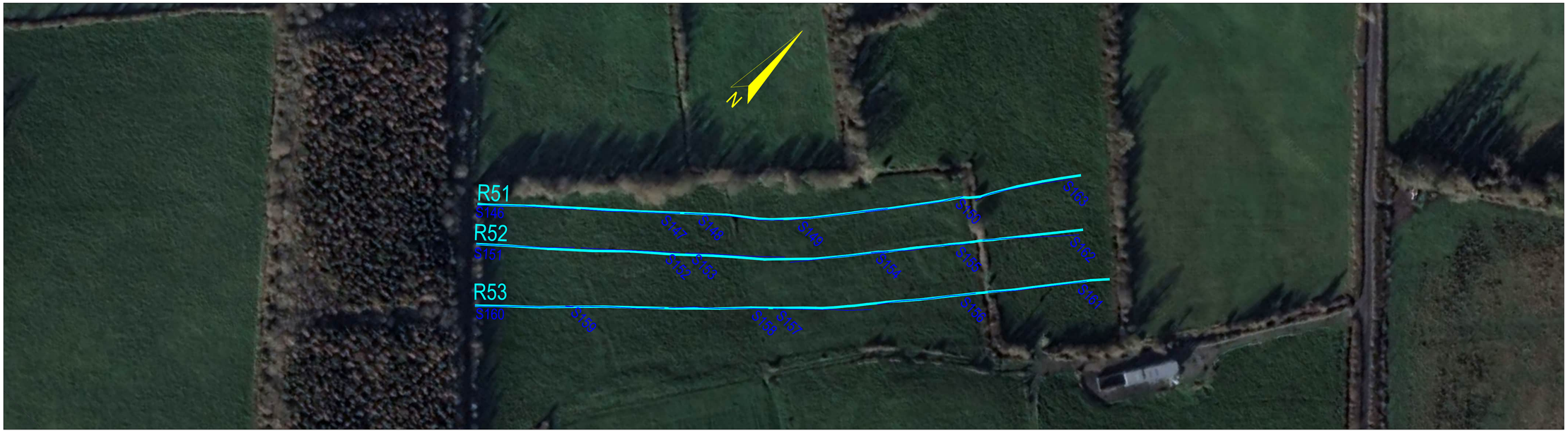
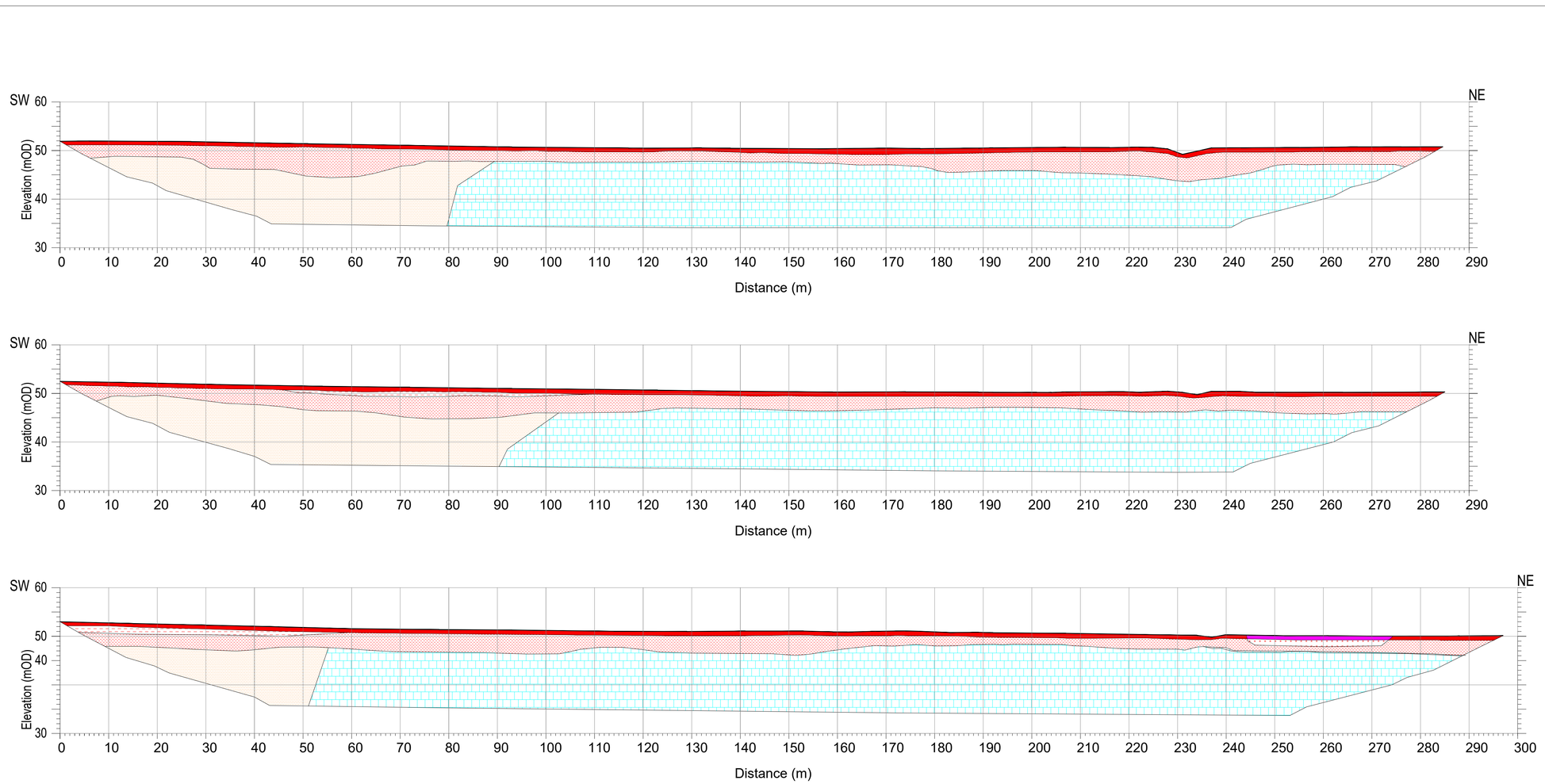


FIGURE 2: Geophysical Sections - Location 7

Scale 1:500



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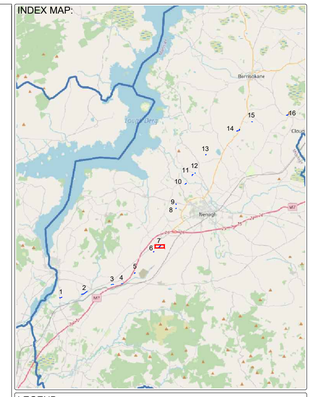

LEGEND:

R1 — 2D resistivity profile

S1 — Seismic refraction profile

Seismic refraction layer with interpreted P-wave velocity (1km-1km m)

- Very soft-Soft SILT/CLAY
- Stiff-Very Stiff SILT/CLAY
- Very soft-Soft sandy gravelly SILT/CLAY
- Firm-Stiff sandy gravelly SILT/CLAY
- Stiff-Very Stiff sandy gravelly SILT/CLAY
- Slightly Weathered - Fresh SANDSTONE/MUDSTONE/LIMESTONE (Lower Limestone Shale)
- Slightly Weathered - Fresh LIMESTONE (Ballysteen)

The information displayed here is to be used in conjunction with AGP21220_01 Report on the Geophysical Investigation for the Water Supply Project - Eastern & Midlands Region Contract 1, for Causeway Geotech Ltd., APEX Geophysics Ltd. 5th October 2022

PROJECT:
IRISH WATER SUPPLY SCHEME
EASTERN & MIDLANDS REGION - CONTRACT 1
GEOPHYSICAL SURVEY

CLIENT:
CAUSEWAY GEOTECH LIMITED

DRAWING NUMBER:
AGP21220_07B

SCALE:
AS SHOWN @ A1

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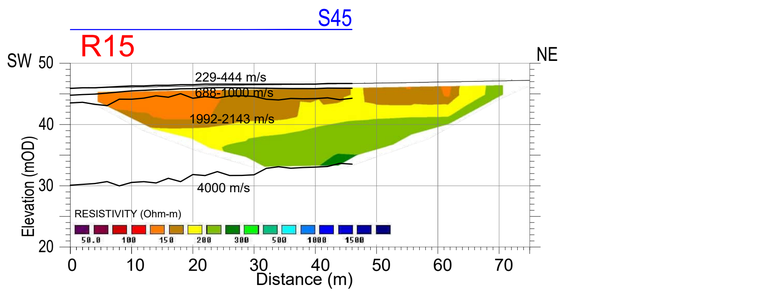
FIGURE 1: Geophysical Locations - Location 8

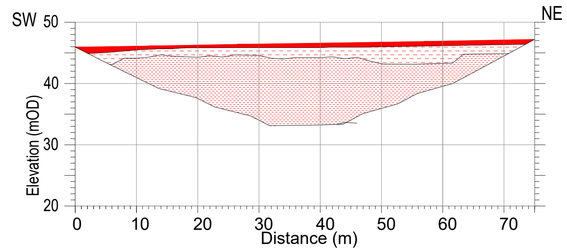
Scale 1:1000

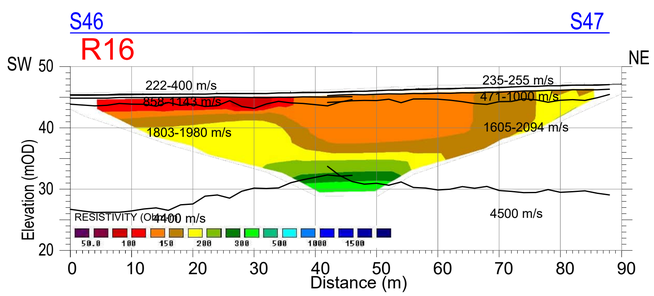


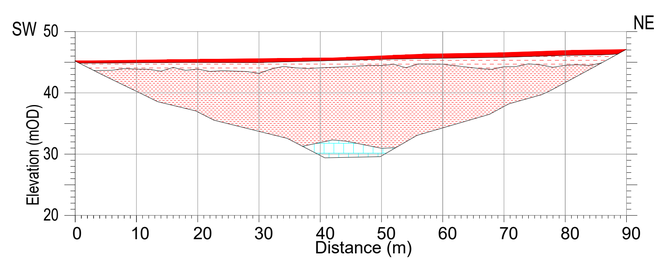
FIGURE 2: Geophysical Sections - Location 8

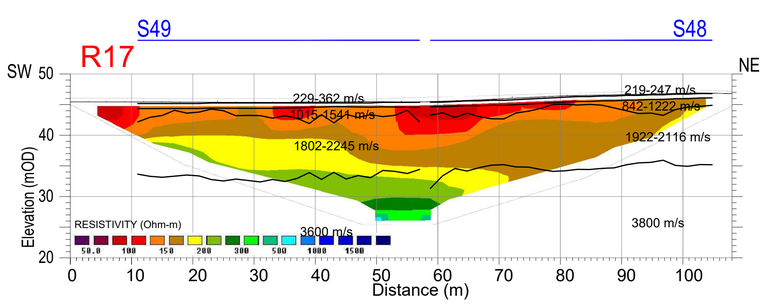
Scale 1:500

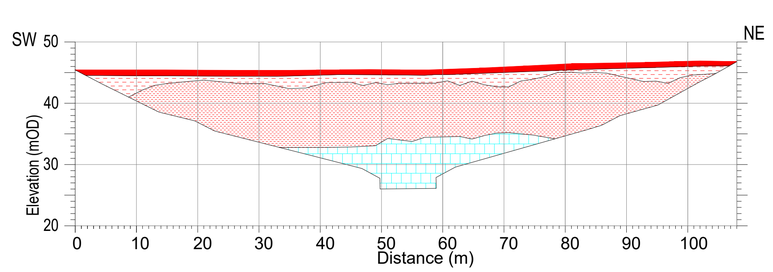












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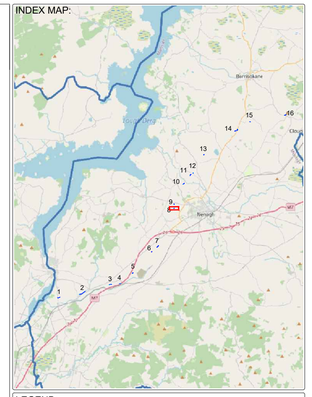

LEGEND:

R1 — 2D resistivity profile

S1 — Seismic refraction profile

Seismic refraction layer with interpreted P-wave velocity

Soft sandy gravelly SILT/CLAY

Firm-Stiff sandy gravelly SILT/CLAY

Very Stiff sandy gravelly SILT/CLAY

Slightly Weathered - Fresh LIMESTONE (Ballysteen)

The information displayed here is to be used in conjunction with AGP21220_01 Report on the Geophysical Investigation for the Water Supply Project - Eastern & Midlands Region Contract 1, for Causeway Geotech Ltd., APEX Geophysics Ltd. 5th October 2022

PROJECT:
IRISH WATER SUPPLY SCHEME
EASTERN & MIDLANDS REGION - CONTRACT 1
GEOPHYSICAL SURVEY

CLIENT:
CAUSEWAY GEOTECH LIMITED

DRAWING NUMBER:
AGP21220_08

SCALE:
AS SHOWN @ A1

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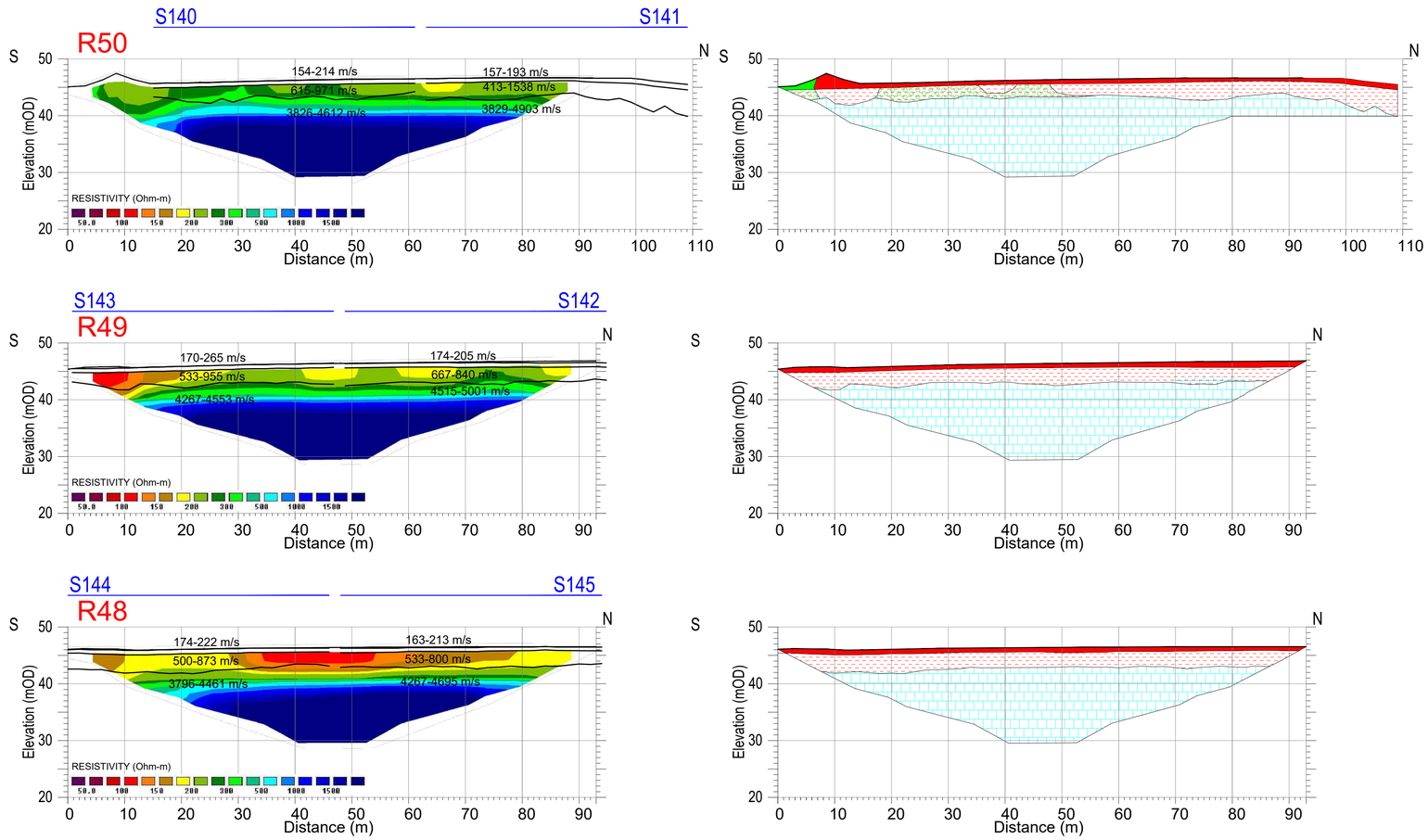
FIGURE 1: Geophysical Locations - Location 9

Scale 1:1000



FIGURE 2: Geophysical Sections - Location 9

Scale 1:500



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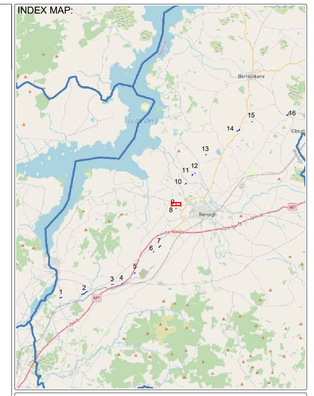

LEGEND:

R1 — 2D resistivity profile

S1 — Seismic refraction profile

Seismic refraction layer with interpreted P-wave velocity

Very soft-Soft sandy gravelly SILT/CLAY

Firm-Stiff sandy gravelly SILT/CLAY

Very Loose-Loose clayey SAND/GRAVEL

Medium dense - Dense clayey SAND/GRAVEL

Slightly Weathered - Fresh LIMESTONE (Ballysteen)

The information displayed here is to be used in conjunction with AGP21220_01 Report on the Geophysical Investigation for the Water Supply Project - Eastern & Midlands Region Contract 1, for Causeway Geotech Ltd., APEX Geophysics Ltd. 5th October 2022

PROJECT:
IRISH WATER SUPPLY SCHEME
EASTERN & MIDLANDS REGION - CONTRACT 1
GEOPHYSICAL SURVEY

CLIENT:
CAUSEWAY GEOTECH LIMITED

DRAWING NUMBER:
AGP21220_09

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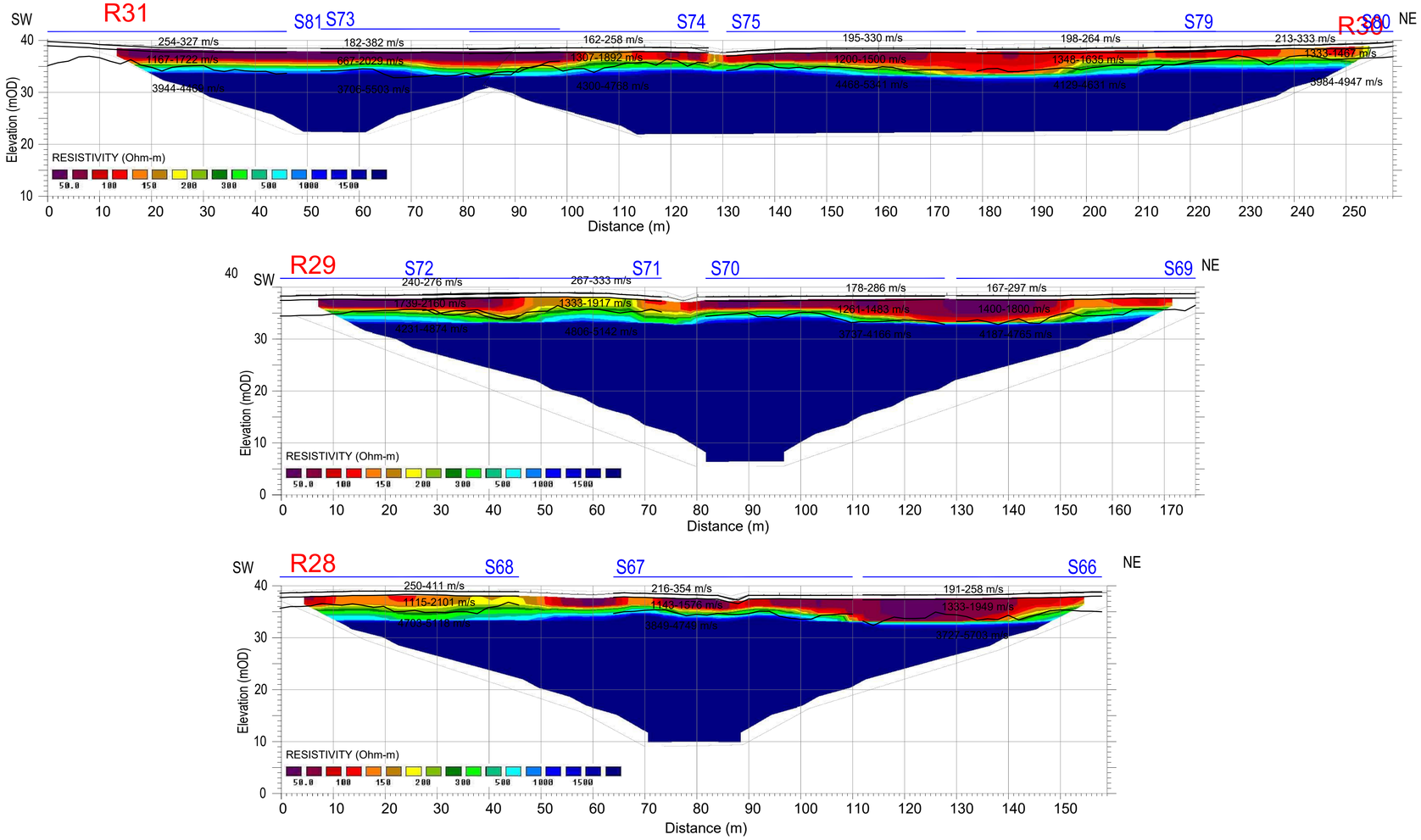
FIGURE 1: Geophysical Locations - Location 10

Scale 1:1000



FIGURE 2: Geophysical Sections - Location 10

Scale 1:500



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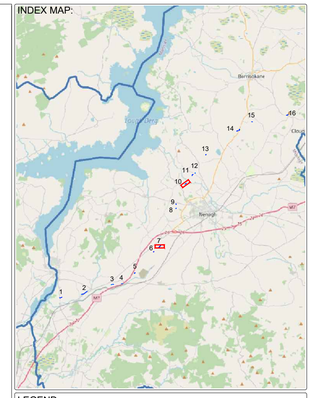

LEGEND:

R1 — 2D resistivity profile

S1 — Seismic refraction profile

Seismic refraction layer with interpreted P-wave velocity

Soft-Firm SILT/CLAY

Firm-Stiff SILT/CLAY

Soft-Firm sandy gravelly SILT/CLAY

Firm-Stiff sandy gravelly SILT/CLAY

Highly -Moderately Weathered/Karstified LIMESTONE

Slightly Weathered - Fresh LIMESTONE

The information displayed here is to be used in conjunction with AGP21220_01 Report on the Geophysical Investigation for the Water Supply Project - Eastern & Midlands Region Contract 1, for Causeway Geotech Ltd., APEX Geophysics Ltd. 5th October 2022

PROJECT:
IRISH WATER SUPPLY SCHEME
EASTERN & MIDLANDS REGION - CONTRACT 1
GEOPHYSICAL SURVEY

CLIENT:
CAUSEWAY GEOTECH LIMITED

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AGP21220_10A

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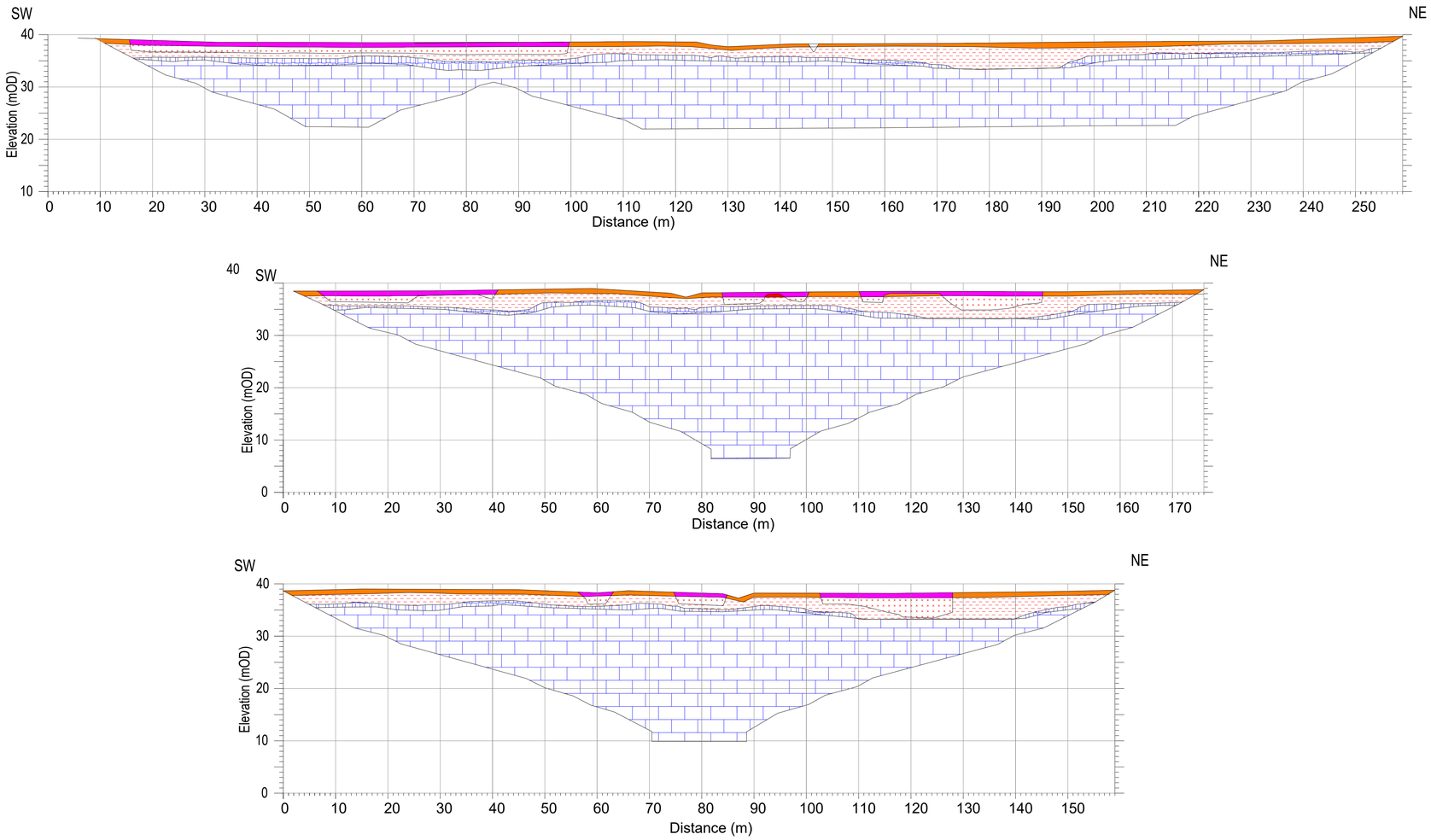
FIGURE 1: Geophysical Locations - Location 10

Scale 1:1000



FIGURE 2: Geophysical Sections - Location 10

Scale 1:500



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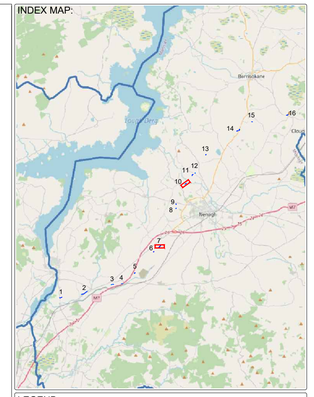

LEGEND:

R1: 2D resistivity profile

S1: Seismic refraction profile

Seismic refraction layer with interpreted P-wave velocity

Soft-Firm SILT/CLAY

Firm-Stiff SILT/CLAY

Soft-Firm sandy gravelly SILT/CLAY

Firm-Stiff sandy gravelly SILT/CLAY

Highly -Moderately Weathered/Karstified LIMESTONE

Slightly Weathered - Fresh LIMESTONE

The information displayed here is to be used in conjunction with AGP21220_01 Report on the Geophysical Investigation for the Water Supply Project - Eastern & Midlands Region Contract 1, for Causeway Geotech Ltd., APEX Geophysics Ltd. 5th October 2022

PROJECT:
IRISH WATER SUPPLY SCHEME
EASTERN & MIDLANDS REGION - CONTRACT 1
GEOPHYSICAL SURVEY

CLIENT:
CAUSEWAY GEOTECH LIMITED

DRAWING NUMBER:
AGP21220_10B

SCALE:
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DATE:
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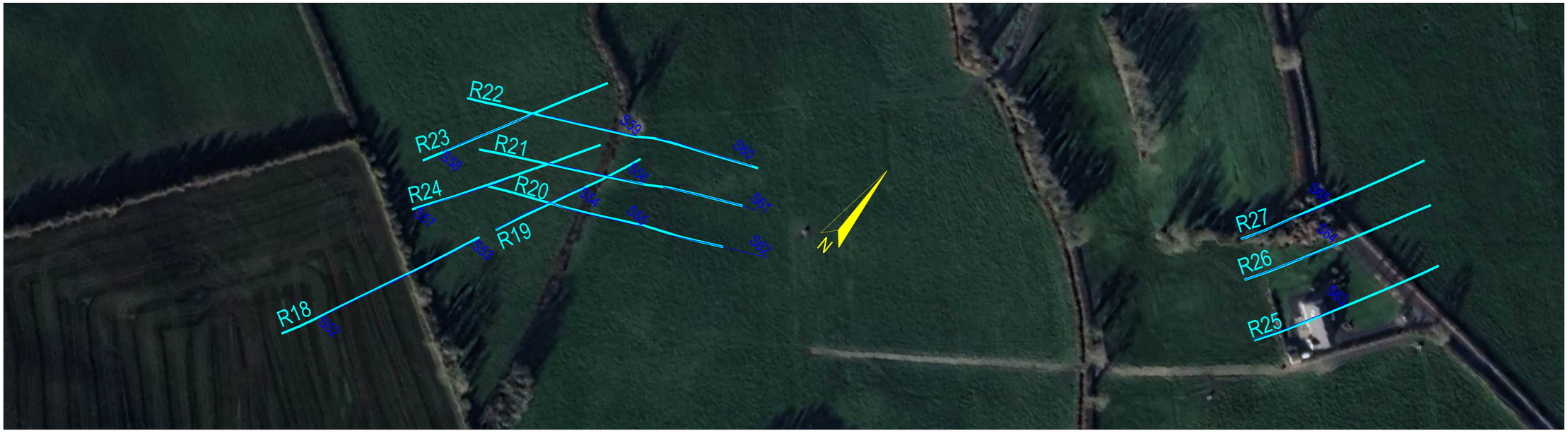
FIGURE 1: Geophysical Locations - Location 11

Scale 1:1000



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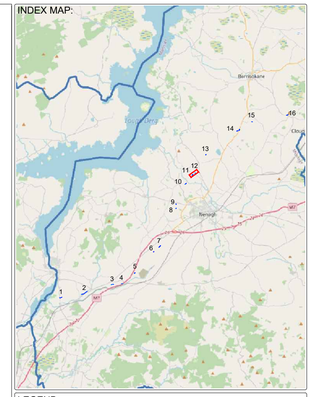


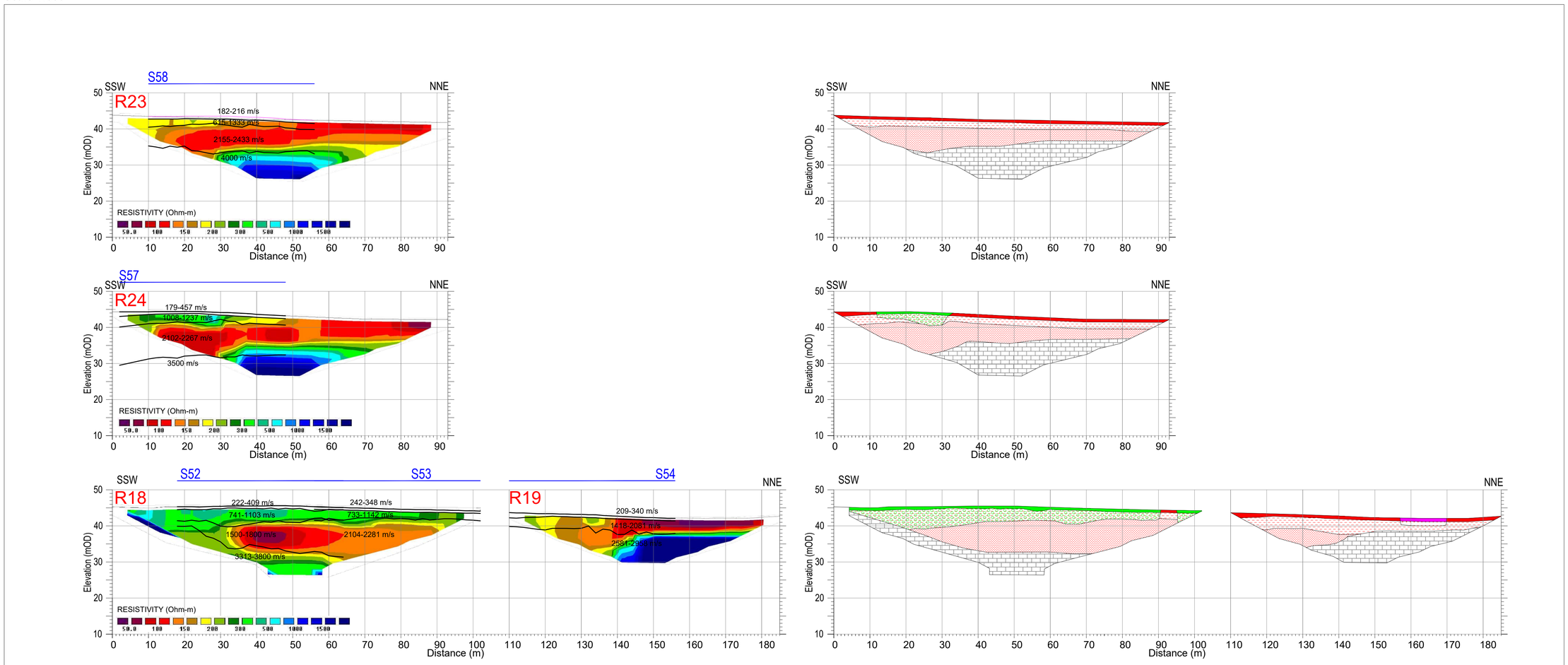
LEGEND:

R1 — 2D resistivity profile

S1 — Seismic refraction profile

FIGURE 2: Geophysical Sections - Location 11

Scale 1:600



Seismic refraction layer with interpreted P-wave velocity

- Soft-Firm SILT/CLAY
- Firm-Stiff SILT/CLAY
- Stiff-Very Stiff SILT/CLAY
- Soft-Firm sandy gravelly SILT/CLAY
- Firm-Stiff sandy gravelly SILT/CLAY
- Stiff-Very Stiff sandy gravelly SILT/CLAY
- Loose-Medium Dense clayey SAND/GRAVEL
- Medium dense - Dense clayey SAND/GRAVEL
- Loose silty SAND/GRAVEL
- Medium dense - Dense silty SAND/GRAVEL
- Slightly Weathered - Fresh LIMESTONE

The information displayed here is to be used in conjunction with AGP21220_01 Report on the Geophysical Investigation for the Water Supply Project - Eastern & Midlands Region Contract 1, for Causeway Geotech Ltd., APEX Geophysics Ltd. 5th October 2022

PROJECT:
IRISH WATER SUPPLY SCHEME
EASTERN & MIDLANDS REGION - CONTRACT 1
GEOPHYSICAL SURVEY

CLIENT:
CAUSEWAY GEOTECH LIMITED

DRAWING NUMBER:
AGP21220_11A

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FIGURE 1: Geophysical Locations - Location 11

Scale 1:1000

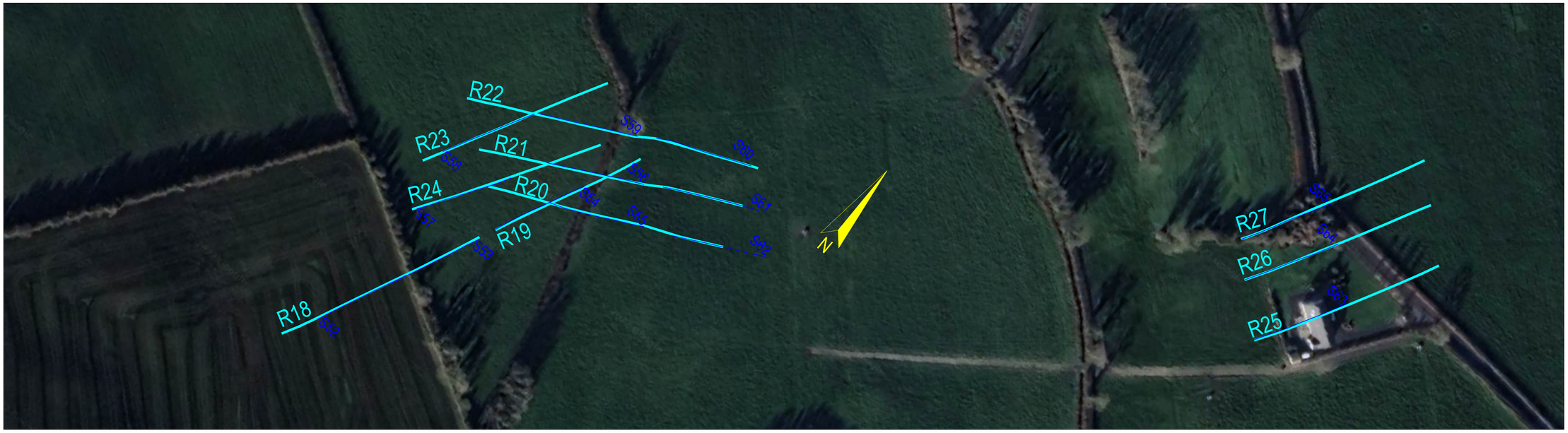
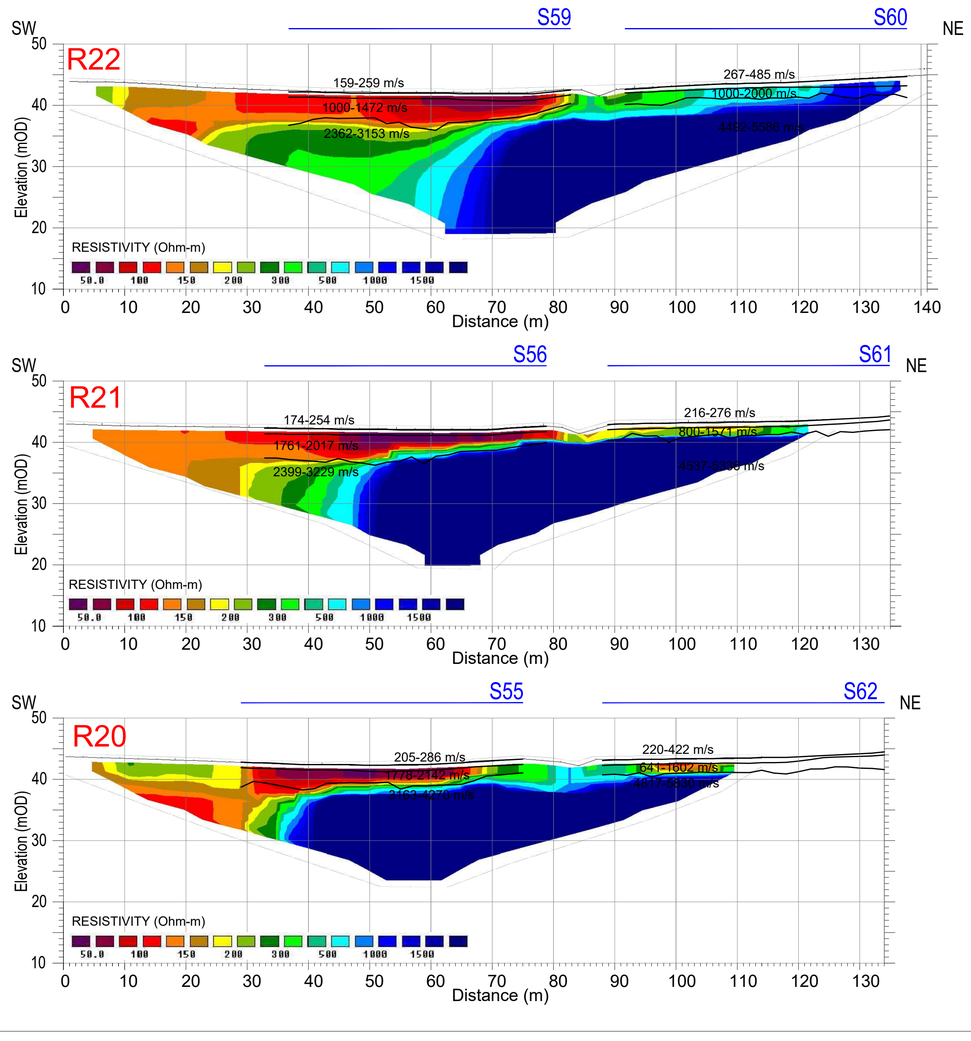
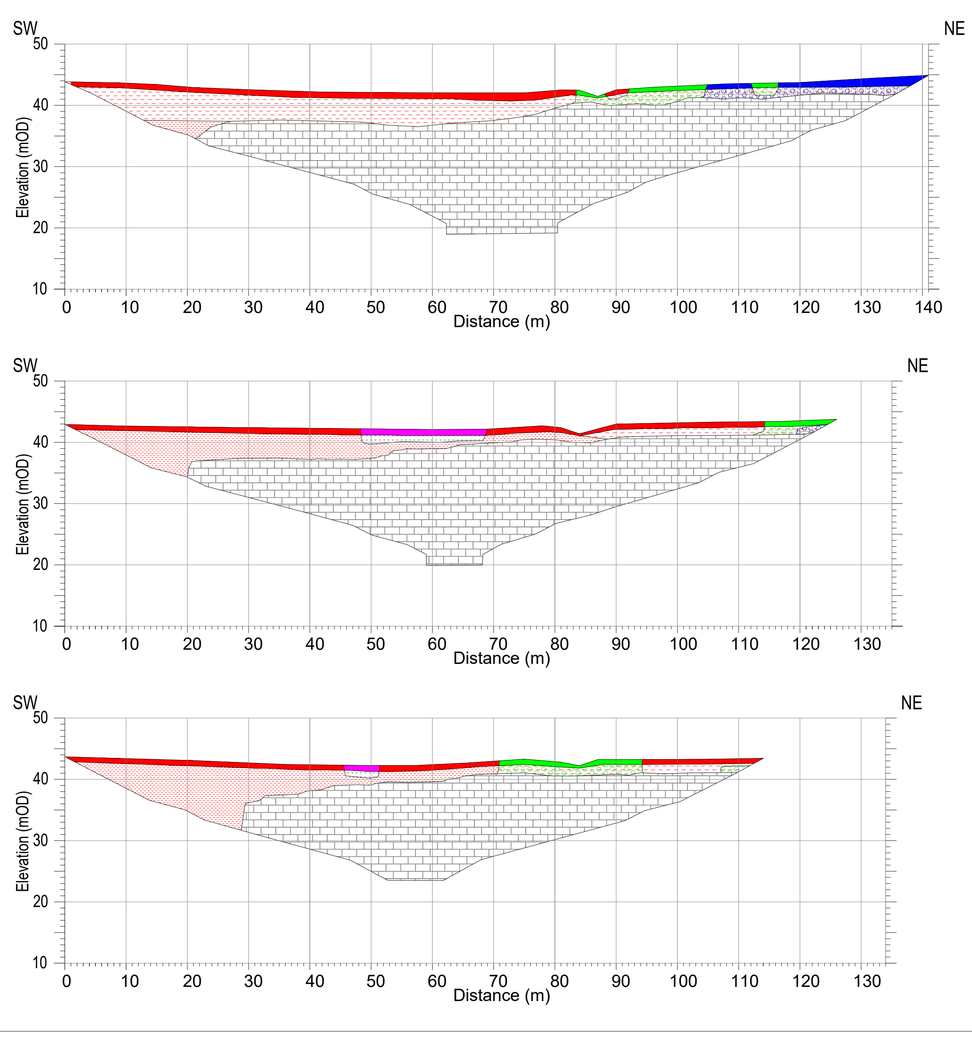


FIGURE 2: Geophysical Sections - Location 11

Scale 1:500





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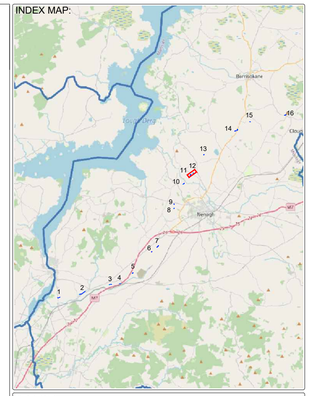

LEGEND:

- R1 — 2D resistivity profile
- S1 — Seismic refraction profile

- Seismic refraction layer with interpreted P-wave velocity
- Soft-Firm SILT/CLAY
- Firm-Stiff SILT/CLAY
- Stiff-Very Stiff SILT/CLAY
- Soft-Firm sandy gravelly SILT/CLAY
- Firm-Stiff sandy gravelly SILT/CLAY
- Stiff-Very Stiff sandy gravelly SILT/CLAY
- Loose-Medium Dense clayey SAND/GRAVEL
- Medium dense - Dense clayey SAND/GRAVEL
- Loose silty SAND/GRAVEL
- Medium dense - Dense silty SAND/GRAVEL
- Slightly Weathered - Fresh LIMESTONE

The information displayed here is to be used in conjunction with AGP21220_01 Report on the Geophysical Investigation for the Water Supply Project - Eastern & Midlands Region Contract 1, for Causeway Geotech Ltd., APEX Geophysics Ltd. 5th October 2022

PROJECT:
IRISH WATER SUPPLY SCHEME
EASTERN & MIDLANDS REGION - CONTRACT 1
GEOPHYSICAL SURVEY

CLIENT:
CAUSEWAY GEOTECH LIMITED

DRAWING NUMBER:
AGP21220_11B

SCALE:
AS SHOWN @ A1

DATE:
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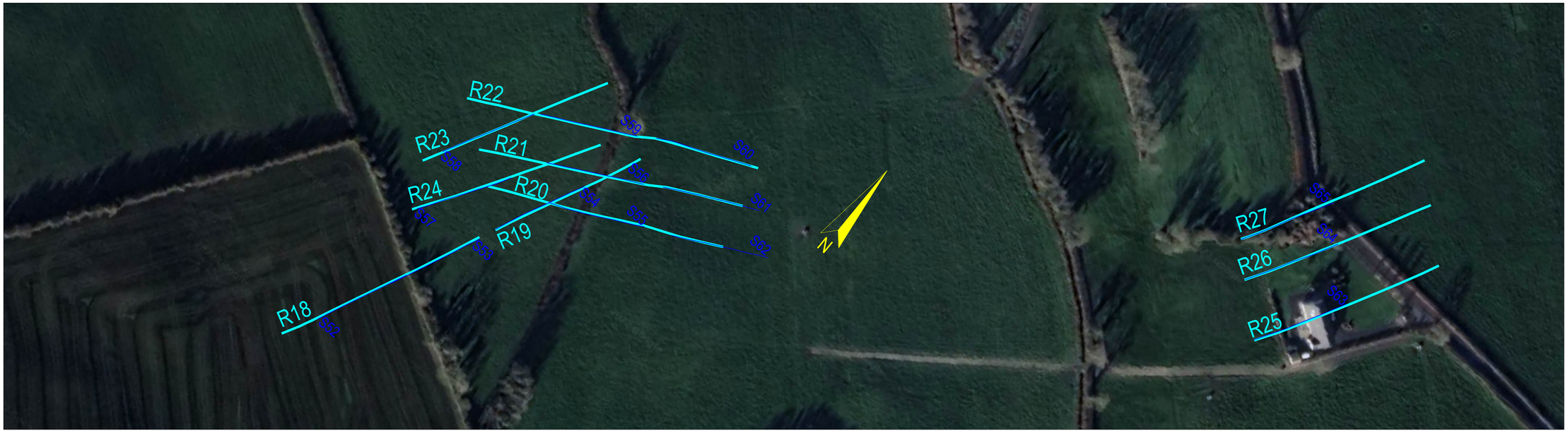
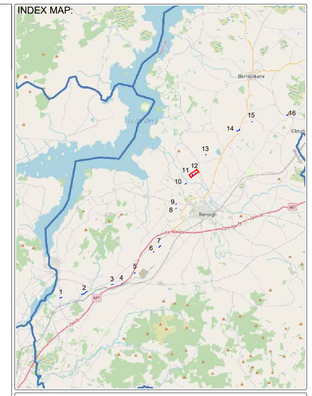
FIGURE 1: Geophysical Locations - Location 12

Scale 1:1000



INDEX MAP:



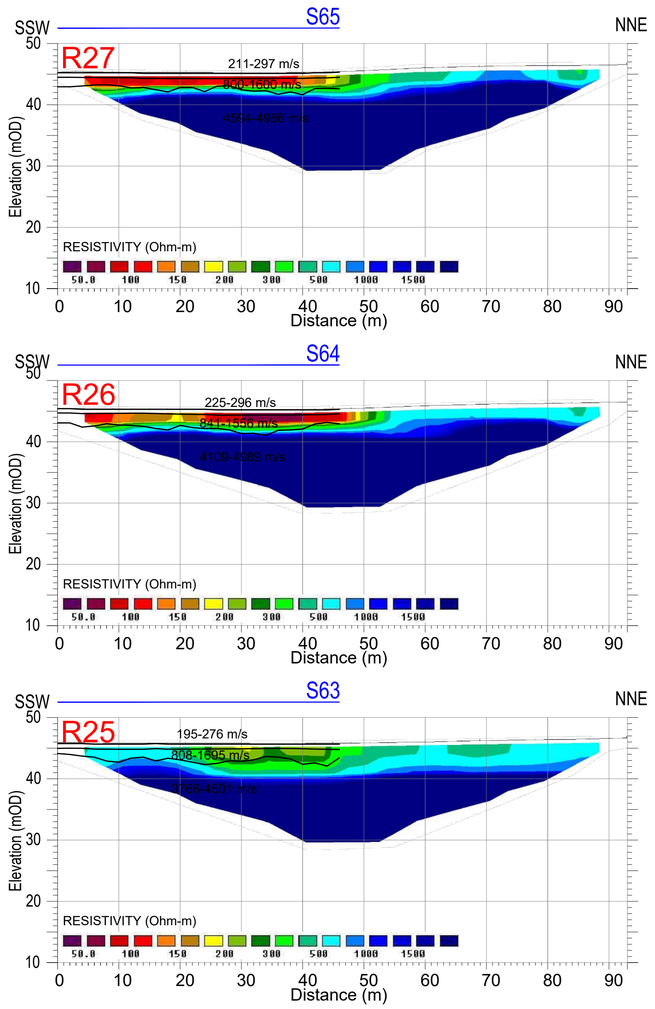
LEGEND:

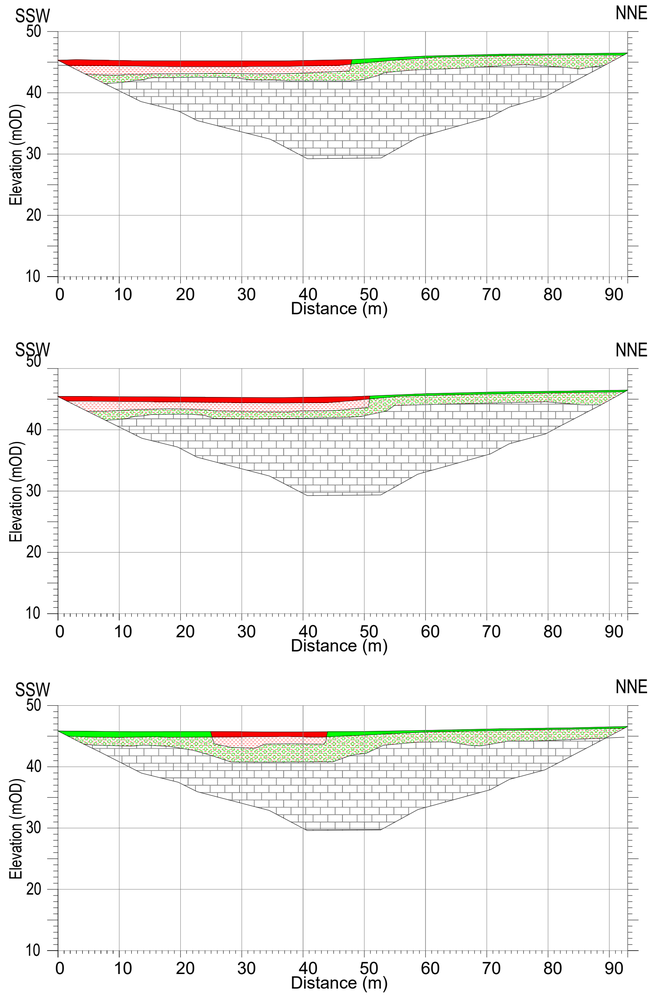
R1 — 2D resistivity profile

S1 — Seismic refraction profile

FIGURE 2: Geophysical Sections - Location 12

Scale 1:500





Seismic refraction layer with interpreted P-wave velocity

Soft sandy gravelly SILT/CLAY

Firm-Stiff sandy gravelly SILT/CLAY

Loose clayey SAND/GRAVEL

Medium dense - Dense clayey SAND/GRAVEL

Slightly Weathered - Fresh LIMESTONE

The information displayed here is to be used in conjunction with AGP21220_01 Report on the Geophysical Investigation for the Water Supply Project - Eastern & Midlands Region Contract 1, for Causeway Geotech Ltd., APEX Geophysics Ltd. 5th October 2022

PROJECT:
IRISH WATER SUPPLY SCHEME
EASTERN & MIDLANDS REGION - CONTRACT 1
GEOPHYSICAL SURVEY

CLIENT:
CAUSEWAY GEOTECH LIMITED

DRAWING NUMBER:
AGP21220_12

SCALE:
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DATE:
05-10-2022

DRAWN:	CHECKED:
YOC	---

REVISION:	DATE:	DRAWN:	CHECKED:
01	05-10-2022	YOC	TL

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www.apexgeophysics.ie

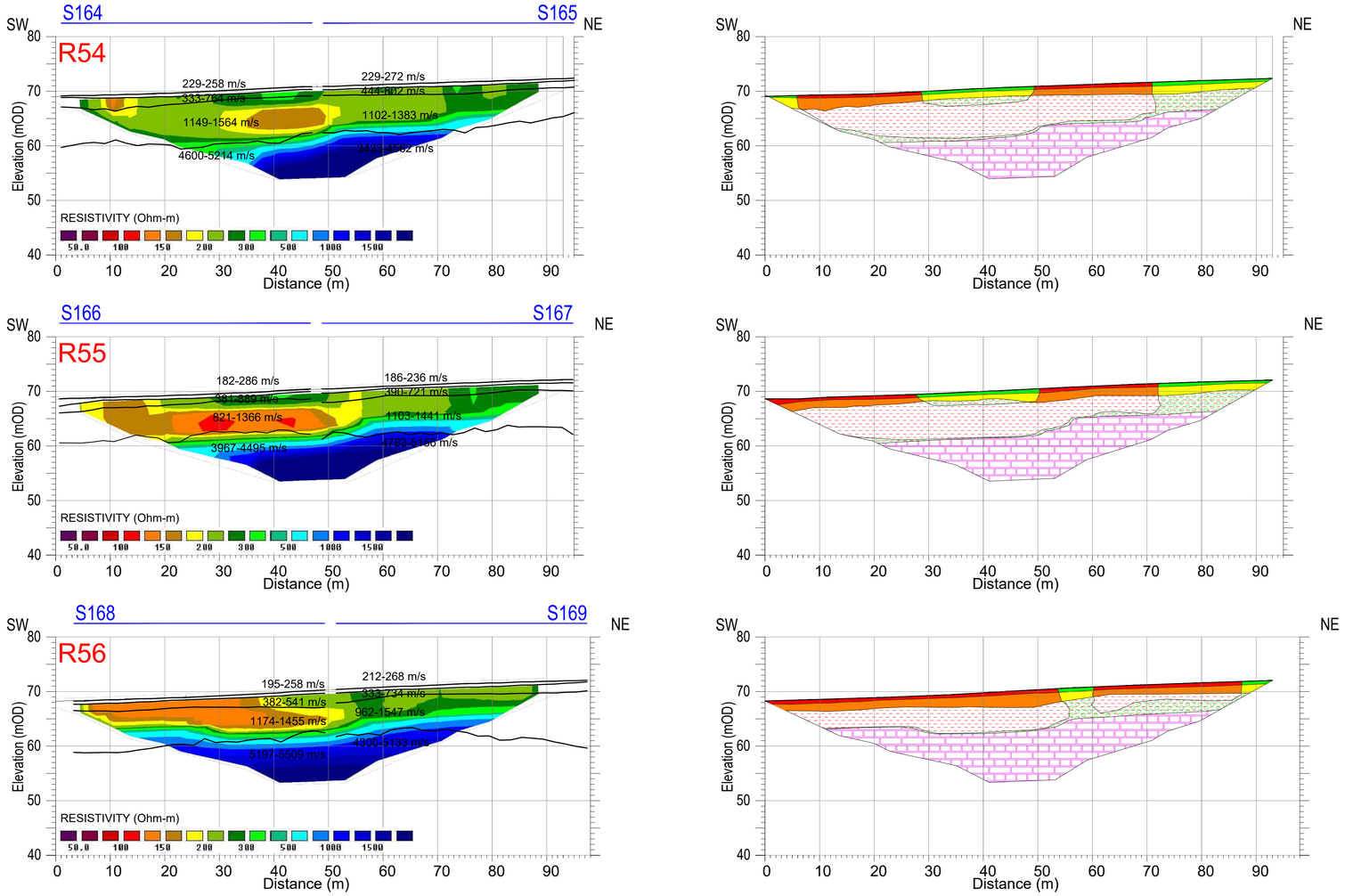
FIGURE 1: Geophysical Locations - Location 13

Scale 1:1000



FIGURE 2: Geophysical Sections - Location 13

Scale 1:500



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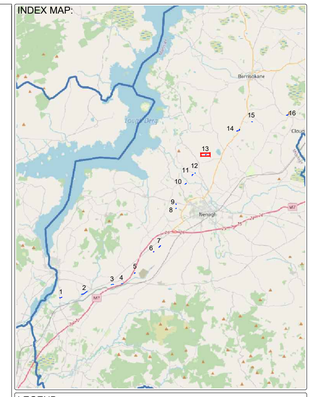

LEGEND:

- R1: 2D resistivity profile
- S1: Seismic refraction profile

Seismic refraction layer with interpreted P-wave velocity

- Very soft-Soft sandy gravelly SILT/CLAY
- Soft-Firm sandy gravelly SILT/CLAY
- Firm-Stiff sandy gravelly SILT/CLAY
- Very Loose-Loose clayey SAND/GRAVEL
- Loose - Medium dense clayey SAND/GRAVEL
- Medium dense - Dense clayey SAND/GRAVEL
- Slightly Weathered - Fresh LIMESTONE (Terryglass)

The information displayed here is to be used in conjunction with AGP21220_01 Report on the Geophysical Investigation for the Water Supply Project - Eastern & Midlands Region Contract 1, for Causeway Geotech Ltd., APEX Geophysics Ltd. 5th October 2022

PROJECT:
IRISH WATER SUPPLY SCHEME
EASTERN & MIDLANDS REGION - CONTRACT 1
GEOPHYSICAL SURVEY

CLIENT:
CAUSEWAY GEOTECH LIMITED

DRAWING NUMBER:
AGP21220_13

SCALE:
AS SHOWN @ A1

DATE:
05-10-2022

DRAWN:	CHECKED:
YOC	---

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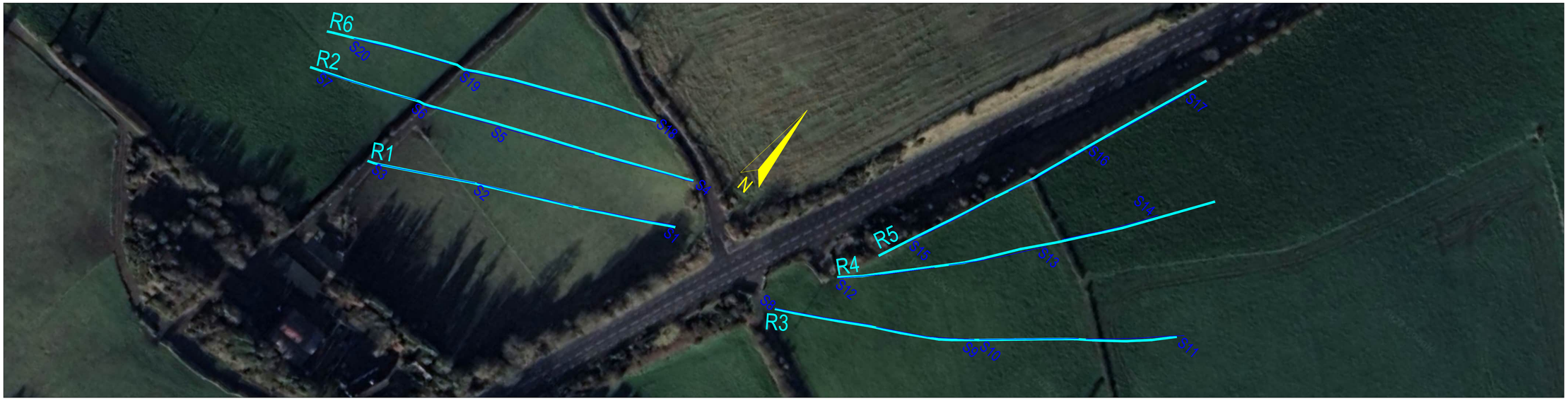
FIGURE 1: Geophysical Locations - Location 14

Scale 1:1000



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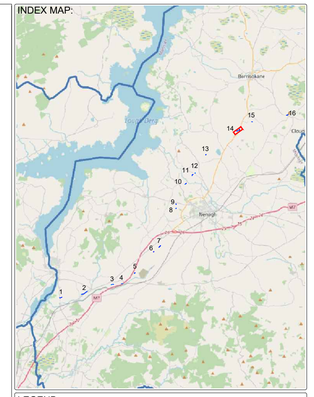


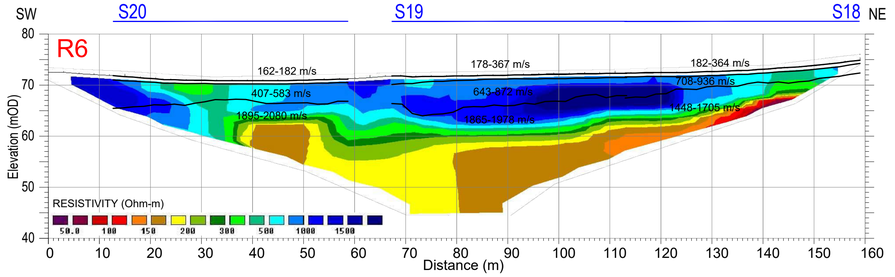
LEGEND:

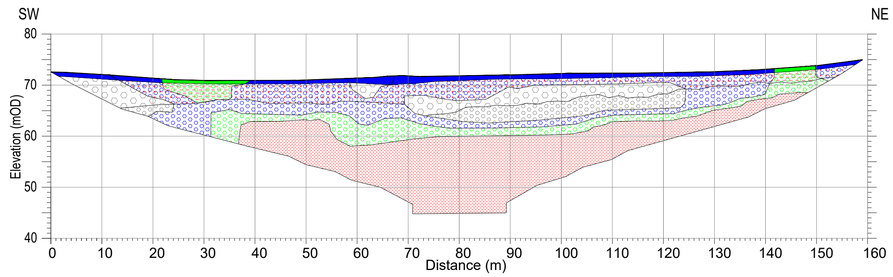
R1 — 2D resistivity profile

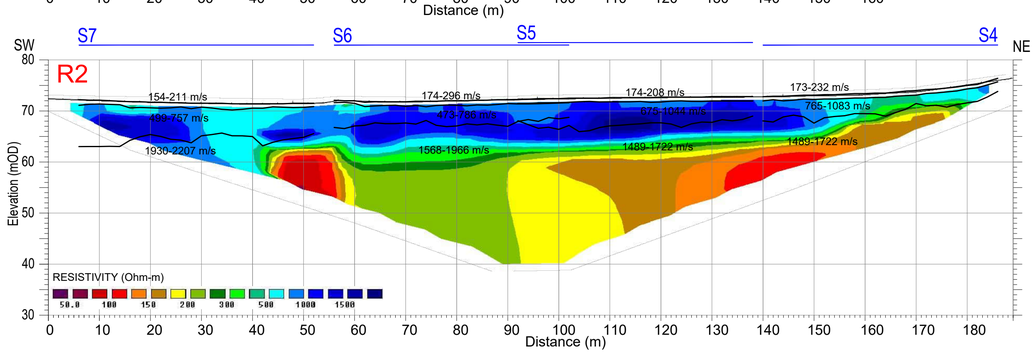
S1 — Seismic refraction profile

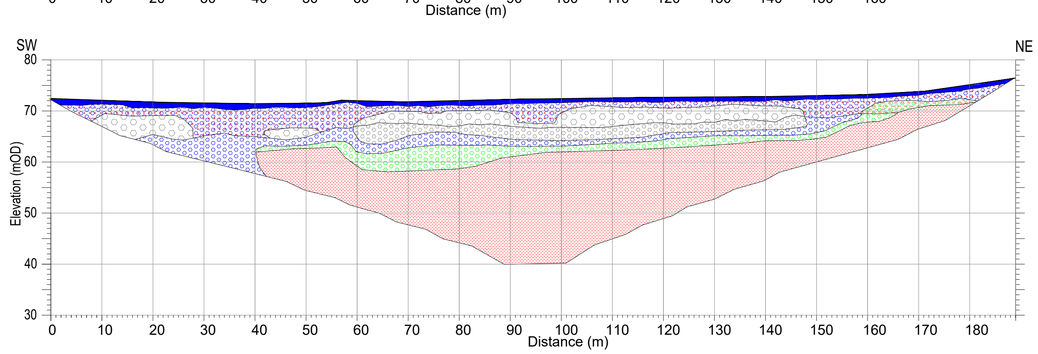
FIGURE 2: Geophysical Sections - Location 14

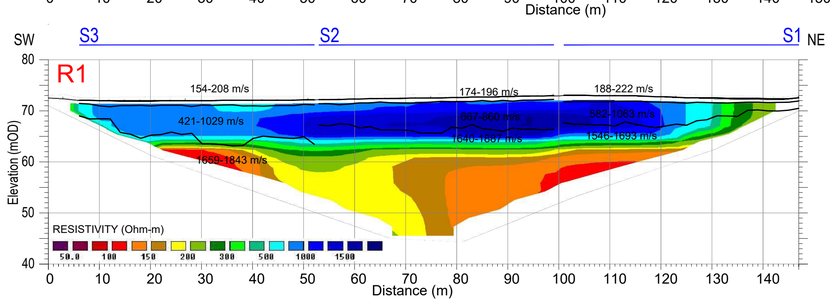
Scale 1:600

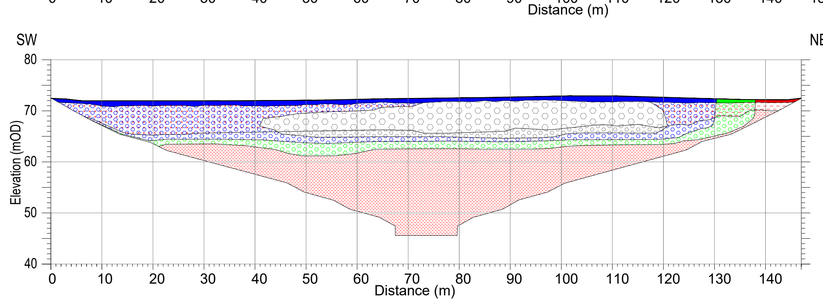












Seismic refraction layer with interpreted P-wave velocity

- Very soft-Soft sandy gravelly SILT/CLAY
- Firm-Stiff sandy gravelly SILT/CLAY
- Very Stiff sandy gravelly SILT/CLAY
- Very Loose-Loose clayey SAND/GRAVEL
- Medium dense - Dense clayey SAND/GRAVEL
- Very Dense clayey SAND/GRAVEL
- Very Loose-Loose silty SAND/GRAVEL
- Medium dense - Dense silty SAND/GRAVEL
- Very Dense silty SAND/GRAVEL
- Medium dense - Dense silty SAND/GRAVEL
- Dense-Very Dense silty SAND/GRAVEL
- Slightly Weathered MUDSTONE/SHALE

The information displayed here is to be used in conjunction with AGP21220_01 Report on the Geophysical Investigation for the Water Supply Project - Eastern & Midlands Region Contract 1, for Causeway Geotech Ltd., APEX Geophysics Ltd. 5th October 2022

PROJECT:
IRISH WATER SUPPLY SCHEME
EASTERN & MIDLANDS REGION - CONTRACT 1
GEOPHYSICAL SURVEY

CLIENT:
CAUSEWAY GEOTECH LIMITED

DRAWING NUMBER:
AGP21220_14A

SCALE:
AS SHOWN @ A1

DATE:
05-10-2022

DRAWN:	CHECKED:
YOC	---

REVISION:	DATE:	DRAWN:	CHECKED:
01	05-10-2022	YOC	TL

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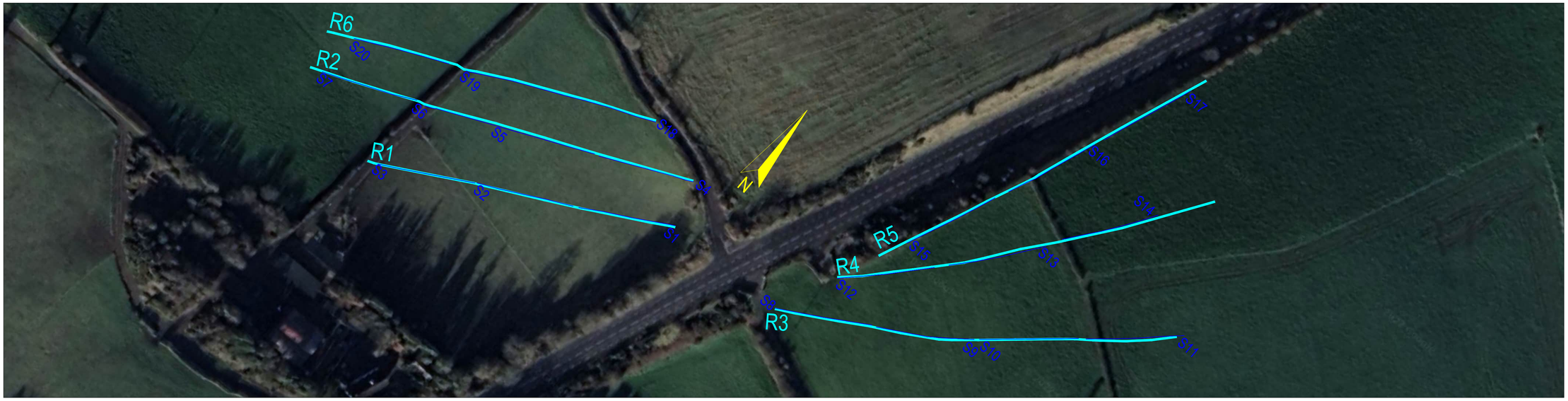
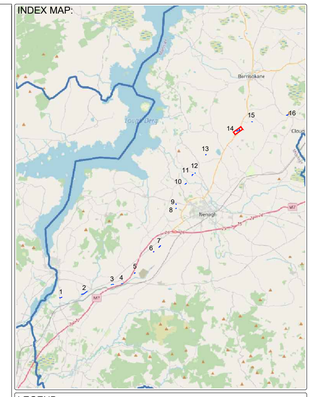
www.apexgeophysics.ie

FIGURE 1: Geophysical Locations - Location 14

Scale 1:1000



INDEX MAP:



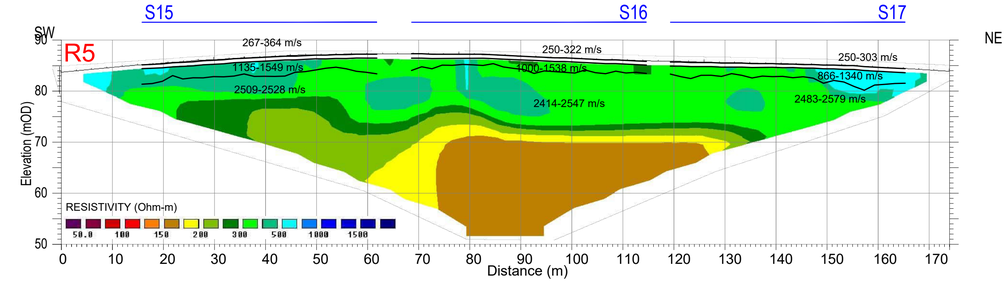
LEGEND:

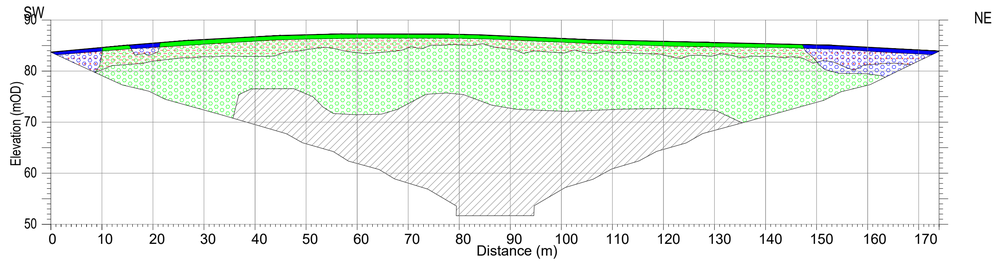
R1 — 2D resistivity profile

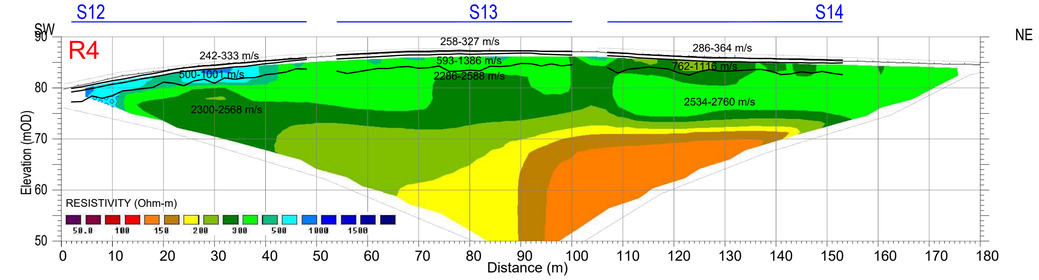
S1 — Seismic refraction profile

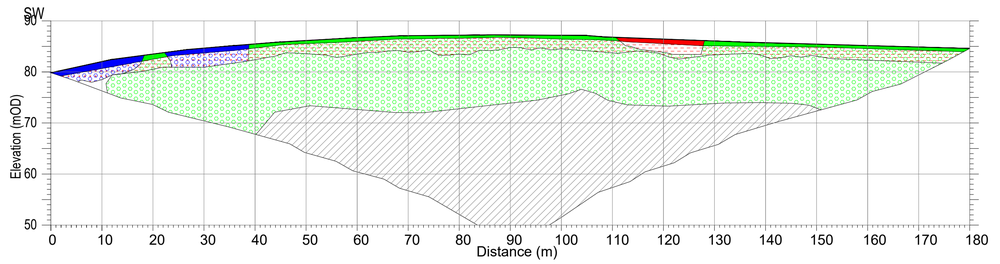
FIGURE 2: Geophysical Sections - Location 14

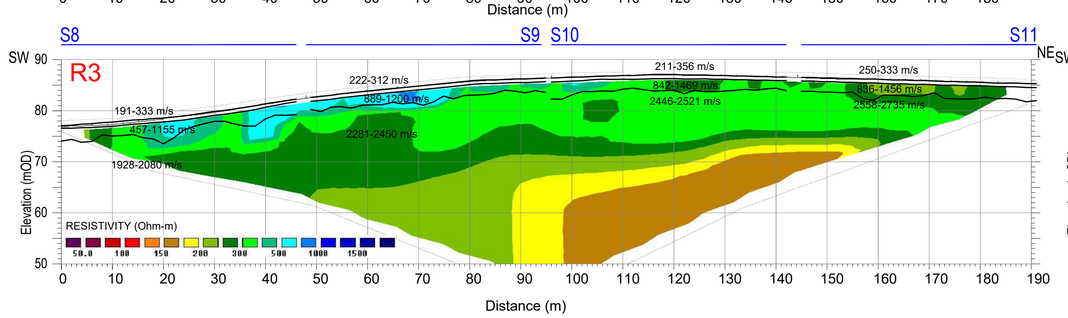
Scale 1:600

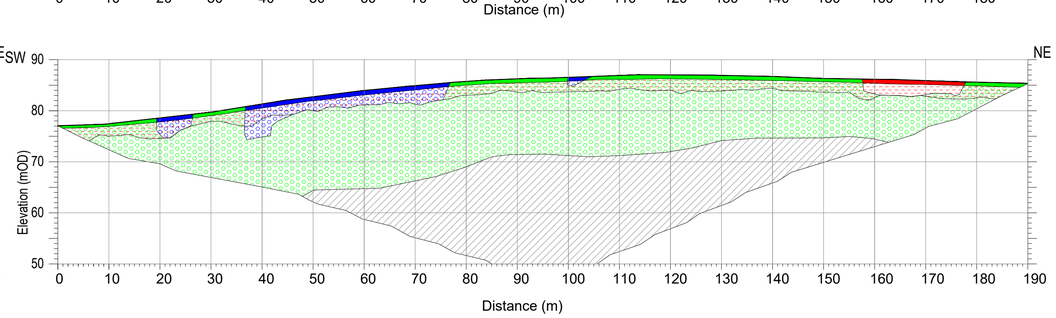












Seismic refraction layer with interpreted P-wave velocity

- Very soft-Soft sandy gravelly SILT/CLAY
- Firm-Stiff sandy gravelly SILT/CLAY
- Very Stiff sandy gravelly SILT/CLAY
- Very Loose-Loose clayey SAND/GRAVEL
- Medium dense - Dense clayey SAND/GRAVEL
- Very Dense clayey SAND/GRAVEL
- Very Loose-Loose silty SAND/GRAVEL
- Medium dense - Dense silty SAND/GRAVEL
- Very Dense silty SAND/GRAVEL
- Medium dense - Dense silty SAND/GRAVEL
- Dense-Very Dense silty SAND/GRAVEL
- Slightly Weathered MUDSTONE/SHALE

The information displayed here is to be used in conjunction with AGP21220_01 Report on the Geophysical Investigation for the Water Supply Project - Eastern & Midlands Region Contract 1, for Causeway Geotech Ltd., APEX Geophysics Ltd. 5th October 2022

PROJECT:
IRISH WATER SUPPLY SCHEME
EASTERN & MIDLANDS REGION - CONTRACT 1
GEOPHYSICAL SURVEY

CLIENT:
CAUSEWAY GEOTECH LIMITED

DRAWING NUMBER:
AGP21220_14B

SCALE:
AS SHOWN @ A1

DATE:
05-10-2022

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YOC	---

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www.apexgeophysics.ie

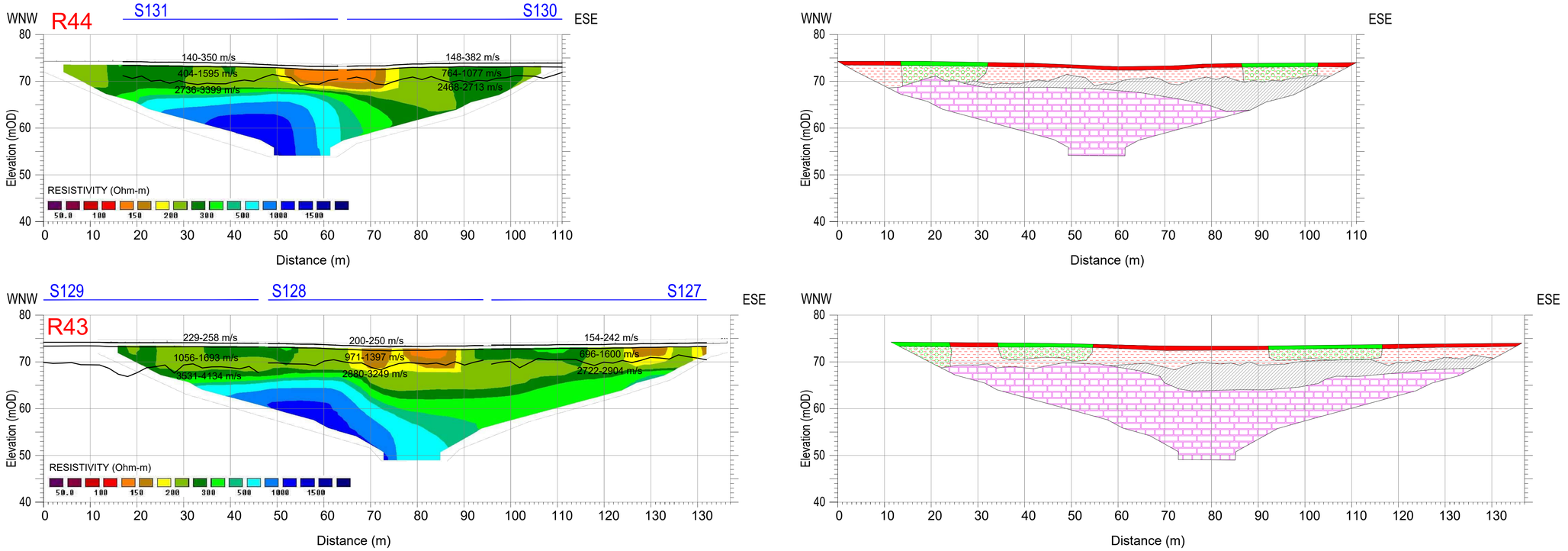
FIGURE 1: Geophysical Locations - Location 15

Scale 1:1000

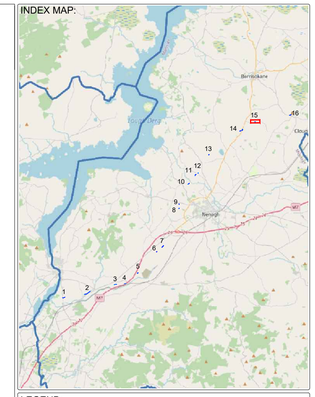


FIGURE 2: Geophysical Sections - Location 15

Scale 1:500



INDEX MAP:



LEGEND:

R1 — 2D resistivity profile

S1 — Seismic refraction profile

Seismic refraction layer with interpreted P-wave velocity

Very soft-Soft sandy gravelly SILT/CLAY

Firm-Stiff sandy gravelly SILT/CLAY

Very Loose-Loose clayey SAND/GRAVEL

Medium dense - Dense clayey SAND/GRAVEL

Slightly Weathered - Fresh MUDSTONE/SHALE

Slightly Weathered - Fresh LIMESTONE (Terryglass)

The information displayed here is to be used in conjunction with AGP21220_01 Report on the Geophysical Investigation for the Water Supply Project - Eastern & Midlands Region Contract 1, for Causeway Geotech Ltd., APEX Geophysics Ltd. 5th October 2022

PROJECT:
IRISH WATER SUPPLY SCHEME
EASTERN & MIDLANDS REGION - CONTRACT 1
GEOPHYSICAL SURVEY

CLIENT:
CAUSEWAY GEOTECH LIMITED

DRAWING NUMBER:
AGP21220_15

SCALE:
AS SHOWN @ A1

DATE:
05-10-2022

DRAWN:	YOC	CHECKED:	---

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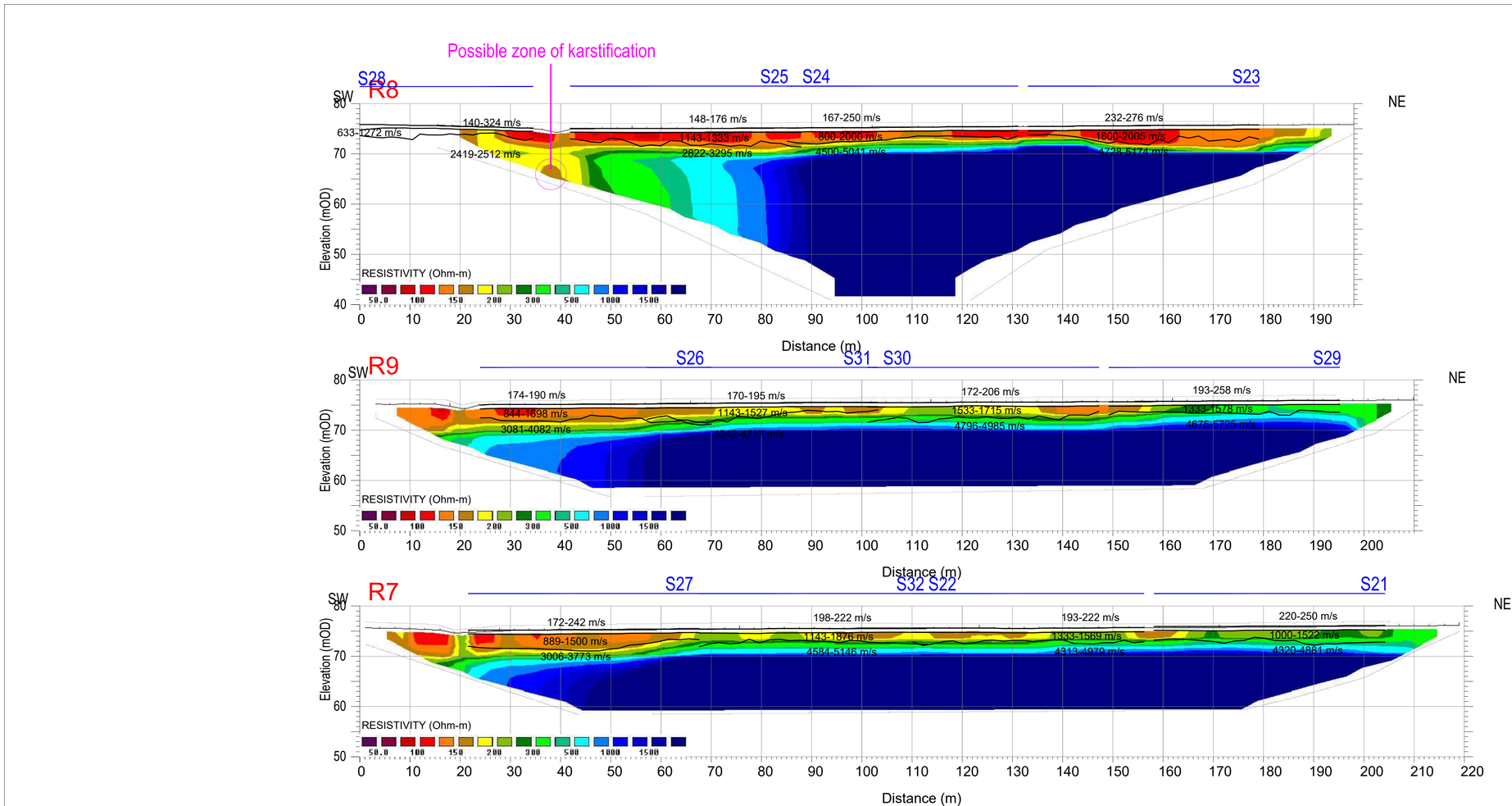
FIGURE 1: Geophysical Locations - Location 16

Scale 1:1000

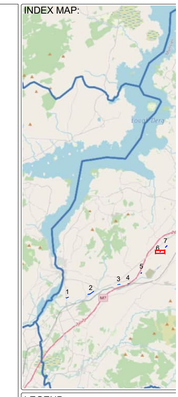


FIGURE 2: Geophysical Sections - Location 16

Scale 1:500



INDEX MAP:



LEGEND:

R1 2D resistivity p

S1 Seismic refrac

Seismic refraction layer with interpreted P-wave velocity

Very soft-Soft sandy gravelly SILT/CLA

Firm-Stiff sandy gravelly SILT/CLAY

Very Loose-Loose clayey SAND/GRA

Medium dense - Dense clayey SAND/

Highly -Moderately Weathered/Karstified LIMESTONE

Slighlty Weathered - Fresh/LIMESTONE

The information displayed conjunction with AGP212 Geophysical Investigation Project - Eastern & Midland Causeway Geotech Ltd., 5th October 2022

PROJECT: IRISH WATER SUPPL EASTERN & MIDLAND GEOPHYSICAL SURV

CLIENT: CAUSEWAY GEOTEC

DRAWING NUMBER: AGP21220_16A

SCALE: AS SHOWN @ A1

DATE: 05-10-2022

DRAWN: YOC

REVISION:	DATE:
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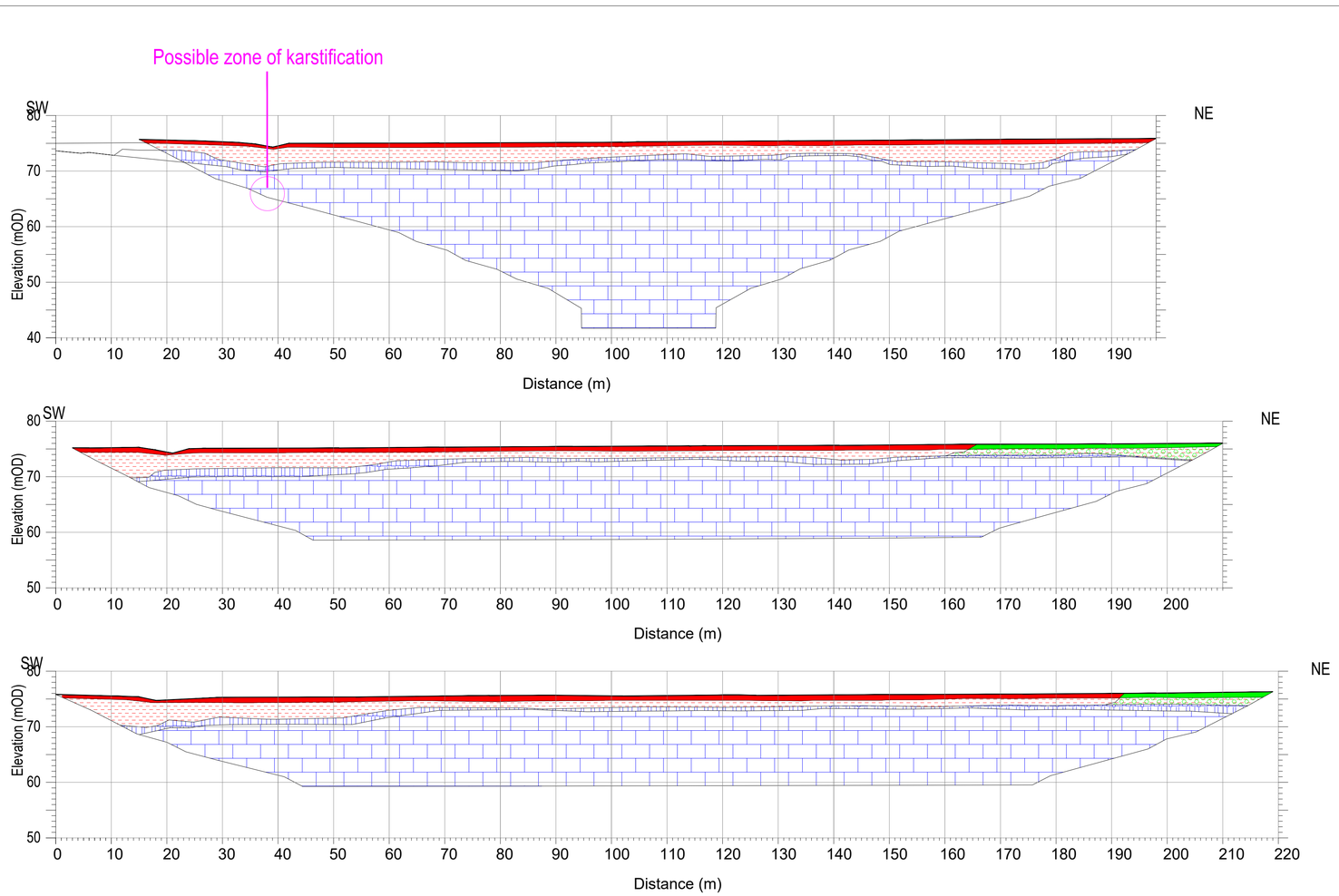
FIGURE 1: Geophysical Locations - Location 16

Scale 1:1000

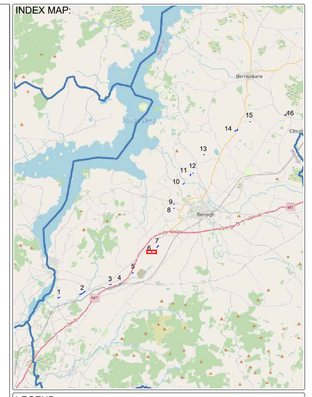


FIGURE 2: Geophysical Sections - Location 16

Scale 1:500



INDEX MAP:



LEGEND:

R1 — 2D resistivity profile

S1 — Seismic refraction profile

Seismic refraction layer with interpreted P-wave velocity

Very soft-Soft sandy gravelly SILT/CLAY

Firm-Stiff sandy gravelly SILT/CLAY

Very Loose-Loose clayey SAND/GRAVEL

Medium dense - Dense clayey SAND/GRAVEL

Highly -Moderately Weathered/Karstified LIMESTONE

Slightly Weathered - FreshLIMESTONE

The information displayed here is to be used in conjunction with AGP21220_01 Report on the Geophysical Investigation for the Water Supply Project - Eastern & Midlands Region Contract 1, for Causeway Geotech Ltd., APEX Geophysics Ltd. 5th October 2022

PROJECT:
IRISH WATER SUPPLY SCHEME
EASTERN & MIDLANDS REGION - CONTRACT 1
GEOPHYSICAL SURVEY

CLIENT:
CAUSEWAY GEOTECH LIMITED

DRAWING NUMBER:
AGP21220_16B

SCALE:
AS SHOWN @ A1

DATE:
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APPENDIX C: SEISMIC REFRACTION DATA

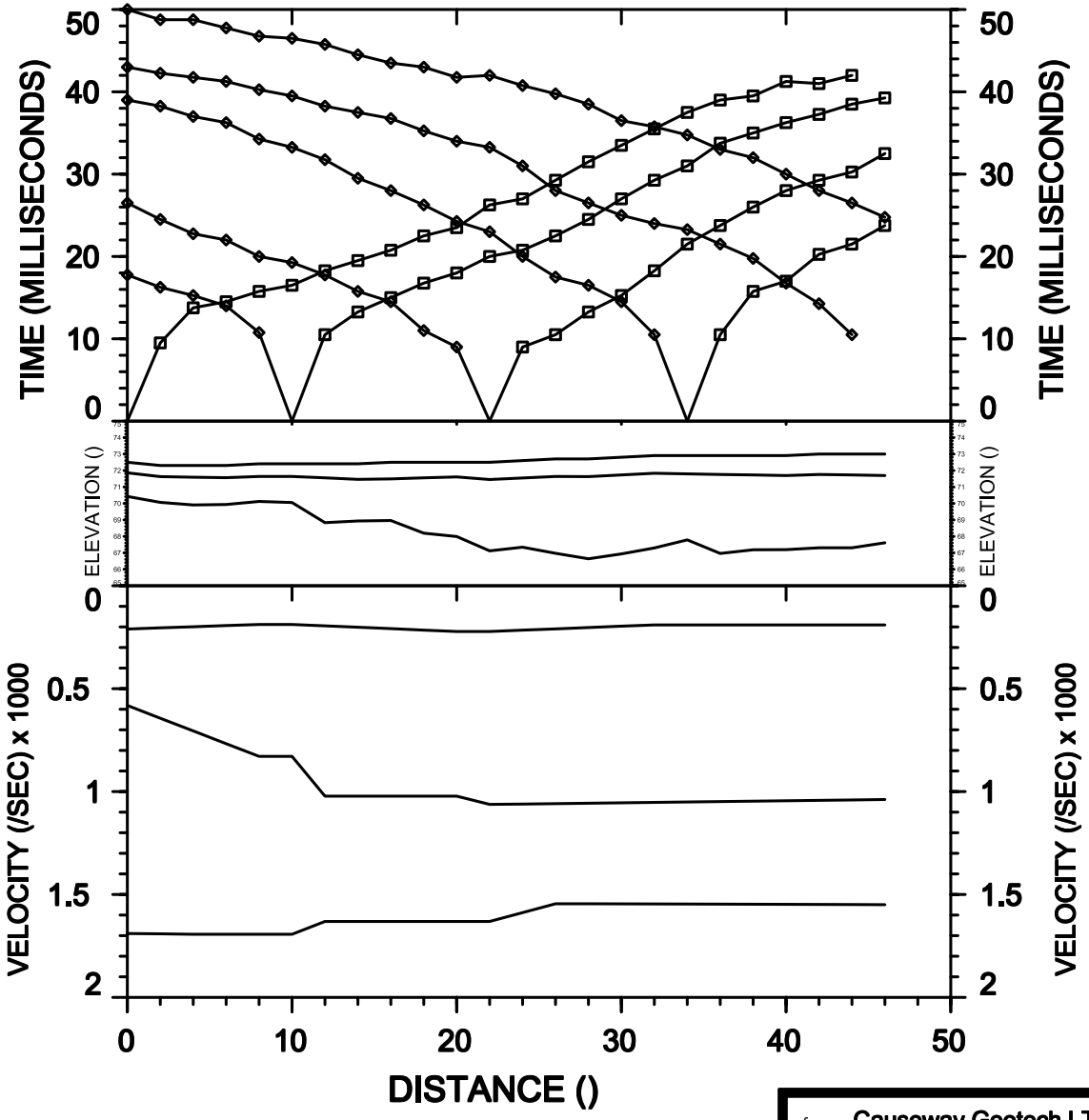


Plate: 10a

for: Causeway Geotech LTD	AGP21220
by: Strata Geophysical, Inc.	
Data SetS1R / Date: 24/05/22	Tipperary
Equipment: / Spread: S1	Azimuth:

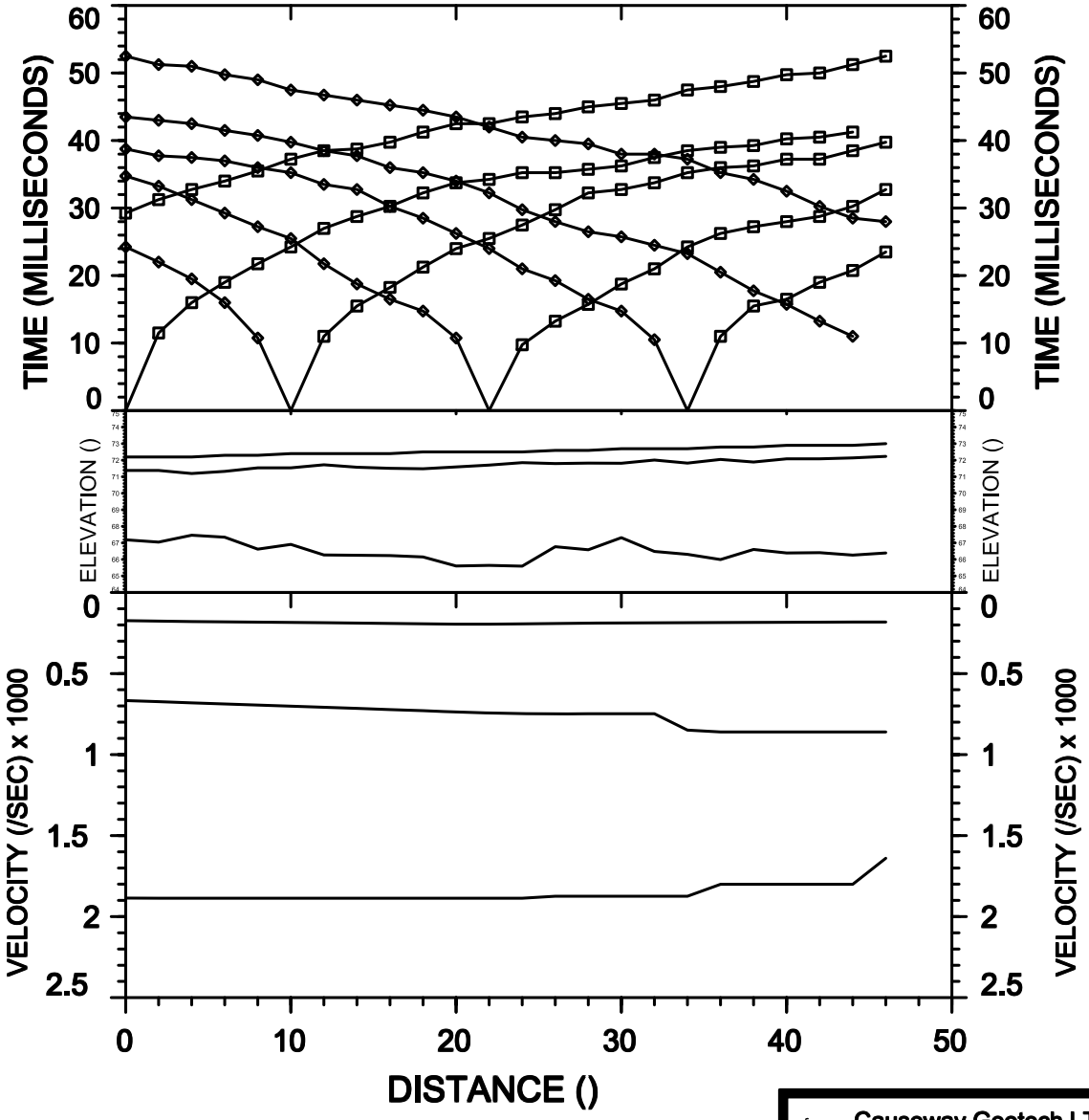


Plate: 10a

for: Causeway Geotech LTD	AGP21220
by: Strata Geophysical, Inc.	
Data SetS2R / Date: 24/05/22	Tipperary
Equipment: / Spread: S2	Azimuth:

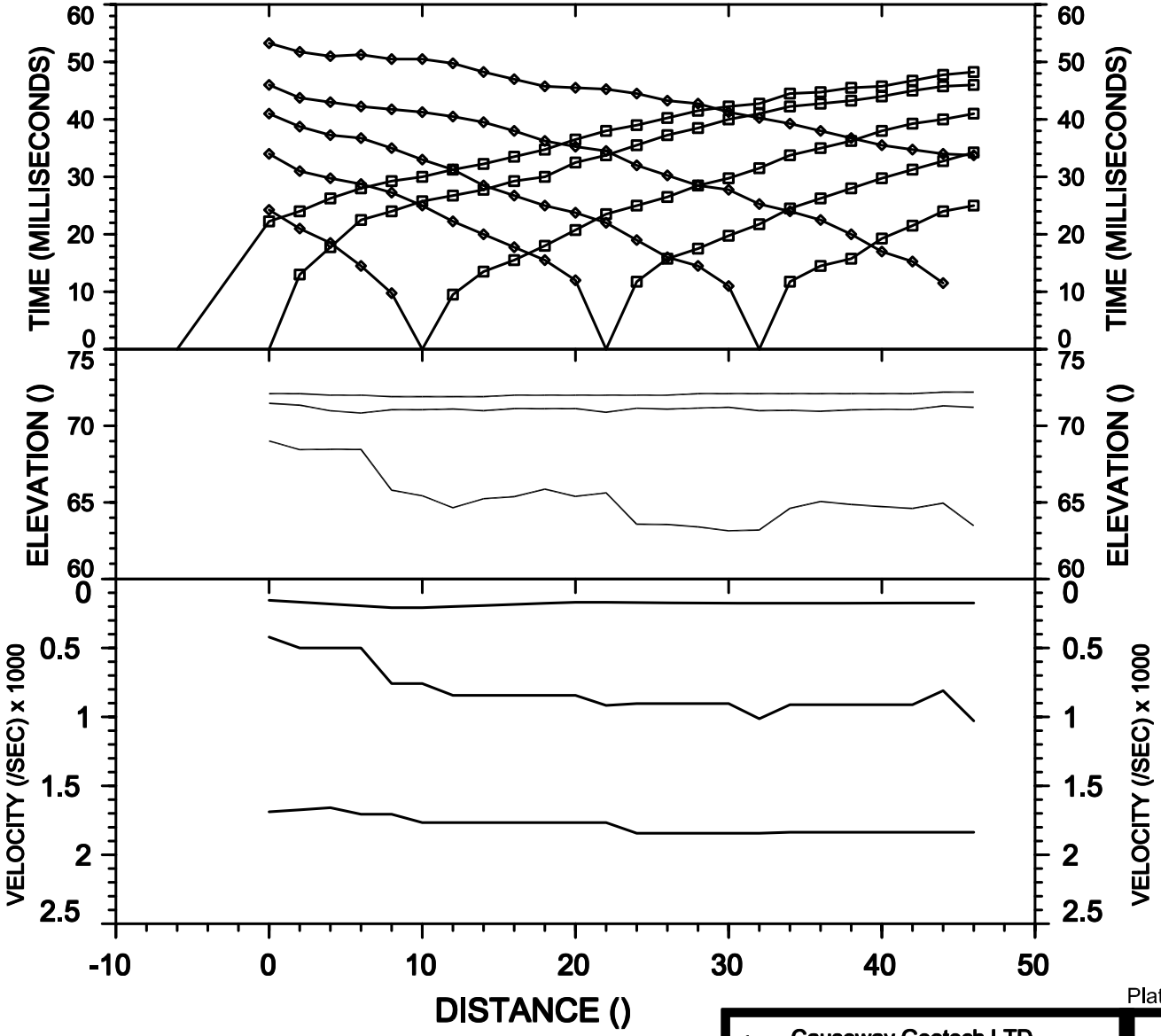


Plate: 10a

for: Causeway Geotech LTD	AGP21220
by: Strata Geophysical, Inc.	Tipperary
Data SetS3 / Date: 24/05/22	
Equipment: / Spread: S3	Azimuth:

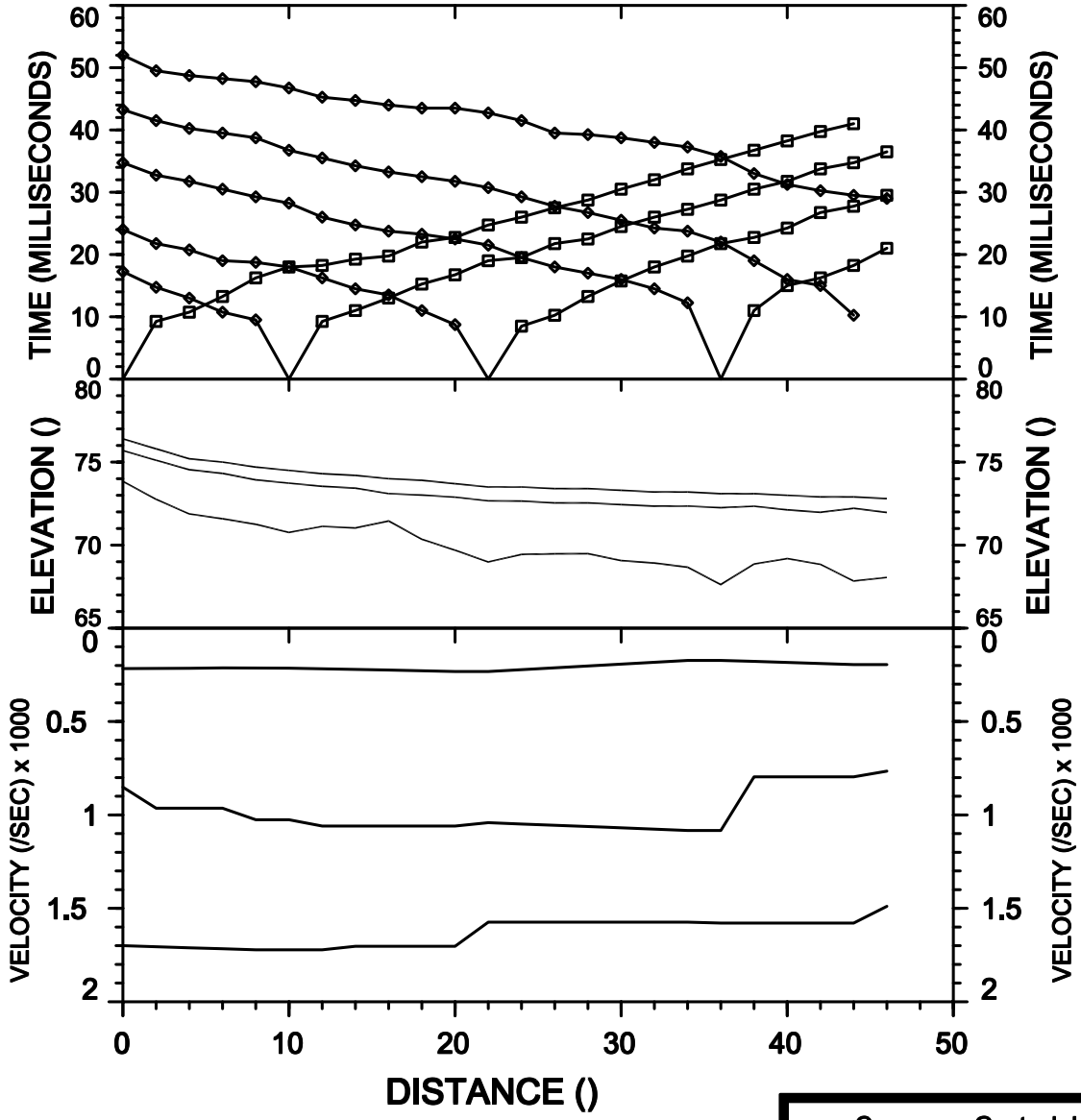


Plate: 10a

for: Causeway Geotech LTD		AGP21220
by: Strata Geophysical, Inc.		Tipperary
Data SetS4	Date: 24/05/22	
Equipment:	Spread: S4	Azimuth:

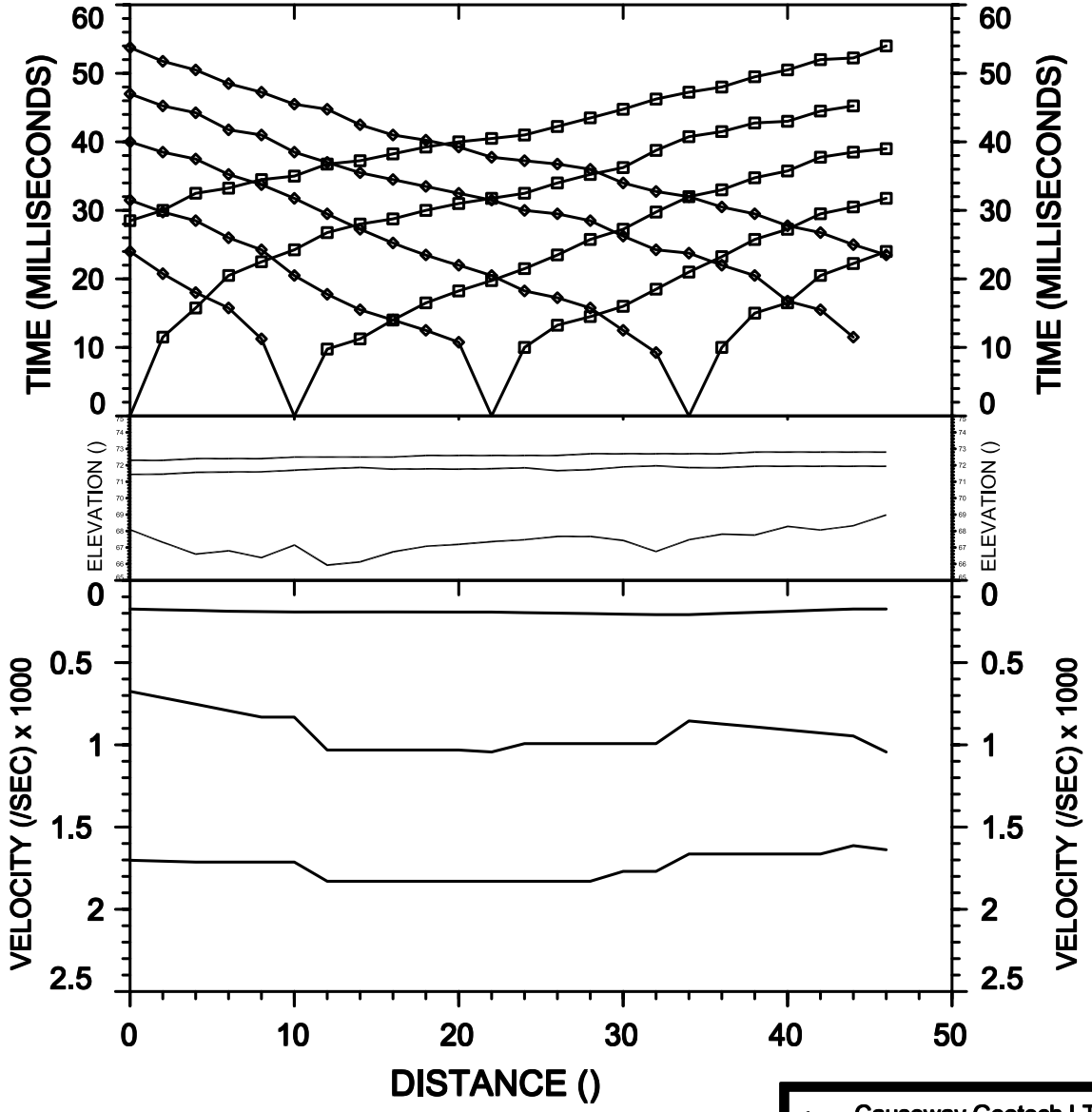


Plate: 10a

for: Causeway Geotech LTD		AGP21220
by: Strata Geophysical, Inc.		Tipperary
Data SetS5	Date: 24/05/22	
Equipment:	Spread: S5	Azimuth:

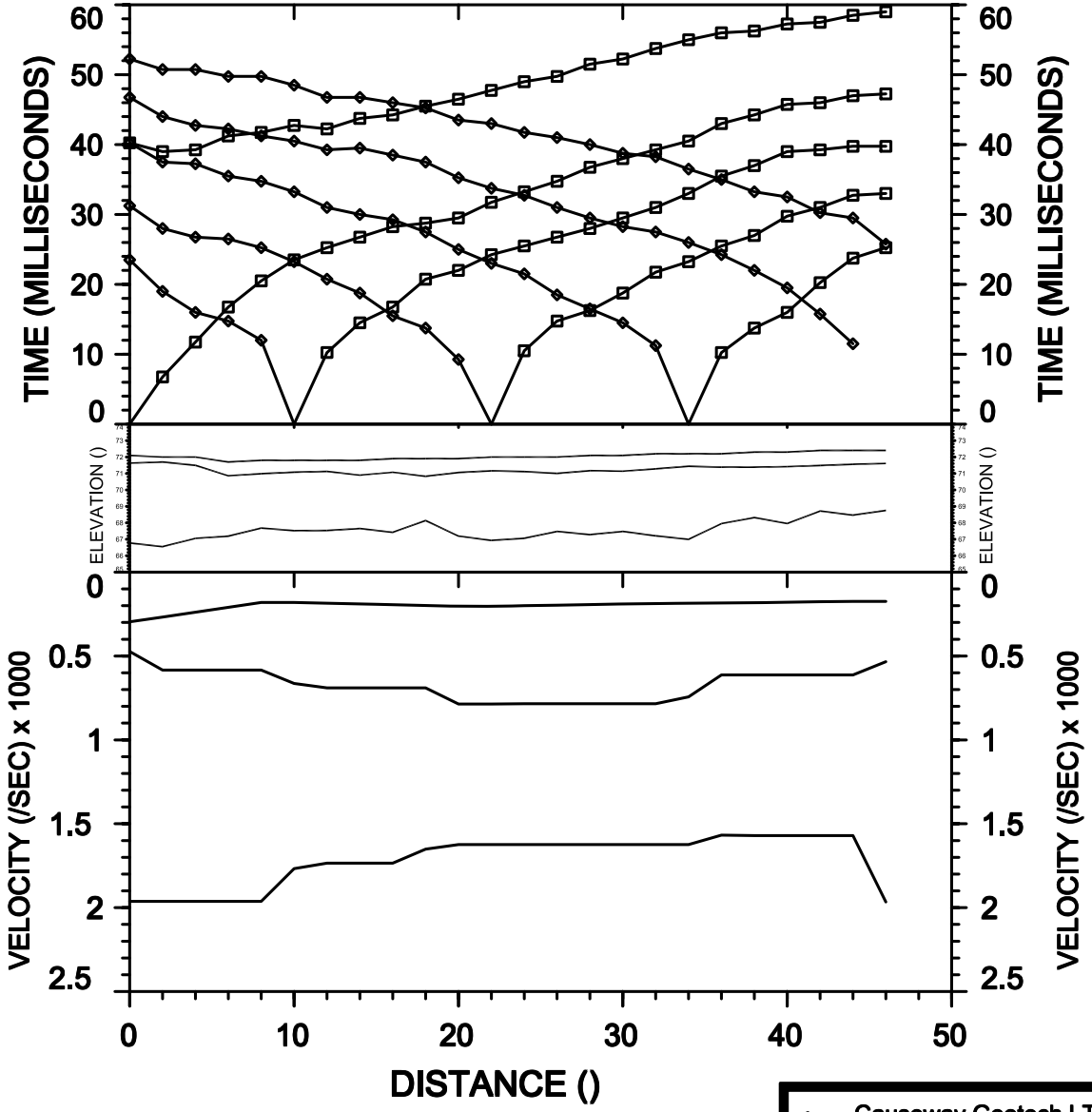


Plate: 10a

for: Causeway Geotech LTD		AGP21220
by: Strata Geophysical, Inc.		Tipperary
Data SetS6	Date: 24/05/22	
Equipment:	Spread: S6	Azimuth:

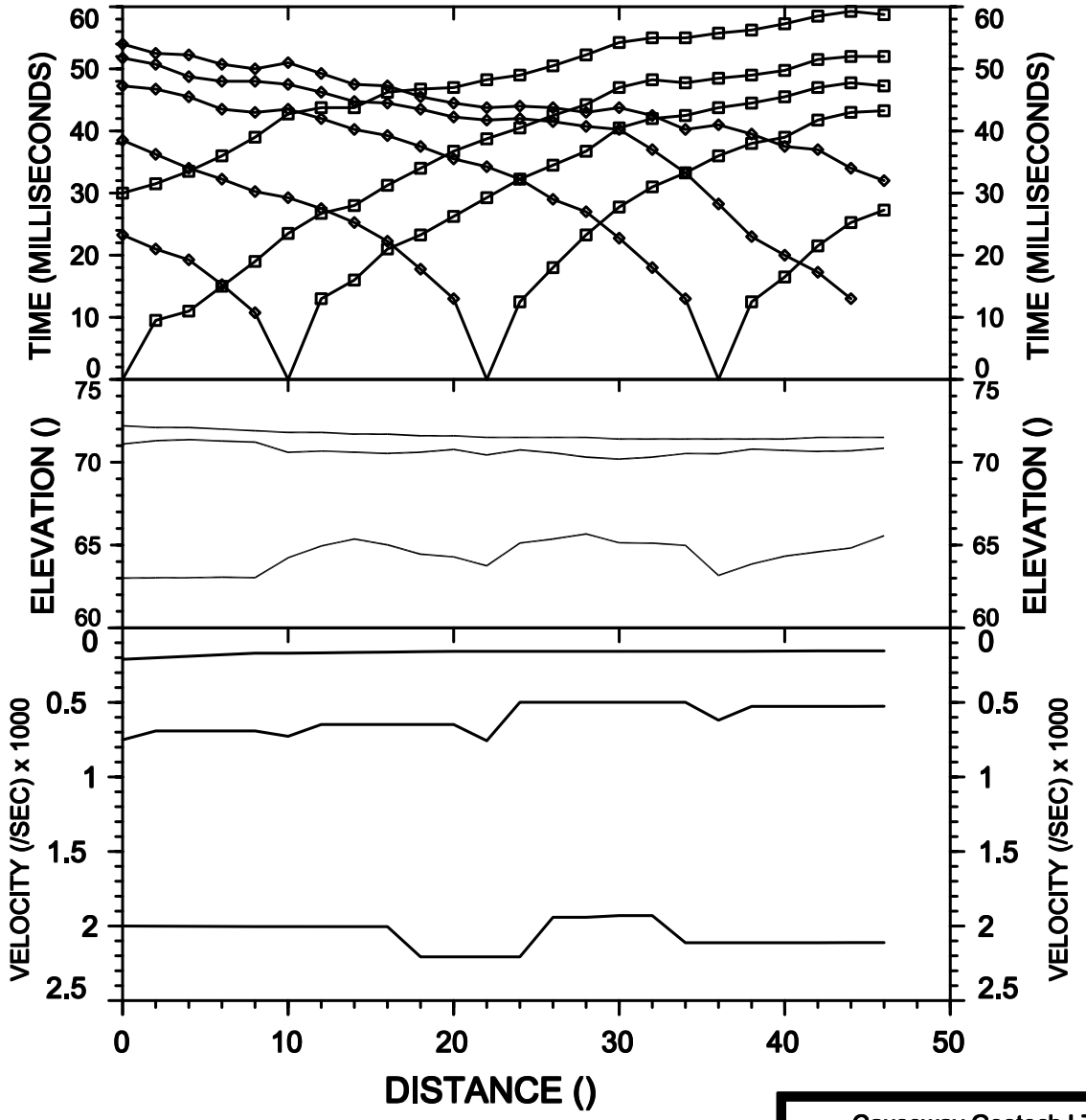


Plate: 10a

for: Causeway Geotech LTD	AGP21220
by: Strata Geophysical, Inc.	Tipperary
Data SetS7 / Date: 24/05/22	
Equipment: / Spread: S7	Azimuth:

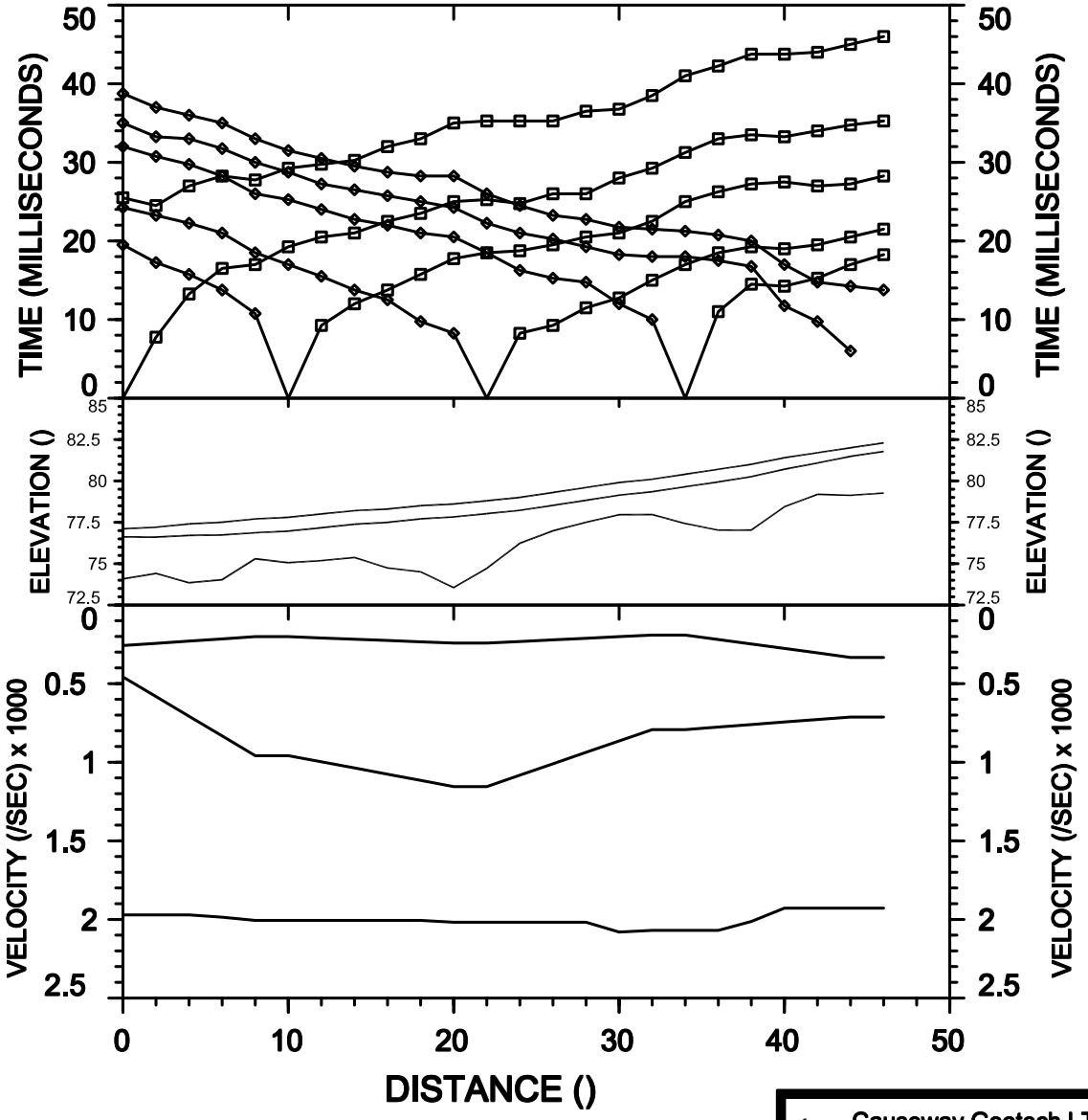


Plate: 10a

for: Causeway Geotech LTD		AGP21220
by: Strata Geophysical, Inc.		
Data SetS8	Date: 25/05/2022	Tipperary
Equipment:	Spread: S8	Azimuth:

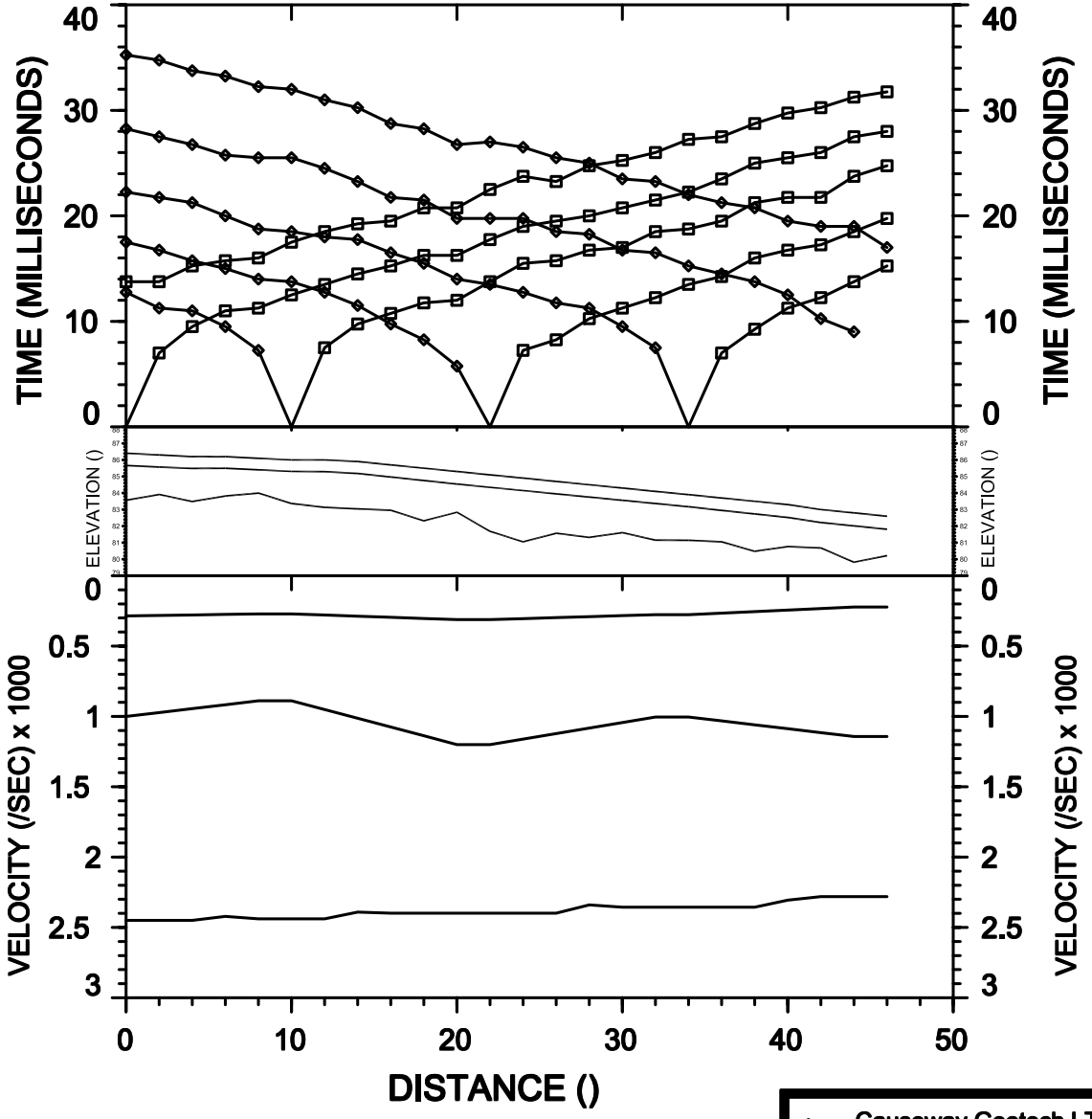


Plate: 10a

for: Causeway Geotech LTD		AGP21220
by: Strata Geophysical, Inc.		Tipperary
Data SetS9	Date: 25/05/2022	
Equipment:	Spread: S9	Azimuth:

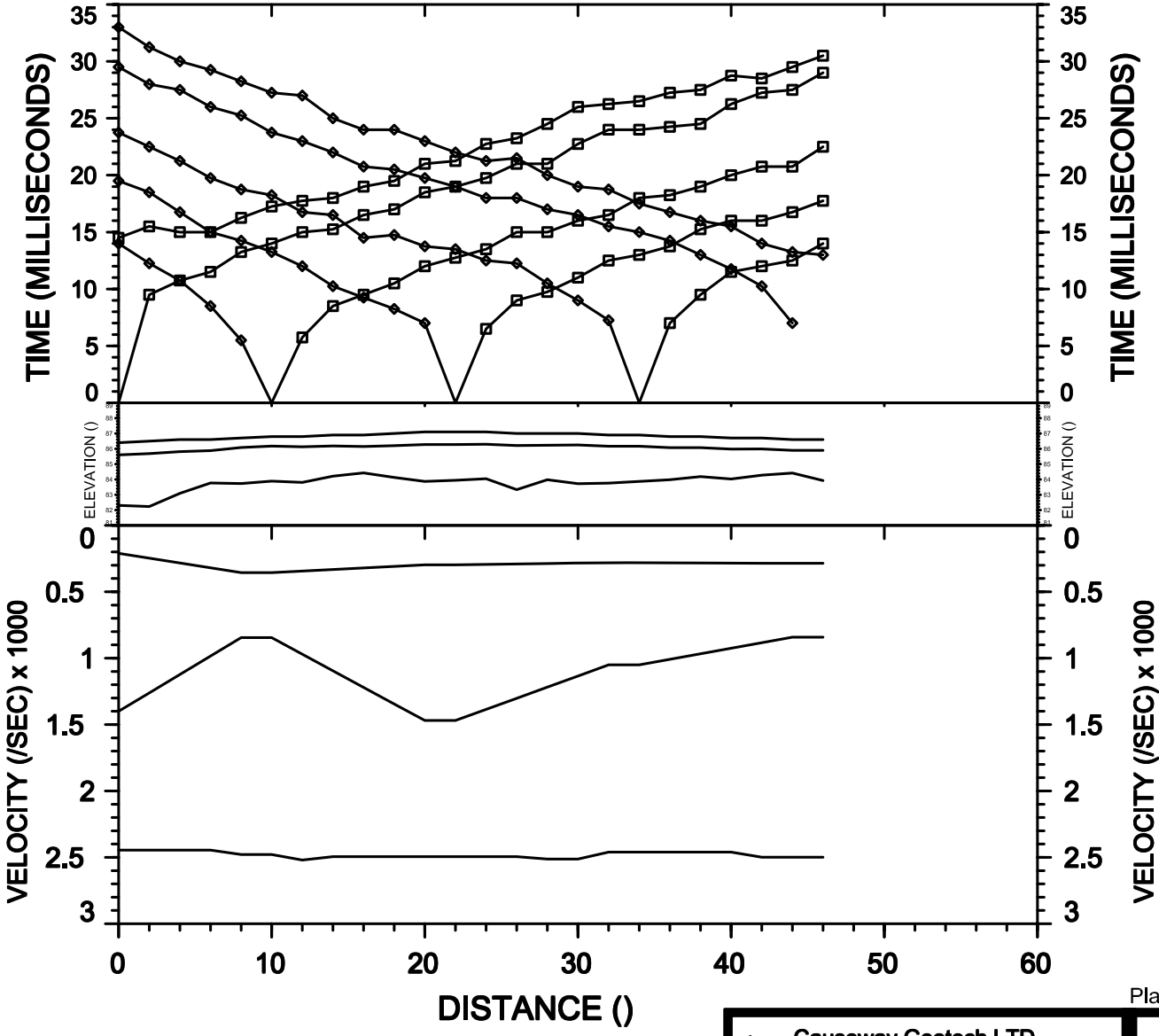


Plate: 10a

for: Causeway Geotech LTD		AGP21220
by: Strata Geophysical, Inc.		Tipperary
Data SetS10R	Date: 25/05/2022	
Equipment:	Spread: S10	Azimuth:

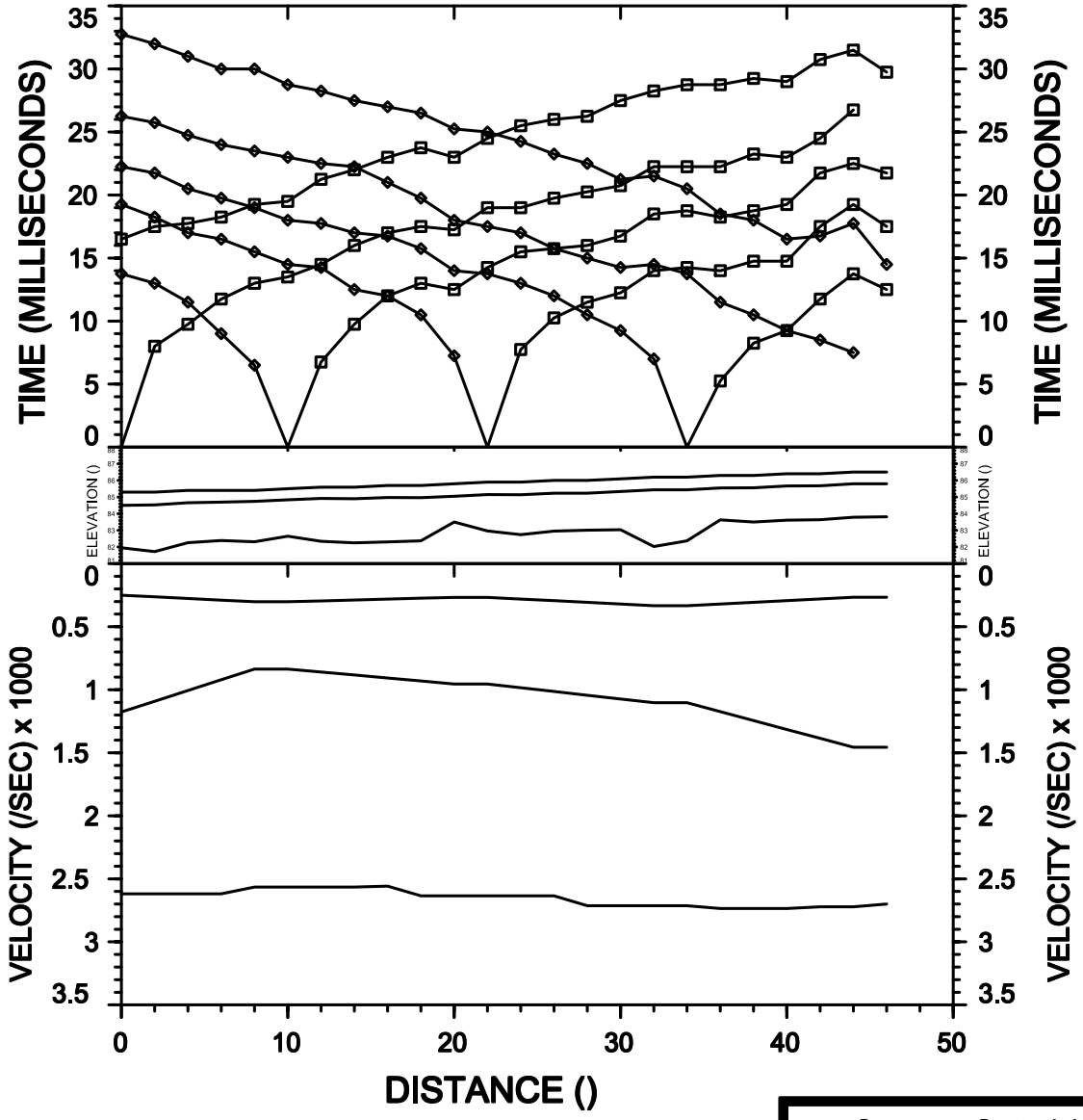


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS11R / Date: 25/05/22	
Equipment: Geode / Spread: S11	Azimuth:

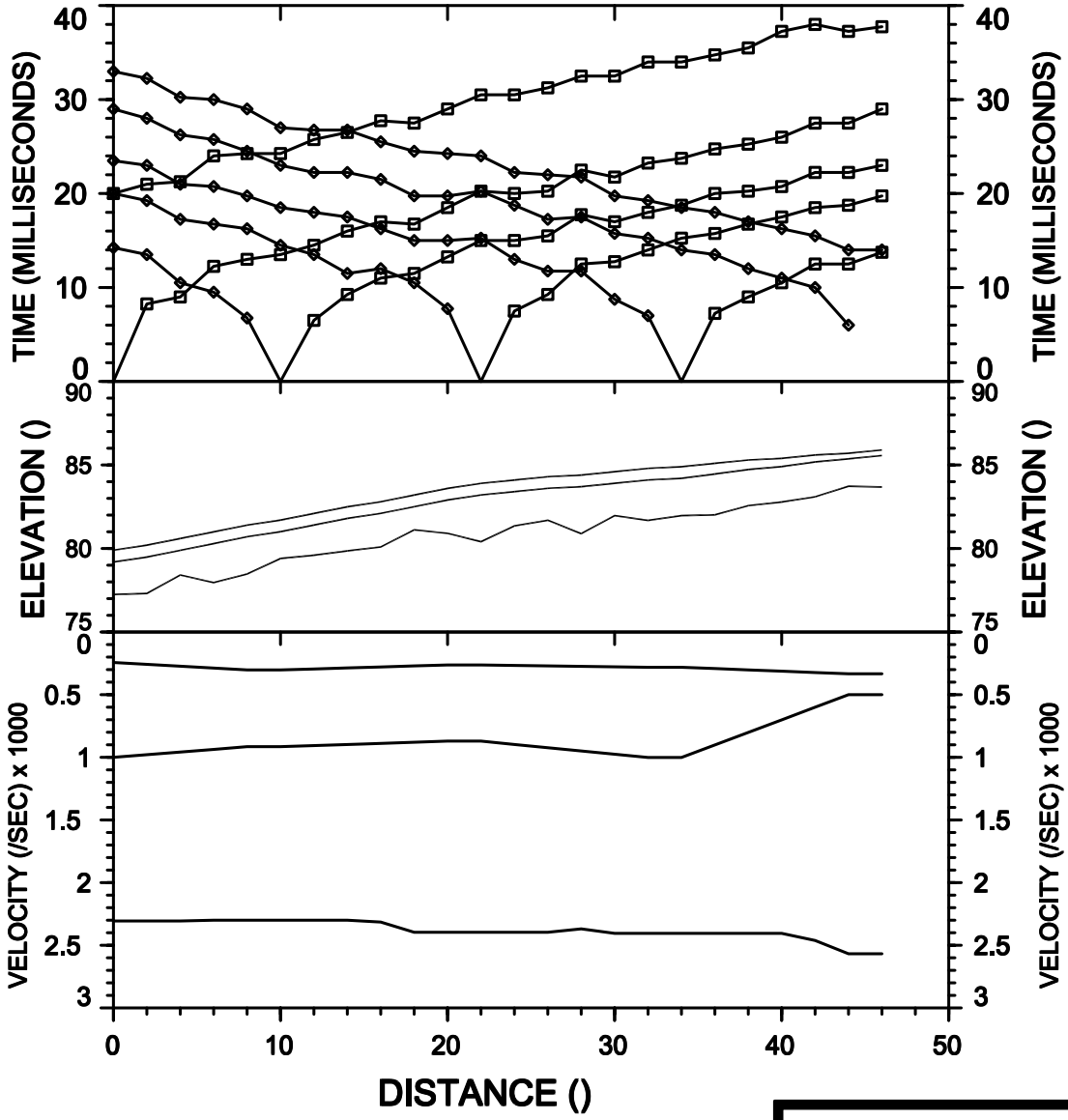


Plate: 10a

for: Causeway Geotech Ltd		AGP21220
by: Strata Geophysical, Inc.		Tipperary Tipperary
Data SetS12	Date: 25/05/22	
Equipment: Geode	Spread: S12	Azimuth:

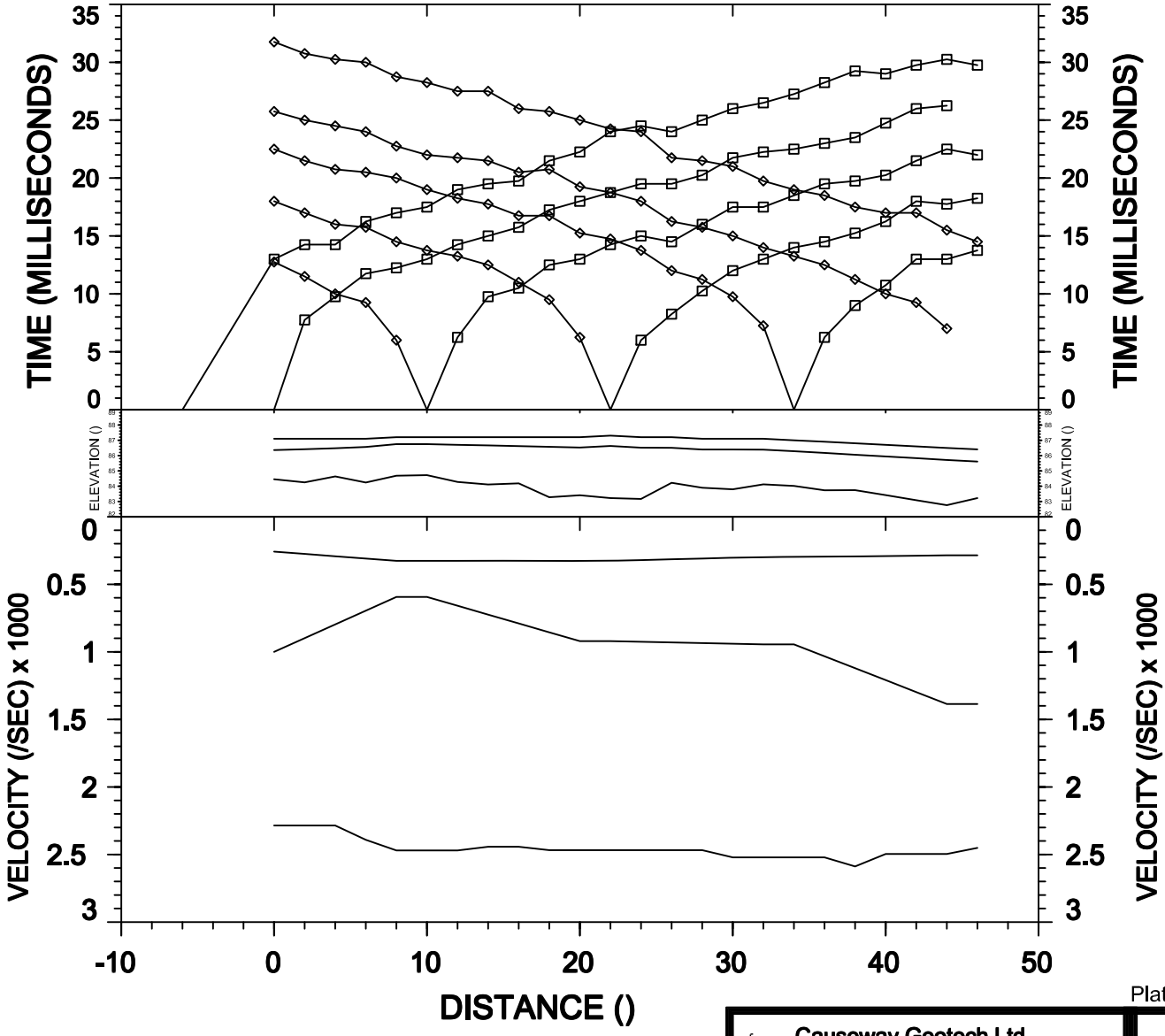


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS13R / Date: 25/05/22	
Equipment: Geode / Spread: S13	Azimuth:

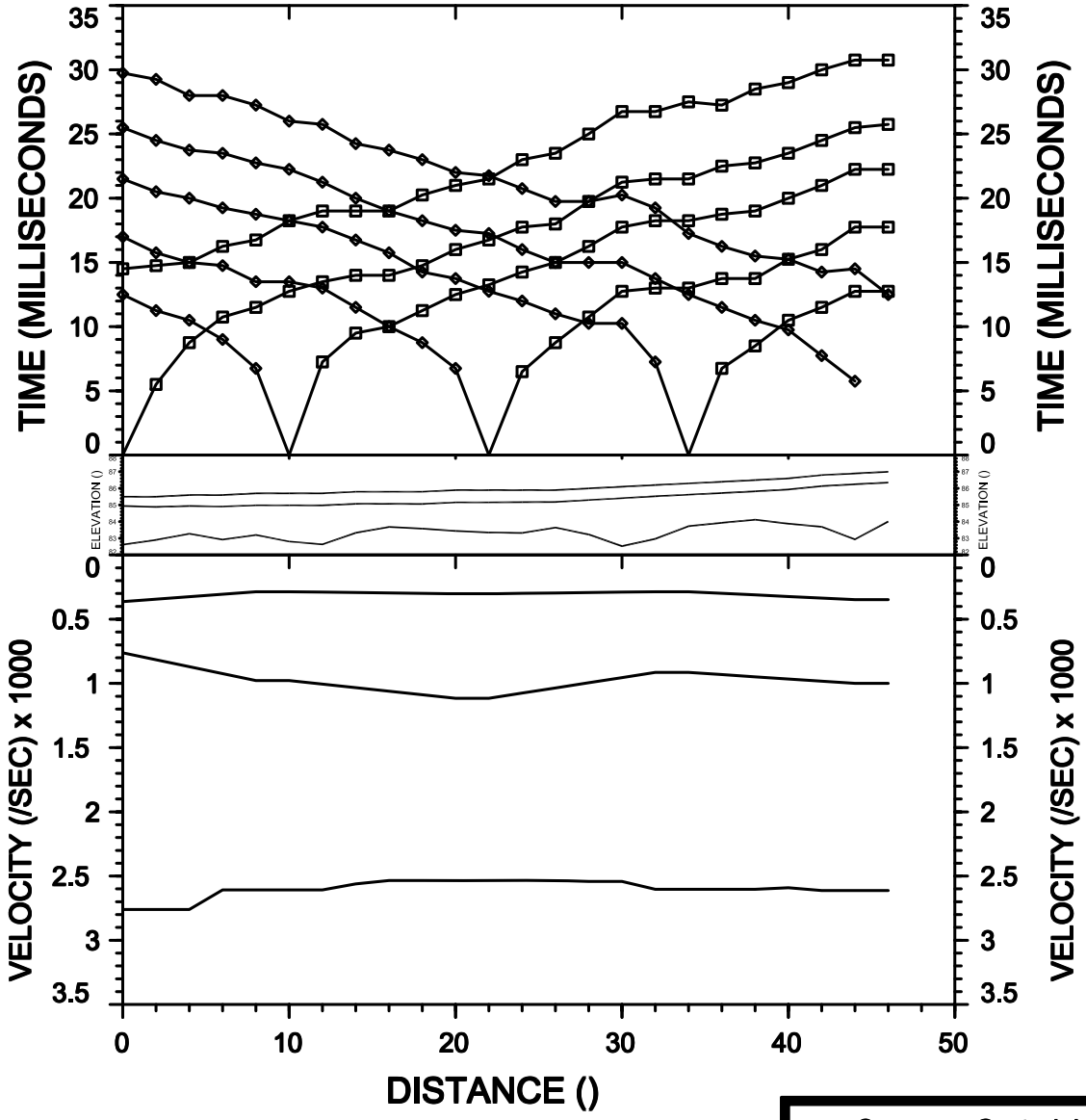


Plate: 10a

for: Causeway Geotech Ltd		AGP21220
by: Strata Geophysical, Inc.		Tipperary Tipperary
Data SetS14	Date: 25/05/22	
Equipment: Geode	Spread: S14	Azimuth:

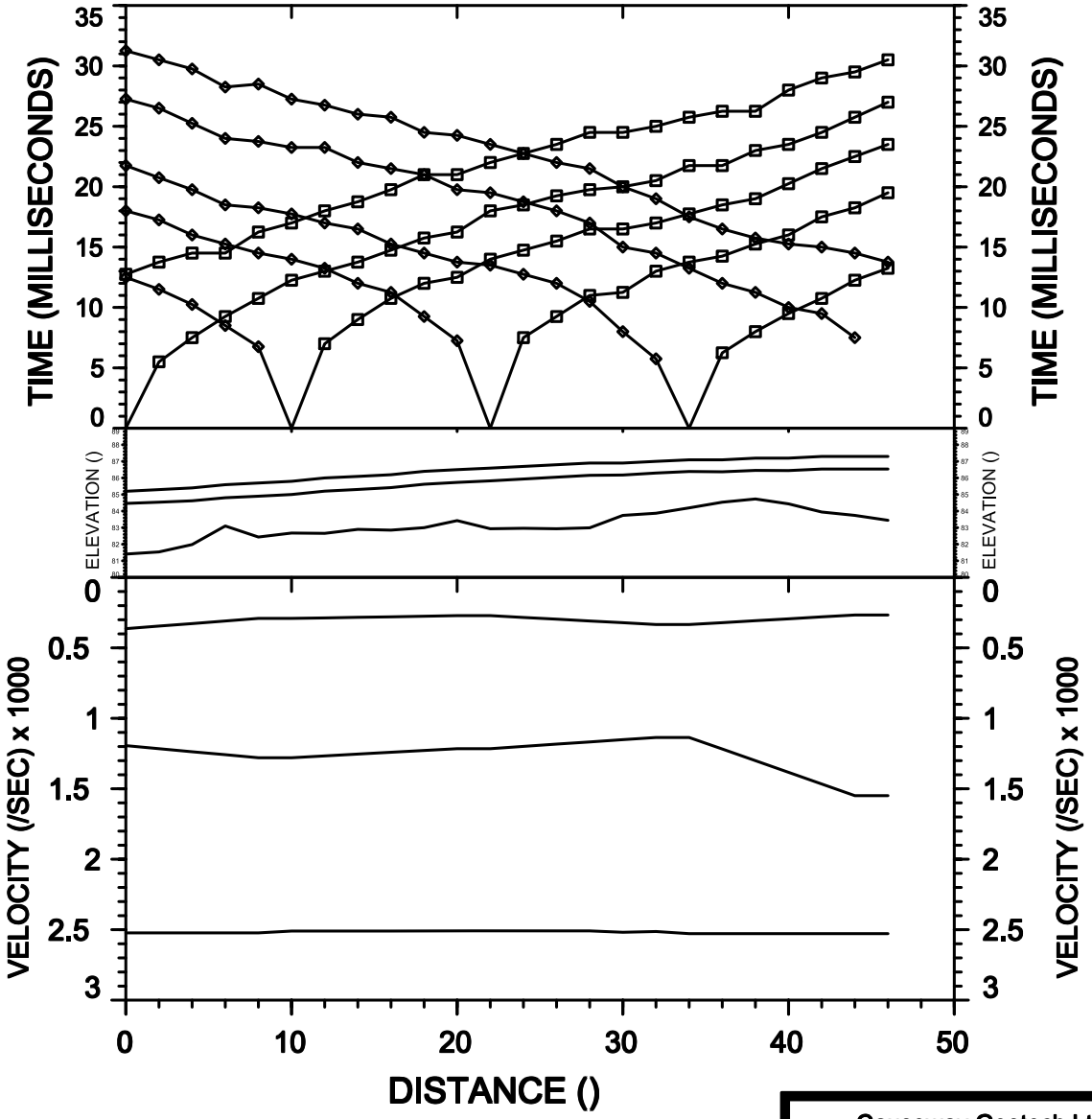


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS15R / Date: 25/05/22	
Equipment: Geode / Spread: S15	Azimuth:

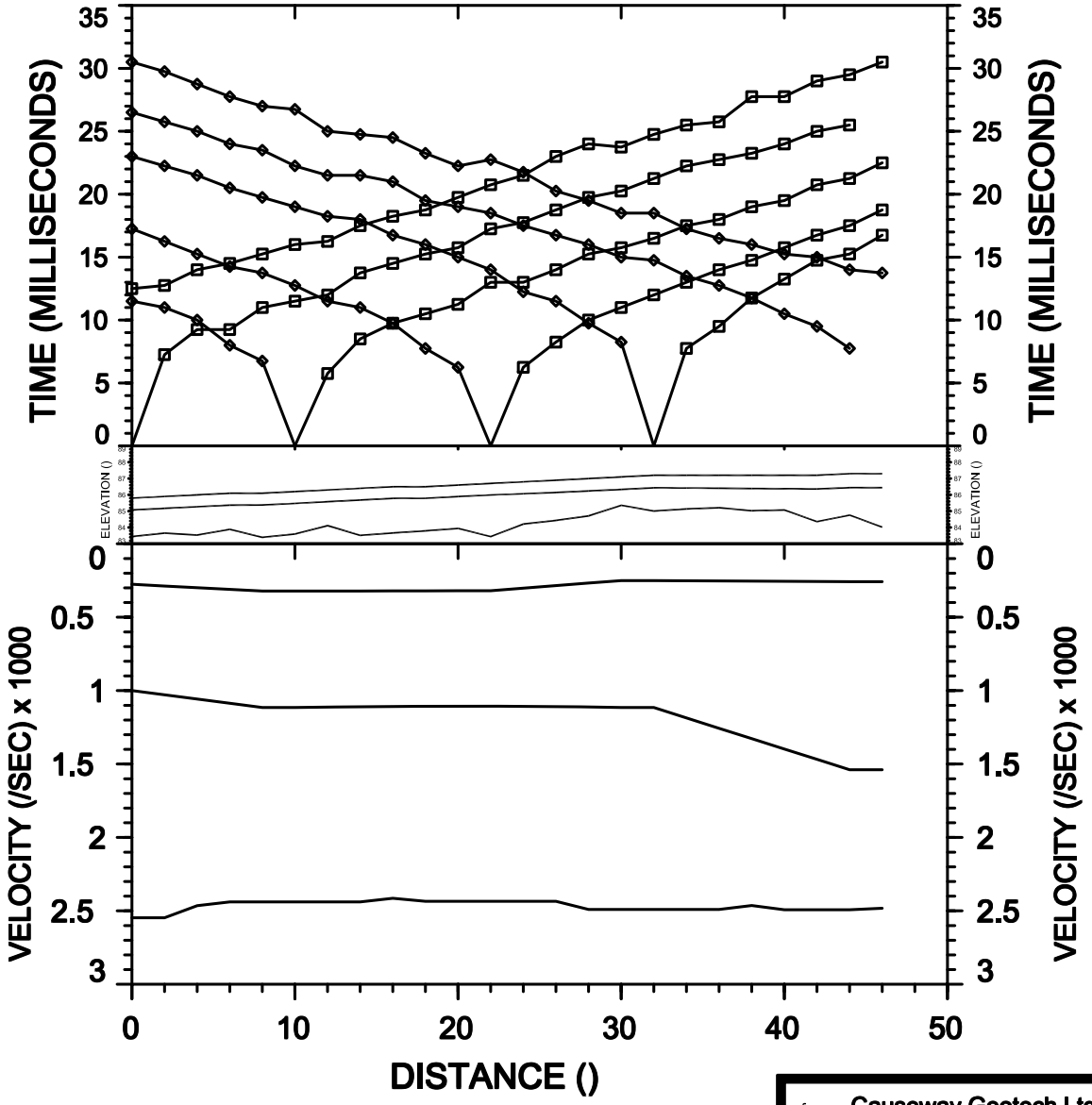


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS16 / Date: 25/05/22	
Equipment: Geode / Spread: S16	Azimuth:

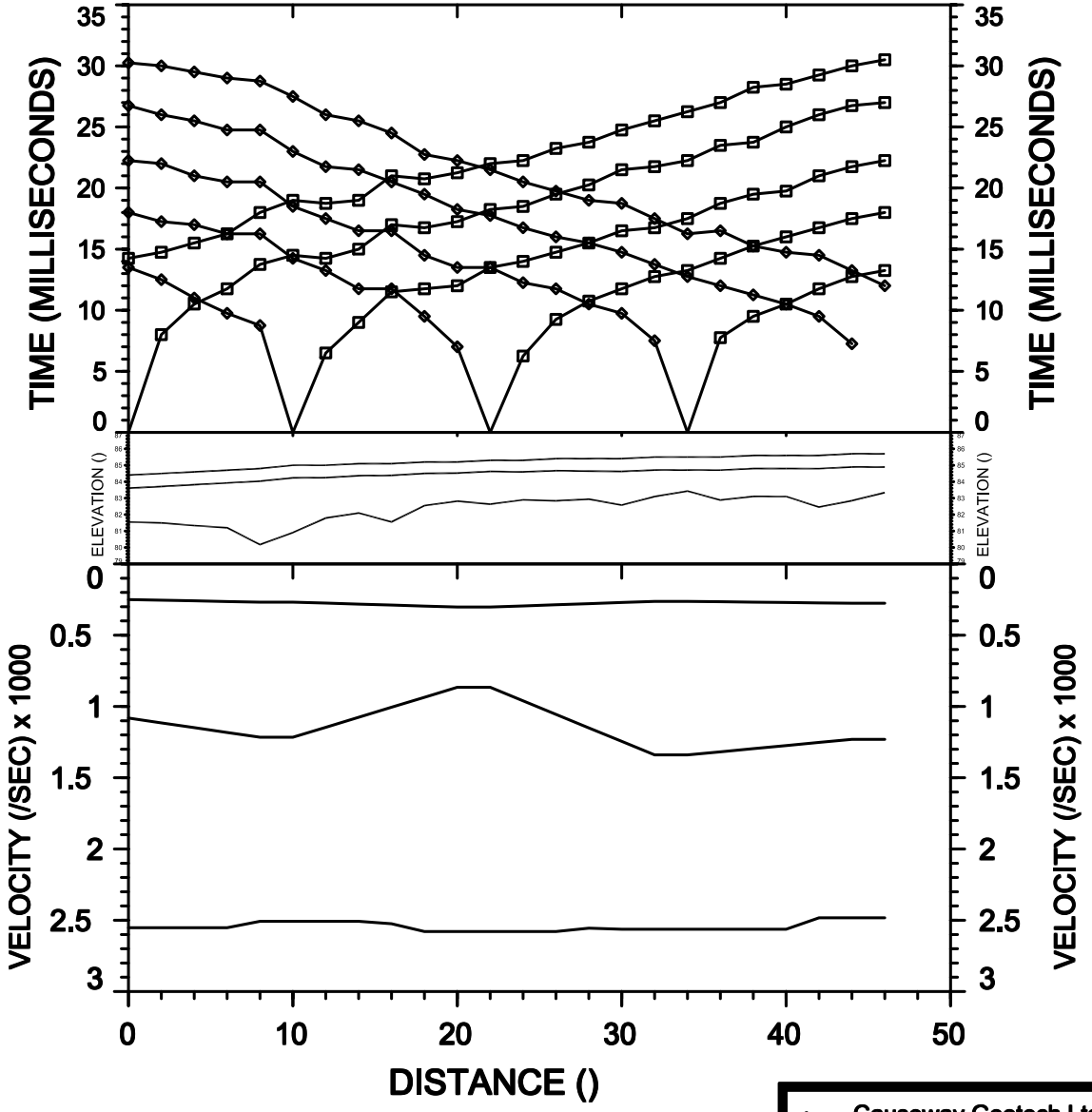


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS17 / Date: 25/05/22	
Equipment: Geode / Spread: S17	Azimuth:

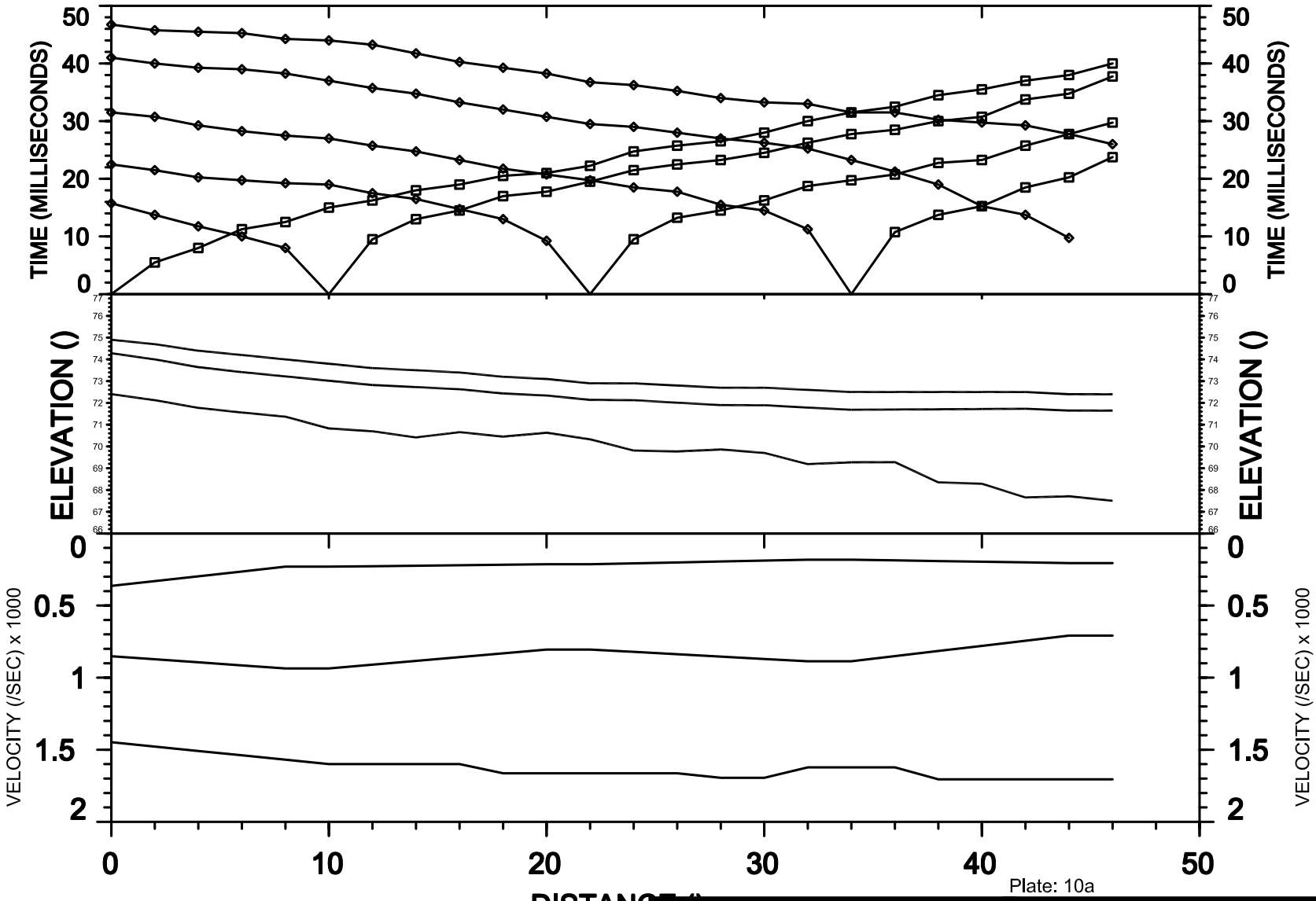


Plate: 10a

for: Causeway Geotech Ltd		AGP21220
by: Strata Geophysical, Inc.		Tipperary Tipperary
Data SetS18	Date: 26/05/22	
Equipment: Geode	Spread: S18	Azimuth:

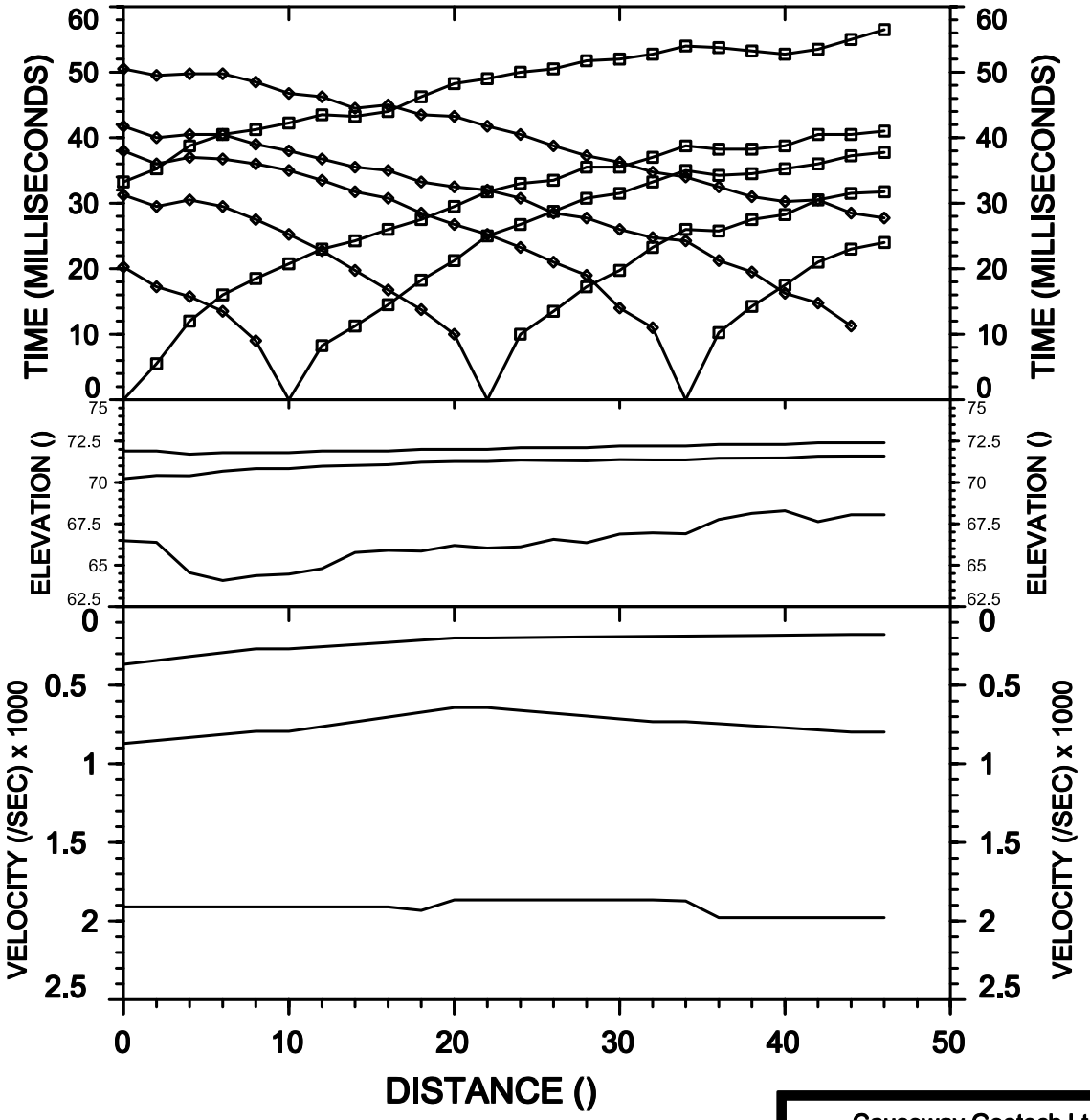


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS19R / Date: 26/05/22	
Equipment: Geode / Spread: S19	Azimuth:

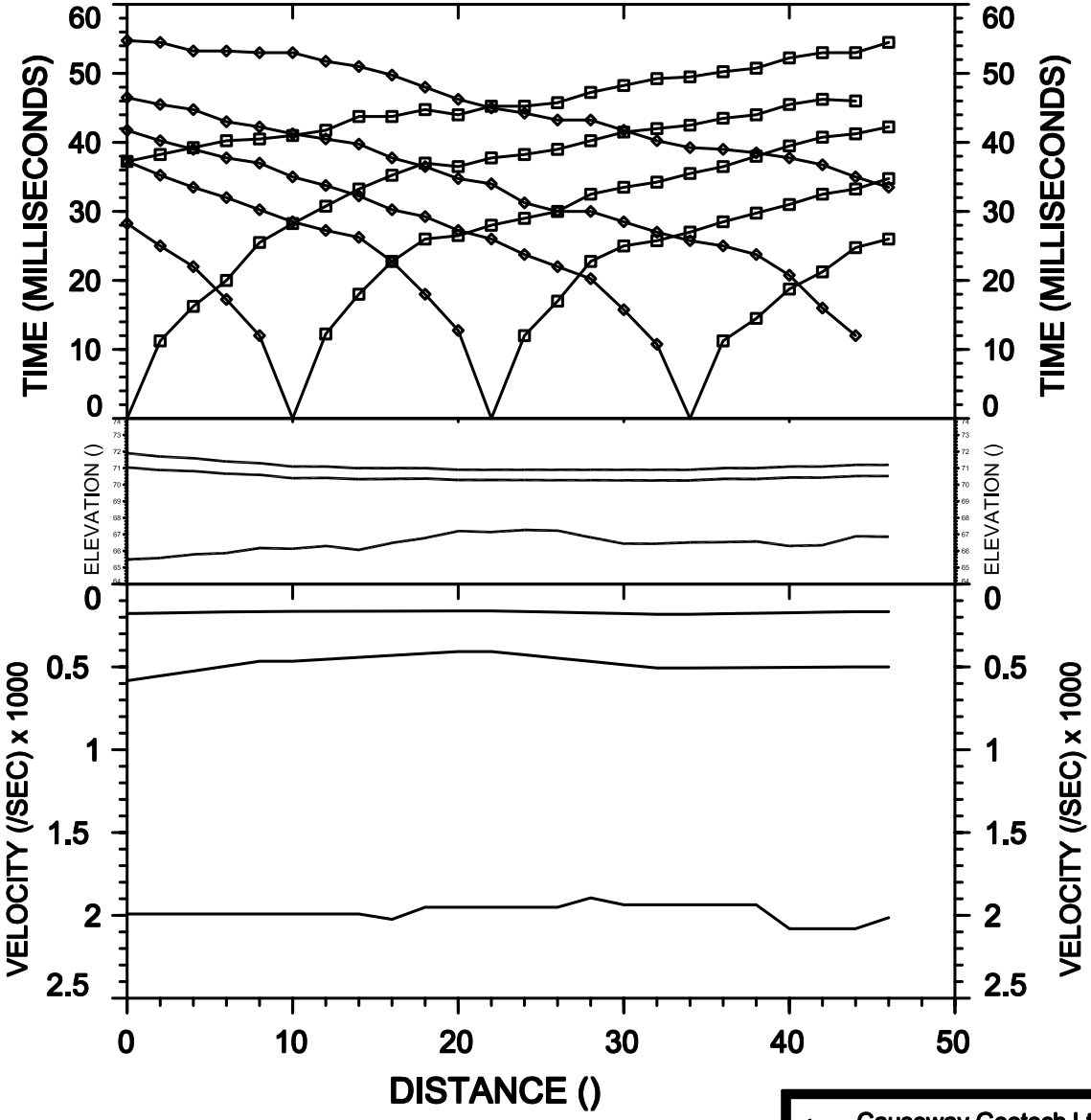


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS20 / Date: 26/05/22	
Equipment: Geode / Spread: S20	Azimuth:

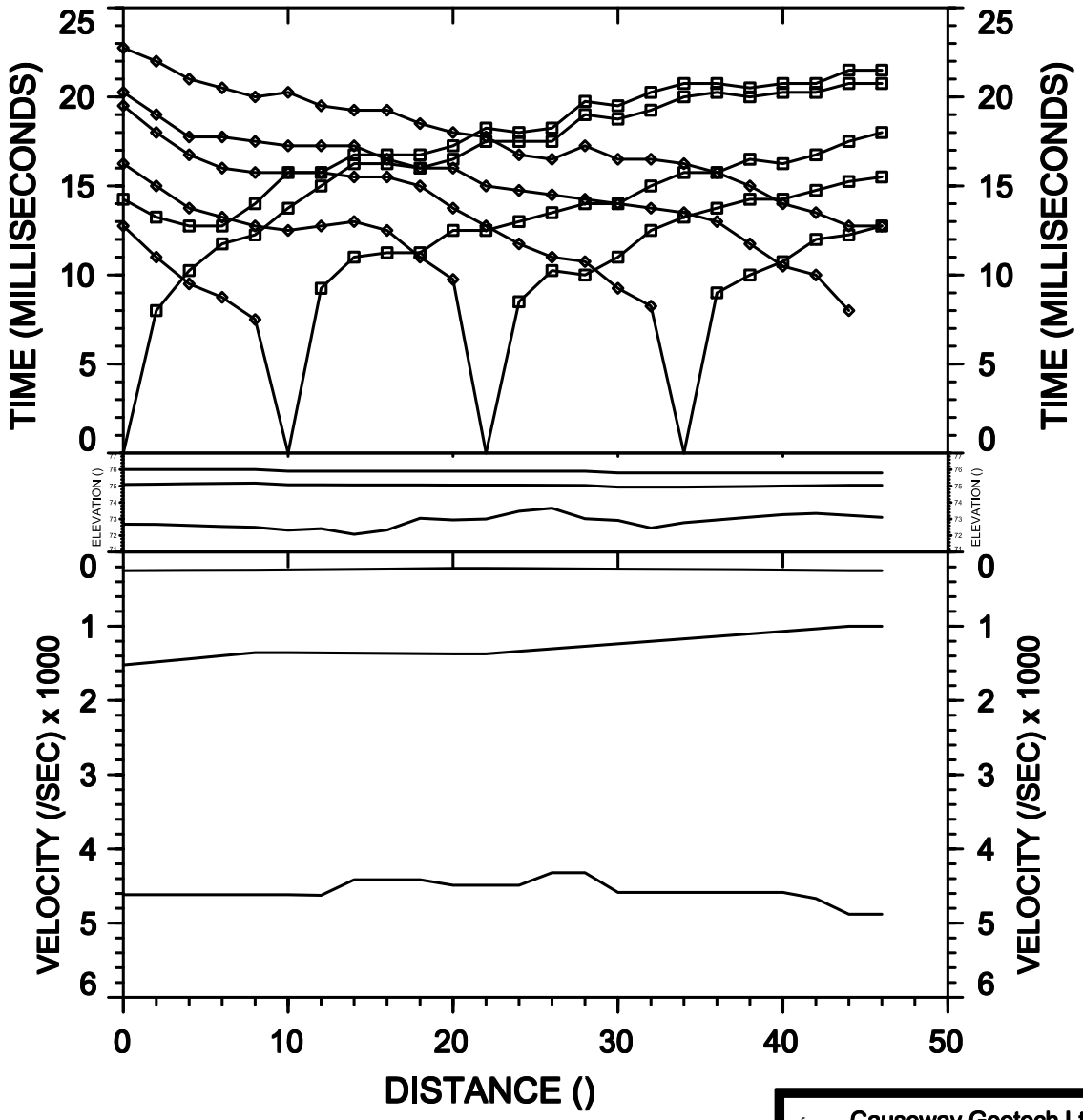


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS21R / Date: 26/05/22	
Equipment: Geode / Spread: S21	Azimuth:

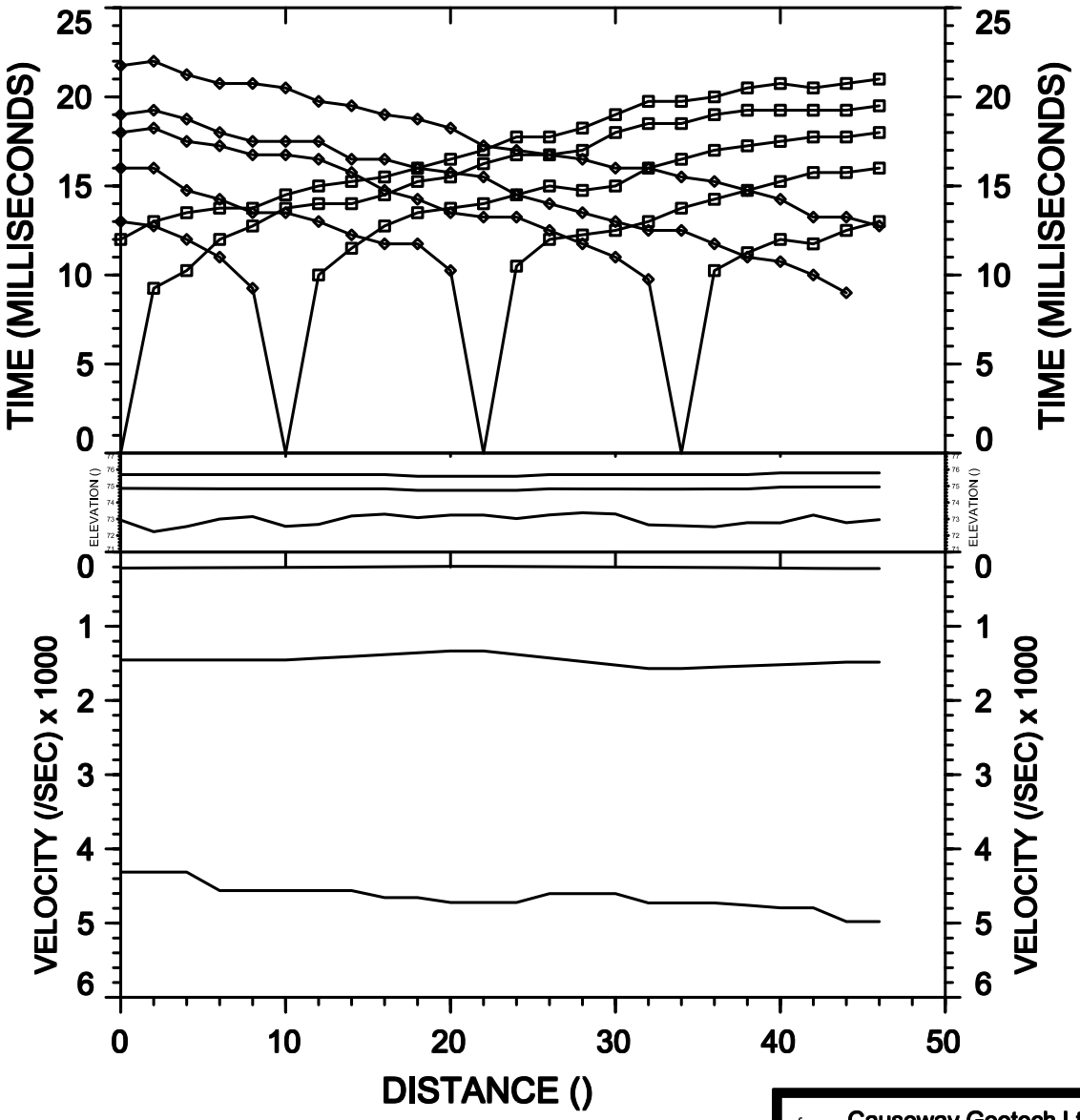


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS22R / Date: 26/05/22	
Equipment: Geode / Spread: S22	Azimuth:

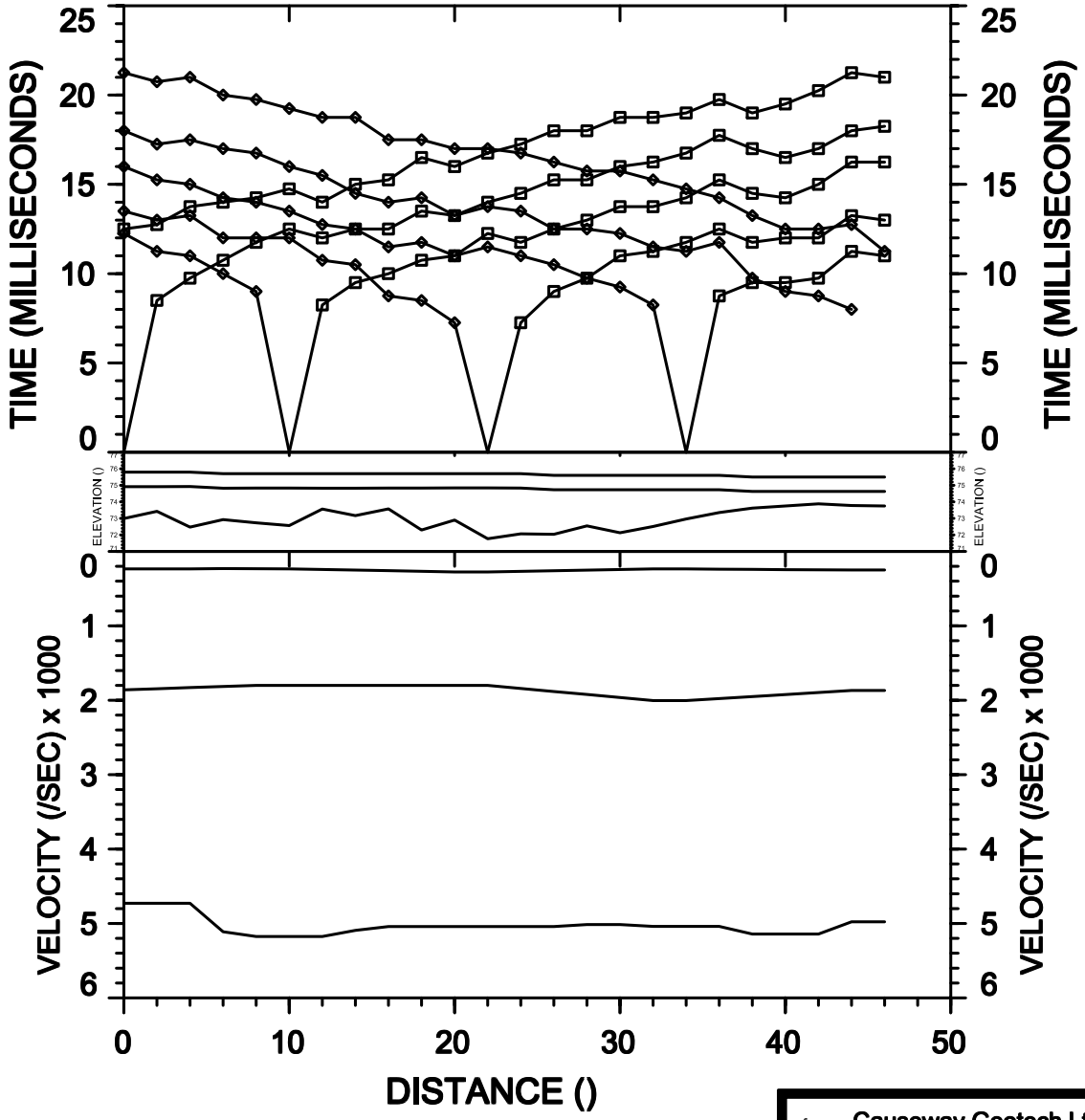


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS23R / Date: 26/05/22	
Equipment: Geode / Spread: S23	Azimuth:

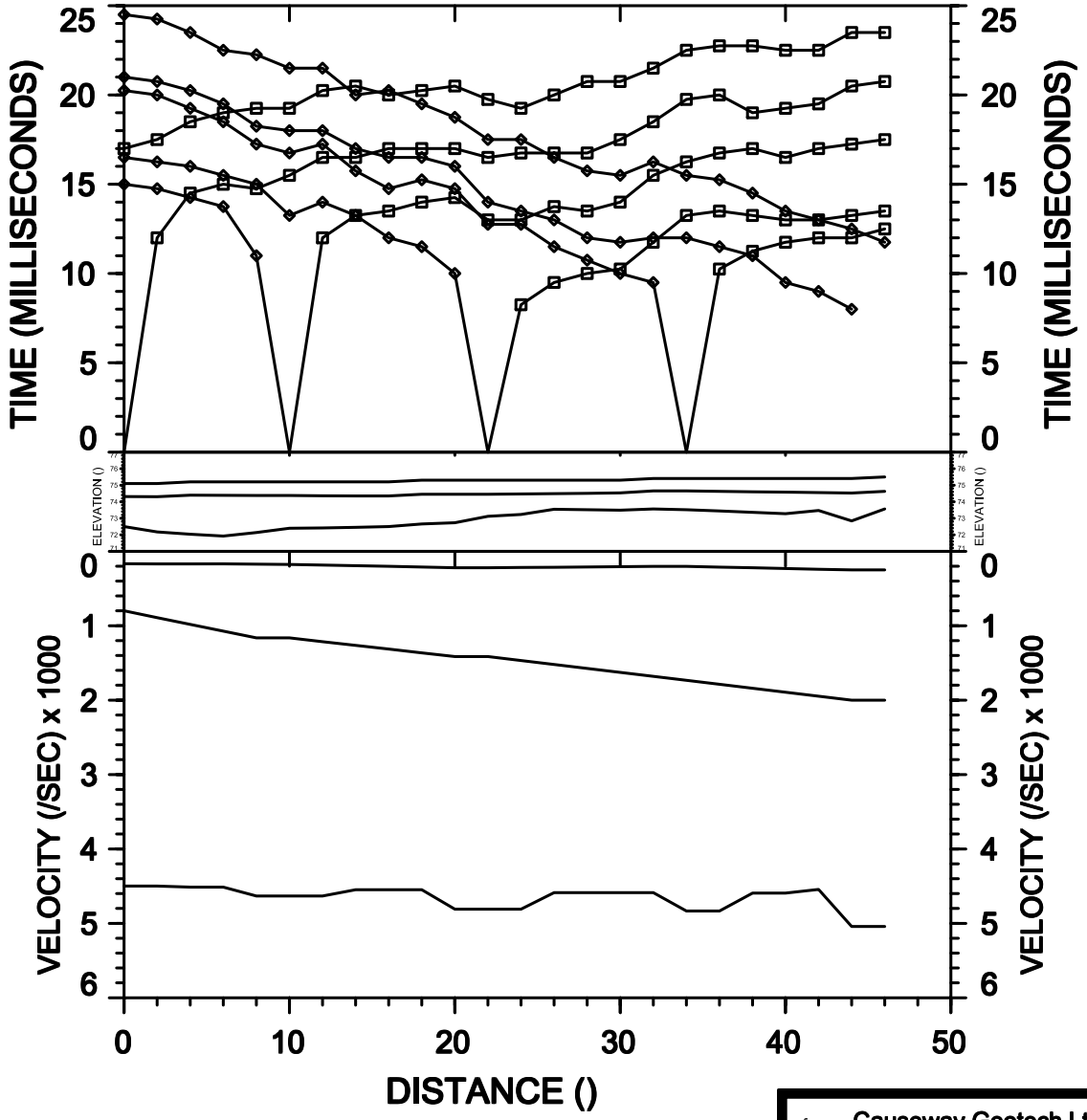


Plate: 10a

for: Causeway Geotech Ltd		AGP21220
by: Strata Geophysical, Inc.		Tipperary Tipperary
Data SetS24R	Date: 26/05/22	
Equipment: Geode	Spread: S24	Azimuth:

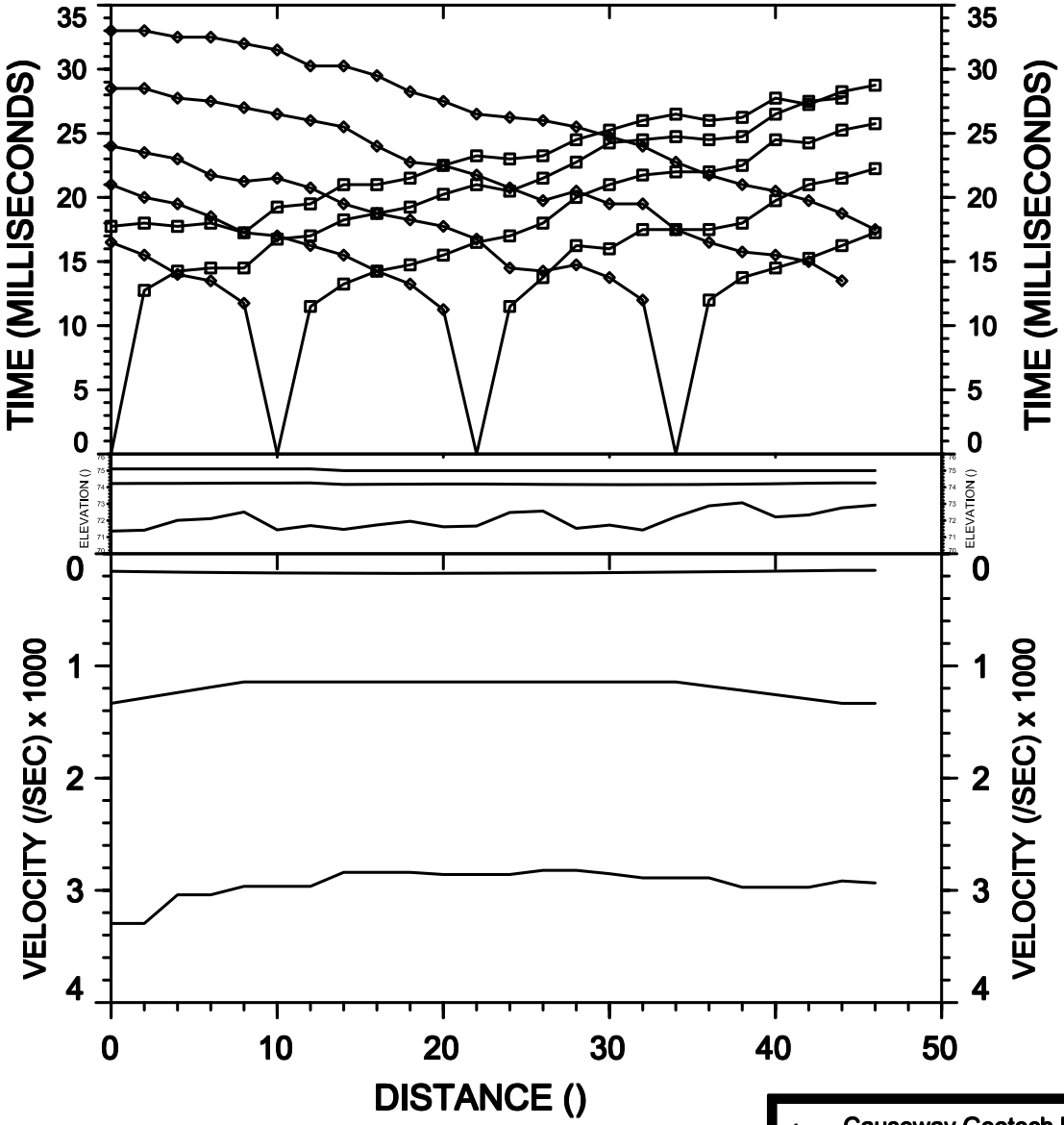


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS25R / Date: 26/05/22	
Equipment: Geode / Spread: S25	Azimuth:

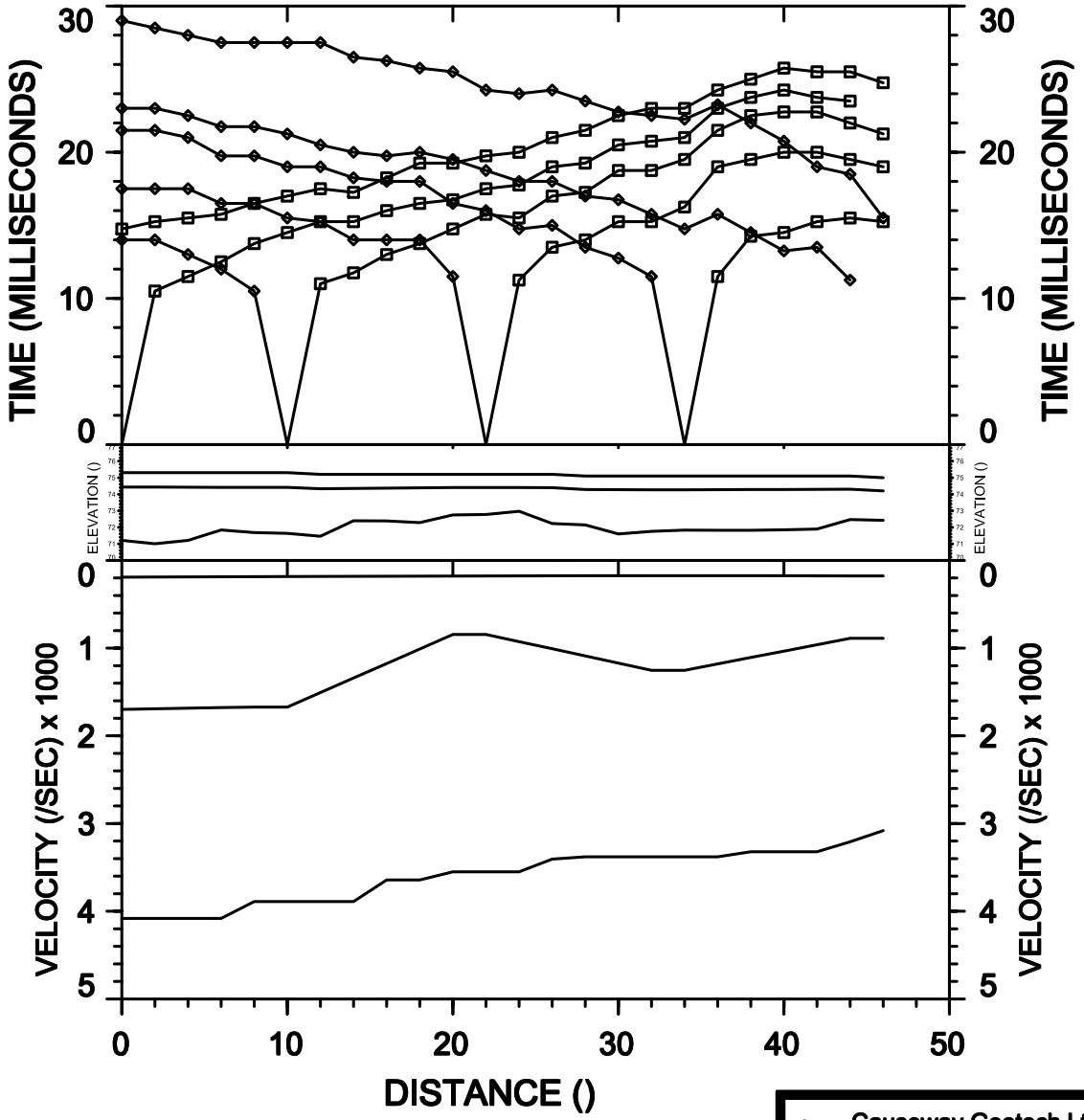


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS26R / Date: 26/05/22	
Equipment: Geode / Spread: S26	Azimuth:

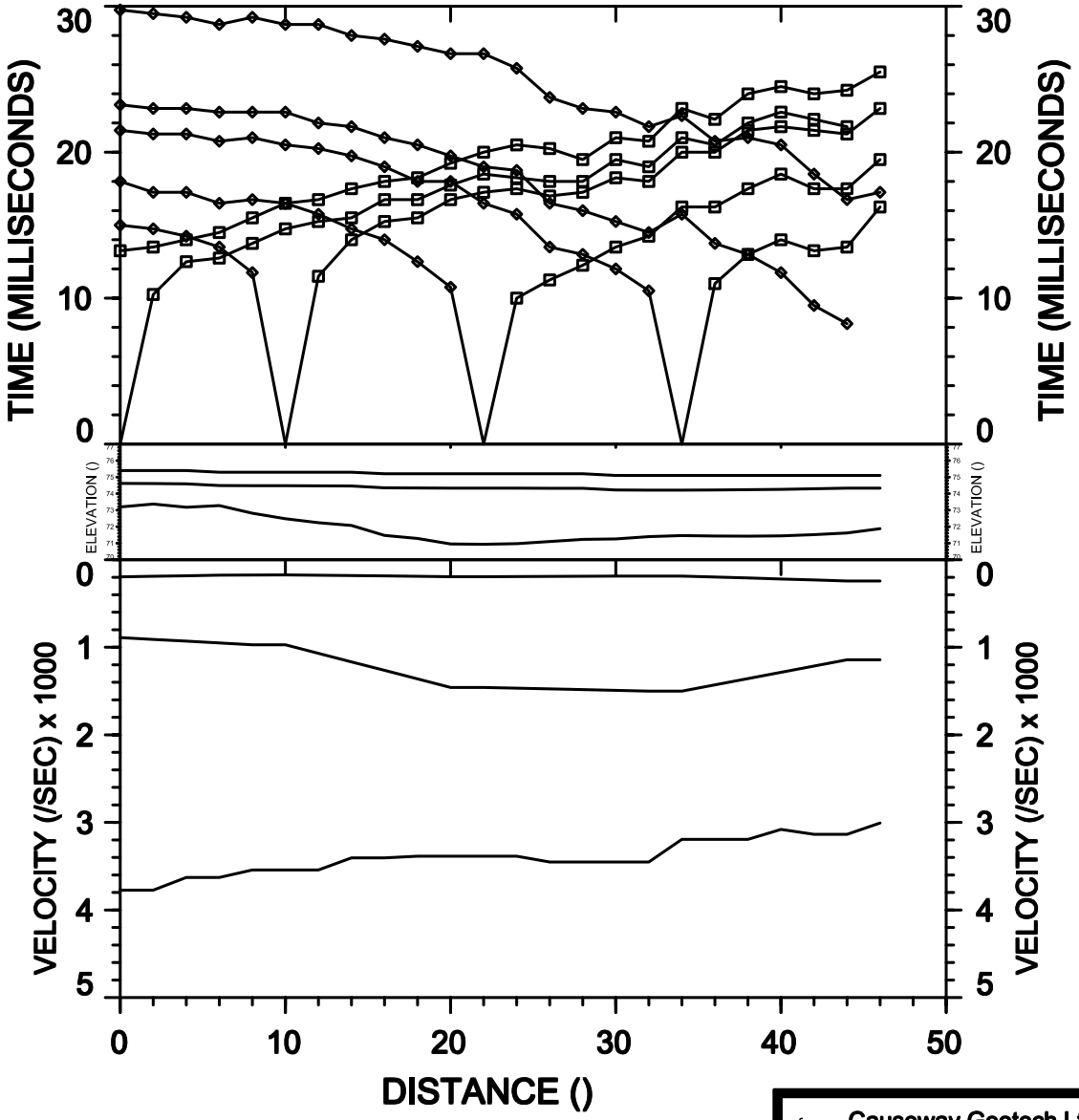


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS27R / Date: 26/05/22	
Equipment: Geode / Spread: S27	Azimuth:

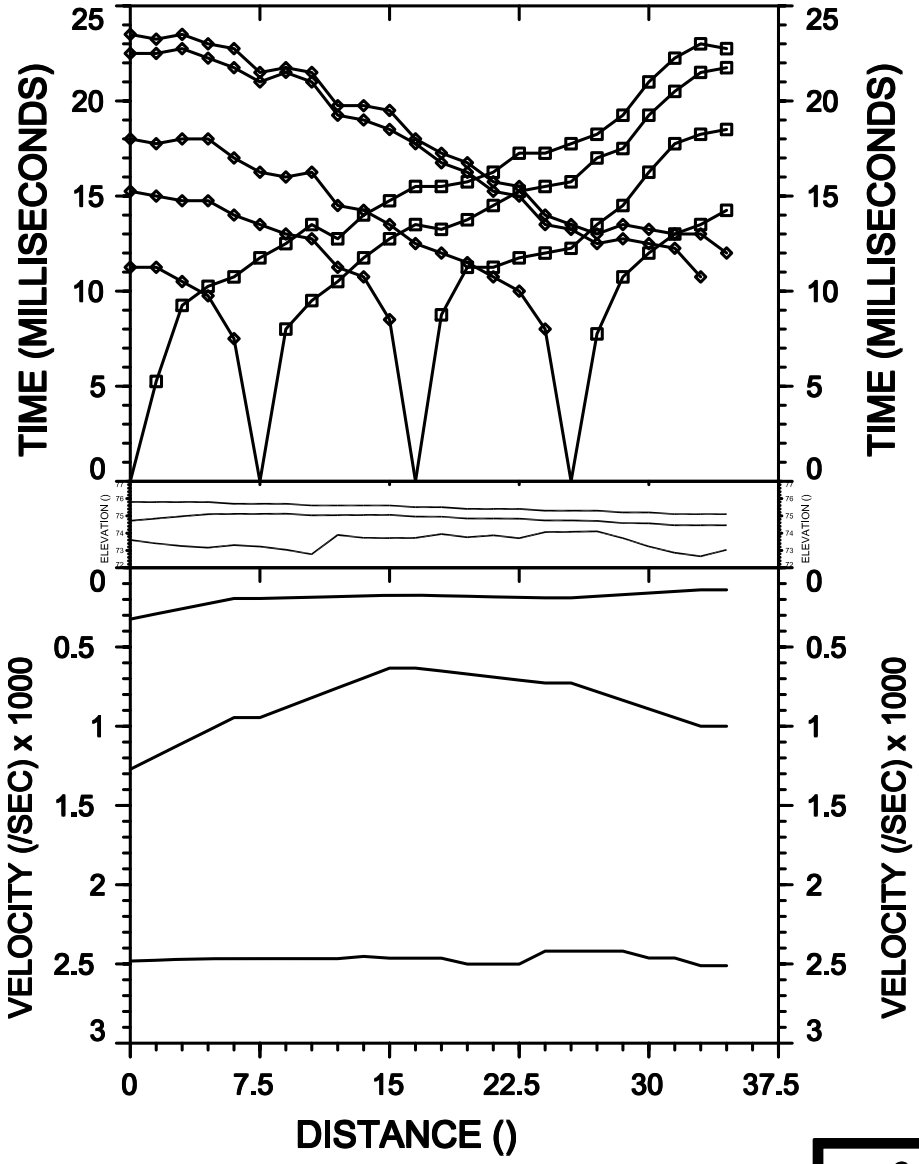


Plate: 10a

for: Causeway Geotech Ltd		AGP21220
by: Strata Geophysical, Inc.		Tipperary Tipperary
Data SetS28	Date: 26/05/22	
Equipment: Geode	Spread: S28	Azimuth:

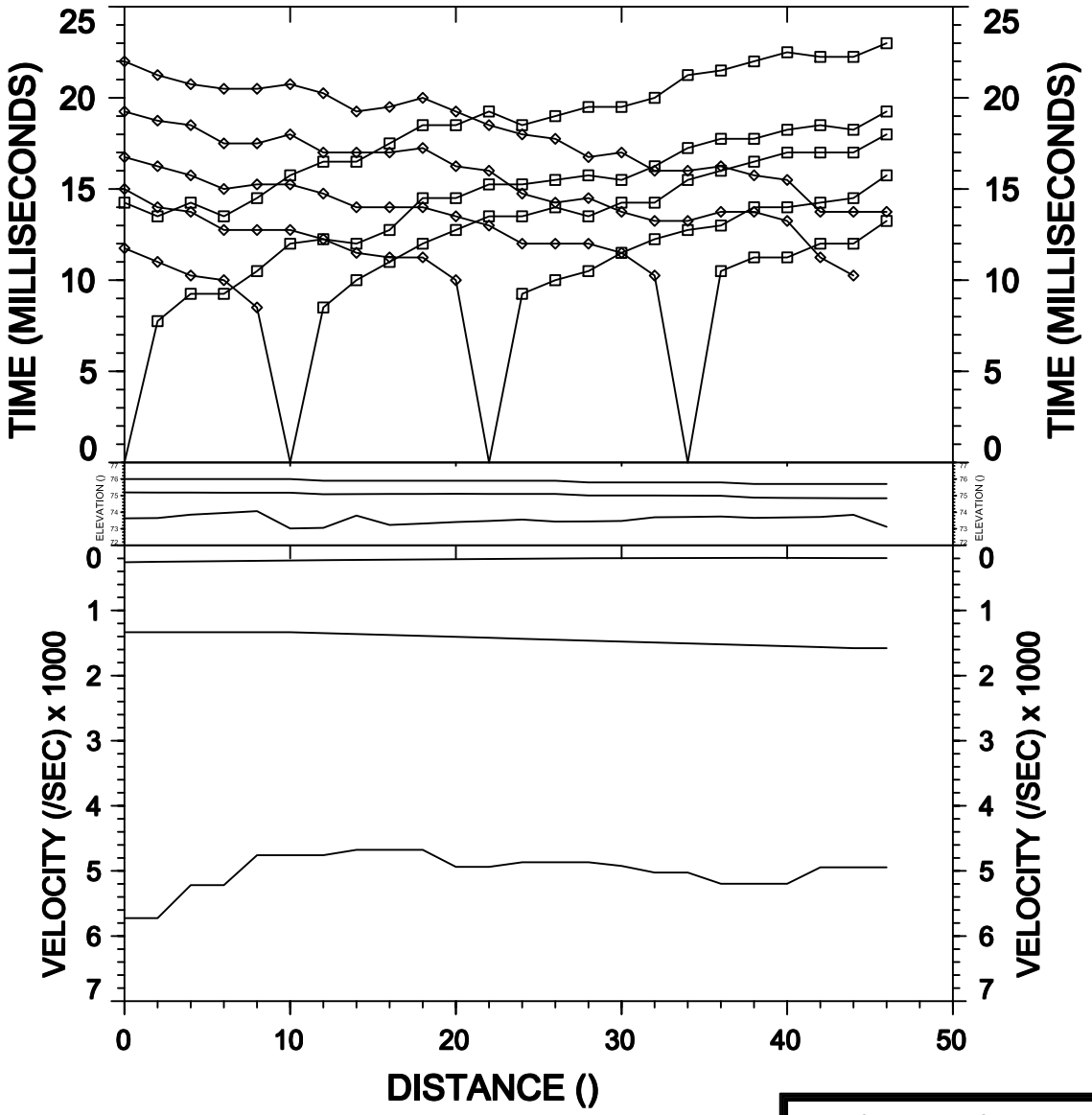


Plate: 10a

for: Causeway Geotech Ltd		AGP21220
by: Strata Geophysical, Inc.		Tipperary Tipperary
Data SetS29R	Date: 27/05/22	
Equipment: Geode	Spread: S29	Azimuth:

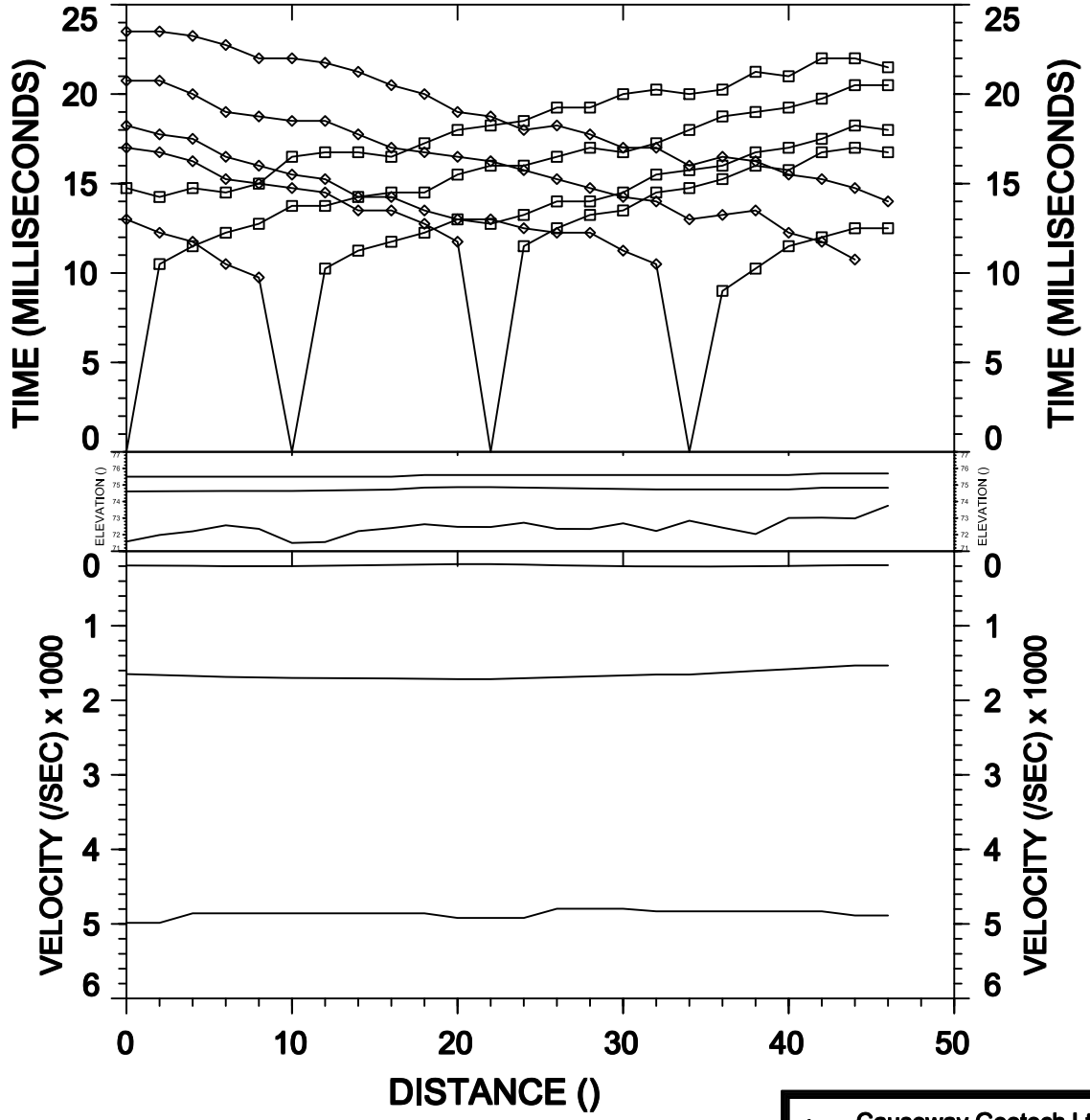


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS30R / Date: 27/05/22	
Equipment: Geode / Spread: S30	Azimuth:

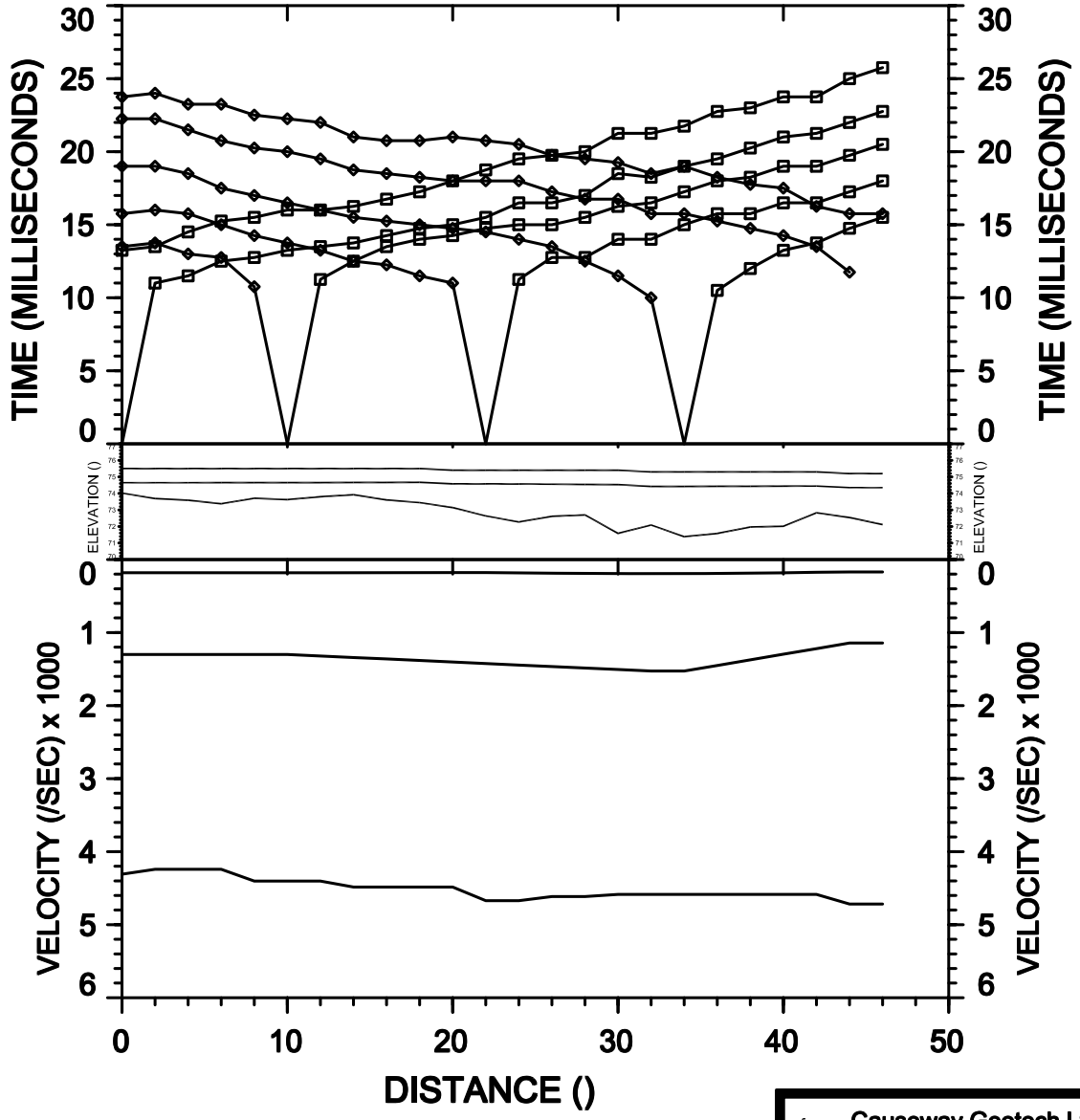


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS31 / Date: 27/05/22	
Equipment: Geode / Spread: S31	Azimuth:

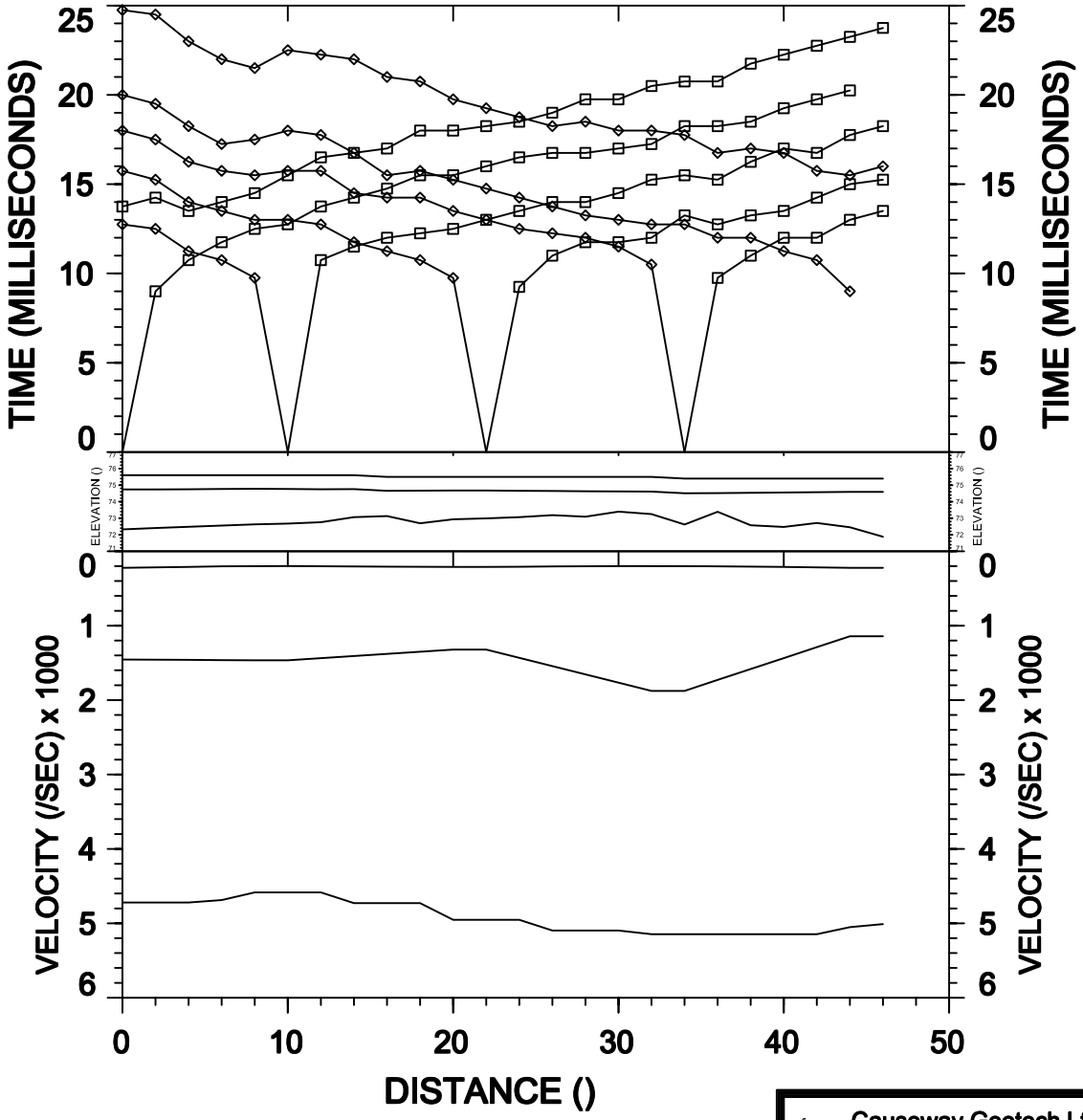


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS32R / Date: 27/05/22	
Equipment: Geode / Spread: S32	Azimuth:

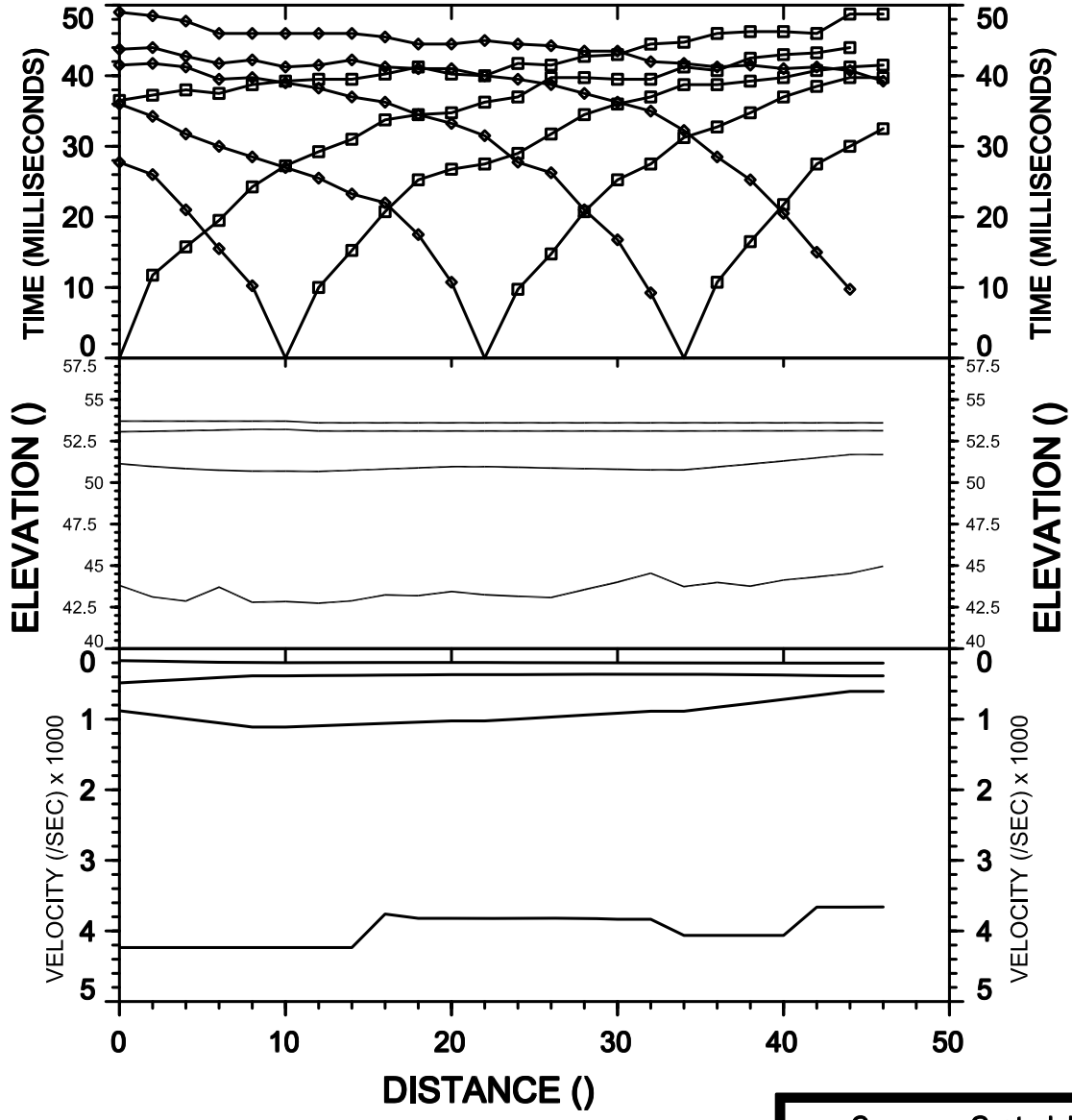


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS33 / Date: 27/05/22	
Equipment: Geode / Spread: S33	Azimuth:

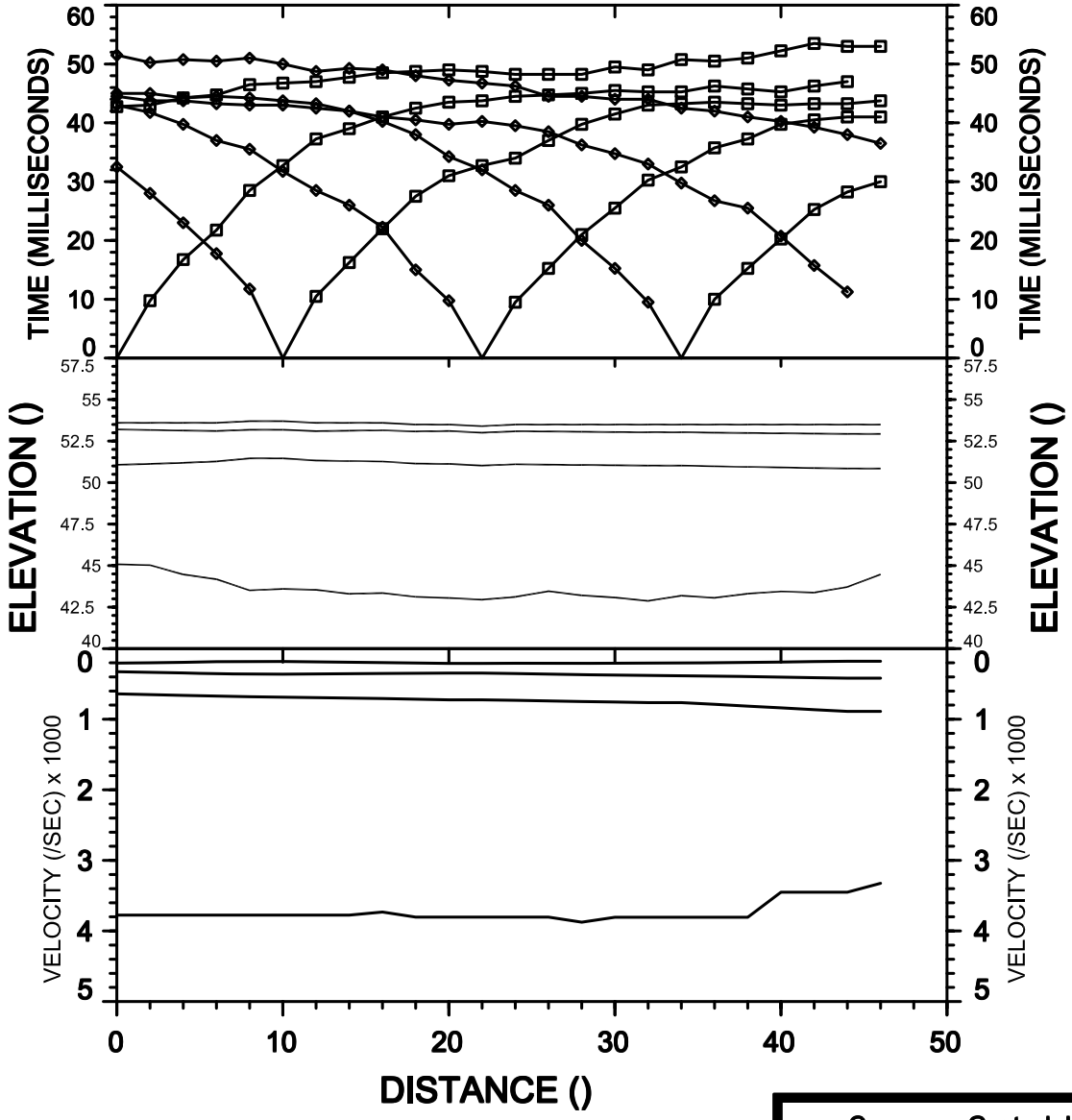


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS34 / Date: 27/05/22	
Equipment: Geode / Spread: S34	Azimuth:

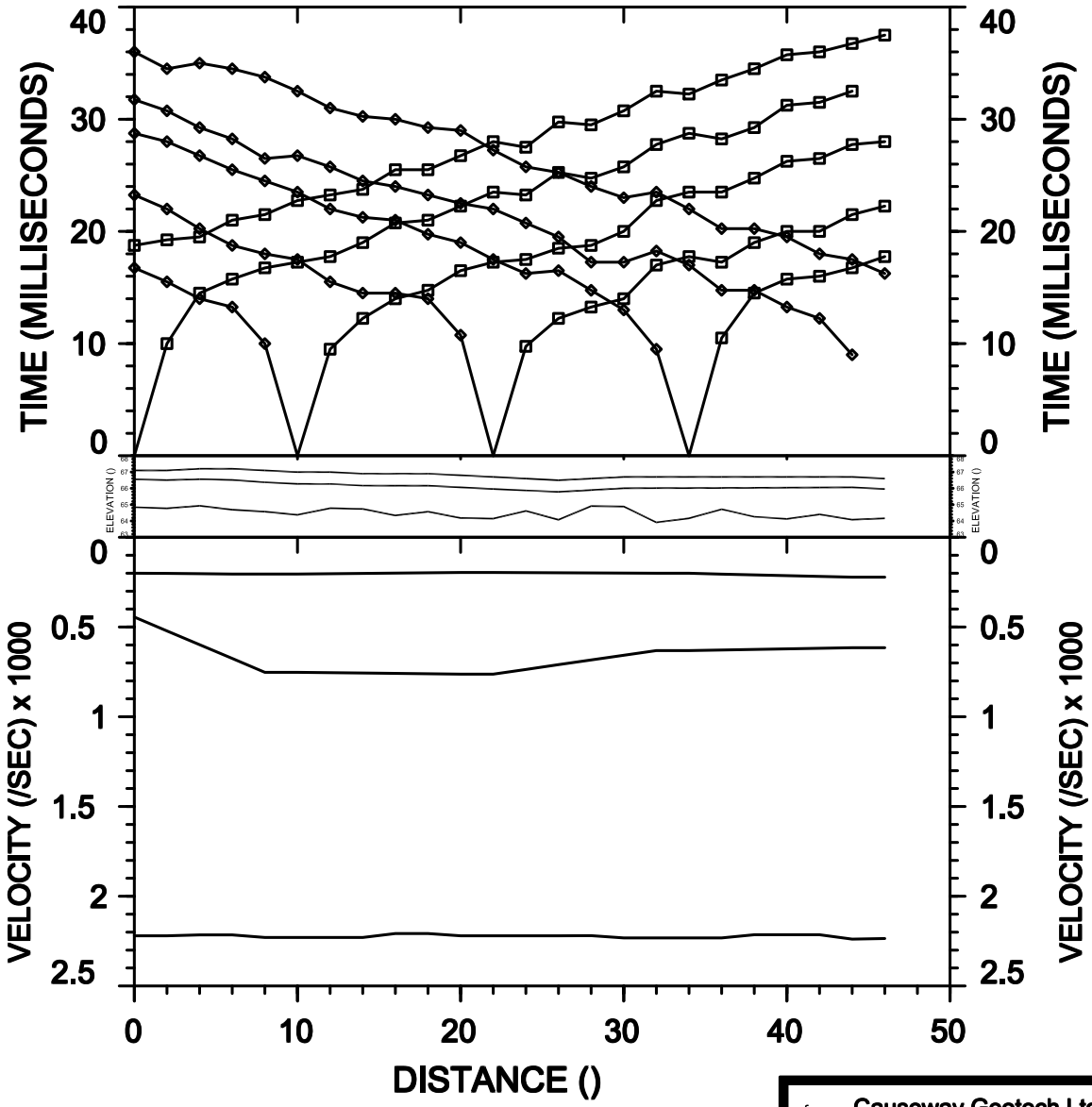


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS35 / Date: 31/05/22	
Equipment: Geode / Spread: S35	Azimuth:

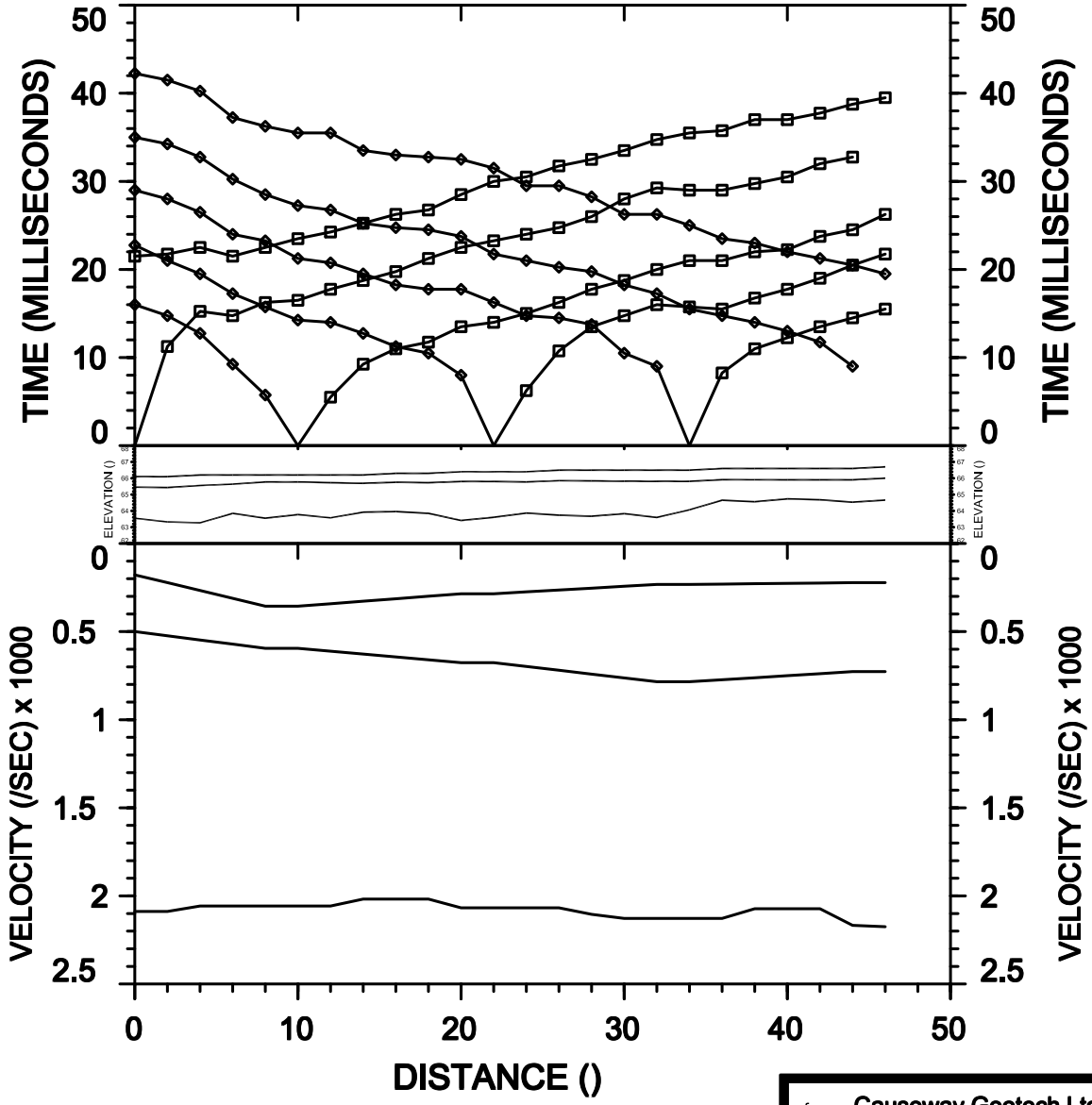


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS36 / Date: 31/05/22	
Equipment: Geode / Spread: S36	Azimuth:

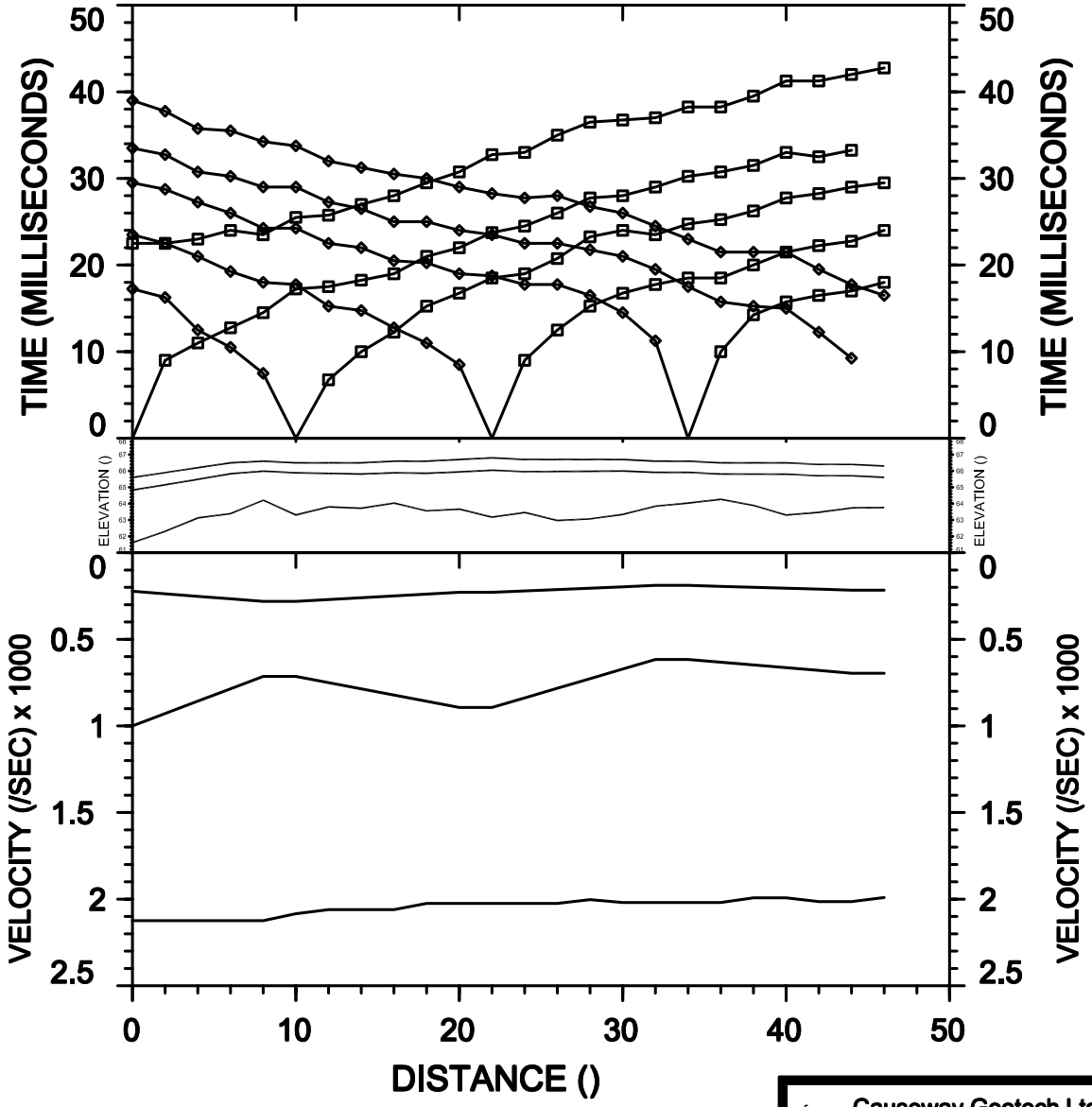


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS37 / Date: 31/05/22	
Equipment: Geode / Spread: S37	Azimuth:

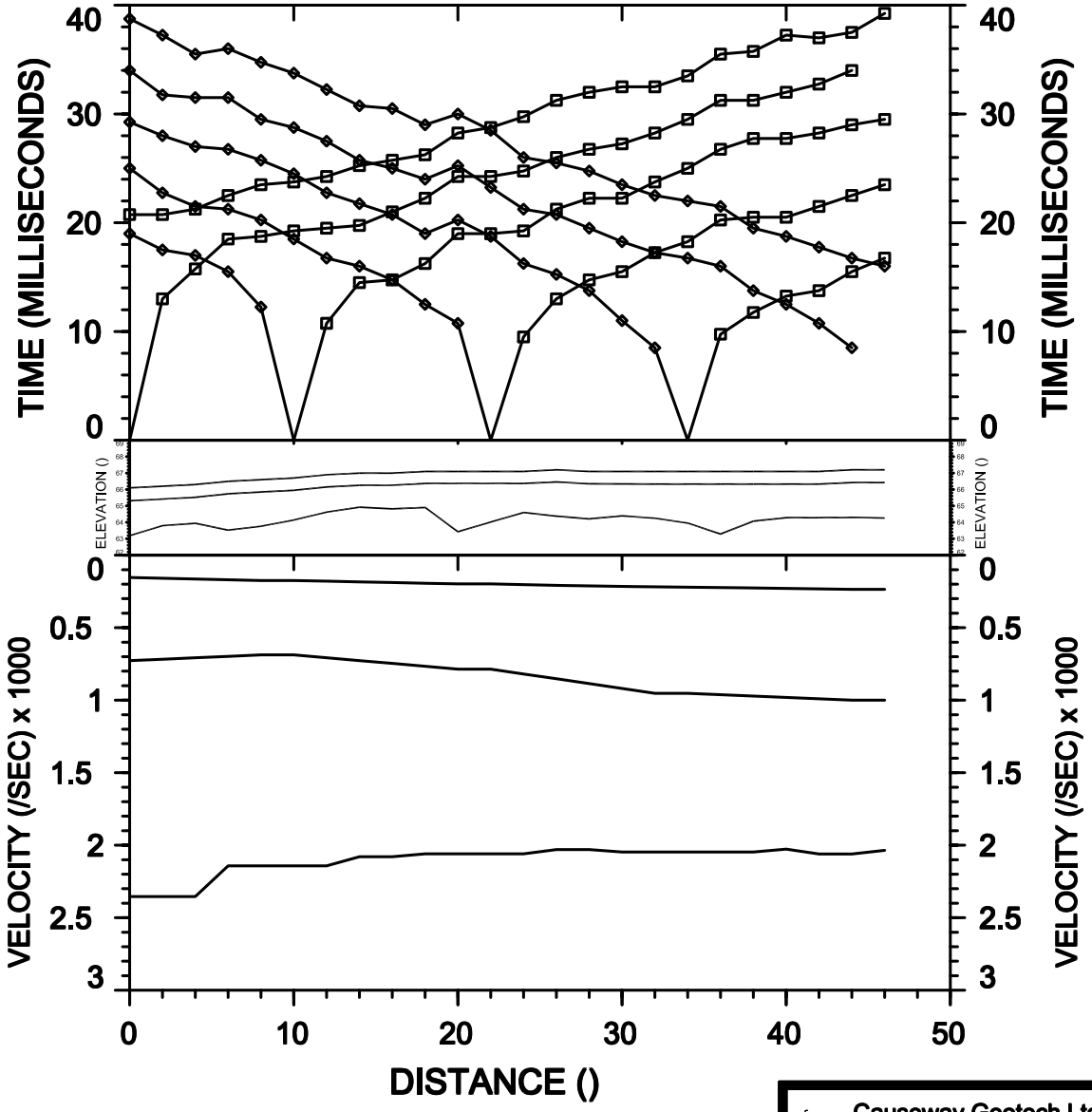


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS38 / Date: 31/05/22	
Equipment: Geode / Spread: S38	Azimuth:

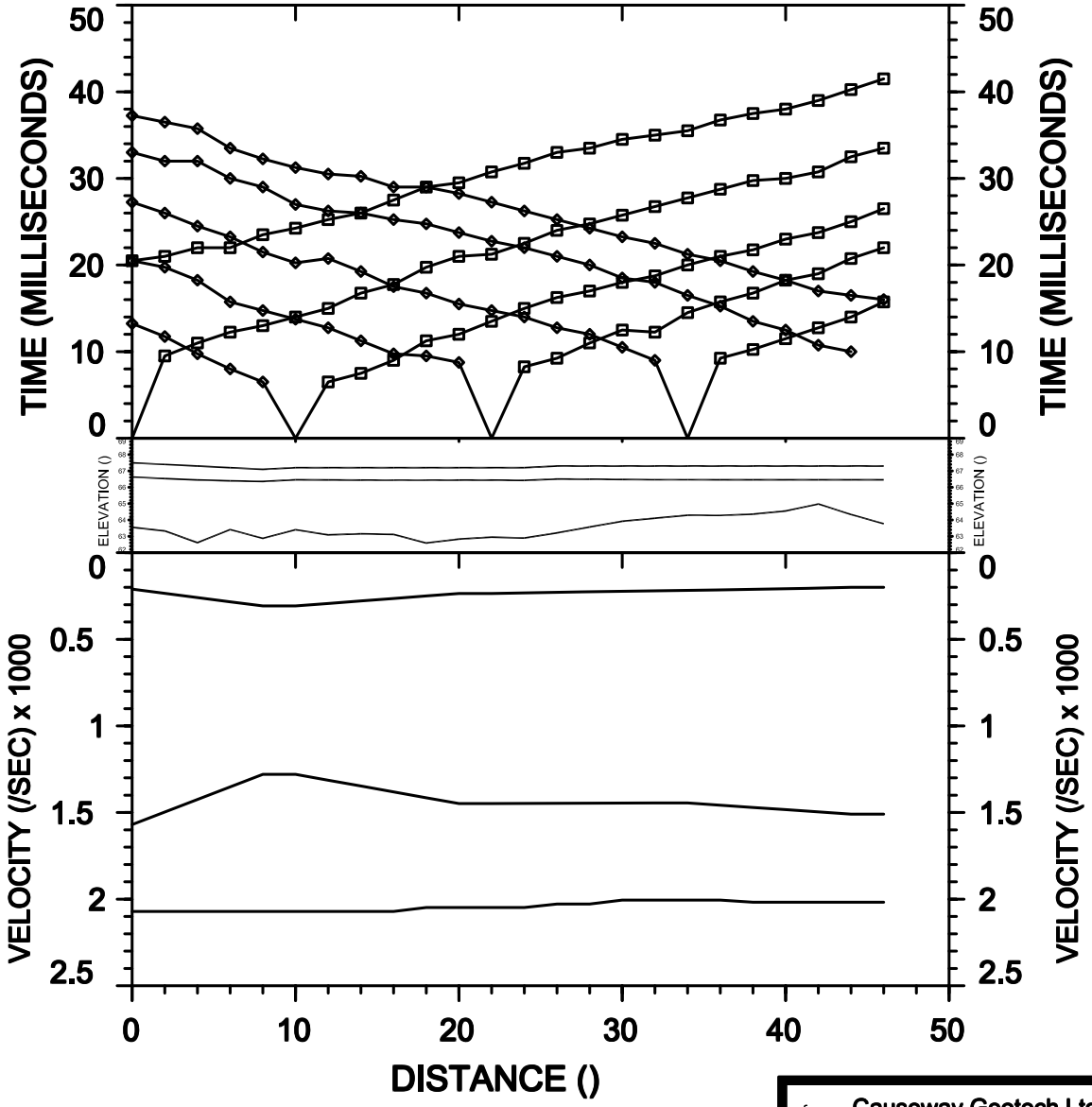


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS39 / Date: 31/05/22	
Equipment: Geode / Spread: S39	Azimuth:

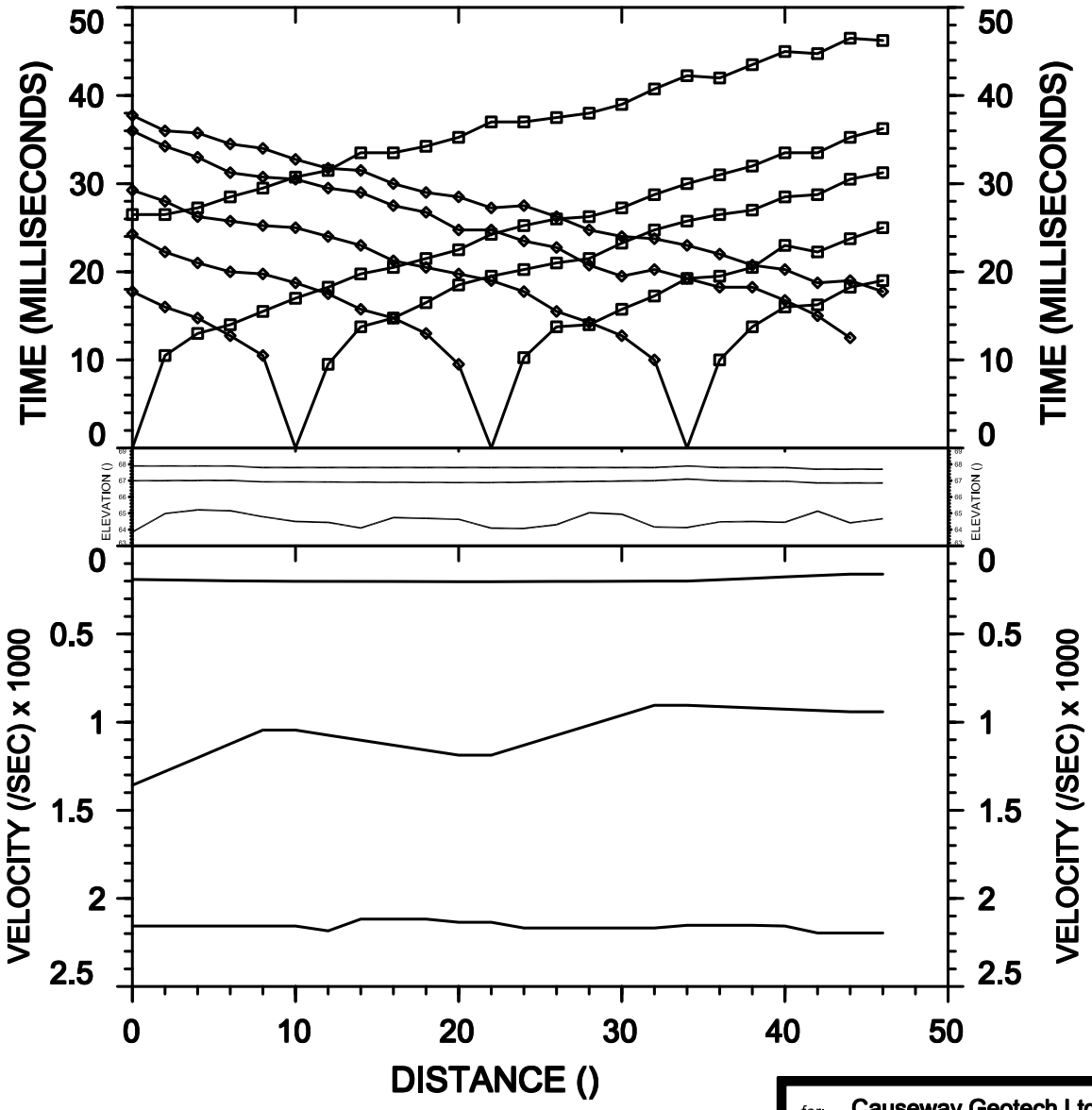


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS40 / Date: 31/05/22	
Equipment: Geode / Spread: S40	Azimuth:

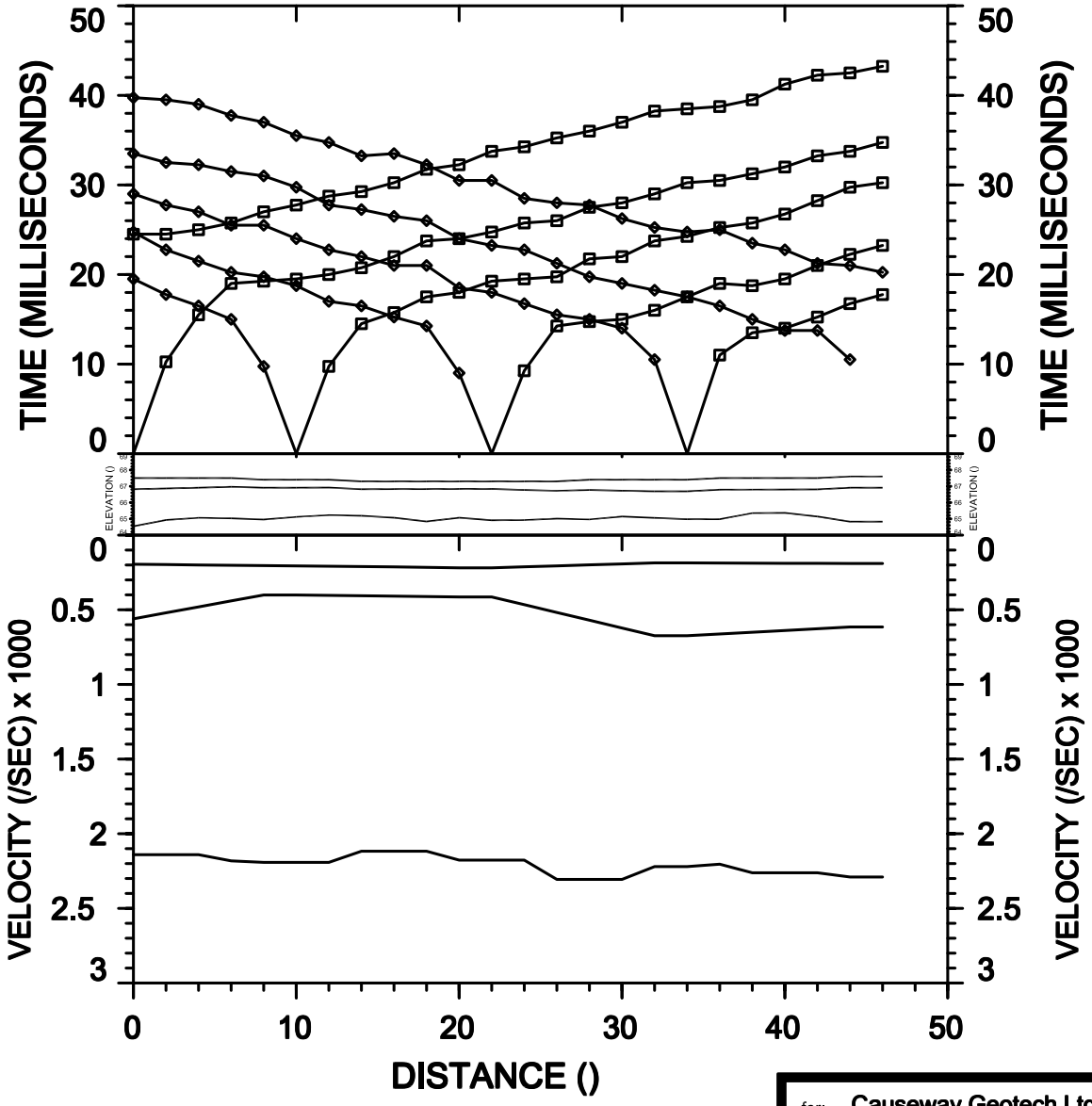


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS41 / Date: 31/05/22	
Equipment: Geode / Spread: S41	Azimuth:

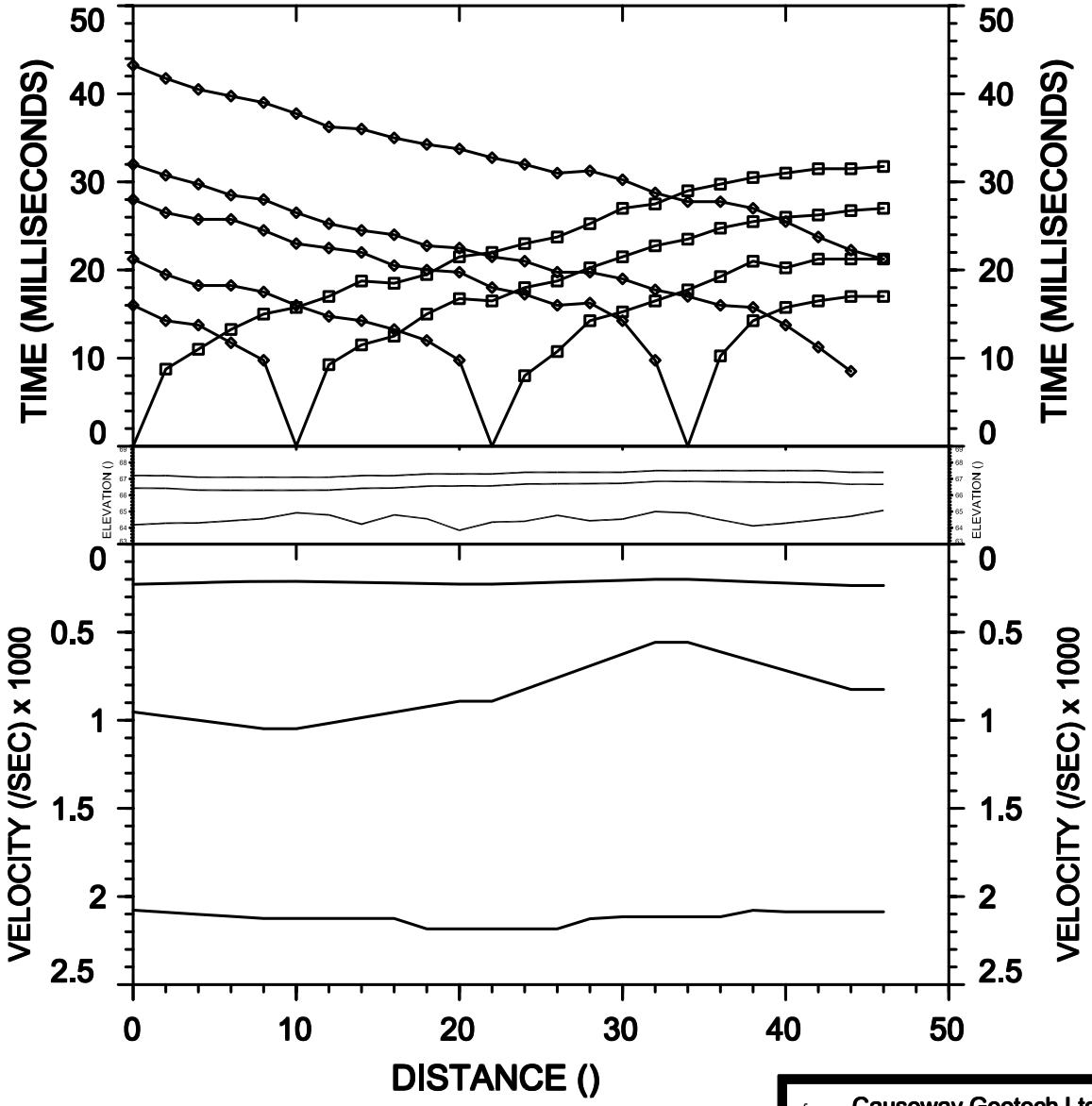


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS42 / Date: 31/05/22	
Equipment: Geode / Spread: S42	Azimuth:

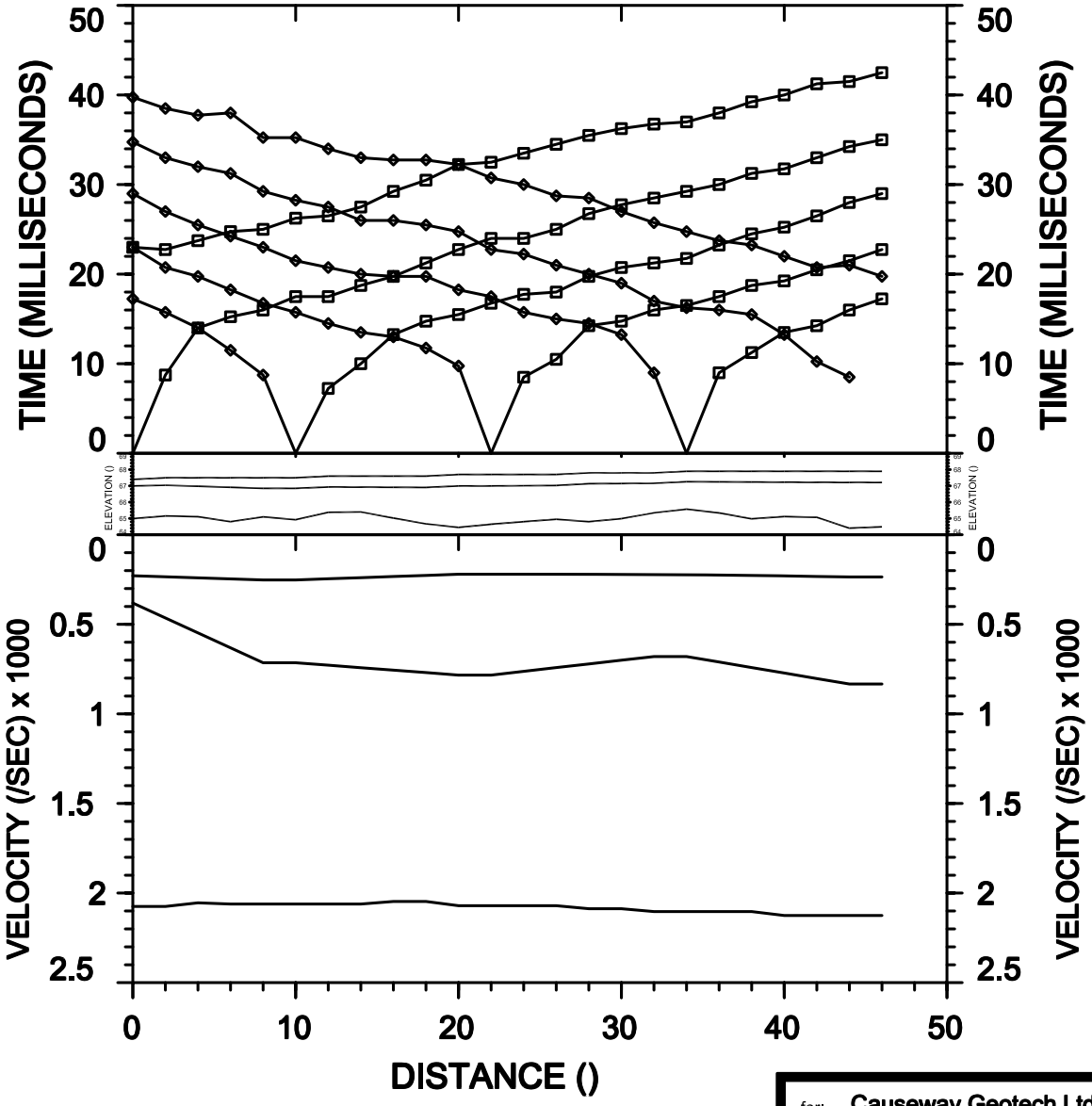


Plate: 10a

for: Causeway Geotech Ltd		AGP21220
by: Strata Geophysical, Inc.		Tipperary Tipperary
Data SetS43	Date: 31/05/22	
Equipment: Geode	Spread: S43	Azimuth:

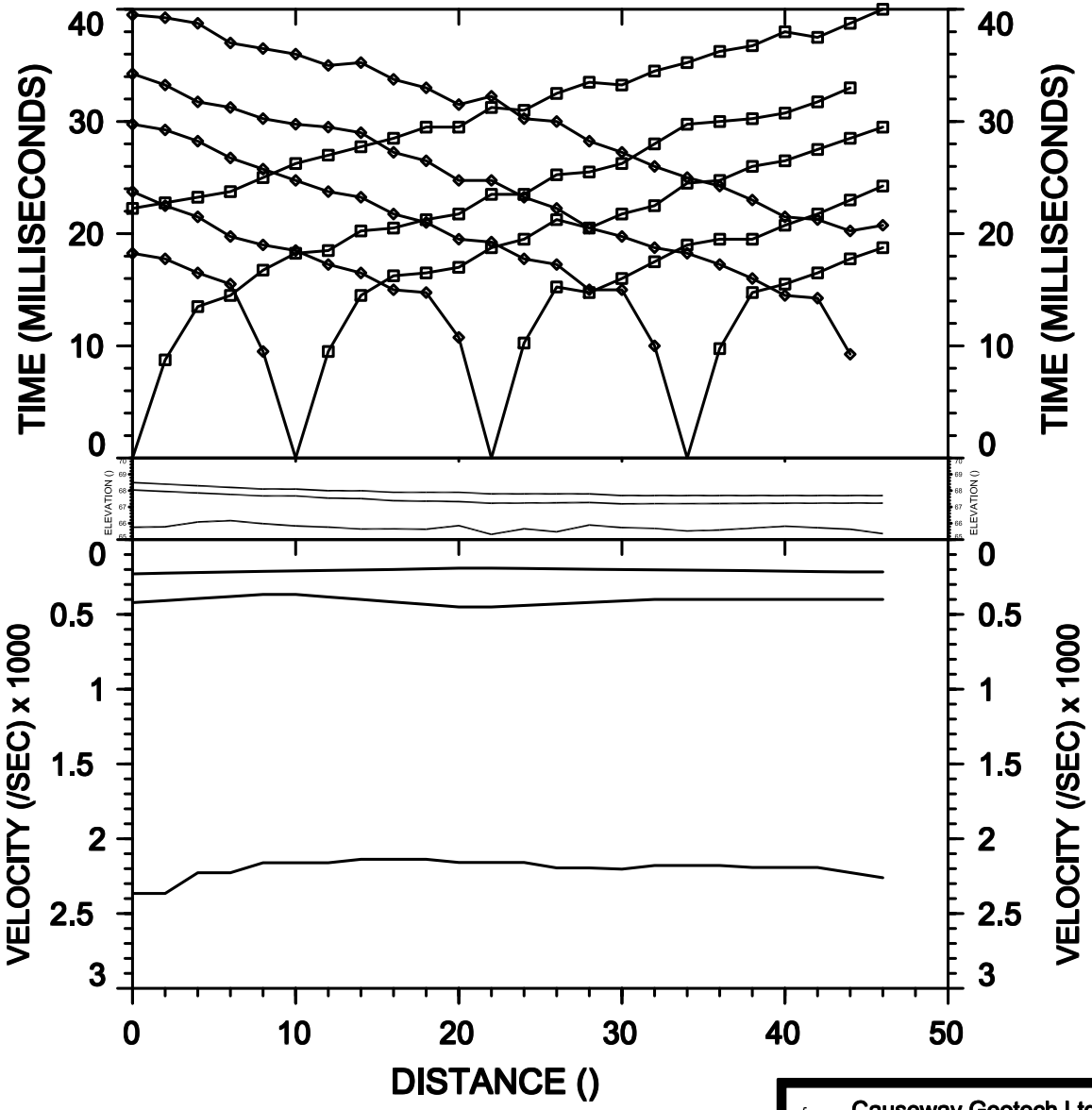


Plate: 10a

for: Causeway Geotech Ltd		AGP21220
by: Strata Geophysical, Inc.		Tipperary Tipperary
Data SetS44	Date: 01/06/22	
Equipment: Geode	Spread: S44	Azimuth:

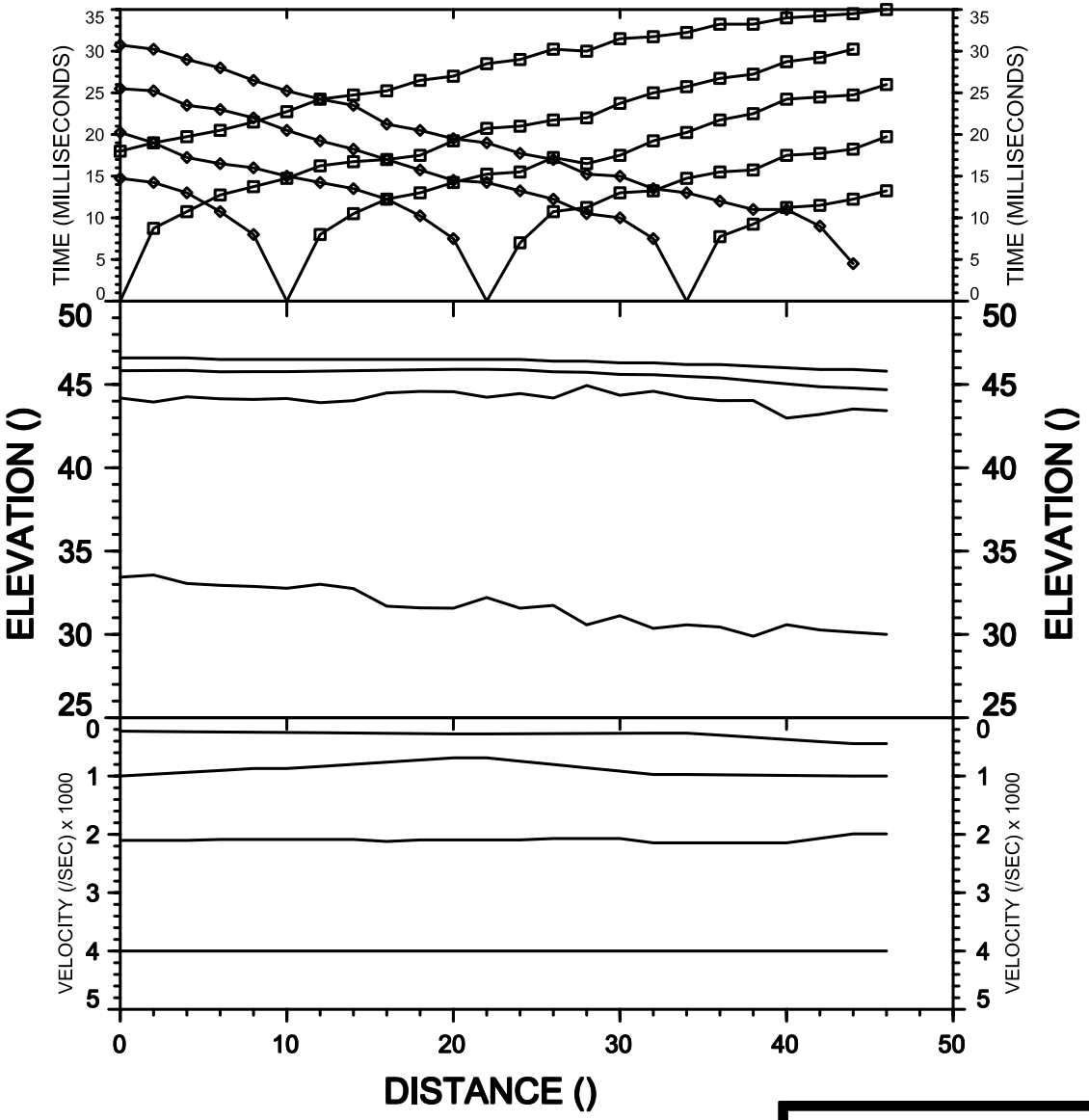


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS45R / Date: 01/06/22	
Equipment: Geode / Spread: S45	Azimuth:

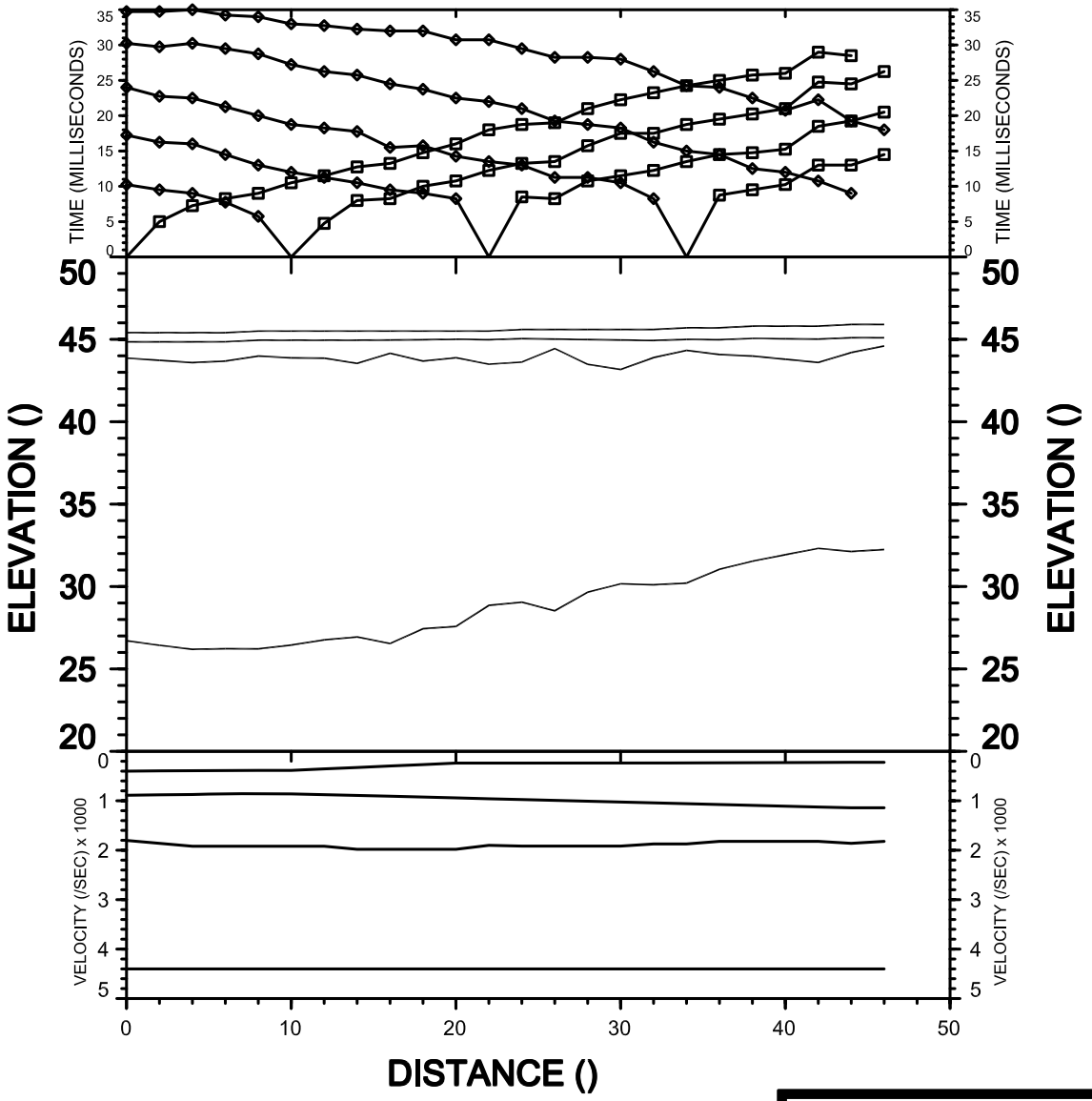


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS46 / Date: 01/06/22	
Equipment: Geode / Spread: S46	Azimuth:

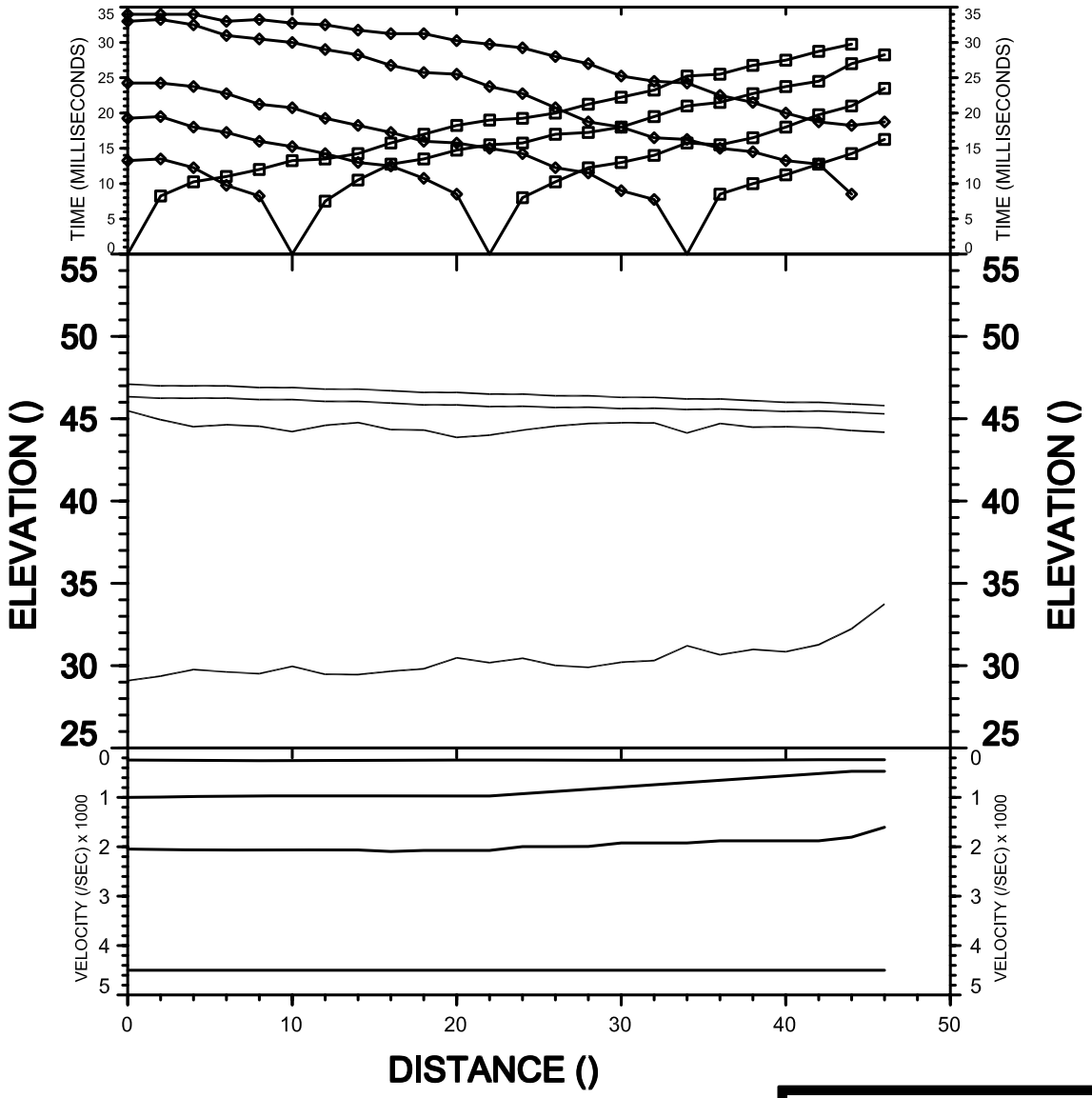


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS47 / Date: 01/06/22	
Equipment: Geode / Spread: S47	Azimuth:

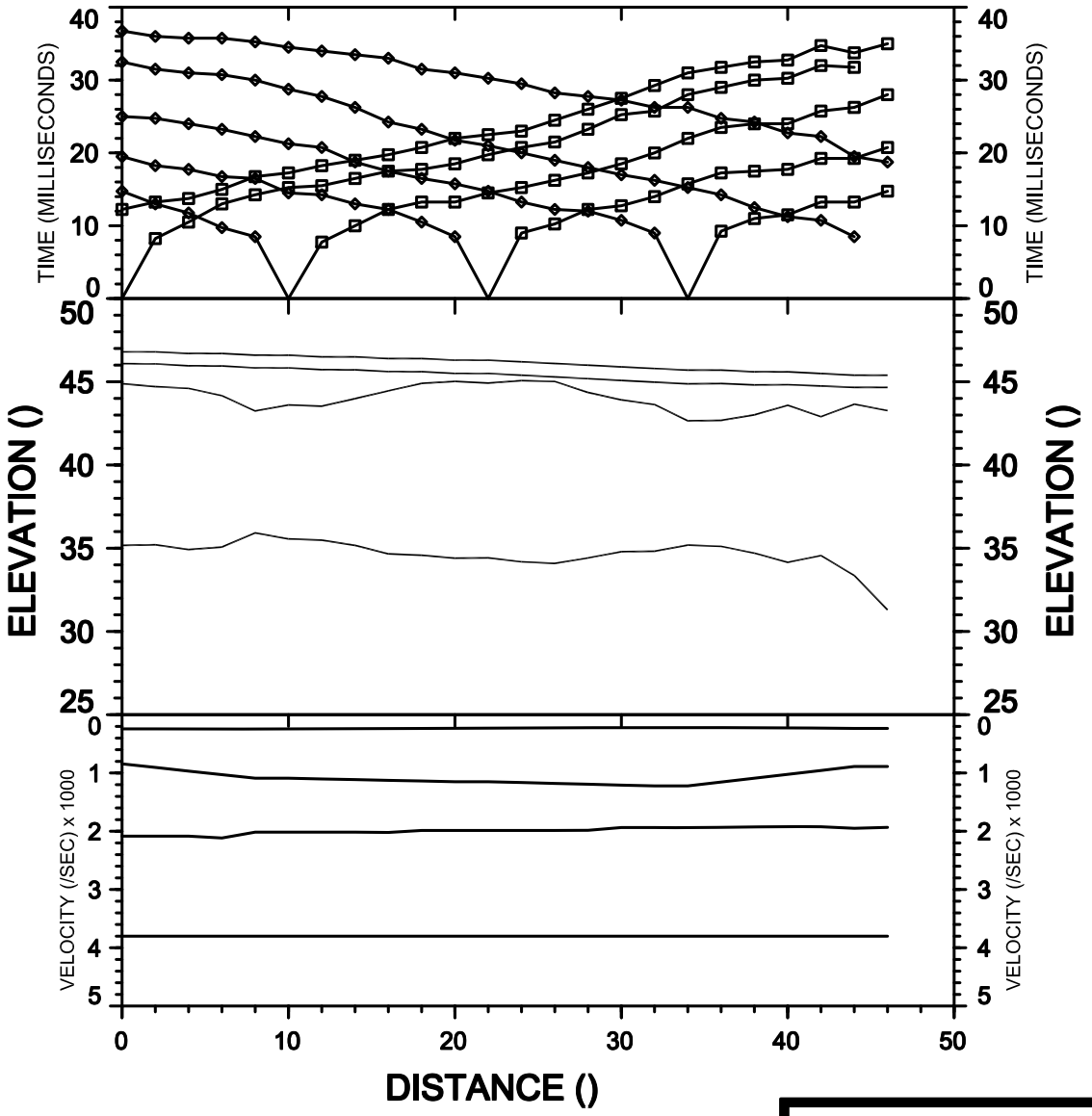


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS48 / Date: 01/06/22	
Equipment: Geode / Spread: S48	Azimuth:

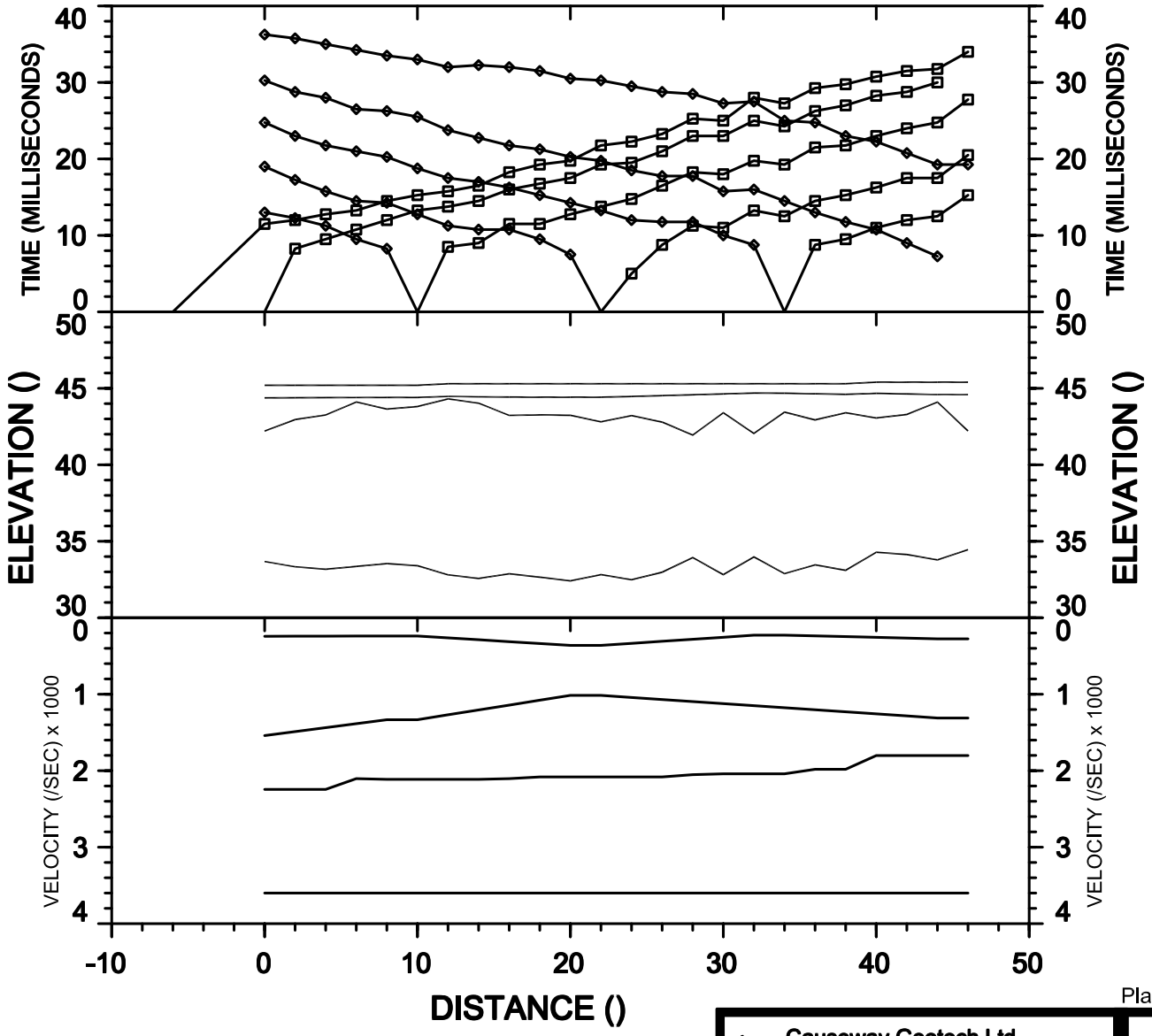


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS49 / Date: 01/06/22	
Equipment: Geode / Spread: S49	Azimuth:

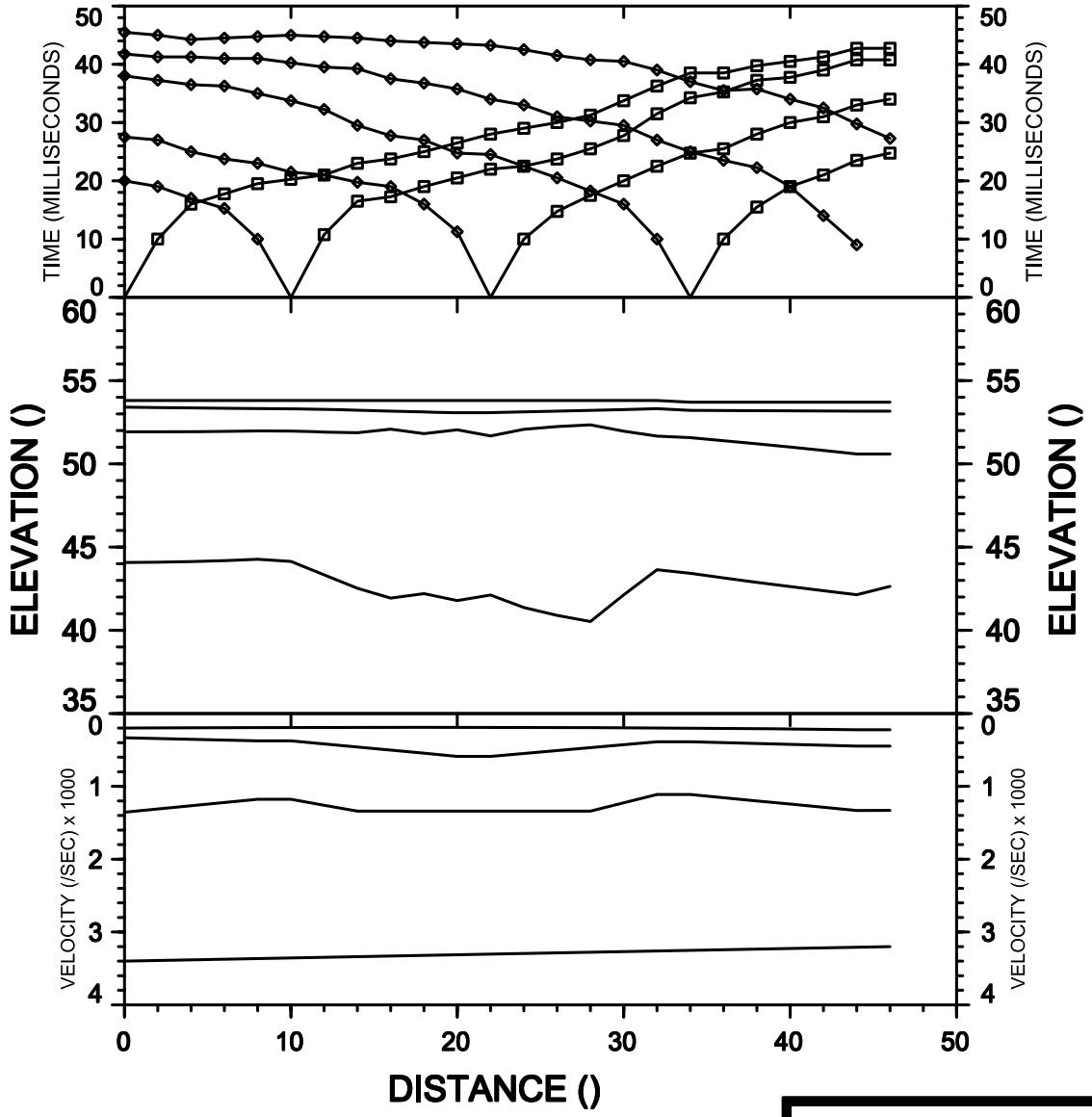


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS50R / Date: 01/06/22	
Equipment: Geode / Spread: S50	Azimuth:

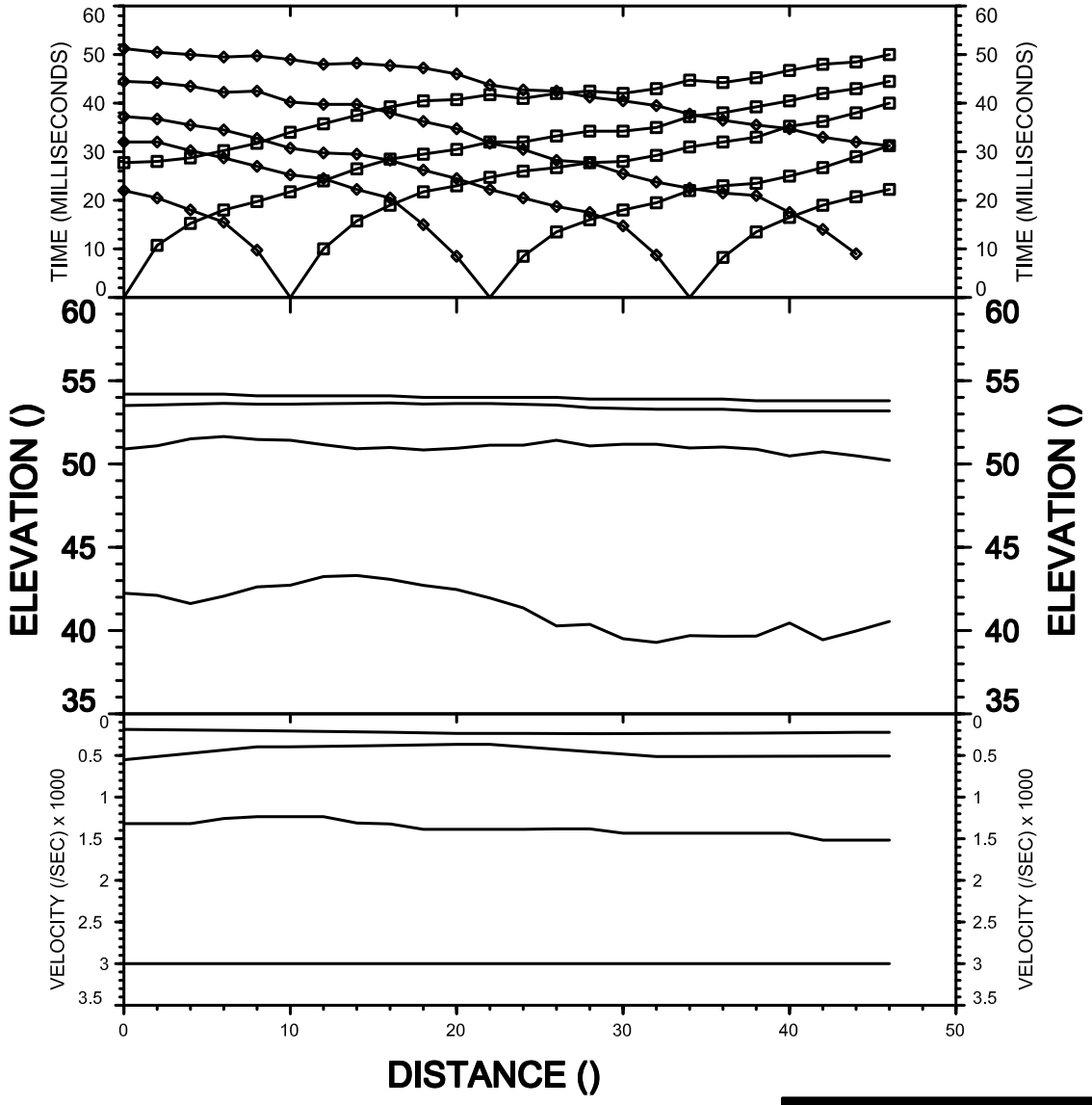


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS51R / Date: 01/06/22	
Equipment: Geode / Spread: S51	Azimuth:

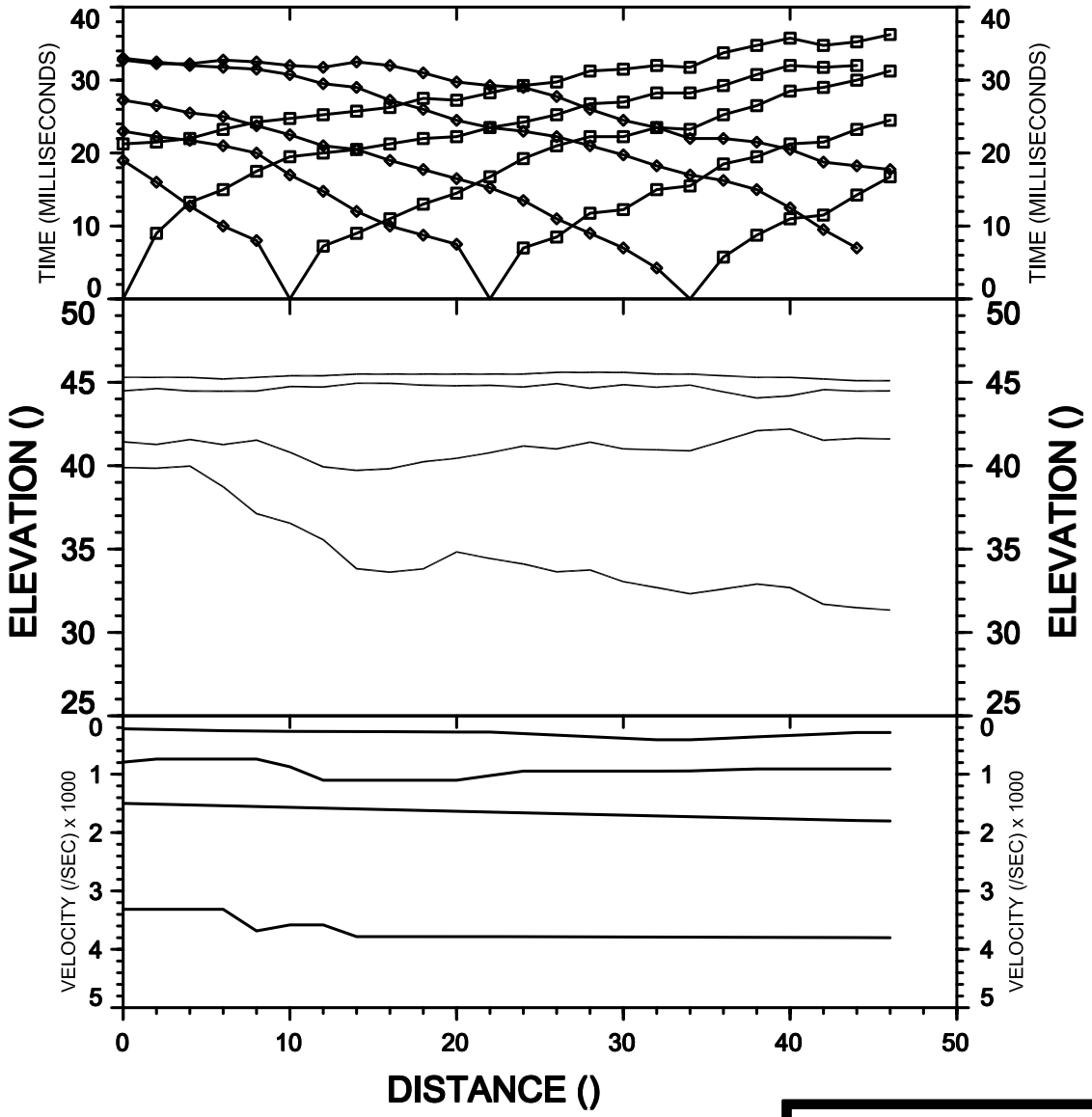


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS52 / Date: 02/06/22	
Equipment: Geode / Spread: S52	Azimuth:

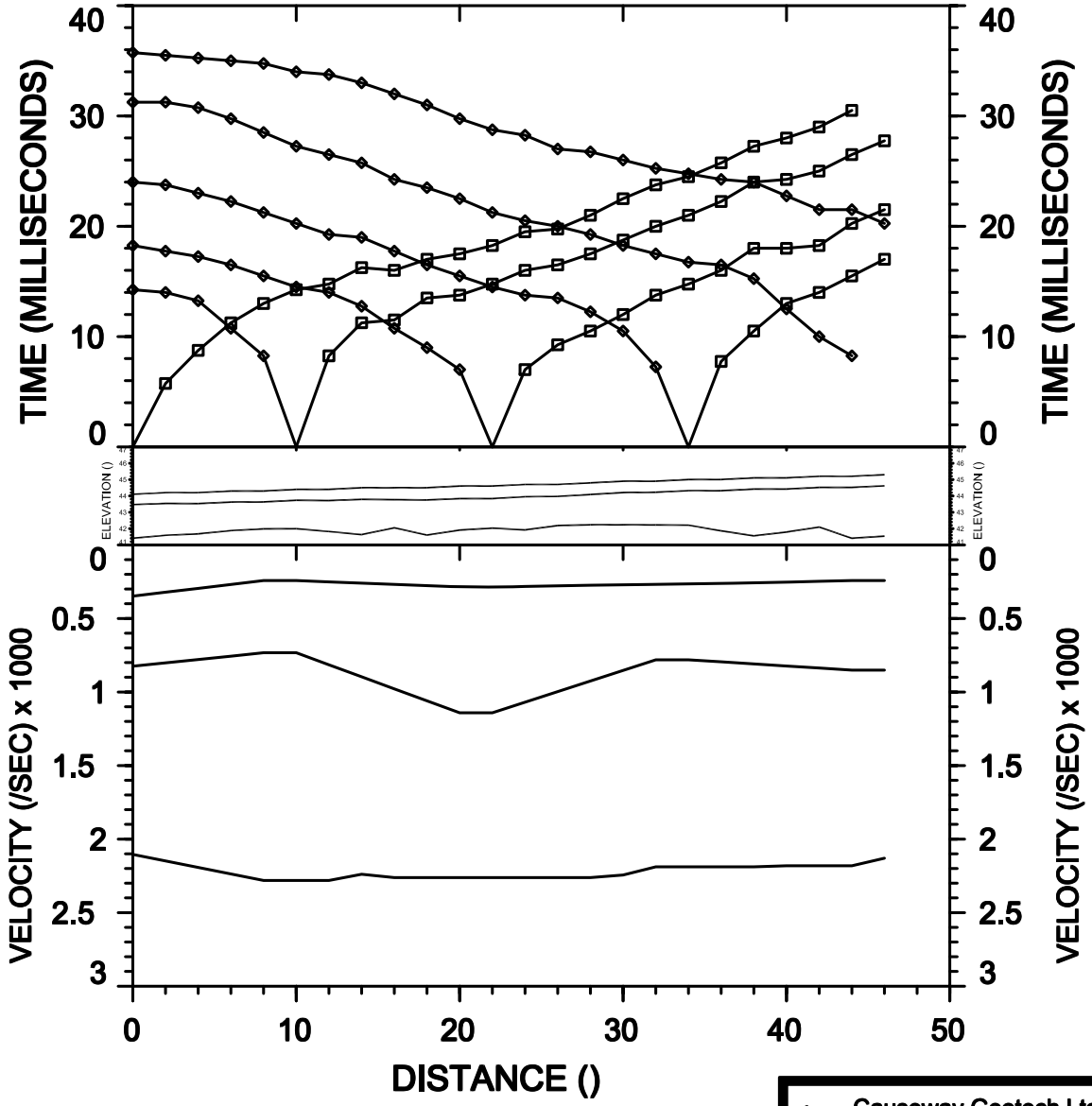


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS53 / Date: 02/06/22	
Equipment: Geode / Spread: S53	Azimuth:

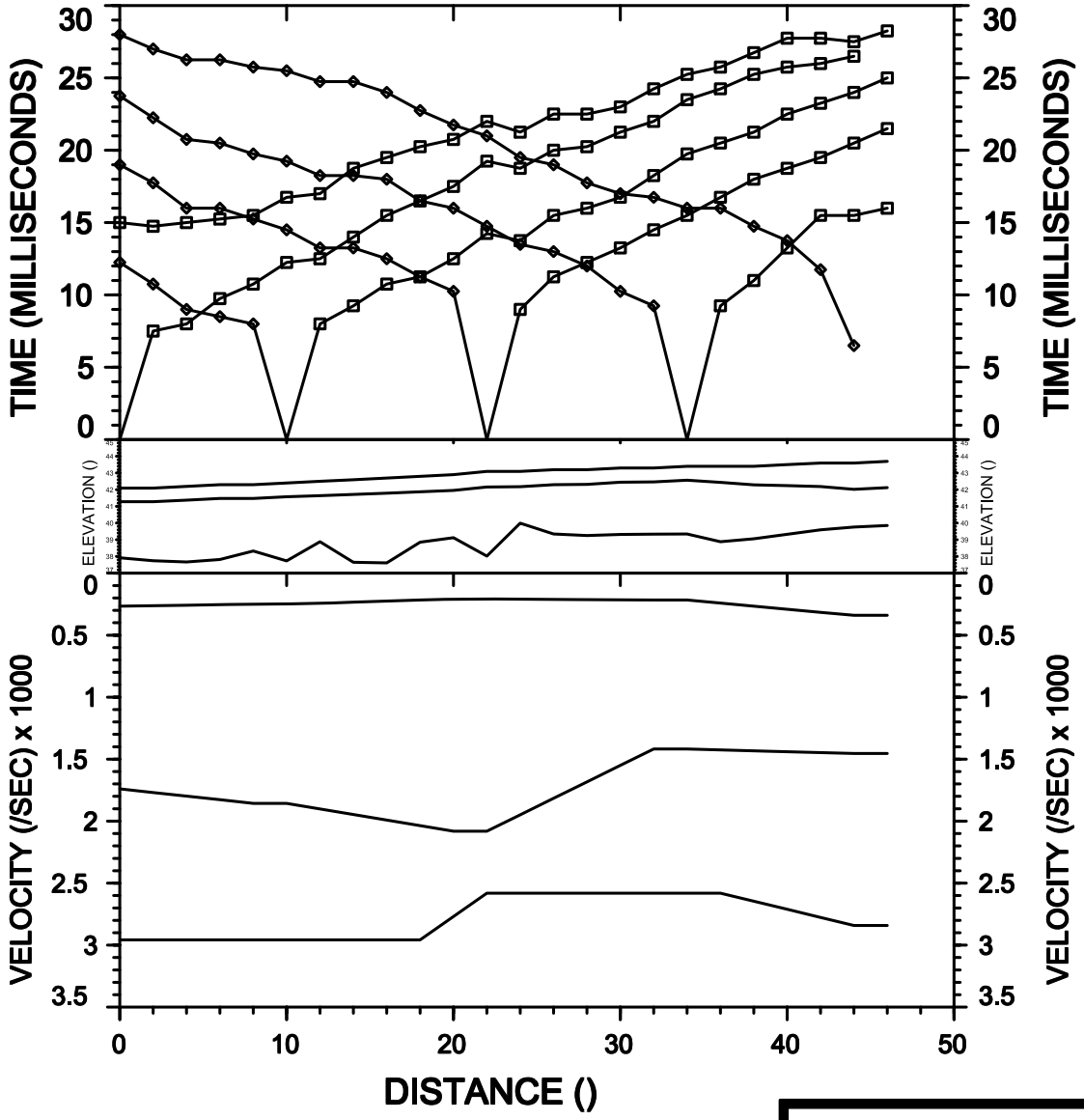


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS54R / Date: 02/06/22	
Equipment: Geode / Spread: S54	Azimuth:

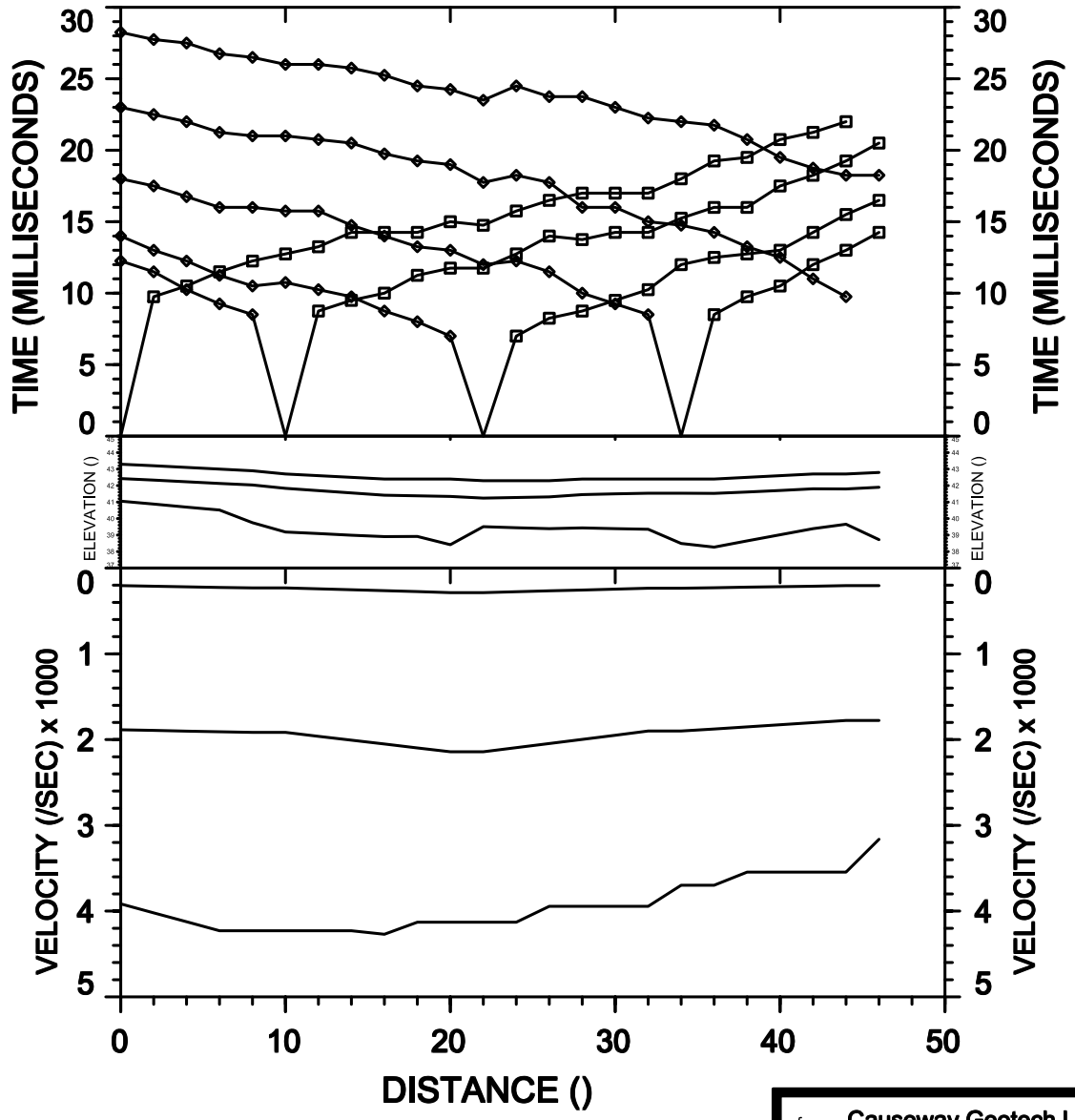


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS55R / Date: 02/06/22	
Equipment: Geode / Spread: S55	Azimuth:

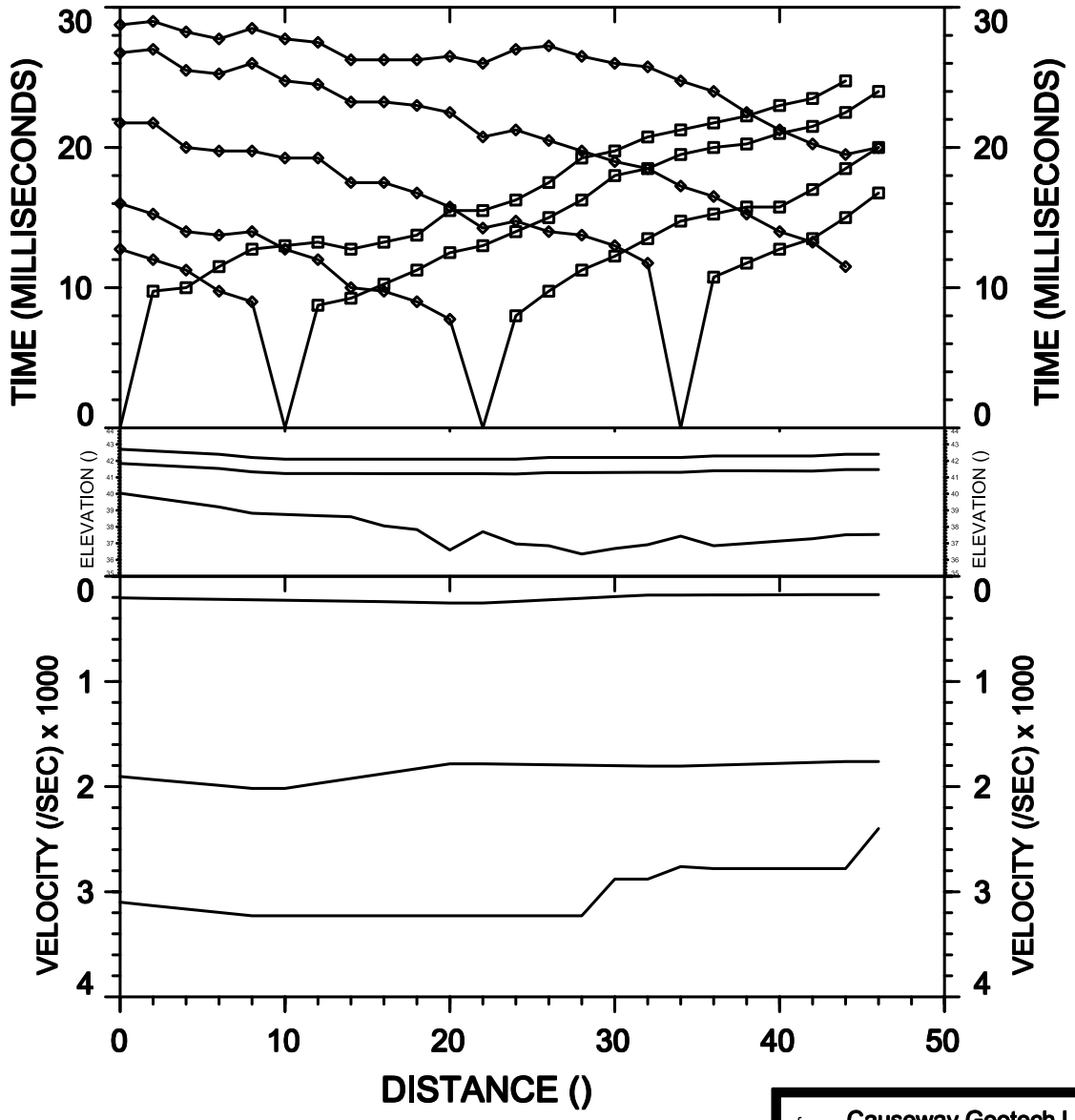


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS56R	Date: 02/06/22
Equipment: Geode	Spread: S56
	Azimuth:

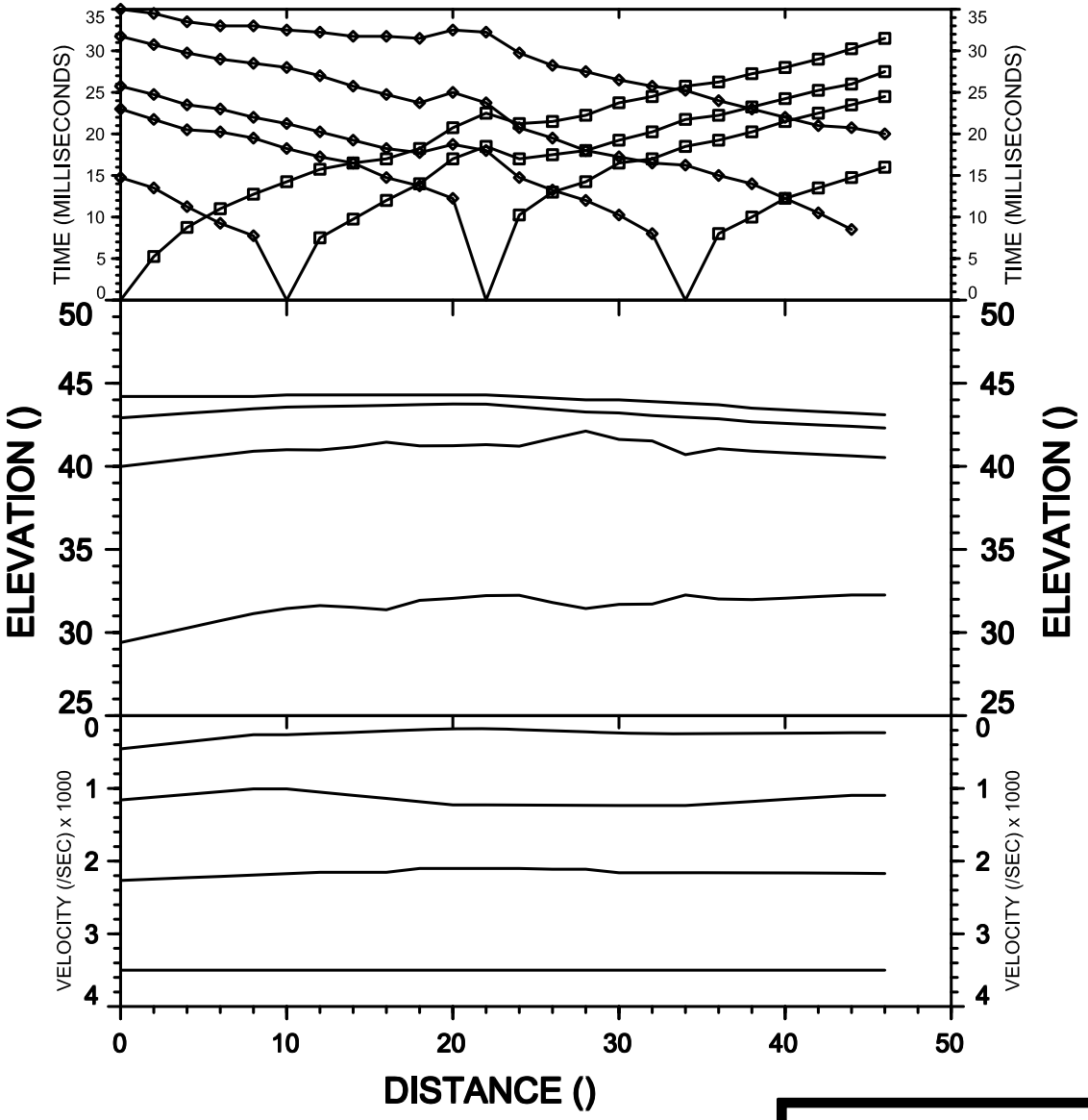


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS57R / Date: 02/06/22	
Equipment: Geode / Spread: S57	Azimuth:

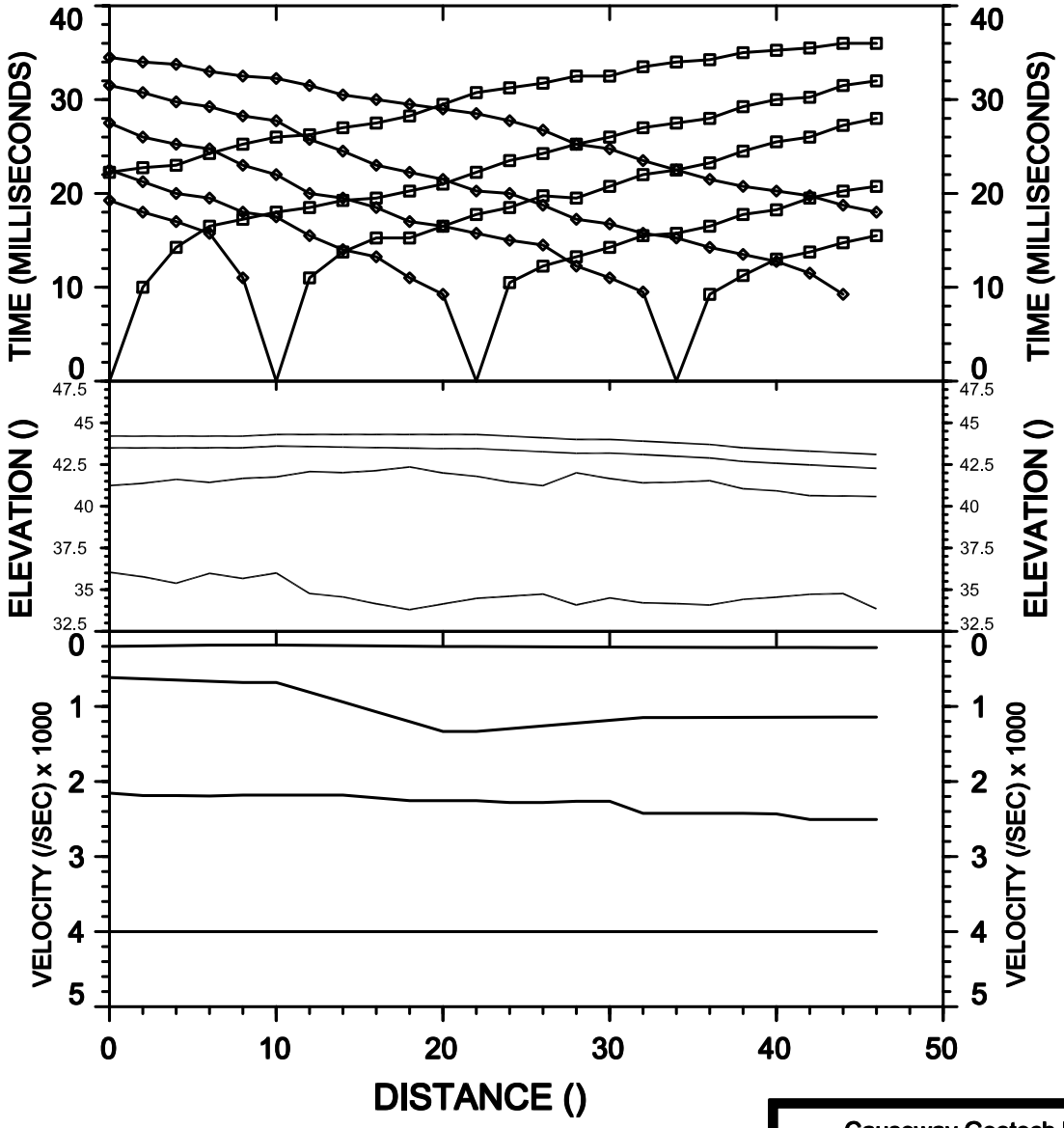


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS58 / Date: 02/06/22	
Equipment: Geode / Spread: S58	Azimuth:

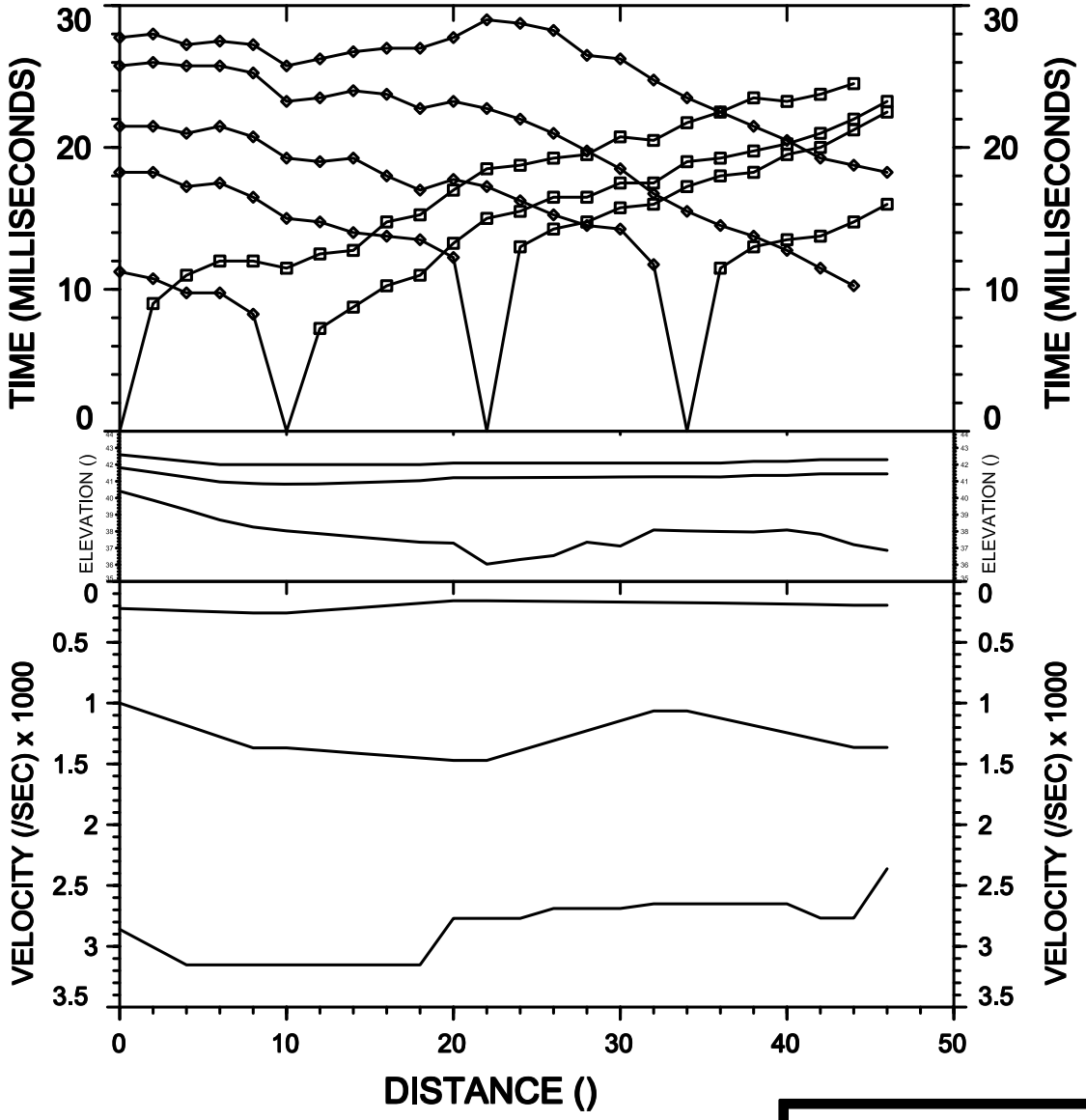


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS59R / Date: 02/06/22	
Equipment: Geode / Spread: S59	Azimuth:

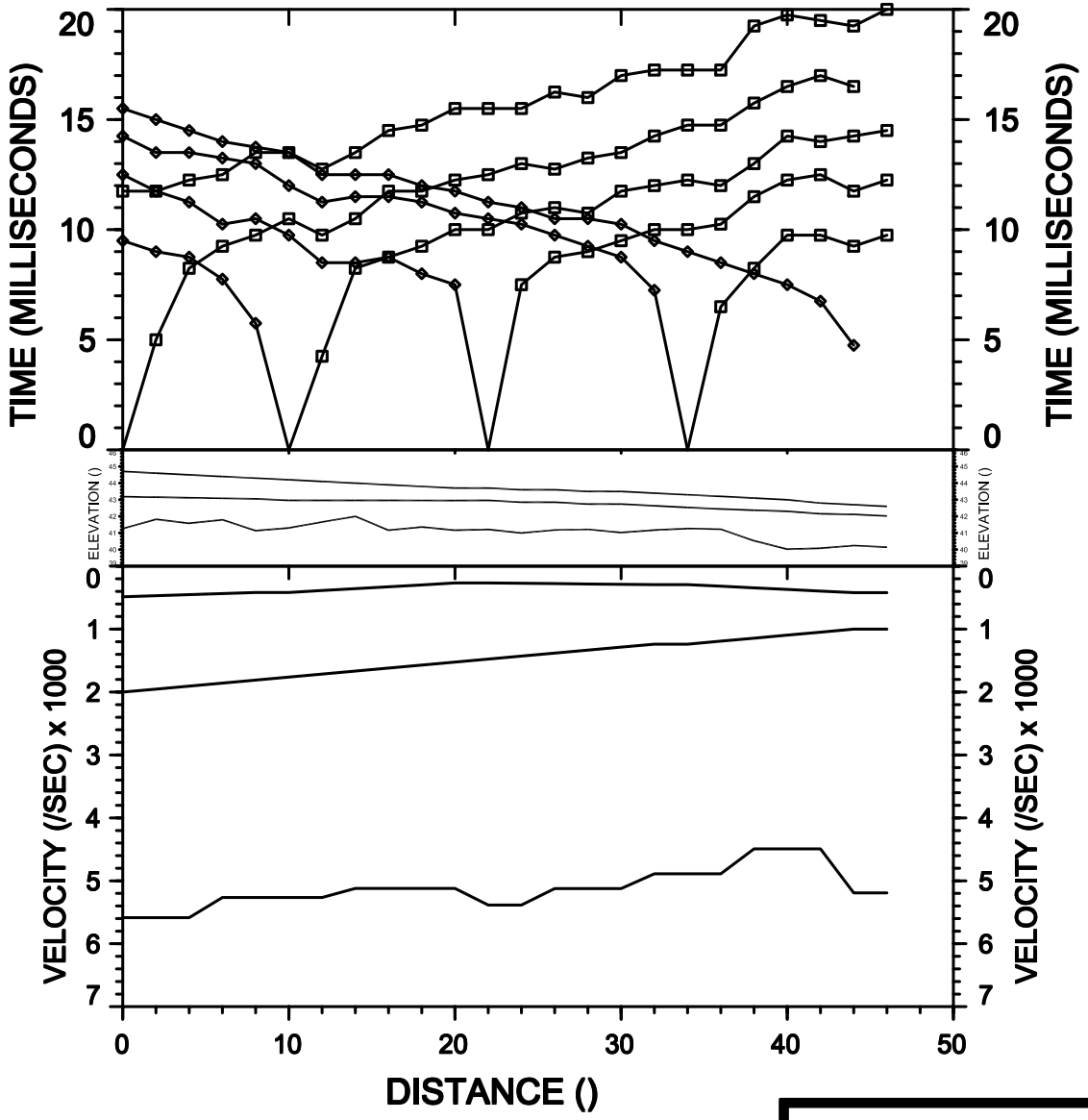


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS60 / Date: 02/06/22	
Equipment: Geode / Spread: S60	Azimuth:

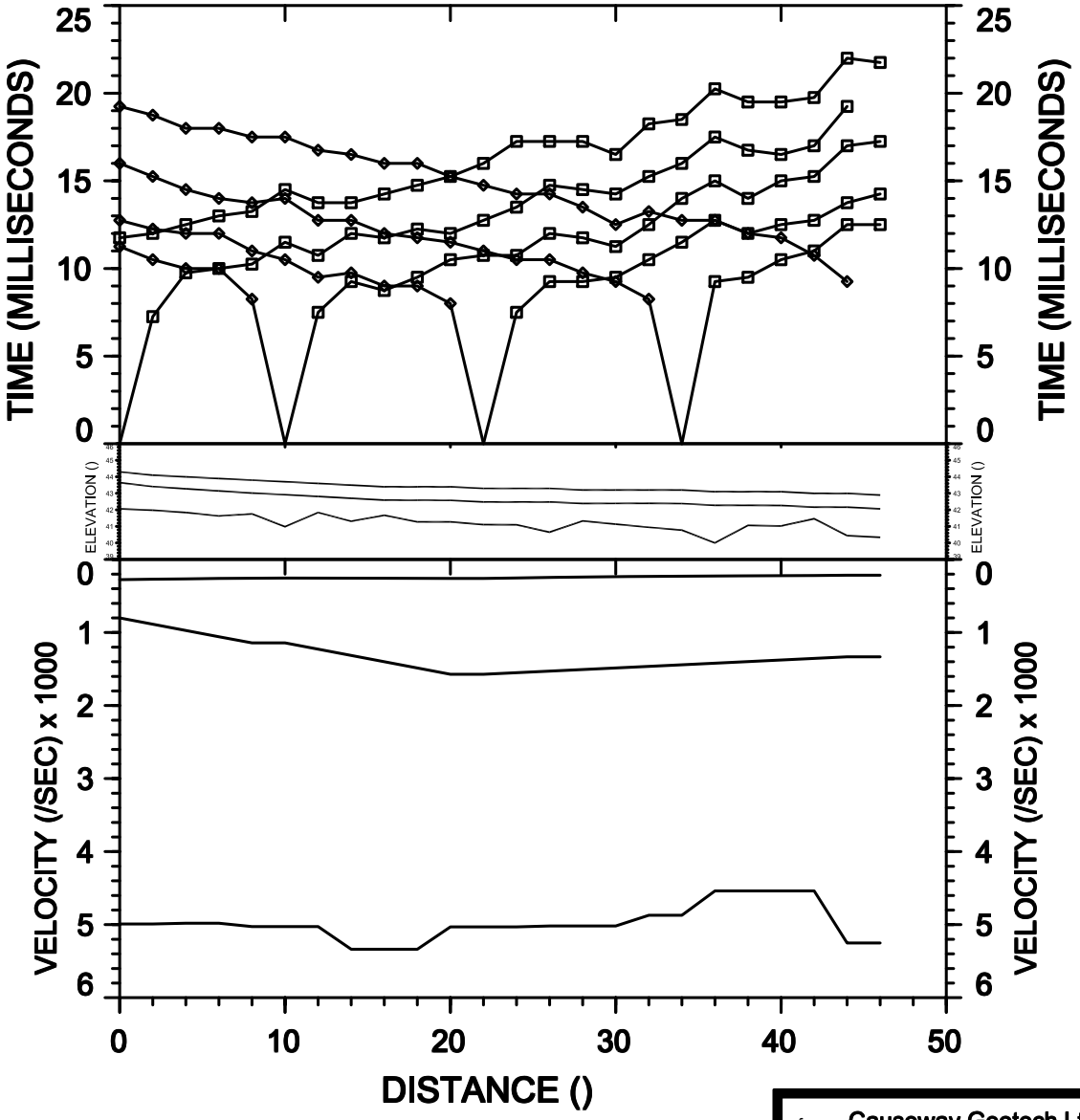


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS61 / Date: 02/06/22	
Equipment: Geode / Spread: S61	Azimuth:

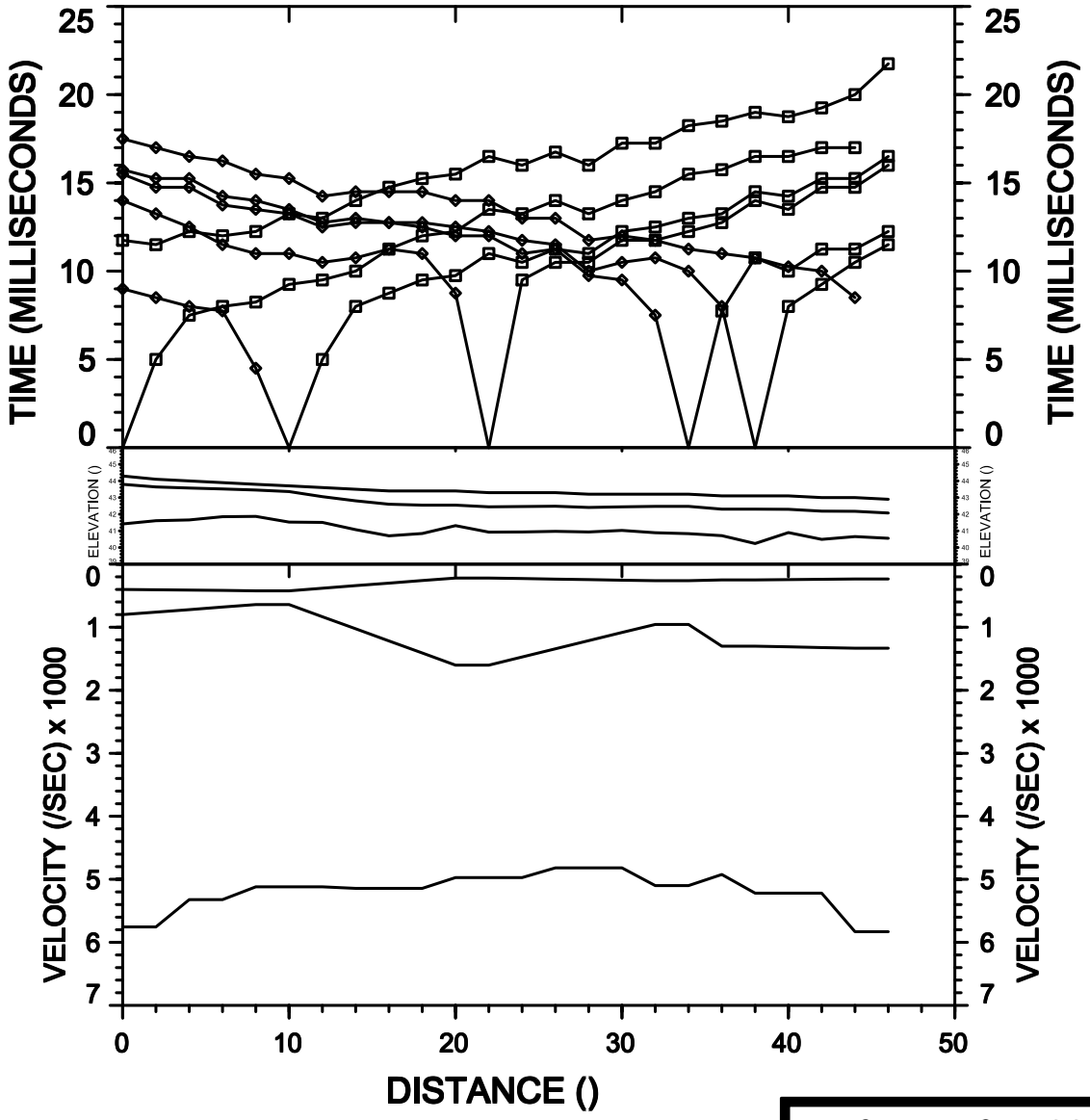


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS62R / Date: 02/06/22	
Equipment: Geode / Spread: S62	Azimuth:

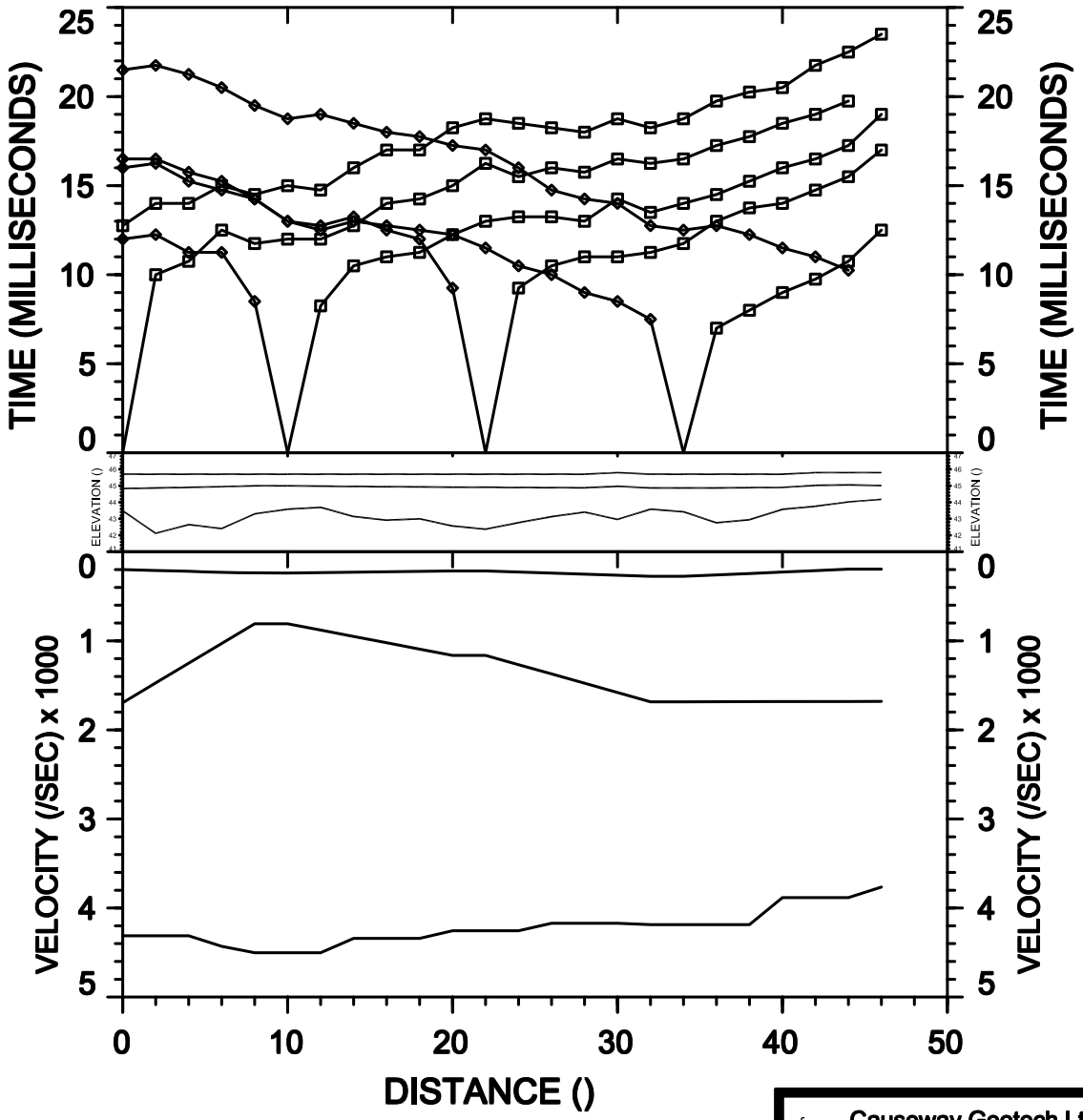


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS63 / Date: 03/06/22	
Equipment: Geode / Spread: S63	Azimuth:

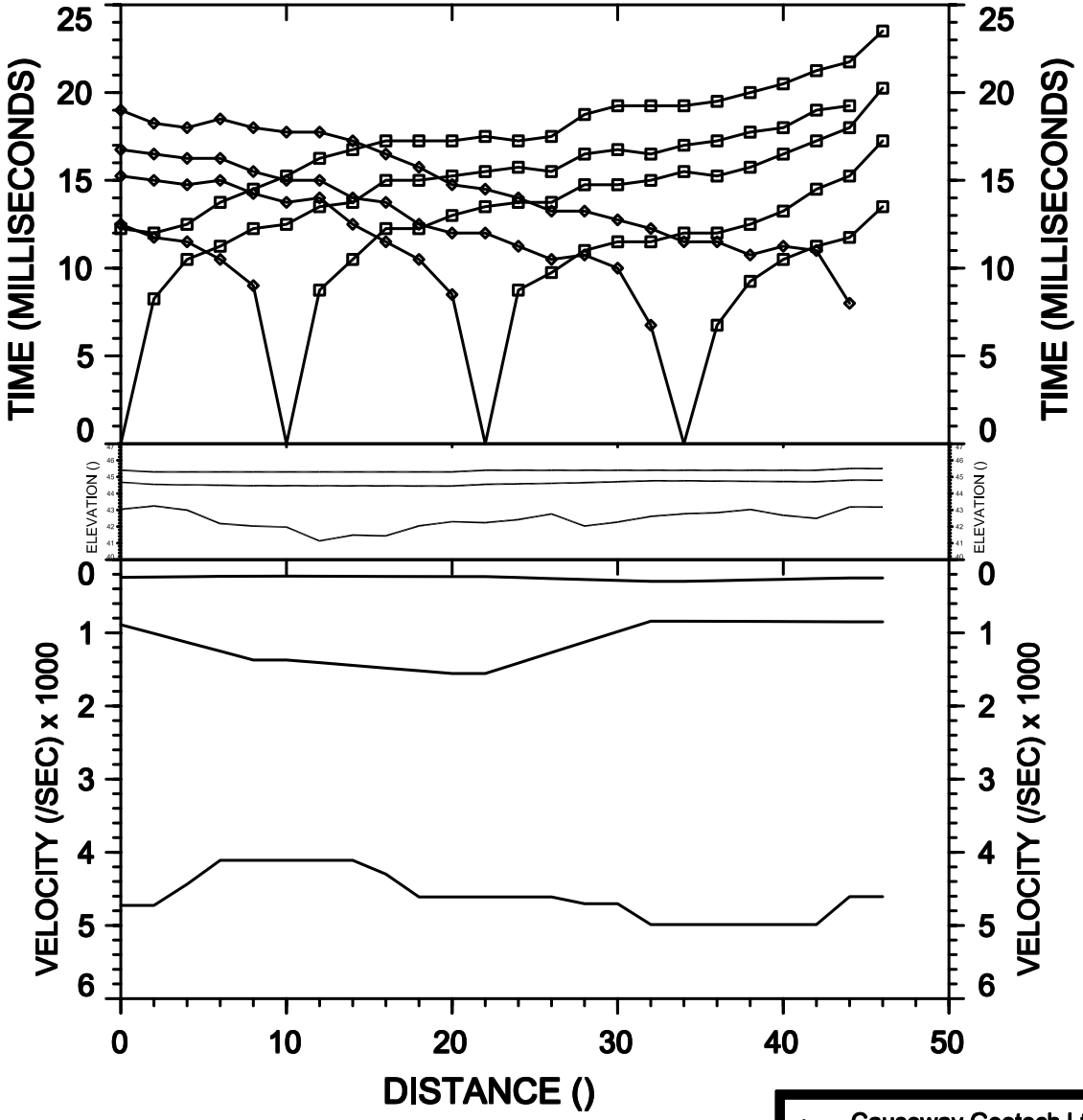


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS64 / Date: 03/06/22	
Equipment: Geode / Spread: S64	Azimuth:

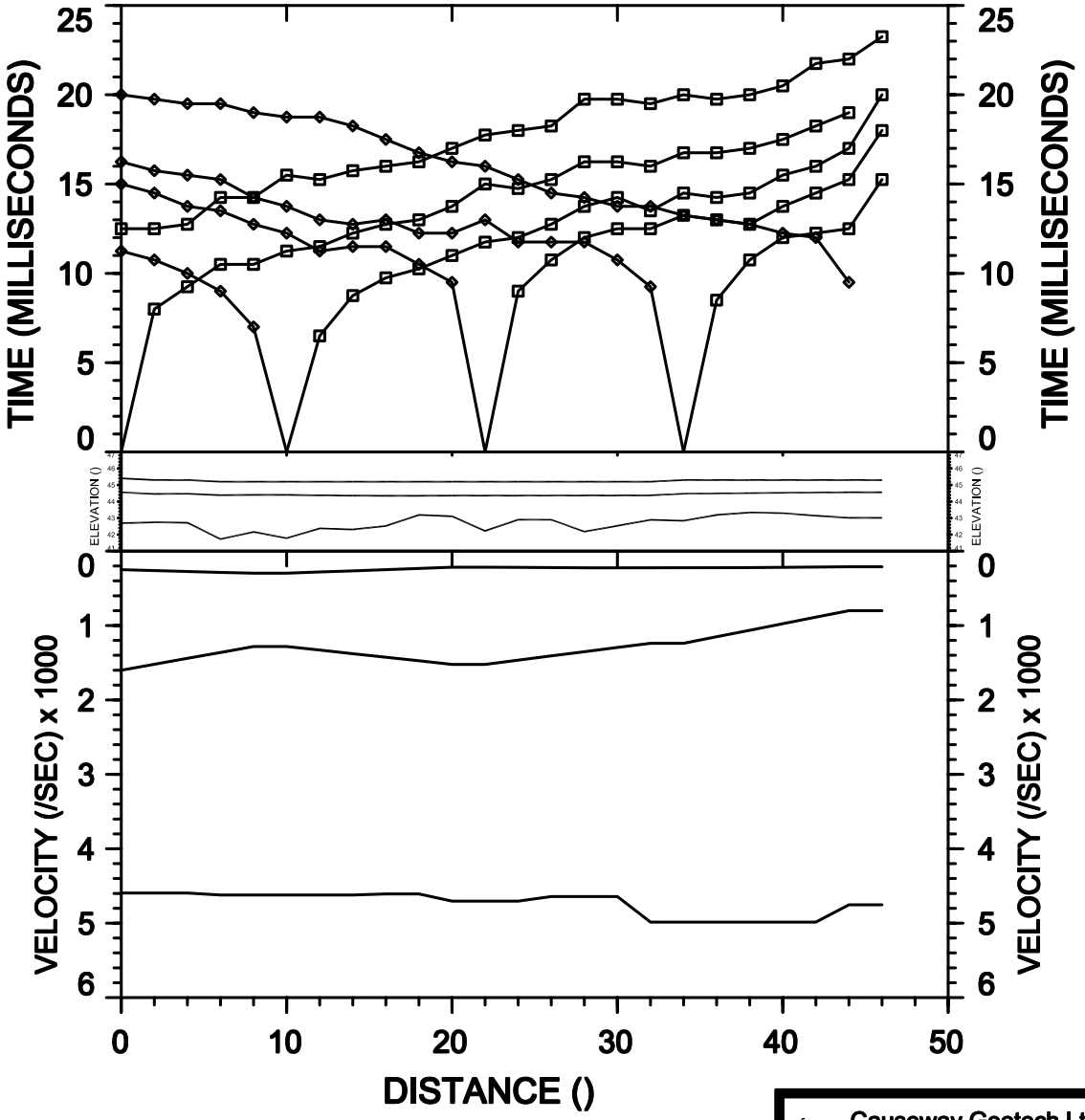


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS65 / Date: 03/06/22	
Equipment: Geode / Spread: S65	Azimuth:

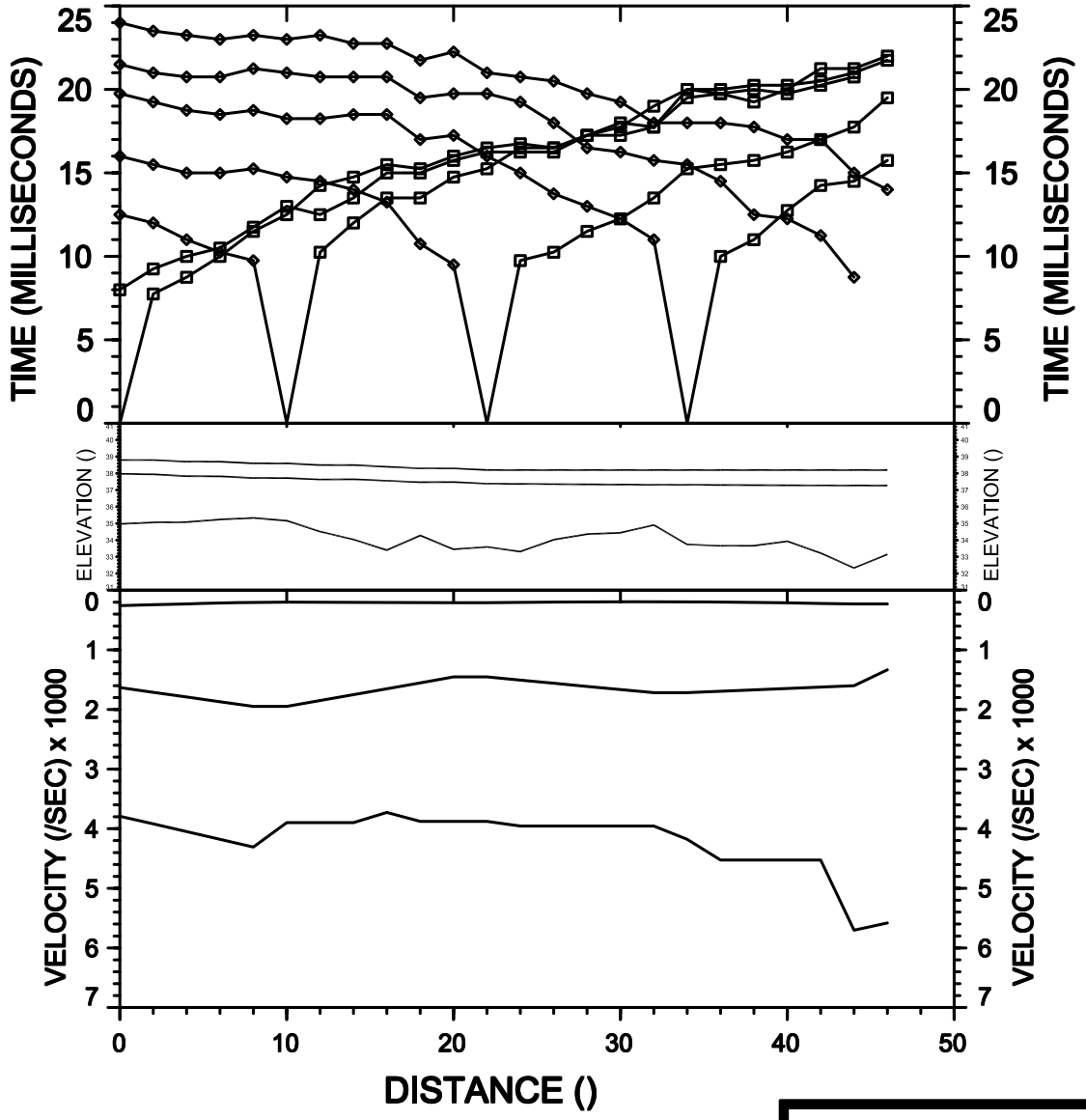


Plate: 10a

for: Causeway Geotech Ltd		AGP21220
by: Strata Geophysical, Inc.		Tipperary Tipperary
Data SetS66	Date: 08/06/22	
Equipment: Geode	Spread: S66	Azimuth:

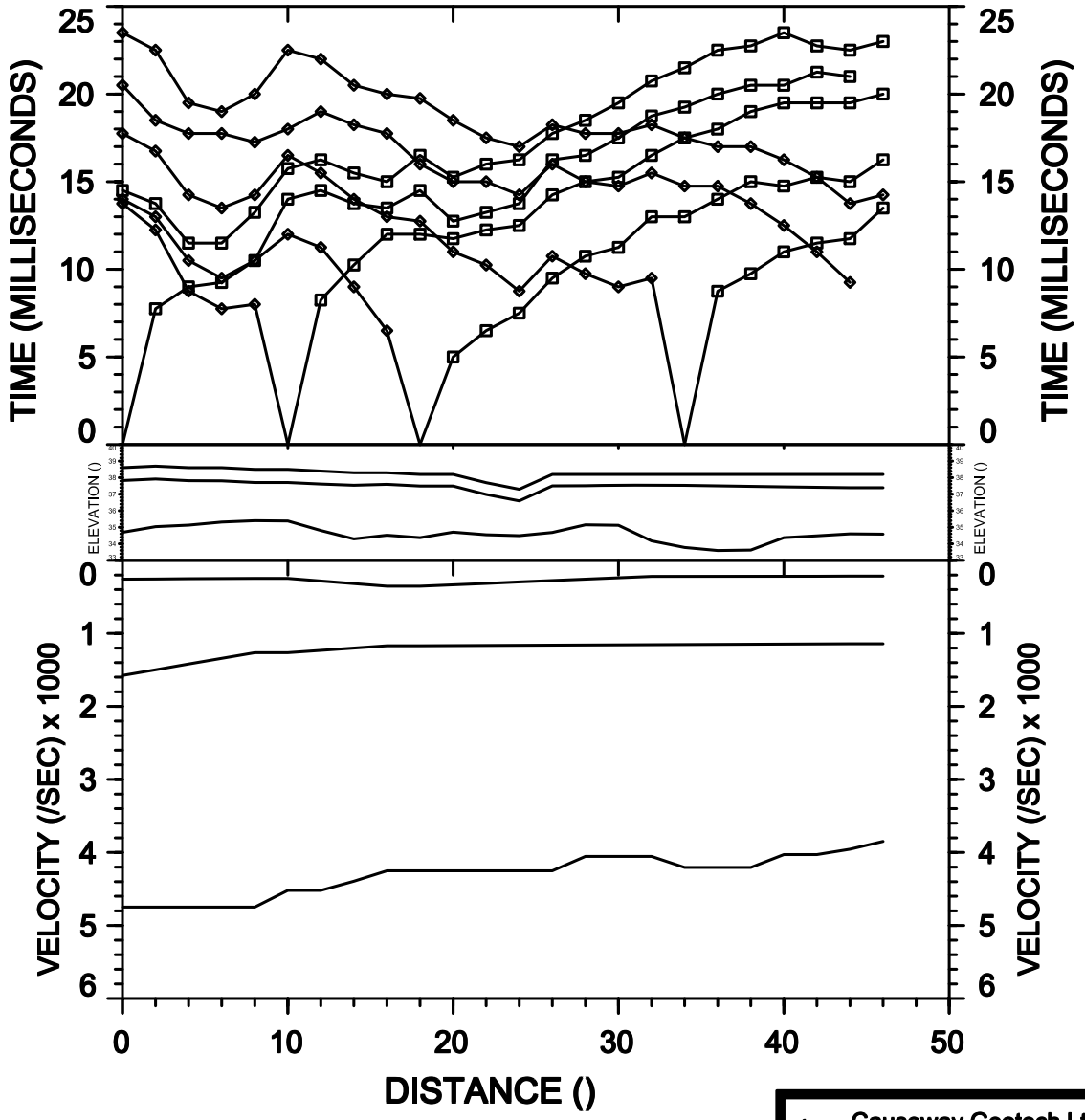


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS67R / Date: 08/06/22	
Equipment: Geode / Spread: S67	Azimuth:

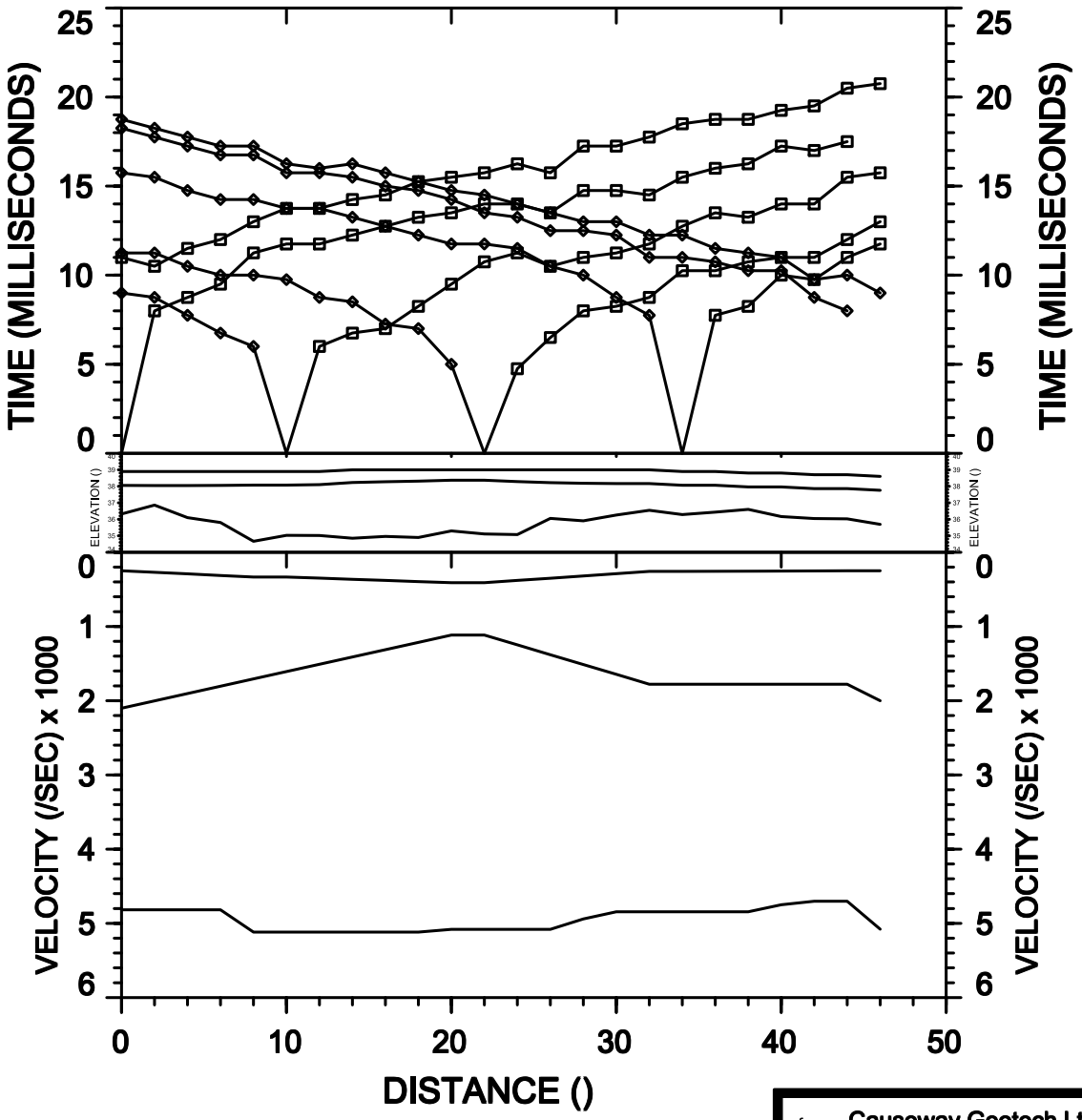


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS68R / Date: 08/06/22	
Equipment: Geode / Spread: S68	Azimuth:

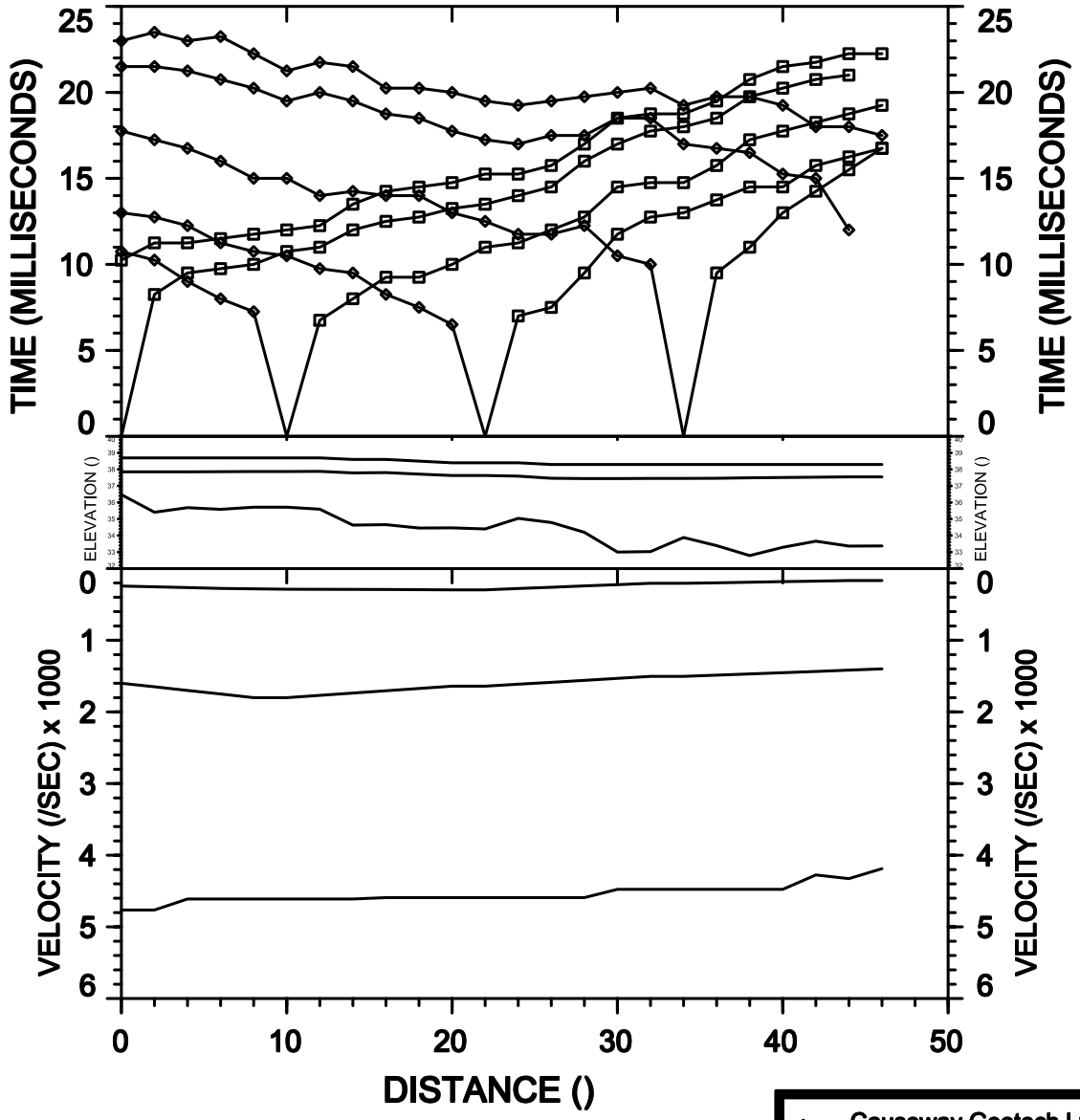


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS69R / Date: 08/06/22	
Equipment: Geode / Spread: S69	Azimuth:

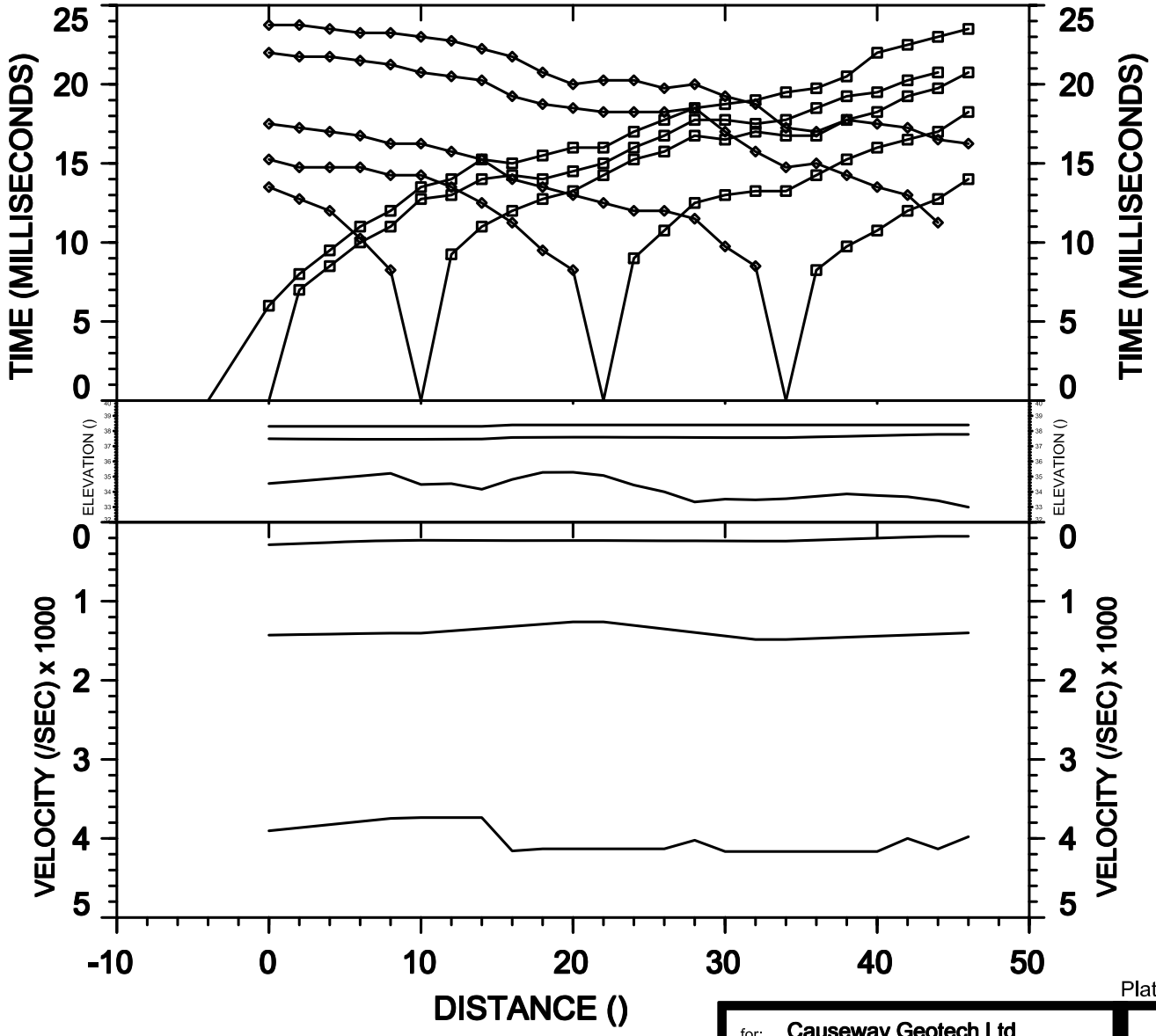


Plate: 10a

for: Causeway Geotech Ltd		AGP21220
by: Strata Geophysical, Inc.		Tipperary Tipperary
Data SetS70R	Date: 08/06/22	
Equipment: Geode	Spread: S70	Azimuth:

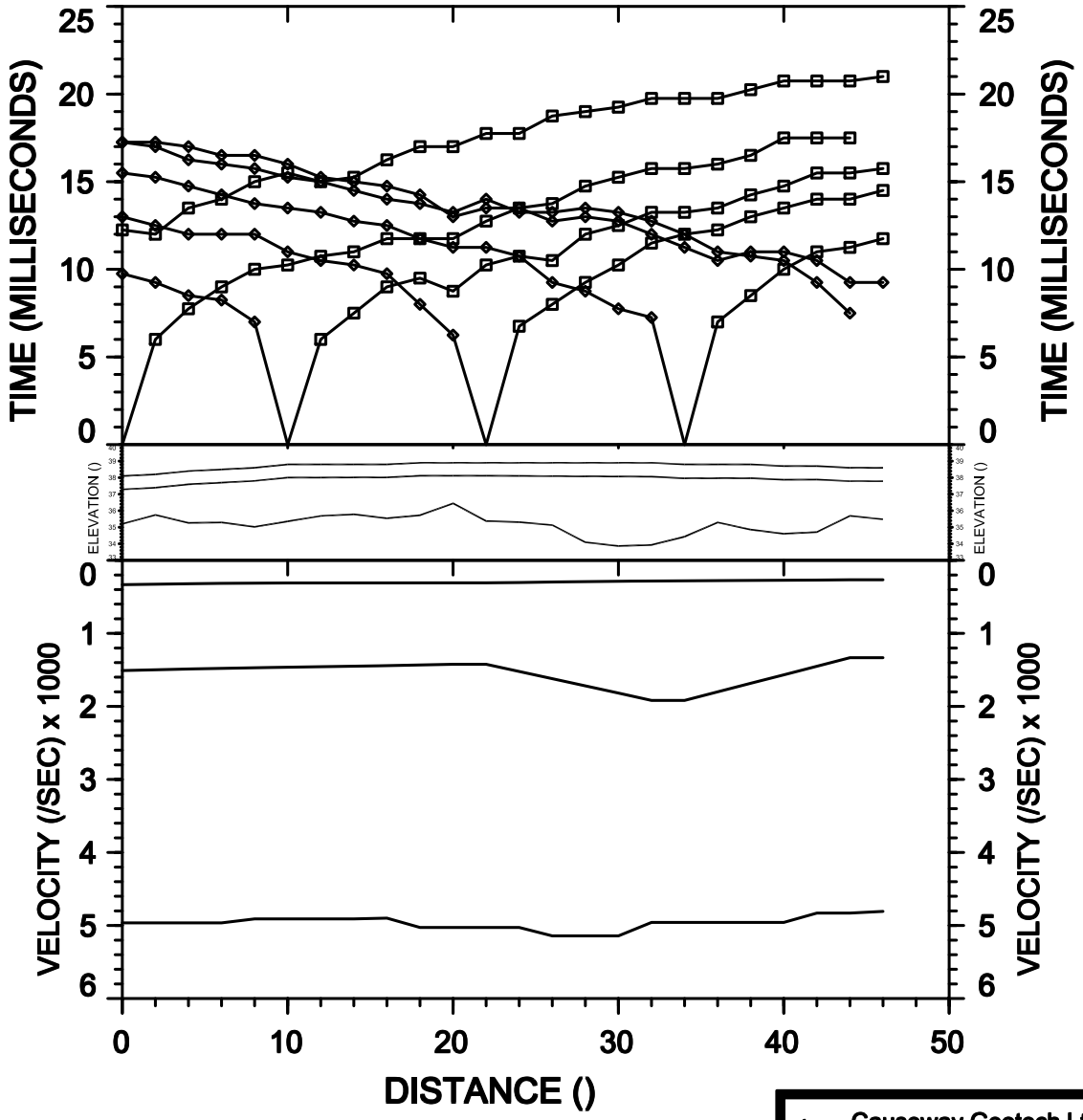


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS71 / Date: 08/06/22	
Equipment: Geode / Spread: S71	Azimuth:

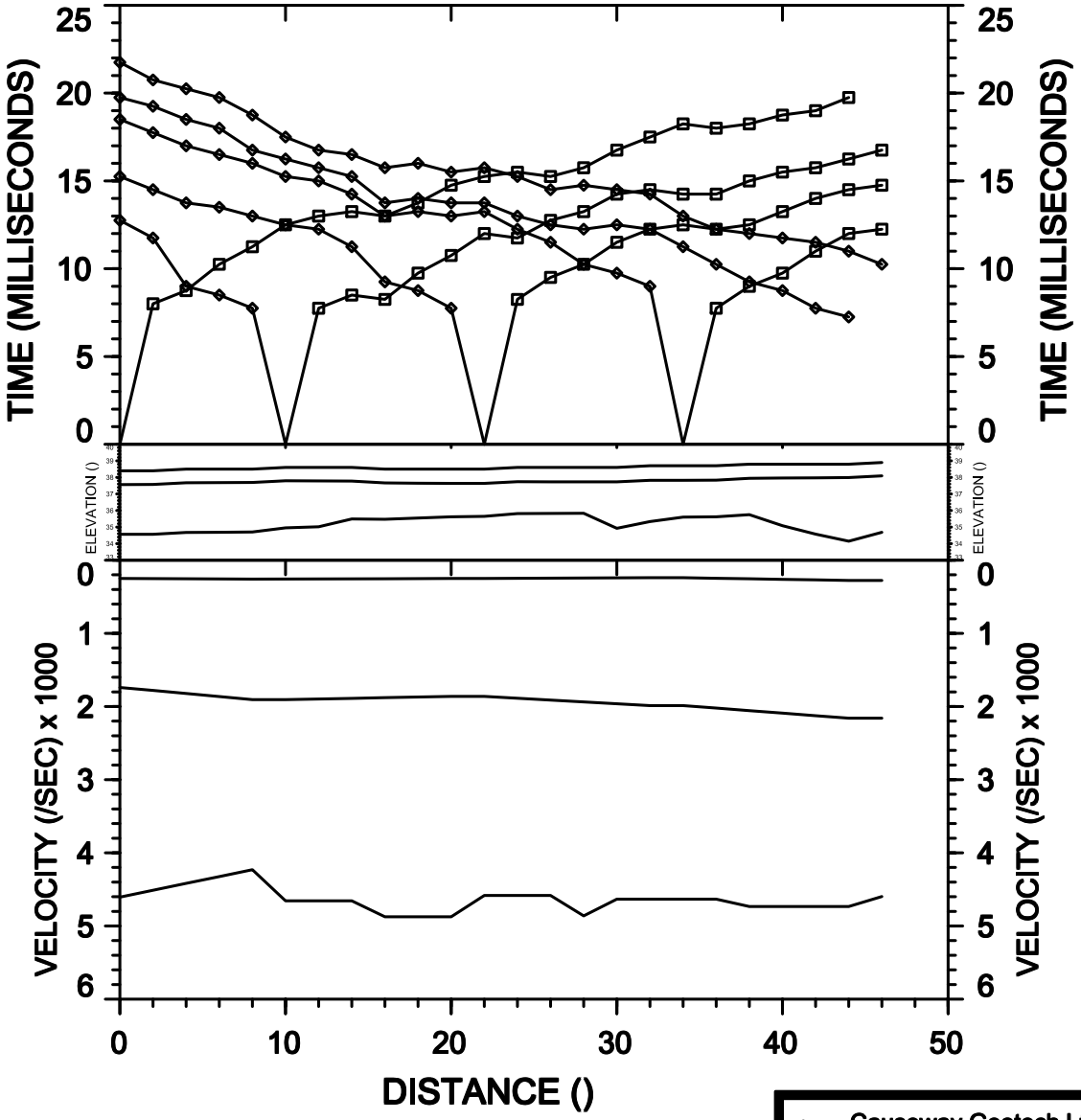


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS72R / Date: 08/06/22	
Equipment: Geode / Spread: S72	Azimuth:

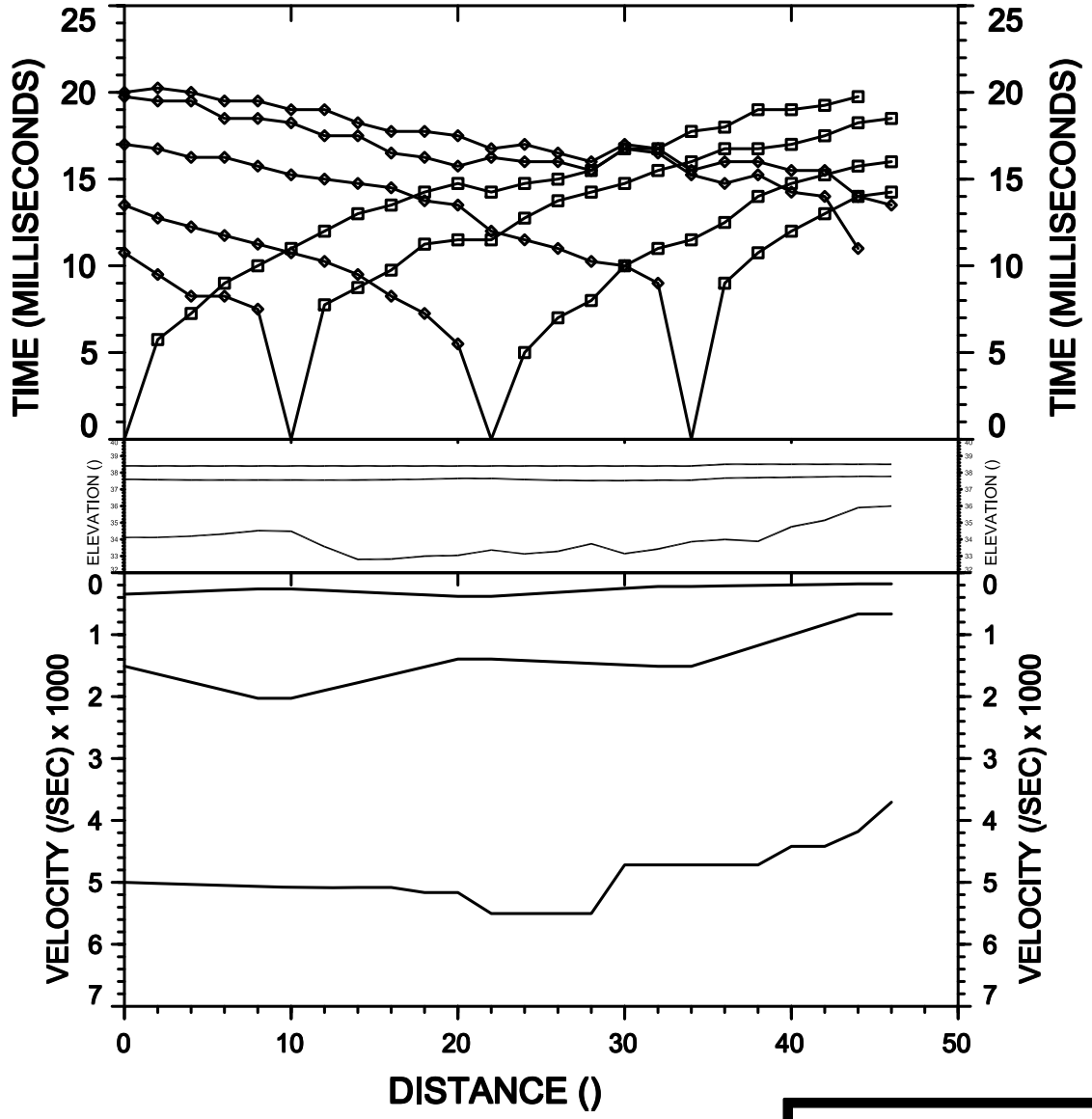


Plate: 10a

for: Causeway Geotech Ltd		AGP21220
by: Strata Geophysical, Inc.		Tipperary Tipperary
Data SetS73	Date: 08/06/22	
Equipment: Geode	Spread: S73	Azimuth:

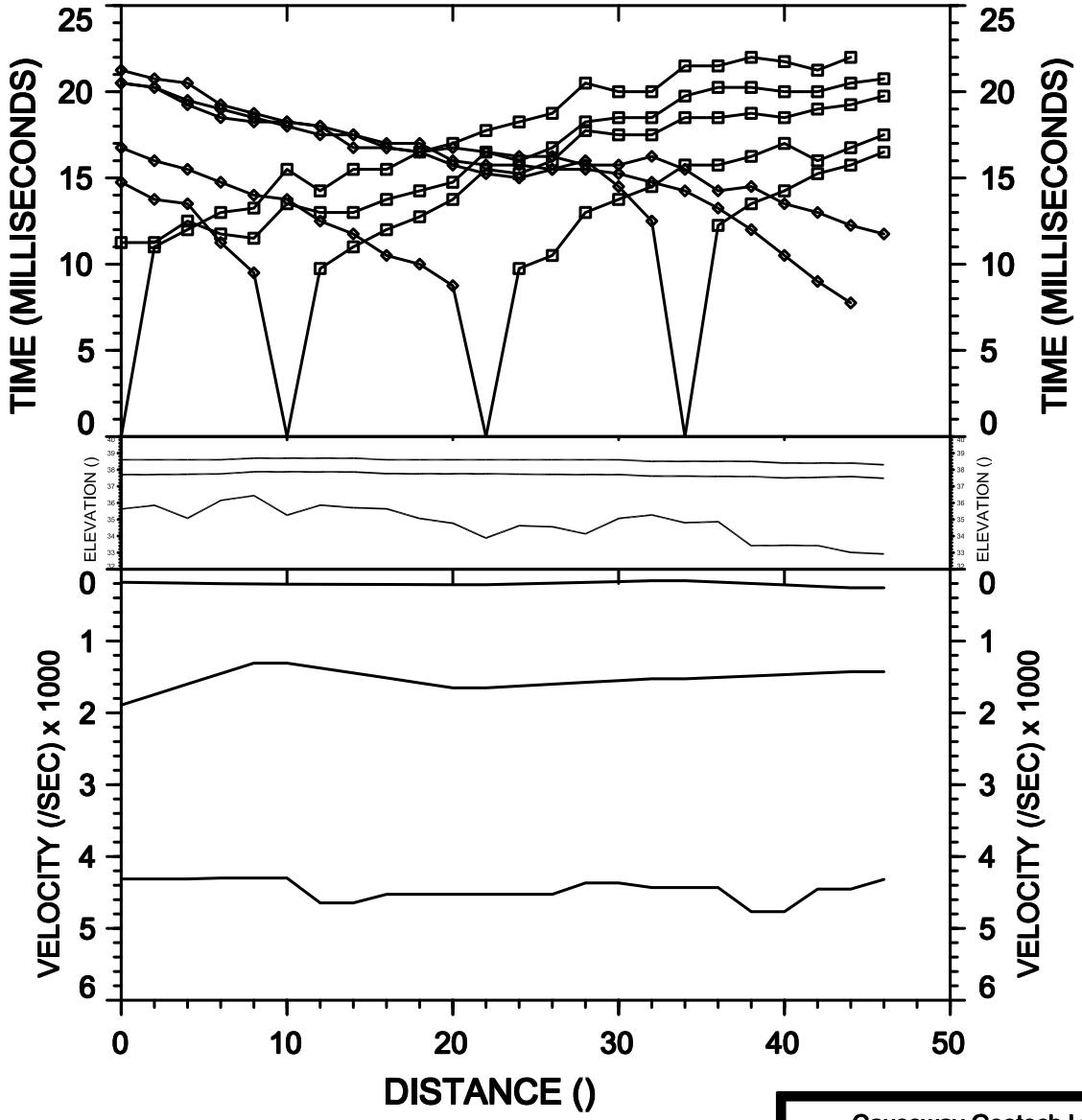


Plate: 10a

for: Causeway Geotech Ltd		AGP21220
by: Strata Geophysical, Inc.		Tipperary Tipperary
Data SetS74	Date: 08/06/22	
Equipment: Geode	Spread: S74	Azimuth:

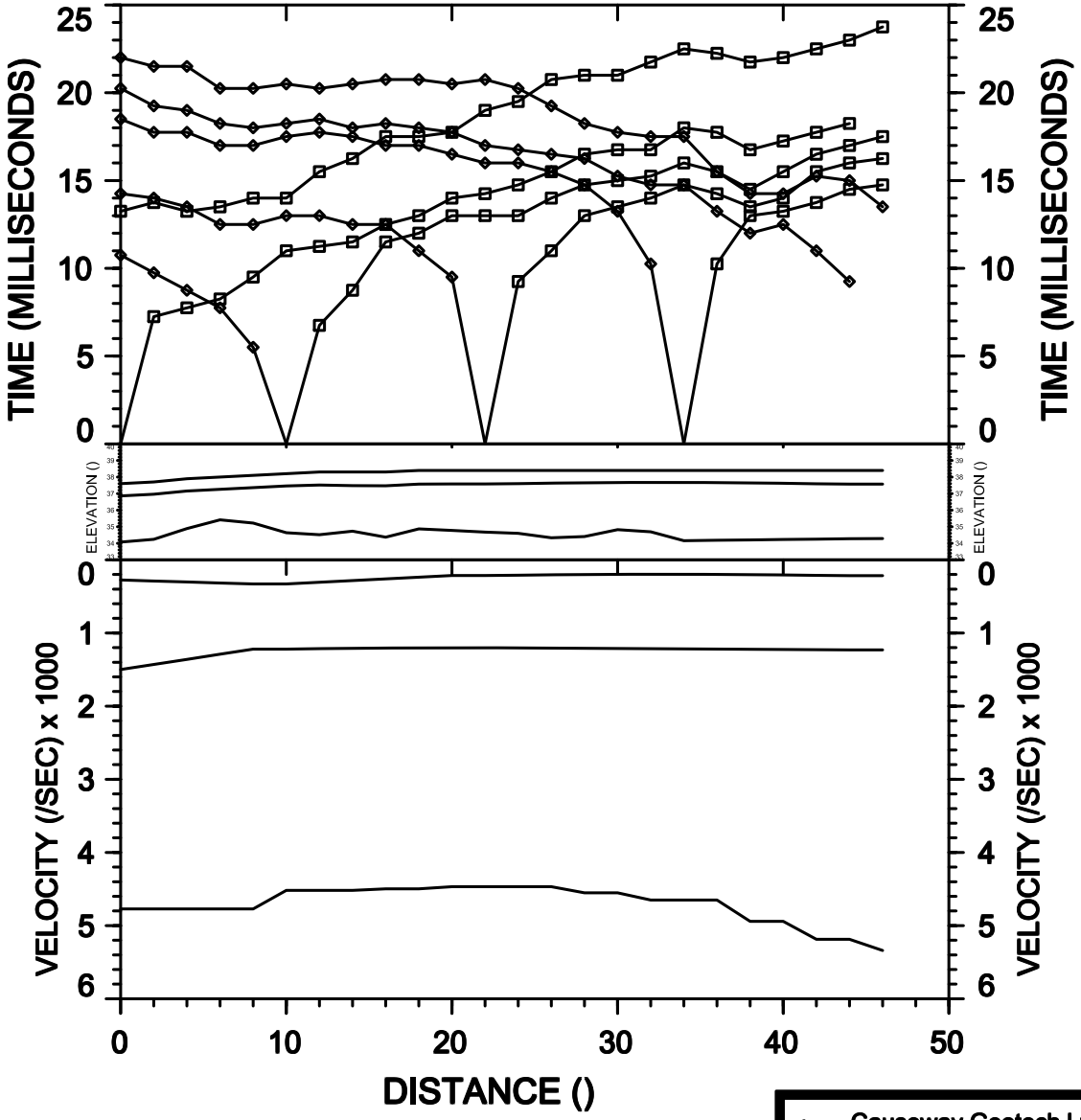


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS75R / Date: 09/06/22	
Equipment: Geode / Spread: S75	Azimuth:

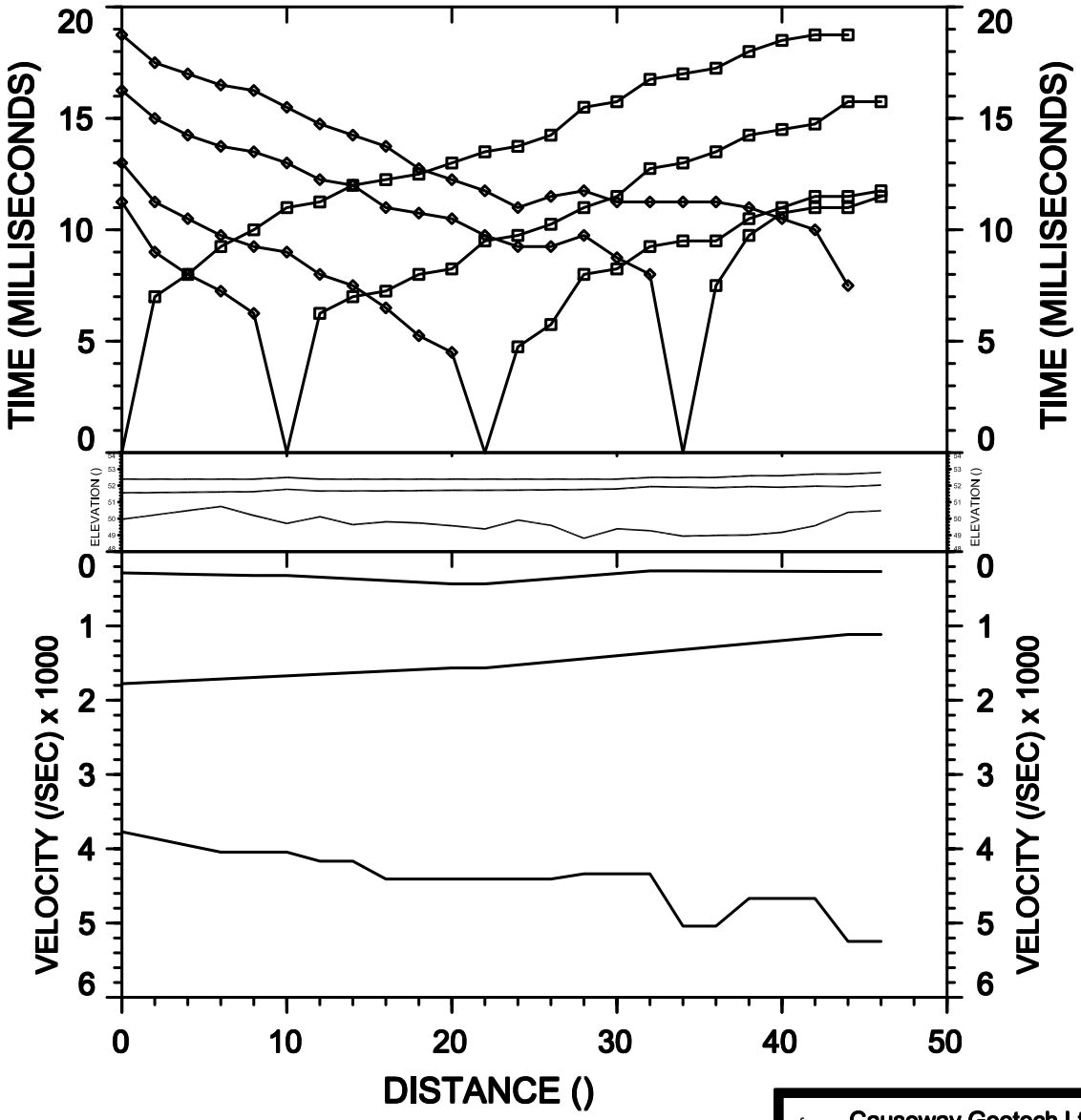


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS76 / Date: 09/06/22	
Equipment: Geode / Spread: S76	Azimuth:

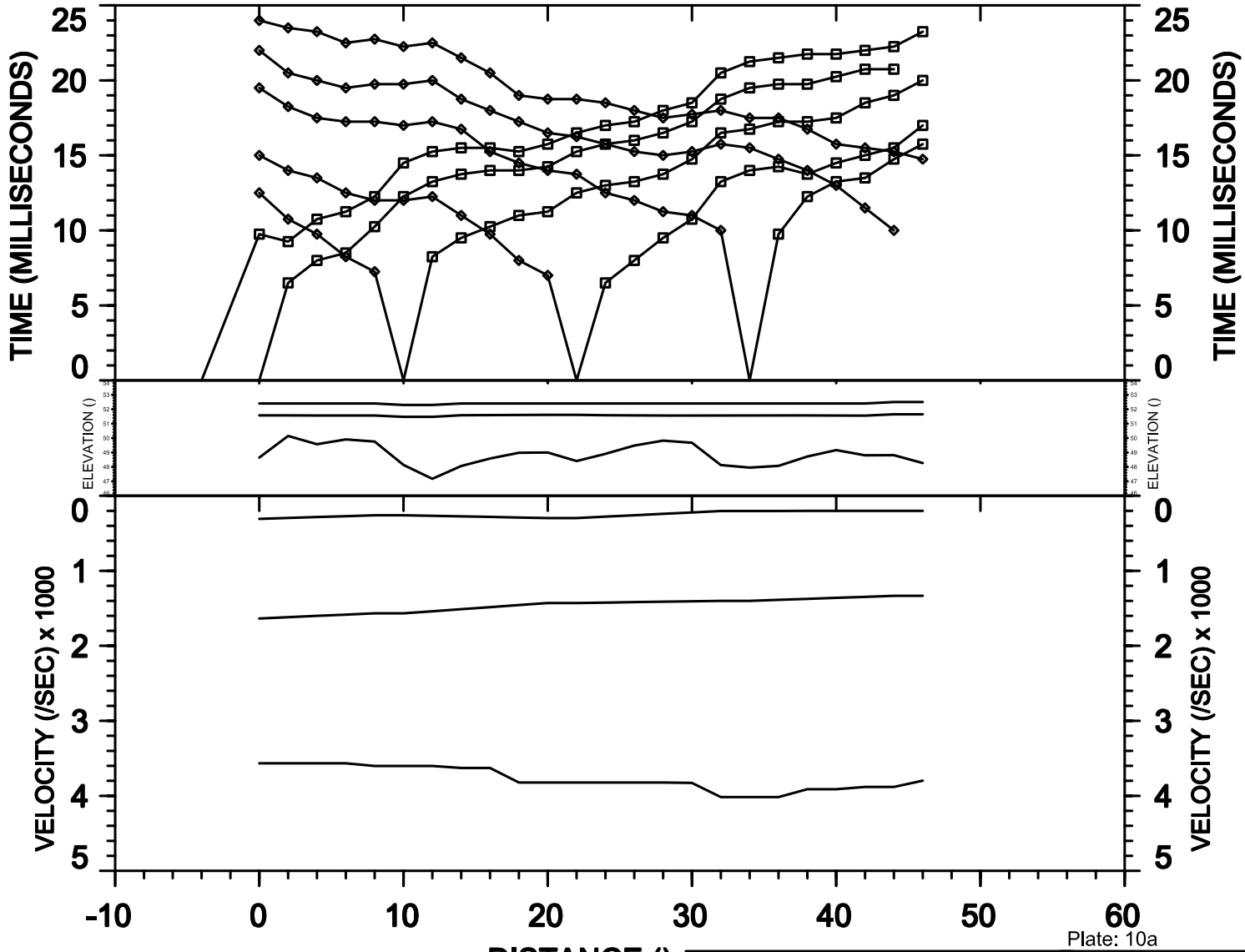


Plate: 10a

for: Causeway Geotech Ltd		AGP21220
by: Strata Geophysical, Inc.		Tipperary Tipperary
Data SetS77	Date: 09/06/22	
Equipment: Geode	Spread: S77	Azimuth:

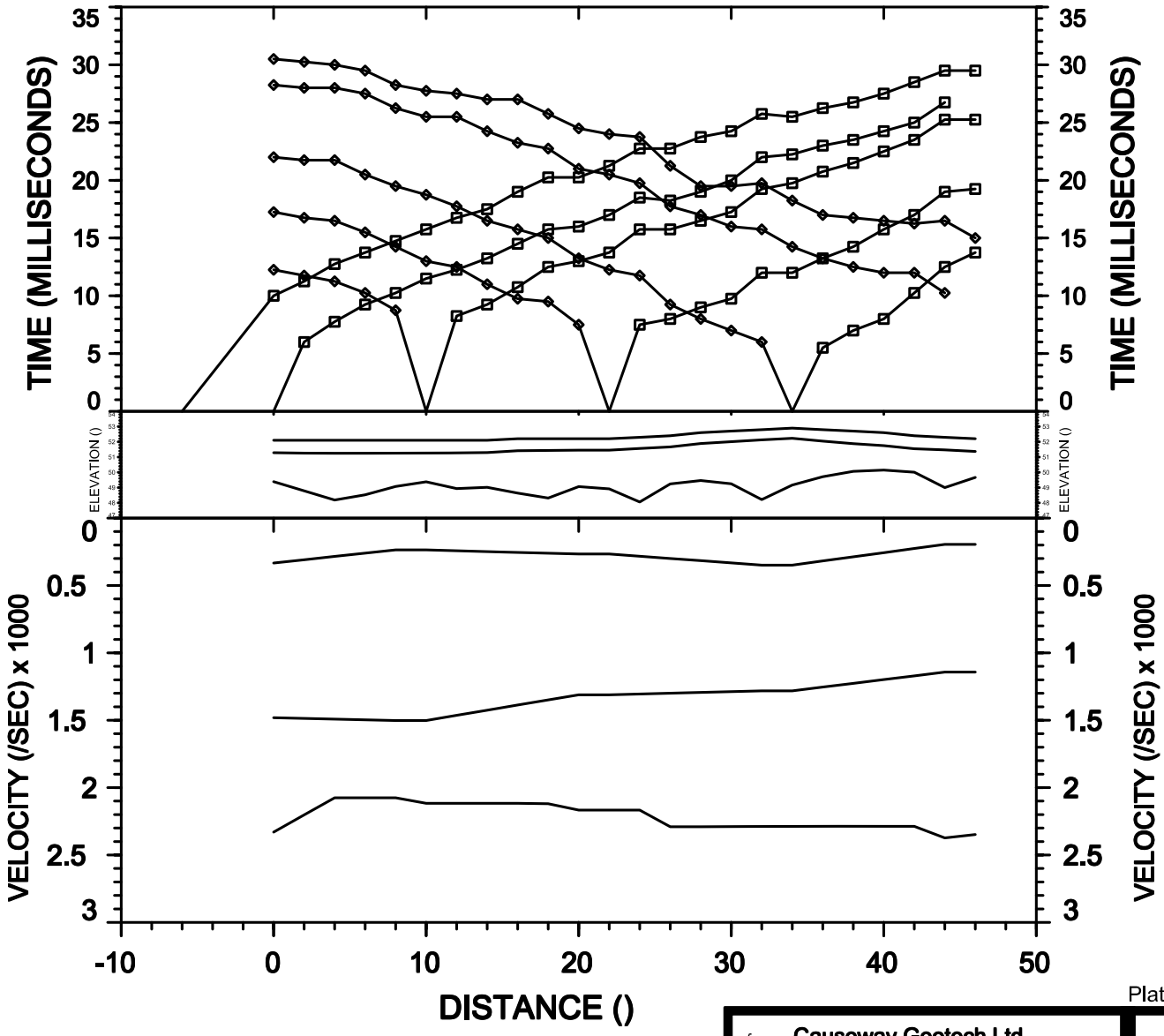


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS78 / Date: 09/06/22	
Equipment: Geode / Spread: S78	Azimuth:

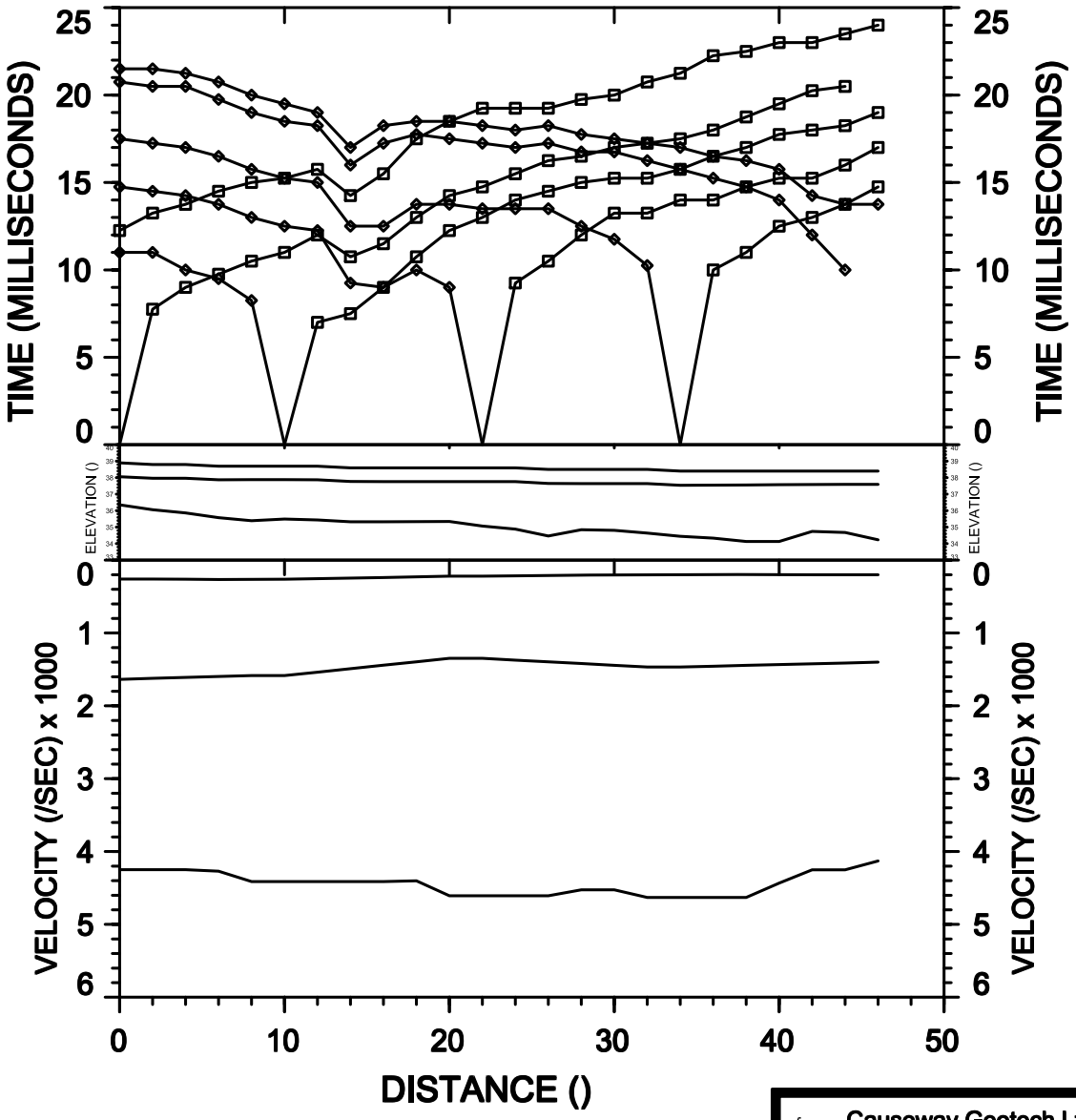


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS79R / Date: 09/06/22	
Equipment: Geode / Spread: S79	Azimuth:

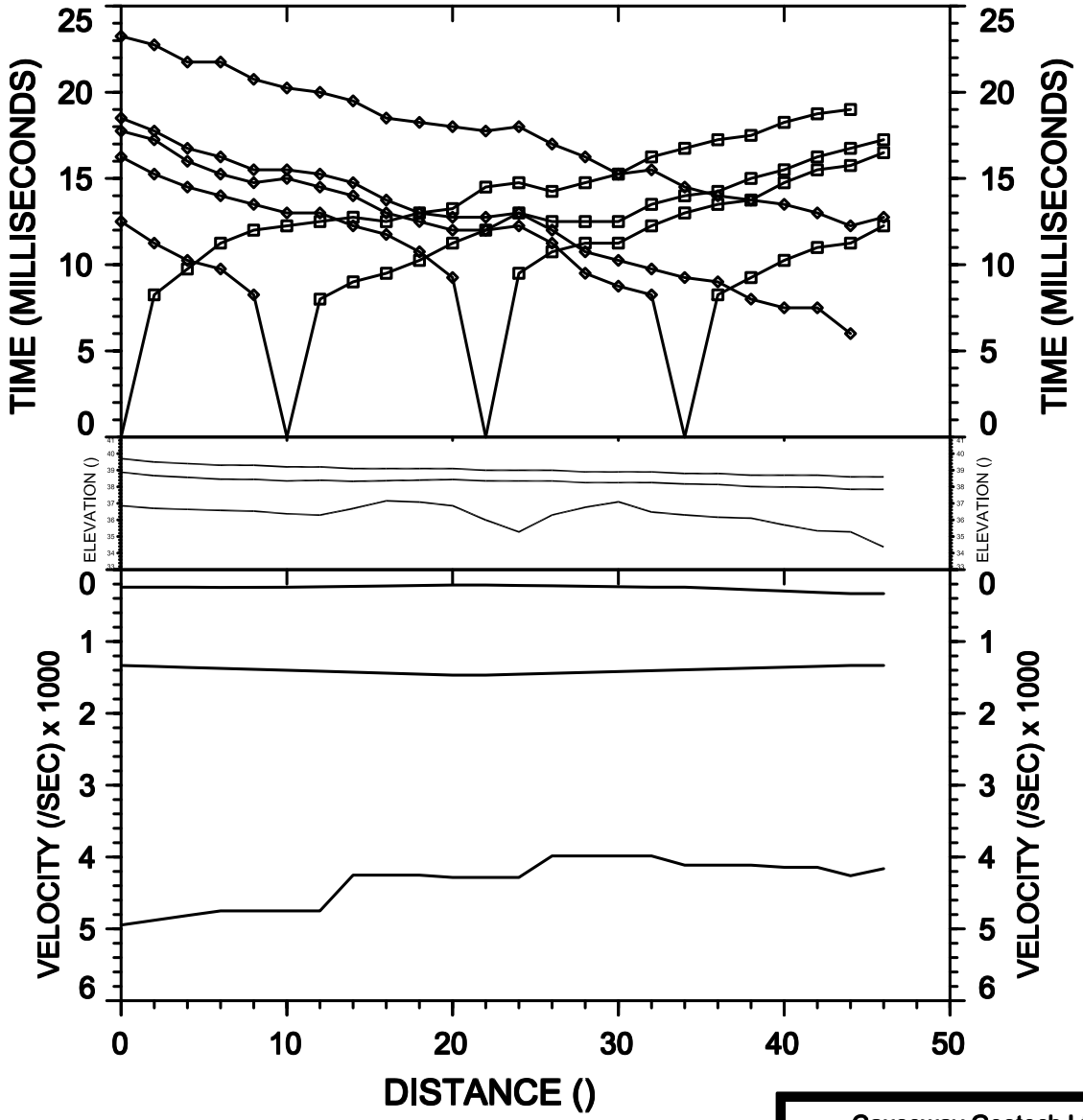


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS80 / Date: 09/06/22	
Equipment: Geode / Spread: S80	Azimuth:

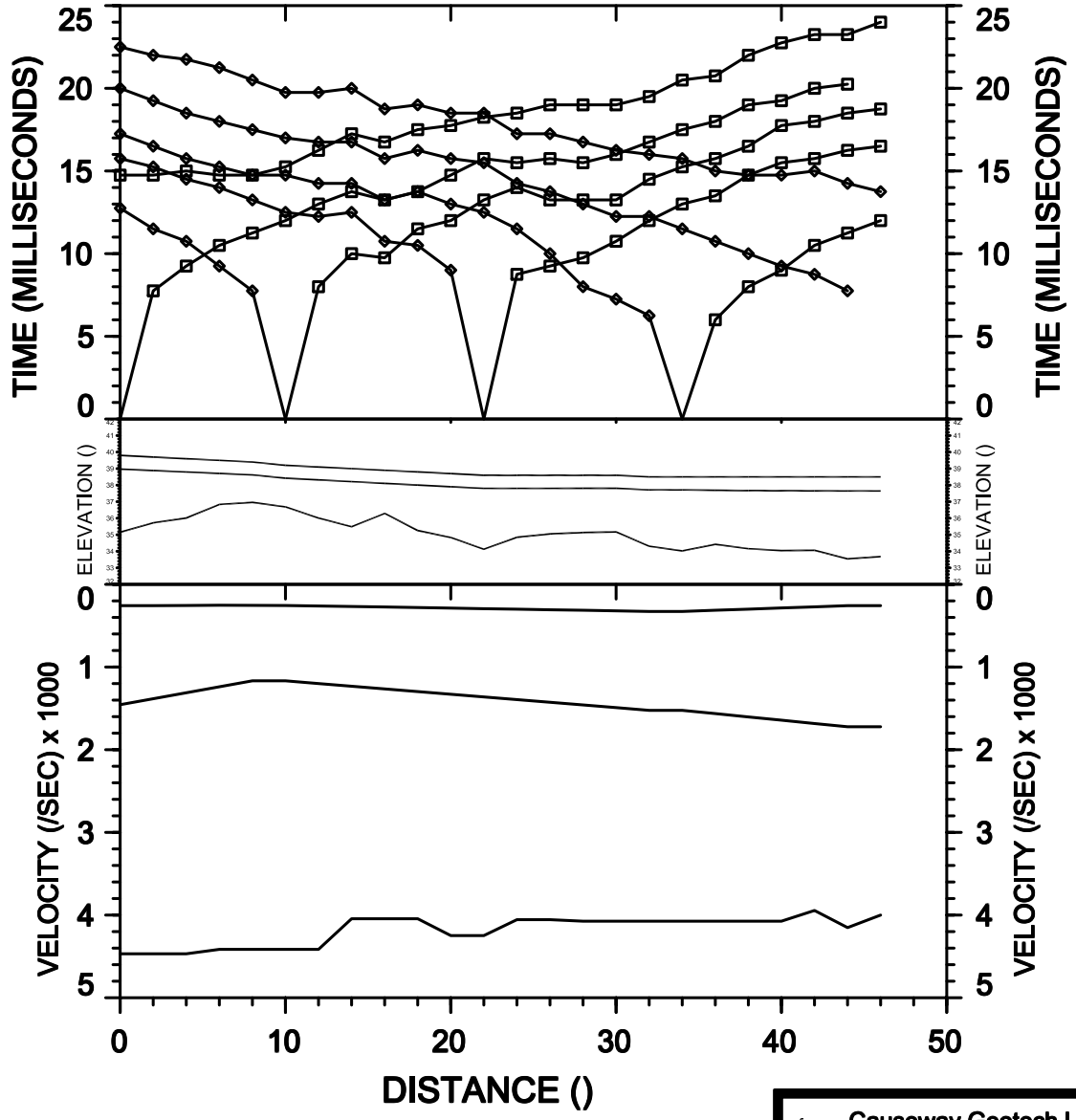


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS81 / Date: 09/06/22	
Equipment: Geode / Spread: S81	Azimuth:

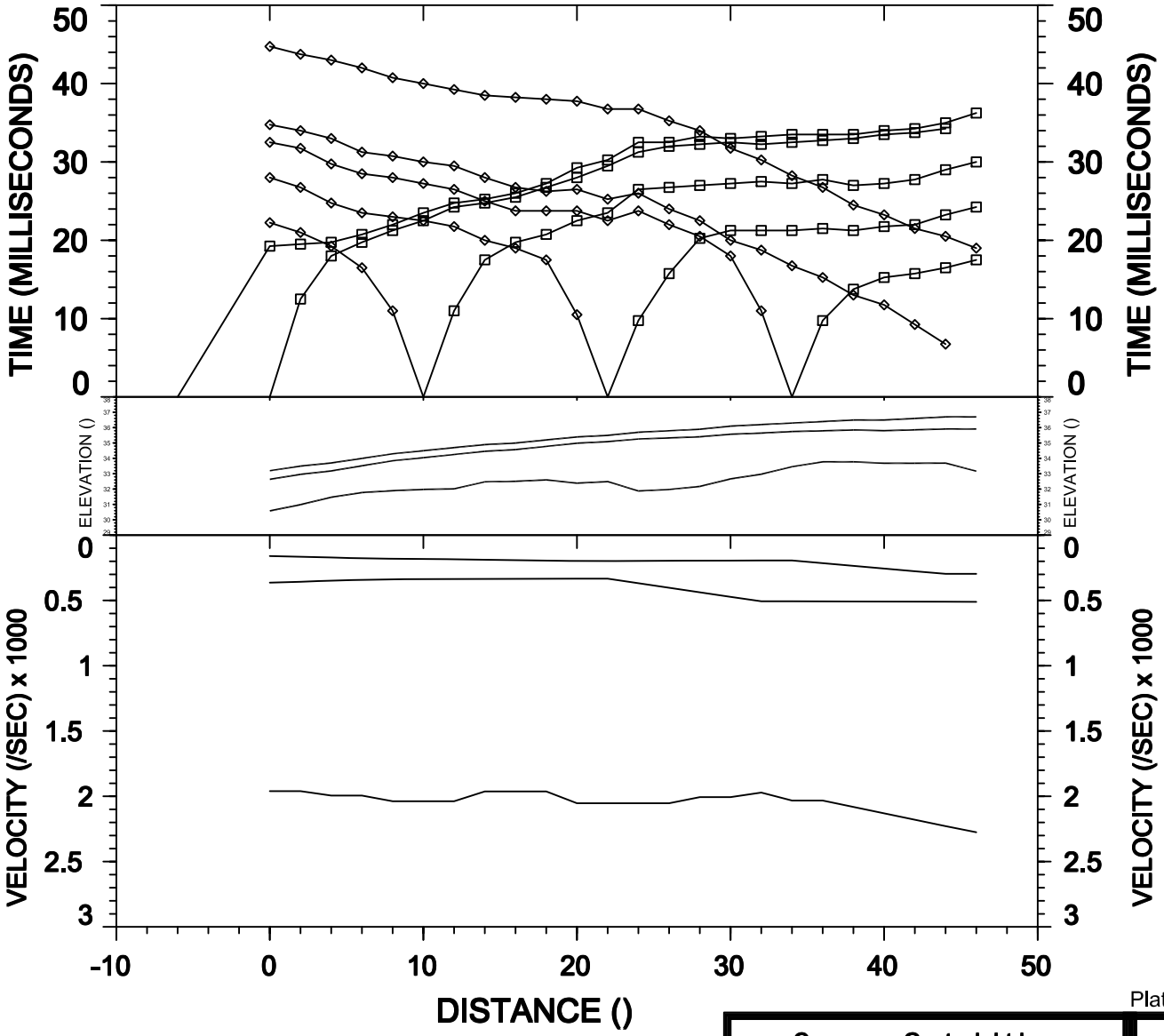


Plate: 10a

for: Causeway Geotech Ltd		AGP21220
by: Strata Geophysical, Inc.		Tipperary Tipperary
Data SetS82	Date: 09/06/22	
Equipment: Geode	Spread: S82	Azimuth:

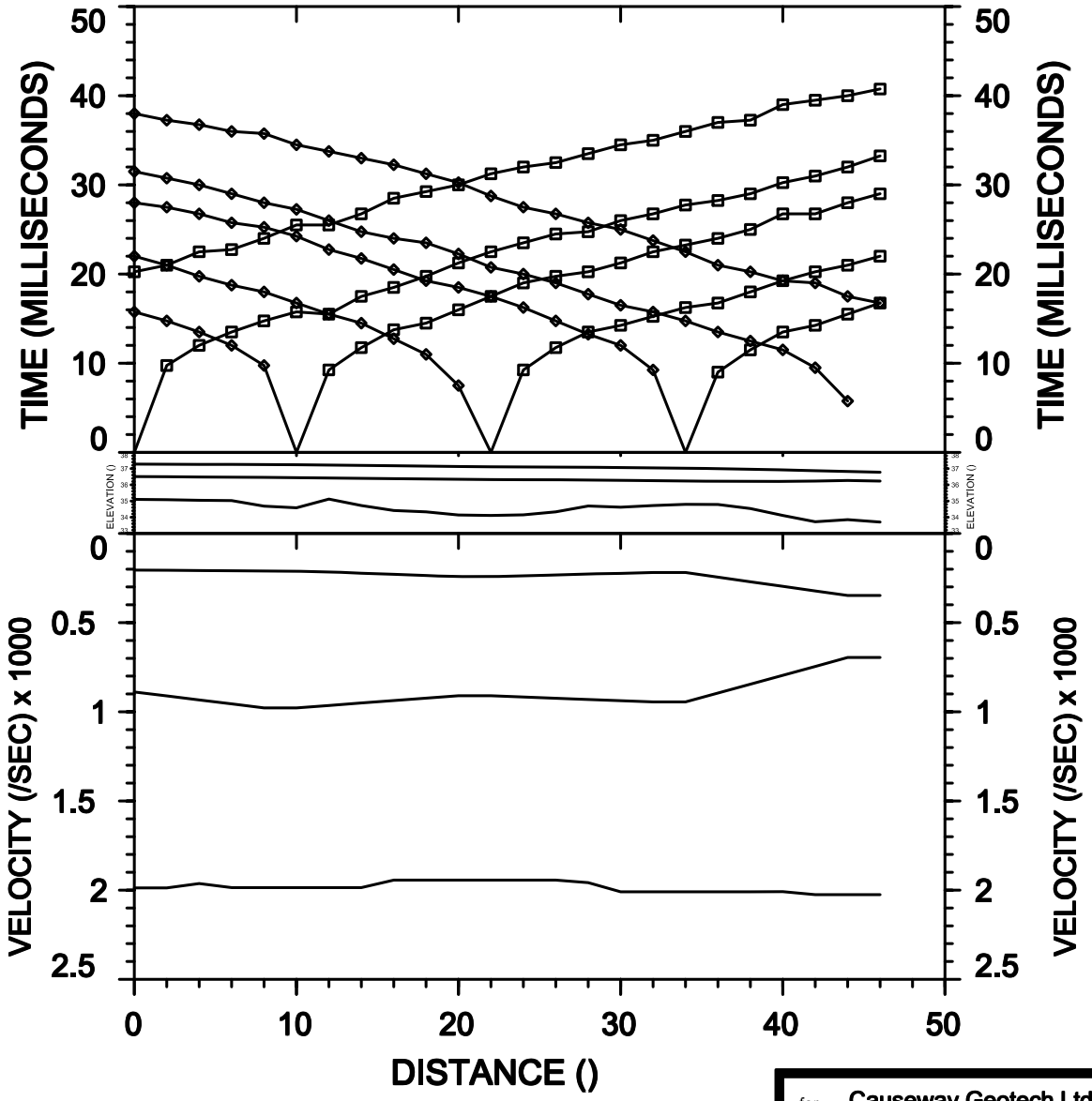


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS83R / Date: 09/06/22	
Equipment: Geode / Spread: S83	Azimuth:

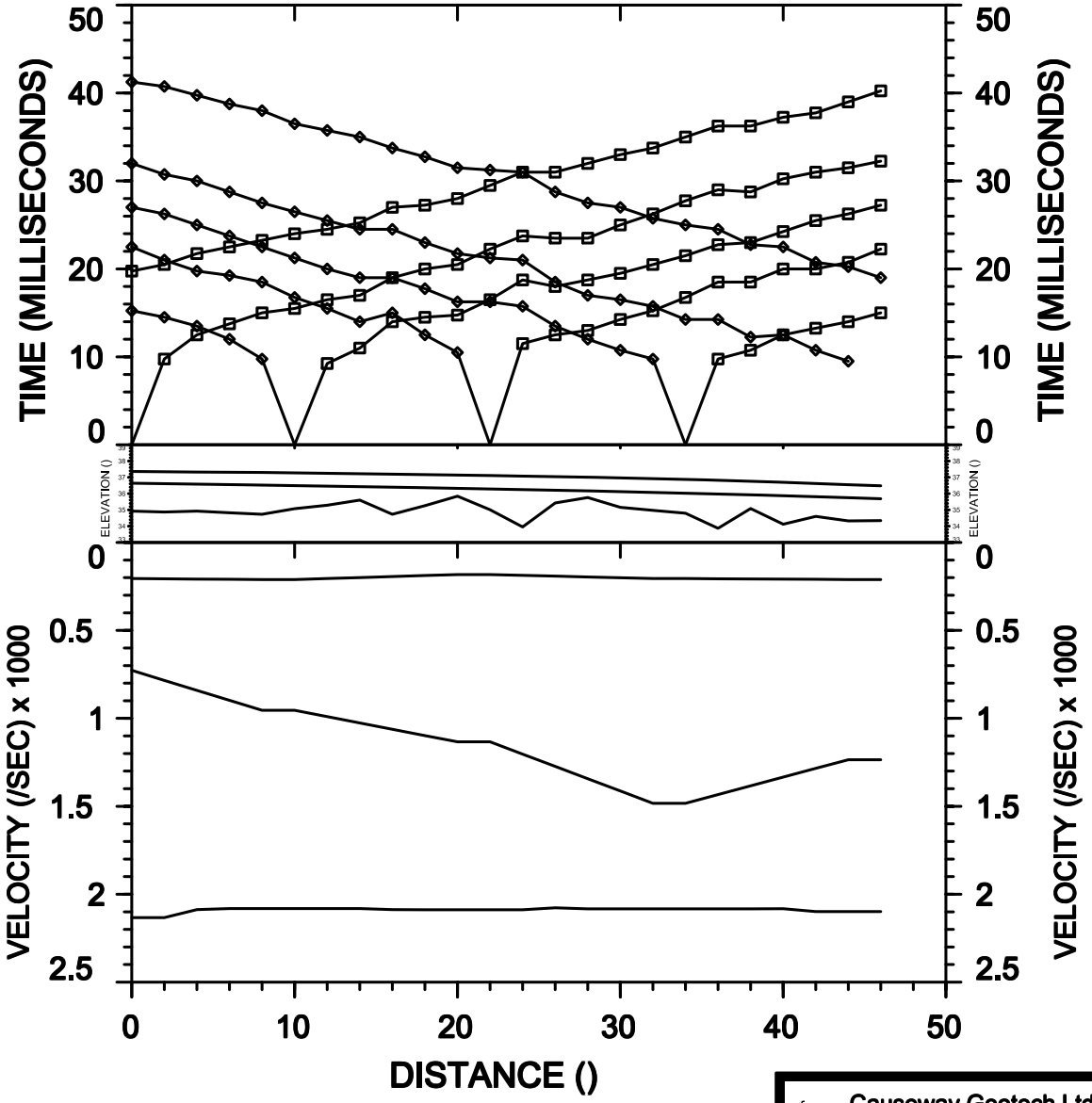


Plate: 10a

for: Causeway Geotech Ltd		AGP21220
by: Strata Geophysical, Inc.		Tipperary Tipperary
Data SetS84R	Date: 09/06/22	
Equipment: Geode	Spread: S84	Azimuth:

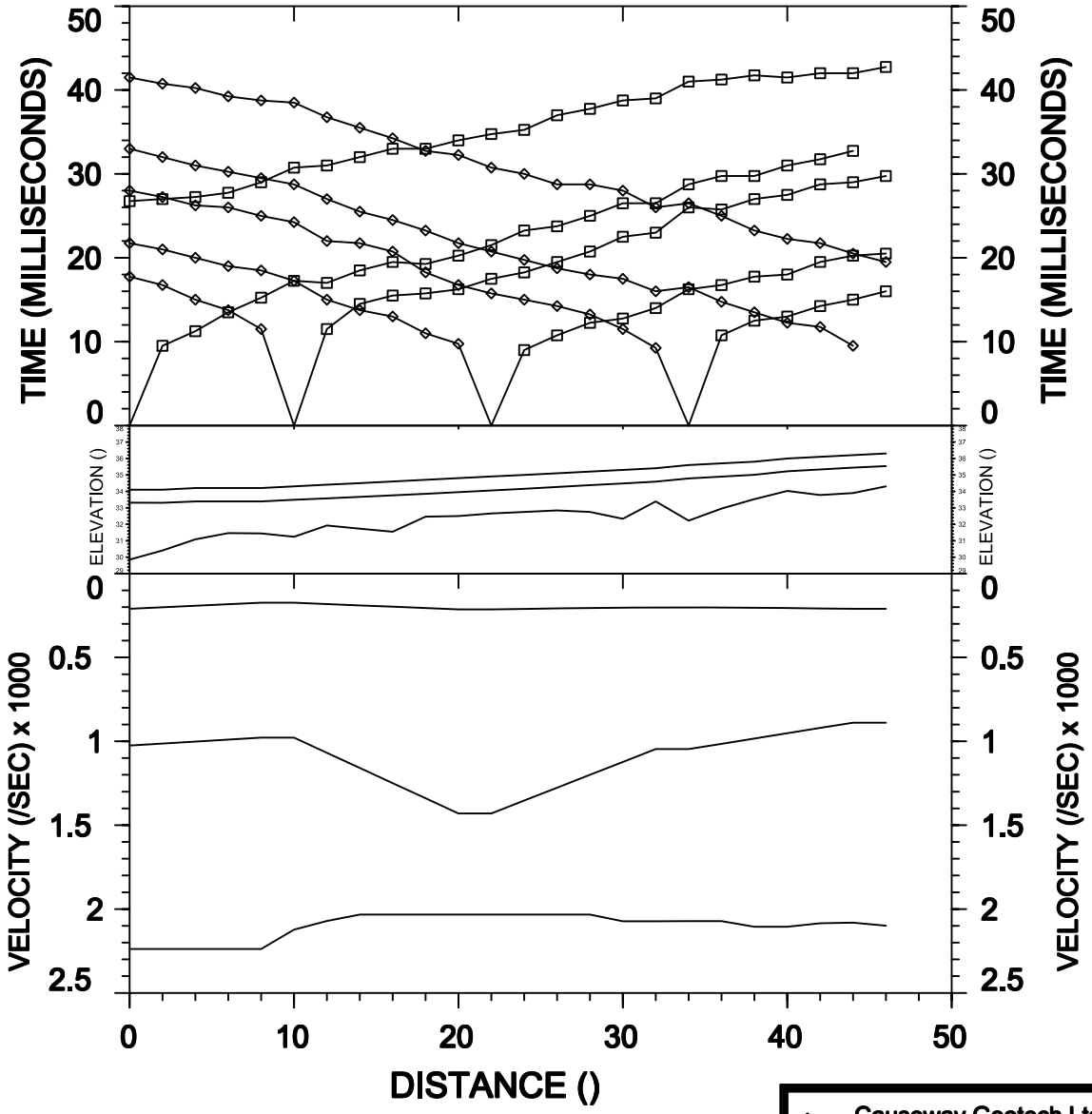


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS85 / Date: 09/06/22	
Equipment: Geode / Spread: S85	Azimuth:

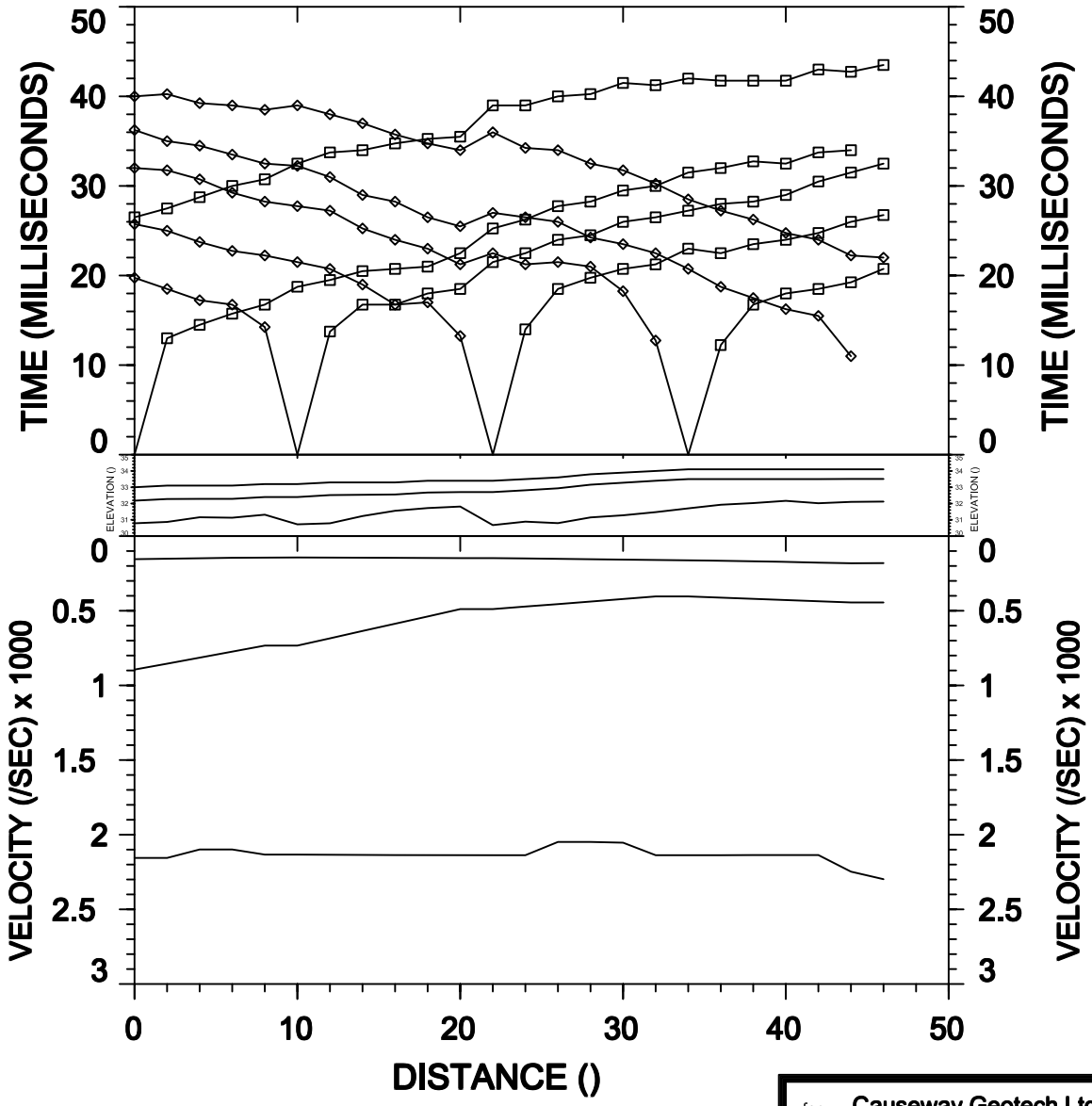


Plate: 10a

for: Causeway Geotech Ltd		AGP21220
by: Strata Geophysical, Inc.		Tipperary Tipperary
Data SetS86R	Date: 09/06/22	
Equipment: Geode	Spread: S86	Azimuth:

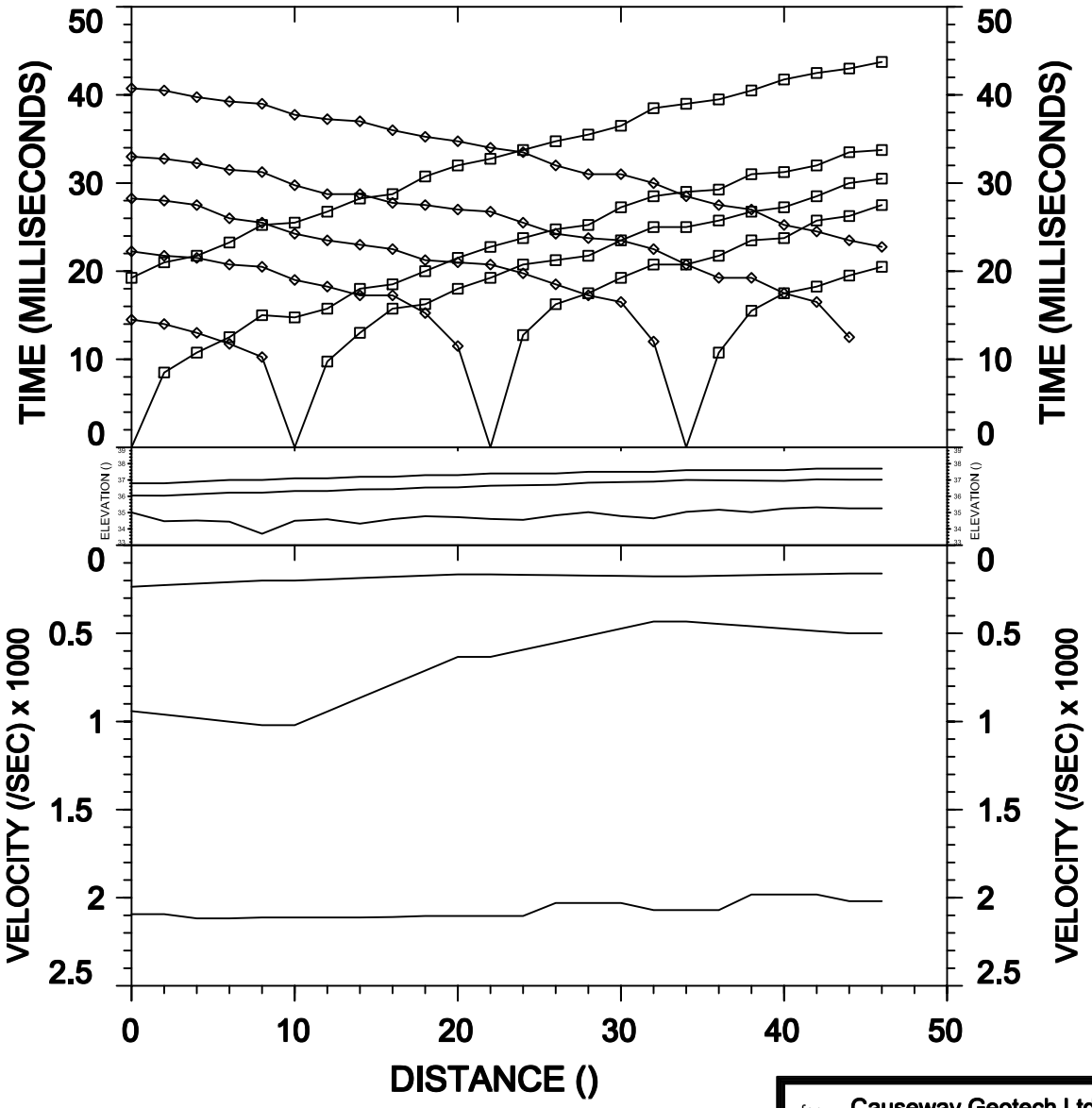


Plate: 10a

for: Causeway Geotech Ltd		AGP21220
by: Strata Geophysical, Inc.		Tipperary Tipperary
Data SetS87R	Date: 10/06/22	
Equipment: Geode	Spread: S87	Azimuth:

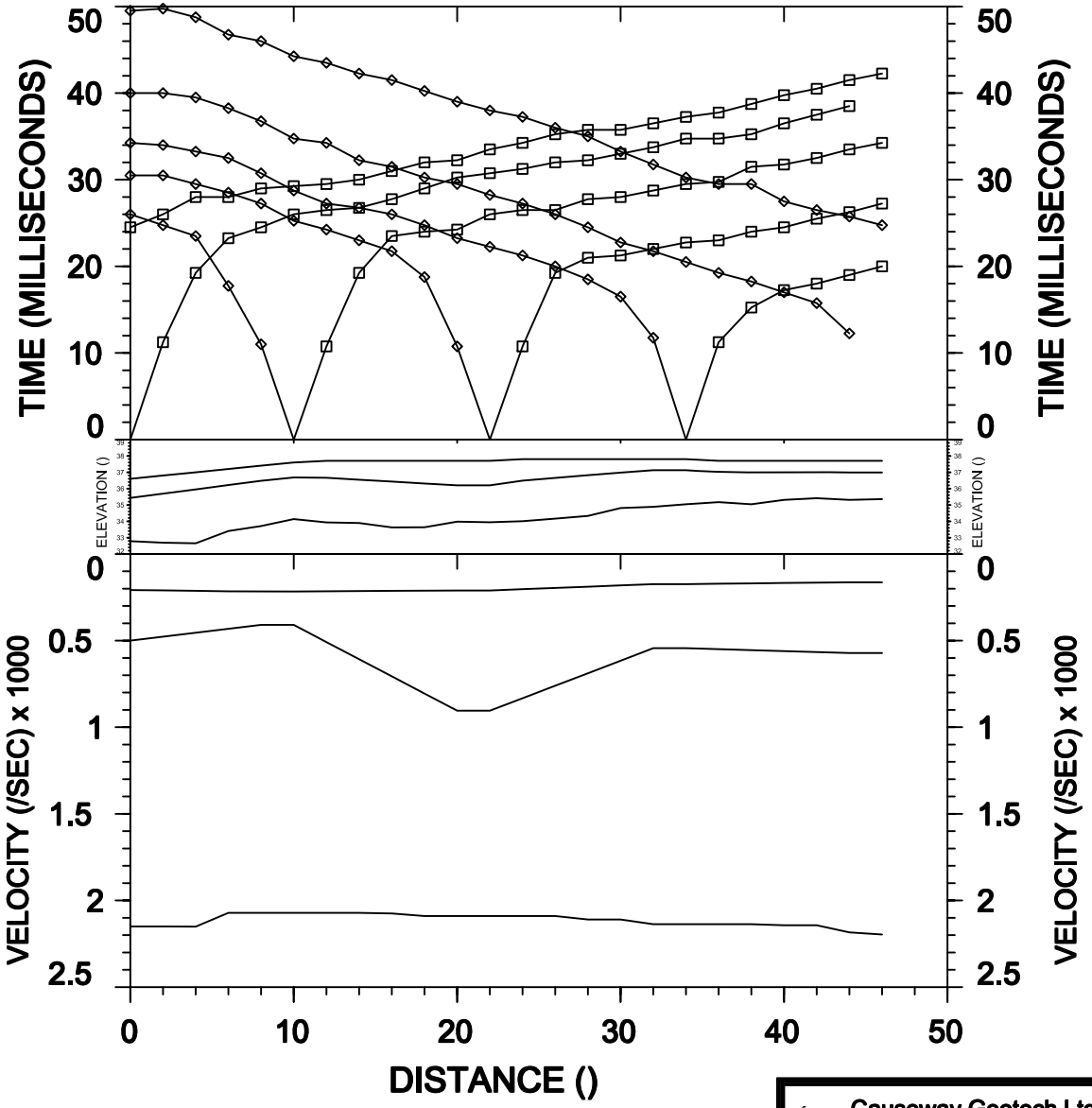


Plate: 10a

for: Causeway Geotech Ltd		AGP21220
by: Strata Geophysical, Inc.		Tipperary Tipperary
Data SetS88	Date: 10/06/22	
Equipment: Geode	Spread: S88	Azimuth:

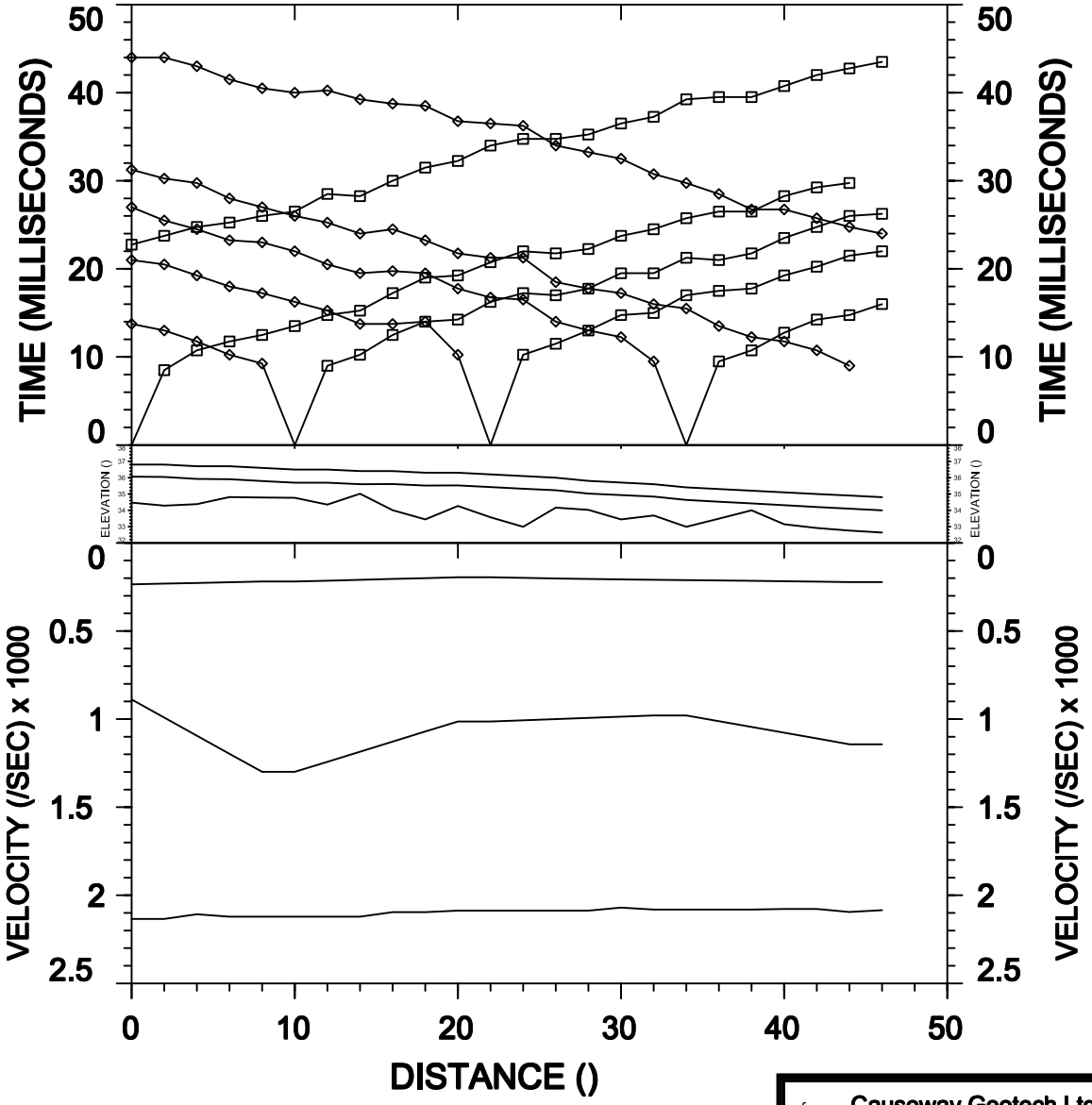


Plate: 10a

for: Causeway Geotech Ltd		AGP21220
by: Strata Geophysical, Inc.		Tipperary
Data SetS89	Date: 10/06/22	Tipperary
Equipment: Geode	Spread: S89	Azimuth:

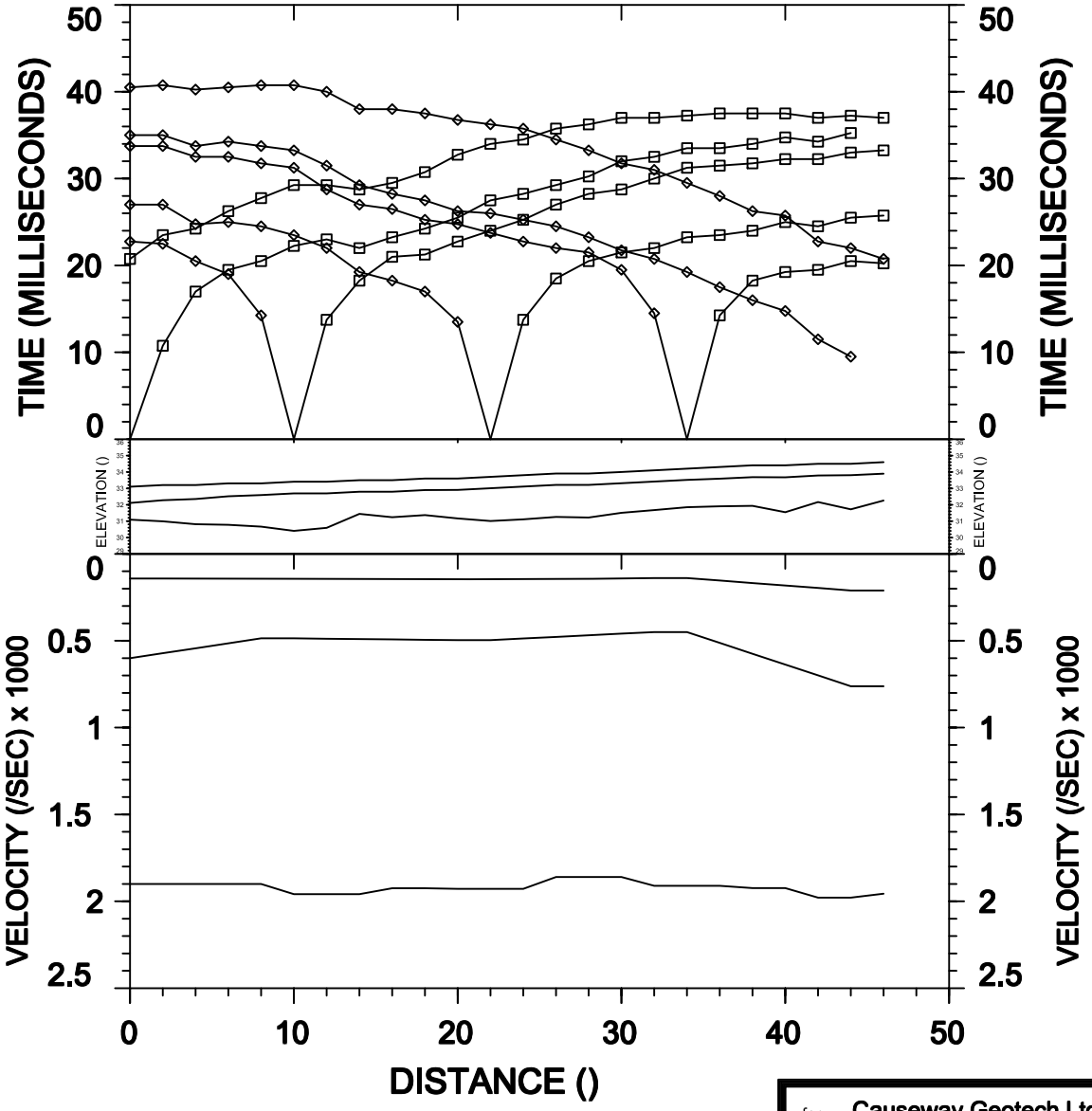


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS90R / Date: 10/06/22	
Equipment: Geode / Spread: S90	Azimuth:

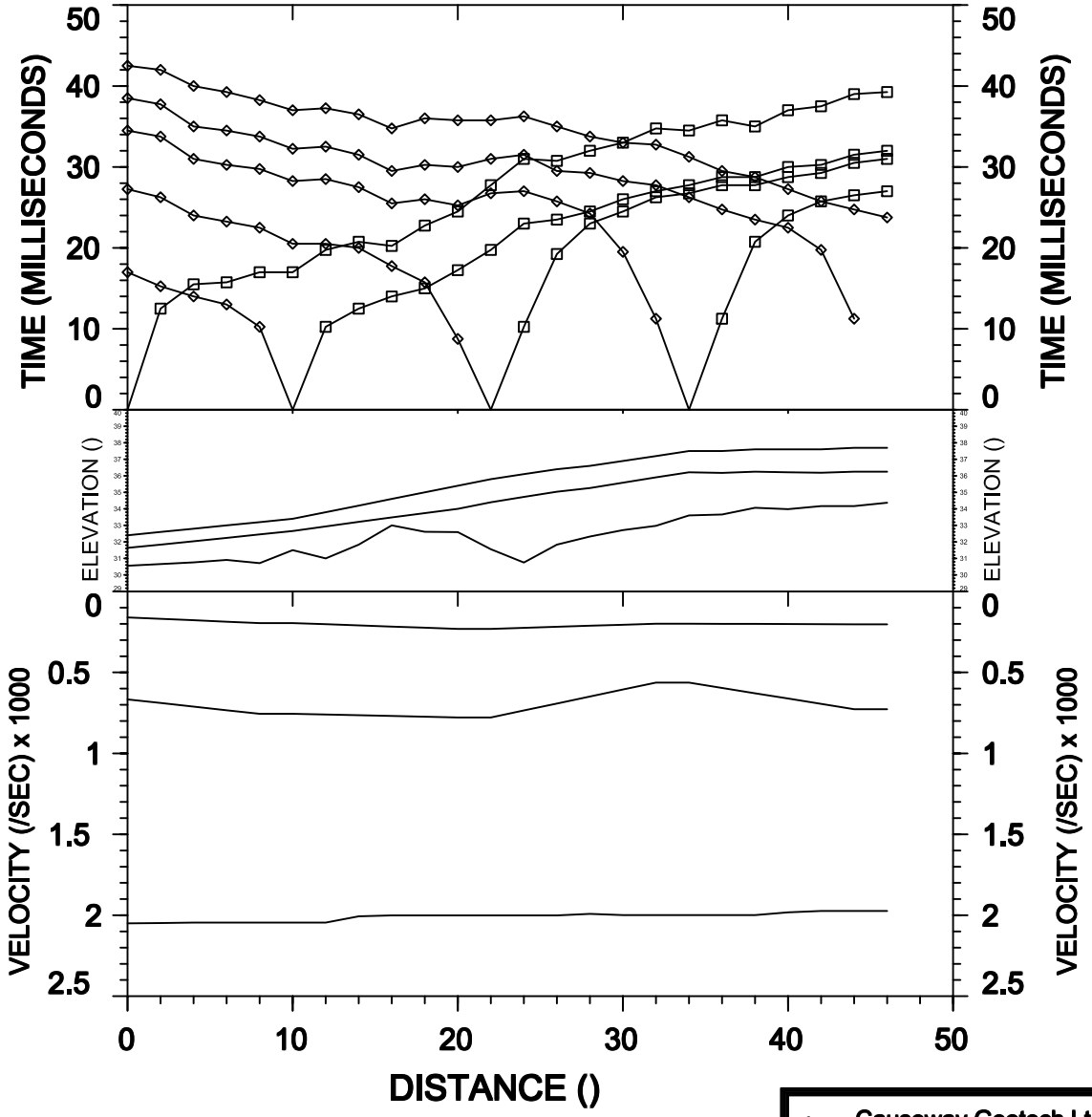


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS91 / Date: 10/06/22	
Equipment: Geode / Spread: S91	Azimuth:

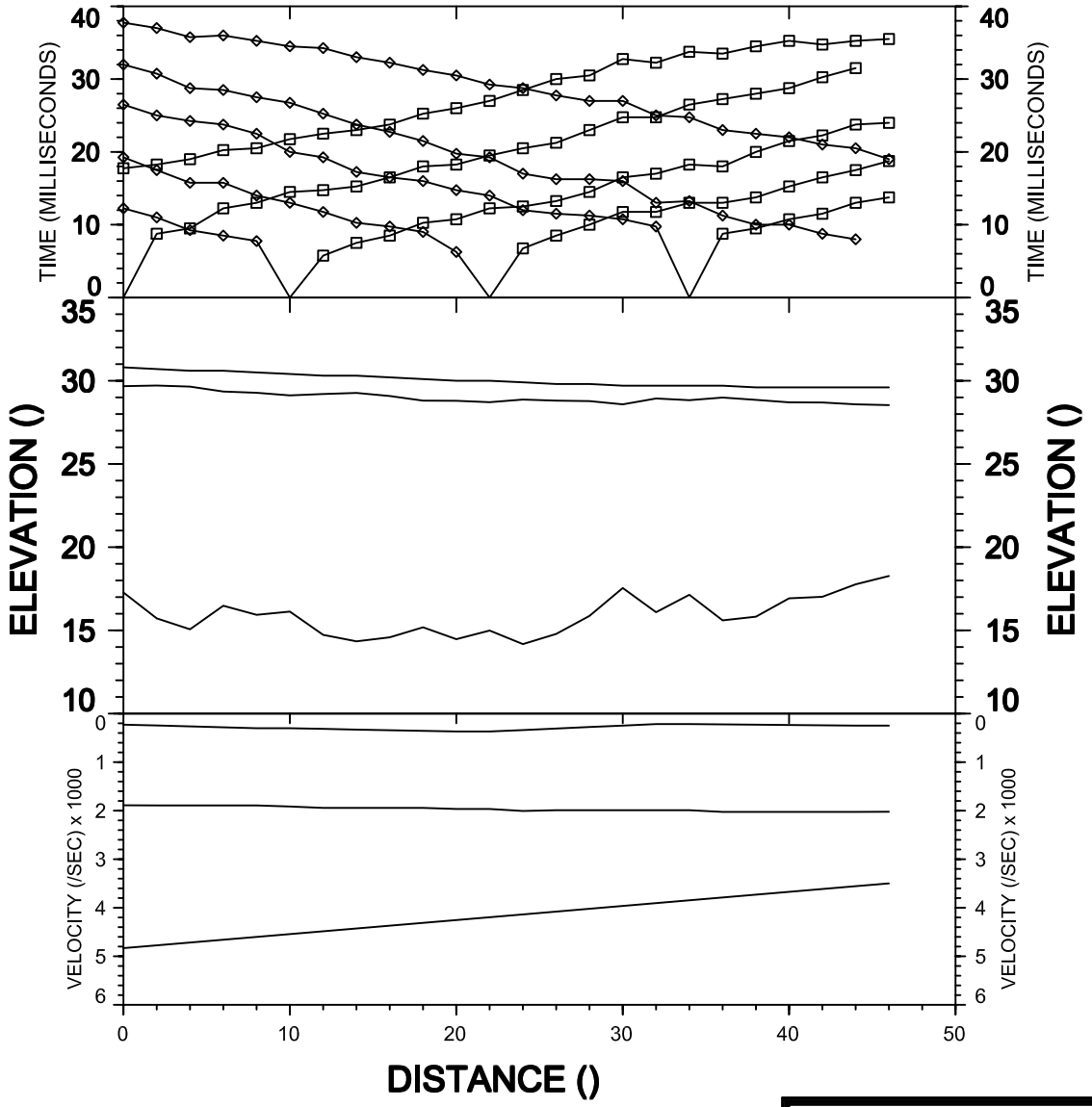


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS92 / Date: 13/06/22	
Equipment: Geode / Spread: S92	Azimuth:

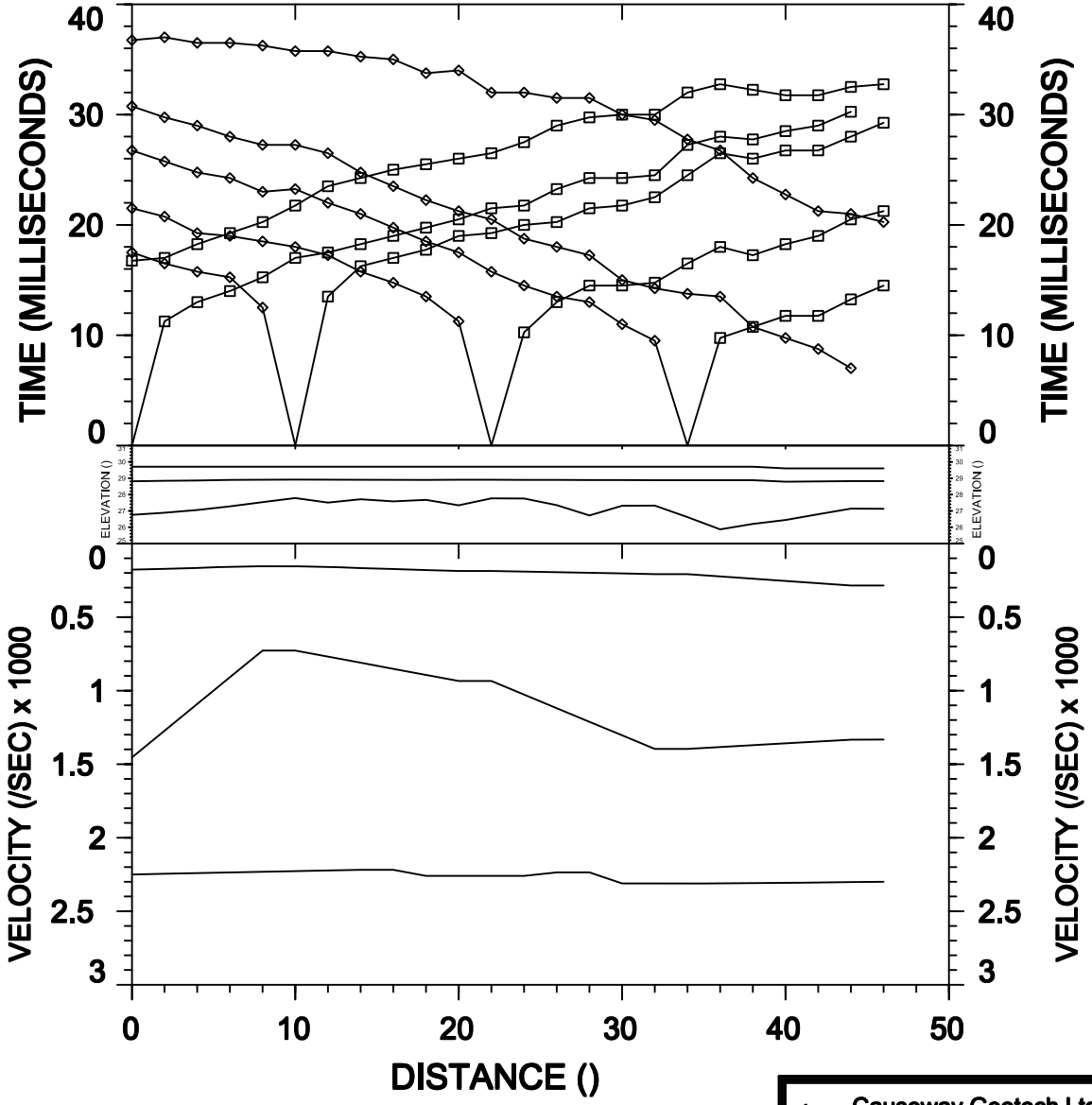


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS93 / Date: 13/06/22	
Equipment: Geode / Spread: S93	Azimuth:

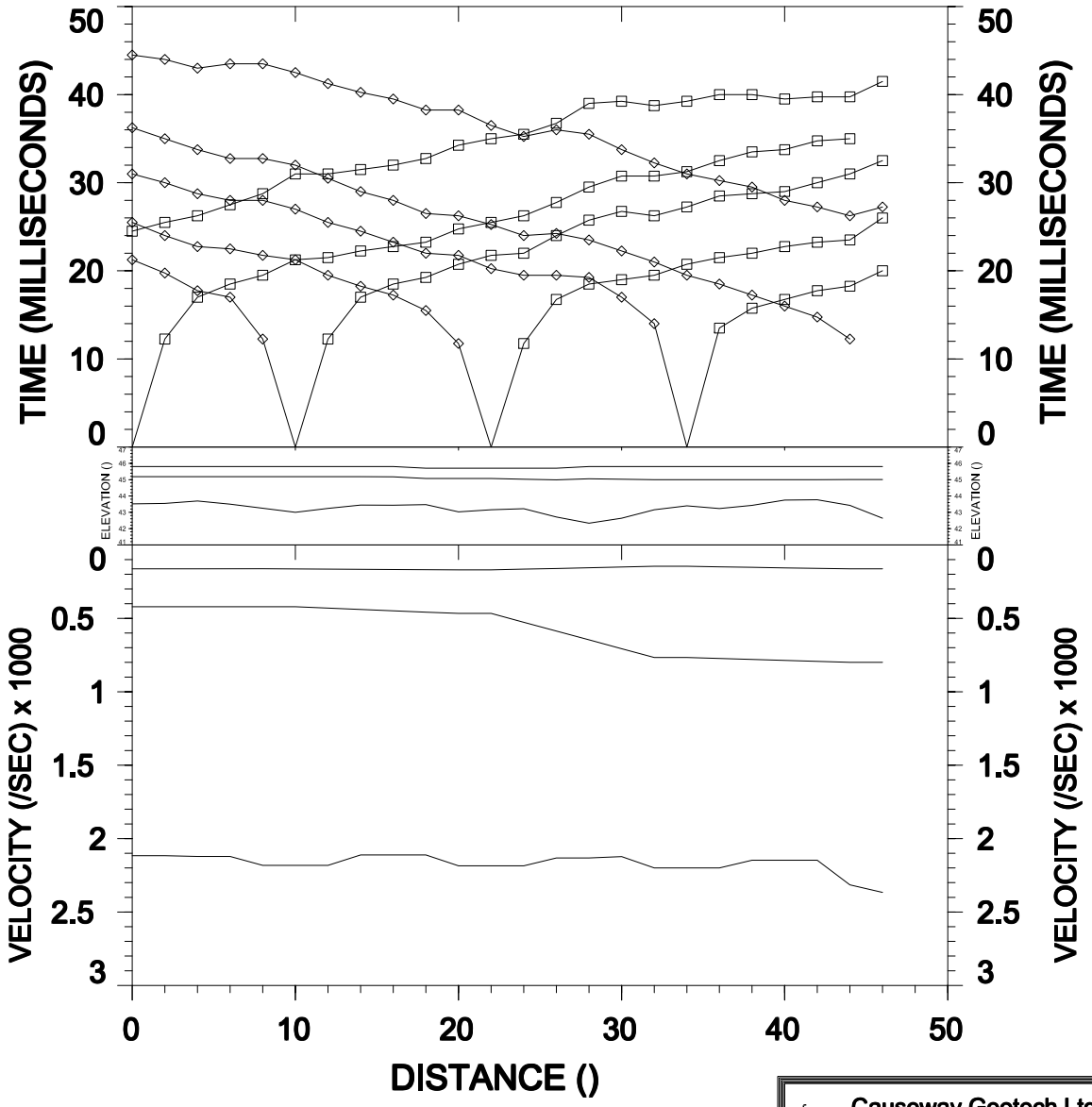


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS94R / Date: 13/06/22	
Equipment: Geode / Spread: S94	Azimuth:

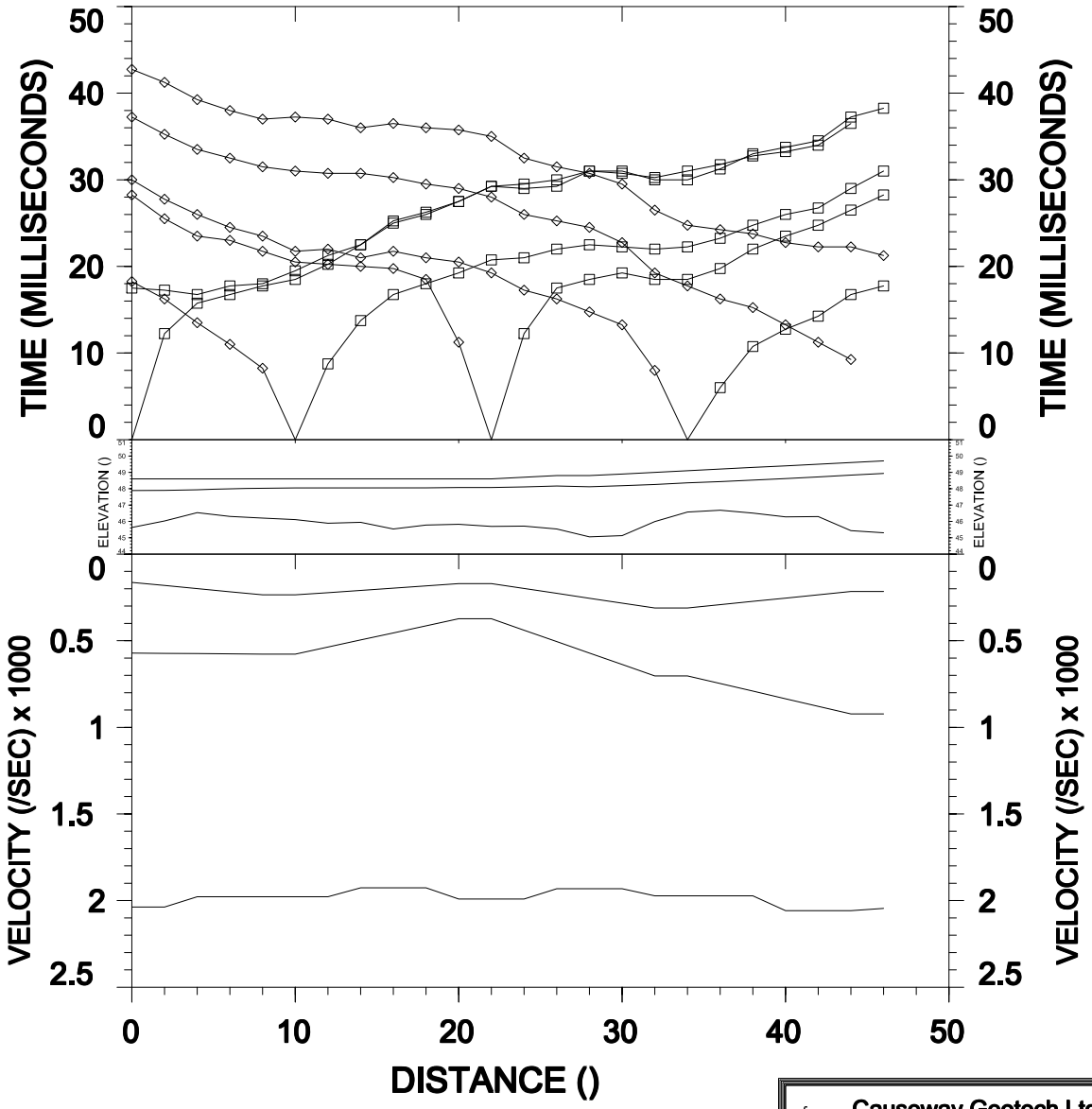


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS95 / Date: 13/06/22	
Equipment: Geode / Spread: S95	Azimuth:

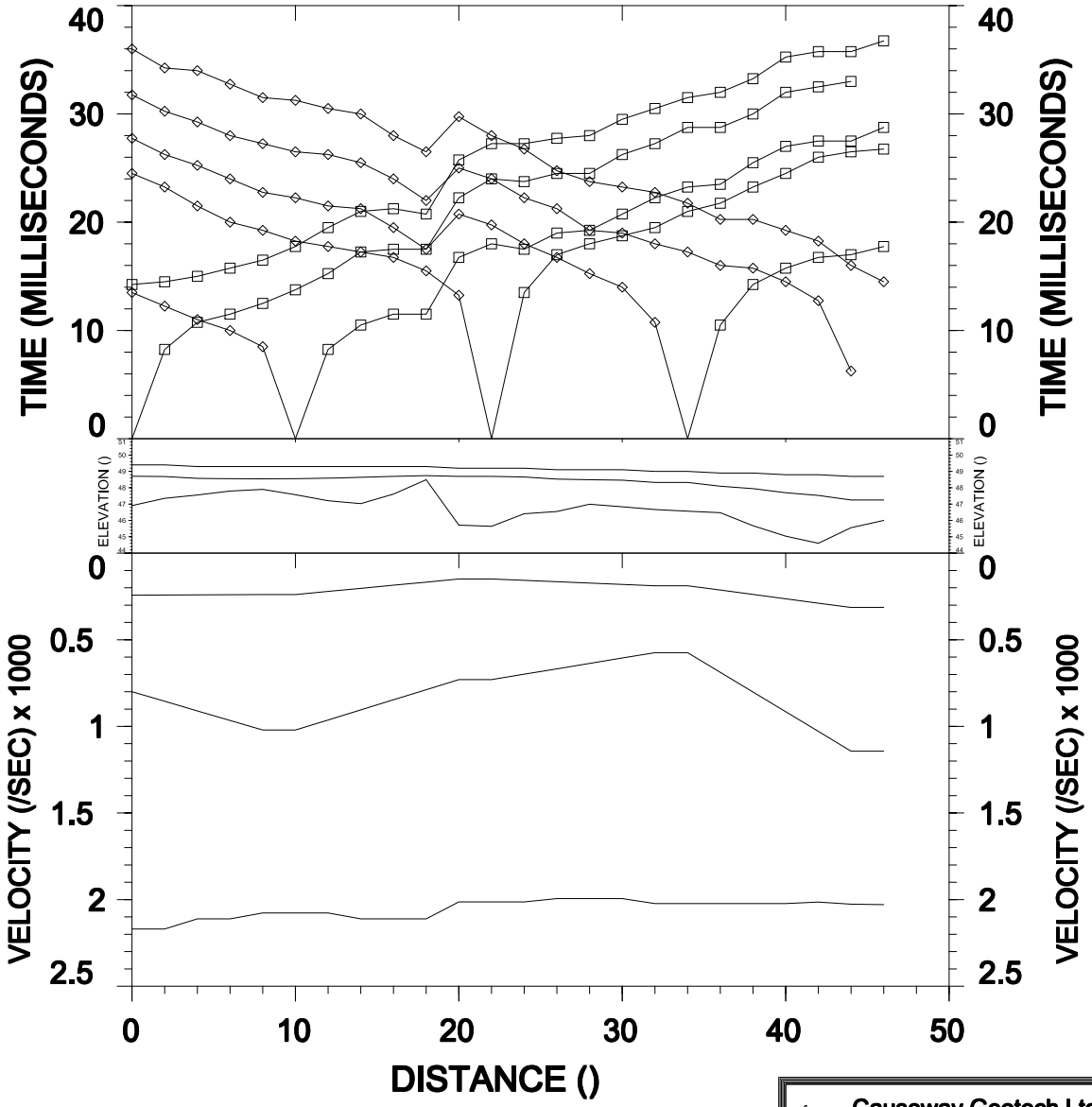


Plate: 10a

for: Causeway Geotech Ltd		AGP21220
by: Strata Geophysical, Inc.		Tipperary Tipperary
Data SetS96	Date: 14/06/22	
Equipment: Geode	Spread: S96	Azimuth:

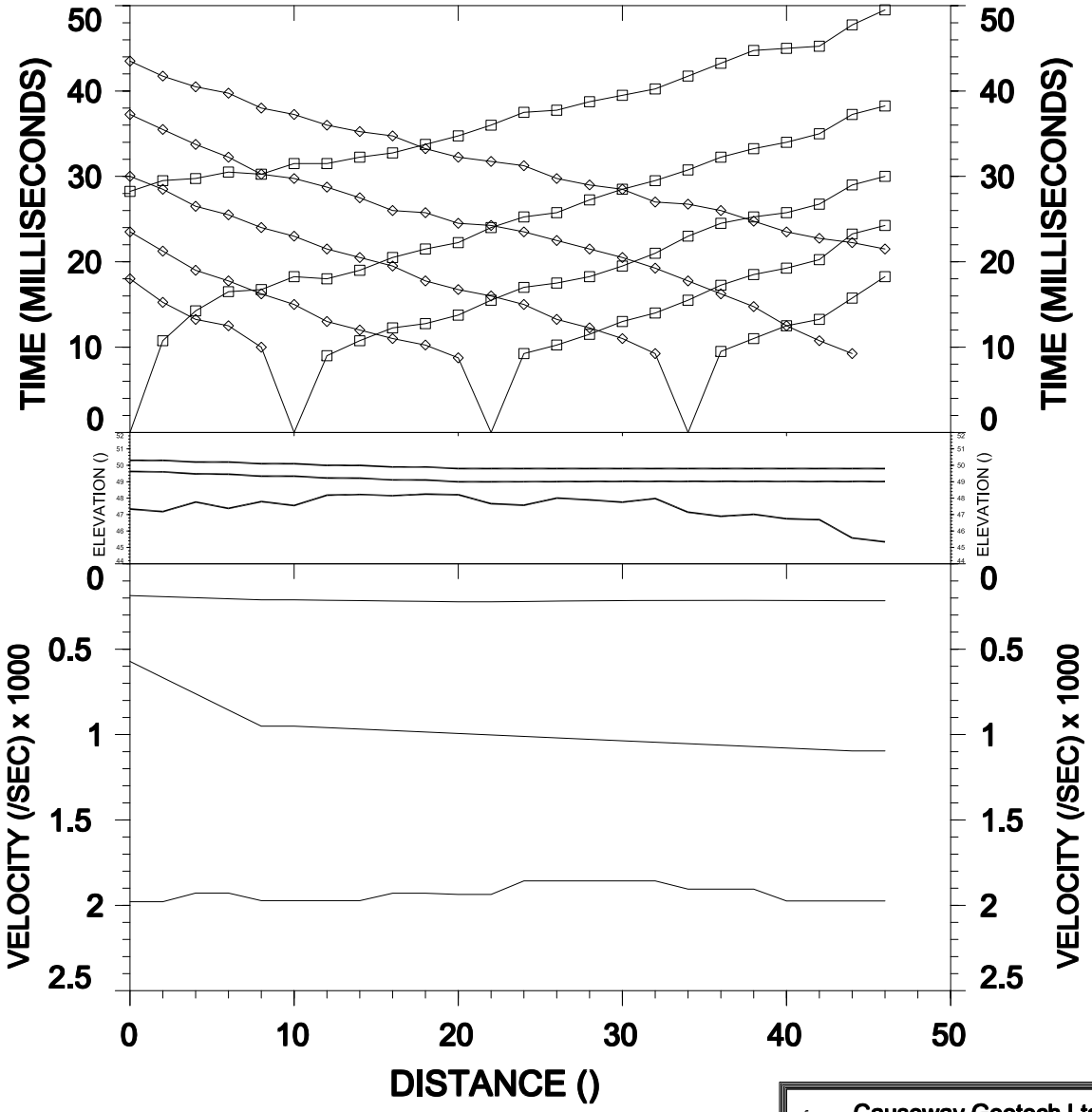


Plate: 10a

for: Causeway Geotech Ltd		AGP21220
by: Strata Geophysical, Inc.		Tipperary
Data SetS97	Date: 14/06/22	Tipperary
Equipment: Geode	Spread: S97	Azimuth:

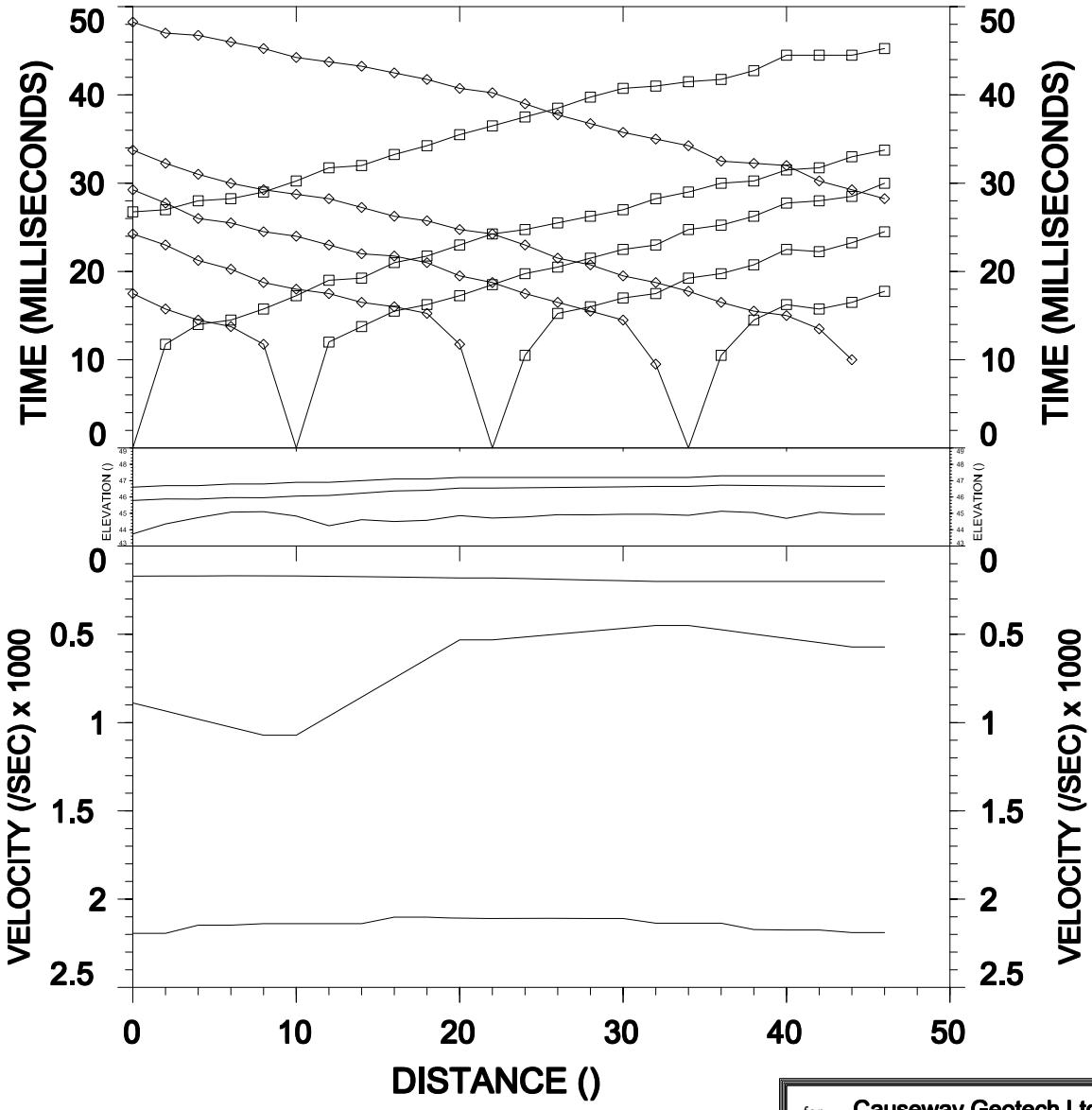


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS98R / Date: 14/06/22	
Equipment: Geode / Spread: S98	Azimuth:

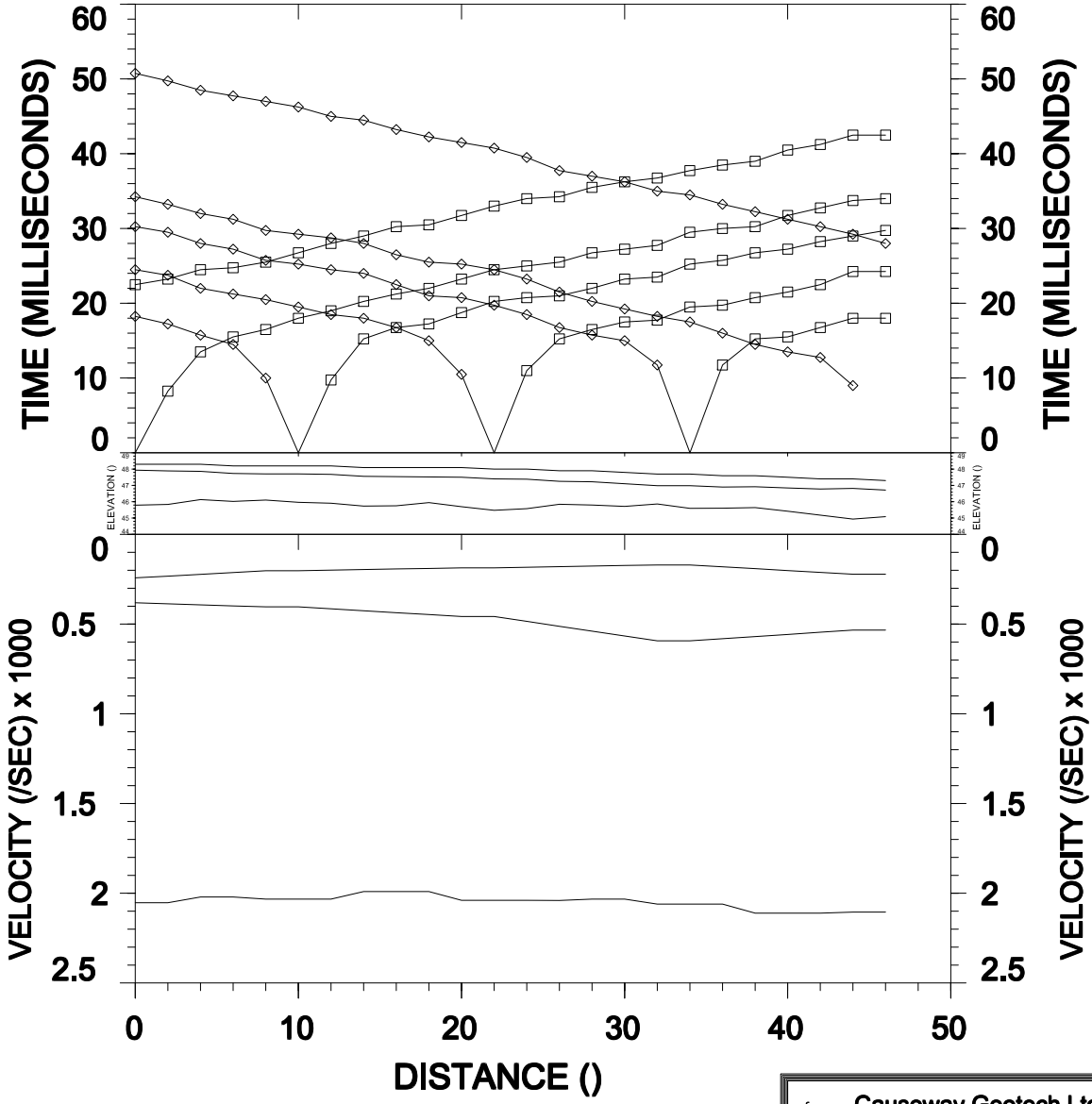


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS99 / Date: 14/06/22	
Equipment: Geode / Spread: S99	Azimuth:

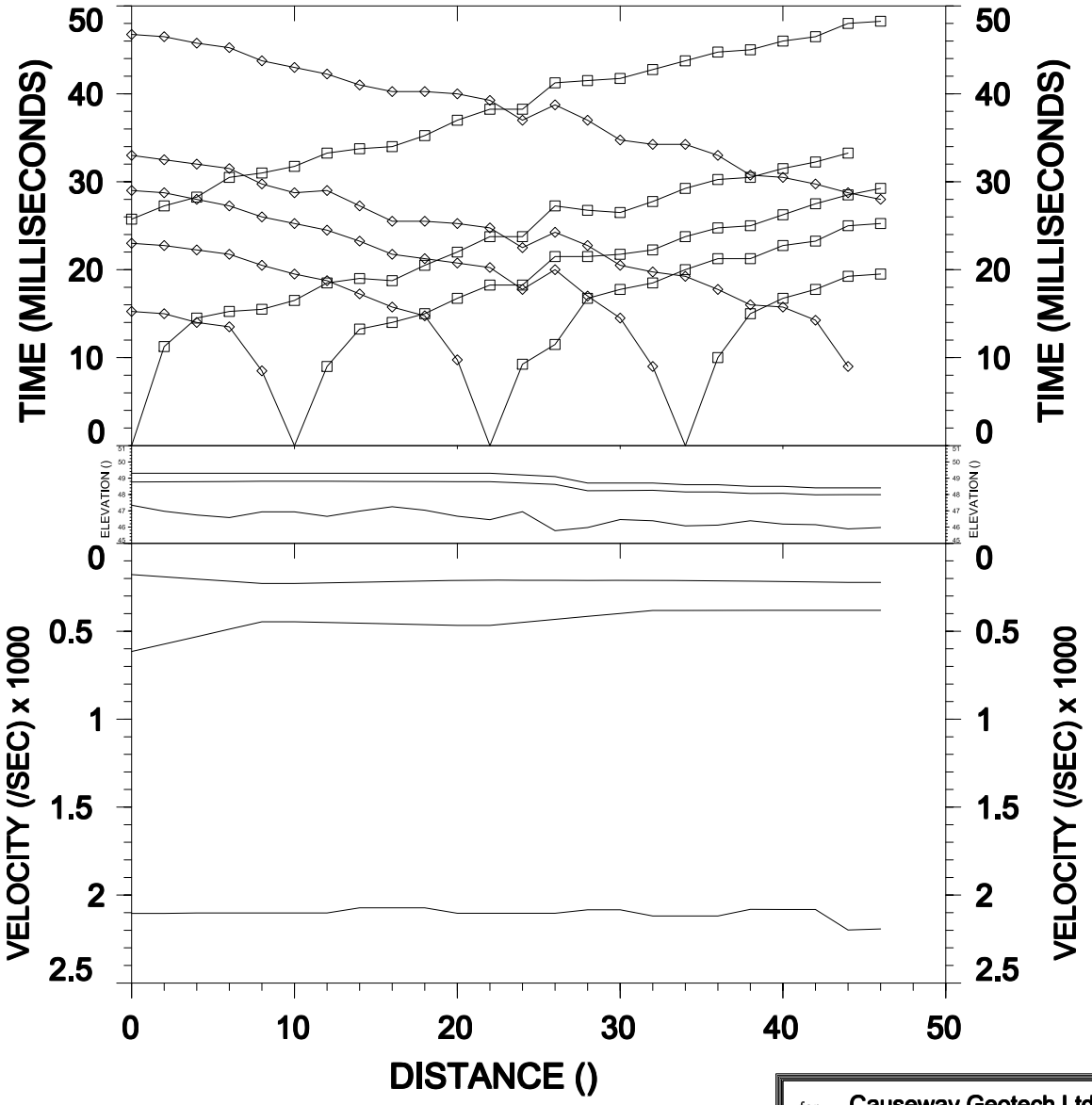


Plate: 10a

for: Causeway Geotech Ltd		AGP21220
by: Strata Geophysical, Inc.		Tipperary
Data SetS100	Date: 14/06/22	Tipperary
Equipment: Geode	Spread: S100	Azimuth:

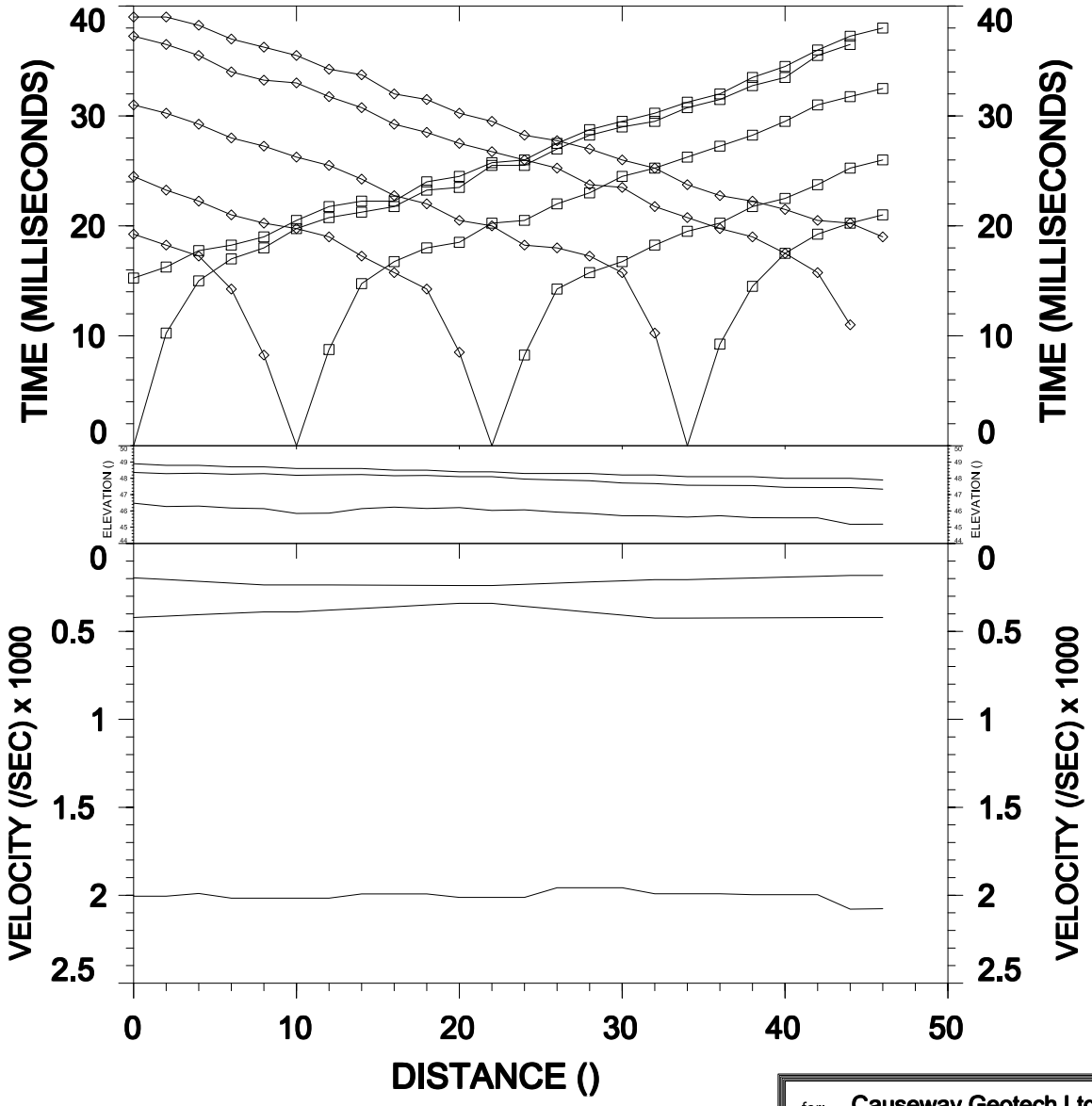


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS101 / Date: 14/06/22	
Equipment: Geode / Spread: S101	Azimuth:

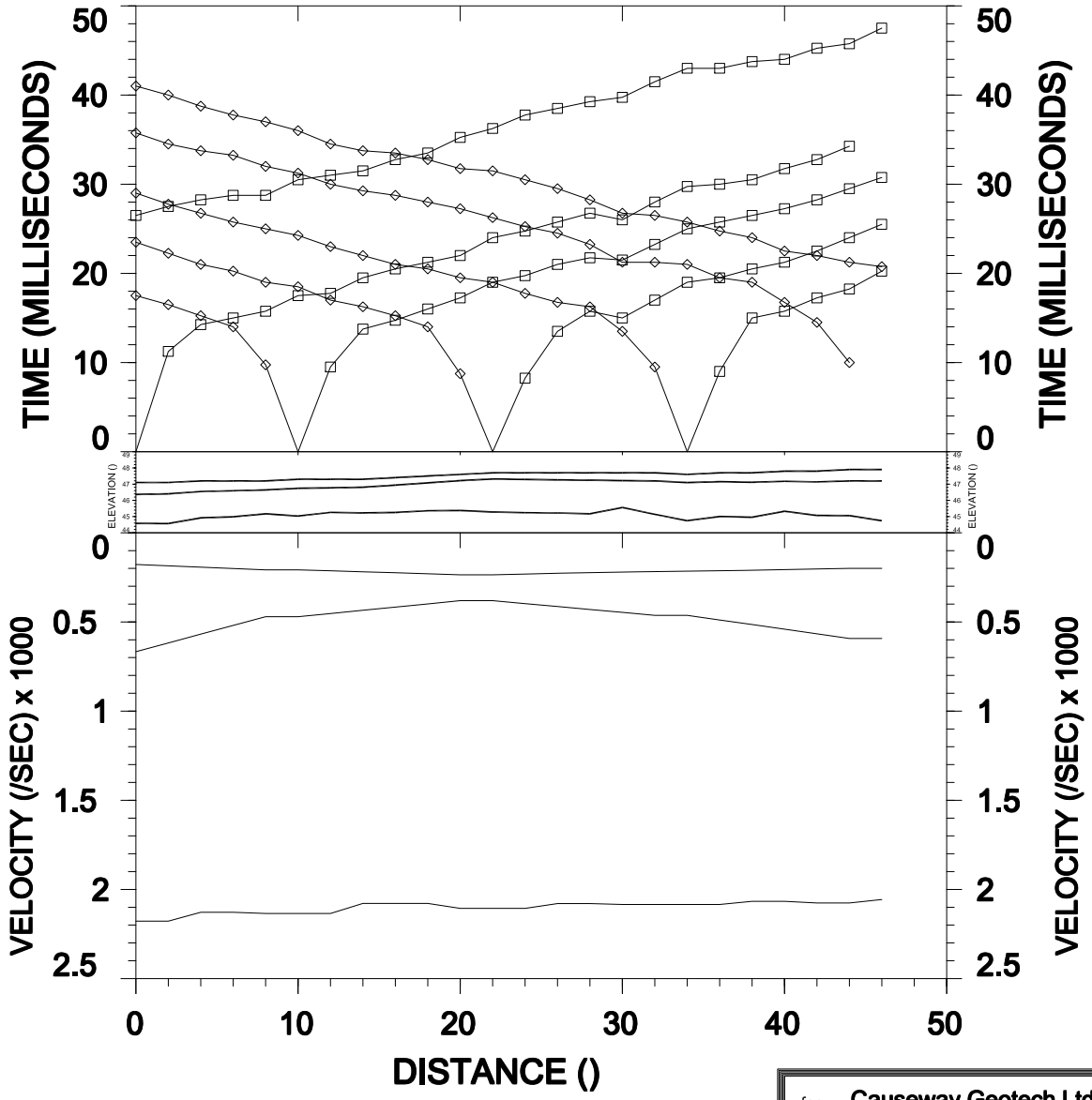


Plate: 10a

for: Causeway Geotech Ltd		AGP21220
by: Strata Geophysical, Inc.		Tipperary
Data SetS102	Date: 14/06/22	Tipperary
Equipment: Geode	Spread: S102	Azimuth:

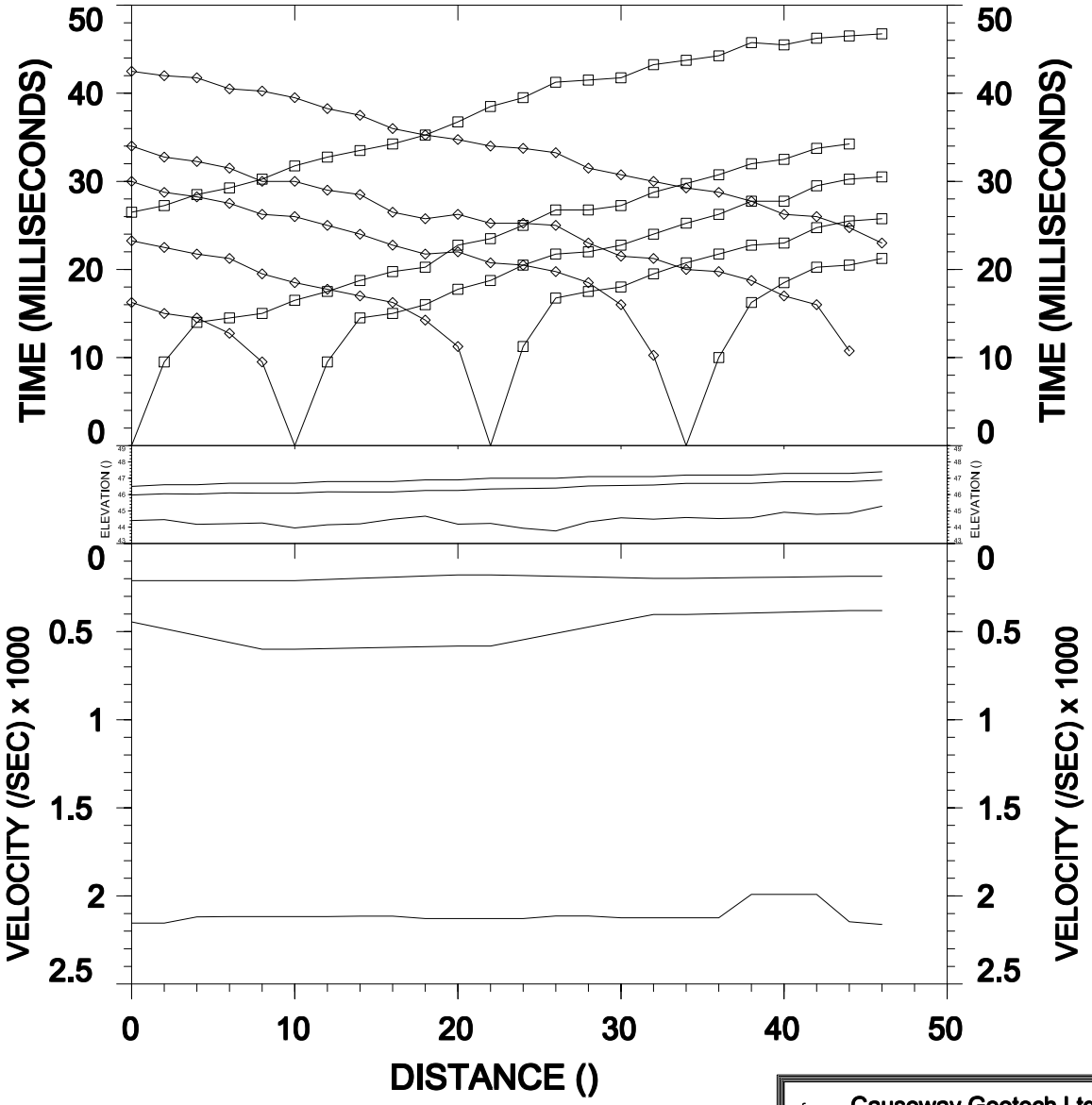


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS103R / Date: 14/06/22	
Equipment: Geode / Spread: S103	Azimuth:

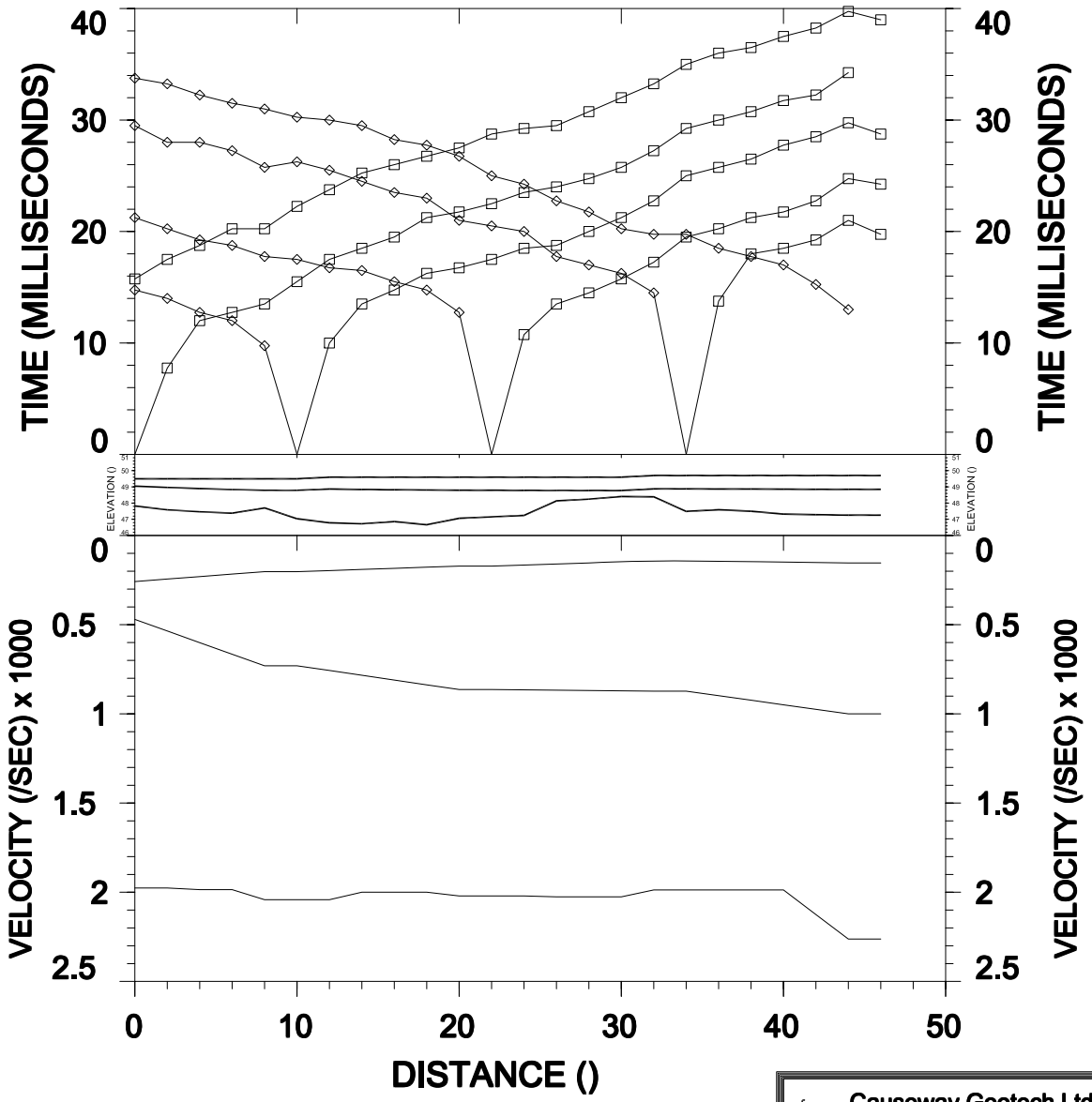


Plate: 10a

for: Causeway Geotech Ltd		AGP21220
by: Strata Geophysical, Inc.		Tipperary Tipperary
Data SetS104	Date: 15/06/22	
Equipment: Geode	Spread: S104	Azimuth:

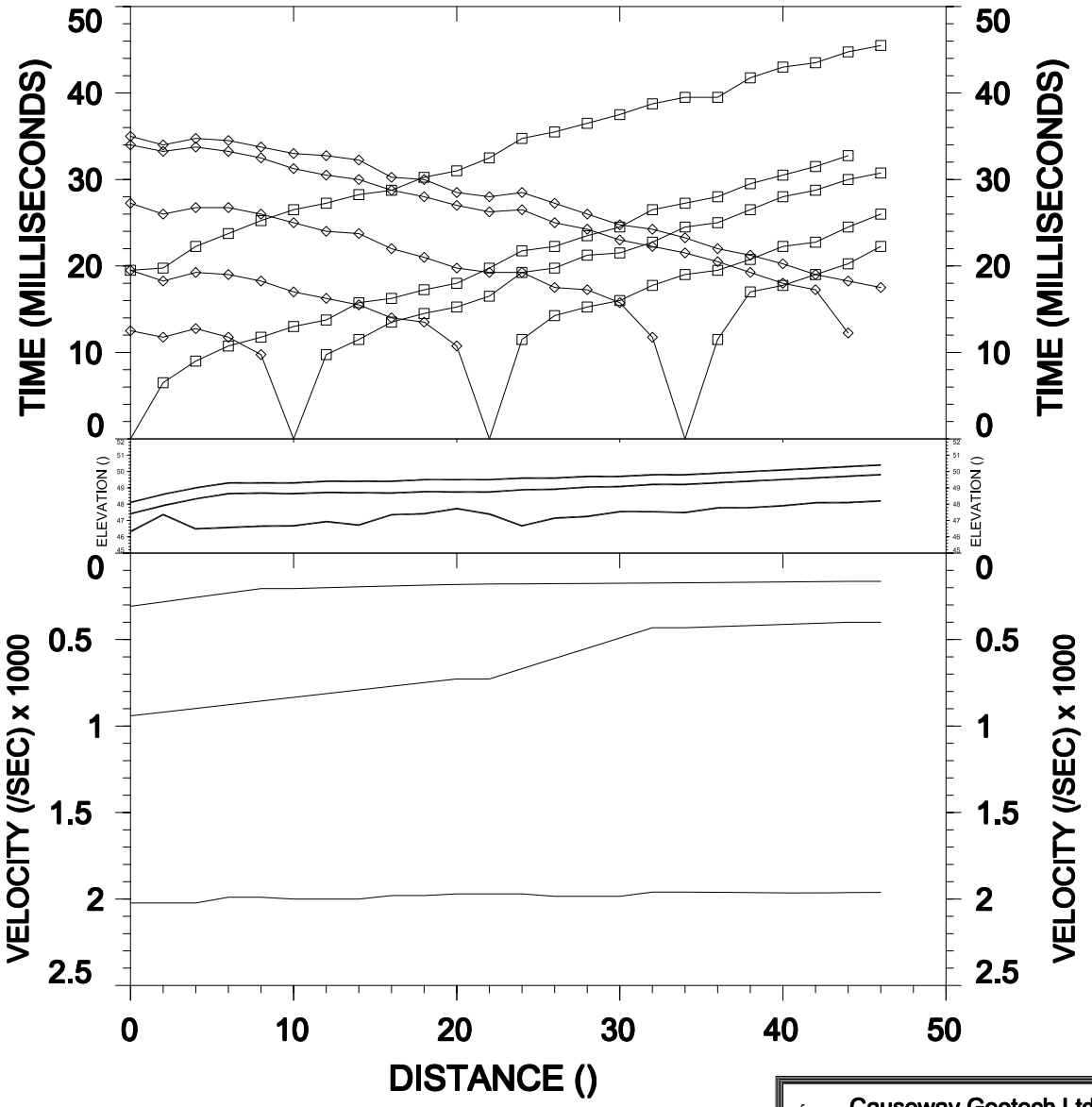


Plate: 10a

for: Causeway Geotech Ltd		AGP21220
by: Strata Geophysical, Inc.		Tipperary Tipperary
Data SetS105	Date: 15/06/22	
Equipment: Geode	Spread: S105	Azimuth:

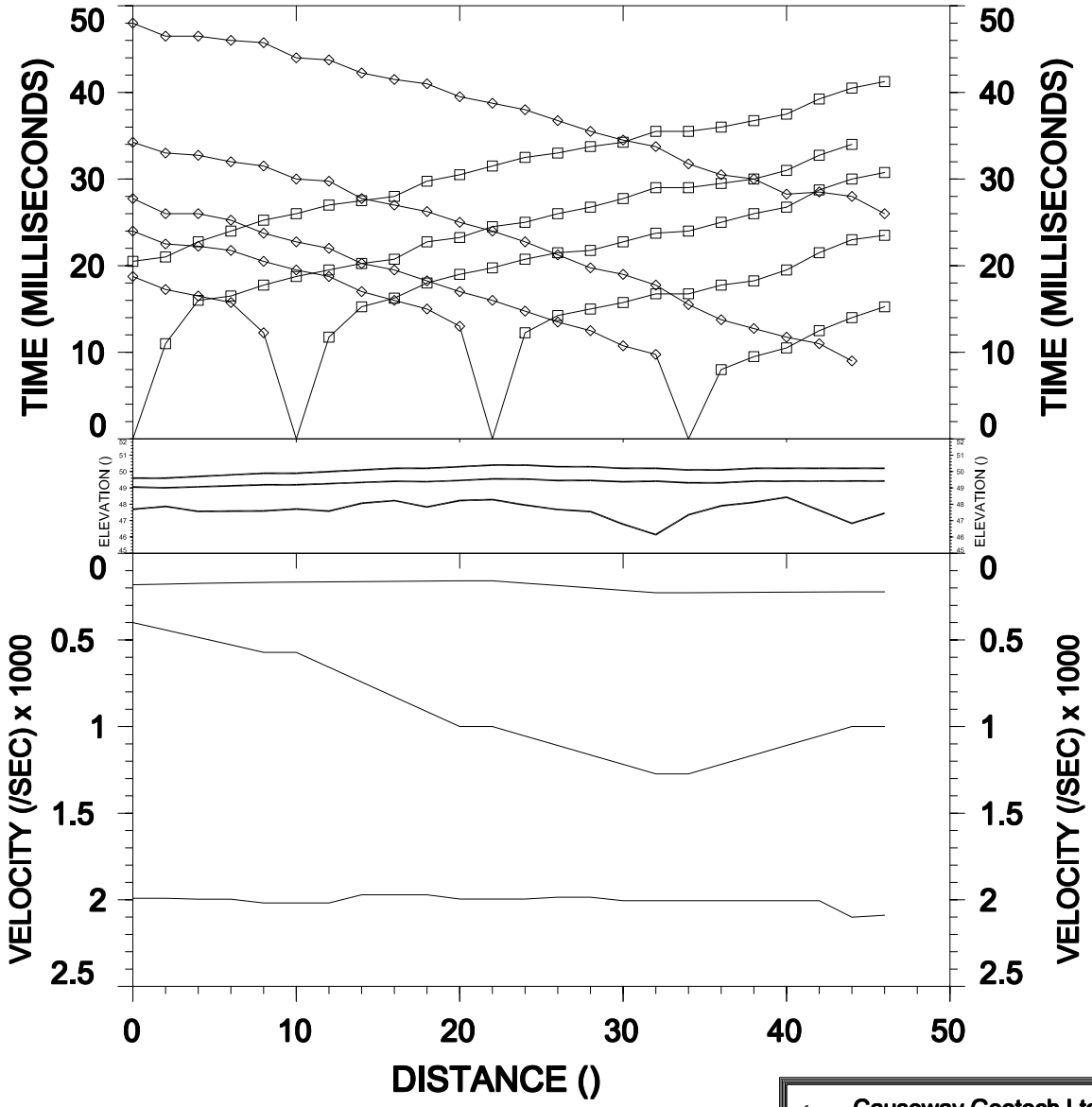


Plate: 10a

for: Causeway Geotech Ltd		AGP21220
by: Strata Geophysical, Inc.		Tipperary Tipperary
Data SetS106	Date: 15/06/22	
Equipment: Geode	Spread: S106	Azimuth:

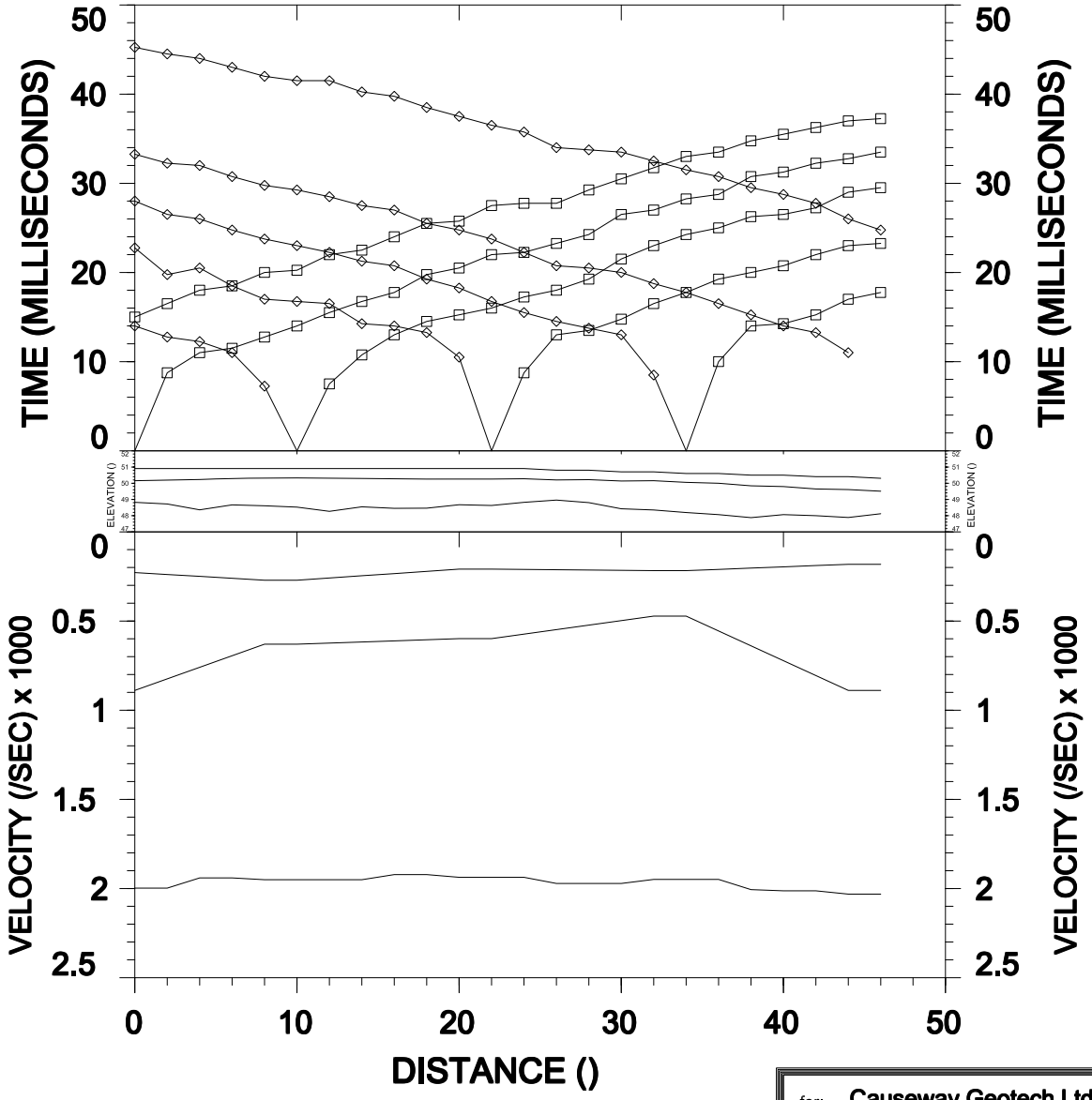


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS107R / Date: 15/06/22	
Equipment: Geode / Spread: S107	Azimuth:

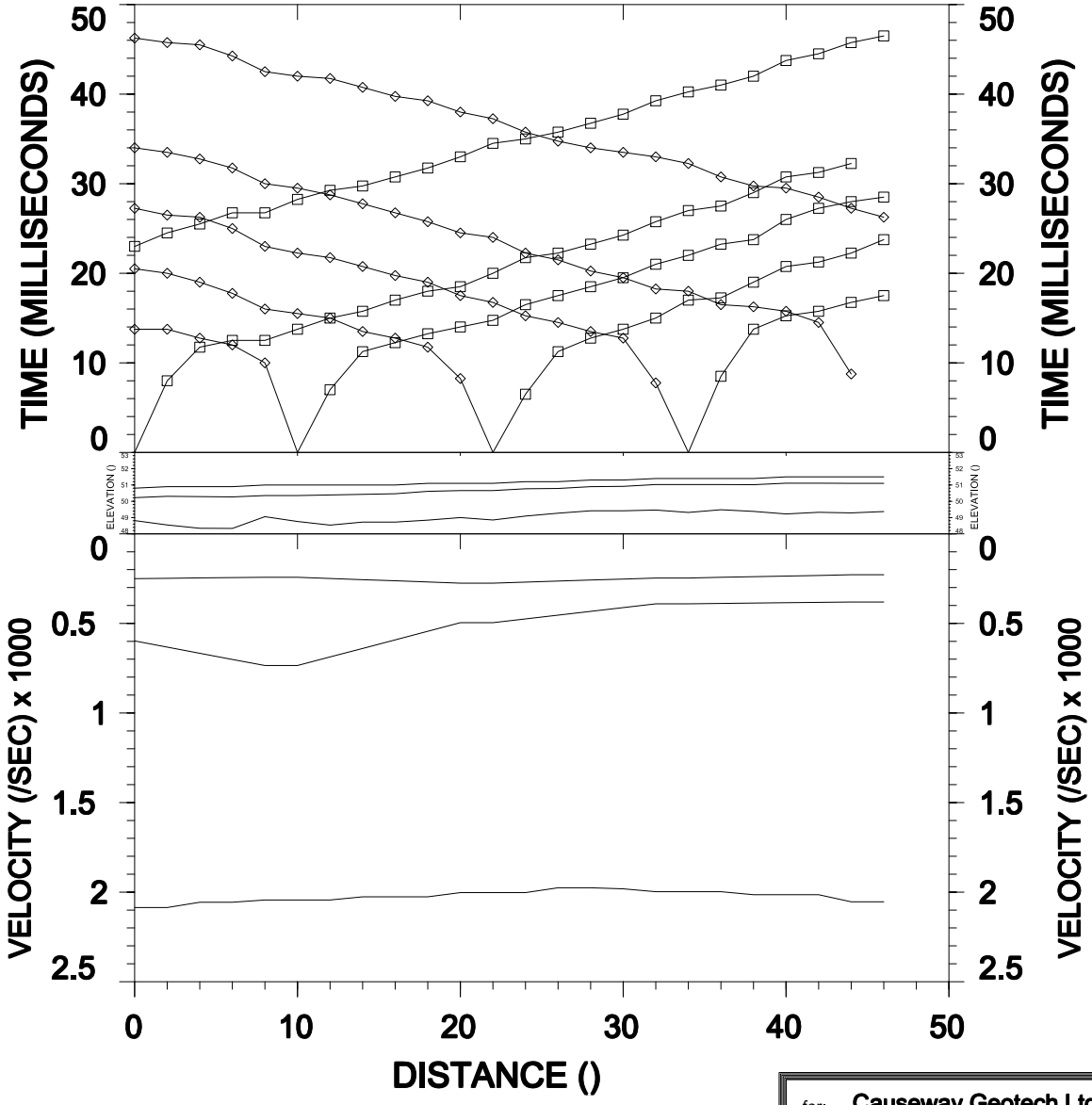
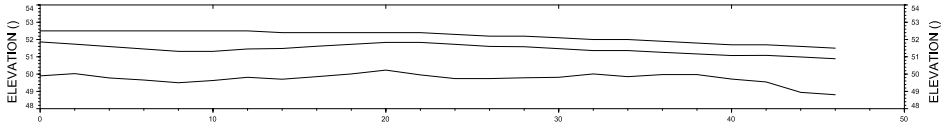


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS108R / Date: 15/06/22	
Equipment: Geode / Spread: S108	Azimuth:



DISTANCE ()

Plate: 10a

for: **Causeway Geotech Ltd**		**AGP21220**
by: Strata Geophysical, Inc.		**Tipperary Tipperary**
Data SetS109	Date: 15/06/22	
Equipment: Geode	**Spread: S109**	**Azimuth:**

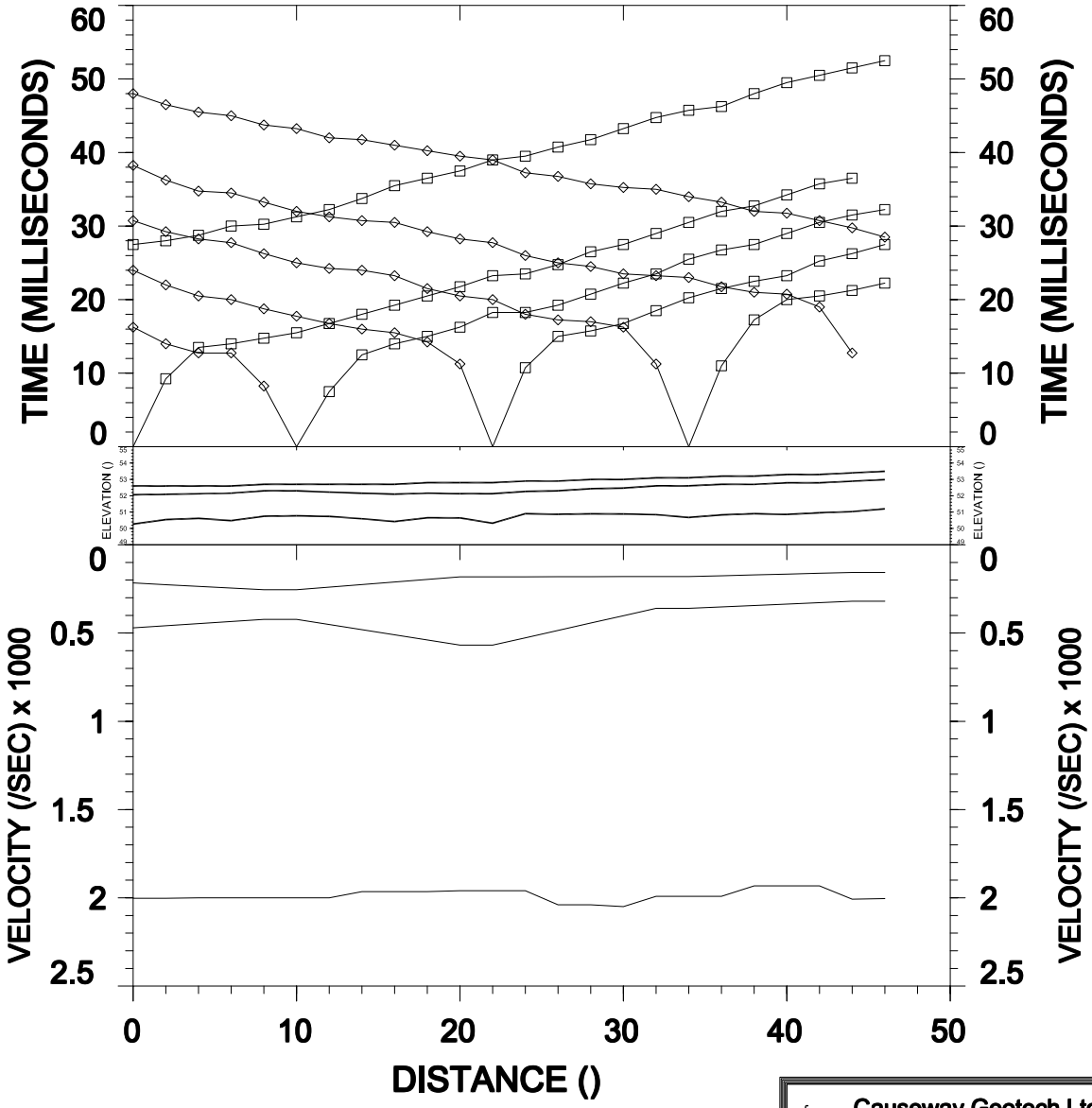


Plate: 10a

for: Causeway Geotech Ltd		AGP21220
by: Strata Geophysical, Inc.		Tipperary Tipperary
Data SetS110	Date: 15/06/22	
Equipment: Geode	Spread: S110	Azimuth:

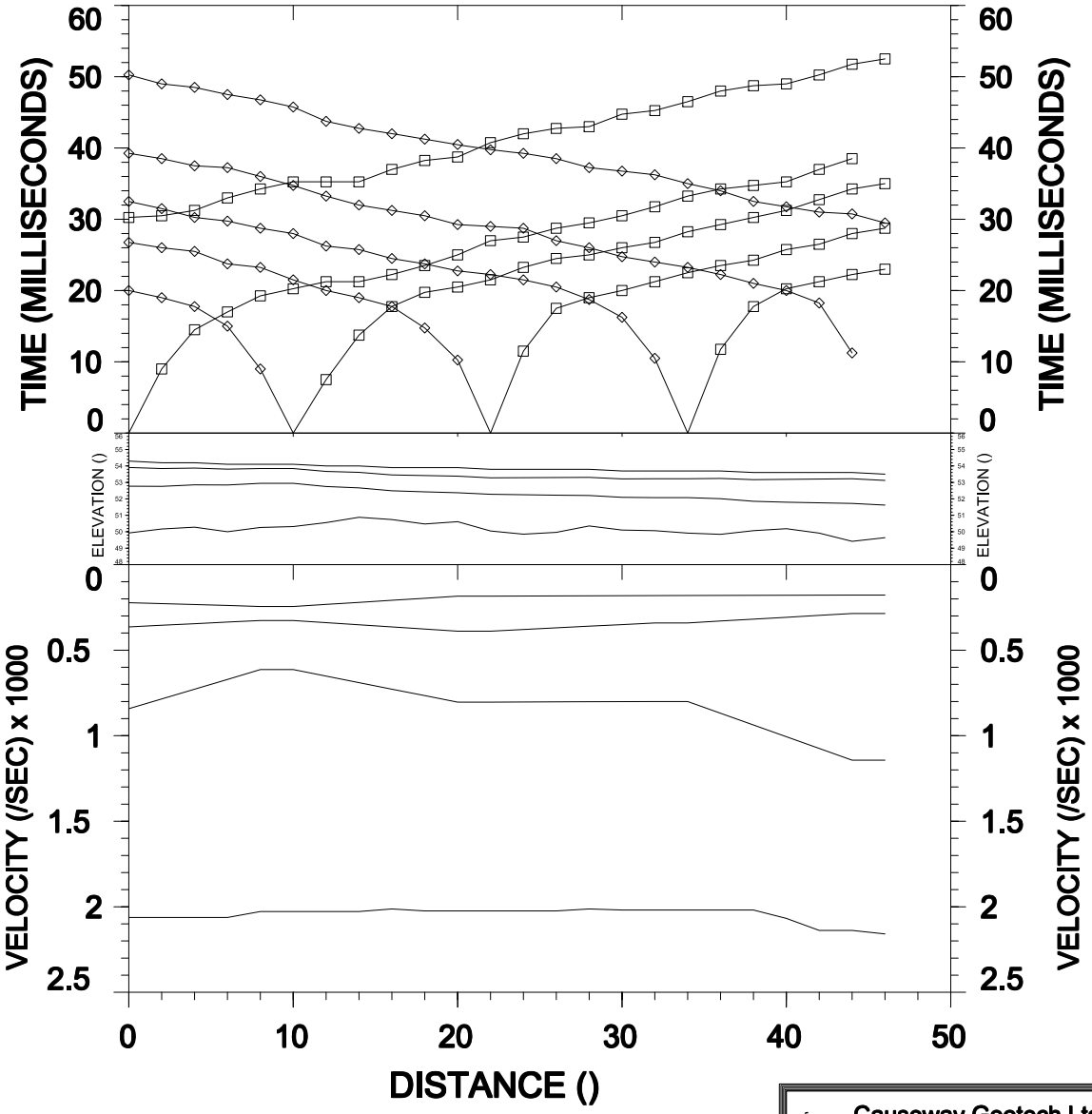


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS111 / Date: 15/06/22	
Equipment: Geode / Spread: S111	Azimuth:

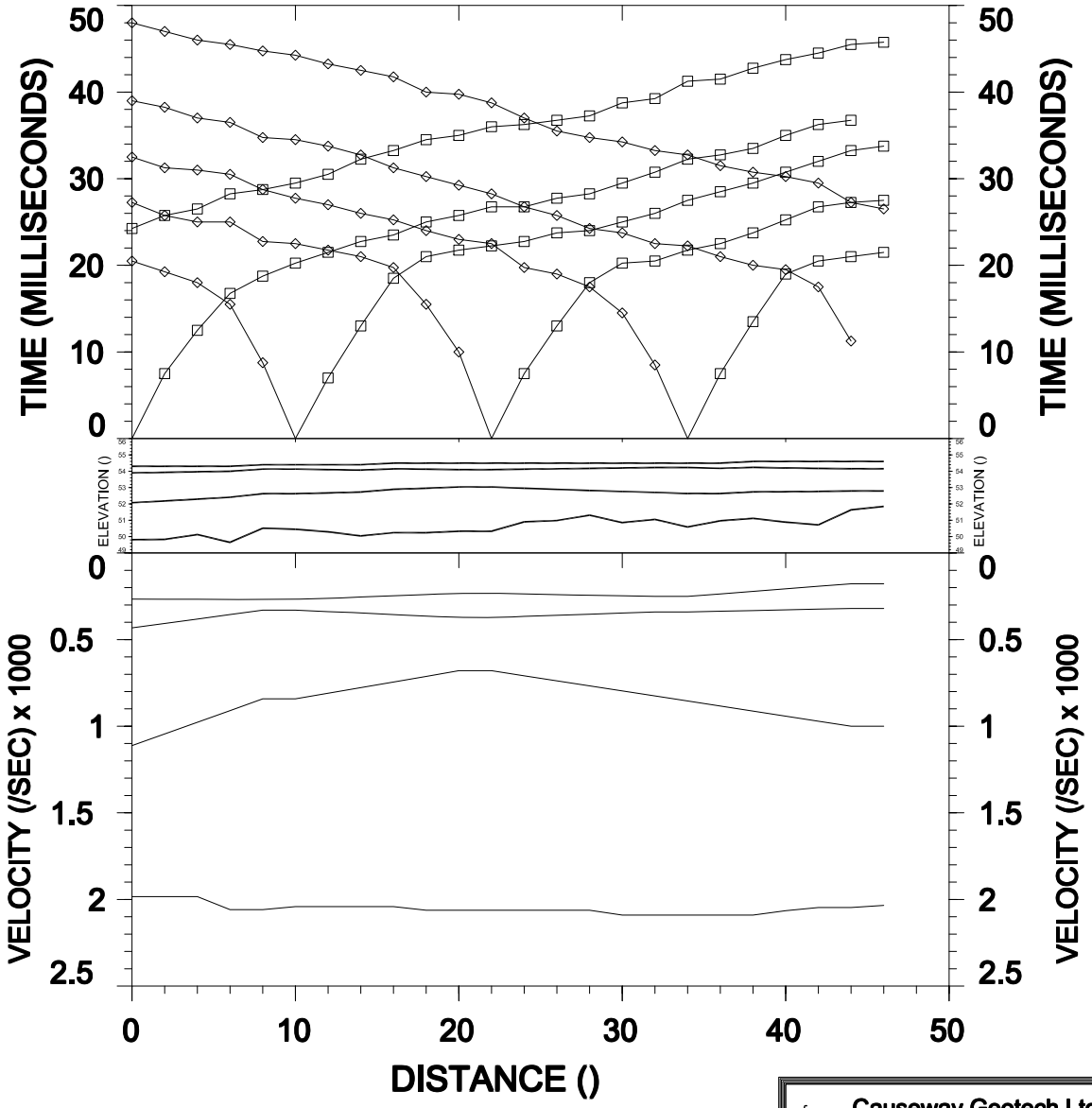


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS112 / Date: 15/06/22	
Equipment: Geode / Spread: S112	Azimuth:

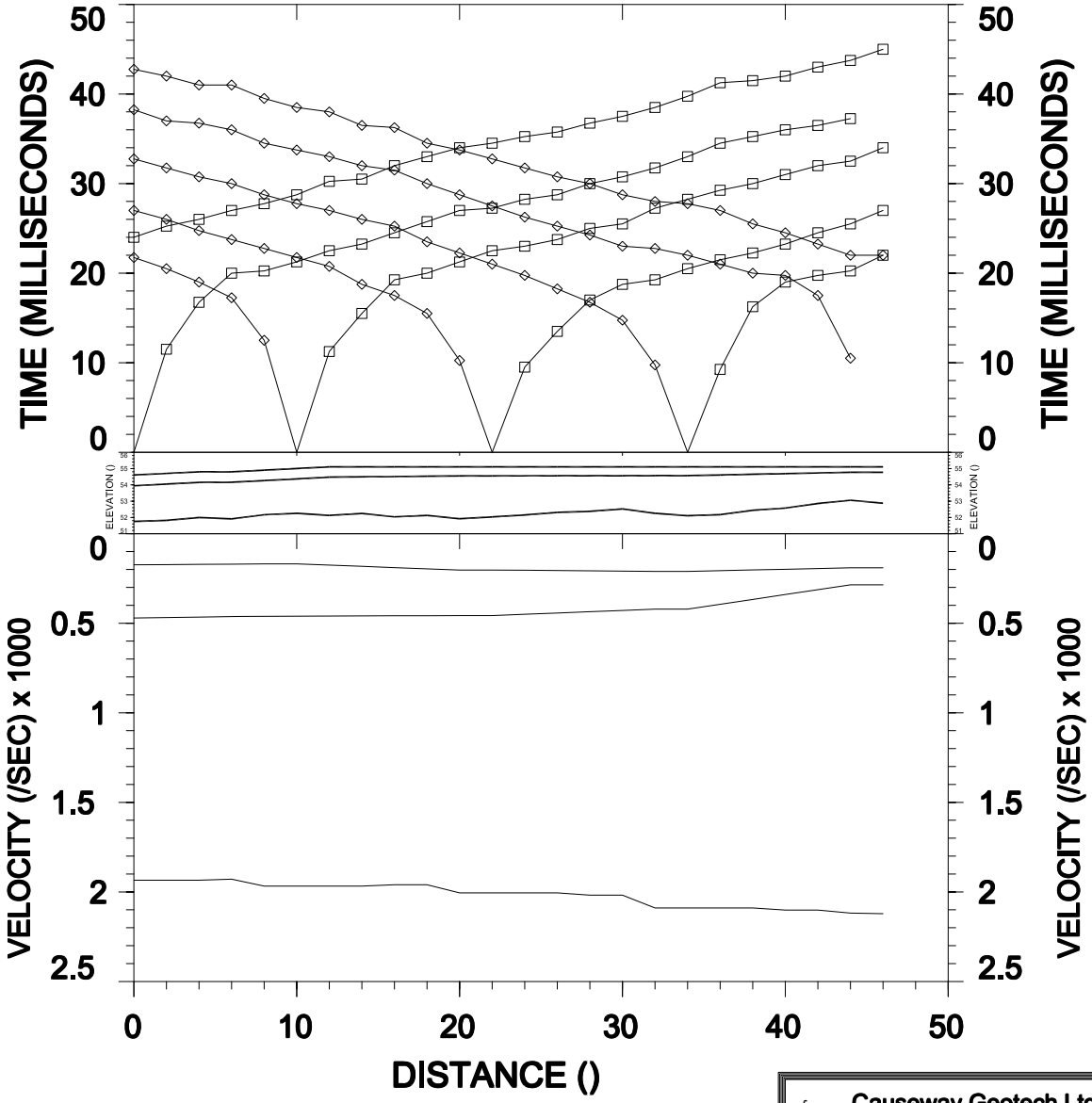


Plate: 10a

for: Causeway Geotech Ltd		AGP21220
by: Strata Geophysical, Inc.		Tipperary Tipperary
Data SetS113	Date: 16/06/22	
Equipment: Geode	Spread: S113	Azimuth:

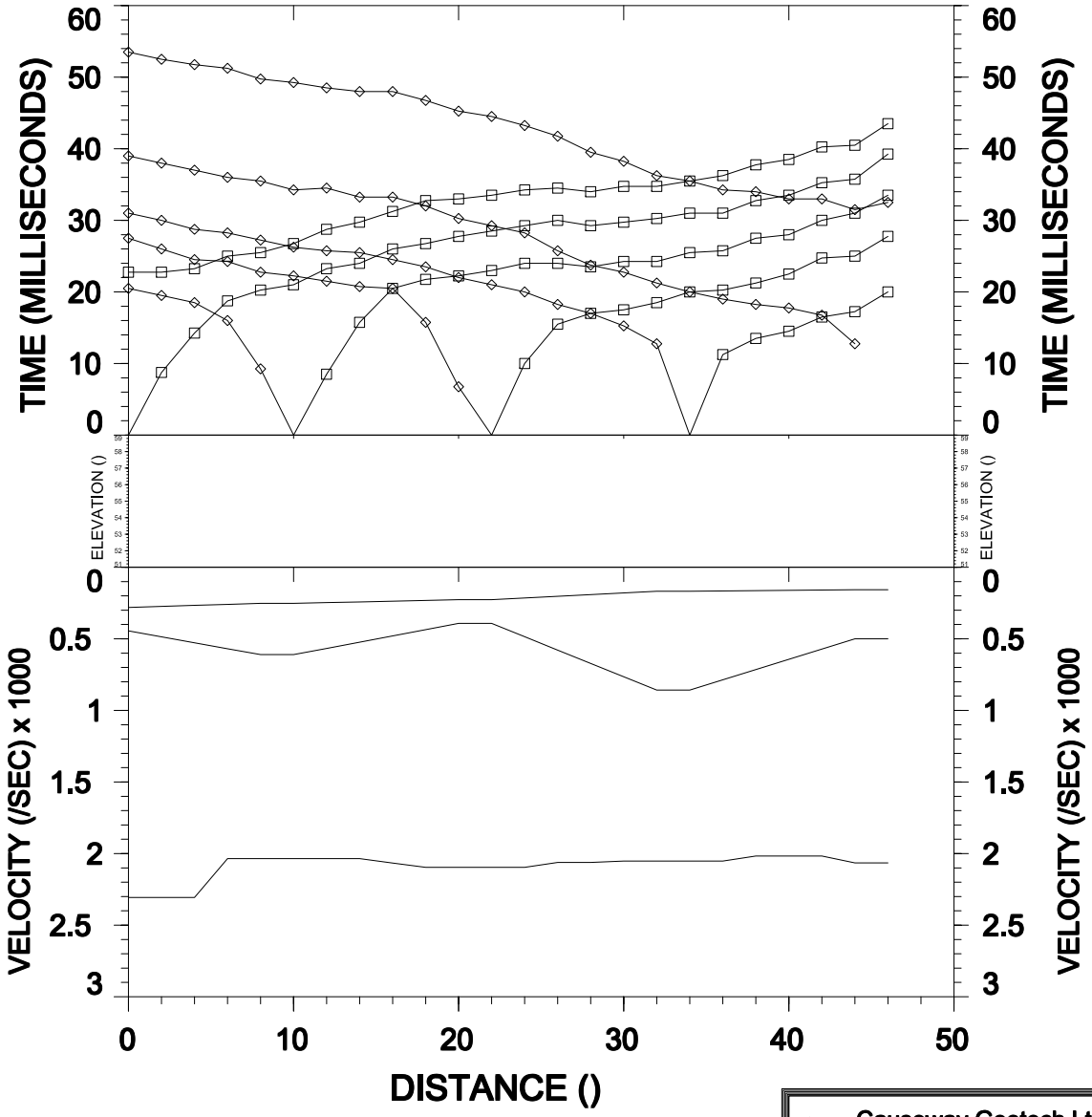


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary
Data SetS114 / Date: 16/06/22	Tipperary
Equipment: Geode / Spread: S114	Azimuth:

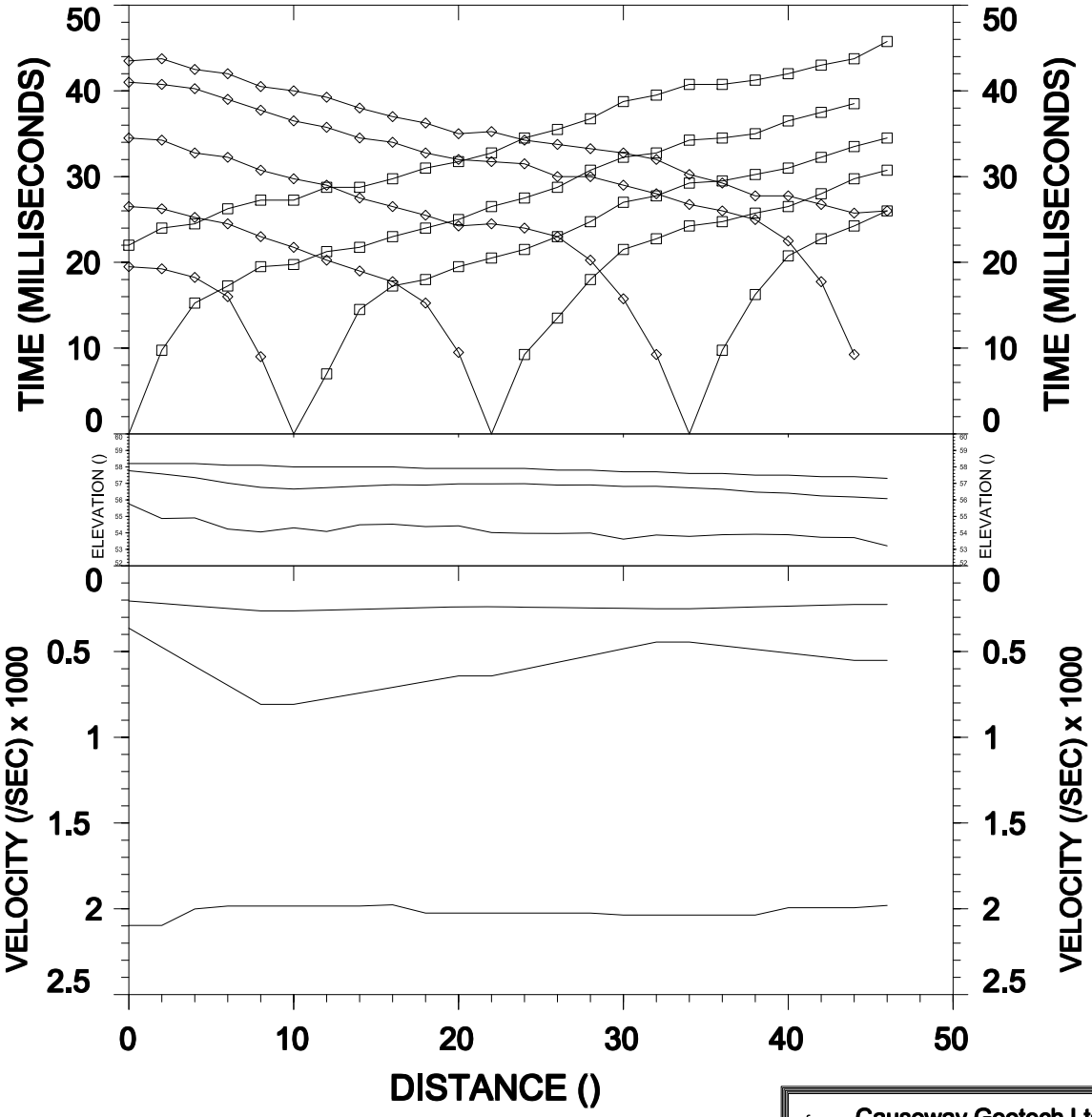


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS115 / Date: 16/06/22	
Equipment: Geode / Spread: S115	Azimuth:

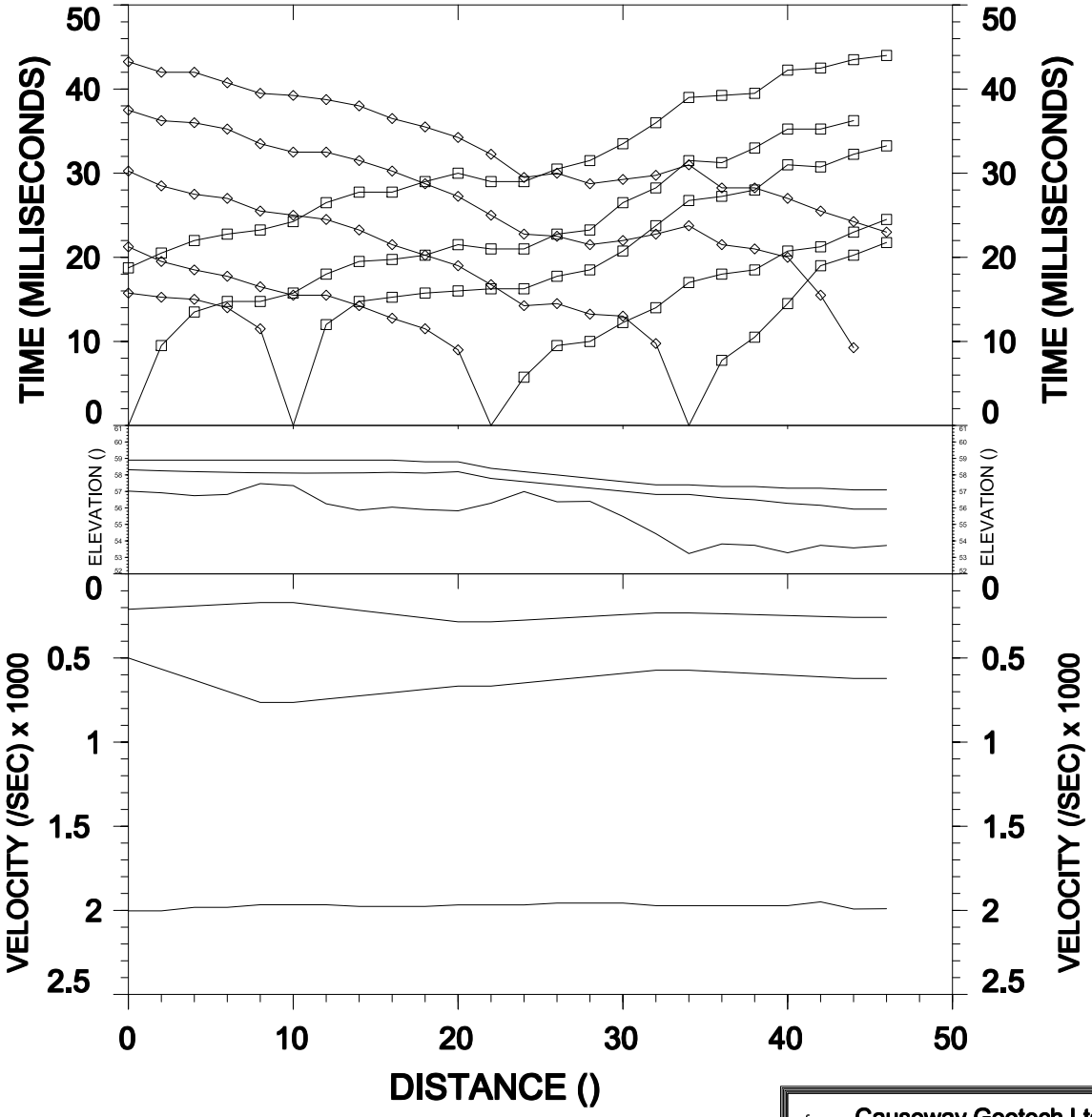


Plate: 10a

for: Causeway Geotech Ltd		AGP21220
by: Strata Geophysical, Inc.		Tipperary Tipperary
Data SetS116	Date: 16/06/22	
Equipment: Geode	Spread: S116	Azimuth:

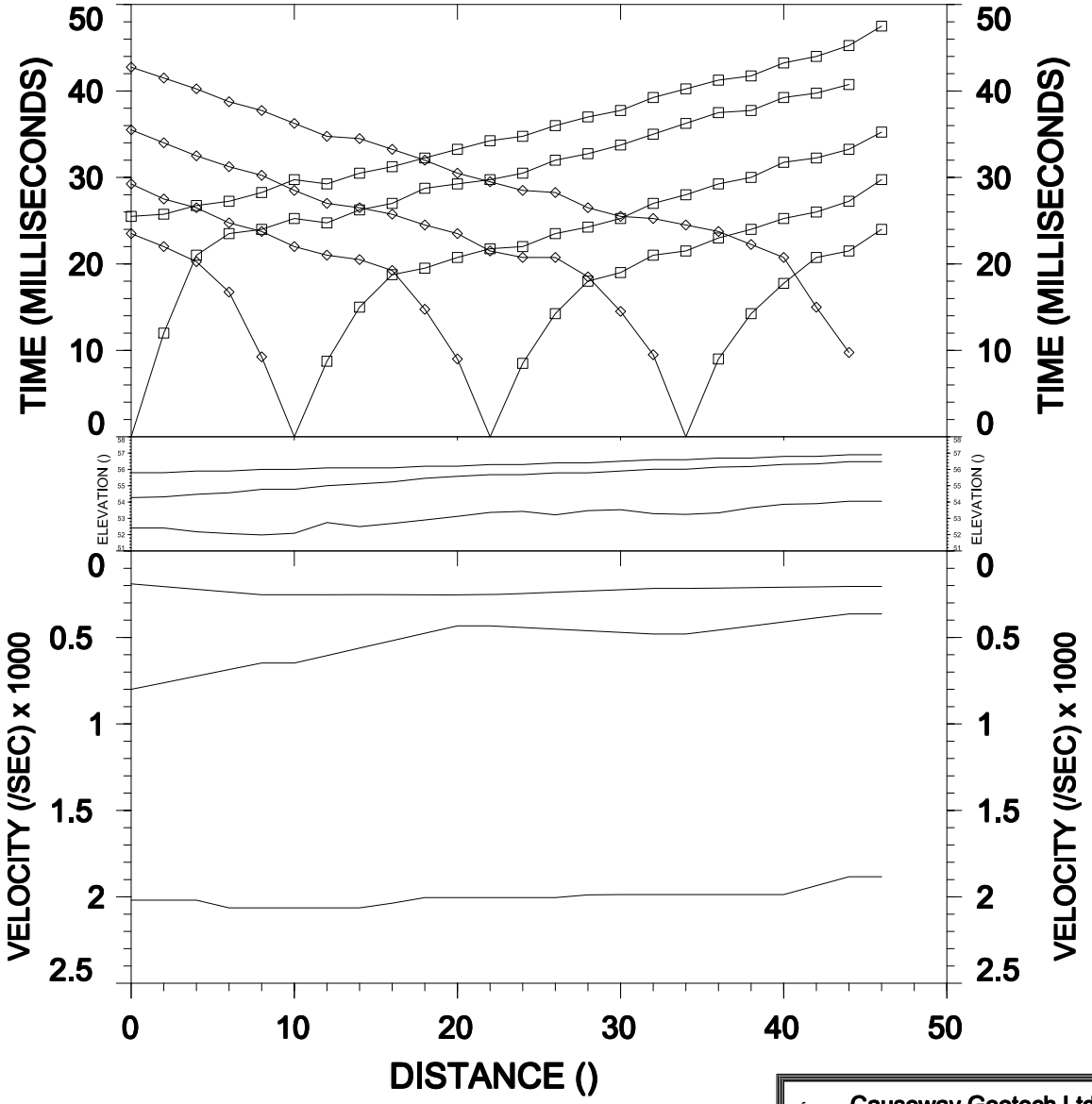


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS117 / Date: 16/06/22	
Equipment: Geode / Spread: S117	Azimuth:

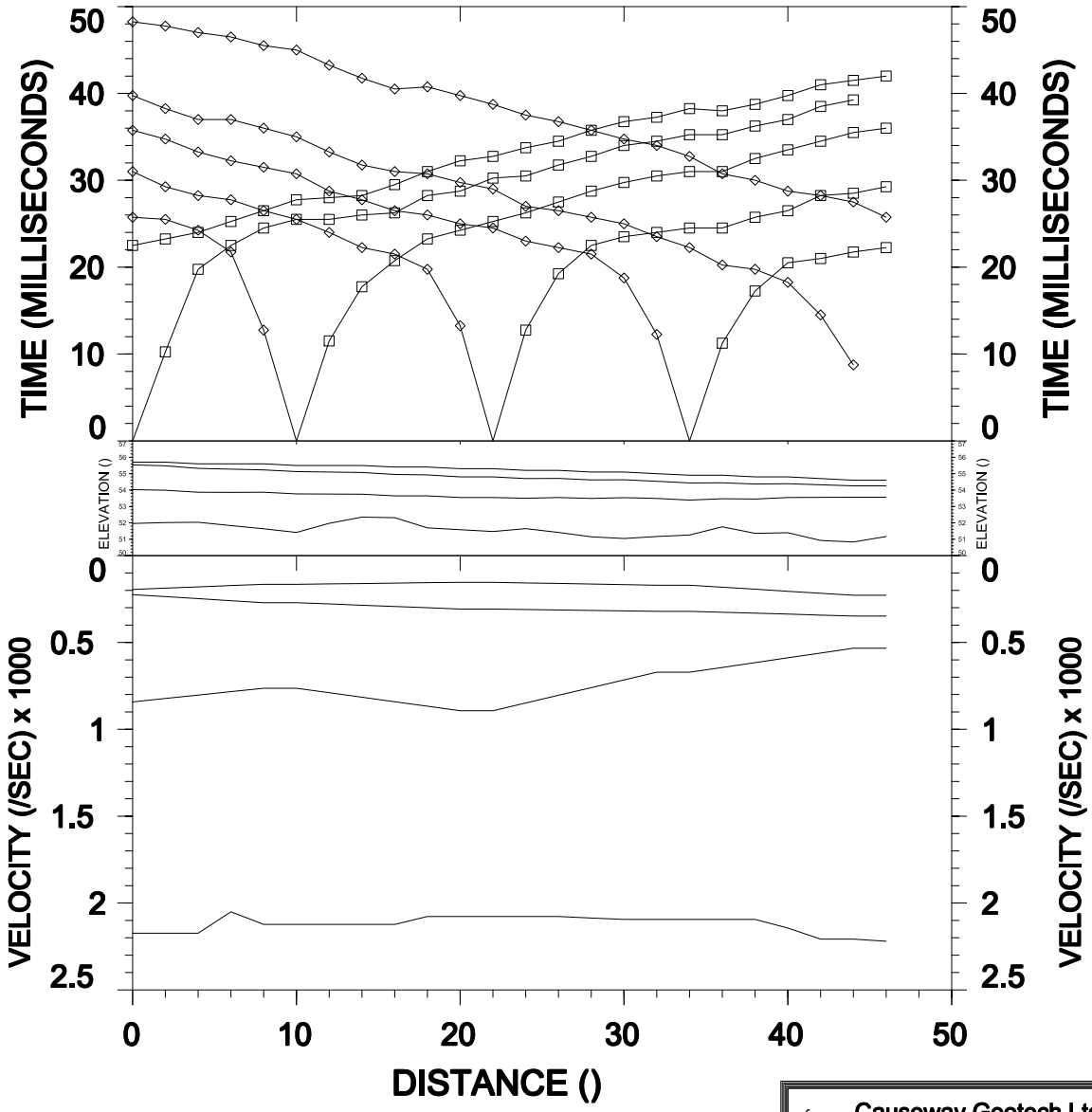


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary
Data SetS118 / Date: 16/06/22	Tipperary
Equipment: Geode / Spread: S118	Azimuth:

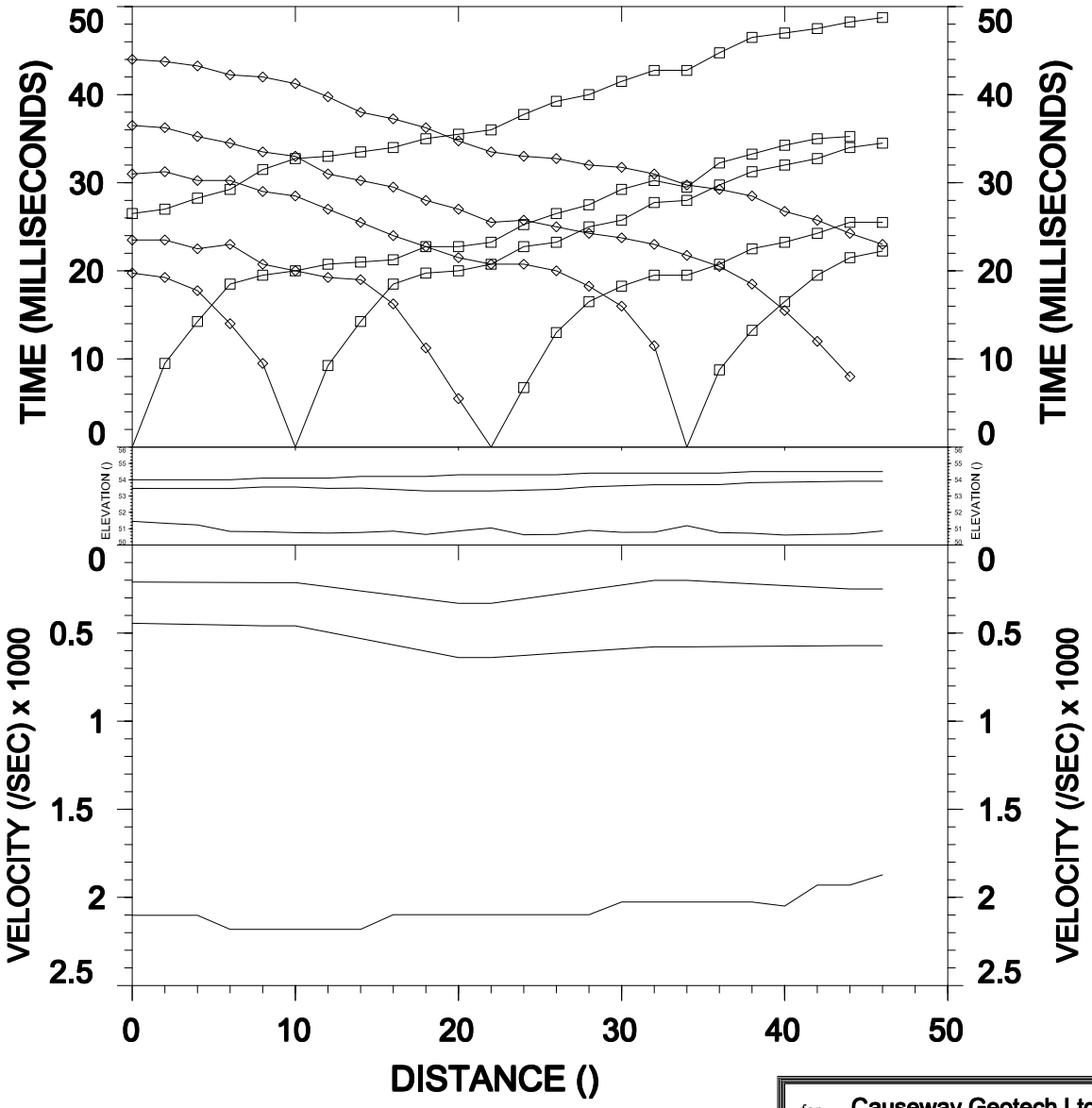


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary
Data SetS119 / Date: 16/06/22	Tipperary
Equipment: Geode / Spread: S119	Azimuth:

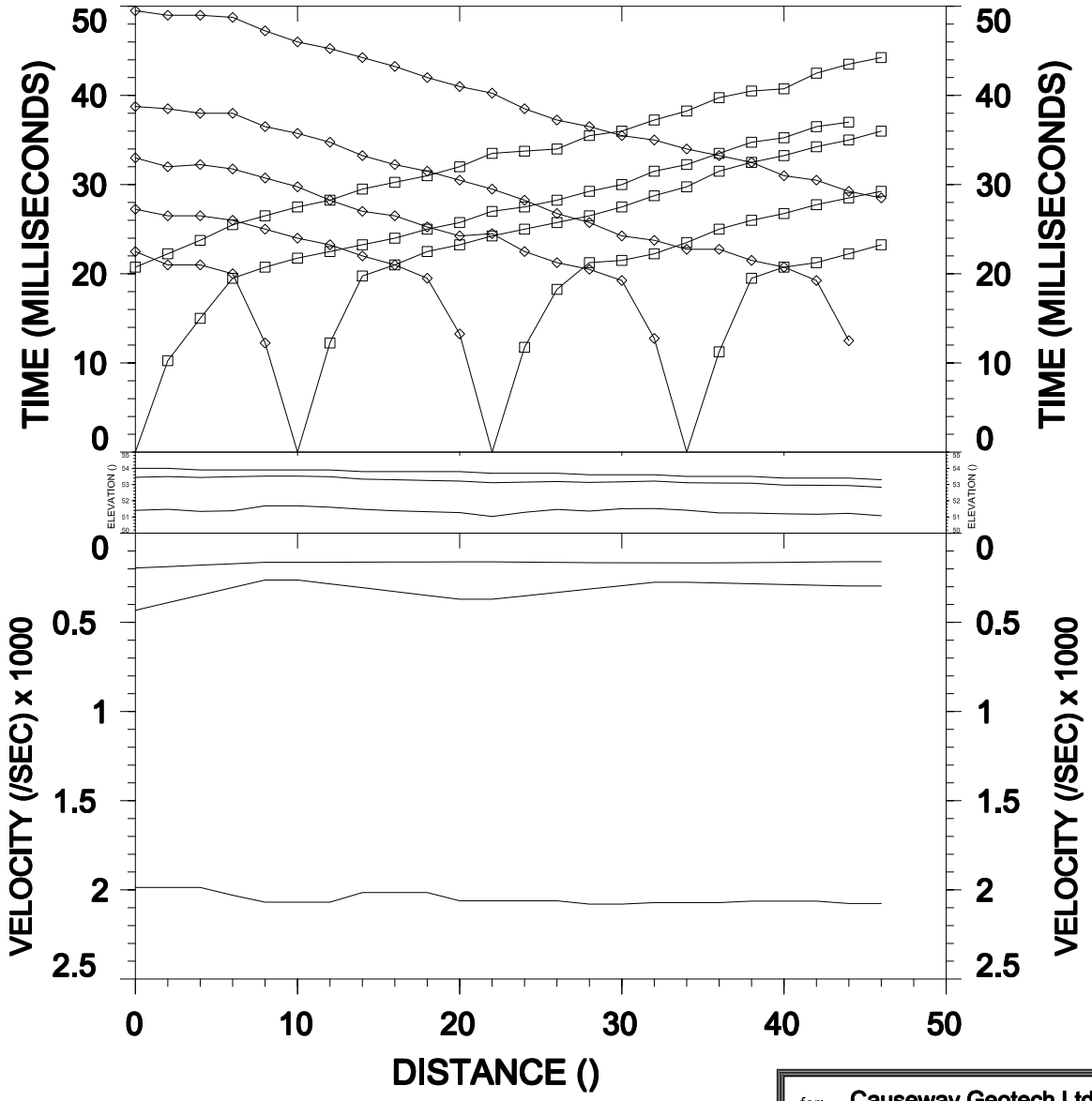


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS120 / Date: 16/06/22	
Equipment: Geode / Spread: S120	Azimuth:

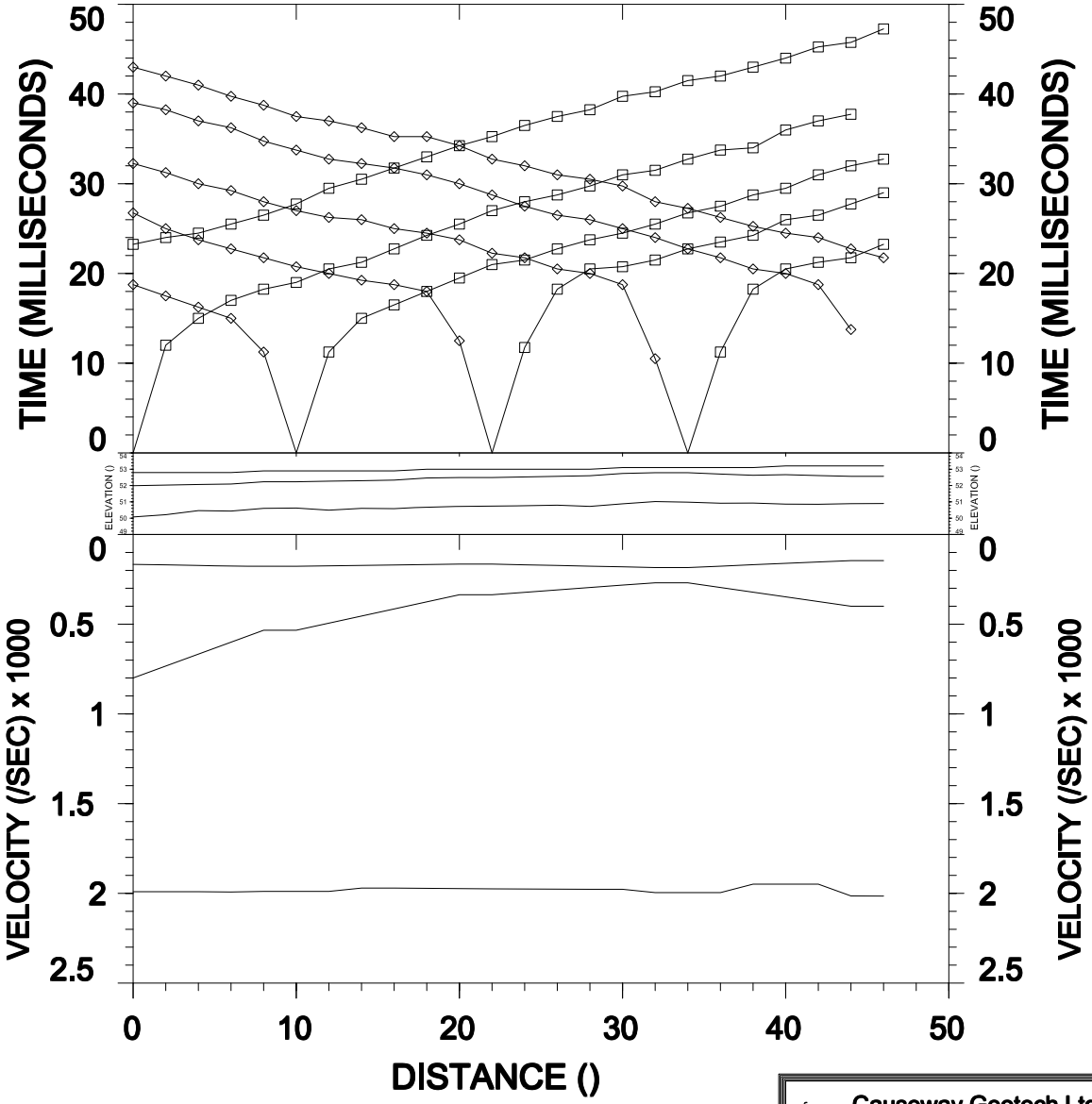


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS121 / Date: 16/06/22	
Equipment: Geode / Spread: S121	Azimuth:

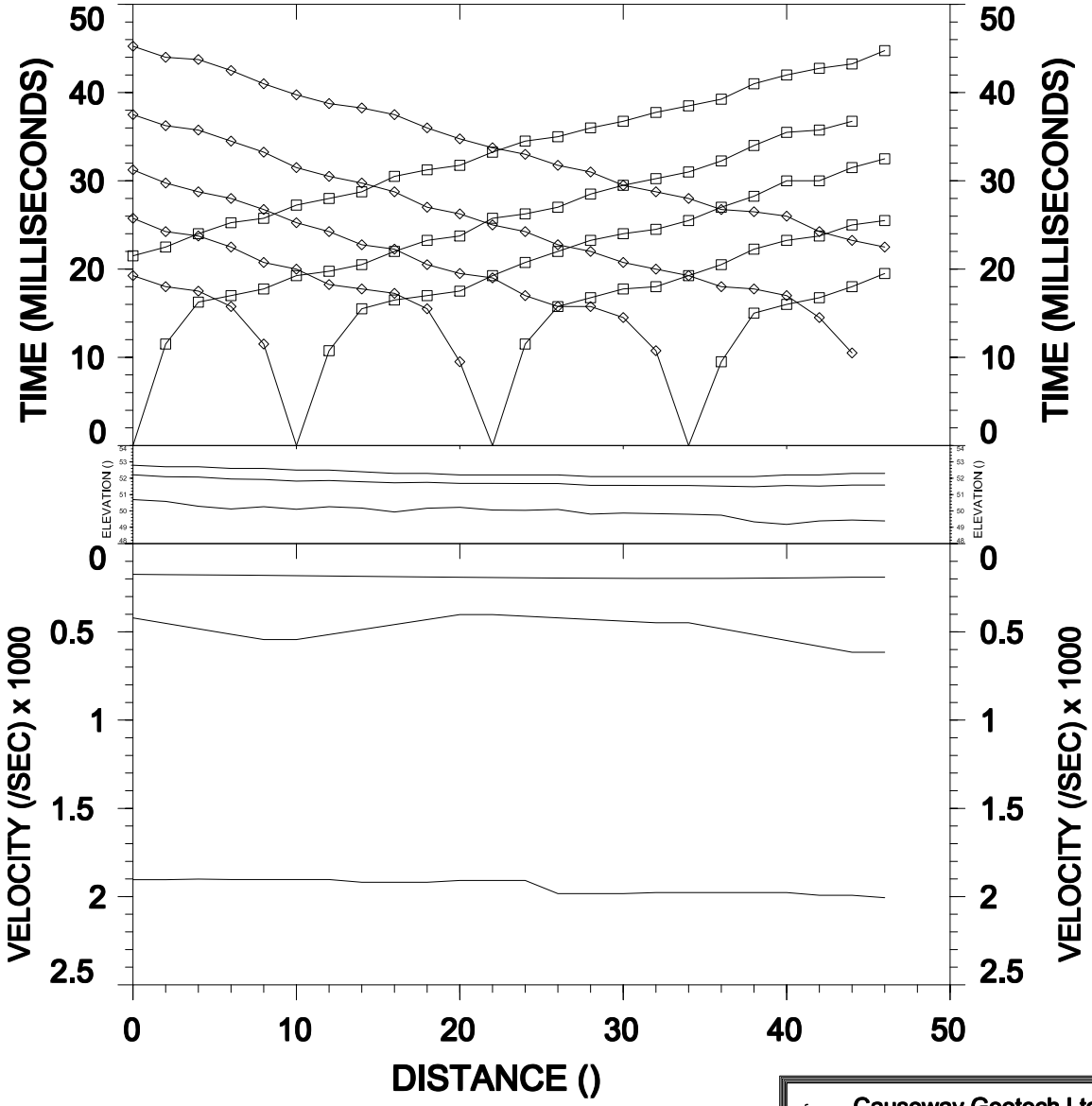


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS122 / Date: 16/06/22	
Equipment: Geode / Spread: S122	Azimuth:

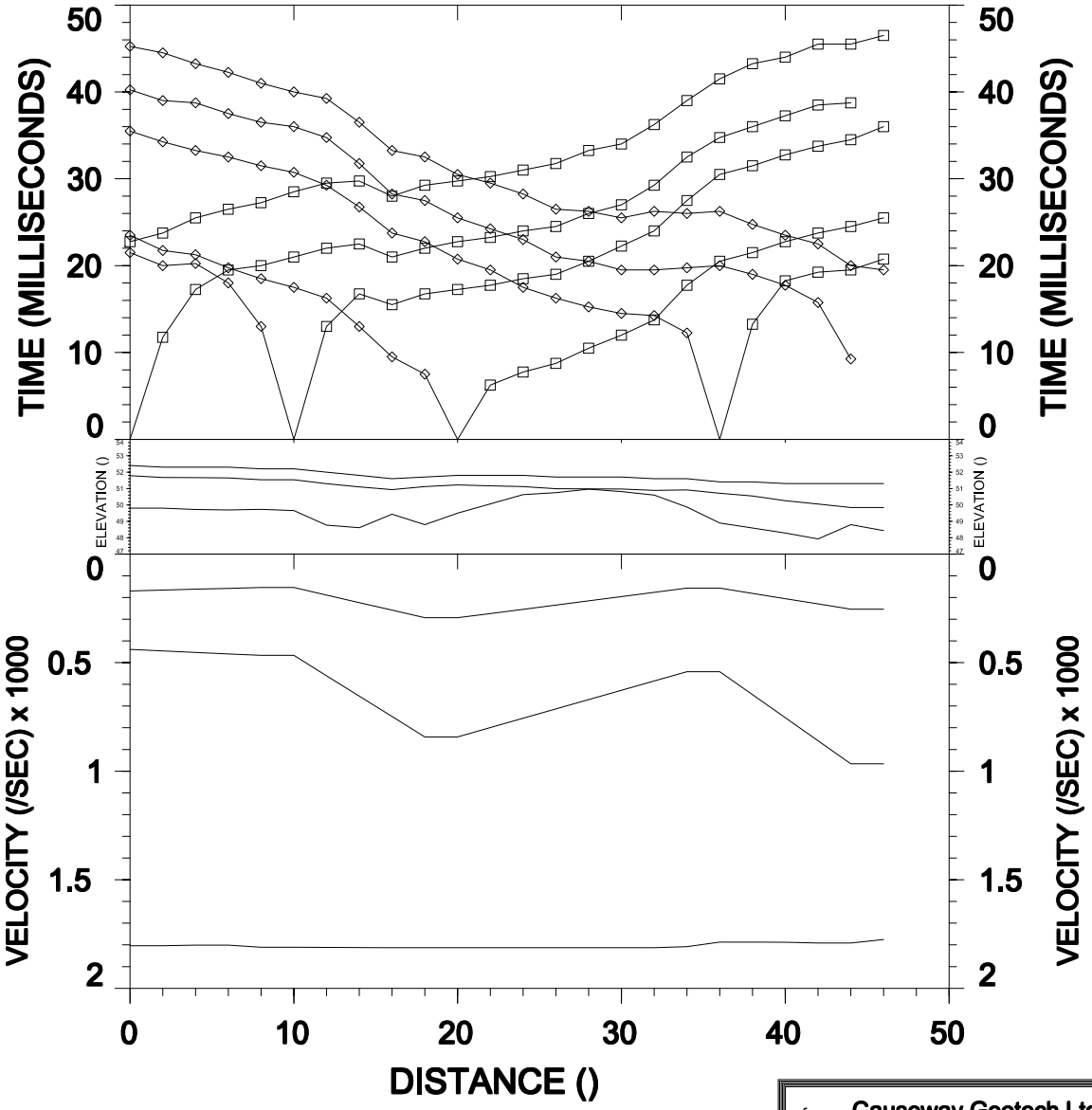


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS123 / Date: 16/06/22	
Equipment: Geode / Spread: S123	Azimuth:

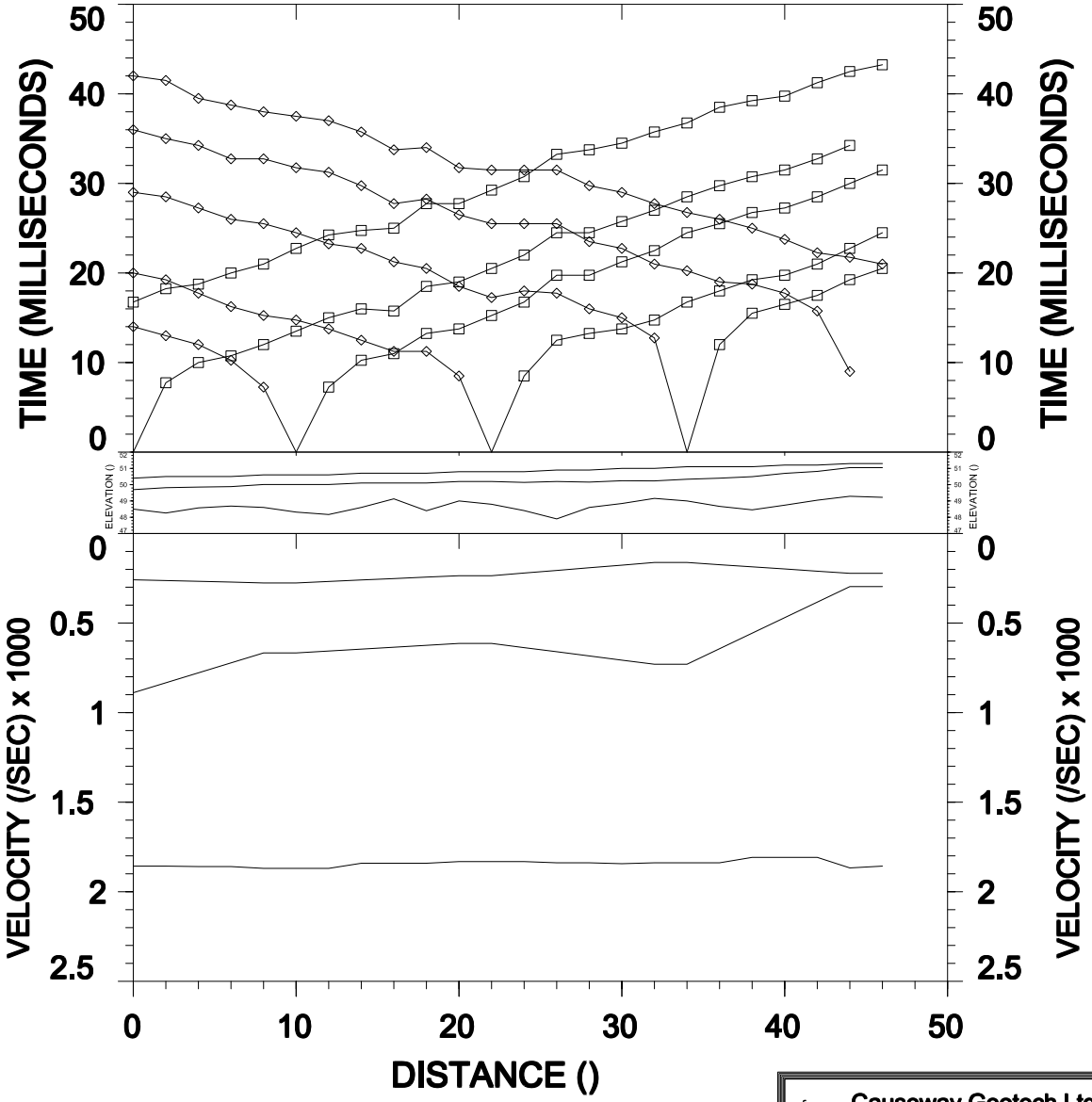


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS124 / Date: 16/06/22	
Equipment: Geode / Spread: S124	Azimuth:

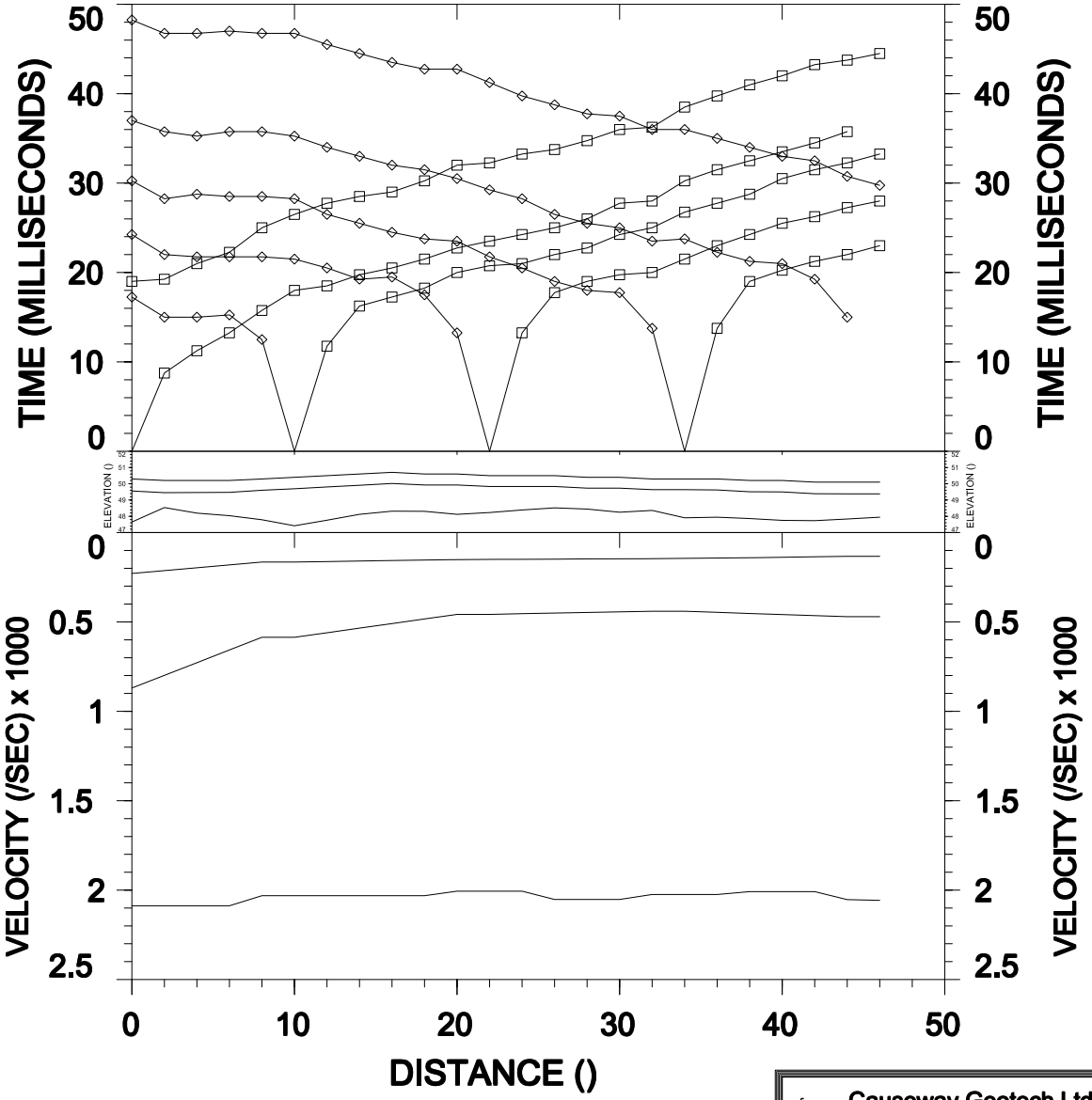


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS125 / Date: 16/06/22	
Equipment: Geode / Spread: S125	Azimuth:

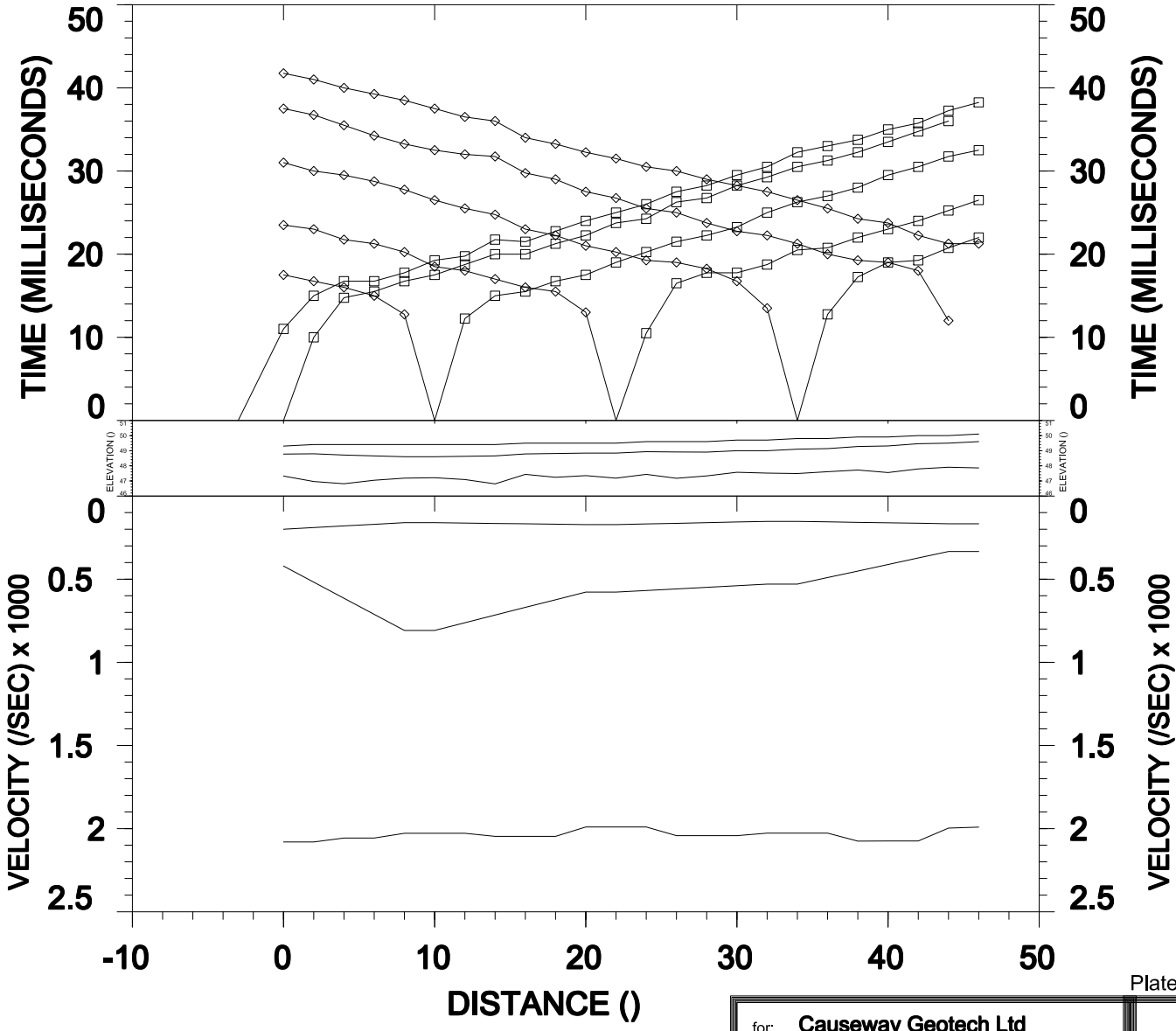


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS126 / Date: 16/06/22	
Equipment: Geode / Spread: S126	Azimuth:

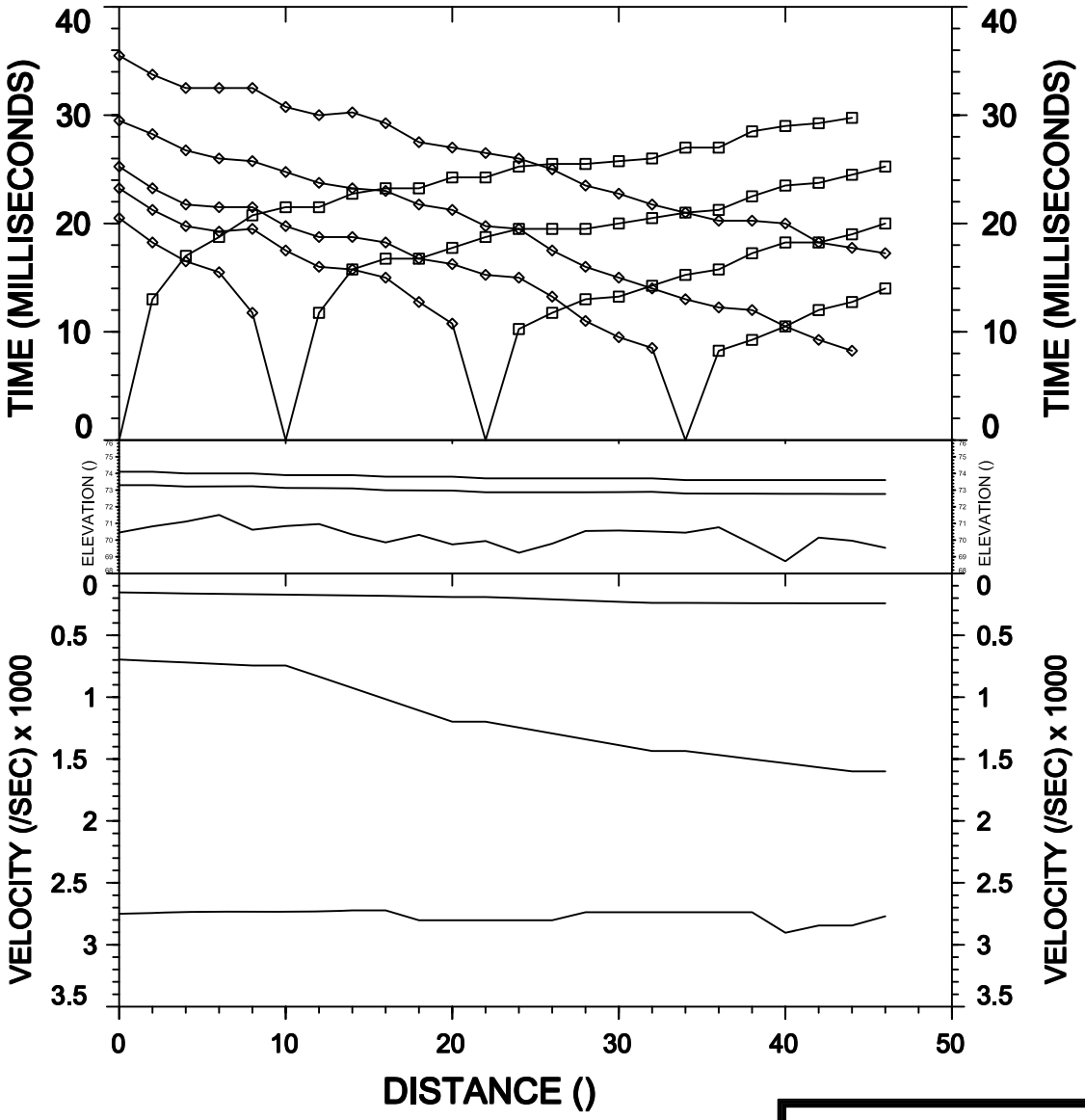


Plate: 10a

for: Causeway Geotech Ltd		AGP21220
by: Strata Geophysical, Inc.		Tipperary Tipperary
Data SetS127	Date: 17/06/22	
Equipment: Geode	Spread: S127	Azimuth:

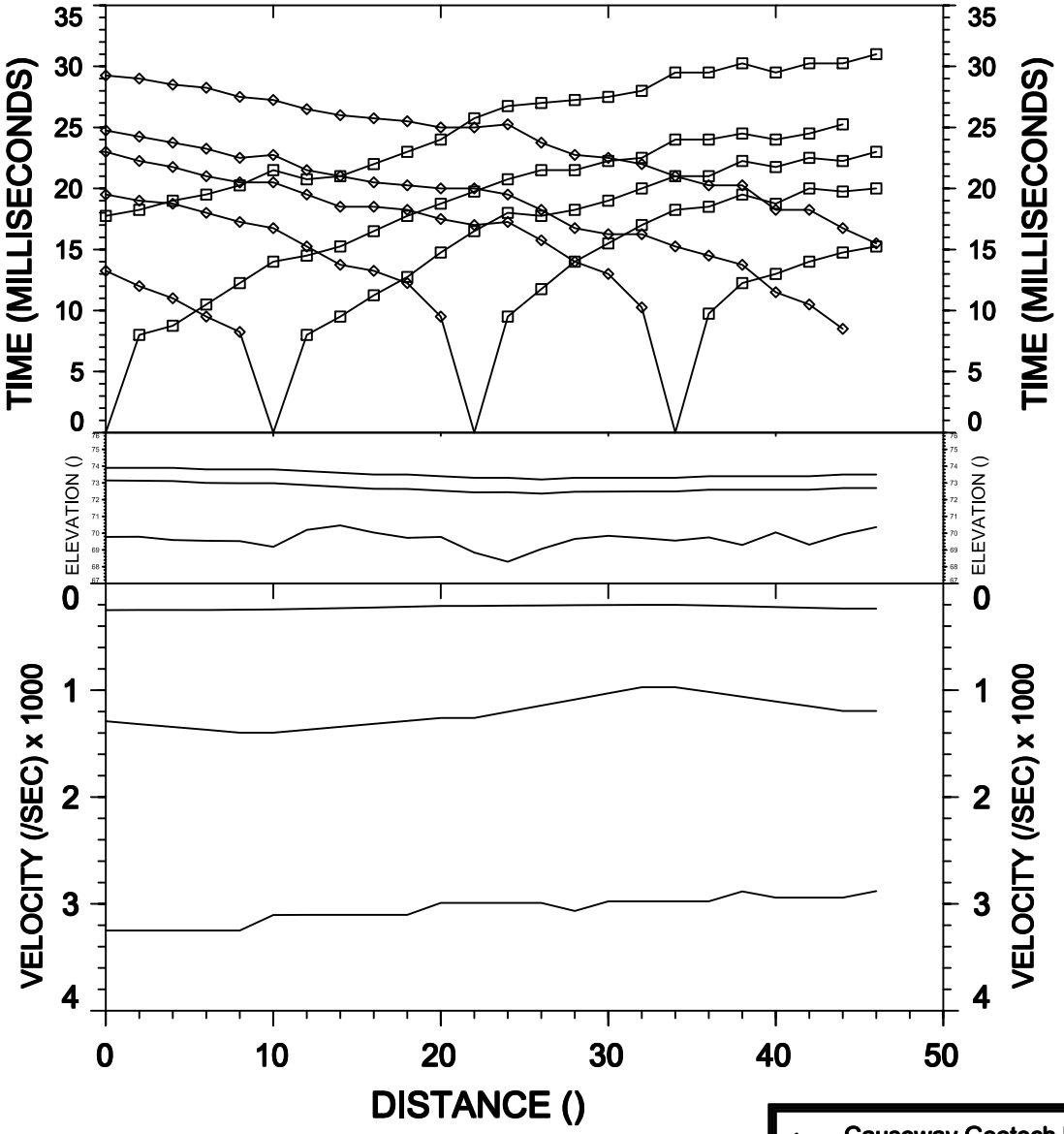


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS128 / Date: 17/06/22	
Equipment: Geode / Spread: S128	Azimuth:

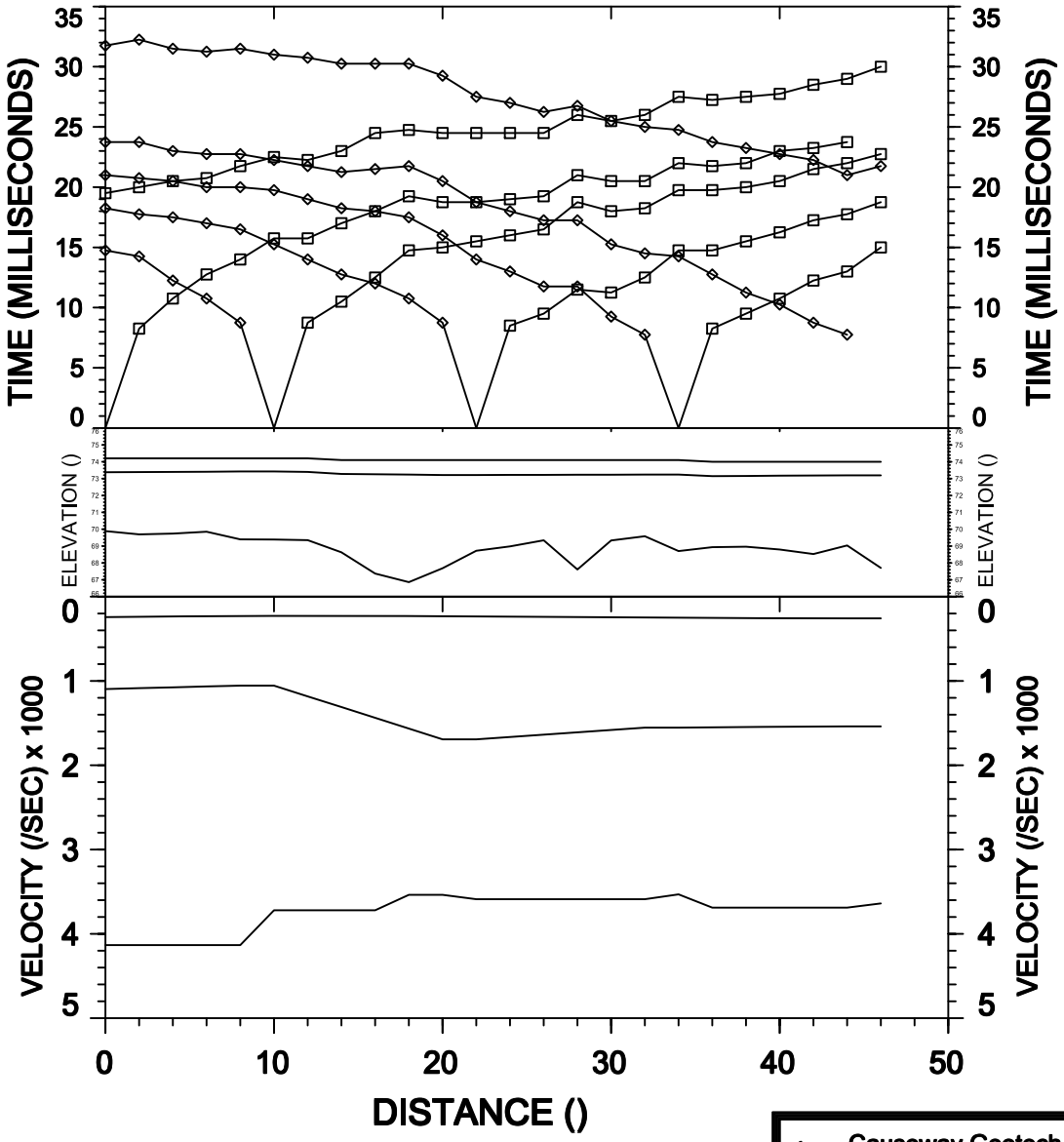


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS129 / Date: 17/06/22	
Equipment: Geode / Spread: S129	Azimuth:

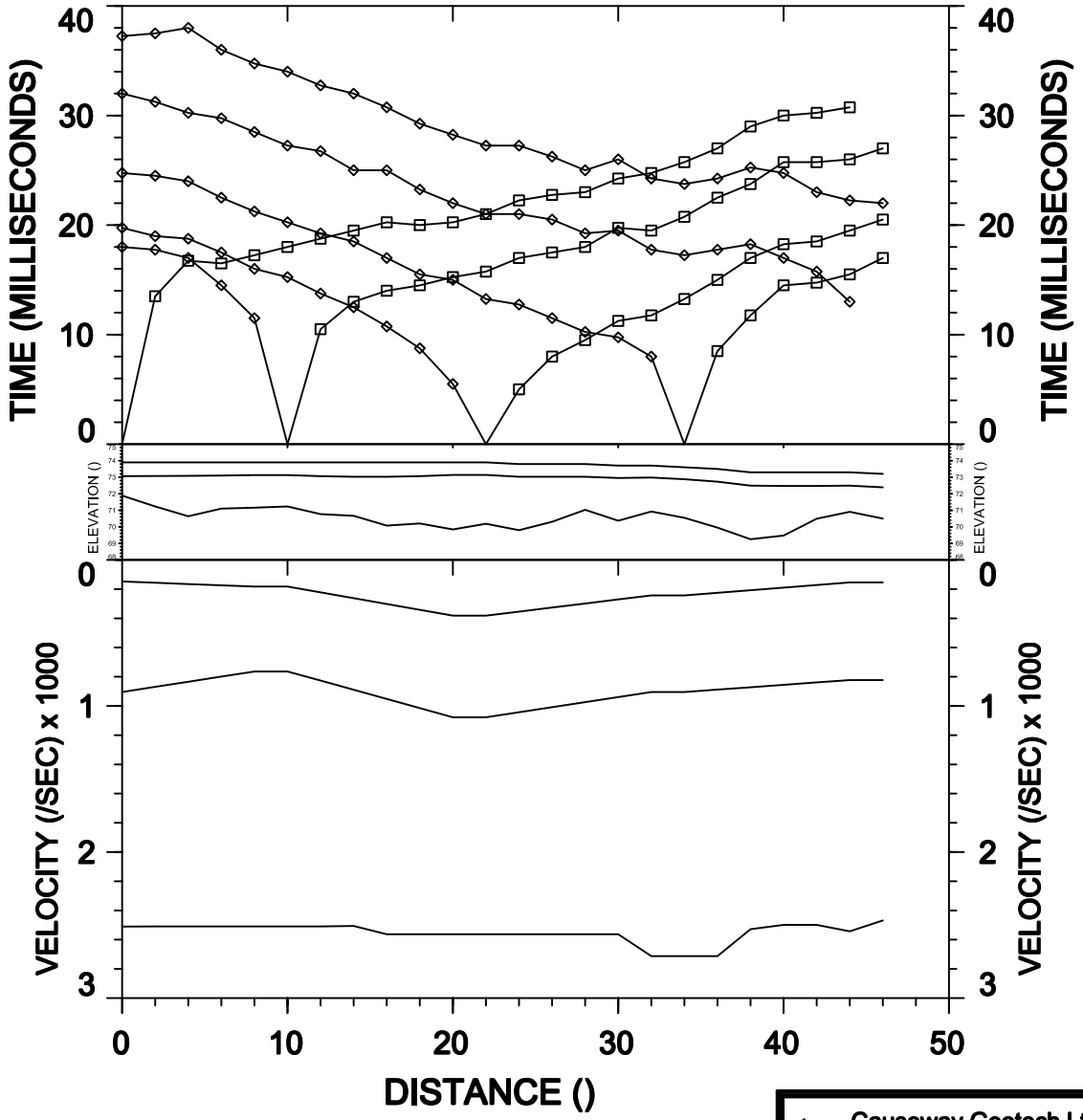


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS130 / Date: 17/06/22	
Equipment: Geode / Spread: S130	Azimuth:

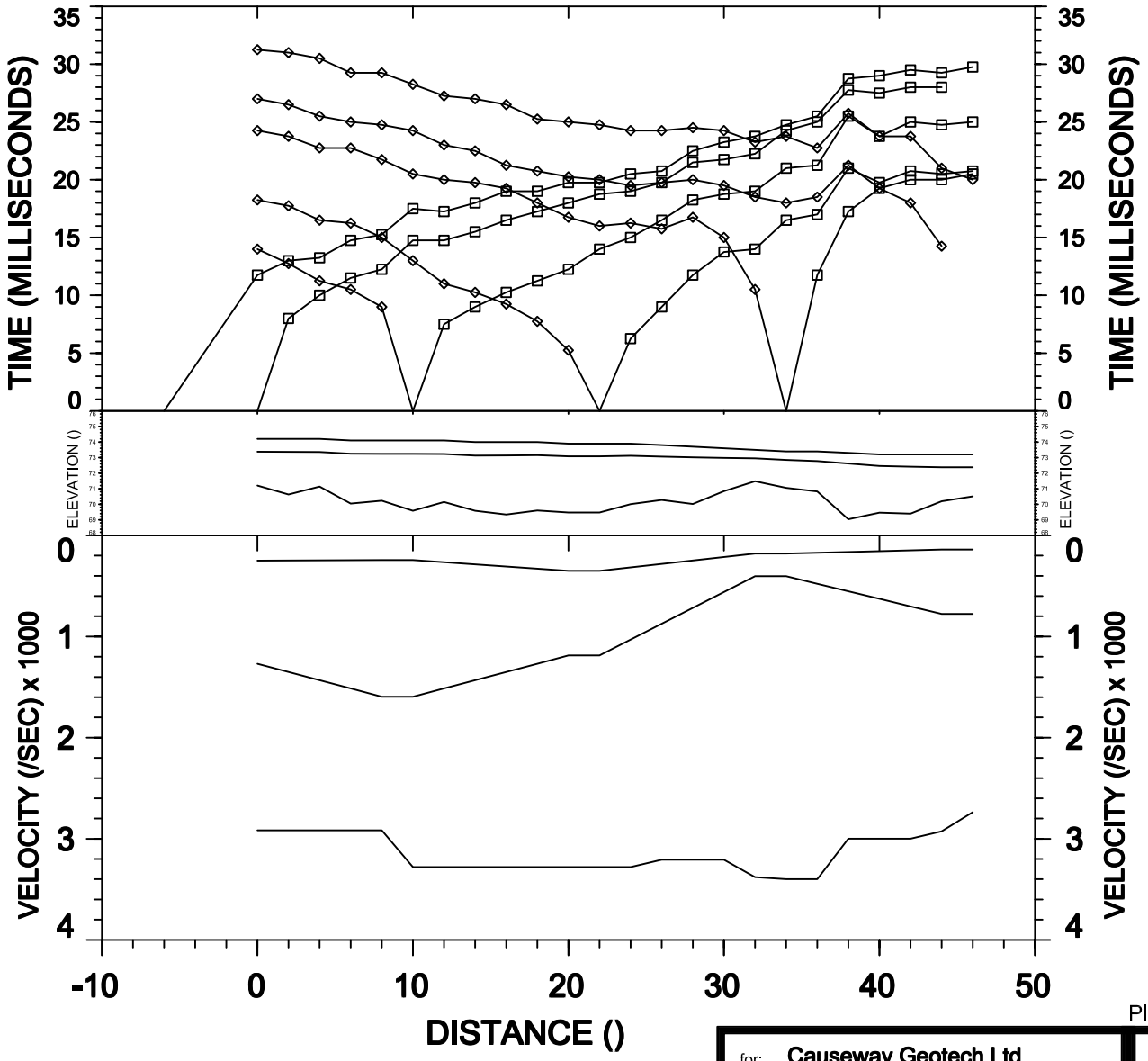


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS131 / Date: 17/06/22	
Equipment: Geode / Spread: S131	Azimuth:

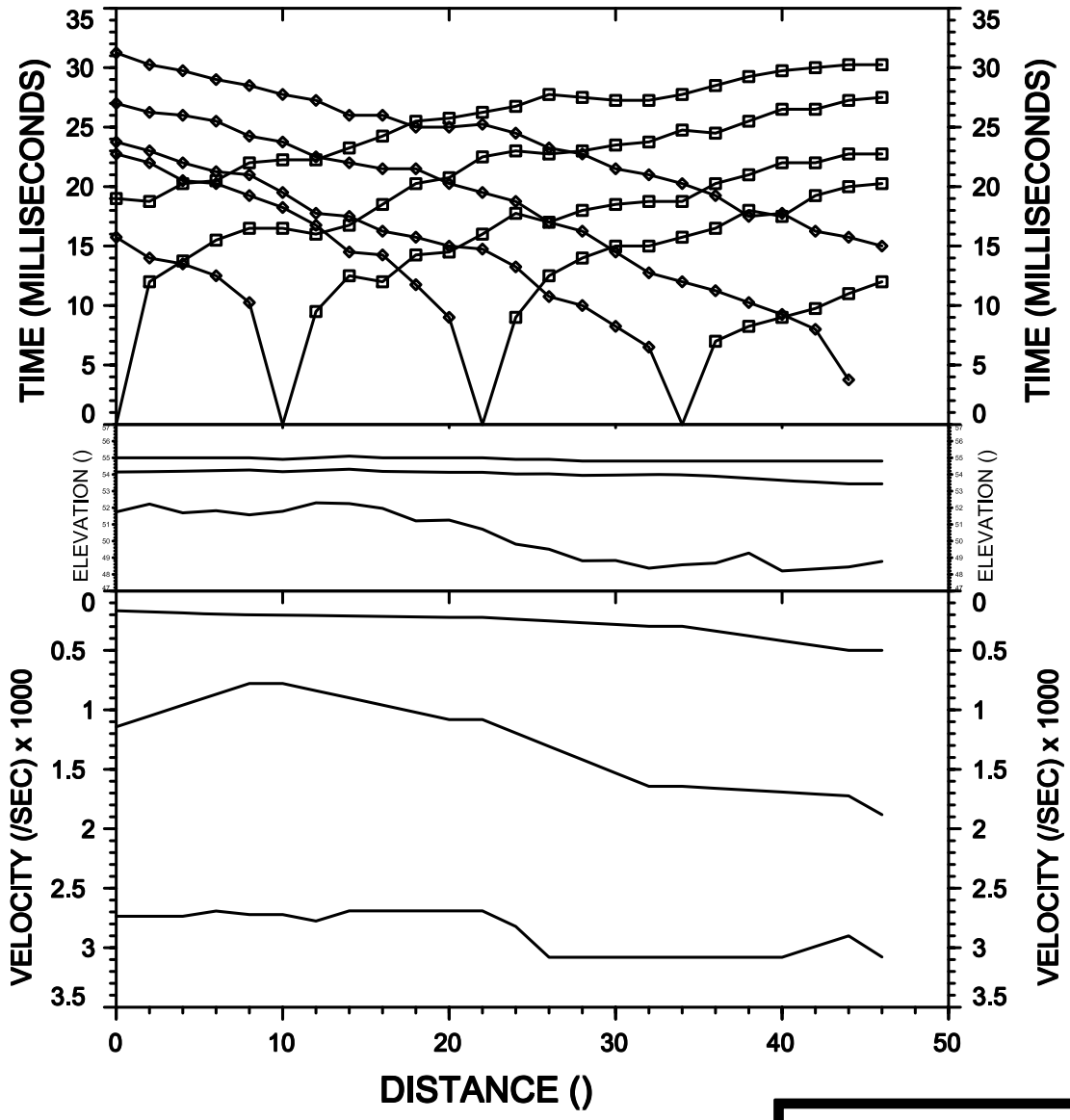


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS132 / Date: 27/06/2022	
Equipment: Geode / Spread: S132	Azimuth:

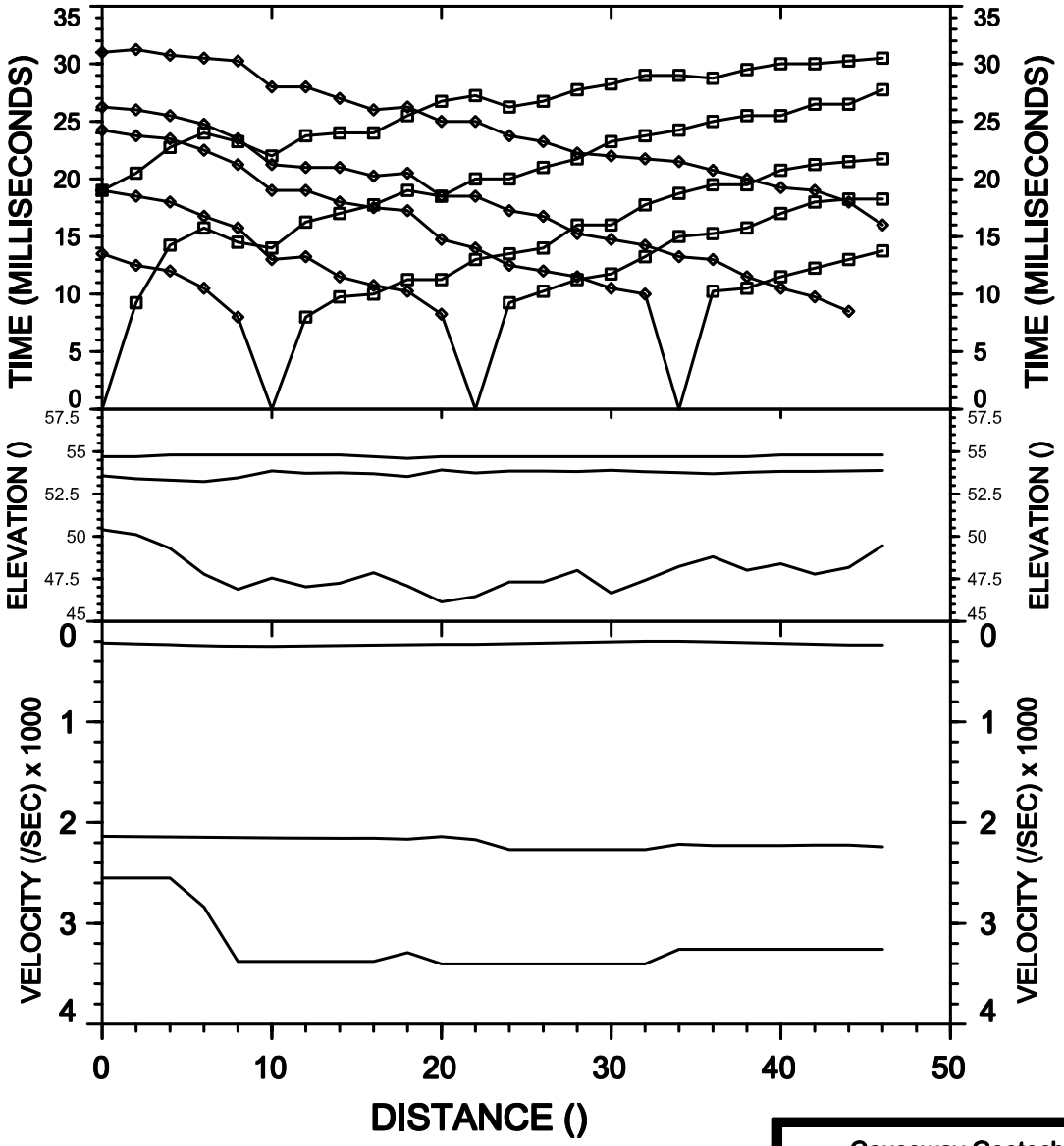


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS133 / Date: 27/06/2022	
Equipment: Geode / Spread: S133	Azimuth:

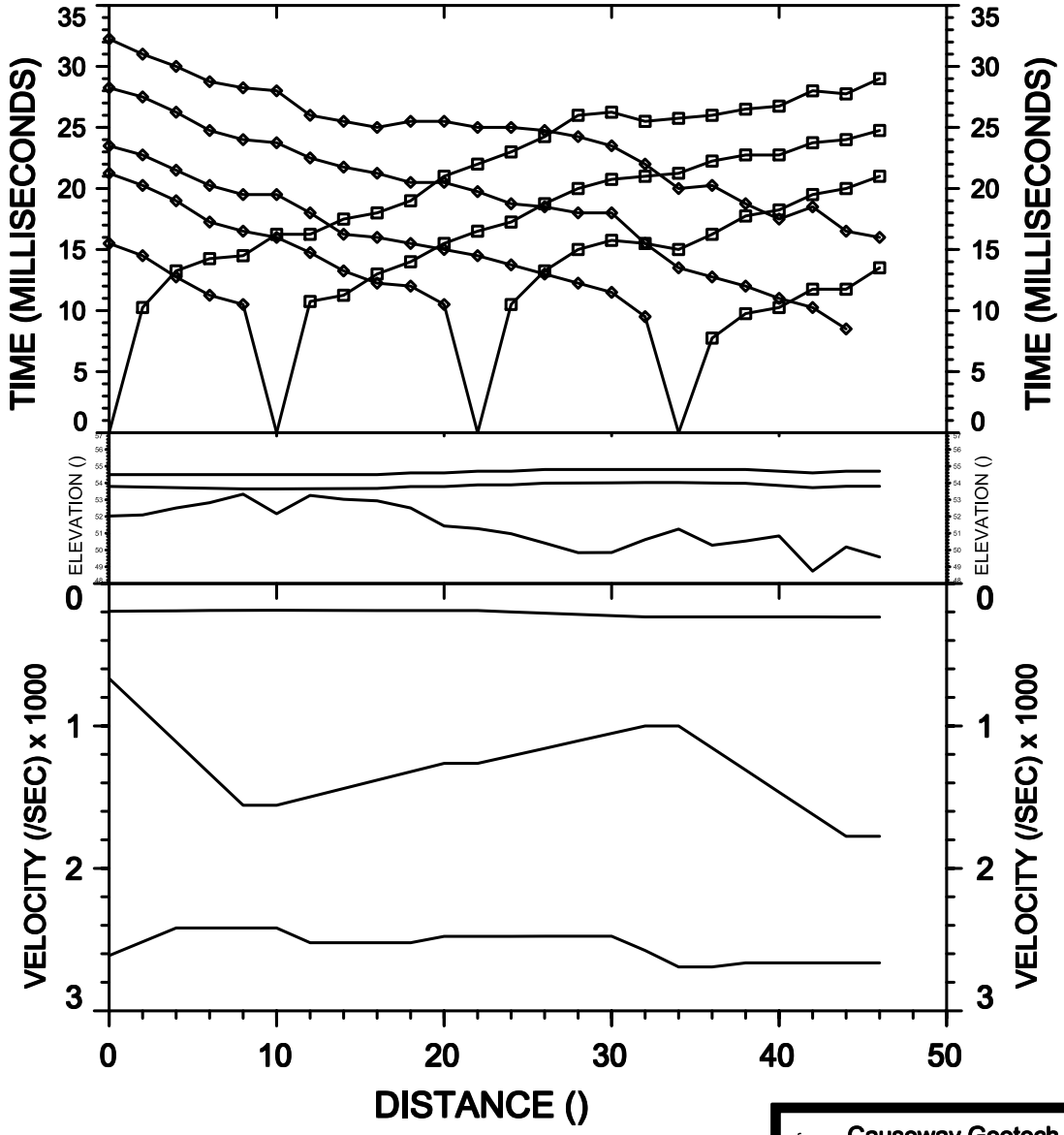


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS134R / Date: 27/06/22	
Equipment: Geode / Spread: S134	Azimuth:

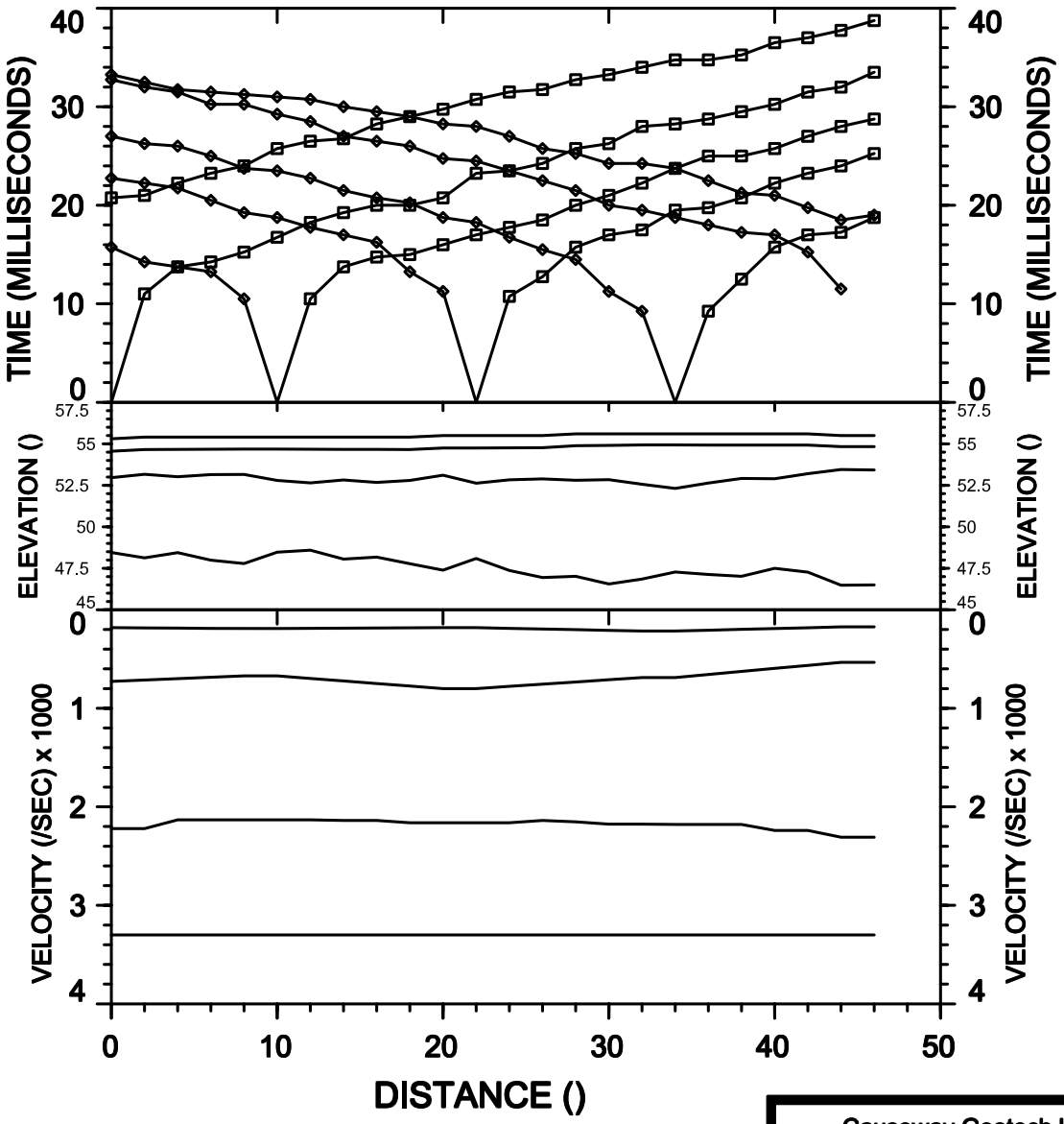


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS135 / Date: 28/06/2022	
Equipment: Geode / Spread: S135	Azimuth:

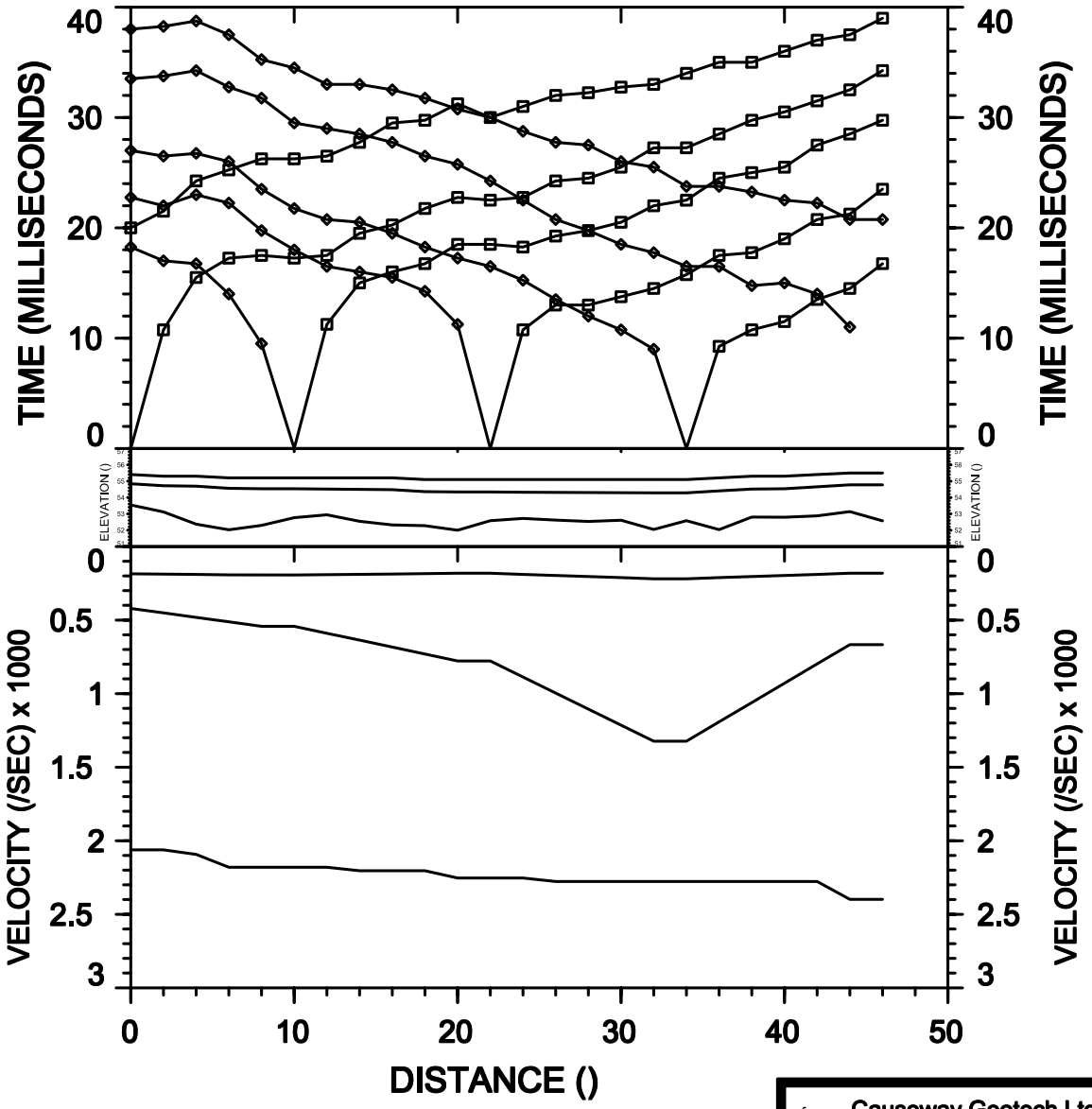


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS136 / Date: 28/06/2022	
Equipment: Geode / Spread: S136	Azimuth:

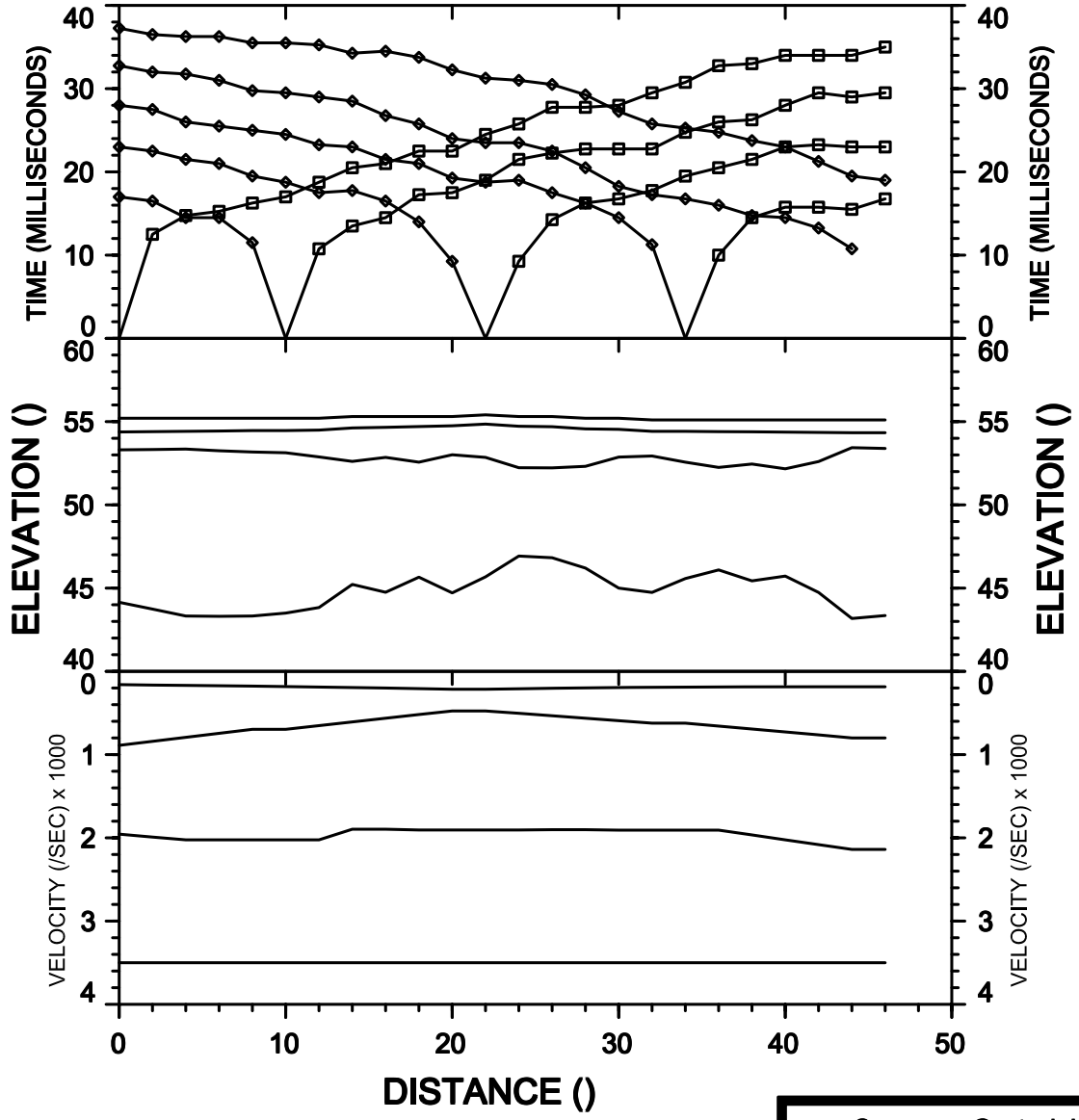


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS137R / Date: 28/06/2022	
Equipment: Geode / Spread: S137	Azimuth:

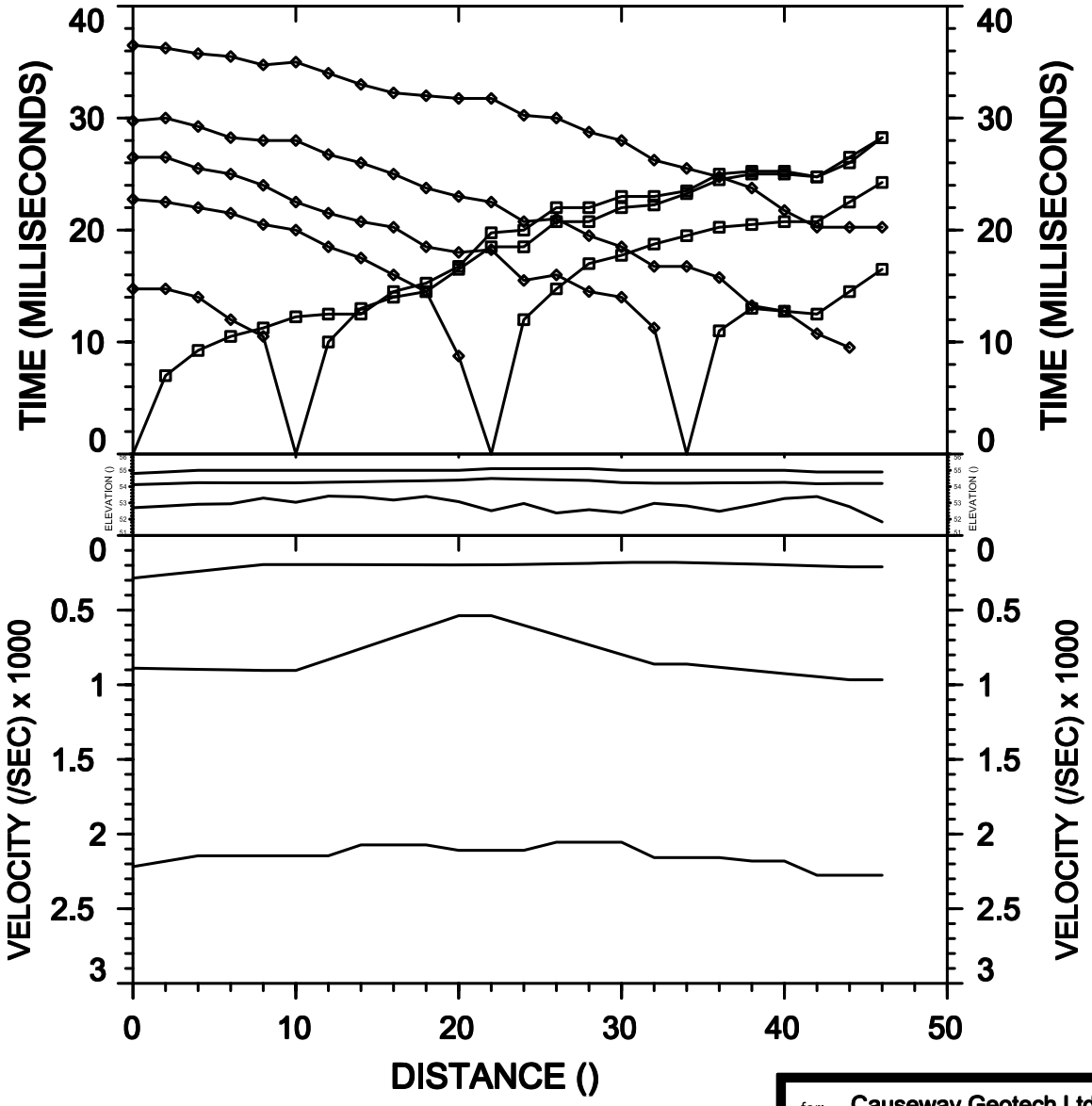


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS138 / Date: 28/06/2022	
Equipment: Geode / Spread: S138	Azimuth:

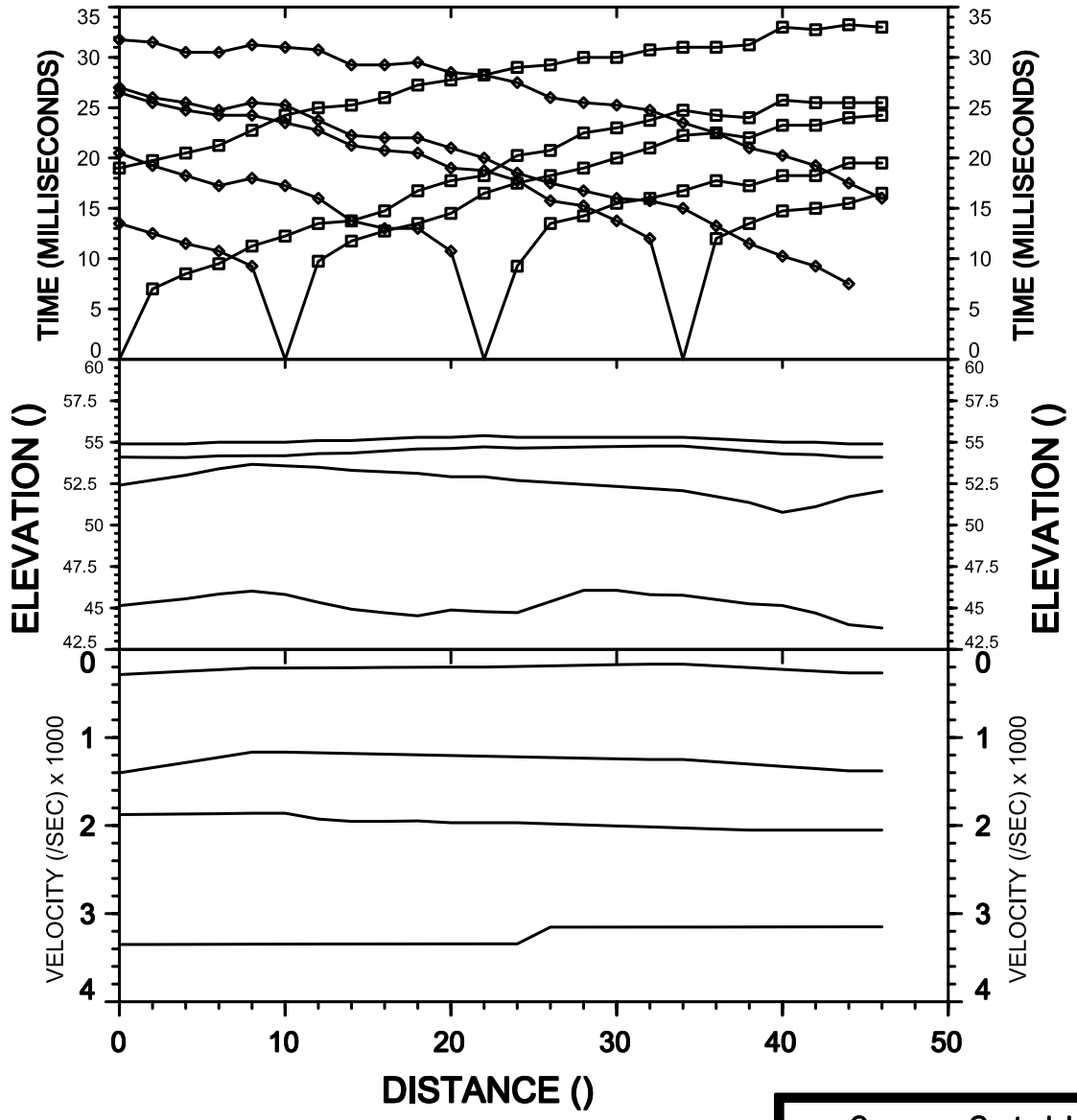


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS139R / Date: 28/06/2022	
Equipment: Geode / Spread: S139	Azimuth:

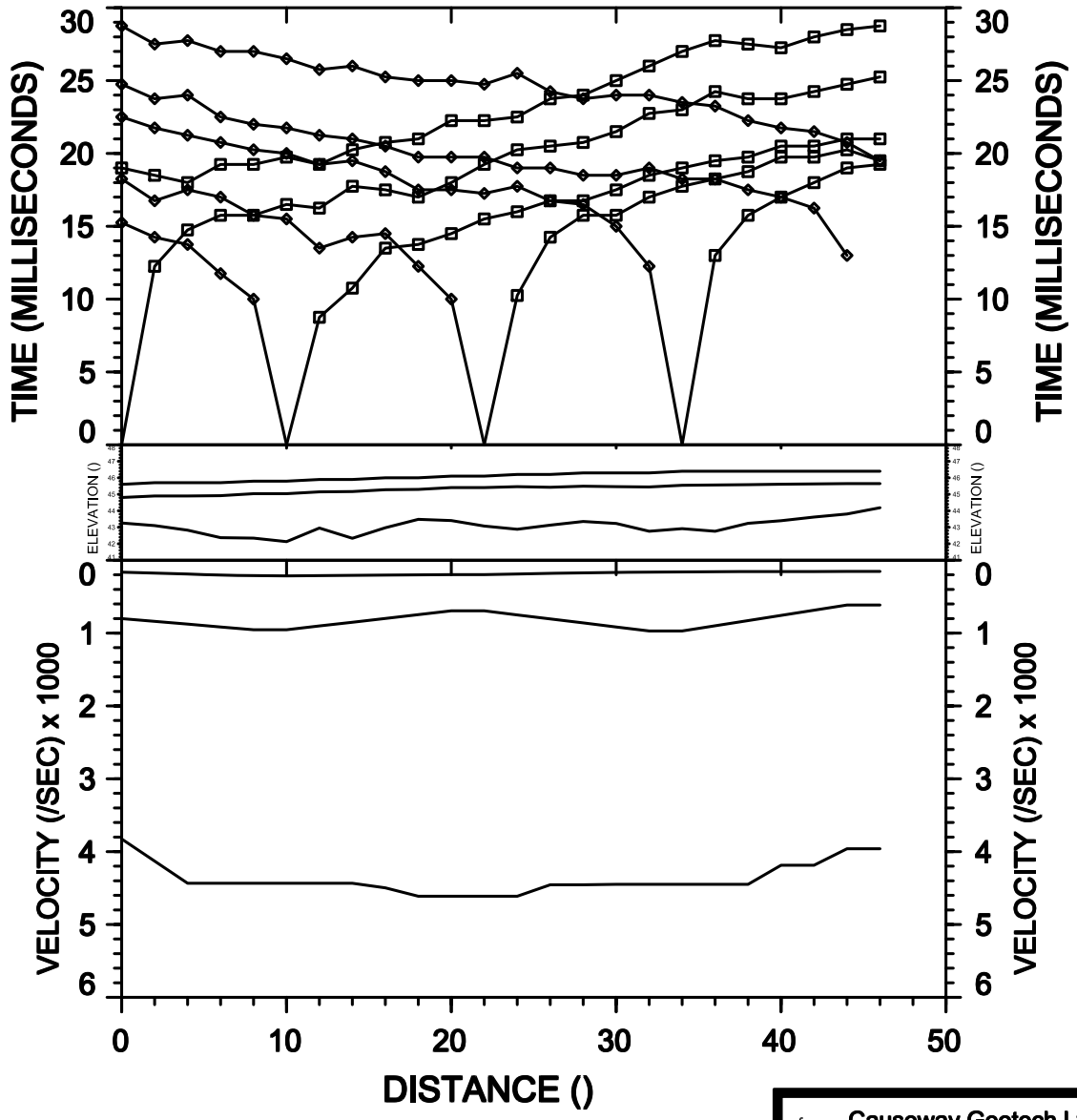


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS140 / Date: 28/06/2022	
Equipment: Geode / Spread: S140	Azimuth:

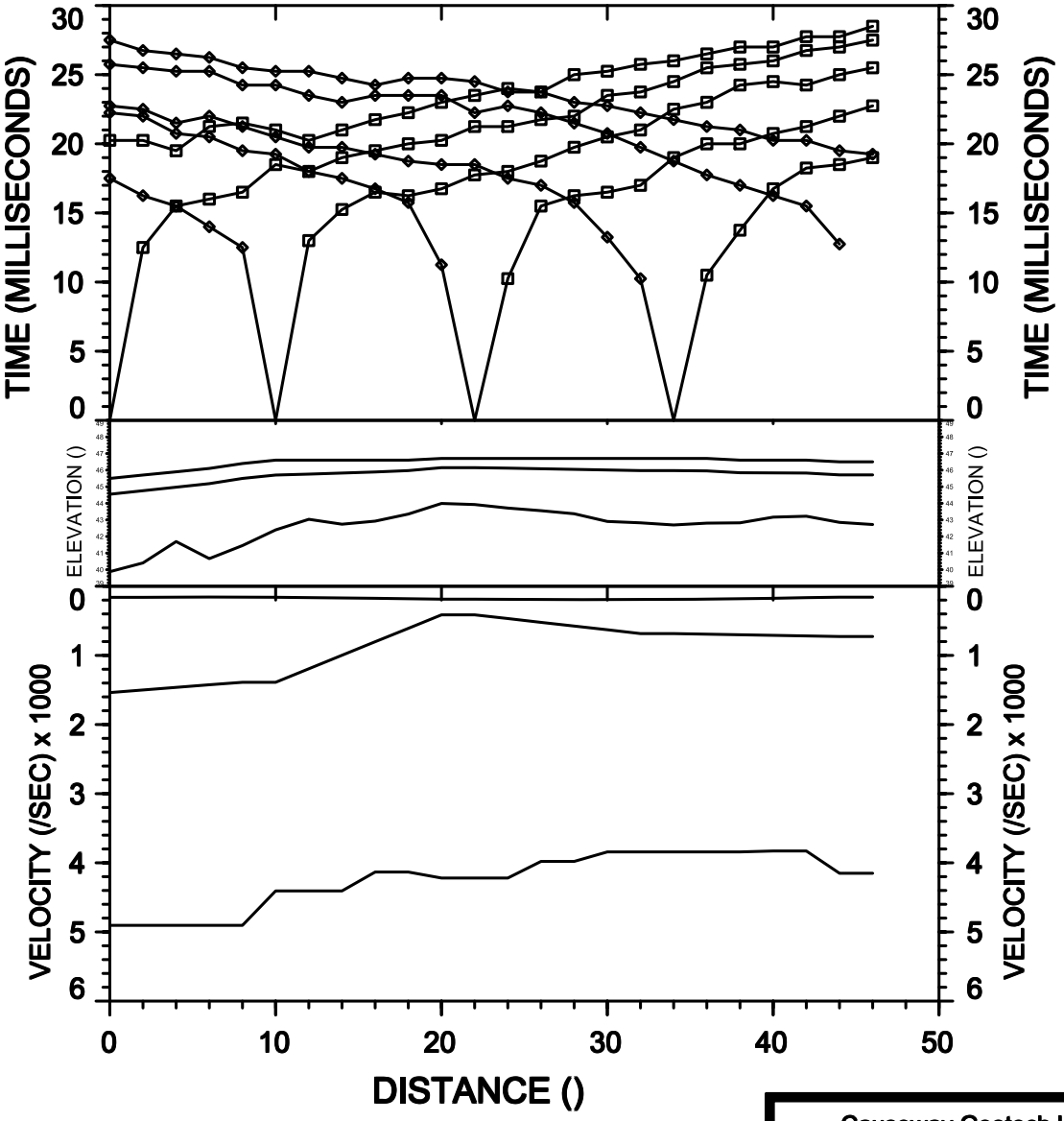


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS141R / Date: 28/06/2022	
Equipment: Geode / Spread: S141	Azimuth:

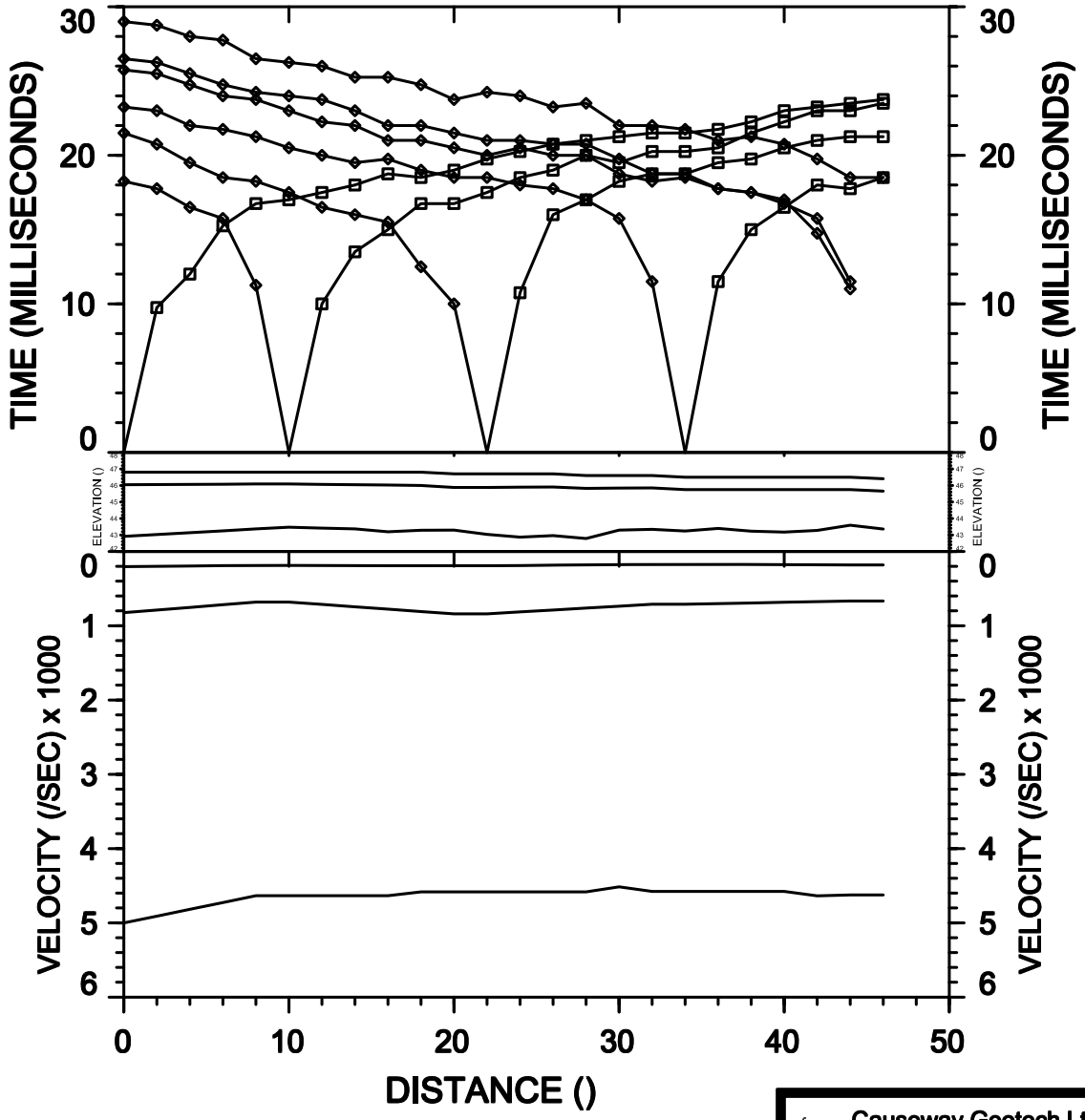


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS142R / Date: 28/06/2022	
Equipment: Geode / Spread: S142	Azimuth:

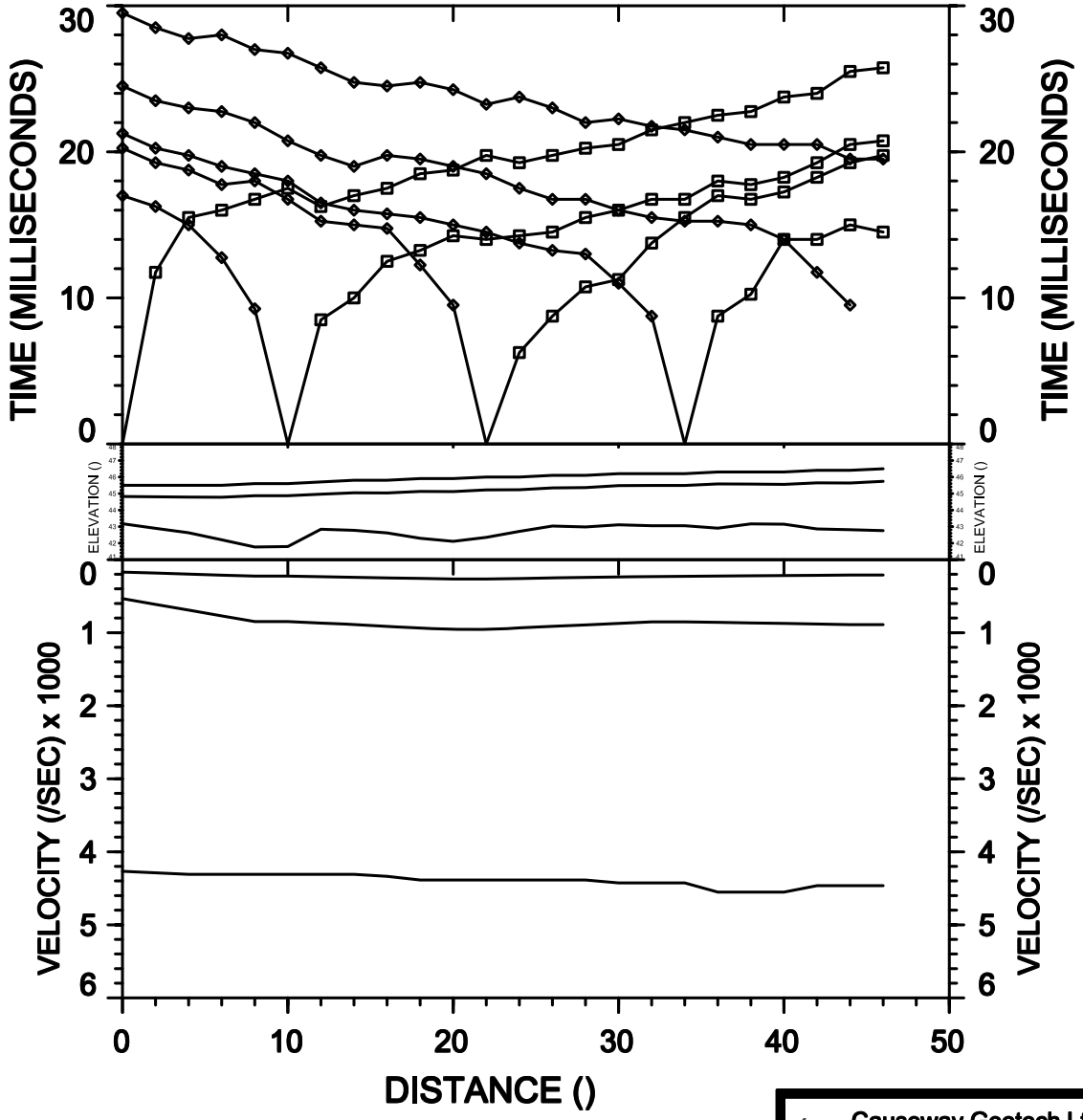


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS143 / Date: 28/06/2022	
Equipment: Geode / Spread: S143	Azimuth:

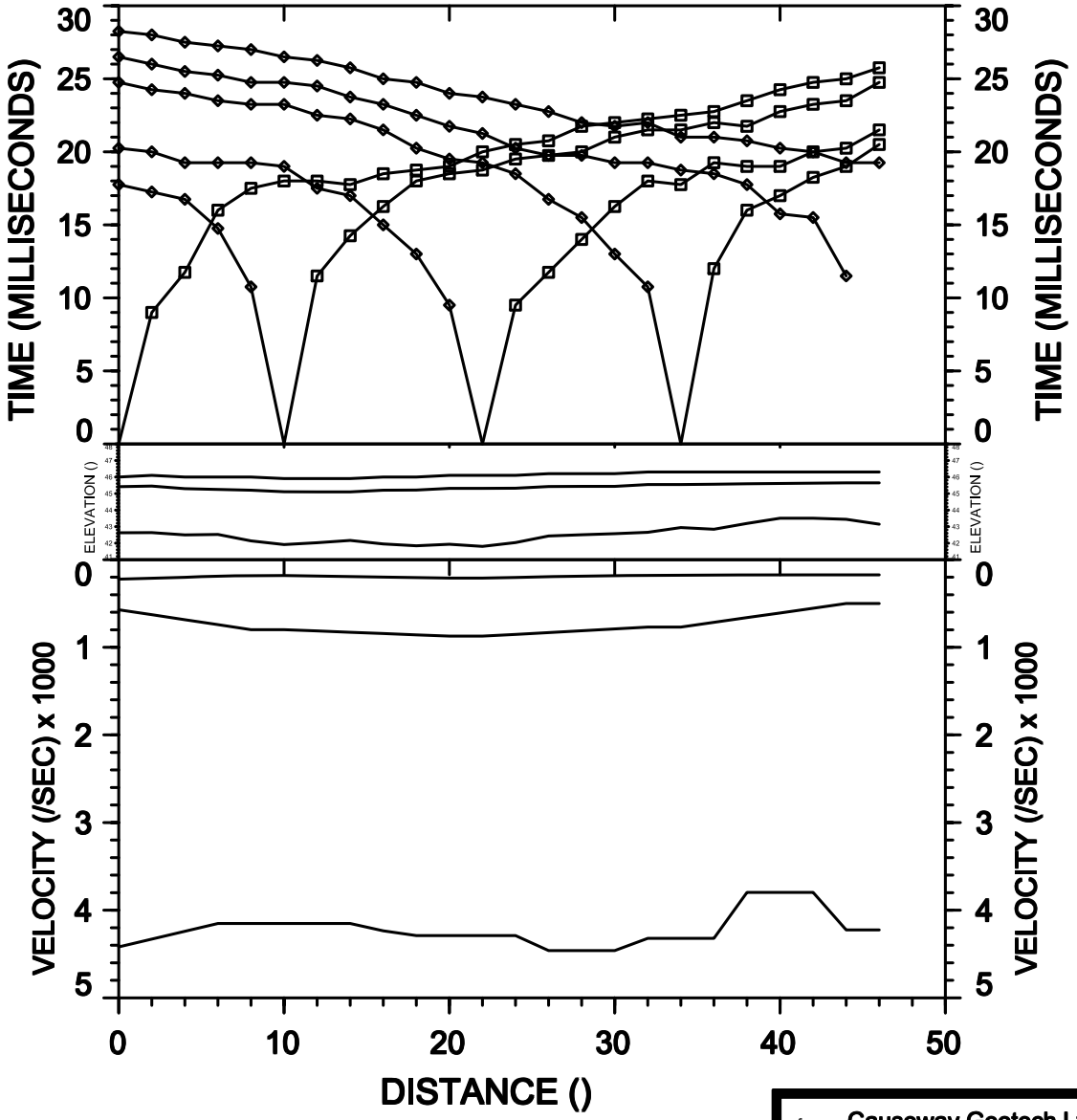


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS144 / Date: 28/06/2022	
Equipment: Geode / Spread: S144	Azimuth:

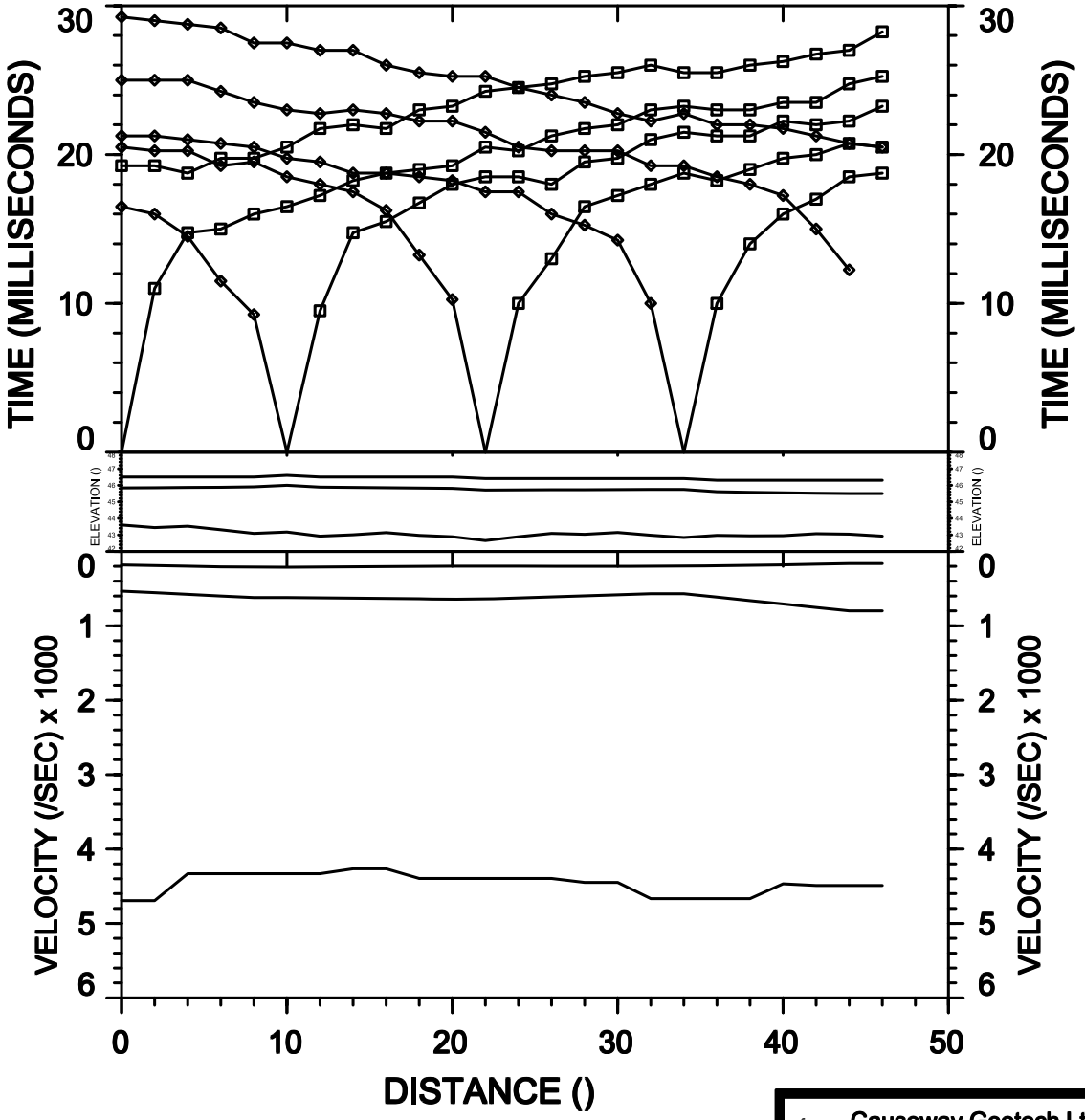


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS145 / Date: 28/06/2022	
Equipment: Geode / Spread: S145	Azimuth:

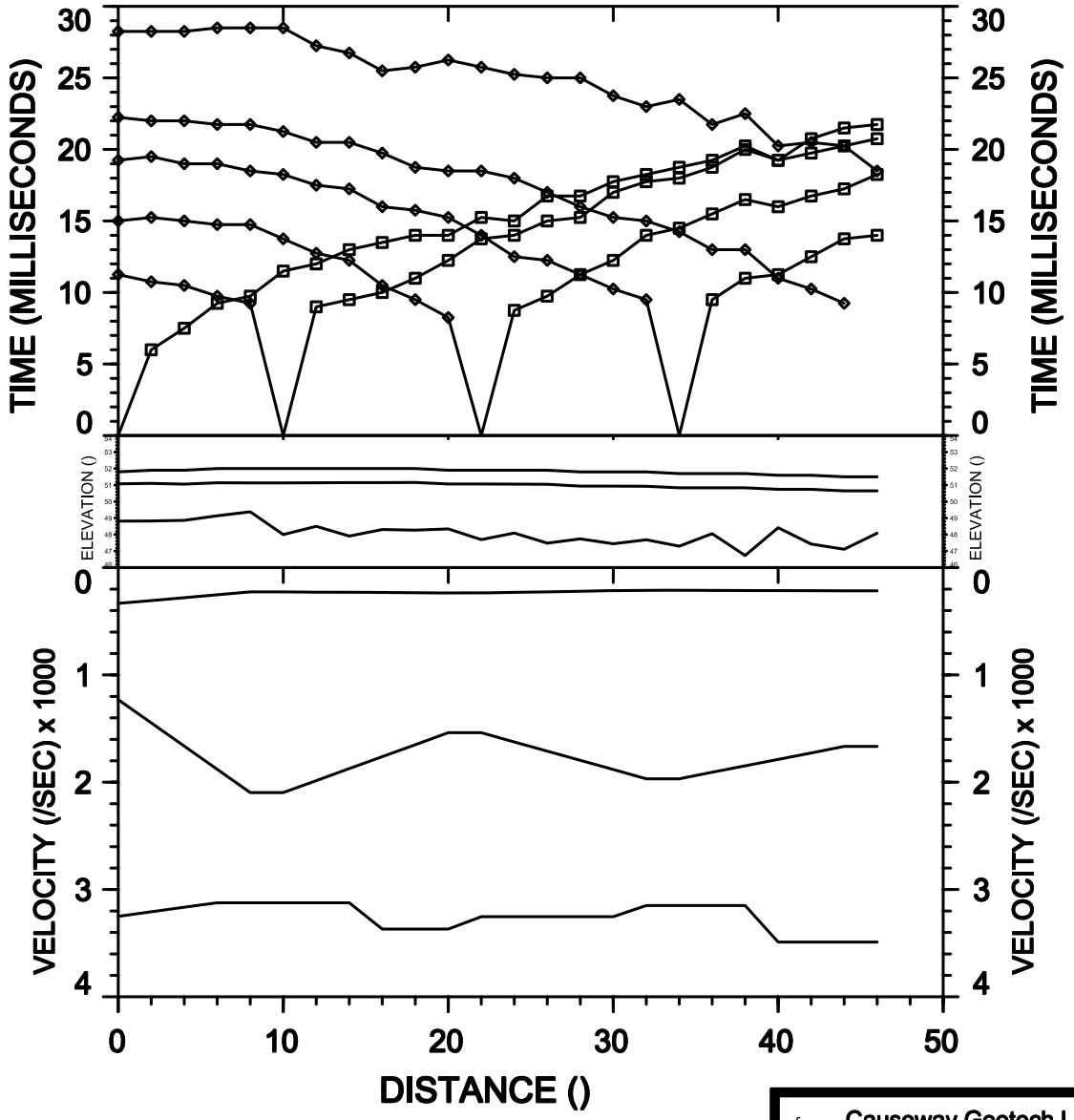


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS146 / Date: 29/06/2022	
Equipment: Geode / Spread: S146	Azimuth:

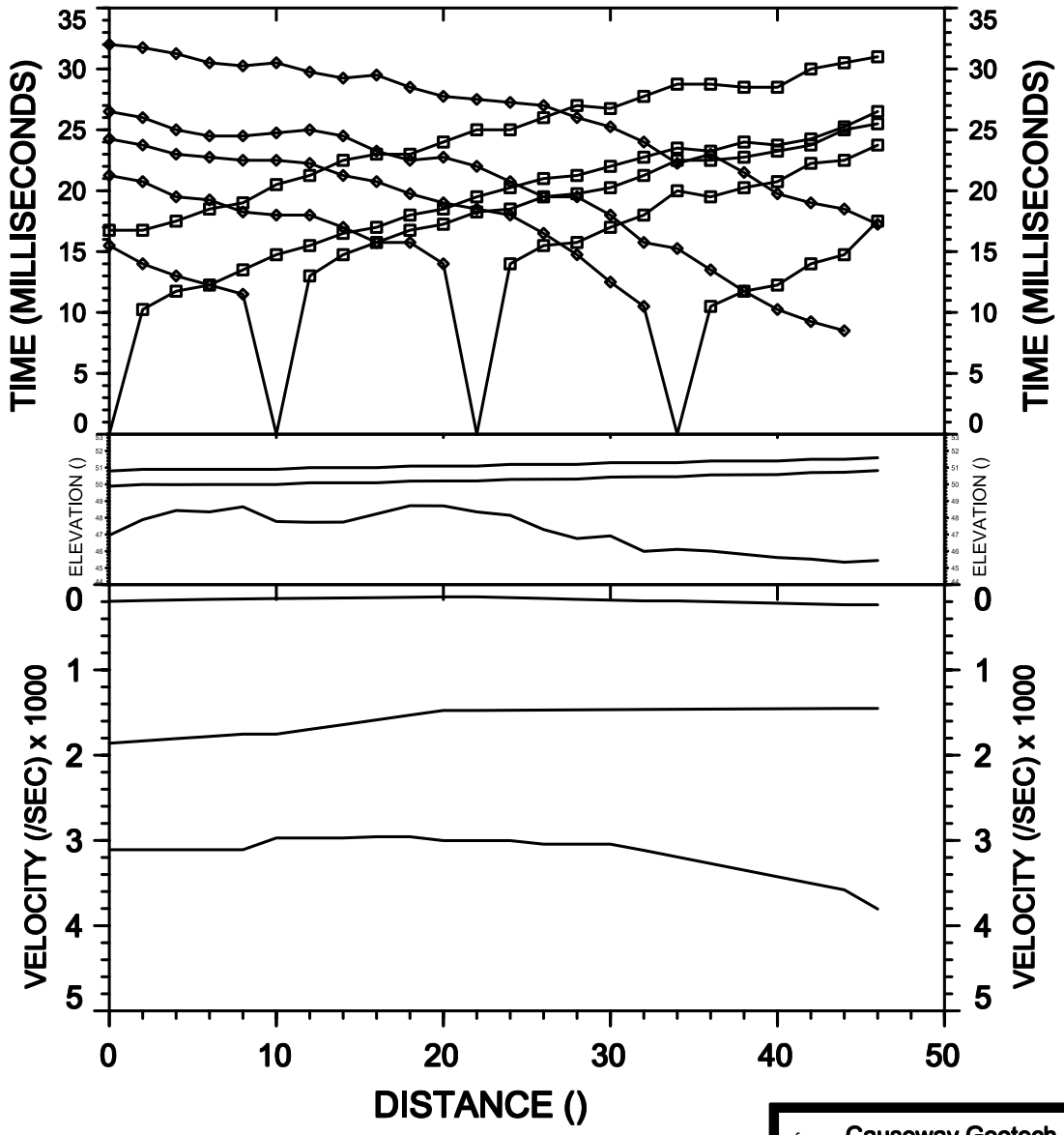


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS147R / Date: 29/06/2022	
Equipment: Geode / Spread: S147	Azimuth:

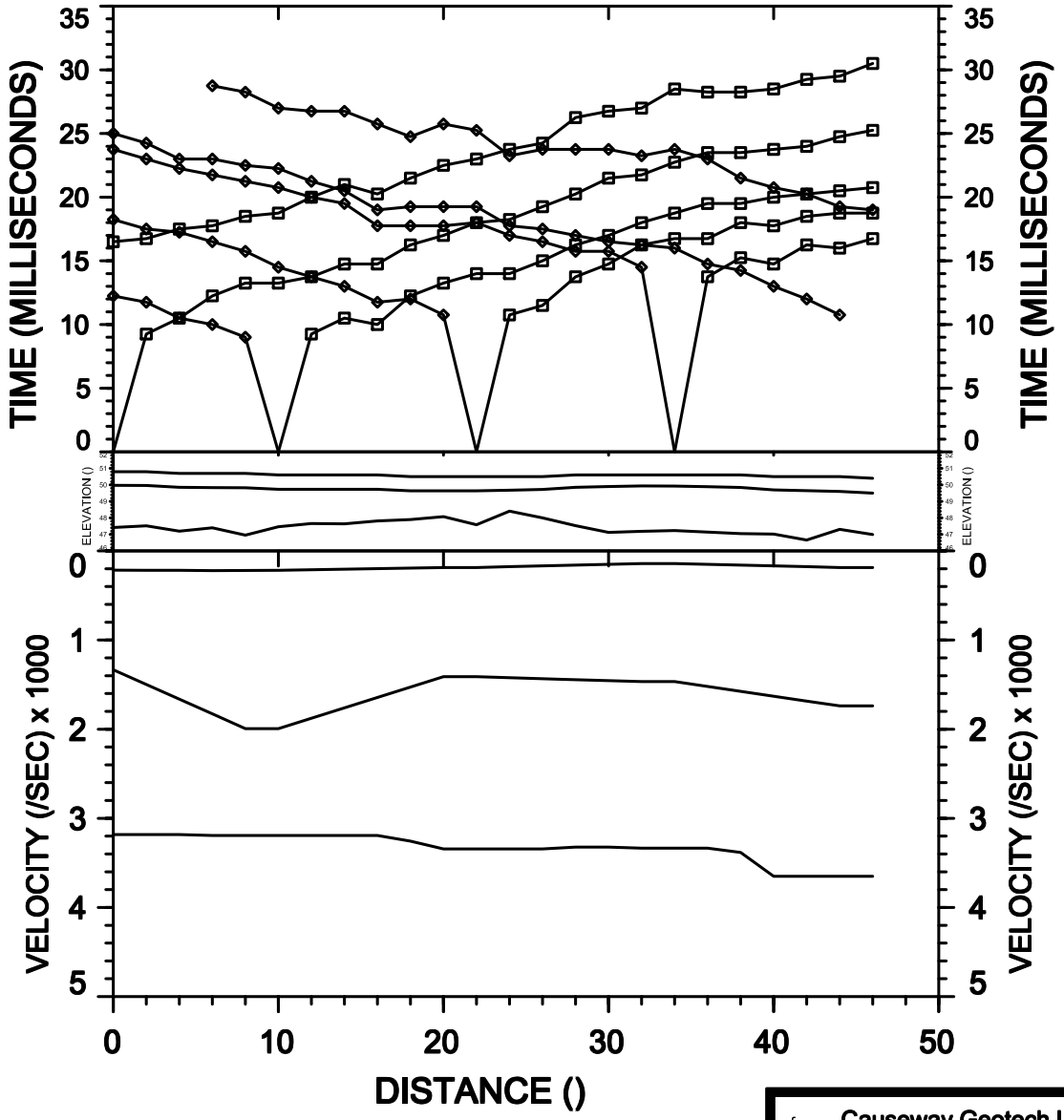


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS148R / Date: 29/06/2022	
Equipment: Geode / Spread: S148	Azimuth:

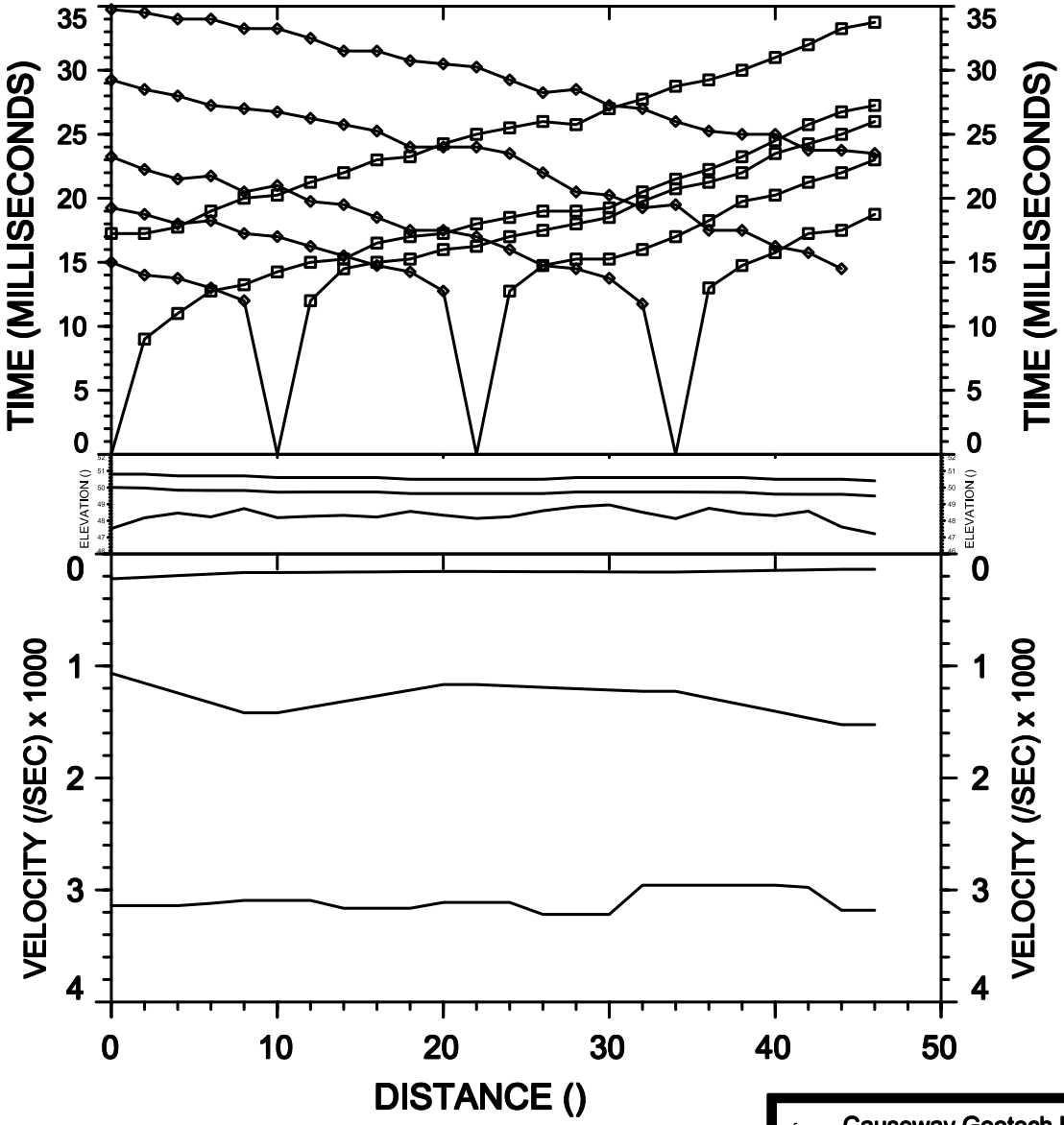


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS149 / Date: 29/06/2022	
Equipment: Geode / Spread: S149	Azimuth:

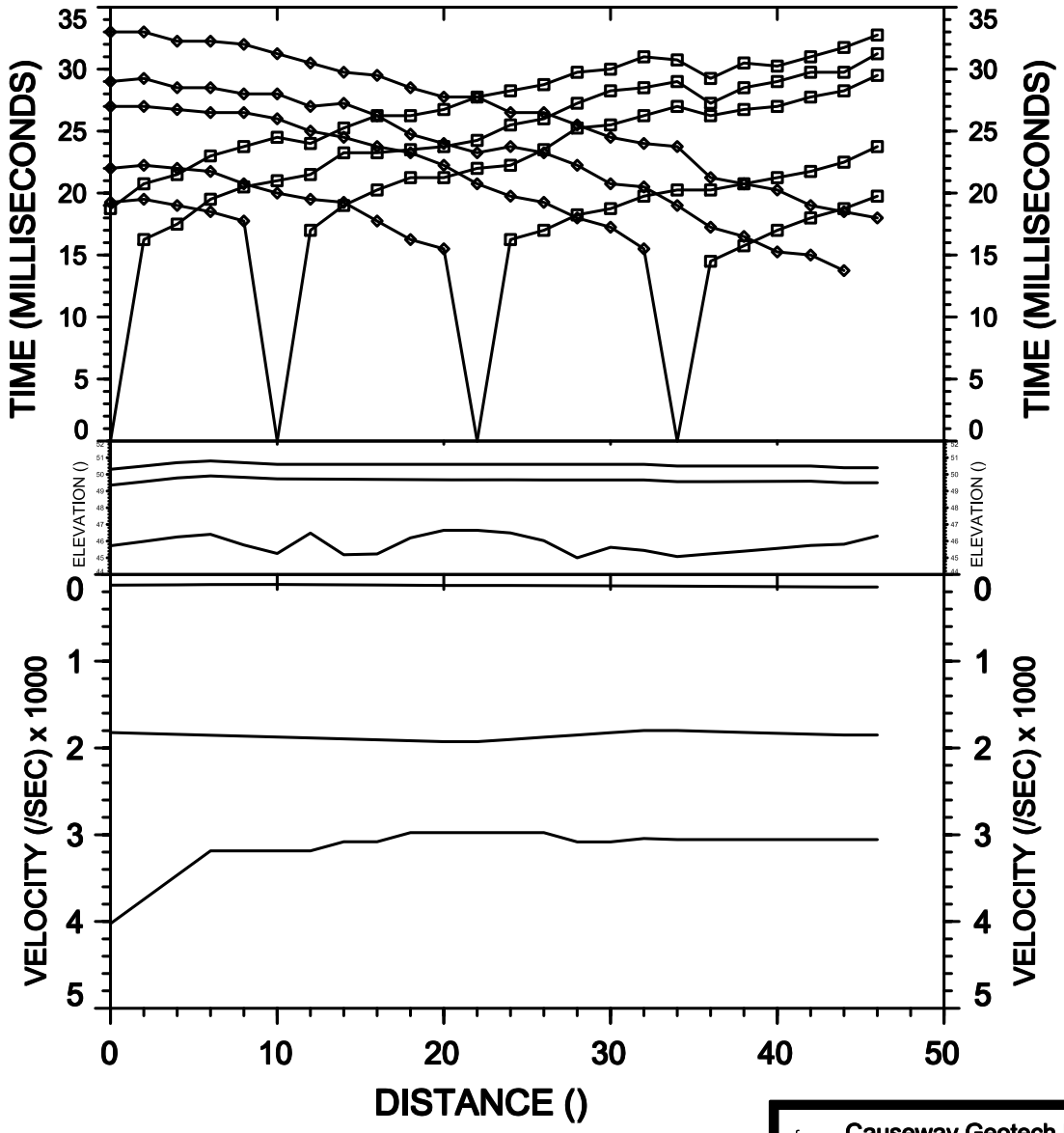


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS150R / Date: 29/06/2022	
Equipment: Geode / Spread: S150	Azimuth:

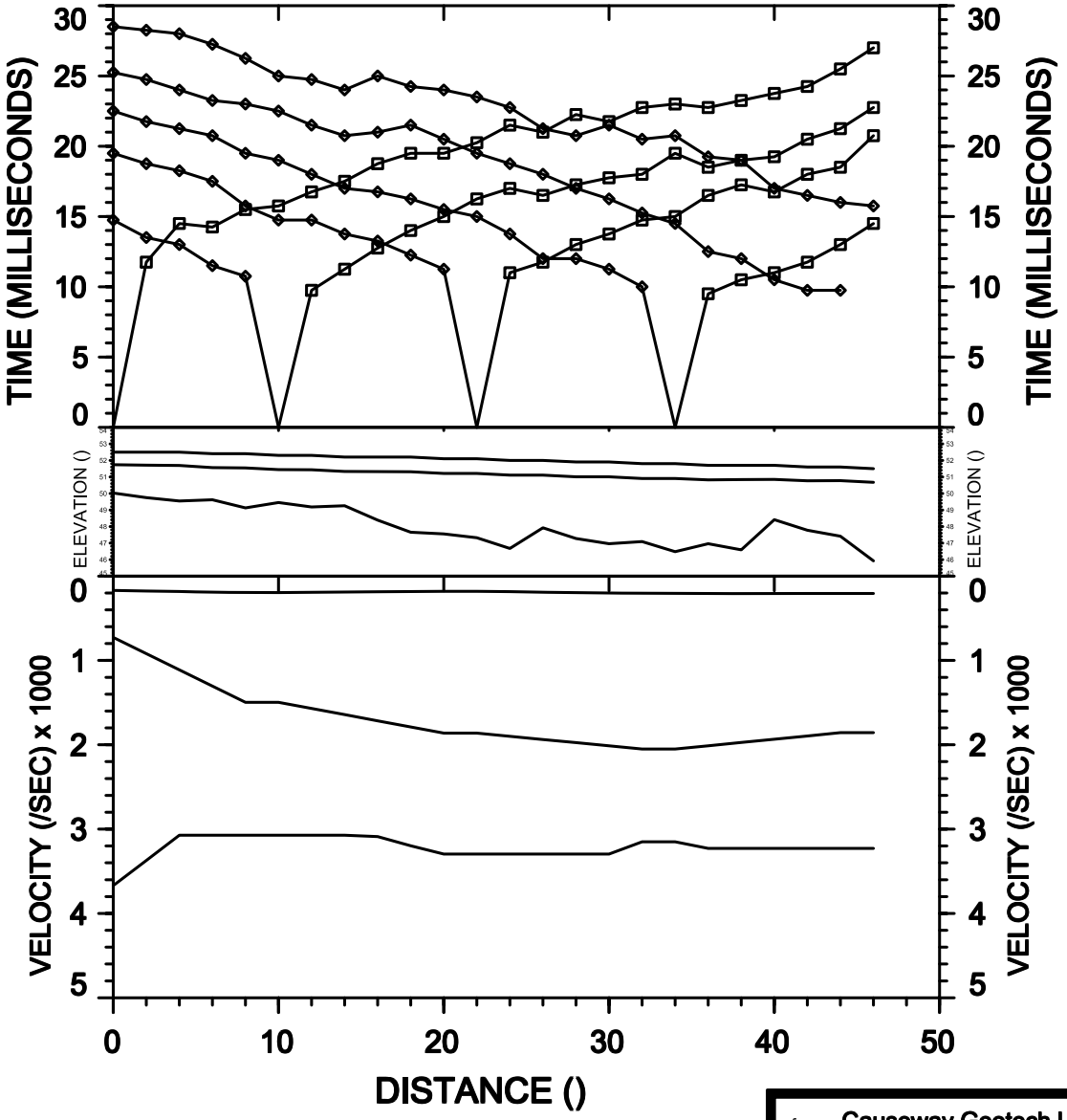


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS151 / Date: 30/06/2022	
Equipment: Geode / Spread: S151	Azimuth:

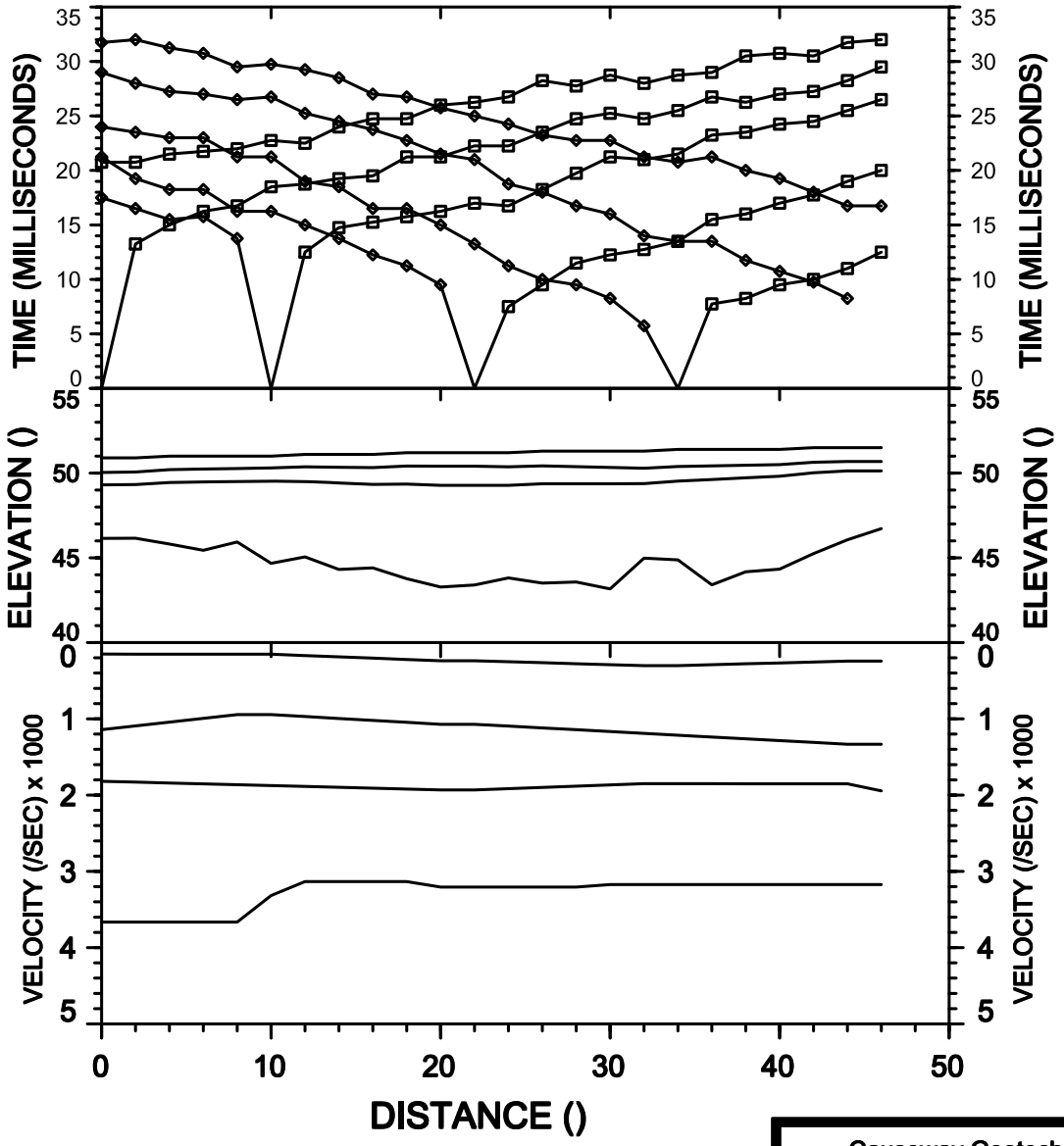


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS152R / Date: 30/06/2022	
Equipment: Geode / Spread: S152	Azimuth:

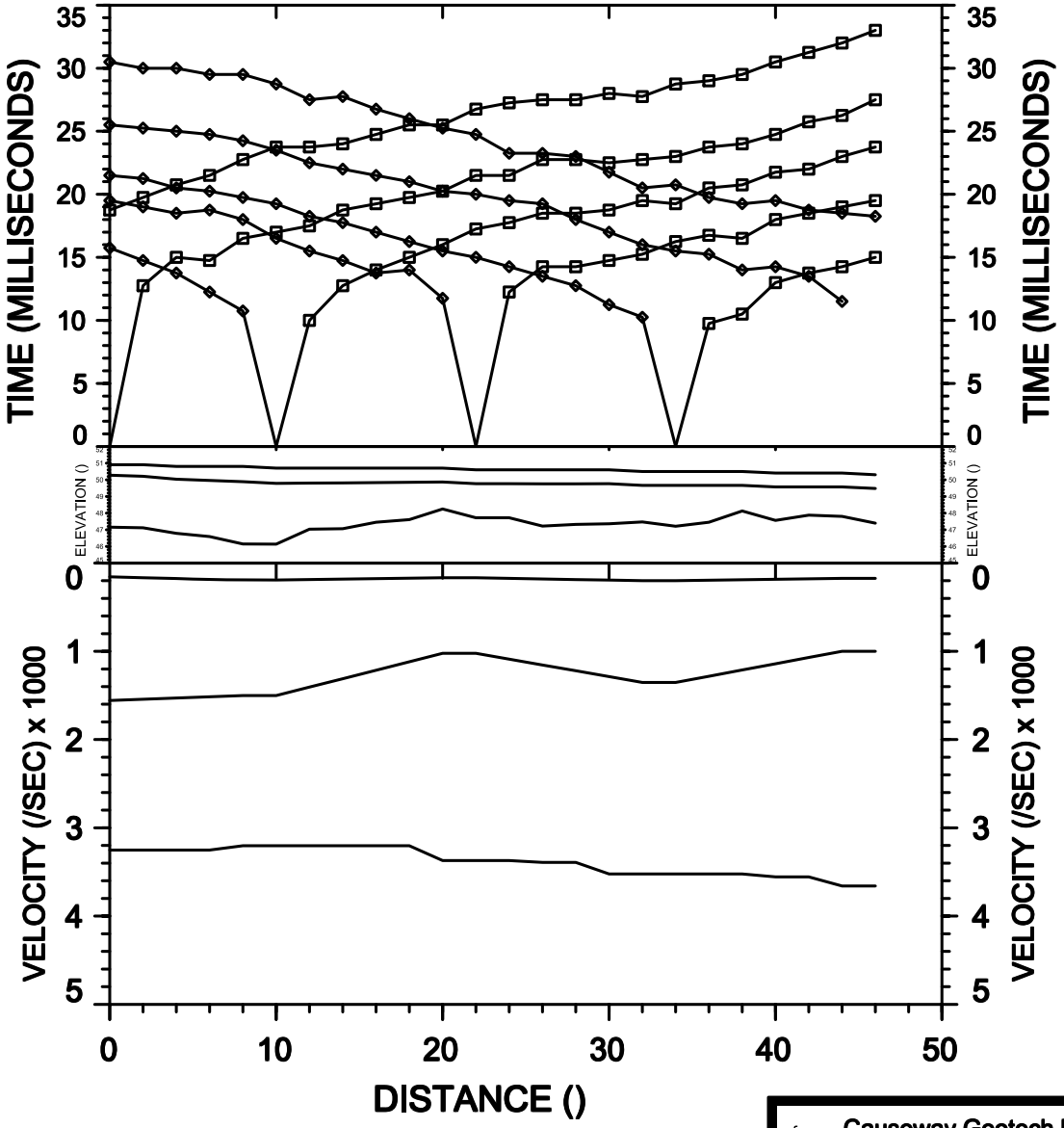


Plate: 10a

for: Causeway Geotech Ltd		AGP21220
by: Strata Geophysical, Inc.		Tipperary
Data SetS153R	Date: 30/06/2022	Tipperary
Equipment: Geode	Spread: S153	Azimuth:

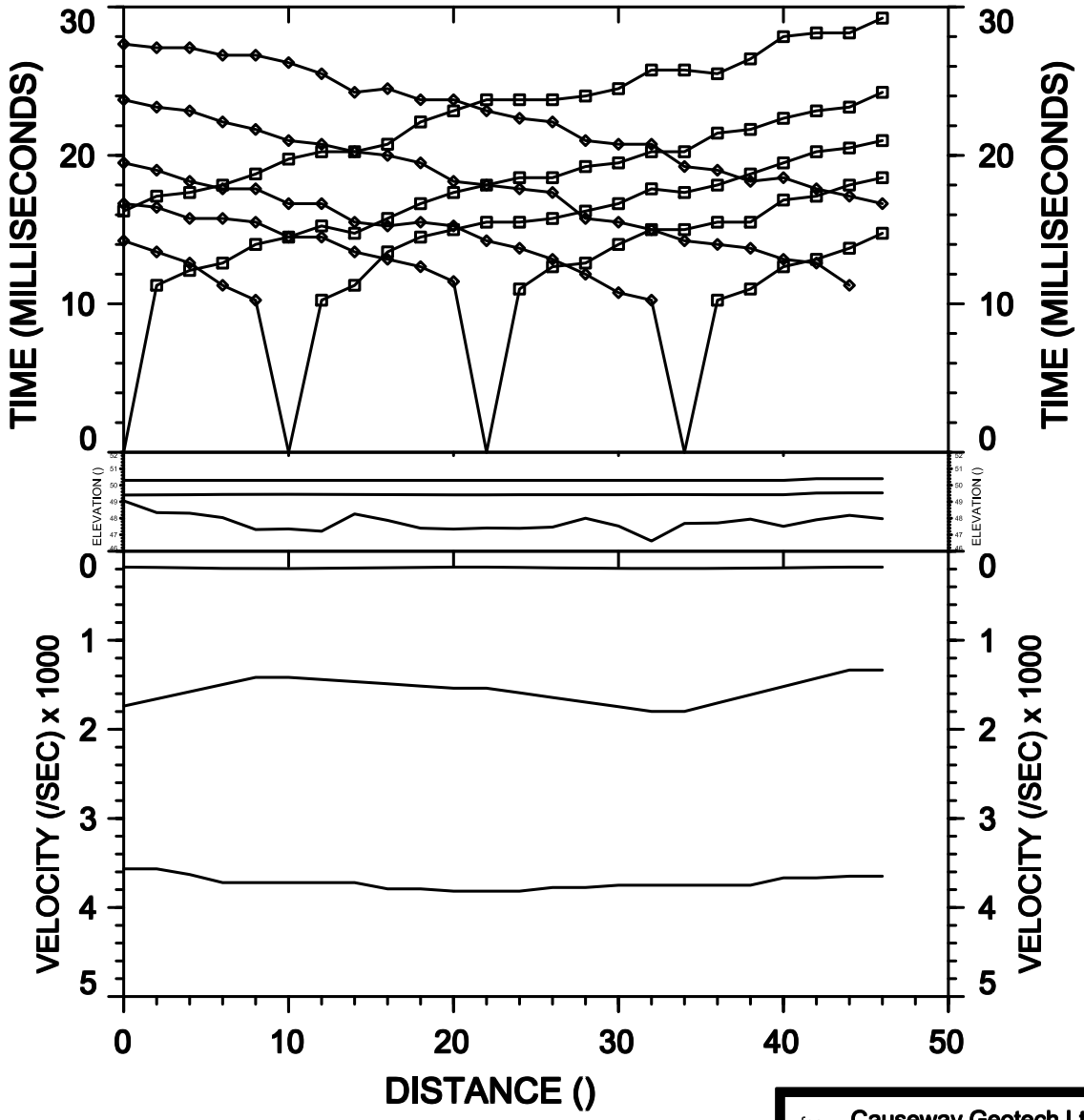


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS154 / Date: 30/06/2022	
Equipment: Geode / Spread: S154	Azimuth:

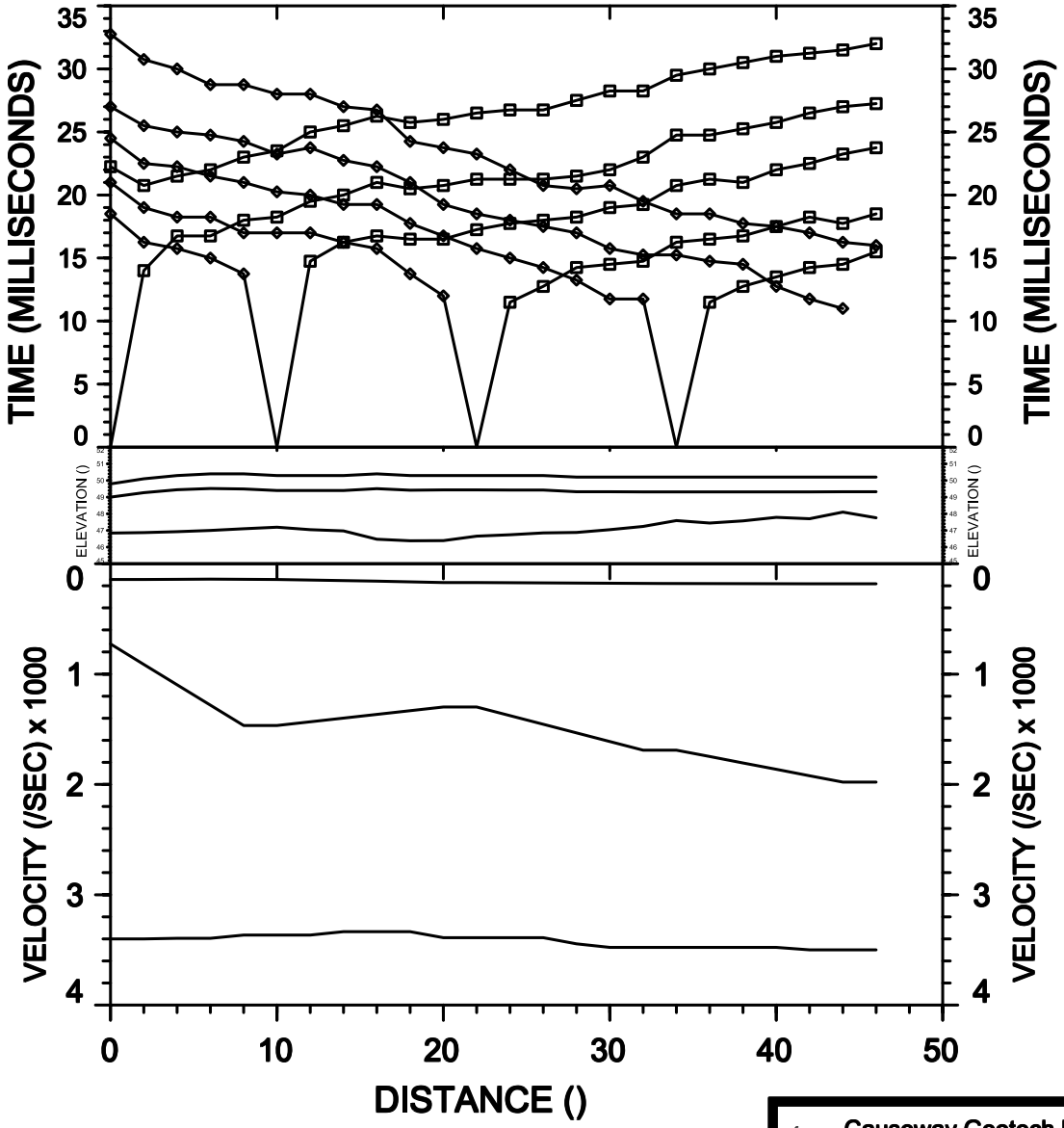


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS155R / Date: 30/06/2022	
Equipment: Geode / Spread: S155	Azimuth:

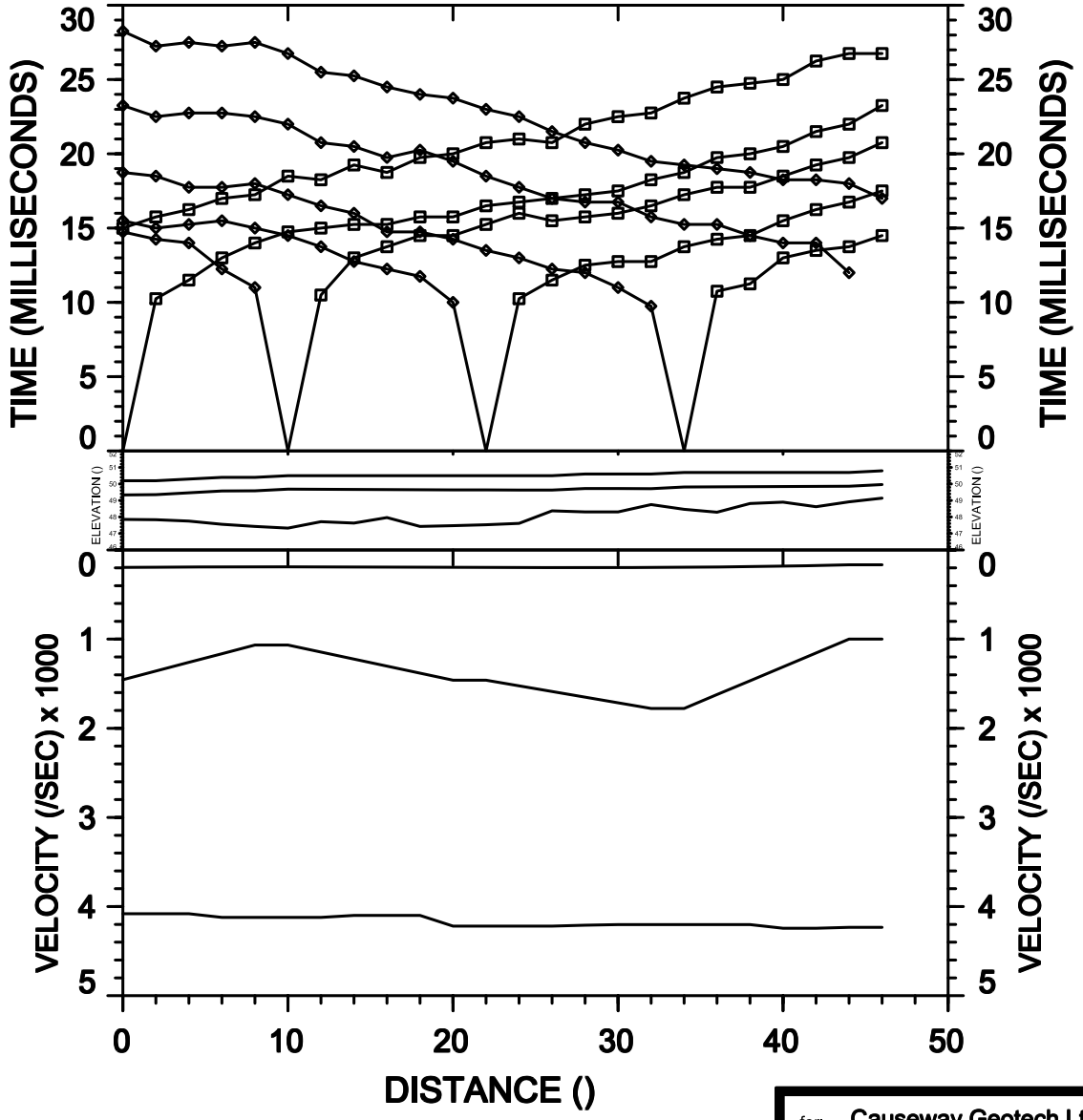


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS156 / Date: 30/06/2022	
Equipment: Geode / Spread: S156	Azimuth:

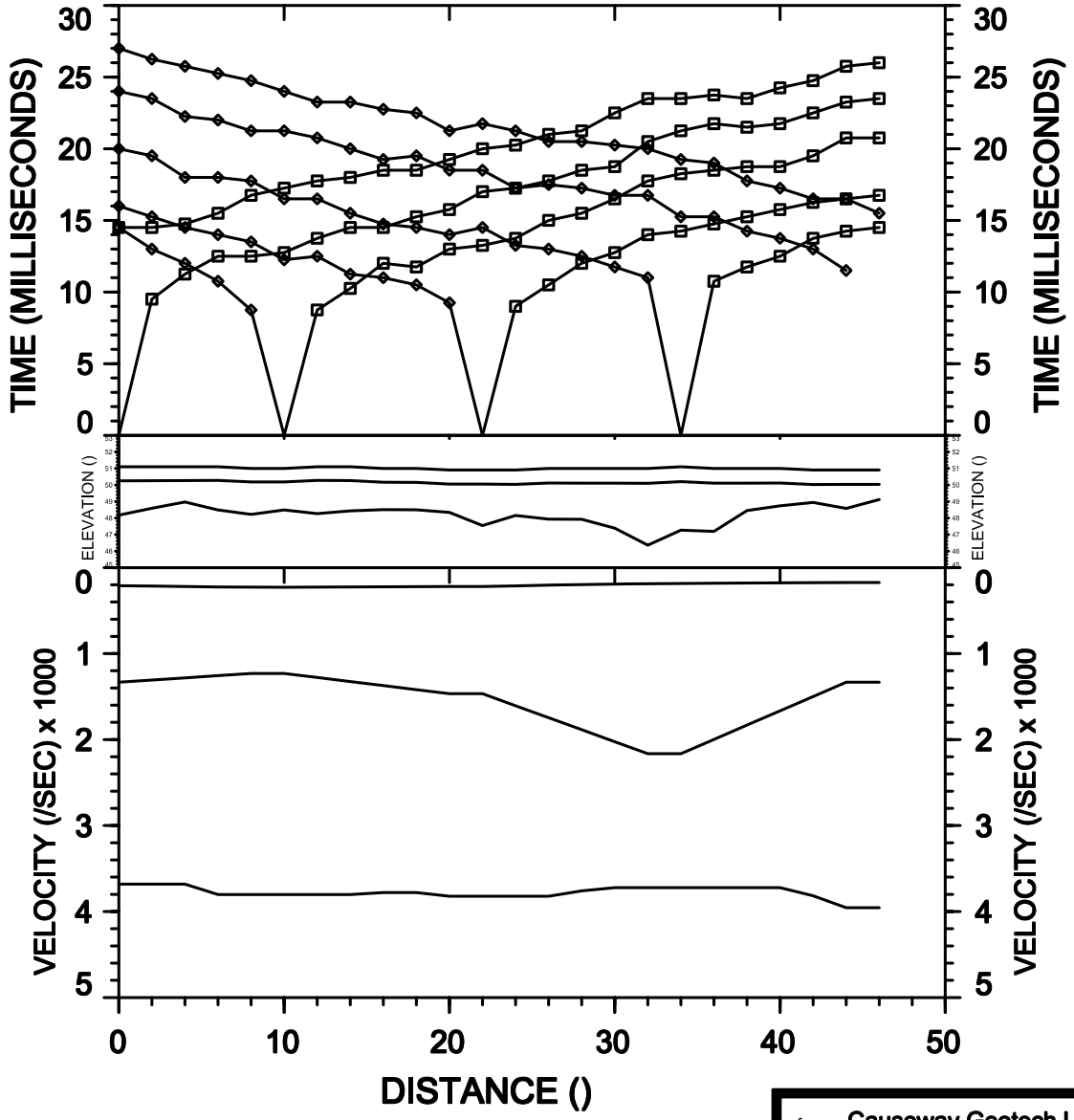


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS157 / Date: 30/06/2022	
Equipment: Geode / Spread: S157	Azimuth:

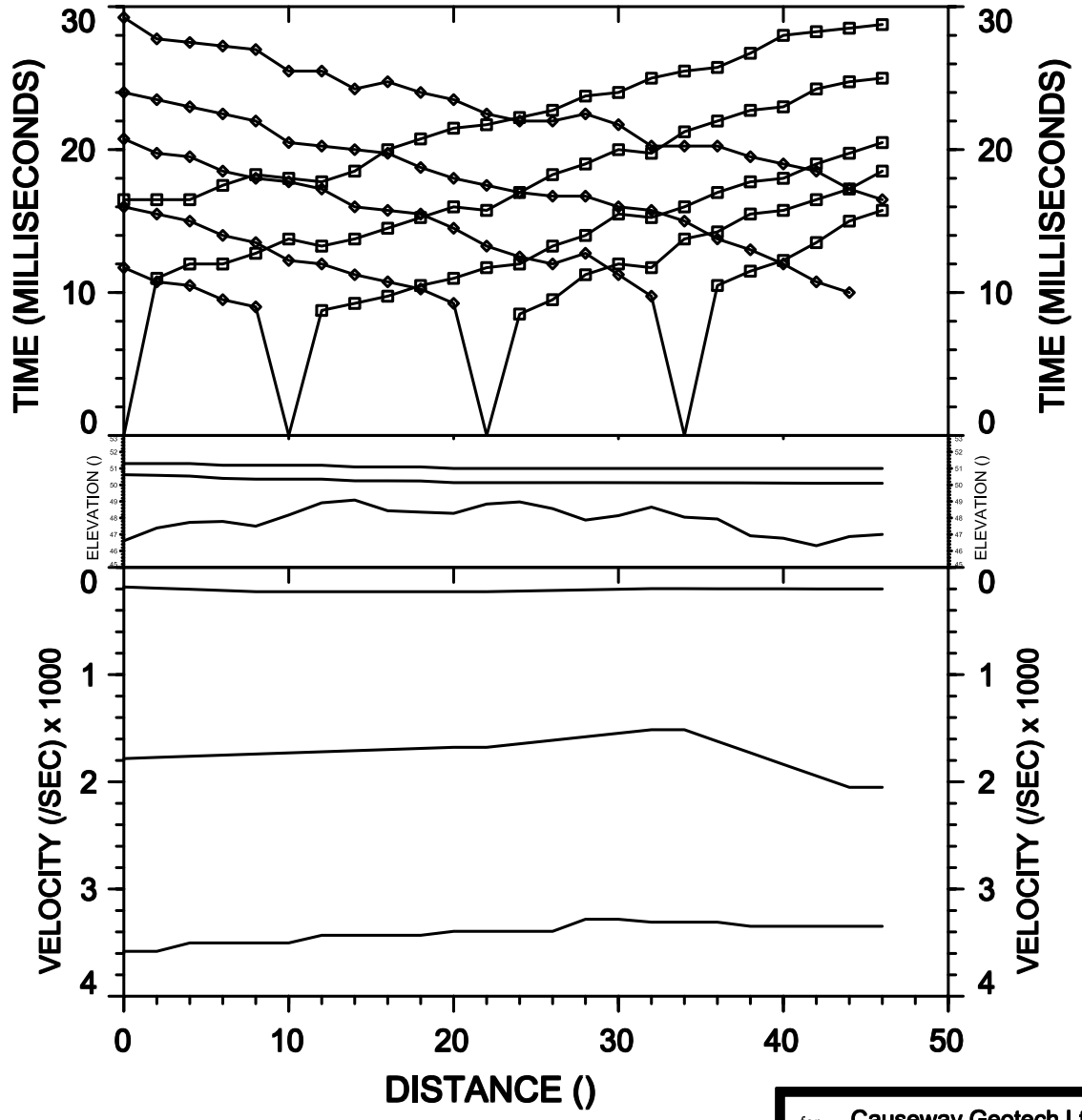


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS158R / Date: 30/06/2022	
Equipment: Geode / Spread: S158	Azimuth:

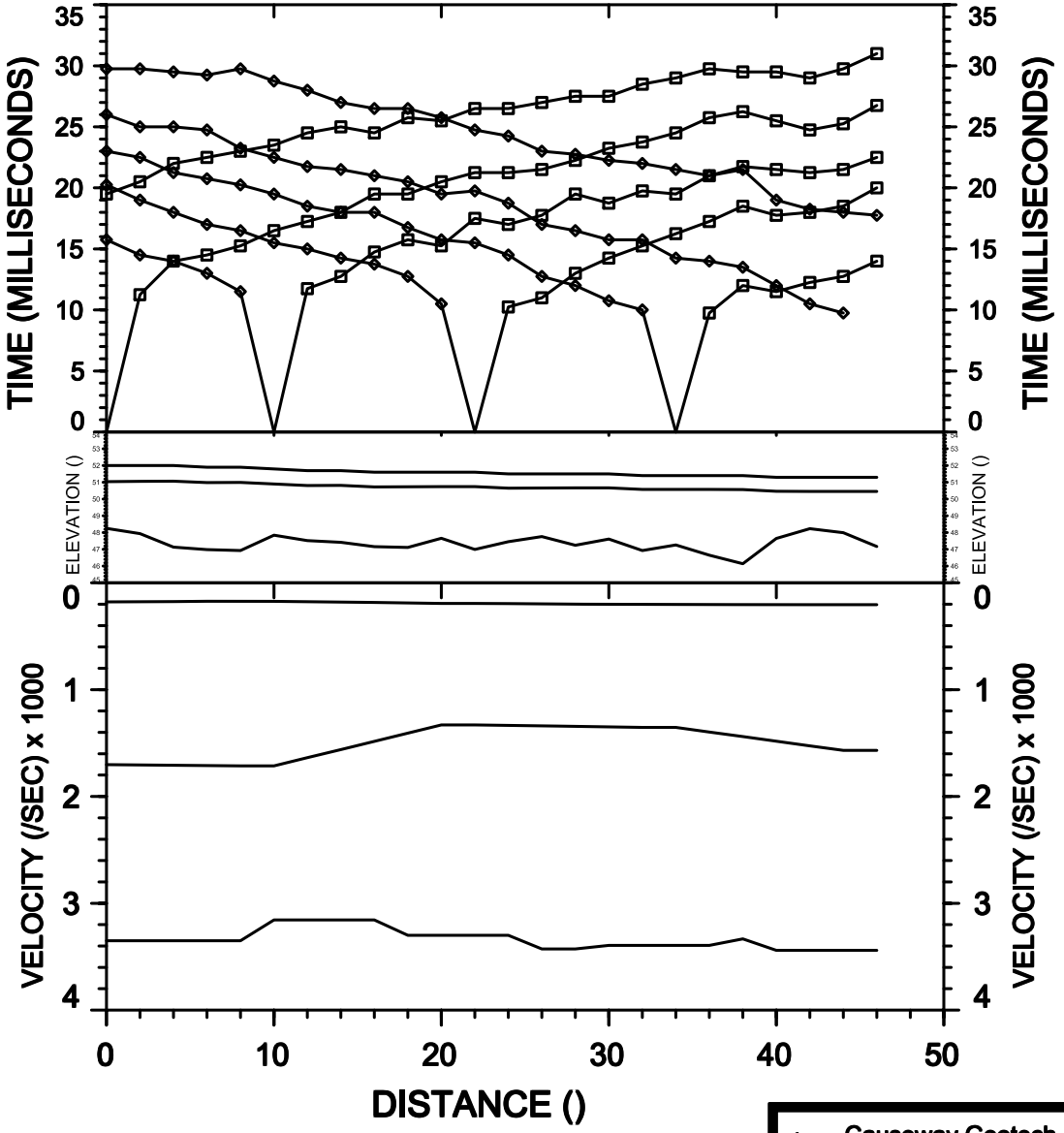


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS159R / Date: 30/06/2022	
Equipment: Geode / Spread: S159	Azimuth:

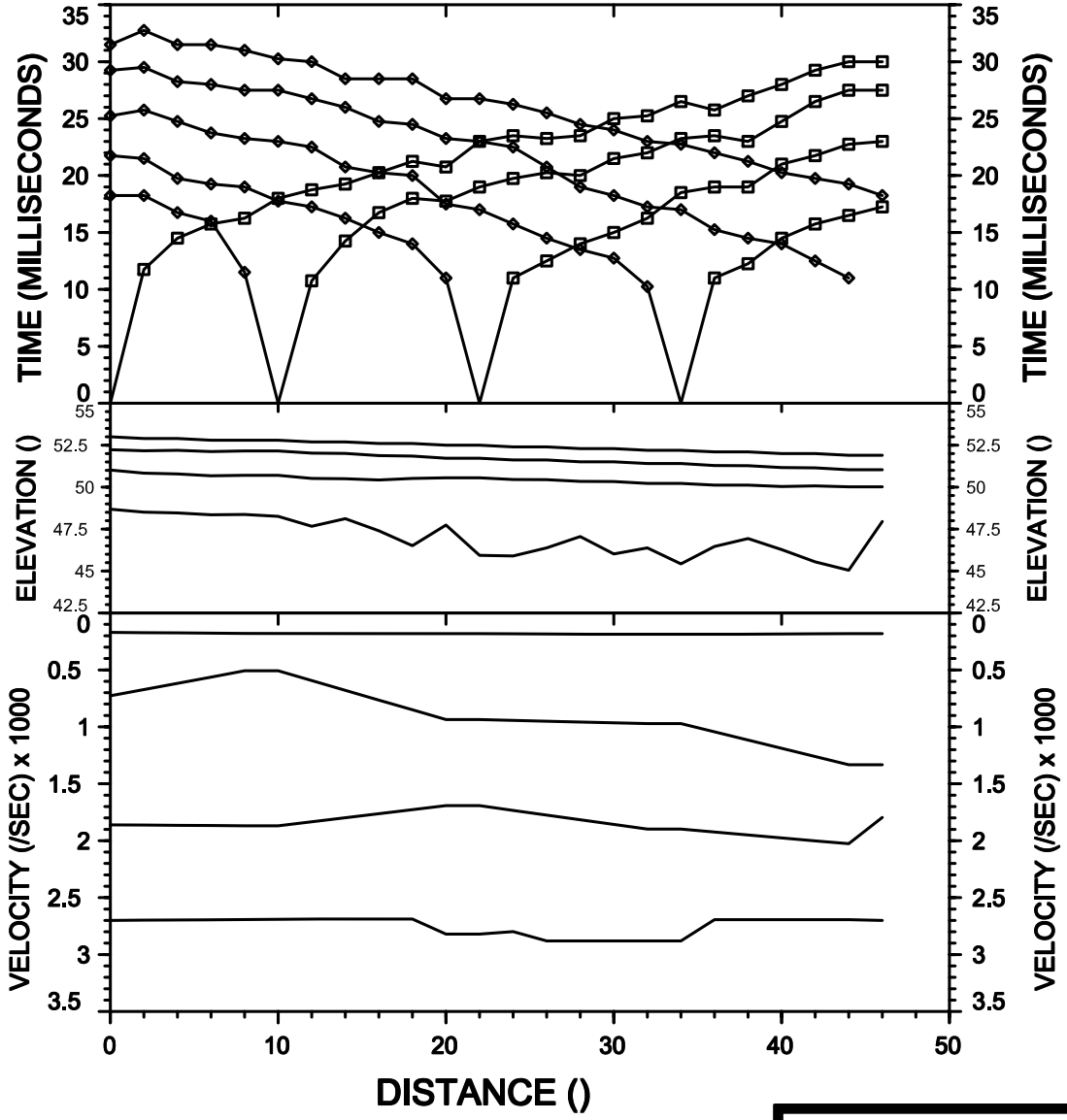


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS160 / Date: 30/06/2022	
Equipment: Geode / Spread: S160	Azimuth:

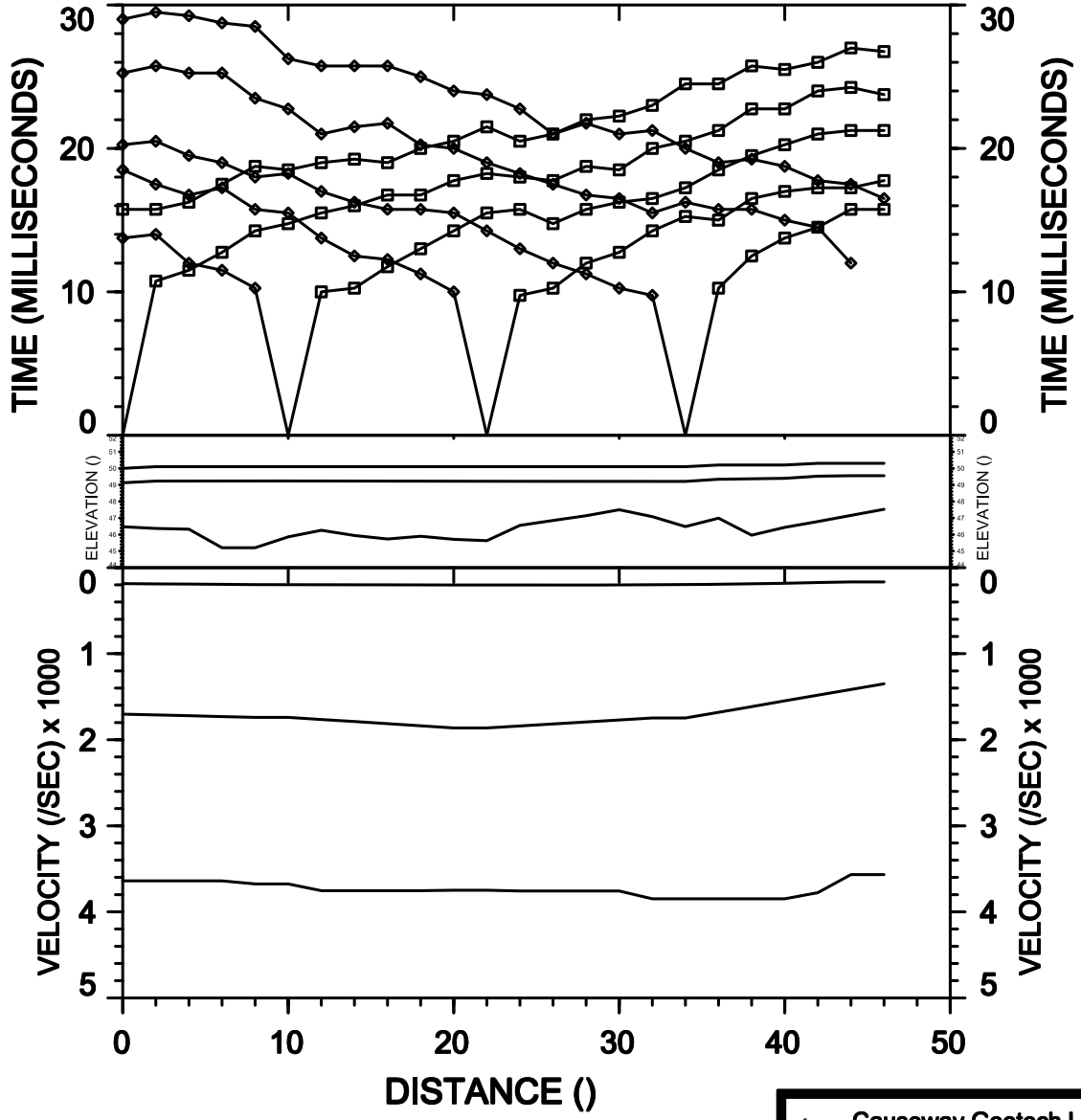


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS161R / Date: 30/06/2022	
Equipment: Geode / Spread: S161	Azimuth:

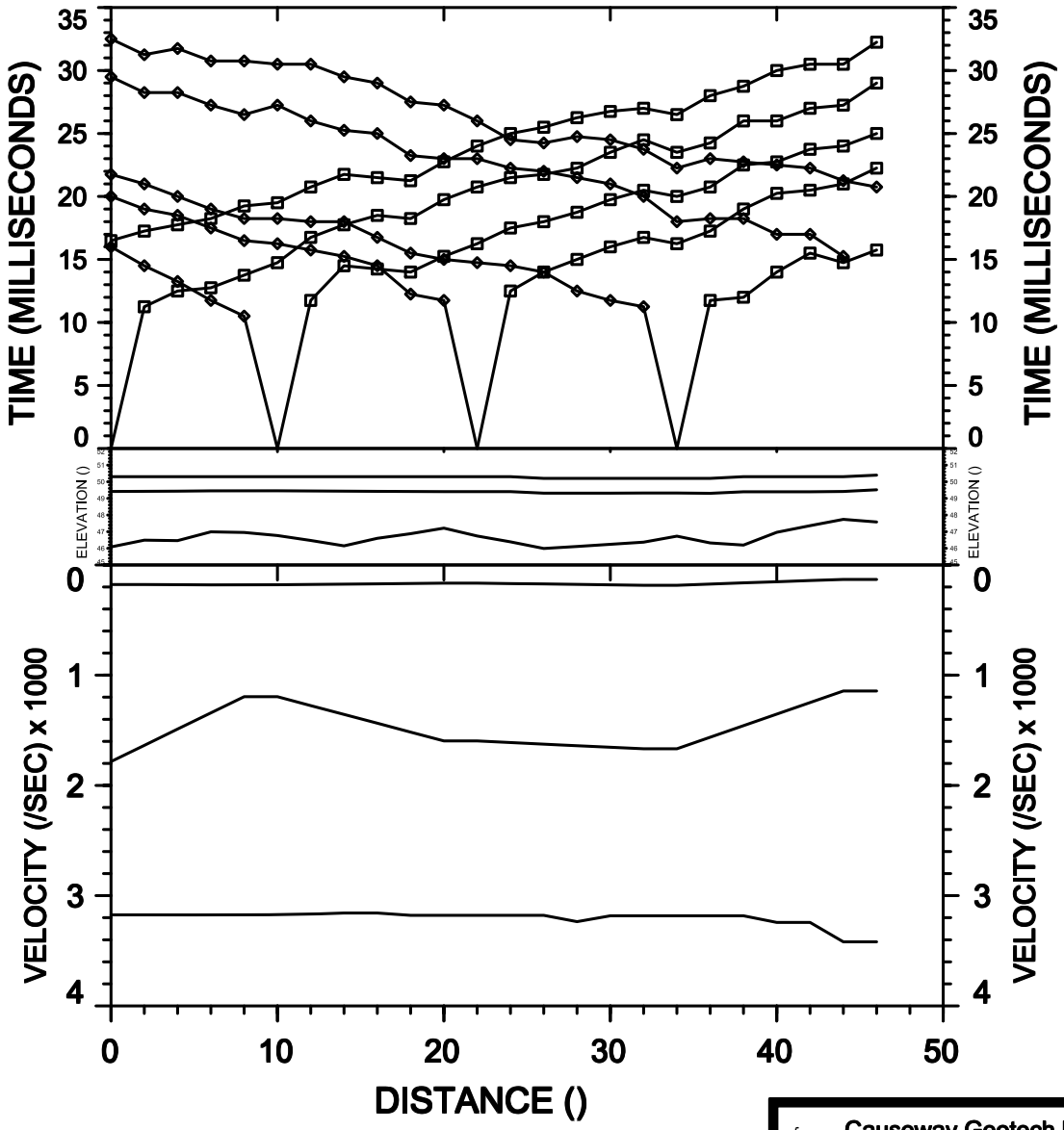


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS162R / Date: 30/06/2022	
Equipment: Geode / Spread: S162	Azimuth:

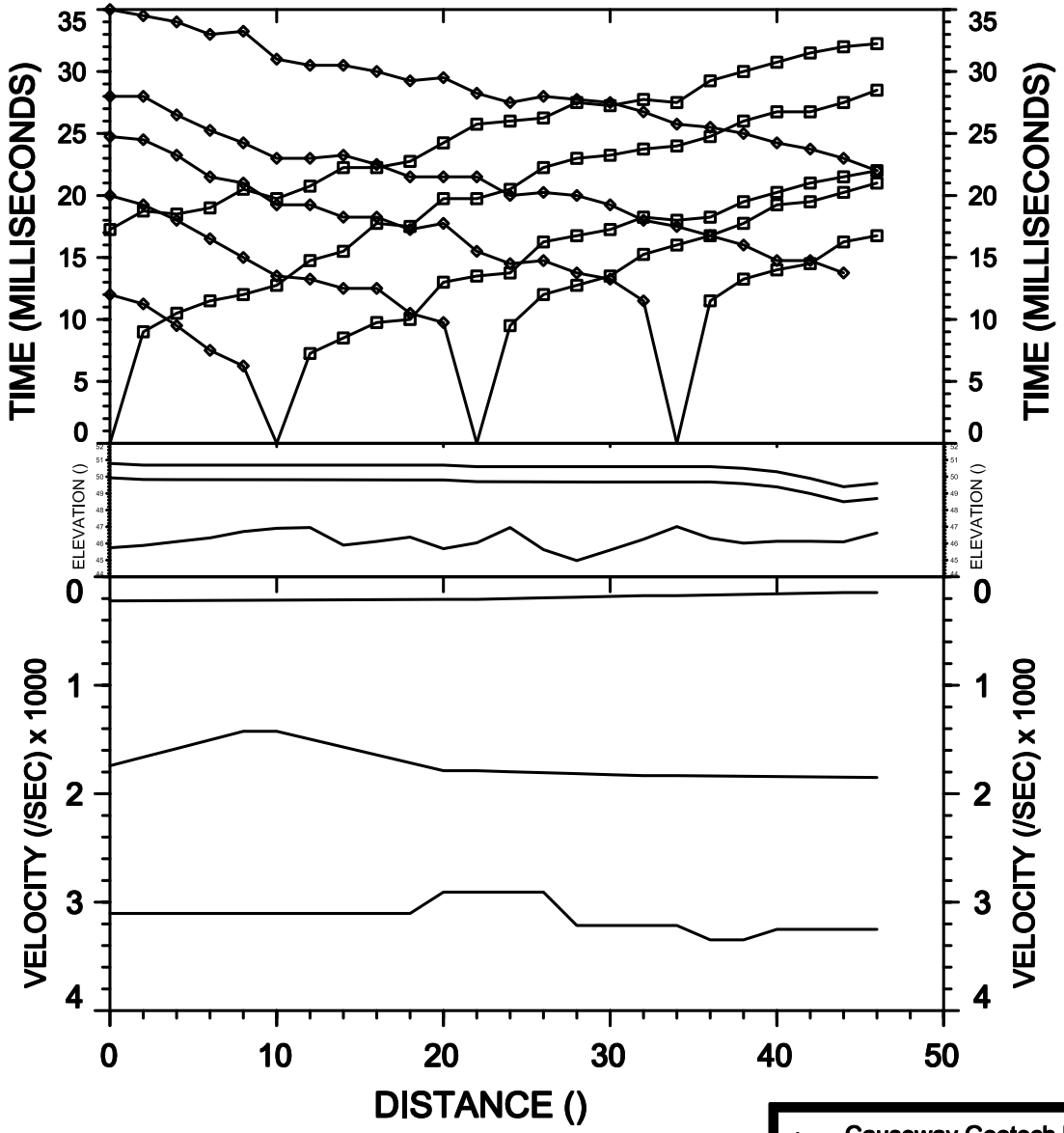


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS163R / Date: 30/06/2022	
Equipment: Geode / Spread: S163	Azimuth:

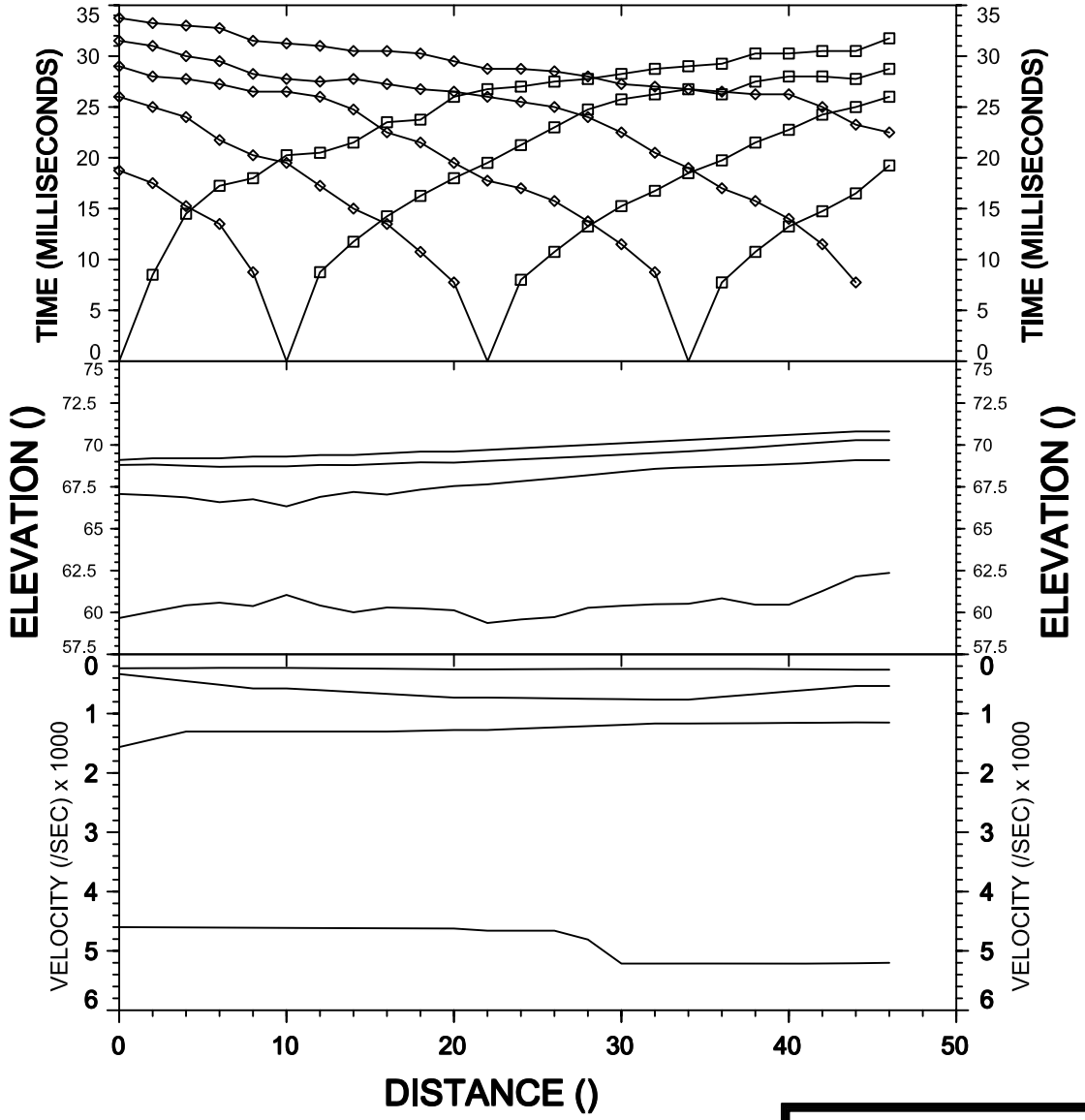


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS164 / Date: 4/7/22	
Equipment: Geode / Spread: S164	Azimuth:

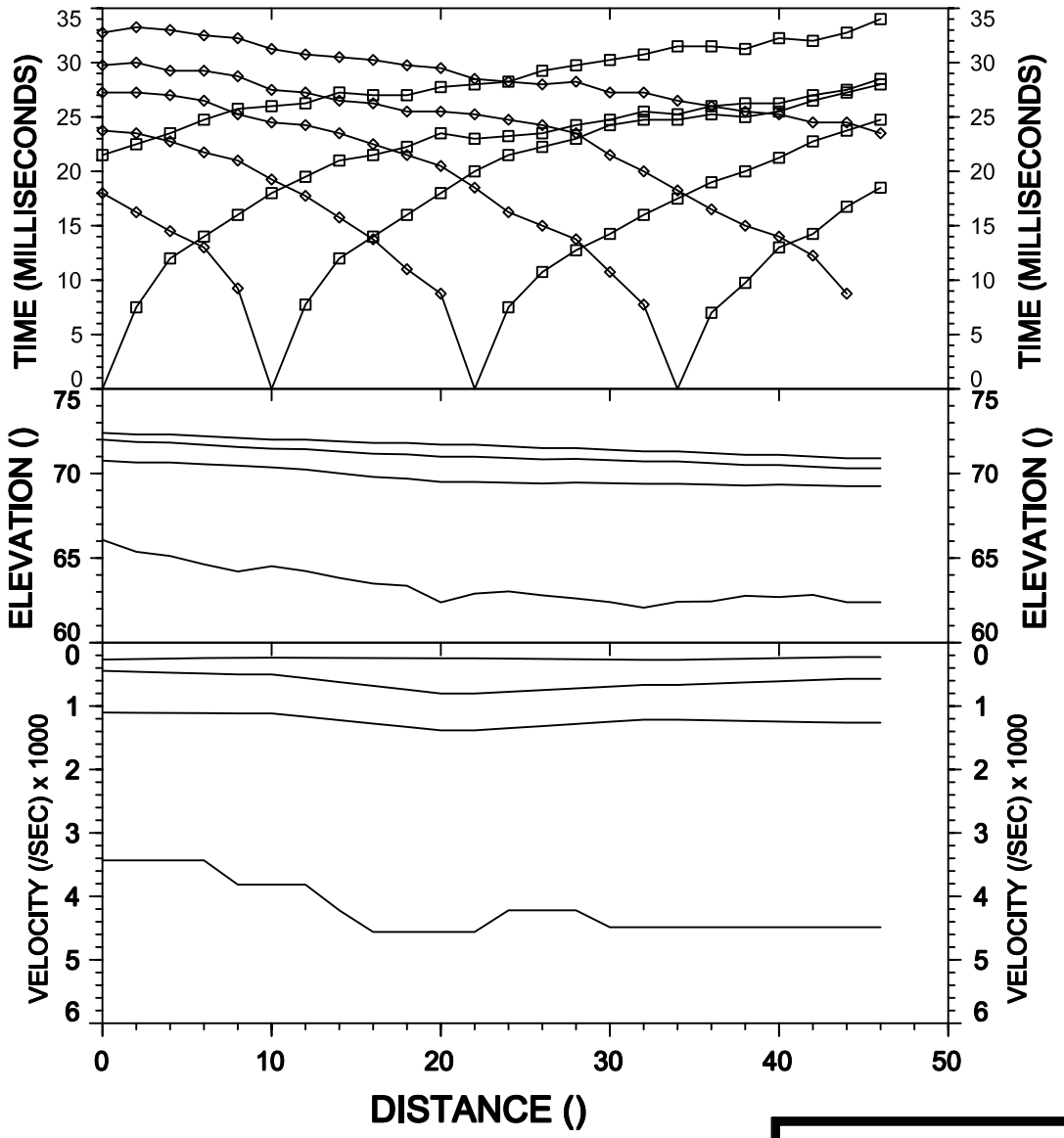


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS165 / Date: 4/7/22	
Equipment: Geode / Spread: S165	Azimuth:

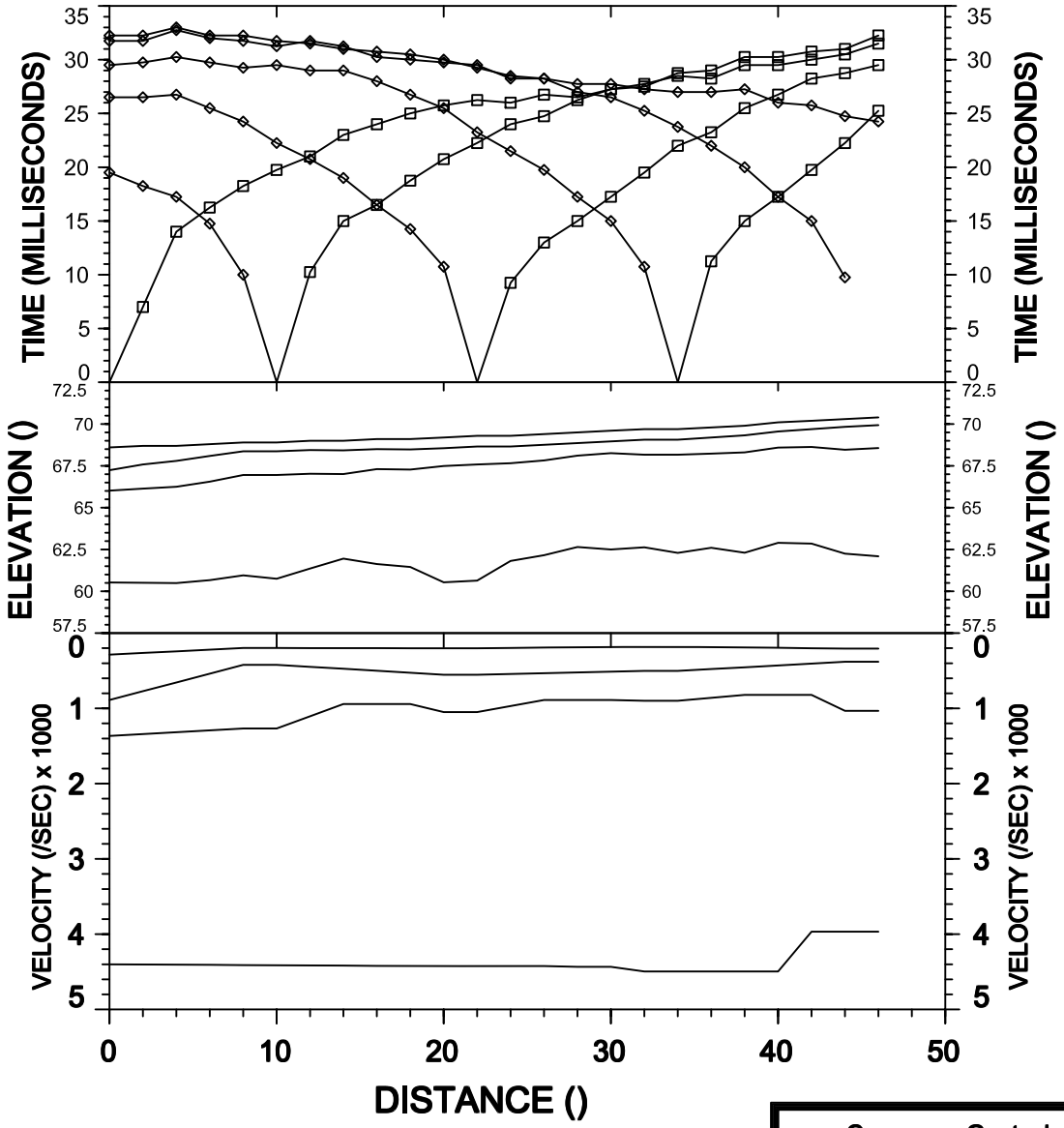


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS166 / Date: 4/7/22	
Equipment: Geode / Spread: S166	Azimuth:

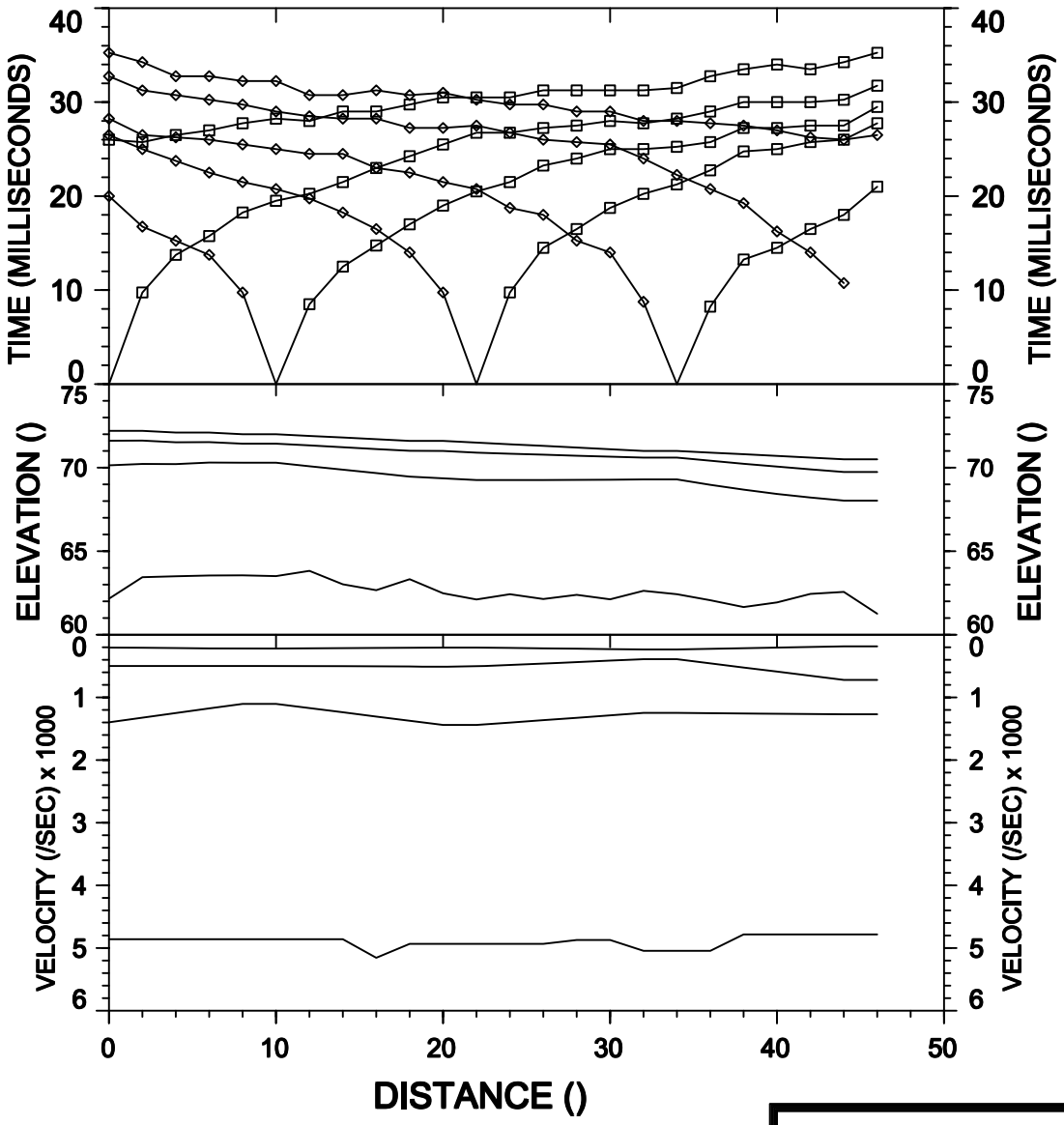


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS167 / Date: 4/7/22	
Equipment: Geode / Spread: S167	Azimuth:

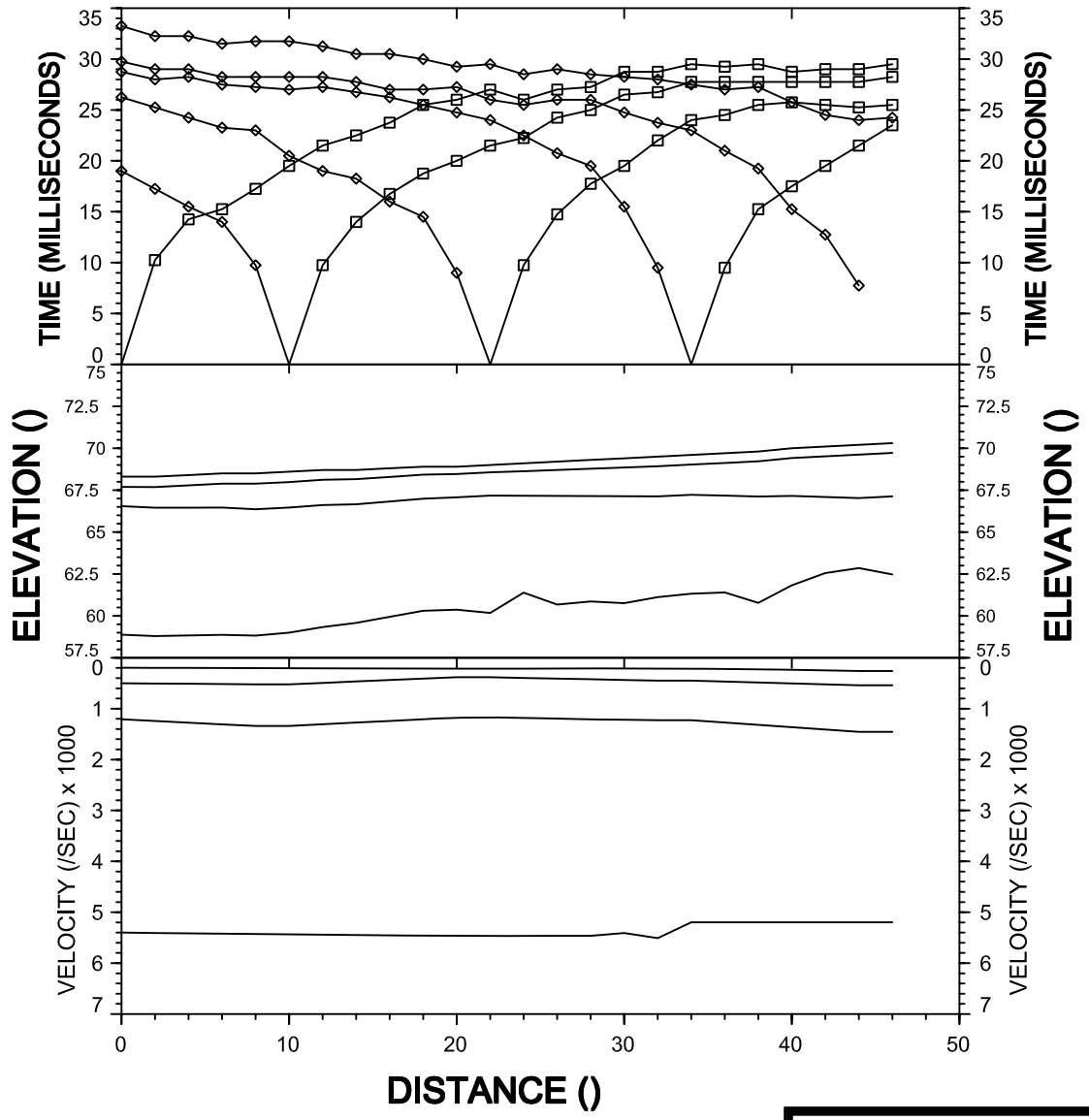


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS168 / Date: 4/7/22	
Equipment: Geode / Spread: S168	Azimuth:

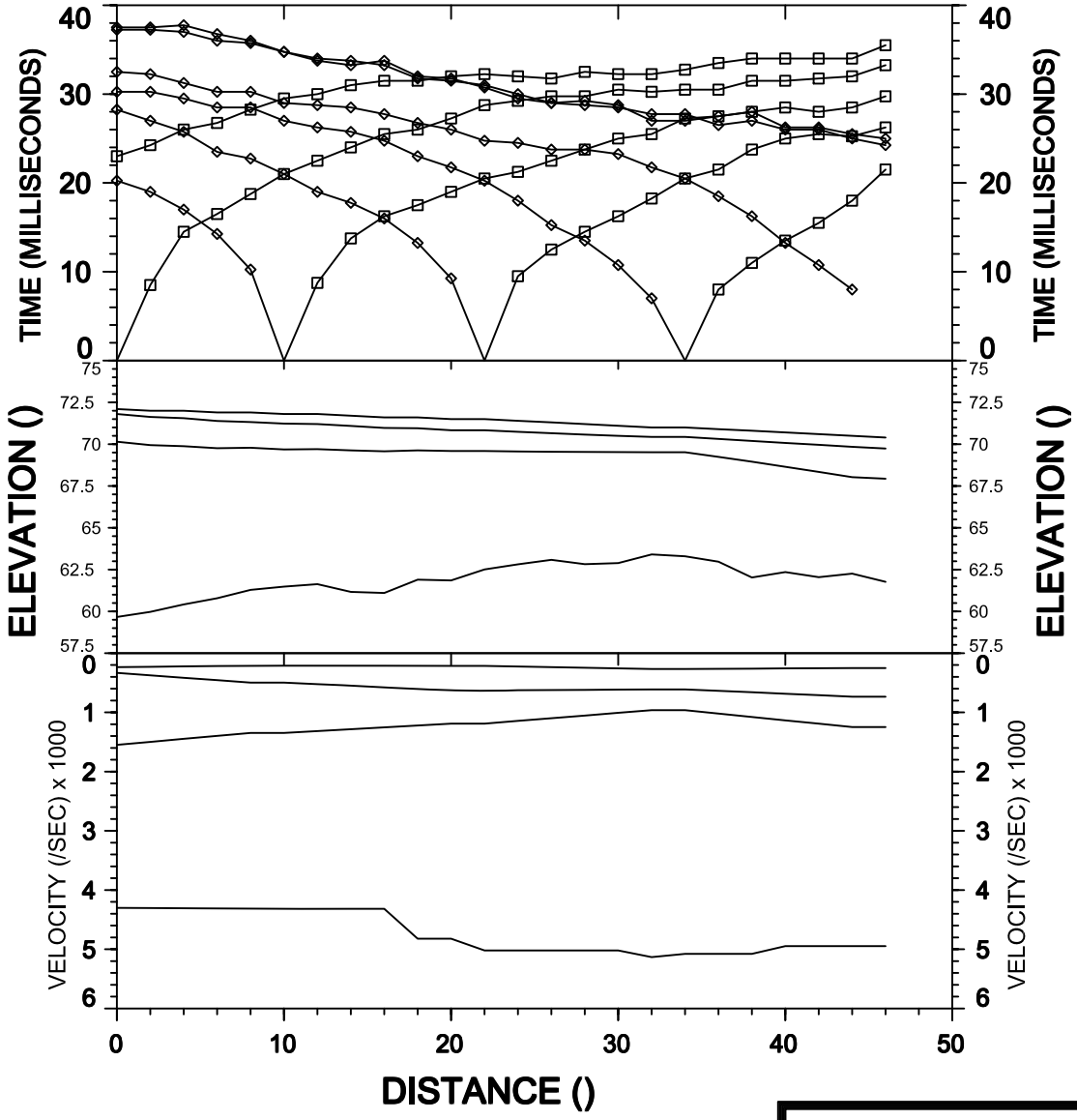


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS169 / Date: 4/7/22	
Equipment: Geode / Spread: S169	Azimuth:

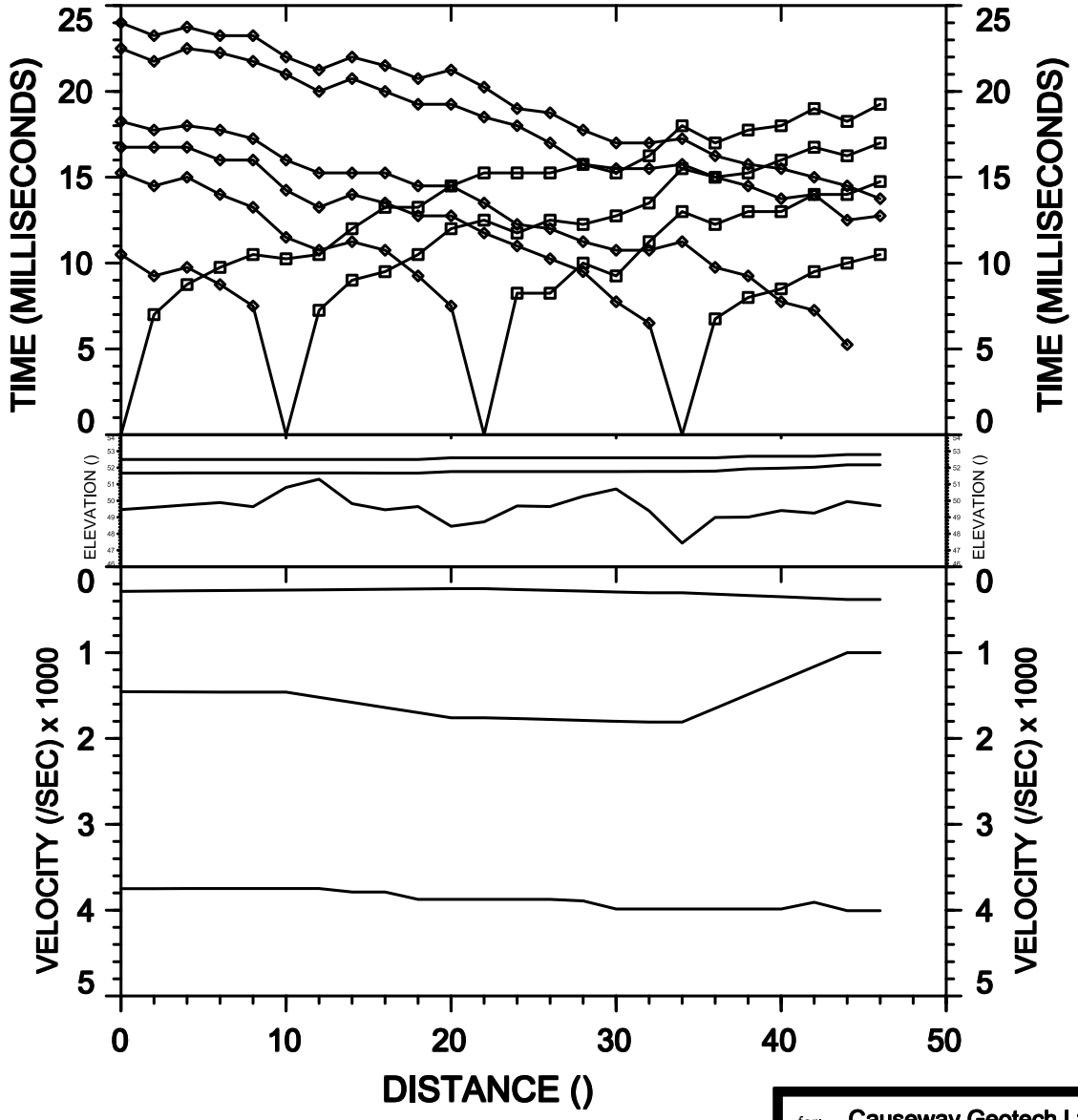


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS170 / Date: 4/7/22	
Equipment: Geode / Spread: S170	Azimuth:

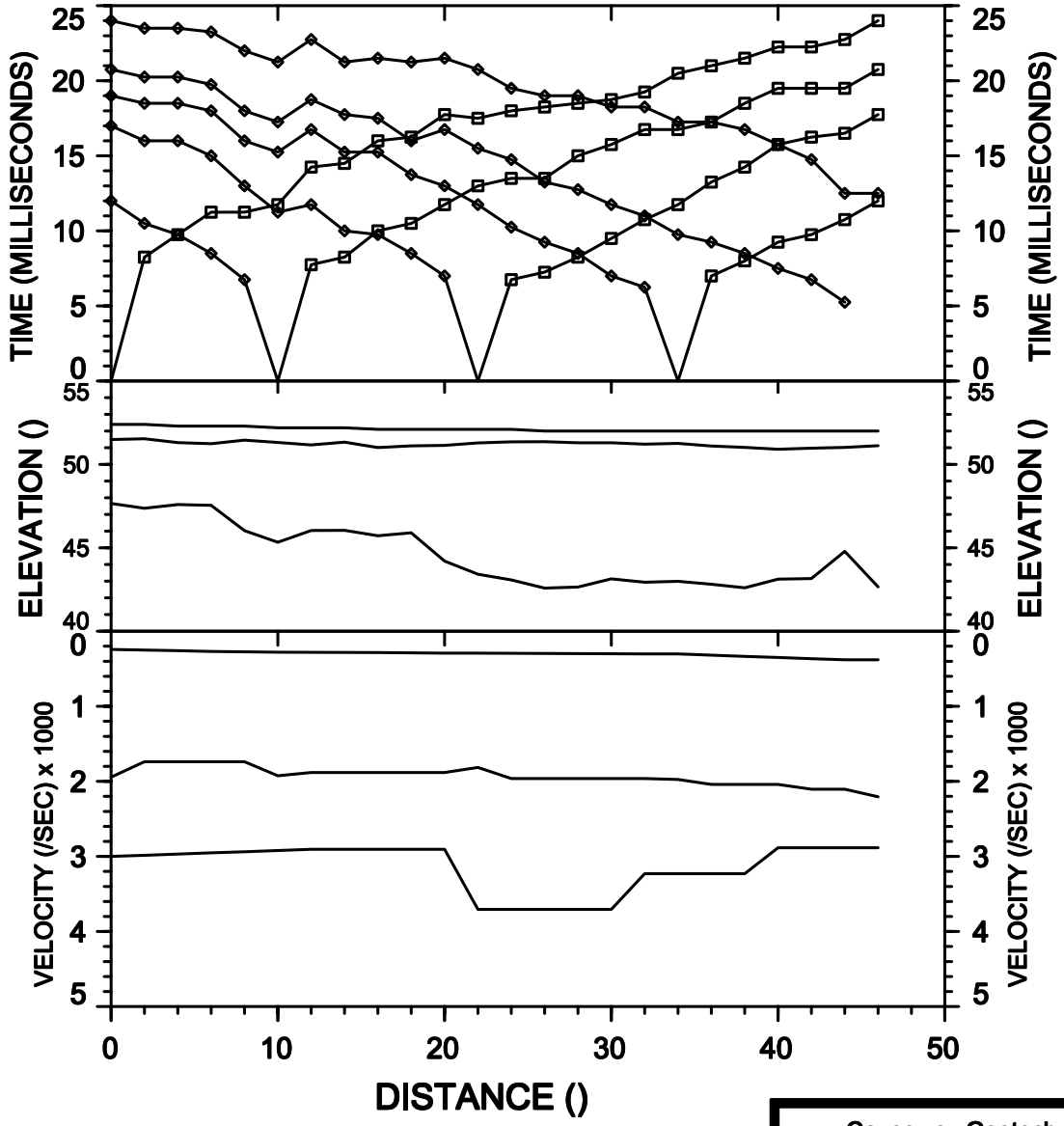


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS171 / Date: 4/7/22	
Equipment: Geode / Spread: S171	Azimuth:

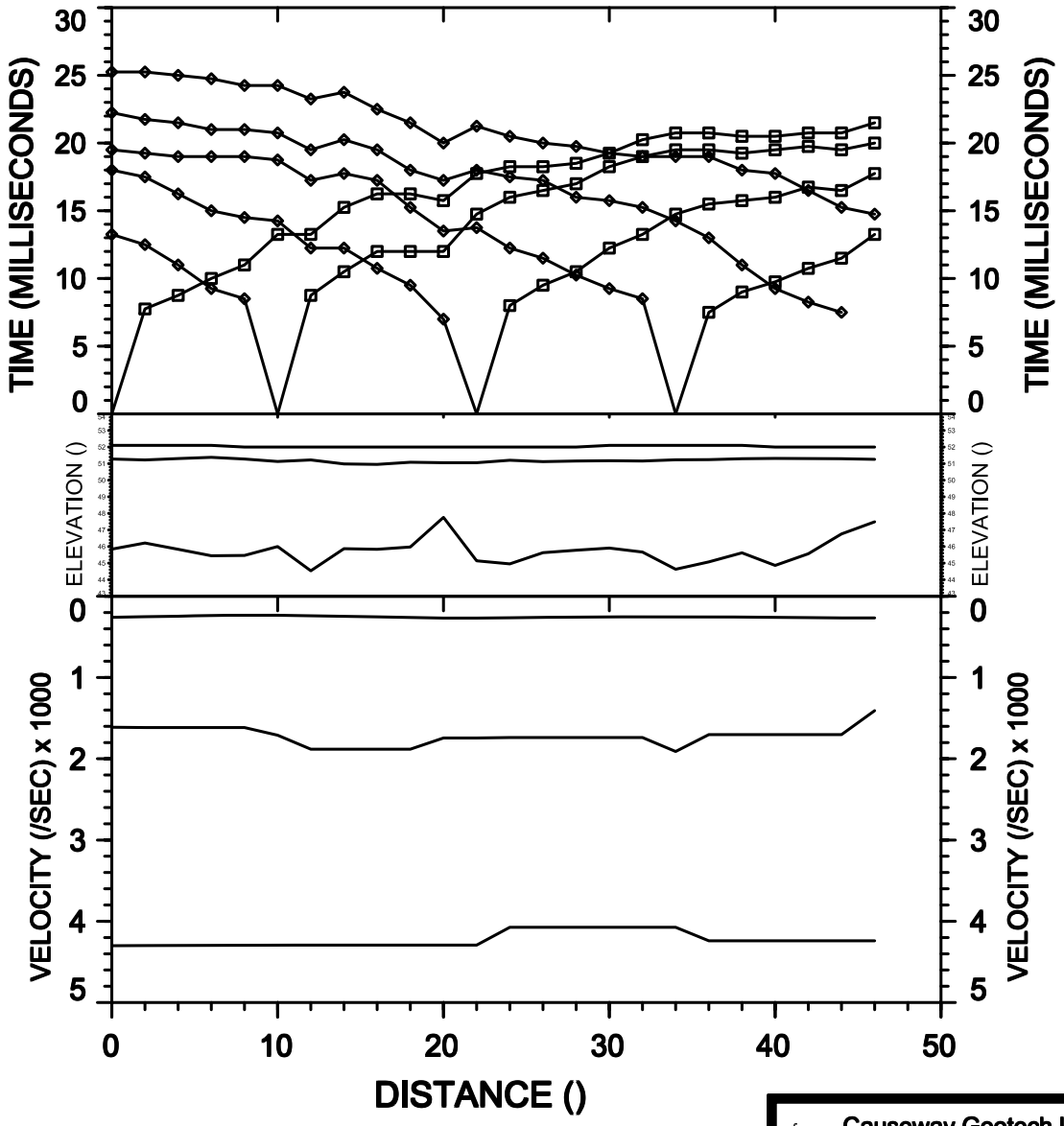


Plate: 10a

for: Causeway Geotech Ltd	AGP21220
by: Strata Geophysical, Inc.	Tipperary Tipperary
Data SetS172 / Date: 4/7/22	
Equipment: Geode / Spread: S172	Azimuth:

APPENDIX D: EXCAVATABILITY

The seismic velocity of a rock formation is related to characteristics of the rock mass which include rock hardness and strength, degree of weathering and discontinuities. Usually the velocity is just one of several parameters used in the assessment of excavatability. The excavatability of a rock formation is favoured by the following factors:

- Open fractures, faults and other planes of weakness of any kind
- Weathering
- Brittleness and crystalline nature
- High degree of stratification or lamination
- Large grain size
- Low compressive strength

Weaver (1975) presented a comprehensive rippability rating chart (Fig.1) in which the p-wave velocity value and the relevant geological factors could be entered and assigned appropriate weightings. The total weighted index was found to correlate very well with actual rippability.

Fig.1 Rippability Rating Chart

Rock class	I	II	III	IV	V
Description	Very good rock	Good rock	Fair rock	Poor rock	Very poor rock
Seismic velocity (m/s)	>2150	2150-1850	1850-1500	1500-1200	1200-450
Rating	26	24	20	12	5
Rock hardness	Extremely hard rock	Very hard rock	Hard rock	Soft rock	Very soft rock
Rating	10	5	2	1	0
Rock weathering	Unweathered	Slightly weathered	Weathered	Highly weathered	Completely weathered
Rating	9	7	5	3	1
Joint spacing (mm)	>3000	3000-1000	1000-300	300-50	<50
Rating	30	25	20	10	5
Joint continuity	Non continuous	Slightly continuous	Continuous-no gouge	Continuous-some gouge	Continuous-with gouge
Rating	5	5	3	0	0
Joint gouge	No separation	Slight separation	Separation <1mm	Gouge <5mm	Gouge >5mm
Rating	5	5	4	3	1
Strike and dip orientation	Very unfavourable	Unfavourable	Slightly unfavourable	Favourable	Very favourable
Rating	15	13	10	5	3
Total rating	100-90	90-70*	70-50	50-25	<25
Rippability assessment	Blasting	Extremely hard ripping and blasting	Very hard ripping	Hard ripping	Easy ripping
Tractor horsepower		770/385	385/270	270/180	180
Tractor kilowatts		575/290	290/200	200/135	135

CAUSEWAY GEOTECH

APPENDIX 4H

LABORATORY TEST RESULTS



HEAD OFFICE
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Registered in Ireland.
Company Number: 633786

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SOIL AND ROCK SAMPLE ANALYSIS
LABORATORY TEST REPORT

22 November 2022

Project Name:	Eastern and Midlands Region WSP - GI - Lot 1 Pipeline Section Only
Project No.:	21-1682
Client:	Ervia
Engineer:	Mott MacDonald

We are pleased to attach the results of laboratory testing carried out for the above project. This memo and its attachments constitute a report of the results of tests as detailed in the Contents page(s).

The attached results complete the testing requested and we would therefore wish to confirm that samples will be retained without charge for a period of 28 days from the above date after which they will be appropriately disposed of unless we receive written instructions to the contrary prior to that date.

We trust our report meets with your approval but if you have any queries or require additional information, please do not hesitate to contact the undersigned.

Stephen Watson

Laboratory Manager

Signed for and on behalf of Causeway Geotech Ltd

SCS ISO 9001 CERTIFIED
SCS ISO 14001 CERTIFIED
SCS ISO 45001 CERTIFIED
UKAS MANAGEMENT SYSTEMS 9235
UKAS TESTING 10122
AGS
BRITISH DRILLING ASSOCIATION

Project Name: Eastern and Midlands Region WSP - GI - Lot 1 Pipeline Section Only

Report Reference: Pipeline - FINAL

The table below details the tests carried out, the specifications used, and the number of tests included in this report. The results contained in this report relate to the sample(s) as received

Tests marked with* in this report are not United Kingdom Accreditation Service (UKAS) accredited and are not included in Causeway Geotech Limited's scope of UKAS Accreditation Schedule of Tests. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

Material tested	Type of test/Properties measured/Range of measurement	Standard specifications	No. of results included in the report
SOIL	Moisture Content of Soil	BS 1377-2: 1990: Cl 3.2	365
SOIL	Liquid and Plastic Limits of soil-1 point cone penetrometer method	BS 1377-2: 1990: Cl 4.4, 5.3 & 5.4	306
SOIL	Particle size distribution - wet sieving	BS 1377-2: 1990: Cl 9.2	463
SOIL	Particle size distribution - sedimentation hydrometer method	BS 1377-2: 1990: Cl 9.5	392
SOIL	Dry density/moisture content relationship (2.5 kg rammer)	BS 1377-4: 1990: Cl 3.3 & 3.4	5
SOIL	Moisture Condition Value at natural moisture content	BS 1377-4: 1990: Cl 5.4	46
SOIL	Moisture Condition Value / Moisture Content Relationship	BS 1377-4: 1990: Cl 5.5	2
SOIL	California Bearing Ratio (CBR)	BS 1377-4: 1990: Cl 7	20
SOIL	California Bearing Ratio (CBR) / Moisture Content Relationship	BS 1377-4: 1990: Cl 7	2
SOIL	Consolidation properties in oedometer - Using 5 pressures (up to 5 days total duration)	BS 1377-5: 1990: Cl 3: 1	19
	Extra over days (more than initial 5 days)		35
SOIL	Undrained shear strength – triaxial compression without measurement of pore pressure (loads from 0.12 to 24 kN)	BS 1377-7: 1990: Cl 8	19
SOIL	Undrained shear strength – triaxial compression with multistage loading and without measurement of pore pressure (loads from 0.12 to 24 kN)	BS 1377-7: 1990: Cl 9	11

Material tested	Type of test/Properties measured/Range of measurement	Standard specifications	No. of results included in the report
SOIL	Direct Shear Test using 60mm Small Shearbox (up to 3 days)	BS EN ISO 17892-10:2018	4
	Extra over days (more than initial 3 days)		3
ROCK	Point load index	ISRM Commission on Testing Methods. Suggested Method for Determining Point Load Strength 1985	175

SUB-CONTRACTED TESTS

In agreement with Client, the following tests were conducted by an approved sub-contractor. All sub-contracting laboratories used are UKAS accredited.

Material tested	Type of test/Properties measured/Range of measurement	Standard specifications	No. of results included in the report
SOIL – Subcontracted to Eurofins Chemtest Ltd *(UKAS 2183)*	BRE Test - Suite B		155
SOIL – Subcontracted to Eurofins Chemtest Ltd *(UKAS 2183)*	Organic Matter Content		25
SOIL – Subcontracted to Eurofins Chemtest Ltd *(UKAS 2183)*	Loss of Ignition		25
ROCK – subcontracted to MATtest Limited *(UKAS 2643)*	Resistance to fragmentation (Los Angeles Abrasion)	Tested in accordance with BS EN 1097 - 2: 202	10
ROCK – subcontracted to MATtest Limited *(UKAS 2643)*	Indirect Tensile Strength - Brazilian		3
ROCK – subcontracted to MATtest Limited *(UKAS 2643)*	Uniaxial Compressive Strength (UCS)	ASTM D7012 - 14	41
ROCK – subcontracted to MATtest Limited *(UKAS 2643)*	Slake Durability	Tested in accordance with ISRM (2007)	1
ROCK – subcontracted to MATtest Limited *(UKAS 2643)*	Flakiness index	BS EN 933-3:2012	1
ROCK – subcontracted to MATtest Limited *(UKAS 2643)*	Aggregate abrasion value	BS EN 1097-8:2020	3

CAUSEWAY GEOTECH

Summary of Classification Test Results

Project No.: 21-1682

Project Name: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only

Hole No.	Sample Ref	Top	Base	Type	Specimen Description	Density bulk Mg/m3	Density dry Mg/m3	w %	Passing 425µm %	LL %	PL %	PI %	Particle density Mg/m3	Casagrande Classification
BH-10413	2	3.60	5.00	C	Greyish brown slightly sandy silty CLAY.			22	100	26 -1pt	16	10		CL
BH-10413	3	5.00	5.15	C	Greyish brown slightly sandy silty CLAY.			31	100	29 -1pt	16	13		CL
BH-10449	7	2.00		D	Grey sandy gravelly silty CLAY.			11	59	23 -1pt	12	11		CL
BH-10475	9	2.00		D	Grey sandy slightly gravelly silty CLAY.			9.9	71	20 -1pt	12	8		CL
BH-11377	1	1.20		D	Greyish brown sandy slightly gravelly silty CLAY.			25	97	38 -1pt	20	18		CI
BH-11594	7	1.20		D	Greyish brown sandy slightly gravelly silty CLAY.			12	67	22 -1pt	15	7		CL
BH-12009	2	1.20		D	Greyish brown sandy slightly gravelly silty CLAY.			12	47	20 -1pt	13	7		CL
BH-12009	9	5.70	6.50	B	Greyish brown sandy gravelly silty CLAY.			8.1	56	20 -1pt	12	8		CL
BH-12406	6	2.00		D	Brownish grey sandy gravelly silty CLAY.			13	71	22 -1pt	13	9		CL
BH-12406A	7	2.00		D	Purplish brown sandy gravelly silty CLAY.			12	54	26 -1pt	15	11		CL
BH-12580	7	1.20		D	Greyish brown sandy slightly gravelly silty CLAY.			57	69	31 -1pt	17	14		CL
BH-12608	7	1.00		D	Greyish brown sandy slightly gravelly silty CLAY.			20	87	28 -1pt	19	9		CL

All tests performed in accordance with BS1377:1990 unless specified otherwise

LAB 01R Version 6

Key

Density test | Liquid Limit | Particle density

Linear measurement unless : | 4pt cone unless : | sp - small pyknometer

wd - water displacement | cas - Casagrande method | gj - gas jar

wi - immersion in water | 1pt - single point test

Date Printed: 17/11/2022

Approved By: Stephen Watson

UKAS TESTING 10122

Summary of Classification Test Results

Project No.	Project Name
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only

Hole No.	Sample				Specimen Description	Density bulk	Density dry	w	Passing 425µm	LL	PL	PI	Particle density	Casagrande Classification
	Ref	Top	Base	Type		Mg/m3		%	%	%	%	%	Mg/m3	
BH-12608	17	6.00		D	Greyish brown sandy slightly gravelly silty CLAY.			6.7	22	20 -1pt	12	8		CL
BH-12658	4	0.80	1.10	B	Brownish grey sandy slightly gravelly clayey SILT.			56	69	70 -1pt	44	26		MH/MV
BH-12658	1	10.75	11.15	C	Orangish brown sandy slightly gravelly silty CLAY.			7.9	62	20 -1pt	14	6		ML/CL
BH-13100	2	5.50	5.90	C	Brownish grey sandy gravelly silty CLAY.			6.8	69	25 -1pt	13	12		CL
BH-13431	5	0.40	0.90	B	Greyish brown slightly gravelly clayey fine to coarse SAND.			19	88	35 -1pt	20	15		CL/CI
BH-13431	4	4.20		D	Greyish brown sandy gravelly silty CLAY.			8.6	44	23 -1pt	14	9		CL
BH-13990	9	1.20		D	Brown sandy gravelly silty CLAY.			9.5	54	23 -1pt	14	9		CL
BH-13990	4	3.00	4.00	B	Brown sandy gravelly silty CLAY.			7.3						
BH-13990	6	5.00	6.00	B	Brown sandy gravelly silty CLAY.			6.4						
BH-14170	5	1.20		D	Brown sandy gravelly silty CLAY.			16	71	26 -1pt	15	11		CL
BH-14170	7	3.20		D	Brown sandy slightly gravelly silty CLAY.			16	71	20 -1pt	12	8		CL
BH-14170	1	8.90	9.65	C	Brown sandy slightly gravelly silty CLAY.			19	100	30 -1pt	23	7		ML/CL

All tests performed in accordance with BS1377:1990 unless specified otherwise

LAB 01R Version 6

Key

Density test	Liquid Limit	Particle density
Linear measurement unless :	4pt cone unless :	sp - small pyknometer
wd - water displacement	cas - Casagrande method	gj - gas jar
wi - immersion in water	1pt - single point test	

Date Printed

17/11/2022

Approved By

Stephen.Watson

UKAS TESTING

10122

Summary of Classification Test Results

Project No.	Project Name
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only

Hole No.	Sample				Specimen Description	Density bulk	Density dry	w	Passing 425µm	LL	PL	PI	Particle density	Casagrande Classification
	Ref	Top	Base	Type		Mg/m3		%	%	%	%	%	Mg/m3	
BH-14357	2	1.20	2.00	B	Brown slightly sandy slightly clayey subangular fine to coarse GRAVEL with cobbles.			8.3	48	28 -1pt	16	12		CL
BH-14357	3	2.00	3.00	B	Greyish brown gravelly slightly silty fine to coarse SAND.			7.2						
BH-14357	4	3.00	4.00	B	Greyish brown slightly sandy slightly silty subangular fine to coarse GRAVEL with cobbles.			4.1						
BH-16610A	3	1.20		D	Brown sandy gravelly silty CLAY.			17	73	26 -1pt	15	11		CL
BH-17401	4	1.60		D	Brown sandy slightly gravelly silty CLAY.			15	83	38 -1pt	19	19		CI
BH-17401	2	2.80	3.30	C	Greyish brown sandy gravelly silty CLAY with cobbles.			4.1	40	22 -1pt	11	11		CL
BH-18231	2	1.00		D	Brown sandy gravelly silty CLAY.			9.9	66	22 -1pt	15	7		CL
BH-18440	9	2.20		D	Brownish grey sandy gravelly silty CLAY.			26	67	39 -1pt	20	19		CI
BH-18440	5	13.00	14.15	C	Brownish grey slightly sandy subangular fine to coarse GRAVEL with cobbles.			6.9	76	68 -1pt	26	42		CH
BH-18804	3	1.00		D	Brown sandy gravelly silty CLAY.			19	44	20 -1pt	13	7		CL
BH-1886	1	8.90	9.20	C	Brown sandy slightly gravelly silty CLAY.			7.5	76	26 -1pt	15	11		CL
BH-1886	3	15.40	15.60	C	Brown sandy slightly gravelly silty CLAY.			9.6	78	27 -1pt	15	12		CL

All tests performed in accordance with BS1377:1990 unless specified otherwise

LAB 01R Version 6

Key

Density test | Liquid Limit | Particle density

Linear measurement unless : | 4pt cone unless : | sp - small pyknometer

wd - water displacement | cas - Casagrande method | gj - gas jar

wi - immersion in water | 1pt - single point test

Date Printed

17/11/2022

Approved By

Stephen.Watson

UKAS TESTING

10122

CAUSEWAY GEOTECH

Summary of Classification Test Results

Project No.: 21-1682

Project Name: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only

Hole No.	Sample Ref	Top	Base	Type	Specimen Description	Density bulk Mg/m3	Density dry Mg/m3	w %	Passing 425µm %	LL %	PL %	PI %	Particle density Mg/m3	Casagrande Classification
BH-1886	5	22.15	22.45	C	Brown sandy slightly gravelly silty CLAY.			7.7	70	22 -1pt	13	9		CL
BH-1922	8	1.00		D	Greyish brown sandy slightly gravelly silty CLAY.			14	65	22 -1pt	14	8		CL
BH-1922	10	3.00		D	Greyish brown sandy slightly gravelly silty CLAY.			13	69	20 -1pt	13	7		CL
BH-1922	3	7.80	8.25	C	Brown sandy gravelly silty CLAY.			7.1	66	20 -1pt	14	6		ML/CL
BH-1922	5	10.20	10.70	C	Brown sandy slightly gravelly silty CLAY.			9	65	23 -1pt	16	7		CL
BH-1922	6	19.00	19.95	C	Brown sandy gravelly silty CLAY.			7	71	23 -1pt	15	8		CL
BH-1922	7	20.50	21.00	C	Brown sandy gravelly silty CLAY.			7.5	73	24 -1pt	16	8		CL
BH-199	5	1.00		D	Brown sandy slightly gravelly silty CLAY.			17	72	28 -1pt	16	12		CL
BH-20326	2	0.80	1.00	B	Brown sandy silty CLAY.			27	86	41 -1pt	20	21		CI
BH-20326	3	1.80	2.00	B	Brown sandy slightly gravelly clayey SILT.			11	57	20 -1pt	15	5		ML
BH-20326	4	2.80	3.00	B	Brown sandy slightly gravelly silty CLAY.			10	64	29 -1pt	14	15		CL
BH-20326	6	4.80	5.00	B	Brown sandy slightly gravelly silty CLAY.			12	65	21 -1pt	13	8		CL

All tests performed in accordance with BS1377:1990 unless specified otherwise

LAB 01R Version 6

Key

Density test | Liquid Limit | Particle density

Linear measurement unless : | 4pt cone unless : | sp - small pyknometer

wd - water displacement | cas - Casagrande method | gj - gas jar

wi - immersion in water | 1pt - single point test

Date Printed: 17/11/2022

Approved By: Stephen.Watson

UKAS TESTING

10122

Summary of Classification Test Results

Project No.	Project Name
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only

Hole No.	Sample				Specimen Description	Density bulk / dry Mg/m3		*w* %	Passing 425µm %	LL %	PL %	PI %	Particle density Mg/m3	Casagrande Classification
	Ref	Top	Base	Type										
BH-20655	5	2.00		D	Brown slightly sandy silty CLAY.			29	31	46 -1pt	21	25		CI
BH-20939	1	0.40	1.20	B	Brown very gravelly sandy silty CLAY.			11	49	20 -1pt	12	8		CL
BH-20939	5	2.20		D	Greyish brown sandy gravelly silty CLAY.			8.6	44	24 -1pt	15	9		CL
BH-2247	9	1.20		D	Greyish brown sandy slightly gravelly silty CLAY.			17	66	38 -1pt	24	14		CI
BH-2247	11	3.20		D	Greyish brown sandy slightly gravelly silty CLAY.			11	68	25 -1pt	14	11		CL
BH-2247	13	5.20		D	Greyish brown sandy slightly gravelly silty CLAY.			14	66	24 -1pt	15	9		CL
BH-2247	1	7.00	8.50	C	Brownish grey sandy gravelly silty CLAY.			3.9	64	20 -1pt	11	9		CL
BH-2247	2	8.50	10.00	C	Brownish grey sandy gravelly silty CLAY.			4	65	28 -1pt	13	15		CL
BH-22776	2	0.80	1.00	B	Brown sandy slightly gravelly silty CLAY.			13						
BH-23514	3	1.20		D	Brown sandy slightly gravelly silty CLAY.			16	71	30 -1pt	13	17		CL
BH-23898	2	1.00		D	Brownish grey sandy gravelly silty CLAY.			14	71	23	15	8		CL
BH-24410A	1	0.30	1.20	B	Brownish grey slightly sandy slightly silty subangular fine to coarse GRAVEL with cobbles.			7.2						

All tests performed in accordance with BS1377:1990 unless specified otherwise

LAB 01R Version 6

Key

Density test	Liquid Limit	Particle density
Linear measurement unless :	4pt cone unless :	sp - small pyknometer
wd - water displacement	cas - Casagrande method	gj - gas jar
wi - immersion in water	1pt - single point test	

Date Printed

17/11/2022

Approved By

Stephen.Watson

UKAS TESTING

10122

Summary of Classification Test Results

Project No.	Project Name
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only

Hole No.	Sample				Specimen Description	Density bulk	Density dry	w	Passing 425µm	LL	PL	PI	Particle density	Casagrande Classification
	Ref	Top	Base	Type		Mg/m3		%	%	%	%	%	Mg/m3	
BH-2461	10	2.00		D	Brownish grey sandy gravelly silty CLAY.			13	69	23	14	9		CL
BH-2461	12	4.00		D	Brownish grey sandy slightly gravelly silty CLAY.			18	70	21	15	6		ML/CL
BH-25603	7	2.00		D	Brownish grey sandy slightly gravelly silty CLAY.			13	60	20	13	7		CL
BH-26135	2	3.90	4.70	C	Brownish grey sandy gravelly silty CLAY with some cobbles.			9.1	53	32 -1pt	16	16		CL
BH-26554	4	1.20		D	Greyish brown slightly gravelly silty fine to coarse SAND.			7.6	55	24 -1pt	16	8		CL
BH-26554A	2	4.40	5.15	C	Brownish grey sandy gravelly silty CLAY with cobbles.			9.3	78	67 -1pt	24	43		CH
BH-27602	6	1.00		D	Greyish brown sandy gravelly clayey SILT.			8.6	66	35 -1pt	30	5		ML/MI
BH-27602	7	2.00		D	Greyish brown sandy slightly gravelly silty CLAY.			9.9	68	20 -1pt	12	8		CL
BH-27602	8	3.00		D	Greyish brown sandy slightly gravelly silty CLAY.			11	58	20 -1pt	12	8		CL
BH-28001	12	2.00		D	Brown sandy slightly gravelly silty CLAY.			11	65	20 -1pt	11	9		CL
BH-28001	18	8.50		D	Brown sandy slightly gravelly silty CLAY.			9.8	65	20 -1pt	8	12		CL
BH-28362	2	1.00		D	Brown sandy slightly gravelly clayey SILT.			9.8	51	38 -1pt	27	11		MI

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LAB 01R Version 6

Key

Density test	Liquid Limit	Particle density
Linear measurement unless :	4pt cone unless :	sp - small pyknometer
wd - water displacement	cas - Casagrande method	gj - gas jar
wi - immersion in water	1pt - single point test	

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17/11/2022

Approved By

Stephen.Watson

UKAS TESTING

10122

CAUSEWAY GEOTECH

Summary of Classification Test Results

Project No.: 21-1682

Project Name: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only

Hole No.	Sample Ref	Top	Base	Type	Specimen Description	Density bulk Mg/m3	Density dry Mg/m3	w %	Passing 425µm %	LL %	PL %	PI %	Particle density Mg/m3	Casagrande Classification
BH-28598	16	7.00		D	Light brown sandy gravelly silty CLAY.			6.8	50	23 -1pt	13	10		CL
BH-28598	18	9.00		D	Light brown sandy gravelly silty CLAY.			17	88	29 -1pt	15	14		CL
BH-28818A	4	1.00		D	Greyish brown sandy slightly gravelly silty CLAY.			8.2	44	20 -1pt	13	7		CL
BH-28886	5	1.00		D	Light brown slightly sandy slightly gravelly silty CLAY.			18	63	23 -1pt	15	8		CL
BH-28886A	1	2.20	3.70	C	Light brown sandy gravelly silty CLAY.			4	54	20 -1pt	12	8		CL
BH-28886A	2	3.70	5.20	C	Light brown sandy gravelly silty CLAY with cobbles.			5.7	61	21 -1pt	13	8		CL
BH-28886A	3	8.20	9.70	C	Light brown sandy gravelly silty CLAY.			5.8	62	21 -1pt	11	10		CL
BH-28924	4	1.00		D	Light brown sandy gravelly silty CLAY.			12	55	24 -1pt	13	11		CL
BH-28924A	1	5.20	6.70	C	Brownish grey sandy very gravelly silty CLAY.			4.5	67	20 -1pt	11	9		CL
BH-28924A	4	8.20	9.70	C	Brownish grey sandy gravelly silty CLAY.			3.3	66	20 -1pt	11	9		CL
BH-29130	3	1.20	2.00	B	Brown slightly sandy slightly silty subangular fine to coarse GRAVEL.			1.7						
BH-29130	5	3.00	4.00	B	Brown sandy slightly gravelly silty CLAY.			15						

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LAB 01R Version 6

Key

Density test | Liquid Limit | Particle density

Linear measurement unless : | 4pt cone unless : | sp - small pyknometer

wd - water displacement | cas - Casagrande method | gj - gas jar

wi - immersion in water | 1pt - single point test

Date Printed: 17/11/2022

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Summary of Classification Test Results

Project No.	Project Name
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only

Hole No.	Sample				Specimen Description	Density bulk	Density dry	w	Passing 425µm	LL	PL	PI	Particle density	Casagrande Classification
	Ref	Top	Base	Type		Mg/m3		%	%	%	%	%	Mg/m3	
BH-29130	1	5.20	5.90	C	Brownish grey slightly sandy subangular fine to coarse GRAVEL with cobbles.			5.6	52	28 -1pt	15	13		CL
BH-29130	13	5.20		D	Brown sandy slightly gravelly silty CLAY.			16	61	30 -1pt	13	17		CL
BH-29130	2	6.80	6.90	C	Brownish grey sandy slightly gravelly silty CLAY.			17	97	39 -1pt	15	24		CI
BH-29130	5	8.90	9.70	C	Brownish grey slightly gravelly clayey fine to coarse SAND.			12	78	29 -1pt	15	14		CL
BH-29575	5	1.20		D	Brown sandy slightly gravelly silty CLAY.			14	58	20 -1pt	14	6		ML/CL
BH-29923	1	0.20	1.20	B	Brown sandy gravelly silty CLAY.			19	88	27 -1pt	20	7		CL
BH-29923A	4	3.70		C	Light grey sandy slightly gravelly silty CLAY.			10	86	32 -1pt	16	16		CL
BH-29923A	7	8.20		C	Orangish brown sandy gravelly silty CLAY with cobbes.			13	90	70 -1pt	25	45		CH/CV
BH-30066	6	2.00		D	Brown sandy slightly gravelly silty CLAY.			8	54	21 -1pt	13	8		CL
BH-30066	8	4.00		D	Brown sandy slightly gravelly silty CLAY.			17	96	31 -1pt	16	15		CL
BH-30066	2	6.70		C	Greyish brown sandy gravelly silty CLAY with cobbles.			6.2	73	31 -1pt	16	15		CL
BH-30066	5	11.20		C	Light grey sandy gravelly silty CLAY with cobbles.			4.6	82	23 -1pt	13	10		CL

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LAB 01R Version 6

Key

Density test	Liquid Limit	Particle density
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Summary of Classification Test Results

Project No.	Project Name
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only

Hole No.	Sample				Specimen Description	Density bulk	Density dry	w	Passing 425µm	LL	PL	PI	Particle density	Casagrande Classification
	Ref	Top	Base	Type		Mg/m3		%	%	%	%	%	Mg/m3	
BH-30414	7	2.00		D	Brown sandy slightly gravelly silty CLAY.			12	72	21 -1pt	13	8		CL
BH-30414	1	5.20		C	Greyish brown sandy gravelly silty CLAY.			6.1	64	20 -1pt	12	8		CL
BH-30414	3	8.20		C	Light brown sandy gravelly silty CLAY with cobbles.			4	65	21 -1pt	13	8		CL
BH-30600	1	2.20		C	Grey sandy gravelly silty CLAY with cobbles.			8.3	62	21 -1pt	11	10		CL
BH-30722	2	3.10		C	Greyish brown sandy gravelly silty CLAY with some cobbles.			4.2	60	21 -1pt	12	9		CL
BH-30722	3	5.20		C	Greyish brown sandy gravelly silty CLAY with cobbles.			3.8	60	20 -1pt	12	8		CL
BH-31227	8	2.00		D	Brown sandy slightly gravelly silty CLAY.			9.7	63	20 -1pt	12	8		CL
BH-31227	1	6.70	8.20	C	Brownish grey sandy gravelly silty CLAY with cobbles.			4.5	70	20 -1pt	11	9		CL
BH-31227	2	8.20	9.70	C	Brownish grey sandy gravelly silty CLAY with cobbles.			4.2	61	20 -1pt	11	9		CL
BH-31466	4	1.00		D	Brown sandy slightly gravelly silty CLAY.			26	82	33 -1pt	24	9		ML/CL
BH-31466	2	2.60	3.70	C	Brownish grey sandy gravelly silty CLAY.			7	68	21 -1pt	11	10		CL
BH-31466	3	3.80	5.20	C	Brownish grey sandy slightly gravelly silty CLAY.			5.3	70	22 -1pt	12	10		CL

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LAB 01R Version 6

Key

Density test	Liquid Limit	Particle density
Linear measurement unless :	4pt cone unless :	sp - small pyknometer
wd - water displacement	cas - Casagrande method	gj - gas jar
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Summary of Classification Test Results

Project No.	Project Name
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only

Hole No.	Sample				Specimen Description	Density bulk	Density dry	w	Passing 425µm	LL	PL	PI	Particle density	Casagrande Classification
	Ref	Top	Base	Type		Mg/m3		%	%	%	%	%	Mg/m3	
BH-31910	4	1.00		D	Light brown sandy slightly gravelly silty CLAY.			11	70	20 -1pt	12	8		CL
BH-31910A	4	3.00		D	Brown sandy slightly gravelly silty CLAY.			10	68	20 -1pt	11	9		CL
BH-31910B	5	5.00		D	Brown sandy slightly gravelly silty CLAY.			10	64	20 -1pt	12	8		CL
BH-31910B	2	5.30		C	Greyish brown sandy gravelly silty CLAY.			6.7	63	20 -1pt	11	9		CL
BH-32020	3	1.00		D	Brownish grey sandy gravelly clayey SILT.			11	40	21 -1pt	16	5		ML
BH-32020A	1	2.20		C	Greyish brown sandy gravelly silty CLAY with some cobbles.			6.5	59	20 -1pt	12	8		CL
BH-32319	6	1.00		D	Brown sandy slightly gravelly silty CLAY.			11	64	20 -1pt	12	8		CL
BH-32319	2	3.80		C	Greyish brown sandy gravelly silty CLAY with cobbles.			5.7	58	22 -1pt	13	9		CL
BH-32601	3	1.00		D	Brown sandy slightly gravelly silty CLAY.			13	64	25 -1pt	17	8		CL
BH-3263	5	1.20		D	Light brown sandy slightly gravelly silty CLAY.			15	52	28 -1pt	19	9		CL
BH-3263	7	3.20		D	Brown sandy slightly gravelly silty CLAY.			17	52	33 -1pt	20	13		CL
BH-33000	7	1.00		D	Light brown sandy gravelly silty CLAY.			12	68	29 -1pt	20	9		CL

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LAB 01R Version 6

Key

Density test	Liquid Limit	Particle density
Linear measurement unless :	4pt cone unless :	sp - small pyknometer
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Summary of Classification Test Results

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21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only

Hole No.	Sample				Specimen Description	Density bulk	Density dry	w	Passing 425µm	LL	PL	PI	Particle density	Casagrande Classification
	Ref	Top	Base	Type		Mg/m3		%	%	%	%	%	Mg/m3	
BH-34598	6	2.00		D	Light brown sandy very gravelly silty CLAY.			11	61	20 -1pt	13	7		CL
BH-34598A	2	5.50		C	Greyish brown sandy gravelly silty CLAY with some cobbles.			1.5	64	23 -1pt	15	8		CL
BH-34816	1	0.00	0.50	B	Light brown sandy gravelly silty CLAY.			10	67	20 -1pt	12	8		CL
BH-35202	7	1.00		D	Light brown sandy slightly gravelly silty CLAY.			9.3	67	21 -1pt	12	9		CL
BH-35202	10	4.00		D	Light brown sandy slightly gravelly silty CLAY.			7.8	68	20 -1pt	13	7		CL
BH-35202	2	5.50		C	Greyish brown sandy gravelly silty CLAY.			9.2	57	20 -1pt	12	8		CL
BH-35473	8	2.00		D	Light brown sandy gravelly silty CLAY.			12	67	22 -1pt	14	8		CL
BH-3588	6	1.20		D	Greyish brown sandy gravelly silty CLAY.			19	62	26 -1pt	11	15		CL
BH-3588	8	3.20		D	Greyish brown sandy gravelly silty CLAY.			20	77	26 -1pt	13	13		CL
BH-3815	6	1.20		D	Greyish brown sandy slightly gravelly silty CLAY.			16	65	22 -1pt	14	8		CL
BH-3815	9	4.20		D	Greyish brown sandy slightly gravelly silty CLAY.			14	64	24 -1pt	12	12		CL
BH-4110	11	1.00		D	Brownish grey sandy slightly gravelly silty CLAY.			21	99	29 -1pt	19	10		CL

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LAB 01R Version 6

Key

Density test | Liquid Limit | Particle density

Linear measurement unless : | 4pt cone unless : | sp - small pyknometer

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Summary of Classification Test Results

Project No.	Project Name
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only

Hole No.	Sample				Specimen Description	Density bulk	Density dry	w	Passing 425µm	LL	PL	PI	Particle density	Casagrande Classification
	Ref	Top	Base	Type		Mg/m3		%	%	%	%	%	Mg/m3	
BH-4110	13	3.00		D	Brownish grey sandy slightly gravelly silty CLAY.			12	54	20 -1pt	14	6		ML/CL
BH-4110	15	5.00		D	Brownish grey sandy slightly gravelly silty CLAY.			13	70	24 -1pt	12	12		CL
BH-4110	17	7.50		D	Brownish grey sandy slightly gravelly silty CLAY.			13	68	25 -1pt	15	10		CL
BH-5260	4	1.20		D	Greyish brown sandy gravelly silty CLAY.			14	43	27 -1pt	16	11		CL
BH-5260	6	3.20		D	Greyish brown sandy gravelly silty CLAY.			12	65	20 -1pt	11	9		CL
BH-5260	7	4.20		D	Greyish brown slightly sandy slightly clayey subangular fine to coarse GRAVEL.			9.8						
BH-533	6	2.00		D	Brown sandy slightly gravelly silty CLAY.			15	70	29 -1pt	16	13		CL
BH-5440	8	1.20		D	Greyish brown sandy slightly gravelly silty CLAY.			17	55	25 -1pt	14	11		CL
BH-5440	10	3.20		D	Greyish brown sandy slightly gravelly silty CLAY.			15	51	25 -1pt	15	10		CL
BH-5440	13	6.20		D	Greyish brown sandy slightly gravelly silty CLAY.			16	55	25 -1pt	14	11		CL
BH-5440	1	10.70	11.10	C	Greyish brown subangular fine to coarse GRAVEL with cobbles.			0.5						
BH-5478	2	1.20	1.90	B	Brownish grey sandy slightly gravelly silty CLAY.			16	79	21 -1pt	15	6		ML/CL

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LAB 01R Version 6

Key

Density test	Liquid Limit	Particle density
Linear measurement unless :	4pt cone unless :	sp - small pyknometer
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Summary of Classification Test Results

Project No.	Project Name
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only

Hole No.	Sample				Specimen Description	Density		*w*	Passing 425µm	LL	PL	PI	Particle density	Casagrande Classification
	Ref	Top	Base	Type		bulk	dry							
						Mg/m3		%	%	%	%	%	Mg/m3	
BH-5478	4	4.00	0.40	B	Brownish grey sandy slightly gravelly silty CLAY.			16	75	29 -1pt	12	17		CL
BH-5478	5	5.40	7.00	B	Brownish grey slightly gravelly silty fine to coarse SAND.			13	33	30 -1pt	17	13		CL
BH-5478	14	10.20		D	Brownish grey gravelly slightly silty fine to coarse SAND.			8.5						
BH-5530	2	1.80	2.00	B	Brownish grey sandy slightly gravelly silty CLAY.			15	81	21 -1pt	9	12		CL
BH-5530	8	6.80	7.00	B	Brownish grey slightly sandy silty CLAY.			25	99	50 -1pt	22	28		CI/CH
BH-5530	12	9.30	9.50	B	Brownish grey slightly sandy silty CLAY.			21						
BH-5530	14	12.30	12.50	B	Brownish grey gravelly silty fine to coarse SAND.			13						
BH-5573	14	2.00		D	Brownish grey sandy slightly gravelly silty CLAY.			17	72	21	14	7		CL
BH-6016	4	3.40	3.70	B	Brown COBBLES with some sandy subangular fine to coarse gravel.			3						
BH-6016	1	14.20	14.70	C	Greyish brown slightly sandy subangular fine to coarse GRAVEL.			2.6						
BH-6016	2	19.20	19.80	C	Greyish brown sandy gravelly silty CLAY.			3.1	64	25 -1pt	14	11		CL
BH-6406	4	3.00		D	Brown sandy slightly gravelly silty CLAY.			12	86	21	14	7		CL

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LAB 01R Version 6

Key

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Summary of Classification Test Results

Project No.	Project Name
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only

Hole No.	Sample				Specimen Description	Density bulk	Density dry	w	Passing 425µm	LL	PL	PI	Particle density	Casagrande Classification
	Ref	Top	Base	Type		Mg/m3		%	%	%	%	%	Mg/m3	
BH-6406	1	4.50	5.00	C	Brown gravelly silty fine to coarse SAND.			31	66	24 -1pt	16	8		CL
BH-6406	3	8.00	8.50	C	Brown sandy slightly gravelly silty CLAY.			13	73	23 -1pt	14	9		CL
BH-6576	9	2.00		D	Brown slightly gravelly clayey fine to coarse SAND.			16	76	21	14	7		CL
BH-6576	1	6.10	6.60	C	Brownish grey sandy gravelly silty CLAY.			8.3	66	21 -1pt	12	9		CL
BH-6576	2	7.50	8.00	C	Brownish grey slightly sandy slightly silty subangular fine to coarse GRAVEL.			8.3						
BH-7255	12	2.00		D	Grey slightly sandy silty CLAY.			17	99	34 -1pt	18	16		CL
BH-7255	13	3.00		D	Grey slightly sandy slightly clayey subangular fine to coarse GRAVEL.			9.4	73	20 -1pt	13	7		CL
BH-7255	18	8.00		D	Greyish brown sandy slightly gravelly silty CLAY.			10	90	27 -1pt	15	12		CL
BH-7282	5	1.00		D	Greyish brown sandy gravelly silty CLAY.			20	95	23 -1pt	17	6		ML/CL
BH-7282	1	7.00	7.50	C	Brownish grey sandy gravelly silty CLAY with cobbles.			3.3	64	27 -1pt	15	12		CL
BH-7282	5	9.50	9.80	C	Brownish grey sandy gravelly silty CLAY with cobbles.			3.9	52	24 -1pt	14	10		CL
BH-7320	7	2.00		D	Brown slightly gravelly clayey fine to coarse SAND.			13	58	20 -1pt	14	6		ML/CL

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LAB 01R Version 6

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Density test	Liquid Limit	Particle density
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Summary of Classification Test Results

Project No.	Project Name
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only

Hole No.	Sample				Specimen Description	Density bulk	Density dry	w	Passing 425µm	LL	PL	PI	Particle density	Casagrande Classification
	Ref	Top	Base	Type		Mg/m3		%	%	%	%	%	Mg/m3	
BH-7320	1	5.20	5.90	C	Greyish brown sandy slightly gravelly silty CLAY.			8.9	67	24 -1pt	13	11		CL
BH-7320	4	6.70	7.50	C	Brown slightly gravelly clayey fine to coarse SAND.			8.1	47	21 -1pt	14	7		CL
BH-7320	5	8.50	9.00	C	Greyish brown sandy slightly gravelly silty CLAY.			3.9	49	23 -1pt	13	10		CL
BH-7320	6	11.20	11.50	C	Greyish brown sandy slightly gravelly silty CLAY.			6.2	49	26 -1pt	14	12		CL
BH-7349	6	6.00		B	Brown sandy gravelly silty CLAY.			9.9	72	27 -1pt	16	11		CL
BH-7349	14	6.50	7.30	B	Grey COBBLES.			1.1						
BH-7349	18	8.00		D	Greyish brown sandy gravelly silty CLAY.			15	77	29 -1pt	16	13		CL
BH-7349	1	9.70		C	Brownish grey sandy slightly gravelly silty CLAY.			18	61	30 -1pt	16	14		CL
BH-7349	2	11.50	12.00	C	Brownish grey sandy slightly gravelly silty CLAY.			12	71	28 -1pt	13	15		CL
BH-8940	3	2.00		D	Orangish brown sandy slightly gravelly silty CLAY.			20	87	31 -1pt	18	13		CL
BH-9668	5	1.20		D	Purplish brown sandy slightly gravelly silty CLAY.			14	66	22 -1pt	15	7		CL
DS-11208	4	1.20		D	Purplish brown sandy slightly gravelly silty CLAY.			24	91	37 -1pt	18	19		CI

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Summary of Classification Test Results

Project No.	Project Name
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only

Hole No.	Sample				Specimen Description	Density bulk	Density dry	w	Passing 425µm	LL	PL	PI	Particle density	Casagrande Classification
	Ref	Top	Base	Type		Mg/m3		%	%	%	%	%	Mg/m3	
DS-1202	2	0.80	1.40	B	Brown gravelly slightly silty fine to coarse SAND.			6.1						
DS-17886	2	0.50		D	Greyish brown sandy slightly gravelly silty CLAY.			19	80	23 -1pt	16	7		CL
DS-19007	3	1.70		D	Brown sandy slightly gravelly silty CLAY.			11	58	23 -1pt	12	11		CL
DS-19160A	2	0.50		D	Grey sandy slightly gravelly silty CLAY.			16	91	20 -1pt	12	8		CL
DS-28605	2	1.20	2.00	B	Brownish grey slightly sandy slightly silty subangular fine to coarse GRAVEL.			6.2						
DS-3384	5	2.00		D	Brown sandy gravelly silty CLAY.			14	48	21 -1pt	13	8		CL
DS-999	6	1.90	3.00	B	Brown gravelly clayey fine to coarse SAND.			11						
RK-10126	2	0.30	0.40	D	Grey sandy slightly clayey SILT with pockets of organic matter.			37						
RK-10199	3	0.50	1.00	D	Grey sandy slightly clayey SILT with pockets of organic matter.			81	98	65 -1pt	48	17		MH
RK-10288	2	0.20	0.50	D	Grey sandy slightly clayey SILT with pockets of organic matter.			69						
RK-10288	3	0.50	0.80	D	Grey sandy slightly clayey SILT with pockets of organic matter.			117						
RK-10288	4	0.80	1.30	D	Grey sandy slightly clayey SILT with pockets of organic matter.			81						

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LAB 01R Version 6

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Density test	Liquid Limit	Particle density
Linear measurement unless :	4pt cone unless :	sp - small pyknometer
wd - water displacement	cas - Casagrande method	gj - gas jar
wi - immersion in water	1pt - single point test	

Date Printed

17/11/2022

Approved By

Stephen.Watson

UKAS TESTING

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Summary of Classification Test Results

Project No.	Project Name
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only

Hole No.	Sample				Specimen Description	Density bulk	Density dry	w	Passing 425µm	LL	PL	PI	Particle density	Casagrande Classification
	Ref	Top	Base	Type		Mg/m3		%	%	%	%	%	Mg/m3	
RK-10288	5	1.30	1.50	D	Grey sandy slightly clayey SILT with pockets of organic matter.			132	95	67 -1pt	46	21		MH
RK-10381	2	0.10	0.40	D	Grey slightly gravelly silty fine to coarse SAND.			19						
TP-12107	2	0.70	1.40	B	Brownish grey sandy slightly gravelly silty CLAY.			12	61	25 -1pt	16	9		CL
TP-12107	3	1.40	2.60	B	Brownish grey sandy gravelly silty CLAY.			9.6	56	25 -1pt	15	10		CL
TP-12203	1	0.50	3.50	B	Purplish grey sandy slightly gravelly silty CLAY.			9.8	65	20 -1pt	13	7		CL
TP-12306	1	0.70	1.20	B	Grey sandy slightly gravelly silty CLAY.			26	96	31 -1pt	19	12		CL
TP-12507	1	0.40	2.50	B	Grey slightly gravelly silty fine to coarse SAND.			11						
TP-12569	2	1.00		B	Purplish grey sandy gravelly silty CLAY.			9.6	67	22 -1pt	12	10		CL
TP-12580	2	1.50		B	Greyish brown gravelly clayey fine to coarse SAND.			8.6	46	20 -1pt	12	8		CL
TP-12581	2	1.50		B	Dark brown slightly sandy slightly gravelly silty CLAY.			9.9	69	22 -1pt	14	8		CL
TP-12582	1	0.50		B	Dark brown sandy gravelly silty CLAY.			10	64	21 -1pt	11	10		CL
TP-12582	3	2.50		B	Brownish grey sandy gravelly silty CLAY.			8.7	65	21 -1pt	11	10		CL

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LAB 01R Version 6

Key

Density test	Liquid Limit	Particle density
Linear measurement unless :	4pt cone unless :	sp - small pyknometer
wd - water displacement	cas - Casagrande method	gj - gas jar
wi - immersion in water	1pt - single point test	

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UKAS TESTING

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CAUSEWAY GEOTECH

Summary of Classification Test Results

Project No.: 21-1682

Project Name: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only

Hole No.	Sample Ref	Sample Top	Sample Base	Sample Type	Specimen Description	Density bulk Mg/m3	Density dry Mg/m3	w %	Passing 425µm %	LL %	PL %	PI %	Particle density Mg/m3	Casagrande Classification
TP-12590	3	1.60		B	Greyish brown sandy gravelly silty CLAY.			9.6	64	25 -1pt	13	12		CL
TP-12595	2	1.50		B	Greyish brown sandy gravelly silty CLAY.			9.3	57	22 -1pt	13	9		CL
TP-12595	3	2.50		B	Greyish brown sandy gravelly silty CLAY with some cobbles.			9.4	64	21 -1pt	12	9		CL
TP-12601	2	1.50		B	Greyish brown sandy gravelly silty CLAY with some cobbles.			11	69	25 -1pt	15	10		CL
TP-12638	2	1.50		B	Greyish brown sandy slightly gravelly clayey SILT.			42	91	52 -1pt	33	19		MH
TP-12639	2	1.50		B	Greyish brown sandy gravelly silty CLAY with some cobbles.			7.8	59	24 -1pt	13	11		CL
TP-12650	2	1.50		B	Greyish brown sandy gravelly silty CLAY with some cobbles.			9.4	65	23 -1pt	14	9		CL
TP-12688	2	1.50		B	Greyish brown sandy clayey SILT.			33	98	63 -1pt	38	25		MH
TP-12688	3	2.50		B	Greyish brown sandy gravelly silty CLAY.			13	63	26 -1pt	15	11		CL
TP-12689	2	1.00		B	Greyish brown slightly sandy slightly gravelly silty CLAY with some cobbles.			16	95	31 -1pt	19	12		CL
TP-12701	2	1.50		B	Greyish brown sandy gravelly silty CLAY.			13	76	28 -1pt	16	12		CL
TP-12726	2	1.50		B	Greyish brown sandy gravelly silty CLAY.			13	65	23 -1pt	15	8		CL

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LAB 01R Version 6

Key

Density test | Liquid Limit | Particle density

Linear measurement unless : | 4pt cone unless : | sp - small pyknometer

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Summary of Classification Test Results

Project No.	Project Name
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only

Hole No.	Sample				Specimen Description	Density bulk	Density dry	*w*	Passing 425µm	LL	PL	PI	Particle density	Casagrande Classification
	Ref	Top	Base	Type		Mg/m3		%	%	%	%	%	Mg/m3	
TP-12737	2	1.50		B	Greyish brown sandy gravelly silty CLAY.			17	78	33 -1pt	20	13		CL
TP-12738	2	1.50		B	Greyish brown sandy gravelly silty CLAY with some cobbles.			12	65	23 -1pt	14	9		CL
TP-12750	2	1.50		B	Greyish brown sandy slightly gravelly silty CLAY.			16	73	30 -1pt	17	13		CL
TP-12786	2	1.50		B	Greyish brown slightly gravelly silty fine to coarse SAND.			57	89	85 -1pt	52	33		MV
TP-12786	3	1.80		B	Greyish brown slightly gravelly silty fine to coarse SAND.			14	66	20 -1pt	13	7		CL
TP-12786	4	2.20		B	Greyish brown sandy slightly gravelly silty CLAY.			20	66	36 -1pt	23	13		CI
TP-12787	3	1.10		B	Greyish brown sandy gravelly silty CLAY.			18	68	34 -1pt	22	12		CL
TP-13208	4	0.50		D	Greyish brown sandy gravelly silty CLAY.			16	63	20 -1pt	13	7		CL
TP-13291	3	0.50		D	Greyish brown slightly gravelly silty fine to coarse SAND.			18	92	24 -1pt	20	4		ML
TP-13605	6	1.50		D	Greyish brown sandy slightly gravelly silty CLAY.			12	63	21 -1pt	15	6		ML/CL
TP-13988	1	0.40	1.50	B	Grey sandy gravelly silty CLAY with cobbles.			12						
TP-13988	2	1.50	2.50	B	Grey sandy gravelly silty CLAY.			11						

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LAB 01R Version 6

Key

Density test	Liquid Limit	Particle density
Linear measurement unless :	4pt cone unless :	sp - small pyknometer
wd - water displacement	cas - Casagrande method	gj - gas jar
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CAUSEWAY GEOTECH

Summary of Classification Test Results

Project No.: 21-1682

Project Name: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only

Hole No.	Sample				Specimen Description	Density bulk	Density dry	w	Passing 425µm	LL	PL	PI	Particle density	Casagrande Classification
	Ref	Top	Base	Type		Mg/m3		%	%	%	%	%	Mg/m3	
TP-14105	1	0.40	2.00	B	Greyish brown sandy gravelly silty CLAY with cobbles.			12						
TP-14170	1	0.30	2.00	B	Grey sandy slightly gravelly silty CLAY.			14						
TP-14170	2	2.00	2.40	B	Grey slightly gravelly clayey fine to coarse SAND.			12	77	20 -1pt	12	8		CL
TP-14307	1	0.40	1.40	B	Greyish brown clayey fine to coarse SAND.			17	88	20 -1pt	14	6		ML/CL
TP-14307	2	1.40	2.00	B	Greyish brown gravelly clayey fine to coarse SAND with cobbles.			9.3						
TP-14409	1	0.40	3.20	B	Greyish brown slightly gravelly clayey fine to coarse SAND.			13						
TP-16005	2	0.40	2.10	B	Greyish brown gravelly clayey fine to coarse SAND with cobbles.			8.7						
TP-16005	3	2.10	3.20	B	Grey slightly gravelly silty fine to coarse SAND.			8.4						
TP-16109	2	1.10	3.20	B	Greyish brown slightly gravelly silty fine to coarse SAND.			9.3						
TP-16208	1	0.30	2.70	B	Grey sandy gravelly silty CLAY with some cobbles.			9.7						
TP-17711	1	0.20	0.80	B	Brownish grey sandy gravelly silty CLAY with cobbles.			9.4						
TP-17894	1	0.30	0.95	B	Greyish brown slightly sandy silty CLAY.			32	99	42 -1pt	21	21		CI

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LAB 01R Version 6

Key

Density test | Liquid Limit | Particle density

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Summary of Classification Test Results

Project No.	Project Name
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only

Hole No.	Sample				Specimen Description	Density bulk	Density dry	w	Passing 425µm	LL	PL	PI	Particle density	Casagrande Classification
	Ref	Top	Base	Type		Mg/m3		%	%	%	%	%	Mg/m3	
TP-17894	2	0.95	2.30	B	Brownish grey slightly sandy silty CLAY.			33	100	48 -1pt	23	25		CI
TP-18187	1	0.30	0.95	B	Grey sandy slightly gravelly silty CLAY.			19						
TP-18187	2	0.95	2.10	B	Grey slightly sandy slightly gravelly silty CLAY.			23	96	45 -1pt	21	24		CI
TP-18505	1	0.50	3.00	B	Grey sandy gravelly silty CLAY with cobbles.			7.6						
TP-18604	1	0.30	3.00	B	Greyish brown sandy slightly gravelly silty CLAY.			13						
TP-18704	1	0.40	3.00	B	Greyish brown sandy gravelly silty CLAY.			9.5						
TP-18802	2	0.25	0.70	D	Brown sandy slightly gravelly silty CLAY.			7.9	66	35 -1pt	22	13		CL/CI
TP-19088	6	2.00	2.80	D	Brownish grey sandy slightly gravelly silty CLAY.			7.9	61	20 -1pt	12	8		CL
TP-2007	1	0.25	0.80	B	Brown sandy slightly gravelly silty CLAY.			15	78	36 -1pt	23	13		CI
TP-2007	2	0.80	1.70	B	Brown sandy slightly gravelly silty CLAY.			19	90	29 -1pt	16	13		CL
TP-2007	3	1.70	2.40	B	Brown sandy slightly gravelly silty CLAY.			14	61	21 -1pt	14	7		CL
TP-2007	4	2.40	3.30	B	Brown sandy gravelly silty CLAY.			13	66	22 -1pt	16	6		ML/CL

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LAB 01R Version 6

Key

Density test	Liquid Limit	Particle density
Linear measurement unless :	4pt cone unless :	sp - small pyknometer
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Summary of Classification Test Results

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21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only

Hole No.	Sample				Specimen Description	Density bulk	Density dry	w	Passing 425µm	LL	PL	PI	Particle density	Casagrande Classification
	Ref	Top	Base	Type		Mg/m3		%	%	%	%	%	Mg/m3	
TP-2140	2	0.50	2.80	B	Brown sandy gravelly silty CLAY.			7.3						
TP-2140	3	2.80	3.50	B	Brown sandy slightly gravelly silty CLAY.			15	69	24 -1pt	15	9		CL
TP-2219A	3	1.20	2.50	B	Brown sandy gravelly silty CLAY with cobbles.			10	57	25 -1pt	14	11		CL
TP-23202	2	0.30	0.80	D	Brownish grey slightly gravelly clayey fine to coarse SAND.			11	66	33 -1pt	21	12		CL
TP-2349	2	0.80	1.60	B	Brown sandy slightly gravelly silty CLAY.			13	67	22 -1pt	14	8		CL
TP-2349	3	1.60	2.20	B	Brown sandy slightly gravelly silty CLAY.			13	66	23 -1pt	15	8		CL
TP-2349	4	2.20	2.90	B	Brown sandy gravelly silty CLAY.			11	64	20 -1pt	11	9		CL
TP-25504	2	0.40	1.30	D	Brownish grey sandy gravelly silty CLAY.			18	71	32 -1pt	19	13		CL
TP-2701	1	0.20	2.00	B	Brown sandy slightly gravelly silty CLAY.			16	63	34 -1pt	17	17		CL
TP-2701	2	2.00	3.50	B	Brown sandy gravelly silty CLAY.			12	65	25 -1pt	14	11		CL
TP-28302	5	0.50		D	Brown sandy gravelly silty CLAY.			11	84	30 -1pt	20	10		CL
TP-28411	4	1.00		D	Brown sandy slightly gravelly clayey SILT.			19	45	39 -1pt	26	13		MI

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LAB 01R Version 6

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Density test | Liquid Limit | Particle density

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Summary of Classification Test Results

Project No.	Project Name
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only

Hole No.	Sample				Specimen Description	Density bulk	Density dry	w	Passing 425µm	LL	PL	PI	Particle density	Casagrande Classification
	Ref	Top	Base	Type		Mg/m3		%	%	%	%	%	Mg/m3	
TP-30103	5	0.50		D	Brown sandy slightly gravelly silty CLAY.			13	74	28 -1pt	17	11		CL
TP-30103	6	1.50		D	Brown sandy gravelly silty CLAY.			9.6	60	21 -1pt	15	6		ML/CL
TP-30204	4	0.50		D	Brown sandy gravelly clayey SILT.			9.8	77	24 -1pt	19	5		ML
TP-30204	5	1.50		D	Brown sandy gravelly silty CLAY.			10	71	23 -1pt	15	8		CL
TP-30303	2	1.50		B	Brown sandy gravelly silty CLAY with some cobbles.			6.9	65	20 -1pt	14	6		ML/CL
TP-30417	4	0.50		D	Brown sandy gravelly silty CLAY.			9.2	63	23 -1pt	17	6		ML/CL
TP-30417	5	1.50		D	Brown sandy gravelly silty CLAY.			7.6	60	20 -1pt	13	7		CL
TP-30501	5	1.50		D	Brownish grey sandy gravelly silty CLAY.			11	78	31 -1pt	18	13		CL
TP-30602	5	1.50		D	Brown sandy gravelly silty CLAY.			7.1	60	20 -1pt	13	7		CL
TP-30818	2	0.35	1.50	D	Brown sandy slightly gravelly silty CLAY.			9.5	70	20 -1pt	13	7		CL
TP-30818	4	1.50	2.50	D	Brown sandy slightly gravelly silty CLAY.			9.9	71	21 -1pt	13	8		CL
TP-30901	2	0.25	1.40	D	Brown sandy slightly gravelly silty CLAY.			6.8	64	24 -1pt	17	7		CL

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LAB 01R Version 6

Key

Density test	Liquid Limit	Particle density
Linear measurement unless :	4pt cone unless :	sp - small pyknometer
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CAUSEWAY GEOTECH

Summary of Classification Test Results

Project No.: 21-1682

Project Name: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only

Hole No.	Sample				Specimen Description	Density bulk / dry Mg/m3		*w* %	Passing 425µm %	LL %	PL %	PI %	Particle density Mg/m3	Casagrande Classification
	Ref	Top	Base	Type										
TP-31002	4	1.50	2.40	D	Greyish brown sandy slightly gravelly silty CLAY.			12	87	21 -1pt	12	9		CL
TP-31805	3	1.70		B	Brown sandy gravelly silty CLAY with cobbles.			6.9	68	20	12	8		CL
TP-32103	1	0.50		B	Brown gravelly slightly silty fine to coarse SAND with cobbles.			4.3	46	32	24	8		ML/CL
TP-32201	1	0.50		B	Brownish grey sandy gravelly silty CLAY.			11	81	32	23	9		ML/CL
TP-32320	1	0.50		B	Brownish grey sandy gravelly silty CLAY with cobbles.			7	62	23	16	7		CL
TP-32401	2	1.40		B	Brownish grey sandy gravelly silty CLAY with cobbles.			5.9	64	21	14	7		CL
TP-3302	3	1.35	3.10	B	Brown sandy gravelly silty CLAY.			13	64	28 -1pt	17	11		CL
TP-3302	4	3.10	3.60	B	Brown sandy gravelly silty CLAY.			12	68	24 -1pt	14	10		CL
TP-3504	4	1.00	2.30	B	Brown slightly gravelly clayey fine to coarse SAND.			27	91	36 -1pt	23	13		CI
TP-3504	3	2.30	2.70	B	Brown slightly gravelly clayey fine to coarse SAND.			56	97	24 -1pt	18	6		ML/CL
TP-3504	2	2.70	3.00	B	Brownish black slightly sandy organic clayey SILT.			112	90	72 -1pt	59	13		MV
TP-3504	1	3.00	3.60	B	Brown sandy clayey subangular fine to coarse GRAVEL.			12						

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LAB 01R Version 6

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Density test | Liquid Limit | Particle density

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Summary of Classification Test Results

Project No.	Project Name
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only

Hole No.	Sample				Specimen Description	Density bulk	Density dry	w	Passing 425µm	LL	PL	PI	Particle density	Casagrande Classification
	Ref	Top	Base	Type		Mg/m3		%	%	%	%	%	Mg/m3	
TP-35302	2	0.30	1.50	D	Brown sandy slightly gravelly silty CLAY.			11	39	22 -1pt	15	7		CL
TP-35435	2	0.30	1.50	D	Greyish brown sandy slightly gravelly silty CLAY.			12	65	24 -1pt	16	8		CL
TP-35435	4	1.50	2.80	D	Greyish brown sandy slightly gravelly silty CLAY.			11	64	20 -1pt	14	6		ML/CL
TP-3978	2	0.60	1.60	B	Brownish grey sandy gravelly silty CLAY.			18	98	36 -1pt	21	15		CI
TP-3978	3	1.60	3.20	B	Brownish grey gravelly silty fine to coarse SAND.			11	66	20 -1pt	14	6		ML/CL
TP-4112	1	0.20	1.60	B	Brown sandy silty CLAY.			19	90	23 -1pt	15	8		CL
TP-4112	2	1.60	3.00	B	Brown sandy slightly gravelly silty CLAY.			15	61	25 -1pt	14	11		CL
TP-5303	2	0.80	1.50	B	Brownish grey sandy slightly gravelly silty CLAY.			18	82	25 -1pt	15	10		CL
TP-5303	4	2.30	3.50	B	Brownish grey sandy slightly gravelly silty CLAY.			16	78	21 -1pt	14	7		CL
TP-5387	1	0.20	1.00	B	Brownish grey sandy slightly gravelly silty CLAY.			16	65	22 -1pt	15	7		CL
TP-5387	3	2.65	3.55	B	Brownish grey sandy gravelly silty CLAY.			14	73	21 -1pt	13	8		CL
TP-5703	2	0.90	2.30	B	Brownish grey sandy gravelly silty CLAY with cobbles.			11	73	21 -1pt	14	7		CL

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Density test	Liquid Limit	Particle density
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Summary of Classification Test Results

Project No.	Project Name
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only

Hole No.	Sample				Specimen Description	Density bulk / dry Mg/m3		*w* %	Passing 425µm %	LL %	PL %	PI %	Particle density Mg/m3	Casagrande Classification
	Ref	Top	Base	Type										
TP-5703	3	2.30	3.50	B	Brownish grey sandy slightly gravelly clayey SILT.			13	65	21 -1pt	16	5		ML
TP-5803	1	0.30	2.50	B	Brownish grey sandy gravelly silty CLAY with cobbles.			13	78	36 -1pt	24	12		MI/CI
TP-5803	2	2.50	3.50	B	Brownish grey gravelly clayey fine to coarse SAND.			12						
TP-5903	1	0.30	3.00	B	Brownish grey slightly silty fine to coarse SAND.			3.3						
TP-5903	2	3.00	3.50	B	Brown gravelly slightly silty fine to coarse SAND with cobbles.			7.3						
TP-6016	1	0.30	1.50	B	Brownish grey sandy gravelly silty CLAY.			12						
TP-6016	2	1.50	2.40	B	Brownish grey sandy slightly gravelly clayey SILT.			13	75	20 -1pt	16	4		ML
TP-6016	3	2.40	3.00	B	Brownish grey sandy gravelly silty CLAY.			10	69	20 -1pt	14	6		ML/CL
TP-6105	2	1.00	2.20	B	Brownish grey sandy slightly gravelly silty CLAY.			15	67	23 -1pt	15	8		CL
TP-6105	3	2.20	3.00	B	Brownish grey sandy gravelly silty CLAY with cobbles .			13	95	28 -1pt	17	11		CL
TP-6105	4	3.00	3.50	B	Orangish brown sandy slightly gravelly silty CLAY.			13	77	21 -1pt	NP			CL
TP-6207	1	0.30	1.40	B	Brownish grey sandy gravelly silty CLAY.			12						

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Hole No.	Sample				Specimen Description	Density bulk / dry Mg/m3		*w* %	Passing 425µm %	LL %	PL %	PI %	Particle density Mg/m3	Casagrande Classification
	Ref	Top	Base	Type										
TP-6207	2	1.40	2.60	B	Brownish grey gravelly silty fine to coarse SAND.			8.3	54	20 -1pt	12	8		CL
TP-6408	1	0.25	1.00	B	Orangish brown slightly gravelly silty fine to coarse SAND.			12	68	22 -1pt	16	6		ML/CL
TP-6408	2	1.00	2.60	B	Brown sandy slightly gravelly silty CLAY.			16	78	24 -1pt	15	9		CL
TP-6408	3	2.60	3.50	B	Brown sandy gravelly silty CLAY.			11	69	21 -1pt	14	7		CL
TP-6505	1	0.25	1.15	B	Brown sandy gravelly silty CLAY.			13	62	23 -1pt	17	6		ML/CL
TP-6505	2	1.15	2.75	B	Brown sandy gravelly silty CLAY with cobbles.			13						
TP-6505	3	2.75	3.50	B	Brown gravelly clayey fine to coarse SAND.			8.4						
TP-6575	1	0.20	0.90	B	Brown sandy gravelly silty CLAY with cobbles.			7.5	61	27 -1pt	18	9		CL
TP-6575	2	0.90	1.60	B	Brown sandy gravelly clayey SILT.			14	73	47 -1pt	36	11		MI
TP-6575	3	1.60	2.40	B	Brown sandy slightly gravelly silty CLAY.			32	85	45 -1pt	26	19		CI
TP-6575	4	2.40	3.30	B	Brown gravelly silty fine to coarse SAND.			14						
TP-6663	1	0.20	0.80	B	Brown sandy gravelly silty CLAY.			10	55	25 -1pt	18	7		CL

All tests performed in accordance with BS1377:1990 unless specified otherwise

LAB 01R Version 6

Key

Density test	Liquid Limit	Particle density
Linear measurement unless :	4pt cone unless :	sp - small pyknometer
wd - water displacement	cas - Casagrande method	gj - gas jar
wi - immersion in water	1pt - single point test	

Date Printed

17/11/2022

Approved By

Stephen.Watson

UKAS TESTING

10122

CAUSEWAY GEOTECH

Summary of Classification Test Results

Project No.: 21-1682

Project Name: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only

Hole No.	Sample Ref	Top	Base	Type	Specimen Description	Density bulk Mg/m3	Density dry Mg/m3	w %	Passing 425µm %	LL %	PL %	PI %	Particle density Mg/m3	Casagrande Classification
TP-6663	2	0.80	2.90	B	Brown slightly gravelly clayey fine to coarse SAND.			24	75	43 -1pt	27	16		MI/CI
TP-6832	1	0.10	0.85	B	Brown sandy gravelly silty CLAY.			11	62	36 -1pt	24	12		MI/CI
TP-6832	2	0.85	2.20	B	Brown slightly gravelly clayey fine to coarse SAND.			18	66	30 -1pt	21	9		CL
TP-6832	3	2.20	3.00	B	Brown sandy gravelly silty CLAY.			13						
TP-6906	1	0.20	1.20	B	Brown sandy slightly gravelly silty CLAY.			28	91	53 -1pt	27	26		CH
TP-6906	2	1.20	1.30	B	Brown slightly sandy silty CLAY.			26	97	45 -1pt	24	21		CI
TP-6906	3	1.30	2.30	B	Brown slightly gravelly silty fine to coarse SAND.			23						
TP-6997	1	0.15	0.60	B	Brown sandy slightly gravelly silty CLAY.			18	86	35 -1pt	24	11		CL/CI/ML/MI
TP-6997	2	0.60	1.70	B	Brown slightly sandy silty CLAY.			21	97	42 -1pt	23	19		CI
TP-6997	3	1.70	2.50	B	Brown sandy gravelly silty CLAY with cobbles.			13						
TP-7207	1	0.20	0.80	B	Brown sandy slightly gravelly silty CLAY.			30	92	36 -1pt	23	13		CI
TP-7207	2	0.80	1.60	B	Brownish grey slightly sandy silty CLAY.			23	97	47 -1pt	21	26		CI

All tests performed in accordance with BS1377:1990 unless specified otherwise

LAB 01R Version 6

Key

Density test | Liquid Limit | Particle density

Linear measurement unless : | 4pt cone unless : | sp - small pyknometer

wd - water displacement | cas - Casagrande method | gj - gas jar

wi - immersion in water | 1pt - single point test

Date Printed: 17/11/2022

Approved By: Stephen.Watson

UKAS TESTING 10122

Summary of Classification Test Results

Project No.	Project Name
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only

Hole No.	Sample				Specimen Description	Density bulk	Density dry	w	Passing 425µm	LL	PL	PI	Particle density	Casagrande Classification
	Ref	Top	Base	Type		Mg/m3		%	%	%	%	%	Mg/m3	
TP-7207	3	1.60	3.50	B	Brownish grey gravelly clayey fine to coarse SAND.			9.6	58	25 -1pt	18	7		CL
TP-7305	1	0.30	0.90	B	Brown slightly gravelly silty fine to coarse SAND.			28	81	40 -1pt	29	11		MI
TP-7305	2	0.90	2.00	B	Brown slightly gravelly silty fine to coarse SAND.			13						
TP-7305	3	2.00	2.50	B	Brown sandy gravelly silty CLAY with cobbles.			7.9	57	20 -1pt	13	7		CL
TP-7373	1	0.15	0.40	B	Greyish brown gravelly silty fine to coarse SAND.			9.4						
TP-7373	3	0.80	1.25	B	Greyish brown slightly sandy subangular fine to coarse GRAVEL with cobbles.			11						
TP-9011	2	0.80	1.50	B	Brownish grey sandy slightly gravelly silty CLAY.			15	60	23 -1pt	14	9		CL
TP-9011	3	1.50	2.20	B	Brownish grey sandy slightly gravelly silty CLAY.			18	73	22 -1pt	14	8		CL
TP-9011	4	2.20	2.60	B	Brownish grey sandy slightly gravelly silty CLAY.			11	60	20 -1pt	12	8		CL
TP-9094	1	0.30	0.80	B	Brownish grey sandy slightly gravelly silty CLAY.			8.6	88	25 -1pt	15	10		CL
TP-9094	2	0.80	2.70	B	Brownish grey gravelly silty fine to coarse SAND with cobbles.			9.4						
TP-9115	2	0.30	0.70	B	Brownish grey sandy silty CLAY.			20	91	28 -1pt	21	7		CL

All tests performed in accordance with BS1377:1990 unless specified otherwise

LAB 01R Version 6

Key

Density test	Liquid Limit	Particle density
Linear measurement unless :	4pt cone unless :	sp - small pyknometer
wd - water displacement	cas - Casagrande method	gj - gas jar
wi - immersion in water	1pt - single point test	

Date Printed

17/11/2022

Approved By

Stephen.Watson

UKAS TESTING

10122

CAUSEWAY GEOTECH

Summary of Classification Test Results

Project No.	Project Name
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only

Hole No.	Sample				Specimen Description	Density bulk / dry Mg/m3		*w* %	Passing 425µm %	LL %	PL %	PI %	Particle density Mg/m3	Casagrande Classification
	Ref	Top	Base	Type										
TP-9115	1	0.70	2.10	B	Brownish grey sandy slightly gravelly silty CLAY.			12	66	28 -1pt	17	11		CL
TP-9115	3	2.10	2.50	B	Brownish grey sandy slightly gravelly silty CLAY.			13	80	31 -1pt	19	12		CL
TP-9206	1	0.30	0.70	B	Brownish grey sandy slightly gravelly silty CLAY.			14	78	39 -1pt	25	14		MI/CI
TP-9206	2	0.70	1.60	B	Brownish grey sandy slightly gravelly silty CLAY.			24	88	32 -1pt	20	12		CL
TP-9206	3	1.60	2.50	B	Brownish grey slightly gravelly clayey fine to coarse SAND.			13						
TP-9305	1	0.30	0.80	B	Greenish grey clayey fine to coarse SAND.			15	79	39 -1pt	23	16		CI
TP-9305	2	0.80	1.70	B	Brownish grey sandy slightly gravelly silty CLAY.			13	54	34 -1pt	21	13		CL
TP-9370	2	0.80	2.00	B	Grey gravelly silty fine to coarse SAND with cobbles.			8.7	55	21 -1pt	15	6		ML/CL
TP-9505	1	0.30	0.80	B	Brownish grey sandy slightly gravelly silty CLAY.			14	84	27 -1pt	17	10		CL
TP-9505	2	0.80	2.10	B	Brownish grey sandy slightly gravelly silty CLAY.			13	46	28 -1pt	19	9		CL
TP-9505	3	2.10	2.70	B	Brownish grey sandy slightly gravelly silty CLAY.			12	45	22 -1pt	15	7		CL
TP-9603	2	0.80	1.90	B	Brownish grey sandy gravelly silty CLAY with cobbles.			12	64	22 -1pt	14	8		CL

All tests performed in accordance with BS1377:1990 unless specified otherwise

LAB 01R Version 6

Key

Density test | Liquid Limit | Particle density

Linear measurement unless : | 4pt cone unless : | sp - small pyknometer

wd - water displacement | cas - Casagrande method | gj - gas jar

wi - immersion in water | 1pt - single point test

Date Printed

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Approved By

Stephen.Watson

UKAS TESTING

10122

Summary of Classification Test Results

Project No.	Project Name
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only

Hole No.	Sample				Specimen Description	Density bulk	Density dry	w	Passing 425µm	LL	PL	PI	Particle density	Casagrande Classification
	Ref	Top	Base	Type		Mg/m3		%	%	%	%	%	Mg/m3	
TP-9603	3	1.90	3.50	B	Brownish grey sandy gravelly silty CLAY.			15	68	22 -1pt	14	8		CL
TP-9705	1	0.30	0.80	B	Brownish grey sandy slightly gravelly silty CLAY.			18	81	32 -1pt	21	11		CL
TP-9705	3	1.60	1.80	B	Brownish grey sandy gravelly silty CLAY.			15	72	23 -1pt	17	6		ML/CL
TP-9830	1	0.40	1.40	B	Brownish grey sandy slightly gravelly silty CLAY.			12	74	25 -1pt	15	10		CL
TP-9830	3	1.90	2.50	B	Brownish grey sandy slightly gravelly silty CLAY.			10	53	20 -1pt	12	8		CL

All tests performed in accordance with BS1377:1990 unless specified otherwise

LAB 01R Version 6

Key

Density test	Liquid Limit	Particle density
Linear measurement unless :	4pt cone unless :	sp - small pyknometer
wd - water displacement	cas - Casagrande method	gj - gas jar
wi - immersion in water	1pt - single point test	

Date Printed

17/11/2022

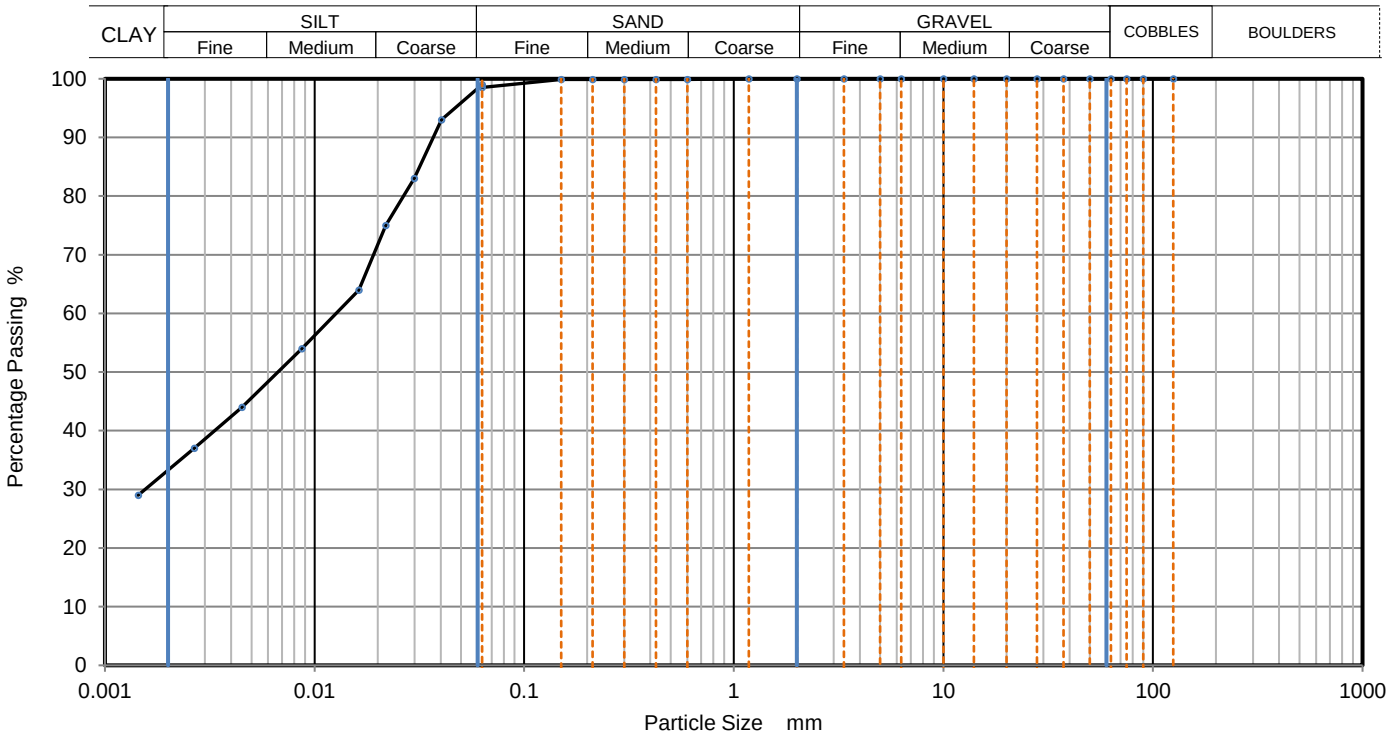
Approved By

Stephen.Watson

UKAS TESTING

10122

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		BH-10413
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		2
Specimen Description	Greyish brown slightly sandy silty CLAY.				Sample Depth (m)	Top	3.60
						Base	5.00
Specimen Reference	3	Specimen Depth	3.6	m	Sample Type		C
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022101849



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	99
90	100	0.04035	93
75	100	0.02991	83
63	100	0.02190	75
50	100	0.01625	64
37.5	100	0.00871	54
28	100	0.00451	44
20	100	0.00267	37
14	100	0.00144	29
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	100	Particle density	(assumed)
0.425	100	2.65	Mg/m3
0.3	100		
0.212	100		
0.15	100		
0.063	99		

Dry Mass of sample, g: 405

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	0.0
Sand	1.4
Silt	65.5
Clay	33.1

Grading Analysis		
D100	mm	
D60	mm	0.0128
D30	mm	0.00156
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

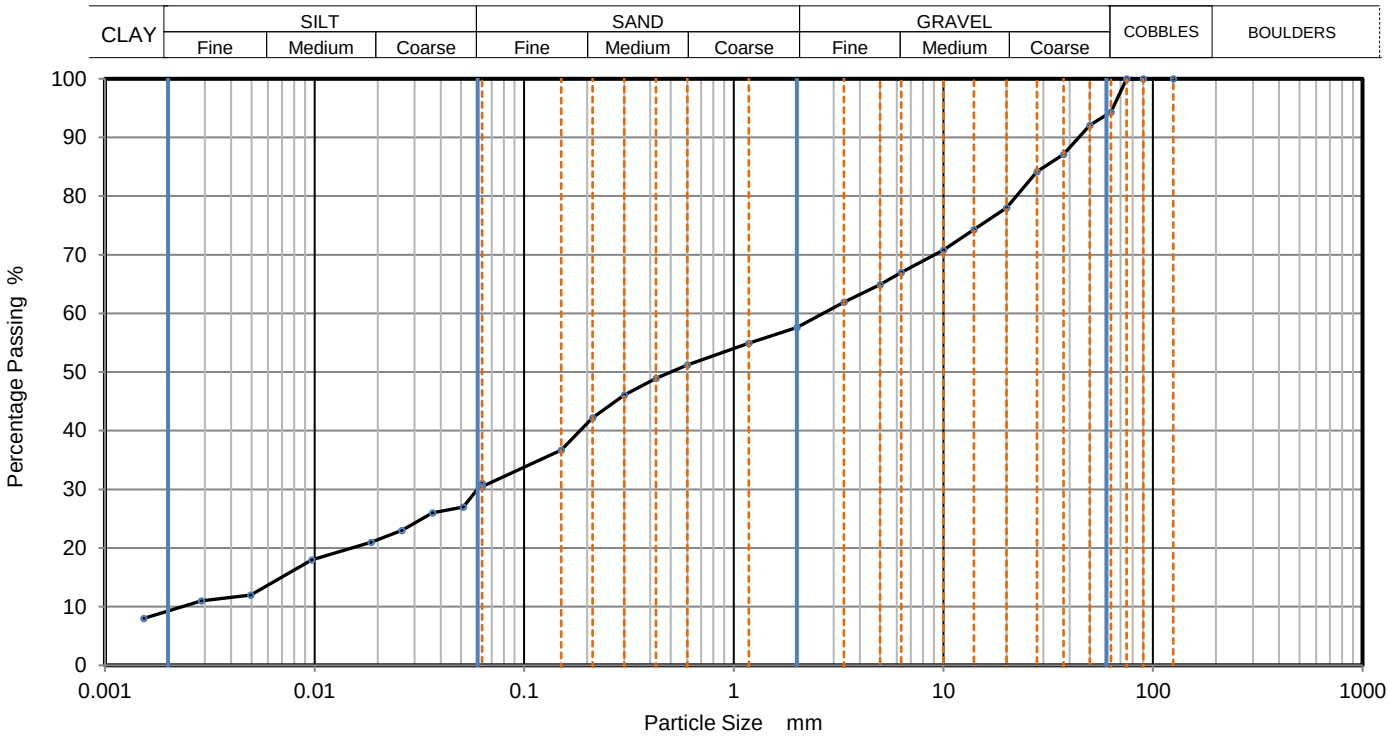
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					BH-10449
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Grey sandy gravelly silty CLAY.			Sample Depth (m) Top	1.50
				Base	2.10
Specimen Reference	2	Specimen Depth	1.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus202208150



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	31
90	100	0.05129	27
75	100	0.03649	26
63	94	0.02611	23
50	92	0.01857	21
37.5	87	0.00970	18
28	84	0.00496	12
20	78	0.00288	11
14	74	0.00153	8
10	71		
6.3	67		
5	65		
3.35	62		
2	58		
1.18	55		
0.6	51	Particle density (assumed)	
0.425	49	2.65 Mg/m3	
0.3	46		
0.212	42		
0.15	37		
0.063	31		

Dry Mass of sample, g: 11641

Sample Proportions	% dry mass
Cobbles	5.7
Gravel	36.7
Sand	27.2
Silt	21.5
Clay	8.9

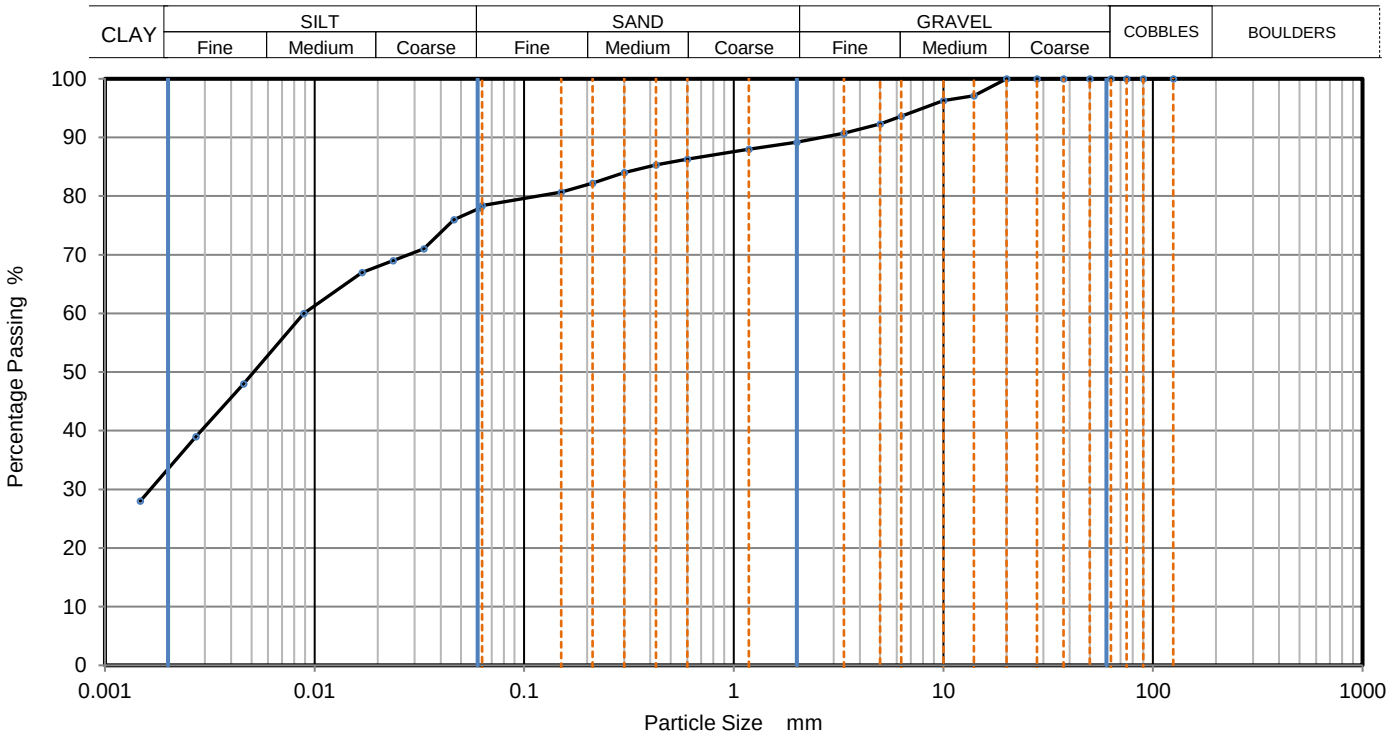
Grading Analysis		
D100	mm	
D60	mm	2.67
D30	mm	0.0611
D10	mm	0.0025
Uniformity Coefficient		1100
Curvature Coefficient		0.56

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-11377
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	4
Specimen Description	Greyish brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	0.80
				Base	1.90
Specimen Reference	3	Specimen Depth	0.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus202208310



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06183	78
90	100	0.04632	76
75	100	0.03324	71
63	100	0.02368	69
50	100	0.01686	67
37.5	100	0.00889	60
28	100	0.00459	48
20	100	0.00272	39
14	97	0.00147	28
10	96		
6.3	94		
5	92		
3.35	91		
2	89		
1.18	88		
0.6	86	Particle density	(assumed)
0.425	85	2.65	Mg/m3
0.3	84		
0.212	82		
0.15	81		
0.063	78		

Dry Mass of sample, g: 514

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	10.8
Sand	10.9
Silt	44.9
Clay	33.4

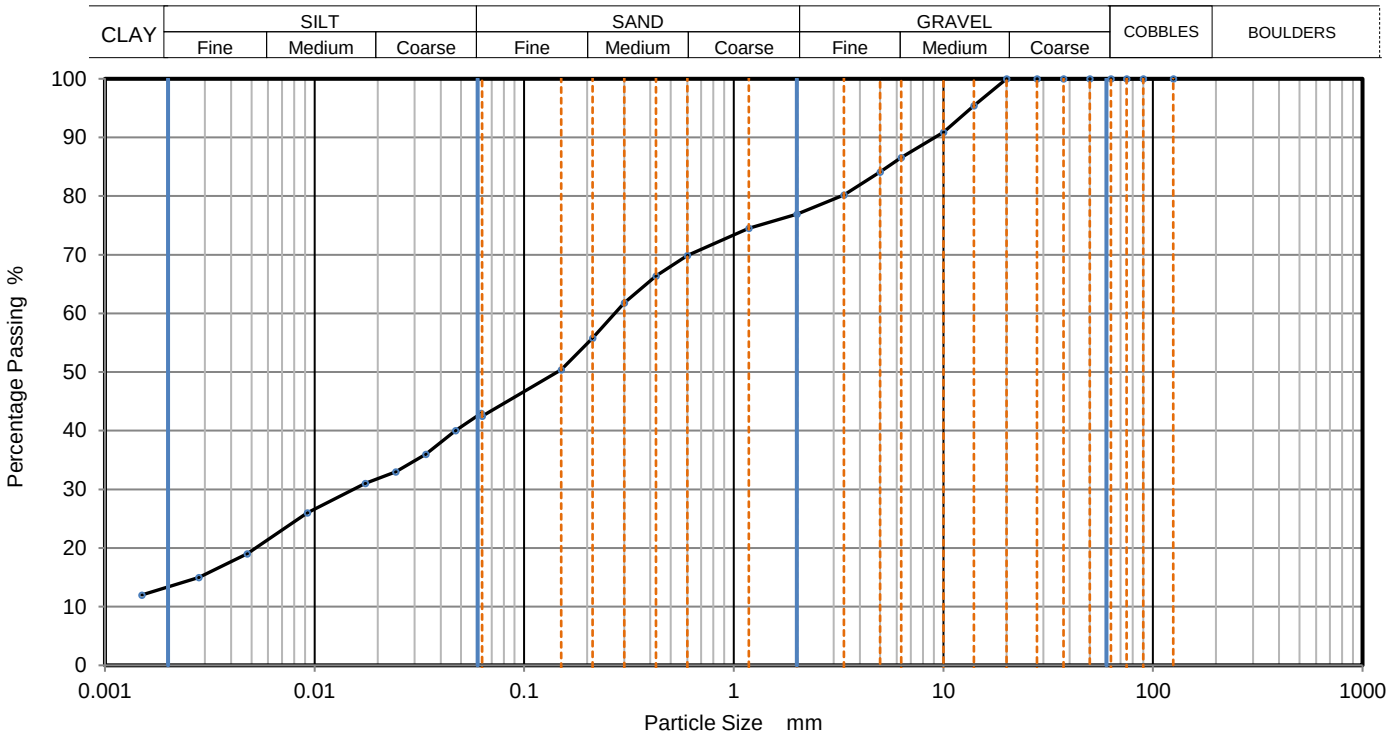
Grading Analysis		
D100	mm	
D60	mm	0.00893
D30	mm	0.00167
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		BH-11377
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		5
Specimen Description	Greyish brown sandy slightly gravelly silty CLAY.				Sample Depth (m)	Top	1.90
						Base	3.00
Specimen Reference	5	Specimen Depth	1.9	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus202208312



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06230	43
90	100	0.04701	40
75	100	0.03397	36
63	100	0.02435	33
50	100	0.01745	31
37.5	100	0.00925	26
28	100	0.00477	19
20	100	0.00280	15
14	95	0.00150	12
10	91		
6.3	87		
5	84		
3.35	80		
2	77		
1.18	75		
0.6	70	Particle density	(assumed)
0.425	66	2.65	Mg/m3
0.3	62		
0.212	56		
0.15	50		
0.063	43		

Dry Mass of sample, g: 547

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	23.1
Sand	34.4
Silt	29.1
Clay	13.4

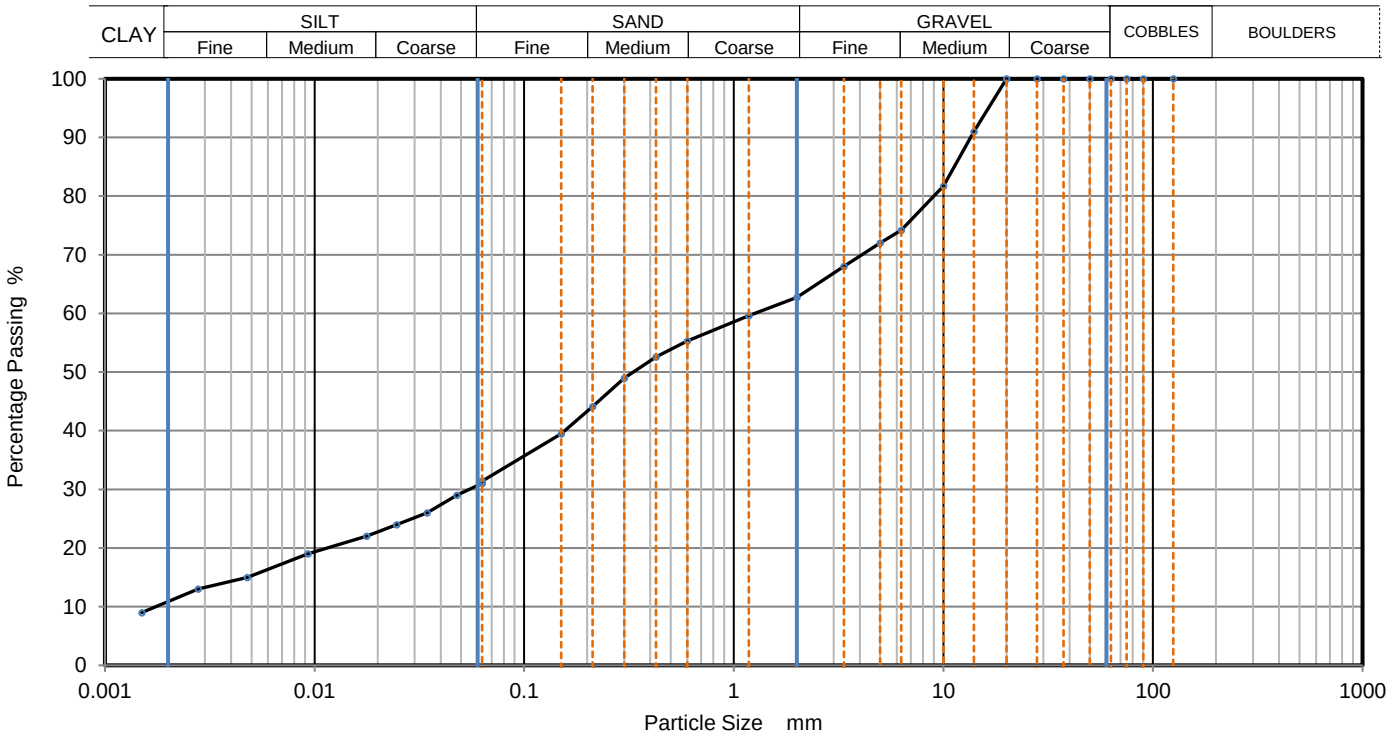
Grading Analysis		
D100	mm	
D60	mm	0.271
D30	mm	0.0156
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION			Job Ref		21-1682
				Borehole/Pit No.		BH-11594
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.		3
Specimen Description	Greyish brown sandy slightly gravelly silty CLAY.			Sample Depth (m)	Top	1.50
					Base	2.50
Specimen Reference	3	Specimen Depth	1.5 m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID		Caus202208315



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	31
90	100	0.04770	29
75	100	0.03444	26
63	100	0.02468	24
50	100	0.01768	22
37.5	100	0.00931	19
28	100	0.00477	15
20	100	0.00278	13
14	91	0.00150	9
10	82		
6.3	74		
5	72		
3.35	68		
2	63		
1.18	60		
0.6	55	Particle density	(assumed)
0.425	53	2.65	Mg/m3
0.3	49		
0.212	44		
0.15	40		
0.063	31		

Dry Mass of sample, g: 565

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	37.3
Sand	31.2
Silt	20.5
Clay	11.0

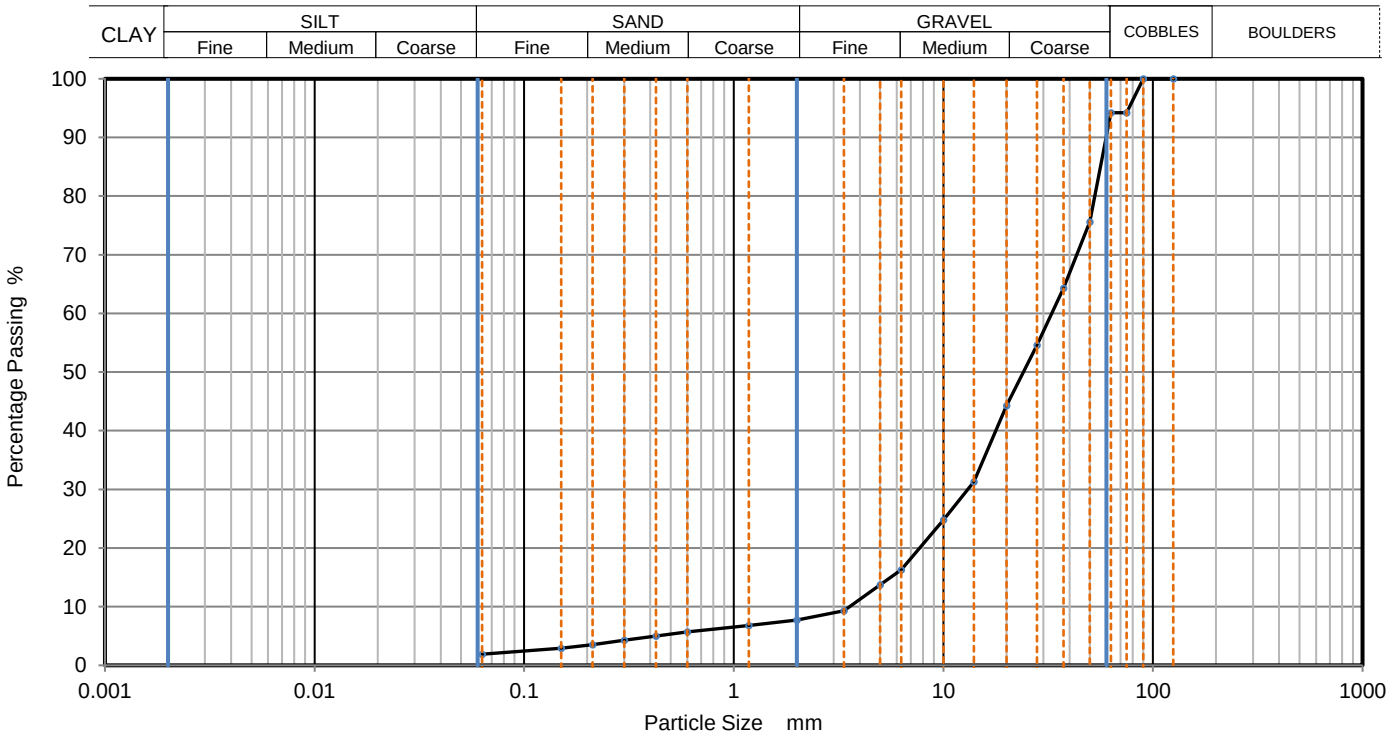
Grading Analysis		
D100	mm	
D60	mm	1.26
D30	mm	0.0519
D10	mm	0.00172
Uniformity Coefficient		740
Curvature Coefficient		1.2

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION			Job Ref		21-1682
				Borehole/Pit No.		BH-11594
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.		5
Specimen Description	Greyish brown slightly sandy slightly clayey subangular fine to coarse GRAVEL.			Sample Depth (m)	Top	3.60
					Base	4.50
Specimen Reference	3	Specimen Depth	3.6 m	Sample Type		B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID		Caus202208318



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	94		
63	94		
50	76		
37.5	64		
28	55		
20	44		
14	31		
10	25		
6.3	16		
5	14		
3.35	9		
2	8		
1.18	7		
0.6	6		
0.425	5		
0.3	4		
0.212	4		
0.15	3		
0.063	2		

Dry Mass of sample, g	12901

Sample Proportions	% dry mass
Cobbles	5.8
Gravel	86.5
Sand	5.8
Fines <0.063mm	2.0

Grading Analysis		
D100	mm	
D60	mm	33
D30	mm	13.1
D10	mm	3.57
Uniformity Coefficient		9.2
Curvature Coefficient		1.5

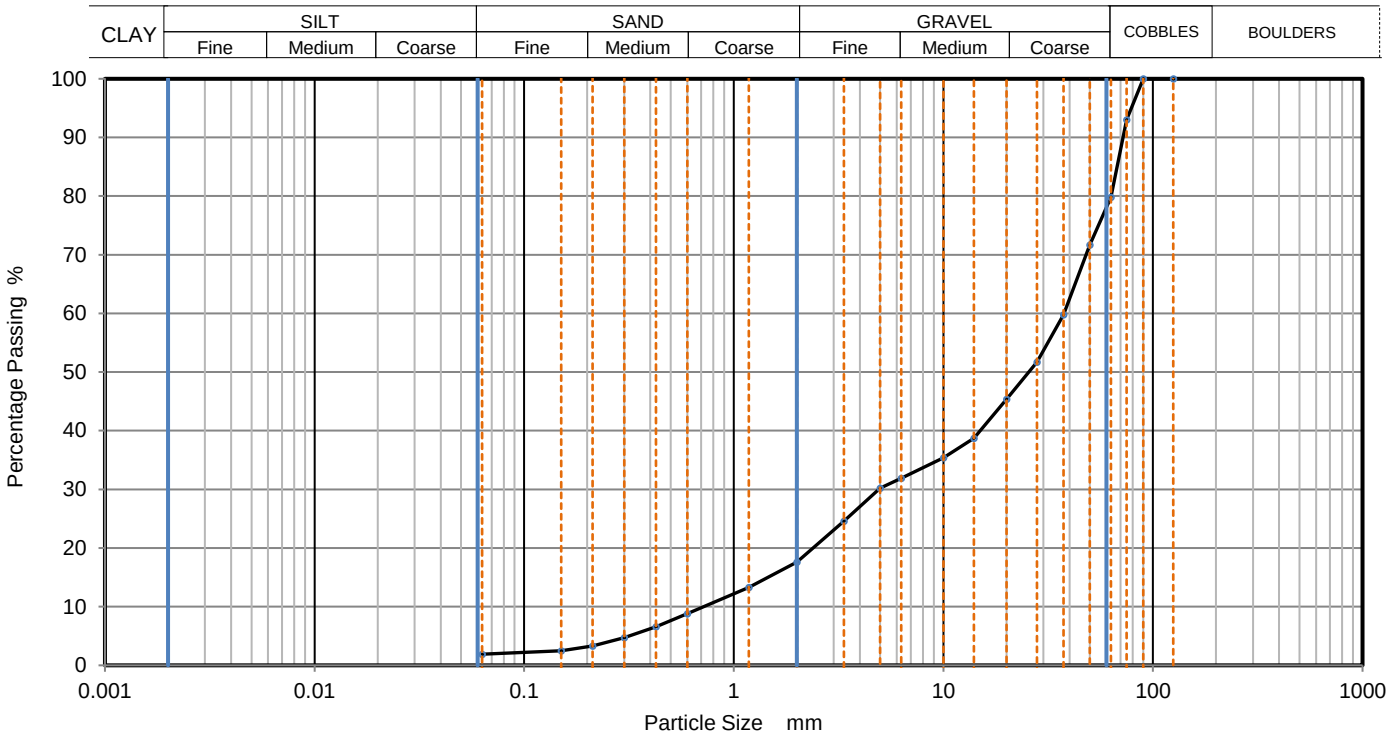
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Joseph

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-11594
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	6
Specimen Description	Greyish brown slightly sandy slightly clayey subangular fine to coarse GRAVEL.			Sample Depth (m) Top	5.60
				Base	6.00
Specimen Reference	3	Specimen Depth	5.6 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus202208319



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	93		
63	80		
50	72		
37.5	60		
28	52		
20	45		
14	39		
10	35		
6.3	32		
5	30		
3.35	25		
2	18		
1.18	13		
0.6	9		
0.425	7		
0.3	5		
0.212	3		
0.15	3		
0.063	2		

Dry Mass of sample, g: 10129

Sample Proportions	% dry mass
Cobbles	20.2
Gravel	62.2
Sand	15.7
Fines <0.063mm	2.0

Grading Analysis		
D100	mm	
D60	mm	37.7
D30	mm	4.91
D10	mm	0.721
Uniformity Coefficient		52
Curvature Coefficient		0.89

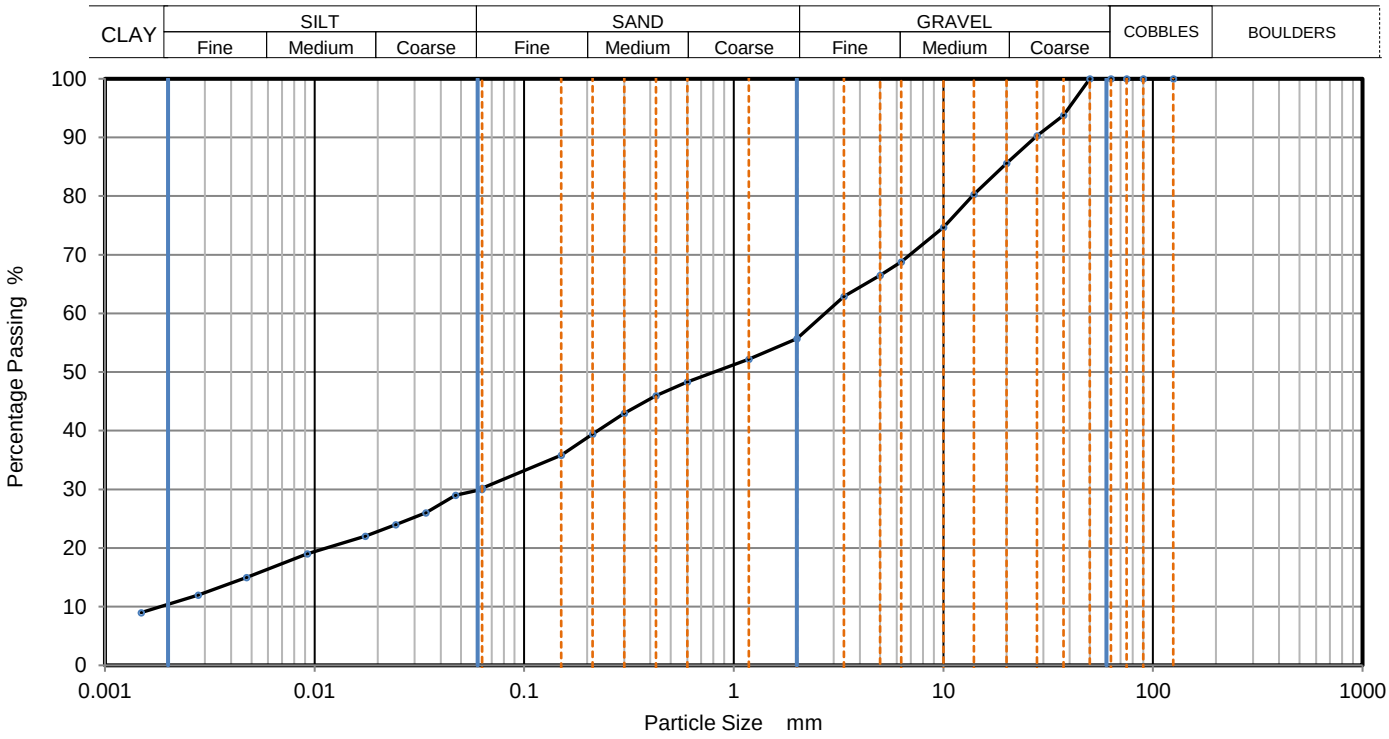
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Joseph

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-12009
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Greyish brown sandy gravelly silty CLAY.			Sample Depth (m) Top	0.25
				Base	1.20
Specimen Reference	3	Specimen Depth	0.25 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022083110



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06275	30
90	100	0.04701	29
75	100	0.03396	26
63	100	0.02435	24
50	100	0.01745	22
37.5	94	0.00925	19
28	90	0.00474	15
20	86	0.00278	12
14	80	0.00149	9
10	75		
6.3	69		
5	67		
3.35	63		
2	56		
1.18	52		
0.6	48	Particle density (assumed)	
0.425	46	2.65 Mg/m3	
0.3	43		
0.212	39		
0.15	36		
0.063	30		

Dry Mass of sample, g: 3664

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	44.3
Sand	25.5
Silt	20.1
Clay	10.1

Grading Analysis		
D100	mm	
D60	mm	2.73
D30	mm	0.0591
D10	mm	0.00194
Uniformity Coefficient		1400
Curvature Coefficient		0.66

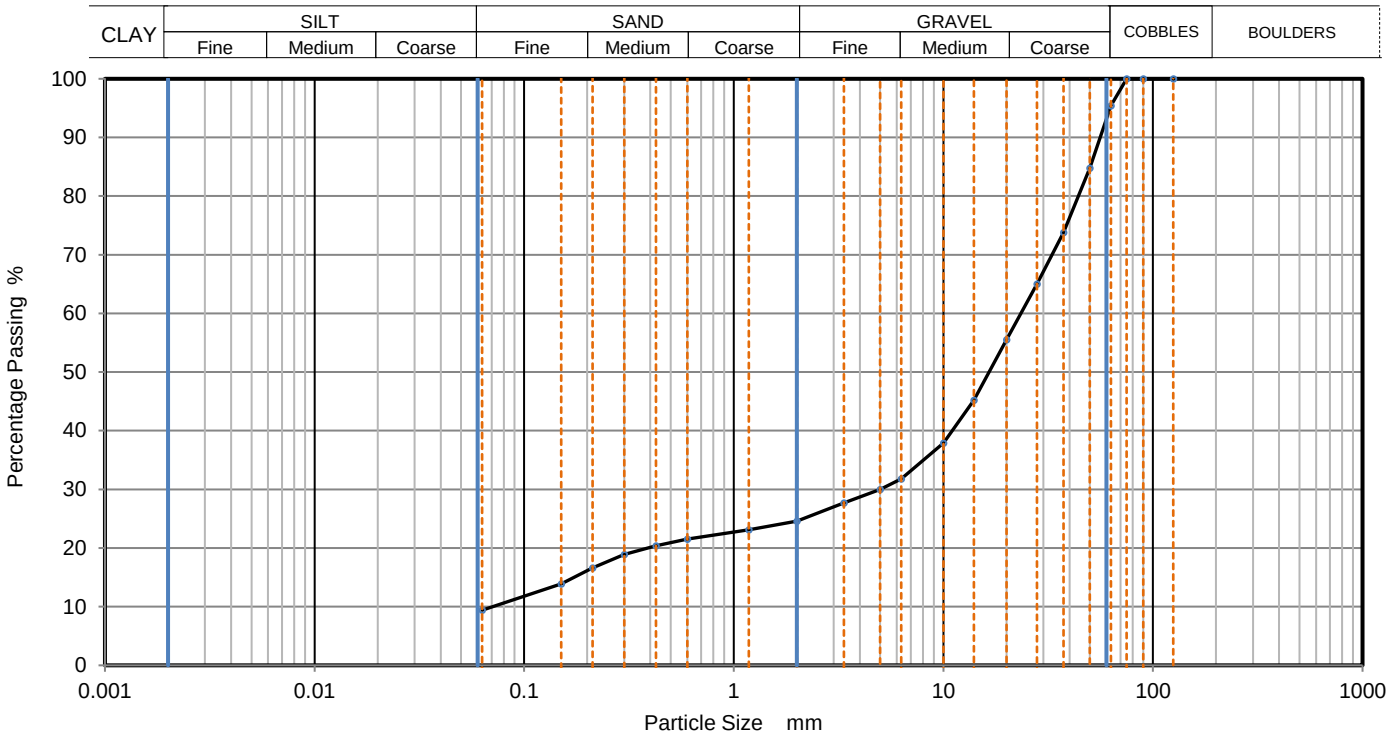
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-12009
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	6
Specimen Description	Greyish brown slightly sandy slightly clayey subangular fine to coarse GRAVEL.			Sample Depth (m) Top	3.40
				Base	4.00
Specimen Reference	3	Specimen Depth	0.25 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022083114



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	95		
50	85		
37.5	74		
28	65		
20	56		
14	45		
10	38		
6.3	32		
5	30		
3.35	28		
2	25		
1.18	23		
0.6	22		
0.425	20		
0.3	19		
0.212	17		
0.15	14		
0.063	9		

Dry Mass of sample, g: 16226

Sample Proportions	% dry mass
Cobbles	4.6
Gravel	70.7
Sand	15.2
Fines <0.063mm	9.0

Grading Analysis		
D100	mm	
D60	mm	23.5
D30	mm	4.97
D10	mm	0.0702
Uniformity Coefficient		330
Curvature Coefficient		15

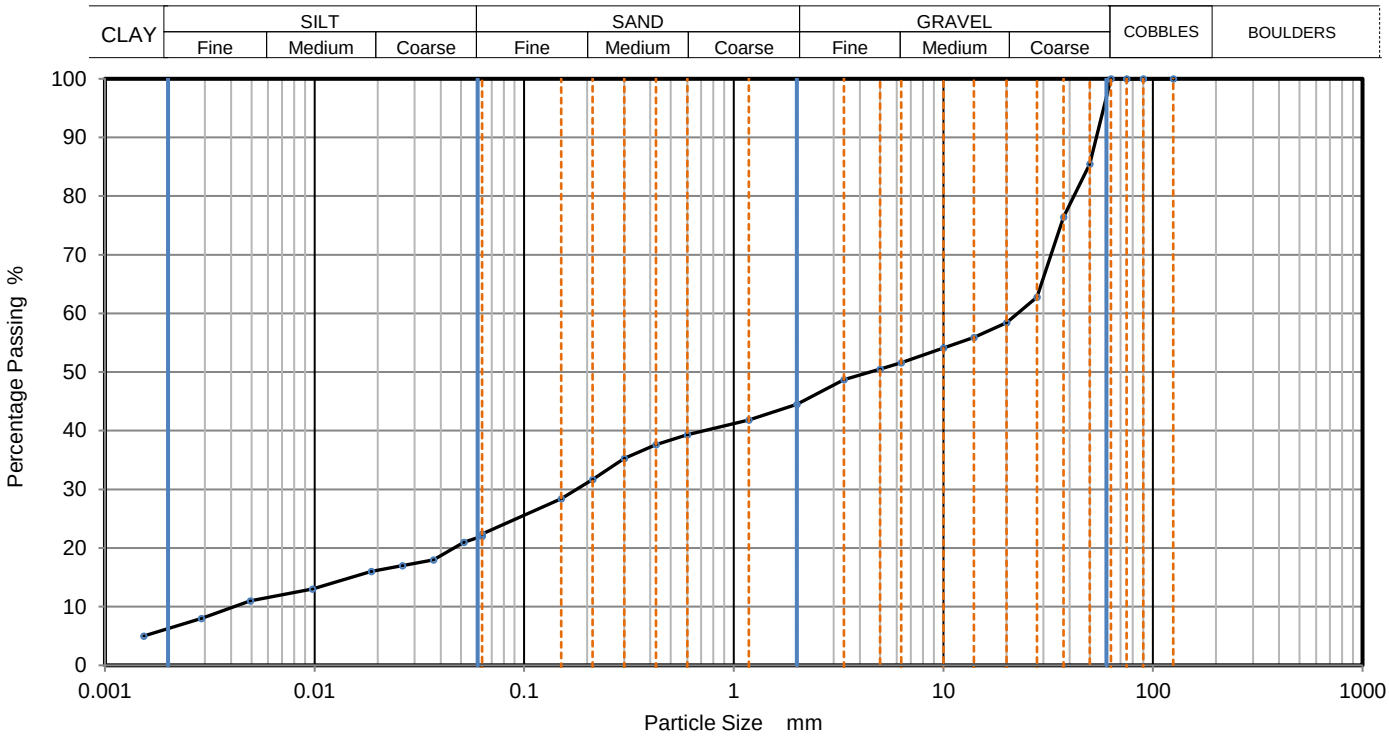
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					BH-12009
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	9
Specimen Description	Greyish brown sandy gravelly silty CLAY.			Sample Depth (m) Top	5.70
				Base	6.50
Specimen Reference	7	Specimen Depth	5.7 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022083115



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	22
90	100	0.05159	21
75	100	0.03692	18
63	100	0.02626	17
50	86	0.01868	16
37.5	76	0.00976	13
28	63	0.00493	11
20	58	0.00288	8
14	56	0.00153	5
10	54		
6.3	52		
5	51		
3.35	49		
2	45		
1.18	42		
0.6	39	Particle density	(assumed)
0.425	38	2.65	Mg/m3
0.3	35		
0.212	32		
0.15	28		
0.063	22		

Dry Mass of sample, g: 15717

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	55.5
Sand	22.1
Silt	16.0
Clay	6.4

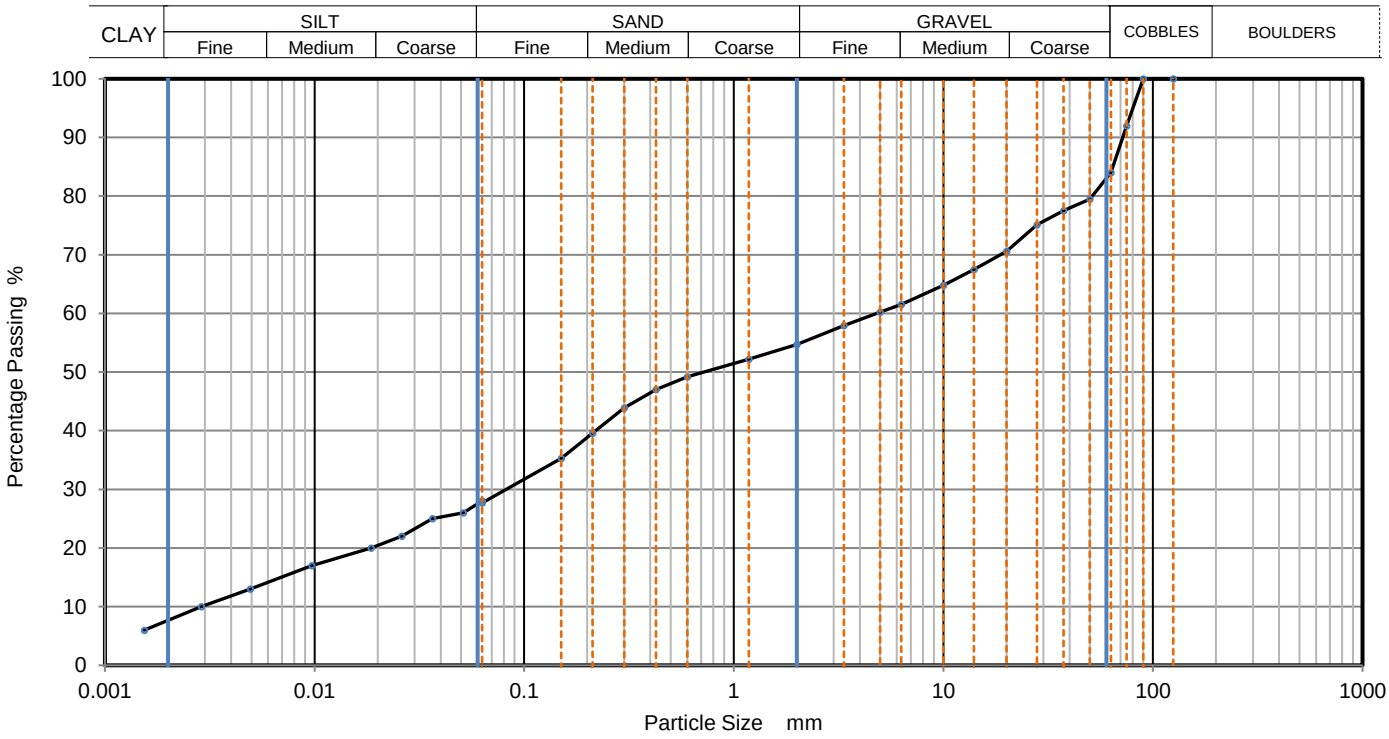
Grading Analysis		
D100	mm	
D60	mm	22.6
D30	mm	0.177
D10	mm	0.00442
Uniformity Coefficient		5100
Curvature Coefficient		0.31

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION			Job Ref		21-1682
				Borehole/Pit No.		BH-12406
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.		3
Specimen Description	Brownish grey sandy clayey subangular fine to coarse GRAVEL with some cobbles.			Sample Depth (m)	Top	1.80
					Base	2.10
Specimen Reference	2	Specimen Depth	1.8 m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID		Caus2022081562



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	28
90	100	0.05129	26
75	92	0.03649	25
63	84	0.02611	22
50	80	0.01857	20
37.5	78	0.00970	17
28	75	0.00493	13
20	71	0.00288	10
14	68	0.00154	6
10	65		
6.3	62		
5	60		
3.35	58		
2	55		
1.18	52		
0.6	49	Particle density	(assumed)
0.425	47	2.65	Mg/m3
0.3	44		
0.212	40		
0.15	35		
0.063	28		

Dry Mass of sample, g: 6627

Sample Proportions	% dry mass
Cobbles	16.0
Gravel	29.3
Sand	27.0
Silt	20.0
Clay	7.7

Grading Analysis		
D100	mm	
D60	mm	4.8
D30	mm	0.0821
D10	mm	0.0028
Uniformity Coefficient		1700
Curvature Coefficient		0.5

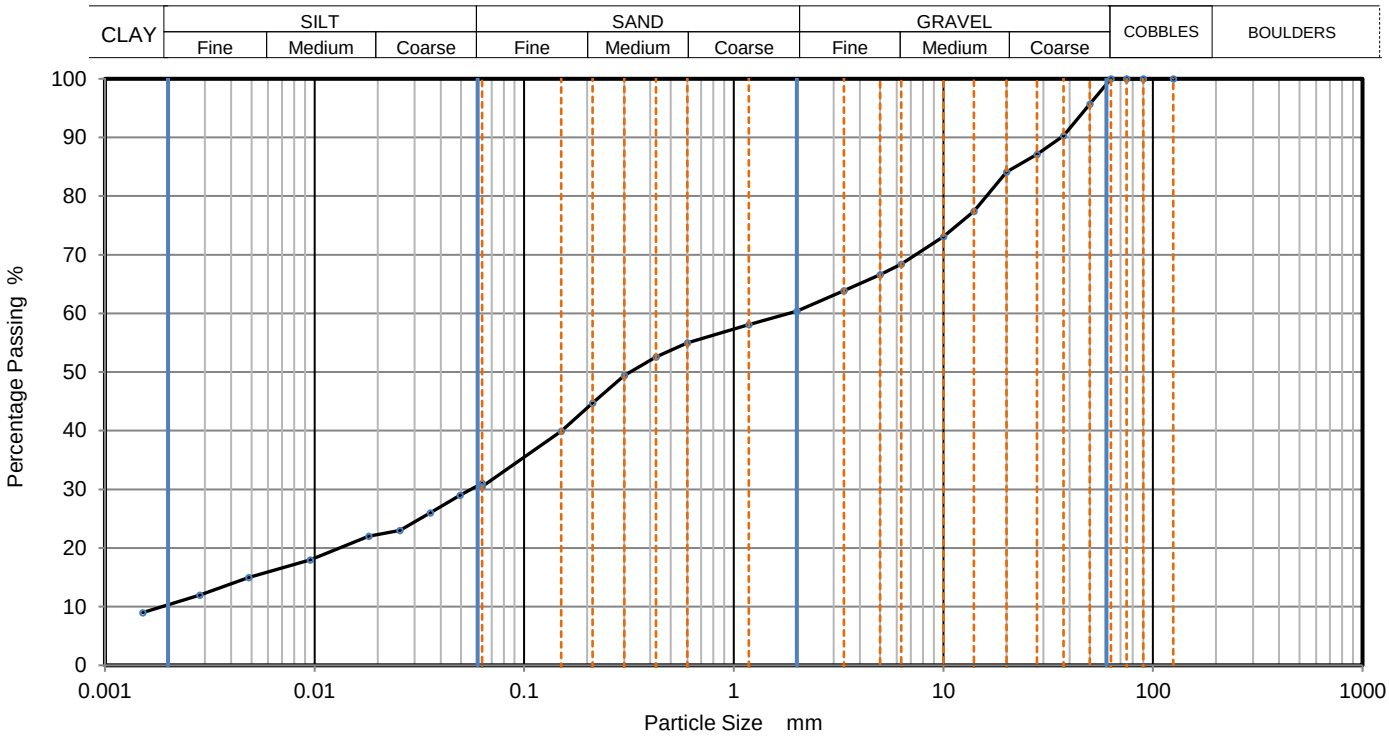
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-12406A
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Purplish brown sandy gravelly silty CLAY.			Sample Depth (m) Top	1.80
				Base	2.10
Specimen Reference	2	Specimen Depth	1.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022081565



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	31
90	100	0.04936	29
75	100	0.03559	26
63	100	0.02549	23
50	96	0.01813	22
37.5	90	0.00953	18
28	87	0.00485	15
20	84	0.00283	12
14	77	0.00152	9
10	73		
6.3	68		
5	67		
3.35	64		
2	60		
1.18	58		
0.6	55	Particle density	(assumed)
0.425	53	2.65	Mg/m3
0.3	49		
0.212	45		
0.15	40		
0.063	31		

Dry Mass of sample, g: 9847

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	39.6
Sand	29.9
Silt	20.3
Clay	10.2

Grading Analysis		
D100	mm	
D60	mm	1.81
D30	mm	0.0569
D10	mm	0.00194
Uniformity Coefficient		930
Curvature Coefficient		0.92

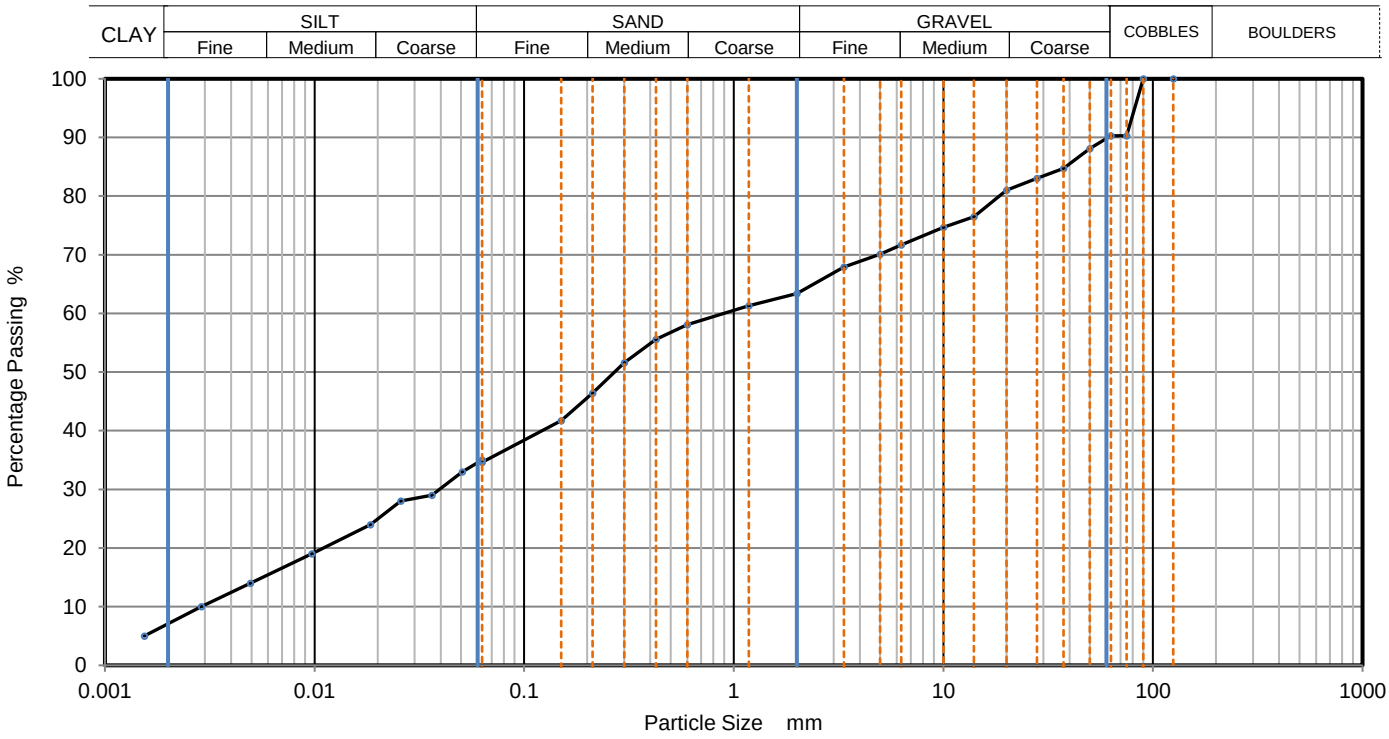
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		BH-12580
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		2
Specimen Description	Greyish brown sandy gravelly silty CLAY.				Sample Depth (m)	Top	0.50
						Base	1.50
Specimen Reference	3	Specimen Depth	0.5	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022083116



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	35
90	100	0.05064	33
75	90	0.03626	29
63	90	0.02580	28
50	88	0.01846	24
37.5	85	0.00970	19
28	83	0.00493	14
20	81	0.00288	10
14	77	0.00154	5
10	75		
6.3	72		
5	70		
3.35	68		
2	63		
1.18	61		
0.6	58	Particle density	(assumed)
0.425	56	2.65	Mg/m3
0.3	52		
0.212	46		
0.15	42		
0.063	35		

Dry Mass of sample, g	10732

Sample Proportions	% dry mass
Cobbles	9.7
Gravel	26.9
Sand	28.8
Silt	27.2
Clay	7.4

Grading Analysis		
D100	mm	
D60	mm	0.898
D30	mm	0.0384
D10	mm	0.00275
Uniformity Coefficient		330
Curvature Coefficient		0.6

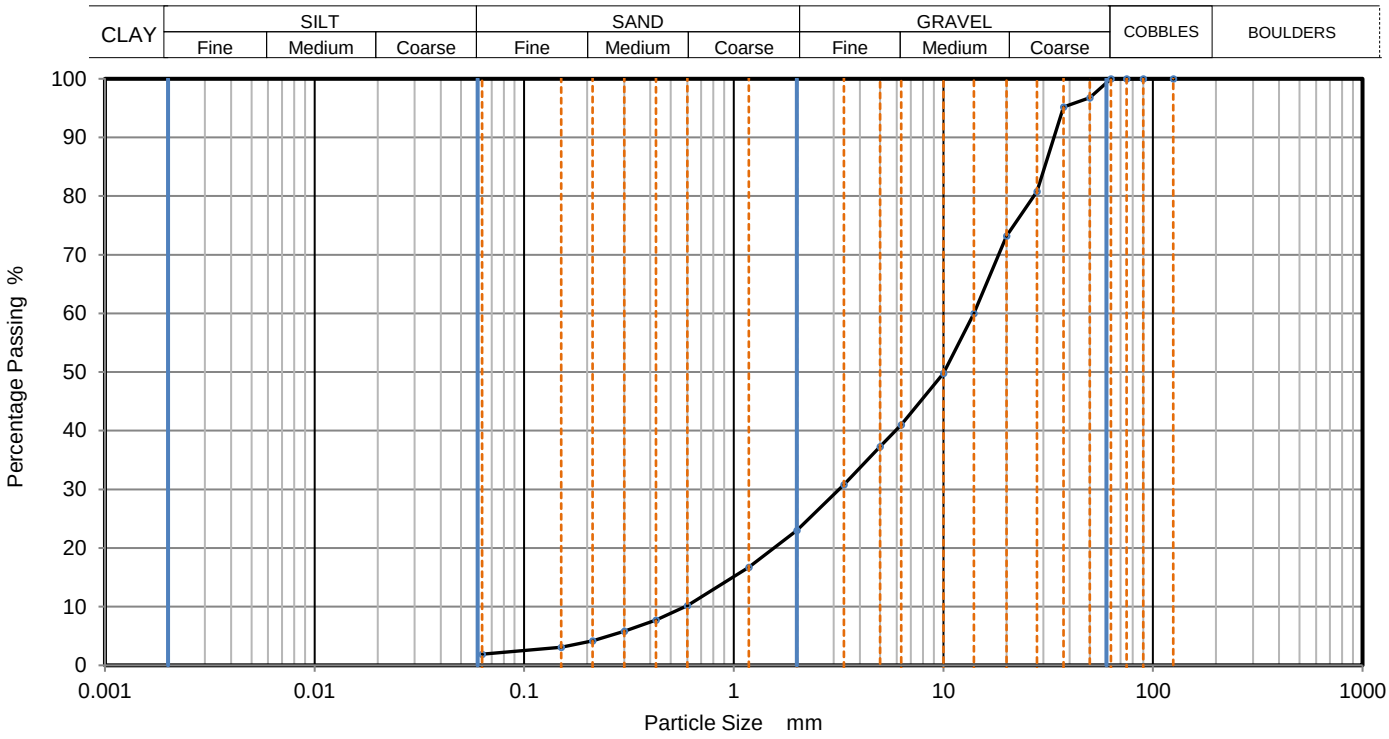
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					BH-12580
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	6
Specimen Description	Greyish brown sandy subangular fine to coarse GRAVEL.			Sample Depth (m) Top	4.00
				Base	4.30
Specimen Reference	3	Specimen Depth	4 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022083120



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	97		
37.5	95		
28	81		
20	73		
14	60		
10	50		
6.3	41		
5	37		
3.35	31		
2	23		
1.18	17		
0.6	10		
0.425	8		
0.3	6		
0.212	4		
0.15	3		
0.063	2		

Dry Mass of sample, g: 6392

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	77.0
Sand	21.1
Fines <0.063mm	2.0

Grading Analysis		
D100	mm	
D60	mm	14
D30	mm	3.17
D10	mm	0.584
Uniformity Coefficient		24
Curvature Coefficient		1.2

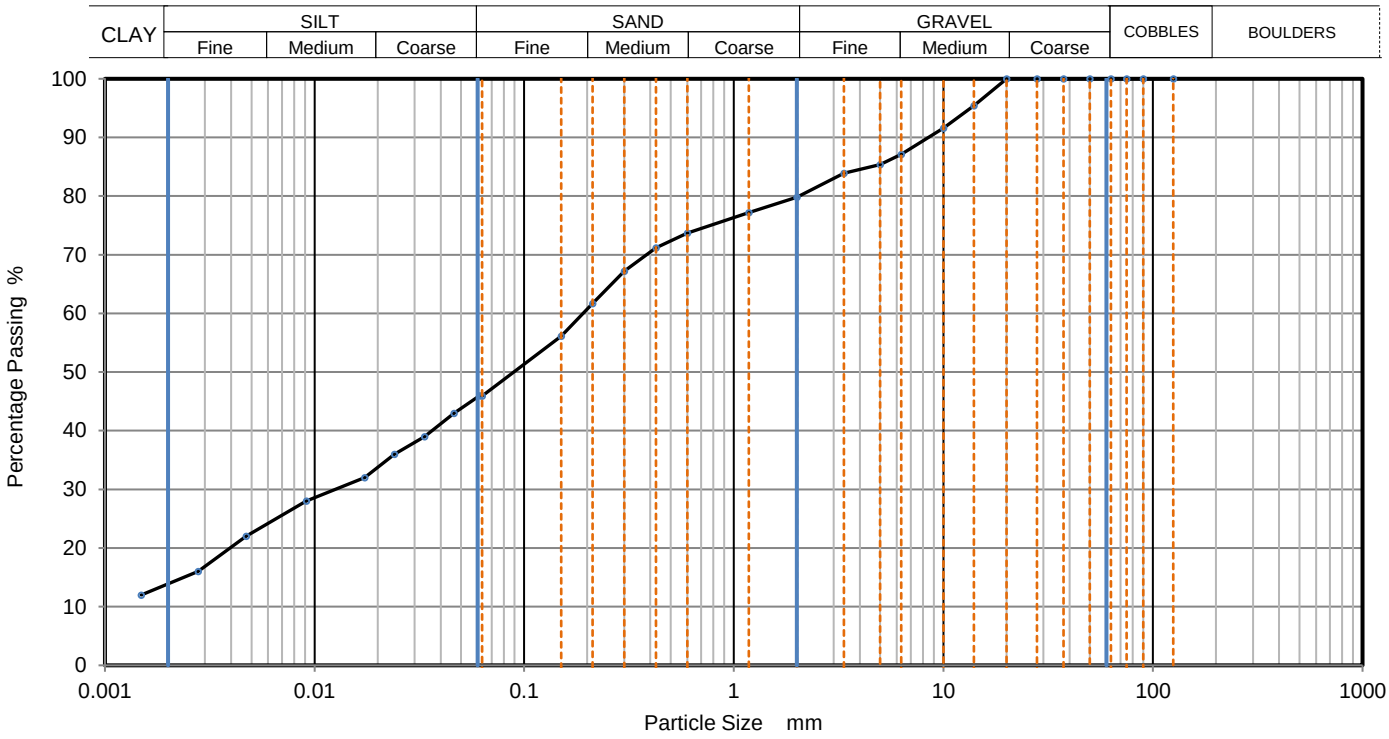
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					BH-12608
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Greyish brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	0.80
				Base	1.10
Specimen Reference	3	Specimen Depth	0.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022083121



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06134	46
90	100	0.04631	43
75	100	0.03348	39
63	100	0.02401	36
50	100	0.01733	32
37.5	100	0.00913	28
28	100	0.00471	22
20	100	0.00278	16
14	95	0.00149	12
10	92		
6.3	87		
5	85		
3.35	84		
2	80		
1.18	77		
0.6	74	Particle density	(assumed)
0.425	71	2.65	Mg/m3
0.3	67		
0.212	62		
0.15	56		
0.063	46		

Dry Mass of sample, g: 561

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	20.2
Sand	33.9
Silt	31.8
Clay	14.1

Grading Analysis		
D100	mm	
D60	mm	0.191
D30	mm	0.0119
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

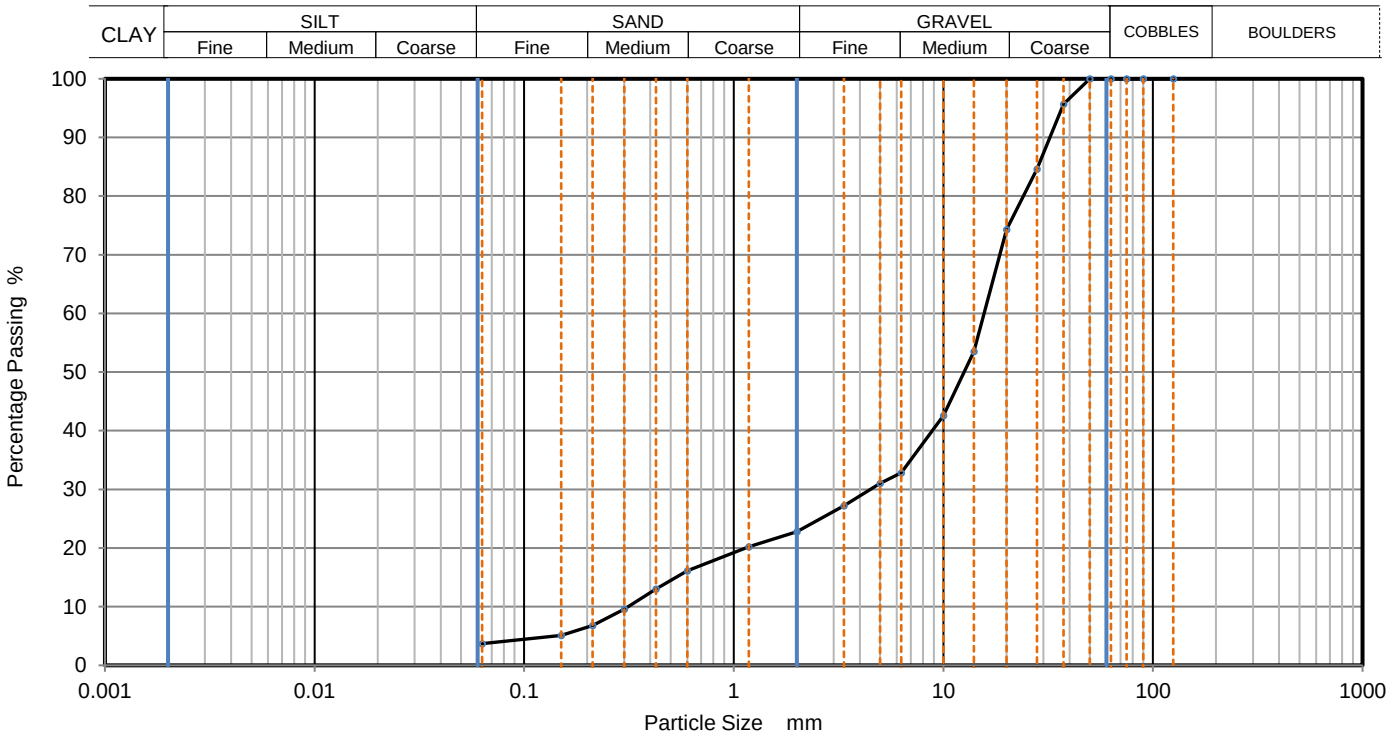
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-12608
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	5
Specimen Description	Greyish brown slightly sandy subangular fine to coarse GRAVEL.			Sample Depth (m) Top	3.80
				Base	4.10
Specimen Reference	3	Specimen Depth	3.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022083125



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	96		
28	85		
20	74		
14	54		
10	43		
6.3	33		
5	31		
3.35	27		
2	23		
1.18	20		
0.6	16		
0.425	13		
0.3	10		
0.212	7		
0.15	5		
0.063	4		

Dry Mass of sample, g: 8029

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	77.2
Sand	19.2
Fines <0.063mm	4.0

Grading Analysis		
D100	mm	
D60	mm	15.7
D30	mm	4.5
D10	mm	0.313
Uniformity Coefficient		50
Curvature Coefficient		4.1

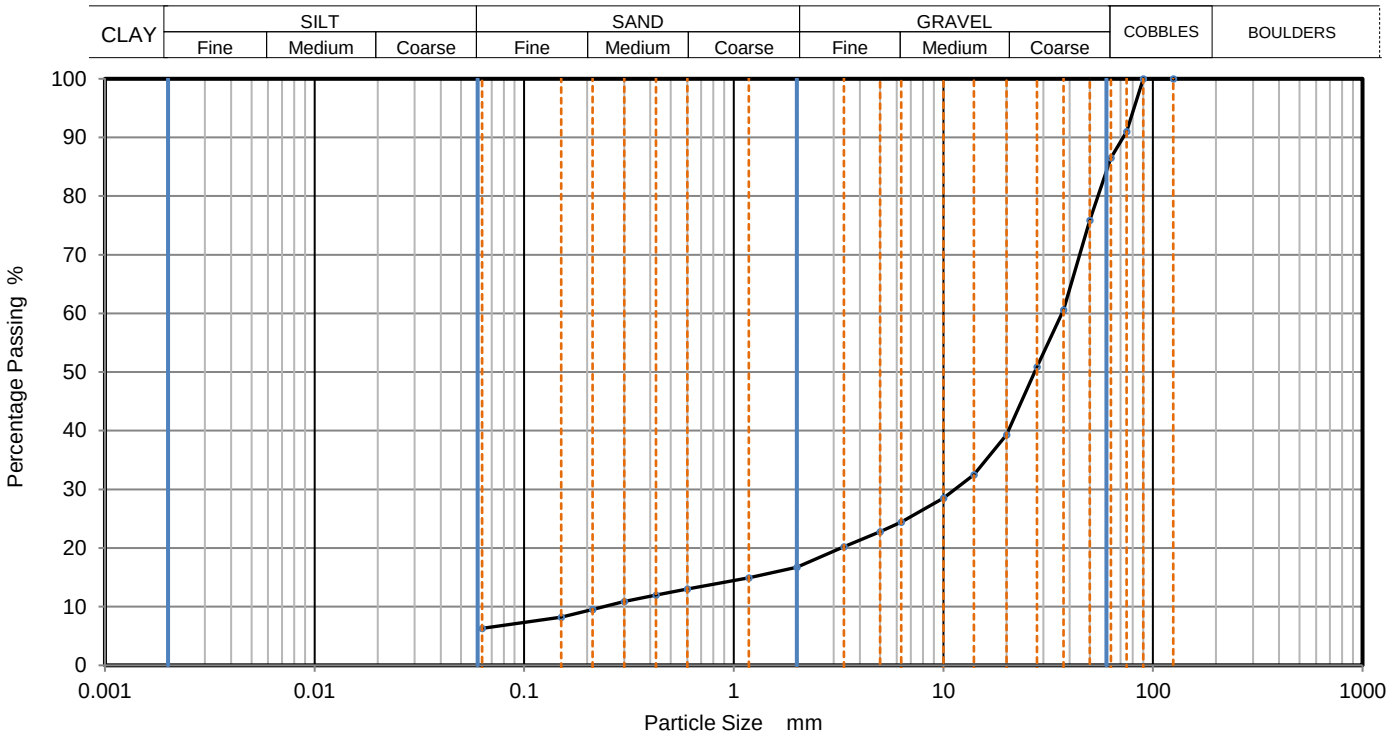
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-12608
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	14
Specimen Description	Greyish brown slightly sandy subangular fine to coarse GRAVEL.			Sample Depth (m) Top	5.80
				Base	6.10
Specimen Reference	5	Specimen Depth	5.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022083127



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	91		
63	87		
50	76		
37.5	61		
28	51		
20	39		
14	33		
10	29		
6.3	24		
5	23		
3.35	20		
2	17		
1.18	15		
0.6	13		
0.425	12		
0.3	11		
0.212	10		
0.15	8		
0.063	6		

Dry Mass of sample, g: 11581

Sample Proportions	% dry mass
Cobbles	13.5
Gravel	69.9
Sand	10.4
Fines <0.063mm	6.0

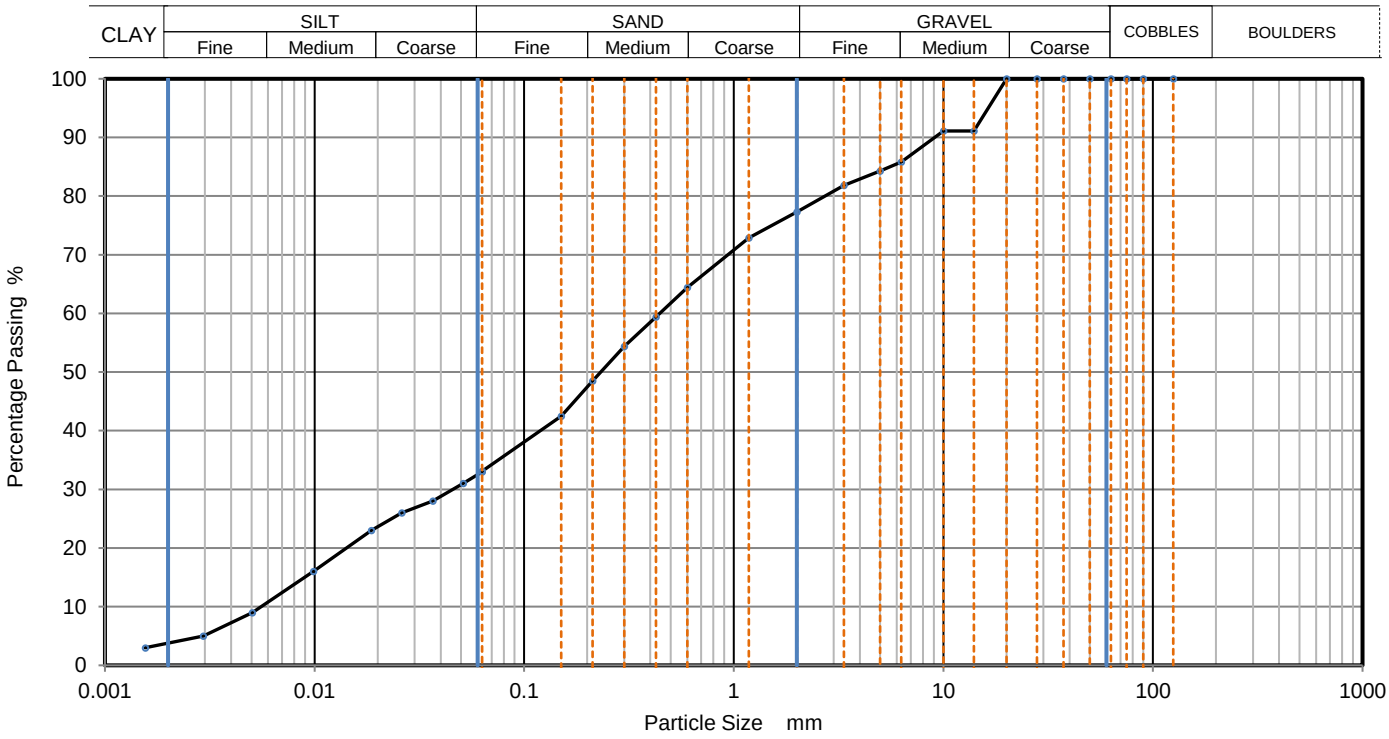
Grading Analysis		
D100	mm	
D60	mm	36.8
D30	mm	11.4
D10	mm	0.243
Uniformity Coefficient		150
Curvature Coefficient		14

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-12658
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	4
Specimen Description	Brownish grey sandy slightly gravelly clayey SILT.			Sample Depth (m) Top	0.80
				Base	1.10
Specimen Reference	4	Specimen Depth	0.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus202208156



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	33
90	100	0.05129	31
75	100	0.03671	28
63	100	0.02611	26
50	100	0.01868	23
37.5	100	0.00987	16
28	100	0.00504	9
20	100	0.00294	5
14	91	0.00156	3
10	91		
6.3	86		
5	84		
3.35	82		
2	77		
1.18	73		
0.6	64	Particle density	(assumed)
0.425	59	2.65	Mg/m3
0.3	54		
0.212	49		
0.15	43		
0.063	33		

Dry Mass of sample, g: 228

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	22.7
Sand	44.3
Silt	28.8
Clay	4.2

Grading Analysis		
D100	mm	
D60	mm	0.442
D30	mm	0.045
D10	mm	0.00571
Uniformity Coefficient		77
Curvature Coefficient		0.8

Remarks

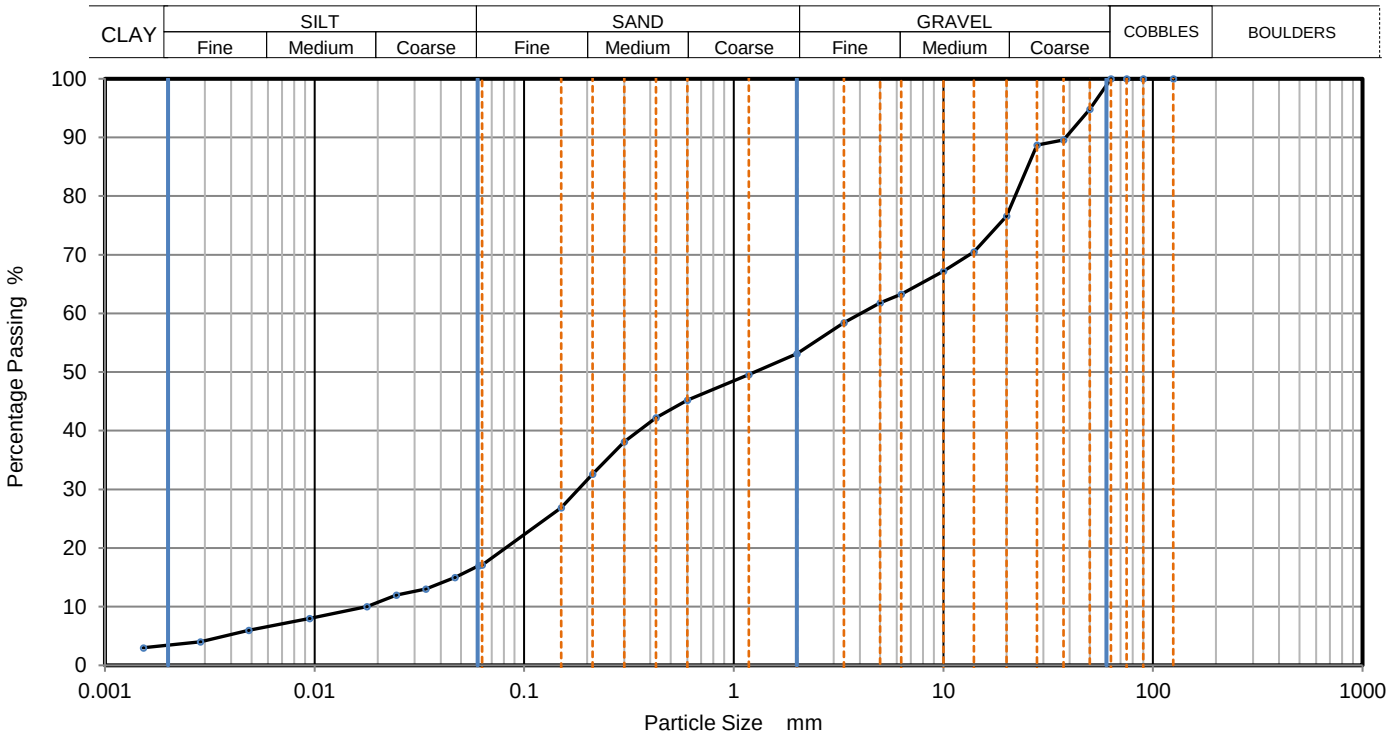
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-12658
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	7
Specimen Description	Brownish grey gravelly silty fine to coarse SAND.			Sample Depth (m) Top	3.80
				Base	4.10
Specimen Reference	2	Specimen Depth	3.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus202208158



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06087	17
90	100	0.04667	15
75	100	0.03397	13
63	100	0.02452	12
50	95	0.01780	10
37.5	90	0.00948	8
28	89	0.00485	6
20	77	0.00285	4
14	71	0.00152	3
10	67		
6.3	63		
5	62		
3.35	58		
2	53		
1.18	50		
0.6	45	Particle density	(assumed)
0.425	42	2.65	Mg/m3
0.3	38		
0.212	33		
0.15	27		
0.063	17		

Dry Mass of sample, g: 4159

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	46.9
Sand	36.0
Silt	13.6
Clay	3.5

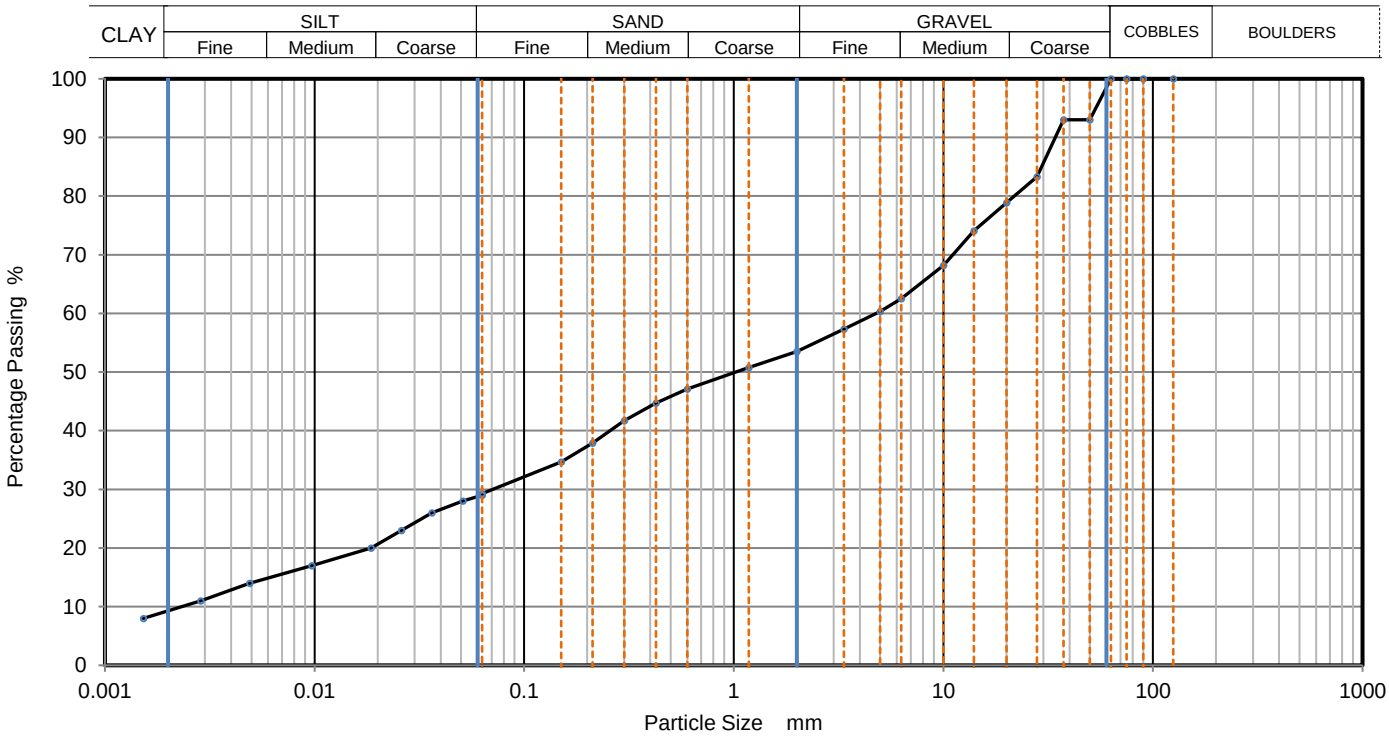
Grading Analysis		
D100	mm	
D60	mm	4.06
D30	mm	0.181
D10	mm	0.0179
Uniformity Coefficient		230
Curvature Coefficient		0.45

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		BH-13100
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		2
Specimen Description	Brownish grey sandy gravelly silty CLAY.				Sample Depth (m)	Top	5.50
						Base	5.90
Specimen Reference	6	Specimen Depth	5.5	m	Sample Type		C
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus202210204



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	29
90	100	0.05096	28
75	100	0.03626	26
63	100	0.02595	23
50	93	0.01857	20
37.5	93	0.00970	17
28	83	0.00491	14
20	79	0.00286	11
14	74	0.00152	8
10	68		
6.3	63		
5	60		
3.35	57		
2	54		
1.18	51		
0.6	47	Particle density	(assumed)
0.425	45	2.65	Mg/m3
0.3	42		
0.212	38		
0.15	35		
0.063	29		

Dry Mass of sample, g: 3714

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	46.5
Sand	24.2
Silt	20.3
Clay	9.0

Grading Analysis		
D100	mm	
D60	mm	4.82
D30	mm	0.0705
D10	mm	0.00243
Uniformity Coefficient		2000
Curvature Coefficient		0.42

Remarks

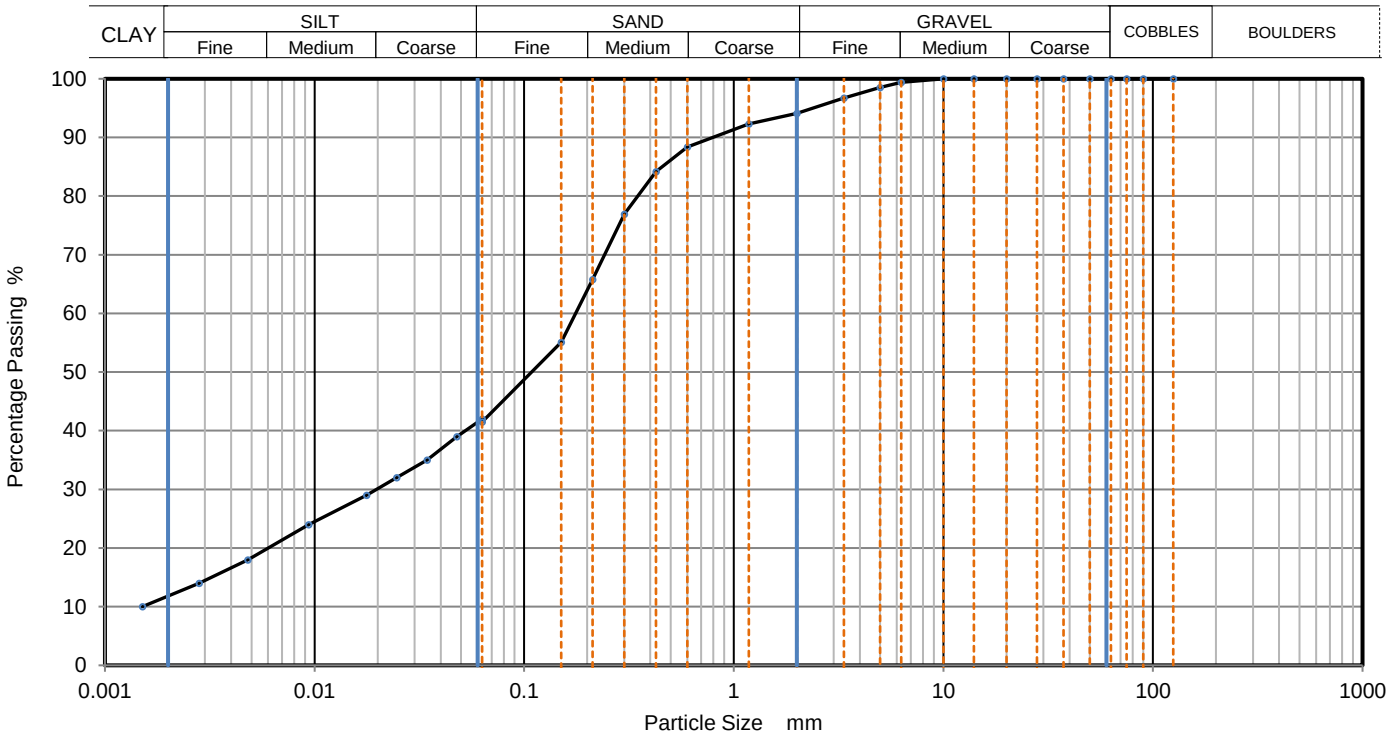
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					BH-13431
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	5
Specimen Description	Greyish brown slightly gravelly clayey fine to coarse SAND.			Sample Depth (m) Top	0.40
				Base	0.90
Specimen Reference	7	Specimen Depth	0.4 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022083129



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	42
90	100	0.04769	39
75	100	0.03443	35
63	100	0.02468	32
50	100	0.01768	29
37.5	100	0.00936	24
28	100	0.00479	18
20	100	0.00282	14
14	100	0.00151	10
10	100		
6.3	99		
5	99		
3.35	97		
2	94		
1.18	92		
0.6	88	Particle density	(assumed)
0.425	84	2.65	Mg/m3
0.3	77		
0.212	66		
0.15	55		
0.063	42		

Dry Mass of sample, g: 355

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	5.9
Sand	52.6
Silt	29.9
Clay	11.6

Grading Analysis		
D100	mm	
D60	mm	0.176
D30	mm	0.0198
D10	mm	0.00158
Uniformity Coefficient		110
Curvature Coefficient		1.4

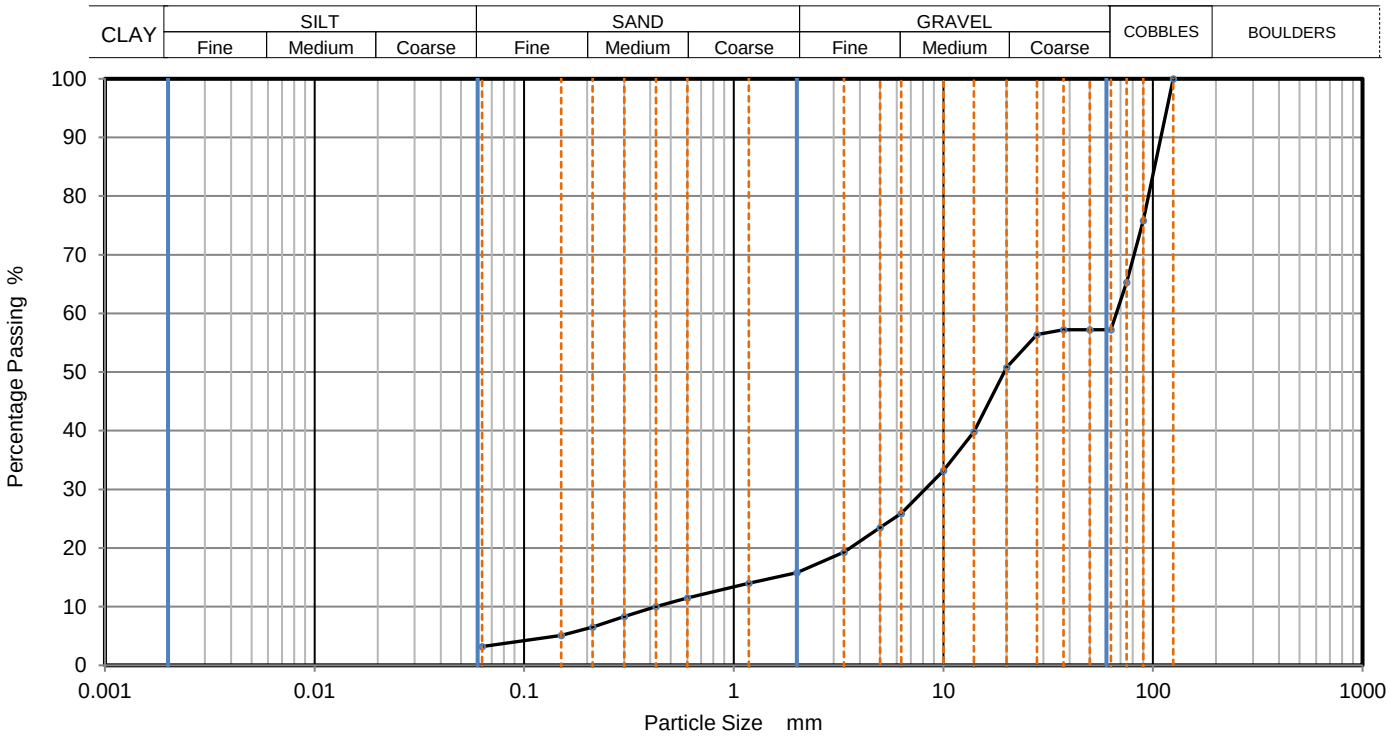
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-13431
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	7
Specimen Description	Greyish brown slightly sandy slightly clayey subangular fine to coarse GRAVEL with cobbles.			Sample Depth (m) Top	2.00
				Base	3.00
Specimen Reference	3	Specimen Depth	2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022083130



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	76		
75	65		
63	57		
50	57		
37.5	57		
28	56		
20	51		
14	40		
10	33		
6.3	26		
5	24		
3.35	19		
2	16		
1.18	14		
0.6	12		
0.425	10		
0.3	8		
0.212	7		
0.15	5		
0.063	3		

Dry Mass of sample, g	7438

Sample Proportions	% dry mass
Cobbles	42.8
Gravel	41.5
Sand	12.6
Fines <0.063mm	3.0

Grading Analysis		
D100	mm	125
D60	mm	66.8
D30	mm	8.17
D10	mm	0.426
Uniformity Coefficient		160
Curvature Coefficient		2.3

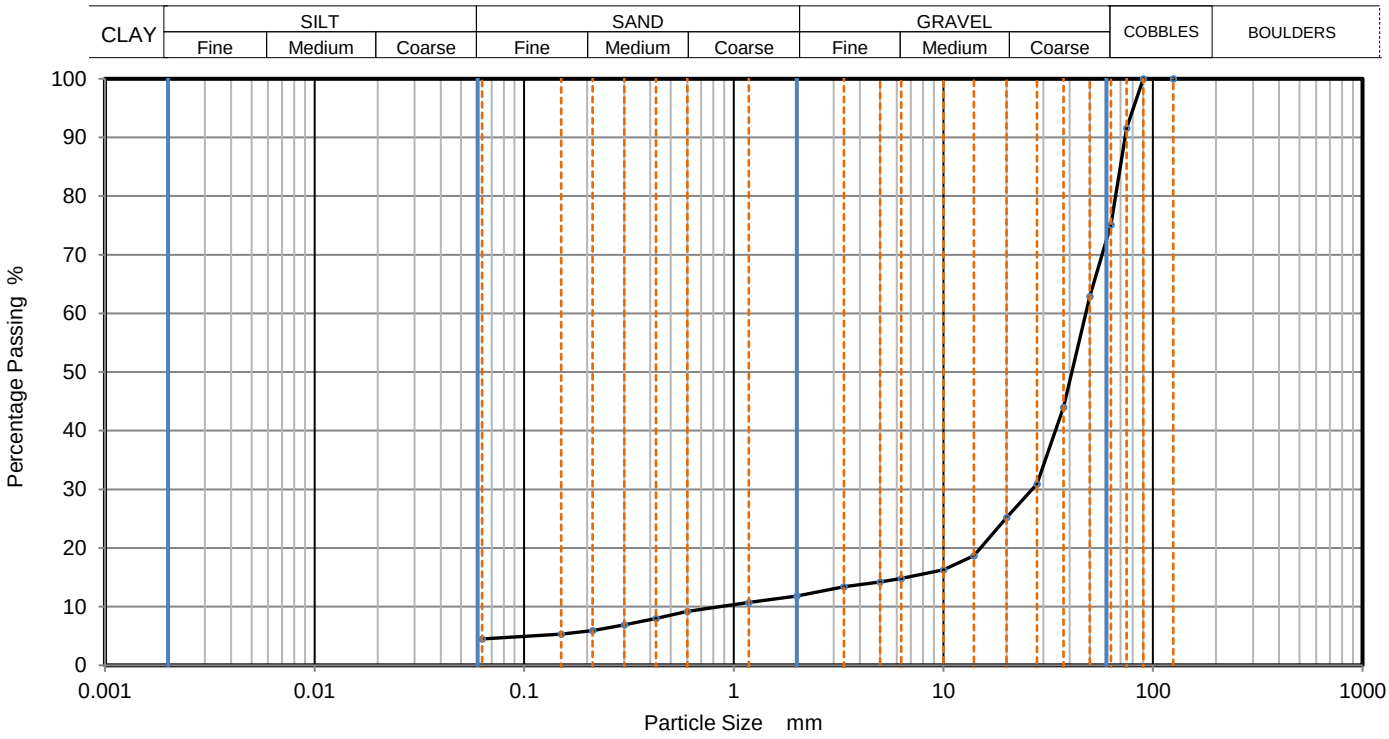
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-13431
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	9
Specimen Description	Greyish brown slightly sandy subangular fine to coarse GRAVEL with cobbles.			Sample Depth (m) Top	3.90
				Base	4.40
Specimen Reference	3	Specimen Depth	3.9 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022083132



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	92		
63	75		
50	63		
37.5	44		
28	31		
20	25		
14	19		
10	16		
6.3	15		
5	14		
3.35	13		
2	12		
1.18	11		
0.6	9		
0.425	8		
0.3	7		
0.212	6		
0.15	5		
0.063	5		

Dry Mass of sample, g: 10889

Sample Proportions	% dry mass
Cobbles	24.9
Gravel	63.2
Sand	7.4
Fines <0.063mm	4.0

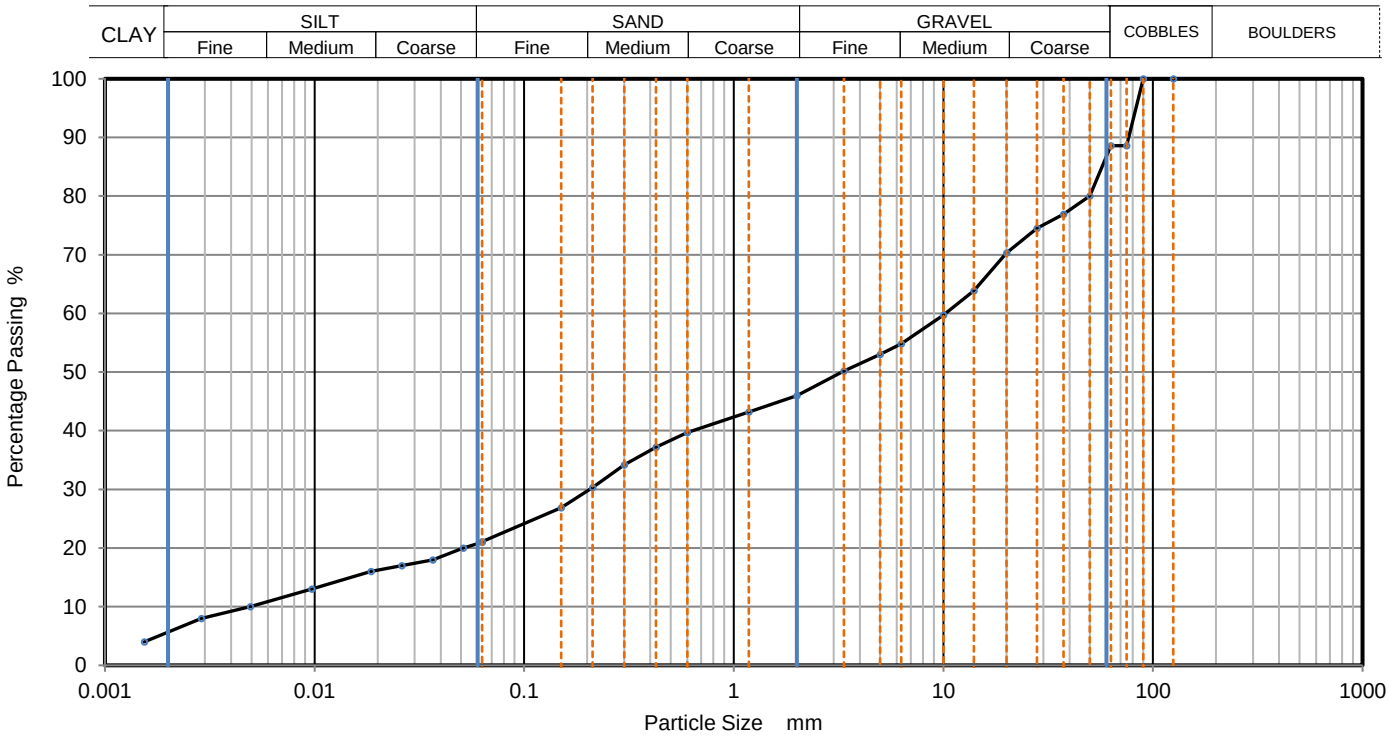
Grading Analysis		
D100	mm	
D60	mm	47.8
D30	mm	26.5
D10	mm	0.873
Uniformity Coefficient		55
Curvature Coefficient		17

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-13990
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brown sandy gravelly silty CLAY.			Sample Depth (m) Top	1.20
				Base	2.00
Specimen Reference	2	Specimen Depth	1.2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022090899



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	21
90	100	0.05129	20
75	89	0.03671	18
63	89	0.02611	17
50	80	0.01857	16
37.5	77	0.00970	13
28	75	0.00493	10
20	70	0.00288	8
14	64	0.00154	4
10	60		
6.3	55		
5	53		
3.35	50		
2	46		
1.18	43		
0.6	40	Particle density	(assumed)
0.425	37	2.65	Mg/m3
0.3	34		
0.212	30		
0.15	27		
0.063	21		

Dry Mass of sample, g: 7790

Sample Proportions	% dry mass
Cobbles	11.4
Gravel	42.7
Sand	24.9
Silt	15.2
Clay	5.8

Grading Analysis		
D100	mm	
D60	mm	10.3
D30	mm	0.206
D10	mm	0.00494
Uniformity Coefficient		2100
Curvature Coefficient		0.84

Remarks

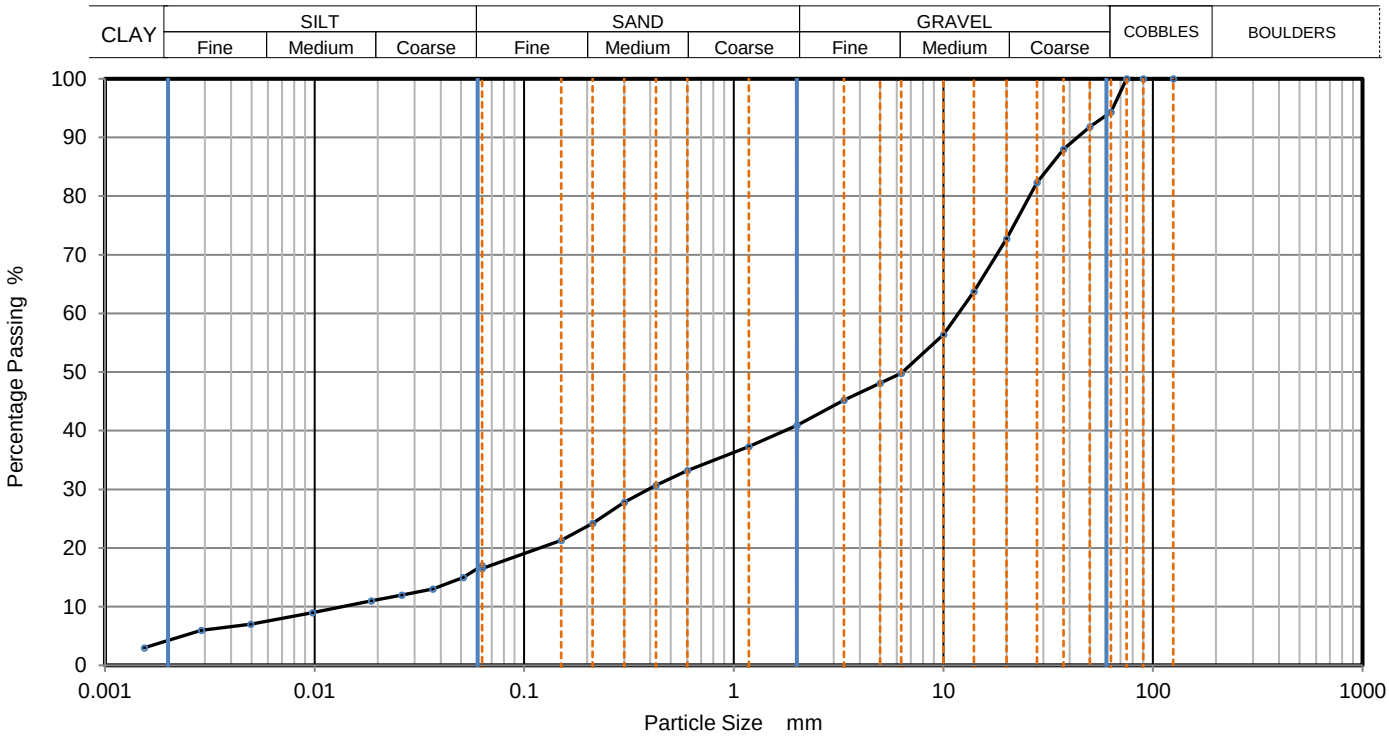
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-13990
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	4
Specimen Description	Brown sandy gravelly silty CLAY.			Sample Depth (m) Top	3.00
				Base	4.00
Specimen Reference	4	Specimen Depth	3 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220908101



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	17
90	100	0.05129	15
75	100	0.03671	13
63	94	0.02611	12
50	92	0.01868	11
37.5	88	0.00976	9
28	82	0.00496	7
20	73	0.00288	6
14	64	0.00154	3
10	56		
6.3	50		
5	48		
3.35	45		
2	41		
1.18	37		
0.6	33	Particle density	(assumed)
0.425	31	2.65	Mg/m3
0.3	28		
0.212	24		
0.15	21		
0.063	17		

Dry Mass of sample, g: 9372

Sample Proportions	% dry mass
Cobbles	5.7
Gravel	53.4
Sand	24.3
Silt	12.3
Clay	4.3

Grading Analysis		
D100	mm	
D60	mm	11.8
D30	mm	0.392
D10	mm	0.014
Uniformity Coefficient		840
Curvature Coefficient		0.92

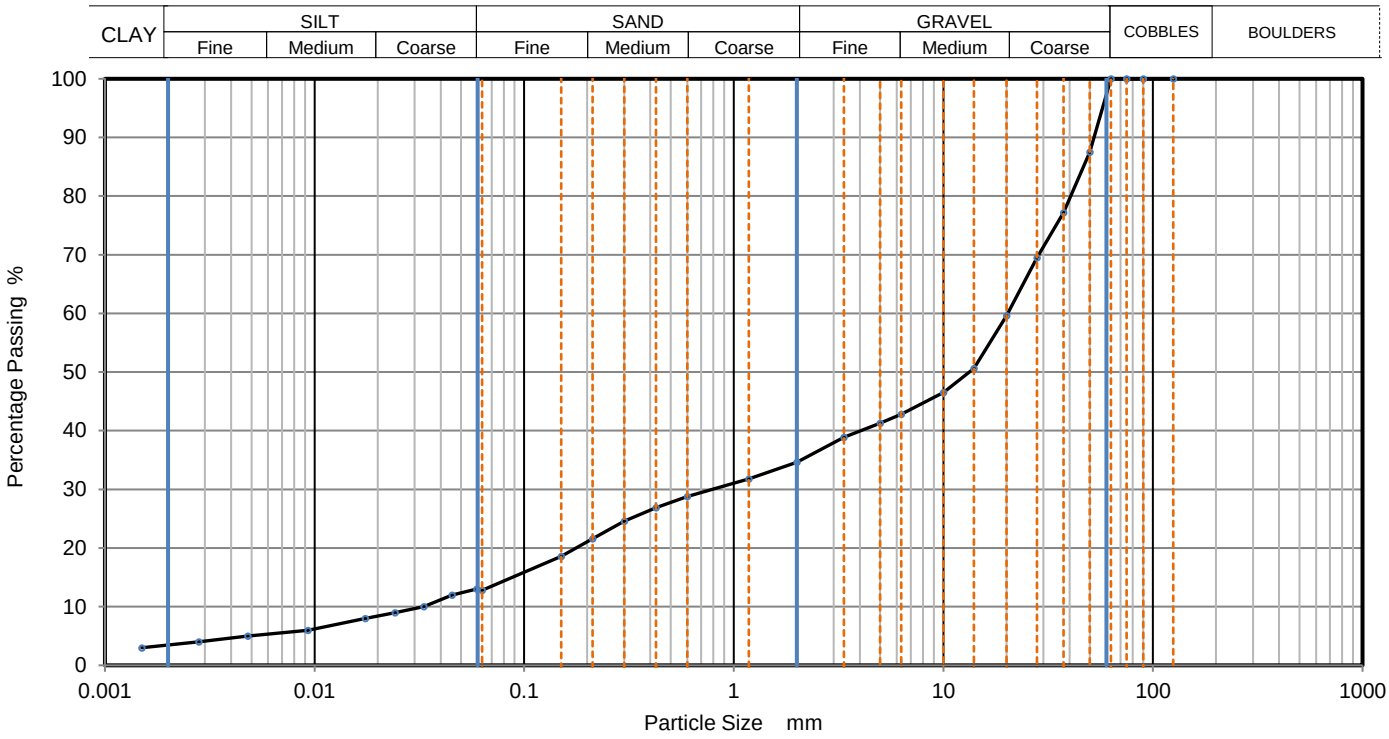
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-13990
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	6
Specimen Description	Brown sandy gravelly silty CLAY.			Sample Depth (m) Top	5.00
				Base	6.00
Specimen Reference	4	Specimen Depth	5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220908102



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.05942	13
90	100	0.04526	12
75	100	0.03324	10
63	100	0.02418	9
50	88	0.01745	8
37.5	77	0.00931	6
28	70	0.00480	5
20	60	0.00280	4
14	51	0.00150	3
10	47		
6.3	43		
5	41		
3.35	39		
2	35		
1.18	32		
0.6	29	Particle density	(assumed)
0.425	27	2.65	Mg/m3
0.3	25		
0.212	22		
0.15	19		
0.063	13		

Dry Mass of sample, g: 17624

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	65.4
Sand	21.8
Silt	9.4
Clay	3.4

Grading Analysis		
D100	mm	
D60	mm	20.3
D30	mm	0.787
D10	mm	0.0319
Uniformity Coefficient		640
Curvature Coefficient		0.96

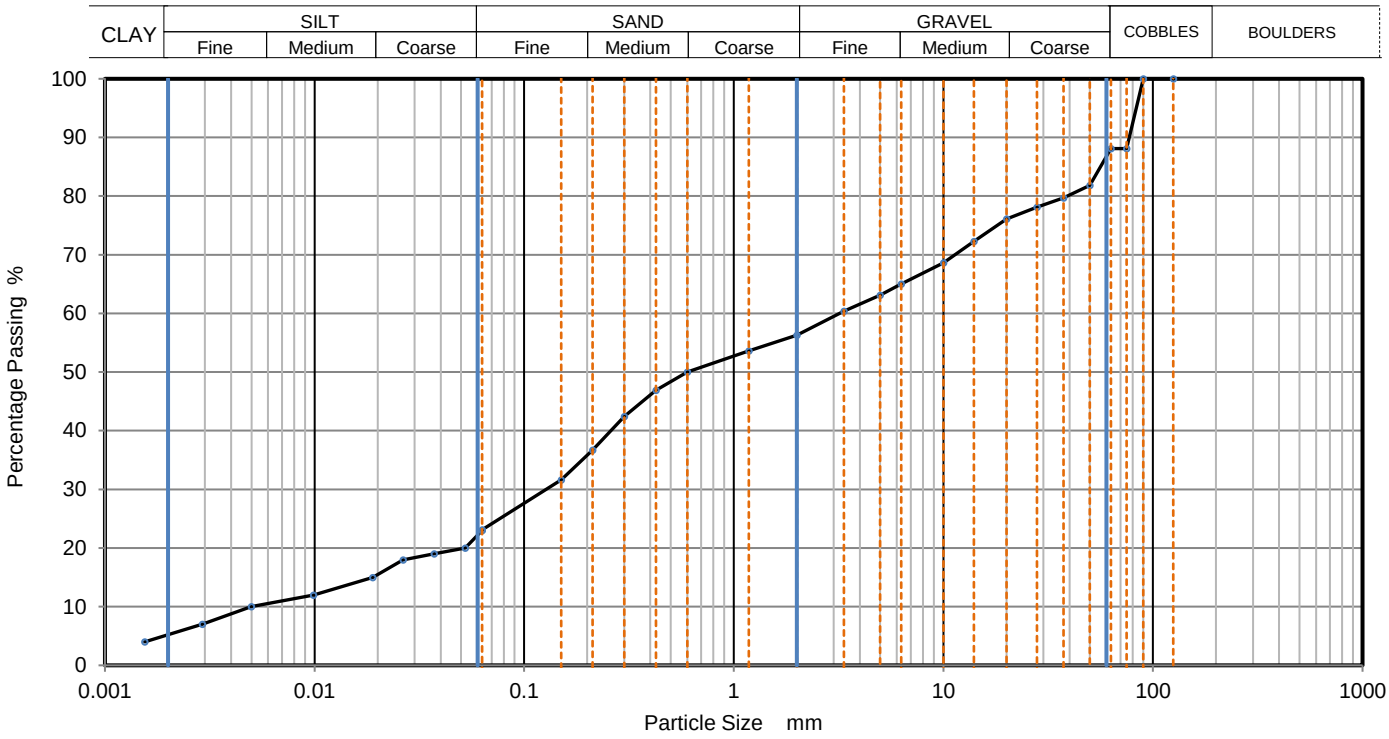
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-14170
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brown sandy gravelly silty CLAY.			Sample Depth (m) Top	1.20
				Base	2.80
Specimen Reference	2	Specimen Depth	1.2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220908103



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	23
90	100	0.05222	20
75	88	0.03715	19
63	88	0.02642	18
50	82	0.01890	15
37.5	80	0.00987	12
28	78	0.00499	10
20	76	0.00291	7
14	72	0.00155	4
10	69		
6.3	65		
5	63		
3.35	60		
2	56		
1.18	54		
0.6	50	Particle density	(assumed)
0.425	47	2.65	Mg/m3
0.3	42		
0.212	37		
0.15	32		
0.063	23		

Dry Mass of sample, g: 11151

Sample Proportions	% dry mass
Cobbles	11.9
Gravel	31.8
Sand	33.1
Silt	18.0
Clay	5.2

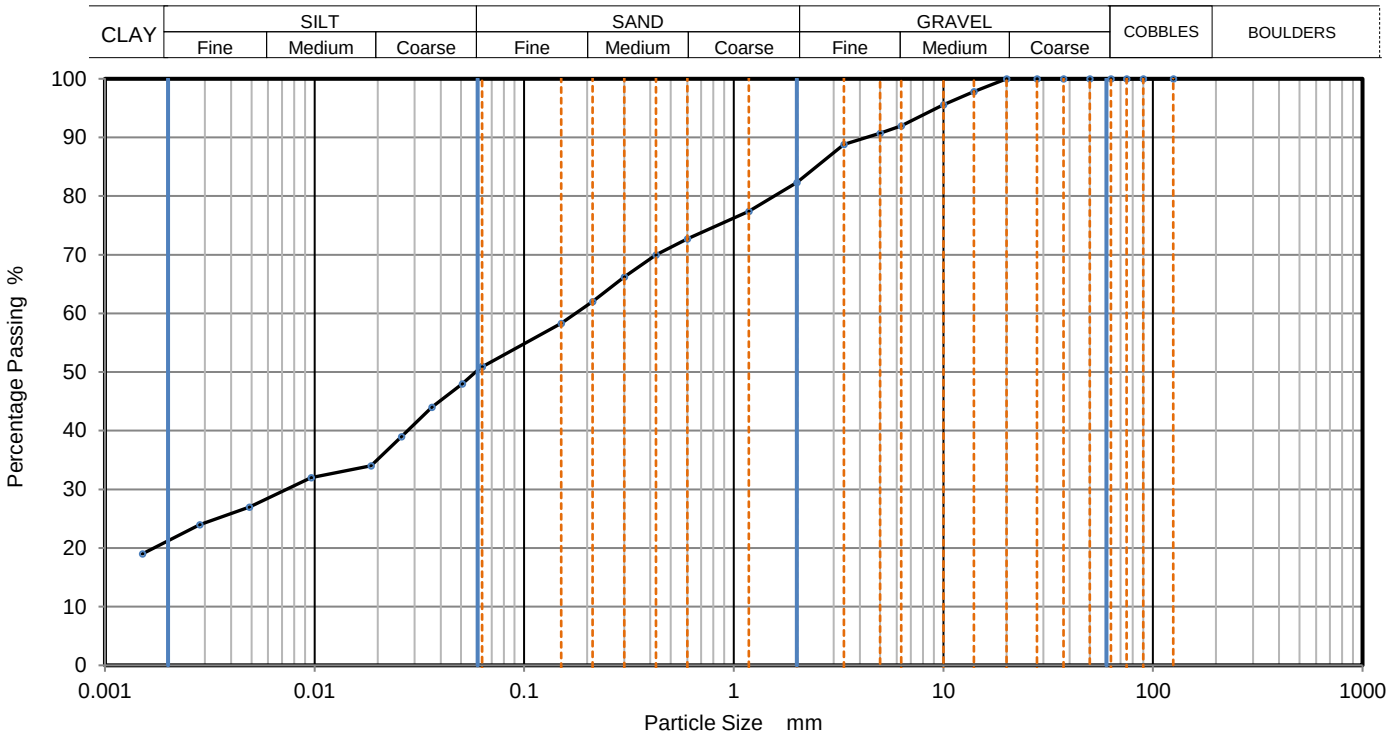
Grading Analysis		
D100	mm	
D60	mm	3.2
D30	mm	0.127
D10	mm	0.00564
Uniformity Coefficient		570
Curvature Coefficient		0.9

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		BH-14170
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		3
Specimen Description	Brown sandy slightly gravelly silty CLAY.				Sample Depth (m)	Top	2.80
						Base	4.00
Specimen Reference	2	Specimen Depth	2.8	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus20220908107



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	51
90	100	0.05065	48
75	100	0.03627	44
63	100	0.02596	39
50	100	0.01857	34
37.5	100	0.00965	32
28	100	0.00488	27
20	100	0.00283	24
14	98	0.00151	19
10	96		
6.3	92		
5	91		
3.35	89		
2	82		
1.18	77		
0.6	73	Particle density	(assumed)
0.425	70	2.65	Mg/m3
0.3	66		
0.212	62		
0.15	58		
0.063	51		

Dry Mass of sample, g: 483

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	17.7
Sand	31.4
Silt	29.3
Clay	21.6

Grading Analysis		
D100	mm	
D60	mm	0.176
D30	mm	0.0078
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

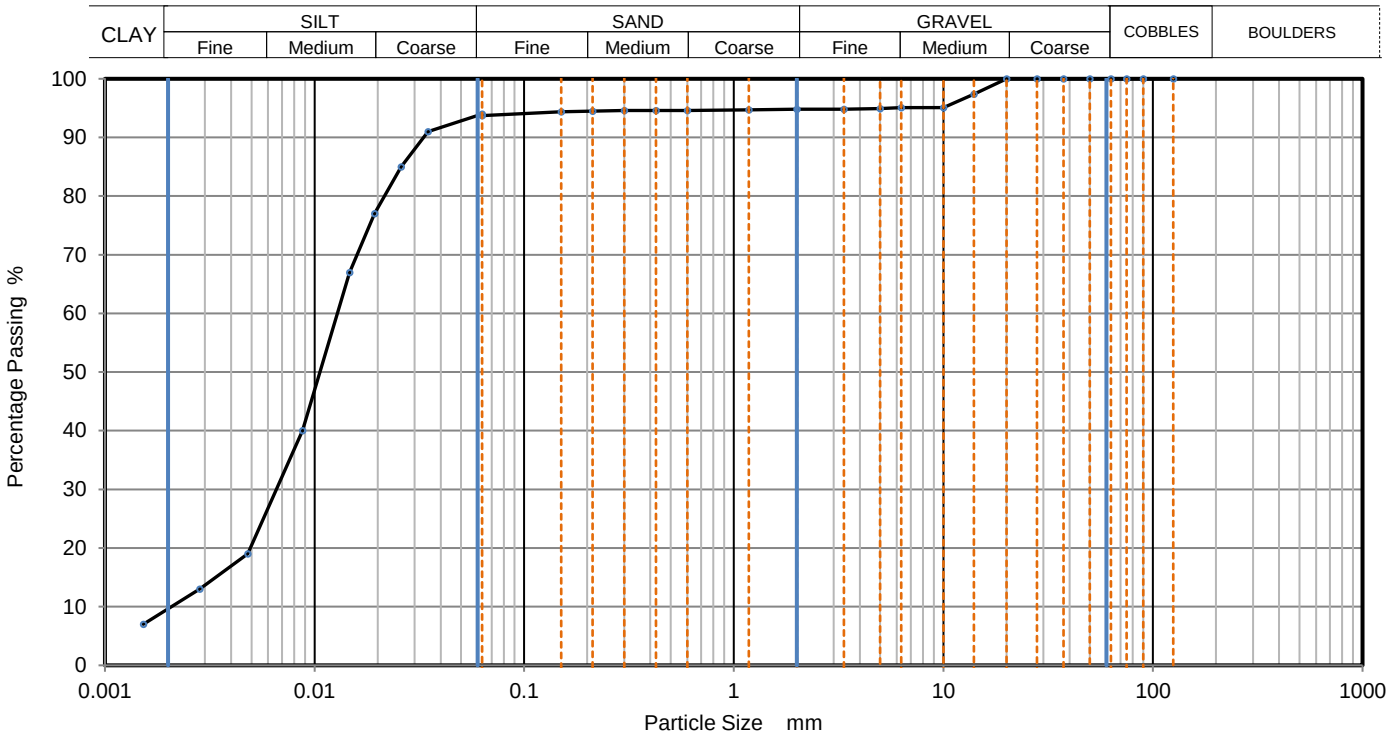
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION			Job Ref		21-1682
				Borehole/Pit No.		BH-14170
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.		1
Specimen Description	Brown sandy slightly gravelly silty CLAY.			Sample Depth (m)	Top	8.90
					Base	9.65
Specimen Reference	9	Specimen Depth	8.9 m	Sample Type		C
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID		Caus202210121



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	94
90	100	0.03476	91
75	100	0.02586	85
63	100	0.01936	77
50	100	0.01468	67
37.5	100	0.00877	40
28	100	0.00479	19
20	100	0.00283	13
14	97	0.00152	7
10	95		
6.3	95		
5	95		
3.35	95		
2	95		
1.18	95		
0.6	95	Particle density	(assumed)
0.425	95	2.65	Mg/m3
0.3	95		
0.212	95		
0.15	94		
0.063	94		

Dry Mass of sample, g: 254

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	5.2
Sand	1.1
Silt	83.7
Clay	10.0

Grading Analysis		
D100	mm	
D60	mm	0.0128
D30	mm	0.00653
D10	mm	0.00199
Uniformity Coefficient		6.5
Curvature Coefficient		1.7

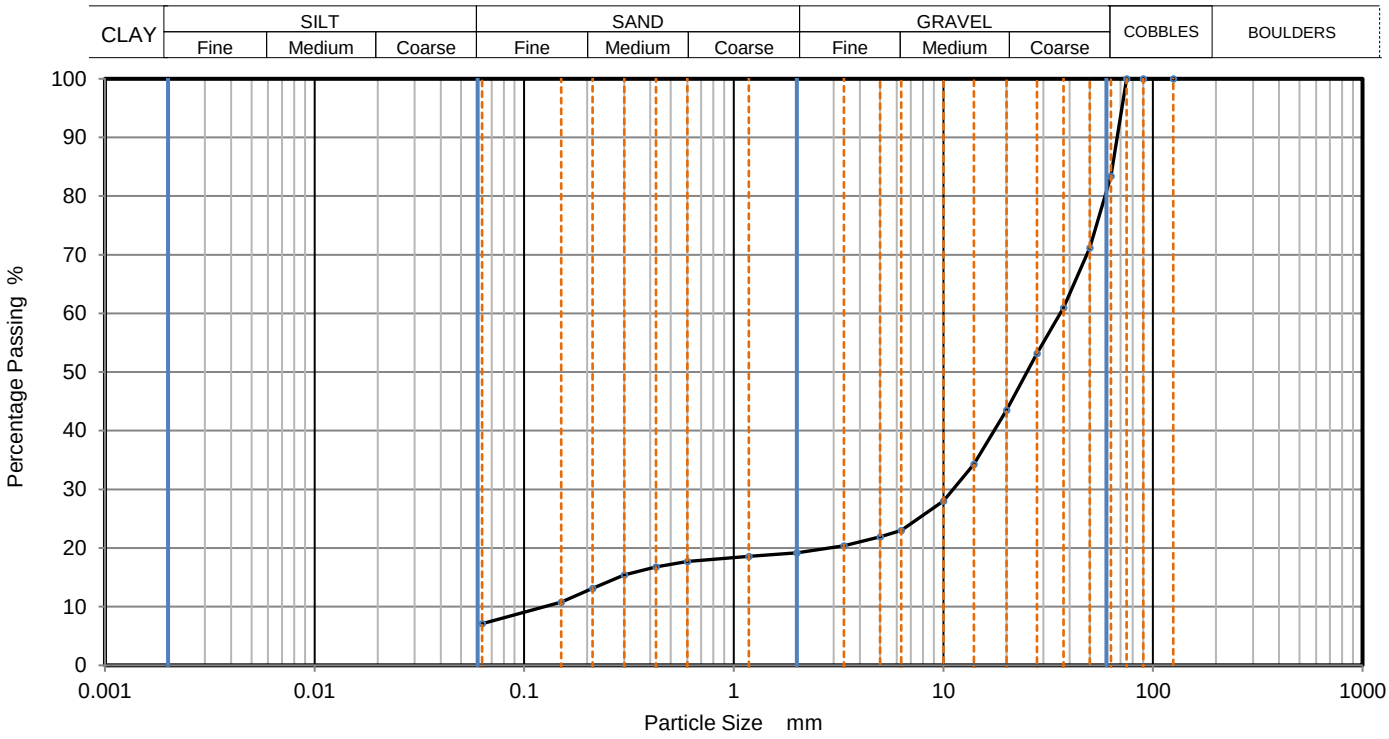
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					BH-14357
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brown slightly sandy slightly clayey subangular fine to coarse GRAVEL with cobbles.			Sample Depth (m) Top	1.20
				Base	2.00
Specimen Reference	6	Specimen Depth	1.2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus20220908109



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	83		
50	71		
37.5	61		
28	53		
20	44		
14	34		
10	28		
6.3	23		
5	22		
3.35	20		
2	19		
1.18	19		
0.6	18		
0.425	17		
0.3	15		
0.212	13		
0.15	11		
0.063	7		

Dry Mass of sample, g: 10917

Sample Proportions	% dry mass
Cobbles	16.6
Gravel	64.2
Sand	12.2
Fines <0.063mm	7.0

Grading Analysis		
D100	mm	
D60	mm	36.1
D30	mm	11.1
D10	mm	0.124
Uniformity Coefficient		290
Curvature Coefficient		28

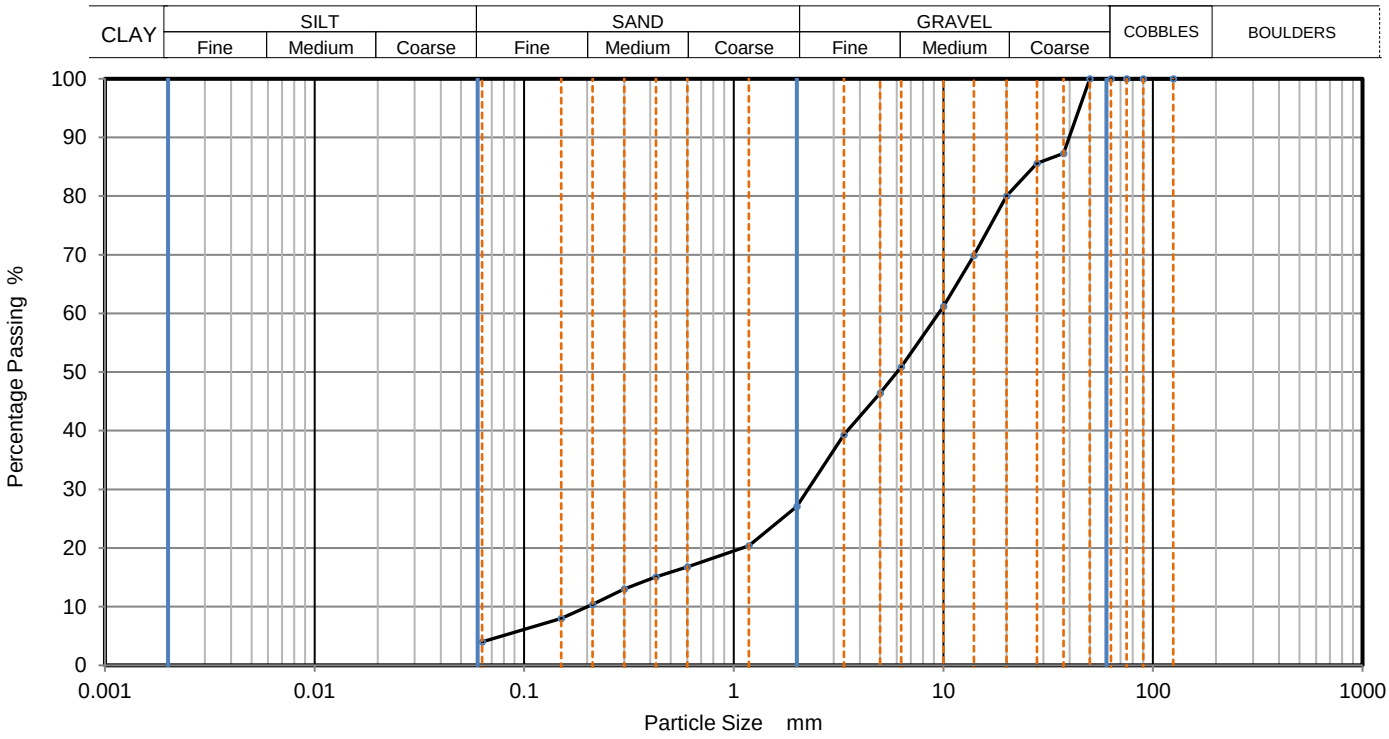
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					BH-14357
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Greyish brown gravelly slightly silty fine to coarse SAND.			Sample Depth (m) Top	2.00
				Base	3.00
Specimen Reference	4	Specimen Depth	2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus20220908110



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	87		
28	86		
20	80		
14	70		
10	61		
6.3	51		
5	46		
3.35	39		
2	27		
1.18	20		
0.6	17		
0.425	15		
0.3	13		
0.212	10		
0.15	8		
0.063	4		

Dry Mass of sample, g: 4527

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	72.9
Sand	23.1
Fines <0.063mm	4.0

Grading Analysis		
D100	mm	
D60	mm	9.48
D30	mm	2.26
D10	mm	0.2
Uniformity Coefficient		47
Curvature Coefficient		2.7

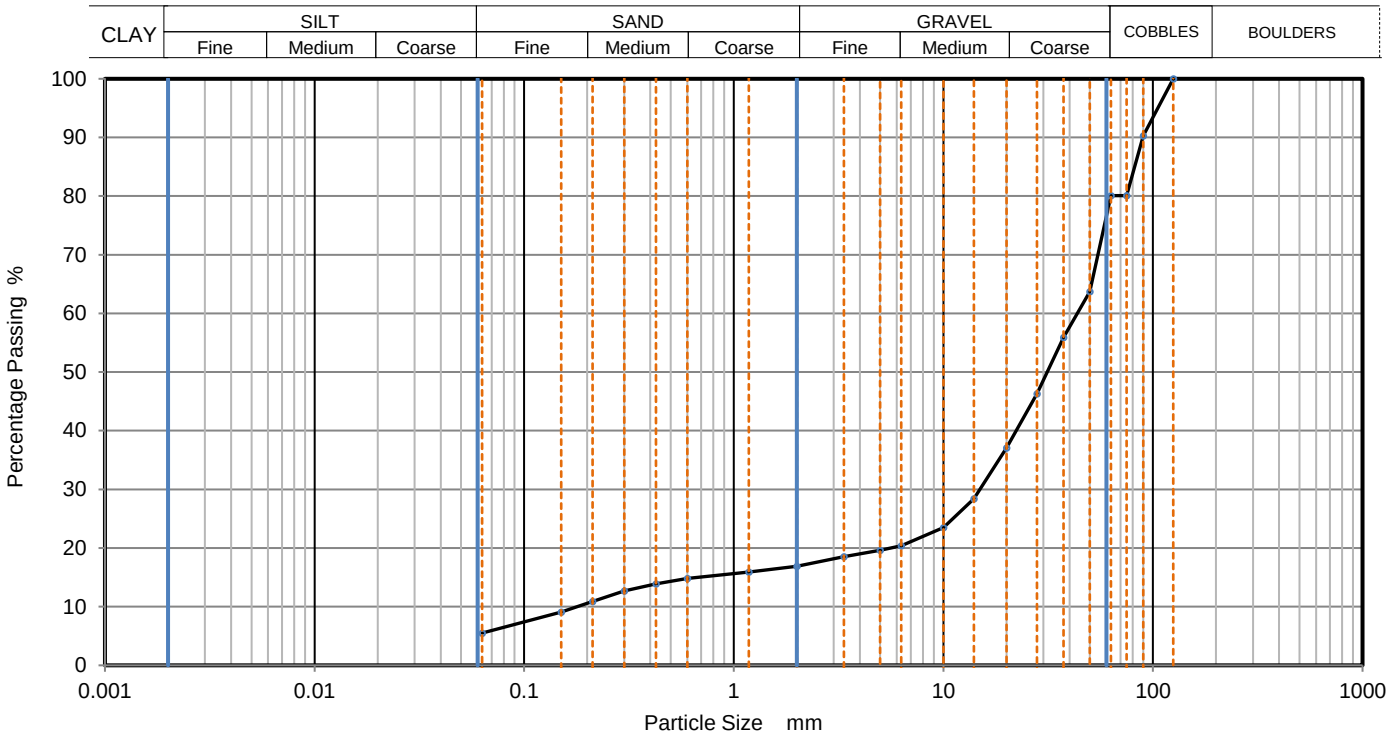
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					BH-14357
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	4
Specimen Description	Greyish brown slightly sandy slightly silty subangular fine to coarse GRAVEL with cobbles.			Sample Depth (m) Top	3.00
				Base	4.00
Specimen Reference	4	Specimen Depth	3 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus20220908111



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	90		
75	80		
63	80		
50	64		
37.5	56		
28	46		
20	37		
14	28		
10	24		
6.3	20		
5	20		
3.35	19		
2	17		
1.18	16		
0.6	15		
0.425	14		
0.3	13		
0.212	11		
0.15	9		
0.063	6		

Dry Mass of sample, g: 11085

Sample Proportions	% dry mass
Cobbles	19.9
Gravel	63.2
Sand	11.4
Fines <0.063mm	6.0

Grading Analysis		
D100	mm	125
D60	mm	43.6
D30	mm	14.9
D10	mm	0.179
Uniformity Coefficient		240
Curvature Coefficient		29

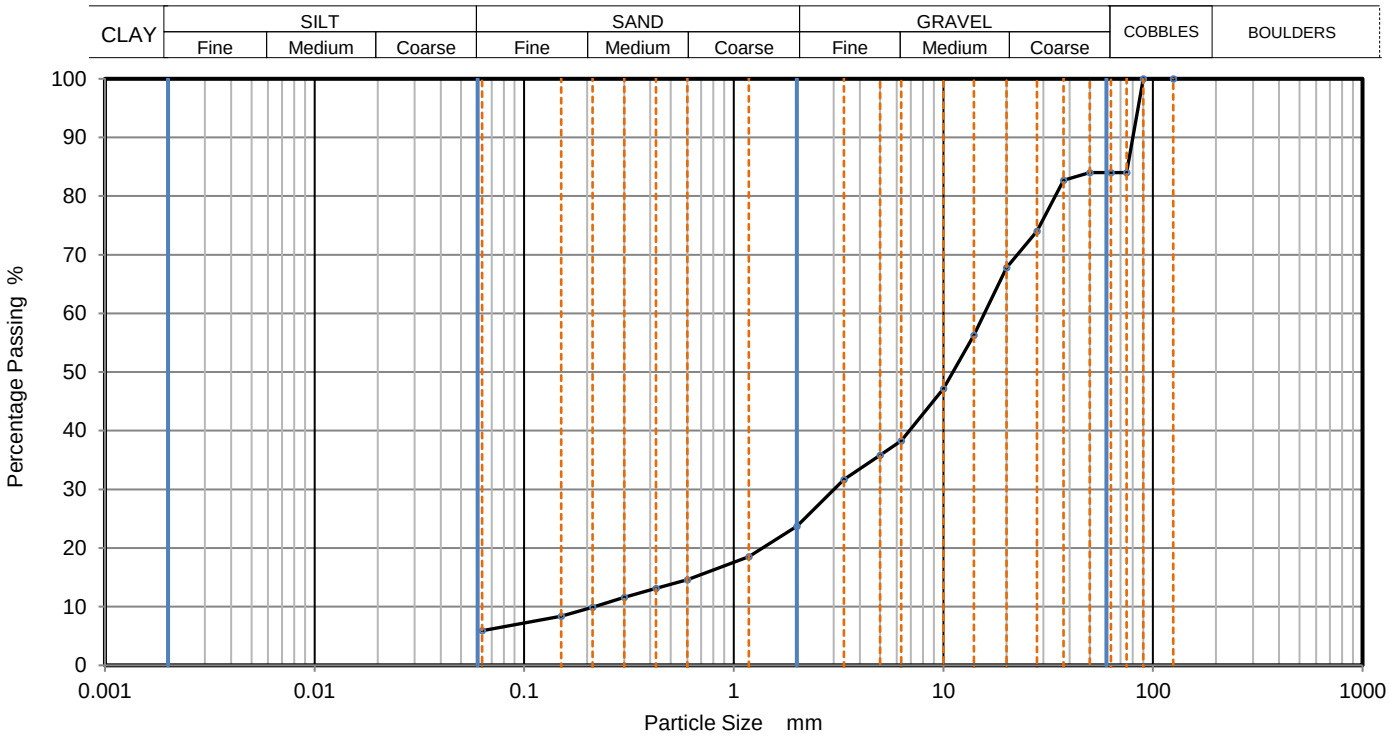
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					**21-1682**
Borehole/Pit No.					BH-14357
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	8
Specimen Description	Greyish brown slightly sandy slightly silty subangular fine to coarse GRAVEL with cobbles.			Sample Depth (m) Top	6.60
				Base	7.30
Specimen Reference	2	Specimen Depth	6.6 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus20220908112



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	84		
63	84		
50	84		
37.5	83		
28	74		
20	68		
14	56		
10	47		
6.3	38		
5	36		
3.35	32		
2	24		
1.18	19		
0.6	15		
0.425	13		
0.3	12		
0.212	10		
0.15	8		
0.063	6		

Dry Mass of sample, g: 8376

Sample Proportions	% dry mass
Cobbles	16.0
Gravel	60.4
Sand	17.7
Fines <0.063mm	6.0

Grading Analysis		
D100	mm	
D60	mm	15.7
D30	mm	3
D10	mm	0.218
Uniformity Coefficient		72
Curvature Coefficient		2.6

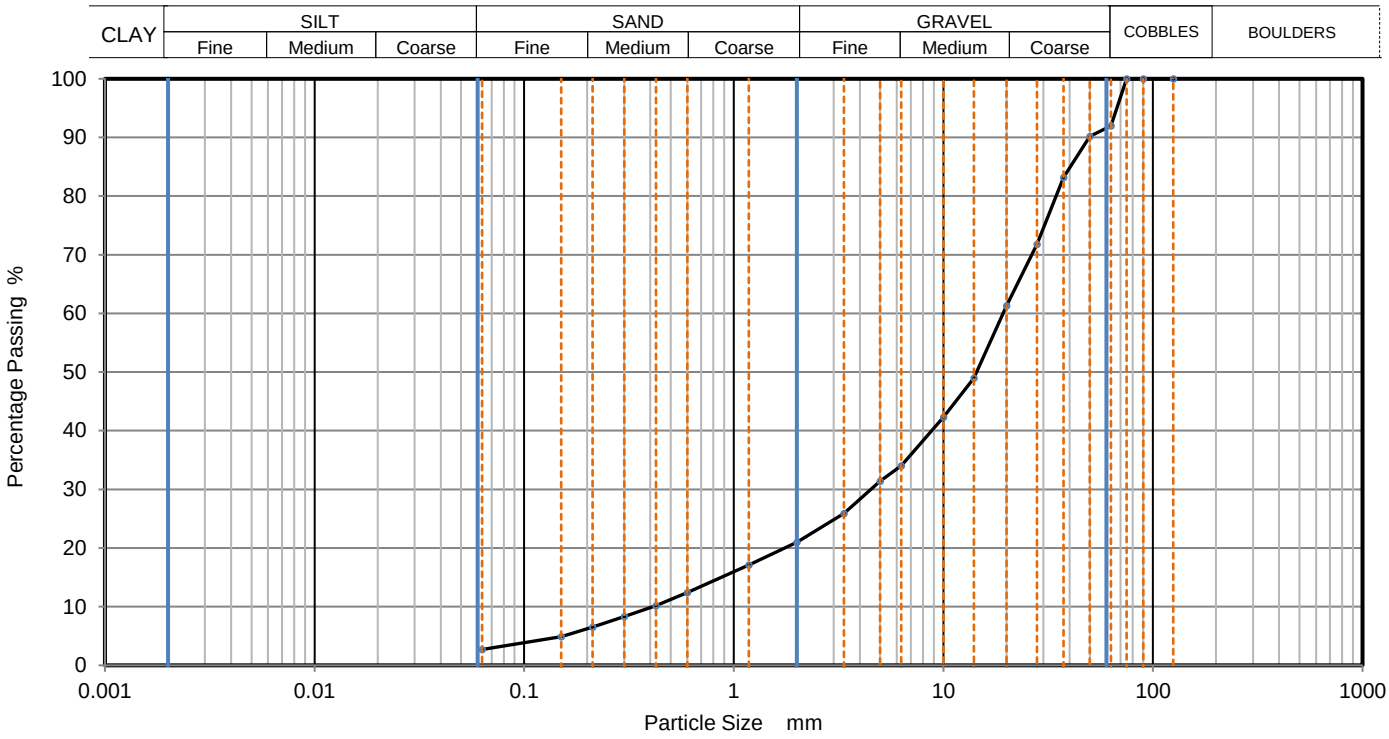
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-16037A
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brownish grey slightly sandy slightly clayey subangular fine to coarse GRAVEL with some cobbles.			Sample Depth (m) Top	1.00
				Base	1.70
Specimen Reference	3	Specimen Depth	1 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus20220815139



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	92		
50	90		
37.5	83		
28	72		
20	61		
14	49		
10	42		
6.3	34		
5	31		
3.35	26		
2	21		
1.18	17		
0.6	12		
0.425	10		
0.3	8		
0.212	7		
0.15	5		
0.063	3		

Dry Mass of sample, g: 10335

Sample Proportions	% dry mass
Cobbles	8.0
Gravel	71.0
Sand	18.2
Fines <0.063mm	3.0

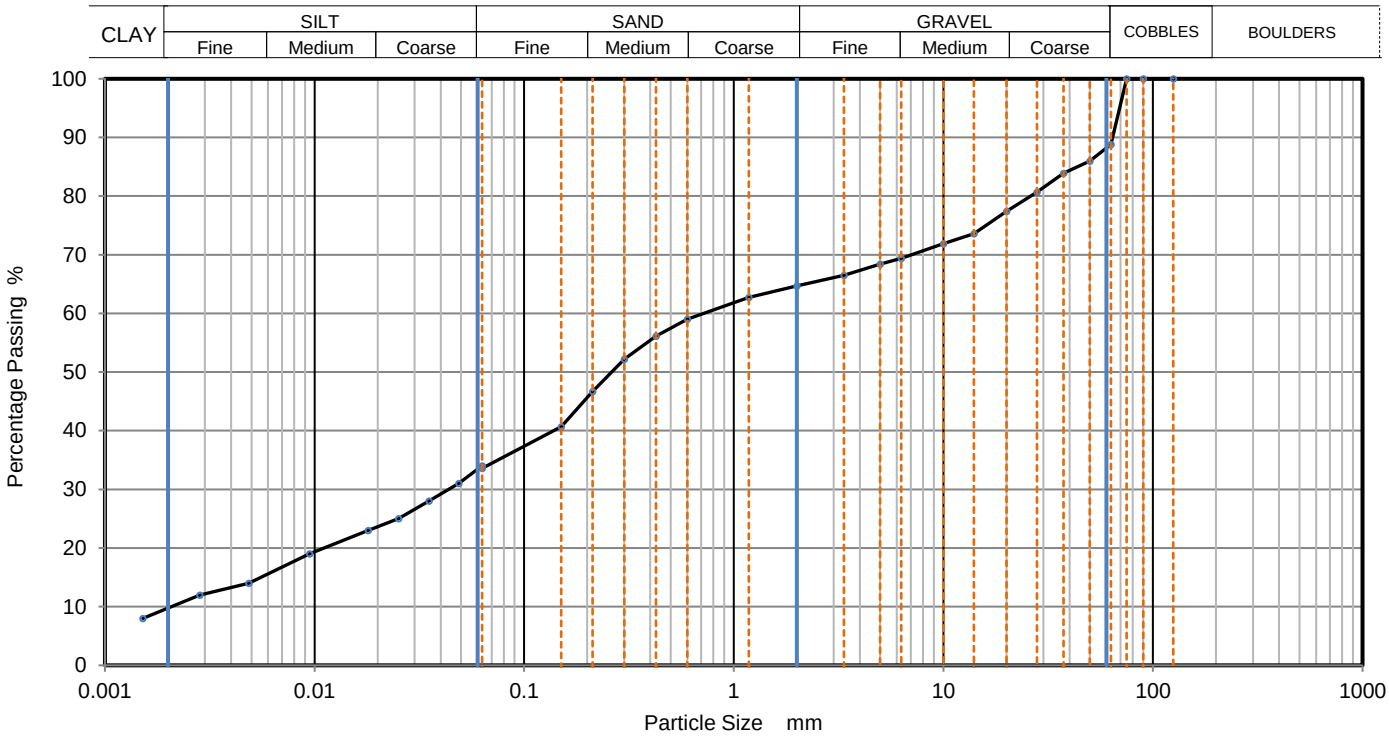
Grading Analysis		
D100	mm	
D60	mm	19.2
D30	mm	4.52
D10	mm	0.408
Uniformity Coefficient		47
Curvature Coefficient		2.6

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		BH-16610A
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		2
Specimen Description	Brown sandy gravelly silty CLAY with some cobbles.				Sample Depth (m)	Top	0.90
						Base	2.20
Specimen Reference	3	Specimen Depth	0.9	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus20220815140



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	34
90	100	0.04870	31
75	100	0.03513	28
63	89	0.02517	25
50	86	0.01802	23
37.5	84	0.00948	19
28	81	0.00485	14
20	77	0.00283	12
14	74	0.00152	8
10	72		
6.3	69		
5	68		
3.35	67		
2	65		
1.18	63		
0.6	59	Particle density	(assumed)
0.425	56	2.65	Mg/m3
0.3	52		
0.212	47		
0.15	41		
0.063	34		

Dry Mass of sample, g: 10947

Sample Proportions	% dry mass
Cobbles	11.2
Gravel	24.1
Sand	31.1
Silt	23.6
Clay	10.0

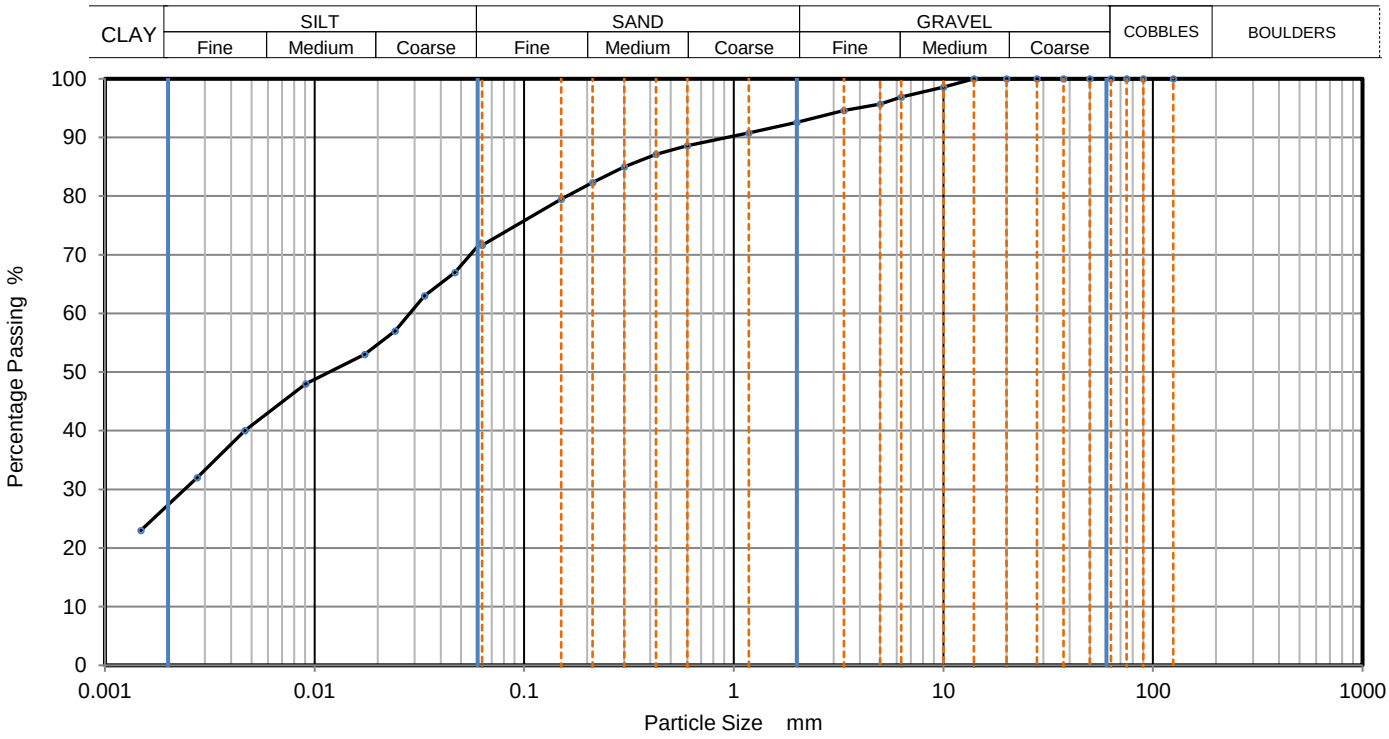
Grading Analysis		
D100	mm	
D60	mm	0.722
D30	mm	0.0437
D10	mm	0.002
Uniformity Coefficient		360
Curvature Coefficient		1.3

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		BH-17401
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		2
Specimen Description	Brown sandy slightly gravelly silty CLAY.				Sample Depth (m)	Top	1.20
						Base	1.60
Specimen Reference	2	Specimen Depth	1.2	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus20220930124



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06183	72
90	100	0.04667	67
75	100	0.03349	63
63	100	0.02418	57
50	100	0.01734	53
37.5	100	0.00907	48
28	100	0.00465	40
20	100	0.00275	32
14	100	0.00148	23
10	99		
6.3	97		
5	96		
3.35	95		
2	93		
1.18	91		
0.6	89	Particle density	(assumed)
0.425	87	2.65	Mg/m3
0.3	85		
0.212	82		
0.15	80		
0.063	72		

Dry Mass of sample, g: 502

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	7.4
Sand	21.0
Silt	44.4
Clay	27.2

Grading Analysis		
D100	mm	
D60	mm	0.0284
D30	mm	0.00245
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

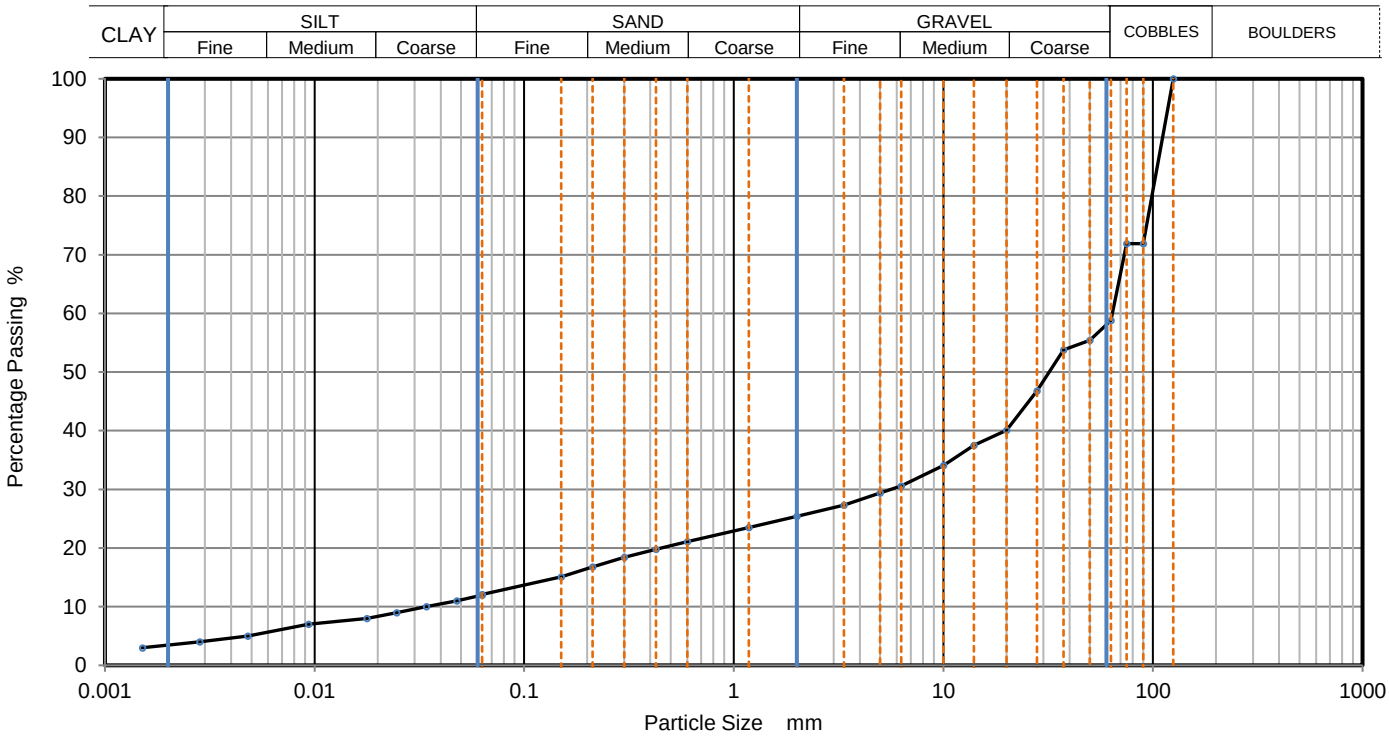
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

UKAS TESTING

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		BH-17401
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		2
Specimen Description	Greyish brown sandy gravelly silty CLAY with cobbles.				Sample Depth (m)	Top	2.80
						Base	3.30
Specimen Reference	3	Specimen Depth	2.8	m	Sample Type		C
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022101851



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	12
90	72	0.04769	11
75	72	0.03420	10
63	59	0.02468	9
50	55	0.01779	8
37.5	54	0.00936	7
28	47	0.00479	5
20	40	0.00283	4
14	38	0.00151	3
10	34		
6.3	31		
5	29		
3.35	27		
2	25		
1.18	24		
0.6	21	Particle density	(assumed)
0.425	20	2.65	Mg/m3
0.3	18		
0.212	17		
0.15	15		
0.063	12		

Dry Mass of sample, g: 6836

Sample Proportions	% dry mass
Cobbles	41.2
Gravel	33.5
Sand	13.3
Silt	8.8
Clay	3.2

Grading Analysis		
D100	mm	125
D60	mm	64
D30	mm	5.63
D10	mm	0.03
Uniformity Coefficient		2100
Curvature Coefficient		16

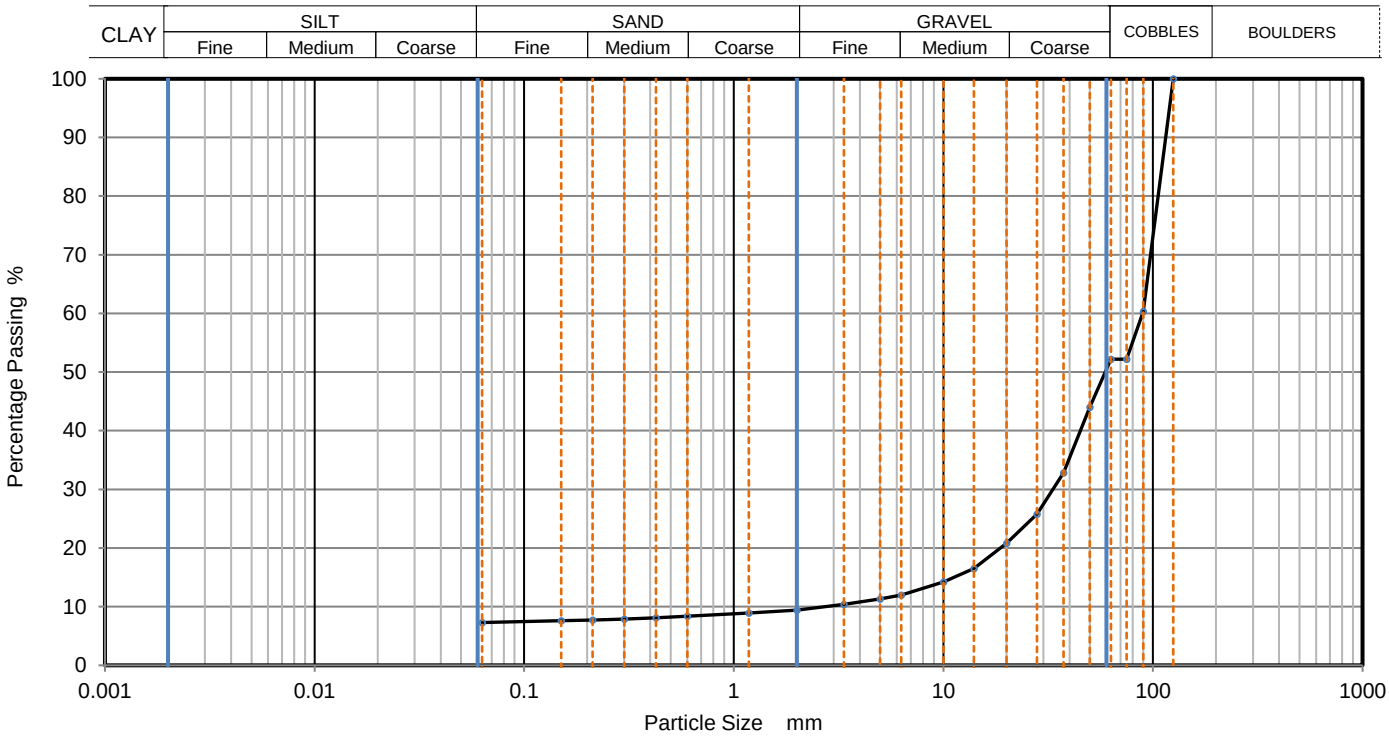
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-17401
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Greyish brown subangular fine to coarse GRAVEL with cobbles.			Sample Depth (m) Top	3.70
				Base	4.70
Specimen Reference	1	Specimen Depth	3.7 m	Sample Type	C
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022101852



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	60		
75	52		
63	52		
50	44		
37.5	33		
28	26		
20	21		
14	17		
10	14		
6.3	12		
5	11		
3.35	10		
2	9		
1.18	9		
0.6	8		
0.425	8		
0.3	8		
0.212	8		
0.15	8		
0.063	7		

Dry Mass of sample, g: 10725

Sample Proportions	% dry mass
Cobbles	47.8
Gravel	42.8
Sand	2.2
Fines <0.063mm	7.0

Grading Analysis		
D100	mm	125
D60	mm	89.4
D30	mm	33.3
D10	mm	2.7
Uniformity Coefficient		33
Curvature Coefficient		4.6

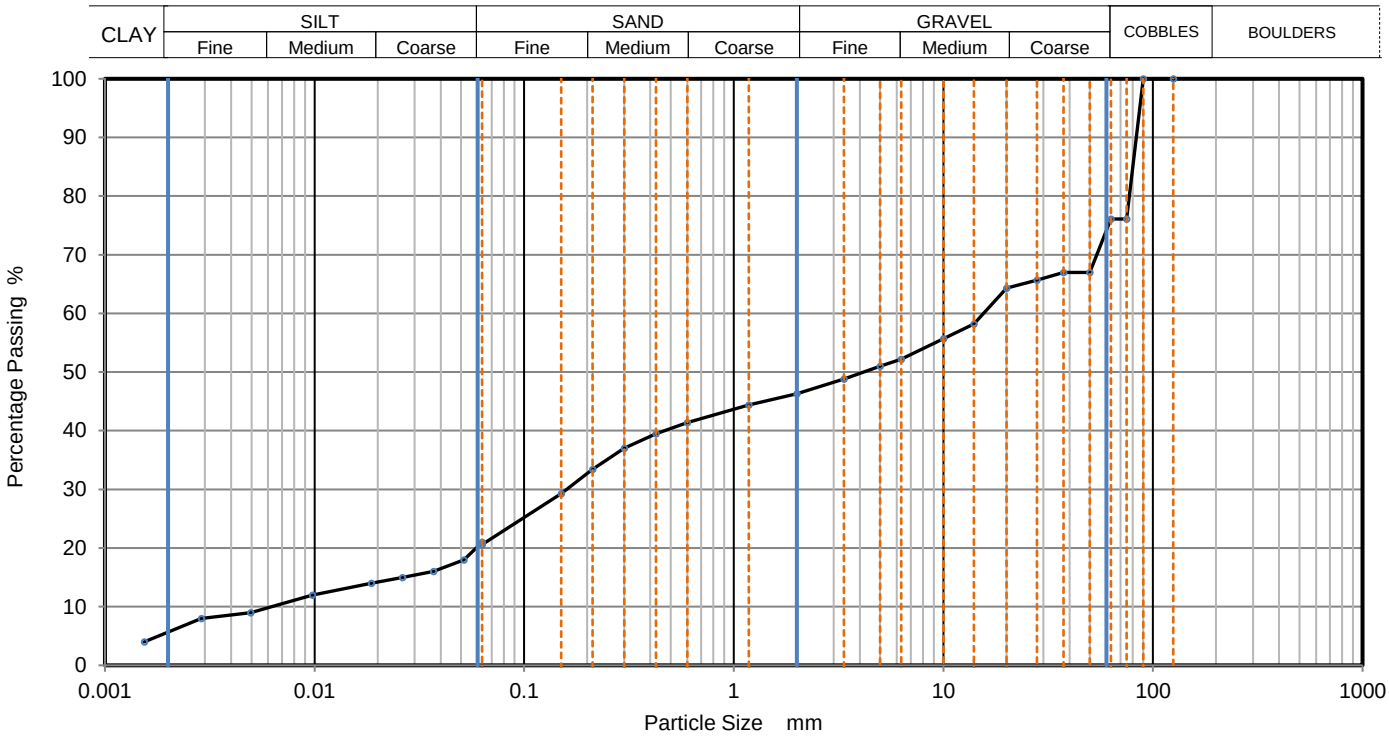
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					BH-18231
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Brown sandy gravelly silty CLAY with cobbles.			Sample Depth (m) Top	0.20
				Base	1.20
Specimen Reference	2	Specimen Depth	0.2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022081567



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	21
90	100	0.05160	18
75	76	0.03693	16
63	76	0.02627	15
50	67	0.01868	14
37.5	67	0.00976	12
28	66	0.00496	9
20	64	0.00288	8
14	58	0.00154	4
10	56		
6.3	52		
5	51		
3.35	49		
2	46		
1.18	44		
0.6	41	Particle density	(assumed)
0.425	40	2.65	Mg/m3
0.3	37		
0.212	33		
0.15	29		
0.063	21		

Dry Mass of sample, g: 7453

Sample Proportions	% dry mass
Cobbles	23.9
Gravel	29.8
Sand	25.7
Silt	14.9
Clay	5.7

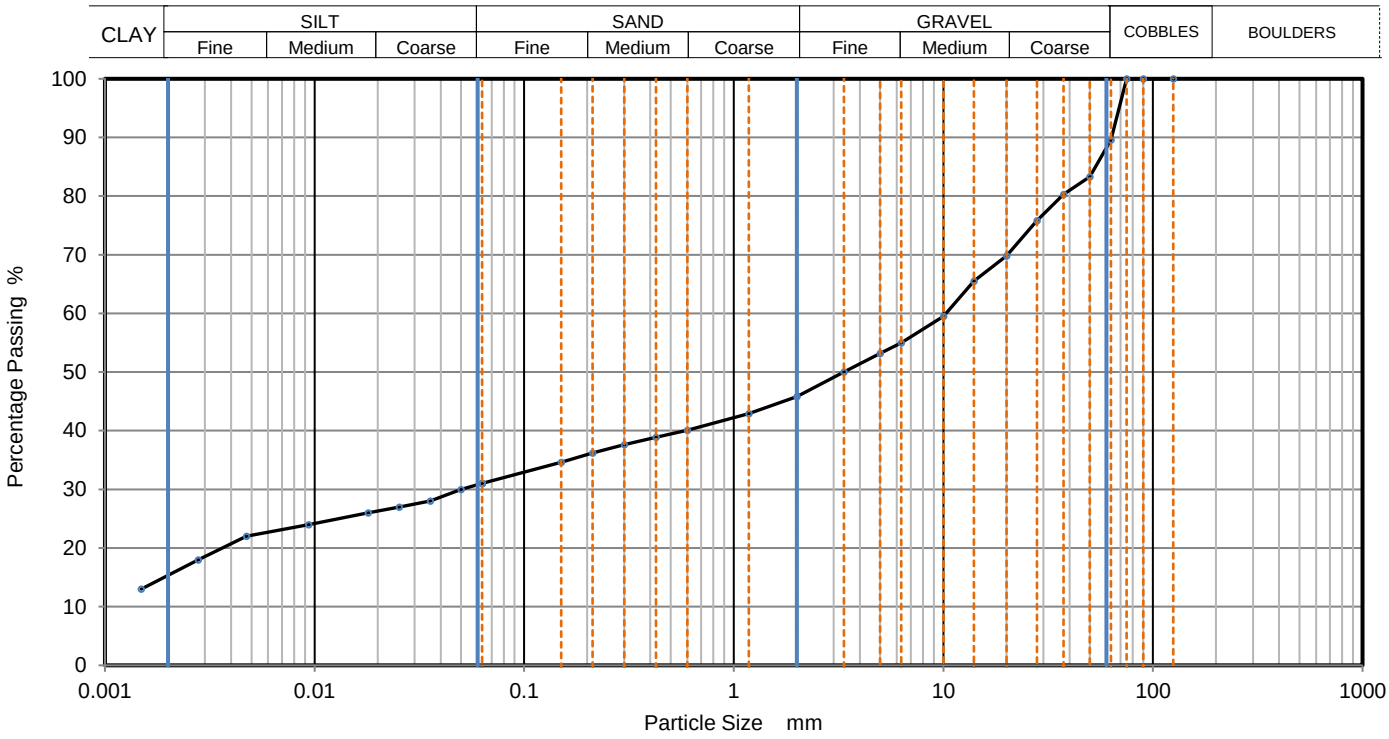
Grading Analysis		
D100	mm	
D60	mm	15.6
D30	mm	0.159
D10	mm	0.00654
Uniformity Coefficient		2400
Curvature Coefficient		0.25

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-18440
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	4
Specimen Description	Brownish grey sandy gravelly silty CLAY.			Sample Depth (m) Top	1.40
				Base	3.00
Specimen Reference	2	Specimen Depth	1.4 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220908114



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	31
90	100	0.05001	30
75	100	0.03559	28
63	90	0.02533	27
50	83	0.01802	26
37.5	80	0.00936	24
28	76	0.00474	22
20	70	0.00278	18
14	66	0.00149	13
10	60		
6.3	55		
5	53		
3.35	50		
2	46		
1.18	43		
0.6	40	Particle density	(assumed)
0.425	39	2.65	Mg/m3
0.3	38		
0.212	36		
0.15	35		
0.063	31		

Dry Mass of sample, g: 10586

Sample Proportions	% dry mass
Cobbles	10.4
Gravel	43.8
Sand	14.8
Silt	15.6
Clay	15.4

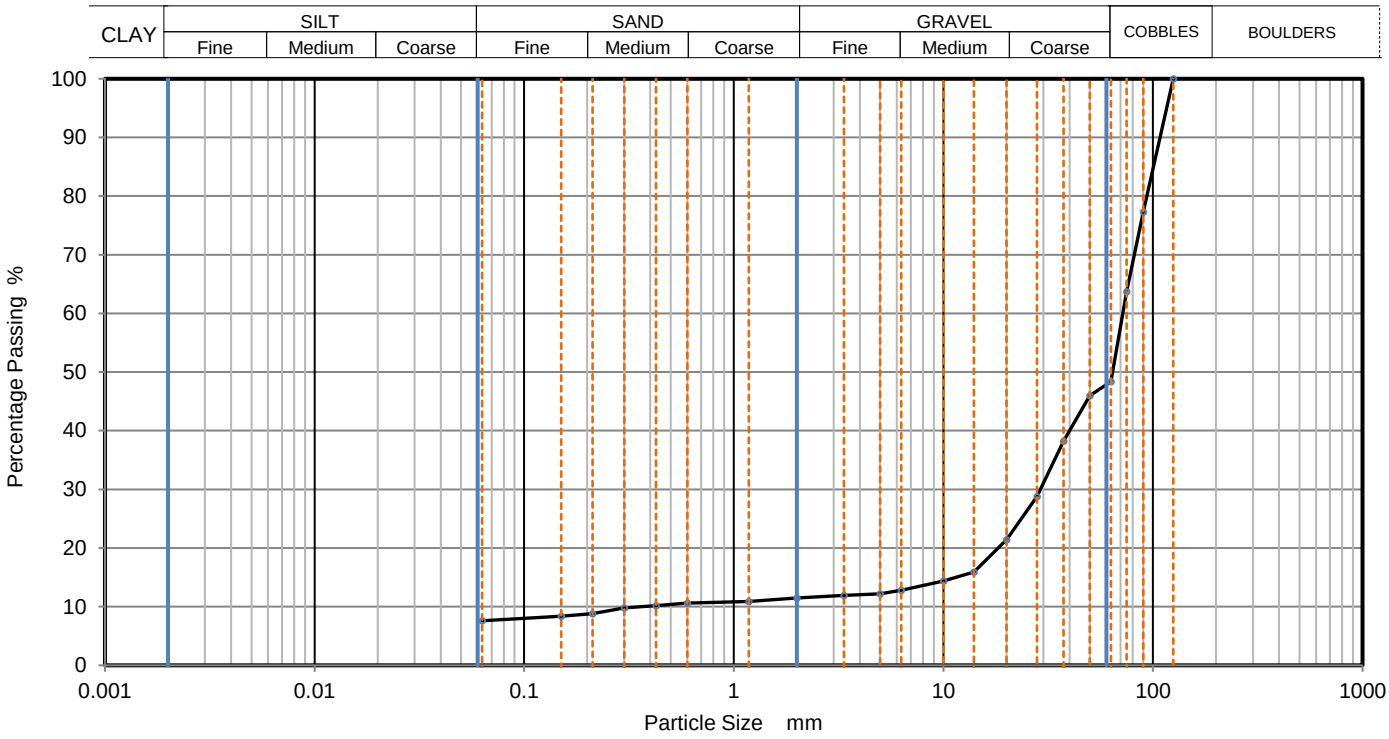
Grading Analysis		
D100	mm	
D60	mm	10.3
D30	mm	0.0532
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-18440
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	5
Specimen Description	Brownish grey slightly sandy subangular fine to coarse GRAVEL with cobbles.			Sample Depth (m) Top	13.00
				Base	14.15
Specimen Reference	6	Specimen Depth	13 m	Sample Type	C
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus202210205



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	77		
75	64		
63	48		
50	46		
37.5	38		
28	29		
20	21		
14	16		
10	14		
6.3	13		
5	12		
3.35	12		
2	12		
1.18	11		
0.6	11		
0.425	10		
0.3	10		
0.212	9		
0.15	8		
0.063	8		

Dry Mass of sample, g	13114

Sample Proportions	% dry mass
Cobbles	51.6
Gravel	36.9
Sand	3.9
Fines <0.063mm	8.0

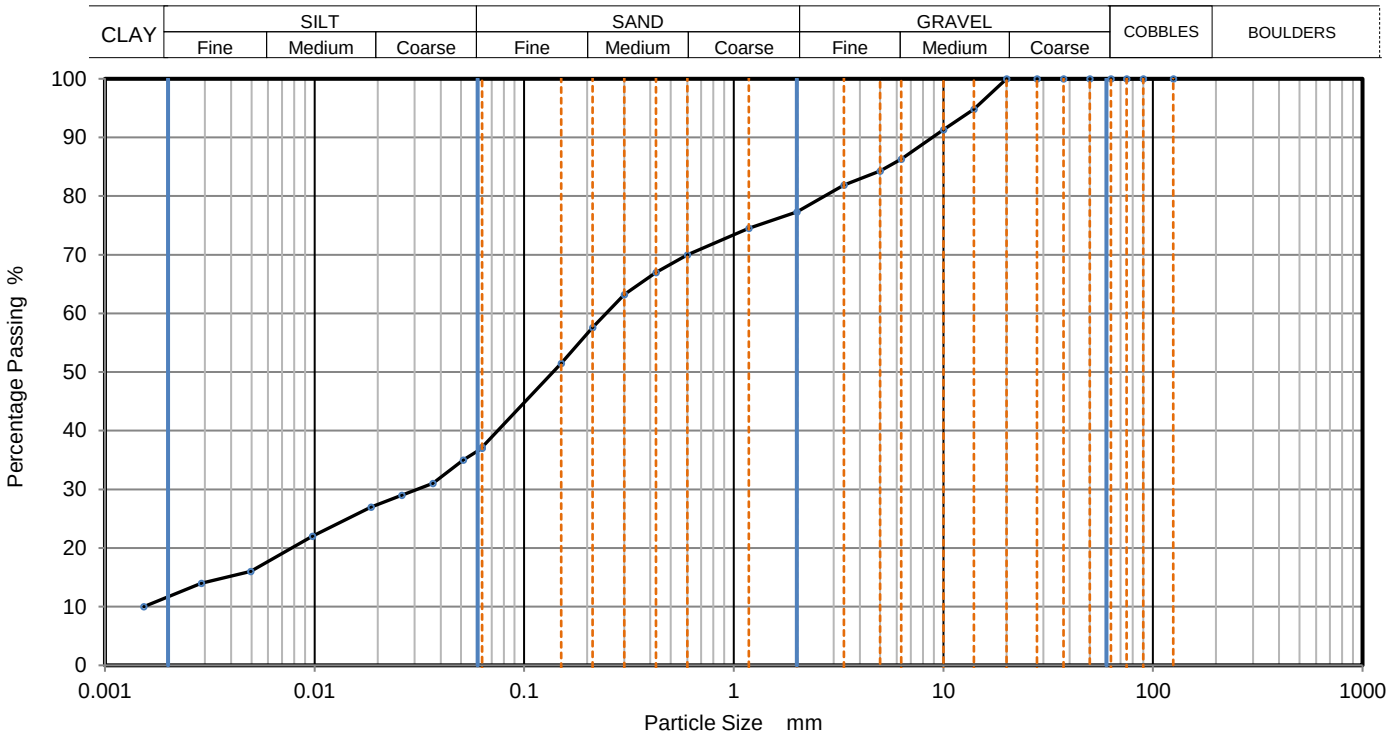
Grading Analysis		
D100	mm	125
D60	mm	71.9
D30	mm	29
D10	mm	0.356
Uniformity Coefficient		200
Curvature Coefficient		33

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		BH-18804
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		2
Specimen Description	Brown sandy slightly gravelly silty CLAY.				Sample Depth (m)	Top	1.20
						Base	2.00
Specimen Reference	2	Specimen Depth	1.2	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022081570



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	37
90	100	0.05129	35
75	100	0.03671	31
63	100	0.02611	29
50	100	0.01857	27
37.5	100	0.00976	22
28	100	0.00496	16
20	100	0.00288	14
14	95	0.00153	10
10	91		
6.3	86		
5	84		
3.35	82		
2	77		
1.18	75		
0.6	70	Particle density	(assumed)
0.425	67	2.65	Mg/m3
0.3	63		
0.212	58		
0.15	52		
0.063	37		

Dry Mass of sample, g	517

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	22.7
Sand	40.2
Silt	25.7
Clay	11.4

Grading Analysis		
D100	mm	
D60	mm	0.246
D30	mm	0.0291
D10	mm	0.00158
Uniformity Coefficient		160
Curvature Coefficient		2.2

Remarks

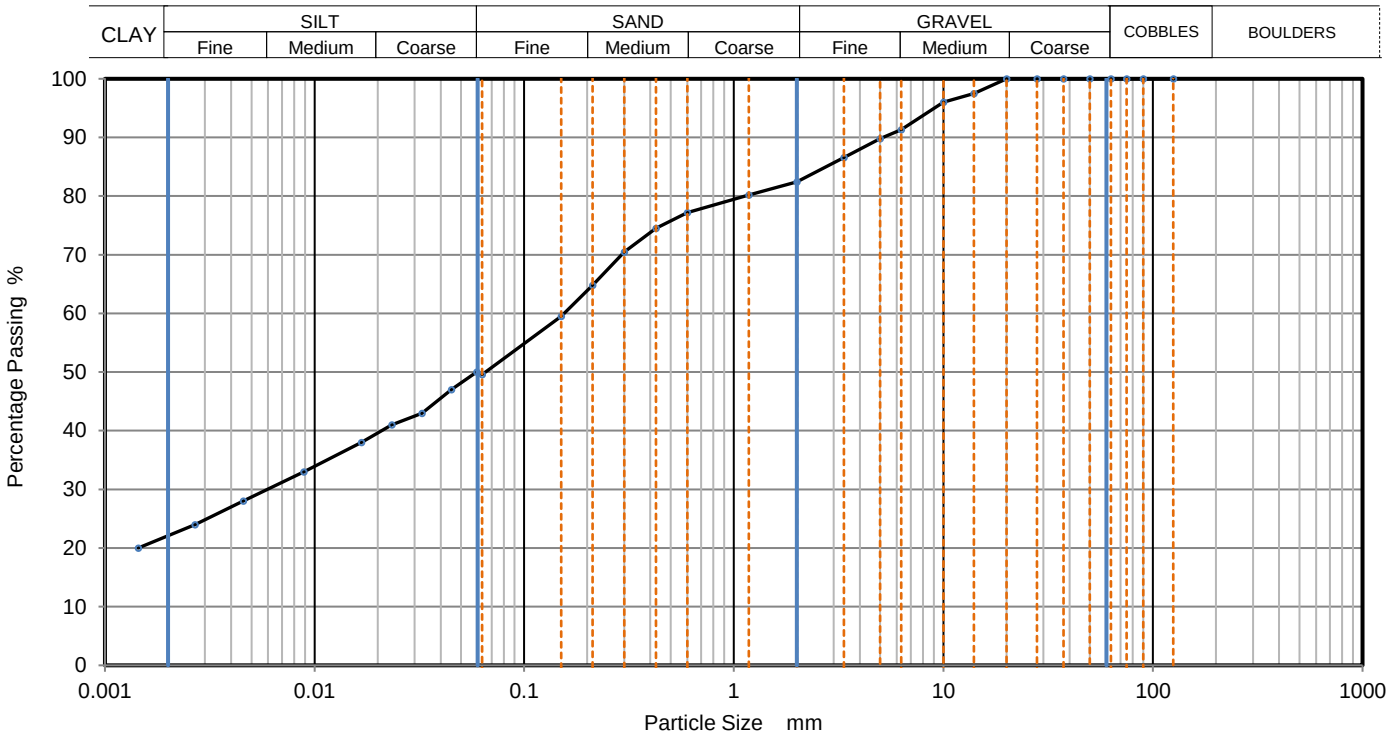
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

Job Ref					**21-1682**
Borehole/Pit No.					BH-1886
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	4
Specimen Description	Brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	15.50
				Base	16.00
Specimen Reference	2	Specimen Depth	15.5 m	Sample Type	C
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022091513



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.05942	50
90	100	0.04491	47
75	100	0.03251	43
63	100	0.02333	41
50	100	0.01674	38
37.5	100	0.00889	33
28	100	0.00457	28
20	100	0.00269	24
14	98	0.00144	20
10	96		
6.3	91		
5	90		
3.35	87		
2	82		
1.18	80		
0.6	77	Particle density 2.65	(assumed) Mg/m3
0.425	75		
0.3	71		
0.212	65		
0.15	60		
0.063	50		

Dry Mass of sample, g: 526

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	17.6
Sand	32.8
Silt	27.2
Clay	22.4

Grading Analysis		
D100	mm	
D60	mm	0.155
D30	mm	0.00595
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

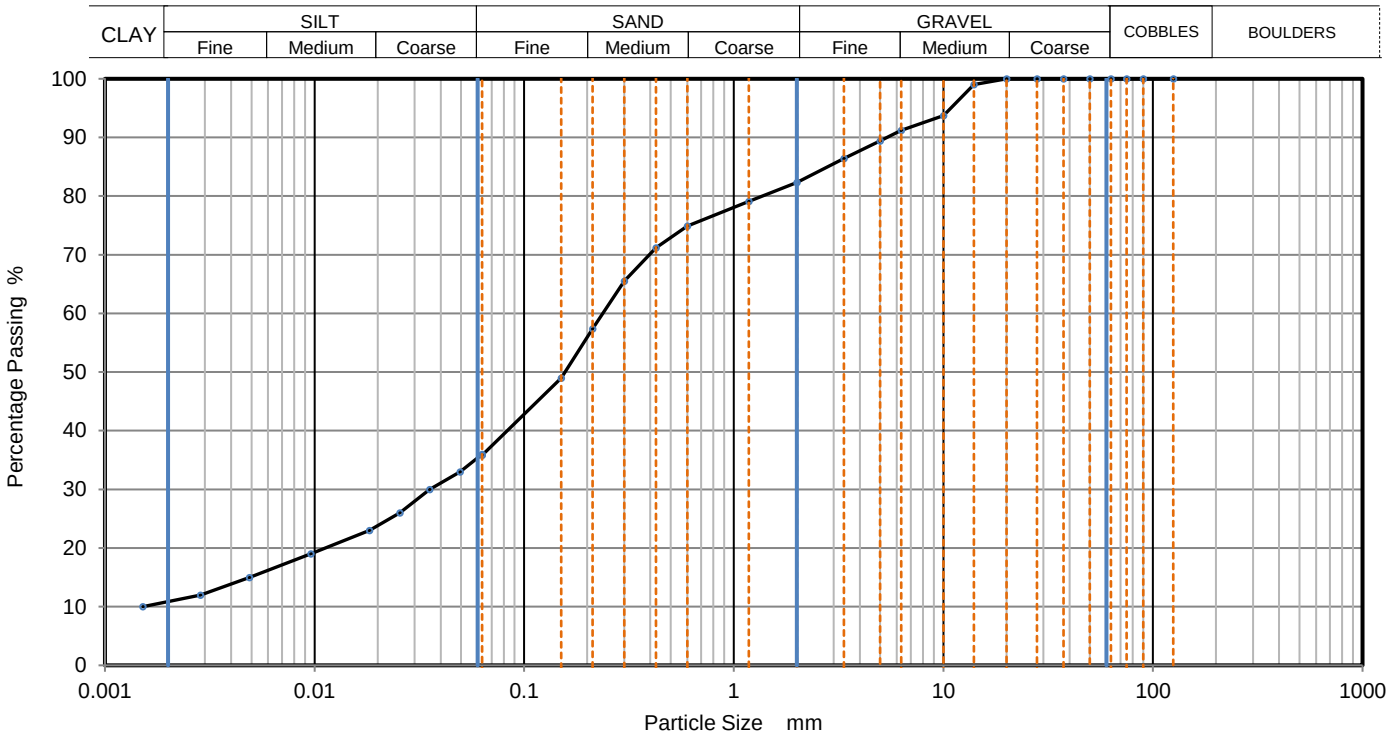
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					**21-1682**
Borehole/Pit No.					BH-1922
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Greyish brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	0.80
				Base	1.00
Specimen Reference	2	Specimen Depth	0.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus202206219



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	36
90	100	0.04936	33
75	100	0.03536	30
63	100	0.02549	26
50	100	0.01824	23
37.5	100	0.00959	19
28	100	0.00488	15
20	100	0.00285	12
14	99	0.00152	10
10	94		
6.3	91		
5	89		
3.35	86		
2	82		
1.18	79		
0.6	75	Particle density	(assumed)
0.425	71	2.65	Mg/m3
0.3	66		
0.212	57		
0.15	49		
0.063	36		

Dry Mass of sample, g: 512

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	17.7
Sand	46.5
Silt	25.0
Clay	10.8

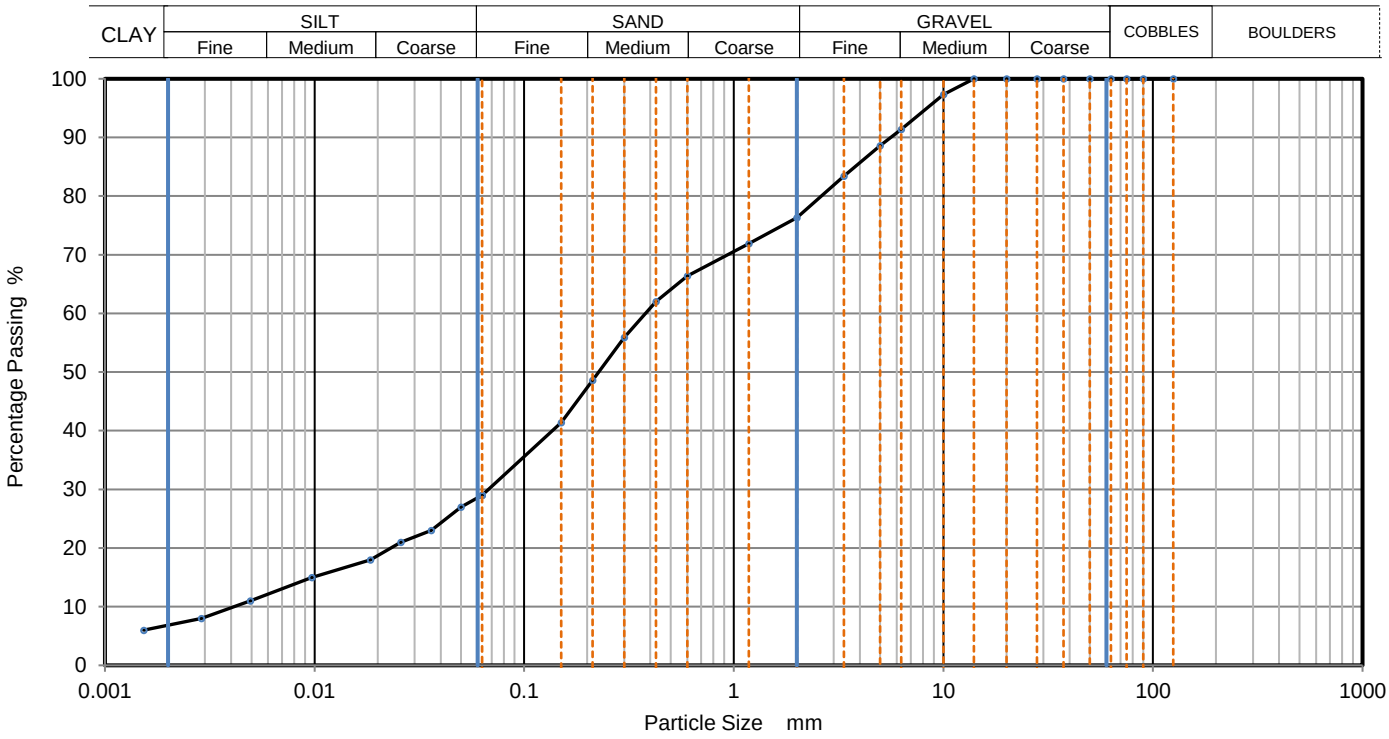
Grading Analysis		
D100	mm	
D60	mm	0.237
D30	mm	0.0346
D10	mm	0.00165
Uniformity Coefficient		140
Curvature Coefficient		3.1

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		BH-1922
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		4
Specimen Description	Greyish brown sandy slightly gravelly silty CLAY.				Sample Depth (m)	Top	2.80
						Base	3.00
Specimen Reference	2	Specimen Depth	2.8	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022062113



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	29
90	100	0.05001	27
75	100	0.03604	23
63	100	0.02580	21
50	100	0.01846	18
37.5	100	0.00970	15
28	100	0.00493	11
20	100	0.00288	8
14	100	0.00153	6
10	97		
6.3	91		
5	89		
3.35	83		
2	76		
1.18	72		
0.6	66	Particle density	(assumed)
0.425	62	2.65	Mg/m3
0.3	56		
0.212	49		
0.15	41		
0.063	29		

Dry Mass of sample, g: 529

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	23.7
Sand	47.2
Silt	22.0
Clay	7.1

Grading Analysis		
D100	mm	
D60	mm	0.378
D30	mm	0.0674
D10	mm	0.00406
Uniformity Coefficient		93
Curvature Coefficient		3

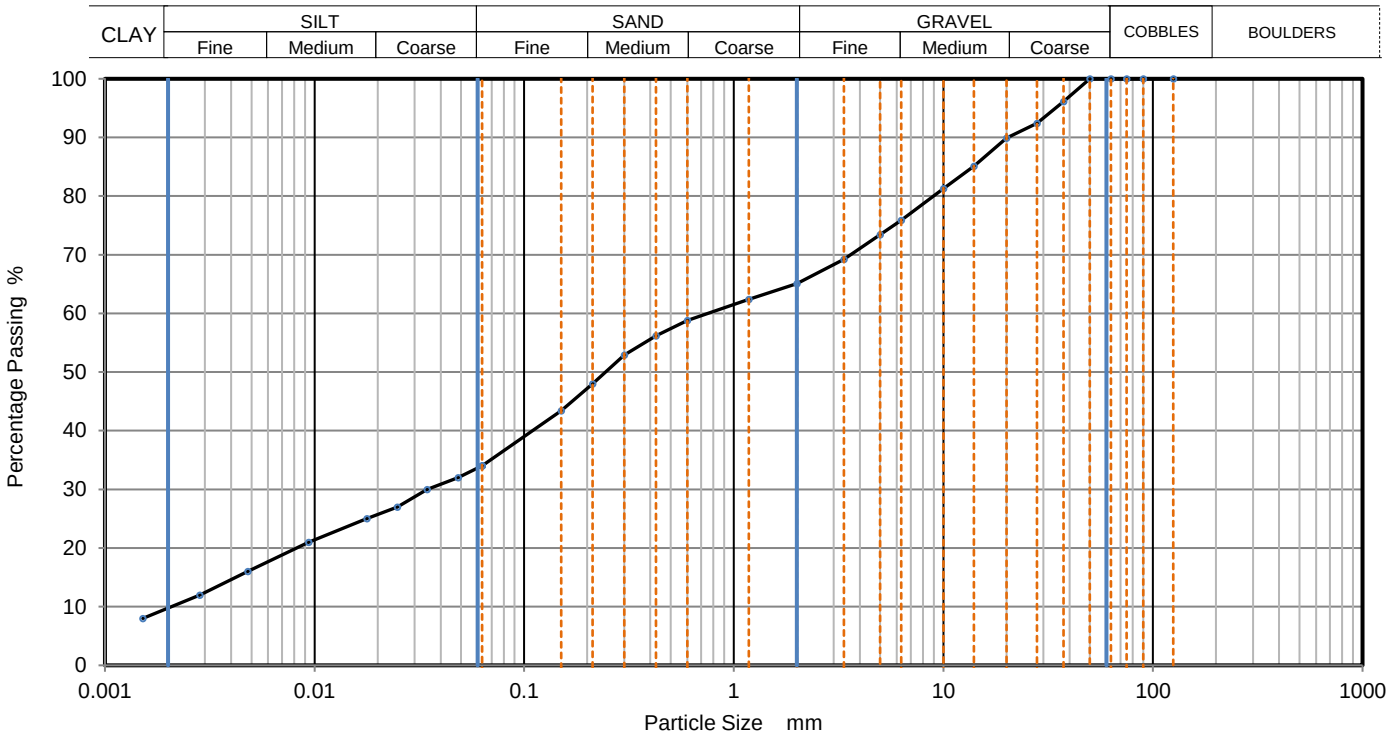
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					**21-1682**
Borehole/Pit No.					BH-1922
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Brown sandy gravelly silty CLAY.			Sample Depth (m) Top	7.80
				Base	8.25
Specimen Reference	6	Specimen Depth	7.8 m	Sample Type	C
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus202209192



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	34
90	100	0.04837	32
75	100	0.03444	30
63	100	0.02484	27
50	100	0.01780	25
37.5	96	0.00936	21
28	92	0.00480	16
20	90	0.00283	12
14	85	0.00152	8
10	81		
6.3	76		
5	73		
3.35	69		
2	65		
1.18	62		
0.6	59	Particle density	(assumed)
0.425	56	2.65	Mg/m3
0.3	53		
0.212	48		
0.15	43		
0.063	34		

Dry Mass of sample, g: 3471

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	34.9
Sand	31.2
Silt	24.1
Clay	9.8

Grading Analysis		
D100	mm	
D60	mm	0.75
D30	mm	0.0329
D10	mm	0.00208
Uniformity Coefficient		360
Curvature Coefficient		0.69

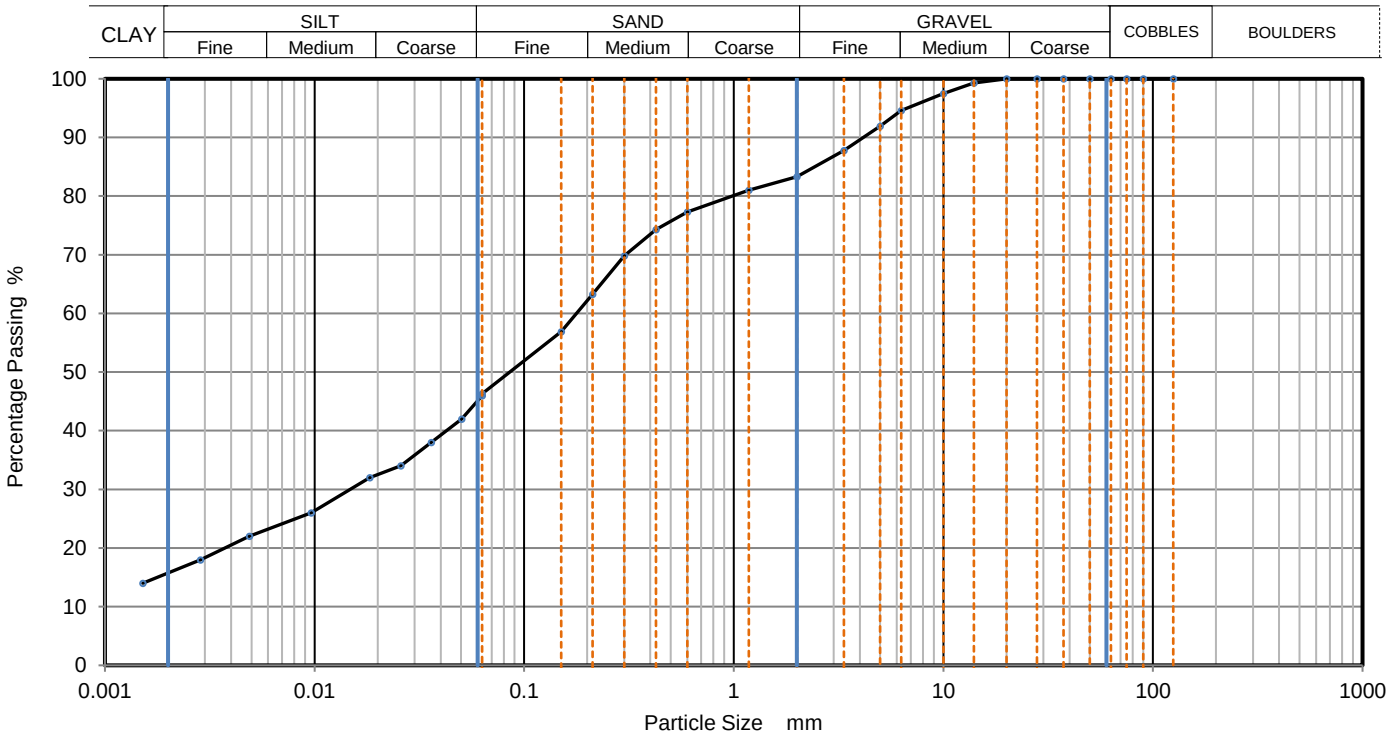
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					**21-1682**
Borehole/Pit No.					BH-1922
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	5
Specimen Description	Brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	10.20
				Base	10.70
Specimen Reference	6	Specimen Depth	10.2 m	Sample Type	C
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus202209194



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	46
90	100	0.05033	42
75	100	0.03604	38
63	100	0.02580	34
50	100	0.01835	32
37.5	100	0.00965	26
28	100	0.00488	22
20	100	0.00285	18
14	99	0.00152	14
10	98		
6.3	95		
5	92		
3.35	88		
2	83		
1.18	81		
0.6	77	Particle density	(assumed)
0.425	74	2.65	Mg/m3
0.3	70		
0.212	63		
0.15	57		
0.063	46		

Dry Mass of sample, g: 532

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	16.7
Sand	37.0
Silt	30.4
Clay	15.9

Grading Analysis		
D100	mm	
D60	mm	0.177
D30	mm	0.0145
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

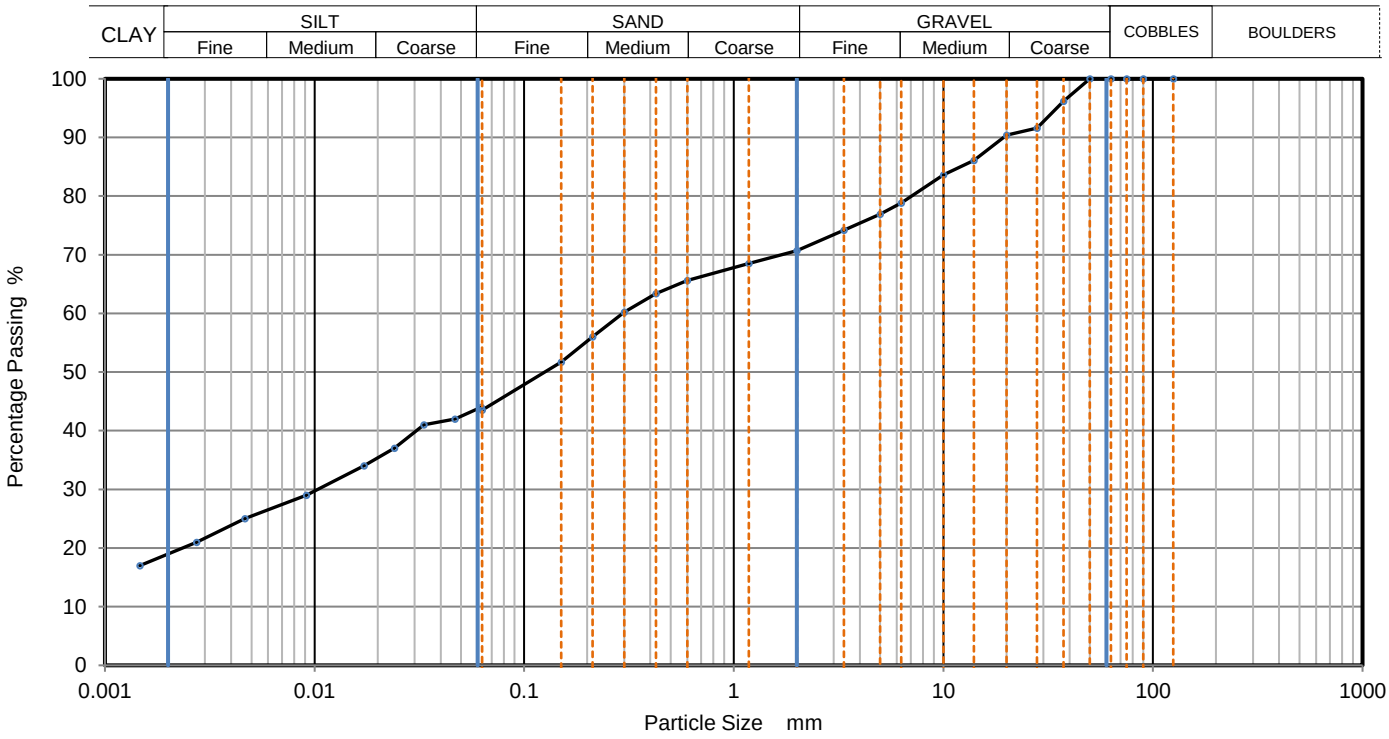
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					**21-1682**
Borehole/Pit No.					BH-1922
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	7
Specimen Description	Brown sandy gravelly silty CLAY.			Sample Depth (m) Top	20.50
				Base	21.00
Specimen Reference	6	Specimen Depth	20.5 m	Sample Type	C
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus202209196



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06230	44
90	100	0.04667	42
75	100	0.03324	41
63	100	0.02402	37
50	100	0.01722	34
37.5	96	0.00913	29
28	92	0.00465	25
20	90	0.00274	21
14	86	0.00147	17
10	84		
6.3	79		
5	77		
3.35	74		
2	71		
1.18	69		
0.6	66	Particle density	(assumed)
0.425	63	2.65	Mg/m3
0.3	60		
0.212	56		
0.15	52		
0.063	44		

Dry Mass of sample, g: 3101

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	29.3
Sand	27.2
Silt	24.4
Clay	19.1

Grading Analysis		
D100	mm	
D60	mm	0.295
D30	mm	0.0103
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

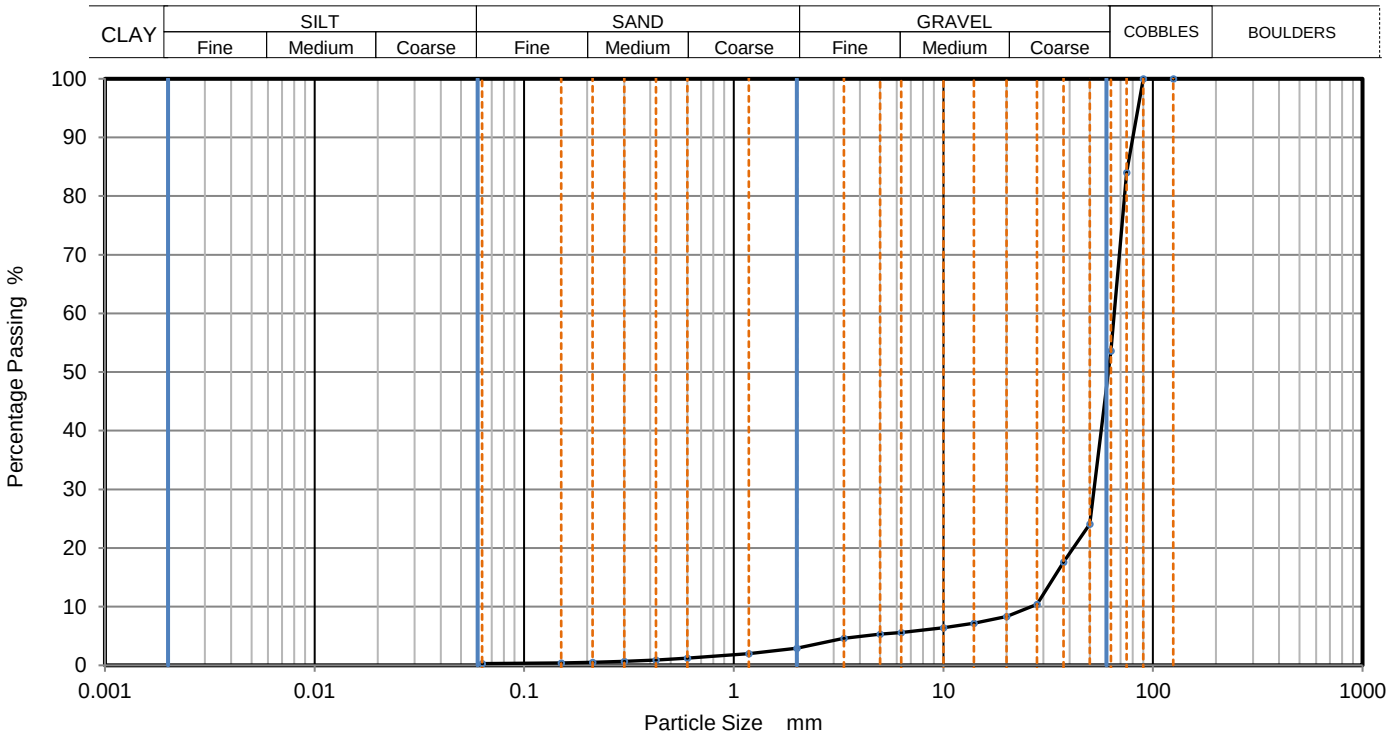
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					BH-19407
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	4
Specimen Description	Brown subangular fine to coarse GRAVEL with cobbles.			Sample Depth (m) Top	2.00
				Base	2.20
Specimen Reference	3	Specimen Depth	2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus20220815143



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	84		
63	54		
50	24		
37.5	18		
28	10		
20	8		
14	7		
10	6		
6.3	6		
5	5		
3.35	5		
2	3		
1.18	2		
0.6	1		
0.425	1		
0.3	1		
0.212	1		
0.15	0		
0.063	0		

Dry Mass of sample, g: 5069

Sample Proportions	% dry mass
Cobbles	46.4
Gravel	50.7
Sand	2.6
Fines <0.063mm	0.0

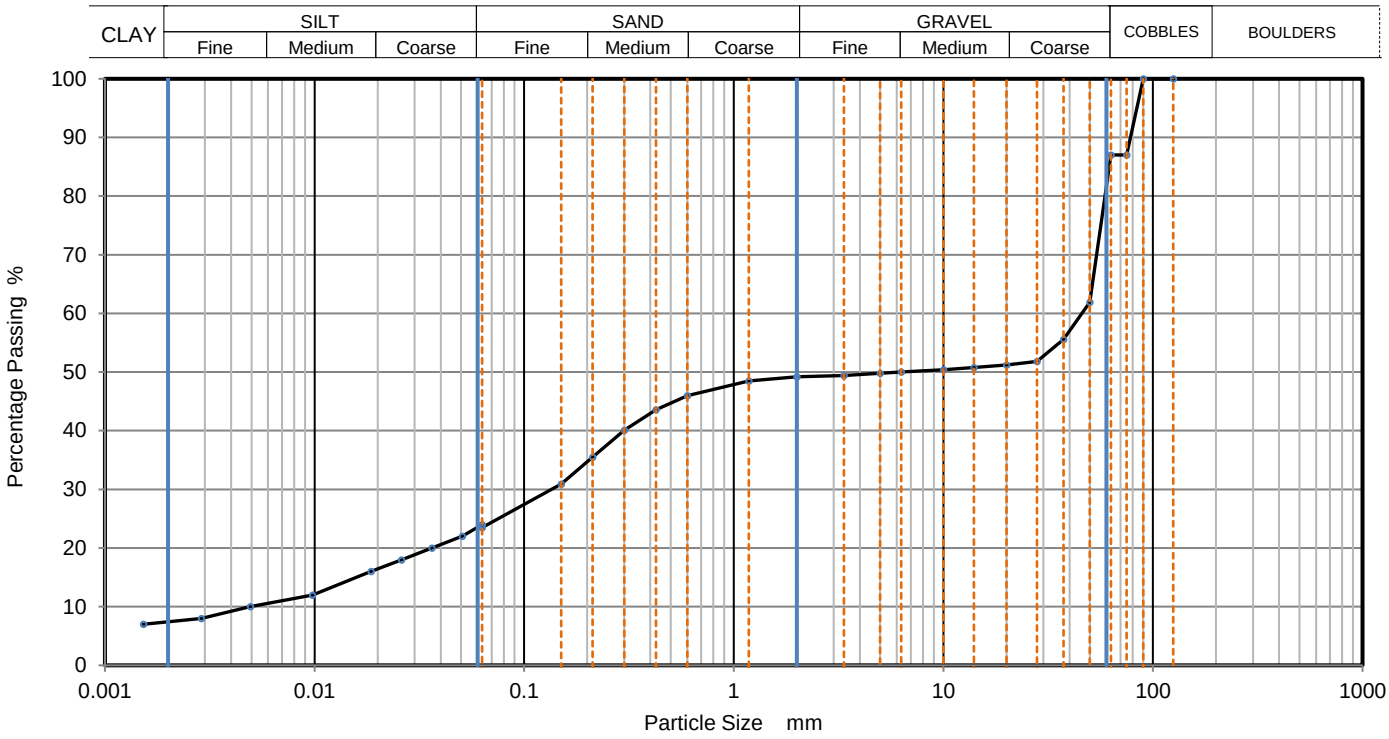
Grading Analysis		
D100	mm	
D60	mm	65.4
D30	mm	52.4
D10	mm	26.2
Uniformity Coefficient		2.5
Curvature Coefficient		1.6

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-19427
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brown sandy gravelly silty CLAY.			Sample Depth (m) Top	0.90
				Base	1.70
Specimen Reference	3	Specimen Depth	0.9 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220815145



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	24
90	100	0.05065	22
75	87	0.03627	20
63	87	0.02596	18
50	62	0.01857	16
37.5	56	0.00976	12
28	52	0.00493	10
20	51	0.00288	8
14	51	0.00152	7
10	50		
6.3	50		
5	50		
3.35	49		
2	49		
1.18	49		
0.6	46	Particle density	(assumed)
0.425	44	2.65	Mg/m3
0.3	40		
0.212	36		
0.15	31		
0.063	24		

Dry Mass of sample, g: 4164

Sample Proportions	% dry mass
Cobbles	13.0
Gravel	37.8
Sand	25.7
Silt	16.3
Clay	7.2

Grading Analysis		
D100	mm	
D60	mm	45.9
D30	mm	0.134
D10	mm	0.00485
Uniformity Coefficient		9500
Curvature Coefficient		0.081

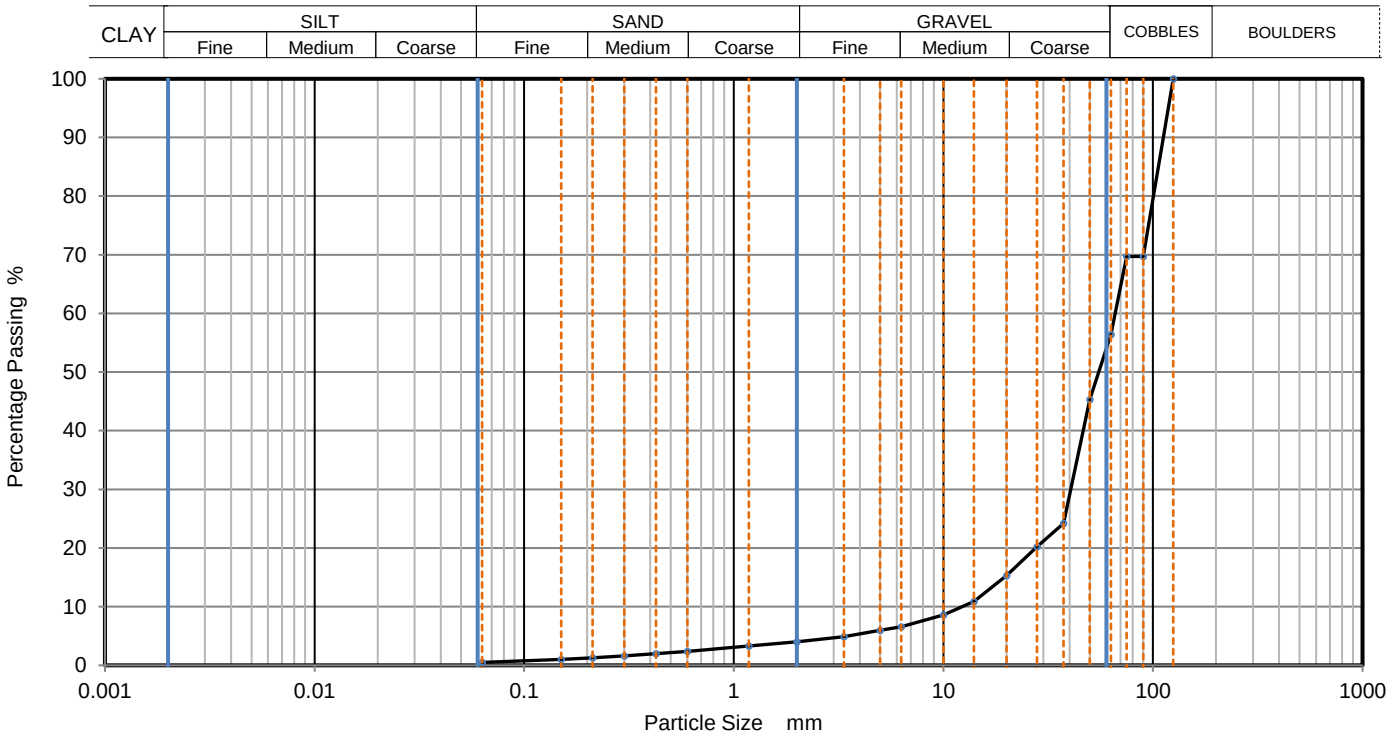
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-19427A
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Brownish grey sandy slightly clayey subangular fine to coarse GRAVEL.			Sample Depth (m) Top	1.20
				Sample Depth (m) Base	2.00
Specimen Reference	3	Specimen Depth	1.2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus20220815146



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	70		
75	70		
63	56		
50	45		
37.5	24		
28	20		
20	15		
14	11		
10	9		
6.3	7		
5	6		
3.35	5		
2	4		
1.18	3		
0.6	2		
0.425	2		
0.3	2		
0.212	1		
0.15	1		
0.063	1		

Dry Mass of sample, g: 10775

Sample Proportions	% dry mass
Cobbles	43.6
Gravel	52.3
Sand	3.6
Fines <0.063mm	0.0

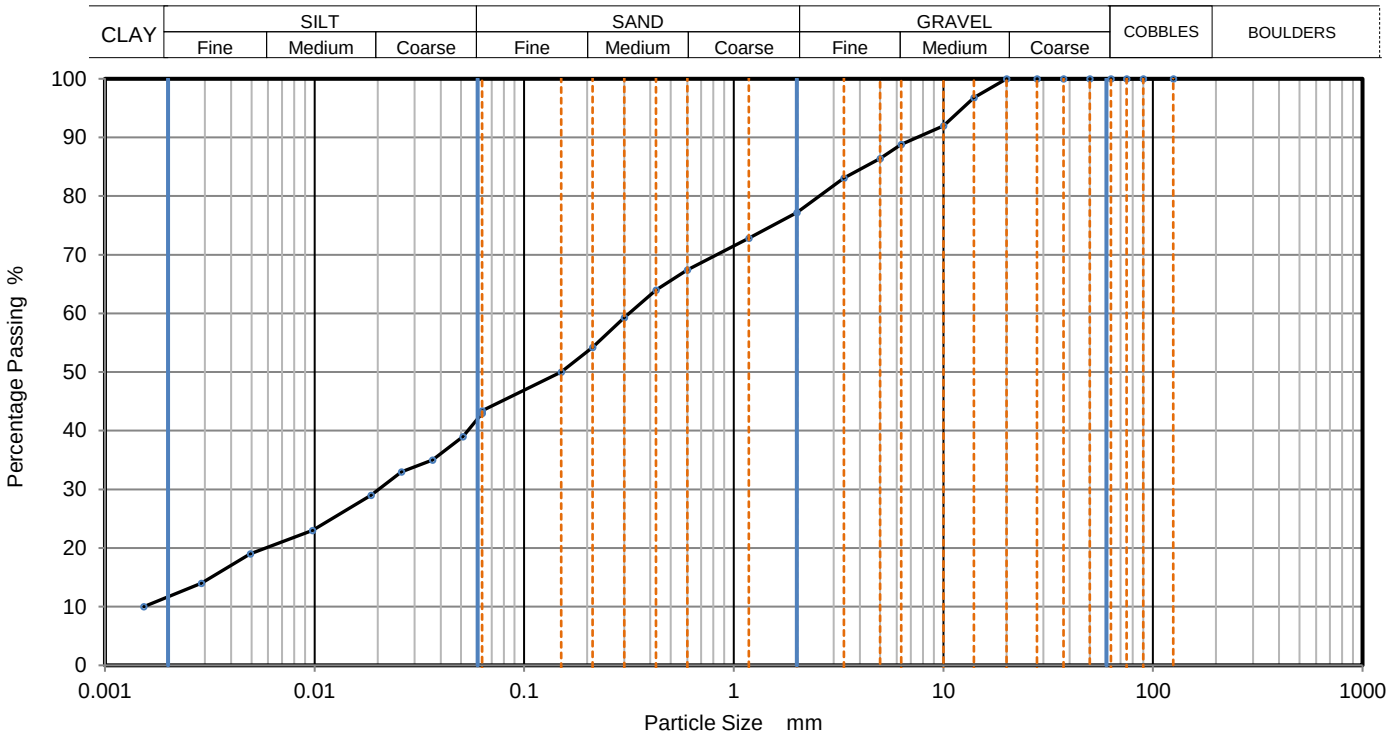
Grading Analysis		
D100	mm	125
D60	mm	66.1
D30	mm	40.6
D10	mm	12.2
Uniformity Coefficient		5.4
Curvature Coefficient		2

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		BH-199
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		2
Specimen Description	Brown sandy slightly gravelly silty CLAY.				Sample Depth (m)	Top	1.20
						Base	2.00
Specimen Reference	2	Specimen Depth	1.2	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus20220930127



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	43
90	100	0.05097	39
75	100	0.03649	35
63	100	0.02596	33
50	100	0.01857	29
37.5	100	0.00976	23
28	100	0.00493	19
20	100	0.00288	14
14	97	0.00153	10
10	92		
6.3	89		
5	86		
3.35	83		
2	77		
1.18	73		
0.6	67	Particle density	(assumed)
0.425	64	2.65	Mg/m3
0.3	59		
0.212	54		
0.15	50		
0.063	43		

Dry Mass of sample, g: 552

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	22.8
Sand	33.8
Silt	31.3
Clay	12.1

Grading Analysis		
D100	mm	
D60	mm	0.316
D30	mm	0.0202
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

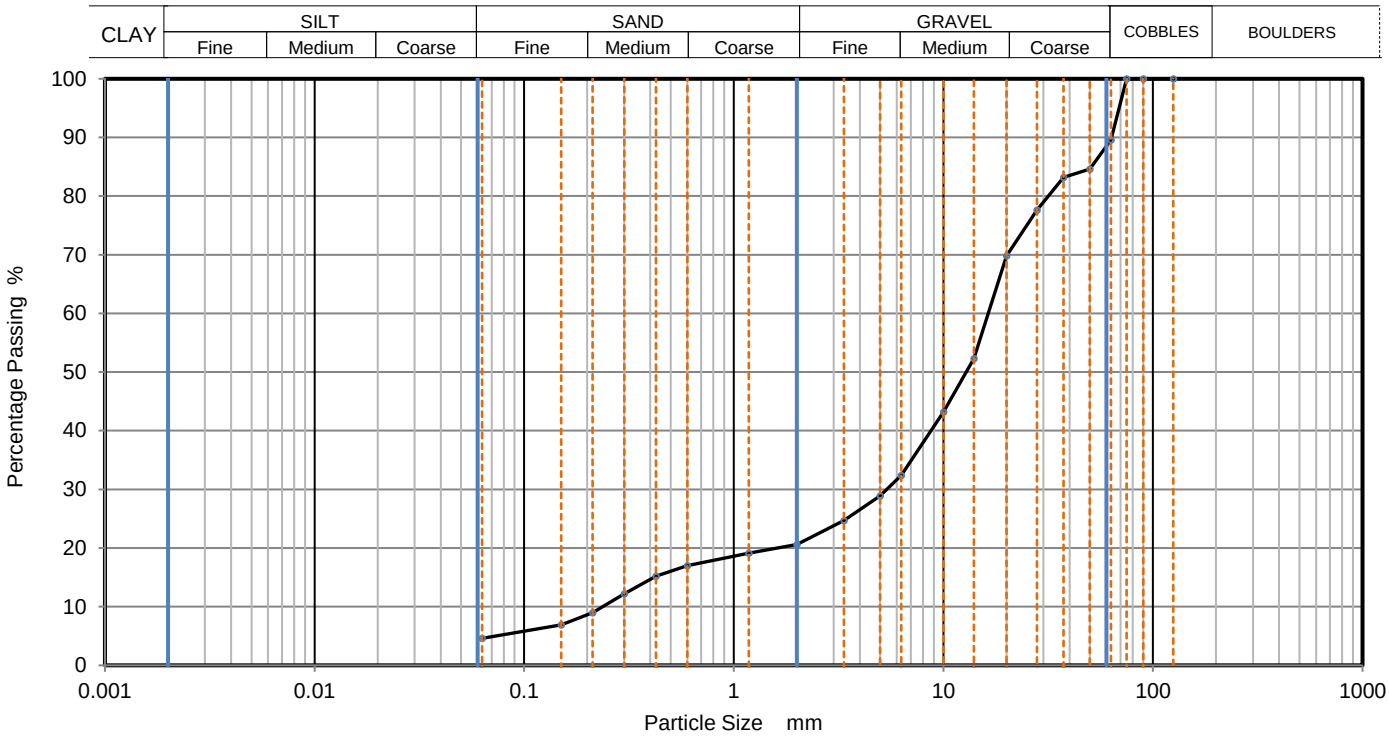
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-199
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	8
Specimen Description	Brown slightly sandy slightly silty subangular fine to coarse GRAVEL.			Sample Depth (m) Top	3.00
				Base	4.00
Specimen Reference	2	Specimen Depth	3 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus20220930129



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	90		
50	85		
37.5	83		
28	78		
20	70		
14	52		
10	43		
6.3	32		
5	29		
3.35	25		
2	21		
1.18	19		
0.6	17		
0.425	15		
0.3	12		
0.212	9		
0.15	7		
0.063	5		

Dry Mass of sample, g: 12459

Sample Proportions	% dry mass
Cobbles	10.4
Gravel	69.0
Sand	15.9
Fines <0.063mm	5.0

Grading Analysis		
D100	mm	
D60	mm	16.4
D30	mm	5.37
D10	mm	0.236
Uniformity Coefficient		69
Curvature Coefficient		7.5

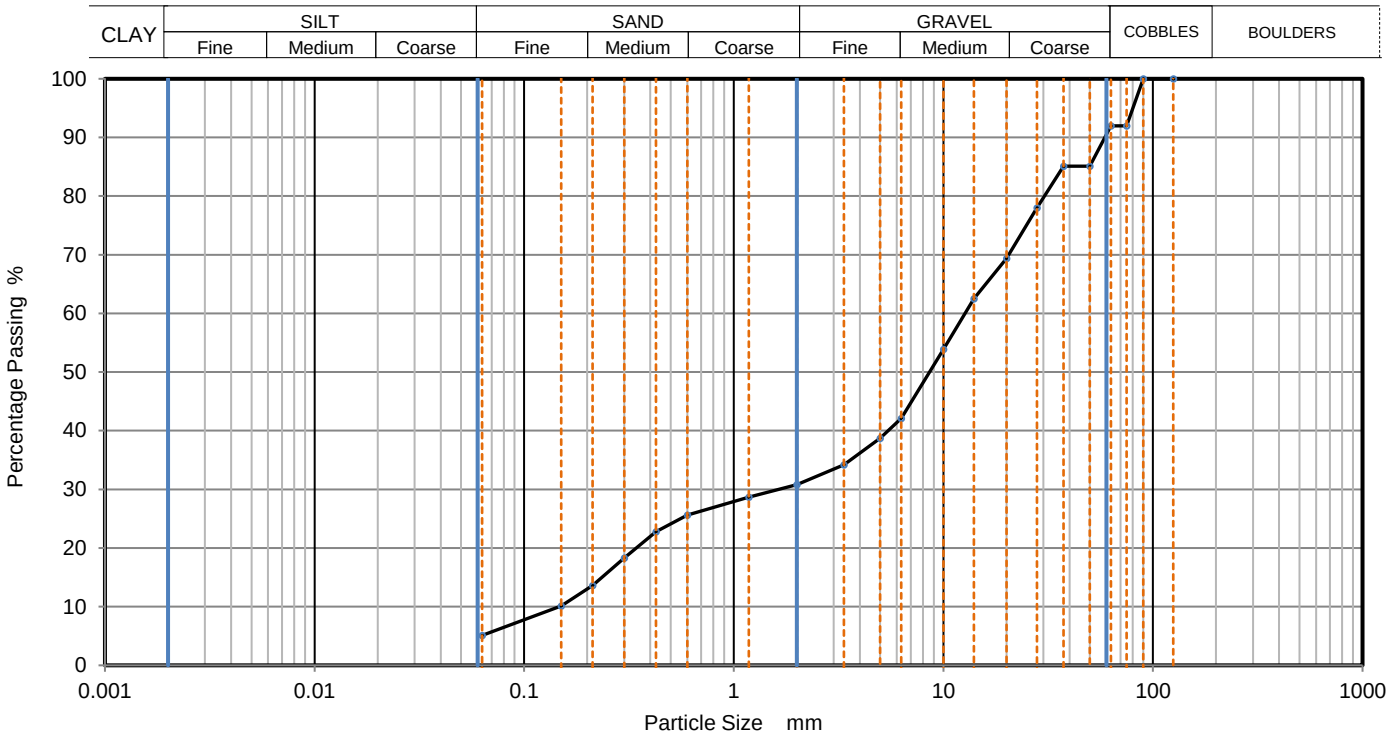
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-199
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	9
Specimen Description	Brown slightly sandy slightly silty subangular fine to coarse GRAVEL.			Sample Depth (m) Top	4.00
				Base	5.00
Specimen Reference	2	Specimen Depth	4 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus20220930130



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	92		
63	92		
50	85		
37.5	85		
28	78		
20	69		
14	63		
10	54		
6.3	42		
5	39		
3.35	34		
2	31		
1.18	29		
0.6	26		
0.425	23		
0.3	18		
0.212	14		
0.15	10		
0.063	5		

Dry Mass of sample, g: 12931

Sample Proportions	% dry mass
Cobbles	8.0
Gravel	61.2
Sand	25.7
Fines <0.063mm	5.0

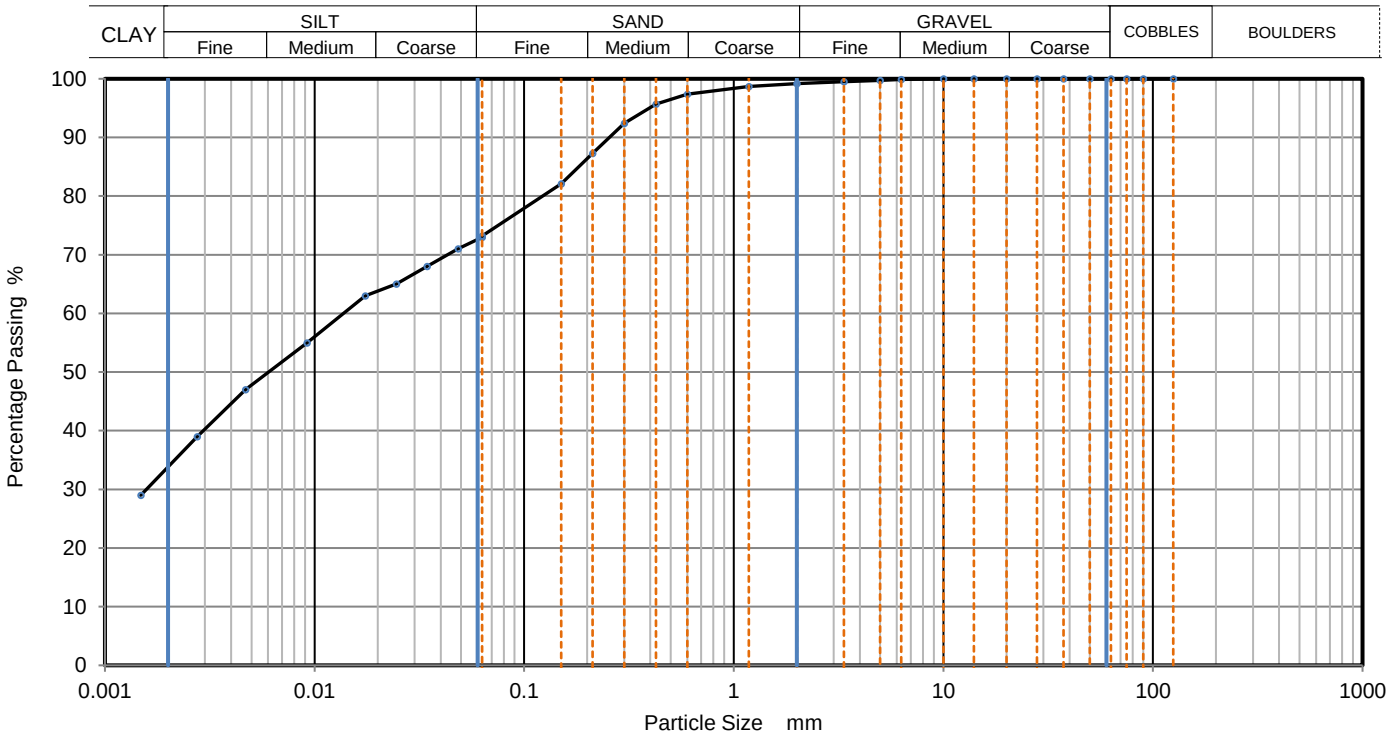
Grading Analysis		
D100	mm	
D60	mm	12.7
D30	mm	1.64
D10	mm	0.147
Uniformity Coefficient		87
Curvature Coefficient		1.4

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION			Job Ref		21-1682
				Borehole/Pit No.		BH-20326
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.		2
Specimen Description	Brown sandy silty CLAY.			Sample Depth (m)	Top	0.80
					Base	1.00
Specimen Reference	6	Specimen Depth	0.8 m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID		Caus2022090858



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	73
90	100	0.04837	71
75	100	0.03444	68
63	100	0.02452	65
50	100	0.01745	63
37.5	100	0.00919	55
28	100	0.00468	47
20	100	0.00275	39
14	100	0.00148	29
10	100		
6.3	100		
5	100		
3.35	100		
2	99		
1.18	99		
0.6	97	Particle density	(assumed)
0.425	96	2.65	Mg/m3
0.3	92		
0.212	87		
0.15	82		
0.063	73		

Dry Mass of sample, g: 251

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	0.8
Sand	26.0
Silt	39.4
Clay	33.8

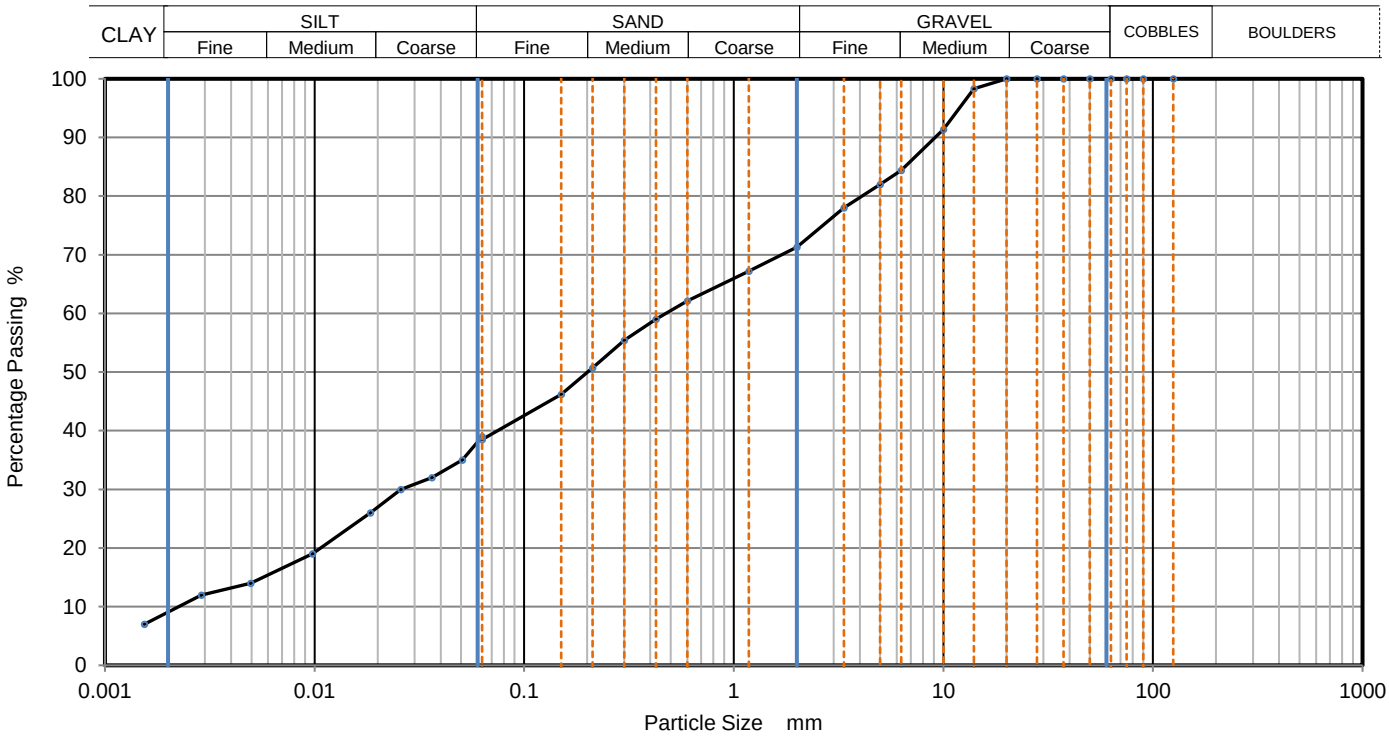
Grading Analysis		
D100	mm	
D60	mm	0.0139
D30	mm	0.0016
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		BH-20326
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		3
Specimen Description	Brown sandy slightly gravelly clayey SILT.				Sample Depth (m)	Top	1.80
						Base	2.00
Specimen Reference	6	Specimen Depth	1.8	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022090859



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	39
90	100	0.05065	35
75	100	0.03627	32
63	100	0.02580	30
50	100	0.01846	26
37.5	100	0.00976	19
28	100	0.00496	14
20	100	0.00288	12
14	98	0.00154	7
10	91		
6.3	84		
5	82		
3.35	78		
2	71		
1.18	67		
0.6	62	Particle density	(assumed)
0.425	59	2.65	Mg/m3
0.3	55		
0.212	51		
0.15	46		
0.063	39		

Dry Mass of sample, g: 500

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	28.7
Sand	32.8
Silt	29.3
Clay	9.2

Grading Analysis		
D100	mm	
D60	mm	0.475
D30	mm	0.0271
D10	mm	0.0022
Uniformity Coefficient		220
Curvature Coefficient		0.7

Remarks

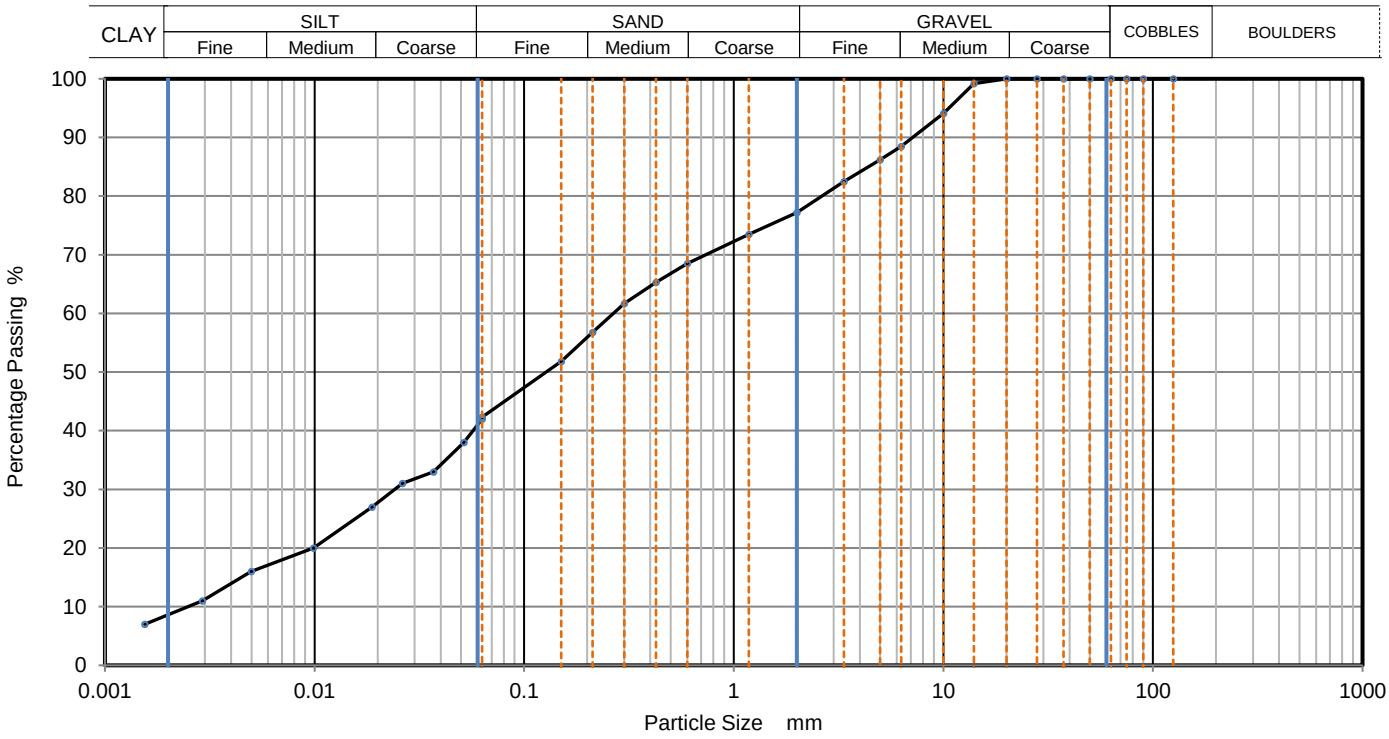
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					BH-20326
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	4
Specimen Description	Brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	2.80
				Base	3.00
Specimen Reference	6	Specimen Depth	2.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022090860



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	42
90	100	0.05160	38
75	100	0.03693	33
63	100	0.02627	31
50	100	0.01879	27
37.5	100	0.00987	20
28	100	0.00499	16
20	100	0.00291	11
14	99	0.00155	7
10	94		
6.3	89		
5	86		
3.35	83		
2	77		
1.18	74		
0.6	69	Particle density	(assumed)
0.425	65	2.65	Mg/m3
0.3	62		
0.212	57		
0.15	52		
0.063	42		

Dry Mass of sample, g: 506

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	22.8
Sand	34.9
Silt	33.8
Clay	8.5

Grading Analysis		
D100	mm	
D60	mm	0.266
D30	mm	0.0241
D10	mm	0.00248
Uniformity Coefficient		110
Curvature Coefficient		0.88

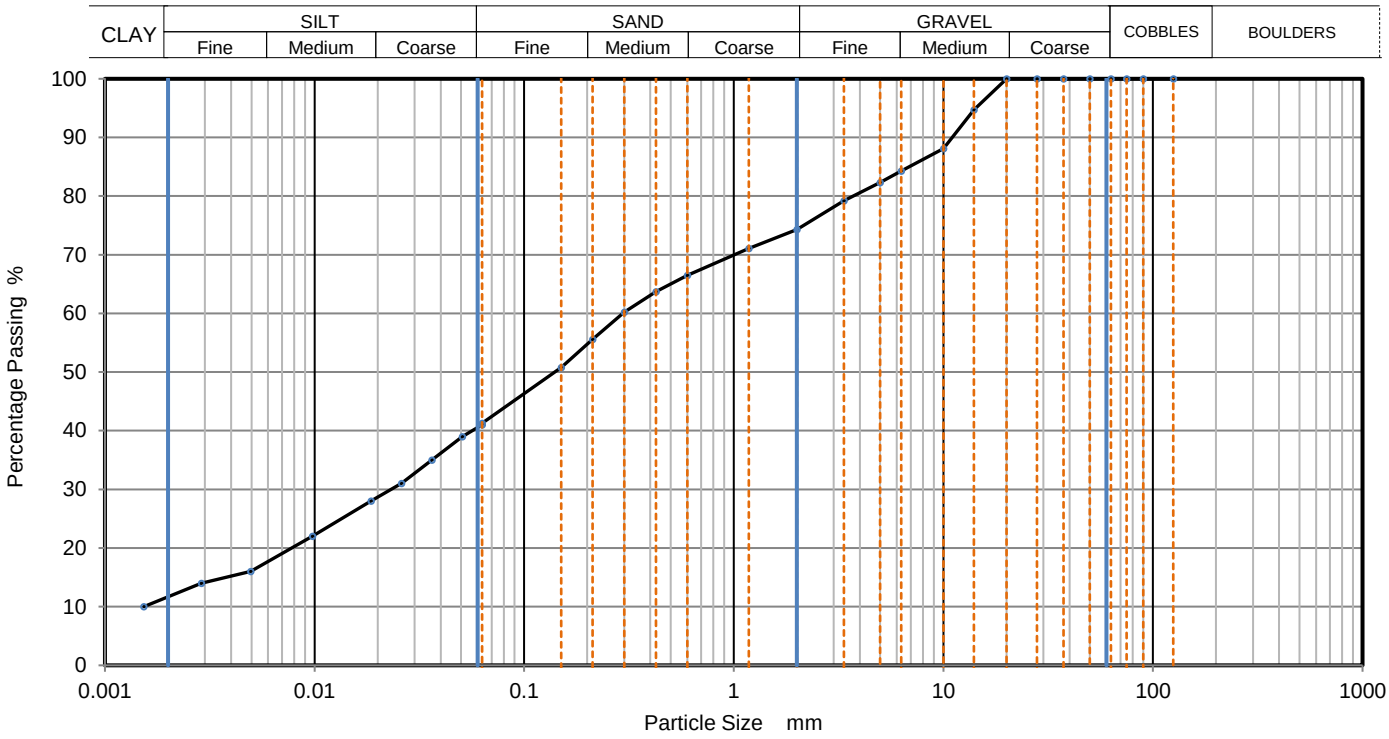
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					BH-20326
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	6
Specimen Description	Brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	4.80
				Base	5.00
Specimen Reference	6	Specimen Depth	4.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022090862



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	41
90	100	0.05065	39
75	100	0.03627	35
63	100	0.02596	31
50	100	0.01857	28
37.5	100	0.00976	22
28	100	0.00496	16
20	100	0.00288	14
14	95	0.00153	10
10	88		
6.3	84		
5	82		
3.35	79		
2	74		
1.18	71		
0.6	67	Particle density	(assumed)
0.425	64	2.65	Mg/m3
0.3	60		
0.212	56		
0.15	51		
0.063	41		

Dry Mass of sample, g: 505

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	25.7
Sand	33.0
Silt	29.8
Clay	11.5

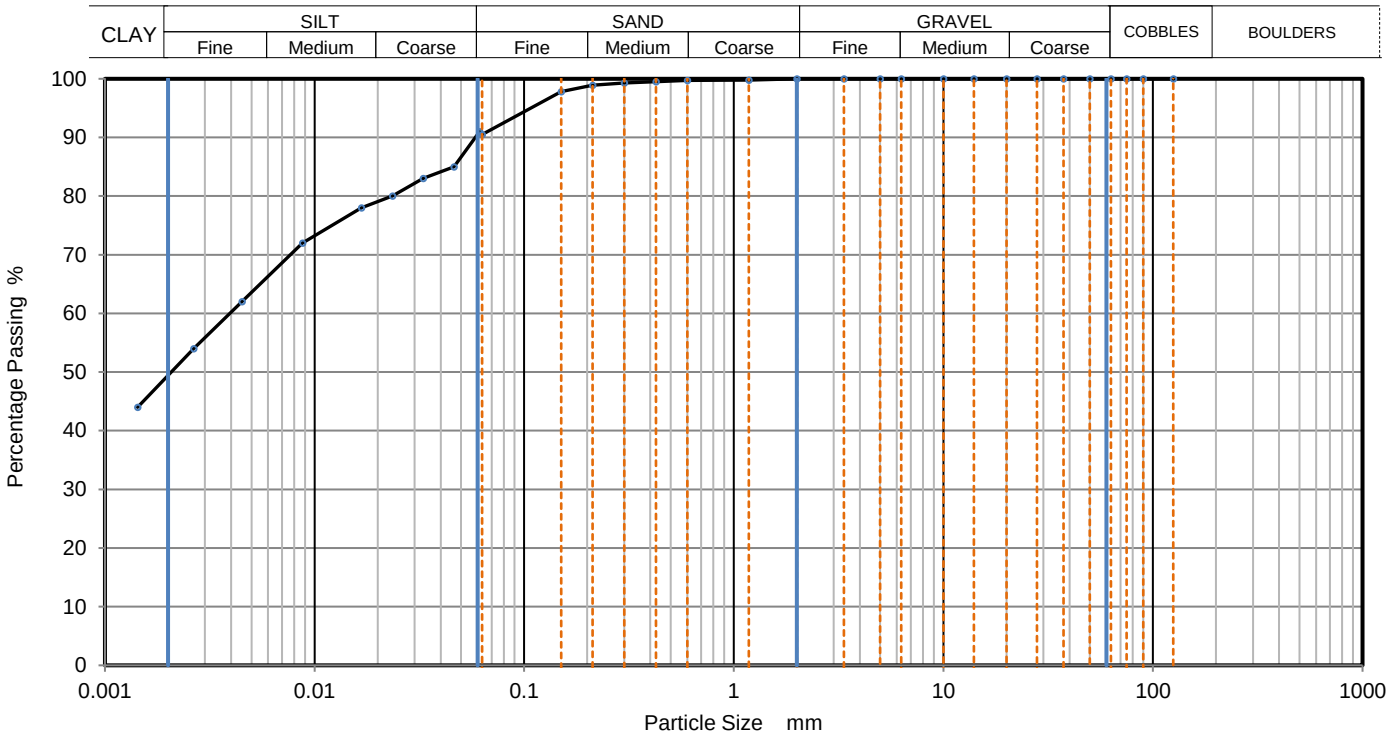
Grading Analysis		
D100	mm	
D60	mm	0.295
D30	mm	0.0229
D10	mm	0.00157
Uniformity Coefficient		190
Curvature Coefficient		1.1

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		BH-20655
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		3
Specimen Description	Brown slightly sandy silty CLAY.				Sample Depth (m)	Top	1.80
						Base	2.00
Specimen Reference	2	Specimen Depth	1.8	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022090864



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06135	91
90	100	0.04632	85
75	100	0.03300	83
63	100	0.02351	80
50	100	0.01674	78
37.5	100	0.00877	72
28	100	0.00451	62
20	100	0.00265	54
14	100	0.00143	44
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	100	Particle density	(assumed)
0.425	100	2.65	Mg/m3
0.3	99		
0.212	99		
0.15	98		
0.063	91		

Dry Mass of sample, g: 250

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	0.0
Sand	9.4
Silt	41.0
Clay	49.6

Grading Analysis		
D100	mm	
D60	mm	0.00392
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

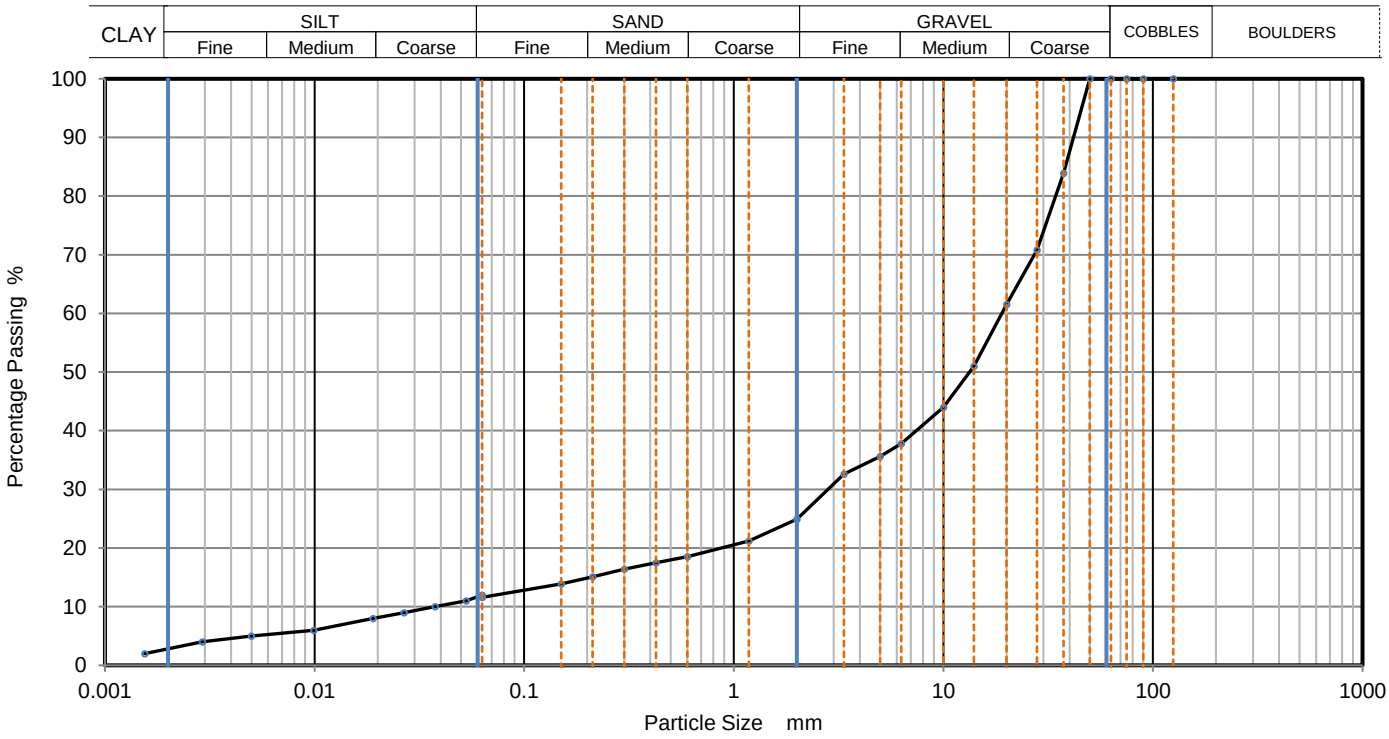
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-20939
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Brown very gravelly sandy silty CLAY.			Sample Depth (m) Top	0.40
				Base	1.20
Specimen Reference	6	Specimen Depth	0.4 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022090892



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	12
90	100	0.05283	11
75	100	0.03757	10
63	100	0.02672	9
50	100	0.01900	8
37.5	84	0.00992	6
28	71	0.00499	5
20	62	0.00291	4
14	51	0.00155	2
10	44		
6.3	38		
5	36		
3.35	33		
2	25		
1.18	21		
0.6	19	Particle density	(assumed)
0.425	18	2.65	Mg/m3
0.3	16		
0.212	15		
0.15	14		
0.063	12		

Dry Mass of sample, g: 2533

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	75.1
Sand	13.3
Silt	9.1
Clay	2.5

Grading Analysis		
D100	mm	
D60	mm	19
D30	mm	2.81
D10	mm	0.0403
Uniformity Coefficient		470
Curvature Coefficient		10

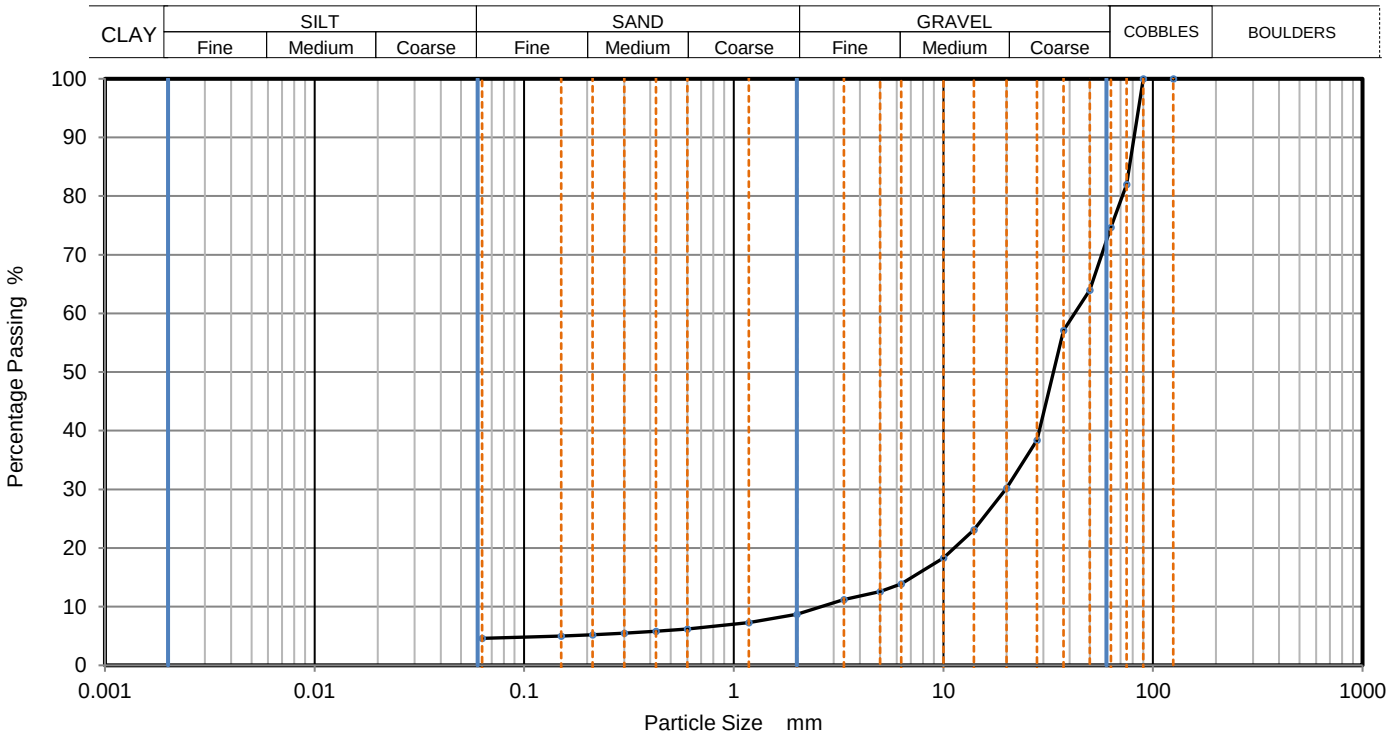
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					BH-20939
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Light brown slightly sandy slightly silty subangular fine to coarse GRAVEL with cobbles.			Sample Depth (m) Top	2.00
				Base	3.00
Specimen Reference	2	Specimen Depth	2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022090893



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	82		
63	75		
50	64		
37.5	57		
28	38		
20	30		
14	23		
10	18		
6.3	14		
5	13		
3.35	11		
2	9		
1.18	7		
0.6	6		
0.425	6		
0.3	6		
0.212	5		
0.15	5		
0.063	5		

Dry Mass of sample, g: 7284

Sample Proportions	% dry mass
Cobbles	25.3
Gravel	65.9
Sand	4.2
Fines <0.063mm	5.0

Grading Analysis		
D100	mm	
D60	mm	42.4
D30	mm	19.8
D10	mm	2.62
Uniformity Coefficient		16
Curvature Coefficient		3.5

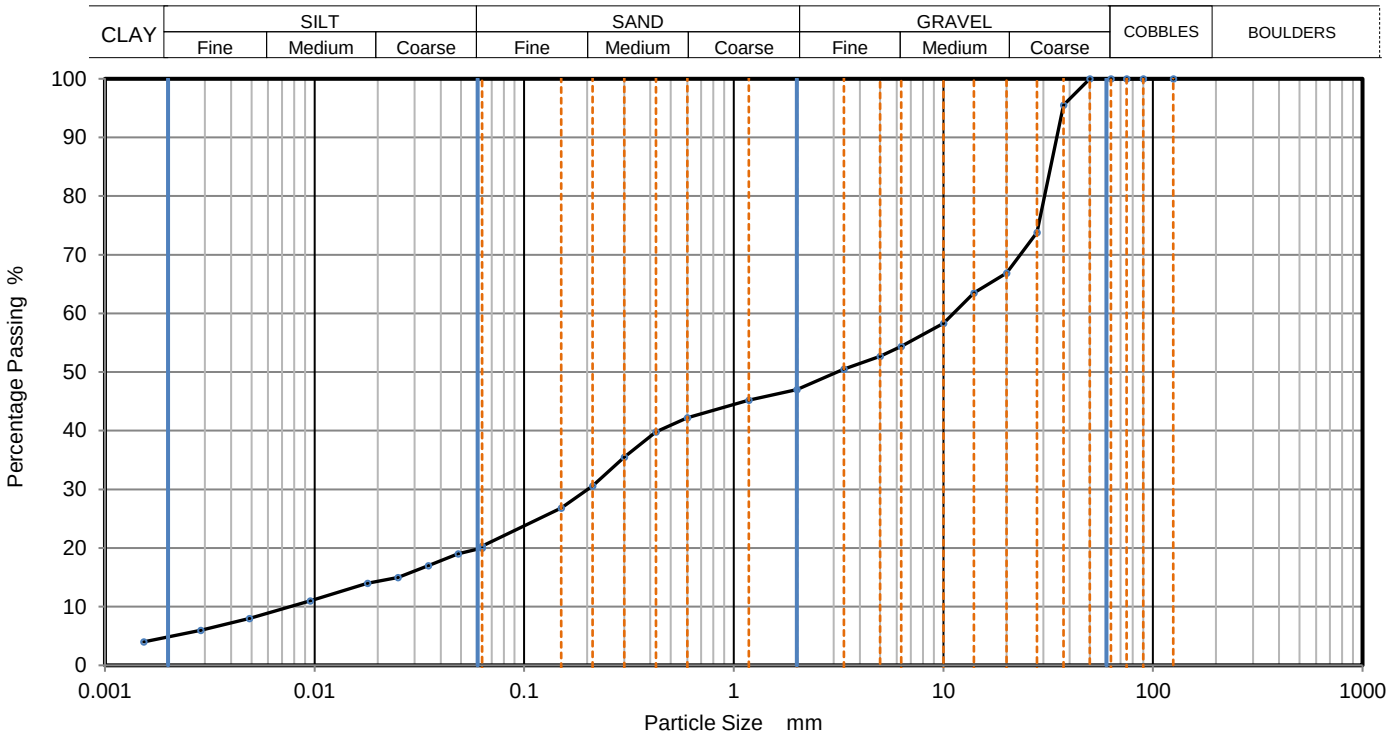
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					BH-2247
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Greyish brown sandy gravelly silty CLAY.			Sample Depth (m) Top	0.90
				Base	1.50
Specimen Reference	2	Specimen Depth	0.9 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022062116



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	20
90	100	0.04837	19
75	100	0.03490	17
63	100	0.02501	15
50	100	0.01791	14
37.5	96	0.00953	11
28	74	0.00488	8
20	67	0.00286	6
14	64	0.00153	4
10	58		
6.3	54		
5	53		
3.35	51		
2	47		
1.18	45		
0.6	42	Particle density (assumed)	
0.425	40	2.65 Mg/m3	
0.3	36		
0.212	31		
0.15	27		
0.063	20		

Dry Mass of sample, g: 2370

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	53.0
Sand	26.7
Silt	15.9
Clay	4.4

Grading Analysis		
D100	mm	
D60	mm	11.1
D30	mm	0.2
D10	mm	0.00846
Uniformity Coefficient		1300
Curvature Coefficient		0.42

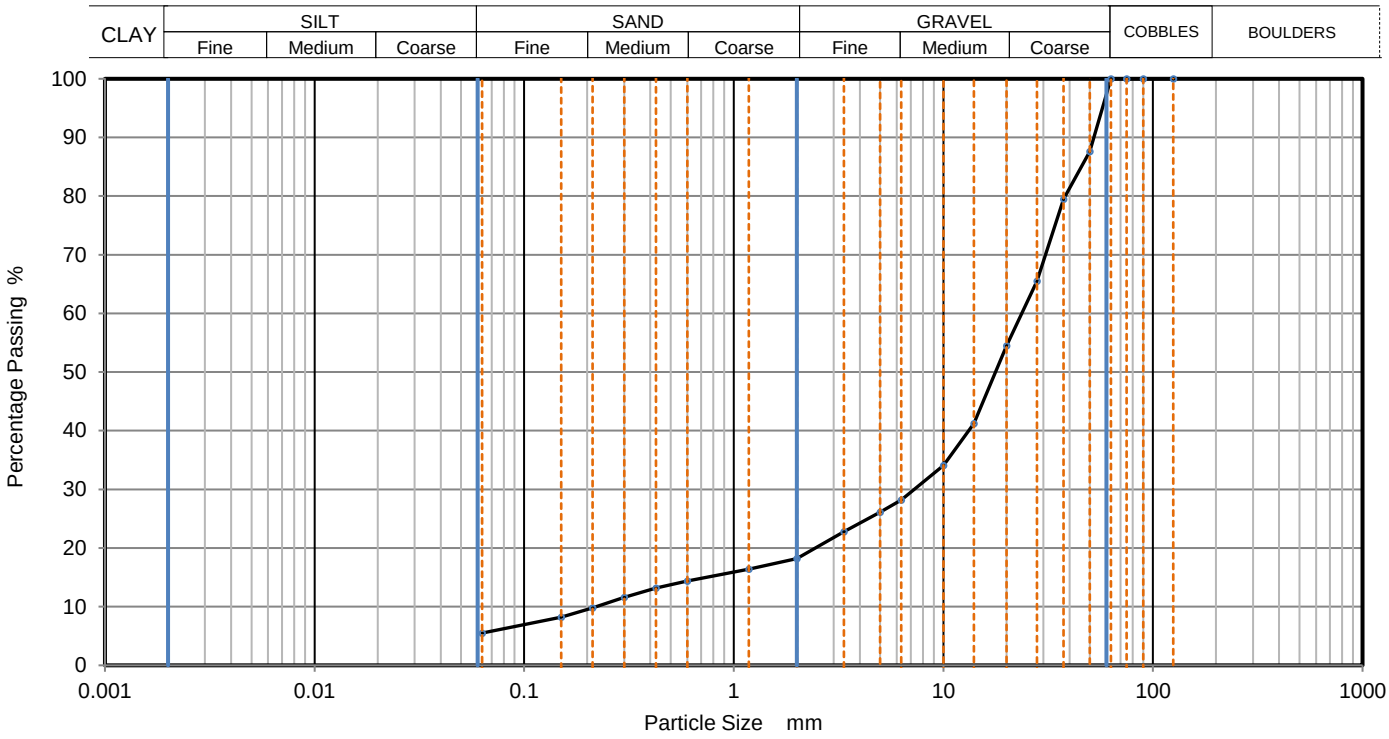
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-2247
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	4
Specimen Description	Greyish brown slightly sandy slightly silty subangular fine to coarse GRAVEL.			Sample Depth (m) Top	2.00
				Base	2.50
Specimen Reference	2	Specimen Depth	2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022062118



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	88		
37.5	80		
28	66		
20	55		
14	41		
10	34		
6.3	28		
5	26		
3.35	23		
2	18		
1.18	16		
0.6	14		
0.425	13		
0.3	12		
0.212	10		
0.15	8		
0.063	6		

Dry Mass of sample, g: 12158

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	81.8
Sand	12.7
Fines <0.063mm	5.0

Grading Analysis		
D100	mm	
D60	mm	23.7
D30	mm	7.24
D10	mm	0.219
Uniformity Coefficient		110
Curvature Coefficient		10

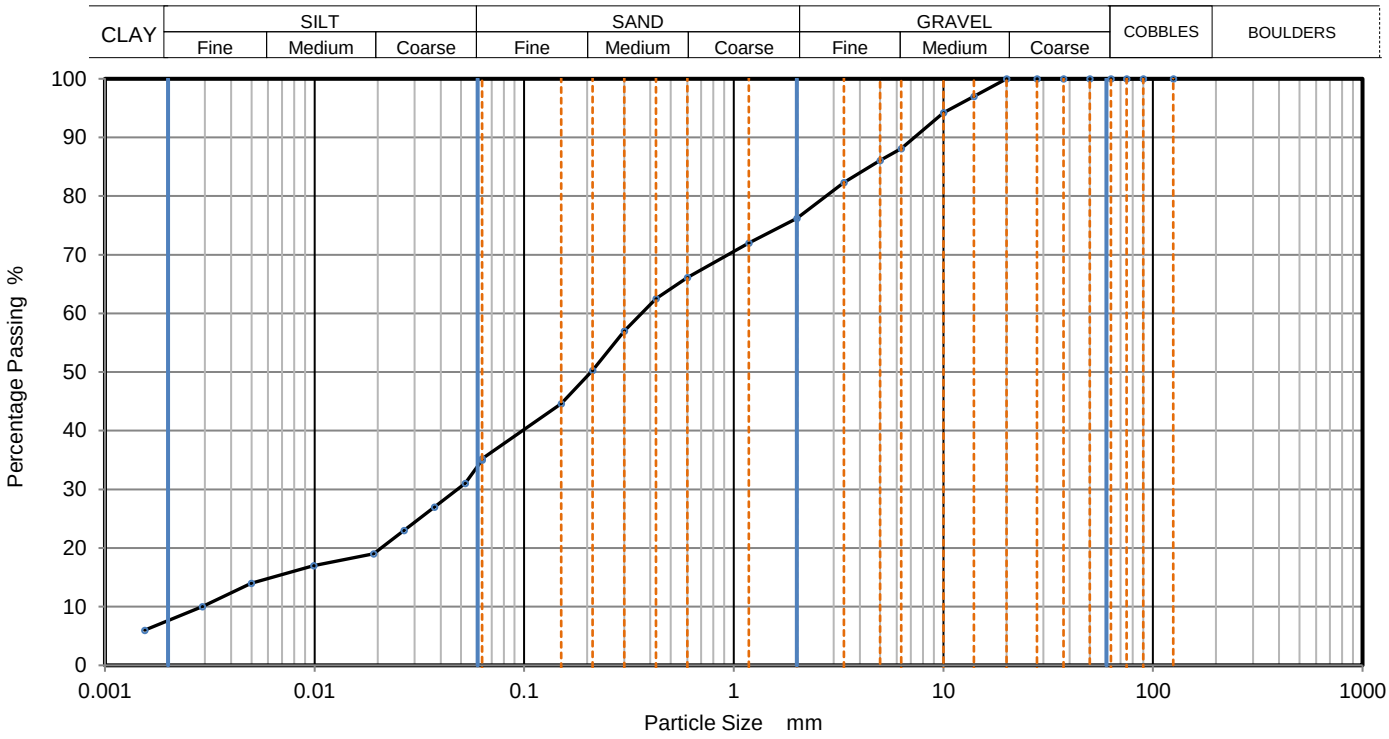
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					**21-1682**
Borehole/Pit No.					BH-2247
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	7
Specimen Description	Greyish brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	5.00
				Base	6.00
Specimen Reference	2	Specimen Depth	5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022062121



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	35
90	100	0.05222	31
75	100	0.03736	27
63	100	0.02672	23
50	100	0.01911	19
37.5	100	0.00992	17
28	100	0.00499	14
20	100	0.00291	10
14	97	0.00155	6
10	94		
6.3	88		
5	86		
3.35	82		
2	76		
1.18	72		
0.6	66	Particle density	(assumed)
0.425	63	2.65	Mg/m3
0.3	57		
0.212	50		
0.15	45		
0.063	35		

Dry Mass of sample, g: 949

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	23.8
Sand	41.0
Silt	27.3
Clay	7.9

Grading Analysis		
D100	mm	
D60	mm	0.362
D30	mm	0.0479
D10	mm	0.00276
Uniformity Coefficient		130
Curvature Coefficient		2.3

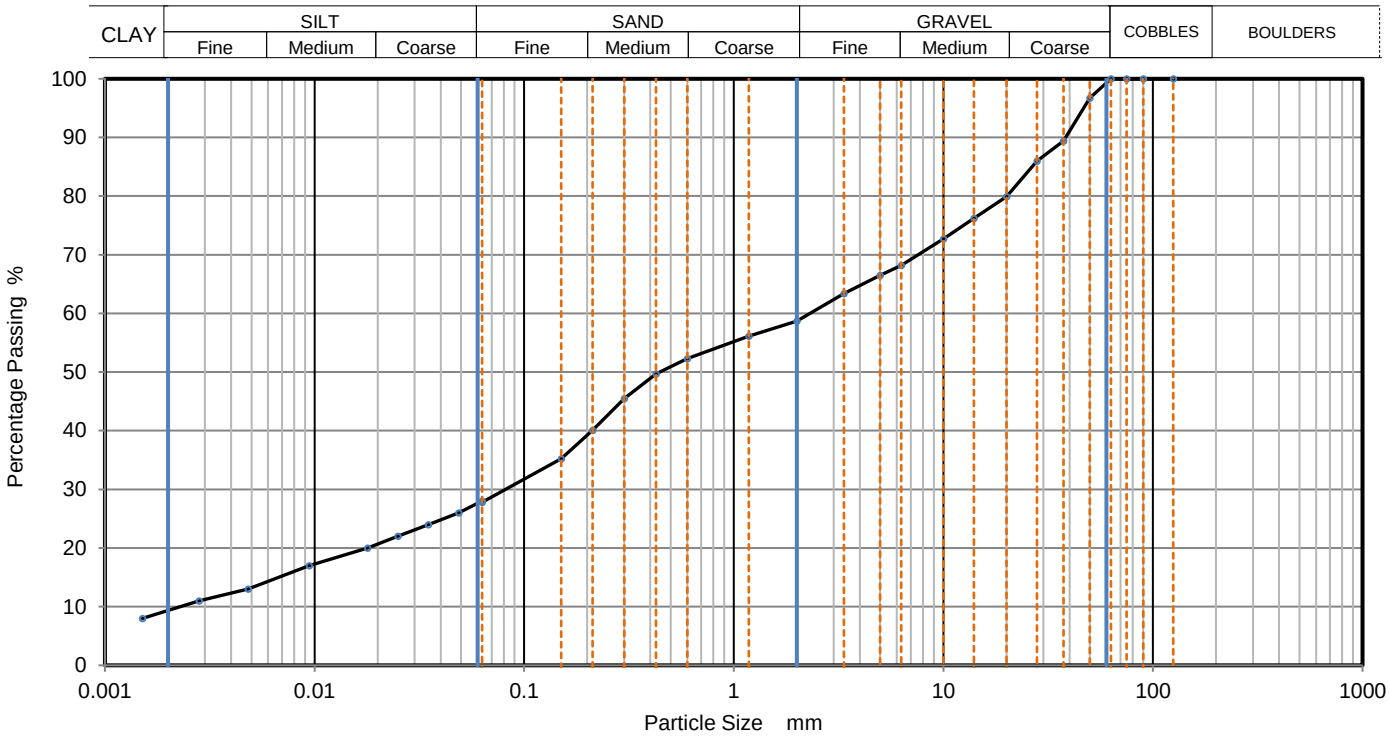
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					BH-2247
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Brownish grey sandy gravelly silty CLAY.			Sample Depth (m) Top	7.00
				Base	8.50
Specimen Reference	6	Specimen Depth	7 m	Sample Type	C
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022082553



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	28
90	100	0.04870	26
75	100	0.03490	24
63	100	0.02501	22
50	97	0.01791	20
37.5	89	0.00942	17
28	86	0.00482	13
20	80	0.00282	11
14	76	0.00151	8
10	73		
6.3	68		
5	67		
3.35	63		
2	59		
1.18	56		
0.6	52	Particle density	(assumed)
0.425	50	2.65	Mg/m3
0.3	46		
0.212	40		
0.15	35		
0.063	28		

Dry Mass of sample, g: 14275

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	41.3
Sand	31.0
Silt	18.4
Clay	9.3

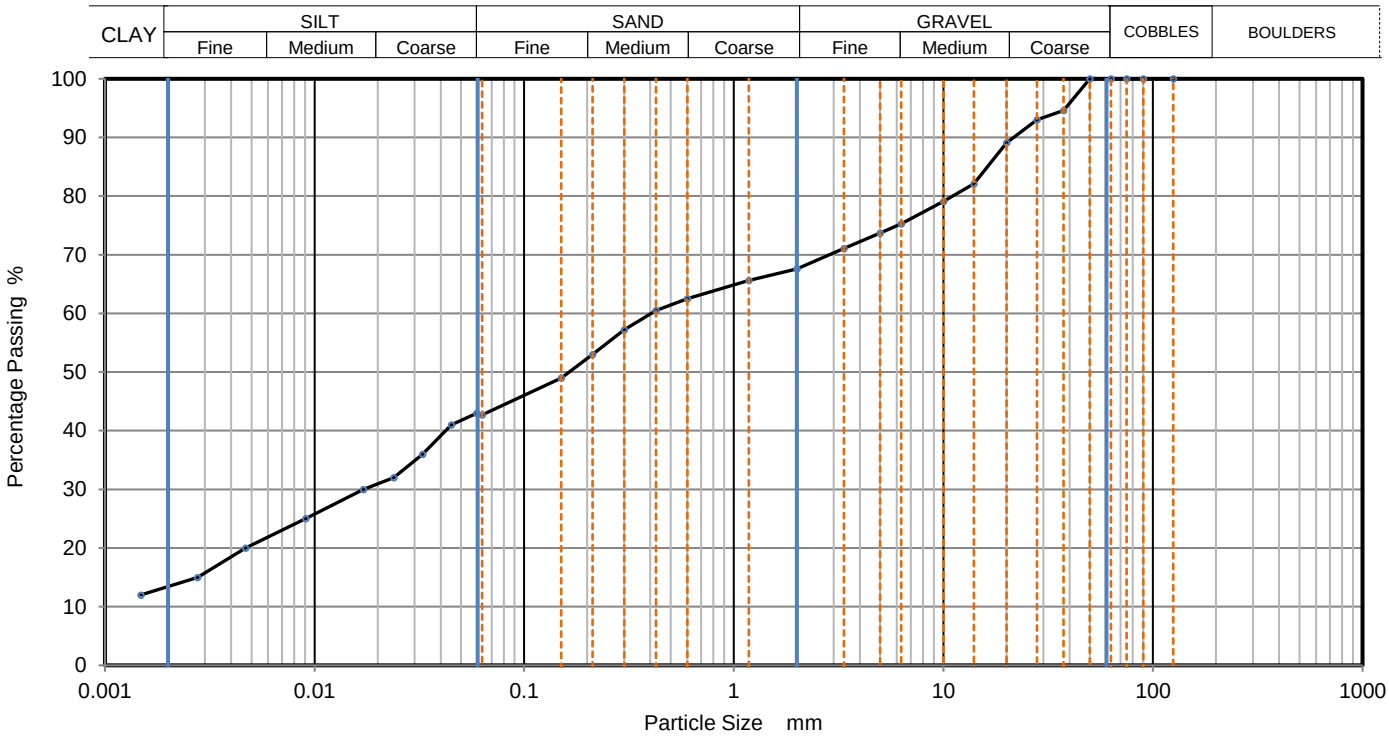
Grading Analysis		
D100	mm	
D60	mm	2.3
D30	mm	0.0818
D10	mm	0.00232
Uniformity Coefficient		990
Curvature Coefficient		1.3

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		BH-2247
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		2
Specimen Description	Brownish grey sandy gravelly silty CLAY.				Sample Depth (m)	Top	8.50
						Base	10.00
Specimen Reference	6	Specimen Depth	8.5	m	Sample Type		C
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022082554



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.05942	43
90	100	0.04491	41
75	100	0.03276	36
63	100	0.02385	32
50	100	0.01710	30
37.5	95	0.00907	25
28	93	0.00468	20
20	89	0.00277	15
14	82	0.00148	12
10	79		
6.3	75		
5	74		
3.35	71		
2	68		
1.18	66		
0.6	63	Particle density	(assumed)
0.425	61	2.65	Mg/m3
0.3	57		
0.212	53		
0.15	49		
0.063	43		

Dry Mass of sample, g: 5790

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	32.4
Sand	25.0
Silt	29.0
Clay	13.6

Grading Analysis		
D100	mm	
D60	mm	0.404
D30	mm	0.0183
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

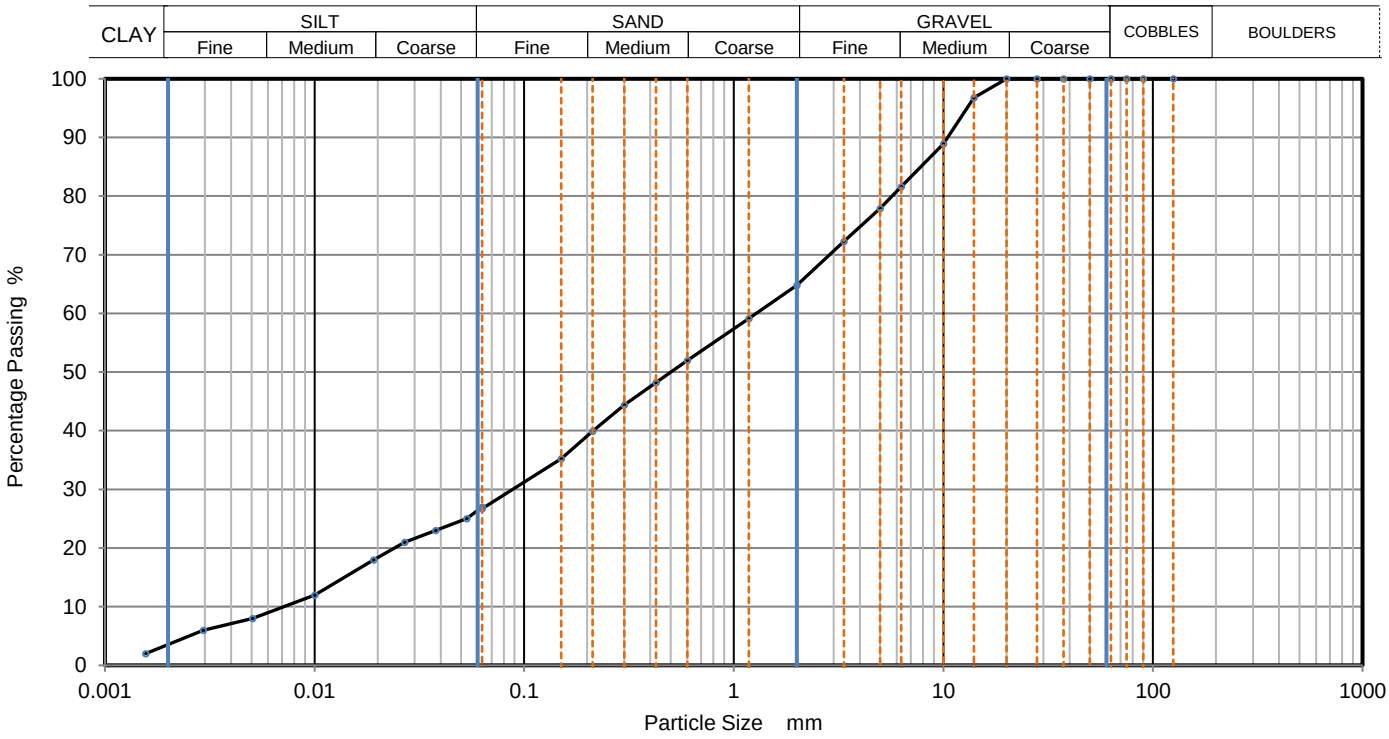
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-22776
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	0.80
				Base	1.00
Specimen Reference	4	Specimen Depth	0.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022090866



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	27
90	100	0.05314	25
75	100	0.03779	23
63	100	0.02687	21
50	100	0.01911	18
37.5	100	0.01003	12
28	100	0.00507	8
20	100	0.00294	6
14	97	0.00156	2
10	89		
6.3	82		
5	78		
3.35	72		
2	65		
1.18	59		
0.6	52	Particle density	(assumed)
0.425	48	2.65	Mg/m3
0.3	44		
0.212	40		
0.15	35		
0.063	27		

Dry Mass of sample, g: 504

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	35.2
Sand	38.0
Silt	23.1
Clay	3.7

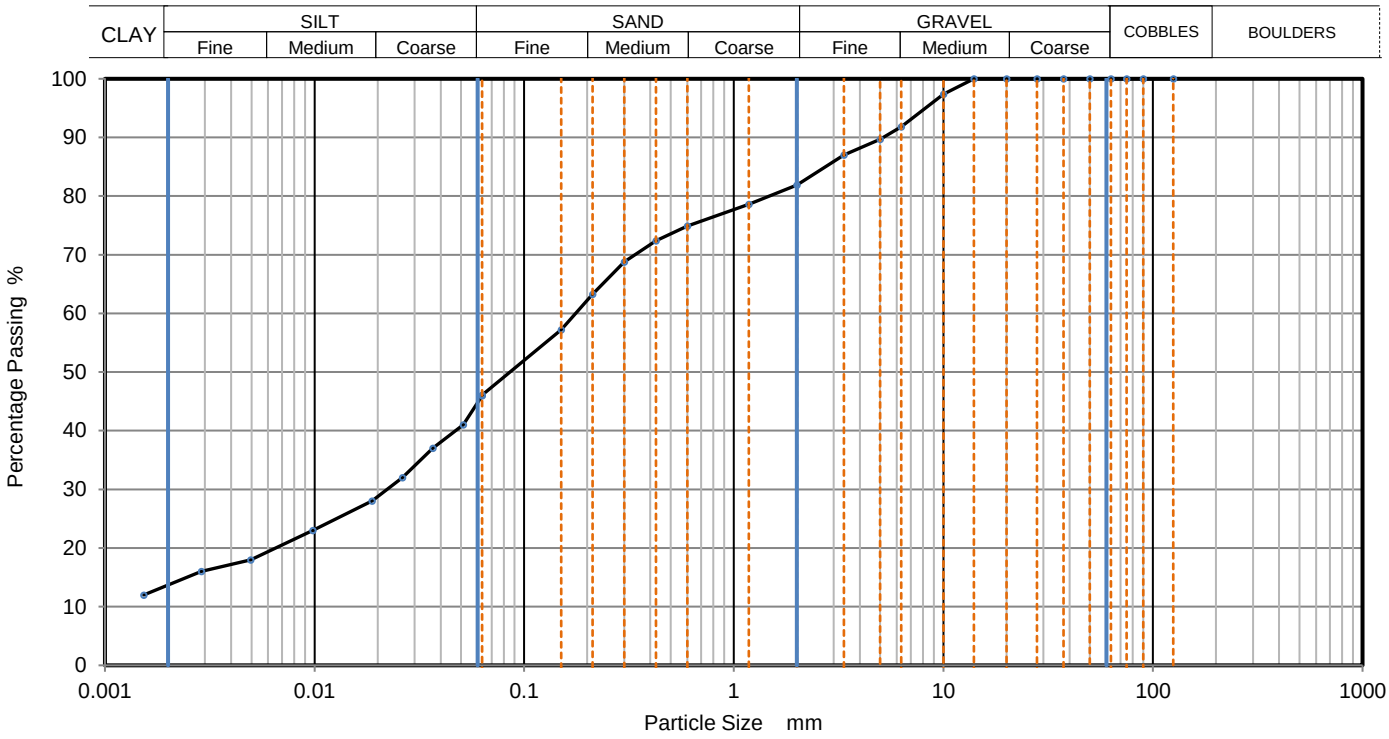
Grading Analysis		
D100	mm	
D60	mm	1.28
D30	mm	0.088
D10	mm	0.00682
Uniformity Coefficient		190
Curvature Coefficient		0.89

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION			Job Ref		21-1682
				Borehole/Pit No.		BH-23514
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.		2
Specimen Description	Brown sandy slightly gravelly silty CLAY.			Sample Depth (m)	Top	0.80
					Base	1.00
Specimen Reference	2	Specimen Depth	0.8 m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID		Caus2022090868



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	46
90	100	0.05129	41
75	100	0.03671	37
63	100	0.02627	32
50	100	0.01879	28
37.5	100	0.00981	23
28	100	0.00496	18
20	100	0.00288	16
14	100	0.00153	12
10	97		
6.3	92		
5	90		
3.35	87		
2	82		
1.18	79		
0.6	75	Particle density	(assumed)
0.425	72	2.65	Mg/m3
0.3	69		
0.212	63		
0.15	57		
0.063	46		

Dry Mass of sample, g: 412

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	18.1
Sand	35.8
Silt	32.6
Clay	13.5

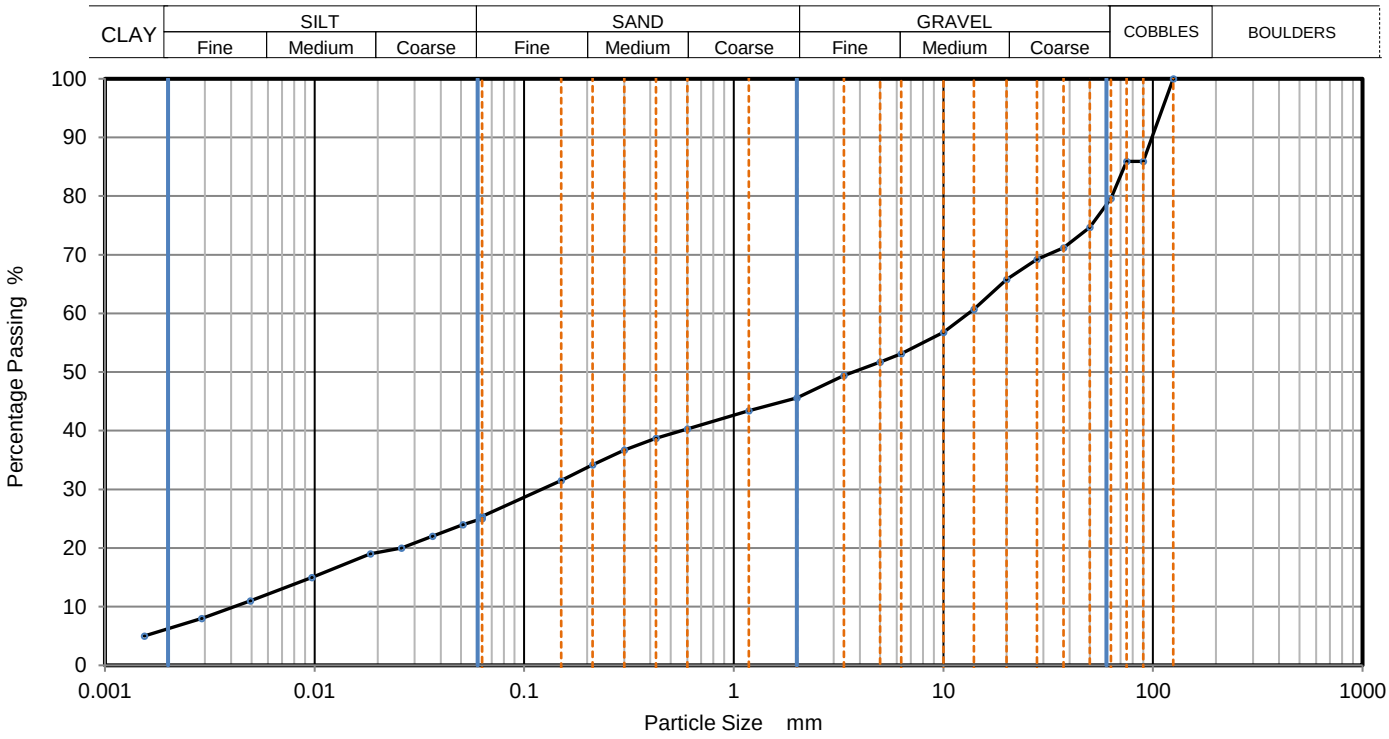
Grading Analysis		
D100	mm	
D60	mm	0.176
D30	mm	0.0223
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-23898
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	7
Specimen Description	Brownish grey sandy gravelly silty CLAY with cobbles.			Sample Depth (m) Top	0.80
				Base	1.10
Specimen Reference	3	Specimen Depth	0.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus202208040



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	25
90	86	0.05097	24
75	86	0.03649	22
63	80	0.02596	20
50	75	0.01846	19
37.5	71	0.00970	15
28	69	0.00493	11
20	66	0.00290	8
14	61	0.00154	5
10	57		
6.3	53		
5	52		
3.35	49		
2	46		
1.18	43		
0.6	40	Particle density	(assumed)
0.425	39	2.65	Mg/m3
0.3	37		
0.212	34		
0.15	32		
0.063	25		

Dry Mass of sample, g: 10704

Sample Proportions	% dry mass
Cobbles	20.4
Gravel	34.0
Sand	20.2
Silt	19.3
Clay	6.1

Grading Analysis		
D100	mm	125
D60	mm	13.2
D30	mm	0.121
D10	mm	0.00404
Uniformity Coefficient		3300
Curvature Coefficient		0.28

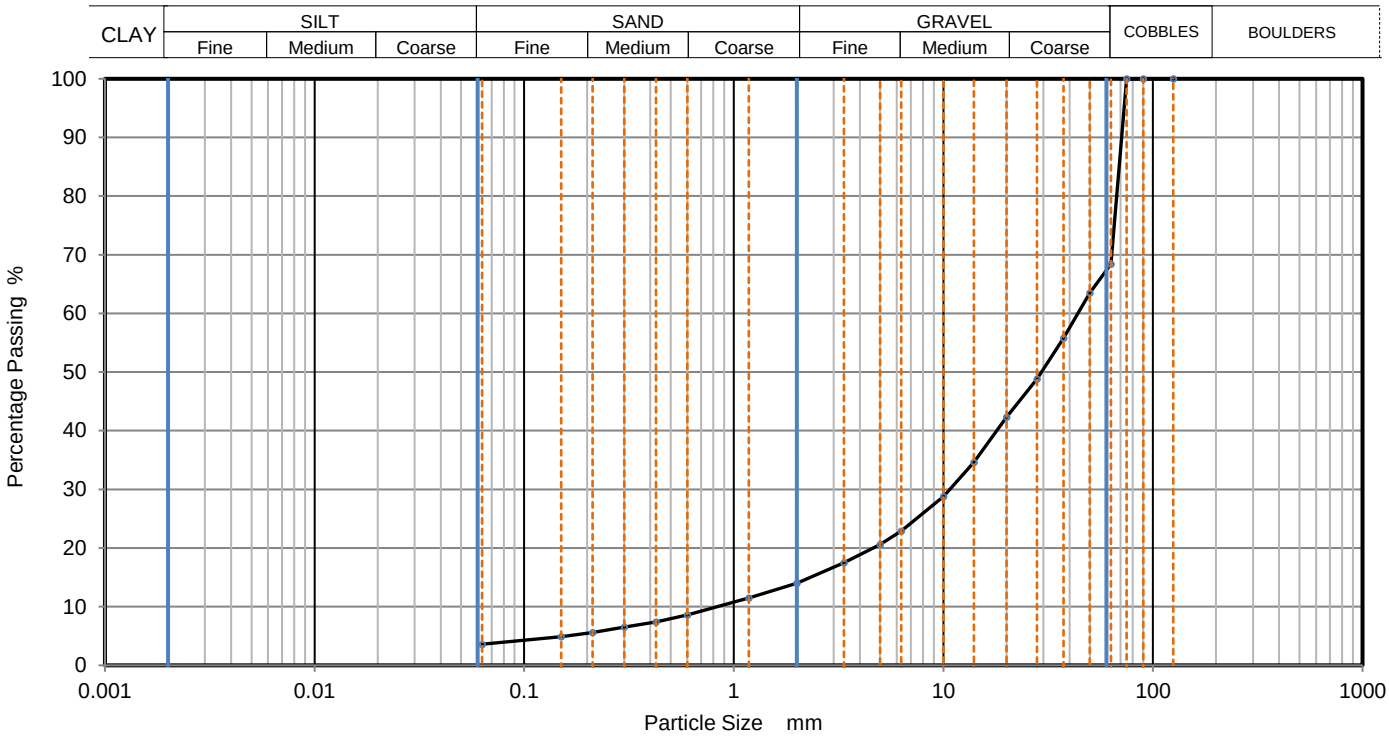
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION			Job Ref		21-1682
				Borehole/Pit No.		BH-24410A
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.		1
Specimen Description	Brownish grey slightly sandy slightly silty subangular fine to coarse GRAVEL with cobbles.			Sample Depth (m)	Top	0.30
					Base	1.20
Specimen Reference	4	Specimen Depth	0.3 m	Sample Type		B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID		Caus20220908116



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	68		
50	64		
37.5	56		
28	49		
20	42		
14	35		
10	29		
6.3	23		
5	21		
3.35	18		
2	14		
1.18	12		
0.6	9		
0.425	7		
0.3	7		
0.212	6		
0.15	5		
0.063	4		

Dry Mass of sample, g	8128

Sample Proportions	% dry mass
Cobbles	31.6
Gravel	54.4
Sand	10.3
Fines <0.063mm	4.0

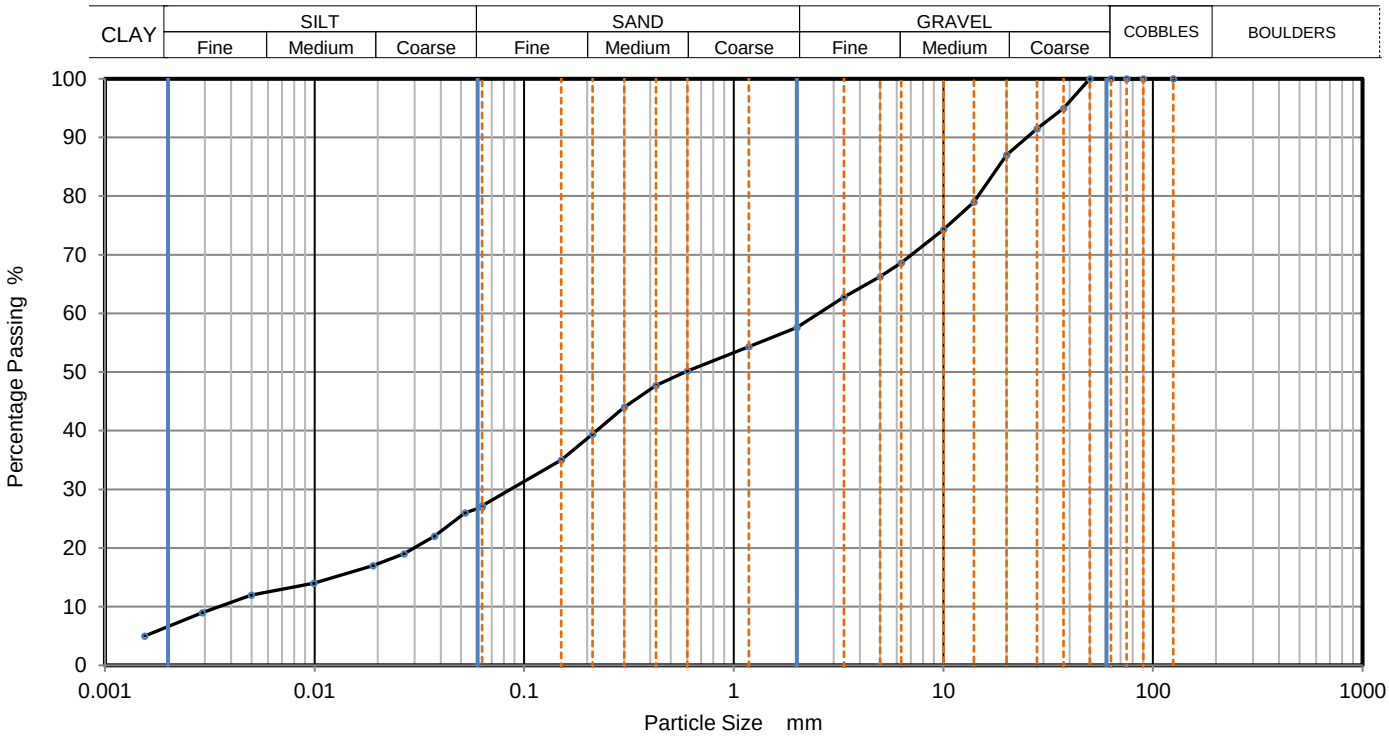
Grading Analysis		
D100	mm	
D60	mm	43.9
D30	mm	10.7
D10	mm	0.83
Uniformity Coefficient		53
Curvature Coefficient		3.2

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION			Job Ref		21-1682
				Borehole/Pit No.		BH-2461
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.		2
Specimen Description	Brownish grey sandy gravelly silty CLAY.			Sample Depth (m)	Top	0.80
					Base	1.00
Specimen Reference	3	Specimen Depth	0.8 m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID		Caus202208046



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	27
90	100	0.05222	26
75	100	0.03736	22
63	100	0.02672	19
50	100	0.01900	17
37.5	95	0.00992	14
28	92	0.00499	12
20	87	0.00291	9
14	79	0.00155	5
10	74		
6.3	69		
5	66		
3.35	63		
2	58		
1.18	54		
0.6	50	Particle density	(assumed)
0.425	48	2.65	Mg/m3
0.3	44		
0.212	39		
0.15	35		
0.063	27		

Dry Mass of sample, g: 3882

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	42.4
Sand	30.5
Silt	20.6
Clay	6.5

Grading Analysis		
D100	mm	
D60	mm	2.54
D30	mm	0.0862
D10	mm	0.00369
Uniformity Coefficient		690
Curvature Coefficient		0.79

Remarks

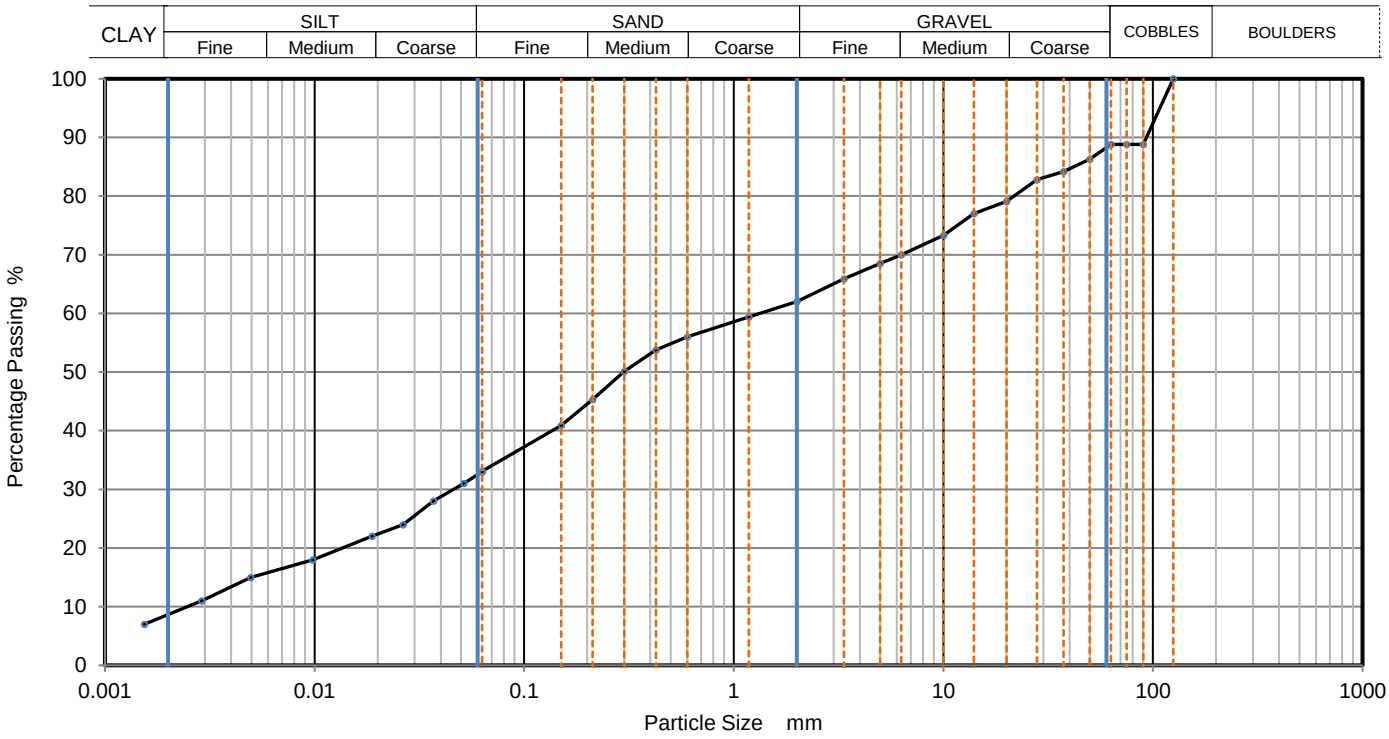
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					BH-2461
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	5
Specimen Description	Brownish grey sandy gravelly silty CLAY with some cobbles.			Sample Depth (m) Top	1.80
				Base	2.00
Specimen Reference	3	Specimen Depth	1.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus202208047



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	33
90	89	0.05160	31
75	89	0.03693	28
63	89	0.02642	24
50	86	0.01879	22
37.5	84	0.00981	18
28	83	0.00496	15
20	79	0.00290	11
14	77	0.00154	7
10	73		
6.3	70		
5	69		
3.35	66		
2	62		
1.18	59		
0.6	56	Particle density	(assumed)
0.425	54	2.65	Mg/m3
0.3	50		
0.212	45		
0.15	41		
0.063	33		

Dry Mass of sample, g: 12023

Sample Proportions	% dry mass
Cobbles	11.2
Gravel	26.8
Sand	28.9
Silt	24.2
Clay	8.9

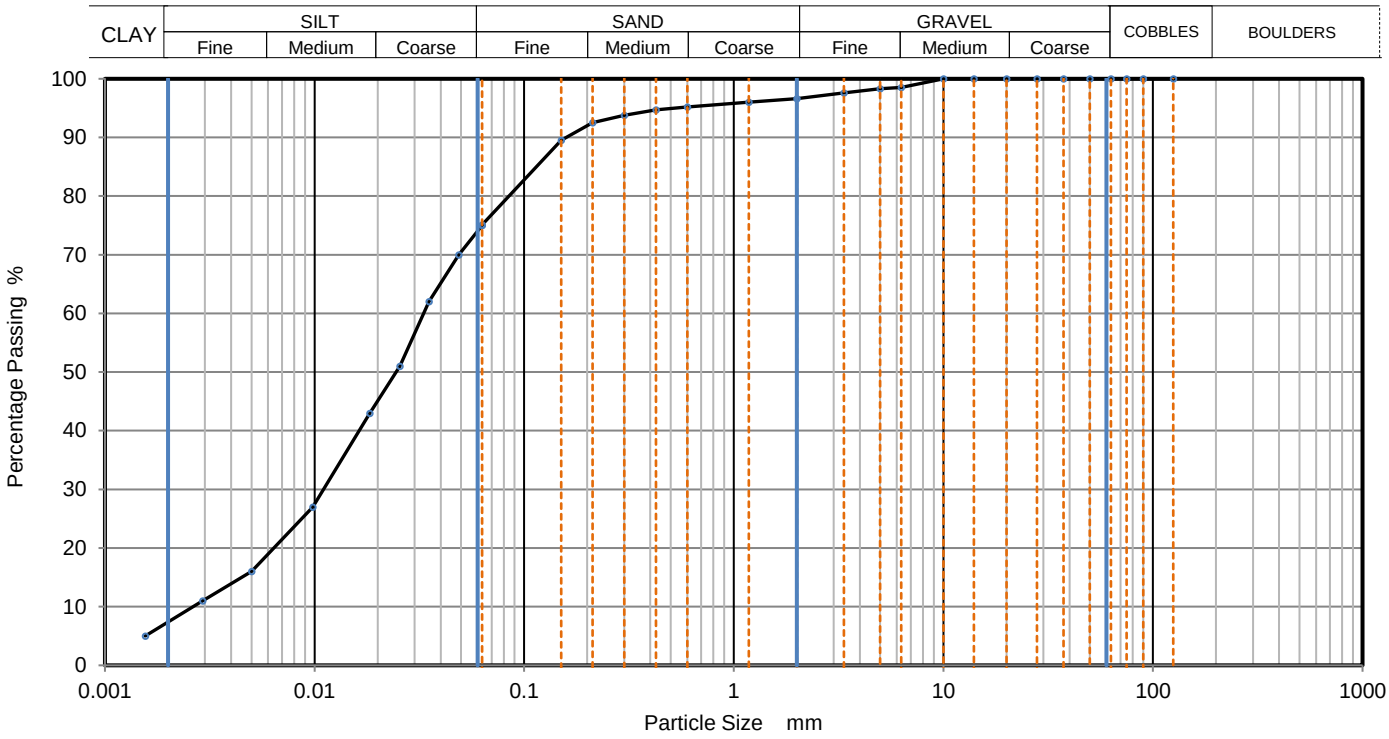
Grading Analysis		
D100	mm	125
D60	mm	1.33
D30	mm	0.046
D10	mm	0.00242
Uniformity Coefficient		550
Curvature Coefficient		0.65

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-2461
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	7
Specimen Description	Brownish grey sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	3.80
				Base	4.00
Specimen Reference	3	Specimen Depth	3.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus202208049



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	75
90	100	0.04870	70
75	100	0.03513	62
63	100	0.02549	51
50	100	0.01835	43
37.5	100	0.00981	27
28	100	0.00501	16
20	100	0.00293	11
14	100	0.00156	5
10	100		
6.3	99		
5	98		
3.35	98		
2	97		
1.18	96		
0.6	95	Particle density	(assumed)
0.425	95	2.65	Mg/m3
0.3	94		
0.212	93		
0.15	90		
0.063	75		

Dry Mass of sample, g: 268

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	3.4
Sand	21.6
Silt	67.5
Clay	7.5

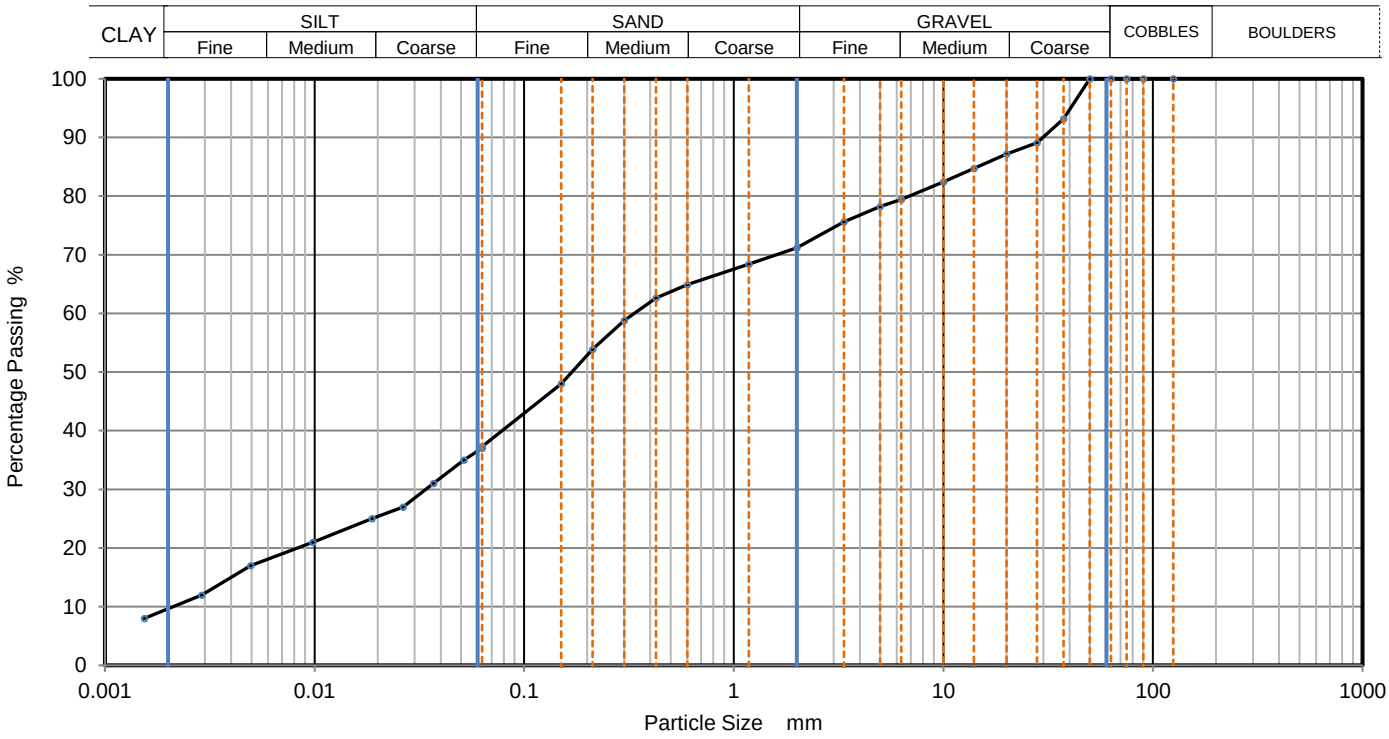
Grading Analysis		
D100	mm	
D60	mm	0.0334
D30	mm	0.0111
D10	mm	0.00269
Uniformity Coefficient		12
Curvature Coefficient		1.4

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-2461
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	8
Specimen Description	Brownish grey sandy gravelly silty CLAY.			Sample Depth (m) Top	4.80
				Base	5.00
Specimen Reference	3	Specimen Depth	4.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022080411



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	37
90	100	0.05160	35
75	100	0.03693	31
63	100	0.02642	27
50	100	0.01879	25
37.5	93	0.00981	21
28	89	0.00496	17
20	87	0.00290	12
14	85	0.00154	8
10	82		
6.3	79		
5	78		
3.35	76		
2	71		
1.18	68		
0.6	65	Particle density	(assumed)
0.425	63	2.65	Mg/m3
0.3	59		
0.212	54		
0.15	48		
0.063	37		

Dry Mass of sample, g: 3580

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	28.8
Sand	34.0
Silt	27.2
Clay	10.0

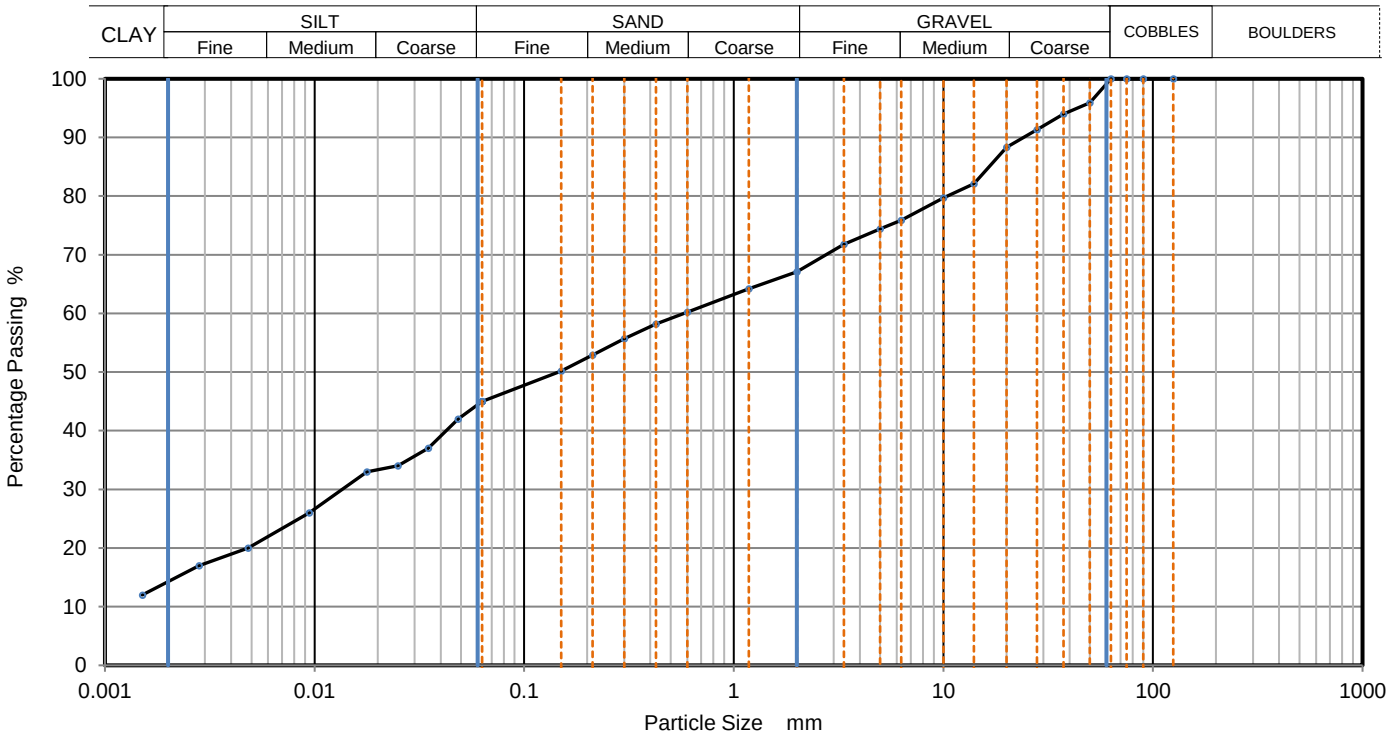
Grading Analysis		
D100	mm	
D60	mm	0.335
D30	mm	0.0338
D10	mm	0.002
Uniformity Coefficient		170
Curvature Coefficient		1.7

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-25603
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Brownish grey sandy gravelly silty CLAY.			Sample Depth (m) Top	0.40
				Base	0.60
Specimen Reference	3	Specimen Depth	0.4 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022080413



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	45
90	100	0.04837	42
75	100	0.03490	37
63	100	0.02501	34
50	96	0.01780	33
37.5	94	0.00942	26
28	91	0.00482	20
20	88	0.00282	17
14	82	0.00151	12
10	80		
6.3	76		
5	74		
3.35	72		
2	67		
1.18	64		
0.6	60	Particle density	(assumed)
0.425	58	2.65	Mg/m3
0.3	56		
0.212	53		
0.15	50		
0.063	45		

Dry Mass of sample, g: 10416

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	32.9
Sand	22.1
Silt	30.5
Clay	14.5

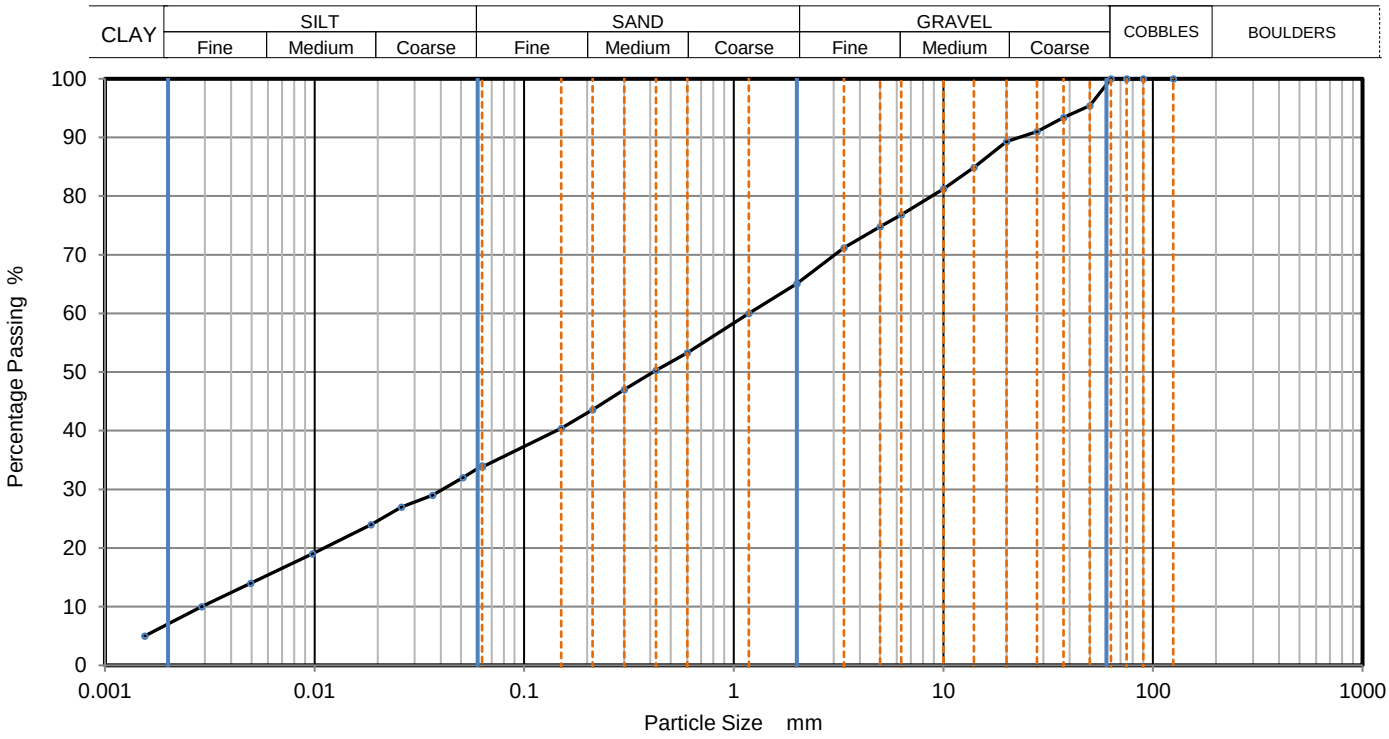
Grading Analysis		
D100	mm	
D60	mm	0.577
D30	mm	0.0137
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		BH-25603
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		3
Specimen Description	Brownish grey sandy gravelly silty CLAY.				Sample Depth (m)	Top	1.80
						Base	2.10
Specimen Reference	3	Specimen Depth	1.8	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022080414



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	34
90	100	0.05097	32
75	100	0.03649	29
63	100	0.02596	27
50	95	0.01857	24
37.5	93	0.00976	19
28	91	0.00496	14
20	89	0.00290	10
14	85	0.00155	5
10	81		
6.3	77		
5	75		
3.35	71		
2	65		
1.18	60		
0.6	53	Particle density	(assumed)
0.425	50	2.65	Mg/m3
0.3	47		
0.212	44		
0.15	40		
0.063	34		

Dry Mass of sample, g: 6713

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	34.9
Sand	31.3
Silt	26.7
Clay	7.1

Grading Analysis		
D100	mm	
D60	mm	1.18
D30	mm	0.0414
D10	mm	0.00285
Uniformity Coefficient		420
Curvature Coefficient		0.51

Remarks

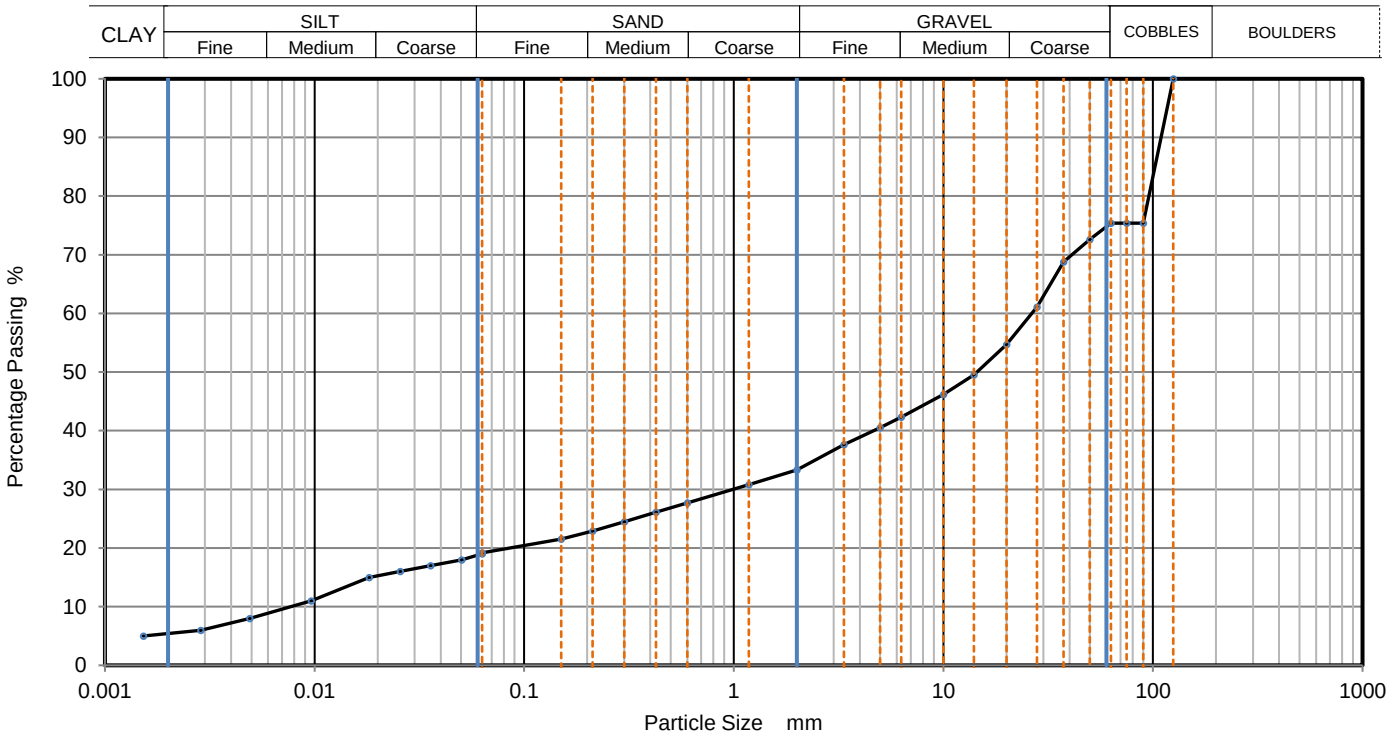
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					BH-26135
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brownish grey sandy gravelly silty CLAY with some cobbles.			Sample Depth (m) Top	3.90
				Base	4.70
Specimen Reference	6	Specimen Depth	3.9 m	Sample Type	C
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus202210206



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	19
90	75	0.05032	18
75	75	0.03581	17
63	75	0.02564	16
50	73	0.01824	15
37.5	69	0.00965	11
28	61	0.00491	8
20	55	0.00286	6
14	50	0.00152	5
10	46		
6.3	42		
5	41		
3.35	38		
2	33		
1.18	31		
0.6	28	Particle density (assumed)	
0.425	26	2.65 Mg/m3	
0.3	25		
0.212	23		
0.15	22		
0.063	19		

Dry Mass of sample, g: 10528

Sample Proportions	% dry mass
Cobbles	24.6
Gravel	42.1
Sand	14.1
Silt	13.8
Clay	5.4

Grading Analysis		
D100	mm	125
D60	mm	26.5
D30	mm	0.99
D10	mm	0.00759
Uniformity Coefficient		3500
Curvature Coefficient		4.9

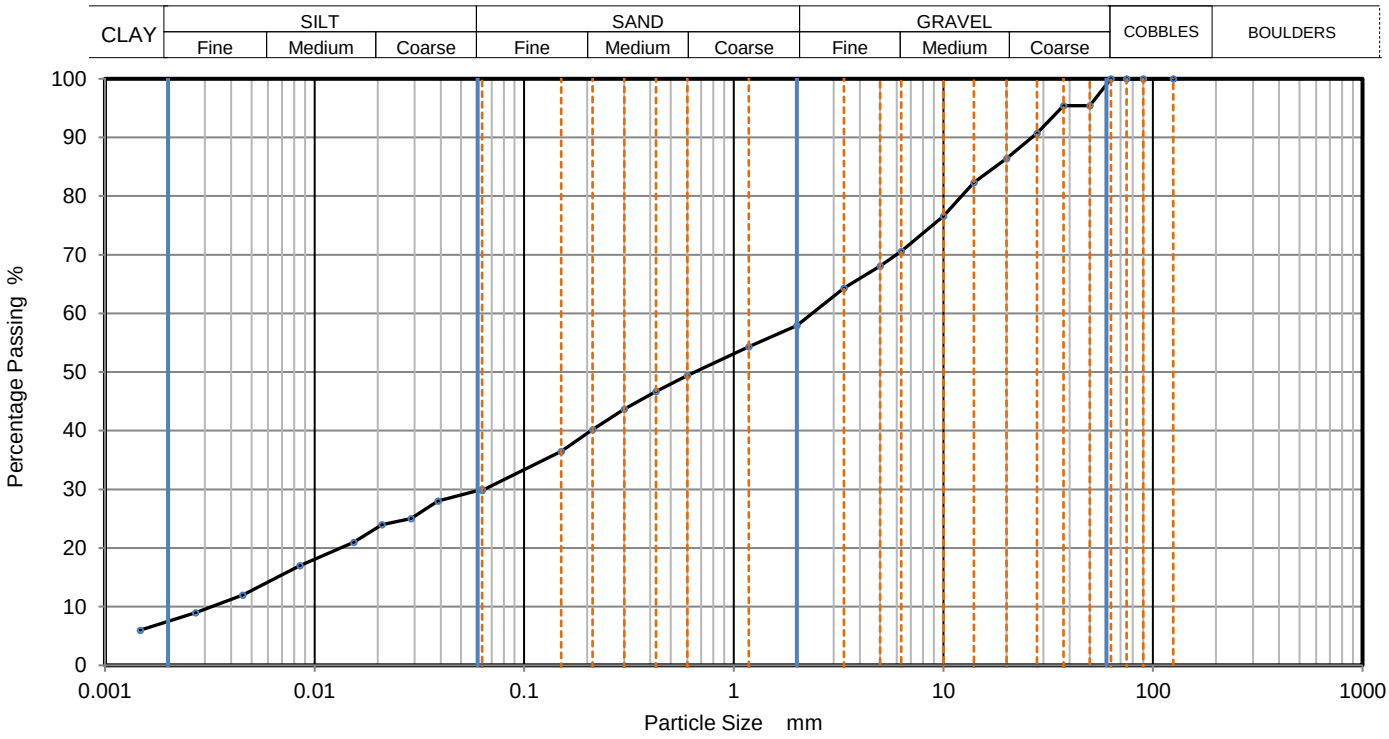
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					BH-26554
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Greyish brown sandy gravelly silty CLAY.			Sample Depth (m) Top	0.30
				Base	1.20
Specimen Reference	3	Specimen Depth	0.3 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022083134



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	30
90	100	0.03873	28
75	100	0.02882	25
63	100	0.02097	24
50	95	0.01536	21
37.5	95	0.00852	17
28	91	0.00454	12
20	86	0.00270	9
14	82	0.00147	6
10	77		
6.3	71		
5	68		
3.35	64		
2	58		
1.18	54		
0.6	49	Particle density	(assumed)
0.425	47	2.65	Mg/m3
0.3	44		
0.212	40		
0.15	37		
0.063	30		

Dry Mass of sample, g: 5739

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	42.1
Sand	28.1
Silt	21.9
Clay	7.9

Grading Analysis		
D100	mm	
D60	mm	2.37
D30	mm	0.0645
D10	mm	0.00304
Uniformity Coefficient		780
Curvature Coefficient		0.58

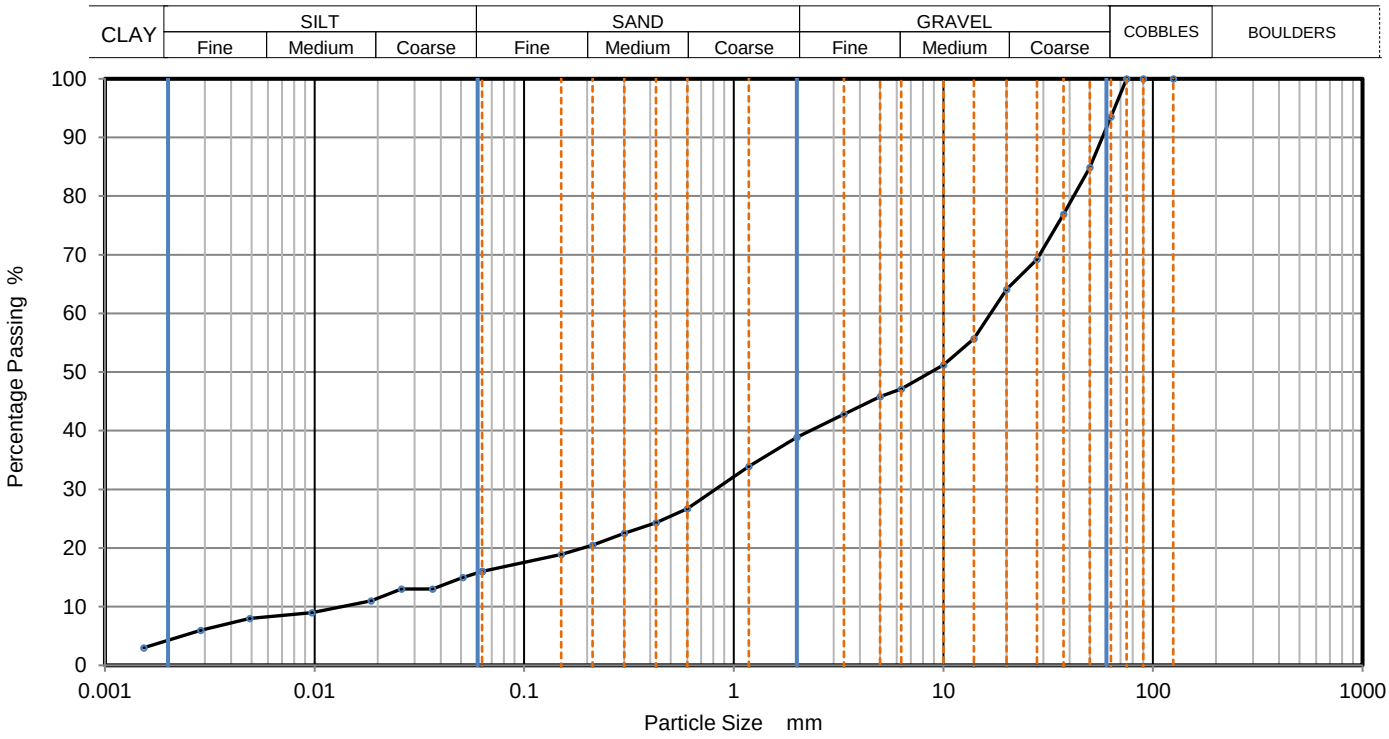
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					BH-26554
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Greyish brown sandy gravelly silty CLAY.			Sample Depth (m) Top	2.00
				Base	2.80
Specimen Reference	3	Specimen Depth	2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022083136



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	16
90	100	0.05096	15
75	100	0.03648	13
63	94	0.02595	13
50	85	0.01857	11
37.5	77	0.00970	9
28	69	0.00491	8
20	64	0.00286	6
14	56	0.00153	3
10	51		
6.3	47		
5	46		
3.35	43		
2	39		
1.18	34		
0.6	27	Particle density	(assumed)
0.425	24	2.65	Mg/m3
0.3	23		
0.212	21		
0.15	19		
0.063	16		

Dry Mass of sample, g: 8004

Sample Proportions	% dry mass
Cobbles	6.5
Gravel	54.6
Sand	22.9
Silt	11.6
Clay	4.4

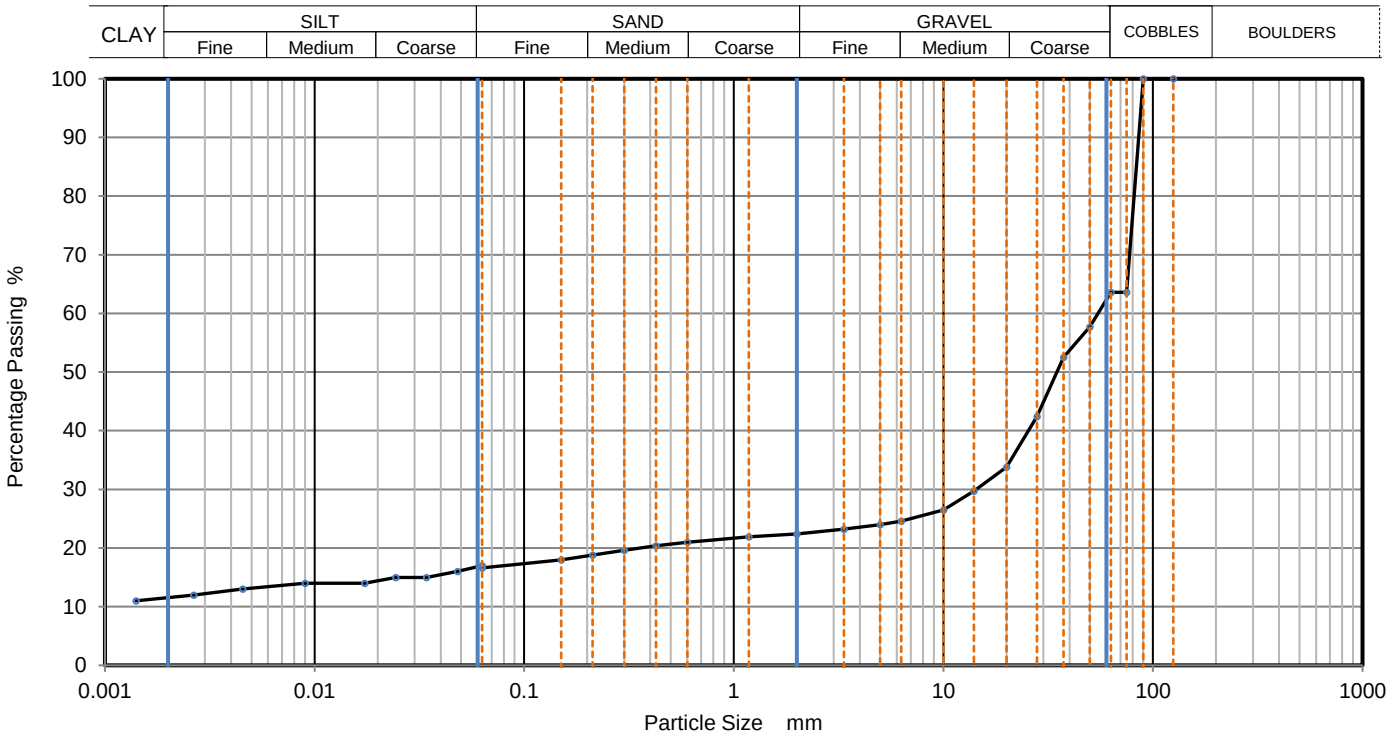
Grading Analysis		
D100	mm	
D60	mm	16.8
D30	mm	0.818
D10	mm	0.0129
Uniformity Coefficient		1300
Curvature Coefficient		3.1

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		BH-26554A
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		2
Specimen Description	Brownish grey sandy gravelly silty CLAY with cobbles.				Sample Depth (m)	Top	4.40
						Base	5.15
Specimen Reference	6	Specimen Depth	4.4	m	Sample Type		C
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus202210207



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	17
90	100	0.04803	16
75	64	0.03420	15
63	64	0.02435	15
50	58	0.01733	14
37.5	53	0.00901	14
28	42	0.00454	13
20	34	0.00265	12
14	30	0.00140	11
10	27		
6.3	25		
5	24		
3.35	23		
2	22		
1.18	22		
0.6	21	Particle density	(assumed)
0.425	20	2.65	Mg/m3
0.3	20		
0.212	19		
0.15	18		
0.063	17		

Dry Mass of sample, g: 7870

Sample Proportions	% dry mass
Cobbles	36.4
Gravel	41.2
Sand	5.8
Silt	5.0
Clay	11.6

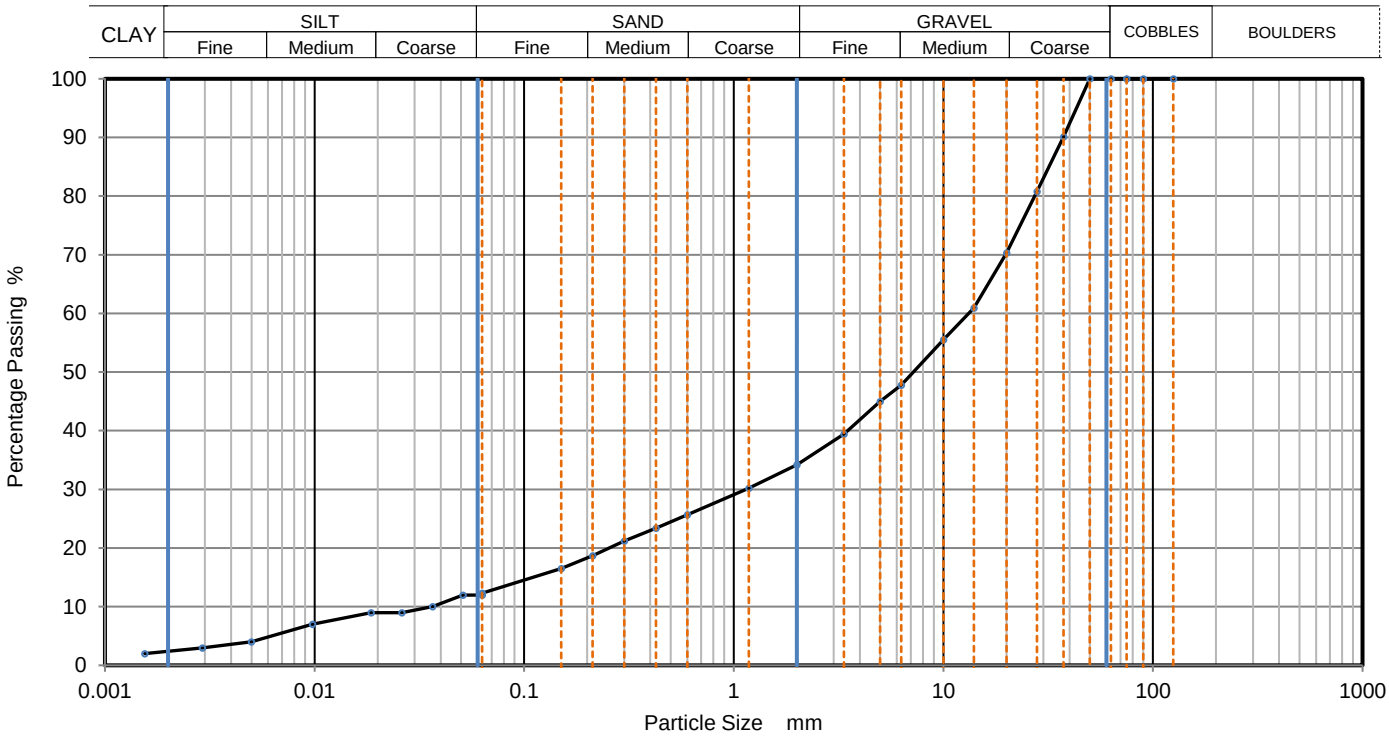
Grading Analysis		
D100	mm	
D60	mm	54.8
D30	mm	14.4
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		BH-27000
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		1
Specimen Description	Greyish brown sandy gravelly silty CLAY.				Sample Depth (m)	Top	0.40
						Base	0.60
Specimen Reference	2	Specimen Depth	0.4	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022062123



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	12
90	100	0.05097	12
75	100	0.03649	10
63	100	0.02611	9
50	100	0.01857	9
37.5	90	0.00976	7
28	81	0.00499	4
20	70	0.00291	3
14	61	0.00155	2
10	56		
6.3	48		
5	45		
3.35	39		
2	34		
1.18	30		
0.6	26	Particle density	(assumed)
0.425	23	2.65	Mg/m3
0.3	21		
0.212	19		
0.15	17		
0.063	12		

Dry Mass of sample, g: 2723

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	65.8
Sand	21.9
Silt	10.0
Clay	2.3

Grading Analysis		
D100	mm	
D60	mm	13.2
D30	mm	1.14
D10	mm	0.0322
Uniformity Coefficient		410
Curvature Coefficient		3.1

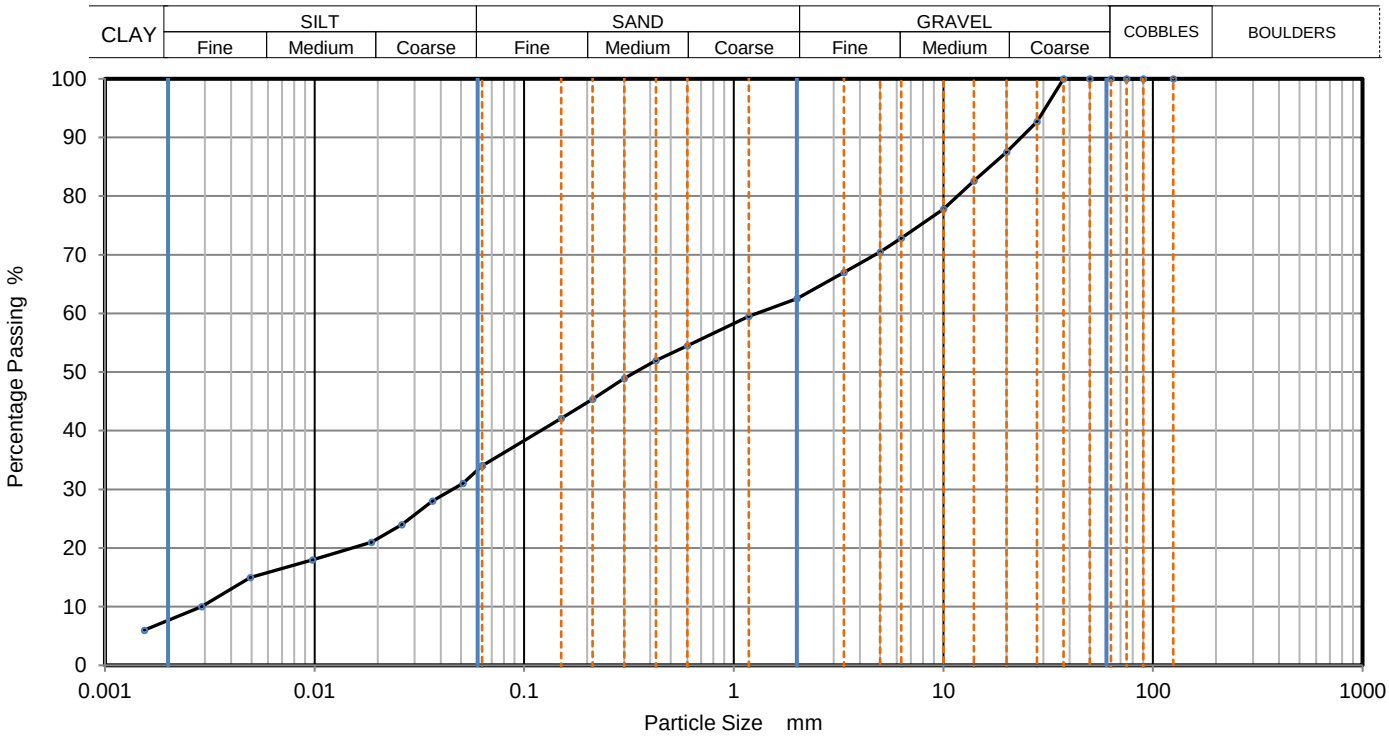
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					**21-1682**
Borehole/Pit No.					BH-27602
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Greyish brown sandy gravelly silty CLAY.			Sample Depth (m) Top	0.80
				Base	1.00
Specimen Reference	2	Specimen Depth	0.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022062124



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	34
90	100	0.05097	31
75	100	0.03649	28
63	100	0.02611	24
50	100	0.01868	21
37.5	100	0.00976	18
28	93	0.00493	15
20	88	0.00290	10
14	83	0.00154	6
10	78		
6.3	73		
5	71		
3.35	67		
2	63		
1.18	60		
0.6	55	Particle density	(assumed)
0.425	52	2.65	Mg/m3
0.3	49		
0.212	45		
0.15	42		
0.063	34		

Dry Mass of sample, g: 2360

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	37.5
Sand	28.5
Silt	26.2
Clay	7.8

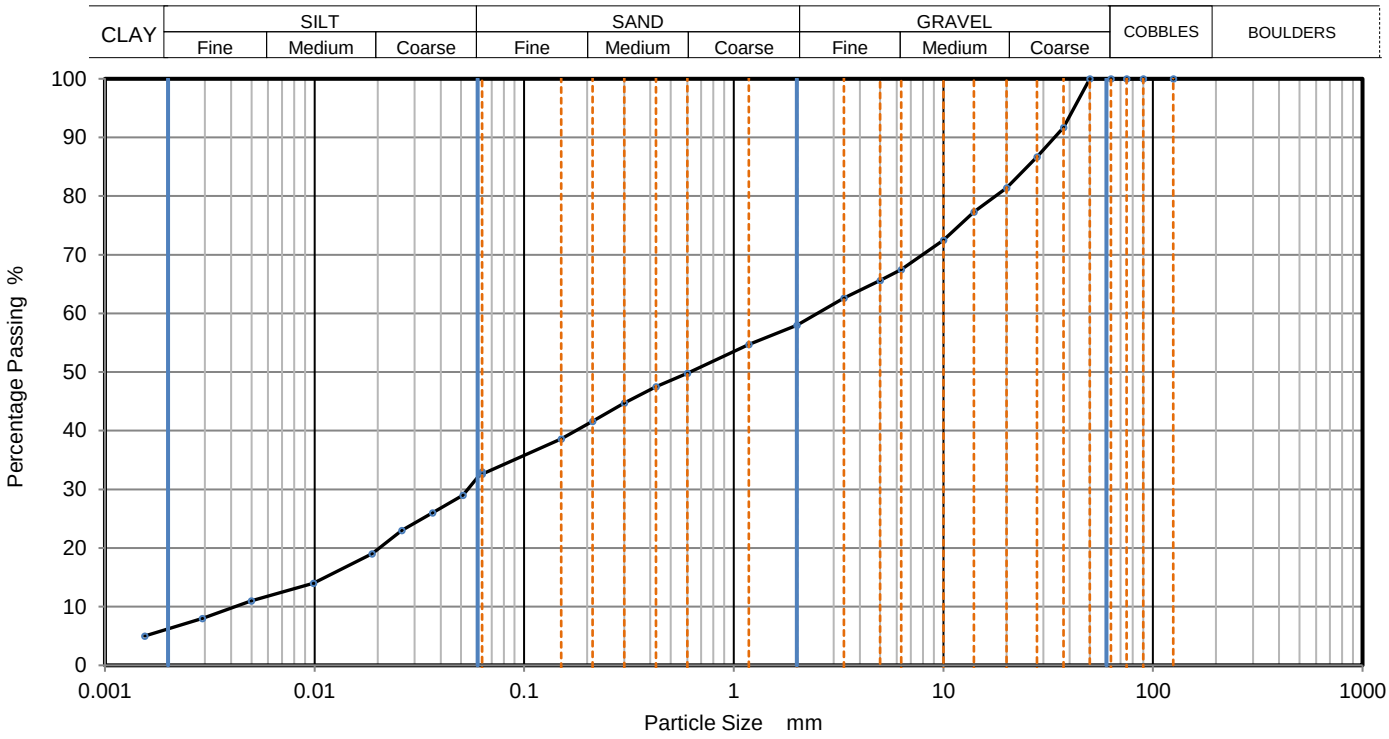
Grading Analysis		
D100	mm	
D60	mm	1.29
D30	mm	0.0471
D10	mm	0.00299
Uniformity Coefficient		430
Curvature Coefficient		0.57

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-27602
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Greyish brown sandy gravelly silty CLAY.			Sample Depth (m) Top	1.80
				Base	2.00
Specimen Reference	2	Specimen Depth	1.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022062127



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	33
90	100	0.05097	29
75	100	0.03649	26
63	100	0.02611	23
50	100	0.01879	19
37.5	92	0.00987	14
28	87	0.00499	11
20	81	0.00291	8
14	77	0.00155	5
10	73		
6.3	68		
5	66		
3.35	63		
2	58		
1.18	55		
0.6	50	Particle density	(assumed)
0.425	48	2.65	Mg/m3
0.3	45		
0.212	42		
0.15	39		
0.063	33		

Dry Mass of sample, g	2436

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	42.0
Sand	25.4
Silt	26.7
Clay	5.9

Grading Analysis		
D100	mm	
D60	mm	2.51
D30	mm	0.0528
D10	mm	0.00429
Uniformity Coefficient		580
Curvature Coefficient		0.26

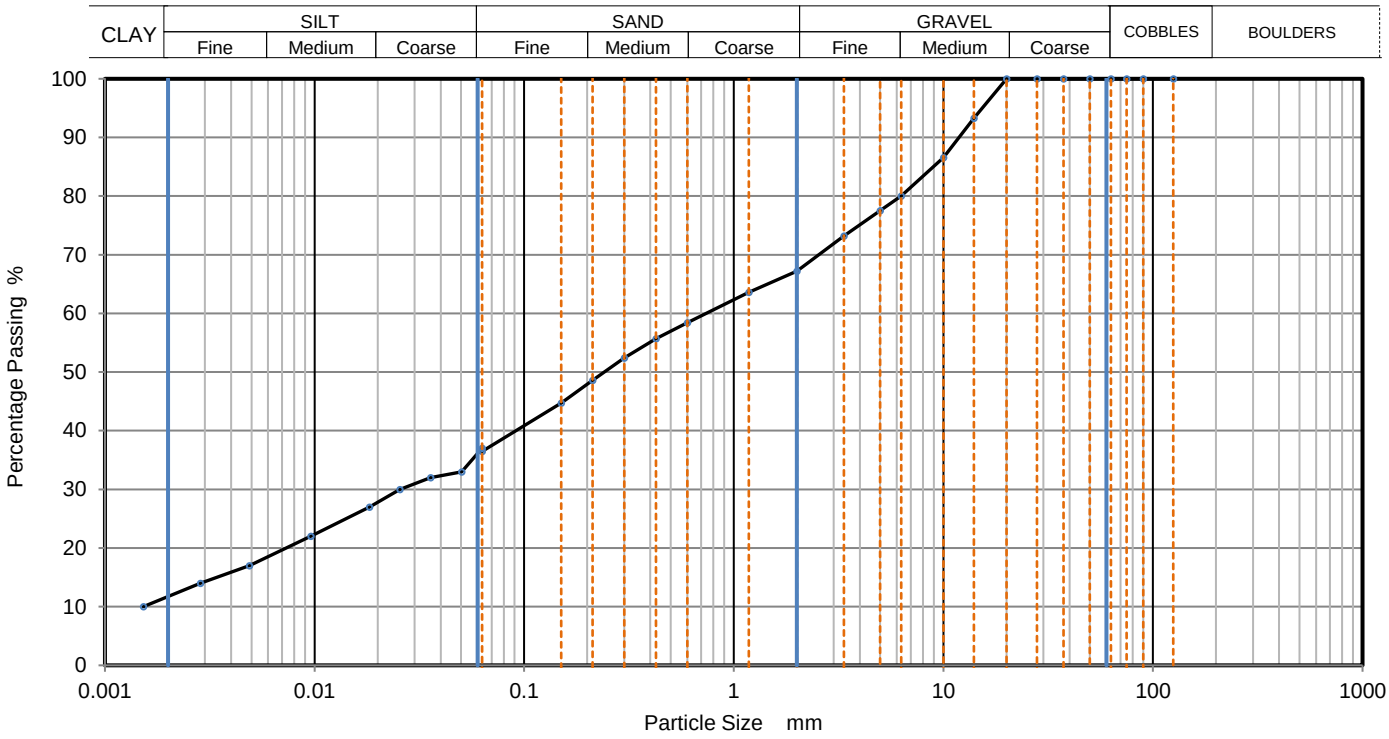
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-27602
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	4
Specimen Description	Greyish brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	2.80
				Base	3.00
Specimen Reference	2	Specimen Depth	2.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022062129



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	37
90	100	0.05033	33
75	100	0.03582	32
63	100	0.02549	30
50	100	0.01824	27
37.5	100	0.00959	22
28	100	0.00488	17
20	100	0.00285	14
14	93	0.00152	10
10	87		
6.3	80		
5	78		
3.35	73		
2	67		
1.18	64		
0.6	58	Particle density	(assumed)
0.425	56	2.65	Mg/m3
0.3	52		
0.212	49		
0.15	45		
0.063	37		

Dry Mass of sample, g: 917

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	32.8
Sand	30.8
Silt	24.8
Clay	11.6

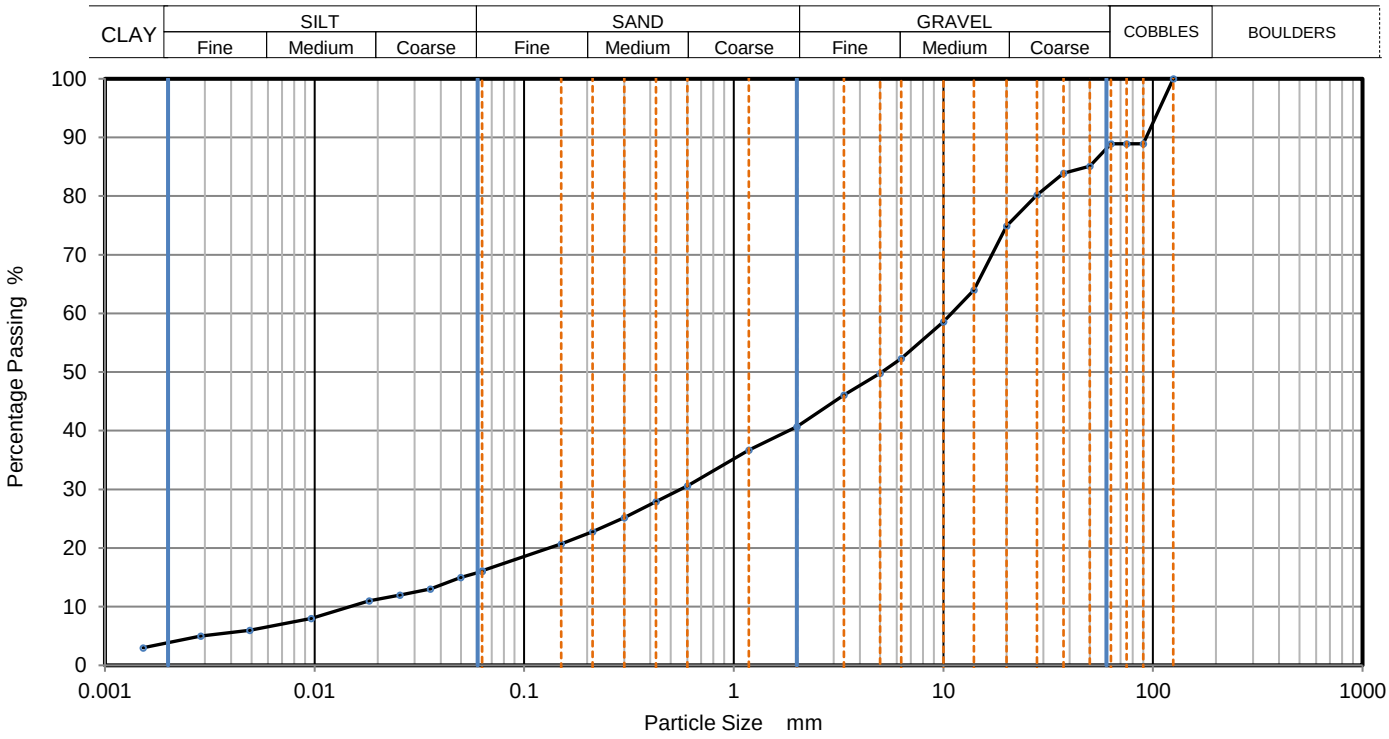
Grading Analysis		
D100	mm	
D60	mm	0.741
D30	mm	0.0251
D10	mm	0.00162
Uniformity Coefficient		460
Curvature Coefficient		0.52

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-28001
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brown sandy gravelly silty CLAY with cobbles.			Sample Depth (m) Top	0.80
				Base	1.00
Specimen Reference	2	Specimen Depth	0.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022061027



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	16
90	89	0.04971	15
75	89	0.03559	13
63	89	0.02548	12
50	85	0.01823	11
37.5	84	0.00964	8
28	80	0.00490	6
20	75	0.00286	5
14	64	0.00152	3
10	59		
6.3	52		
5	50		
3.35	46		
2	41		
1.18	37		
0.6	31	Particle density	(assumed)
0.425	28	2.65	Mg/m3
0.3	25		
0.212	23		
0.15	21		
0.063	16		

Dry Mass of sample, g: 16048

Sample Proportions	% dry mass
Cobbles	11.1
Gravel	48.1
Sand	24.7
Silt	12.2
Clay	3.9

Grading Analysis		
D100	mm	125
D60	mm	10.9
D30	mm	0.554
D10	mm	0.0153
Uniformity Coefficient		710
Curvature Coefficient		1.8

Remarks

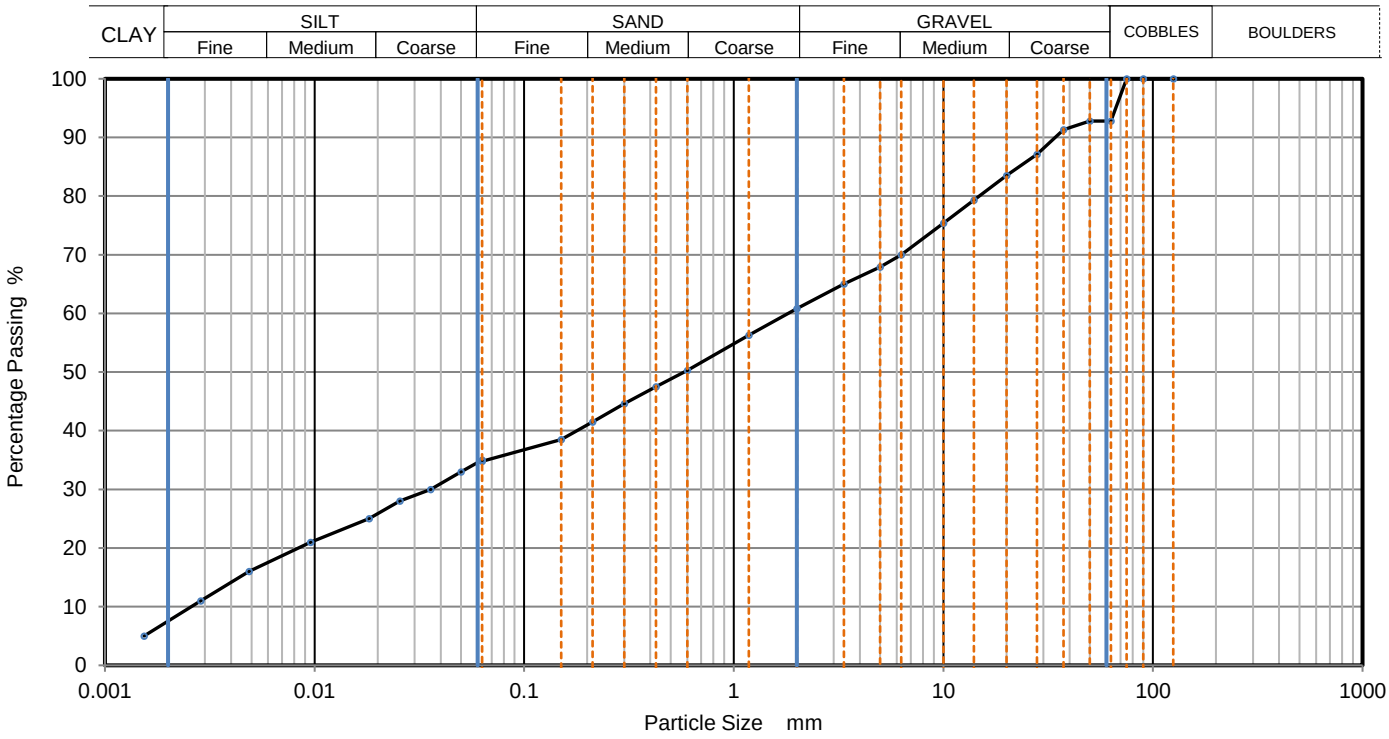
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					BH-28001
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	8
Specimen Description	Brown sandy gravelly silty CLAY.			Sample Depth (m) Top	8.00
				Base	8.50
Specimen Reference	2	Specimen Depth	8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022061033



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	35
90	100	0.05002	33
75	100	0.03581	30
63	93	0.02548	28
50	93	0.01823	25
37.5	91	0.00958	21
28	87	0.00487	16
20	84	0.00286	11
14	79	0.00154	5
10	75		
6.3	70		
5	68		
3.35	65		
2	61		
1.18	56		
0.6	50	Particle density	(assumed)
0.425	48	2.65	Mg/m3
0.3	45		
0.212	42		
0.15	39		
0.063	35		

Dry Mass of sample, g: 7579

Sample Proportions	% dry mass
Cobbles	7.2
Gravel	32.0
Sand	25.9
Silt	27.5
Clay	7.4

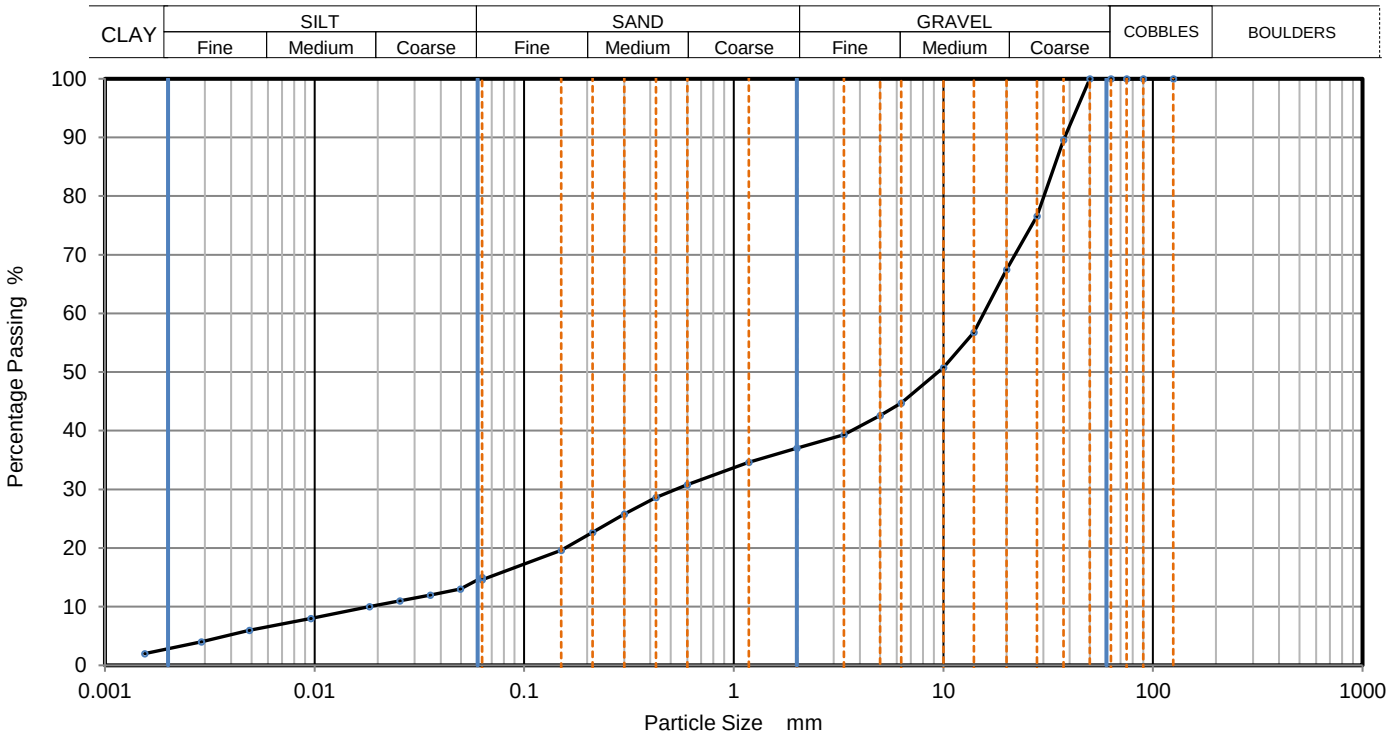
Grading Analysis		
D100	mm	
D60	mm	1.83
D30	mm	0.0354
D10	mm	0.00257
Uniformity Coefficient		710
Curvature Coefficient		0.27

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-28362
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Brown sandy gravelly silty CLAY.			Sample Depth (m) Top	0.40
				Base	1.20
Specimen Reference	2	Specimen Depth	0.4 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022061036



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	15
90	100	0.04969	13
75	100	0.03559	12
63	100	0.02549	11
50	100	0.01824	10
37.5	90	0.00959	8
28	77	0.00488	6
20	68	0.00288	4
14	57	0.00155	2
10	51		
6.3	45		
5	43		
3.35	39		
2	37		
1.18	35		
0.6	31	Particle density 2.65	(assumed) Mg/m3
0.425	29		
0.3	26		
0.212	23		
0.15	20		
0.063	15		

Dry Mass of sample, g: 2357

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	63.0
Sand	22.4
Silt	11.9
Clay	2.7

Grading Analysis		
D100	mm	
D60	mm	15.6
D30	mm	0.531
D10	mm	0.0186
Uniformity Coefficient		840
Curvature Coefficient		0.97

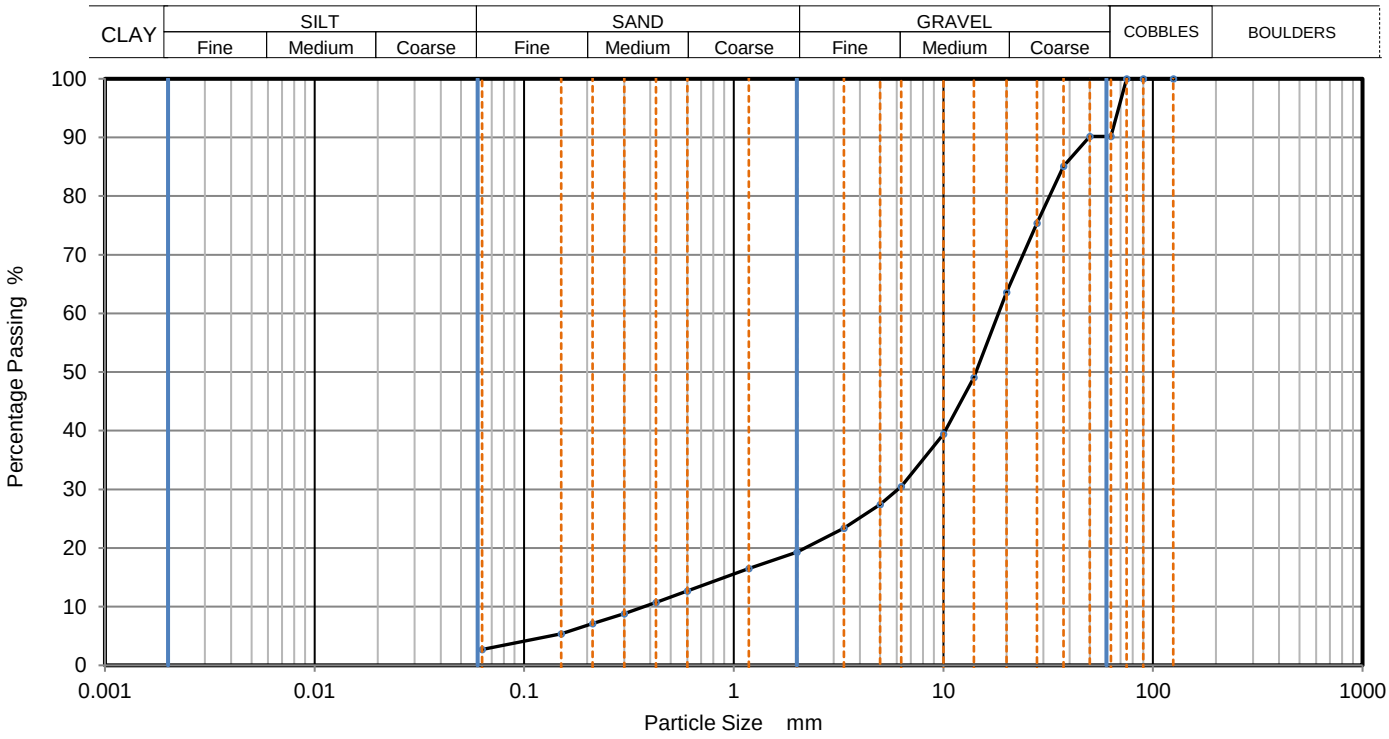
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION			Job Ref		21-1682
				Borehole/Pit No.		BH-28598
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.		3
Specimen Description	Brown slightly sandy slightly clayey subangular fine to coarse GRAVEL with cobbles.			Sample Depth (m)	Top	1.20
					Base	2.00
Specimen Reference	2	Specimen Depth	1.2 m	Sample Type		B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID		Caus2022061038



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	90		
50	90		
37.5	85		
28	75		
20	64		
14	49		
10	39		
6.3	31		
5	27		
3.35	23		
2	19		
1.18	17		
0.6	13		
0.425	11		
0.3	9		
0.212	7		
0.15	5		
0.063	3		

Dry Mass of sample, g	11455

Sample Proportions	% dry mass
Cobbles	9.8
Gravel	70.9
Sand	16.6
Fines <0.063mm	3.0

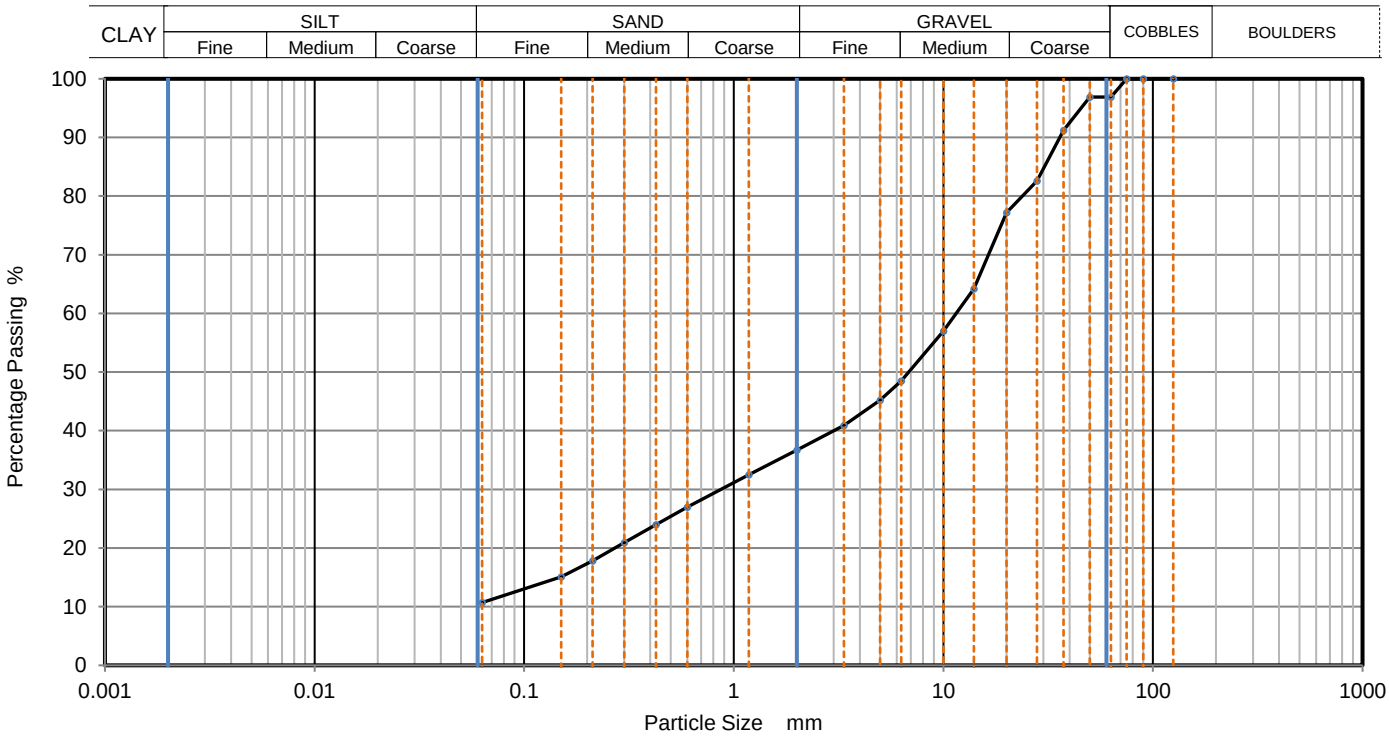
Grading Analysis		
D100	mm	
D60	mm	18.3
D30	mm	6.08
D10	mm	0.376
Uniformity Coefficient		49
Curvature Coefficient		5.4

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		BH-28598
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		4
Specimen Description	Brown sandy slightly clayey subangular fine to coarse GRAVEL.				Sample Depth (m)	Top	2.00
						Base	3.00
Specimen Reference	2	Specimen Depth	2	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clause 9.2				KeyLAB ID		Caus2022061039



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	97		
50	97		
37.5	91		
28	83		
20	77		
14	64		
10	57		
6.3	49		
5	45		
3.35	41		
2	37		
1.18	33		
0.6	27		
0.425	24		
0.3	21		
0.212	18		
0.15	15		
0.063	11		

Dry Mass of sample, g	13387

Sample Proportions	% dry mass
Cobbles	3.1
Gravel	60.2
Sand	26.0
Fines <0.063mm	11.0

Grading Analysis		
D100	mm	
D60	mm	11.5
D30	mm	0.871
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

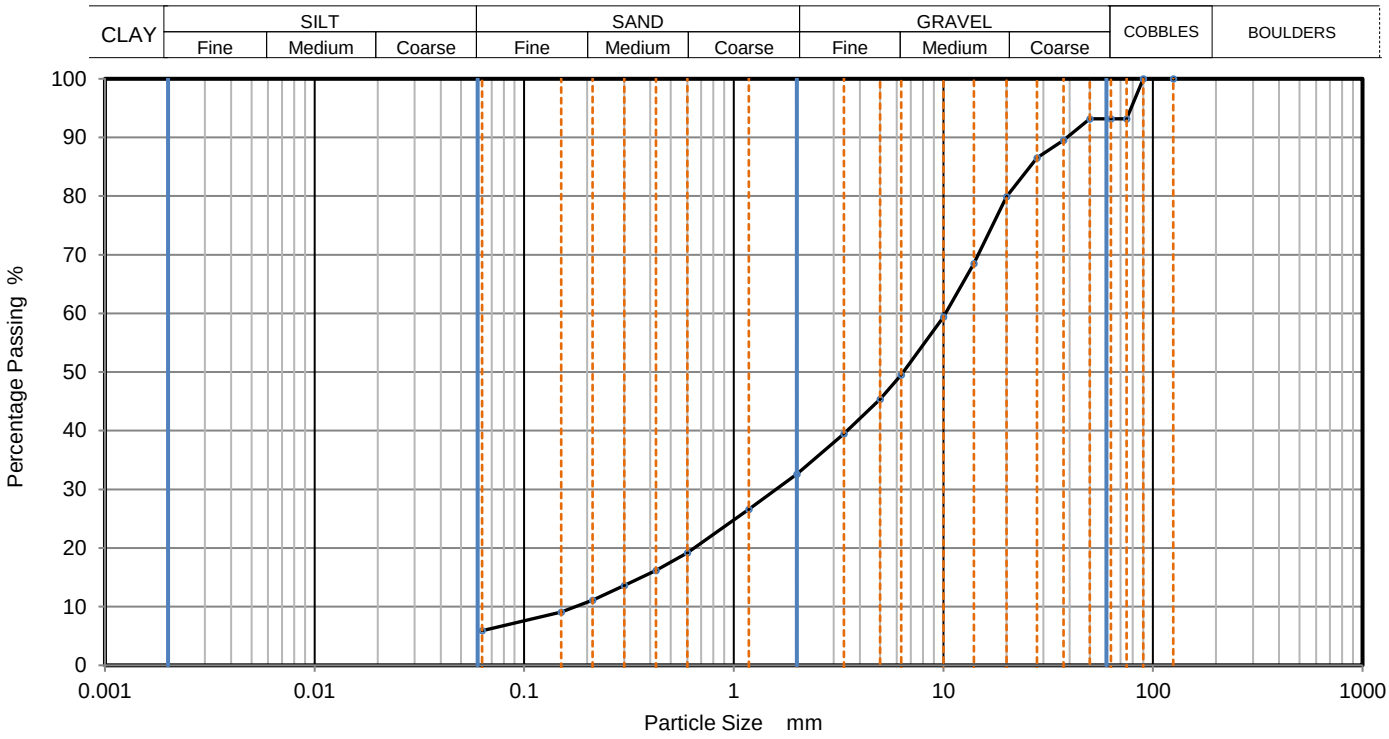
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-28598
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	8
Specimen Description	Brownish grey sandy slightly clayey subangular fine to coarse GRAVEL.			Sample Depth (m) Top	4.00
				Base	5.00
Specimen Reference	2	Specimen Depth	4 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022061041



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	93		
63	93		
50	93		
37.5	90		
28	87		
20	80		
14	69		
10	59		
6.3	50		
5	45		
3.35	40		
2	33		
1.18	27		
0.6	19		
0.425	16		
0.3	14		
0.212	11		
0.15	9		
0.063	6		

Dry Mass of sample, g	15282

Sample Proportions	% dry mass
Cobbles	6.8
Gravel	60.6
Sand	26.7
Fines <0.063mm	6.0

Grading Analysis		
D100	mm	
D60	mm	10.2
D30	mm	1.59
D10	mm	0.176
Uniformity Coefficient		58
Curvature Coefficient		1.4

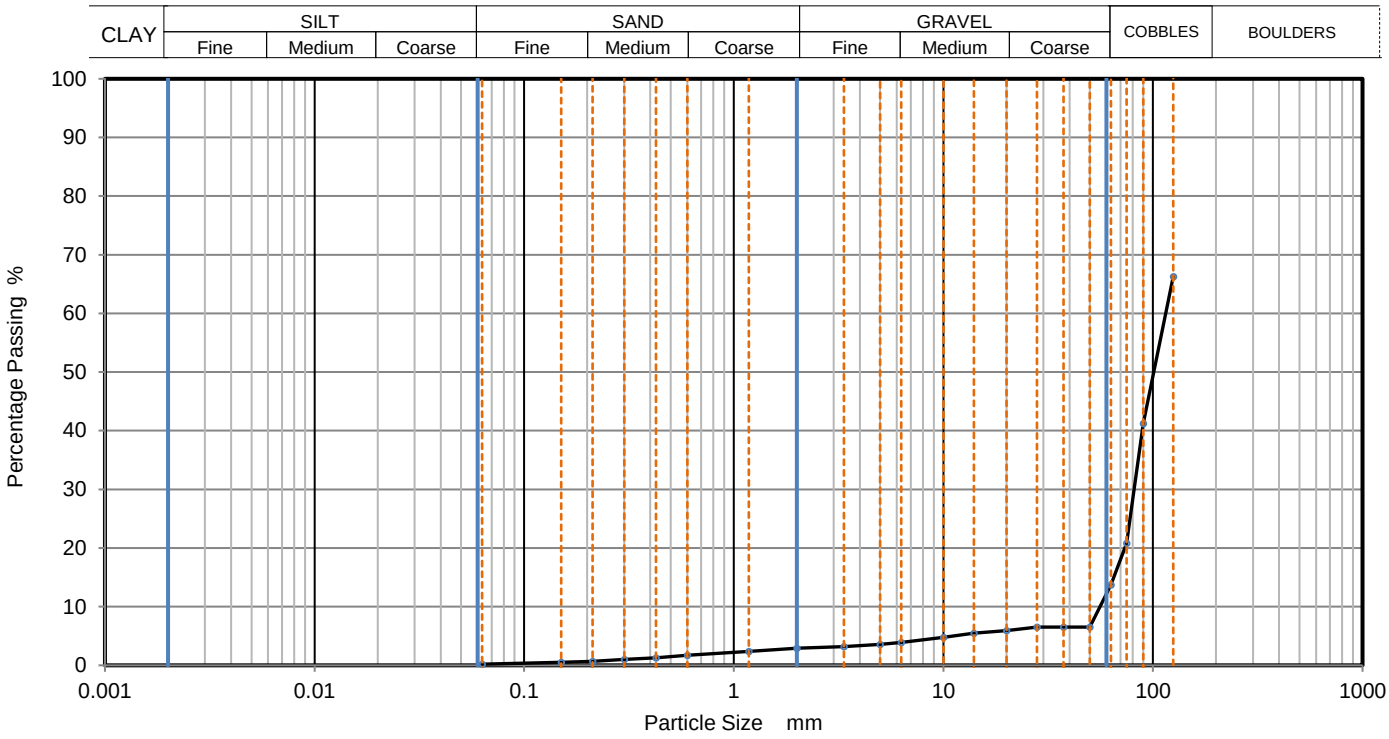
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					BH-28598
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	9
Specimen Description	COBBLES with subangular medium to coarse gravel.			Sample Depth (m) Top	5.00
				Base	6.50
Specimen Reference	2	Specimen Depth	5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022061042



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	66		
90	41		
75	21		
63	14		
50	7		
37.5	7		
28	7		
20	6		
14	6		
10	5		
6.3	4		
5	4		
3.35	3		
2	3		
1.18	2		
0.6	2		
0.425	1		
0.3	1		
0.212	1		
0.15	1		
0.063	0		

Dry Mass of sample, g: 13980

Sample Proportions	% dry mass
Cobbles	86.3
Gravel	10.8
Sand	2.7
Fines <0.063mm	0.0

Grading Analysis		
D100	mm	
D60	mm	115
D30	mm	81.4
D10	mm	56
Uniformity Coefficient		2.1
Curvature Coefficient		1

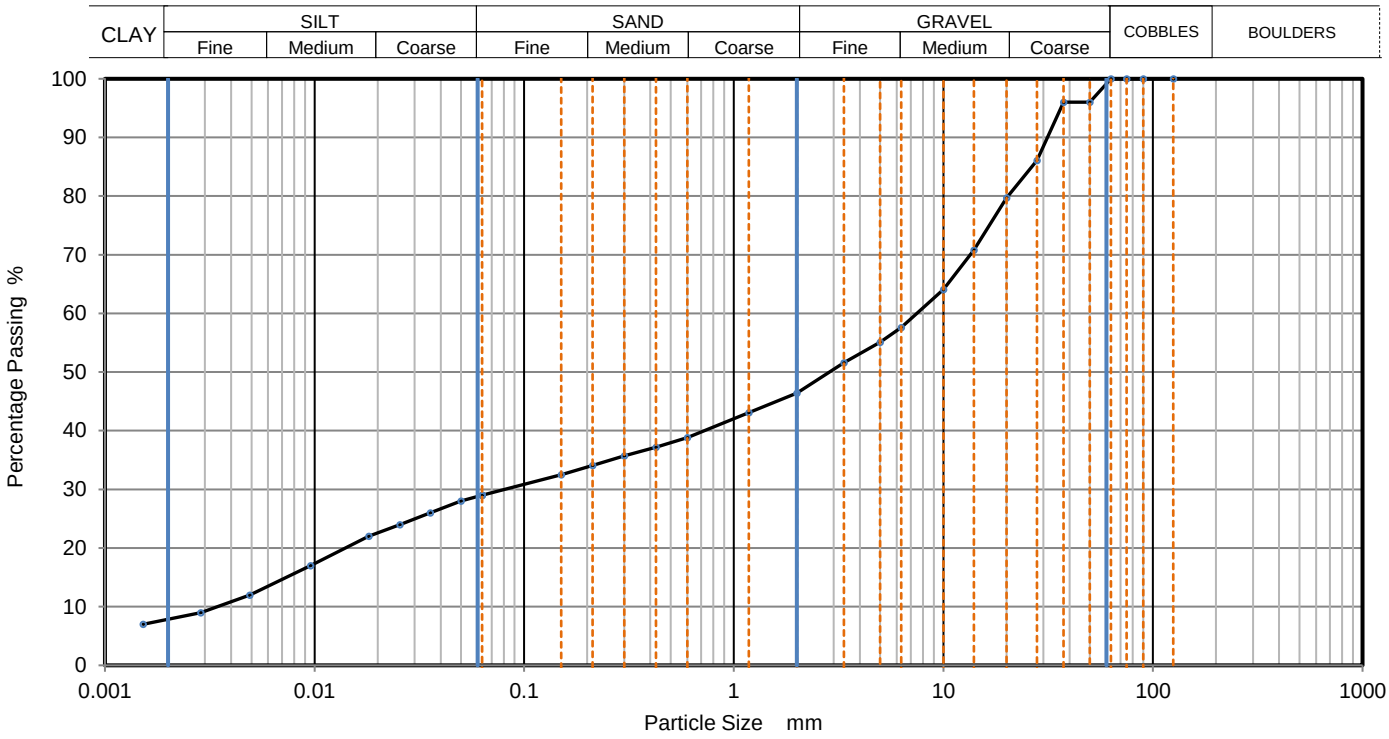
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					BH-28598
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	10
Specimen Description	Light brown sandy gravelly silty CLAY.			Sample Depth (m) Top	6.50
				Base	8.00
Specimen Reference	2	Specimen Depth	6.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022061043



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	29
90	100	0.05002	28
75	100	0.03559	26
63	100	0.02548	24
50	96	0.01813	22
37.5	96	0.00958	17
28	86	0.00490	12
20	80	0.00286	9
14	71	0.00152	7
10	64		
6.3	58		
5	55		
3.35	52		
2	46		
1.18	43		
0.6	39	Particle density	(assumed)
0.425	37	2.65	Mg/m3
0.3	36		
0.212	34		
0.15	33		
0.063	29		

Dry Mass of sample, g: 6050

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	53.6
Sand	17.3
Silt	21.4
Clay	7.7

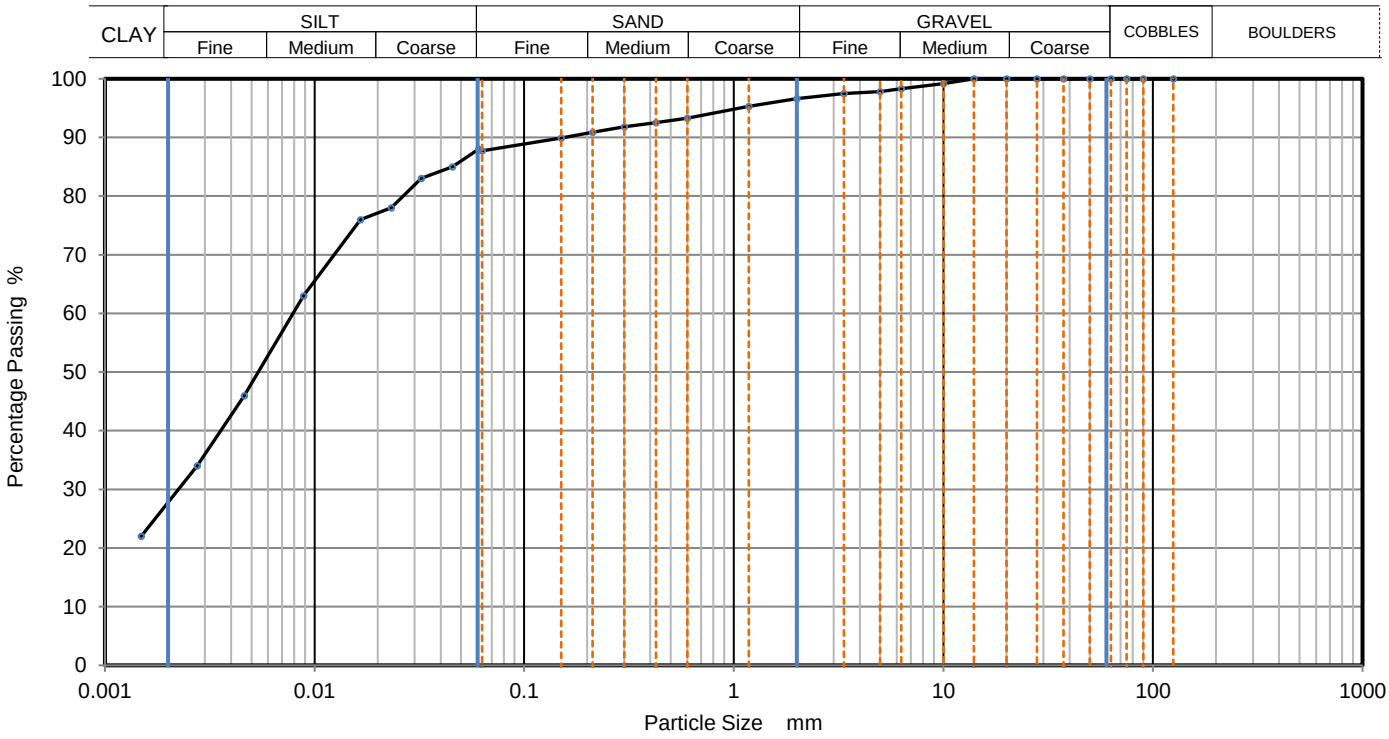
Grading Analysis		
D100	mm	
D60	mm	7.47
D30	mm	0.0803
D10	mm	0.00335
Uniformity Coefficient		2200
Curvature Coefficient		0.26

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-28598
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	11
Specimen Description	Light brown slightly sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	8.60
				Base	9.40
Specimen Reference	2	Specimen Depth	8.6 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022061045



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06060	88
90	100	0.04541	85
75	100	0.03235	83
63	100	0.02322	78
50	100	0.01654	76
37.5	100	0.00884	63
28	100	0.00462	46
20	100	0.00275	34
14	100	0.00149	22
10	99		
6.3	98		
5	98		
3.35	98		
2	97		
1.18	95		
0.6	93	Particle density	(assumed)
0.425	93	2.65	Mg/m3
0.3	92		
0.212	91		
0.15	90		
0.063	88		

Dry Mass of sample, g: 502

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	3.4
Sand	8.9
Silt	59.9
Clay	27.8

Grading Analysis		
D100	mm	
D60	mm	0.00779
D30	mm	0.00224
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

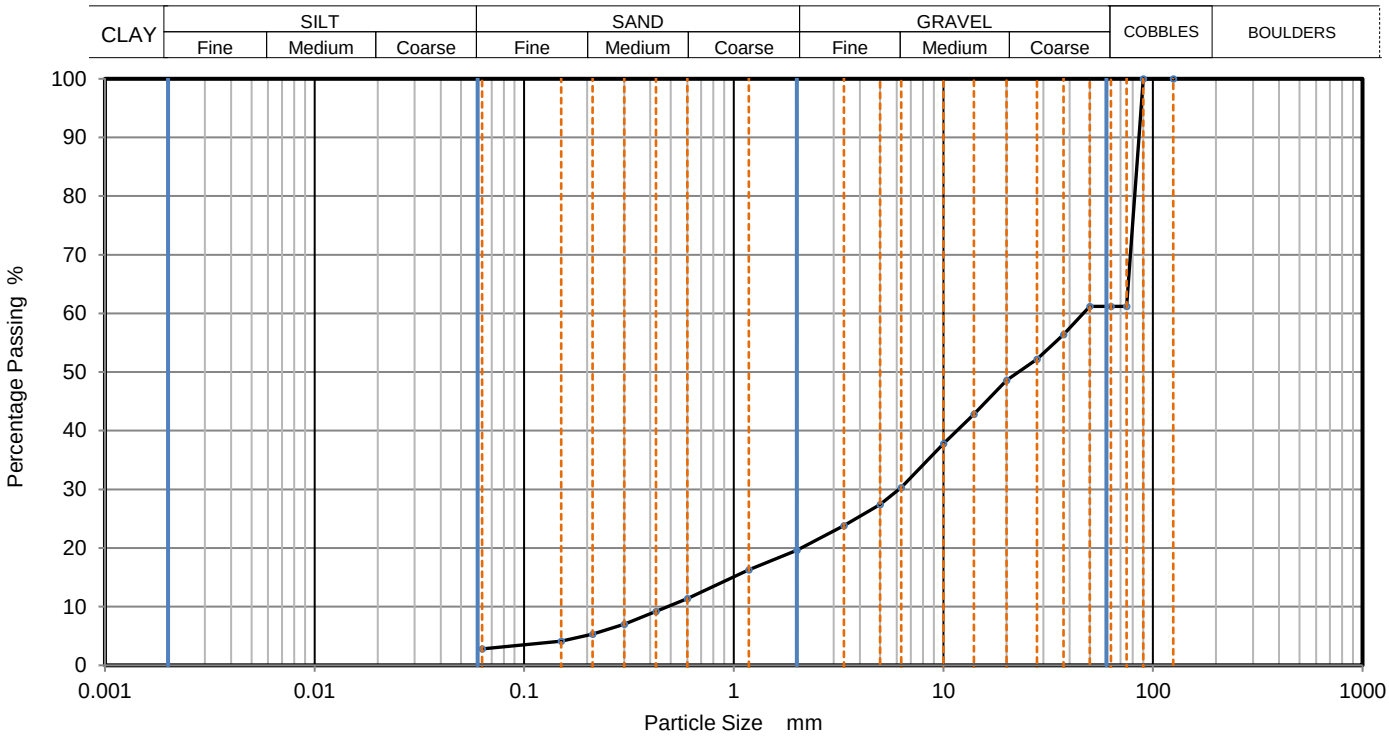
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-28796
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Light brown gravelly slightly clayey fine to coarse SAND with cobbles.			Sample Depth (m) Top	0.20
				Base	1.20
Specimen Reference	2	Specimen Depth	0.2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022061047



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	61		
63	61		
50	61		
37.5	56		
28	52		
20	49		
14	43		
10	38		
6.3	30		
5	27		
3.35	24		
2	20		
1.18	16		
0.6	11		
0.425	9		
0.3	7		
0.212	5		
0.15	4		
0.063	3		

Dry Mass of sample, g: 2905

Sample Proportions	% dry mass
Cobbles	38.8
Gravel	41.6
Sand	16.7
Fines <0.063mm	3.0

Grading Analysis		
D100	mm	
D60	mm	46.5
D30	mm	6.14
D10	mm	0.482
Uniformity Coefficient		97
Curvature Coefficient		1.7

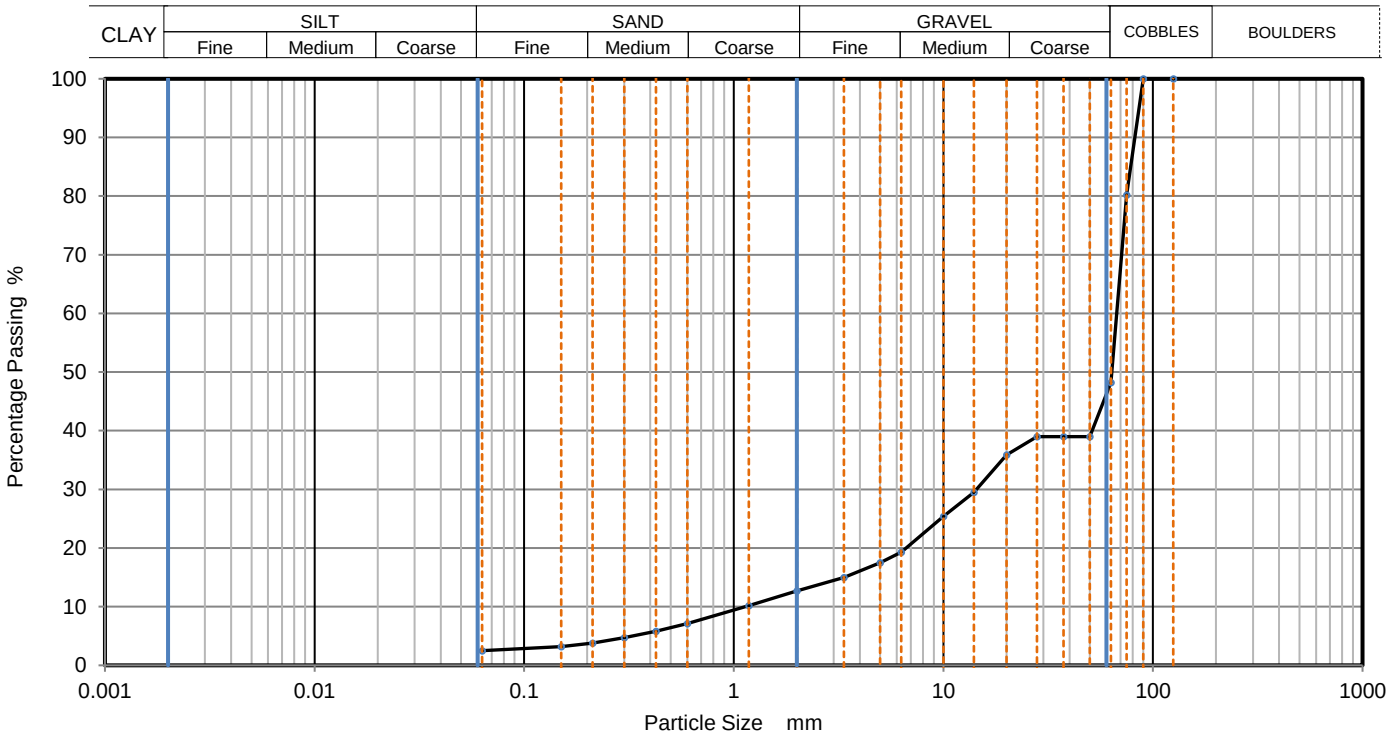
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-28796
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Light brown gravelly slightly clayey fine to coarse SAND with cobbles.			Sample Depth (m) Top	1.00
				Sample Depth (m) Base	
Specimen Reference	2	Specimen Depth	1 m	Sample Type	D
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022061048



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	80		
63	48		
50	39		
37.5	39		
28	39		
20	36		
14	30		
10	25		
6.3	19		
5	18		
3.35	15		
2	13		
1.18	10		
0.6	7		
0.425	6		
0.3	5		
0.212	4		
0.15	3		
0.063	3		

Dry Mass of sample, g: 3516

Sample Proportions	% dry mass
Cobbles	51.8
Gravel	35.5
Sand	10.2
Fines <0.063mm	3.0

Grading Analysis		
D100	mm	
D60	mm	67.2
D30	mm	14.4
D10	mm	1.13
Uniformity Coefficient		59
Curvature Coefficient		2.7

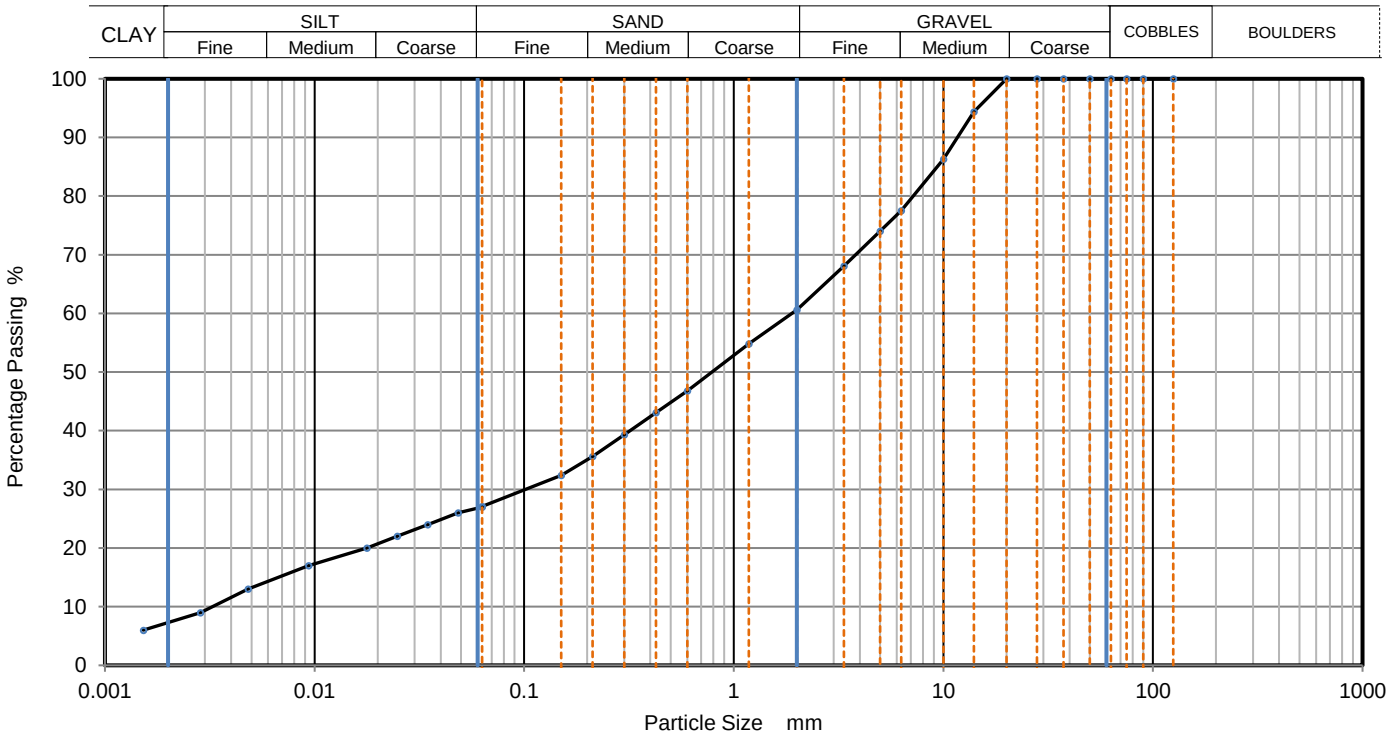
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					BH-28818A
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Greyish brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	0.80
				Base	1.00
Specimen Reference	2	Specimen Depth	0.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022062131



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	27
90	100	0.04837	26
75	100	0.03467	24
63	100	0.02484	22
50	100	0.01780	20
37.5	100	0.00936	17
28	100	0.00482	13
20	100	0.00285	9
14	94	0.00152	6
10	86		
6.3	78		
5	74		
3.35	68		
2	61		
1.18	55		
0.6	47	Particle density	(assumed)
0.425	43	2.65	Mg/m3
0.3	39		
0.212	36		
0.15	32		
0.063	27		

Dry Mass of sample, g: 897

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	39.4
Sand	33.5
Silt	20.0
Clay	7.1

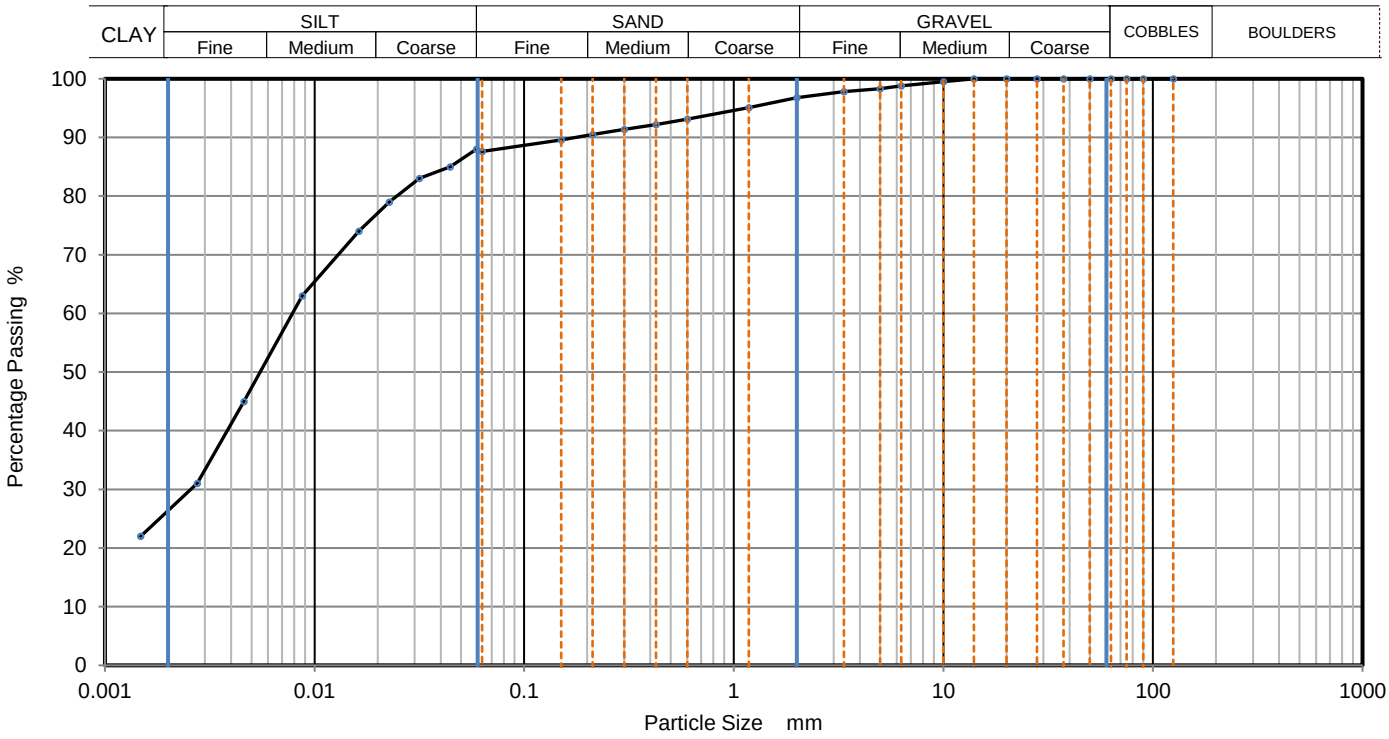
Grading Analysis		
D100	mm	
D60	mm	1.9
D30	mm	0.101
D10	mm	0.00339
Uniformity Coefficient		560
Curvature Coefficient		1.6

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-28886
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Light brown slightly sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	0.80
				Base	1.00
Specimen Reference	2	Specimen Depth	0.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022061049



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.05917	88
90	100	0.04436	85
75	100	0.03161	83
63	100	0.02270	79
50	100	0.01630	74
37.5	100	0.00872	63
28	100	0.00460	45
20	100	0.00275	31
14	100	0.00148	22
10	100		
6.3	99		
5	98		
3.35	98		
2	97		
1.18	95		
0.6	93	Particle density	(assumed)
0.425	92	2.65	Mg/m3
0.3	91		
0.212	91		
0.15	90		
0.063	88		

Dry Mass of sample, g: 506

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	3.2
Sand	9.1
Silt	60.9
Clay	26.8

Grading Analysis		
D100	mm	
D60	mm	0.00787
D30	mm	0.00249
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

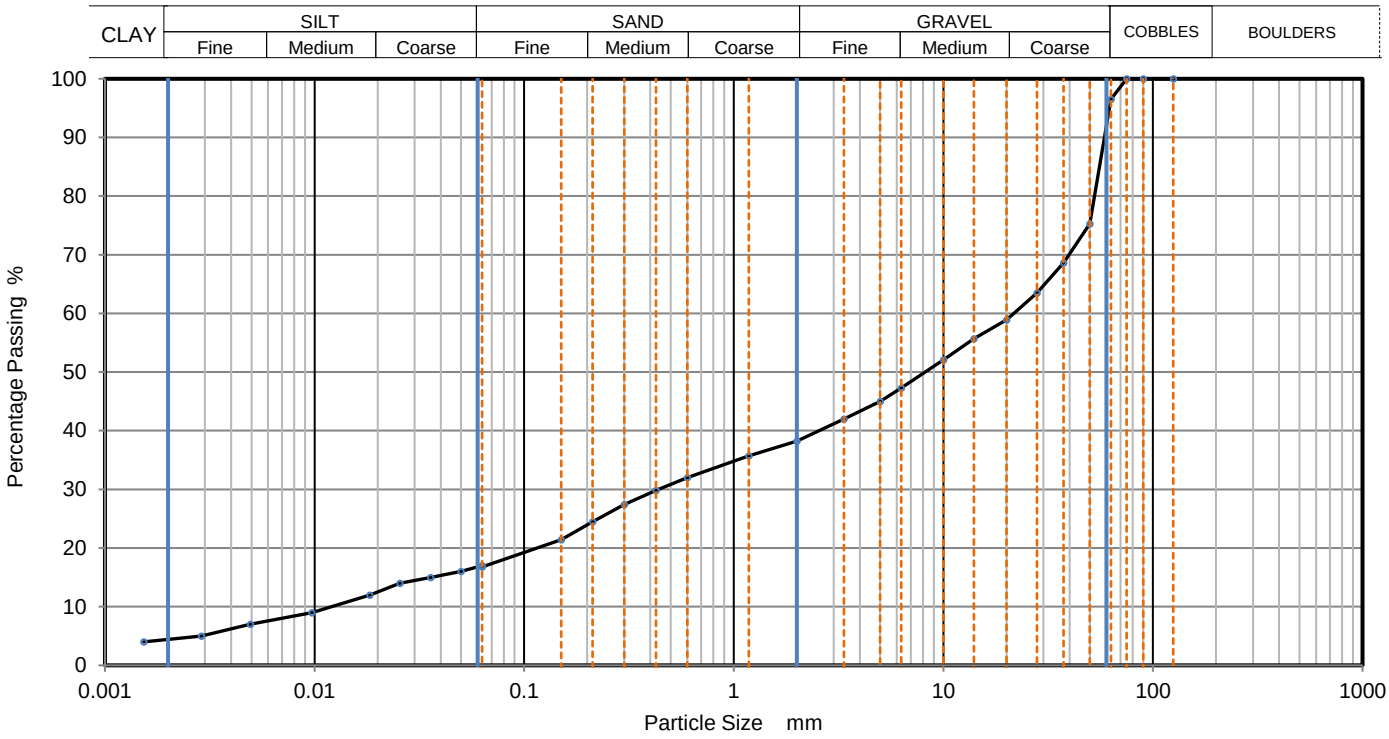
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-28886A
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Light brown sandy gravelly silty CLAY.			Sample Depth (m) Top	2.20
				Base	3.70
Specimen Reference	9	Specimen Depth	2.2 m	Sample Type	C
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022082580



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	17
90	100	0.05001	16
75	100	0.03582	15
63	97	0.02549	14
50	75	0.01835	12
37.5	69	0.00970	9
28	64	0.00493	7
20	59	0.00288	5
14	56	0.00153	4
10	52		
6.3	47		
5	45		
3.35	42		
2	38		
1.18	36		
0.6	32	Particle density	(assumed)
0.425	30	2.65	Mg/m3
0.3	27		
0.212	25		
0.15	21		
0.063	17		

Dry Mass of sample, g: 10585

Sample Proportions	% dry mass
Cobbles	3.5
Gravel	58.3
Sand	21.4
Silt	12.5
Clay	4.3

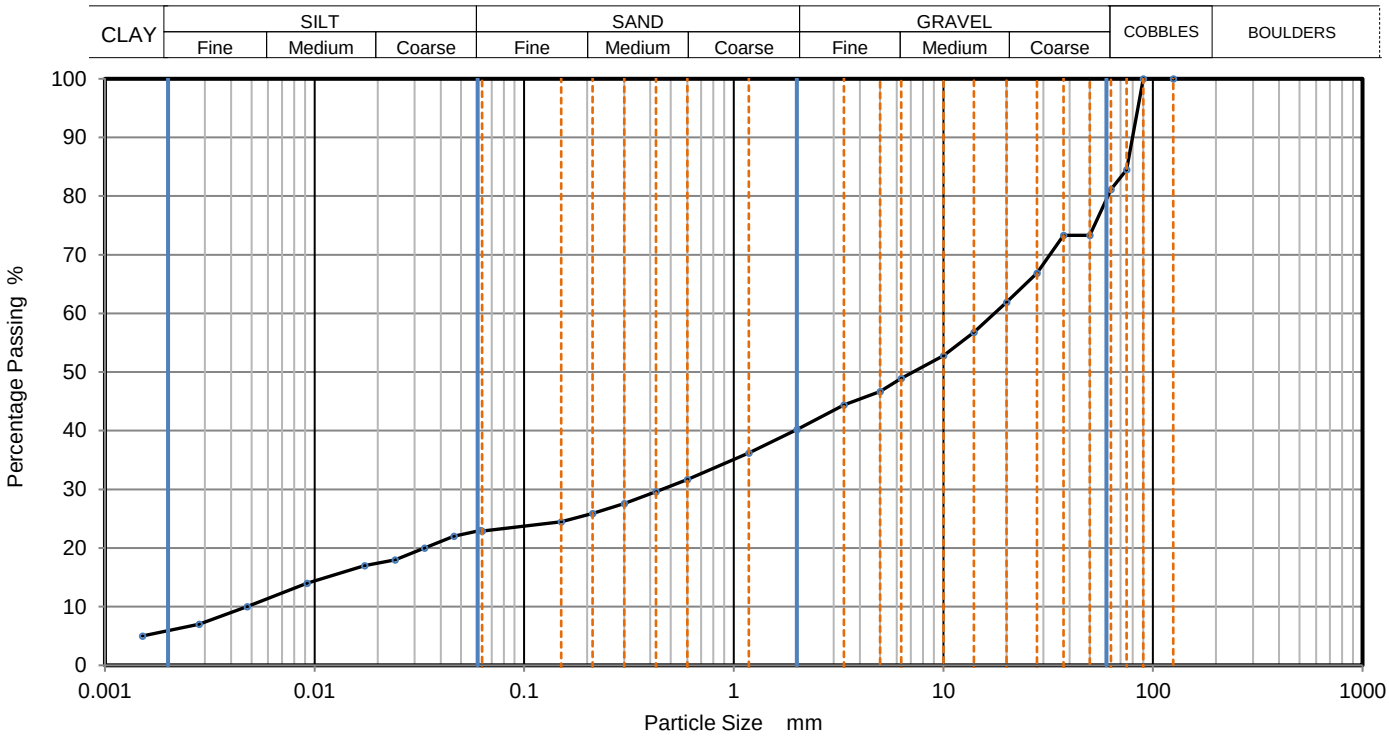
Grading Analysis		
D100	mm	
D60	mm	21.7
D30	mm	0.44
D10	mm	0.0127
Uniformity Coefficient		1700
Curvature Coefficient		0.7

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		BH-28886A
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		2
Specimen Description	Light brown sandy gravelly silty CLAY with cobbles.				Sample Depth (m)	Top	3.70
						Base	5.20
Specimen Reference	9	Specimen Depth	3.7	m	Sample Type		C
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022082581



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06183	23
90	100	0.04632	22
75	85	0.03349	20
63	81	0.02418	18
50	73	0.01734	17
37.5	73	0.00919	14
28	67	0.00477	10
20	62	0.00282	7
14	57	0.00151	5
10	53		
6.3	49		
5	47		
3.35	44		
2	40		
1.18	36		
0.6	32	Particle density	(assumed)
0.425	30	2.65	Mg/m3
0.3	28		
0.212	26		
0.15	25		
0.063	23		

Dry Mass of sample, g: 11988

Sample Proportions	% dry mass
Cobbles	18.9
Gravel	40.9
Sand	17.3
Silt	16.6
Clay	6.3

Grading Analysis		
D100	mm	
D60	mm	17.5
D30	mm	0.456
D10	mm	0.00467
Uniformity Coefficient		3700
Curvature Coefficient		2.5

Remarks

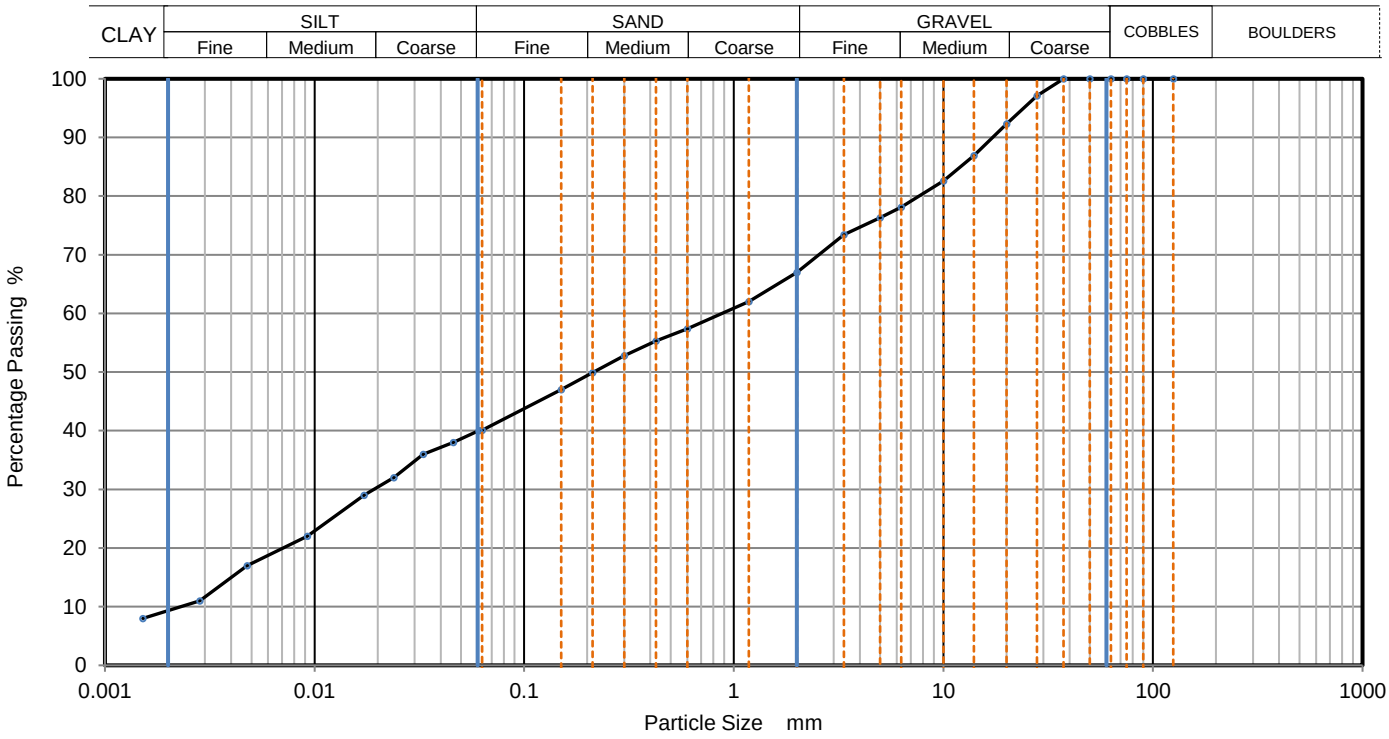
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					BH-28886A
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Light brown sandy gravelly silty CLAY.			Sample Depth (m) Top	8.20
				Base	9.70
Specimen Reference	9	Specimen Depth	8.2 m	Sample Type	C
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022082582



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06087	40
90	100	0.04597	38
75	100	0.03300	36
63	100	0.02385	32
50	100	0.01722	29
37.5	100	0.00925	22
28	97	0.00477	17
20	92	0.00283	11
14	87	0.00152	8
10	83		
6.3	78		
5	76		
3.35	73		
2	67		
1.18	62		
0.6	57	Particle density	(assumed)
0.425	55	2.65	Mg/m3
0.3	53		
0.212	50		
0.15	47		
0.063	40		

Dry Mass of sample, g: 2895

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	33.0
Sand	26.9
Silt	30.8
Clay	9.3

Grading Analysis		
D100	mm	
D60	mm	0.878
D30	mm	0.0191
D10	mm	0.00229
Uniformity Coefficient		380
Curvature Coefficient		0.18

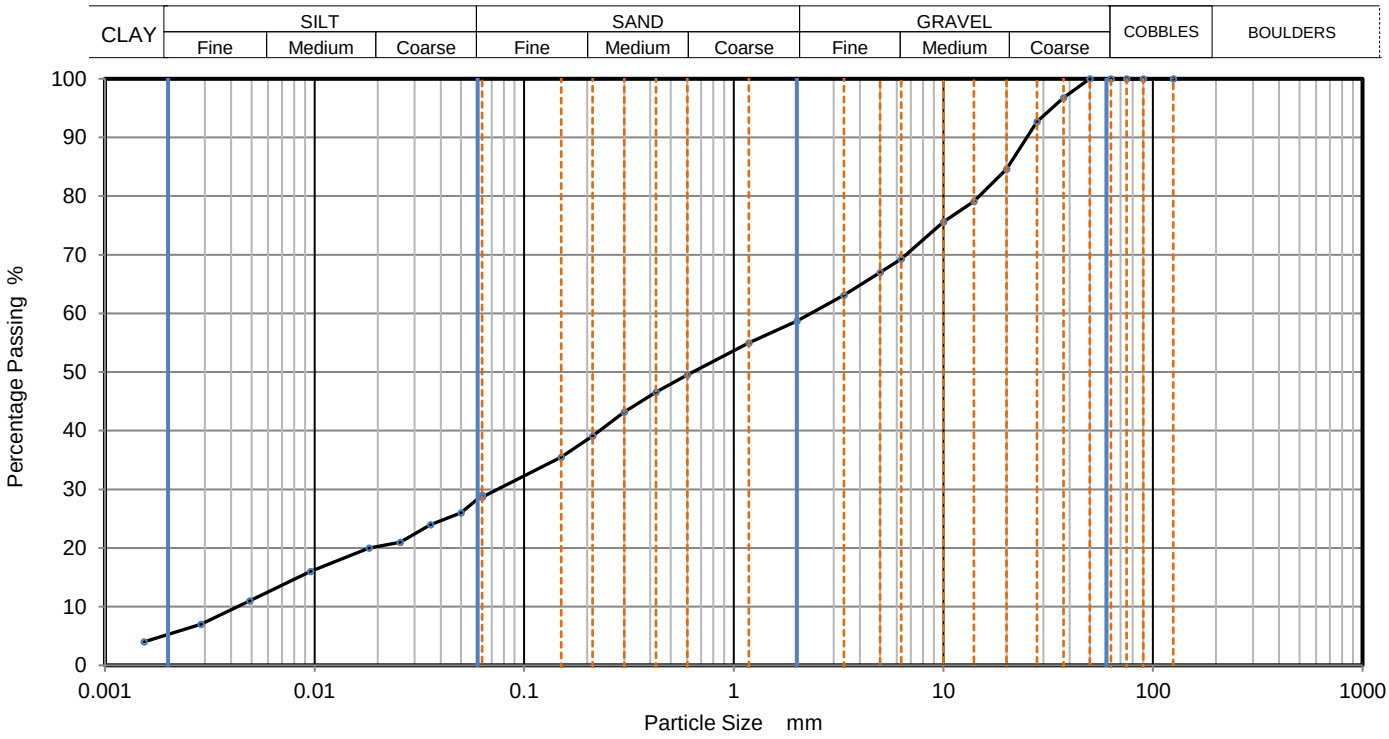
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					BH-28924
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Light brown sandy gravelly silty CLAY.			Sample Depth (m) Top	0.40
				Base	0.60
Specimen Reference	2	Specimen Depth	0.4 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022061051



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	29
90	100	0.05002	26
75	100	0.03581	24
63	100	0.02563	21
50	100	0.01823	20
37.5	97	0.00958	16
28	93	0.00490	11
20	85	0.00287	7
14	79	0.00154	4
10	76		
6.3	69		
5	67		
3.35	63		
2	59		
1.18	55		
0.6	50	Particle density	(assumed)
0.425	47	2.65	Mg/m3
0.3	43		
0.212	39		
0.15	36		
0.063	29		

Dry Mass of sample, g: 3247

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	41.3
Sand	30.1
Silt	23.3
Clay	5.3

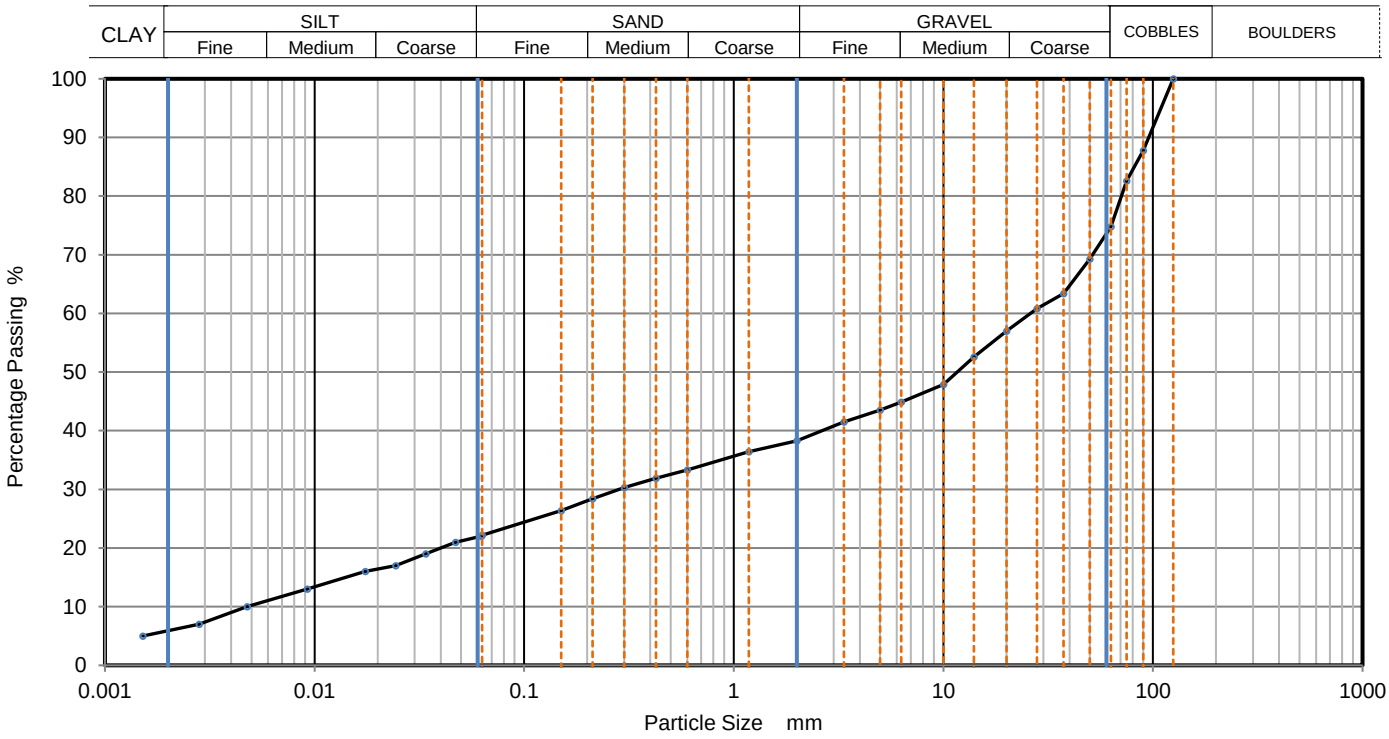
Grading Analysis		
D100	mm	
D60	mm	2.32
D30	mm	0.0745
D10	mm	0.00411
Uniformity Coefficient		560
Curvature Coefficient		0.58

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-28924A
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Brownish grey sandy very gravelly silty CLAY.			Sample Depth (m) Top	5.20
				Base	6.70
Specimen Reference	6	Specimen Depth	5.2 m	Sample Type	C
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022082556



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06230	22
90	88	0.04701	21
75	83	0.03397	19
63	75	0.02435	17
50	69	0.01745	16
37.5	63	0.00925	13
28	61	0.00477	10
20	57	0.00282	7
14	53	0.00152	5
10	48		
6.3	45		
5	44		
3.35	42		
2	38		
1.18	36		
0.6	33	Particle density	(assumed)
0.425	32	2.65	Mg/m3
0.3	30		
0.212	28		
0.15	26		
0.063	22		

Dry Mass of sample, g: 16290

Sample Proportions	% dry mass
Cobbles	25.2
Gravel	36.4
Sand	16.1
Silt	16.4
Clay	5.9

Grading Analysis		
D100	mm	125
D60	mm	26.1
D30	mm	0.286
D10	mm	0.00468
Uniformity Coefficient		5600
Curvature Coefficient		0.67

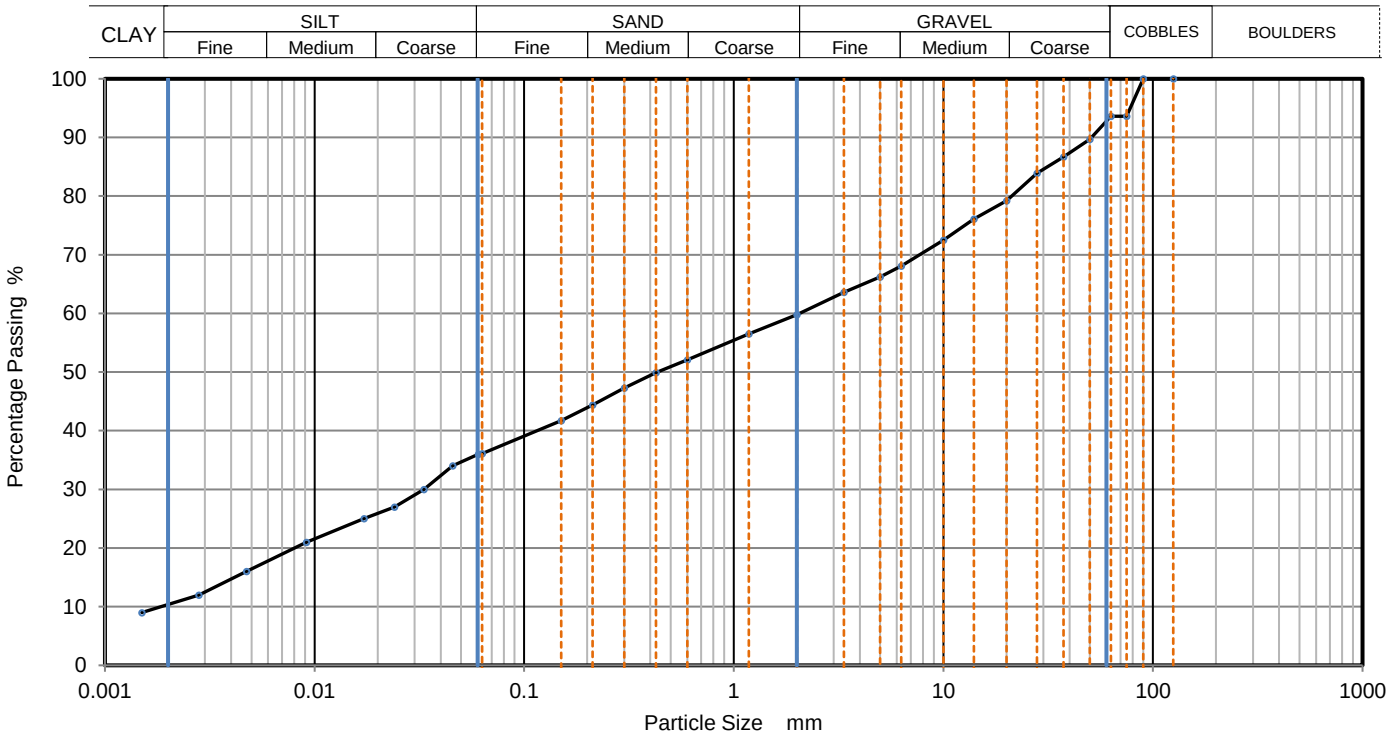
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-28924A
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	4
Specimen Description	Brownish grey sandy gravelly silty CLAY.			Sample Depth (m) Top	8.20
				Base	9.70
Specimen Reference	6	Specimen Depth	8.2 m	Sample Type	C
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022082559



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06039	36
90	100	0.04562	34
75	94	0.03324	30
63	94	0.02402	27
50	90	0.01722	25
37.5	87	0.00913	21
28	84	0.00474	16
20	79	0.00280	12
14	76	0.00150	9
10	73		
6.3	68		
5	66		
3.35	64		
2	60		
1.18	57		
0.6	52	Particle density	(assumed)
0.425	50	2.65	Mg/m3
0.3	47		
0.212	44		
0.15	42		
0.063	36		

Dry Mass of sample, g: 17447

Sample Proportions	% dry mass
Cobbles	6.4
Gravel	33.7
Sand	23.7
Silt	26.1
Clay	10.1

Grading Analysis		
D100	mm	
D60	mm	2.04
D30	mm	0.0323
D10	mm	0.00194
Uniformity Coefficient		1100
Curvature Coefficient		0.26

Remarks

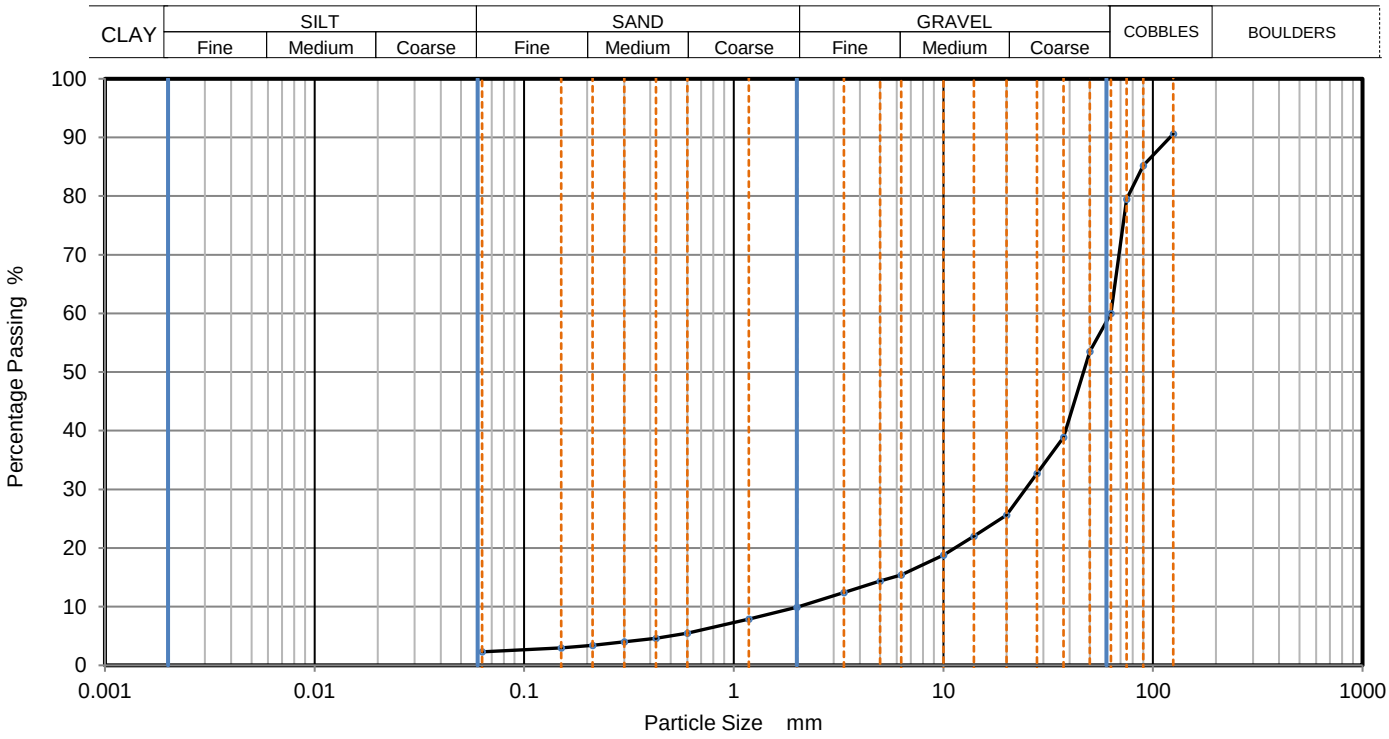
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-29130
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Brown slightly sandy slightly silty subangular fine to coarse GRAVEL.			Sample Depth (m) Top	1.20
				Base	2.00
Specimen Reference	4	Specimen Depth	1.2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022090870



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	91		
90	85		
75	80		
63	60		
50	54		
37.5	39		
28	33		
20	26		
14	22		
10	19		
6.3	15		
5	14		
3.35	12		
2	10		
1.18	8		
0.6	6		
0.425	5		
0.3	4		
0.212	3		
0.15	3		
0.063	2		

Dry Mass of sample, g: 13527

Sample Proportions	% dry mass
Cobbles	40.0
Gravel	50.1
Sand	7.7
Fines <0.063mm	2.0

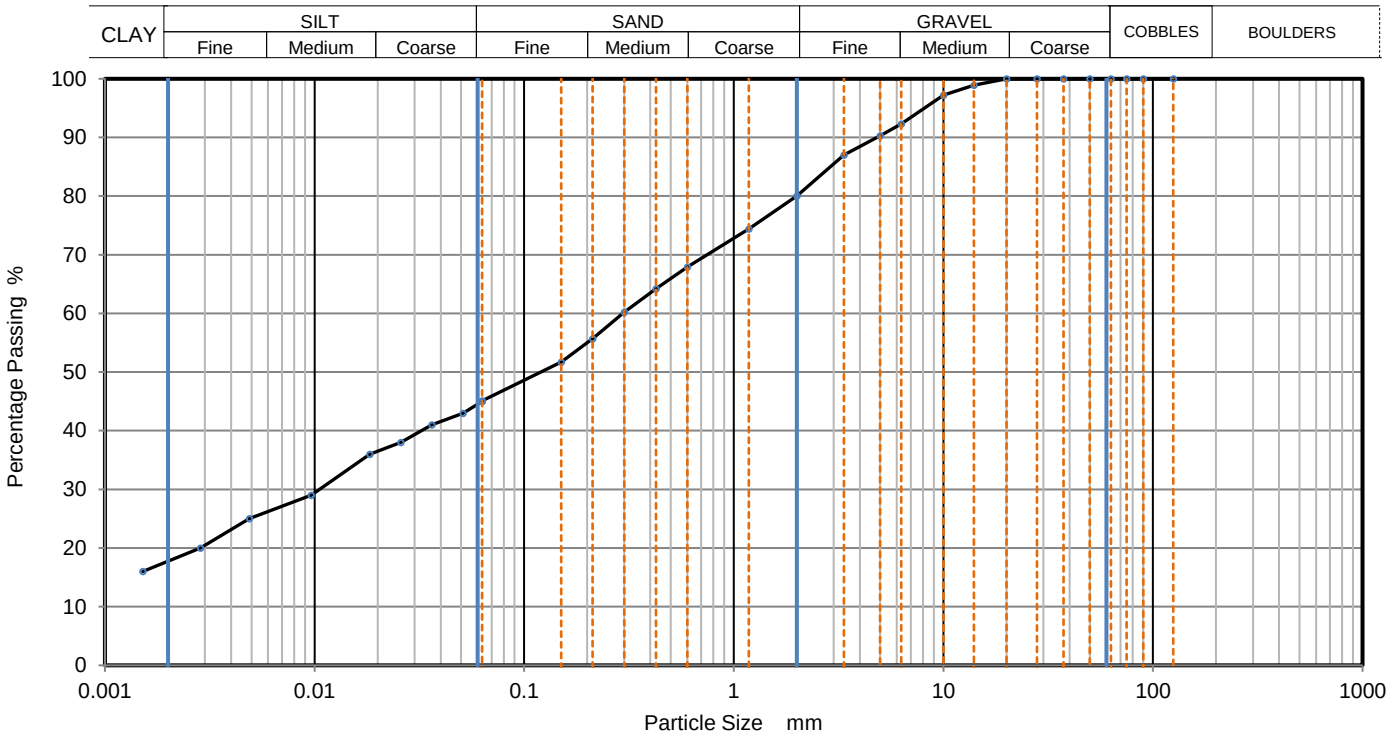
Grading Analysis		
D100	mm	
D60	mm	63
D30	mm	24.6
D10	mm	2.03
Uniformity Coefficient		31
Curvature Coefficient		4.8

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-29130
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	5
Specimen Description	Brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	3.00
				Base	4.00
Specimen Reference	4	Specimen Depth	3 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022090871



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	45
90	100	0.05097	43
75	100	0.03627	41
63	100	0.02580	38
50	100	0.01835	36
37.5	100	0.00965	29
28	100	0.00488	25
20	100	0.00285	20
14	99	0.00152	16
10	97		
6.3	92		
5	90		
3.35	87		
2	80		
1.18	74		
0.6	68	Particle density	(assumed)
0.425	64	2.65	Mg/m3
0.3	60		
0.212	56		
0.15	52		
0.063	45		

Dry Mass of sample, g: 506

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	20.0
Sand	34.9
Silt	27.3
Clay	17.8

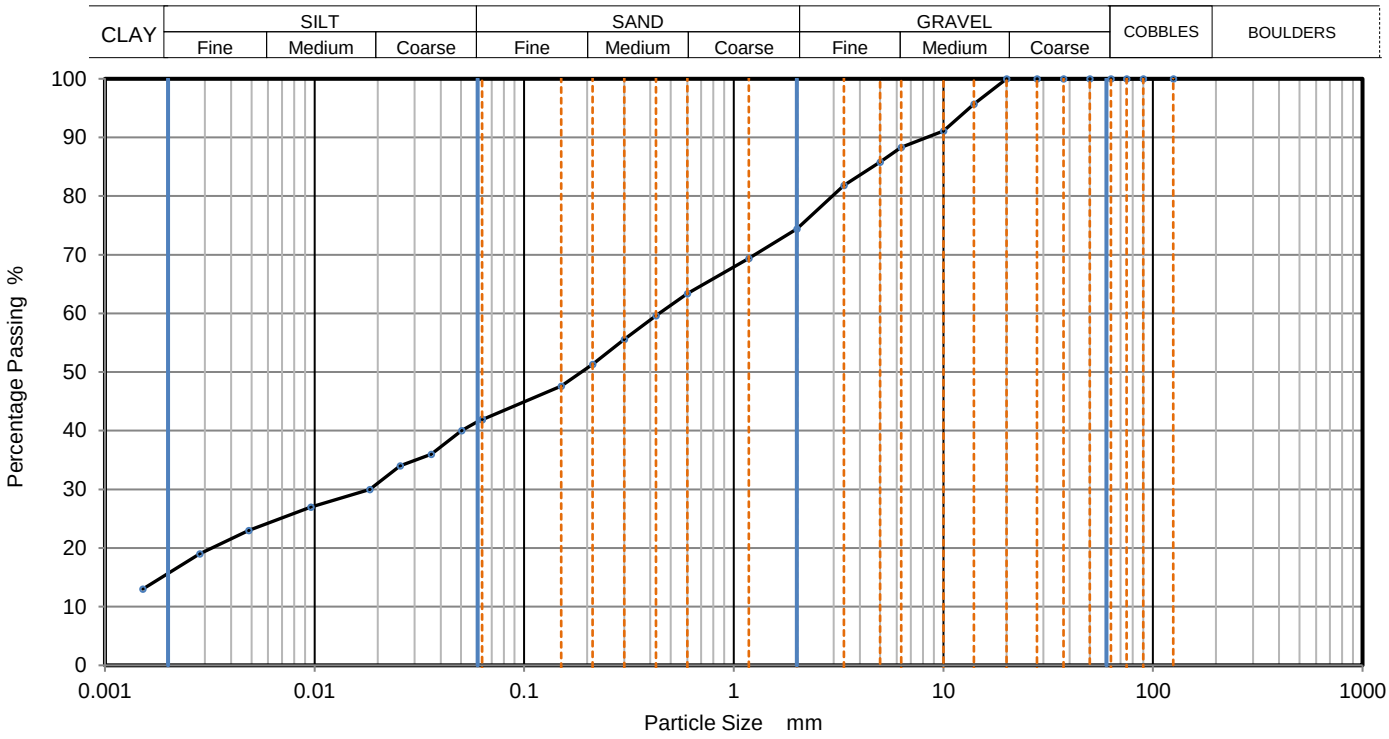
Grading Analysis		
D100	mm	
D60	mm	0.294
D30	mm	0.0103
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION			Job Ref		21-1682
				Borehole/Pit No.		BH-29130
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.		12
Specimen Description	Brown sandy slightly gravelly silty CLAY.			Sample Depth (m)	Top	5.00
					Base	5.70
Specimen Reference	2	Specimen Depth	5 m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID		Caus2022090873



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	42
90	100	0.05033	40
75	100	0.03604	36
63	100	0.02564	34
50	100	0.01835	30
37.5	100	0.00959	27
28	100	0.00485	23
20	100	0.00283	19
14	96	0.00152	13
10	91		
6.3	88		
5	86		
3.35	82		
2	74		
1.18	69		
0.6	63	Particle density	(assumed)
0.425	60	2.65	Mg/m3
0.3	56		
0.212	51		
0.15	48		
0.063	42		

Dry Mass of sample, g: 505

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	25.6
Sand	32.6
Silt	25.9
Clay	15.9

Grading Analysis		
D100	mm	
D60	mm	0.439
D30	mm	0.0169
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

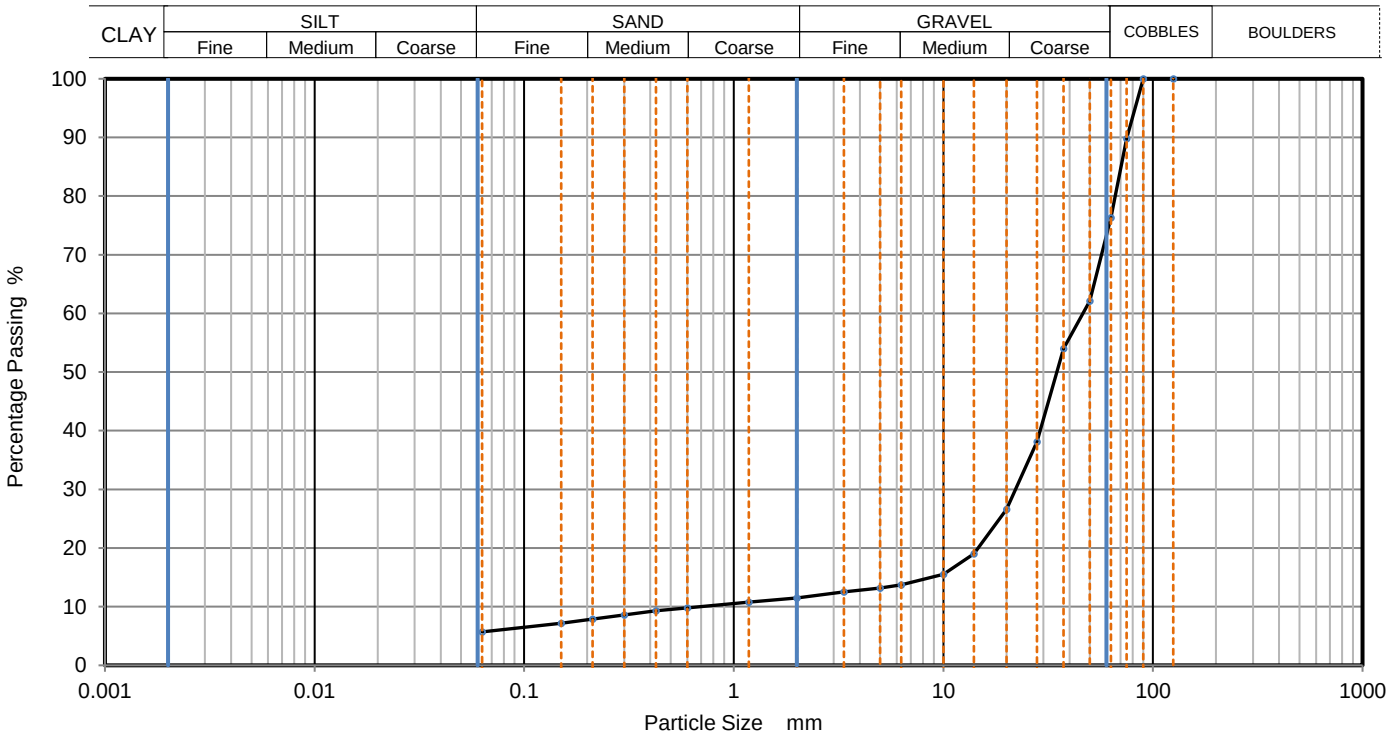
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-29130
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Brownish grey slightly sandy subangular fine to coarse GRAVEL with cobbles.			Sample Depth (m) Top	5.20
				Sample Depth (m) Base	5.90
Specimen Reference	6	Specimen Depth	5.2 m	Sample Type	C
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus202210208



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	90		
63	76		
50	62		
37.5	54		
28	38		
20	27		
14	19		
10	16		
6.3	14		
5	13		
3.35	13		
2	12		
1.18	11		
0.6	10		
0.425	9		
0.3	9		
0.212	8		
0.15	7		
0.063	6		

Dry Mass of sample, g: 8432

Sample Proportions	% dry mass
Cobbles	23.7
Gravel	64.9
Sand	5.8
Fines <0.063mm	6.0

Grading Analysis		
D100	mm	
D60	mm	46.4
D30	mm	22.1
D10	mm	0.694
Uniformity Coefficient		67
Curvature Coefficient		15

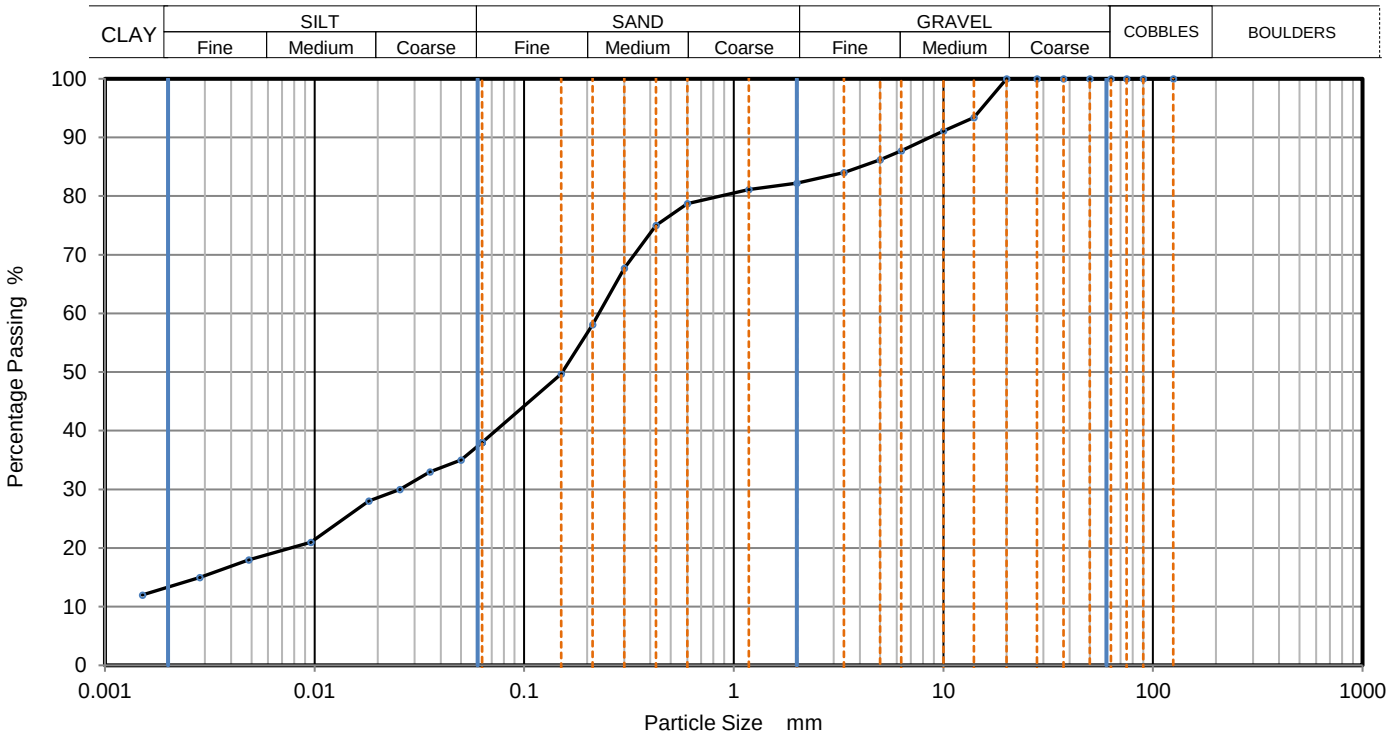
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					BH-29130
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	5
Specimen Description	Brownish grey slightly gravelly clayey fine to coarse SAND.			Sample Depth (m) Top	8.90
				Base	9.70
Specimen Reference	6	Specimen Depth	8.9 m	Sample Type	C
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022102012



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	38
90	100	0.05000	35
75	100	0.03559	33
63	100	0.02548	30
50	100	0.01813	28
37.5	100	0.00959	21
28	100	0.00485	18
20	100	0.00283	15
14	93	0.00151	12
10	91		
6.3	88		
5	86		
3.35	84		
2	82		
1.18	81		
0.6	79	Particle density	(assumed)
0.425	75	2.65	Mg/m3
0.3	68		
0.212	58		
0.15	50		
0.063	38		

Dry Mass of sample, g: 538

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	17.8
Sand	44.2
Silt	25.0
Clay	13.0

Grading Analysis		
D100	mm	
D60	mm	0.227
D30	mm	0.0262
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

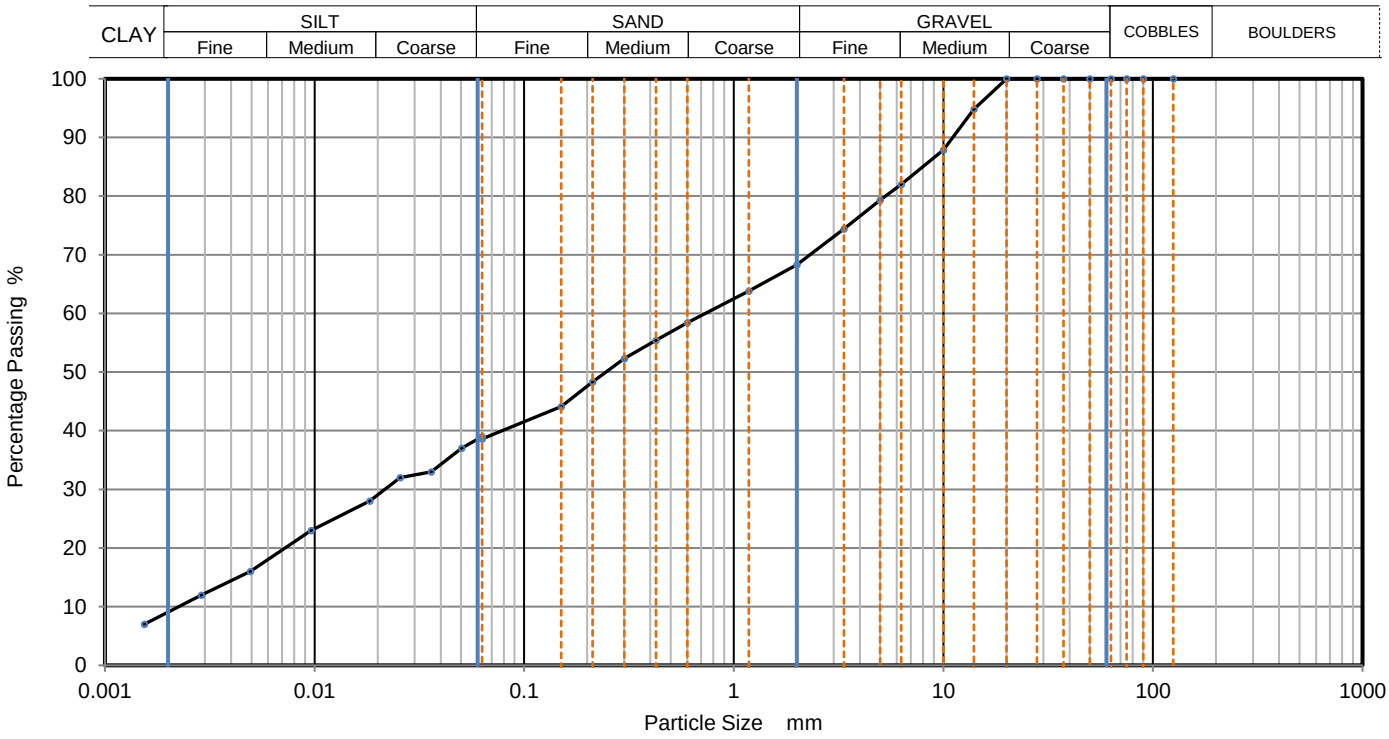
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					BH-29575
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	0.80
				Base	1.00
Specimen Reference	2	Specimen Depth	0.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022090875



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	39
90	100	0.05033	37
75	100	0.03604	33
63	100	0.02564	32
50	100	0.01835	28
37.5	100	0.00965	23
28	100	0.00493	16
20	100	0.00288	12
14	95	0.00154	7
10	88		
6.3	82		
5	79		
3.35	74		
2	68		
1.18	64		
0.6	58	Particle density	(assumed)
0.425	55	2.65	Mg/m3
0.3	52		
0.212	48		
0.15	44		
0.063	39		

Dry Mass of sample, g: 506

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	31.7
Sand	29.7
Silt	29.4
Clay	9.2

Grading Analysis		
D100	mm	
D60	mm	0.731
D30	mm	0.0221
D10	mm	0.0022
Uniformity Coefficient		330
Curvature Coefficient		0.3

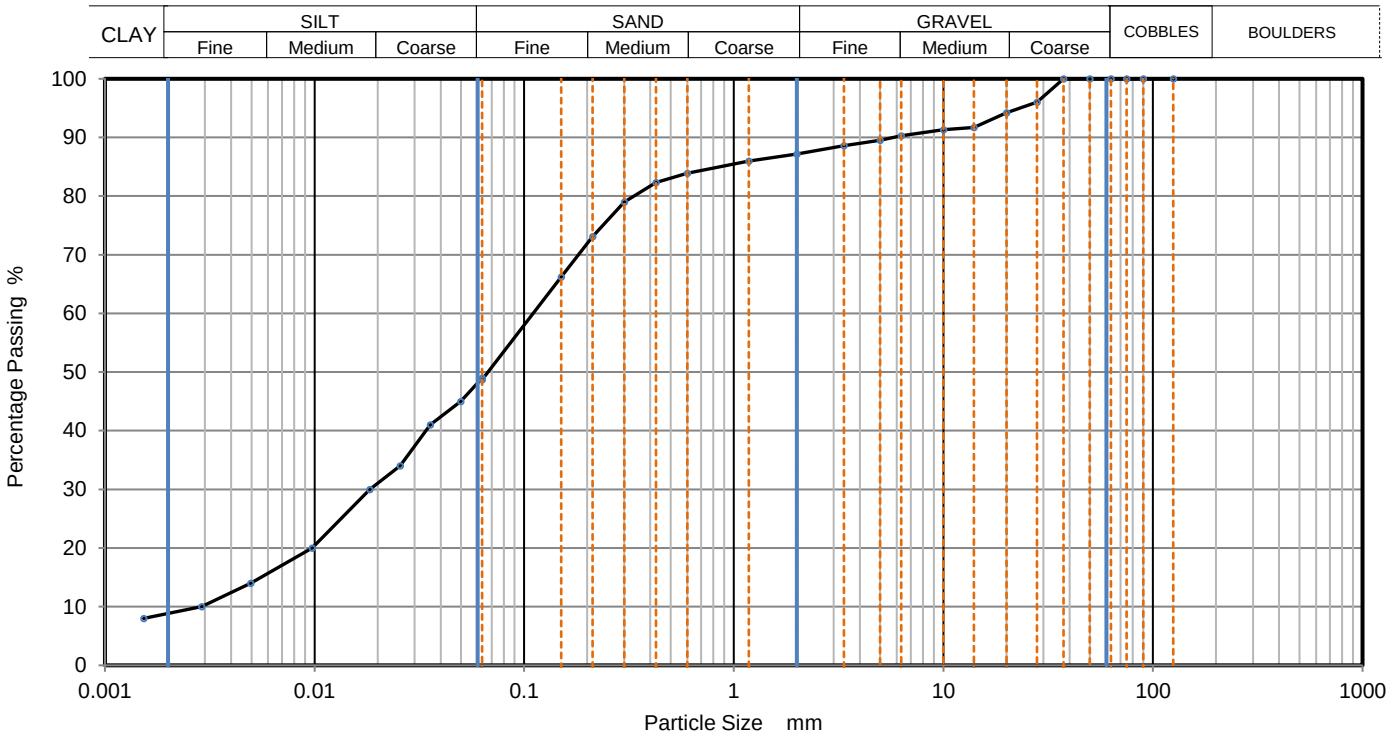
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					BH-29923
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Brown sandy gravelly silty CLAY.			Sample Depth (m) Top	0.20
				Base	1.20
Specimen Reference	6	Specimen Depth	0.2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus202206100



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	49
90	100	0.04971	45
75	100	0.03559	41
63	100	0.02563	34
50	100	0.01834	30
37.5	100	0.00974	20
28	96	0.00495	14
20	94	0.00289	10
14	92	0.00153	8
10	91		
6.3	90		
5	90		
3.35	89		
2	87		
1.18	86		
0.6	84	Particle density	(assumed)
0.425	82	2.65	Mg/m3
0.3	79		
0.212	73		
0.15	66		
0.063	49		

Dry Mass of sample, g: 2462

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	12.8
Sand	38.5
Silt	39.7
Clay	9.0

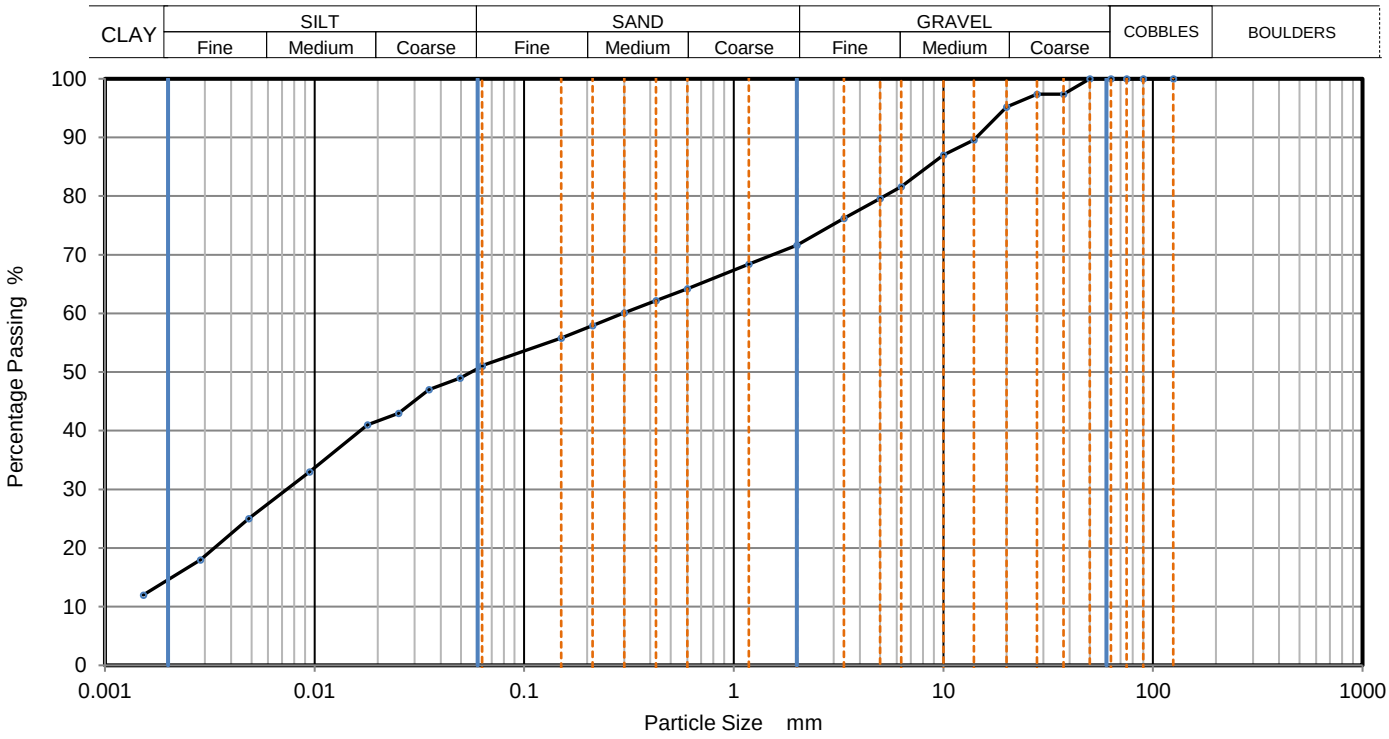
Grading Analysis		
D100	mm	
D60	mm	0.11
D30	mm	0.0178
D10	mm	0.00276
Uniformity Coefficient		40
Curvature Coefficient		1

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		BH-29923A
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		4
Specimen Description	Light grey sandy slightly gravelly silty CLAY.				Sample Depth (m)	Top	3.70
						Base	
Specimen Reference	6	Specimen Depth	3.7	m	Sample Type		C
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022081050



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	51
90	100	0.04936	49
75	100	0.03513	47
63	100	0.02517	43
50	100	0.01791	41
37.5	97	0.00948	33
28	97	0.00485	25
20	95	0.00285	18
14	90	0.00152	12
10	87		
6.3	82		
5	80		
3.35	76		
2	72		
1.18	68		
0.6	64	Particle density	(assumed)
0.425	62	2.65	Mg/m3
0.3	60		
0.212	58		
0.15	56		
0.063	51		

Dry Mass of sample, g: 3540

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	28.4
Sand	20.5
Silt	36.2
Clay	14.9

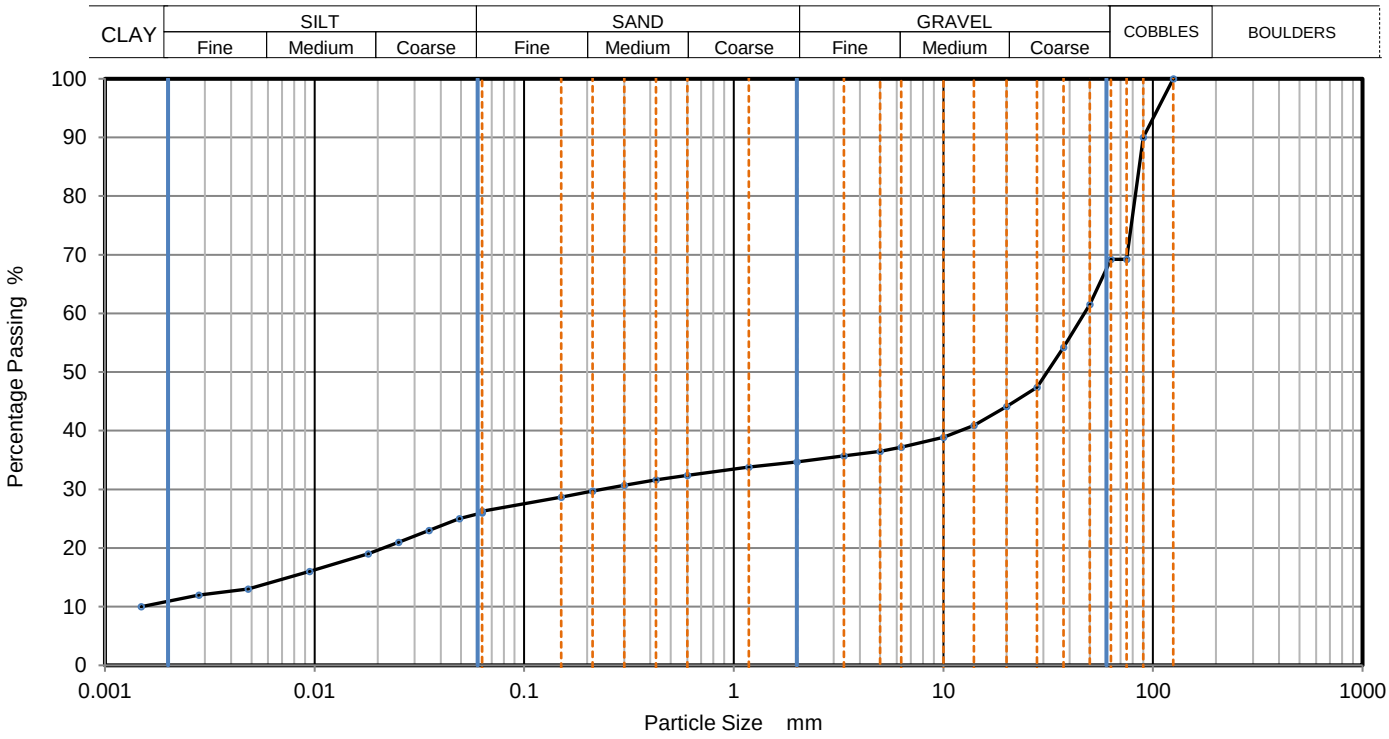
Grading Analysis		
D100	mm	
D60	mm	0.295
D30	mm	0.00759
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		BH-29923A
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		7
Specimen Description	Orangish brown sandy gravelly silty CLAY with cobbes.				Sample Depth (m)	Top	8.20
						Base	
Specimen Reference	6	Specimen Depth	8.2	m	Sample Type		C
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022081053



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	26
90	90	0.04903	25
75	69	0.03513	23
63	69	0.02517	21
50	62	0.01802	19
37.5	54	0.00948	16
28	47	0.00482	13
20	44	0.00280	12
14	41	0.00149	10
10	39		
6.3	37		
5	37		
3.35	36		
2	35		
1.18	34		
0.6	32	Particle density	(assumed)
0.425	32	2.65	Mg/m3
0.3	31		
0.212	30		
0.15	29		
0.063	26		

Dry Mass of sample, g: 15239

Sample Proportions	% dry mass
Cobbles	30.8
Gravel	34.5
Sand	8.4
Silt	15.2
Clay	11.1

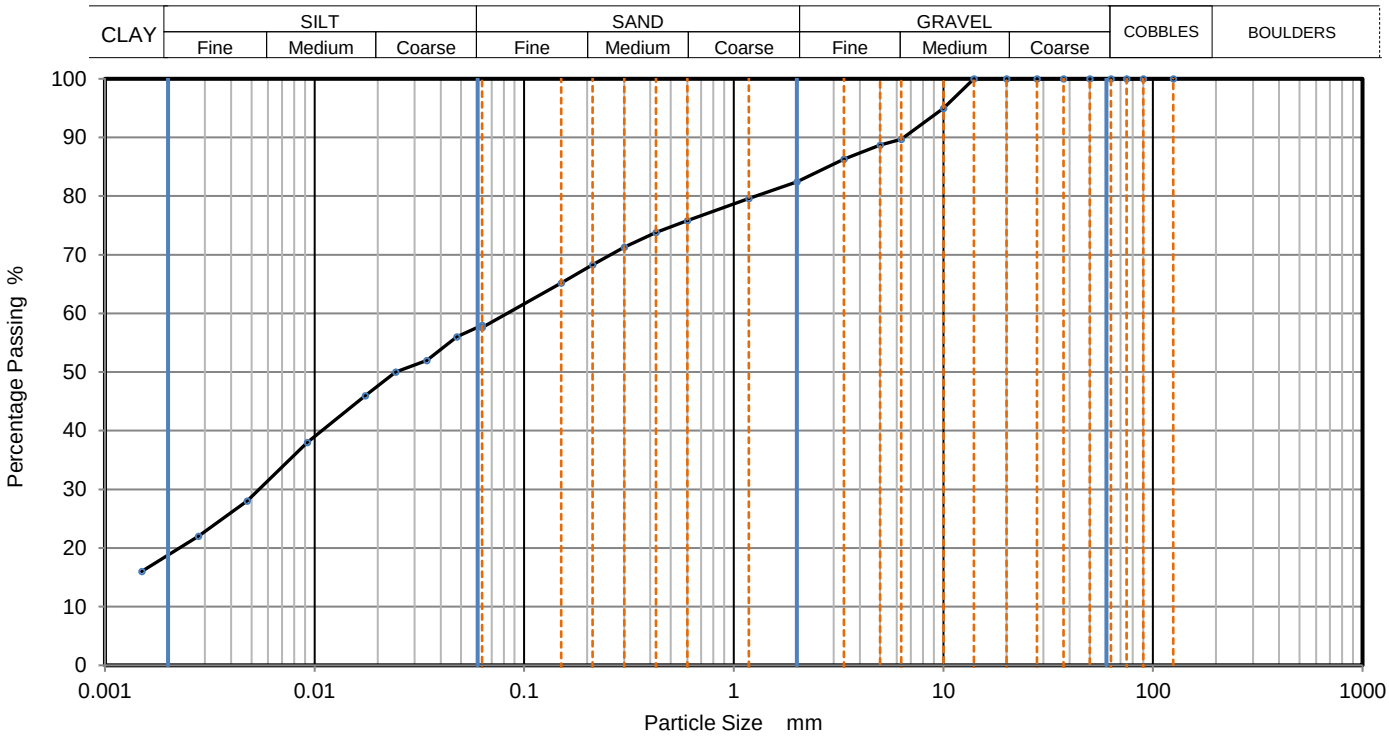
Grading Analysis		
D100	mm	125
D60	mm	47.1
D30	mm	0.235
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		BH-30066
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		2
Specimen Description	Brown sandy slightly gravelly silty CLAY.				Sample Depth (m)	Top	1.20
						Base	2.00
Specimen Reference	3	Specimen Depth	1.2	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus202206102



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	58
90	100	0.04777	56
75	100	0.03424	52
63	100	0.02437	50
50	100	0.01746	46
37.5	100	0.00925	38
28	100	0.00476	28
20	100	0.00280	22
14	100	0.00150	16
10	95		
6.3	90		
5	89		
3.35	86		
2	82		
1.18	80		
0.6	76	Particle density	(assumed)
0.425	74	2.65	Mg/m3
0.3	71		
0.212	68		
0.15	65		
0.063	58		

Dry Mass of sample, g: 214

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	17.6
Sand	24.8
Silt	38.9
Clay	18.7

Grading Analysis		
D100	mm	
D60	mm	0.0832
D30	mm	0.00551
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

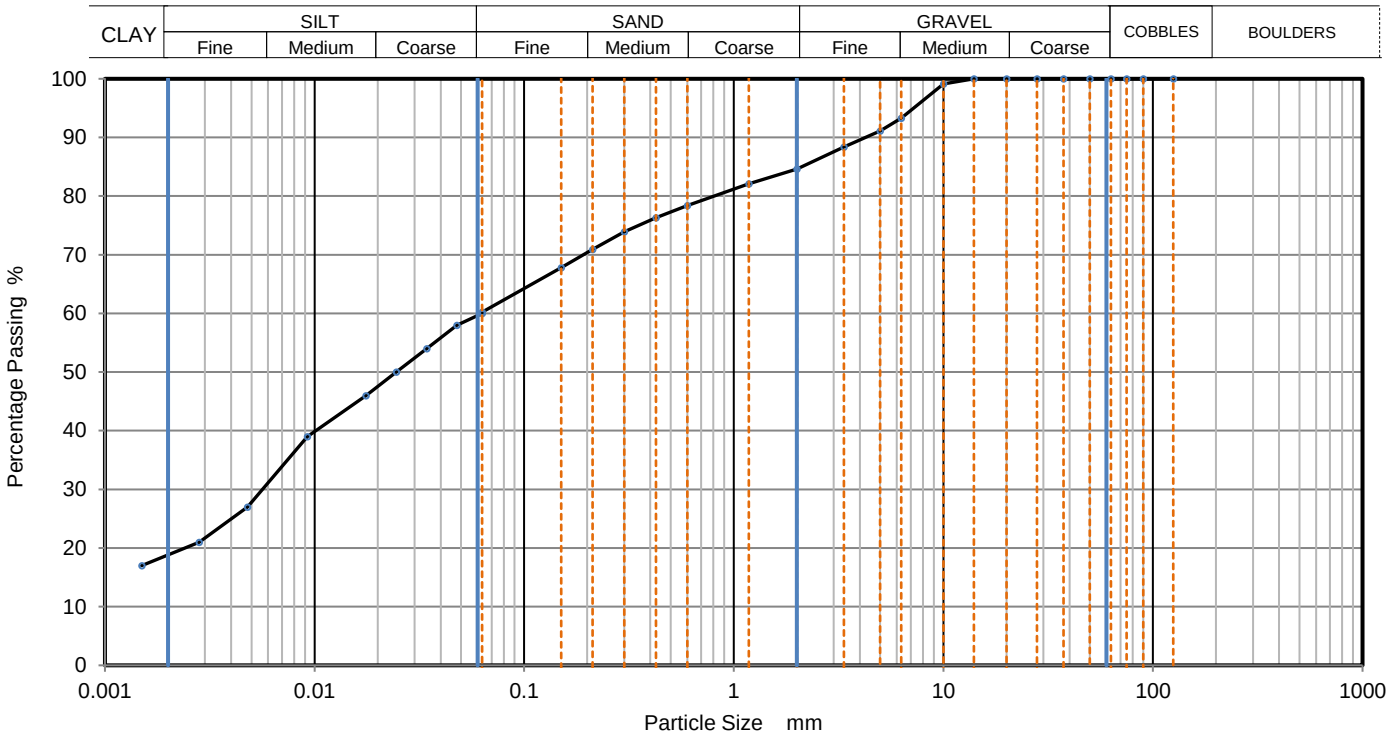
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					BH-30066
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	9
Specimen Description	Brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	4.00
				Base	5.00
Specimen Reference	2	Specimen Depth	4 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus202206106



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	60
90	100	0.04777	58
75	100	0.03424	54
63	100	0.02454	50
50	100	0.01757	46
37.5	100	0.00925	39
28	100	0.00479	27
20	100	0.00281	21
14	100	0.00150	17
10	99		
6.3	93		
5	91		
3.35	88		
2	85		
1.18	82		
0.6	78	Particle density	(assumed)
0.425	76	2.65	Mg/m3
0.3	74		
0.212	71		
0.15	68		
0.063	60		

Dry Mass of sample, g: 209

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	15.4
Sand	24.4
Silt	41.7
Clay	18.5

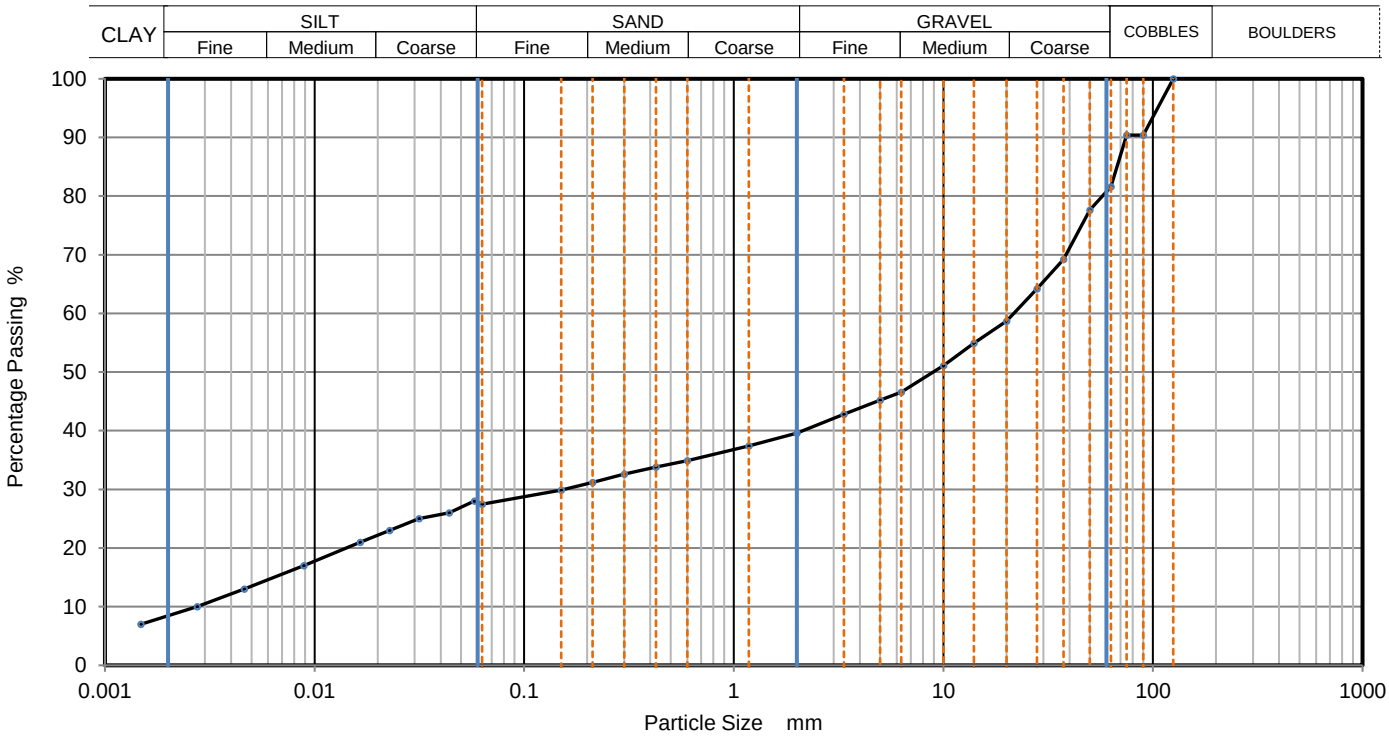
Grading Analysis		
D100	mm	
D60	mm	0.061
D30	mm	0.00562
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-30066
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Greyish brown sandy gravelly silty CLAY with cobbles.			Sample Depth (m) Top	6.70
				Sample Depth (m) Base	
Specimen Reference	6	Specimen Depth	6.7 m	Sample Type	C
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022081054



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.05792	28
90	90	0.04381	26
75	90	0.03150	25
63	82	0.02281	23
50	78	0.01650	21
37.5	69	0.00889	17
28	64	0.00462	13
20	59	0.00275	10
14	55	0.00148	7
10	51		
6.3	47		
5	45		
3.35	43		
2	40		
1.18	37		
0.6	35	Particle density (assumed)	
0.425	34	2.65 Mg/m3	
0.3	33		
0.212	31		
0.15	30		
0.063	28		

Dry Mass of sample, g: 13216

Sample Proportions	% dry mass
Cobbles	18.4
Gravel	42.0
Sand	12.1
Silt	19.0
Clay	8.5

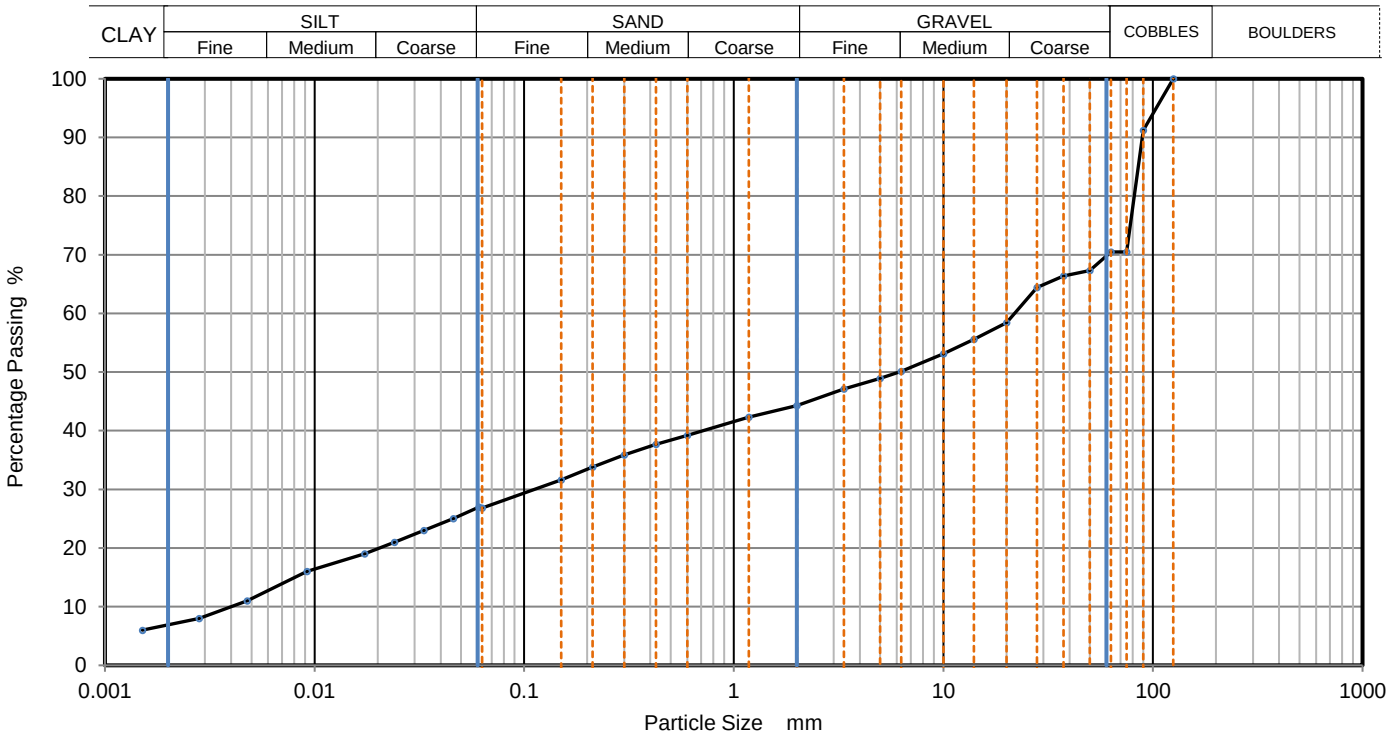
Grading Analysis		
D100	mm	125
D60	mm	21.7
D30	mm	0.152
D10	mm	0.00283
Uniformity Coefficient		7600
Curvature Coefficient		0.38

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		BH-30066
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		5
Specimen Description	Light grey sandy gravelly silty CLAY with cobbles.				Sample Depth (m)	Top	11.20
						Base	
Specimen Reference	6	Specimen Depth	11.2	m	Sample Type		C
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022081057



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06087	27
90	91	0.04597	25
75	71	0.03324	23
63	71	0.02402	21
50	67	0.01734	19
37.5	66	0.00919	16
28	64	0.00477	11
20	58	0.00282	8
14	56	0.00151	6
10	53		
6.3	50		
5	49		
3.35	47		
2	44		
1.18	42		
0.6	39	Particle density	(assumed)
0.425	38	2.65	Mg/m3
0.3	36		
0.212	34		
0.15	32		
0.063	27		

Dry Mass of sample, g: 14568

Sample Proportions	% dry mass
Cobbles	29.5
Gravel	26.2
Sand	17.6
Silt	19.7
Clay	7.0

Grading Analysis		
D100	mm	125
D60	mm	21.8
D30	mm	0.112
D10	mm	0.00388
Uniformity Coefficient		5600
Curvature Coefficient		0.15

Remarks

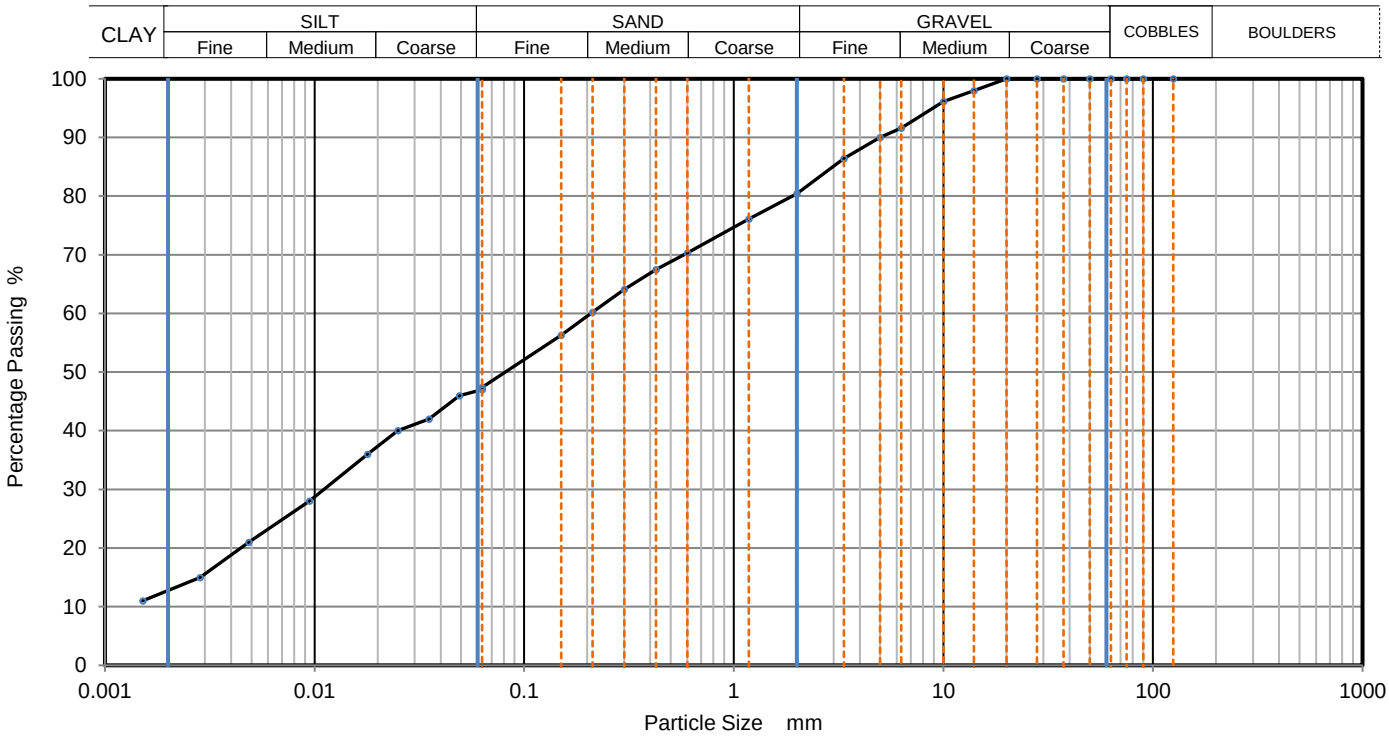
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					BH-30414
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	1.20
				Base	2.00
Specimen Reference	2	Specimen Depth	1.2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus202206107



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	47
90	100	0.04907	46
75	100	0.03515	42
63	100	0.02501	40
50	100	0.01791	36
37.5	100	0.00947	28
28	100	0.00485	21
20	100	0.00284	15
14	98	0.00151	11
10	96		
6.3	92		
5	90		
3.35	86		
2	80		
1.18	76		
0.6	70	Particle density	(assumed)
0.425	68	2.65	Mg/m3
0.3	64		
0.212	60		
0.15	56		
0.063	47		

Dry Mass of sample, g: 213

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	19.6
Sand	32.9
Silt	34.4
Clay	13.1

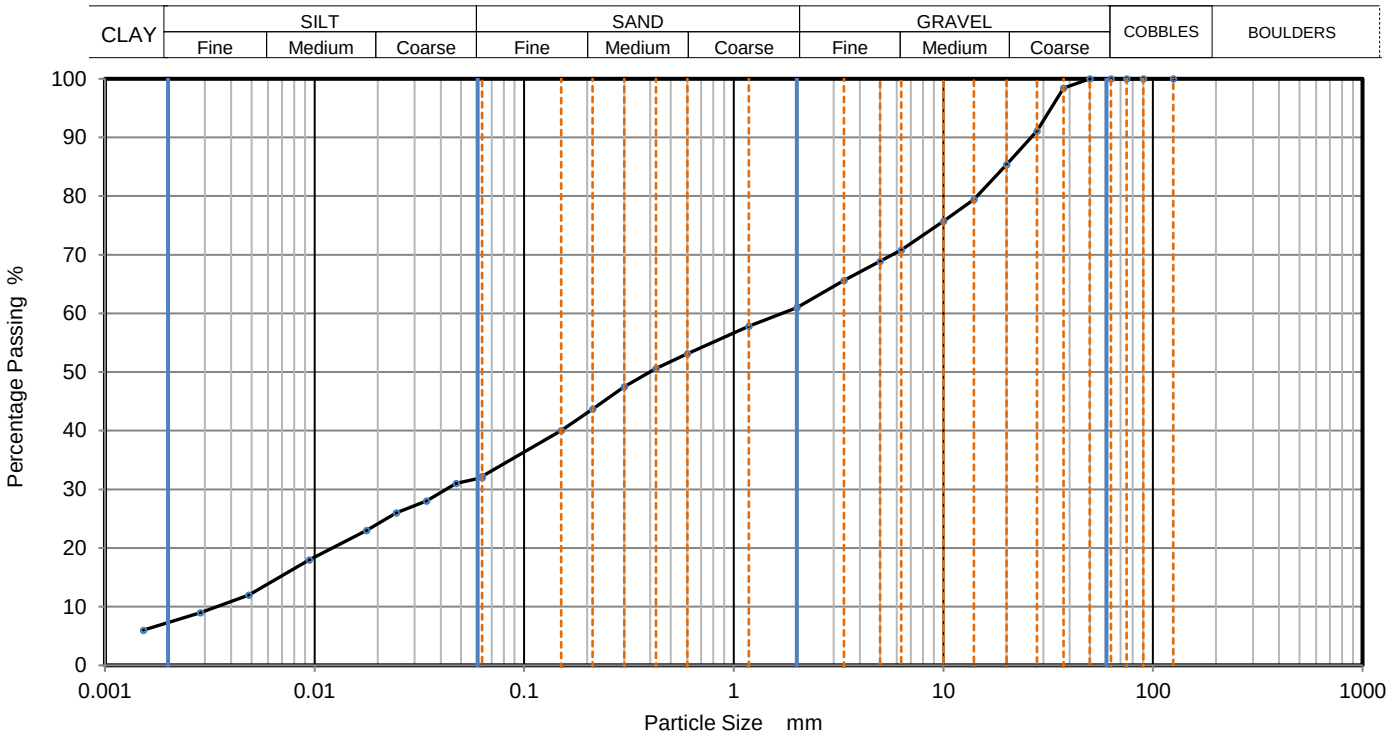
Grading Analysis		
D100	mm	
D60	mm	0.208
D30	mm	0.0108
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		BH-30414
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		1
Specimen Description	Greyish brown sandy gravelly silty CLAY.				Sample Depth (m)	Top	5.20
						Base	
Specimen Reference	6	Specimen Depth	5.2	m	Sample Type		C
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022081058



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	32
90	100	0.04736	31
75	100	0.03420	28
63	100	0.02452	26
50	100	0.01768	23
37.5	98	0.00942	18
28	91	0.00485	12
20	85	0.00285	9
14	79	0.00152	6
10	76		
6.3	71		
5	69		
3.35	66		
2	61		
1.18	58		
0.6	53	Particle density	(assumed)
0.425	51	2.65	Mg/m3
0.3	48		
0.212	44		
0.15	40		
0.063	32		

Dry Mass of sample, g: 3987

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	39.0
Sand	28.8
Silt	24.6
Clay	7.6

Grading Analysis		
D100	mm	
D60	mm	1.69
D30	mm	0.0419
D10	mm	0.00318
Uniformity Coefficient		530
Curvature Coefficient		0.33

Remarks

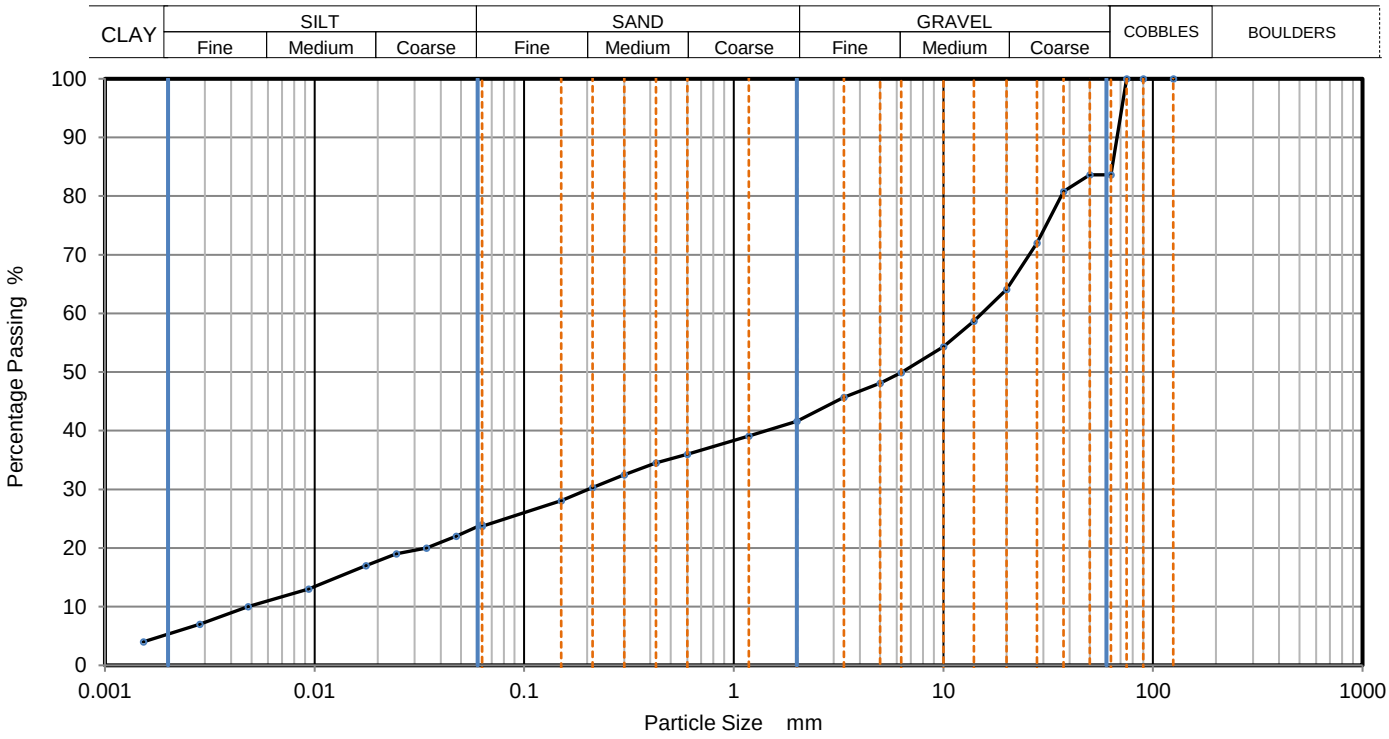
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					BH-30414
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Light brown sandy gravelly silty CLAY with cobbles.			Sample Depth (m) Top	8.20
				Sample Depth (m) Base	
Specimen Reference	6	Specimen Depth	8.2 m	Sample Type	C
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022081059



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06276	24
90	100	0.04736	22
75	100	0.03420	20
63	84	0.02452	19
50	84	0.01757	17
37.5	81	0.00936	13
28	72	0.00482	10
20	64	0.00283	7
14	59	0.00152	4
10	54		
6.3	50		
5	48		
3.35	46		
2	42		
1.18	39		
0.6	36	Particle density	(assumed)
0.425	35	2.65	Mg/m3
0.3	33		
0.212	30		
0.15	28		
0.063	24		

Dry Mass of sample, g: 6566

Sample Proportions	% dry mass
Cobbles	16.4
Gravel	42.0
Sand	17.9
Silt	18.0
Clay	5.7

Grading Analysis		
D100	mm	
D60	mm	15.3
D30	mm	0.203
D10	mm	0.00516
Uniformity Coefficient		3000
Curvature Coefficient		0.52

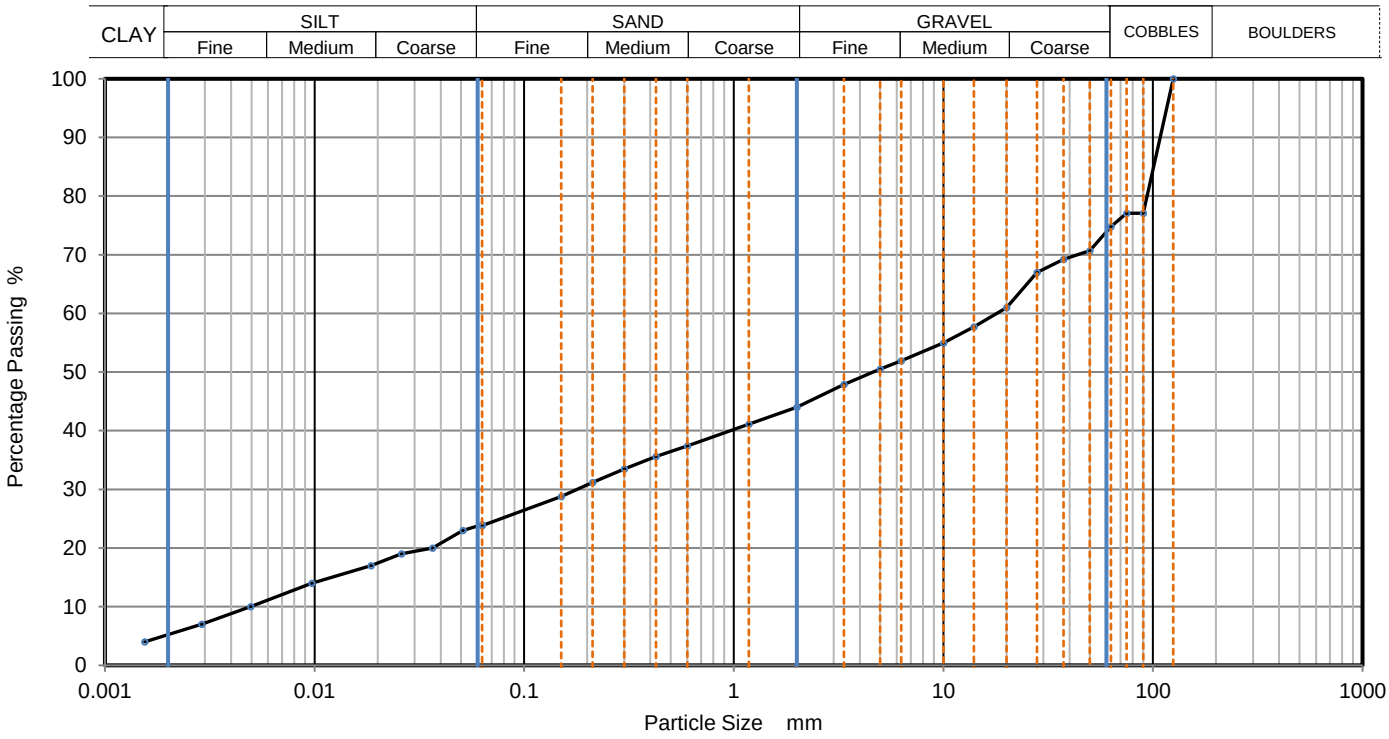
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-30600
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Grey sandy gravelly silty CLAY with cobbles.			Sample Depth (m) Top	2.20
				Sample Depth (m) Base	
Specimen Reference	6	Specimen Depth	2.2 m	Sample Type	C
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022081061



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	24
90	77	0.05097	23
75	77	0.03649	20
63	75	0.02596	19
50	71	0.01857	17
37.5	69	0.00970	14
28	67	0.00496	10
20	61	0.00290	7
14	58	0.00155	4
10	55		
6.3	52		
5	51		
3.35	48		
2	44		
1.18	41		
0.6	37	Particle density	(assumed)
0.425	36	2.65	Mg/m3
0.3	34		
0.212	31		
0.15	29		
0.063	24		

Dry Mass of sample, g: 14722

Sample Proportions	% dry mass
Cobbles	25.2
Gravel	30.9
Sand	20.1
Silt	18.8
Clay	5.0

Grading Analysis		
D100	mm	125
D60	mm	18
D30	mm	0.178
D10	mm	0.00531
Uniformity Coefficient		3400
Curvature Coefficient		0.33

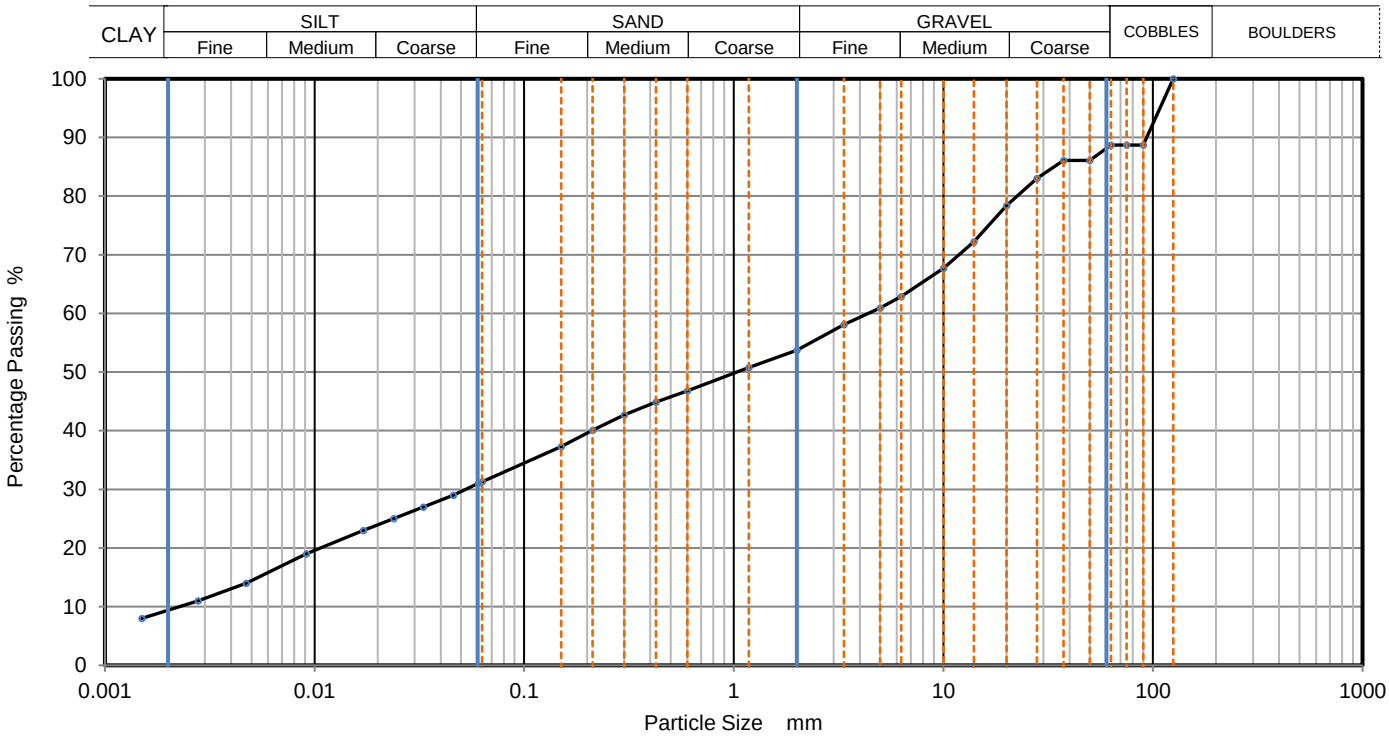
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-30722
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Greyish brown sandy gravelly silty CLAY with some cobbles.			Sample Depth (m) Top	3.10
				Sample Depth (m) Base	
Specimen Reference	6	Specimen Depth	3.1 m	Sample Type	C
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022081014



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06039	31
90	89	0.04597	29
75	89	0.03300	27
63	89	0.02385	25
50	86	0.01710	23
37.5	86	0.00913	19
28	83	0.00471	14
20	78	0.00278	11
14	72	0.00150	8
10	68		
6.3	63		
5	61		
3.35	58		
2	54		
1.18	51		
0.6	47	Particle density	(assumed)
0.425	45	2.65	Mg/m3
0.3	43		
0.212	40		
0.15	37		
0.063	31		

Dry Mass of sample, g: 8623

Sample Proportions	% dry mass
Cobbles	11.3
Gravel	35.0
Sand	22.4
Silt	22.1
Clay	9.2

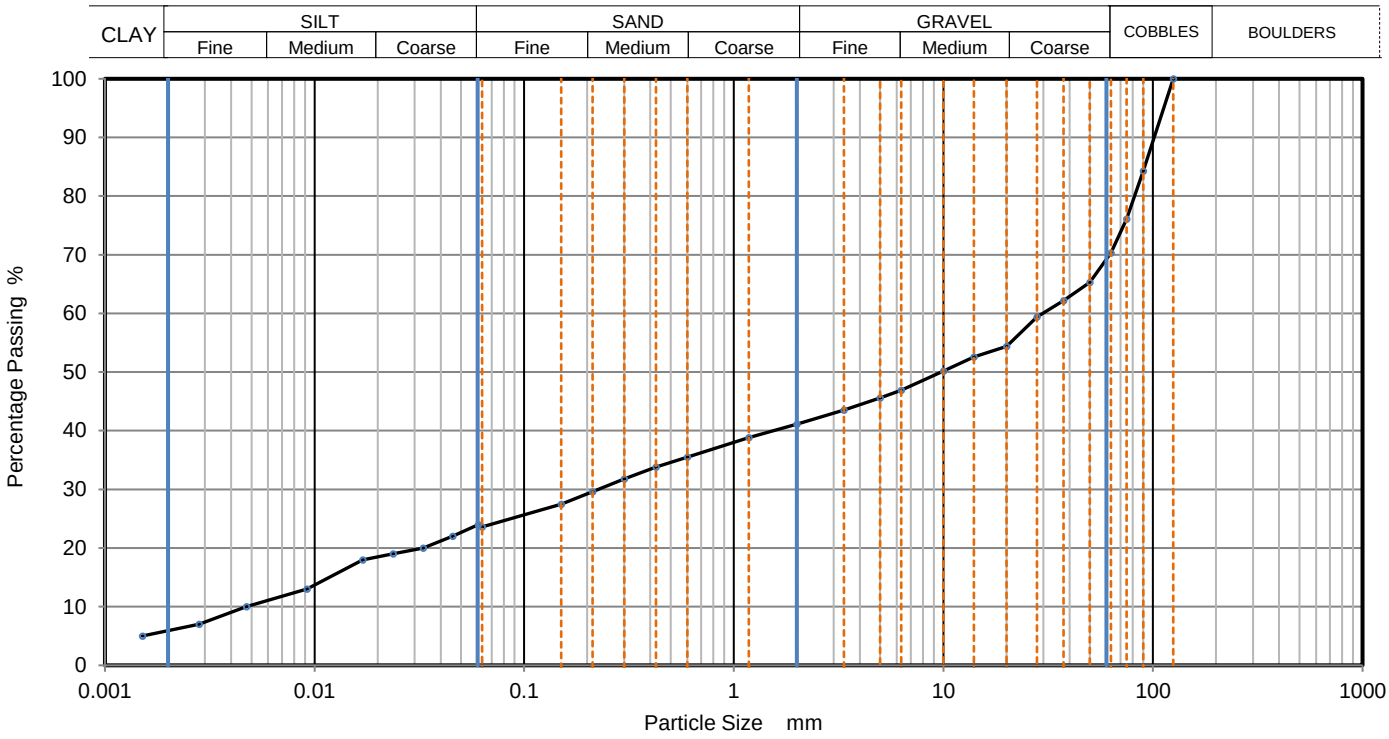
Grading Analysis		
D100	mm	125
D60	mm	4.38
D30	mm	0.0525
D10	mm	0.00232
Uniformity Coefficient		1900
Curvature Coefficient		0.27

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-30722
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Greyish brown sandy gravelly silty CLAY with cobbles.			Sample Depth (m) Top	5.20
				Sample Depth (m) Base	
Specimen Reference	6	Specimen Depth	5.2 m	Sample Type	C
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022081015



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06039	24
90	84	0.04562	22
75	76	0.03300	20
63	70	0.02368	19
50	65	0.01698	18
37.5	62	0.00919	13
28	59	0.00474	10
20	54	0.00282	7
14	53	0.00151	5
10	50		
6.3	47		
5	46		
3.35	44		
2	41		
1.18	39		
0.6	36	Particle density	(assumed)
0.425	34	2.65	Mg/m3
0.3	32		
0.212	30		
0.15	28		
0.063	24		

Dry Mass of sample, g: 13349

Sample Proportions	% dry mass
Cobbles	29.7
Gravel	29.2
Sand	17.5
Silt	17.6
Clay	6.0

Grading Analysis		
D100	mm	125
D60	mm	29.8
D30	mm	0.226
D10	mm	0.00458
Uniformity Coefficient		6500
Curvature Coefficient		0.38

Remarks

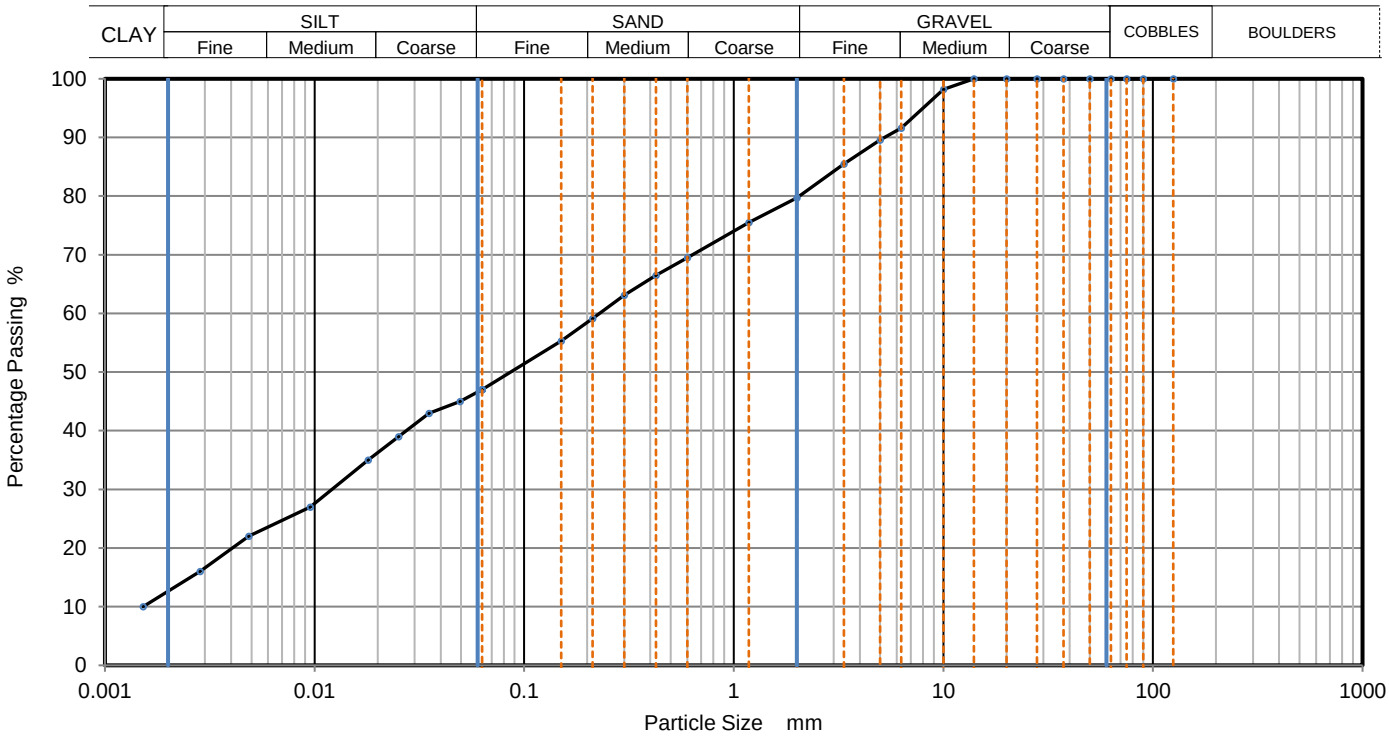
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

Job Ref					**21-1682**
Borehole/Pit No.					BH-31227
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	1.20
				Base	2.00
Specimen Reference	2	Specimen Depth	1.2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022061011



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	47
90	100	0.04939	45
75	100	0.03515	43
63	100	0.02517	39
50	100	0.01802	35
37.5	100	0.00953	27
28	100	0.00485	22
20	100	0.00284	16
14	100	0.00152	10
10	98		
6.3	92		
5	90		
3.35	86		
2	80		
1.18	76		
0.6	70	Particle density	(assumed)
0.425	67	2.65	Mg/m3
0.3	63		
0.212	59		
0.15	55		
0.063	47		

Dry Mass of sample, g: 203

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	20.3
Sand	32.7
Silt	34.6
Clay	12.4

Grading Analysis		
D100	mm	
D60	mm	0.229
D30	mm	0.0118
D10	mm	0.00155
Uniformity Coefficient		150
Curvature Coefficient		0.39

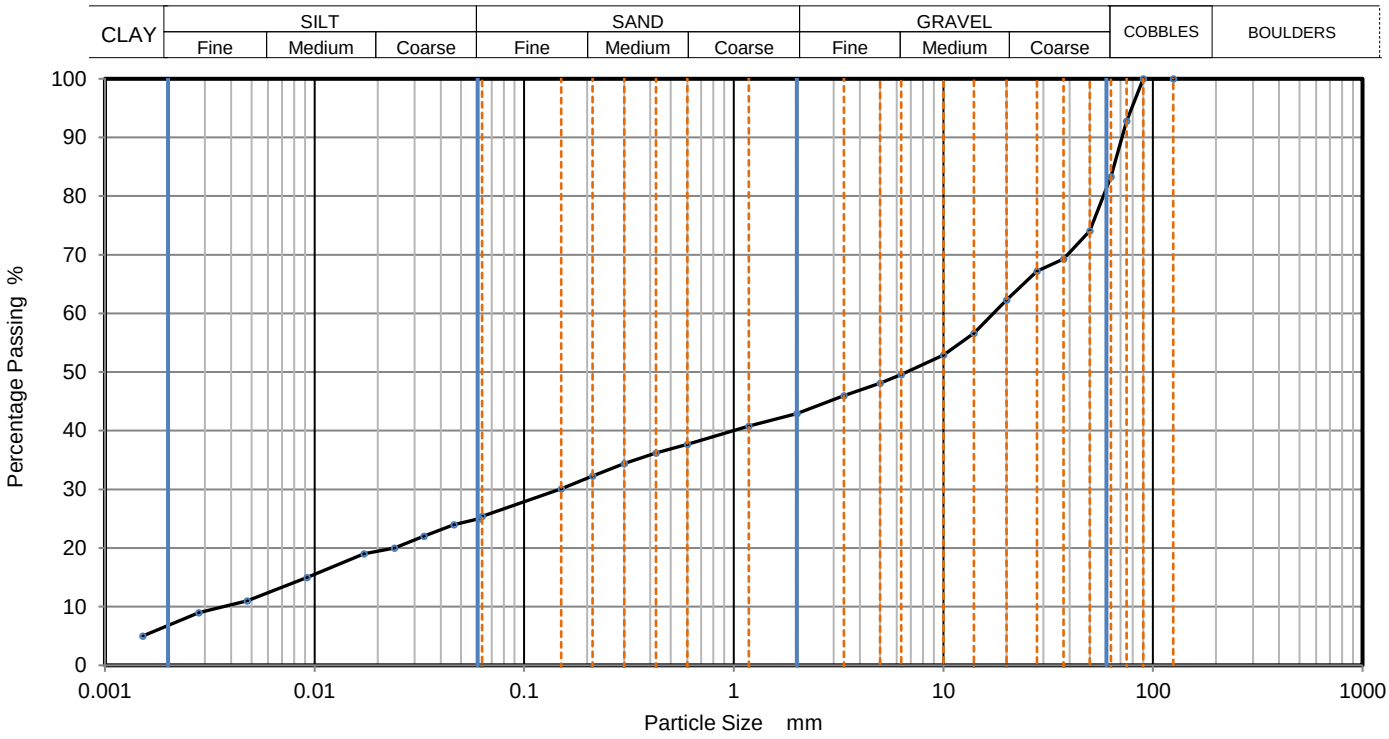
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					BH-31227
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Brownish grey sandy gravelly silty CLAY with cobbles.			Sample Depth (m) Top	6.70
				Base	8.20
Specimen Reference	6	Specimen Depth	6.7 m	Sample Type	C
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022082560



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06135	25
90	100	0.04632	24
75	93	0.03324	22
63	83	0.02402	20
50	74	0.01722	19
37.5	69	0.00919	15
28	67	0.00477	11
20	62	0.00280	9
14	57	0.00152	5
10	53		
6.3	50		
5	48		
3.35	46		
2	43		
1.18	41		
0.6	38	Particle density	(assumed)
0.425	36	2.65	Mg/m3
0.3	34		
0.212	32		
0.15	30		
0.063	25		

Dry Mass of sample, g: 13820

Sample Proportions	% dry mass
Cobbles	16.7
Gravel	40.4
Sand	17.4
Silt	18.8
Clay	6.7

Grading Analysis		
D100	mm	
D60	mm	17.3
D30	mm	0.149
D10	mm	0.00384
Uniformity Coefficient		4500
Curvature Coefficient		0.33

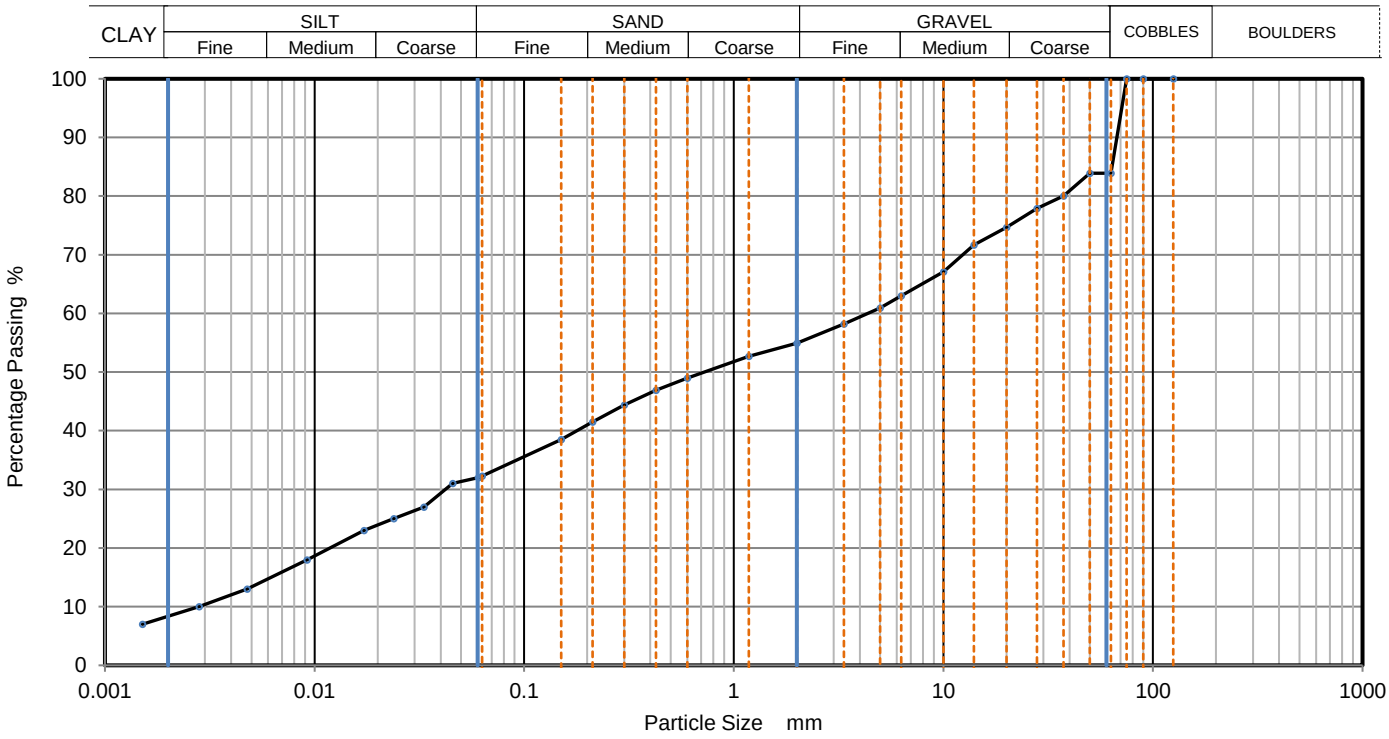
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-31227
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brownish grey sandy gravelly silty CLAY with cobbles.			Sample Depth (m) Top	8.20
				Base	9.70
Specimen Reference	6	Specimen Depth	8.2 m	Sample Type	C
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022082561



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06039	32
90	100	0.04562	31
75	100	0.03324	27
63	84	0.02385	25
50	84	0.01722	23
37.5	80	0.00919	18
28	78	0.00477	13
20	75	0.00282	10
14	72	0.00151	7
10	67		
6.3	63		
5	61		
3.35	58		
2	55		
1.18	53		
0.6	49	Particle density	(assumed)
0.425	47	2.65	Mg/m3
0.3	44		
0.212	42		
0.15	39		
0.063	32		

Dry Mass of sample, g: 11922

Sample Proportions	% dry mass
Cobbles	16.1
Gravel	29.1
Sand	22.6
Silt	24.0
Clay	8.2

Grading Analysis		
D100	mm	
D60	mm	4.39
D30	mm	0.0434
D10	mm	0.00299
Uniformity Coefficient		1500
Curvature Coefficient		0.14

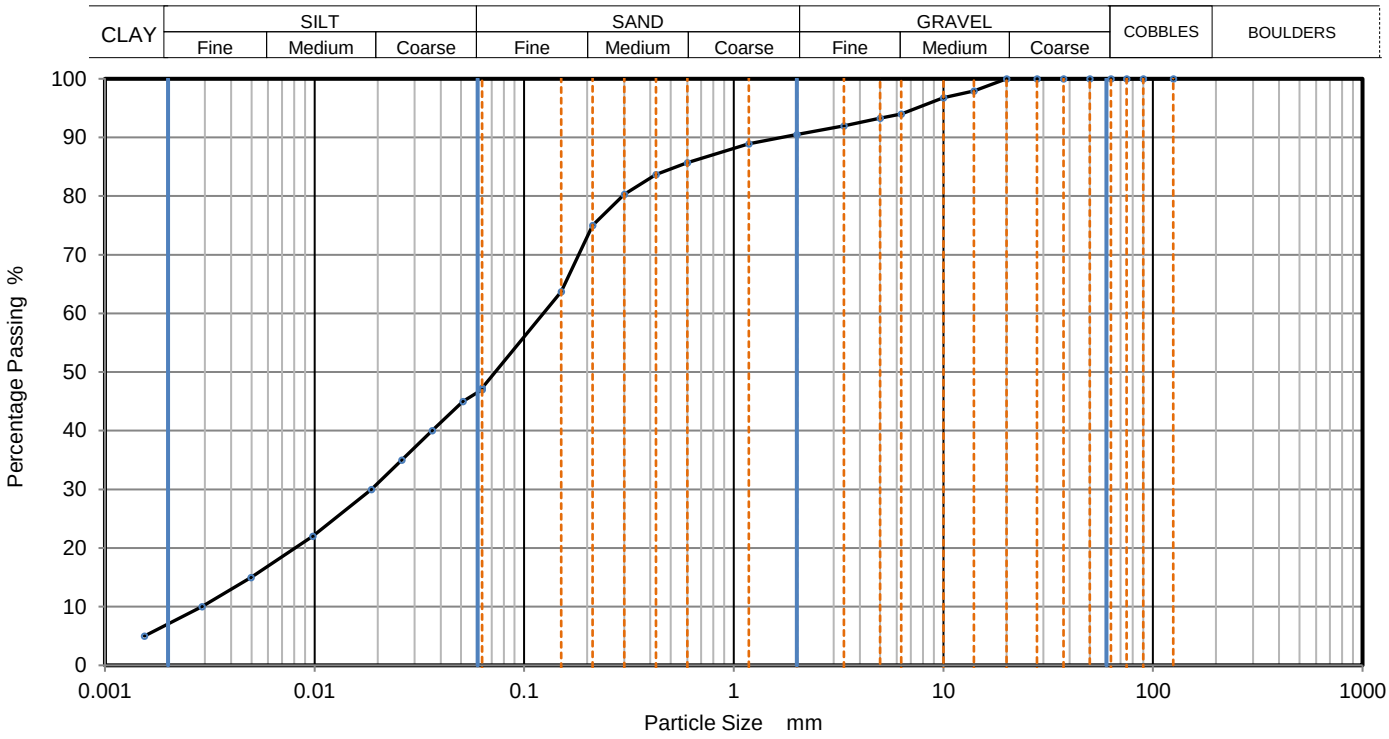
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					BH-31466
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Brown slightly gravelly clayey fine to coarse SAND.			Sample Depth (m) Top	0.20
				Base	1.20
Specimen Reference	2	Specimen Depth	0.2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022061014



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	47
90	100	0.05096	45
75	100	0.03647	40
63	100	0.02609	35
50	100	0.01866	30
37.5	100	0.00980	22
28	100	0.00498	15
20	100	0.00290	10
14	98	0.00154	5
10	97		
6.3	94		
5	93		
3.35	92		
2	91		
1.18	89		
0.6	86	Particle density	(assumed)
0.425	84	2.65	Mg/m3
0.3	80		
0.212	75		
0.15	64		
0.063	47		

Dry Mass of sample, g: 217

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	9.5
Sand	43.1
Silt	40.4
Clay	7.0

Grading Analysis		
D100	mm	
D60	mm	0.123
D30	mm	0.0188
D10	mm	0.00292
Uniformity Coefficient		42
Curvature Coefficient		0.98

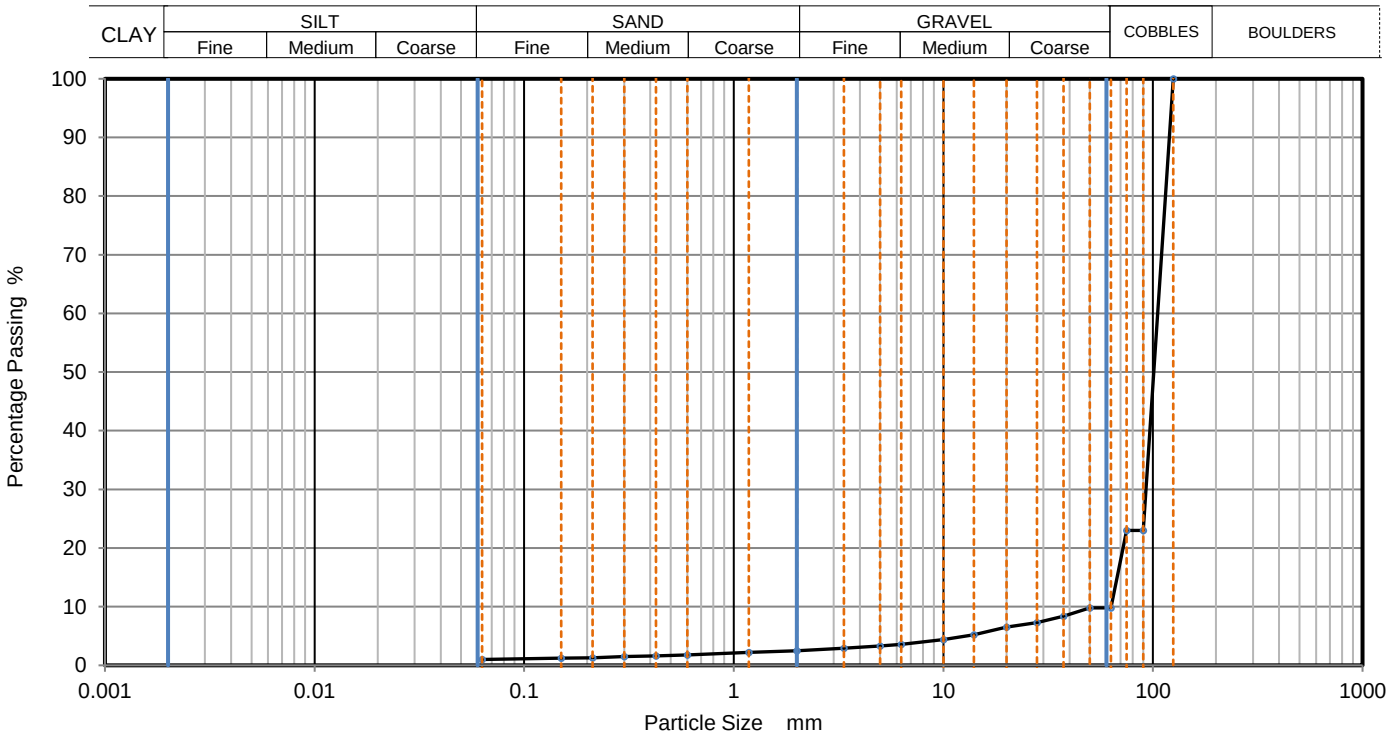
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-31466
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	COBBLES with some greyish brown fine to coarse gravel.			Sample Depth (m) Top	2.00
				Base	2.80
Specimen Reference	2	Specimen Depth	2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022061016



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	23		
75	23		
63	10		
50	10		
37.5	8		
28	7		
20	7		
14	5		
10	4		
6.3	4		
5	3		
3.35	3		
2	3		
1.18	2		
0.6	2		
0.425	2		
0.3	2		
0.212	1		
0.15	1		
0.063	1		

Dry Mass of sample, g: 11572

Sample Proportions	% dry mass
Cobbles	90.2
Gravel	7.3
Sand	1.6
Fines <0.063mm	1.0

Grading Analysis		
D100	mm	125
D60	mm	105
D30	mm	92.7
D10	mm	63.1
Uniformity Coefficient		1.7
Curvature Coefficient		1.3

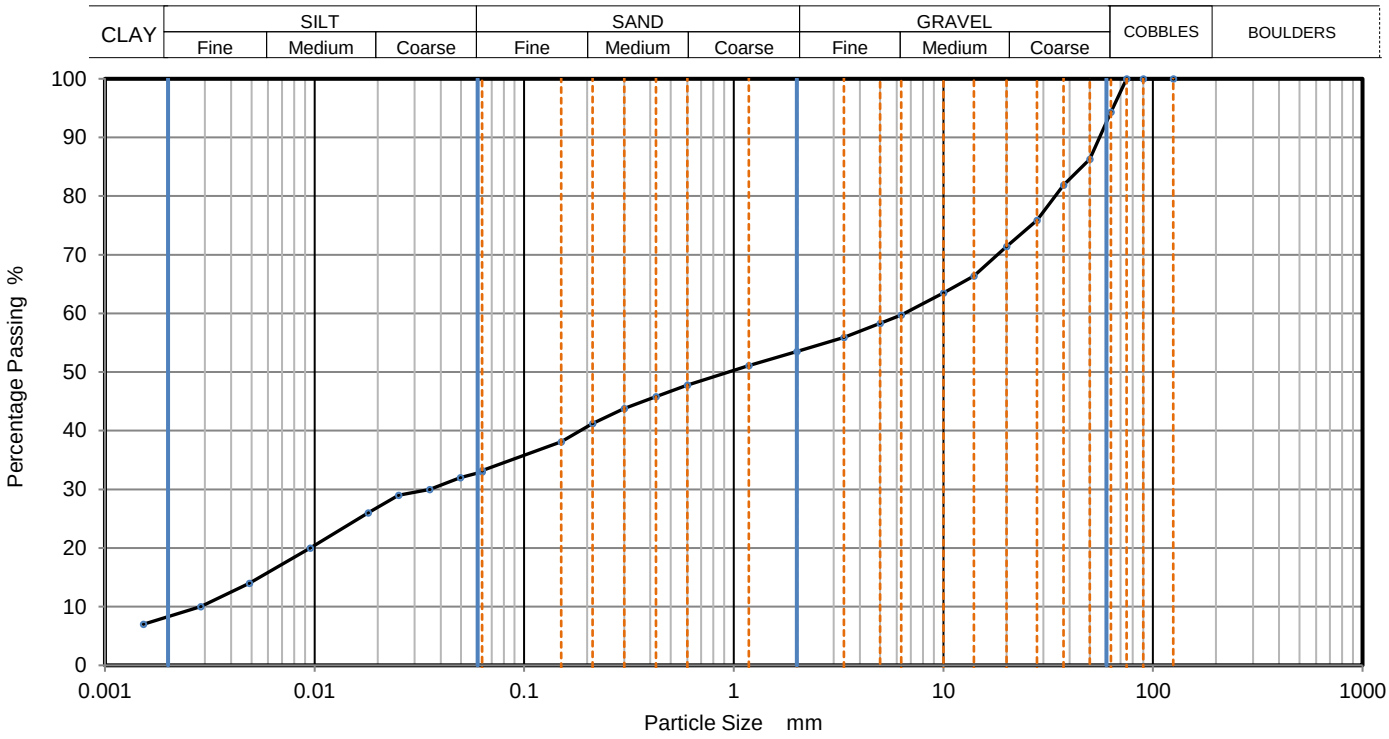
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					BH-31466
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brownish grey sandy gravelly silty CLAY.			Sample Depth (m) Top	2.60
				Base	3.70
Specimen Reference	6	Specimen Depth	2.6 m	Sample Type	C
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022102013



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	33
90	100	0.04968	32
75	100	0.03536	30
63	94	0.02516	29
50	86	0.01802	26
37.5	82	0.00953	20
28	76	0.00488	14
20	71	0.00286	10
14	66	0.00152	7
10	64		
6.3	60		
5	58		
3.35	56		
2	54		
1.18	51		
0.6	48	Particle density	(assumed)
0.425	46	2.65	Mg/m3
0.3	44		
0.212	41		
0.15	38		
0.063	33		

Dry Mass of sample, g: 9564

Sample Proportions	% dry mass
Cobbles	5.7
Gravel	40.7
Sand	20.3
Silt	24.8
Clay	8.5

Grading Analysis		
D100	mm	
D60	mm	6.52
D30	mm	0.0328
D10	mm	0.0028
Uniformity Coefficient		2300
Curvature Coefficient		0.059

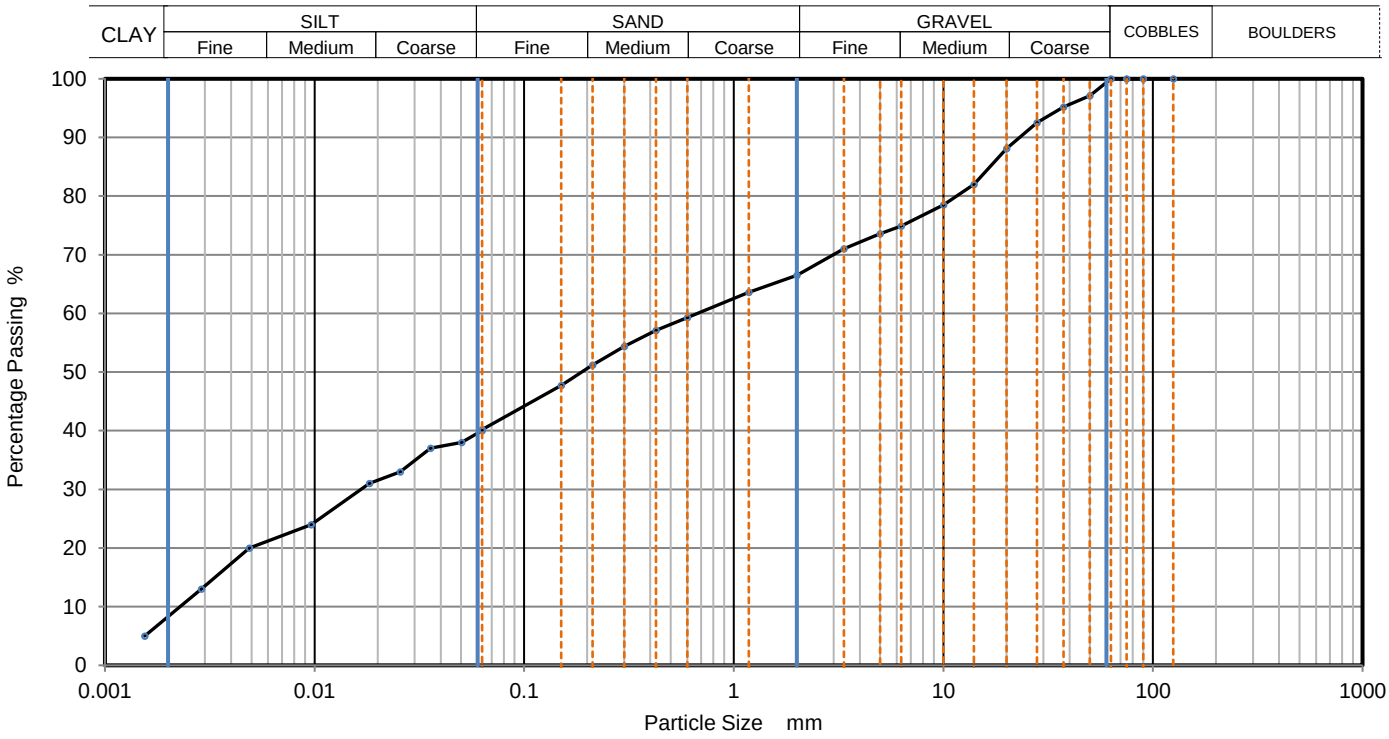
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					BH-31910
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Light brown sandy gravelly silty CLAY.			Sample Depth (m) Top	0.30
				Base	1.20
Specimen Reference	2	Specimen Depth	0.3 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022052411



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	40
90	100	0.05033	38
75	100	0.03582	37
63	100	0.02564	33
50	97	0.01824	31
37.5	95	0.00965	24
28	93	0.00488	20
20	88	0.00288	13
14	82	0.00155	5
10	79		
6.3	75		
5	74		
3.35	71		
2	67		
1.18	64		
0.6	59	Particle density	(assumed)
0.425	57	2.65	Mg/m3
0.3	54		
0.212	51		
0.15	48		
0.063	40		

Dry Mass of sample, g: 6455

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	33.5
Sand	26.3
Silt	31.7
Clay	8.5

Grading Analysis		
D100	mm	
D60	mm	0.672
D30	mm	0.0166
D10	mm	0.00227
Uniformity Coefficient		300
Curvature Coefficient		0.18

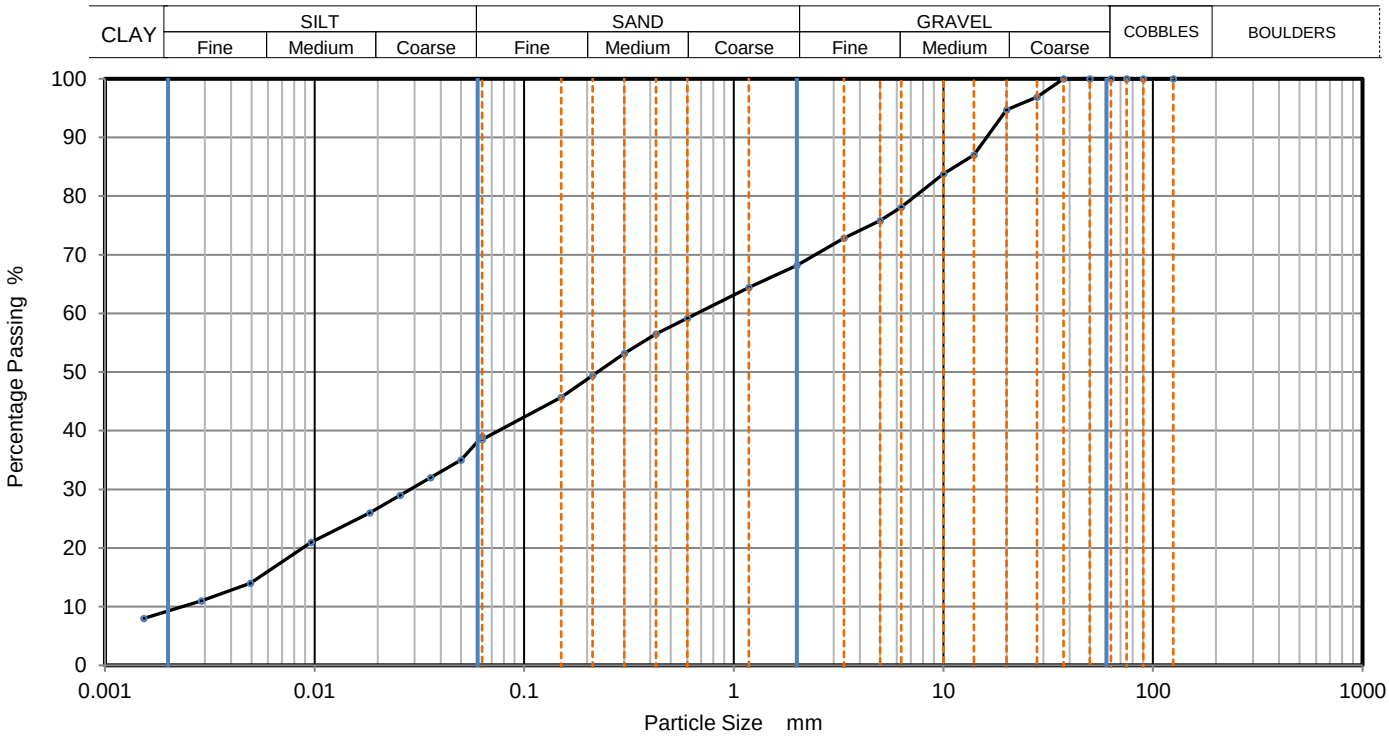
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-31910A
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brown sandy gravelly silty CLAY.			Sample Depth (m) Top	3.00
				Base	3.60
Specimen Reference	2	Specimen Depth	3 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022061018



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	39
90	100	0.05001	35
75	100	0.03582	32
63	100	0.02564	29
50	100	0.01835	26
37.5	100	0.00965	21
28	97	0.00493	14
20	95	0.00288	11
14	87	0.00153	8
10	84		
6.3	78		
5	76		
3.35	73		
2	68		
1.18	64		
0.6	59	Particle density	(assumed)
0.425	57	2.65	Mg/m3
0.3	53		
0.212	49		
0.15	46		
0.063	39		

Dry Mass of sample, g: 2473

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	31.8
Sand	29.6
Silt	29.2
Clay	9.4

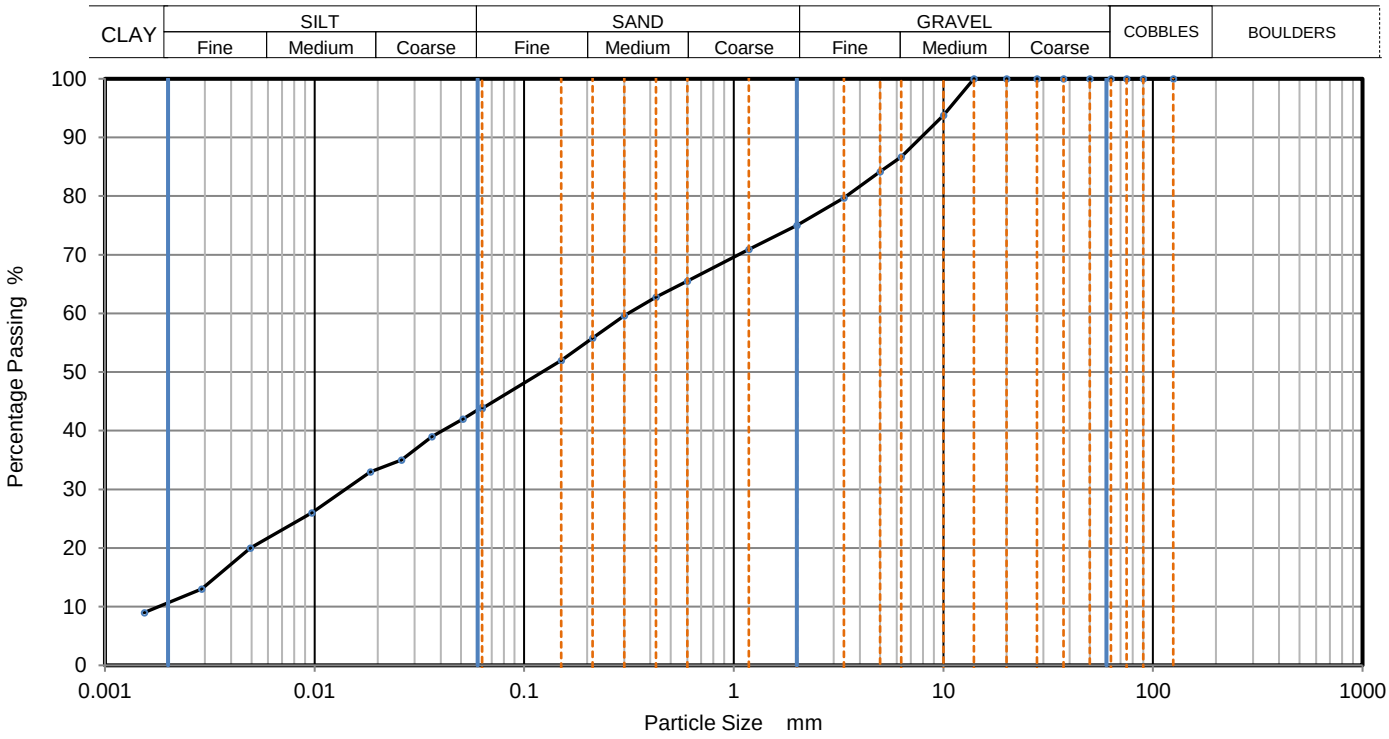
Grading Analysis		
D100	mm	
D60	mm	0.669
D30	mm	0.0288
D10	mm	0.00226
Uniformity Coefficient		300
Curvature Coefficient		0.55

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-31910B
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	5.00
				Base	5.50
Specimen Reference	2	Specimen Depth	5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022061020



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	44
90	100	0.05097	42
75	100	0.03627	39
63	100	0.02596	35
50	100	0.01846	33
37.5	100	0.00970	26
28	100	0.00493	20
20	100	0.00290	13
14	100	0.00154	9
10	94		
6.3	87		
5	84		
3.35	80		
2	75		
1.18	71		
0.6	66	Particle density	(assumed)
0.425	63	2.65	Mg/m3
0.3	60		
0.212	56		
0.15	52		
0.063	44		

Dry Mass of sample, g: 205

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	25.0
Sand	31.3
Silt	33.1
Clay	10.6

Grading Analysis		
D100	mm	
D60	mm	0.313
D30	mm	0.014
D10	mm	0.00184
Uniformity Coefficient		170
Curvature Coefficient		0.34

Remarks

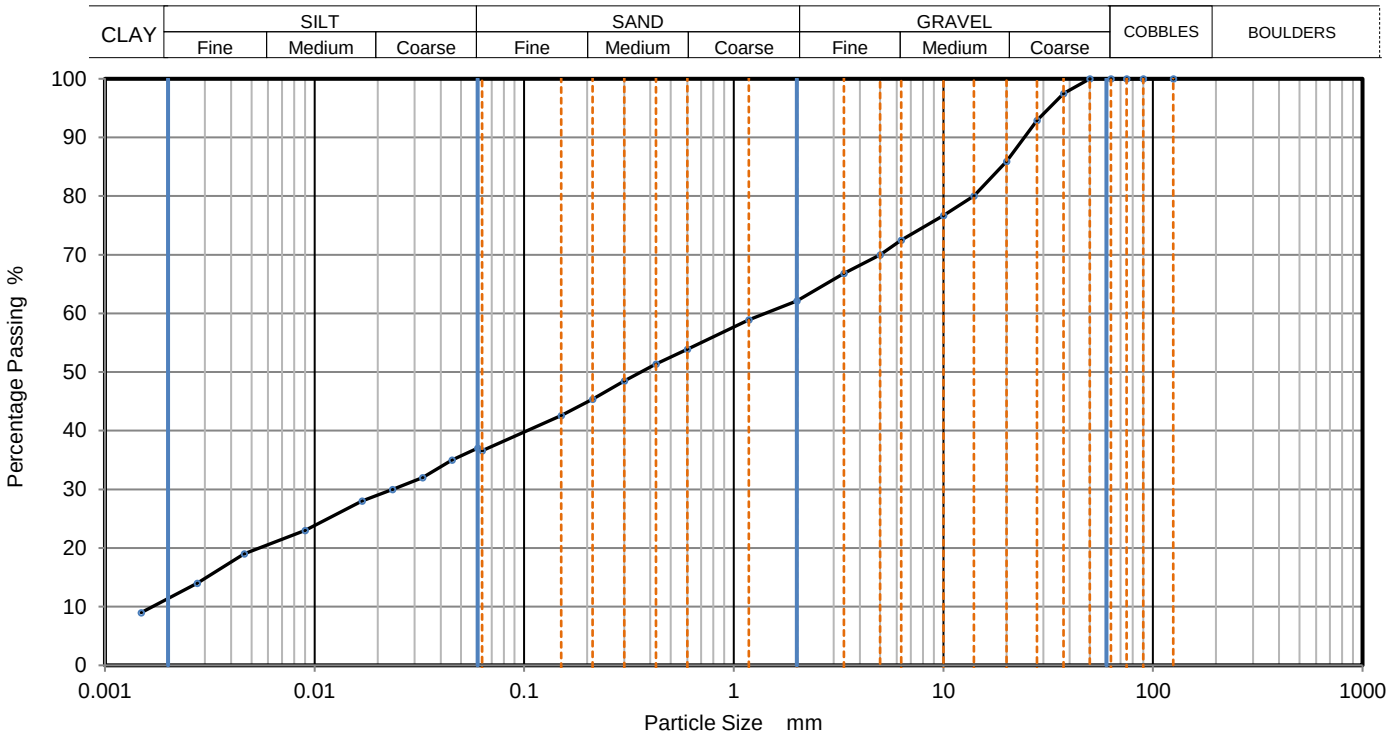
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-31910B
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Greyish brown sandy gravelly silty CLAY.			Sample Depth (m) Top	5.30
				Sample Depth (m) Base	
Specimen Reference	6	Specimen Depth	5.3 m	Sample Type	C
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022081017



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.05989	37
90	100	0.04526	35
75	100	0.03275	32
63	100	0.02350	30
50	100	0.01686	28
37.5	98	0.00901	23
28	93	0.00462	19
20	86	0.00275	14
14	80	0.00149	9
10	77		
6.3	73		
5	70		
3.35	67		
2	62		
1.18	59		
0.6	54	Particle density (assumed)	
0.425	51	2.65 Mg/m3	
0.3	49		
0.212	45		
0.15	43		
0.063	37		

Dry Mass of sample, g: 3689

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	37.9
Sand	25.5
Silt	25.3
Clay	11.3

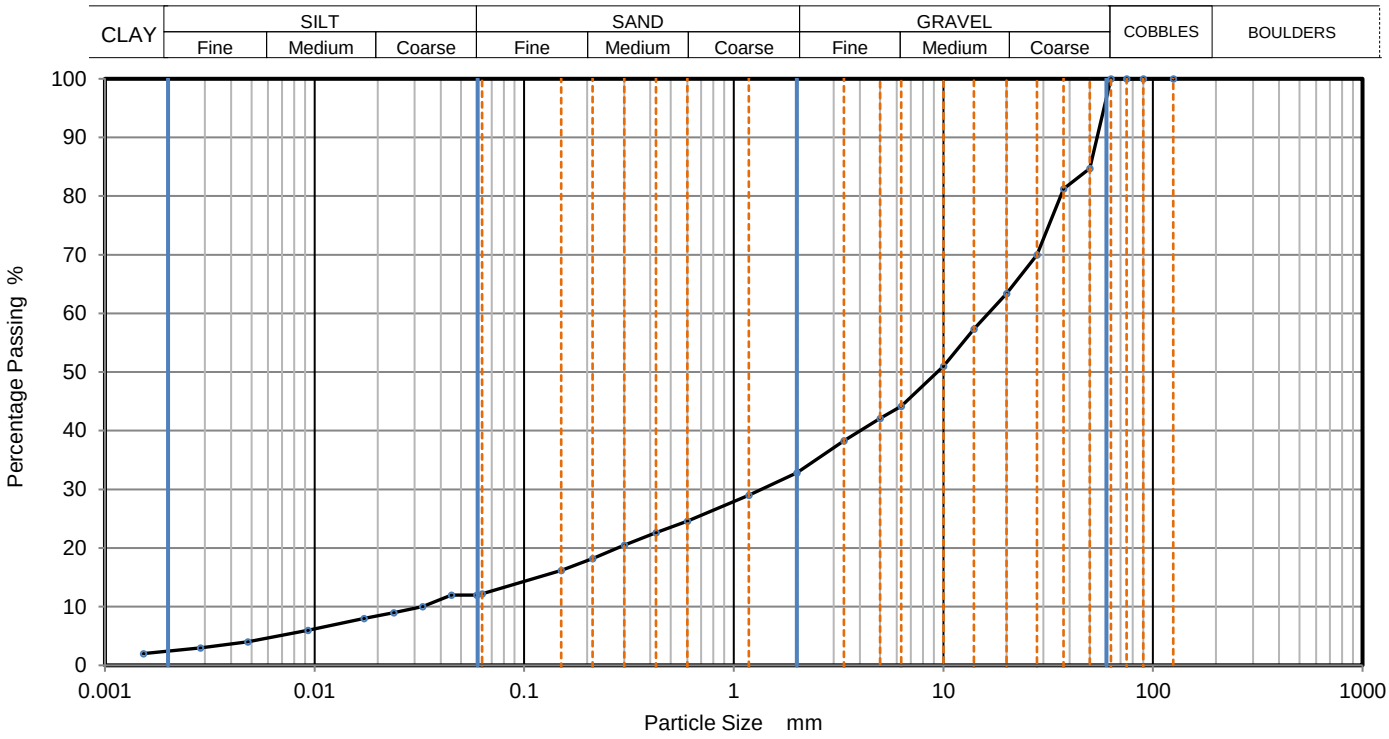
Grading Analysis		
D100	mm	
D60	mm	1.42
D30	mm	0.0248
D10	mm	0.00171
Uniformity Coefficient		830
Curvature Coefficient		0.25

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-32020
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Light brown sandy very gravelly silty CLAY.			Sample Depth (m) Top	0.30
				Base	1.20
Specimen Reference	2	Specimen Depth	0.3 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022052416



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.05942	12
90	100	0.04491	12
75	100	0.03276	10
63	100	0.02385	9
50	85	0.01722	8
37.5	81	0.00931	6
28	70	0.00480	4
20	63	0.00285	3
14	57	0.00152	2
10	51		
6.3	44		
5	42		
3.35	38		
2	33		
1.18	29		
0.6	25	Particle density	(assumed)
0.425	23	2.65	Mg/m3
0.3	21		
0.212	18		
0.15	16		
0.063	12		

Dry Mass of sample, g: 2538

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	67.2
Sand	20.6
Silt	9.9
Clay	2.3

Grading Analysis		
D100	mm	
D60	mm	16.4
D30	mm	1.36
D10	mm	0.0302
Uniformity Coefficient		540
Curvature Coefficient		3.7

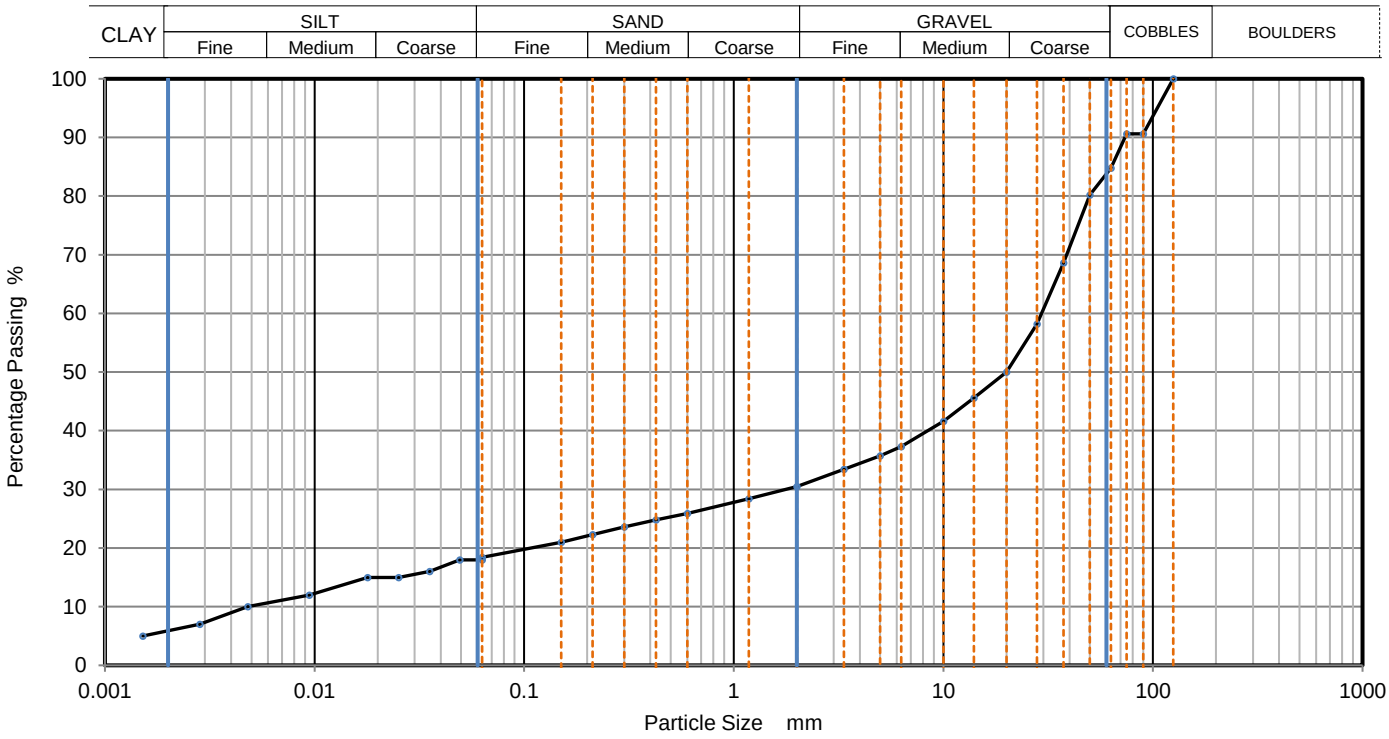
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-32020A
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Greyish brown sandy gravelly silty CLAY with some cobbles.			Sample Depth (m) Top	2.20
				Sample Depth (m) Base	
Specimen Reference	6	Specimen Depth	2.2 m	Sample Type	C
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022081020



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	18
90	91	0.04935	18
75	91	0.03536	16
63	85	0.02516	15
50	80	0.01791	15
37.5	69	0.00942	12
28	58	0.00479	10
20	50	0.00283	7
14	46	0.00152	5
10	42		
6.3	37		
5	36		
3.35	33		
2	31		
1.18	28		
0.6	26	Particle density (assumed)	
0.425	25	2.65 Mg/m3	
0.3	24		
0.212	22		
0.15	21		
0.063	18		

Dry Mass of sample, g: 15038

Sample Proportions	% dry mass
Cobbles	15.2
Gravel	54.3
Sand	12.1
Silt	12.8
Clay	5.6

Grading Analysis		
D100	mm	125
D60	mm	29.5
D30	mm	1.77
D10	mm	0.00484
Uniformity Coefficient		6100
Curvature Coefficient		22

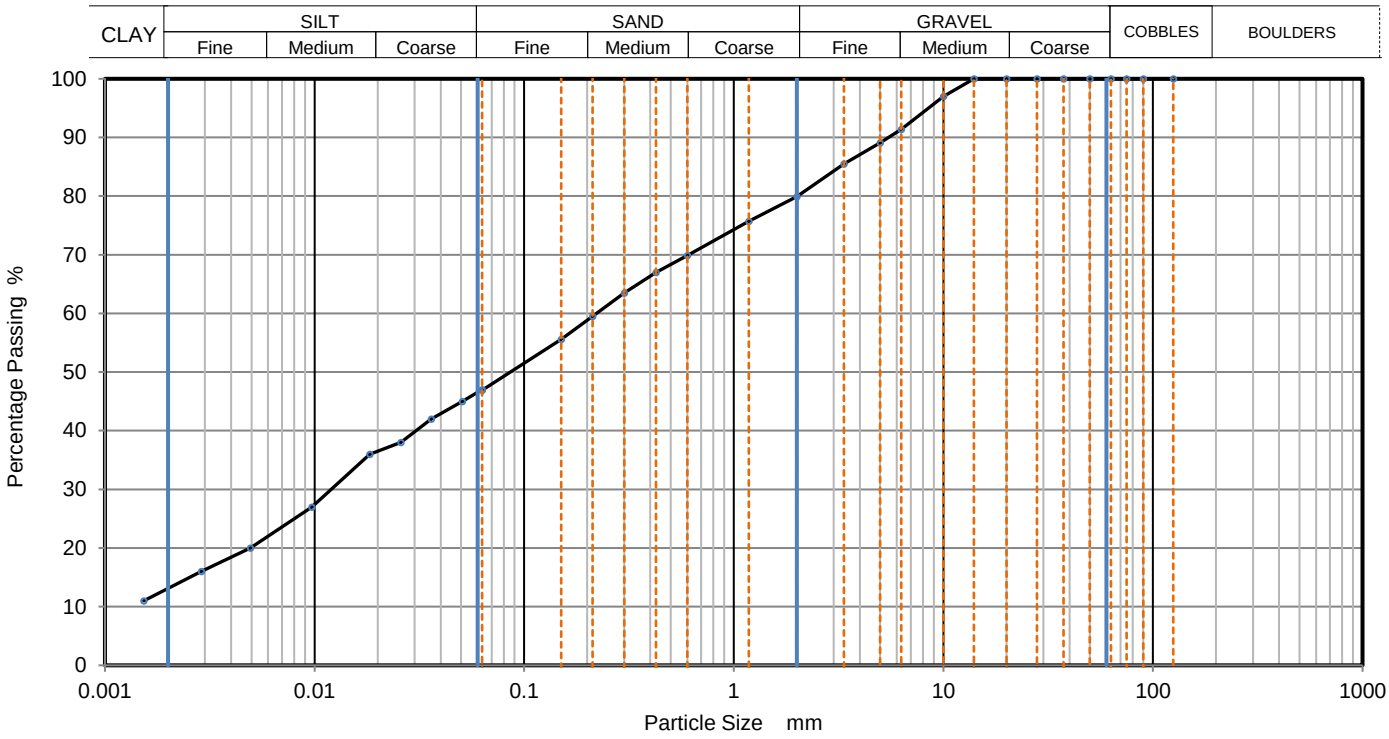
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					BH-32319
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	1.20
				Base	2.00
Specimen Reference	2	Specimen Depth	1.2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022061022



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	47
90	100	0.05065	45
75	100	0.03604	42
63	100	0.02580	38
50	100	0.01835	36
37.5	100	0.00970	27
28	100	0.00493	20
20	100	0.00288	16
14	100	0.00153	11
10	97		
6.3	91		
5	89		
3.35	86		
2	80		
1.18	76		
0.6	70	Particle density	(assumed)
0.425	67	2.65	Mg/m3
0.3	64		
0.212	60		
0.15	56		
0.063	47		

Dry Mass of sample, g: 206

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	20.1
Sand	33.0
Silt	33.8
Clay	13.1

Grading Analysis		
D100	mm	
D60	mm	0.222
D30	mm	0.0122
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

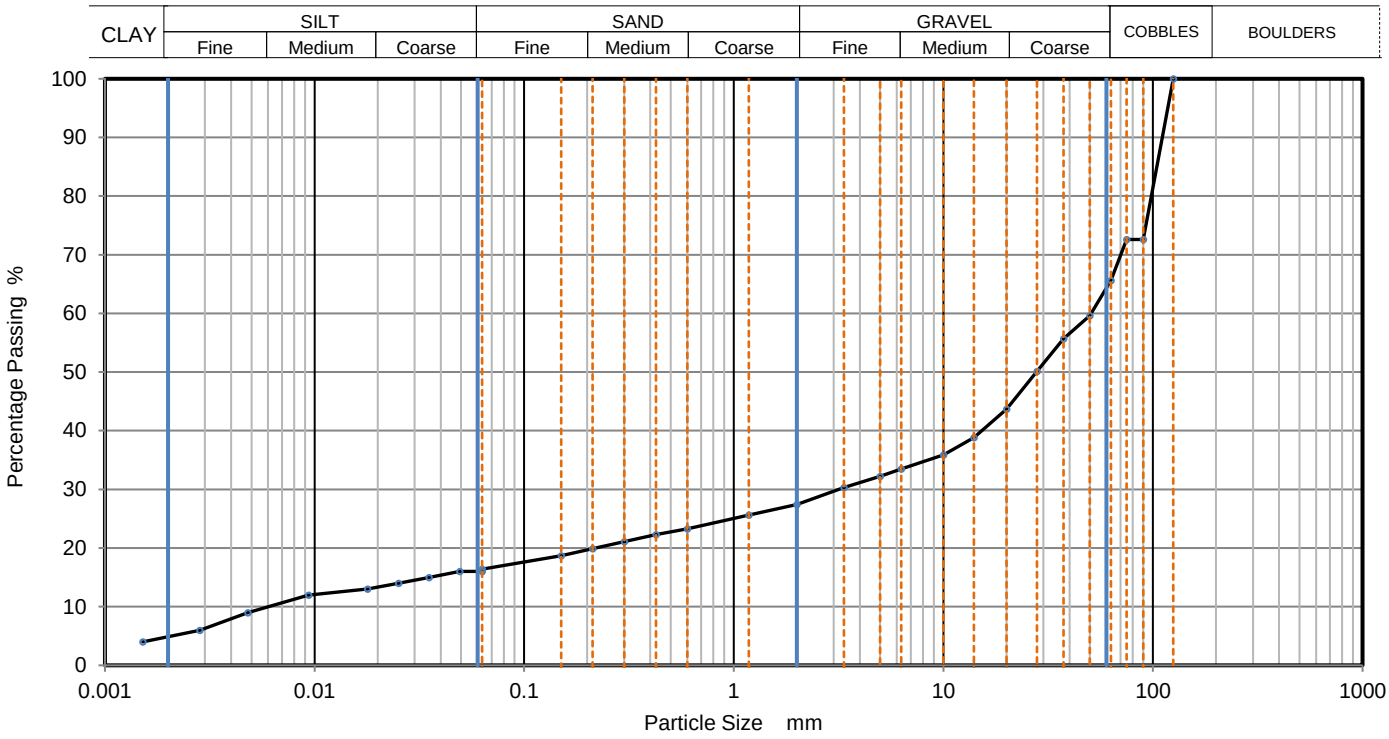
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					BH-32319
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Greyish brown sandy gravelly silty CLAY with cobbles.			Sample Depth (m) Top	3.80
				Sample Depth (m) Base	
Specimen Reference	7	Specimen Depth	3.8 m	Sample Type	C
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022081023



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	16
90	73	0.04935	16
75	73	0.03513	15
63	66	0.02516	14
50	60	0.01791	13
37.5	56	0.00936	12
28	50	0.00479	9
20	44	0.00283	6
14	39	0.00152	4
10	36		
6.3	34		
5	32		
3.35	30		
2	27		
1.18	26		
0.6	23	Particle density	(assumed)
0.425	22	2.65	Mg/m3
0.3	21		
0.212	20		
0.15	19		
0.063	16		

Dry Mass of sample, g: 10884

Sample Proportions	% dry mass
Cobbles	34.4
Gravel	38.2
Sand	11.0
Silt	11.4
Clay	5.0

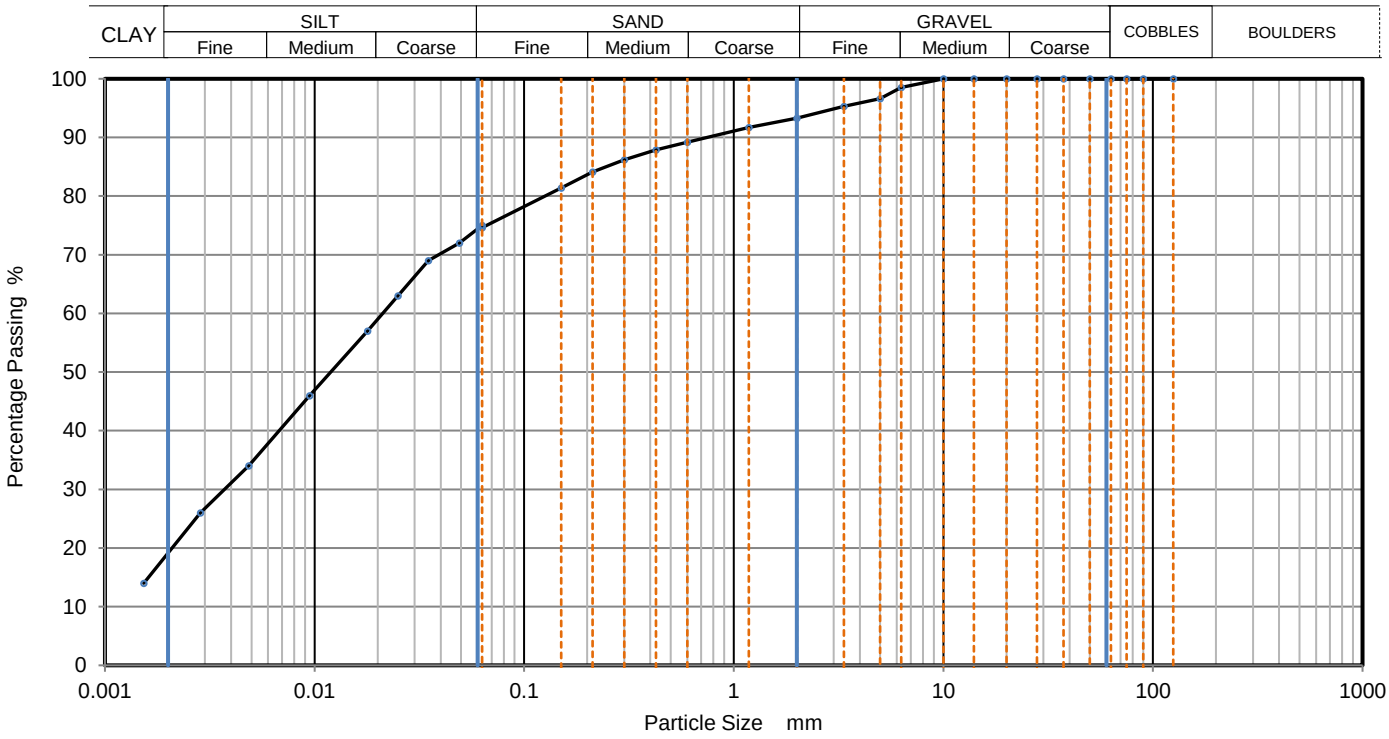
Grading Analysis		
D100	mm	125
D60	mm	50.9
D30	mm	3.15
D10	mm	0.0063
Uniformity Coefficient		8100
Curvature Coefficient		31

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-32601
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	0.40
				Base	1.20
Specimen Reference	2	Specimen Depth	0.4 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022061025



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	75
90	100	0.04903	72
75	100	0.03490	69
63	100	0.02501	63
50	100	0.01791	57
37.5	100	0.00948	46
28	100	0.00485	34
20	100	0.00285	26
14	100	0.00153	14
10	100		
6.3	99		
5	97		
3.35	95		
2	93		
1.18	92		
0.6	89	Particle density	(assumed)
0.425	88	2.65	Mg/m3
0.3	86		
0.212	84		
0.15	81		
0.063	75		

Dry Mass of sample, g: 215

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	6.7
Sand	18.7
Silt	55.3
Clay	19.3

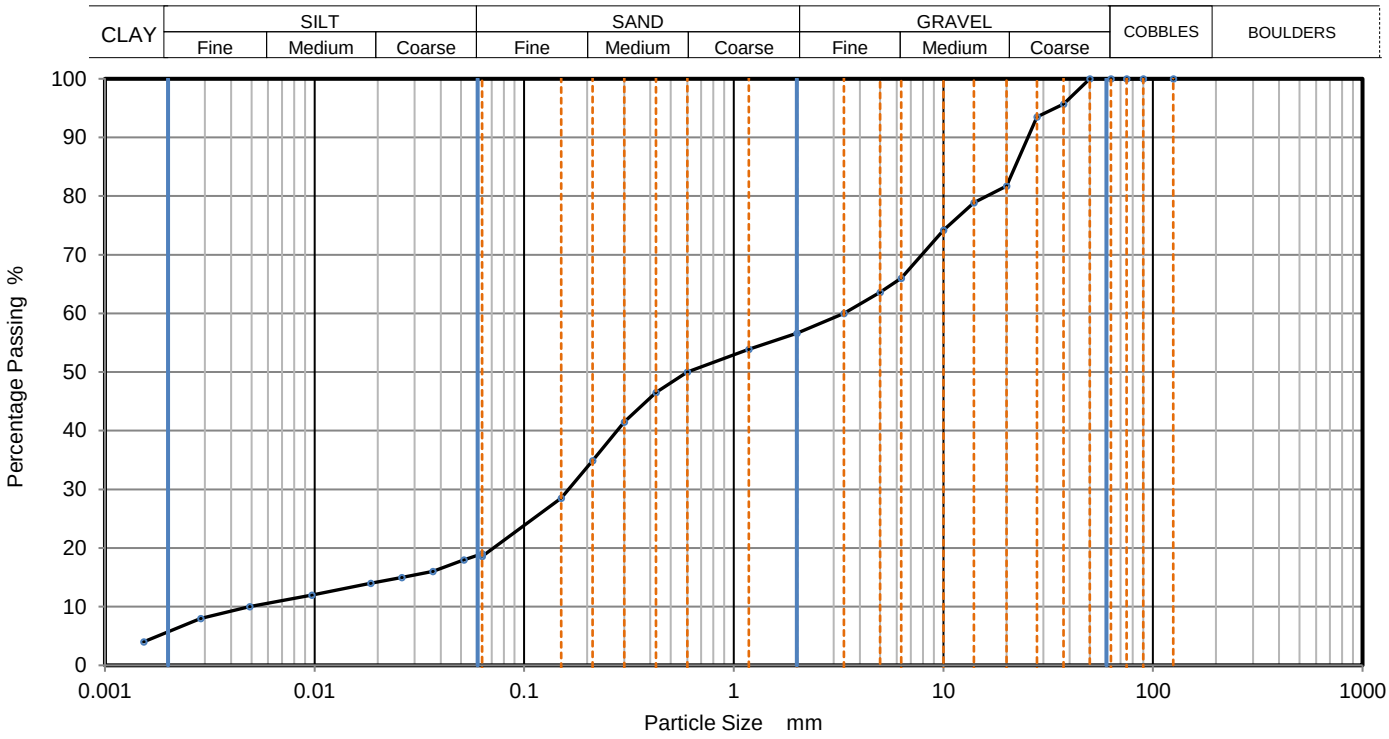
Grading Analysis		
D100	mm	
D60	mm	0.0209
D30	mm	0.00369
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		BH-3263
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		1
Specimen Description	Light brown sandy gravelly silty CLAY.				Sample Depth (m)	Top	0.20
						Base	1.20
Specimen Reference	2	Specimen Depth	0.2	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022061053



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	19
90	100	0.05157	18
75	100	0.03668	16
63	100	0.02609	15
50	100	0.01855	14
37.5	96	0.00969	12
28	94	0.00490	10
20	82	0.00286	8
14	79	0.00153	4
10	74		
6.3	66		
5	64		
3.35	60		
2	57		
1.18	54		
0.6	50	Particle density	(assumed)
0.425	47	2.65	Mg/m3
0.3	42		
0.212	35		
0.15	29		
0.063	19		

Dry Mass of sample, g: 2409

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	43.4
Sand	38.0
Silt	12.8
Clay	5.8

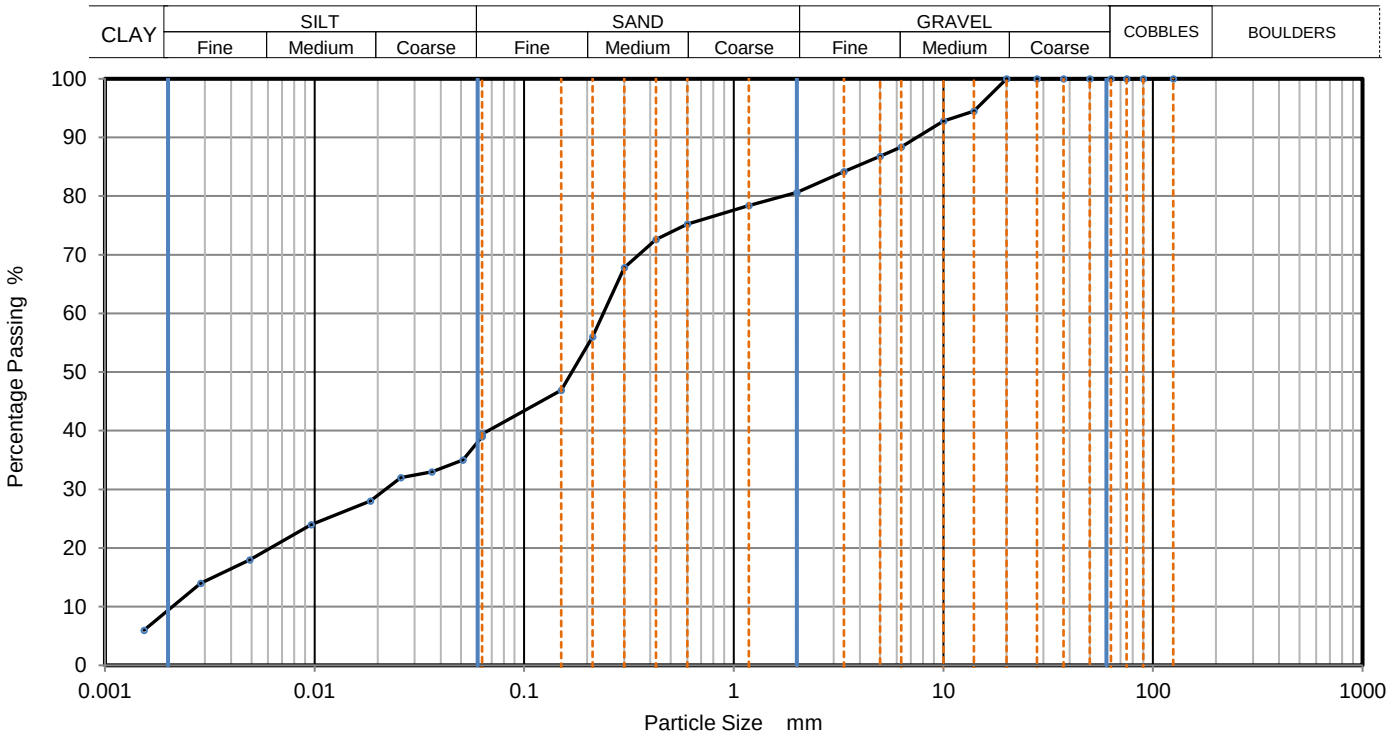
Grading Analysis		
D100	mm	
D60	mm	3.33
D30	mm	0.162
D10	mm	0.00514
Uniformity Coefficient		650
Curvature Coefficient		1.5

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		BH-3263
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		2
Specimen Description	Light brown sandy slightly gravelly silty CLAY.				Sample Depth (m)	Top	1.20
						Base	2.00
Specimen Reference	2	Specimen Depth	1.2	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022061054



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	39
90	100	0.05096	35
75	100	0.03625	33
63	100	0.02579	32
50	100	0.01845	28
37.5	100	0.00964	24
28	100	0.00490	18
20	100	0.00286	14
14	95	0.00154	6
10	93		
6.3	88		
5	87		
3.35	84		
2	81		
1.18	78		
0.6	75	Particle density	(assumed)
0.425	73	2.65	Mg/m3
0.3	68		
0.212	56		
0.15	47		
0.063	39		

Dry Mass of sample, g: 511

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	19.4
Sand	41.3
Silt	30.0
Clay	9.3

Grading Analysis		
D100	mm	
D60	mm	0.239
D30	mm	0.0227
D10	mm	0.00212
Uniformity Coefficient		110
Curvature Coefficient		1

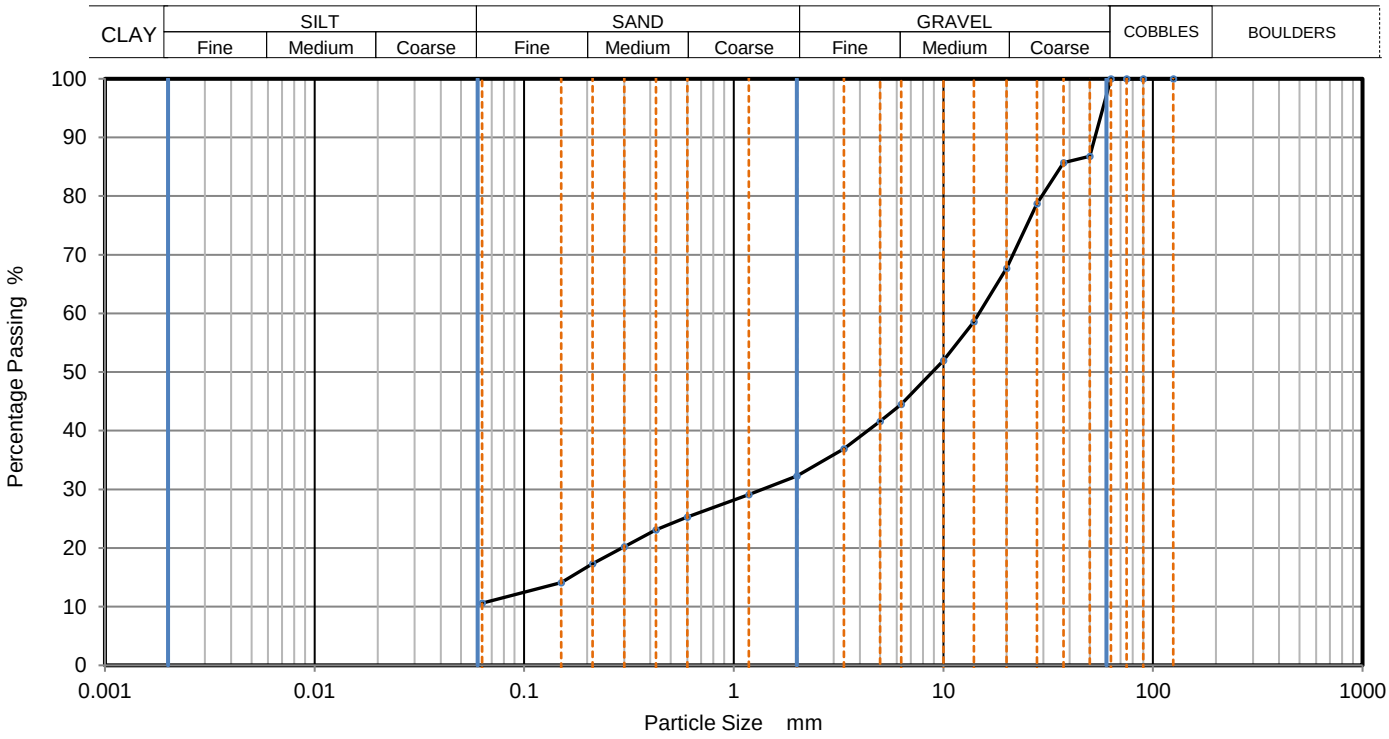
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-3263
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	4
Specimen Description	Light brown gravelly slightly clayey fine to coarse SAND.			Sample Depth (m) Top	3.00
				Base	4.00
Specimen Reference	2	Specimen Depth	3 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022061056



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	87		
37.5	86		
28	79		
20	68		
14	59		
10	52		
6.3	45		
5	42		
3.35	37		
2	32		
1.18	29		
0.6	25		
0.425	23		
0.3	20		
0.212	17		
0.15	14		
0.063	11		

Dry Mass of sample, g: 8735

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	67.7
Sand	21.7
Fines <0.063mm	11.0

Grading Analysis		
D100	mm	
D60	mm	14.8
D30	mm	1.37
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

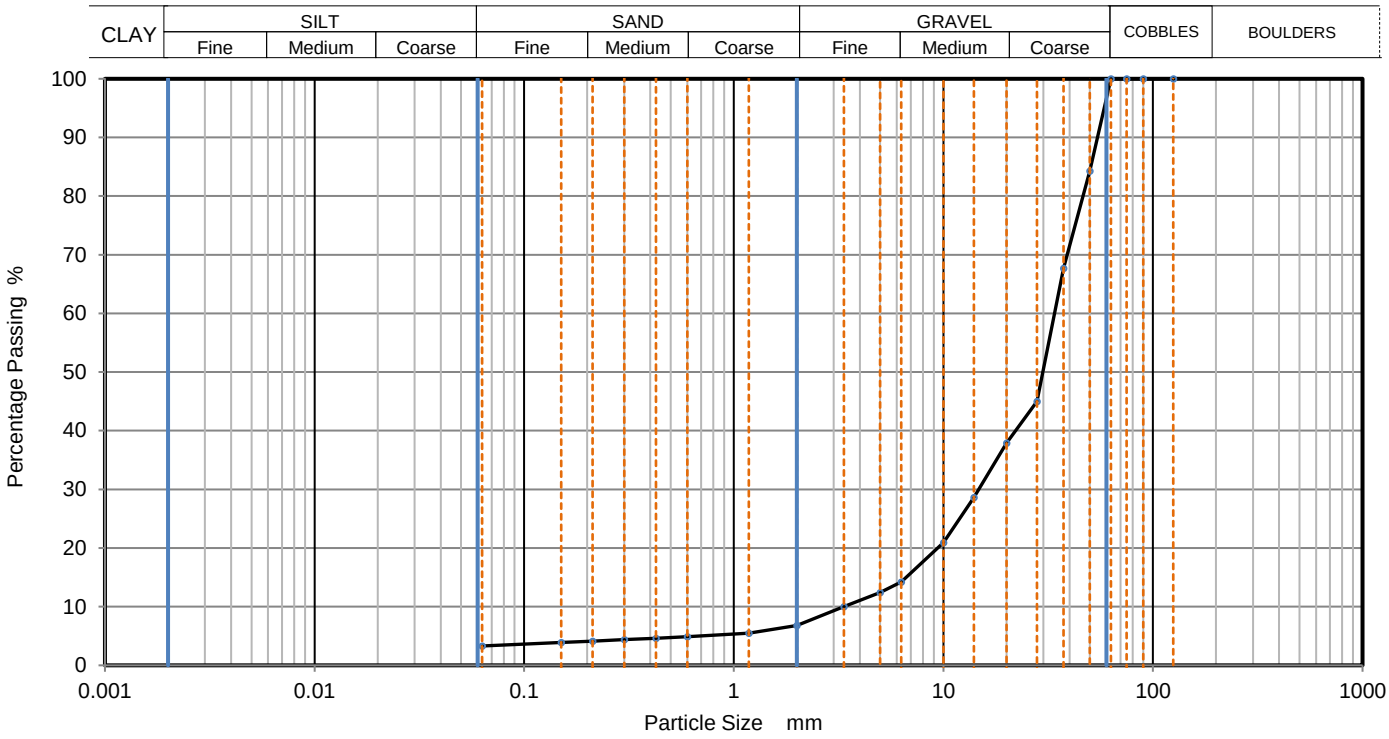
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

			Job Ref		21-1682
			Borehole/Pit No.		BH-3263
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only		Sample No.		12
Specimen Description	Greyish brown slightly sandy slightly clayey subangular fine to coarse GRAVEL.		Sample Depth (m)	Top	6.00
				Base	7.00
Specimen Reference	2	Specimen Depth 6 m	Sample Type		B
Test Method	BS1377:Part 2:1990, clause 9.2		KeyLAB ID		Caus2022061058



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	84		
37.5	68		
28	45		
20	38		
14	29		
10	21		
6.3	14		
5	12		
3.35	10		
2	7		
1.18	6		
0.6	5		
0.425	5		
0.3	4		
0.212	4		
0.15	4		
0.063	3		

Dry Mass of sample, g: 5701

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	93.2
Sand	3.5
Fines <0.063mm	3.0

Grading Analysis		
D100	mm	
D60	mm	34
D30	mm	14.7
D10	mm	3.35
Uniformity Coefficient		10
Curvature Coefficient		1.9

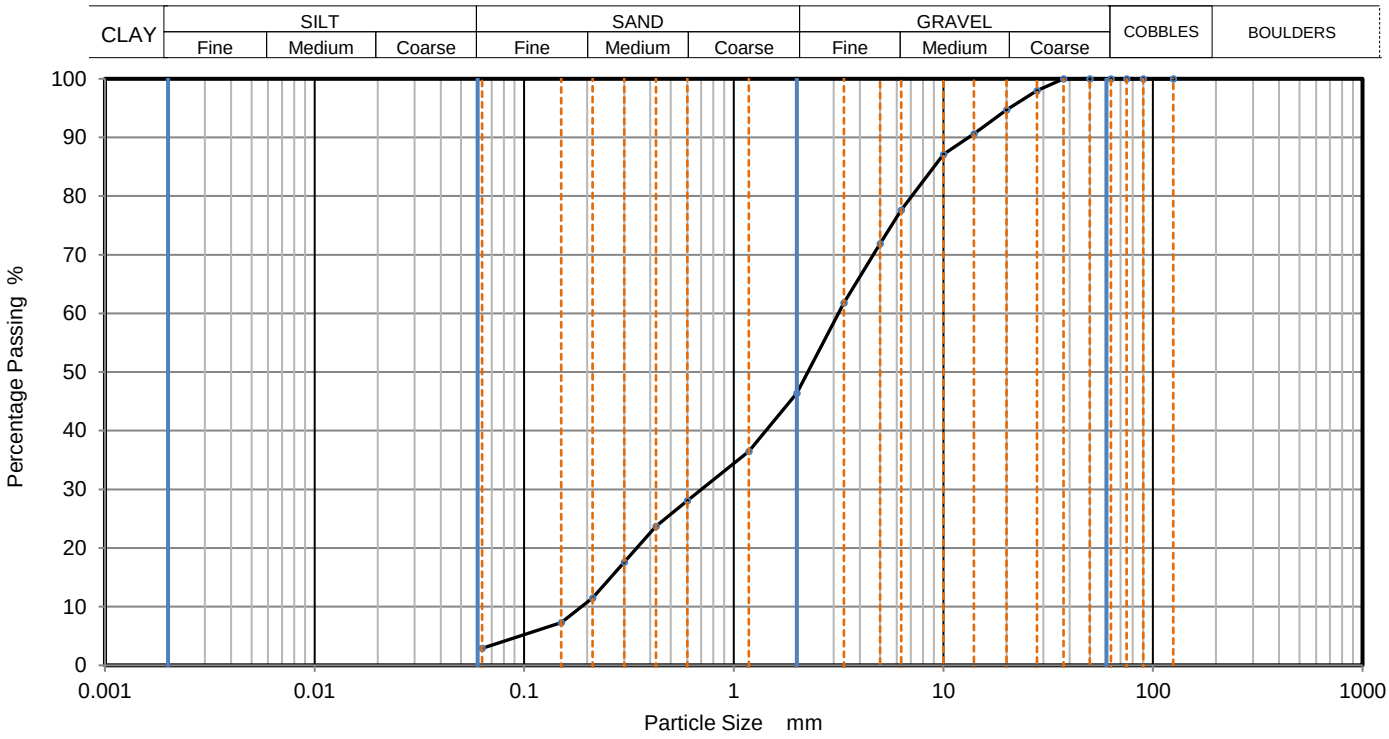
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-3263
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	13
Specimen Description	Greyish brown sandy slightly clayey subangular fine to coarse GRAVEL.			Sample Depth (m) Top	7.00
				Base	8.00
Specimen Reference	2	Specimen Depth	7 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022061059



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	98		
20	95		
14	91		
10	87		
6.3	78		
5	72		
3.35	62		
2	46		
1.18	37		
0.6	28		
0.425	24		
0.3	18		
0.212	12		
0.15	7		
0.063	3		

Dry Mass of sample, g: 7295

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	53.6
Sand	43.5
Fines <0.063mm	3.0

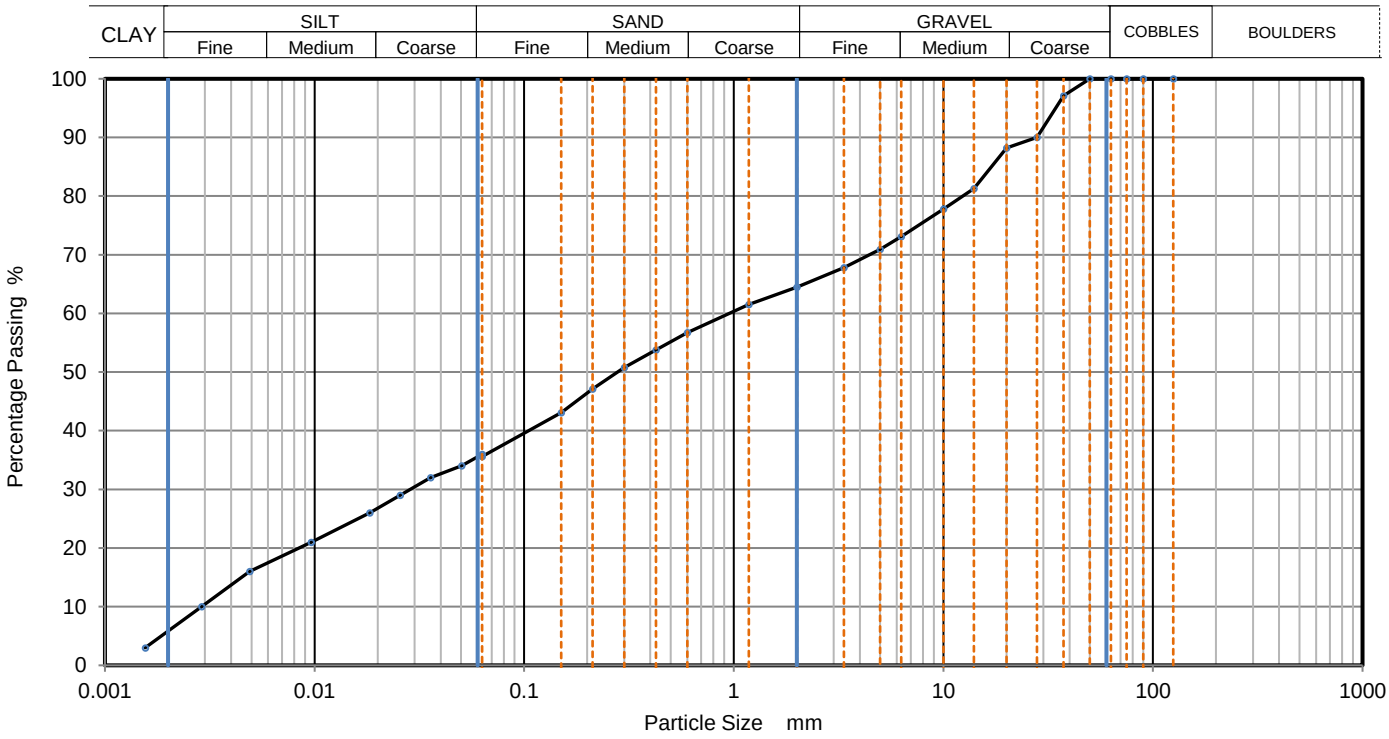
Grading Analysis		
D100	mm	
D60	mm	3.15
D30	mm	0.7
D10	mm	0.187
Uniformity Coefficient		17
Curvature Coefficient		0.83

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		BH-33000
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		2
Specimen Description	Light brown sandy gravelly silty CLAY.				Sample Depth (m)	Top	0.30
						Base	1.20
Specimen Reference	2	Specimen Depth	0.3	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022052418



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	36
90	100	0.05033	34
75	100	0.03582	32
63	100	0.02564	29
50	100	0.01835	26
37.5	97	0.00965	21
28	90	0.00491	16
20	88	0.00290	10
14	81	0.00156	3
10	78		
6.3	73		
5	71		
3.35	68		
2	65		
1.18	62		
0.6	57	Particle density	(assumed)
0.425	54	2.65	Mg/m3
0.3	51		
0.212	47		
0.15	43		
0.063	36		

Dry Mass of sample, g	3447

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	35.5
Sand	28.9
Silt	29.7
Clay	5.9

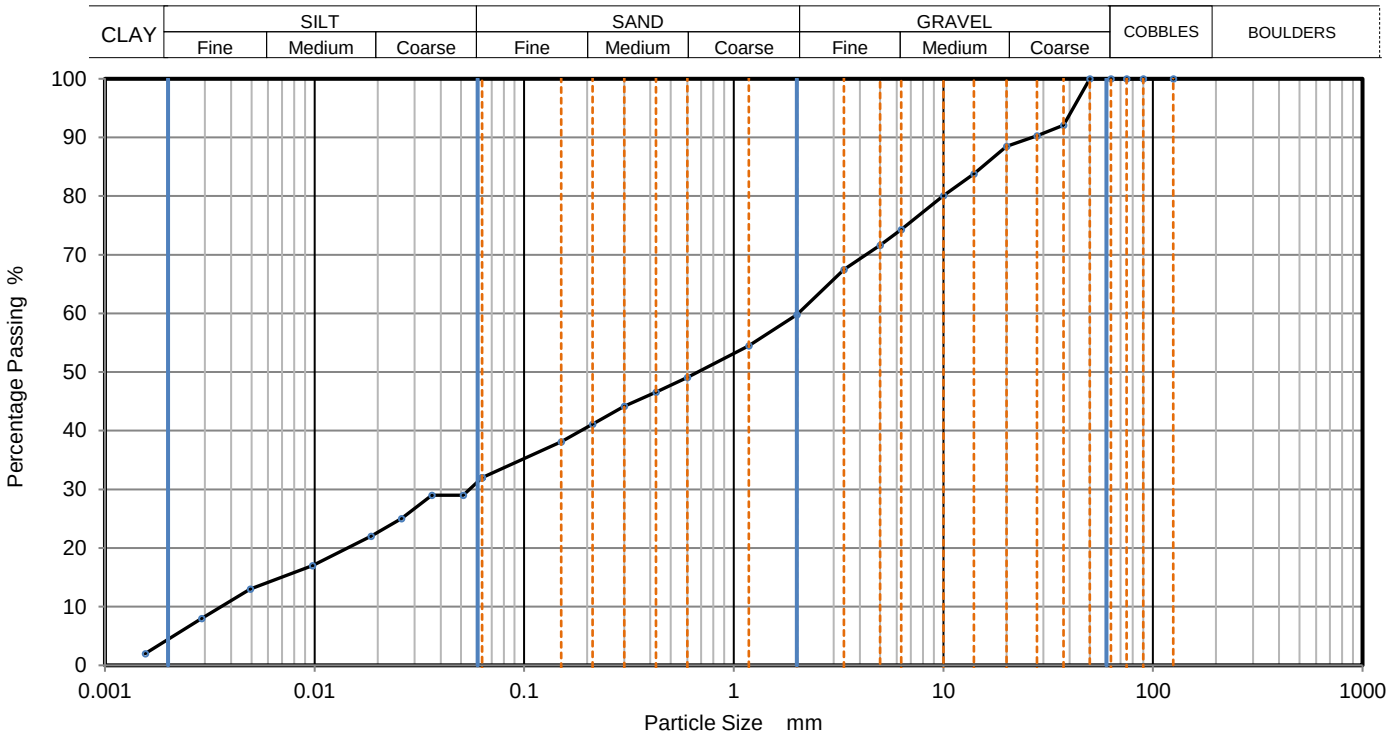
Grading Analysis		
D100	mm	
D60	mm	0.959
D30	mm	0.0281
D10	mm	0.00296
Uniformity Coefficient		320
Curvature Coefficient		0.28

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION			Job Ref		21-1682
				Borehole/Pit No.		BH-33000
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.		4
Specimen Description	Light brown sandy gravelly silty CLAY.			Sample Depth (m)	Top	2.00
					Base	3.00
Specimen Reference	2	Specimen Depth	2 m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID		Caus2022052421



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	32
90	100	0.05128	29
75	100	0.03626	29
63	100	0.02595	25
50	100	0.01857	22
37.5	92	0.00976	17
28	90	0.00493	13
20	89	0.00289	8
14	84	0.00156	2
10	80		
6.3	74		
5	72		
3.35	68		
2	60		
1.18	55		
0.6	49	Particle density	(assumed)
0.425	47	2.65	Mg/m3
0.3	44		
0.212	41		
0.15	38		
0.063	32		

Dry Mass of sample, g: 5434

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	40.2
Sand	27.8
Silt	27.6
Clay	4.4

Grading Analysis		
D100	mm	
D60	mm	2.03
D30	mm	0.0558
D10	mm	0.00342
Uniformity Coefficient		590
Curvature Coefficient		0.45

Remarks

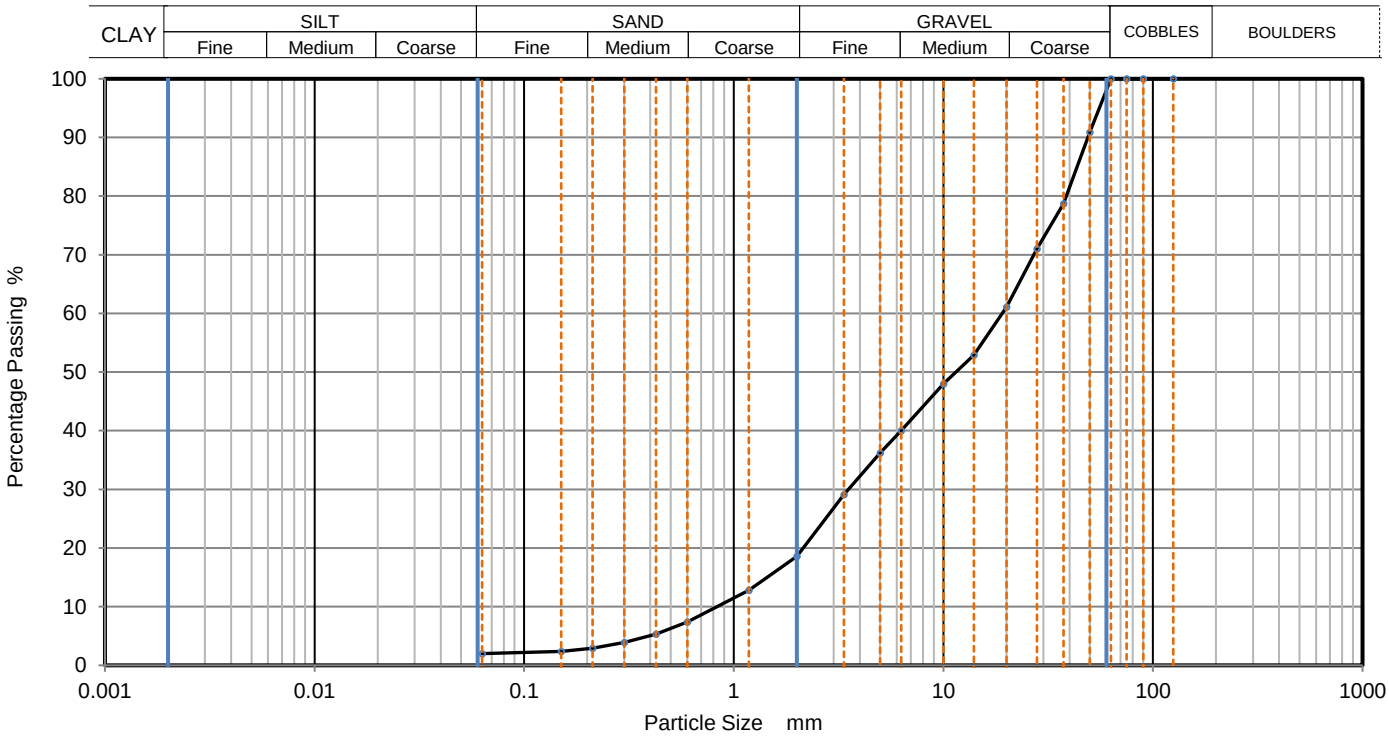
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					BH-33000
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	5
Specimen Description	Light brown slightly sandy slightly silty subangular fine to coarse GRAVEL.			Sample Depth (m) Top	3.00
				Base	4.00
Specimen Reference	2	Specimen Depth	3 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022052423



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	91		
37.5	79		
28	71		
20	61		
14	53		
10	48		
6.3	40		
5	36		
3.35	29		
2	19		
1.18	13		
0.6	7		
0.425	5		
0.3	4		
0.212	3		
0.15	2		
0.063	2		

Dry Mass of sample, g: 8944

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	81.4
Sand	16.6
Fines <0.063mm	2.0

Grading Analysis		
D100	mm	
D60	mm	19
D30	mm	3.52
D10	mm	0.827
Uniformity Coefficient		23
Curvature Coefficient		0.79

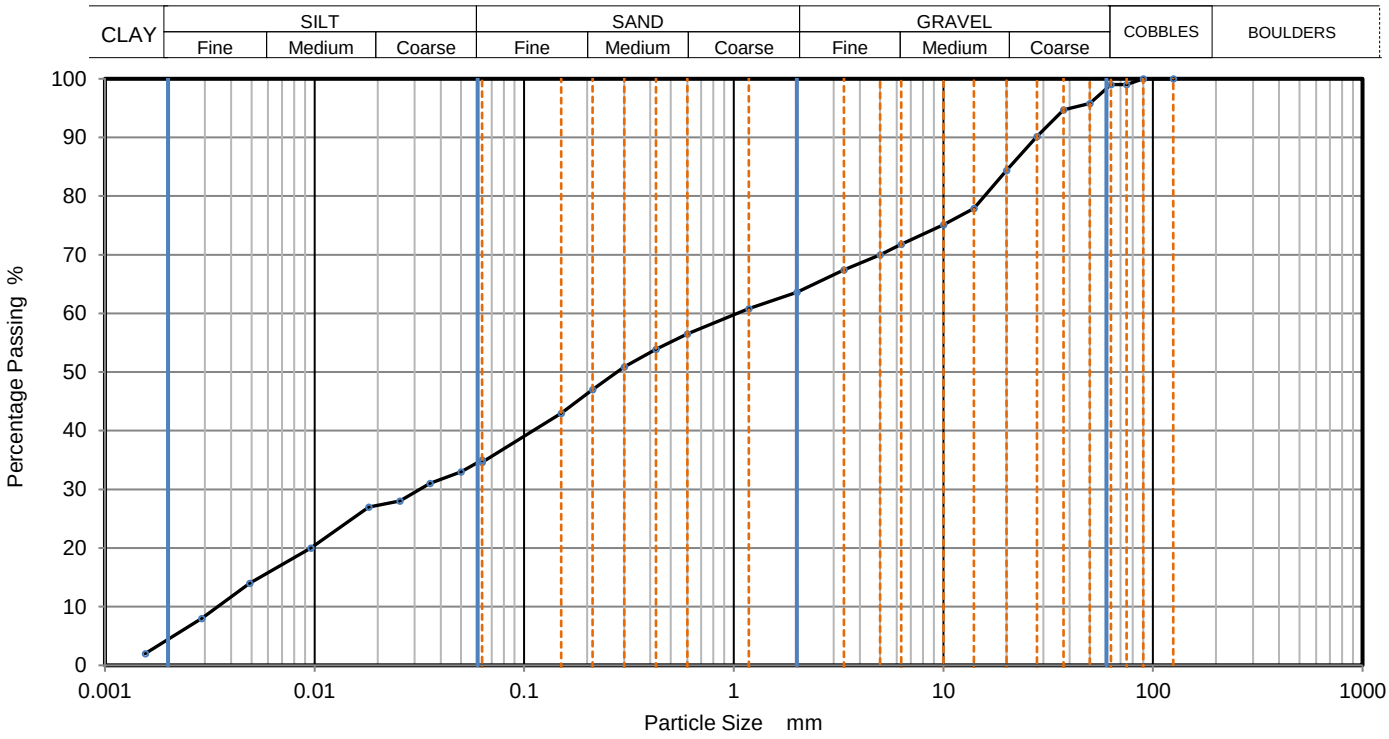
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					BH-34598
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Light brown sandy gravelly silty CLAY.			Sample Depth (m) Top	1.20
				Base	2.00
Specimen Reference	2	Specimen Depth	1.2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022052425



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	35
90	100	0.05000	33
75	99	0.03559	31
63	99	0.02548	28
50	96	0.01813	27
37.5	95	0.00959	20
28	90	0.00491	14
20	84	0.00289	8
14	78	0.00156	2
10	75		
6.3	72		
5	70		
3.35	67		
2	64		
1.18	61		
0.6	57	Particle density	(assumed)
0.425	54	2.65	Mg/m3
0.3	51		
0.212	47		
0.15	43		
0.063	35		

Dry Mass of sample, g: 10258

Sample Proportions	% dry mass
Cobbles	1.0
Gravel	35.4
Sand	29.1
Silt	30.4
Clay	4.1

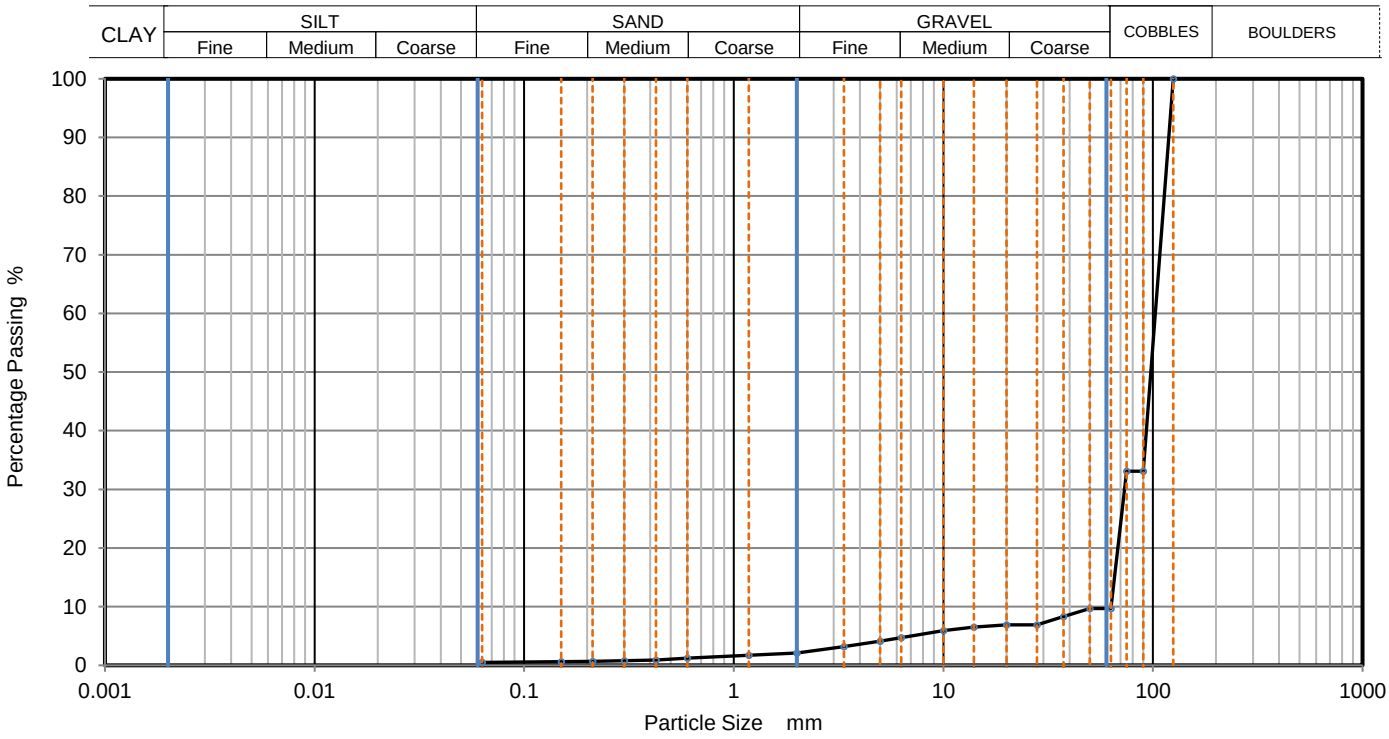
Grading Analysis		
D100	mm	
D60	mm	1.04
D30	mm	0.0305
D10	mm	0.00346
Uniformity Coefficient		300
Curvature Coefficient		0.26

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		BH-34598
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		7
Specimen Description	Greyish brown COBBLES with some medium coarse gravel.				Sample Depth (m)	Top	3.00
						Base	
Specimen Reference	2	Specimen Depth	3	m	Sample Type		D
Test Method	BS1377:Part 2:1990, clause 9.2				KeyLAB ID		Caus2022052429



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	33		
75	33		
63	10		
50	10		
37.5	8		
28	7		
20	7		
14	7		
10	6		
6.3	5		
5	4		
3.35	3		
2	2		
1.18	2		
0.6	1		
0.425	1		
0.3	1		
0.212	1		
0.15	1		
0.063	1		

Dry Mass of sample, g	7670

Sample Proportions	% dry mass
Cobbles	90.3
Gravel	7.6
Sand	1.7
Fines <0.063mm	0.0

Grading Analysis		
D100	mm	125
D60	mm	103
D30	mm	73.3
D10	mm	63.1
Uniformity Coefficient		1.6
Curvature Coefficient		0.83

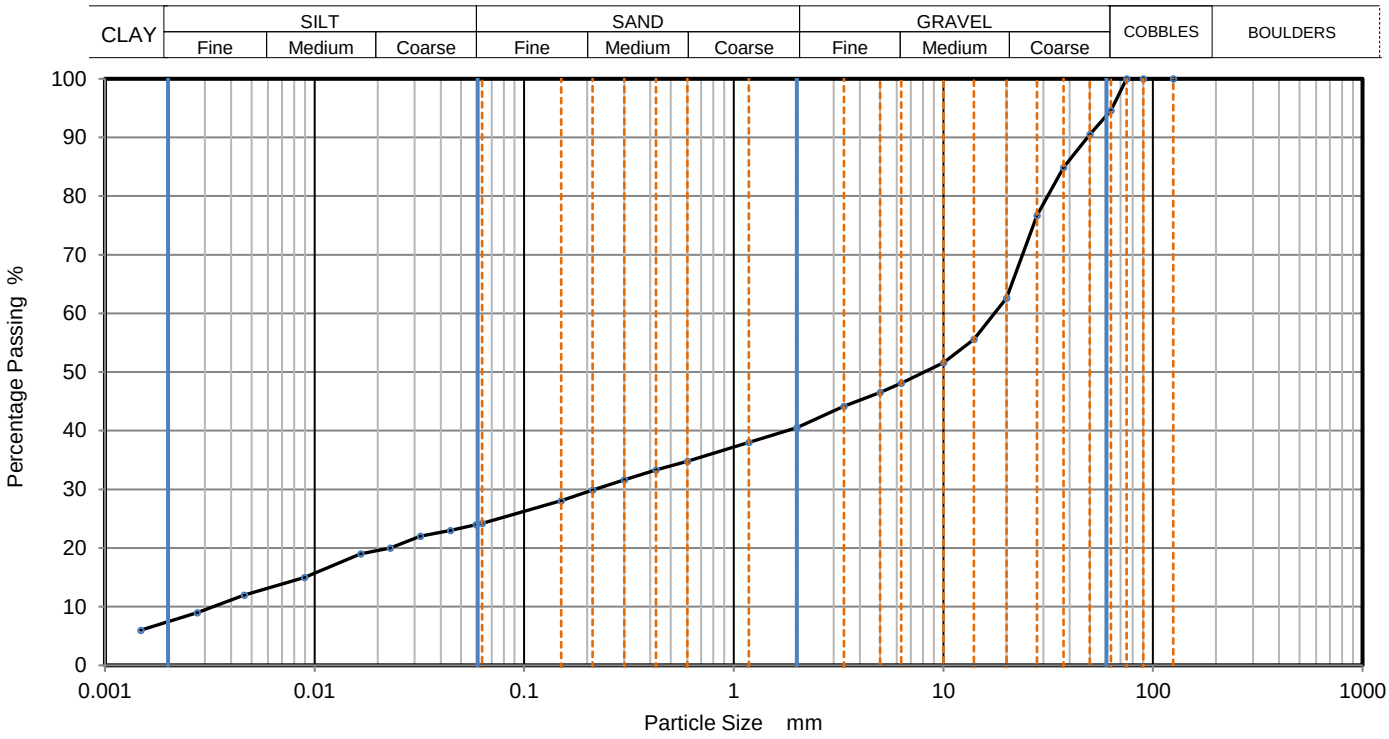
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-34598A
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Greyish brown sandy gravelly silty CLAY with some cobbles.			Sample Depth (m) Top	5.50
				Sample Depth (m) Base	
Specimen Reference	6	Specimen Depth	5.5 m	Sample Type	C
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022081034



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.05891	24
90	100	0.04454	23
75	100	0.03200	22
63	95	0.02298	20
50	91	0.01662	19
37.5	85	0.00895	15
28	77	0.00462	12
20	63	0.00275	9
14	56	0.00148	6
10	52		
6.3	48		
5	47		
3.35	44		
2	41		
1.18	38		
0.6	35	Particle density	(assumed)
0.425	33	2.65	Mg/m3
0.3	32		
0.212	30		
0.15	28		
0.063	24		

Dry Mass of sample, g: 8270

Sample Proportions	% dry mass
Cobbles	5.4
Gravel	54.1
Sand	16.3
Silt	16.8
Clay	7.4

Grading Analysis		
D100	mm	
D60	mm	17.5
D30	mm	0.218
D10	mm	0.00343
Uniformity Coefficient		5100
Curvature Coefficient		0.79

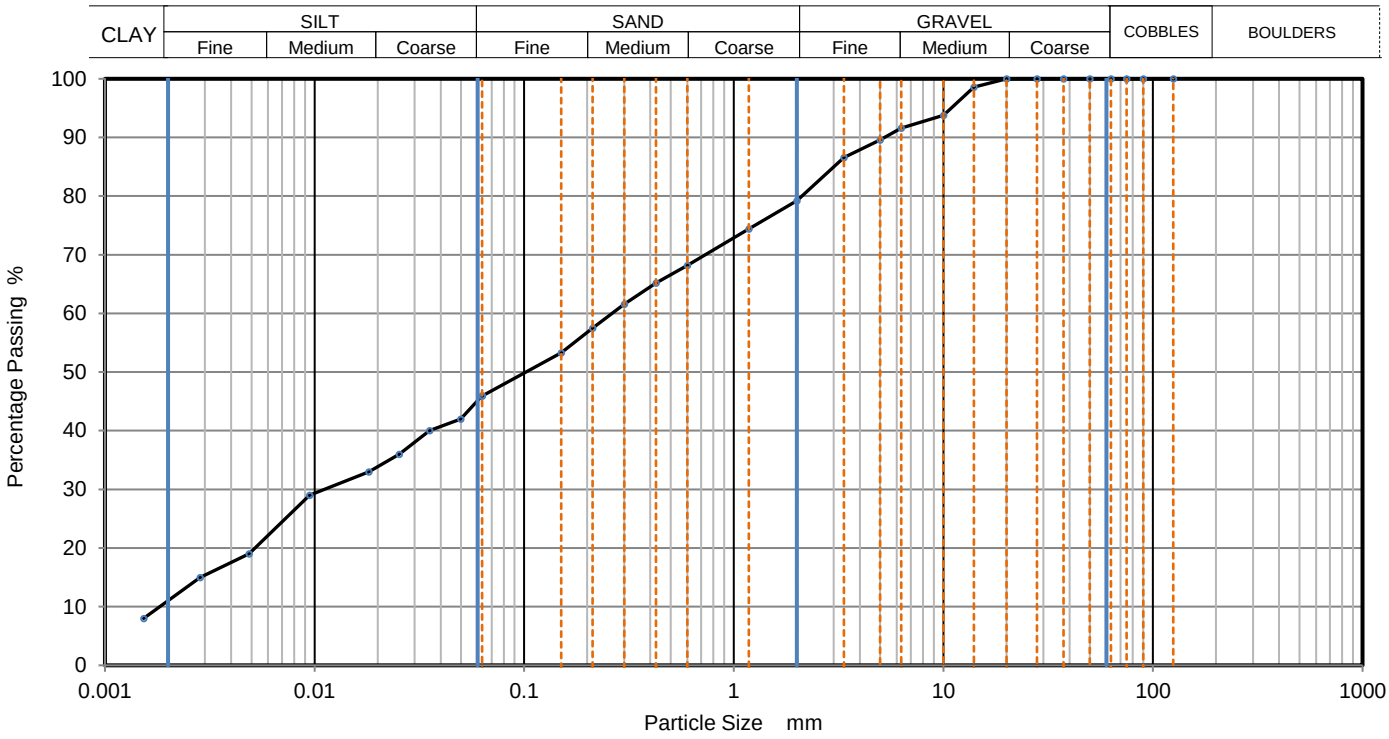
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					BH-34816
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Light brown sandy gravelly silty CLAY.			Sample Depth (m) Top	0.00
				Base	0.50
Specimen Reference	4	Specimen Depth	0 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022052430



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	46
90	100	0.04971	42
75	100	0.03537	40
63	100	0.02532	36
50	100	0.01813	33
37.5	100	0.00947	29
28	100	0.00487	19
20	100	0.00284	15
14	99	0.00153	8
10	94		
6.3	92		
5	90		
3.35	87		
2	79		
1.18	74		
0.6	68	Particle density	(assumed)
0.425	65	2.65	Mg/m3
0.3	62		
0.212	58		
0.15	53		
0.063	46		

Dry Mass of sample, g: 507

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	20.8
Sand	33.3
Silt	34.9
Clay	11.0

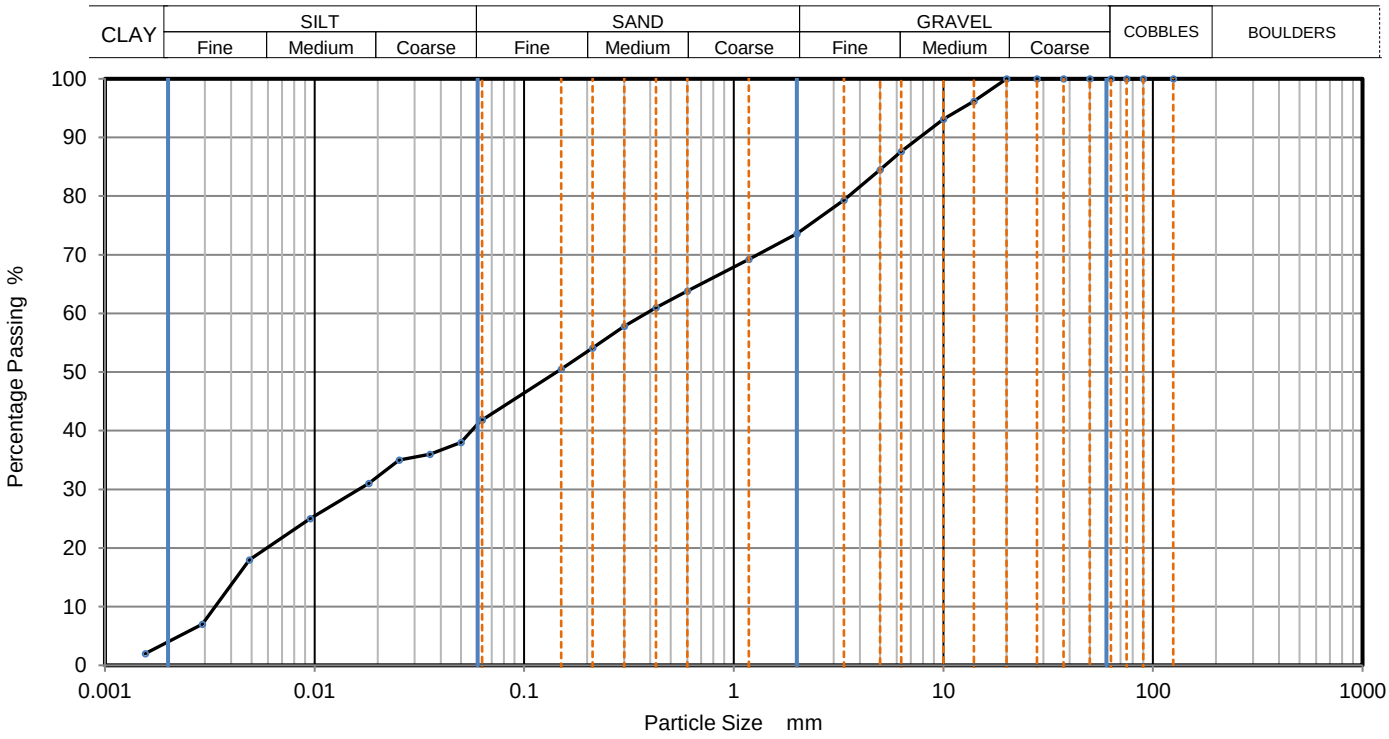
Grading Analysis		
D100	mm	
D60	mm	0.262
D30	mm	0.0118
D10	mm	0.00185
Uniformity Coefficient		140
Curvature Coefficient		0.29

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-35202
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Light brown sandy gravelly silty CLAY.			Sample Depth (m) Top	0.40
				Base	1.20
Specimen Reference	2	Specimen Depth	0.4 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022052431



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	42
90	100	0.05000	38
75	100	0.03559	36
63	100	0.02532	35
50	100	0.01813	31
37.5	100	0.00953	25
28	100	0.00488	18
20	100	0.00291	7
14	96	0.00156	2
10	93		
6.3	88		
5	85		
3.35	79		
2	74		
1.18	69		
0.6	64	Particle density	(assumed)
0.425	61	2.65	Mg/m3
0.3	58		
0.212	54		
0.15	51		
0.063	42		

Dry Mass of sample, g: 221

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	26.4
Sand	31.8
Silt	37.8
Clay	4.0

Grading Analysis		
D100	mm	
D60	mm	0.38
D30	mm	0.0163
D10	mm	0.00331
Uniformity Coefficient		110
Curvature Coefficient		0.21

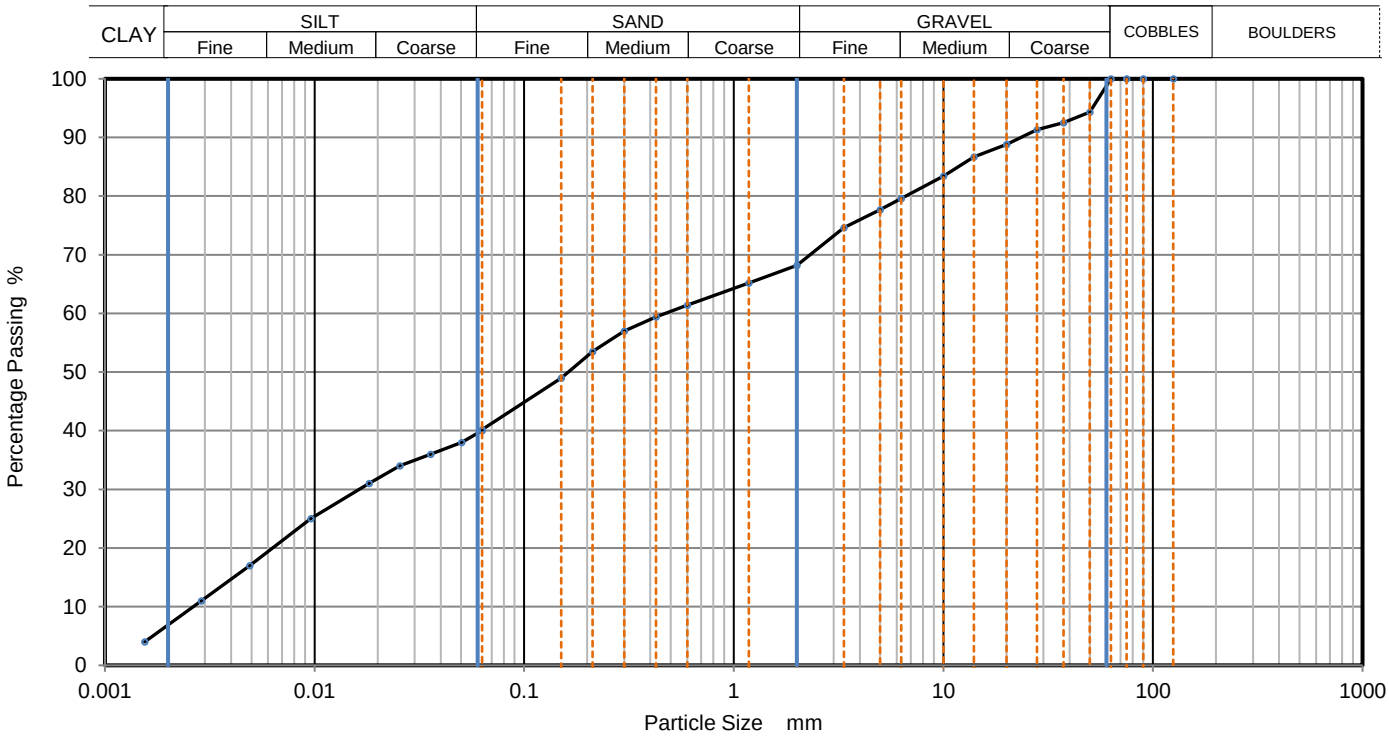
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					BH-35202
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	5
Specimen Description	Light brown sandy gravelly silty CLAY.			Sample Depth (m) Top	3.00
				Base	4.00
Specimen Reference	2	Specimen Depth	3 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022052435



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	40
90	100	0.05032	38
75	100	0.03581	36
63	100	0.02548	34
50	94	0.01824	31
37.5	93	0.00959	25
28	91	0.00491	17
20	89	0.00288	11
14	87	0.00155	4
10	83		
6.3	80		
5	78		
3.35	75		
2	68		
1.18	65		
0.6	61	Particle density	(assumed)
0.425	59	2.65	Mg/m3
0.3	57		
0.212	54		
0.15	49		
0.063	40		

Dry Mass of sample, g: 7441

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	31.8
Sand	28.0
Silt	33.2
Clay	7.0

Grading Analysis		
D100	mm	
D60	mm	0.472
D30	mm	0.017
D10	mm	0.00255
Uniformity Coefficient		180
Curvature Coefficient		0.24

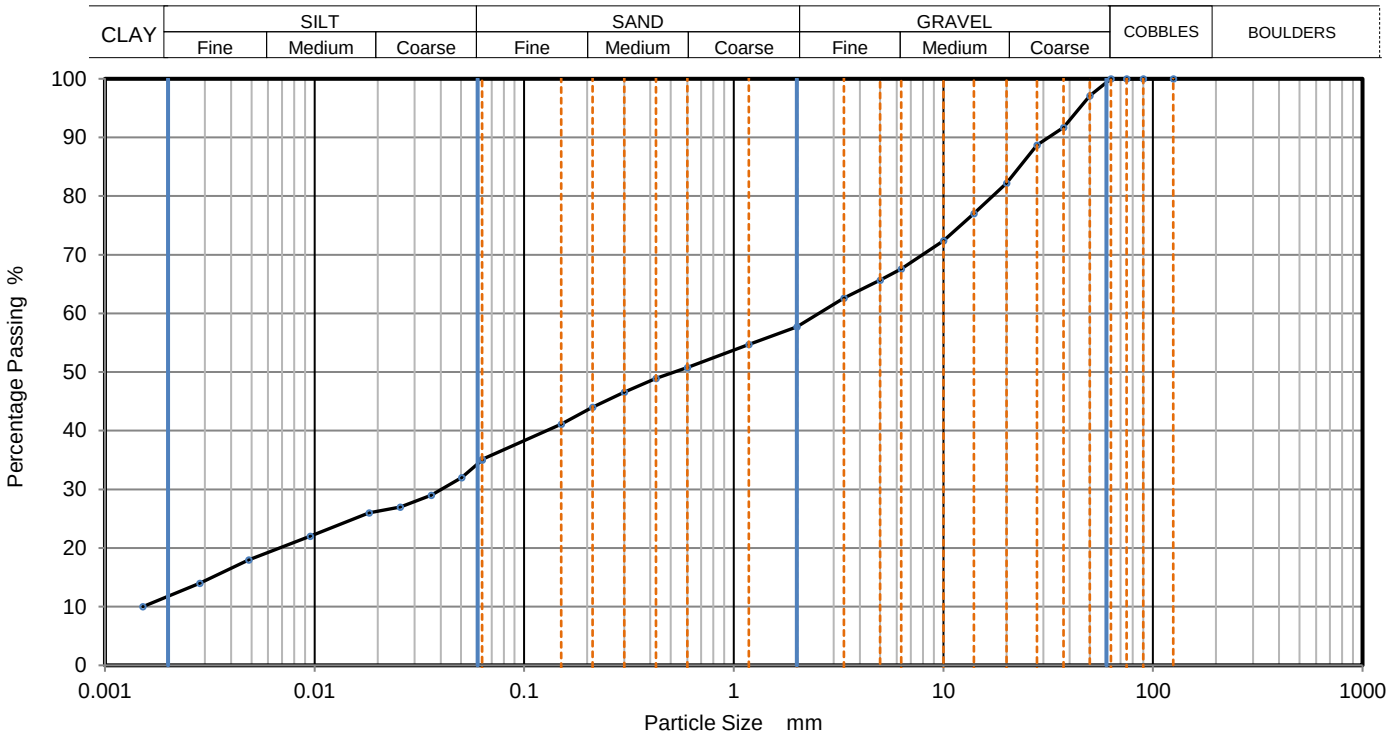
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					**21-1682**
Borehole/Pit No.					BH-35202
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Greyish brown sandy gravelly silty CLAY.			Sample Depth (m) Top	5.50
				Base	
Specimen Reference	6	Specimen Depth	5.5 m	Sample Type	C
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022081045



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	35
90	100	0.05032	32
75	100	0.03604	29
63	100	0.02564	27
50	97	0.01824	26
37.5	92	0.00953	22
28	89	0.00485	18
20	82	0.00283	14
14	77	0.00152	10
10	72		
6.3	68		
5	66		
3.35	63		
2	58		
1.18	55		
0.6	51	Particle density	(assumed)
0.425	49	2.65	Mg/m3
0.3	47		
0.212	44		
0.15	41		
0.063	35		

Dry Mass of sample, g: 8376

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	42.3
Sand	22.5
Silt	23.5
Clay	11.7

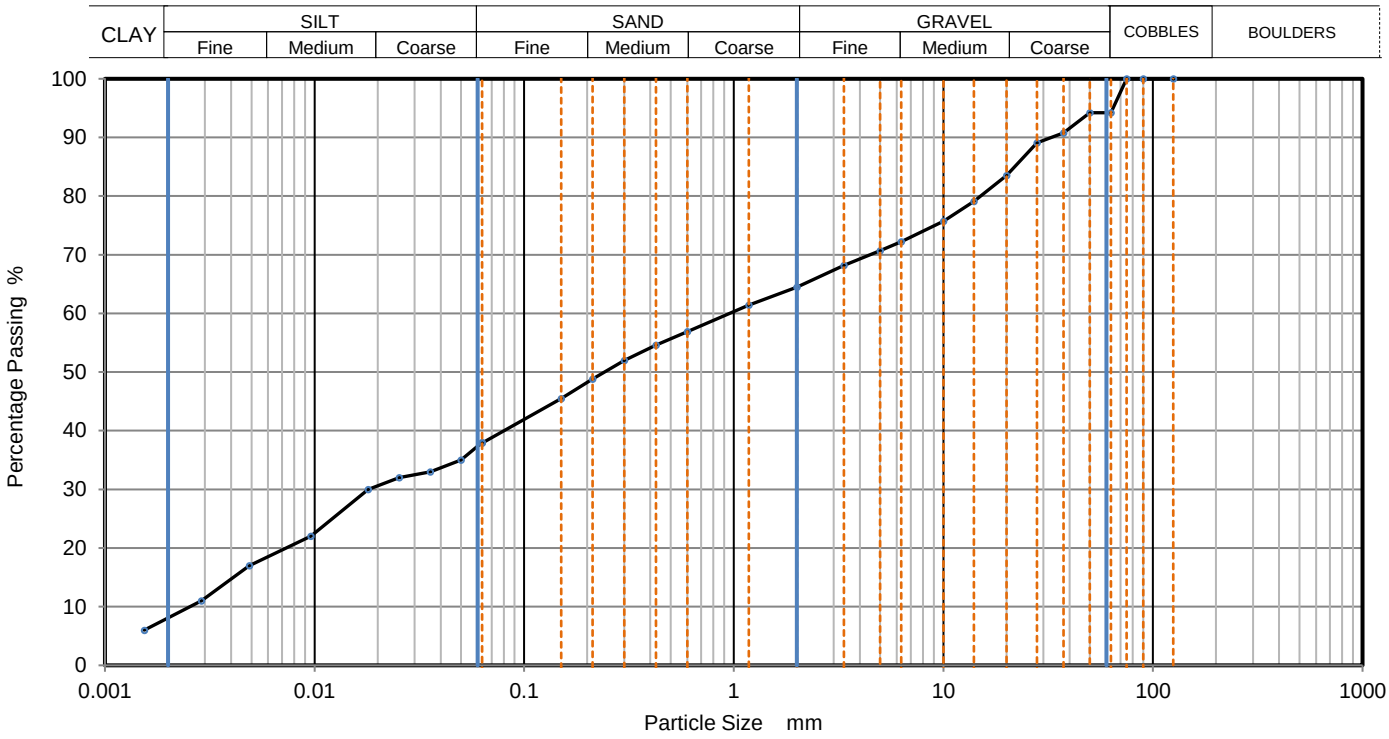
Grading Analysis		
D100	mm	
D60	mm	2.54
D30	mm	0.0412
D10	mm	0.0016
Uniformity Coefficient		1600
Curvature Coefficient		0.42

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		BH-35473
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		3
Specimen Description	Light brown sandy gravelly silty CLAY.				Sample Depth (m)	Top	1.20
						Base	2.00
Specimen Reference	2	Specimen Depth	1.2	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022052437



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	38
90	100	0.05001	35
75	100	0.03559	33
63	94	0.02533	32
50	94	0.01802	30
37.5	91	0.00959	22
28	89	0.00488	17
20	84	0.00288	11
14	79	0.00154	6
10	76		
6.3	72		
5	71		
3.35	68		
2	65		
1.18	61		
0.6	57	Particle density	(assumed)
0.425	55	2.65	Mg/m3
0.3	52		
0.212	49		
0.15	46		
0.063	38		

Dry Mass of sample, g: 8602

Sample Proportions	% dry mass
Cobbles	5.8
Gravel	29.7
Sand	26.6
Silt	29.6
Clay	8.3

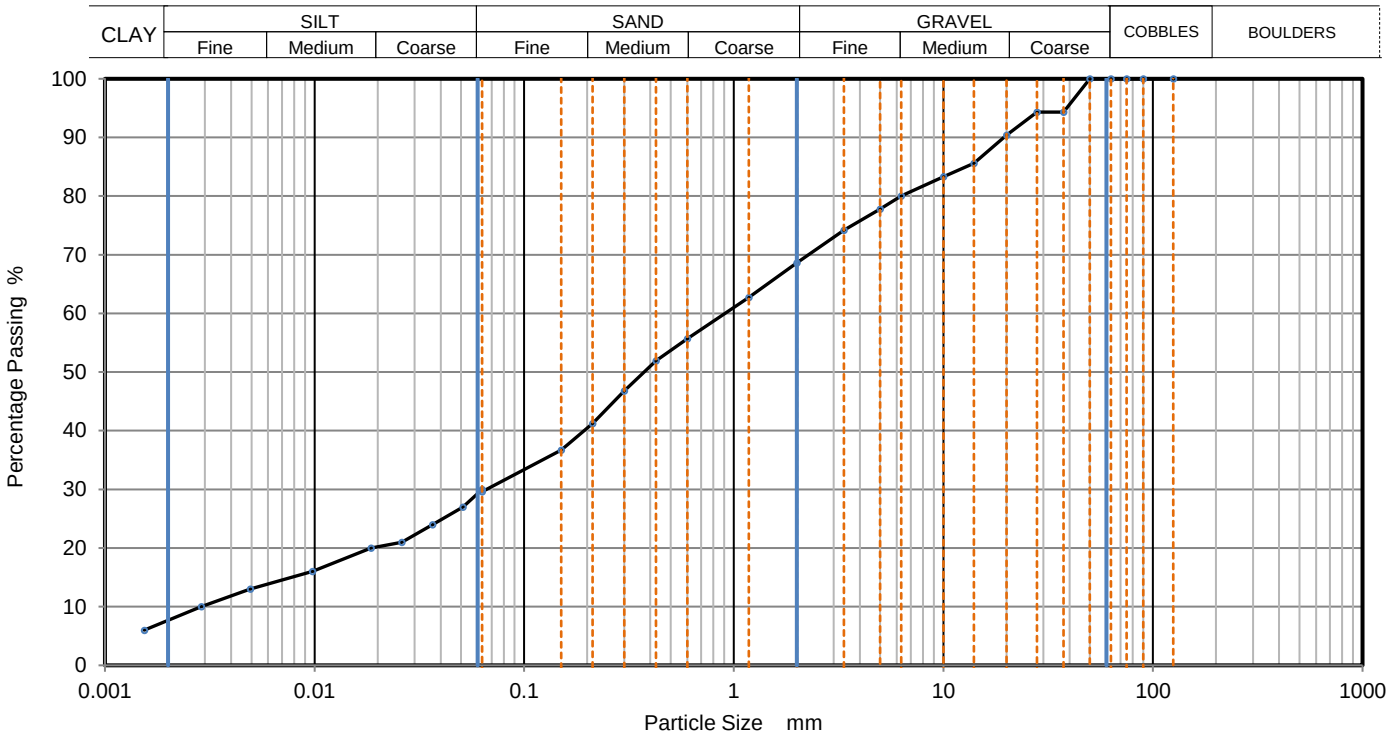
Grading Analysis		
D100	mm	
D60	mm	0.951
D30	mm	0.018
D10	mm	0.00251
Uniformity Coefficient		380
Curvature Coefficient		0.14

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-3588
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Greyish brown sandy gravelly silty CLAY.			Sample Depth (m) Top	1.20
				Base	2.00
Specimen Reference	2	Specimen Depth	1.2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022061061



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	30
90	100	0.05097	27
75	100	0.03649	24
63	100	0.02611	21
50	100	0.01857	20
37.5	94	0.00976	16
28	94	0.00493	13
20	90	0.00288	10
14	86	0.00154	6
10	83		
6.3	80		
5	78		
3.35	74		
2	69		
1.18	63		
0.6	56	Particle density (assumed)	
0.425	52	2.65 Mg/m3	
0.3	47		
0.212	41		
0.15	37		
0.063	30		

Dry Mass of sample, g: 4072

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	31.4
Sand	39.0
Silt	22.2
Clay	7.4

Grading Analysis		
D100	mm	
D60	mm	0.909
D30	mm	0.0665
D10	mm	0.00295
Uniformity Coefficient		310
Curvature Coefficient		1.6

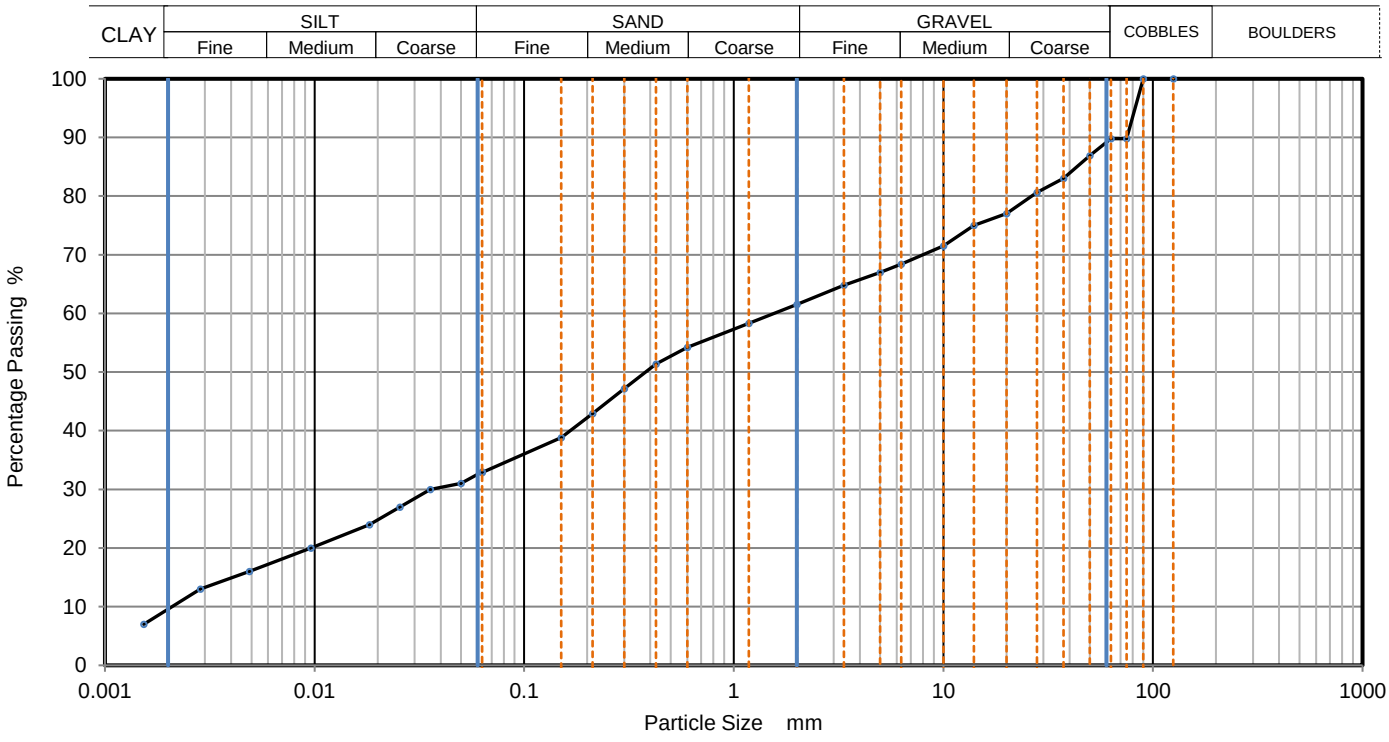
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					BH-3588
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	4
Specimen Description	Greyish brown sandy gravelly silty CLAY with some cobbles.			Sample Depth (m) Top	3.00
				Base	4.00
Specimen Reference	2	Specimen Depth	3 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022061063



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	33
90	100	0.05001	31
75	90	0.03559	30
63	90	0.02549	27
50	87	0.01824	24
37.5	83	0.00959	20
28	81	0.00488	16
20	77	0.00285	13
14	75	0.00153	7
10	72		
6.3	68		
5	67		
3.35	65		
2	62		
1.18	58		
0.6	54	Particle density	(assumed)
0.425	51	2.65	Mg/m3
0.3	47		
0.212	43		
0.15	39		
0.063	33		

Dry Mass of sample, g: 7962

Sample Proportions	% dry mass
Cobbles	10.2
Gravel	28.2
Sand	28.6
Silt	23.4
Clay	9.6

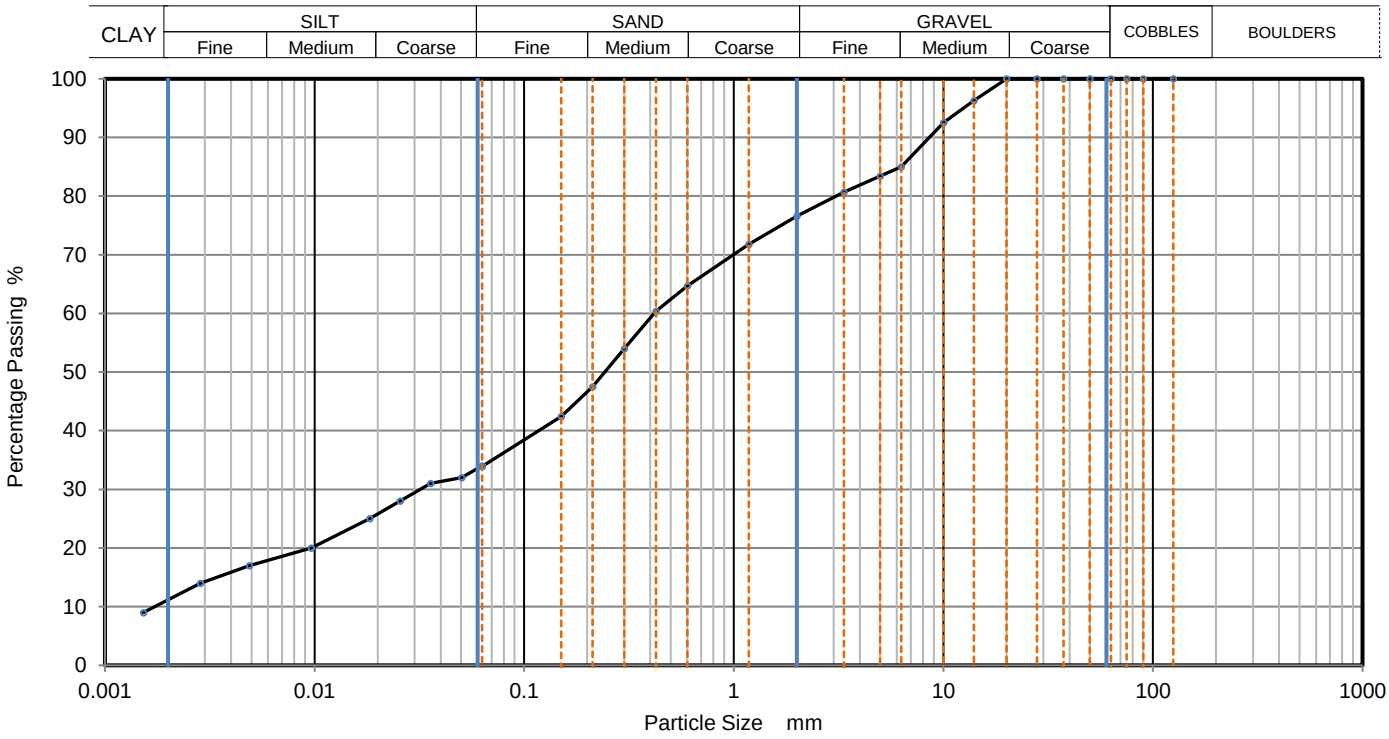
Grading Analysis		
D100	mm	
D60	mm	1.56
D30	mm	0.0354
D10	mm	0.00209
Uniformity Coefficient		750
Curvature Coefficient		0.39

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-3815
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Greyish brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	0.30
				Base	1.00
Specimen Reference	2	Specimen Depth	0.3 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022061065



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	34
90	100	0.05033	32
75	100	0.03582	31
63	100	0.02564	28
50	100	0.01835	25
37.5	100	0.00965	20
28	100	0.00488	17
20	100	0.00285	14
14	96	0.00152	9
10	93		
6.3	85		
5	83		
3.35	81		
2	77		
1.18	72		
0.6	65	Particle density	(assumed)
0.425	60	2.65	Mg/m3
0.3	54		
0.212	48		
0.15	42		
0.063	34		

Dry Mass of sample, g: 514

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	23.4
Sand	42.7
Silt	22.6
Clay	11.3

Grading Analysis		
D100	mm	
D60	mm	0.416
D30	mm	0.0328
D10	mm	0.00169
Uniformity Coefficient		250
Curvature Coefficient		1.5

Remarks

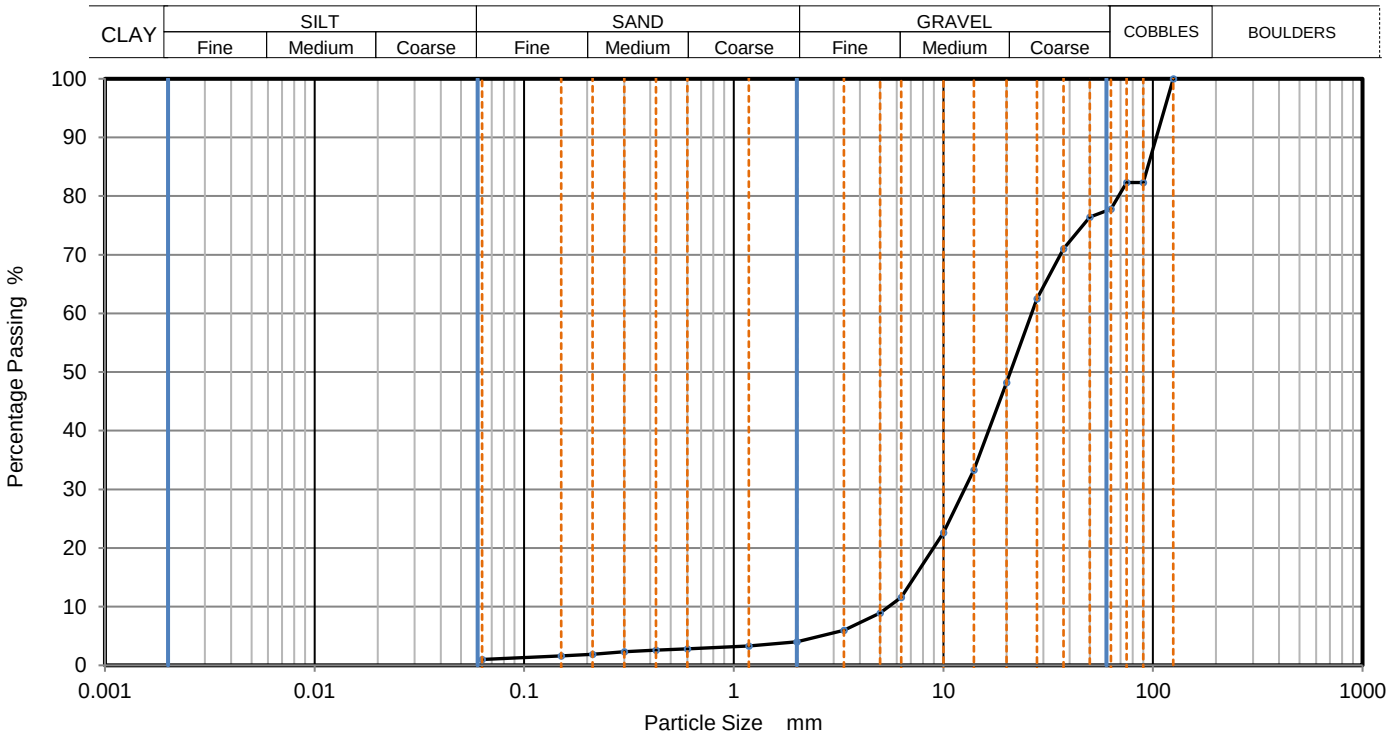
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-3815
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Greyish brown slightly sandy subangular fine to coarse GRAVEL with cobbles.			Sample Depth (m) Top	1.60
				Base	3.00
Specimen Reference	2	Specimen Depth	1.6 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022061067



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	82		
75	82		
63	78		
50	76		
37.5	71		
28	63		
20	48		
14	33		
10	23		
6.3	12		
5	9		
3.35	6		
2	4		
1.18	3		
0.6	3		
0.425	3		
0.3	2		
0.212	2		
0.15	2		
0.063	1		

Dry Mass of sample, g: 12139

Sample Proportions	% dry mass
Cobbles	22.2
Gravel	73.8
Sand	3.0
Fines <0.063mm	1.0

Grading Analysis		
D100	mm	125
D60	mm	26.4
D30	mm	12.6
D10	mm	5.5
Uniformity Coefficient		4.8
Curvature Coefficient		1.1

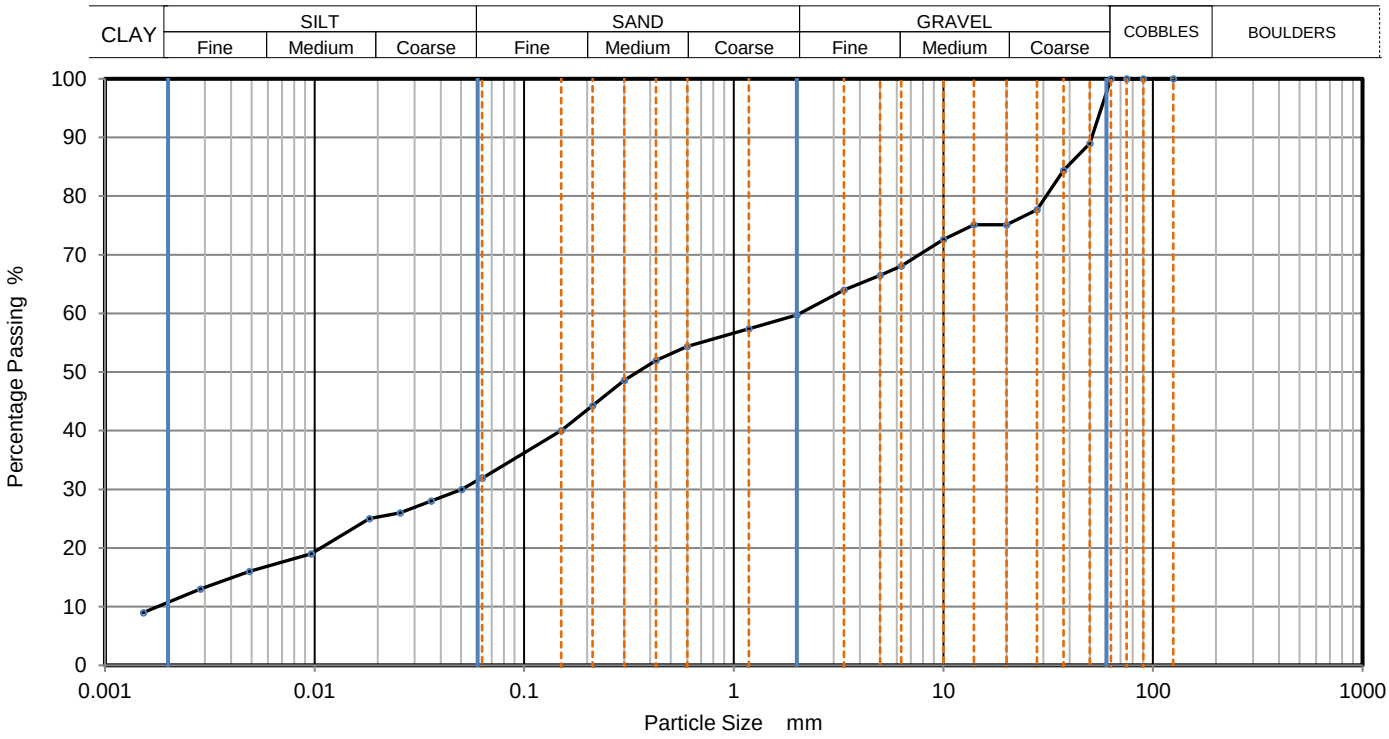
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					BH-3815
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	5
Specimen Description	Greyish brown sandy gravelly silty CLAY.			Sample Depth (m) Top	4.00
				Base	5.00
Specimen Reference	2	Specimen Depth	4 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022061068



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	32
90	100	0.05033	30
75	100	0.03604	28
63	100	0.02564	26
50	89	0.01824	25
37.5	84	0.00965	19
28	78	0.00488	16
20	75	0.00285	13
14	75	0.00152	9
10	73		
6.3	68		
5	67		
3.35	64		
2	60		
1.18	57		
0.6	54	Particle density	(assumed)
0.425	52	2.65	Mg/m3
0.3	49		
0.212	44		
0.15	40		
0.063	32		

Dry Mass of sample, g: 4771

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	40.3
Sand	27.8
Silt	21.3
Clay	10.6

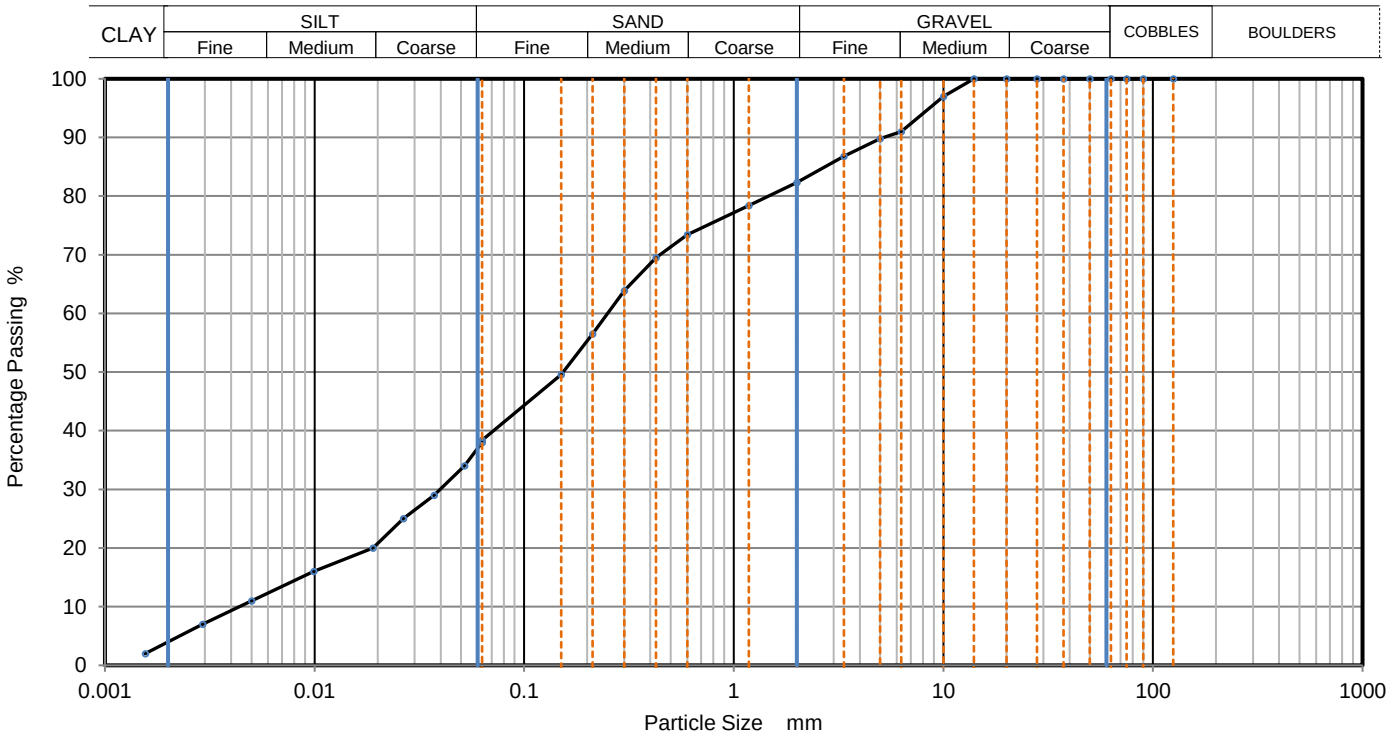
Grading Analysis		
D100	mm	
D60	mm	2.08
D30	mm	0.0478
D10	mm	0.00184
Uniformity Coefficient		1100
Curvature Coefficient		0.6

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		BH-4110
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		4
Specimen Description	Brownish grey sandy slightly gravelly silty CLAY.				Sample Depth (m)	Top	0.80
						Base	1.00
Specimen Reference	2	Specimen Depth	0.8	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022062161



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	38
90	100	0.05190	34
75	100	0.03714	29
63	100	0.02657	25
50	100	0.01900	20
37.5	100	0.00992	16
28	100	0.00501	11
20	100	0.00293	7
14	100	0.00156	2
10	97		
6.3	91		
5	90		
3.35	87		
2	82		
1.18	78		
0.6	73	Particle density	(assumed)
0.425	70	2.65	Mg/m3
0.3	64		
0.212	57		
0.15	50		
0.063	38		

Dry Mass of sample, g: 203

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	17.7
Sand	43.9
Silt	34.3
Clay	4.1

Grading Analysis		
D100	mm	
D60	mm	0.249
D30	mm	0.0389
D10	mm	0.0043
Uniformity Coefficient		58
Curvature Coefficient		1.4

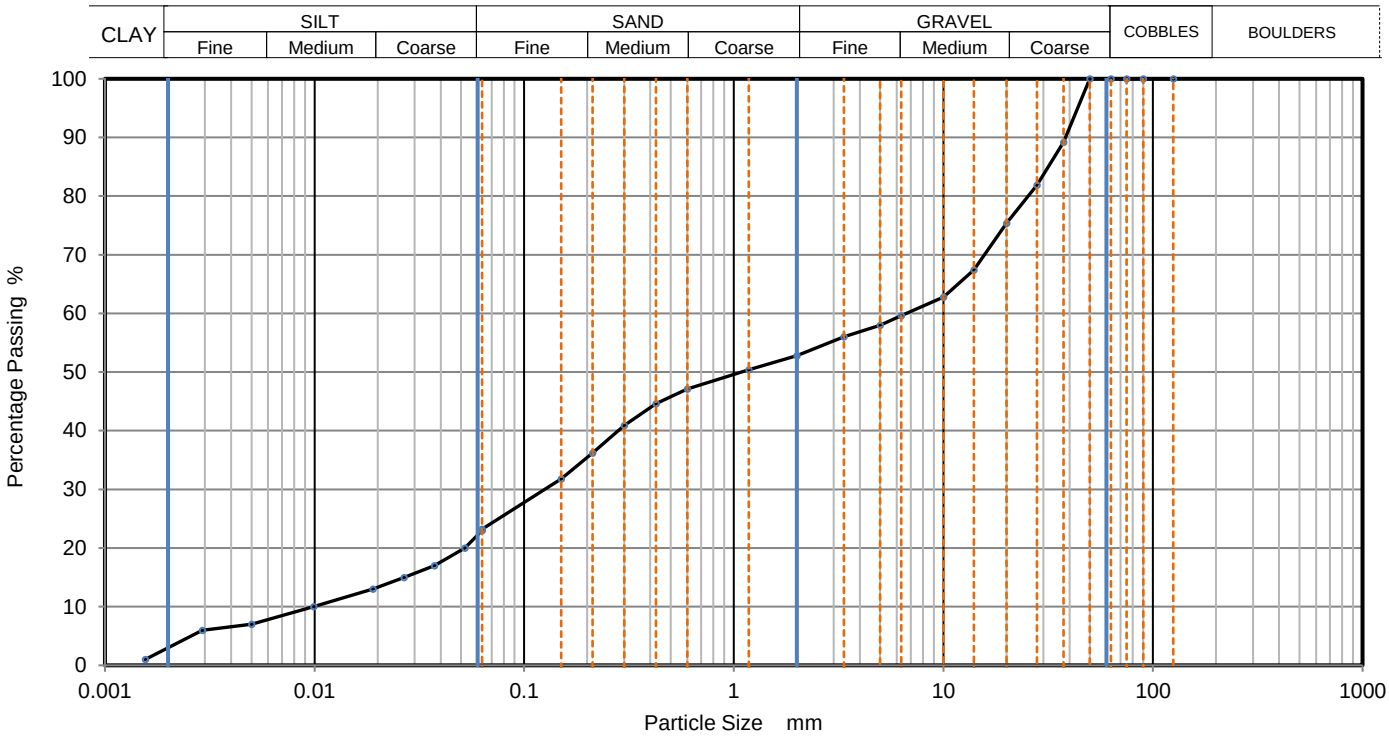
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-4110
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	6
Specimen Description	Brownish grey sandy gravelly silty CLAY.			Sample Depth (m) Top	2.80
				Base	3.00
Specimen Reference	3	Specimen Depth	2.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022062166



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	23
90	100	0.05222	20
75	100	0.03736	17
63	100	0.02672	15
50	100	0.01900	13
37.5	89	0.00992	10
28	82	0.00501	7
20	75	0.00291	6
14	67	0.00156	1
10	63		
6.3	60		
5	58		
3.35	56		
2	53		
1.18	50		
0.6	47	Particle density	(assumed)
0.425	45	2.65	Mg/m3
0.3	41		
0.212	36		
0.15	32		
0.063	23		

Dry Mass of sample, g: 2751

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	47.2
Sand	29.6
Silt	20.0
Clay	3.2

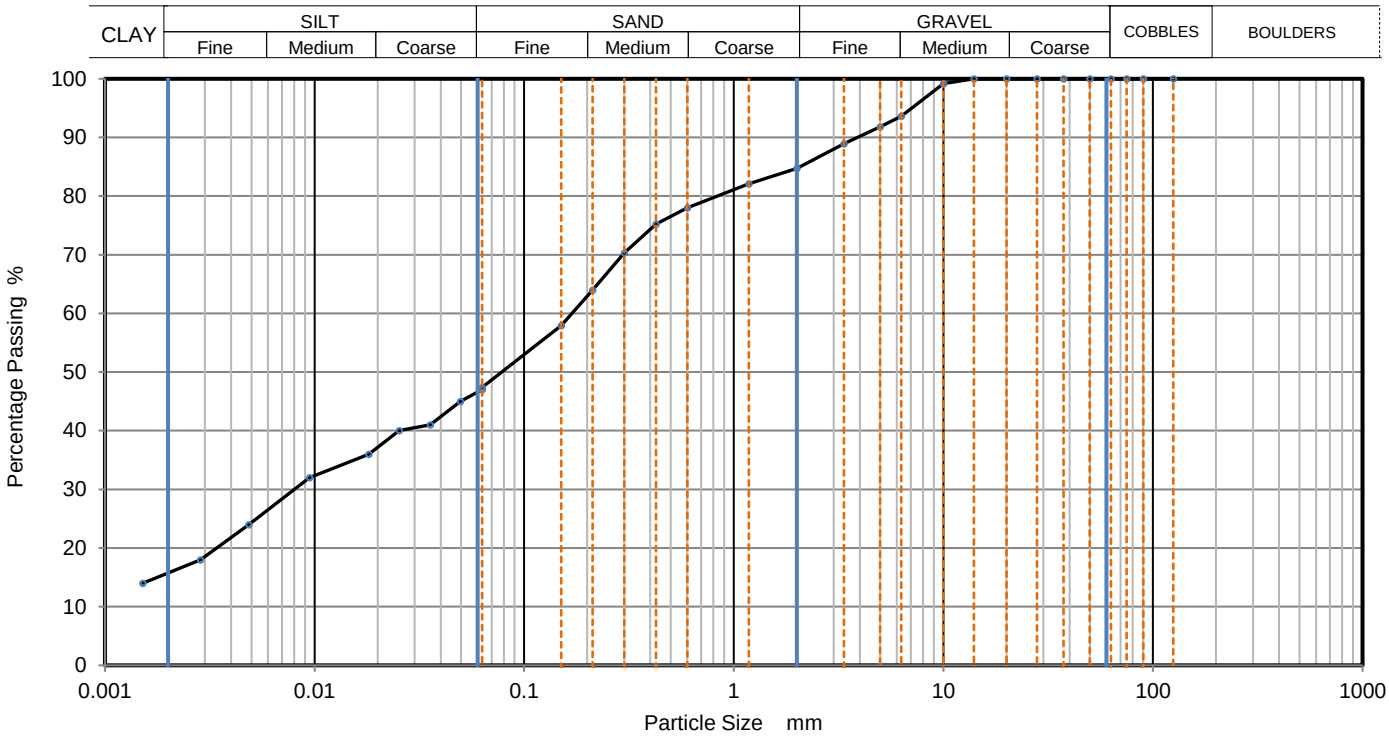
Grading Analysis		
D100	mm	
D60	mm	6.69
D30	mm	0.125
D10	mm	0.00958
Uniformity Coefficient		700
Curvature Coefficient		0.24

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		BH-4110
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		8
Specimen Description	Brownish grey sandy slightly gravelly silty CLAY.				Sample Depth (m)	Top	4.80
						Base	5.00
Specimen Reference	2	Specimen Depth	4.8	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022062169



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	47
90	100	0.04969	45
75	100	0.03559	41
63	100	0.02533	40
50	100	0.01813	36
37.5	100	0.00948	32
28	100	0.00485	24
20	100	0.00285	18
14	100	0.00152	14
10	99		
6.3	94		
5	92		
3.35	89		
2	85		
1.18	82		
0.6	78	Particle density	(assumed)
0.425	75	2.65	Mg/m3
0.3	70		
0.212	64		
0.15	58		
0.063	47		

Dry Mass of sample, g: 209

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	15.3
Sand	37.3
Silt	31.8
Clay	15.6

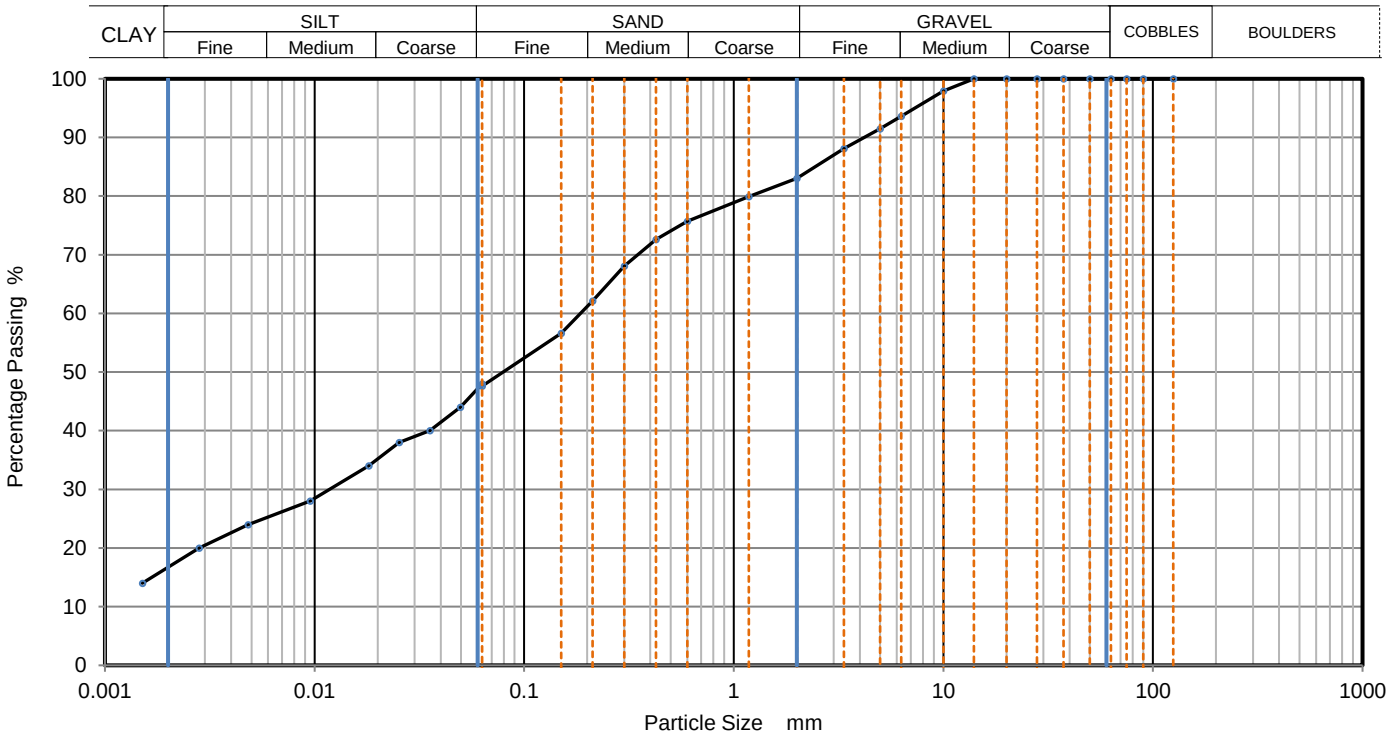
Grading Analysis		
D100	mm	
D60	mm	0.169
D30	mm	0.00828
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-4110
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	16
Specimen Description	Brownish grey sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	7.30
				Base	7.50
Specimen Reference	2	Specimen Depth	7.3 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022062171



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	48
90	100	0.04968	44
75	100	0.03559	40
63	100	0.02532	38
50	100	0.01813	34
37.5	100	0.00953	28
28	100	0.00482	24
20	100	0.00282	20
14	100	0.00151	14
10	98		
6.3	94		
5	92		
3.35	88		
2	83		
1.18	80		
0.6	76	Particle density	(assumed)
0.425	73	2.65	Mg/m3
0.3	68		
0.212	62		
0.15	57		
0.063	48		

Dry Mass of sample, g: 210

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	17.0
Sand	35.4
Silt	31.0
Clay	16.6

Grading Analysis		
D100	mm	
D60	mm	0.186
D30	mm	0.0121
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

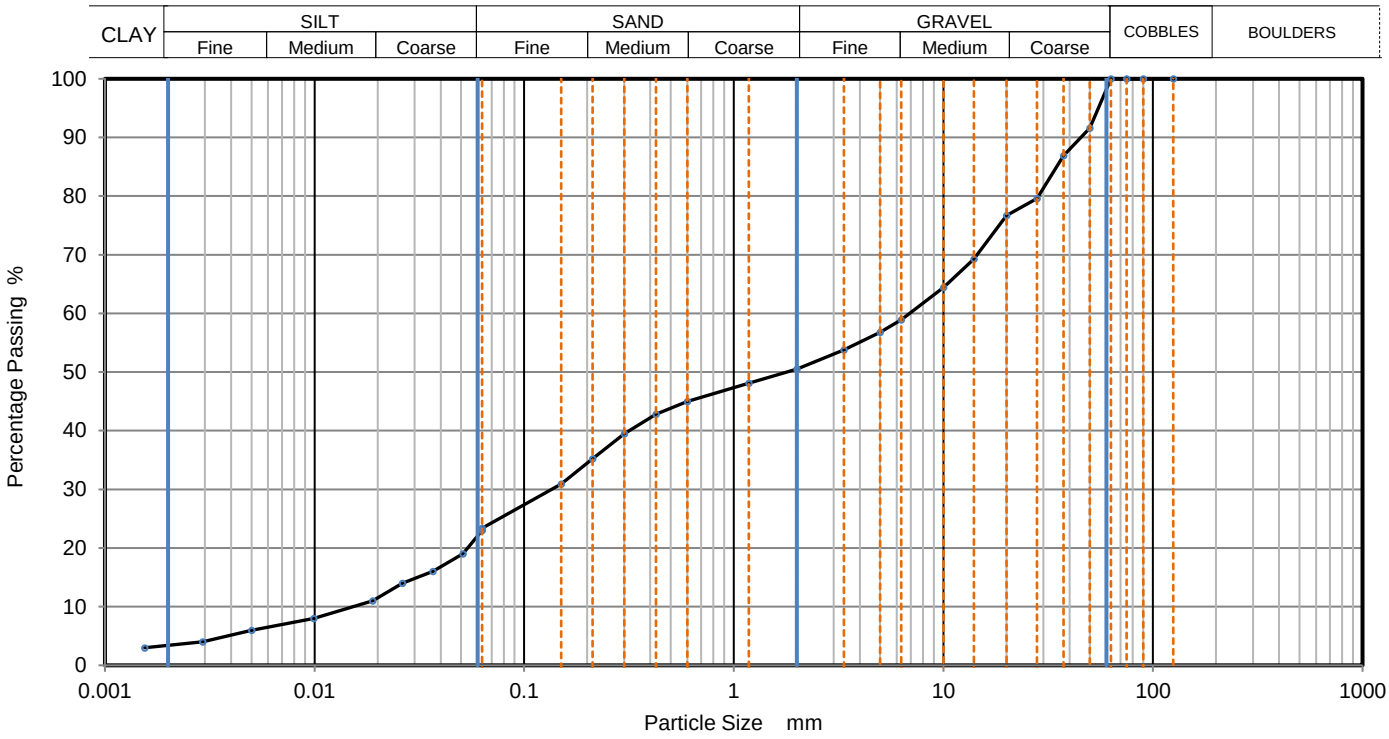
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-5260
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Greyish brown sandy gravelly silty CLAY.			Sample Depth (m) Top	1.20
				Base	2.00
Specimen Reference	2	Specimen Depth	1.2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022062134



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	23
90	100	0.05097	19
75	100	0.03671	16
63	100	0.02627	14
50	92	0.01890	11
37.5	87	0.00992	8
28	80	0.00501	6
20	77	0.00293	4
14	69	0.00155	3
10	64		
6.3	59		
5	57		
3.35	54		
2	51		
1.18	48		
0.6	45	Particle density	(assumed)
0.425	43	2.65	Mg/m3
0.3	40		
0.212	35		
0.15	31		
0.063	23		

Dry Mass of sample, g: 2746

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	49.5
Sand	27.0
Silt	20.0
Clay	3.5

Grading Analysis		
D100	mm	
D60	mm	6.93
D30	mm	0.135
D10	mm	0.0147
Uniformity Coefficient		470
Curvature Coefficient		0.18

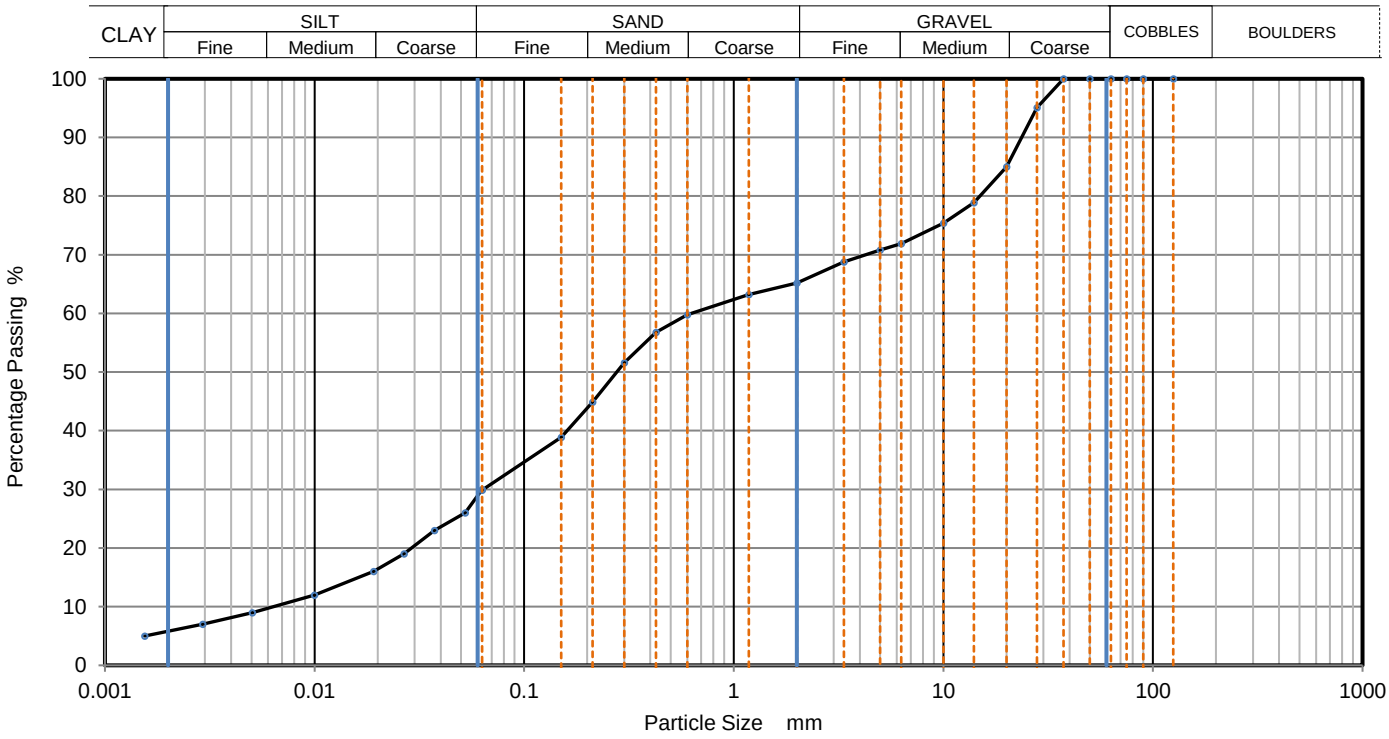
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					BH-5260
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	9
Specimen Description	Greyish brown sandy gravelly silty CLAY.			Sample Depth (m) Top	3.00
				Base	4.00
Specimen Reference	2	Specimen Depth	3 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022062137



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	30
90	100	0.05222	26
75	100	0.03736	23
63	100	0.02672	19
50	100	0.01911	16
37.5	100	0.00998	12
28	95	0.00504	9
20	85	0.00293	7
14	79	0.00155	5
10	75		
6.3	72		
5	71		
3.35	69		
2	65		
1.18	63		
0.6	60	Particle density (assumed)	
0.425	57	2.65 Mg/m3	
0.3	52		
0.212	45		
0.15	39		
0.063	30		

Dry Mass of sample, g: 2439

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	34.8
Sand	35.3
Silt	23.9
Clay	6.0

Grading Analysis		
D100	mm	
D60	mm	0.622
D30	mm	0.0635
D10	mm	0.00637
Uniformity Coefficient		98
Curvature Coefficient		1

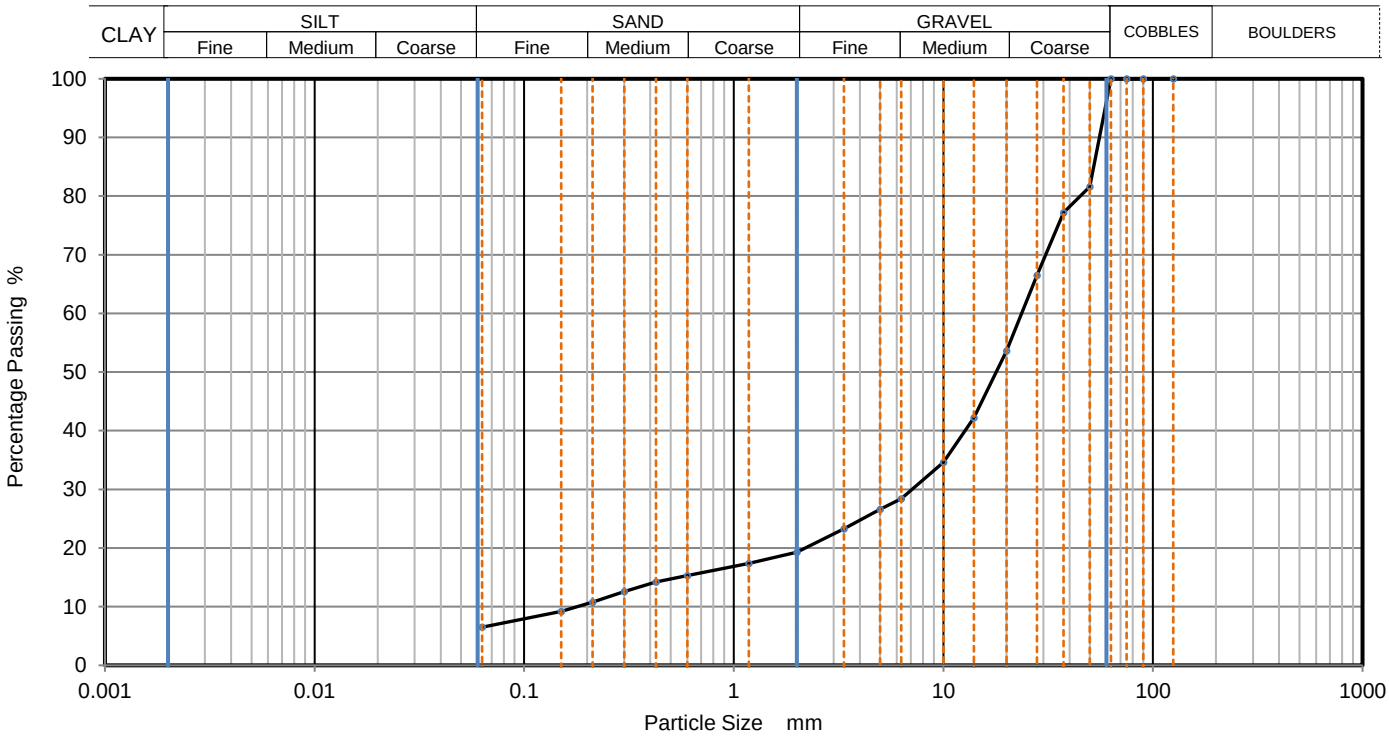
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					BH-5260
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	10
Specimen Description	Greyish brown slightly sandy slightly clayey subangular fine to coarse GRAVEL.			Sample Depth (m) Top	4.00
				Base	5.00
Specimen Reference	2	Specimen Depth	4 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022062139



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	82		
37.5	77		
28	67		
20	54		
14	42		
10	35		
6.3	28		
5	27		
3.35	23		
2	19		
1.18	17		
0.6	15		
0.425	14		
0.3	13		
0.212	11		
0.15	9		
0.063	7		

Dry Mass of sample, g	7608

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	80.7
Sand	12.8
Fines <0.063mm	7.0

Grading Analysis		
D100	mm	
D60	mm	23.6
D30	mm	7.11
D10	mm	0.177
Uniformity Coefficient		130
Curvature Coefficient		12

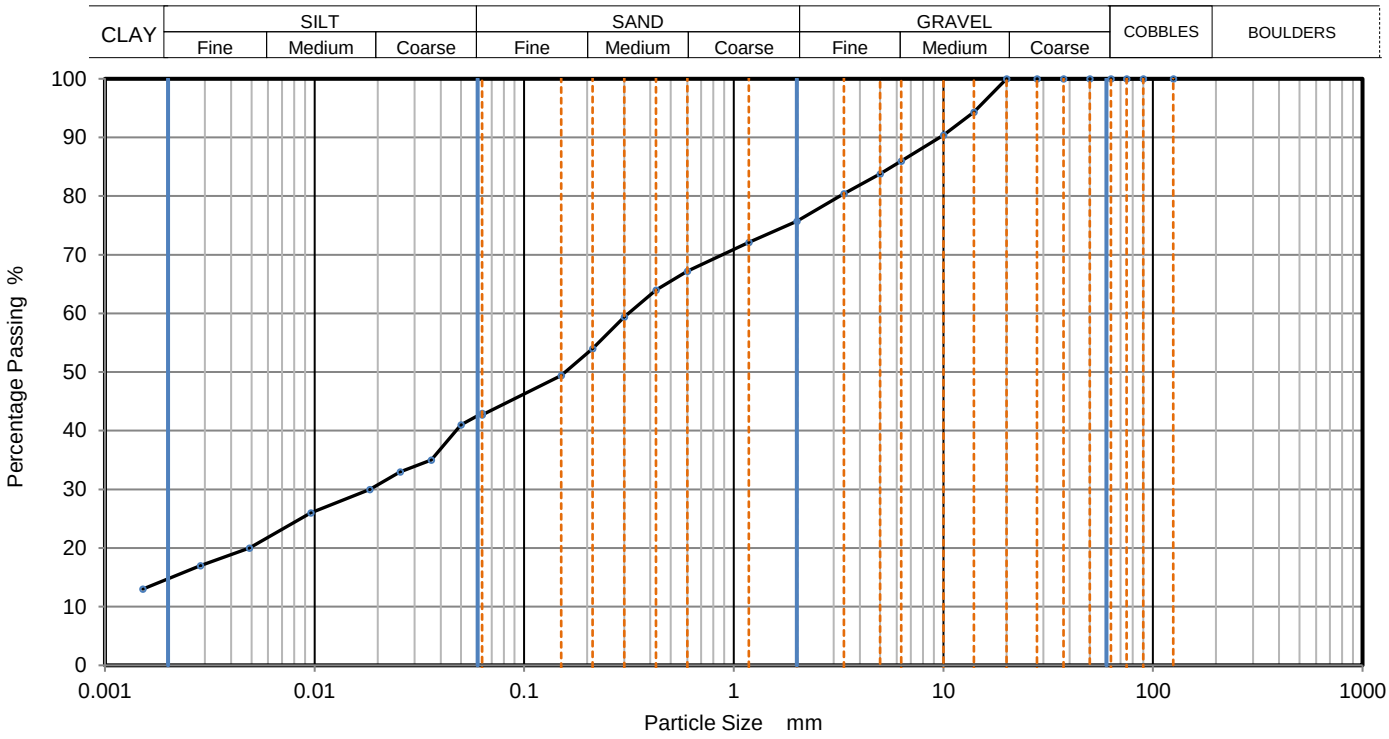
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-533
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brownish grey sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	1.20
				Base	2.00
Specimen Reference	2	Specimen Depth	1.2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220930131



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	43
90	100	0.05001	41
75	100	0.03604	35
63	100	0.02564	33
50	100	0.01835	30
37.5	100	0.00959	26
28	100	0.00488	20
20	100	0.00285	17
14	94	0.00152	13
10	90		
6.3	86		
5	84		
3.35	80		
2	76		
1.18	72		
0.6	67	Particle density (assumed)	
0.425	64	2.65 Mg/m3	
0.3	59		
0.212	54		
0.15	49		
0.063	43		

Dry Mass of sample, g: 559

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	24.3
Sand	33.1
Silt	28.0
Clay	14.6

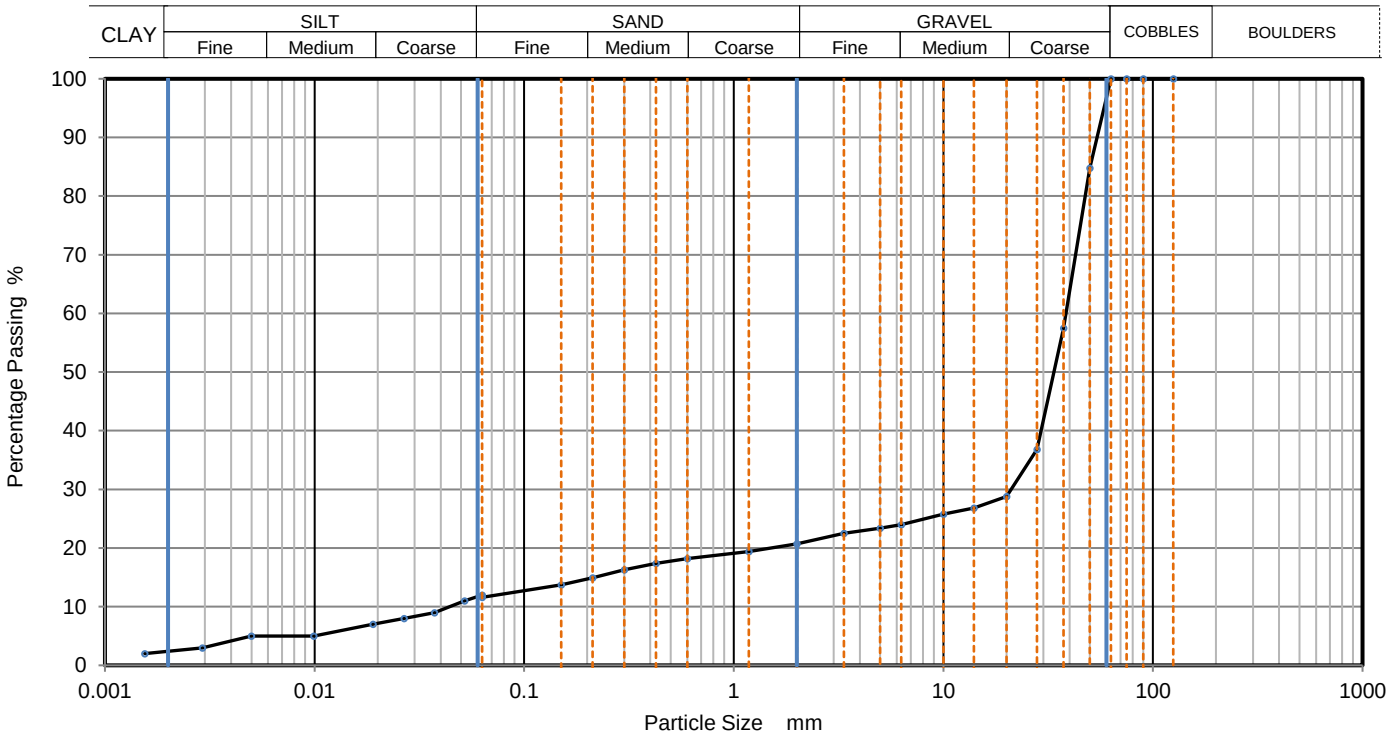
Grading Analysis		
D100	mm	
D60	mm	0.314
D30	mm	0.0188
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-533
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	11
Specimen Description	Brown slightly sandy clayey subangular fine to coarse GRAVEL.			Sample Depth (m) Top	5.00
				Base	5.80
Specimen Reference	2	Specimen Depth	5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220930134



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	12
90	100	0.05191	11
75	100	0.03736	9
63	100	0.02672	8
50	85	0.01900	7
37.5	58	0.00992	5
28	37	0.00499	5
20	29	0.00291	3
14	27	0.00155	2
10	26		
6.3	24		
5	23		
3.35	23		
2	21		
1.18	19		
0.6	18	Particle density (assumed)	
0.425	17	2.65 Mg/m3	
0.3	16		
0.212	15		
0.15	14		
0.063	12		

Dry Mass of sample, g: 1736

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	79.3
Sand	9.1
Silt	9.0
Clay	2.6

Grading Analysis		
D100	mm	
D60	mm	38.5
D30	mm	21
D10	mm	0.0448
Uniformity Coefficient		860
Curvature Coefficient		260

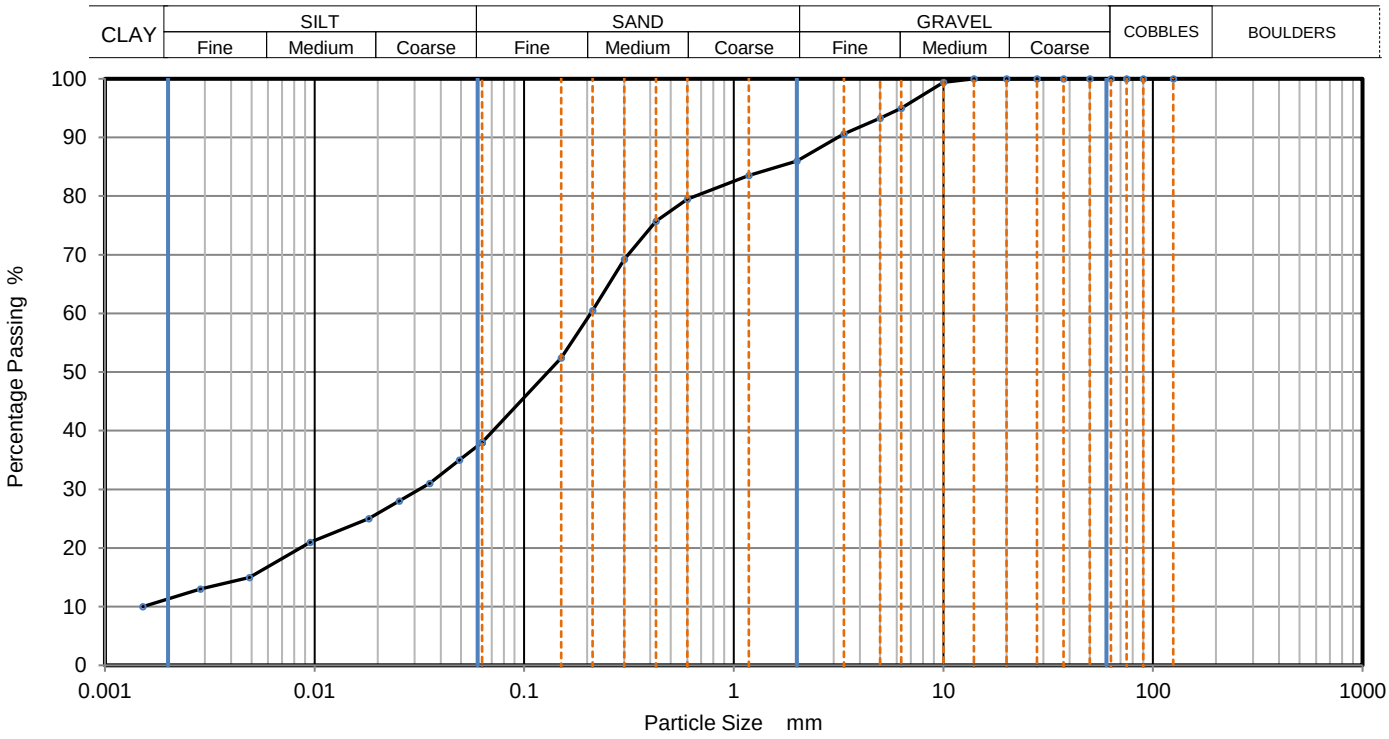
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-5440
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Greyish brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	1.20
				Base	2.00
Specimen Reference	2	Specimen Depth	1.2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022062141



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	38
90	100	0.04903	35
75	100	0.03536	31
63	100	0.02533	28
50	100	0.01813	25
37.5	100	0.00953	21
28	100	0.00488	15
20	100	0.00285	13
14	100	0.00152	10
10	99		
6.3	95		
5	93		
3.35	91		
2	86		
1.18	84		
0.6	80	Particle density	(assumed)
0.425	76	2.65	Mg/m3
0.3	69		
0.212	61		
0.15	52		
0.063	38		

Dry Mass of sample, g: 542

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	14.0
Sand	48.0
Silt	26.9
Clay	11.1

Grading Analysis		
D100	mm	
D60	mm	0.208
D30	mm	0.0315
D10	mm	0.00157
Uniformity Coefficient		130
Curvature Coefficient		3.1

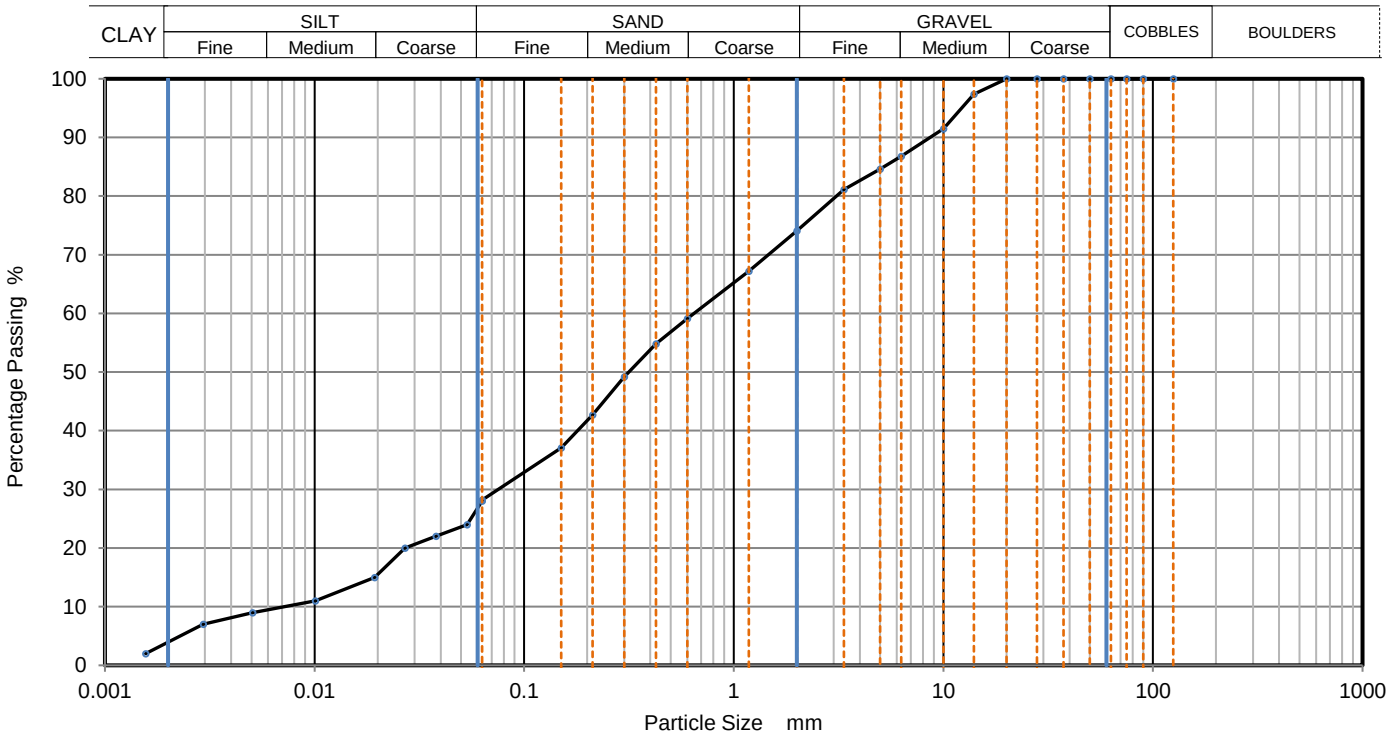
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-5440
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	4
Specimen Description	Greyish brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	3.00
				Base	4.00
Specimen Reference	2	Specimen Depth	3 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022062144



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	28
90	100	0.05345	24
75	100	0.03801	22
63	100	0.02702	20
50	100	0.01932	15
37.5	100	0.01008	11
28	100	0.00507	9
20	100	0.00294	7
14	97	0.00156	2
10	92		
6.3	87		
5	85		
3.35	81		
2	74		
1.18	67		
0.6	59	Particle density	(assumed)
0.425	55	2.65	Mg/m3
0.3	49		
0.212	43		
0.15	37		
0.063	28		

Dry Mass of sample, g: 918

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	25.9
Sand	45.9
Silt	24.3
Clay	3.9

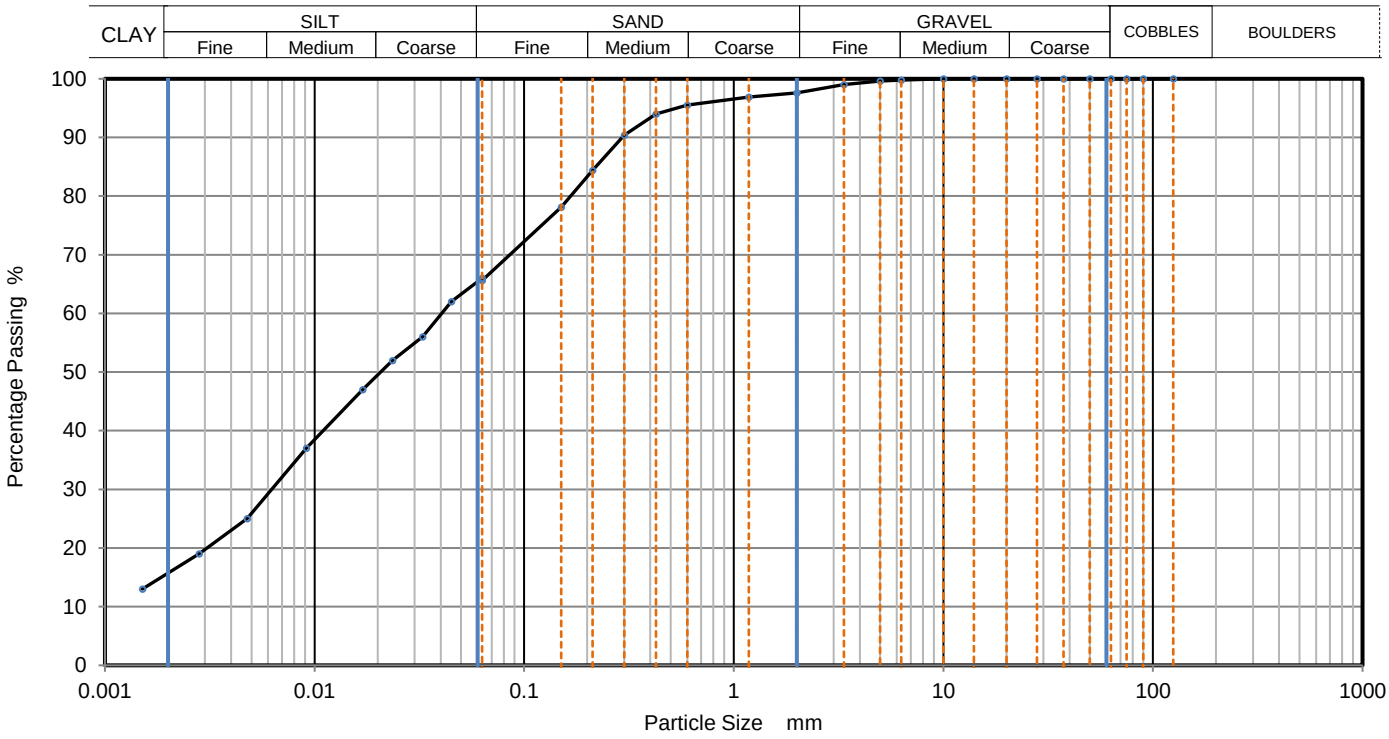
Grading Analysis		
D100	mm	
D60	mm	0.648
D30	mm	0.0752
D10	mm	0.00771
Uniformity Coefficient		84
Curvature Coefficient		1.1

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION			Job Ref		21-1682
				Borehole/Pit No.		BH-5440
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.		7
Specimen Description	Greyish brown sandy silty CLAY.			Sample Depth (m)	Top	6.00
					Base	6.90
Specimen Reference	2	Specimen Depth	6 m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID		Caus2022062147



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	66
90	100	0.04491	62
75	100	0.03276	56
63	100	0.02351	52
50	100	0.01698	47
37.5	100	0.00913	37
28	100	0.00477	25
20	100	0.00282	19
14	100	0.00151	13
10	100		
6.3	100		
5	100		
3.35	99		
2	98		
1.18	97		
0.6	96	Particle density	(assumed)
0.425	94	2.65	Mg/m3
0.3	90		
0.212	84		
0.15	78		
0.063	66		

Dry Mass of sample, g: 557

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	2.4
Sand	32.0
Silt	49.9
Clay	15.7

Grading Analysis		
D100	mm	
D60	mm	0.0404
D30	mm	0.0062
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

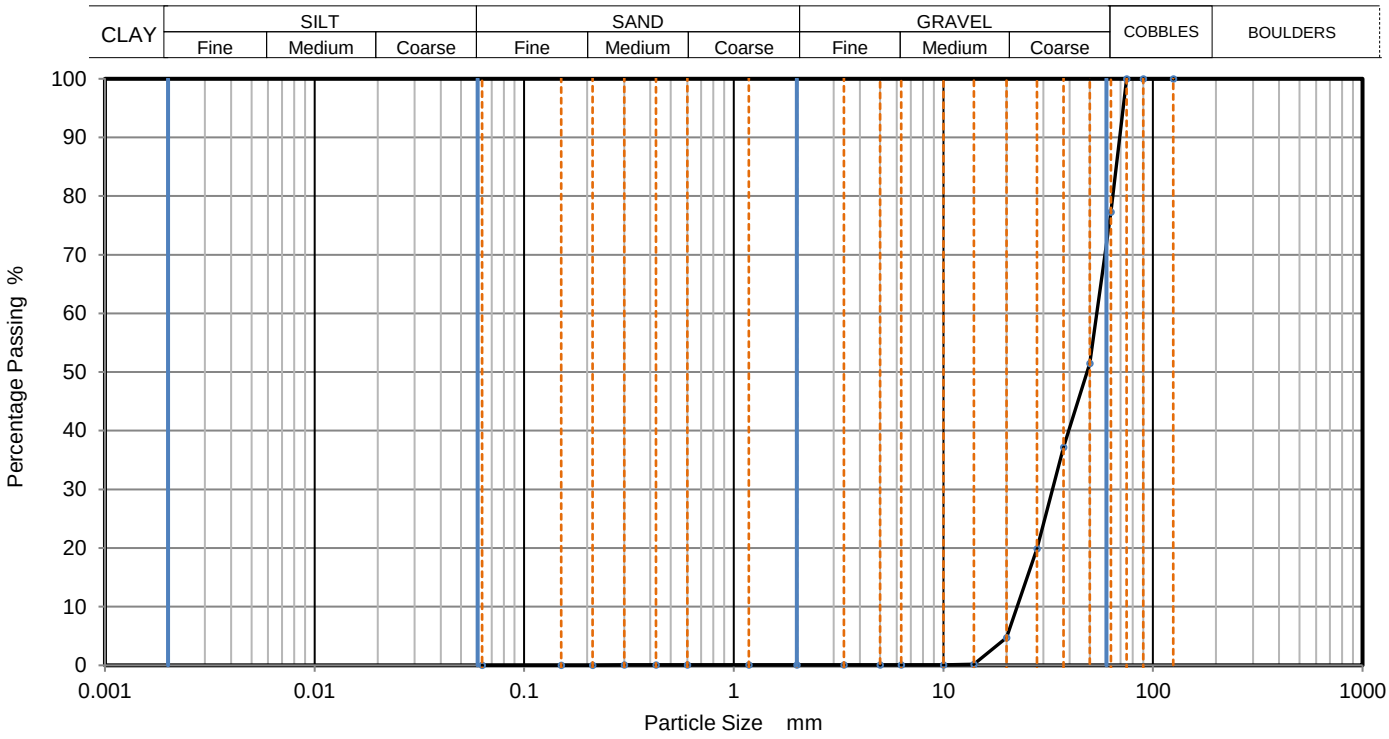
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

Job Ref					**21-1682**
Borehole/Pit No.					BH-5440
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Greyish brown subangular fine to coarse GRAVEL with cobbles.			Sample Depth (m) Top	10.70
				Base	11.10
Specimen Reference	6	Specimen Depth	10.7 m	Sample Type	C
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022091913



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	77		
50	52		
37.5	37		
28	20		
20	5		
14	0		
10	0		
6.3	0		
5	0		
3.35	0		
2	0		
1.18	0		
0.6	0		
0.425	0		
0.3	0		
0.212	0		
0.15	0		
0.063	0		

Dry Mass of sample, g	5830

Sample Proportions	% dry mass
Cobbles	22.7
Gravel	77.2
Sand	0.1
Fines <0.063mm	0.0

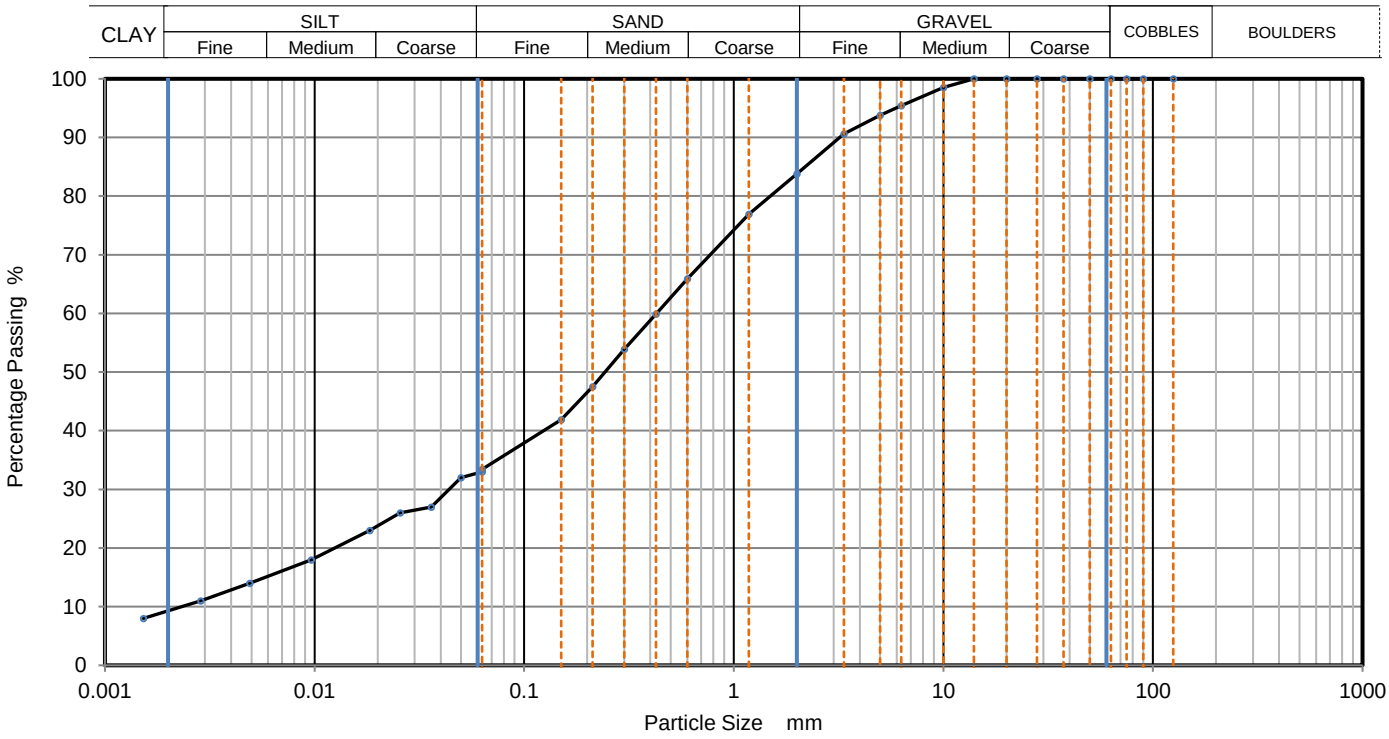
Grading Analysis		
D100	mm	
D60	mm	54
D30	mm	33.2
D10	mm	22.5
Uniformity Coefficient		2.4
Curvature Coefficient		0.91

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-5478
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brownish grey sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	1.20
				Base	1.90
Specimen Reference	4	Specimen Depth	1.2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022062174



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	33
90	100	0.05000	32
75	100	0.03604	27
63	100	0.02564	26
50	100	0.01835	23
37.5	100	0.00965	18
28	100	0.00491	14
20	100	0.00286	11
14	100	0.00152	8
10	99		
6.3	95		
5	94		
3.35	91		
2	84		
1.18	77		
0.6	66	Particle density	(assumed)
0.425	60	2.65	Mg/m3
0.3	54		
0.212	48		
0.15	42		
0.063	33		

Dry Mass of sample, g: 203

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	16.2
Sand	50.4
Silt	24.5
Clay	8.9

Grading Analysis		
D100	mm	
D60	mm	0.428
D30	mm	0.0437
D10	mm	0.00251
Uniformity Coefficient		170
Curvature Coefficient		1.8

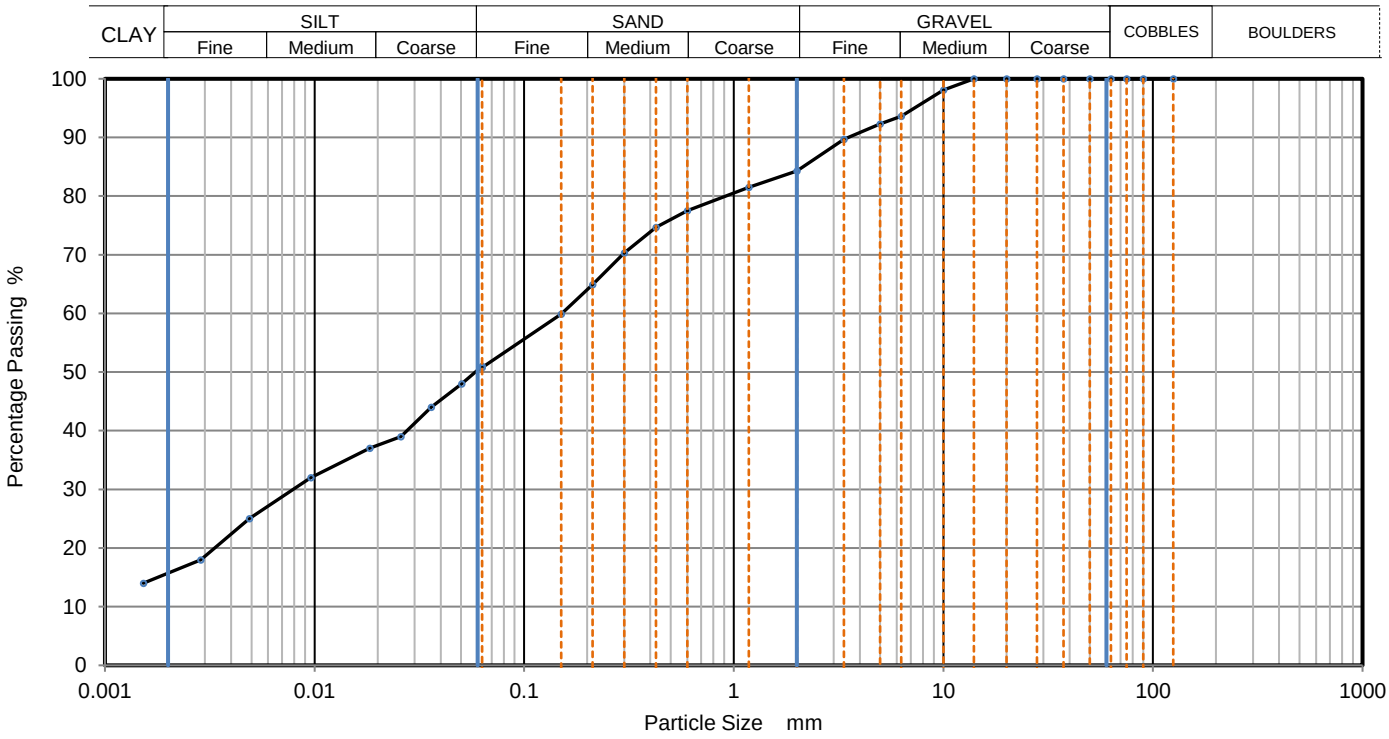
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		BH-5478
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		4
Specimen Description	Brownish grey sandy slightly gravelly silty CLAY.				Sample Depth (m)	Top	4.00
						Base	0.40
Specimen Reference	4	Specimen Depth	4	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022062175



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	51
90	100	0.05033	48
75	100	0.03604	44
63	100	0.02580	39
50	100	0.01835	37
37.5	100	0.00959	32
28	100	0.00488	25
20	100	0.00286	18
14	100	0.00152	14
10	98		
6.3	94		
5	92		
3.35	90		
2	84		
1.18	82		
0.6	78	Particle density	(assumed)
0.425	75	2.65	Mg/m3
0.3	70		
0.212	65		
0.15	60		
0.063	51		

Dry Mass of sample, g: 203

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	15.7
Sand	33.4
Silt	35.1
Clay	15.8

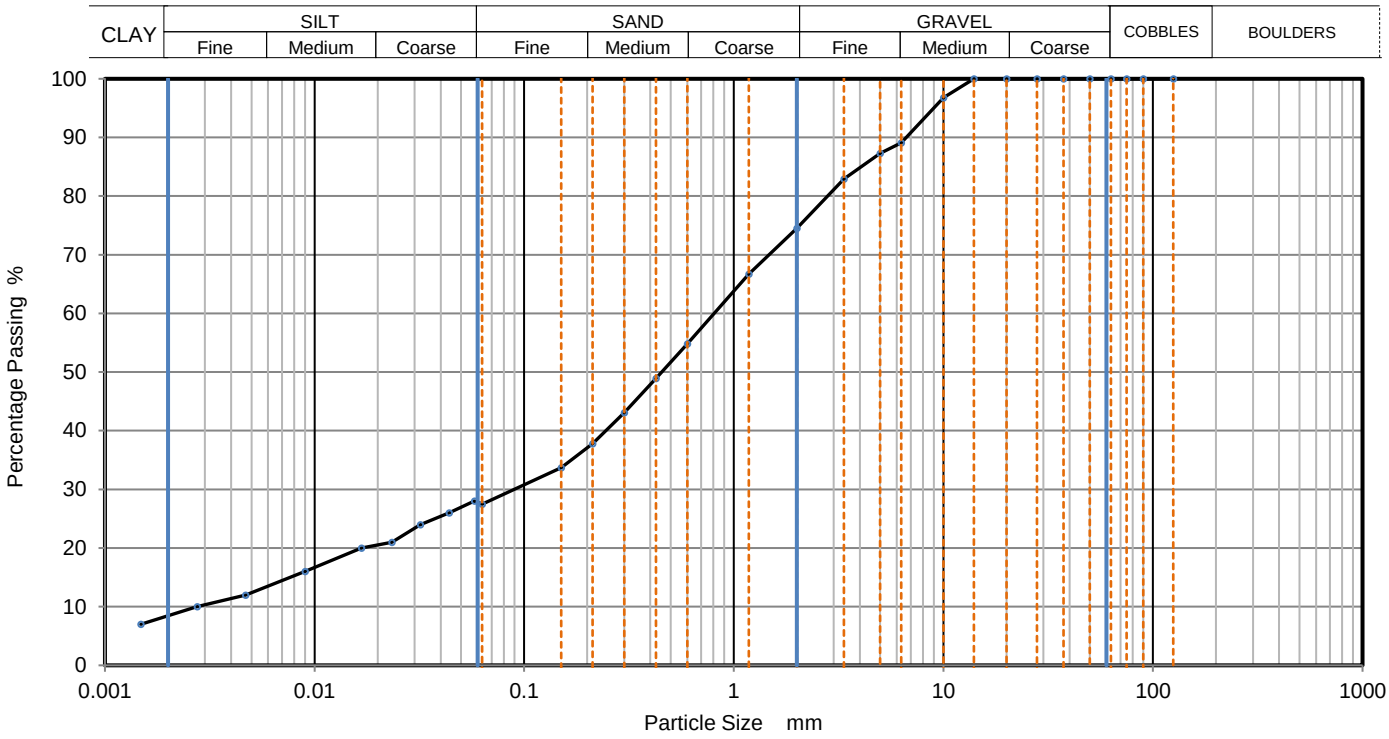
Grading Analysis		
D100	mm	
D60	mm	0.151
D30	mm	0.00764
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		BH-5478
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		5
Specimen Description	Brownish grey slightly gravelly silty fine to coarse SAND.				Sample Depth (m)	Top	5.40
						Base	7.00
Specimen Reference	4	Specimen Depth	5.4	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022062176



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.05792	28
90	100	0.04381	26
75	100	0.03201	24
63	100	0.02333	21
50	100	0.01674	20
37.5	100	0.00901	16
28	100	0.00468	12
20	100	0.00275	10
14	100	0.00148	7
10	97		
6.3	89		
5	87		
3.35	83		
2	75		
1.18	67		
0.6	55	Particle density	(assumed)
0.425	49	2.65	Mg/m3
0.3	43		
0.212	38		
0.15	34		
0.063	28		

Dry Mass of sample, g: 202

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	25.5
Sand	47.0
Silt	19.0
Clay	8.5

Grading Analysis		
D100	mm	
D60	mm	0.805
D30	mm	0.0889
D10	mm	0.00289
Uniformity Coefficient		280
Curvature Coefficient		3.4

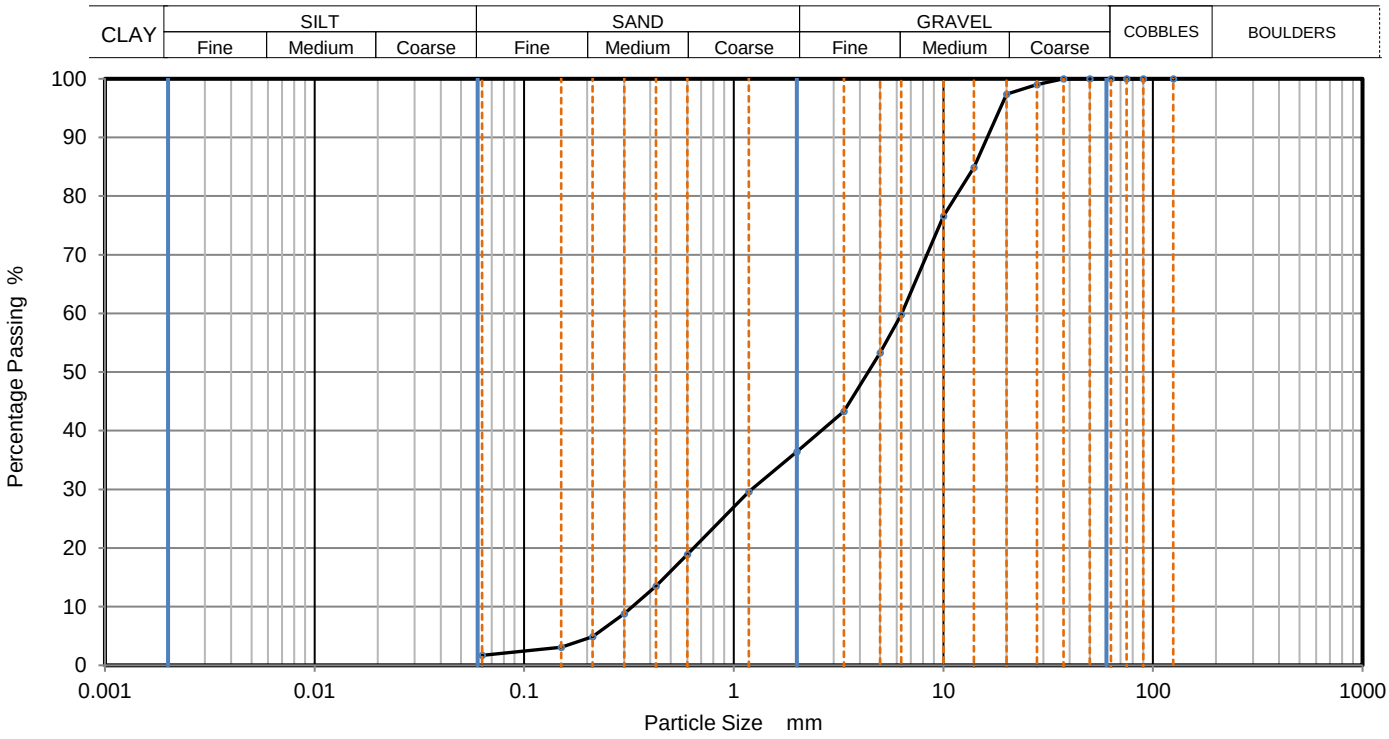
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-5478
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	11
Specimen Description	Brownish grey gravelly slightly silty fine to coarse SAND.			Sample Depth (m) Top	10.00
				Base	11.50
Specimen Reference	2	Specimen Depth	10 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022062177



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	99		
20	97		
14	85		
10	77		
6.3	60		
5	53		
3.35	43		
2	36		
1.18	30		
0.6	19		
0.425	14		
0.3	9		
0.212	5		
0.15	3		
0.063	2		

Dry Mass of sample, g: 12678

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	63.6
Sand	34.7
Fines <0.063mm	2.0

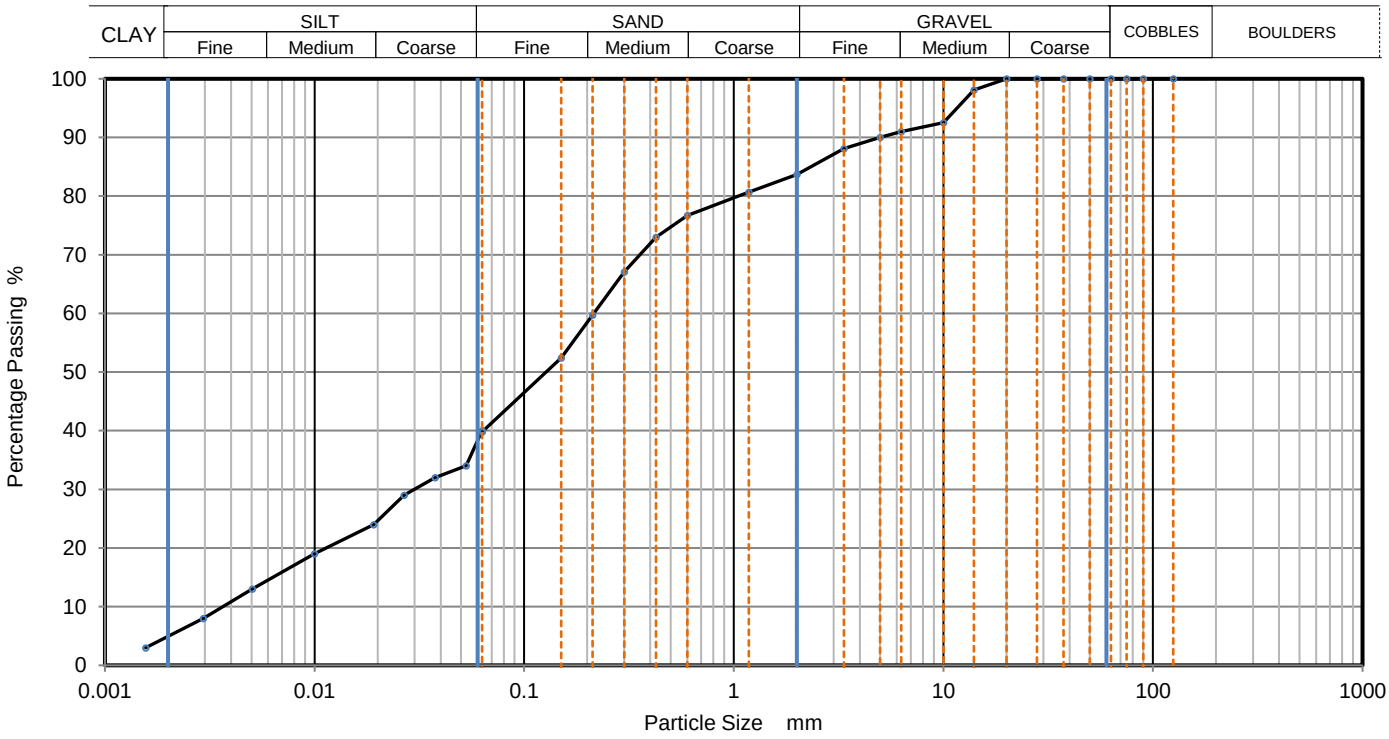
Grading Analysis		
D100	mm	
D60	mm	6.33
D30	mm	1.21
D10	mm	0.328
Uniformity Coefficient		19
Curvature Coefficient		0.71

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-5530
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brownish grey sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	1.80
				Base	2.00
Specimen Reference	6	Specimen Depth	1.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022071438



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	40
90	100	0.05284	34
75	100	0.03758	32
63	100	0.02672	29
50	100	0.01911	24
37.5	100	0.00998	19
28	100	0.00504	13
20	100	0.00294	8
14	98	0.00156	3
10	93		
6.3	91		
5	90		
3.35	88		
2	84		
1.18	81		
0.6	77	Particle density	(assumed)
0.425	73	2.65	Mg/m3
0.3	67		
0.212	60		
0.15	52		
0.063	40		

Dry Mass of sample, g: 505

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	16.3
Sand	43.9
Silt	35.1
Clay	4.7

Grading Analysis		
D100	mm	
D60	mm	0.215
D30	mm	0.0297
D10	mm	0.00362
Uniformity Coefficient		59
Curvature Coefficient		1.1

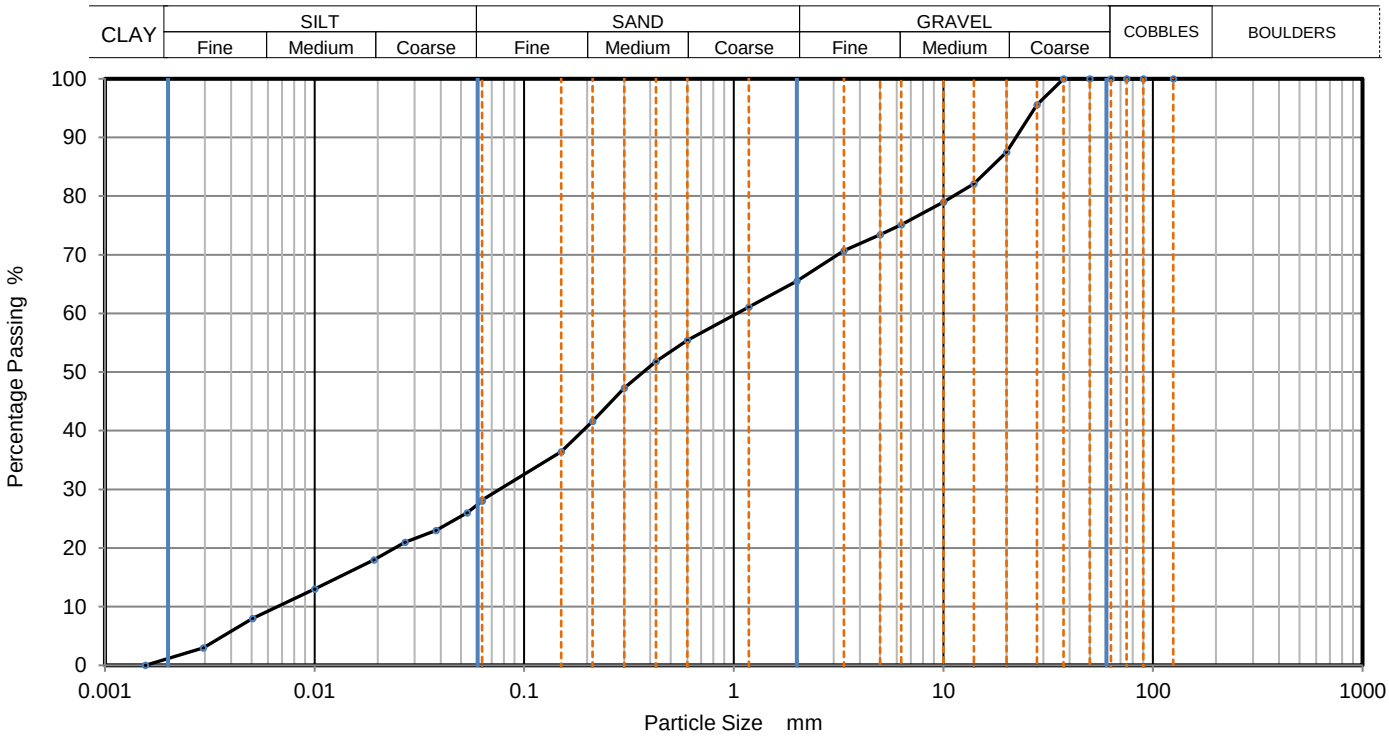
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-5530
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	5
Specimen Description	Brownish grey sandy gravelly silty CLAY.			Sample Depth (m) Top	3.80
				Base	4.00
Specimen Reference	2	Specimen Depth	3.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022071440



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	28
90	100	0.05337	26
75	100	0.03795	23
63	100	0.02698	21
50	100	0.01918	18
37.5	100	0.01001	13
28	96	0.00506	8
20	88	0.00295	3
14	82	0.00156	0
10	79		
6.3	75		
5	73		
3.35	71		
2	66		
1.18	61		
0.6	55	Particle density	(assumed)
0.425	52	2.65	Mg/m3
0.3	47		
0.212	42		
0.15	36		
0.063	28		

Dry Mass of sample, g: 2191

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	34.5
Sand	37.3
Silt	27.2
Clay	1.0

Grading Analysis		
D100	mm	
D60	mm	1.04
D30	mm	0.0764
D10	mm	0.00688
Uniformity Coefficient		150
Curvature Coefficient		0.82

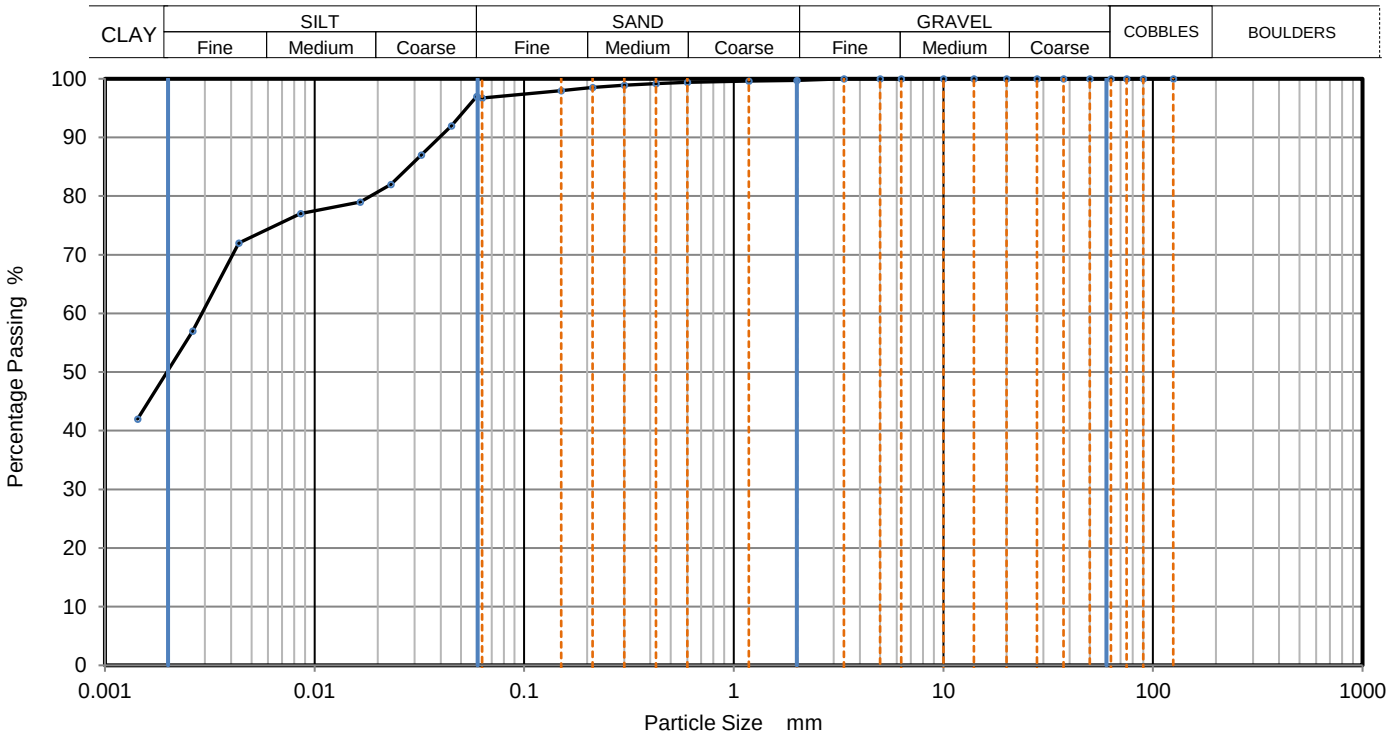
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		BH-5530
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		8
Specimen Description	Brownish grey slightly sandy silty CLAY.				Sample Depth (m)	Top	6.80
						Base	7.00
Specimen Reference	6	Specimen Depth	6.8	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022071442



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.05942	97
90	100	0.04491	92
75	100	0.03226	87
63	100	0.02316	82
50	100	0.01650	79
37.5	100	0.00858	77
28	100	0.00435	72
20	100	0.00262	57
14	100	0.00143	42
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	99	Particle density	(assumed)
0.425	99	2.65	Mg/m3
0.3	99		
0.212	99		
0.15	98		
0.063	97		

Dry Mass of sample, g: 256

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	0.3
Sand	3.0
Silt	46.3
Clay	50.4

Grading Analysis		
D100	mm	
D60	mm	0.0029
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

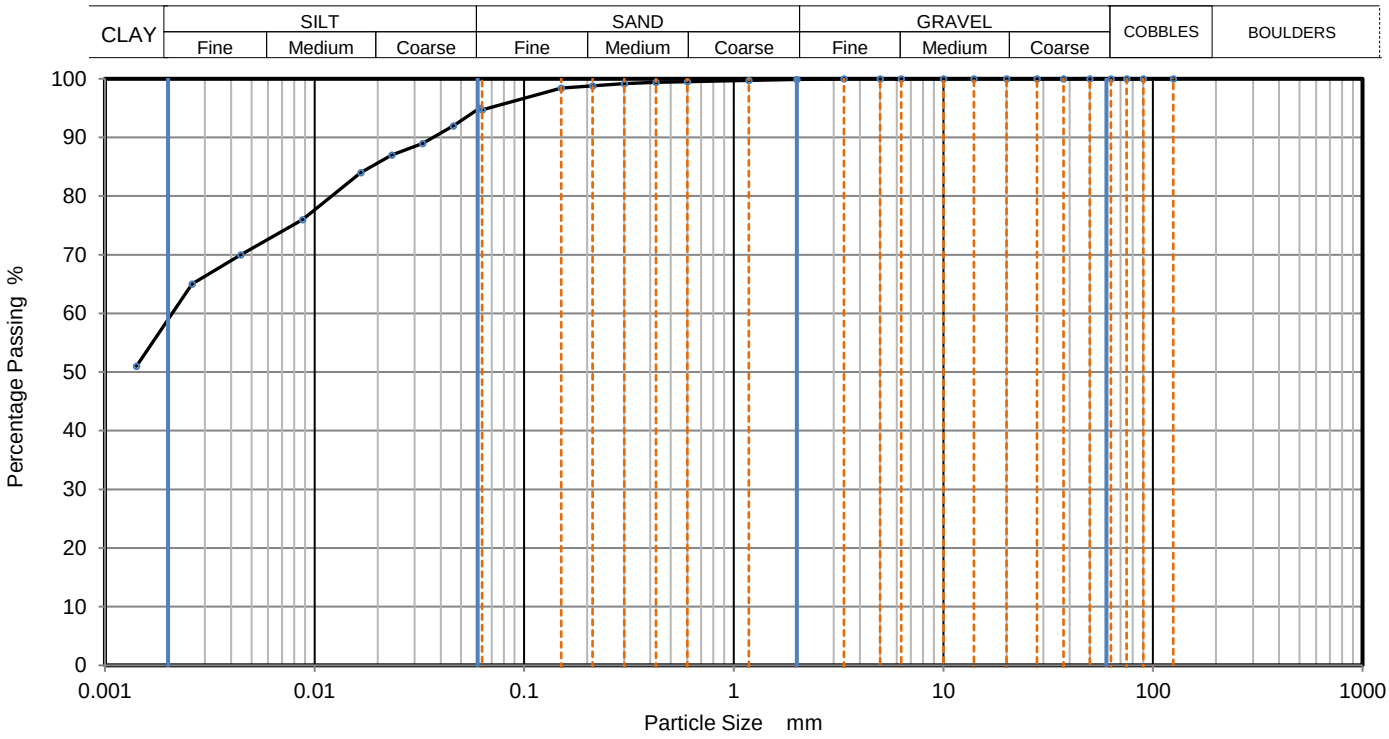
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		BH-5530
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		9
Specimen Description	Brownish grey slightly sandy silty CLAY.				Sample Depth (m)	Top	7.80
						Base	8.00
Specimen Reference	2	Specimen Depth	7.8	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022071443



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06135	95
90	100	0.04597	92
75	100	0.03276	89
63	100	0.02333	87
50	100	0.01662	84
37.5	100	0.00877	76
28	100	0.00445	70
20	100	0.00260	65
14	100	0.00141	51
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	100	Particle density	(assumed)
0.425	99	2.65	Mg/m3
0.3	99		
0.212	99		
0.15	98		
0.063	95		

Dry Mass of sample, g: 247

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	0.1
Sand	5.1
Silt	35.7
Clay	59.1

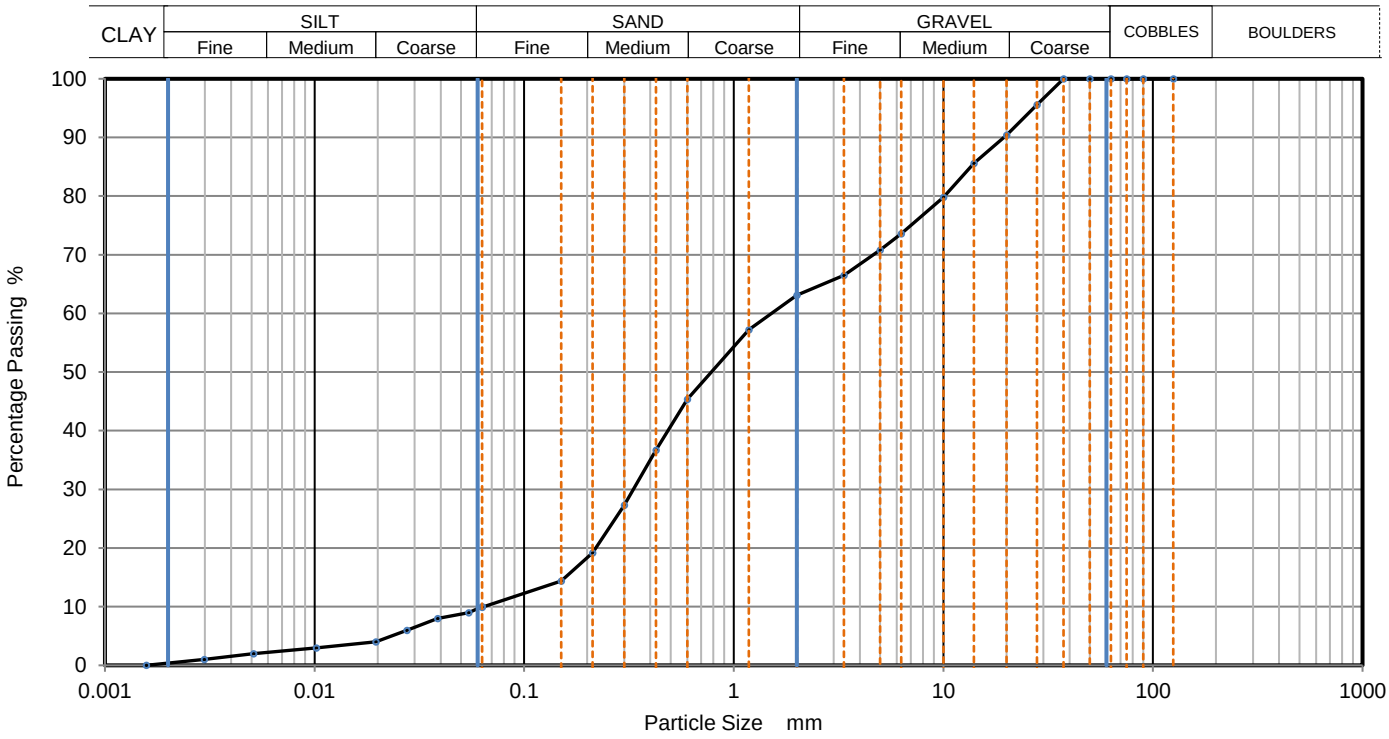
Grading Analysis		
D100	mm	
D60	mm	0.00208
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION			Job Ref		21-1682
				Borehole/Pit No.		BH-5530
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.		13
Specimen Description	Brownish grey gravelly silty fine to coarse SAND.			Sample Depth (m)	Top	10.80
					Base	11.00
Specimen Reference	2	Specimen Depth	10.8 m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID		Caus2022071445



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	10
90	100	0.05434	9
75	100	0.03864	8
63	100	0.02761	6
50	100	0.01963	4
37.5	100	0.01019	3
28	96	0.00512	2
20	90	0.00297	1
14	86	0.00157	0
10	80		
6.3	74		
5	71		
3.35	67		
2	63		
1.18	57		
0.6	45	Particle density	(assumed)
0.425	37	2.65	Mg/m3
0.3	27		
0.212	19		
0.15	14		
0.063	10		

Dry Mass of sample, g: 2250

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	36.9
Sand	53.1
Silt	9.6
Clay	0.4

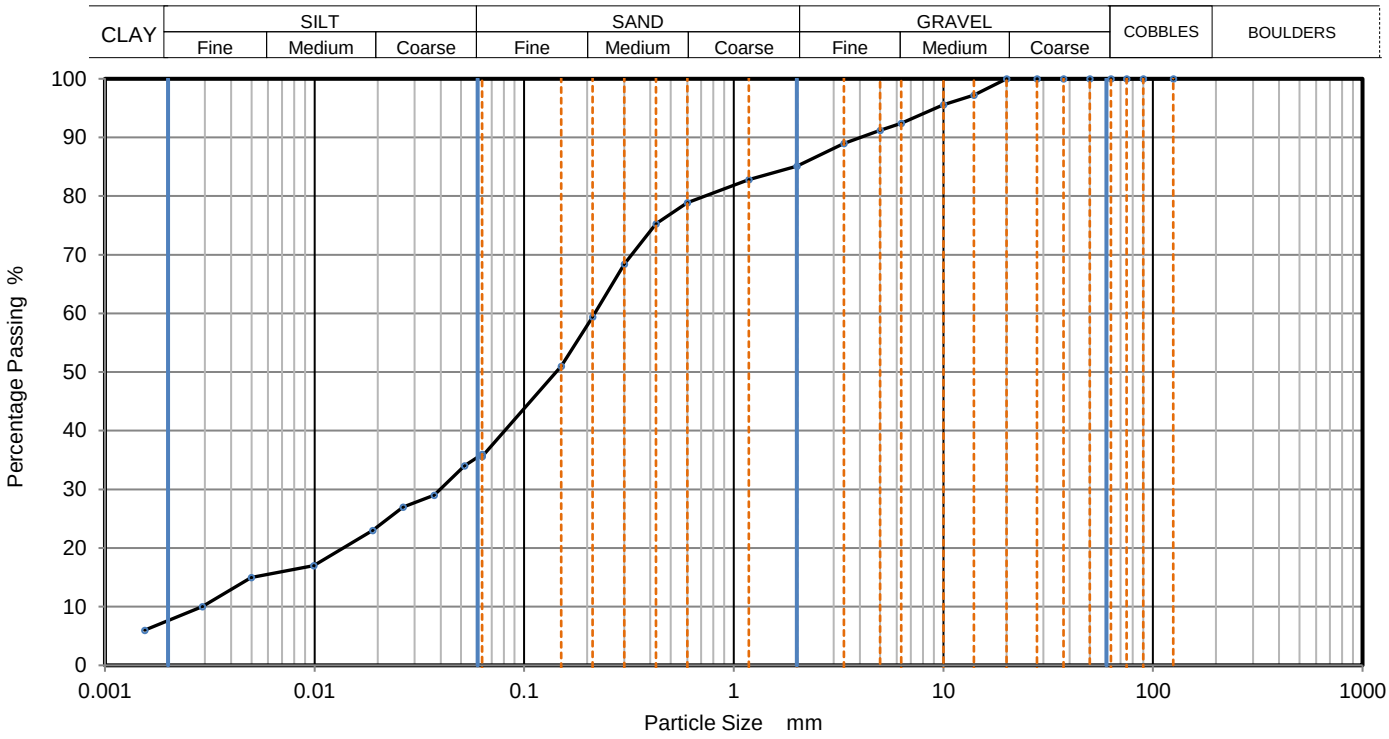
Grading Analysis		
D100	mm	
D60	mm	1.51
D30	mm	0.332
D10	mm	0.0637
Uniformity Coefficient		24
Curvature Coefficient		1.1

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-5573
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Brownish grey slightly gravelly clayey fine to coarse SAND.			Sample Depth (m) Top	1.80
				Base	2.00
Specimen Reference	3	Specimen Depth	1.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022080417



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	36
90	100	0.05191	34
75	100	0.03715	29
63	100	0.02642	27
50	100	0.01890	23
37.5	100	0.00992	17
28	100	0.00499	15
20	100	0.00291	10
14	97	0.00155	6
10	96		
6.3	92		
5	91		
3.35	89		
2	85		
1.18	83		
0.6	79	Particle density	(assumed)
0.425	75	2.65	Mg/m3
0.3	68		
0.212	59		
0.15	51		
0.063	36		

Dry Mass of sample, g: 506

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	14.9
Sand	49.5
Silt	27.6
Clay	8.0

Grading Analysis		
D100	mm	
D60	mm	0.217
D30	mm	0.0392
D10	mm	0.00271
Uniformity Coefficient		80
Curvature Coefficient		2.6

Remarks

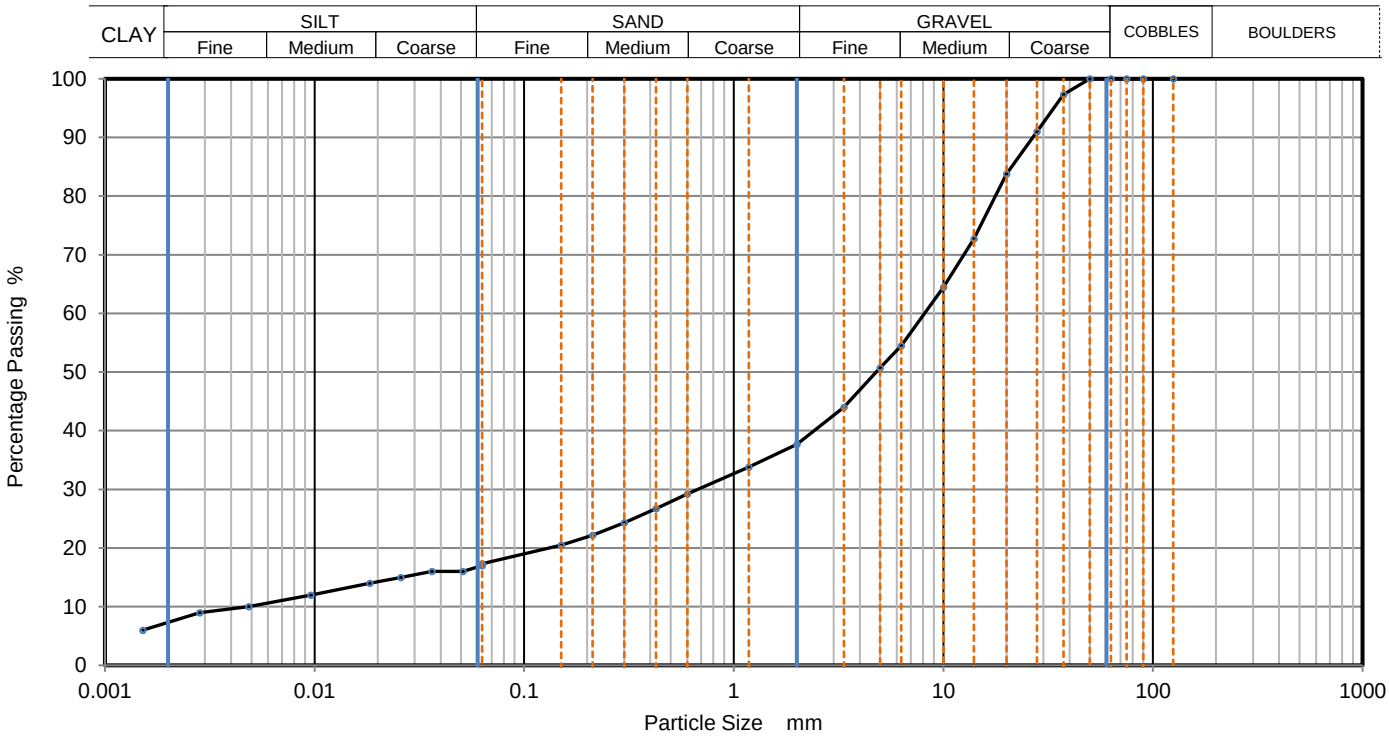
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-5573
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	7
Specimen Description	Brownish grey sandy clayey subangular fine to coarse GRAVEL.			Sample Depth (m) Top	6.30
				Base	6.50
Specimen Reference	3	Specimen Depth	6.3 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022080421



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	17
90	100	0.05097	16
75	100	0.03627	16
63	100	0.02580	15
50	100	0.01835	14
37.5	97	0.00959	12
28	91	0.00485	10
20	84	0.00283	9
14	73	0.00152	6
10	65		
6.3	55		
5	51		
3.35	44		
2	38		
1.18	34		
0.6	29	Particle density	(assumed)
0.425	27	2.65	Mg/m3
0.3	24		
0.212	22		
0.15	21		
0.063	17		

Dry Mass of sample, g: 4321

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	62.3
Sand	20.4
Silt	10.1
Clay	7.2

Grading Analysis		
D100	mm	
D60	mm	8.13
D30	mm	0.676
D10	mm	0.00431
Uniformity Coefficient		1900
Curvature Coefficient		13

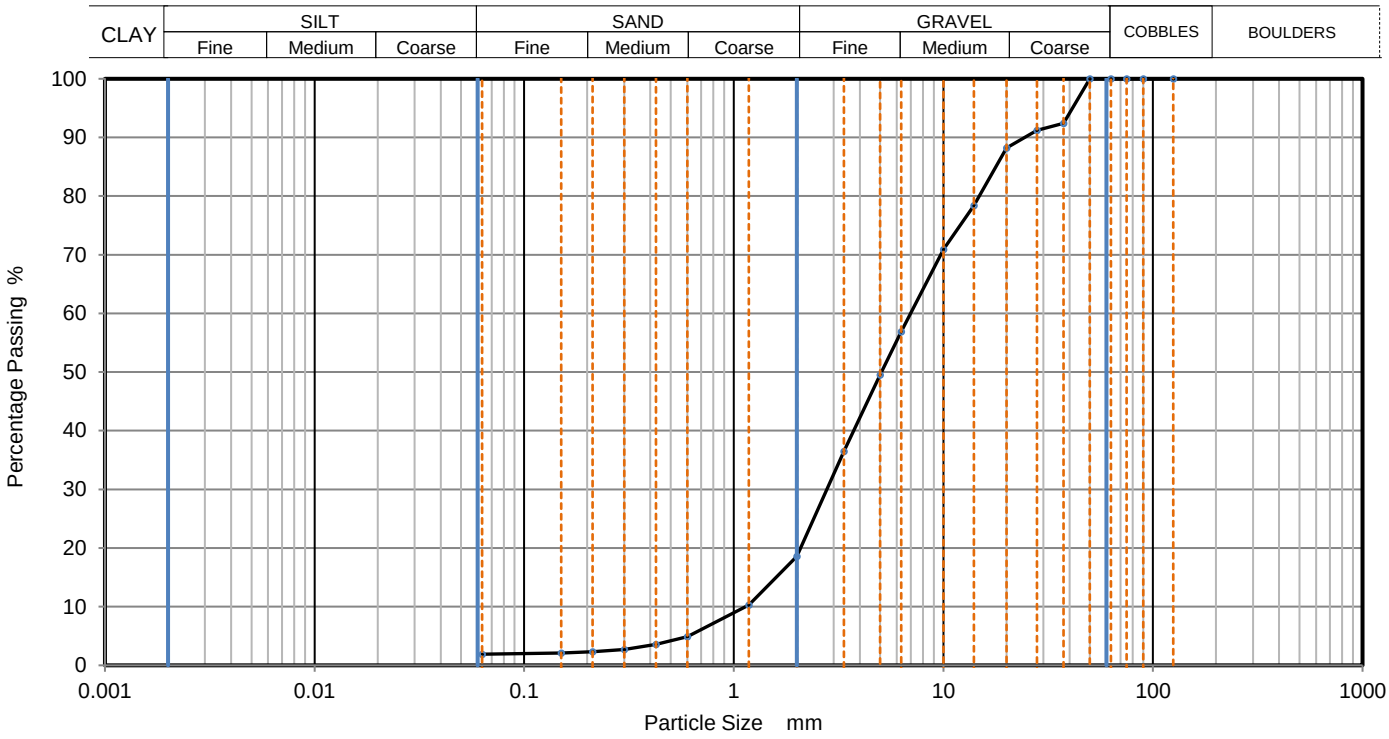
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-5573
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	9
Specimen Description	Brownish grey sandy subangular fine to coarse GRAVEL.			Sample Depth (m) Top	9.20
				Base	9.50
Specimen Reference	3	Specimen Depth	9.2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022080422



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	92		
28	91		
20	88		
14	78		
10	71		
6.3	57		
5	50		
3.35	37		
2	19		
1.18	10		
0.6	5		
0.425	4		
0.3	3		
0.212	2		
0.15	2		
0.063	2		

Dry Mass of sample, g: 3589

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	81.4
Sand	16.7
Fines <0.063mm	2.0

Grading Analysis		
D100	mm	
D60	mm	6.97
D30	mm	2.78
D10	mm	1.13
Uniformity Coefficient		6.2
Curvature Coefficient		0.98

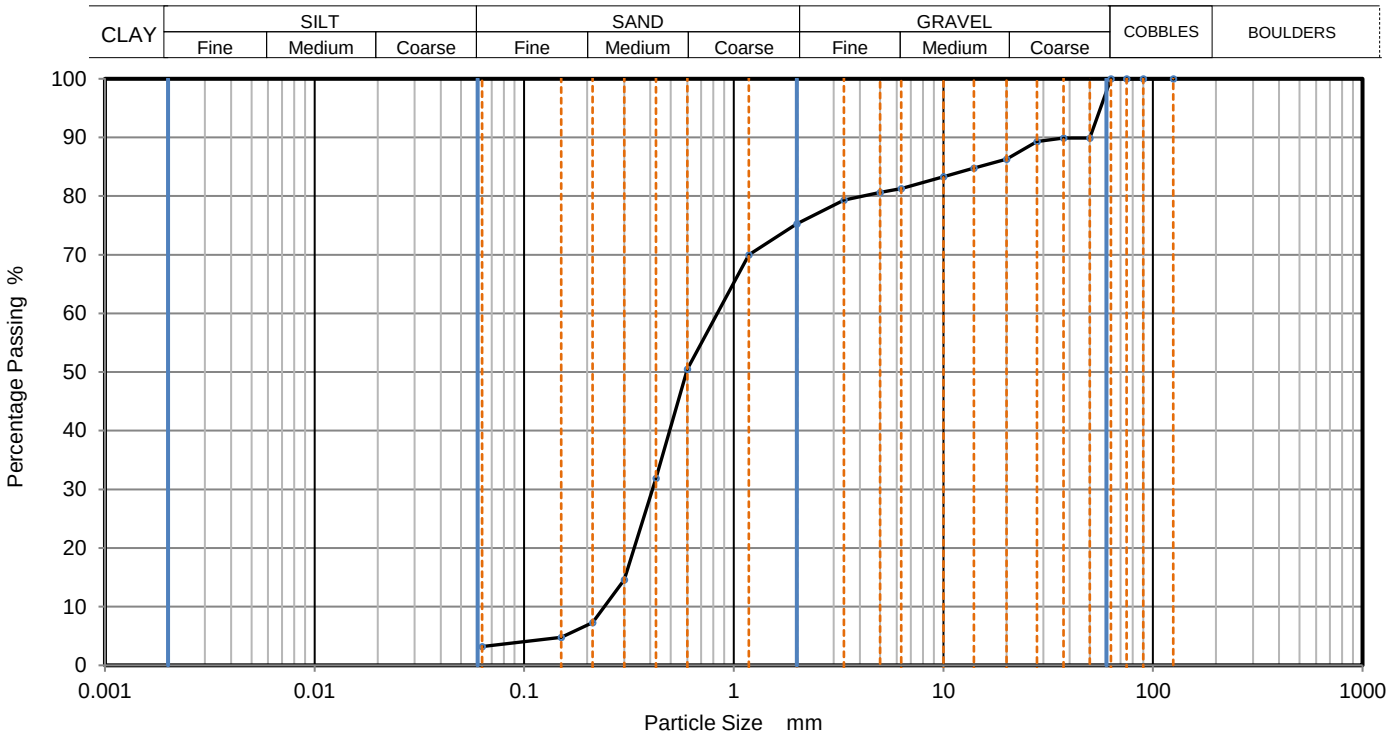
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-5573
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	10
Specimen Description	Brownish grey gravelly slightly silty fine to coarse SAND.			Sample Depth (m) Top	10.70
				Base	11.00
Specimen Reference	3	Specimen Depth	10.7 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022080423



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	90		
37.5	90		
28	89		
20	86		
14	85		
10	83		
6.3	81		
5	81		
3.35	79		
2	75		
1.18	70		
0.6	51		
0.425	32		
0.3	15		
0.212	7		
0.15	5		
0.063	3		

Dry Mass of sample, g: 5877

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	24.7
Sand	72.1
Fines <0.063mm	3.0

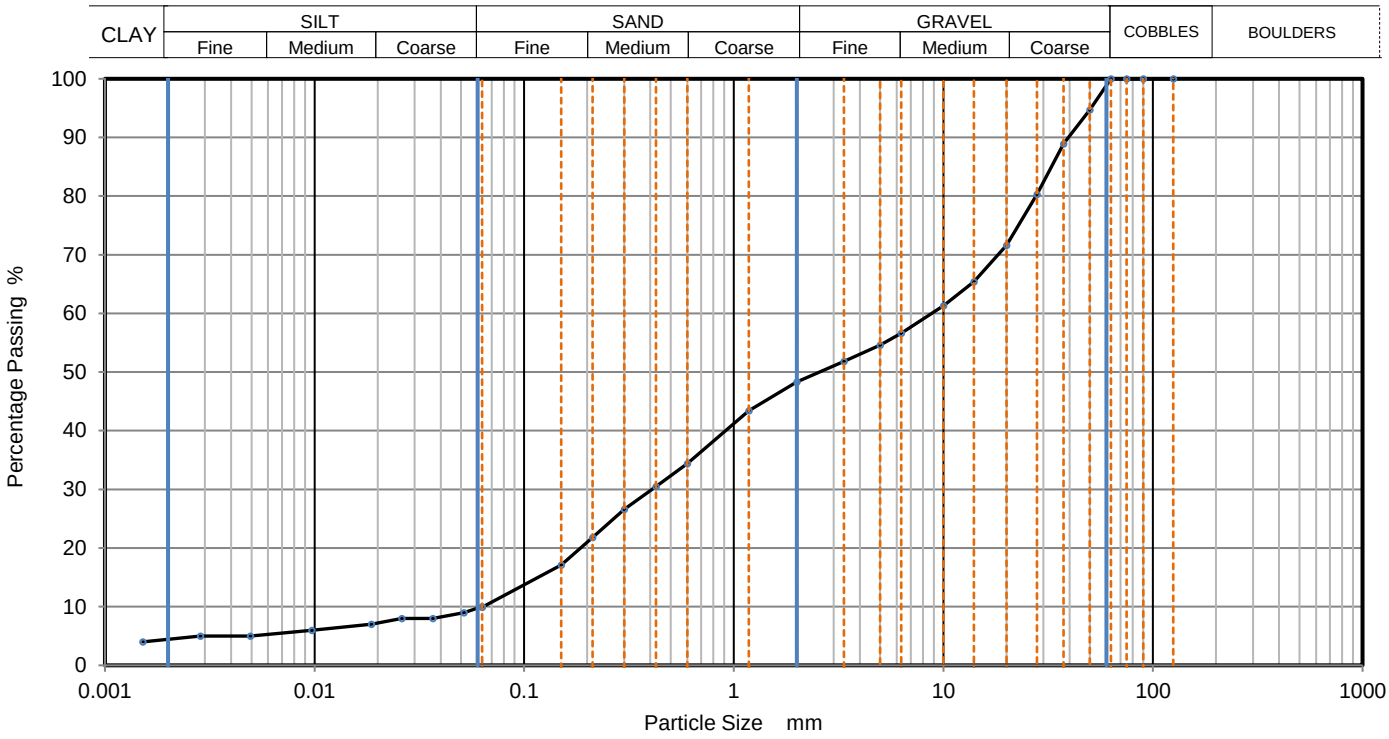
Grading Analysis		
D100	mm	
D60	mm	0.834
D30	mm	0.409
D10	mm	0.241
Uniformity Coefficient		3.5
Curvature Coefficient		0.83

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		BH-5573
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		1
Specimen Description	Brown gravelly silty fine to coarse SAND.				Sample Depth (m)	Top	13.50
						Base	14.20
Specimen Reference	2	Specimen Depth	13.5	m	Sample Type		C
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022091517



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	10
90	100	0.05160	9
75	100	0.03671	8
63	100	0.02611	8
50	95	0.01868	7
37.5	89	0.00970	6
28	80	0.00493	5
20	72	0.00285	5
14	65	0.00152	4
10	61		
6.3	57		
5	55		
3.35	52		
2	48		
1.18	43		
0.6	34	Particle density	(assumed)
0.425	31	2.65	Mg/m3
0.3	27		
0.212	22		
0.15	17		
0.063	10		

Dry Mass of sample, g: 8875

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	51.7
Sand	38.4
Silt	5.8
Clay	4.1

Grading Analysis		
D100	mm	
D60	mm	8.77
D30	mm	0.406
D10	mm	0.0638
Uniformity Coefficient		140
Curvature Coefficient		0.29

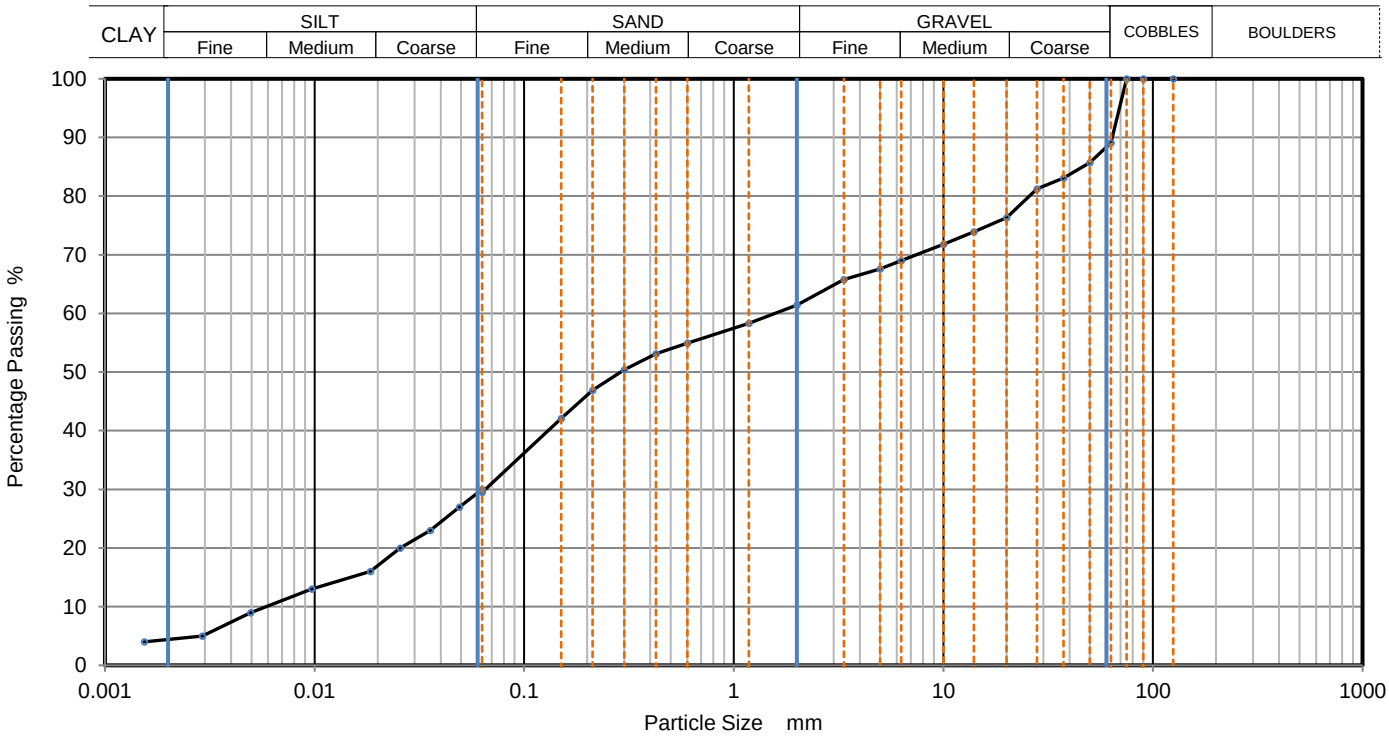
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-6016
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brownish grey gravelly clayey fine to coarse SAND with some cobbles.			Sample Depth (m) Top	1.80
				Base	2.00
Specimen Reference	3	Specimen Depth	1.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022080424



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	30
90	100	0.04903	27
75	100	0.03559	23
63	89	0.02564	20
50	86	0.01846	16
37.5	83	0.00970	13
28	81	0.00496	9
20	76	0.00291	5
14	74	0.00154	4
10	72		
6.3	69		
5	68		
3.35	66		
2	61		
1.18	58		
0.6	55	Particle density	(assumed)
0.425	53	2.65	Mg/m3
0.3	50		
0.212	47		
0.15	42		
0.063	30		

Dry Mass of sample, g: 9260

Sample Proportions	% dry mass
Cobbles	10.9
Gravel	27.6
Sand	31.9
Silt	24.8
Clay	4.8

Grading Analysis		
D100	mm	
D60	mm	1.57
D30	mm	0.0652
D10	mm	0.00602
Uniformity Coefficient		260
Curvature Coefficient		0.45

Remarks

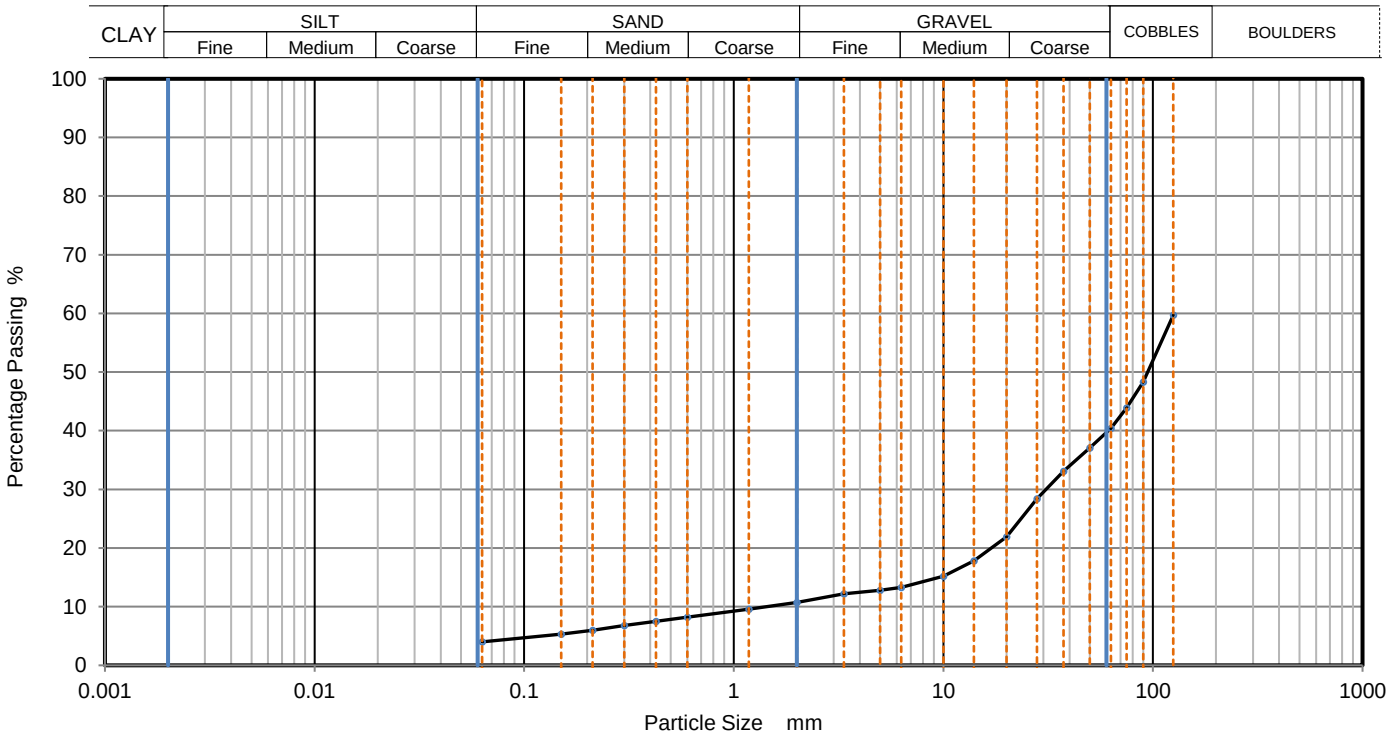
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-6016
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	4
Specimen Description	Brown COBBLES with some sandy subangular fine to coarse gravel.			Sample Depth (m) Top	3.40
				Base	3.70
Specimen Reference	7	Specimen Depth	3.4 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022080425



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	60		
90	48		
75	44		
63	40		
50	37		
37.5	33		
28	28		
20	22		
14	18		
10	15		
6.3	13		
5	13		
3.35	12		
2	11		
1.18	10		
0.6	8		
0.425	8		
0.3	7		
0.212	6		
0.15	5		
0.063	4		

Dry Mass of sample, g: 18474

Sample Proportions	% dry mass
Cobbles	59.6
Gravel	29.6
Sand	6.8
Fines <0.063mm	4.0

Grading Analysis		
D100	mm	
D60	mm	
D30	mm	30.9
D10	mm	1.44
Uniformity Coefficient		
Curvature Coefficient		

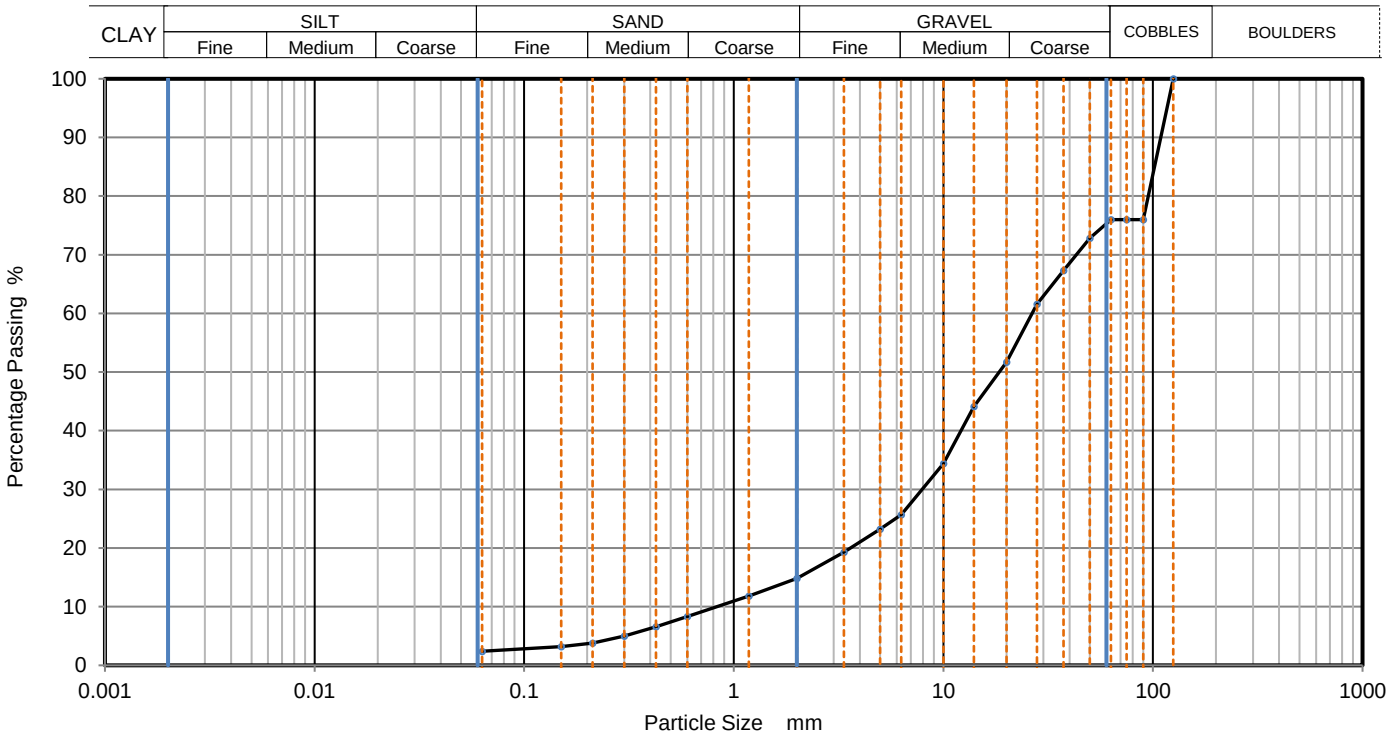
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-6016
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	9
Specimen Description	Grey slightly sandy slightly silty subangular fine to coarse GRAVEL with cobbles.			Sample Depth (m) Top	10.70
				Base	11.00
Specimen Reference	3	Specimen Depth	10.7 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022080426



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	76		
75	76		
63	76		
50	73		
37.5	67		
28	62		
20	52		
14	44		
10	34		
6.3	26		
5	23		
3.35	19		
2	15		
1.18	12		
0.6	8		
0.425	7		
0.3	5		
0.212	4		
0.15	3		
0.063	2		

Dry Mass of sample, g: 13598

Sample Proportions	% dry mass
Cobbles	24.0
Gravel	61.2
Sand	12.4
Fines <0.063mm	2.0

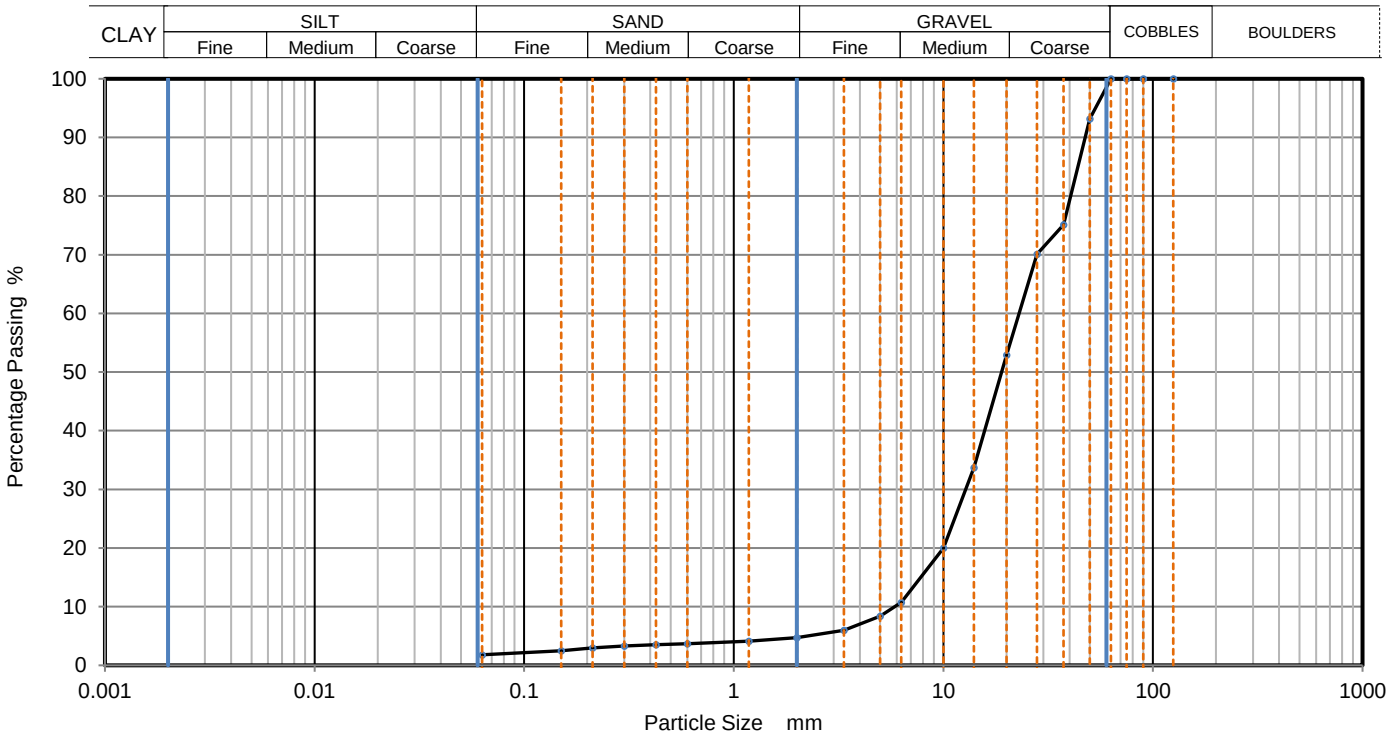
Grading Analysis		
D100	mm	125
D60	mm	26.5
D30	mm	7.92
D10	mm	0.833
Uniformity Coefficient		32
Curvature Coefficient		2.8

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION			Job Ref		21-1682
				Borehole/Pit No.		BH-6016
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.		1
Specimen Description	Greyish brown slightly sandy subangular fine to coarse GRAVEL.			Sample Depth (m)	Top	14.20
					Base	14.70
Specimen Reference	4	Specimen Depth	14.2 m	Sample Type		C
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID		Caus202209197



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	93		
37.5	75		
28	70		
20	53		
14	34		
10	20		
6.3	11		
5	8		
3.35	6		
2	5		
1.18	4		
0.6	4		
0.425	4		
0.3	3		
0.212	3		
0.15	3		
0.063	2		

Dry Mass of sample, g	5207

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	95.3
Sand	2.9
Fines <0.063mm	2.0

Grading Analysis		
D100	mm	
D60	mm	23
D30	mm	12.8
D10	mm	5.86
Uniformity Coefficient		3.9
Curvature Coefficient		1.2

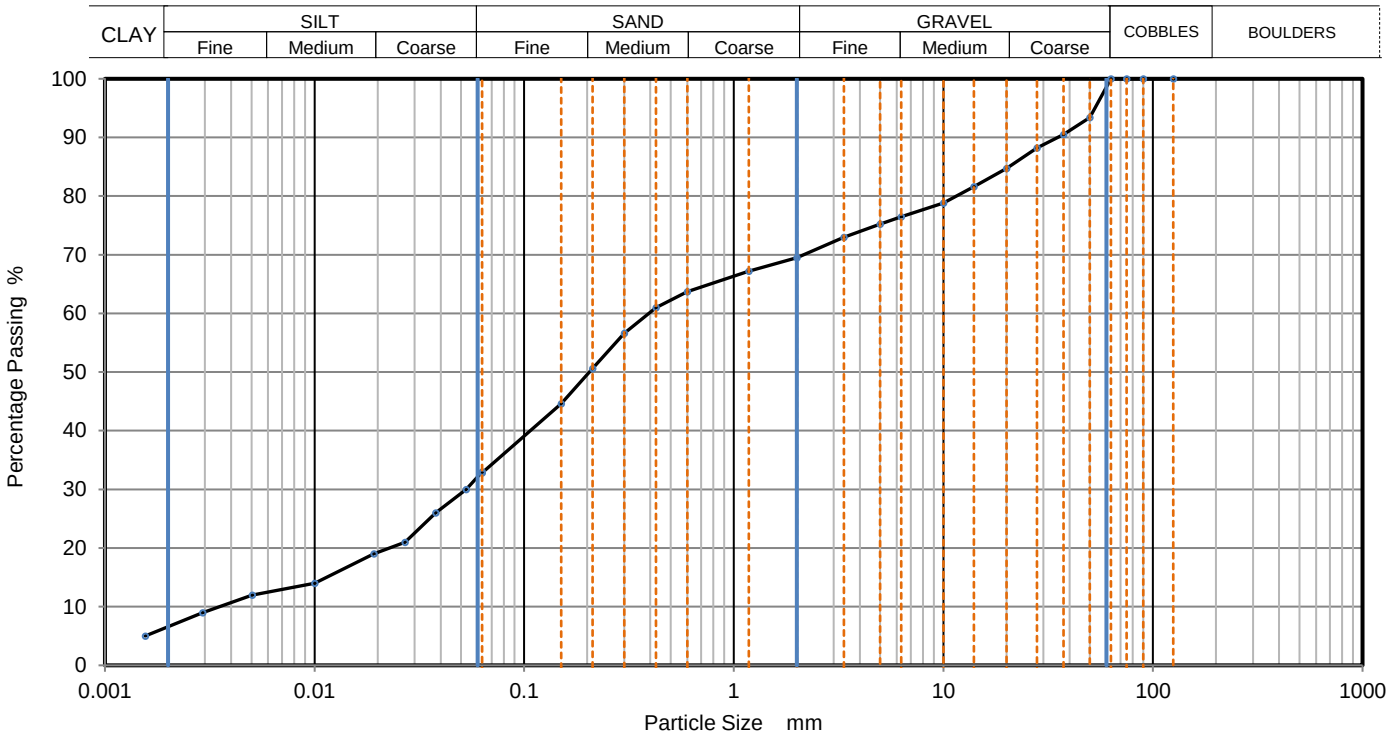
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION			Job Ref		21-1682
				Borehole/Pit No.		BH-6406
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.		8
Specimen Description	Brown sandy gravelly silty CLAY.			Sample Depth (m)	Top	1.80
					Base	2.00
Specimen Reference	3	Specimen Depth	1.8 m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID		Caus2022080428



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	33
90	100	0.05284	30
75	100	0.03779	26
63	100	0.02702	21
50	93	0.01921	19
37.5	91	0.01003	14
28	88	0.00504	12
20	85	0.00293	9
14	82	0.00156	5
10	79		
6.3	77		
5	75		
3.35	73		
2	70		
1.18	67		
0.6	64	Particle density	(assumed)
0.425	61	2.65	Mg/m3
0.3	57		
0.212	51		
0.15	45		
0.063	33		

Dry Mass of sample, g: 3807

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	30.5
Sand	36.7
Silt	26.3
Clay	6.5

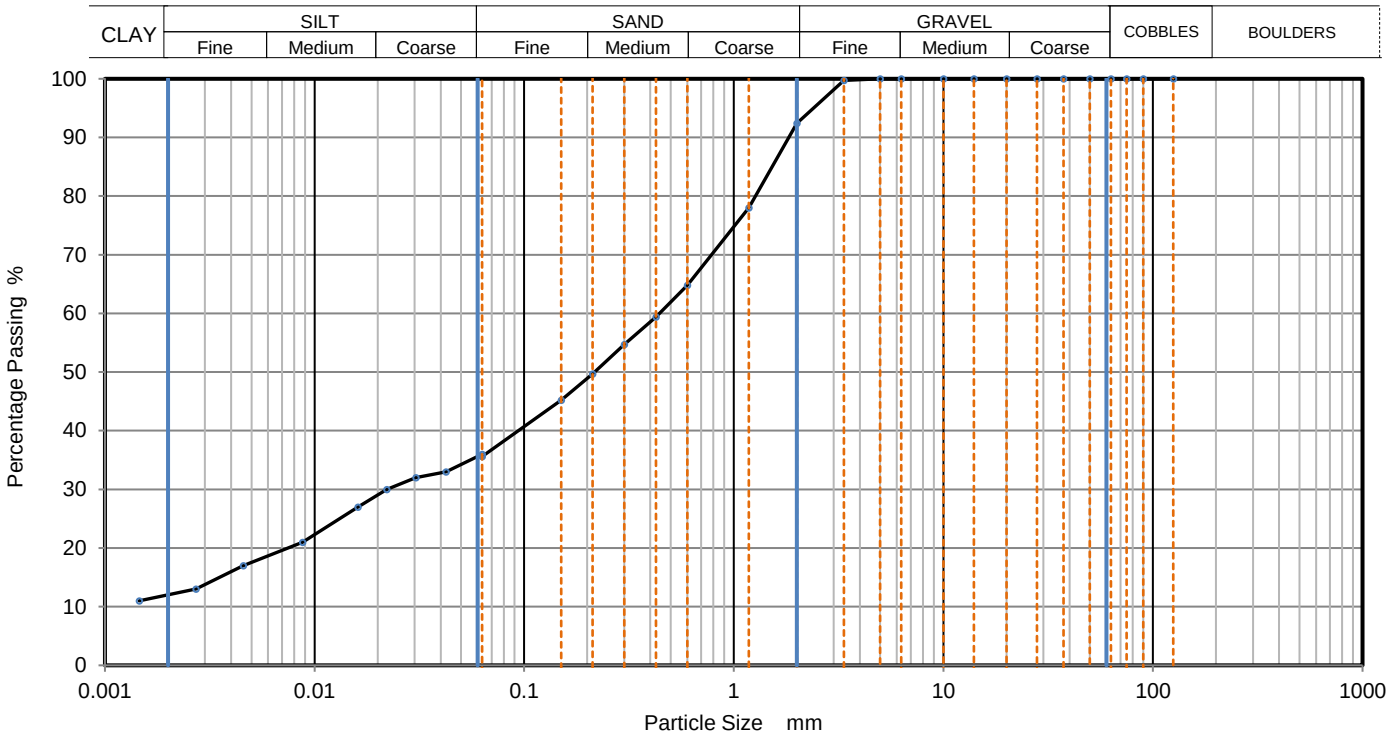
Grading Analysis		
D100	mm	
D60	mm	0.393
D30	mm	0.0511
D10	mm	0.00339
Uniformity Coefficient		120
Curvature Coefficient		2

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-6406
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Brown gravelly silty fine to coarse SAND.			Sample Depth (m) Top	4.50
				Base	5.00
Specimen Reference	6	Specimen Depth	4.5 m	Sample Type	C
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus202209199



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	36
90	100	0.04231	33
75	100	0.03046	32
63	100	0.02209	30
50	100	0.01613	27
37.5	100	0.00877	21
28	100	0.00457	17
20	100	0.00272	13
14	100	0.00146	11
10	100		
6.3	100		
5	100		
3.35	100		
2	92		
1.18	78		
0.6	65	Particle density 2.65	(assumed) Mg/m3
0.425	59		
0.3	55		
0.212	50		
0.15	45		
0.063	36		

Dry Mass of sample, g: 331

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	7.6
Sand	56.9
Silt	23.7
Clay	11.8

Grading Analysis		
D100	mm	
D60	mm	0.441
D30	mm	0.0236
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

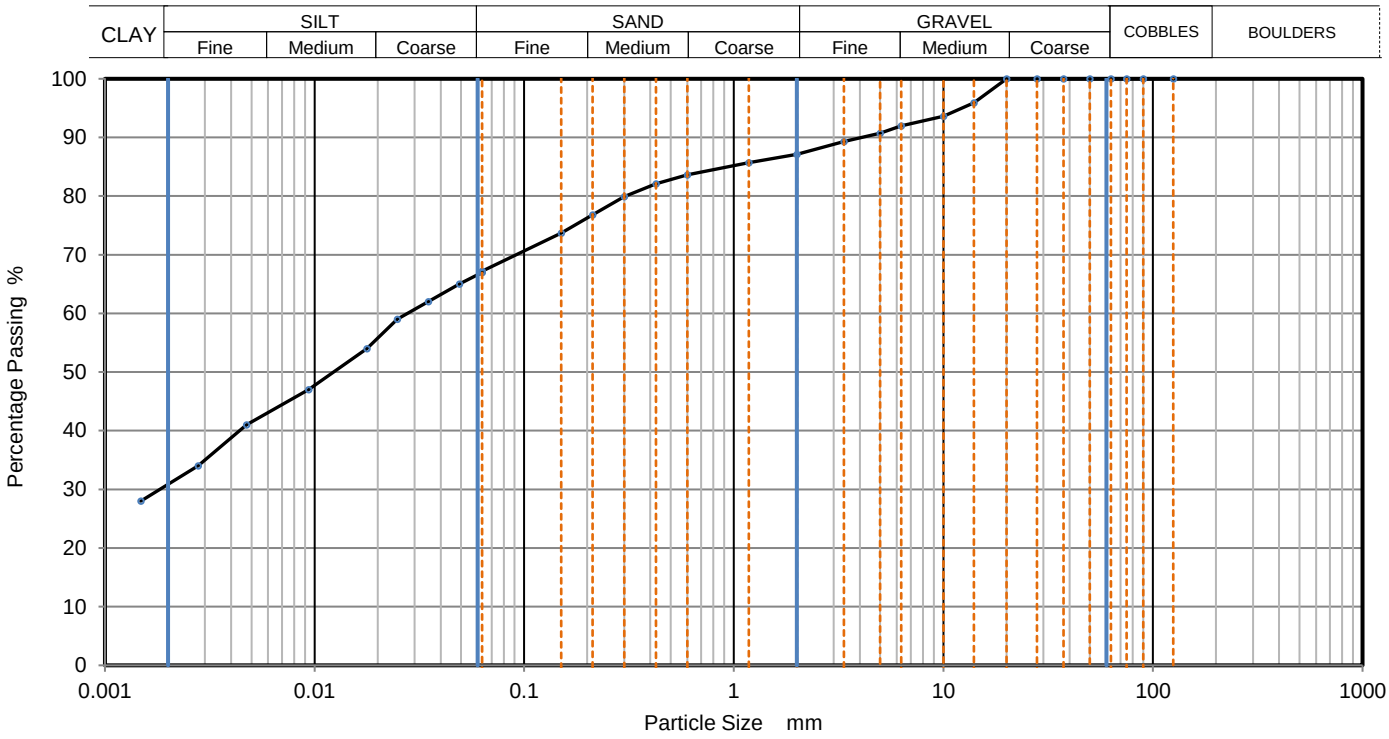
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					**21-1682**
Borehole/Pit No.					BH-6406
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	8.00
				Base	8.50
Specimen Reference	6	Specimen Depth	8 m	Sample Type	C
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022091911



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	67
90	100	0.04903	65
75	100	0.03490	62
63	100	0.02484	59
50	100	0.01780	54
37.5	100	0.00936	47
28	100	0.00474	41
20	100	0.00278	34
14	96	0.00148	28
10	94		
6.3	92		
5	91		
3.35	89		
2	87		
1.18	86		
0.6	84	Particle density	(assumed)
0.425	82	2.65	Mg/m3
0.3	80		
0.212	77		
0.15	74		
0.063	67		

Dry Mass of sample, g: 526

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	12.9
Sand	19.9
Silt	36.3
Clay	30.9

Grading Analysis		
D100	mm	
D60	mm	0.0267
D30	mm	0.0018
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

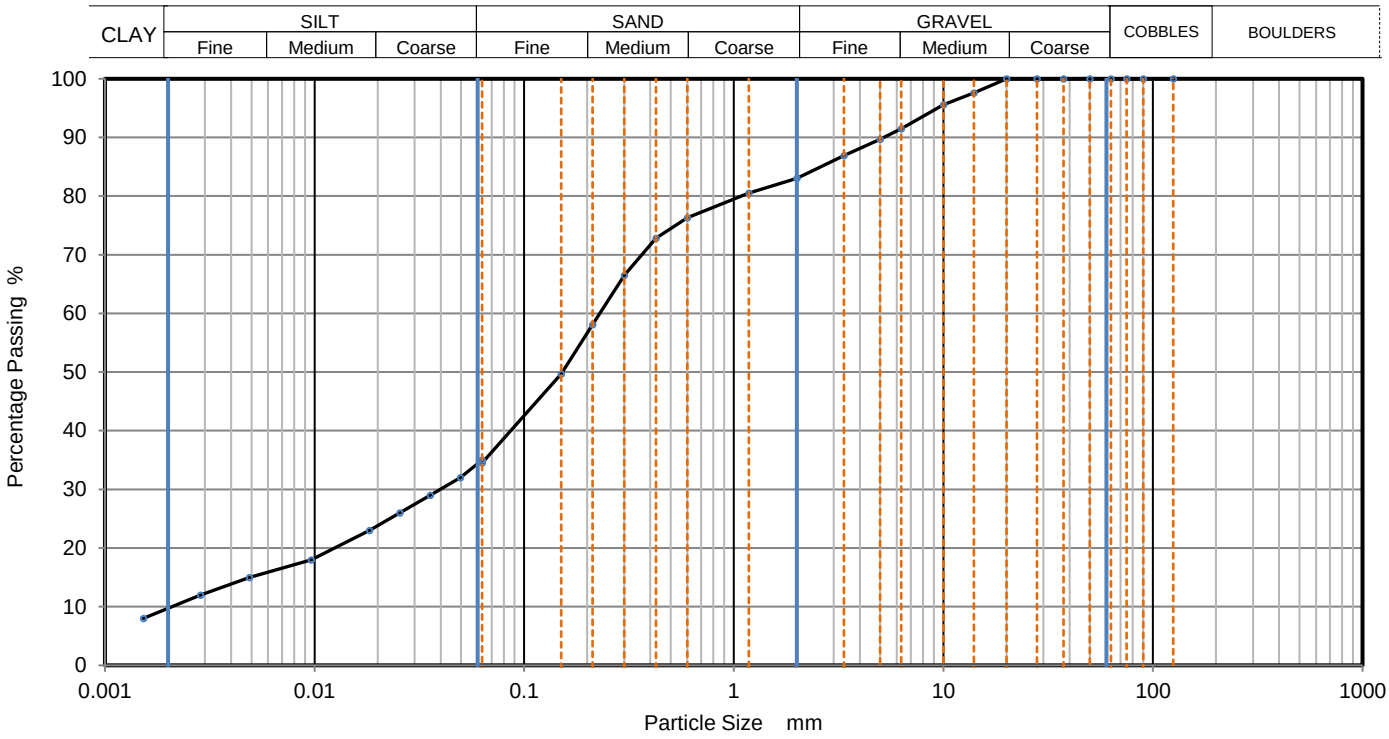
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-6576
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Brown slightly gravelly clayey fine to coarse SAND.			Sample Depth (m) Top	1.80
				Base	2.00
Specimen Reference	3	Specimen Depth	1.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022080431



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	35
90	100	0.04969	32
75	100	0.03559	29
63	100	0.02549	26
50	100	0.01824	23
37.5	100	0.00965	18
28	100	0.00488	15
20	100	0.00285	12
14	98	0.00152	8
10	96		
6.3	92		
5	90		
3.35	87		
2	83		
1.18	81		
0.6	76	Particle density	(assumed)
0.425	73	2.65	Mg/m3
0.3	67		
0.212	58		
0.15	50		
0.063	35		

Dry Mass of sample, g: 588

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	17.0
Sand	48.5
Silt	24.4
Clay	10.1

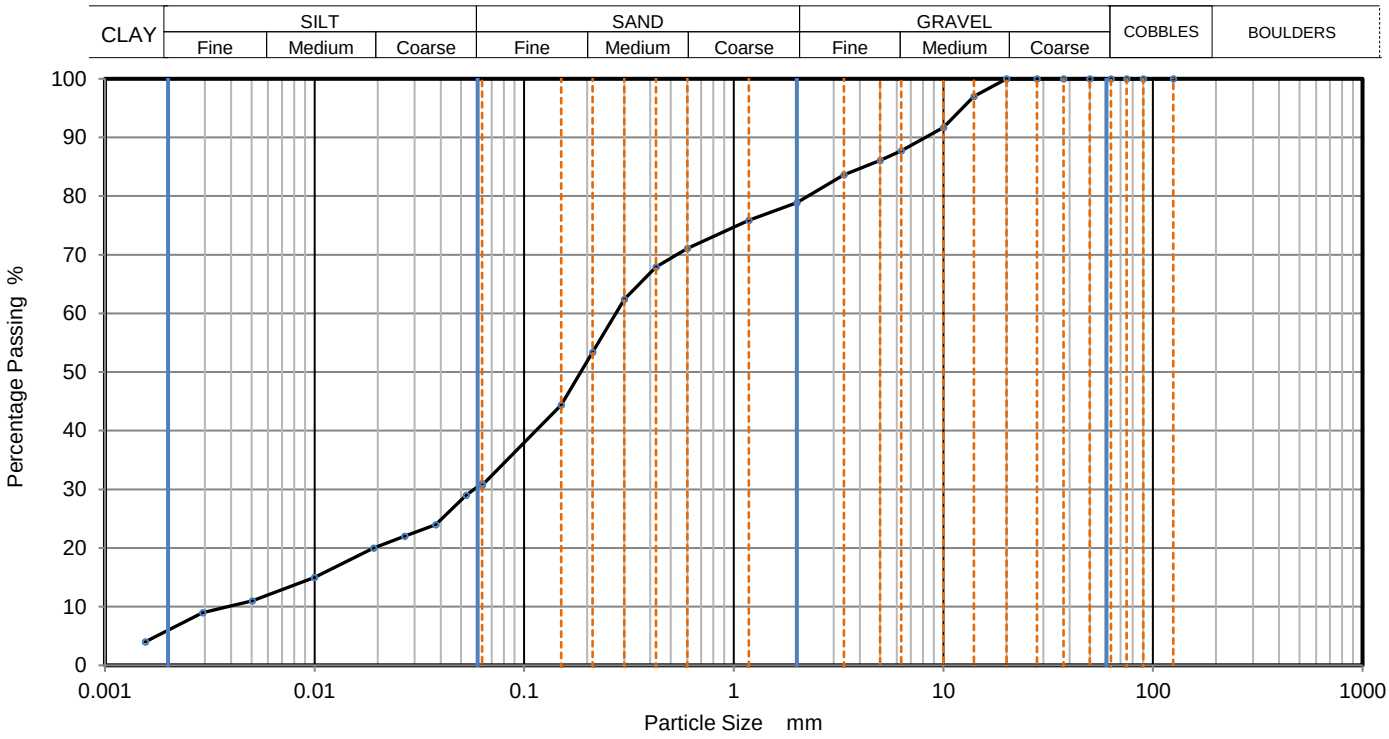
Grading Analysis		
D100	mm	
D60	mm	0.229
D30	mm	0.0403
D10	mm	0.00198
Uniformity Coefficient		120
Curvature Coefficient		3.6

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		BH-6576
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		6
Specimen Description	Brown slightly gravelly clayey fine to coarse SAND.				Sample Depth (m)	Top	5.80
						Base	6.00
Specimen Reference	3	Specimen Depth	5.8	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022080434



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	31
90	100	0.05284	29
75	100	0.03779	24
63	100	0.02687	22
50	100	0.01911	20
37.5	100	0.00998	15
28	100	0.00504	11
20	100	0.00293	9
14	97	0.00156	4
10	92		
6.3	88		
5	86		
3.35	84		
2	79		
1.18	76		
0.6	71	Particle density	(assumed)
0.425	68	2.65	Mg/m3
0.3	62		
0.212	53		
0.15	44		
0.063	31		

Dry Mass of sample, g: 552

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	21.1
Sand	48.2
Silt	24.6
Clay	6.1

Grading Analysis		
D100	mm	
D60	mm	0.274
D30	mm	0.0596
D10	mm	0.00397
Uniformity Coefficient		69
Curvature Coefficient		3.3

Remarks

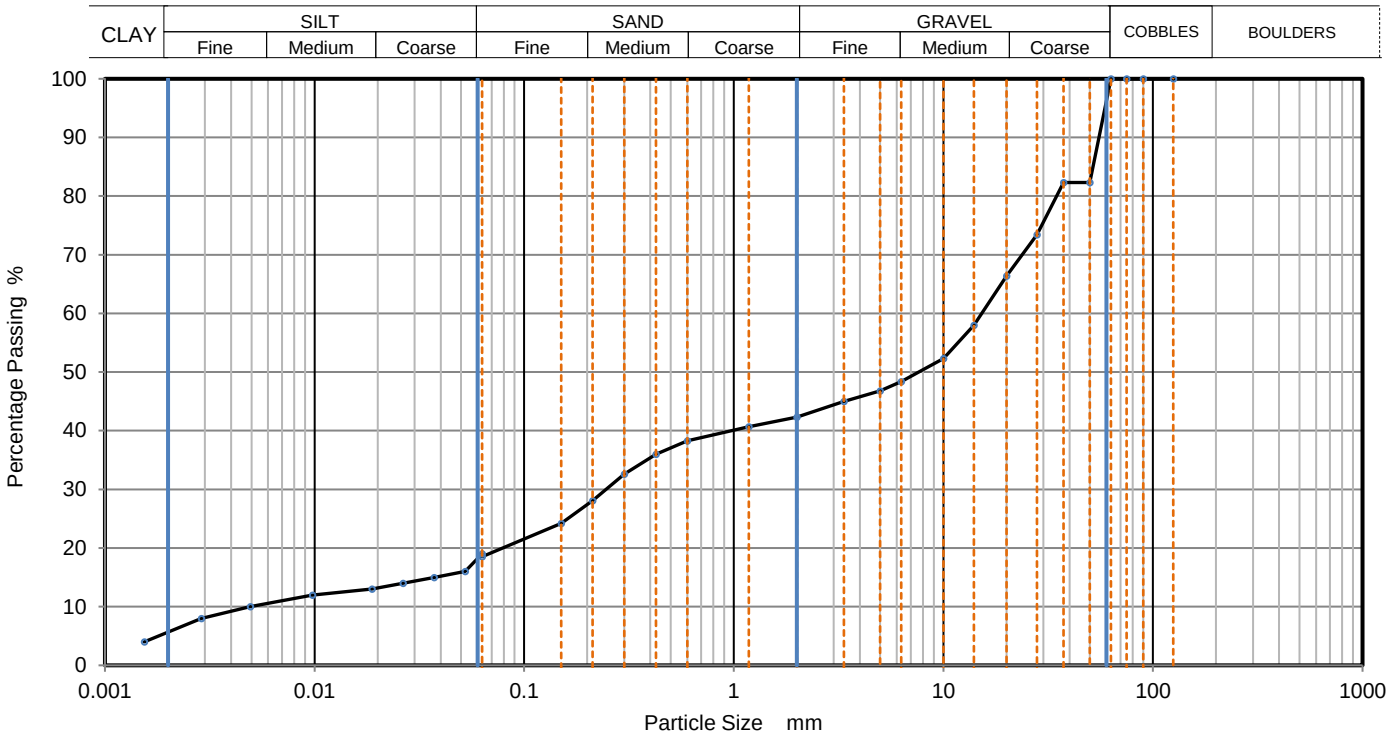
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-6576
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Brownish grey sandy gravelly silty CLAY.			Sample Depth (m) Top	6.10
				Base	6.60
Specimen Reference	8	Specimen Depth	6.1 m	Sample Type	C
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022091916



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	19
90	100	0.05222	16
75	100	0.03715	15
63	100	0.02642	14
50	82	0.01879	13
37.5	82	0.00976	12
28	73	0.00493	10
20	66	0.00288	8
14	58	0.00154	4
10	52		
6.3	48		
5	47		
3.35	45		
2	42		
1.18	41		
0.6	38	Particle density (assumed)	
0.425	36	2.65 Mg/m3	
0.3	33		
0.212	28		
0.15	24		
0.063	19		

Dry Mass of sample, g: 5397

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	57.7
Sand	23.9
Silt	12.7
Clay	5.7

Grading Analysis		
D100	mm	
D60	mm	15.2
D30	mm	0.246
D10	mm	0.00526
Uniformity Coefficient		2900
Curvature Coefficient		0.76

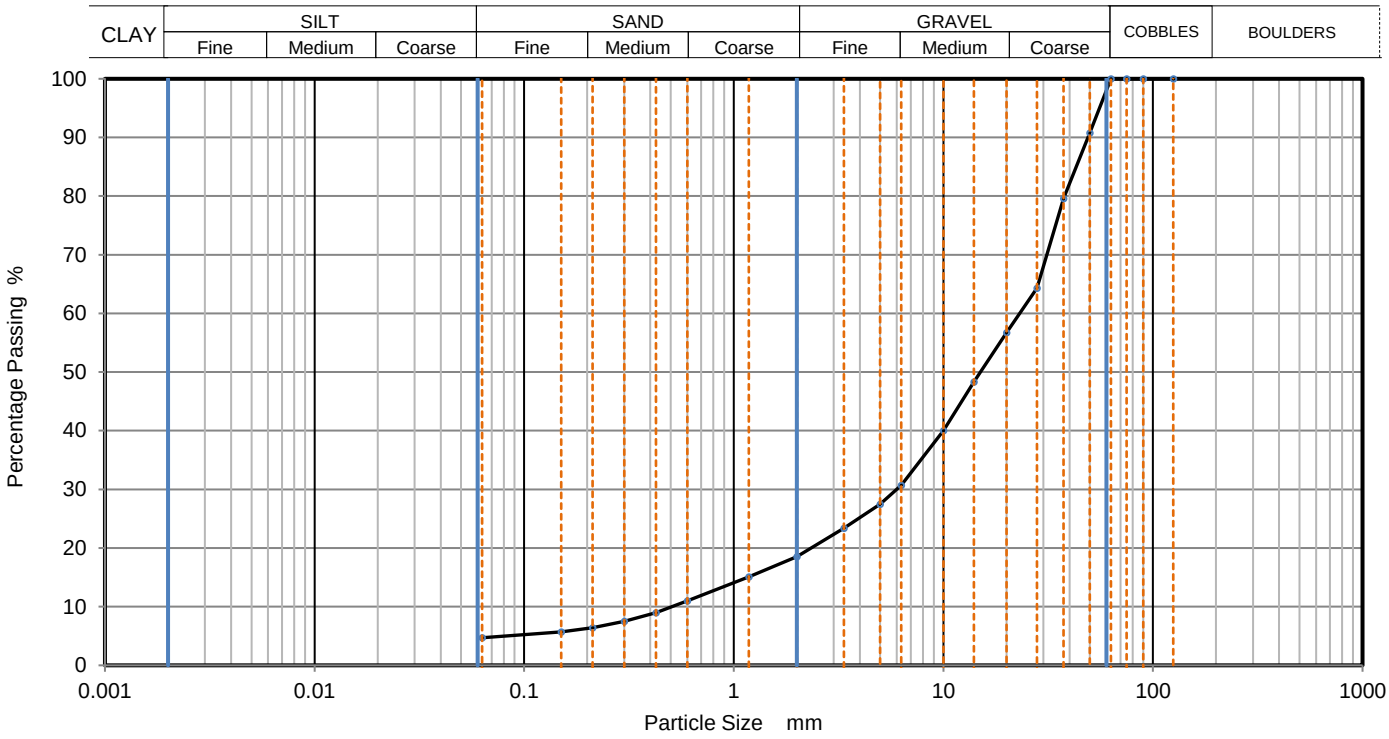
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					**21-1682**
Borehole/Pit No.					BH-6576
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brownish grey slightly sandy slightly silty subangular fine to coarse GRAVEL.			Sample Depth (m) Top	7.50
				Base	8.00
Specimen Reference	6	Specimen Depth	7.5 m	Sample Type	C
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022091917



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	91		
37.5	80		
28	64		
20	57		
14	48		
10	40		
6.3	31		
5	28		
3.35	23		
2	19		
1.18	15		
0.6	11		
0.425	9		
0.3	8		
0.212	6		
0.15	6		
0.063	5		

Dry Mass of sample, g: 4871

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	81.5
Sand	13.8
Fines <0.063mm	5.0

Grading Analysis		
D100	mm	
D60	mm	23.2
D30	mm	6
D10	mm	0.506
Uniformity Coefficient		46
Curvature Coefficient		3.1

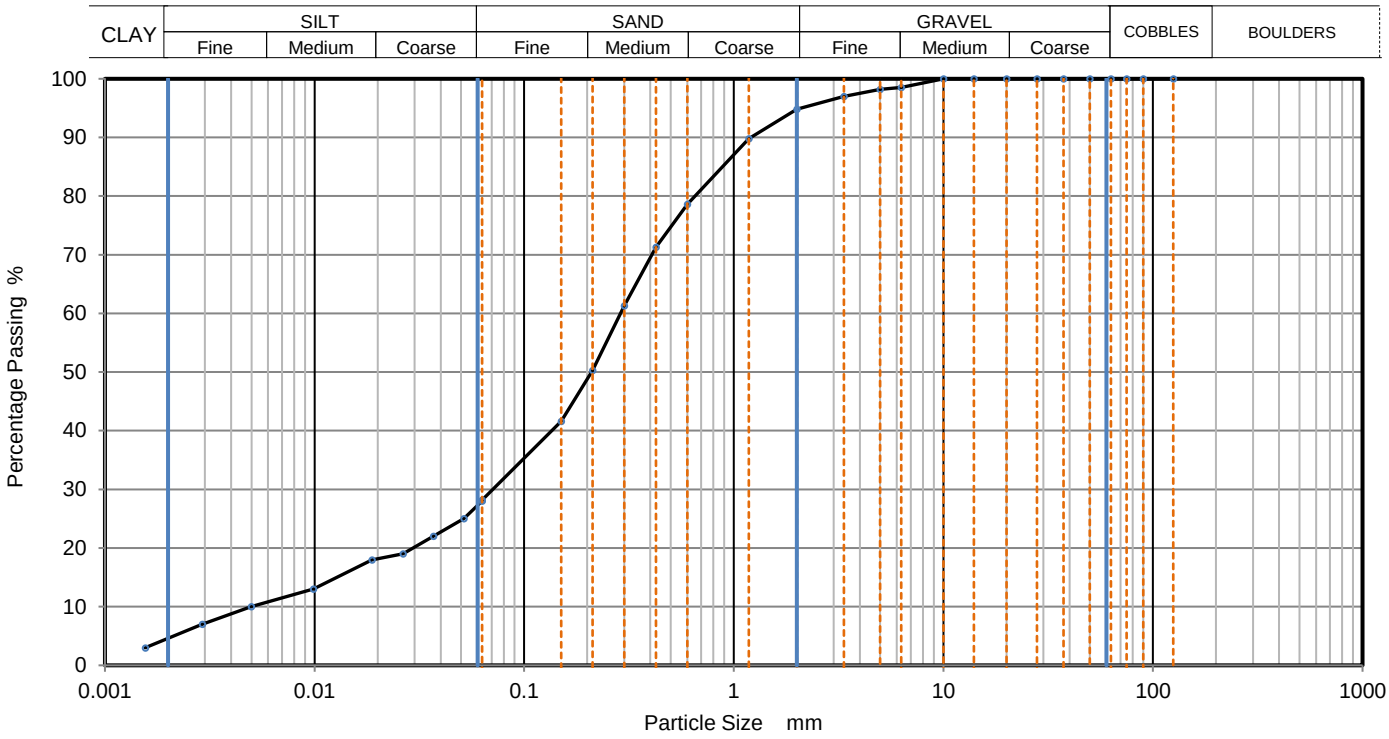
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					BH-6886
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brown slightly gravelly clayey fine to coarse SAND.			Sample Depth (m) Top	0.80
				Base	1.00
Specimen Reference	3	Specimen Depth	0.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022080435



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	28
90	100	0.05160	25
75	100	0.03693	22
63	100	0.02642	19
50	100	0.01879	18
37.5	100	0.00987	13
28	100	0.00499	10
20	100	0.00291	7
14	100	0.00156	3
10	100		
6.3	99		
5	98		
3.35	97		
2	95		
1.18	90		
0.6	79	Particle density	(assumed)
0.425	71	2.65	Mg/m3
0.3	61		
0.212	50		
0.15	42		
0.063	28		

Dry Mass of sample, g: 231

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	5.2
Sand	66.6
Silt	23.4
Clay	4.8

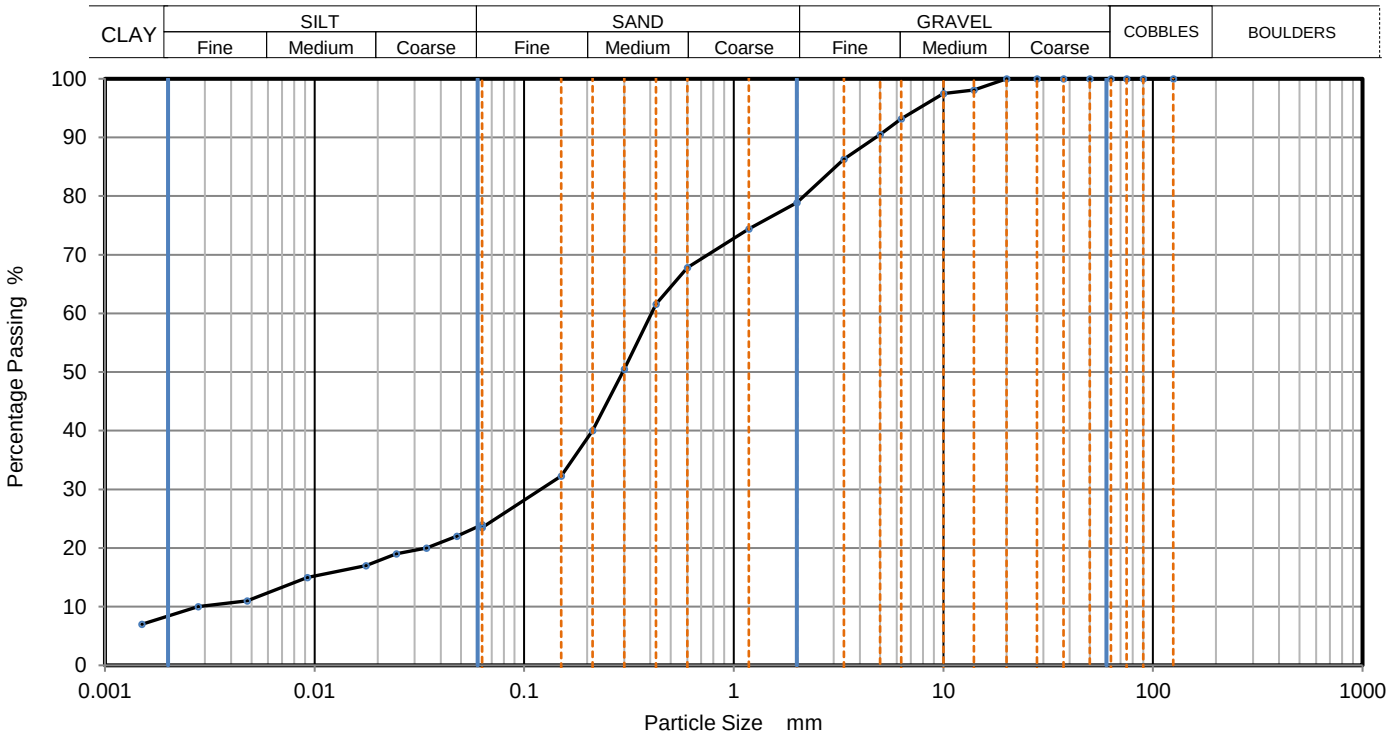
Grading Analysis		
D100	mm	
D60	mm	0.288
D30	mm	0.0709
D10	mm	0.00465
Uniformity Coefficient		62
Curvature Coefficient		3.8

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-6886
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Brown slightly gravelly silty fine to coarse SAND.			Sample Depth (m) Top	1.80
				Base	2.00
Specimen Reference	3	Specimen Depth	1.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022080436



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	24
90	100	0.04770	22
75	100	0.03420	20
63	100	0.02452	19
50	100	0.01757	17
37.5	100	0.00925	15
28	100	0.00477	11
20	100	0.00278	10
14	98	0.00150	7
10	98		
6.3	93		
5	91		
3.35	86		
2	79		
1.18	74		
0.6	68	Particle density	(assumed)
0.425	62	2.65	Mg/m3
0.3	51		
0.212	40		
0.15	32		
0.063	24		

Dry Mass of sample, g: 525

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	21.1
Sand	55.5
Silt	15.2
Clay	8.2

Grading Analysis		
D100	mm	
D60	mm	0.405
D30	mm	0.12
D10	mm	0.00293
Uniformity Coefficient		140
Curvature Coefficient		12

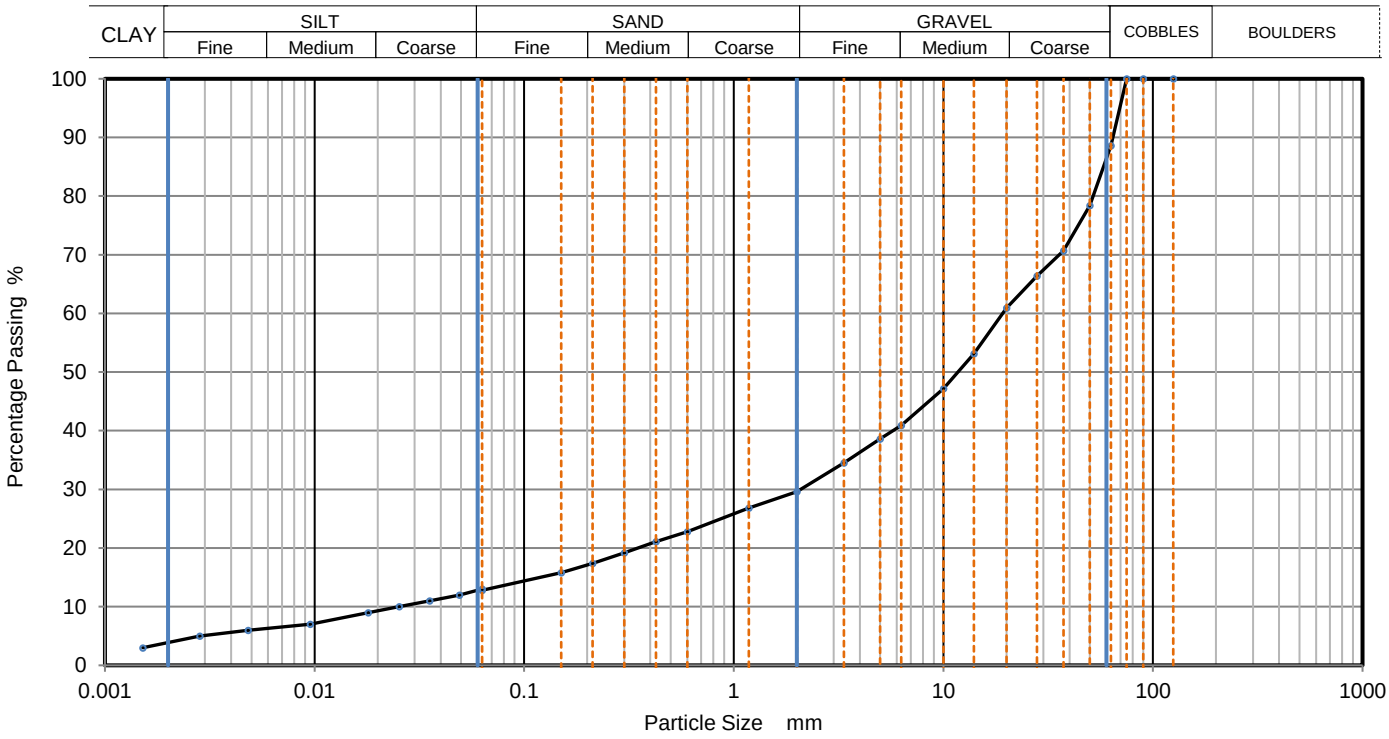
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-6886
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	7
Specimen Description	Dark grey slightly sandy clayey subangular fine to coarse GRAVEL with some cobbles.			Sample Depth (m) Top	5.80
				Base	6.00
Specimen Reference	3	Specimen Depth	5.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022080439



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	13
90	100	0.04902	12
75	100	0.03536	11
63	89	0.02532	10
50	78	0.01802	9
37.5	71	0.00953	7
28	66	0.00482	6
20	61	0.00283	5
14	53	0.00152	3
10	47		
6.3	41		
5	39		
3.35	35		
2	30		
1.18	27		
0.6	23	Particle density	(assumed)
0.425	21	2.65	Mg/m3
0.3	19		
0.212	17		
0.15	16		
0.063	13		

Dry Mass of sample, g: 22979

Sample Proportions	% dry mass
Cobbles	11.4
Gravel	59.0
Sand	16.8
Silt	9.0
Clay	3.8

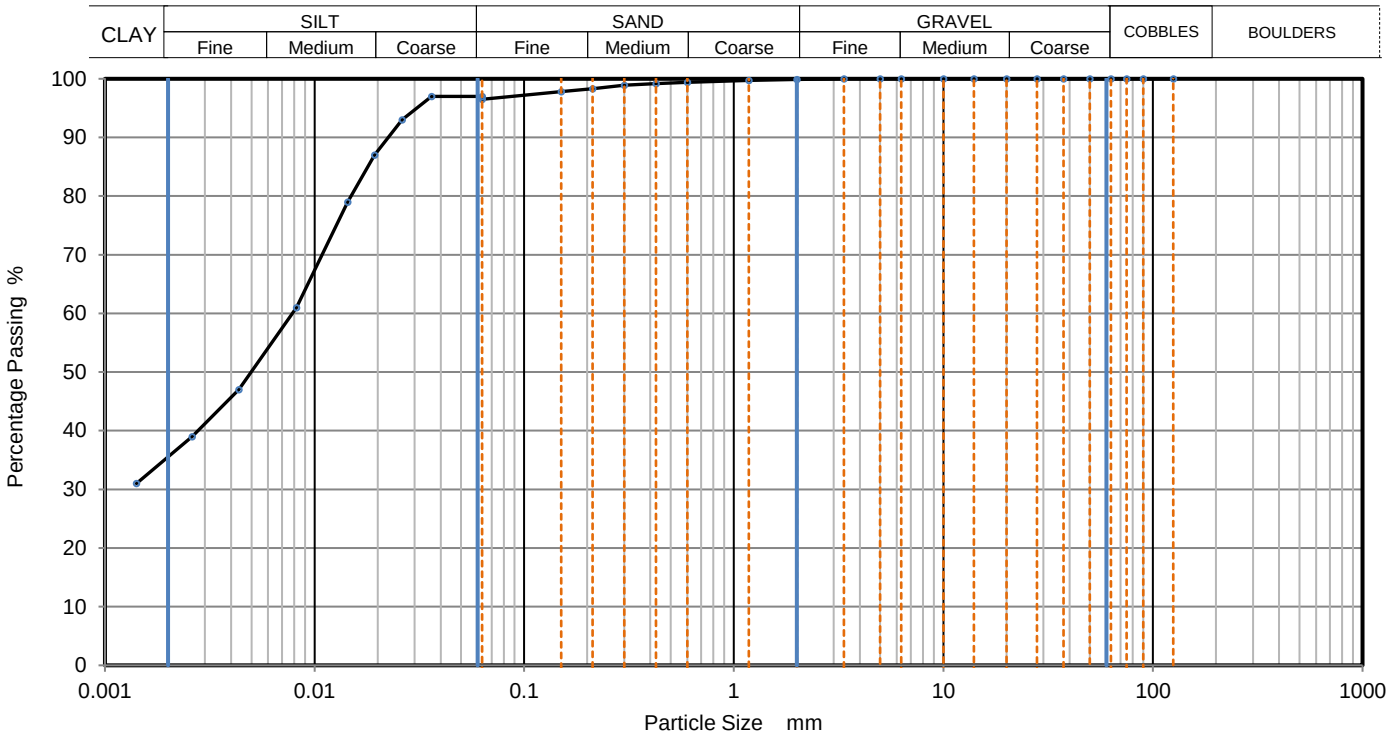
Grading Analysis		
D100	mm	
D60	mm	19.2
D30	mm	2.08
D10	mm	0.0277
Uniformity Coefficient		690
Curvature Coefficient		8.1

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-7255
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Purplish grey slightly sandy silty CLAY.			Sample Depth (m) Top	1.20
				Base	2.00
Specimen Reference	2	Specimen Depth	1.2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus202208159



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	97
90	100	0.03614	97
75	100	0.02618	93
63	100	0.01936	87
50	100	0.01441	79
37.5	100	0.00820	61
28	100	0.00435	47
20	100	0.00260	39
14	100	0.00141	31
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	99	Particle density 2.65	(assumed) Mg/m3
0.425	99		
0.3	99		
0.212	98		
0.15	98		
0.063	97		

Dry Mass of sample, g: 262

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	0.1
Sand	3.4
Silt	60.8
Clay	35.7

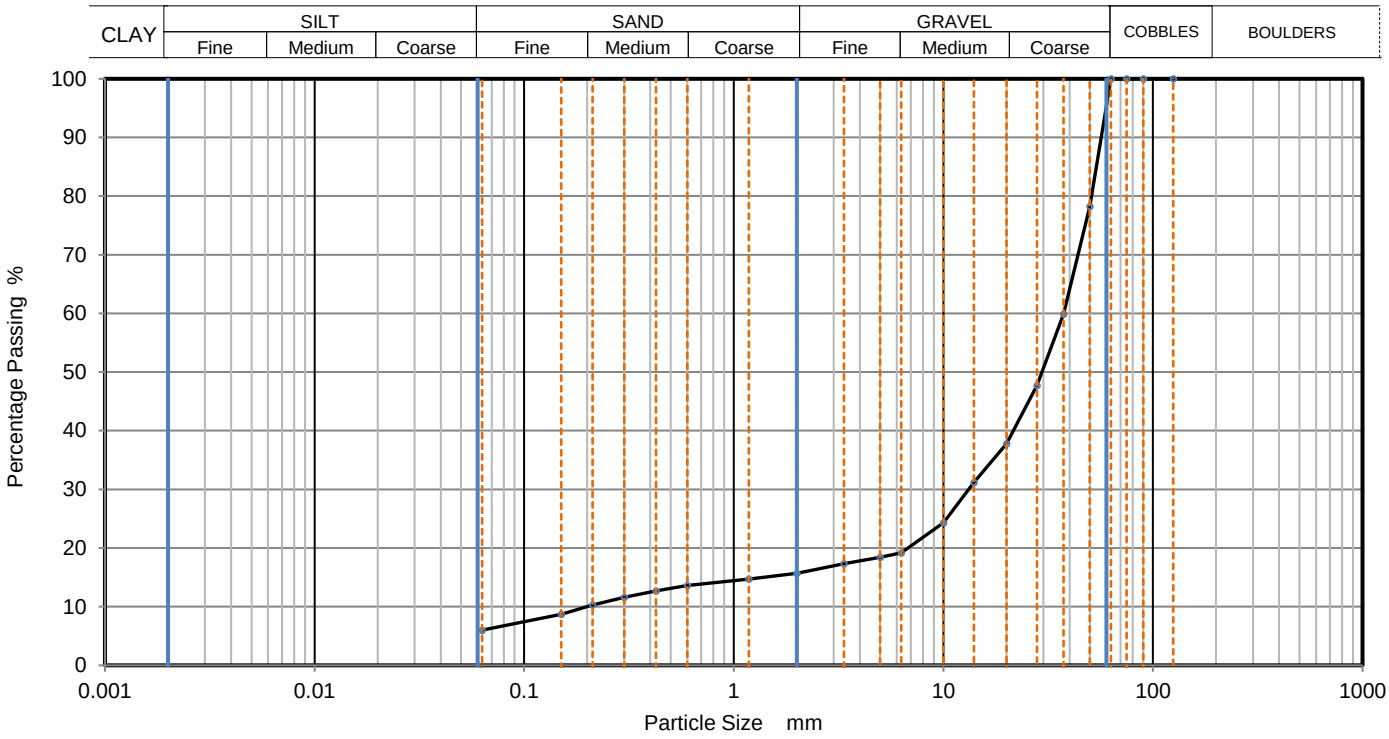
Grading Analysis		
D100	mm	
D60	mm	0.008
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-7255
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	4
Specimen Description	Grey slightly sandy slightly clayey subangular fine to coarse GRAVEL.			Sample Depth (m) Top	3.00
				Base	4.00
Specimen Reference	2	Specimen Depth	3 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022081513



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	78		
37.5	60		
28	48		
20	38		
14	31		
10	24		
6.3	19		
5	18		
3.35	17		
2	16		
1.18	15		
0.6	14		
0.425	13		
0.3	12		
0.212	10		
0.15	9		
0.063	6		

Dry Mass of sample, g	7976

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	84.3
Sand	9.6
Fines <0.063mm	6.0

Grading Analysis		
D100	mm	
D60	mm	37.6
D30	mm	13.2
D10	mm	0.201
Uniformity Coefficient		190
Curvature Coefficient		23

Remarks

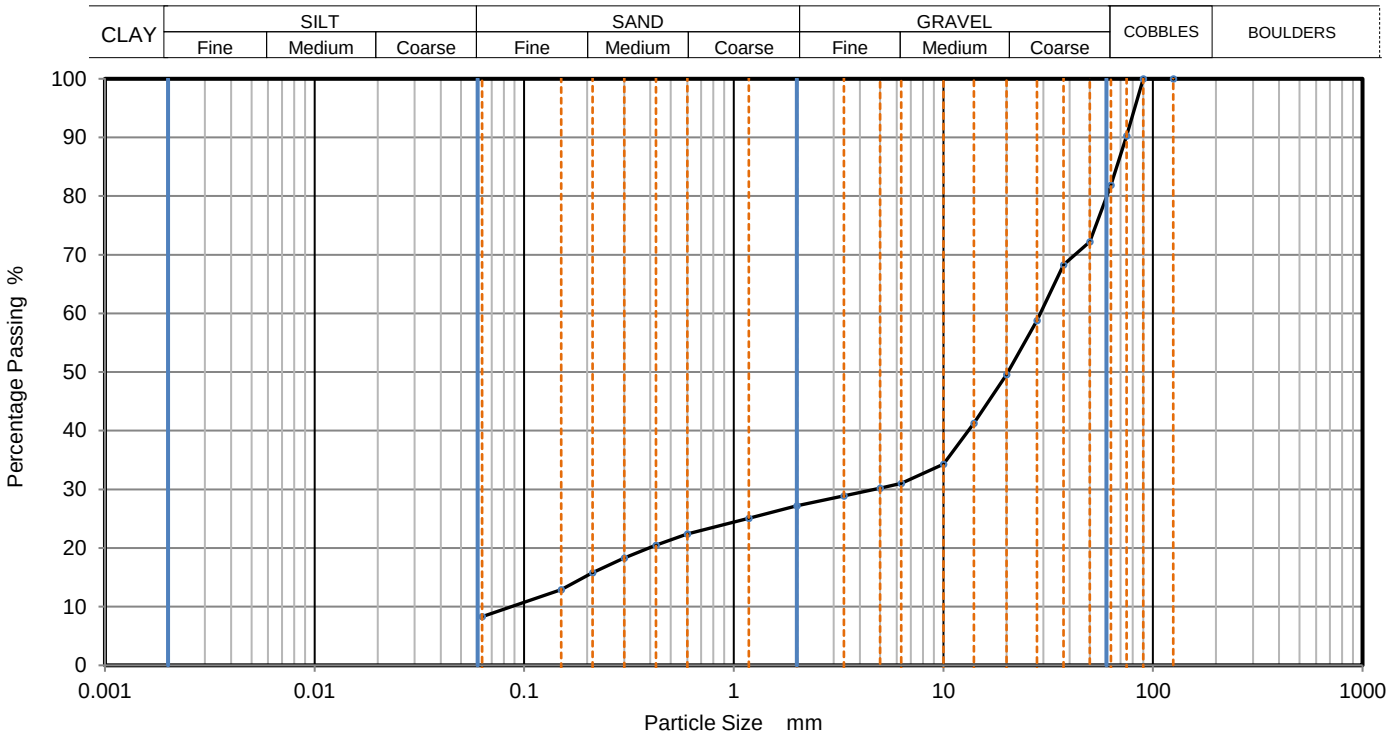
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					BH-7255
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	6
Specimen Description	Grey slightly sandy slightly silty subangular fine to coarse GRAVEL with cobbles.			Sample Depth (m) Top	5.00
				Base	6.50
Specimen Reference	2	Specimen Depth	5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022081515



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	90		
63	82		
50	72		
37.5	68		
28	59		
20	50		
14	41		
10	34		
6.3	31		
5	30		
3.35	29		
2	27		
1.18	25		
0.6	22		
0.425	21		
0.3	18		
0.212	16		
0.15	13		
0.063	8		

Dry Mass of sample, g: 6610

Sample Proportions	% dry mass
Cobbles	18.1
Gravel	54.7
Sand	18.9
Fines <0.063mm	8.0

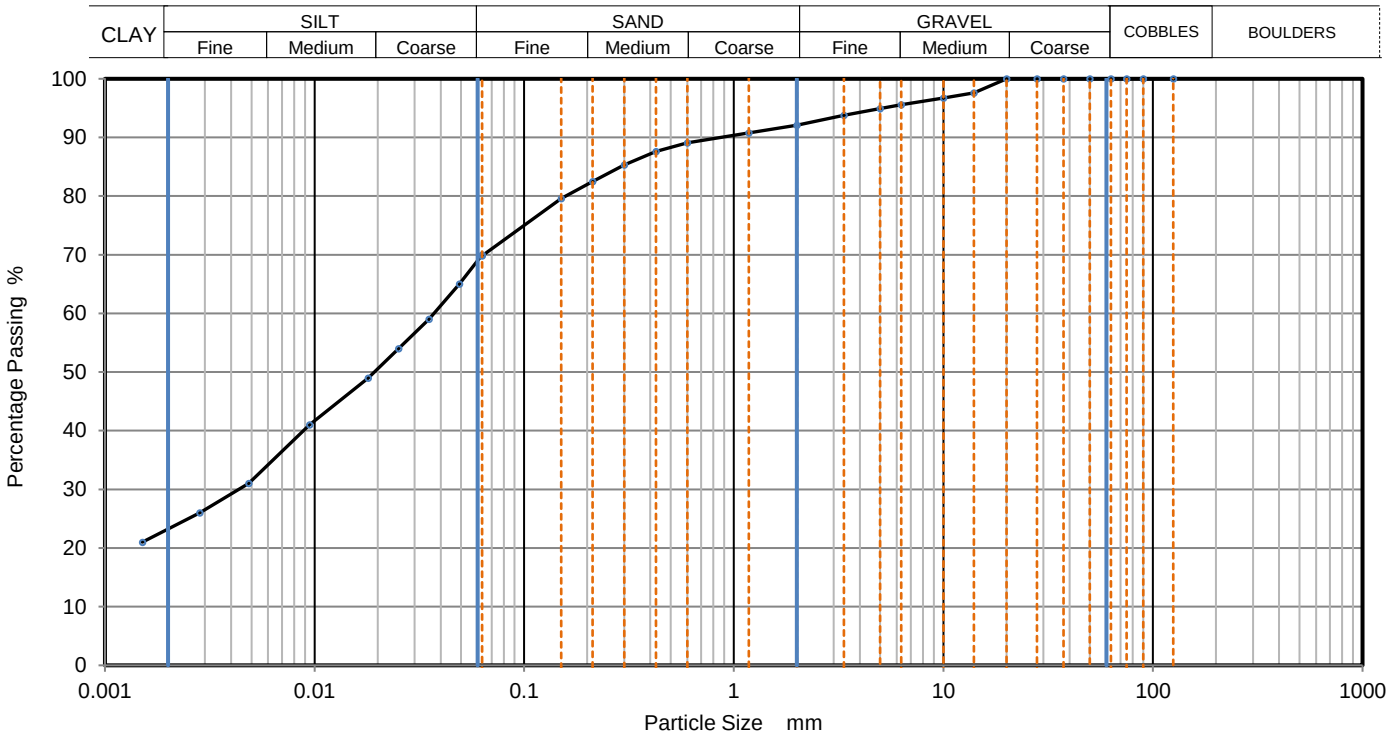
Grading Analysis		
D100	mm	
D60	mm	29.1
D30	mm	4.76
D10	mm	0.0869
Uniformity Coefficient		330
Curvature Coefficient		9

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		BH-7255
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		8
Specimen Description	Greyish brown sandy slightly gravelly silty CLAY.				Sample Depth (m)	Top	8.00
						Base	9.50
Specimen Reference	2	Specimen Depth	8	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022081517



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	70
90	100	0.04903	65
75	100	0.03513	59
63	100	0.02517	54
50	100	0.01802	49
37.5	100	0.00948	41
28	100	0.00485	31
20	100	0.00283	26
14	98	0.00151	21
10	97		
6.3	96		
5	95		
3.35	94		
2	92		
1.18	91		
0.6	89	Particle density	(assumed)
0.425	88	2.65	Mg/m3
0.3	85		
0.212	83		
0.15	80		
0.063	70		

Dry Mass of sample, g: 503

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	7.9
Sand	22.3
Silt	46.8
Clay	23.0

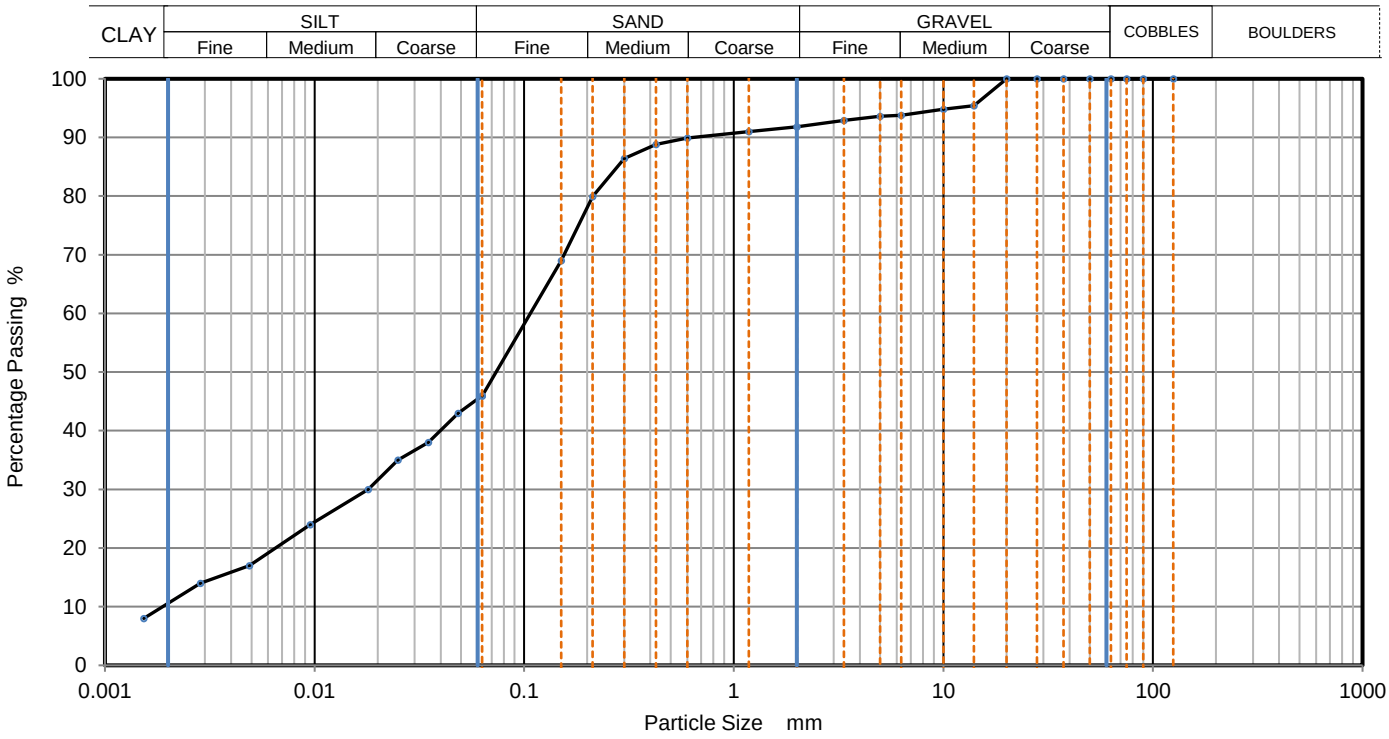
Grading Analysis		
D100	mm	
D60	mm	0.0364
D30	mm	0.00436
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-7282
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Greyish brown slightly gravelly clayey fine to coarse SAND.			Sample Depth (m) Top	1.20
				Base	2.00
Specimen Reference	2	Specimen Depth	1.2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022081572



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	46
90	100	0.04837	43
75	100	0.03490	38
63	100	0.02501	35
50	100	0.01802	30
37.5	100	0.00953	24
28	100	0.00488	17
20	100	0.00285	14
14	95	0.00153	8
10	95		
6.3	94		
5	94		
3.35	93		
2	92		
1.18	91		
0.6	90	Particle density	(assumed)
0.425	89	2.65	Mg/m3
0.3	86		
0.212	80		
0.15	69		
0.063	46		

Dry Mass of sample, g: 542

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	8.2
Sand	45.9
Silt	35.3
Clay	10.6

Grading Analysis		
D100	mm	
D60	mm	0.107
D30	mm	0.0179
D10	mm	0.00188
Uniformity Coefficient		57
Curvature Coefficient		1.6

Remarks

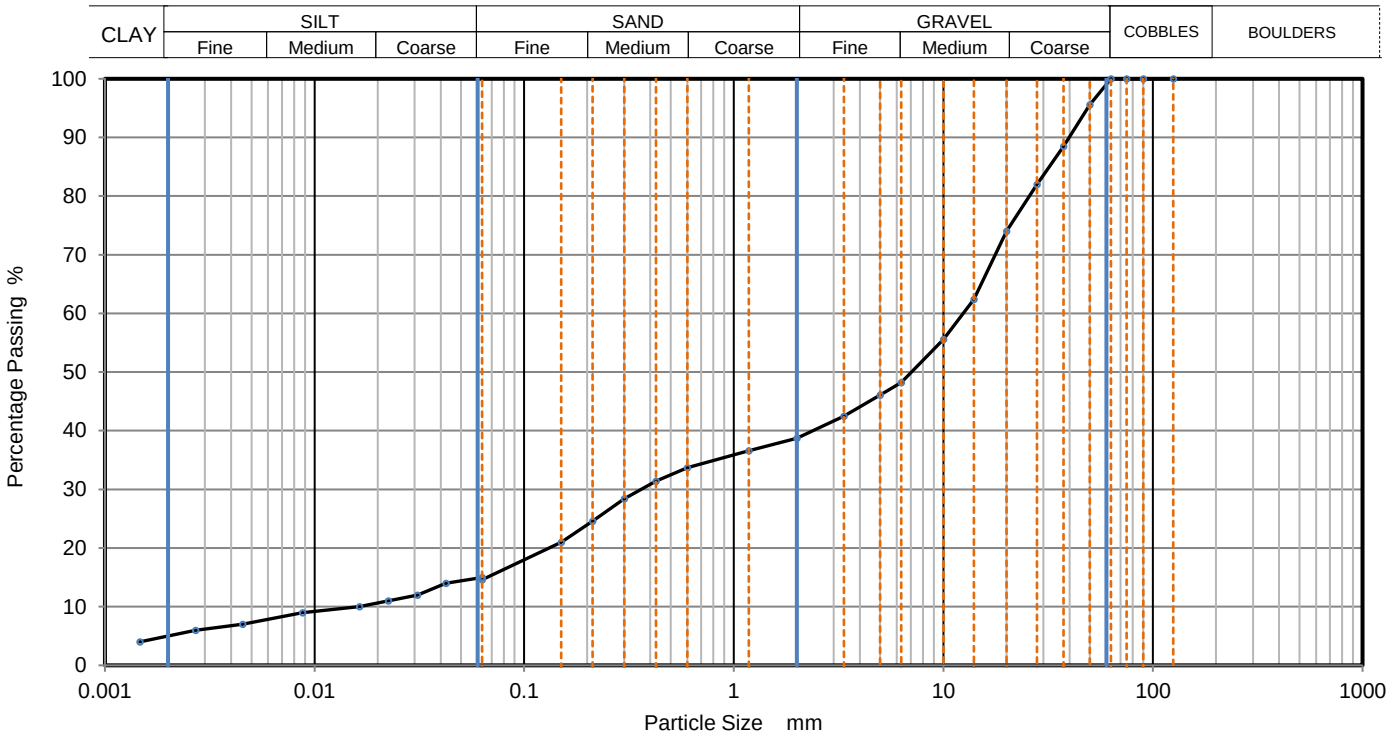
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-7282
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Brownish grey sandy gravelly silty CLAY.			Sample Depth (m) Top	2.00
				Base	3.00
Specimen Reference	2	Specimen Depth	2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022081573



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	15
90	100	0.04231	14
75	100	0.03098	12
63	100	0.02245	11
50	96	0.01638	10
37.5	89	0.00877	9
28	82	0.00454	7
20	74	0.00270	6
14	62	0.00147	4
10	56		
6.3	48		
5	46		
3.35	43		
2	39		
1.18	37		
0.6	34	Particle density	(assumed)
0.425	31	2.65	Mg/m3
0.3	28		
0.212	25		
0.15	21		
0.063	15		

Dry Mass of sample, g: 10652

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	61.3
Sand	24.1
Silt	9.8
Clay	4.8

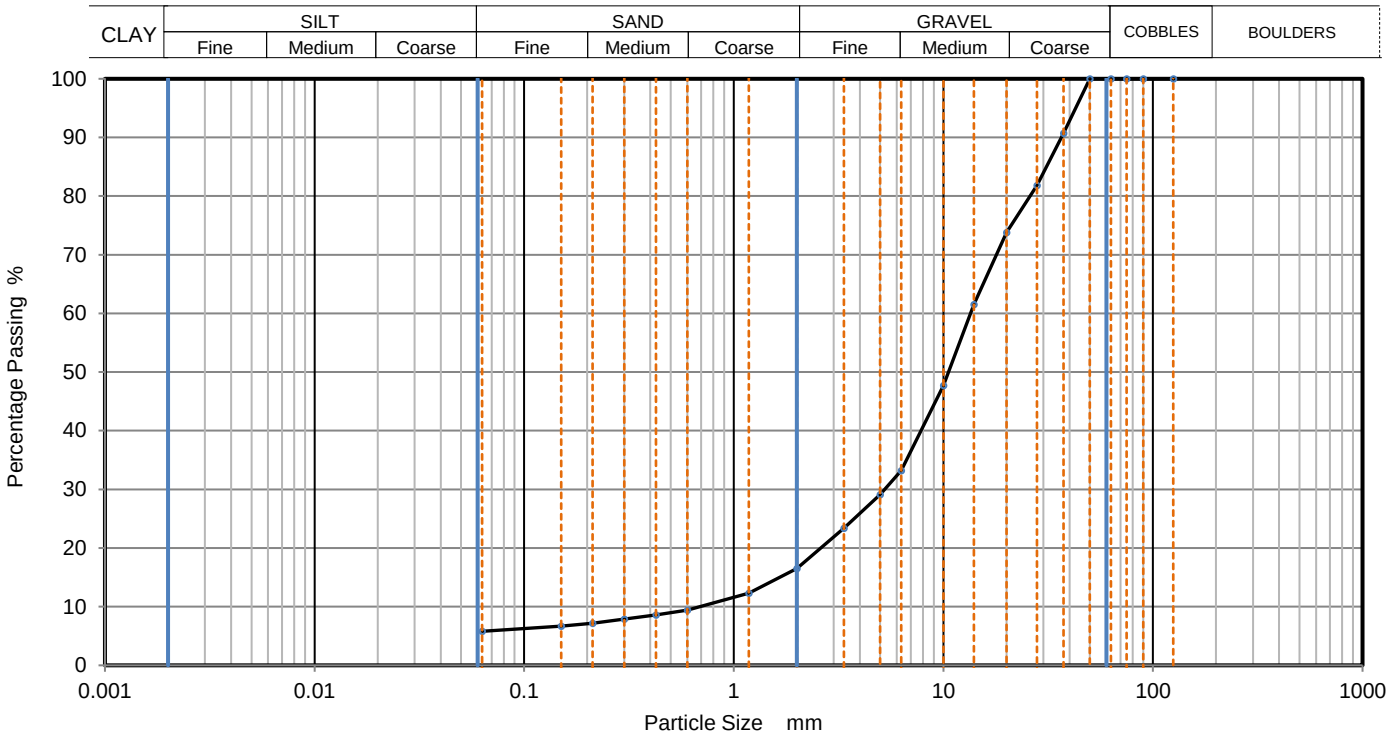
Grading Analysis		
D100	mm	
D60	mm	12.4
D30	mm	0.362
D10	mm	0.0148
Uniformity Coefficient		840
Curvature Coefficient		0.71

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		BH-7282
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		11
Specimen Description	Greyish brown gravelly slightly silty fine to coarse SAND.				Sample Depth (m)	Top	5.00
						Base	6.50
Specimen Reference	2	Specimen Depth	5	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clause 9.2				KeyLAB ID		Caus2022081576



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	91		
28	82		
20	74		
14	62		
10	48		
6.3	33		
5	29		
3.35	23		
2	17		
1.18	12		
0.6	9		
0.425	9		
0.3	8		
0.212	7		
0.15	7		
0.063	6		

Dry Mass of sample, g	9807

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	83.5
Sand	10.7
Fines <0.063mm	6.0

Grading Analysis		
D100	mm	
D60	mm	13.5
D30	mm	5.26
D10	mm	0.686
Uniformity Coefficient		20
Curvature Coefficient		3

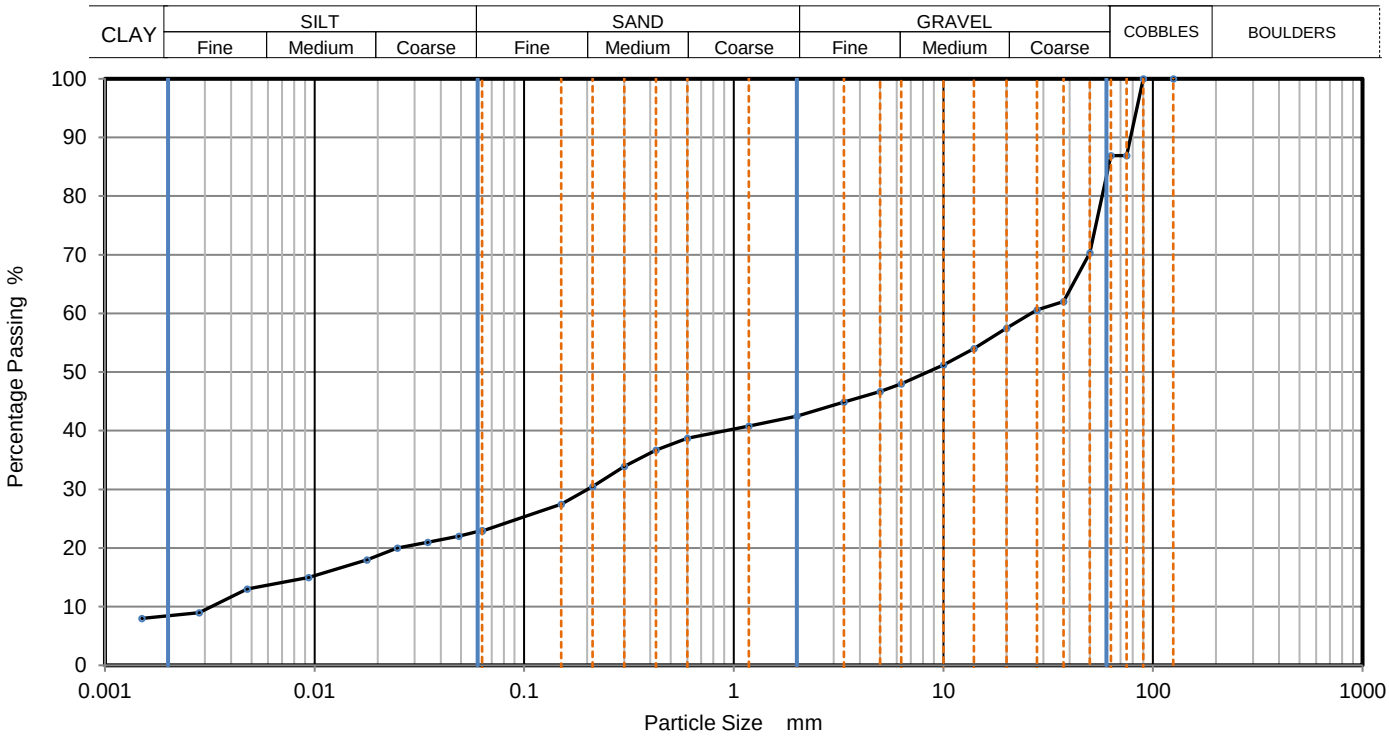
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					BH-7282
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Brownish grey sandy gravelly silty CLAY with cobbles.			Sample Depth (m) Top	7.00
				Base	7.50
Specimen Reference	8	Specimen Depth	7 m	Sample Type	C
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022091920



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	23
90	100	0.04870	22
75	87	0.03467	21
63	87	0.02484	20
50	70	0.01780	18
37.5	62	0.00936	15
28	61	0.00477	13
20	58	0.00282	9
14	54	0.00150	8
10	51		
6.3	48		
5	47		
3.35	45		
2	43		
1.18	41		
0.6	39	Particle density	(assumed)
0.425	37	2.65	Mg/m3
0.3	34		
0.212	31		
0.15	28		
0.063	23		

Dry Mass of sample, g: 5974

Sample Proportions	% dry mass
Cobbles	13.1
Gravel	44.4
Sand	19.7
Silt	14.4
Clay	8.4

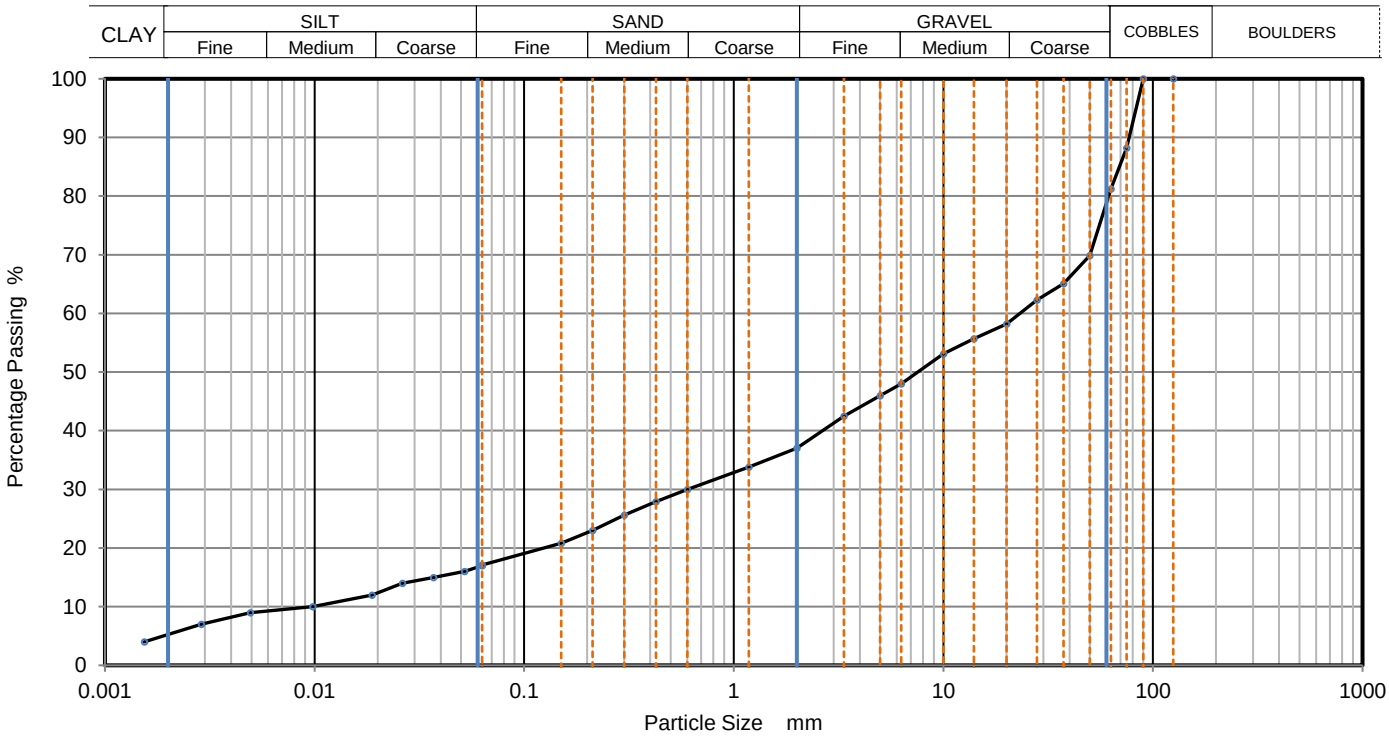
Grading Analysis		
D100	mm	
D60	mm	26.3
D30	mm	0.2
D10	mm	0.00313
Uniformity Coefficient		8400
Curvature Coefficient		0.49

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-7282
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	5
Specimen Description	Brownish grey sandy gravelly silty CLAY with cobbles.			Sample Depth (m) Top	9.50
				Base	9.80
Specimen Reference	10	Specimen Depth	9.5 m	Sample Type	C
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022091924



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	17
90	100	0.05191	16
75	88	0.03693	15
63	81	0.02627	14
50	70	0.01879	12
37.5	65	0.00981	10
28	62	0.00493	9
20	58	0.00288	7
14	56	0.00154	4
10	53		
6.3	48		
5	46		
3.35	43		
2	37		
1.18	34		
0.6	30	Particle density	(assumed)
0.425	28	2.65	Mg/m3
0.3	26		
0.212	23		
0.15	21		
0.063	17		

Dry Mass of sample, g: 8259

Sample Proportions	% dry mass
Cobbles	18.8
Gravel	44.2
Sand	19.9
Silt	11.8
Clay	5.3

Grading Analysis		
D100	mm	
D60	mm	23.2
D30	mm	0.599
D10	mm	0.00943
Uniformity Coefficient		2500
Curvature Coefficient		1.6

Remarks

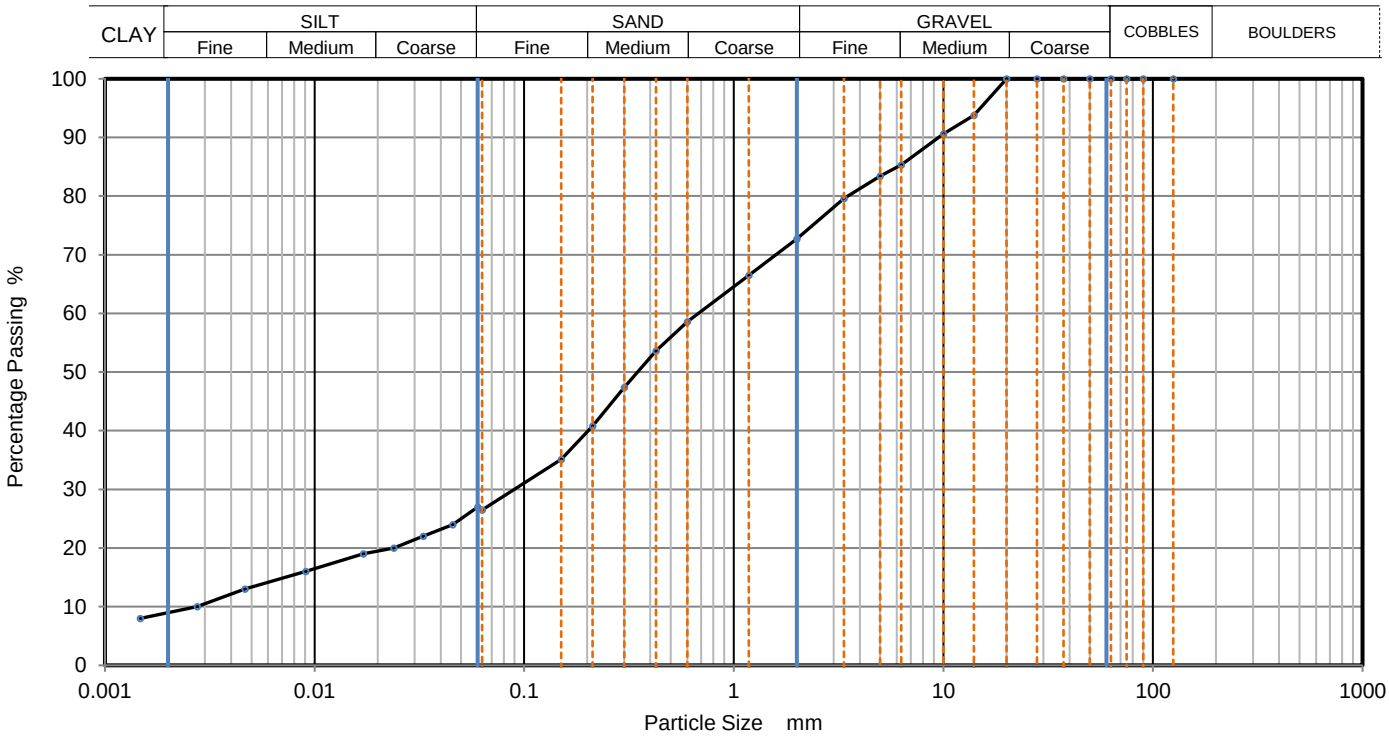
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					BH-7320
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Brown slightly gravelly clayey fine to coarse SAND.			Sample Depth (m) Top	2.00
				Base	3.00
Specimen Reference	2	Specimen Depth	2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022081579



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.05991	27
90	100	0.04562	24
75	100	0.03300	22
63	100	0.02385	20
50	100	0.01710	19
37.5	100	0.00907	16
28	100	0.00465	13
20	100	0.00275	10
14	94	0.00147	8
10	91		
6.3	85		
5	83		
3.35	80		
2	73		
1.18	67		
0.6	59	Particle density	(assumed)
0.425	54	2.65	Mg/m3
0.3	47		
0.212	41		
0.15	35		
0.063	27		

Dry Mass of sample, g: 573

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	27.3
Sand	46.2
Silt	17.1
Clay	9.4

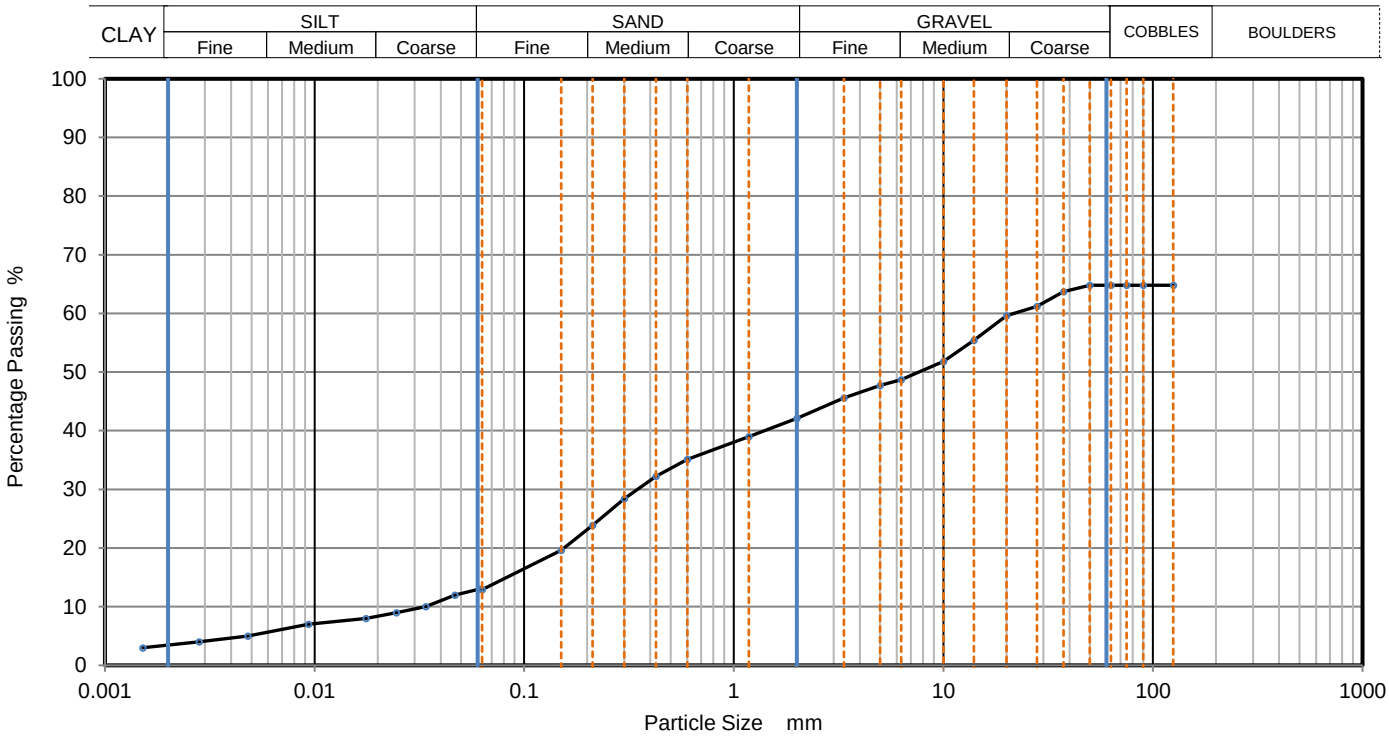
Grading Analysis		
D100	mm	
D60	mm	0.676
D30	mm	0.0899
D10	mm	0.0024
Uniformity Coefficient		280
Curvature Coefficient		5

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-7320
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	5
Specimen Description	Brown gravelly clayey fine to coarse SAND with cobbles.			Sample Depth (m) Top	4.00
				Base	5.00
Specimen Reference	2	Specimen Depth	4 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022081581



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	65	0.06135	13
90	65	0.04667	12
75	65	0.03397	10
63	65	0.02452	9
50	65	0.01757	8
37.5	64	0.00936	7
28	61	0.00480	5
20	60	0.00282	4
14	55	0.00152	3
10	52		
6.3	49		
5	48		
3.35	46		
2	42		
1.18	39		
0.6	35	Particle density	(assumed)
0.425	32	2.65	Mg/m3
0.3	28		
0.212	24		
0.15	20		
0.063	13		

Dry Mass of sample, g: 10392

Sample Proportions	% dry mass
Cobbles	35.2
Gravel	22.7
Sand	29.2
Silt	9.7
Clay	3.2

Grading Analysis		
D100	mm	
D60	mm	21.6
D30	mm	0.348
D10	mm	0.0309
Uniformity Coefficient		700
Curvature Coefficient		0.18

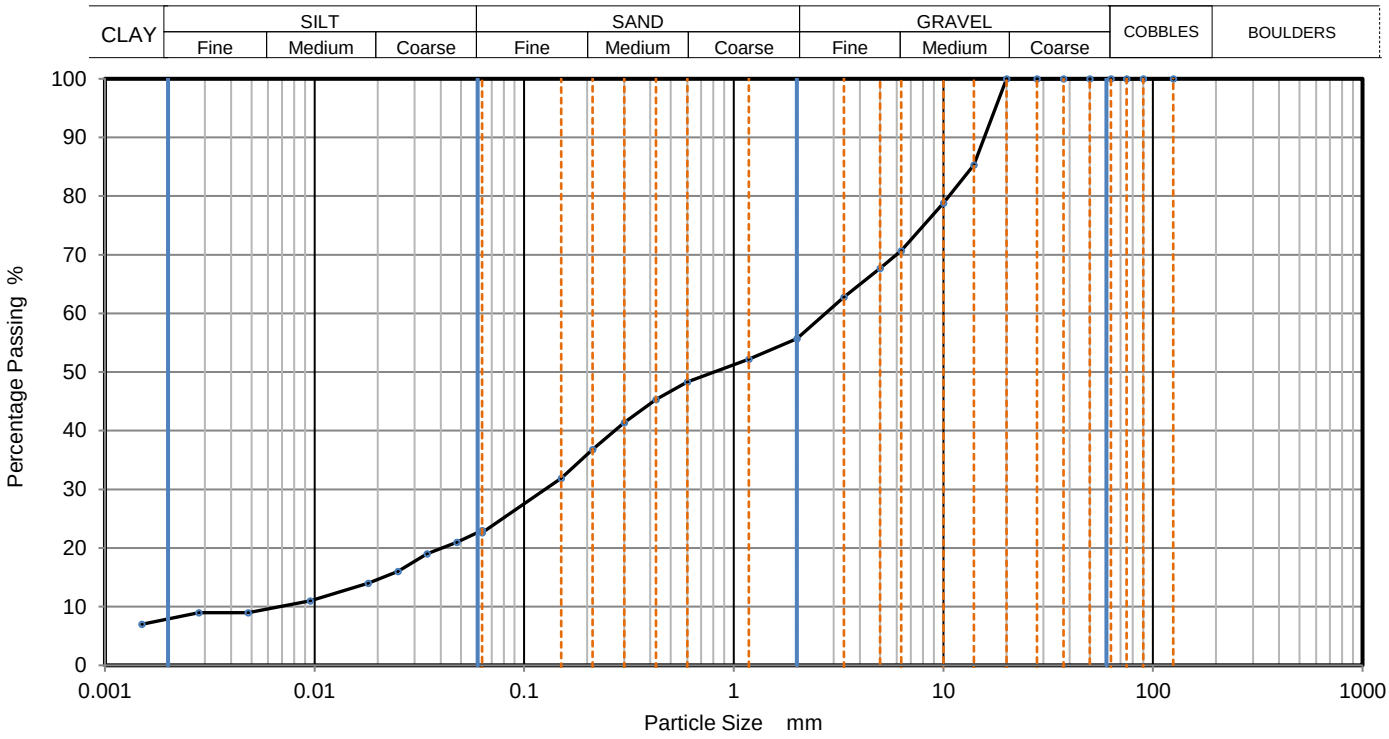
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		BH-7320
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		4
Specimen Description	Brown slightly gravelly clayey fine to coarse SAND.				Sample Depth (m)	Top	6.70
						Base	7.50
Specimen Reference	3	Specimen Depth	6.7	m	Sample Type		C
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022101724



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	23
90	100	0.04770	21
75	100	0.03444	19
63	100	0.02501	16
50	100	0.01802	14
37.5	100	0.00953	11
28	100	0.00482	9
20	100	0.00280	9
14	85	0.00150	7
10	79		
6.3	71		
5	68		
3.35	63		
2	56		
1.18	52		
0.6	48	Particle density	(assumed)
0.425	45	2.65	Mg/m3
0.3	41		
0.212	37		
0.15	32		
0.063	23		

Dry Mass of sample, g: 582

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	44.3
Sand	33.1
Silt	15.0
Clay	7.6

Grading Analysis		
D100	mm	
D60	mm	2.73
D30	mm	0.126
D10	mm	0.00616
Uniformity Coefficient		440
Curvature Coefficient		0.95

Remarks

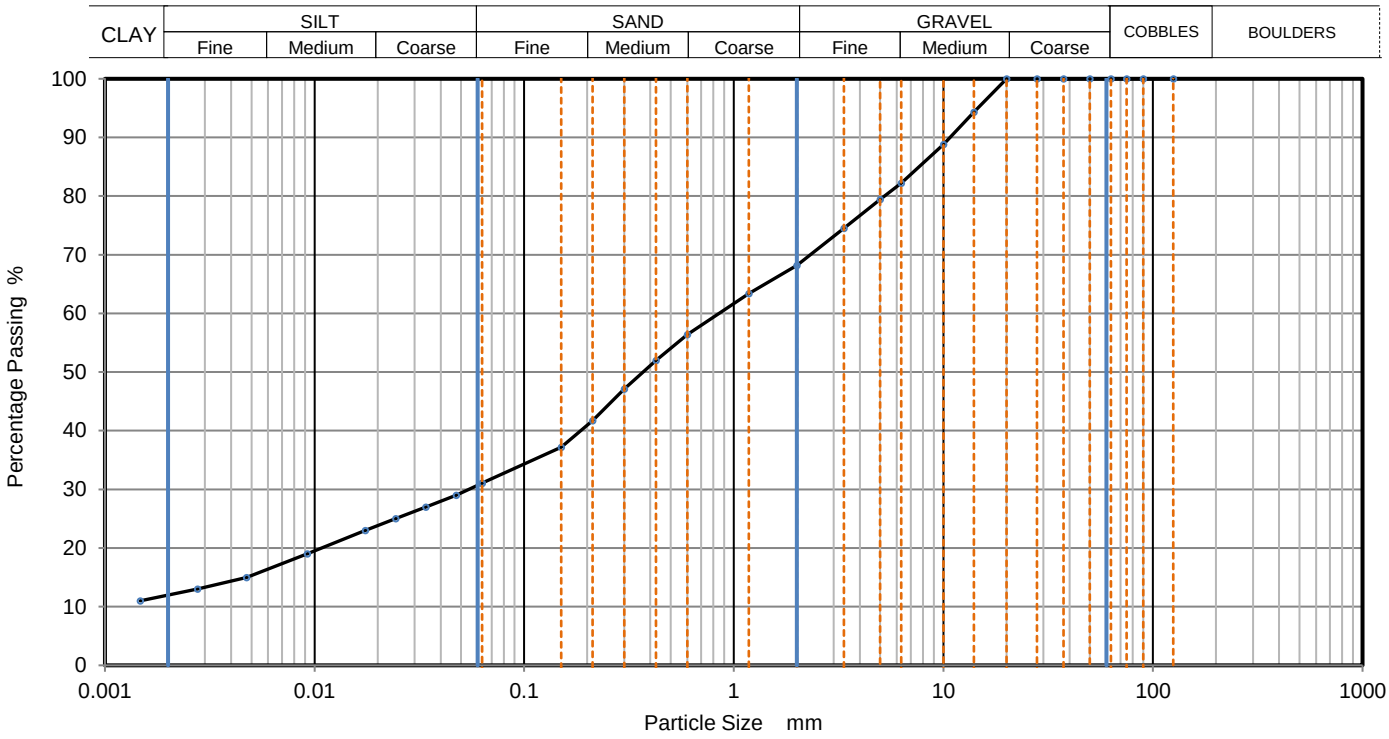
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-7320
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	5
Specimen Description	Greyish brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	8.50
				Base	9.00
Specimen Reference	3	Specimen Depth	8.5 m	Sample Type	C
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022101725



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06275	31
90	100	0.04735	29
75	100	0.03396	27
63	100	0.02435	25
50	100	0.01745	23
37.5	100	0.00925	19
28	100	0.00474	15
20	100	0.00277	13
14	94	0.00147	11
10	89		
6.3	82		
5	79		
3.35	75		
2	68		
1.18	63		
0.6	56	Particle density	(assumed)
0.425	52	2.65	Mg/m3
0.3	47		
0.212	42		
0.15	37		
0.063	31		

Dry Mass of sample, g: 547

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	31.8
Sand	37.1
Silt	19.1
Clay	12.0

Grading Analysis		
D100	mm	
D60	mm	0.847
D30	mm	0.0538
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

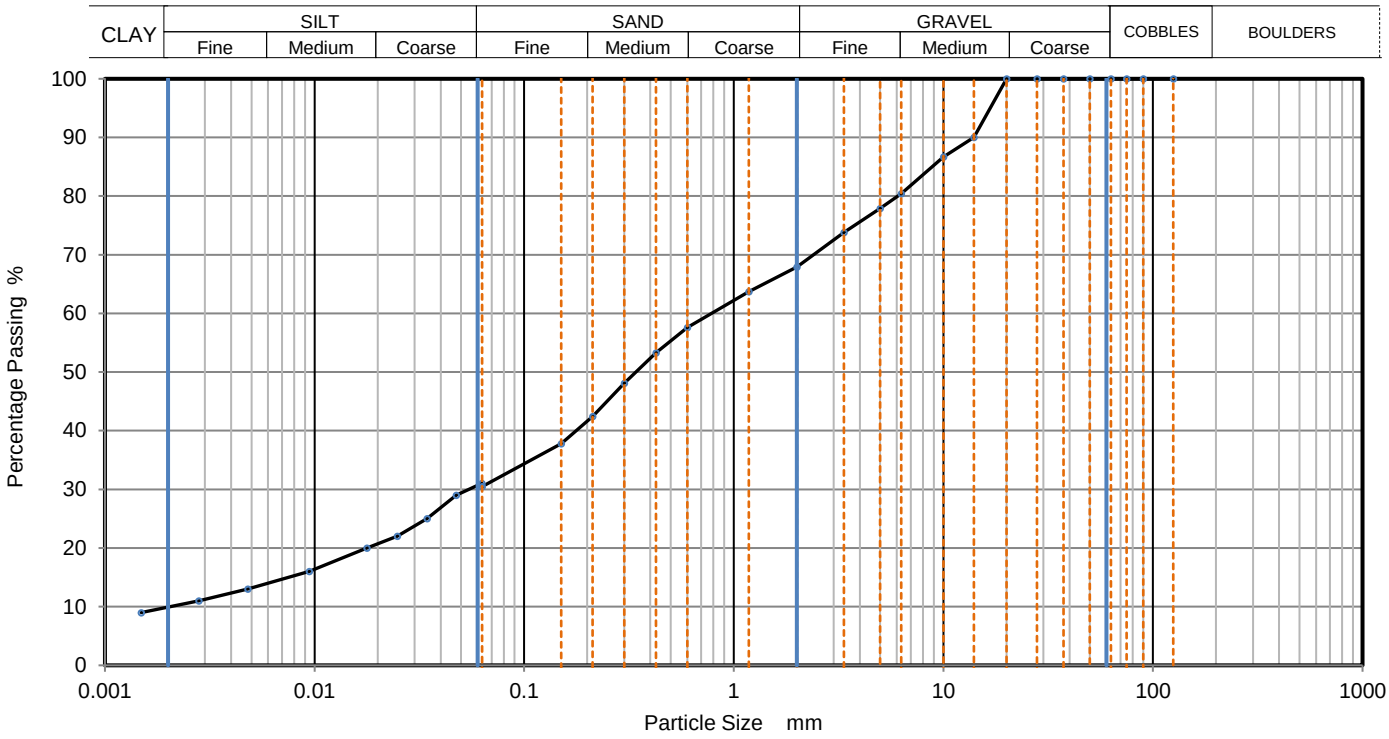
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-7320
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	6
Specimen Description	Greyish brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	11.20
				Base	11.50
Specimen Reference	3	Specimen Depth	11.2 m	Sample Type	C
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022101726



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06275	31
90	100	0.04735	29
75	100	0.03443	25
63	100	0.02484	22
50	100	0.01779	20
37.5	100	0.00942	16
28	100	0.00479	13
20	100	0.00280	11
14	90	0.00149	9
10	87		
6.3	80		
5	78		
3.35	74		
2	68		
1.18	64		
0.6	58	Particle density	(assumed)
0.425	53	2.65	Mg/m3
0.3	48		
0.212	42		
0.15	38		
0.063	31		

Dry Mass of sample, g: 637

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	32.1
Sand	37.4
Silt	20.7
Clay	9.8

Grading Analysis		
D100	mm	
D60	mm	0.783
D30	mm	0.0584
D10	mm	0.00215
Uniformity Coefficient		360
Curvature Coefficient		2

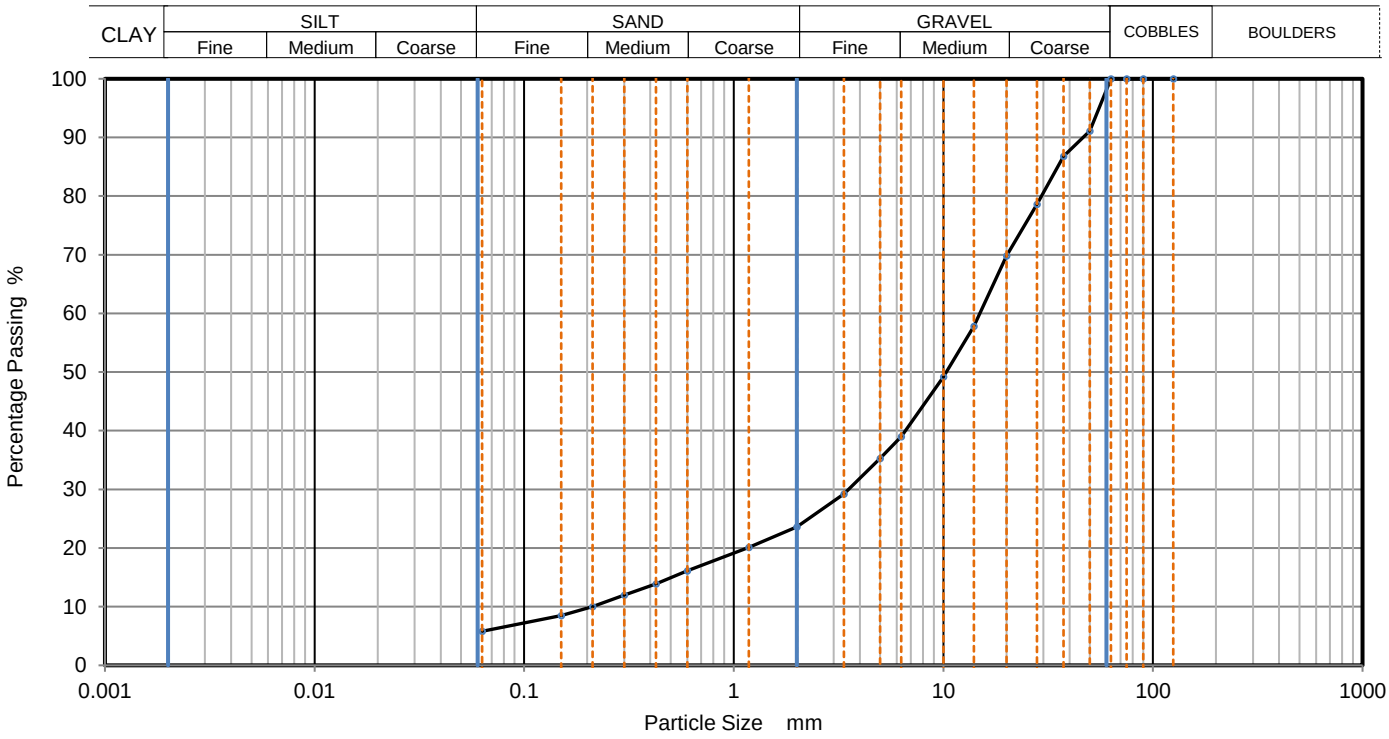
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-7349
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Greyish brown gravelly clayey fine to coarse SAND.			Sample Depth (m) Top	1.20
				Base	2.00
Specimen Reference	2	Specimen Depth	1.2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022081582



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	91		
37.5	87		
28	79		
20	70		
14	58		
10	49		
6.3	39		
5	35		
3.35	29		
2	24		
1.18	20		
0.6	16		
0.425	14		
0.3	12		
0.212	10		
0.15	9		
0.063	6		

Dry Mass of sample, g: 7499

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	76.4
Sand	17.8
Fines <0.063mm	6.0

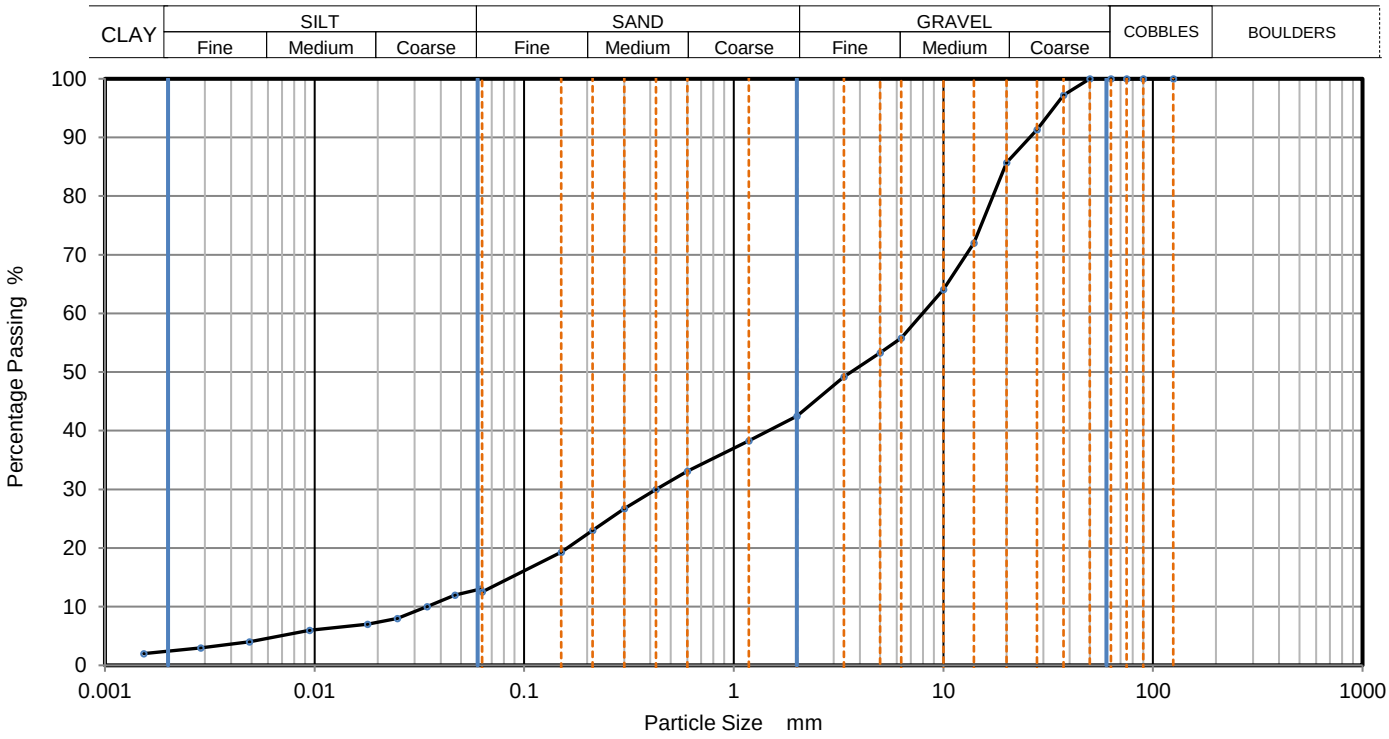
Grading Analysis		
D100	mm	
D60	mm	15
D30	mm	3.53
D10	mm	0.21
Uniformity Coefficient		71
Curvature Coefficient		4

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-7349
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	4
Specimen Description	Greyish brown gravelly clayey fine to coarse SAND.			Sample Depth (m) Top	3.00
				Base	4.00
Specimen Reference	2	Specimen Depth	3 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022081583



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06183	13
90	100	0.04667	12
75	100	0.03444	10
63	100	0.02484	8
50	100	0.01791	7
37.5	97	0.00948	6
28	91	0.00488	4
20	86	0.00286	3
14	72	0.00153	2
10	64		
6.3	56		
5	53		
3.35	49		
2	43		
1.18	38		
0.6	33	Particle density	(assumed)
0.425	30	2.65	Mg/m3
0.3	27		
0.212	23		
0.15	19		
0.063	13		

Dry Mass of sample, g: 10465

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	57.5
Sand	30.0
Silt	10.2
Clay	2.3

Grading Analysis		
D100	mm	
D60	mm	7.95
D30	mm	0.424
D10	mm	0.0366
Uniformity Coefficient		220
Curvature Coefficient		0.62

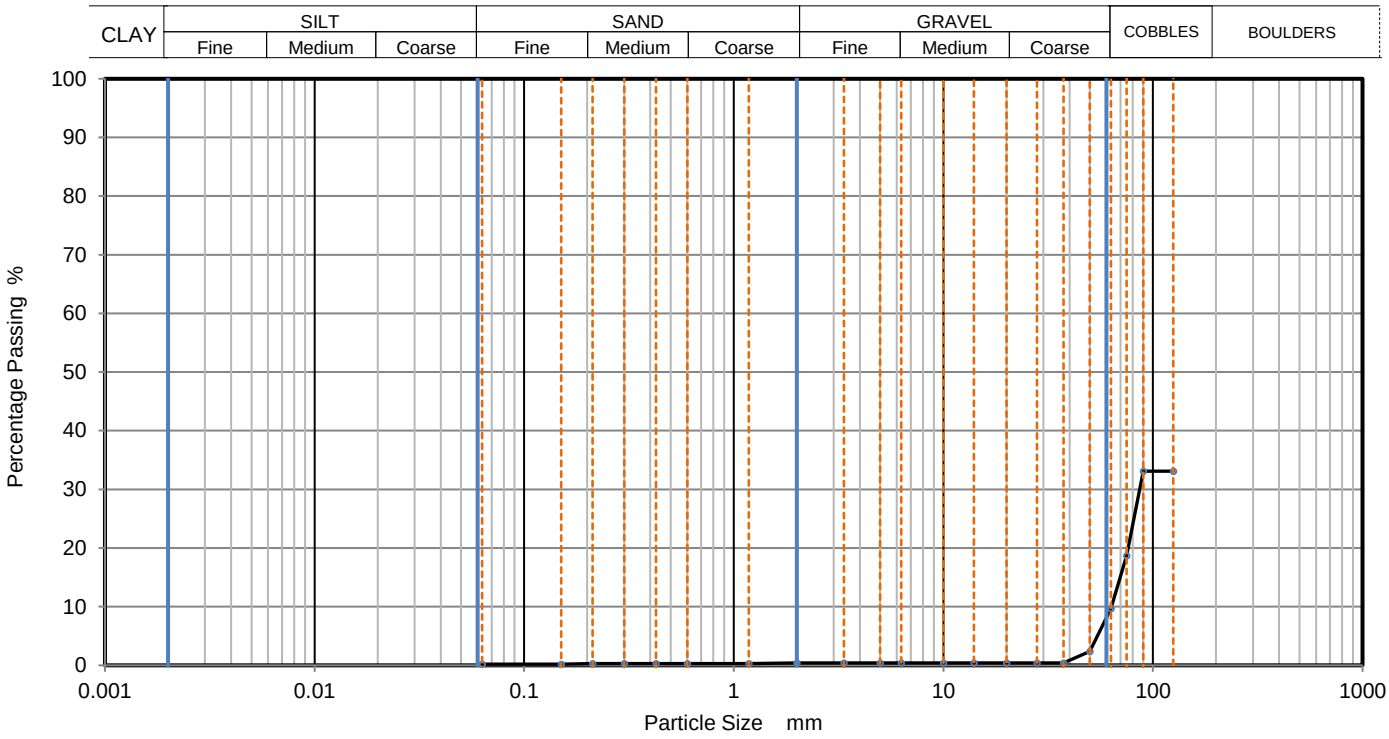
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-7349
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	5
Specimen Description	Grey COBBLES.			Sample Depth (m) Top	4.00
				Base	5.00
Specimen Reference	2	Specimen Depth	4 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022081584



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	33		
90	33		
75	19		
63	10		
50	2		
37.5	0		
28	0		
20	0		
14	0		
10	0		
6.3	0		
5	0		
3.35	0		
2	0		
1.18	0		
0.6	0		
0.425	0		
0.3	0		
0.212	0		
0.15	0		
0.063	0		

Dry Mass of sample, g	7239

Sample Proportions	% dry mass
Cobbles	90.3
Gravel	9.3
Sand	0.2
Fines <0.063mm	0.0

Grading Analysis		
D100	mm	
D60	mm	
D30	mm	86.6
D10	mm	63.4
Uniformity Coefficient		
Curvature Coefficient		

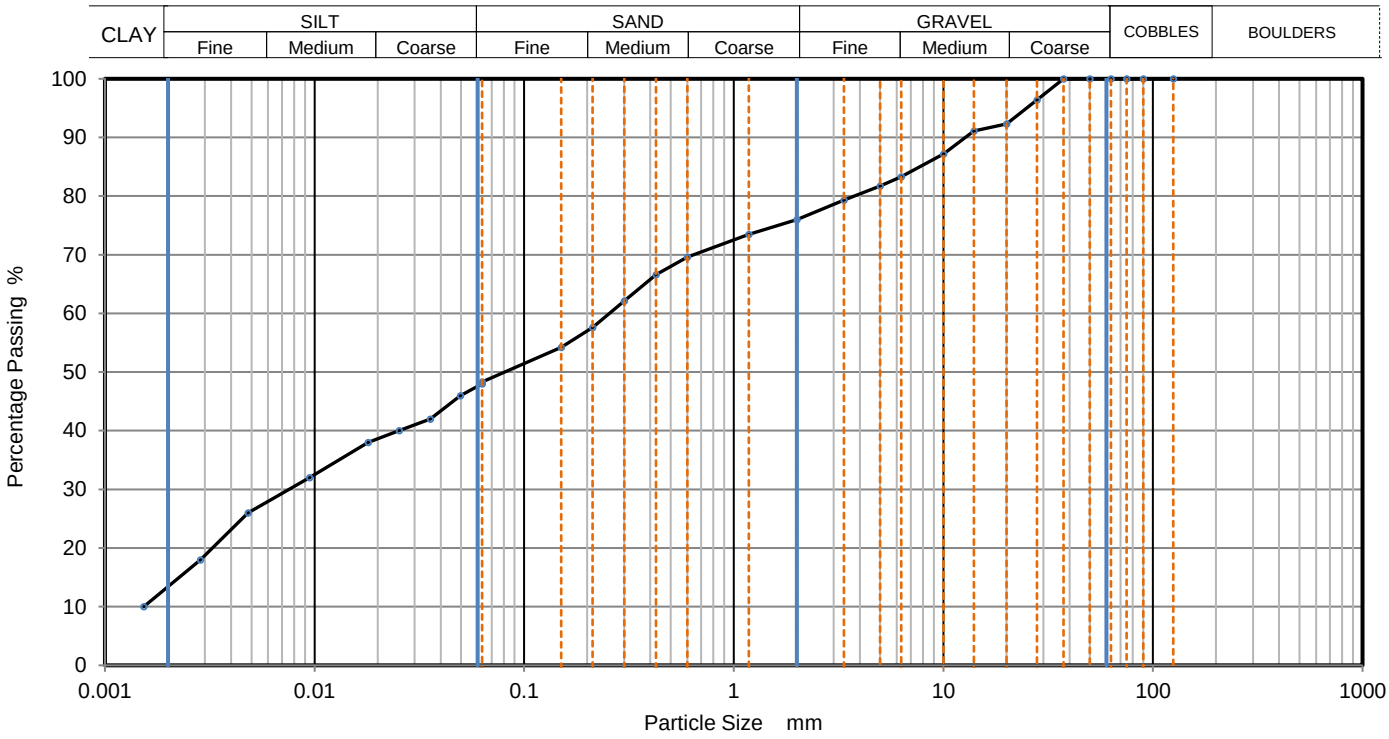
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					**21-1682**
Borehole/Pit No.					BH-7349
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	6
Specimen Description	Brown sandy gravelly silty CLAY.			Sample Depth (m) Top	6.00
				Base	
Specimen Reference	1	Specimen Depth	6 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus202209020



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	48
90	100	0.04969	46
75	100	0.03559	42
63	100	0.02533	40
50	100	0.01802	38
37.5	100	0.00948	32
28	96	0.00482	26
20	92	0.00285	18
14	91	0.00153	10
10	87		
6.3	83		
5	82		
3.35	79		
2	76		
1.18	74		
0.6	70	Particle density (assumed)	
0.425	67	2.65 Mg/m3	
0.3	62		
0.212	58		
0.15	54		
0.063	48		

Dry Mass of sample, g: 2624

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	24.0
Sand	27.7
Silt	34.8
Clay	13.5

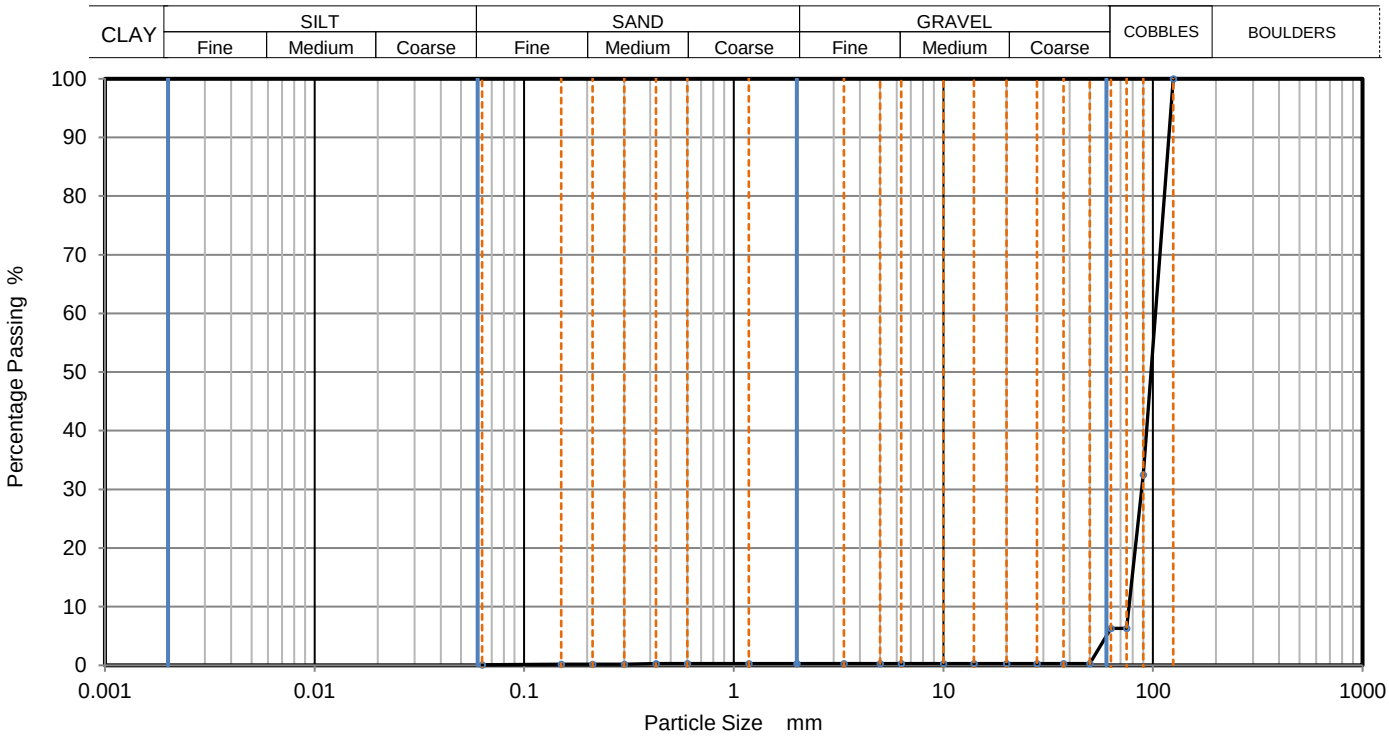
Grading Analysis		
D100	mm	
D60	mm	0.256
D30	mm	0.00741
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		BH-7349
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		14
Specimen Description	Grey COBBLES.				Sample Depth (m)	Top	6.50
						Base	7.30
Specimen Reference	4	Specimen Depth	6.5	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clause 9.2				KeyLAB ID		Caus2022081585



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	33		
75	6		
63	6		
50	0		
37.5	0		
28	0		
20	0		
14	0		
10	0		
6.3	0		
5	0		
3.35	0		
2	0		
1.18	0		
0.6	0		
0.425	0		
0.3	0		
0.212	0		
0.15	0		
0.063	0		

Dry Mass of sample, g	9287

Sample Proportions	% dry mass
Cobbles	93.7
Gravel	6.0
Sand	0.2
Fines <0.063mm	0.0

Grading Analysis		
D100	mm	125
D60	mm	103
D30	mm	88.5
D10	mm	77
Uniformity Coefficient		1.3
Curvature Coefficient		0.99

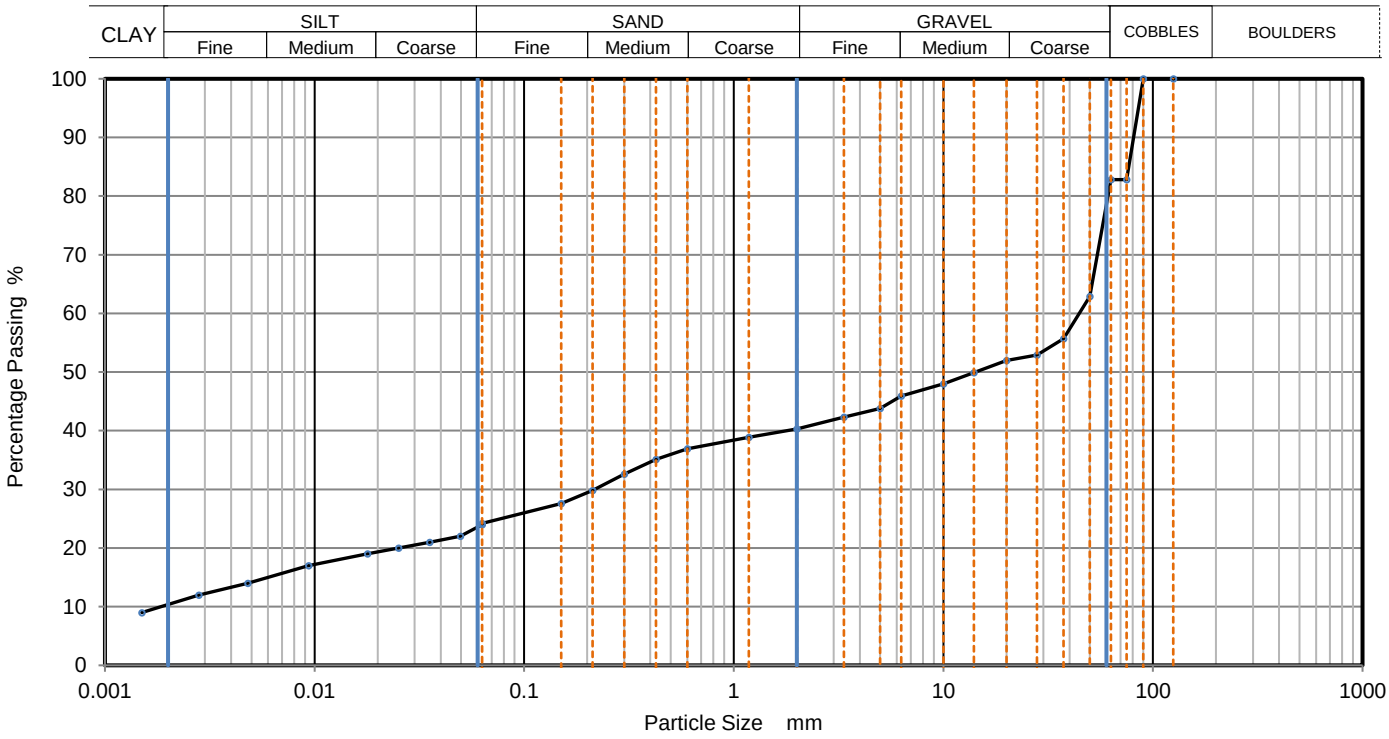
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					**21-1682**
Borehole/Pit No.					BH-7349
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	16
Specimen Description	Greyish brown sandy gravelly silty CLAY with some cobbles..			Sample Depth (m) Top	8.00
				Base	9.50
Specimen Reference	2	Specimen Depth	8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022081588



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	24
90	100	0.04969	22
75	83	0.03536	21
63	83	0.02517	20
50	63	0.01791	19
37.5	56	0.00936	17
28	53	0.00480	14
20	52	0.00280	12
14	50	0.00150	9
10	48		
6.3	46		
5	44		
3.35	42		
2	40		
1.18	39		
0.6	37	Particle density	(assumed)
0.425	35	2.65	Mg/m3
0.3	33		
0.212	30		
0.15	28		
0.063	24		

Dry Mass of sample, g: 6302

Sample Proportions	% dry mass
Cobbles	17.2
Gravel	42.4
Sand	16.2
Silt	14.1
Clay	10.1

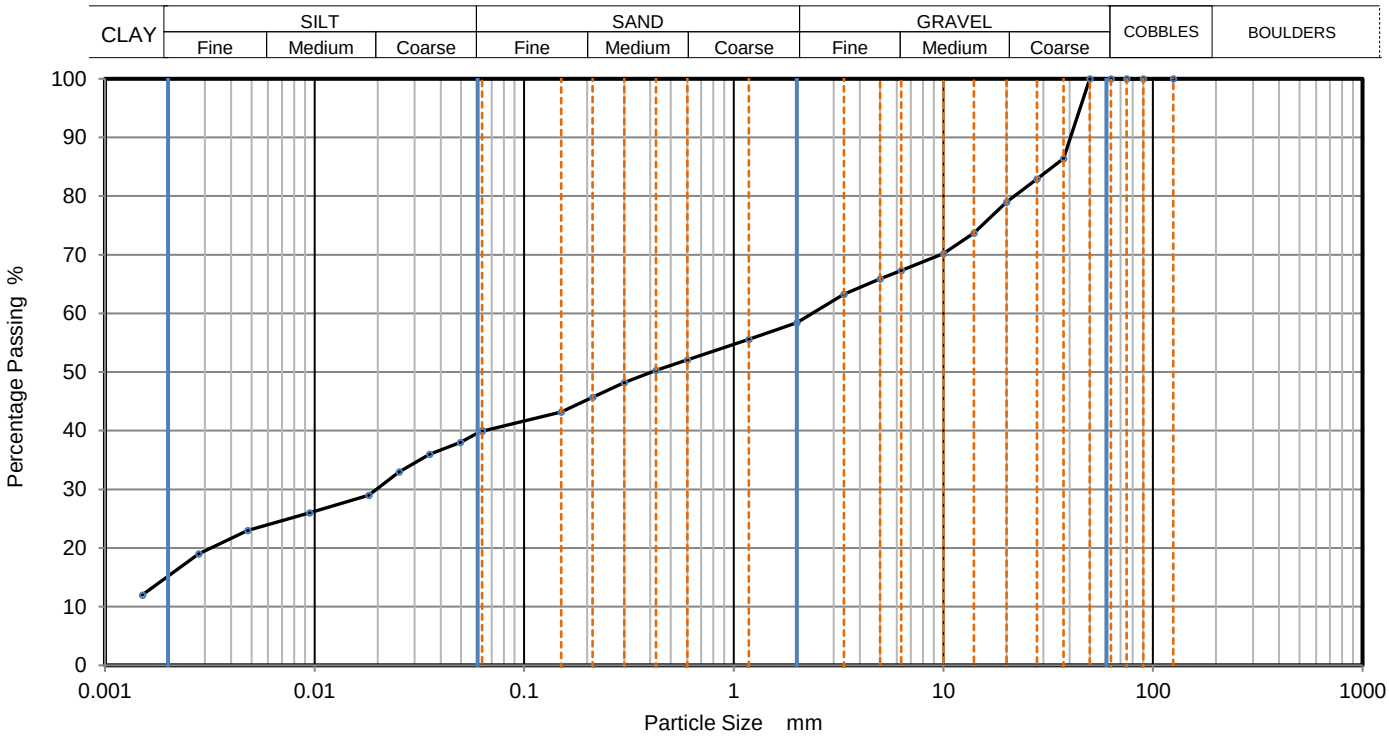
Grading Analysis		
D100	mm	
D60	mm	44.6
D30	mm	0.218
D10	mm	0.00198
Uniformity Coefficient		23000
Curvature Coefficient		0.54

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-7349
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Brownish grey sandy gravelly silty CLAY.			Sample Depth (m) Top	13.20
				Base	14.20
Specimen Reference	2	Specimen Depth	13.2 m	Sample Type	C
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus202210202



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	40
90	100	0.04968	38
75	100	0.03536	36
63	100	0.02532	33
50	100	0.01813	29
37.5	86	0.00948	26
28	83	0.00479	23
20	79	0.00280	19
14	74	0.00151	12
10	70		
6.3	67		
5	66		
3.35	63		
2	58		
1.18	56		
0.6	52	Particle density	(assumed)
0.425	50	2.65	Mg/m3
0.3	48		
0.212	46		
0.15	43		
0.063	40		

Dry Mass of sample, g: 3664

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	41.6
Sand	18.5
Silt	24.6
Clay	15.3

Grading Analysis		
D100	mm	
D60	mm	2.37
D30	mm	0.019
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

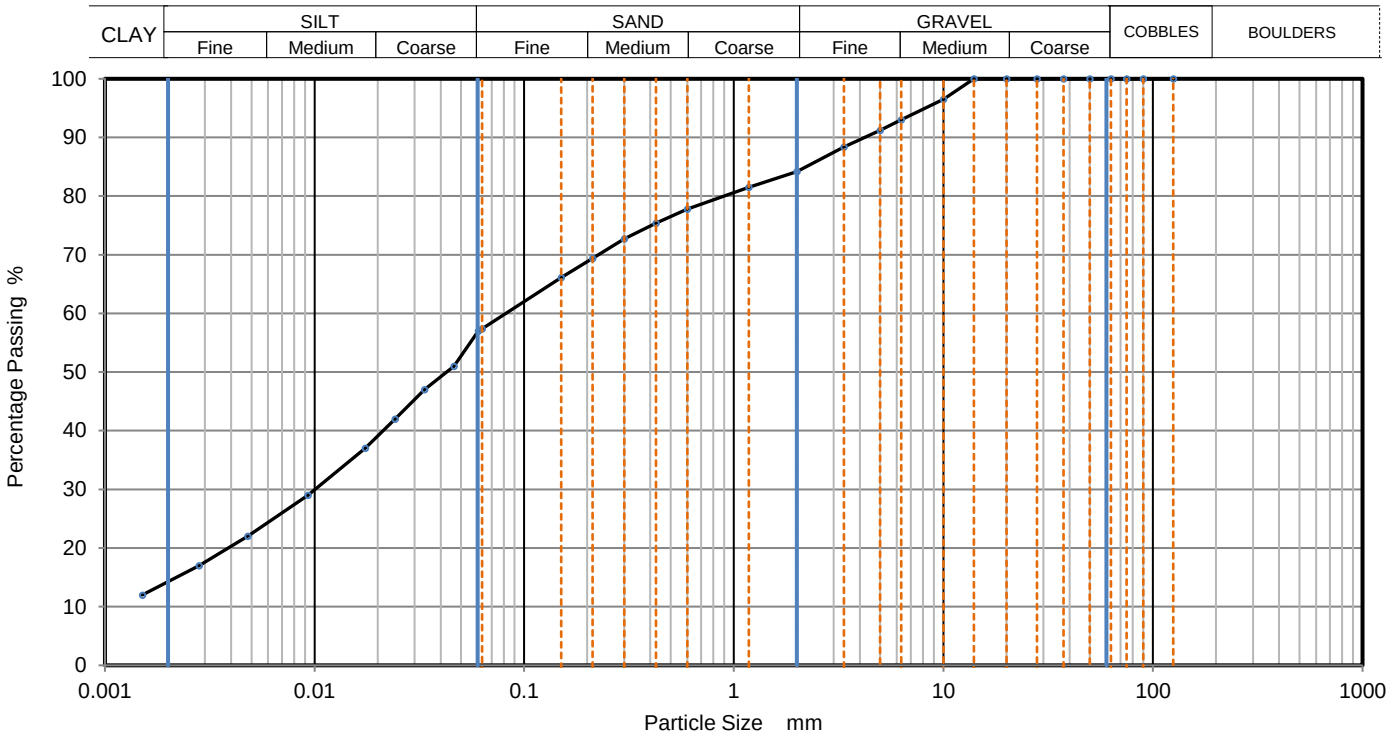
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-8940
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Greyish brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	0.70
				Base	1.50
Specimen Reference	3	Specimen Depth	0.7 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022083138



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06039	57
90	100	0.04632	51
75	100	0.03349	47
63	100	0.02418	42
50	100	0.01745	37
37.5	100	0.00931	29
28	100	0.00480	22
20	100	0.00282	17
14	100	0.00151	12
10	97		
6.3	93		
5	91		
3.35	88		
2	84		
1.18	82		
0.6	78	Particle density	(assumed)
0.425	75	2.65	Mg/m3
0.3	73		
0.212	69		
0.15	66		
0.063	57		

Dry Mass of sample, g: 566

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	15.8
Sand	26.8
Silt	42.9
Clay	14.5

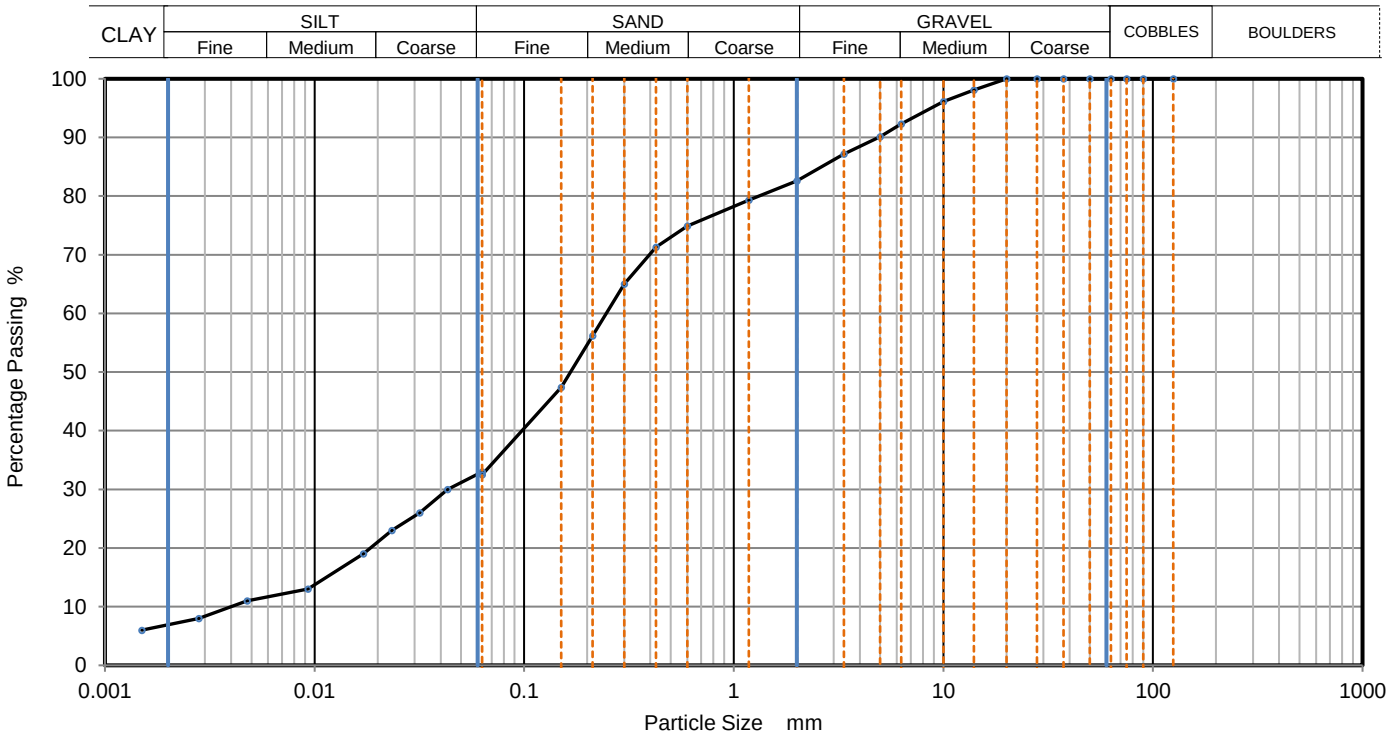
Grading Analysis		
D100	mm	
D60	mm	0.0816
D30	mm	0.00971
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-8940
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	4
Specimen Description	Orangish brown slightly gravelly clayey fine to coarse SAND.			Sample Depth (m) Top	2.30
				Base	3.00
Specimen Reference	3	Specimen Depth	2.3 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022083140



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	33
90	100	0.04307	30
75	100	0.03175	26
63	100	0.02333	23
50	100	0.01710	19
37.5	100	0.00931	13
28	100	0.00477	11
20	100	0.00280	8
14	98	0.00150	6
10	96		
6.3	92		
5	90		
3.35	87		
2	83		
1.18	79		
0.6	75	Particle density	(assumed)
0.425	71	2.65	Mg/m3
0.3	65		
0.212	56		
0.15	47		
0.063	33		

Dry Mass of sample, g: 540

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	17.4
Sand	50.1
Silt	25.2
Clay	7.3

Grading Analysis		
D100	mm	
D60	mm	0.246
D30	mm	0.045
D10	mm	0.0041
Uniformity Coefficient		60
Curvature Coefficient		2

Remarks

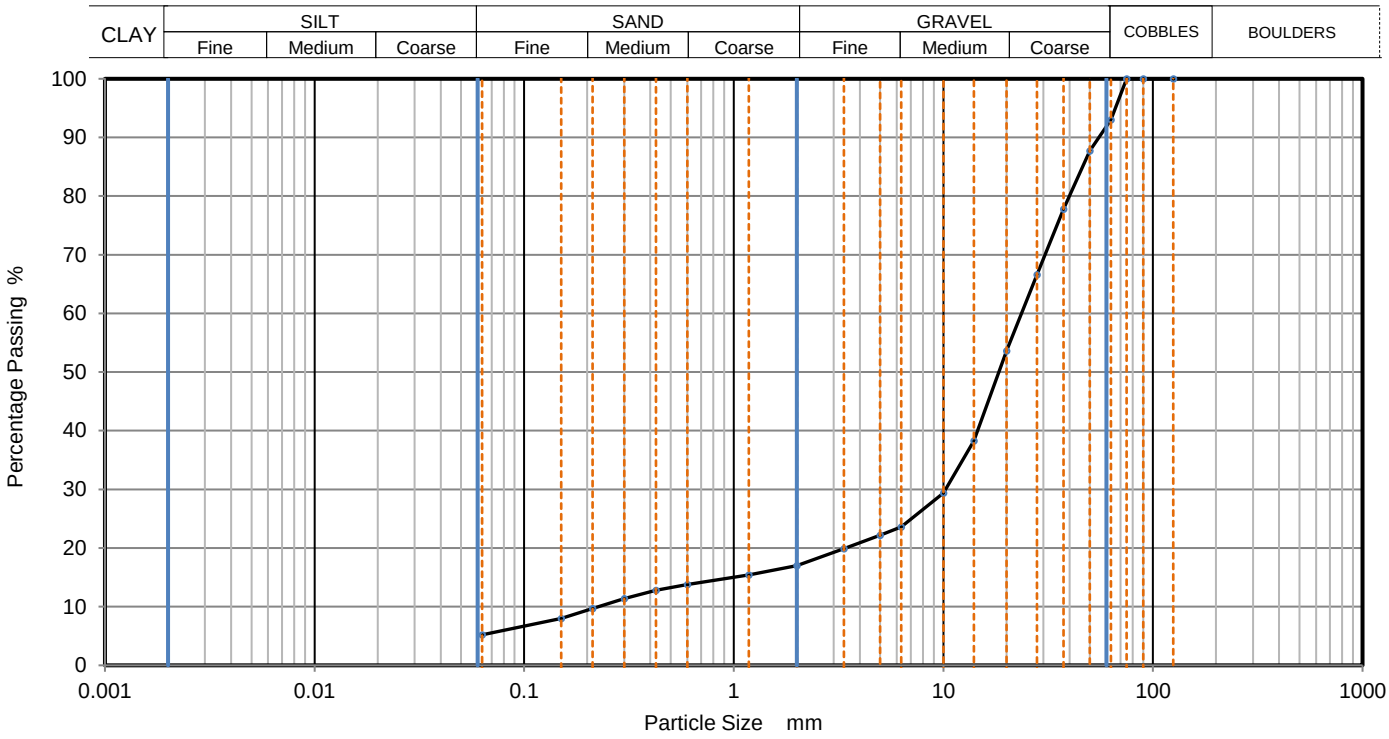
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	BH-8940
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	8
Specimen Description	Greyish brown slightly sandy subangular fine to coarse GRAVEL.			Sample Depth (m) Top	5.10
				Base	6.00
Specimen Reference	3	Specimen Depth	5.1 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022083142



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	93		
50	88		
37.5	78		
28	67		
20	54		
14	38		
10	29		
6.3	24		
5	22		
3.35	20		
2	17		
1.18	15		
0.6	14		
0.425	13		
0.3	11		
0.212	10		
0.15	8		
0.063	5		

Dry Mass of sample, g: 14756

Sample Proportions	% dry mass
Cobbles	7.0
Gravel	76.0
Sand	11.8
Fines <0.063mm	5.0

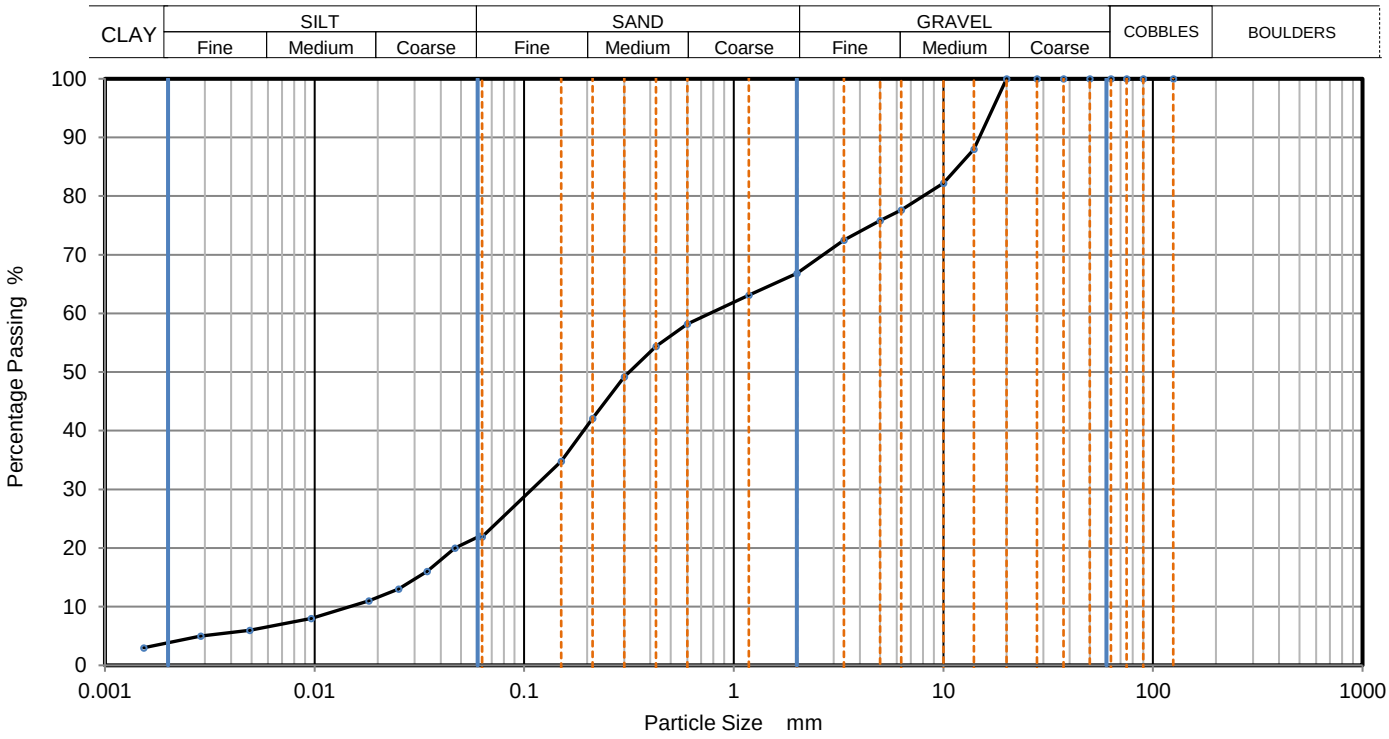
Grading Analysis		
D100	mm	
D60	mm	23.6
D30	mm	10.2
D10	mm	0.225
Uniformity Coefficient		100
Curvature Coefficient		20

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Joseph

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		BH-8940
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		10
Specimen Description	Greyish brown slightly gravelly clayey fine to coarse SAND.				Sample Depth (m)	Top	6.40
						Base	7.50
Specimen Reference	3	Specimen Depth	6.4	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022083143



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06135	22
90	100	0.04667	20
75	100	0.03444	16
63	100	0.02517	13
50	100	0.01813	11
37.5	100	0.00965	8
28	100	0.00491	6
20	100	0.00286	5
14	88	0.00153	3
10	82		
6.3	78		
5	76		
3.35	73		
2	67		
1.18	63		
0.6	58	Particle density	(assumed)
0.425	54	2.65	Mg/m3
0.3	49		
0.212	42		
0.15	35		
0.063	22		

Dry Mass of sample, g: 510

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	33.2
Sand	44.9
Silt	18.0
Clay	3.9

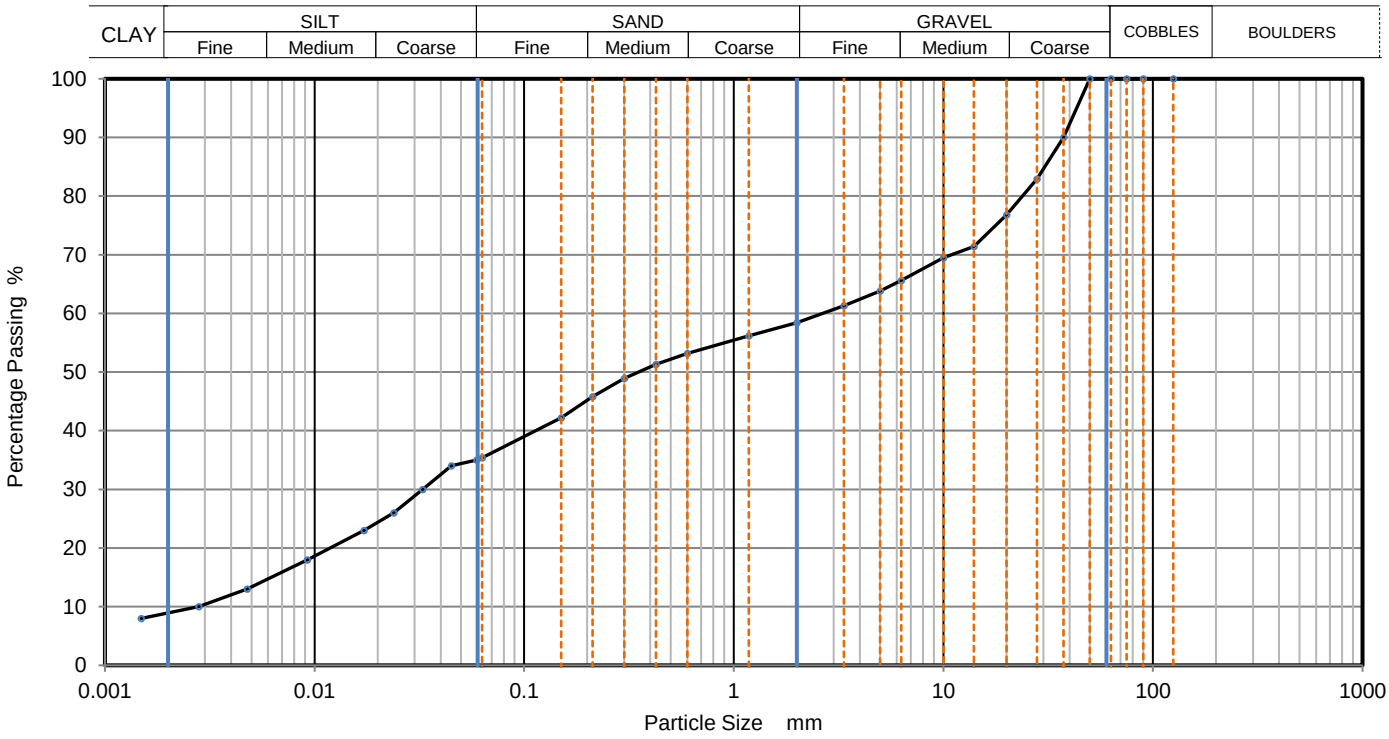
Grading Analysis		
D100	mm	
D60	mm	0.77
D30	mm	0.108
D10	mm	0.0141
Uniformity Coefficient		55
Curvature Coefficient		1.1

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	BH-9668
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Purplish brown sandy gravelly silty CLAY.			Sample Depth (m) Top	0.30
				Base	1.50
Specimen Reference	3	Specimen Depth	0.3 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022083144



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.05940	35
90	100	0.04490	34
75	100	0.03275	30
63	100	0.02384	26
50	100	0.01722	23
37.5	90	0.00925	18
28	83	0.00477	13
20	77	0.00280	10
14	71	0.00149	8
10	70		
6.3	66		
5	64		
3.35	61		
2	58		
1.18	56		
0.6	53	Particle density	(assumed)
0.425	51	2.65	Mg/m3
0.3	49		
0.212	46		
0.15	42		
0.063	35		

Dry Mass of sample, g: 2974

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	41.6
Sand	23.0
Silt	26.1
Clay	9.3

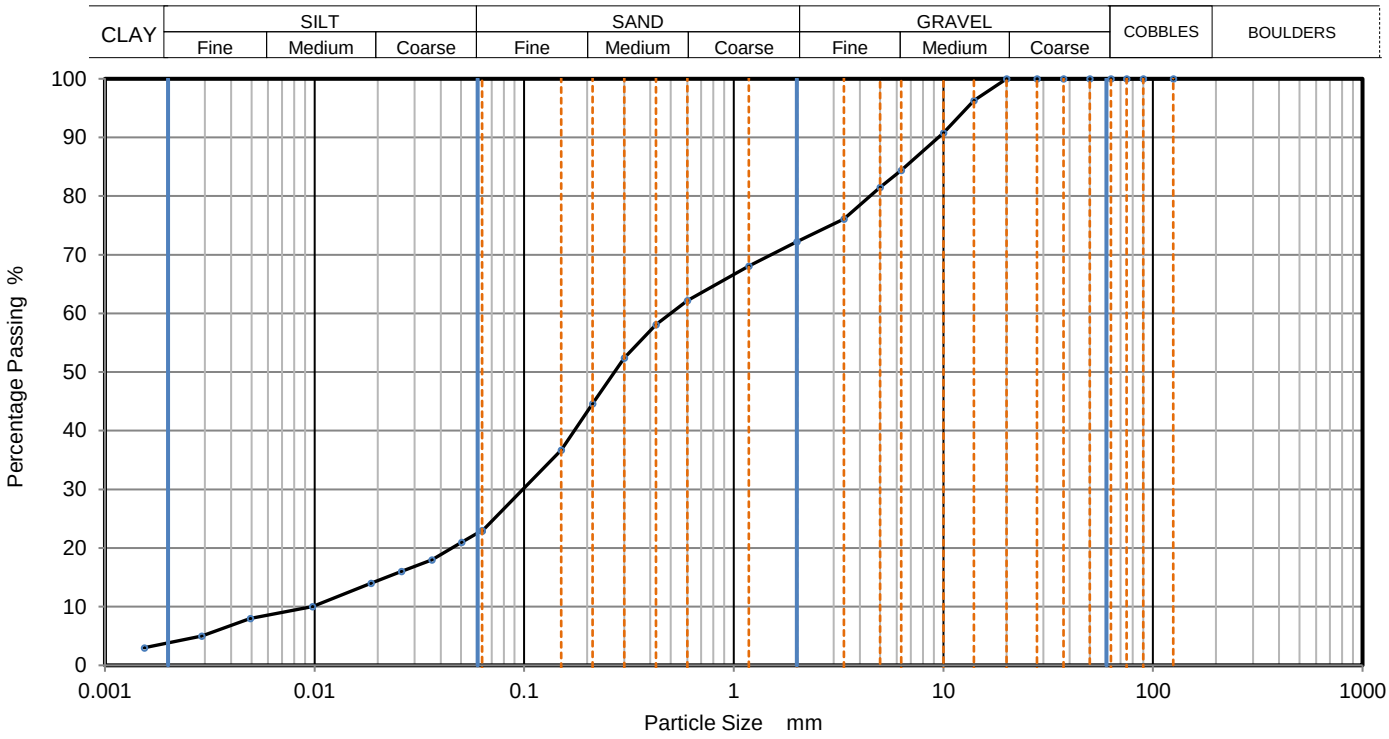
Grading Analysis		
D100	mm	
D60	mm	2.67
D30	mm	0.0333
D10	mm	0.00258
Uniformity Coefficient		1000
Curvature Coefficient		0.16

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		BH-9668
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		3
Specimen Description	Purplish brown slightly gravelly clayey fine to ocarse SAND.				Sample Depth (m)	Top	2.70
						Base	3.30
Specimen Reference	3	Specimen Depth	2.7	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022083147



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	23
90	100	0.05032	21
75	100	0.03626	18
63	100	0.02595	16
50	100	0.01857	14
37.5	100	0.00976	10
28	100	0.00493	8
20	100	0.00289	5
14	96	0.00154	3
10	91		
6.3	84		
5	82		
3.35	76		
2	72		
1.18	68		
0.6	62	Particle density	(assumed)
0.425	58	2.65	Mg/m3
0.3	52		
0.212	45		
0.15	37		
0.063	23		

Dry Mass of sample, g: 578

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	27.8
Sand	49.3
Silt	18.9
Clay	4.0

Grading Analysis		
D100	mm	
D60	mm	0.498
D30	mm	0.0987
D10	mm	0.00853
Uniformity Coefficient		58
Curvature Coefficient		2.3

Remarks

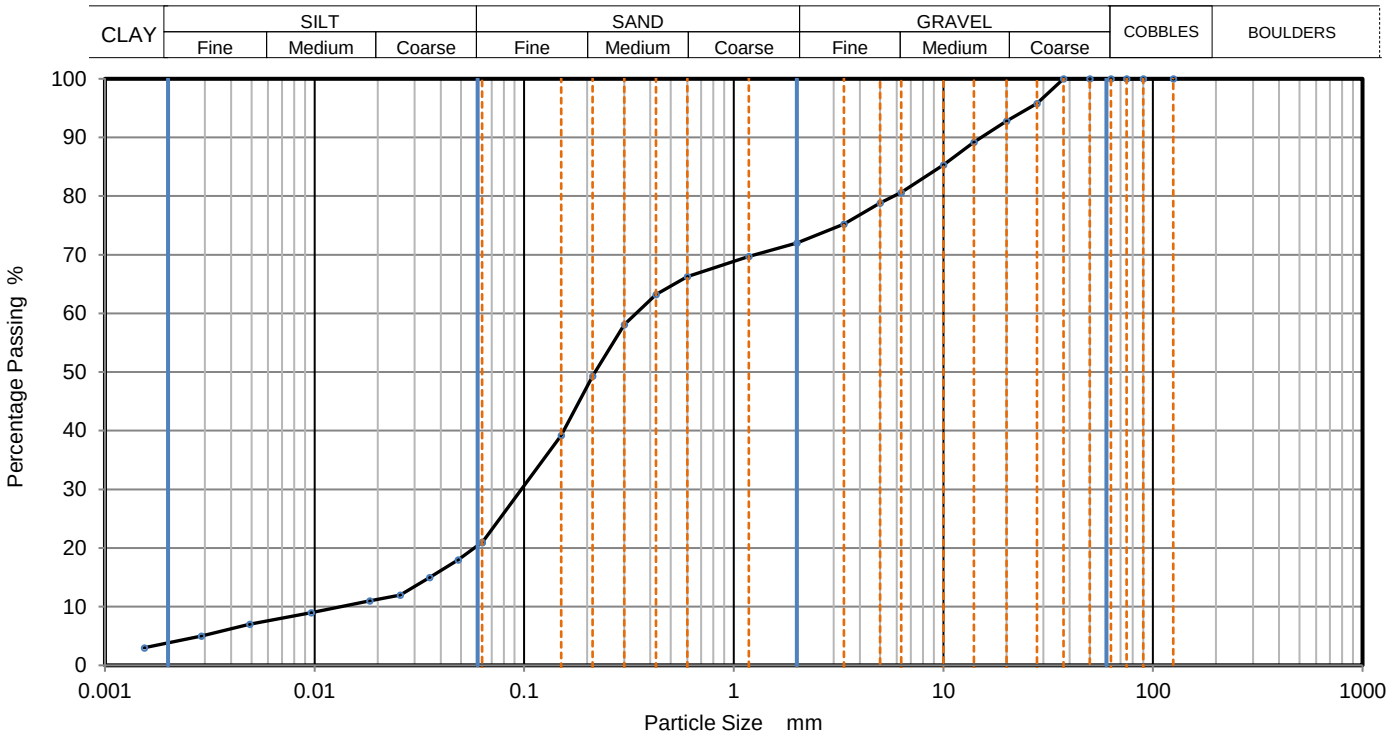
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	DS-11208A
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	6
Specimen Description	Greyish brown slightly gravelly clayey fine to coarse SAND.			Sample Depth (m) Top	1.50
				Sample Depth (m) Base	
Specimen Reference	3	Specimen Depth	1.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022083150



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	21
90	100	0.04837	18
75	100	0.03536	15
63	100	0.02564	12
50	100	0.01835	11
37.5	100	0.00965	9
28	96	0.00491	7
20	93	0.00288	5
14	89	0.00154	3
10	85		
6.3	81		
5	79		
3.35	75		
2	72		
1.18	70		
0.6	66	Particle density	(assumed)
0.425	63	2.65	Mg/m3
0.3	58		
0.212	49		
0.15	39		
0.063	21		

Dry Mass of sample, g: 3860

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	28.0
Sand	51.1
Silt	17.4
Clay	3.5

Grading Analysis		
D100	mm	
D60	mm	0.342
D30	mm	0.097
D10	mm	0.0143
Uniformity Coefficient		24
Curvature Coefficient		1.9

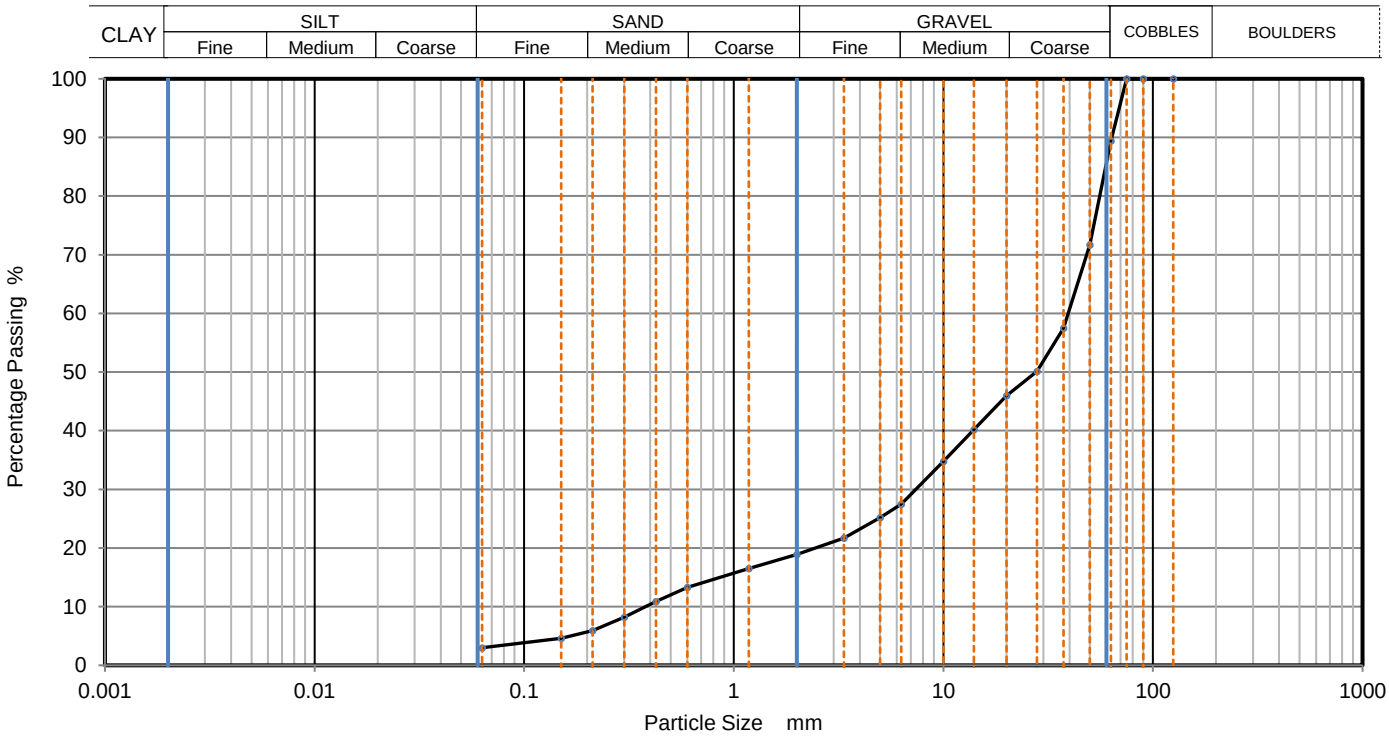
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					**21-1682**
Borehole/Pit No.					DS-1202
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brown gravelly slightly silty fine to coarse SAND.			Sample Depth (m) Top	0.80
				Base	1.40
Specimen Reference	4	Specimen Depth	0.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022090879



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	89		
50	72		
37.5	58		
28	50		
20	46		
14	40		
10	35		
6.3	28		
5	25		
3.35	22		
2	19		
1.18	17		
0.6	13		
0.425	11		
0.3	8		
0.212	6		
0.15	5		
0.063	3		

Dry Mass of sample, g: 4706

Sample Proportions	% dry mass
Cobbles	10.6
Gravel	70.5
Sand	15.9
Fines <0.063mm	3.0

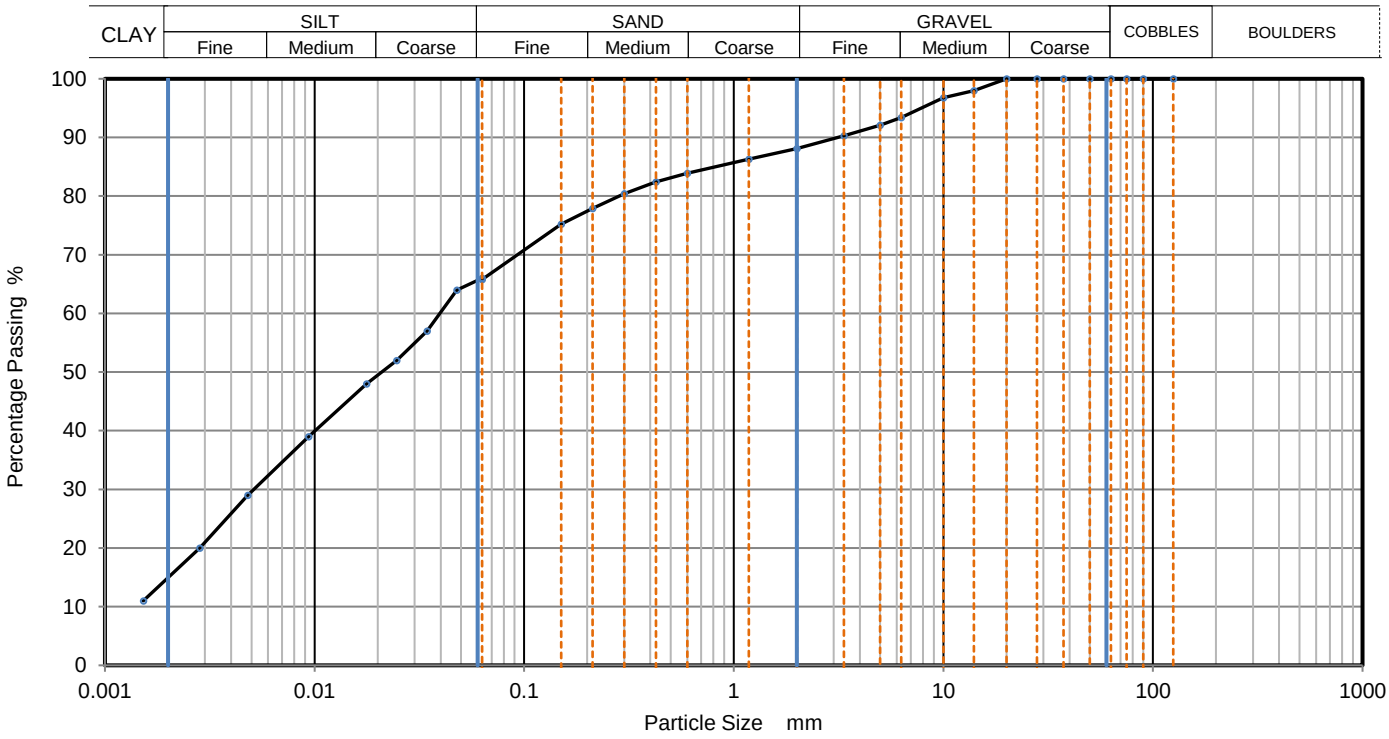
Grading Analysis		
D100	mm	
D60	mm	39.5
D30	mm	7.4
D10	mm	0.38
Uniformity Coefficient		100
Curvature Coefficient		3.7

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	DS-17886
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Greyish brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	0.50
				Sample Depth (m) Base	
Specimen Reference	6	Specimen Depth	0.5 m	Sample Type	D
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022090896



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	66
90	100	0.04769	64
75	100	0.03443	57
63	100	0.02468	52
50	100	0.01768	48
37.5	100	0.00936	39
28	100	0.00479	29
20	100	0.00283	20
14	98	0.00152	11
10	97		
6.3	93		
5	92		
3.35	90		
2	88		
1.18	86		
0.6	84	Particle density 2.65	(assumed) Mg/m3
0.425	82		
0.3	80		
0.212	78		
0.15	75		
0.063	66		

Dry Mass of sample, g: 500

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	11.9
Sand	22.3
Silt	50.5
Clay	15.3

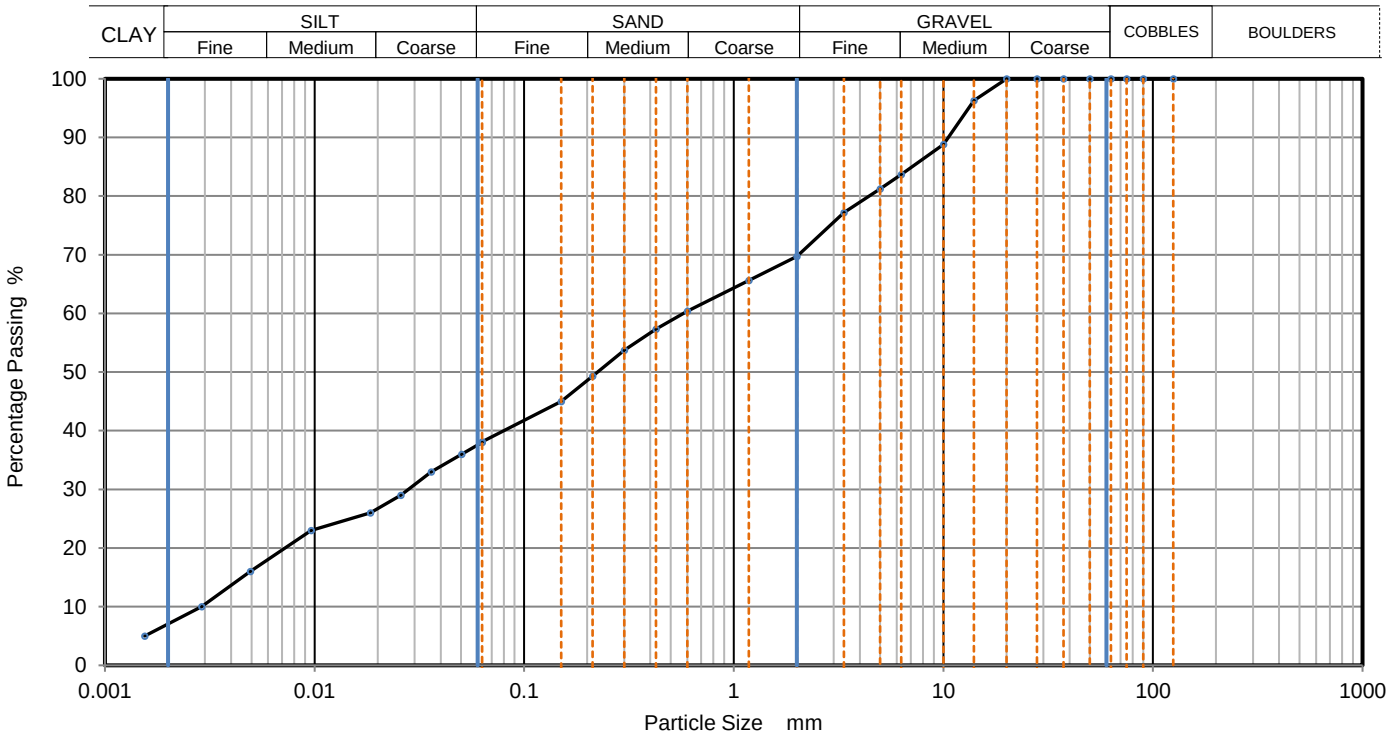
Grading Analysis		
D100	mm	
D60	mm	0.0403
D30	mm	0.00498
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	DS-19007
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	0.80
				Base	1.70
Specimen Reference	2	Specimen Depth	0.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022090880



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	38
90	100	0.05033	36
75	100	0.03604	33
63	100	0.02580	29
50	100	0.01846	26
37.5	100	0.00965	23
28	100	0.00493	16
20	100	0.00290	10
14	96	0.00155	5
10	89		
6.3	84		
5	81		
3.35	77		
2	70		
1.18	66		
0.6	60	Particle density	(assumed)
0.425	57	2.65	Mg/m3
0.3	54		
0.212	49		
0.15	45		
0.063	38		

Dry Mass of sample, g: 500

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	30.3
Sand	31.6
Silt	30.8
Clay	7.3

Grading Analysis		
D100	mm	
D60	mm	0.575
D30	mm	0.0272
D10	mm	0.00276
Uniformity Coefficient		210
Curvature Coefficient		0.47

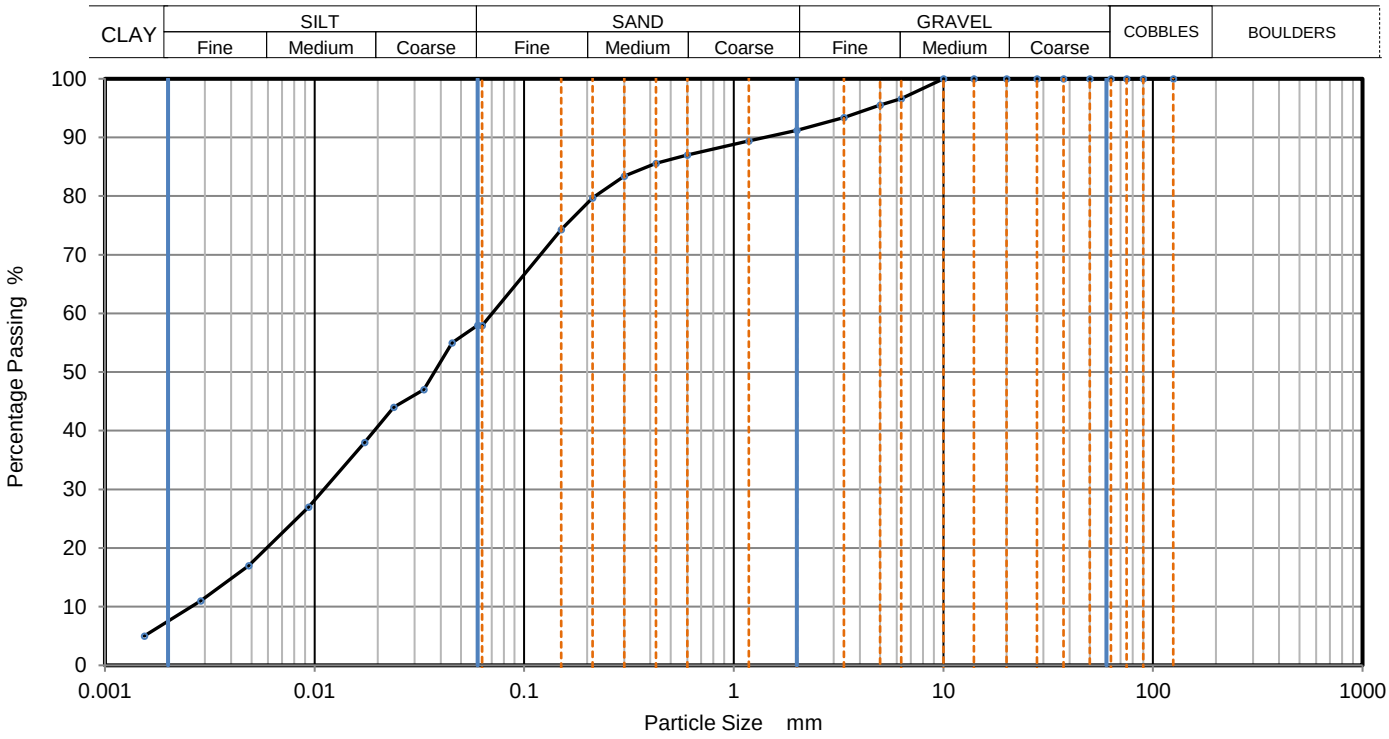
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	DS-19160A
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Grey sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	0.50
				Sample Depth (m) Base	
Specimen Reference	6	Specimen Depth	0.5 m	Sample Type	D
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022090897



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.05989	58
90	100	0.04526	55
75	100	0.03324	47
63	100	0.02384	44
50	100	0.01733	38
37.5	100	0.00936	27
28	100	0.00485	17
20	100	0.00286	11
14	100	0.00154	5
10	100		
6.3	97		
5	96		
3.35	93		
2	91		
1.18	89		
0.6	87	Particle density	(assumed)
0.425	86	2.65	Mg/m3
0.3	83		
0.212	80		
0.15	74		
0.063	58		

Dry Mass of sample, g: 256

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	8.8
Sand	33.3
Silt	50.6
Clay	7.3

Grading Analysis		
D100	mm	
D60	mm	0.0705
D30	mm	0.0113
D10	mm	0.00261
Uniformity Coefficient		27
Curvature Coefficient		0.7

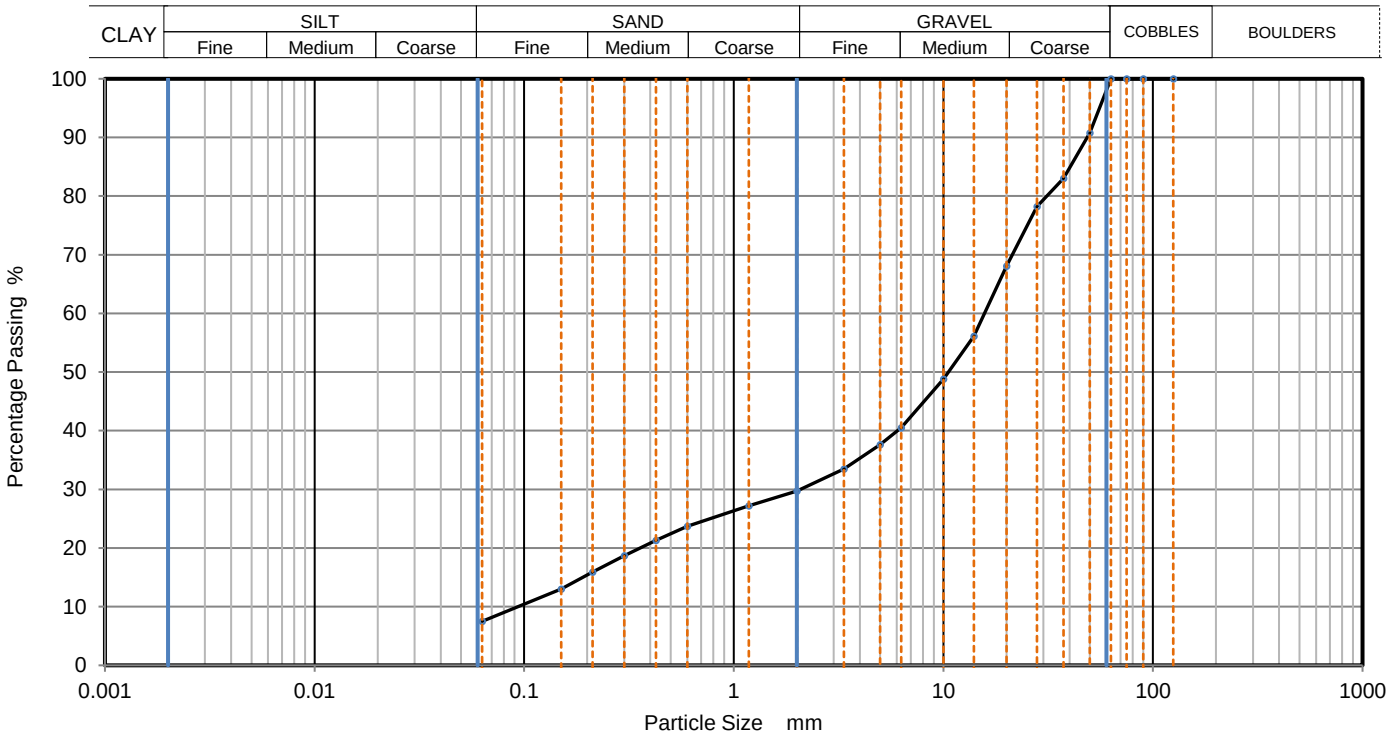
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					DS-28605
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brownish grey slightly sandy slightly silty subangular fine to coarse GRAVEL.			Sample Depth (m) Top	1.20
				Base	2.00
Specimen Reference	4	Specimen Depth	1.2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus20220908117



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	91		
37.5	83		
28	78		
20	68		
14	56		
10	49		
6.3	41		
5	38		
3.35	34		
2	30		
1.18	27		
0.6	24		
0.425	21		
0.3	19		
0.212	16		
0.15	13		
0.063	8		

Dry Mass of sample, g: 6955

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	70.3
Sand	22.3
Fines <0.063mm	7.0

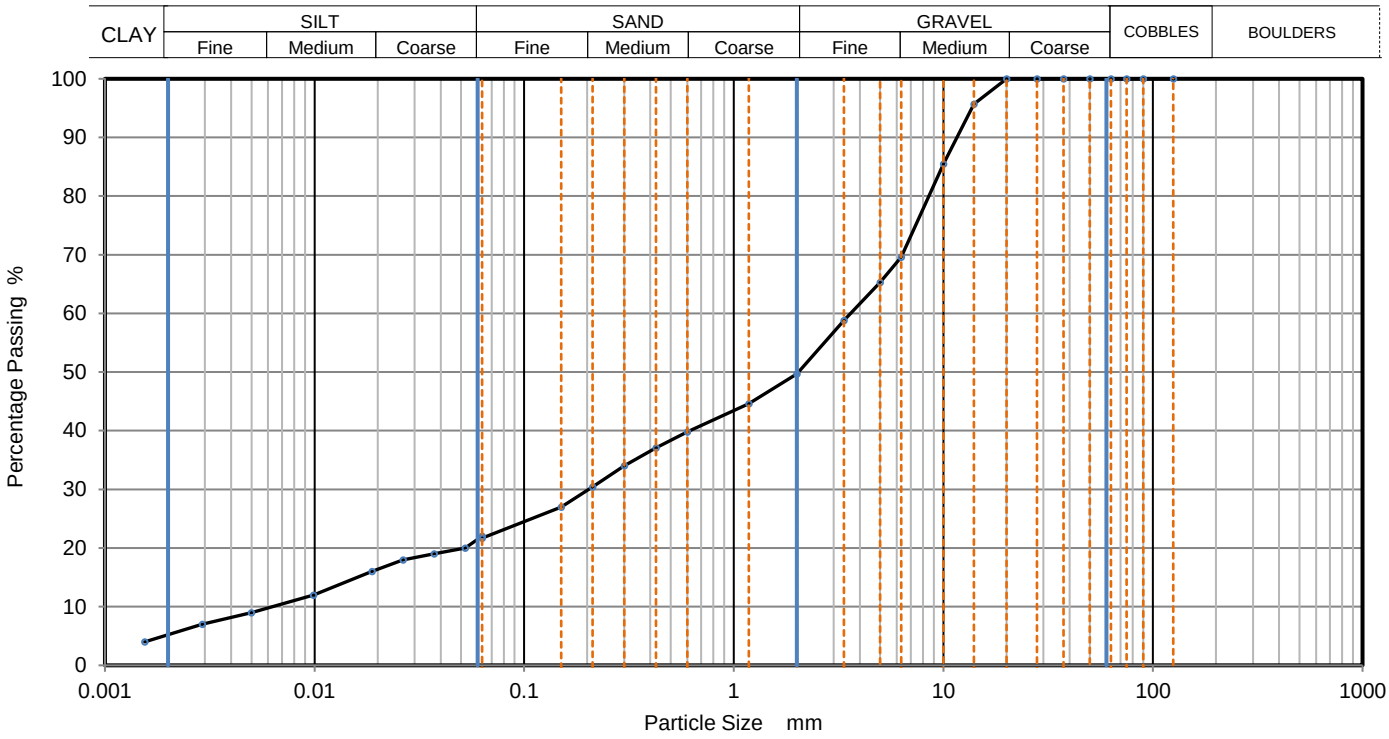
Grading Analysis		
D100	mm	
D60	mm	15.7
D30	mm	2.07
D10	mm	0.0935
Uniformity Coefficient		170
Curvature Coefficient		2.9

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	DS-3384
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brown sandy gravelly silty CLAY.			Sample Depth (m) Top	1.80
				Base	3.20
Specimen Reference	2	Specimen Depth	1.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022090882



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	22
90	100	0.05222	20
75	100	0.03715	19
63	100	0.02642	18
50	100	0.01879	16
37.5	100	0.00987	12
28	100	0.00499	9
20	100	0.00291	7
14	96	0.00155	4
10	86		
6.3	70		
5	65		
3.35	59		
2	50		
1.18	45		
0.6	40	Particle density	(assumed)
0.425	37	2.65	Mg/m3
0.3	34		
0.212	30		
0.15	27		
0.063	22		

Dry Mass of sample, g: 506

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	50.3
Sand	27.9
Silt	16.6
Clay	5.2

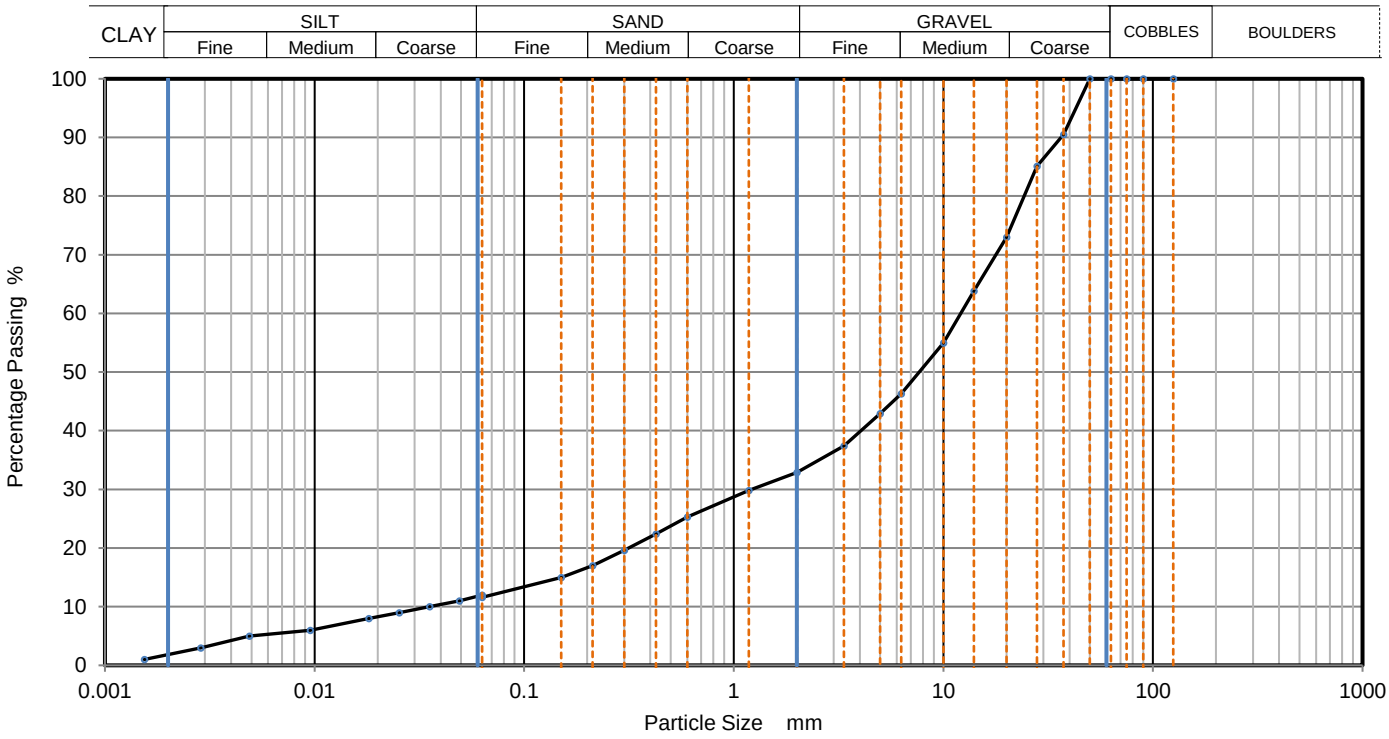
Grading Analysis		
D100	mm	
D60	mm	3.62
D30	mm	0.203
D10	mm	0.00567
Uniformity Coefficient		640
Curvature Coefficient		2

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	DS-999
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	6
Specimen Description	Brown gravelly clayey fine to coarse SAND.			Sample Depth (m) Top	1.90
				Base	3.00
Specimen Reference	4	Specimen Depth	1.9 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022090884



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	12
90	100	0.04902	11
75	100	0.03536	10
63	100	0.02532	9
50	100	0.01813	8
37.5	91	0.00953	6
28	85	0.00488	5
20	73	0.00286	3
14	64	0.00154	1
10	55		
6.3	46		
5	43		
3.35	37		
2	33		
1.18	30		
0.6	25	Particle density	(assumed)
0.425	22	2.65	Mg/m3
0.3	20		
0.212	17		
0.15	15		
0.063	12		

Dry Mass of sample, g: 2445

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	67.1
Sand	21.3
Silt	9.4
Clay	2.2

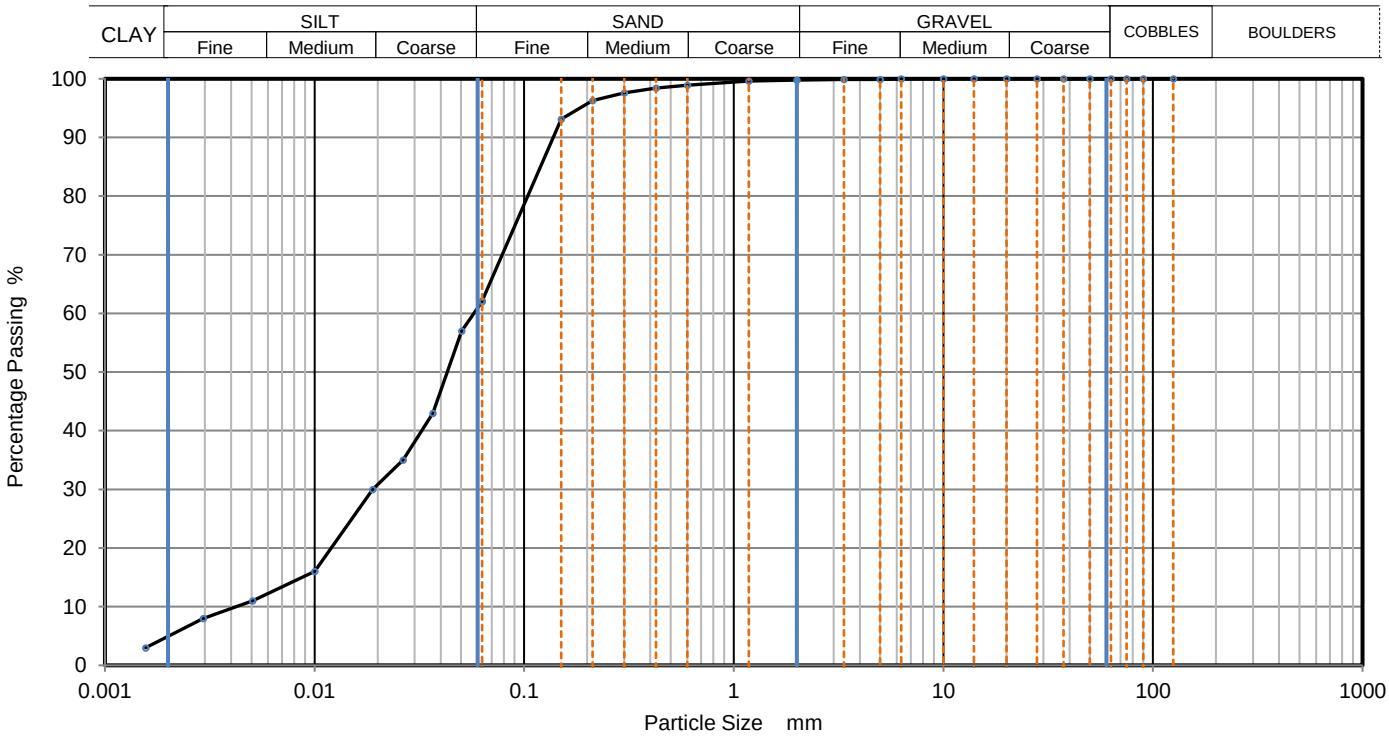
Grading Analysis		
D100	mm	
D60	mm	12.1
D30	mm	1.22
D10	mm	0.0375
Uniformity Coefficient		320
Curvature Coefficient		3.3

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	RK-10199
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Grey sandy slightly clayey SILT with pockets of organic matter.			Sample Depth (m) Top	0.50
				Base	1.00
Specimen Reference	9	Specimen Depth	0.5 m	Sample Type	D
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022090528



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	62
90	100	0.05033	57
75	100	0.03671	43
63	100	0.02642	35
50	100	0.01890	30
37.5	100	0.01003	16
28	100	0.00507	11
20	100	0.00294	8
14	100	0.00156	3
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	99	Particle density	(assumed)
0.425	98	2.65	Mg/m3
0.3	98		
0.212	96		
0.15	93		
0.063	62		

Dry Mass of sample, g: 195

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	0.2
Sand	37.7
Silt	57.3
Clay	4.8

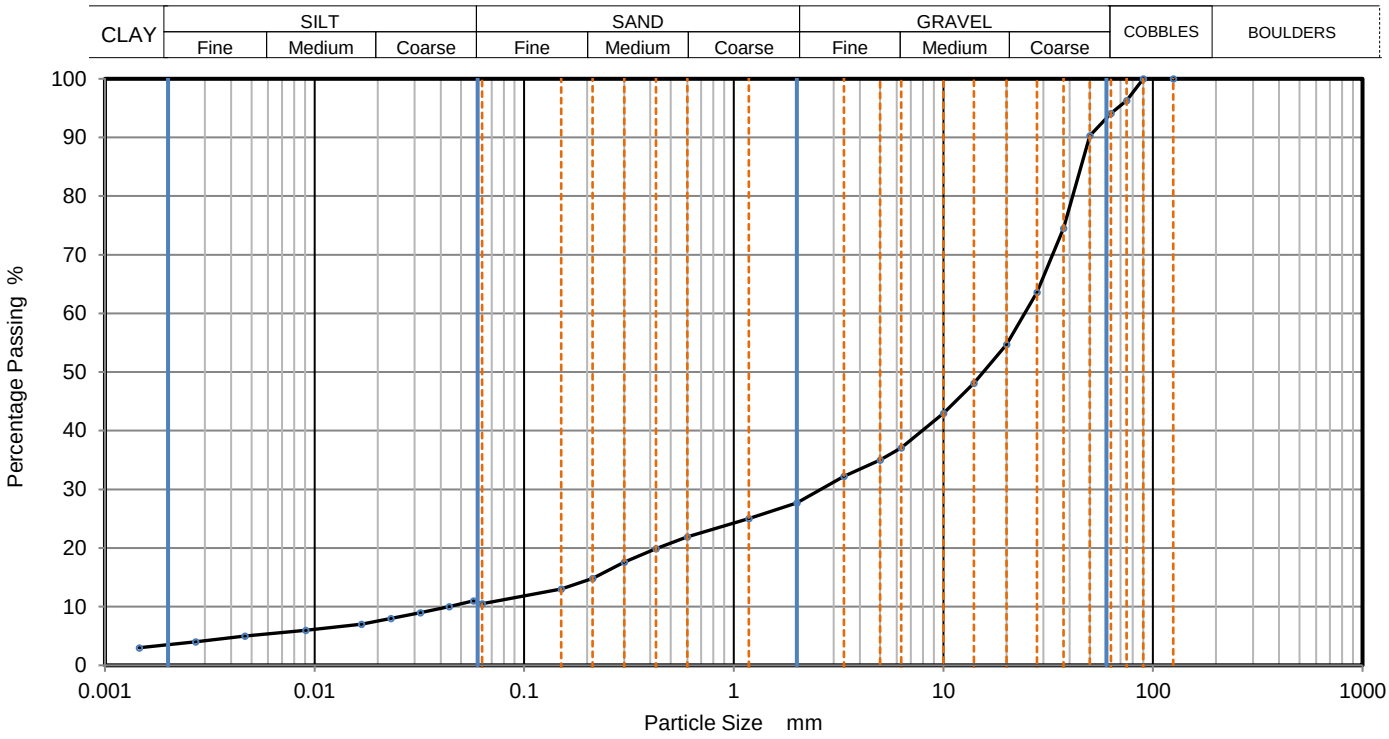
Grading Analysis		
D100	mm	
D60	mm	0.0578
D30	mm	0.0193
D10	mm	0.00431
Uniformity Coefficient		13
Curvature Coefficient		1.5

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION			Job Ref		21-1682
				Borehole/Pit No.		ST-14000
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.		1
Specimen Description	Brownish grey slightly sandy clayey subangular fine to coarse GRAVEL with some cobbles.			Sample Depth (m)	Top	0.20
					Base	0.80
Specimen Reference	2	Specimen Depth	0.2 m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID		Caus2022093083



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.05742	11
90	100	0.04381	10
75	96	0.03201	9
63	94	0.02316	8
50	90	0.01674	7
37.5	75	0.00907	6
28	64	0.00465	5
20	55	0.00270	4
14	48	0.00146	3
10	43		
6.3	37		
5	35		
3.35	32		
2	28		
1.18	25		
0.6	22	Particle density	(assumed)
0.425	20	2.65	Mg/m3
0.3	18		
0.212	15		
0.15	13		
0.063	11		

Dry Mass of sample, g: 13859

Sample Proportions	% dry mass
Cobbles	5.9
Gravel	66.5
Sand	17.1
Silt	6.6
Clay	3.9

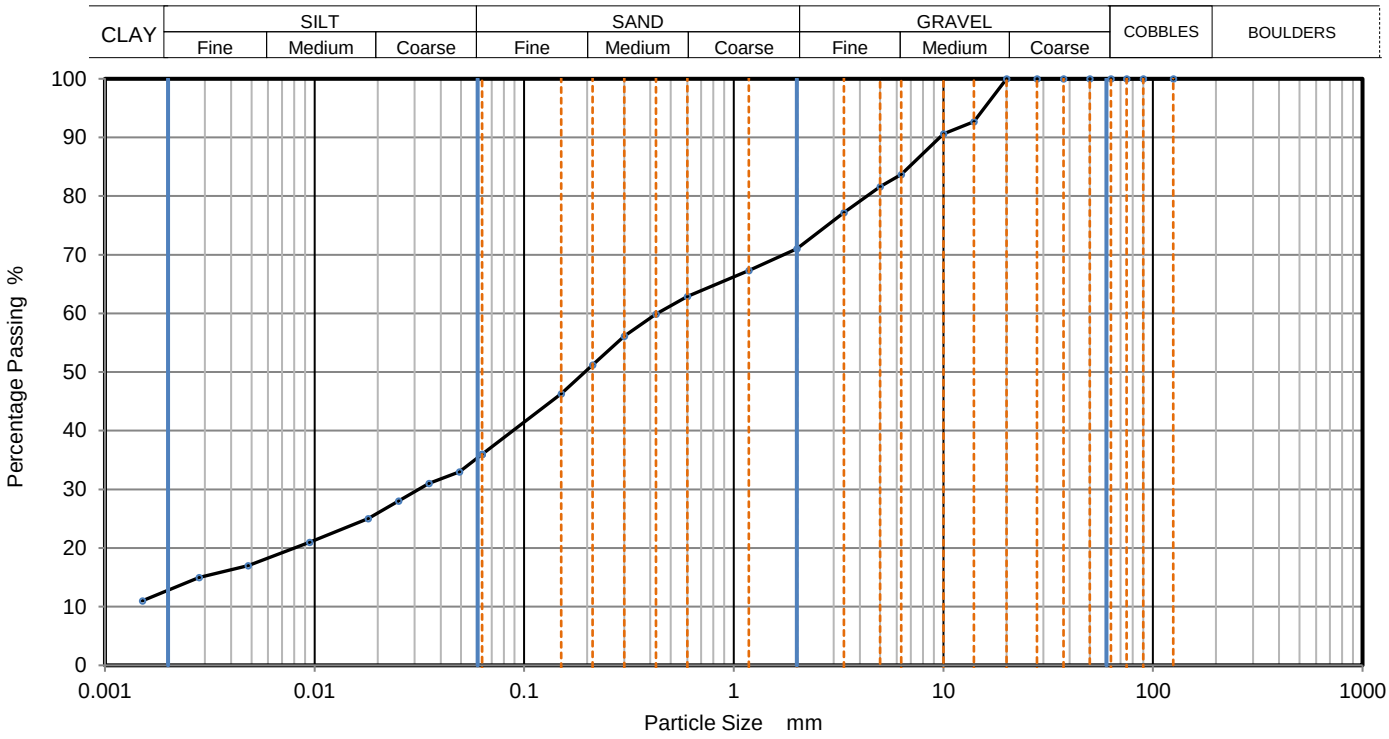
Grading Analysis		
D100	mm	
D60	mm	24.4
D30	mm	2.61
D10	mm	0.0477
Uniformity Coefficient		510
Curvature Coefficient		5.9

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-12107
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		2
Specimen Description	Brownish grey sandy slightly gravelly silty CLAY.				Sample Depth (m)	Top	0.70
						Base	1.40
Specimen Reference	9	Specimen Depth	0.7	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022090534



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	36
90	100	0.04903	33
75	100	0.03513	31
63	100	0.02517	28
50	100	0.01802	25
37.5	100	0.00948	21
28	100	0.00482	17
20	100	0.00282	15
14	93	0.00151	11
10	91		
6.3	84		
5	82		
3.35	77		
2	71		
1.18	67		
0.6	63	Particle density	(assumed)
0.425	60	2.65	Mg/m3
0.3	56		
0.212	51		
0.15	46		
0.063	36		

Dry Mass of sample, g: 668

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	29.0
Sand	35.0
Silt	23.5
Clay	12.5

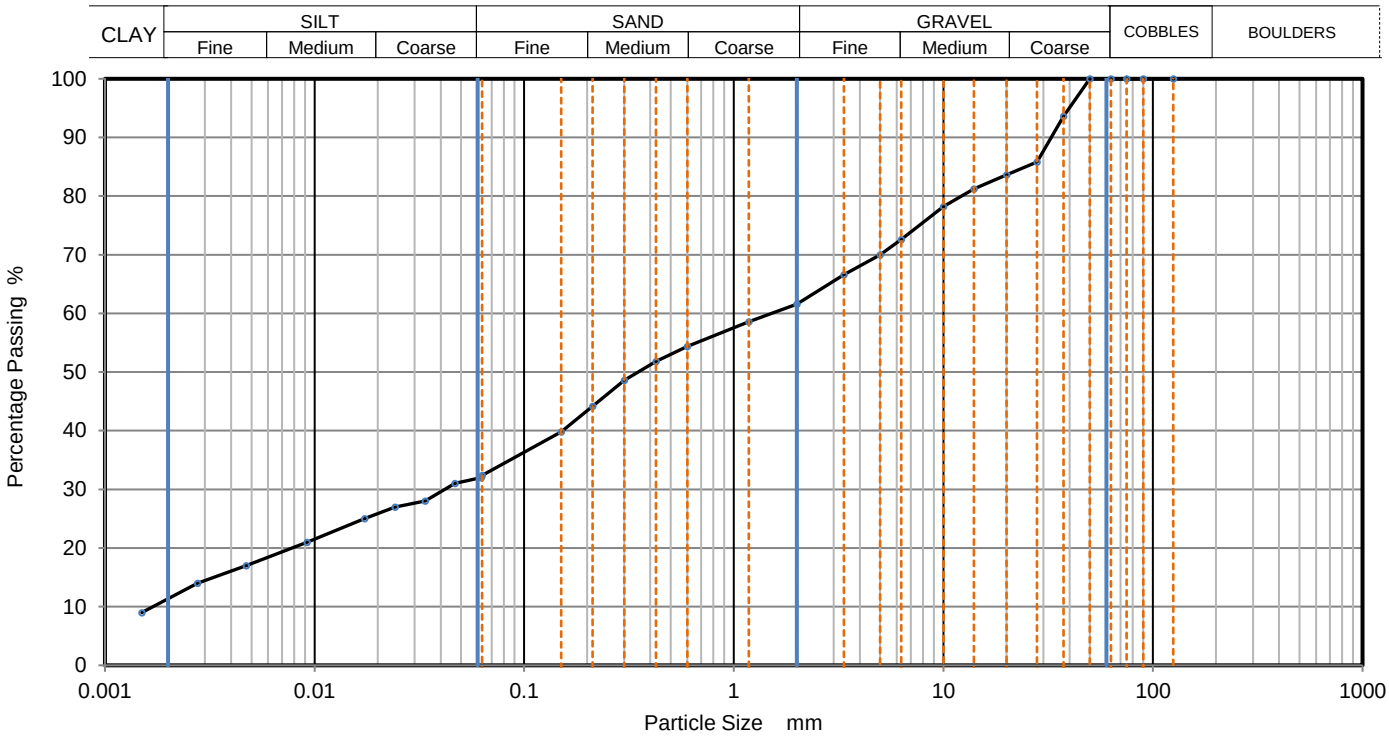
Grading Analysis		
D100	mm	
D60	mm	0.428
D30	mm	0.0323
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-12107
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		3
Specimen Description	Brownish grey sandy gravelly silty CLAY.				Sample Depth (m)	Top	1.40
						Base	2.60
Specimen Reference	9	Specimen Depth	1.4	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022090535



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06230	32
90	100	0.04667	31
75	100	0.03373	28
63	100	0.02418	27
50	100	0.01734	25
37.5	94	0.00919	21
28	86	0.00471	17
20	84	0.00277	14
14	81	0.00150	9
10	78		
6.3	73		
5	70		
3.35	67		
2	62		
1.18	59		
0.6	54	Particle density	(assumed)
0.425	52	2.65	Mg/m3
0.3	49		
0.212	44		
0.15	40		
0.063	32		

Dry Mass of sample, g: 6017

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	38.4
Sand	29.3
Silt	21.2
Clay	11.1

Grading Analysis		
D100	mm	
D60	mm	1.5
D30	mm	0.0399
D10	mm	0.00173
Uniformity Coefficient		870
Curvature Coefficient		0.61

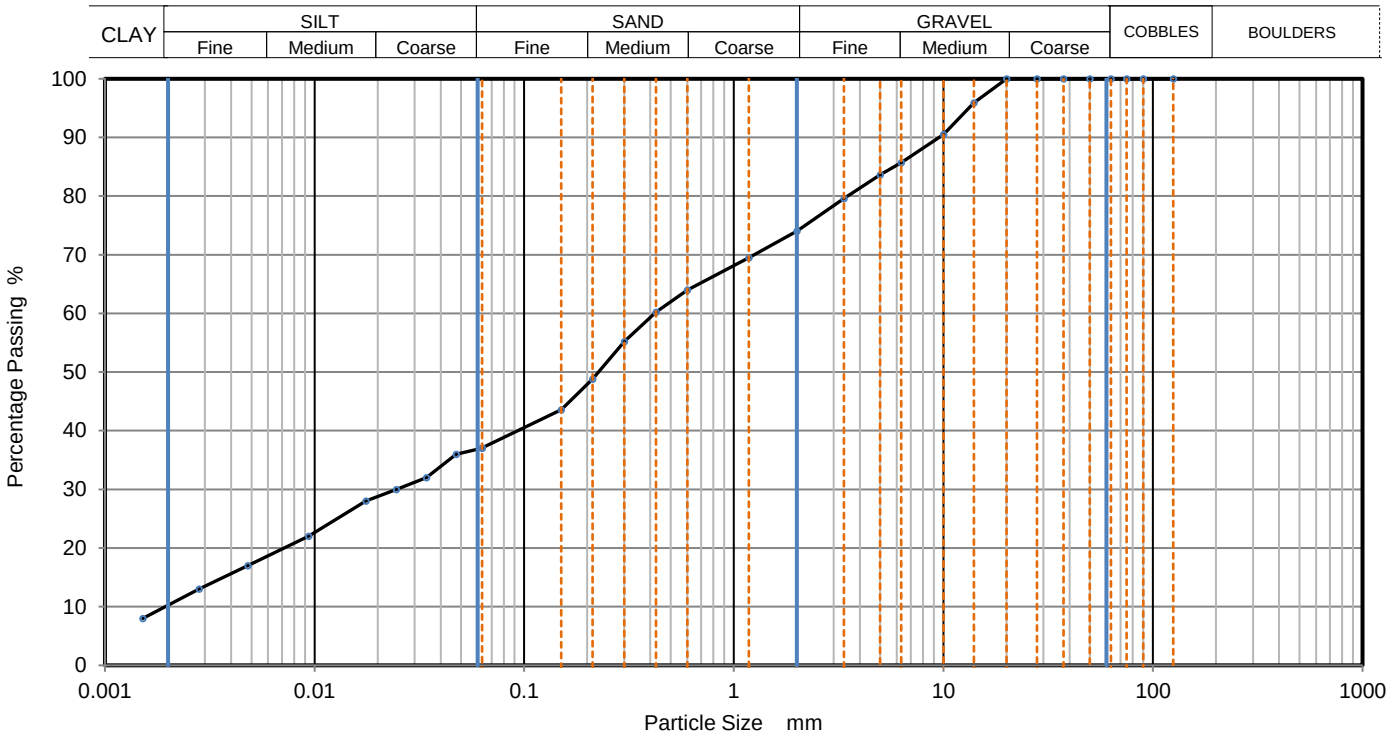
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-12203
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Purplish grey sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	0.50
				Base	3.50
Specimen Reference	7	Specimen Depth	0.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022092826



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	37
90	100	0.04736	36
75	100	0.03420	32
63	100	0.02452	30
50	100	0.01757	28
37.5	100	0.00936	22
28	100	0.00480	17
20	100	0.00282	13
14	96	0.00152	8
10	91		
6.3	86		
5	84		
3.35	80		
2	74		
1.18	70		
0.6	64	Particle density	(assumed)
0.425	60	2.65	Mg/m3
0.3	55		
0.212	49		
0.15	44		
0.063	37		

Dry Mass of sample, g: 555

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	26.0
Sand	36.9
Silt	26.6
Clay	10.5

Grading Analysis		
D100	mm	
D60	mm	0.419
D30	mm	0.0248
D10	mm	0.00187
Uniformity Coefficient		220
Curvature Coefficient		0.79

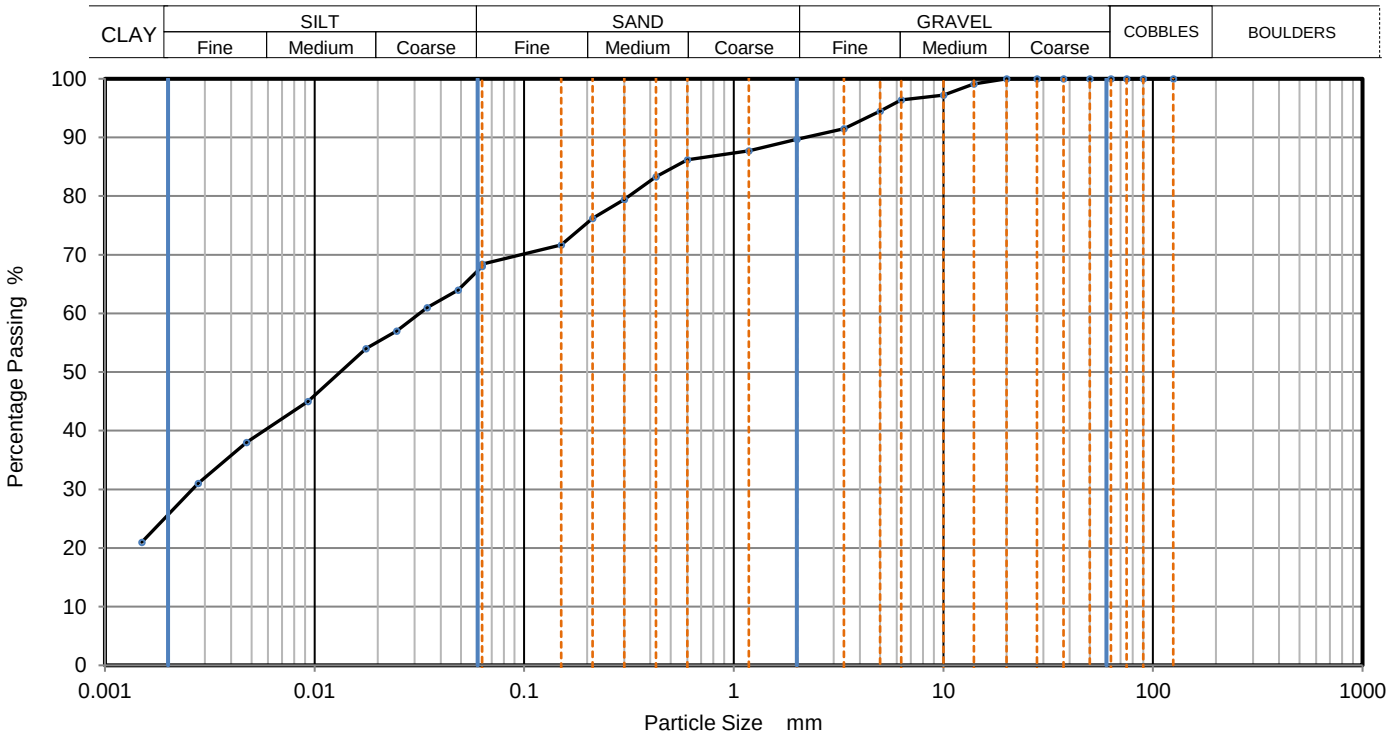
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					**21-1682**
Borehole/Pit No.					TP-12306
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Grey sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	0.70
				Base	1.20
Specimen Reference	7	Specimen Depth	0.7 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus202209280



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	68
90	100	0.04837	64
75	100	0.03444	61
63	100	0.02468	57
50	100	0.01757	54
37.5	100	0.00931	45
28	100	0.00474	38
20	100	0.00278	31
14	99	0.00150	21
10	97		
6.3	96		
5	95		
3.35	92		
2	90		
1.18	88		
0.6	86	Particle density	(assumed)
0.425	83	2.65	Mg/m3
0.3	79		
0.212	76		
0.15	72		
0.063	68		

Dry Mass of sample, g: 372

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	10.3
Sand	21.3
Silt	42.8
Clay	25.6

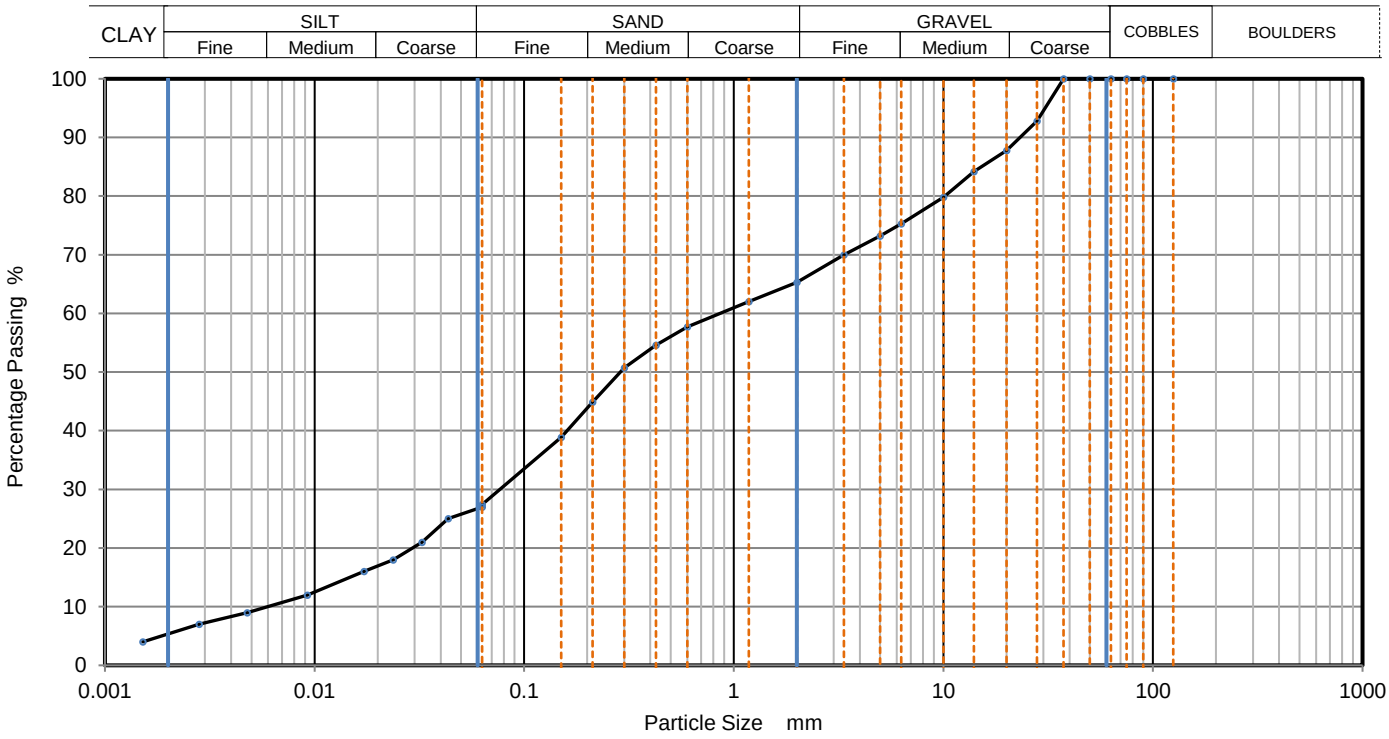
Grading Analysis		
D100	mm	
D60	mm	0.0314
D30	mm	0.00267
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-12306
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		2
Specimen Description	Grey gravelly silty fine to coarse SAND.				Sample Depth (m)	Top	1.20
						Base	3.50
Specimen Reference	2	Specimen Depth	1.2	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus202209281



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	27
90	100	0.04344	25
75	100	0.03251	21
63	100	0.02368	18
50	100	0.01722	16
37.5	100	0.00925	12
28	93	0.00477	9
20	88	0.00282	7
14	84	0.00152	4
10	80		
6.3	75		
5	73		
3.35	70		
2	65		
1.18	62		
0.6	58	Particle density	(assumed)
0.425	55	2.65	Mg/m3
0.3	51		
0.212	45		
0.15	39		
0.063	27		

Dry Mass of sample, g: 4368

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	34.7
Sand	37.9
Silt	22.0
Clay	5.4

Grading Analysis		
D100	mm	
D60	mm	0.865
D30	mm	0.0768
D10	mm	0.00576
Uniformity Coefficient		150
Curvature Coefficient		1.2

Remarks

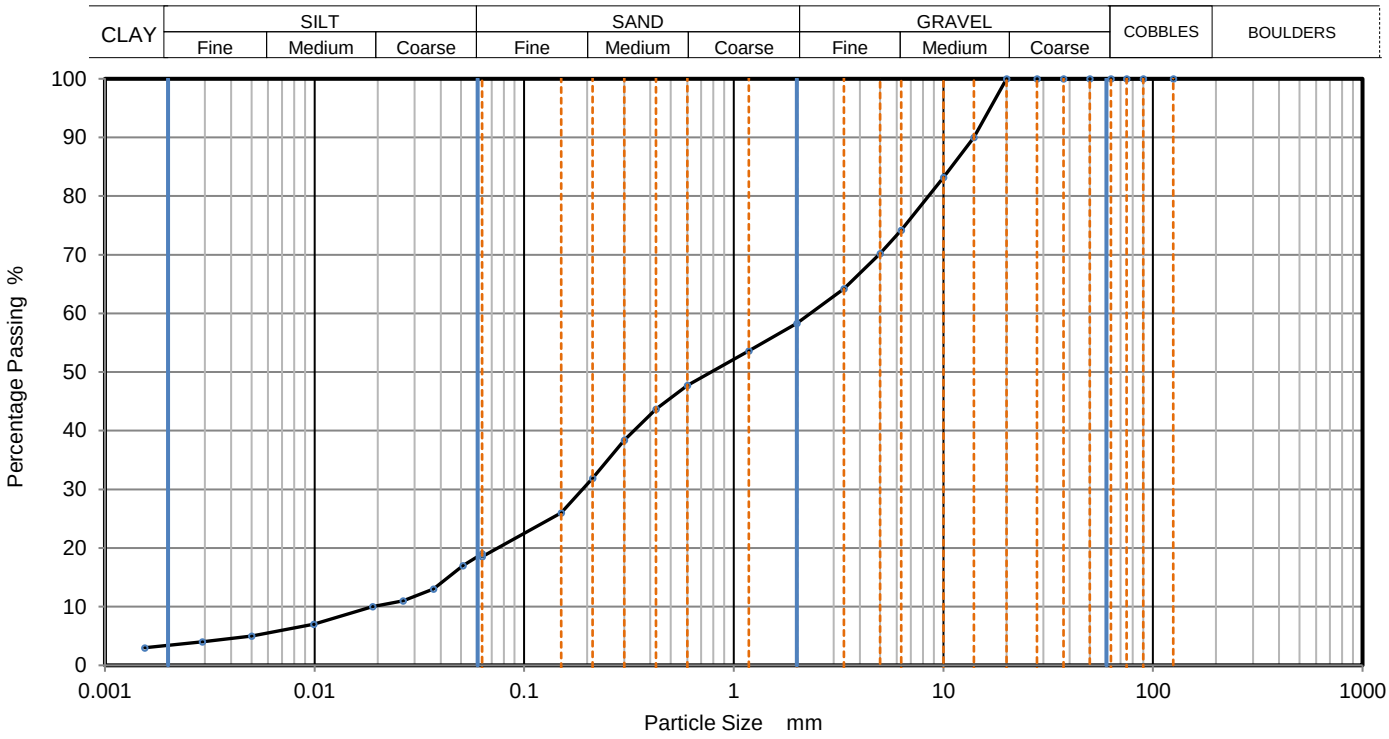
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	TP-12507
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Grey slightly gravelly silty fine to coarse SAND.			Sample Depth (m) Top	0.40
				Base	2.50
Specimen Reference	5	Specimen Depth	0.4 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus202209282



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	19
90	100	0.05097	17
75	100	0.03693	13
63	100	0.02642	11
50	100	0.01890	10
37.5	100	0.00992	7
28	100	0.00501	5
20	100	0.00291	4
14	90	0.00155	3
10	83		
6.3	74		
5	70		
3.35	64		
2	58		
1.18	54		
0.6	48	Particle density	(assumed)
0.425	44	2.65	Mg/m3
0.3	38		
0.212	32		
0.15	26		
0.063	19		

Dry Mass of sample, g: 590

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	41.7
Sand	39.8
Silt	15.1
Clay	3.4

Grading Analysis		
D100	mm	
D60	mm	2.32
D30	mm	0.189
D10	mm	0.02
Uniformity Coefficient		120
Curvature Coefficient		0.77

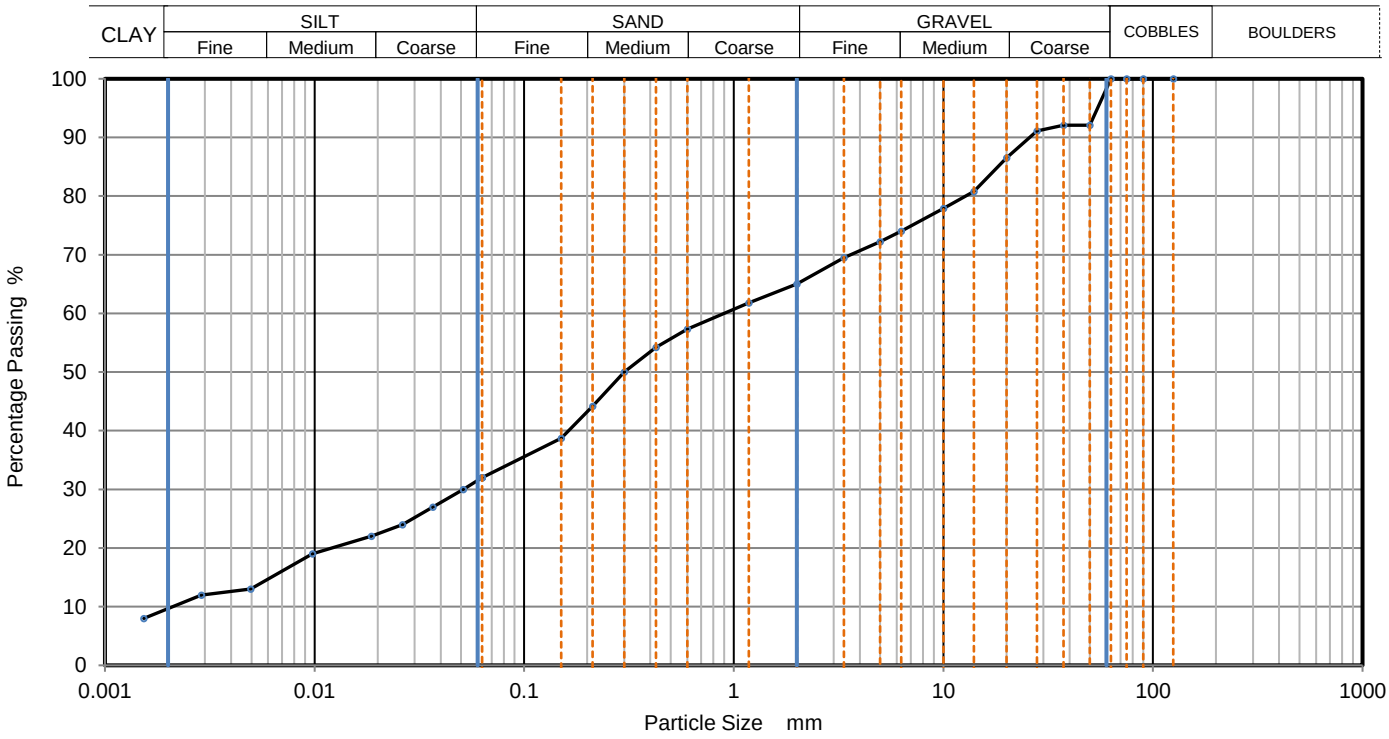
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					TP-12569
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Purplish grey sandy gravelly silty CLAY.			Sample Depth (m) Top	1.00
				Base	
Specimen Reference	4	Specimen Depth	1 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022081519



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	32
90	100	0.05129	30
75	100	0.03671	27
63	100	0.02627	24
50	92	0.01868	22
37.5	92	0.00976	19
28	91	0.00496	13
20	87	0.00288	12
14	81	0.00153	8
10	78		
6.3	74		
5	72		
3.35	70		
2	65		
1.18	62		
0.6	57	Particle density	(assumed)
0.425	54	2.65	Mg/m3
0.3	50		
0.212	44		
0.15	39		
0.063	32		

Dry Mass of sample, g: 4645

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	35.0
Sand	33.0
Silt	22.2
Clay	9.8

Grading Analysis		
D100	mm	
D60	mm	0.898
D30	mm	0.0497
D10	mm	0.00206
Uniformity Coefficient		440
Curvature Coefficient		1.3

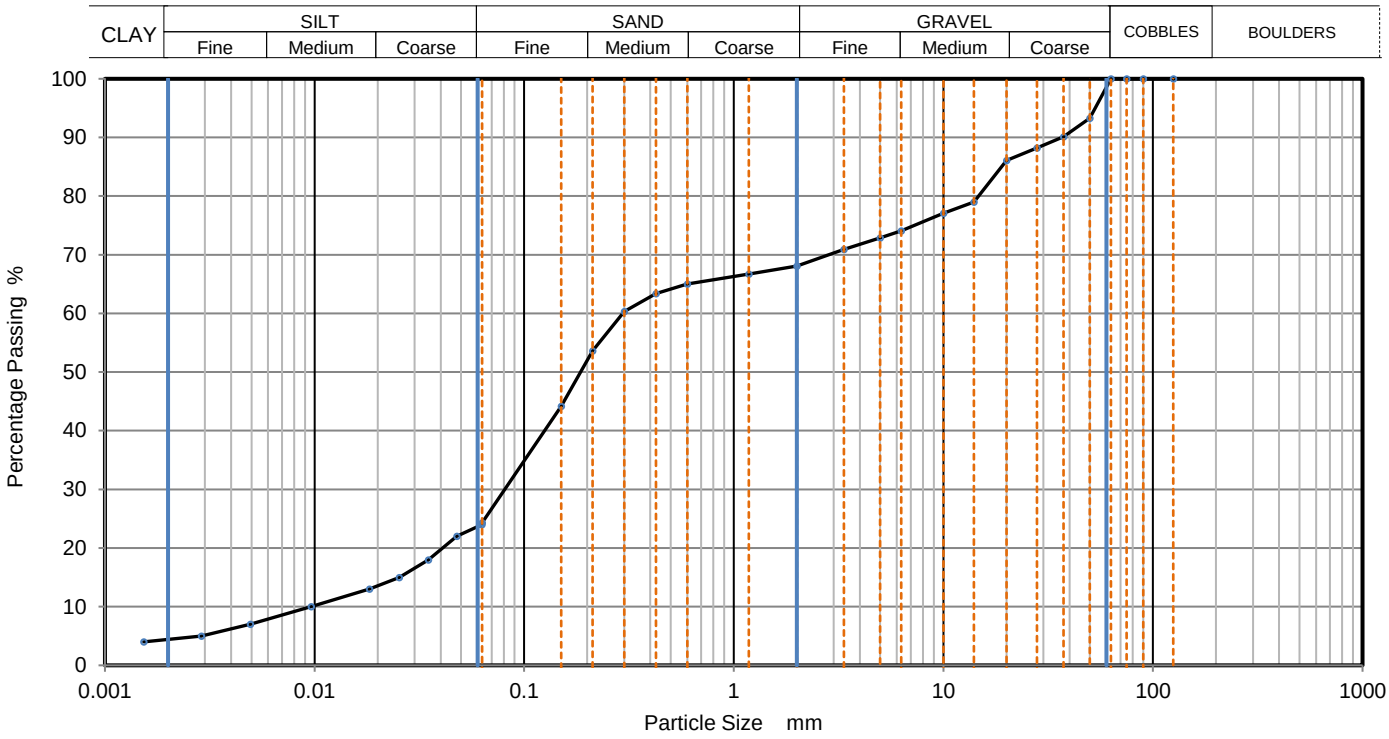
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					TP-12569
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Greyish brown gravelly silty fine to coarse SAND.			Sample Depth (m) Top	2.00
				Sample Depth (m) Base	
Specimen Reference	2	Specimen Depth	2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022081520



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06276	24
90	100	0.04770	22
75	100	0.03490	18
63	100	0.02533	15
50	93	0.01824	13
37.5	90	0.00965	10
28	88	0.00493	7
20	86	0.00288	5
14	79	0.00153	4
10	77		
6.3	74		
5	73		
3.35	71		
2	68		
1.18	67		
0.6	65	Particle density	(assumed)
0.425	63	2.65	Mg/m3
0.3	60		
0.212	54		
0.15	44		
0.063	24		

Dry Mass of sample, g: 4510

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	31.9
Sand	43.9
Silt	19.8
Clay	4.4

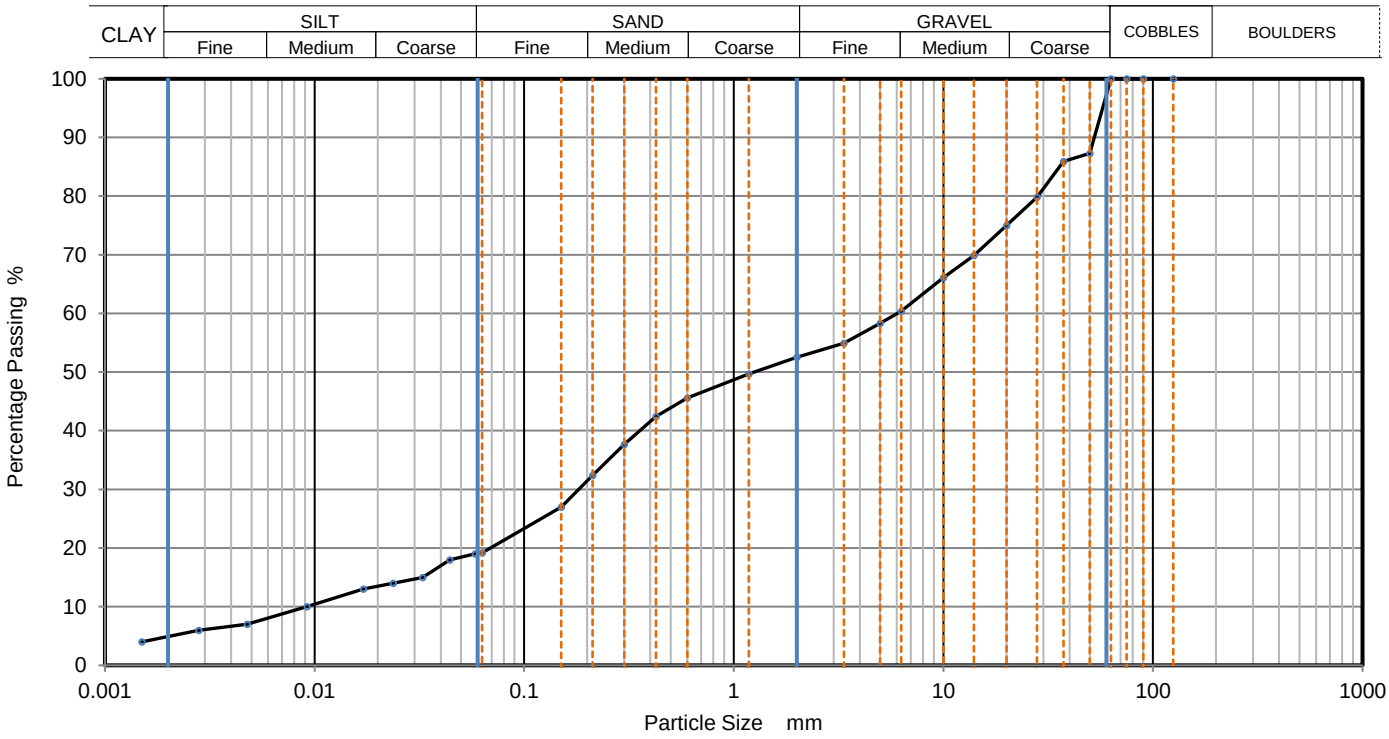
Grading Analysis		
D100	mm	
D60	mm	0.295
D30	mm	0.0808
D10	mm	0.00991
Uniformity Coefficient		30
Curvature Coefficient		2.2

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-12580
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Greyish brown gravelly clayey fine to coarse SAND.			Sample Depth (m) Top	1.50
				Sample Depth (m) Base	
Specimen Reference	4	Specimen Depth	1.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022081522



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.05843	19
90	100	0.04418	18
75	100	0.03276	15
63	100	0.02368	14
50	87	0.01710	13
37.5	86	0.00919	10
28	80	0.00477	7
20	75	0.00280	6
14	70	0.00150	4
10	66		
6.3	60		
5	58		
3.35	55		
2	53		
1.18	50		
0.6	46	Particle density	(assumed)
0.425	42	2.65	Mg/m3
0.3	38		
0.212	32		
0.15	27		
0.063	19		

Dry Mass of sample, g: 6450

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	47.5
Sand	33.4
Silt	14.2
Clay	4.9

Grading Analysis		
D100	mm	
D60	mm	6.02
D30	mm	0.182
D10	mm	0.00953
Uniformity Coefficient		630
Curvature Coefficient		0.58

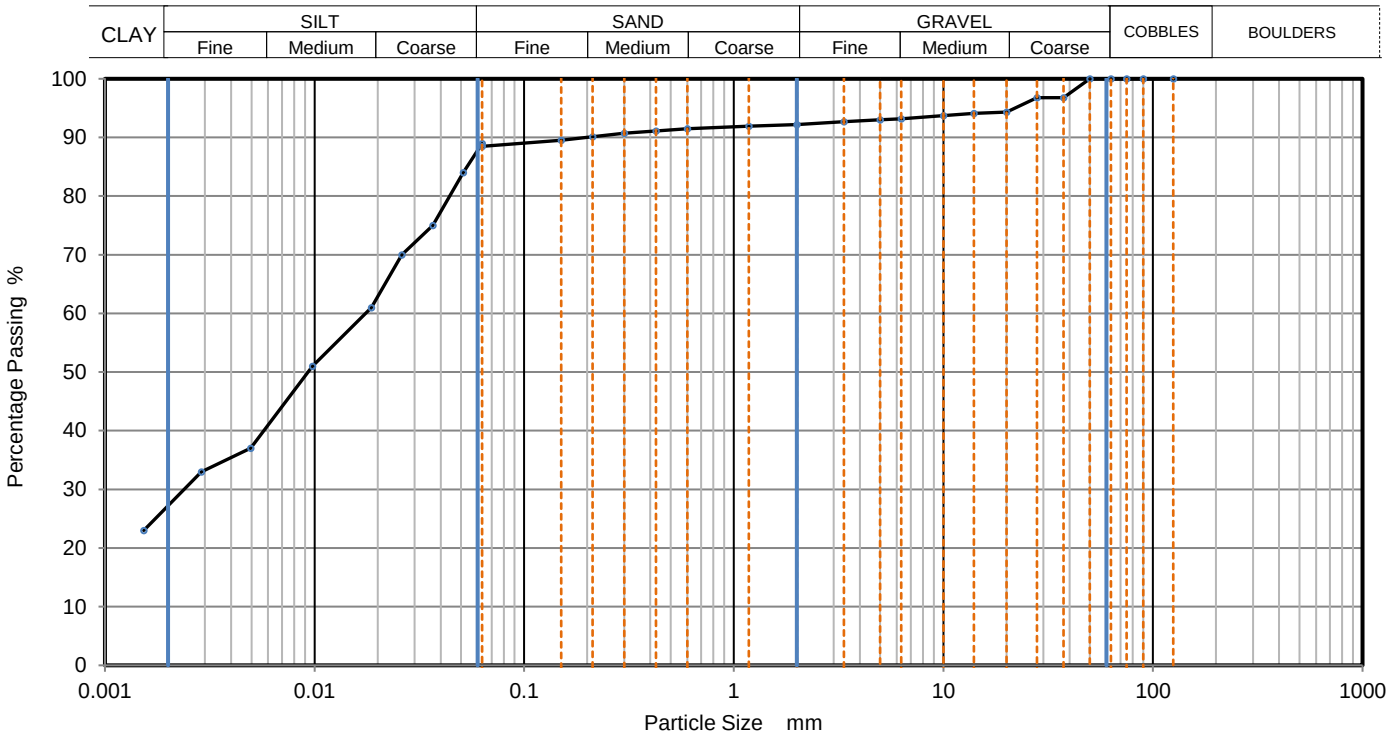
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-12581
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Dark brown slightly sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	1.50
				Sample Depth (m) Base	
Specimen Reference	4	Specimen Depth	1.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022081524



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	89
90	100	0.05129	84
75	100	0.03671	75
63	100	0.02611	70
50	100	0.01868	61
37.5	97	0.00976	51
28	97	0.00496	37
20	94	0.00288	33
14	94	0.00153	23
10	94		
6.3	93		
5	93		
3.35	93		
2	92		
1.18	92		
0.6	92	Particle density	(assumed)
0.425	91	2.65	Mg/m3
0.3	91		
0.212	90		
0.15	90		
0.063	89		

Dry Mass of sample, g: 3643

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	7.8
Sand	3.6
Silt	61.4
Clay	27.2

Grading Analysis		
D100	mm	
D60	mm	0.018
D30	mm	0.00241
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

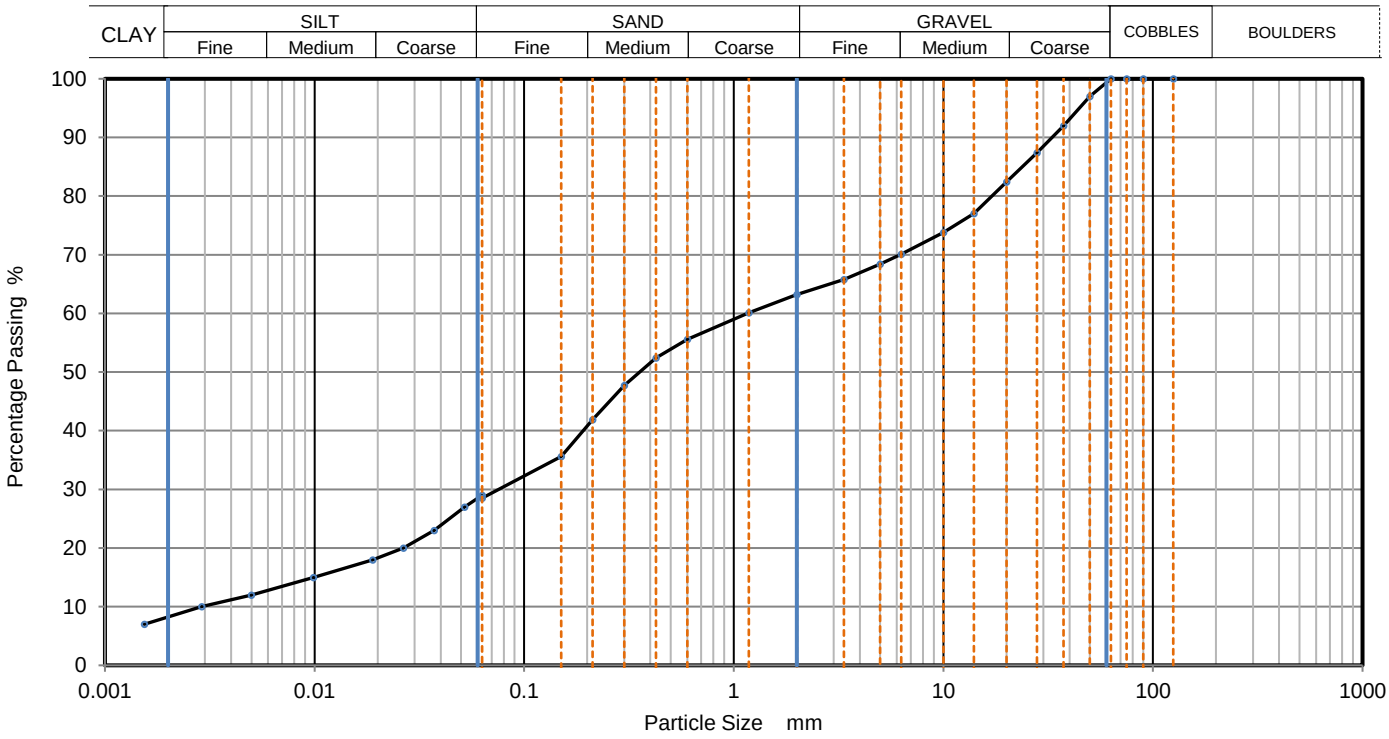
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	TP-12582
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Dark brown sandy gravelly silty CLAY.			Sample Depth (m) Top	0.50
				Base	
Specimen Reference	4	Specimen Depth	0.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022081525



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	29
90	100	0.05191	27
75	100	0.03715	23
63	100	0.02657	20
50	97	0.01890	18
37.5	92	0.00987	15
28	87	0.00499	12
20	82	0.00290	10
14	77	0.00154	7
10	74		
6.3	70		
5	68		
3.35	66		
2	63		
1.18	60		
0.6	56	Particle density	(assumed)
0.425	52	2.65	Mg/m3
0.3	48		
0.212	42		
0.15	36		
0.063	29		

Dry Mass of sample, g: 6384

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	36.8
Sand	34.7
Silt	20.4
Clay	8.1

Grading Analysis		
D100	mm	
D60	mm	1.16
D30	mm	0.0757
D10	mm	0.00286
Uniformity Coefficient		400
Curvature Coefficient		1.7

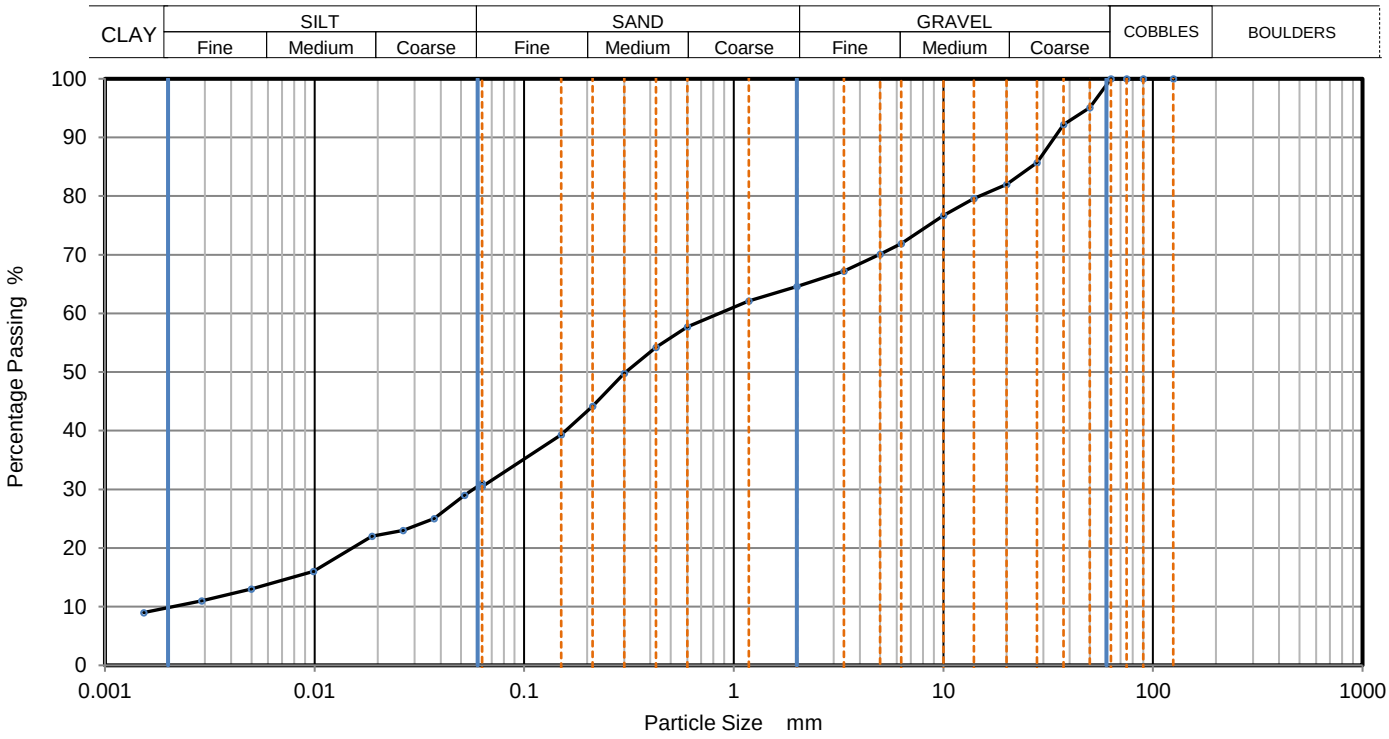
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					**21-1682**
Borehole/Pit No.					TP-12582
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Brownish grey sandy gravelly silty CLAY.			Sample Depth (m) Top	2.50
				Base	
Specimen Reference	4	Specimen Depth	2.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022081527



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	31
90	100	0.05191	29
75	100	0.03715	25
63	100	0.02642	23
50	95	0.01879	22
37.5	92	0.00987	16
28	86	0.00499	13
20	82	0.00290	11
14	80	0.00153	9
10	77		
6.3	72		
5	70		
3.35	67		
2	65		
1.18	62		
0.6	58	Particle density	(assumed)
0.425	54	2.65	Mg/m3
0.3	50		
0.212	44		
0.15	39		
0.063	31		

Dry Mass of sample, g: 4111

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	35.4
Sand	34.1
Silt	20.8
Clay	9.7

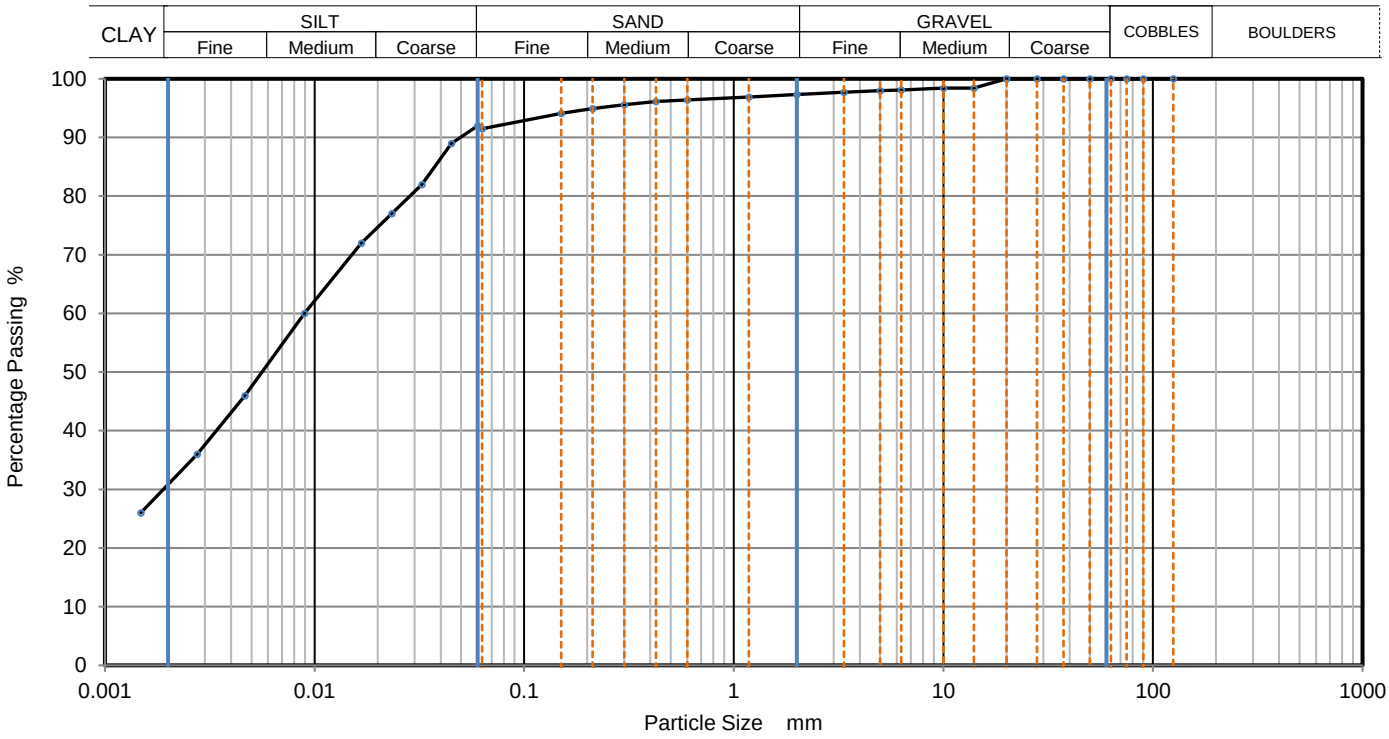
Grading Analysis		
D100	mm	
D60	mm	0.854
D30	mm	0.0596
D10	mm	0.00221
Uniformity Coefficient		390
Curvature Coefficient		1.9

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-12589
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Greyish brown slightly sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	1.50
				Sample Depth (m) Base	
Specimen Reference	2	Specimen Depth	1.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022081529



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.05991	92
90	100	0.04491	89
75	100	0.03251	82
63	100	0.02333	77
50	100	0.01674	72
37.5	100	0.00895	60
28	100	0.00465	46
20	100	0.00275	36
14	98	0.00148	26
10	98		
6.3	98		
5	98		
3.35	98		
2	97		
1.18	97		
0.6	96	Particle density 2.65	(assumed) Mg/m3
0.425	96		
0.3	96		
0.212	95		
0.15	94		
0.063	92		

Dry Mass of sample, g: 503

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	2.7
Sand	5.8
Silt	60.4
Clay	31.1

Grading Analysis		
D100	mm	
D60	mm	0.00887
D30	mm	0.00186
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

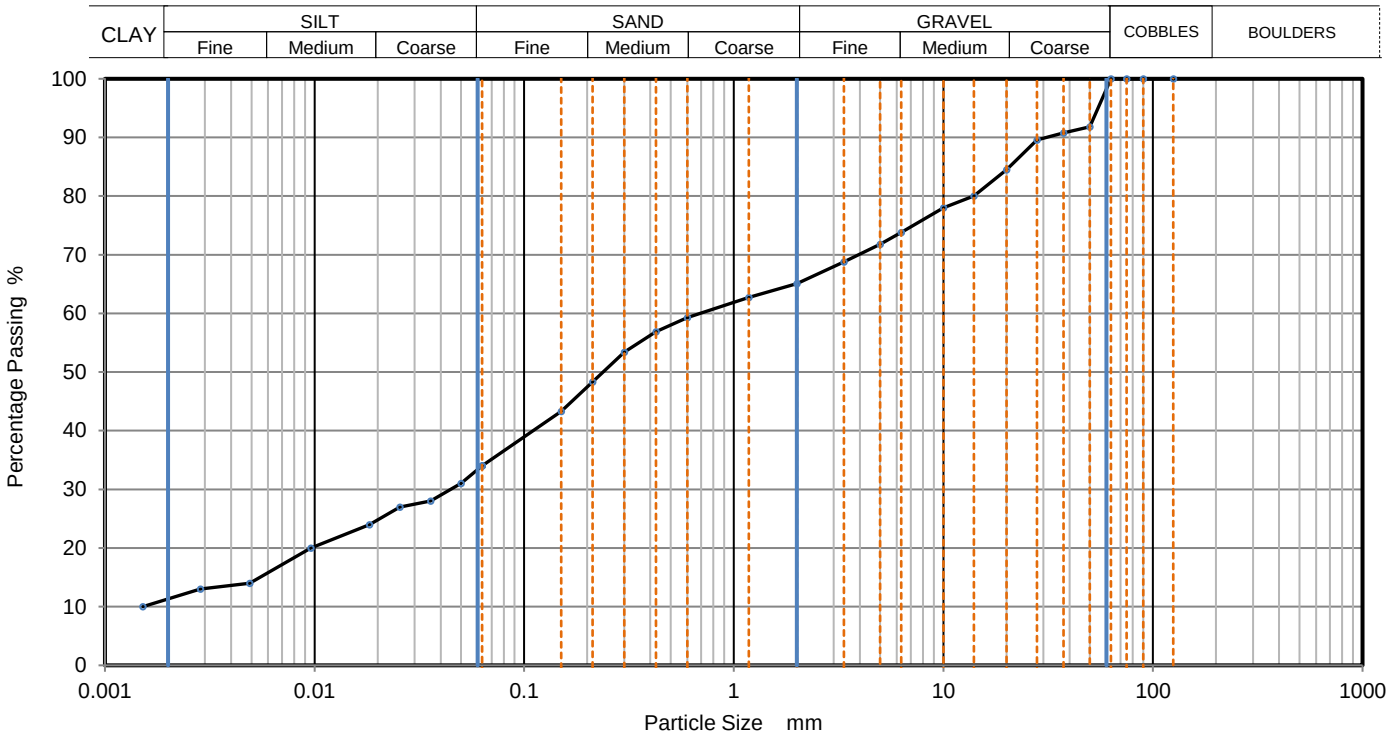
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					**21-1682**
Borehole/Pit No.					TP-12590
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Greyish brown sandy gravelly silty CLAY.			Sample Depth (m) Top	1.60
				Sample Depth (m) Base	
Specimen Reference	4	Specimen Depth	1.6 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022081530



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	34
90	100	0.05001	31
75	100	0.03582	28
63	100	0.02549	27
50	92	0.01824	24
37.5	91	0.00959	20
28	90	0.00491	14
20	85	0.00285	13
14	80	0.00152	10
10	78		
6.3	74		
5	72		
3.35	69		
2	65		
1.18	63		
0.6	59	Particle density	(assumed)
0.425	57	2.65	Mg/m3
0.3	53		
0.212	48		
0.15	43		
0.063	34		

Dry Mass of sample, g: 6684

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	34.9
Sand	31.0
Silt	22.9
Clay	11.2

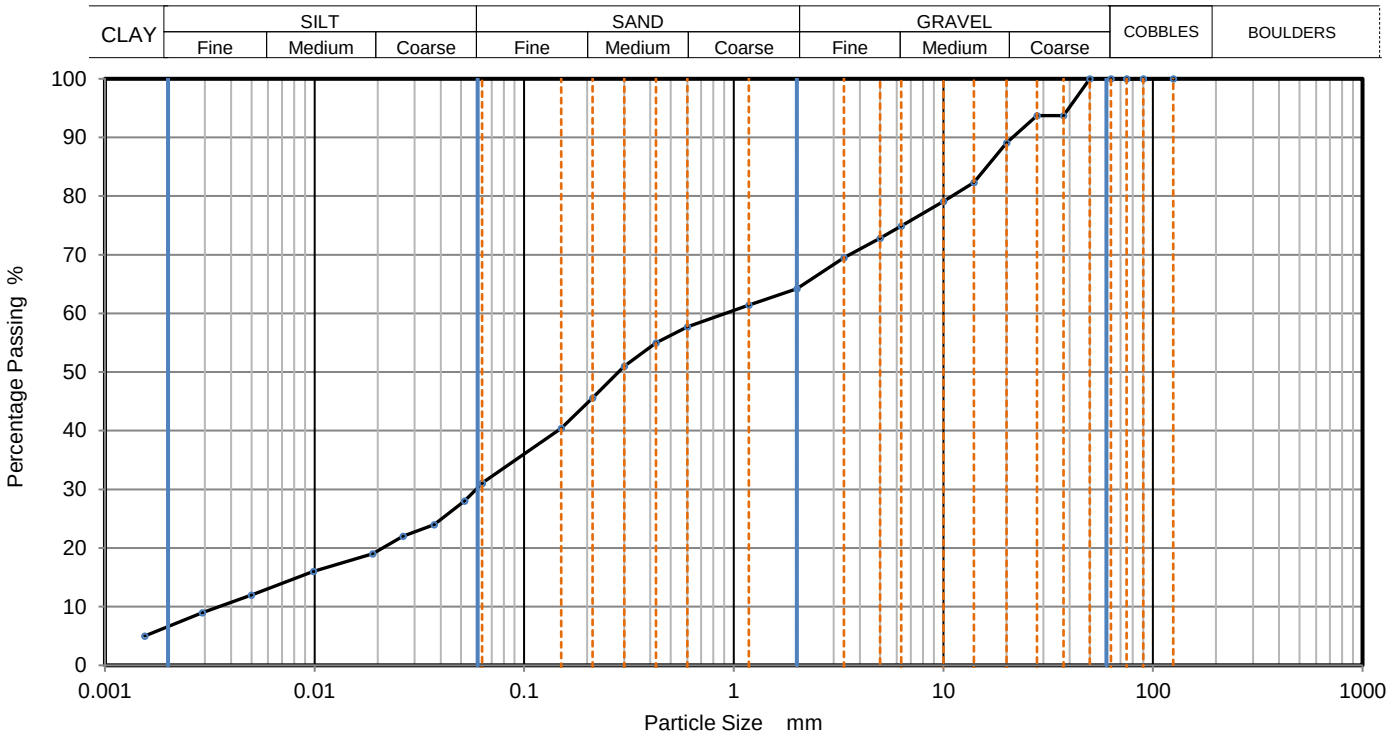
Grading Analysis		
D100	mm	
D60	mm	0.688
D30	mm	0.0436
D10	mm	0.00154
Uniformity Coefficient		450
Curvature Coefficient		1.8

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-12595
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		2
Specimen Description	Greyish brown sandy gravelly silty CLAY.				Sample Depth (m)	Top	1.50
						Base	
Specimen Reference	5	Specimen Depth	1.5	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022081531



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	31
90	100	0.05191	28
75	100	0.03715	24
63	100	0.02642	22
50	100	0.01890	19
37.5	94	0.00987	16
28	94	0.00499	12
20	89	0.00291	9
14	82	0.00155	5
10	79		
6.3	75		
5	73		
3.35	70		
2	64		
1.18	61		
0.6	58	Particle density	(assumed)
0.425	55	2.65	Mg/m3
0.3	51		
0.212	46		
0.15	40		
0.063	31		

Dry Mass of sample, g: 4670

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	35.8
Sand	33.1
Silt	24.5
Clay	6.6

Grading Analysis		
D100	mm	
D60	mm	0.913
D30	mm	0.0592
D10	mm	0.0036
Uniformity Coefficient		250
Curvature Coefficient		1.1

Remarks

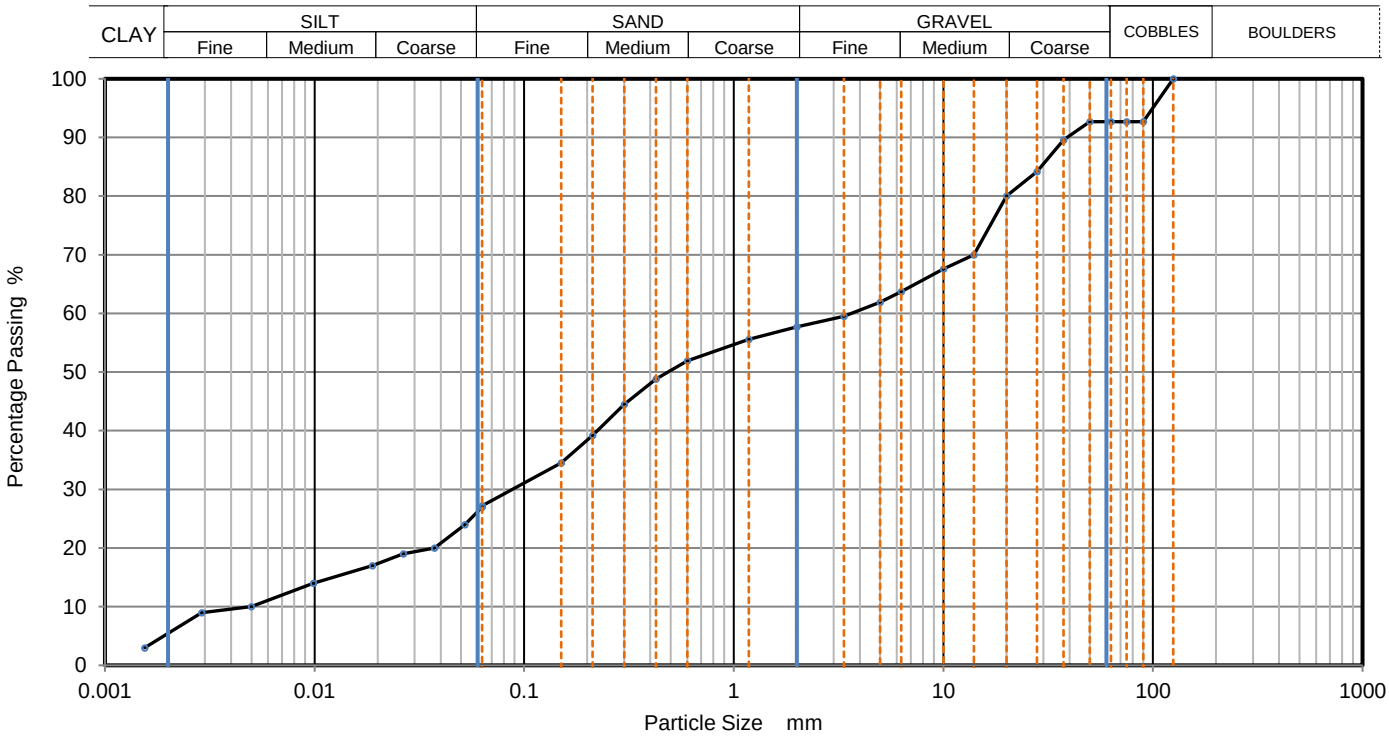
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

Job Ref					**21-1682**
Borehole/Pit No.					TP-12595
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Greyish brown sandy gravelly silty CLAY with some cobbles.			Sample Depth (m) Top	2.50
				Base	
Specimen Reference	4	Specimen Depth	2.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022081532



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	27
90	93	0.05222	24
75	93	0.03736	20
63	93	0.02657	19
50	93	0.01889	17
37.5	90	0.00987	14
28	84	0.00499	10
20	80	0.00289	9
14	70	0.00155	3
10	68		
6.3	64		
5	62		
3.35	60		
2	58		
1.18	56		
0.6	52	Particle density	(assumed)
0.425	49	2.65	Mg/m3
0.3	45		
0.212	39		
0.15	35		
0.063	27		

Dry Mass of sample, g: 13660

Sample Proportions	% dry mass
Cobbles	7.3
Gravel	35.0
Sand	30.5
Silt	21.7
Clay	5.5

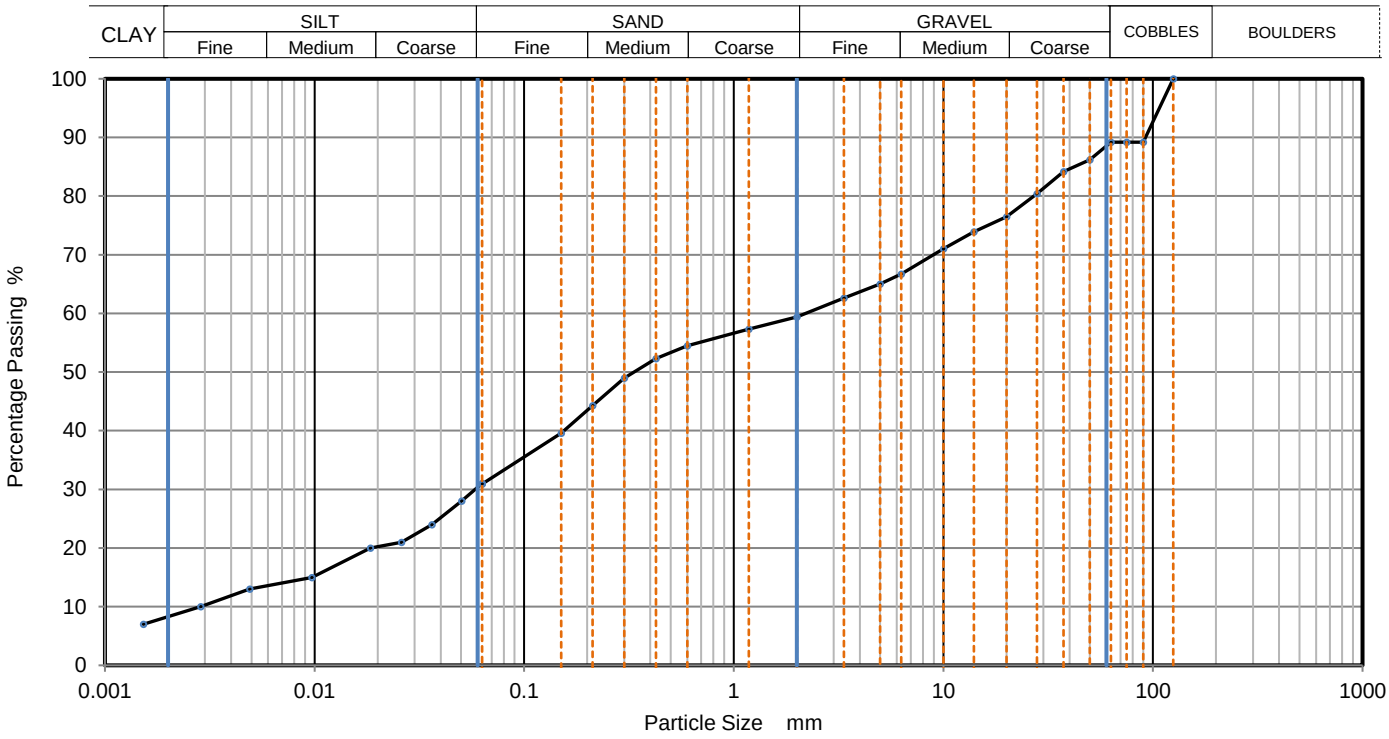
Grading Analysis		
D100	mm	125
D60	mm	3.62
D30	mm	0.088
D10	mm	0.00468
Uniformity Coefficient		770
Curvature Coefficient		0.46

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-12601
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		2
Specimen Description	Greyish brown sandy gravelly silty CLAY with some cobbles.				Sample Depth (m)	Top	1.50
						Base	
Specimen Reference	4	Specimen Depth	1.5	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022081535



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	31
90	89	0.05032	28
75	89	0.03626	24
63	89	0.02595	21
50	86	0.01846	20
37.5	84	0.00970	15
28	80	0.00491	13
20	77	0.00286	10
14	74	0.00152	7
10	71		
6.3	67		
5	65		
3.35	63		
2	59		
1.18	57		
0.6	55	Particle density	(assumed)
0.425	52	2.65	Mg/m3
0.3	49		
0.212	44		
0.15	40		
0.063	31		

Dry Mass of sample, g: 12390

Sample Proportions	% dry mass
Cobbles	10.8
Gravel	29.8
Sand	28.5
Silt	22.7
Clay	8.2

Grading Analysis		
D100	mm	125
D60	mm	2.2
D30	mm	0.0586
D10	mm	0.00296
Uniformity Coefficient		740
Curvature Coefficient		0.53

Remarks

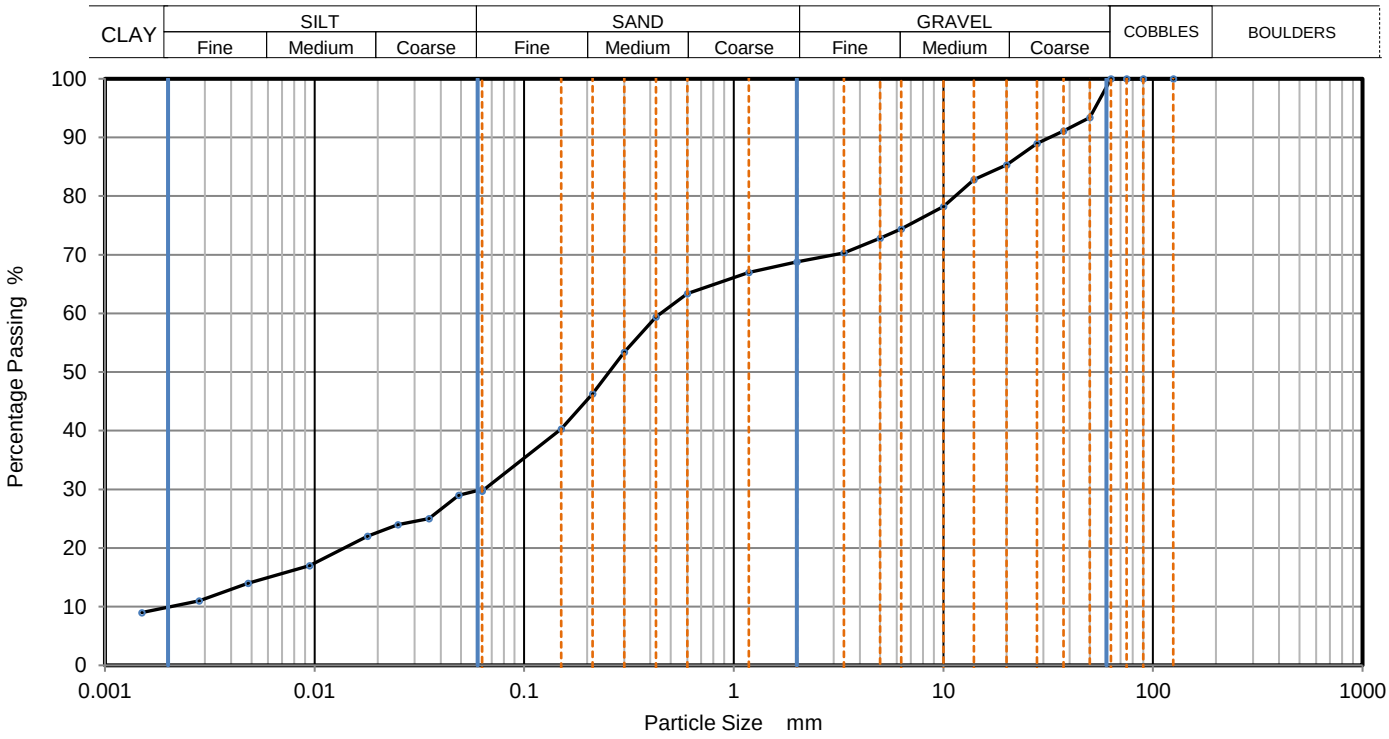
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

Job Ref					**21-1682**
Borehole/Pit No.					TP-12601
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	4
Specimen Description	Greyish brown sandy gravelly silty CLAY.			Sample Depth (m) Top	2.30
				Base	
Specimen Reference	2	Specimen Depth	2.3 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022081536



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	30
90	100	0.04869	29
75	100	0.03513	25
63	100	0.02500	24
50	93	0.01791	22
37.5	91	0.00948	17
28	89	0.00482	14
20	85	0.00282	11
14	83	0.00150	9
10	78		
6.3	74		
5	73		
3.35	70		
2	69		
1.18	67		
0.6	63	Particle density	(assumed)
0.425	59	2.65	Mg/m3
0.3	53		
0.212	46		
0.15	40		
0.063	30		

Dry Mass of sample, g: 5087

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	31.2
Sand	39.1
Silt	19.5
Clay	10.2

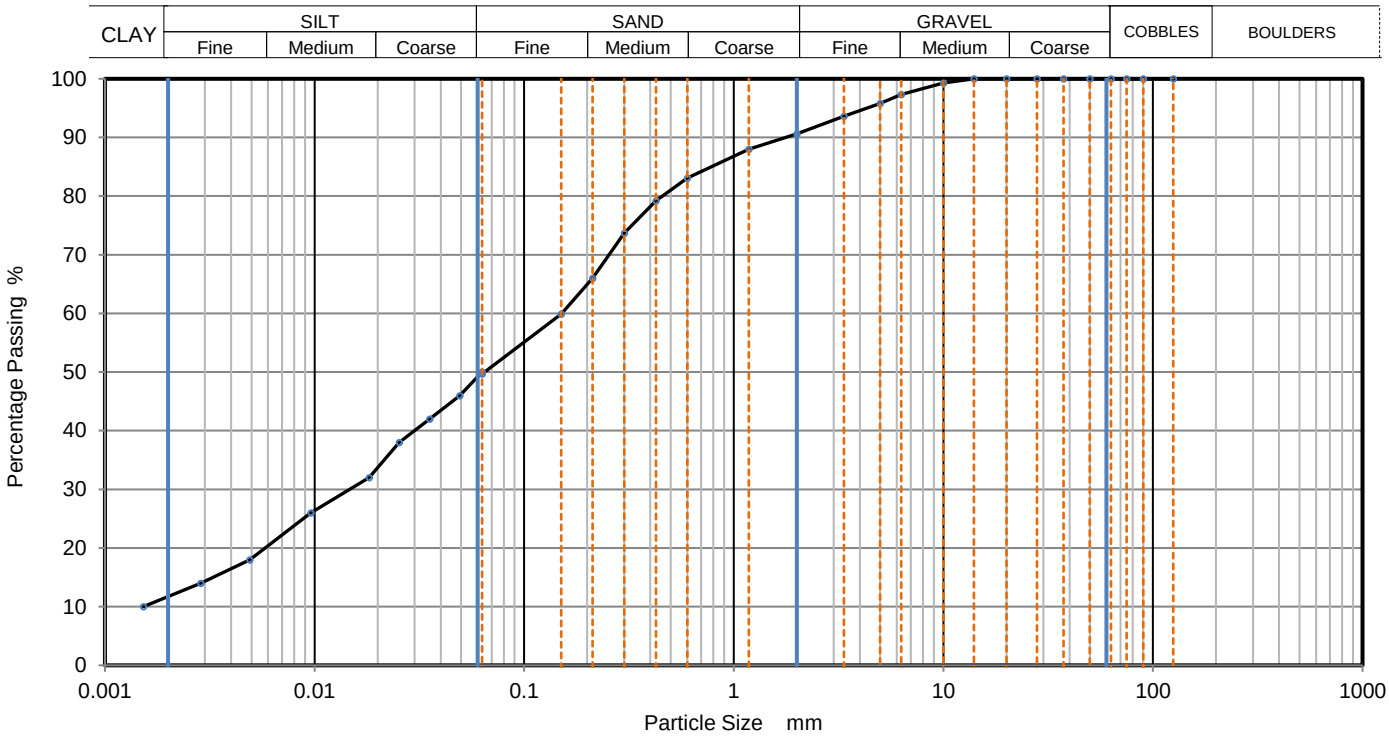
Grading Analysis		
D100	mm	
D60	mm	0.447
D30	mm	0.0644
D10	mm	0.0019
Uniformity Coefficient		230
Curvature Coefficient		4.9

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-12638
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Greyish brown sandy slightly gravelly clayey SILT.			Sample Depth (m) Top	1.50
				Sample Depth (m) Base	
Specimen Reference	4	Specimen Depth	1.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022081537



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	50
90	100	0.04935	46
75	100	0.03536	42
63	100	0.02532	38
50	100	0.01824	32
37.5	100	0.00959	26
28	100	0.00491	18
20	100	0.00286	14
14	100	0.00152	10
10	99		
6.3	97		
5	96		
3.35	94		
2	91		
1.18	88		
0.6	83	Particle density	(assumed)
0.425	79	2.65	Mg/m3
0.3	74		
0.212	66		
0.15	60		
0.063	50		

Dry Mass of sample, g: 281

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	9.4
Sand	41.0
Silt	37.9
Clay	11.7

Grading Analysis		
D100	mm	
D60	mm	0.151
D30	mm	0.015
D10	mm	0.00154
Uniformity Coefficient		98
Curvature Coefficient		0.97

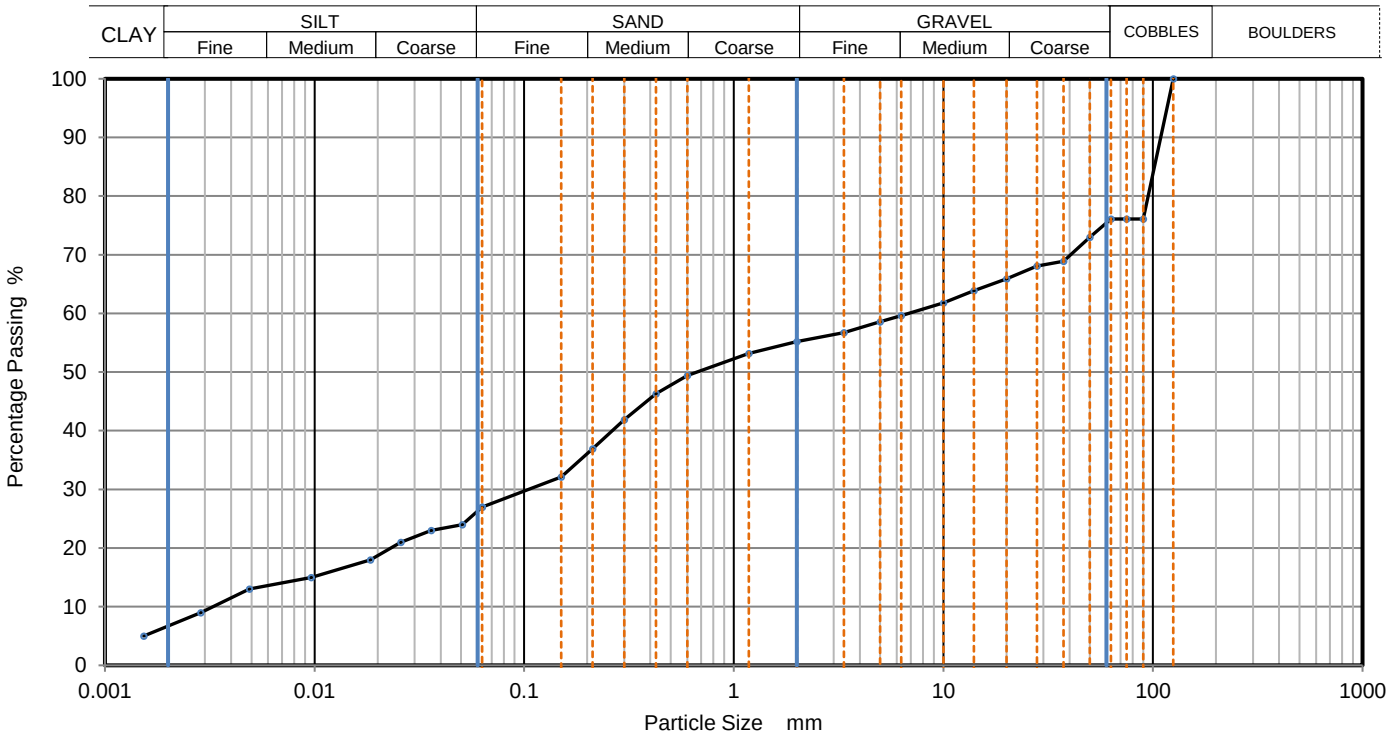
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-12639
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		2
Specimen Description	Greyish brown sandy gravelly silty CLAY with some cobbles.				Sample Depth (m)	Top	1.50
						Base	
Specimen Reference	4	Specimen Depth	1.5	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022081538



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	27
90	76	0.05064	24
75	76	0.03604	23
63	76	0.02580	21
50	73	0.01846	18
37.5	69	0.00965	15
28	68	0.00488	13
20	66	0.00286	9
14	64	0.00153	5
10	62		
6.3	60		
5	59		
3.35	57		
2	55		
1.18	53		
0.6	49	Particle density	(assumed)
0.425	46	2.65	Mg/m3
0.3	42		
0.212	37		
0.15	32		
0.063	27		

Dry Mass of sample, g: 9062

Sample Proportions	% dry mass
Cobbles	23.9
Gravel	20.9
Sand	28.2
Silt	20.2
Clay	6.8

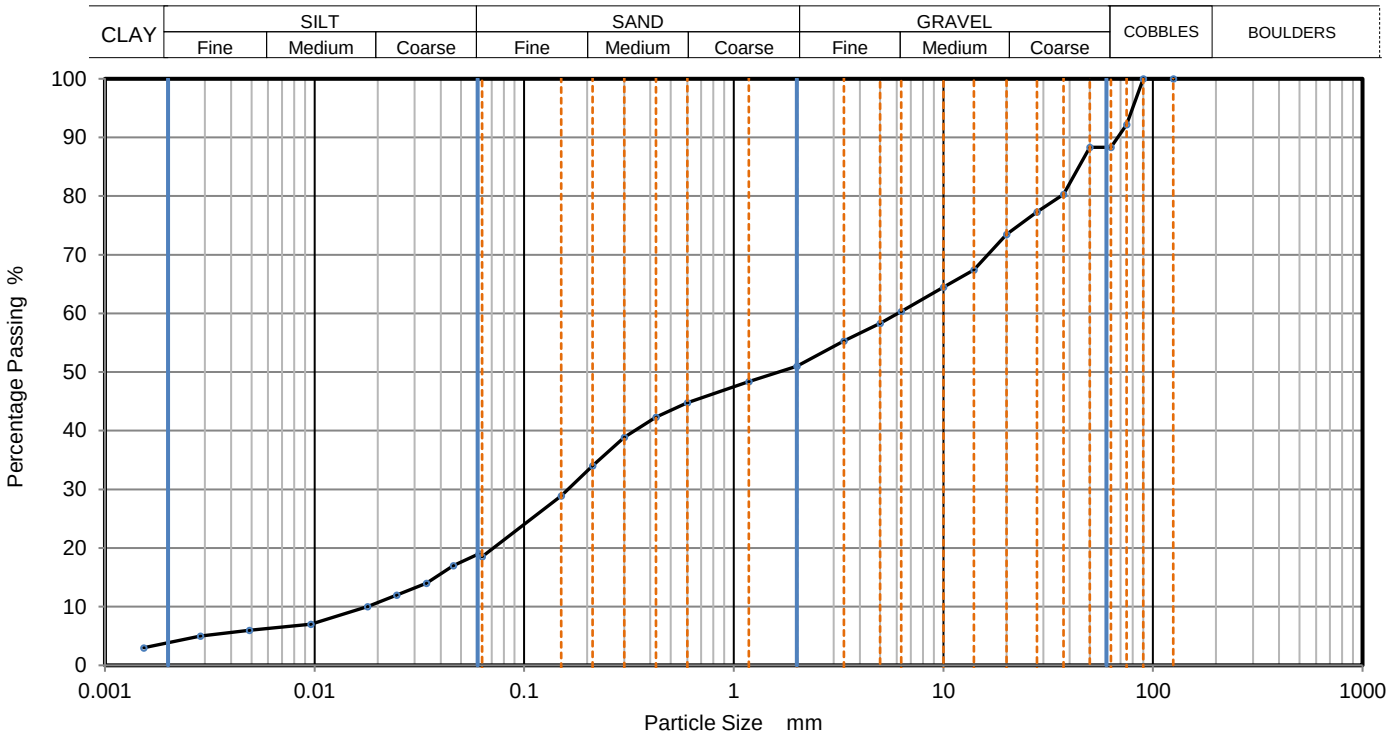
Grading Analysis		
D100	mm	125
D60	mm	6.9
D30	mm	0.104
D10	mm	0.00329
Uniformity Coefficient		2100
Curvature Coefficient		0.48

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-12639
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Greysih brown gravelly silty fine to coarse SAND with some cobbles.			Sample Depth (m) Top	2.50
				Sample Depth (m) Base	
Specimen Reference	2	Specimen Depth	2.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022081539



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06087	19
90	100	0.04597	17
75	92	0.03420	14
63	88	0.02468	12
50	88	0.01791	10
37.5	80	0.00959	7
28	77	0.00488	6
20	74	0.00285	5
14	67	0.00153	3
10	65		
6.3	60		
5	58		
3.35	55		
2	51		
1.18	48		
0.6	45	Particle density	(assumed)
0.425	42	2.65	Mg/m3
0.3	39		
0.212	34		
0.15	29		
0.063	19		

Dry Mass of sample, g: 14397

Sample Proportions	% dry mass
Cobbles	11.7
Gravel	37.3
Sand	32.5
Silt	15.0
Clay	3.5

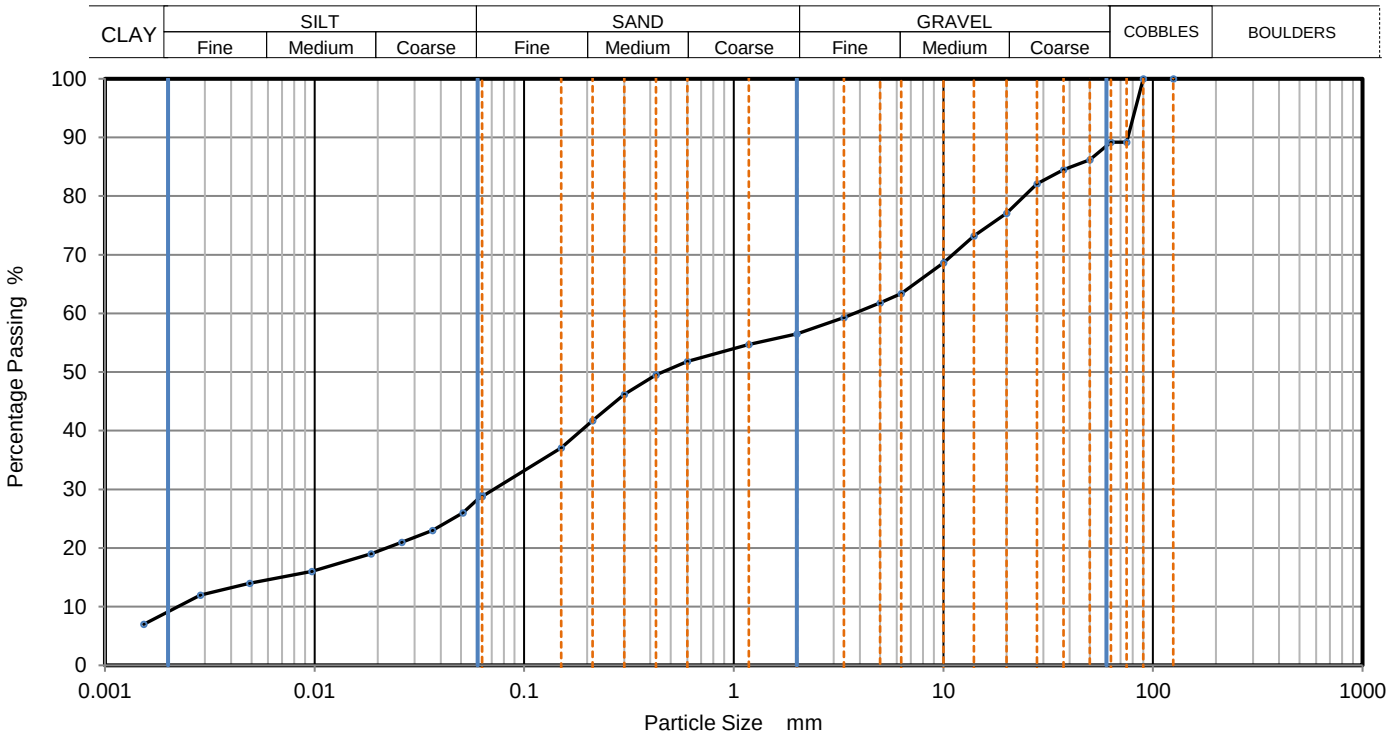
Grading Analysis		
D100	mm	
D60	mm	6.09
D30	mm	0.162
D10	mm	0.0169
Uniformity Coefficient		360
Curvature Coefficient		0.25

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-12650
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Greyish brown sandy gravelly silty CLAY with some cobbles.			Sample Depth (m) Top	1.50
				Sample Depth (m) Base	
Specimen Reference	4	Specimen Depth	1.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022081540



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	29
90	100	0.05097	26
75	89	0.03649	23
63	89	0.02611	21
50	86	0.01857	19
37.5	85	0.00970	16
28	82	0.00491	14
20	77	0.00285	12
14	73	0.00153	7
10	69		
6.3	63		
5	62		
3.35	59		
2	57		
1.18	55		
0.6	52	Particle density	(assumed)
0.425	50	2.65	Mg/m3
0.3	46		
0.212	42		
0.15	37		
0.063	29		

Dry Mass of sample, g: 13184

Sample Proportions	% dry mass
Cobbles	10.8
Gravel	32.6
Sand	27.7
Silt	19.7
Clay	9.2

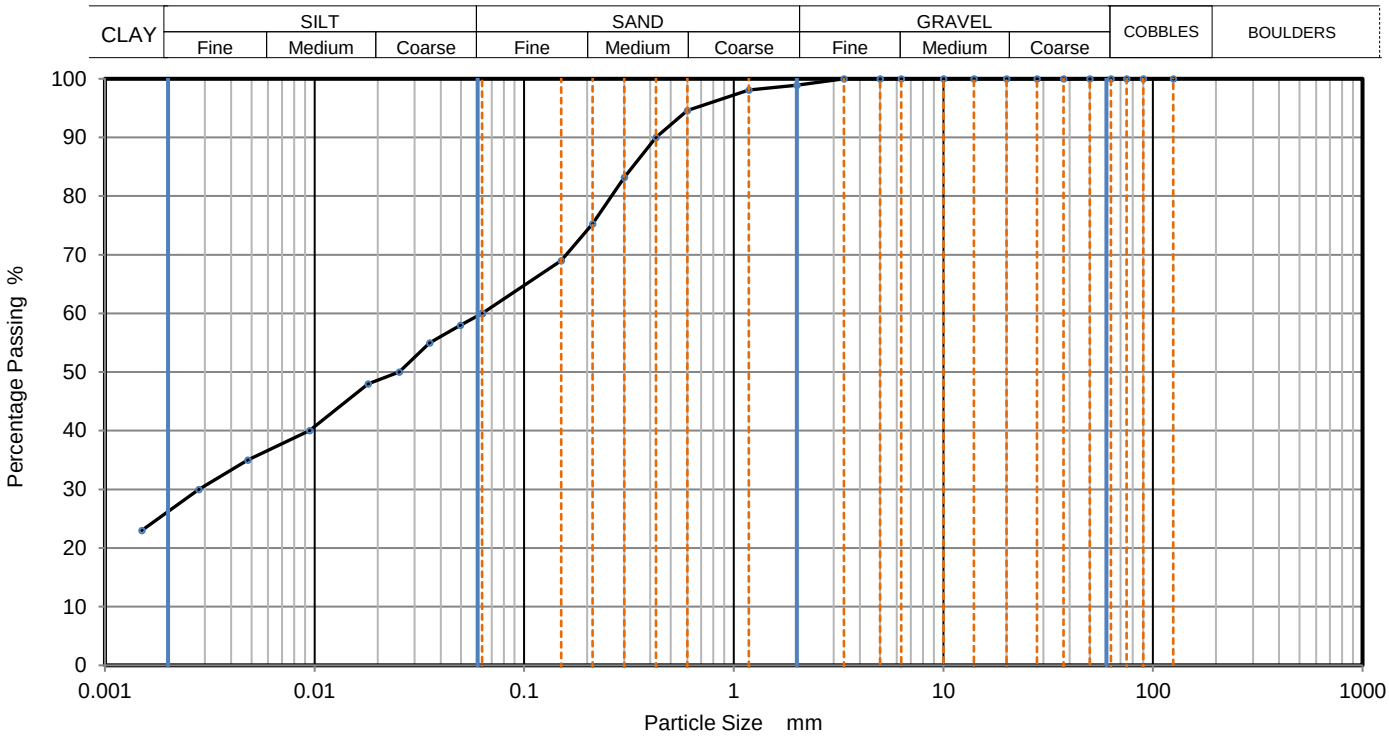
Grading Analysis		
D100	mm	
D60	mm	3.74
D30	mm	0.0712
D10	mm	0.00219
Uniformity Coefficient		1700
Curvature Coefficient		0.62

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-12688
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Greyish brown sandy clayey SILT.			Sample Depth (m) Top	1.50
				Sample Depth (m) Base	
Specimen Reference	4	Specimen Depth	1.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022081543



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	60
90	100	0.04969	58
75	100	0.03536	55
63	100	0.02533	50
50	100	0.01802	48
37.5	100	0.00948	40
28	100	0.00480	35
20	100	0.00280	30
14	100	0.00150	23
10	100		
6.3	100		
5	100		
3.35	100		
2	99		
1.18	98		
0.6	95	Particle density 2.65	(assumed) Mg/m3
0.425	90		
0.3	83		
0.212	75		
0.15	69		
0.063	60		

Dry Mass of sample, g: 257

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	1.1
Sand	38.9
Silt	34.0
Clay	26.0

Grading Analysis		
D100	mm	
D60	mm	
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

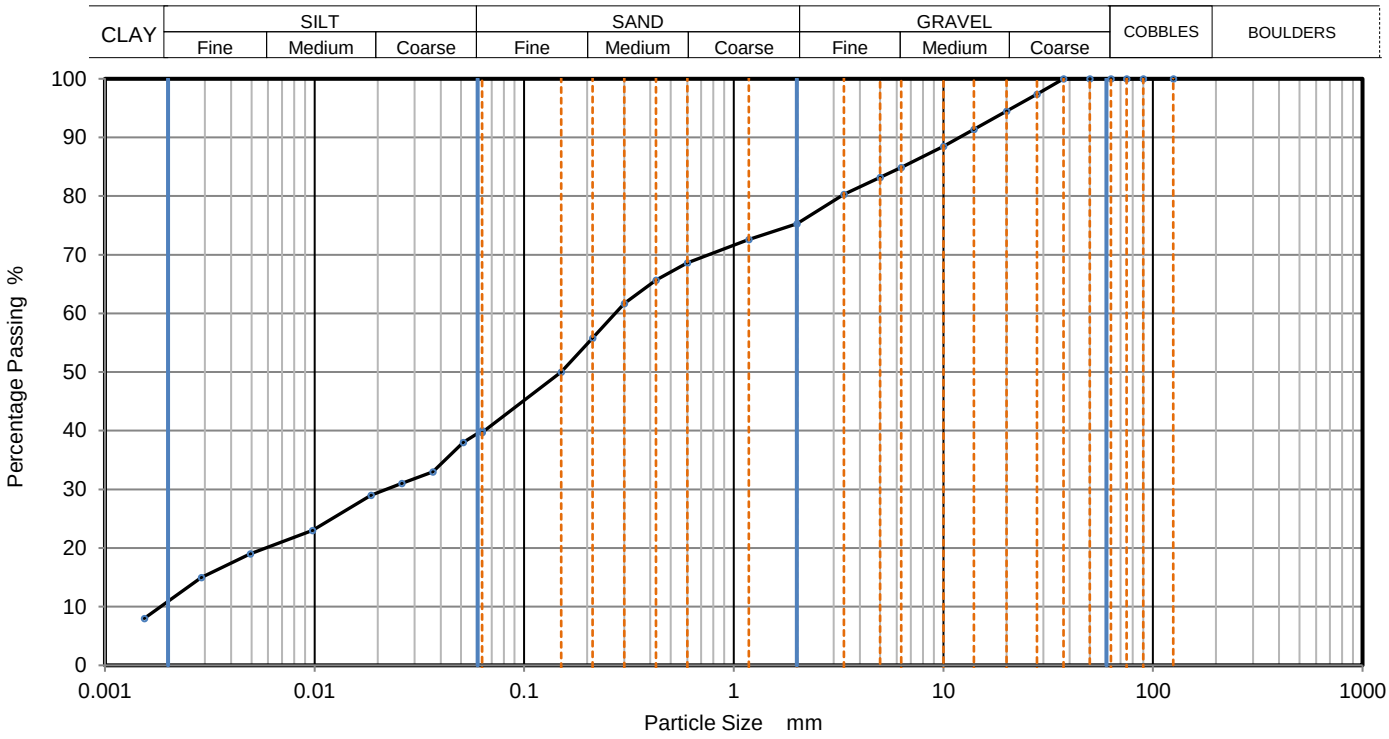
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					**21-1682**
Borehole/Pit No.					TP-12688
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Greyish brown sandy gravelly silty CLAY.			Sample Depth (m) Top	2.50
				Base	
Specimen Reference	5	Specimen Depth	2.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022081544



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	40
90	100	0.05129	38
75	100	0.03671	33
63	100	0.02611	31
50	100	0.01857	29
37.5	100	0.00976	23
28	97	0.00493	19
20	95	0.00288	15
14	91	0.00154	8
10	89		
6.3	85		
5	83		
3.35	80		
2	75		
1.18	73		
0.6	69	Particle density (assumed)	
0.425	66	2.65 Mg/m3	
0.3	62		
0.212	56		
0.15	50		
0.063	40		

Dry Mass of sample, g: 3795

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	24.7
Sand	35.6
Silt	28.7
Clay	11.0

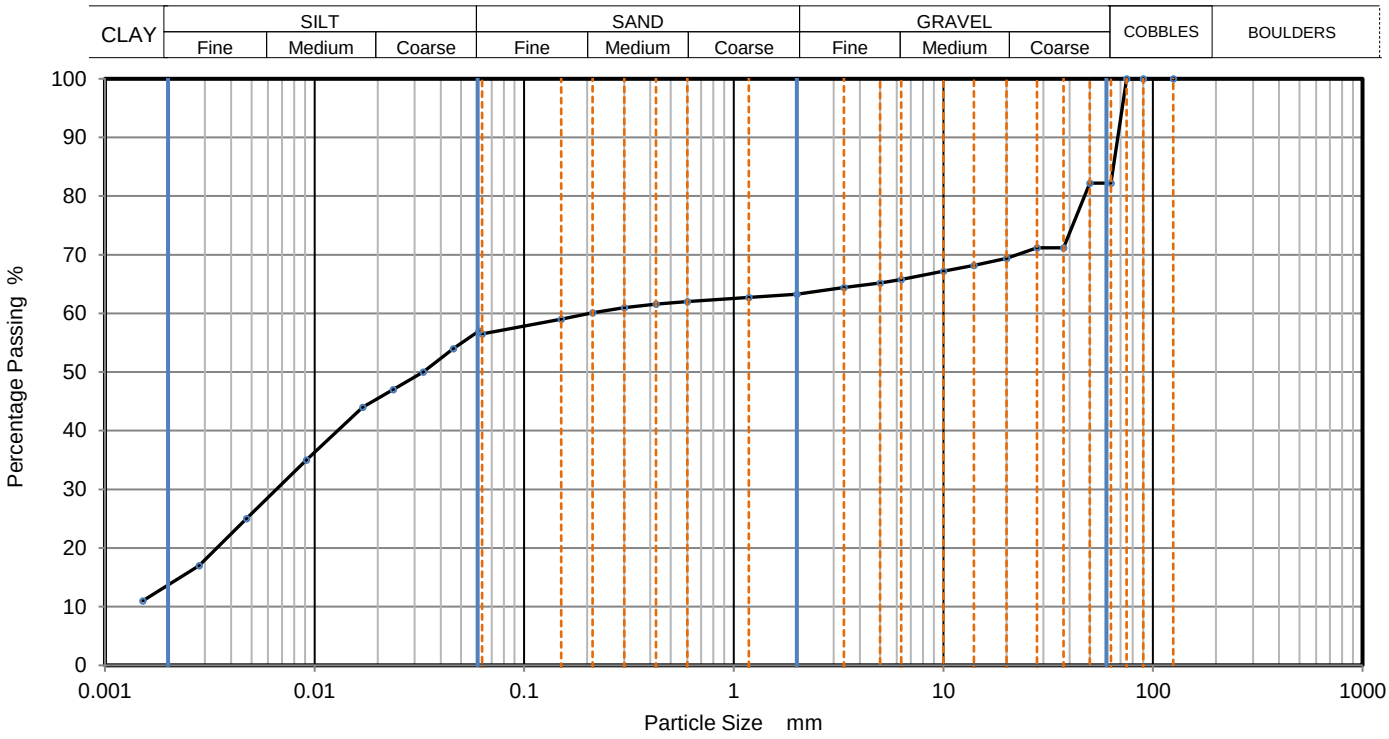
Grading Analysis		
D100	mm	
D60	mm	0.272
D30	mm	0.021
D10	mm	0.00181
Uniformity Coefficient		150
Curvature Coefficient		0.89

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-12689
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Greyish brown slightly sandy slightly gravelly silty CLAY with some cobbles.			Sample Depth (m) Top	1.00
				Sample Depth (m) Base	
Specimen Reference	4	Specimen Depth	1 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022081545



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06087	57
90	100	0.04590	54
75	100	0.03300	50
63	82	0.02368	47
50	82	0.01698	44
37.5	71	0.00913	35
28	71	0.00474	25
20	69	0.00282	17
14	68	0.00152	11
10	67		
6.3	66		
5	65		
3.35	64		
2	63		
1.18	63		
0.6	62	Particle density	(assumed)
0.425	62	2.65	Mg/m3
0.3	61		
0.212	60		
0.15	59		
0.063	57		

Dry Mass of sample, g: 3901

Sample Proportions	% dry mass
Cobbles	17.8
Gravel	18.8
Sand	6.9
Silt	42.7
Clay	13.8

Grading Analysis		
D100	mm	
D60	mm	0.204
D30	mm	0.00666
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

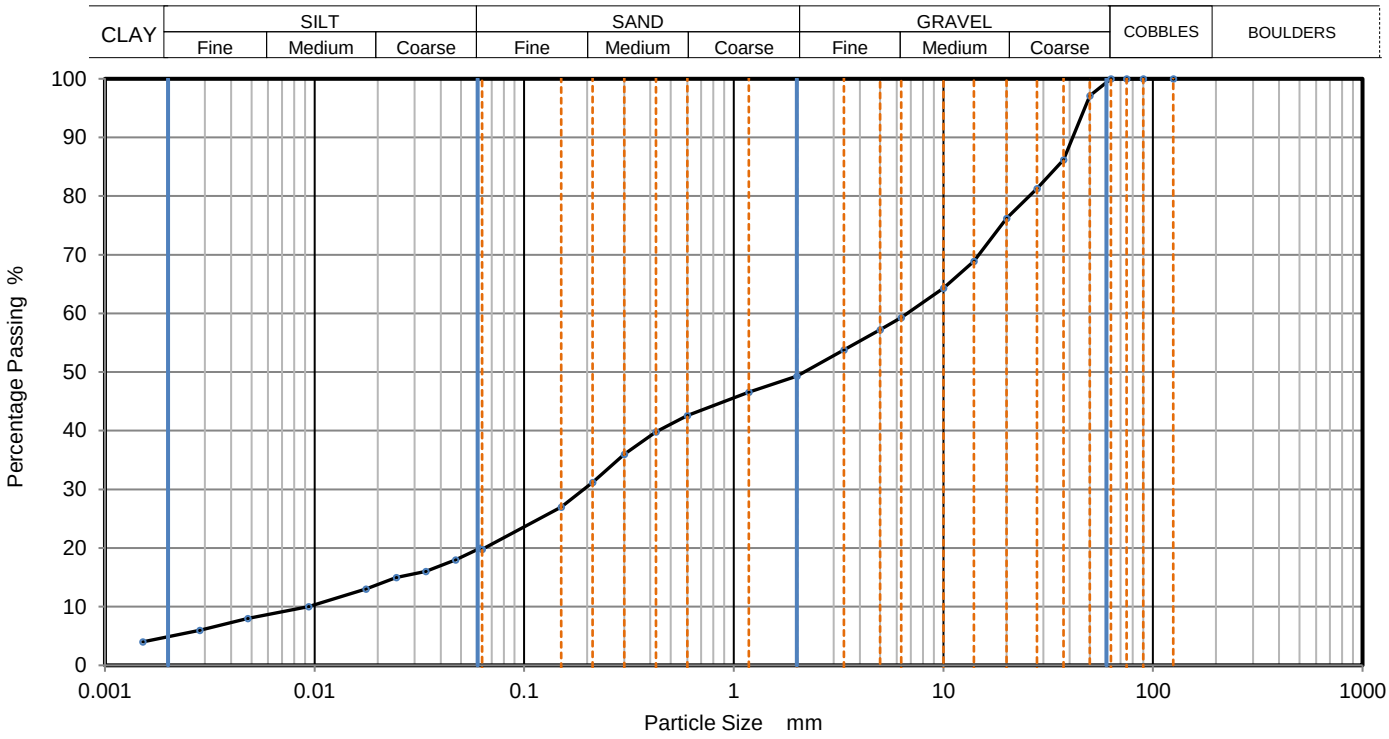
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	TP-12689
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	4
Specimen Description	Greyish brown sandy gravelly silty CLAY.			Sample Depth (m) Top	2.20
				Sample Depth (m) Base	
Specimen Reference	2	Specimen Depth	2.2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022081546



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06183	20
90	100	0.04701	18
75	100	0.03397	16
63	100	0.02452	15
50	97	0.01757	13
37.5	86	0.00936	10
28	81	0.00480	8
20	76	0.00283	6
14	69	0.00152	4
10	64		
6.3	59		
5	57		
3.35	54		
2	49		
1.18	47		
0.6	43	Particle density	(assumed)
0.425	40	2.65	Mg/m3
0.3	36		
0.212	31		
0.15	27		
0.063	20		

Dry Mass of sample, g: 6454

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	50.7
Sand	29.6
Silt	14.8
Clay	4.9

Grading Analysis		
D100	mm	
D60	mm	6.71
D30	mm	0.192
D10	mm	0.00815
Uniformity Coefficient		820
Curvature Coefficient		0.67

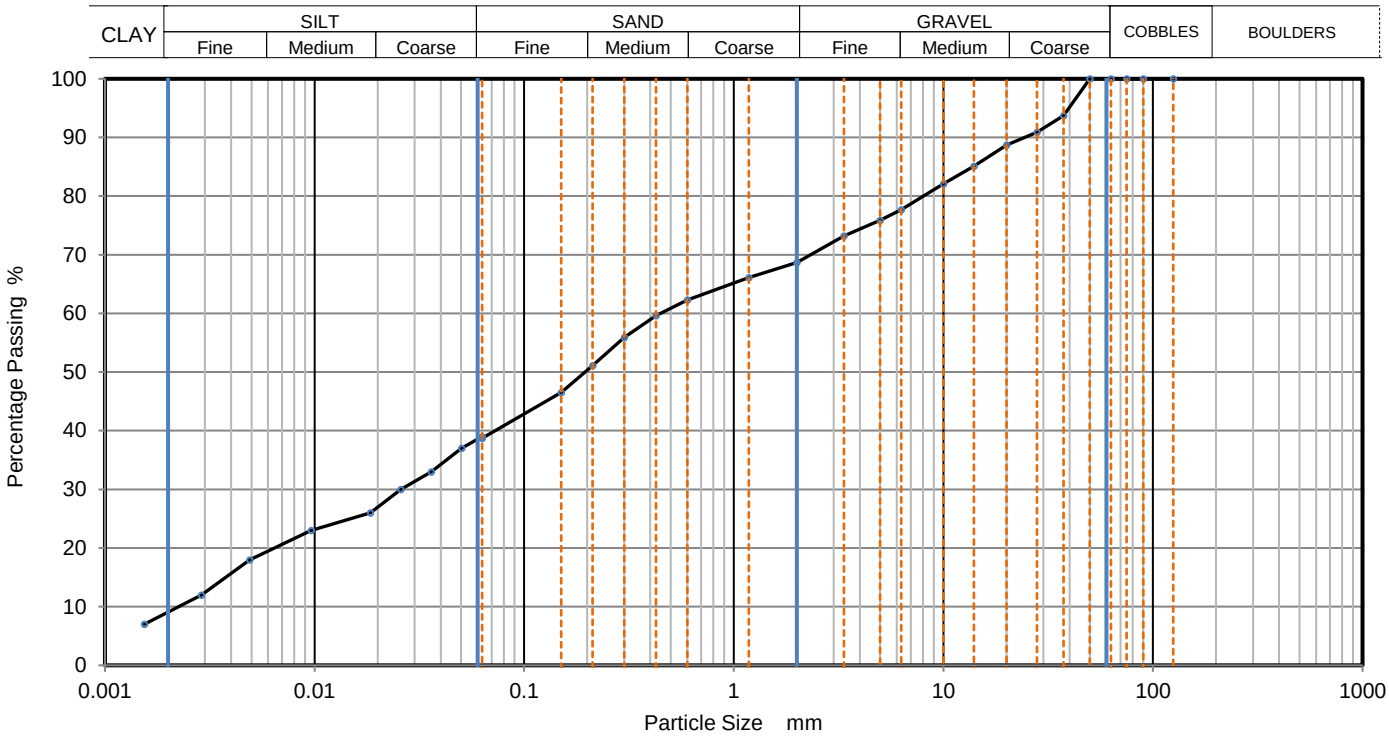
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	TP-12701
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Greyish brown sandy gravelly silty CLAY.			Sample Depth (m) Top	1.50
				Sample Depth (m) Base	
Specimen Reference	4	Specimen Depth	1.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022081547



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	39
90	100	0.05033	37
75	100	0.03604	33
63	100	0.02580	30
50	100	0.01846	26
37.5	94	0.00965	23
28	91	0.00491	18
20	89	0.00288	12
14	85	0.00154	7
10	82		
6.3	78		
5	76		
3.35	73		
2	69		
1.18	66		
0.6	62	Particle density	(assumed)
0.425	60	2.65	Mg/m3
0.3	56		
0.212	51		
0.15	47		
0.063	39		

Dry Mass of sample, g: 3769

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	31.3
Sand	30.0
Silt	29.5
Clay	9.2

Grading Analysis		
D100	mm	
D60	mm	0.446
D30	mm	0.026
D10	mm	0.00219
Uniformity Coefficient		200
Curvature Coefficient		0.69

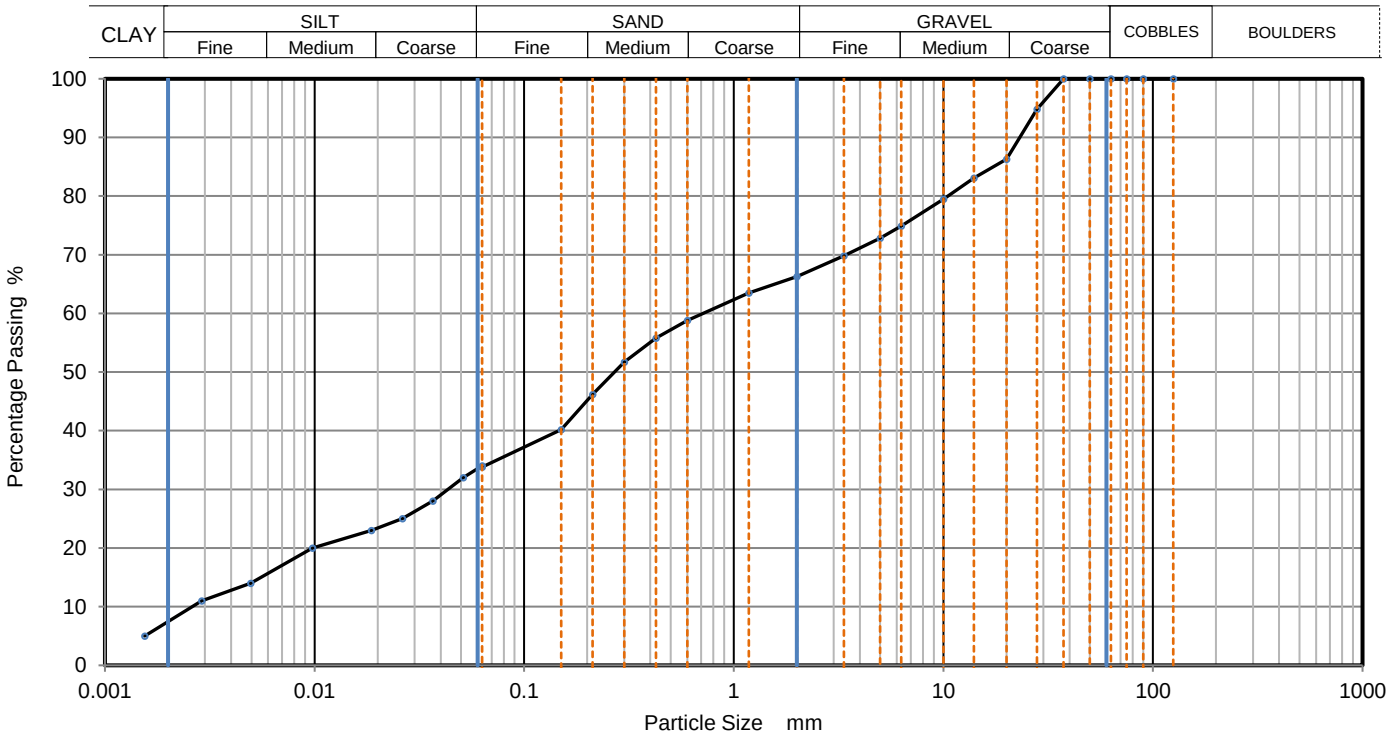
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					TP-12726
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Greyish brown sandy gravelly silty CLAY.			Sample Depth (m) Top	1.50
				Sample Depth (m) Base	
Specimen Reference	4	Specimen Depth	1.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022081549



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	34
90	100	0.05129	32
75	100	0.03671	28
63	100	0.02627	25
50	100	0.01868	23
37.5	100	0.00976	20
28	95	0.00496	14
20	86	0.00290	11
14	83	0.00155	5
10	80		
6.3	75		
5	73		
3.35	70		
2	66		
1.18	64		
0.6	59	Particle density	(assumed)
0.425	56	2.65	Mg/m3
0.3	52		
0.212	46		
0.15	40		
0.063	34		

Dry Mass of sample, g: 4331

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	33.7
Sand	32.5
Silt	26.3
Clay	7.5

Grading Analysis		
D100	mm	
D60	mm	0.71
D30	mm	0.0424
D10	mm	0.00268
Uniformity Coefficient		270
Curvature Coefficient		0.95

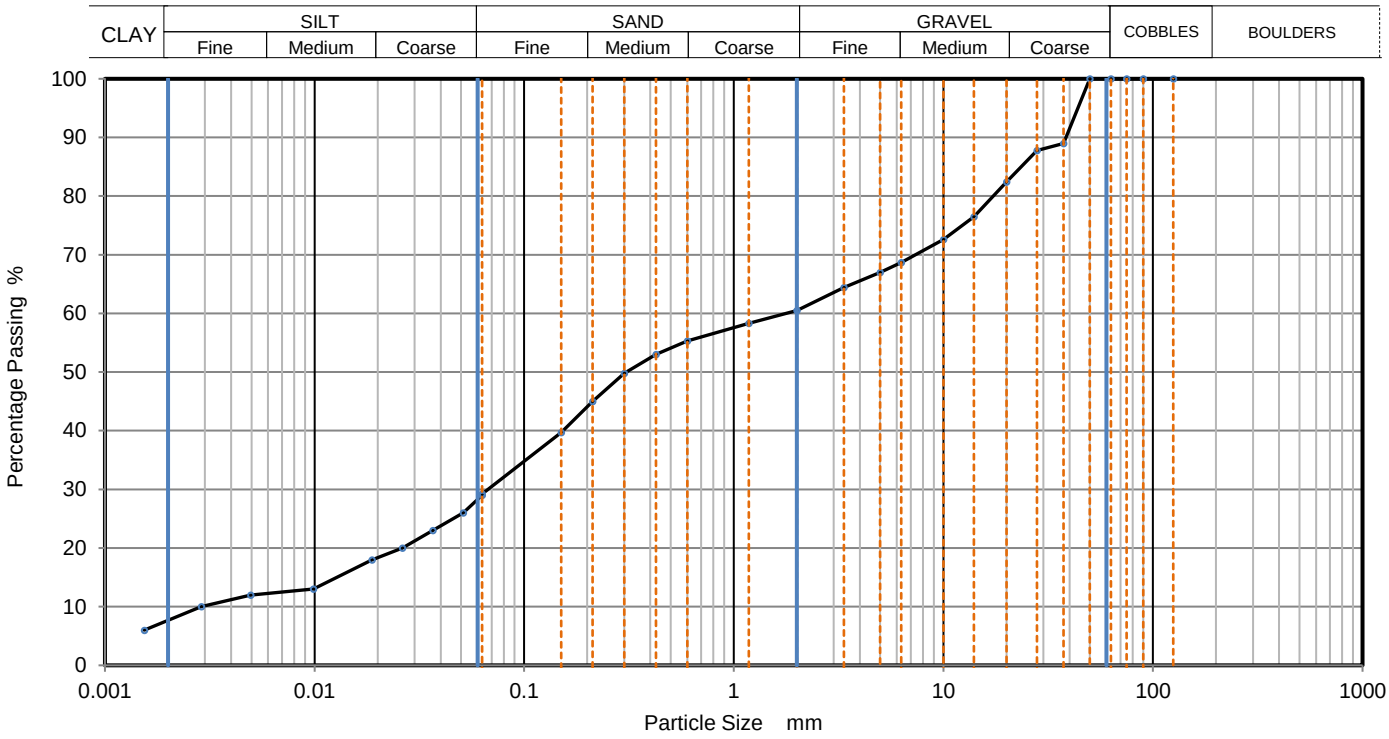
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					**21-1682**
Borehole/Pit No.					TP-12737
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Greyish brown sandy gravelly silty CLAY.			Sample Depth (m) Top	1.50
				Sample Depth (m) Base	
Specimen Reference	4	Specimen Depth	1.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022081550



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	29
90	100	0.05129	26
75	100	0.03671	23
63	100	0.02627	20
50	100	0.01879	18
37.5	89	0.00987	13
28	88	0.00496	12
20	82	0.00288	10
14	77	0.00154	6
10	73		
6.3	69		
5	67		
3.35	64		
2	61		
1.18	58		
0.6	55	Particle density	(assumed)
0.425	53	2.65	Mg/m3
0.3	50		
0.212	45		
0.15	40		
0.063	29		

Dry Mass of sample, g: 3421

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	39.5
Sand	31.3
Silt	21.5
Clay	7.7

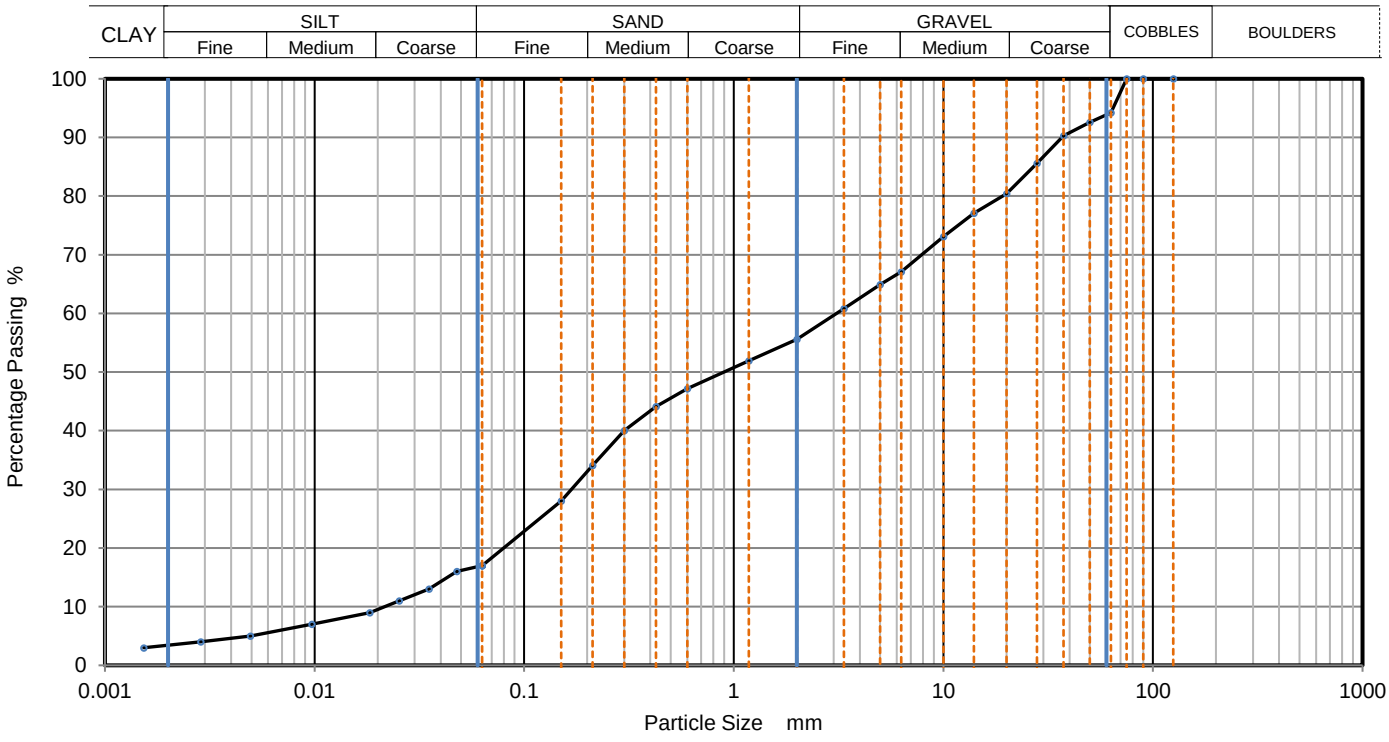
Grading Analysis		
D100	mm	
D60	mm	1.76
D30	mm	0.0671
D10	mm	0.00279
Uniformity Coefficient		630
Curvature Coefficient		0.92

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-12737
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		4
Specimen Description	Greyish brown gravelly silty fine to coarse SAND.				Sample Depth (m)	Top	3.00
						Base	
Specimen Reference	2	Specimen Depth	3	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022081551



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	17
90	100	0.04770	16
75	100	0.03513	13
63	94	0.02533	11
50	93	0.01835	9
37.5	90	0.00970	7
28	86	0.00493	5
20	80	0.00286	4
14	77	0.00153	3
10	73		
6.3	67		
5	65		
3.35	61		
2	56		
1.18	52		
0.6	47	Particle density	(assumed)
0.425	44	2.65	Mg/m3
0.3	40		
0.212	34		
0.15	28		
0.063	17		

Dry Mass of sample, g: 14521

Sample Proportions	% dry mass
Cobbles	5.8
Gravel	38.6
Sand	38.6
Silt	13.6
Clay	3.4

Grading Analysis		
D100	mm	
D60	mm	3.09
D30	mm	0.168
D10	mm	0.022
Uniformity Coefficient		140
Curvature Coefficient		0.41

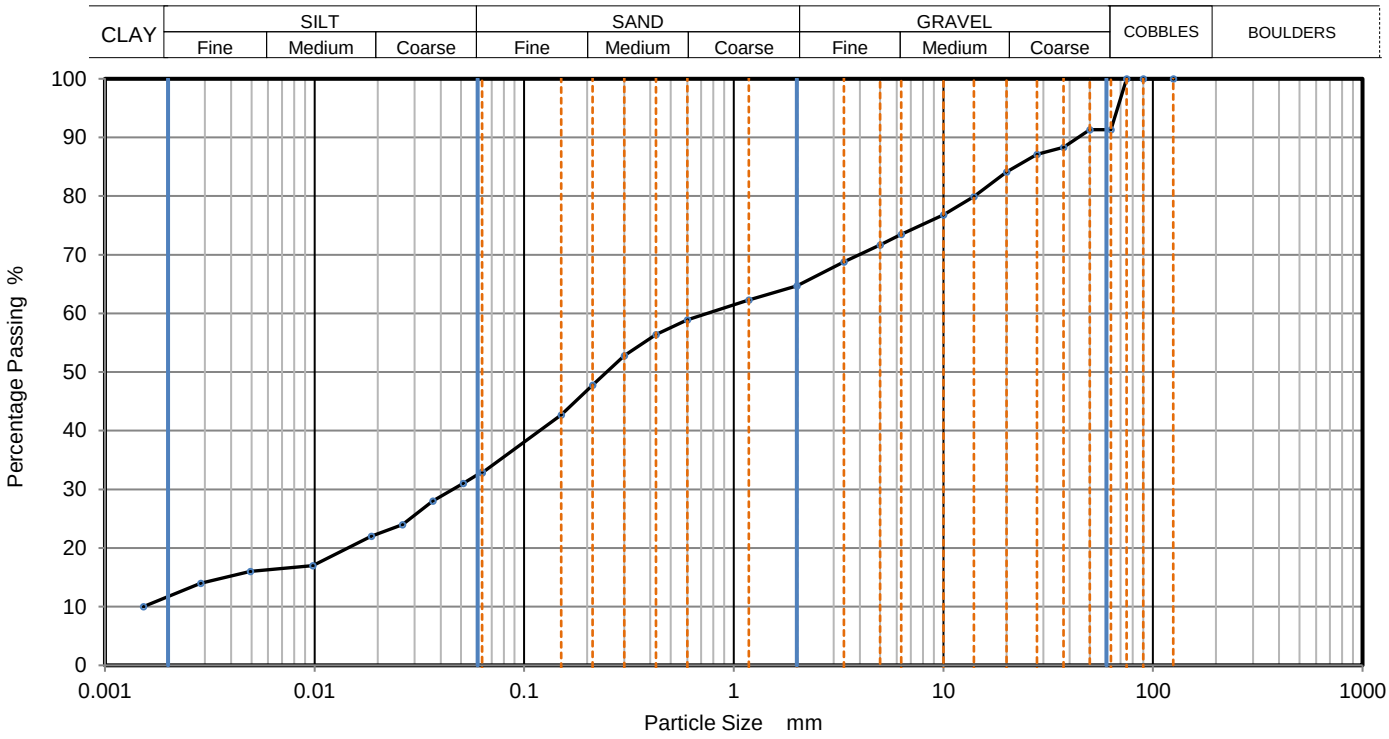
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-12738
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Greyish brown sandy gravelly silty CLAY with some cobbles.			Sample Depth (m) Top	1.50
				Sample Depth (m) Base	
Specimen Reference	4	Specimen Depth	1.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022081552



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	33
90	100	0.05129	31
75	100	0.03671	28
63	91	0.02627	24
50	91	0.01868	22
37.5	88	0.00981	17
28	87	0.00493	16
20	84	0.00286	14
14	80	0.00152	10
10	77		
6.3	74		
5	72		
3.35	69		
2	65		
1.18	62		
0.6	59	Particle density	(assumed)
0.425	56	2.65	Mg/m3
0.3	53		
0.212	48		
0.15	43		
0.063	33		

Dry Mass of sample, g: 5139

Sample Proportions	% dry mass
Cobbles	8.7
Gravel	26.6
Sand	31.9
Silt	21.0
Clay	11.8

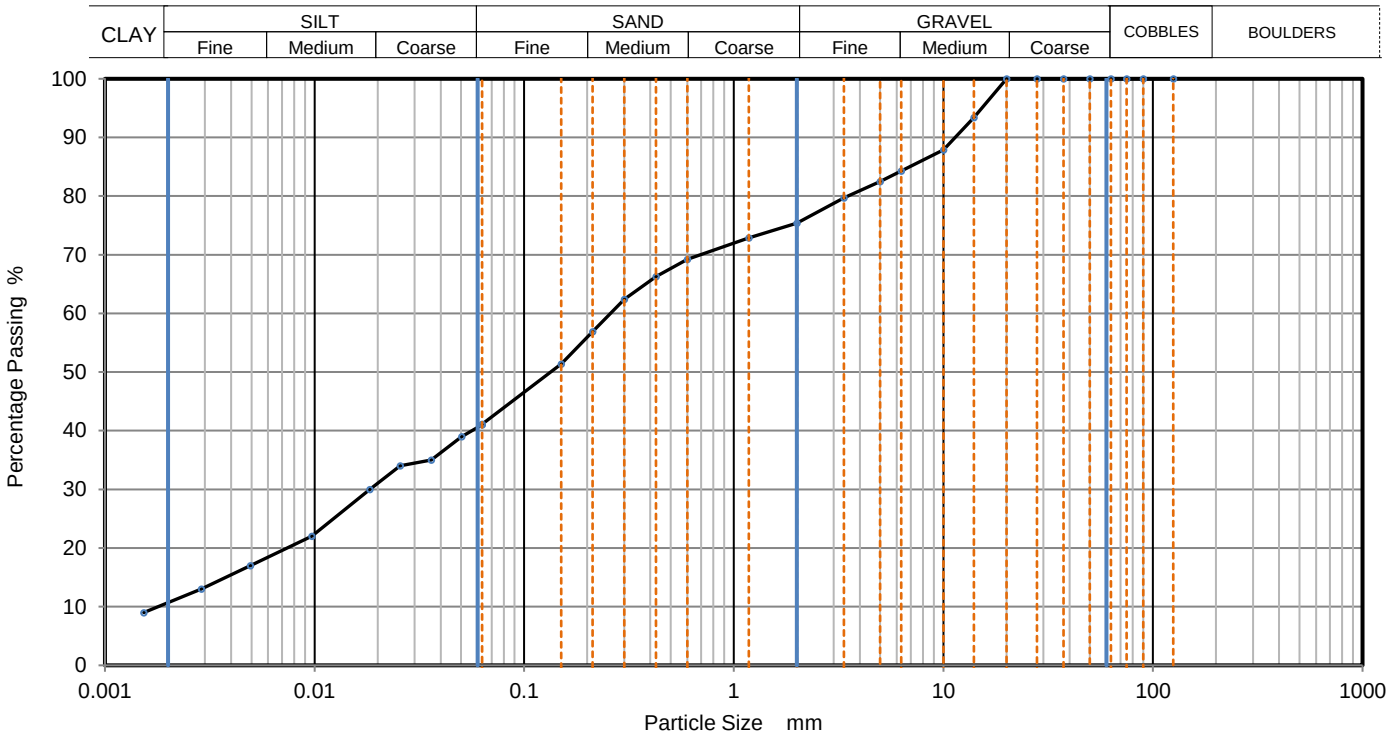
Grading Analysis		
D100	mm	
D60	mm	0.744
D30	mm	0.0462
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-12750
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Greyish brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	1.50
				Sample Depth (m) Base	
Specimen Reference	5	Specimen Depth	1.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022081553



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	41
90	100	0.05033	39
75	100	0.03604	35
63	100	0.02564	34
50	100	0.01835	30
37.5	100	0.00970	22
28	100	0.00493	17
20	100	0.00288	13
14	93	0.00153	9
10	88		
6.3	84		
5	83		
3.35	80		
2	75		
1.18	73		
0.6	69	Particle density	(assumed)
0.425	66	2.65	Mg/m3
0.3	62		
0.212	57		
0.15	51		
0.063	41		

Dry Mass of sample, g: 508

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	24.6
Sand	34.4
Silt	30.1
Clay	10.9

Grading Analysis		
D100	mm	
D60	mm	0.257
D30	mm	0.0185
D10	mm	0.00171
Uniformity Coefficient		150
Curvature Coefficient		0.78

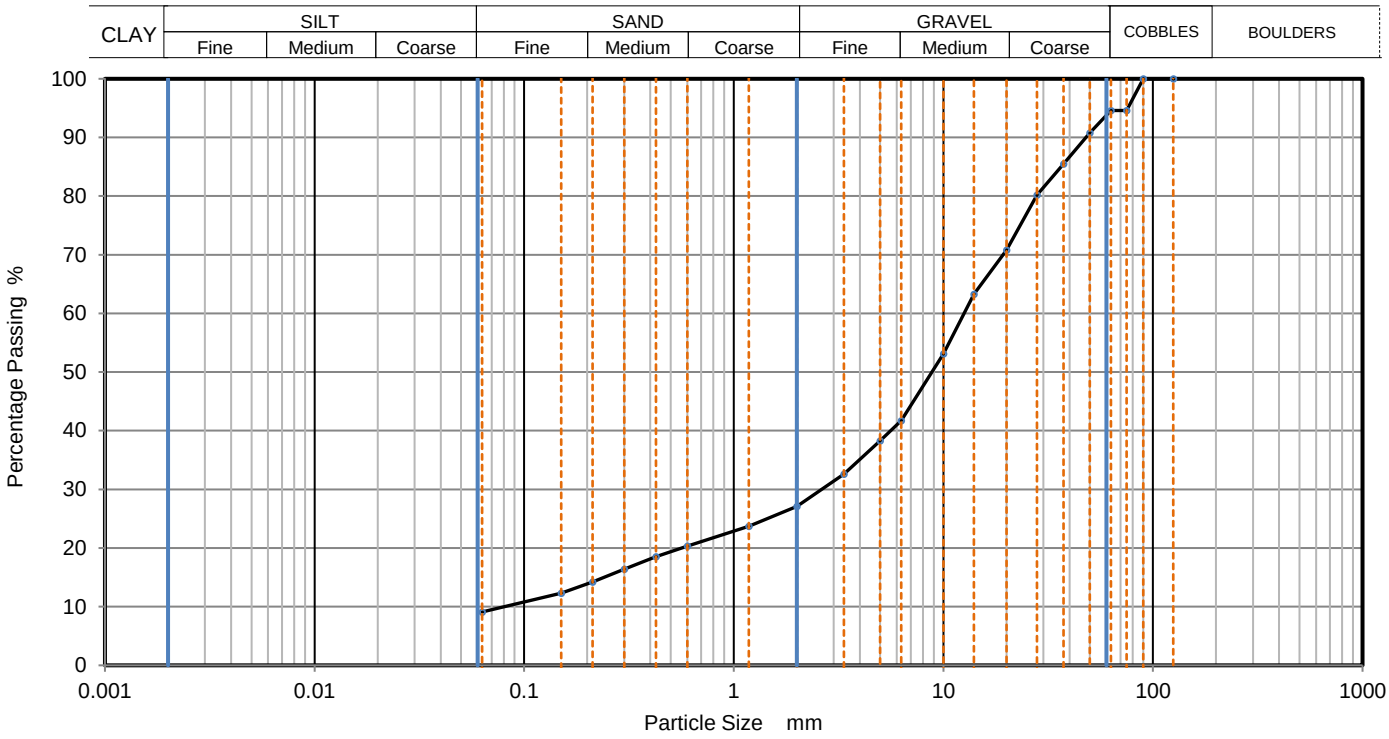
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	TP-12775
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brown slightly sandy slightly clayey subangular fine to coarse GRAVEL.			Sample Depth (m) Top	0.80
				Sample Depth (m) Base	
Specimen Reference	3	Specimen Depth	0.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022080440



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	95		
63	95		
50	91		
37.5	86		
28	80		
20	71		
14	63		
10	53		
6.3	42		
5	38		
3.35	33		
2	27		
1.18	24		
0.6	20		
0.425	19		
0.3	16		
0.212	14		
0.15	12		
0.063	9		

Dry Mass of sample, g: 11770

Sample Proportions	% dry mass
Cobbles	5.4
Gravel	67.5
Sand	18.0
Fines <0.063mm	9.0

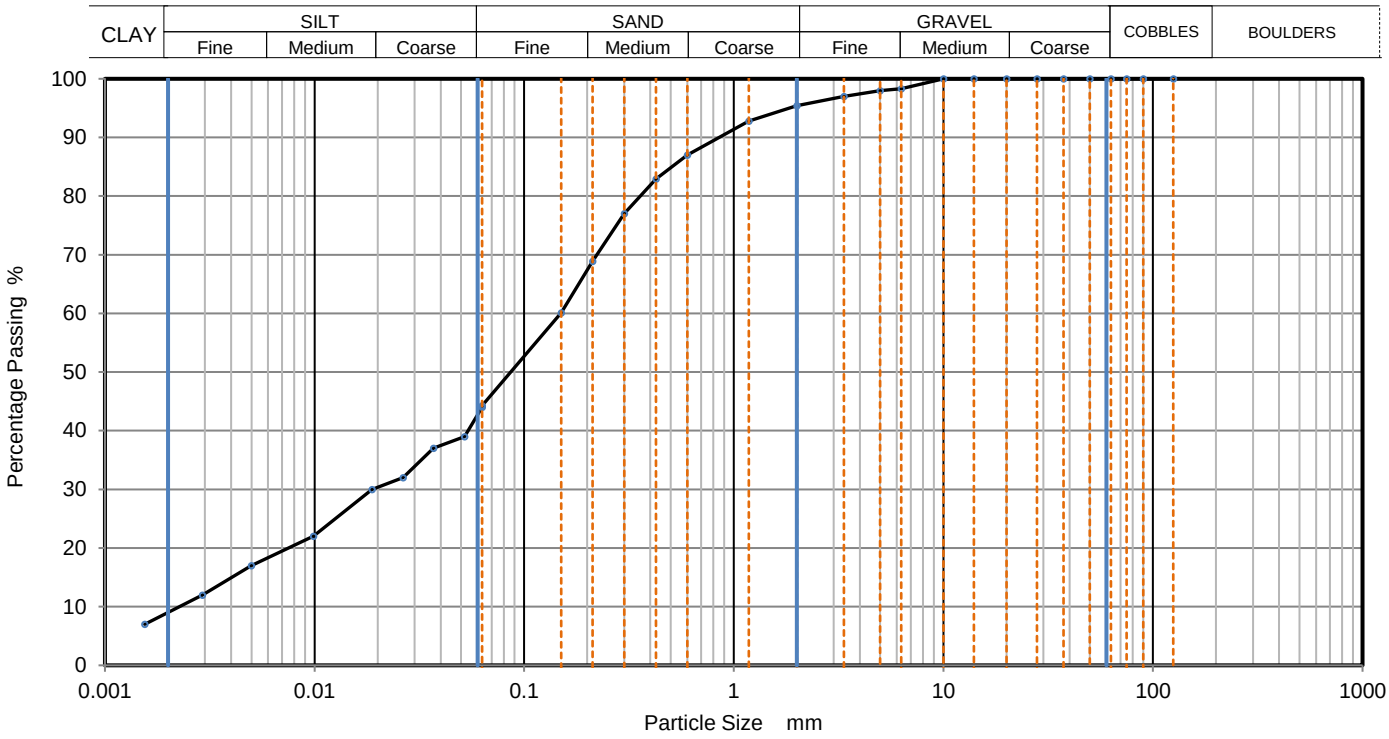
Grading Analysis		
D100	mm	
D60	mm	12.6
D30	mm	2.62
D10	mm	0.0809
Uniformity Coefficient		160
Curvature Coefficient		6.8

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION			Job Ref		21-1682
				Borehole/Pit No.		TP-12786
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.		2
Specimen Description	Greyish brown slightly gravelly silty fine to coarse SAND.			Sample Depth (m)	Top	1.50
					Base	
Specimen Reference	4	Specimen Depth	1.5 m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID		Caus2022081554



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	44
90	100	0.05191	39
75	100	0.03693	37
63	100	0.02642	32
50	100	0.01879	30
37.5	100	0.00987	22
28	100	0.00499	17
20	100	0.00291	12
14	100	0.00155	7
10	100		
6.3	98		
5	98		
3.35	97		
2	95		
1.18	93		
0.6	87	Particle density	(assumed)
0.425	83	2.65	Mg/m3
0.3	77		
0.212	69		
0.15	60		
0.063	44		

Dry Mass of sample, g: 243

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	4.6
Sand	51.1
Silt	34.9
Clay	9.4

Grading Analysis		
D100	mm	
D60	mm	0.149
D30	mm	0.02
D10	mm	0.00217
Uniformity Coefficient		69
Curvature Coefficient		1.2

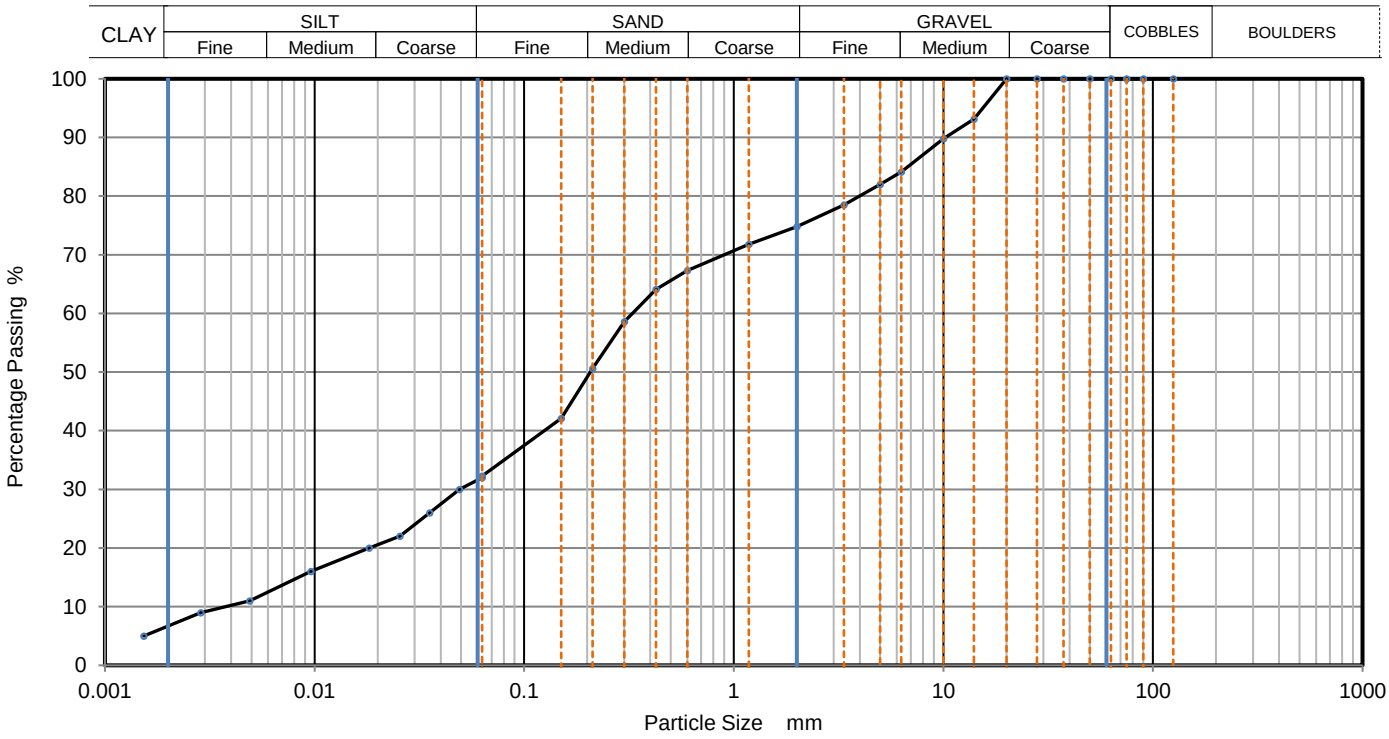
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-12786
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Greyish brown slightly gravelly silty fine to coarse SAND.			Sample Depth (m) Top	1.80
				Sample Depth (m) Base	
Specimen Reference	4	Specimen Depth	1.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022081555



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	32
90	100	0.04902	30
75	100	0.03536	26
63	100	0.02548	22
50	100	0.01824	20
37.5	100	0.00959	16
28	100	0.00491	11
20	100	0.00286	9
14	93	0.00153	5
10	90		
6.3	84		
5	82		
3.35	79		
2	75		
1.18	72		
0.6	67	Particle density	(assumed)
0.425	64	2.65	Mg/m3
0.3	59		
0.212	51		
0.15	42		
0.063	32		

Dry Mass of sample, g: 539

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	25.2
Sand	42.5
Silt	25.7
Clay	6.6

Grading Analysis		
D100	mm	
D60	mm	0.329
D30	mm	0.0499
D10	mm	0.0038
Uniformity Coefficient		86
Curvature Coefficient		2

Remarks

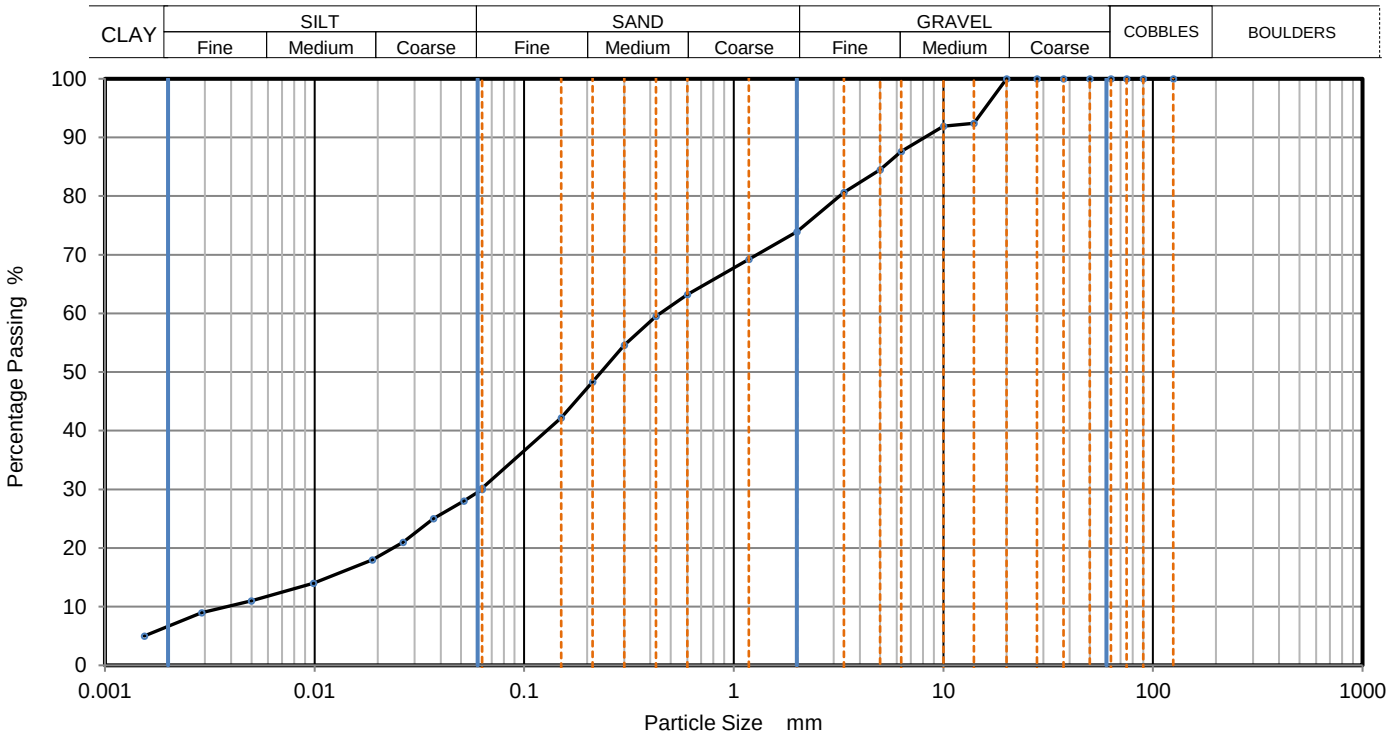
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

Job Ref					**21-1682**
Borehole/Pit No.					TP-12786
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	4
Specimen Description	Greyish brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	2.20
				Base	
Specimen Reference	4	Specimen Depth	2.2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022081556



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	30
90	100	0.05159	28
75	100	0.03692	25
63	100	0.02642	21
50	100	0.01889	18
37.5	100	0.00987	14
28	100	0.00499	11
20	100	0.00289	9
14	92	0.00154	5
10	92		
6.3	88		
5	85		
3.35	81		
2	74		
1.18	69		
0.6	63	Particle density	(assumed)
0.425	60	2.65	Mg/m3
0.3	55		
0.212	48		
0.15	42		
0.063	30		

Dry Mass of sample, g: 290

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	26.1
Sand	43.7
Silt	23.4
Clay	6.8

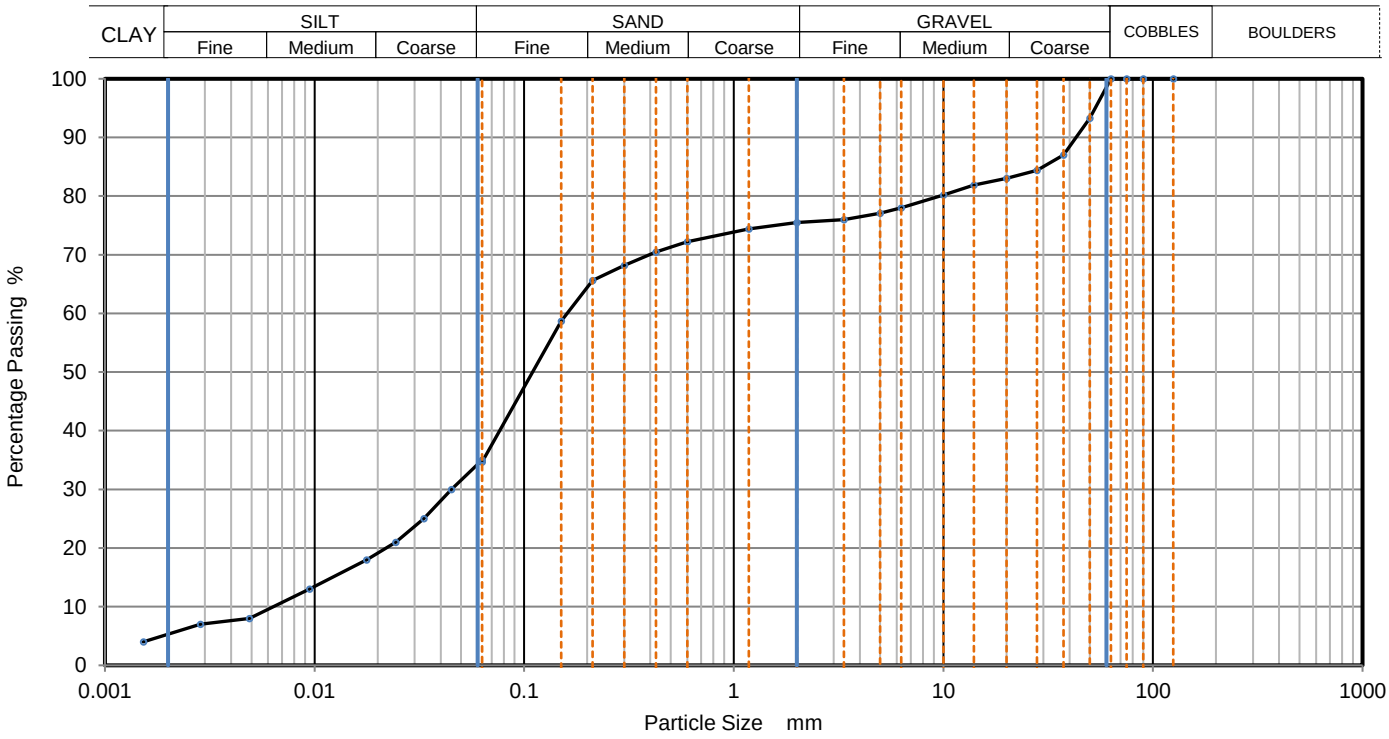
Grading Analysis		
D100	mm	
D60	mm	0.446
D30	mm	0.0615
D10	mm	0.00408
Uniformity Coefficient		110
Curvature Coefficient		2.1

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-12786
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	5
Specimen Description	Greyish brown gravelly silty fine to coarse SAND.			Sample Depth (m) Top	2.60
				Sample Depth (m) Base	
Specimen Reference	2	Specimen Depth	2.6 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022081557



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	35
90	100	0.04490	30
75	100	0.03324	25
63	100	0.02435	21
50	93	0.01768	18
37.5	87	0.00948	13
28	84	0.00488	8
20	83	0.00285	7
14	82	0.00152	4
10	80		
6.3	78		
5	77		
3.35	76		
2	76		
1.18	74		
0.6	72	Particle density	(assumed)
0.425	71	2.65	Mg/m3
0.3	68		
0.212	66		
0.15	59		
0.063	35		

Dry Mass of sample, g: 3709

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	24.5
Sand	40.8
Silt	29.4
Clay	5.3

Grading Analysis		
D100	mm	
D60	mm	0.16
D30	mm	0.0437
D10	mm	0.00621
Uniformity Coefficient		26
Curvature Coefficient		1.9

Remarks

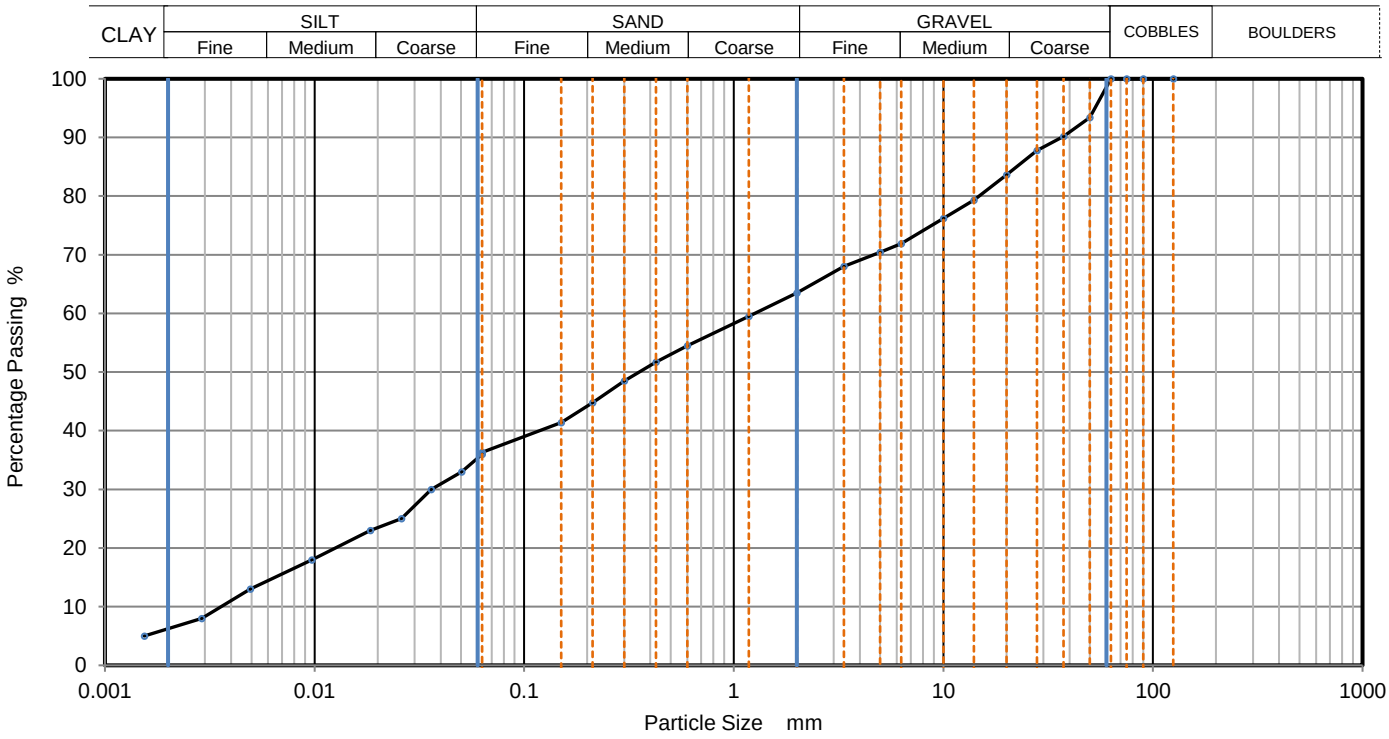
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

Job Ref					**21-1682**
Borehole/Pit No.					TP-12787
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Greyish brown sandy gravelly silty CLAY.			Sample Depth (m) Top	1.10
				Sample Depth (m) Base	
Specimen Reference	4	Specimen Depth	1.1 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022081558



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	36
90	100	0.05032	33
75	100	0.03604	30
63	100	0.02595	25
50	93	0.01846	23
37.5	90	0.00970	18
28	88	0.00493	13
20	84	0.00289	8
14	79	0.00154	5
10	76		
6.3	72		
5	70		
3.35	68		
2	64		
1.18	60		
0.6	55	Particle density	(assumed)
0.425	52	2.65	Mg/m3
0.3	49		
0.212	45		
0.15	41		
0.063	36		

Dry Mass of sample, g: 3740

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	36.5
Sand	27.1
Silt	30.1
Clay	6.3

Grading Analysis		
D100	mm	
D60	mm	1.27
D30	mm	0.0371
D10	mm	0.0035
Uniformity Coefficient		360
Curvature Coefficient		0.31

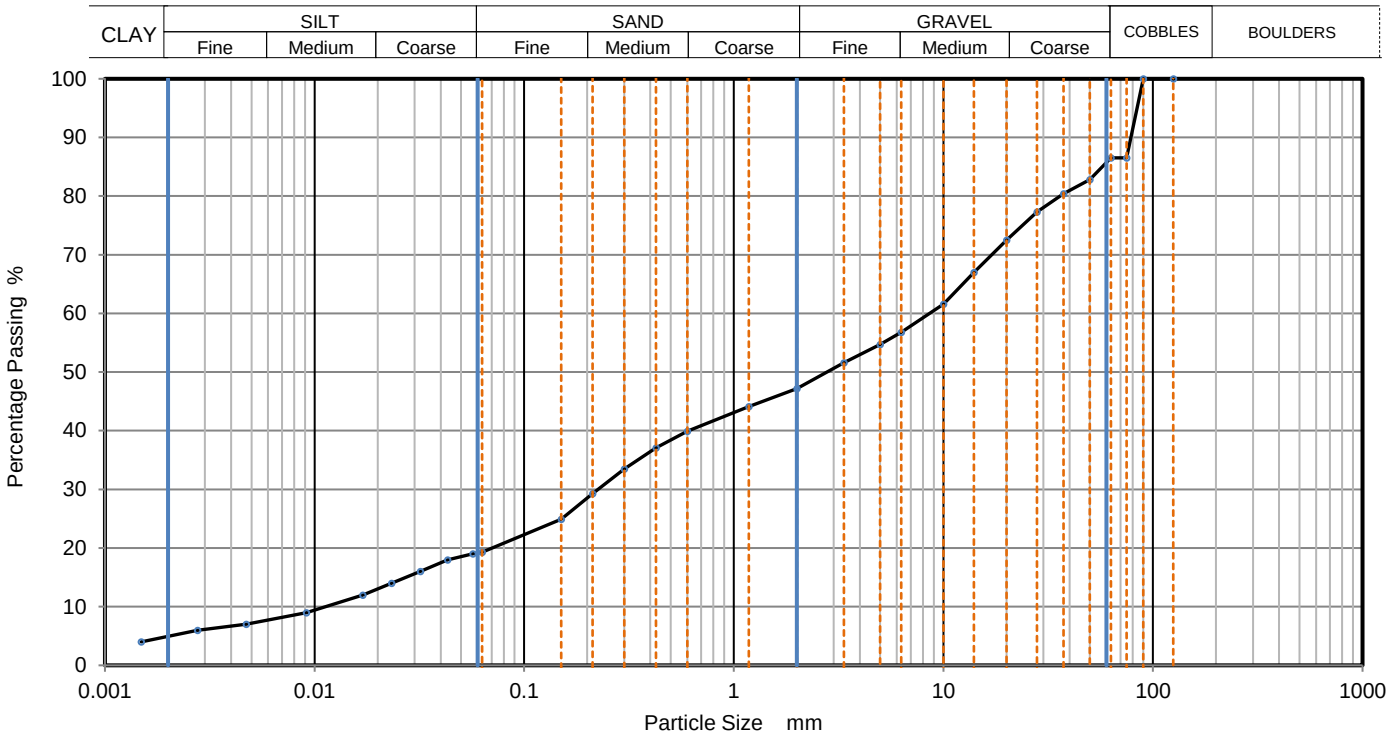
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	TP-12787
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	5
Specimen Description	Greyish brown gravelly silty fine to coarse SAND with some cobbles.			Sample Depth (m) Top	2.50
				Sample Depth (m) Base	
Specimen Reference	2	Specimen Depth	2.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022081560



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.05689	19
90	100	0.04306	18
75	87	0.03200	16
63	87	0.02333	14
50	83	0.01698	12
37.5	80	0.00913	9
28	77	0.00471	7
20	73	0.00277	6
14	67	0.00149	4
10	62		
6.3	57		
5	55		
3.35	52		
2	47		
1.18	44		
0.6	40	Particle density	(assumed)
0.425	37	2.65	Mg/m3
0.3	34		
0.212	29		
0.15	25		
0.063	19		

Dry Mass of sample, g: 12295

Sample Proportions	% dry mass
Cobbles	13.5
Gravel	39.3
Sand	27.9
Silt	14.4
Clay	4.9

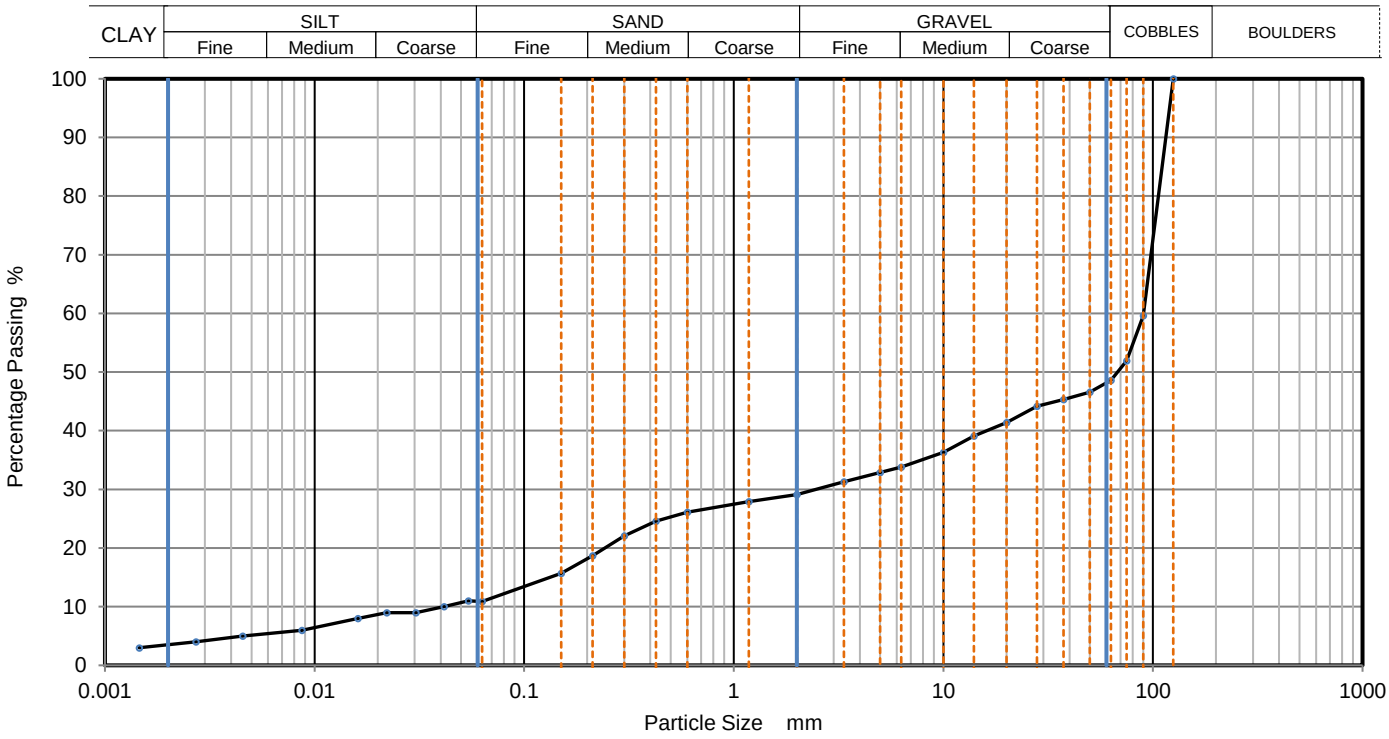
Grading Analysis		
D100	mm	
D60	mm	8.56
D30	mm	0.224
D10	mm	0.0104
Uniformity Coefficient		820
Curvature Coefficient		0.56

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION			Job Ref		21-1682
				Borehole/Pit No.		TP-12800
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.		2
Specimen Description	Greyish brown slighlty sandy silty subangular fine to coarse GRAVEL with cobbles.			Sample Depth (m)	Top	0.90
					Base	
Specimen Reference	2	Specimen Depth	0.9 m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID		Caus2022081561



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.05426	11
90	60	0.04153	10
75	52	0.03045	9
63	49	0.02209	9
50	47	0.01613	8
37.5	45	0.00871	6
28	44	0.00454	5
20	41	0.00272	4
14	39	0.00146	3
10	36		
6.3	34		
5	33		
3.35	31		
2	29		
1.18	28		
0.6	26	Particle density	(assumed)
0.425	25	2.65	Mg/m3
0.3	22		
0.212	19		
0.15	16		
0.063	11		

Dry Mass of sample, g: 14990

Sample Proportions	% dry mass
Cobbles	51.4
Gravel	19.4
Sand	18.2
Silt	7.7
Clay	3.3

Grading Analysis		
D100	mm	125
D60	mm	90.3
D30	mm	2.46
D10	mm	0.0385
Uniformity Coefficient		2300
Curvature Coefficient		1.7

Remarks

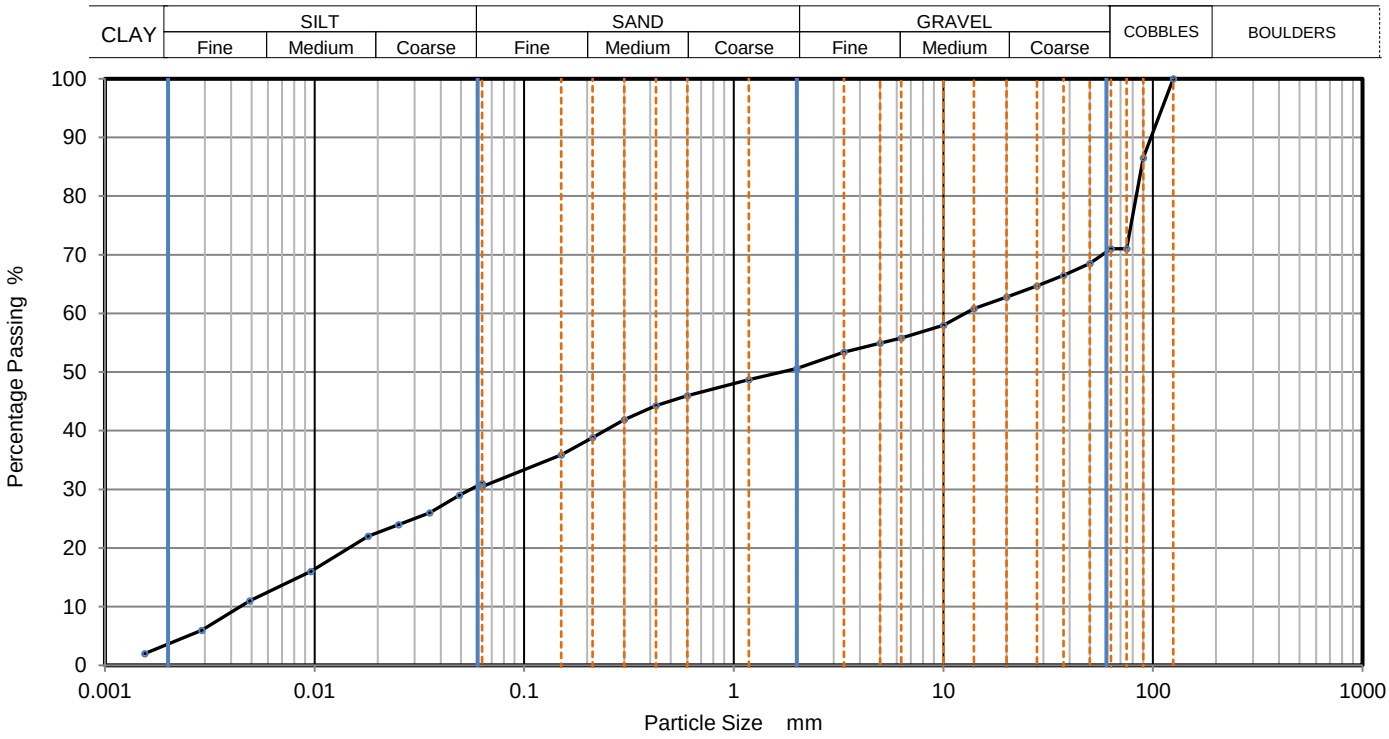
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					TP-12801
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Brown sandy gravelly silty CLAY with cobbles.			Sample Depth (m) Top	0.70
				Sample Depth (m) Base	
Specimen Reference	3	Specimen Depth	0.7 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022080442



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	31
90	87	0.04902	29
75	71	0.03536	26
63	71	0.02516	24
50	69	0.01802	22
37.5	67	0.00959	16
28	65	0.00491	11
20	63	0.00289	6
14	61	0.00155	2
10	58		
6.3	56		
5	55		
3.35	53		
2	51		
1.18	49		
0.6	46	Particle density	(assumed)
0.425	44	2.65	Mg/m3
0.3	42		
0.212	39		
0.15	36		
0.063	31		

Dry Mass of sample, g: 9327

Sample Proportions	% dry mass
Cobbles	29.0
Gravel	20.4
Sand	20.1
Silt	26.6
Clay	3.9

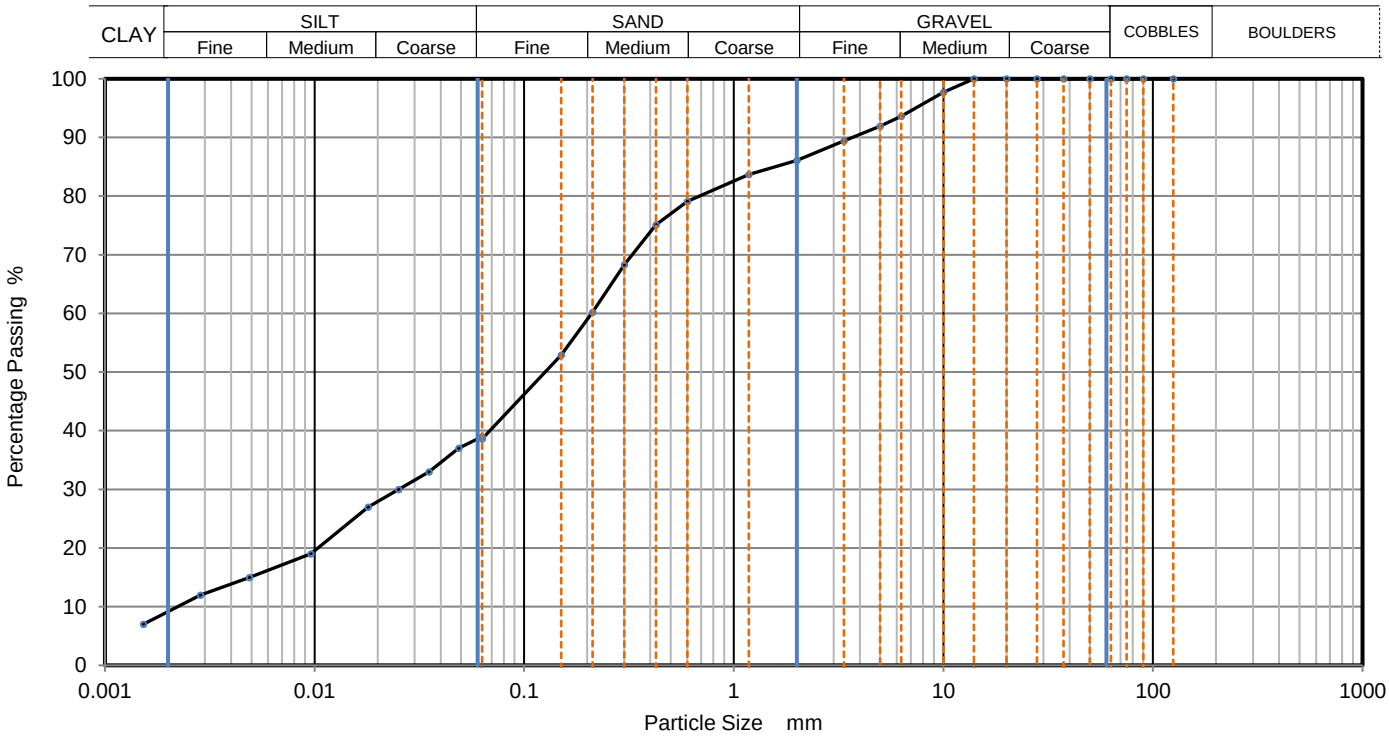
Grading Analysis		
D100	mm	125
D60	mm	12.7
D30	mm	0.0571
D10	mm	0.00441
Uniformity Coefficient		2900
Curvature Coefficient		0.058

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-12801
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Grey sandy slightly gravelly silty fine to coarse SAND.			Sample Depth (m) Top	2.30
				Sample Depth (m) Base	
Specimen Reference	3	Specimen Depth	2.3 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022080444



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	39
90	100	0.04869	37
75	100	0.03513	33
63	100	0.02516	30
50	100	0.01802	27
37.5	100	0.00959	19
28	100	0.00488	15
20	100	0.00285	12
14	100	0.00152	7
10	98		
6.3	94		
5	92		
3.35	89		
2	86		
1.18	84		
0.6	79	Particle density	(assumed)
0.425	75	2.65	Mg/m3
0.3	68		
0.212	60		
0.15	53		
0.063	39		

Dry Mass of sample, g: 533

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	13.9
Sand	47.5
Silt	29.2
Clay	9.4

Grading Analysis		
D100	mm	
D60	mm	0.21
D30	mm	0.026
D10	mm	0.00219
Uniformity Coefficient		96
Curvature Coefficient		1.5

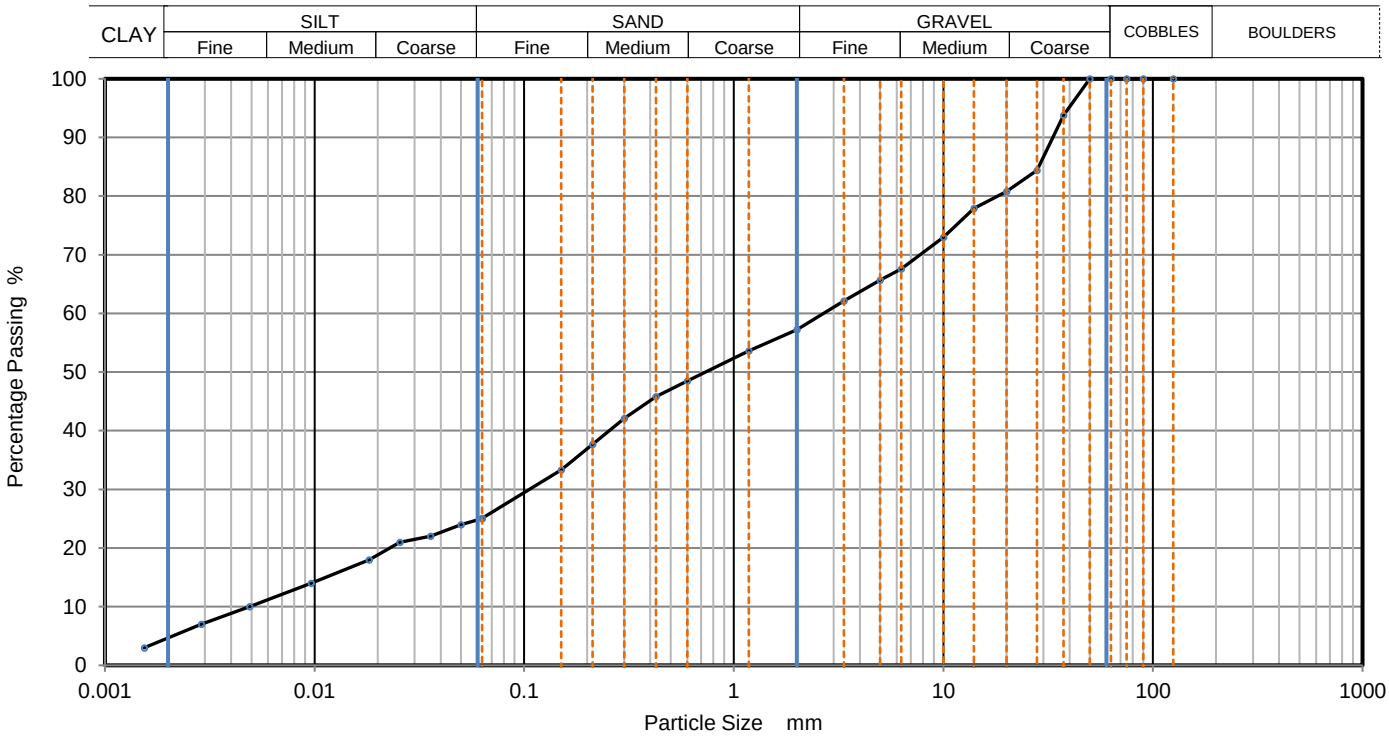
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-12823
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brown sandy gravelly silty CLAY.			Sample Depth (m) Top	0.90
				Sample Depth (m) Base	
Specimen Reference	3	Specimen Depth	0.9 m	Sample Type	D
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022080446



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	25
90	100	0.05000	24
75	100	0.03581	22
63	100	0.02548	21
50	100	0.01824	18
37.5	94	0.00965	14
28	84	0.00491	10
20	81	0.00288	7
14	78	0.00154	3
10	73		
6.3	68		
5	66		
3.35	62		
2	57		
1.18	54		
0.6	49	Particle density 2.65	(assumed) Mg/m3
0.425	46		
0.3	42		
0.212	38		
0.15	33		
0.063	25		

Dry Mass of sample, g: 2602

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	42.8
Sand	32.1
Silt	20.2
Clay	4.9

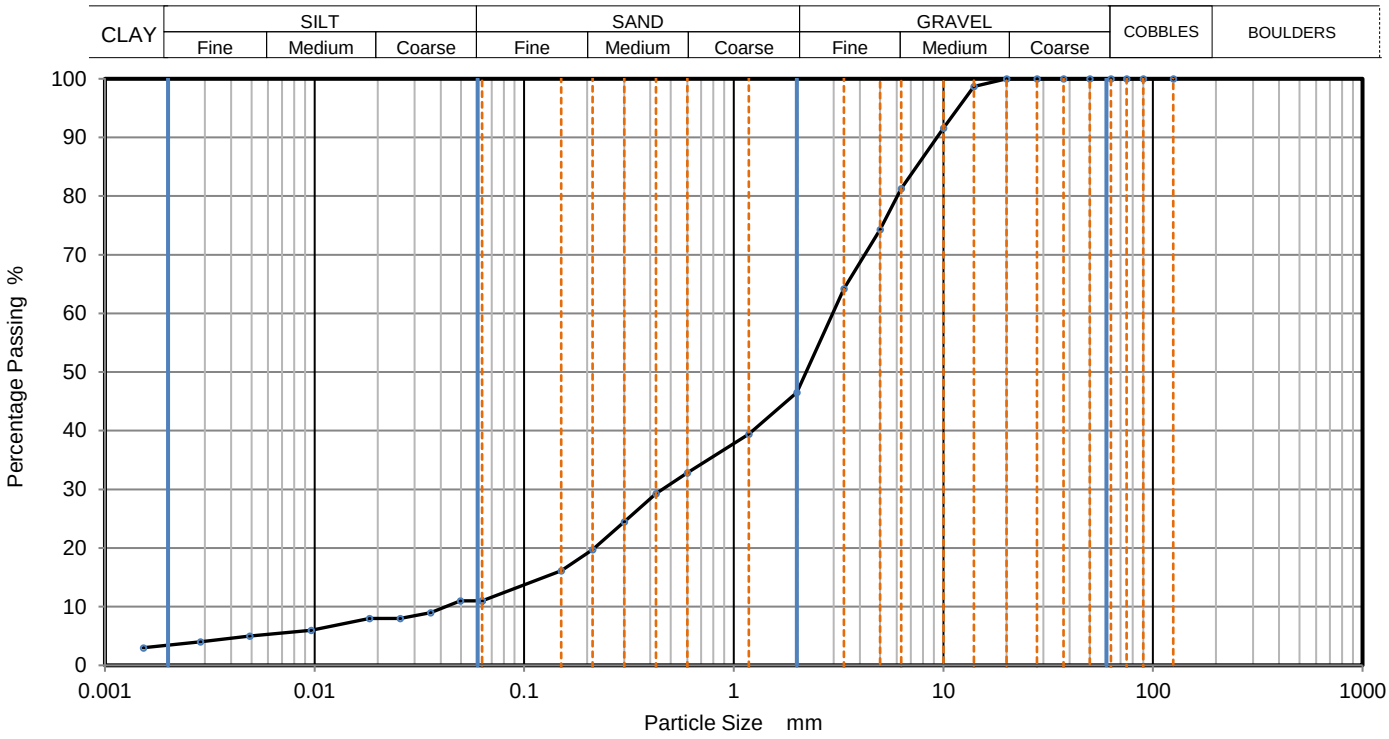
Grading Analysis		
D100	mm	
D60	mm	2.69
D30	mm	0.106
D10	mm	0.00471
Uniformity Coefficient		570
Curvature Coefficient		0.88

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-12823
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		3
Specimen Description	Brownish grey gravelly silty fine to coarse SAND.				Sample Depth (m)	Top	2.10
						Base	
Specimen Reference	3	Specimen Depth	2.1	m	Sample Type		D
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022080447



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	11
90	100	0.04969	11
75	100	0.03582	9
63	100	0.02564	8
50	100	0.01824	8
37.5	100	0.00965	6
28	100	0.00491	5
20	100	0.00285	4
14	99	0.00152	3
10	92		
6.3	81		
5	74		
3.35	64		
2	47		
1.18	39		
0.6	33	Particle density	(assumed)
0.425	29	2.65	Mg/m3
0.3	25		
0.212	20		
0.15	16		
0.063	11		

Dry Mass of sample, g: 504

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	53.5
Sand	35.4
Silt	7.8
Clay	3.3

Grading Analysis		
D100	mm	
D60	mm	2.96
D30	mm	0.455
D10	mm	0.0437
Uniformity Coefficient		68
Curvature Coefficient		1.6

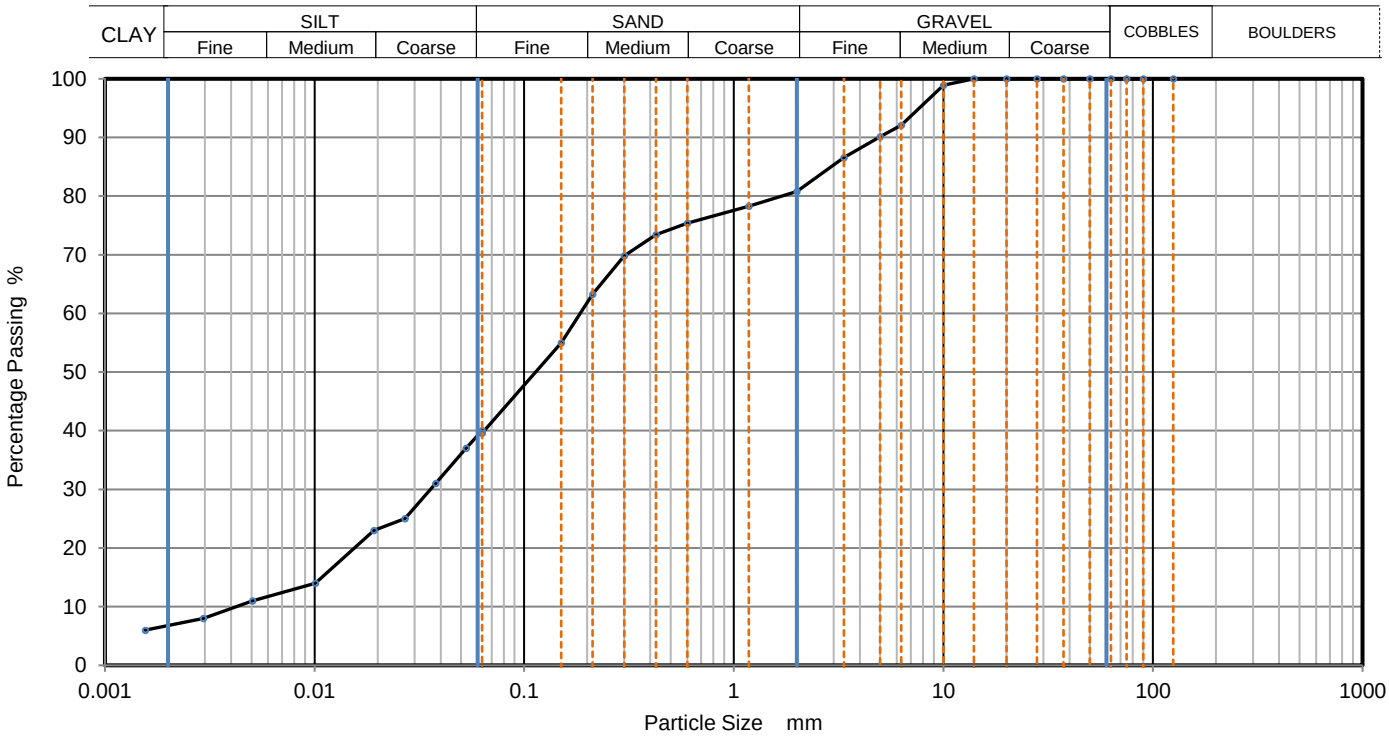
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-12823
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	4
Specimen Description	Brown slightly gravelly silty fine to coarse SAND.			Sample Depth (m) Top	3.20
				Sample Depth (m) Base	
Specimen Reference	3	Specimen Depth	3.2 m	Sample Type	D
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022080448



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	40
90	100	0.05284	37
75	100	0.03779	31
63	100	0.02702	25
50	100	0.01921	23
37.5	100	0.01008	14
28	100	0.00507	11
20	100	0.00294	8
14	100	0.00156	6
10	99		
6.3	92		
5	90		
3.35	87		
2	81		
1.18	78		
0.6	75	Particle density	(assumed)
0.425	73	2.65	Mg/m3
0.3	70		
0.212	63		
0.15	55		
0.063	40		

Dry Mass of sample, g: 504

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	19.2
Sand	41.3
Silt	32.7
Clay	6.8

Grading Analysis		
D100	mm	
D60	mm	0.185
D30	mm	0.0354
D10	mm	0.00394
Uniformity Coefficient		47
Curvature Coefficient		1.7

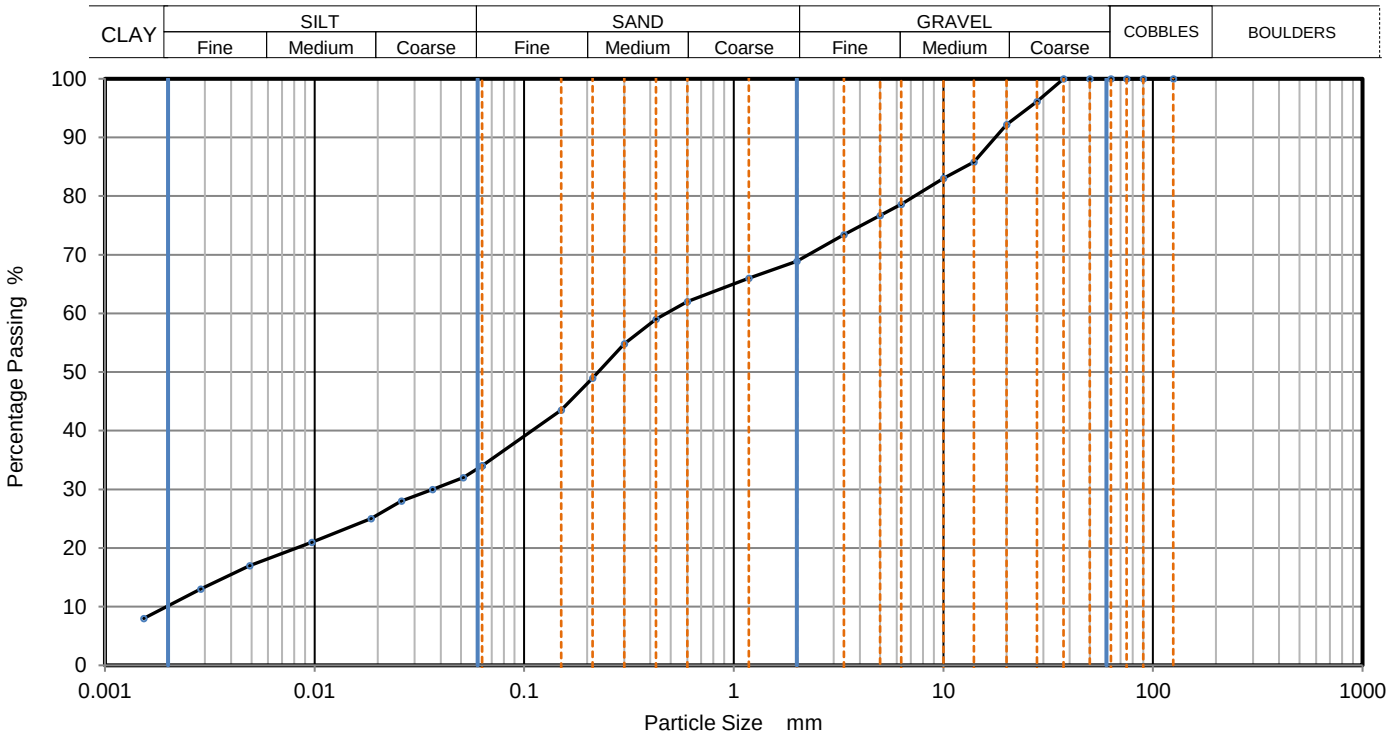
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-13208
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		1
Specimen Description	Greyish brown sandy gravelly silty CLAY.				Sample Depth (m)	Top	0.50
						Base	
Specimen Reference	2	Specimen Depth	0.5	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022081590



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	34
90	100	0.05128	32
75	100	0.03648	30
63	100	0.02595	28
50	100	0.01857	25
37.5	100	0.00970	21
28	96	0.00491	17
20	92	0.00286	13
14	86	0.00153	8
10	83		
6.3	79		
5	77		
3.35	73		
2	69		
1.18	66		
0.6	62	Particle density	(assumed)
0.425	59	2.65	Mg/m3
0.3	55		
0.212	49		
0.15	44		
0.063	34		

Dry Mass of sample, g: 6992

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	31.1
Sand	34.9
Silt	24.0
Clay	10.0

Grading Analysis		
D100	mm	
D60	mm	0.475
D30	mm	0.035
D10	mm	0.00201
Uniformity Coefficient		240
Curvature Coefficient		1.3

Remarks

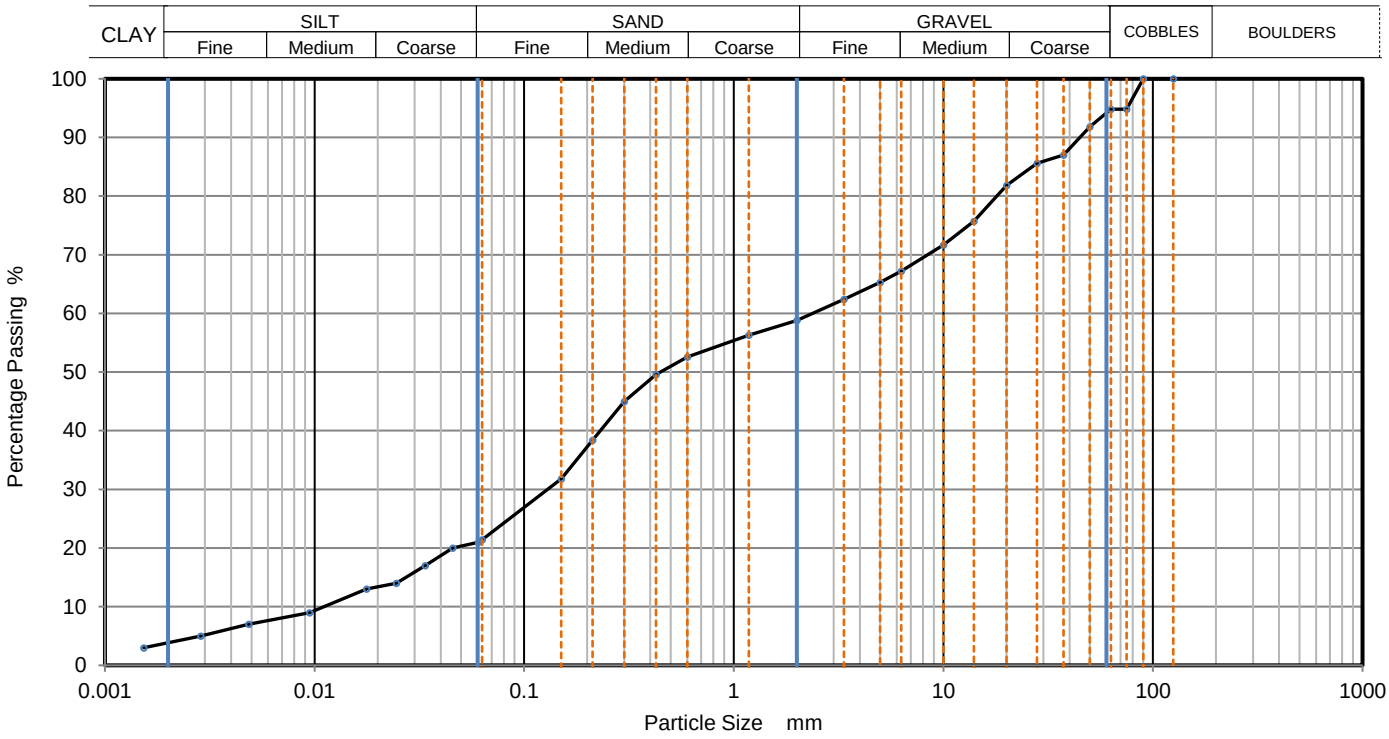
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	TP-13208
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Greyish brown gravelly clayey fine to coarse SAND.			Sample Depth (m) Top	1.50
				Sample Depth (m) Base	
Specimen Reference	2	Specimen Depth	1.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022081591



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06039	21
90	100	0.04562	20
75	95	0.03373	17
63	95	0.02452	14
50	92	0.01768	13
37.5	87	0.00948	9
28	86	0.00485	7
20	82	0.00286	5
14	76	0.00153	3
10	72		
6.3	67		
5	65		
3.35	62		
2	59		
1.18	56		
0.6	53	Particle density	(assumed)
0.425	50	2.65	Mg/m3
0.3	45		
0.212	38		
0.15	32		
0.063	21		

Dry Mass of sample, g: 17032

Sample Proportions	% dry mass
Cobbles	5.2
Gravel	36.0
Sand	37.4
Silt	17.8
Clay	3.6

Grading Analysis		
D100	mm	
D60	mm	2.37
D30	mm	0.129
D10	mm	0.0108
Uniformity Coefficient		220
Curvature Coefficient		0.65

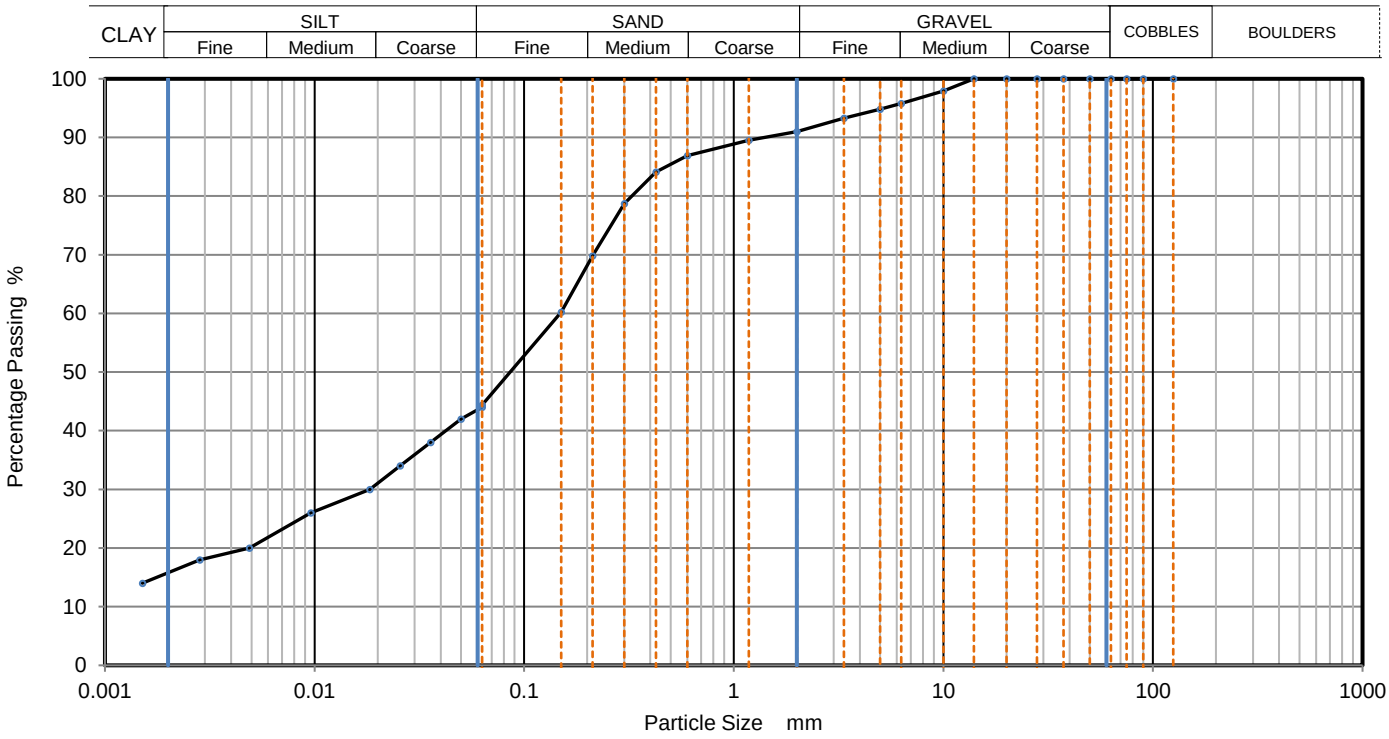
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					TP-13291
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Greyish brown slightly gravelly silty fine to coarse SAND.			Sample Depth (m) Top	0.50
				Base	
Specimen Reference	2	Specimen Depth	0.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022081594



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	44
90	100	0.05000	42
75	100	0.03581	38
63	100	0.02564	34
50	100	0.01835	30
37.5	100	0.00959	26
28	100	0.00488	20
20	100	0.00283	18
14	100	0.00151	14
10	98		
6.3	96		
5	95		
3.35	93		
2	91		
1.18	90		
0.6	87	Particle density	(assumed)
0.425	84	2.65	Mg/m3
0.3	79		
0.212	70		
0.15	60		
0.063	44		

Dry Mass of sample, g: 530

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	9.0
Sand	46.6
Silt	28.5
Clay	15.9

Grading Analysis		
D100	mm	
D60	mm	0.148
D30	mm	0.0176
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

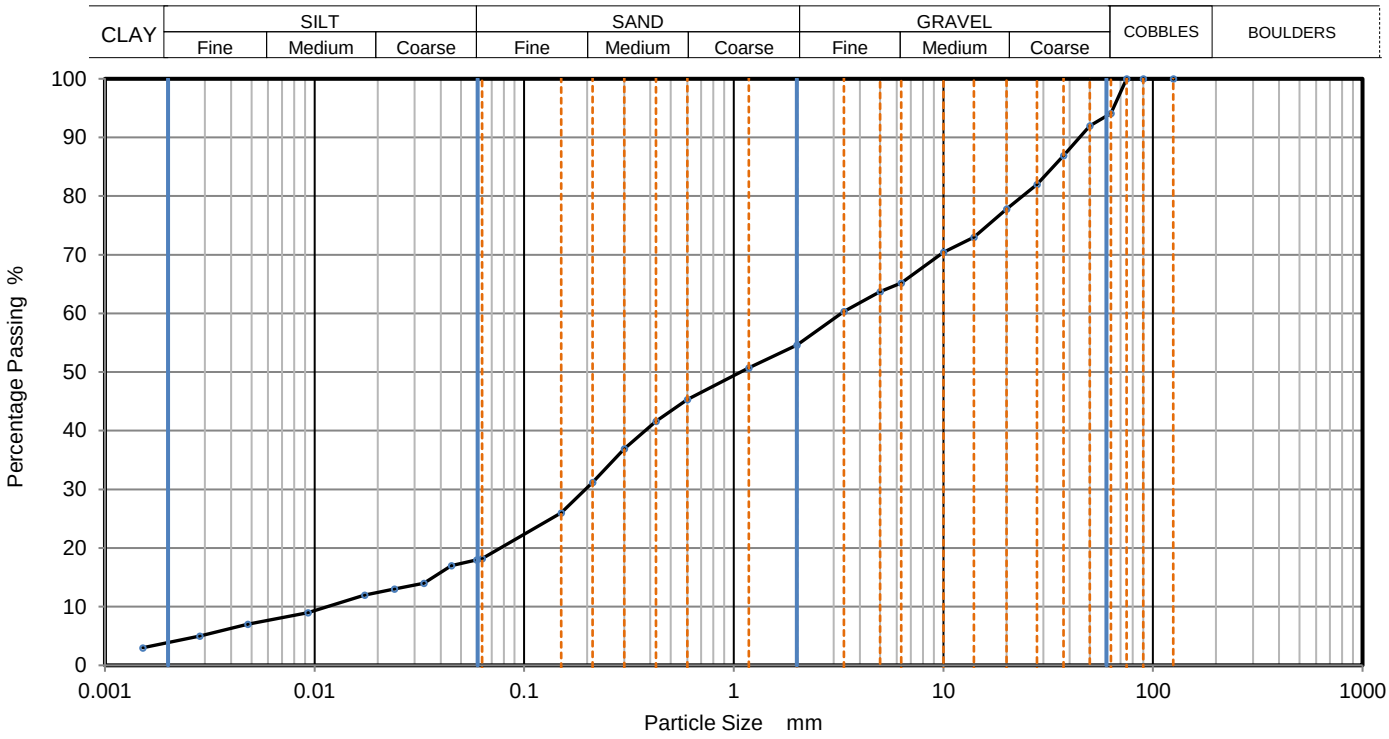
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					TP-13291
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Greyish brown sandy gravelly silty CLAY.			Sample Depth (m) Top	1.50
				Sample Depth (m) Base	
Specimen Reference	2	Specimen Depth	1.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022081596



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.05942	18
90	100	0.04491	17
75	100	0.03324	14
63	94	0.02402	13
50	92	0.01734	12
37.5	87	0.00931	9
28	82	0.00480	7
20	78	0.00283	5
14	73	0.00152	3
10	70		
6.3	65		
5	64		
3.35	60		
2	55		
1.18	51		
0.6	45	Particle density 2.65	(assumed) Mg/m3
0.425	42		
0.3	37		
0.212	31		
0.15	26		
0.063	18		

Dry Mass of sample, g: 8834

Sample Proportions	% dry mass
Cobbles	5.9
Gravel	39.5
Sand	36.4
Silt	14.3
Clay	3.9

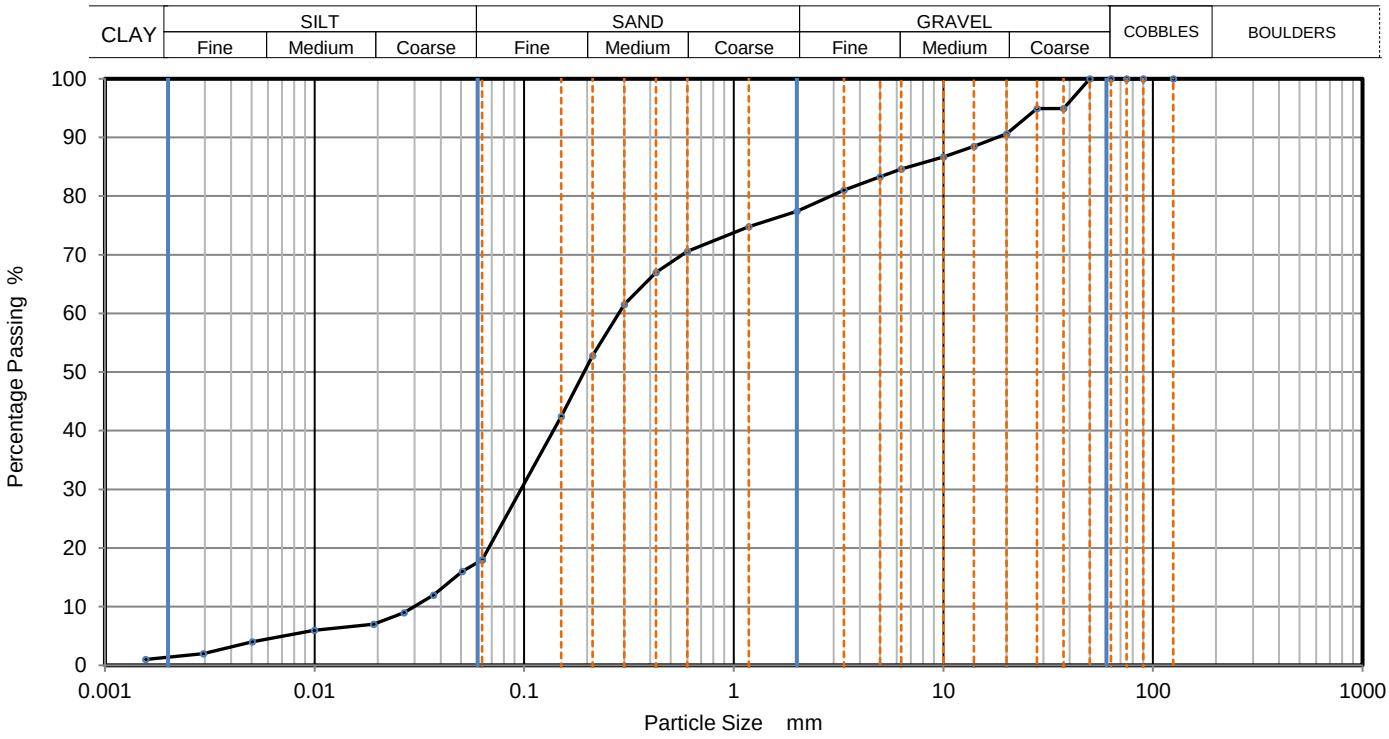
Grading Analysis		
D100	mm	
D60	mm	3.25
D30	mm	0.196
D10	mm	0.012
Uniformity Coefficient		270
Curvature Coefficient		0.99

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-13433
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		1
Specimen Description	Greyish brown gravelly silty fine to coarse SAND.				Sample Depth (m)	Top	0.50
						Base	
Specimen Reference	2	Specimen Depth	0.5	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022081597



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	18
90	100	0.05065	16
75	100	0.03693	12
63	100	0.02672	9
50	100	0.01911	7
37.5	95	0.00998	6
28	95	0.00504	4
20	91	0.00294	2
14	89	0.00156	1
10	87		
6.3	85		
5	83		
3.35	81		
2	77		
1.18	75		
0.6	71	Particle density	(assumed)
0.425	67	2.65	Mg/m3
0.3	62		
0.212	53		
0.15	42		
0.063	18		

Dry Mass of sample, g: 2721

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	22.6
Sand	59.5
Silt	16.4
Clay	1.5

Grading Analysis		
D100	mm	
D60	mm	0.283
D30	mm	0.0966
D10	mm	0.0295
Uniformity Coefficient		9.6
Curvature Coefficient		1.1

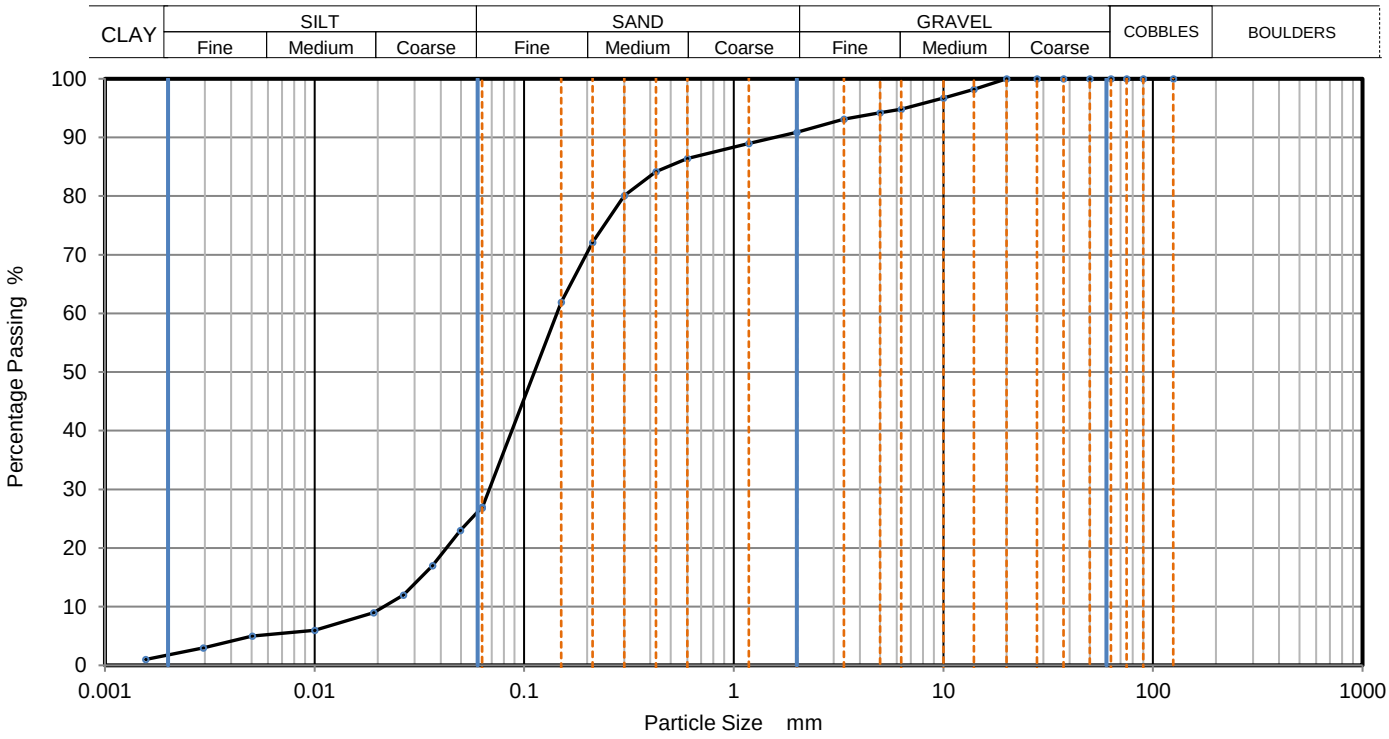
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	TP-13433
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Greyish brown slightly gravelly silty fine to coarse SAND.			Sample Depth (m) Top	1.50
				Sample Depth (m) Base	
Specimen Reference	2	Specimen Depth	1.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022081598



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	27
90	100	0.04969	23
75	100	0.03649	17
63	100	0.02657	12
50	100	0.01911	9
37.5	100	0.01003	6
28	100	0.00504	5
20	100	0.00294	3
14	98	0.00156	1
10	97		
6.3	95		
5	94		
3.35	93		
2	91		
1.18	89		
0.6	86	Particle density	(assumed)
0.425	84	2.65	Mg/m3
0.3	80		
0.212	72		
0.15	62		
0.063	27		

Dry Mass of sample, g: 513

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	9.1
Sand	64.1
Silt	25.0
Clay	1.8

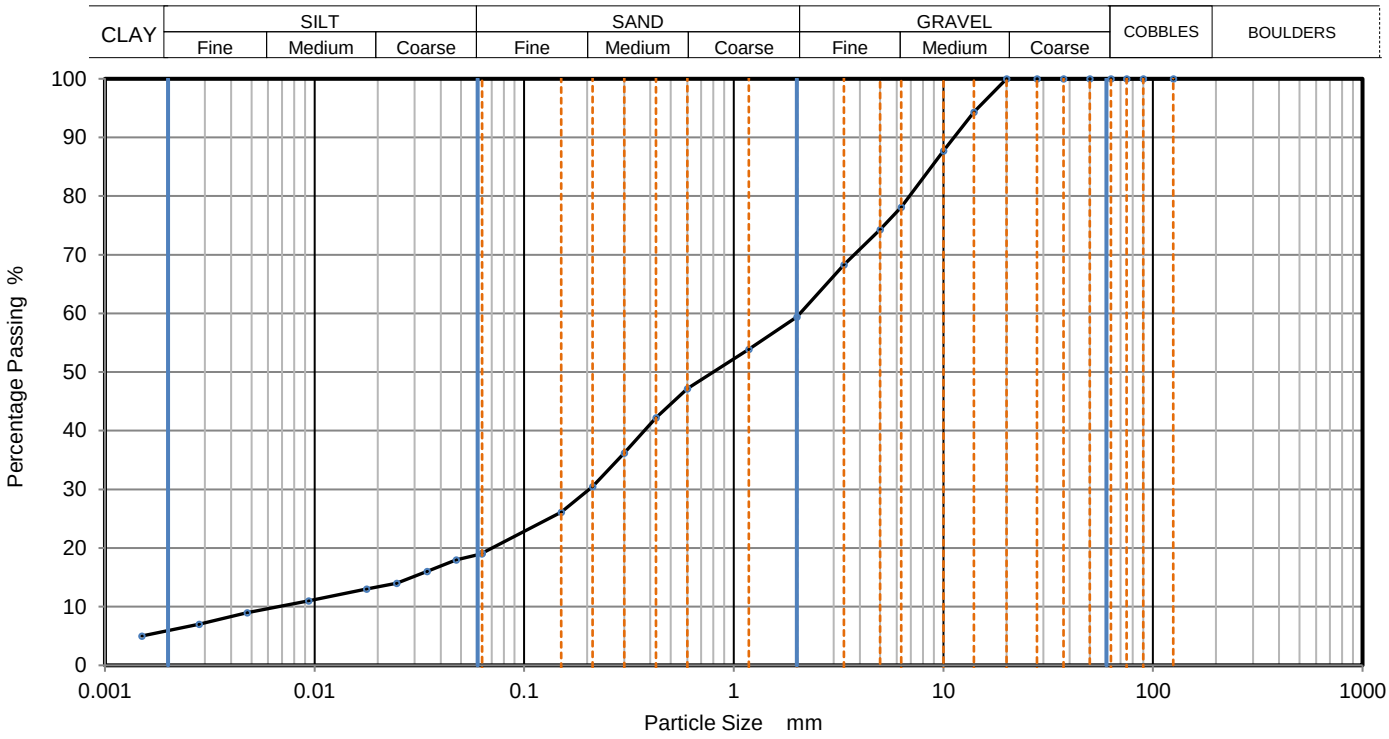
Grading Analysis		
D100	mm	
D60	mm	0.143
D30	mm	0.0682
D10	mm	0.0215
Uniformity Coefficient		6.7
Curvature Coefficient		1.5

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-13433
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Greyish brown slightly gravelly silty fine to coarse SAND.			Sample Depth (m) Top	2.50
				Sample Depth (m) Base	
Specimen Reference	2	Specimen Depth	2.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220815100



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06276	19
90	100	0.04736	18
75	100	0.03444	16
63	100	0.02468	14
50	100	0.01768	13
37.5	100	0.00936	11
28	100	0.00477	9
20	100	0.00282	7
14	94	0.00150	5
10	88		
6.3	78		
5	74		
3.35	68		
2	59		
1.18	54		
0.6	47	Particle density	(assumed)
0.425	42	2.65	Mg/m3
0.3	36		
0.212	31		
0.15	26		
0.063	19		

Dry Mass of sample, g: 514

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	40.6
Sand	40.3
Silt	13.2
Clay	5.9

Grading Analysis		
D100	mm	
D60	mm	2.07
D30	mm	0.204
D10	mm	0.00707
Uniformity Coefficient		290
Curvature Coefficient		2.8

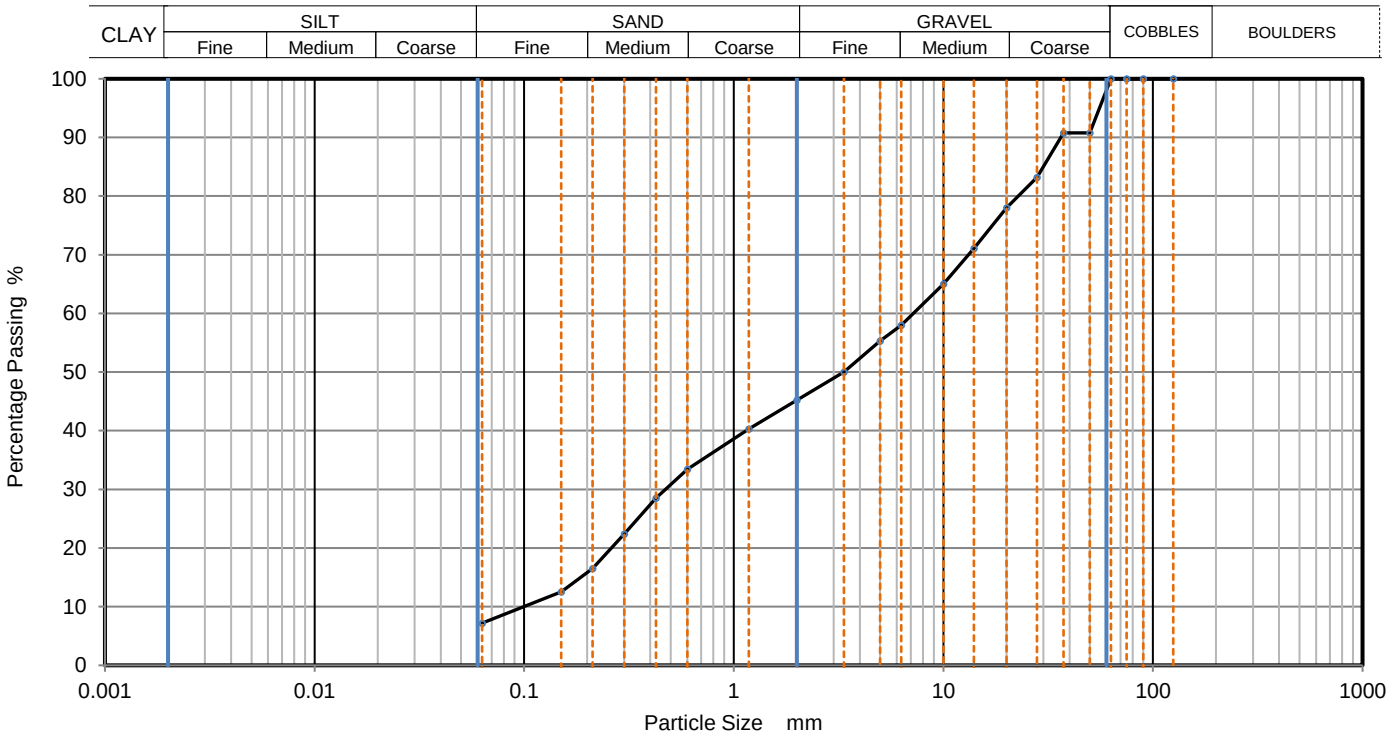
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-13509
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Greyish brown gravelly slightly clayey fiine to coarse SAND.			Sample Depth (m) Top	0.50
				Sample Depth (m) Base	
Specimen Reference	2	Specimen Depth	0.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus20220815101



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	91		
37.5	91		
28	83		
20	78		
14	71		
10	65		
6.3	58		
5	55		
3.35	50		
2	45		
1.18	40		
0.6	33		
0.425	29		
0.3	22		
0.212	17		
0.15	13		
0.063	7		

Dry Mass of sample, g	4695

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	54.8
Sand	38.0
Fines <0.063mm	7.0

Grading Analysis		
D100	mm	
D60	mm	7.19
D30	mm	0.474
D10	mm	0.0997
Uniformity Coefficient		72
Curvature Coefficient		0.31

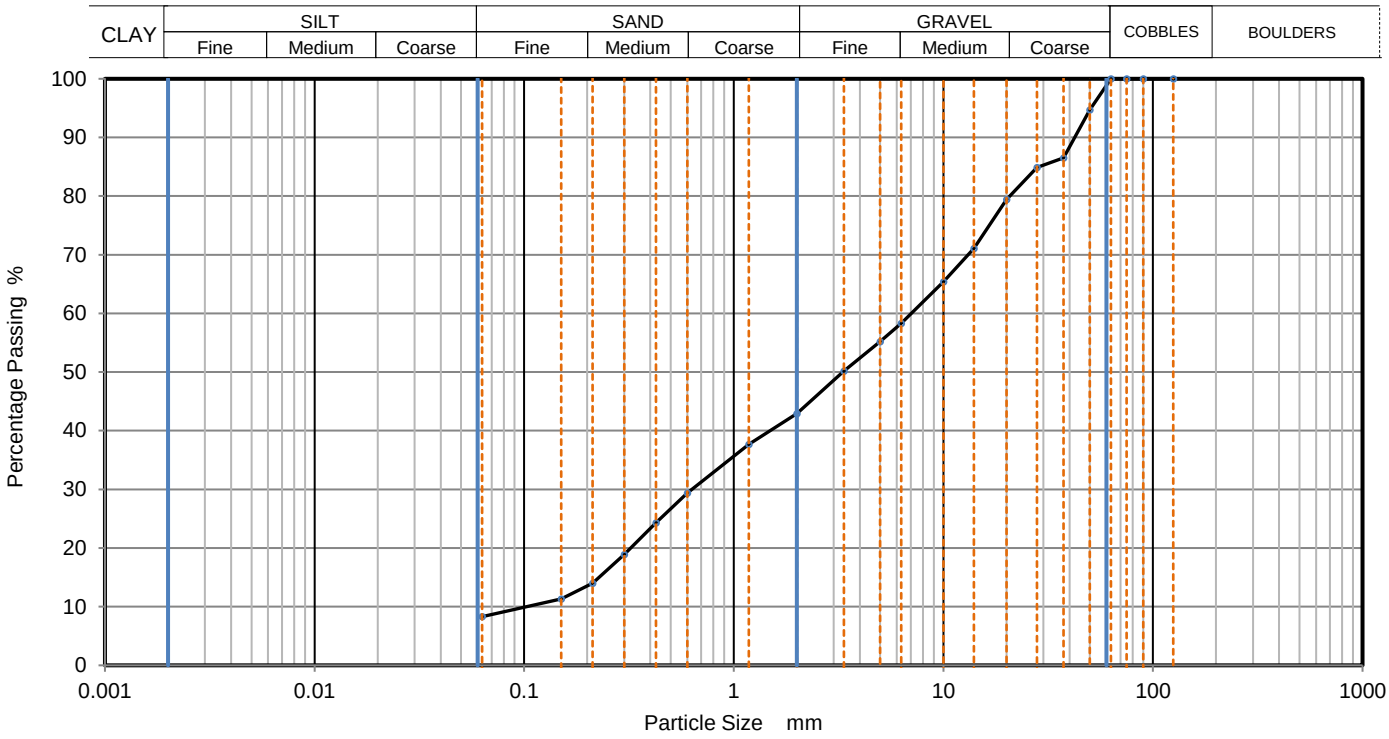
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-13509
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		2
Specimen Description	Greyish brown gravelly silty fine to coarse SAND.				Sample Depth (m)	Top	1.50
						Base	
Specimen Reference	2	Specimen Depth	1.5	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clause 9.2				KeyLAB ID		Caus20220815103



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	95		
37.5	87		
28	85		
20	79		
14	71		
10	65		
6.3	58		
5	55		
3.35	50		
2	43		
1.18	38		
0.6	29		
0.425	24		
0.3	19		
0.212	14		
0.15	11		
0.063	8		

Dry Mass of sample, g: 5664

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	57.1
Sand	34.5
Fines <0.063mm	8.0

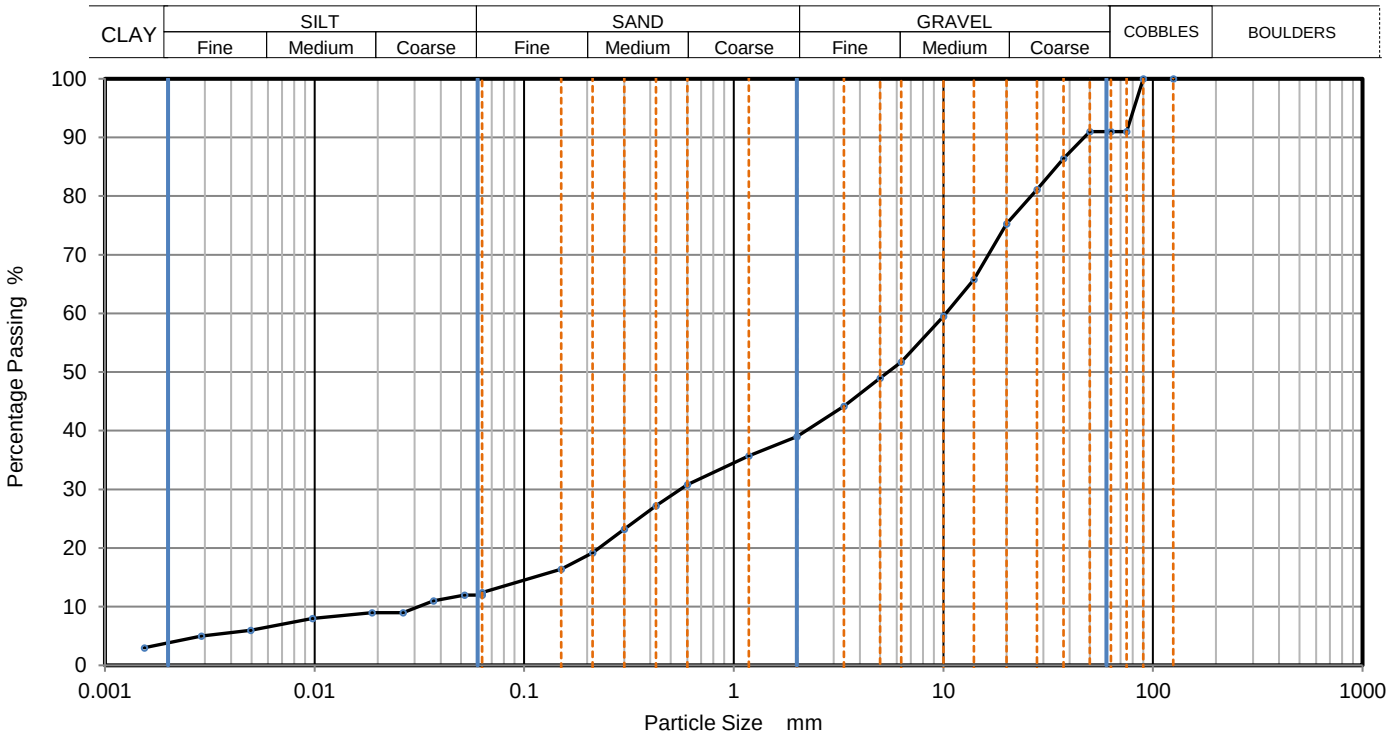
Grading Analysis		
D100	mm	
D60	mm	7.05
D30	mm	0.631
D10	mm	0.103
Uniformity Coefficient		68
Curvature Coefficient		0.55

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-13605
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Greyish brown gravelly silty fine to coarse SAND.			Sample Depth (m) Top	0.50
				Sample Depth (m) Base	
Specimen Reference	2	Specimen Depth	0.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220815104



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	12
90	100	0.05191	12
75	91	0.03693	11
63	91	0.02642	9
50	91	0.01879	9
37.5	86	0.00976	8
28	81	0.00496	6
20	75	0.00288	5
14	66	0.00154	3
10	60		
6.3	52		
5	49		
3.35	44		
2	39		
1.18	36		
0.6	31	Particle density	(assumed)
0.425	27	2.65	Mg/m3
0.3	23		
0.212	19		
0.15	16		
0.063	12		

Dry Mass of sample, g: 12289

Sample Proportions	% dry mass
Cobbles	9.0
Gravel	52.1
Sand	26.6
Silt	8.5
Clay	3.8

Grading Analysis		
D100	mm	
D60	mm	10.3
D30	mm	0.557
D10	mm	0.0298
Uniformity Coefficient		340
Curvature Coefficient		1

Remarks

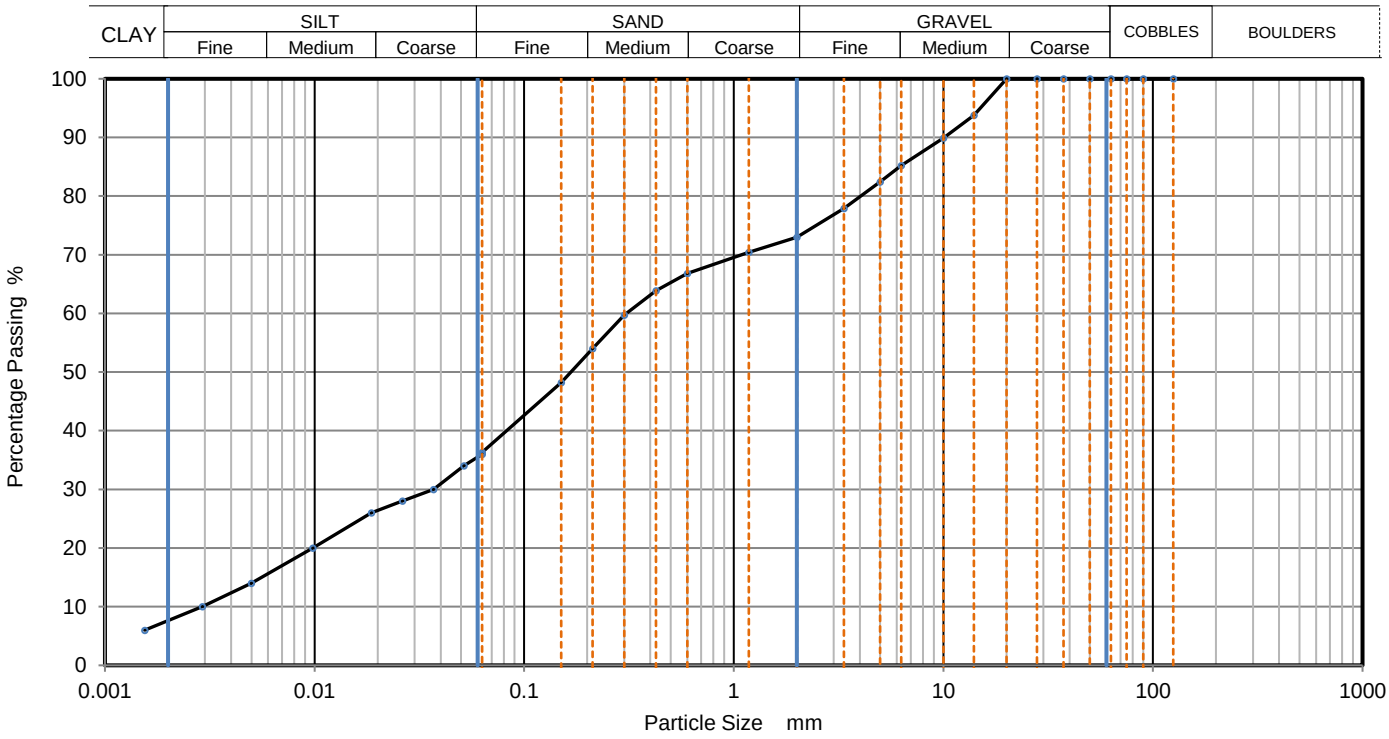
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

10122

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-13605
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		2
Specimen Description	Greyish brown sandy slightly gravelly silty CLAY.				Sample Depth (m)	Top	1.50
						Base	
Specimen Reference	2	Specimen Depth	1.5	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus20220815106



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	36
90	100	0.05160	34
75	100	0.03693	30
63	100	0.02627	28
50	100	0.01868	26
37.5	100	0.00981	20
28	100	0.00499	14
20	100	0.00291	10
14	94	0.00155	6
10	90		
6.3	85		
5	82		
3.35	78		
2	73		
1.18	70		
0.6	67	Particle density	(assumed)
0.425	64	2.65	Mg/m3
0.3	60		
0.212	54		
0.15	48		
0.063	36		

Dry Mass of sample, g: 525

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	27.0
Sand	36.7
Silt	28.6
Clay	7.7

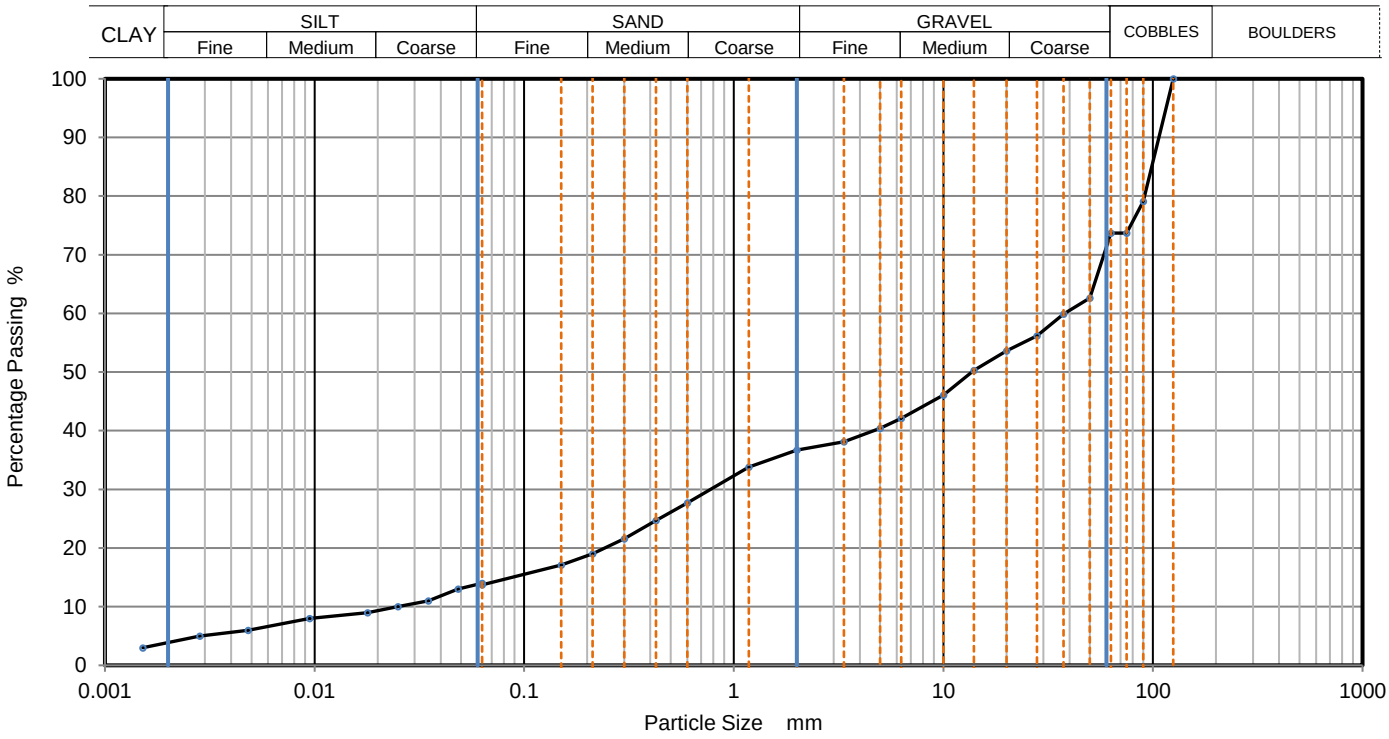
Grading Analysis		
D100	mm	
D60	mm	0.308
D30	mm	0.0354
D10	mm	0.00287
Uniformity Coefficient		110
Curvature Coefficient		1.4

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-13988
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Grey sandy gravelly silty CLAY with cobbles.			Sample Depth (m) Top	0.40
				Base	1.50
Specimen Reference	4	Specimen Depth	0.4 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus202209283



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	14
90	79	0.04837	13
75	74	0.03490	11
63	74	0.02501	10
50	63	0.01791	9
37.5	60	0.00948	8
28	56	0.00482	6
20	54	0.00283	5
14	50	0.00152	3
10	46		
6.3	42		
5	40		
3.35	38		
2	37		
1.18	34		
0.6	28	Particle density	(assumed)
0.425	25	2.65	Mg/m3
0.3	22		
0.212	19		
0.15	17		
0.063	14		

Dry Mass of sample, g: 9022

Sample Proportions	% dry mass
Cobbles	26.3
Gravel	37.0
Sand	23.0
Silt	9.8
Clay	3.9

Grading Analysis		
D100	mm	125
D60	mm	38
D30	mm	0.772
D10	mm	0.0218
Uniformity Coefficient		1700
Curvature Coefficient		0.72

Remarks

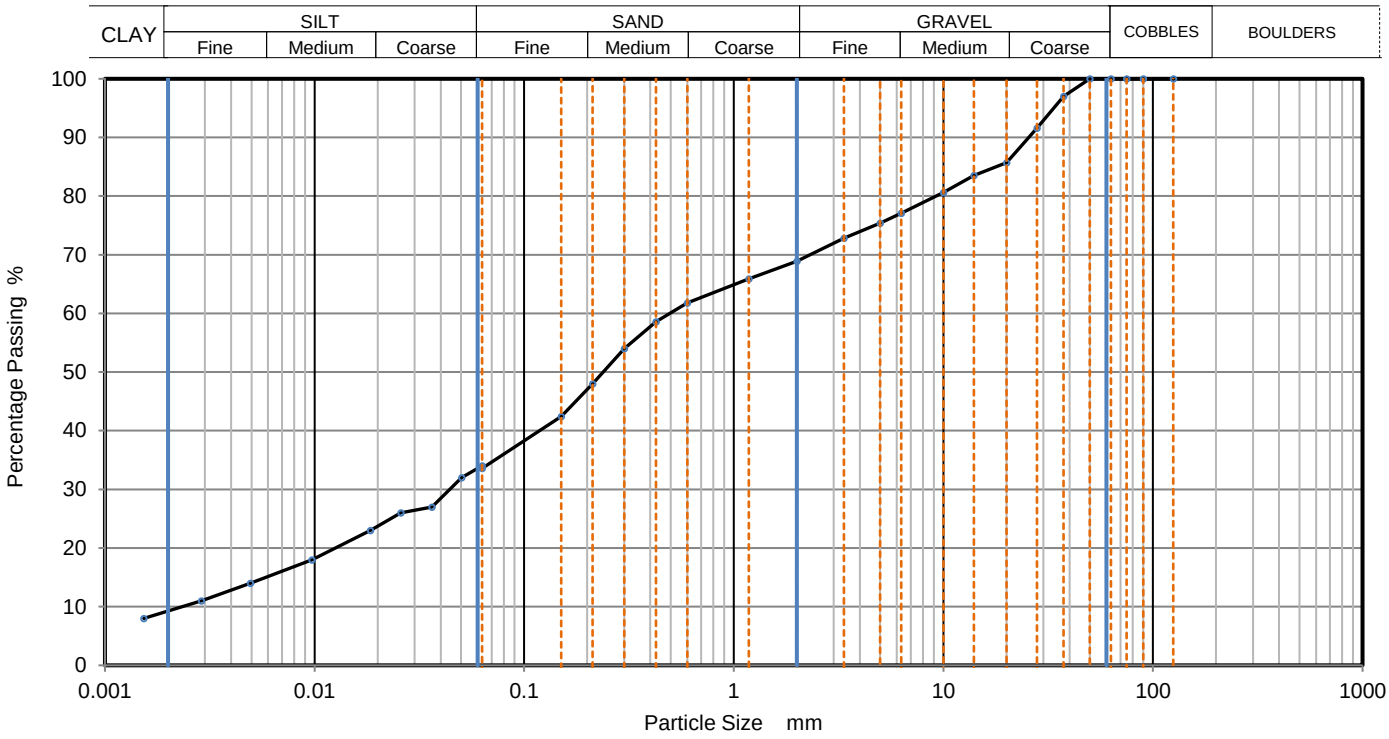
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

Job Ref					**21-1682**
Borehole/Pit No.					TP-13988
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Grey sandy gravelly silty CLAY.			Sample Depth (m) Top	1.50
				Base	2.50
Specimen Reference	4	Specimen Depth	1.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus202209284



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	34
90	100	0.05033	32
75	100	0.03627	27
63	100	0.02580	26
50	100	0.01846	23
37.5	97	0.00970	18
28	92	0.00493	14
20	86	0.00288	11
14	84	0.00153	8
10	81		
6.3	77		
5	75		
3.35	73		
2	69		
1.18	66		
0.6	62	Particle density	(assumed)
0.425	59	2.65	Mg/m3
0.3	54		
0.212	48		
0.15	42		
0.063	34		

Dry Mass of sample, g: 3741

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	31.1
Sand	35.3
Silt	24.7
Clay	8.9

Grading Analysis		
D100	mm	
D60	mm	0.495
D30	mm	0.0434
D10	mm	0.0025
Uniformity Coefficient		200
Curvature Coefficient		1.5

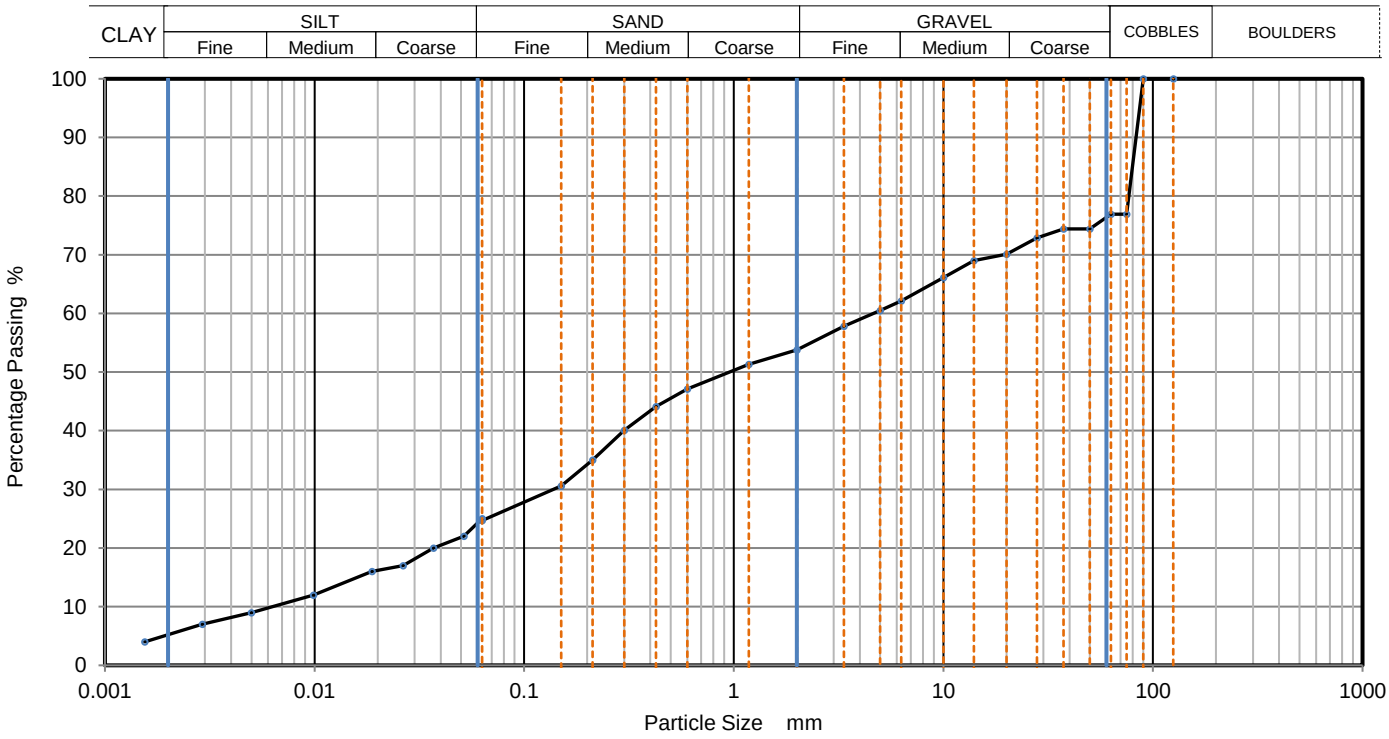
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					TP-14105
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Greyish brown sandy gravelly silty CLAY with cobbles.			Sample Depth (m) Top	0.40
				Base	2.00
Specimen Reference	4	Specimen Depth	0.4 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus202209285



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	25
90	100	0.05160	22
75	77	0.03693	20
63	77	0.02642	17
50	74	0.01879	16
37.5	74	0.00987	12
28	73	0.00499	9
20	70	0.00291	7
14	69	0.00155	4
10	66		
6.3	62		
5	61		
3.35	58		
2	54		
1.18	51		
0.6	47	Particle density	(assumed)
0.425	44	2.65	Mg/m3
0.3	40		
0.212	35		
0.15	31		
0.063	25		

Dry Mass of sample, g: 9484

Sample Proportions	% dry mass
Cobbles	23.1
Gravel	23.1
Sand	29.1
Silt	19.7
Clay	5.0

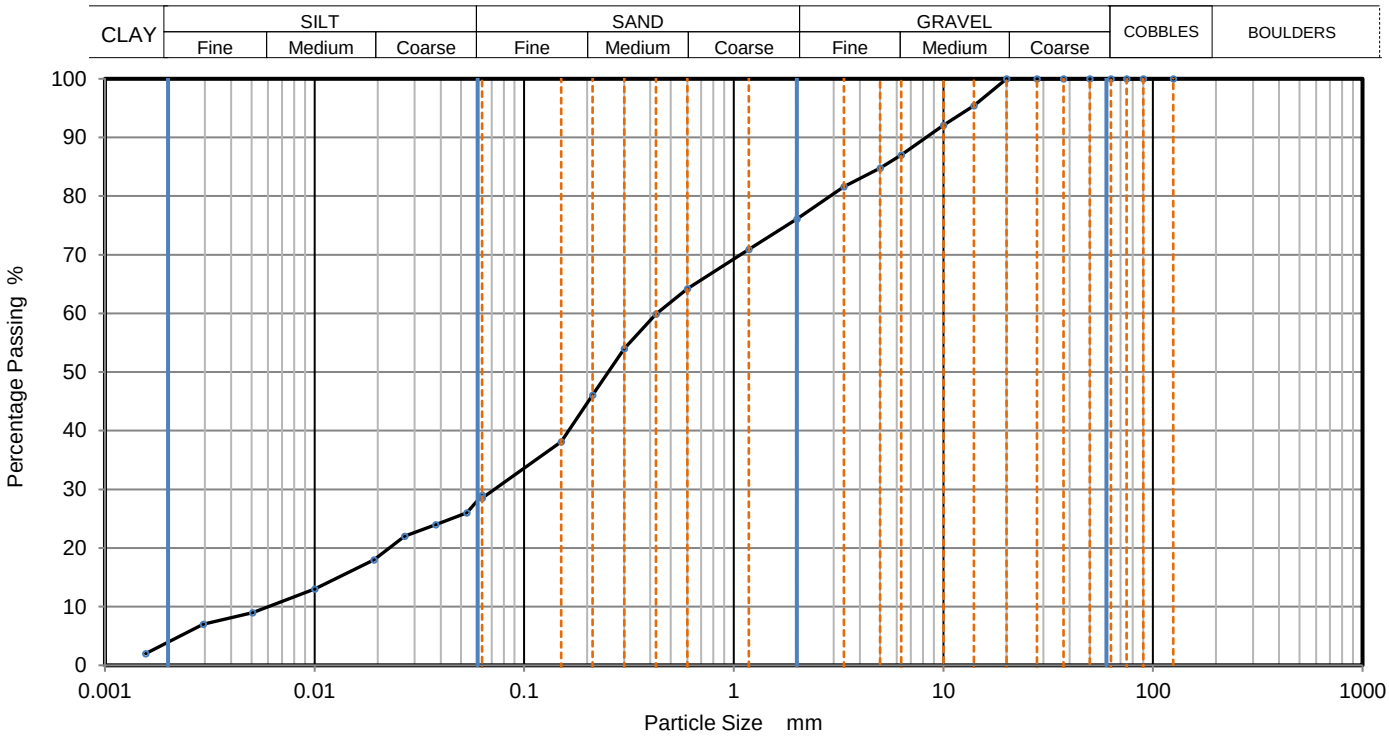
Grading Analysis		
D100	mm	
D60	mm	4.64
D30	mm	0.138
D10	mm	0.00632
Uniformity Coefficient		730
Curvature Coefficient		0.65

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION			Job Ref		21-1682
				Borehole/Pit No.		TP-14170
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.		1
Specimen Description	Grey sandy slightly gravelly silty CLAY.			Sample Depth (m)	Top	0.30
					Base	2.00
Specimen Reference	4	Specimen Depth	0.3 m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID		Caus202209286



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	29
90	100	0.05314	26
75	100	0.03779	24
63	100	0.02687	22
50	100	0.01921	18
37.5	100	0.01003	13
28	100	0.00507	9
20	100	0.00294	7
14	95	0.00156	2
10	92		
6.3	87		
5	85		
3.35	82		
2	76		
1.18	71		
0.6	64	Particle density	(assumed)
0.425	60	2.65	Mg/m3
0.3	54		
0.212	46		
0.15	38		
0.063	29		

Dry Mass of sample, g: 527

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	23.9
Sand	47.6
Silt	24.6
Clay	3.9

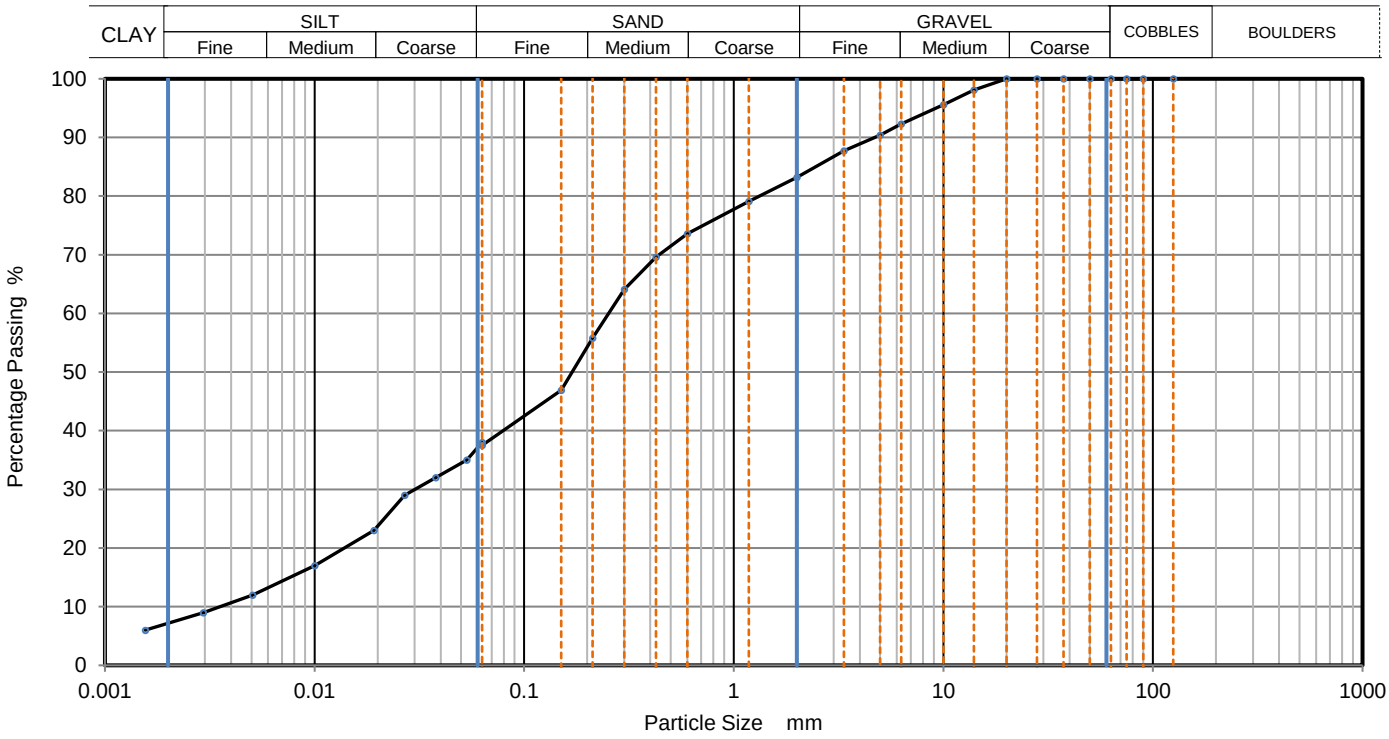
Grading Analysis		
D100	mm	
D60	mm	0.43
D30	mm	0.0723
D10	mm	0.00614
Uniformity Coefficient		70
Curvature Coefficient		2

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-14170
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		2
Specimen Description	Grey slightly gravelly clayey fine to coarse SAND.				Sample Depth (m)	Top	2.00
						Base	2.40
Specimen Reference	6	Specimen Depth	2	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus202209287



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	38
90	100	0.05314	35
75	100	0.03779	32
63	100	0.02687	29
50	100	0.01921	23
37.5	100	0.01003	17
28	100	0.00507	12
20	100	0.00294	9
14	98	0.00156	6
10	96		
6.3	92		
5	90		
3.35	88		
2	83		
1.18	79		
0.6	74	Particle density	(assumed)
0.425	70	2.65	Mg/m3
0.3	64		
0.212	56		
0.15	47		
0.063	38		

Dry Mass of sample, g: 537

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	16.8
Sand	45.7
Silt	30.6
Clay	6.9

Grading Analysis		
D100	mm	
D60	mm	0.252
D30	mm	0.0308
D10	mm	0.00379
Uniformity Coefficient		67
Curvature Coefficient		0.99

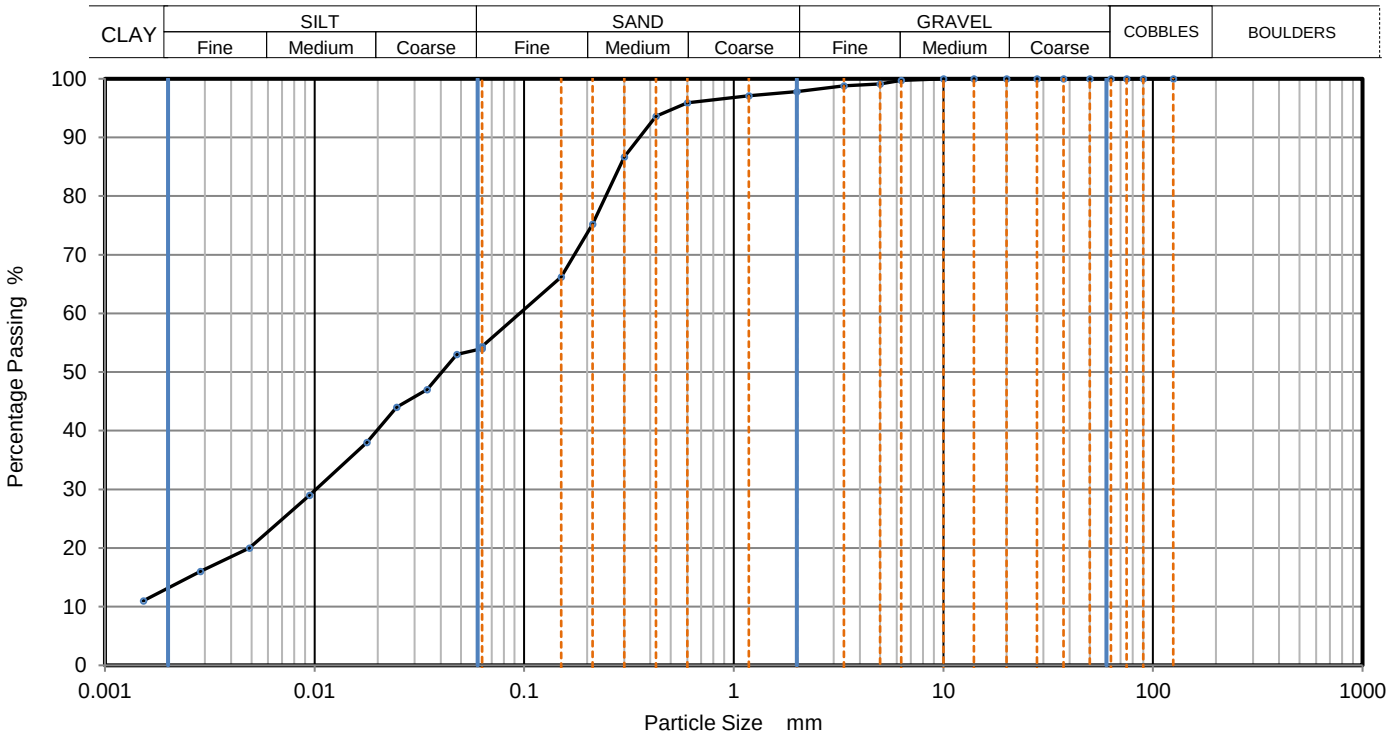
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

UKAS TESTING

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-14307
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		1
Specimen Description	Greyish brown clayey fine to coarse SAND.				Sample Depth (m)	Top	0.40
						Base	1.40
Specimen Reference	7	Specimen Depth	0.4	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus202209288



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	54
90	100	0.04770	53
75	100	0.03444	47
63	100	0.02468	44
50	100	0.01780	38
37.5	100	0.00948	29
28	100	0.00488	20
20	100	0.00285	16
14	100	0.00152	11
10	100		
6.3	100		
5	99		
3.35	99		
2	98		
1.18	97		
0.6	96	Particle density	(assumed)
0.425	94	2.65	Mg/m3
0.3	87		
0.212	75		
0.15	66		
0.063	54		

Dry Mass of sample, g: 360

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	2.2
Sand	43.4
Silt	41.2
Clay	13.2

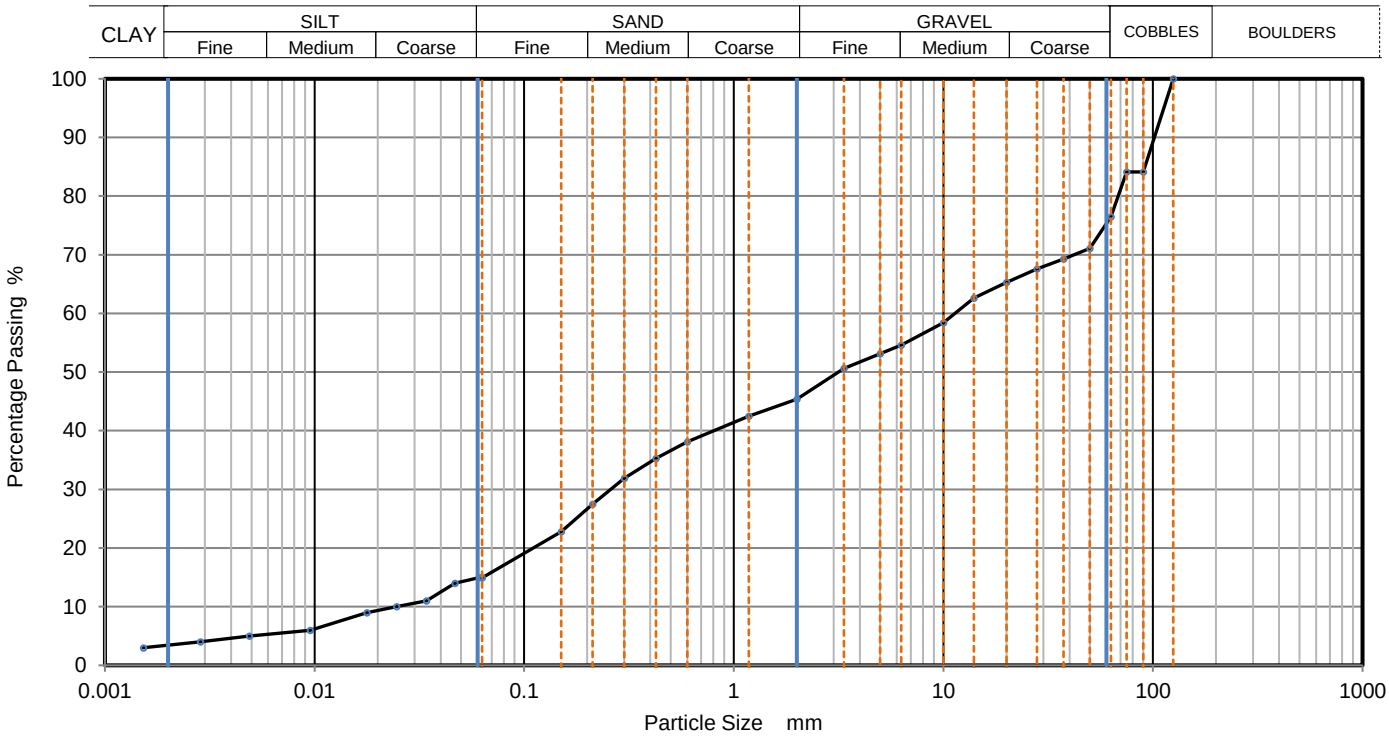
Grading Analysis		
D100	mm	
D60	mm	0.0951
D30	mm	0.0102
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-14307
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Greyish brown gravelly clayey fine to coarse SAND with cobbles.			Sample Depth (m) Top	1.40
				Base	2.00
Specimen Reference	4	Specimen Depth	1.4 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus202209289



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06135	15
90	84	0.04667	14
75	84	0.03420	11
63	77	0.02468	10
50	71	0.01780	9
37.5	69	0.00953	6
28	68	0.00488	5
20	65	0.00285	4
14	63	0.00152	3
10	58		
6.3	55		
5	53		
3.35	51		
2	45		
1.18	43		
0.6	38	Particle density	(assumed)
0.425	35	2.65	Mg/m3
0.3	32		
0.212	28		
0.15	23		
0.063	15		

Dry Mass of sample, g: 11935

Sample Proportions	% dry mass
Cobbles	23.5
Gravel	31.1
Sand	30.5
Silt	11.8
Clay	3.1

Grading Analysis		
D100	mm	125
D60	mm	11.4
D30	mm	0.258
D10	mm	0.0233
Uniformity Coefficient		490
Curvature Coefficient		0.25

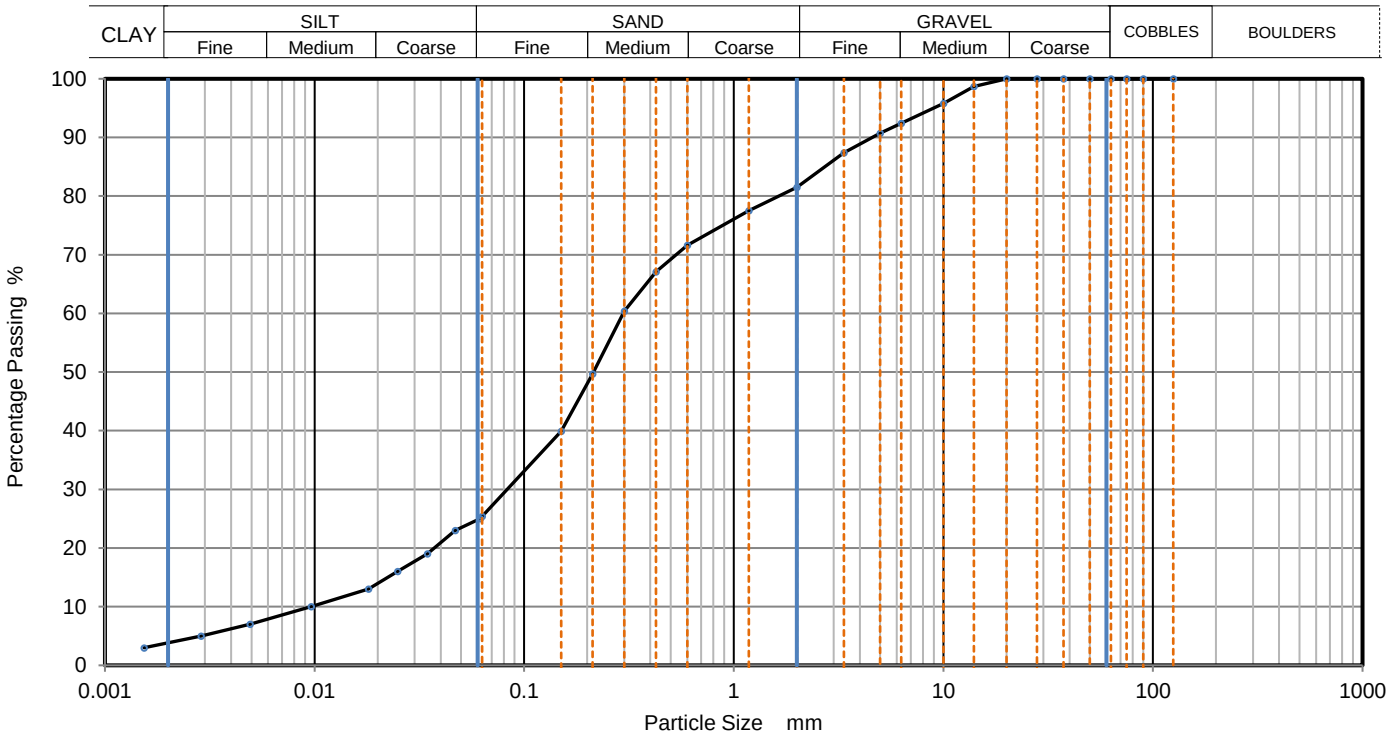
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

UKAS TESTING

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-14409
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Greyish brown slightly gravelly clayey fine to coarse SAND.			Sample Depth (m) Top	0.40
				Base	3.20
Specimen Reference	4	Specimen Depth	0.4 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022092810



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06164	25
90	100	0.04688	23
75	100	0.03458	19
63	100	0.02494	16
50	100	0.01809	13
37.5	100	0.00962	10
28	100	0.00492	7
20	100	0.00287	5
14	99	0.00154	3
10	96		
6.3	92		
5	91		
3.35	87		
2	82		
1.18	78		
0.6	72	Particle density	(assumed)
0.425	67	2.65	Mg/m3
0.3	60		
0.212	50		
0.15	40		
0.063	25		

Dry Mass of sample, g: 406

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	18.5
Sand	56.1
Silt	21.5
Clay	3.9

Grading Analysis		
D100	mm	
D60	mm	0.296
D30	mm	0.0828
D10	mm	0.0101
Uniformity Coefficient		29
Curvature Coefficient		2.3

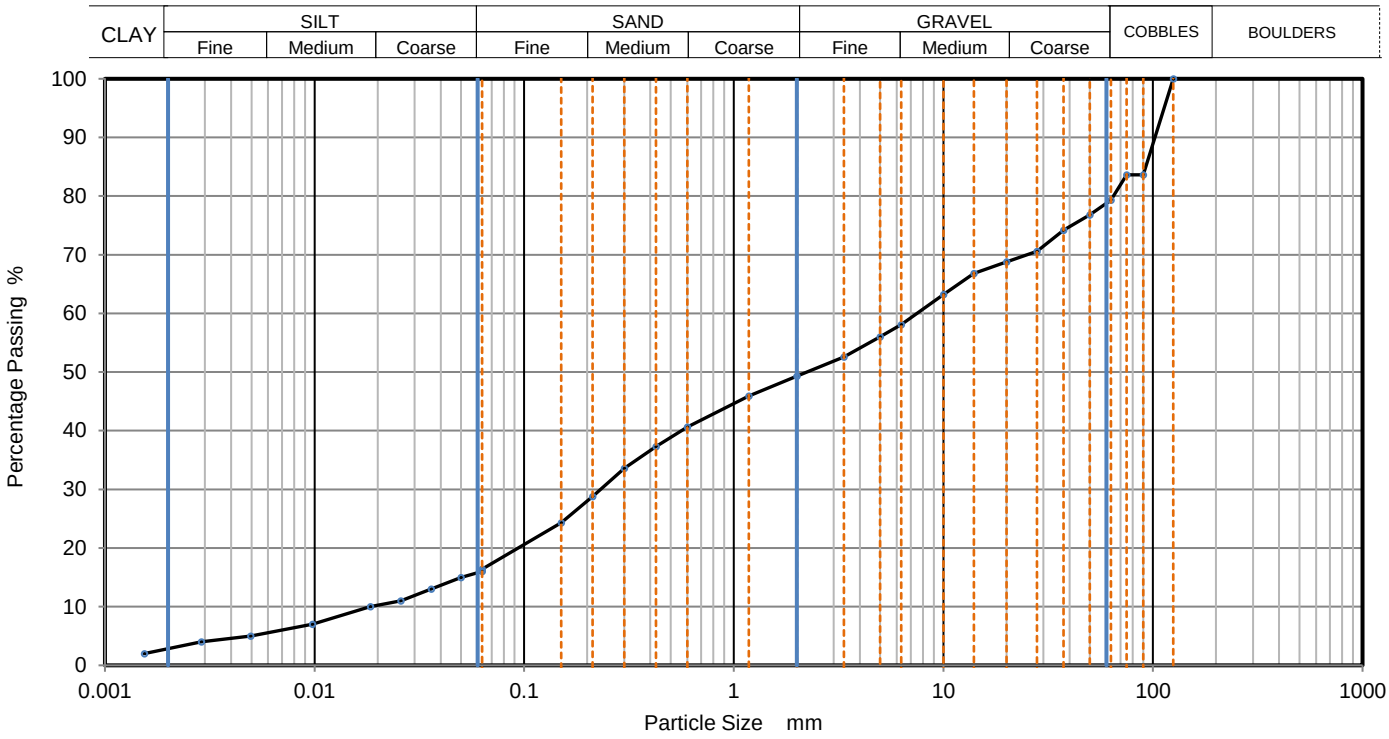
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

UKAS TESTING

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-16005
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Greyish brown gravelly clayey fine to coarse SAND with cobbles.			Sample Depth (m) Top	0.40
				Base	2.10
Specimen Reference	5	Specimen Depth	0.4 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022092811



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	16
90	84	0.05000	15
75	84	0.03604	13
63	79	0.02580	11
50	77	0.01846	10
37.5	74	0.00976	7
28	71	0.00496	5
20	69	0.00288	4
14	67	0.00154	2
10	63		
6.3	58		
5	56		
3.35	53		
2	49		
1.18	46		
0.6	41	Particle density	(assumed)
0.425	37	2.65	Mg/m3
0.3	34		
0.212	29		
0.15	24		
0.063	16		

Dry Mass of sample, g: 10203

Sample Proportions	% dry mass
Cobbles	20.7
Gravel	29.9
Sand	32.9
Silt	13.5
Clay	3.0

Grading Analysis		
D100	mm	125
D60	mm	7.47
D30	mm	0.232
D10	mm	0.0185
Uniformity Coefficient		400
Curvature Coefficient		0.39

Remarks

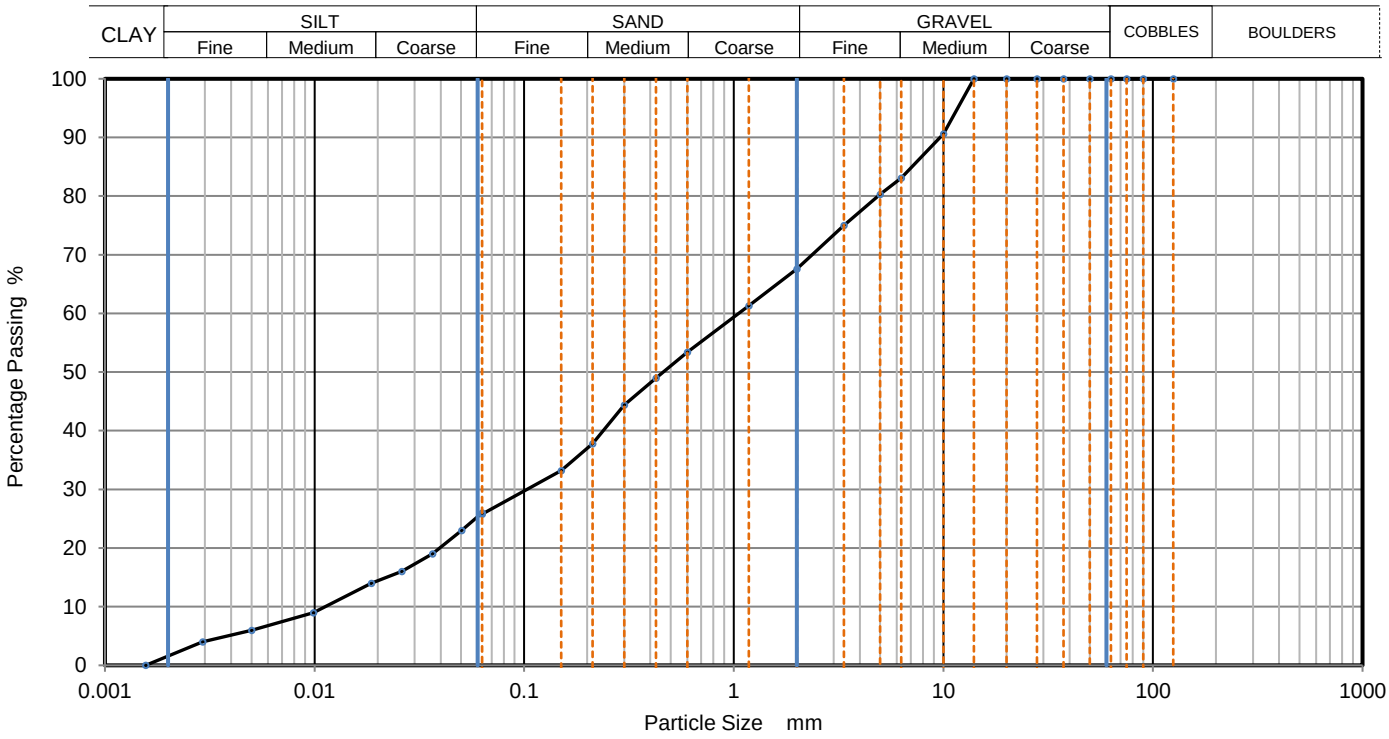
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	TP-16005
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Grey slightly gravelly silty fine to coarse SAND.			Sample Depth (m) Top	2.10
				Base	3.20
Specimen Reference	4	Specimen Depth	2.1 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022092812



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	26
90	100	0.05032	23
75	100	0.03648	19
63	100	0.02611	16
50	100	0.01868	14
37.5	100	0.00987	9
28	100	0.00501	6
20	100	0.00293	4
14	100	0.00156	0
10	91		
6.3	83		
5	80		
3.35	75		
2	68		
1.18	61		
0.6	53	Particle density	(assumed)
0.425	49	2.65	Mg/m3
0.3	44		
0.212	38		
0.15	33		
0.063	26		

Dry Mass of sample, g: 475

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	32.4
Sand	41.9
Silt	24.3
Clay	1.4

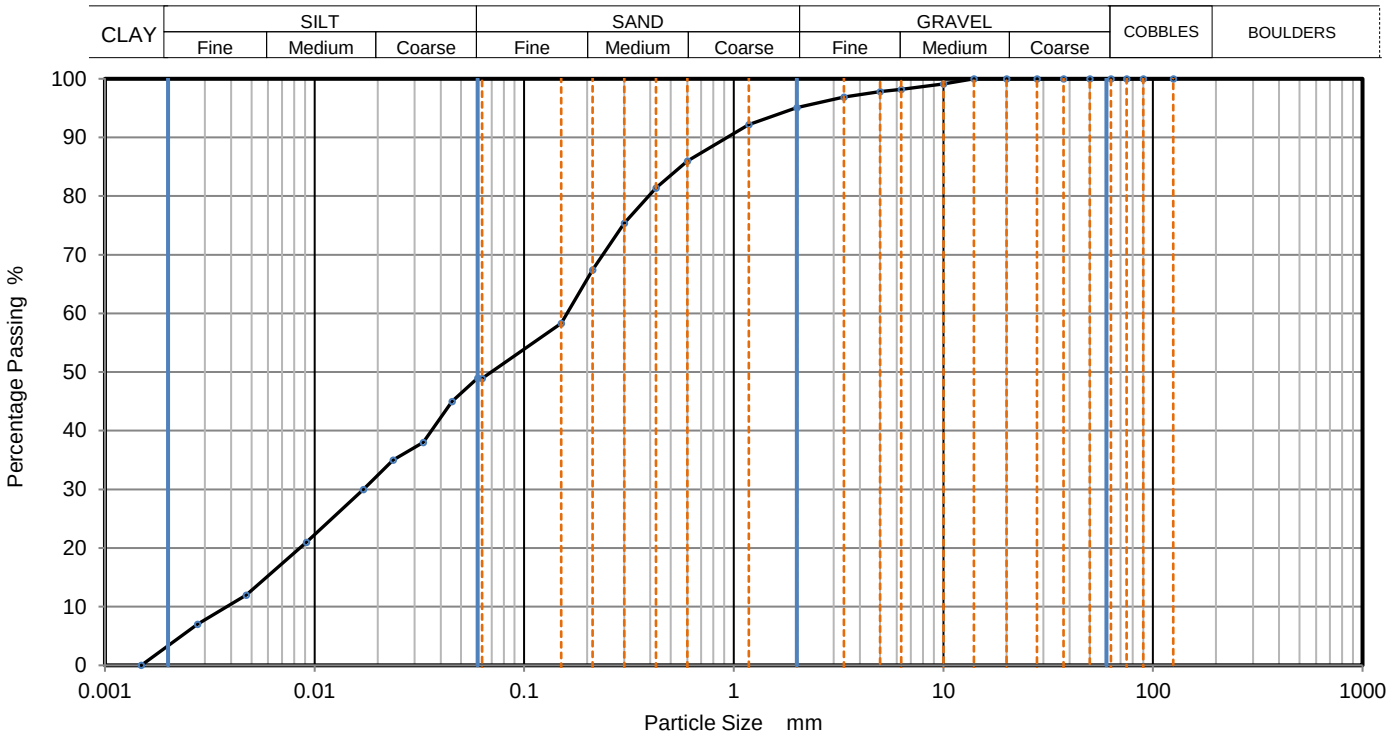
Grading Analysis		
D100	mm	
D60	mm	1.06
D30	mm	0.104
D10	mm	0.0107
Uniformity Coefficient		98
Curvature Coefficient		0.95

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-16109
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Greyish brown slightly gravelly silty fine to coarse SAND.			Sample Depth (m) Top	0.20
				Base	1.10
Specimen Reference	2	Specimen Depth	0.2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022092813



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.05989	49
90	100	0.04526	45
75	100	0.03299	38
63	100	0.02367	35
50	100	0.01710	30
37.5	100	0.00913	21
28	100	0.00471	12
20	100	0.00277	7
14	100	0.00149	0
10	99		
6.3	98		
5	98		
3.35	97		
2	95		
1.18	92		
0.6	86	Particle density	(assumed)
0.425	81	2.65	Mg/m3
0.3	75		
0.212	67		
0.15	58		
0.063	49		

Dry Mass of sample, g: 340

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	4.9
Sand	46.2
Silt	45.6
Clay	3.3

Grading Analysis		
D100	mm	
D60	mm	0.16
D30	mm	0.0174
D10	mm	0.00376
Uniformity Coefficient		43
Curvature Coefficient		0.5

Remarks

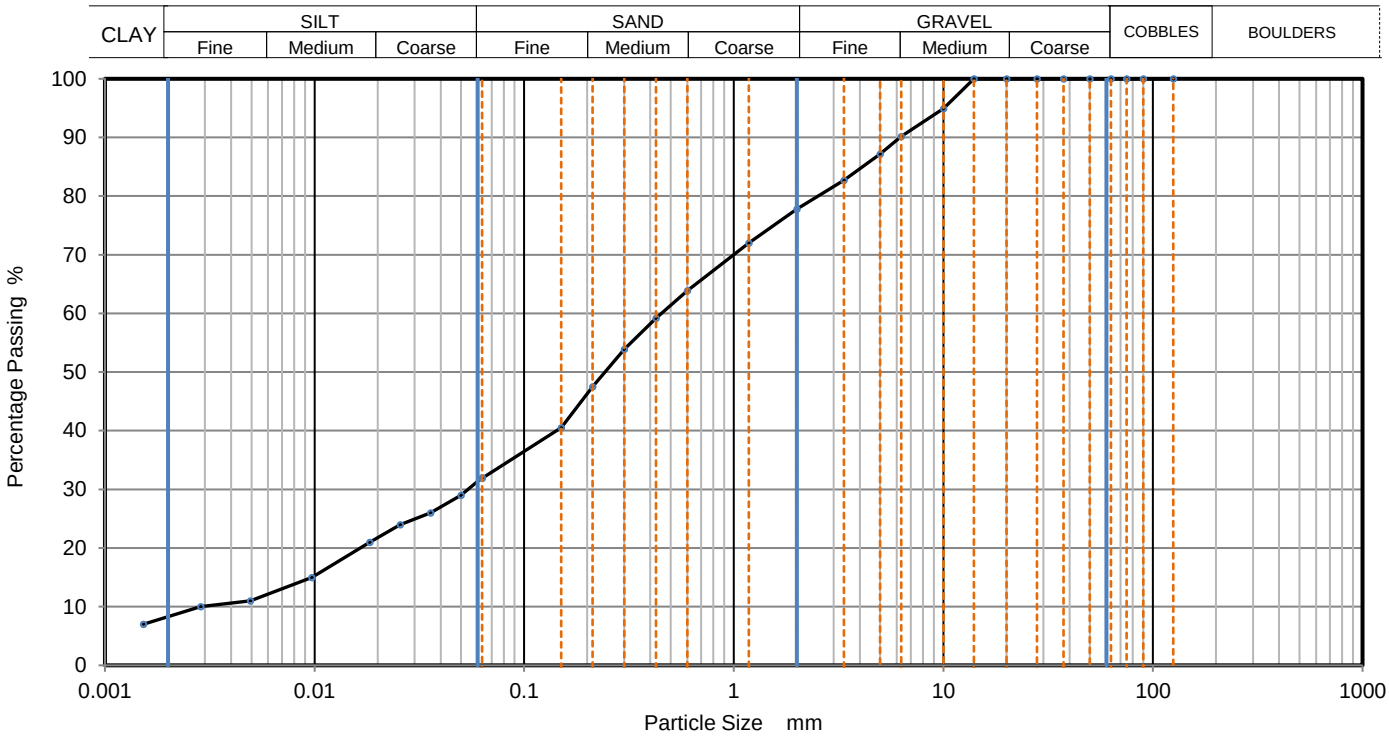
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	TP-16109
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Greyish brown slightly gravelly silty fine to coarse SAND.			Sample Depth (m) Top	1.10
				Base	3.20
Specimen Reference	4	Specimen Depth	1.1 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022092814



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	32
90	100	0.05000	29
75	100	0.03581	26
63	100	0.02564	24
50	100	0.01835	21
37.5	100	0.00970	15
28	100	0.00493	11
20	100	0.00286	10
14	100	0.00152	7
10	95		
6.3	90		
5	87		
3.35	83		
2	78		
1.18	72		
0.6	64	Particle density	(assumed)
0.425	59	2.65	Mg/m3
0.3	54		
0.212	48		
0.15	41		
0.063	32		

Dry Mass of sample, g: 471

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	22.2
Sand	45.9
Silt	23.8
Clay	8.1

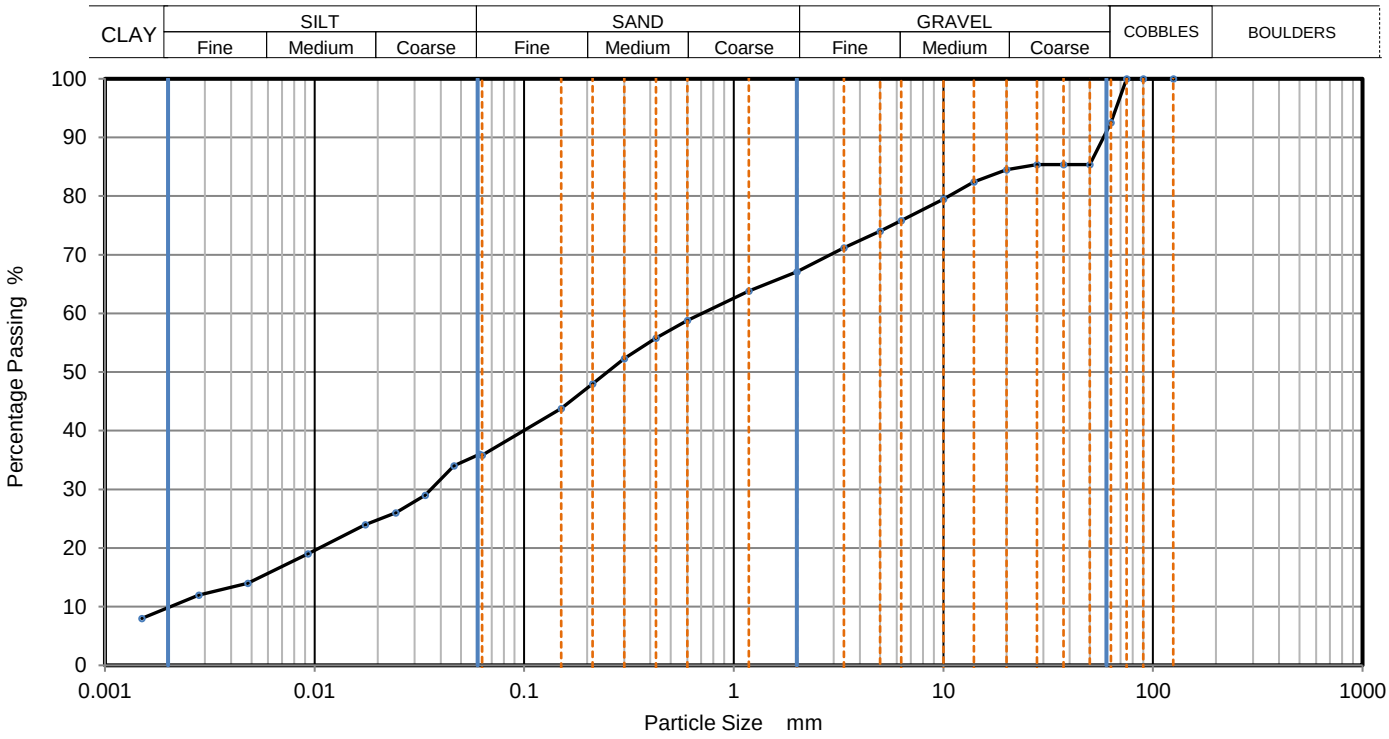
Grading Analysis		
D100	mm	
D60	mm	0.451
D30	mm	0.0538
D10	mm	0.00321
Uniformity Coefficient		140
Curvature Coefficient		2

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-16208
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		1
Specimen Description	Grey sandy gravelly silty CLAY with some cobbles.				Sample Depth (m)	Top	0.30
						Base	2.70
Specimen Reference	5	Specimen Depth	0.3	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022092815



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06134	36
90	100	0.04631	34
75	100	0.03372	29
63	93	0.02435	26
50	85	0.01745	24
37.5	85	0.00930	19
28	85	0.00479	14
20	85	0.00280	12
14	82	0.00150	8
10	80		
6.3	76		
5	74		
3.35	71		
2	67		
1.18	64		
0.6	59	Particle density	(assumed)
0.425	56	2.65	Mg/m3
0.3	52		
0.212	48		
0.15	44		
0.063	36		

Dry Mass of sample, g: 8100

Sample Proportions	% dry mass
Cobbles	7.5
Gravel	25.4
Sand	31.3
Silt	25.9
Clay	9.9

Grading Analysis		
D100	mm	
D60	mm	0.705
D30	mm	0.0351
D10	mm	0.00205
Uniformity Coefficient		340
Curvature Coefficient		0.85

Remarks

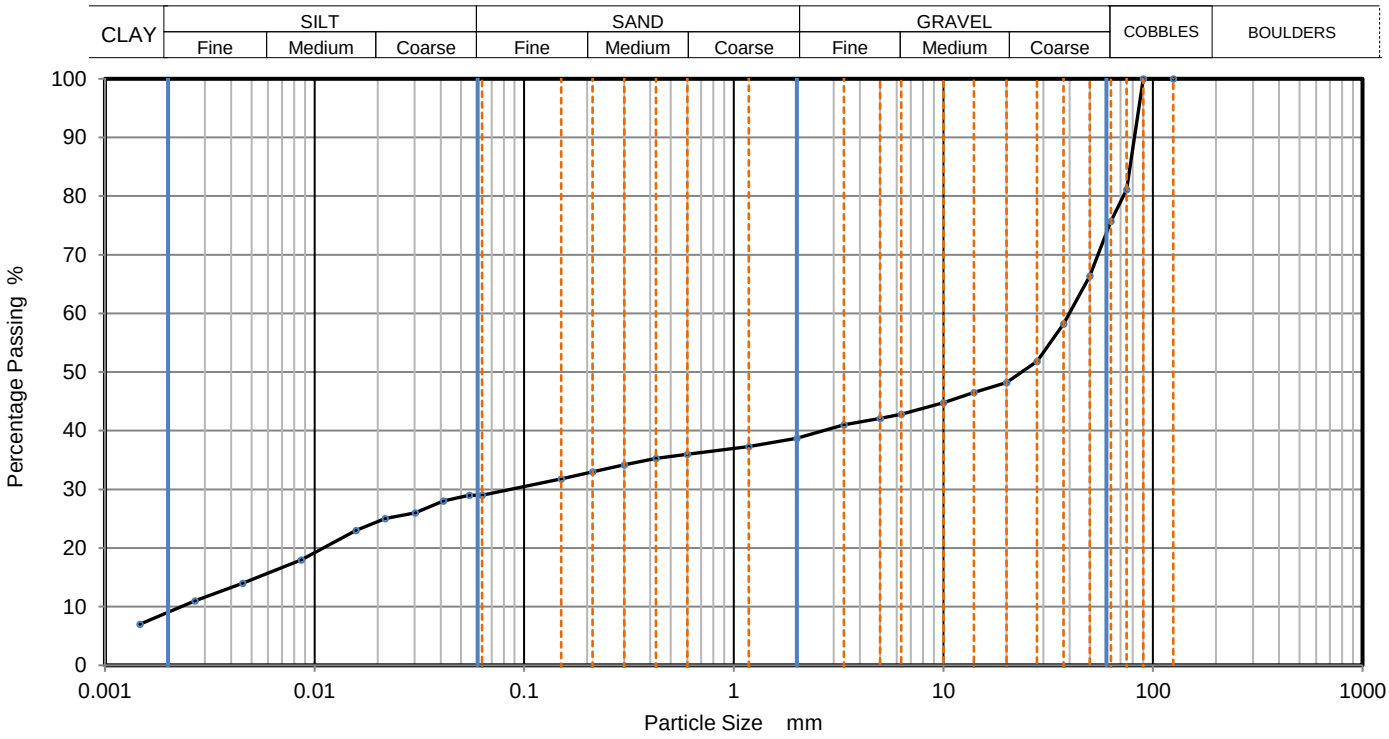
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					TP-17711
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Brownish grey sandy gravelly silty CLAY with cobbles.			Sample Depth (m) Top	0.20
				Base	0.80
Specimen Reference	4	Specimen Depth	0.2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022092816



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.05480	29
90	100	0.04114	28
75	81	0.03018	26
63	76	0.02172	25
50	66	0.01575	23
37.5	58	0.00864	18
28	52	0.00454	14
20	48	0.00269	11
14	47	0.00147	7
10	45		
6.3	43		
5	42		
3.35	41		
2	39		
1.18	37		
0.6	36	Particle density	(assumed)
0.425	35	2.65	Mg/m3
0.3	34		
0.212	33		
0.15	32		
0.063	29		

Dry Mass of sample, g: 9137

Sample Proportions	% dry mass
Cobbles	24.3
Gravel	37.0
Sand	9.7
Silt	19.7
Clay	9.3

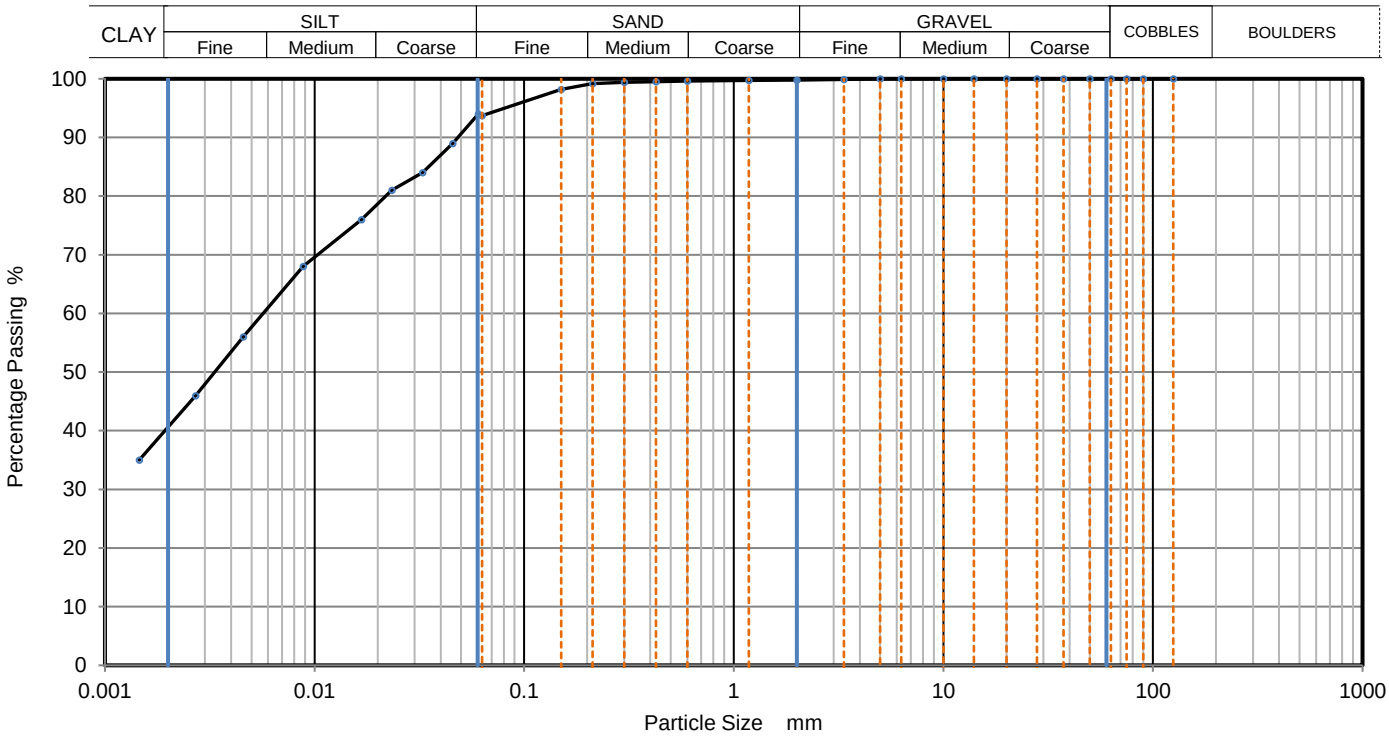
Grading Analysis		
D100	mm	
D60	mm	40
D30	mm	0.0857
D10	mm	0.00224
Uniformity Coefficient		18000
Curvature Coefficient		0.082

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-17894
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		1
Specimen Description	Greyish brown slightly sandy silty CLAY.				Sample Depth (m)	Top	0.30
						Base	0.95
Specimen Reference	6	Specimen Depth	0.3	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022092817



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06039	94
90	100	0.04562	89
75	100	0.03276	84
63	100	0.02333	81
50	100	0.01674	76
37.5	100	0.00883	68
28	100	0.00457	56
20	100	0.00270	46
14	100	0.00146	35
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	100	Particle density	(assumed)
0.425	100	2.65	Mg/m3
0.3	99		
0.212	99		
0.15	98		
0.063	94		

Dry Mass of sample, g: 331

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	0.2
Sand	6.1
Silt	53.1
Clay	40.6

Grading Analysis		
D100	mm	
D60	mm	0.00571
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

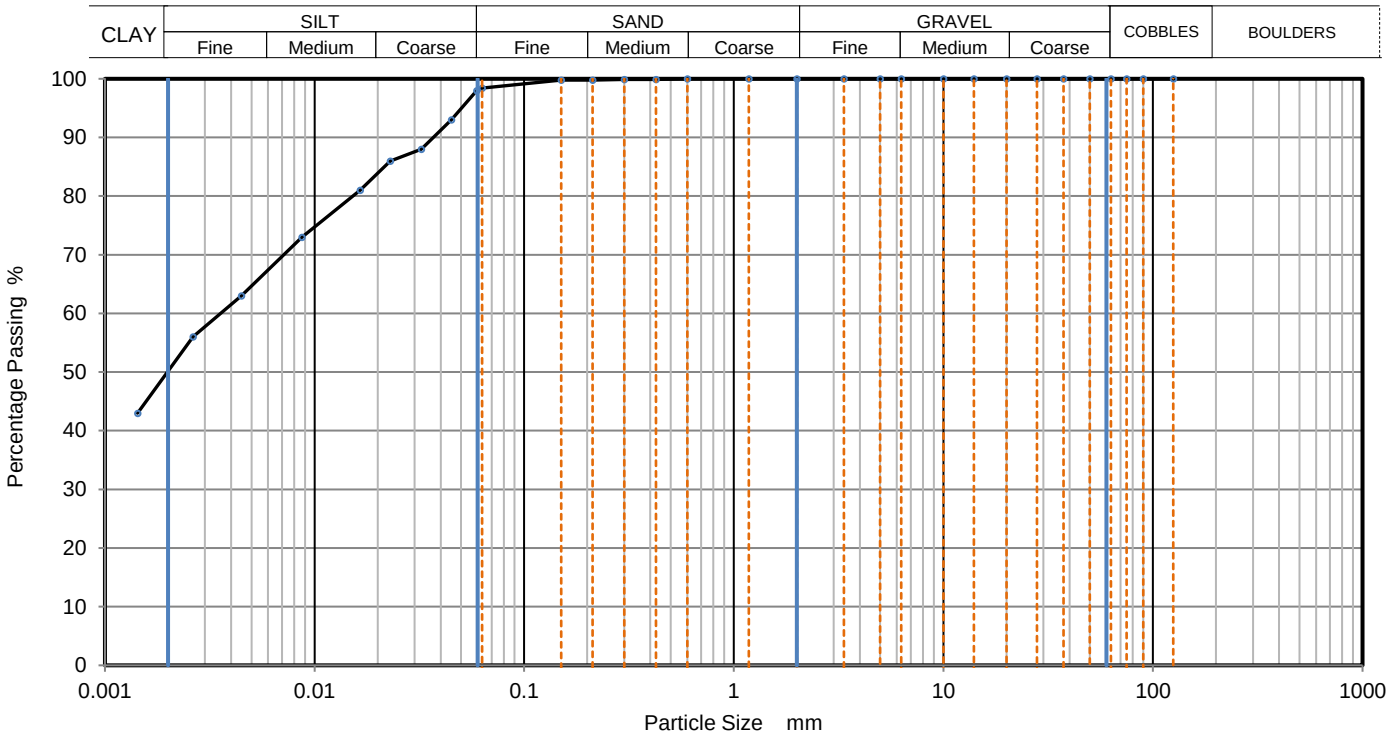
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					TP-17894
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brownish grey slightly sandy silty CLAY.			Sample Depth (m) Top	0.95
				Base	2.30
Specimen Reference	7	Specimen Depth	0.95 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022092818



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.05942	98
90	100	0.04491	93
75	100	0.03226	88
63	100	0.02299	86
50	100	0.01650	81
37.5	100	0.00871	73
28	100	0.00448	63
20	100	0.00264	56
14	100	0.00143	43
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	100	Particle density	(assumed)
0.425	100	2.65	Mg/m3
0.3	100		
0.212	100		
0.15	100		
0.063	98		

Dry Mass of sample, g: 300

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	0.0
Sand	1.6
Silt	48.6
Clay	49.8

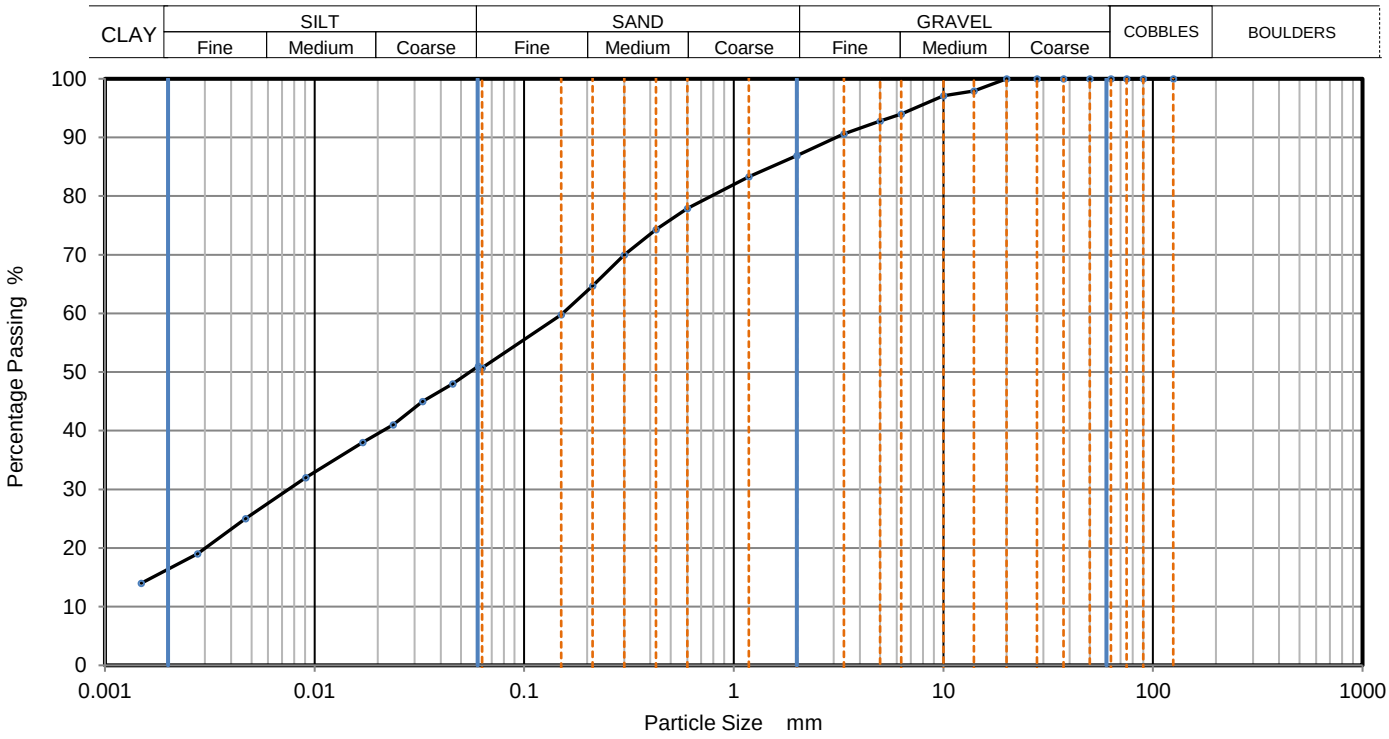
Grading Analysis		
D100	mm	
D60	mm	0.00361
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION			Job Ref		21-1682
				Borehole/Pit No.		TP-18187
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.		1
Specimen Description	Grey sandy slightly gravelly silty CLAY.			Sample Depth (m)	Top	0.30
					Base	0.95
Specimen Reference	5	Specimen Depth	0.3 m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID		Caus2022092819



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06039	51
90	100	0.04562	48
75	100	0.03276	45
63	100	0.02368	41
50	100	0.01698	38
37.5	100	0.00907	32
28	100	0.00468	25
20	100	0.00277	19
14	98	0.00149	14
10	97		
6.3	94		
5	93		
3.35	91		
2	87		
1.18	83		
0.6	78	Particle density	(assumed)
0.425	74	2.65	Mg/m3
0.3	70		
0.212	65		
0.15	60		
0.063	51		

Dry Mass of sample, g: 541

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	13.1
Sand	36.1
Silt	34.5
Clay	16.3

Grading Analysis		
D100	mm	
D60	mm	0.152
D30	mm	0.00784
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

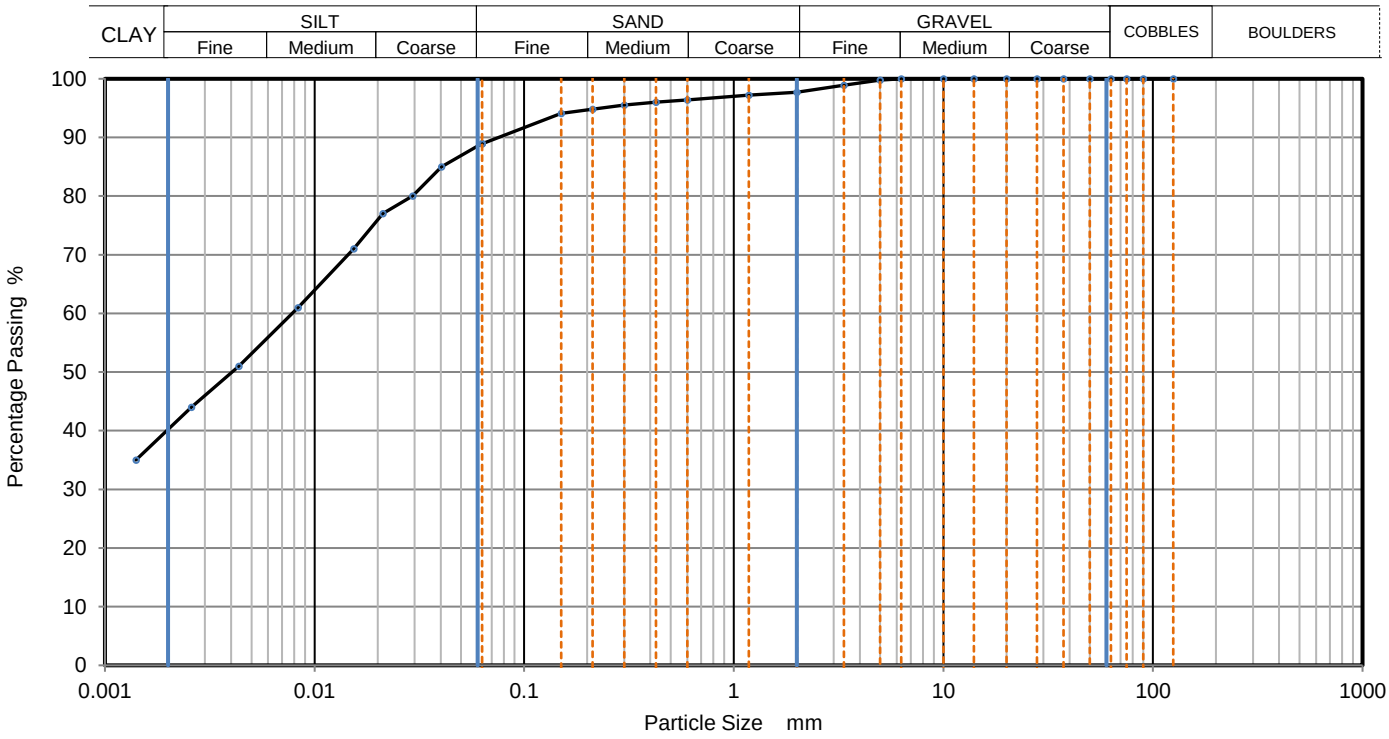
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

UKAS TESTING

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-18187
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Grey slightly sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	0.95
				Base	2.10
Specimen Reference	6	Specimen Depth	0.95 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022092820



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	89
90	100	0.04036	85
75	100	0.02938	80
63	100	0.02116	77
50	100	0.01536	71
37.5	100	0.00833	61
28	100	0.00435	51
20	100	0.00258	44
14	100	0.00140	35
10	100		
6.3	100		
5	100		
3.35	99		
2	98		
1.18	97		
0.6	96	Particle density	(assumed)
0.425	96	2.65	Mg/m3
0.3	96		
0.212	95		
0.15	94		
0.063	89		

Dry Mass of sample, g: 369

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	2.3
Sand	8.8
Silt	49.0
Clay	39.9

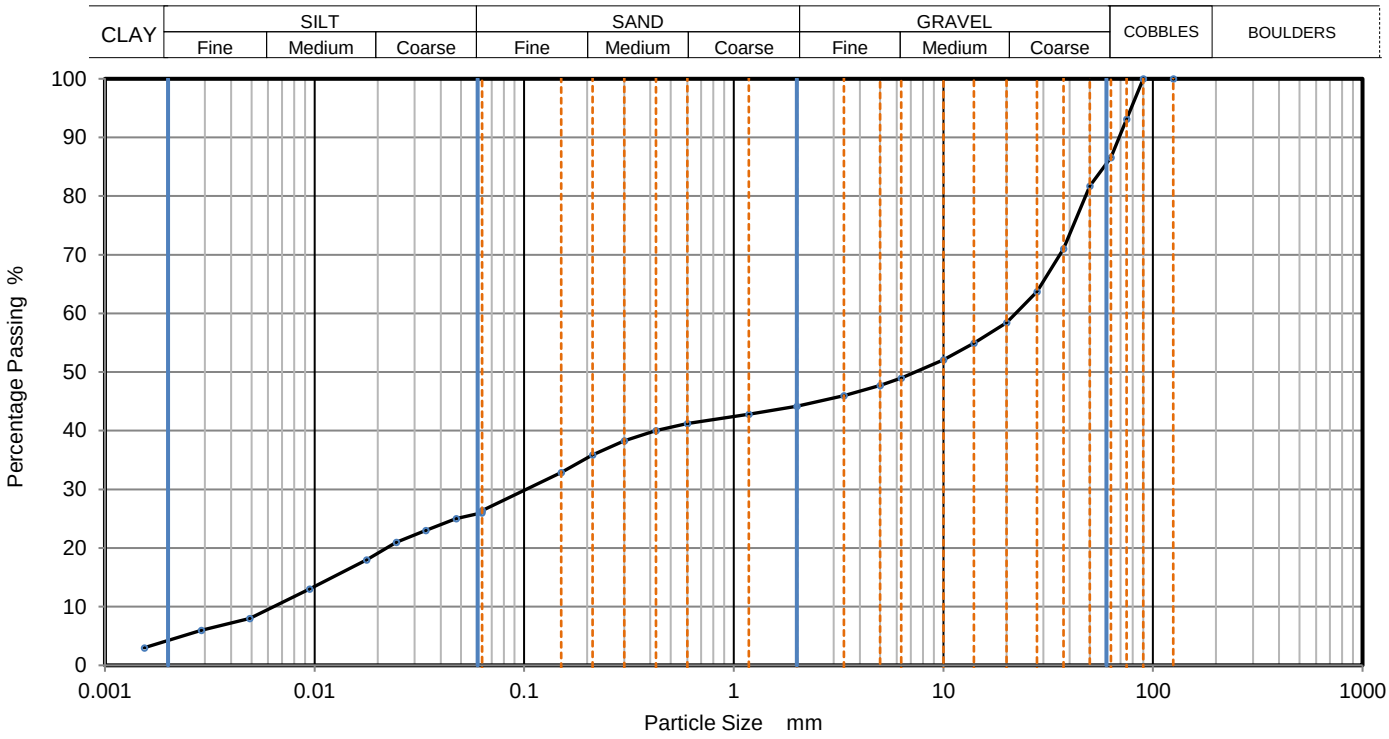
Grading Analysis		
D100	mm	
D60	mm	0.00782
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-18307
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		1
Specimen Description	Grey sandy gravelly silty CLAY with cobbles.				Sample Depth (m)	Top	0.20
						Base	0.65
Specimen Reference	2	Specimen Depth	0.2	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022092821



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06276	26
90	100	0.04736	25
75	93	0.03397	23
63	87	0.02452	21
50	82	0.01768	18
37.5	71	0.00948	13
28	64	0.00491	8
20	58	0.00288	6
14	55	0.00154	3
10	52		
6.3	49		
5	48		
3.35	46		
2	44		
1.18	43		
0.6	41	Particle density	(assumed)
0.425	40	2.65	Mg/m3
0.3	38		
0.212	36		
0.15	33		
0.063	26		

Dry Mass of sample, g: 9444

Sample Proportions	% dry mass
Cobbles	13.4
Gravel	42.4
Sand	17.8
Silt	22.1
Clay	4.3

Grading Analysis		
D100	mm	
D60	mm	22.1
D30	mm	0.102
D10	mm	0.00619
Uniformity Coefficient		3600
Curvature Coefficient		0.075

Remarks

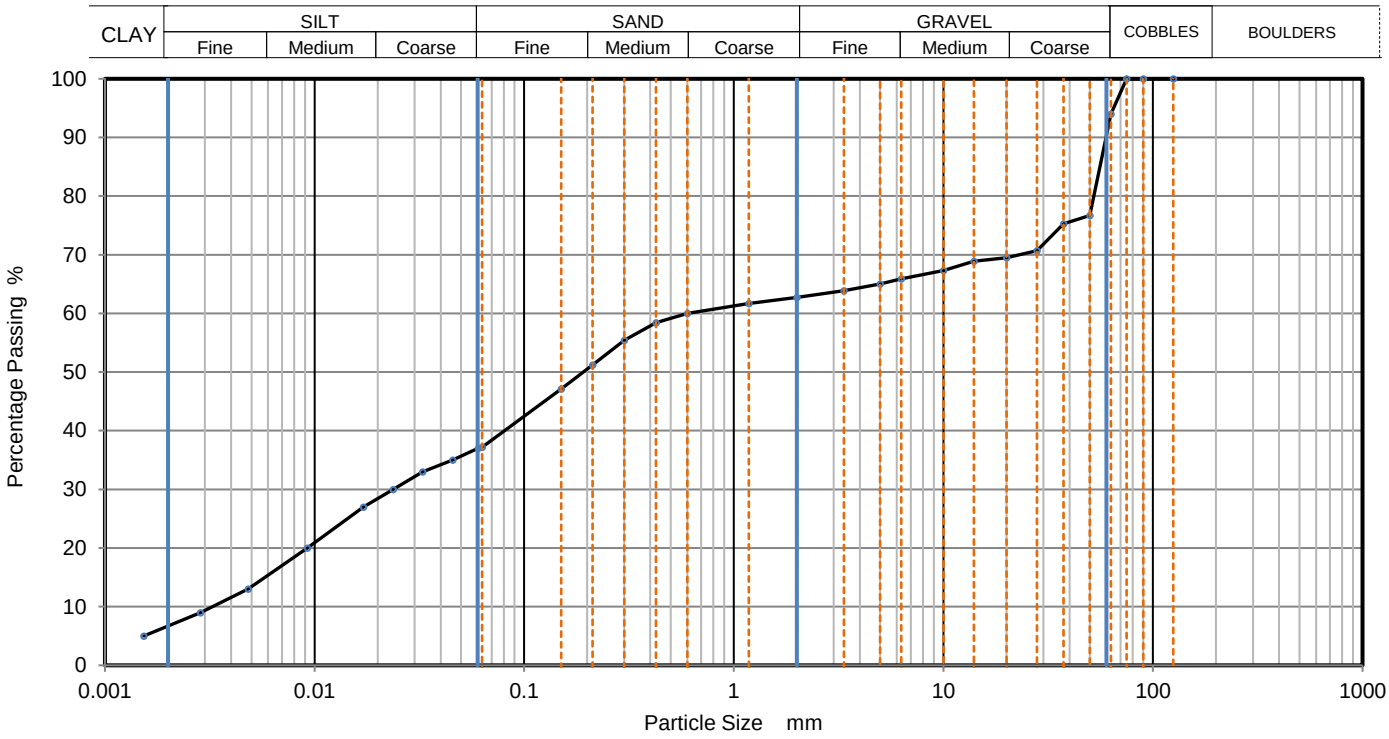
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					TP-18411
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Grey sandy gravelly silty CLAY.			Sample Depth (m) Top	0.20
				Base	0.50
Specimen Reference	2	Specimen Depth	0.2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022092822



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06039	37
90	100	0.04562	35
75	100	0.03276	33
63	94	0.02368	30
50	77	0.01710	27
37.5	75	0.00925	20
28	71	0.00482	13
20	70	0.00285	9
14	69	0.00153	5
10	67		
6.3	66		
5	65		
3.35	64		
2	63		
1.18	62		
0.6	60	Particle density	(assumed)
0.425	58	2.65	Mg/m3
0.3	55		
0.212	51		
0.15	47		
0.063	37		

Dry Mass of sample, g: 7571

Sample Proportions	% dry mass
Cobbles	6.0
Gravel	31.3
Sand	25.5
Silt	30.4
Clay	6.8

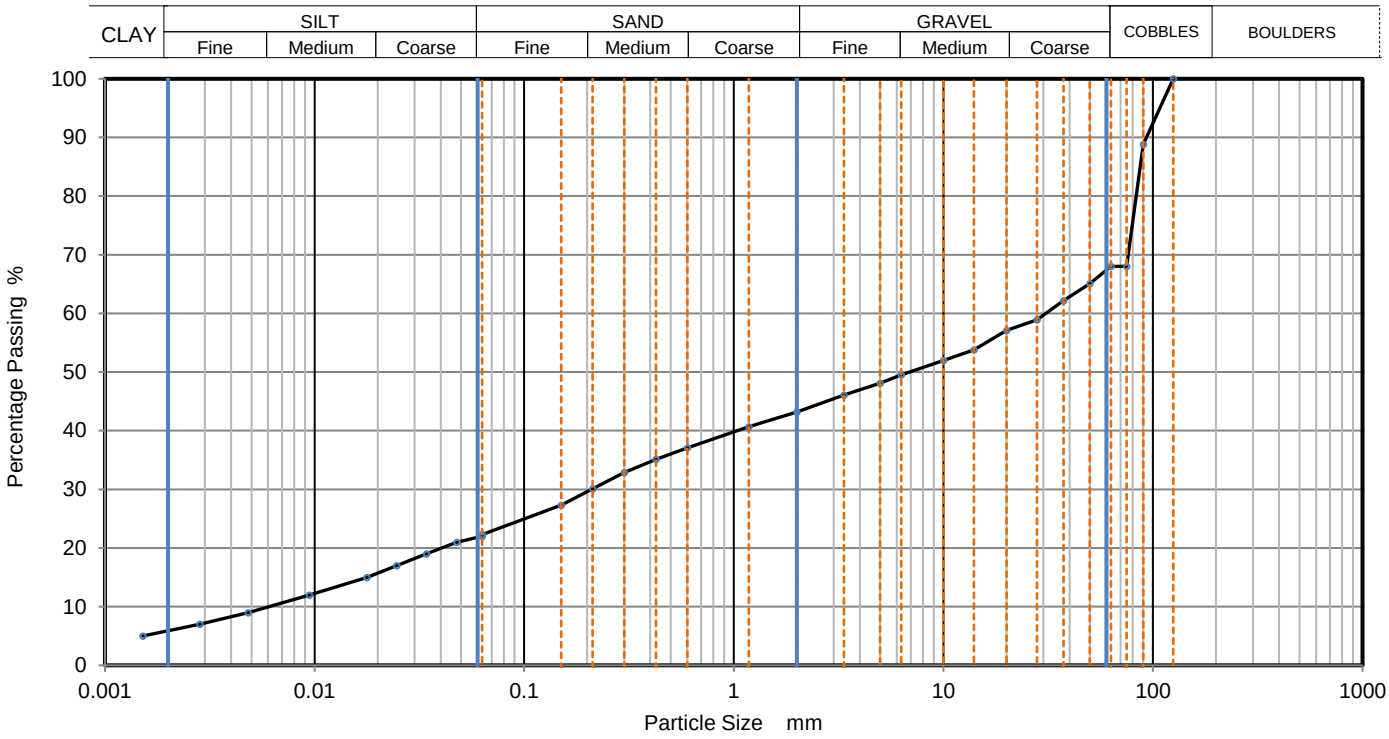
Grading Analysis		
D100	mm	
D60	mm	0.605
D30	mm	0.0233
D10	mm	0.00323
Uniformity Coefficient		190
Curvature Coefficient		0.28

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-18505
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		1
Specimen Description	Grey sandy gravelly silty CLAY with cobbles.				Sample Depth (m)	Top	0.50
						Base	3.00
Specimen Reference	4	Specimen Depth	0.5	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022092823



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	22
90	89	0.04770	21
75	68	0.03420	19
63	68	0.02468	17
50	65	0.01780	15
37.5	62	0.00942	12
28	59	0.00482	9
20	57	0.00283	7
14	54	0.00152	5
10	52		
6.3	50		
5	48		
3.35	46		
2	43		
1.18	41		
0.6	37	Particle density	(assumed)
0.425	35	2.65	Mg/m3
0.3	33		
0.212	30		
0.15	27		
0.063	22		

Dry Mass of sample, g: 12943

Sample Proportions	% dry mass
Cobbles	32.0
Gravel	24.8
Sand	20.9
Silt	16.3
Clay	6.0

Grading Analysis		
D100	mm	125
D60	mm	30.8
D30	mm	0.209
D10	mm	0.00561
Uniformity Coefficient		5500
Curvature Coefficient		0.25

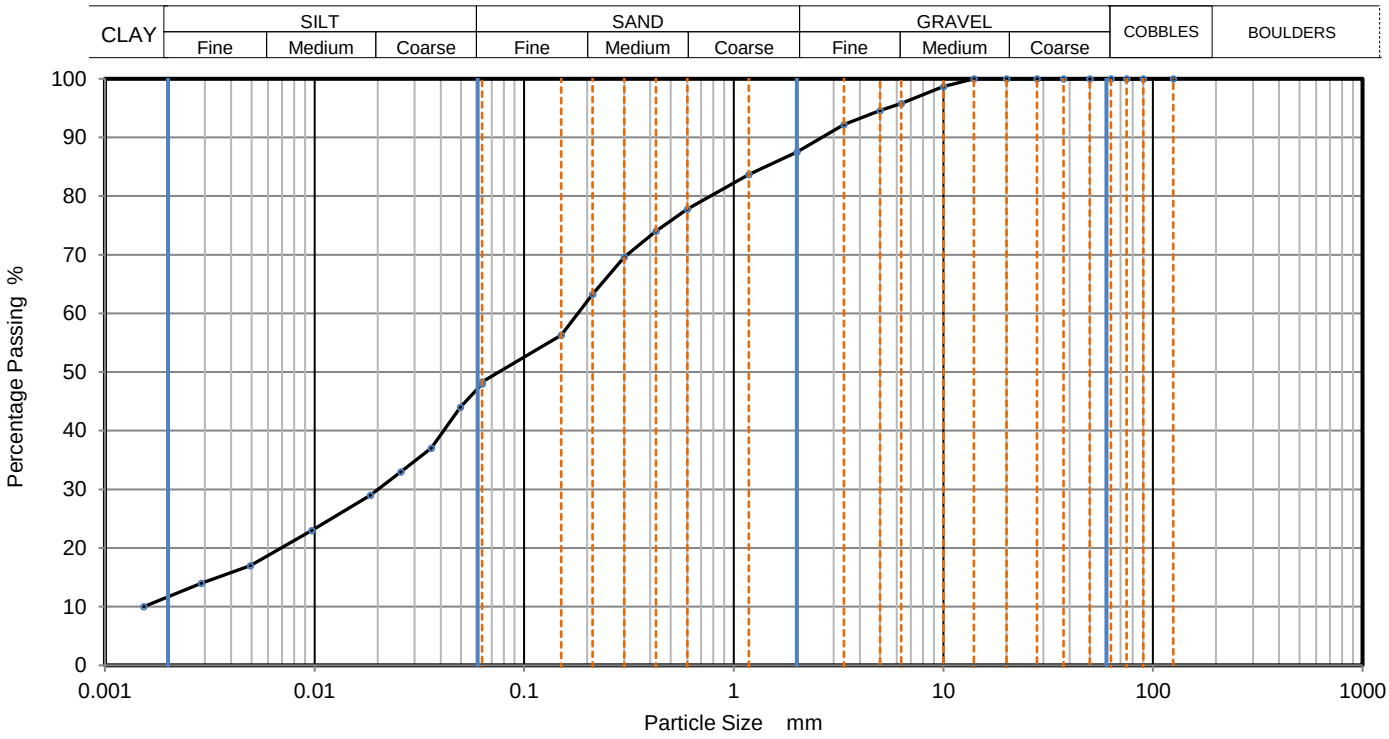
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

UKAS TESTING

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-18604
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		1
Specimen Description	Greyish brown sandy slightly gravelly silty CLAY.				Sample Depth (m)	Top	0.30
						Base	3.00
Specimen Reference	5	Specimen Depth	0.3	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022092824



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	48
90	100	0.04969	44
75	100	0.03604	37
63	100	0.02580	33
50	100	0.01846	29
37.5	100	0.00970	23
28	100	0.00493	17
20	100	0.00288	14
14	100	0.00153	10
10	99		
6.3	96		
5	95		
3.35	92		
2	88		
1.18	84		
0.6	78	Particle density	(assumed)
0.425	74	2.65	Mg/m3
0.3	70		
0.212	63		
0.15	56		
0.063	48		

Dry Mass of sample, g: 320

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	12.5
Sand	39.3
Silt	36.9
Clay	11.3

Grading Analysis		
D100	mm	
D60	mm	0.18
D30	mm	0.0202
D10	mm	0.00162
Uniformity Coefficient		110
Curvature Coefficient		1.4

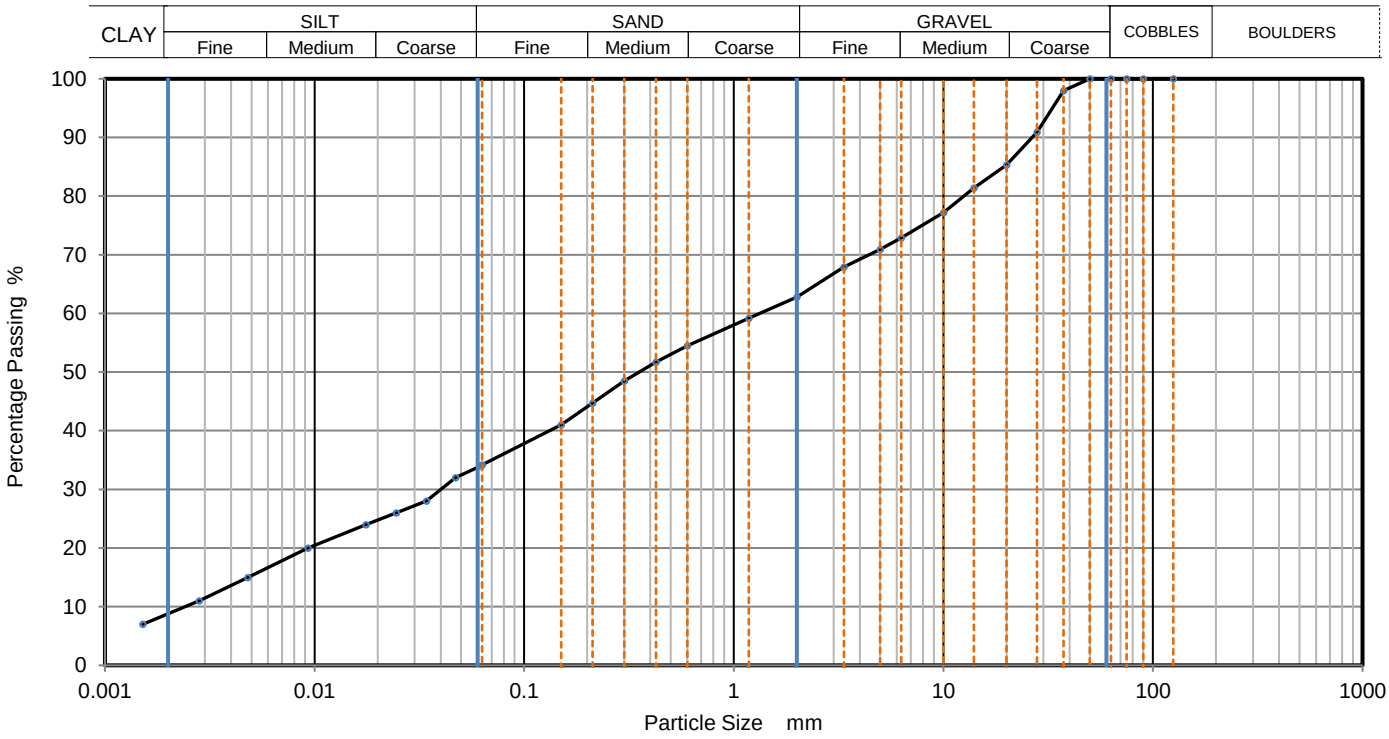
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

UKAS TESTING

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-18704
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		1
Specimen Description	Greyish brown sandy gravelly silty CLAY.				Sample Depth (m)	Top	0.40
						Base	3.00
Specimen Reference	4	Specimen Depth	0.4	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022092825



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06230	34
90	100	0.04701	32
75	100	0.03420	28
63	100	0.02452	26
50	100	0.01757	24
37.5	98	0.00931	20
28	91	0.00480	15
20	85	0.00282	11
14	81	0.00152	7
10	77		
6.3	73		
5	71		
3.35	68		
2	63		
1.18	59		
0.6	55	Particle density	(assumed)
0.425	52	2.65	Mg/m3
0.3	49		
0.212	45		
0.15	41		
0.063	34		

Dry Mass of sample, g: 3365

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	37.2
Sand	28.6
Silt	25.1
Clay	9.1

Grading Analysis		
D100	mm	
D60	mm	1.33
D30	mm	0.0399
D10	mm	0.00228
Uniformity Coefficient		580
Curvature Coefficient		0.52

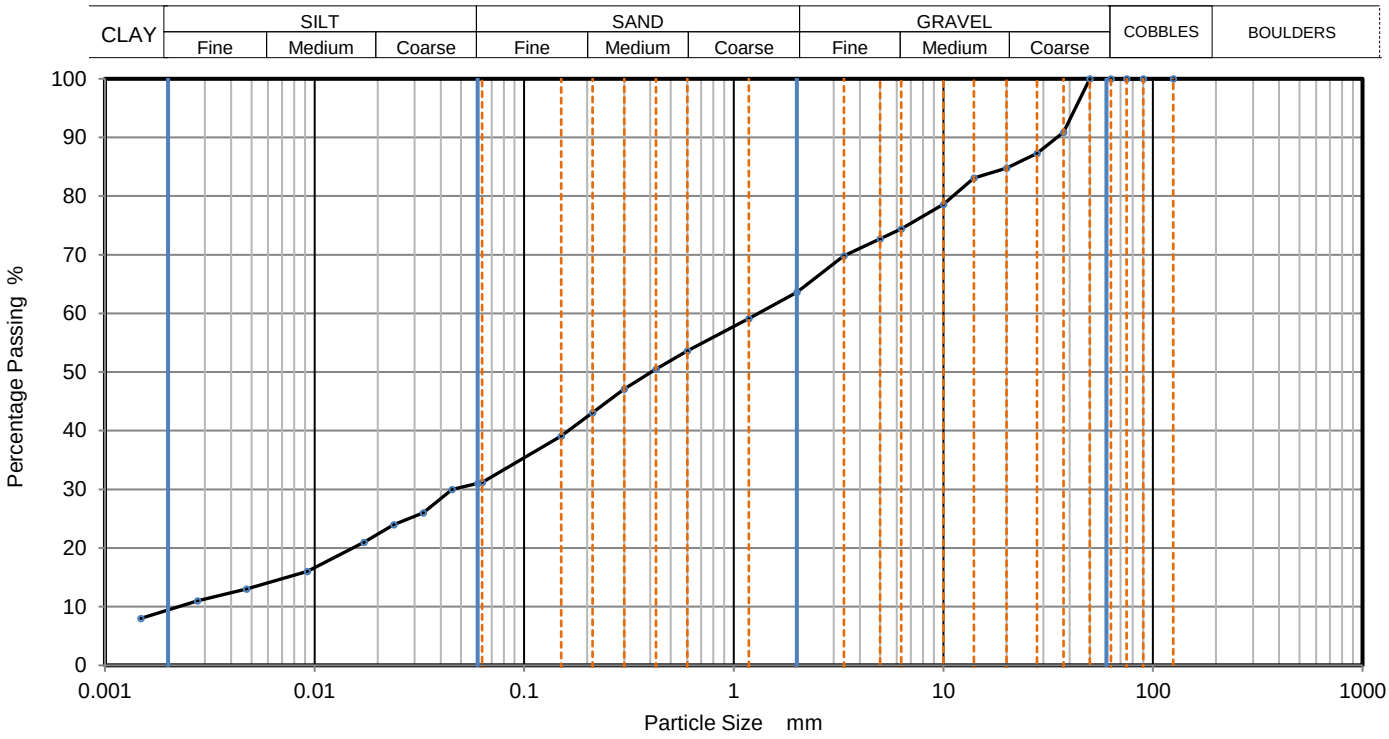
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

UKAS TESTING

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-18906
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Brownish grey sandy gravelly silty CLAY.			Sample Depth (m) Top	0.30
				Base	1.10
Specimen Reference	3	Specimen Depth	0.3 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022093086



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.05989	31
90	100	0.04526	30
75	100	0.03299	26
63	100	0.02384	24
50	100	0.01722	21
37.5	91	0.00925	16
28	87	0.00474	13
20	85	0.00277	11
14	83	0.00148	8
10	79		
6.3	74		
5	73		
3.35	70		
2	64		
1.18	59		
0.6	54	Particle density (assumed)	
0.425	51	2.65 Mg/m3	
0.3	47		
0.212	43		
0.15	39		
0.063	31		

Dry Mass of sample, g: 3188

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	36.4
Sand	32.5
Silt	21.5
Clay	9.6

Grading Analysis		
D100	mm	
D60	mm	1.31
D30	mm	0.0491
D10	mm	0.00218
Uniformity Coefficient		600
Curvature Coefficient		0.84

Remarks

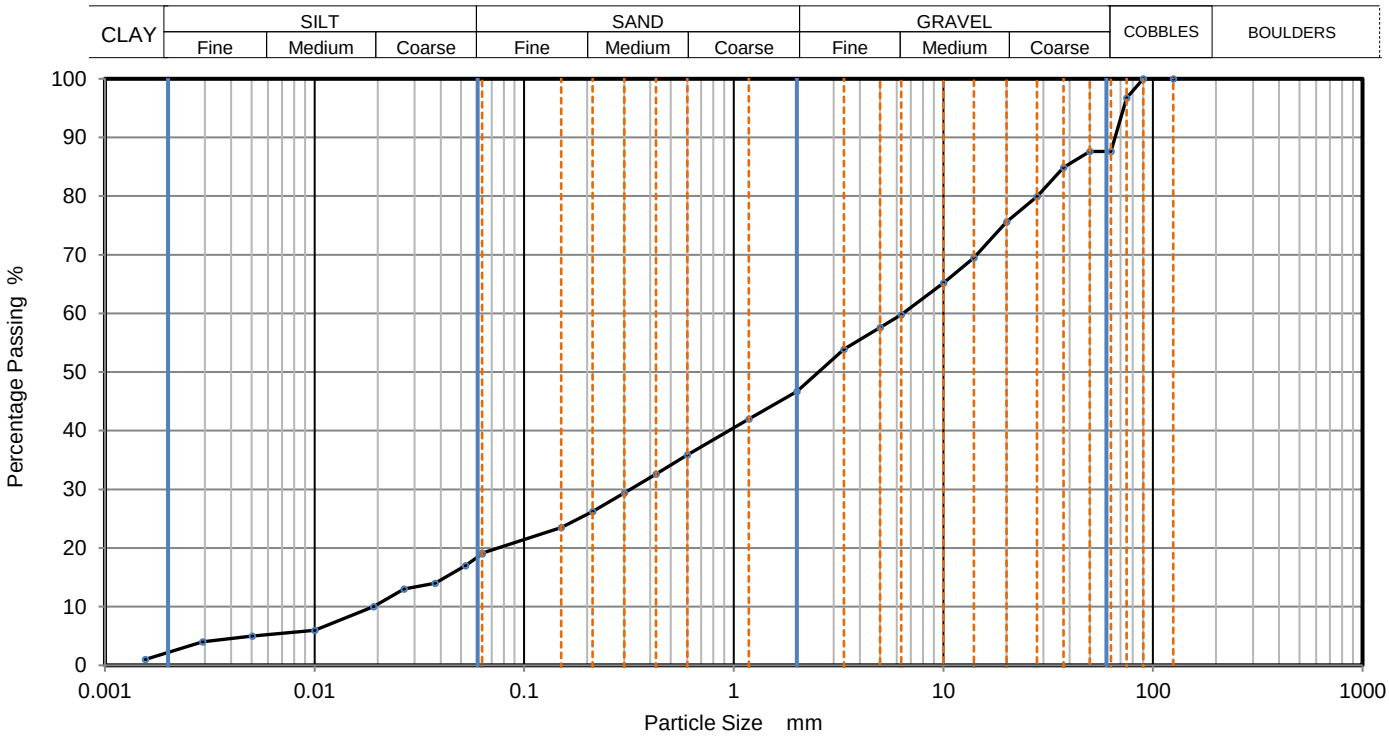
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					TP-19088
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brownish grey sandy gravelly silty CLAY.			Sample Depth (m) Top	1.00
				Base	2.00
Specimen Reference	2	Specimen Depth	1 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022093087



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	19
90	100	0.05252	17
75	97	0.03757	14
63	88	0.02672	13
50	88	0.01911	10
37.5	85	0.01003	6
28	80	0.00504	5
20	76	0.00293	4
14	70	0.00156	1
10	65		
6.3	60		
5	58		
3.35	54		
2	47		
1.18	42		
0.6	36	Particle density (assumed)	
0.425	33	2.65 Mg/m3	
0.3	29		
0.212	26		
0.15	24		
0.063	19		

Dry Mass of sample, g: 10800

Sample Proportions	% dry mass
Cobbles	12.4
Gravel	40.9
Sand	27.6
Silt	16.8
Clay	2.3

Grading Analysis		
D100	mm	
D60	mm	6.4
D30	mm	0.32
D10	mm	0.0185
Uniformity Coefficient		350
Curvature Coefficient		0.86

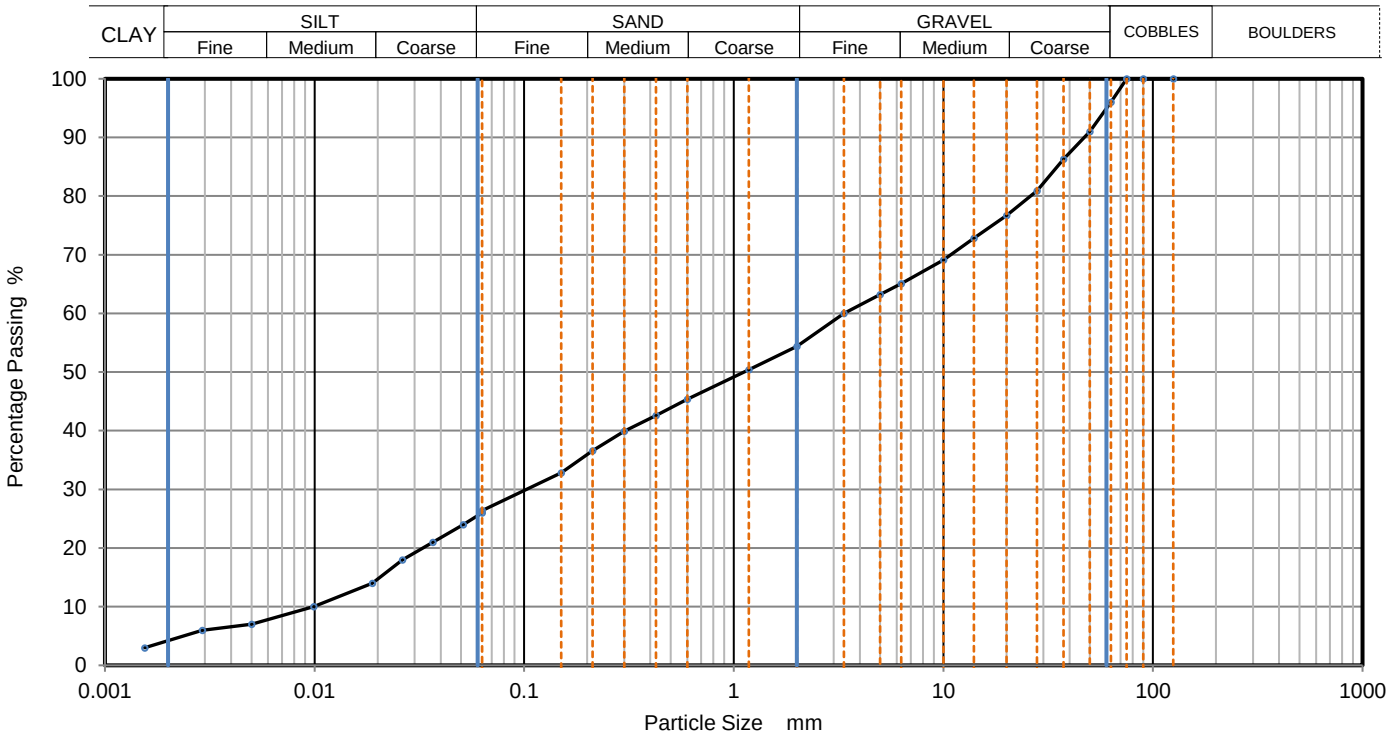
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					**21-1682**
Borehole/Pit No.					TP-19088
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	5
Specimen Description	Brownish grey sandy gravelly silty CLAY.			Sample Depth (m) Top	2.00
				Base	2.80
Specimen Reference	2	Specimen Depth	2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022093089



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	26
90	100	0.05128	24
75	100	0.03670	21
63	96	0.02626	18
50	91	0.01889	14
37.5	86	0.00992	10
28	81	0.00501	7
20	77	0.00291	6
14	73	0.00155	3
10	69		
6.3	65		
5	63		
3.35	60		
2	54		
1.18	50		
0.6	45	Particle density	(assumed)
0.425	43	2.65	Mg/m3
0.3	40		
0.212	37		
0.15	33		
0.063	26		

Dry Mass of sample, g: 11712

Sample Proportions	% dry mass
Cobbles	4.0
Gravel	41.6
Sand	28.0
Silt	22.5
Clay	3.9

Grading Analysis		
D100	mm	
D60	mm	3.36
D30	mm	0.103
D10	mm	0.0103
Uniformity Coefficient		320
Curvature Coefficient		0.31

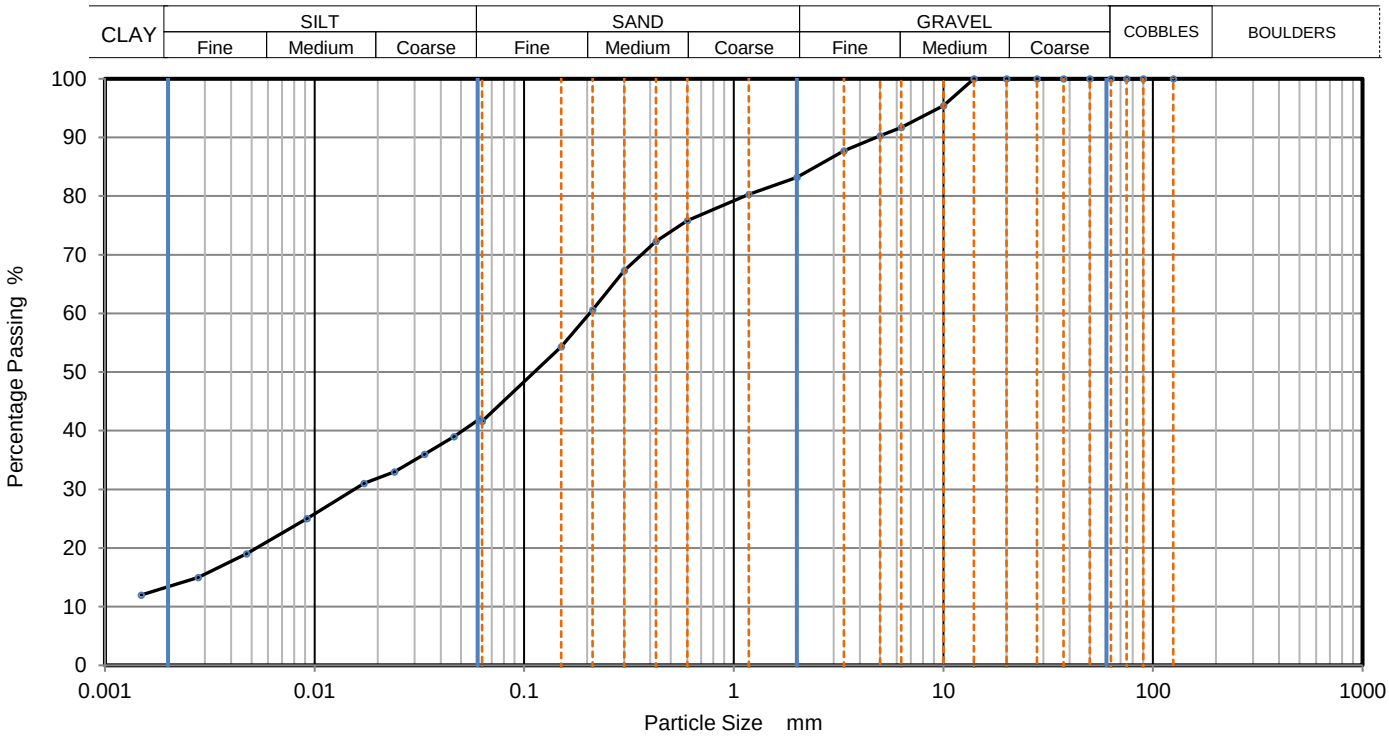
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					**21-1682**
Borehole/Pit No.					TP-2007
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	0.25
				Base	0.80
Specimen Reference	6	Specimen Depth	0.25 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220908125



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06135	42
90	100	0.04632	39
75	100	0.03349	36
63	100	0.02402	33
50	100	0.01722	31
37.5	100	0.00919	25
28	100	0.00474	19
20	100	0.00278	15
14	100	0.00149	12
10	95		
6.3	92		
5	90		
3.35	88		
2	83		
1.18	80		
0.6	76	Particle density	(assumed)
0.425	72	2.65	Mg/m3
0.3	67		
0.212	61		
0.15	54		
0.063	42		

Dry Mass of sample, g: 415

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	16.8
Sand	41.7
Silt	27.9
Clay	13.6

Grading Analysis		
D100	mm	
D60	mm	0.205
D30	mm	0.0157
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

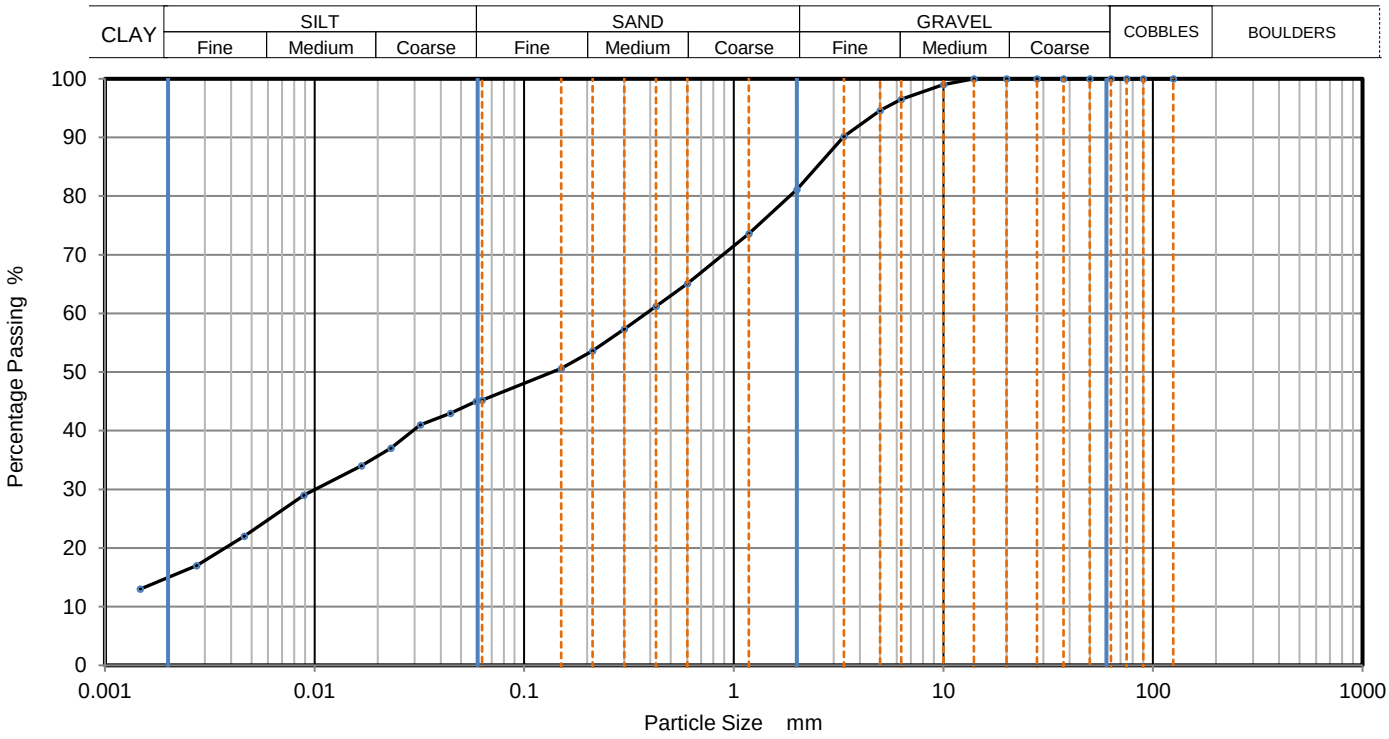
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					TP-2007
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	0.80
				Base	1.70
Specimen Reference	7	Specimen Depth	0.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220908126



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.05891	45
90	100	0.04454	43
75	100	0.03200	41
63	100	0.02316	37
50	100	0.01674	34
37.5	100	0.00889	29
28	100	0.00462	22
20	100	0.00274	17
14	100	0.00147	13
10	99		
6.3	97		
5	95		
3.35	90		
2	81		
1.18	74		
0.6	65	Particle density	(assumed)
0.425	61	2.65	Mg/m3
0.3	57		
0.212	54		
0.15	51		
0.063	45		

Dry Mass of sample, g: 346

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	18.9
Sand	35.8
Silt	30.3
Clay	15.0

Grading Analysis		
D100	mm	
D60	mm	0.381
D30	mm	0.0102
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

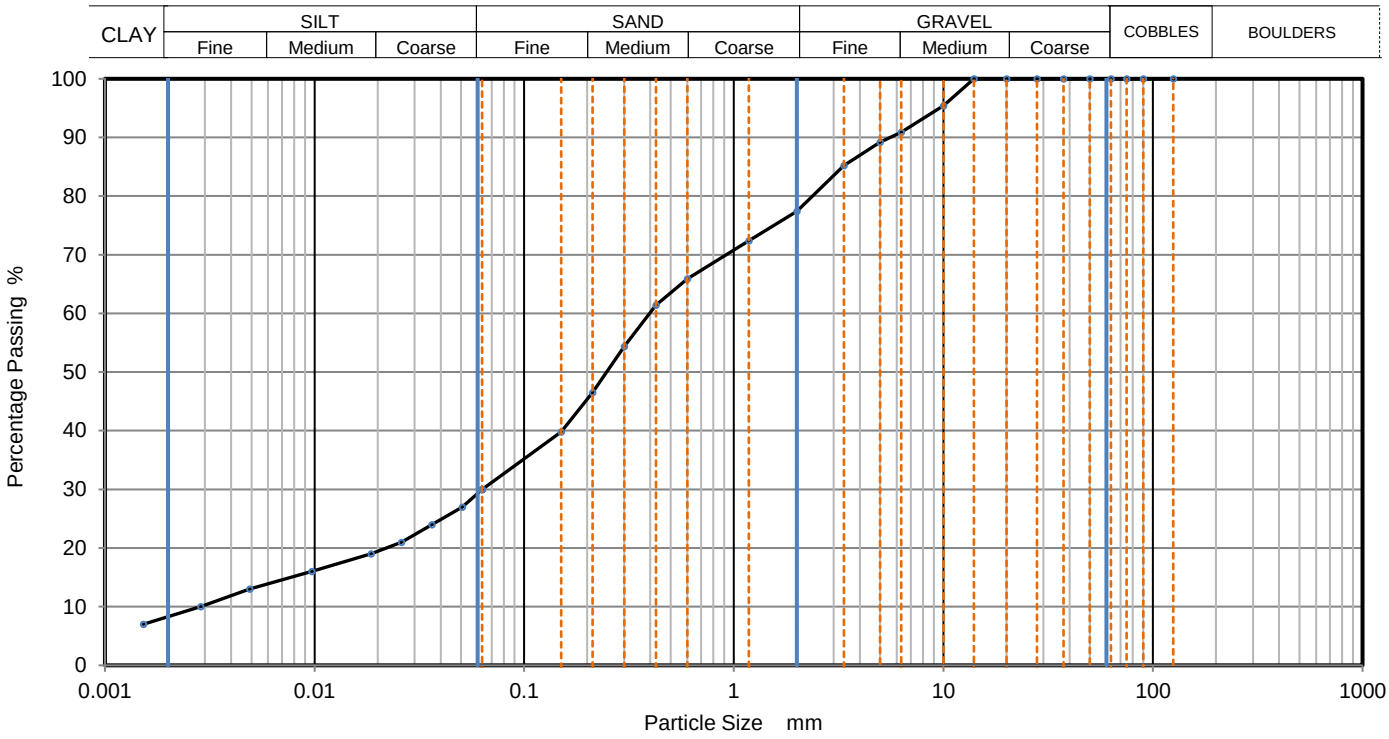
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					**21-1682**
Borehole/Pit No.					TP-2007
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	1.70
				Base	2.40
Specimen Reference	7	Specimen Depth	1.7 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220908127



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	30
90	100	0.05064	27
75	100	0.03626	24
63	100	0.02595	21
50	100	0.01857	19
37.5	100	0.00970	16
28	100	0.00491	13
20	100	0.00286	10
14	100	0.00152	7
10	95		
6.3	91		
5	89		
3.35	85		
2	77		
1.18	72		
0.6	66	Particle density	(assumed)
0.425	61	2.65	Mg/m3
0.3	54		
0.212	47		
0.15	40		
0.063	30		

Dry Mass of sample, g: 452

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	22.6
Sand	47.4
Silt	21.6
Clay	8.4

Grading Analysis		
D100	mm	
D60	mm	0.397
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

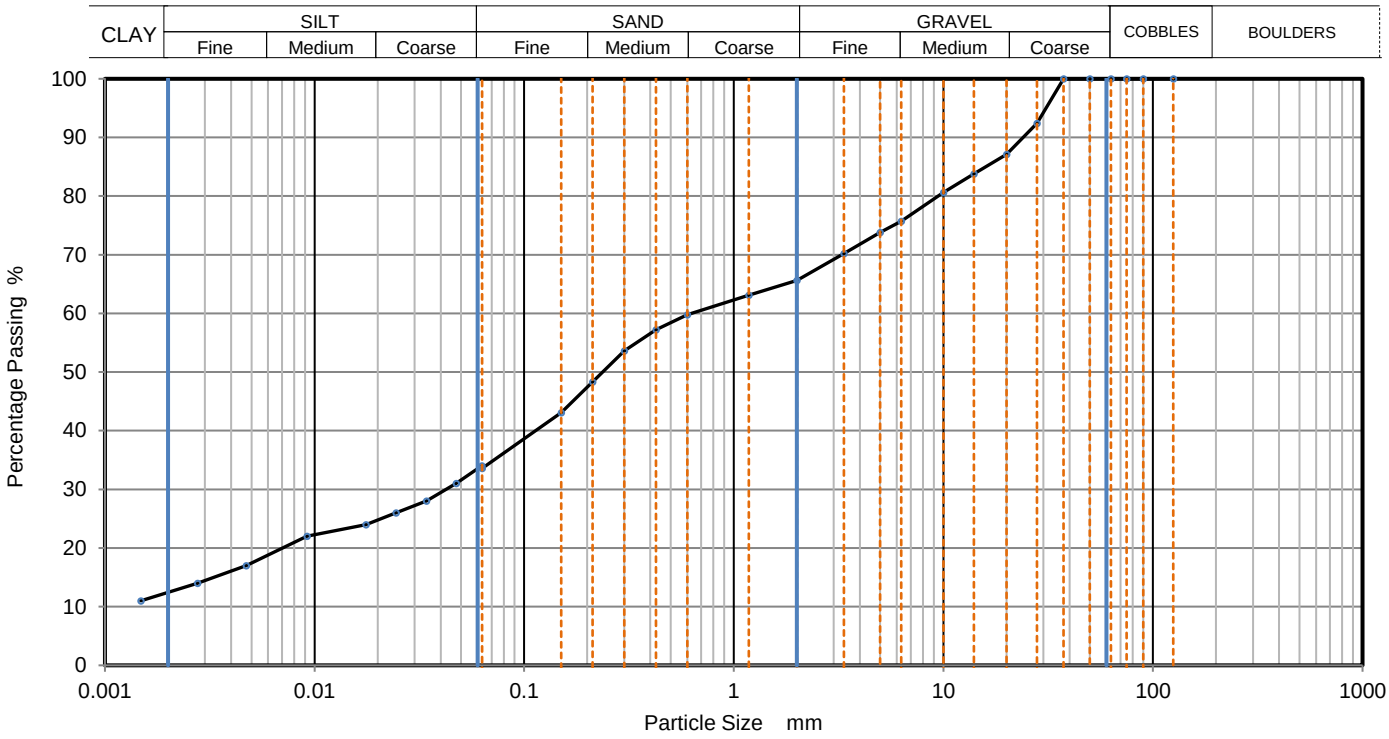
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					**21-1682**
Borehole/Pit No.					TP-2007
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	4
Specimen Description	Brown sandy gravelly silty CLAY.			Sample Depth (m) Top	2.40
				Base	3.30
Specimen Reference	6	Specimen Depth	2.4 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220908128



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06275	34
90	100	0.04735	31
75	100	0.03420	28
63	100	0.02451	26
50	100	0.01756	24
37.5	100	0.00919	22
28	92	0.00471	17
20	87	0.00277	14
14	84	0.00148	11
10	81		
6.3	76		
5	74		
3.35	70		
2	66		
1.18	63		
0.6	60	Particle density	(assumed)
0.425	57	2.65	Mg/m3
0.3	54		
0.212	48		
0.15	43		
0.063	34		

Dry Mass of sample, g: 3107

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	34.4
Sand	32.0
Silt	21.2
Clay	12.4

Grading Analysis		
D100	mm	
D60	mm	0.628
D30	mm	0.041
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

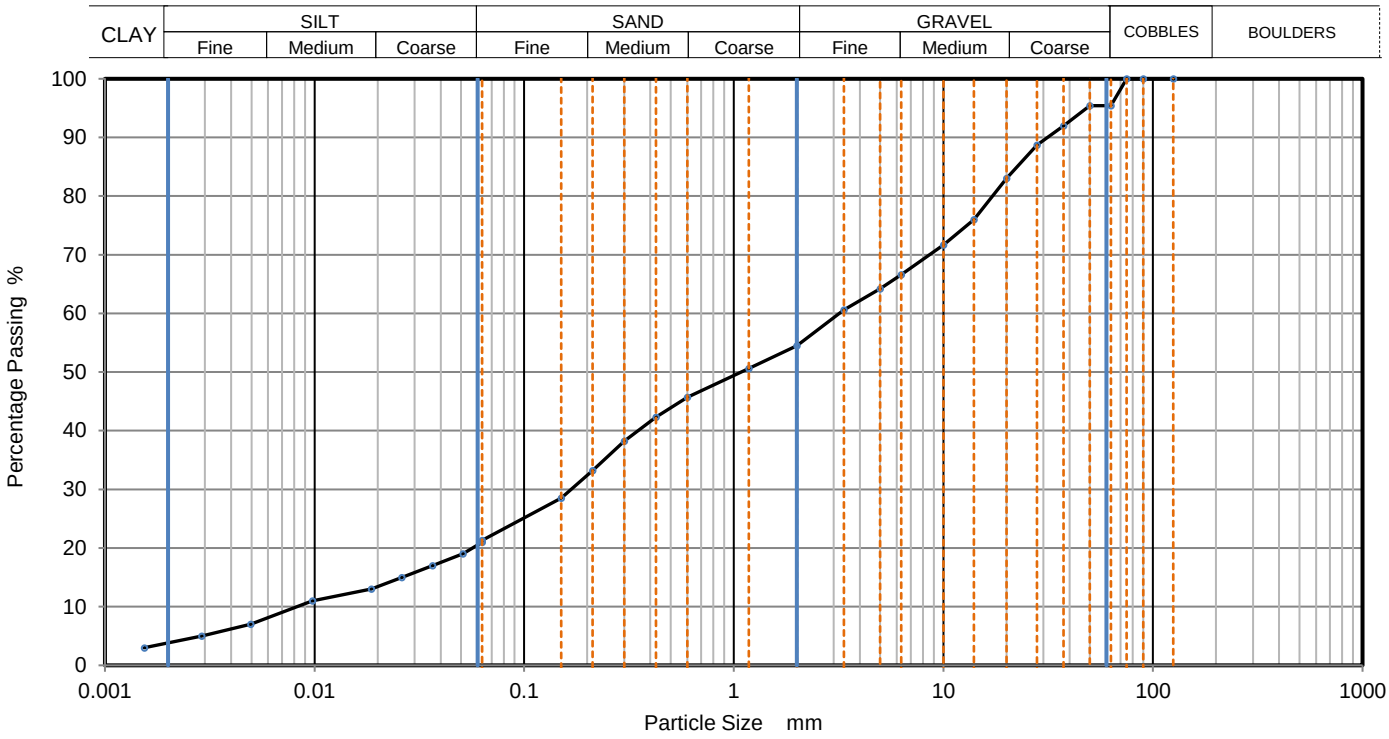
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	TP-2140
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brown sandy gravelly silty CLAY.			Sample Depth (m) Top	0.50
				Base	2.80
Specimen Reference	4	Specimen Depth	0.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220908129



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	21
90	100	0.05096	19
75	100	0.03648	17
63	95	0.02611	15
50	95	0.01868	13
37.5	92	0.00976	11
28	89	0.00496	7
20	83	0.00289	5
14	76	0.00154	3
10	72		
6.3	67		
5	64		
3.35	61		
2	55		
1.18	51		
0.6	46	Particle density	(assumed)
0.425	42	2.65	Mg/m3
0.3	38		
0.212	33		
0.15	29		
0.063	21		

Dry Mass of sample, g: 10857

Sample Proportions	% dry mass
Cobbles	4.6
Gravel	40.9
Sand	33.2
Silt	17.2
Clay	4.1

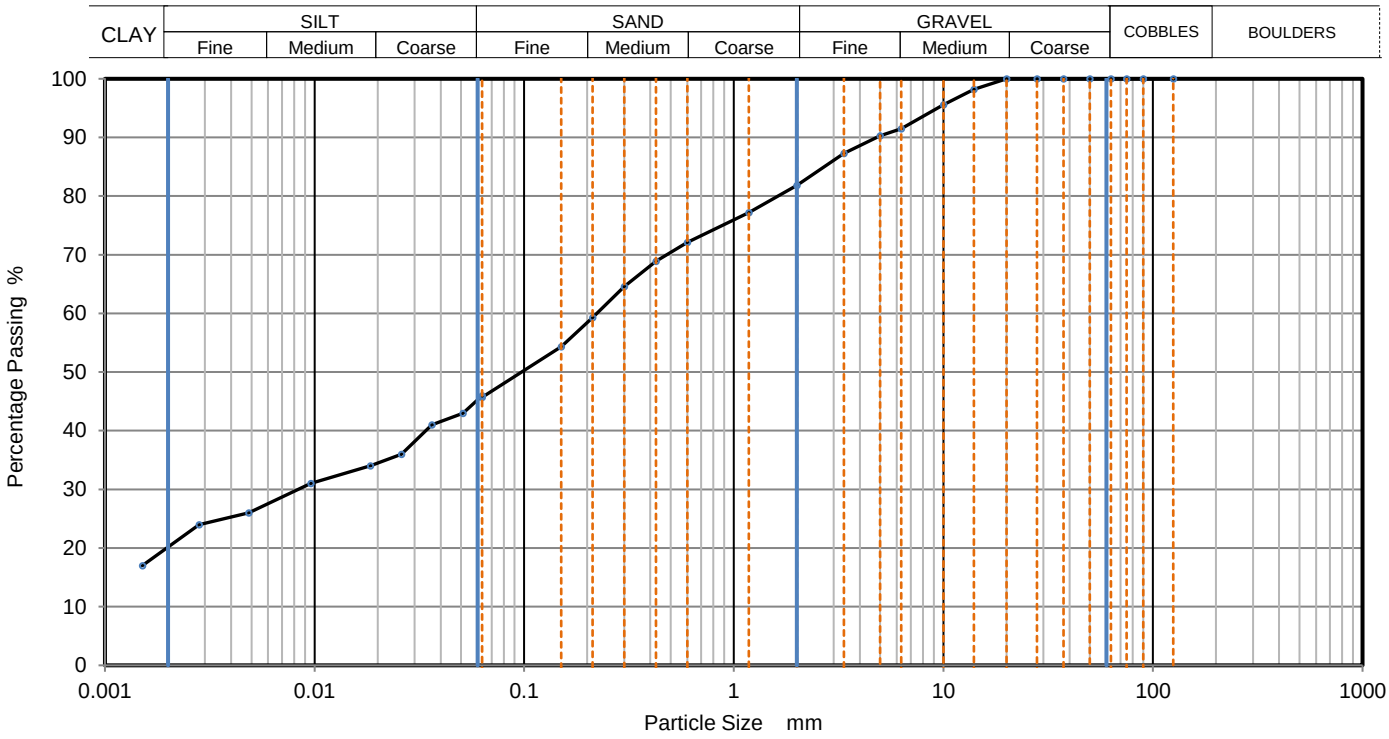
Grading Analysis		
D100	mm	
D60	mm	3.19
D30	mm	0.167
D10	mm	0.0085
Uniformity Coefficient		380
Curvature Coefficient		1

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-2140
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		3
Specimen Description	Brown sandy slightly gravelly silty CLAY.				Sample Depth (m)	Top	2.80
						Base	3.50
Specimen Reference	6	Specimen Depth	2.8	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus20220908130



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	46
90	100	0.05096	43
75	100	0.03626	41
63	100	0.02595	36
50	100	0.01846	34
37.5	100	0.00959	31
28	100	0.00485	26
20	100	0.00282	24
14	98	0.00151	17
10	96		
6.3	92		
5	90		
3.35	87		
2	82		
1.18	77		
0.6	72	Particle density	(assumed)
0.425	69	2.65	Mg/m3
0.3	65		
0.212	59		
0.15	54		
0.063	46		

Dry Mass of sample, g: 438

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	18.2
Sand	36.0
Silt	25.7
Clay	20.1

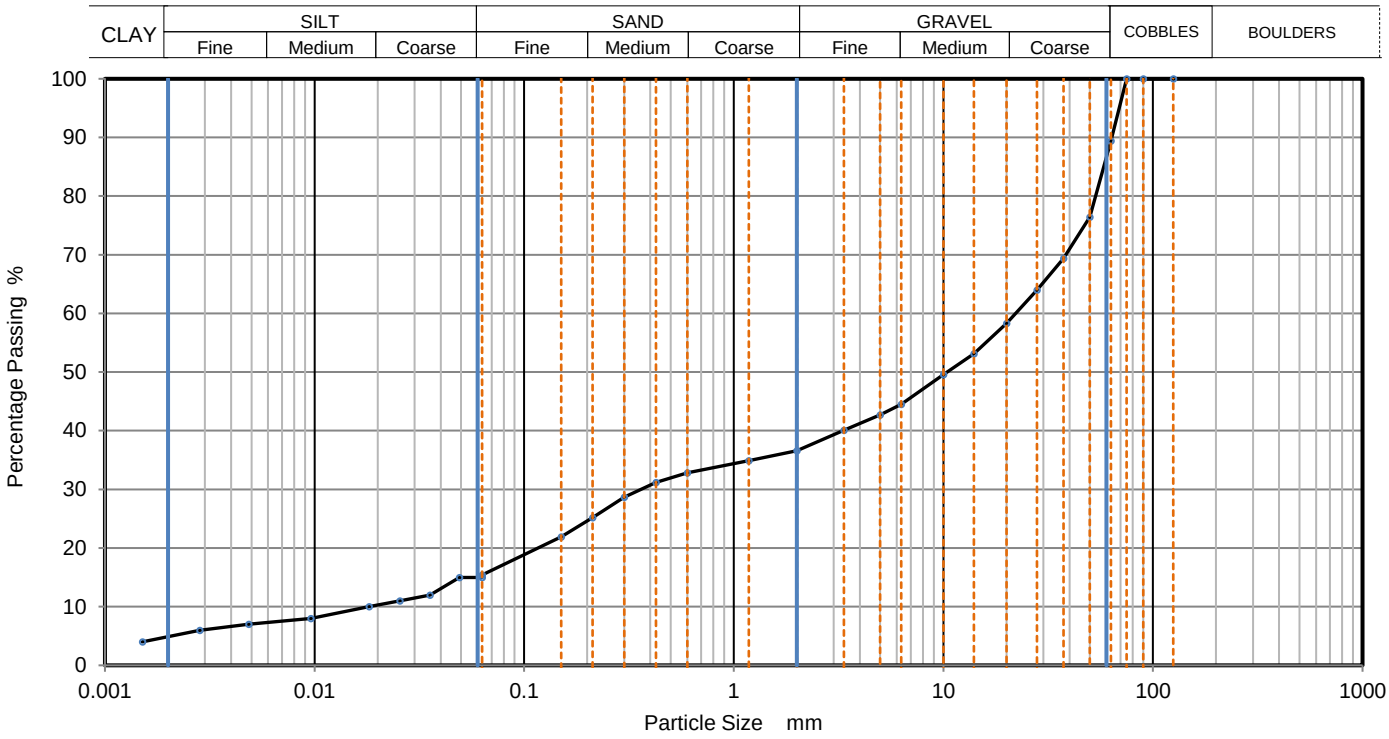
Grading Analysis		
D100	mm	
D60	mm	0.222
D30	mm	0.00801
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-2219A
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Brown sandy gravelly silty CLAY with cobbles.			Sample Depth (m) Top	1.20
				Base	2.50
Specimen Reference	7	Specimen Depth	1.2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220908131



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	15
90	100	0.04902	15
75	100	0.03559	12
63	89	0.02548	11
50	76	0.01824	10
37.5	69	0.00959	8
28	64	0.00485	7
20	58	0.00283	6
14	53	0.00151	4
10	50		
6.3	45		
5	43		
3.35	40		
2	37		
1.18	35		
0.6	33	Particle density	(assumed)
0.425	31	2.65	Mg/m3
0.3	29		
0.212	25		
0.15	22		
0.063	15		

Dry Mass of sample, g: 9609

Sample Proportions	% dry mass
Cobbles	10.6
Gravel	52.8
Sand	21.2
Silt	10.5
Clay	4.9

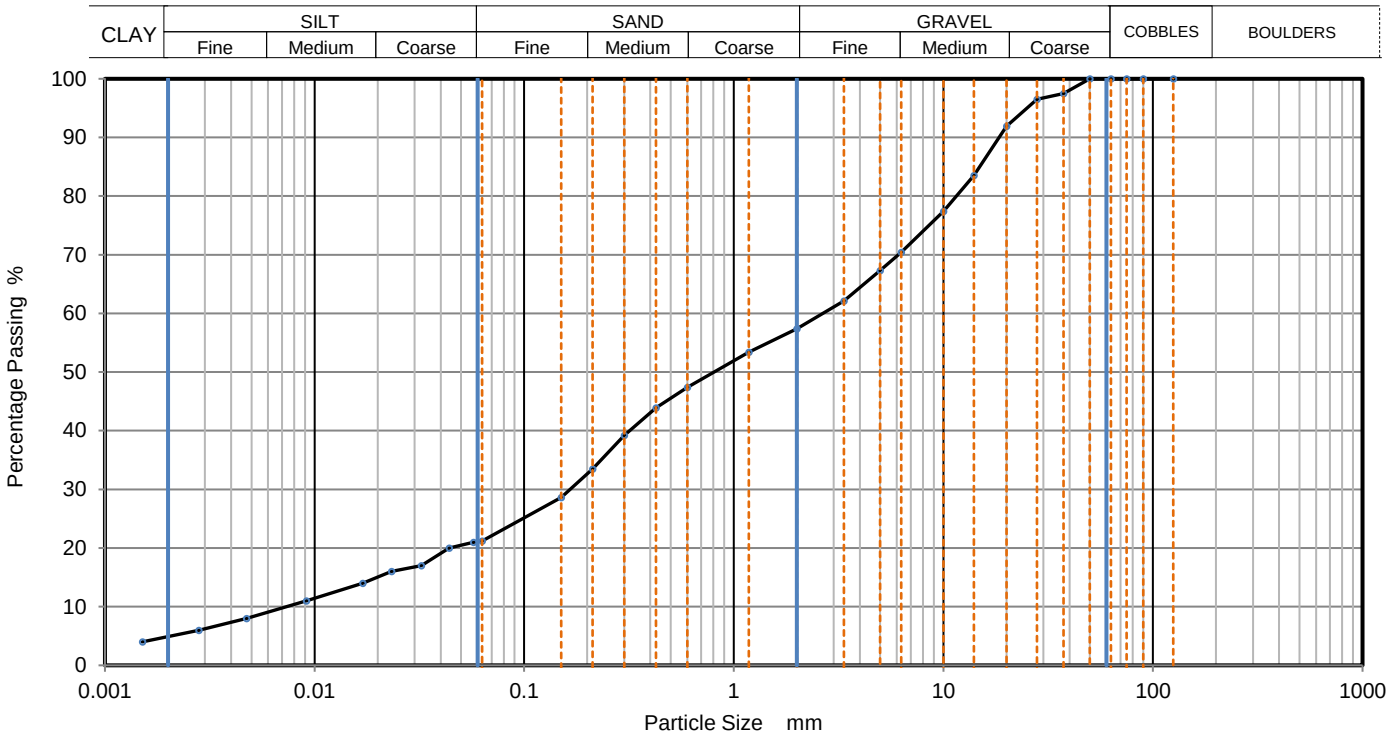
Grading Analysis		
D100	mm	
D60	mm	22.2
D30	mm	0.36
D10	mm	0.019
Uniformity Coefficient		1200
Curvature Coefficient		0.31

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-23202
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	5
Specimen Description	Brownish grey sandy gravelly silty CLAY.			Sample Depth (m) Top	1.80
				Base	2.80
Specimen Reference	3	Specimen Depth	1.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022093091



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.05740	21
90	100	0.04380	20
75	100	0.03225	17
63	100	0.02333	16
50	100	0.01698	14
37.5	98	0.00913	11
28	97	0.00474	8
20	92	0.00280	6
14	84	0.00151	4
10	77		
6.3	70		
5	67		
3.35	62		
2	57		
1.18	53		
0.6	47	Particle density	(assumed)
0.425	44	2.65	Mg/m3
0.3	39		
0.212	34		
0.15	29		
0.063	21		

Dry Mass of sample, g: 3824

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	42.6
Sand	36.1
Silt	16.8
Clay	4.5

Grading Analysis		
D100	mm	
D60	mm	2.67
D30	mm	0.166
D10	mm	0.00802
Uniformity Coefficient		330
Curvature Coefficient		1.3

Remarks

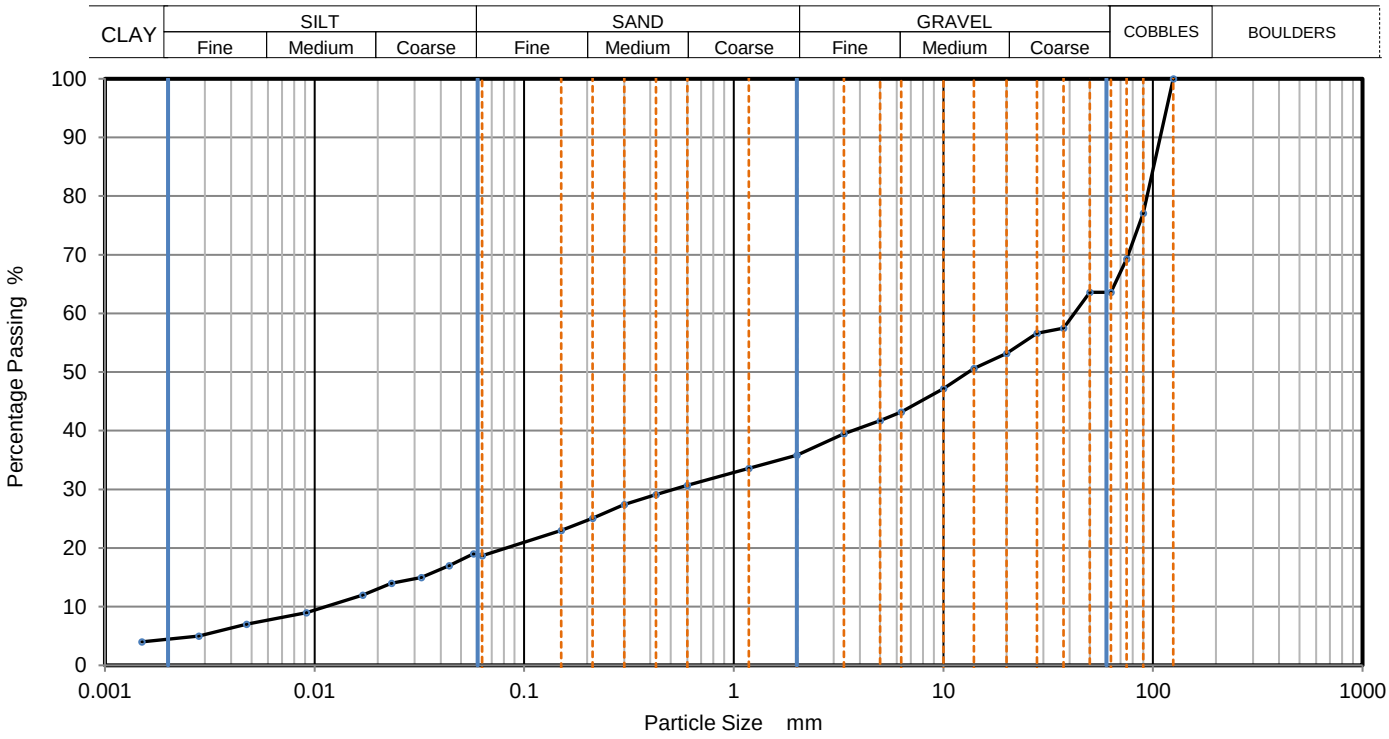
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					TP-23307
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Brownish grey gravelly clayey fine to coarse SAND with cobbles.			Sample Depth (m) Top	0.30
				Base	3.10
Specimen Reference	2	Specimen Depth	0.3 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022093092



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.05740	19
90	77	0.04380	17
75	69	0.03225	15
63	64	0.02333	14
50	64	0.01698	12
37.5	58	0.00913	9
28	57	0.00474	7
20	53	0.00280	5
14	51	0.00150	4
10	47		
6.3	43		
5	42		
3.35	40		
2	36		
1.18	34		
0.6	31	Particle density	(assumed)
0.425	29	2.65	Mg/m3
0.3	27		
0.212	25		
0.15	23		
0.063	19		

Dry Mass of sample, g: 14571

Sample Proportions	% dry mass
Cobbles	36.4
Gravel	27.8
Sand	17.1
Silt	14.5
Clay	4.2

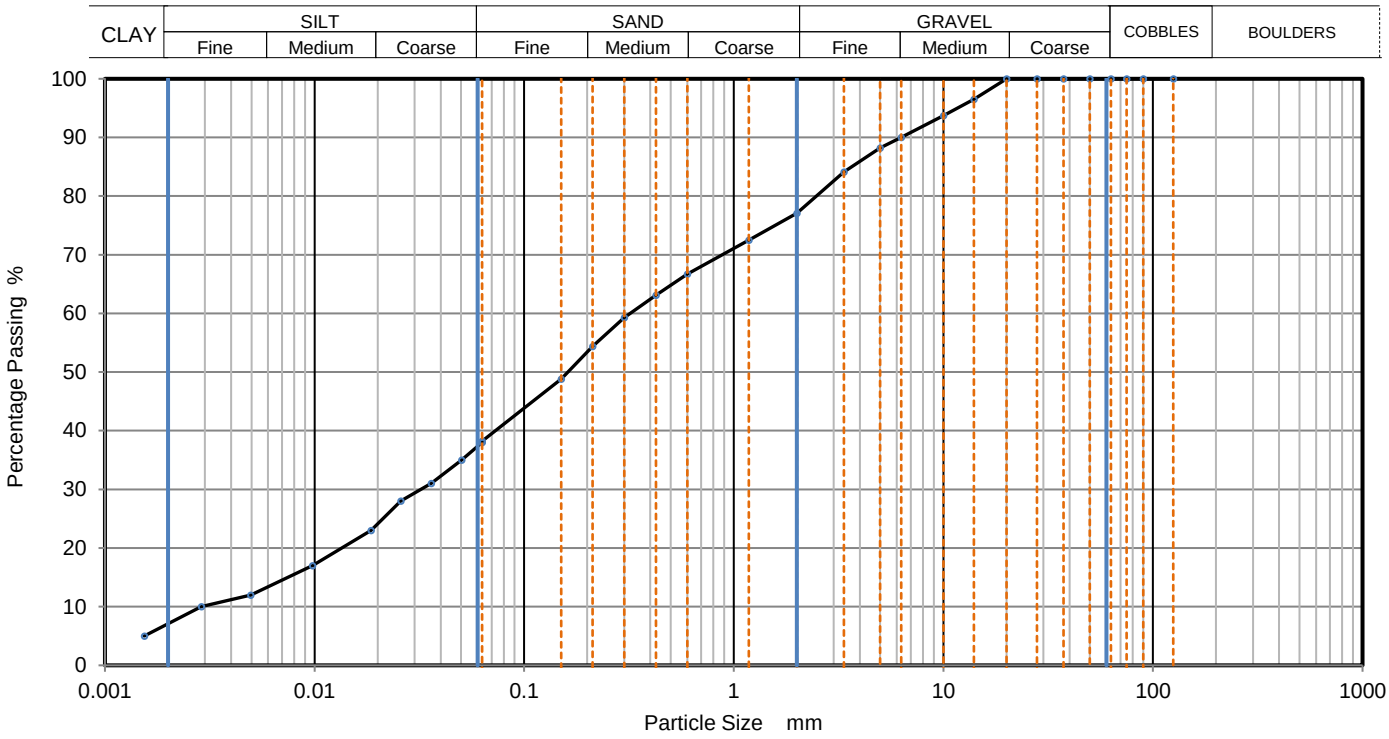
Grading Analysis		
D100	mm	125
D60	mm	42.2
D30	mm	0.514
D10	mm	0.0106
Uniformity Coefficient		4000
Curvature Coefficient		0.59

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION			Job Ref		21-1682
				Borehole/Pit No.		TP-23401
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.		1
Specimen Description	Brownish grey gravelly clayey fine to coarse SAND.			Sample Depth (m)	Top	0.30
					Base	3.00
Specimen Reference	2	Specimen Depth	0.3 m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID		Caus2022093093



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	38
90	100	0.05032	35
75	100	0.03604	31
63	100	0.02580	28
50	100	0.01857	23
37.5	100	0.00976	17
28	100	0.00496	12
20	100	0.00288	10
14	97	0.00154	5
10	94		
6.3	90		
5	88		
3.35	84		
2	77		
1.18	73		
0.6	67	Particle density	(assumed)
0.425	63	2.65	Mg/m3
0.3	59		
0.212	54		
0.15	49		
0.063	38		

Dry Mass of sample, g: 543

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	22.9
Sand	38.8
Silt	30.9
Clay	7.4

Grading Analysis		
D100	mm	
D60	mm	0.319
D30	mm	0.0319
D10	mm	0.00274
Uniformity Coefficient		120
Curvature Coefficient		1.2

Remarks

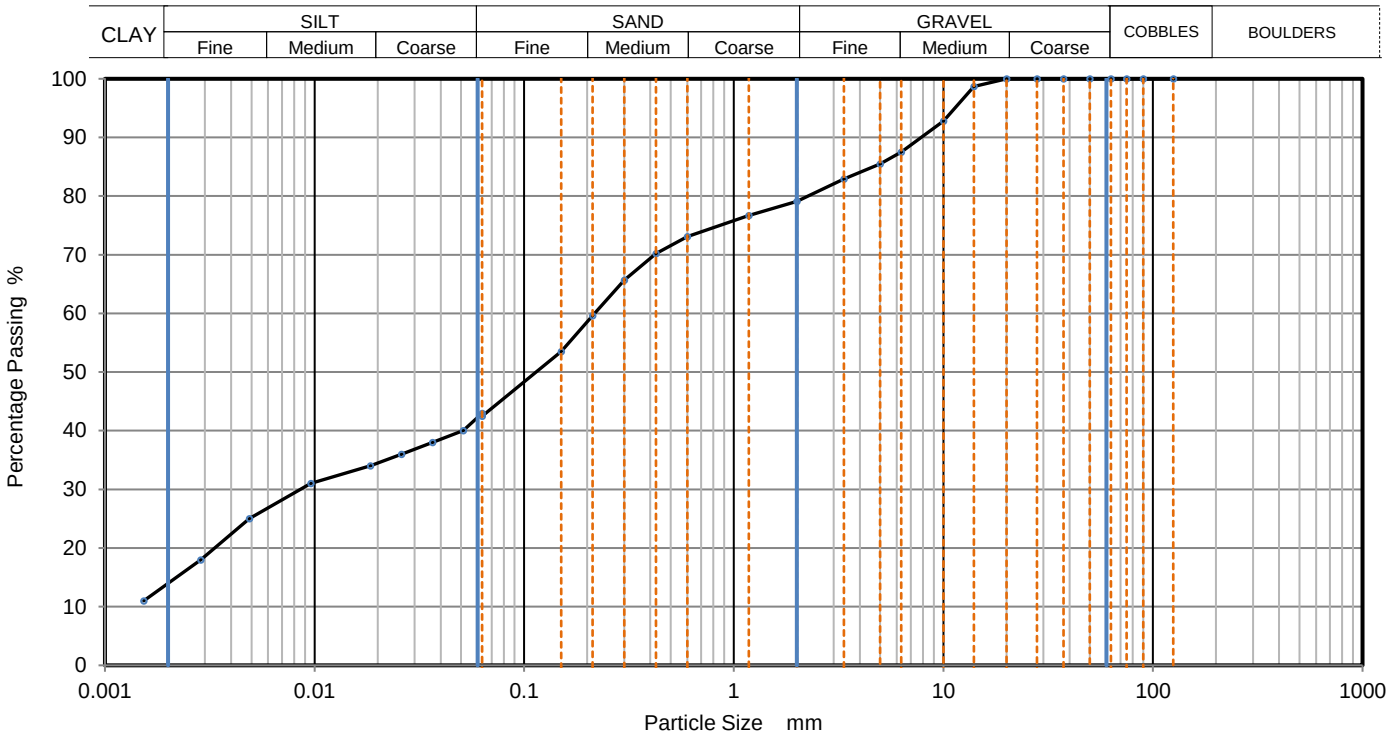
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

Job Ref					**21-1682**
Borehole/Pit No.					TP-2349
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	0.80
				Base	1.60
Specimen Reference	6	Specimen Depth	0.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220908132



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	43
90	100	0.05129	40
75	100	0.03649	38
63	100	0.02596	36
50	100	0.01846	34
37.5	100	0.00959	31
28	100	0.00488	25
20	100	0.00286	18
14	99	0.00153	11
10	93		
6.3	88		
5	86		
3.35	83		
2	79		
1.18	77		
0.6	73	Particle density	(assumed)
0.425	70	2.65	Mg/m3
0.3	66		
0.212	60		
0.15	54		
0.063	43		

Dry Mass of sample, g: 410

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	20.9
Sand	36.7
Silt	28.4
Clay	14.0

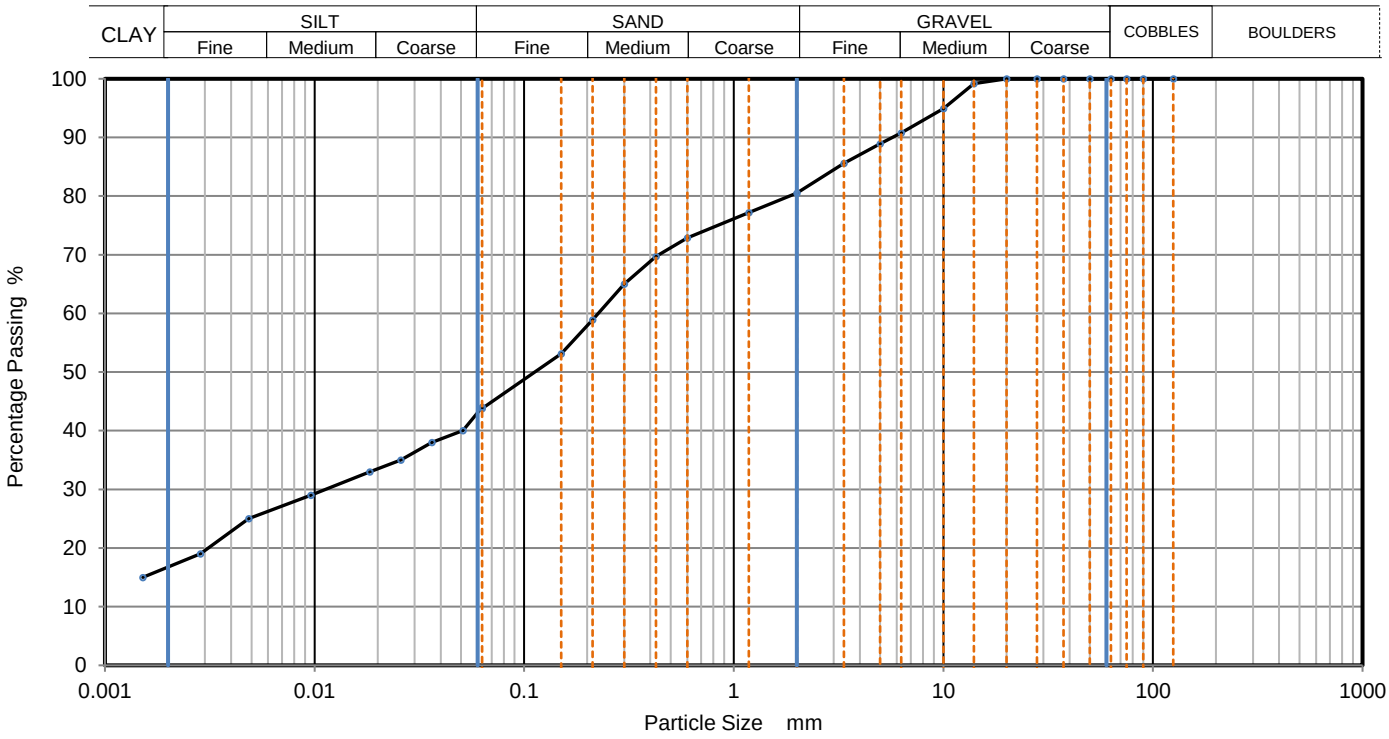
Grading Analysis		
D100	mm	
D60	mm	0.217
D30	mm	0.0084
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-2349
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		3
Specimen Description	Brown sandy slightly gravelly silty CLAY.				Sample Depth (m)	Top	1.60
						Base	2.20
Specimen Reference	7	Specimen Depth	1.6	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus20220908133



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	44
90	100	0.05097	40
75	100	0.03627	38
63	100	0.02580	35
50	100	0.01835	33
37.5	100	0.00959	29
28	100	0.00485	25
20	100	0.00285	19
14	99	0.00152	15
10	95		
6.3	91		
5	89		
3.35	86		
2	81		
1.18	77		
0.6	73	Particle density	(assumed)
0.425	70	2.65	Mg/m3
0.3	65		
0.212	59		
0.15	53		
0.063	44		

Dry Mass of sample, g: 366

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	19.5
Sand	36.7
Silt	27.4
Clay	16.4

Grading Analysis		
D100	mm	
D60	mm	0.226
D30	mm	0.0109
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

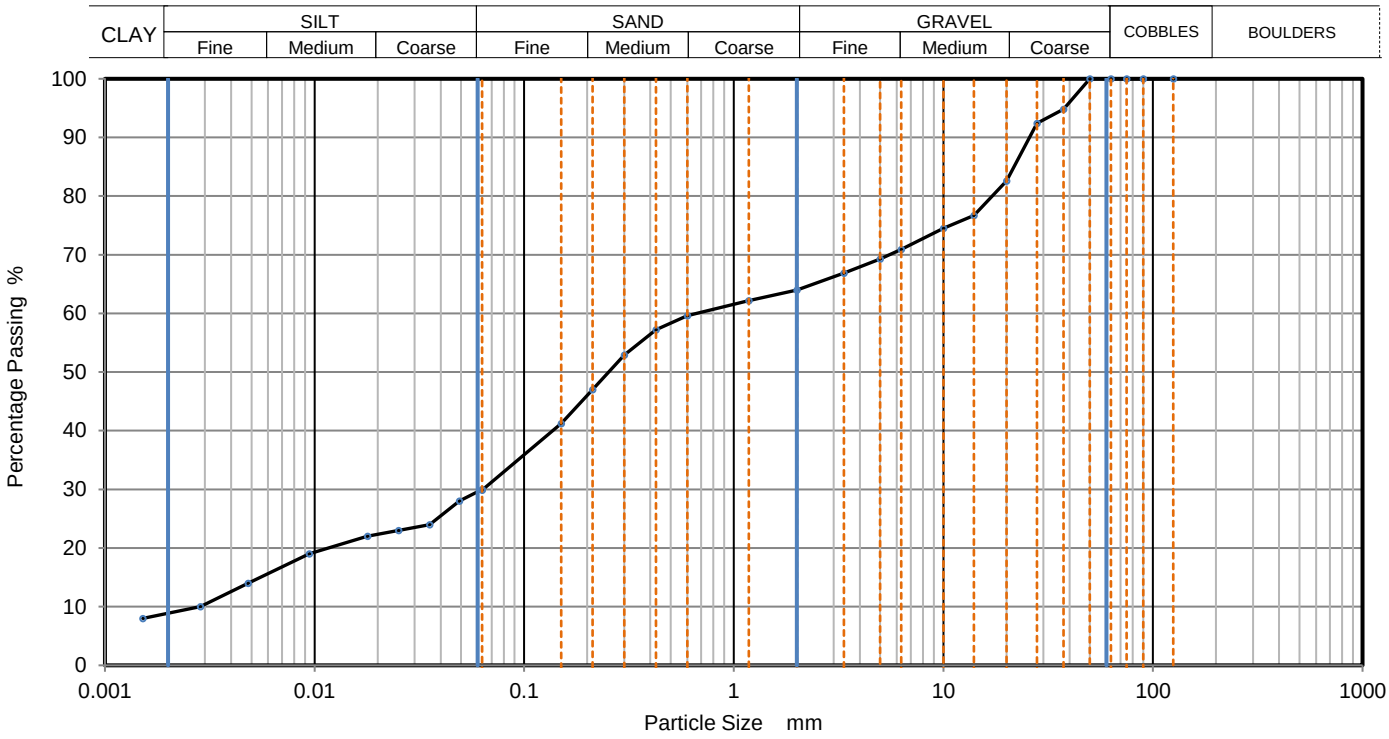
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					**21-1682**
Borehole/Pit No.					TP-2349
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	4
Specimen Description	Brown sandy gravelly silty CLAY.			Sample Depth (m) Top	2.20
				Base	2.90
Specimen Reference	6	Specimen Depth	2.2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220908134



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	30
90	100	0.04903	28
75	100	0.03536	24
63	100	0.02517	23
50	100	0.01791	22
37.5	95	0.00942	19
28	92	0.00482	14
20	83	0.00285	10
14	77	0.00152	8
10	75		
6.3	71		
5	69		
3.35	67		
2	64		
1.18	62		
0.6	60	Particle density	(assumed)
0.425	57	2.65	Mg/m3
0.3	53		
0.212	47		
0.15	41		
0.063	30		

Dry Mass of sample, g: 3373

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	36.0
Sand	34.1
Silt	21.2
Clay	8.7

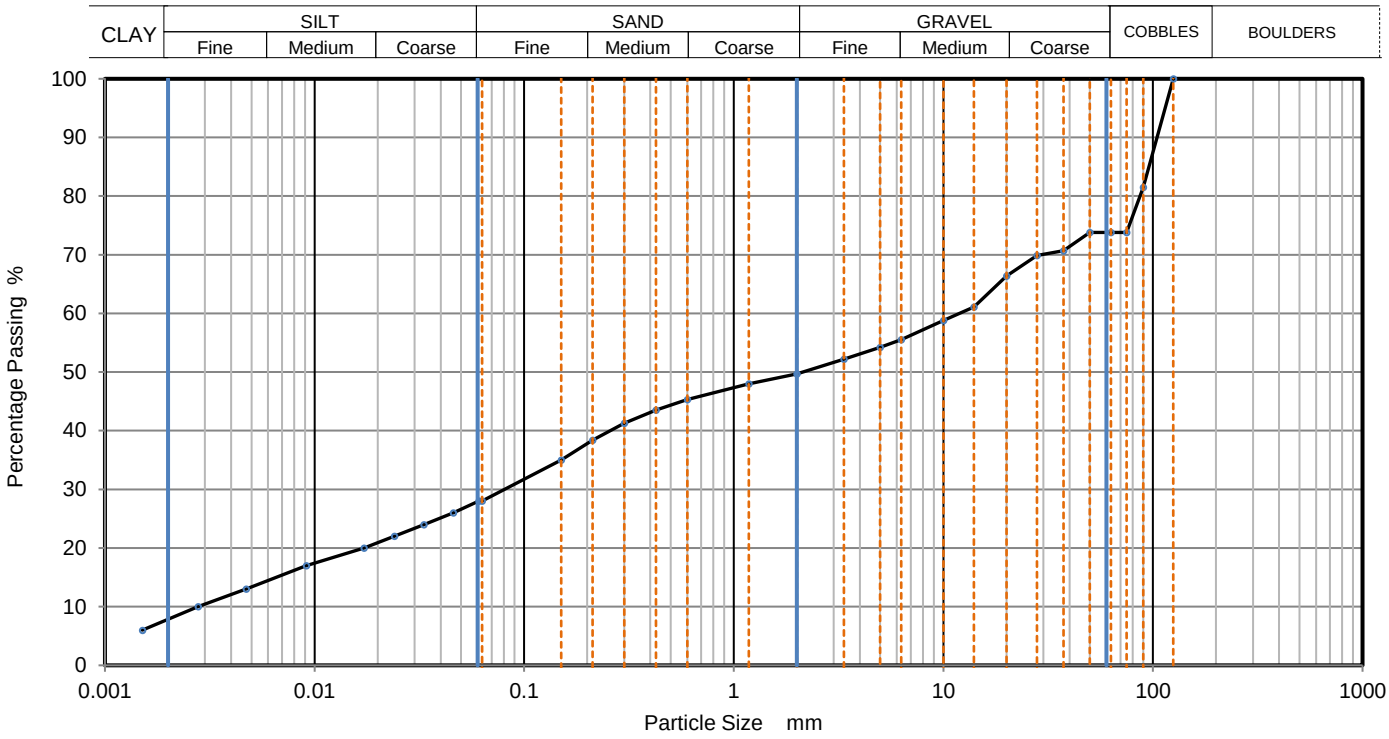
Grading Analysis		
D100	mm	
D60	mm	0.671
D30	mm	0.0633
D10	mm	0.00286
Uniformity Coefficient		230
Curvature Coefficient		2.1

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-23508
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Brownish grey sandy gravelly silty CLAY with some cobbles.			Sample Depth (m) Top	0.30
				Base	1.80
Specimen Reference	2	Specimen Depth	0.3 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022093095



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06086	28
90	82	0.04596	26
75	74	0.03324	24
63	74	0.02401	22
50	74	0.01722	20
37.5	71	0.00913	17
28	70	0.00471	13
20	66	0.00278	10
14	61	0.00151	6
10	59		
6.3	56		
5	54		
3.35	52		
2	50		
1.18	48		
0.6	45	Particle density	(assumed)
0.425	44	2.65	Mg/m3
0.3	41		
0.212	38		
0.15	35		
0.063	28		

Dry Mass of sample, g: 12600

Sample Proportions	% dry mass
Cobbles	26.2
Gravel	24.1
Sand	21.8
Silt	20.5
Clay	7.4

Grading Analysis		
D100	mm	125
D60	mm	11.9
D30	mm	0.081
D10	mm	0.00297
Uniformity Coefficient		4000
Curvature Coefficient		0.19

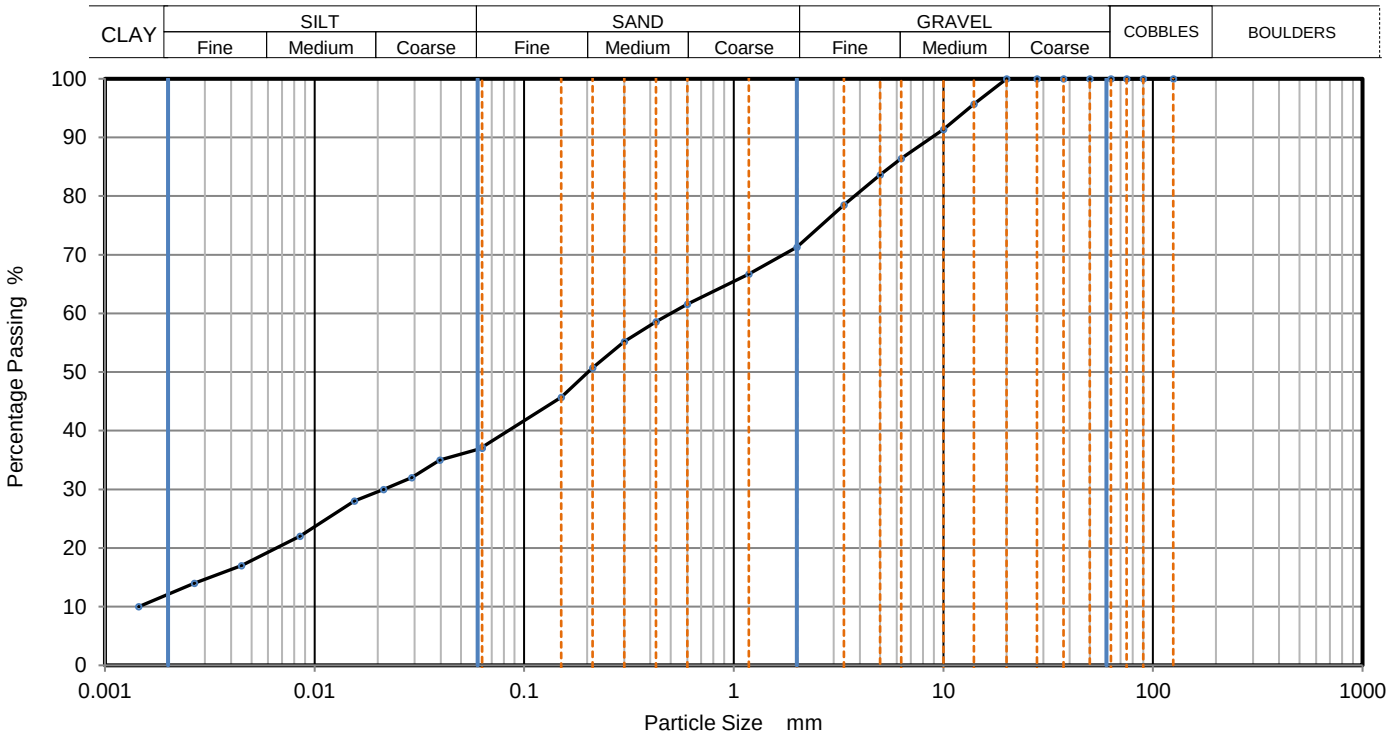
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

UKAS TESTING

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-23608
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		1
Specimen Description	Brownish grey slightly gravelly clayey fine to coarse SAND.				Sample Depth (m)	Top	0.30
						Base	3.20
Specimen Reference	3	Specimen Depth	0.3	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022093096



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	37
90	100	0.03955	35
75	100	0.02910	32
63	100	0.02135	30
50	100	0.01549	28
37.5	100	0.00852	22
28	100	0.00448	17
20	100	0.00267	14
14	96	0.00145	10
10	91		
6.3	86		
5	84		
3.35	79		
2	71		
1.18	67		
0.6	62	Particle density	(assumed)
0.425	59	2.65	Mg/m3
0.3	55		
0.212	51		
0.15	46		
0.063	37		

Dry Mass of sample, g: 554

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	28.7
Sand	34.1
Silt	25.0
Clay	12.2

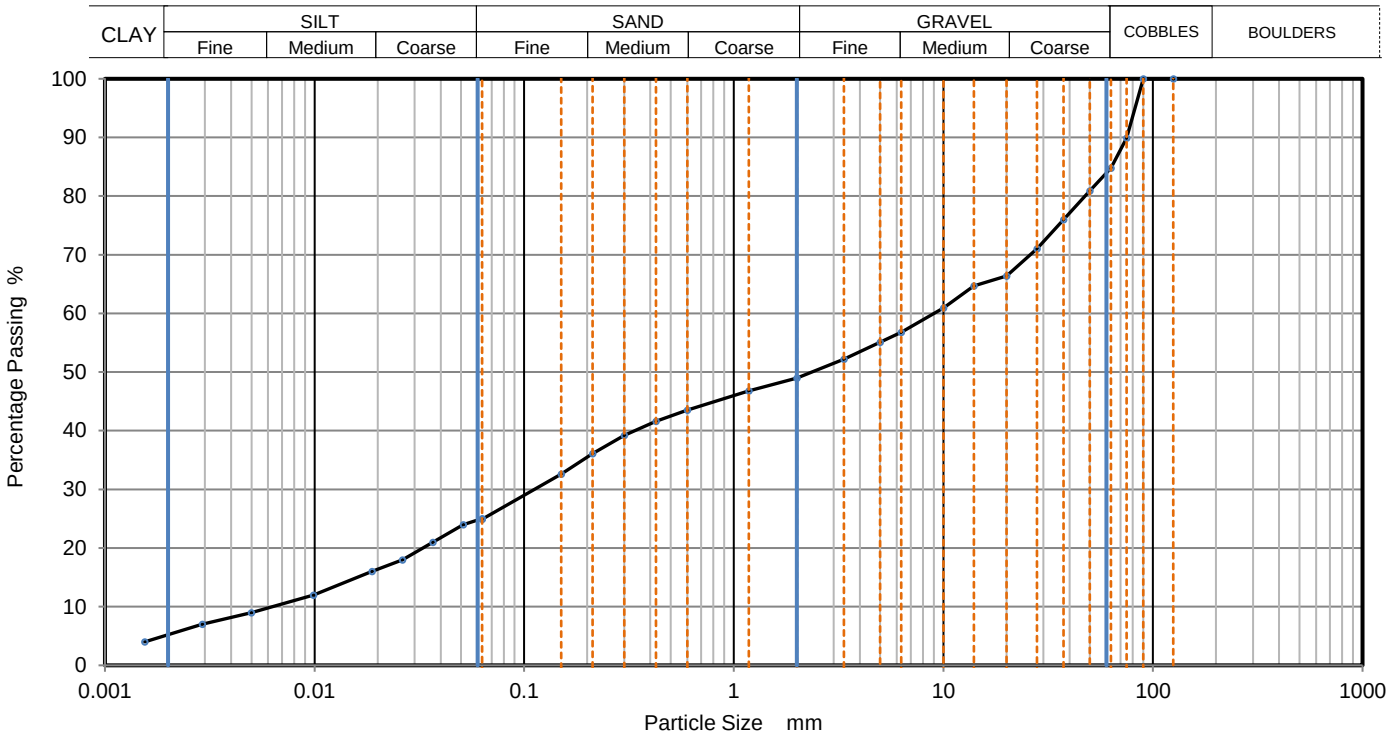
Grading Analysis		
D100	mm	
D60	mm	0.498
D30	mm	0.0223
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-23707
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		1
Specimen Description	Brownish grey sandy very gravelly silty CLAY.				Sample Depth (m)	Top	0.30
						Base	2.80
Specimen Reference	2	Specimen Depth	0.3	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022093098



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	25
90	100	0.05129	24
75	90	0.03671	21
63	85	0.02627	18
50	81	0.01879	16
37.5	76	0.00987	12
28	71	0.00499	9
20	66	0.00291	7
14	65	0.00155	4
10	61		
6.3	57		
5	55		
3.35	52		
2	49		
1.18	47		
0.6	44	Particle density	(assumed)
0.425	42	2.65	Mg/m3
0.3	39		
0.212	36		
0.15	33		
0.063	25		

Dry Mass of sample, g: 9625

Sample Proportions	% dry mass
Cobbles	15.2
Gravel	35.8
Sand	24.1
Silt	19.9
Clay	5.0

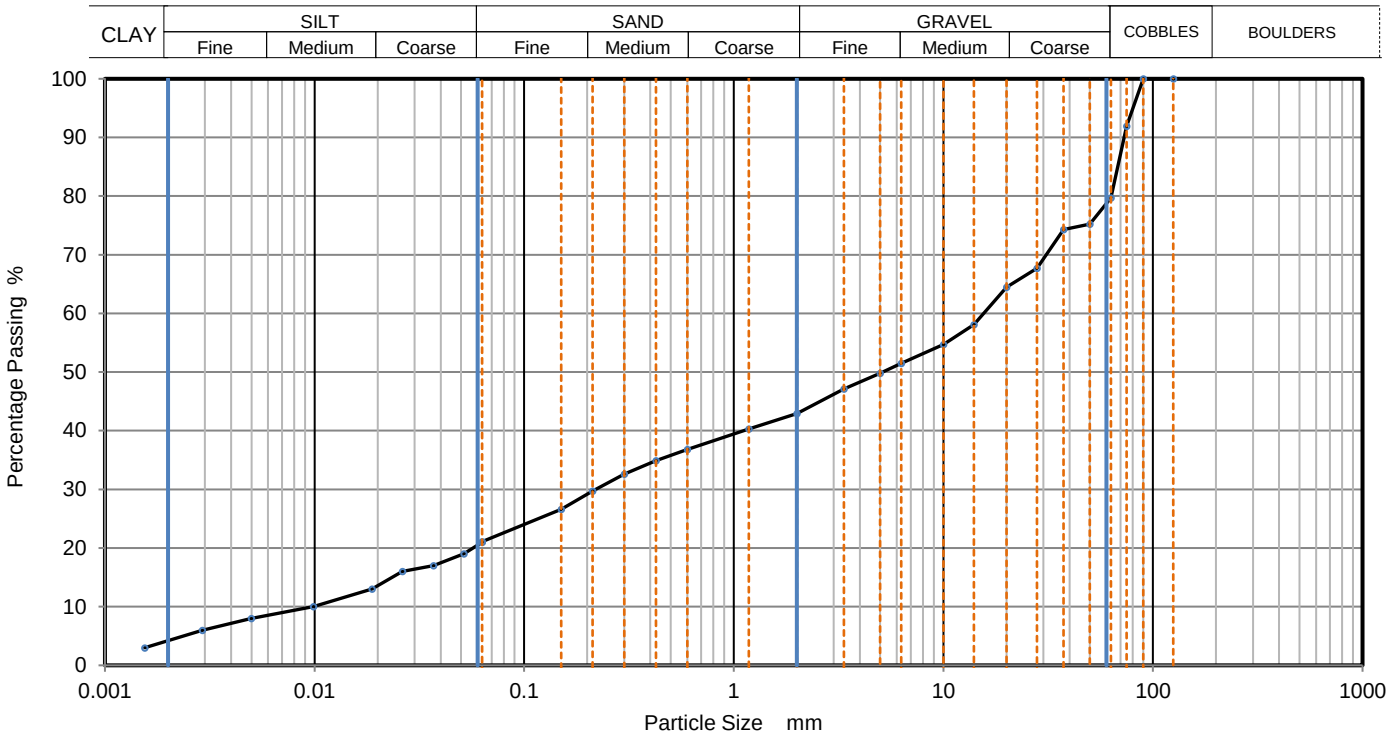
Grading Analysis		
D100	mm	
D60	mm	9.02
D30	mm	0.112
D10	mm	0.00618
Uniformity Coefficient		1500
Curvature Coefficient		0.23

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-23810
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Brownish grey sandy gravelly silty CLAY with cobbles.			Sample Depth (m) Top	0.25
				Base	3.00
Specimen Reference	3	Specimen Depth	0.25 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022093099



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	21
90	100	0.05160	19
75	92	0.03693	17
63	80	0.02627	16
50	75	0.01879	13
37.5	74	0.00987	10
28	68	0.00499	8
20	65	0.00291	6
14	58	0.00155	3
10	55		
6.3	52		
5	50		
3.35	47		
2	43		
1.18	40		
0.6	37	Particle density	(assumed)
0.425	35	2.65	Mg/m3
0.3	33		
0.212	30		
0.15	27		
0.063	21		

Dry Mass of sample, g: 10154

Sample Proportions	% dry mass
Cobbles	20.3
Gravel	36.8
Sand	21.8
Silt	16.9
Clay	4.2

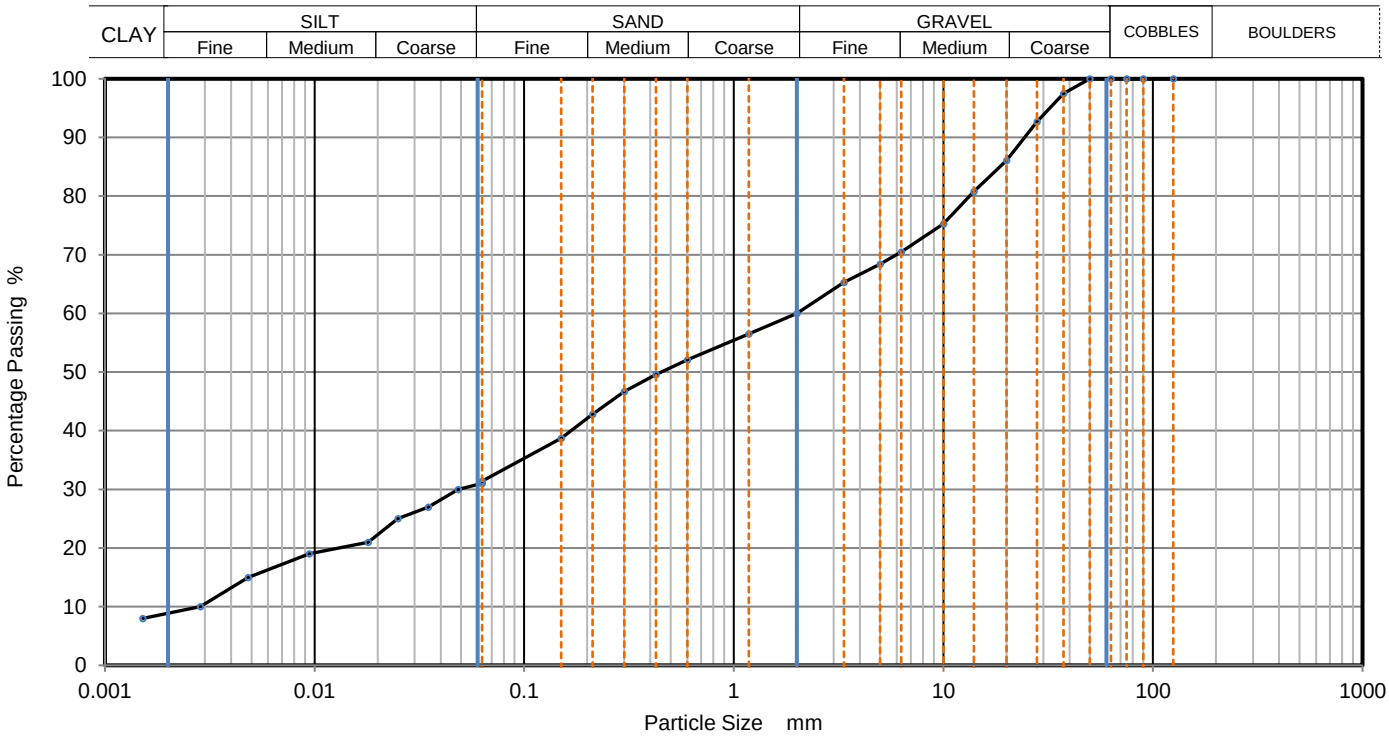
Grading Analysis		
D100	mm	
D60	mm	15.5
D30	mm	0.22
D10	mm	0.00988
Uniformity Coefficient		1600
Curvature Coefficient		0.32

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-23910
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		1
Specimen Description	Brownish grey sandy gravelly silty CLAY.				Sample Depth (m)	Top	0.25
						Base	3.10
Specimen Reference	2	Specimen Depth	0.25	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus20220930100



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	31
90	100	0.04837	30
75	100	0.03490	27
63	100	0.02501	25
50	100	0.01802	21
37.5	98	0.00942	19
28	93	0.00482	15
20	86	0.00285	10
14	81	0.00152	8
10	75		
6.3	71		
5	68		
3.35	65		
2	60		
1.18	57		
0.6	52	Particle density	(assumed)
0.425	50	2.65	Mg/m3
0.3	47		
0.212	43		
0.15	39		
0.063	31		

Dry Mass of sample, g: 4424

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	40.0
Sand	28.5
Silt	22.7
Clay	8.8

Grading Analysis		
D100	mm	
D60	mm	2.01
D30	mm	0.0471
D10	mm	0.00278
Uniformity Coefficient		720
Curvature Coefficient		0.4

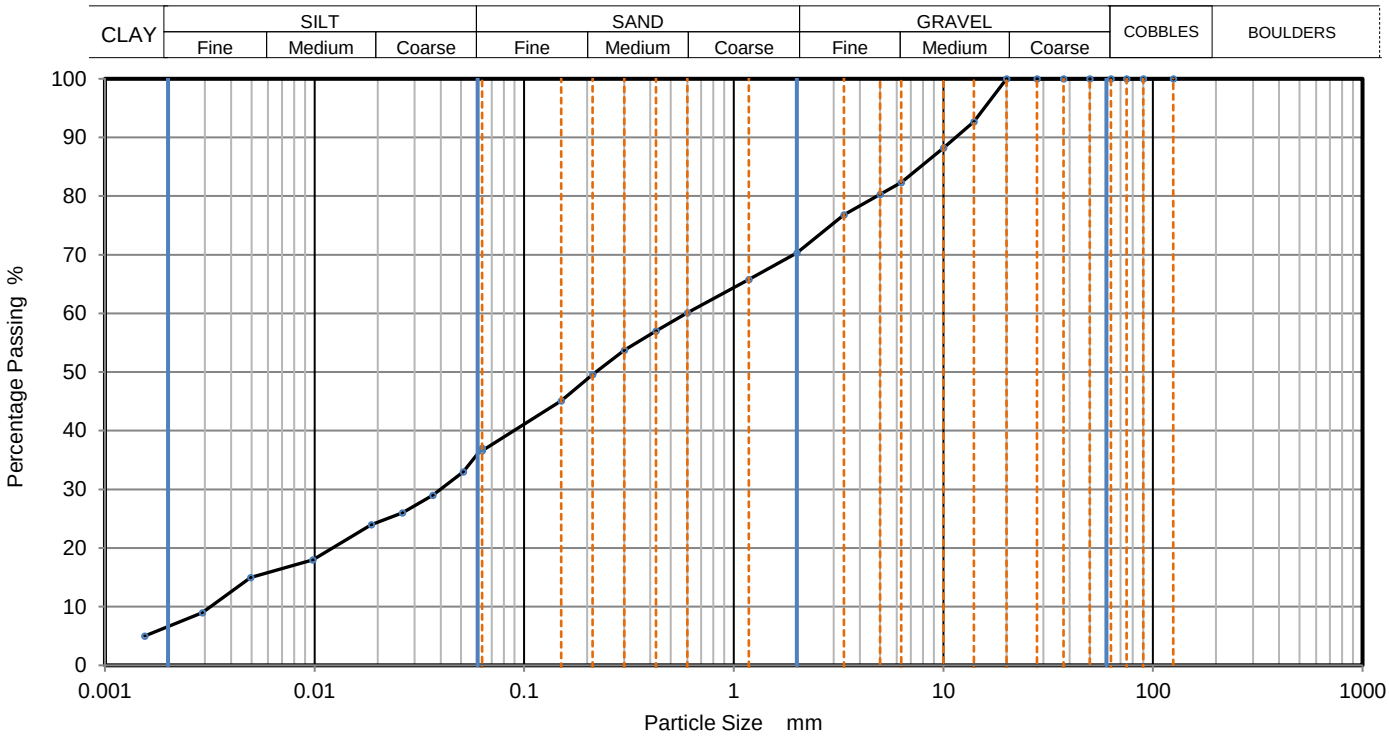
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

UKAS TESTING

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-24008
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Brownish grey sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	0.80
				Base	3.20
Specimen Reference	3	Specimen Depth	0.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220930101



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	37
90	100	0.05129	33
75	100	0.03671	29
63	100	0.02627	26
50	100	0.01868	24
37.5	100	0.00981	18
28	100	0.00496	15
20	100	0.00291	9
14	93	0.00155	5
10	88		
6.3	82		
5	80		
3.35	77		
2	70		
1.18	66		
0.6	60	Particle density	(assumed)
0.425	57	2.65	Mg/m3
0.3	54		
0.212	50		
0.15	45		
0.063	37		

Dry Mass of sample, g: 566

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	29.7
Sand	33.7
Silt	29.6
Clay	7.0

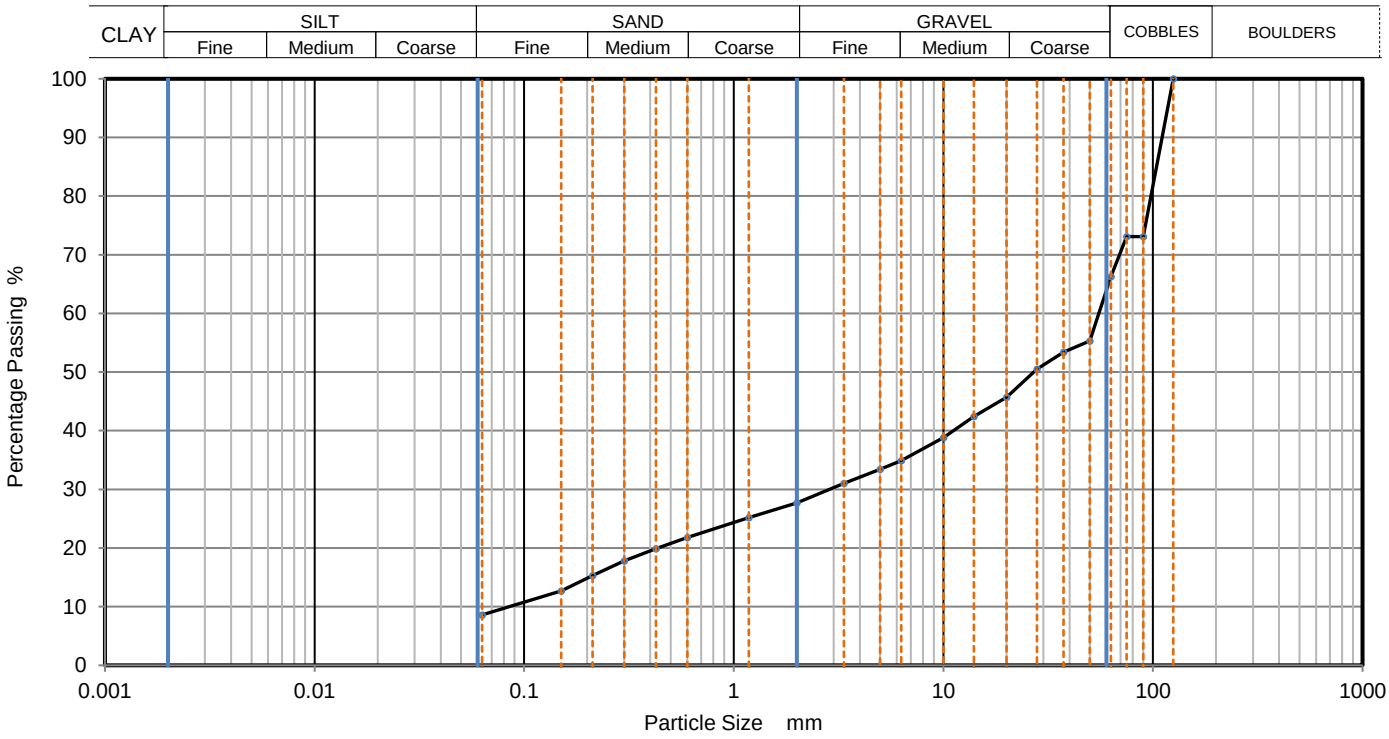
Grading Analysis		
D100	mm	
D60	mm	0.596
D30	mm	0.0392
D10	mm	0.00316
Uniformity Coefficient		190
Curvature Coefficient		0.82

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION			Job Ref		21-1682
				Borehole/Pit No.		TP-24110
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.		3
Specimen Description	Brownish grey slightly sandy subangular fine to coarse GRAVEL with cobbles.			Sample Depth (m)	Top	0.60
					Base	2.00
Specimen Reference	2	Specimen Depth	0.6 m	Sample Type		B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID		Caus20220930103



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	73		
75	73		
63	66		
50	55		
37.5	53		
28	51		
20	46		
14	42		
10	39		
6.3	35		
5	33		
3.35	31		
2	28		
1.18	25		
0.6	22		
0.425	20		
0.3	18		
0.212	15		
0.15	13		
0.063	9		

Dry Mass of sample, g	14318

Sample Proportions	% dry mass
Cobbles	33.7
Gravel	38.6
Sand	19.1
Fines <0.063mm	9.0

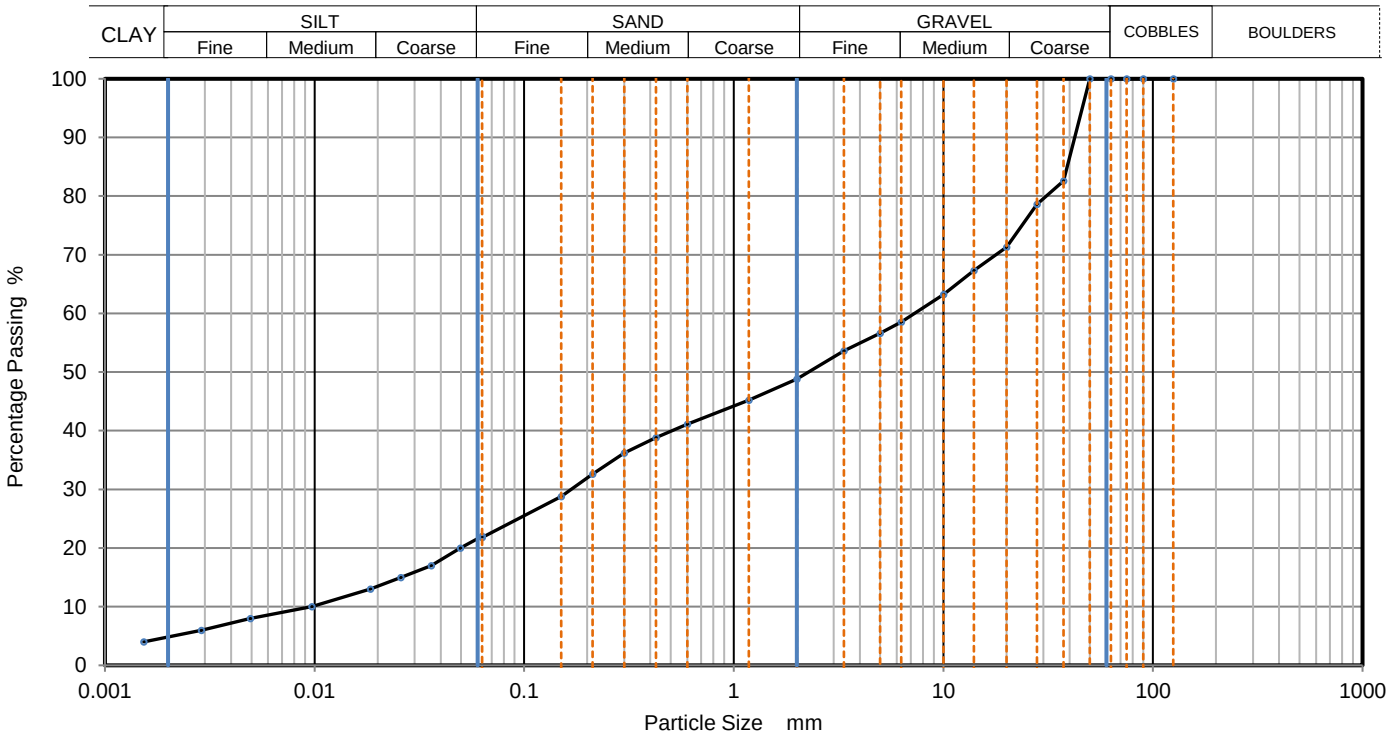
Grading Analysis		
D100	mm	125
D60	mm	55.2
D30	mm	2.88
D10	mm	0.0842
Uniformity Coefficient		660
Curvature Coefficient		1.8

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-24209
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		1
Specimen Description	Brownish grey sandy gravelly silty CLAY.				Sample Depth (m)	Top	0.30
						Base	3.00
Specimen Reference	3	Specimen Depth	0.3	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus20220930104



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	22
90	100	0.04969	20
75	100	0.03604	17
63	100	0.02580	15
50	100	0.01846	13
37.5	83	0.00970	10
28	79	0.00493	8
20	71	0.00288	6
14	67	0.00153	4
10	63		
6.3	59		
5	57		
3.35	54		
2	49		
1.18	45		
0.6	41	Particle density	(assumed)
0.425	39	2.65	Mg/m3
0.3	36		
0.212	33		
0.15	29		
0.063	22		

Dry Mass of sample, g: 2835

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	51.2
Sand	27.0
Silt	16.7
Clay	5.1

Grading Analysis		
D100	mm	
D60	mm	7.3
D30	mm	0.167
D10	mm	0.00861
Uniformity Coefficient		850
Curvature Coefficient		0.44

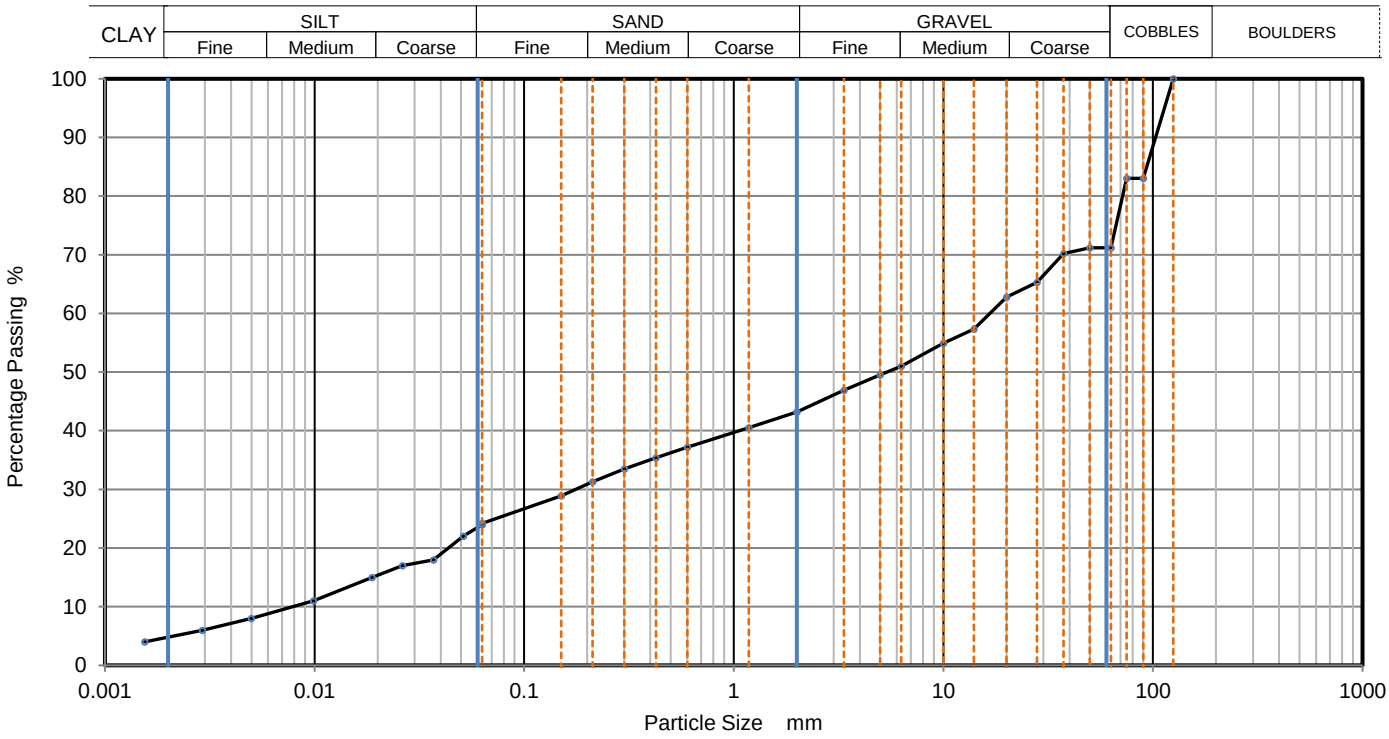
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

UKAS TESTING

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-25504
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Brownish grey sandy gravelly silty CLAY with cobbles.			Sample Depth (m) Top	1.30
				Base	3.30
Specimen Reference	2	Specimen Depth	1.3 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220930107



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	24
90	83	0.05129	22
75	83	0.03693	18
63	71	0.02627	17
50	71	0.01879	15
37.5	70	0.00987	11
28	65	0.00499	8
20	63	0.00291	6
14	57	0.00155	4
10	55		
6.3	51		
5	50		
3.35	47		
2	43		
1.18	41		
0.6	37	Particle density	(assumed)
0.425	35	2.65	Mg/m3
0.3	34		
0.212	31		
0.15	29		
0.063	24		

Dry Mass of sample, g: 8840

Sample Proportions	% dry mass
Cobbles	28.8
Gravel	28.0
Sand	19.0
Silt	19.6
Clay	4.6

Grading Analysis		
D100	mm	125
D60	mm	16.7
D30	mm	0.176
D10	mm	0.00768
Uniformity Coefficient		2200
Curvature Coefficient		0.24

Remarks

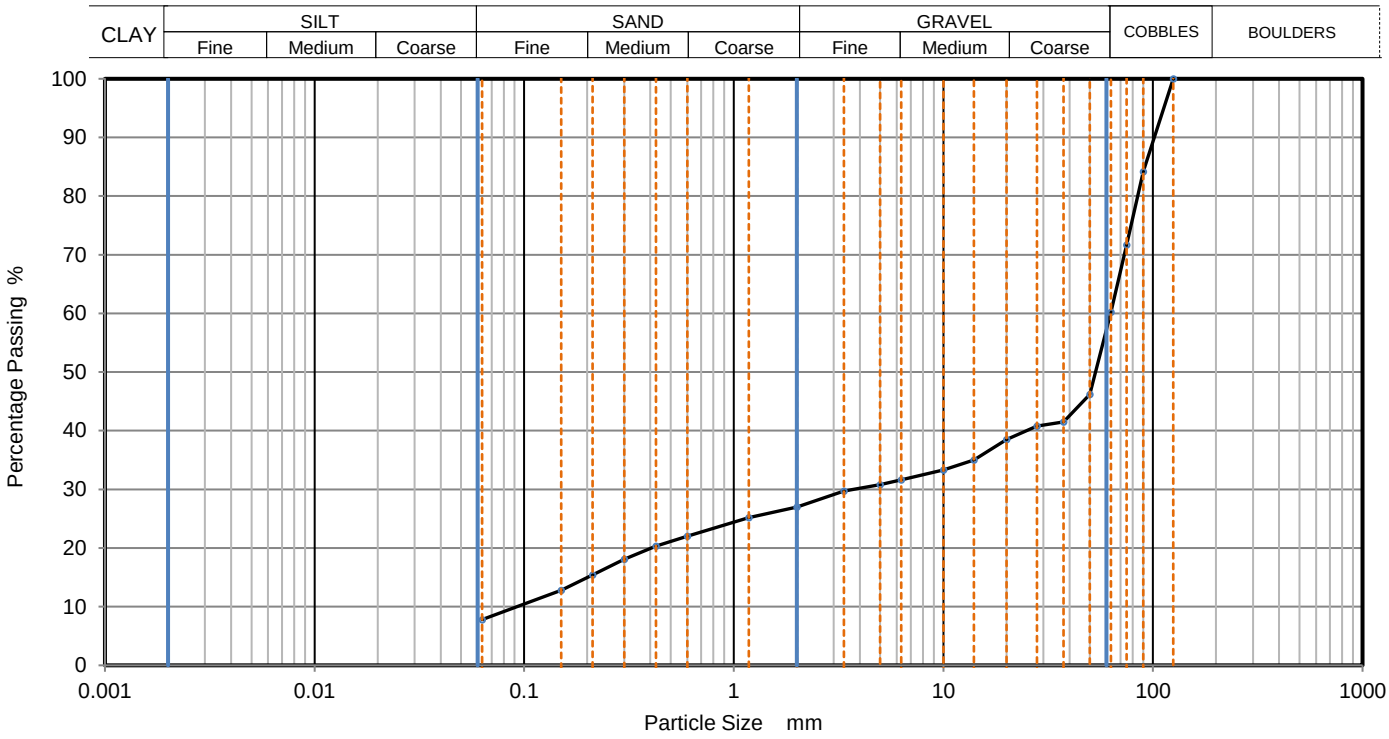
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					TP-26512
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Brownish grey slightly sandy slightly clayey subangular fine to coarse GRAVEL with cobbles.			Sample Depth (m) Top	0.20
				Base	0.60
Specimen Reference	2	Specimen Depth	0.2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus20220930108



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	84		
75	72		
63	60		
50	46		
37.5	42		
28	41		
20	39		
14	35		
10	33		
6.3	32		
5	31		
3.35	30		
2	27		
1.18	25		
0.6	22		
0.425	20		
0.3	18		
0.212	15		
0.15	13		
0.063	8		

Dry Mass of sample, g: 7090

Sample Proportions	% dry mass
Cobbles	39.8
Gravel	33.2
Sand	19.3
Fines <0.063mm	8.0

Grading Analysis		
D100	mm	125
D60	mm	62.8
D30	mm	3.73
D10	mm	0.0927
Uniformity Coefficient		680
Curvature Coefficient		2.4

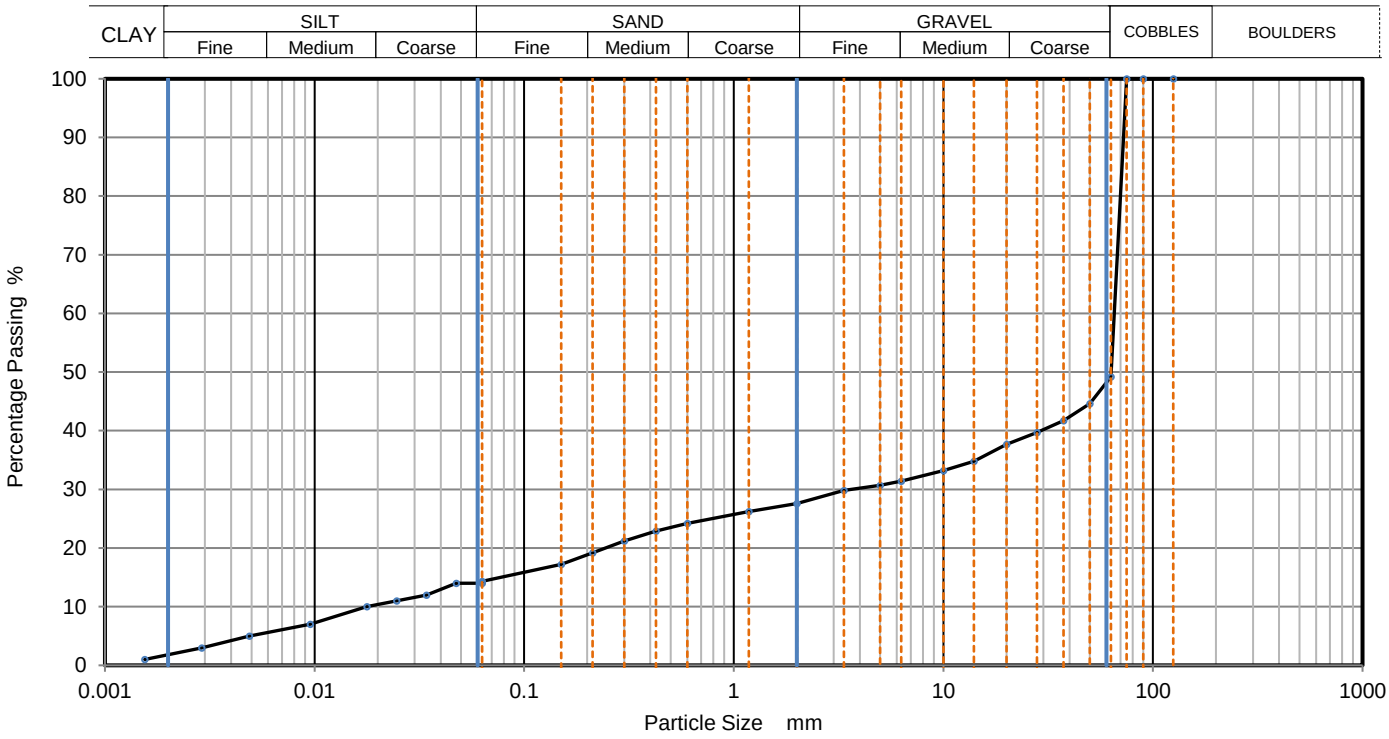
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					**21-1682**
Borehole/Pit No.					TP-26702
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Brownish grey sandy gravelly silty CLAY with cobbles.			Sample Depth (m) Top	0.30
				Base	0.60
Specimen Reference	2	Specimen Depth	0.3 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220930109



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	14
90	100	0.04736	14
75	100	0.03420	12
63	49	0.02468	11
50	45	0.01780	10
37.5	42	0.00953	7
28	40	0.00488	5
20	38	0.00290	3
14	35	0.00155	1
10	33		
6.3	31		
5	31		
3.35	30		
2	28		
1.18	26		
0.6	24	Particle density	(assumed)
0.425	23	2.65	Mg/m3
0.3	21		
0.212	19		
0.15	17		
0.063	14		

Dry Mass of sample, g: 5813

Sample Proportions	% dry mass
Cobbles	50.8
Gravel	21.5
Sand	13.4
Silt	12.3
Clay	2.0

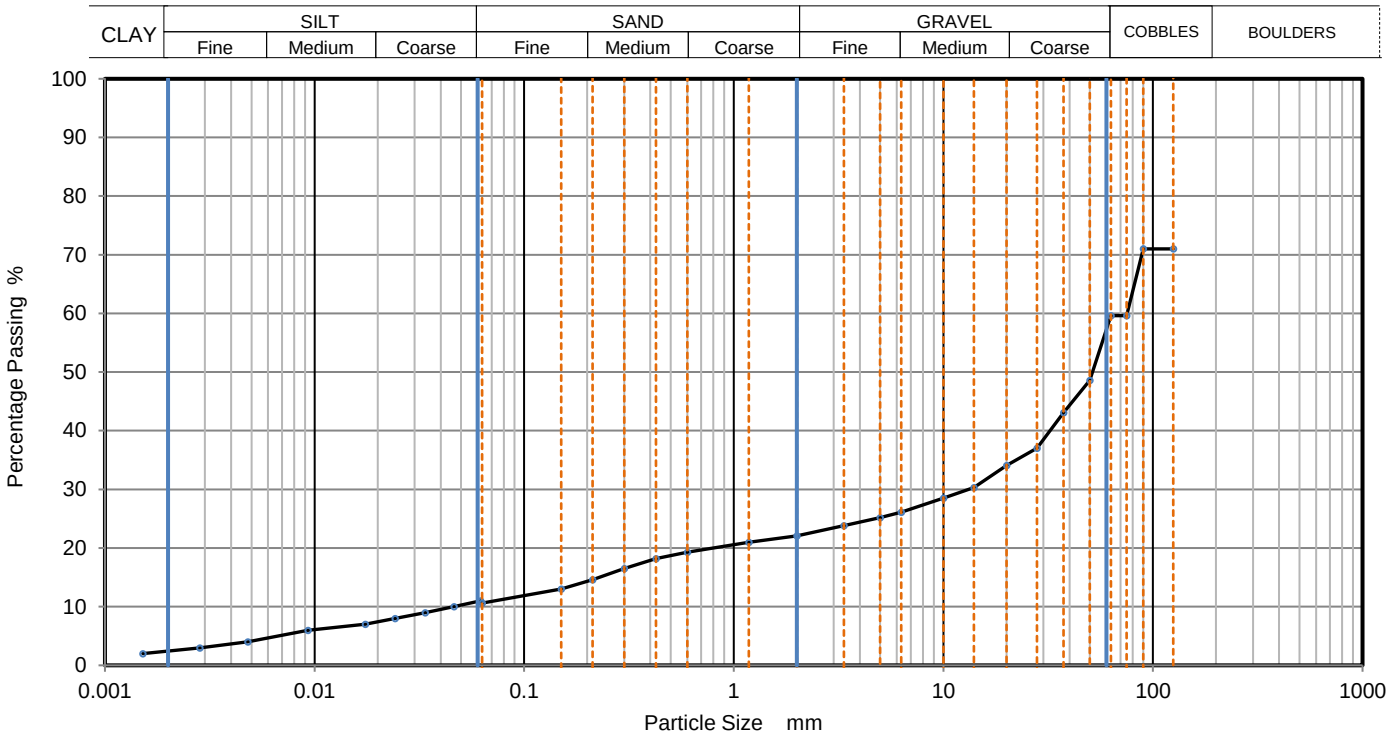
Grading Analysis		
D100	mm	
D60	mm	65.4
D30	mm	3.71
D10	mm	0.0192
Uniformity Coefficient		3400
Curvature Coefficient		11

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION			Job Ref		21-1682
				Borehole/Pit No.		TP-26785
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.		1
Specimen Description	Brownish grey sandy gravelly silty CLAY with cobbles.			Sample Depth (m)	Top	0.30
					Base	1.00
Specimen Reference	2	Specimen Depth	0.3 m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID		Caus20220930110



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	71	0.06183	11
90	71	0.04632	10
75	60	0.03373	9
63	60	0.02418	8
50	49	0.01745	7
37.5	43	0.00931	6
28	37	0.00480	4
20	34	0.00283	3
14	30	0.00152	2
10	29		
6.3	26		
5	25		
3.35	24		
2	22		
1.18	21		
0.6	19	Particle density	(assumed)
0.425	18	2.65	Mg/m3
0.3	17		
0.212	15		
0.15	13		
0.063	11		

Dry Mass of sample, g: 8205

Sample Proportions	% dry mass
Cobbles	40.4
Gravel	37.5
Sand	11.5
Silt	8.0
Clay	2.6

Grading Analysis		
D100	mm	
D60	mm	75.5
D30	mm	13.2
D10	mm	0.043
Uniformity Coefficient		1800
Curvature Coefficient		54

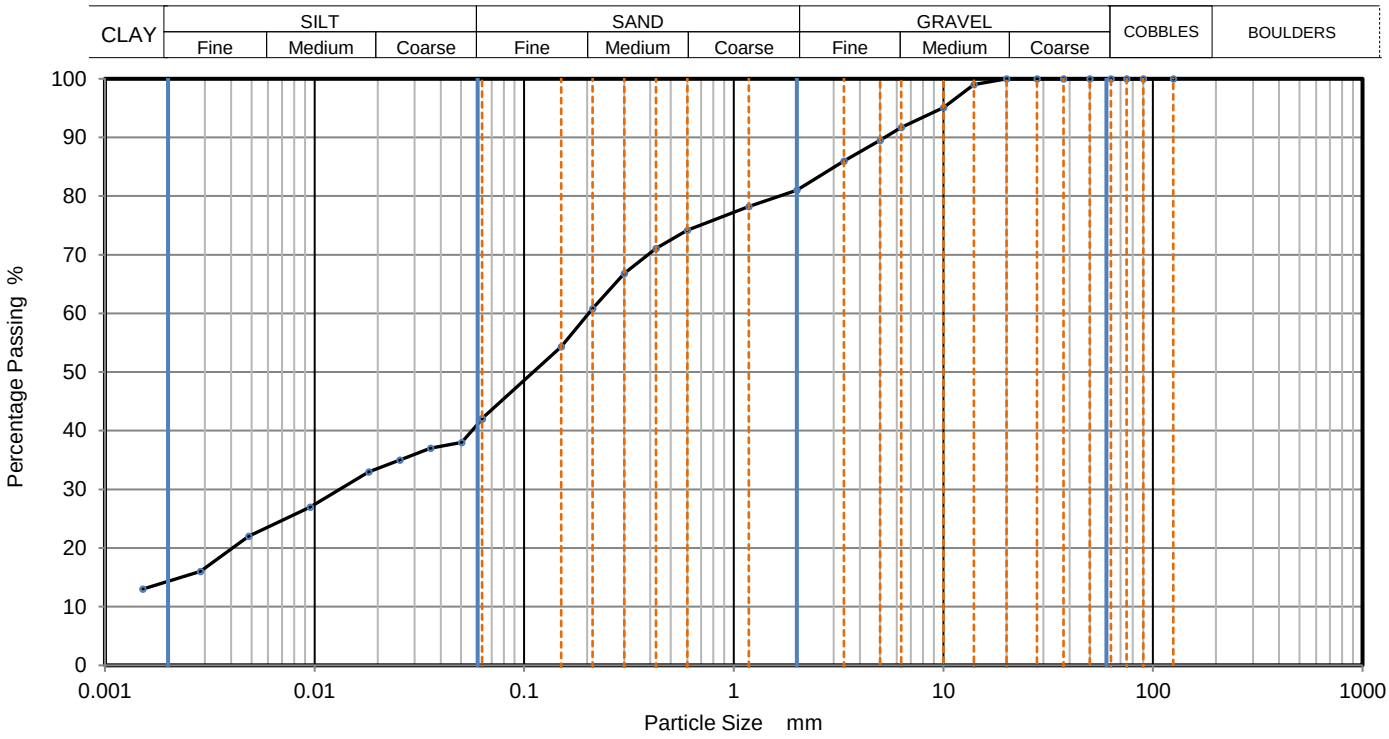
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					**21-1682**
Borehole/Pit No.					TP-2701
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				
Sample No.					1
Specimen Description	Brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	0.20
				Base	2.00
Specimen Reference	7	Specimen Depth	0.2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220908135



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	42
90	100	0.05033	38
75	100	0.03582	37
63	100	0.02549	35
50	100	0.01813	33
37.5	100	0.00953	27
28	100	0.00485	22
20	100	0.00285	16
14	99	0.00152	13
10	95		
6.3	92		
5	90		
3.35	86		
2	81		
1.18	78		
0.6	74	Particle density	(assumed)
0.425	71	2.65	Mg/m3
0.3	67		
0.212	61		
0.15	54		
0.063	42		

Dry Mass of sample, g: 455

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	19.0
Sand	39.0
Silt	27.6
Clay	14.4

Grading Analysis		
D100	mm	
D60	mm	0.203
D30	mm	0.0128
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

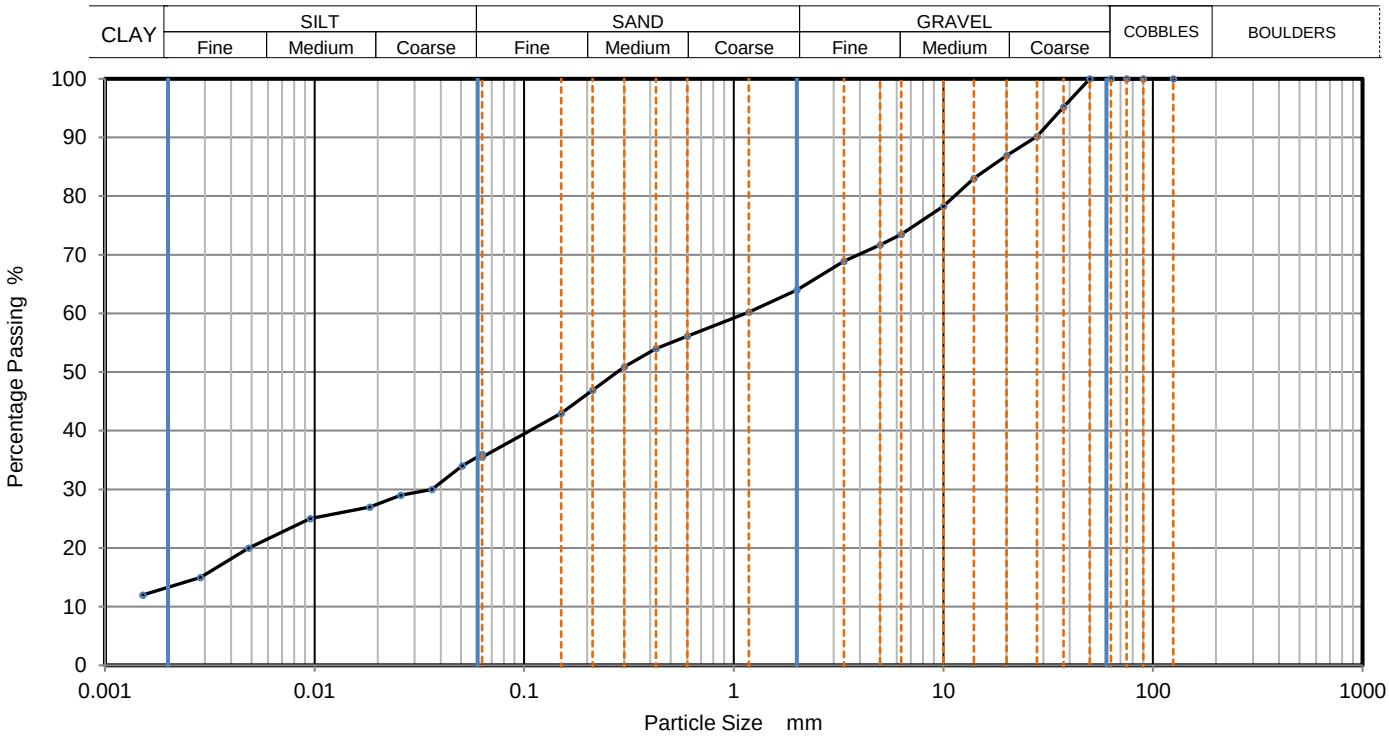
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					TP-2701
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brown sandy gravelly silty CLAY.			Sample Depth (m) Top	2.00
				Base	3.50
Specimen Reference	7	Specimen Depth	2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220908136



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	36
90	100	0.05065	34
75	100	0.03627	30
63	100	0.02580	29
50	100	0.01835	27
37.5	95	0.00953	25
28	90	0.00485	20
20	87	0.00285	15
14	83	0.00152	12
10	78		
6.3	74		
5	72		
3.35	69		
2	64		
1.18	60		
0.6	56	Particle density	(assumed)
0.425	54	2.65	Mg/m3
0.3	51		
0.212	47		
0.15	43		
0.063	36		

Dry Mass of sample, g: 3761

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	36.0
Sand	28.5
Silt	22.2
Clay	13.3

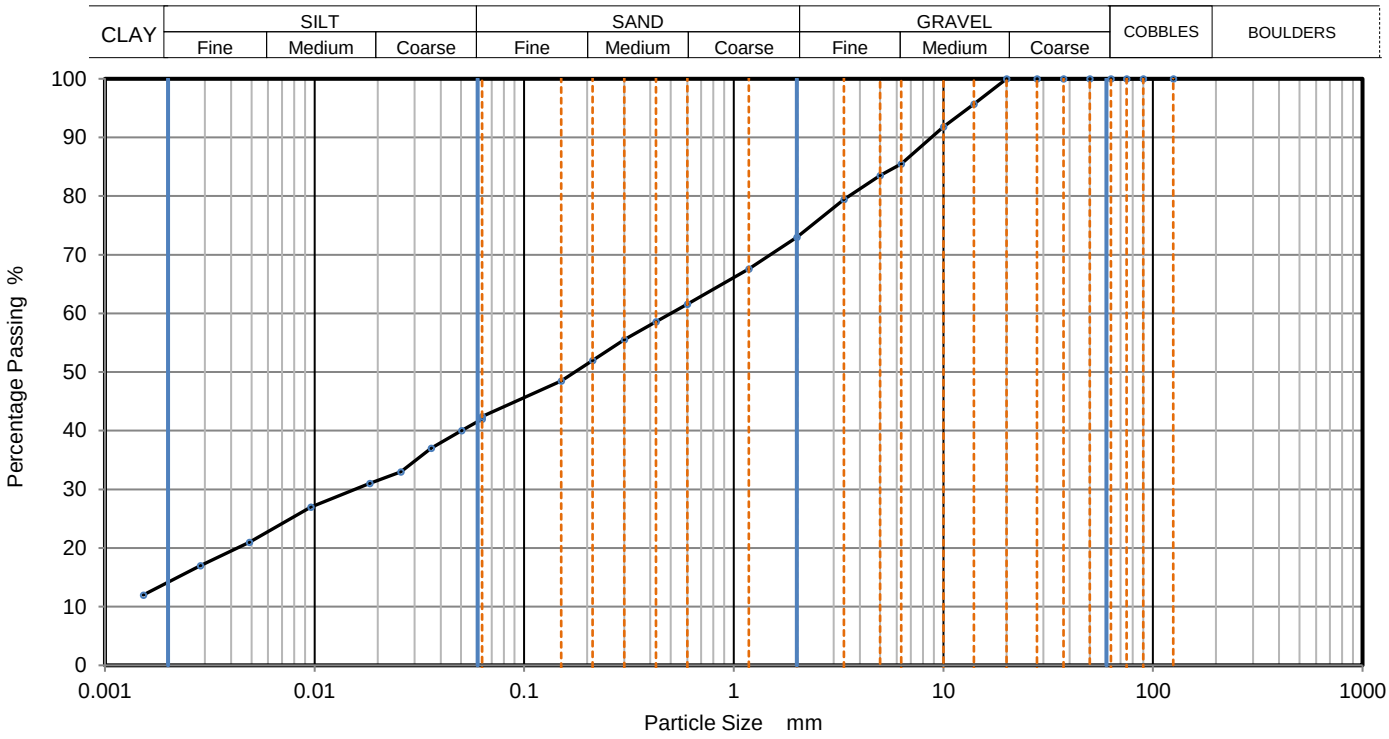
Grading Analysis		
D100	mm	
D60	mm	1.13
D30	mm	0.0333
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION			Job Ref		21-1682
				Borehole/Pit No.		TP-27781
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.		3
Specimen Description	Brownish grey sandy slightly gravelly silty CLAY.			Sample Depth (m)	Top	0.90
					Base	2.80
Specimen Reference	3	Specimen Depth	0.9 m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID		Caus20220930111



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	42
90	100	0.05033	40
75	100	0.03604	37
63	100	0.02580	33
50	100	0.01835	31
37.5	100	0.00959	27
28	100	0.00488	21
20	100	0.00285	17
14	96	0.00152	12
10	92		
6.3	86		
5	84		
3.35	79		
2	73		
1.18	68		
0.6	62	Particle density	(assumed)
0.425	59	2.65	Mg/m3
0.3	56		
0.212	52		
0.15	49		
0.063	42		

Dry Mass of sample, g: 515

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	27.0
Sand	30.5
Silt	28.4
Clay	14.1

Grading Analysis		
D100	mm	
D60	mm	0.499
D30	mm	0.0159
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

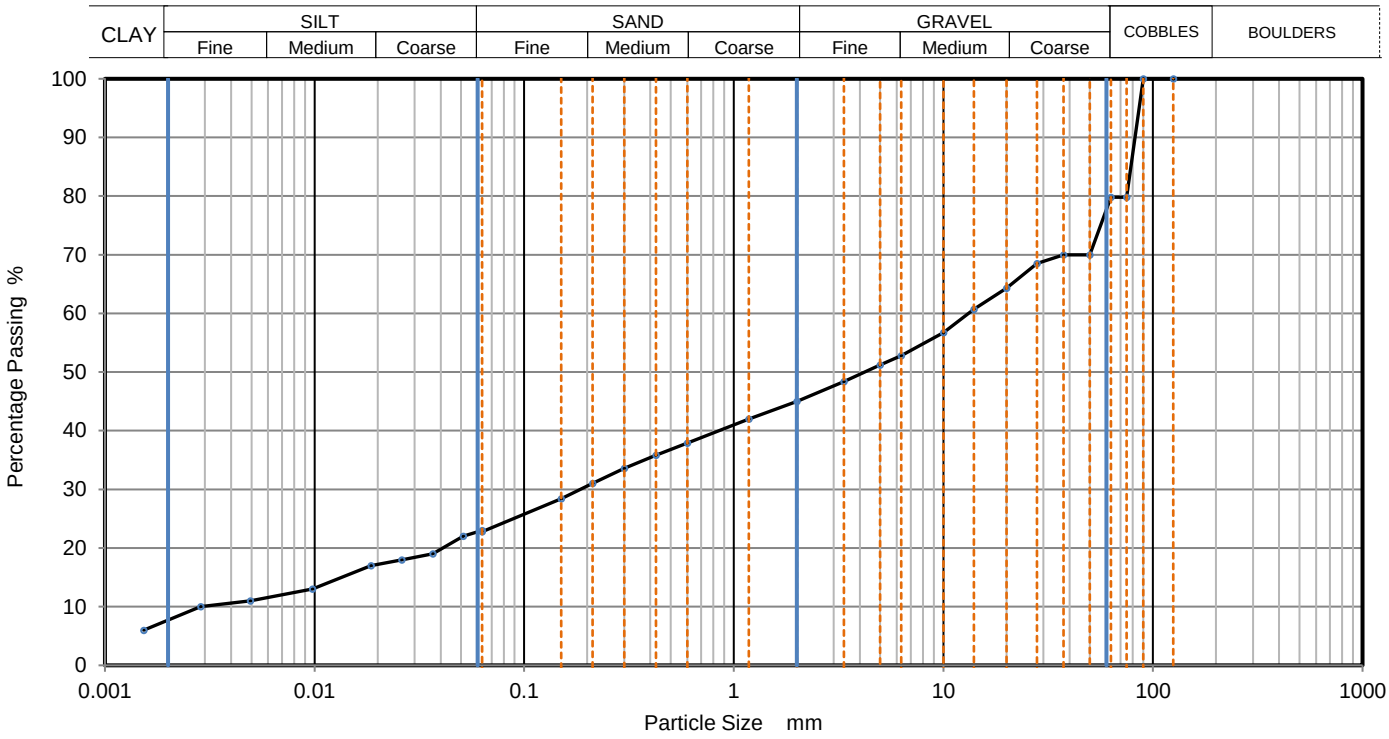
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	TP-27901
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Brown sandy gravelly silty CLAY with cobbles.			Sample Depth (m) Top	0.30
				Base	3.00
Specimen Reference	2	Specimen Depth	0.3 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220930113



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	23
90	100	0.05129	22
75	80	0.03671	19
63	80	0.02611	18
50	70	0.01857	17
37.5	70	0.00976	13
28	69	0.00493	11
20	64	0.00286	10
14	61	0.00153	6
10	57		
6.3	53		
5	51		
3.35	48		
2	45		
1.18	42		
0.6	38	Particle density	(assumed)
0.425	36	2.65	Mg/m3
0.3	34		
0.212	31		
0.15	28		
0.063	23		

Dry Mass of sample, g: 8932

Sample Proportions	% dry mass
Cobbles	20.2
Gravel	34.8
Sand	22.2
Silt	15.3
Clay	7.5

Grading Analysis		
D100	mm	
D60	mm	13.2
D30	mm	0.185
D10	mm	0.00343
Uniformity Coefficient		3800
Curvature Coefficient		0.76

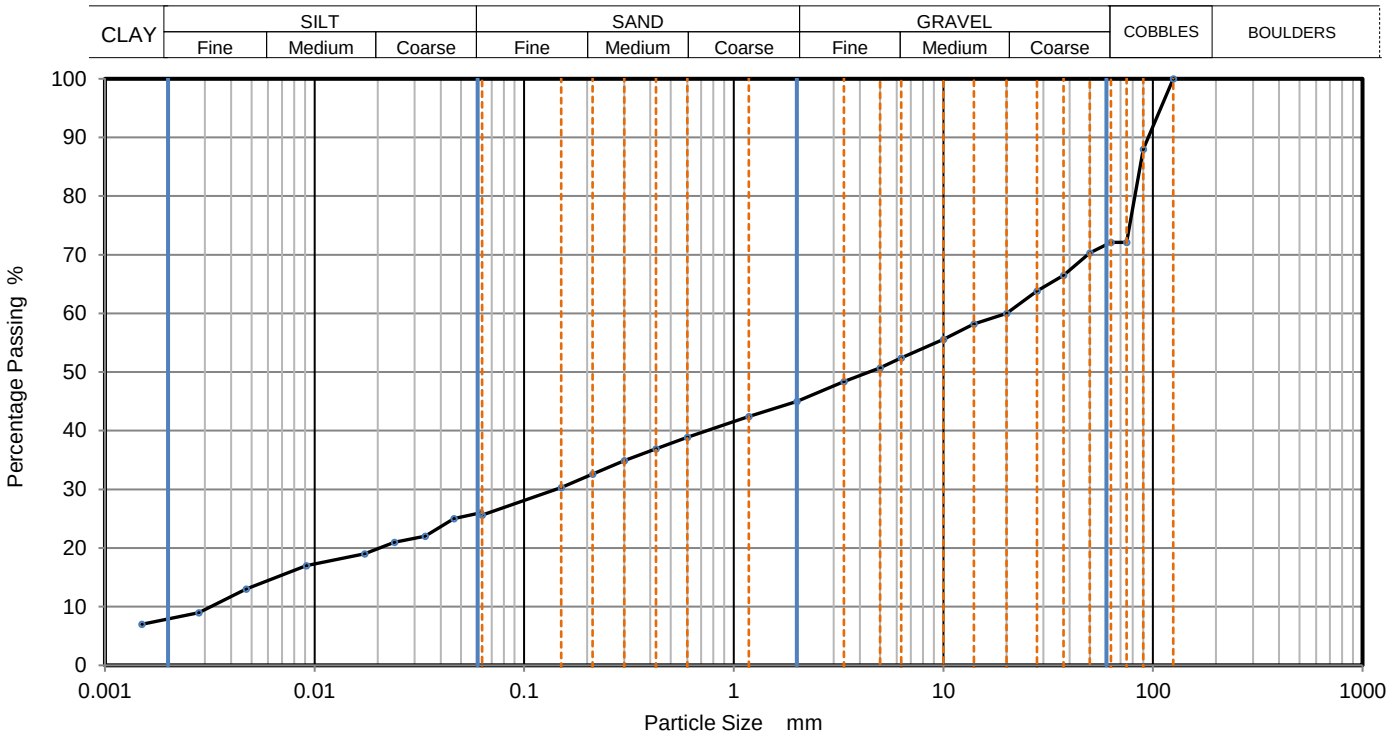
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					TP-27901
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Brown sandy gravelly silty CLAY with cobbles.			Sample Depth (m) Top	3.00
				Base	3.30
Specimen Reference	2	Specimen Depth	3 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220930115



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06183	26
90	88	0.04632	25
75	72	0.03373	22
63	72	0.02402	21
50	70	0.01734	19
37.5	67	0.00913	17
28	64	0.00471	13
20	60	0.00280	9
14	58	0.00150	7
10	56		
6.3	52		
5	51		
3.35	48		
2	45		
1.18	42		
0.6	39	Particle density	(assumed)
0.425	37	2.65	Mg/m3
0.3	35		
0.212	33		
0.15	30		
0.063	26		

Dry Mass of sample, g: 10671

Sample Proportions	% dry mass
Cobbles	27.9
Gravel	27.1
Sand	19.3
Silt	17.9
Clay	7.8

Grading Analysis		
D100	mm	125
D60	mm	19.8
D30	mm	0.142
D10	mm	0.0032
Uniformity Coefficient		6200
Curvature Coefficient		0.32

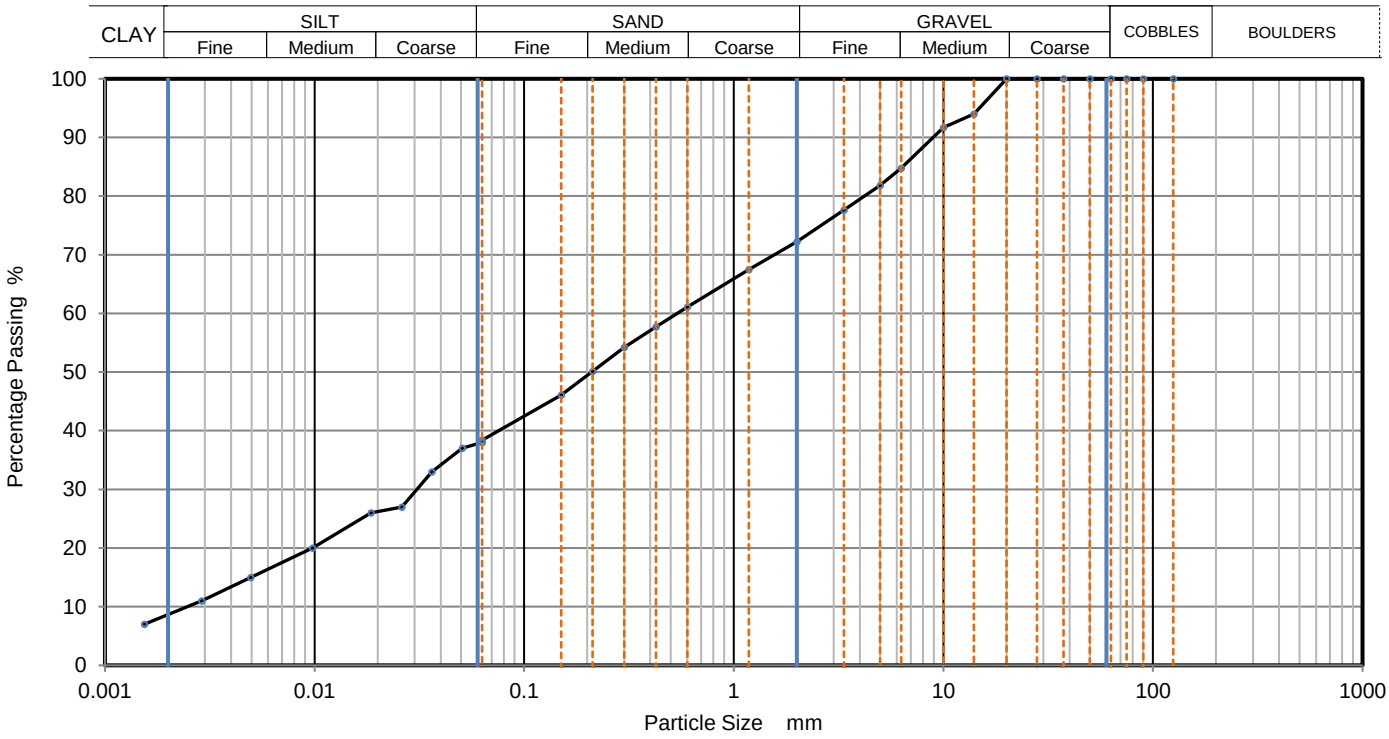
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					TP-28001
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	4
Specimen Description	Brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	1.00
				Base	3.30
Specimen Reference	3	Specimen Depth	1 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220930117



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	38
90	100	0.05065	37
75	100	0.03627	33
63	100	0.02611	27
50	100	0.01857	26
37.5	100	0.00976	20
28	100	0.00496	15
20	100	0.00290	11
14	94	0.00154	7
10	92		
6.3	85		
5	82		
3.35	78		
2	72		
1.18	68		
0.6	61	Particle density	(assumed)
0.425	58	2.65	Mg/m3
0.3	54		
0.212	50		
0.15	46		
0.063	38		

Dry Mass of sample, g: 530

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	27.8
Sand	33.8
Silt	29.6
Clay	8.8

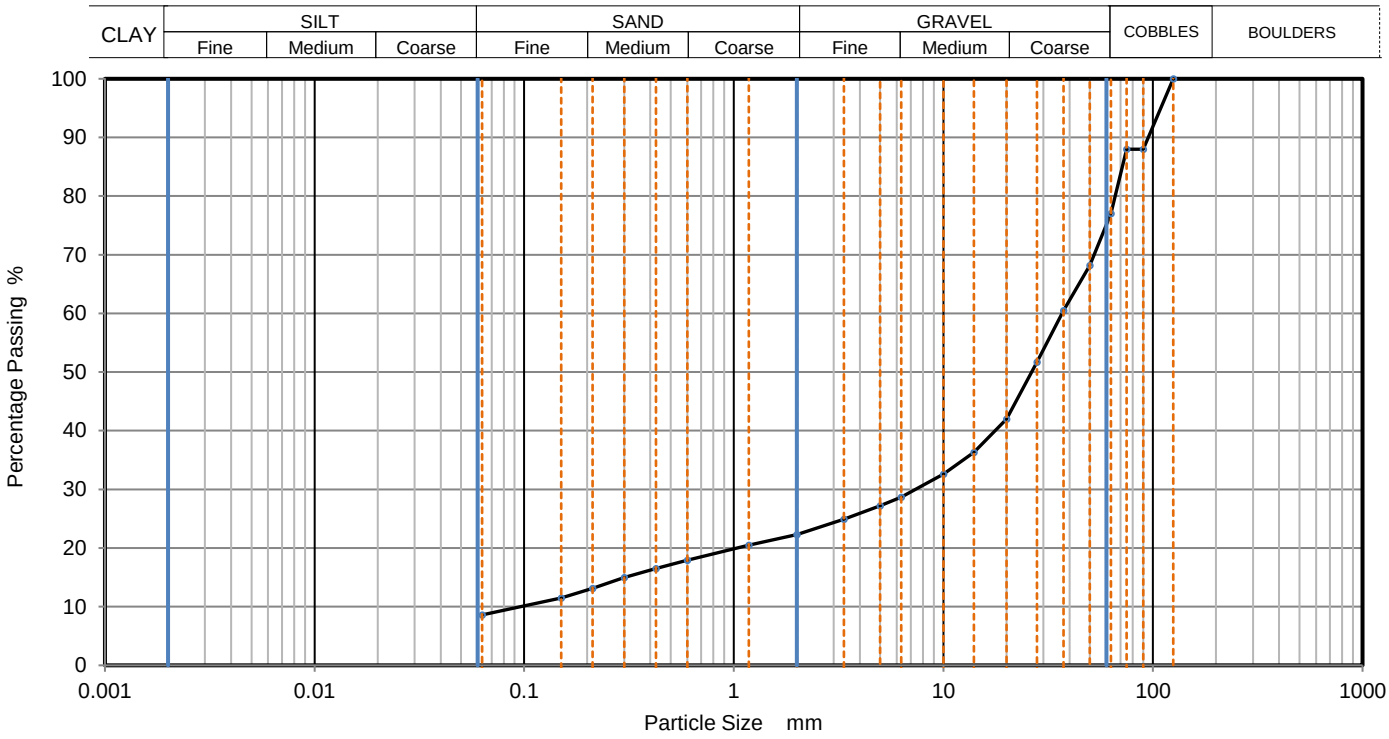
Grading Analysis		
D100	mm	
D60	mm	0.534
D30	mm	0.0305
D10	mm	0.00245
Uniformity Coefficient		220
Curvature Coefficient		0.71

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-28102
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		1
Specimen Description	Brown slightly sandy slightly clayey subangular fine to coarse GRAVEL with cobbles.				Sample Depth (m)	Top	0.50
						Base	
Specimen Reference	2	Specimen Depth	0.5	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clause 9.2				KeyLAB ID		Caus20220930118



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	88		
75	88		
63	77		
50	68		
37.5	61		
28	52		
20	42		
14	36		
10	33		
6.3	29		
5	27		
3.35	25		
2	22		
1.18	21		
0.6	18		
0.425	17		
0.3	15		
0.212	13		
0.15	12		
0.063	9		

Dry Mass of sample, g	13198

Sample Proportions	% dry mass
Cobbles	23.0
Gravel	54.7
Sand	13.7
Fines <0.063mm	9.0

Grading Analysis		
D100	mm	125
D60	mm	36.9
D30	mm	7.35
D10	mm	0.0952
Uniformity Coefficient		390
Curvature Coefficient		15

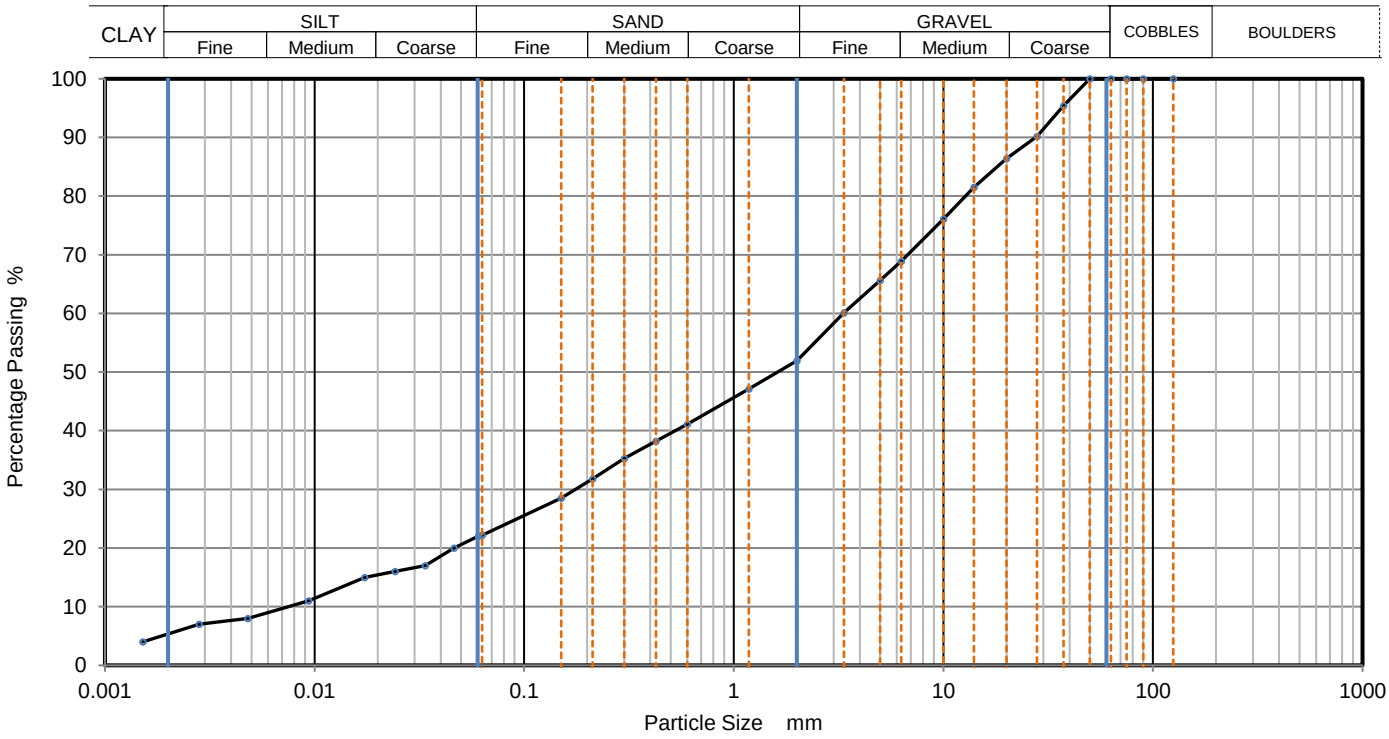
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

UKAS TESTING

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-28102
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		3
Specimen Description	Brown gravelly clayey fine to coarse SAND.				Sample Depth (m)	Top	2.20
						Base	
Specimen Reference	2	Specimen Depth	2.2	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus20220930119



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06039	22
90	100	0.04632	20
75	100	0.03373	17
63	100	0.02418	16
50	100	0.01734	15
37.5	95	0.00936	11
28	90	0.00480	8
20	86	0.00282	7
14	82	0.00152	4
10	76		
6.3	69		
5	66		
3.35	60		
2	52		
1.18	47		
0.6	41	Particle density	(assumed)
0.425	38	2.65	Mg/m3
0.3	35		
0.212	32		
0.15	29		
0.063	22		

Dry Mass of sample, g	4150

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	48.1
Sand	29.8
Silt	16.8
Clay	5.3

Grading Analysis		
D100	mm	
D60	mm	3.34
D30	mm	0.175
D10	mm	0.00749
Uniformity Coefficient		450
Curvature Coefficient		1.2

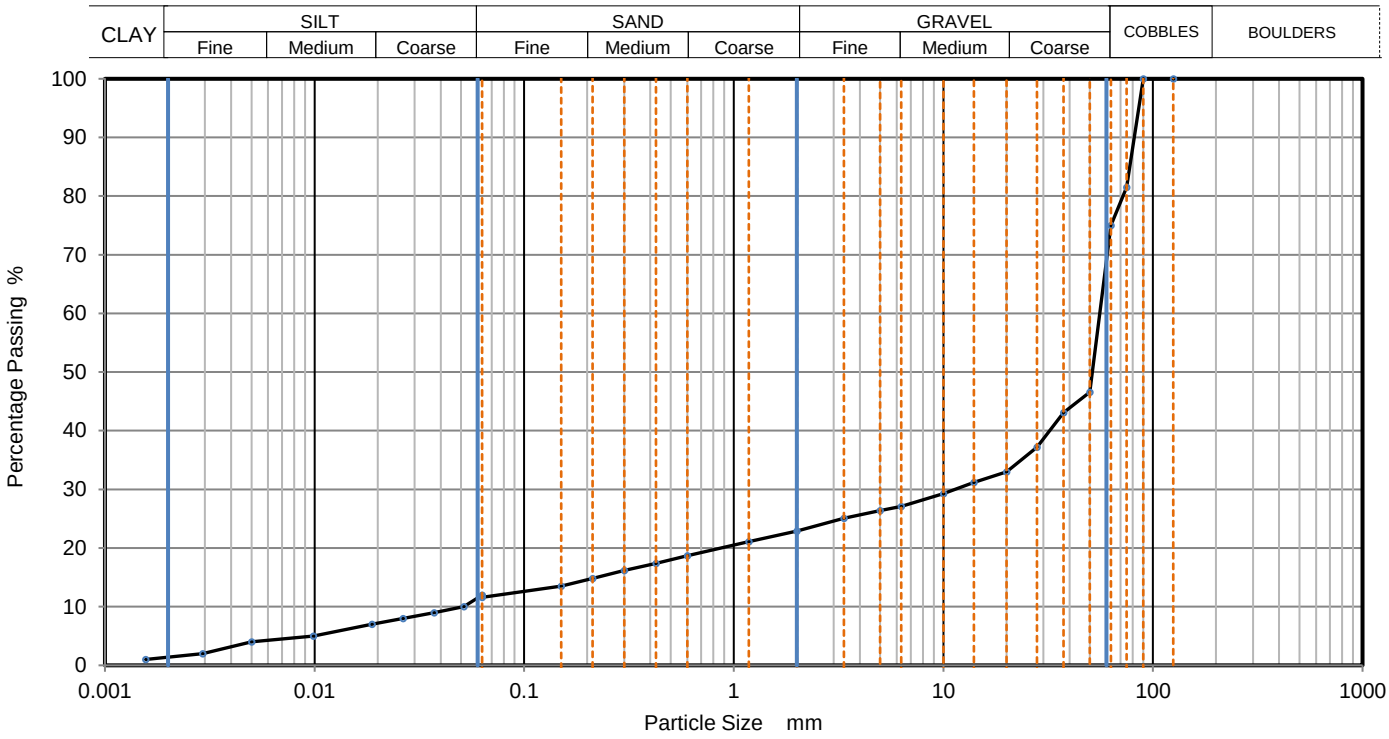
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

UKAS TESTING

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-28302
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brown sandy clayey subangular fine to coparse GRAVEL with cobbles.			Sample Depth (m) Top	1.20
				Base	
Specimen Reference	2	Specimen Depth	1.2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220930121



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	12
90	100	0.05160	10
75	82	0.03715	9
63	75	0.02642	8
50	47	0.01879	7
37.5	43	0.00987	5
28	37	0.00501	4
20	33	0.00293	2
14	31	0.00156	1
10	29		
6.3	27		
5	26		
3.35	25		
2	23		
1.18	21		
0.6	19	Particle density	(assumed)
0.425	17	2.65	Mg/m3
0.3	16		
0.212	15		
0.15	14		
0.063	12		

Dry Mass of sample, g: 16357

Sample Proportions	% dry mass
Cobbles	25.0
Gravel	52.2
Sand	11.2
Silt	10.3
Clay	1.3

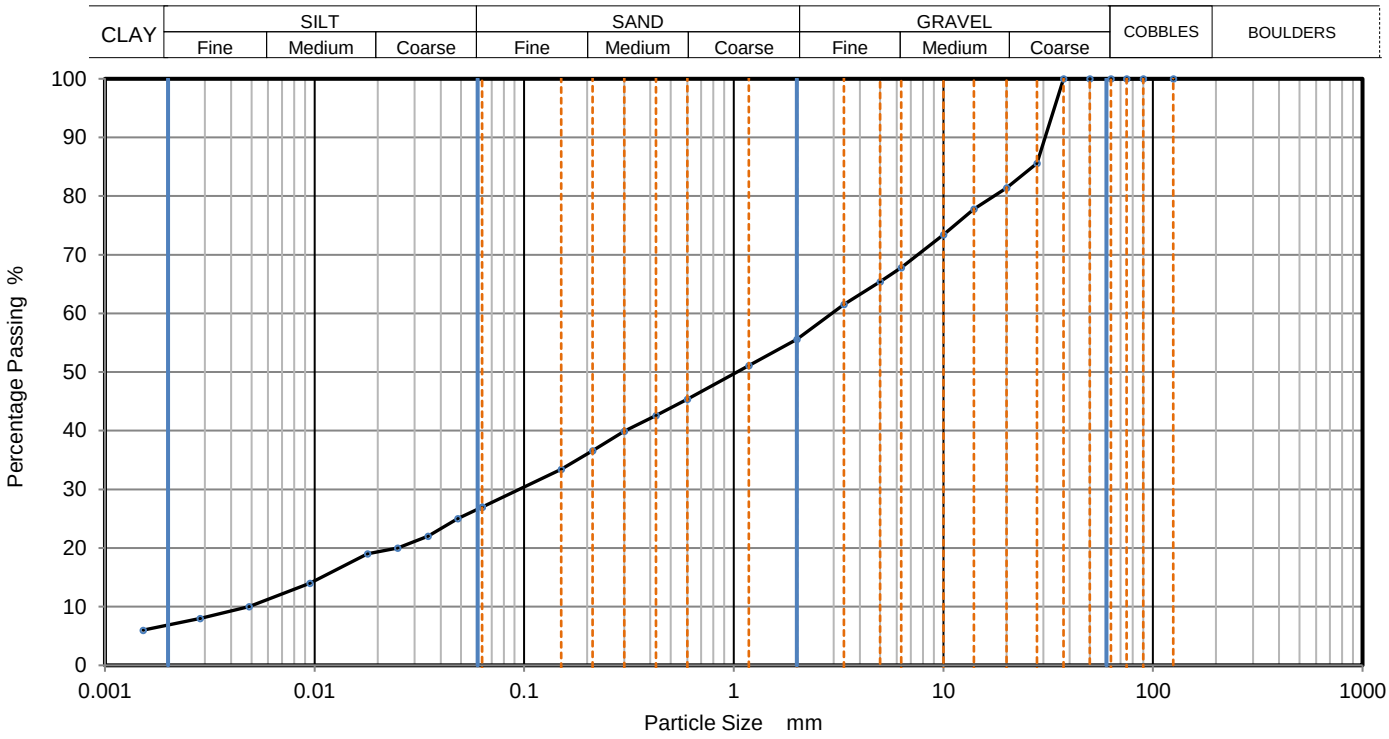
Grading Analysis		
D100	mm	
D60	mm	55.8
D30	mm	11.2
D10	mm	0.0482
Uniformity Coefficient		1200
Curvature Coefficient		47

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-28302
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		4
Specimen Description	Brown sandy gravelly silty CLAY.				Sample Depth (m)	Top	2.50
						Base	
Specimen Reference	2	Specimen Depth	2.5	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus20220930122



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	27
90	100	0.04824	25
75	100	0.03481	22
63	100	0.02494	20
50	100	0.01786	19
37.5	100	0.00951	14
28	86	0.00487	10
20	81	0.00284	8
14	78	0.00152	6
10	73		
6.3	68		
5	65		
3.35	62		
2	56		
1.18	51		
0.6	45	Particle density	(assumed)
0.425	43	2.65	Mg/m3
0.3	40		
0.212	37		
0.15	33		
0.063	27		

Dry Mass of sample, g: 3007

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	44.4
Sand	28.6
Silt	20.2
Clay	6.8

Grading Analysis		
D100	mm	
D60	mm	2.94
D30	mm	0.0949
D10	mm	0.00454
Uniformity Coefficient		650
Curvature Coefficient		0.67

Remarks

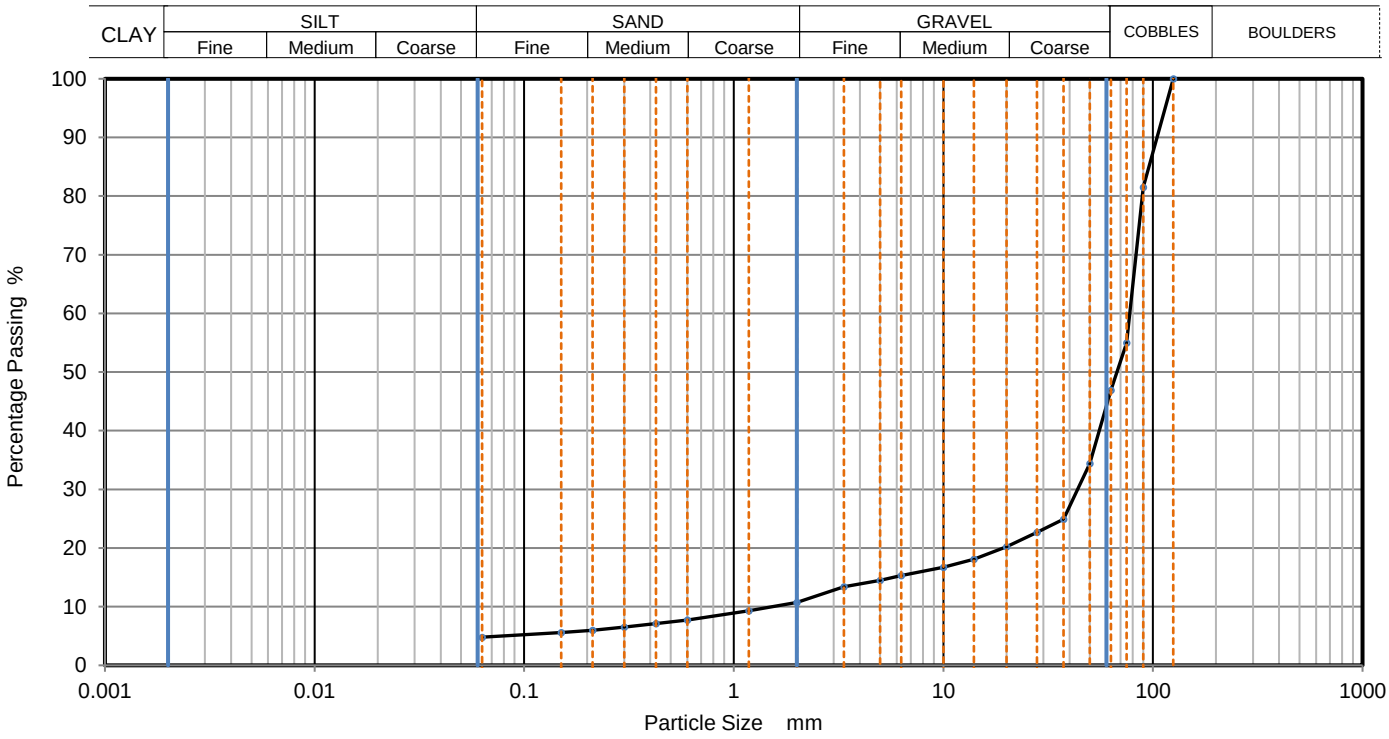
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	TP-28411
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brown sandy gravelly clayey SILT with cobbles.			Sample Depth (m) Top	1.00
				Base	2.40
Specimen Reference	2	Specimen Depth	1 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus20220930136



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	82		
75	55		
63	47		
50	34		
37.5	25		
28	23		
20	20		
14	18		
10	17		
6.3	15		
5	15		
3.35	13		
2	11		
1.18	9		
0.6	8		
0.425	7		
0.3	7		
0.212	6		
0.15	6		
0.063	5		

Dry Mass of sample, g: 8040

Sample Proportions	% dry mass
Cobbles	53.1
Gravel	36.2
Sand	5.9
Fines <0.063mm	5.0

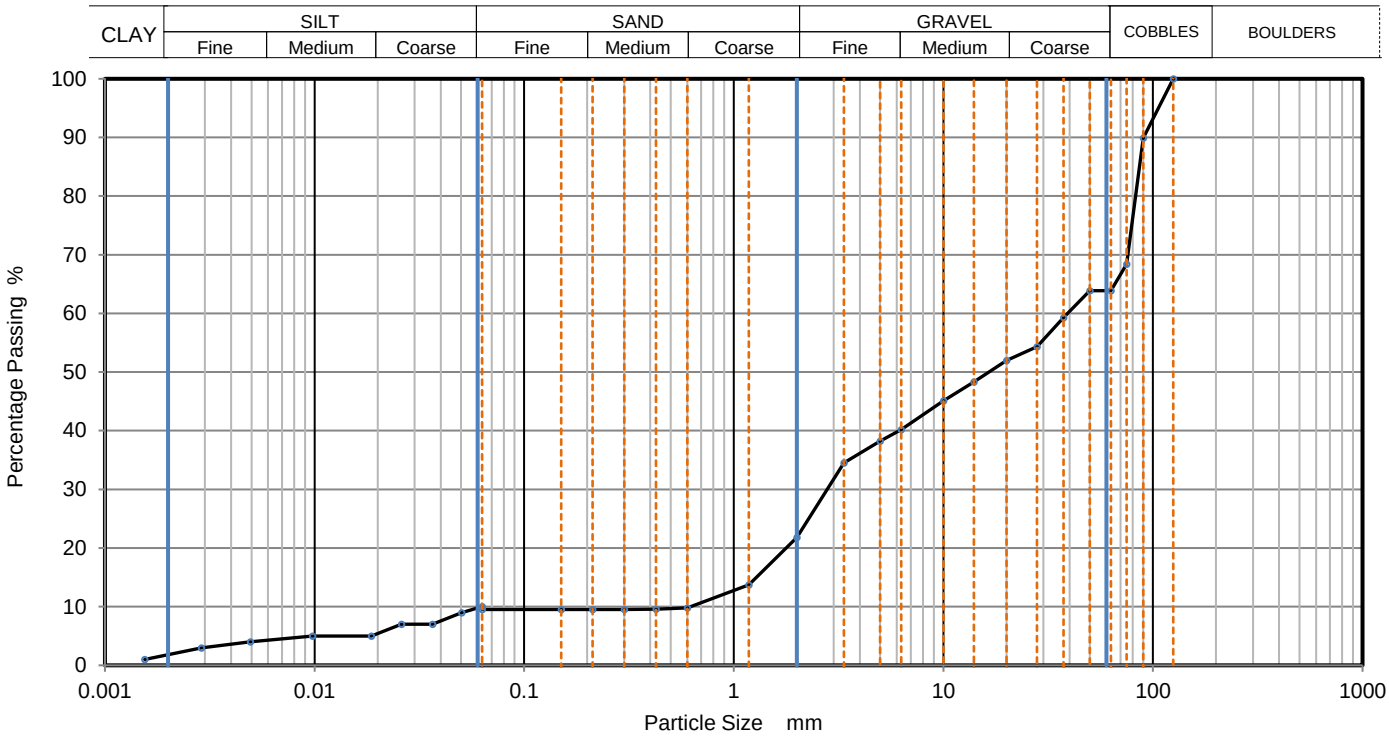
Grading Analysis		
D100	mm	125
D60	mm	77.6
D30	mm	43.7
D10	mm	1.54
Uniformity Coefficient		50
Curvature Coefficient		16

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-28505
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		2
Specimen Description	Brown slightly sandy slightly clayey GRAVEL with cobbles.				Sample Depth (m)	Top	0.70
						Base	1.20
Specimen Reference	2	Specimen Depth	0.7	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus20220930138



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	10
90	90	0.05033	9
75	68	0.03649	7
63	64	0.02596	7
50	64	0.01868	5
37.5	59	0.00976	5
28	54	0.00493	4
20	52	0.00288	3
14	48	0.00155	1
10	45		
6.3	40		
5	38		
3.35	35		
2	22		
1.18	14		
0.6	10	Particle density	(assumed)
0.425	10	2.65	Mg/m3
0.3	10		
0.212	10		
0.15	10		
0.063	10		

Dry Mass of sample, g: 10230

Sample Proportions	% dry mass
Cobbles	36.1
Gravel	42.1
Sand	12.3
Silt	7.6
Clay	1.9

Grading Analysis		
D100	mm	125
D60	mm	39.2
D30	mm	2.79
D10	mm	0.617
Uniformity Coefficient		64
Curvature Coefficient		0.32

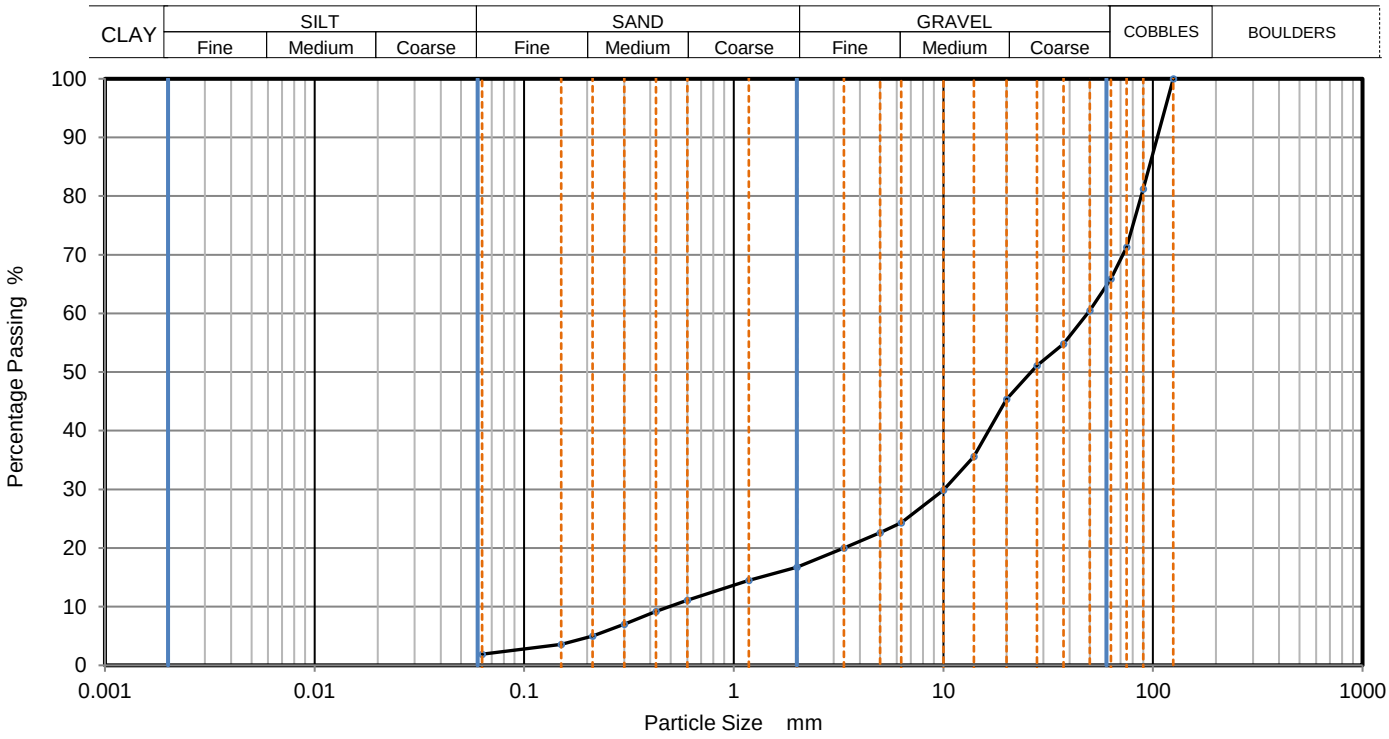
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					TP-28709
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brown clayey gravelly SAND with cobbles.			Sample Depth (m) Top	0.80
				Base	3.80
Specimen Reference	3	Specimen Depth	0.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus20220930139



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	81		
75	71		
63	66		
50	61		
37.5	55		
28	51		
20	45		
14	36		
10	30		
6.3	24		
5	23		
3.35	20		
2	17		
1.18	15		
0.6	11		
0.425	9		
0.3	7		
0.212	5		
0.15	4		
0.063	2		

Dry Mass of sample, g: 9039

Sample Proportions	% dry mass
Cobbles	34.1
Gravel	49.3
Sand	14.7
Fines <0.063mm	2.0

Grading Analysis		
D100	mm	125
D60	mm	48.8
D30	mm	10.1
D10	mm	0.49
Uniformity Coefficient		100
Curvature Coefficient		4.2

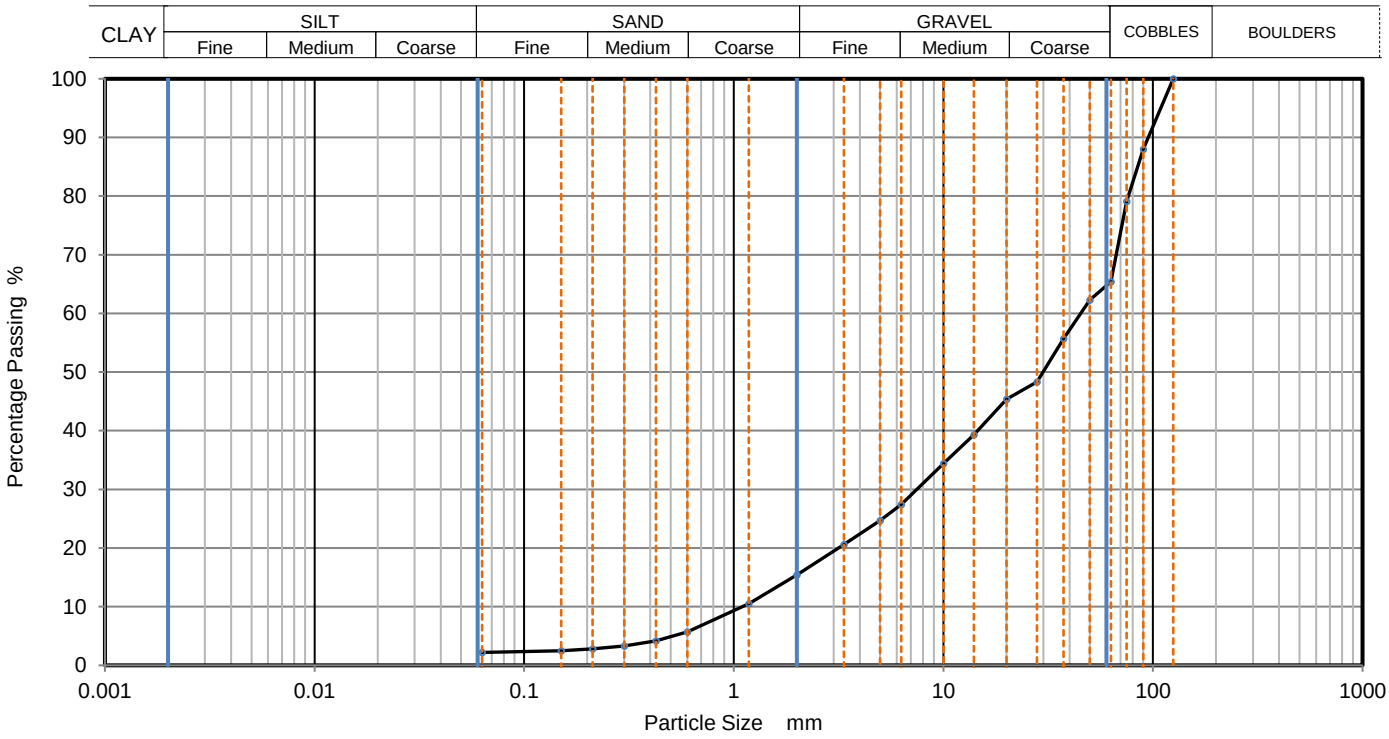
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	TP-28752
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brown slightly sandy slightly clayey subangular fine to coarse GRAVEL with cobbles.			Sample Depth (m) Top	1.00
				Base	1.90
Specimen Reference	2	Specimen Depth	1 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus20220930141



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	88		
75	79		
63	65		
50	62		
37.5	56		
28	48		
20	45		
14	39		
10	34		
6.3	27		
5	25		
3.35	21		
2	15		
1.18	11		
0.6	6		
0.425	4		
0.3	3		
0.212	3		
0.15	3		
0.063	2		

Dry Mass of sample, g: 10140

Sample Proportions	% dry mass
Cobbles	34.6
Gravel	50.0
Sand	13.2
Fines <0.063mm	2.0

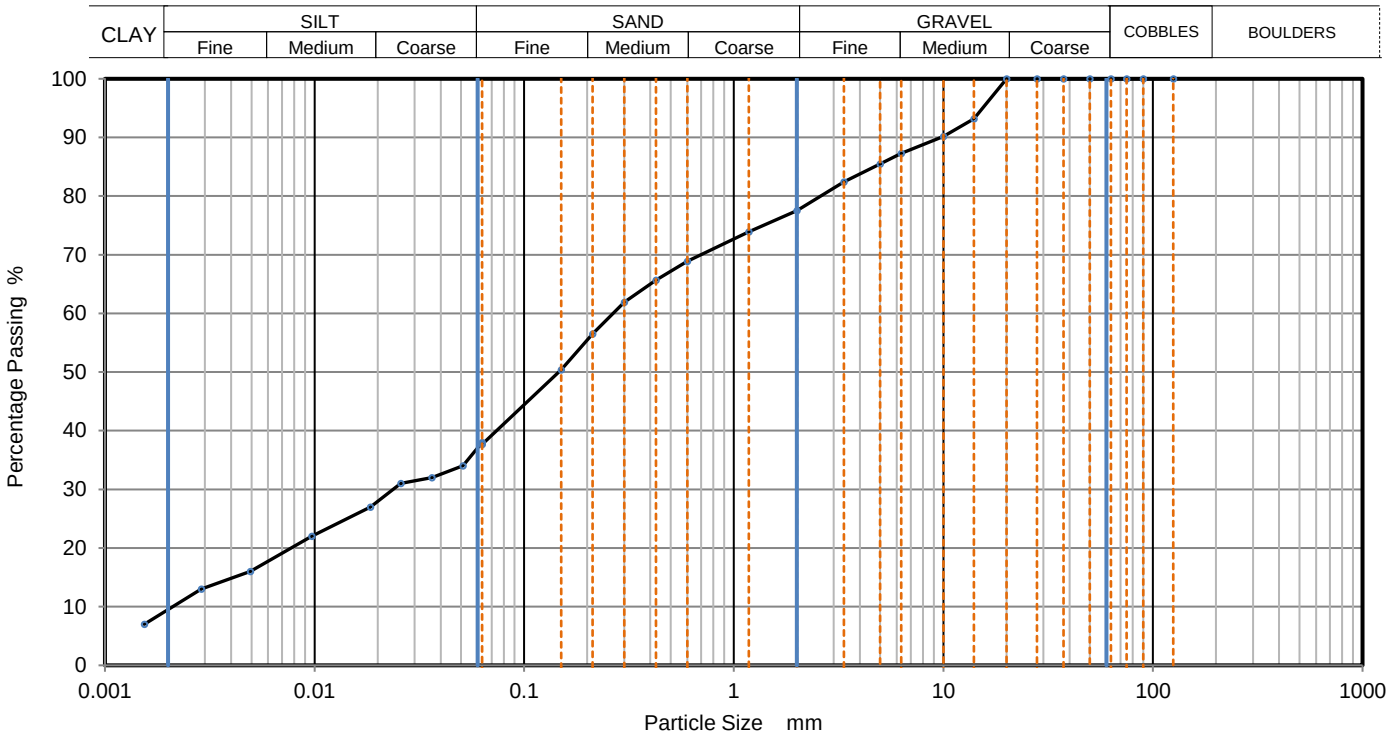
Grading Analysis		
D100	mm	125
D60	mm	45.2
D30	mm	7.5
D10	mm	1.1
Uniformity Coefficient		41
Curvature Coefficient		1.1

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-30103
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		1
Specimen Description	Brown sandy slightly gravelly silty CLAY.				Sample Depth (m)	Top	0.50
						Base	
Specimen Reference	2	Specimen Depth	0.5	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus20220815110



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	38
90	100	0.05097	34
75	100	0.03627	32
63	100	0.02580	31
50	100	0.01846	27
37.5	100	0.00970	22
28	100	0.00493	16
20	100	0.00288	13
14	93	0.00154	7
10	90		
6.3	87		
5	86		
3.35	82		
2	78		
1.18	74		
0.6	69	Particle density	(assumed)
0.425	66	2.65	Mg/m3
0.3	62		
0.212	57		
0.15	50		
0.063	38		

Dry Mass of sample, g: 509

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	22.5
Sand	39.8
Silt	28.3
Clay	9.4

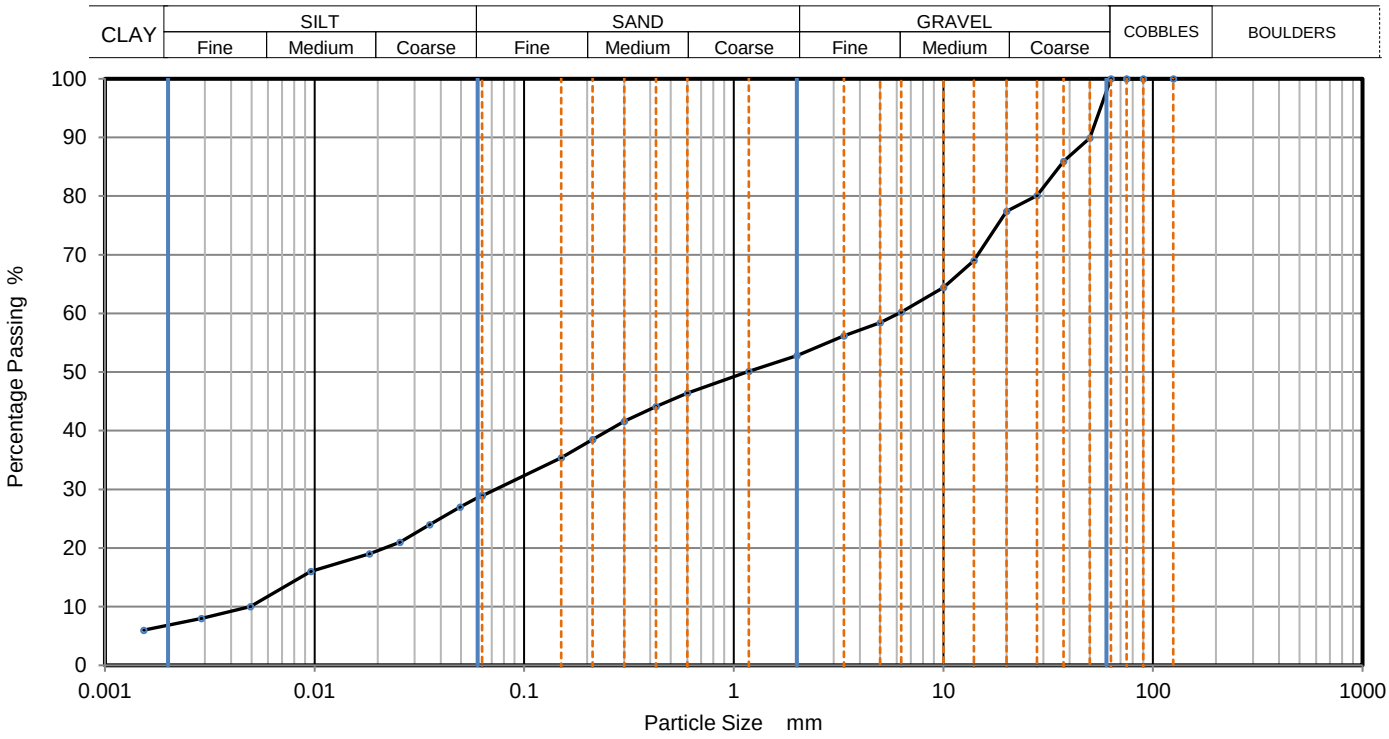
Grading Analysis		
D100	mm	
D60	mm	0.265
D30	mm	0.0246
D10	mm	0.00214
Uniformity Coefficient		120
Curvature Coefficient		1.1

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-30103
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brown sandy gravelly silty CLAY.			Sample Depth (m) Top	1.50
				Sample Depth (m) Base	
Specimen Reference	2	Specimen Depth	1.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220815112



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	29
90	100	0.04936	27
75	100	0.03536	24
63	100	0.02549	21
50	90	0.01824	19
37.5	86	0.00959	16
28	80	0.00493	10
20	77	0.00288	8
14	69	0.00153	6
10	64		
6.3	60		
5	58		
3.35	56		
2	53		
1.18	50		
0.6	46	Particle density	(assumed)
0.425	44	2.65	Mg/m3
0.3	42		
0.212	39		
0.15	35		
0.063	29		

Dry Mass of sample, g: 12619

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	47.2
Sand	23.9
Silt	22.4
Clay	6.5

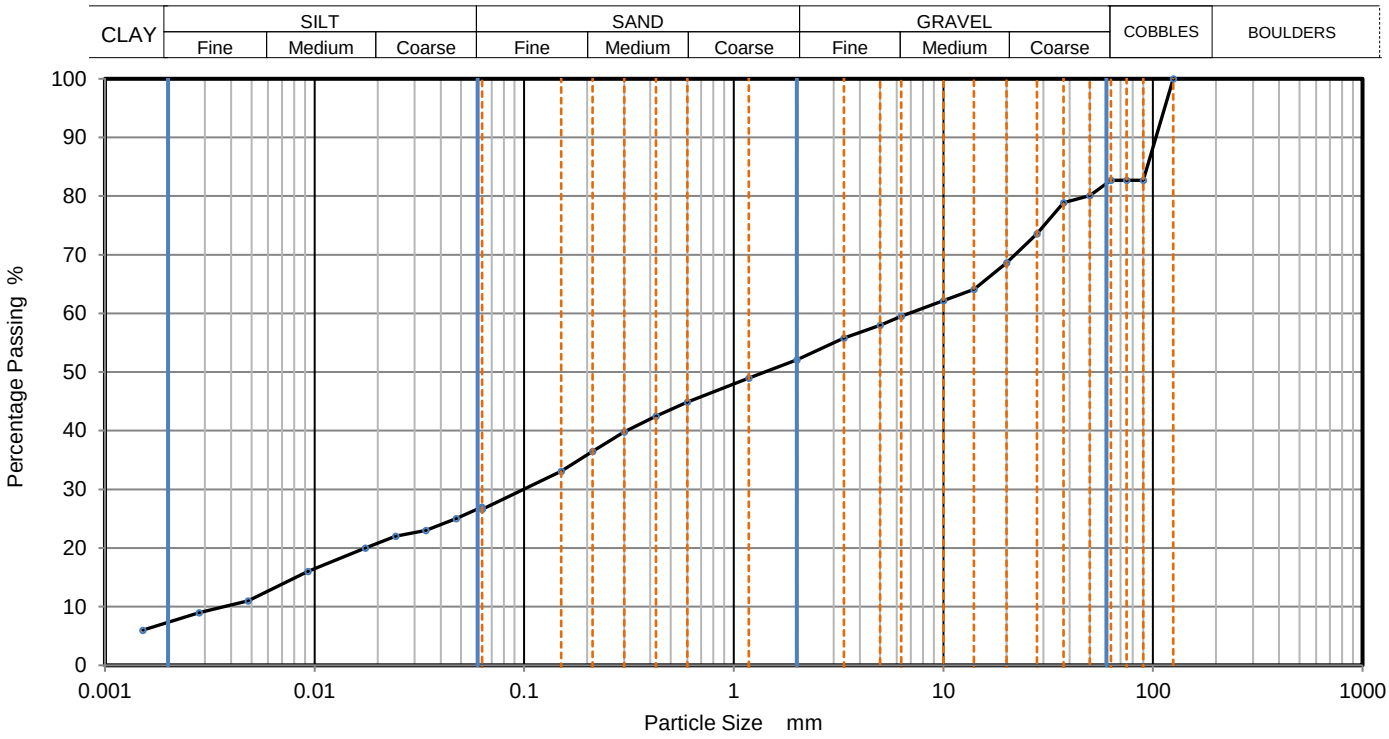
Grading Analysis		
D100	mm	
D60	mm	6.15
D30	mm	0.0729
D10	mm	0.00493
Uniformity Coefficient		1200
Curvature Coefficient		0.18

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-30204
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		1
Specimen Description	Brown sandy gravelly clayey SILT with cobbles.				Sample Depth (m)	Top	0.50
						Base	
Specimen Reference	2	Specimen Depth	0.5	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus20220815117



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06276	27
90	83	0.04736	25
75	83	0.03397	23
63	83	0.02435	22
50	80	0.01745	20
37.5	79	0.00931	16
28	74	0.00482	11
20	69	0.00282	9
14	64	0.00152	6
10	62		
6.3	60		
5	58		
3.35	56		
2	52		
1.18	49		
0.6	45	Particle density	(assumed)
0.425	43	2.65	Mg/m3
0.3	40		
0.212	37		
0.15	33		
0.063	27		

Dry Mass of sample, g: 13668

Sample Proportions	% dry mass
Cobbles	17.3
Gravel	30.6
Sand	25.5
Silt	19.3
Clay	7.3

Grading Analysis		
D100	mm	125
D60	mm	6.91
D30	mm	0.0991
D10	mm	0.00372
Uniformity Coefficient		1900
Curvature Coefficient		0.38

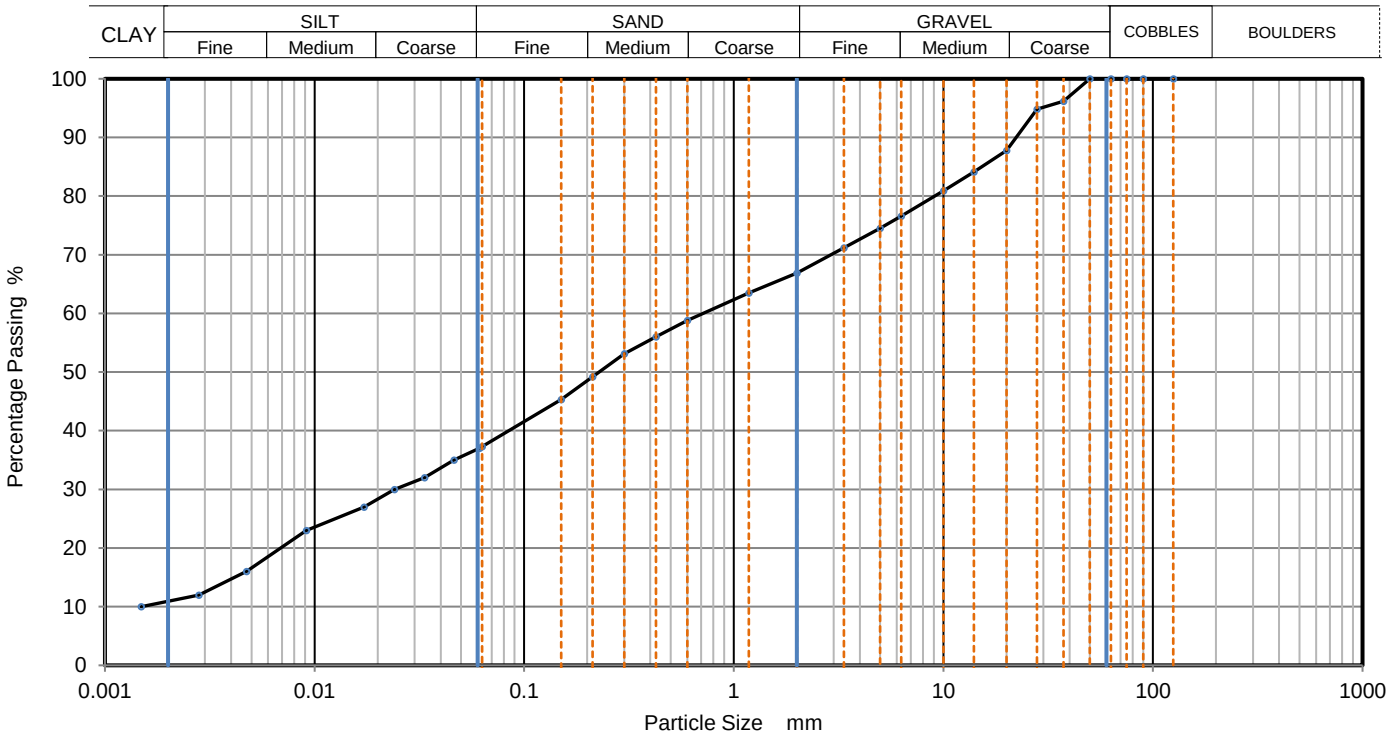
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					**21-1682**
Borehole/Pit No.					TP-30204
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brown sandy gravelly silty CLAY.			Sample Depth (m) Top	1.50
				Sample Depth (m) Base	
Specimen Reference	2	Specimen Depth	1.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220815119



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06134	37
90	100	0.04631	35
75	100	0.03348	32
63	100	0.02401	30
50	100	0.01722	27
37.5	96	0.00913	23
28	95	0.00474	16
20	88	0.00280	12
14	84	0.00149	10
10	81		
6.3	77		
5	75		
3.35	71		
2	67		
1.18	64		
0.6	59	Particle density	(assumed)
0.425	56	2.65	Mg/m3
0.3	53		
0.212	49		
0.15	45		
0.063	37		

Dry Mass of sample, g: 2957

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	33.1
Sand	29.6
Silt	26.4
Clay	10.9

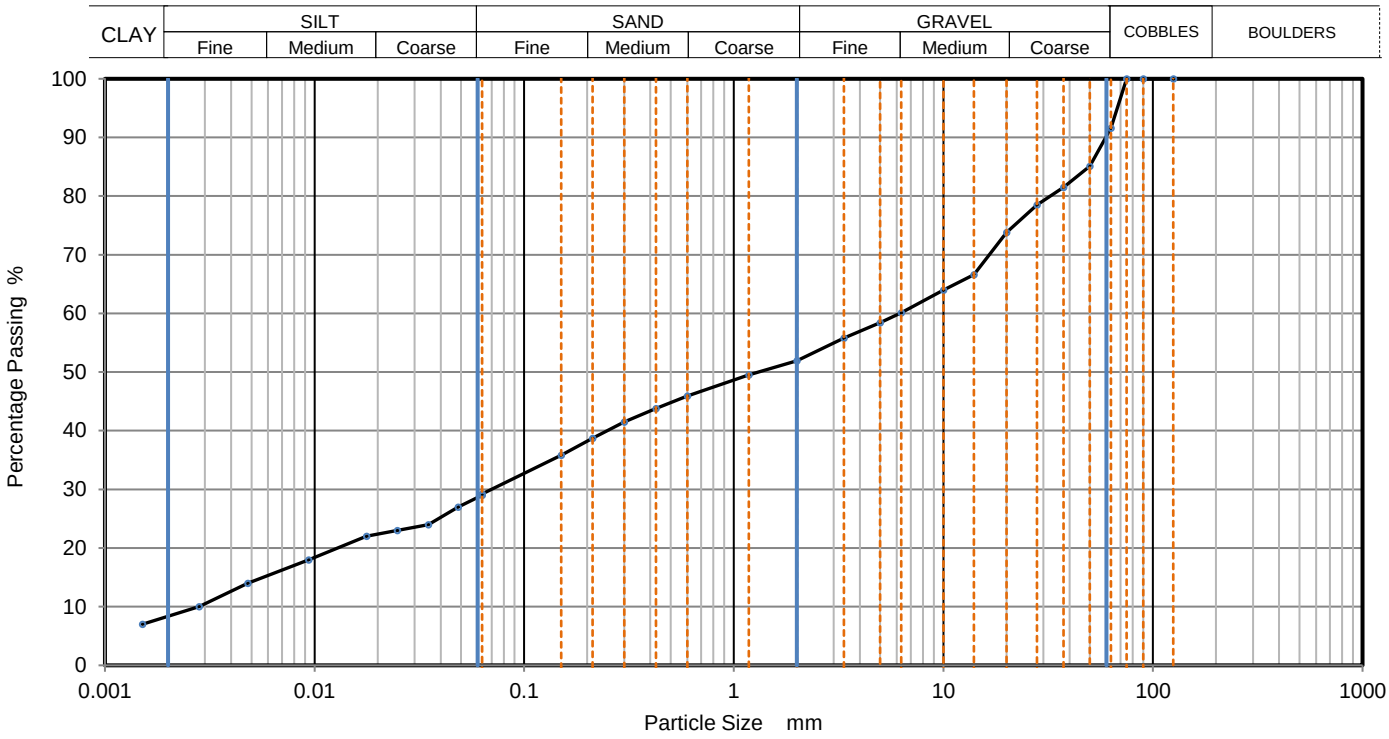
Grading Analysis		
D100	mm	
D60	mm	0.714
D30	mm	0.0254
D10	mm	0.00155
Uniformity Coefficient		460
Curvature Coefficient		0.59

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-30303
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		1
Specimen Description	Brown sandy gravelly silty CLAY with some cobbles.				Sample Depth (m)	Top	0.50
						Base	
Specimen Reference	2	Specimen Depth	0.5	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus20220815121



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	29
90	100	0.04836	27
75	100	0.03490	24
63	92	0.02484	23
50	85	0.01768	22
37.5	82	0.00936	18
28	79	0.00479	14
20	74	0.00282	10
14	67	0.00151	7
10	64		
6.3	60		
5	58		
3.35	56		
2	52		
1.18	50		
0.6	46	Particle density	(assumed)
0.425	44	2.65	Mg/m3
0.3	42		
0.212	39		
0.15	36		
0.063	29		

Dry Mass of sample, g: 13198

Sample Proportions	% dry mass
Cobbles	8.4
Gravel	39.7
Sand	22.7
Silt	20.5
Clay	8.7

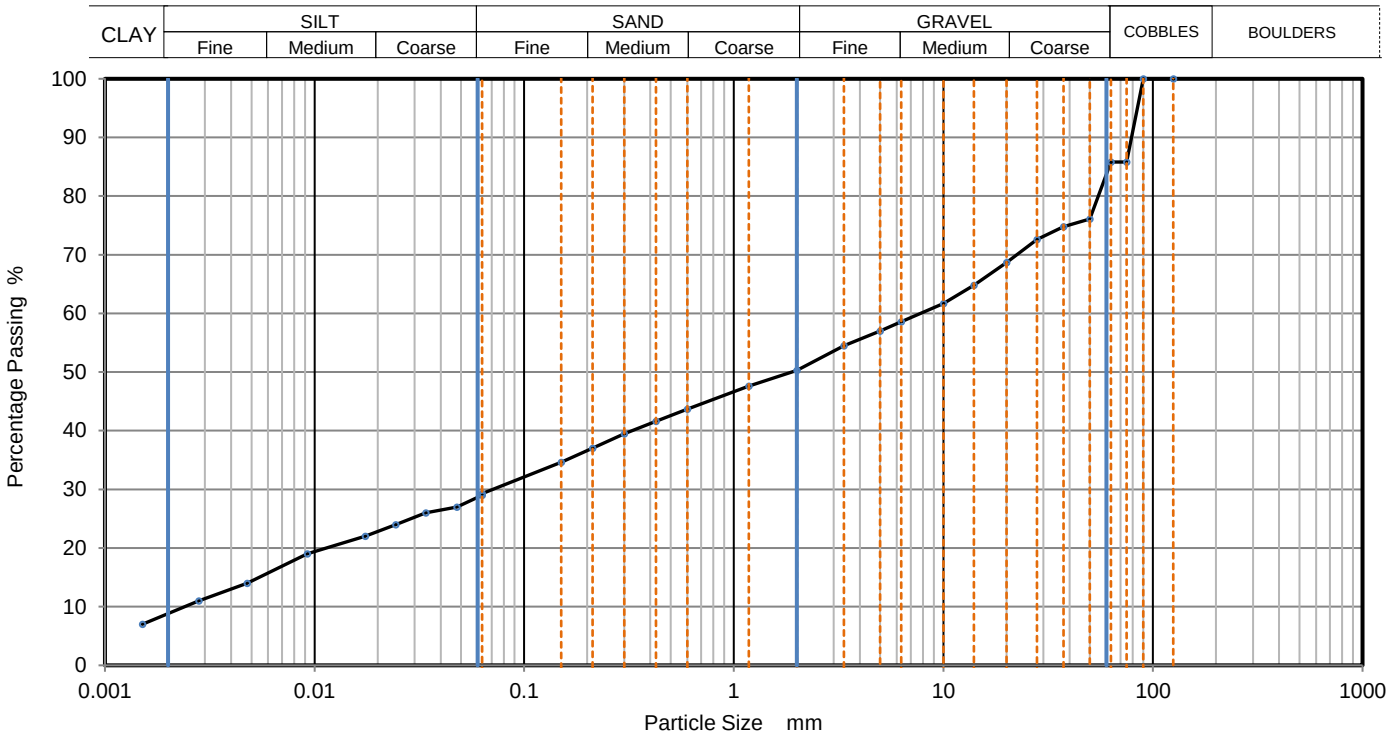
Grading Analysis		
D100	mm	
D60	mm	6.24
D30	mm	0.0703
D10	mm	0.00259
Uniformity Coefficient		2400
Curvature Coefficient		0.31

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-30303
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brown sandy gravelly silty CLAY with some cobbles.			Sample Depth (m) Top	1.50
				Sample Depth (m) Base	
Specimen Reference	4	Specimen Depth	1.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220815122



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	29
90	100	0.04769	27
75	86	0.03396	26
63	86	0.02435	24
50	76	0.01745	22
37.5	75	0.00925	19
28	73	0.00477	14
20	69	0.00280	11
14	65	0.00151	7
10	62		
6.3	59		
5	57		
3.35	55		
2	50		
1.18	48		
0.6	44	Particle density	(assumed)
0.425	42	2.65	Mg/m3
0.3	40		
0.212	37		
0.15	35		
0.063	29		

Dry Mass of sample, g: 12743

Sample Proportions	% dry mass
Cobbles	14.2
Gravel	35.5
Sand	21.0
Silt	20.7
Clay	8.6

Grading Analysis		
D100	mm	
D60	mm	7.76
D30	mm	0.0703
D10	mm	0.00249
Uniformity Coefficient		3100
Curvature Coefficient		0.26

Remarks

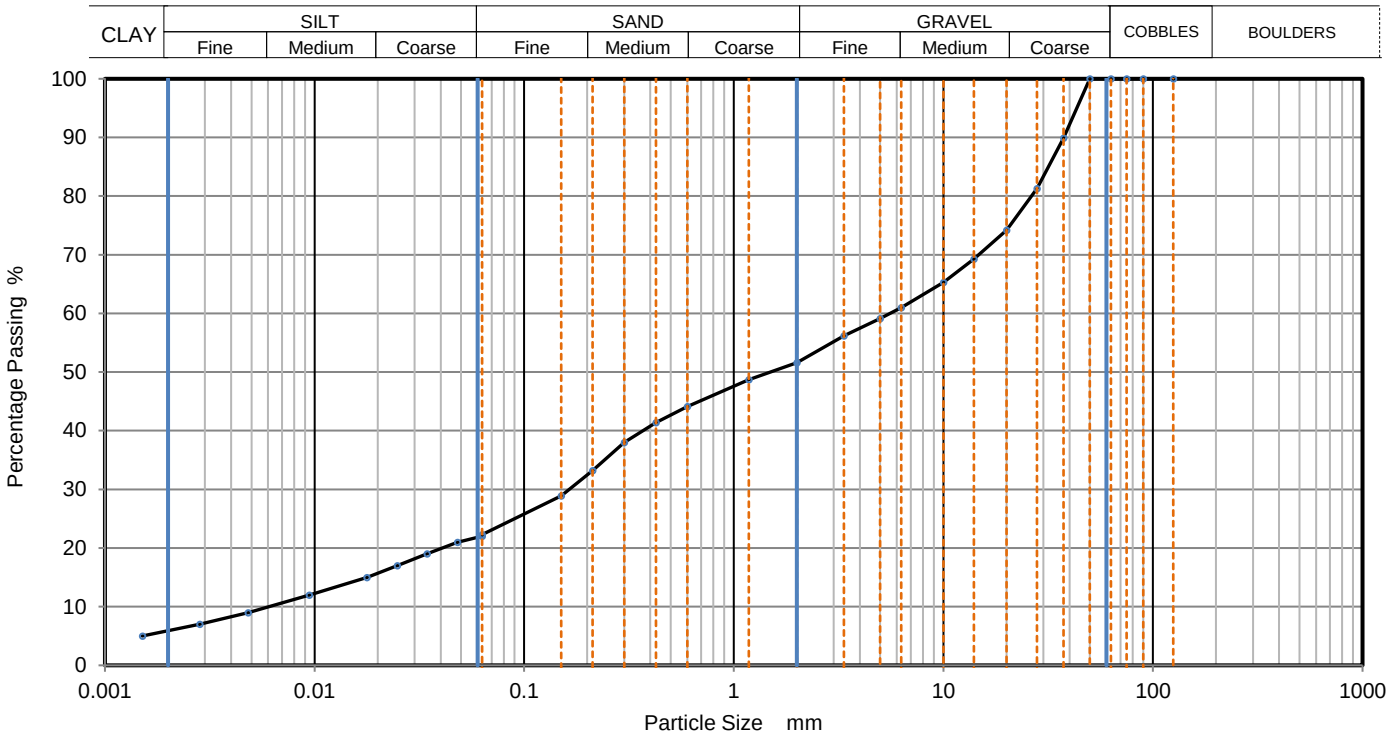
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	TP-30417
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Brown sandy gravelly silty CLAY.			Sample Depth (m) Top	0.50
				Sample Depth (m) Base	
Specimen Reference	2	Specimen Depth	0.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220815125



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	22
90	100	0.04803	21
75	100	0.03443	19
63	100	0.02484	17
50	100	0.01779	15
37.5	90	0.00942	12
28	81	0.00482	9
20	74	0.00283	7
14	69	0.00151	5
10	65		
6.3	61		
5	59		
3.35	56		
2	52		
1.18	49		
0.6	44	Particle density	(assumed)
0.425	41	2.65	Mg/m3
0.3	38		
0.212	33		
0.15	29		
0.063	22		

Dry Mass of sample, g: 3840

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	48.4
Sand	29.3
Silt	16.2
Clay	6.1

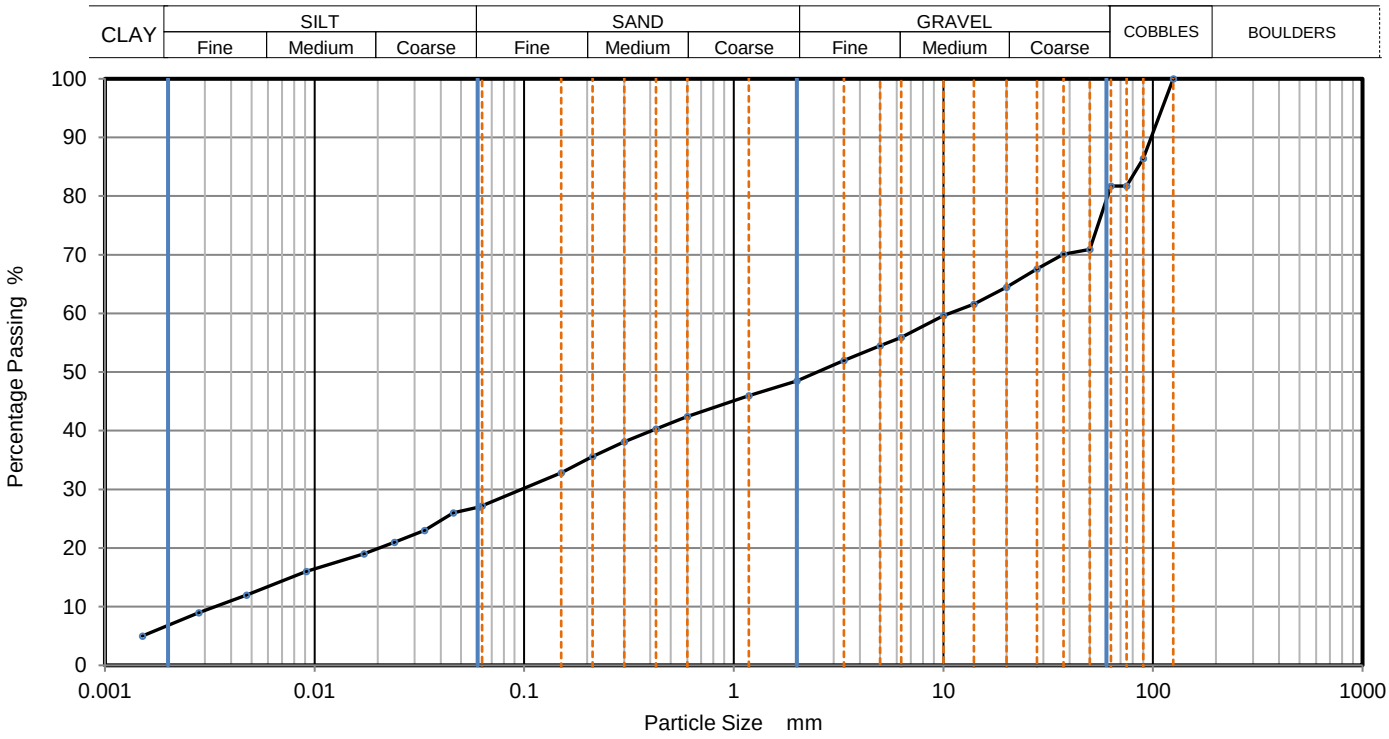
Grading Analysis		
D100	mm	
D60	mm	5.59
D30	mm	0.163
D10	mm	0.00571
Uniformity Coefficient		980
Curvature Coefficient		0.84

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-30417
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brown sandy gravelly silty CLAY with some cobbles.			Sample Depth (m) Top	1.50
				Sample Depth (m) Base	
Specimen Reference	2	Specimen Depth	1.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220815127



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06086	27
90	86	0.04596	26
75	82	0.03348	23
63	82	0.02401	21
50	71	0.01722	19
37.5	70	0.00913	16
28	68	0.00474	12
20	65	0.00280	9
14	62	0.00151	5
10	60		
6.3	56		
5	55		
3.35	52		
2	49		
1.18	46		
0.6	42	Particle density	(assumed)
0.425	40	2.65	Mg/m3
0.3	38		
0.212	36		
0.15	33		
0.063	27		

Dry Mass of sample, g: 11791

Sample Proportions	% dry mass
Cobbles	18.3
Gravel	33.3
Sand	21.2
Silt	20.3
Clay	6.9

Grading Analysis		
D100	mm	125
D60	mm	10.6
D30	mm	0.0965
D10	mm	0.00358
Uniformity Coefficient		3000
Curvature Coefficient		0.24

Remarks

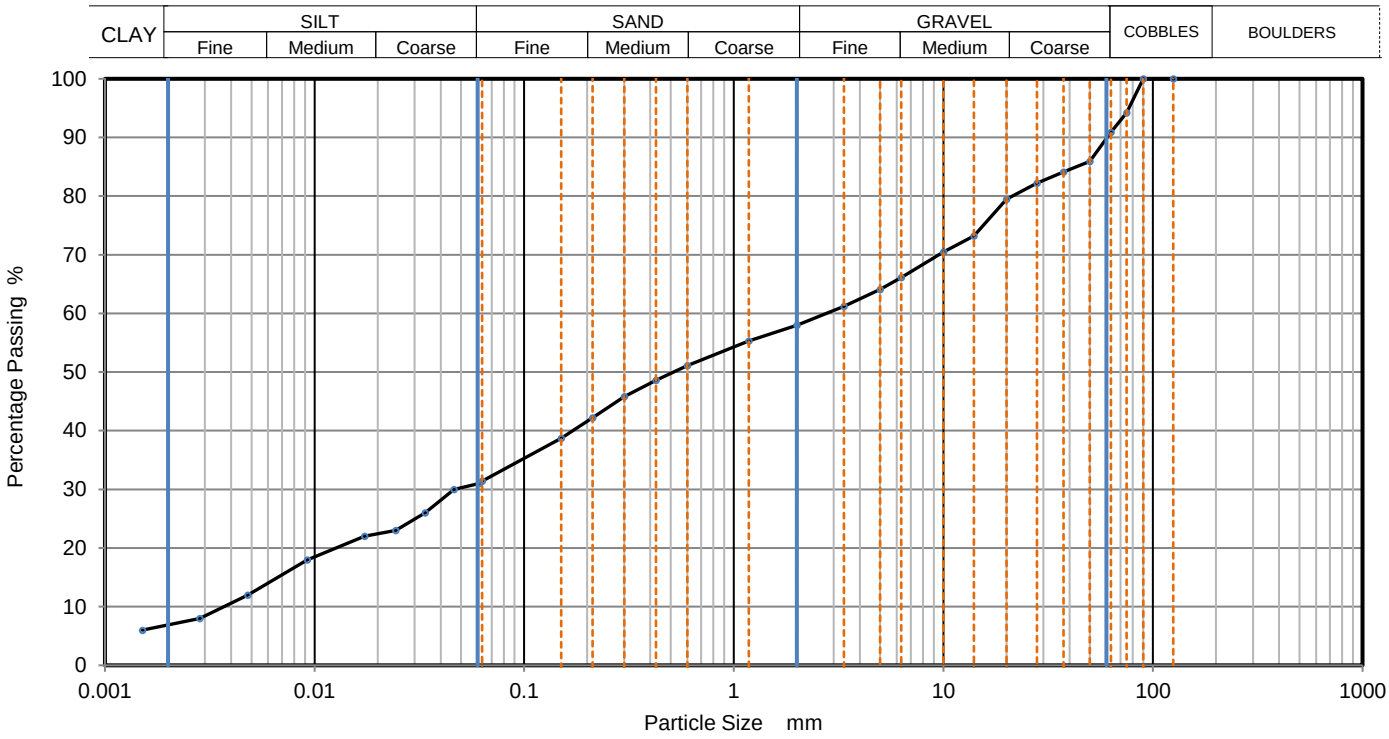
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	TP-30501
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Brown sandy gravelly silty CLAY with some cobbles.			Sample Depth (m) Top	0.50
				Sample Depth (m) Base	
Specimen Reference	2	Specimen Depth	0.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220815129



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06134	31
90	100	0.04631	30
75	94	0.03372	26
63	91	0.02435	23
50	86	0.01733	22
37.5	84	0.00925	18
28	82	0.00479	12
20	80	0.00283	8
14	73	0.00151	6
10	71		
6.3	66		
5	64		
3.35	61		
2	58		
1.18	55		
0.6	51	Particle density	(assumed)
0.425	49	2.65	Mg/m3
0.3	46		
0.212	42		
0.15	39		
0.063	31		

Dry Mass of sample, g: 13154

Sample Proportions	% dry mass
Cobbles	9.1
Gravel	32.9
Sand	26.6
Silt	24.1
Clay	7.3

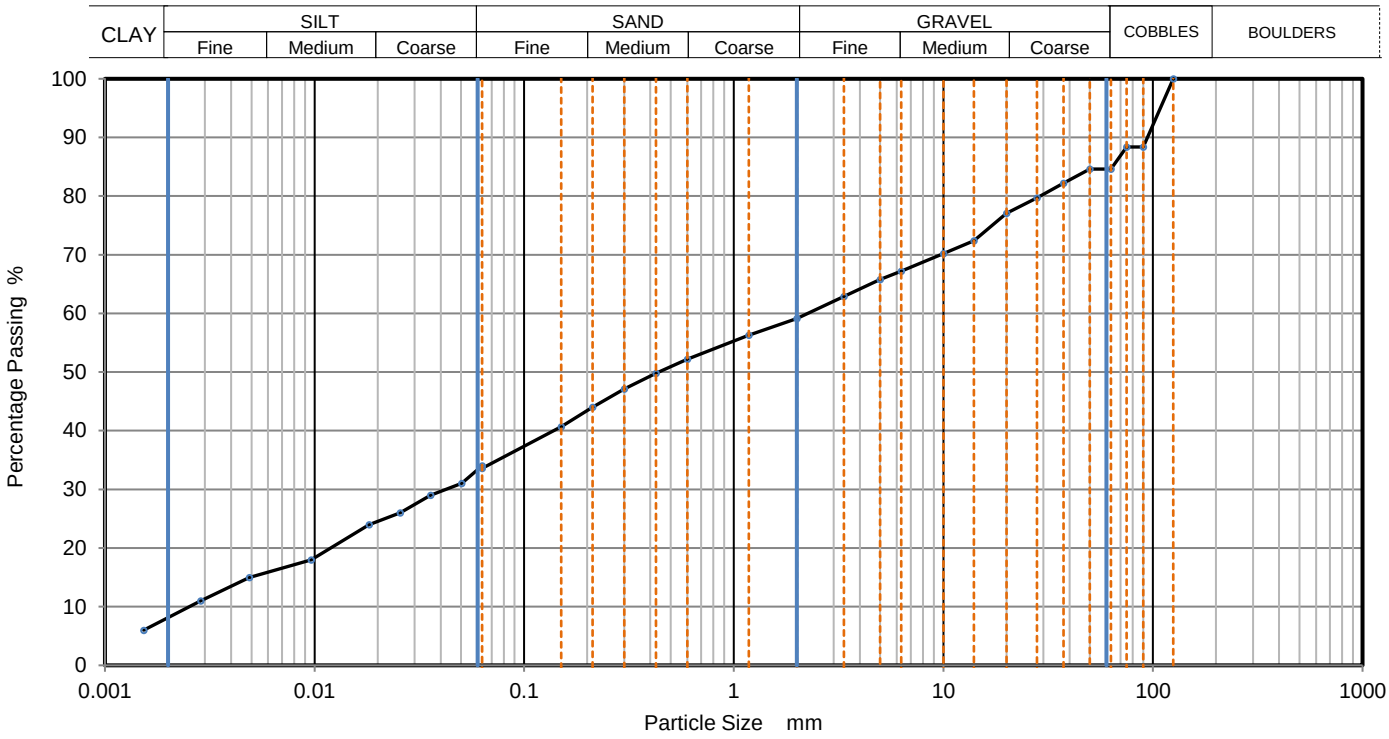
Grading Analysis		
D100	mm	
D60	mm	2.77
D30	mm	0.0496
D10	mm	0.0036
Uniformity Coefficient		770
Curvature Coefficient		0.25

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-30501
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brown sandy gravelly silty CLAY with some cobbles.			Sample Depth (m) Top	1.50
				Sample Depth (m) Base	
Specimen Reference	2	Specimen Depth	1.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220815131



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	34
90	88	0.05032	31
75	88	0.03581	29
63	85	0.02564	26
50	85	0.01824	24
37.5	82	0.00965	18
28	80	0.00488	15
20	77	0.00286	11
14	72	0.00153	6
10	70		
6.3	67		
5	66		
3.35	63		
2	59		
1.18	56		
0.6	52	Particle density	(assumed)
0.425	50	2.65	Mg/m3
0.3	47		
0.212	44		
0.15	41		
0.063	34		

Dry Mass of sample, g: 13336

Sample Proportions	% dry mass
Cobbles	15.4
Gravel	25.5
Sand	25.5
Silt	25.5
Clay	8.1

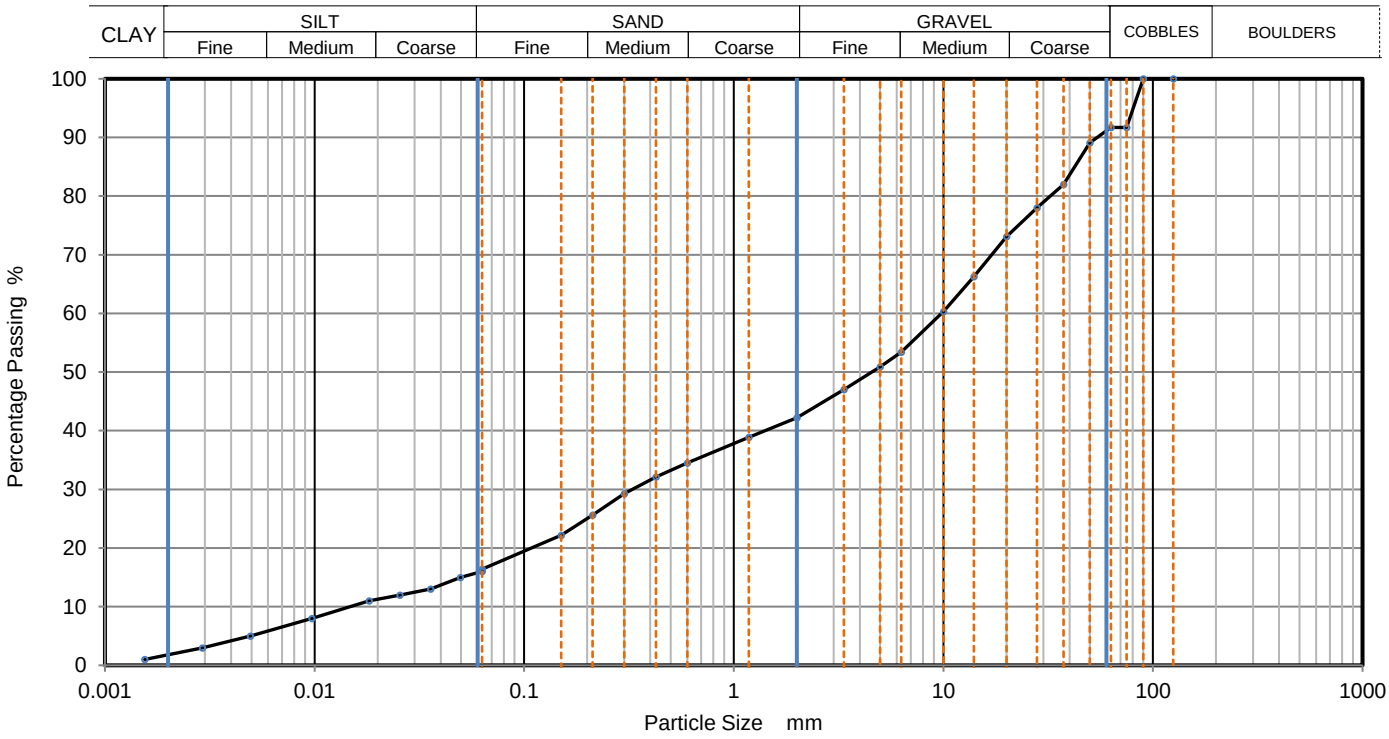
Grading Analysis		
D100	mm	125
D60	mm	2.26
D30	mm	0.0446
D10	mm	0.00261
Uniformity Coefficient		870
Curvature Coefficient		0.34

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-30602
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Brown sandy gravelly silty CLAY with some cobbles.			Sample Depth (m) Top	0.50
				Sample Depth (m) Base	
Specimen Reference	2	Specimen Depth	0.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220815134



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	16
90	100	0.04968	15
75	92	0.03581	13
63	92	0.02548	12
50	89	0.01824	11
37.5	82	0.00970	8
28	78	0.00493	5
20	73	0.00291	3
14	66	0.00155	1
10	60		
6.3	53		
5	51		
3.35	47		
2	42		
1.18	39		
0.6	35	Particle density	(assumed)
0.425	32	2.65	Mg/m3
0.3	29		
0.212	26		
0.15	22		
0.063	16		

Dry Mass of sample, g: 14481

Sample Proportions	% dry mass
Cobbles	8.3
Gravel	49.5
Sand	25.8
Silt	14.5
Clay	1.9

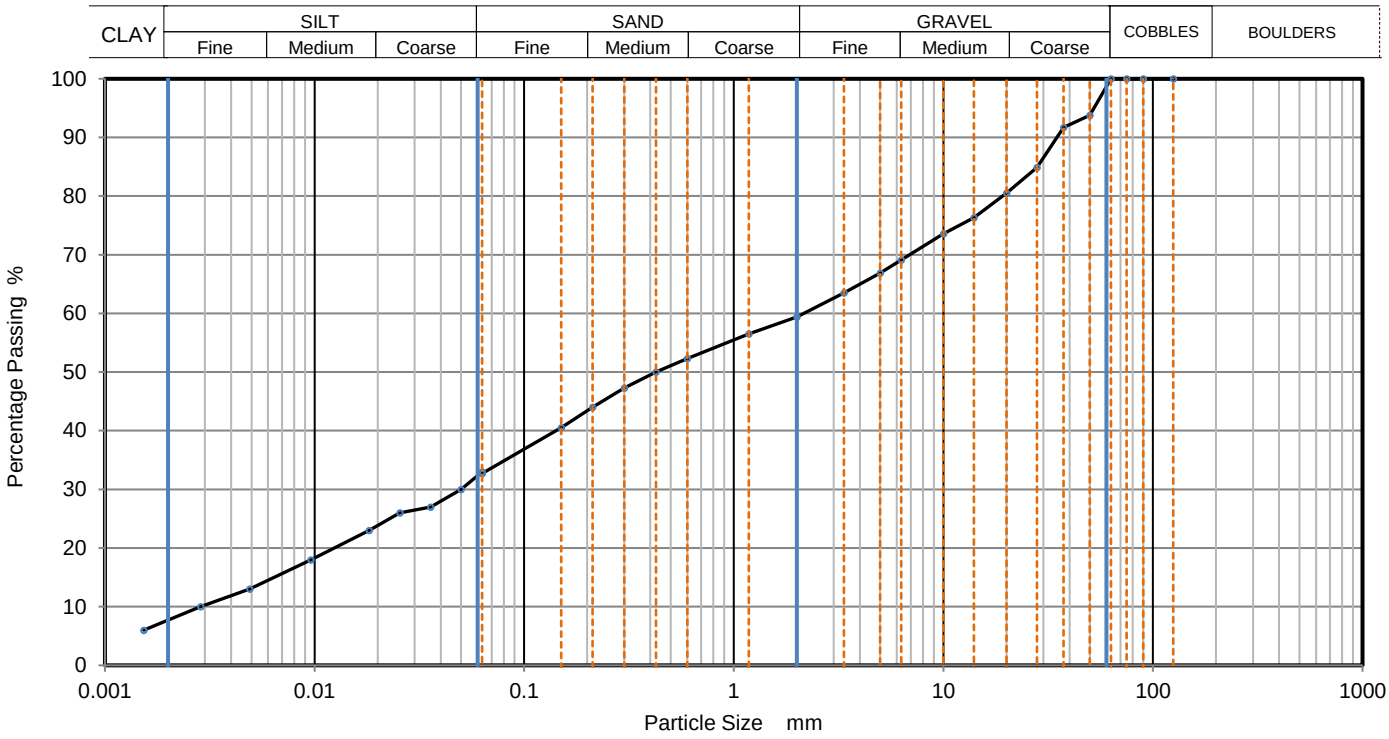
Grading Analysis		
D100	mm	
D60	mm	9.82
D30	mm	0.328
D10	mm	0.0154
Uniformity Coefficient		640
Curvature Coefficient		0.72

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-30602
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		2
Specimen Description	Brown sandy gravelly silty CLAY.				Sample Depth (m)	Top	1.50
						Base	
Specimen Reference	2	Specimen Depth	1.5	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus20220815136



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	33
90	100	0.05000	30
75	100	0.03581	27
63	100	0.02548	26
50	94	0.01824	23
37.5	92	0.00959	18
28	85	0.00491	13
20	81	0.00286	10
14	76	0.00153	6
10	74		
6.3	69		
5	67		
3.35	64		
2	59		
1.18	57		
0.6	52	Particle density	(assumed)
0.425	50	2.65	Mg/m3
0.3	47		
0.212	44		
0.15	41		
0.063	33		

Dry Mass of sample, g: 11321

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	40.6
Sand	26.7
Silt	25.2
Clay	7.5

Grading Analysis		
D100	mm	
D60	mm	2.16
D30	mm	0.0506
D10	mm	0.00289
Uniformity Coefficient		750
Curvature Coefficient		0.41

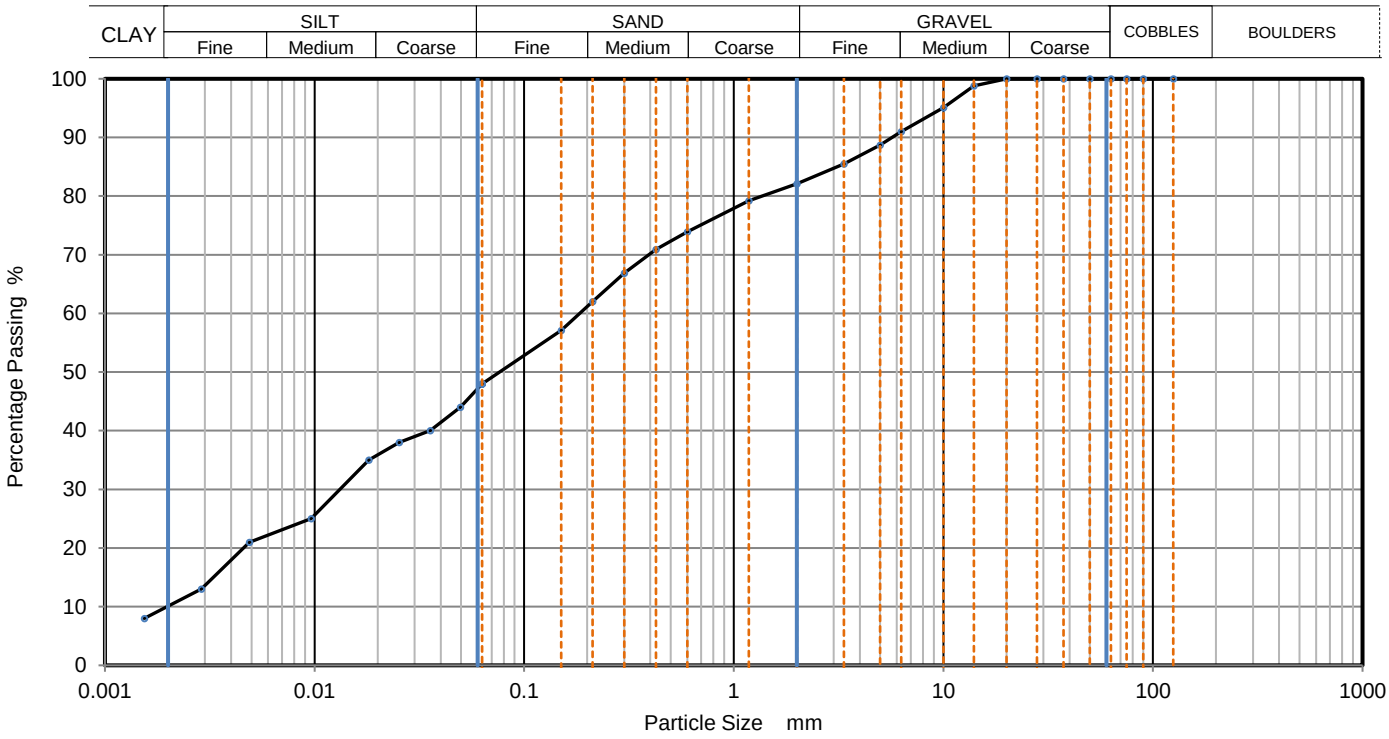
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION			Job Ref		21-1682
				Borehole/Pit No.		TP-30818
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.		3
Specimen Description	Brown sandy slightly gravelly silty CLAY.			Sample Depth (m)	Top	1.50
					Base	2.50
Specimen Reference	3	Specimen Depth	1.5 m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID		Caus20220930143



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	48
90	100	0.04969	44
75	100	0.03559	40
63	100	0.02533	38
50	100	0.01813	35
37.5	100	0.00965	25
28	100	0.00488	21
20	100	0.00288	13
14	99	0.00154	8
10	95		
6.3	91		
5	89		
3.35	86		
2	82		
1.18	79		
0.6	74	Particle density	(assumed)
0.425	71	2.65	Mg/m3
0.3	67		
0.212	62		
0.15	57		
0.063	48		

Dry Mass of sample, g: 500

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	17.9
Sand	34.1
Silt	37.9
Clay	10.1

Grading Analysis		
D100	mm	
D60	mm	0.184
D30	mm	0.0134
D10	mm	0.00198
Uniformity Coefficient		93
Curvature Coefficient		0.5

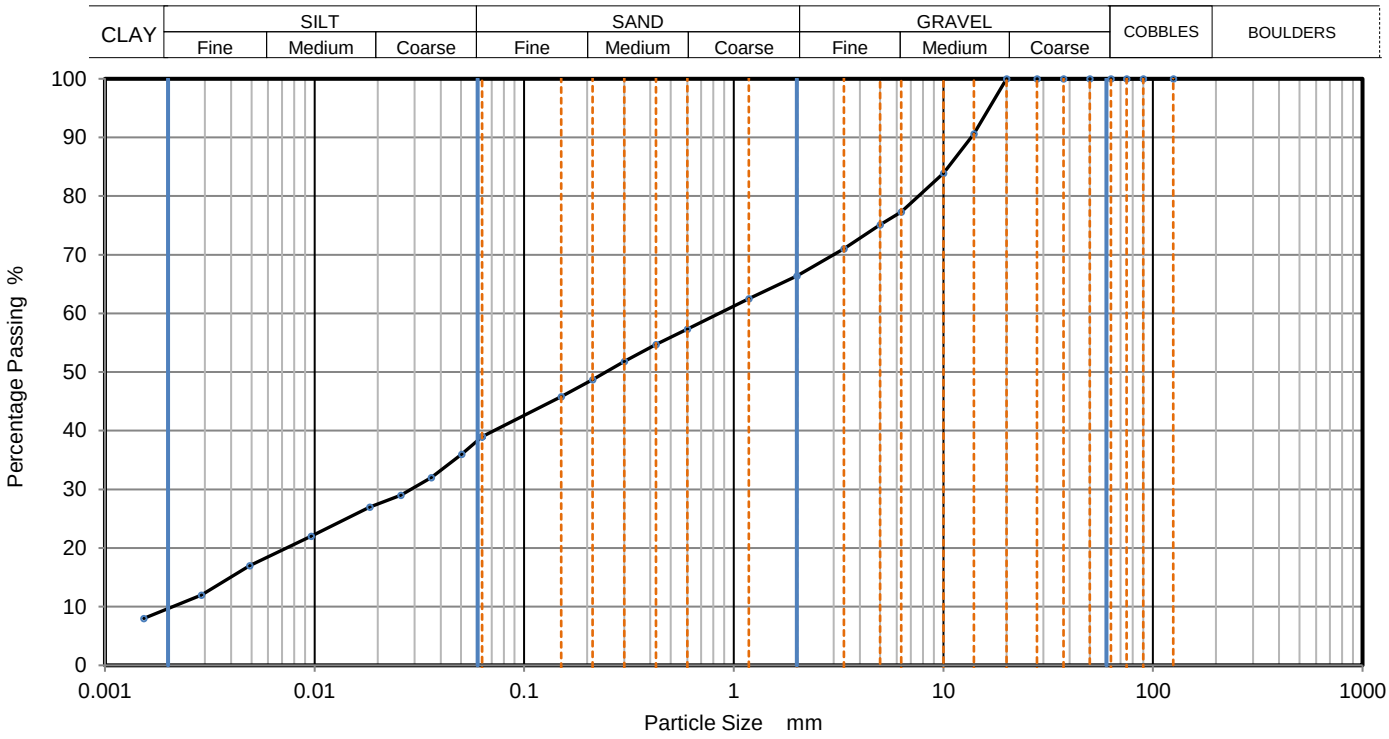
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

UKAS TESTING

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-31002
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Greyish brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	1.50
				Base	2.10
Specimen Reference	2	Specimen Depth	1.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220930148



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	39
90	100	0.05033	36
75	100	0.03604	32
63	100	0.02580	29
50	100	0.01835	27
37.5	100	0.00965	22
28	100	0.00491	17
20	100	0.00288	12
14	91	0.00153	8
10	84		
6.3	77		
5	75		
3.35	71		
2	66		
1.18	63		
0.6	57	Particle density	(assumed)
0.425	55	2.65	Mg/m3
0.3	52		
0.212	49		
0.15	46		
0.063	39		

Dry Mass of sample, g: 536

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	33.6
Sand	27.4
Silt	29.1
Clay	9.9

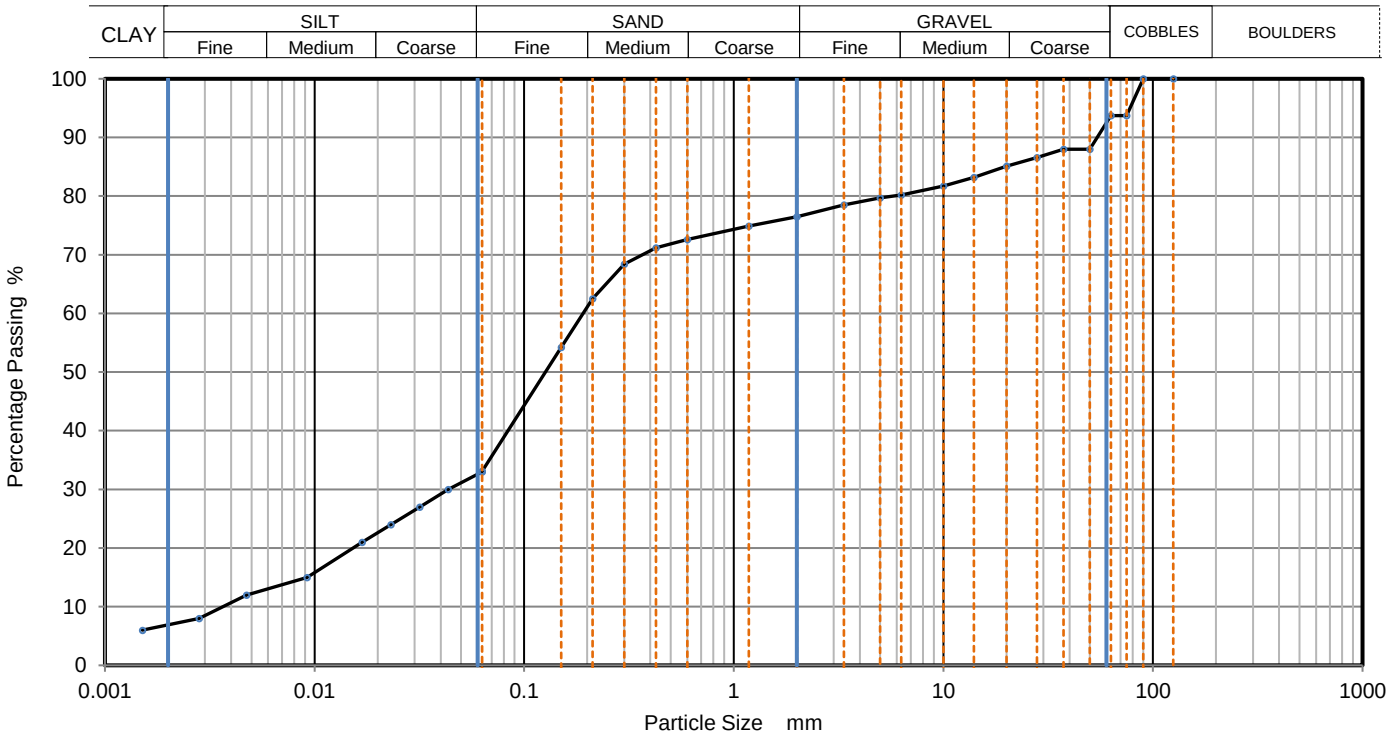
Grading Analysis		
D100	mm	
D60	mm	0.851
D30	mm	0.029
D10	mm	0.00203
Uniformity Coefficient		420
Curvature Coefficient		0.49

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-31603
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Brown gravelly clayey fine to coarse SAND with some cobbles.			Sample Depth (m) Top	0.90
				Sample Depth (m) Base	
Specimen Reference	3	Specimen Depth	0.9 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022080449



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	33
90	100	0.04344	30
75	94	0.03175	27
63	94	0.02316	24
50	88	0.01686	21
37.5	88	0.00919	15
28	87	0.00474	12
20	85	0.00282	8
14	83	0.00151	6
10	82		
6.3	80		
5	80		
3.35	79		
2	77		
1.18	75		
0.6	73	Particle density	(assumed)
0.425	71	2.65	Mg/m3
0.3	68		
0.212	63		
0.15	54		
0.063	33		

Dry Mass of sample, g: 7049

Sample Proportions	% dry mass
Cobbles	6.3
Gravel	17.2
Sand	43.4
Silt	26.2
Clay	6.9

Grading Analysis		
D100	mm	
D60	mm	0.191
D30	mm	0.0427
D10	mm	0.00369
Uniformity Coefficient		52
Curvature Coefficient		2.6

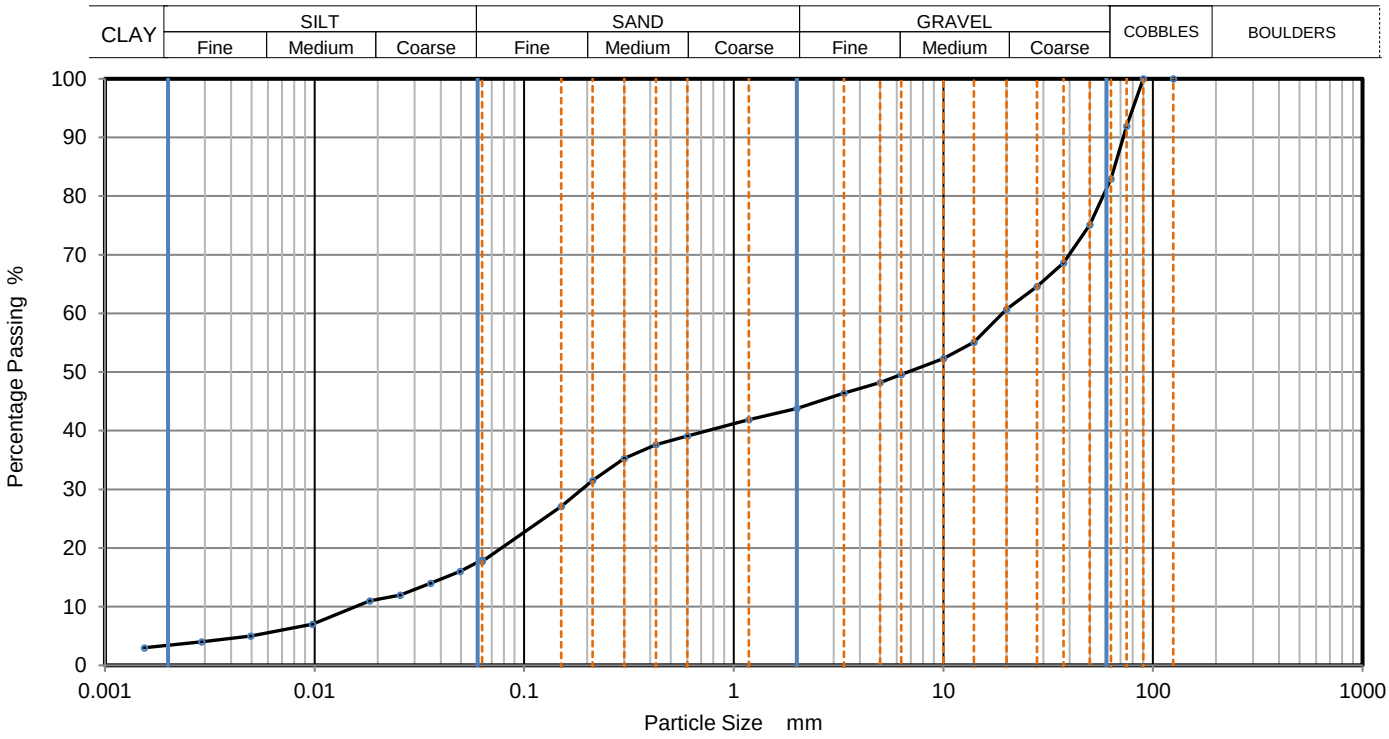
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					TP-31603
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brown sandy silty subangular fine to coarse GRAVEL with cobbles.			Sample Depth (m) Top	1.50
				Sample Depth (m) Base	
Specimen Reference	3	Specimen Depth	1.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022080450



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	18
90	100	0.04936	16
75	92	0.03582	14
63	83	0.02564	12
50	75	0.01835	11
37.5	69	0.00976	7
28	65	0.00496	5
20	61	0.00290	4
14	55	0.00154	3
10	52		
6.3	50		
5	48		
3.35	46		
2	44		
1.18	42		
0.6	39	Particle density	(assumed)
0.425	38	2.65	Mg/m3
0.3	35		
0.212	32		
0.15	27		
0.063	18		

Dry Mass of sample, g: 13086

Sample Proportions	% dry mass
Cobbles	17.1
Gravel	39.1
Sand	26.1
Silt	14.4
Clay	3.3

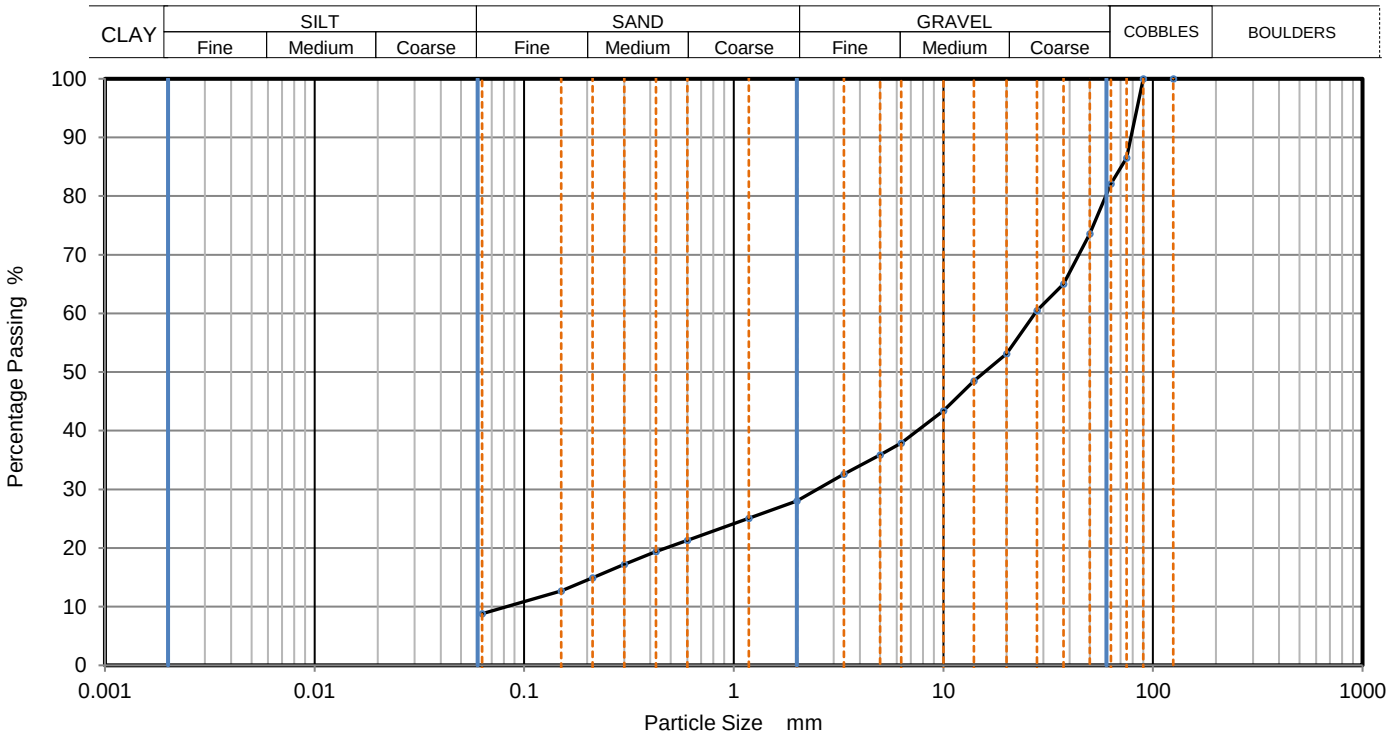
Grading Analysis		
D100	mm	
D60	mm	19.1
D30	mm	0.188
D10	mm	0.0156
Uniformity Coefficient		1200
Curvature Coefficient		0.12

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-31705
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Brown slightly sandy slightly silty subangular fine to coarse GRAVEL with cobbles.			Sample Depth (m) Top	0.50
				Sample Depth (m) Base	
Specimen Reference	3	Specimen Depth	0.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022080451



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	87		
63	82		
50	74		
37.5	65		
28	61		
20	53		
14	49		
10	43		
6.3	38		
5	36		
3.35	33		
2	28		
1.18	25		
0.6	21		
0.425	19		
0.3	17		
0.212	15		
0.15	13		
0.063	9		

Dry Mass of sample, g	13802

Sample Proportions	% dry mass
Cobbles	17.9
Gravel	54.1
Sand	19.2
Fines <0.063mm	9.0

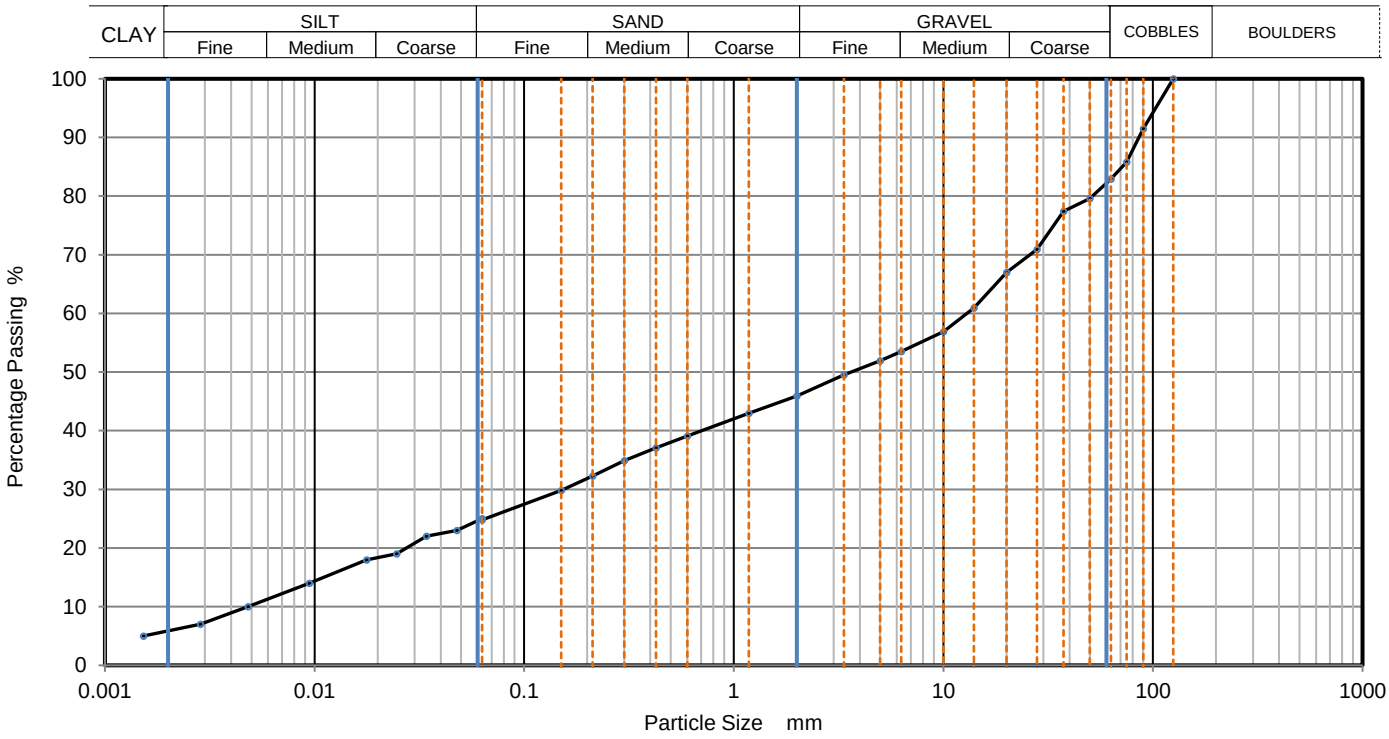
Grading Analysis		
D100	mm	
D60	mm	27.4
D30	mm	2.5
D10	mm	0.0825
Uniformity Coefficient		330
Curvature Coefficient		2.8

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-31805
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		1
Specimen Description	Brown sandy gravelly silty CLAY with cobbles.				Sample Depth (m)	Top	0.50
						Base	
Specimen Reference	3	Specimen Depth	0.5	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022080452



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	25
90	92	0.04770	23
75	86	0.03420	22
63	83	0.02468	19
50	80	0.01768	18
37.5	77	0.00942	14
28	71	0.00482	10
20	67	0.00285	7
14	61	0.00152	5
10	57		
6.3	54		
5	52		
3.35	50		
2	46		
1.18	43		
0.6	39	Particle density	(assumed)
0.425	37	2.65	Mg/m3
0.3	35		
0.212	32		
0.15	30		
0.063	25		

Dry Mass of sample, g: 15946

Sample Proportions	% dry mass
Cobbles	17.1
Gravel	37.0
Sand	21.1
Silt	19.0
Clay	5.8

Grading Analysis		
D100	mm	125
D60	mm	13
D30	mm	0.153
D10	mm	0.00452
Uniformity Coefficient		2900
Curvature Coefficient		0.4

Remarks

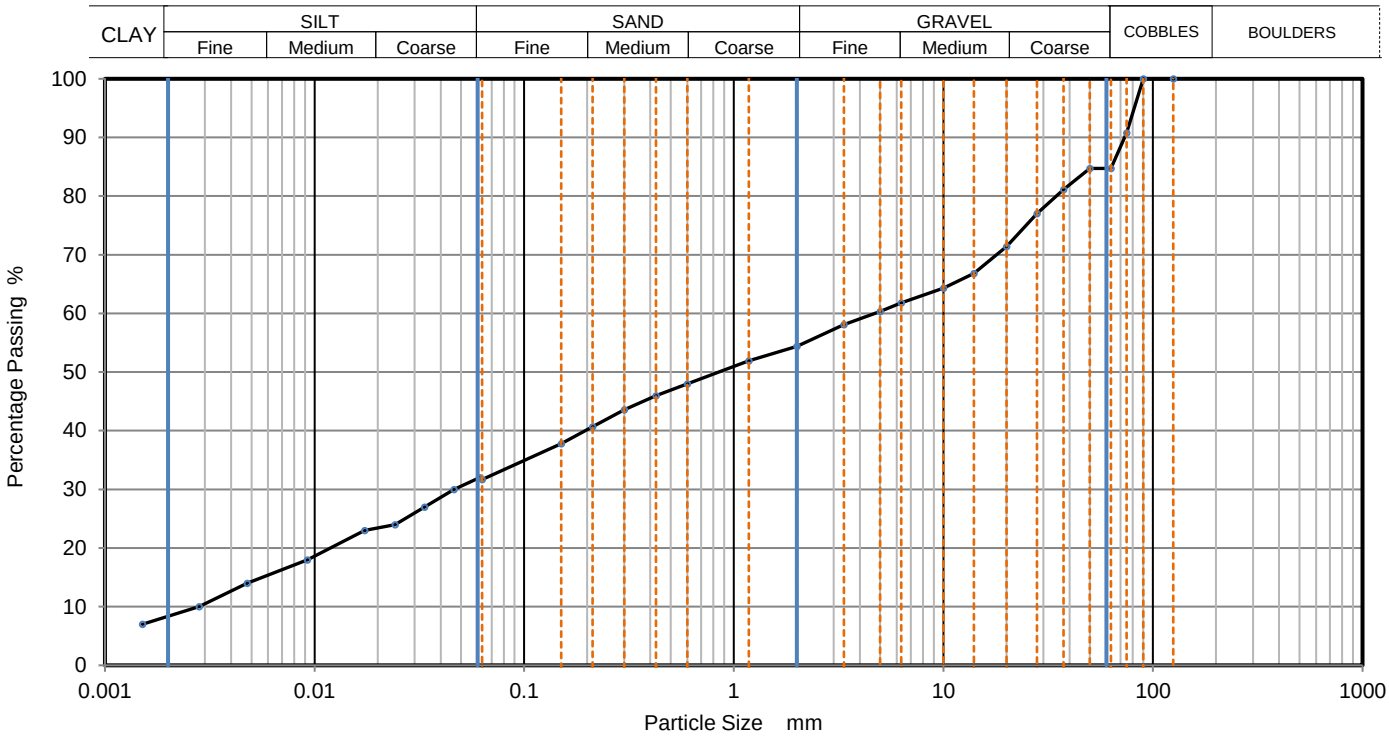
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					TP-31805
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Brown sandy gravelly silty CLAY with cobbles.			Sample Depth (m) Top	1.70
				Sample Depth (m) Base	
Specimen Reference	7	Specimen Depth	1.7 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022080453



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06135	32
90	100	0.04632	30
75	91	0.03349	27
63	85	0.02418	24
50	85	0.01734	23
37.5	81	0.00925	18
28	77	0.00477	14
20	71	0.00282	10
14	67	0.00151	7
10	64		
6.3	62		
5	60		
3.35	58		
2	54		
1.18	52		
0.6	48	Particle density	(assumed)
0.425	46	2.65	Mg/m3
0.3	44		
0.212	41		
0.15	38		
0.063	32		

Dry Mass of sample, g: 11684

Sample Proportions	% dry mass
Cobbles	15.3
Gravel	30.3
Sand	22.7
Silt	23.2
Clay	8.5

Grading Analysis		
D100	mm	
D60	mm	4.73
D30	mm	0.0471
D10	mm	0.00283
Uniformity Coefficient		1700
Curvature Coefficient		0.17

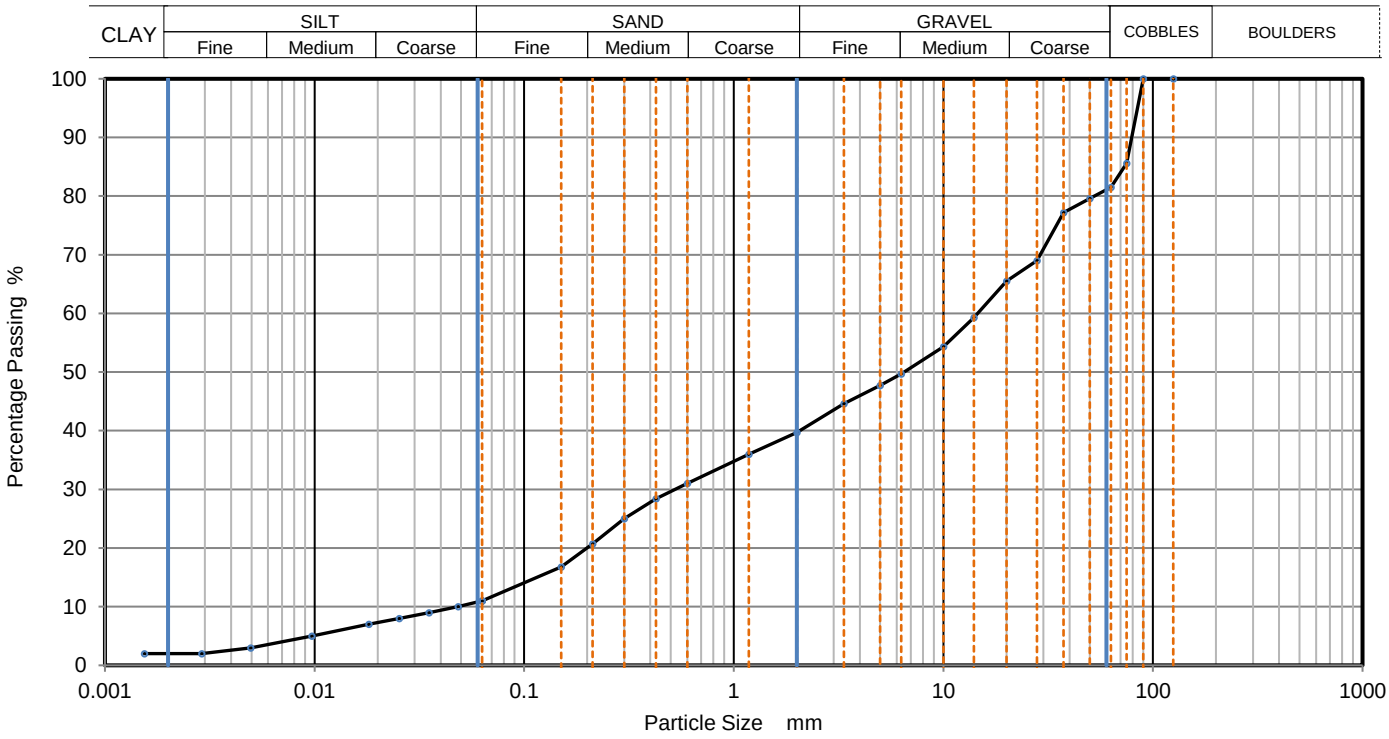
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	TP-32013
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Brown gravelly silty fine to coarse SAND with cobbles.			Sample Depth (m) Top	0.50
				Sample Depth (m) Base	
Specimen Reference	3	Specimen Depth	0.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022080454



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	11
90	100	0.04837	10
75	86	0.03513	9
63	82	0.02533	8
50	80	0.01813	7
37.5	77	0.00970	5
28	69	0.00496	3
20	66	0.00290	2
14	59	0.00154	2
10	54		
6.3	50		
5	48		
3.35	45		
2	40		
1.18	36		
0.6	31	Particle density	(assumed)
0.425	28	2.65	Mg/m3
0.3	25		
0.212	21		
0.15	17		
0.063	11		

Dry Mass of sample, g: 16720

Sample Proportions	% dry mass
Cobbles	18.5
Gravel	41.8
Sand	28.7
Silt	9.2
Clay	1.8

Grading Analysis		
D100	mm	
D60	mm	14.6
D30	mm	0.528
D10	mm	0.046
Uniformity Coefficient		320
Curvature Coefficient		0.42

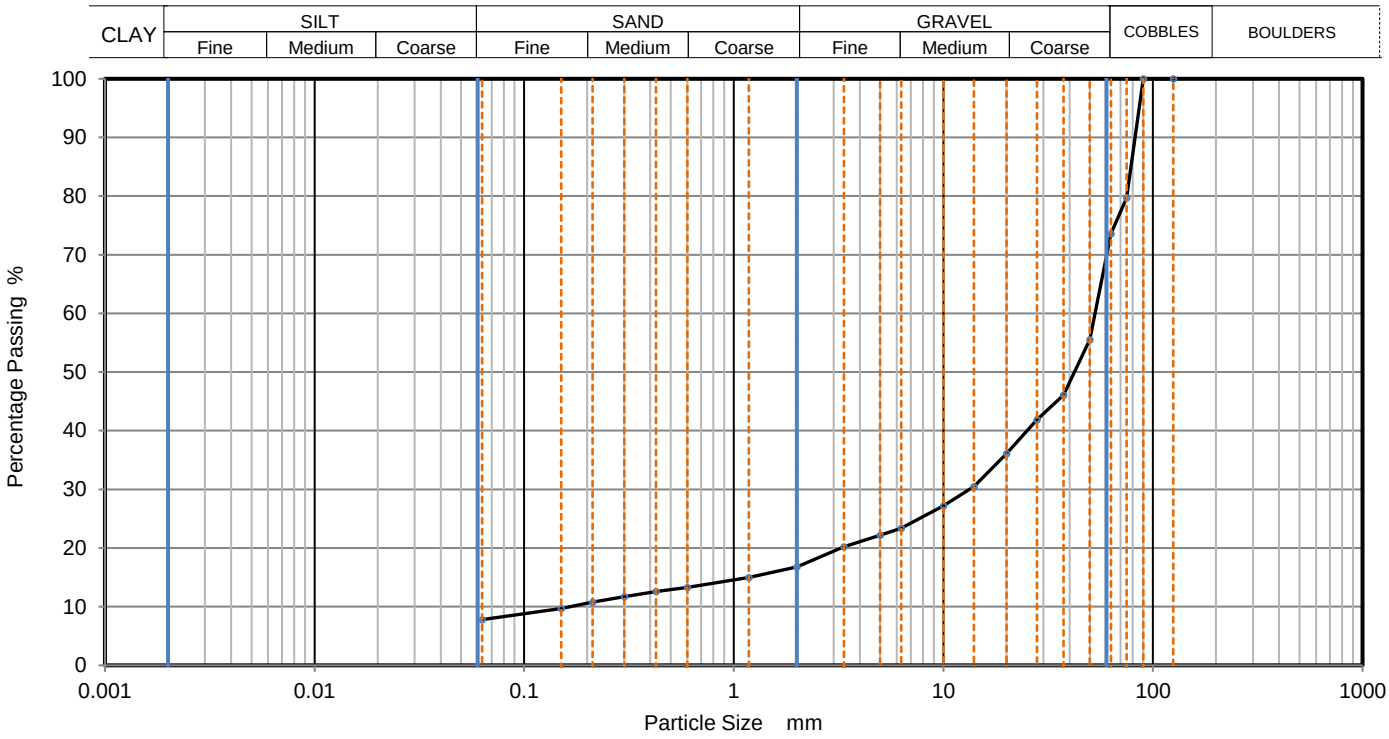
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	TP-32103
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Brown gravelly slightly silty fine to coarse SAND with cobbles.			Sample Depth (m) Top	0.50
				Sample Depth (m) Base	
Specimen Reference	7	Specimen Depth	0.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022080455



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	80		
63	74		
50	56		
37.5	46		
28	42		
20	36		
14	31		
10	27		
6.3	23		
5	22		
3.35	20		
2	17		
1.18	15		
0.6	13		
0.425	13		
0.3	12		
0.212	11		
0.15	10		
0.063	8		

Dry Mass of sample, g: 15891

Sample Proportions	% dry mass
Cobbles	26.4
Gravel	56.8
Sand	9.0
Fines <0.063mm	8.0

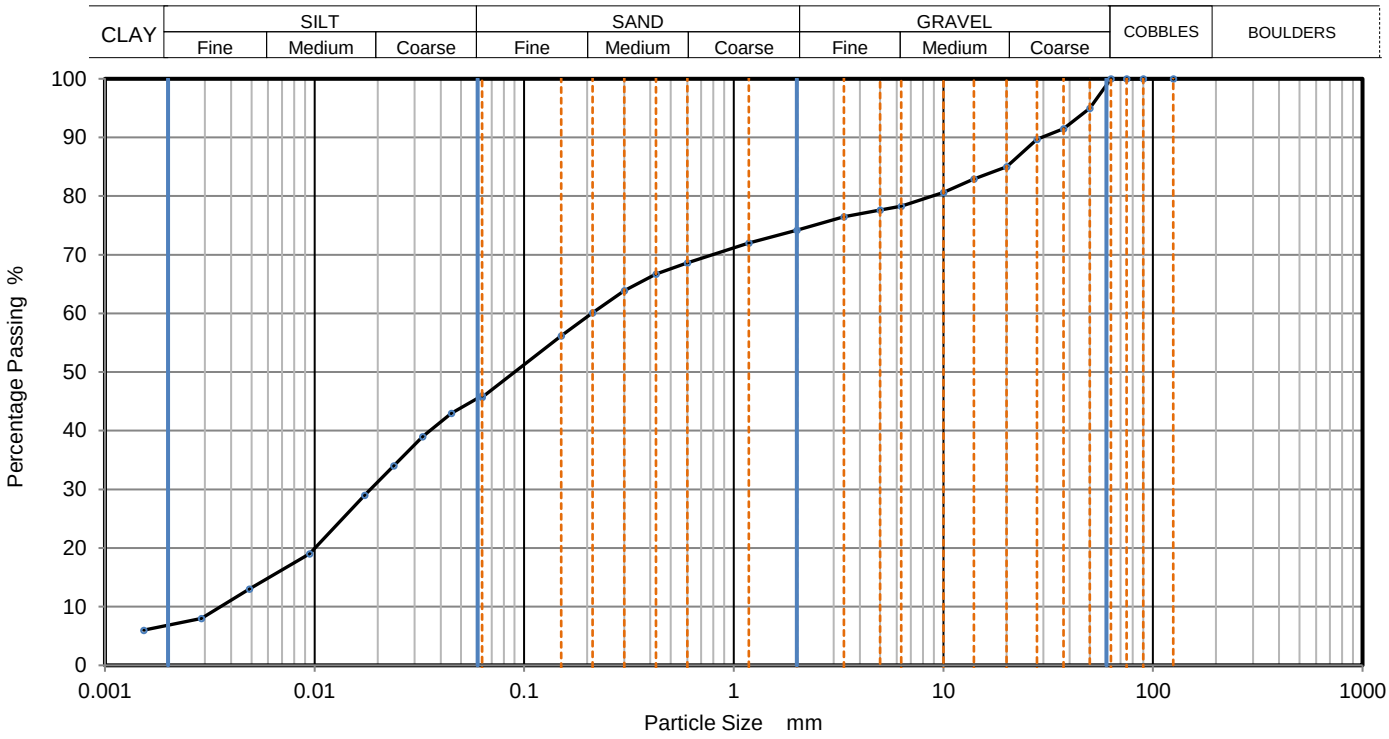
Grading Analysis		
D100	mm	
D60	mm	52.9
D30	mm	13.3
D10	mm	0.163
Uniformity Coefficient		320
Curvature Coefficient		21

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-32201
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		1
Specimen Description	Brownish grey sandy gravelly silty CLAY.				Sample Depth (m)	Top	0.50
						Base	
Specimen Reference	7	Specimen Depth	0.5	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022080456



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	46
90	100	0.04491	43
75	100	0.03276	39
63	100	0.02385	34
50	95	0.01734	29
37.5	92	0.00948	19
28	90	0.00488	13
20	85	0.00288	8
14	83	0.00153	6
10	81		
6.3	78		
5	78		
3.35	77		
2	74		
1.18	72		
0.6	69	Particle density	(assumed)
0.425	67	2.65	Mg/m3
0.3	64		
0.212	60		
0.15	56		
0.063	46		

Dry Mass of sample, g: 9611

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	25.8
Sand	28.5
Silt	38.9
Clay	6.8

Grading Analysis		
D100	mm	
D60	mm	0.21
D30	mm	0.0182
D10	mm	0.00353
Uniformity Coefficient		59
Curvature Coefficient		0.45

Remarks

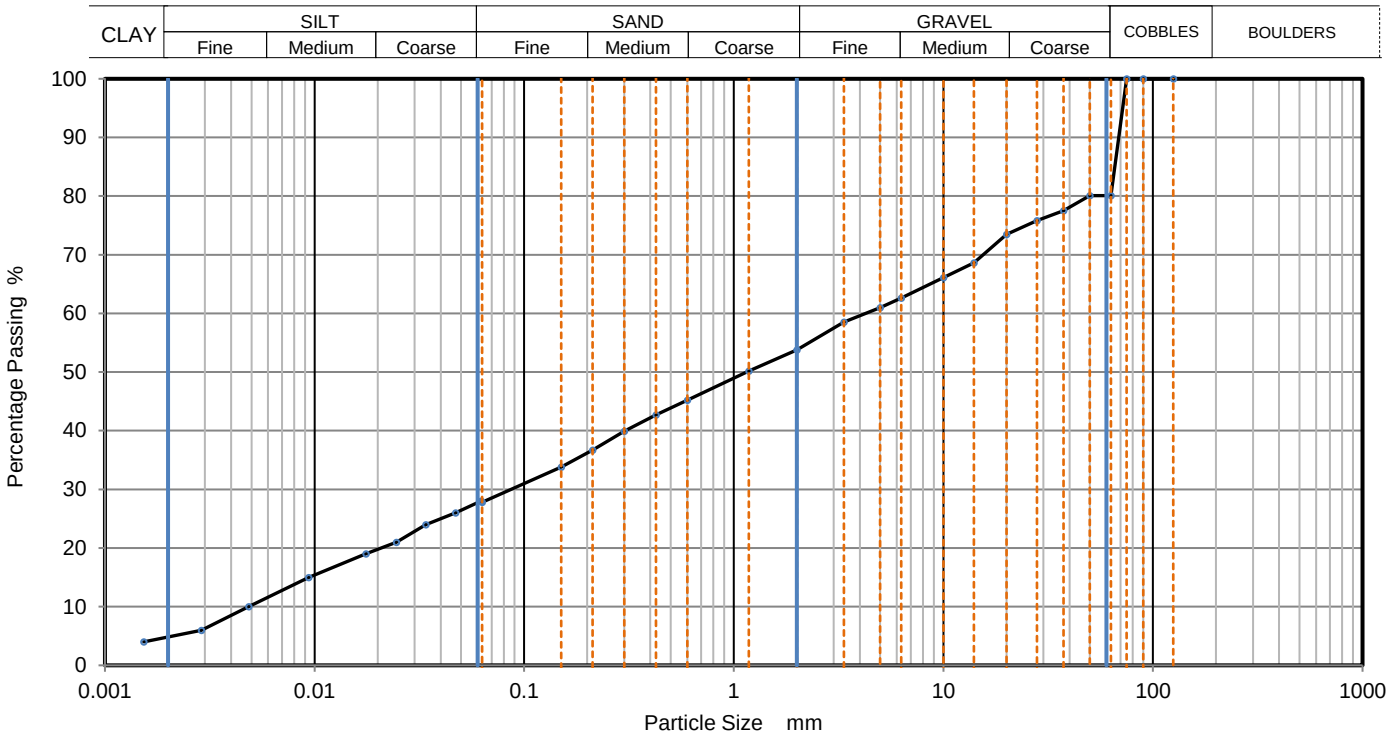
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

Job Ref					**21-1682**
Borehole/Pit No.					TP-32320
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Brownish grey sandy gravelly silty CLAY with cobbles.			Sample Depth (m) Top	0.50
				Sample Depth (m) Base	
Specimen Reference	7	Specimen Depth	0.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022080457



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06230	28
90	100	0.04701	26
75	100	0.03397	24
63	80	0.02452	21
50	80	0.01757	19
37.5	78	0.00936	15
28	76	0.00485	10
20	74	0.00288	6
14	69	0.00153	4
10	66		
6.3	63		
5	61		
3.35	59		
2	54		
1.18	50		
0.6	45	Particle density	(assumed)
0.425	43	2.65	Mg/m3
0.3	40		
0.212	37		
0.15	34		
0.063	28		

Dry Mass of sample, g: 13751

Sample Proportions	% dry mass
Cobbles	19.9
Gravel	26.3
Sand	26.1
Silt	22.8
Clay	4.9

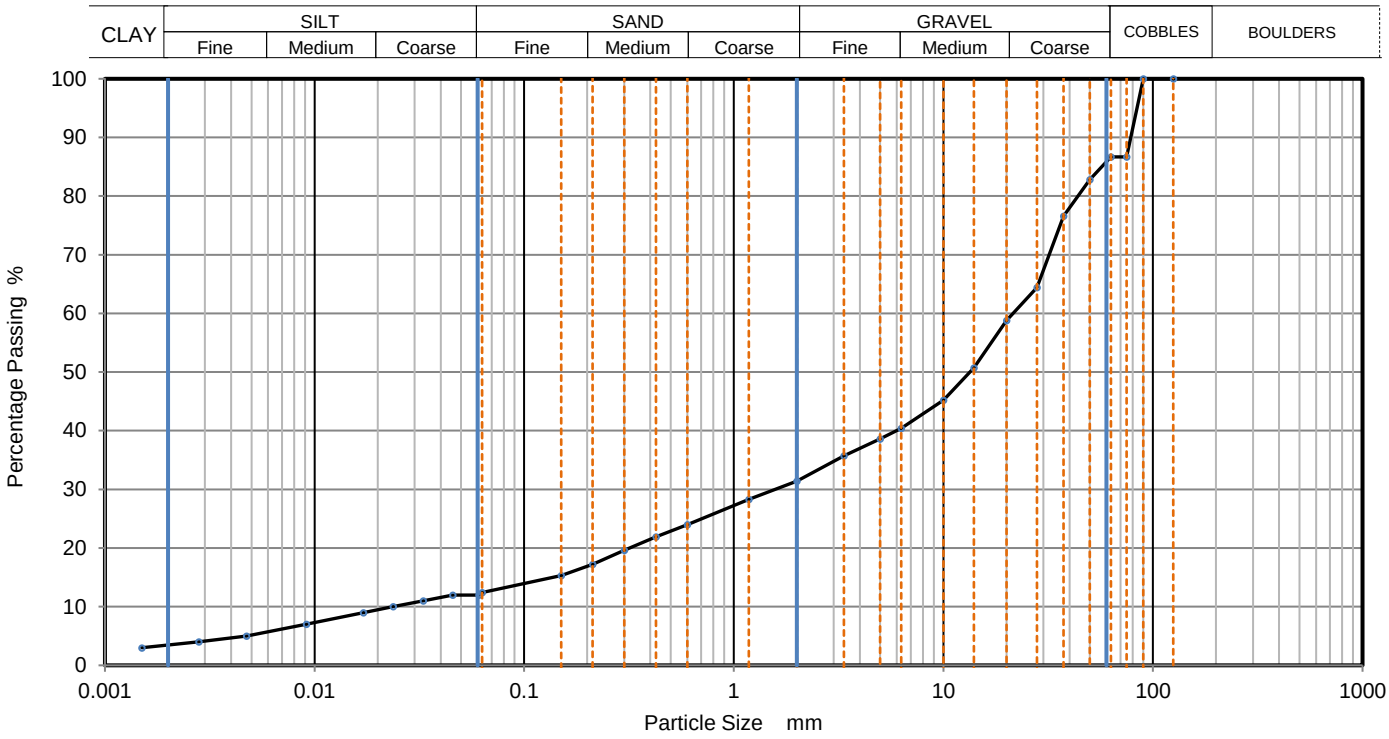
Grading Analysis		
D100	mm	
D60	mm	4.24
D30	mm	0.0869
D10	mm	0.00479
Uniformity Coefficient		890
Curvature Coefficient		0.37

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-32320
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brownish grey sandy silty subangular fine to coarse GRAVEL with some cobbles.			Sample Depth (m) Top	1.40
				Base	
Specimen Reference	3	Specimen Depth	1.4 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022080458



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06086	12
90	100	0.04561	12
75	87	0.03299	11
63	87	0.02367	10
50	83	0.01710	9
37.5	77	0.00913	7
28	64	0.00474	5
20	59	0.00280	4
14	51	0.00150	3
10	45		
6.3	40		
5	39		
3.35	36		
2	31		
1.18	28		
0.6	24	Particle density	(assumed)
0.425	22	2.65	Mg/m3
0.3	20		
0.212	17		
0.15	15		
0.063	12		

Dry Mass of sample, g: 17144

Sample Proportions	% dry mass
Cobbles	13.3
Gravel	55.4
Sand	19.0
Silt	9.0
Clay	3.3

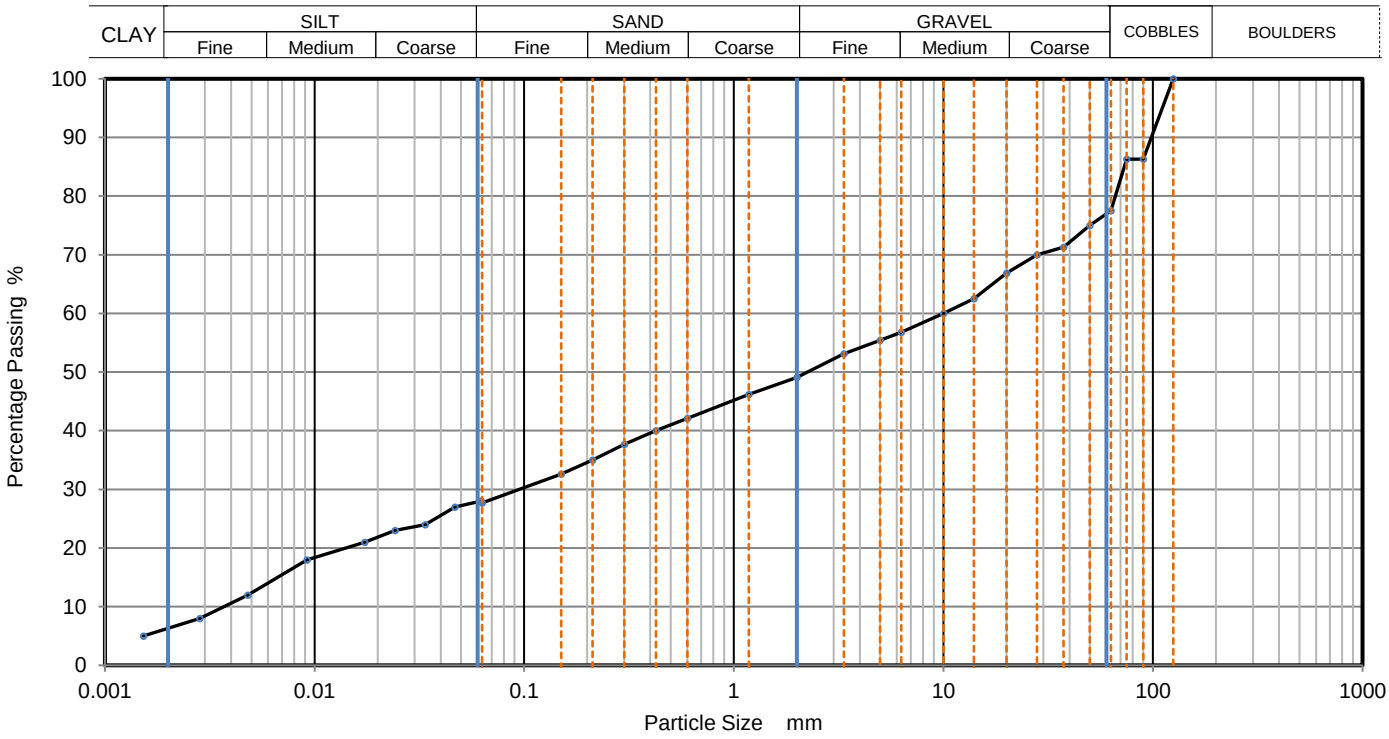
Grading Analysis		
D100	mm	
D60	mm	21.5
D30	mm	1.58
D10	mm	0.0218
Uniformity Coefficient		990
Curvature Coefficient		5.3

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-32401
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brownish grey sandy gravelly silty CLAY with cobbles.			Sample Depth (m) Top	1.40
				Sample Depth (m) Base	
Specimen Reference	7	Specimen Depth	1.4 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022080459



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06230	28
90	86	0.04667	27
75	86	0.03373	24
63	78	0.02418	23
50	75	0.01734	21
37.5	71	0.00919	18
28	70	0.00480	12
20	67	0.00283	8
14	63	0.00152	5
10	60		
6.3	57		
5	55		
3.35	53		
2	49		
1.18	46		
0.6	42	Particle density	(assumed)
0.425	40	2.65	Mg/m3
0.3	38		
0.212	35		
0.15	33		
0.063	28		

Dry Mass of sample, g: 11841

Sample Proportions	% dry mass
Cobbles	22.5
Gravel	28.4
Sand	21.4
Silt	21.2
Clay	6.5

Grading Analysis		
D100	mm	125
D60	mm	10.1
D30	mm	0.0948
D10	mm	0.00364
Uniformity Coefficient		2800
Curvature Coefficient		0.25

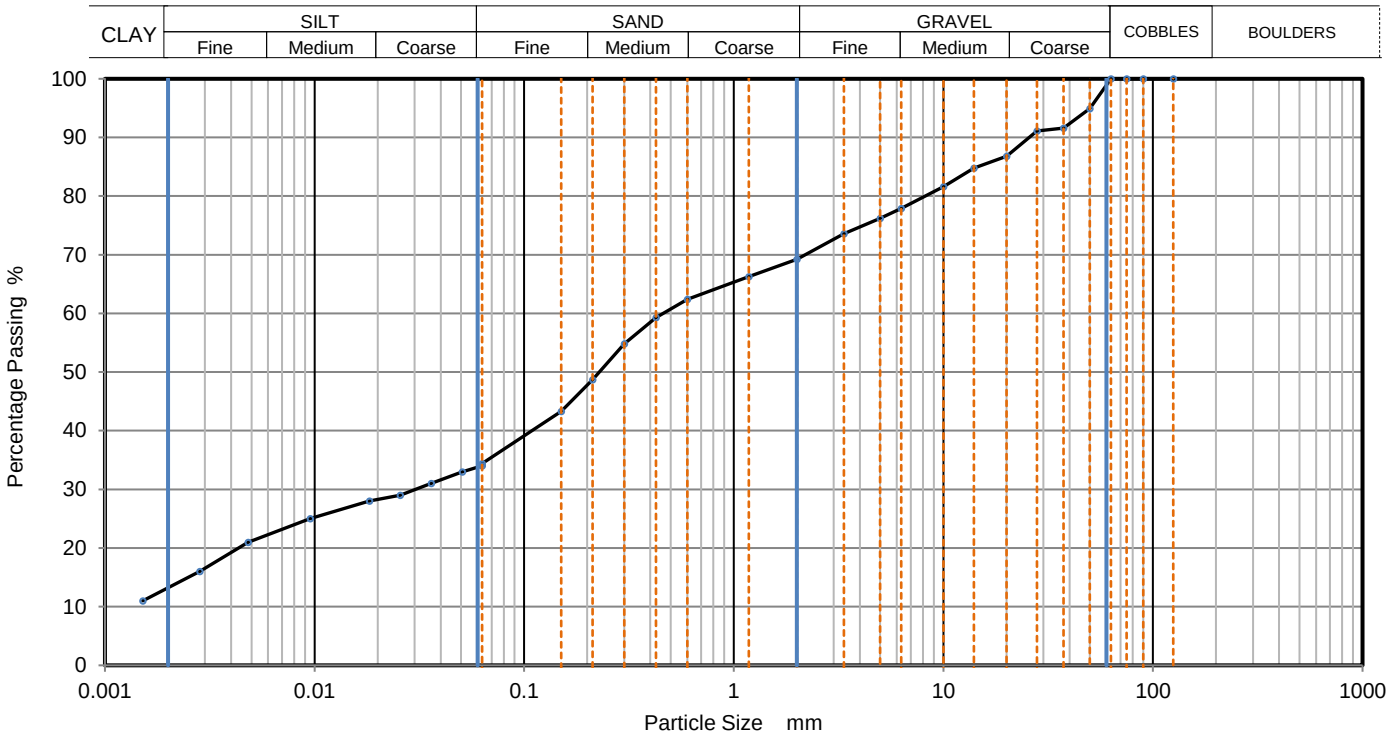
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION			Job Ref		21-1682
				Borehole/Pit No.		TP-3302
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.		3
Specimen Description	Brown sandy gravelly silty CLAY.			Sample Depth (m)	Top	1.35
					Base	3.10
Specimen Reference	6	Specimen Depth	1.35 m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID		Caus20220908137



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	34
90	100	0.05065	33
75	100	0.03604	31
63	100	0.02564	29
50	95	0.01824	28
37.5	92	0.00953	25
28	91	0.00482	21
20	87	0.00283	16
14	85	0.00152	11
10	82		
6.3	78		
5	76		
3.35	74		
2	69		
1.18	66		
0.6	62	Particle density	(assumed)
0.425	59	2.65	Mg/m3
0.3	55		
0.212	49		
0.15	43		
0.063	34		

Dry Mass of sample, g: 10262

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	30.8
Sand	34.8
Silt	20.8
Clay	13.6

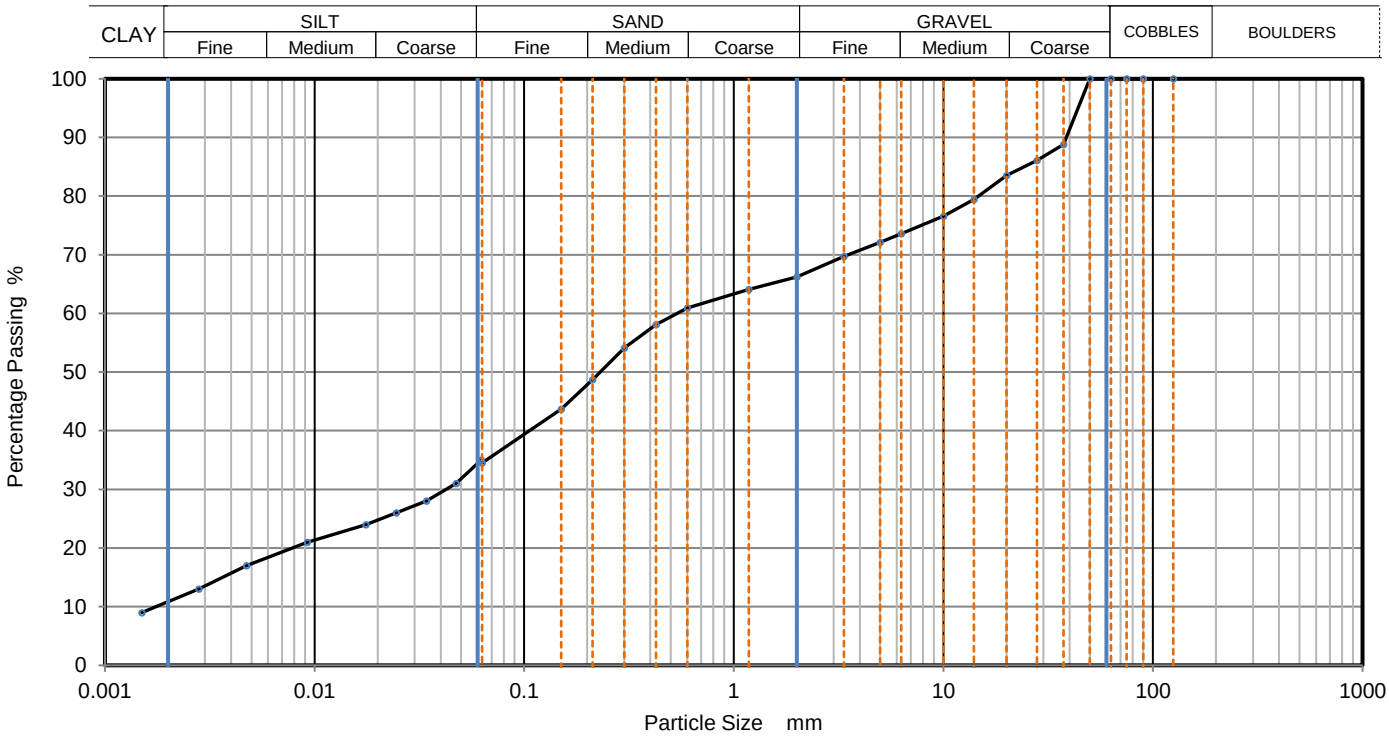
Grading Analysis		
D100	mm	
D60	mm	0.458
D30	mm	0.0285
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION			Job Ref		21-1682
				Borehole/Pit No.		TP-3302
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.		4
Specimen Description	Brown sandy gravelly silty CLAY.			Sample Depth (m)	Top	3.10
					Base	3.60
Specimen Reference	6	Specimen Depth	3.1 m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID		Caus20220908138



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06230	35
90	100	0.04736	31
75	100	0.03420	28
63	100	0.02452	26
50	100	0.01757	24
37.5	89	0.00925	21
28	86	0.00474	17
20	84	0.00280	13
14	79	0.00150	9
10	77		
6.3	74		
5	72		
3.35	70		
2	66		
1.18	64		
0.6	61	Particle density	(assumed)
0.425	58	2.65	Mg/m3
0.3	54		
0.212	49		
0.15	44		
0.063	35		

Dry Mass of sample, g: 2820

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	33.8
Sand	31.7
Silt	23.6
Clay	10.9

Grading Analysis		
D100	mm	
D60	mm	0.536
D30	mm	0.0411
D10	mm	0.00169
Uniformity Coefficient		320
Curvature Coefficient		1.9

Remarks

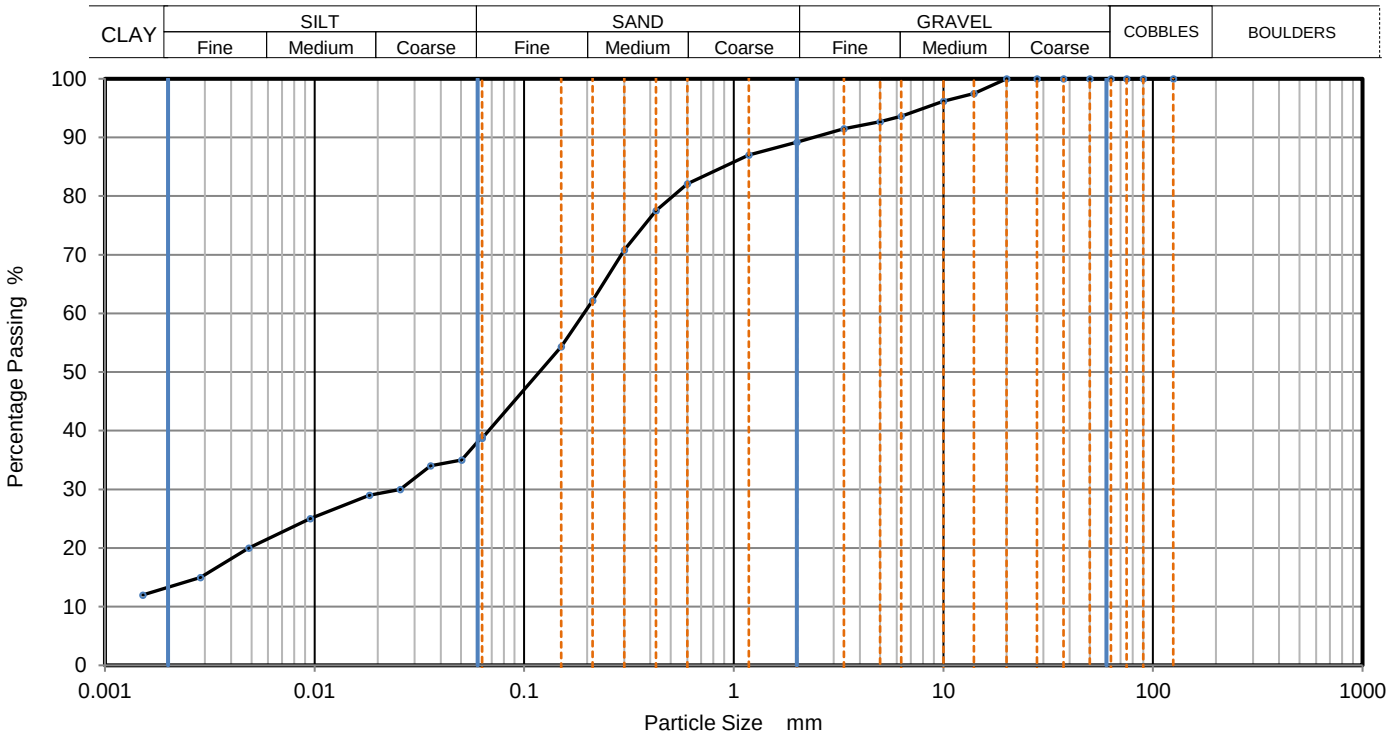
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					TP-3504
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	4
Specimen Description	Brown slightly gravelly clayey fine to coarse SAND.			Sample Depth (m) Top	1.00
				Base	2.30
Specimen Reference	7	Specimen Depth	1 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220908139



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	39
90	100	0.05033	35
75	100	0.03582	34
63	100	0.02564	30
50	100	0.01824	29
37.5	100	0.00953	25
28	100	0.00485	20
20	100	0.00285	15
14	98	0.00152	12
10	96		
6.3	94		
5	93		
3.35	92		
2	89		
1.18	87		
0.6	82	Particle density	(assumed)
0.425	78	2.65	Mg/m3
0.3	71		
0.212	62		
0.15	54		
0.063	39		

Dry Mass of sample, g: 393

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	10.8
Sand	50.5
Silt	25.4
Clay	13.3

Grading Analysis		
D100	mm	
D60	mm	0.192
D30	mm	0.0242
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

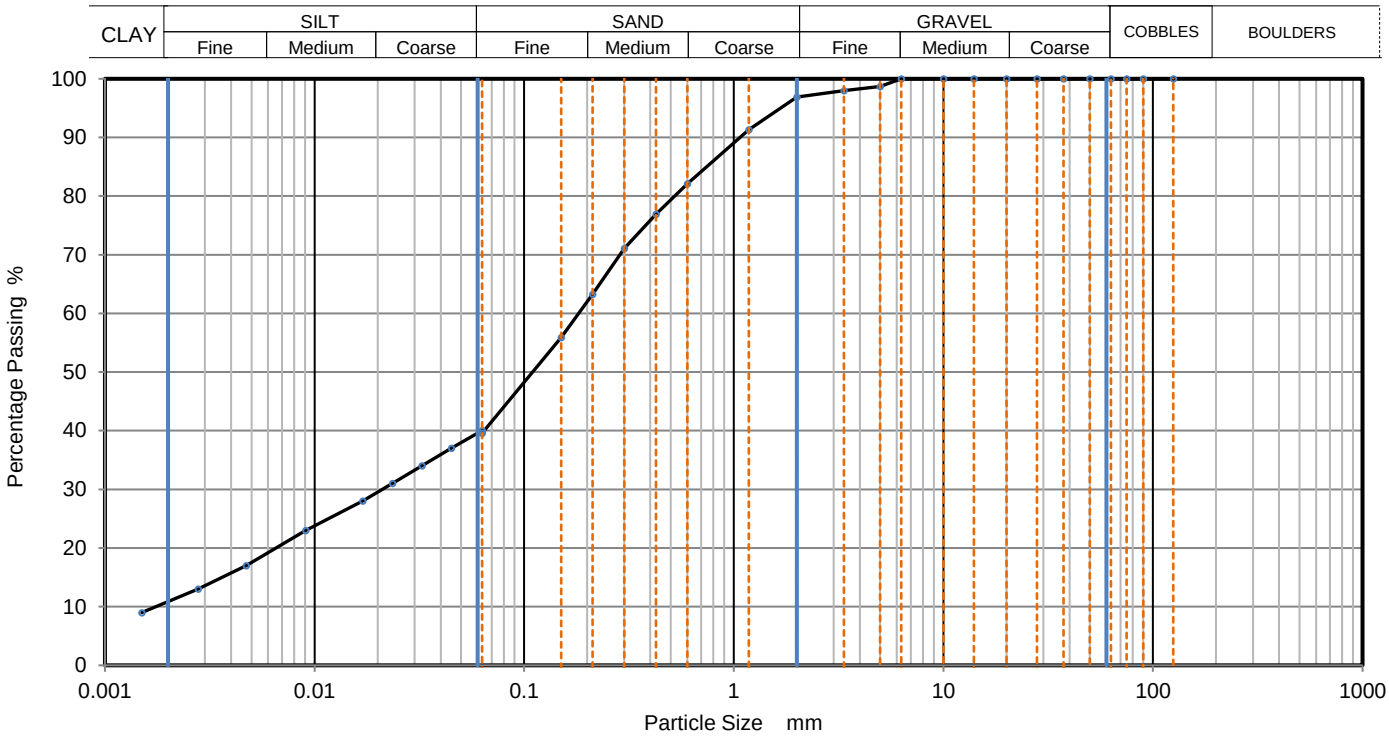
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					**21-1682**
Borehole/Pit No.					TP-3504
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Brown slightly gravelly clayey fine to coarse SAND.			Sample Depth (m) Top	2.30
				Base	2.70
Specimen Reference	6	Specimen Depth	2.3 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220908140



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	40
90	100	0.04491	37
75	100	0.03251	34
63	100	0.02351	31
50	100	0.01698	28
37.5	100	0.00907	23
28	100	0.00471	17
20	100	0.00278	13
14	100	0.00150	9
10	100		
6.3	100		
5	99		
3.35	98		
2	97		
1.18	91		
0.6	82	Particle density	(assumed)
0.425	77	2.65	Mg/m3
0.3	71		
0.212	63		
0.15	56		
0.063	40		

Dry Mass of sample, g: 262

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	3.1
Sand	57.3
Silt	28.8
Clay	10.8

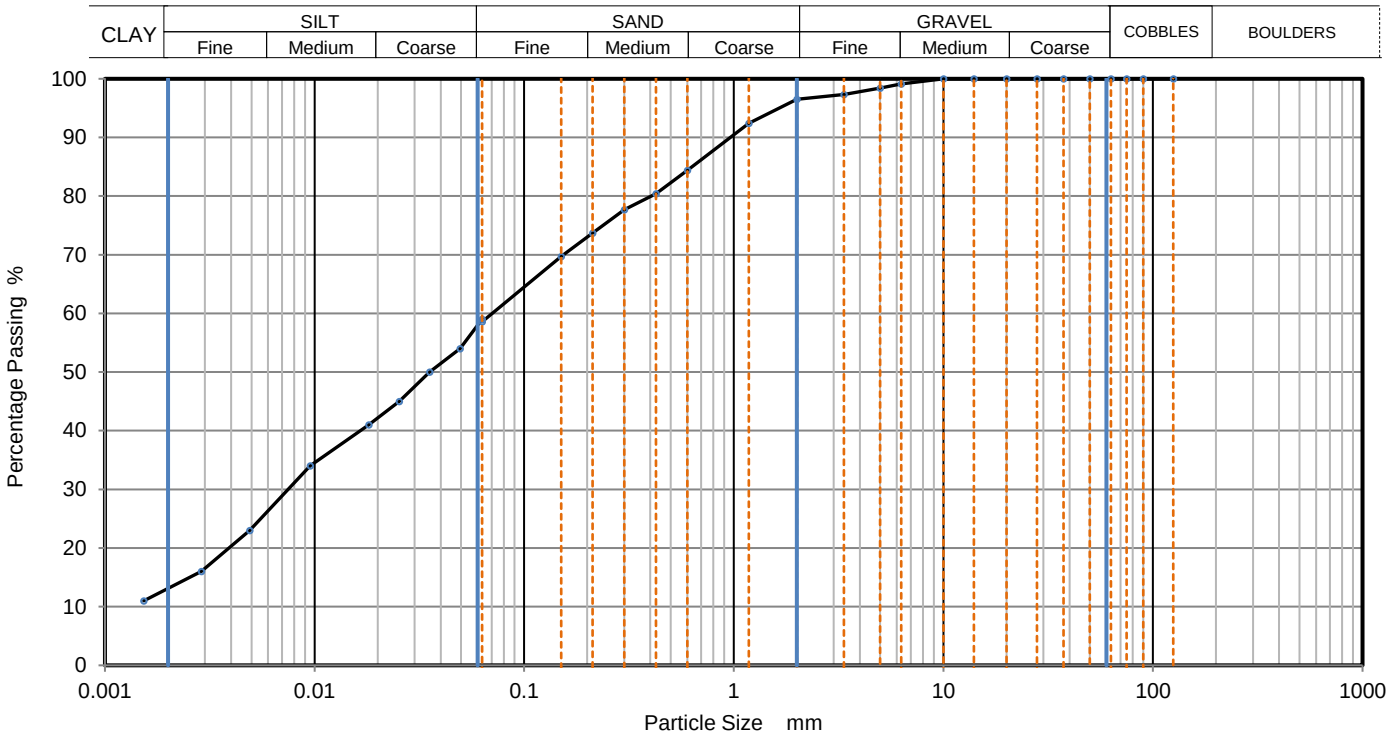
Grading Analysis		
D100	mm	
D60	mm	0.182
D30	mm	0.0218
D10	mm	0.00178
Uniformity Coefficient		100
Curvature Coefficient		1.5

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-3504
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		2
Specimen Description	Brownish black slightly sandy organic clayey SILT.				Sample Depth (m)	Top	2.70
						Base	3.00
Specimen Reference	6	Specimen Depth	2.7	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus20220908141



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	59
90	100	0.04936	54
75	100	0.03536	50
63	100	0.02533	45
50	100	0.01813	41
37.5	100	0.00953	34
28	100	0.00491	23
20	100	0.00288	16
14	100	0.00153	11
10	100		
6.3	99		
5	98		
3.35	97		
2	97		
1.18	92		
0.6	84	Particle density	(assumed)
0.425	80	2.65	Mg/m3
0.3	78		
0.212	74		
0.15	70		
0.063	59		

Dry Mass of sample, g: 254

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	3.5
Sand	38.0
Silt	45.3
Clay	13.2

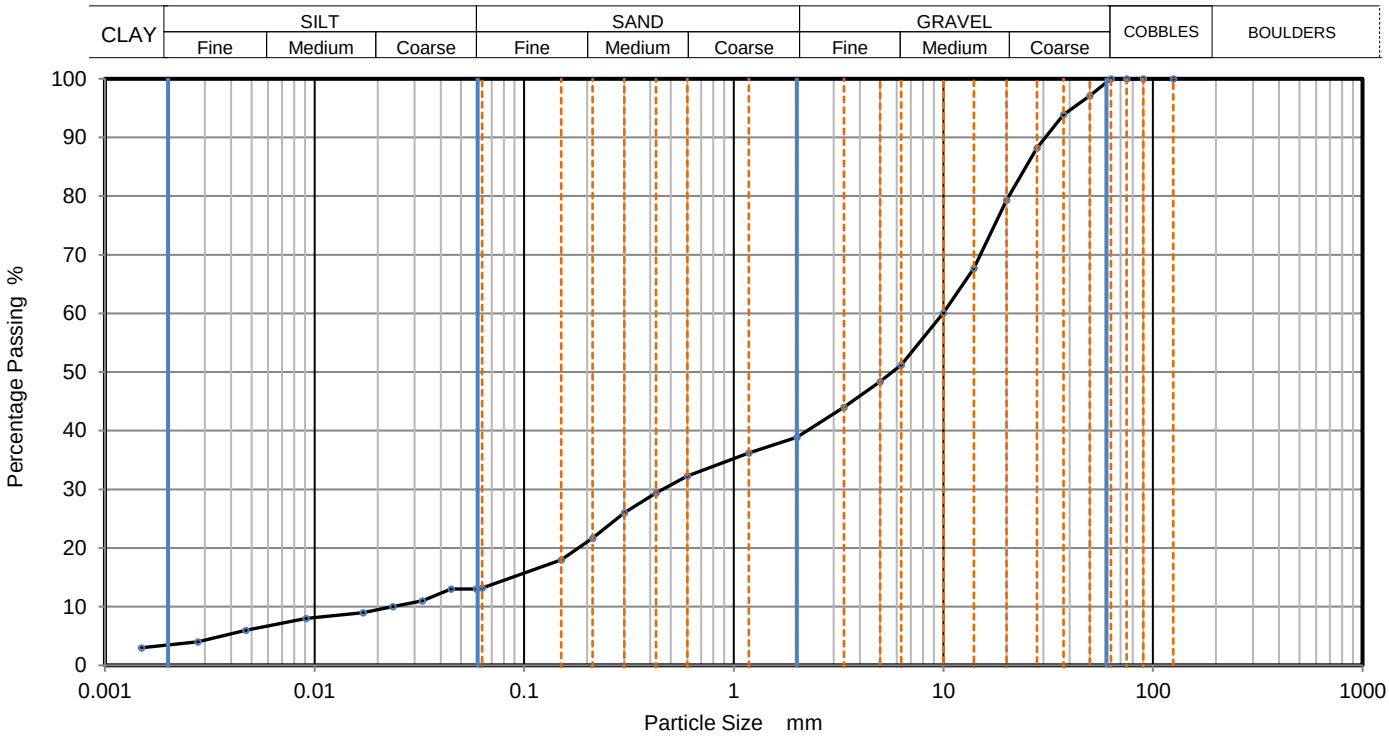
Grading Analysis		
D100	mm	
D60	mm	0.0705
D30	mm	0.00762
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-3504
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		1
Specimen Description	Brown sandy clayey subangular fine to coarse GRAVEL.				Sample Depth (m)	Top	3.00
						Base	3.60
Specimen Reference	4	Specimen Depth	3	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus20220908142



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.05922	13
90	100	0.04476	13
75	100	0.03266	11
63	100	0.02361	10
50	97	0.01705	9
37.5	94	0.00911	8
28	88	0.00470	6
20	79	0.00278	4
14	68	0.00150	3
10	60		
6.3	51		
5	48		
3.35	44		
2	39		
1.18	36		
0.6	32	Particle density	(assumed)
0.425	29	2.65	Mg/m3
0.3	26		
0.212	22		
0.15	18		
0.063	13		

Dry Mass of sample, g: 14811

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	61.1
Sand	25.7
Silt	9.4
Clay	3.8

Grading Analysis		
D100	mm	
D60	mm	9.95
D30	mm	0.456
D10	mm	0.0222
Uniformity Coefficient		450
Curvature Coefficient		0.94

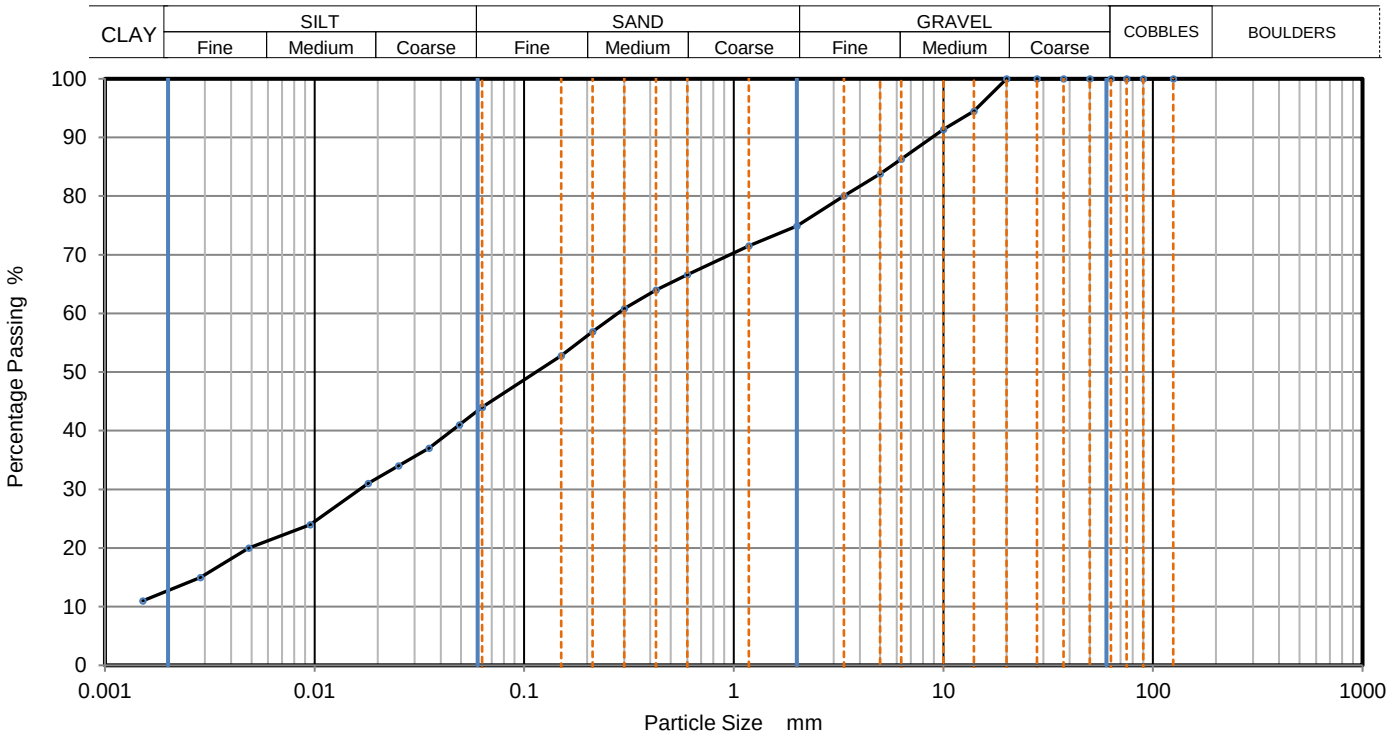
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION			Job Ref		21-1682
				Borehole/Pit No.		TP-35435
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.		3
Specimen Description	Greyish brown sandy slightly gravelly silty CLAY.			Sample Depth (m)	Top	1.50
					Base	2.80
Specimen Reference	3	Specimen Depth	1.5 m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID		Caus20220930151



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	44
90	100	0.04903	41
75	100	0.03513	37
63	100	0.02517	34
50	100	0.01802	31
37.5	100	0.00953	24
28	100	0.00485	20
20	100	0.00285	15
14	95	0.00152	11
10	91		
6.3	86		
5	84		
3.35	80		
2	75		
1.18	72		
0.6	67	Particle density	(assumed)
0.425	64	2.65	Mg/m3
0.3	61		
0.212	57		
0.15	53		
0.063	44		

Dry Mass of sample, g: 510

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	25.1
Sand	31.0
Silt	31.1
Clay	12.8

Grading Analysis		
D100	mm	
D60	mm	0.28
D30	mm	0.0164
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

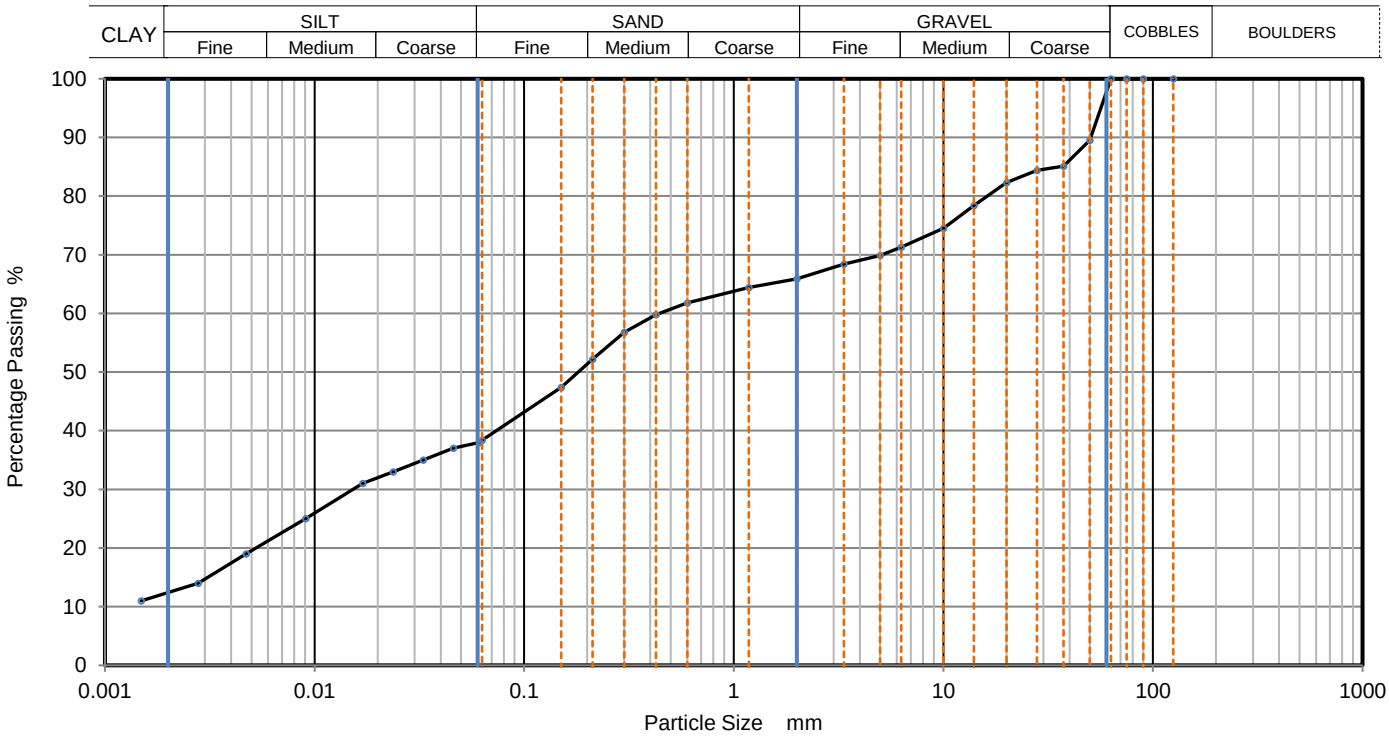
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					TP-3978
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brownish grey sandy gravelly silty CLAY.			Sample Depth (m) Top	0.60
				Base	1.60
Specimen Reference	9	Specimen Depth	0.6 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022090536



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06135	38
90	100	0.04597	37
75	100	0.03300	35
63	100	0.02368	33
50	90	0.01698	31
37.5	85	0.00907	25
28	84	0.00471	19
20	82	0.00278	14
14	78	0.00149	11
10	75		
6.3	71		
5	70		
3.35	68		
2	66		
1.18	64		
0.6	62	Particle density	(assumed)
0.425	60	2.65	Mg/m3
0.3	57		
0.212	52		
0.15	47		
0.063	38		

Dry Mass of sample, g: 10322

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	34.1
Sand	27.5
Silt	25.9
Clay	12.5

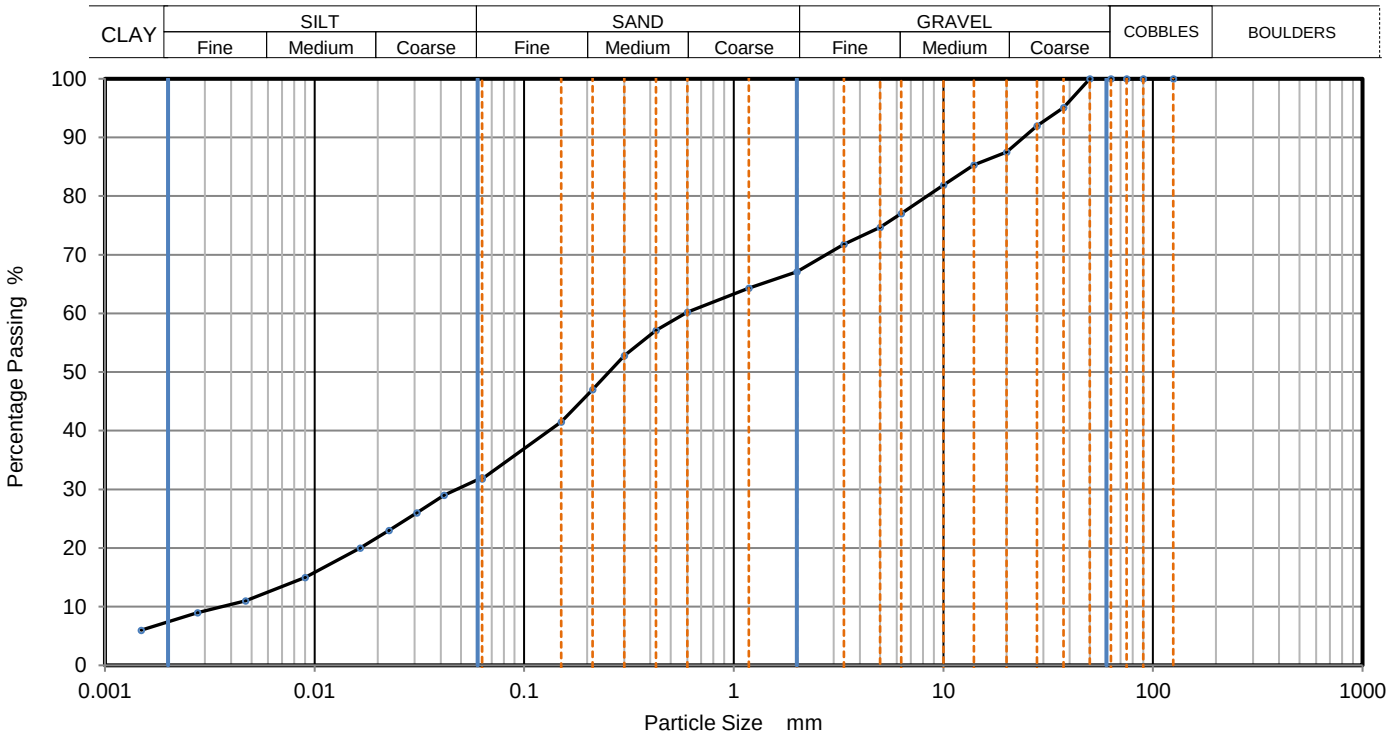
Grading Analysis		
D100	mm	
D60	mm	0.437
D30	mm	0.0156
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-3978
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Brownish grey gravelly silty fine to coarse SAND.			Sample Depth (m) Top	1.60
				Base	3.20
Specimen Reference	11	Specimen Depth	1.6 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022090537



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	32
90	100	0.04154	29
75	100	0.03072	26
63	100	0.02263	23
50	100	0.01650	20
37.5	95	0.00901	15
28	92	0.00468	11
20	88	0.00277	9
14	85	0.00149	6
10	82		
6.3	77		
5	75		
3.35	72		
2	67		
1.18	64		
0.6	60	Particle density	(assumed)
0.425	57	2.65	Mg/m3
0.3	53		
0.212	47		
0.15	42		
0.063	32		

Dry Mass of sample, g: 3715

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	32.9
Sand	35.3
Silt	24.2
Clay	7.6

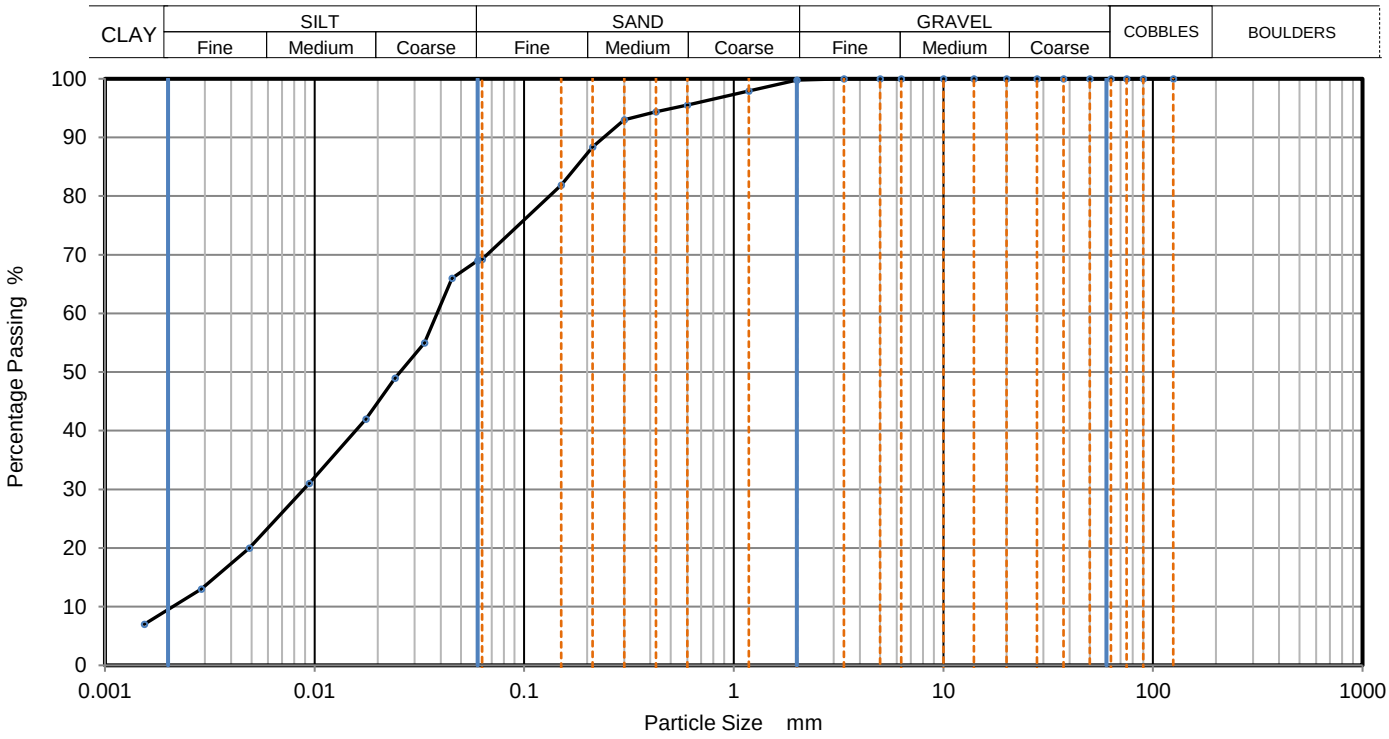
Grading Analysis		
D100	mm	
D60	mm	0.59
D30	mm	0.047
D10	mm	0.00347
Uniformity Coefficient		170
Curvature Coefficient		1.1

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-4112
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Brown sandy silty CLAY.			Sample Depth (m) Top	0.20
				Base	1.60
Specimen Reference	6	Specimen Depth	0.2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220908143



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.05991	69
90	100	0.04526	66
75	100	0.03349	55
63	100	0.02418	49
50	100	0.01757	42
37.5	100	0.00942	31
28	100	0.00488	20
20	100	0.00288	13
14	100	0.00154	7
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	98		
0.6	96	Particle density	(assumed)
0.425	94	2.65	Mg/m3
0.3	93		
0.212	88		
0.15	82		
0.063	69		

Dry Mass of sample, g: 393

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	0.2
Sand	30.6
Silt	59.6
Clay	9.6

Grading Analysis		
D100	mm	
D60	mm	0.0388
D30	mm	0.00889
D10	mm	0.0021
Uniformity Coefficient		18
Curvature Coefficient		0.97

Remarks

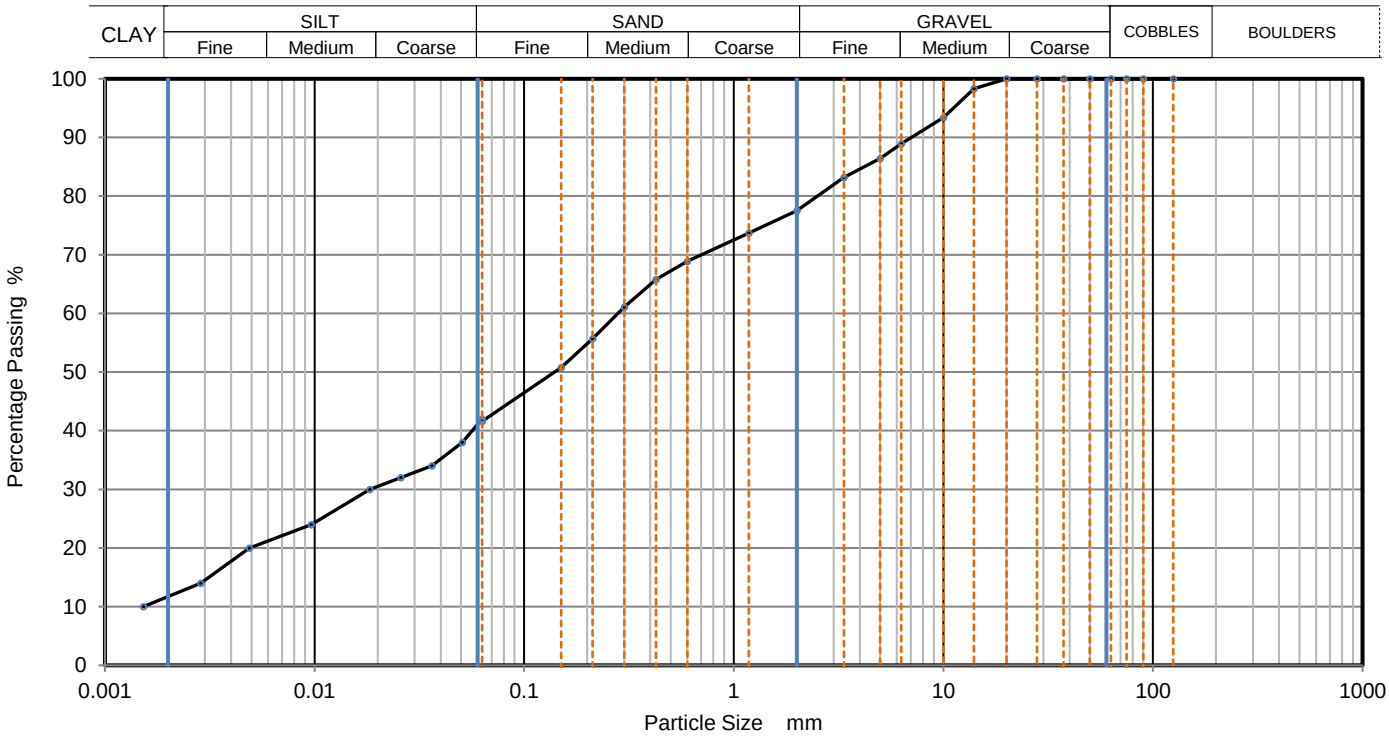
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	TP-4112
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	1.60
				Base	3.00
Specimen Reference	6	Specimen Depth	1.6 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220908144



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	42
90	100	0.05064	38
75	100	0.03626	34
63	100	0.02580	32
50	100	0.01835	30
37.5	100	0.00965	24
28	100	0.00488	20
20	100	0.00286	14
14	98	0.00152	10
10	93		
6.3	89		
5	86		
3.35	83		
2	78		
1.18	74		
0.6	69	Particle density	(assumed)
0.425	66	2.65	Mg/m3
0.3	61		
0.212	56		
0.15	51		
0.063	42		

Dry Mass of sample, g: 431

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	22.5
Sand	35.9
Silt	30.0
Clay	11.6

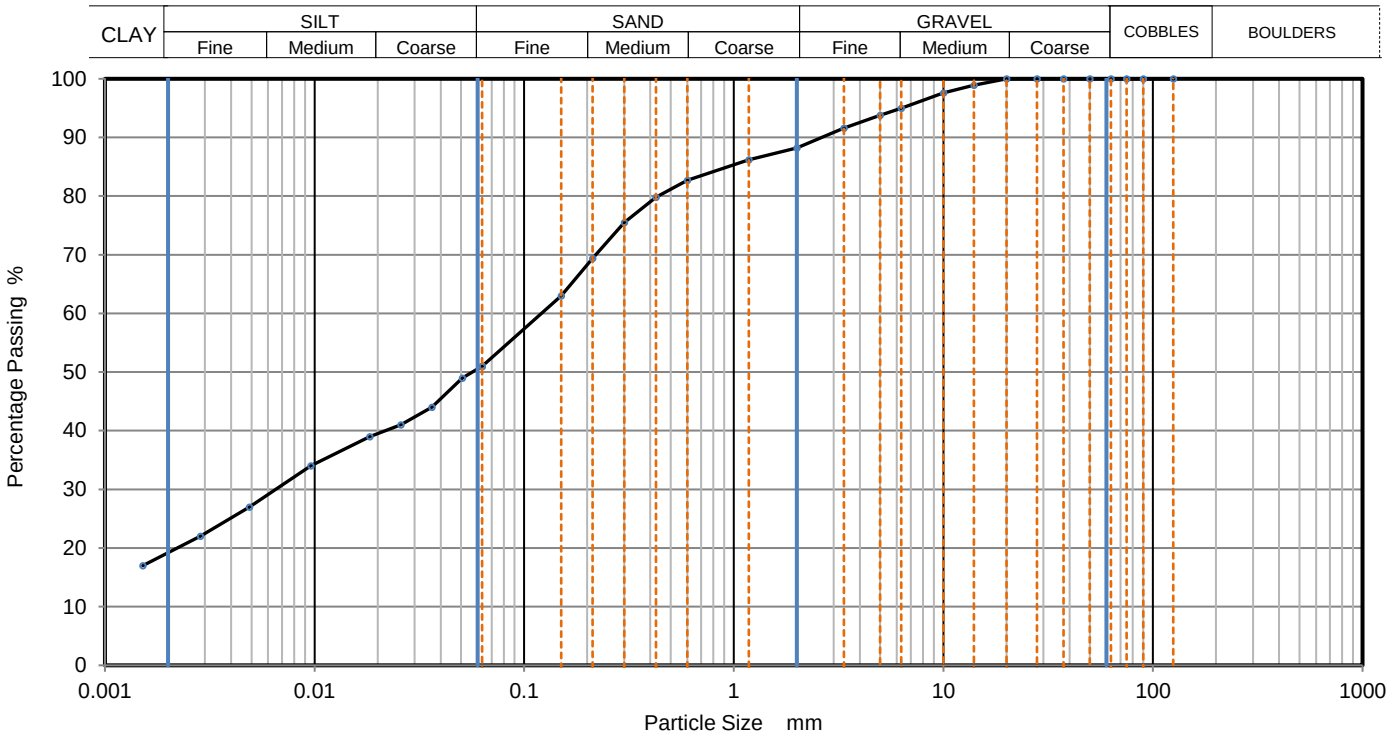
Grading Analysis		
D100	mm	
D60	mm	0.279
D30	mm	0.0193
D10	mm	0.00155
Uniformity Coefficient		180
Curvature Coefficient		0.86

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-5303
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brownish grey sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	0.80
				Base	1.50
Specimen Reference	9	Specimen Depth	0.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022090538



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	51
90	100	0.05065	49
75	100	0.03627	44
63	100	0.02580	41
50	100	0.01835	39
37.5	100	0.00959	34
28	100	0.00488	27
20	100	0.00285	22
14	99	0.00152	17
10	98		
6.3	95		
5	94		
3.35	92		
2	88		
1.18	86		
0.6	83	Particle density	(assumed)
0.425	80	2.65	Mg/m3
0.3	76		
0.212	69		
0.15	63		
0.063	51		

Dry Mass of sample, g: 514

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	11.8
Sand	37.2
Silt	31.9
Clay	19.1

Grading Analysis		
D100	mm	
D60	mm	0.121
D30	mm	0.00662
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

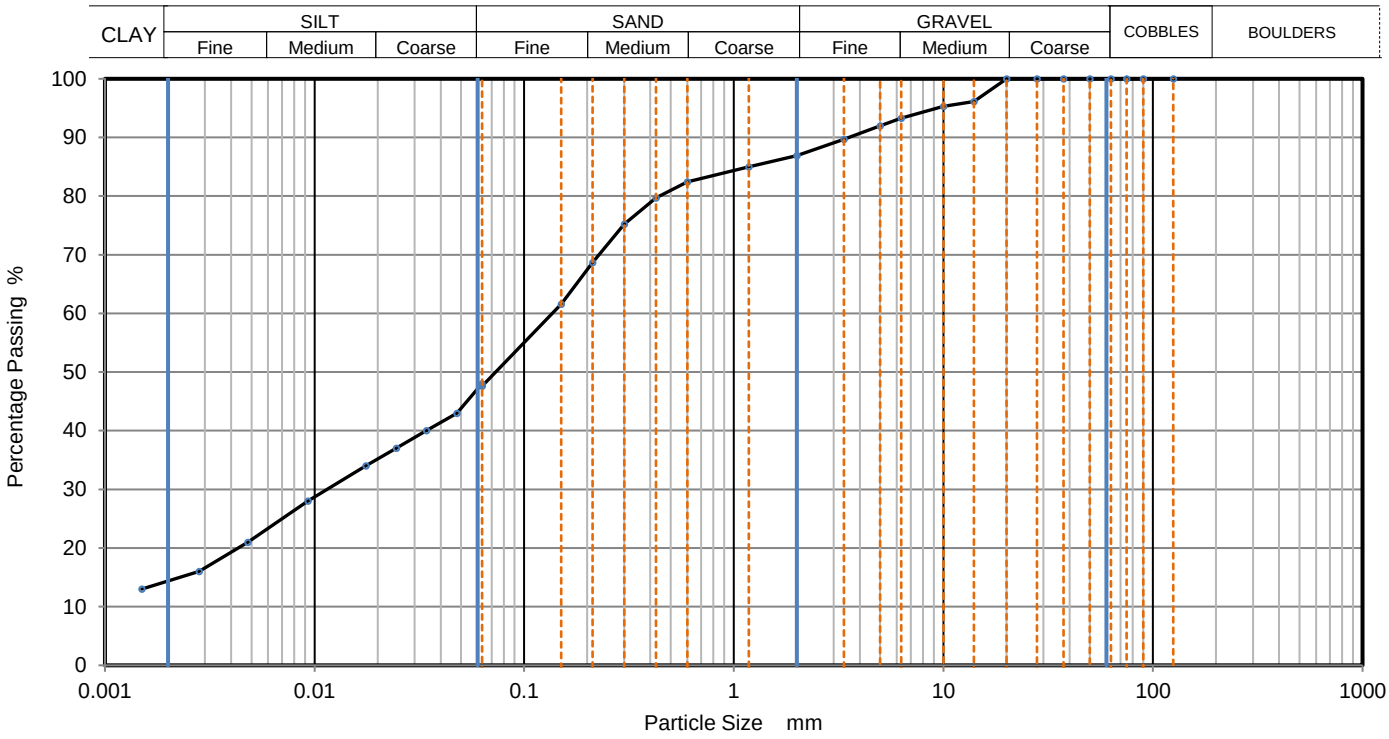
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

Job Ref					**21-1682**
Borehole/Pit No.					TP-5303
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	4
Specimen Description	Brownish grey sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	2.30
				Base	3.50
Specimen Reference	11	Specimen Depth	2.3 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022090540



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06276	48
90	100	0.04770	43
75	100	0.03420	40
63	100	0.02452	37
50	100	0.01757	34
37.5	100	0.00931	28
28	100	0.00480	21
20	100	0.00282	16
14	96	0.00150	13
10	95		
6.3	93		
5	92		
3.35	90		
2	87		
1.18	85		
0.6	82	Particle density	(assumed)
0.425	80	2.65	Mg/m3
0.3	75		
0.212	69		
0.15	62		
0.063	48		

Dry Mass of sample, g: 507

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	13.1
Sand	39.3
Silt	32.9
Clay	14.7

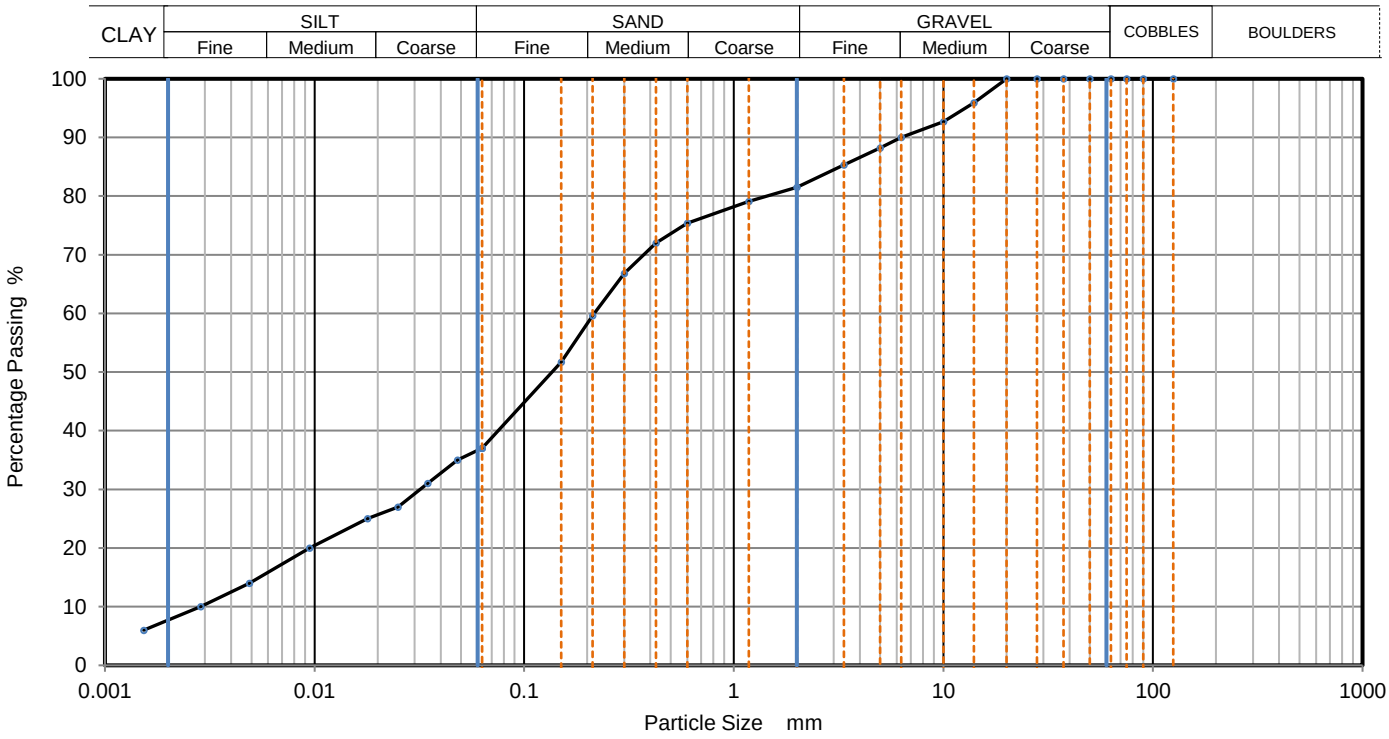
Grading Analysis		
D100	mm	
D60	mm	0.136
D30	mm	0.0112
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-5387
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		1
Specimen Description	Brownish grey sandy slightly gravelly silty CLAY.				Sample Depth (m)	Top	0.20
						Base	1.00
Specimen Reference	9	Specimen Depth	0.2	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022090541



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	37
90	100	0.04803	35
75	100	0.03467	31
63	100	0.02501	27
50	100	0.01791	25
37.5	100	0.00948	20
28	100	0.00488	14
20	100	0.00286	10
14	96	0.00153	6
10	93		
6.3	90		
5	88		
3.35	85		
2	82		
1.18	79		
0.6	75	Particle density	(assumed)
0.425	72	2.65	Mg/m3
0.3	67		
0.212	60		
0.15	52		
0.063	37		

Dry Mass of sample, g: 539

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	18.5
Sand	44.5
Silt	29.3
Clay	7.7

Grading Analysis		
D100	mm	
D60	mm	0.217
D30	mm	0.0322
D10	mm	0.00292
Uniformity Coefficient		74
Curvature Coefficient		1.6

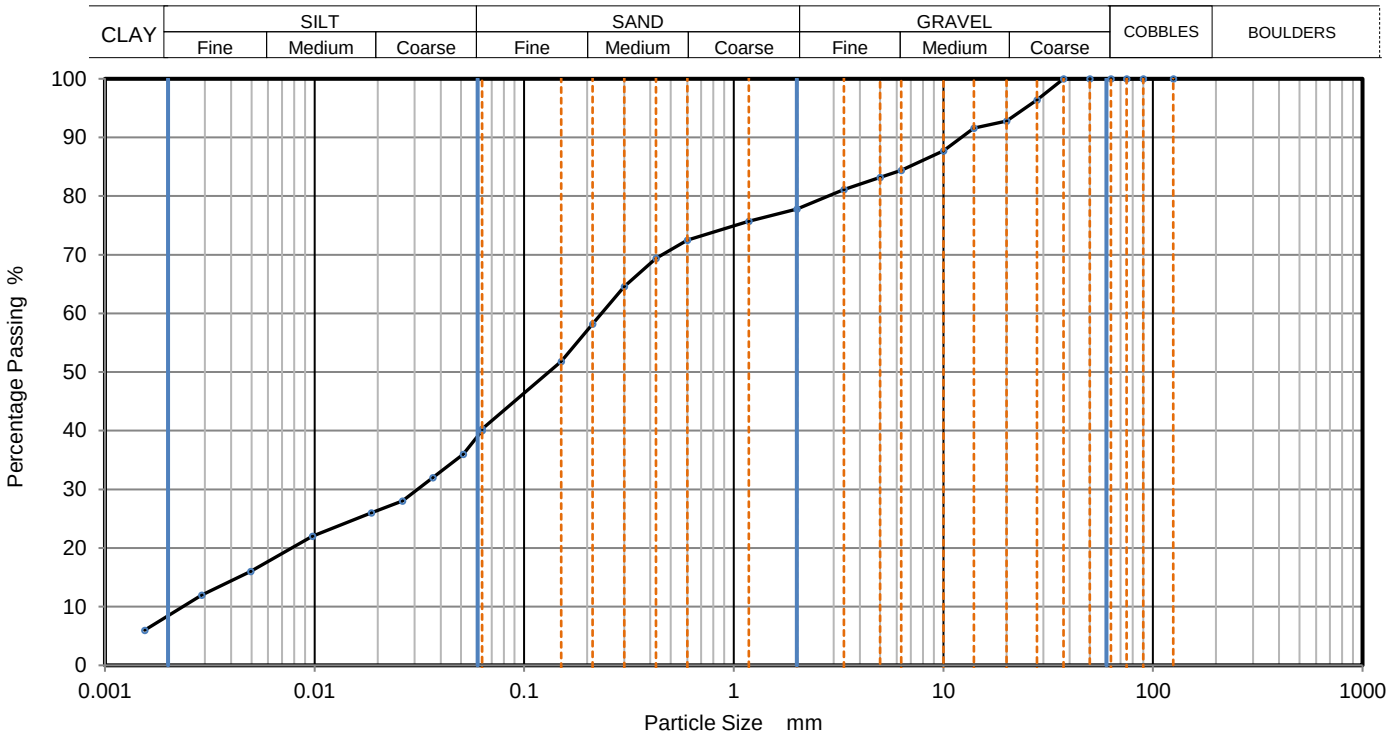
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-5387
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Brownish grey sandy gravelly silty CLAY.			Sample Depth (m) Top	2.65
				Base	3.55
Specimen Reference	11	Specimen Depth	2.65 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022090542



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	40
90	100	0.05129	36
75	100	0.03671	32
63	100	0.02627	28
50	100	0.01868	26
37.5	100	0.00976	22
28	96	0.00496	16
20	93	0.00290	12
14	92	0.00155	6
10	88		
6.3	84		
5	83		
3.35	81		
2	78		
1.18	76		
0.6	73	Particle density	(assumed)
0.425	69	2.65	Mg/m3
0.3	65		
0.212	58		
0.15	52		
0.063	40		

Dry Mass of sample, g: 3606

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	22.2
Sand	37.5
Silt	31.8
Clay	8.5

Grading Analysis		
D100	mm	
D60	mm	0.234
D30	mm	0.0305
D10	mm	0.00233
Uniformity Coefficient		100
Curvature Coefficient		1.7

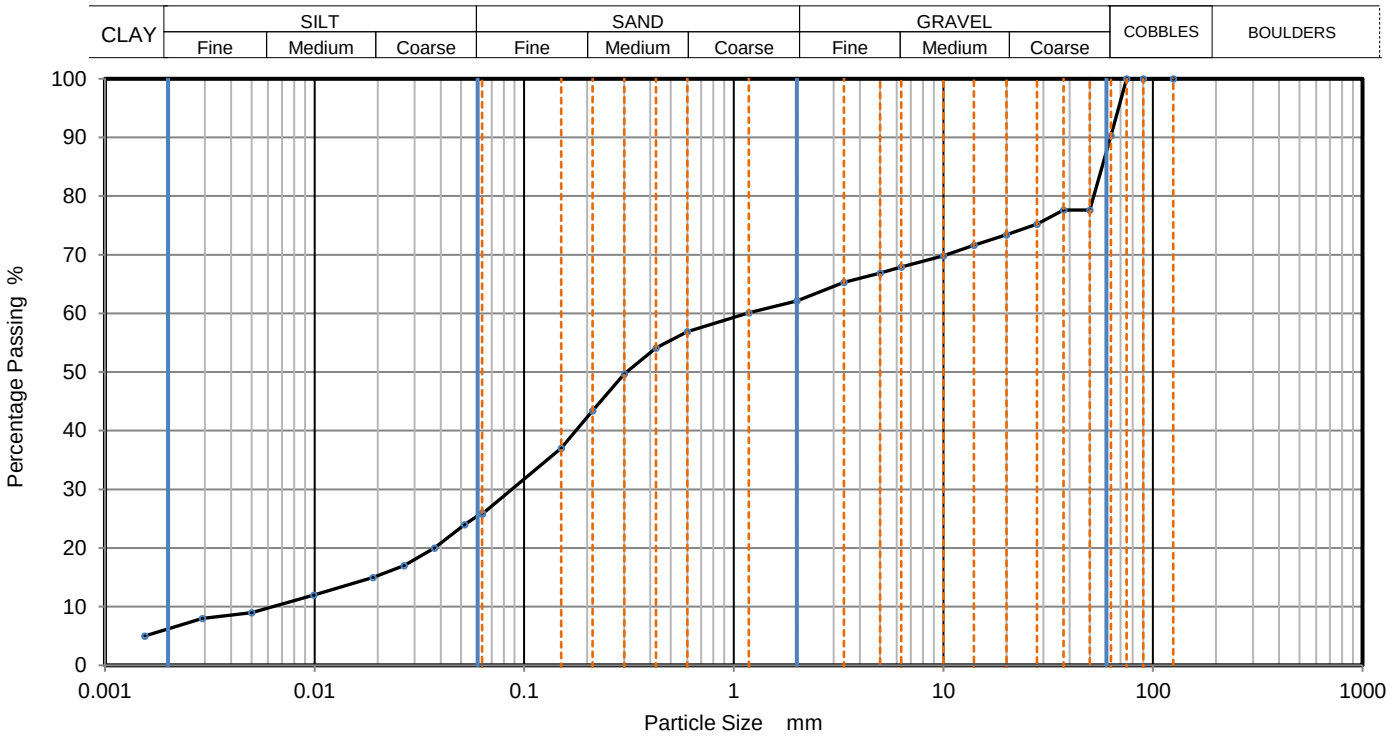
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					**21-1682**
Borehole/Pit No.					TP-5703
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brownish grey sandy gravelly silty CLAY with cobbles.			Sample Depth (m) Top	0.90
				Base	2.30
Specimen Reference	9	Specimen Depth	0.9 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022090543



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	26
90	100	0.05191	24
75	100	0.03736	20
63	90	0.02672	17
50	78	0.01900	15
37.5	78	0.00992	12
28	75	0.00501	9
20	73	0.00291	8
14	72	0.00155	5
10	70		
6.3	68		
5	67		
3.35	65		
2	62		
1.18	60		
0.6	57	Particle density	(assumed)
0.425	54	2.65	Mg/m3
0.3	50		
0.212	43		
0.15	37		
0.063	26		

Dry Mass of sample, g: 10768

Sample Proportions	% dry mass
Cobbles	9.7
Gravel	28.2
Sand	36.3
Silt	20.0
Clay	5.8

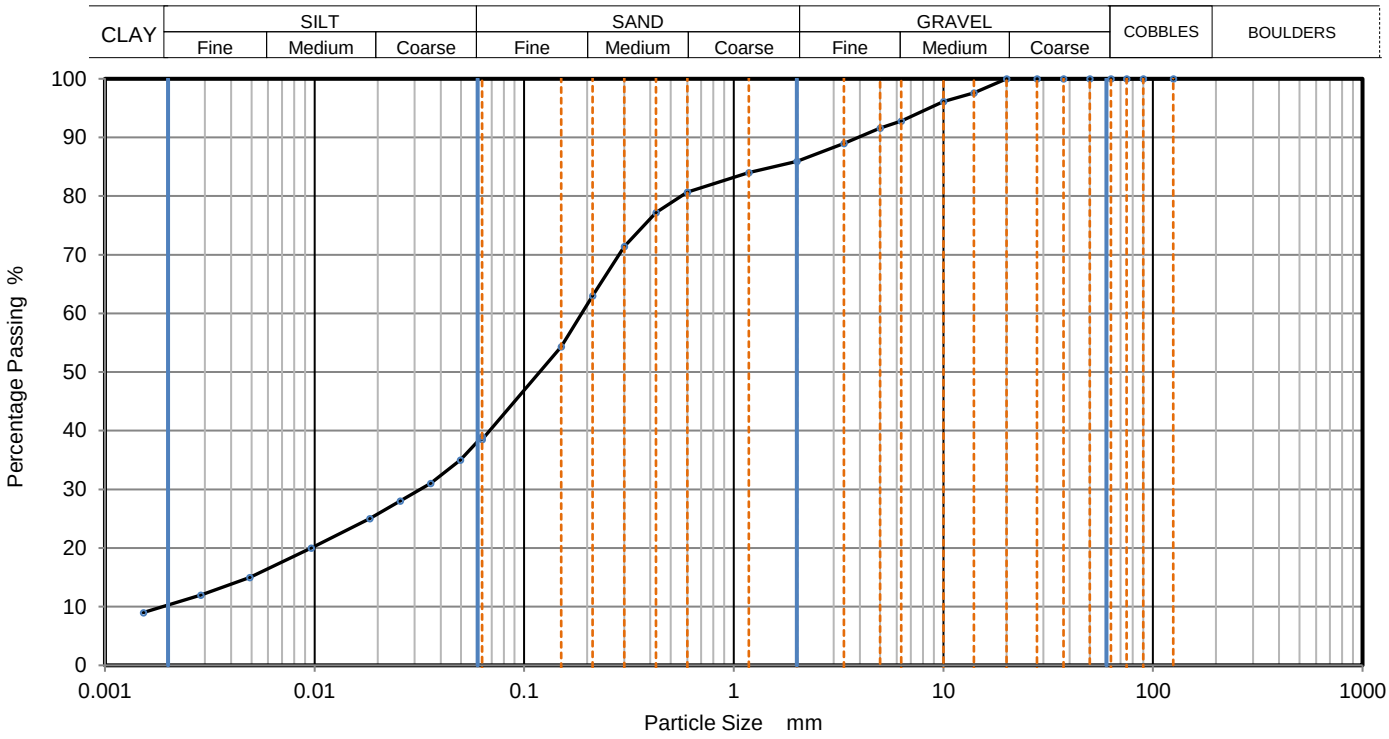
Grading Analysis		
D100	mm	
D60	mm	1.16
D30	mm	0.0873
D10	mm	0.00613
Uniformity Coefficient		190
Curvature Coefficient		1.1

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-5703
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		3
Specimen Description	Brownish grey sandy slightly gravelly clayey SILT.				Sample Depth (m)	Top	2.30
						Base	3.50
Specimen Reference	9	Specimen Depth	2.3	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022090544



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	39
90	100	0.04969	35
75	100	0.03582	31
63	100	0.02564	28
50	100	0.01835	25
37.5	100	0.00965	20
28	100	0.00491	15
20	100	0.00286	12
14	98	0.00152	9
10	96		
6.3	93		
5	92		
3.35	89		
2	86		
1.18	84		
0.6	81	Particle density	(assumed)
0.425	77	2.65	Mg/m3
0.3	71		
0.212	63		
0.15	54		
0.063	39		

Dry Mass of sample, g: 515

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	14.1
Sand	47.4
Silt	27.9
Clay	10.6

Grading Analysis		
D100	mm	
D60	mm	0.188
D30	mm	0.0328
D10	mm	0.00178
Uniformity Coefficient		110
Curvature Coefficient		3.2

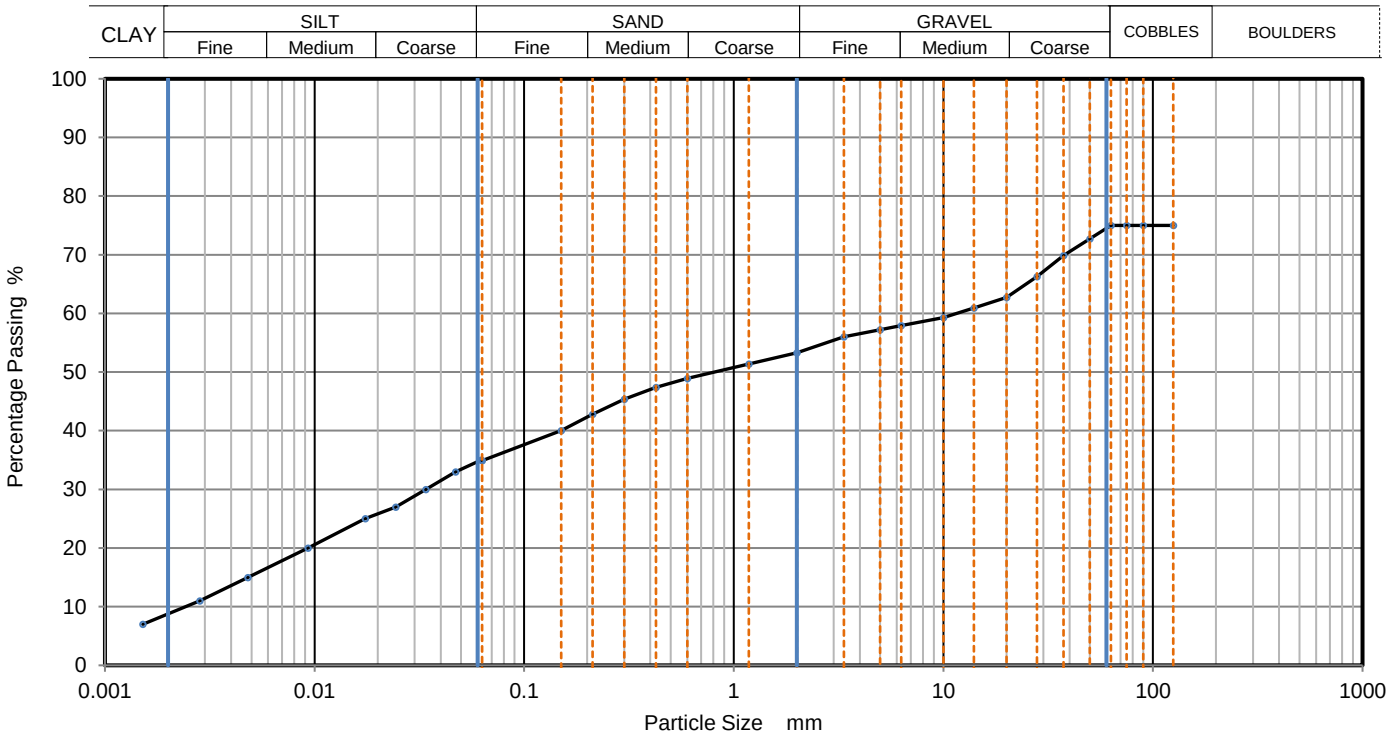
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-5803
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Brownish grey sandy gravelly silty CLAY with cobbles.			Sample Depth (m) Top	0.30
				Base	2.50
Specimen Reference	9	Specimen Depth	0.3 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022090545



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	75	0.06230	35
90	75	0.04701	33
75	75	0.03397	30
63	75	0.02435	27
50	73	0.01745	25
37.5	70	0.00931	20
28	66	0.00480	15
20	63	0.00283	11
14	61	0.00152	7
10	59		
6.3	58		
5	57		
3.35	56		
2	53		
1.18	51		
0.6	49	Particle density	(assumed)
0.425	47	2.65	Mg/m3
0.3	45		
0.212	43		
0.15	40		
0.063	35		

Dry Mass of sample, g: 10641

Sample Proportions	% dry mass
Cobbles	25.0
Gravel	21.8
Sand	18.3
Silt	26.1
Clay	8.8

Grading Analysis		
D100	mm	
D60	mm	11.5
D30	mm	0.0353
D10	mm	0.00253
Uniformity Coefficient		4500
Curvature Coefficient		0.043

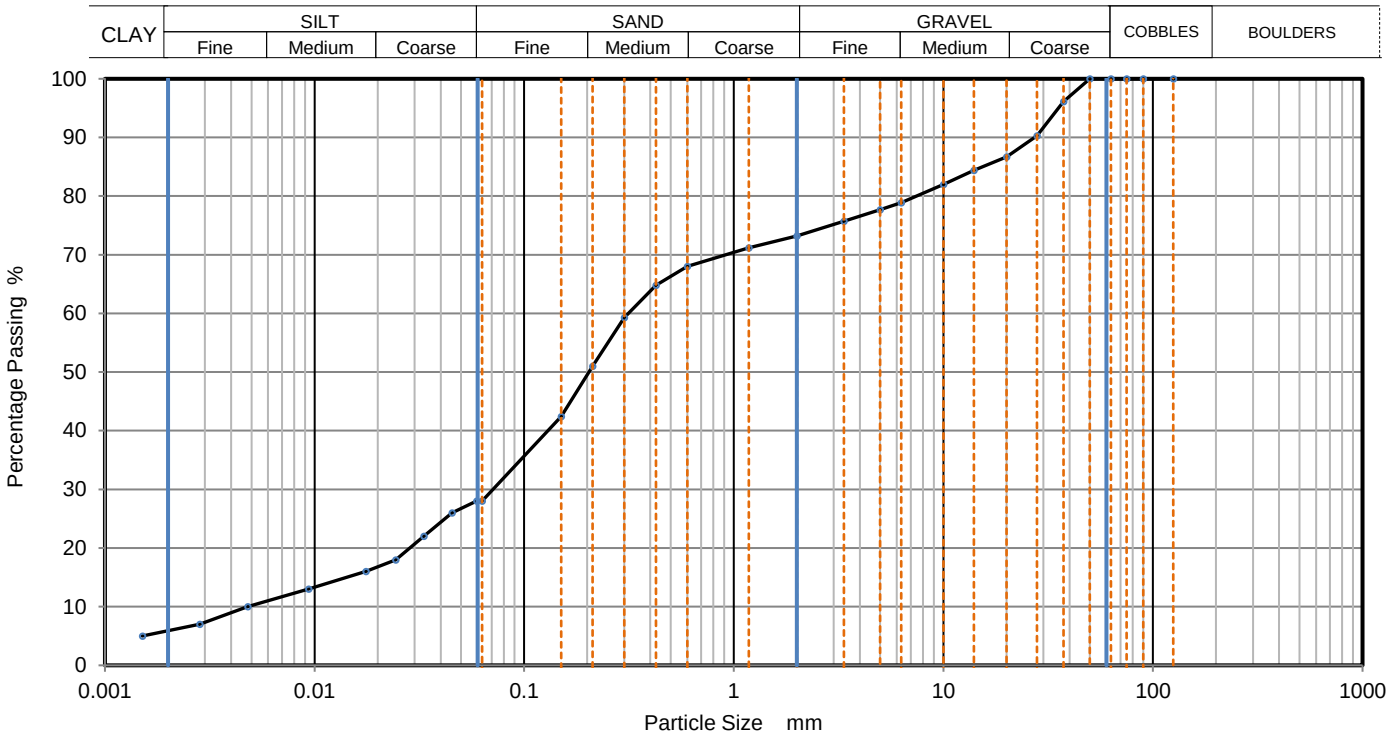
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-5803
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brownish grey gravelly clayey fine to coarse SAND.			Sample Depth (m) Top	2.50
				Base	3.50
Specimen Reference	6	Specimen Depth	2.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022090546



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.05940	28
90	100	0.04526	26
75	100	0.03324	22
63	100	0.02435	18
50	100	0.01756	16
37.5	96	0.00936	13
28	90	0.00479	10
20	87	0.00283	7
14	84	0.00151	5
10	82		
6.3	79		
5	78		
3.35	76		
2	73		
1.18	71		
0.6	68	Particle density	(assumed)
0.425	65	2.65	Mg/m3
0.3	59		
0.212	51		
0.15	42		
0.063	28		

Dry Mass of sample, g: 4990

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	26.8
Sand	45.2
Silt	22.2
Clay	5.8

Grading Analysis		
D100	mm	
D60	mm	0.314
D30	mm	0.0709
D10	mm	0.00528
Uniformity Coefficient		60
Curvature Coefficient		3

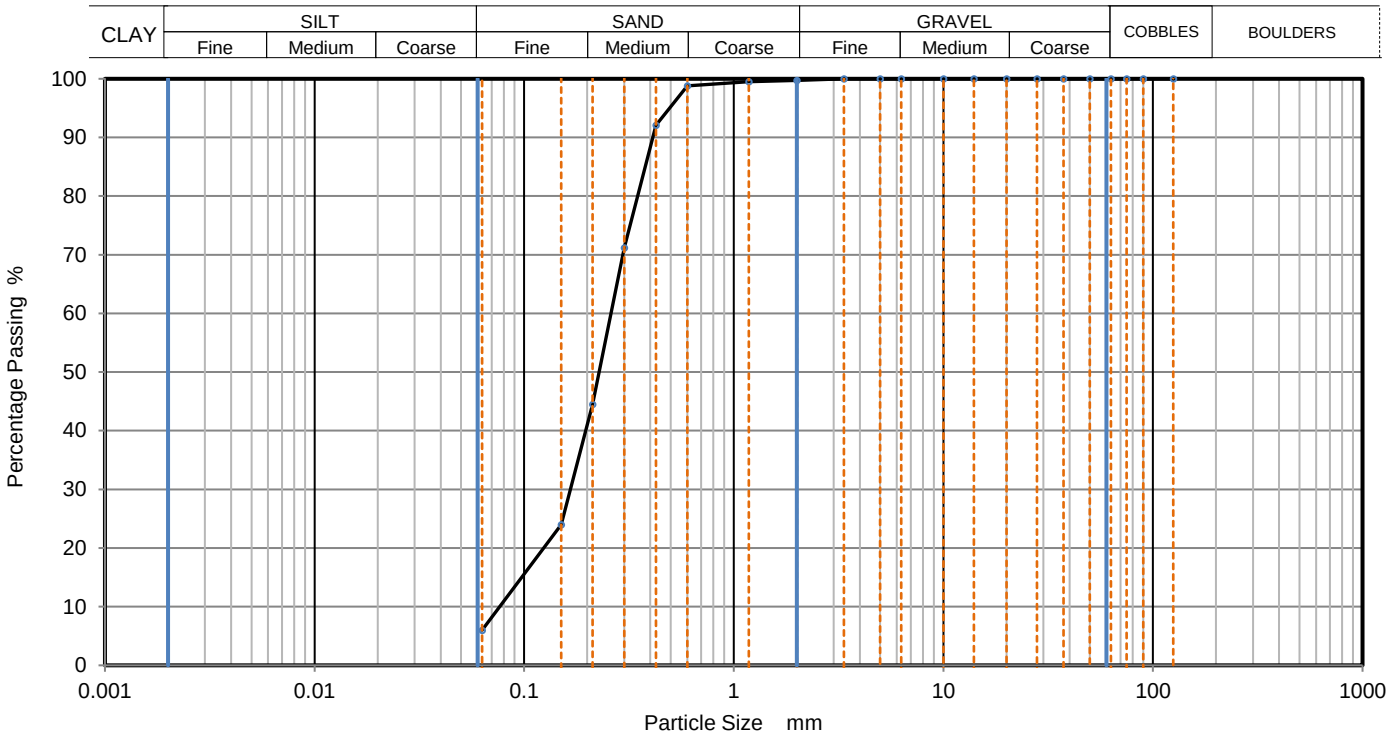
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-5903
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		1
Specimen Description	Brownish grey slightly silty fine to coarse SAND.				Sample Depth (m)	Top	0.30
						Base	3.00
Specimen Reference	6	Specimen Depth	0.3	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clause 9.2				KeyLAB ID		Caus2022090547



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	99		
0.425	92		
0.3	71		
0.212	45		
0.15	24		
0.063	6		

Dry Mass of sample, g	326

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	0.3
Sand	93.6
Fines <0.063mm	6.0

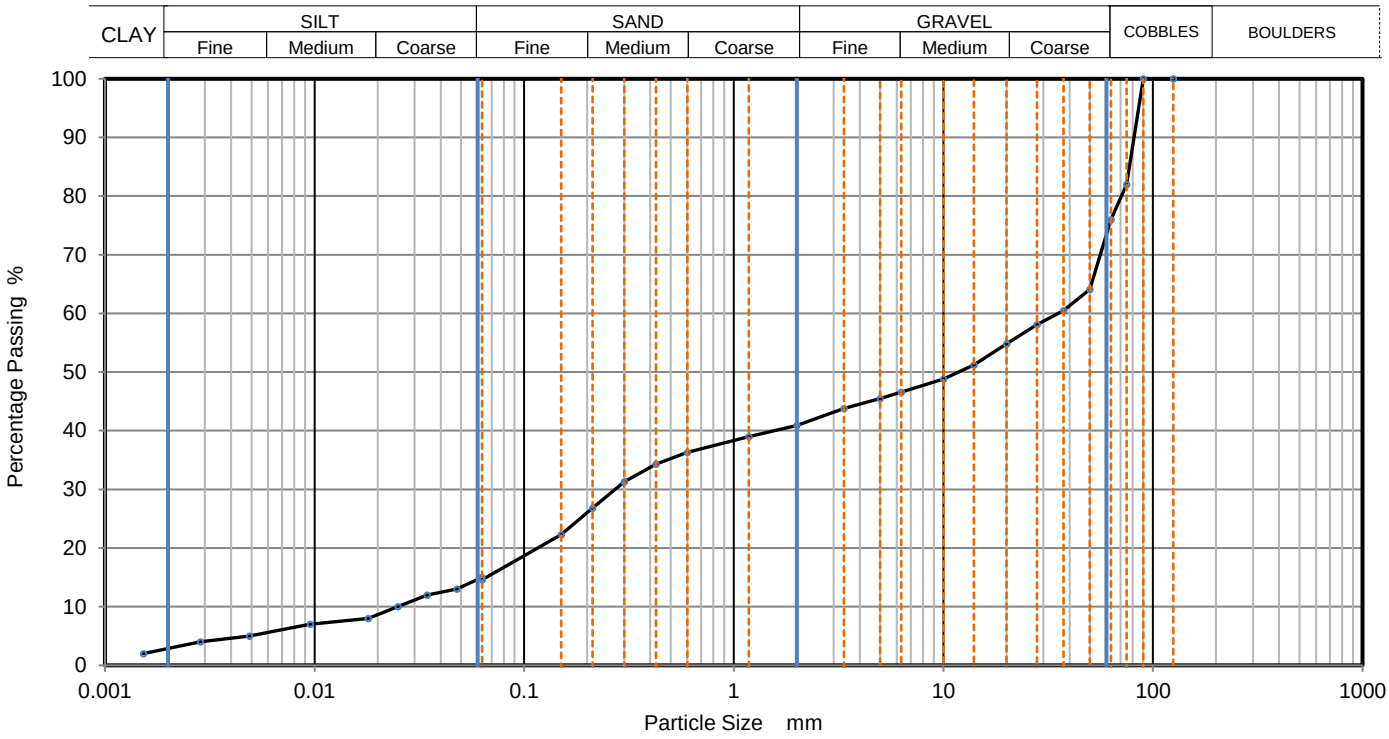
Grading Analysis		
D100	mm	
D60	mm	0.259
D30	mm	0.166
D10	mm	0.0763
Uniformity Coefficient		3.4
Curvature Coefficient		1.4

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-5903
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brown gravelly slightly silty fine to coarse SAND with cobbles.			Sample Depth (m) Top	3.00
				Base	3.50
Specimen Reference	6	Specimen Depth	3 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022090548



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06275	15
90	100	0.04769	13
75	82	0.03443	12
63	76	0.02500	10
50	64	0.01802	8
37.5	61	0.00953	7
28	58	0.00488	5
20	55	0.00285	4
14	51	0.00152	2
10	49		
6.3	47		
5	46		
3.35	44		
2	41		
1.18	39		
0.6	36	Particle density	(assumed)
0.425	34	2.65	Mg/m3
0.3	31		
0.212	27		
0.15	22		
0.063	15		

Dry Mass of sample, g: 12485

Sample Proportions	% dry mass
Cobbles	24.0
Gravel	35.0
Sand	26.4
Silt	11.6
Clay	3.0

Grading Analysis		
D100	mm	
D60	mm	35.3
D30	mm	0.271
D10	mm	0.0255
Uniformity Coefficient		1400
Curvature Coefficient		0.082

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

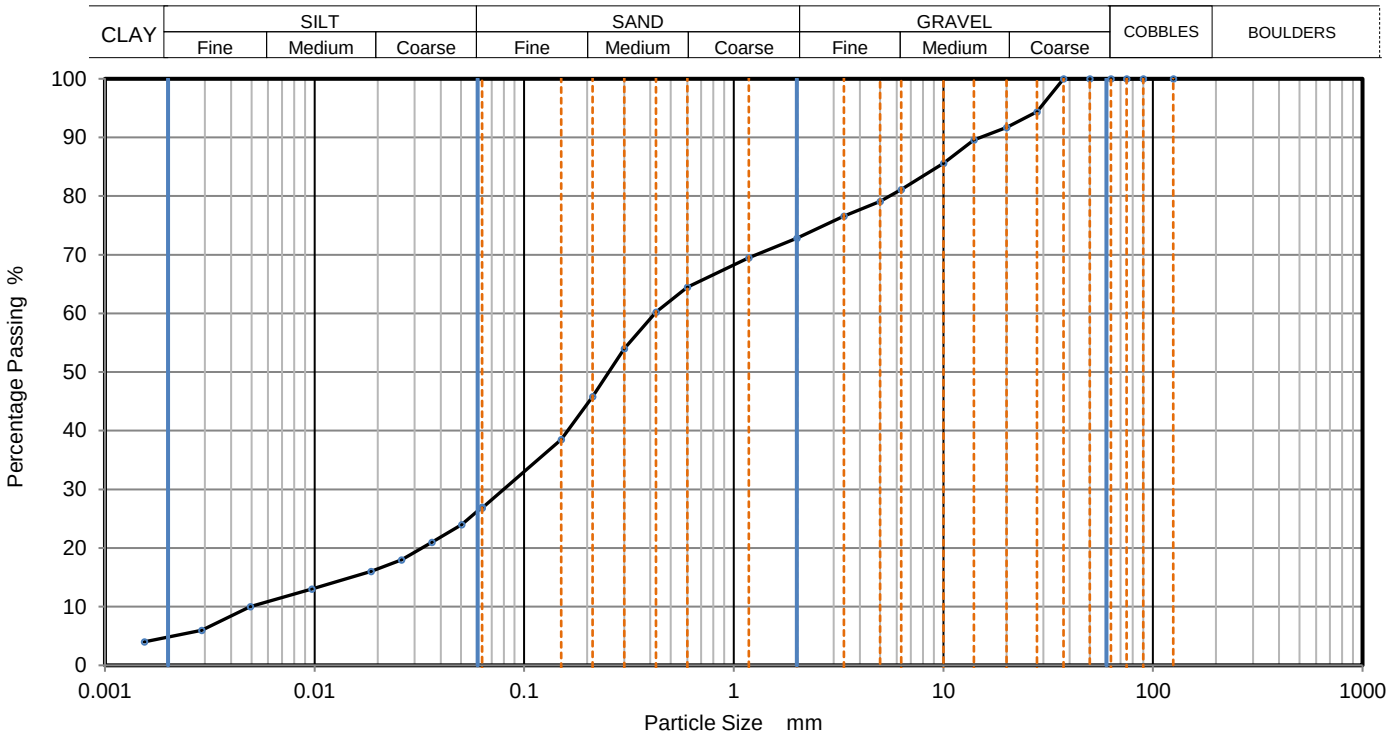
Approved
Stephen.Watson

UKAS TESTING

10122

PARTICLE SIZE DISTRIBUTION

Job Ref					**21-1682**
Borehole/Pit No.					TP-6016
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Brownish grey sandy gravelly silty CLAY.			Sample Depth (m) Top	0.30
				Base	1.50
Specimen Reference	6	Specimen Depth	0.3 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022090549



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	27
90	100	0.05032	24
75	100	0.03626	21
63	100	0.02595	18
50	100	0.01857	16
37.5	100	0.00970	13
28	94	0.00493	10
20	92	0.00289	6
14	90	0.00154	4
10	86		
6.3	81		
5	79		
3.35	77		
2	73		
1.18	70		
0.6	65	Particle density (assumed)	
0.425	60	2.65 Mg/m3	
0.3	54		
0.212	46		
0.15	39		
0.063	27		

Dry Mass of sample, g: 2791

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	27.2
Sand	46.1
Silt	22.0
Clay	4.7

Grading Analysis		
D100	mm	
D60	mm	0.42
D30	mm	0.08
D10	mm	0.00517
Uniformity Coefficient		81
Curvature Coefficient		3

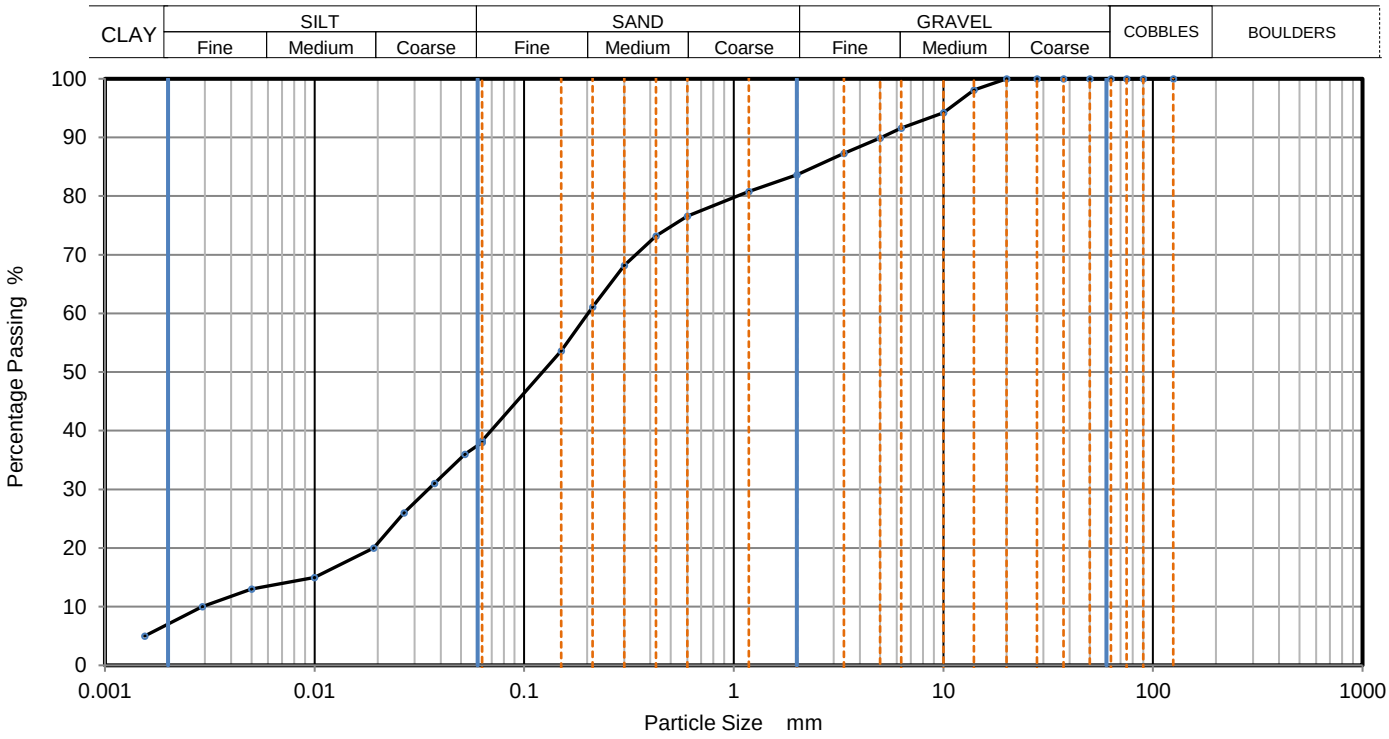
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					**21-1682**
Borehole/Pit No.					TP-6016
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brownish grey sandy slightly gravelly clayey SILT.			Sample Depth (m) Top	1.50
				Base	2.40
Specimen Reference	9	Specimen Depth	1.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022090550



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	38
90	100	0.05222	36
75	100	0.03736	31
63	100	0.02672	26
50	100	0.01911	20
37.5	100	0.00997	15
28	100	0.00501	13
20	100	0.00291	10
14	98	0.00155	5
10	94		
6.3	92		
5	90		
3.35	87		
2	84		
1.18	81		
0.6	77	Particle density	(assumed)
0.425	73	2.65	Mg/m3
0.3	68		
0.212	61		
0.15	54		
0.063	38		

Dry Mass of sample, g: 677

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	16.4
Sand	45.3
Silt	31.1
Clay	7.2

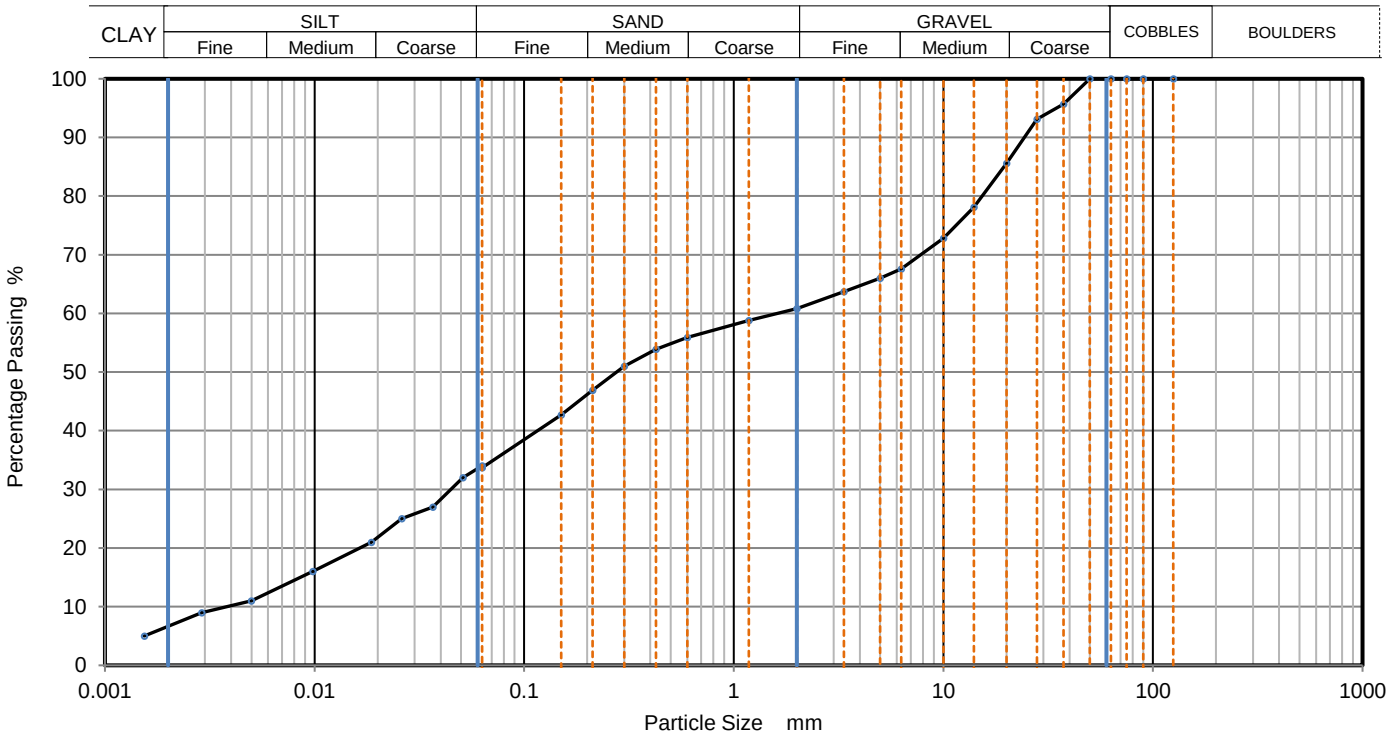
Grading Analysis		
D100	mm	
D60	mm	0.202
D30	mm	0.0358
D10	mm	0.00283
Uniformity Coefficient		71
Curvature Coefficient		2.2

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-6016
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		3
Specimen Description	Brownish grey sandy gravelly silty CLAY.				Sample Depth (m)	Top	2.40
						Base	3.00
Specimen Reference	9	Specimen Depth	2.4	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022090551



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	34
90	100	0.05096	32
75	100	0.03670	27
63	100	0.02611	25
50	100	0.01868	21
37.5	96	0.00981	16
28	93	0.00499	11
20	86	0.00289	9
14	78	0.00154	5
10	73		
6.3	68		
5	66		
3.35	64		
2	61		
1.18	59		
0.6	56	Particle density	(assumed)
0.425	54	2.65	Mg/m3
0.3	51		
0.212	47		
0.15	43		
0.063	34		

Dry Mass of sample, g: 2478

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	39.2
Sand	27.1
Silt	26.9
Clay	6.8

Grading Analysis		
D100	mm	
D60	mm	1.62
D30	mm	0.0453
D10	mm	0.0041
Uniformity Coefficient		400
Curvature Coefficient		0.31

Remarks

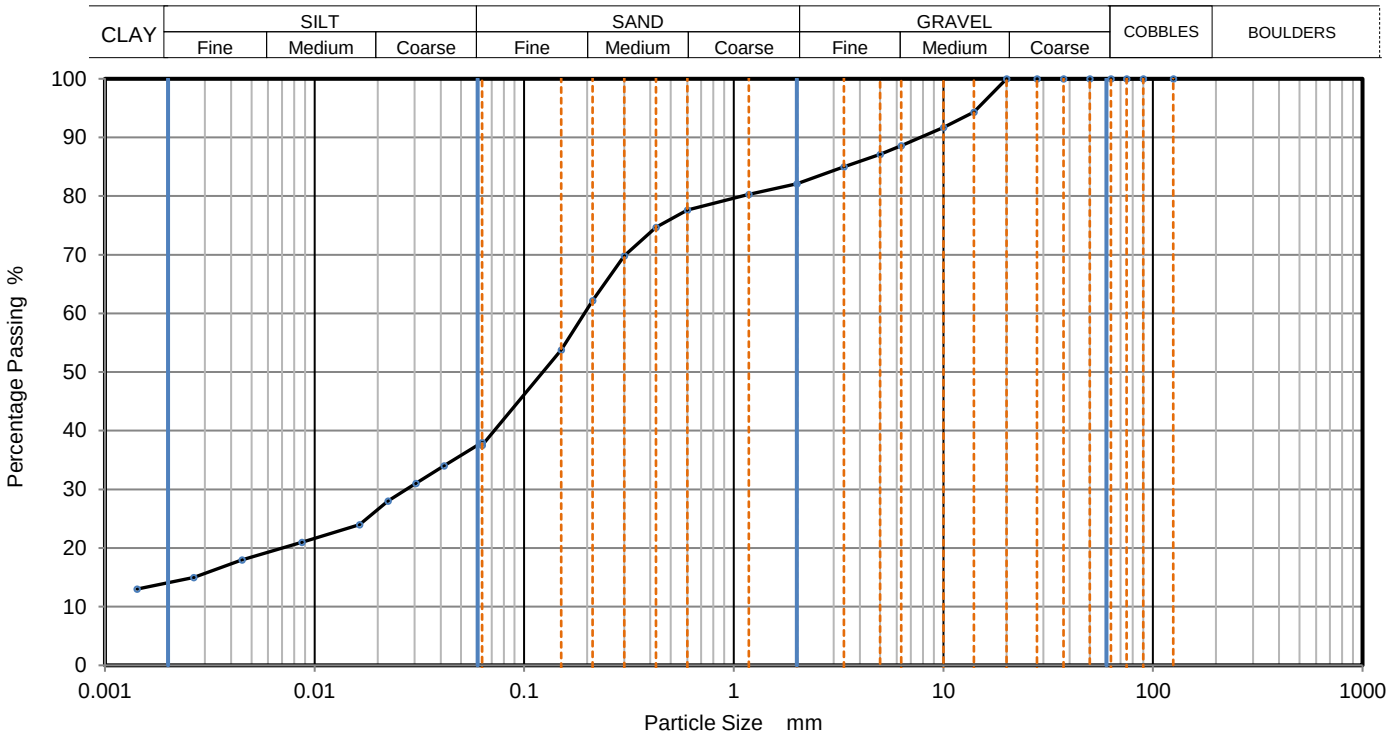
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	TP-6105
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brownish grey sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	1.00
				Base	2.20
Specimen Reference	11	Specimen Depth	1 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022090552



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	38
90	100	0.04153	34
75	100	0.03045	31
63	100	0.02245	28
50	100	0.01637	24
37.5	100	0.00871	21
28	100	0.00451	18
20	100	0.00265	15
14	94	0.00142	13
10	92		
6.3	89		
5	87		
3.35	85		
2	82		
1.18	80		
0.6	78	Particle density	(assumed)
0.425	75	2.65	Mg/m3
0.3	70		
0.212	62		
0.15	54		
0.063	38		

Dry Mass of sample, g: 665

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	17.9
Sand	44.6
Silt	23.2
Clay	14.3

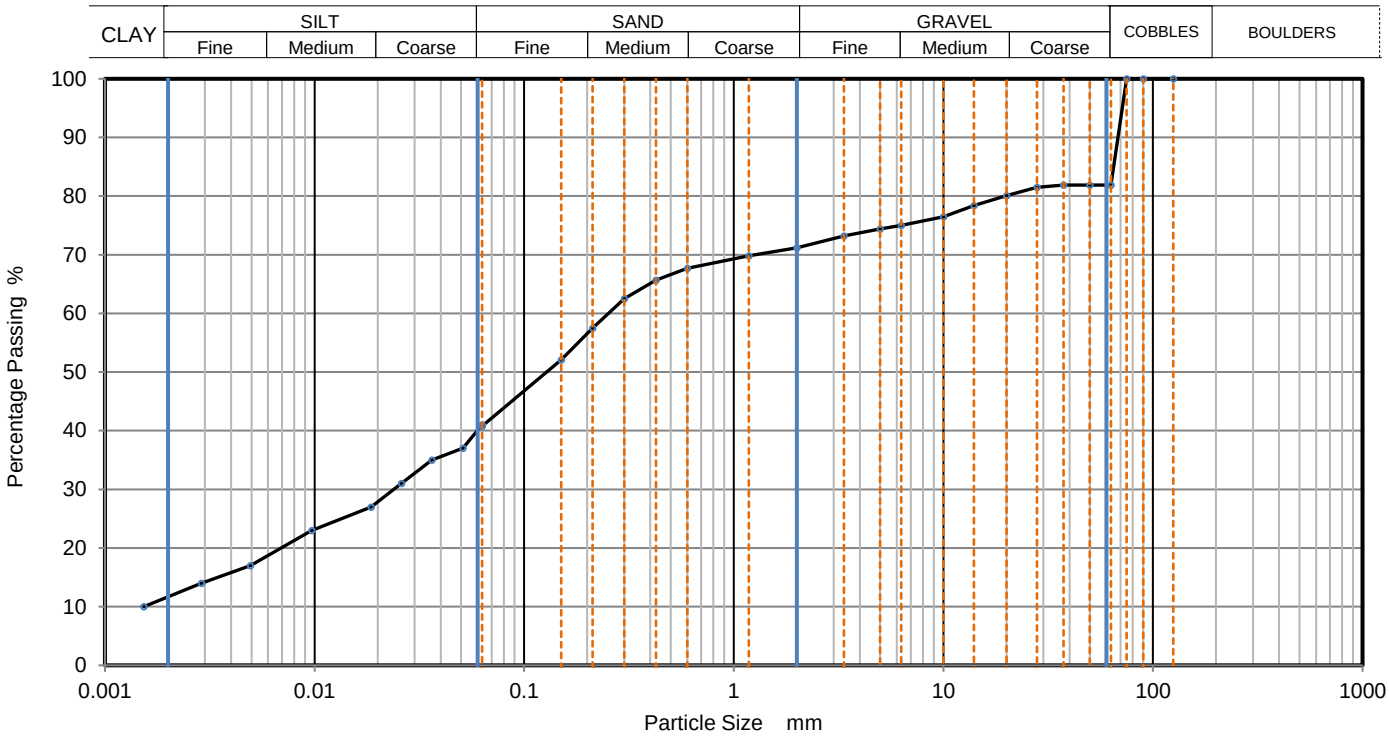
Grading Analysis		
D100	mm	
D60	mm	0.194
D30	mm	0.0273
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-6105
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Brownish grey sandy gravelly silty CLAY with cobbles .			Sample Depth (m) Top	2.20
				Base	3.00
Specimen Reference	9	Specimen Depth	2.2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022090553



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	41
90	100	0.05097	37
75	100	0.03627	35
63	82	0.02596	31
50	82	0.01857	27
37.5	82	0.00970	23
28	82	0.00493	17
20	80	0.00288	14
14	78	0.00153	10
10	77		
6.3	75		
5	74		
3.35	73		
2	71		
1.18	70		
0.6	68	Particle density (assumed)	
0.425	66	2.65 Mg/m3	
0.3	63		
0.212	58		
0.15	52		
0.063	41		

Dry Mass of sample, g: 9515

Sample Proportions	% dry mass
Cobbles	18.1
Gravel	10.7
Sand	30.4
Silt	29.4
Clay	11.4

Grading Analysis		
D100	mm	
D60	mm	0.252
D30	mm	0.0236
D10	mm	0.0016
Uniformity Coefficient		160
Curvature Coefficient		1.4

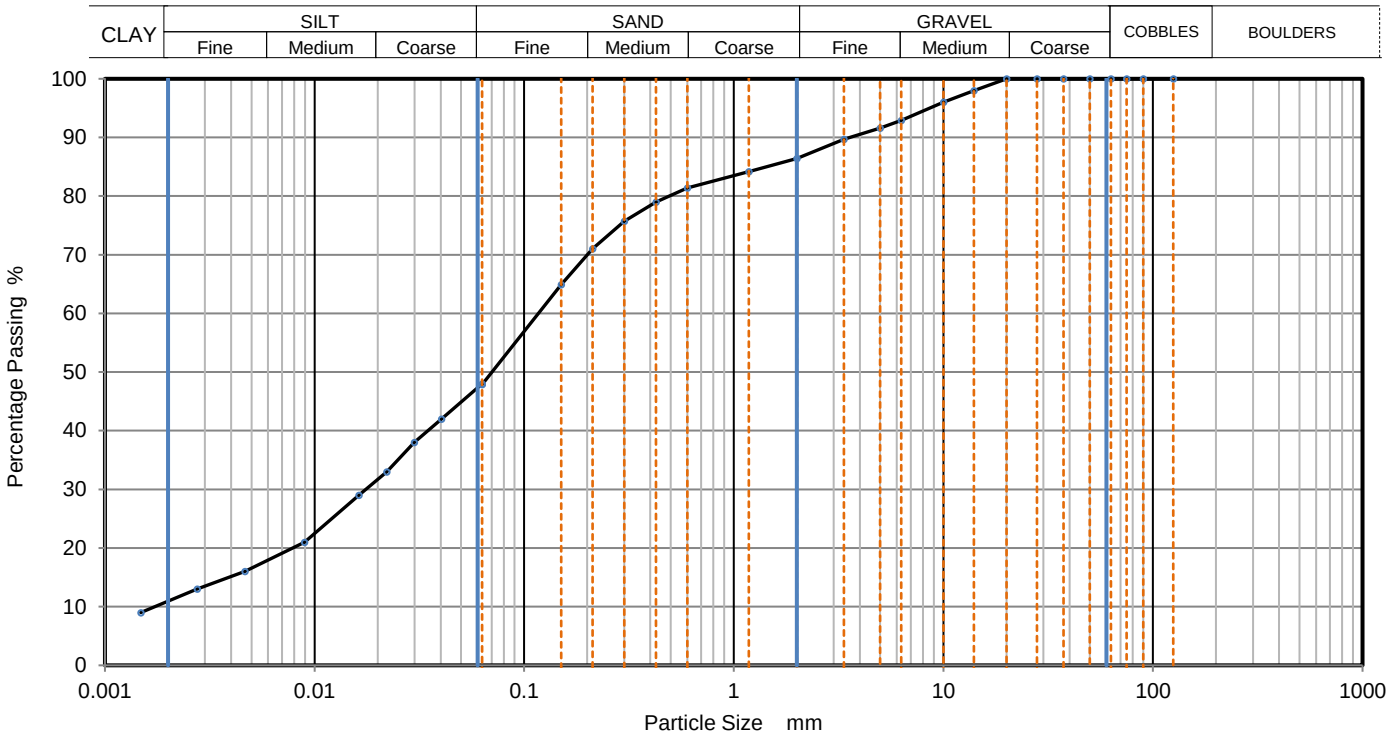
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-6105
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	4
Specimen Description	Orangish brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	3.00
				Base	3.50
Specimen Reference	9	Specimen Depth	3 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022090554



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	48
90	100	0.04036	42
75	100	0.02992	38
63	100	0.02209	33
50	100	0.01625	29
37.5	100	0.00895	21
28	100	0.00465	16
20	100	0.00275	13
14	98	0.00148	9
10	96		
6.3	93		
5	92		
3.35	90		
2	86		
1.18	84		
0.6	81	Particle density	(assumed)
0.425	79	2.65	Mg/m3
0.3	76		
0.212	71		
0.15	65		
0.063	48		

Dry Mass of sample, g: 762

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	13.6
Sand	38.5
Silt	36.8
Clay	11.1

Grading Analysis		
D100	mm	
D60	mm	0.117
D30	mm	0.0174
D10	mm	0.00165
Uniformity Coefficient		71
Curvature Coefficient		1.6

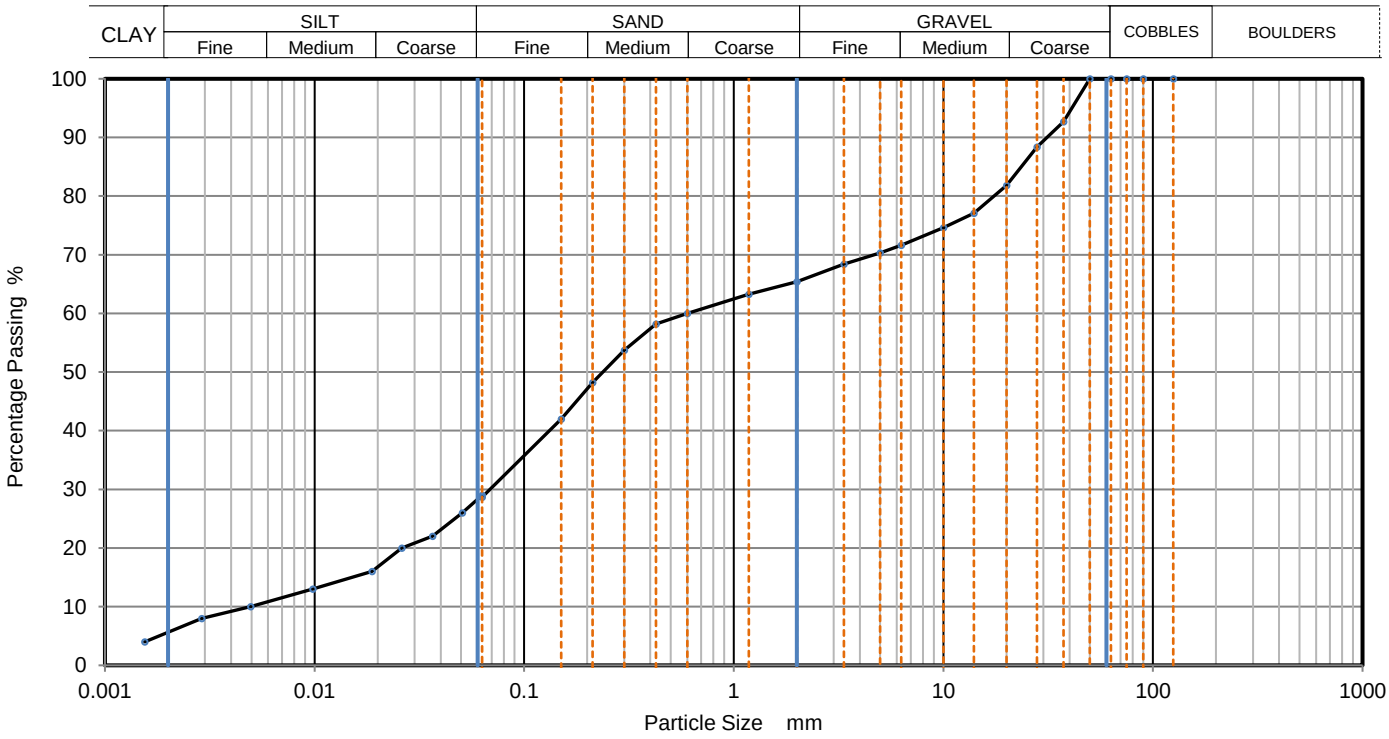
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-6207
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Brownish grey sandy gravelly silty CLAY.			Sample Depth (m) Top	0.30
				Base	1.40
Specimen Reference	6	Specimen Depth	0.3 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022090555



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	29
90	100	0.05065	26
75	100	0.03649	22
63	100	0.02611	20
50	100	0.01879	16
37.5	93	0.00981	13
28	88	0.00496	10
20	82	0.00290	8
14	77	0.00155	4
10	75		
6.3	72		
5	70		
3.35	68		
2	65		
1.18	63		
0.6	60	Particle density	(assumed)
0.425	58	2.65	Mg/m3
0.3	54		
0.212	48		
0.15	42		
0.063	29		

Dry Mass of sample, g: 10321

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	34.6
Sand	36.7
Silt	23.2
Clay	5.5

Grading Analysis		
D100	mm	
D60	mm	0.604
D30	mm	0.0686
D10	mm	0.00453
Uniformity Coefficient		130
Curvature Coefficient		1.7

Remarks

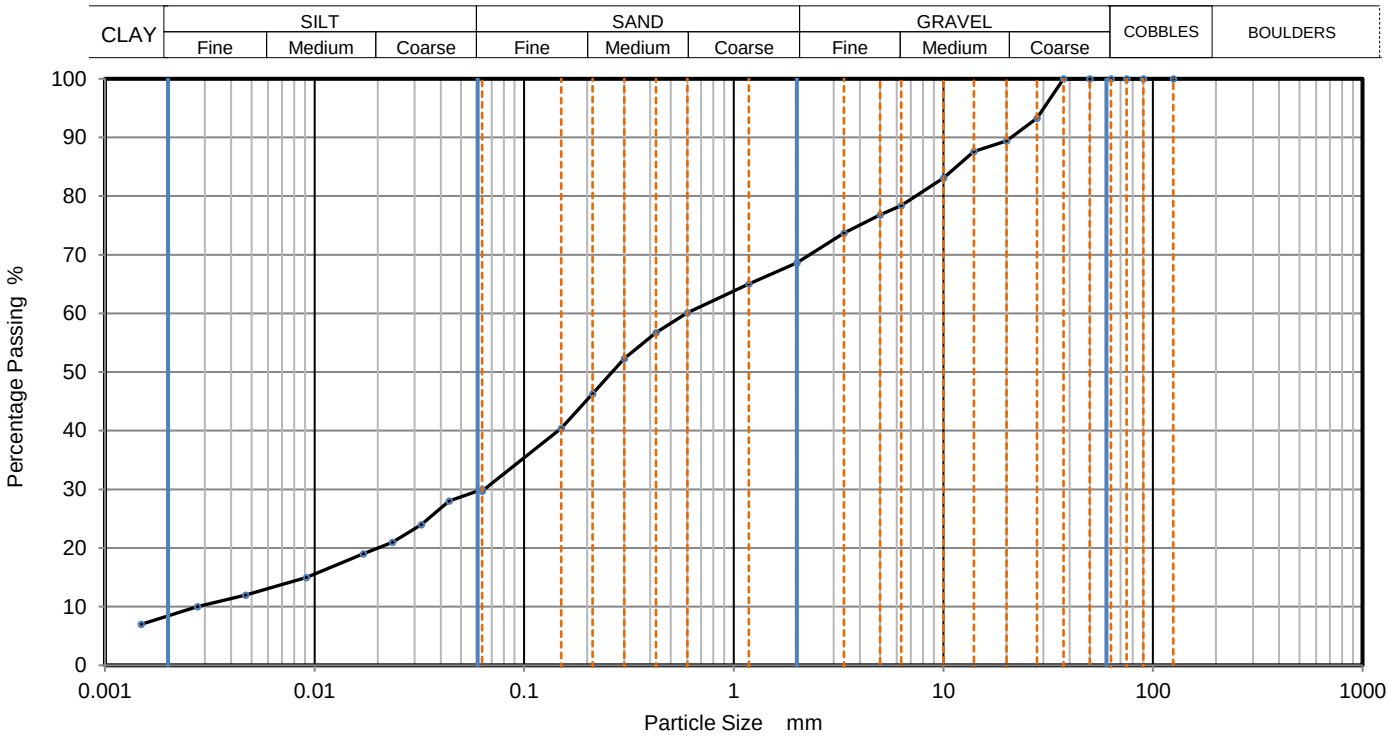
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

Job Ref					**21-1682**
Borehole/Pit No.					TP-6207
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brownish grey gravelly silty fine to coarse SAND.			Sample Depth (m) Top	1.40
				Base	2.60
Specimen Reference	9	Specimen Depth	1.4 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022090556



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	30
90	100	0.04381	28
75	100	0.03226	24
63	100	0.02351	21
50	100	0.01710	19
37.5	100	0.00913	15
28	93	0.00468	12
20	89	0.00277	10
14	88	0.00149	7
10	83		
6.3	78		
5	77		
3.35	74		
2	69		
1.18	65		
0.6	60	Particle density	(assumed)
0.425	57	2.65	Mg/m3
0.3	52		
0.212	46		
0.15	40		
0.063	30		

Dry Mass of sample, g: 4641

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	31.4
Sand	38.9
Silt	21.5
Clay	8.2

Grading Analysis		
D100	mm	
D60	mm	0.595
D30	mm	0.0644
D10	mm	0.00295
Uniformity Coefficient		200
Curvature Coefficient		2.4

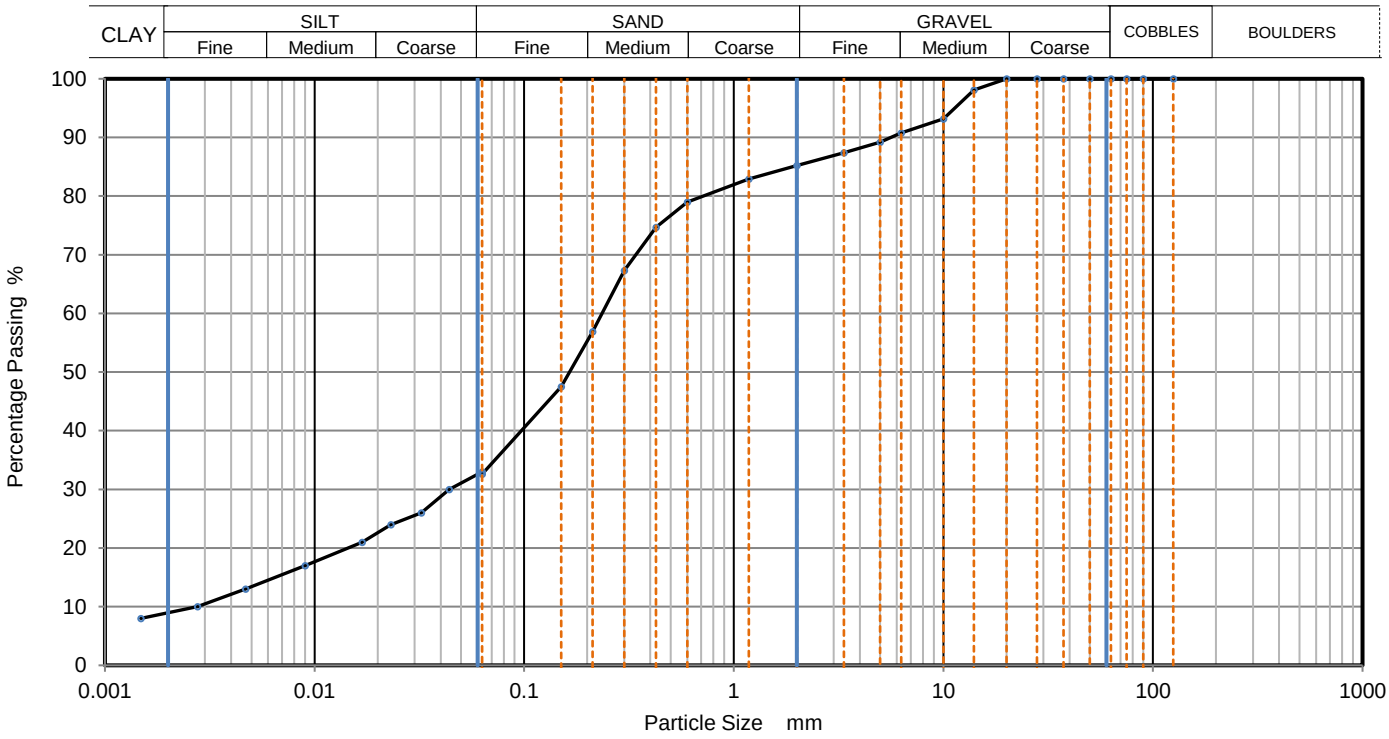
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					**21-1682**
Borehole/Pit No.					TP-6408
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Orangish brown slightly gravelly silty fine to coarse SAND.			Sample Depth (m) Top	0.25
				Base	1.00
Specimen Reference	6	Specimen Depth	0.25 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220908145



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	33
90	100	0.04380	30
75	100	0.03225	26
63	100	0.02316	24
50	100	0.01686	21
37.5	100	0.00901	17
28	100	0.00468	13
20	100	0.00277	10
14	98	0.00148	8
10	93		
6.3	91		
5	89		
3.35	87		
2	85		
1.18	83		
0.6	79	Particle density	(assumed)
0.425	75	2.65	Mg/m3
0.3	67		
0.212	57		
0.15	48		
0.063	33		

Dry Mass of sample, g: 386

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	14.8
Sand	52.6
Silt	23.9
Clay	8.7

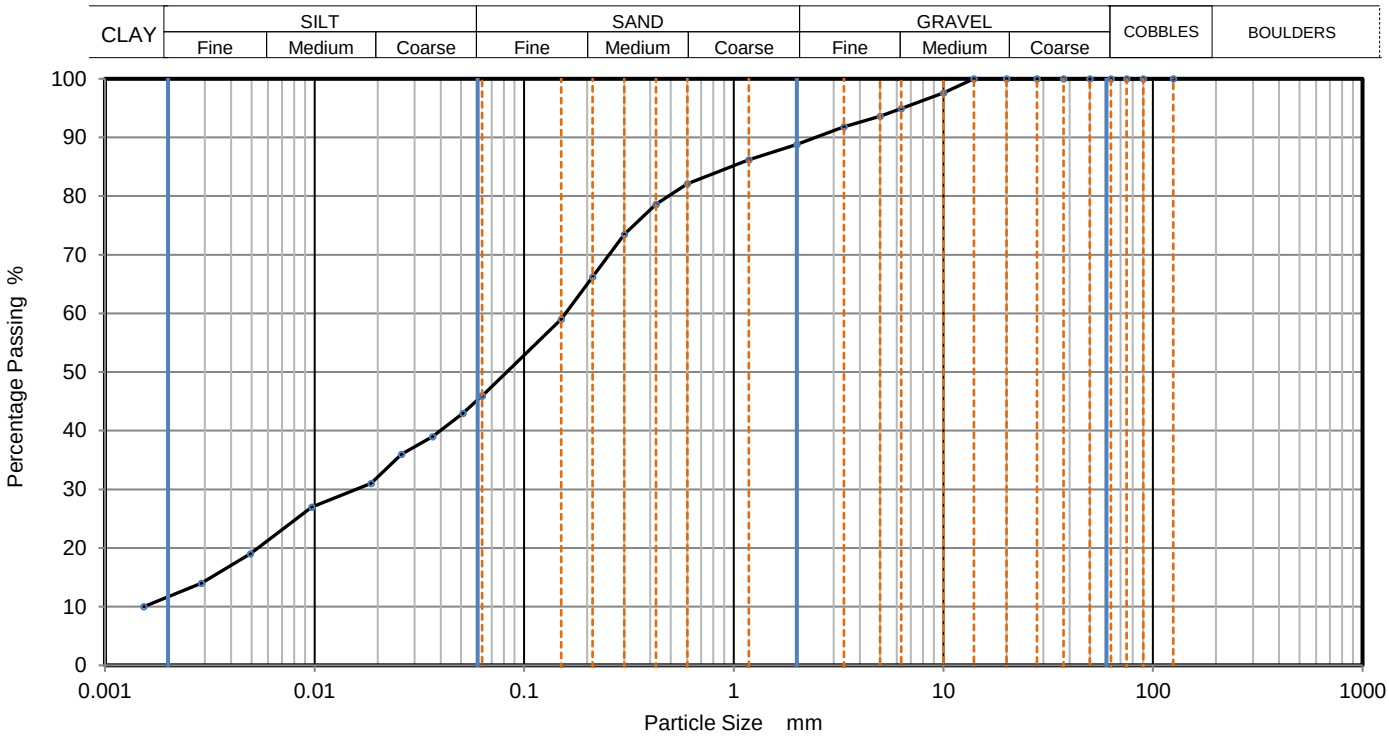
Grading Analysis		
D100	mm	
D60	mm	0.235
D30	mm	0.0461
D10	mm	0.00284
Uniformity Coefficient		83
Curvature Coefficient		3.2

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-6408
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	1.00
				Base	2.60
Specimen Reference	6	Specimen Depth	1 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220908146



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	46
90	100	0.05096	43
75	100	0.03648	39
63	100	0.02595	36
50	100	0.01857	31
37.5	100	0.00970	27
28	100	0.00493	19
20	100	0.00288	14
14	100	0.00153	10
10	98		
6.3	95		
5	94		
3.35	92		
2	89		
1.18	86		
0.6	82	Particle density	(assumed)
0.425	79	2.65	Mg/m3
0.3	74		
0.212	66		
0.15	59		
0.063	46		

Dry Mass of sample, g: 456

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	11.2
Sand	42.9
Silt	34.2
Clay	11.7

Grading Analysis		
D100	mm	
D60	mm	0.157
D30	mm	0.0154
D10	mm	0.0016
Uniformity Coefficient		98
Curvature Coefficient		0.94

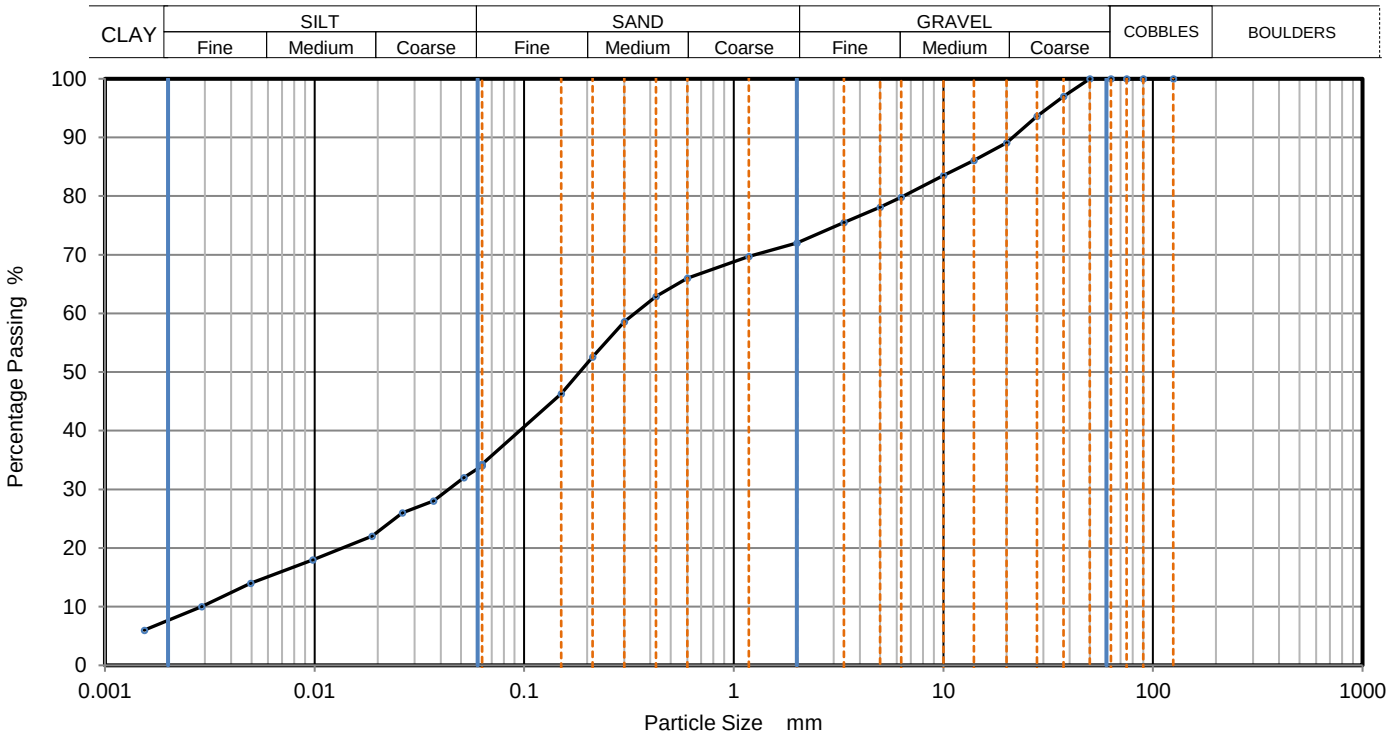
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-6408
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Brown sandy gravelly silty CLAY.			Sample Depth (m) Top	2.60
				Base	3.50
Specimen Reference	6	Specimen Depth	2.6 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220908147



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	34
90	100	0.05159	32
75	100	0.03692	28
63	100	0.02626	26
50	100	0.01879	22
37.5	97	0.00981	18
28	94	0.00496	14
20	89	0.00289	10
14	86	0.00154	6
10	84		
6.3	80		
5	78		
3.35	76		
2	72		
1.18	70		
0.6	66	Particle density	(assumed)
0.425	63	2.65	Mg/m3
0.3	59		
0.212	53		
0.15	46		
0.063	34		

Dry Mass of sample, g: 3525

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	28.0
Sand	37.8
Silt	26.5
Clay	7.7

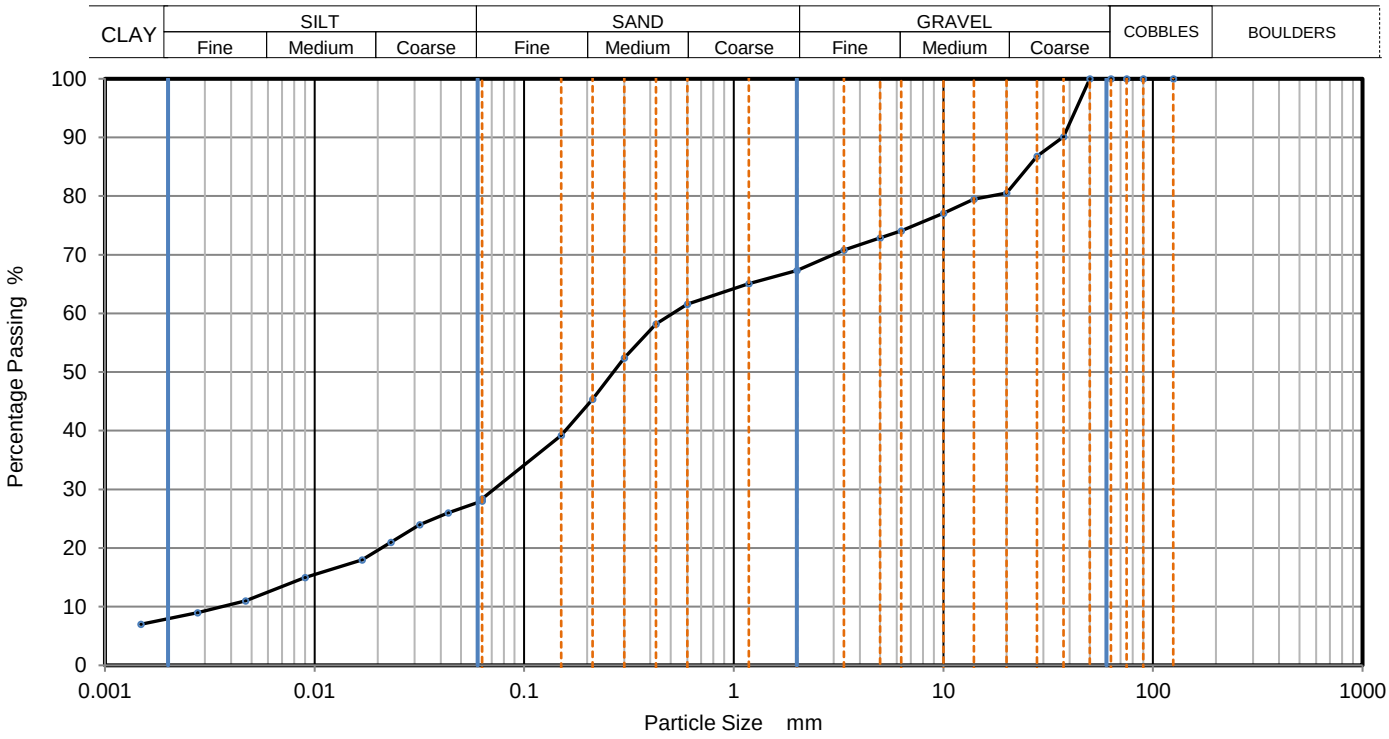
Grading Analysis		
D100	mm	
D60	mm	0.335
D30	mm	0.0427
D10	mm	0.00286
Uniformity Coefficient		120
Curvature Coefficient		1.9

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-6505
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		1
Specimen Description	Brown sandy gravelly silty CLAY.				Sample Depth (m)	Top	0.25
						Base	1.15
Specimen Reference	6	Specimen Depth	0.25	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus20220908148



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	28
90	100	0.04343	26
75	100	0.03175	24
63	100	0.02316	21
50	100	0.01686	18
37.5	90	0.00901	15
28	87	0.00468	11
20	81	0.00277	9
14	80	0.00148	7
10	77		
6.3	74		
5	73		
3.35	71		
2	67		
1.18	65		
0.6	62	Particle density	(assumed)
0.425	58	2.65	Mg/m3
0.3	52		
0.212	45		
0.15	39		
0.063	28		

Dry Mass of sample, g	2848

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	32.7
Sand	39.0
Silt	20.7
Clay	7.6

Grading Analysis		
D100	mm	
D60	mm	0.508
D30	mm	0.0718
D10	mm	0.00367
Uniformity Coefficient		140
Curvature Coefficient		2.8

Remarks

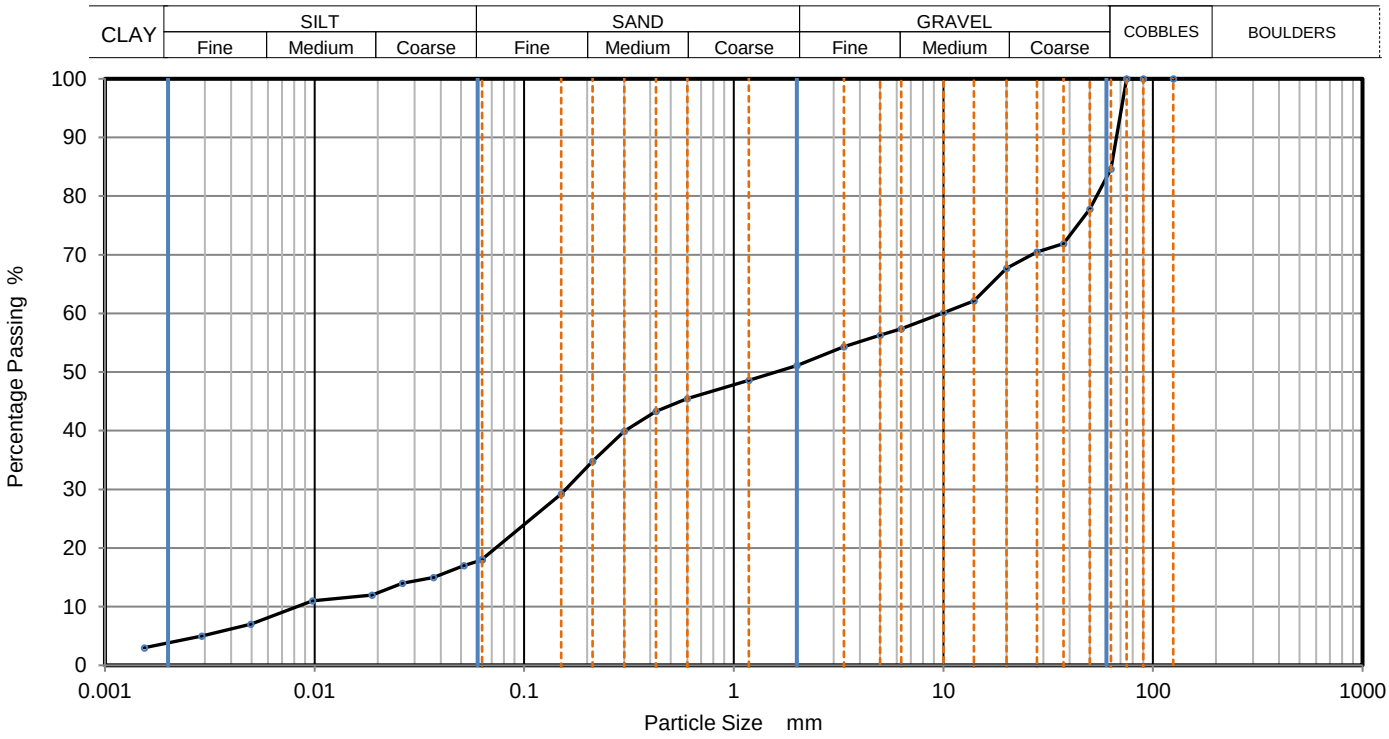
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	TP-6505
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brown sandy gravelly silty CLAY with cobbles.			Sample Depth (m) Top	1.15
				Base	2.75
Specimen Reference	4	Specimen Depth	1.15 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220908149



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	18
90	100	0.05159	17
75	100	0.03692	15
63	85	0.02626	14
50	78	0.01879	12
37.5	72	0.00976	11
28	71	0.00496	7
20	68	0.00289	5
14	62	0.00154	3
10	60		
6.3	57		
5	56		
3.35	54		
2	51		
1.18	49		
0.6	46	Particle density	(assumed)
0.425	43	2.65	Mg/m3
0.3	40		
0.212	35		
0.15	29		
0.063	18		

Dry Mass of sample, g: 14109

Sample Proportions	% dry mass
Cobbles	15.4
Gravel	33.5
Sand	33.0
Silt	14.0
Clay	4.1

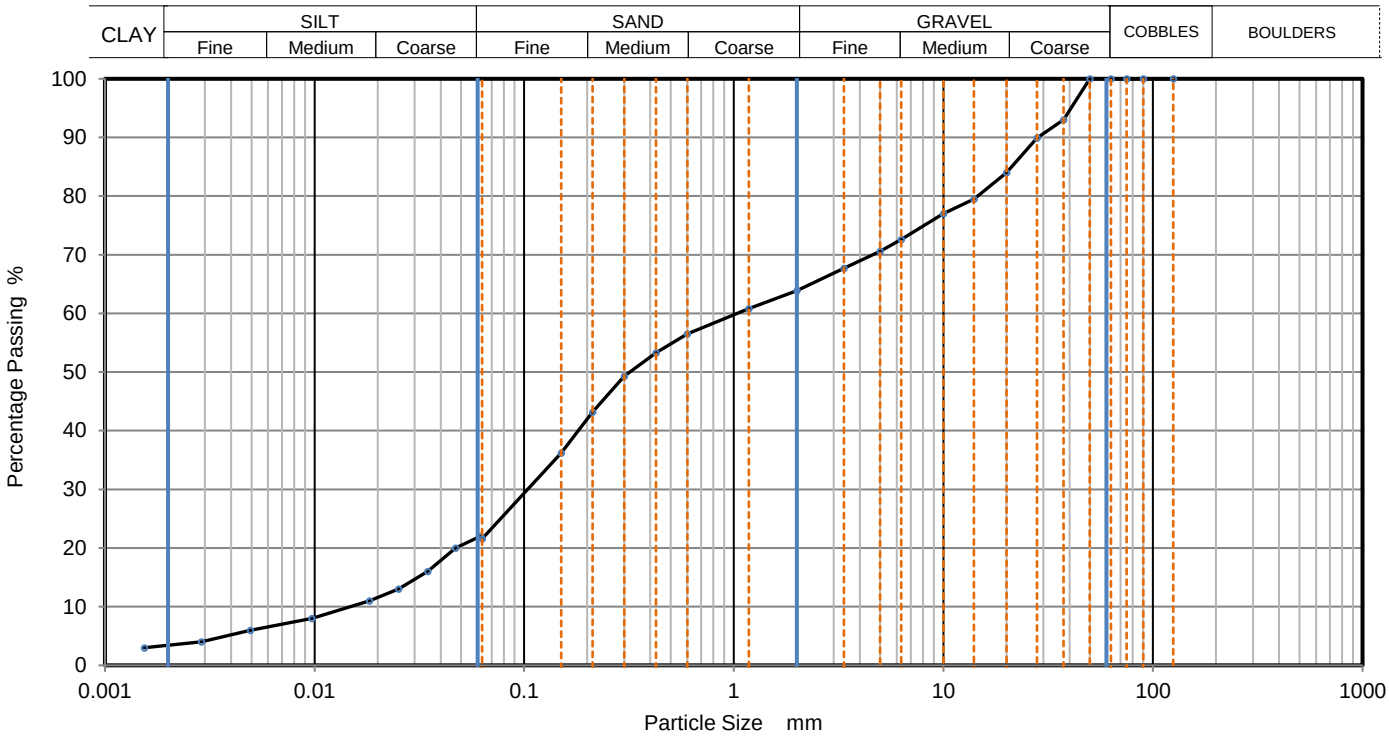
Grading Analysis		
D100	mm	
D60	mm	9.86
D30	mm	0.158
D10	mm	0.00851
Uniformity Coefficient		1200
Curvature Coefficient		0.3

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-6505
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Brown gravelly clayey fine to coarse SAND.			Sample Depth (m) Top	2.75
				Base	3.50
Specimen Reference	4	Specimen Depth	2.75 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220908150



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06183	22
90	100	0.04701	20
75	100	0.03467	16
63	100	0.02517	13
50	100	0.01824	11
37.5	93	0.00970	8
28	90	0.00493	6
20	84	0.00288	4
14	80	0.00154	3
10	77		
6.3	73		
5	71		
3.35	68		
2	64		
1.18	61		
0.6	57	Particle density	(assumed)
0.425	53	2.65	Mg/m3
0.3	49		
0.212	43		
0.15	36		
0.063	22		

Dry Mass of sample, g: 3059

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	36.1
Sand	42.3
Silt	18.3
Clay	3.3

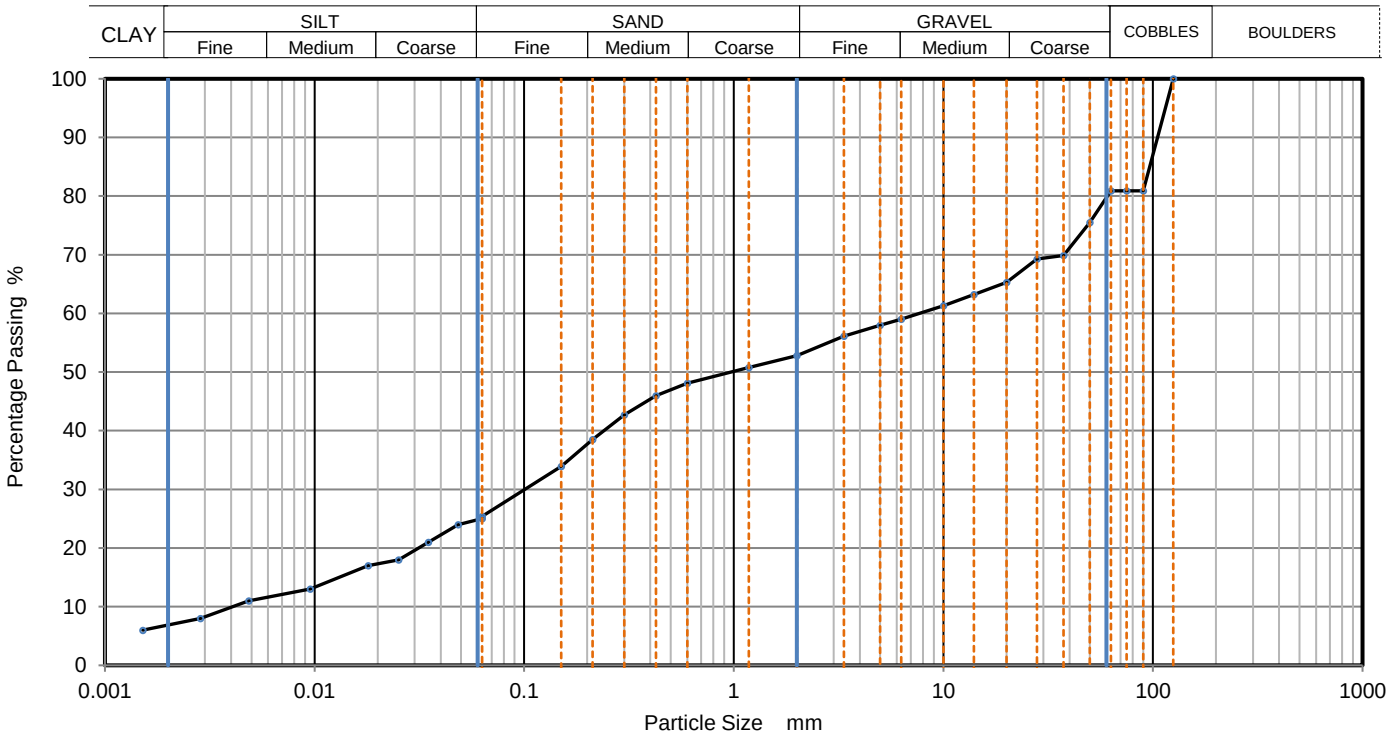
Grading Analysis		
D100	mm	
D60	mm	1.04
D30	mm	0.104
D10	mm	0.0156
Uniformity Coefficient		67
Curvature Coefficient		0.67

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-6575
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Brown sandy gravelly silty CLAY with cobbles.			Sample Depth (m) Top	0.20
				Base	0.90
Specimen Reference	6	Specimen Depth	0.2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220908151



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	25
90	81	0.04837	24
75	81	0.03490	21
63	81	0.02517	18
50	76	0.01802	17
37.5	70	0.00953	13
28	69	0.00485	11
20	65	0.00285	8
14	63	0.00152	6
10	61		
6.3	59		
5	58		
3.35	56		
2	53		
1.18	51		
0.6	48	Particle density	(assumed)
0.425	46	2.65	Mg/m3
0.3	43		
0.212	39		
0.15	34		
0.063	25		

Dry Mass of sample, g: 13573

Sample Proportions	% dry mass
Cobbles	19.1
Gravel	28.2
Sand	27.4
Silt	18.4
Clay	6.9

Grading Analysis		
D100	mm	125
D60	mm	7.68
D30	mm	0.101
D10	mm	0.00437
Uniformity Coefficient		1800
Curvature Coefficient		0.3

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

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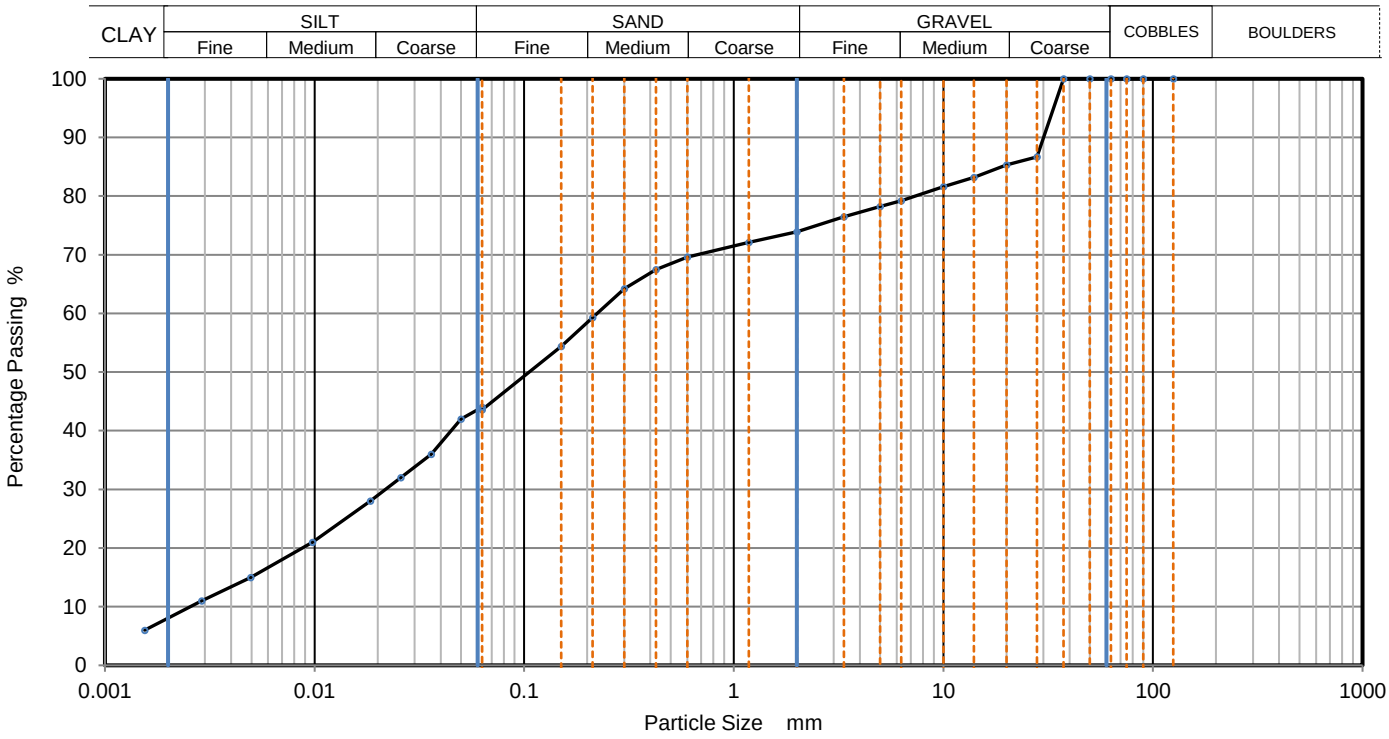
CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-6575
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brown sandy gravelly clayey SILT.			Sample Depth (m) Top	0.90
				Base	1.60
Specimen Reference	6	Specimen Depth	0.9 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220908152



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	44
90	100	0.05001	42
75	100	0.03604	36
63	100	0.02580	32
50	100	0.01846	28
37.5	100	0.00976	21
28	87	0.00496	15
20	85	0.00290	11
14	83	0.00155	6
10	82		
6.3	79		
5	78		
3.35	77		
2	74		
1.18	72		
0.6	70	Particle density	(assumed)
0.425	68	2.65	Mg/m3
0.3	64		
0.212	59		
0.15	54		
0.063	44		

Dry Mass of sample, g: 2838

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	26.1
Sand	30.3
Silt	35.6
Clay	8.0

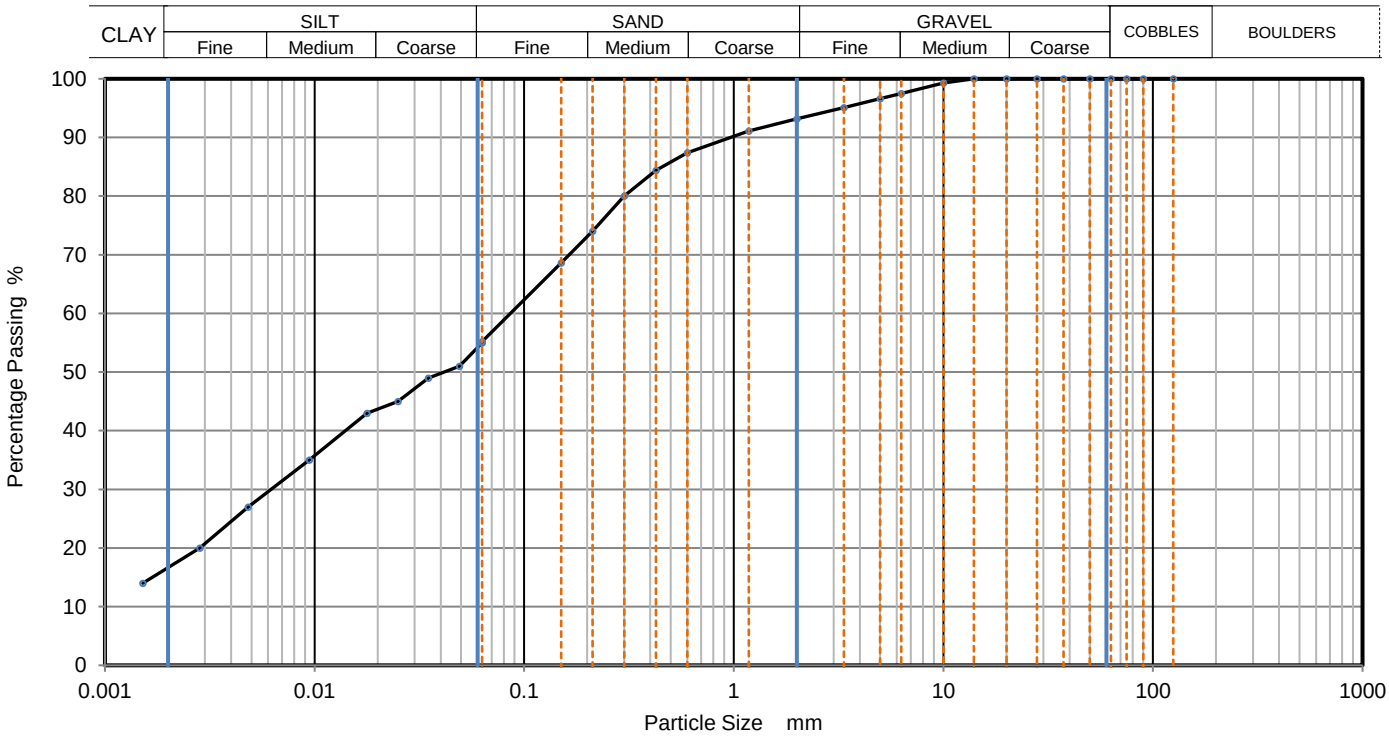
Grading Analysis		
D100	mm	
D60	mm	0.222
D30	mm	0.0212
D10	mm	0.00249
Uniformity Coefficient		89
Curvature Coefficient		0.81

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-6575
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		3
Specimen Description	Brown sandy slightly gravelly silty CLAY.				Sample Depth (m)	Top	1.60
						Base	2.40
Specimen Reference	7	Specimen Depth	1.6	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus20220908153



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	55
90	100	0.04903	51
75	100	0.03490	49
63	100	0.02501	45
50	100	0.01780	43
37.5	100	0.00942	35
28	100	0.00482	27
20	100	0.00283	20
14	100	0.00152	14
10	99		
6.3	98		
5	97		
3.35	95		
2	93		
1.18	91		
0.6	87	Particle density	(assumed)
0.425	84	2.65	Mg/m3
0.3	80		
0.212	74		
0.15	69		
0.063	55		

Dry Mass of sample, g: 357

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	6.8
Sand	38.0
Silt	38.2
Clay	17.0

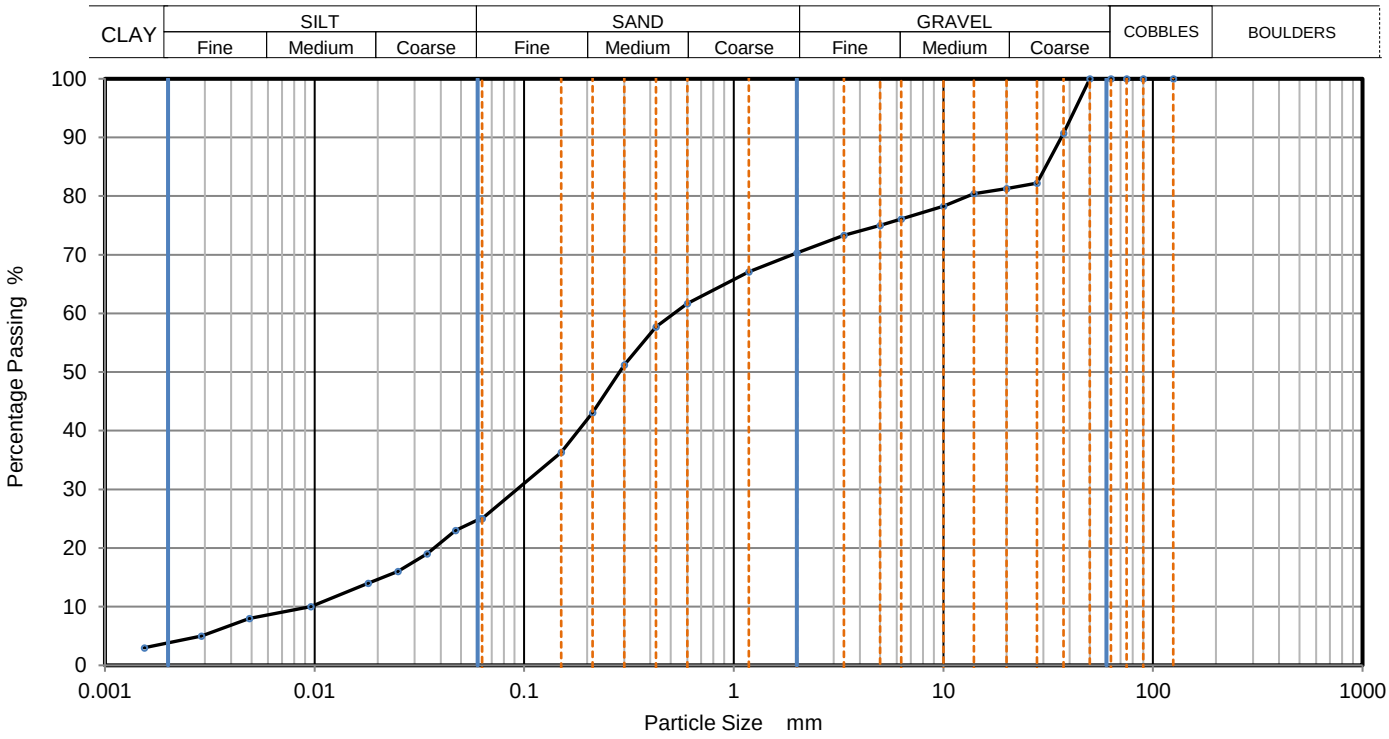
Grading Analysis		
D100	mm	
D60	mm	0.0859
D30	mm	0.00638
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-6575
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	4
Specimen Description	Brown gravelly silty fine to coarse SAND.			Sample Depth (m) Top	2.40
				Base	3.30
Specimen Reference	4	Specimen Depth	2.4 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220908154



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06183	25
90	100	0.04701	23
75	100	0.03444	19
63	100	0.02501	16
50	100	0.01802	14
37.5	91	0.00959	10
28	82	0.00488	8
20	81	0.00288	5
14	80	0.00154	3
10	78		
6.3	76		
5	75		
3.35	73		
2	70		
1.18	67		
0.6	62	Particle density	(assumed)
0.425	58	2.65	Mg/m3
0.3	51		
0.212	43		
0.15	36		
0.063	25		

Dry Mass of sample, g: 3018

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	29.7
Sand	45.3
Silt	21.1
Clay	3.9

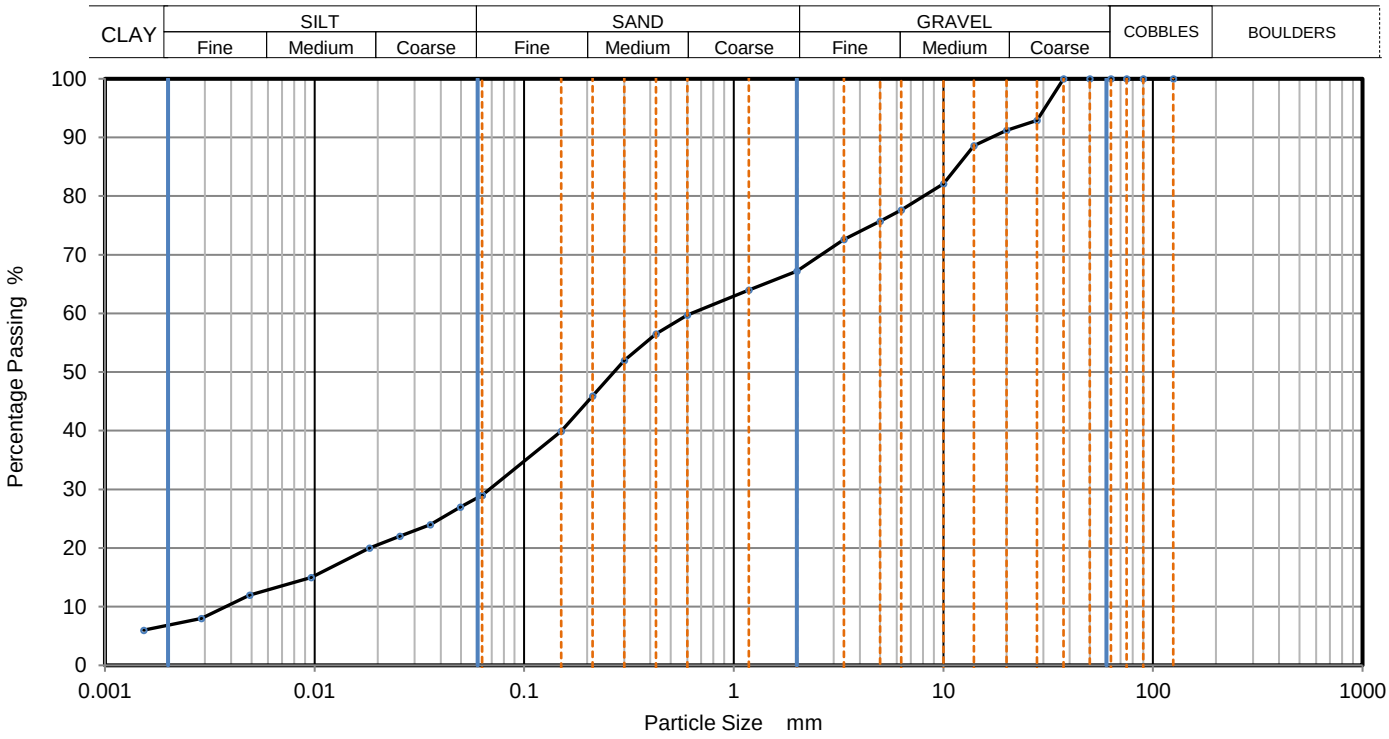
Grading Analysis		
D100	mm	
D60	mm	0.519
D30	mm	0.0925
D10	mm	0.00876
Uniformity Coefficient		59
Curvature Coefficient		1.9

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-6663
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		1
Specimen Description	Brown sandy gravelly silty CLAY.				Sample Depth (m)	Top	0.20
						Base	0.80
Specimen Reference	6	Specimen Depth	0.2	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus20220908155



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	29
90	100	0.04969	27
75	100	0.03559	24
63	100	0.02549	22
50	100	0.01824	20
37.5	100	0.00965	15
28	93	0.00491	12
20	91	0.00288	8
14	89	0.00153	6
10	82		
6.3	78		
5	76		
3.35	73		
2	67		
1.18	64		
0.6	60	Particle density	(assumed)
0.425	57	2.65	Mg/m3
0.3	52		
0.212	46		
0.15	40		
0.063	29		

Dry Mass of sample, g	2661

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	32.8
Sand	38.2
Silt	22.2
Clay	6.8

Grading Analysis		
D100	mm	
D60	mm	0.625
D30	mm	0.0682
D10	mm	0.00384
Uniformity Coefficient		160
Curvature Coefficient		1.9

Remarks

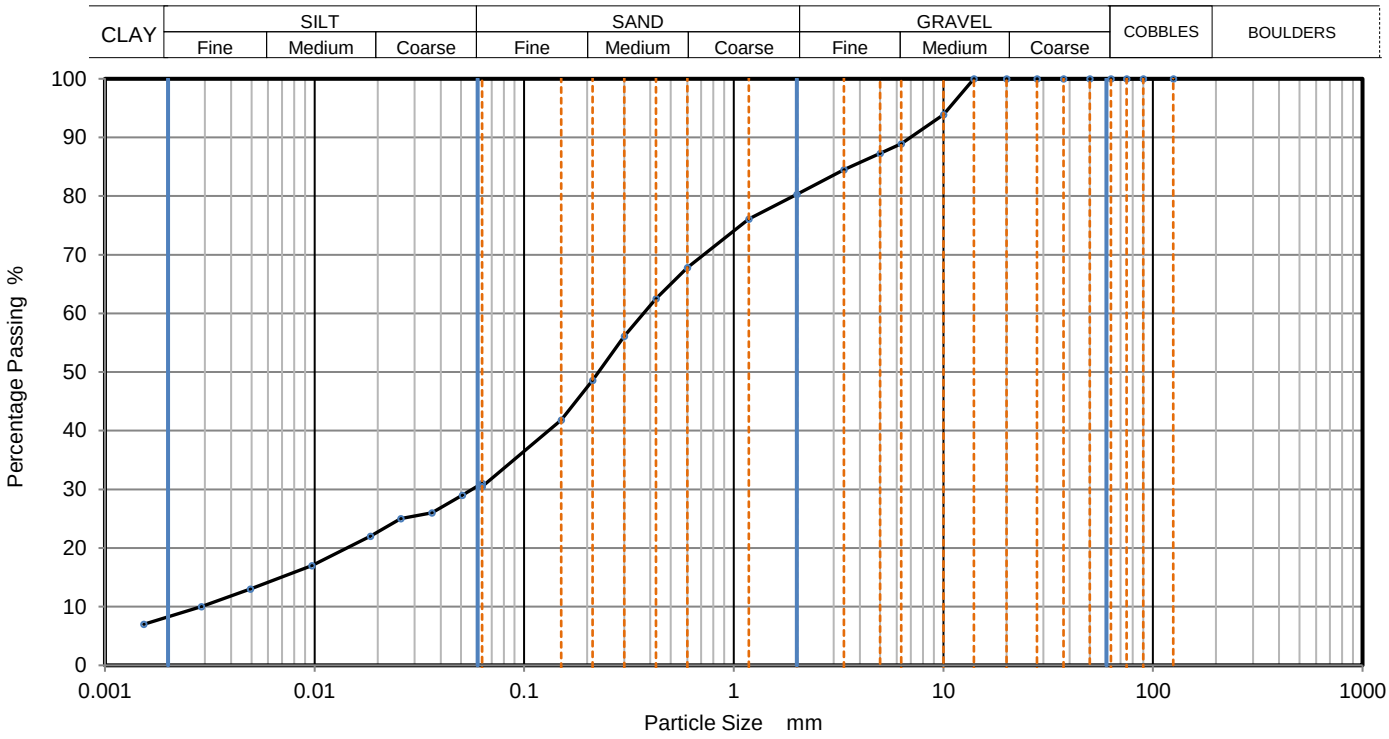
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

10122

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-6663
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brown slightly gravelly clayey fine to coarse SAND.			Sample Depth (m) Top	0.80
				Base	2.90
Specimen Reference	6	Specimen Depth	0.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220908156



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	31
90	100	0.05065	29
75	100	0.03627	26
63	100	0.02580	25
50	100	0.01846	22
37.5	100	0.00970	17
28	100	0.00493	13
20	100	0.00288	10
14	100	0.00153	7
10	94		
6.3	89		
5	87		
3.35	85		
2	80		
1.18	76		
0.6	68	Particle density	(assumed)
0.425	63	2.65	Mg/m3
0.3	56		
0.212	49		
0.15	42		
0.063	31		

Dry Mass of sample, g: 401

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	19.7
Sand	49.8
Silt	22.0
Clay	8.5

Grading Analysis		
D100	mm	
D60	mm	0.37
D30	mm	0.0586
D10	mm	0.00278
Uniformity Coefficient		130
Curvature Coefficient		3.3

Remarks

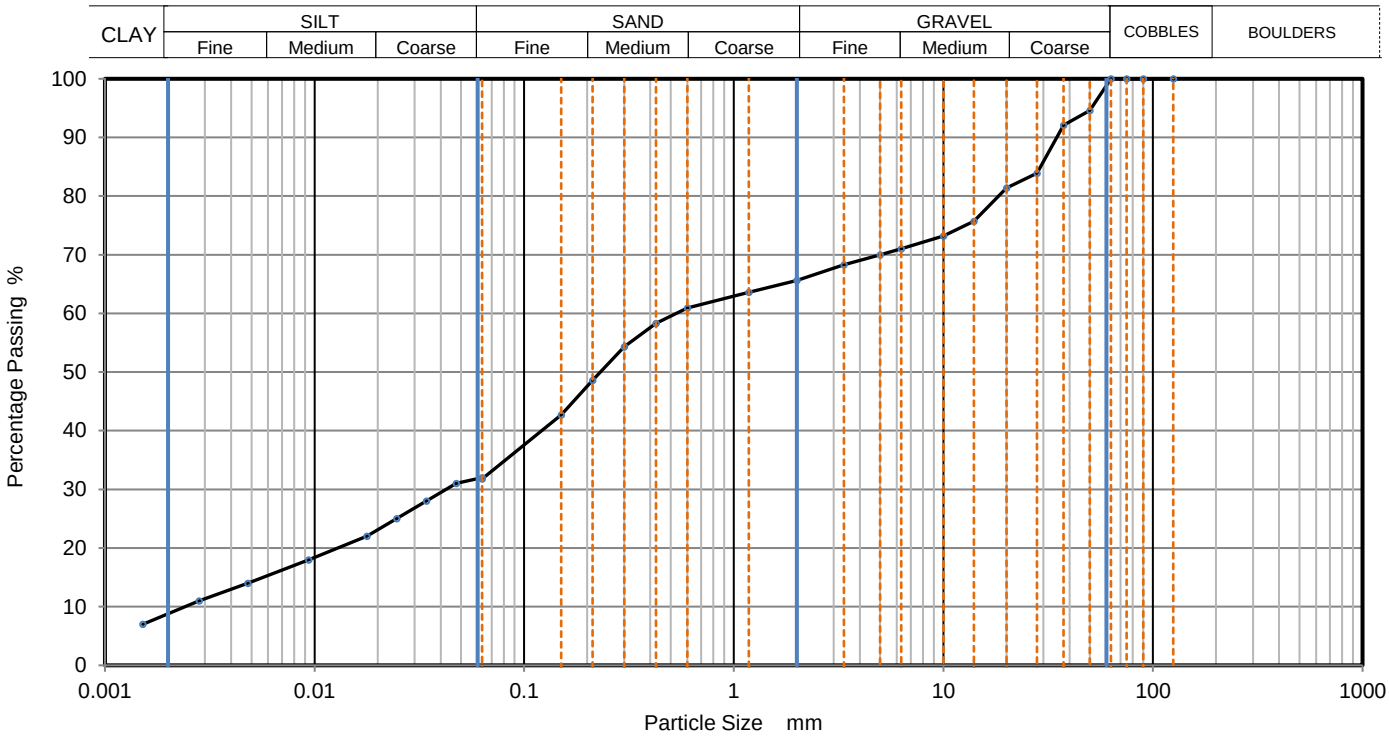
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

Job Ref					**21-1682**
Borehole/Pit No.					TP-6832
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Brown sandy gravelly silty CLAY.			Sample Depth (m) Top	0.10
				Base	0.85
Specimen Reference	6	Specimen Depth	0.1 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220908157



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	32
90	100	0.04736	31
75	100	0.03420	28
63	100	0.02468	25
50	95	0.01780	22
37.5	92	0.00936	18
28	84	0.00480	14
20	81	0.00282	11
14	76	0.00152	7
10	73		
6.3	71		
5	70		
3.35	68		
2	66		
1.18	64		
0.6	61	Particle density	(assumed)
0.425	58	2.65	Mg/m3
0.3	54		
0.212	49		
0.15	43		
0.063	32		

Dry Mass of sample, g: 9051

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	34.4
Sand	33.8
Silt	22.8
Clay	9.0

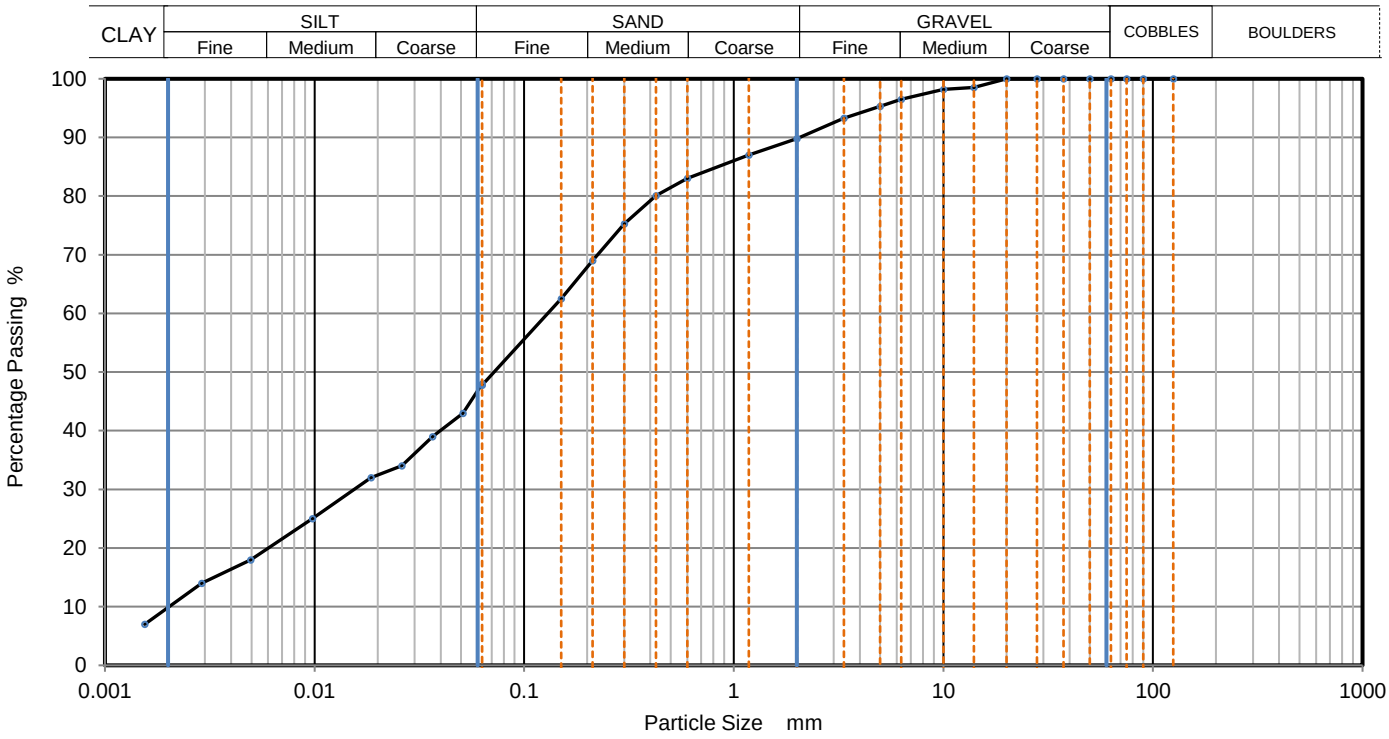
Grading Analysis		
D100	mm	
D60	mm	0.531
D30	mm	0.0436
D10	mm	0.00232
Uniformity Coefficient		230
Curvature Coefficient		1.5

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION			Job Ref		21-1682
				Borehole/Pit No.		TP-6832
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.		2
Specimen Description	Brown slightly gravelly clayey fine to coarse SAND.			Sample Depth (m)	Top	0.85
					Base	2.20
Specimen Reference	7	Specimen Depth	0.85 m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID		Caus20220908158



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	48
90	100	0.05097	43
75	100	0.03649	39
63	100	0.02611	34
50	100	0.01857	32
37.5	100	0.00976	25
28	100	0.00496	18
20	100	0.00290	14
14	99	0.00155	7
10	98		
6.3	97		
5	95		
3.35	93		
2	90		
1.18	87		
0.6	83	Particle density	(assumed)
0.425	80	2.65	Mg/m3
0.3	75		
0.212	69		
0.15	63		
0.063	48		

Dry Mass of sample, g: 399

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	10.2
Sand	42.0
Silt	38.2
Clay	9.6

Grading Analysis		
D100	mm	
D60	mm	0.13
D30	mm	0.0156
D10	mm	0.00207
Uniformity Coefficient		63
Curvature Coefficient		0.9

Remarks

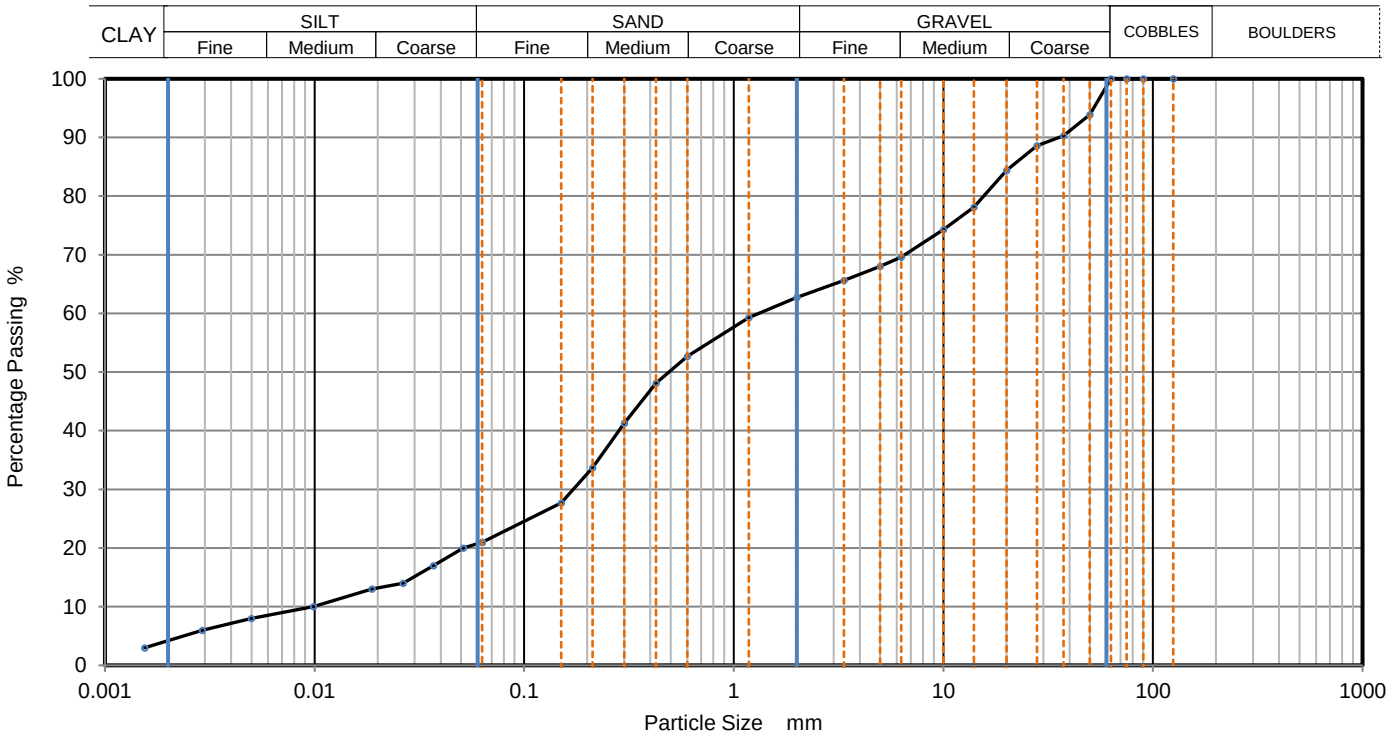
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	TP-6832
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Brown sandy gravelly silty CLAY.			Sample Depth (m) Top	2.20
				Base	3.00
Specimen Reference	4	Specimen Depth	2.2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220908159



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	21
90	100	0.05129	20
75	100	0.03693	17
63	100	0.02642	14
50	94	0.01879	13
37.5	90	0.00987	10
28	89	0.00499	8
20	84	0.00291	6
14	78	0.00155	3
10	74		
6.3	70		
5	68		
3.35	66		
2	63		
1.18	59		
0.6	53	Particle density	(assumed)
0.425	48	2.65	Mg/m3
0.3	41		
0.212	34		
0.15	28		
0.063	21		

Dry Mass of sample, g: 8175

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	37.3
Sand	41.7
Silt	16.8
Clay	4.2

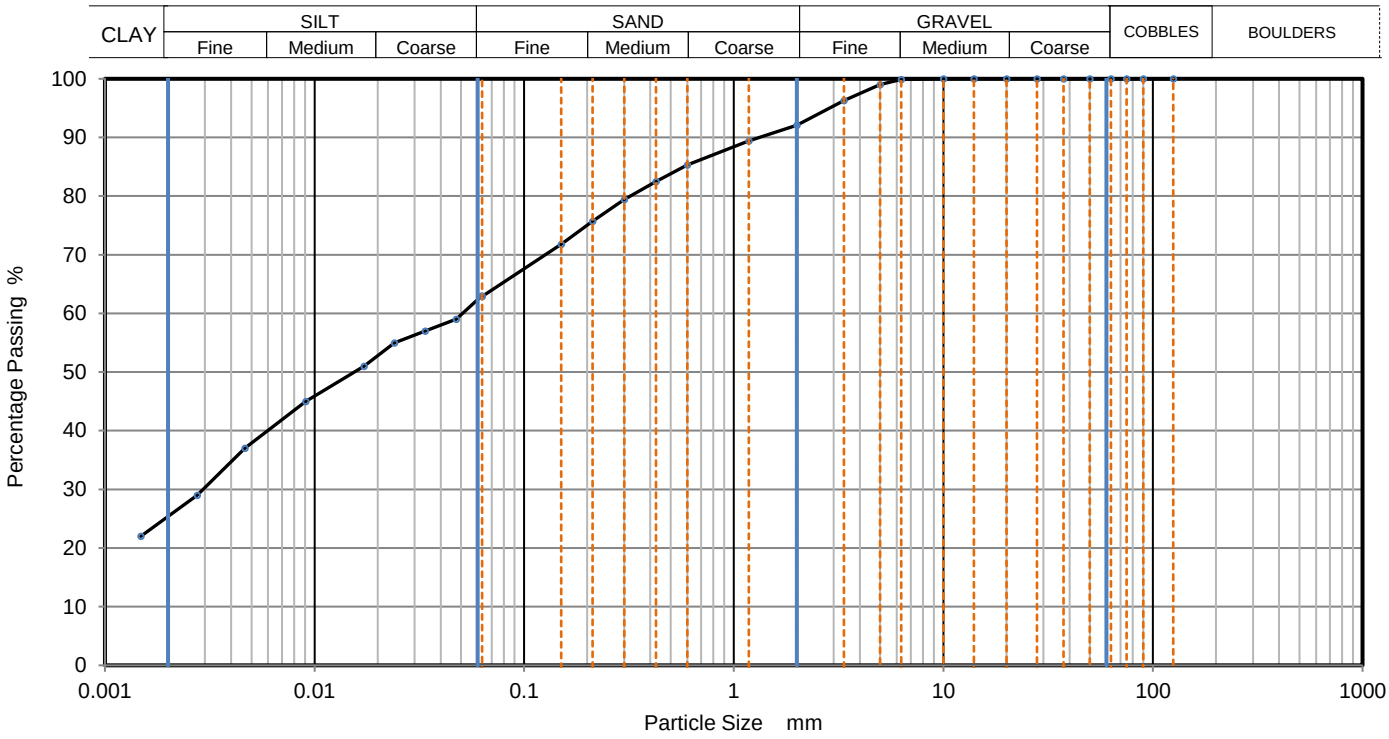
Grading Analysis		
D100	mm	
D60	mm	1.32
D30	mm	0.171
D10	mm	0.00997
Uniformity Coefficient		130
Curvature Coefficient		2.2

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-6906
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		1
Specimen Description	Brown sandy slightly gravelly silty CLAY.				Sample Depth (m)	Top	0.20
						Base	1.20
Specimen Reference	6	Specimen Depth	0.2	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus20220908160



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06276	63
90	100	0.04736	59
75	100	0.03373	57
63	100	0.02402	55
50	100	0.01722	51
37.5	100	0.00907	45
28	100	0.00465	37
20	100	0.00275	29
14	100	0.00148	22
10	100		
6.3	100		
5	99		
3.35	96		
2	92		
1.18	89		
0.6	85	Particle density	(assumed)
0.425	83	2.65	Mg/m3
0.3	79		
0.212	76		
0.15	72		
0.063	63		

Dry Mass of sample, g: 321

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	7.9
Sand	29.2
Silt	37.5
Clay	25.4

Grading Analysis		
D100	mm	
D60	mm	0.051
D30	mm	0.00285
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

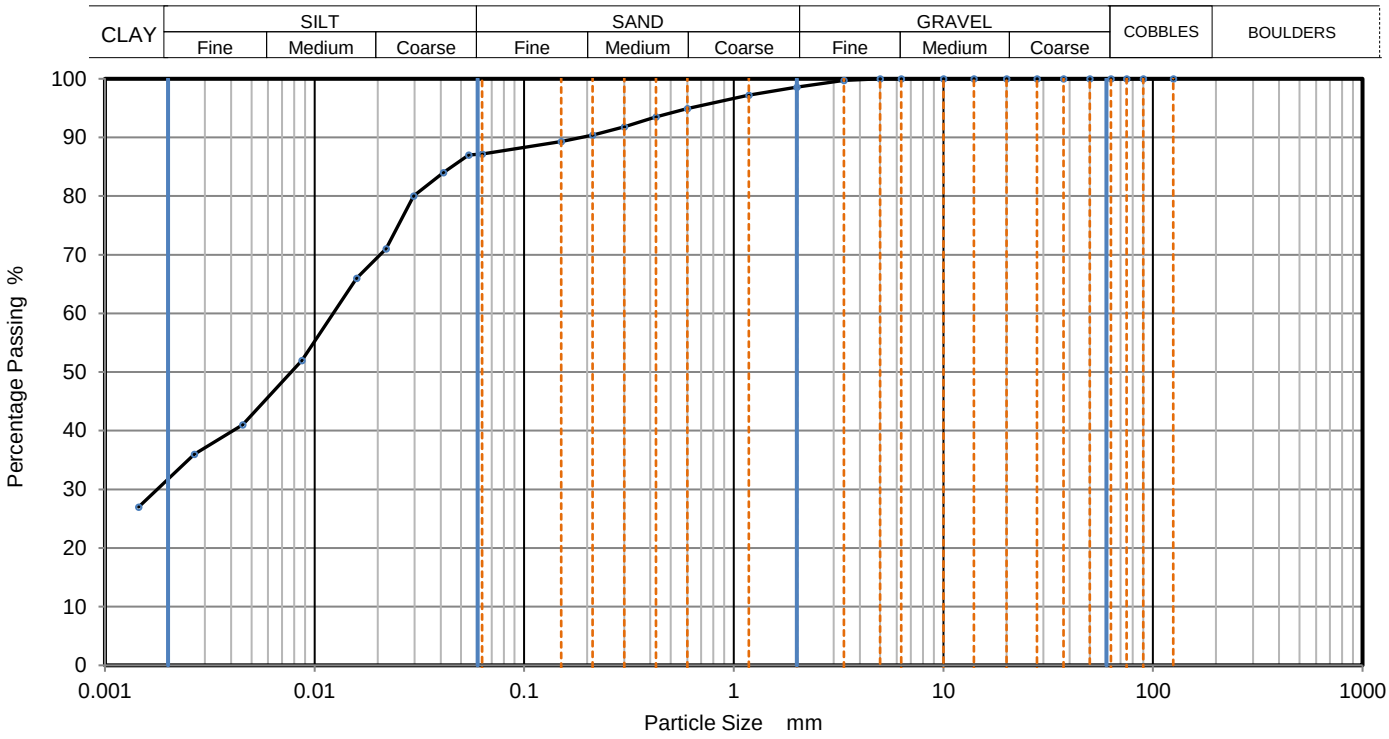
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-6906
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		2
Specimen Description	Brown slightly sandy silty CLAY.				Sample Depth (m)	Top	1.20
						Base	1.30
Specimen Reference	6	Specimen Depth	1.2	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus20220908161



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.05428	87
90	100	0.04115	84
75	100	0.02965	80
63	100	0.02191	71
50	100	0.01588	66
37.5	100	0.00871	52
28	100	0.00454	41
20	100	0.00267	36
14	100	0.00145	27
10	100		
6.3	100		
5	100		
3.35	100		
2	99		
1.18	97		
0.6	95	Particle density	(assumed)
0.425	94	2.65	Mg/m3
0.3	92		
0.212	90		
0.15	89		
0.063	87		

Dry Mass of sample, g: 335

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	1.4
Sand	11.4
Silt	55.8
Clay	31.4

Grading Analysis		
D100	mm	
D60	mm	0.0124
D30	mm	0.00182
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

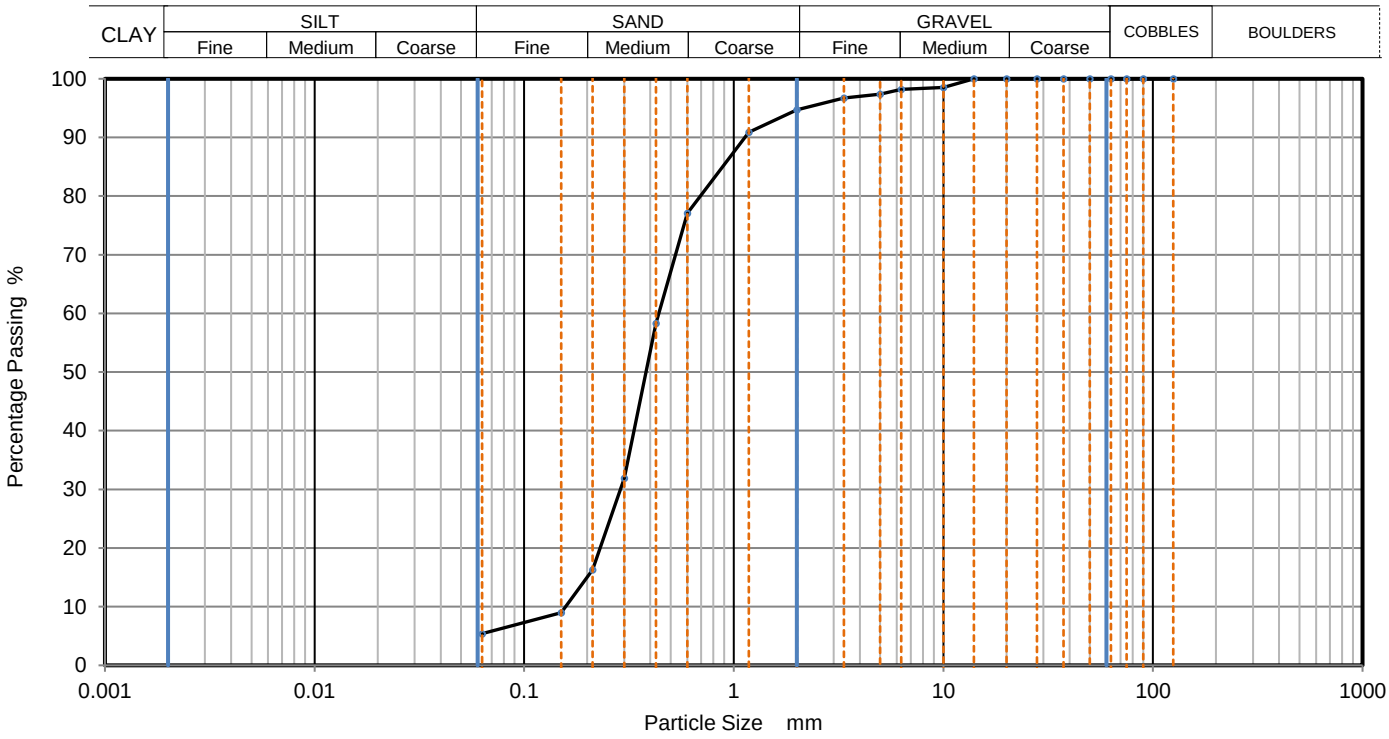
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

Job Ref					**21-1682**
Borehole/Pit No.					TP-6906
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Brown slightly gravelly silty fine to coarse SAND.			Sample Depth (m) Top	1.30
				Base	2.30
Specimen Reference	4	Specimen Depth	1.3 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus20220908162



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	99		
6.3	98		
5	97		
3.35	97		
2	95		
1.18	91		
0.6	77		
0.425	58		
0.3	32		
0.212	16		
0.15	9		
0.063	5		

Dry Mass of sample, g: 312

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	5.3
Sand	89.3
Fines <0.063mm	5.0

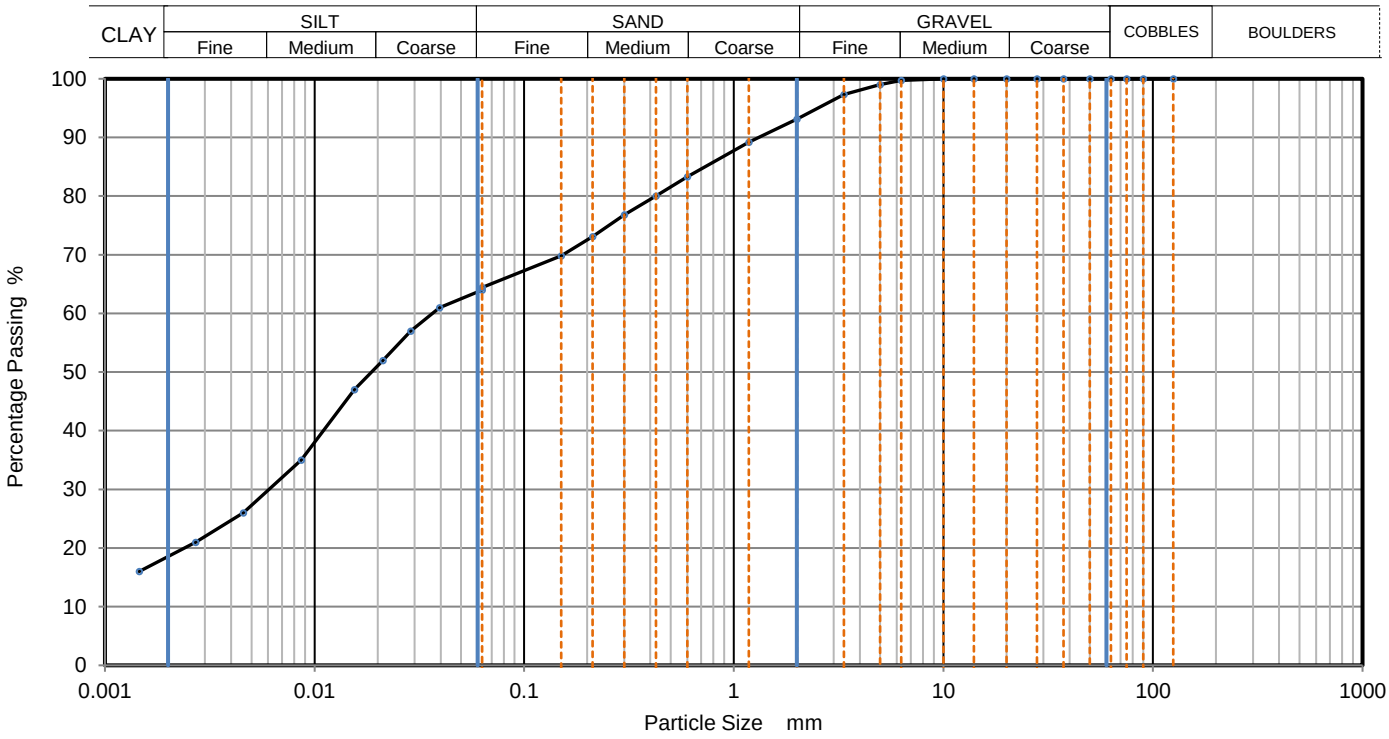
Grading Analysis		
D100	mm	
D60	mm	0.438
D30	mm	0.288
D10	mm	0.157
Uniformity Coefficient		2.8
Curvature Coefficient		1.2

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-6997
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	0.15
				Base	0.60
Specimen Reference	6	Specimen Depth	0.15 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220908163



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	64
90	100	0.03954	61
75	100	0.02881	57
63	100	0.02115	52
50	100	0.01549	47
37.5	100	0.00864	35
28	100	0.00456	26
20	100	0.00270	21
14	100	0.00146	16
10	100		
6.3	100		
5	99		
3.35	97		
2	93		
1.18	89		
0.6	83	Particle density	(assumed)
0.425	80	2.65	Mg/m3
0.3	77		
0.212	73		
0.15	70		
0.063	64		

Dry Mass of sample, g: 321

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	6.9
Sand	28.6
Silt	46.2
Clay	18.3

Grading Analysis		
D100	mm	
D60	mm	0.037
D30	mm	0.00613
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

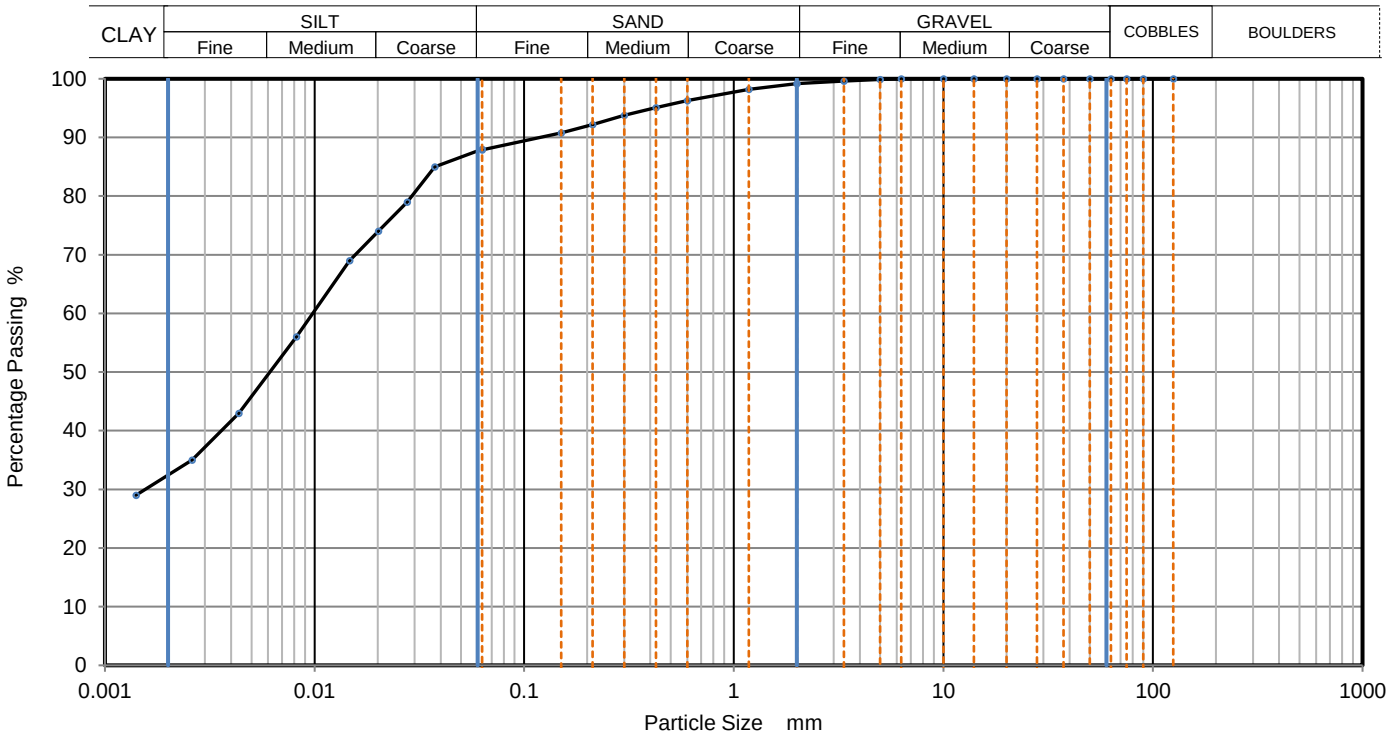
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-6997
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brown slightly sandy silty CLAY.			Sample Depth (m) Top	0.60
				Base	1.70
Specimen Reference	6	Specimen Depth	0.6 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220908164



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	88
90	100	0.03744	85
75	100	0.02767	79
63	100	0.02017	74
50	100	0.01468	69
37.5	100	0.00820	56
28	100	0.00435	43
20	100	0.00260	35
14	100	0.00140	29
10	100		
6.3	100		
5	100		
3.35	100		
2	99		
1.18	98		
0.6	96	Particle density	(assumed)
0.425	95	2.65	Mg/m3
0.3	94		
0.212	92		
0.15	91		
0.063	88		

Dry Mass of sample, g: 391

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	0.8
Sand	11.3
Silt	55.1
Clay	32.8

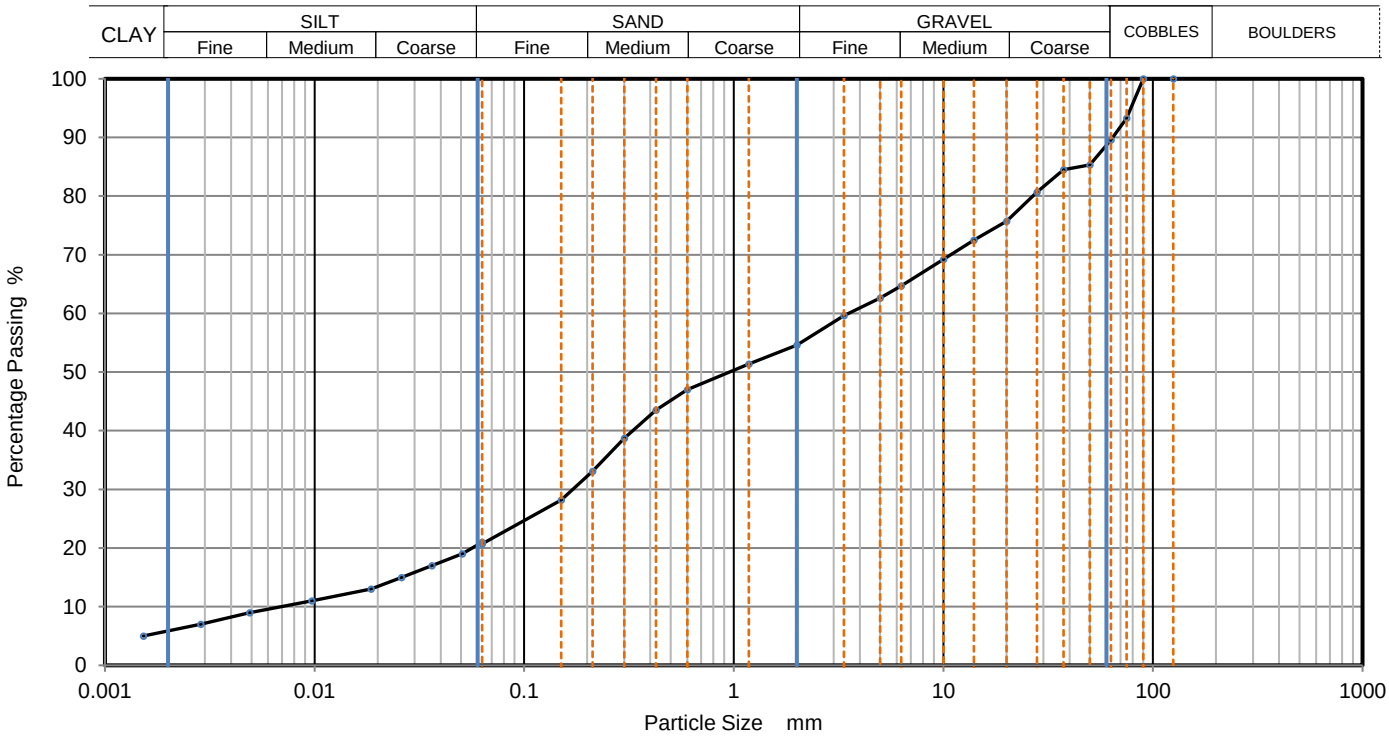
Grading Analysis		
D100	mm	
D60	mm	0.0099
D30	mm	0.00151
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-6997
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Brown sandy gravelly silty CLAY with cobbles.			Sample Depth (m) Top	1.70
				Base	2.50
Specimen Reference	4	Specimen Depth	1.7 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220908165



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	21
90	100	0.05064	19
75	93	0.03626	17
63	90	0.02595	15
50	85	0.01857	13
37.5	85	0.00970	11
28	81	0.00491	9
20	76	0.00286	7
14	73	0.00152	5
10	69		
6.3	65		
5	63		
3.35	60		
2	55		
1.18	51		
0.6	47	Particle density (assumed)	
0.425	44	2.65 Mg/m3	
0.3	39		
0.212	33		
0.15	28		
0.063	21		

Dry Mass of sample, g: 13596

Sample Proportions	% dry mass
Cobbles	10.4
Gravel	35.1
Sand	33.8
Silt	14.9
Clay	5.8

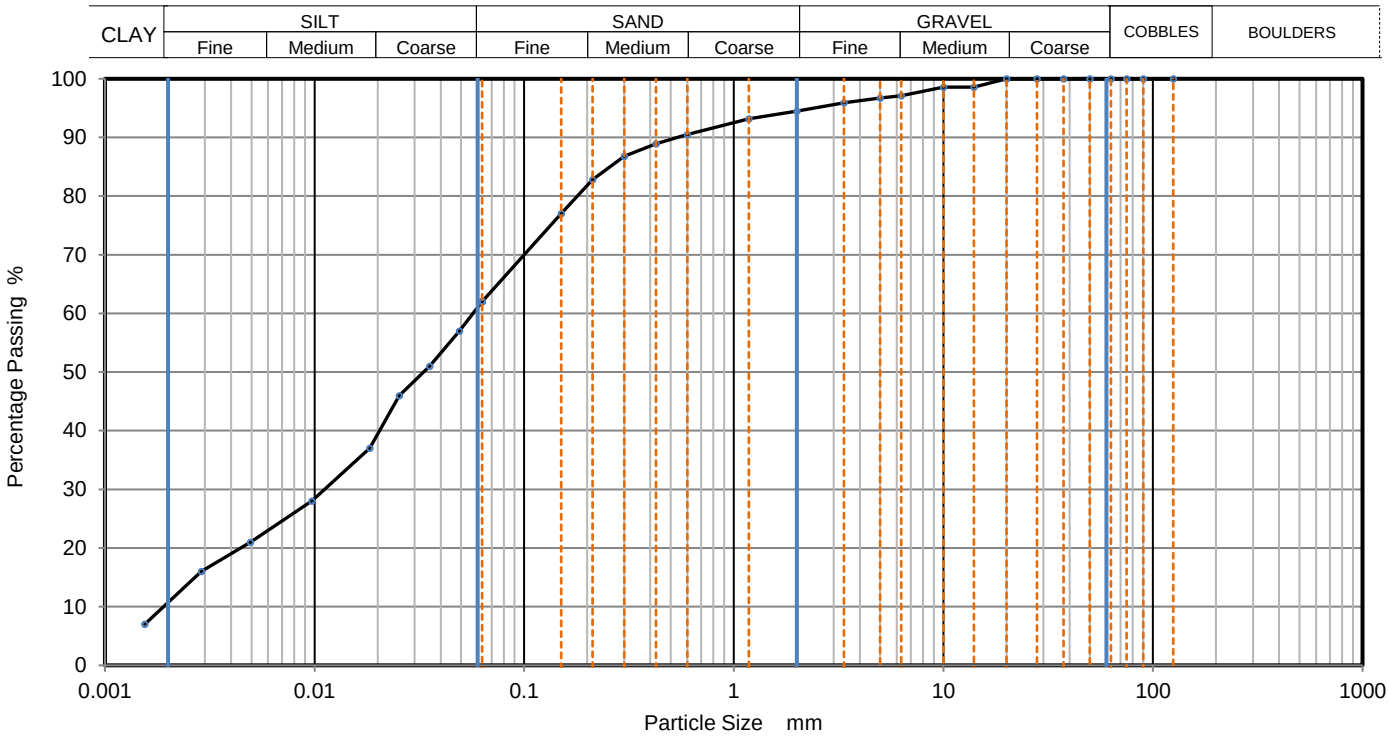
Grading Analysis		
D100	mm	
D60	mm	3.55
D30	mm	0.17
D10	mm	0.00725
Uniformity Coefficient		490
Curvature Coefficient		1.1

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-7207
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		1
Specimen Description	Brown sandy slightly gravelly silty CLAY.				Sample Depth (m)	Top	0.20
						Base	0.80
Specimen Reference	9	Specimen Depth	0.2	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022090557



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	62
90	100	0.04903	57
75	100	0.03536	51
63	100	0.02533	46
50	100	0.01835	37
37.5	100	0.00970	28
28	100	0.00493	21
20	100	0.00288	16
14	99	0.00155	7
10	99		
6.3	97		
5	97		
3.35	96		
2	95		
1.18	93		
0.6	91	Particle density	(assumed)
0.425	89	2.65	Mg/m3
0.3	87		
0.212	83		
0.15	77		
0.063	62		

Dry Mass of sample, g: 501

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	5.5
Sand	32.5
Silt	51.3
Clay	10.7

Grading Analysis		
D100	mm	
D60	mm	0.0564
D30	mm	0.0115
D10	mm	0.00191
Uniformity Coefficient		30
Curvature Coefficient		1.2

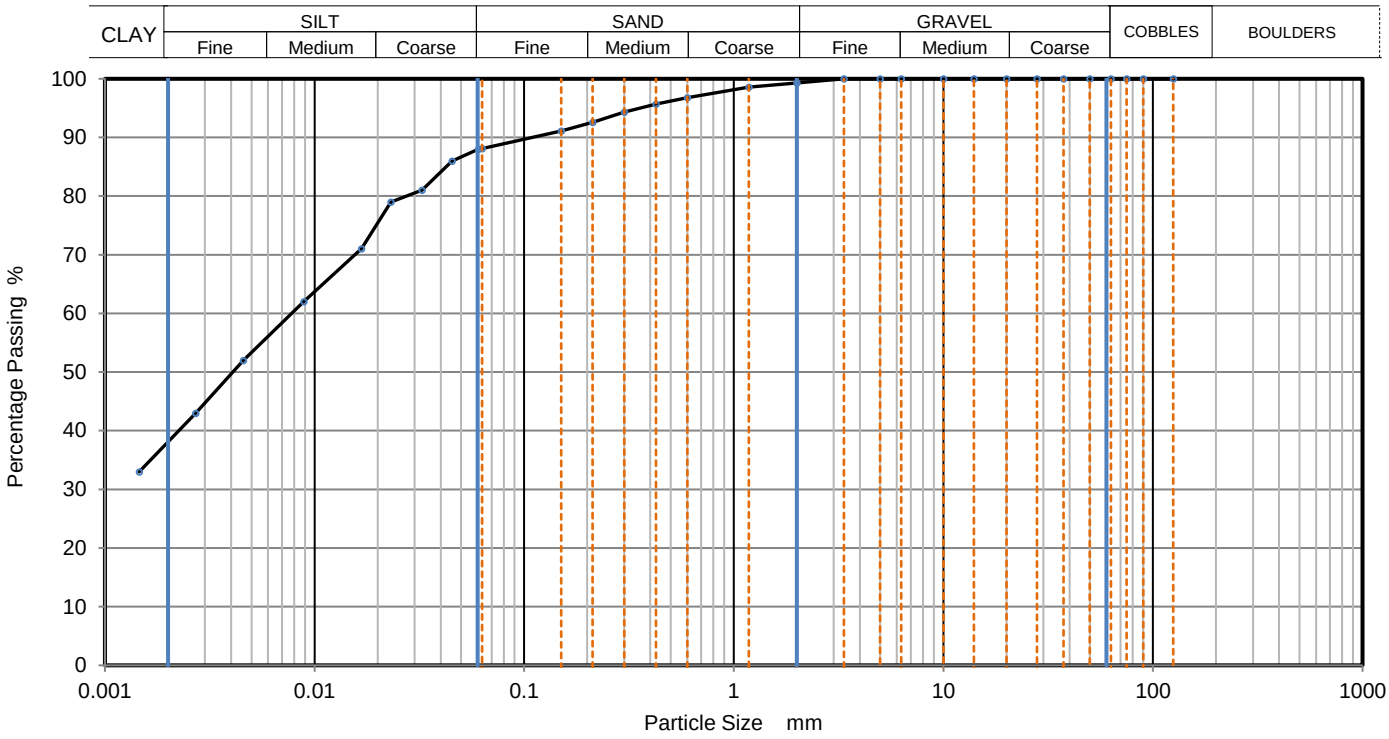
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-7207
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brownish grey slightly sandy silty CLAY.			Sample Depth (m) Top	0.80
				Base	1.60
Specimen Reference	9	Specimen Depth	0.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022090558



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06039	88
90	100	0.04526	86
75	100	0.03251	81
63	100	0.02316	79
50	100	0.01674	71
37.5	100	0.00889	62
28	100	0.00457	52
20	100	0.00270	43
14	100	0.00146	33
10	100		
6.3	100		
5	100		
3.35	100		
2	99		
1.18	99		
0.6	97	Particle density	(assumed)
0.425	96	2.65	Mg/m3
0.3	94		
0.212	93		
0.15	91		
0.063	88		

Dry Mass of sample, g: 329

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	0.7
Sand	11.2
Silt	49.9
Clay	38.2

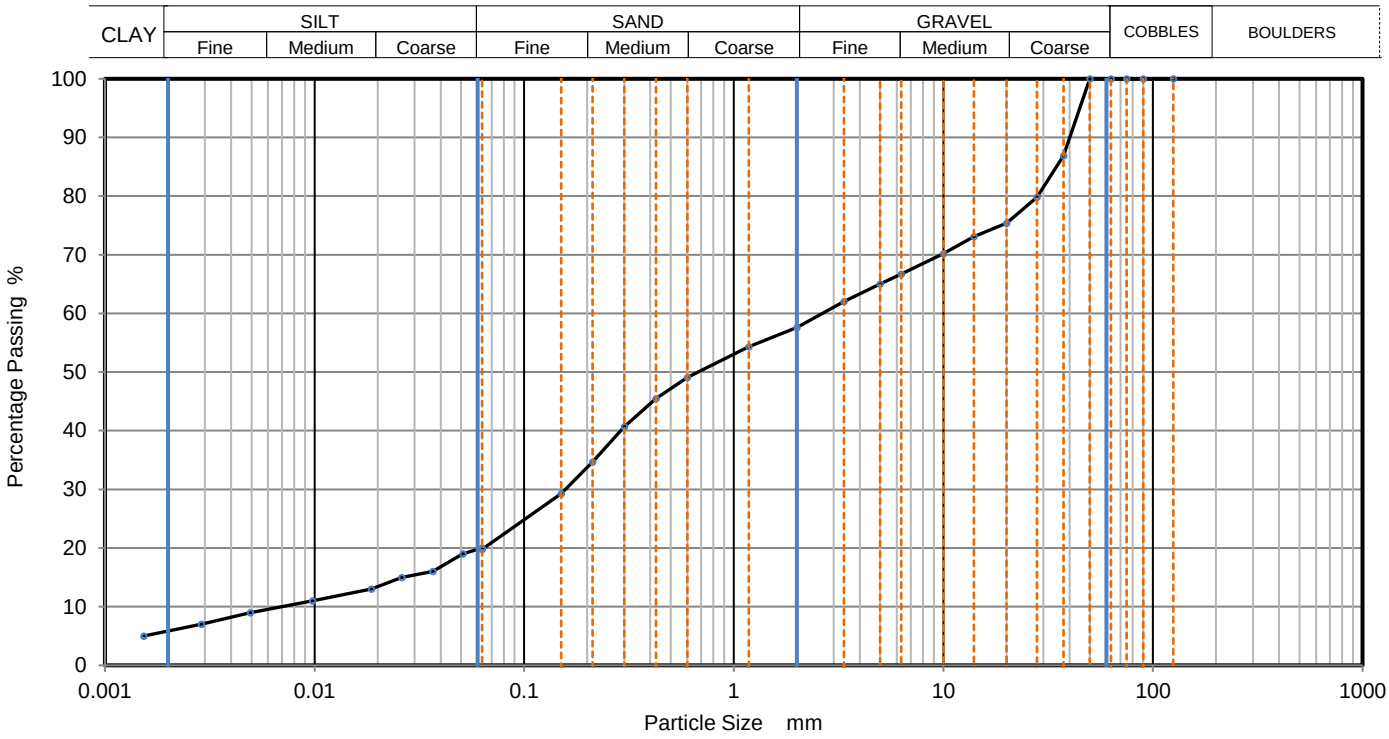
Grading Analysis		
D100	mm	
D60	mm	0.00778
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION			Job Ref		21-1682
				Borehole/Pit No.		TP-7207
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.		3
Specimen Description	Brownish grey gravelly clayey fine to coarse SAND.			Sample Depth (m)	Top	1.60
					Base	3.50
Specimen Reference	9	Specimen Depth	1.6 m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID		Caus2022090559



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	20
90	100	0.05097	19
75	100	0.03671	16
63	100	0.02611	15
50	100	0.01868	13
37.5	87	0.00976	11
28	80	0.00493	9
20	75	0.00288	7
14	73	0.00153	5
10	70		
6.3	67		
5	65		
3.35	62		
2	58		
1.18	54		
0.6	49	Particle density	(assumed)
0.425	46	2.65	Mg/m3
0.3	41		
0.212	35		
0.15	29		
0.063	20		

Dry Mass of sample, g: 10654

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	42.4
Sand	37.8
Silt	14.0
Clay	5.8

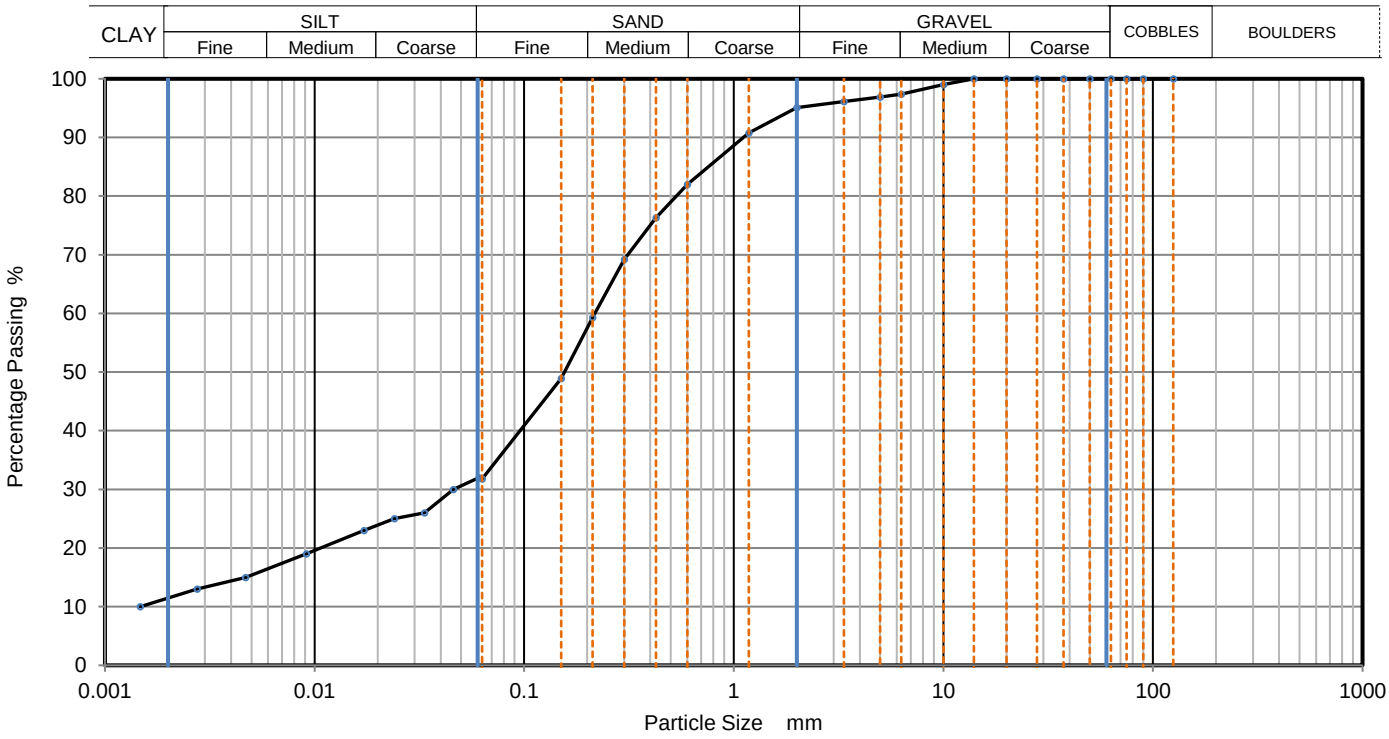
Grading Analysis		
D100	mm	
D60	mm	2.64
D30	mm	0.157
D10	mm	0.00718
Uniformity Coefficient		370
Curvature Coefficient		1.3

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-7305
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		1
Specimen Description	Brown slightly gravelly silty fine to coarse SAND.				Sample Depth (m)	Top	0.30
						Base	0.90
Specimen Reference	6	Specimen Depth	0.3	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus20220908166



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06086	32
90	100	0.04596	30
75	100	0.03348	26
63	100	0.02401	25
50	100	0.01722	23
37.5	100	0.00913	19
28	100	0.00468	15
20	100	0.00275	13
14	100	0.00147	10
10	99		
6.3	97		
5	97		
3.35	96		
2	95		
1.18	91		
0.6	82	Particle density	(assumed)
0.425	76	2.65	Mg/m3
0.3	69		
0.212	59		
0.15	49		
0.063	32		

Dry Mass of sample, g: 329

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	4.9
Sand	63.3
Silt	20.5
Clay	11.3

Grading Analysis		
D100	mm	
D60	mm	0.217
D30	mm	0.0461
D10	mm	0.00148
Uniformity Coefficient		150
Curvature Coefficient		6.6

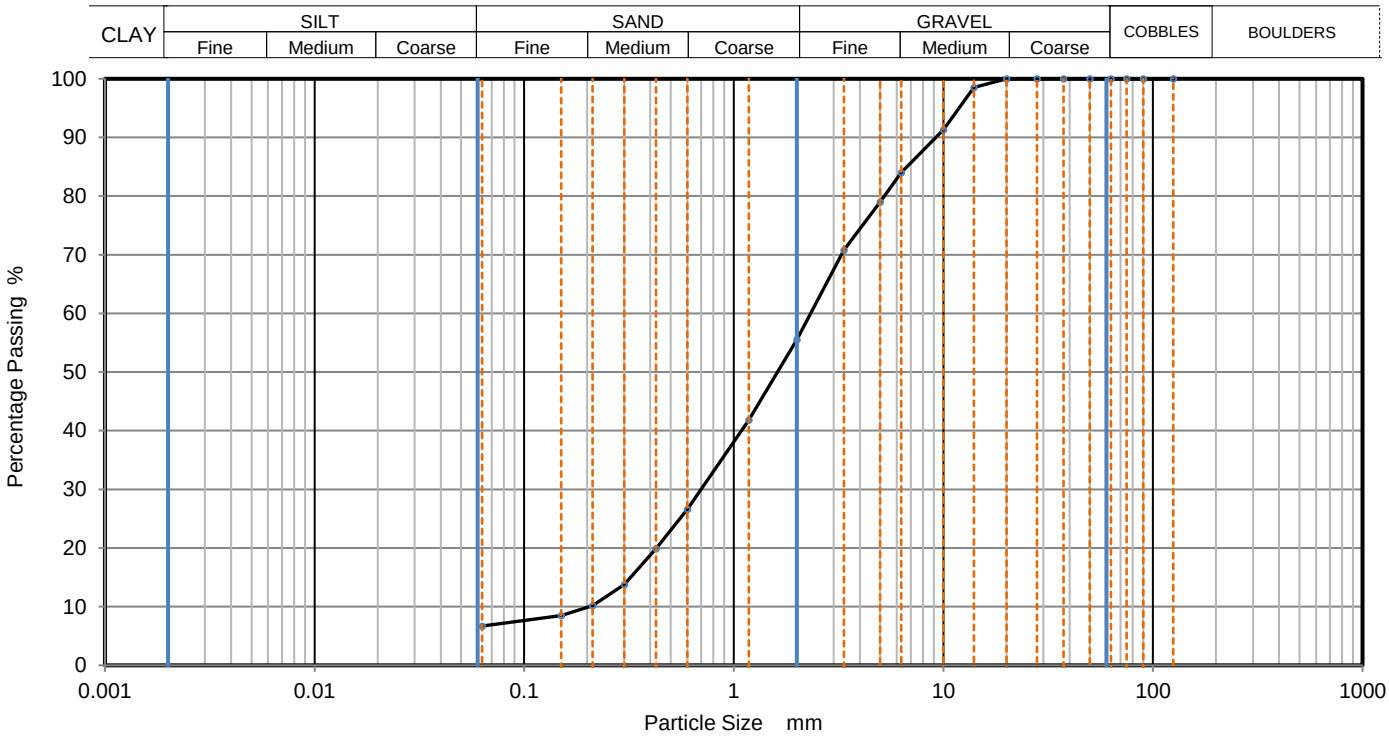
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-7305
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		2
Specimen Description	Brown slightly gravelly silty fine to coarse SAND.				Sample Depth (m)	Top	0.90
						Base	2.00
Specimen Reference	4	Specimen Depth	0.9	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clause 9.2				KeyLAB ID		Caus20220908167



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	99		
10	91		
6.3	84		
5	79		
3.35	71		
2	56		
1.18	42		
0.6	27		
0.425	20		
0.3	14		
0.212	10		
0.15	9		
0.063	7		

Dry Mass of sample, g	439

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	44.5
Sand	48.8
Fines <0.063mm	7.0

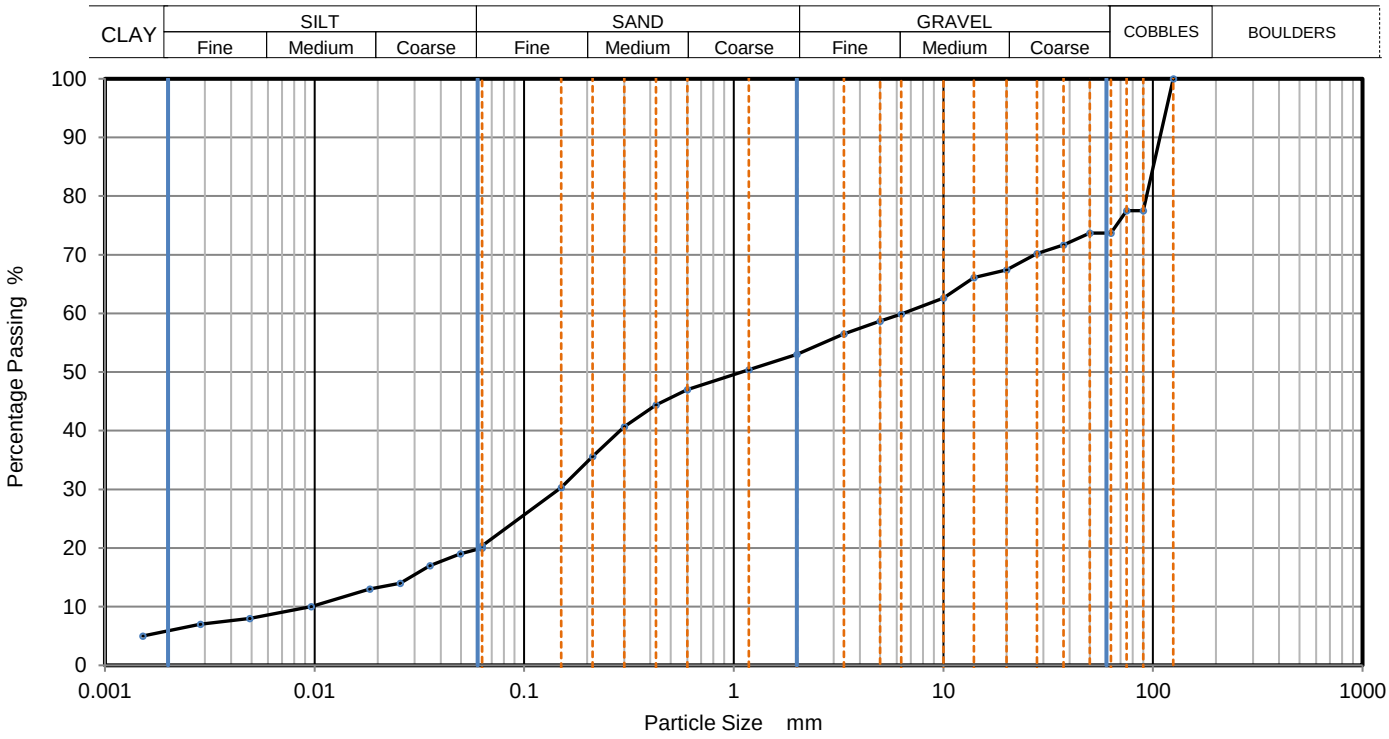
Grading Analysis		
D100	mm	
D60	mm	2.32
D30	mm	0.699
D10	mm	0.204
Uniformity Coefficient		11
Curvature Coefficient		1

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-7305
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Brown sandy gravelly silty CLAY with cobbles.			Sample Depth (m) Top	2.00
				Base	2.50
Specimen Reference	6	Specimen Depth	2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus20220908168



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	20
90	78	0.04968	19
75	78	0.03559	17
63	74	0.02564	14
50	74	0.01835	13
37.5	72	0.00965	10
28	70	0.00491	8
20	67	0.00285	7
14	66	0.00152	5
10	63		
6.3	60		
5	59		
3.35	57		
2	53		
1.18	50		
0.6	47	Particle density	(assumed)
0.425	44	2.65	Mg/m3
0.3	41		
0.212	36		
0.15	30		
0.063	20		

Dry Mass of sample, g: 13044

Sample Proportions	% dry mass
Cobbles	26.3
Gravel	20.7
Sand	32.6
Silt	14.6
Clay	5.8

Grading Analysis		
D100	mm	125
D60	mm	6.37
D30	mm	0.146
D10	mm	0.00915
Uniformity Coefficient		700
Curvature Coefficient		0.37

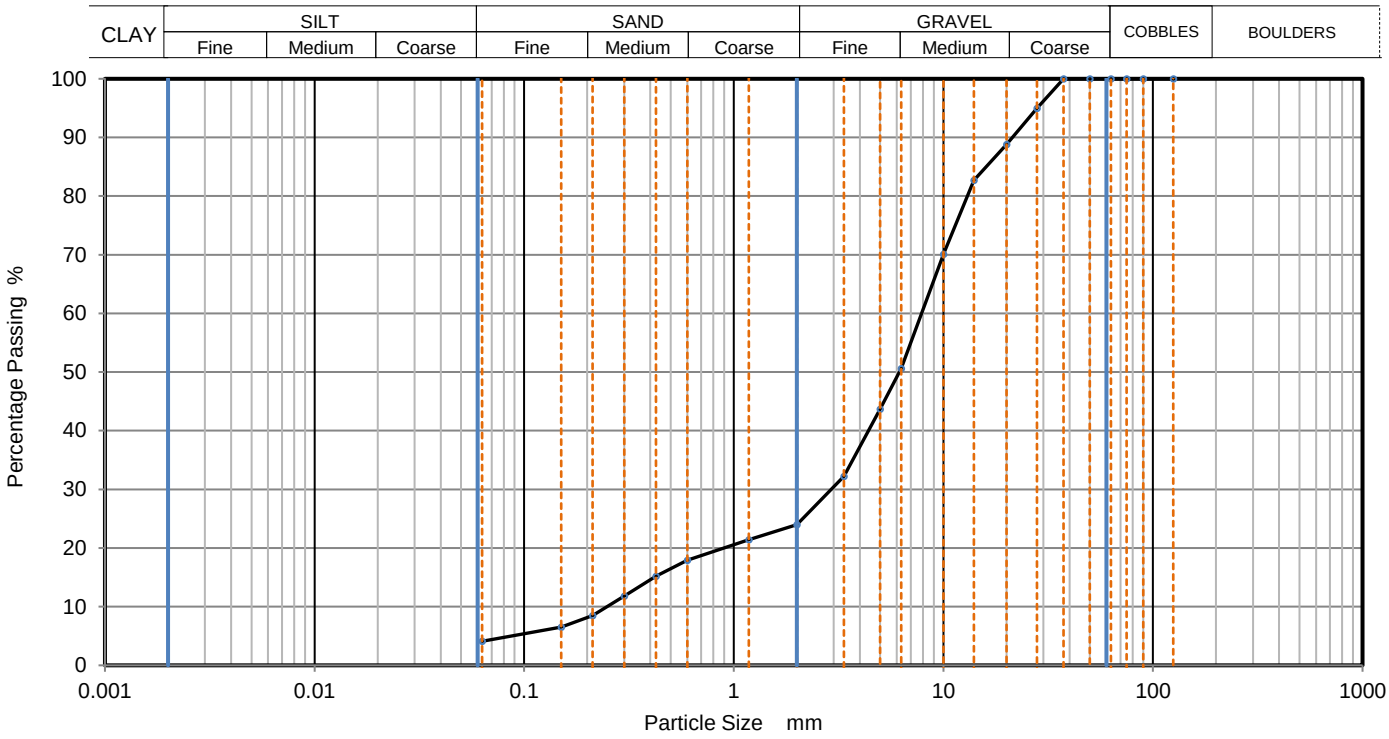
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-7373
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		1
Specimen Description	Greyish brown gravelly silty fine to coarse SAND.				Sample Depth (m)	Top	0.15
						Base	0.40
Specimen Reference	4	Specimen Depth	0.15	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clause 9.2				KeyLAB ID		Caus20220908169



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	95		
20	89		
14	83		
10	70		
6.3	51		
5	44		
3.35	32		
2	24		
1.18	21		
0.6	18		
0.425	15		
0.3	12		
0.212	9		
0.15	7		
0.063	4		

Dry Mass of sample, g	3327

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	76.0
Sand	19.9
Fines <0.063mm	4.0

Grading Analysis		
D100	mm	
D60	mm	7.87
D30	mm	2.91
D10	mm	0.248
Uniformity Coefficient		32
Curvature Coefficient		4.3

Remarks

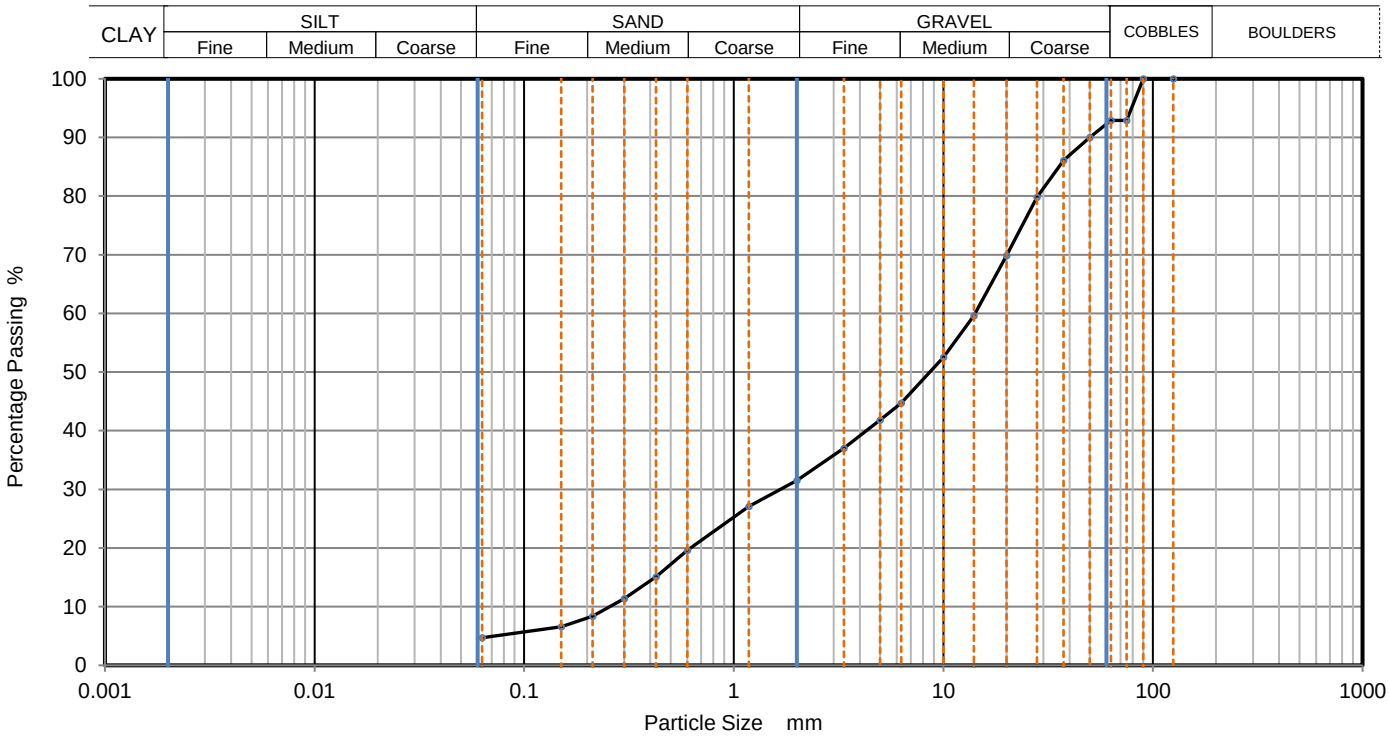
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	TP-7373
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Greyish brown slightly sandy subangular fine to coarse GRAVEL with cobbles.			Sample Depth (m) Top	0.80
				Base	1.25
Specimen Reference	4	Specimen Depth	0.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus20220908170



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	93		
63	93		
50	90		
37.5	86		
28	80		
20	70		
14	60		
10	53		
6.3	45		
5	42		
3.35	37		
2	32		
1.18	27		
0.6	20		
0.425	15		
0.3	11		
0.212	8		
0.15	7		
0.063	5		

Dry Mass of sample, g: 13536

Sample Proportions	% dry mass
Cobbles	7.1
Gravel	61.4
Sand	26.8
Fines <0.063mm	5.0

Grading Analysis		
D100	mm	
D60	mm	14.2
D30	mm	1.68
D10	mm	0.256
Uniformity Coefficient		55
Curvature Coefficient		0.77

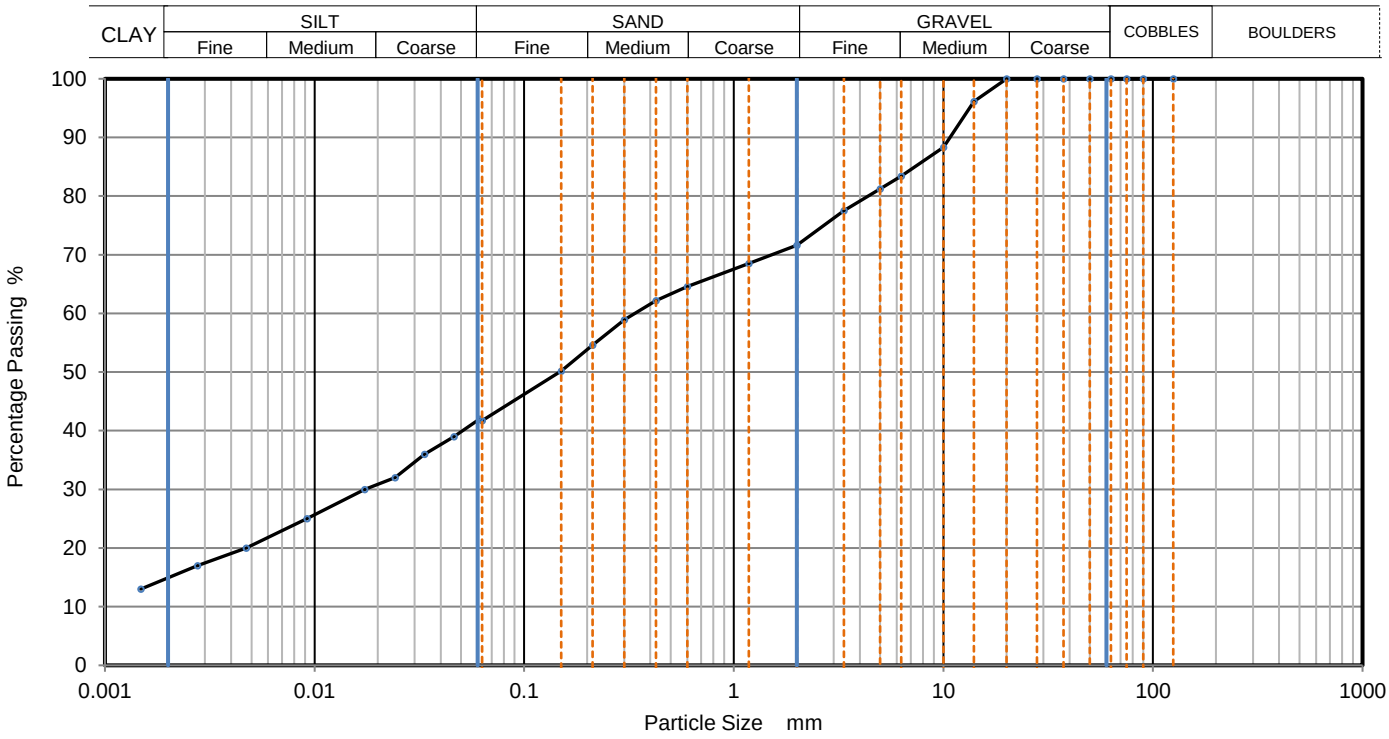
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					**21-1682**
Borehole/Pit No.					TP-9011
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brownish grey sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	0.80
				Base	1.50
Specimen Reference	9	Specimen Depth	0.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022090560



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06135	42
90	100	0.04632	39
75	100	0.03349	36
63	100	0.02418	32
50	100	0.01734	30
37.5	100	0.00919	25
28	100	0.00471	20
20	100	0.00277	17
14	96	0.00148	13
10	88		
6.3	83		
5	81		
3.35	78		
2	72		
1.18	69		
0.6	65	Particle density	(assumed)
0.425	62	2.65	Mg/m3
0.3	59		
0.212	55		
0.15	50		
0.063	42		

Dry Mass of sample, g: 511

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	28.4
Sand	29.9
Silt	26.9
Clay	14.8

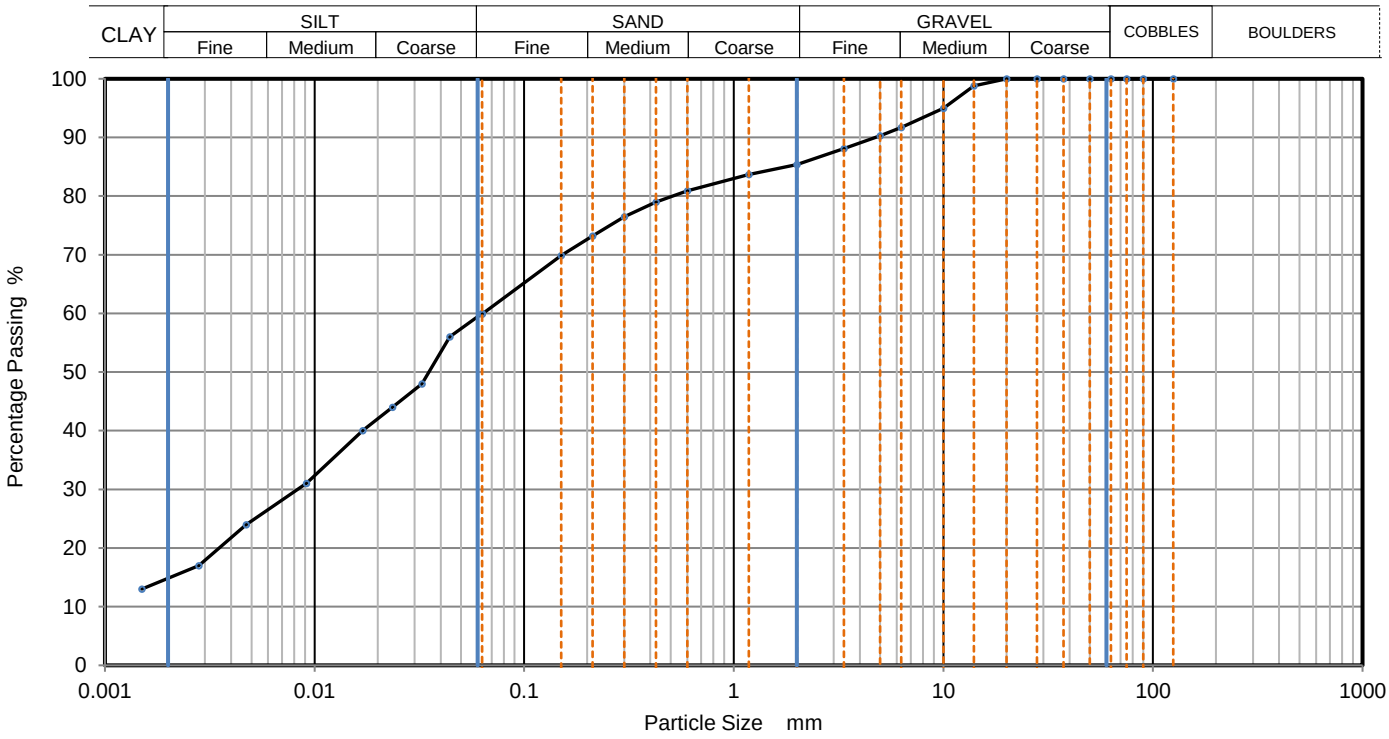
Grading Analysis		
D100	mm	
D60	mm	0.337
D30	mm	0.0179
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION			Job Ref		21-1682
				Borehole/Pit No.		TP-9011
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.		3
Specimen Description	Brownish grey sandy slightly gravelly silty CLAY.			Sample Depth (m)	Top	1.50
					Base	2.20
Specimen Reference	11	Specimen Depth	1.5 m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID		Caus2022090561



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	60
90	100	0.04418	56
75	100	0.03251	48
63	100	0.02351	44
50	100	0.01698	40
37.5	100	0.00913	31
28	100	0.00471	24
20	100	0.00280	17
14	99	0.00150	13
10	95		
6.3	92		
5	90		
3.35	88		
2	85		
1.18	84		
0.6	81	Particle density	(assumed)
0.425	79	2.65	Mg/m3
0.3	77		
0.212	73		
0.15	70		
0.063	60		

Dry Mass of sample, g: 576

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	14.6
Sand	25.5
Silt	45.1
Clay	14.8

Grading Analysis		
D100	mm	
D60	mm	0.0633
D30	mm	0.00804
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

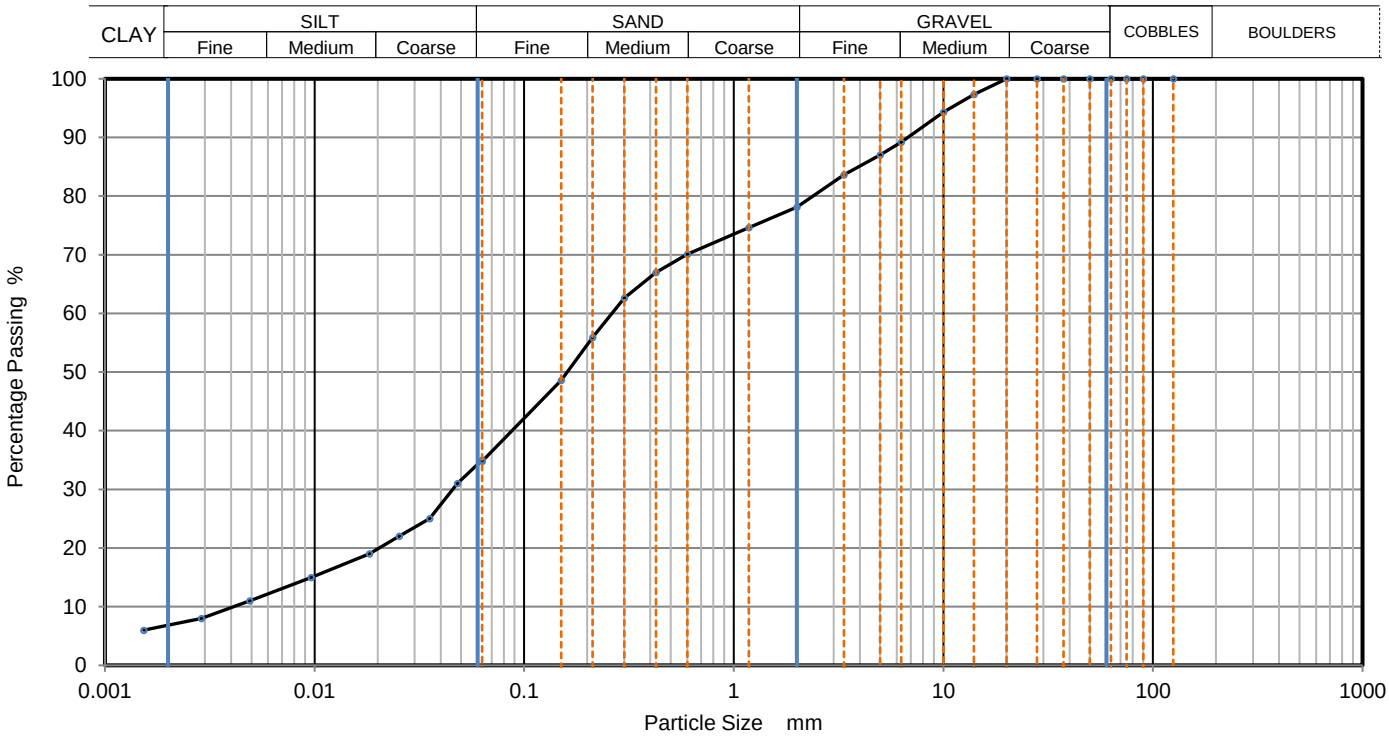
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					**21-1682**
Borehole/Pit No.					TP-9011
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	4
Specimen Description	Brownish grey sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	2.20
				Base	2.60
Specimen Reference	9	Specimen Depth	2.2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022090562



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	35
90	100	0.04803	31
75	100	0.03536	25
63	100	0.02533	22
50	100	0.01824	19
37.5	100	0.00965	15
28	100	0.00491	11
20	100	0.00288	8
14	97	0.00153	6
10	94		
6.3	89		
5	87		
3.35	84		
2	78		
1.18	75		
0.6	70	Particle density	(assumed)
0.425	67	2.65	Mg/m3
0.3	63		
0.212	56		
0.15	49		
0.063	35		

Dry Mass of sample, g: 558

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	21.9
Sand	43.3
Silt	28.2
Clay	6.6

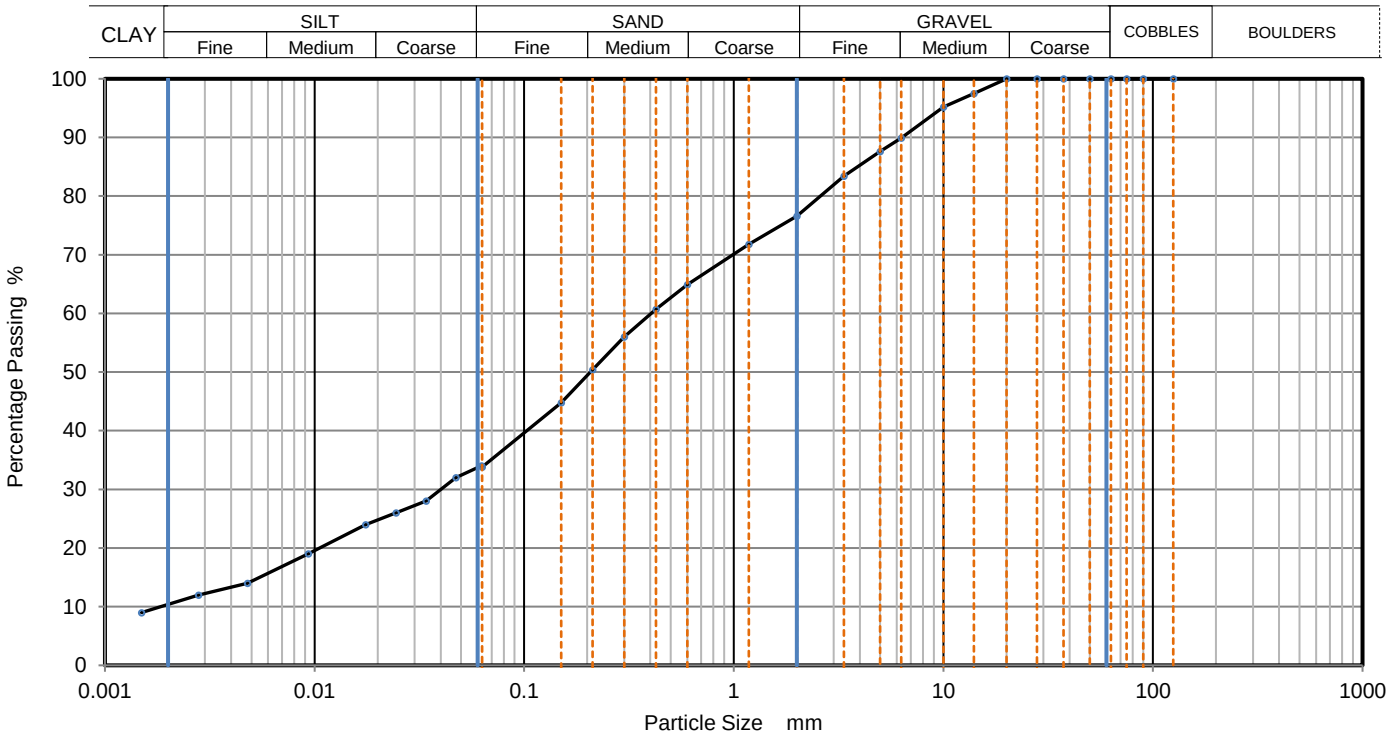
Grading Analysis		
D100	mm	
D60	mm	0.262
D30	mm	0.045
D10	mm	0.00404
Uniformity Coefficient		65
Curvature Coefficient		1.9

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-9094
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		1
Specimen Description	Brownish grey sandy slightly gravelly silty CLAY.				Sample Depth (m)	Top	0.30
						Base	0.80
Specimen Reference	9	Specimen Depth	0.3	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022090563



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06251	34
90	100	0.04717	32
75	100	0.03407	28
63	100	0.02443	26
50	100	0.01751	24
37.5	100	0.00933	19
28	100	0.00478	14
20	100	0.00279	12
14	98	0.00149	9
10	95		
6.3	90		
5	88		
3.35	83		
2	77		
1.18	72		
0.6	65	Particle density	(assumed)
0.425	61	2.65	Mg/m3
0.3	56		
0.212	50		
0.15	45		
0.063	34		

Dry Mass of sample, g: 513

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	23.4
Sand	42.8
Silt	23.6
Clay	10.2

Grading Analysis		
D100	mm	
D60	mm	0.404
D30	mm	0.0402
D10	mm	0.00191
Uniformity Coefficient		210
Curvature Coefficient		2.1

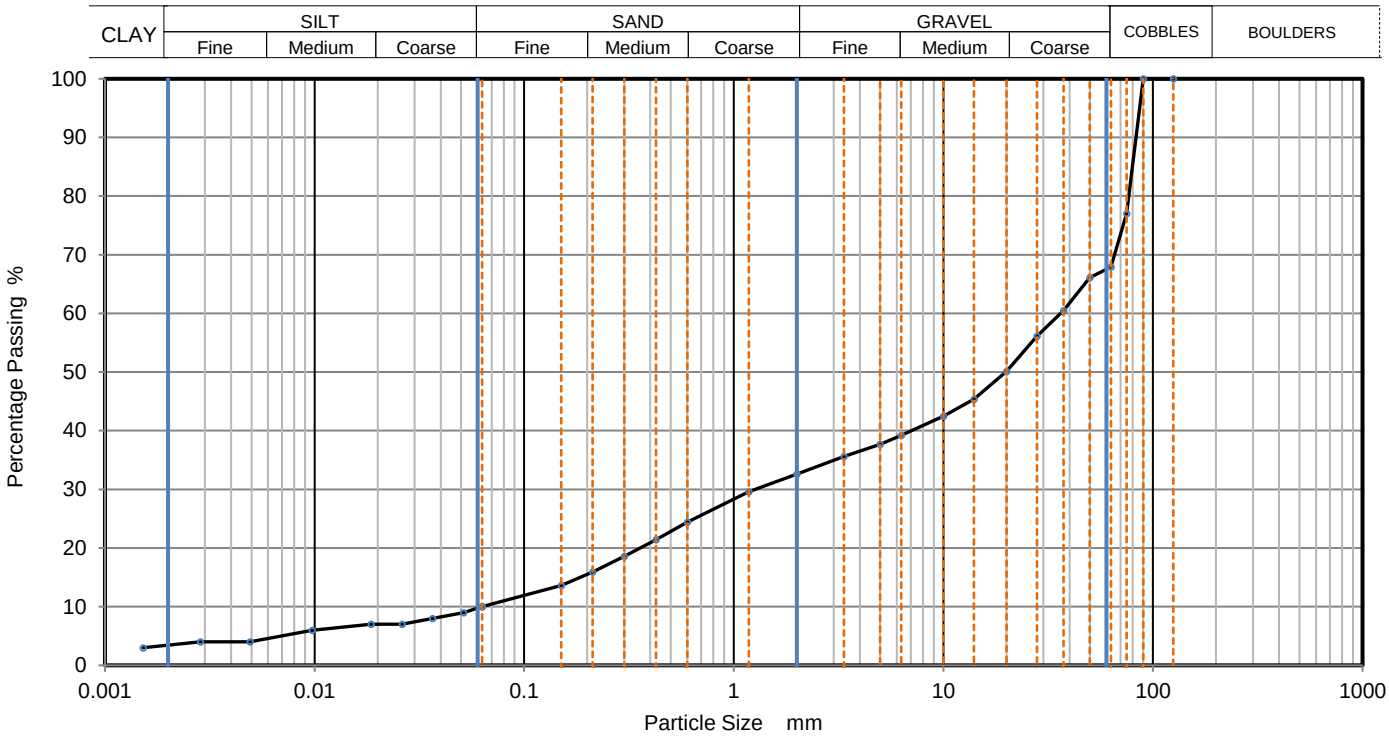
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					TP-9094
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brownish grey gravelly silty fine to coarse SAND with cobbles.			Sample Depth (m) Top	0.80
				Base	2.70
Specimen Reference	6	Specimen Depth	0.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022090564



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	10
90	100	0.05143	9
75	77	0.03659	8
63	68	0.02618	7
50	66	0.01862	7
37.5	61	0.00973	6
28	56	0.00492	4
20	50	0.00286	4
14	45	0.00152	3
10	43		
6.3	39		
5	38		
3.35	36		
2	33		
1.18	30		
0.6	24	Particle density	(assumed)
0.425	21	2.65	Mg/m3
0.3	19		
0.212	16		
0.15	14		
0.063	10		

Dry Mass of sample, g: 10877

Sample Proportions	% dry mass
Cobbles	32.1
Gravel	35.3
Sand	22.6
Silt	6.7
Clay	3.3

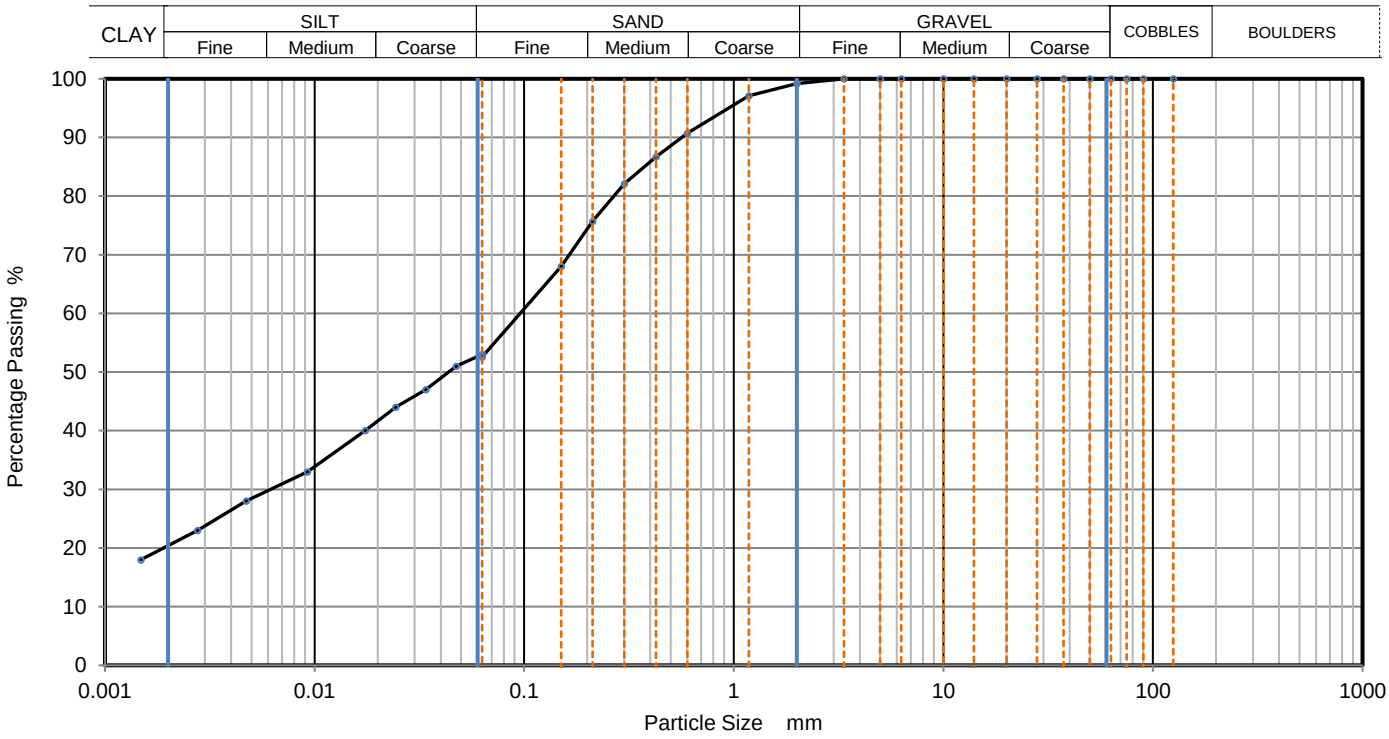
Grading Analysis		
D100	mm	
D60	mm	36.3
D30	mm	1.26
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-9115
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brownish grey sandy silty CLAY.			Sample Depth (m) Top	0.30
				Base	0.70
Specimen Reference	9	Specimen Depth	0.3 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022090565



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	53
90	100	0.04735	51
75	100	0.03396	47
63	100	0.02435	44
50	100	0.01745	40
37.5	100	0.00925	33
28	100	0.00471	28
20	100	0.00277	23
14	100	0.00148	18
10	100		
6.3	100		
5	100		
3.35	100		
2	99		
1.18	97		
0.6	91	Particle density	(assumed)
0.425	87	2.65	Mg/m3
0.3	82		
0.212	76		
0.15	68		
0.063	53		

Dry Mass of sample, g: 327

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	0.8
Sand	46.6
Silt	32.5
Clay	20.1

Grading Analysis		
D100	mm	
D60	mm	0.0956
D30	mm	0.00605
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

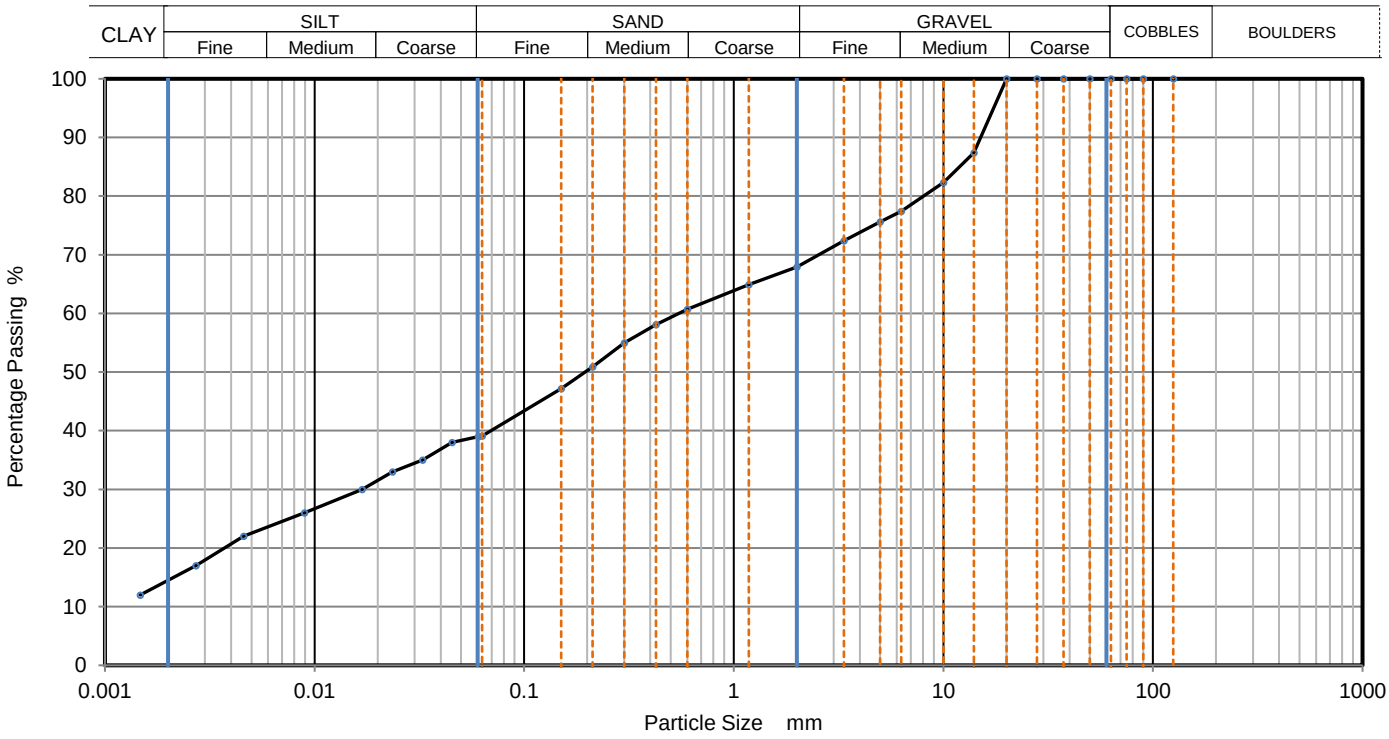
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					**21-1682**
Borehole/Pit No.					TP-9115
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Brownish grey sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	0.70
				Base	2.10
Specimen Reference	11	Specimen Depth	0.7 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022090566



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06038	39
90	100	0.04526	38
75	100	0.03275	35
63	100	0.02350	33
50	100	0.01686	30
37.5	100	0.00895	26
28	100	0.00459	22
20	100	0.00272	17
14	87	0.00147	12
10	82		
6.3	77		
5	76		
3.35	72		
2	68		
1.18	65		
0.6	61	Particle density	(assumed)
0.425	58	2.65	Mg/m3
0.3	55		
0.212	51		
0.15	47		
0.063	39		

Dry Mass of sample, g: 517

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	32.1
Sand	28.8
Silt	24.4
Clay	14.7

Grading Analysis		
D100	mm	
D60	mm	0.549
D30	mm	0.0159
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

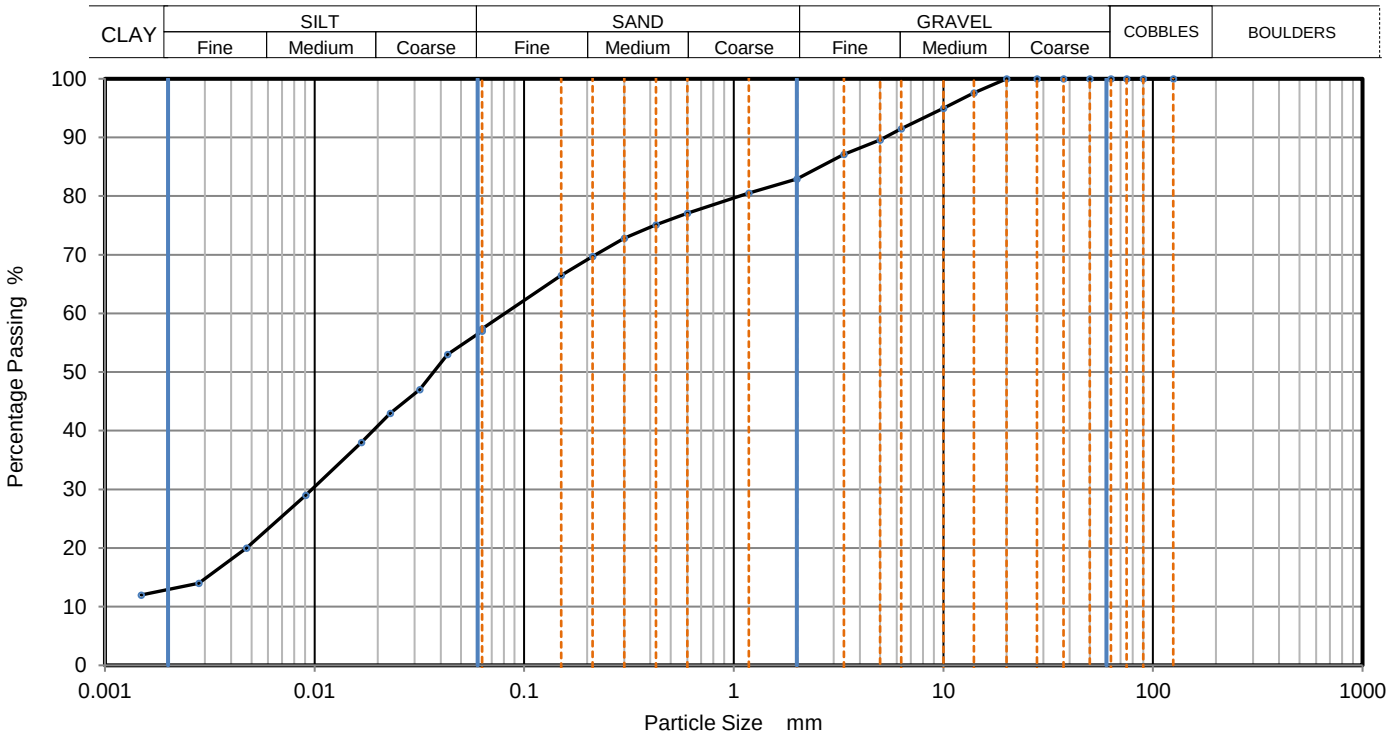
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	TP-9115
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Brownish grey sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	2.10
				Base	2.50
Specimen Reference	9	Specimen Depth	2.1 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022090567



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	57
90	100	0.04306	53
75	100	0.03175	47
63	100	0.02298	43
50	100	0.01674	38
37.5	100	0.00907	29
28	100	0.00474	20
20	100	0.00280	14
14	98	0.00149	12
10	95		
6.3	92		
5	90		
3.35	87		
2	83		
1.18	81		
0.6	77	Particle density	(assumed)
0.425	75	2.65	Mg/m3
0.3	73		
0.212	70		
0.15	67		
0.063	57		

Dry Mass of sample, g: 507

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	17.1
Sand	25.4
Silt	44.5
Clay	13.0

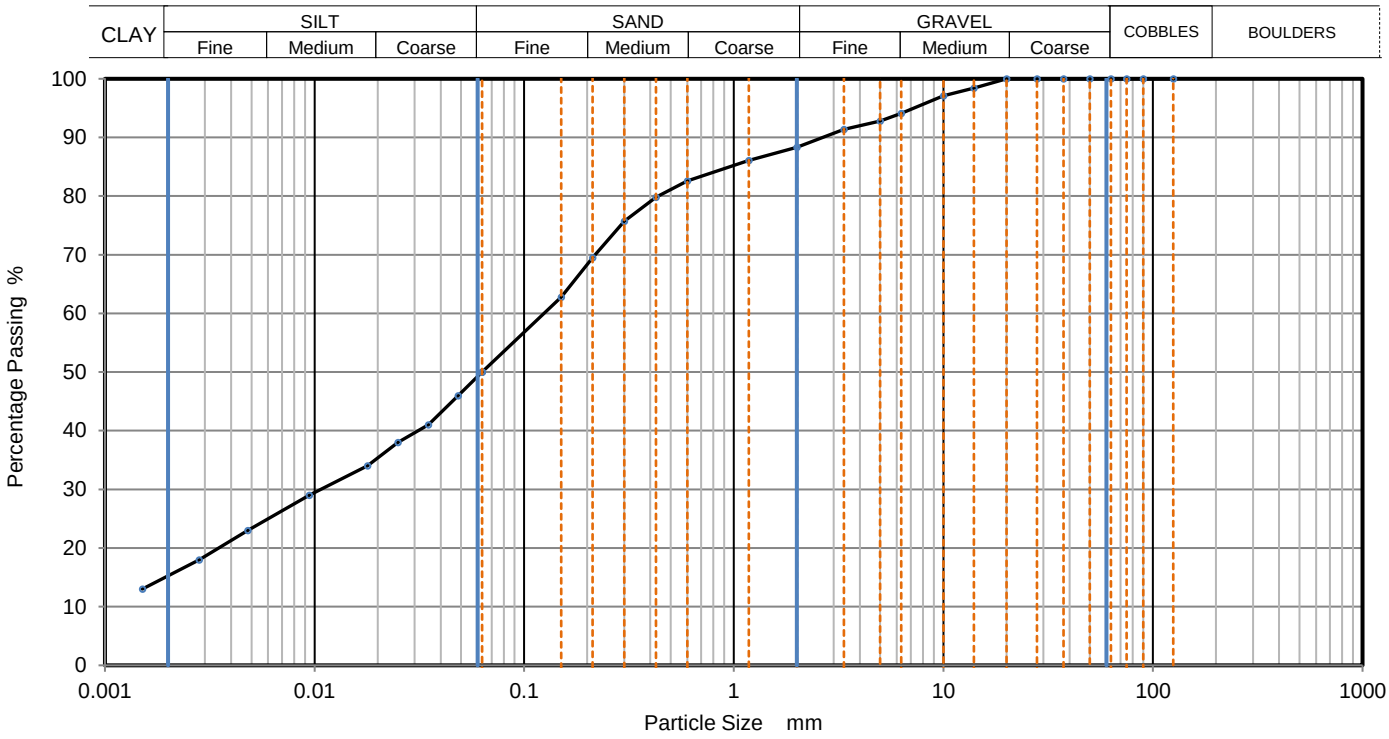
Grading Analysis		
D100	mm	
D60	mm	0.0806
D30	mm	0.0099
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-9206
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		1
Specimen Description	Brownish grey sandy slightly gravelly silty CLAY.				Sample Depth (m)	Top	0.30
						Base	0.70
Specimen Reference	9	Specimen Depth	0.3	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022090568



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	50
90	100	0.04836	46
75	100	0.03490	41
63	100	0.02500	38
50	100	0.01791	34
37.5	100	0.00942	29
28	100	0.00479	23
20	100	0.00282	18
14	98	0.00151	13
10	97		
6.3	94		
5	93		
3.35	91		
2	88		
1.18	86		
0.6	83	Particle density	(assumed)
0.425	80	2.65	Mg/m3
0.3	76		
0.212	70		
0.15	63		
0.063	50		

Dry Mass of sample, g: 550

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	11.7
Sand	38.3
Silt	35.1
Clay	14.9

Grading Analysis		
D100	mm	
D60	mm	0.124
D30	mm	0.0112
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

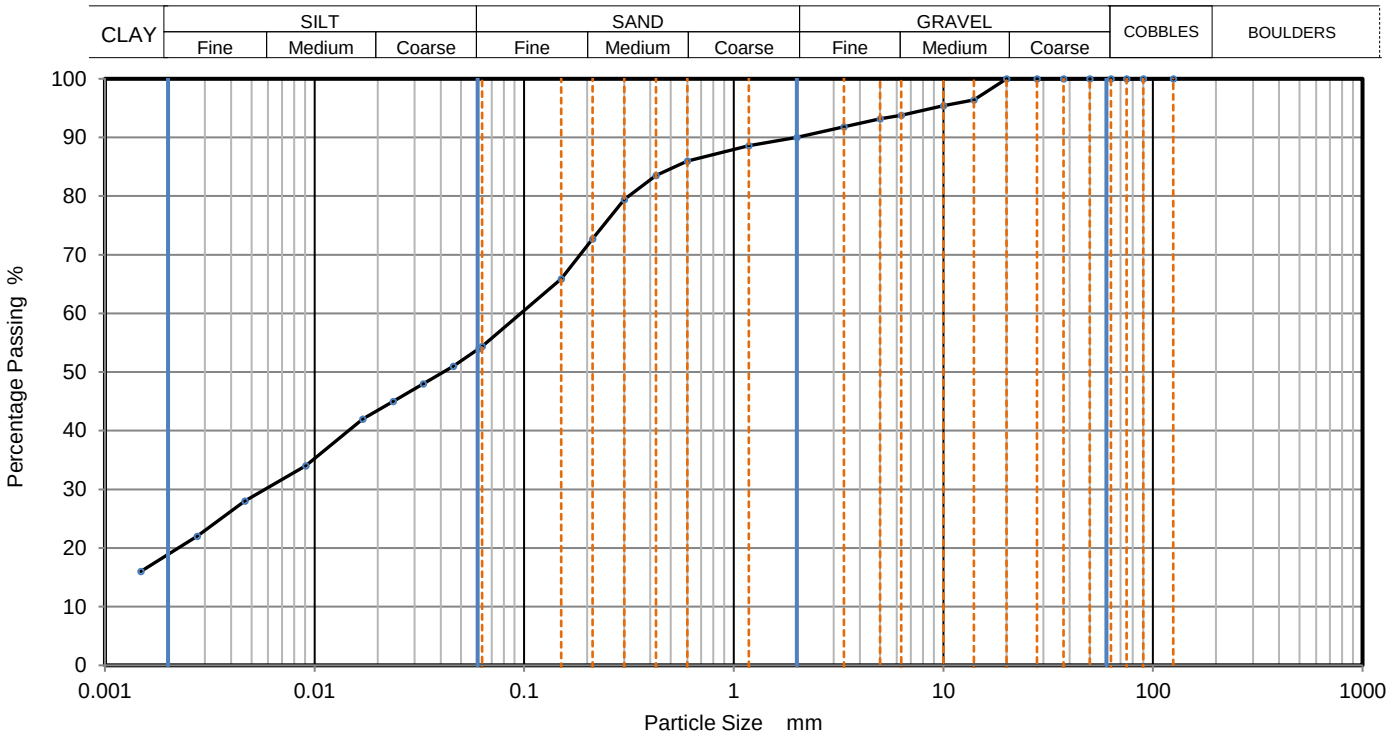
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-9206
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brownish grey sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	0.70
				Base	1.60
Specimen Reference	9	Specimen Depth	0.7 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022090569



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06086	54
90	100	0.04596	51
75	100	0.03299	48
63	100	0.02367	45
50	100	0.01698	42
37.5	100	0.00907	34
28	100	0.00465	28
20	100	0.00275	22
14	96	0.00148	16
10	95		
6.3	94		
5	93		
3.35	92		
2	90		
1.18	89		
0.6	86	Particle density (assumed)	
0.425	84	2.65 Mg/m3	
0.3	79		
0.212	73		
0.15	66		
0.063	54		

Dry Mass of sample, g: 510

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	10.0
Sand	35.7
Silt	35.7
Clay	18.6

Grading Analysis		
D100	mm	
D60	mm	0.0963
D30	mm	0.00578
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

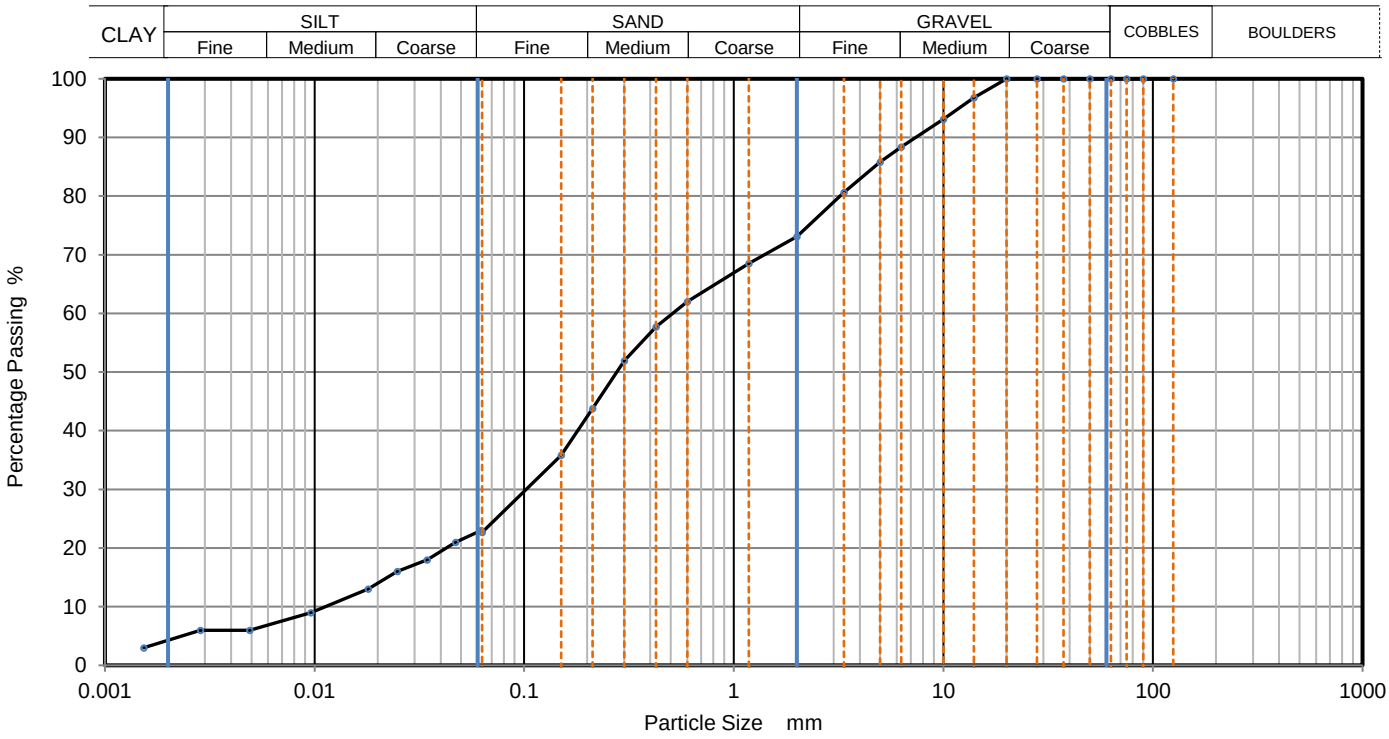
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					TP-9206
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Brownish grey slightly gravelly clayey fine to coarse SAND.			Sample Depth (m) Top	1.60
				Base	2.50
Specimen Reference	6	Specimen Depth	1.6 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022090570



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06229	23
90	100	0.04701	21
75	100	0.03443	18
63	100	0.02484	16
50	100	0.01802	13
37.5	100	0.00959	9
28	100	0.00491	6
20	100	0.00285	6
14	97	0.00153	3
10	93		
6.3	88		
5	86		
3.35	81		
2	73		
1.18	69		
0.6	62	Particle density	(assumed)
0.425	58	2.65	Mg/m3
0.3	52		
0.212	44		
0.15	36		
0.063	23		

Dry Mass of sample, g: 1060

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	26.9
Sand	50.5
Silt	18.5
Clay	4.1

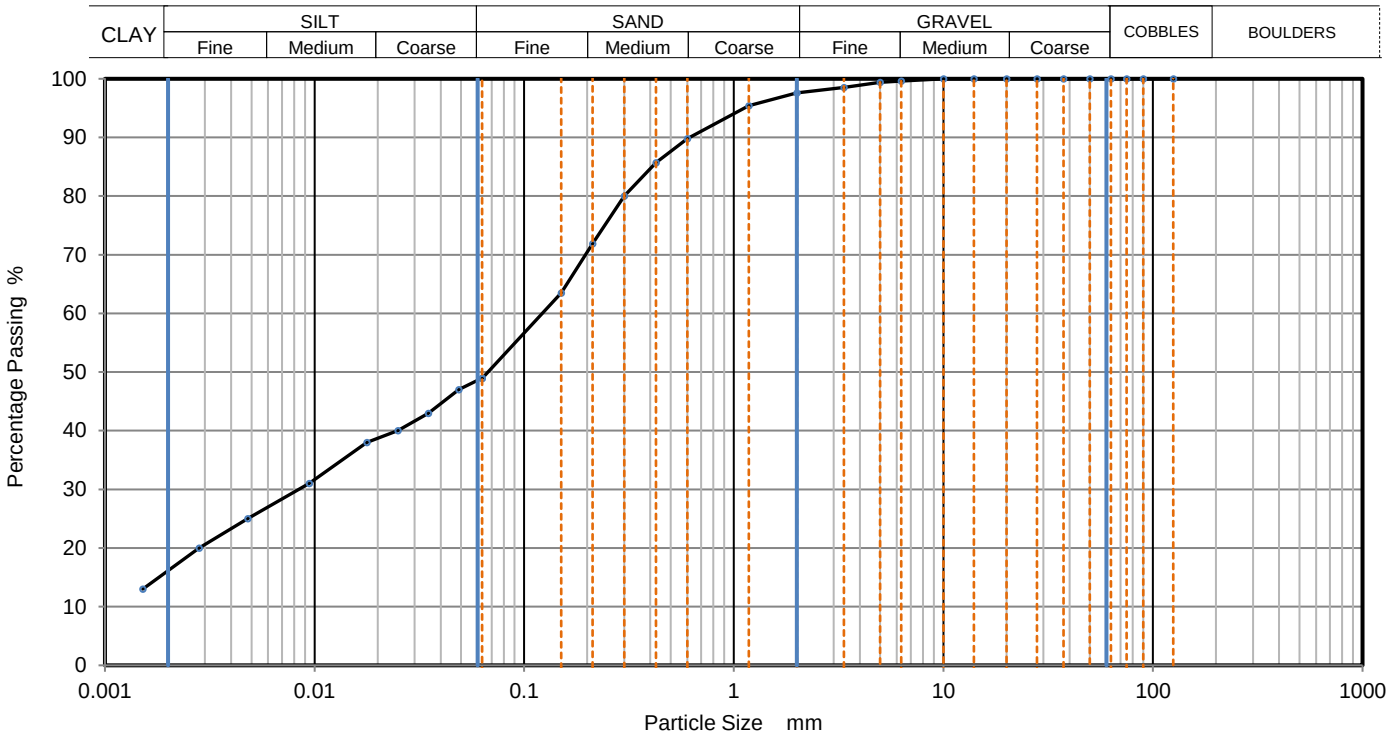
Grading Analysis		
D100	mm	
D60	mm	0.512
D30	mm	0.102
D10	mm	0.011
Uniformity Coefficient		46
Curvature Coefficient		1.9

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-9305
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		1
Specimen Description	Greenish grey clayey fine to coarse SAND.				Sample Depth (m)	Top	0.30
						Base	0.80
Specimen Reference	9	Specimen Depth	0.3	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022090571



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	49
90	100	0.04870	47
75	100	0.03490	43
63	100	0.02501	40
50	100	0.01780	38
37.5	100	0.00942	31
28	100	0.00480	25
20	100	0.00282	20
14	100	0.00152	13
10	100		
6.3	100		
5	99		
3.35	99		
2	98		
1.18	95		
0.6	90	Particle density	(assumed)
0.425	86	2.65	Mg/m3
0.3	80		
0.212	72		
0.15	64		
0.063	49		

Dry Mass of sample, g: 531

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	2.4
Sand	48.7
Silt	33.0
Clay	15.9

Grading Analysis		
D100	mm	
D60	mm	0.122
D30	mm	0.00854
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

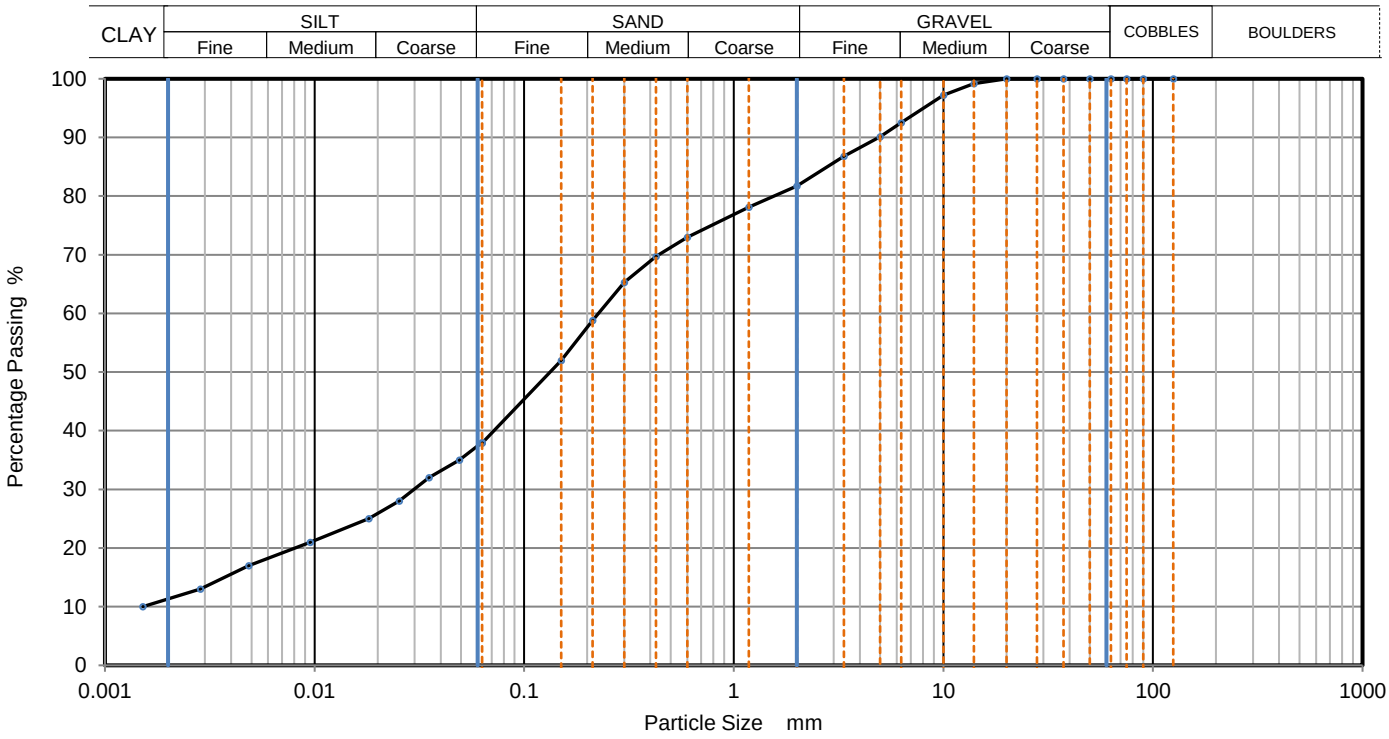
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-9305
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brownish grey sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	0.80
				Base	1.70
Specimen Reference	9	Specimen Depth	0.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022090572



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	38
90	100	0.04903	35
75	100	0.03513	32
63	100	0.02533	28
50	100	0.01813	25
37.5	100	0.00953	21
28	100	0.00485	17
20	100	0.00285	13
14	99	0.00152	10
10	97		
6.3	93		
5	90		
3.35	87		
2	82		
1.18	78		
0.6	73	Particle density	(assumed)
0.425	70	2.65	Mg/m3
0.3	65		
0.212	59		
0.15	52		
0.063	38		

Dry Mass of sample, g: 558

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	18.3
Sand	43.8
Silt	26.8
Clay	11.1

Grading Analysis		
D100	mm	
D60	mm	0.226
D30	mm	0.0294
D10	mm	0.00158
Uniformity Coefficient		140
Curvature Coefficient		2.4

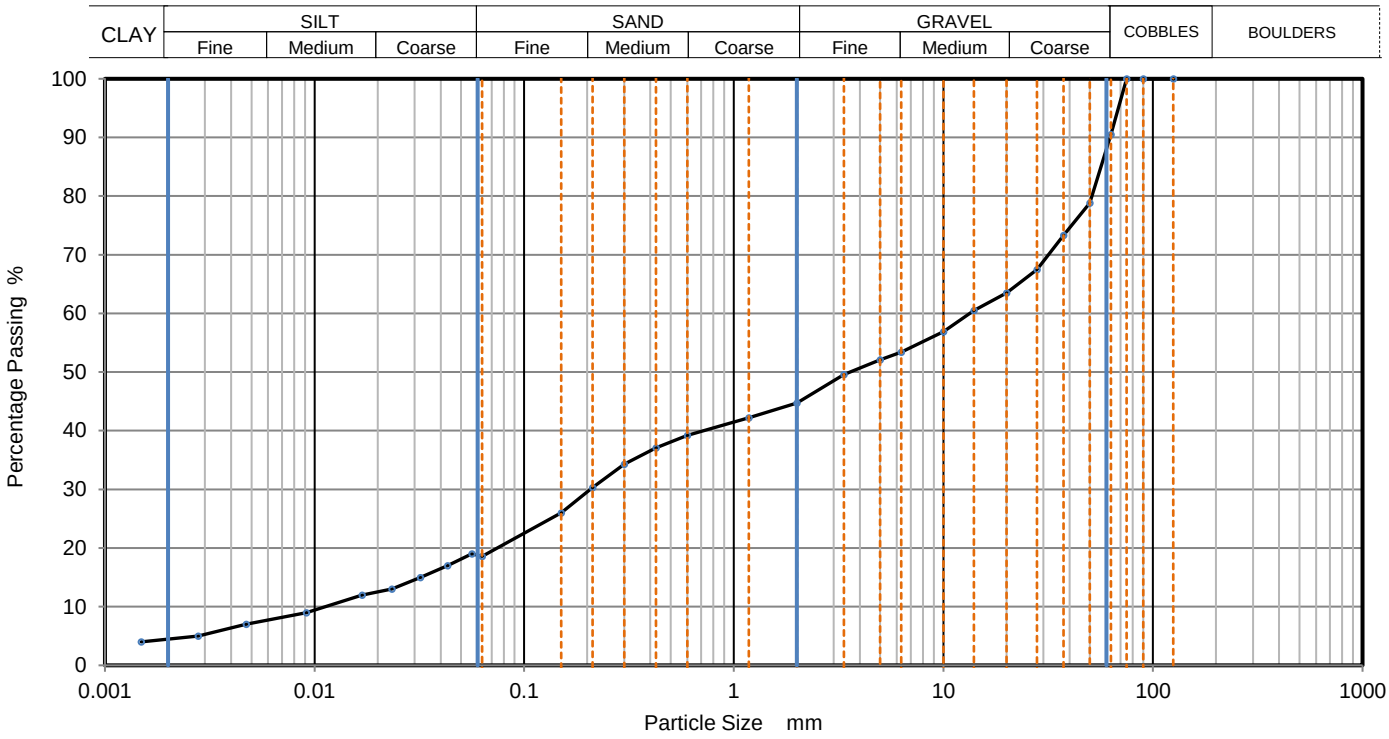
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-9370
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Grey gravelly silty fine to coarse SAND with cobbles.			Sample Depth (m) Top	0.80
				Base	2.00
Specimen Reference	9	Specimen Depth	0.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022090573



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.05639	19
90	100	0.04307	17
75	100	0.03201	15
63	91	0.02333	13
50	79	0.01686	12
37.5	73	0.00913	9
28	68	0.00471	7
20	64	0.00278	5
14	61	0.00149	4
10	57		
6.3	53		
5	52		
3.35	50		
2	45		
1.18	42		
0.6	39	Particle density	(assumed)
0.425	37	2.65	Mg/m3
0.3	34		
0.212	30		
0.15	26		
0.063	19		

Dry Mass of sample, g: 11327

Sample Proportions	% dry mass
Cobbles	9.5
Gravel	45.8
Sand	26.1
Silt	13.9
Clay	4.7

Grading Analysis		
D100	mm	
D60	mm	13.4
D30	mm	0.206
D10	mm	0.0111
Uniformity Coefficient		1200
Curvature Coefficient		0.29

Remarks

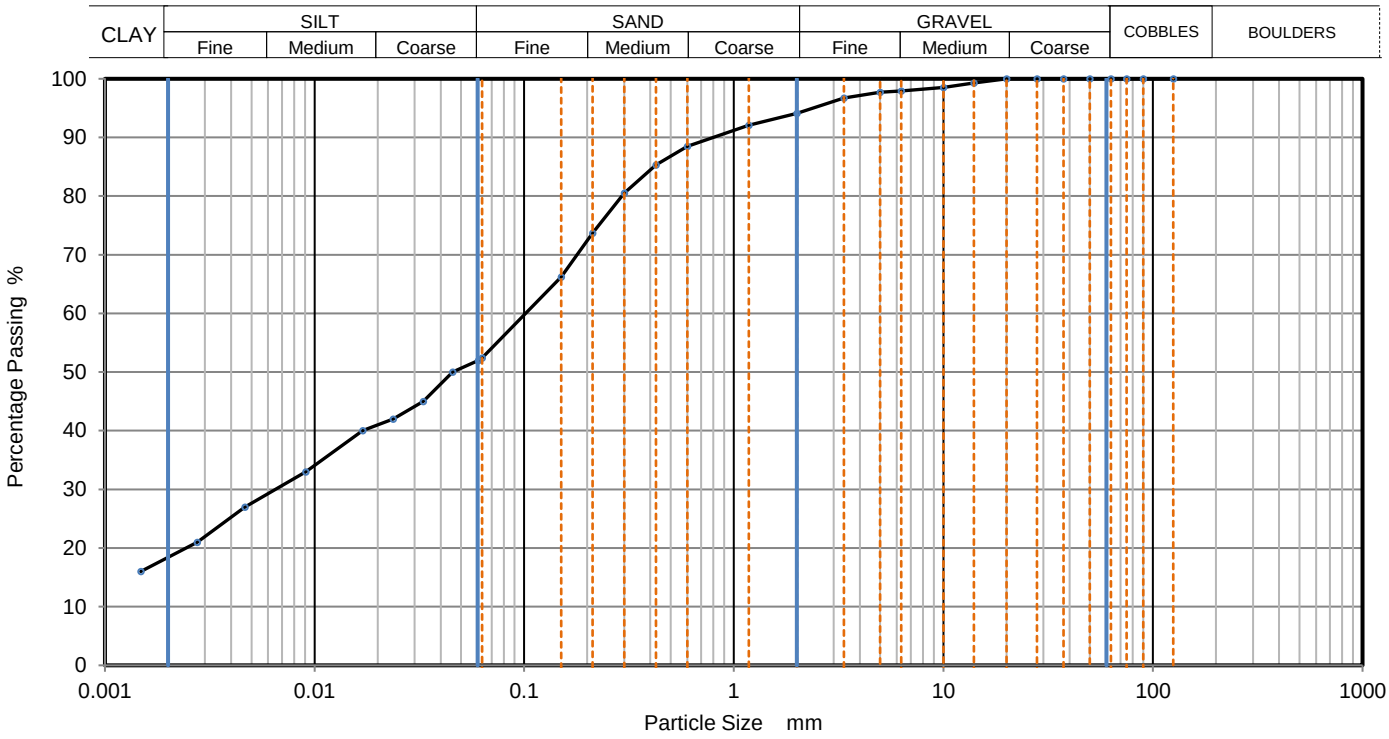
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

PARTICLE SIZE DISTRIBUTION

Job Ref					21-1682
Borehole/Pit No.					TP-9505
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Brownish grey sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	0.30
				Base	0.80
Specimen Reference	9	Specimen Depth	0.3 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022090574



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06039	52
90	100	0.04562	50
75	100	0.03300	45
63	100	0.02368	42
50	100	0.01698	40
37.5	100	0.00907	33
28	100	0.00465	27
20	100	0.00275	21
14	99	0.00148	16
10	99		
6.3	98		
5	98		
3.35	97		
2	94		
1.18	92		
0.6	89	Particle density	(assumed)
0.425	85	2.65	Mg/m3
0.3	81		
0.212	74		
0.15	66		
0.063	52		

Dry Mass of sample, g: 530

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	5.9
Sand	41.7
Silt	34.1
Clay	18.3

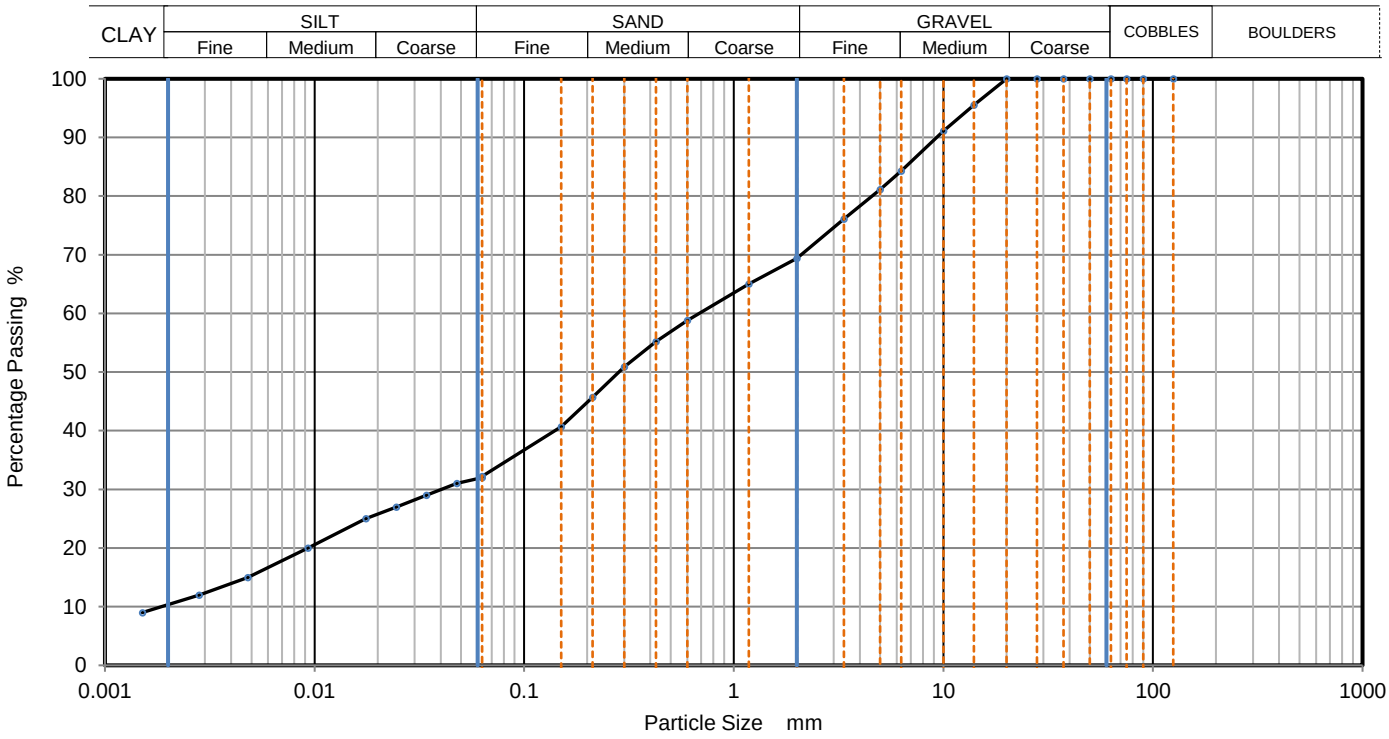
Grading Analysis		
D100	mm	
D60	mm	0.101
D30	mm	0.0067
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-9505
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brownish grey sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	0.80
				Base	2.10
Specimen Reference	9	Specimen Depth	0.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022090575



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	32
90	100	0.04770	31
75	100	0.03420	29
63	100	0.02452	27
50	100	0.01757	25
37.5	100	0.00931	20
28	100	0.00480	15
20	100	0.00282	12
14	96	0.00151	9
10	91		
6.3	84		
5	81		
3.35	76		
2	69		
1.18	65		
0.6	59	Particle density	(assumed)
0.425	55	2.65	Mg/m3
0.3	51		
0.212	46		
0.15	41		
0.063	32		

Dry Mass of sample, g: 590

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	30.6
Sand	37.3
Silt	22.1
Clay	10.0

Grading Analysis		
D100	mm	
D60	mm	0.682
D30	mm	0.0401
D10	mm	0.00198
Uniformity Coefficient		340
Curvature Coefficient		1.2

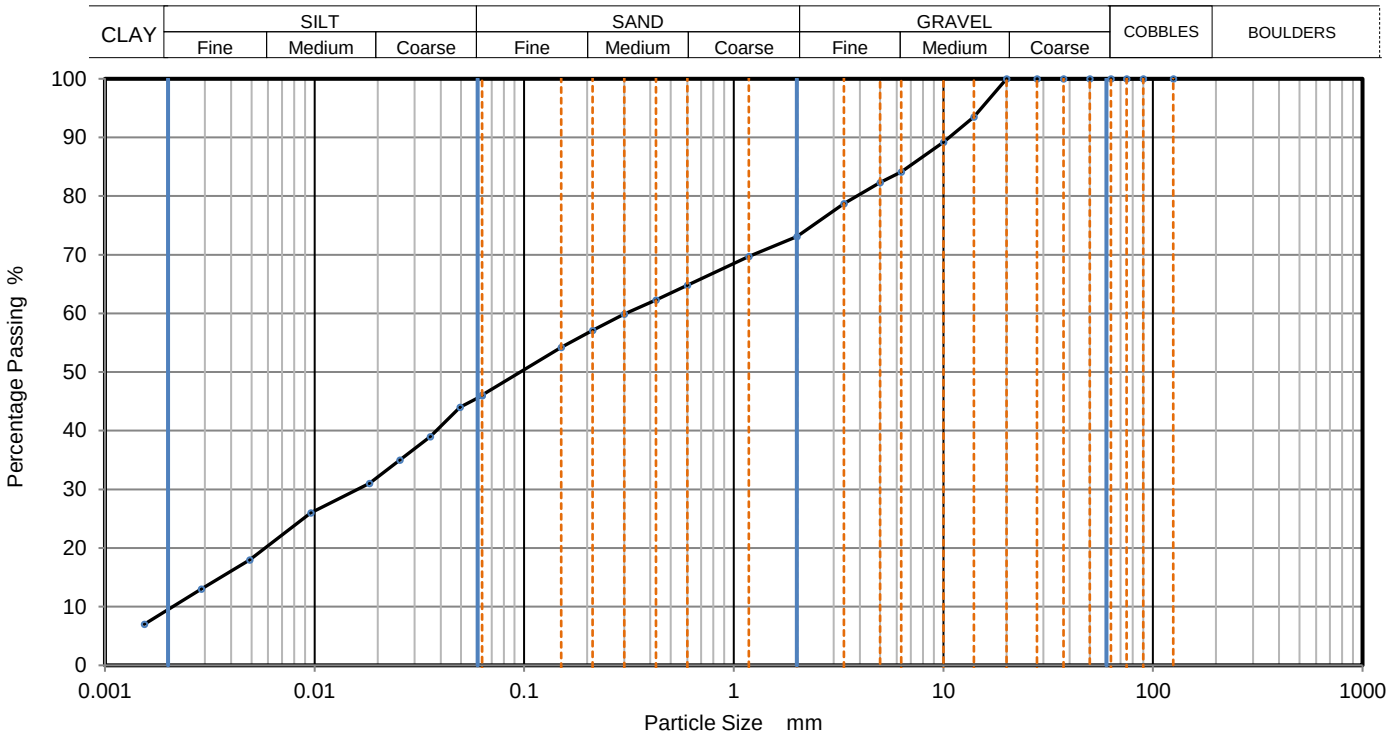
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-9505
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Brownish grey sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	2.10
				Base	2.70
Specimen Reference	9	Specimen Depth	2.1 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022090576



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	46
90	100	0.04936	44
75	100	0.03559	39
63	100	0.02549	35
50	100	0.01824	31
37.5	100	0.00959	26
28	100	0.00491	18
20	100	0.00288	13
14	94	0.00154	7
10	89		
6.3	84		
5	82		
3.35	79		
2	73		
1.18	70		
0.6	65	Particle density	(assumed)
0.425	62	2.65	Mg/m3
0.3	60		
0.212	57		
0.15	54		
0.063	46		

Dry Mass of sample, g: 525

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	26.9
Sand	27.0
Silt	36.4
Clay	9.7

Grading Analysis		
D100	mm	
D60	mm	0.305
D30	mm	0.0156
D10	mm	0.00207
Uniformity Coefficient		150
Curvature Coefficient		0.39

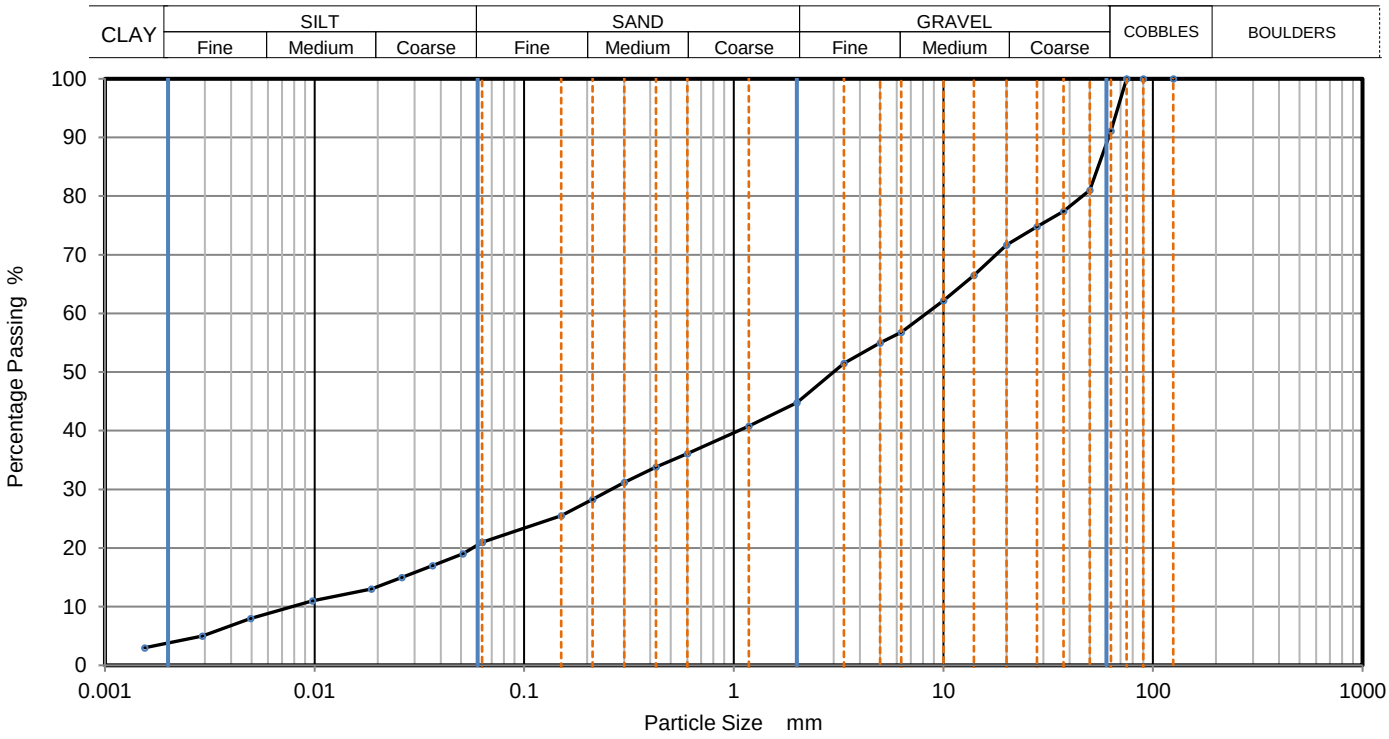
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					**21-1682**
Borehole/Pit No.					TP-9603
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Specimen Description	Brownish grey sandy gravelly silty CLAY with cobbles.			Sample Depth (m) Top	0.80
				Base	1.90
Specimen Reference	9	Specimen Depth	0.8 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022090577



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	21
90	100	0.05097	19
75	100	0.03649	17
63	91	0.02611	15
50	81	0.01868	13
37.5	77	0.00976	11
28	75	0.00496	8
20	72	0.00291	5
14	67	0.00155	3
10	62		
6.3	57		
5	55		
3.35	52		
2	45		
1.18	41		
0.6	36	Particle density	(assumed)
0.425	34	2.65	Mg/m3
0.3	31		
0.212	28		
0.15	26		
0.063	21		

Dry Mass of sample, g: 10572

Sample Proportions	% dry mass
Cobbles	8.9
Gravel	46.2
Sand	23.9
Silt	17.2
Clay	3.8

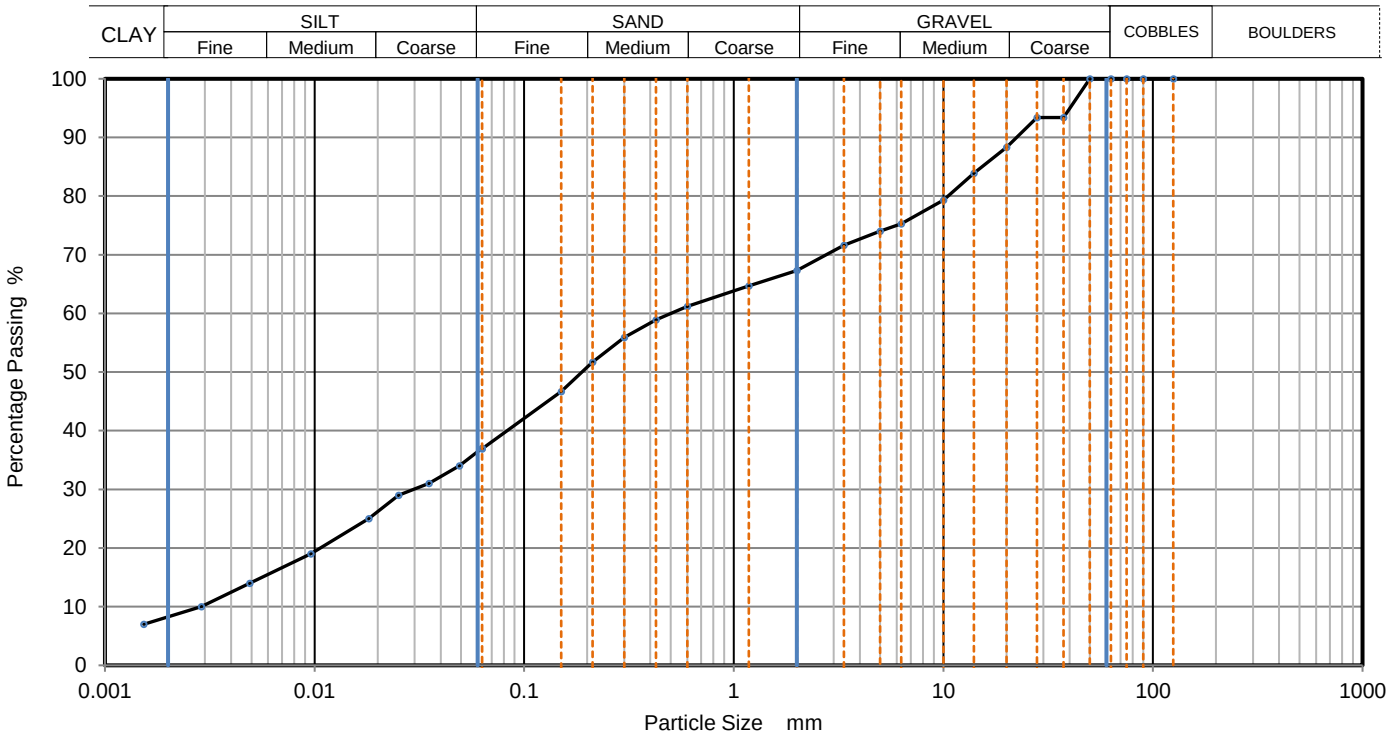
Grading Analysis		
D100	mm	
D60	mm	8.28
D30	mm	0.259
D10	mm	0.00779
Uniformity Coefficient		1100
Curvature Coefficient		1

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-9603
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Brownish grey sandy gravelly silty CLAY.			Sample Depth (m) Top	1.90
				Base	3.50
Specimen Reference	9	Specimen Depth	1.9 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022090578



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	37
90	100	0.04903	34
75	100	0.03513	31
63	100	0.02517	29
50	100	0.01813	25
37.5	93	0.00959	19
28	93	0.00491	14
20	88	0.00288	10
14	84	0.00153	7
10	79		
6.3	75		
5	74		
3.35	72		
2	67		
1.18	65		
0.6	61	Particle density	(assumed)
0.425	59	2.65	Mg/m3
0.3	56		
0.212	52		
0.15	47		
0.063	37		

Dry Mass of sample, g: 3215

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	32.7
Sand	30.4
Silt	28.9
Clay	8.0

Grading Analysis		
D100	mm	
D60	mm	0.5
D30	mm	0.0295
D10	mm	0.00305
Uniformity Coefficient		160
Curvature Coefficient		0.57

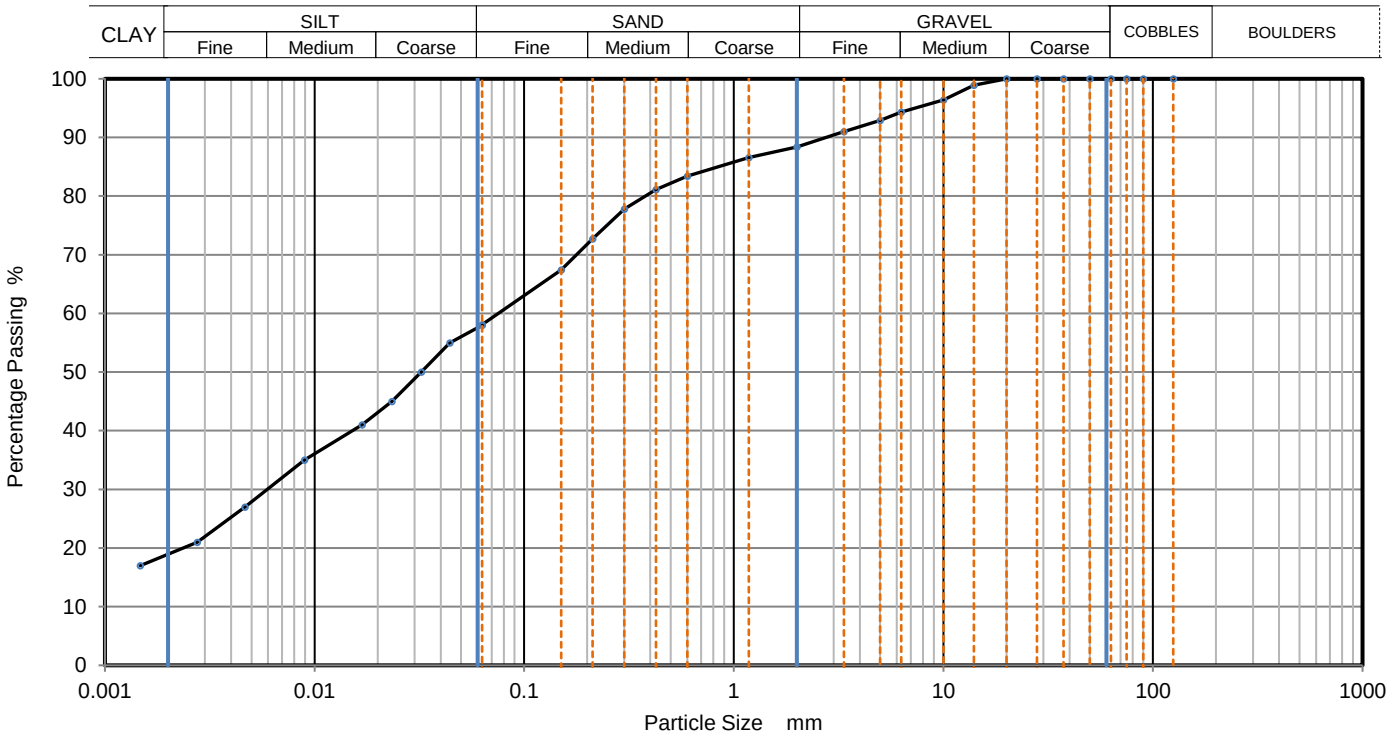
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-1682
					Borehole/Pit No.		TP-9705
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		1
Specimen Description	Brownish grey sandy slightly gravelly silty CLAY.				Sample Depth (m)	Top	0.30
						Base	0.80
Specimen Reference	9	Specimen Depth	0.3	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022090579



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	58
90	100	0.04418	55
75	100	0.03226	50
63	100	0.02333	45
50	100	0.01686	41
37.5	100	0.00895	35
28	100	0.00465	27
20	100	0.00275	21
14	99	0.00147	17
10	96		
6.3	94		
5	93		
3.35	91		
2	88		
1.18	87		
0.6	83	Particle density	(assumed)
0.425	81	2.65	Mg/m3
0.3	78		
0.212	73		
0.15	67		
0.063	58		

Dry Mass of sample, g: 512

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	11.6
Sand	30.4
Silt	38.9
Clay	19.1

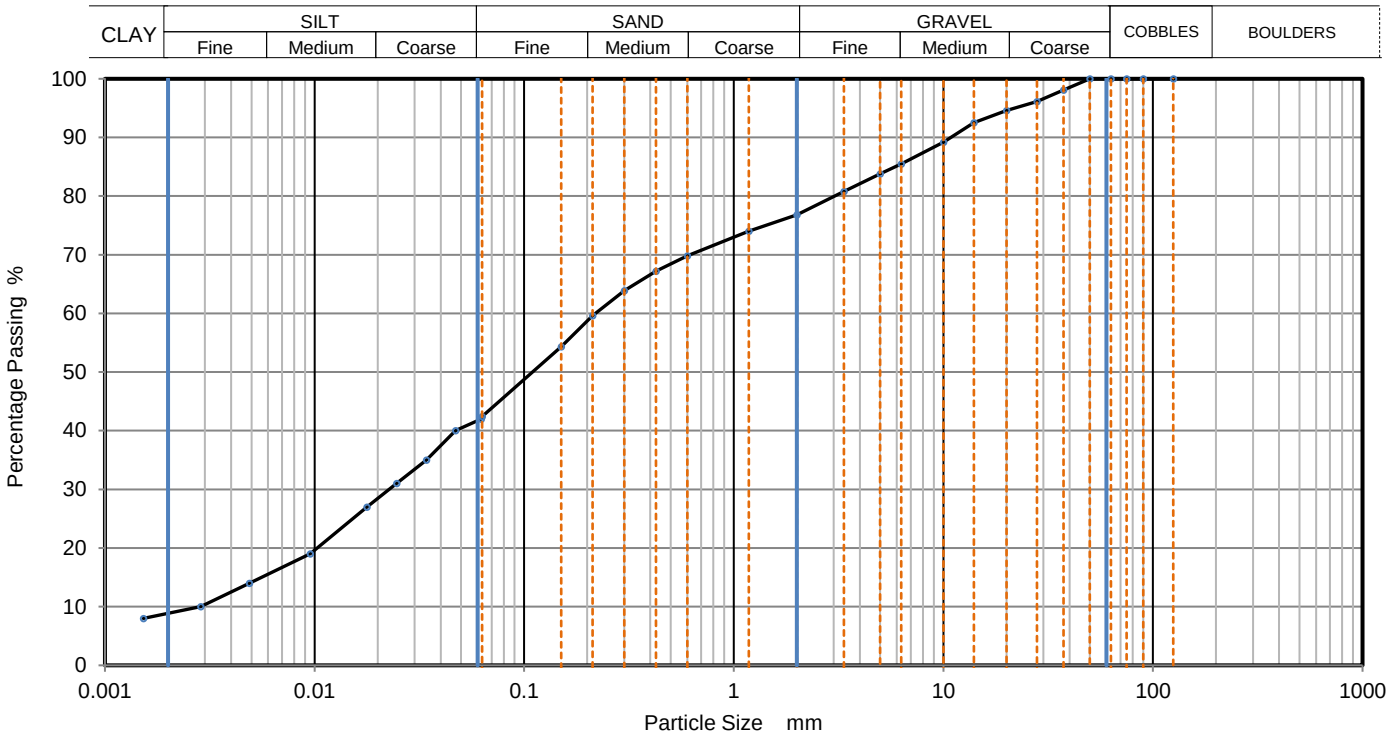
Grading Analysis		
D100	mm	
D60	mm	0.0752
D30	mm	0.0059
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-9705
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Brownish grey sandy gravelly silty CLAY.			Sample Depth (m) Top	1.60
				Base	1.80
Specimen Reference	9	Specimen Depth	1.6 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022090580



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06230	42
90	100	0.04701	40
75	100	0.03420	35
63	100	0.02468	31
50	100	0.01780	27
37.5	98	0.00953	19
28	96	0.00488	14
20	95	0.00286	10
14	93	0.00152	8
10	89		
6.3	86		
5	84		
3.35	81		
2	77		
1.18	74		
0.6	70	Particle density	(assumed)
0.425	67	2.65	Mg/m3
0.3	64		
0.212	60		
0.15	54		
0.063	42		

Dry Mass of sample, g: 4430

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	23.2
Sand	34.4
Silt	33.6
Clay	8.8

Grading Analysis		
D100	mm	
D60	mm	0.219
D30	mm	0.023
D10	mm	0.00267
Uniformity Coefficient		82
Curvature Coefficient		0.9

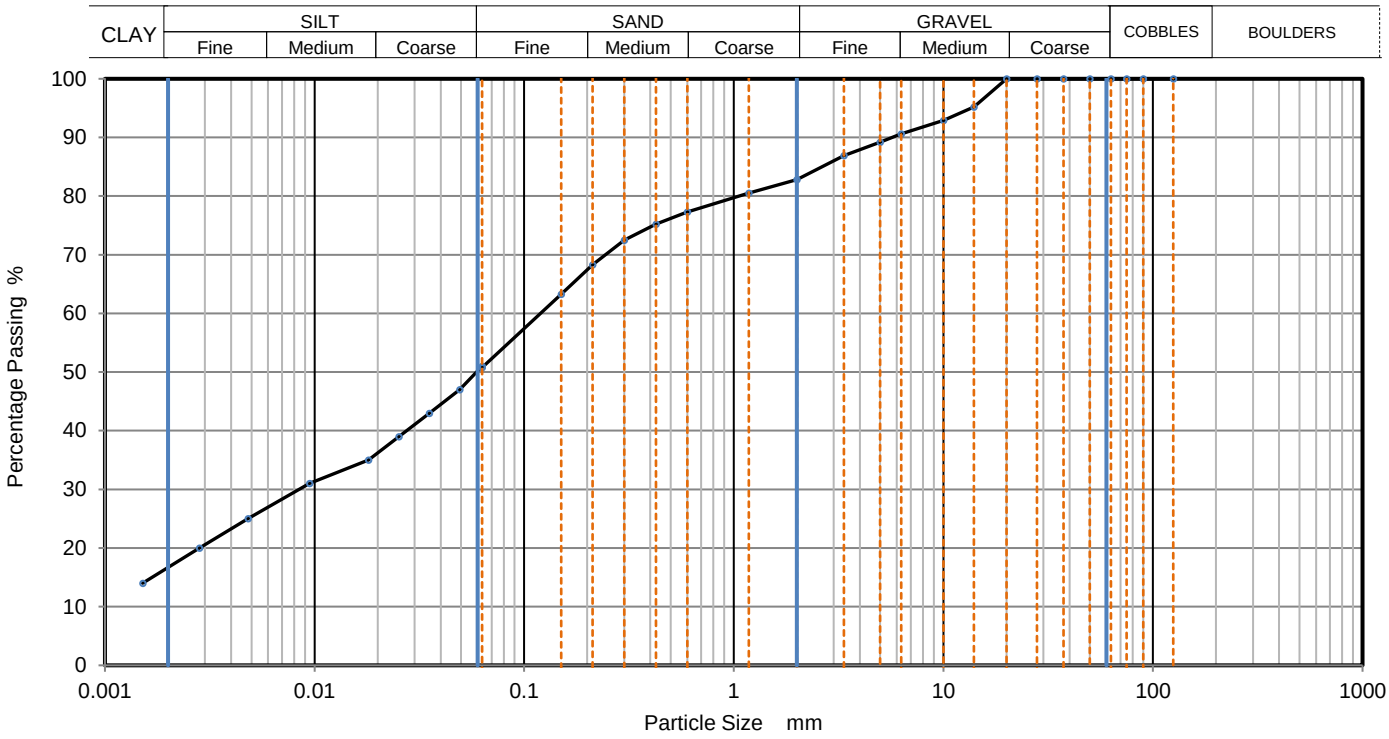
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-1682**
				Borehole/Pit No.	TP-9830
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Specimen Description	Brownish grey sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	0.40
				Base	1.40
Specimen Reference	9	Specimen Depth	0.4 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022090581



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	51
90	100	0.04923	47
75	100	0.03527	43
63	100	0.02526	39
50	100	0.01809	35
37.5	100	0.00946	31
28	100	0.00481	25
20	100	0.00283	20
14	95	0.00151	14
10	93		
6.3	91		
5	89		
3.35	87		
2	83		
1.18	81		
0.6	77	Particle density	(assumed)
0.425	75	2.65	Mg/m3
0.3	73		
0.212	68		
0.15	63		
0.063	51		

Dry Mass of sample, g: 522

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	17.2
Sand	32.0
Silt	34.5
Clay	16.3

Grading Analysis		
D100	mm	
D60	mm	0.12
D30	mm	0.00818
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

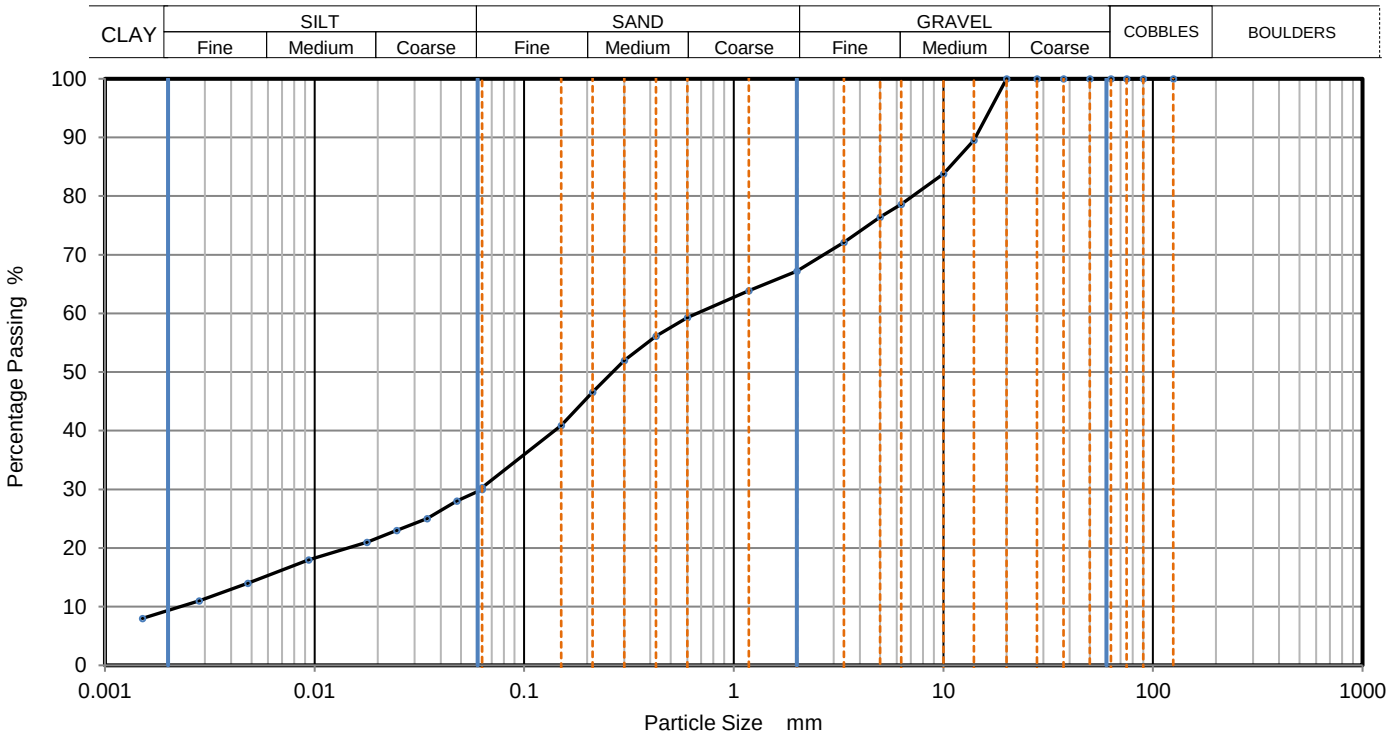
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

PARTICLE SIZE DISTRIBUTION

				Job Ref	**21-1682**
				Borehole/Pit No.	TP-9830
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Specimen Description	Brownish grey sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	1.90
				Base	2.50
Specimen Reference	9	Specimen Depth	1.9 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022090582



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	30
90	100	0.04770	28
75	100	0.03444	25
63	100	0.02468	23
50	100	0.01780	21
37.5	100	0.00936	18
28	100	0.00480	14
20	100	0.00282	11
14	90	0.00151	8
10	84		
6.3	79		
5	76		
3.35	72		
2	67		
1.18	64		
0.6	59	Particle density	(assumed)
0.425	56	2.65	Mg/m3
0.3	52		
0.212	47		
0.15	41		
0.063	30		

Dry Mass of sample, g: 554

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	32.8
Sand	36.9
Silt	21.2
Clay	9.1

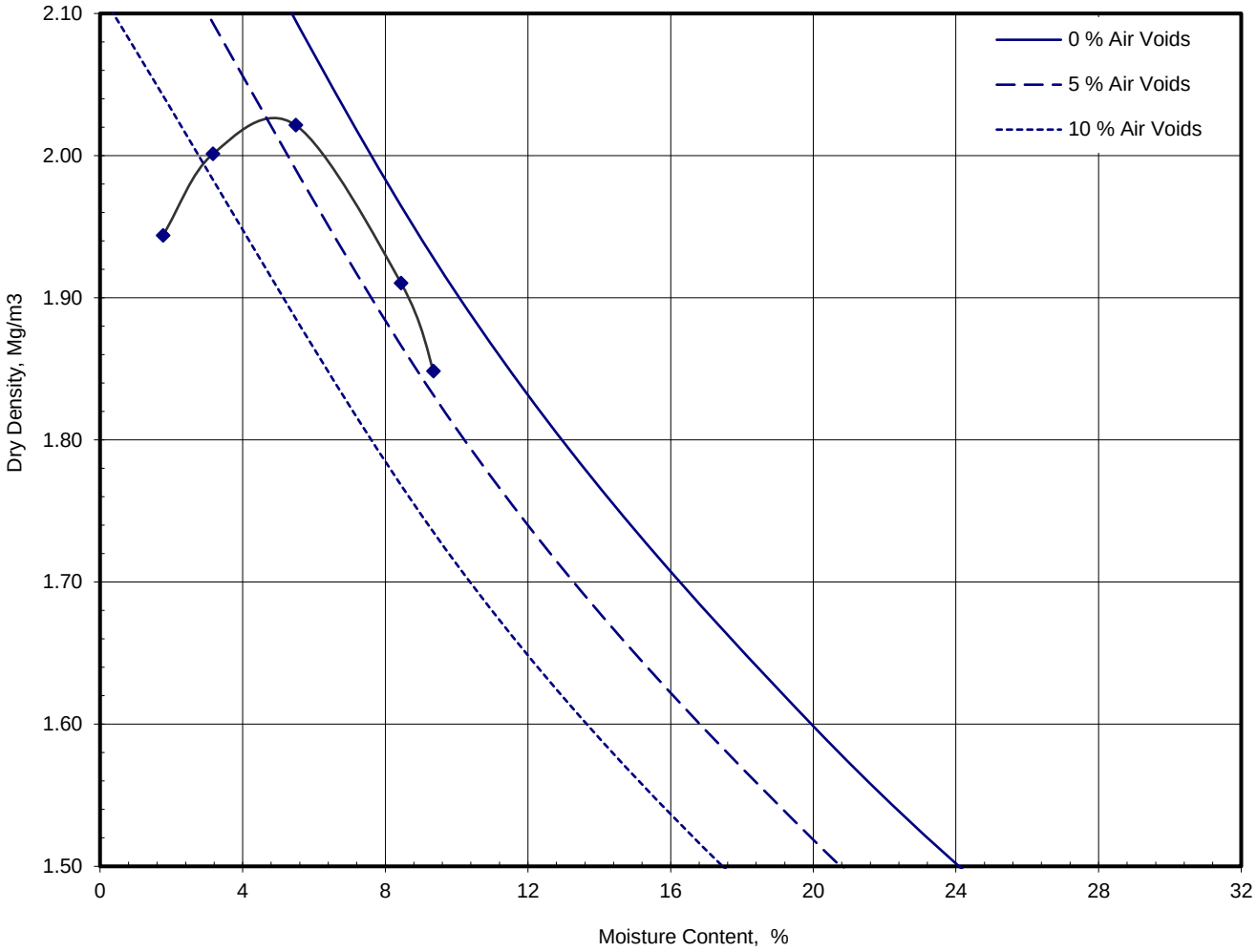
Grading Analysis		
D100	mm	
D60	mm	0.663
D30	mm	0.0604
D10	mm	0.0024
Uniformity Coefficient		280
Curvature Coefficient		2.3

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**Dry Density / Moisture Content Relationship Light Compaction**			Job Ref	**21-1682**
				Borehole / Pit No	TP-12507
Site Name	**Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only**			Sample No	1
Specimen Description	Grey slightly gravelly silty fine to coarse SAND.			Sample Depth (m) Top	0.40
				Sample Depth (m) Base	2.50
Specimen Ref.	6	Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.4, 2.5kg rammer			Keylab ID	Caus202209282

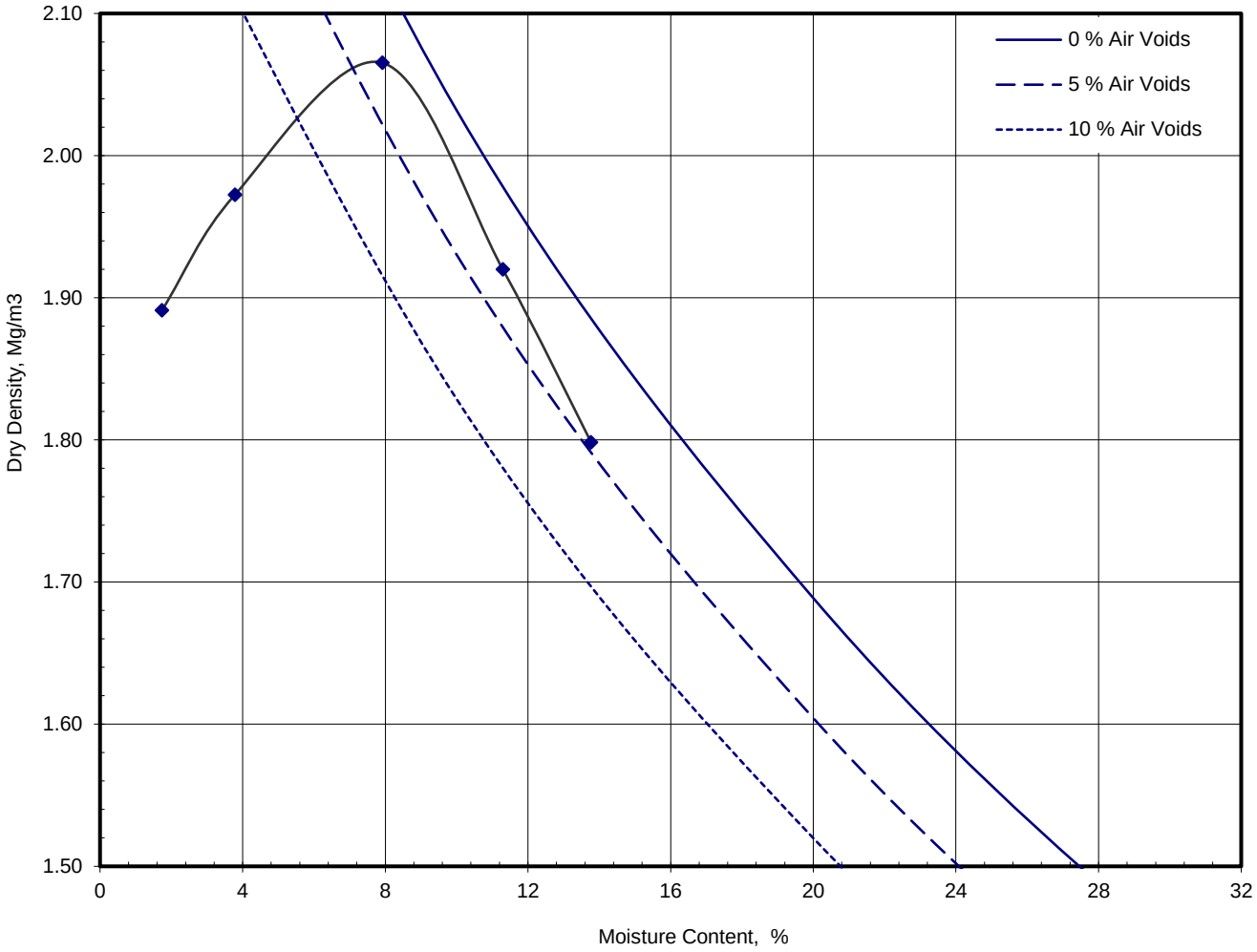


Preparation		Material used was air dried
Mould Type		CBR
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	3
Material Retained on 20.0 mm Sieve	%	13
Particle Density - Assumed	Mg/m³	2.35

Maximum Dry Density	Mg/m³	**2.02**
Optimum Moisture Content	%	**5.5**

Approved	Remarks	UKAS TESTING 10122
Stephen Watson	LAB 08R - Version 6	

CAUSEWAY GEOTECH	**Dry Density / Moisture Content Relationship Light Compaction**	Job Ref	**21-1682**
		Borehole / Pit No	TP-16208
Site Name	**Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only**	Sample No	1
Specimen Description	Grey sandy gravelly silty CLAY with some cobbles.	Sample Depth (m) Top	0.30
		Sample Depth (m) Base	2.70
Specimen Ref.	6	Specimen Depth m	Sample Type B
Test Method	BS1377:Part 4:1990, clause 3.3, 2.5kg rammer	Keylab ID	Caus2022092815

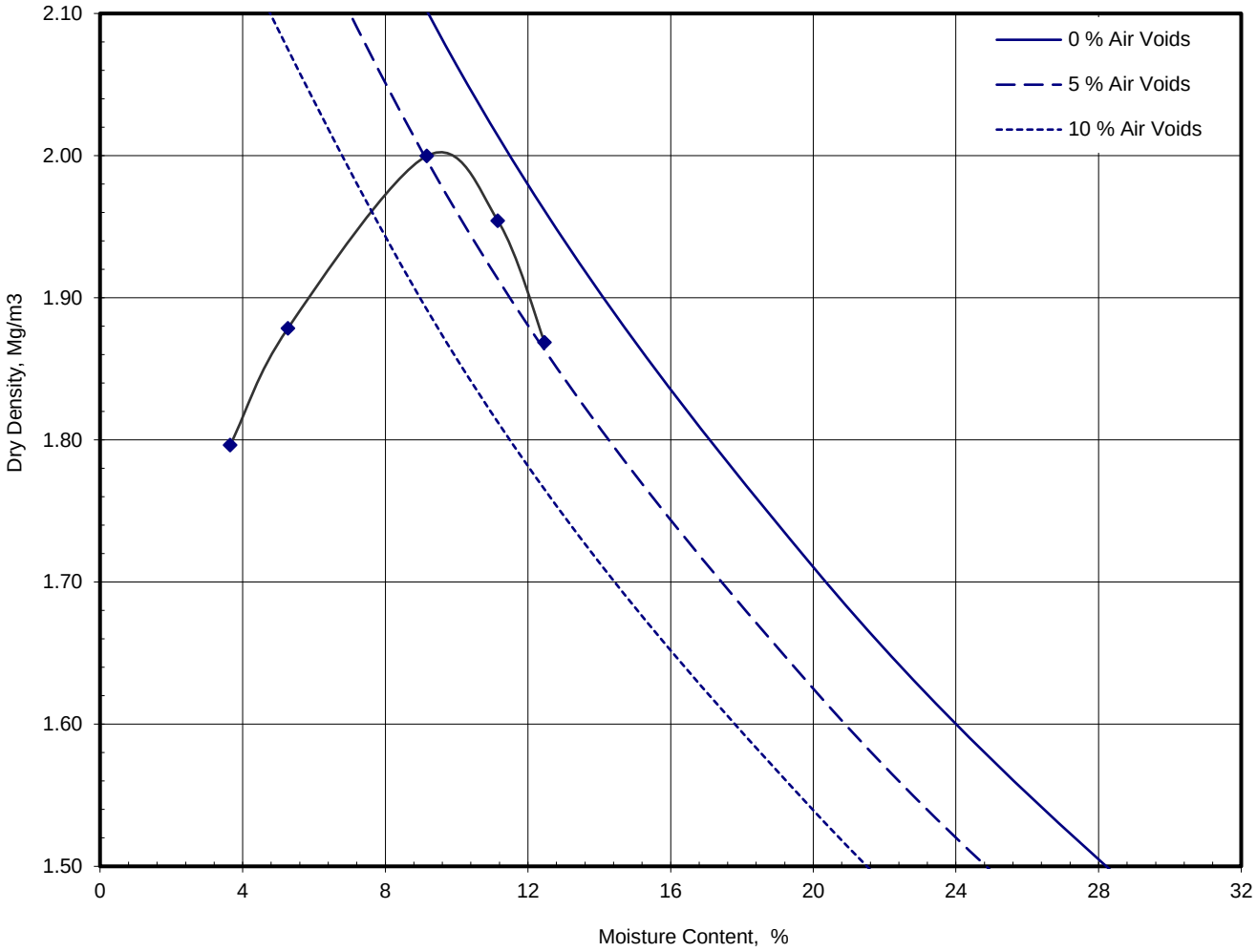


Preparation		Material used was air dried
Mould Type		1 LITRE
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	1
Particle Density - Assumed	Mg/m³	2.55

Maximum Dry Density	Mg/m³	**2.07**
Optimum Moisture Content	%	**7.9**

Approved	Remarks	UKAS TESTING 10122
Stephen Watson	LAB 08R - Version 6	

CAUSEWAY GEOTECH	**Dry Density / Moisture Content Relationship Light Compaction**			Job Ref	**21-1682**
				Borehole / Pit No	TP-23202
Site Name	**Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only**			Sample No	5
Specimen Description	Brownish grey sandy gravelly silty CLAY.			Sample Depth (m) Top	1.80
				Sample Depth (m) Base	2.80
Specimen Ref.	4	Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.4, 2.5kg rammer			Keylab ID	Caus2022093091

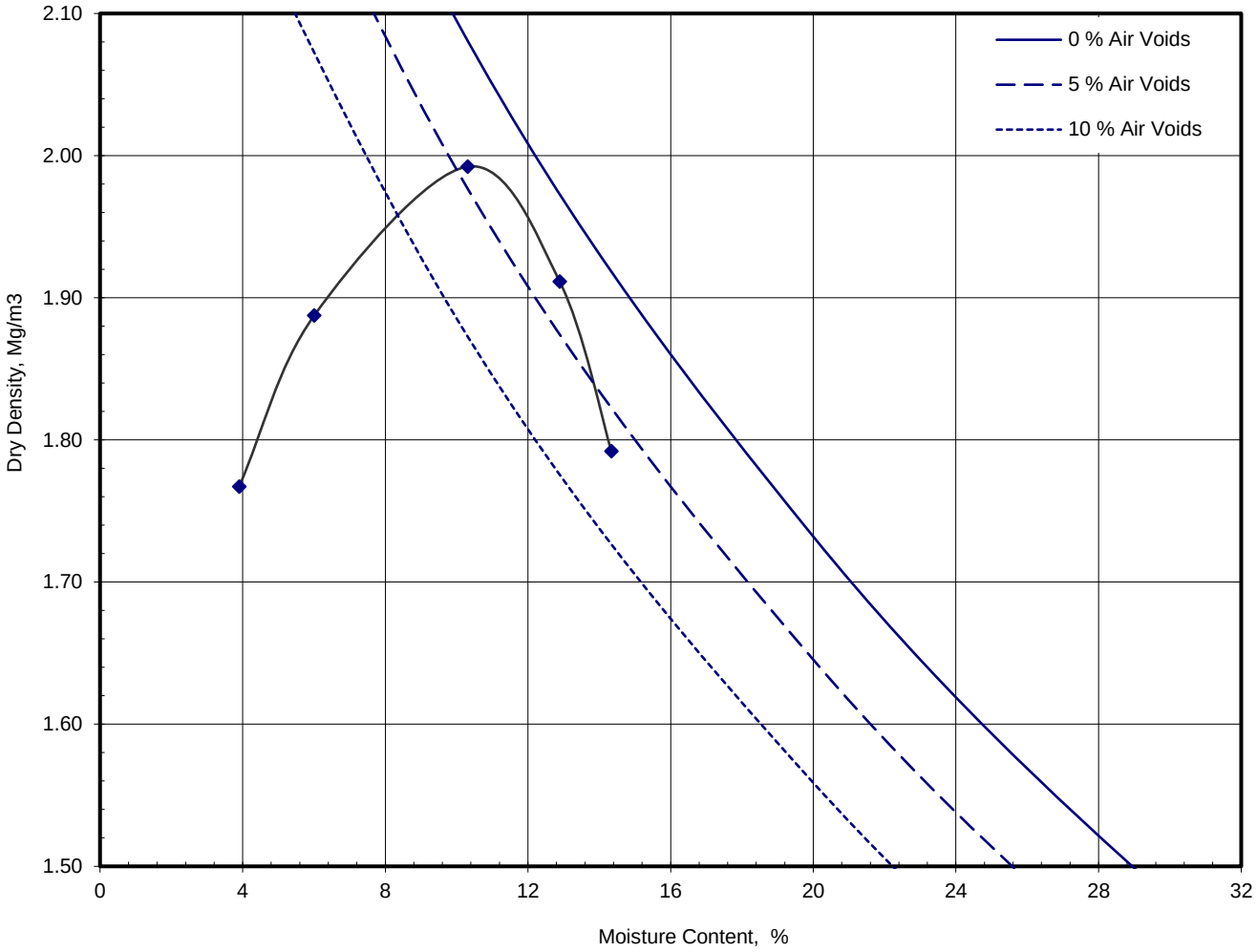


Preparation		Material used was air dried
Mould Type		CBR
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	11
Particle Density - Assumed	Mg/m³	2.60

Maximum Dry Density	Mg/m³	**2.00**
Optimum Moisture Content	%	**9.2**

Approved	Remarks	UKAS TESTING 10122
Stephen Watson	LAB 08R - Version 6	

CAUSEWAY GEOTECH	**Dry Density / Moisture Content Relationship Light Compaction**			Job Ref	**21-1682**
				Borehole / Pit No	TP-24008
Site Name	**Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only**			Sample No	3
Specimen Description	Brownish grey sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	0.80
				Sample Depth (m) Base	3.20
Specimen Ref.	4	Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.3, 2.5kg rammer			Keylab ID	Caus20220930101

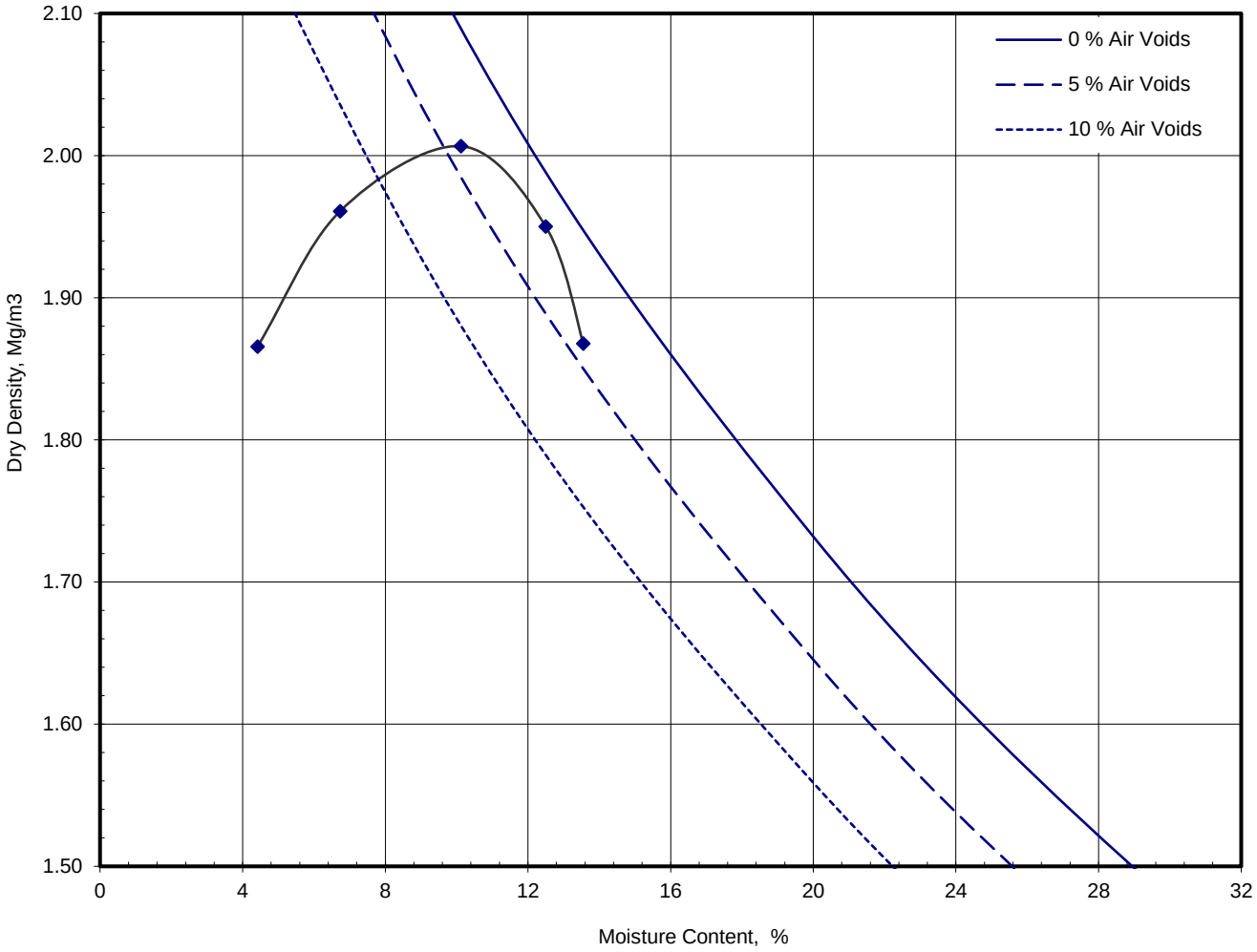


Preparation		Material used was air dried
Mould Type		1 LITRE
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	5
Particle Density - Assumed	Mg/m³	2.65

Maximum Dry Density	Mg/m³	**1.99**
Optimum Moisture Content	%	**10**

Approved	Remarks	UKAS TESTING 10122
Stephen Watson	LAB 08R - Version 6	

CAUSEWAY GEOTECH	**Dry Density / Moisture Content Relationship Light Compaction**			Job Ref	**21-1682**
				Borehole / Pit No	TP-28001
Site Name	**Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only**			Sample No	4
Specimen Description	Brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	1.00
				Sample Depth (m) Base	3.30
Specimen Ref.	4	Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.3, 2.5kg rammer			Keylab ID	Caus20220930117



Preparation		Material used was air dried
Mould Type		1 LITRE
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	5
Particle Density - Assumed	Mg/m³	2.65

Maximum Dry Density	Mg/m³	**2.01**
Optimum Moisture Content	%	**10**

Approved	Remarks	UKAS TESTING 10122
Stephen Watson	LAB 08R - Version 6	

Moisture Condition Value at Natural Moisture Content
Summary of Results

Project No.	Project Name
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only

Hole No.	Sample				Specimen Description	Retained on 20mm sieve %	Moisture Content <20mm %	Moisture Condition Value	Method of Interpretation	Remarks
	Ref	Top	Base	Type						
BH-11377	5	1.90	3.00	B	Greyish brown sandy slightly gravelly silty CLAY.	9	10	3.0	Best fit line	
BH-11594	4	2.50	3.50	B	Greyish brown sandy slightly gravelly silty CLAY.	23	11	3.1	Best fit line	
BH-12009	3	1.50	2.50	B	Greyish brown sandy slightly gravelly silty CLAY.	11	12	2.8	Best fit line	
BH-23898	9	2.80	3.10	B	Brownish grey sandy gravelly silty CLAY.	17	10	9.1	Best fit line	
BH-28001	3	1.80	2.00	B	Brown sandy slightly gravelly silty CLAY.	17	12	too wet	Best fit line	
BH-30066	2	1.20	2.00	B	Brown sandy slightly gravelly silty CLAY.	8	13	6.0	Best fit line	
BH-30414	4	3.00	4.00	B	Brown sandy slightly gravelly silty CLAY.	10	10	6.2	Best fit line	
BH-31910	3	1.20	2.00	B	Light brown sandy gravelly silty CLAY.	40	9	4.1	Best fit line	
BH-32319	5	3.00	3.80	B	Brown sandy slightly gravelly silty CLAY.	6	11	2.0	Best fit line	
BH-34598	4	2.00	3.00	B	Light brown sandy very gravelly silty CLAY.	60	9	9.0	Best fit line	
BH-35473	5	3.00	4.00	B	Light brown sandy gravelly silty CLAY.	20	10	7.3	Best fit line	
BH-4110	5	1.80	2.00	B	Brownish grey sandy slightly gravelly silty CLAY.	0	22	5.8	Best fit line	

LAB 10R - Version 7

Key

Test performed in accordance with BS1377:Part4:1990, clause 5.4 unless annotated otherwise

Date Printed

17/11/2022

Approved By

Stephen.Watson

UKAS TESTING

10122

Moisture Condition Value at Natural Moisture Content
Summary of Results

Project No.	Project Name
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only

Hole No.	Sample				Specimen Description	Retained on 20mm sieve %	Moisture Content <20mm %	Moisture Condition Value	Method of Interpretation	Remarks
	Ref	Top	Base	Type						
BH-5440	3	2.00	3.00	B	Greyish brown sandy slightly gravelly silty CLAY.	23	12	0.7	Best fit line	
BH-5440	5	4.00	5.00	B	Greyish brown sandy slightly gravelly silty CLAY.	23	11	1.6	Best fit line	
BH-7255	3	2.00	3.00	B	Grey slightly sandy slightly gravelly silty CLAY.	5	14	too wet	Best fit line	
BH-7320	2	1.20	2.00	B	Greyish brown sandy gravelly silty CLAY.	7	19	4.3	Best fit line	
BH-9668	2	2.00	2.70	B	Purplish brown sandy slightly gravelly silty CLAY.	14	12	3.7	Best fit line	
TP-12203	1	0.50	3.50	B	Purplish grey sandy slightly gravelly silty CLAY.	7	10	8.6	Best fit line	
TP-12582	2	1.50		B	Brownish grey sandy gravelly silty CLAY.	17	10	7.5	Best fit line	
TP-12595	2	1.50		B	Greyish brown sandy gravelly silty CLAY.	17	10	5.1	Best fit line	
TP-12650	3	2.50		B	Greyish brown sandy slightly gravelly silty CLAY.	7	12	2.3	Best fit line	
TP-12688	3	2.50		B	Greyish brown sandy gravelly silty CLAY.	15	14	4.8	Best fit line	
TP-12750	2	1.50		B	Greyish brown sandy slightly gravelly silty CLAY.	6	20	6.1	Best fit line	
TP-13605	3	2.50		B	Brown sandy gravelly silty CLAY.	7	11	2.9	Best fit line	

Key

Test performed in accordance with BS1377:Part4:1990, clause 5.4 unless annotated otherwise

Date Printed

17/11/2022

Approved By

Stephen.Watson

UKAS TESTING

10122

Moisture Condition Value at Natural Moisture Content
Summary of Results

Project No.	Project Name
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only

Hole No.	Sample				Specimen Description	Retained on 20mm sieve %	Moisture Content <20mm %	Moisture Condition Value	Method of Interpretation	Remarks
	Ref	Top	Base	Type						
TP-14307	1	0.40	1.40	B	Greyish brown clayey fine to coarse SAND.	0	17	4.4	Best fit line	
TP-2007	2	0.80	1.70	B	Brown sandy slightly gravelly silty CLAY.	4	18	8.1	Best fit line	
TP-2219A	3	1.20	2.50	B	Brown sandy gravelly silty CLAY with cobbles.	31	15	too wet	Best fit line	
TP-23608	1	0.30	3.20	B	Brownish grey slightly gravelly clayey fine to coarse SAND.	6	9	10.8	Best fit line	
TP-24209	1	0.30	3.00	B	Brownish grey sandy gravelly silty CLAY.	7	10	11.7	Best fit line	
TP-2701	2	2.00	3.50	B	Brown sandy gravelly silty CLAY.	0	14	6.2	Best fit line	
TP-27781	3	0.90	2.80	B	Brownish grey sandy slightly gravelly silty CLAY.	8	13	too wet	Best fit line	
TP-28709	2	0.80	3.80	B	Brown clayey gravelly SAND with cobbles.	39	9	0.1	Best fit line	
TP-30103	3	2.50		B	Brown sandy gravelly silty CLAY.	7	11	4.2	Best fit line	
TP-30417	3	2.50		B	Brown sandy gravelly silty CLAY.	9	10	2.5	Best fit line	
TP-30501	3	2.50		B	Brown sandy gravelly silty CLAY.	3	10	7.0	Best fit line	
TP-30818	3	1.50	2.50	B	Brown sandy slightly gravelly silty CLAY.	5	11	7.2	Best fit line	

LAB 10R - Version 7

Key

Test performed in accordance with BS1377:Part4:1990, clause 5.4 unless annotated otherwise

Date Printed

17/11/2022

Approved By

Stephen Watson

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Moisture Condition Value at Natural Moisture Content
Summary of Results

Project No.	Project Name
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only

Hole No.	Sample				Specimen Description	Retained on 20mm sieve	Moisture Content <20mm	Moisture Condition Value	Method of Interpretation	Remarks
	Ref	Top	Base	Type		%	%			
TP-3504	4	1.00	2.30	B	Brown slightly gravelly clayey fine to coarse SAND.	2	27	4.3	Best fit line	
TP-35435	3	1.50	2.80	B	Greyish brown sandy slightly gravelly silty CLAY.	11	11	3.2	Best fit line	
TP-3978	3	1.60	3.20	B	Brownish grey gravelly silty fine to coarse SAND.	2	13	1.3	Best fit line	
TP-5303	3	1.50	2.30	B	Brownish grey sandy slightly gravelly silty CLAY.	9	17	3.0	Best fit line	
TP-5387	3	2.65	3.55	B	Brownish grey sandy gravelly silty CLAY.	2	14	3.4	Best fit line	
TP-6105	2	1.00	2.20	B	Brownish grey sandy slightly gravelly silty CLAY.	4	16	3.8	Best fit line	
TP-6575	3	1.60	2.40	B	Brown sandy slightly gravelly silty CLAY.	11	29	5.3	Best fit line	
TP-6832	2	0.85	2.20	B	Brown slightly gravelly clayey fine to coarse SAND.	0	16	9.2	Best fit line	
TP-9011	3	1.50	2.20	B	Brownish grey sandy slightly gravelly silty CLAY.	9	14	3.9	Best fit line	
TP-9115	1	0.70	2.10	B	Brownish grey sandy slightly gravelly silty CLAY.	9	13	7.5	Best fit line	

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Key

Test performed in accordance with BS1377:Part4:1990, clause 5.4 unless annotated otherwise

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CAUSEWAY GEOTECH	**Moisture Condition Value / Moisture Content Relationship**			Job Ref		21-1682
				Borehole/Pit No.		TP-17894
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.		2
Soil Description	Brownish grey slightly sandy silty CLAY.			Sample Depth (m)	Top	0.95
					Base	2.3
Specimen Reference	8	Specimen Depth	0.95 m	Sample Type		B
Specimen Description	Brownish grey slightly sandy silty CLAY.			KeyLAB ID		Caus2022092818
Test Method	BS1377:Part4:1990:clause 5.5			Date started		17/10/2022

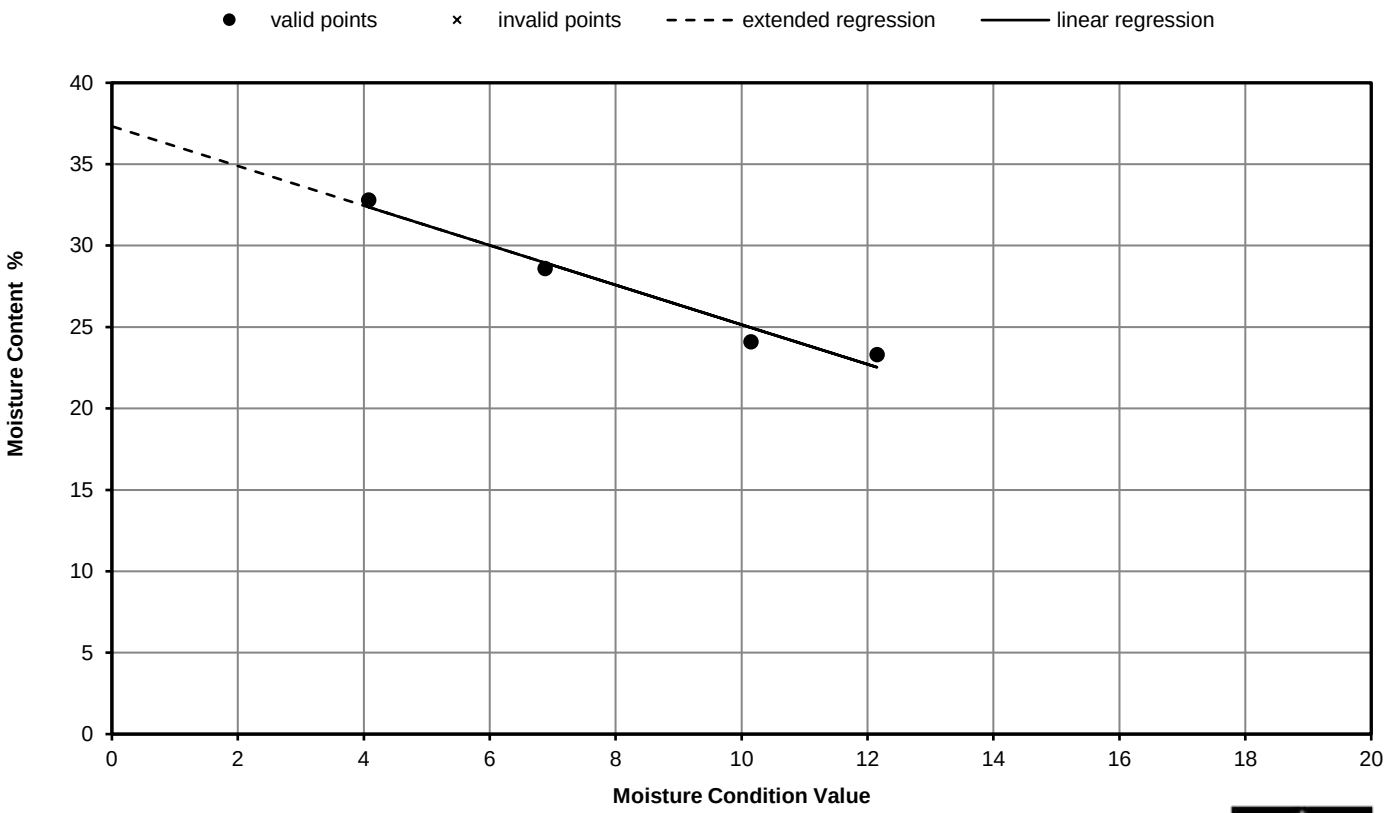
Sample preparation

Amount of material larger than 20mm sieve removed	0	%
Natural Moisture Content of sample	32.8	%
Initial Moisture Content of test sample below 20mm	32.8	%
Separate specimens tested		

General remarks

Table of results

MCV Test Number	1	2	3	4	
Moisture Content, %	33	24	23	29	
Moisture Condition Value	4.1	10.2	12.2	6.9	
MCV report	4.1	10.2	12.2	6.9	
Effective / Valid data point	YES	YES	YES	YES	
Specimen remarks					



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CAUSEWAY GEOTECH	Moisture Condition Value / Moisture Content Relationship				Job Ref		21-1682
					Borehole/Pit No.		TP-18604
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		1
Soil Description	Greyish brown sandy slightly gravelly silty CLAY.				Sample Depth (m)	Top	0.3
						Base	3
Specimen Reference	6	Specimen Depth	0.3	m	Sample Type		B
Specimen Description	Greyish brown sandy slightly gravelly silty CLAY.				KeyLAB ID		Caus2022092824
Test Method	BS1377:Part4:1990:clause 5.5				Date started		17/10/2022

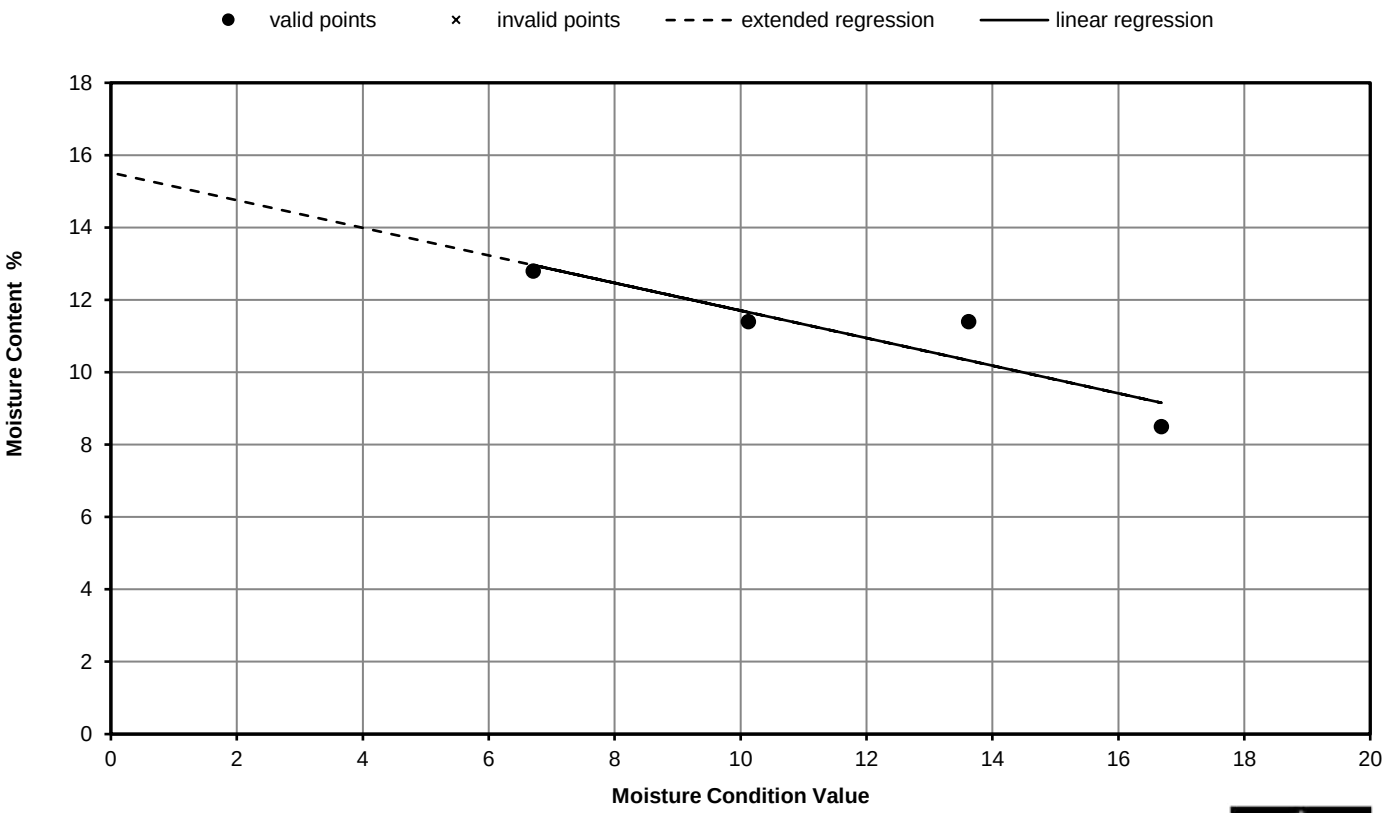
Sample preparation

Amount of material larger than 20mm sieve removed	7	%
Natural Moisture Content of sample	11.3	%
Initial Moisture Content of test sample below 20mm	12.2	%
Separate specimens tested		

General remarks

Table of results

MCV Test Number	1	2	3	4	
Moisture Content, %	11	13	11	9	
Moisture Condition Value	10.1	6.7	13.6	16.7	
MCV report	10.1	6.7	13.6	16.7	
Effective / Valid data point	YES	YES	YES	YES	
Specimen remarks					



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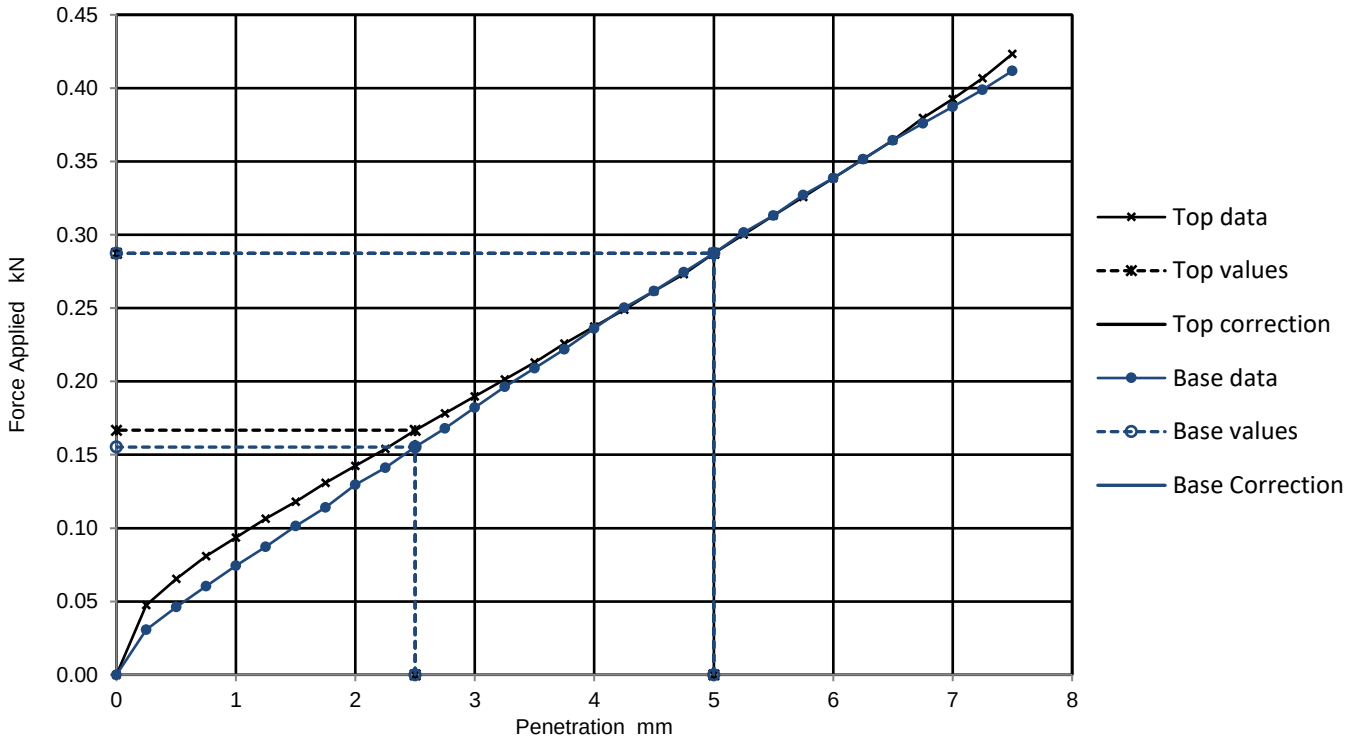
CAUSEWAY GEOTECH	**California Bearing Ratio (CBR)**			Job Ref	21-1682
				Borehole/Pit No.	BH-2247
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	6
Soil Description	Greyish brown sandy slightly gravelly silty CLAY.			Depth m	3.50
Specimen Reference		Specimen Depth	m	Sample Type	B
Specimen Description	Greyish brown sandy slightly gravelly silty CLAY.			KeyLAB ID	Caus2022062120
Test Method	BS1377 : Part 4 : 1990, clause 7			CBR Test Number	1

Specimen Preparation

Condition	REMOULDED			Soaking details	Not soaked	
Details	Recompacted with specified standard effort using 2.5kg rammer			Period of soaking		days
				Time to surface		days
				Amount of swell recorded		mm
Material retained on 20mm sieve removed		37	%	Dry density after soaking		Mg/m3
Initial Specimen details	Bulk density	2.27	Mg/m3	Surcharge applied	4.5	kg
	Dry density	2.03	Mg/m3		3	kPa
	Moisture content	11.6	%			

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, %				Moisture Content %
		2.5mm	5mm	Highest	Average	
TOP	No	1.3	1.4	1.4	1.4	11.6
BASE	No	1.2	1.4	1.4		11.2

General remarks	Test specific remarks	Approved
Tested at natural moisture content. Non-Standard Test	Average result may be reported if within 10% of the mean CBR value of top and base.	Stephen.Watson

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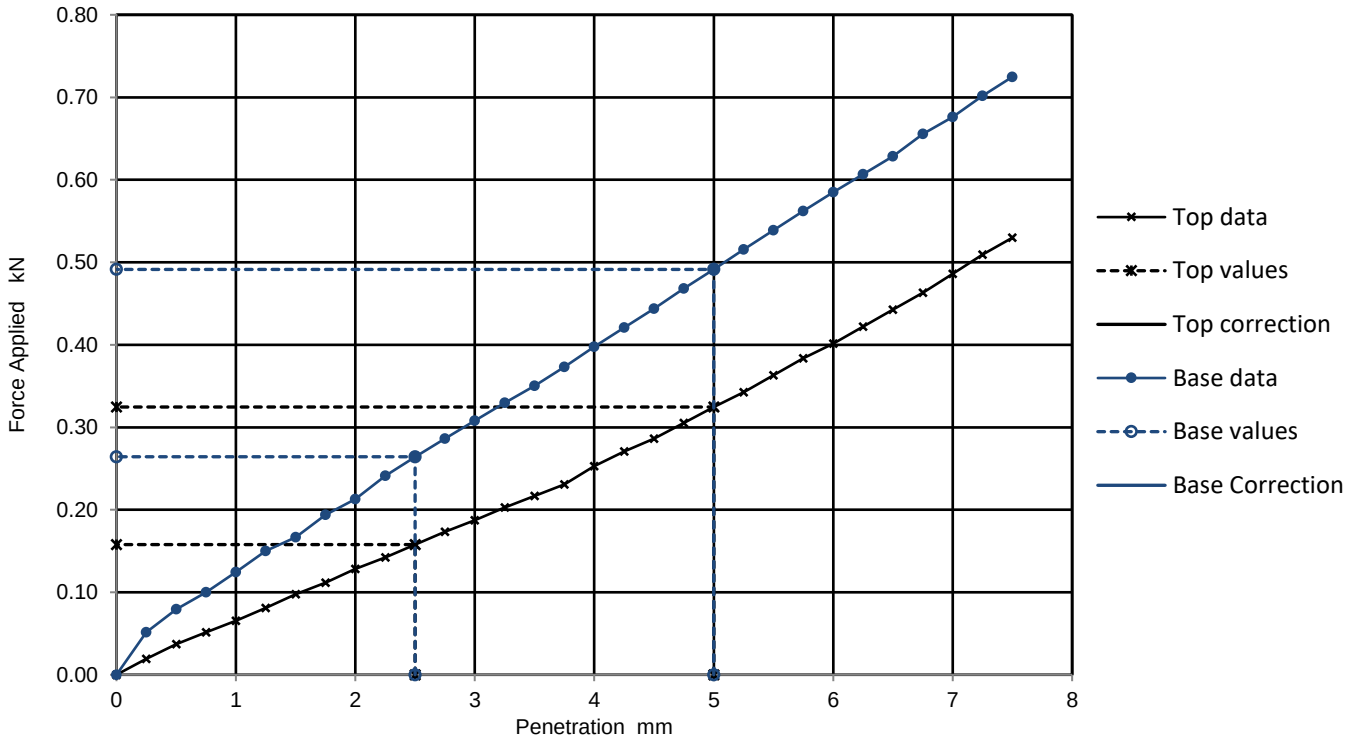
California Bearing Ratio (CBR)

				Job Ref	21-1682
				Borehole/Pit No.	BH-23898
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	10
Soil Description	Brownish grey sandy gravelly silty CLAY.			Depth m	3.80
Specimen Reference		Specimen Depth	m	Sample Type	B
Specimen Description	Brownish grey sandy gravelly silty CLAY.			KeyLAB ID	Caus202208044
Test Method	BS1377 : Part 4 : 1990, clause 7			CBR Test Number	1

Specimen Preparation

Condition	REMOULDED			Soaking details	Not soaked	
Details	Recompacted with specified standard effort using 2.5kg rammer			Period of soaking		days
				Time to surface		days
				Amount of swell recorded		mm
Material retained on 20mm sieve removed		25	%	Dry density after soaking		Mg/m3
Initial Specimen details	Bulk density	2.28	Mg/m3	Surcharge applied	4.5	kg
	Dry density	2.08	Mg/m3		3	kPa
	Moisture content	9.4	%			

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, %				Moisture Content %
		2.5mm	5mm	Highest	Average	
TOP	No	1.2	1.6	1.6		9.4
BASE	No	2.0	2.5	2.5		9.3

General remarks	Test specific remarks	Approved
Tested at natural moisture content.	Average result may be reported if within 10% of the mean CBR value of top and base.	Stephen.Watson

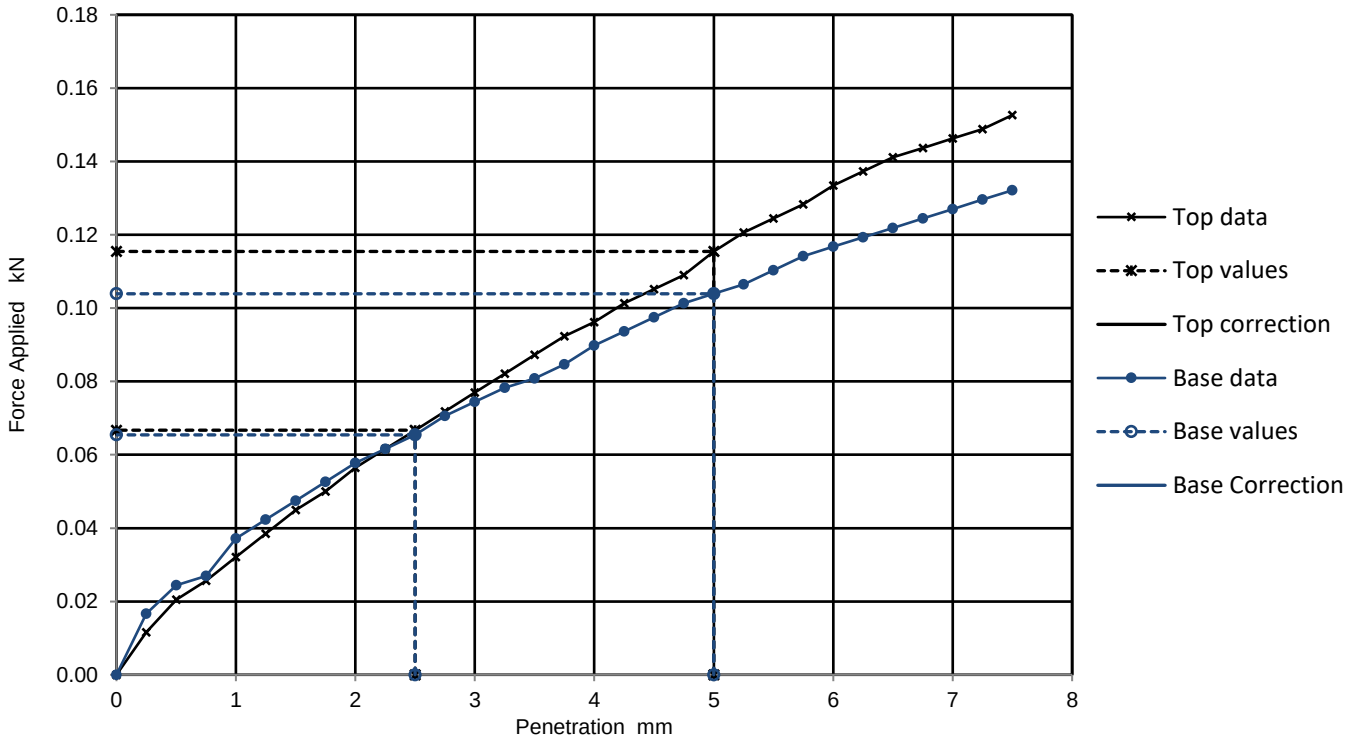
California Bearing Ratio (CBR)

				Job Ref	21-1682
				Borehole/Pit No.	BH-33000
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Soil Description	Light brown sandy gravelly silty CLAY.			Depth m	1.20
Specimen Reference		Specimen Depth	m	Sample Type	B
Specimen Description	Light brown sandy gravelly silty CLAY.			KeyLAB ID	Caus2022052420
Test Method	BS1377 : Part 4 : 1990, clause 7			CBR Test Number	1

Specimen Preparation

Condition	REMOULDED			Soaking details	Not soaked	
Details	Recompacted with specified standard effort using 2.5kg rammer			Period of soaking		days
				Time to surface		days
				Amount of swell recorded		mm
Material retained on 20mm sieve removed		17	%	Dry density after soaking		Mg/m3
Initial Specimen details	Bulk density	2.26	Mg/m3	Surcharge applied	4.5	kg
	Dry density	2.03	Mg/m3		3	kPa
	Moisture content	11.1	%			

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, %				Moisture Content %
		2.5mm	5mm	Highest	Average	
TOP	No	0.5	0.6	0.6	0.6	11.1
BASE	No	0.5	0.5	0.5		11.4

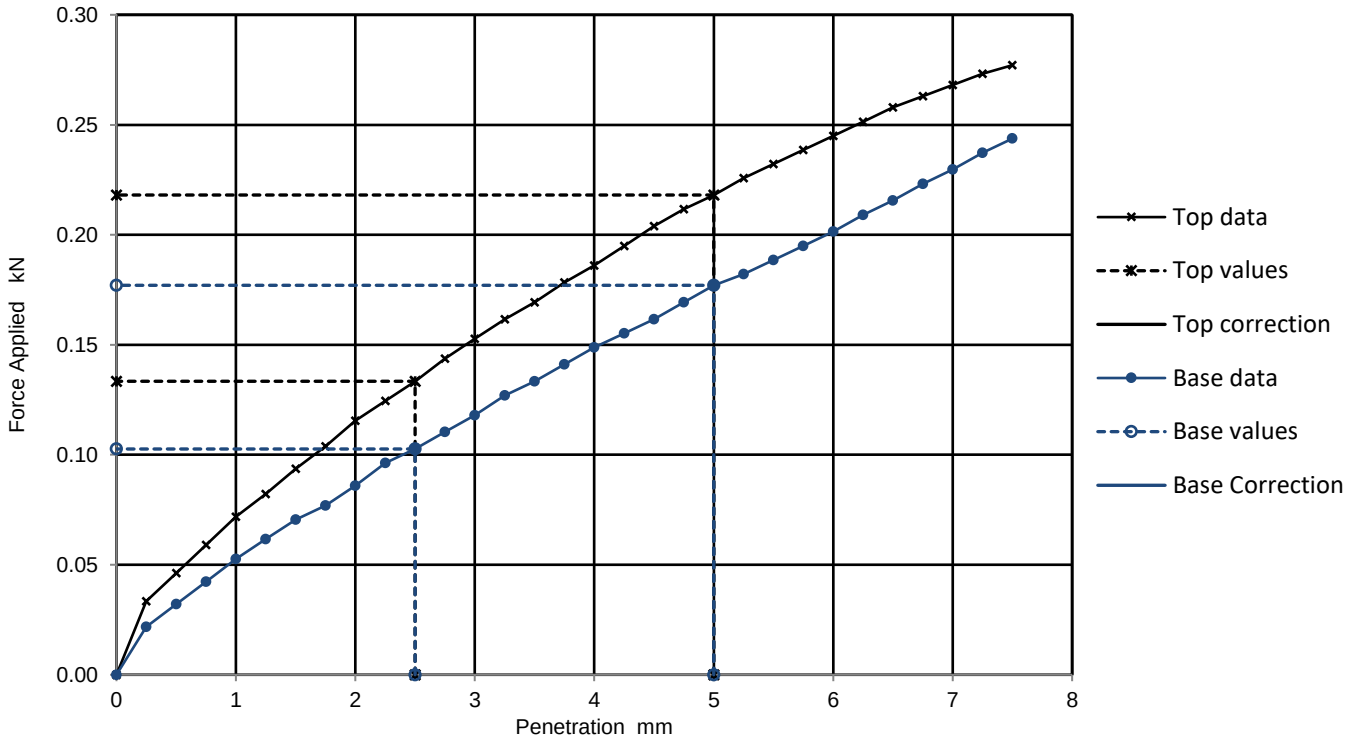
General remarks	Test specific remarks	Approved
Tested at natural moisture content.	Average result may be reported if within 10% of the mean CBR value of top and base.	Stephen.Watson

CAUSEWAY GEOTECH	**California Bearing Ratio (CBR)**			Job Ref	21-1682
				Borehole/Pit No.	BH-35202
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Soil Description	Light brown sandy slightly gravelly silty CLAY.			Depth m	1.20
Specimen Reference		Specimen Depth	m	Sample Type	B
Specimen Description	Light brown sandy slightly gravelly silty CLAY.			KeyLAB ID	Caus2022052433
Test Method	BS1377 : Part 4 : 1990, clause 7			CBR Test Number	1

Specimen Preparation

Condition	REMOULDED			Soaking details	Not soaked	
Details	Recompacted with specified standard effort using 2.5kg rammer			Period of soaking		days
				Time to surface		days
				Amount of swell recorded		mm
Material retained on 20mm sieve removed		34	%	Dry density after soaking		Mg/m3
Initial Specimen details	Bulk density	2.28	Mg/m3	Surcharge applied	4.5	kg
	Dry density	2.07	Mg/m3		3	kPa
	Moisture content	10.4	%			

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, %				Moisture Content %
		2.5mm	5mm	Highest	Average	
TOP	No	1.0	1.1	1.1		10.4
BASE	No	0.8	0.9	0.9		10.5

General remarks	Test specific remarks	Approved
Tested at natural moisture content.	Average result may be reported if within 10% of the mean CBR value of top and base.	Stephen.Watson

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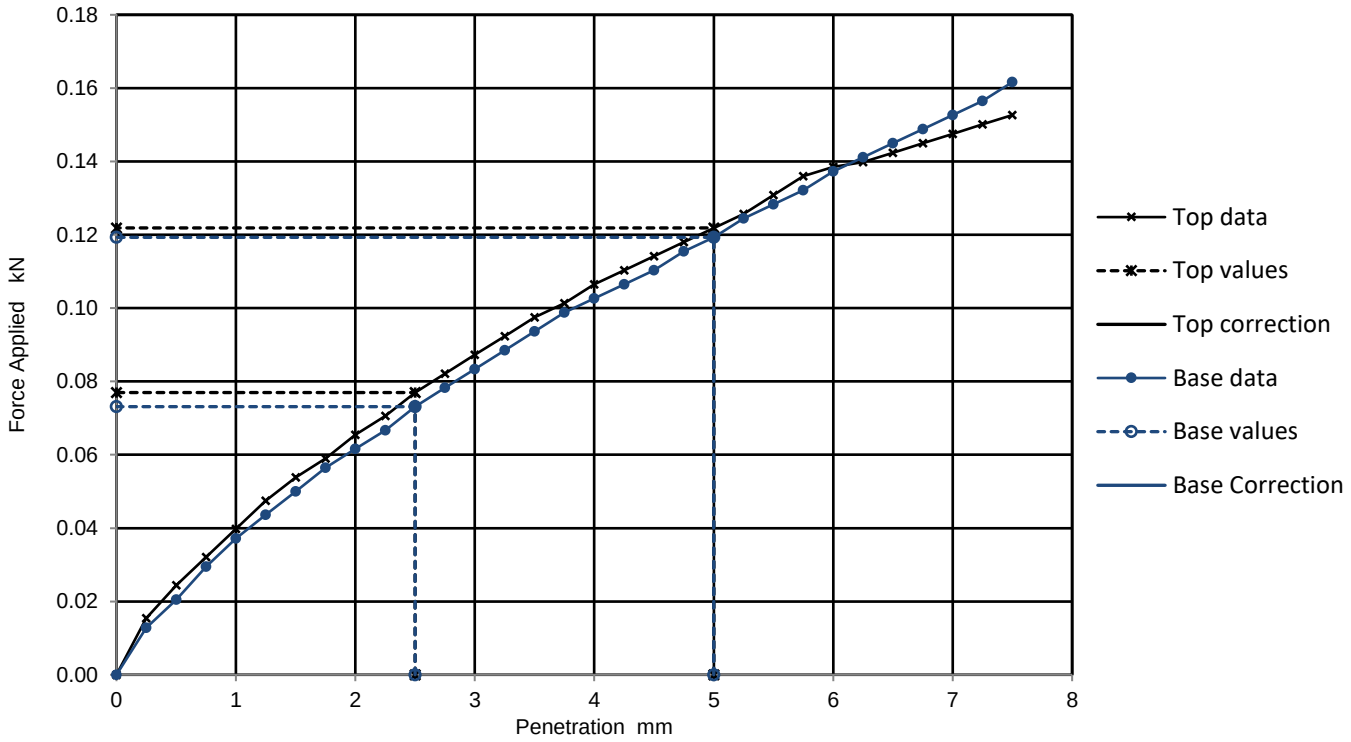
CAUSEWAY GEOTECH	**California Bearing Ratio (CBR)**			Job Ref	21-1682
				Borehole/Pit No.	BH-4110
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	6
Soil Description	Brownish grey sandy gravelly silty CLAY.			Depth m	2.80
Specimen Reference		Specimen Depth	m	Sample Type	B
Specimen Description	Brownish grey sandy gravelly silty CLAY.			KeyLAB ID	Caus2022062166
Test Method	BS1377 : Part 4 : 1990, clause 7			CBR Test Number	1

Specimen Preparation

Condition	REMOULDED			Soaking details	Not soaked	
Details	Recompacted with specified standard effort using 2.5kg rammer			Period of soaking		days
				Time to surface		days
				Amount of swell recorded		mm
Material retained on 20mm sieve removed		18	%	Dry density after soaking		Mg/m3
Initial Specimen details	Bulk density	2.29	Mg/m3	Surcharge applied	4.5	kg
	Dry density	2.09	Mg/m3		3	kPa
	Moisture content	9.7	%			

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, %				Moisture Content %
		2.5mm	5mm	Highest	Average	
TOP	No	0.6	0.6	0.6	0.6	9.7
BASE	No	0.6	0.6	0.6		10.4

General remarks	Test specific remarks	Approved
Tested at natural moisture content.	Average result may be reported if within 10% of the mean CBR value of top and base.	Stephen.Watson

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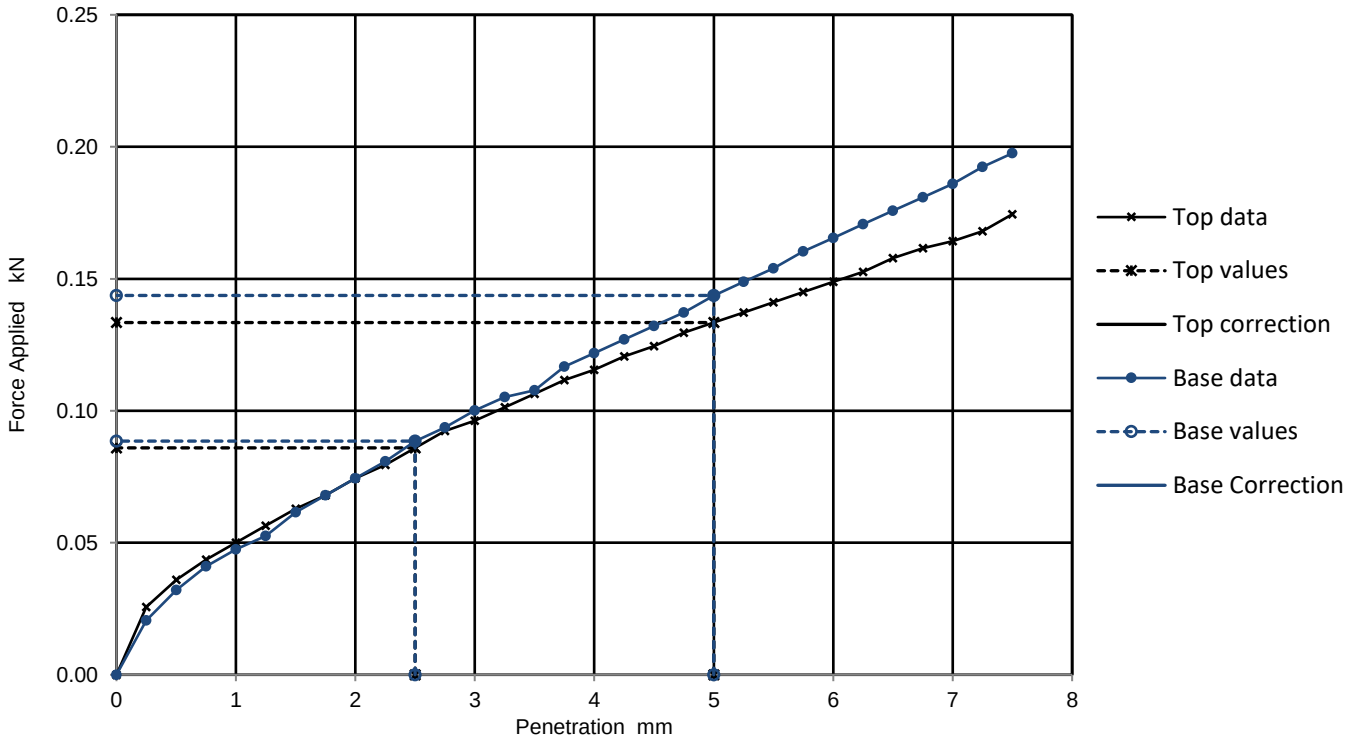
CAUSEWAY GEOTECH	**California Bearing Ratio (CBR)**			Job Ref	21-1682
				Borehole/Pit No.	BH-6406
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	7
Soil Description	Brown sandy gravelly silty CLAY.			Depth m	0.80
Specimen Reference		Specimen Depth	m	Sample Type	B
Specimen Description	Brown sandy gravelly silty CLAY.			KeyLAB ID	Caus2022080427
Test Method	BS1377 : Part 4 : 1990, clause 7			CBR Test Number	1

Specimen Preparation

Condition	REMOULDED			Soaking details	Not soaked	
Details	Recompacted with specified standard effort using 2.5kg rammer			Period of soaking		days
				Time to surface		days
				Amount of swell recorded		mm
Material retained on 20mm sieve removed		6	%	Dry density after soaking		Mg/m3
Initial Specimen details	Bulk density	2.16	Mg/m3	Surcharge applied	4.5	kg
	Dry density	1.88	Mg/m3		3	kPa
	Moisture content	15	%			

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, %				Moisture Content %
		2.5mm	5mm	Highest	Average	
TOP	No	0.7	0.7	0.7	0.7	15
BASE	No	0.7	0.7	0.7		15.2

General remarks	Test specific remarks	Approved
Tested at natural moisture content.	Average result may be reported if within 10% of the mean CBR value of top and base.	Stephen.Watson

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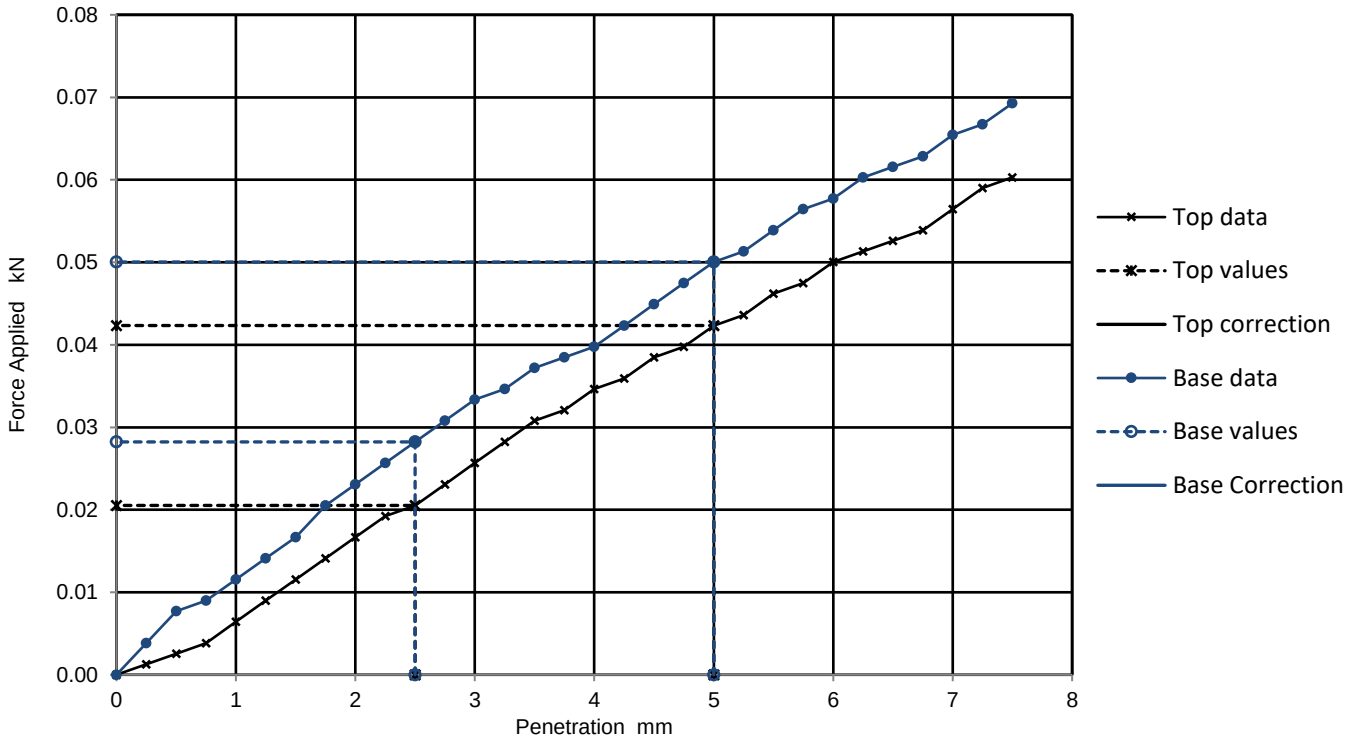
California Bearing Ratio (CBR)

				Job Ref	21-1682
				Borehole/Pit No.	TP-12306
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Soil Description	Grey sandy slightly gravelly silty CLAY.			Depth m	0.70
Specimen Reference		Specimen Depth	m	Sample Type	B
Specimen Description	Grey sandy slightly gravelly silty CLAY.			KeyLAB ID	Caus202209280
Test Method	BS1377 : Part 4 : 1990, clause 7			CBR Test Number	1

Specimen Preparation

Condition	REMOULDED			Soaking details	Not soaked	
Details	Recompacted with specified standard effort using 2.5kg rammer			Period of soaking		days
				Time to surface		days
				Amount of swell recorded		mm
Material retained on 20mm sieve removed		0	%	Dry density after soaking		Mg/m3
Initial Specimen details	Bulk density	2.00	Mg/m3	Surcharge applied	4.5	kg
	Dry density	1.60	Mg/m3		3	kPa
	Moisture content	24.7	%			

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, %				Moisture Content %
		2.5mm	5mm	Highest	Average	
TOP	No	0.2	0.2	0.2	0.2	24.7
BASE	No	0.2	0.3	0.3		25.3

General remarks	Test specific remarks	Approved
Tested at natural moisture content.	Average result may be reported if within 10% of the mean CBR value of top and base.	Stephen Watson

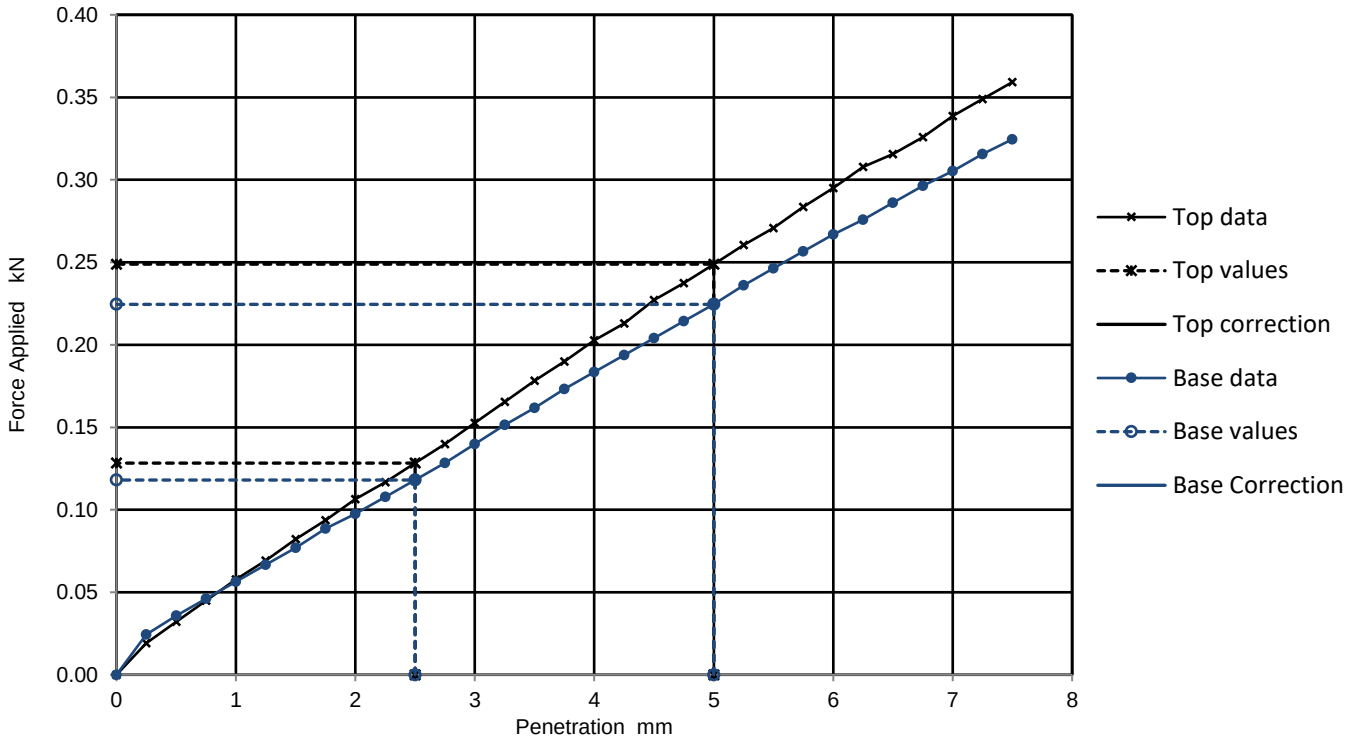
California Bearing Ratio (CBR)

				Job Ref	21-1682
				Borehole/Pit No.	TP-12582
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	4
Soil Description	Brownish grey sandy gravelly silty CLAY.			Depth m	3.50
Specimen Reference		Specimen Depth	m	Sample Type	B
Specimen Description	Brownish grey sandy gravelly silty CLAY.			KeyLAB ID	Caus2022081528
Test Method	BS1377 : Part 4 : 1990, clause 7			CBR Test Number	1

Specimen Preparation

Condition	REMOULDED			Soaking details	Not soaked	
Details	Recompacted with specified standard effort using 2.5kg rammer			Period of soaking		days
				Time to surface		days
				Amount of swell recorded		mm
Material retained on 20mm sieve removed		23	%	Dry density after soaking		Mg/m3
Initial Specimen details	Bulk density	2.30	Mg/m3	Surcharge applied	4.5	kg
	Dry density	2.09	Mg/m3		3	kPa
	Moisture content	9.8	%			

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, %				Moisture Content %
		2.5mm	5mm	Highest	Average	
TOP	No	1.0	1.2	1.2	1.2	9.8
BASE	No	0.9	1.1	1.1		10.1

General remarks	Test specific remarks	Approved
Tested at natural moisture content.	Average result may be reported if within 10% of the mean CBR value of top and base.	Stephen.Watson

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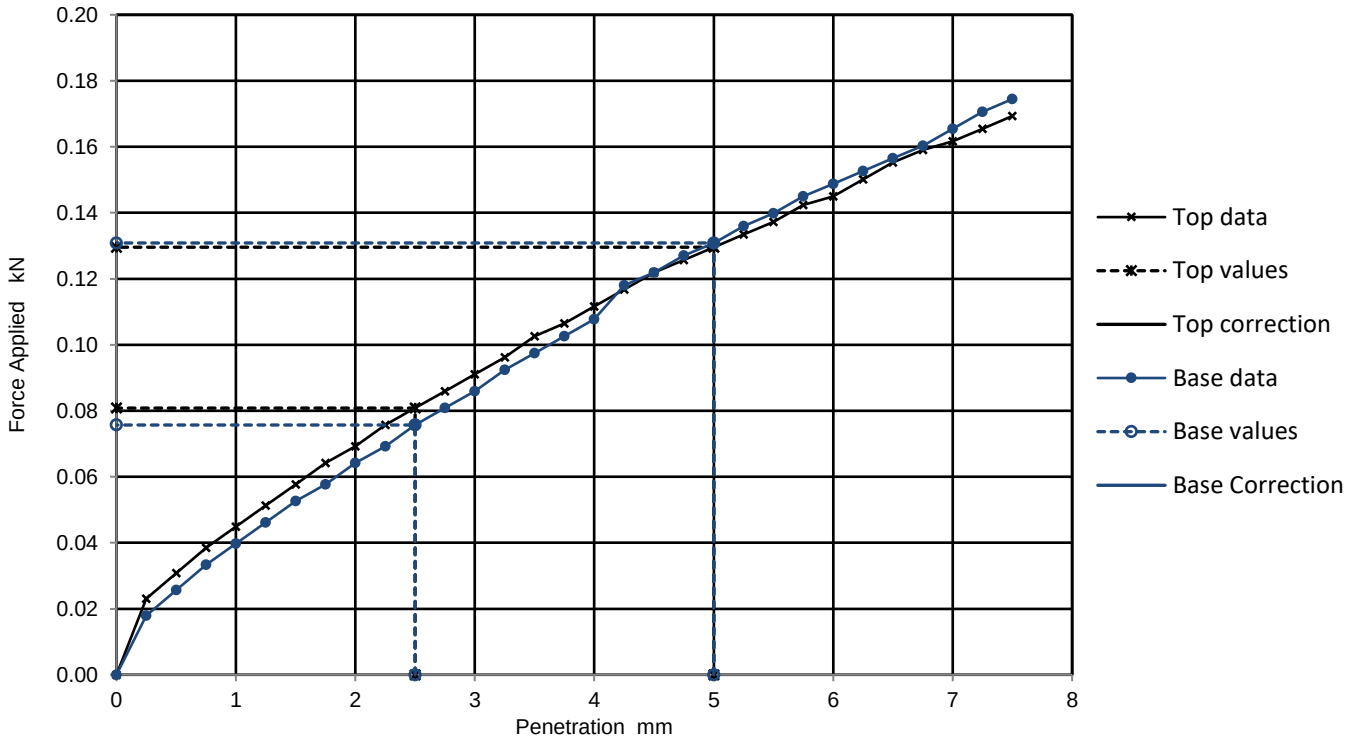
CAUSEWAY GEOTECH	**California Bearing Ratio (CBR)**			Job Ref	21-1682
				Borehole/Pit No.	TP-12595
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	4
Soil Description	Greyish brown sandy gravelly silty CLAY with some cobbles.			Depth m	3.50
Specimen Reference		Specimen Depth	m	Sample Type	B
Specimen Description	greyish brown sandy gravelly silty CLAY with some cobbles.			KeyLAB ID	Caus2022081533
Test Method	BS1377 : Part 4 : 1990, clause 7			CBR Test Number	1

Specimen Preparation

Condition	REMOULDED			Soaking details	Not soaked	
Details	Recompacted with specified standard effort using 2.5kg rammer			Period of soaking		days
				Time to surface		days
				Amount of swell recorded		mm
Material retained on 20mm sieve removed		19	%	Dry density after soaking		Mg/m3
Initial Specimen details	Bulk density	2.28	Mg/m3	Surcharge applied	4.5	kg
	Dry density	2.06	Mg/m3		3	kPa
	Moisture content	10.6	%			

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, %				Moisture Content %
		2.5mm	5mm	Highest	Average	
TOP	No	0.6	0.7	0.7	0.7	10.6
BASE	No	0.6	0.7	0.7		10.5

General remarks	Test specific remarks	Approved
Tested at natural moisture content.	Average result may be reported if within 10% of the mean CBR value of top and base.	Stephen.Watson

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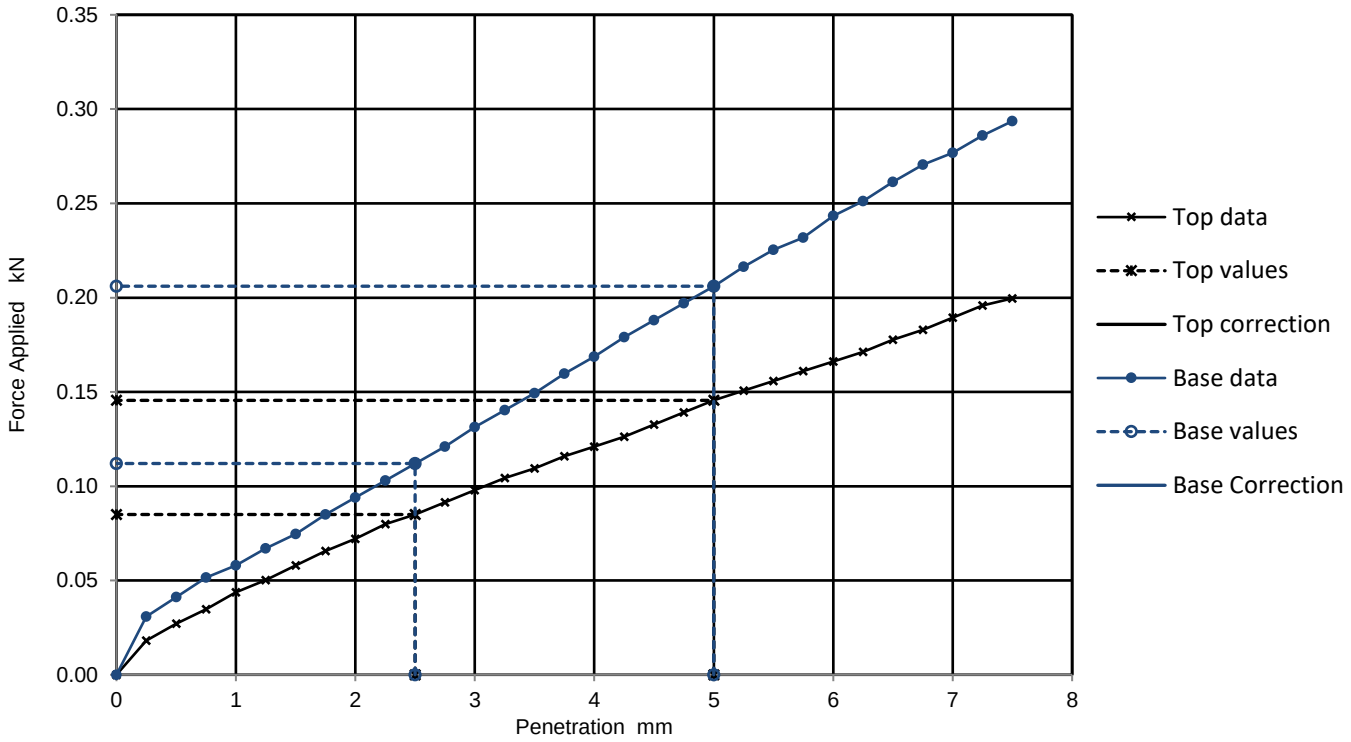
California Bearing Ratio (CBR)

				Job Ref	21-1682
				Borehole/Pit No.	TP-13605
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	4
Soil Description	Brown sandy gravelly silty CLAY.			Depth m	3.50
Specimen Reference		Specimen Depth	m	Sample Type	B
Specimen Description	Brown sandy gravelly silty CLAY.			KeyLAB ID	Caus20220815109
Test Method	BS1377 : Part 4 : 1990, clause 7			CBR Test Number	1

Specimen Preparation

Condition	REMOULDED			Soaking details	Not soaked	
Details	Recompacted with specified standard effort using 2.5kg rammer			Period of soaking		days
				Time to surface		days
				Amount of swell recorded		mm
Material retained on 20mm sieve removed		10	%	Dry density after soaking		Mg/m3
Initial Specimen details	Bulk density	2.29	Mg/m3	Surcharge applied	4.5	kg
	Dry density	2.08	Mg/m3		3	kPa
	Moisture content	10	%			

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, %				Moisture Content %
		2.5mm	5mm	Highest	Average	
TOP	No	0.6	0.7	0.7		10
BASE	No	0.9	1.0	1.0		10

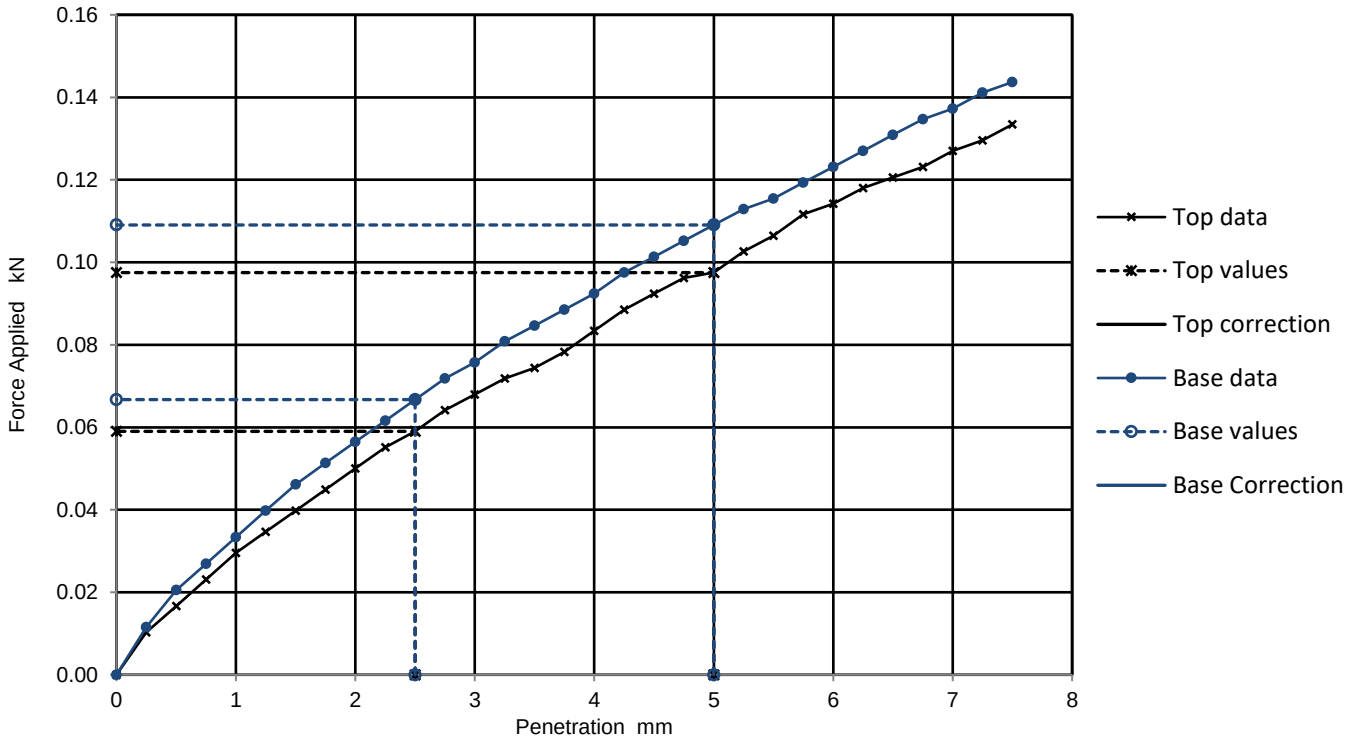
General remarks	Test specific remarks	Approved
Tested at natural moisture content.	Average result may be reported if within 10% of the mean CBR value of top and base.	Stephen.Watson

CAUSEWAY GEOTECH	**California Bearing Ratio (CBR)**			Job Ref	21-1682
				Borehole/Pit No.	TP-18187
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Soil Description	Grey sandy slightly gravelly silty CLAY.			Depth m	0.30
Specimen Reference		Specimen Depth	m	Sample Type	B
Specimen Description	Grey sandy slightly gravelly silty CLAY.			KeyLAB ID	Caus2022092819
Test Method	BS1377 : Part 4 : 1990, clause 7			CBR Test Number	1

Specimen Preparation

Condition	REMOULDED			Soaking details	Not soaked	
Details	Recompacted with specified standard effort using 2.5kg rammer			Period of soaking		days
				Time to surface		days
				Amount of swell recorded		mm
Material retained on 20mm sieve removed		7	%	Dry density after soaking		Mg/m3
Initial Specimen details	Bulk density	2.09	Mg/m3	Surcharge applied	4.5	kg
	Dry density	1.76	Mg/m3		3	kPa
	Moisture content	18.8	%			

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, %				Moisture Content %
		2.5mm	5mm	Highest	Average	
TOP	No	0.5	0.5	0.5	0.5	18.8
BASE	No	0.5	0.6	0.6		17.7

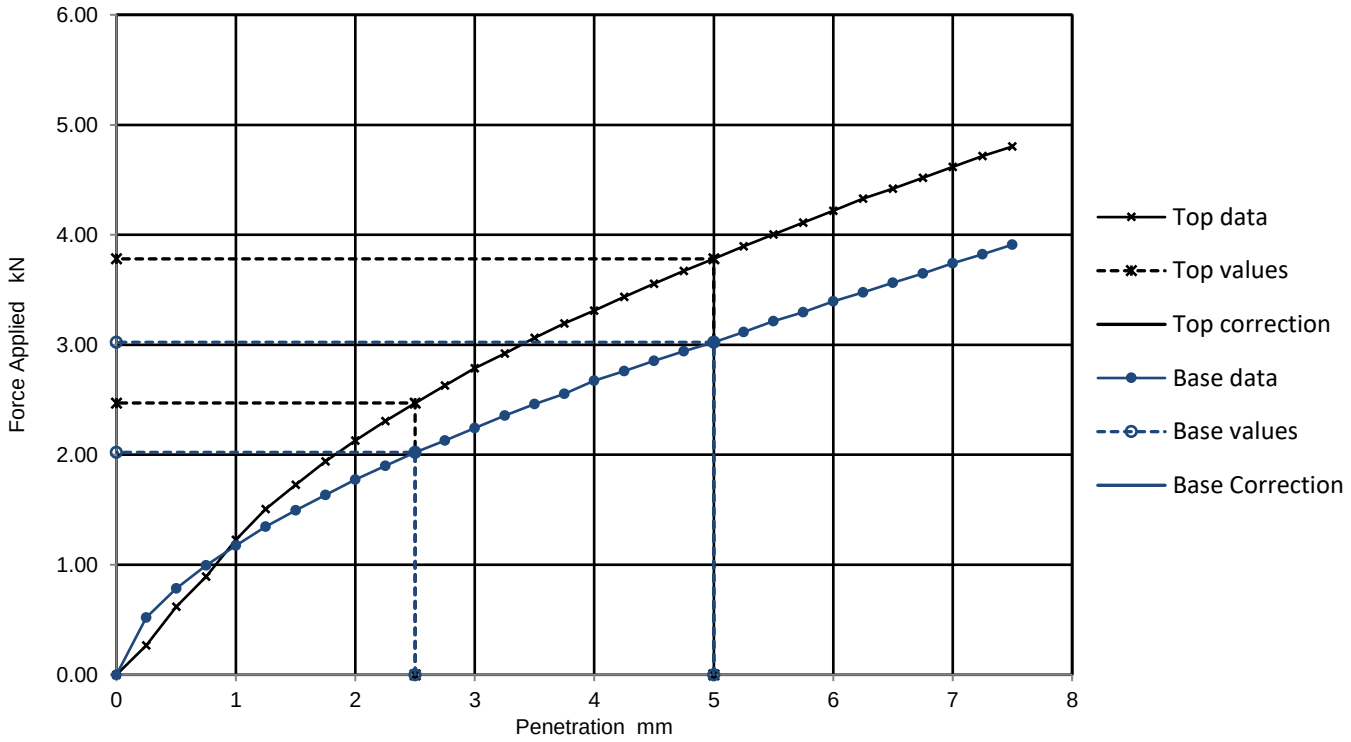
General remarks	Test specific remarks	Approved
Tested at natural moisture content.	Average result may be reported if within 10% of the mean CBR value of top and base	Stephen Watson

CAUSEWAY GEOTECH	**California Bearing Ratio (CBR)**			Job Ref	21-1682
				Borehole/Pit No.	TP-18906
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Soil Description	Brownish grey sandy gravelly silty CLAY.			Depth m	0.30
Specimen Reference		Specimen Depth	m	Sample Type	B
Specimen Description	Brownish grey sandy gravelly silty CLAY.			KeyLAB ID	Caus2022093086
Test Method	BS1377 : Part 4 : 1990, clause 7			CBR Test Number	1

Specimen Preparation

Condition	REMOULDED			Soaking details	Not soaked	
Details	Recompacted with specified standard effort using 2.5kg rammer			Period of soaking		days
				Time to surface		days
				Amount of swell recorded		mm
Material retained on 20mm sieve removed		15	%	Dry density after soaking		Mg/m3
Initial Specimen details	Bulk density	2.07	Mg/m3	Surcharge applied	4.5	kg
	Dry density	1.88	Mg/m3		3	kPa
	Moisture content	10.1	%			

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, %				Moisture Content %
		2.5mm	5mm	Highest	Average	
TOP	No	19.0	19.0	19.0		11.5
BASE	No	15.0	15.0	15.0		9.2

General remarks	Test specific remarks	Approved
Tested at natural moisture content.	Average result may be reported if within 10% of the mean CBR value of top and base.	Stephen Watson

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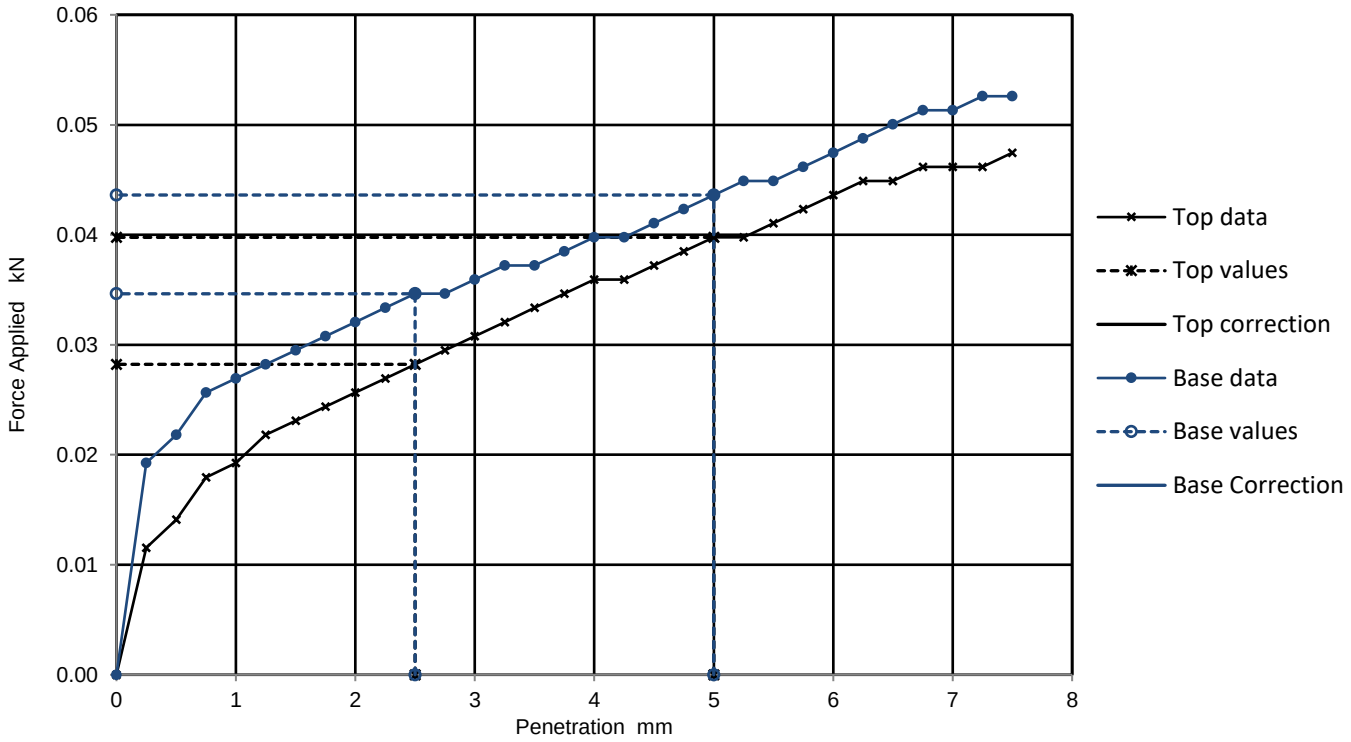
California Bearing Ratio (CBR)

				Job Ref	21-1682
				Borehole/Pit No.	TP-2007
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Soil Description	Brown sandy slightly gravelly silty CLAY.			Depth m	1.70
Specimen Reference		Specimen Depth	m	Sample Type	B
Specimen Description	Brown sandy slightly gravelly silty CLAY.			KeyLAB ID	Caus20220908127
Test Method	BS1377 : Part 4 : 1990, clause 7			CBR Test Number	1

Specimen Preparation

Condition	REMOULDED			Soaking details	Not soaked	
Details	Recompacted with specified standard effort using 2.5kg rammer			Period of soaking		days
				Time to surface		days
				Amount of swell recorded		mm
Material retained on 20mm sieve removed		4	%	Dry density after soaking		Mg/m3
Initial Specimen details	Bulk density	2.16	Mg/m3	Surcharge applied	4.5	kg
	Dry density	1.87	Mg/m3		3	kPa
	Moisture content	15.4	%			

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, %				Moisture Content %
		2.5mm	5mm	Highest	Average	
TOP	No	0.2	0.2	0.2		15.4
BASE	No	0.3	0.2	0.3		15.6

General remarks	Test specific remarks	Approved
Tested at natural moisture content	Average result may be reported if within 10% of the mean CBR value of top and base.	Stephen.Watson

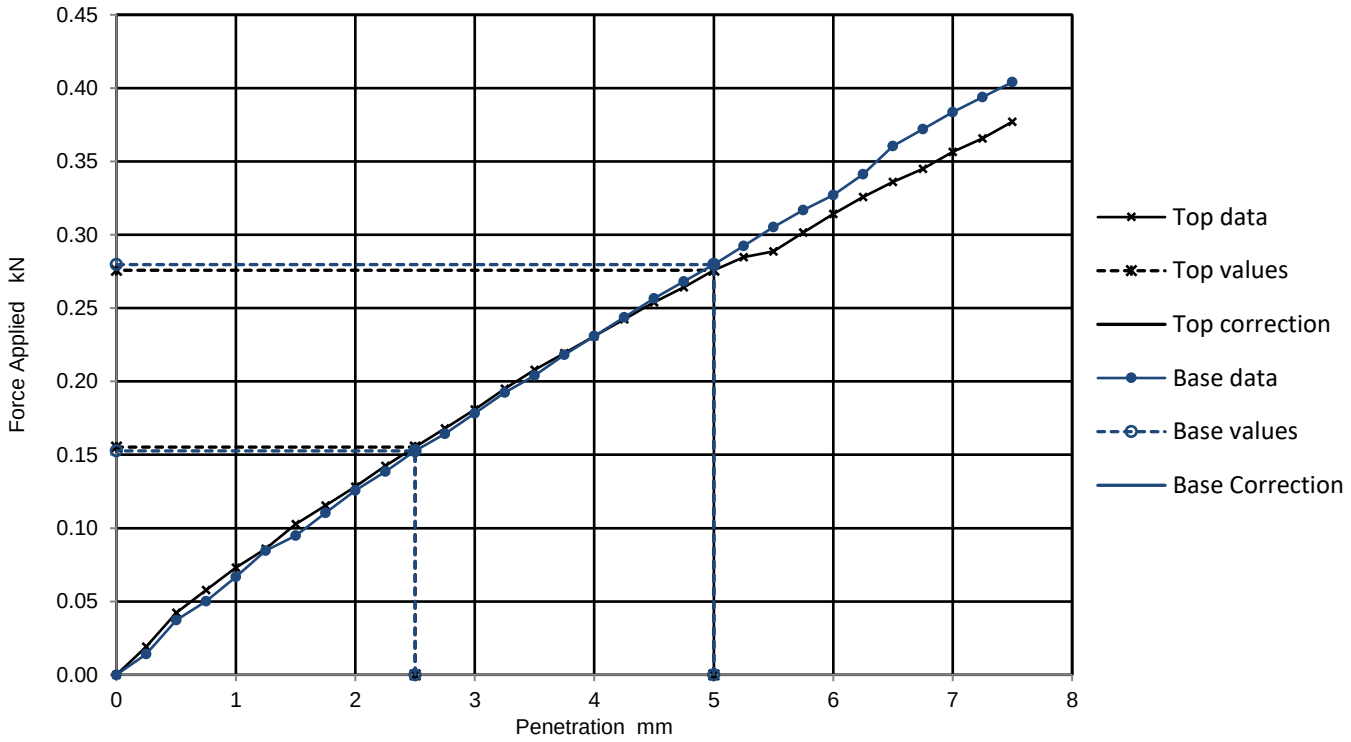
California Bearing Ratio (CBR)

				Job Ref	21-1682
				Borehole/Pit No.	TP-2349
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Soil Description	Brown sandy slightly gravelly silty CLAY.			Depth m	1.60
Specimen Reference		Specimen Depth	m	Sample Type	B
Specimen Description	Brown sandy slightly gravelly silty CLAY.			KeyLAB ID	Caus20220908133
Test Method	BS1377 : Part 4 : 1990, clause 7			CBR Test Number	1

Specimen Preparation

Condition	REMOULDED			Soaking details	Not soaked	
Details	Recompacted with specified standard effort using 2.5kg rammer			Period of soaking		days
				Time to surface		days
				Amount of swell recorded		mm
Material retained on 20mm sieve removed		3	%	Dry density after soaking		Mg/m3
Initial Specimen details	Bulk density	2.22	Mg/m3	Surcharge applied	4.5	kg
	Dry density	1.96	Mg/m3		3	kPa
	Moisture content	13.5	%			

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, %				Moisture Content %
		2.5mm	5mm	Highest	Average	
TOP	No	1.2	1.4	1.4	1.4	13.5
BASE	No	1.2	1.4	1.4		13.1

General remarks	Test specific remarks	Approved
Tested at natural moisture content.	Average result may be reported if within 10% of the mean CBR value of top and base.	Stephen.Watson

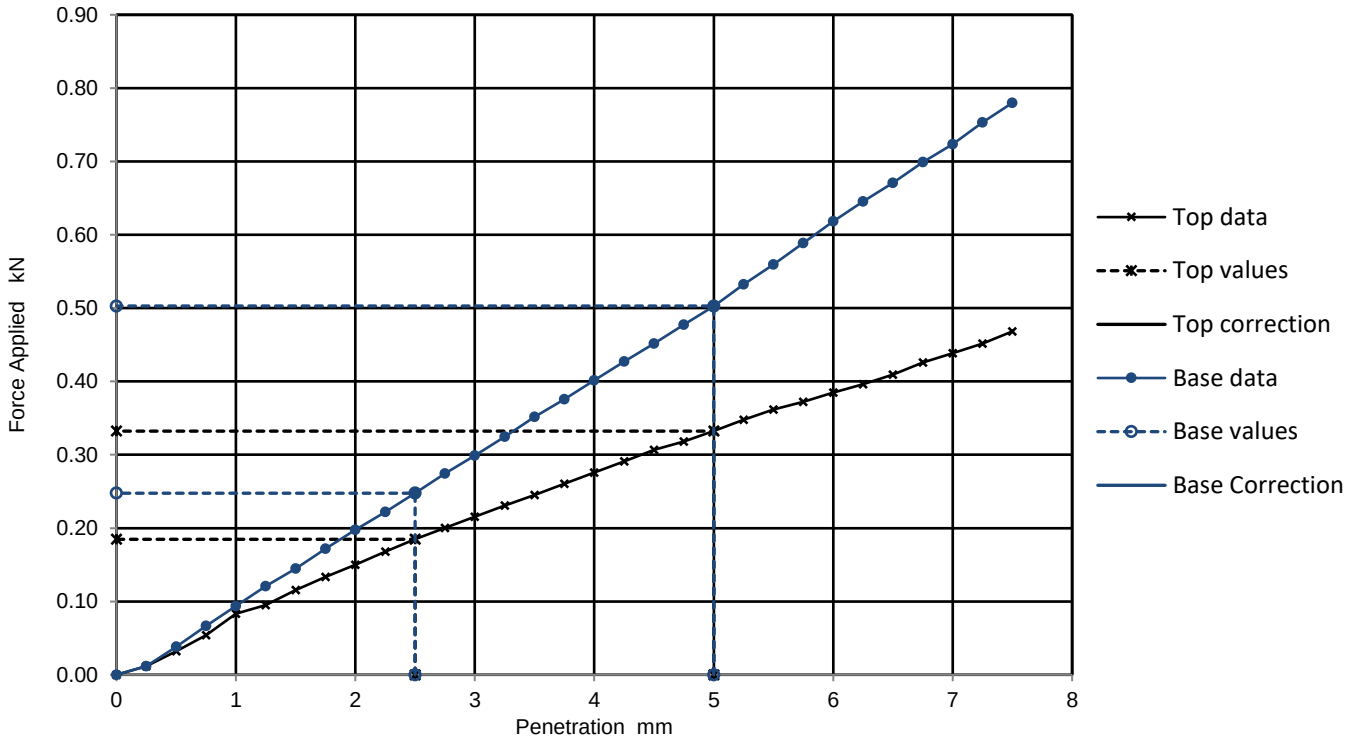
California Bearing Ratio (CBR)

				Job Ref	21-1682
				Borehole/Pit No.	TP-23810
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Soil Description	Brownish grey sandy gravelly silty CLAY with cobbles.			Depth m	0.25
Specimen Reference		Specimen Depth	m	Sample Type	B
Specimen Description	Brownish grey sandy gravelly silty CLAY with cobbles.			KeyLAB ID	Caus2022093099
Test Method	BS1377 : Part 4 : 1990, clause 7			CBR Test Number	1

Specimen Preparation

Condition	REMOULDED			Soaking details	Not soaked	
Details	Recompacted with specified standard effort using 2.5kg rammer			Period of soaking		days
				Time to surface		days
				Amount of swell recorded		mm
Material retained on 20mm sieve removed		36	%	Dry density after soaking		Mg/m3
Initial Specimen details	Bulk density	2.24	Mg/m3	Surcharge applied	4.5	kg
	Dry density	2.03	Mg/m3		3	kPa
	Moisture content	10.5	%			

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, %				Moisture Content %
		2.5mm	5mm	Highest	Average	
TOP	No	1.4	1.7	1.7		10.4
BASE	No	1.9	2.5	2.5		10.7

General remarks	Test specific remarks	Approved
Tested at natural moisture content.	Average result may be reported if within 10% of the mean CBR value of top and base.	Stephen Watson

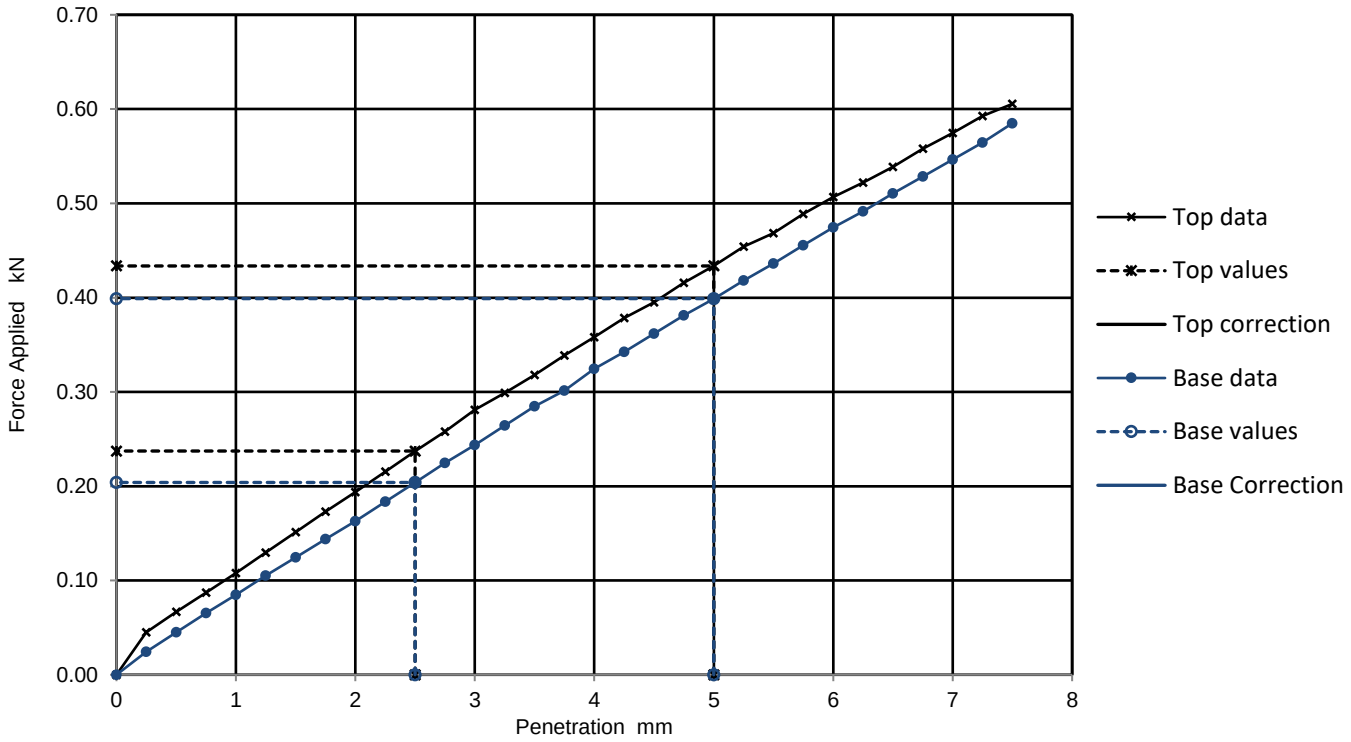
California Bearing Ratio (CBR)

				Job Ref	21-1682
				Borehole/Pit No.	TP-25504
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Soil Description	Brownish grey sandy gravelly silty CLAY.			Depth m	0.40
Specimen Reference		Specimen Depth	m	Sample Type	D
Specimen Description	Brownish grey sandy gravelly silty CLAY.			KeyLAB ID	Caus20220930105
Test Method	BS1377 : Part 4 : 1990, clause 7			CBR Test Number	1

Specimen Preparation

Condition	REMOULDED			Soaking details	Not soaked	
Details	Recompacted with specified standard effort using 2.5kg rammer			Period of soaking		days
				Time to surface		days
				Amount of swell recorded		mm
Material retained on 20mm sieve removed		5	%	Dry density after soaking		Mg/m3
Initial Specimen details	Bulk density	2.06	Mg/m3	Surcharge applied	4.5	kg
	Dry density	1.76	Mg/m3		3	kPa
	Moisture content	16.9	%			

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, %				Moisture Content %
		2.5mm	5mm	Highest	Average	
TOP	No	1.8	2.2	2.2	2.1	16.8
BASE	No	1.5	2.0	2.0		17.2

General remarks	Test specific remarks	Approved
Tested at natural moisture content.	Average result may be reported if within 10% of the mean CBR value of top and base.	Stephen Watson

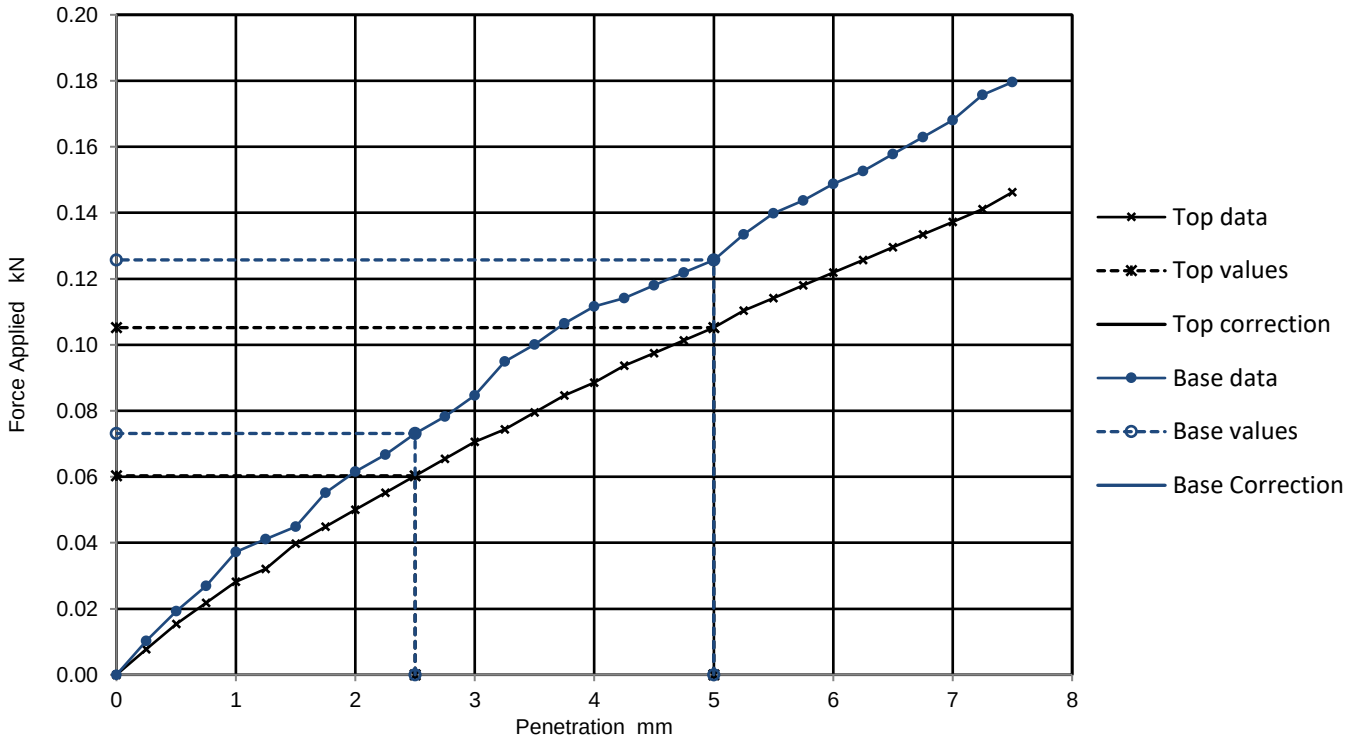
California Bearing Ratio (CBR)

				Job Ref	21-1682
				Borehole/Pit No.	TP-2701
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Soil Description	Brown sandy slightly gravelly silty CLAY.			Depth m	0.20
Specimen Reference		Specimen Depth	m	Sample Type	B
Specimen Description	Brown sandy slightly gravelly silty CLAY.			KeyLAB ID	Caus20220908135
Test Method	BS1377 : Part 4 : 1990, clause 7			CBR Test Number	1

Specimen Preparation

Condition	REMOULDED			Soaking details	Not soaked	
Details	Recompacted with specified standard effort using 2.5kg rammer			Period of soaking		days
				Time to surface		days
				Amount of swell recorded		mm
Material retained on 20mm sieve removed		8	%	Dry density after soaking		Mg/m3
Initial Specimen details	Bulk density	2.14	Mg/m3	Surcharge applied	4.5	kg
	Dry density	1.84	Mg/m3		3	kPa
	Moisture content	16.1	%			

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, %				Moisture Content %
		2.5mm	5mm	Highest	Average	
TOP	No	0.5	0.5	0.5	0.6	16.1
BASE	No	0.6	0.6	0.6		15.6

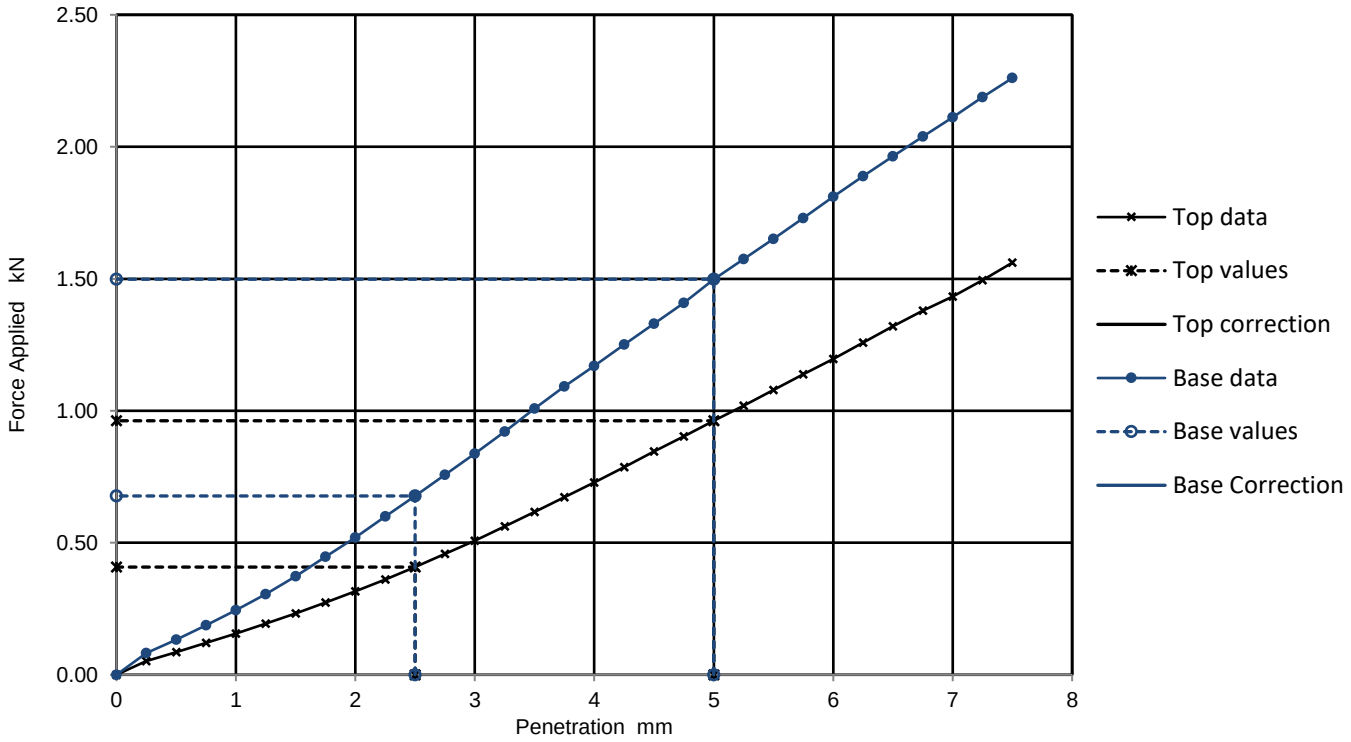
General remarks	Test specific remarks	Approved
Tested at natural moisture content.	Average result may be reported if within 10% of the mean CBR value of top and base.	Stephen.Watson

CAUSEWAY GEOTECH	**California Bearing Ratio (CBR)**			Job Ref	21-1682
				Borehole/Pit No.	TP-30103
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	4
Soil Description	Brown sandy gravelly silty CLAY.			Depth m	3.40
Specimen Reference		Specimen Depth	m	Sample Type	B
Specimen Description	Brown sandy gravelly silty CLAY.			KeyLAB ID	Caus20220815116
Test Method	BS1377 : Part 4 : 1990, clause 7			CBR Test Number	1

Specimen Preparation

Condition	REMOULDED			Soaking details	Not soaked	
Details	Recompacted with specified standard effort using 2.5kg rammer			Period of soaking		days
				Time to surface		days
				Amount of swell recorded		mm
Material retained on 20mm sieve removed		17	%	Dry density after soaking		Mg/m3
Initial Specimen details	Bulk density	2.23	Mg/m3	Surcharge applied	4.5	kg
	Dry density	2.02	Mg/m3		3	kPa
	Moisture content	10.3	%			

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, %				Moisture Content %
		2.5mm	5mm	Highest	Average	
TOP	No	3.1	4.8	4.8		10.3
BASE	No	5.1	7.5	7.5		10.1

General remarks	Test specific remarks	Approved
Tested at natural moisture content.	Average result may be reported if within 10% of the mean CBR value of top and base.	Stephen.Watson

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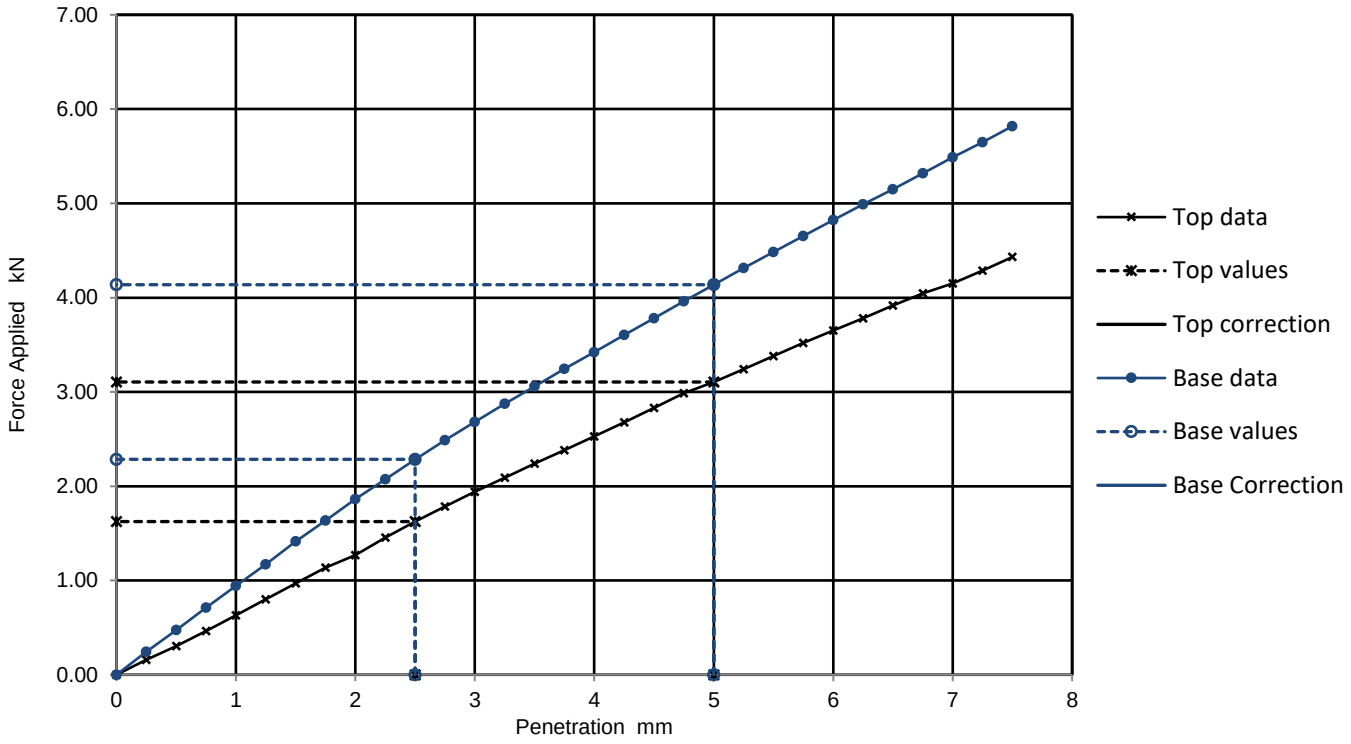
CAUSEWAY GEOTECH	**California Bearing Ratio (CBR)**			Job Ref	21-1682
				Borehole/Pit No.	TP-30602
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Soil Description	Brown sandy gravelly silty CLAY.			Depth m	2.20
Specimen Reference		Specimen Depth	m	Sample Type	B
Specimen Description	Brown sandy gravelly silty CLAY.			KeyLAB ID	Caus20220815137
Test Method	BS1377 : Part 4 : 1990, clause 7			CBR Test Number	1

Specimen Preparation

Condition	REMOULDED			Soaking details	Not soaked	
Details	Recompacted with specified standard effort using 2.5kg rammer			Period of soaking		days
				Time to surface		days
				Amount of swell recorded		mm
Material retained on 20mm sieve removed		21	%	Dry density after soaking		Mg/m3
Initial Specimen details	Bulk density	2.26	Mg/m3	Surcharge applied	4.5	kg
	Dry density	2.09	Mg/m3		3	kPa
	Moisture content	7.9	%			

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, %				Moisture Content %
		2.5mm	5mm	Highest	Average	
TOP	No	12.0	16.0	16.0		7.9
BASE	No	17.0	21.0	21.0		7.6

General remarks	Test specific remarks	Approved
Tested at natural moisture content.	Average result may be reported if within 10% of the mean CBR value of top and base.	Stephen.Watson

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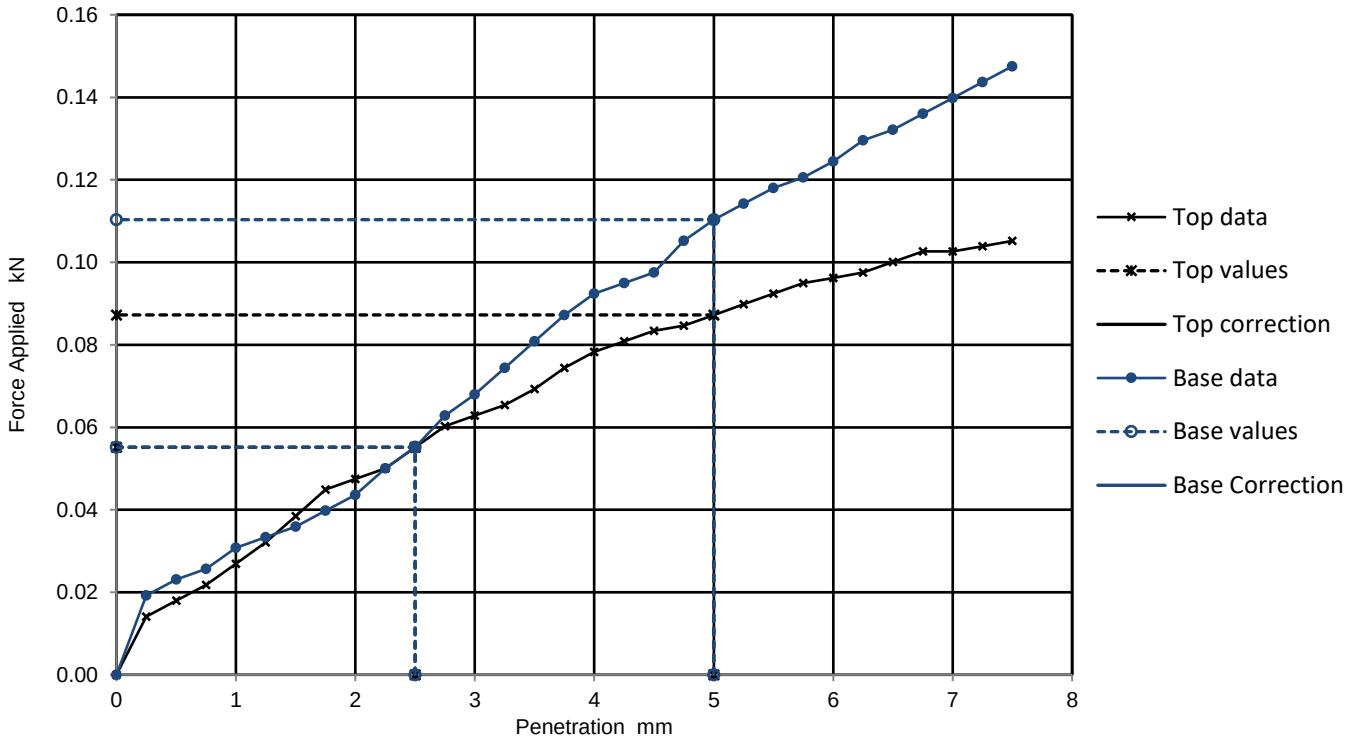
CAUSEWAY GEOTECH	**California Bearing Ratio (CBR)**			Job Ref	21-1682
				Borehole/Pit No.	TP-31002
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Soil Description	Brown sandy slightly gravelly silty CLAY.			Depth m	0.25
Specimen Reference		Specimen Depth	m	Sample Type	B
Specimen Description	Brown sandy slightly gravelly silty CLAY.			KeyLAB ID	Caus20220930146
Test Method	BS1377 : Part 4 : 1990, clause 7			CBR Test Number	1

Specimen Preparation

Condition	REMOULDED			Soaking details	Not soaked	
Details	Recompacted with specified standard effort using 2.5kg rammer			Period of soaking		days
				Time to surface		days
				Amount of swell recorded		mm
Material retained on 20mm sieve removed		14	%	Dry density after soaking		Mg/m3
Initial Specimen details	Bulk density	2.25	Mg/m3	Surcharge applied	4.5	kg
	Dry density	2.03	Mg/m3		3	kPa
	Moisture content	10.7	%			

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, %				Moisture Content %
		2.5mm	5mm	Highest	Average	
TOP	No	0.4	0.4	0.4		11.4
BASE	No	0.4	0.6	0.6		10.6

General remarks	Test specific remarks	Approved
Tested at natural moisture content.	Average result may be reported if within 10% of the mean CBR value of top and base.	Stephen Watson

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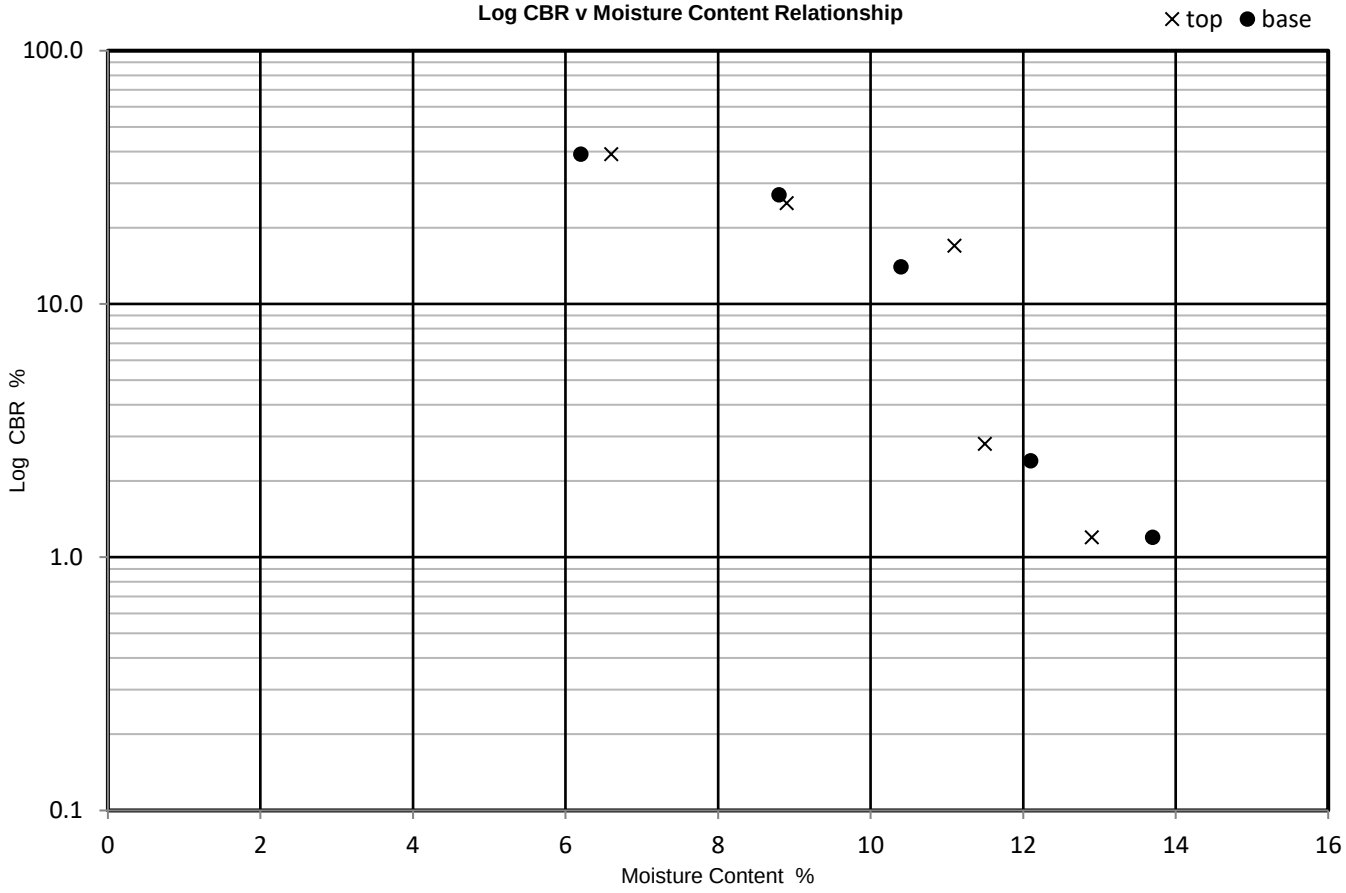
CAUSEWAY GEOTECH	**California Bearing Ratio (CBR)** **CBR v Moisture Content Relationship**	Job Ref	21-1682
		Borehole/Pit No.	BH-30066
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	Sample No.	4
Soil Description	Brown sandy slightly gravelly silty CLAY.	Depth m	3
Test Method	BS1377 : Part 4 : 1990, clause 7	Sample Type	B
Preparation details	Recompacted with specified standard effort using 2.5kg rammer	KeyLAB ID	Caus202206104

Specimens listed in ascending order of initial moisture content

Spec Ref	Bulk density Mg/m^3	Dry density Mg/m^3	Moisture Content			CBR Value		Swell if soaked mm	Surcharge kPa	Remarks
			Initial %	Top %	Base %	Top %	Base %			
1	1.95	1.83	6.6	6.6	6.2	39.0	39.0		3	
2	2.00	1.84	8.9	8.9	8.8	25.0	27.0		3	
3	2.14	1.93	11.1	11.1	10.4	17.0	14.0		3	
4	2.21	1.98	11.5	11.5	12.1	2.8	2.4		3	
5	2.17	1.92	12.9	12.9	13.7	1.2	1.2		3	

Log CBR v Moisture Content Relationship



General Remarks

Approved
Stephen.Watson

1

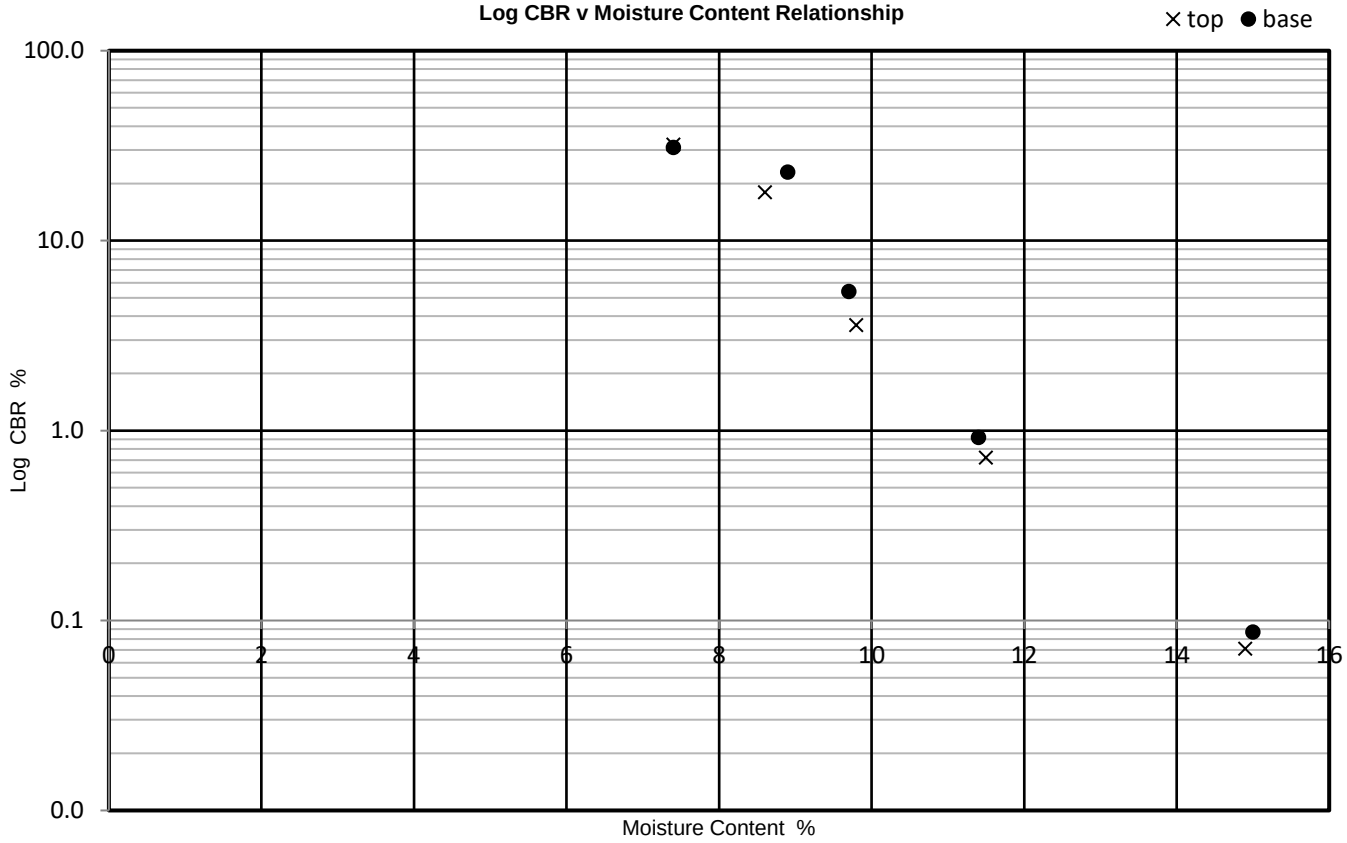
1

CAUSEWAY GEOTECH	**California Bearing Ratio (CBR)** **CBR v Moisture Content Relationship**	Job Ref	21-1682
		Borehole/Pit No.	TP-5303
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only	Sample No.	4
Soil Description	Brownish grey sandy slightly gravelly silty CLAY.	Depth m	2.3
Test Method	BS1377 : Part 4 : 1990, clause 7	Sample Type	B
Preparation details	Recompacted with specified standard effort using 2.5kg rammer	KeyLAB ID	Caus2022090540

Specimens listed in ascending order of initial moisture content

Spec Ref	Bulk density	Dry density	Moisture Content			CBR Value		Swell if soaked	Surcharge	Remarks
			Initial	Top	Base	Top	Base			
	Mg/m3	Mg/m3	%	%	%	%	%	mm	kPa	
1	2.12	1.97	7.4	7.4	7.4	32.0	31.0		3	
2	2.23	2.05	8.6	8.6	8.9	18.0	23.0		3	
3	2.21	2.01	9.7	9.8	9.7	3.6	5.4		3	
4	2.19	1.96	11.5	11.5	11.4	0.7	0.9		3	
5	2.16	1.88	14.9	14.9	15.0	0.1	0.1		3	

Log CBR v Moisture Content Relationship



General Remarks

Approved
Stephen.Watson

1

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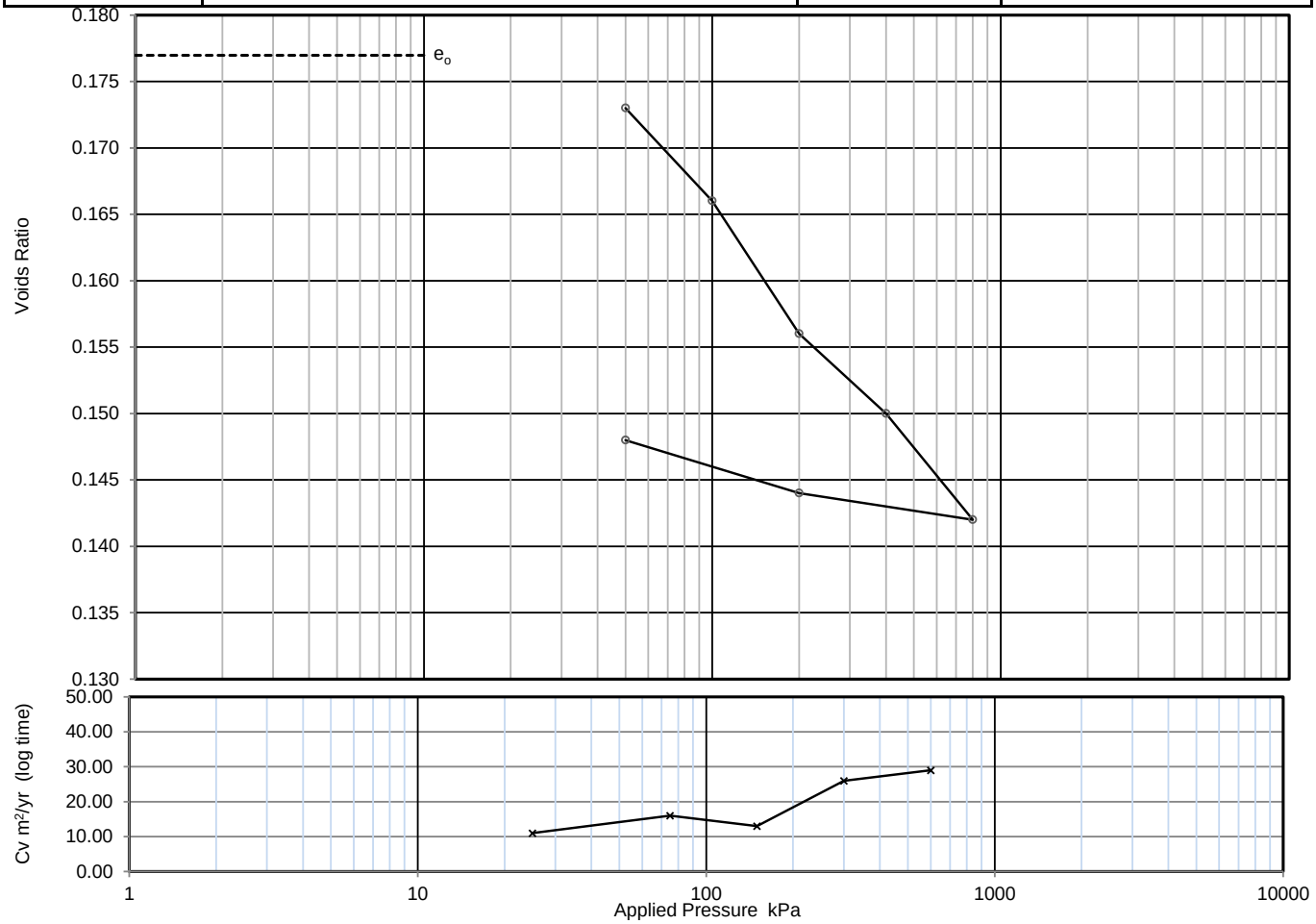
CAUSEWAY GEOTECH	ONE DIMENSIONAL CONSOLIDATION TEST BS1377:Part 5:1990, clause 3				Job Ref		21-1682
					Borehole/Pit No.		BH-13100
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		1
Soil Description	Brownish grey sandy gravelly silty CLAY.				Sample Depth (m)	Top	4.30
						Bottom	4.55
Specimen Reference	2	Specimen Depth	4.3	m	Sample Type		C
Specimen Description	Brownish grey sandy gravelly silty CLAY.				KeyLAB ID		Caus202210203
Test Method	BS1377:Part 5:1990, clause 3				Date started		01/11/2022



Applied Pressure kPa	Voids ratio	Mv m2/MN	Cv (t50, log) m2/yr	Cv (t90, root) m2/yr	Csec
0.0	0.177	-	-	-	-
50	0.173	0.071	11	27	0.00025
100	0.166	0.12	16	46	0.00034
200	0.156	0.08	13	50	0.00029
400	0.150	0.027	26	50	0.00041
800	0.142	0.018	29	50	0.00059
200	0.144	0.0033			
50	0.148	0.023			

Preparation

Particle density assumed 2.65 Mg/m3

Specimen details	Initial	Final	
Diameter	75.00	-	mm
Height	19.80	19.31	mm
Moisture Content	7.6	8.0	%
Bulk density	2.42	2.49	Mg/m3
Dry density	2.25	2.31	Mg/m3
Voids Ratio	0.177	0.148	
Saturation	114	144	%
Average temperature for test	20.0		oC
Swelling Pressure			kPa
Settlement on saturation			%

Remarks

Final values should be used with caution

Cv plotted at mid point of load increments

Cv corrected to 20oC

Approved

Administrator

Printed :

17/11/2022 18:02

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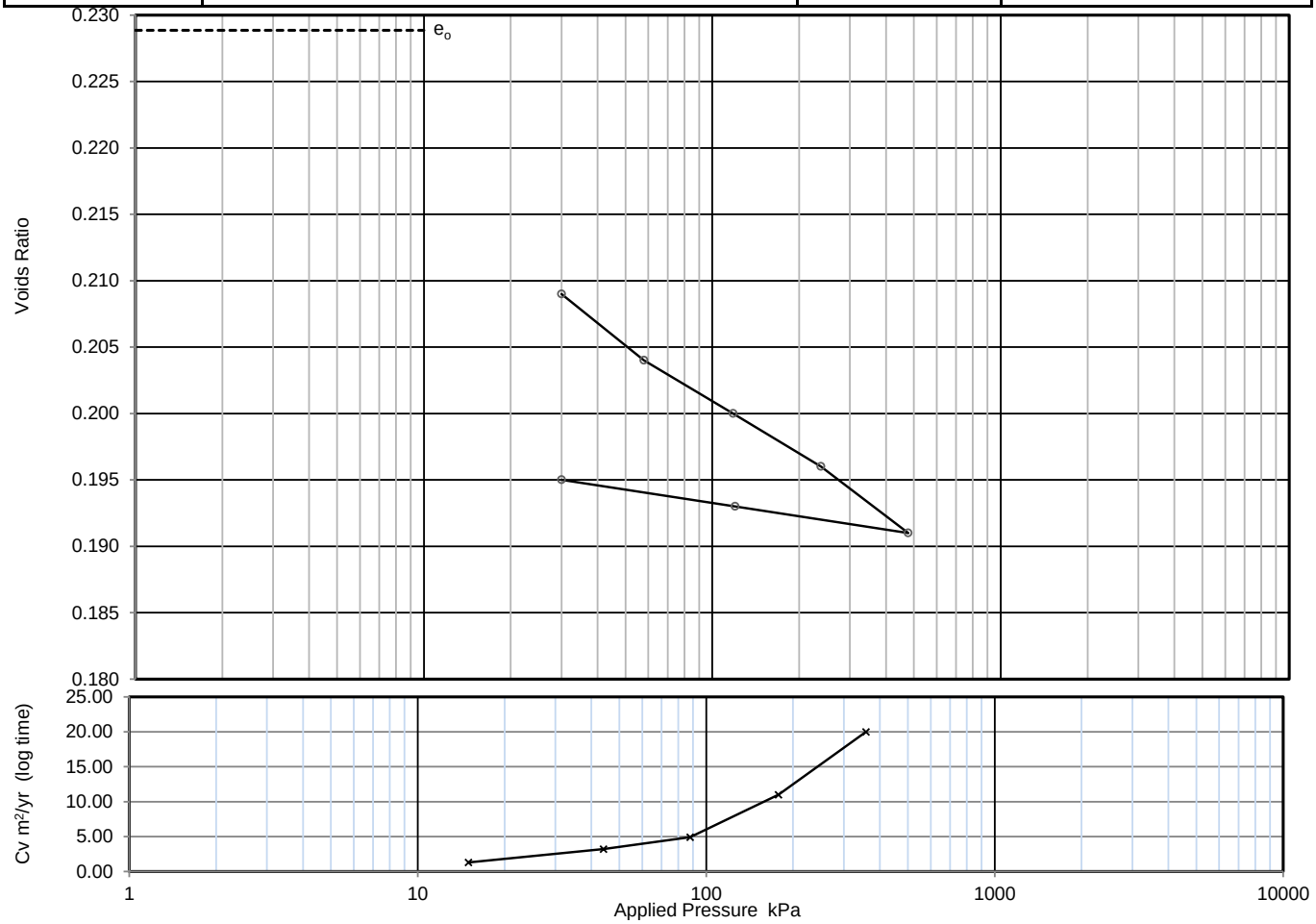
CAUSEWAY GEOTECH	**ONE DIMENSIONAL CONSOLIDATION TEST BS1377:Part 5:1990, clause 3**			Job Ref	21-1682
				Borehole/Pit No.	BH-1922
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	13
Soil Description	Greyish brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	1.20
				Bottom	1.65
Specimen Reference	5	Specimen Depth	1.25 m	Sample Type	U
Specimen Description	Greyish brown sandy slightly gravelly silty CLAY.			KeyLAB ID	Caus2022062111
Test Method	BS1377:Part 5:1990, clause 3			Date started	29/06/2022



Applied Pressure kPa	Voids ratio	Mv m2/MN	Cv (t50, log) m2/yr	Cv (t90, root) m2/yr	Csec
0.0	0.229	-	-	-	-
30	0.209	0.53	1.3	1.1	0.0014
58	0.204	0.17	3.2	4.9	0.000072
118	0.200	0.052	4.9	5.3	0.0002
238	0.196	0.028	11	30	0.00016
478	0.191	0.015	20	56	0.00027
120	0.193	0.0046			
30	0.195	0.011			

Preparation

Particle density assumed 2.65 Mg/m3

Specimen details	Initial	Final	
Diameter	75.00	-	mm
Height	20.00	19.44	mm
Moisture Content	11.0	10.1	%
Bulk density	2.39	2.44	Mg/m3
Dry density	2.16	2.22	Mg/m3
Voids Ratio	0.229	0.195	
Saturation	128	137	%
Average temperature for test	20.0		oC
Swelling Pressure			kPa
Settlement on saturation			%
Remarks			

Final values should be used with caution

Cv plotted at mid point of load increments

Cv corrected to 20oC

Approved: Stephen.Watson

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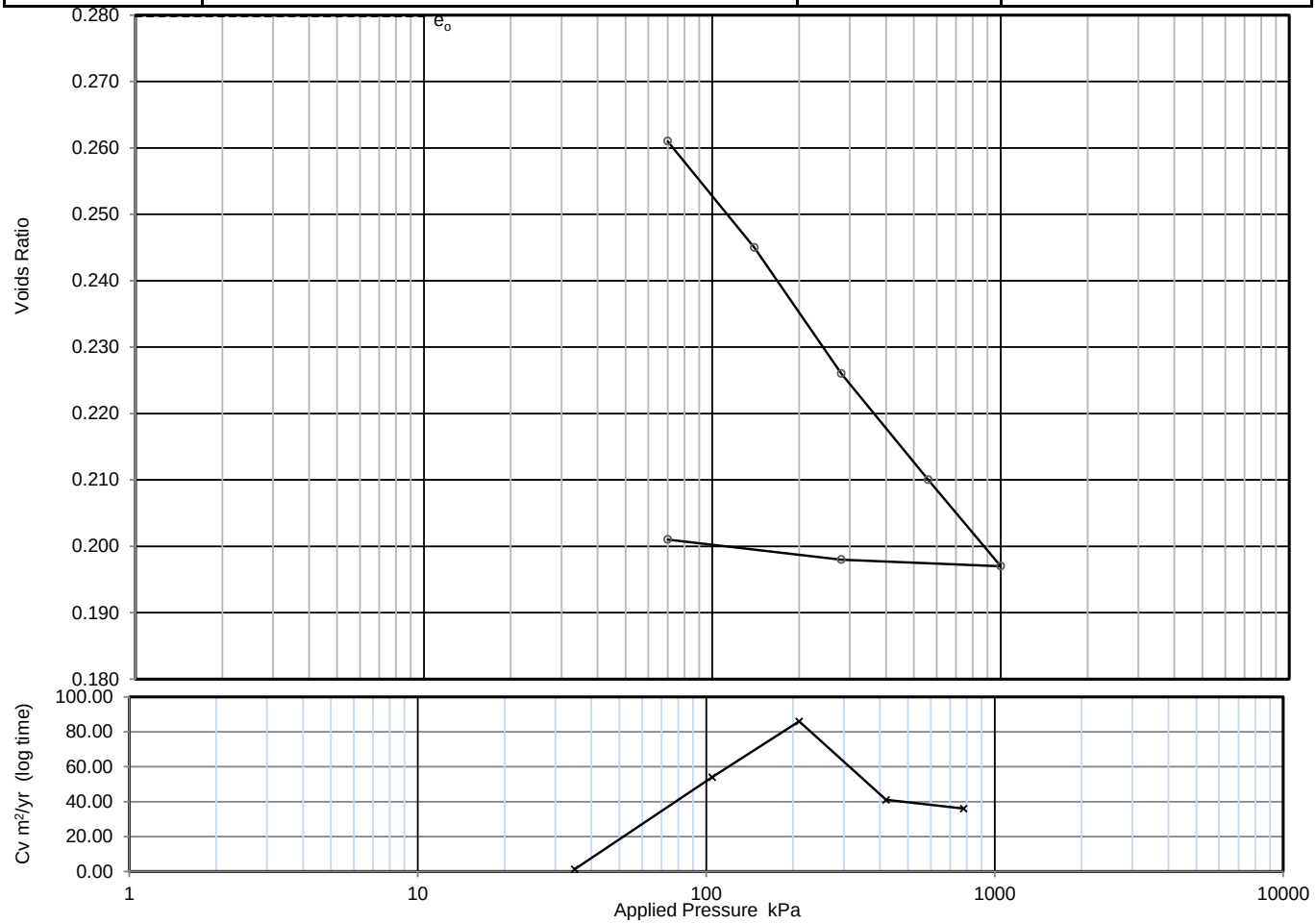
CAUSEWAY GEOTECH	ONE DIMENSIONAL CONSOLIDATION TEST BS1377:Part 5:1990, clause 3				Job Ref		21-1682
					Borehole/Pit No.		BH-2247
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		3
Soil Description	Brownish grey sandy gravelly silty CLAY.				Sample Depth (m)	Top	9.75
						Bottom	9.9
Specimen Reference	2	Specimen Depth	9.75	m	Sample Type		C
Specimen Description	Brownish grey sandy gravelly silty CLAY.				KeyLAB ID		Caus2022082555
Test Method	BS1377:Part 5:1990, clause 3				Date started		25/08/2022



Applied Pressure kPa	Voids ratio	Mv m2/MN	Cv (t50, log) m2/yr	Cv (t90, root) m2/yr	Csec
0.0	0.280	-	-	-	-
70	0.261	0.21	1.3	0.81	0.00078
140	0.245	0.19	54	91	0.00056
280	0.226	0.11	86	130	0.00055
560	0.210	0.047	41	70	0.00056
1,000	0.197	0.024	36	210	0.00069
280	0.198	0.0013			
70	0.201	0.012			

Preparation

Particle density assumed 2.65 Mg/m3

Specimen details	Initial	Final	
Diameter	75.00	-	mm
Height	20.00	18.77	mm
Moisture Content	8.0	11.1	%
Bulk density	2.24	2.45	Mg/m3
Dry density	2.07	2.21	Mg/m3
Voids Ratio	0.280	0.201	
Saturation	76	146	%
Average temperature for test	20.0		oC
Swelling Pressure			kPa
Settlement on saturation			%
Remarks			

Final values should be used with caution

Cv plotted at mid point of load increments

Cv corrected to 20oC

Approved: Stephen.Watson

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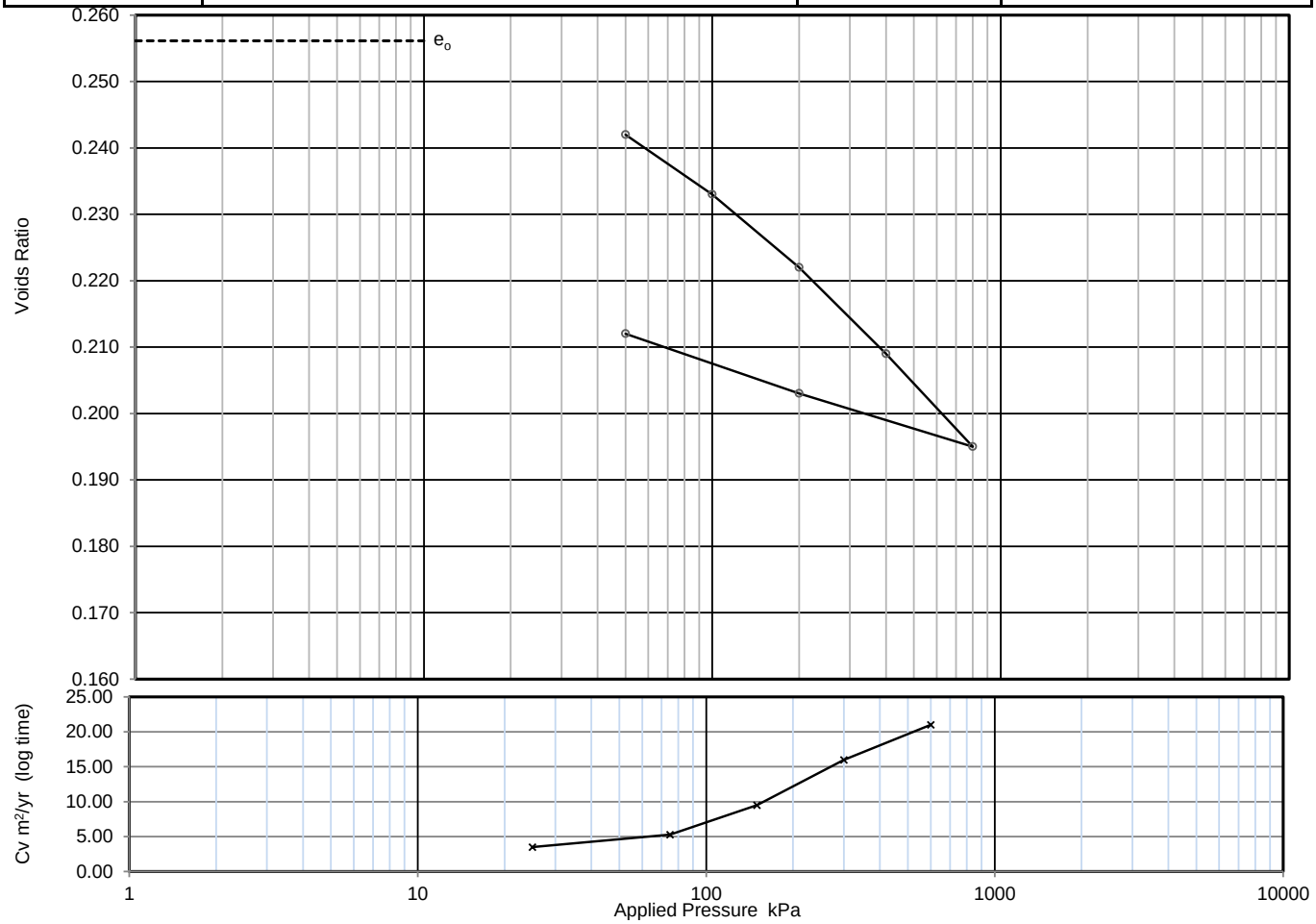
CAUSEWAY GEOTECH	ONE DIMENSIONAL CONSOLIDATION TEST BS1377:Part 5:1990, clause 3				Job Ref		21-1682
					Borehole/Pit No.		BH-2461
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		15
Soil Description	Brownish grey sandy gravelly silty CLAY.				Sample Depth (m)	Top	5.00
						Bottom	5.45
Specimen Reference	1	Specimen Depth	5.05	m	Sample Type		U
Specimen Description	Brownish grey sandy gravelly silty CLAY.				KeyLAB ID		Caus202208050
Test Method	BS1377:Part 5:1990, clause 3				Date started		08/08/2022



Applied Pressure kPa	Voids ratio	Mv m2/MN	Cv (t50, log) m2/yr	Cv (t90, root) m2/yr	Csec
0.0	0.256	-	-	-	-
50	0.242	0.22	3.5	5.2	0.00052
100	0.233	0.15	5.3	24	0.00036
200	0.222	0.09	9.5	35	0.00034
400	0.209	0.052	16	36	0.00036
800	0.195	0.029	21	39	0.0004
200	0.203	0.011			
50	0.212	0.052			

Preparation

Particle density assumed 2.65 Mg/m3

Specimen details	Initial	Final	
Diameter	75.00	-	mm
Height	19.90	19.21	mm
Moisture Content	11.0	10.0	%
Bulk density	2.34	2.40	Mg/m3
Dry density	2.11	2.19	Mg/m3
Voids Ratio	0.256	0.212	
Saturation	114	125	%
Average temperature for test	20.0		oC
Swelling Pressure			kPa
Settlement on saturation			%
Remarks			

Final values should be used with caution

Cv plotted at mid point of load increments

Cv corrected to 20oC

Approved: Stephen.Watson

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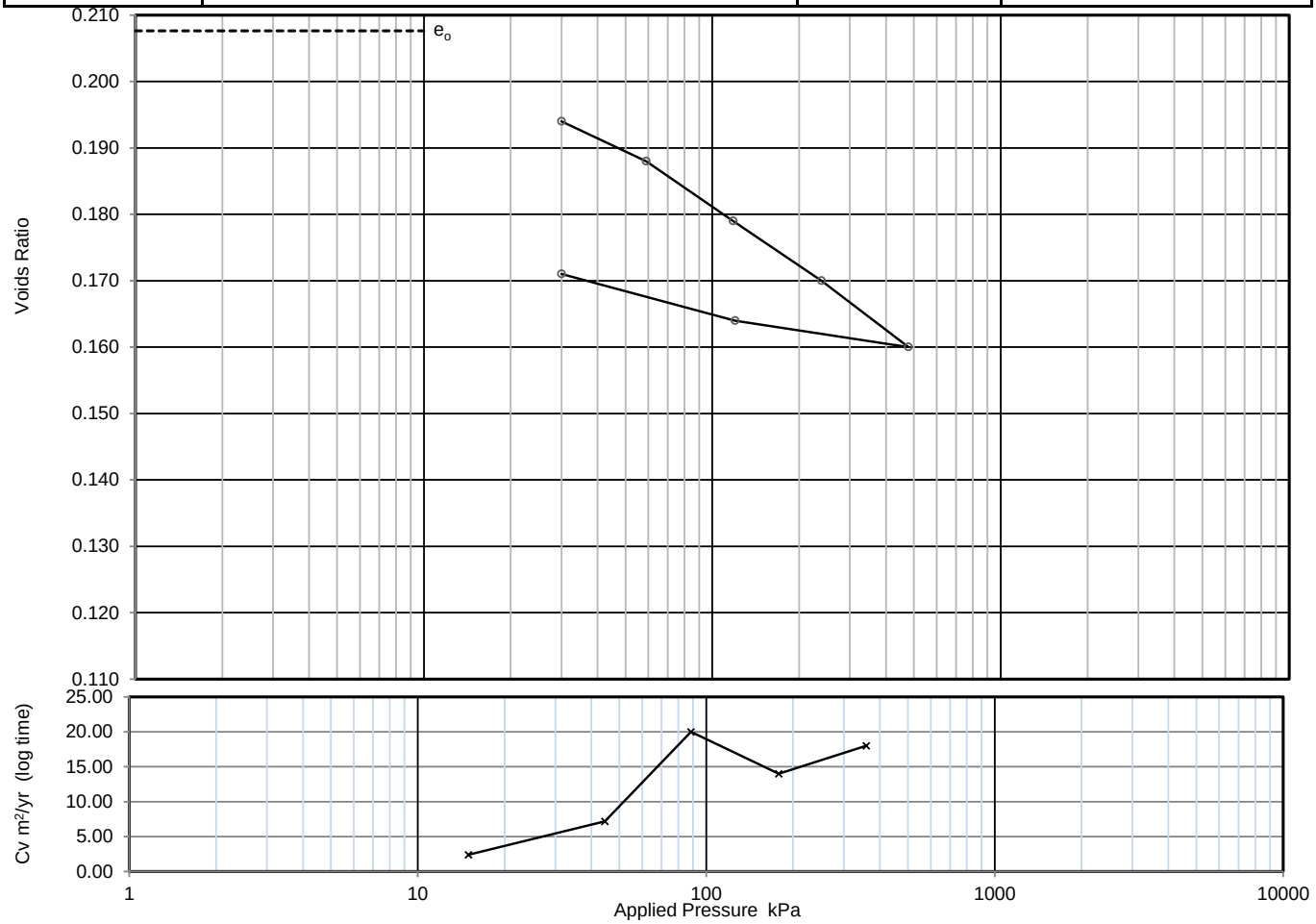
CAUSEWAY GEOTECH	**ONE DIMENSIONAL CONSOLIDATION TEST BS1377:Part 5:1990, clause 3**			Job Ref	21-1682
				Borehole/Pit No.	BH-27602
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	11
Soil Description	Greyish brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	1.20
				Bottom	
Specimen Reference	5	Specimen Depth	1.25 m	Sample Type	U
Specimen Description	Greyish brown sandy slightly gravelly silty CLAY.			KeyLAB ID	Caus2022062126
Test Method	BS1377:Part 5:1990, clause 3			Date started	29/06/2022



Applied Pressure kPa	Voids ratio	Mv m2/MN	Cv (t50, log) m2/yr	Cv (t90, root) m2/yr	Csec
0.0	0.208	-	-	-	-
30	0.194	0.39	2.4	2.7	0.00055
59	0.188	0.18	7.2	100	0.00039
118	0.179	0.12	20	260	0.00059
239	0.170	0.063	14	51	0.00029
479	0.160	0.037	18	170	0.00033
120	0.164	0.01			
30	0.171	0.066			

Preparation

Particle density assumed 2.65 Mg/m3

Specimen details	Initial	Final	
Diameter	75.10	-	mm
Height	19.70	19.10	mm
Moisture Content	8.9	8.1	%
Bulk density	2.39	2.45	Mg/m3
Dry density	2.19	2.26	Mg/m3
Voids Ratio	0.208	0.171	
Saturation	113	125	%
Average temperature for test	20.0		oC
Swelling Pressure			kPa
Settlement on saturation			%
Remarks			

Final values should be used with caution

Cv plotted at mid point of load increments

Cv corrected to 20oC

Approved: Stephen.Watson

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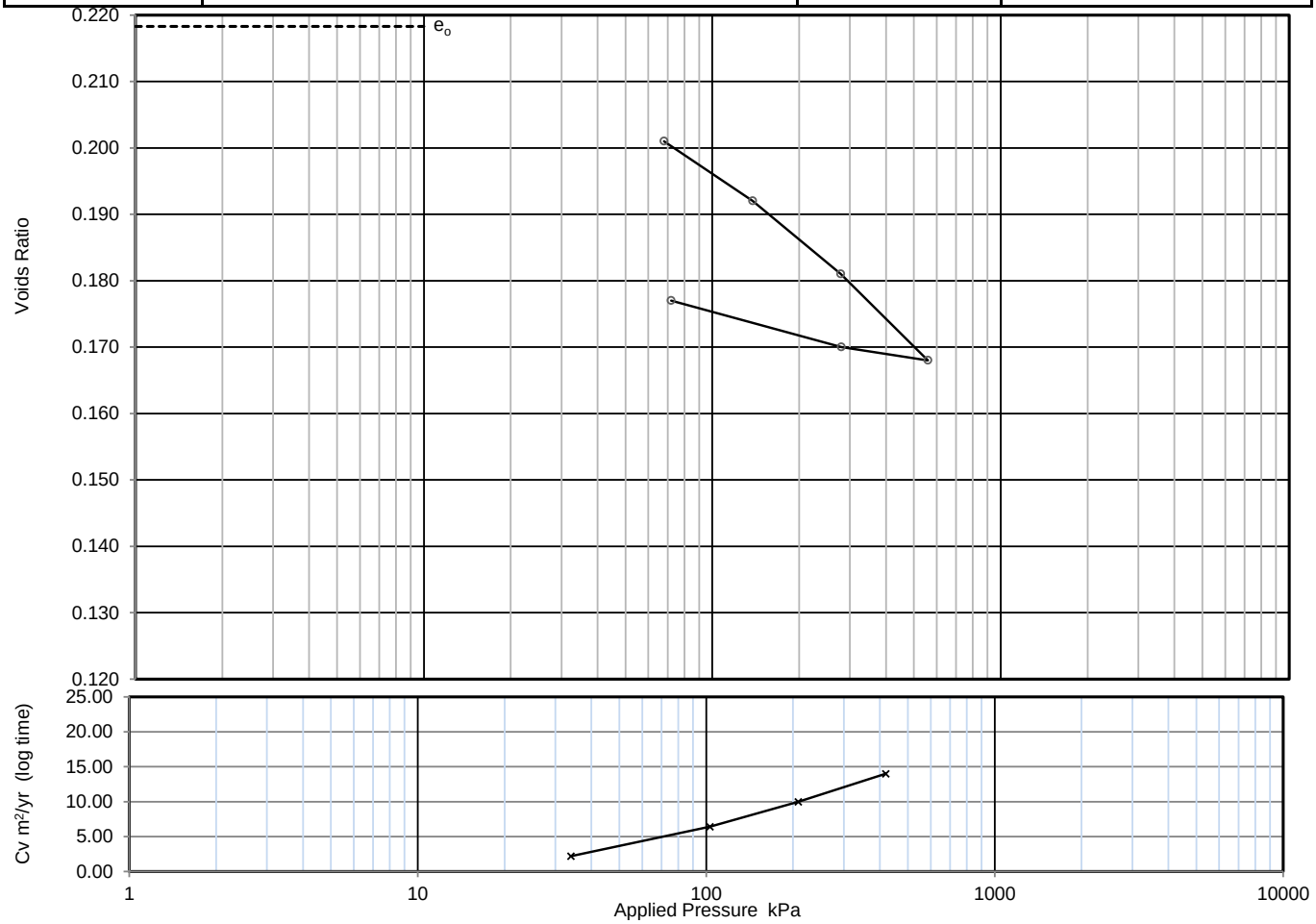
CAUSEWAY GEOTECH	ONE DIMENSIONAL CONSOLIDATION TEST BS1377:Part 5:1990, clause 3				Job Ref		21-1682
					Borehole/Pit No.		BH-28001
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		20
Soil Description	Brown sandy slightly gravelly silty CLAY.				Sample Depth (m)	Top	3.00
						Bottom	3.45
Specimen Reference	3	Specimen Depth	3.05	m	Sample Type		U
Specimen Description	Brown sandy slightly gravelly silty CLAY.				KeyLAB ID		Caus2022061031
Test Method	BS1377:Part 5:1990, clause 3				Date started		15/06/2022



Applied Pressure kPa	Voids ratio	Mv m2/MN	Cv (t50, log) m2/yr	Cv (t90, root) m2/yr	Csec
0.0	0.218	-	-	-	-
68	0.201	0.21	2.2	2.2	0.00029
138	0.192	0.1	6.4	100	0.00041
279	0.181	0.066	10	270	0.00038
559	0.168	0.039	14	52	0.00042
280	0.170	0.0054			
72	0.177	0.028			

Preparation

Particle density assumed 2.65 Mg/m3

Specimen details	Initial	Final	
Diameter	75.10	-	mm
Height	19.90	19.22	mm
Moisture Content	10.4	9.3	%
Bulk density	2.40	2.46	Mg/m3
Dry density	2.18	2.25	Mg/m3
Voids Ratio	0.218	0.177	
Saturation	126	140	%
Average temperature for test	20.0		oC
Swelling Pressure			kPa
Settlement on saturation			%

Remarks

Final values should be used with caution

Cv plotted at mid point of load increments

Cv corrected to 20oC

Approved

Stephen.Watson

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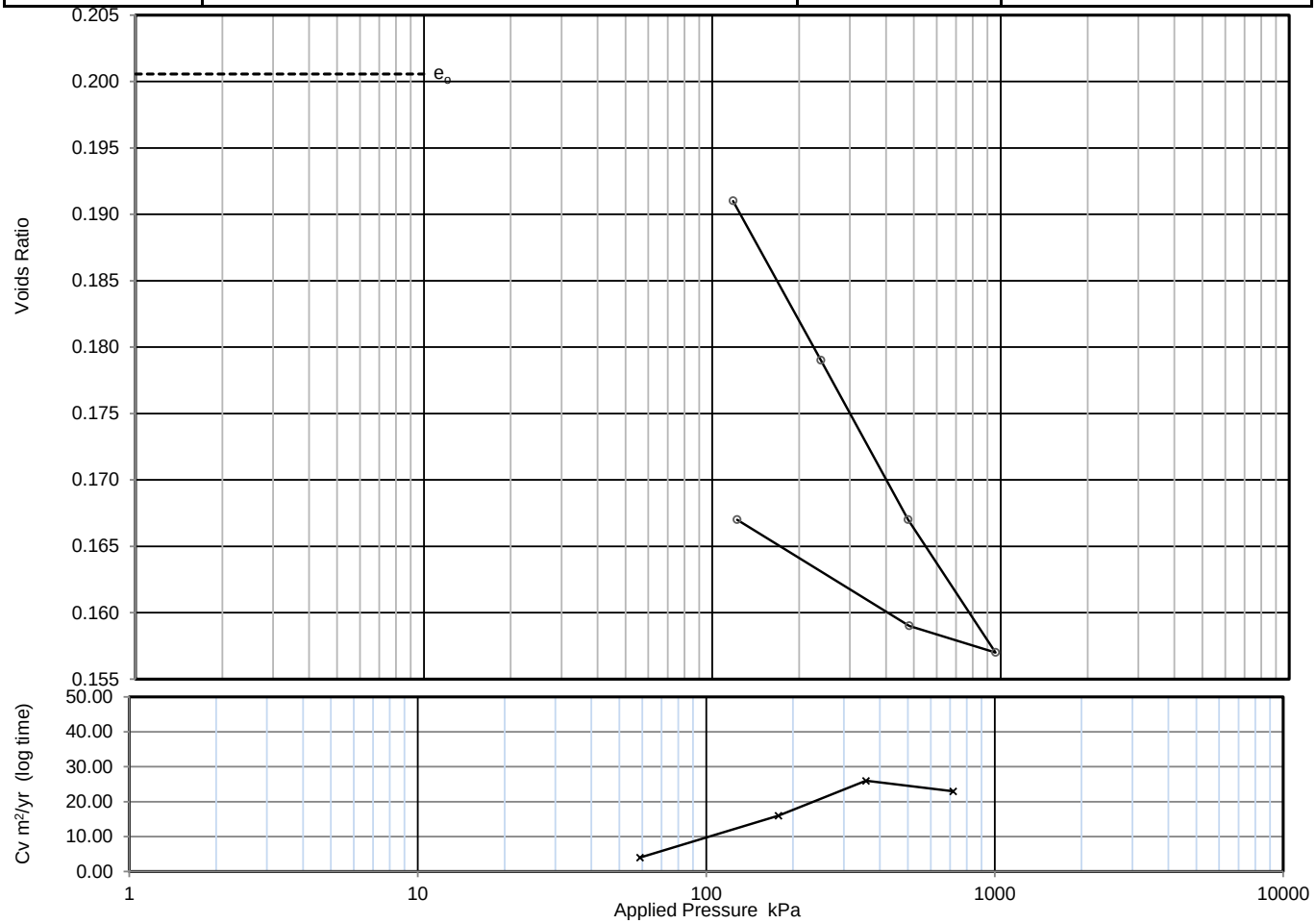
CAUSEWAY GEOTECH	**ONE DIMENSIONAL CONSOLIDATION TEST BS1377:Part 5:1990, clause 3**			Job Ref	21-1682
				Borehole/Pit No.	BH-28001
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	21
Soil Description	Brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	6.00
				Bottom	6.45
Specimen Reference	3	Specimen Depth	6.05 m	Sample Type	U
Specimen Description	Brown sandy slightly gravelly silty CLAY.			KeyLAB ID	Caus2022061032
Test Method	BS1377:Part 5:1990, clause 3			Date started	15/06/2022



Applied Pressure kPa	Voids ratio	Mv m2/MN	Cv (t50, log) m2/yr	Cv (t90, root) m2/yr	Csec
0.0	0.201	-	-	-	-
118	0.191	0.069	4	3.8	0.00061
238	0.179	0.082	16	55	0.00064
478	0.167	0.041	26	190	0.00062
959	0.157	0.018	23	180	0.00079
482	0.159	0.0035			
122	0.167	0.019			

Preparation

Particle density assumed 2.65 Mg/m3

Specimen details	Initial	Final	
Diameter	75.00	-	mm
Height	20.00	19.44	mm
Moisture Content	8.5	7.5	%
Bulk density	2.40	2.44	Mg/m3
Dry density	2.21	2.27	Mg/m3
Voids Ratio	0.201	0.167	
Saturation	113	120	%
Average temperature for test	20.0		oC
Swelling Pressure			kPa
Settlement on saturation			%

Remarks

Final values should be used with caution

Cv plotted at mid point of load increments

Cv corrected to 20oC

Approved

Stephen.Watson

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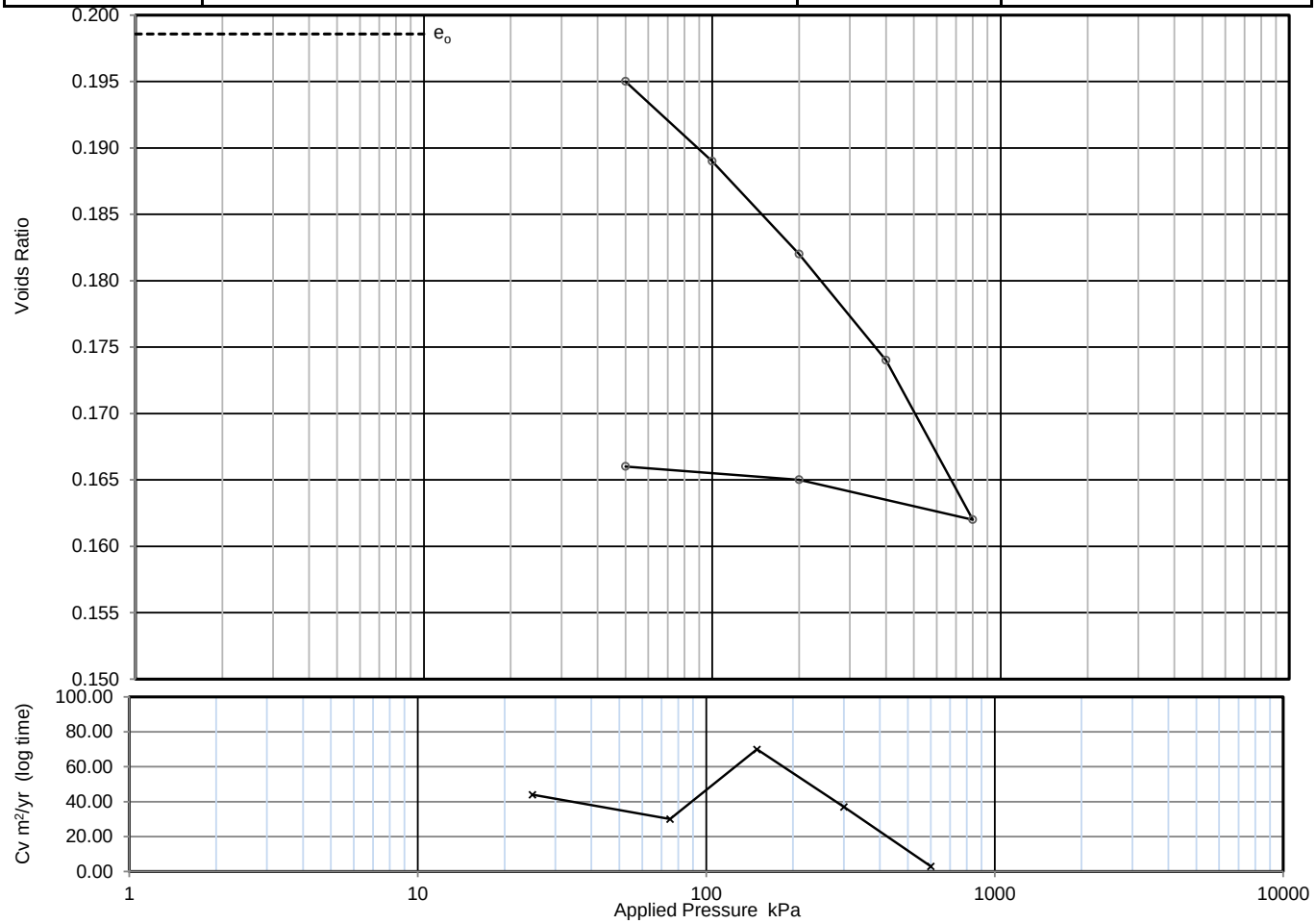
CAUSEWAY GEOTECH	**ONE DIMENSIONAL CONSOLIDATION TEST BS1377:Part 5:1990, clause 3**			Job Ref	21-1682
				Borehole/Pit No.	BH-28924A
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Soil Description	Brownish grey sandy gravelly silty CLAY.			Sample Depth (m) Top	6.30
				Bottom	6.6
Specimen Reference	2	Specimen Depth	6.3 m	Sample Type	C
Specimen Description	Brownish grey sandy gravelly silty CLAY.			KeyLAB ID	Caus2022082557
Test Method	BS1377:Part 5:1990, clause 3			Date started	25/08/2022



Applied Pressure kPa	Voids ratio	Mv m2/MN	Cv (t50, log) m2/yr	Cv (t90, root) m2/yr	Csec
0.0	0.199	-	-	-	-
50	0.195	0.067	44	48	0.00069
100	0.189	0.094	30	48	0.00054
200	0.182	0.058	70	110	0.00083
400	0.174	0.035	37	49	0.0009
800	0.162	0.024	3	52	0.0015
200	0.165	0.0037			
50	0.166	0.0081			

Preparation

Particle density assumed 2.65 Mg/m3

Specimen details	Initial	Final	
Diameter	75.00	-	mm
Height	19.80	19.27	mm
Moisture Content	7.6	8.6	%
Bulk density	2.38	2.47	Mg/m3
Dry density	2.21	2.27	Mg/m3
Voids Ratio	0.199	0.166	
Saturation	102	136	%
Average temperature for test	20.0		oC
Swelling Pressure			kPa
Settlement on saturation			%
Remarks			

Final values should be used with caution

Cv plotted at mid point of load increments

Cv corrected to 20oC

Approved: Stephen.Watson

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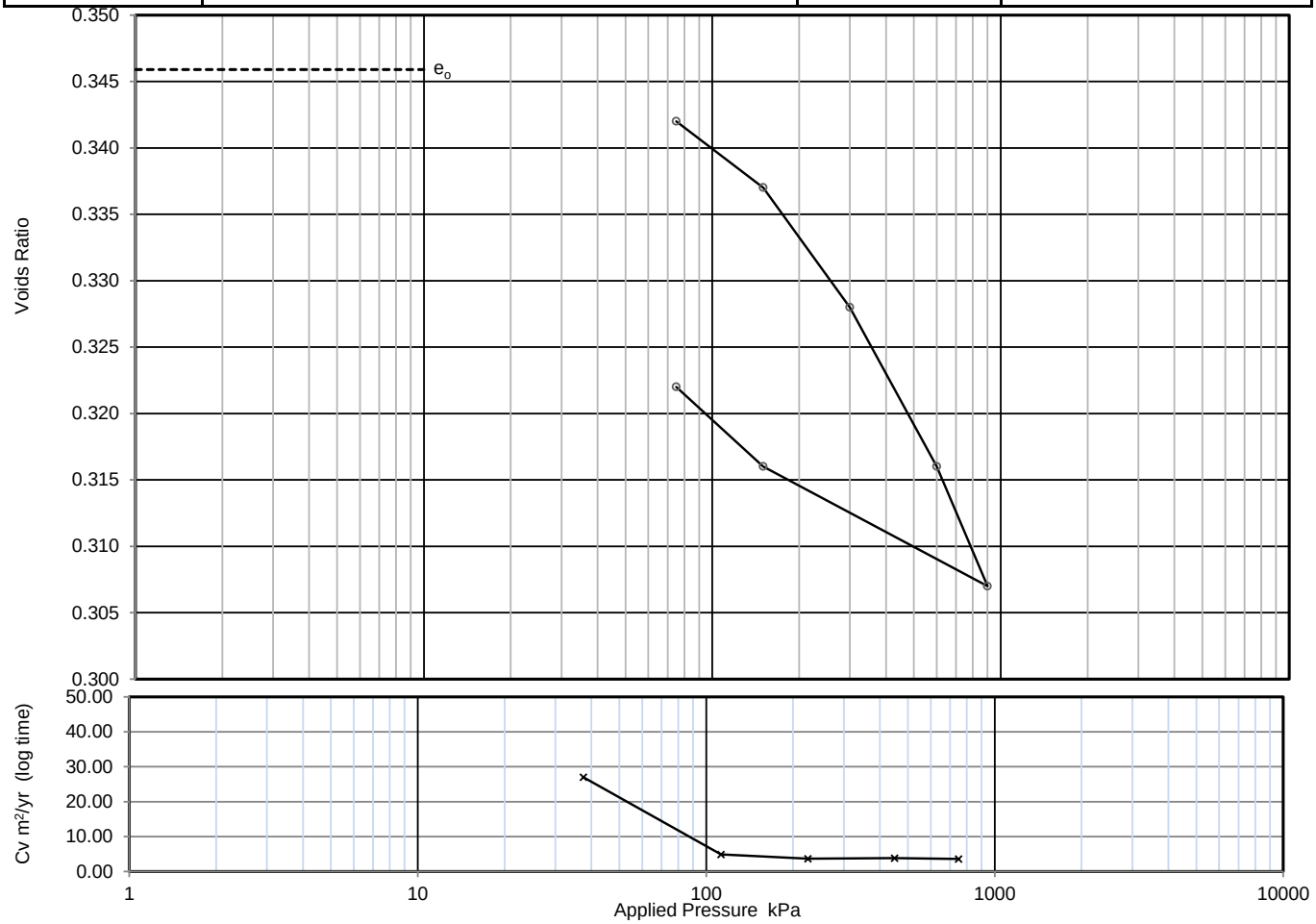
UKAS TESTING 10122

CAUSEWAY GEOTECH	**ONE DIMENSIONAL CONSOLIDATION TEST BS1377:Part 5:1990, clause 3**				Job Ref		21-1682
					Borehole/Pit No.		BH-29130
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		4
Soil Description	Brownish grey sandy silty CLAY.				Sample Depth (m)	Top	8.60
						Bottom	8.75
Specimen Reference	2	Specimen Depth	8.6	m	Sample Type		C
Specimen Description	Brownish grey sandy silty CLAY.				KeyLAB ID		Caus2022102011
Test Method	BS1377:Part 5:1990, clause 3				Date started		01/11/2022



Applied Pressure kPa	Voids ratio	Mv m2/MN	Cv (t50, log) m2/yr	Cv (t90, root) m2/yr	Csec
0.0	0.346	-	-	-	-
75	0.342	0.035	27	65	0.000045
150	0.337	0.052	4.9	18	0.0003
300	0.328	0.044	3.7	13	0.00052
600	0.316	0.031	3.8	9.6	0.00064
900	0.307	0.022	3.6	5.9	0.00076
150	0.316	0.0092			
75	0.322	0.057			

Preparation

Particle density assumed 2.65 Mg/m3

Specimen details	Initial	Final	
Diameter	75.00	-	mm
Height	20.00	19.64	mm
Moisture Content	13.8	14.2	%
Bulk density	2.24	2.29	Mg/m3
Dry density	1.97	2.00	Mg/m3
Voids Ratio	0.346	0.322	
Saturation	105	117	%
Average temperature for test	20.0		oC
Swelling Pressure			kPa
Settlement on saturation			%

Remarks

Final values should be used with caution

Cv plotted at mid point of load increments

Cv corrected to 20oC

Approved

Stephen Watson

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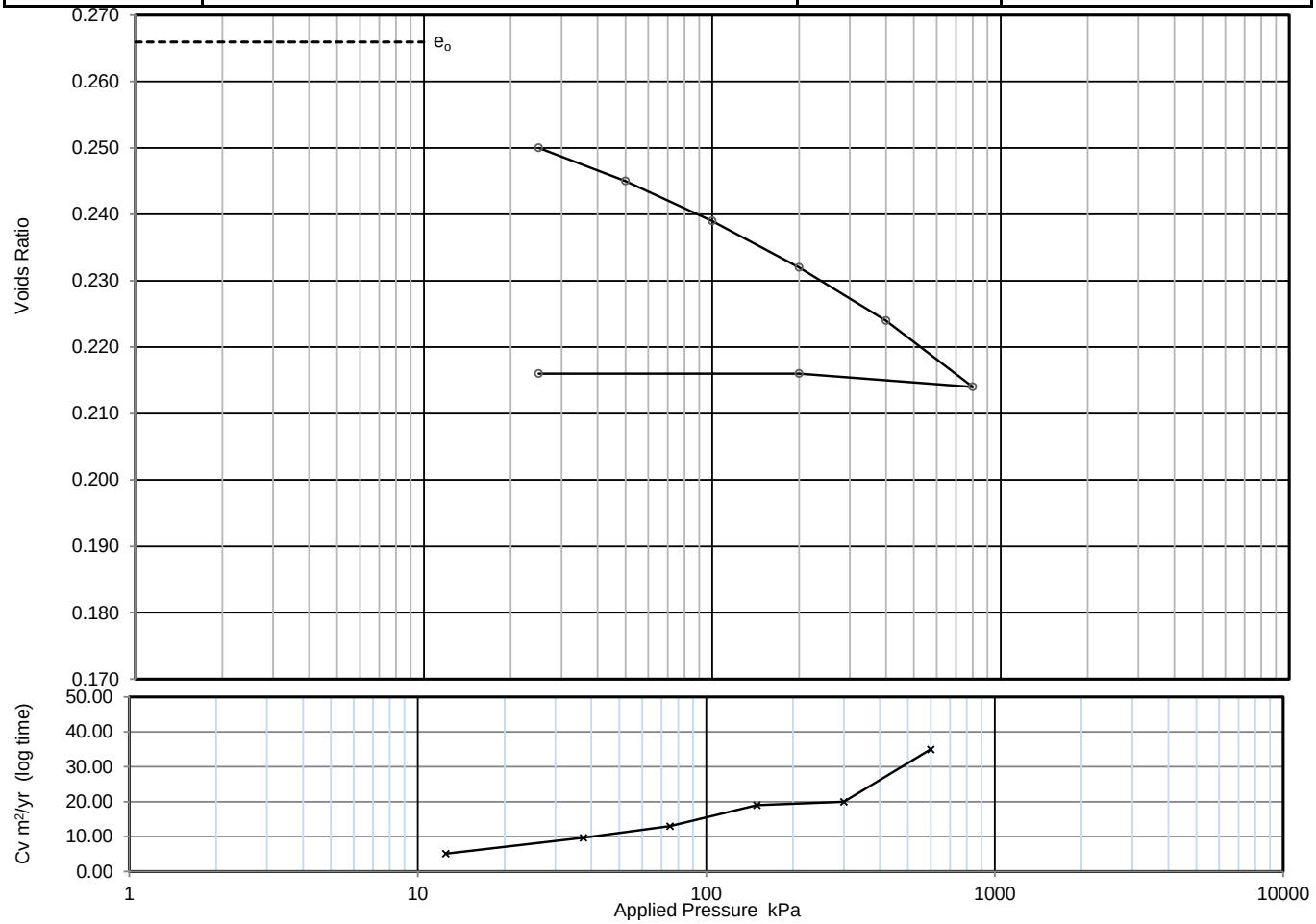
CAUSEWAY GEOTECH	**ONE DIMENSIONAL CONSOLIDATION TEST BS1377:Part 5:1990, clause 3**			Job Ref	21-1682
				Borehole/Pit No.	BH-29923A
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Soil Description	Light grey slightly sandy silty CLAY.			Sample Depth (m) Top	3.05
				Bottom	
Specimen Reference	2	Specimen Depth	3.05 m	Sample Type	C
Specimen Description	Light grey slightly sandy silty CLAY.			KeyLAB ID	Caus2022081049
Test Method	BS1377:Part 5:1990, clause 3			Date started	11/08/2022



Applied Pressure kPa	Voids ratio	Mv m2/MN	Cv (t50, log) m2/yr	Cv (t90, root) m2/yr	Csec
0.0	0.266	-	-	-	-
25	0.250	0.5	5.1	7.2	0.00047
50	0.245	0.17	9.7	14	0.00048
100	0.239	0.095	13	39	0.00035
200	0.232	0.056	19	47	0.0007
400	0.224	0.032	20	45	0.00091
800	0.214	0.021	35	45	0.0013
200	0.216	0.0029			
25	0.216	0.00024			

Preparation

Particle density assumed 2.65 Mg/m3

Specimen details	Initial	Final	
Diameter	75.10	-	mm
Height	19.70	18.92	mm
Moisture Content	11.0	9.5	%
Bulk density	2.32	2.39	Mg/m3
Dry density	2.09	2.18	Mg/m3
Voids Ratio	0.266	0.216	
Saturation	110	117	%
Average temperature for test	20.0		oC
Swelling Pressure			kPa
Settlement on saturation			%

Remarks

Final values should be used with caution

Cv plotted at mid point of load increments

Cv corrected to 20oC

Approved

Stephen.Watson

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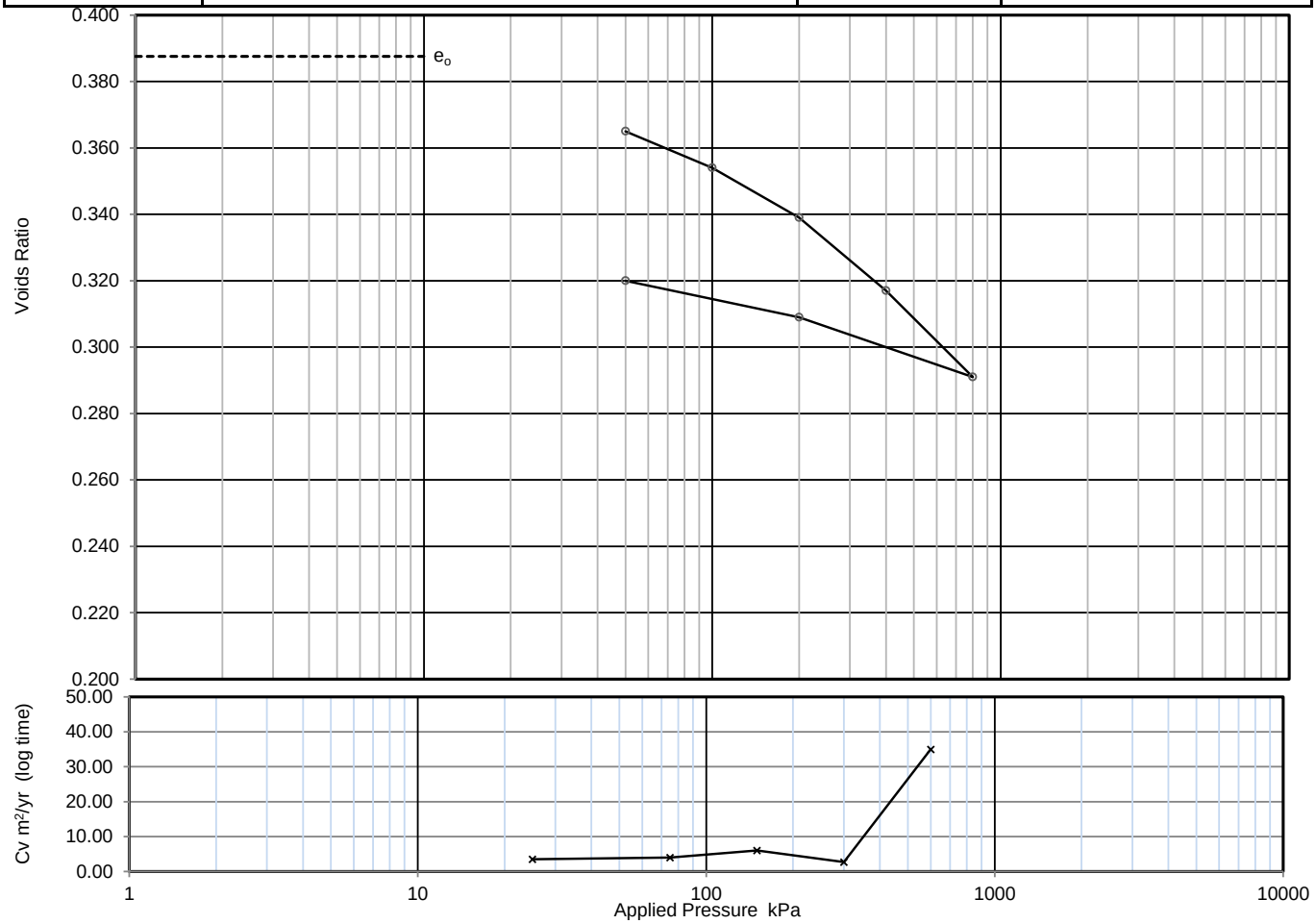
CAUSEWAY GEOTECH	**ONE DIMENSIONAL CONSOLIDATION TEST BS1377:Part 5:1990, clause 3**				Job Ref		21-1682
					Borehole/Pit No.		BH-29923A
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		5
Soil Description	Light grey slightly sandy silty CLAY.				Sample Depth (m)	Top	5.20
						Bottom	
Specimen Reference	2	Specimen Depth	5.25	m	Sample Type		C
Specimen Description	Light grey slightly sandy silty CLAY.				KeyLAB ID		Caus2022081051
Test Method	BS1377:Part 5:1990, clause 3				Date started		11/08/2022



Applied Pressure kPa	Voids ratio	Mv m2/MN	Cv (t50, log) m2/yr	Cv (t90, root) m2/yr	Csec
0.0	0.388	-	-	-	-
50	0.365	0.32	3.5	4.6	0.00079
100	0.354	0.16	4	6.6	0.0011
200	0.339	0.11	6	21	0.0013
400	0.317	0.081	2.7	35	0.0021
800	0.291	0.05	35	27	0.0025
200	0.309	0.023			
50	0.320	0.059			

Preparation

Particle density assumed 2.65 Mg/m3

Specimen details	Initial	Final	
Diameter	75.20	-	mm
Height	19.80	18.84	mm
Moisture Content	17.1	15.1	%
Bulk density	2.24	2.31	Mg/m3
Dry density	1.91	2.01	Mg/m3
Voids Ratio	0.388	0.320	
Saturation	117	125	%
Average temperature for test	20.0		oC
Swelling Pressure			kPa
Settlement on saturation			%

Remarks

Final values should be used with caution

Cv plotted at mid point of load increments

Cv corrected to 20oC

Approved

Stephen.Watson

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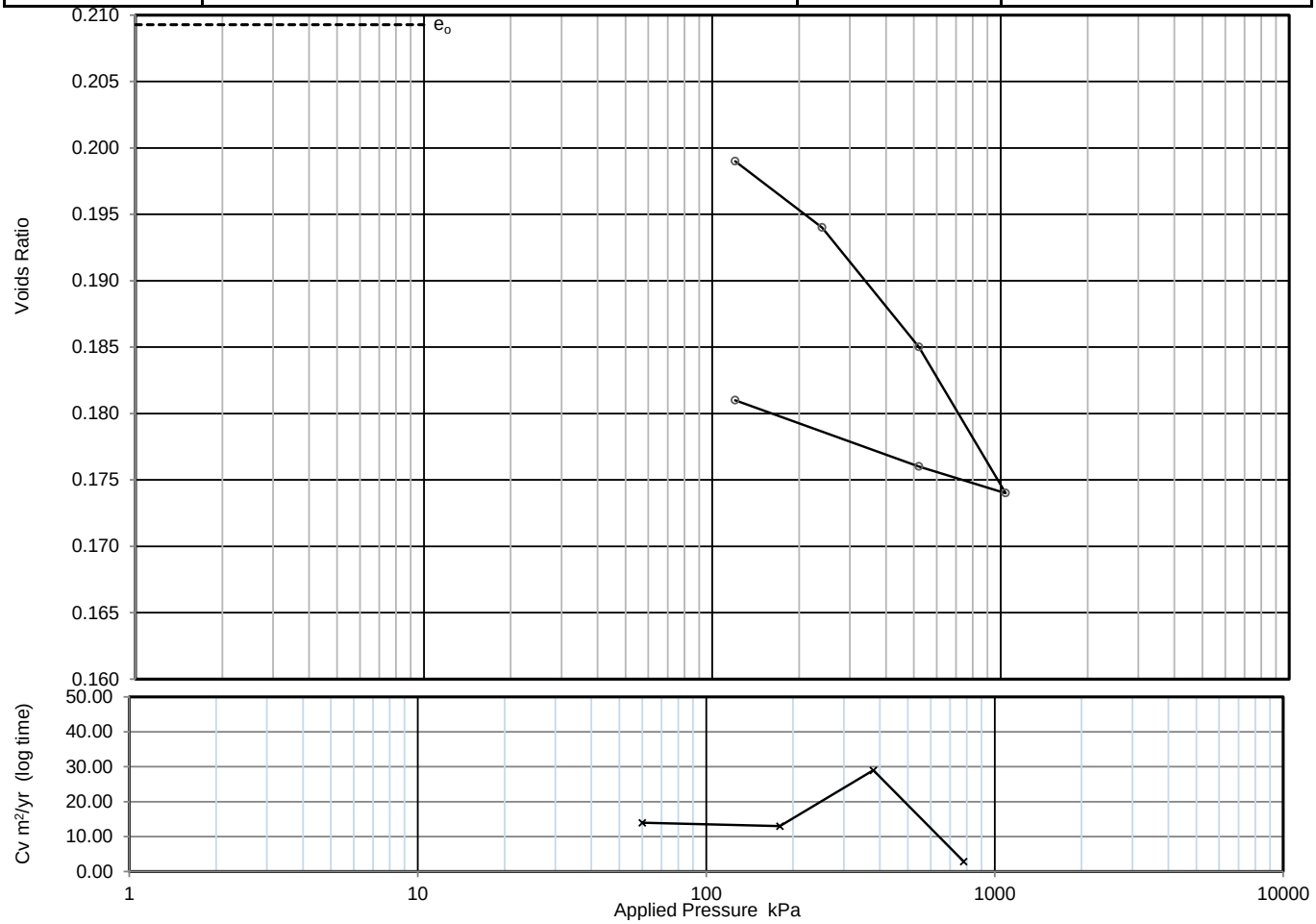
CAUSEWAY GEOTECH	ONE DIMENSIONAL CONSOLIDATION TEST BS1377:Part 5:1990, clause 3				Job Ref		21-1682
					Borehole/Pit No.		BH-30066
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		4
Soil Description	Light grey slightly sandy silty CLAY.				Sample Depth (m)	Top	12.00
						Bottom	
Specimen Reference	2	Specimen Depth	12.05	m	Sample Type		C
Specimen Description	Light grey slightly sandy silty CLAY.				KeyLAB ID		Caus2022081056
Test Method	BS1377:Part 5:1990, clause 3				Date started		11/08/2022



Applied Pressure kPa	Voids ratio	Mv m2/MN	Cv (t50, log) m2/yr	Cv (t90, root) m2/yr	Csec
0.0	0.209	-	-	-	-
120	0.199	0.07	14	21	0.00022
240	0.194	0.039	13	30	0.00048
520	0.185	0.027	29	44	0.00085
1,040	0.174	0.017	2.9	44	0.0034
520	0.176	0.0028			
120	0.181	0.0097			

Preparation

Particle density assumed 2.65 Mg/m3

Specimen details	Initial	Final	
Diameter	75.10	-	mm
Height	19.80	19.33	mm
Moisture Content	8.8	8.3	%
Bulk density	2.38	2.43	Mg/m3
Dry density	2.19	2.24	Mg/m3
Voids Ratio	0.209	0.181	
Saturation	111	122	%
Average temperature for test	20.0		oC
Swelling Pressure			kPa
Settlement on saturation			%

Remarks

Final values should be used with caution

Cv plotted at mid point of load increments

Cv corrected to 20oC

Approved

Stephen.Watson

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17/11/2022 18:03

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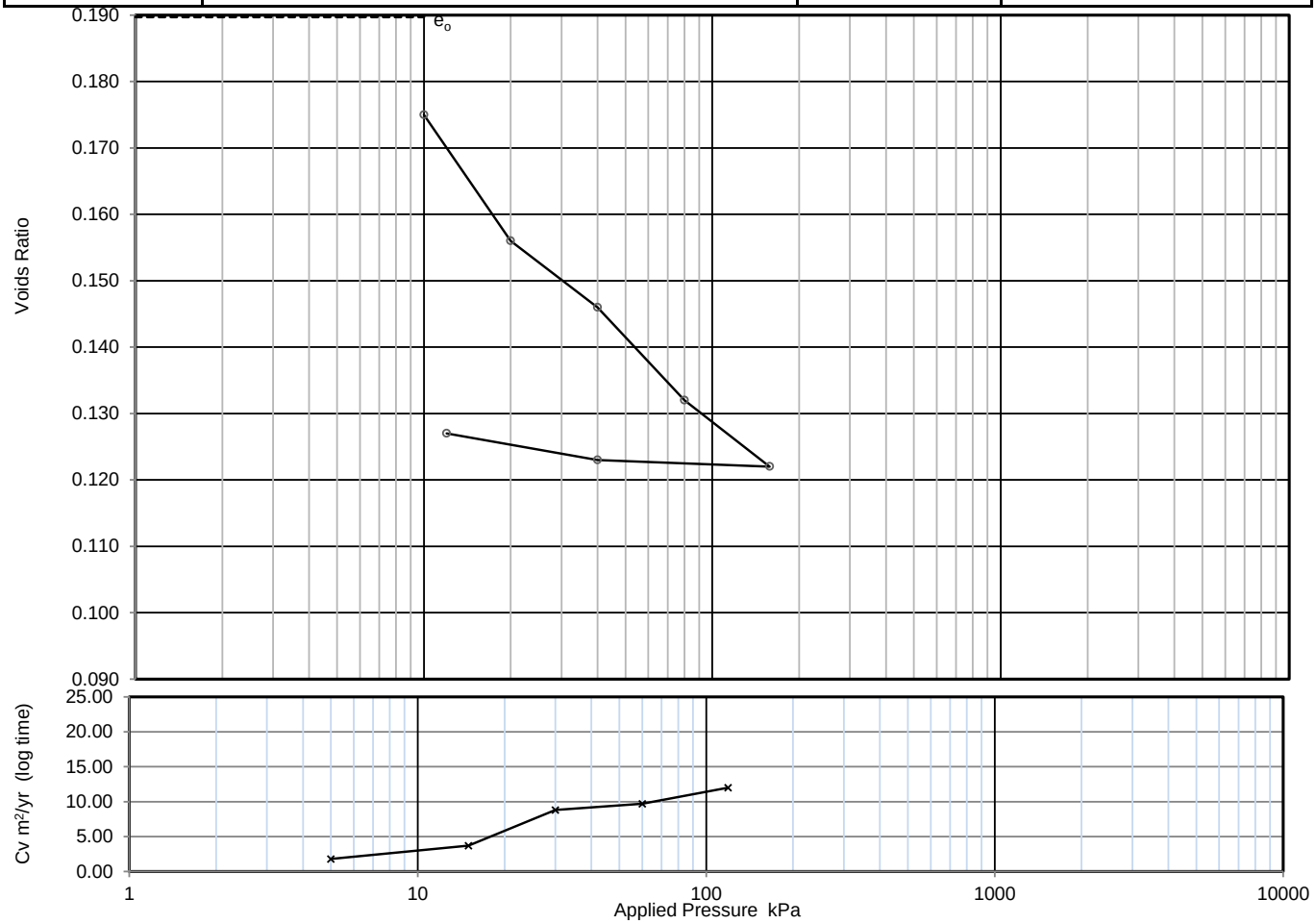
CAUSEWAY GEOTECH	ONE DIMENSIONAL CONSOLIDATION TEST BS1377:Part 5:1990, clause 3				Job Ref		21-1682
					Borehole/Pit No.		BH-31910
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		7
Soil Description	Light brown sandy slightly gravelly silty CLAY.				Sample Depth (m)	Top	2.00
						Bottom	2.45
Specimen Reference	3	Specimen Depth	2.05	m	Sample Type		U
Specimen Description	Light brown sandy slightly gravelly silty CLAY.				KeyLAB ID		Caus2022052414
Test Method	BS1377:Part 5:1990, clause 3				Date started		07/06/2022



Applied Pressure kPa	Voids ratio	Mv m2/MN	Cv (t50, log) m2/yr	Cv (t90, root) m2/yr	Csec
0.0	0.190	-	-	-	-
10	0.175	1.2	1.8	2.5	0.00067
20	0.156	1.7	3.7	200	0.00041
40	0.146	0.41	8.8	160	0.00053
80	0.132	0.31	9.7	48	0.00053
158	0.122	0.11	12	45	0.00061
40	0.123	0.007			
12	0.127	0.12			

Preparation

Particle density assumed 2.65 Mg/m3

Specimen details	Initial	Final	
Diameter	75.10	-	mm
Height	19.70	18.66	mm
Moisture Content	9.3	8.6	%
Bulk density	2.43	2.55	Mg/m3
Dry density	2.23	2.35	Mg/m3
Voids Ratio	0.190	0.127	
Saturation	130	179	%
Average temperature for test	20.0		oC
Swelling Pressure			kPa
Settlement on saturation			%
Remarks			

Final values should be used with caution

Cv plotted at mid point of load increments

Cv corrected to 20oC

Approved

Stephen.Watson

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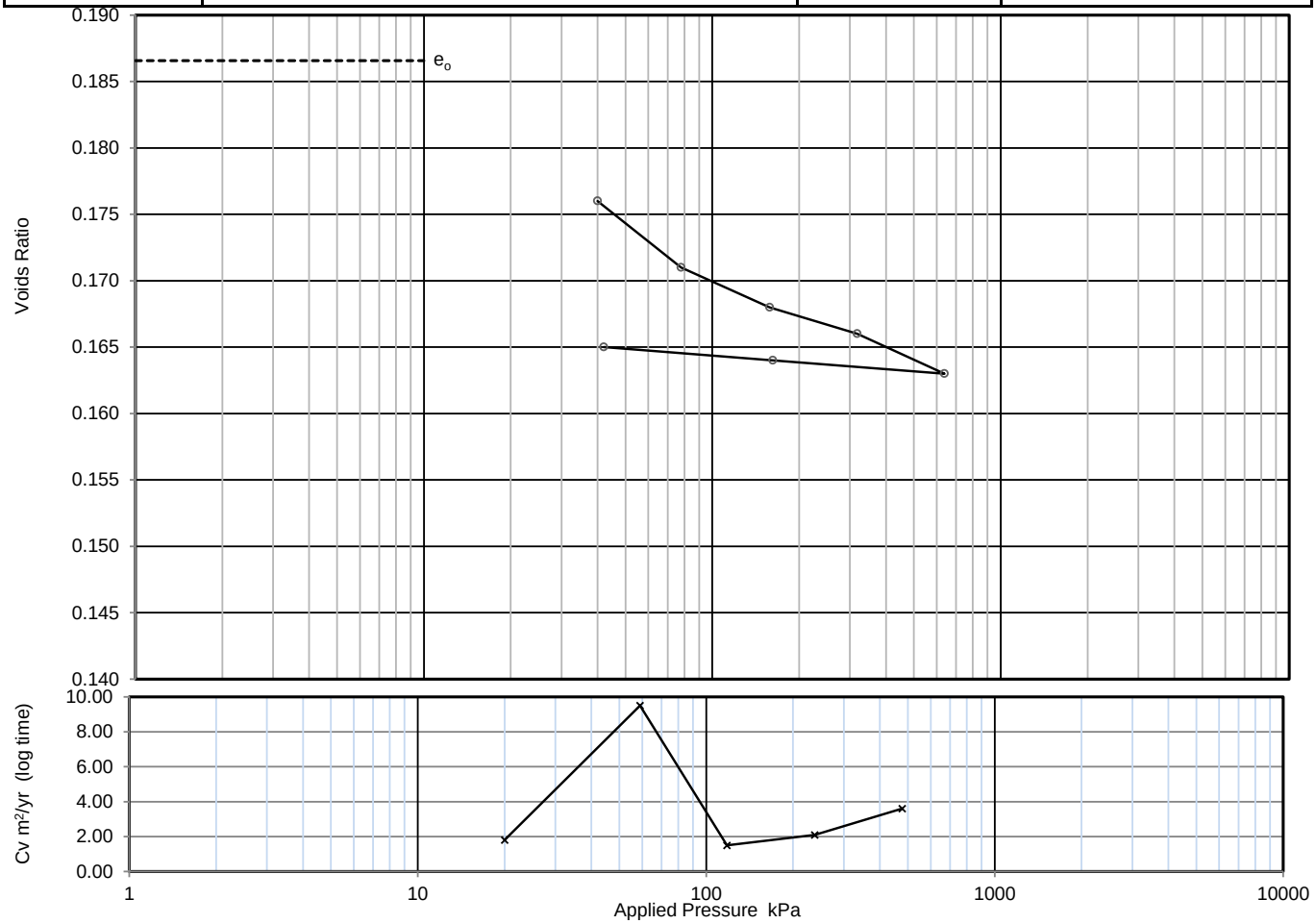
CAUSEWAY GEOTECH	ONE DIMENSIONAL CONSOLIDATION TEST BS1377:Part 5:1990, clause 3				Job Ref		21-1682
					Borehole/Pit No.		BH-32319
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		9
Soil Description	Brown sandy slightly gravelly silty CLAY.				Sample Depth (m)	Top	2.00
						Bottom	2.45
Specimen Reference	3	Specimen Depth	2.05	m	Sample Type		U
Specimen Description	Brown sandy slightly gravelly silty CLAY.				KeyLAB ID		Caus2022061023
Test Method	BS1377:Part 5:1990, clause 3				Date started		



Applied Pressure kPa	Voids ratio	Mv m2/MN	Cv (t50, log) m2/yr	Cv (t90, root) m2/yr	Csec
0.0	0.187	-	-	-	-
40	0.176	0.23	1.8	1.7	0.00055
78	0.171	0.11	9.5	41	0.00046
158	0.168	0.024	1.5	2.6	0.00063
318	0.166	0.013	2.1	3.6	0.00075
638	0.163	0.0069	3.6	5.8	0.00085
162	0.164	0.0019			
42	0.165	0.0053			

Preparation

Particle density assumed 2.65 Mg/m3

Specimen details	Initial	Final	
Diameter	75.00	-	mm
Height	20.00	19.64	mm
Moisture Content	8.8	8.1	%
Bulk density	2.43	2.46	Mg/m3
Dry density	2.23	2.27	Mg/m3
Voids Ratio	0.187	0.165	
Saturation	124	131	%
Average temperature for test	20.0		oC
Swelling Pressure			kPa
Settlement on saturation			%
Remarks			

Final values should be used with caution

Cv plotted at mid point of load increments

Cv corrected to 20oC

Approved

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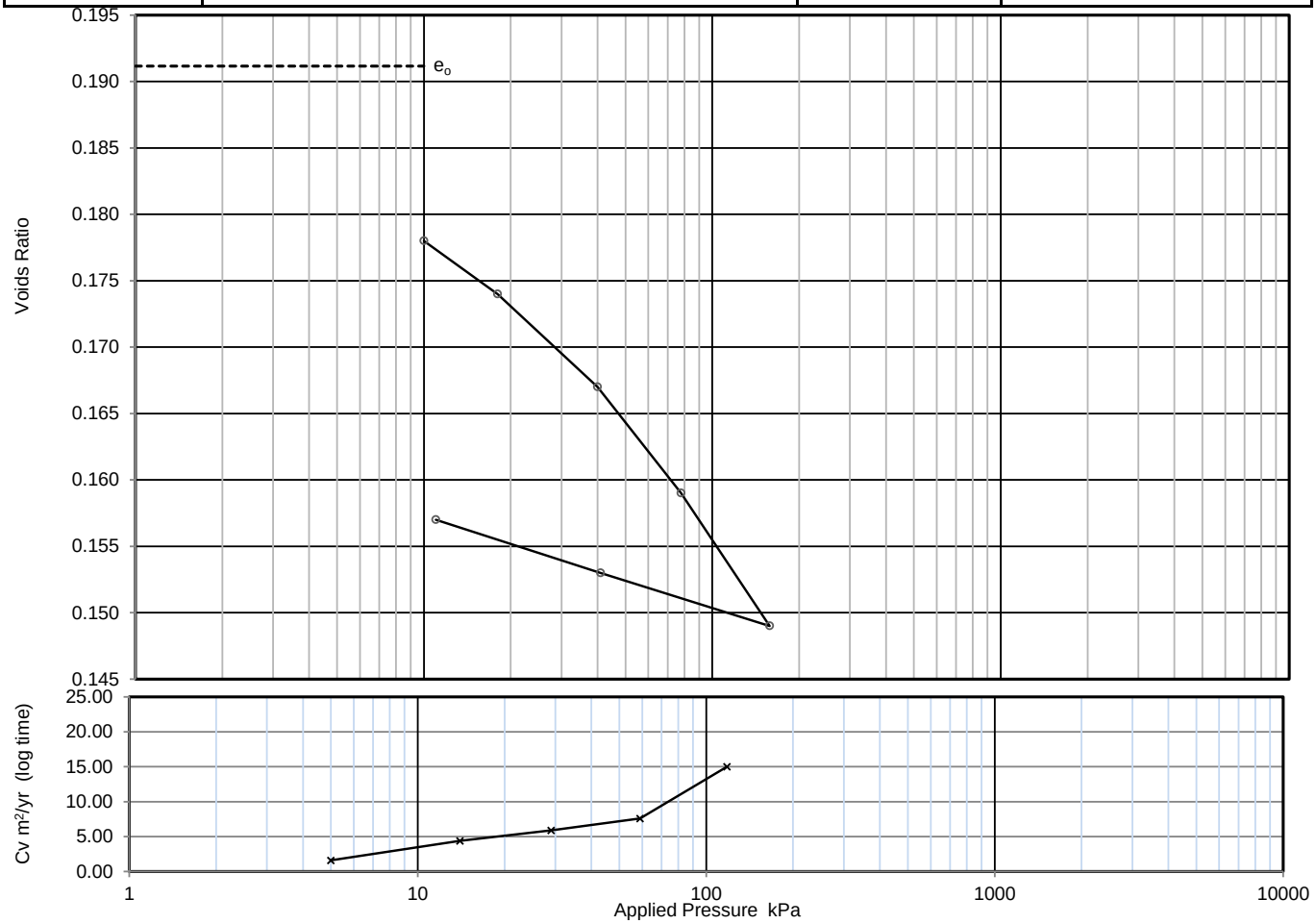
CAUSEWAY GEOTECH	**ONE DIMENSIONAL CONSOLIDATION TEST BS1377:Part 5:1990, clause 3**			Job Ref	21-1682
				Borehole/Pit No.	BH-34598
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	9
Soil Description	Light brown sandy gravelly silty CLAY.			Sample Depth (m) Top	2.00
				Bottom	2.45
Specimen Reference	3	Specimen Depth	2.05 m	Sample Type	U
Specimen Description	Light brown sandy gravelly silty CLAY.			KeyLAB ID	Caus2022052427
Test Method	BS1377:Part 5:1990, clause 3			Date started	07/06/2022



Applied Pressure kPa	Voids ratio	Mv m2/MN	Cv (t50, log) m2/yr	Cv (t90, root) m2/yr	Csec
0.0	0.191	-	-	-	-
10	0.178	1.1	1.6	1.6	0.00042
18	0.174	0.4	4.4	9.6	0.00046
40	0.167	0.28	5.9	17	0.00053
78	0.159	0.18	7.6	36	0.0003
158	0.149	0.11	15	170	0.00066
41	0.153	0.032			
11	0.157	0.098			

Preparation

Particle density assumed 2.65 Mg/m3

Specimen details	Initial	Final	
Diameter	75.10	-	mm
Height	20.10	19.52	mm
Moisture Content	9.0	8.3	%
Bulk density	2.42	2.48	Mg/m3
Dry density	2.22	2.29	Mg/m3
Voids Ratio	0.191	0.157	
Saturation	125	141	%
Average temperature for test	20.0		oC
Swelling Pressure			kPa
Settlement on saturation			%
Remarks			

Final values should be used with caution

Cv plotted at mid point of load increments

Cv corrected to 20oC

Approved

Stephen.Watson

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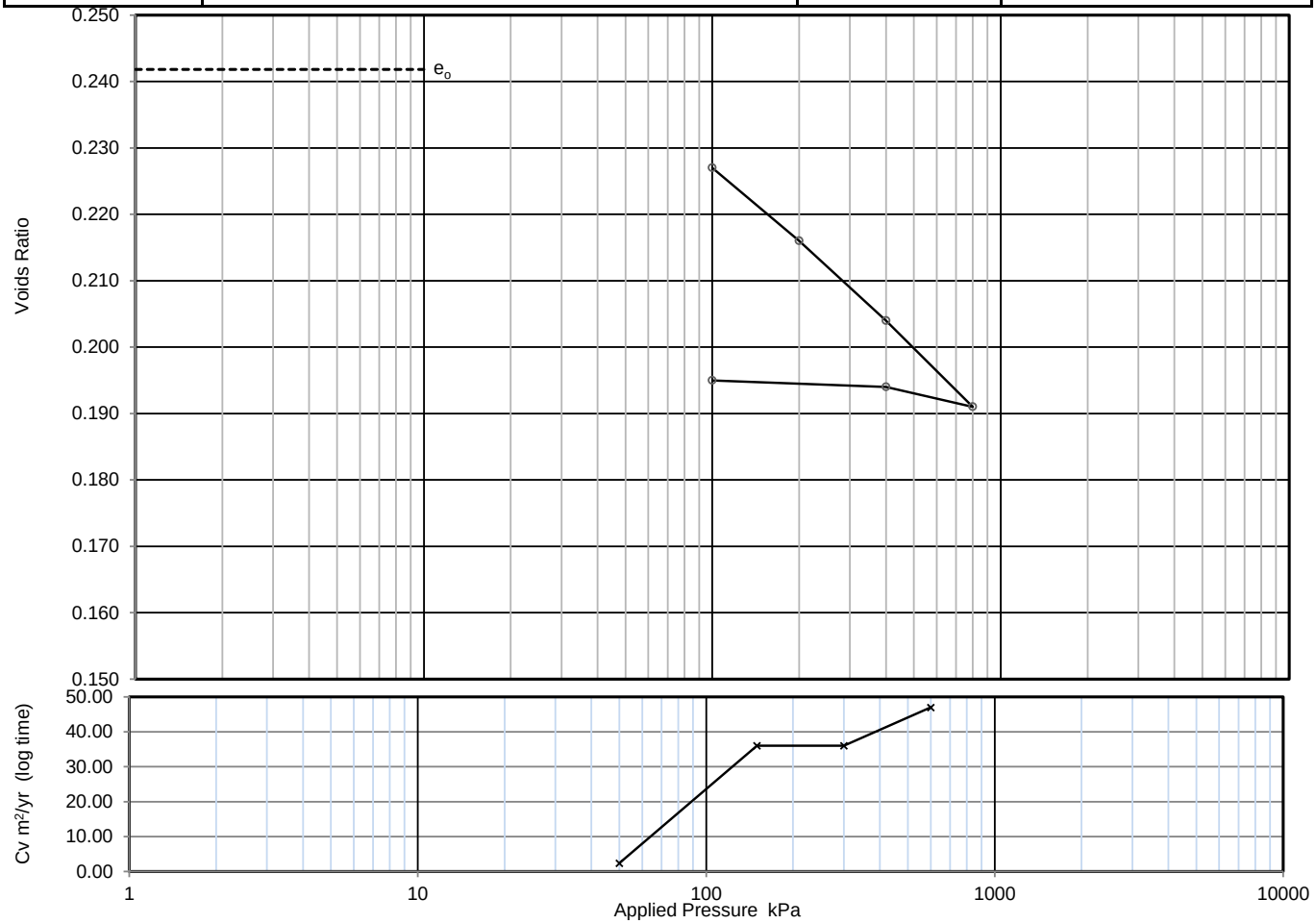
CAUSEWAY GEOTECH	ONE DIMENSIONAL CONSOLIDATION TEST BS1377:Part 5:1990, clause 3				Job Ref		21-1682
					Borehole/Pit No.		BH-35202
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		4
Soil Description	Greyish brown sandy gravelly silty CLAY.				Sample Depth (m)	Top	9.10
						Bottom	
Specimen Reference	2	Specimen Depth	9.1	m	Sample Type		C
Specimen Description	Greyish brown sandy gravelly silty CLAY.				KeyLAB ID		Caus2022081047
Test Method	BS1377:Part 5:1990, clause 3				Date started		11/08/2022



Applied Pressure kPa	Voids ratio	Mv m2/MN	Cv (t50, log) m2/yr	Cv (t90, root) m2/yr	Csec
0.0	0.242	-	-	-	-
100	0.227	0.12	2.4	3.1	0.00082
200	0.216	0.084	36	59	0.0007
400	0.204	0.05	36	60	0.00091
800	0.191	0.027	47	88	0.0013
400	0.194	0.0058			
100	0.195	0.0023			

Preparation

Particle density assumed 2.65 Mg/m3

Specimen details	Initial	Final	
Diameter	75.00	-	mm
Height	20.00	19.24	mm
Moisture Content	5.2	10.2	%
Bulk density	2.24	2.44	Mg/m3
Dry density	2.13	2.22	Mg/m3
Voids Ratio	0.242	0.195	
Saturation	57	138	%
Average temperature for test	20.0		oC
Swelling Pressure			kPa
Settlement on saturation			%
Remarks			

Final values should be used with caution

Cv plotted at mid point of load increments

Cv corrected to 20oC

Approved

Stephen.Watson

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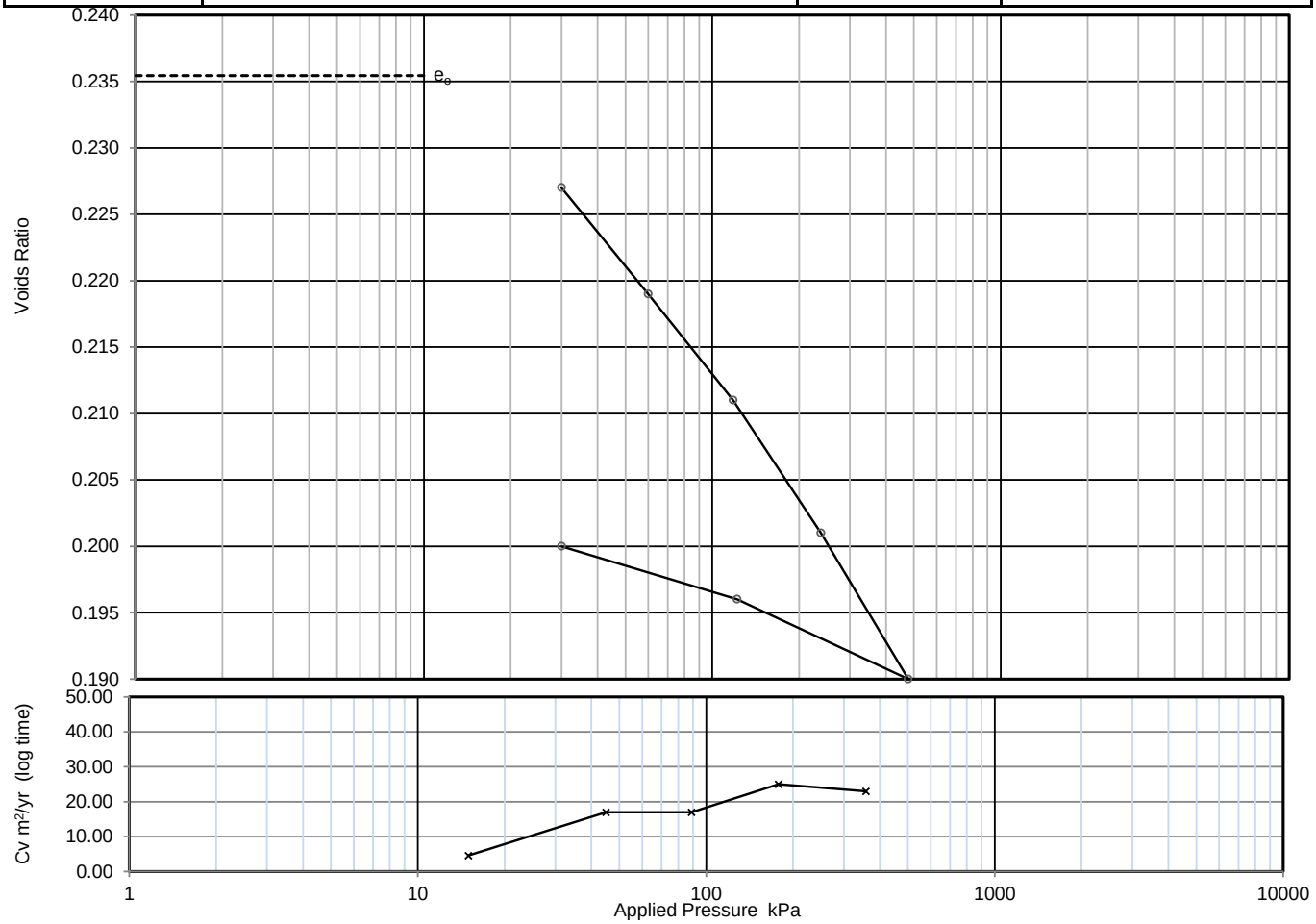
CAUSEWAY GEOTECH	ONE DIMENSIONAL CONSOLIDATION TEST BS1377:Part 5:1990, clause 3				Job Ref		21-1682
					Borehole/Pit No.		BH-4110
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		1
Soil Description	Brownish grey sandy slightly gravelly silty CLAY.				Sample Depth (m)	Top	1.20
						Bottom	1.65
Specimen Reference	3	Specimen Depth	1.25	m	Sample Type		U
Specimen Description	Brownish grey sandy slightly gravelly silty CLAY.				KeyLAB ID		Caus2022062163
Test Method	BS1377:Part 5:1990, clause 3				Date started		29/06/2022



Applied Pressure kPa	Voids ratio	Mv m2/MN	Cv (t50, log) m2/yr	Cv (t90, root) m2/yr	Csec
0.0	0.235	-	-	-	-
30	0.227	0.22	4.6	4.9	0.00062
60	0.219	0.22	17	250	0.00052
118	0.211	0.12	17	49	0.00031
238	0.201	0.068	25	190	0.00052
478	0.190	0.04	23	59	0.0005
122	0.196	0.014			
30	0.200	0.044			

Preparation

Particle density assumed 2.65 Mg/m3

Specimen details	Initial	Final	
Diameter	75.10	-	mm
Height	19.70	19.14	mm
Moisture Content	11.2	10.3	%
Bulk density	2.38	2.44	Mg/m3
Dry density	2.14	2.21	Mg/m3
Voids Ratio	0.235	0.200	
Saturation	126	137	%
Average temperature for test	20.0		oC
Swelling Pressure			kPa
Settlement on saturation			%
Remarks			

Final values should be used with caution

Cv plotted at mid point of load increments

Cv corrected to 20oC

Approved

Stephen.Watson

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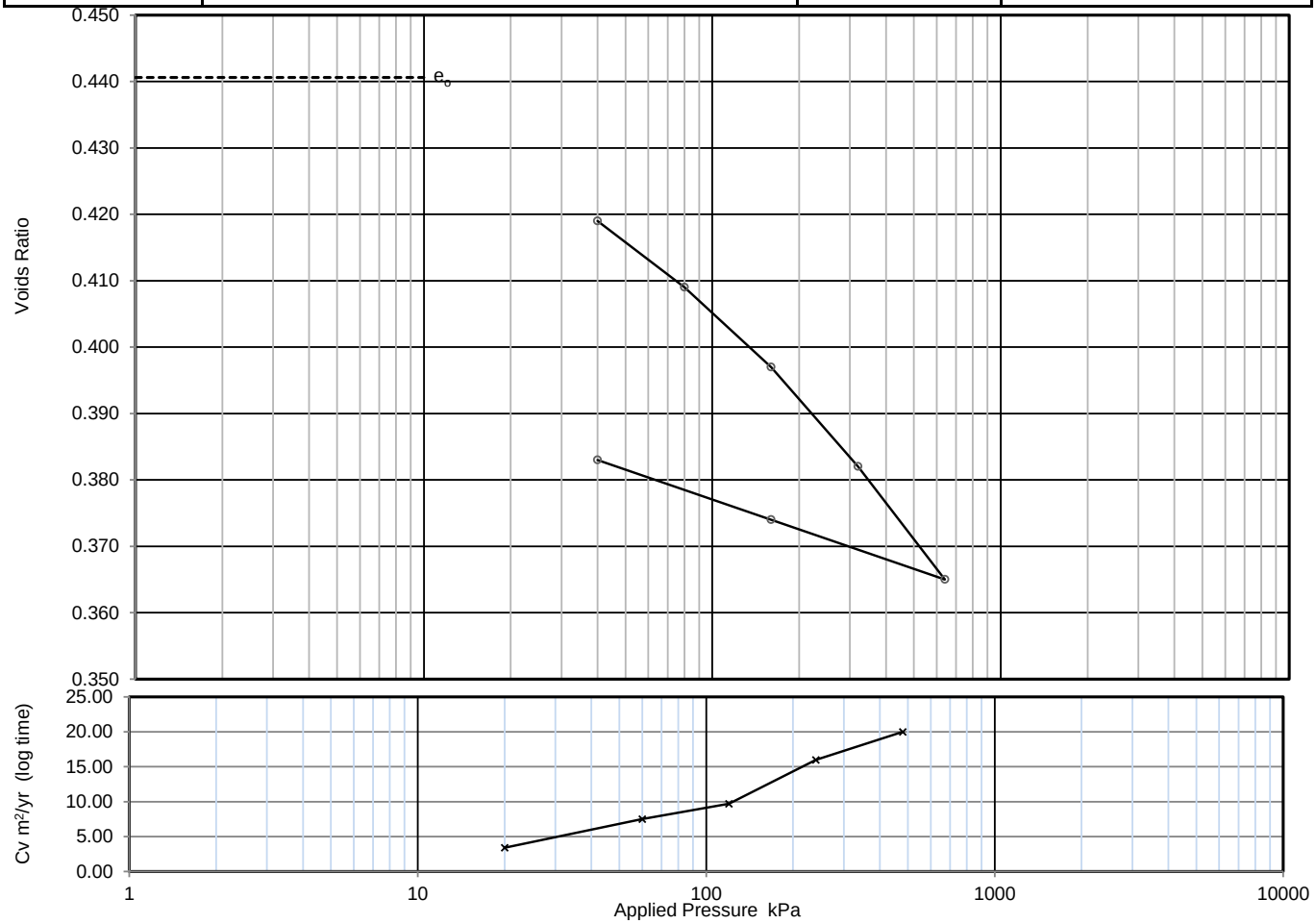
CAUSEWAY GEOTECH	ONE DIMENSIONAL CONSOLIDATION TEST BS1377:Part 5:1990, clause 3				Job Ref		21-1682
					Borehole/Pit No.		BH-5573
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		12
Soil Description	Brownish grey sandy slightly gravelly silty CLAY.				Sample Depth (m)	Top	4.00
						Bottom	4.45
Specimen Reference	5	Specimen Depth	4.05	m	Sample Type		U
Specimen Description	Brownish grey sandy slightly gravelly silty CLAY.				KeyLAB ID		Caus2022080420
Test Method	BS1377:Part 5:1990, clause 3				Date started		05/08/2022



Applied Pressure kPa	Voids ratio	Mv m2/MN	Cv (t50, log) m2/yr	Cv (t90, root) m2/yr	Csec
0.0	0.441	-	-	-	-
40	0.419	0.37	3.4	5	0.00035
80	0.409	0.18	7.5	27	0.00035
160	0.397	0.11	9.7	30	0.00015
320	0.382	0.067	16	40	0.00037
640	0.365	0.038	20	48	0.00041
160	0.374	0.014			
40	0.383	0.059			

Preparation

Particle density assumed 2.65 Mg/m3

Specimen details	Initial	Final	
Diameter	75.00	-	mm
Height	19.90	19.11	mm
Moisture Content	17.5	15.9	%
Bulk density	2.16	2.22	Mg/m3
Dry density	1.84	1.92	Mg/m3
Voids Ratio	0.441	0.383	
Saturation	105	110	%
Average temperature for test	20.0		oC
Swelling Pressure			kPa
Settlement on saturation			%
Remarks			

Final values should be used with caution

Cv plotted at mid point of load increments

Cv corrected to 20oC

Approved

Stephen.Watson

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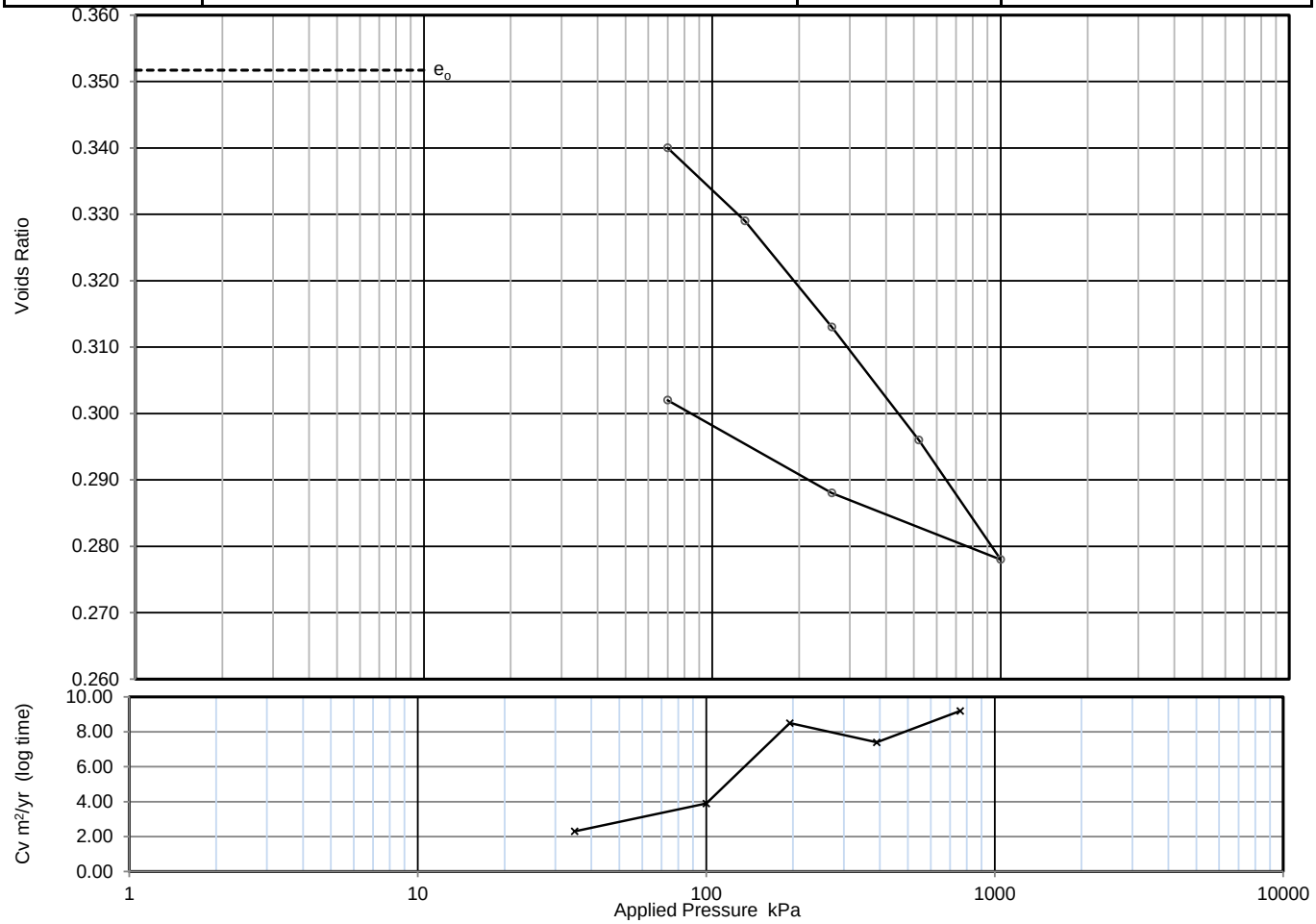
CAUSEWAY GEOTECH	ONE DIMENSIONAL CONSOLIDATION TEST BS1377:Part 5:1990, clause 3				Job Ref		21-1682
					Borehole/Pit No.		BH-7349
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only				Sample No.		13
Soil Description	Greyish brown sandy slightly gravelly silty CLAY.				Sample Depth (m)	Top	6.50
						Bottom	6.95
Specimen Reference	2	Specimen Depth	6.55	m	Sample Type		U
Specimen Description	Greyish brown sandy slightly gravelly silty CLAY.				KeyLAB ID		Caus2022081586
Test Method	BS1377:Part 5:1990, clause 3				Date started		23/08/2022



Applied Pressure kPa	Voids ratio	Mv m2/MN	Cv (t50, log) m2/yr	Cv (t90, root) m2/yr	Csec
0.0	0.352	-	-	-	-
70	0.340	0.13	2.3	3.9	0.0007
130	0.329	0.13	3.9	11	0.0005
260	0.313	0.09	8.5	33	0.0005
520	0.296	0.05	7.4	19	0.00067
1,000	0.278	0.029	9.2	22	0.00088
260	0.288	0.011			
70	0.302	0.056			

Preparation

Particle density assumed 2.65 Mg/m3

Specimen details	Initial	Final	
Diameter	75.00	-	mm
Height	19.80	19.07	mm
Moisture Content	14.4	13.6	%
Bulk density	2.24	2.31	Mg/m3
Dry density	1.96	2.04	Mg/m3
Voids Ratio	0.352	0.302	
Saturation	108	119	%
Average temperature for test	20.0		oC
Swelling Pressure			kPa
Settlement on saturation			%
Remarks			

Final values should be used with caution

Cv plotted at mid point of load increments

Cv corrected to 20oC

Approved

Stephen.Watson

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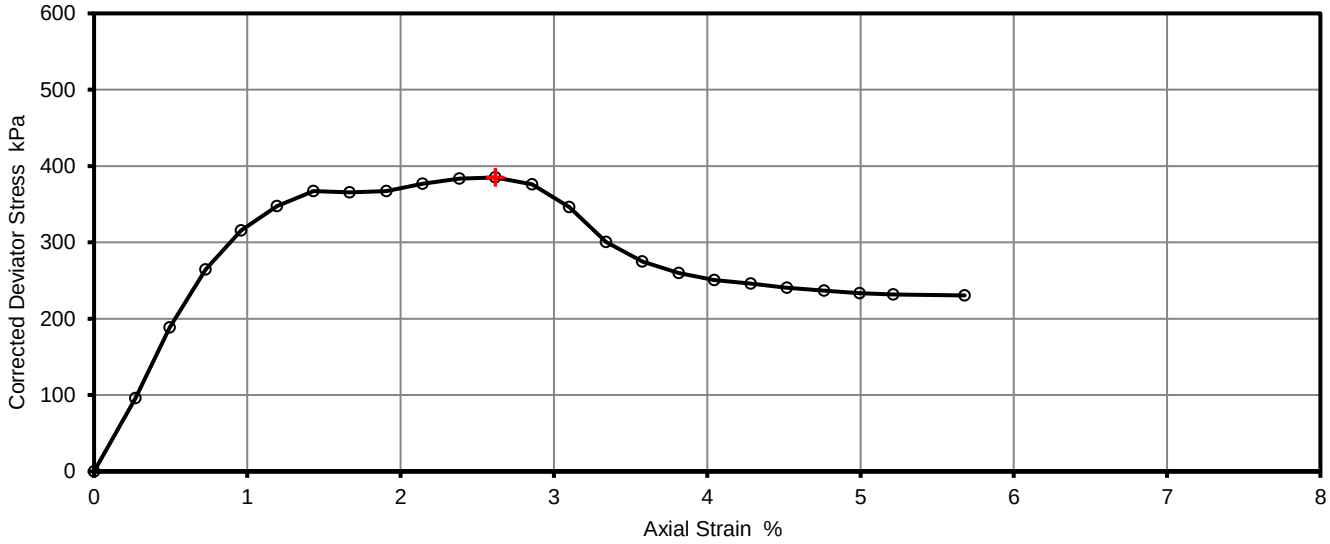
Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen

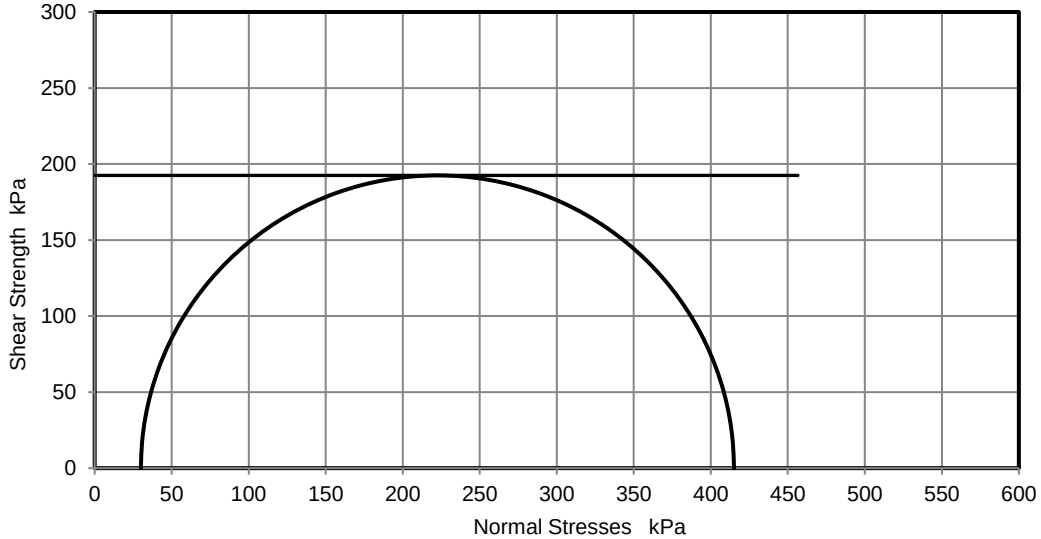
				Job Ref	21-1682
				Borehole/Pit No.	BH-12406A
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	9
Soil Description	Greyish brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	1.20
				Sample Depth (m) Base	1.64
Specimen Reference	2	Specimen Depth	1.25 m	Sample Type	U
Specimen Description	Stiff greyish brown sandy slightly gravelly silty CLAY.			KeyLAB ID	Caus2022081564
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen			Date of test	24/08/2022

Sample Condition		UNDISTURBED	
Test Number		1	
Length		210.1	mm
Diameter		104.0	mm
Bulk Density		2.23	Mg/m3
Moisture Content		8	%
Dry Density		2.07	Mg/m3
Rate of Strain		3.0	%/min
Cell Pressure		30	kPa
At failure	Axial Strain	2.6	%
	Deviator Stress, (σ1 - σ3)f	385	kPa
	Undrained Shear Strength, cu	193	kPa ½(σ1 - σ3)f
	Mode of Failure	Brittle	

Deviator Stress v Axial Strain



Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377.
This is provided for information only.

Remarks

Approved	Printed
Stephen.Watson	17/11/2022 18:08

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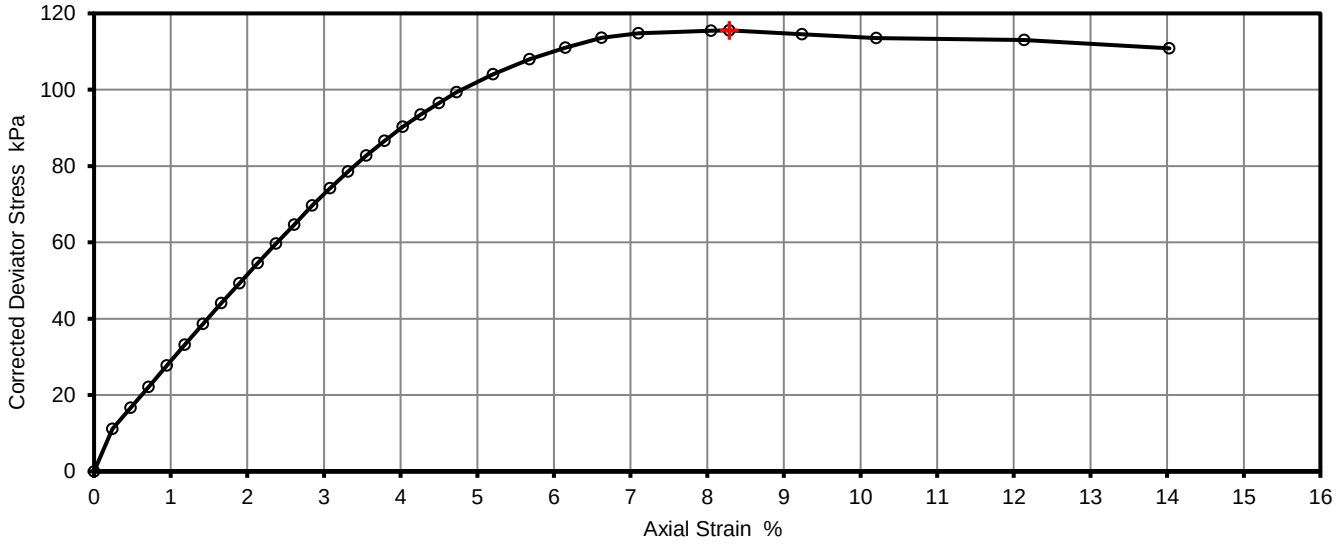
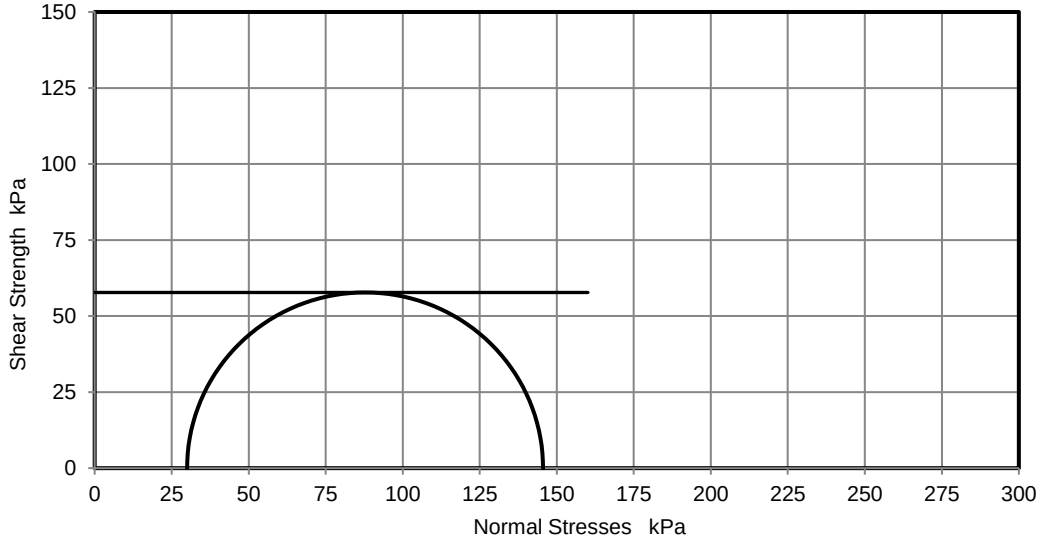
CAUSEWAY GEOTECH	**Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**			Job Ref	21-1682
				Borehole/Pit No.	BH-18440
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	7
Soil Description	Brownish grey sandy gravelly silty CLAY.			Sample Depth (m) Top	1.20
				Base	1.60
Specimen Reference	2	Specimen Depth	1.20 m	Sample Type	U
Specimen Description	Firm brownish grey sandy gravelly silty CLAY.			KeyLAB ID	Caus20220908113
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen			Date of test	26/09/2022

Sample Condition		UNDISTURBED	
Test Number		1	
Length		210.0	mm
Diameter		106.0	mm
Bulk Density		2.01	Mg/m3
Moisture Content		31	%
Dry Density		1.53	Mg/m3
Rate of Strain		3.0	%/min
Cell Pressure		30	kPa
At failure	Axial Strain	8.3	%
	Deviator Stress, (σ1 - σ3)f	116	kPa
	Undrained Shear Strength, cu	58	kPa ½(σ1 - σ3)f
	Mode of Failure	Compound	

Deviator Stress v Axial Strain



Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377.
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Remarks

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Stephen.Watson	17/11/2022 18:09

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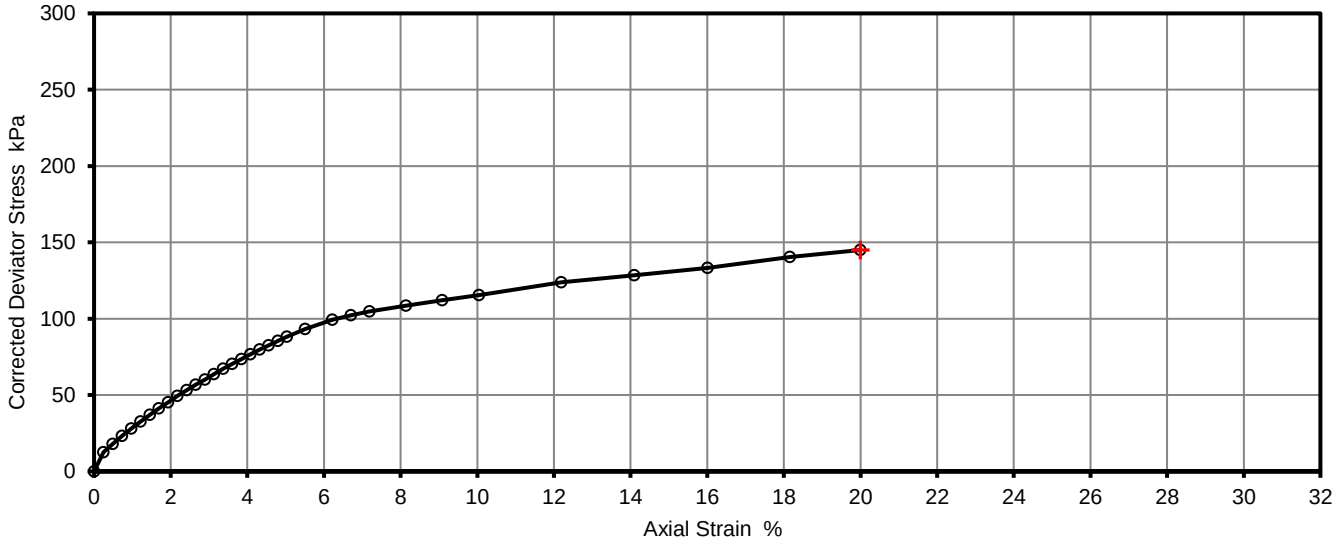
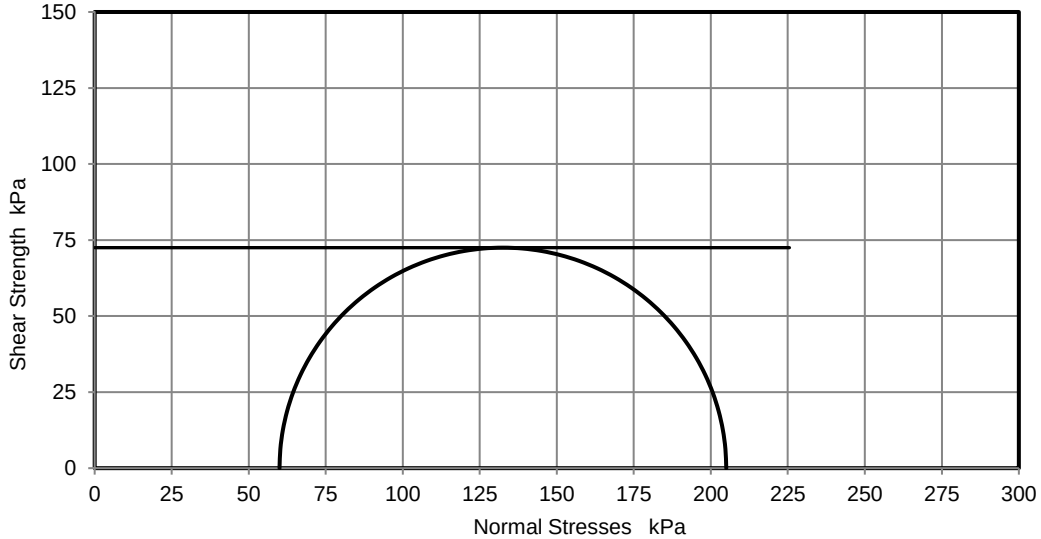
CAUSEWAY GEOTECH	**Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**			Job Ref	21-1682
				Borehole/Pit No.	BH-20326
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	10
Soil Description	Brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	3.00
				Base	3.45
Specimen Reference	2	Specimen Depth	3.05 m	Sample Type	U
Specimen Description	Firm brown sandy slightly gravelly silty CLAY.			KeyLAB ID	Caus2022090861
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen			Date of test	26/09/2022

Sample Condition		UNDISTURBED	
Test Number		1	
Length		208.6	mm
Diameter		107.2	mm
Bulk Density		2.30	Mg/m3
Moisture Content		11	%
Dry Density		2.07	Mg/m3
Rate of Strain		3.0	%/min
Cell Pressure		60	kPa
At failure	Axial Strain	20.0	%
	Deviator Stress, (σ1 - σ3)f	145	kPa
	Undrained Shear Strength, cu	73	kPa ½(σ1 - σ3)f
	Mode of Failure		

Deviator Stress v Axial Strain



Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377.
This is provided for information only.

Remarks

No failure defined. Testing terminated at 20% axial strain.

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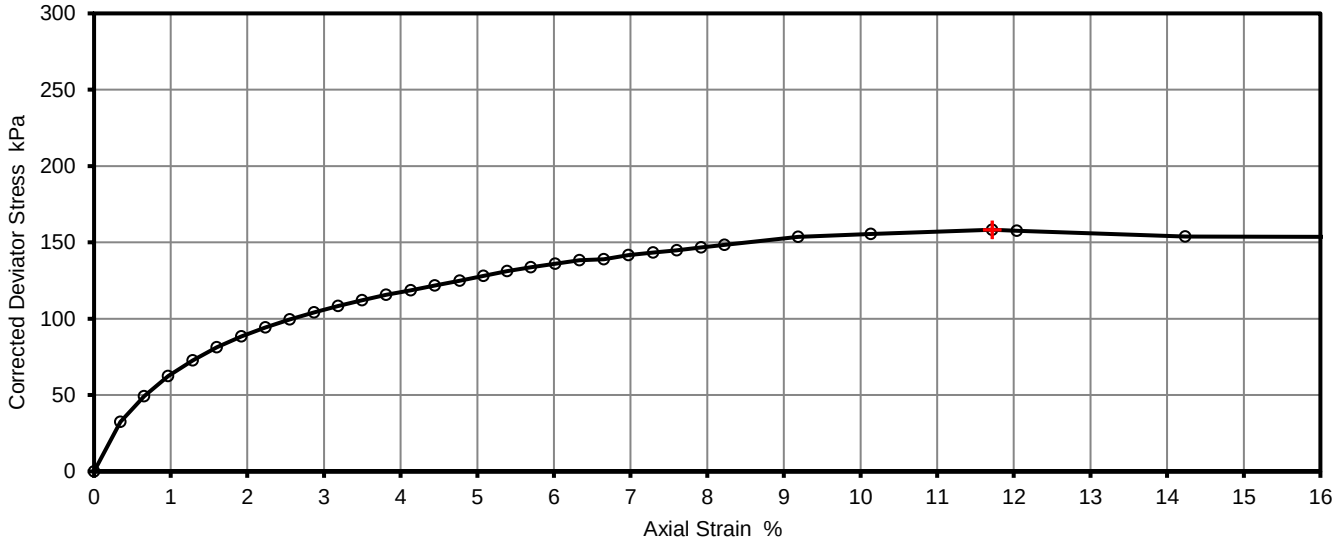
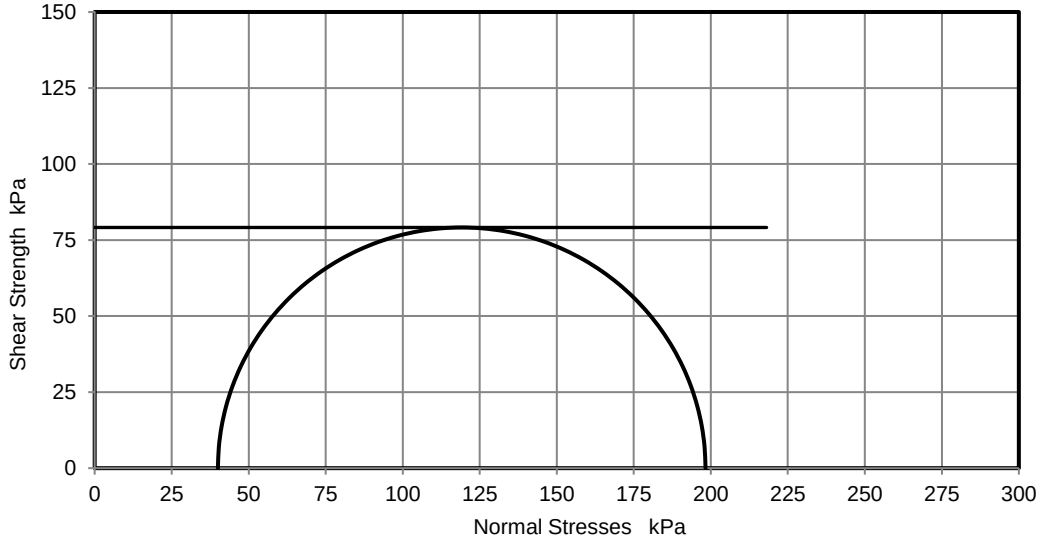
CAUSEWAY GEOTECH	**Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**			Job Ref	21-1682
				Borehole/Pit No.	BH-23898
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	12
Soil Description	Brownish grey sandy gravelly silty CLAY.			Sample Depth (m) Top	2.00
				Base	2.45
Specimen Reference	3	Specimen Depth	2.05 m	Sample Type	U
Specimen Description	Stiff brownish grey sandy gravelly silty CLAY.			KeyLAB ID	Caus202208042
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen			Date of test	05/08/2022

Sample Condition		UNDISTURBED	
Test Number		1	
Length		210.1	mm
Diameter		104.7	mm
Bulk Density		2.25	Mg/m3
Moisture Content		10	%
Dry Density		2.04	Mg/m3
Rate of Strain		4.0	%/min
Cell Pressure		40	kPa
At failure	Axial Strain	11.7	%
	Deviator Stress, (σ1 - σ3)f	158	kPa
	Undrained Shear Strength, cu	79	kPa ½(σ1 - σ3)f
	Mode of Failure	Compound	

Deviator Stress v Axial Strain



Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377.
This is provided for information only.

Remarks

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Stephen.Watson	17/11/2022 18:09

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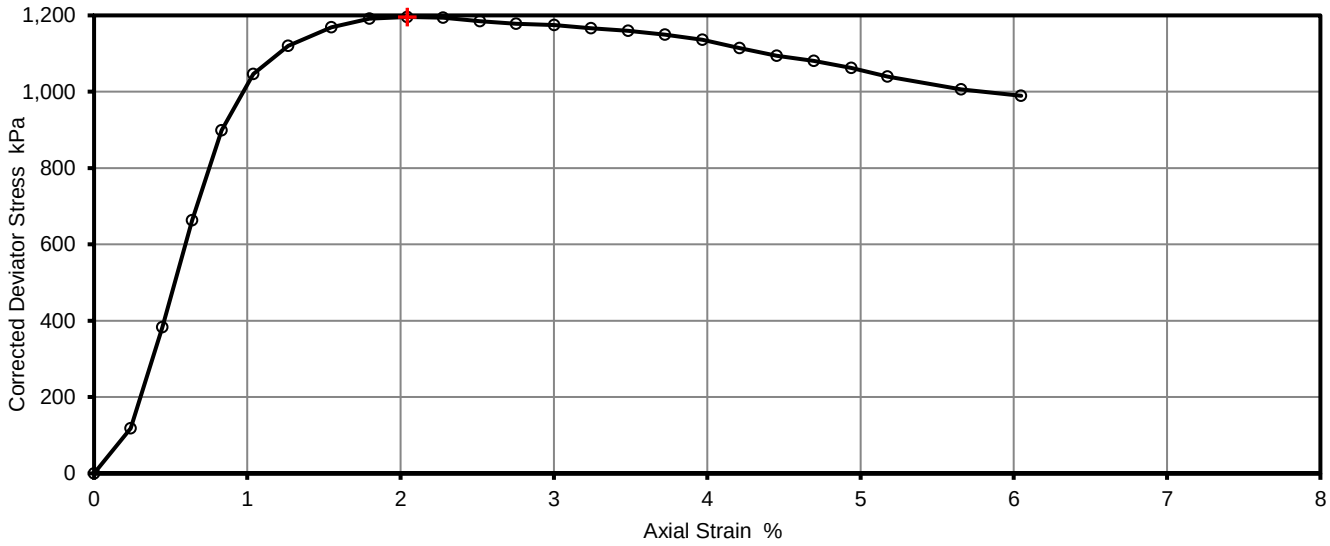
10122

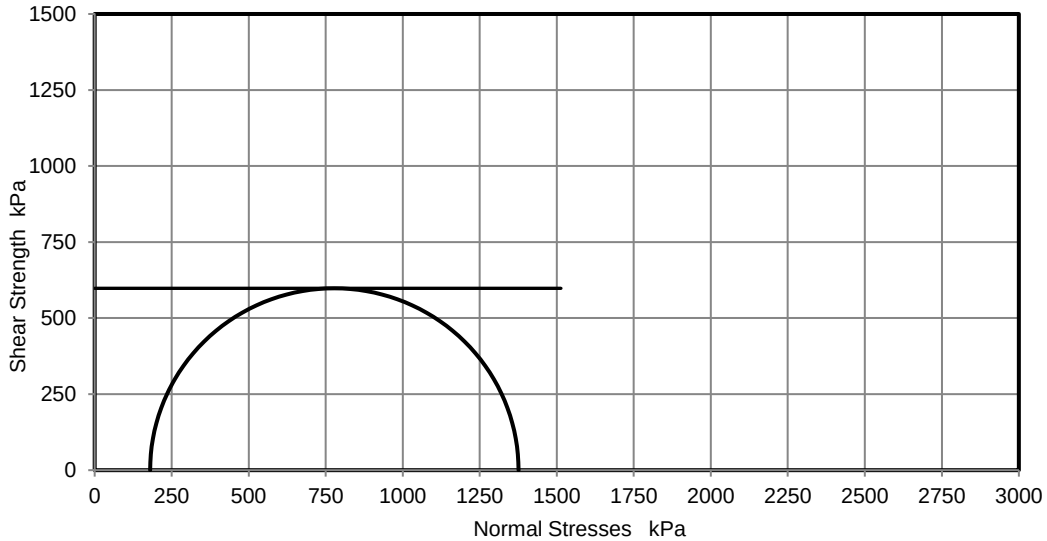
CAUSEWAY GEOTECH	**Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**			Job Ref	21-1682
				Borehole/Pit No.	BH-28886A
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	4
Soil Description	Light brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	8.75
				Base	8.95
Specimen Reference	3	Specimen Depth	8.75 m	Sample Type	C
Specimen Description	Stiff light brown sandy slightly gravelly silty CLAY.			KeyLAB ID	Caus2022082583
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen			Date of test	13/09/2022

Sample Condition		UNDISTURBED	
Test Number		1	
Length		210.1	mm
Diameter		104.1	mm
Bulk Density		2.22	Mg/m3
Moisture Content		5	%
Dry Density		2.11	Mg/m3
Rate of Strain		3.0	%/min
Cell Pressure		180	kPa
At failure	Axial Strain	2.0	%
	Deviator Stress, (σ1 - σ3)f	1196	kPa
	Undrained Shear Strength, cu	598	kPa ½(σ1 - σ3)f
	Mode of Failure	Compound	

Deviator Stress v Axial Strain



Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377.
This is provided for information only.

Remarks

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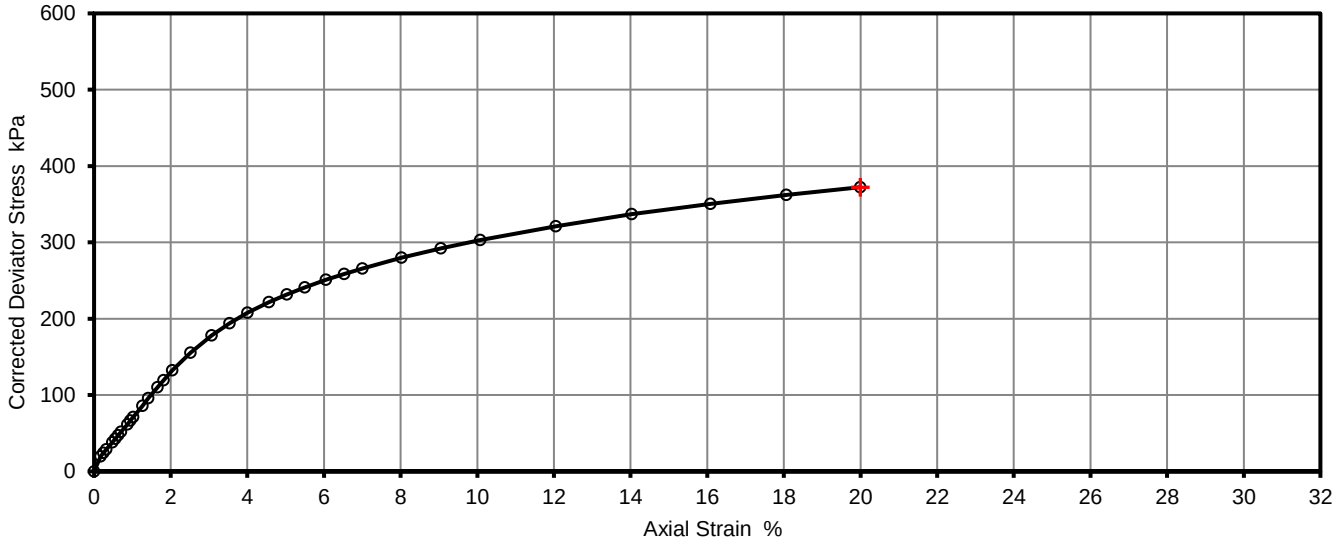
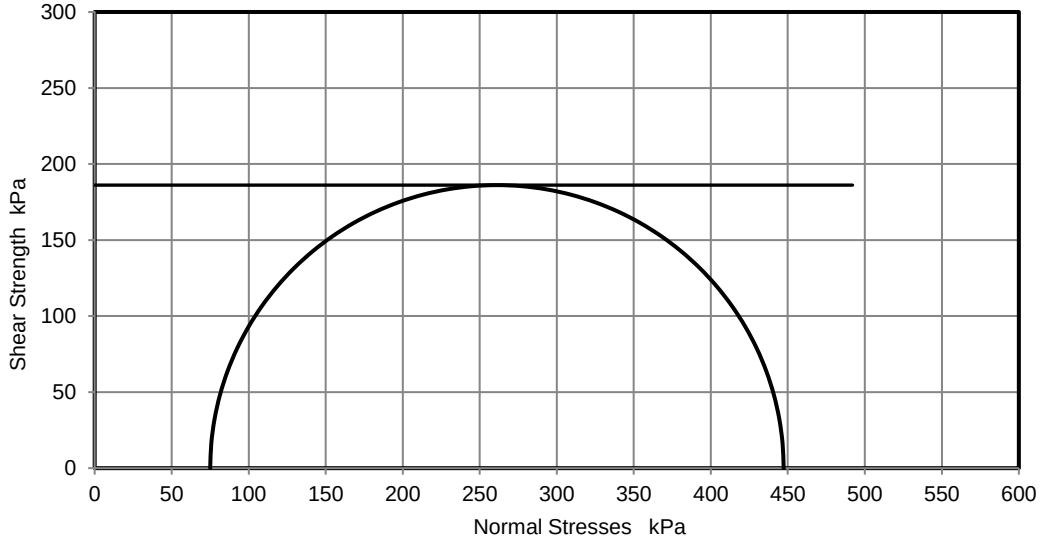
CAUSEWAY GEOTECH	**Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**			Job Ref	21-1682
				Borehole/Pit No.	BH-29130
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Soil Description	Brownish grey sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	6.90
				Base	7.15
Specimen Reference	2	Specimen Depth	6.90 m	Sample Type	C
Specimen Description	Stiff brownish grey sandy slightly gravelly silty CLAY.			KeyLAB ID	Caus2022102010
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen			Date of test	20/10/2022

Sample Condition		UNDISTURBED	
Test Number		1	
Length		210.0	mm
Diameter		105.5	mm
Bulk Density		2.07	Mg/m3
Moisture Content		17	%
Dry Density		1.77	Mg/m3
Rate of Strain		2.0	%/min
Cell Pressure		75	kPa
At failure	Axial Strain	20.0	%
	Deviator Stress, (σ1 - σ3)f	372	kPa
	Undrained Shear Strength, cu	186	kPa ½(σ1 - σ3)f
	Mode of Failure		

Deviator Stress v Axial Strain



Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377.
This is provided for information only.

Remarks

No failure defined. Testing terminated at 20% axial strain.

Approved: Stephen Watson

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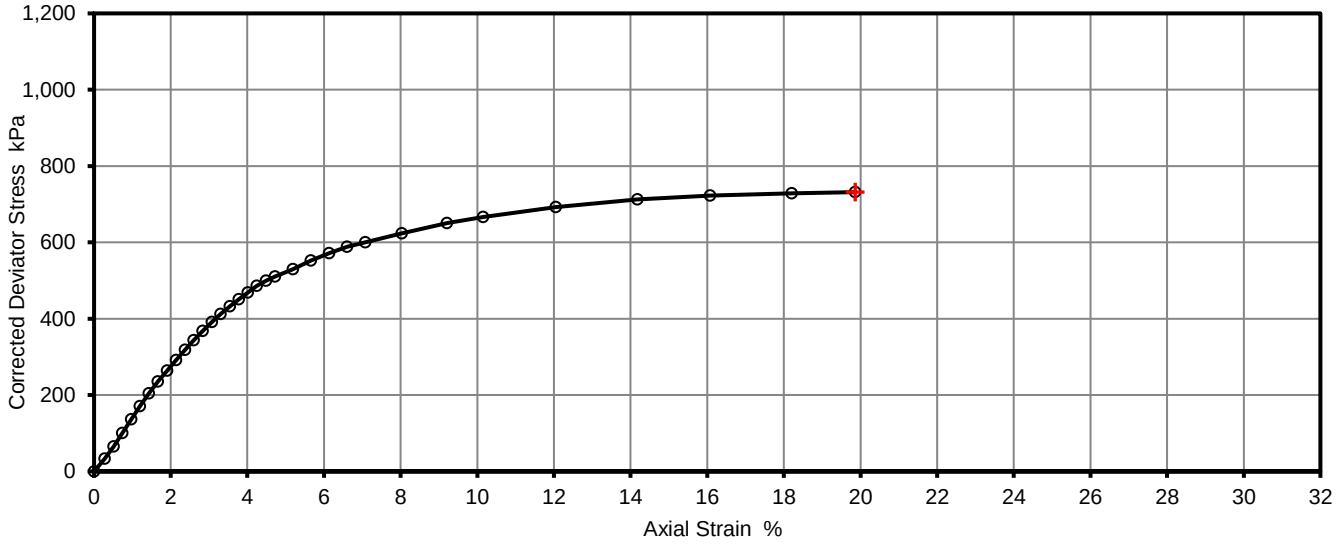
UKAS TESTING
10122

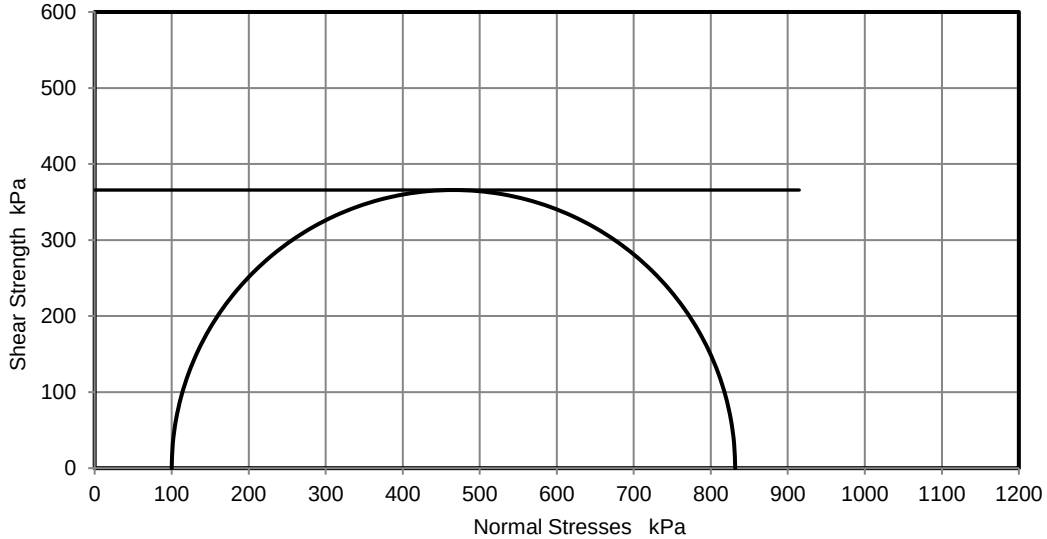
CAUSEWAY GEOTECH	**Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**			Job Ref	21-1682
				Borehole/Pit No.	BH-29923A
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	6
Soil Description	Light greyish brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	5.50
				Sample Depth (m) Base	
Specimen Reference	2	Specimen Depth	5.50 m	Sample Type	C
Specimen Description	Stiff light greyish brown sandy slightly gravelly silty CLAY.			KeyLAB ID	Caus2022081052
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen			Date of test	17/08/2022

Sample Condition		UNDISTURBED	
Test Number		1	
Length		210.0	mm
Diameter		105.4	mm
Bulk Density		2.19	Mg/m3
Moisture Content		11	%
Dry Density		1.98	Mg/m3
Rate of Strain		3.0	%/min
Cell Pressure		100	kPa
At failure	Axial Strain	19.9	%
	Deviator Stress, (σ1 - σ3)f	732	kPa
	Undrained Shear Strength, cu	366	kPa ½(σ1 - σ3)f
	Mode of Failure		

Deviator Stress v Axial Strain



Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377.
This is provided for information only.

Remarks

No failure defined. Testing terminated at 20% axial strain.

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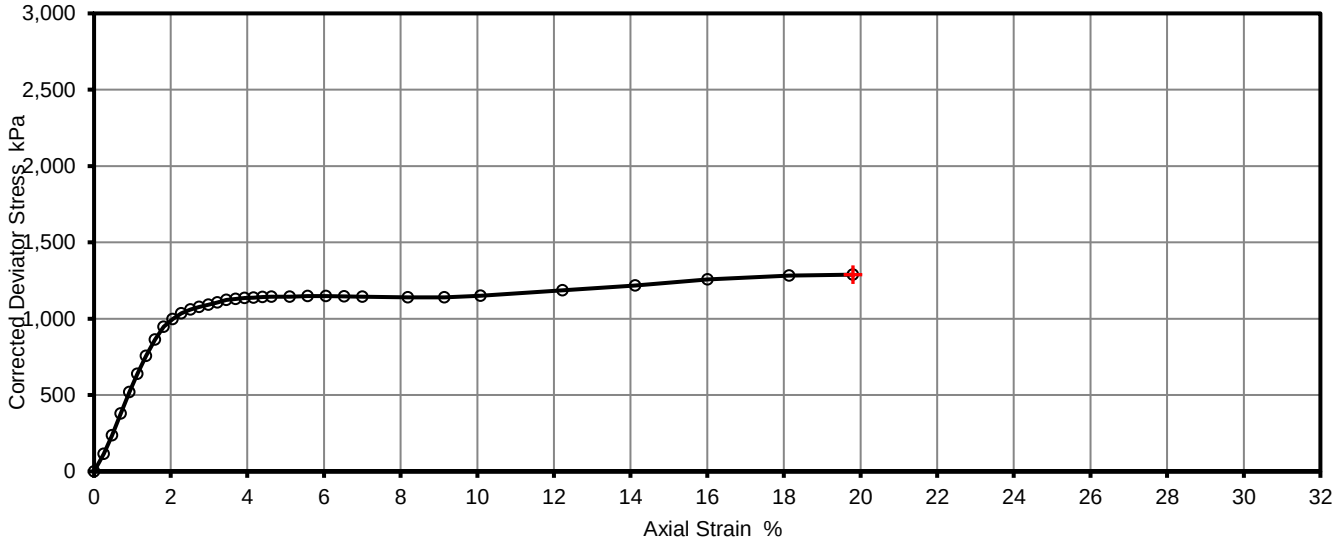
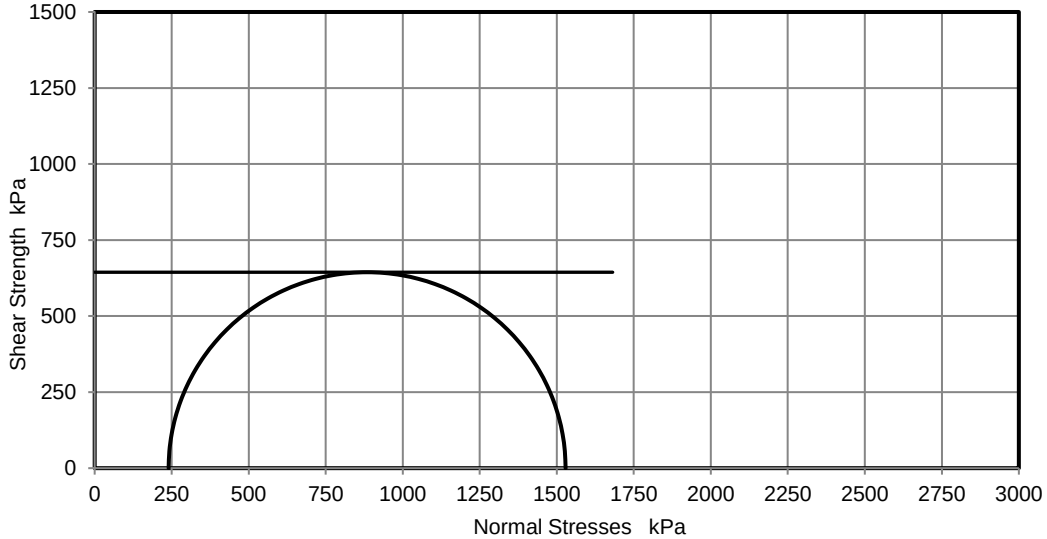
CAUSEWAY GEOTECH	**Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**			Job Ref	21-1682
				Borehole/Pit No.	BH-30066
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Soil Description	Greyish brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	11.50
				Base	
Specimen Reference	2	Specimen Depth	11.50 m	Sample Type	C
Specimen Description	Stiff greyish brown sandy slightly gravelly silty CLAY.			KeyLAB ID	Caus2022081055
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen			Date of test	17/08/2022

Sample Condition		UNDISTURBED	
Test Number		1	
Length		210.1	mm
Diameter		104.9	mm
Bulk Density		2.31	Mg/m3
Moisture Content		6	%
Dry Density		2.18	Mg/m3
Rate of Strain		3.0	%/min
Cell Pressure		240	kPa
At failure	Axial Strain	19.8	%
	Deviator Stress, (σ1 - σ3)f	1289	kPa
	Undrained Shear Strength, cu	644	kPa ½(σ1 - σ3)f
	Mode of Failure		

Deviator Stress v Axial Strain



Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377.
This is provided for information only.

Remarks

No failure defined. Testing terminated at 20% axial strain.

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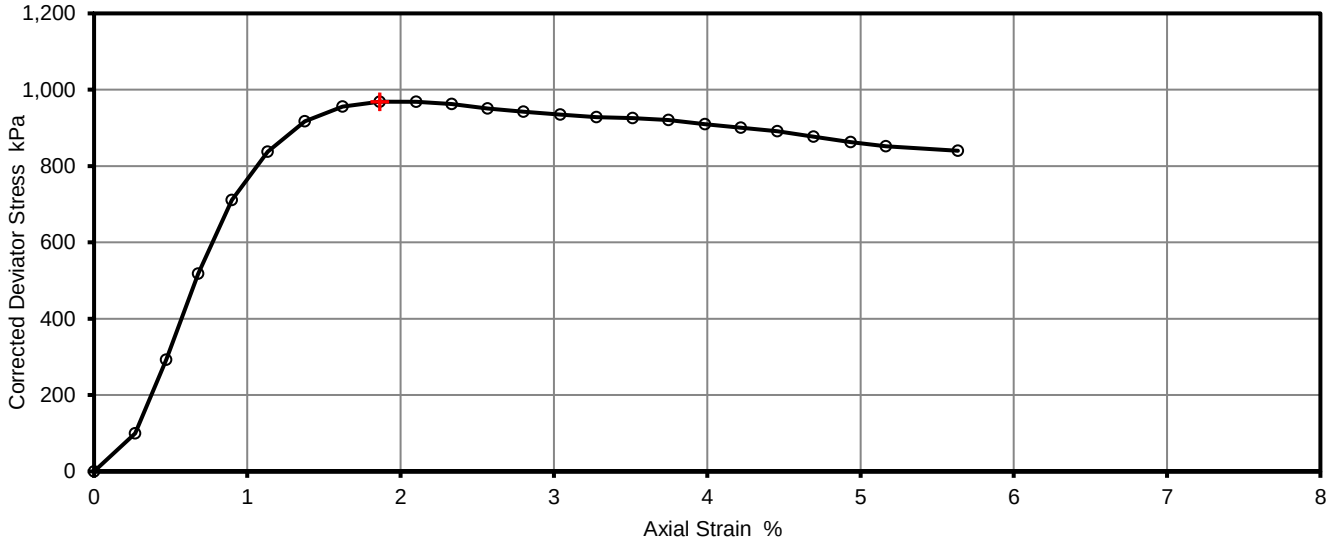
UKAS TESTING
10122

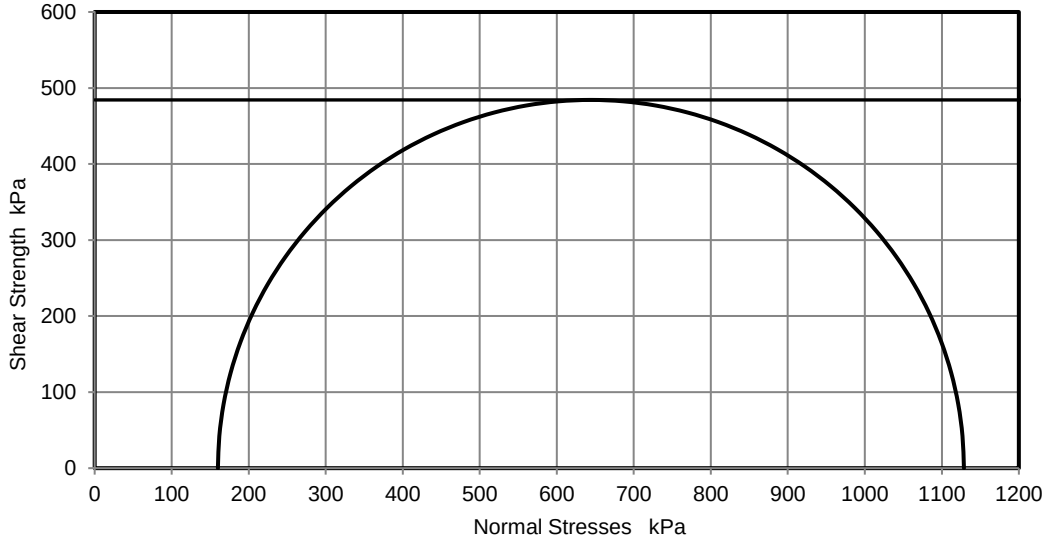
CAUSEWAY GEOTECH	**Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**			Job Ref	21-1682
				Borehole/Pit No.	BH-31227
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Soil Description	Brownish grey sandy gravelly silty CLAY.			Sample Depth (m) Top	8.90
				Base	9.20
Specimen Reference	2	Specimen Depth	8.90 m	Sample Type	C
Specimen Description	Stiff brownish grey sandy gravelly silty CLAY.			KeyLAB ID	Caus2022082562
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen			Date of test	12/09/2022

Sample Condition		UNDISTURBED	
Test Number		1	
Length		210.0	mm
Diameter		104.0	mm
Bulk Density		2.16	Mg/m3
Moisture Content		6	%
Dry Density		2.05	Mg/m3
Rate of Strain		3.0	%/min
Cell Pressure		160	kPa
At failure	Axial Strain	1.9	%
	Deviator Stress, (σ1 - σ3)f	969	kPa
	Undrained Shear Strength, cu	484	kPa ½(σ1 - σ3)f
	Mode of Failure	Compound	

Deviator Stress v Axial Strain



Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377.
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Remarks

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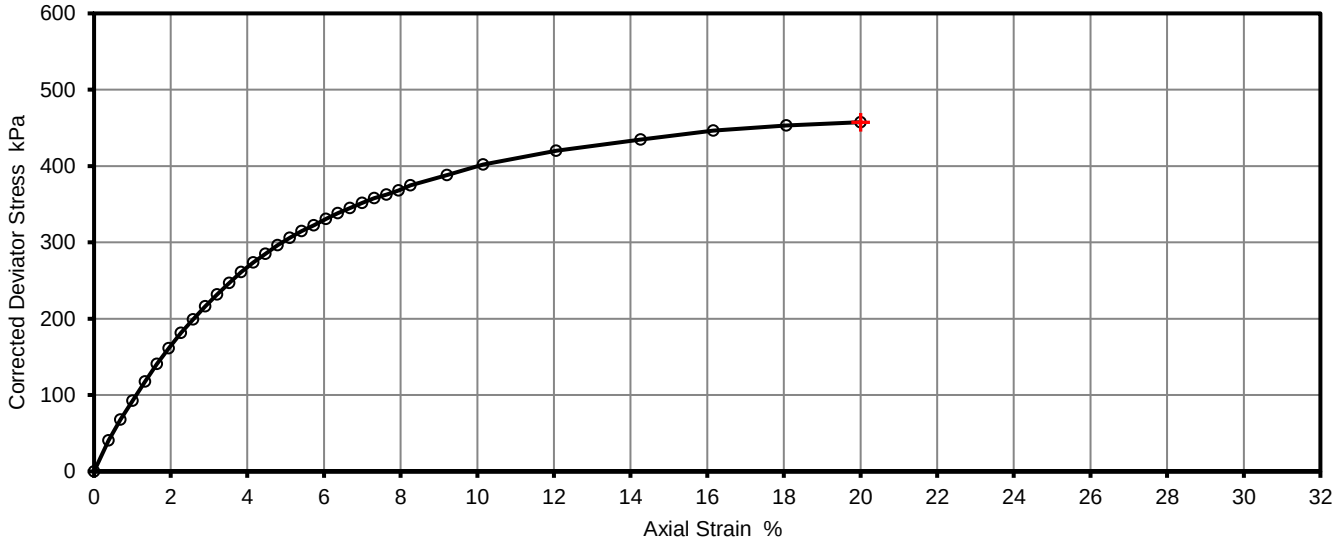
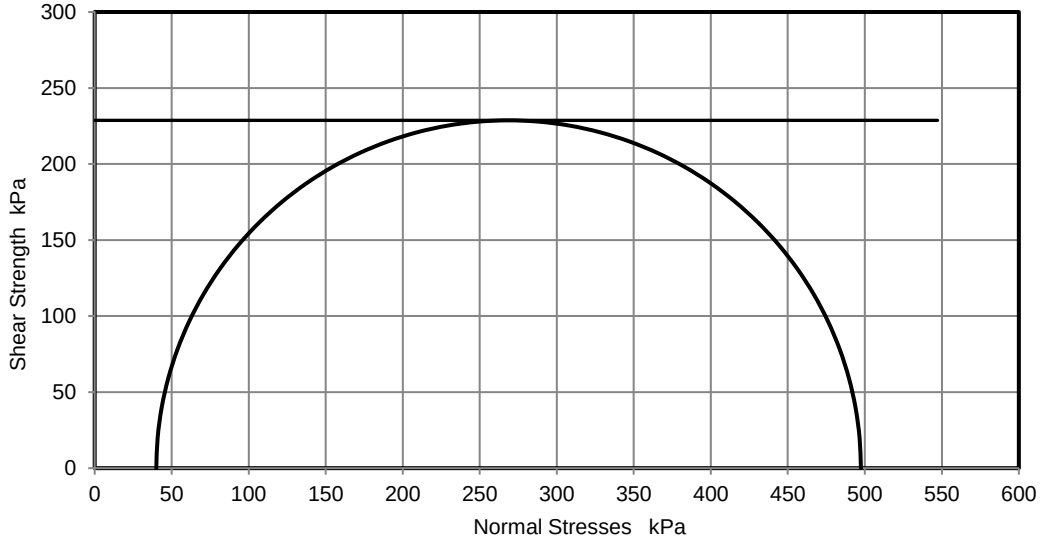
CAUSEWAY GEOTECH	**Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**			Job Ref	21-1682
				Borehole/Pit No.	BH-31910
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	7
Soil Description	Light brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	2.00
				Sample Depth (m) Base	2.45
Specimen Reference	4	Specimen Depth	2.05 m	Sample Type	U
Specimen Description	Stiff light brown sandy slightly gravelly silty CLAY.			KeyLAB ID	Caus2022052414
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen			Date of test	07/06/2022

Sample Condition		UNDISTURBED	
Test Number		1	
Length		210.0	mm
Diameter		105.9	mm
Bulk Density		2.42	Mg/m3
Moisture Content		8	%
Dry Density		2.24	Mg/m3
Rate of Strain		4.0	%/min
Cell Pressure		40	kPa
At failure	Axial Strain	20.0	%
	Deviator Stress, (σ1 - σ3)f	457	kPa
	Undrained Shear Strength, cu	229	kPa ½(σ1 - σ3)f
	Mode of Failure		

Deviator Stress v Axial Strain



Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377.
This is provided for information only.

Remarks

No failure defined. Testing terminated at 20% axial strain.

Approved: Stephen.Watson

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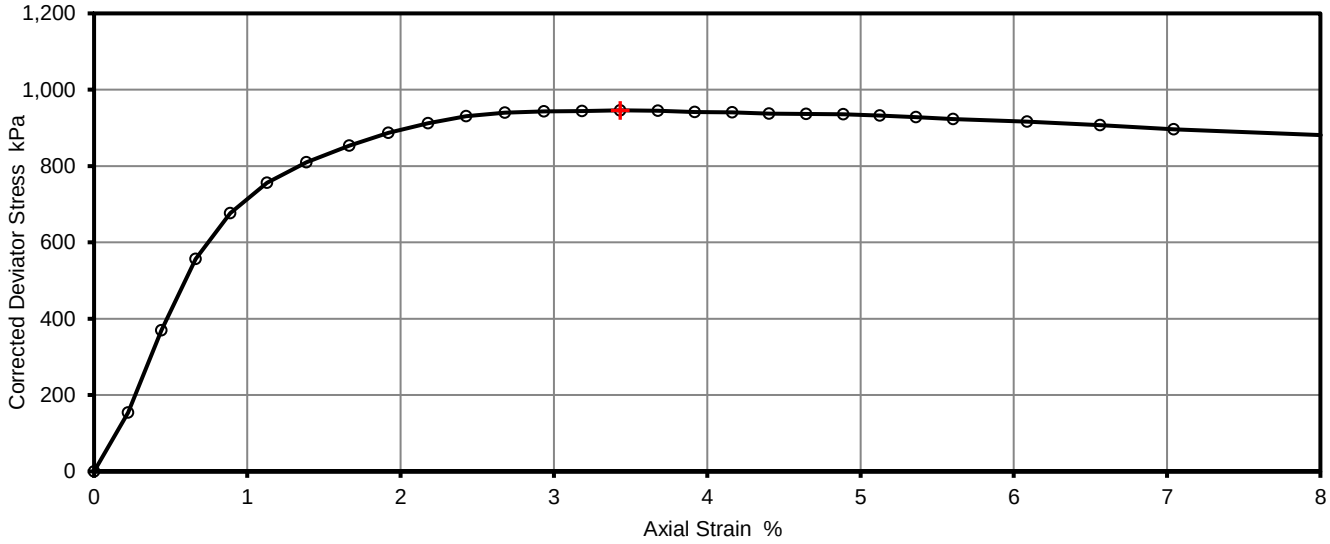
UKAS TESTING
10122

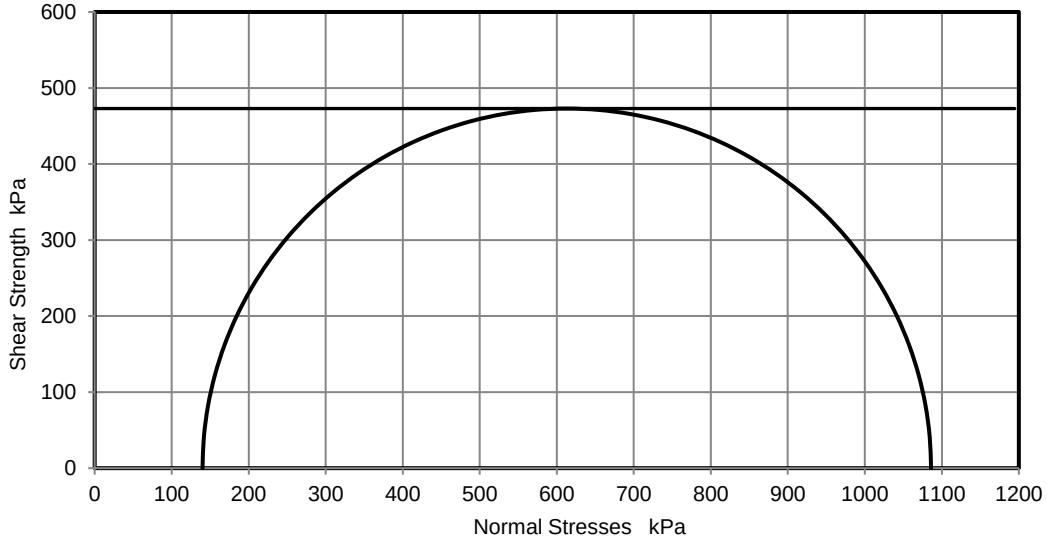
CAUSEWAY GEOTECH	**Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**			Job Ref	21-1682
				Borehole/Pit No.	BH-31910B
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	4
Soil Description	Greyish brown sandy gravelly silty CLAY.			Sample Depth (m) Top	7.10
				Sample Depth (m) Base	
Specimen Reference	2	Specimen Depth	7.10 m	Sample Type	C
Specimen Description	Stiff greyish brown sandy gravelly silty CLAY.			KeyLAB ID	Caus2022081019
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen			Date of test	16/08/2022

Sample Condition		UNDISTURBED	
Test Number		1	
Length		210.1	mm
Diameter		104.6	mm
Bulk Density		2.28	Mg/m3
Moisture Content		6	%
Dry Density		2.15	Mg/m3
Rate of Strain		3.0	%/min
Cell Pressure		140	kPa
At failure	Axial Strain	3.4	%
	Deviator Stress, (σ1 - σ3)f	946	kPa
	Undrained Shear Strength, cu	473	kPa ½(σ1 - σ3)f
	Mode of Failure	Brittle	

Deviator Stress v Axial Strain



Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377.
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Remarks

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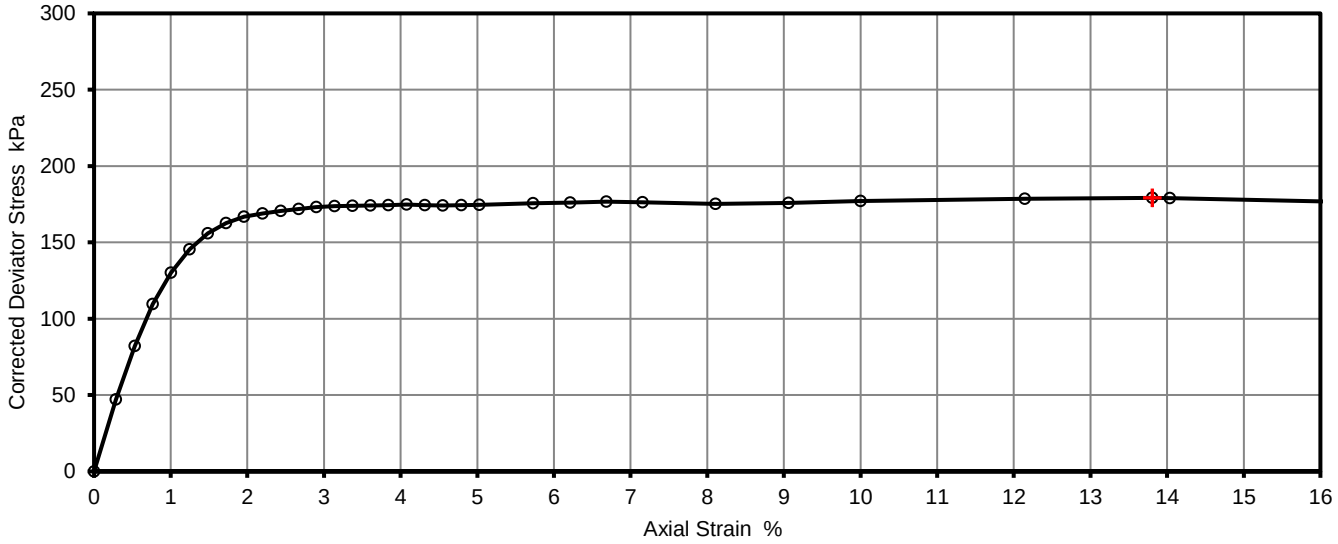
10122

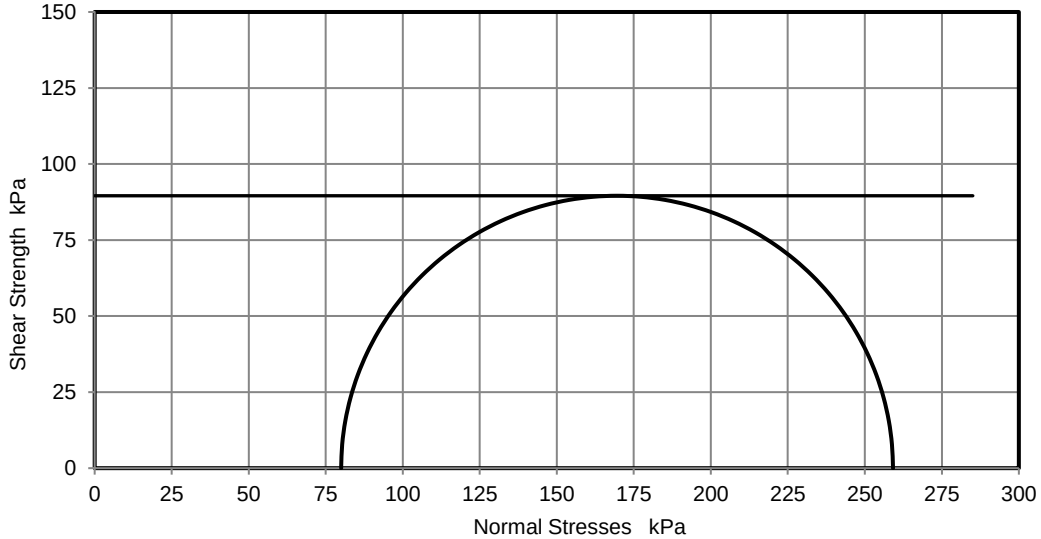
CAUSEWAY GEOTECH	**Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**			Job Ref	21-1682
				Borehole/Pit No.	BH-32319
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Soil Description	Greyish brown sandy gravelly silty CLAY with cobbles.			Sample Depth (m) Top	3.80
				Sample Depth (m) Base	
Specimen Reference	8	Specimen Depth	3.80 m	Sample Type	C
Specimen Description	Stiff greyish brown sandy gravelly silty CLAY with cobbles.			KeyLAB ID	Caus2022081023
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen			Date of test	16/08/2022

Sample Condition		UNDISTURBED	
Test Number		1	
Length		210.0	mm
Diameter		105.7	mm
Bulk Density		2.31	Mg/m3
Moisture Content		7	%
Dry Density		2.15	Mg/m3
Rate of Strain		3.0	%/min
Cell Pressure		80	kPa
At failure	Axial Strain	13.8	%
	Deviator Stress, (σ1 - σ3)f	179	kPa
	Undrained Shear Strength, cu	90	kPa ½(σ1 - σ3)f
	Mode of Failure	Brittle	

Deviator Stress v Axial Strain



Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377.
This is provided for information only.

Remarks

Approved	Printed
Stephen.Watson	17/11/2022 18:10

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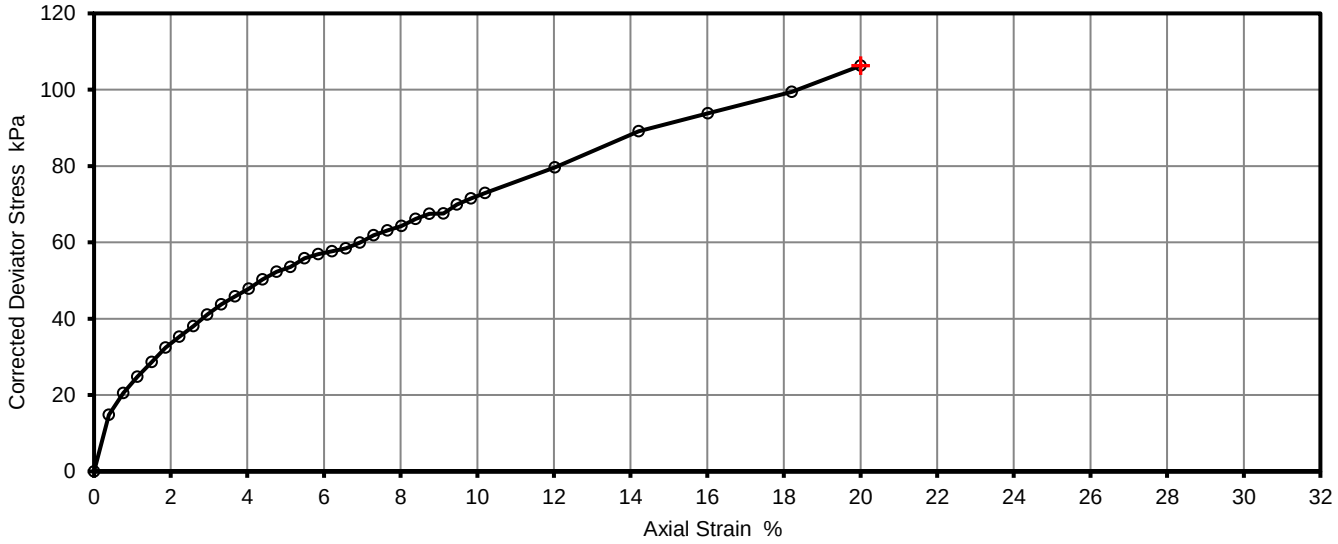
10122

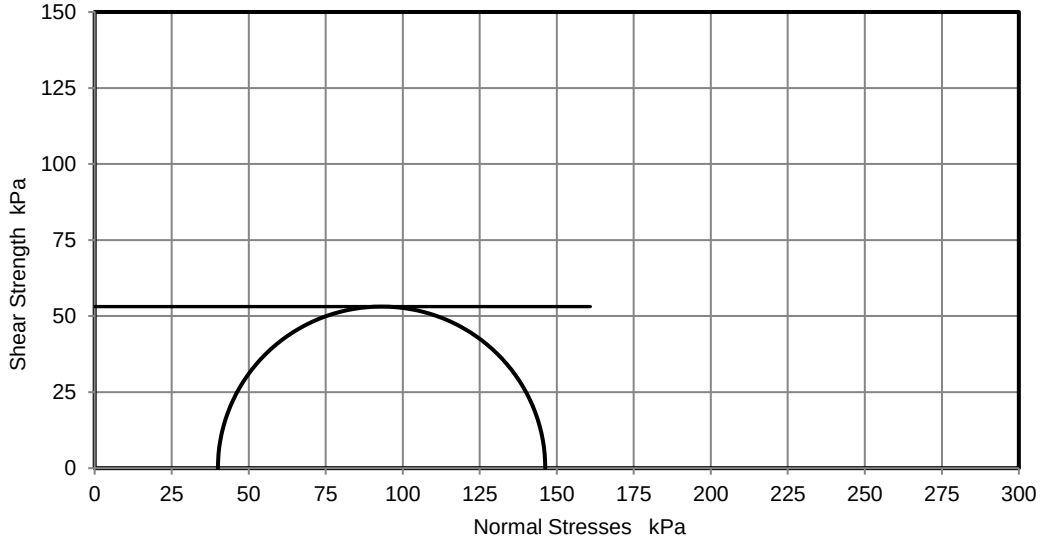
CAUSEWAY GEOTECH	**Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**			Job Ref	21-1682
				Borehole/Pit No.	BH-34598
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	9
Soil Description	Light brown sandy gravelly silty CLAY.			Sample Depth (m) Top	2.00
				Sample Depth (m) Base	2.45
Specimen Reference	4	Specimen Depth	2.05 m	Sample Type	U
Specimen Description	Firm light brown sandy gravelly silty CLAY.			KeyLAB ID	Caus2022052427
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen			Date of test	07/06/2022

Sample Condition		UNDISTURBED	
Test Number		1	
Length		183.6	mm
Diameter		105.9	mm
Bulk Density		2.41	Mg/m3
Moisture Content		8	%
Dry Density		2.23	Mg/m3
Rate of Strain		4.0	%/min
Cell Pressure		40	kPa
At failure	Axial Strain	20.0	%
	Deviator Stress, (σ1 - σ3)f	106	kPa
	Undrained Shear Strength, cu	53	kPa ½(σ1 - σ3)f
	Mode of Failure		

Deviator Stress v Axial Strain



Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377.
This is provided for information only.

Remarks

No failure defined. Testing terminated at 20% axial strain.

Approved: Stephen.Watson

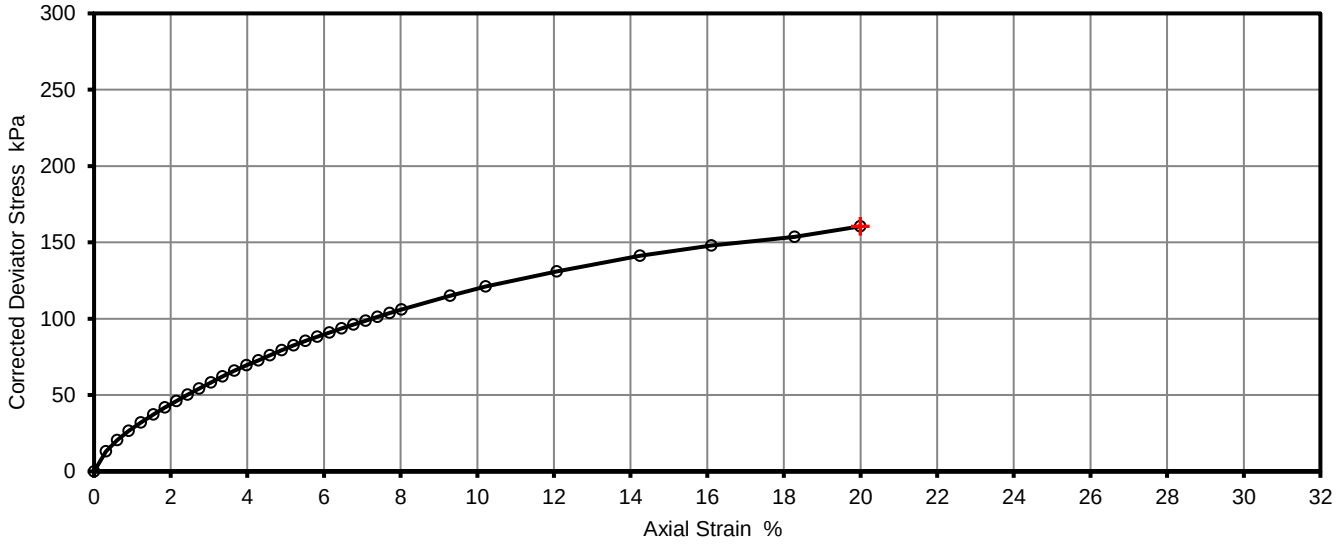
Printed: 17/11/2022 18:10

UKAS TESTING
10122

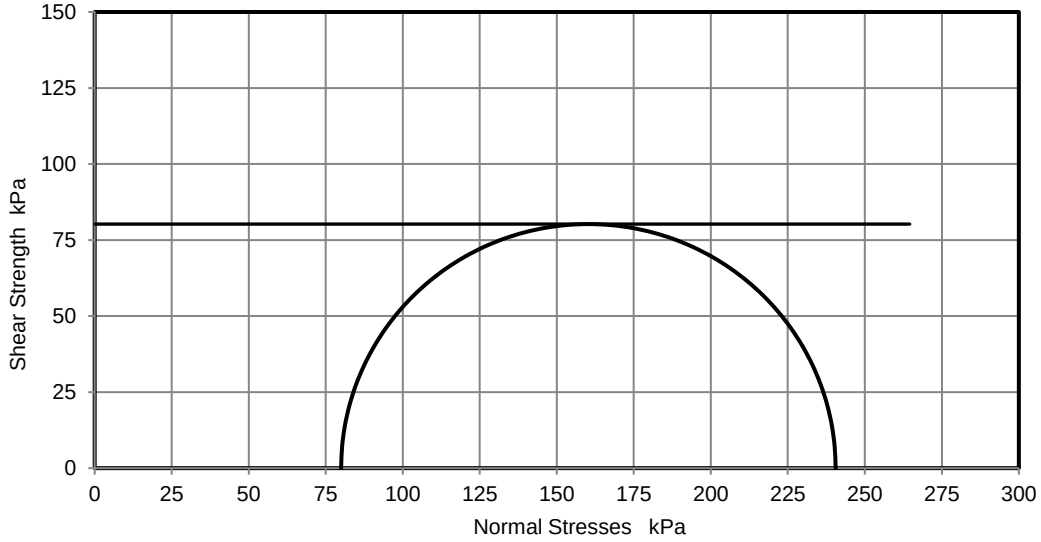
CAUSEWAY GEOTECH	**Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**			Job Ref	21-1682
				Borehole/Pit No.	BH-4110
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Soil Description	Brownish grey sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	4.00
				Sample Depth (m) Base	4.40
Specimen Reference	2	Specimen Depth	4.05 m	Sample Type	U
Specimen Description	Stiff brownish grey sandy slightly gravelly silty CLAY.			KeyLAB ID	Caus2022062168
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen			Date of test	07/07/2022

Sample Condition		UNDISTURBED	
Test Number		1	
Length		210.0	mm
Diameter		105.8	mm
Bulk Density		2.28	Mg/m3
Moisture Content		10	%
Dry Density		2.06	Mg/m3
Rate of Strain		4.0	%/min
Cell Pressure		80	kPa
At failure	Axial Strain	20.0	%
	Deviator Stress, (σ1 - σ3)f	161	kPa
	Undrained Shear Strength, cu	80	kPa ½(σ1 - σ3)f
	Mode of Failure		

Deviator Stress v Axial Strain



Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377.
This is provided for information only.

Remarks

No failure defined. Testing terminated at 20% axial strain.

Approved: Stephen.Watson

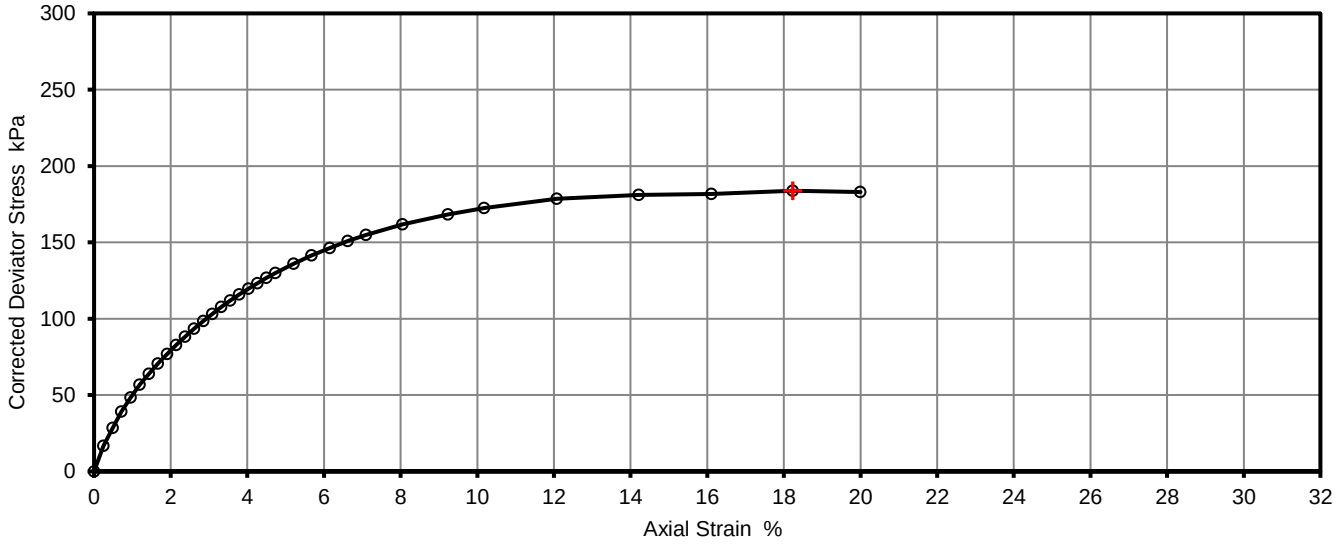
Printed: 17/11/2022 18:10

UKAS TESTING
10122

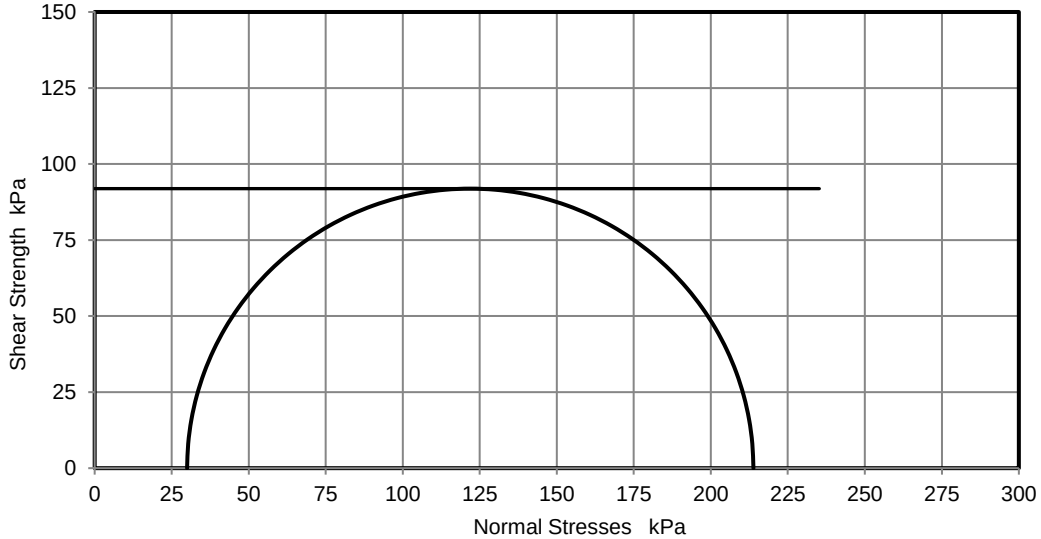
CAUSEWAY GEOTECH	**Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**			Job Ref	21-1682
				Borehole/Pit No.	BH-533
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	9
Soil Description	Brownish grey sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	1.20
				Base	1.65
Specimen Reference	2	Specimen Depth	1.25 m	Sample Type	U
Specimen Description	Stiff brownish grey sandy slightly gravelly silty CLAY.			KeyLAB ID	Caus20220930132
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen			Date of test	07/10/2022

Sample Condition		UNDISTURBED	
Test Number		1	
Length		210.0	mm
Diameter		105.5	mm
Bulk Density		2.24	Mg/m3
Moisture Content		14	%
Dry Density		1.97	Mg/m3
Rate of Strain		3.0	%/min
Cell Pressure		30	kPa
At failure	Axial Strain	18.2	%
	Deviator Stress, (σ1 - σ3)f	184	kPa
	Undrained Shear Strength, cu	92	kPa ½(σ1 - σ3)f
	Mode of Failure	Compound	

Deviator Stress v Axial Strain



Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377.
This is provided for information only.

Remarks

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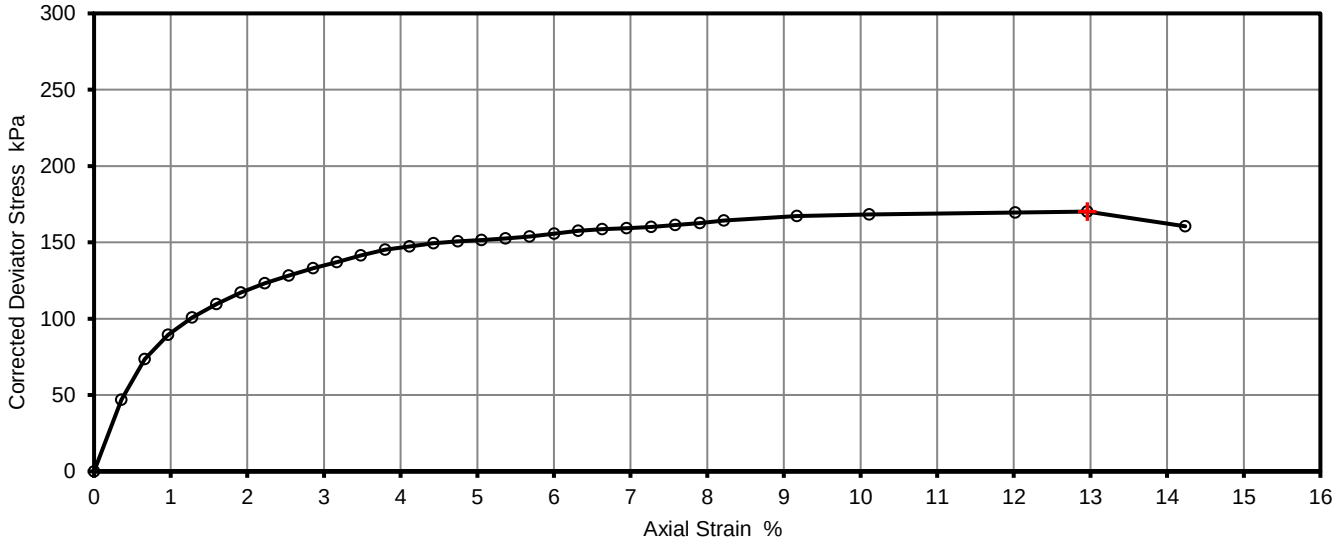
10122

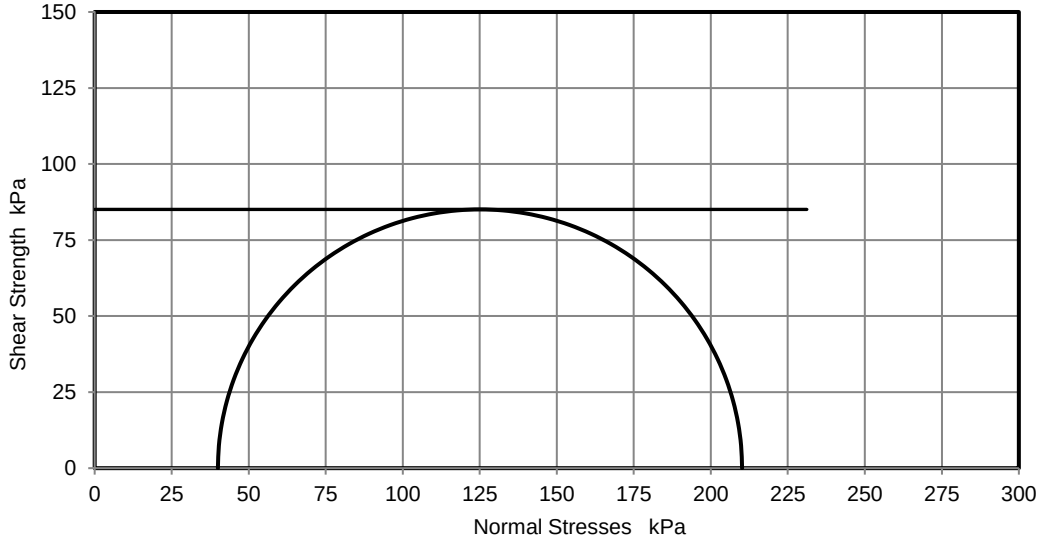
CAUSEWAY GEOTECH	**Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**			Job Ref	21-1682
				Borehole/Pit No.	BH-5530
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	10
Soil Description	Brownish grey sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	2.00
				Base	2.45
Specimen Reference	2	Specimen Depth	2.05 m	Sample Type	U
Specimen Description	Stiff brownish grey sandy slightly gravelly silty CLAY.			KeyLAB ID	Caus2022071439
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen			Date of test	01/08/2022

Sample Condition		UNDISTURBED	
Test Number		1	
Length		210.1	mm
Diameter		105.7	mm
Bulk Density		2.23	Mg/m3
Moisture Content		9	%
Dry Density		2.05	Mg/m3
Rate of Strain		4.0	%/min
Cell Pressure		40	kPa
At failure	Axial Strain	13.0	%
	Deviator Stress, (σ1 - σ3)f	170	kPa
	Undrained Shear Strength, cu	85	kPa ½(σ1 - σ3)f
	Mode of Failure	Compound	

Deviator Stress v Axial Strain



Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377.
This is provided for information only.

Remarks

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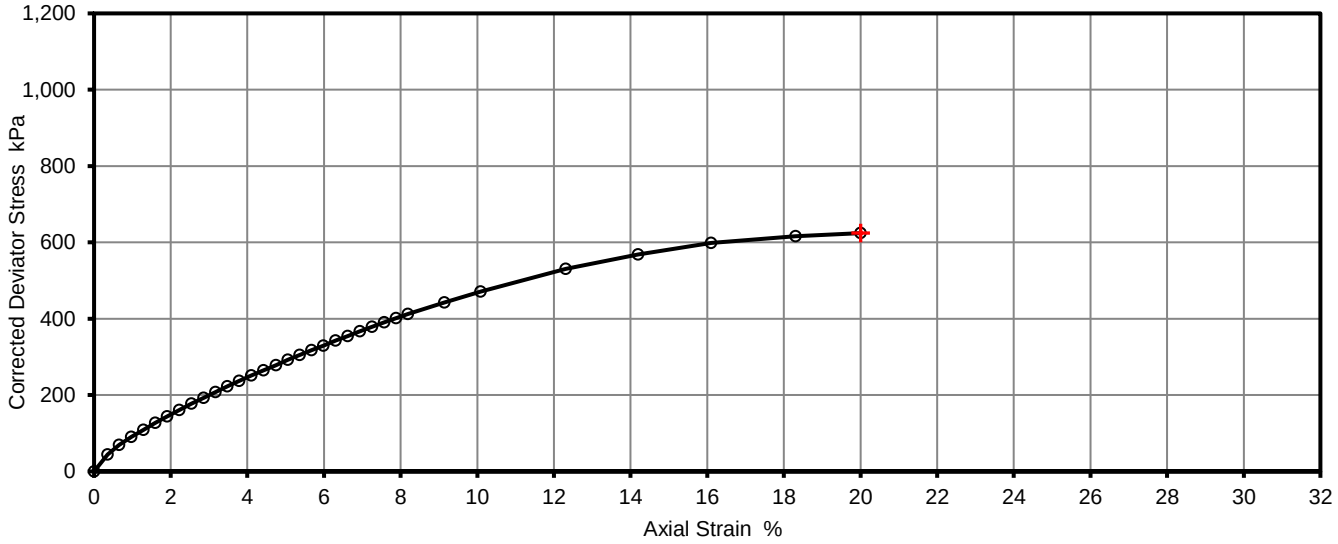
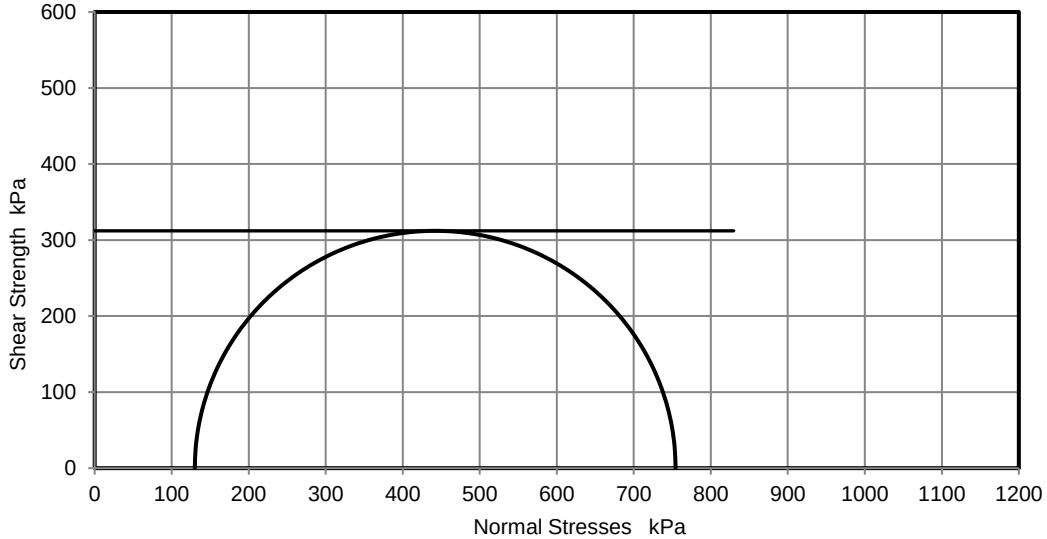
CAUSEWAY GEOTECH	**Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**			Job Ref	21-1682
				Borehole/Pit No.	BH-5530
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	11
Soil Description	Brownish grey slightly sandy silty CLAY.			Sample Depth (m) Top	6.50
				Base	6.95
Specimen Reference	2	Specimen Depth	6.55 m	Sample Type	U
Specimen Description	Stiff brownish grey slightly sandy silty CLAY.			KeyLAB ID	Caus2022071441
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen			Date of test	01/08/2022

Sample Condition		UNDISTURBED	
Test Number		1	
Length		210.0	mm
Diameter		104.9	mm
Bulk Density		2.18	Mg/m3
Moisture Content		16	%
Dry Density		1.88	Mg/m3
Rate of Strain		4.0	%/min
Cell Pressure		130	kPa
At failure	Axial Strain	20.0	%
	Deviator Stress, (σ1 - σ3)f	624	kPa
	Undrained Shear Strength, cu	312	kPa ½(σ1 - σ3)f
	Mode of Failure		

Deviator Stress v Axial Strain



Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377.
This is provided for information only.

Remarks

No failure defined. Testing terminated at 20% axial strain.

Approved: Stephen.Watson

Printed: 17/11/2022 18:10

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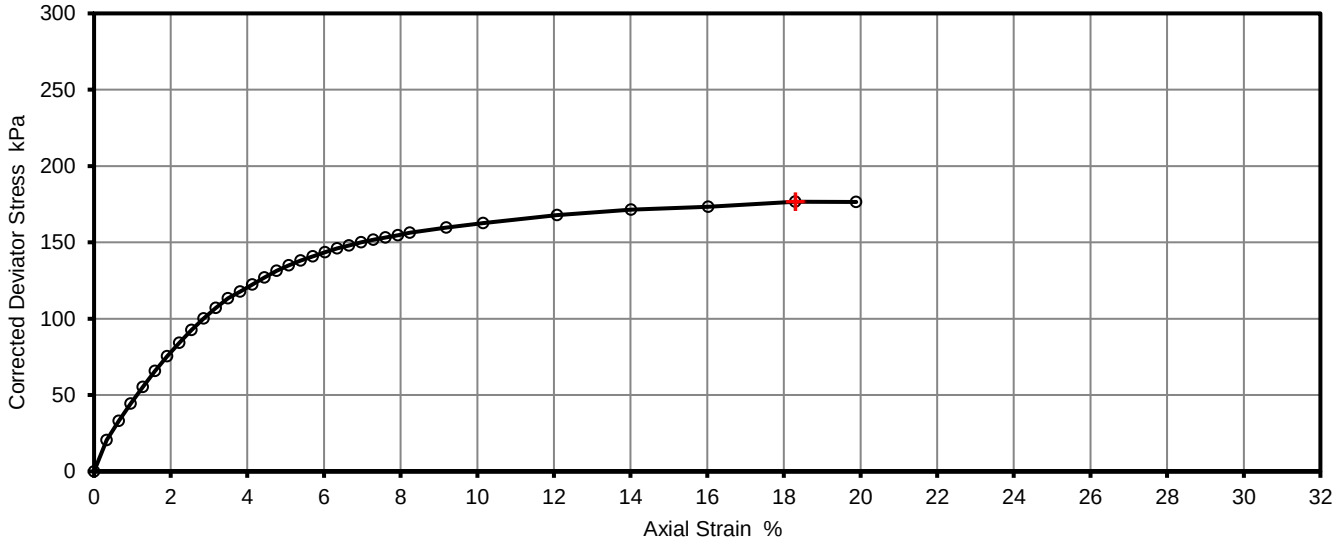
10122

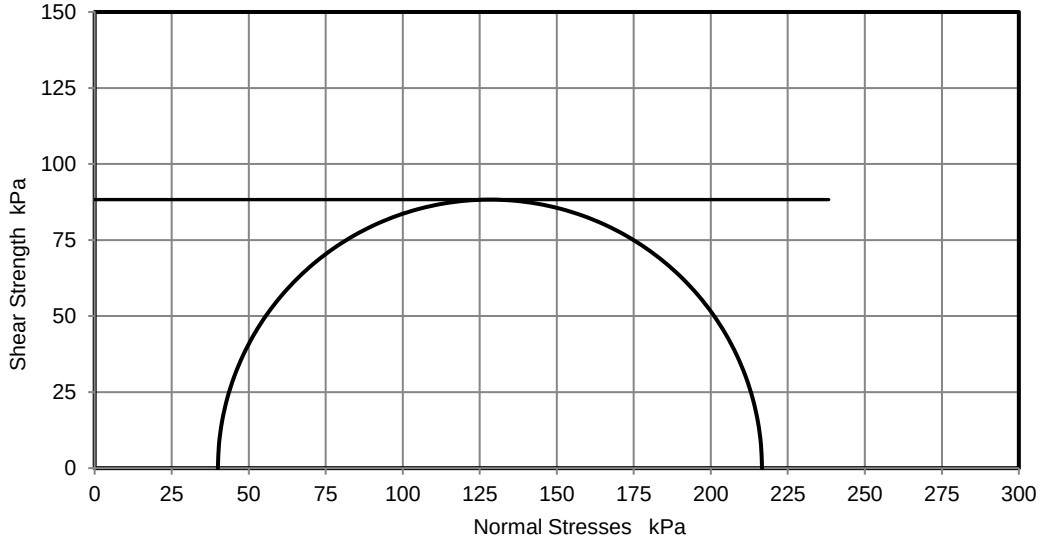
CAUSEWAY GEOTECH	**Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**			Job Ref	21-1682
				Borehole/Pit No.	BH-5573
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	11
Soil Description	Brownish grey sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	2.00
				Base	2.45
Specimen Reference	3	Specimen Depth	2.05 m	Sample Type	U
Specimen Description	Stiff brownish grey sandy slightly gravelly silty CLAY.			KeyLAB ID	Caus2022080418
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen			Date of test	05/08/2022

Sample Condition		UNDISTURBED	
Test Number		1	
Length		210.0	mm
Diameter		104.9	mm
Bulk Density		2.22	Mg/m3
Moisture Content		13	%
Dry Density		1.97	Mg/m3
Rate of Strain		4.0	%/min
Cell Pressure		40	kPa
At failure	Axial Strain	18.3	%
	Deviator Stress, (σ1 - σ3)f	177	kPa
	Undrained Shear Strength, cu	88	kPa ½(σ1 - σ3)f
	Mode of Failure		

Deviator Stress v Axial Strain



Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377.
This is provided for information only.

Remarks

Approved	Printed
Stephen.Watson	17/11/2022 18:10

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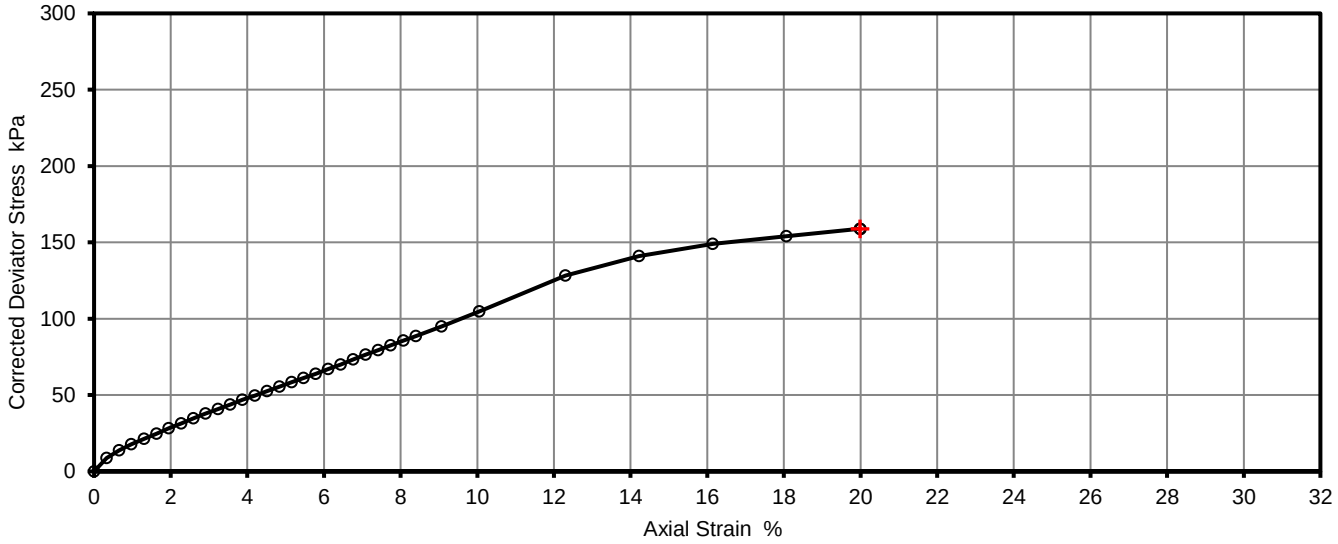
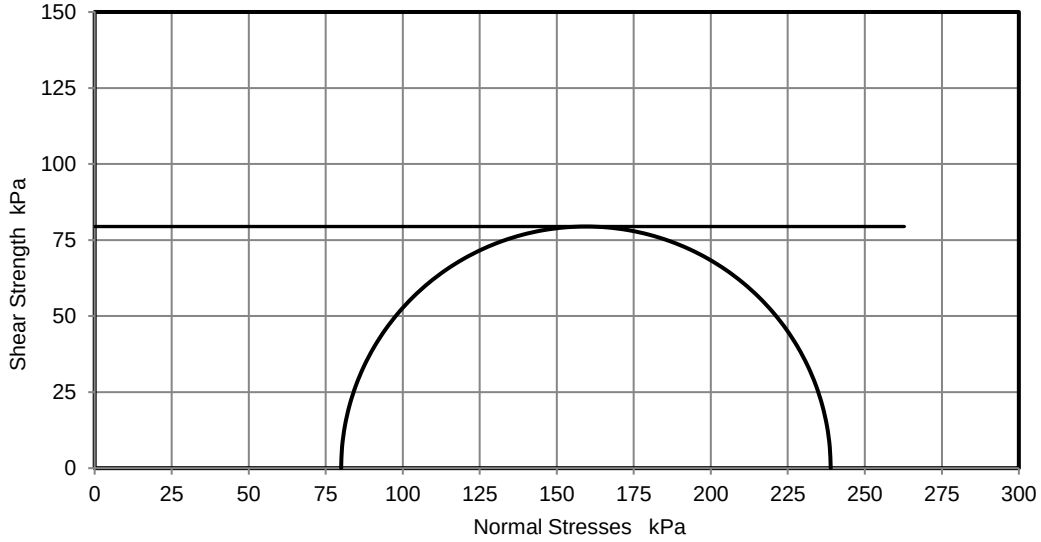
CAUSEWAY GEOTECH	**Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**			Job Ref	21-1682
				Borehole/Pit No.	BH-6886
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	8
Soil Description	Brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	3.00
				Base	3.45
Specimen Reference	3	Specimen Depth	3.05 m	Sample Type	U
Specimen Description	Stiff brown sandy slightly gravelly silty CLAY.			KeyLAB ID	Caus2022080438
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen			Date of test	05/08/2022

Sample Condition		UNDISTURBED	
Test Number		1	
Length		207.9	mm
Diameter		104.9	mm
Bulk Density		2.04	Mg/m3
Moisture Content		20	%
Dry Density		1.70	Mg/m3
Rate of Strain		4.0	%/min
Cell Pressure		80	kPa
At failure	Axial Strain	20.0	%
	Deviator Stress, (σ1 - σ3)f	159	kPa
	Undrained Shear Strength, cu	79	kPa ½(σ1 - σ3)f
	Mode of Failure		

Deviator Stress v Axial Strain



Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377.
This is provided for information only.

Remarks

No failure defined. Testing terminated at 20% axial strain.

Approved: Stephen.Watson

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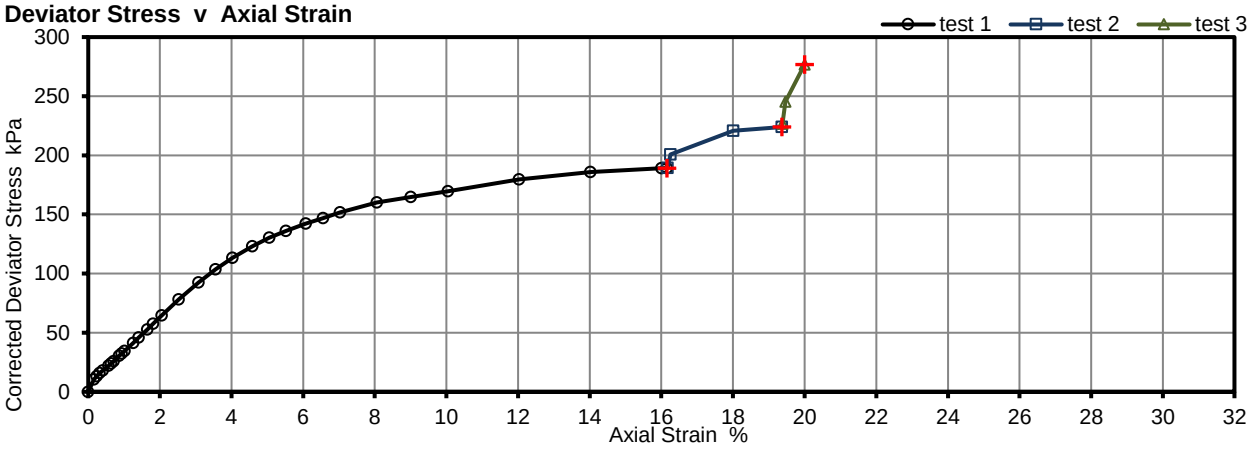
CAUSEWAY GEOTECH	**Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - Multistage test**			Job Ref	21-1682
				Borehole/Pit No.	BH-1922
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	13
Soil Description	Greyish brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	1.20
				Sample Depth (m) Base	1.65
Specimen Reference	6	Specimen Depth	1.25 m	Sample Type	U
Specimen Description	Stiff greyish brown sandy slightly gravelly silty CLAY.			KeyLAB ID	Caus2022062111
Test Method	BS1377:Part 7:1990, clause 9, multistage test on a single spe			Date of test	30/06/2022

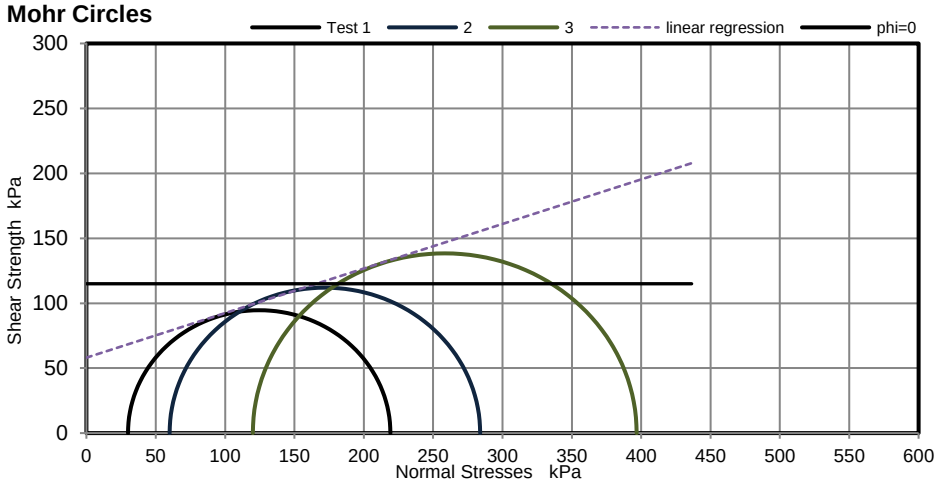
Length	mm	209.7
Diameter	mm	105.2
Bulk Density	Mg/m3	2.33
Moisture Content	%	11.1
Dry Density	Mg/m3	2.10

Rate of Strain		%/min	2.00		
Stage Number			1	2	3
Cell Pressure		kPa	30	60	120
End of stage	Axial Strain	%	16.2	19.4	20.0
	Deviator Stress, (σ1 - σ3) corrected for area and membrane	kPa	189.2	223.9	276.7
	Shear strength, cu	kPa	94.6	112.0	138.4
	Mode of failure				

Deviator Stress v Axial Strain



Mohr Circles



ϕu = 0

Average cu 115 kPa

Linear Regression

ϕu 18.9 °

cu 58 kPa

Mohr circles and their interpretation is not covered by BS1377-7: 1990. These are provided for information only.

Remarks

No failure defined. Testing terminated at 20% axial strain.

Approved: Stephen.Watson

Printed: 17/11/2022 18:14

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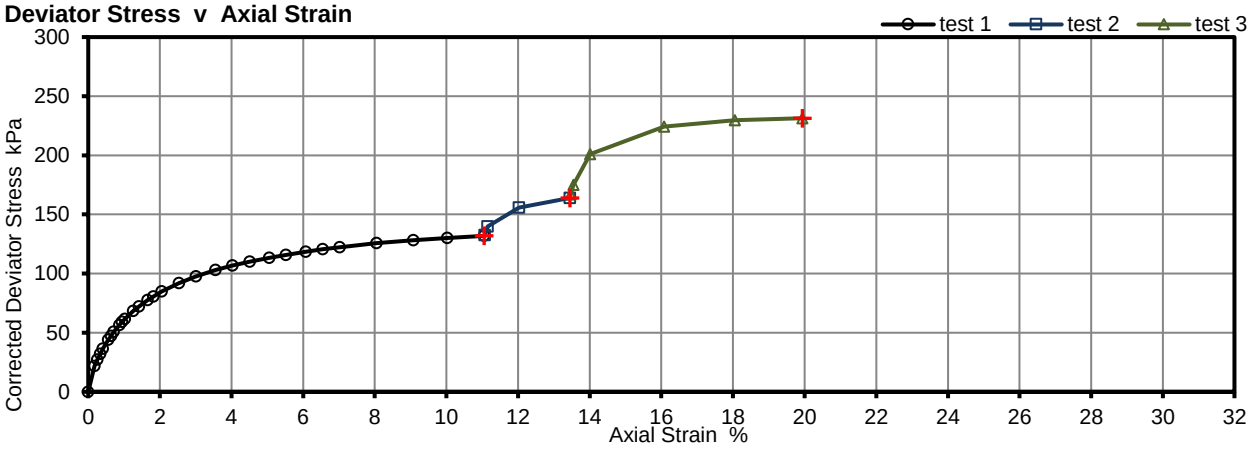
CAUSEWAY GEOTECH	**Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - Multistage test**			Job Ref	21-1682
				Borehole/Pit No.	BH-27602
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	11
Soil Description	Greyish brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	1.20
				Sample Depth (m) Base	
Specimen Reference	6	Specimen Depth	1.25 m	Sample Type	U
Specimen Description	Stiff greyish brown sandy slightly gravelly silty CLAY.			KeyLAB ID	Caus2022062126
Test Method	BS1377:Part 7:1990, clause 9, multistage test on a single spe			Date of test	30/06/2022

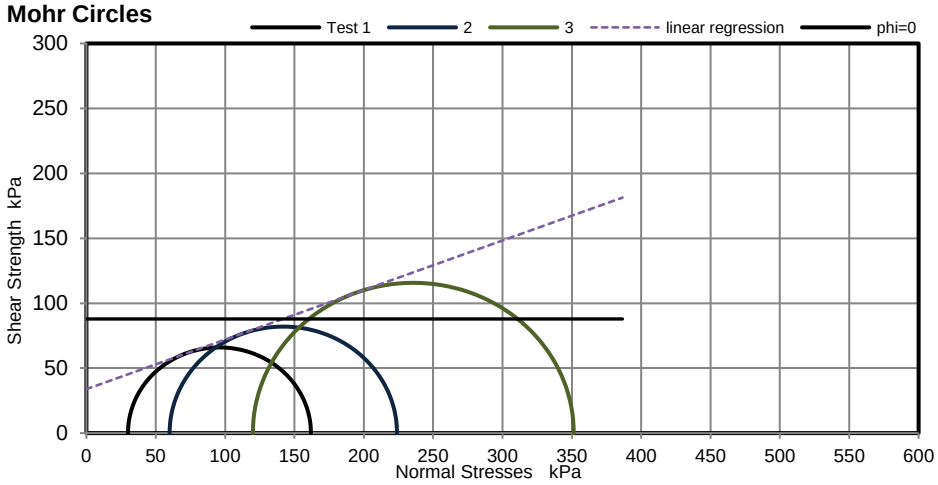
Length	mm	210.7
Diameter	mm	105.0
Bulk Density	Mg/m3	2.14
Moisture Content	%	8.9
Dry Density	Mg/m3	1.97

Rate of Strain		%/min	2.00		
Stage Number			1	2	3
Cell Pressure		kPa	30	60	120
End of stage	Axial Strain	%	11.1	13.4	19.9
	Deviator Stress, (σ1 - σ3) corrected for area and membrane	kPa	131.9	164.0	231.4
	Shear strength, cu	kPa	65.9	82.0	115.7
	Mode of failure				

Deviator Stress v Axial Strain



Mohr Circles



ϕu = 0

Average cu 88 kPa

Linear Regression

ϕu 20.9 °

cu 34 kPa

Mohr circles and their interpretation is not covered by BS1377-7: 1990. These are provided for information only.

Remarks

No failure defined. Testing terminated at 20% axial strain.

Approved: Stephen.Watson

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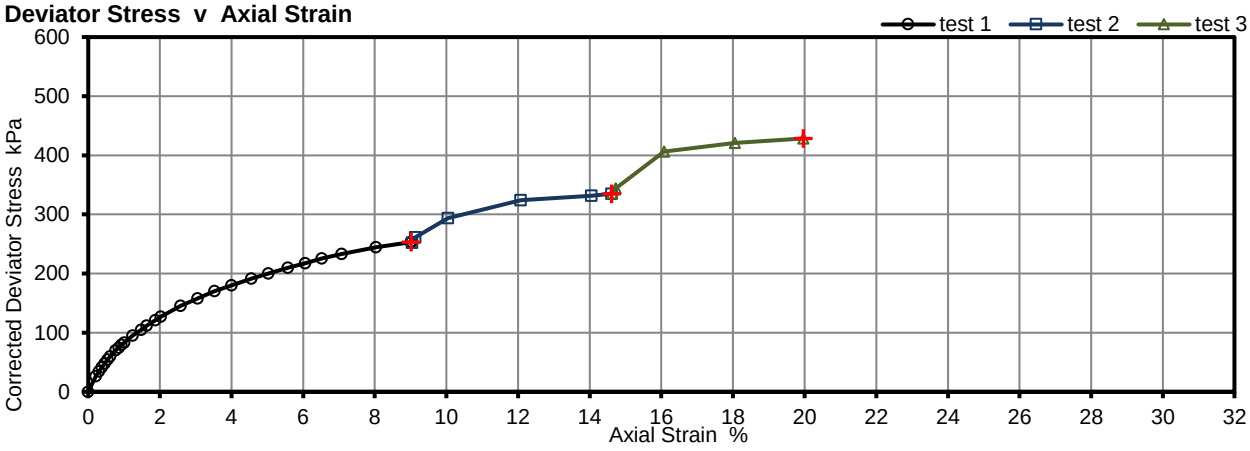
10122

CAUSEWAY GEOTECH	**Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - Multistage test**			Job Ref	21-1682
				Borehole/Pit No.	BH-28001
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	20
Soil Description	Brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	3.00
				Sample Depth (m) Base	3.45
Specimen Reference	4	Specimen Depth	3.05 m	Sample Type	U
Specimen Description	Stiff brown sandy slightly gravelly silty CLAY.			KeyLAB ID	Caus2022061031
Test Method	BS1377:Part 7:1990, clause 9, multistage test on a single spe			Date of test	20/06/2022

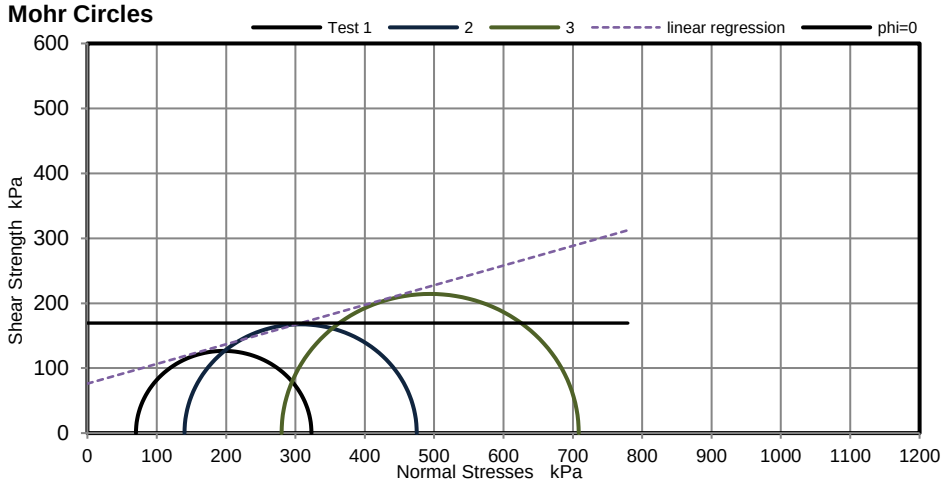
Length	mm	210.1
Diameter	mm	105.7
Bulk Density	Mg/m3	2.31
Moisture Content	%	8.2
Dry Density	Mg/m3	2.14

Rate of Strain		%/min	2.00		
Stage Number			1	2	3
Cell Pressure		kPa	70	140	280
End of stage	Axial Strain	%	9.0	14.6	20.0
	Deviator Stress, (σ1 - σ3) corrected for area and membrane	kPa	253.1	335.0	428.5
	Shear strength, cu	kPa	126.5	167.5	214.3
	Mode of failure				

Deviator Stress v Axial Strain



Mohr Circles



ϕu = 0

Average cu 169 kPa

Linear Regression

ϕu 16.9 °

cu 76 kPa

Mohr circles and their interpretation is not covered by BS1377-7: 1990. These are provided for information only.

Remarks

No failure defined. Testing terminated at 20% axial strain.

Approved: Stephen.Watson

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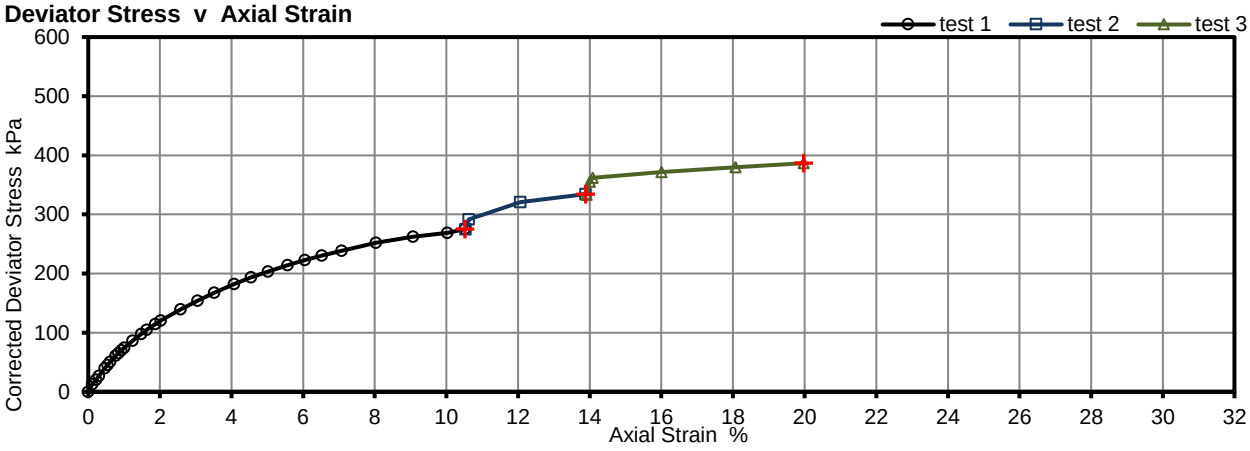
CAUSEWAY GEOTECH	**Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - Multistage test**			Job Ref	21-1682
				Borehole/Pit No.	BH-28001
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	21
Soil Description	Brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	6.00
				Sample Depth (m) Base	6.45
Specimen Reference	4	Specimen Depth	6.05 m	Sample Type	U
Specimen Description	Stiff brown sandy slightly gravelly silty CLAY.			KeyLAB ID	Caus2022061032
Test Method	BS1377:Part 7:1990, clause 9, multistage test on a single spe			Date of test	20/06/2022

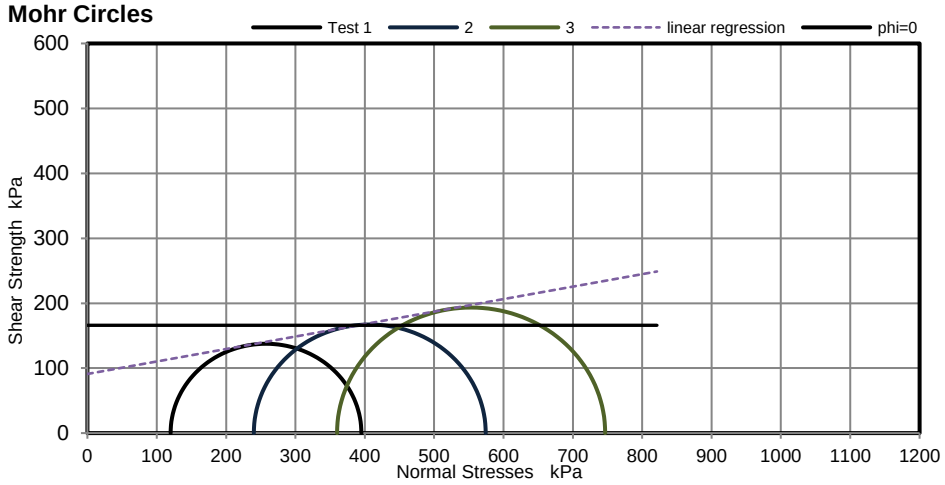
Length	mm	210.1
Diameter	mm	105.7
Bulk Density	Mg/m3	2.38
Moisture Content	%	7.4
Dry Density	Mg/m3	2.22

Rate of Strain		%/min	2.00		
Stage Number			1	2	3
Cell Pressure		kPa	120	240	360
End of stage	Axial Strain	%	10.5	13.9	20.0
	Deviator Stress, (σ1 - σ3) corrected for area and membrane	kPa	275.1	334.4	386.7
	Shear strength, cu	kPa	137.5	167.2	193.3
	Mode of failure				

Deviator Stress v Axial Strain



Mohr Circles



ϕu = 0

Average cu 166 kPa

Linear Regression

ϕu 10.9 °

cu 91 kPa

Mohr circles and their interpretation is not covered by BS1377-7: 1990. These are provided for information only.

Remarks

No failure defined. Testing terminated at 20% axial strain.

Approved: Stephen.Watson

Printed: 17/11/2022 18:14

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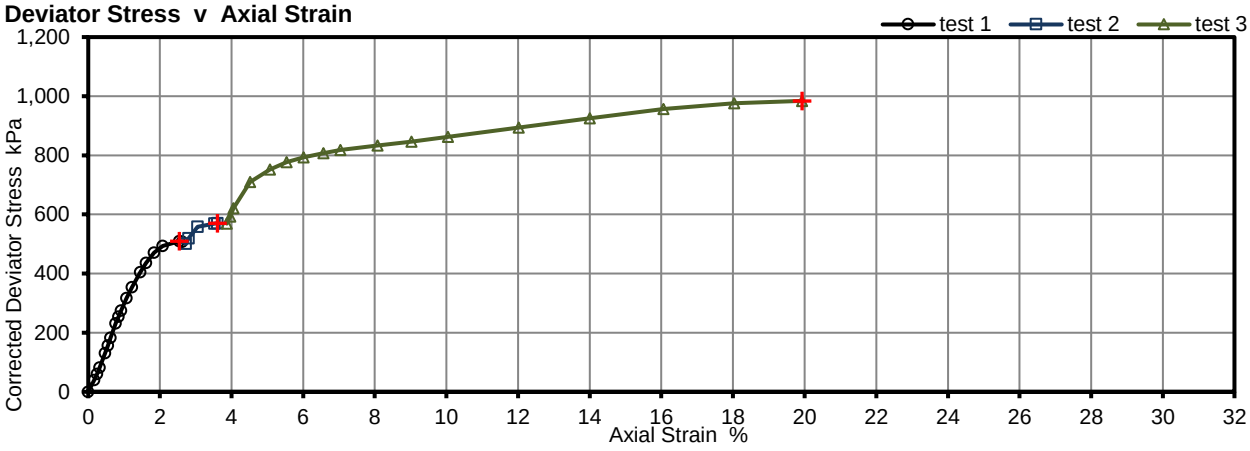
Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - Multistage test

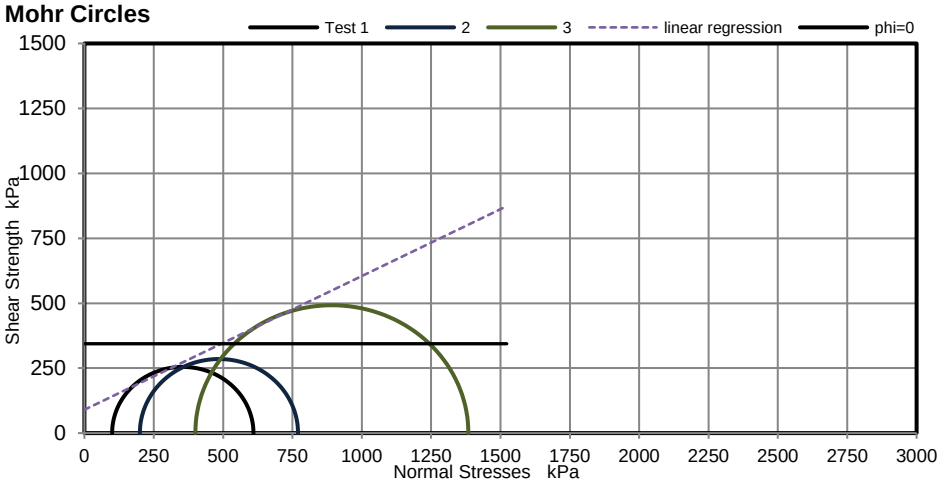
Job Ref					21-1682
Borehole/Pit No.					BH-28924A
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	3
Soil Description	Brownish grey sandy gravelly silty CLAY with cobbles.			Sample Depth (m) Top	5.20
				Base	5.50
Specimen Reference	2	Specimen Depth	5.20 m	Sample Type	C
Specimen Description	Stiff brownish grey sandy gravelly silty CLAY with cobbles.			KeyLAB ID	Caus2022082558
Test Method	BS1377:Part 7:1990, clause 9, multistage test on a single spe			Date of test	07/09/2022

Length			mm	210.1	
Diameter			mm	104.7	
Bulk Density			Mg/m3	2.24	
Moisture Content			%	6.9	
Dry Density			Mg/m3	2.10	
Rate of Strain			%/min	2.00	
Stage Number				1	2	3
Cell Pressure			kPa	100	200	400
End of stage	Axial Strain		%	2.5	3.6	19.9
	Deviator Stress, (σ1 - σ3)	corrected for area and membrane	kPa	509.5	570.2	984.2
	Shear strength, cu		kPa	254.7	285.1	492.1
	Mode of failure					

Deviator Stress v Axial Strain



Mohr Circles



ϕu = 0

Average cu 344 kPa

Linear Regression

ϕu 27.2 °

cu 90 kPa

Mohr circles and their interpretation is not covered by BS1377-7: 1990. These are provided for information only.

Remarks

No failure defined. Testing terminated at 20% axial strain.

Approved: Stephen.Watson

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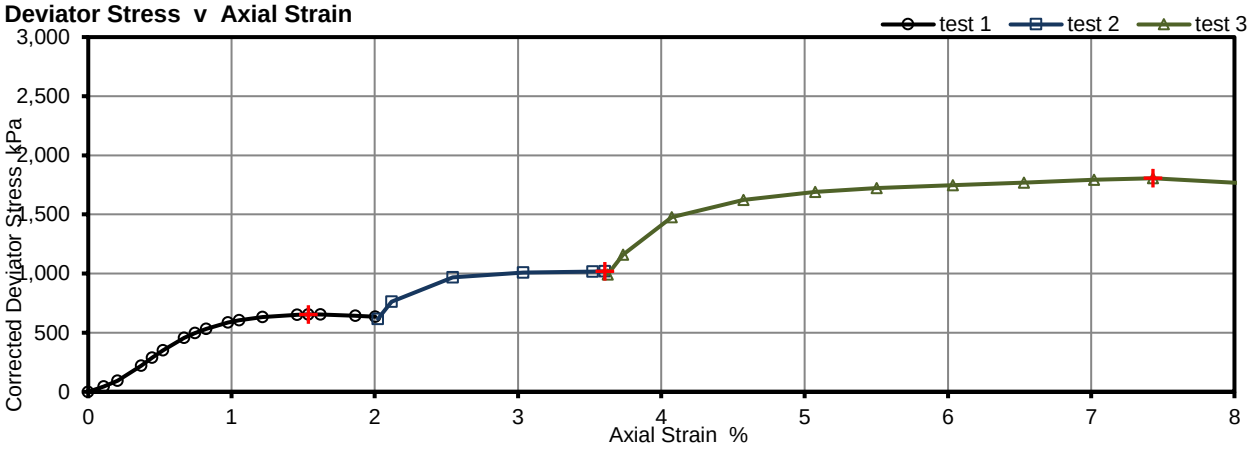
CAUSEWAY GEOTECH	**Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - Multistage test**			Job Ref	21-1682
				Borehole/Pit No.	BH-30722
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	4
Soil Description	Greyish brown sandy gravelly silty CLAY.			Sample Depth (m) Top	6.40
				Sample Depth (m) Base	
Specimen Reference	2	Specimen Depth	6.40 m	Sample Type	C
Specimen Description	Stiff greyish brown sandy gravelly silty CLAY.			KeyLAB ID	Caus2022081016
Test Method	BS1377:Part 7:1990, clause 9, multistage test on a single spe			Date of test	16/08/2022

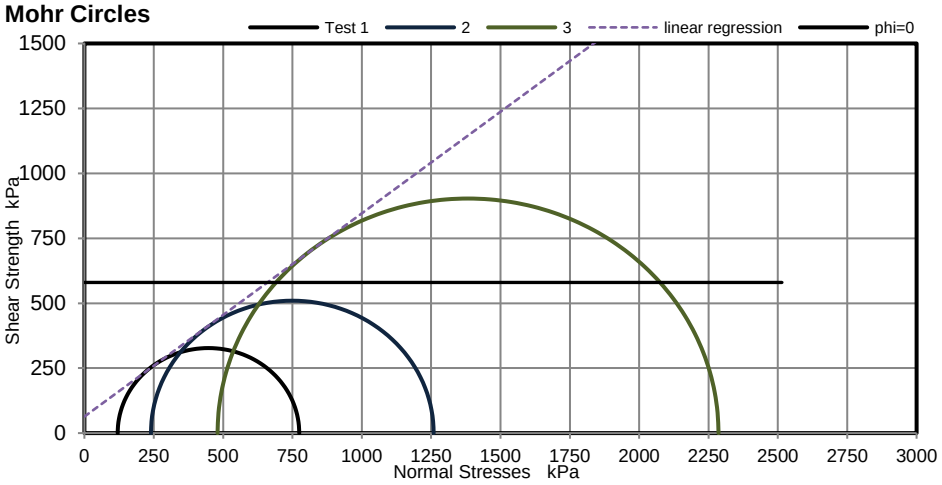
Length	mm	210.0
Diameter	mm	103.5
Bulk Density	Mg/m3	2.22
Moisture Content	%	4.9
Dry Density	Mg/m3	2.11

Rate of Strain		%/min	2.00		
Stage Number			1	2	3
Cell Pressure		kPa	120	240	480
End of stage	Axial Strain	%	1.5	3.6	7.4
	Deviator Stress, (σ1 - σ3) corrected for area and membrane	kPa	654.6	1019.1	1806.0
	Shear strength, cu	kPa	327.3	509.5	903.0
	Mode of failure		Compound		

Deviator Stress v Axial Strain



Mohr Circles



ϕu = 0

Average cu 580 kPa

Linear Regression

ϕu 38.0 °

cu 64 kPa

Mohr circles and their interpretation is not covered by BS1377-7: 1990. These are provided for information only.

Remarks

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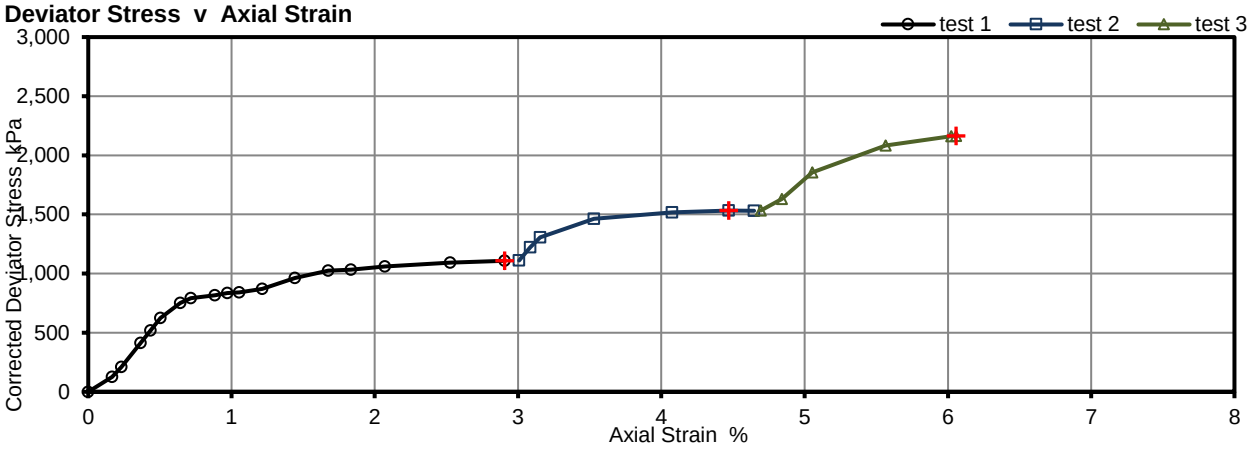
CAUSEWAY GEOTECH	**Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - Multistage test**			Job Ref	21-1682
				Borehole/Pit No.	BH-35473
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Soil Description	Greyish brown sandy gravelly silty CLAY.			Sample Depth (m) Top	6.00
				Base	
Specimen Reference	2	Specimen Depth	6.00 m	Sample Type	C
Specimen Description	Stiff greyish brown sandy gravelly silty CLAY.			KeyLAB ID	Caus2022081032
Test Method	BS1377:Part 7:1990, clause 9, multistage test on a single spe			Date of test	17/08/2022

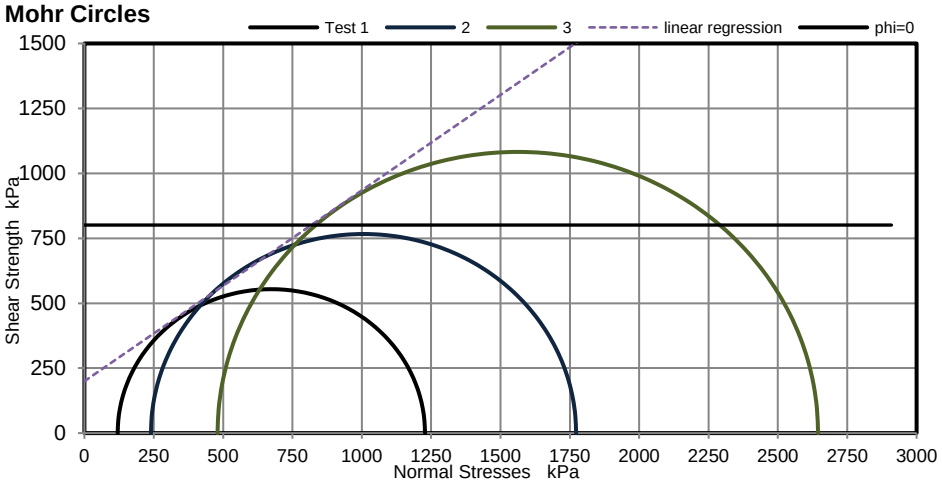
Length	mm	210.1
Diameter	mm	104.8
Bulk Density	Mg/m3	2.23
Moisture Content	%	6.7
Dry Density	Mg/m3	2.09

Rate of Strain		%/min	2.00		
Stage Number			1	2	3
Cell Pressure		kPa	120	240	480
End of stage	Axial Strain	%	2.9	4.5	6.1
	Deviator Stress, (σ1 - σ3) corrected for area and membrane	kPa	1107.9	1532.7	2164.9
	Shear strength, cu	kPa	554.0	766.3	1082.4
	Mode of failure				

Deviator Stress v Axial Strain



Mohr Circles



ϕu = 0

Average cu 801 kPa

Linear Regression

ϕu 36.3 °

cu 200 kPa

Mohr circles and their interpretation is not covered by BS1377-7: 1990. These are provided for information only.

Remarks

Testing terminated. Maximum capacity of load ring met.

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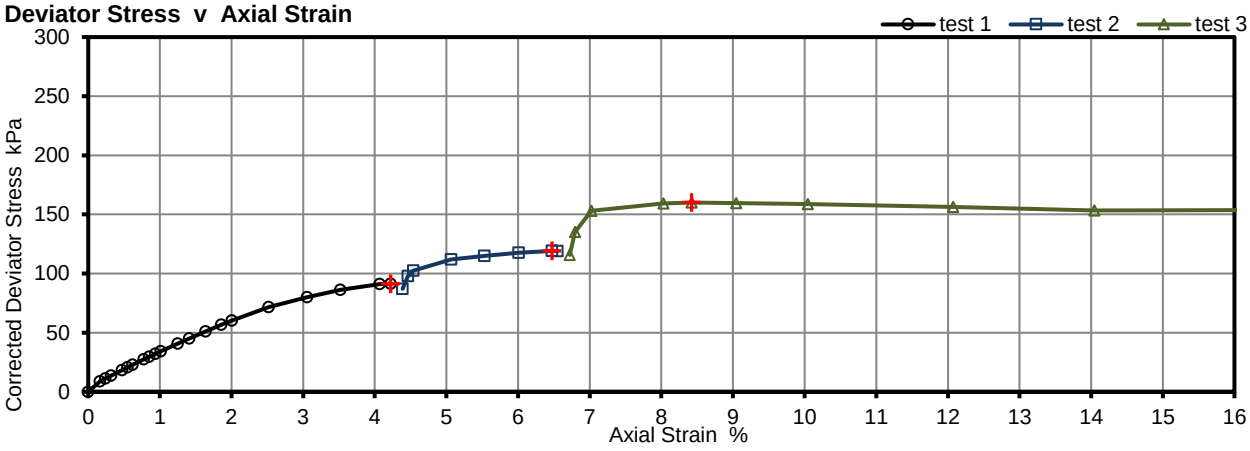
CAUSEWAY GEOTECH	**Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - Multistage test**			Job Ref	21-1682
				Borehole/Pit No.	BH-4110
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	1
Soil Description	Brownish grey sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	1.20
				Base	1.65
Specimen Reference	4	Specimen Depth	1.25 m	Sample Type	U
Specimen Description	Firm brownish grey sandy slightly gravelly silty CLAY.			KeyLAB ID	Caus2022062163
Test Method	BS1377:Part 7:1990, clause 9, multistage test on a single spe			Date of test	07/07/2022

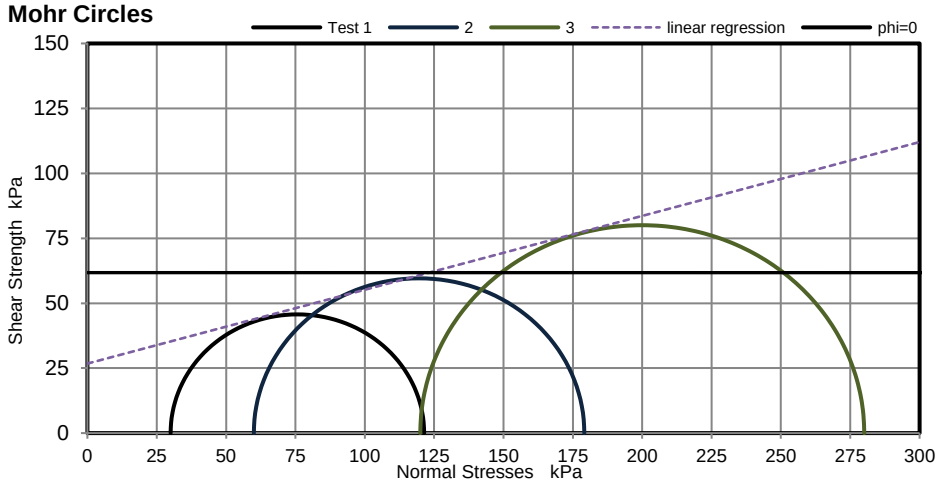
Length	mm	210.0
Diameter	mm	106.4
Bulk Density	Mg/m3	2.03
Moisture Content	%	15.1
Dry Density	Mg/m3	1.77

Rate of Strain		%/min	2.00		
Stage Number			1	2	3
Cell Pressure		kPa	30	60	120
End of stage	Axial Strain	%	4.2	6.5	8.4
	Deviator Stress, (σ1 - σ3) corrected for area and membrane	kPa	91.4	119.1	160.1
	Shear strength, cu	kPa	45.7	59.6	80.0
	Mode of failure		Brittle		

Deviator Stress v Axial Strain



Mohr Circles



ϕu = 0

Average cu 62 kPa

Linear Regression

ϕu 15.9 °

cu 27 kPa

Mohr circles and their interpretation is not covered by BS1377-7: 1990. These are provided for information only.

Remarks

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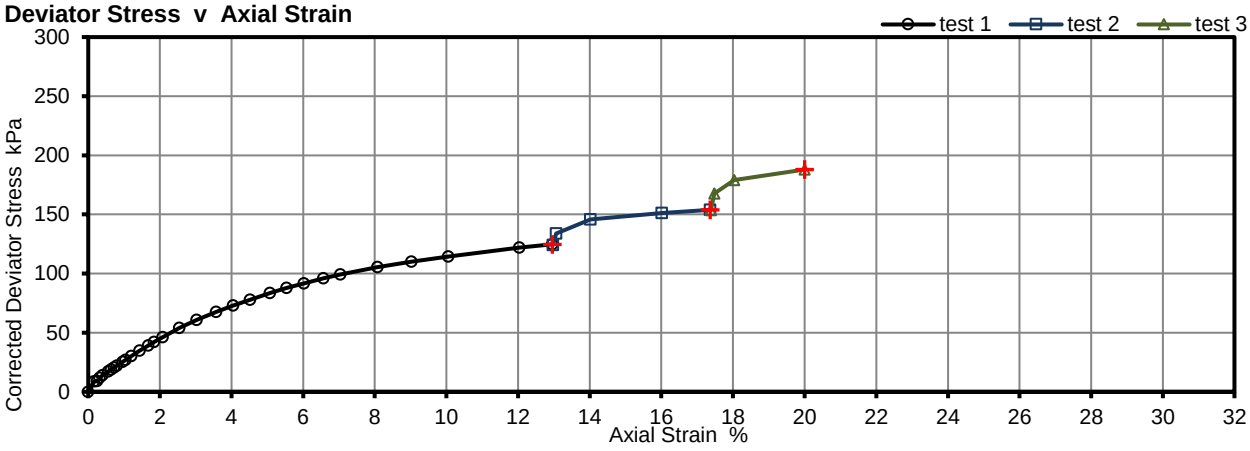
CAUSEWAY GEOTECH	**Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - Multistage test**			Job Ref	21-1682
				Borehole/Pit No.	BH-5573
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	12
Soil Description	Brownish grey sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	4.00
				Base	4.45
Specimen Reference	6	Specimen Depth	4.05 m	Sample Type	U
Specimen Description	Stiff brownish grey sandy slightly gravelly silty CLAY.			KeyLAB ID	Caus2022080420
Test Method	BS1377:Part 7:1990, clause 9, multistage test on a single spe			Date of test	22/08/2022

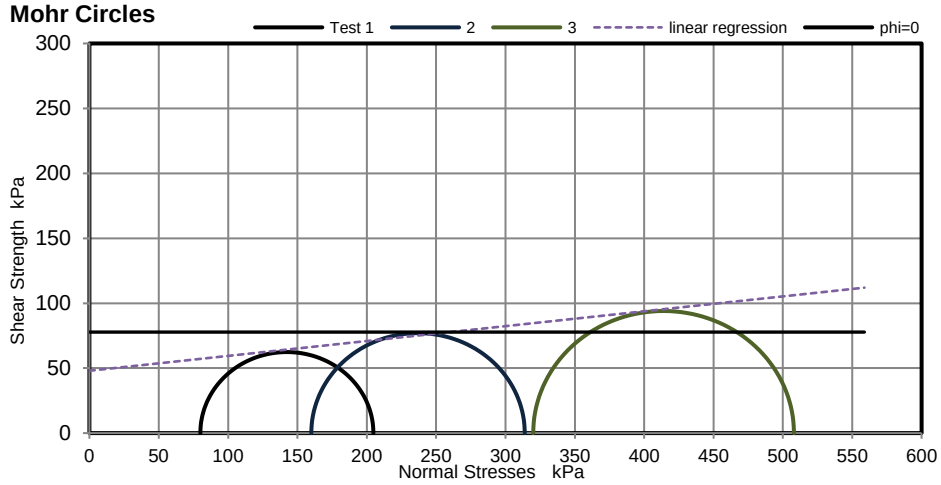
Length	mm	210.0
Diameter	mm	105.7
Bulk Density	Mg/m3	2.15
Moisture Content	%	19.3
Dry Density	Mg/m3	1.80

Rate of Strain		%/min	2.00		
Stage Number			1	2	3
Cell Pressure		kPa	80	160	320
End of stage	Axial Strain	%	13.0	17.4	20.0
	Deviator Stress, (σ1 - σ3) corrected for area and membrane	kPa	124.8	153.9	188.0
	Shear strength, cu	kPa	62.4	76.9	94.0
	Mode of failure				

Deviator Stress v Axial Strain



Mohr Circles



ϕu = 0

Average cu 78 kPa

Linear Regression

ϕu 6.5 °

cu 48 kPa

Mohr circles and their interpretation is not covered by BS1377-7: 1990. These are provided for information only.

Remarks

No failure defined. Testing terminated at 20% axial strain.

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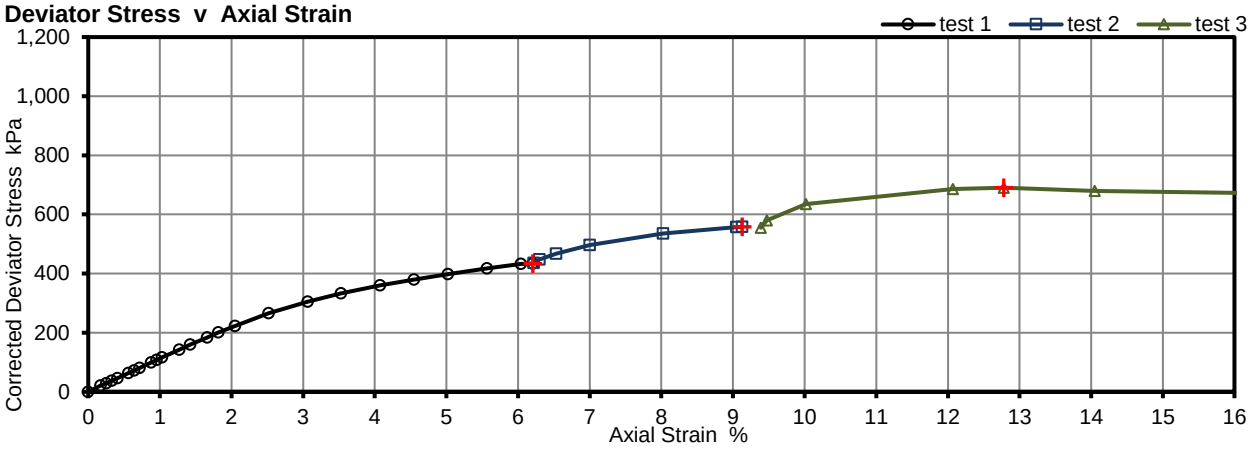
CAUSEWAY GEOTECH	**Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - Multistage test**			Job Ref	21-1682
				Borehole/Pit No.	BH-7320
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	2
Soil Description	Greyish brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	5.90
				Base	6.20
Specimen Reference	1	Specimen Depth	5.90 m	Sample Type	C
Specimen Description	Stiff greyish brown sandy slightly gravelly silty CLAY.			KeyLAB ID	Caus2022101722
Test Method	BS1377:Part 7:1990, clause 9, multistage test on a single spe			Date of test	18/10/2022

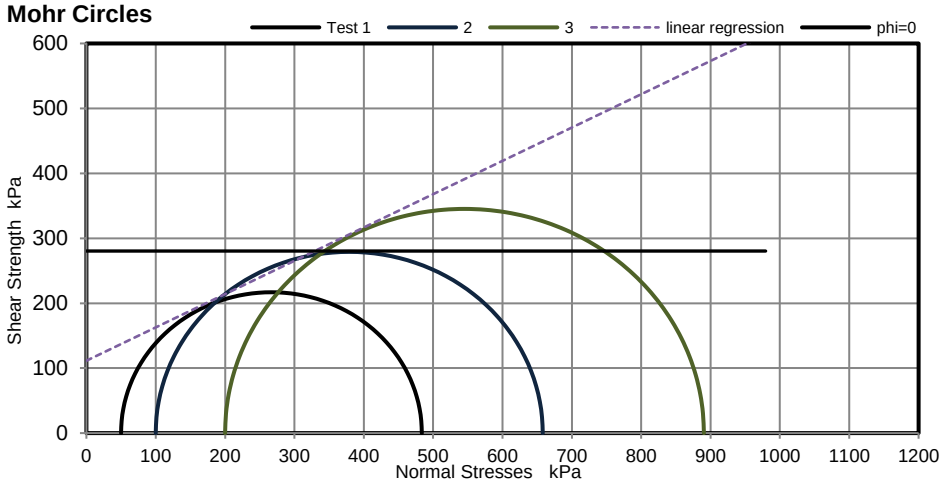
Length	mm	210.1
Diameter	mm	105.1
Bulk Density	Mg/m3	2.14
Moisture Content	%	13.2
Dry Density	Mg/m3	1.89

Rate of Strain		%/min	2.00		
Stage Number			1	2	3
Cell Pressure		kPa	50	100	200
End of stage	Axial Strain	%	6.2	9.1	12.8
	Deviator Stress, (σ1 - σ3) corrected for area and membrane	kPa	433.7	558.1	690.4
	Shear strength, cu	kPa	216.8	279.0	345.2
	Mode of failure		Compound		

Deviator Stress v Axial Strain



Mohr Circles



ϕu = 0

Average cu 280 kPa

Linear Regression

ϕu 27.2 °

cu 111 kPa

Mohr circles and their interpretation is not covered by BS1377-7: 1990. These are provided for information only.

Remarks

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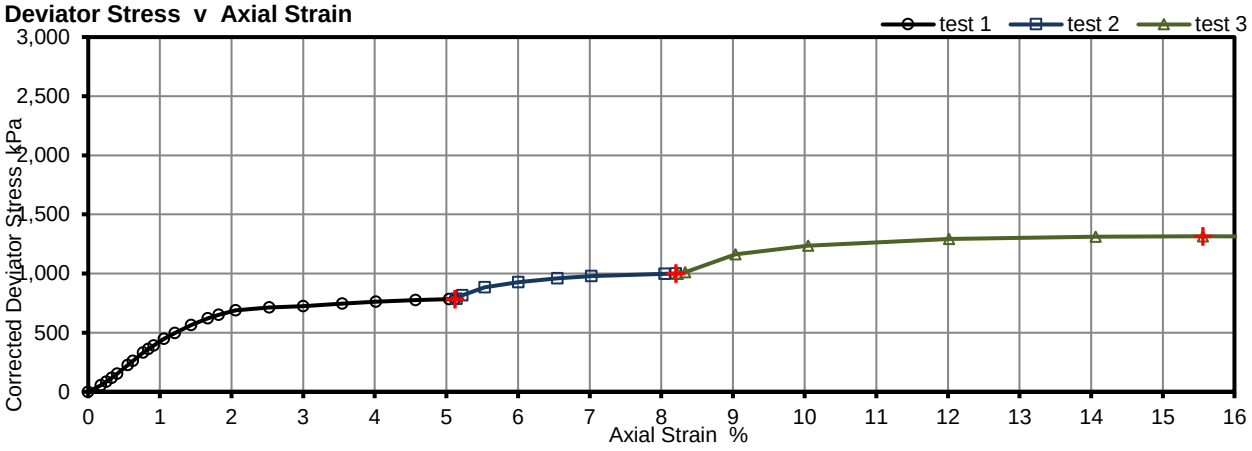
CAUSEWAY GEOTECH	**Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - Multistage test**			Job Ref	21-1682
				Borehole/Pit No.	BH-7320
Site Name	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only			Sample No.	8
Soil Description	Greyish brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	11.80
				Base	12.10
Specimen Reference	1	Specimen Depth	11.80 m	Sample Type	C
Specimen Description	Stiff greyish brown sandy slightly gravelly silty CLAY.			KeyLAB ID	Caus2022101728
Test Method	BS1377:Part 7:1990, clause 9, multistage test on a single spe			Date of test	18/10/2022

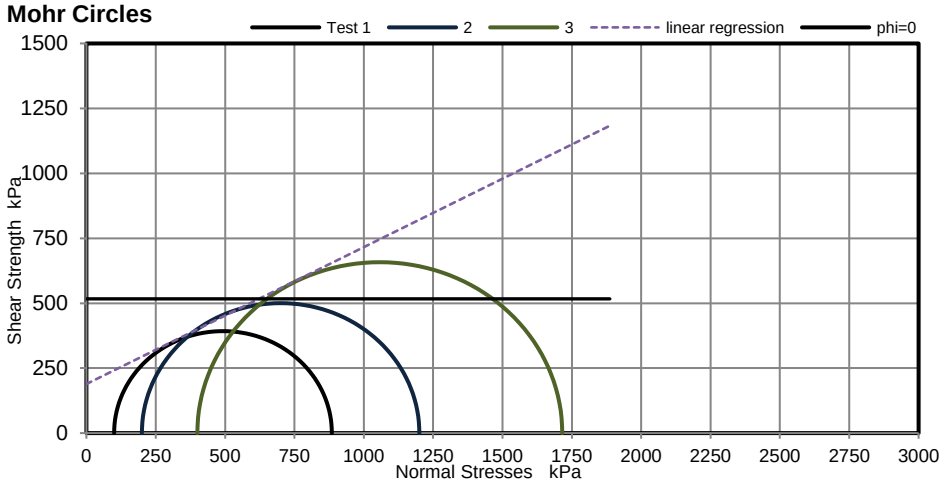
Length	mm	210.1
Diameter	mm	104.6
Bulk Density	Mg/m3	2.31
Moisture Content	%	6.7
Dry Density	Mg/m3	2.16

Rate of Strain		%/min	2.00		
Stage Number			1	2	3
Cell Pressure		kPa	100	200	400
End of stage	Axial Strain	%	5.1	8.2	15.6
	Deviator Stress, (σ1 - σ3) corrected for area and membrane	kPa	784.9	1000.4	1315.5
	Shear strength, cu	kPa	392.4	500.2	657.7
	Mode of failure		Compound		

Deviator Stress v Axial Strain



Mohr Circles



ϕu = 0

Average cu 517 kPa

Linear Regression

ϕu 27.8 °

cu 189 kPa

Mohr circles and their interpretation is not covered by BS1377-7: 1990. These are provided for information only.

Remarks

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Direct Shear Test BS EN ISO 17892-10:2018					
Project Number	21-1682	Project	Eastern and Midlands Region WSP		
Location Number	BH-7282	Sample Reference		10	
Depth (m)	4.00	Sample Submerged?		Yes	~~No~~
Sample Type	B	Particle Density (Mg/m^3)		2.65	Assumed
Description	Greyish brown gravelly slightly silty fine to coarse SAND.				
Sample Preparation	Sample is recompacted using material passing 2mm test sieve				

Stage	1	2	3
Initial Conditions			
Height (mm)	20.0	20.0	20.0
Diameter (mm)	60.0	60.0	60.0
Water Content (%)	12.0	12.0	12.0
Bulk Density (Mg/m^3)	1.97	1.96	1.96
Dry Density (Mg/m^3)	1.75	1.75	1.75
Voids Ratio	0.515	0.517	0.517
Consolidation			
Normal Pressure (kPa)	50	100	200
Vertical Displacement (mm)	0.214	0.546	0.518
Shearing			
Rate of Strain (mm/min)	0.600	0.600	0.600
Peak Shear Stress (kPa)	38.4	107.6	163.5
Hoz Displacement (mm)	10.2	10.2	10.2
Hoz Displacement at Peak Shear Stress (mm)	5.343	3.417	10.200
Final Conditions			
Water Content (%)	18.0	17.0	17.0
Dry Density (Mg/m^3)	1.78	1.78	1.86
Voids Ratio	0.484	0.507	0.454

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CAUSEWAY GEOTECH

Tested	Approved
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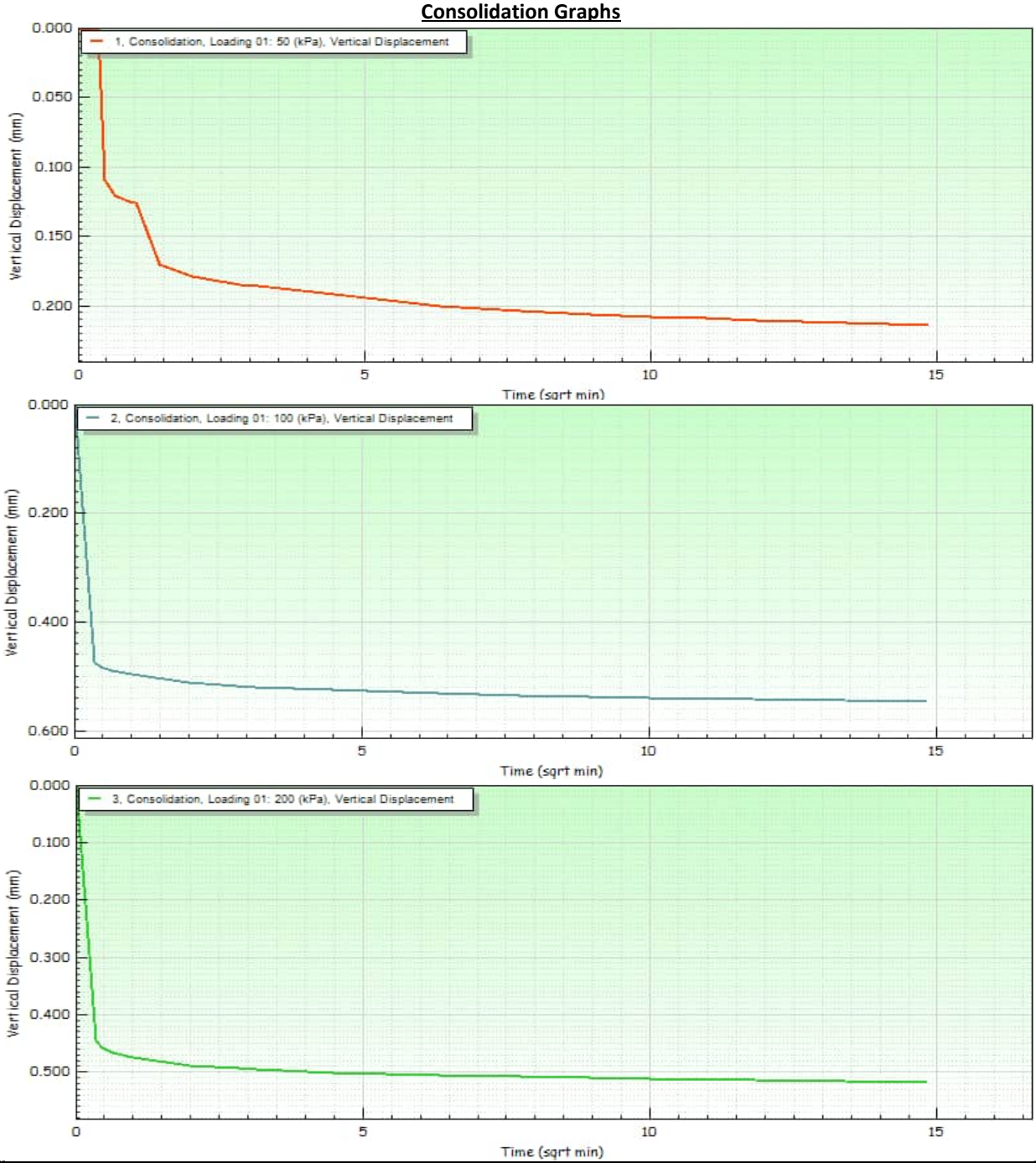
Direct Shear Test BS EN ISO 17892-10:2018				
Project Number	21-1682	Project	Eastern and Midlands Region WSP	
Location Number	BH-7282	Sample Reference	10	
Depth (m)	4.00	Sample Submerged?	Yes	~~No~~
Sample Type	B	Particle Density (Mg/m^3)	2.65	Assumed

Consolidation Graphs

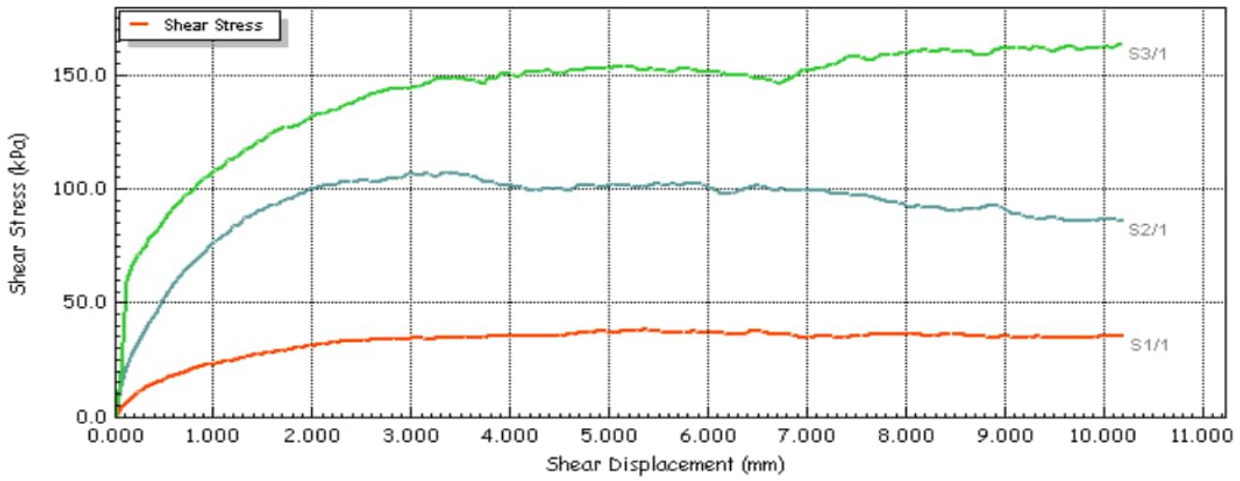


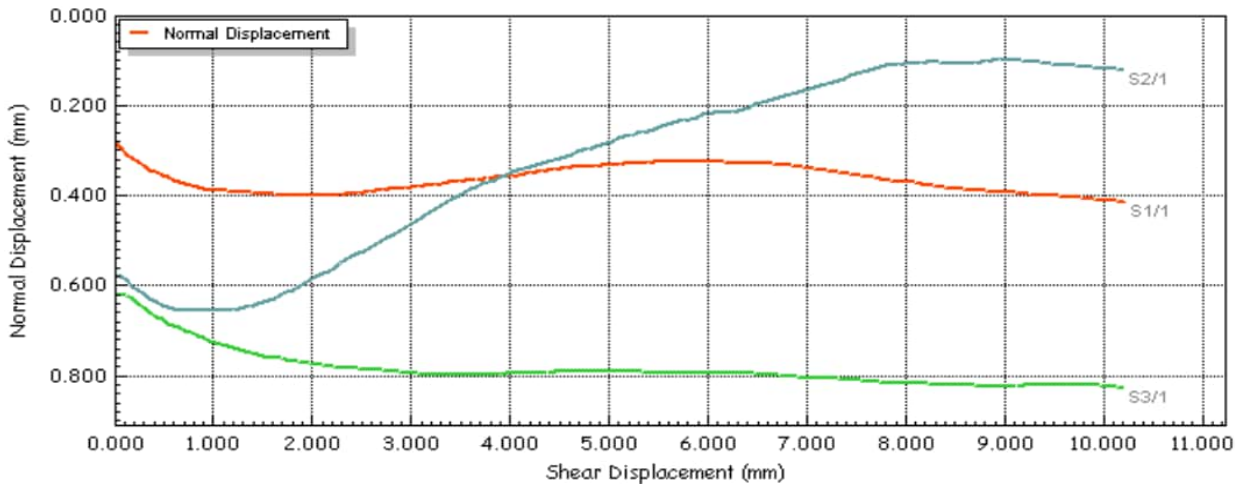
	Tested	Approved
10122	Aaron Nutt	Joseph Nicholl

Lab Sheet Reference : LAB25R - Version 4

Direct Shear Test BS EN ISO 17892-10:2018				
Project Number	21-1682	Project	Eastern and Midlands Region WSP	
Location Number	BH-7282	Sample Reference	10	
Depth (m)	4.00	Sample Submerged?	Yes	~~No~~
Sample Type	B	Particle Density (Mg/m^3)	2.65	Assumed

Shear Stage



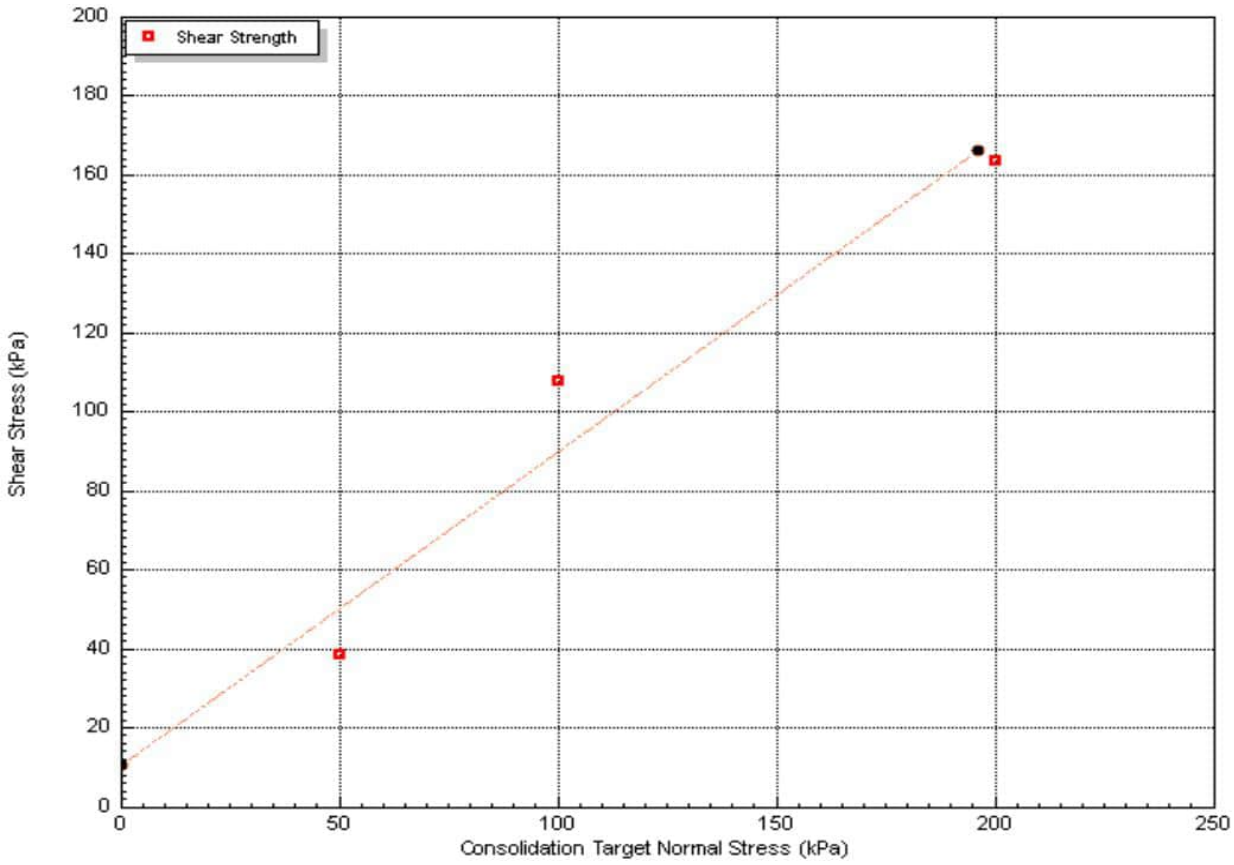


	Tested	Approved
UKAS TESTING 10122 / CAUSEWAY GEOTECH	Aaron Nutt	Joseph Nicholl

Lab Sheet Reference : LAB25R - Version 4

Direct Shear Test BS EN ISO 17892-10:2018				
Project Number	21-1682	Project	Eastern and Midlands Region WSP	
Location Number	BH-7282	Sample Reference	10	
Depth (m)	4.00	Sample Submerged?	Yes	~~No~~
Sample Type	B	Particle Density (Mg/m^3)	2.65	Assumed

Stage	1	2	3
Envelope Failure Results			
Apparent Cohesion (kPa)	10		
Angle of Shearing Resistance (°)	38.5		



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Lab Sheet Reference : LAB25R - Version 4

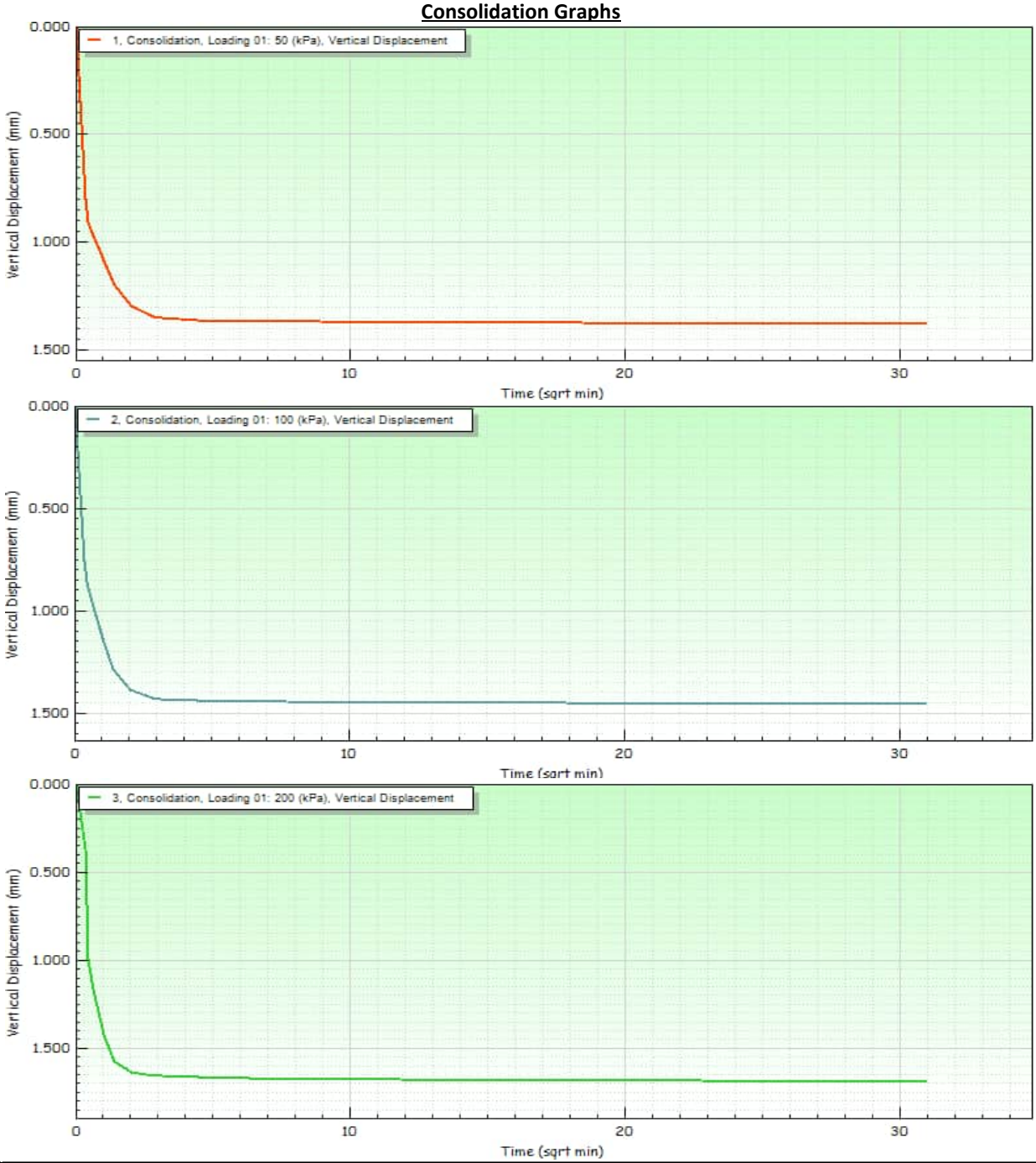
Direct Shear Test BS EN ISO 17892-10:2018					
Project Number	21-1682	Project	Eastern and Midlands Region WSP		
Location Number	BH-10475	Sample Reference		5	
Depth (m)	3.80	Sample Submerged?		Yes	~~No~~
Sample Type	B	Particle Density (Mg/m^3)		2.65	Assumed
Description	Grey sandy slightly gravelly silty CLAY.				
Sample Preparation	Sample is recompacted using material passing 2mm test sieve				

Stage	1	2	3
Initial Conditions			
Height (mm)	20.0	20.0	20.0
Diameter (mm)	60.0	60.0	60.0
Water Content (%)	15.0	15.0	15.0
Bulk Density (Mg/m^3)	2.22	2.19	2.18
Dry Density (Mg/m^3)	1.93	1.90	1.89
Voids Ratio	0.372	0.396	0.400
Consolidation			
Normal Pressure (kPa)	50	100	200
Vertical Displacement (mm)	1.376	1.455	1.690
Shearing			
Rate of Strain (mm/min)	0.070	0.070	0.070
Peak Shear Stress (kPa)	50.5	78.9	163.0
Hoz Displacement (mm)	10.2	10.2	10.2
Hoz Displacement at Peak Shear Stress (mm)	4.443	3.237	3.063
Final Conditions			
Water Content (%)	14.0	13.0	13.0
Dry Density (Mg/m^3)	2.21	2.19	2.27
Voids Ratio	0.276	0.286	0.266

	Tested	Approved
UKAS TESTING 10122 / CAUSEWAY GEOTECH	Aaron Nutt	Joseph Nicholl

Direct Shear Test BS EN ISO 17892-10:2018				
Project Number	21-1682	Project	Eastern and Midlands Region WSP	
Location Number	BH-10475	Sample Reference	5	
Depth (m)	3.80	Sample Submerged?	Yes	~~No~~
Sample Type	B	Particle Density (Mg/m^3)	2.65	Assumed

Consolidation Graphs

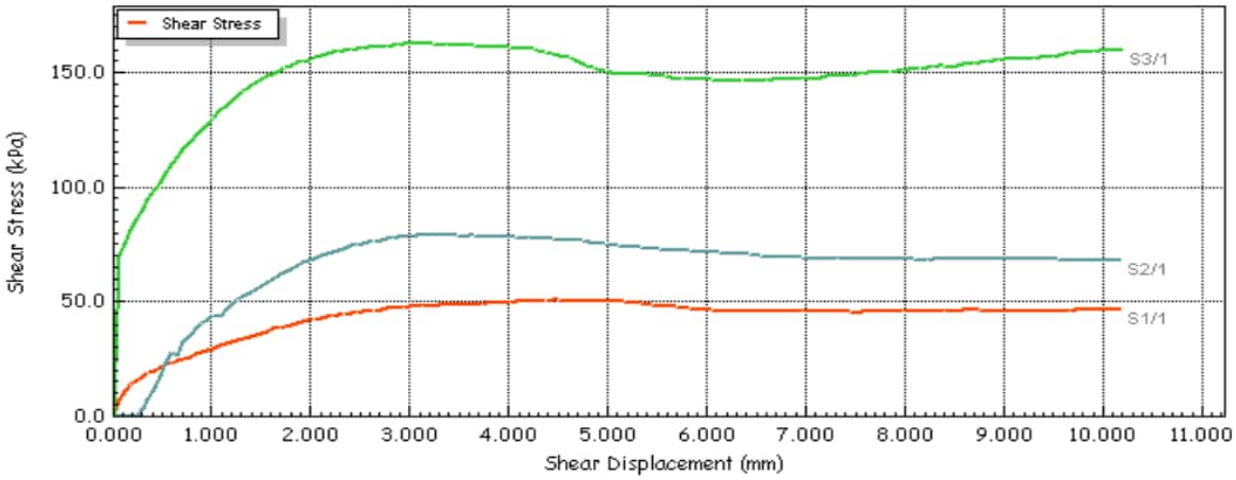


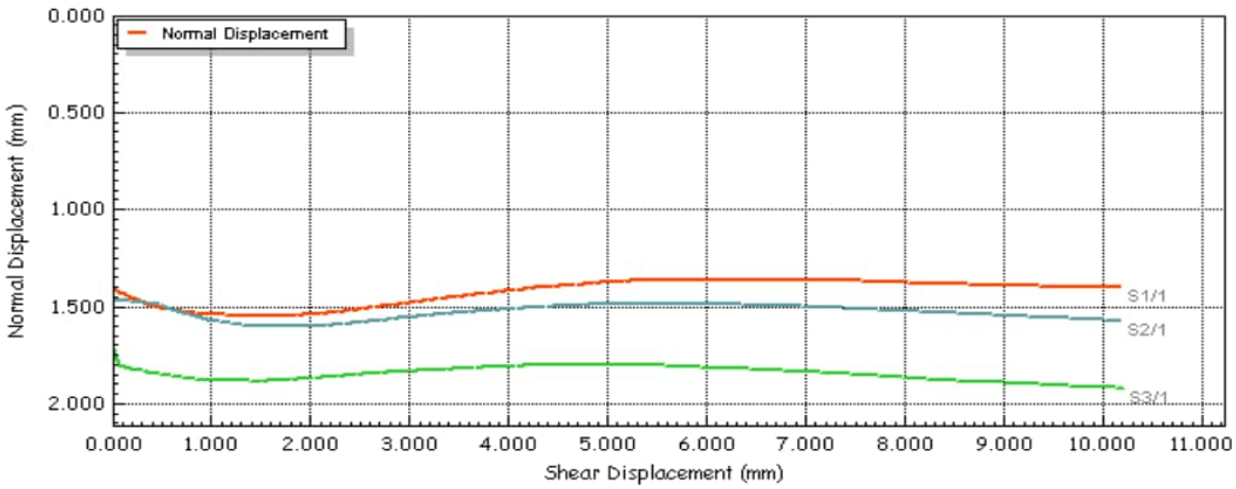
	Tested	Approved
10122	Aaron Nutt	Joseph Nicholl

Lab Sheet Reference : LAB25R - Version 4

Direct Shear Test BS EN ISO 17892-10:2018				
Project Number	21-1682	Project	Eastern and Midlands Region WSP	
Location Number	BH-10475	Sample Reference	5	
Depth (m)	3.80	Sample Submerged?	Yes	~~No~~
Sample Type	B	Particle Density (Mg/m^3)	2.65	Assumed

Shear Stage



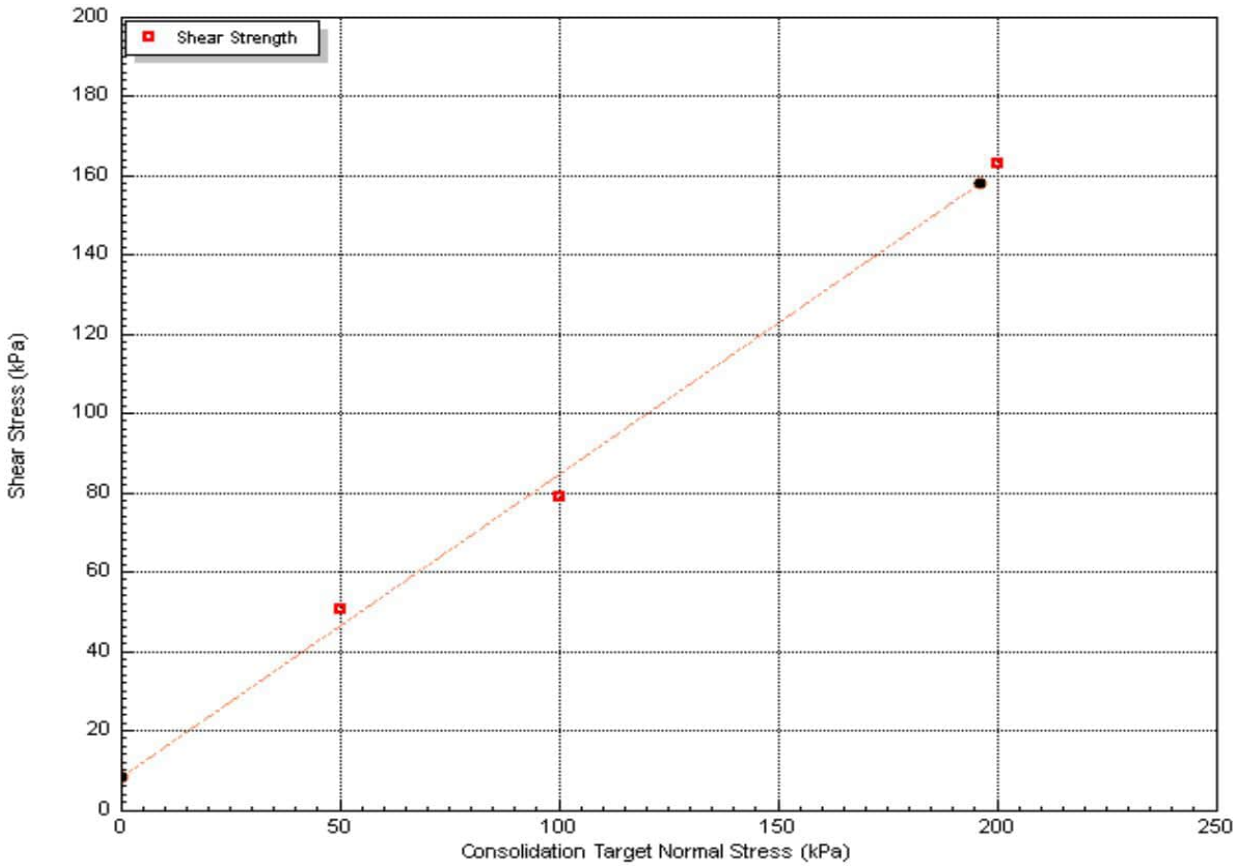


	Tested	Approved
UKAS TESTING 10122 / CAUSEWAY GEOTECH	Aaron Nutt	Joseph Nicholl

Lab Sheet Reference : LAB25R - Version 4

Direct Shear Test BS EN ISO 17892-10:2018				
Project Number	21-1682	Project	Eastern and Midlands Region WSP	
Location Number	BH-10475	Sample Reference	5	
Depth (m)	3.80	Sample Submerged?	Yes	~~No~~
Sample Type	B	Particle Density (Mg/m^3)	2.65	Assumed

Stage	1	2	3
Envelope Failure Results			
Apparent Cohesion (kPa)	8		
Angle of Shearing Resistance (°)	37.5		



	Tested	Approved
UKAS TESTING 10122 / CAUSEWAY GEOTECH	Aaron Nutt	Joseph Nicholl

Lab Sheet Reference : LAB25R - Version 4

Direct Shear Test BS EN ISO 17892-10:2018					
Project Number	21-1682	Project	Eastern and Midlands Region WSP - GI		
Location Number	BH-12608	Sample Reference		13	
Depth (m)	4.80	Sample Submerged?		Yes	~~No~~
Sample Type	B	Particle Density (Mg/m^3)		2.65	Assumed
Description	Greyish brown sandy silty subangular fine to coarse GRAVEL				
Sample Preparation	Sample is recompacted using material passing 2mm test sieve				

Stage	1	2	3
Initial Conditions			
Height (mm)	20.0	20.0	20.0
Diameter (mm)	60.0	60.0	60.0
Water Content (%)	12.0	12.0	12.0
Bulk Density (Mg/m^3)	2.25	2.27	2.27
Dry Density (Mg/m^3)	2.01	2.02	2.02
Voids Ratio	0.320	0.313	0.311
Consolidation			
Normal Pressure (kPa)	50	100	200
Vertical Displacement (mm)	0.845	1.351	1.383
Shearing			
Rate of Strain (mm/min)	0.054	0.054	0.054
Peak Shear Stress (kPa)	40.9	86.0	151.8
Hoz Displacement (mm)	10.2	10.2	10.2
Hoz Displacement at Peak Shear Stress (mm)	2.637	2.523	2.877
Final Conditions			
Water Content (%)	12.0	12.0	12.0
Dry Density (Mg/m^3)	2.18	2.33	2.33
Voids Ratio	0.258	0.211	0.210

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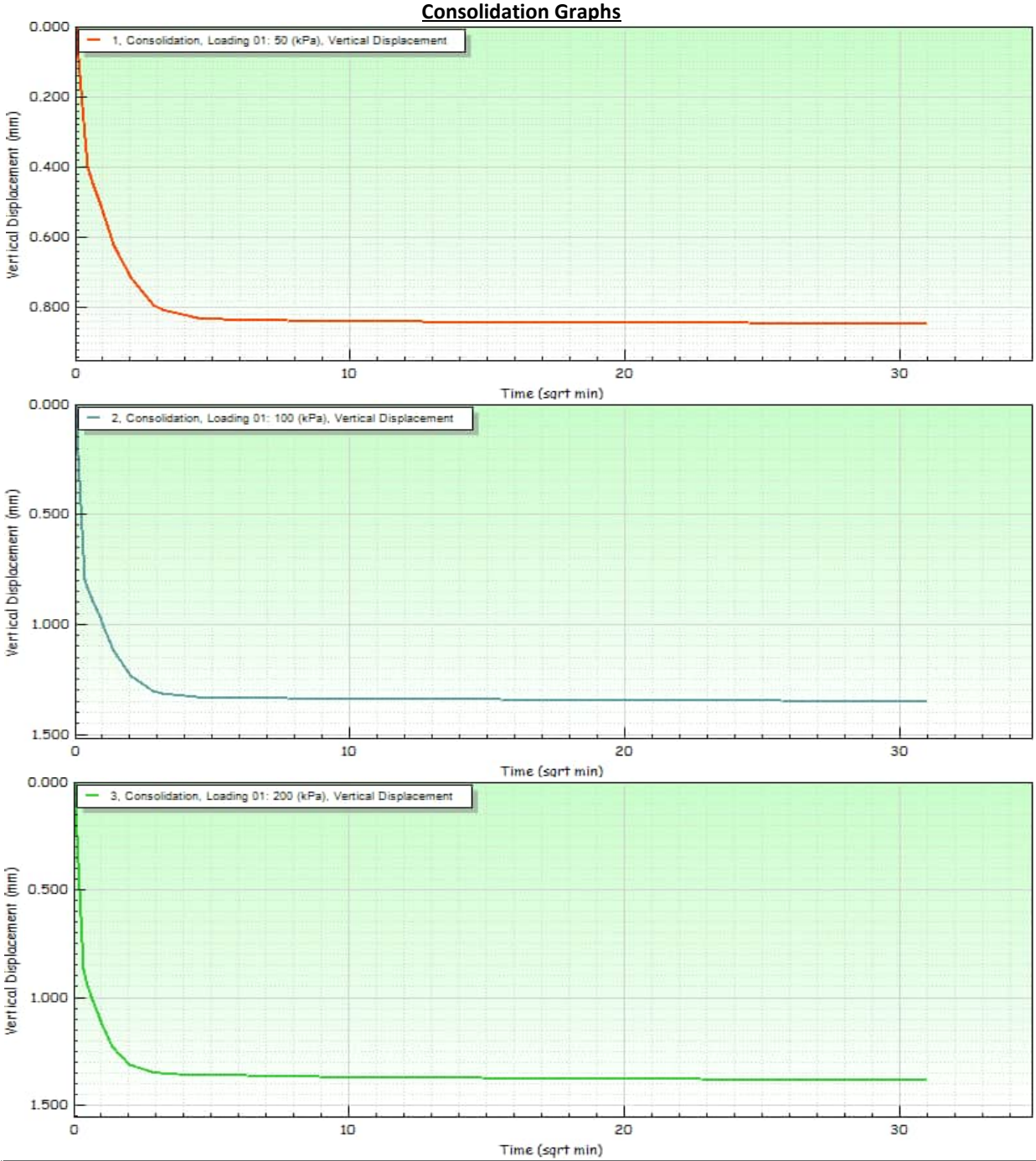
CAUSEWAY GEOTECH

Tested	Approved
Aaron Nutt	Joseph Nicholl

Direct Shear Test BS EN ISO 17892-10:2018				
Project Number	21-1682	Project	Eastern and Midlands Region WSP - GI	
Location Number	BH-12608	Sample Reference	13	
Depth (m)	4.80	Sample Submerged?	Yes	~~No~~
Sample Type	B	Particle Density (Mg/m^3)	2.65	Assumed

Consolidation Graphs

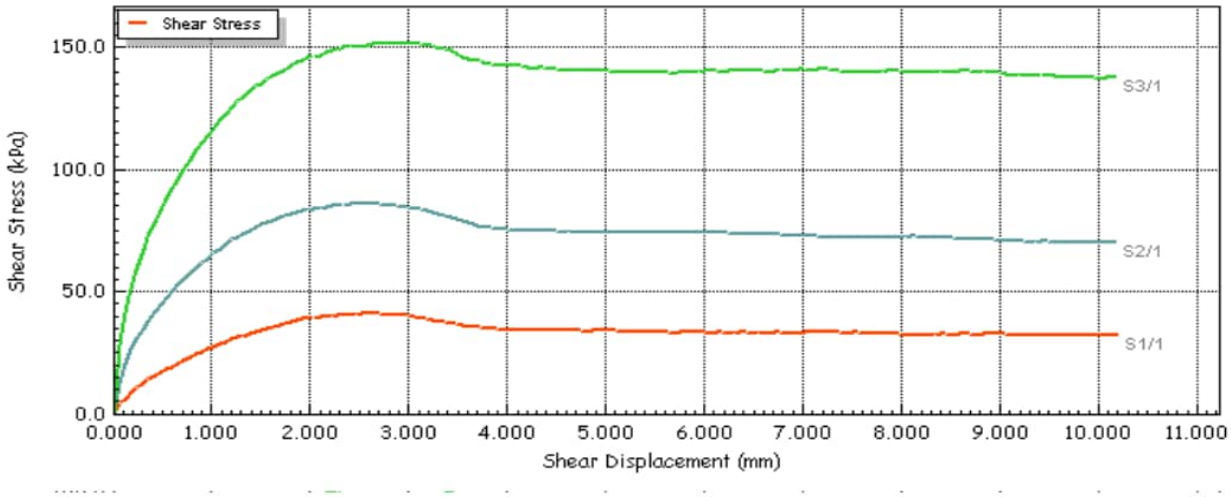


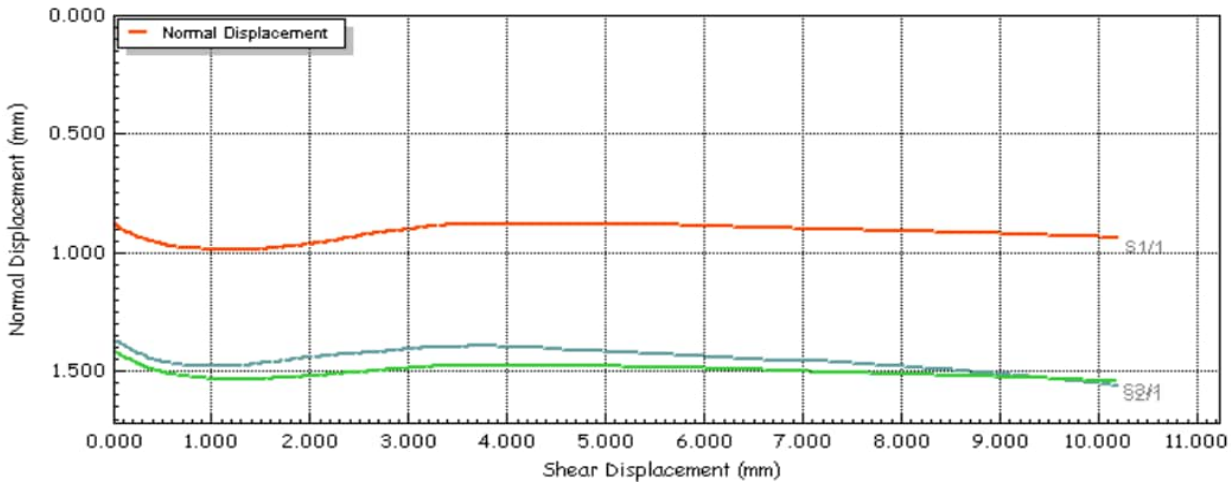
	Tested	Approved
UKAS TESTING 10122 / CAUSEWAY GEOTECH	Aaron Nutt	Joseph Nicholl

Lab Sheet Reference : LAB25R - Version 4

Direct Shear Test BS EN ISO 17892-10:2018				
Project Number	21-1682	Project	Eastern and Midlands Region WSP - GI	
Location Number	BH-12608	Sample Reference	13	
Depth (m)	4.80	Sample Submerged?	Yes	~~No~~
Sample Type	B	Particle Density (Mg/m^3)	2.65	Assumed

Shear Stage

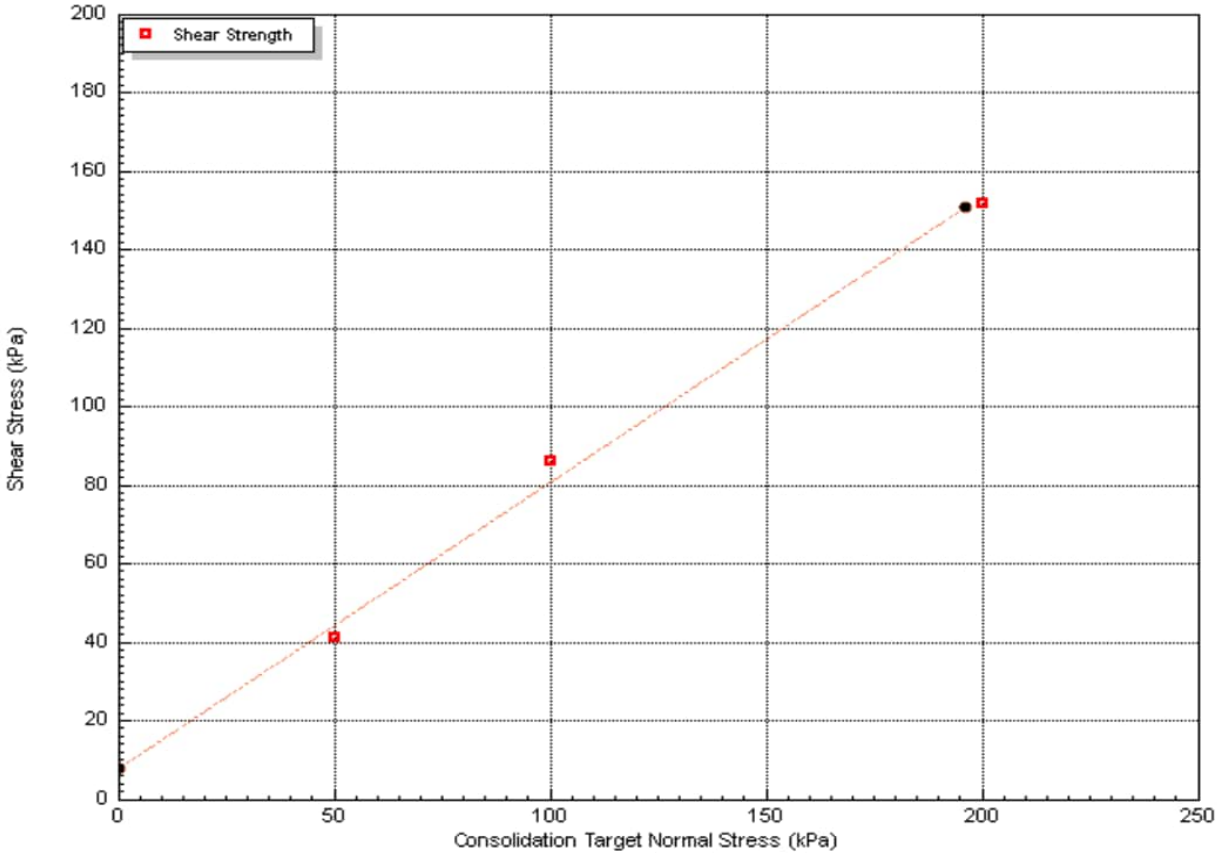




	Tested	Approved
UKAS TESTING 10122 / CAUSEWAY GEOTECH	Aaron Nutt	Joseph Nicholl

Direct Shear Test BS EN ISO 17892-10:2018				
Project Number	21-1682	Project	Eastern and Midlands Region WSP - GI	
Location Number	BH-12608	Sample Reference	13	
Depth (m)	4.80	Sample Submerged?	Yes	~~No~~
Sample Type	B	Particle Density (Mg/m^3)	2.65	Assumed

Stage	1	2	3
Envelope Failure Results			
Apparent Cohesion (kPa)	8		
Angle of Shearing Resistance (°)	36.0		



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Lab Sheet Reference : LAB25R - Version 4

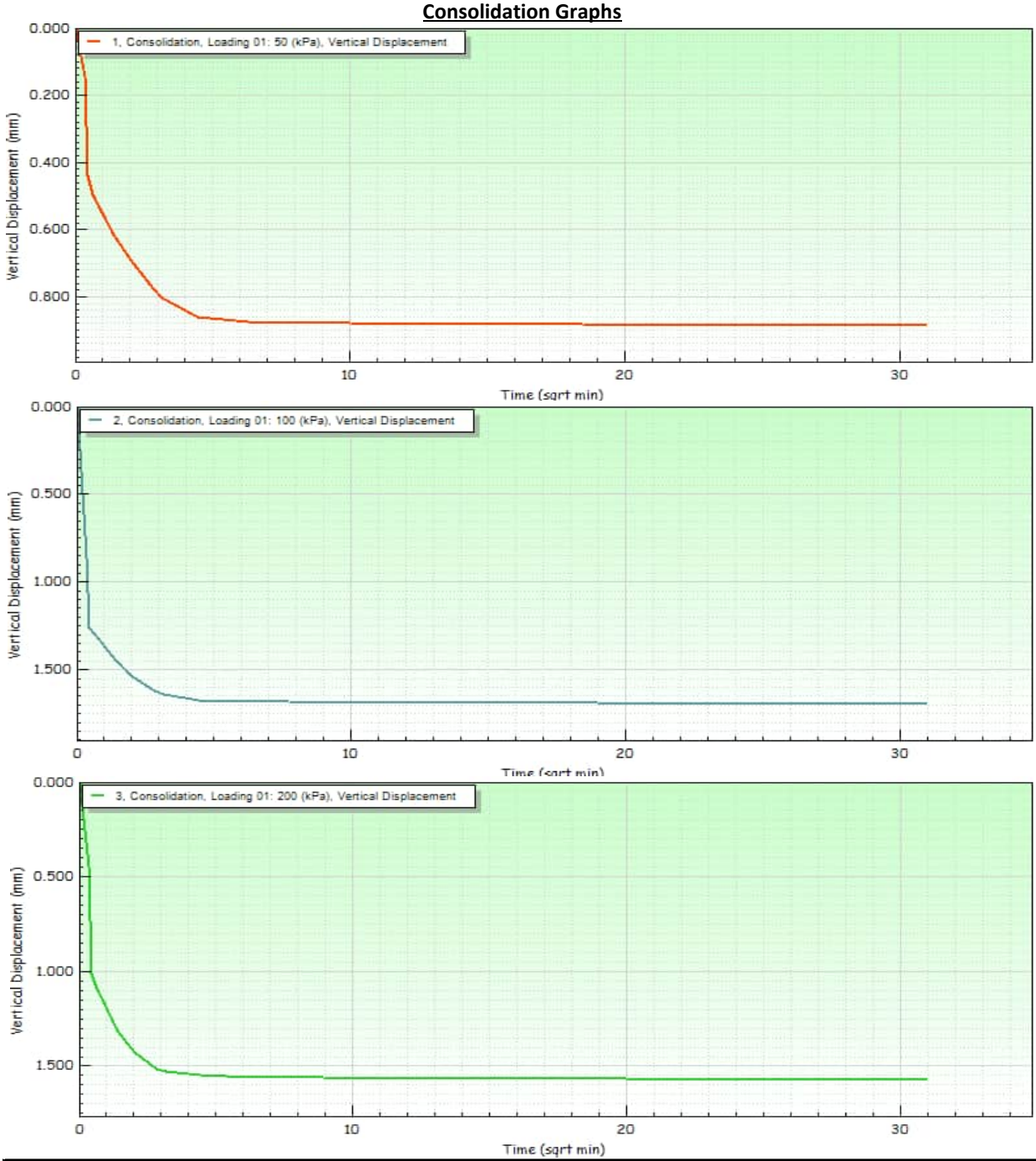
Direct Shear Test BS EN ISO 17892-10:2018					
Project Number	21-1682	Project	Eastern and Midlands Region WSP		
Location Number	TP-13605	Sample Reference		4	
Depth (m)	3.50	Sample Submerged?		Yes	~~No~~
Sample Type	B	Particle Density (Mg/m^3)		2.65	Assumed
Description	Greyish brown gravelly silty fine to coarse SAND.				
Sample Preparation	Sample is recompacted using material passing 2mm test sieve				

Stage	1	2	3
Initial Conditions			
Height (mm)	20.0	20.0	20.0
Diameter (mm)	60.0	60.0	60.0
Water Content (%)	12.0	12.0	12.0
Bulk Density (Mg/m^3)	2.22	2.21	2.23
Dry Density (Mg/m^3)	1.97	1.97	1.99
Voids Ratio	0.342	0.347	0.335
Consolidation			
Normal Pressure (kPa)	50	100	200
Vertical Displacement (mm)	0.885	1.694	1.572
Shearing			
Rate of Strain (mm/min)	0.062	0.062	0.062
Peak Shear Stress (kPa)	44.4	79.6	141.9
Hoz Displacement (mm)	10.2	10.2	10.2
Hoz Displacement at Peak Shear Stress (mm)	2.523	2.403	2.397
Final Conditions			
Water Content (%)	13.0	14.0	13.0
Dry Density (Mg/m^3)	2.11	2.35	2.32
Voids Ratio	0.286	0.213	0.214

	Tested	Approved
UKAS TESTING 10122 CAUSEWAY GEOTECH	Aaron Nutt	Joseph Nicholl

Direct Shear Test BS EN ISO 17892-10:2018				
Project Number	21-1682	Project	Eastern and Midlands Region WSP	
Location Number	TP-13605	Sample Reference	4	
Depth (m)	3.50	Sample Submerged?	Yes	~~No~~
Sample Type	B	Particle Density (Mg/m^3)	2.65	Assumed

Consolidation Graphs

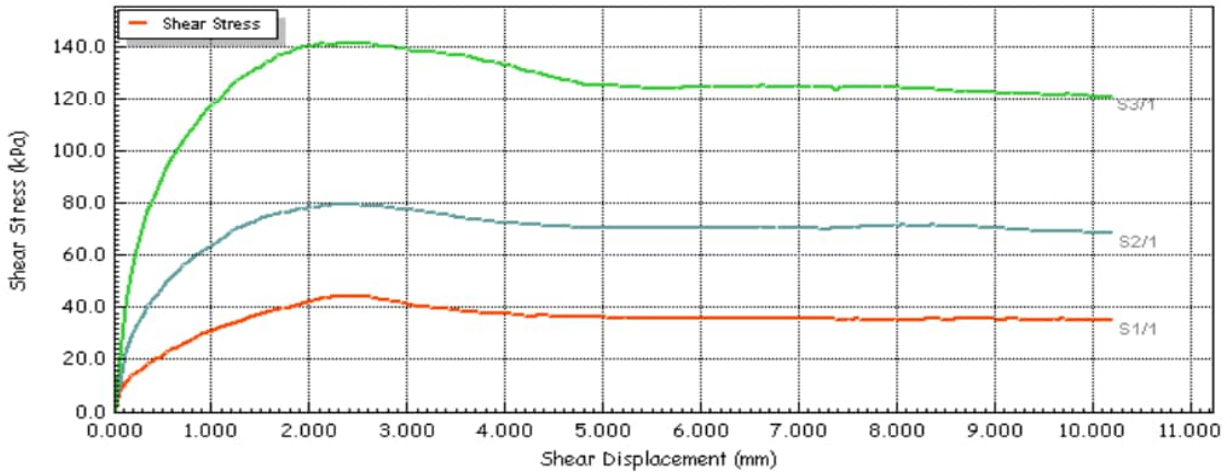


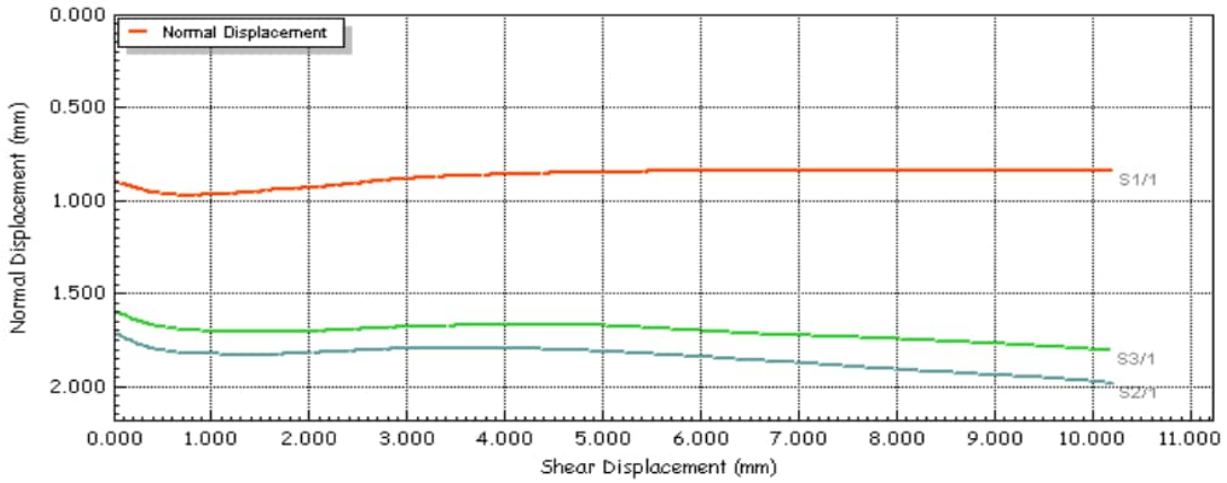
	Tested	Approved
UKAS TESTING 10122 / CAUSEWAY GEOTECH	Aaron Nutt	Joseph Nicholl

Lab Sheet Reference : LAB25R - Version 4

Direct Shear Test BS EN ISO 17892-10:2018				
Project Number	21-1682	Project	Eastern and Midlands Region WSP	
Location Number	TP-13605	Sample Reference	4	
Depth (m)	3.50	Sample Submerged?	Yes	~~No~~
Sample Type	B	Particle Density (Mg/m^3)	2.65	Assumed

Shear Stage





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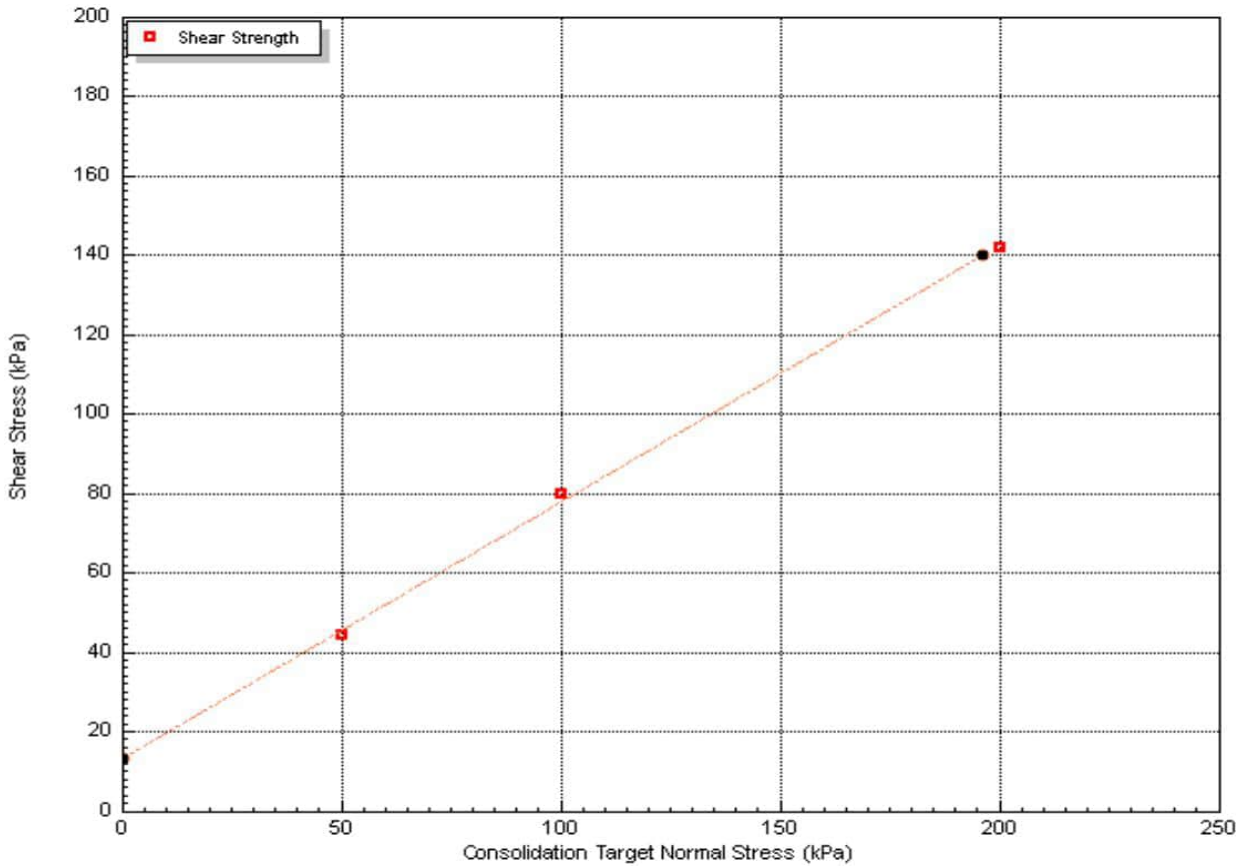
UKAS TESTING 10122 / CAUSEWAY GEOTECH	Aaron Nutt	Joseph Nicholl

Lab Sheet Reference : LAB25R - Version 4

Direct Shear Test BS EN ISO 17892-10:2018				
Project Number	21-1682	Project	Eastern and Midlands Region WSP	
Location Number	TP-13605	Sample Reference	4	
Depth (m)	3.50	Sample Submerged?	Yes	~~No~~
Sample Type	B	Particle Density (Mg/m^3)	2.65	Assumed

Stage	1	2	3
Envelope Failure Results			
Apparent Cohesion (kPa)	13		
Angle of Shearing Resistance (°)	33.0		



	Tested	Approved
10122	Aaron Nutt	Joseph Nicholl

Lab Sheet Reference : LAB25R - Version 4

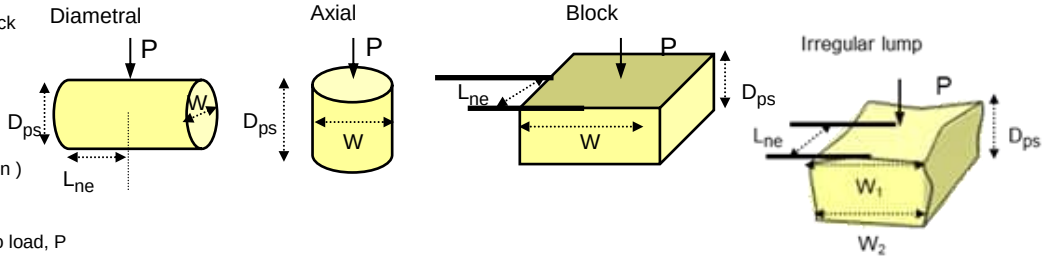
CAUSEWAY GEOTECH

Point Load Strength Index Tests
Summary of Results

Project No.	Project Name
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only

Borehole No.	Sample			Specimen		Rock Type	Test Type see ISRM		Failure Valid (Y/N)	Dimensions				Force P	Equivalent diameter, De	Point Load Strength Index		Remarks (including water content if measured)
	Depth	Ref.	Type	Ref.	Depth		Type (D, A, I, B)	Direction (L, P or U)		Lne	W	Dps	Dps'			Is	Is(50)	
	m				m					mm	mm	mm	mm	kN	mm	MPa	MPa	
BH-10413	7.50	4	C	1	7.50	MUDSTONE	A	U	NO		101.0	87.0	84.0	20.2	103.9	1.9	2.6	
BH-10413	7.70	5	C	1	7.70	MUDSTONE	D	U	YES	55.0	100.9	100.9	100.0	2.6	100.4	0.3	0.4	
BH-10413	10.65	7	C	1	10.65	LIMESTONE	A	U	YES		100.8	89.0	86.0	8.3	105.1	0.8	1.1	
BH-10413	11.15	11	C	1	11.15	LIMESTONE	A	U	YES		101.1	81.0	79.0	2.1	100.8	0.2	0.3	
BH-10413	11.25	9	C	1	11.25	LIMESTONE	A	U	YES		101.1	96.0	83.0	23.5	103.4	2.2	3.0	
BH-10413	11.85	12	C	1	11.85	LIMESTONE	D	U	NO	57.2	101.2	101.2	98.0	20.4	99.6	2.1	2.8	
BH-10475	6.20	2	C	1	6.20	LIMESTONE	A	U	YES		101.0	109.0	102.0	4.2	114.5	0.3	0.5	
BH-10475	6.75	3	C	1	6.75	LIMESTONE	A	U	YES		101.0	90.0	76.0	17.8	98.9	1.8	2.5	
BH-10475	10.00	C	4	1	10.00	LIMESTONE	A	U	NO		101.0	96.0	86.0	18.1	105.2	1.6	2.3	
BH-10499	3.25	2	C	1	3.25	MUDSTONE	A	U	NO		101.1	90.0	87.6	22.6	106.2	2.0	2.8	
BH-10499	3.60	3	C	1	3.60	MUDSTONE	D	U	YES	31.4	101.1	101.1	99.0	9.1	100.0	0.9	1.2	
BH-10499	4.60	5	C	1	4.60	MUDSTONE	D	U	NO	65.7	101.2	101.2	98.0	21.1	99.6	2.1	2.9	
BH-10499	4.85	4	C	1	4.85	MUDSTONE	A	U	YES		101.1	89.0	87.0	13.1	105.8	1.2	1.6	
BH-10499	7.05	7	C	1	7.05	MUDSTONE	A	U	NO		101.1	110.0	103.0	21.8	115.1	1.6	2.4	
BH-11377	4.05	2	C	1	4.05	SANDSTONE	A	U	NO		93.0	86.0	83.0	32.5	99.1	3.3	4.5	
BH-11377	4.30	3	C	1	4.30	SANDSTONE	D	U	YES	72.8	100.8	100.8	97.0	19.6	98.9	2.0	2.7	
BH-11377	5.20	4	C	1	5.20	LIMESTONE	A	U	NO		100.9	80.0	78.0	26.3	100.1	2.6	3.6	
BH-11377	6.40	6	C	1	6.40	SANDSTONE	A	U	NO		100.9	84.0	81.0	47.5	102.0	4.6	6.3	

Test Type
D - Diametral, A - Axial, I - Irregular Lump, B - Block
Direction
L - parallel to planes of weakness
P - perpendicular to planes of weakness
U - unknown or random
Dimensions
Dps - Distance between platens (platen separation)
Dps' - at failure (see ISRM note 6)
Lne - Length from platens to nearest free end
W - Width of shortest dimension perpendicular to load, P



Test performed in accordance with ISRM Suggested Methods : 2007, unless noted otherwise

Detailed legend for test and dimensions, based on ISRM, is shown above.

Size factor, F = (De/50)0.45 for all tests.

LAB 17R - Version 5

Date Printed: 18/11/2022

Approved By: Stephen Watson

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CAUSEWAY GEOTECH

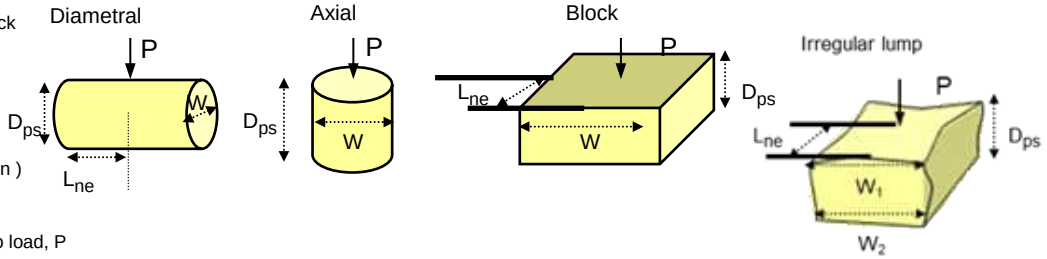
Point Load Strength Index Tests
Summary of Results

Project No.: 21-1682

Project Name: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only

Borehole No.	Sample			Specimen		Rock Type	Test Type see ISRM		Failure Valid (Y/N)	Dimensions				Force P	Equivalent diameter, De	Point Load Strength Index		Remarks (including water content if measured)
	Depth m	Ref.	Type	Ref.	Depth m		Type (D, A, I, B)	Direction (L, P or U)		Lne mm	W mm	Dps mm	Dps' mm	kN	mm	Is MPa	Is(50) MPa	
BH-11377	8.20	7	C	1	8.20	GREYWACKE	A	U	YES		99.1	41.0	38.0	2.3	69.2	0.5	0.6	
BH-11594	6.80	2	C	1	6.80	LIMESTONE	A	U	YES		99.8	74.0	62.0	15.7	88.8	2.0	2.6	
BH-11594	7.50	3	C	1	7.50	LIMESTONE	A	U	YES		100.0	98.0	94.0	5.3	109.4	0.4	0.6	
BH-11594	9.10	4	C	1	9.10	LIMESTONE	A	U	YES		100.4	108.0	101.0	6.6	113.6	0.5	0.7	
BH-13100	5.90	3	C	1	5.90	SANDSTONE	A	U	NO		101.0	88.0	86.0	22.2	105.2	2.0	2.8	
BH-13100	8.20	6	C	1	8.20	SANDSTONE	A	U	YES		101.0	92.0	87.0	4.2	105.8	0.4	0.5	
BH-13100	8.75	7	C	1	8.75	SANDSTONE	A	U	YES		101.1	88.0	86.0	4.8	105.2	0.4	0.6	
BH-13100	12.00	8	C	1	12.00	SANDSTONE	A	U	YES		100.5	89.0	86.0	17.9	104.9	1.6	2.3	
BH-16430	4.40	2	C	1	4.40	LIMESTONE	A	U	NO		101.3	87.0	85.0	21.2	104.7	1.9	2.7	
BH-16430	4.65	3	C	1	4.65	LIMESTONE	D	U	NO	65.1	101.2	101.2	100.0	16.5	100.6	1.6	2.2	
BH-16430	6.95	5	C	1	6.95	LIMESTONE	A	U	NO		101.0	84.0	82.0	17.0	102.7	1.6	2.2	
BH-16610A	7.65	2	C	1	7.65	LIMESTONE	A	U	YES		100.1	75.0	70.0	16.2	94.5	1.8	2.4	
BH-16610A	9.20	3	C	1	9.20	LIMESTONE	A	U	NO		99.9	84.0	80.0	9.7	100.9	1.0	1.3	
BH-17401	6.35	5	C	1	6.35	LIMESTONE	A	U	NO		100.4	88.0	86.0	25.2	104.9	2.3	3.2	
BH-17401	6.55	6	C	1	6.55	LIMESTONE	D	U	NO	73.2	100.9	100.9	95.0	27.8	97.9	2.9	3.9	
BH-17401	7.95	7	C	1	7.95	LIMESTONE	A	U	YES		100.9	111.0	101.0	15.0	113.9	1.2	1.7	
BH-17401	8.10	8	C	1	8.10	LIMESTONE	D	U	NO	84.3	101.0	101.0	96.0	12.3	98.5	1.3	1.7	
BH-17806	2.90	3	C	1	2.90	LIMESTONE	D	U	YES	57.2	101.1	101.1	99.0	8.6	100.0	0.9	1.2	

Test Type
D - Diametral, A - Axial, I - Irregular Lump, B - Block
Direction
L - parallel to planes of weakness
P - perpendicular to planes of weakness
U - unknown or random
Dimensions
Dps - Distance between platens (platen separation)
Dps' - at failure (see ISRM note 6)
Lne - Length from platens to nearest free end
W - Width of shortest dimension perpendicular to load, P



Test performed in accordance with ISRM Suggested Methods : 2007, unless noted otherwise

Detailed legend for test and dimensions, based on ISRM, is shown above.

Size factor, F = (De/50)0.45 for all tests.

LAB 17R - Version 5

Date Printed: 18/11/2022

Approved By: Stephen Watson

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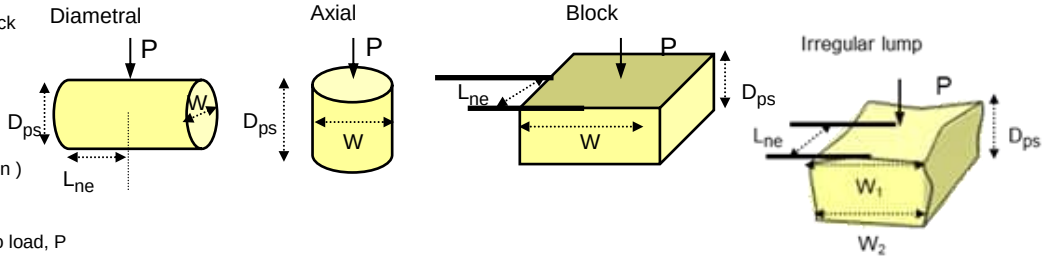
CAUSEWAY GEOTECH

Point Load Strength Index Tests
Summary of Results

Project No.	Project Name
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only

Borehole No.	Sample			Specimen		Rock Type	Test Type see ISRM		Failure Valid (Y/N)	Dimensions				Force P	Equivalent diameter, De	Point Load Strength Index		Remarks (including water content if measured)
	Depth	Ref.	Type	Ref.	Depth		Type (D, A, I, B)	Direction (L, P or U)		Lne	W	Dps	Dps'			Is	Is(50)	
	m				m					mm	mm	mm	mm	kN	mm	MPa	MPa	
BH-17806	3.45	5	C	1	3.45	LIMESTONE	A	U	NO		101.1	86.0	80.0	11.3	101.5	1.1	1.5	
BH-17806	4.10	6	C	1	4.10	LIMESTONE	A	U	NO		101.0	87.0	84.0	20.7	103.9	1.9	2.7	
BH-17806	4.75	7	C	1	4.75	LIMESTONE	D	U	NO	72.4	101.0	101.0	99.0	17.9	100.0	1.8	2.4	
BH-17806	6.10	8	C	1	6.10	LIMESTONE	A	U	NO		101.1	89.0	87.0	14.4	105.8	1.3	1.8	
BH-18231B	4.90	2	C	1	4.90	LIMESTONE	A	U	YES		99.9	75.0	71.0	8.9	95.0	1.0	1.3	
BH-18231B	5.30	3	C	1	5.30	LIMESTONE	A	U	NO		100.9	78.0	76.0	15.5	98.8	1.6	2.2	
BH-18231B	5.50	4	C	1	5.50	LIMESTONE	A	U	YES		100.8	84.0	80.0	11.4	101.3	1.1	1.5	
BH-18231B	6.80	5	C	1	6.80	LIMESTONE	A	U	NO		100.2	87.0	85.0	22.1	104.1	2.0	2.8	
BH-18440	7.20	1	C	1	7.20	LIMESTONE	A	U	YES		99.0	87.0	76.0	18.0	97.9	1.9	2.5	
BH-18440	7.75	3	C	1	7.75	LIMESTONE	A	U	YES		100.8	71.0	91.0	17.6	108.1	1.5	2.1	
BH-18440	10.85	4	C	1	10.85	LIMESTONE	A	U	YES		99.1	84.0	83.0	1.8	102.3	0.2	0.2	
BH-18440	14.70	6	C	1	14.70	LIMESTONE	A	U	YES		100.3	105.0	98.0	17.8	111.9	1.4	2.0	
BH-18804	4.35	3	C	1	4.35	LIMESTONE	D	U	NO	75.1	100.8	100.8	98.0	18.8	99.4	1.9	2.6	
BH-18804	4.45	2	C	1	4.45	LIMESTONE	A	U	NO		100.3	79.0	77.0	17.6	99.2	1.8	2.4	
BH-18804	7.45	4	C	1	7.45	LIMESTONE	A	U	NO		100.2	84.0	81.0	17.3	101.7	1.7	2.3	
BH-19057A	3.95	1	C	1	3.95	LIMESTONE	A	U	NO		100.8	79.0	77.0	25.4	99.4	2.6	3.5	
BH-19057A	5.00	2	C	1	5.00	LIMESTONE	D	U	NO	72.8	100.6	100.6	98.0	20.6	99.3	2.1	2.8	
BH-19057A	5.80	6	C	1	5.80	LIMESTONE	A	U	NO		100.8	88.0	86.0	14.7	105.1	1.3	1.9	

Test Type
D - Diametral, A - Axial, I - Irregular Lump, B - Block
Direction
L - parallel to planes of weakness
P - perpendicular to planes of weakness
U - unknown or random
Dimensions
Dps - Distance between platens (platen separation)
Dps' - at failure (see ISRM note 6)
Lne - Length from platens to nearest free end
W - Width of shortest dimension perpendicular to load, P



Test performed in accordance with ISRM Suggested Methods : 2007, unless noted otherwise

Detailed legend for test and dimensions, based on ISRM, is shown above.

Size factor, F = (De/50)0.45 for all tests.

LAB 17R - Version 5

Date Printed: 18/11/2022

Approved By: Stephen Watson

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CAUSEWAY GEOTECH

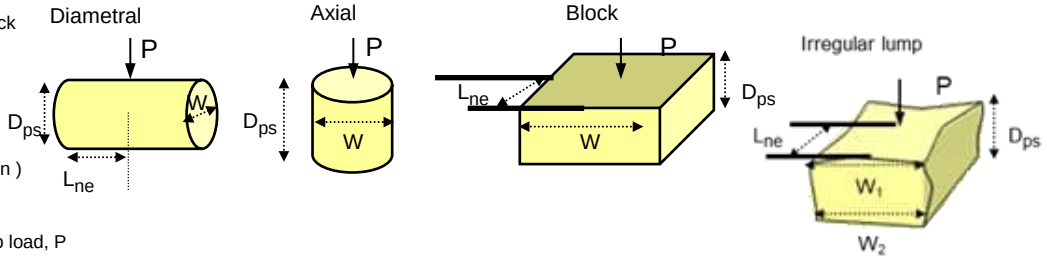
Point Load Strength Index Tests
Summary of Results

Project No.: 21-1682

Project Name: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only

Borehole No.	Sample			Specimen		Rock Type	Test Type see ISRM		Failure Valid (Y/N)	Dimensions				Force P	Equivalent diameter, De	Point Load Strength Index		Remarks (including water content if measured)
	Depth m	Ref.	Type	Ref.	Depth m		Type (D, A, I, B)	Direction (L, P or U)		Lne mm	W mm	Dps mm	Dps' mm	kN	mm	Is MPa	Is(50) MPa	
BH-19057A	6.15	4	C	1	6.15	LIMESTONE	A	U	NO		100.2	84.0	81.0	15.0	101.7	1.5	2.0	
BH-19057A	6.30	5	C	1	6.30	LIMESTONE	A	U	NO		100.8	87.0	84.0	19.6	103.8	1.8	2.5	
BH-19057A	7.25	7	C	1	7.25	LIMESTONE	A	U	NO		100.3	104.0	96.0	19.8	110.7	1.6	2.3	
BH-19407	3.10	2	C	1	3.10	LIMESTONE	D	U	NO	123.7	100.9	100.9	98.0	20.9	99.4	2.1	2.9	
BH-19407	3.65	3	C	1	3.65	LIMESTONE	A	U	NO		100.8	87.0	84.0	14.0	103.8	1.3	1.8	
BH-19407	5.90	7	C	1	5.90	LIMESTONE	A	U	YES		101.0	90.0	87.0	36.4	105.8	3.3	4.6	
BH-19407	6.30	8	C	1	6.30	LIMESTONE	D	U	NO	54.3	100.9	100.9	99.0	16.2	99.9	1.6	2.2	
BH-19407	9.50	9	C	1	9.50	LIMESTONE	A	U	NO		101.0	86.0	83.0	18.3	103.3	1.7	2.4	
BH-19427A	2.75	2	C	1	2.75	LIMESTONE	A	U	YES		100.3	75.0	73.0	13.3	96.6	1.4	1.9	
BH-19427A	3.10	3	C	1	3.10	LIMESTONE	D	U	NO	102.2	100.1	100.1	98.0	19.5	99.0	2.0	2.7	
BH-19427A	7.35	10	C	1	7.35	LIMESTONE	A	U	NO		100.5	88.0	85.0	24.8	104.3	2.3	3.2	
BH-19427A	11.00	11	C	1	11.00	LIMESTONE	A	U	NO		100.4	84.0	80.0	22.1	101.1	2.2	3.0	
BH-19807	5.40	4	C	1	5.40	LIMESTONE	A	U	YES		101.1	62.0	60.0	4.7	87.9	0.6	0.8	
BH-19807	5.55	5	C	1	5.55	LIMESTONE	D	U	YES	99.4	101.0	101.0	100.0	6.7	100.5	0.7	0.9	
BH-19807	5.90	2	C	1	5.90	LIMESTONE	A	U	NO		100.9	107.0	10.3	12.4	36.4	9.4	8.1	
BH-19807	6.25	3	C	1	6.25	LIMESTONE	A	U	NO		101.0	91.0	89.0	19.6	107.0	1.7	2.4	
BH-19807	7.60	6	C	1	7.60	LIMESTONE	A	U	YES		100.1	98.0	97.0	15.7	111.2	1.3	1.8	
BH-20655	4.30	1	C	1	4.30	LIMESTONE	A	U	NO		100.1	80.0	78.0	21.2	99.7	2.1	2.9	

Test Type
D - Diametral, A - Axial, I - Irregular Lump, B - Block
Direction
L - parallel to planes of weakness
P - perpendicular to planes of weakness
U - unknown or random
Dimensions
Dps - Distance between platens (platen separation)
Dps' - at failure (see ISRM note 6)
Lne - Length from platens to nearest free end
W - Width of shortest dimension perpendicular to load, P



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Detailed legend for test and dimensions, based on ISRM, is shown above.

Size factor, F = (De/50)0.45 for all tests.

LAB 17R - Version 5

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UKAS TESTING 10122

CAUSEWAY GEOTECH

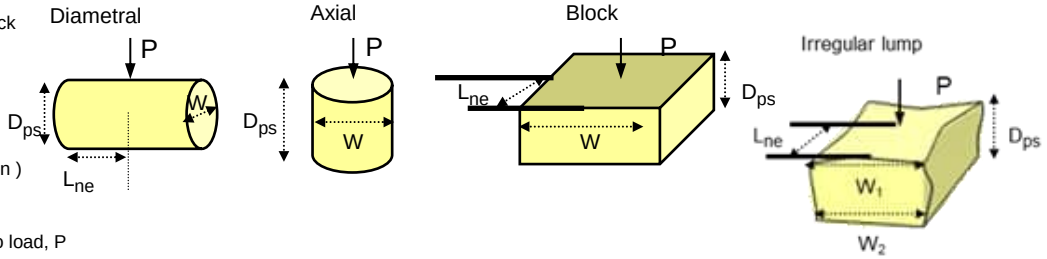
Point Load Strength Index Tests
Summary of Results

Project No.: 21-1682

Project Name: Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only

Borehole No.	Sample			Specimen		Rock Type	Test Type see ISRM		Failure Valid (Y/N)	Dimensions				Force P	Equivalent diameter, De	Point Load Strength Index		Remarks (including water content if measured)
	Depth	Ref.	Type	Ref.	Depth		Type (D, A, I, B)	Direction (L, P or U)		Lne	W	Dps	Dps'			Is	Is(50)	
	m				m					mm	mm	mm	mm	kN	mm	MPa	MPa	
BH-20655	6.50	4	C	1	6.50	LIMESTONE	A	U	NO		100.3	97.0	94.0	22.0	109.6	1.8	2.6	
BH-22776	2.70	1	C	1	2.70	LIMESTONE	D	U	NO	66.5	100.9	100.9	79.0	22.6	89.3	2.8	3.7	
BH-22776	2.80	2	C	1	2.80	LIMESTONE	A	U	NO		100.7	76.0	74.0	19.5	97.4	2.1	2.8	
BH-22776	3.80	3	C	1	3.80	LIMESTONE	A	U	NO		101.0	78.0	76.0	25.4	98.9	2.6	3.5	
BH-22776	4.80	4	C	1	4.80	LIMESTONE	A	U	NO		100.9	82.0	80.0	15.4	101.4	1.5	2.1	
BH-22776	5.05	5	C	1	5.05	LIMESTONE	A	U	NO		100.9	83.0	81.0	16.6	102.0	1.6	2.2	
BH-22776	6.20	6	C	1	6.20	LIMESTONE	A	U	NO		100.5	89.0	86.0	15.2	104.9	1.4	1.9	
BH-23514A	8.80	2	C	1	8.80	LIMESTONE	A	U	YES		101.2	73.0	71.0	21.9	95.6	2.4	3.2	
BH-23898	5.70	1	C	1	5.70	LIMESTONE	A	U	NO		101.1	77.0	74.0	21.7	97.6	2.3	3.1	
BH-23898	6.65	2	C	1	6.65	LIMESTONE	A	U	NO		101.1	78.0	75.0	21.9	98.3	2.3	3.1	
BH-24410A	4.60	2	C	1	4.60	LIMESTONE	A	U	NO		101.0	90.0	88.0	24.1	106.4	2.1	3.0	
BH-24410A	6.05	4	C	1	6.05	LIMESTONE	A	U	NO		101.1	86.0	83.0	21.3	103.4	2.0	2.8	
BH-24410A	6.85	5	C	1	6.85	LIMESTONE	A	U	NO		101.1	89.0	88.0	18.0	106.4	1.6	2.2	
BH-25603A	5.25	1	C	1	5.25	LIMESTONE	A	U	NO		101.2	87.0	85.0	20.8	104.7	1.9	2.6	
BH-25603A	6.50	2	C	1	6.50	LIMESTONE	A	U	NO		101.3	84.0	82.0	14.2	102.8	1.3	1.9	
BH-25603A	7.25	3	C	1	7.25	LIMESTONE	A	U	YES		101.2	84.0	82.0	15.3	102.8	1.4	2.0	
BH-26087	3.35	2	C	1	3.35	LIMESTONE	A	U	NO		100.8	95.0	93.0	17.3	109.3	1.4	2.1	
BH-26087	3.55	3	C	1	3.55	LIMESTONE	D	U	YES	50.8	101.0	101.0	98.0	10.6	99.5	1.1	1.5	

Test Type
D - Diametral, A - Axial, I - Irregular Lump, B - Block
Direction
L - parallel to planes of weakness
P - perpendicular to planes of weakness
U - unknown or random
Dimensions
Dps - Distance between platens (platen separation)
Dps' - at failure (see ISRM note 6)
Lne - Length from platens to nearest free end
W - Width of shortest dimension perpendicular to load, P



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Detailed legend for test and dimensions, based on ISRM, is shown above.

Size factor, F = (De/50)0.45 for all tests.

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UKAS TESTING 10122

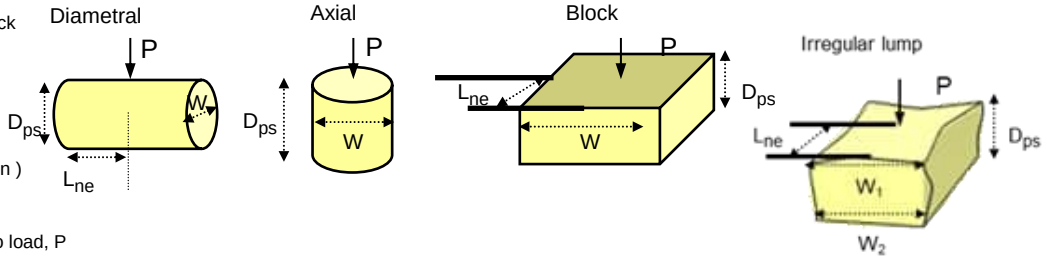
CAUSEWAY GEOTECH

Point Load Strength Index Tests
Summary of Results

Project No.	Project Name
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only

Borehole No.	Sample			Specimen		Rock Type	Test Type see ISRM		Failure Valid (Y/N)	Dimensions				Force P	Equivalent diameter, De	Point Load Strength Index		Remarks (including water content if measured)
	Depth	Ref.	Type	Ref.	Depth		Type (D, A, I, B)	Direction (L, P or U)		Lne	W	Dps	Dps'			Is	Is(50)	
	m				m					mm	mm	mm	mm	kN	mm	MPa	MPa	
BH-26087	4.00	4	C	1	4.00	LIMESTONE	A	U	NO		101.0	89.0	87.0	20.5	105.8	1.8	2.6	
BH-26087	6.50	6	C	1	6.50	LIMESTONE	A	U	YES		100.9	71.0	69.0	11.1	94.2	1.3	1.7	
BH-26135	5.55	3	C	1	5.55	LIMESTONE	A	U	NO		101.0	84.0	82.0	12.9	102.7	1.2	1.7	
BH-26135	5.75	4	C	1	5.75	LIMESTONE	A	U	NO		101.0	78.0	77.0	13.2	99.5	1.3	1.8	
BH-26135	5.95	5	C	1	5.95	LIMESTONE	A	U	YES		101.2	87.0	86.0	2.1	105.3	0.2	0.3	
BH-26135	8.60	6	C	1	8.60	LIMESTONE	A	U	NO		101.1	75.0	73.0	16.5	96.9	1.8	2.4	
BH-26214	6.75	2	C	1	6.75	LIMESTONE	A	U	YES		100.7	77.0	76.0	0.3	98.7	0.0	0.0	
BH-26214	7.00	3	C	1	7.00	LIMESTONE	A	U	NO		100.1	84.0	82.0	15.7	102.2	1.5	2.1	
BH-26214	9.20	6	C	1	9.20	LIMESTONE	A	U	NO		100.8	87.0	85.0	19.1	104.4	1.8	2.4	
BH-27000	4.20	2	C	1	4.20	LIMESTONE	A	U	NO		101.0	84.0	81.0	12.0	102.1	1.2	1.6	
BH-27000	4.90	3	C	1	4.90	LIMESTONE	D	U	NO	112.5	100.8	100.8	98.0	11.0	99.4	1.1	1.5	
BH-27000	5.95	5	C	1	5.95	LIMESTONE	A	U	YES		100.8	111.0	109.0	21.5	118.3	1.5	2.3	
BH-27000	7.00	6	C	1	7.00	LIMESTONE	A	U	NO		100.5	77.0	75.0	15.1	98.0	1.6	2.1	
BH-28818A	8.65	2	C	1	8.65	LIMESTONE	A	U	YES		100.1	85.0	83.0	10.1	102.9	1.0	1.3	
BH-28818A	10.50	4	C	1	10.50	LIMESTONE	A	U	YES		100.1	83.0	78.0	33.4	99.7	3.4	4.6	
BH-28886A	13.70	6	C	1	13.70	LIMESTONE	D	U	YES	92.8	101.0	101.0	98.0	5.7	99.5	0.6	0.8	
BH-29577	6.10	2	C	1	6.10	LIMESTONE	A	U	NO		100.3	98.0	95.0	30.5	110.1	2.5	3.6	
BH-29577	6.80	3	C	1	6.80	LIMESTONE	A	U	NO		100.3	87.0	85.0	37.2	104.2	3.4	4.8	

Test Type
D - Diametral, A - Axial, I - Irregular Lump, B - Block
Direction
L - parallel to planes of weakness
P - perpendicular to planes of weakness
U - unknown or random
Dimensions
Dps - Distance between platens (platen separation)
Dps' - at failure (see ISRM note 6)
Lne - Length from platens to nearest free end
W - Width of shortest dimension perpendicular to load, P



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Detailed legend for test and dimensions, based on ISRM, is shown above.

Size factor, F = (De/50)0.45 for all tests.

LAB 17R - Version 5

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CAUSEWAY GEOTECH

Point Load Strength Index Tests
Summary of Results

Project No.	Project Name
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only

Borehole No.	Sample			Specimen		Rock Type	Test Type see ISRM		Failure Valid (Y/N)	Dimensions				Force P	Equivalent diameter, De	Point Load Strength Index		Remarks (including water content if measured)
	Depth	Ref.	Type	Ref.	Depth		Type (D, A, I, B)	Direction (L, P or U)		Lne	W	Dps	Dps'			Is	Is(50)	
	m				m					mm	mm	mm	mm	kN	mm	MPa	MPa	
BH-29577	8.65	5	C	1	8.65	LIMESTONE	A	U	NO		100.2	75.0	73.0	15.0	96.5	1.6	2.2	
BH-30414	12.50	5	C	1	12.50	LIMESTONE	A	U	NO		100.2	62.0	60.0	27.4	87.5	3.6	4.6	
BH-30600	6.20	5	C	1	6.20	LIMESTONE	D	U	NO	148.3	100.3	100.3	95.0	21.4	97.6	2.2	3.0	
BH-30600	6.40	6	C	1	6.40	LIMESTONE	D	U	YES	133.6	100.1	100.1	99.0	10.0	99.5	1.0	1.4	
BH-30600	9.00	7	C	1	9.00	LIMESTONE	A	U	YES		100.3	87.0	83.0	20.5	103.0	1.9	2.7	
BH-30600	9.30	8	C	1	9.30	LIMESTONE	D	U	YES	101.4	100.5	100.5	98.0	7.9	99.2	0.8	1.1	
BH-32020A	6.70	4	C	1	6.70	LIMESTONE	A	U	YES		99.8	76.0	73.0	13.1	96.3	1.4	1.9	
BH-32020A	9.00	5	C	1	9.00	LIMESTONE	A	U	YES		100.2	70.0	68.0	4.7	93.1	0.5	0.7	
BH-32319	5.20	3	C	1	5.20	LIMESTONE	A	U	NO		100.5	75.0	72.0	19.7	96.0	2.1	2.9	
BH-32319	5.90	4	C	1	5.90	LIMESTONE	D	U	NO	74.0	100.7	100.7	98.0	22.8	99.3	2.3	3.1	
BH-32319	7.60	5	C	1	7.60	LIMESTONE	D	U	NO	82.6	100.8	100.8	97.0	17.6	98.9	1.8	2.4	
BH-32601	3.10	2	C	1	3.10	LIMESTONE	A	U	YES		100.5	63.0	61.0	13.8	88.3	1.8	2.3	
BH-32601	6.30	5	C	1	6.30	LIMESTONE	D	U	NO	83.4	100.8	100.8	97.0	21.2	98.9	2.2	2.9	
BH-33000A	5.70	1	C	1	5.70	LIMESTONE	D	U	NO	117.2	100.0	100.0	97.0	19.1	98.5	2.0	2.7	
BH-33000A	7.70	3	C	1	7.70	LIMESTONE	D	U	NO	113.1	100.7	100.7	99.0	15.9	99.8	1.6	2.2	
BH-33000A	9.60	4	C	1	9.60	LIMESTONE	A	U	NO		100.8	111.0	108.0	18.2	117.7	1.3	1.9	
BH-34598A	9.05	4	C	1	9.05	LIMESTONE	D	U	YES	108.1	101.1	101.1	99.0	21.0	100.0	2.1	2.9	
BH-34598A	10.20	5	C	1	10.20	LIMESTONE	A	U	YES		100.1	104.0	102.0	8.3	114.0	0.6	0.9	

Test Type
D - Diametral, A - Axial, I - Irregular Lump, B - Block
Direction
L - parallel to planes of weakness
P - perpendicular to planes of weakness
U - unknown or random
Dimensions
Dps - Distance between platens (platen separation)
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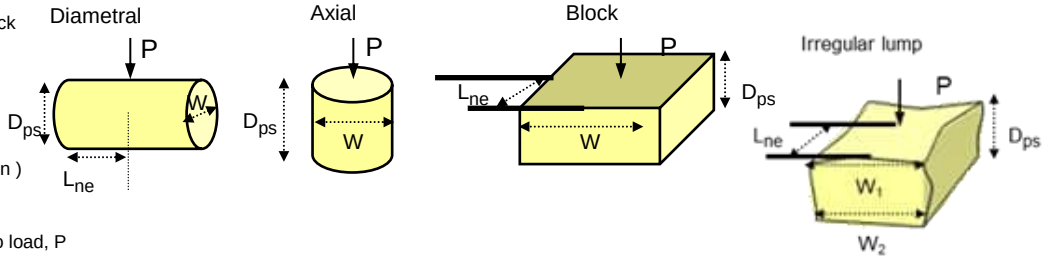
W - Width of shortest dimension perpendicular to load, P



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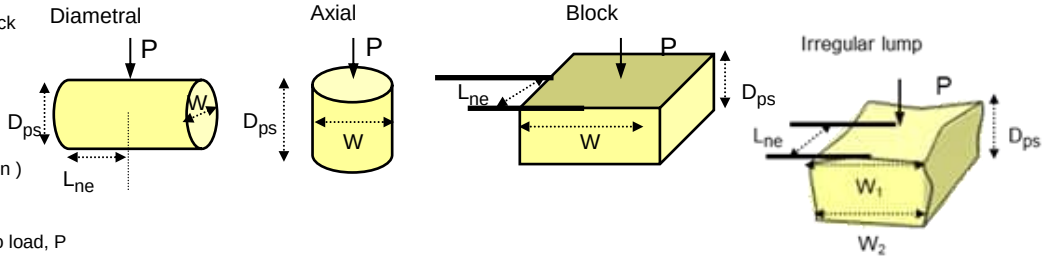
Point Load Strength Index Tests
Summary of Results

Project No.	Project Name
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only

Borehole No.	Sample			Specimen		Rock Type	Test Type see ISRM		Failure Valid (Y/N)	Dimensions				Force P	Equivalent diameter, De	Point Load Strength Index		Remarks (including water content if measured)
	Depth	Ref.	Type	Ref.	Depth		Type (D, A, I, B)	Direction (L, P or U)		Lne	W	Dps	Dps'			Is	Is(50)	
	m				m					mm	mm	mm	mm	kN	mm	MPa	MPa	
BH-34598A	12.10	6	C	1	12.10	LIMESTONE	D	U	NO	136.5	100.6	100.6	99.0	17.3	99.8	1.7	2.4	
BH-34598A	17.20	8	C	1	17.20	LIMESTONE	A	U	YES		100.9	97.0	96.0	6.1	111.1	0.5	0.7	
BH-34598A	24.20	9	C	1	24.20	LIMESTONE	D	U	YES	137.4	100.9	100.9	99.0	20.2	99.9	2.0	2.8	
BH-34816B	3.20	1	C	1	3.20	LIMESTONE	A	U	YES		100.6	109.0	107.0	19.9	117.1	1.5	2.1	
BH-34816B	4.85	2	C	1	4.85	LIMESTONE	D	U	YES	78.4	100.0	100.0	98.0	27.5	99.0	2.8	3.8	
BH-34816B	5.20	3	C	1	5.20	LIMESTONE	A	U	YES		100.1	66.0	64.0	27.2	90.3	3.3	4.4	
BH-34816B	7.30	6	C	1	7.30	LIMESTONE	A	U	YES		98.9	90.0	89.0	7.2	105.9	0.6	0.9	
BH-34816B	9.20	7	C	1	9.20	LIMESTONE	D	U	NO	112.8	99.8	99.8	97.0	15.5	98.4	1.6	2.2	
BH-35473	7.00	2	C	1	7.00	LIMESTONE	D	U	NO	111.7	100.3	100.3	97.0	35.8	98.6	3.7	5.0	
BH-5440	15.00	3	C	1	15.00	LIMESTONE	A	U	YES		101.1	108.0	99.0	1.5	112.9	0.1	0.2	
BH-5440	15.75	6	C	1	15.75	LIMESTONE	A	U	NO		101.0	74.0	67.0	17.2	92.8	2.0	2.6	
BH-5440	16.15	7	C	1	16.15	LIMESTONE	D	U	YES	60.8	100.8	100.8	98.0	6.0	99.4	0.6	0.8	
BH-5440	21.20	10	C	1	21.20	LIMESTONE	A	U	NO		101.2	85.0	83.0	21.3	103.4	2.0	2.8	
BH-5478	14.75	3	C	1	14.75	LIMESTONE	A	U	YES		101.1	90.0	86.0	33.1	105.2	3.0	4.2	
BH-5478	14.90	3	C	1	14.90	LIMESTONE	D	U	YES	67.9	101.2	101.2	100.0	2.1	100.6	0.2	0.3	
BH-5478	15.00	4	C	1	15.00	LIMESTONE	D	U	YES	68.3	101.1	84.0	81.0	5.7	90.5	0.7	0.9	
BH-5478	15.30	4	C	1	15.30	LIMESTONE	D	U	YES	57.2	101.0	101.0	100.0	10.6	100.5	1.0	1.4	
BH-5478	16.50	5	C	1	16.50	LIMESTONE	A	U	YES		101.1	79.0	76.0	19.0	98.9	1.9	2.6	

Test Type
D - Diametral, A - Axial, I - Irregular Lump, B - Block
Direction
L - parallel to planes of weakness
P - perpendicular to planes of weakness
U - unknown or random
Dimensions
Dps - Distance between platens (platen separation)
Dps' - at failure (see ISRM note 6)
Lne - Length from platens to nearest free end
W - Width of shortest dimension perpendicular to load, P



Test performed in accordance with ISRM Suggested Methods : 2007, unless noted otherwise

Detailed legend for test and dimensions, based on ISRM, is shown above.

Size factor, F = (De/50)0.45 for all tests.

LAB 17R - Version 5

Date Printed: 18/11/2022

Approved By: Stephen.Watson

UKAS TESTING
10122

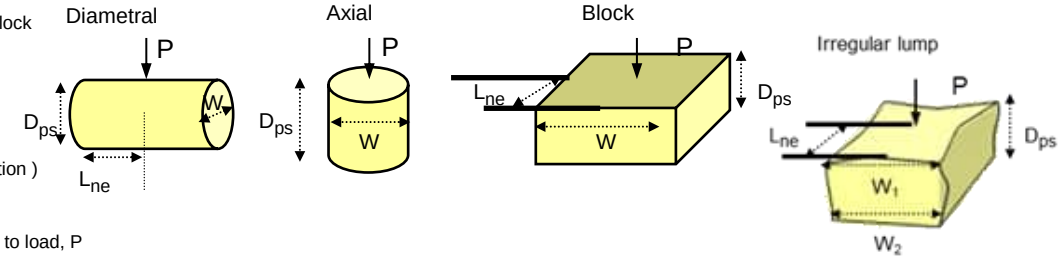
CAUSEWAY GEOTECH

Point Load Strength Index Tests
Summary of Results

Project No.	Project Name
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only

Borehole No.	Sample			Specimen		Rock Type	Test Type see ISRM		Failure Valid (Y/N)	Dimensions				Force P	Equivalent diameter, De	Point Load Strength Index		Remarks (including water content if measured)
	Depth	Ref.	Type	Ref.	Depth		Type (D, A, I, B)	Direction (L, P or U)		Lne	W	Dps	Dps'			Is	Is(50)	
	m				m					mm	mm	mm	mm	kN	mm	MPa	MPa	
BH-5478	19.65	7	C	1	19.65	LIMESTONE	A	U	YES		101.1	79.0	75.0	15.4	98.3	1.6	2.2	
BH-5530	21.20	1	C	1	21.20	LIMESTONE	A	U	NO		99.9	93.0	91.0	2.4	107.6	0.2	0.3	
BH-5530	22.00	3	C	1	22.00	LIMESTONE	A	U	YES		99.7	88.0	84.0	15.0	103.3	1.4	1.9	
BH-5573	14.30	2	C	1	14.30	SANDSTONE	A	U	YES		100.0	75.0	70.0	0.4	94.4	0.0	0.1	
BH-5573	14.42	3	C	1	14.42	SANDSTONE	D	U	YES	62.4	99.9	99.9	95.0	0.3	97.4	0.0	0.0	
BH-5573	16.30	7	C	1	16.30	SANDSTONE	A	U	YES		101.0	90.0	87.0	13.3	105.8	1.2	1.7	
BH-5573	20.25	8	C	1	20.25	SANDSTONE	A	U	YES		100.9	95.0	91.0	9.8	108.1	0.8	1.2	
BH-5573	22.90	9	C	1	22.90	SANDSTONE	A	U	YES		100.5	94.0	89.0	12.8	106.7	1.1	1.6	
BH-6886	6.50	1	C	1	6.50	LIMESTONE	A	U	NO		100.9	100.0	95.0	22.9	110.5	1.9	2.7	
BH-6886	7.40	3	C	1	7.40	LIMESTONE	A	U	YES		101.0	75.0	73.0	13.4	96.9	1.4	1.9	
BH-6886	7.50	4	C	1	7.50	LIMESTONE	A	U	YES		101.0	104.0	98.0	27.9	112.3	2.2	3.2	
BH-6886	8.10	5	C	1	8.10	LIMESTONE	A	U	NO		100.8	72.0	70.0	32.8	94.8	3.7	4.9	
BH-7282	13.20	7	C	1	13.20	SANDSTONE	A	U	NO		100.8	99.0	97.0	19.1	111.6	1.5	2.2	
BH-7282	13.55	8	C	1	13.55	SANDSTONE	A	U	NO		100.9	76.0	75.0	15.2	98.2	1.6	2.1	
BH-7282	13.65	9	C	1	13.65	SANDSTONE	D	U	NO	129.4	101.2	101.2	99.0	13.2	100.1	1.3	1.8	
BH-7282	13.80	10	C	1	13.80	SANDSTONE	A	U	YES		101.0	95.0	91.0	2.5	108.2	0.2	0.3	
BH-7282	16.00	11	C	1	16.00	SANDSTONE	A	U	YES		101.0	82.0	81.0	2.6	102.1	0.2	0.3	
BH-7282	17.00	12	C	1	17.00	LIMESTONE	A	U	YES		101.1	80.0	79.0	17.5	100.8	1.7	2.4	

Test Type
D - Diametral, A - Axial, I - Irregular Lump, B - Block
Direction
L - parallel to planes of weakness
P - perpendicular to planes of weakness
U - unknown or random
Dimensions
Dps - Distance between platens (platen separation)
Dps' - at failure (see ISRM note 6)
Lne - Length from platens to nearest free end
W - Width of shortest dimension perpendicular to load, P



Test performed in accordance with ISRM Suggested Methods : 2007, unless noted otherwise

Detailed legend for test and dimensions, based on ISRM, is shown above.

Size factor, F = (De/50)0.45 for all tests.

LAB 17R - Version 5

Date Printed: 18/11/2022

Approved By: Stephen.Watson

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10122

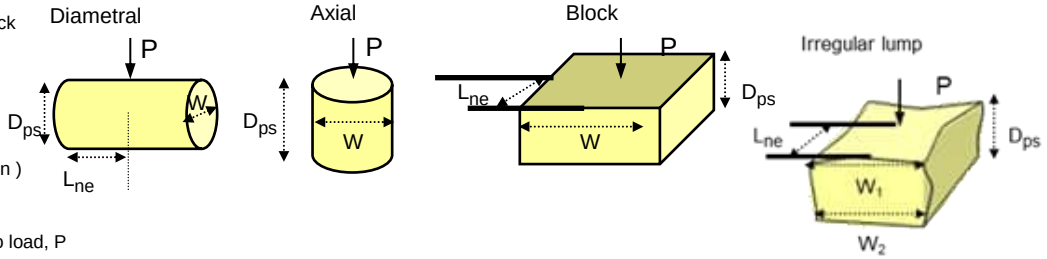
CAUSEWAY GEOTECH

Point Load Strength Index Tests
Summary of Results

Project No.	Project Name
21-1682	Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only

Borehole No.	Sample			Specimen		Rock Type	Test Type see ISRM		Failure Valid (Y/N)	Dimensions				Force P	Equivalent diameter, De	Point Load Strength Index		Remarks (including water content if measured)
	Depth	Ref.	Type	Ref.	Depth		Type (D, A, I, B)	Direction (L, P or U)		Lne	W	Dps	Dps'			Is	Is(50)	
	m				m					mm	mm	mm	mm	kN	mm	MPa	MPa	
BH-7320	14.00	10	C	1	14.00	SANDSTONE	A	U	NO		100.6	78.0	75.0	29.4	98.0	3.1	4.1	
BH-7320	14.10	11	C	1	14.10	SANDSTONE	D	U	NO	64.2	100.7	100.7	99.0	26.3	99.8	2.6	3.6	
BH-7320	17.70	12	C	1	17.70	SANDSTONE	A	U	YES		101.1	88.0	86.0	18.5	105.2	1.7	2.3	
BH-7349	14.65	4	C	1	14.65	SANDSTONE	A	U	NO		101.3	85.0	83.0	11.1	103.5	1.0	1.4	
BH-7349	15.20	5	C	1	15.20	SANDSTONE	A	U	YES		101.1	92.0	88.0	11.3	106.4	1.0	1.4	
BH-9368	2.70	1	C	1	2.70	MUDSTONE	A	U	NO		101.1	84.0	81.0	21.6	102.1	2.1	2.9	
BH-9368	3.90	5	C	1	3.90	LIMESTONE	A	U	NO		101.1	68.0	64.0	17.2	90.8	2.1	2.7	
BH-9368	4.55	6	C	1	4.55	LIMESTONE	D	U	NO	76.2	100.9	100.9	99.0	18.9	99.9	1.9	2.6	
BH-9368	5.40	7	C	1	5.40	LIMESTONE	A	U	YES		101.1	82.0	80.0	16.6	101.5	1.6	2.2	
BH-9368	6.95	8	C	1	6.95	LIMESTONE	A	U	NO		101.0	83.0	80.0	16.1	101.4	1.6	2.2	
BH-9668	4.80	1	C	1	4.80	LIMESTONE	A	U	YES		101.0	58.0	54.0	4.1	83.3	0.6	0.7	
BH-9668	6.00	3	C	1	6.00	LIMESTONE	A	U	YES		101.0	110.0	95.0	3.9	110.5	0.3	0.5	
BH-9668	7.70	4	C	1	7.70	LIMESTONE	A	U	NO		101.0	81.0	79.0	20.0	100.8	2.0	2.7	

Test Type
D - Diametral, A - Axial, I - Irregular Lump, B - Block
Direction
L - parallel to planes of weakness
P - perpendicular to planes of weakness
U - unknown or random
Dimensions
Dps - Distance between platens (platen separation)
Dps' - at failure (see ISRM note 6)
Lne - Length from platens to nearest free end
W - Width of shortest dimension perpendicular to load, P



Test performed in accordance with ISRM Suggested Methods : 2007, unless noted otherwise

Detailed legend for test and dimensions, based on ISRM, is shown above.

Size factor, F = (De/50)0.45 for all tests.

LAB 17R - Version 5

Date Printed: 18/11/2022

Approved By: Stephen Watson

UKAS TESTING
10122

LABORATORY TEST CERTIFICATE

10 Queenslie Point
Queenslie Industrial Estate
120 Stepps Road
Glasgow
G33 3NQ

Tel: 0141 774 4032

email: info@mattest.org
Website: www.mattest.org

Certificate No : **22/886 - 01-1 to 06-1 and 22/1013 - 01-1 to 02-1**

To : **Stephen Watson**

Client : **Causeway Geotech Limited**
8 Drumahiskey Road
Ballymoney
Co. Antrim
BT53 7QL

LABORATORY TESTING OF ROCK

Introduction

We refer to samples taken from Eastern and Midlands Region WSP - Ground Investigation - Lot 1 Pipeline Section Only.

Material & Source

Sample Reference	:	See Report Plates
Sampled By	:	Client
Sampling Certificate	:	Not Supplied
Location	:	See Report Plates
Description	:	Rock Cores
Date Sampled	:	Not Supplied
Date Tested	:	16th August 2022 Onwards
Source	:	21-1682 - Eastern and Midlands Region WSP - GI - Lot 1 Pipeline Section Only

Test Results

As Detailed On Page 2 to Page 44 inclusive

Comments

The results contained in this report relate to the sample(s) as received
Opinions and interpretations expressed herein are outside the scope of UKAS accreditation
This report should not be reproduced except in full without the written approval of the laboratory
All remaining samples for this project will be disposed of 28 days after issue of this test certificate

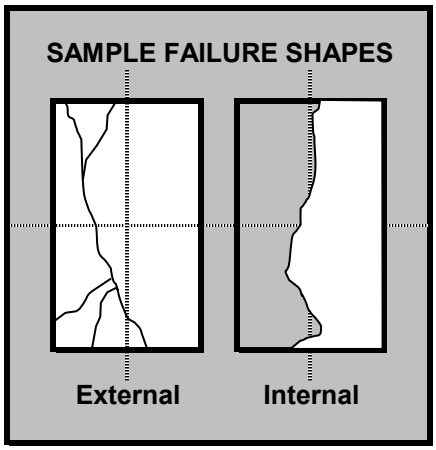
Remarks

Approved for Issue

T McLelland (Director)

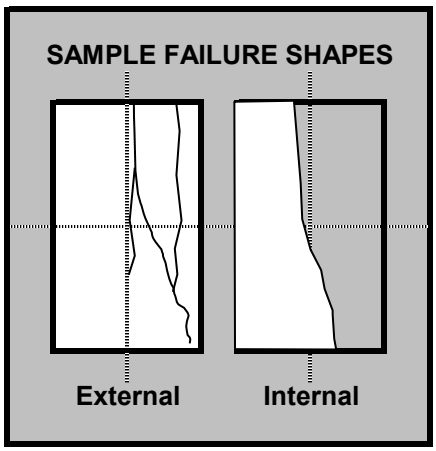
Date 21/11/2022

BOREHOLE		**BH-5440**
SAMPLE		**C5**
DEPTH	m	**16.95-17.15**
SAMPLE DIAMETER	mm	**101.45**
SAMPLE HEIGHT	mm	**168.89**
TEST CONDITION		**As Received**
RATE OF LOADING	kN/s	**0.6**
TEST DURATION	min.sec	**6.48**
DATE OF TESTING		**04/10/2022**
LOAD FRAME USED		**2000kN**
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		**Unknown**
FAILURE LOAD	kN	**223.5**
UNCONFINED COMPRESSIVE STRENGTH	MPa	**27.7**
WATER CONTENT (ISRM Suggested Methods)	%	**0.9**
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.67**
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.64**

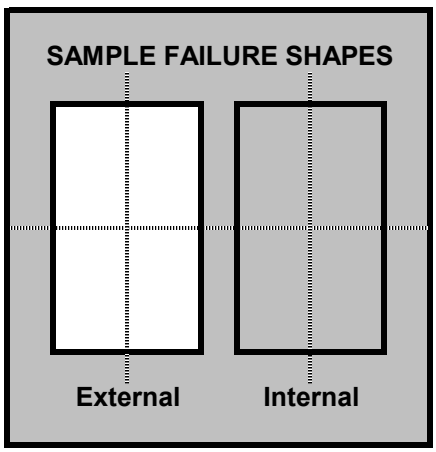


Test specimen does not meet specified length / diameter ratio requirements

BOREHOLE		**BH-5440**
SAMPLE		**C9**
DEPTH	m	**20.15-20.60**
SAMPLE DIAMETER	mm	**101.81**
SAMPLE HEIGHT	mm	**199.95**
TEST CONDITION		**As Received**
RATE OF LOADING	kN/s	**0.9**
TEST DURATION	min.sec	**8.58**
DATE OF TESTING		**03/10/2022**
LOAD FRAME USED		**2000kN**
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		**Unknown**
FAILURE LOAD	kN	**455.3**
UNCONFINED COMPRESSIVE STRENGTH	MPa	**55.9**
WATER CONTENT (ISRM Suggested Methods)	%	**0.1**
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.66**
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.66**



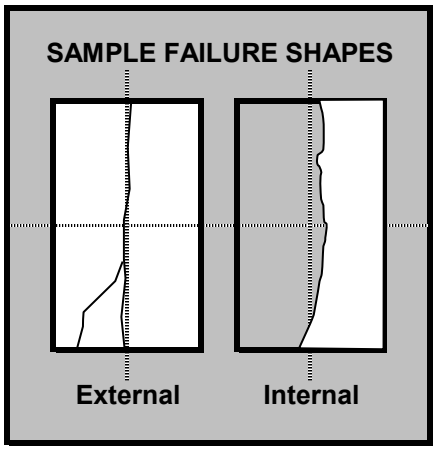
BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



Tested in accordance with ASTM D7012 - 14

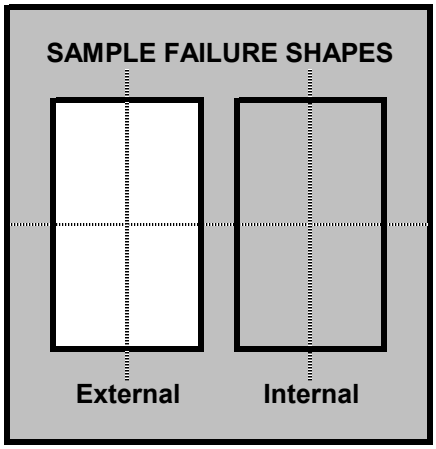
SUMMARY OF UNCONFINED COMPRESSIVE STRENGTH

BOREHOLE		**BH-5478**
SAMPLE		**C2**
DEPTH	m	**14.90-15.10**
SAMPLE DIAMETER	mm	**101.59**
SAMPLE HEIGHT	mm	**169.28**
TEST CONDITION		**As Received**
RATE OF LOADING	kN/s	**0.9**
TEST DURATION	min.sec	**7.36**
DATE OF TESTING		**04/10/2022**
LOAD FRAME USED		**2000kN**
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		**Unknown**
FAILURE LOAD	kN	**381.0**
UNCONFINED COMPRESSIVE STRENGTH	MPa	**47.0**
WATER CONTENT (ISRM Suggested Methods)	%	**0.2**
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.71**
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.70**

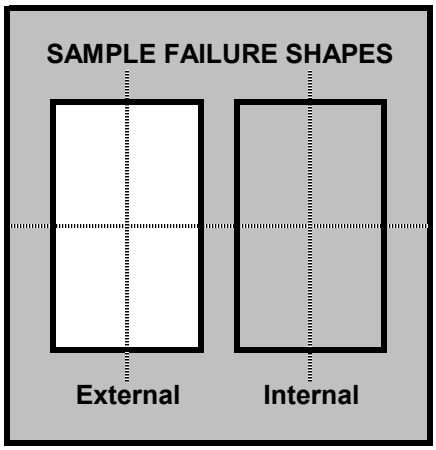


Test specimen does not meet specified length / diameter ratio requirements

BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



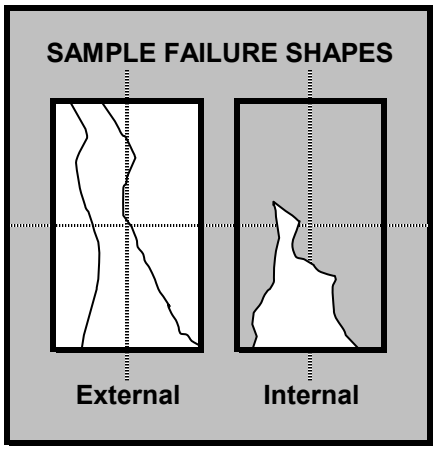
BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



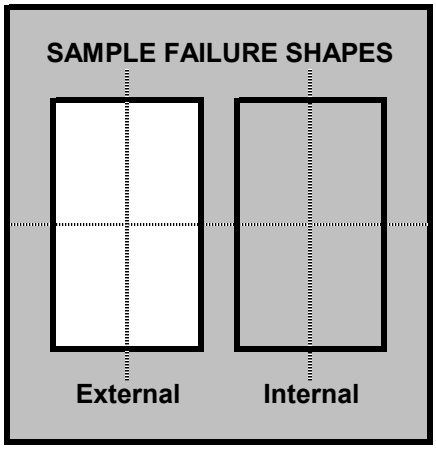
Tested in accordance with ASTM D7012 - 14

SUMMARY OF UNCONFINED COMPRESSIVE STRENGTH

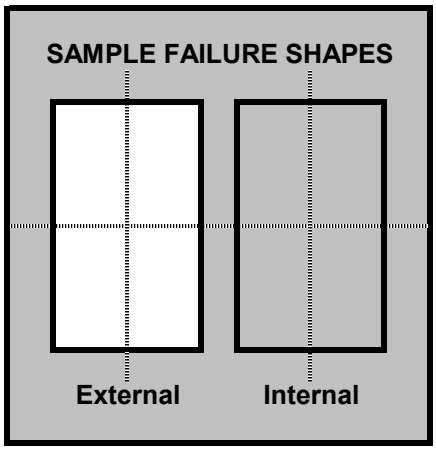
BOREHOLE		**BH-5530**
SAMPLE		**C4**
DEPTH	m	**22.70-23.00**
SAMPLE DIAMETER	mm	**100.19**
SAMPLE HEIGHT	mm	**210.31**
TEST CONDITION		**As Received**
RATE OF LOADING	kN/s	**1.6**
TEST DURATION	min.sec	**2.25**
DATE OF TESTING		**27/09/2022**
LOAD FRAME USED		**2000kN**
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		**Unknown**
FAILURE LOAD	kN	**214.0**
UNCONFINED COMPRESSIVE STRENGTH	MPa	**27.1**
WATER CONTENT (ISRM Suggested Methods)	%	**0.4**
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.70**
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.69**



BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



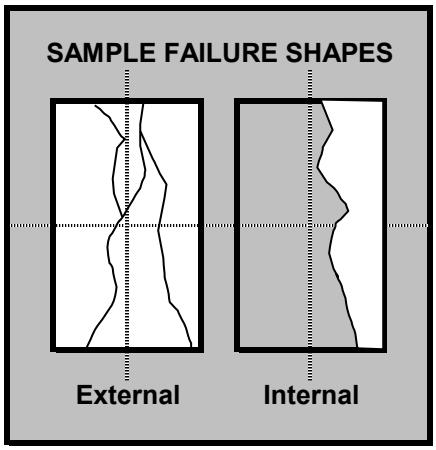
BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



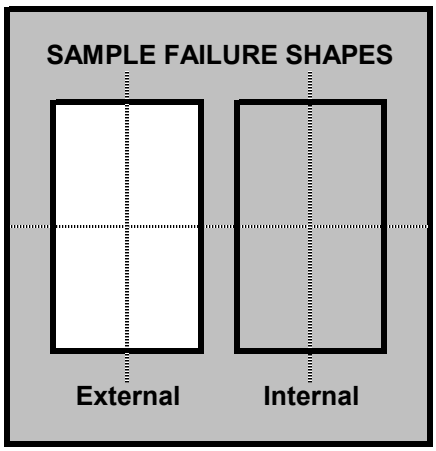
Tested in accordance with ASTM D7012 - 14

SUMMARY OF UNCONFINED COMPRESSIVE STRENGTH

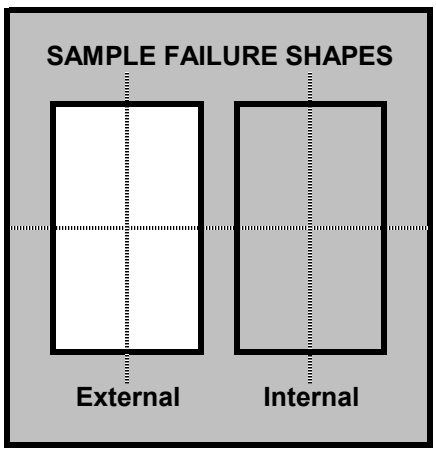
BOREHOLE		**BH-5573**
SAMPLE		**C4**
DEPTH	m	**14.90-15.20**
SAMPLE DIAMETER	mm	**101.18**
SAMPLE HEIGHT	mm	**211.91**
TEST CONDITION		**As Received**
RATE OF LOADING	kN/s	**1.6**
TEST DURATION	min.sec	**5.25**
DATE OF TESTING		**27/09/2022**
LOAD FRAME USED		**2000kN**
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		**Unknown**
FAILURE LOAD	kN	**510.2**
UNCONFINED COMPRESSIVE STRENGTH	MPa	**63.5**
WATER CONTENT (ISRM Suggested Methods)	%	**0.6**
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.75**
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.73**



BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



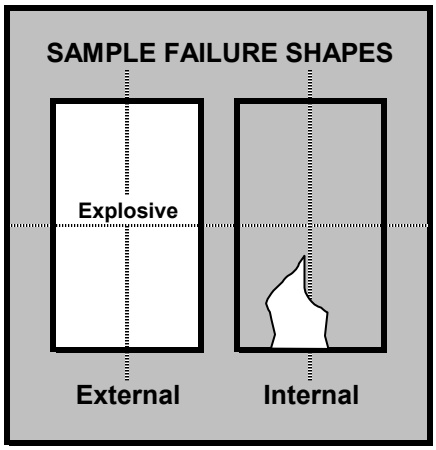
BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



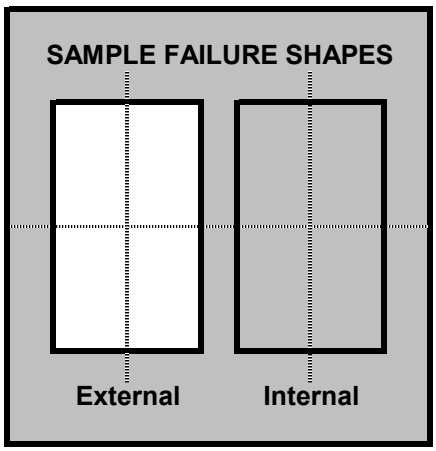
Tested in accordance with ASTM D7012 - 14

SUMMARY OF UNCONFINED COMPRESSIVE STRENGTH

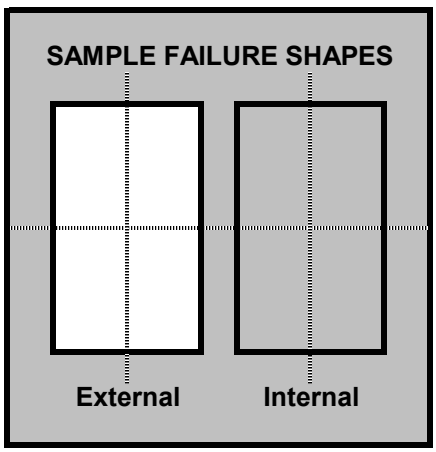
BOREHOLE		**BH-7320**
SAMPLE		**C9**
DEPTH	m	**13.70-14.00**
SAMPLE DIAMETER	mm	**101.42**
SAMPLE HEIGHT	mm	**210.91**
TEST CONDITION		**As Received**
RATE OF LOADING	kN/s	**1.1**
TEST DURATION	min.sec	**14.15**
DATE OF TESTING		**01/11/2022**
LOAD FRAME USED		**2000kN**
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		**Unknown**
FAILURE LOAD	kN	**950.1**
UNCONFINED COMPRESSIVE STRENGTH	MPa	**117.6**
WATER CONTENT (ISRM Suggested Methods)	%	**1.0**
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.62**
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.59**



BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	

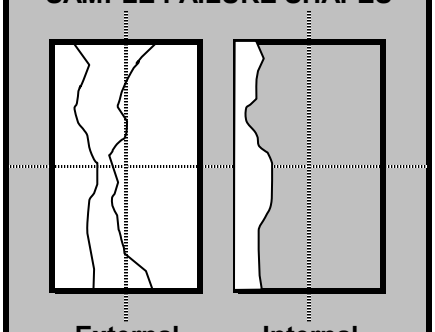


Tested in accordance with ASTM D7012 - 14

SUMMARY OF UNCONFINED COMPRESSIVE STRENGTH

BOREHOLE		**BH-7349**
SAMPLE		**C6**
DEPTH	m	**15.80-16.20**
SAMPLE DIAMETER	mm	**102.22**
SAMPLE HEIGHT	mm	**214.13**
TEST CONDITION		**As Received**
RATE OF LOADING	kN/s	**1.0**
TEST DURATION	min.sec	**8.55**
DATE OF TESTING		**31/10/2022**
LOAD FRAME USED		**2000kN**
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		**Perpendicular**
FAILURE LOAD	kN	**518.4**
UNCONFINED COMPRESSIVE STRENGTH	MPa	**63.2**
WATER CONTENT (ISRM Suggested Methods)	%	**0.5**
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.67**
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.66**

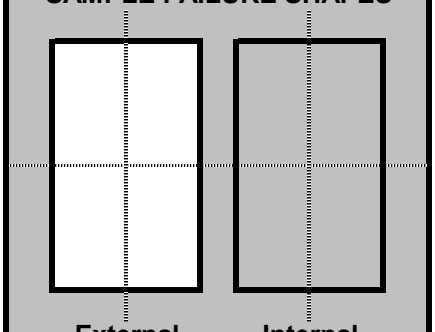
SAMPLE FAILURE SHAPES



External **Internal**

BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	

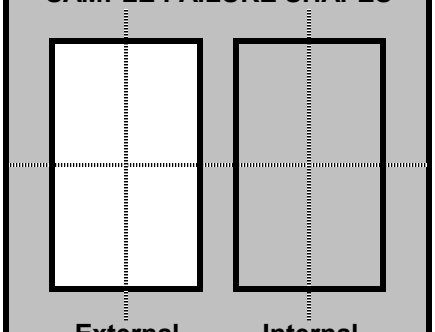
SAMPLE FAILURE SHAPES



External **Internal**

BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	

SAMPLE FAILURE SHAPES

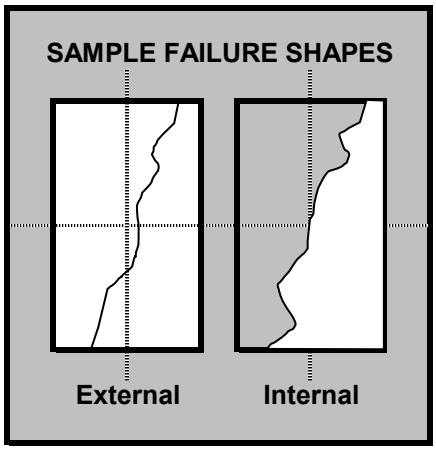


External **Internal**

Tested in accordance with ASTM D7012 - 14

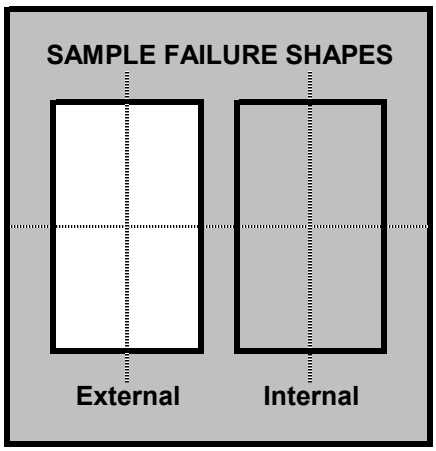
SUMMARY OF UNCONFINED COMPRESSIVE STRENGTH

BOREHOLE		**BH-9368**
SAMPLE		**C4**
DEPTH	m	**3.65-3.90**
SAMPLE DIAMETER	mm	**101.63**
SAMPLE HEIGHT	mm	**184.06**
TEST CONDITION		**As Received**
RATE OF LOADING	kN/s	**1.0**
TEST DURATION	min.sec	**5.32**
DATE OF TESTING		**17/10/2022**
LOAD FRAME USED		**2000kN**
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		**Unknown**
FAILURE LOAD	kN	**310.5**
UNCONFINED COMPRESSIVE STRENGTH	MPa	**38.3**
WATER CONTENT (ISRM Suggested Methods)	%	**0.3**
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.70**
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.70**

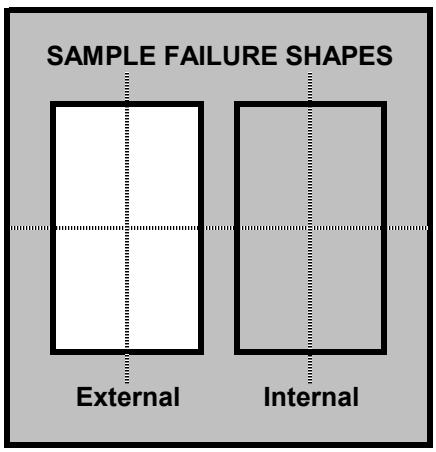


Test specimen does not meet specified length / diameter ratio requirements

BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



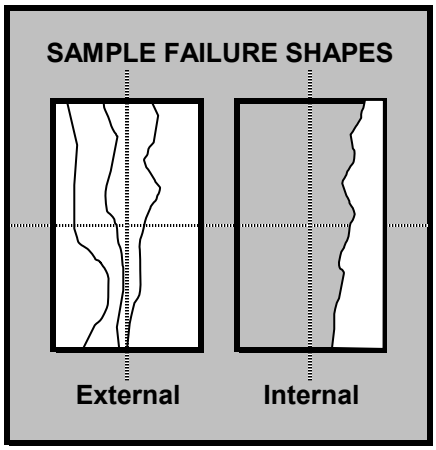
BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



Tested in accordance with ASTM D7012 - 14

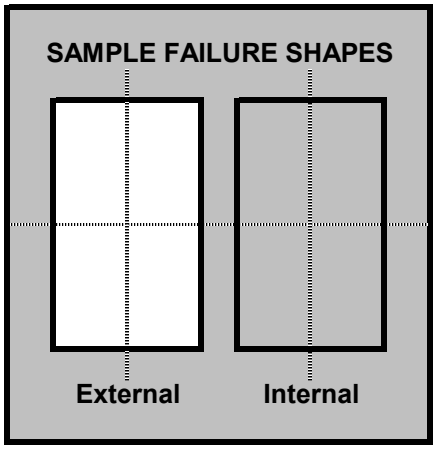
SUMMARY OF UNCONFINED COMPRESSIVE STRENGTH

BOREHOLE		**BH-9668**
SAMPLE		**C2**
DEPTH	m	**6.10-6.32**
SAMPLE DIAMETER	mm	**101.67**
SAMPLE HEIGHT	mm	**183.72**
TEST CONDITION		**As Received**
RATE OF LOADING	kN/s	**1.0**
TEST DURATION	min.sec	**8.50**
DATE OF TESTING		**17/10/2022**
LOAD FRAME USED		**2000kN**
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		**Unknown**
FAILURE LOAD	kN	**493.8**
UNCONFINED COMPRESSIVE STRENGTH	MPa	**60.8**
WATER CONTENT (ISRM Suggested Methods)	%	**1.1**
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.75**
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.72**

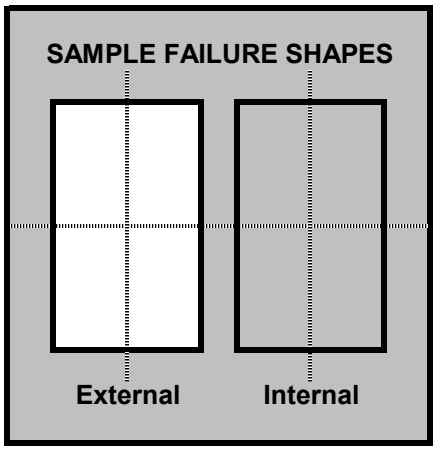


Test specimen does not meet specified length / diameter ratio requirements

BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	

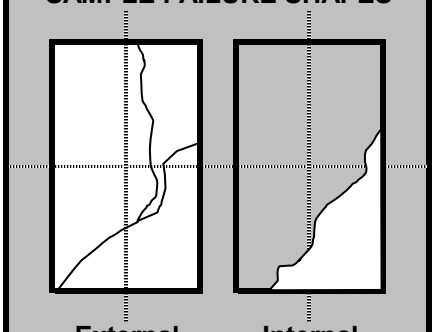


Tested in accordance with ASTM D7012 - 14

SUMMARY OF UNCONFINED COMPRESSIVE STRENGTH

BOREHOLE		**BH-10413**
SAMPLE		**C10**
DEPTH	m	**11.45-11.75**
SAMPLE DIAMETER	mm	**101.79**
SAMPLE HEIGHT	mm	**210.73**
TEST CONDITION		**As Received**
RATE OF LOADING	kN/s	**1.0**
TEST DURATION	min.sec	**4.41**
DATE OF TESTING		**01/11/2022**
LOAD FRAME USED		**2000kN**
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		**Unknown**
FAILURE LOAD	kN	**275.1**
UNCONFINED COMPRESSIVE STRENGTH	MPa	**33.8**
WATER CONTENT (ISRM Suggested Methods)	%	**1.2**
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.72**
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.69**

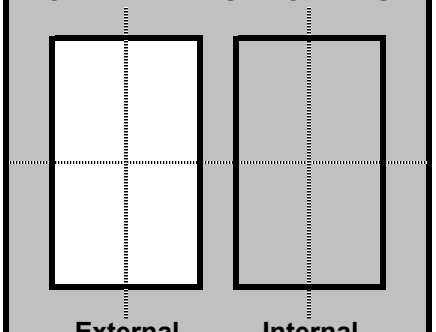
SAMPLE FAILURE SHAPES



External **Internal**

BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	

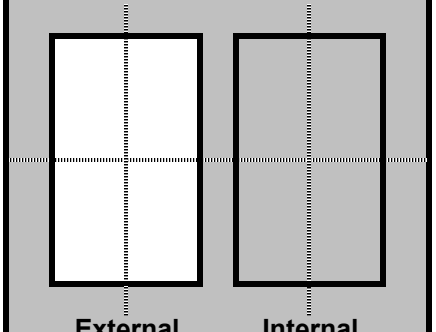
SAMPLE FAILURE SHAPES



External **Internal**

BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	

SAMPLE FAILURE SHAPES

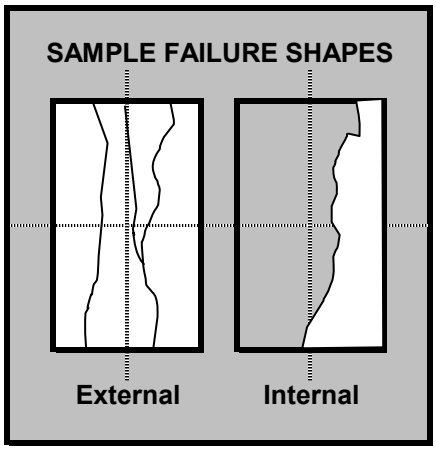


External **Internal**

Tested in accordance with ASTM D7012 - 14

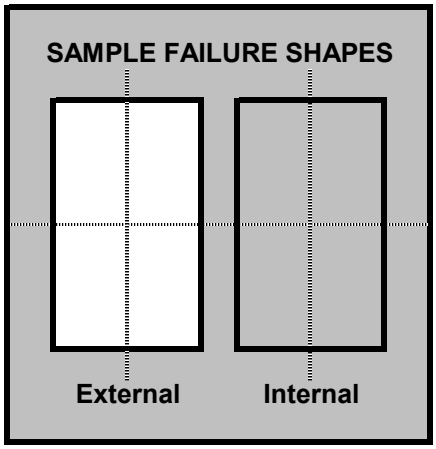
SUMMARY OF UNCONFINED COMPRESSIVE STRENGTH

BOREHOLE		**BH-10499**
SAMPLE		**C6**
DEPTH	m	**6.20-6.40**
SAMPLE DIAMETER	mm	**101.73**
SAMPLE HEIGHT	mm	**192.46**
TEST CONDITION		**As Received**
RATE OF LOADING	kN/s	**1.0**
TEST DURATION	min.sec	**5.15**
DATE OF TESTING		**02/11/2022**
LOAD FRAME USED		**2000kN**
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		**Unknown**
FAILURE LOAD	kN	**304.5**
UNCONFINED COMPRESSIVE STRENGTH	MPa	**37.5**
WATER CONTENT (ISRM Suggested Methods)	%	**0.2**
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.70**
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.70**

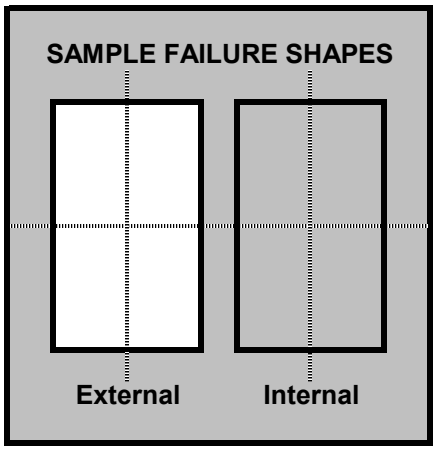


Test specimen does not meet specified length / diameter ratio requirements

BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



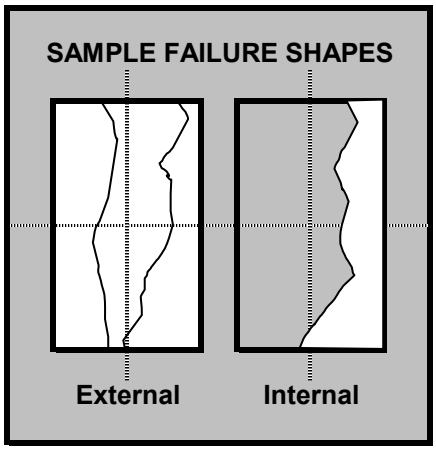
BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



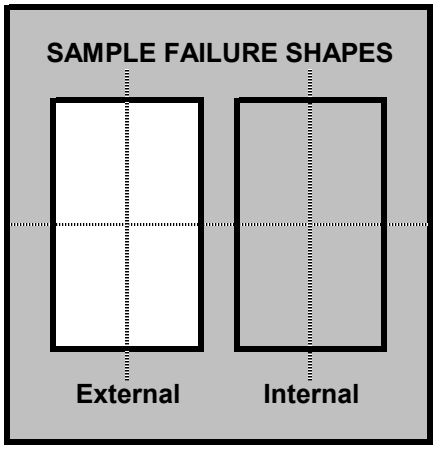
Tested in accordance with ASTM D7012 - 14

SUMMARY OF UNCONFINED COMPRESSIVE STRENGTH

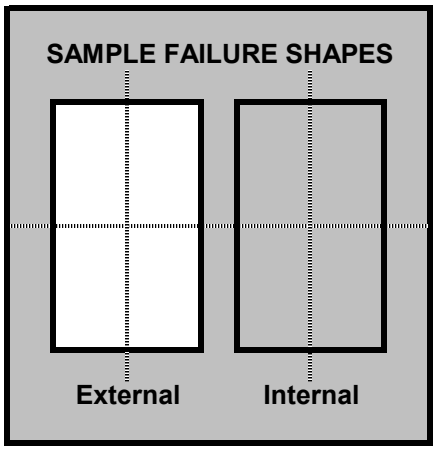
BOREHOLE		**BH-11377**
SAMPLE		**C5**
DEPTH	m	**6.00-6.40**
SAMPLE DIAMETER	mm	**101.18**
SAMPLE HEIGHT	mm	**204.48**
TEST CONDITION		**As Received**
RATE OF LOADING	kN/s	**1.0**
TEST DURATION	min.sec	**13.16**
DATE OF TESTING		**17/10/2022**
LOAD FRAME USED		**2000kN**
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		**Unknown**
FAILURE LOAD	kN	**761.9**
UNCONFINED COMPRESSIVE STRENGTH	MPa	**94.8**
WATER CONTENT (ISRM Suggested Methods)	%	**2.1**
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.60**
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.55**



BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



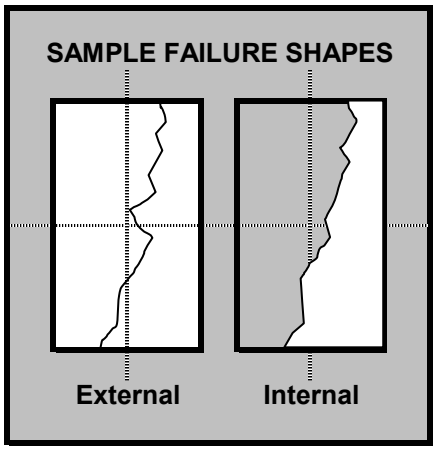
BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



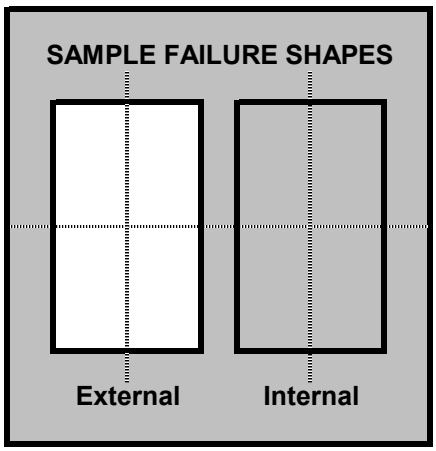
Tested in accordance with ASTM D7012 - 14

SUMMARY OF UNCONFINED COMPRESSIVE STRENGTH

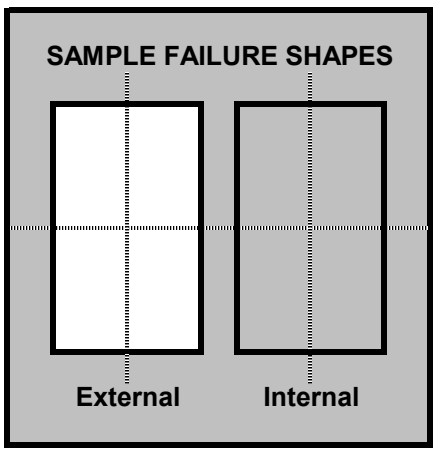
BOREHOLE		**BH-11594**
SAMPLE		**C1**
DEPTH	m	**5.60-5.95**
SAMPLE DIAMETER	mm	**100.57**
SAMPLE HEIGHT	mm	**198.62**
TEST CONDITION		**As Received**
RATE OF LOADING	kN/s	**1.0**
TEST DURATION	min.sec	**7.28**
DATE OF TESTING		**17/10/2022**
LOAD FRAME USED		**2000kN**
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		**Unknown**
FAILURE LOAD	kN	**439.1**
UNCONFINED COMPRESSIVE STRENGTH	MPa	**55.3**
WATER CONTENT (ISRM Suggested Methods)	%	**0.2**
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.74**
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.74**



BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



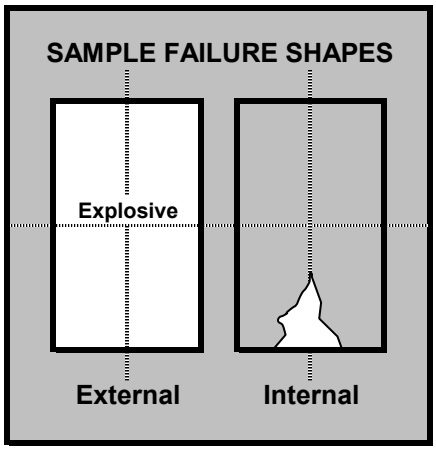
BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



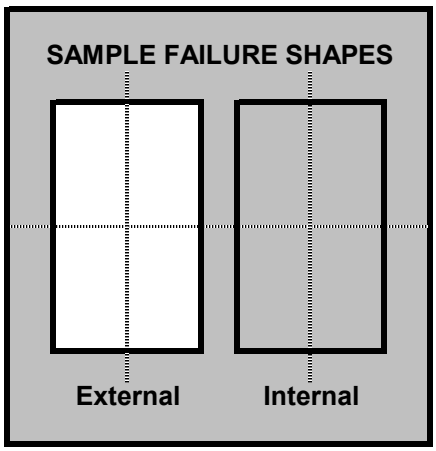
Tested in accordance with ASTM D7012 - 14

SUMMARY OF UNCONFINED COMPRESSIVE STRENGTH

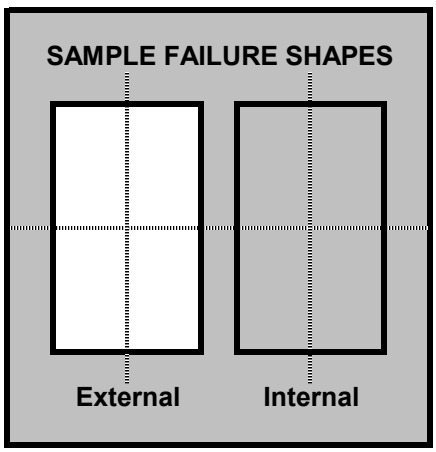
BOREHOLE		**BH-13100**
SAMPLE		**C4**
DEPTH	m	**6.30-6.60**
SAMPLE DIAMETER	mm	**101.54**
SAMPLE HEIGHT	mm	**209.90**
TEST CONDITION		**As Received**
RATE OF LOADING	kN/s	**1.0**
TEST DURATION	min.sec	**13.52**
DATE OF TESTING		**31/10/2022**
LOAD FRAME USED		**2000kN**
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		**Unknown**
FAILURE LOAD	kN	**809.3**
UNCONFINED COMPRESSIVE STRENGTH	MPa	**99.9**
WATER CONTENT (ISRM Suggested Methods)	%	**0.6**
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.71**
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.70**



BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



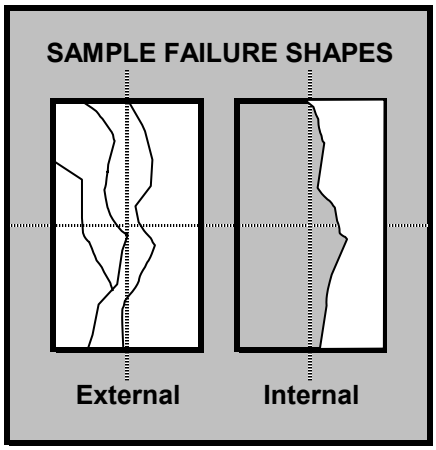
BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



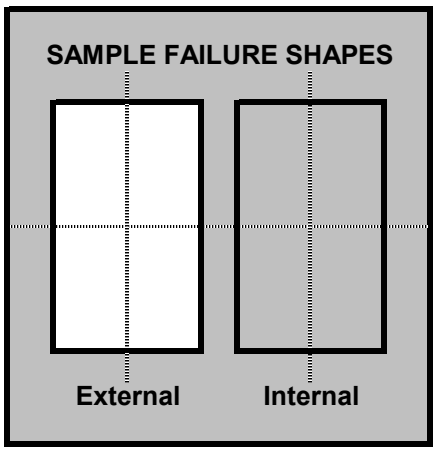
Tested in accordance with ASTM D7012 - 14

SUMMARY OF UNCONFINED COMPRESSIVE STRENGTH

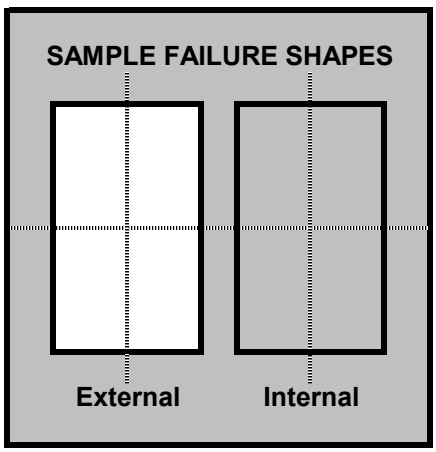
BOREHOLE		**BH-16430**
SAMPLE		**C4**
DEPTH	m	**4.75-5.20**
SAMPLE DIAMETER	mm	**102.20**
SAMPLE HEIGHT	mm	**209.07**
TEST CONDITION		**As Received**
RATE OF LOADING	kN/s	**1.0**
TEST DURATION	min.sec	**7.55**
DATE OF TESTING		**02/11/2022**
LOAD FRAME USED		**2000kN**
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		**Unknown**
FAILURE LOAD	kN	**463.1**
UNCONFINED COMPRESSIVE STRENGTH	MPa	**56.4**
WATER CONTENT (ISRM Suggested Methods)	%	**0.2**
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.71**
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.70**



BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



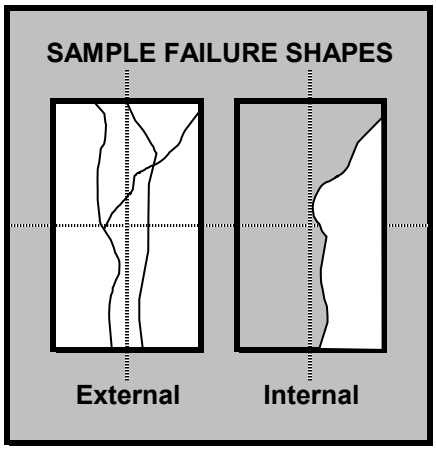
BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



Tested in accordance with ASTM D7012 - 14

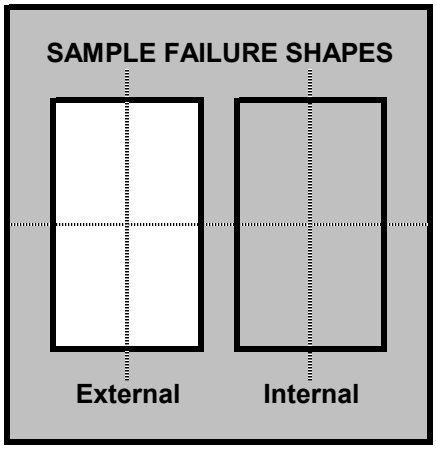
SUMMARY OF UNCONFINED COMPRESSIVE STRENGTH

BOREHOLE		**BH-16610A**
SAMPLE		**C2**
DEPTH	m	**7.75-8.00**
SAMPLE DIAMETER	mm	**101.16**
SAMPLE HEIGHT	mm	**160.63**
TEST CONDITION		**As Received**
RATE OF LOADING	kN/s	**1.1**
TEST DURATION	min.sec	**3.45**
DATE OF TESTING		**02/11/2022**
LOAD FRAME USED		**2000kN**
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		**Unknown**
FAILURE LOAD	kN	**217.4**
UNCONFINED COMPRESSIVE STRENGTH	MPa	**27.1**
WATER CONTENT (ISRM Suggested Methods)	%	**1.3**
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.64**
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.61**

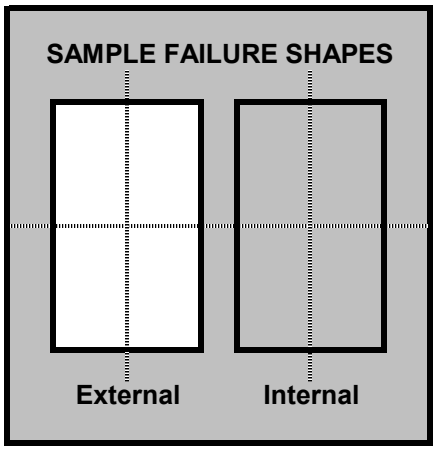


Test specimen does not meet specified length / diameter ratio requirements

BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



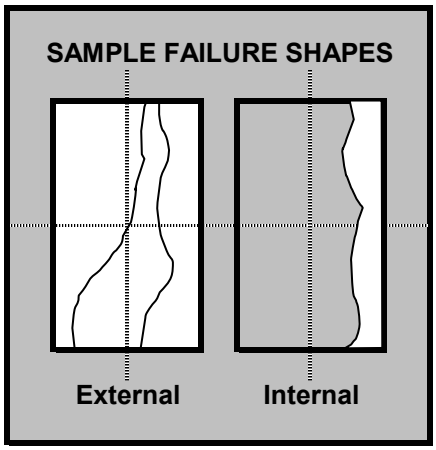
BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



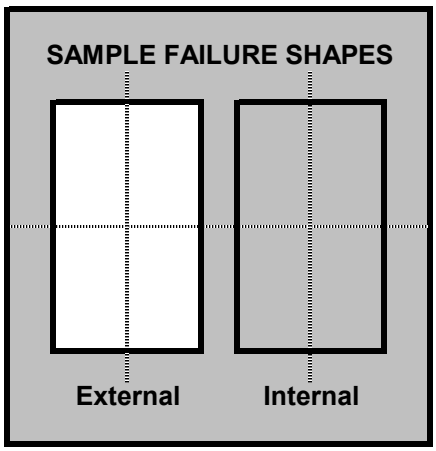
Tested in accordance with ASTM D7012 - 14

SUMMARY OF UNCONFINED COMPRESSIVE STRENGTH

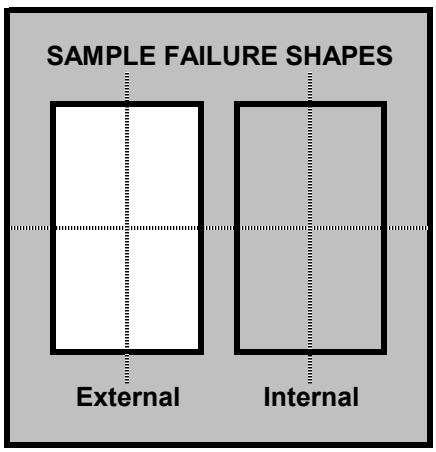
BOREHOLE		**BH-17401**
SAMPLE		**C4**
DEPTH	m	**6.05-6.35**
SAMPLE DIAMETER	mm	**101.80**
SAMPLE HEIGHT	mm	**210.22**
TEST CONDITION		**As Received**
RATE OF LOADING	kN/s	**1.1**
TEST DURATION	min.sec	**4.48**
DATE OF TESTING		**02/11/2022**
LOAD FRAME USED		**2000kN**
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		**Unknown**
FAILURE LOAD	kN	**287.1**
UNCONFINED COMPRESSIVE STRENGTH	MPa	**35.3**
WATER CONTENT (ISRM Suggested Methods)	%	**0.8**
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.66**
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.64**



BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



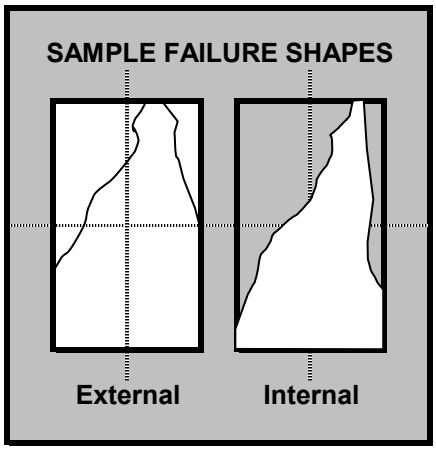
BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



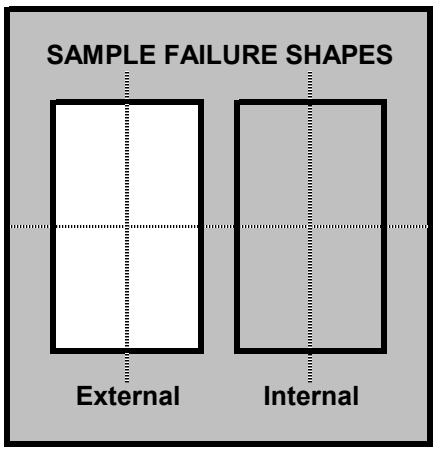
Tested in accordance with ASTM D7012 - 14

SUMMARY OF UNCONFINED COMPRESSIVE STRENGTH

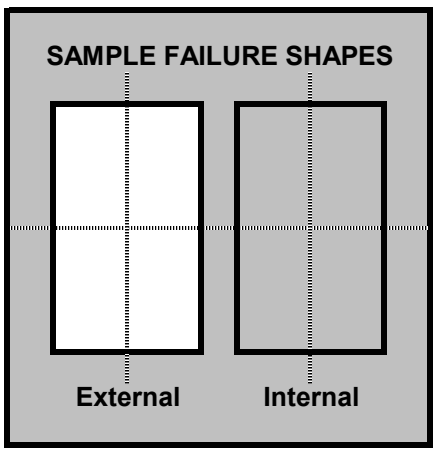
BOREHOLE		**BH-17806**
SAMPLE		**C4**
DEPTH	m	**3.10-3.45**
SAMPLE DIAMETER	mm	**101.79**
SAMPLE HEIGHT	mm	**207.08**
TEST CONDITION		**As Received**
RATE OF LOADING	kN/s	**1.0**
TEST DURATION	min.sec	**5.03**
DATE OF TESTING		**02/11/2022**
LOAD FRAME USED		**2000kN**
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		**Unknown**
FAILURE LOAD	kN	**292.5**
UNCONFINED COMPRESSIVE STRENGTH	MPa	**35.9**
WATER CONTENT (ISRM Suggested Methods)	%	**0.7**
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.69**
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.67**



BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



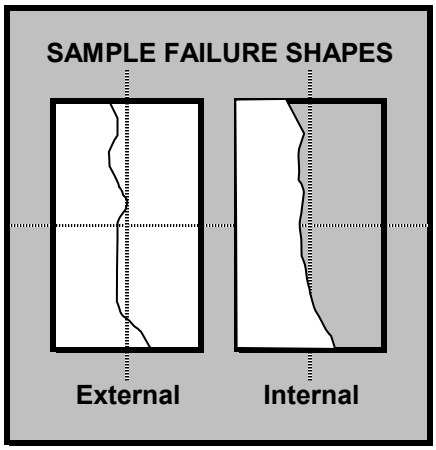
BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



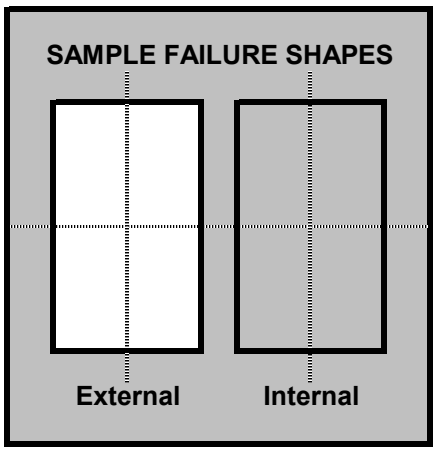
Tested in accordance with ASTM D7012 - 14

SUMMARY OF UNCONFINED COMPRESSIVE STRENGTH

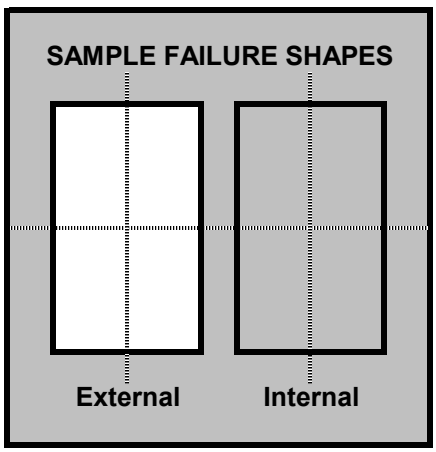
BOREHOLE		**BH-18440**
SAMPLE		**C2**
DEPTH	m	**7.40-7.75**
SAMPLE DIAMETER	mm	**101.25**
SAMPLE HEIGHT	mm	**212.52**
TEST CONDITION		**As Received**
RATE OF LOADING	kN/s	**0.9**
TEST DURATION	min.sec	**3.05**
DATE OF TESTING		**31/10/2022**
LOAD FRAME USED		**2000kN**
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		**Unknown**
FAILURE LOAD	kN	**170.3**
UNCONFINED COMPRESSIVE STRENGTH	MPa	**21.1**
WATER CONTENT (ISRM Suggested Methods)	%	**3.0**
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.51**
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.44**



BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



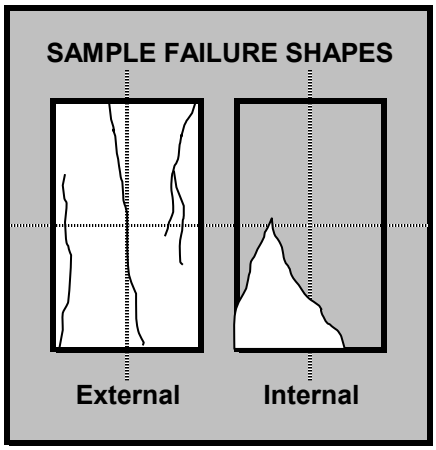
BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



Tested in accordance with ASTM D7012 - 14

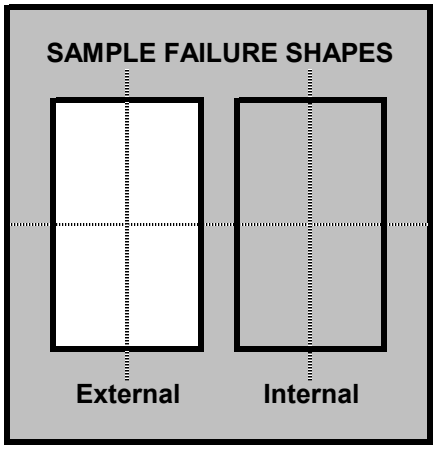
SUMMARY OF UNCONFINED COMPRESSIVE STRENGTH

BOREHOLE		**BH-18804**
SAMPLE		**C3**
DEPTH	m	**4.80-5.00**
SAMPLE DIAMETER	mm	**101.30**
SAMPLE HEIGHT	mm	**167.78**
TEST CONDITION		**As Received**
RATE OF LOADING	kN/s	**1.1**
TEST DURATION	min.sec	**6.20**
DATE OF TESTING		**02/11/2022**
LOAD FRAME USED		**2000kN**
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		**Unknown**
FAILURE LOAD	kN	**415.0**
UNCONFINED COMPRESSIVE STRENGTH	MPa	**51.5**
WATER CONTENT (ISRM Suggested Methods)	%	**0.2**
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.69**
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.68**

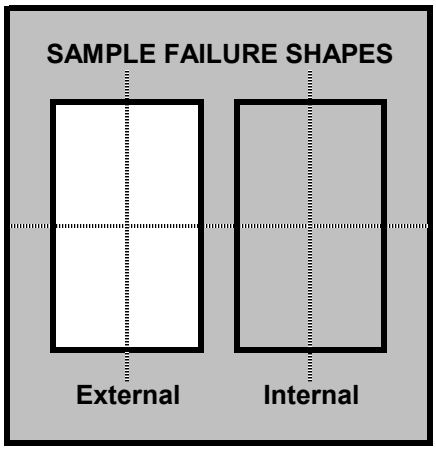


Test specimen does not meet specified length / diameter ratio requirements

BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



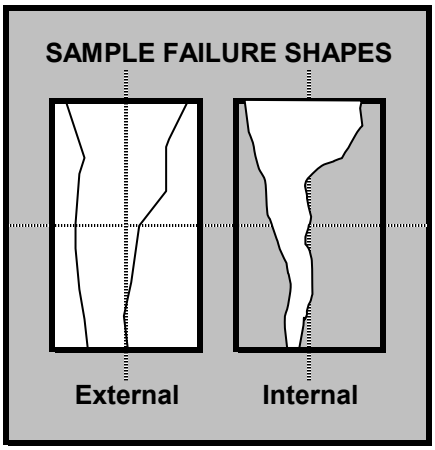
BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



Tested in accordance with ASTM D7012 - 14

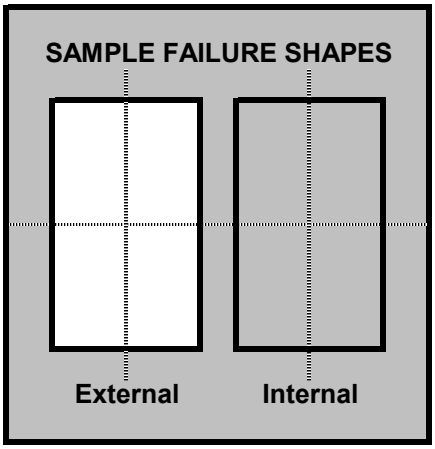
SUMMARY OF UNCONFINED COMPRESSIVE STRENGTH

BOREHOLE		**BH-19407**
SAMPLE		**C3**
DEPTH	m	**3.30-3.55**
SAMPLE DIAMETER	mm	**101.51**
SAMPLE HEIGHT	mm	**112.31**
TEST CONDITION		**As Received**
RATE OF LOADING	kN/s	**1.0**
TEST DURATION	min.sec	**9.16**
DATE OF TESTING		**02/11/2022**
LOAD FRAME USED		**2000kN**
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		**Unknown**
FAILURE LOAD	kN	**539.3**
UNCONFINED COMPRESSIVE STRENGTH	MPa	**66.6**
WATER CONTENT (ISRM Suggested Methods)	%	**0.4**
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.67**
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.66**

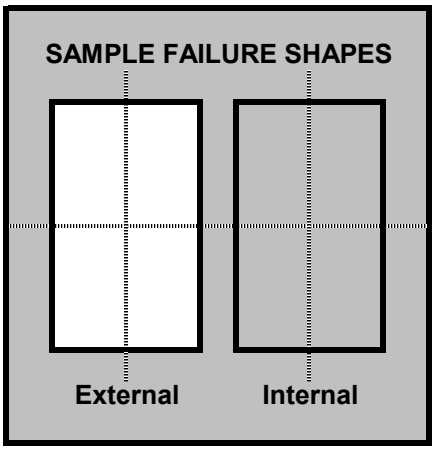


Test specimen does not meet specified length / diameter ratio requirements

BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



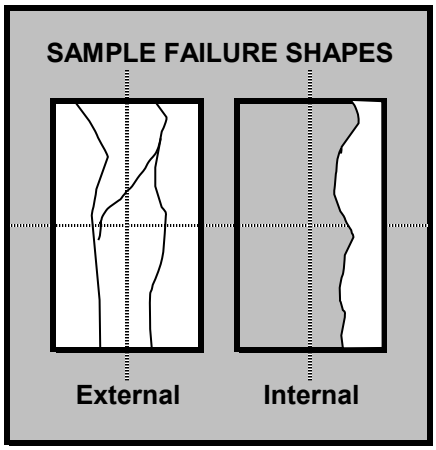
BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



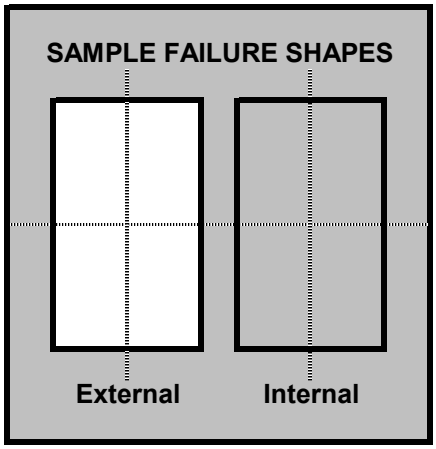
Tested in accordance with ASTM D7012 - 14

SUMMARY OF UNCONFINED COMPRESSIVE STRENGTH

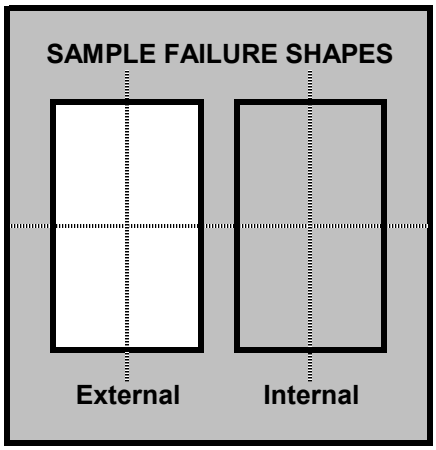
BOREHOLE		**BH-19427A**
SAMPLE		**C1**
DEPTH	m	**2.50-4.00**
SAMPLE DIAMETER	mm	**100.71**
SAMPLE HEIGHT	mm	**200.37**
TEST CONDITION		**As Received**
RATE OF LOADING	kN/s	**1.2**
TEST DURATION	min.sec	**8.21**
DATE OF TESTING		**01/11/2022**
LOAD FRAME USED		**2000kN**
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		**Unknown**
FAILURE LOAD	kN	**585.6**
UNCONFINED COMPRESSIVE STRENGTH	MPa	**73.5**
WATER CONTENT (ISRM Suggested Methods)	%	**0.4**
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.70**
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.69**



BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



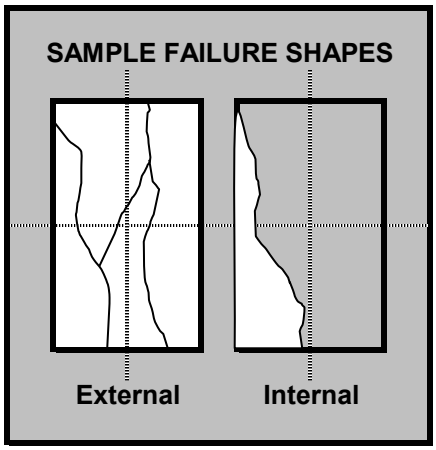
BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



Tested in accordance with ASTM D7012 - 14

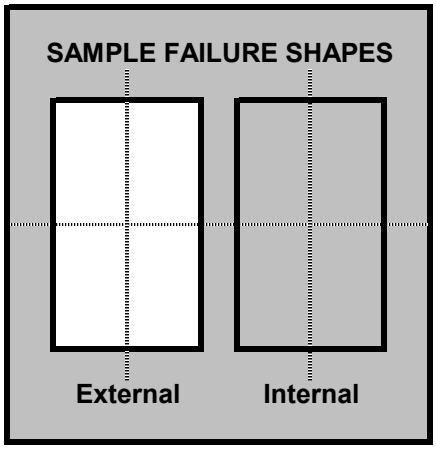
SUMMARY OF UNCONFINED COMPRESSIVE STRENGTH

BOREHOLE		**BH-20655**
SAMPLE		**C2**
DEPTH	m	**4.50-4.75**
SAMPLE DIAMETER	mm	**100.87**
SAMPLE HEIGHT	mm	**150.30**
TEST CONDITION		**As Received**
RATE OF LOADING	kN/s	**1.1**
TEST DURATION	min.sec	**7.18**
DATE OF TESTING		**02/11/2022**
LOAD FRAME USED		**2000kN**
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		**Unknown**
FAILURE LOAD	kN	**462.5**
UNCONFINED COMPRESSIVE STRENGTH	MPa	**57.9**
WATER CONTENT (ISRM Suggested Methods)	%	**0.2**
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.67**
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.67**

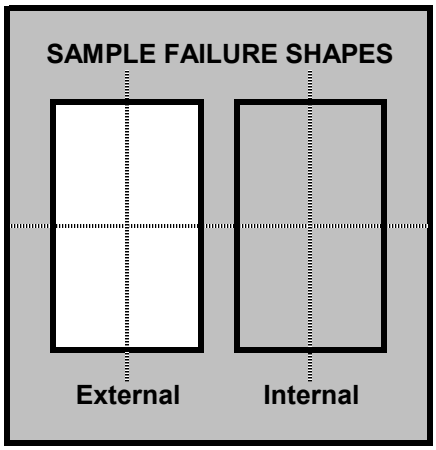


Test specimen does not meet specified length / diameter ratio requirements

BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



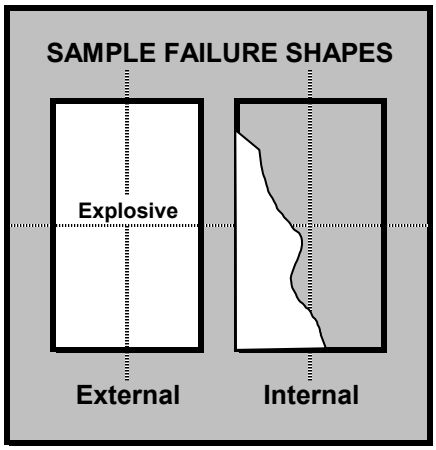
BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



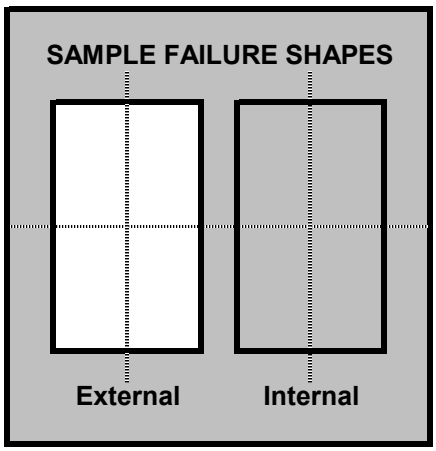
Tested in accordance with ASTM D7012 - 14

SUMMARY OF UNCONFINED COMPRESSIVE STRENGTH

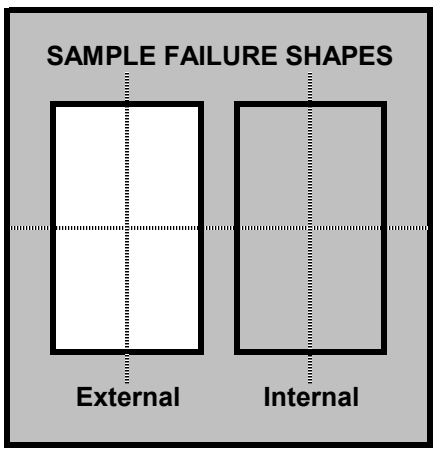
BOREHOLE		**BH-23898**
SAMPLE		**C3**
DEPTH	m	**7.50-7.95**
SAMPLE DIAMETER	mm	**101.70**
SAMPLE HEIGHT	mm	**210.42**
TEST CONDITION		**As Received**
RATE OF LOADING	kN/s	**1.1**
TEST DURATION	min.sec	**10.50**
DATE OF TESTING		**01/11/2022**
LOAD FRAME USED		**2000kN**
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		**Unknown**
FAILURE LOAD	kN	**684.3**
UNCONFINED COMPRESSIVE STRENGTH	MPa	**84.2**
WATER CONTENT (ISRM Suggested Methods)	%	**1.3**
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.71**
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.67**



BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



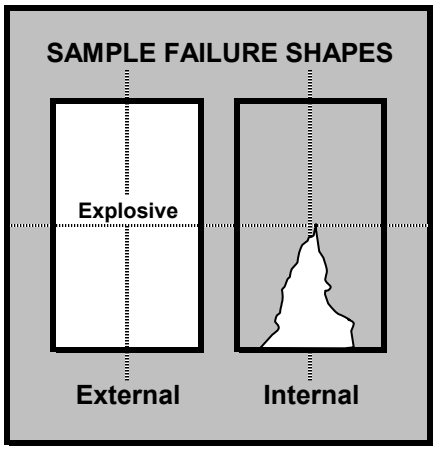
BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



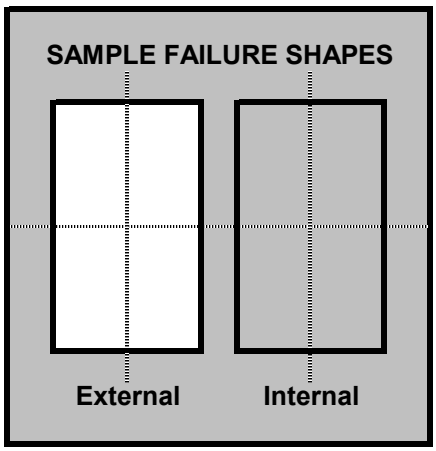
Tested in accordance with ASTM D7012 - 14

SUMMARY OF UNCONFINED COMPRESSIVE STRENGTH

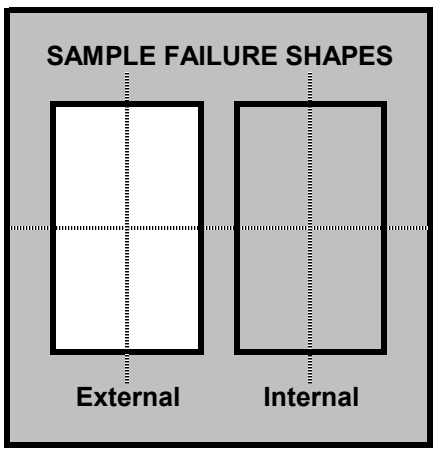
BOREHOLE		**BH-24410A**
SAMPLE		**C3**
DEPTH	m	**5.35-5.80**
SAMPLE DIAMETER	mm	**101.73**
SAMPLE HEIGHT	mm	**212.53**
TEST CONDITION		**As Received**
RATE OF LOADING	kN/s	**1.2**
TEST DURATION	min.sec	**14.31**
DATE OF TESTING		**31/10/2022**
LOAD FRAME USED		**2000kN**
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		**Unknown**
FAILURE LOAD	kN	**995.5**
UNCONFINED COMPRESSIVE STRENGTH	MPa	**122.5**
WATER CONTENT (ISRM Suggested Methods)	%	**0.1**
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.71**
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.71**



BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



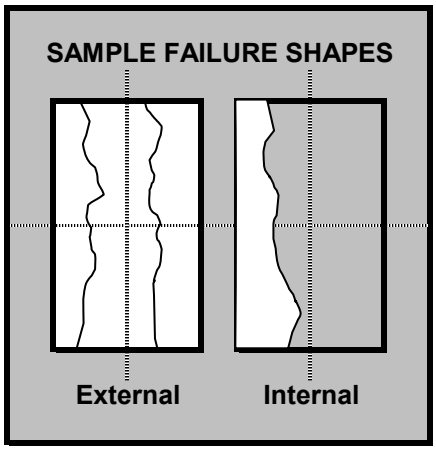
BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



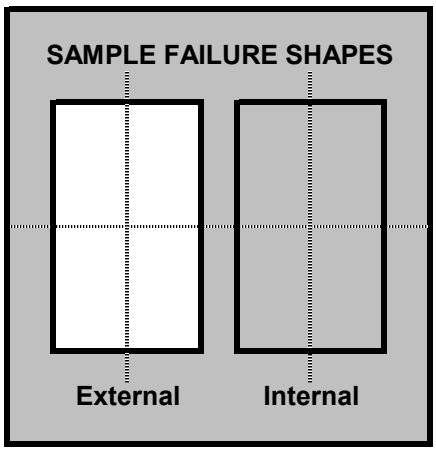
Tested in accordance with ASTM D7012 - 14

SUMMARY OF UNCONFINED COMPRESSIVE STRENGTH

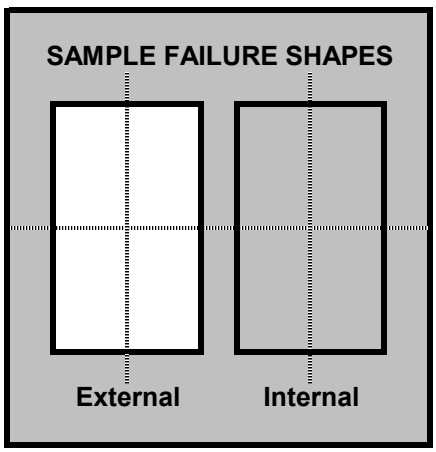
BOREHOLE		**BH-25603A**
SAMPLE		**C4**
DEPTH	m	**7.70-7.90**
SAMPLE DIAMETER	mm	**101.69**
SAMPLE HEIGHT	mm	**199.09**
TEST CONDITION		**As Received**
RATE OF LOADING	kN/s	**1.0**
TEST DURATION	min.sec	**5.48**
DATE OF TESTING		**31/10/2022**
LOAD FRAME USED		**2000kN**
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		**Unknown**
FAILURE LOAD	kN	**326.1**
UNCONFINED COMPRESSIVE STRENGTH	MPa	**40.2**
WATER CONTENT (ISRM Suggested Methods)	%	**0.4**
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.65**
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.64**



BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



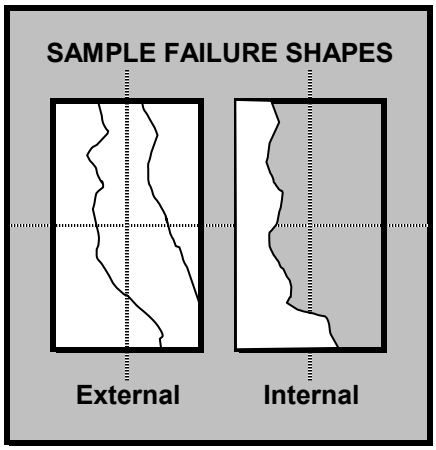
BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



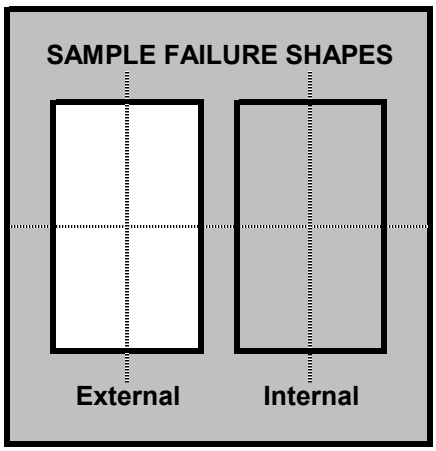
Tested in accordance with ASTM D7012 - 14

SUMMARY OF UNCONFINED COMPRESSIVE STRENGTH

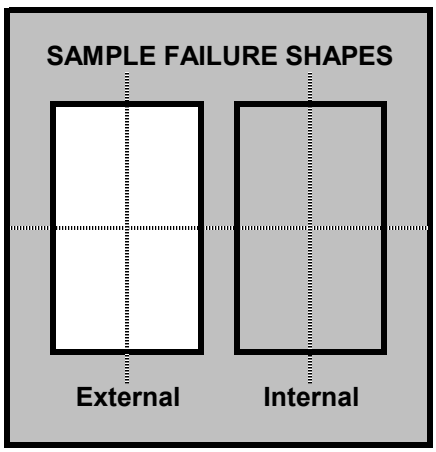
BOREHOLE		**BH-26087**
SAMPLE		**C5**
DEPTH	m	**4.20-4.45**
SAMPLE DIAMETER	mm	**101.40**
SAMPLE HEIGHT	mm	**210.93**
TEST CONDITION		**As Received**
RATE OF LOADING	kN/s	**1.1**
TEST DURATION	min.sec	**2.55**
DATE OF TESTING		**31/10/2022**
LOAD FRAME USED		**2000kN**
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		**Unknown**
FAILURE LOAD	kN	**170.2**
UNCONFINED COMPRESSIVE STRENGTH	MPa	**21.1**
WATER CONTENT (ISRM Suggested Methods)	%	**0.8**
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.65**
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.63**



BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



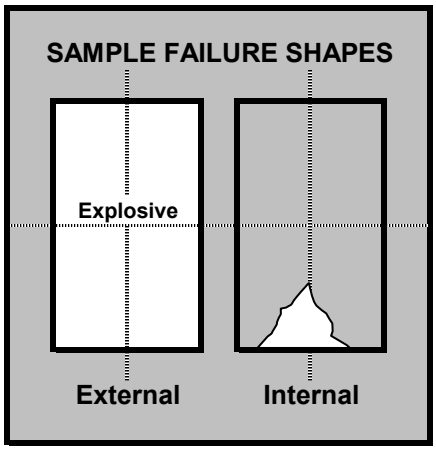
BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



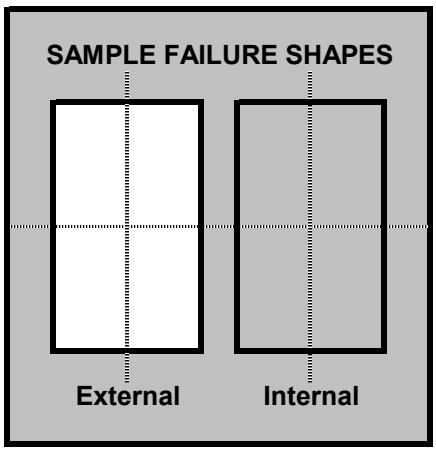
Tested in accordance with ASTM D7012 - 14

SUMMARY OF UNCONFINED COMPRESSIVE STRENGTH

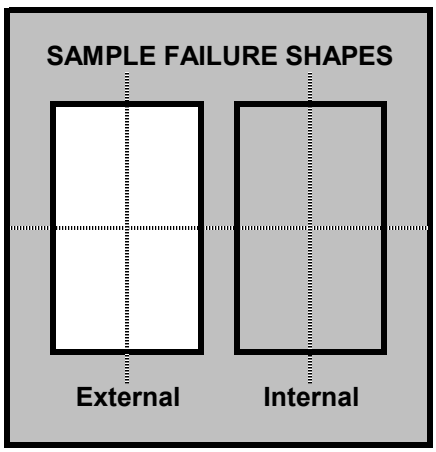
BOREHOLE		**BH-26214**
SAMPLE		**C5**
DEPTH	m	**7.35-7.65**
SAMPLE DIAMETER	mm	**101.31**
SAMPLE HEIGHT	mm	**214.16**
TEST CONDITION		**As Received**
RATE OF LOADING	kN/s	**1.4**
TEST DURATION	min.sec	**10.39**
DATE OF TESTING		**31/10/2022**
LOAD FRAME USED		**2000kN**
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		**Unknown**
FAILURE LOAD	kN	**842.4**
UNCONFINED COMPRESSIVE STRENGTH	MPa	**104.5**
WATER CONTENT (ISRM Suggested Methods)	%	**0.1**
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.71**
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.70**



BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



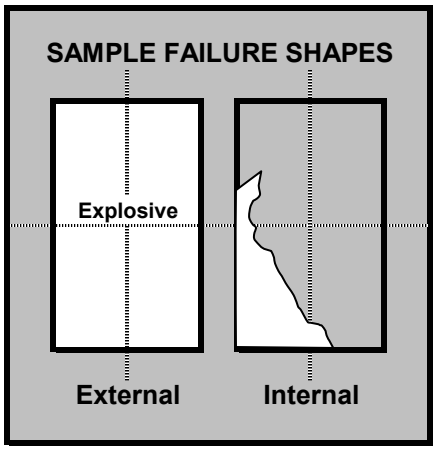
BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



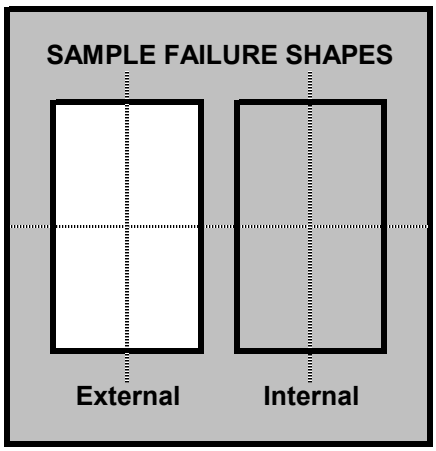
Tested in accordance with ASTM D7012 - 14

SUMMARY OF UNCONFINED COMPRESSIVE STRENGTH

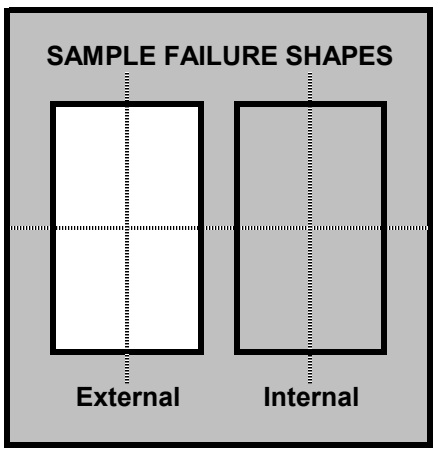
BOREHOLE		**BH-27000**
SAMPLE		**C4**
DEPTH	m	**6.20-6.50**
SAMPLE DIAMETER	mm	**101.41**
SAMPLE HEIGHT	mm	**212.82**
TEST CONDITION		**As Received**
RATE OF LOADING	kN/s	**1.0**
TEST DURATION	min.sec	**10.47**
DATE OF TESTING		**31/10/2022**
LOAD FRAME USED		**2000kN**
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		**Unknown**
FAILURE LOAD	kN	**646.6**
UNCONFINED COMPRESSIVE STRENGTH	MPa	**80.1**
WATER CONTENT (ISRM Suggested Methods)	%	**0.2**
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.70**
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.70**



BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



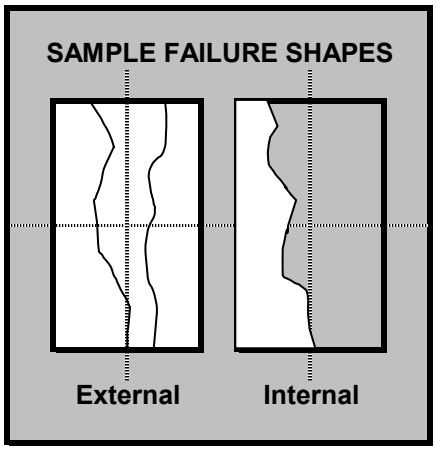
BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



Tested in accordance with ASTM D7012 - 14

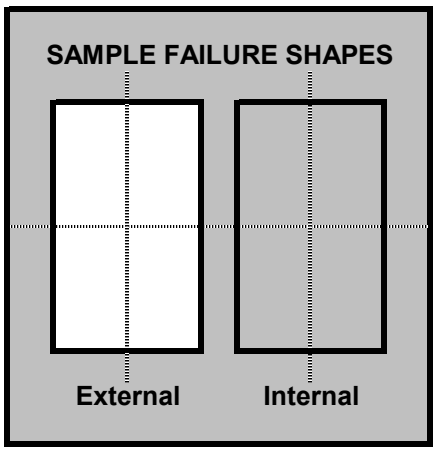
SUMMARY OF UNCONFINED COMPRESSIVE STRENGTH

BOREHOLE		**BH-28818A**
SAMPLE		**C3**
DEPTH	m	**9.45-9.70**
SAMPLE DIAMETER	mm	**101.70**
SAMPLE HEIGHT	mm	**184.42**
TEST CONDITION		**As Received**
RATE OF LOADING	kN/s	**1.0**
TEST DURATION	min.sec	**3.34**
DATE OF TESTING		**02/11/2022**
LOAD FRAME USED		**2000kN**
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		**Unknown**
FAILURE LOAD	kN	**203.6**
UNCONFINED COMPRESSIVE STRENGTH	MPa	**25.1**
WATER CONTENT (ISRM Suggested Methods)	%	**4.1**
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.48**
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.38**

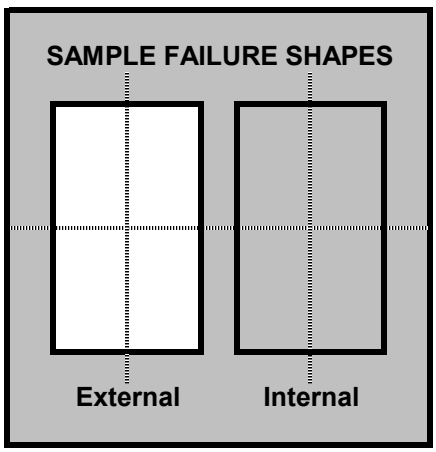


Test specimen does not meet specified length / diameter ratio requirements

BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



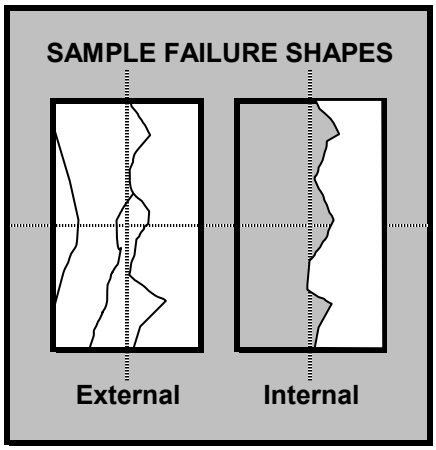
BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



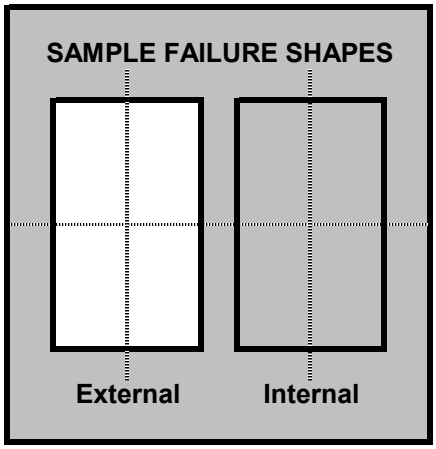
Tested in accordance with ASTM D7012 - 14

SUMMARY OF UNCONFINED COMPRESSIVE STRENGTH

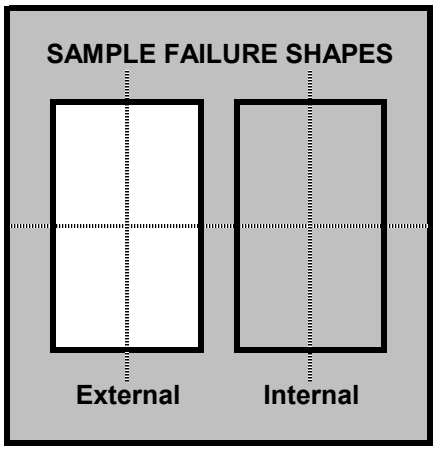
BOREHOLE		**BH-28886A**
SAMPLE		**C5**
DEPTH	m	**12.70-13.00**
SAMPLE DIAMETER	mm	**101.07**
SAMPLE HEIGHT	mm	**216.29**
TEST CONDITION		**As Received**
RATE OF LOADING	kN/s	**0.9**
TEST DURATION	min.sec	**2.05**
DATE OF TESTING		**15/09/2022**
LOAD FRAME USED		**2000kN**
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		**Unknown**
FAILURE LOAD	kN	**113.8**
UNCONFINED COMPRESSIVE STRENGTH	MPa	**14.2**
WATER CONTENT (ISRM Suggested Methods)	%	**1.0**
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.47**
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.44**



BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



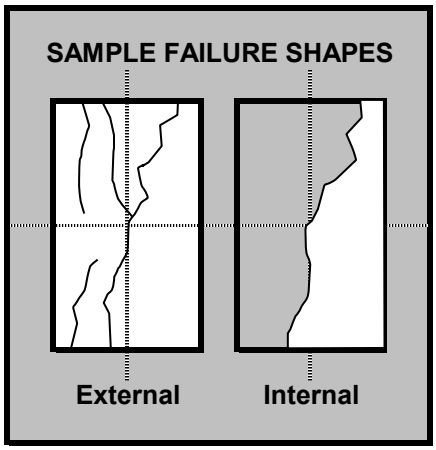
BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



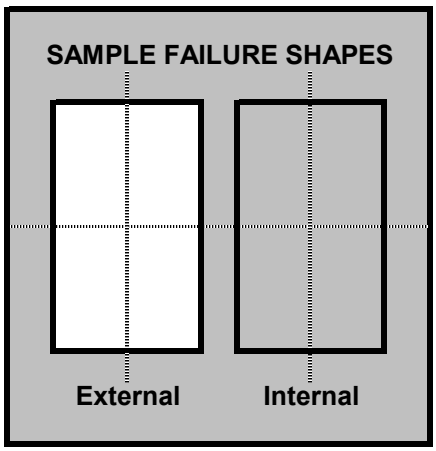
Tested in accordance with ASTM D7012 - 14

SUMMARY OF UNCONFINED COMPRESSIVE STRENGTH

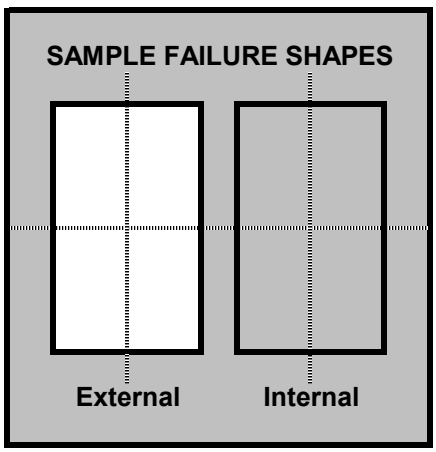
BOREHOLE		**BH-29577**
SAMPLE		**C4**
DEPTH	m	**7.50-7.70**
SAMPLE DIAMETER	mm	**101.52**
SAMPLE HEIGHT	mm	**199.49**
TEST CONDITION		**As Received**
RATE OF LOADING	kN/s	**1.0**
TEST DURATION	min.sec	**5.25**
DATE OF TESTING		**31/10/2022**
LOAD FRAME USED		**2000kN**
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		**Unknown**
FAILURE LOAD	kN	**320.3**
UNCONFINED COMPRESSIVE STRENGTH	MPa	**39.6**
WATER CONTENT (ISRM Suggested Methods)	%	**0.6**
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.63**
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.62**



BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



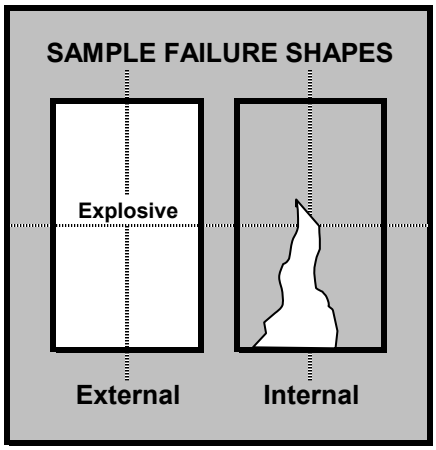
BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



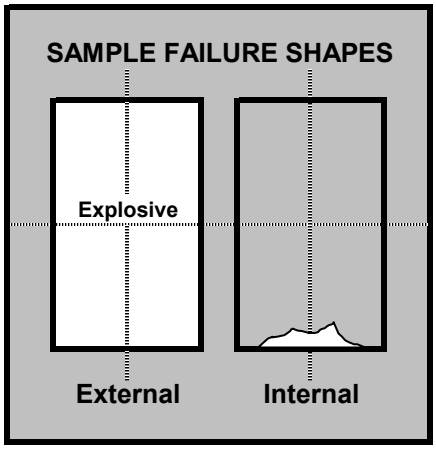
Tested in accordance with ASTM D7012 - 14

SUMMARY OF UNCONFINED COMPRESSIVE STRENGTH

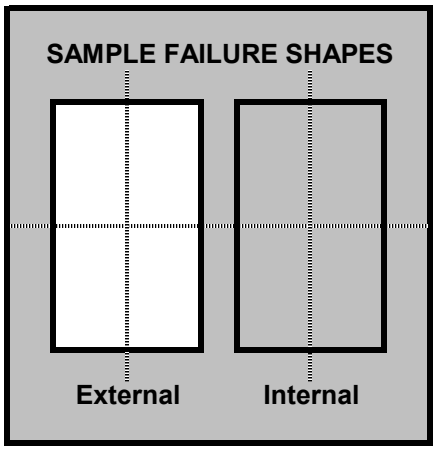
BOREHOLE		BH-32319
SAMPLE		C6
DEPTH	m	7.75-7.98
SAMPLE DIAMETER	mm	101.03
SAMPLE HEIGHT	mm	224.50
TEST CONDITION		As Received
RATE OF LOADING	kN/s	1.6
TEST DURATION	min.sec	8.57
DATE OF TESTING		24/08/2022
LOAD FRAME USED		2000kN
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		Unknown
FAILURE LOAD	kN	833.4
UNCONFINED COMPRESSIVE STRENGTH	MPa	104.0
WATER CONTENT (ISRM Suggested Methods)	%	0.6
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	2.70
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	2.68



BOREHOLE		BH-32319
SAMPLE		C7
DEPTH	m	7.99-8.20
SAMPLE DIAMETER	mm	101.04
SAMPLE HEIGHT	mm	222.47
TEST CONDITION		As Received
RATE OF LOADING	kN/s	1.4
TEST DURATION	min.sec	7.41
DATE OF TESTING		24/08/2022
LOAD FRAME USED		2000kN
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		Unknown
FAILURE LOAD	kN	638.3
UNCONFINED COMPRESSIVE STRENGTH	MPa	79.6
WATER CONTENT (ISRM Suggested Methods)	%	0.3
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	2.68
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	2.67



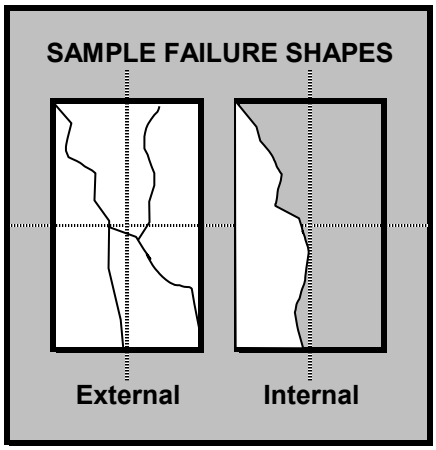
BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



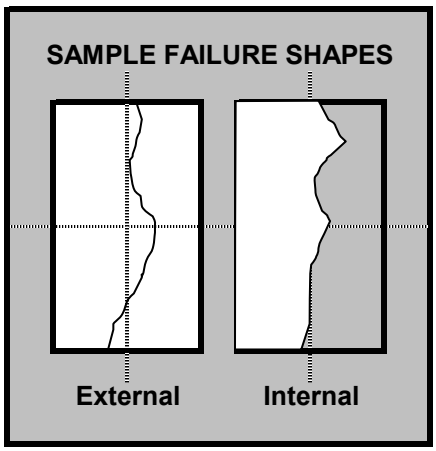
Tested in accordance with ASTM D7012 - 14

SUMMARY OF UNCONFINED COMPRESSIVE STRENGTH

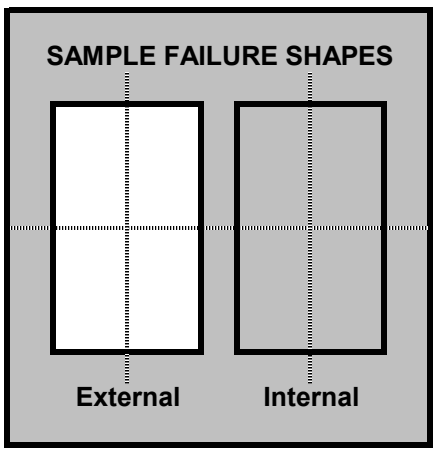
BOREHOLE		BH-32601
SAMPLE		C3
DEPTH	m	4.60-4.95
SAMPLE DIAMETER	mm	101.19
SAMPLE HEIGHT	mm	201.59
TEST CONDITION		As Received
RATE OF LOADING	kN/s	1.2
TEST DURATION	min.sec	4.36
DATE OF TESTING		22/08/2022
LOAD FRAME USED		2000kN
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		Unknown
FAILURE LOAD	kN	319.5
UNCONFINED COMPRESSIVE STRENGTH	MPa	39.7
WATER CONTENT (ISRM Suggested Methods)	%	0.2
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	2.69
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	2.68



BOREHOLE		BH-32601
SAMPLE		C4
DEPTH	m	5.80-6.03
SAMPLE DIAMETER	mm	101.22
SAMPLE HEIGHT	mm	211.27
TEST CONDITION		As Received
RATE OF LOADING	kN/s	1.2
TEST DURATION	min.sec	4.21
DATE OF TESTING		22/08/2022
LOAD FRAME USED		2000kN
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		Unknown
FAILURE LOAD	kN	310.5
UNCONFINED COMPRESSIVE STRENGTH	MPa	38.6
WATER CONTENT (ISRM Suggested Methods)	%	0.2
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	2.71
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	2.70



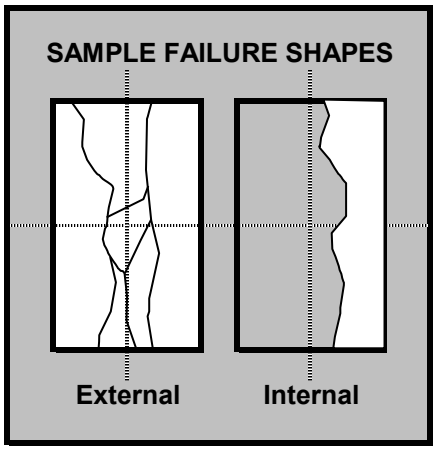
BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



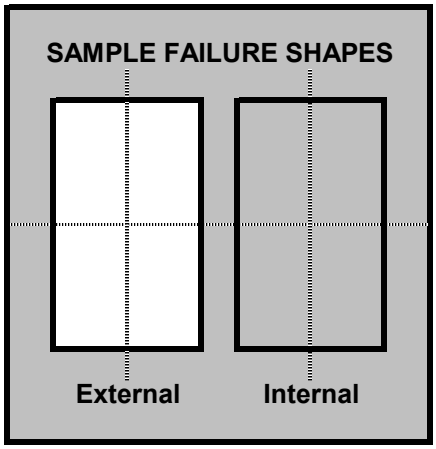
Tested in accordance with ASTM D7012 - 14

SUMMARY OF UNCONFINED COMPRESSIVE STRENGTH

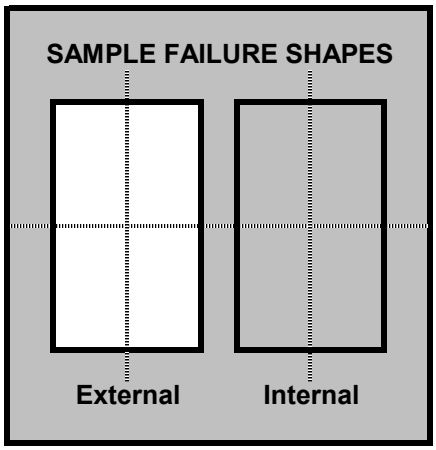
BOREHOLE		**BH-33000A**
SAMPLE		**C2**
DEPTH	m	**7.30-7.65**
SAMPLE DIAMETER	mm	**101.09**
SAMPLE HEIGHT	mm	**204.78**
TEST CONDITION		**As Received**
RATE OF LOADING	kN/s	**1.8**
TEST DURATION	min.sec	**8.10**
DATE OF TESTING		**24/08/2022**
LOAD FRAME USED		**2000kN**
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		**Unknown**
FAILURE LOAD	kN	**879.6**
UNCONFINED COMPRESSIVE STRENGTH	MPa	**109.6**
WATER CONTENT (ISRM Suggested Methods)	%	**0.5**
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.73**
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.71**



BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



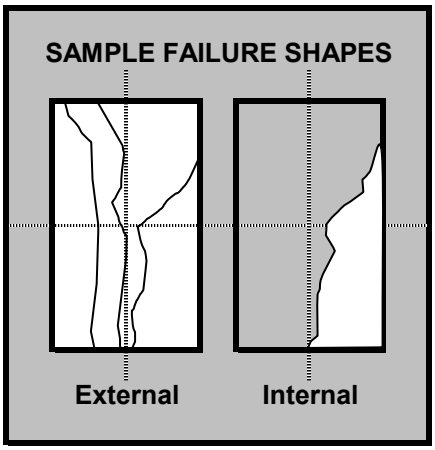
BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	



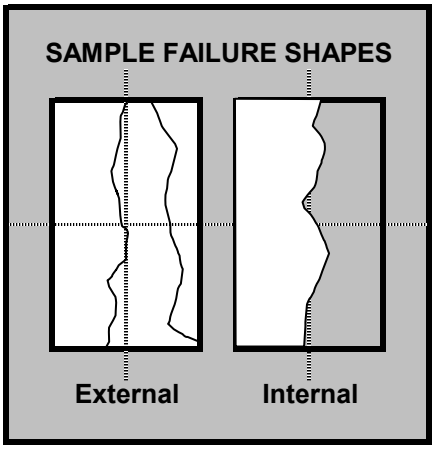
Tested in accordance with ASTM D7012 - 14

SUMMARY OF UNCONFINED COMPRESSIVE STRENGTH

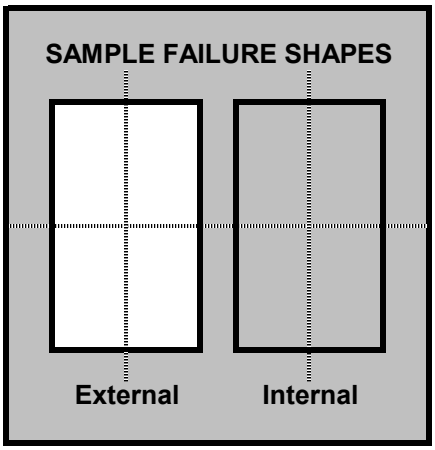
BOREHOLE		BH-34598A
SAMPLE		C3
DEPTH	m	8.45-9.00
SAMPLE DIAMETER	mm	101.60
SAMPLE HEIGHT	mm	204.89
TEST CONDITION		As Received
RATE OF LOADING	kN/s	1.5
TEST DURATION	min.sec	7.45
DATE OF TESTING		22/08/2022
LOAD FRAME USED		2000kN
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		Unknown
FAILURE LOAD	kN	653.1
UNCONFINED COMPRESSIVE STRENGTH	MPa	80.6
WATER CONTENT (ISRM Suggested Methods)	%	0.2
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	2.77
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	2.77



BOREHOLE		BH-34598A
SAMPLE		C7
DEPTH	m	12.85-13.20
SAMPLE DIAMETER	mm	101.40
SAMPLE HEIGHT	mm	202.89
TEST CONDITION		As Received
RATE OF LOADING	kN/s	1.2
TEST DURATION	min.sec	4.15
DATE OF TESTING		22/08/2022
LOAD FRAME USED		2000kN
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		Unknown
FAILURE LOAD	kN	303.3
UNCONFINED COMPRESSIVE STRENGTH	MPa	37.6
WATER CONTENT (ISRM Suggested Methods)	%	0.5
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	2.69
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	2.67



BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	

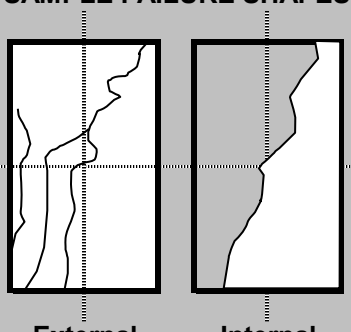


Tested in accordance with ASTM D7012 - 14

SUMMARY OF UNCONFINED COMPRESSIVE STRENGTH

BOREHOLE		**BH-34816B**
SAMPLE		**C4**
DEPTH	m	**5.40-5.62**
SAMPLE DIAMETER	mm	**100.50**
SAMPLE HEIGHT	mm	**207.61**
TEST CONDITION		**As Received**
RATE OF LOADING	kN/s	**1.2**
TEST DURATION	min.sec	**7.02**
DATE OF TESTING		**22/08/2022**
LOAD FRAME USED		**2000kN**
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		**Unknown**
FAILURE LOAD	kN	**494.9**
UNCONFINED COMPRESSIVE STRENGTH	MPa	**62.4**
WATER CONTENT (ISRM Suggested Methods)	%	**0.5**
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.73**
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.71**

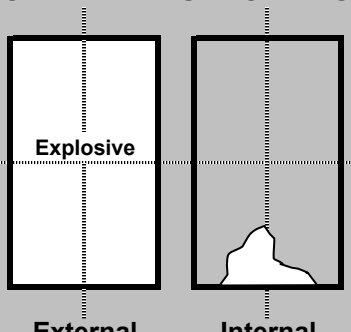
SAMPLE FAILURE SHAPES



External **Internal**

BOREHOLE		**BH-34816B**
SAMPLE		**C5**
DEPTH	m	**6.20-6.60**
SAMPLE DIAMETER	mm	**101.21**
SAMPLE HEIGHT	mm	**204.51**
TEST CONDITION		**As Received**
RATE OF LOADING	kN/s	**2.1**
TEST DURATION	min.sec	**8.13**
DATE OF TESTING		**22/08/2022**
LOAD FRAME USED		**2000kN**
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		**Unknown**
FAILURE LOAD	kN	**1019.6**
UNCONFINED COMPRESSIVE STRENGTH	MPa	**126.7**
WATER CONTENT (ISRM Suggested Methods)	%	**0.1**
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.79**
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	**2.78**

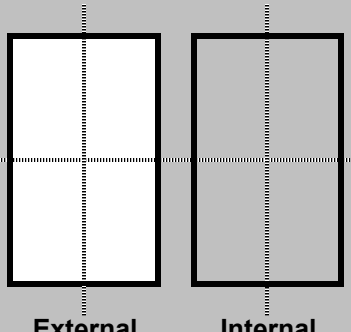
SAMPLE FAILURE SHAPES



External **Internal**

BOREHOLE		
SAMPLE		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE HEIGHT	mm	
TEST CONDITION		
RATE OF LOADING	kN/s	
TEST DURATION	min.sec	
DATE OF TESTING		
LOAD FRAME USED		
LOAD DIRECTION WITH RESPECT TO LITHOLOGY		
FAILURE LOAD	kN	
UNCONFINED COMPRESSIVE STRENGTH	MPa	
WATER CONTENT (ISRM Suggested Methods)	%	
BULK DENSITY (ISRM Suggested Methods)	Mg/m^3	
DRY DENSITY (ISRM Suggested Methods)	Mg/m^3	

SAMPLE FAILURE SHAPES



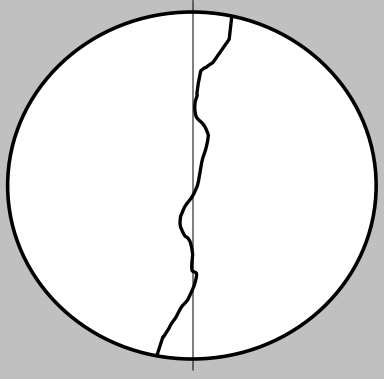
External **Internal**

Tested in accordance with ASTM D7012 - 14

SUMMARY OF UNCONFINED COMPRESSIVE STRENGTH

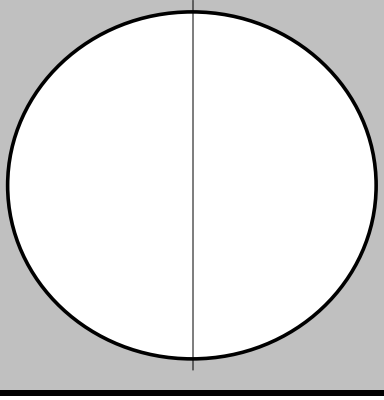
BOREHOLE		BH-10413
CORE RUN		C14
DEPTH	m	11.30
SAMPLE DIAMETER	mm	101.78
SAMPLE THICKNESS	mm	49.62
WATER CONTENT	%	0.4
DEGREE OF SATURATION	%	N/A
STRESS RATE	kN/s	1.70
TEST DURATION	secs	17
DATE OF TESTING		18/11/2022
LOAD FRAME USED		2000kN
ORIENTATION OF LOADING		Diam
TENSILE STRENGTH	MPa	3.69

SAMPLE FAILURE SHAPE



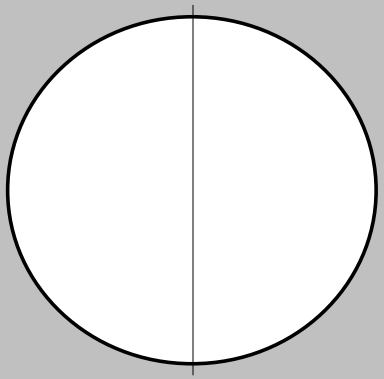
BOREHOLE		
CORE RUN		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE THICKNESS	mm	
WATER CONTENT	%	
DEGREE OF SATURATION	%	
STRESS RATE	kN/s	
TEST DURATION	secs	
DATE OF TESTING		
LOAD FRAME USED		
ORIENTATION OF LOADING		
TENSILE STRENGTH	MPa	

SAMPLE FAILURE SHAPE



BOREHOLE		
CORE RUN		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE THICKNESS	mm	
WATER CONTENT	%	
DEGREE OF SATURATION	%	
STRESS RATE	kN/s	
TEST DURATION	secs	
DATE OF TESTING		
LOAD FRAME USED		
ORIENTATION OF LOADING		
TENSILE STRENGTH	MPa	

SAMPLE FAILURE SHAPE

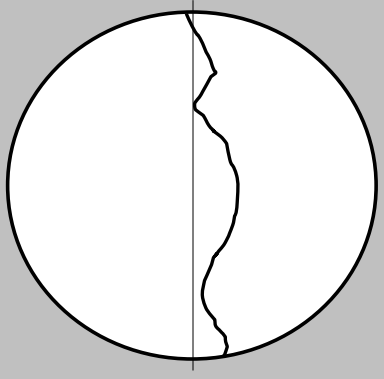


Tested in accordance with ISRM (2007)

SUMMARY OF INDIRECT TENSILE STRENGTH BY THE BRAZIL TEST

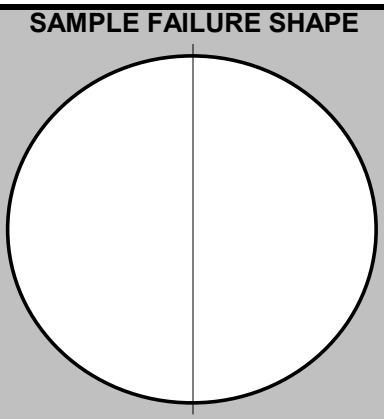
BOREHOLE		BH-19407
CORE RUN		C10
DEPTH	m	5.50
SAMPLE DIAMETER	mm	101.58
SAMPLE THICKNESS	mm	48.73
WATER CONTENT	%	0.2
DEGREE OF SATURATION	%	N/A
STRESS RATE	kN/s	1.90
TEST DURATION	secs	25
DATE OF TESTING		18/11/2022
LOAD FRAME USED		2000kN
ORIENTATION OF LOADING		Diam
TENSILE STRENGTH	MPa	5.96

SAMPLE FAILURE SHAPE



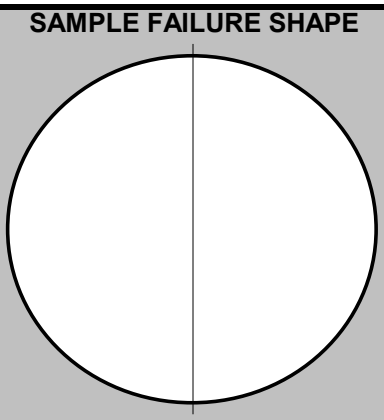
BOREHOLE		
CORE RUN		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE THICKNESS	mm	
WATER CONTENT	%	
DEGREE OF SATURATION	%	
STRESS RATE	kN/s	
TEST DURATION	secs	
DATE OF TESTING		
LOAD FRAME USED		
ORIENTATION OF LOADING		
TENSILE STRENGTH	MPa	

SAMPLE FAILURE SHAPE



BOREHOLE		
CORE RUN		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE THICKNESS	mm	
WATER CONTENT	%	
DEGREE OF SATURATION	%	
STRESS RATE	kN/s	
TEST DURATION	secs	
DATE OF TESTING		
LOAD FRAME USED		
ORIENTATION OF LOADING		
TENSILE STRENGTH	MPa	

SAMPLE FAILURE SHAPE



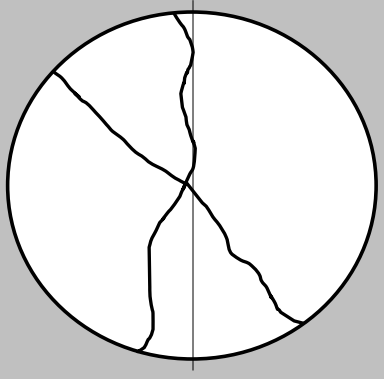
Tested in accordance with ISRM (2007)

SUMMARY OF INDIRECT TENSILE STRENGTH BY THE BRAZIL TEST

MATtest Limited
materials testing & consultancy

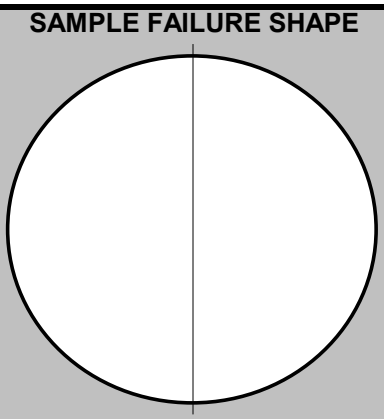
BOREHOLE		BH-19427A
CORE RUN		C1
DEPTH	m	4.30
SAMPLE DIAMETER	mm	101.51
SAMPLE THICKNESS	mm	49.58
WATER CONTENT	%	0.4
DEGREE OF SATURATION	%	N/A
STRESS RATE	kN/s	1.90
TEST DURATION	secs	15
DATE OF TESTING		18/11/2022
LOAD FRAME USED		2000kN
ORIENTATION OF LOADING		Diam
TENSILE STRENGTH	MPa	3.51

SAMPLE FAILURE SHAPE



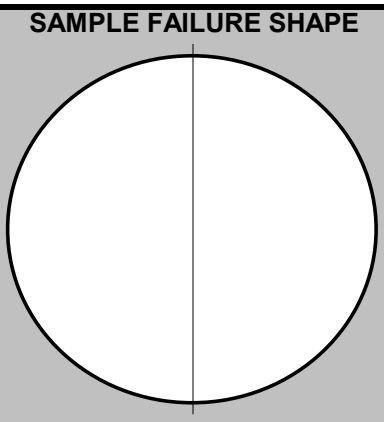
BOREHOLE		
CORE RUN		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE THICKNESS	mm	
WATER CONTENT	%	
DEGREE OF SATURATION	%	
STRESS RATE	kN/s	
TEST DURATION	secs	
DATE OF TESTING		
LOAD FRAME USED		
ORIENTATION OF LOADING		
TENSILE STRENGTH	MPa	

SAMPLE FAILURE SHAPE



BOREHOLE		
CORE RUN		
DEPTH	m	
SAMPLE DIAMETER	mm	
SAMPLE THICKNESS	mm	
WATER CONTENT	%	
DEGREE OF SATURATION	%	
STRESS RATE	kN/s	
TEST DURATION	secs	
DATE OF TESTING		
LOAD FRAME USED		
ORIENTATION OF LOADING		
TENSILE STRENGTH	MPa	

SAMPLE FAILURE SHAPE



Tested in accordance with ISRM (2007)

SUMMARY OF INDIRECT TENSILE STRENGTH BY THE BRAZIL TEST

MATtest Limited
materials testing & consultancy

BOREHOLE	SAMPLE	DEPTH (m)	SIZE FRACTION (mm)	LOS ANGELES COEFFICIENT
BH-5440	C4	17.15-17.45	10mm to 14mm	36
BH-5478	C1	14.60-15.65	10mm to 14mm	18
BH-5530	C1	21.20-21.35	10mm to 14mm	41
BH-5573	C5	14.54-14.88	10mm to 14mm	65
BH-7282	C6	12.80-14.30	10mm to 14mm	33
BH-9368	C3 & C4	3.65-4.34	10mm to 14mm	20
BH-10413	C12	12.00-12.25	10mm to 14mm	23
BH-17806	C2	2.60-3.60	10mm to 14mm	21
BH-19407	C8	6.40-7.00	10mm to 14mm	24
BH-19427A	C8	4.60-5.05	10mm to 14mm	24

Tested in accordance with BS EN 1097 - 2 : 2020

SUMMARY OF RESISTANCE TO FRAGMENTATION BY THE LOS ANGELES TEST METHOD

MATtest Limited
materials testing & consultancy

BOREHOLE	SAMPLE	DEPTH (m)	SAMPLE MASS (g)	SIZE FRACTION (mm)	FLAKINESS INDEX	OVERALL FLAKINESS INDEX
BH-19427A	C9	5.40-6.10	3523.1	80 to 100	-	27
				63 to 80	-	
				50 to 63	-	
				40 to 50	-	
				31.5 to 40	-	
				25 to 31.5	-	
				20 to 25	-	
				16 to 20	11	
				12.5 to 16	31	
				10 to 12.5	34	
				8.0 to 10	28	
				6.3 to 8.0	24	
				5.0 to 6.3	32	
				4.0 to 5.0	40	

Tested in accordance with BS EN 933 - 3 : 2012

DETERMINATION OF FLAKINESS INDEX

BOREHOLE	SAMPLE	DEPTH (m)	SLAKING FLUID	FLUID TEMPERATURE (°C)	APPEARANCE OF FRAGMENTS RETAINED IN THE DRUM (see notes)	APPEARANCE OF MATERIAL PASSING THROUGH THE DRUM (see notes)	SLAKE DURABILITY INDEX (%)
BH-19427A	C7	4.30-4.60	Water	20 ± 2	R1	P2	99.3

Notes

Appearance of fragments retained in the drum
R1. Retained pieces remain virtually unchanged
R2. Retained fragments consist of small and large pieces
R3. Retained fragments are mainly small pieces

Appearance of material passing through the drum
P1. Passing material consists of mainly coarse sand sized particles
P2. Passing material ranges from fine to coarse sand sized particles
P3. Passing material consists of mainly clay / silt sized particles

Tested in accordance with ISRM (2007)

SUMMARY OF SLAKE DURABILITY INDEX (SECOND CYCLE)

MATtest Limited
materials testing & consultancy

BOREHOLE	SAMPLE	DEPTH (m)	AGGREGATE ABRASION VALUE (Test 1)	AGGREGATE ABRASION VALUE (Test 2)	MEAN AGGREGATE ABRASION VALUE
BH-10413	C13	12.25-12.65	14.6	14.2	14
BH-19407	C5	5.50-5.90	14.6	15.1	15
BH-19427A	C6	4.05-4.30	13.6	12.8	13

Tested in accordance with BS EN 1097 - 8 : 2020 ANNEX A

SUMMARY OF AGGREGATE ABRASION VALUE (AAV) TEST RESULTS

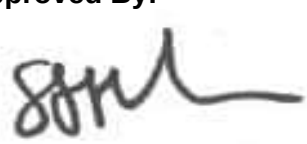
Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	22-20415-1
Initial Date of Issue:	08-Jun-2022
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Carin Cornwall Colm Hurley Darren O'Mahony Gabriella Horan Joe Gervin John Cameron Lucy Newland Martin Gardiner Matthew Gilbert Neil Haggan Paul Dunlop Sean Ross Stephen Franey Stephen Watson Stuart Abraham Thomas McAllister
Project	21-1682 Water Supply Project

Quotation No.:		**Date Received:**	31-May-2022
Order No.:		**Date Instructed:**	31-May-2022
No. of Samples:	4		
Turnaround (Wkdays):	7	**Results Due:**	10-Jun-2022
Date Approved:	08-Jun-2022		

Approved By:



Details: Stuart Henderson, Technical Manager

Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Results - Soil

Project: 21-1682 Water Supply Project

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-20415	22-20415	22-20415	22-20415
Quotation No.:			**Chemtest Sample ID.:**		1439990	1439991	1439992	1439993
Order No.:			Client Sample Ref.:		5	8	5	8
			Sample Location:		BH-31910	BH-33000	BH-34598	BH-35202
			Sample Type:		SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		2	2	1	2
			Date Sampled:		30-May-2022	30-May-2022	30-May-2022	30-May-2022
Determinand	**Accred.**	**SOP**	**Units**	**LOD**				
Moisture	N	2030	%	0.020	9.4	11	4.5	9.0
pH	U	2010		4.0	10.2	9.1	9.6	9.4
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.074	0.018	0.023	< 0.010
Sulphate (Total)	U	2430	%	0.010	0.023	0.017	< 0.010	< 0.010
Sulphate (Acid Soluble)	U	2430	%	0.010	< 0.010	< 0.010	< 0.010	< 0.010

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
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Sample Retention and Disposal

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All water samples will be retained for 14 days from the date of receipt
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If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

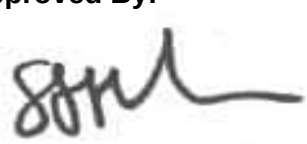
Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	22-22060-1
Initial Date of Issue:	21-Jun-2022
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Carin Cornwall Colm Hurley Darren O'Mahony Gabriella Horan Joe Gervin John Cameron Lucy Newland Martin Gardiner Matthew Gilbert Neil Haggan Paul Dunlop Sean Ross Stephen Franey Stephen Watson Stuart Abraham Thomas McAllister
Project	21-1682 Water Supply Project

Quotation No.:		**Date Received:**	14-Jun-2022
Order No.:		**Date Instructed:**	14-Jun-2022
No. of Samples:	2		
Turnaround (Wkdays):	7	**Results Due:**	22-Jun-2022
Date Approved:	21-Jun-2022		

Approved By:



Details: Stuart Henderson, Technical Manager

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Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Results - Soil

Project: 21-1682 Water Supply Project

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-22060	22-22060
Quotation No.:			**Chemtest Sample ID.:**		1447790	1447791
Order No.:			Client Sample Ref.:		5	7
			Sample Location:		BH-30066	BH-31227
			Sample Type:		SOIL	SOIL
			Top Depth (m):		1	1
			Date Sampled:		13-Jun-2022	13-Jun-2022
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
Moisture	N	2030	%	0.020	11	2.9
pH	U	2010		4.0	8.6	8.5
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.055	< 0.010
Sulphate (Total)	U	2430	%	0.010	0.025	0.022
Sulphate (Acid Soluble)	U	2430	%	0.010	< 0.010	< 0.010

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.

Report Information

Key

U	UKAS accredited
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<	"less than"
>	"greater than"
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Final Report

Report No.:	22-22463-1
Initial Date of Issue:	20-Jun-2022
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Carin Cornwall Colm Hurley Darren O'Mahony Gabriella Horan Joe Gervin John Cameron Lucy Newland Martin Gardiner Matthew Gilbert Neil Haggan Paul Dunlop Sean Ross Stephen Franey Stephen Watson Stuart Abraham Thomas McAllister
Project	21-1682 Water Supply Project
Quotation No.:	
Order No.:	
No. of Samples:	6
Turnaround (Wkdays):	7
Date Approved:	20-Jun-2022
Approved By:	
Details:	Stuart Henderson, Technical Manager

Date Received:	16-Jun-2022
Date Instructed:	16-Jun-2022
Results Due:	24-Jun-2022

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Depot Road
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Tel: 01638 606070
Email: info@chemtest.com

Results - Soil

Project: 21-1682 Water Supply Project

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-22463	22-22463	22-22463	22-22463	22-22463	[redacted]
Quotation No.:			**Chemtest Sample ID.:**		1449666	1449667	1449668	1449669	1449670	
Order No.:			Client Sample Ref.:		11	12	4	7	6	
			Sample Location:		BH-28001	BH-28598	BH-28924	BH-3588	BH-2815	
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	
			Top Depth (m):		1.00	4.00	1.00	2.20	1.20	
			Date Sampled:		15-Jun-2022	15-Jun-2022	15-Jun-2022	15-Jun-2022	15-Jun-2022	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**						
Moisture	N	2030	%	0.020	17	8.0	1.8	10	10	
pH	U	2010		4.0	8.8	8.7	9.0	8.6	8.5	
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.017	0.015	0.013	0.026	0.010	
Sulphate (Total)	U	2430	%	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	
Sulphate (Acid Soluble)	U	2430	%	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.

Report Information

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Final Report

Report No.:	22-22967-1
Initial Date of Issue:	22-Jun-2022
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Carin Cornwall Colm Hurley Darren O'Mahony Gabriella Horan Joe Gervin John Cameron Lucy Newland Martin Gardiner Matthew Gilbert Neil Haggan Paul Dunlop Sean Ross Stephen Franey Stephen Watson Stuart Abraham Thomas McAllister
Project	21-1682 Water Supply Project
Quotation No.:	
Order No.:	
No. of Samples:	1
Turnaround (Wkdays):	7
Date Approved:	22-Jun-2022
Approved By:	
Details:	Stuart Henderson, Technical Manager

Date Received:	20-Jun-2022
Date Instructed:	20-Jun-2022
Results Due:	28-Jun-2022

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Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Results - Soil

Project: 21-1682 Water Supply Project

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-22967
Quotation No.:			**Chemtest Sample ID.:**		1451745
Order No.:			Client Sample Ref.:		1
			Sample Location:		BH28796
			Sample Type:		SOIL
			Top Depth (m):		0.20
			Date Sampled:		17-Jun-2022
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Moisture	N	2030	%	0.020	1.3
Organic Matter	U	2625	%	0.40	6.0

Test Methods

SOP	Title	Parameters included	Method summary
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.

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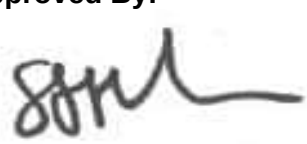
Final Report

Report No.:	22-24374-1
Initial Date of Issue:	04-Jul-2022
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Carin Cornwall Colm Hurley Darren O'Mahony Gabriella Horan Joe Gervin John Cameron Lucy Newland Martin Gardiner Matthew Gilbert Neil Haggan Paul Dunlop Sean Ross Stephen Franey Stephen Watson Stuart Abraham Thomas McAllister
Project	21-1682 Water Supply Project

Quotation No.:		**Date Received:**	29-Jun-2022
Order No.:		**Date Instructed:**	29-Jun-2022
No. of Samples:	3		
Turnaround (Wkdays):	7	**Results Due:**	07-Jul-2022
Date Approved:	04-Jul-2022		

Approved By:



Details: Stuart Henderson, Technical Manager

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Results - Soil

Project: 21-1682 Water Supply Project

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-24374	22-24374	[redacted]
Quotation No.:			**Chemtest Sample ID.:**		1457818	1457819	
Order No.:			Client Sample Ref.:		9	5	
			Sample Location:		BH-1922	BH-5260	
			Sample Type:		SOIL	SOIL	
			Top Depth (m):		2.00	2.20	
			Date Sampled:		28-Jun-2022	28-Jun-2022	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
Moisture	N	2030	%	0.020	8.5	7.1	
pH	U	2010		4.0	8.7	9.0	
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.013	0.028	
Sulphate (Total)	U	2430	%	0.010	< 0.010	0.013	
Sulphate (Acid Soluble)	U	2430	%	0.010	< 0.010	< 0.010	

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.

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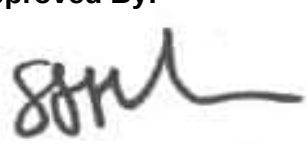
UKAS TESTING
2183

Final Report

Report No.:	22-24380-1
Initial Date of Issue:	04-Jul-2022
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Carin Cornwall Colm Hurley Darren O'Mahony Gabriella Horan Joe Gervin John Cameron Lucy Newland Martin Gardiner Matthew Gilbert Neil Haggan Paul Dunlop Sean Ross Stephen Franey Stephen Watson Stuart Abraham Thomas McAllister
Project	21-1682 Water Supply Project

Quotation No.:		**Date Received:**	29-Jun-2022
Order No.:		**Date Instructed:**	29-Jun-2022
No. of Samples:	2		
Turnaround (Wkdays):	7	**Results Due:**	07-Jul-2022
Date Approved:	04-Jul-2022		

Approved By:



Details: Stuart Henderson, Technical Manager

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Tel: 01638 606070
Email: info@chemtest.com

Results - Soil

Project: 21-1682 Water Supply Project

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-24380	[redacted]
Quotation No.:			**Chemtest Sample ID.:**		1457839	
Order No.:			Client Sample Ref.:		12	
			Sample Location:		BH-4110	
			Sample Type:		SOIL	
			Top Depth (m):		2.00	
			Date Sampled:		28-Jun-2022	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
Moisture	N	2030	%	0.020	9.2	
pH	U	2010		4.0	8.8	
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	< 0.010	
Sulphate (Total)	U	2430	%	0.010	< 0.010	
Sulphate (Acid Soluble)	U	2430	%	0.010	< 0.010	

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.

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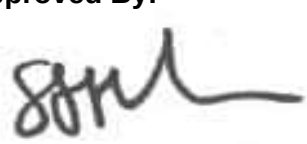
Final Report

Report No.:	22-29048-1
Initial Date of Issue:	05-Aug-2022
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Colm Hurley Darren O'Mahony Gabriella Horan Joe Gervin John Cameron Lucy Newland Martin Gardiner Matthew Gilbert Neil Haggan Paul Dunlop Sean Ross Stephen Franey Stephen Watson Stuart Abraham Thomas McAllister Rachel White
Project	22-1682 Water Supply Project

Quotation No.:		**Date Received:**	01-Aug-2022
Order No.:		**Date Instructed:**	01-Aug-2022
No. of Samples:	8		
Turnaround (Wkdays):	7	**Results Due:**	09-Aug-2022
Date Approved:	05-Aug-2022		

Approved By:



Details: Stuart Henderson, Technical Manager

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Email: info@chemtest.com

Results - Soil

Project: 22-1682 Water Supply Project

Client: Causeway Geotech Ltd				Chemtest Job No.:	22-29048	22-29048	22-29048
Quotation No.:				Chemtest Sample ID.:	1478977	1478978	1478979
Order No.:				Client Sample Ref.:	3	12	14
				Sample Location:	BH-5530	BH-5530	BH-5530
				Sample Type:	SOIL	SOIL	SOIL
				Top Depth (m):	2.8	9.3	12.3
				Date Sampled:	29-Jul-2022	29-Jul-2022	29-Jul-2022
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
Moisture	N	2030	%	0.020	13	14	10
pH (2.5:1)	N	2010		4.0	8.9	8.6	8.8
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	< 0.010	0.016	0.013
Total Sulphur	U	2175	%	0.010	< 0.010	0.012	0.017
Sulphate (Acid Soluble)	U	2430	%	0.010	< 0.010	< 0.010	< 0.010

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
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U/S	Unsuitable Sample
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>	"greater than"
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All results are expressed on a dry weight basis

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Sample Deviation Codes

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Sample Retention and Disposal

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eurofins | Chemtest
Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

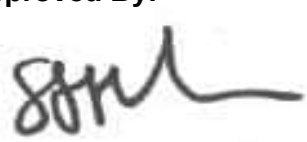
UKAS TESTING
2183

Final Report

Report No.:	22-30410-1
Initial Date of Issue:	15-Aug-2022
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Colm Hurley Darren O'Mahony Gabriella Horan Joe Gervin John Cameron Lucy Newland Martin Gardiner Matthew Gilbert Neil Haggan Paul Dunlop Sean Ross Stephen Franey Stephen Watson Stuart Abraham Thomas McAllister
Project	21-1682 WATER SUPPPLY PROJECT

Quotation No.:		**Date Received:**	10-Aug-2022
Order No.:		**Date Instructed:**	10-Aug-2022
No. of Samples:	9		
Turnaround (Wkdays):	7	**Results Due:**	18-Aug-2022
Date Approved:	15-Aug-2022		

Approved By:



Details: Stuart Henderson, Technical Manager

Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Results - Soil

Project: 21-1682 WATER SUPPPLY PROJECT

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-30410	22-30410	22-30410	22-30410	22-30410	22-30410	22-30410	22-30410
Quotation No.:			**Chemtest Sample ID.:**		1484990	1484991	1484992	1484993	1484994	1484995	1484996	1484997
Order No.:			Client Sample Ref.:		5	8	3	10	4	3	2	1
			Sample Location:		BH-23898	BH-25603	BH-6406	BH-6576	BH-6886	TP-12775	TP-12801	TP-12823
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		4.0	3.0	2.0	4.0	2.8	1.5	1.5	0.5
			Date Sampled:		09-Aug-2022	09-Aug-2022	09-Aug-2022	09-Aug-2022	09-Aug-2022	09-Aug-2022	09-Aug-2022	09-Aug-2022
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
Moisture	N	2030	%	0.020	3.7	4.6	3.4	5.9	4.8	5.6	5.3	9.9
pH	U	2010		4.0	8.4	8.3	8.5	8.4	8.4	8.1	8.1	
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	
Sulphate (Total)	U	2430	%	0.010	0.018	0.027	0.059	0.027	0.028	0.20	0.14	
Sulphate (Acid Soluble)	U	2430	%	0.010	< 0.010	< 0.010	< 0.010	0.016	0.011	0.065	0.056	
LOI	U	2610	%	0.10								8.3
Organic Matter	U	2625	%	0.40								5.9

Results - Soil

Project: 21-1682 WATER SUPPPLY PROJECT

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-30410
Quotation No.:			**Chemtest Sample ID.:**		1484998
Order No.:			Client Sample Ref.:		1
			Sample Location:		TP32201
			Sample Type:		SOIL
			Top Depth (m):		0.5
			Date Sampled:		09-Aug-2022
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Moisture	N	2030	%	0.020	5.5
pH	U	2010		4.0	8.7
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	< 0.010
Sulphate (Total)	U	2430	%	0.010	0.027
Sulphate (Acid Soluble)	U	2430	%	0.010	0.014
LOI	U	2610	%	0.10	
Organic Matter	U	2625	%	0.40	

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2610	Loss on Ignition	loss on ignition (LOI)	Determination of the proportion by mass that is lost from a soil by ignition at 550°C.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.

Report Information

Key

U	UKAS accredited
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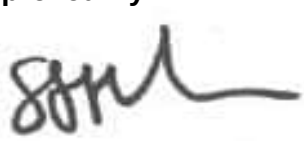
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	22-30804-1
Initial Date of Issue:	17-Aug-2022
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Colm Hurley Darren O'Mahony Gabriella Horan Joe Gervin John Cameron Lucy Newland Martin Gardiner Matthew Gilbert Neil Haggan Paul Dunlop Sean Ross Stephen Franey Stephen Watson Stuart Abraham Thomas McAllister
Project	21-1682 Water Supply Project

Quotation No.:		**Date Received:**	12-Aug-2022
Order No.:		**Date Instructed:**	12-Aug-2022
No. of Samples:	3		
Turnaround (Wkdays):	7	**Results Due:**	22-Aug-2022
Date Approved:	17-Aug-2022		

Approved By:



Details: Stuart Henderson, Technical Manager

Results - Soil

Project: 21-1682 Water Supply Project

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-30804	22-30804	22-30804
Quotation No.:			**Chemtest Sample ID.:**		1486785	1486786	1486787
Order No.:			Client Sample Ref.:		3	1	1
			Sample Location:		BH-29923A	BH-30066	BH-30600
			Sample Type:		SOIL	SOIL	SOIL
			Top Depth (m):		3.20	5.30	2.20
			Date Sampled:		11-Aug-2022	11-Aug-2022	11-Aug-2022
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
Moisture	N	2030	%	0.020	12	14	7.3
pH (2.5:1)	N	2010		4.0	9.0	9.1	9.1
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	< 0.010	< 0.010	< 0.010
Total Sulphur	U	2175	%	0.010	0.013	0.017	0.020
Sulphate (Acid Soluble)	U	2430	%	0.010	< 0.010	< 0.010	< 0.010

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.

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eurofins | Chemtest
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Newmarket
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Email: info@chemtest.com

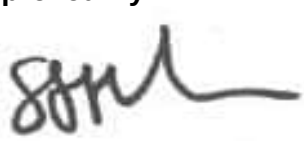
UKAS TESTING
2183

Final Report

Report No.:	22-30837-1
Initial Date of Issue:	16-Aug-2022
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Colm Hurley Darren O'Mahony Gabriella Horan Joe Gervin John Cameron Lucy Newland Martin Gardiner Matthew Gilbert Neil Haggan Paul Dunlop Sean Ross Stephen Franey Stephen Watson Stuart Abraham Thomas McAllister
Project	22-1682 Water Supply Project

Quotation No.:		**Date Received:**	12-Aug-2022
Order No.:		**Date Instructed:**	12-Aug-2022
No. of Samples:	7		
Turnaround (Wkdays):	7	**Results Due:**	22-Aug-2022
Date Approved:	16-Aug-2022		

Approved By:



Details: Stuart Henderson, Technical Manager

Results - Soil

Project: 22-1682 Water Supply Project

Client: Causeway Geotech Ltd		**Chemtest Job No.:**			22-30837	22-30837	22-30837	22-30837	22-30837	22-30837	22-30837
Quotation No.:		**Chemtest Sample ID.:**			1486935	1486936	1486937	1486938	1486939	1486940	1486941
Order No.:		Client Sample Ref.:			1	1	2	1	1	1	1
		Sample Location:			BH-30722	BH-31910B	BH-32020A	BH-32318	BH-32601	BH-34598A	BH-35202
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			2.2	5.2	3.7	3.7	2.2	4.6	5.2
		Date Sampled:			11-Aug-2022	11-Aug-2022	11-Aug-2022	11-Aug-2022	11-Aug-2022	11-Aug-2022	11-Aug-2022
Determinand	**Accred.**	**SOP**	**Units**	**LOD**							
Moisture	N	2030	%	0.020	8.1	8.8	13	8.8	3.0	2.0	6.8
pH	U	2010		4.0	8.7	8.9	8.6	8.7	8.8	9.0	8.9
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Sulphate (Total)	U	2430	%	0.010	0.019	0.017	0.015	0.013	0.014	0.019	0.018
Sulphate (Acid Soluble)	U	2430	%	0.010	< 0.010	< 0.010	0.015	< 0.010	< 0.010	< 0.010	< 0.010

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.

Report Information

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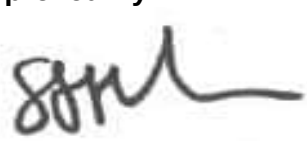
Email: info@chemtest.com

Final Report

Report No.:	22-32053-1
Initial Date of Issue:	31-Aug-2022
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Alistair McQuat Colm Hurley Darren O'Mahony Gabriella Horan Joe Gervin John Cameron Lucy Newland Martin Gardiner Matthew Gilbert Neil Haggan Paul Dunlop Sean Ross Stephen Franey Stephen Watson Stuart Abraham Thomas McAllister Rachel White
Project	21-1682 Water Supply Project

Quotation No.:		**Date Received:**	22-Aug-2022
Order No.:		**Date Instructed:**	22-Aug-2022
No. of Samples:	18		
Turnaround (Wkdays):	7	**Results Due:**	31-Aug-2022
Date Approved:	31-Aug-2022		

Approved By:



Details: Stuart Henderson, Technical Manager

Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Results - Soil

Project: 21-1682 Water Supply Project

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-32053	22-32053	22-32053	22-32053	22-32053	22-32053	22-32053	22-32053
Quotation No.:			**Chemtest Sample ID.:**		1492327	1492328	1492329	1492330	1492331	1492332	1492333	1492334
Order No.:			Client Sample Ref.:		5	1	1	1	1	1	1	2
			Sample Location:		BH-12658	TP-12569	TP-12580	TP-12581	TP-12601	TP-12688	TP-12726	TP-12786
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		1.80	0.30	0.50	0.30	0.50	0.50	0.50	1.50
			Date Sampled:		19-Aug-2022	19-Aug-2022	19-Aug-2022	19-Aug-2022	19-Aug-2022	19-Aug-2022	19-Aug-2022	19-Aug-2022
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
Moisture	N	2030	%	0.020	18	27	24	27	8.7	19	17	19
pH (2.5:1)	N	2010		4.0								
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010								
Total Sulphur	U	2175	%	0.010								
Sulphate (Acid Soluble)	U	2430	%	0.010								
LOI	U	2610	%	0.10	9.9	52	44	36	1.2	5.6	3.7	1.4
Organic Matter	U	2625	%	0.40	7.6	18	7.6	21	1.2	20	10	5.2

Results - Soil

Project: 21-1682 Water Supply Project

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-32053	22-32053	22-32053	22-32053	22-32053	22-32053	22-32053	22-32053
Quotation No.:			**Chemtest Sample ID.:**		1492335	1492336	1492337	1492338	1492339	1492340	1492341	1492342
Order No.:			Client Sample Ref.:		7	10	7	3	3	4	3	4
			Sample Location:		BH-10449	BH-10475	BH-12658	TP-12569	TP-12582	TP-12601	TP-12639	TP-12689
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		2.00	3.00	3.80	2.00	2.50	2.30	2.50	2.20
			Date Sampled:		19-Aug-2022	19-Aug-2022	19-Aug-2022	19-Aug-2022	19-Aug-2022	19-Aug-2022	19-Aug-2022	19-Aug-2022
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
Moisture	N	2030	%	0.020	1.4	7.0	5.8	8.7	5.7	36	6.1	8.7
pH (2.5:1)	N	2010		4.0	9.1	9.2	9.1	9.0	8.7	7.6	9.1	8.9
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.076	0.011	0.014	0.078	0.010	0.054	0.020	0.015
Total Sulphur	U	2175	%	0.010	0.072	0.097	0.062	0.052	0.083	0.085	0.096	0.090
Sulphate (Acid Soluble)	U	2430	%	0.010	0.011	< 0.010	0.024	0.024	< 0.010	0.12	0.016	0.012
LOI	U	2610	%	0.10								
Organic Matter	U	2625	%	0.40								

Results - Soil

Project: 21-1682 Water Supply Project

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-32053	22-32053
Quotation No.:			**Chemtest Sample ID.:**		1492343	1492344
Order No.:			Client Sample Ref.:		4	4
			Sample Location:		TP-12737	TP-12787
			Sample Type:		SOIL	SOIL
			Top Depth (m):		3.00	2.10
			Date Sampled:		19-Aug-2022	19-Aug-2022
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
Moisture	N	2030	%	0.020	7.6	7.5
pH (2.5:1)	N	2010		4.0	9.2	9.1
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	< 0.010	< 0.010
Total Sulphur	U	2175	%	0.010	0.057	0.11
Sulphate (Acid Soluble)	U	2430	%	0.010	< 0.010	0.012
LOI	U	2610	%	0.10		
Organic Matter	U	2625	%	0.40		

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2610	Loss on Ignition	loss on ignition (LOI)	Determination of the proportion by mass that is lost from a soil by ignition at 550°C.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.

Report Information

Key

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S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
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U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

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D - Broken Container
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Sample Retention and Disposal

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customerservices@chemtest.com

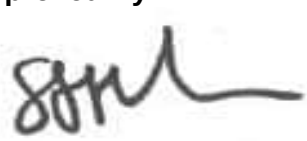
Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	22-32055-1
Initial Date of Issue:	31-Aug-2022
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Alistair McQuat Colm Hurley Darren O'Mahony Gabriella Horan Joe Gervin John Cameron Lucy Newland Martin Gardiner Matthew Gilbert Neil Haggan Paul Dunlop Sean Ross Stephen Franey Stephen Watson Stuart Abraham Thomas McAllister Rachel White
Project	21-1682 Water Supply Project

Quotation No.:		**Date Received:**	22-Aug-2022
Order No.:		**Date Instructed:**	22-Aug-2022
No. of Samples:	12		
Turnaround (Wkdays):	7	**Results Due:**	31-Aug-2022
Date Approved:	31-Aug-2022		

Approved By:



Details: Stuart Henderson, Technical Manager

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Depot Road
Newmarket
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Tel: 01638 606070
Email: info@chemtest.com

Results - Soil

Project: 21-1682 Water Supply Project

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-32055	22-32055	22-32055	22-32055	22-32055	22-32055	22-32055	22-32055
Quotation No.:			**Chemtest Sample ID.:**		1492349	1492350	1492351	1492352	1492353	1492354	1492355	1492356
Order No.:			Client Sample Ref.:		6	7	9	5	4	6	4	7
			Sample Location:		BH-12406	BH-7282	BH-7320	TP-13208	TP-13291	TP-13433	TP-13509	TP-13605
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		2.00	3.00	4.00	1.50	1.50	2.50	1.50	2.50
			Date Sampled:		19-Aug-2022	19-Aug-2022	19-Aug-2022	19-Aug-2022	19-Aug-2022	19-Aug-2022	19-Aug-2022	19-Aug-2022
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
Moisture	N	2030	%	0.020	11	6.6	10	7.3	6.2	9.5	7.3	6.4
pH (2.5:1)	N	2010		4.0	8.2	8.3	8.6	8.8	8.7	9.1	8.9	8.8
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Total Sulphur	U	2175	%	0.010	0.11	0.013	0.087	0.021	0.027	< 0.010	< 0.010	< 0.010
Sulphate (Acid Soluble)	U	2430	%	0.010	< 0.010	< 0.010	0.019	0.010	0.024	0.015	< 0.010	0.015

Results - Soil

Project: 21-1682 Water Supply Project

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-32055	22-32055	22-32055	22-32055
Quotation No.:			**Chemtest Sample ID.:**		1492357	1492358	1492359	1492360
Order No.:			Client Sample Ref.:		7	3	6	6
			Sample Location:		TP-30103	TP-30303	TP-30501	TP-30602
			Sample Type:		SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		2.50	2.50	2.50	2.20
			Date Sampled:		19-Aug-2022	19-Aug-2022	19-Aug-2022	19-Aug-2022
Determinand	**Accred.**	**SOP**	**Units**	**LOD**				
Moisture	N	2030	%	0.020	8.1	9.6	7.6	5.3
pH (2.5:1)	N	2010		4.0	8.8	8.7	8.8	9.3
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010
Total Sulphur	U	2175	%	0.010	0.046	< 0.010	< 0.010	< 0.010
Sulphate (Acid Soluble)	U	2430	%	0.010	0.011	0.016	< 0.010	0.012

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.

Report Information

Key

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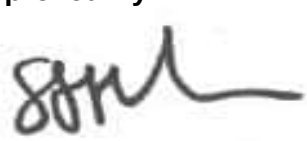
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	22-32371-1
Initial Date of Issue:	02-Sep-2022
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Alistair McQuat Colm Hurley Darren O'Mahony Gabriella Horan Joe Gervin John Cameron Lucy Newland Martin Gardiner Matthew Gilbert Neil Haggan Paul Dunlop Sean Ross Stephen Franey Stephen Watson Stuart Abraham Thomas McAllister Ciaran Dohert
Project	21-1682 Water Supply Project

Quotation No.:		**Date Received:**	24-Aug-2022
Order No.:		**Date Instructed:**	24-Aug-2022
No. of Samples:	3		
Turnaround (Wkdays):	7	**Results Due:**	02-Sep-2022
Date Approved:	02-Sep-2022		

Approved By:



Details: Stuart Henderson, Technical Manager

Eurofins Chemtest Ltd
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CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Results - Soil

Project: 21-1682 Water Supply Project

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-32371	22-32371	22-32371
Quotation No.:			**Chemtest Sample ID.:**		1493737	1493738	1493739
Order No.:			Client Sample Ref.:		4	6	5
			Sample Location:		BH-16610A	BH-19407	BH-19427A
			Sample Type:		SOIL	SOIL	SOIL
			Top Depth (m):		2.20	2.20	2.00
			Date Sampled:		23-Aug-2022	23-Aug-2022	23-Aug-2022
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
Moisture	N	2030	%	0.020	5.8	1.9	4.5
pH (2.5:1)	N	2010		4.0	8.9	8.9	9.4
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	< 0.010	< 0.010	< 0.010
Total Sulphur	U	2175	%	0.010	< 0.010	< 0.010	< 0.010
Sulphate (Acid Soluble)	U	2430	%	0.010	0.029	< 0.010	0.024

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.

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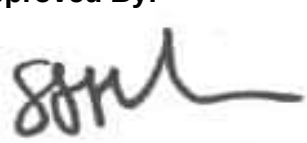
Final Report

Report No.:	22-33018-1
Initial Date of Issue:	02-Sep-2022
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Alistair McQuat Colm Hurley Darren O'Mahony Gabriella Horan Joe Gervin John Cameron Lucy Newland Martin Gardiner Matthew Gilbert Neil Haggan Paul Dunlop Sean Ross Stephen Franey Stephen Watson Stuart Abraham Thomas McAllister Ciaran Dohert
Project	21-1682 Water Supply Project

Quotation No.:		**Date Received:**	30-Aug-2022
Order No.:		**Date Instructed:**	30-Aug-2022
No. of Samples:	2		
Turnaround (Wkdays):	7	**Results Due:**	07-Sep-2022
Date Approved:	02-Sep-2022		

Approved By:



Details: Stuart Henderson, Technical Manager

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Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Results - Soil

Project: 21-1682 Water Supply Project

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-33018
Quotation No.:			**Chemtest Sample ID.:**		1496529
Order No.:			Client Sample Ref.:		1
			Sample Location:		BH-28886A
			Sample Type:		SOIL
			Top Depth (m):		2.2
			Date Sampled:		26-Aug-2022
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Moisture	N	2030	%	0.020	4.7
pH (2.5:1)	N	2010		4.0	9.4
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	< 0.010
Total Sulphur	U	2175	%	0.010	0.010
Sulphate (Acid Soluble)	U	2430	%	0.010	0.014

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.

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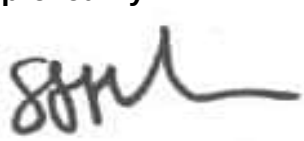
Final Report

Report No.:	22-34167-1
Initial Date of Issue:	12-Sep-2022
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Alistair McQuat Colm Hurley Darren O'Mahony Gabriella Horan Joe Gervin John Cameron Lucy Newland Martin Gardiner Matthew Gilbert Neil Haggan Paul Dunlop Sean Ross Stephen Franey Stephen Watson Stuart Abraham Thomas McAllister Ciaran Dohert
Project	22-1682 Water Supply Project

Quotation No.:		**Date Received:**	07-Sep-2022
Order No.:		**Date Instructed:**	07-Sep-2022
No. of Samples:	11		
Turnaround (Wkdays):	7	**Results Due:**	15-Sep-2022
Date Approved:	12-Sep-2022		

Approved By:



Details:	Stuart Henderson, Technical Manager

Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Results - Soil

Project: 22-1682 Water Supply Project

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-34167	22-34167	22-34167	22-34167	22-34167	22-34167	22-34167	22-34167	22-34167
Quotation No.:			**Chemtest Sample ID.:**		1501894	1501895	1501896	1501897	1501898	1501899	1501900	1501901	1501902
Order No.:			Client Sample Ref.:		2	9	4	8	8	2	5	5	8
			Sample Location:		BH-11377	BH-11594	BH-12009	BH-12580	BH-12608	BH-13431	BH-26554	BH-8940	BH-9668
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		3	3	2	2.2	2	2.2	2.2	3	4
			Date Sampled:		06-Sep-2022	06-Sep-2022	06-Sep-2022	06-Sep-2022	06-Sep-2022	06-Sep-2022	06-Sep-2022	06-Sep-2022	06-Sep-2022
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
Moisture	N	2030	%	0.020	11	8.6	9.0	3.0	4.3	5.7	11	13	4.0
pH (2.5:1)	N	2010		4.0	9.5	9.5	9.3	9.8	9.5	9.7	9.3	9.2	9.3
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.017	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.11
Total Sulphur	U	2175	%	0.010	0.052	0.040	0.040	0.054	0.059	0.038	0.033	0.034	0.62
Sulphate (Acid Soluble)	U	2430	%	0.010	0.036	0.011	< 0.010	0.019	0.013	0.014	0.019	0.011	0.064
LOI	U	2610	%	0.10									
Organic Matter	U	2625	%	0.40									

Results - Soil

Project: 22-1682 Water Supply Project

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-34167	[redacted]
Quotation No.:			**Chemtest Sample ID.:**		1501903	
Order No.:			Client Sample Ref.:		5	
			Sample Location:		DS-11208A	
			Sample Type:		SOIL	
			Top Depth (m):		2	
			Date Sampled:		06-Sep-2022	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
Moisture	N	2030	%	0.020	9.7	
pH (2.5:1)	N	2010		4.0	9.5	
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	< 0.010	
Total Sulphur	U	2175	%	0.010	0.047	
Sulphate (Acid Soluble)	U	2430	%	0.010	< 0.010	
LOI	U	2610	%	0.10		
Organic Matter	U	2625	%	0.40		

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2610	Loss on Ignition	loss on ignition (LOI)	Determination of the proportion by mass that is lost from a soil by ignition at 550°C.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.

Report Information

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Amended Report

Report No.:	22-35839-2		
Initial Date of Issue:	28-Sep-2022	**Date of Re-Issue:**	28-Sep-2022
Client	Causeway Geotech Ltd		
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL		
Contact(s):	Alistair McQuat Colm Hurley Darren O'Mahony Gabriella Horan Joe Gervin John Cameron Lucy Newland Martin Gardiner Matthew Gilbert Neil Haggan Paul Dunlop Sean Ross Stephen Franey Stephen McCracken Stephen Watson Stuart Abraham Thomas McAlli		
Project	21-1682 Water Supply Project		
Quotation No.:		**Date Received:**	20-Sep-2022
Order No.:		**Date Instructed:**	20-Sep-2022
No. of Samples:	28		
Turnaround (Wkdays):	7	**Results Due:**	28-Sep-2022
Date Approved:	28-Sep-2022		

Approved By:



Details: Stuart Henderson, Technical Manager

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CB8 0AL
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Email: info@chemtest.com

Results - Soil

Project: 21-1682 Water Supply Project

Client: Causeway Geotech Ltd					Chemtest Job No.:	22-35839	22-35839	22-35839	22-35839	22-35839	22-35839	22-35839
Quotation No.:					Chemtest Sample ID.:	1509268	1509269	1509270	1509271	1509272	1509273	1509274
Order No.:					Client Sample Ref.:	4	5	6	8	4	5	6
					Sample Location:	BH-20326	BH-20655	BH-22776	BH-29130	BH-29575	DS-3384	DS-999
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	2.8	2	2	3.2	2.8	2	1.9
					Date Sampled:	16-Sep-2022	16-Sep-2022	16-Sep-2022	16-Sep-2022	16-Sep-2022	16-Sep-2022	16-Sep-2022
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
Moisture	N	2030	%	0.020		7.7	7.5	8.0	19	7.7	6.8	9.1
pH (2.5:1)	N	2010		4.0		9.3	8.7	9.1	9.0	9.0	9.1	8.2
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.19
Total Sulphur	U	2175	%	0.010		< 0.010	< 0.010	< 0.010	0.011	< 0.010	< 0.010	0.015
Sulphate (Acid Soluble)	U	2430	%	0.010		0.018	0.014	0.027	0.022	< 0.010	0.012	0.049

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is descr bed based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.

Report Information

Key

U	UKAS accredited
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I/S	Insufficient Sample
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<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

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All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
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Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
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Amended Report

Report No.:	22-35839-3		
Initial Date of Issue:	28-Sep-2022	**Date of Re-Issue:**	29-Sep-2022
Client	Causeway Geotech Ltd		
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL		
Contact(s):	Alistair McQuat Colm Hurley Darren O'Mahony Gabriella Horan Joe Gervin John Cameron Lucy Newland Martin Gardiner Matthew Gilbert Neil Haggan Paul Dunlop Sean Ross Stephen Franey Stephen McCracken Stephen Watson Stuart Abraham Thomas McAlli		
Project	21-1682 Water Supply Project		
Quotation No.:		**Date Received:**	20-Sep-2022
Order No.:		**Date Instructed:**	20-Sep-2022
No. of Samples:	28		
Turnaround (Wkdays):	7	**Results Due:**	28-Sep-2022
Date Approved:	28-Sep-2022		

Approved By:



Details: Stuart Henderson, Technical Manager

Eurofins Chemtest Ltd
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Tel: 01638 606070
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Results - Soil

Project: 21-1682 Water Supply Project

Client: Causeway Geotech Ltd		**Chemtest Job No.:**			22-35839	22-35839	22-35839	22-35839	22-35839	22-35839	22-35839	22-35839	22-35839	22-35839
Quotation No.:		**Chemtest Sample ID.:**			1509249	1509250	1509251	1509252	1509253	1509254	1509255	1509256	1509257	1509258
Order No.:		Client Sample Ref.:			10	6	4	9	2	1	4	3	4	4
		Sample Location:			BH-13990	BH-14170	BH-14357	BH-18440	DS-28605	ST-120650A-HS	TP-2007	TP-2140	TP-2349	TP-3302
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			2.2	2.2	3	2.2	1.2	1	2.4	2.8	2.2	3.1
		Date Sampled:			16-Sep-2022	16-Sep-2022	16-Sep-2022	16-Sep-2022	16-Sep-2022	16-Sep-2022	16-Sep-2022	16-Sep-2022	16-Sep-2022	16-Sep-2022
Determinand	**Accred.**	**SOP**	**Units**	**LOD**										
Moisture	N	2030	%	0.020	3.6	9.2	5.4	1.9	5.0	11	10	11	9.5	16
pH (2.5:1)	N	2010		4.0	9.0	9.0	9.3	8.9	9.1	8.7	8.9	8.6	8.9	8.3
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.011	0.054	< 0.010	0.015	< 0.010	0.012	< 0.010	< 0.010	< 0.010	< 0.010
Total Sulphur	U	2175	%	0.010	0.011	0.036	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Sulphate (Acid Soluble)	U	2430	%	0.010	0.028	0.032	0.018	0.022	0.028	0.020	< 0.010	< 0.010	< 0.010	< 0.010
LOI	U	2610	%	0.10										
Organic Matter	U	2625	%	0.40										

Results - Soil

Project: 21-1682 Water Supply Project

Client: Causeway Geotech Ltd		**Chemtest Job No.:**			22-35839	22-35839	22-35839	22-35839	22-35839	22-35839	22-35839	22-35839	22-35839
Quotation No.:		**Chemtest Sample ID.:**			1509259	1509260	1509261	1509262	1509263	1509264	1509265	1509266	1509267
Order No.:		Client Sample Ref.:			3	4	3	2	2	1	1	1	1
		Sample Location:			TP-6408	TP-6575	TP-7305	TP-3504	TP-4112	TP-6575	TP-6832	TP-6997	TP-7305
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			2.6	2.4	2	2.7	1.6	0.2	0.1	0.15	0.3
		Date Sampled:			16-Sep-2022	16-Sep-2022	16-Sep-2022	16-Sep-2022	16-Sep-2022	16-Sep-2022	16-Sep-2022	16-Sep-2022	16-Sep-2022
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
Moisture	N	2030	%	0.020	9.5	11	8.4	35	11	8.2	9.5	15	10
pH (2.5:1)	N	2010		4.0	8.9	8.6	9.2						
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	< 0.010	< 0.010	< 0.010						
Total Sulphur	U	2175	%	0.010	< 0.010	< 0.010	< 0.010						
Sulphate (Acid Soluble)	U	2430	%	0.010	0.013	< 0.010	0.022						
LOI	U	2610	%	0.10				30	1.0	2.4	4.3	2.9	4.5
Organic Matter	U	2625	%	0.40				17	< 0.40	0.76	2.2	0.86	0.74

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2610	Loss on Ignition	loss on ignition (LOI)	Determination of the proportion by mass that is lost from a soil by ignition at 550°C.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.

Report Information

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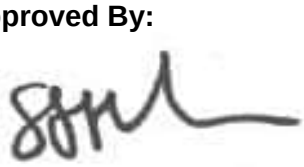
Final Report

Report No.:	22-35880-1
Initial Date of Issue:	23-Sep-2022
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Alistair McQuat Ciaran Doherty Colm Hurley Darren O'Mahony Gabriella Horan Joe Gervin John Cameron Lucy Newland Martin Gardiner Matthew Gilbert Megan Walsh Neil Haggan Paul Dunlop Rachel White Sean Ross Stephen Franey Stephen McCracken St
Project	21-1682 Water Supply Project

Quotation No.:		**Date Received:**	20-Sep-2022
Order No.:		**Date Instructed:**	20-Sep-2022
No. of Samples:	1		
Turnaround (Wkdays):	7	**Results Due:**	28-Sep-2022
Date Approved:	23-Sep-2022		

Approved By:



Details: Stuart Henderson, Technical Manager

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Email: info@chemtest.com

Results - Soil

Project: 21-1682 Water Supply Project

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-35880
Quotation No.:			**Chemtest Sample ID.:**		1509458
Order No.:			Client Sample Ref.:		6
			Sample Location:		BH-20939
			Sample Type:		SOIL
			Top Depth (m):		3.2
			Date Sampled:		16-Sep-2022
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Moisture	N	2030	%	0.020	5.3
pH (2.5:1)	N	2010		4.0	9.7
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	< 0.010
Total Sulphur	U	2175	%	0.010	0.012
Sulphate (Acid Soluble)	U	2430	%	0.010	0.017

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.

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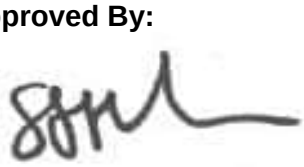
Final Report

Report No.:	22-36207-1
Initial Date of Issue:	29-Sep-2022
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Alistair McQuat Ciaran Doherty Colm Hurley Darren O'Mahony Gabriella Horan Joe Gervin John Cameron Lucy Newland Martin Gardiner Matthew Gilbert Megan Walsh Neil Haggan Paul Dunlop Rachel White Sean Ross Stephen Franey Stephen McCracken St
Project	21-1682 Water Supply Project

Quotation No.:		**Date Received:**	22-Sep-2022
Order No.:		**Date Instructed:**	22-Sep-2022
No. of Samples:	22		
Turnaround (Wkdays):	7	**Results Due:**	30-Sep-2022
Date Approved:	29-Sep-2022		

Approved By:



Details: Stuart Henderson, Technical Manager

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Results - Soil

Project: 21-1682 Water Supply Project

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-36207	22-36207	22-36207	22-36207	22-36207	22-36207	22-36207	22-36207	22-36207
Quotation No.:			**Chemtest Sample ID.:**		1510870	1510871	1510872	1510873	1510874	1510875	1510876	1510877	1510878
Order No.:			Client Sample Ref.:		2	3	2	4	2	4	1	1	1
			Sample Location:		RK-10126	RK-10199	RK-10288	RK-10288	RK-10381	TP-6105	TP-9094	TP-9206	TP-9305
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.3	0.5	0.2	0.8	0.1	3	0.3	0.3	0.3
			Date Sampled:		21-Sep-2022	21-Sep-2022	21-Sep-2022	21-Sep-2022	21-Sep-2022	21-Sep-2022	21-Sep-2022	21-Sep-2022	21-Sep-2022
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
Moisture	N	2030	%	0.020	27	25	35	33	13	7.4	6.4	12	11
pH (2.5:1)	N	2010		4.0									
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010									
Total Sulphur	U	2175	%	0.010									
Sulphate (Acid Soluble)	U	2430	%	0.010									
LOI	U	2610	%	0.10	7.2	8.0	8.9	21	1.7	1.3	2.1	3.7	3.5
Organic Matter	U	2625	%	0.40	3.0	7.6	6.8	17	0.76	< 0.40	0.50	2.1	1.7

Results - Soil

Project: 21-1682 Water Supply Project

Client: Causeway Geotech Ltd					**Chemtest Job No.:**	22-36207	22-36207	22-36207	22-36207	22-36207	22-36207	22-36207	22-36207
Quotation No.:					**Chemtest Sample ID.:**	1510879	1510880	1510881	1510882	1510883	1510884	1510885	1510886	1510887
Order No.:					Client Sample Ref.:	1	3	1	3	3	2	3	3	2
					Sample Location:	TP-9505	TP-9705	TP-9830	TP-12107	TP-5703	TP-5803	TP-6016	TP-6105	TP-6207
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	0.3	1.6	0.4	1.4	2.3	2.5	2.4	2.2	1.4
					Date Sampled:	21-Sep-2022	21-Sep-2022	21-Sep-2022	21-Sep-2022	21-Sep-2022	21-Sep-2022	21-Sep-2022	21-Sep-2022	21-Sep-2022
Determinand	**Accred.**	**SOP**	**Units**	**LOD**										
Moisture	N	2030	%	0.020		9.5	11	12	7.8	11	10	9.5	13	6.3
pH (2.5:1)	N	2010		4.0					8.8	8.5	8.6	8.6	7.7	8.8
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010					< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Total Sulphur	U	2175	%	0.010					0.019	0.014	< 0.010	0.020	0.015	0.018
Sulphate (Acid Soluble)	U	2430	%	0.010					< 0.010	< 0.010	< 0.010	0.021	< 0.010	0.013
LOI	U	2610	%	0.10		1.2	0.69	0.49						
Organic Matter	U	2625	%	0.40		0.79	0.47	< 0.40						

Results - Soil

Project: 21-1682 Water Supply Project

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-36207	22-36207	22-36207	22-36207
Quotation No.:			**Chemtest Sample ID.:**		1510888	1510889	1510890	1510891
Order No.:			Client Sample Ref.:		4	3	3	3
			Sample Location:		TP-9011	TP-9115	TP-9206	TP-9603
			Sample Type:		SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		2.2	2.1	1.6	1.9
			Date Sampled:		21-Sep-2022	21-Sep-2022	21-Sep-2022	21-Sep-2022
Determinand	**Accred.**	**SOP**	**Units**	**LOD**				
Moisture	N	2030	%	0.020	6.9	8.7	9.4	9.8
pH (2.5:1)	N	2010		4.0	8.9	8.8	8.9	8.5
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	< 0.010	< 0.010	< 0.010	0.059
Total Sulphur	U	2175	%	0.010	0.034	0.028	0.023	0.096
Sulphate (Acid Soluble)	U	2430	%	0.010	0.017	0.010	0.018	0.041
LOI	U	2610	%	0.10				
Organic Matter	U	2625	%	0.40				

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2610	Loss on Ignition	loss on ignition (LOI)	Determination of the proportion by mass that is lost from a soil by ignition at 550°C.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.

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SOP	Standard operating procedure
LOD	Limit of detection

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D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt
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If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

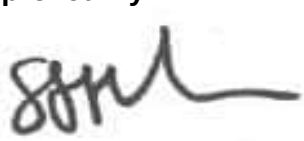
Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	22-36829-1
Initial Date of Issue:	30-Sep-2022
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Alistair McQuat Colm Hurley Darren O'Mahony Gabriella Horan Joe Gervin John Cameron Lucy Newland Martin Gardiner Matthew Gilbert Neil Haggan Paul Dunlop Sean Ross Stephen Franey Stephen McCracken Stephen Watson Stuart Abraham Thomas McAlli
Project	21-1682 Water Supply Project

Quotation No.:		**Date Received:**	27-Sep-2022
Order No.:		**Date Instructed:**	27-Sep-2022
No. of Samples:	6		
Turnaround (Wkdays):	7	**Results Due:**	05-Oct-2022
Date Approved:	30-Sep-2022		

Approved By:



Details:	Stuart Henderson, Technical Manager

Eurofins Chemtest Ltd
Depot Road
Newmarket
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Tel: 01638 606070
Email: info@chemtest.com

Results - Soil

Project: 21-1682 Water Supply Project

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-36829	22-36829	22-36829	22-36829	22-36829	22-36829
Quotation No.:			**Chemtest Sample ID.:**		1513733	1513734	1513735	1513736	1513737	1513738
Order No.:			Client Sample Ref.:		1	2	8	3	2	2
			Sample Location:		BH-5260	BH-5440	BH-5440	BH-6576	BH-6886	BH-7282
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		6.7	11.1	17.5	8.0	6.6	7.0
			Date Sampled:		26-Sep-2022	26-Sep-2022	26-Sep-2022	26-Sep-2022	26-Sep-2022	26-Sep-2022
			Asbestos Lab:		NEW-ASB					
Determinand	**Accred.**	**SOP**	**Units**	**LOD**						
Moisture	N	2030	%	0.020	0.49	1.0	8.5	9.3	0.67	4.1
pH (2.5:1)	N	2010		4.0	9.7	9.8	9.4	9.5	9.3	9.5
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	< 0.010	< 0.010	0.030	< 0.010	0.24	< 0.010
Total Sulphur	U	2175	%	0.010	0.10	0.015	0.054	0.015	1.0	0.015
Sulphate (Acid Soluble)	U	2430	%	0.010	0.025	< 0.010	0.014	0.013	0.088	0.015

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.

Report Information

Key

U	UKAS accredited
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Amended Report

Report No.:	22-36846-2		
Initial Date of Issue:	04-Oct-2022	**Date of Re-Issue:**	10-Oct-2022
Client	Causeway Geotech Ltd		
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL		
Contact(s):	Alistair McQuat Colm Hurley Darren O'Mahony Gabriella Horan Joe Gervin John Cameron Lucy Newland Martin Gardiner Matthew Gilbert Neil Haggan Paul Dunlop Sean Ross Stephen Franey Stephen McCracken Stephen Watson Stuart Abraham Thomas McAlli		
Project	21-1682 Water Supply Project		
Quotation No.:		**Date Received:**	27-Sep-2022
Order No.:	NEIL HAGGAN	**Date Instructed:**	27-Sep-2022
No. of Samples:	2		
Turnaround (Wkdays):	7	**Results Due:**	05-Oct-2022
Date Approved:	04-Oct-2022		
Approved By:			
Details:	Stuart Henderson, Technical Manager		

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Email: info@chemtest.com

Results - Soil

Project: 21-1682 Water Supply Project

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-36846	22-36846
Quotation No.:			**Chemtest Sample ID.:**		1513789	1513790
Order No.: NEIL HAGGAN			Client Sample Ref.:		2	6
			Sample Location:		BH-1886	BH-5573
			Sample Type:		SOIL	SOIL
			Top Depth (m):		9.30	15.70
			Date Sampled:		23-Sep-2022	23-Sep-2022
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
Moisture	N	2030	%	0.020	6.1	8.0
pH	U	2010		4.0	8.3	8.3
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.15	0.95
Sulphate (Total)	U	2430	%	0.010	0.22	3.9
Sulphate (Acid Soluble)	U	2430	%	0.010	0.032	0.33

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.

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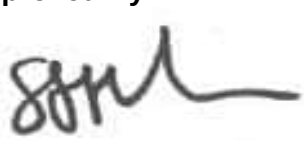
UKAS TESTING
2183

Final Report

Report No.:	22-36848-1
Initial Date of Issue:	30-Sep-2022
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Alistair McQuat Colm Hurley Darren O'Mahony Gabriella Horan Joe Gervin John Cameron Lucy Newland Martin Gardiner Matthew Gilbert Neil Haggan Paul Dunlop Sean Ross Stephen Franey Stephen McCracken Stephen Watson Stuart Abraham Thomas McAlli
Project	21-1682 Water Supply Subject

Quotation No.:		**Date Received:**	27-Sep-2022
Order No.:		**Date Instructed:**	27-Sep-2022
No. of Samples:	2		
Turnaround (Wkdays):	7	**Results Due:**	05-Oct-2022
Date Approved:	30-Sep-2022		

Approved By:



Details: Stuart Henderson, Technical Manager

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Tel: 01638 606070
Email: info@chemtest.com

Results - Soil

Project: 21-1682 Water Supply Subject

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-36848	22-36848
Quotation No.:			**Chemtest Sample ID.:**		1513798	1513799
Order No.:			Client Sample Ref.:		4	2
			Sample Location:		BH-1922	BH-6406
			Sample Type:		SOIL	SOIL
			Date Sampled:		23-Sep-2022	23-Sep-2022
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
Moisture	N	2030	%	0.020	2.3	19
pH	U	2010		4.0	9.0	9.1
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	< 0.010	< 0.010
Sulphate (Total)	U	2430	%	0.010	0.040	0.040
Sulphate (Acid Soluble)	U	2430	%	0.010	0.010	0.014

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
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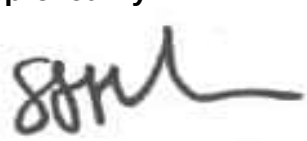
Final Report

Report No.:	22-38409-1
Initial Date of Issue:	17-Oct-2022
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Alistair McQuat Colm Hurley Darren O'Mahony Gabriella Horan Joe Gervin John Cameron Lucy Newland Martin Gardiner Matthew Gilbert Neil Haggan Paul Dunlop Sean Ross Stephen Franey Stephen McCracken Stephen Watson Stuart Abraham Thomas McAlli
Project	21-1682 Water Supply Project

Quotation No.:		**Date Received:**	07-Oct-2022
Order No.:		**Date Instructed:**	07-Oct-2022
No. of Samples:	10		
Turnaround (Wkdays):	7	**Results Due:**	17-Oct-2022
Date Approved:	17-Oct-2022		

Approved By:



Details: Stuart Henderson, Technical Manager

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Results - Soil

Project: 21-1682 Water Supply Project

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-38409	22-38409	22-38409	22-38409	22-38409	22-38409	22-38409	22-38409	22-38409
Quotation No.:			**Chemtest Sample ID.:**		1520866	1520867	1520868	1520869	1520870	1520871	1520872	1520873	1520874
Order No.:			Client Sample Ref.:		2	2	1	3	2	2	1	1	1
			Sample Location:		TP-13988	TP-14170	TP-14409	TP-16005	TP-16109	TP-18187	TP-18505	TP-18604	TP-18702
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		1.50	2.00	0.40	2.10	1.10	0.95	0.50	0.30	0.40
			Date Sampled:		06-Oct-2022	06-Oct-2022	06-Oct-2022	06-Oct-2022	06-Oct-2022	06-Oct-2022	06-Oct-2022	06-Oct-2022	06-Oct-2022
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
Moisture	N	2030	%	0.020	10	10	10	8.0	8.4	19	9.6	9.4	10
pH (2.5:1)	N	2010		4.0	8.1	8.3	8.9	9.0	8.9	8.3	8.7	8.6	8.5
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.055	0.035	0.017	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Total Sulphur	U	2175	%	0.010	0.082	0.043	0.050	0.050	0.037	0.030	0.035	0.029	0.030
Sulphate (Acid Soluble)	U	2430	%	0.010	0.022	0.038	0.014	< 0.010	0.011	0.017	0.011	0.019	0.018

Results - Soil

Project: 21-1682 Water Supply Project

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-38409
Quotation No.:			**Chemtest Sample ID.:**		1520875
Order No.:			Client Sample Ref.:		1
			Sample Location:		TP-12203
			Sample Type:		SOIL
			Top Depth (m):		0.50
			Date Sampled:		06-Oct-2022
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Moisture	N	2030	%	0.020	8.5
pH (2.5:1)	N	2010		4.0	8.6
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	< 0.010
Total Sulphur	U	2175	%	0.010	0.076
Sulphate (Acid Soluble)	U	2430	%	0.010	< 0.010

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.

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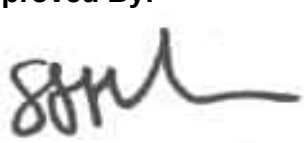
Final Report

Report No.:	22-38643-1
Initial Date of Issue:	14-Oct-2022
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Alistair McQuat Colm Hurley Darren O'Mahony Gabriella Horan Joe Gervin John Cameron Lucy Newland Martin Gardiner Matthew Gilbert Neil Haggan Paul Dunlop Sean Ross Stephen Franey Stephen McCracken Stephen Watson Stuart Abraham Thomas McAlli
Project	21-1682 Water Supply Project

Quotation No.:		**Date Received:**	10-Oct-2022
Order No.:		**Date Instructed:**	10-Oct-2022
No. of Samples:	4		
Turnaround (Wkdays):	7	**Results Due:**	18-Oct-2022
Date Approved:	14-Oct-2022		

Approved By:



Details: Stuart Henderson, Technical Manager

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Results - Soil

Project: 21-1682 Water Supply Project

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-38643	22-38643	22-38643	22-38643
Quotation No.:			**Chemtest Sample ID.:**		1521818	1521819	1521820	1521821
Order No.:			Client Sample Ref.:		6	3	4	4
			Sample Location:		BH-199	TP-28752	TP-31002	TP-35435
			Sample Type:		SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		2.00	0.45	1.50	1.50
			Date Sampled:		07-Oct-2022	07-Oct-2022	07-Oct-2022	07-Oct-2022
Determinand	**Accred.**	**SOP**	**Units**	**LOD**				
Moisture	N	2030	%	0.020	14	7.3	8.7	9.3
Soil Colour	N	2040		N/A		Brown		
Other Material	N	2040		N/A		Stones		
Soil Texture	N	2040		N/A		Sand		
pH (2.5:1)	N	2010		4.0	8.2	8.9	9.0	8.7
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010
Total Sulphur	M	2175	%	0.010	0.036	0.040	0.041	0.058
Sulphate (Acid Soluble)	U	2430	%	0.010	< 0.010	0.021	0.013	0.015

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
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2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
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T	This analysis has been subcontracted to an unaccredited laboratory
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U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
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LOD	Limit of detection

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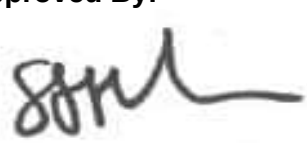
Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	22-38649-1
Initial Date of Issue:	18-Oct-2022
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Alistair McQuat Colm Hurley Darren O'Mahony Gabriella Horan Joe Gervin John Cameron Lucy Newland Martin Gardiner Matthew Gilbert Neil Haggan Paul Dunlop Sean Ross Stephen Franey Stephen McCracken Stephen Watson Stuart Abraham Thomas McAlli
Project	21-1682 Water Supply Project

Quotation No.:		**Date Received:**	10-Oct-2022
Order No.:		**Date Instructed:**	10-Oct-2022
No. of Samples:	10		
Turnaround (Wkdays):	7	**Results Due:**	18-Oct-2022
Date Approved:	18-Oct-2022		

Approved By:



Details: Stuart Henderson, Technical Manager

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Depot Road
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CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Results - Soil

Project: 21-1682 Water Supply Project

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-38649	22-38649	22-38649	22-38649	22-38649	22-38649	22-38649	22-38649	22-38649
Quotation No.:			**Chemtest Sample ID.:**		1521850	1521851	1521852	1521853	1521854	1521855	1521856	1521857	1521858
Order No.:			Client Sample Ref.:		2	6	2	2	4	4	4	4	5
			Sample Location:		ST-14000	TP-19088	TP-23401	TP-23707	TP24008	TP25504	TP27781	TP-27901	TP-28001
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.8	2.0	0.3	0.3	0.8	1.3	0.9	3.0	1.0
			Date Sampled:		07-Oct-2022	07-Oct-2022	07-Oct-2022	07-Oct-2022	07-Oct-2022	07-Oct-2022	07-Oct-2022	07-Oct-2022	07-Oct-2022
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
Moisture	N	2030	%	0.020	28	8.2	5.3	9.3	11	10	10	8.2	11
pH	U	2010		4.0			9.1	8.4					
pH (2.5:1)	N	2010		4.0		8.9			8.9	8.9	8.9	8.8	8.7
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Total Sulphur	U	2175	%	0.010		0.041			0.035	0.047	0.034	0.031	0.042
Sulphate (Acid Soluble)	U	2430	%	0.010		0.013			0.011	< 0.010	0.012	0.019	0.011
Organic Matter	U	2625	%	0.40	9.5								

Results - Soil

Project: 21-1682 Water Supply Project

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-38649
Quotation No.:			**Chemtest Sample ID.:**		1521859
Order No.:			Client Sample Ref.:		8
			Sample Location:		TP-28302
			Sample Type:		SOIL
			Top Depth (m):		2.5
			Date Sampled:		07-Oct-2022
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Moisture	N	2030	%	0.020	7.0
pH	U	2010		4.0	
pH (2.5:1)	N	2010		4.0	8.9
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	< 0.010
Total Sulphur	U	2175	%	0.010	0.036
Sulphate (Acid Soluble)	U	2430	%	0.010	0.014
Organic Matter	U	2625	%	0.40	

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.

Report Information

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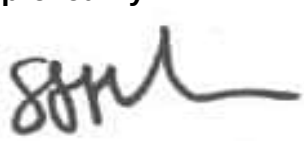
Final Report

Report No.:	22-39213-1
Initial Date of Issue:	19-Oct-2022
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Alistair McQuat Carin Cornwall Colm Hurley Darren O'Mahony Gabriella Horan Joe Gervin John Cameron Lucy Newland Martin Gardiner Matthew Gilbert Neil Haggan Paul Dunlop Sean Ross Stephen Franey Stephen McCracken Stephen Watson Stuart Abraha
Project	21-1682 Water Supply Project

Quotation No.:		**Date Received:**	13-Oct-2022
Order No.:		**Date Instructed:**	13-Oct-2022
No. of Samples:	2		
Turnaround (Wkdays):	5	**Results Due:**	19-Oct-2022
Date Approved:	19-Oct-2022		

Approved By:



Details: Stuart Henderson, Technical Manager

Eurofins Chemtest Ltd
Depot Road
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CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Results - Soil

Project: 21-1682 Water Supply Project

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-39213	22-39213
Quotation No.:			**Chemtest Sample ID.:**		1524532	1524533
Order No.:			Client Sample Ref.:		2	1
			Sample Location:		BH-9368	BH-11377
			Sample Type:		SOIL	SOIL
			Top Depth (m):		2.60	4.00
			Bottom Depth (m):		3.65	4.30
			Date Sampled:		12-Oct-2022	12-Oct-2022
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
Moisture	N	2030	%	0.020	0.75	0.79
pH (2.5:1)	N	2010		4.0	8.6	9.2
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.056	< 0.010
Total Sulphur	U	2175	%	0.010	1.1	0.13
Sulphate (Acid Soluble)	U	2430	%	0.010	0.059	0.015

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.

Report Information

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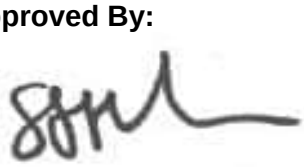
Final Report

Report No.:	22-40233-1
Initial Date of Issue:	27-Oct-2022
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Colm Hurley Darren O'Mahony Gabriella Horan John Cameron Matthew Gilbert Neil Haggan Paul Dunlop Sean Ross Stephen Franey Stuart Abraham Alistair McQuat Carin Cornwall Ciaran Doherty Joe Gervin Lucy Newland Martin Gardiner Megan Walsh Rac
Project	21-1682 Water Supply Project

Quotation No.:		**Date Received:**	20-Oct-2022
Order No.:		**Date Instructed:**	20-Oct-2022
No. of Samples:	8		
Turnaround (Wkdays):	7	**Results Due:**	28-Oct-2022
Date Approved:	27-Oct-2022		

Approved By:



Details: Stuart Henderson, Technical Manager

Chemtest
Eurofins Chemtest Ltd
Depot Road
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Tel: 01638 606070
Email: info@chemtest.com

Results - Soil

Project: 21-1682 Water Supply Project

Client: Causeway Geotech Ltd		**Chemtest Job No.:**				22-40233	22-40233	22-40233	22-40233	22-40233	22-40233	22-40233
Quotation No.:		**Chemtest Sample ID.:**				1529296	1529297	1529298	1529299	1529300	1529301	1529302
Order No.:			Client Sample Ref.:			1	6	1	3	1	4	1
			Sample Location:			BH-10413	BH-10413	BH-17401	BH-19057A	BH-19407	BH-19427A	BH-19807
			Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):			3.5	7.8	2.7	5.15	3	3.9	2.2
			Date Sampled:			19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
Moisture	N	2030	%	0.020		16	0.63	5.5	0.83	0.52	0.93	6.3
pH (2.5:1)	N	2010		4.0		8.6	9.7	9.3	9.6	9.9	9.7	9.6
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Total Sulphur	U	2175	%	0.010		< 0.010	0.36	0.16	< 0.010	< 0.010	< 0.010	< 0.010
Sulphate (Acid Soluble)	U	2430	%	0.010		< 0.010	< 0.010	0.024	< 0.010	< 0.010	< 0.010	< 0.010

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.

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Email: info@chemtest.com

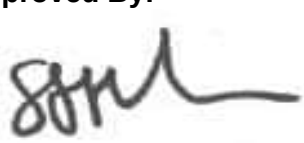
UKAS TESTING
2183

Final Report

Report No.:	22-40763-1
Initial Date of Issue:	01-Nov-2022
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Alistair McQuat Carin Cornwall Carin Cornwall Colm Hurley Darren O'Mahony Gabriella Horan Joe Gervin John Cameron Lucy Newland Martin Gardiner Matthew Gilbert Neil Haggan Paul Dunlop Sean Ross Stephen Franey Stephen McCracken Stephen Watso
Project	21-1682 Water Supply Project

Quotation No.:		**Date Received:**	25-Oct-2022
Order No.:		**Date Instructed:**	25-Oct-2022
No. of Samples:	10		
Turnaround (Wkdays):	7	**Results Due:**	02-Nov-2022
Date Approved:	01-Nov-2022		

Approved By:



Details: Stuart Henderson, Technical Manager

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Depot Road
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CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Results - Soil

Project: 21-1682 Water Supply Project

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-40763	22-40763	22-40763	22-40763	22-40763	22-40763	22-40763	22-40763	22-40763
Quotation No.:			**Chemtest Sample ID.:**		1531490	1531491	1531492	1531493	1531494	1531495	1531496	1531497	1531498
Order No.:			Client Sample Ref.:		1	1	1	1	1	1	1	1	1
			Sample Location:		BH-10475	BH-18231B	BH-24410A	BH-26087	BH-26135	BH-26214	BH26554A	BH-27000	BH-29577
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		4.1	3.0	3.0	3.1	2.2	4.0	4.3	3.0	2.4
			Date Sampled:		21-Oct-2022	21-Oct-2022	21-Oct-2022	21-Oct-2022	21-Oct-2022	21-Oct-2022	21-Oct-2022	21-Oct-2022	21-Oct-2022
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
Moisture	N	2030	%	0.020	9.7	2.4	1.1	11	3.2	1.0	59	0.99	1.7
pH (2.5:1)	N	2010		4.0	9.3	9.6	9.7	9.2	9.5	9.7	8.7	9.7	9.5
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Total Sulphur	U	2175	%	0.010	0.053	0.036	0.33	0.12	0.073	0.077	0.039	0.034	0.057
Sulphate (Acid Soluble)	U	2430	%	0.010	0.011	< 0.010	0.013	0.026	< 0.010	< 0.010	0.011	< 0.010	< 0.010

Results - Soil

Project: 21-1682 Water Supply Project

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-40763
Quotation No.:			**Chemtest Sample ID.:**		1531499
Order No.:			Client Sample Ref.:		1
			Sample Location:		BH-31466
			Sample Type:		SOIL
			Top Depth (m):		2.5
			Date Sampled:		21-Oct-2022
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Moisture	N	2030	%	0.020	6.9
pH (2.5:1)	N	2010		4.0	8.9
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	< 0.010
Total Sulphur	U	2175	%	0.010	0.057
Sulphate (Acid Soluble)	U	2430	%	0.010	0.012

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.

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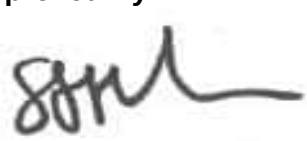
Final Report

Report No.:	22-41450-1
Initial Date of Issue:	03-Nov-2022
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Alistair McQuat Carin Cornwall Celine Rooney Colm Hurley Darren O'Mahony Gabriella Horan Joe Gervin John Cameron Lucy Newland Martin Gardiner Matthew Gilbert Neil Haggan Paul Dunlop Sean Ross Stephen Franey Stephen McCracken Stephen Watson
Project	22-1682 Water Supply Project

Quotation No.:		**Date Received:**	28-Oct-2022
Order No.:		**Date Instructed:**	28-Oct-2022
No. of Samples:	4		
Turnaround (Wkdays):	7	**Results Due:**	07-Nov-2022
Date Approved:	03-Nov-2022		

Approved By:



Details: Stuart Henderson, Technical Manager

Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Results - Soil

Project: 22-1682 Water Supply Project

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-41450	22-41450	22-41450	22-41450
Quotation No.:			**Chemtest Sample ID.:**		1534591	1534592	1534593	1534594
Order No.:			Client Sample Ref.:		1	1	1	1
			Sample Location:		BH-10499	BH-16430	BH-17806	BH-23514A
			Sample Type:		SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		2.6	3.7	2.7	2.6
			Bottom Depth (m):		3.1	3.8	2.8	3.1
			Date Sampled:		26-Oct-2022	26-Oct-2022	26-Oct-2022	26-Oct-2022
Determinand	**Accred.**	**SOP**	**Units**	**LOD**				
Moisture	N	2030	%	0.020	2.5	7.8	0.74	5.6
pH (2.5:1)	N	2010		4.0	9.2	9.2	9.4	9.3
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010
Total Sulphur	U	2175	%	0.010	0.10	0.040	1.2	0.018
Sulphate (Acid Soluble)	U	2430	%	0.010	0.013	< 0.010	0.025	< 0.010

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

LABORATORY RESTRICTION REPORT

Project Reference	21-1682	To	Neil Haggan
Project Name	Eastern and Midlands Region WSP GI - Lot 1 Pieline Section Only	Position	Project Manager
TR reference	21-1682 / G01	From	Joseph Nicholl
		Position	Laboratory Quality Manager

The following sample(s) and test(s) are restricted as detailed below. Could you please complete the "Required Action" column and return the completed form to he laboratory.

Hole Number	Sample			Test Type	Reason for Restriction	Required Action
	Number	Depth (m)	Type			
BH-35202	3	1.20	B	CBR	>25% retained on 20mm test sieve	Non-standard test possible and completed

For electronic reporting a form of electronic signature or printed name is acceptable

Laboratory Signature	Project Manager Signature
Joseph Nicholl	Neil Haggan
Date	Date
31 May 2022	31 May 2022

LABORATORY RESTRICTION REPORT

Project Reference	21-1682	To	Neil Haggan
Project Name	Eastern and Midlands Region WSP GI - Lot 1 Pipeline Section Only	Position	Project Manager
TR reference	21-1682 / G02	From	Joseph Nicholl
		Position	Laboratory Quality Manager

The following sample(s) and test(s) are restricted as detailed below. Could you please complete the "Required Action" column and return the completed form to the laboratory.

Hole Number	Sample			Test Type	Reason for Restriction	Required Action
	Number	Depth (m)	Type			
BH-31227	12	2.00	U	UU Triaxial	Insufficient material to obtain test specimen 20% recovery	CANCEL TEST
BH-32319	9	2.00	U	UU Triaxial	Insufficient material to obtain test specimen after oedometer taken - 30% recovery	CANCEL TEST

For electronic reporting a form of electronic signature or printed name is acceptable

Laboratory Signature	Project Manager Signature
Joseph Nicholl	Neil Haggan
Date	Date
21 June 2022	21 June 2022

LABORATORY RESTRICTION REPORT

Project Reference	21-1682	To	Neil Haggan
Project Name	Eastern and Midlands Region WSP GI - Lot 1 Pipeline Section Only	Position	Project Manager
TR reference	21-1682 / G03	From	Joseph Nicholl
		Position	Laboratory Quality Manager

The following sample(s) and test(s) are restricted as detailed below. Could you please complete the "Required Action" column and return the completed form to he laboratory.

Hole Number	Sample			Test Type	Reason for Restriction	Required Action
	Number	Depth (m)	Type			
BH-28001	22	9.00	U	UU Triaxial	Insufficient material to obtain test specimen - 40% recovery High coarse gravel content	CANCEL TEST
REDACTED						

For electronic reporting a form of electronic signature or printed name is acceptable

Laboratory Signature Joseph Nicholl	Project Manager Signature Neil Haggan
Date 21 June 2022	Date 21 June 2022

LABORATORY RESTRICTION REPORT

Project Reference	21-1682	To	Neil Haggan
Project Name	Eastern and Midlands Region WSP GI - Lot 1 Pipeline Section Only	Position	Project Manager
TR reference	21-1682 / G04	From	Joseph Nicholl
		Position	Laboratory Quality Manager

The following sample(s) and test(s) are restricted as detailed below. Could you please complete he "Required Action" column and return the completed form to the laboratory.

Hole Number	Sample			Test Type	Reason for Restriction	Required Action
	Number	Depth (m)	Type			
BH-5260	7	4.20	D	Atterberg limits	Unsuitable material for test - GRAVEL	CANCEL TEST
BH-1922	14	4.00	U	UU Triaxial	Unable to obtain test specimen - material was non cohesive	CANCEL TEST
BH-28818A	5	1.20	U	UU Triaxial	Unable to obtain test specimen - sample disturbed	CANCEL TEST
REDACTED						

For electronic reporting a form of electronic signature or printed name is acceptable

Laboratory Signature	Project Manager Signature
Joseph Nicholl	Neil Haggan
Date	Date
07 July 2022	07 July 2022

LABORATORY RESTRICTION REPORT

Project Reference	21-1682	To	Neil Haggan
Project Name	Eastern and Midlands Region WSP GI - Lot 1 Pipeline Section Only	Position	Project Manager
TR reference	21-1682 / G05	From	Joseph Nicholl
		Position	Laboratory Quality Manager

The following sample(s) and test(s) are restricted as detailed below. Could you please complete the "Required Action" column and return the completed form to he laboratory.

Hole Number	Sample			Test Type	Reason for Restriction	Required Action
	Number	Depth (m)	Type			
BH-5478	14	10.20	D	Atterberg limits	Unsuitable material for test - GRAVEL	CANCEL TEST
REDACTED						
BH-4110	18	7.90	U	UU Triaxial	Insufficient intact material to obtain test specimen (sample disturbed) - 40% recovery	CANCEL TEST
REDACTED						
REDACTED						

For electronic reporting a form of electronic signature or printed name is acceptable

Laboratory Signature	Project Manager Signature
Joseph Nicholl	Neil Haggan
Date	Date
08 July 2022	18 July 2022

LABORATORY RESTRICTION REPORT

Project Reference	21-1682	To	Neil Haggan
Project Name	Eastern and Midlands Region WSP GI - Lot 1 Pipeline Section Only	Position	Project Manager
TR reference	21-1682 / G08	From	Joseph Nicholl
		Position	Laboratory Quality Manager

The following sample(s) and test(s) are restricted as detailed below. Could you please complete the "Required Action" column and return the completed form to the laboratory.

Hole Number	Sample			Test Type	Reason for Restriction	Required Action
	Number	Depth (m)	Type			
BH-6016	4	3.40	B	Atterberg Limit	GRAVEL - Material unsuitable	CANCEL
BH-2461	15	5.00	U	UU Triaxial	Insufficient intact material to obtain test specimen	CANCEL

For electronic reporting a form of electronic signature or printed name is acceptable

Laboratory Signature	Project Manager Signature
Joseph Nicholl	Neil Haggan
Date	Date
11 August 2022	11 August 2022

LABORATORY RESTRICTION REPORT

Project Reference	21-1682	To	Neil Haggan
Project Name	Eastern and Midlands Region WSP GI - Lot 1 Pipeline Section Only	Position	Project Manager
TR reference	21-1682 / G09	From	Joseph Nicholl
		Position	Laboratory Quality Manager

The following sample(s) and test(s) are restricted as detailed below. Could you please complete the "Required Action" column and return the completed form to the laboratory.

Hole Number	Sample			Test Type	Reason for Restriction	Required Action
	Number	Depth (m)	Type			
BH-7255	5	4.00	B	CBR	>25% retained on 20mm sieve. Insufficient material remaining to conduct test	CANCEL TEST

For electronic reporting a form of electronic signature or printed name is acceptable

Laboratory Signature	Project Manager Signature
Joseph Nicholl	Neil Haggan
Date	Date
24 August 2022	25 August 2022

LABORATORY RESTRICTION REPORT

Project Reference	21-1682	To	Neil Haggan
Project Name	Eastern and Midlands Region WSP GI - Lot 1 Pipeline Section Only	Position	Project Manager
TR reference	21-1682 / G10	From	Joseph Nicholl
		Position	Laboratory Quality Manager

The following sample(s) and test(s) are restricted as detailed below. Could you please complete the "Required Action" column and return the completed form to the laboratory.

Hole Number	Sample			Test Type	Reason for Restriction	Required Action
	Number	Depth (m)	Type			
BH-7349	14	6.50	B	Atterberg limits	Unsuitable material for test - coarse GRAVEL / COBBLES	Please move all testing to sample above B6 6.00-6.50m. Plese also carry out PSD and MC on B6.

For electronic reporting a form of electronic signature or printed name is acceptable

Laboratory Signature	Project Manager Signature
Joseph Nicholl	Neil Haggan
Date	Date
24 August 2022	02 September 2022

LABORATORY RESTRICTION REPORT

Project Reference	21-1682	To	Neil Haggan
Project Name	Eastern and Midlands Region WSP GI - Lot 1 Pipeline Section Only	Position	Project Manager
TR reference	21-1682 / G12	From	Joseph Nicholl
		Position	Laboratory Quality Manager

The following sample(s) and test(s) are restricted as detailed below. Could you please complete the "Required Action" column and return the completed form to the laboratory.

Hole Number	Sample			Test Type	Reason for Restriction	Required Action
	Number	Depth (m)	Type			
BH-12009	6	3.40	B	300mm Shearbox	Insufficient material to conduct test	CANCEL TEST
BH-12608	14	5.80	B	5 point CBR	Unsuitable material for test - GRAVEL	CANCEL TEST
BH-12580	11	1.20	U	UU Triaxial	Insufficient intact cohesive material to obtain test specimen - 60% recovery	CANCEL TEST
BH-12608	11	1.20	U	UU Triaxial	Insufficient intact cohesive material to obtain test specimen - 40% recovery	CANCEL TEST

For electronic reporting a form of electronic signature or printed name is acceptable

Laboratory Signature	Project Manager Signature
Joseph Nicholl	Neil Haggan
Date	Date
09 September 2022	13 September 2022

LABORATORY RESTRICTION REPORT

Project Reference	21-1682	To	Neil Haggan
Project Name	Eastern and Midlands Region WSP GI - Lot 1 Pipeline Section Only	Position	Project Manager
TR reference	21-1682 / G13	From	Joseph Nicholl
		Position	Laboratory Quality Manager

The following sample(s) and test(s) are restricted as detailed below. Could you please complete the "Required Action" column and return the completed form to the laboratory.

Hole Number	Sample			Test Type	Reason for Restriction	Required Action
	Number	Depth (m)	Type			
BH-20655	7	1.20	U	UU Triaxial	Insufficient intact material to obtain test specimen - sample broken by parting of sand	CANCEL TEST
BH-29575	6	2.00	U	UU Triaxial	Insufficient intact material to obtain test specimen - 50% recovery	CANCEL TEST

For electronic reporting a form of electronic signature or printed name is acceptable

Laboratory Signature	Project Manager Signature
Joseph Nicholl	Neil Haggan
Date	Date
27 September 2022	27 September 2022

LABORATORY RESTRICTION REPORT

Project Reference	21-1682	To	Neil Haggan
Project Name	Eastern and Midlands Region WSP GI - Lot 1 Pipeline Section Only	Position	Project Manager
TR reference	21-1682 / G15	From	Joseph Nicholl
		Position	Laboratory Quality Manager

The following sample(s) and test(s) are restricted as detailed below. Could you please complete the "Required Action" column and return the completed form to the laboratory.

Hole Number	Sample			Test Type	Reason for Restriction	Required Action
	Number	Depth (m)	Type			
BH-14170	9	1.20	U	UU triaxial	Insufficient material for test - 20% recovery	CANCEL TEST

For electronic reporting a form of electronic signature or printed name is acceptable

Laboratory Signature	Project Manager Signature
Joseph Nicholl	Neil Haggan
Date	Date
27 September 2022	27 September 2022

LABORATORY RESTRICTION REPORT

Project Reference	21-1682	To	Neil Haggan
Project Name	Eastern and Midlands Region WSP GI - Lot 1 Pipeline Section Only	Position	Project Manager
TR reference	21-1682 / G16	From	Stephen Watson
		Position	Laboratory Manager

The following sample(s) and test(s) are restricted as detailed below. Could you please complete the "Required Action" column and return the completed form to he laboratory.

Hole Number	Sample			Test Type	Reason for Restriction	Required Action
	Number	Depth (m)	Type			
RK-10126	2	0.30	D	Atterberg limits & PSD	Insufficient material.	No alternative tests required.
RK-10288	3	0.50	D	Atterberg limits & PSD	Insufficient material.	No alternative tests required.
RK-10288	5	1.30	D	Atterberg limits & PSD	Insufficient material.	No alternative tests required.
RK-10381	2	0.10	D	Atterberg limits & PSD	Insufficient material.	No alternative tests required.

For electronic reporting a form of electronic signature or printed name is acceptable

Laboratory Signature	Project Manager Signature
Stephen Watson	Neil Haggan
Date	Date
20 September 2022	20 September 2022

LABORATORY RESTRICTION REPORT

Project Reference	21-1682	To	Neil Haggan
Project Name	Eastern and Midlands Region WSP GI - Lot 1 Pipeline Section Only	Position	Project Manager
TR reference	21-1682 / G17	From	Joseph Nicholl
		Position	Laboratory Quality Manager

The following sample(s) and test(s) are restricted as detailed below. Could you please complete the "Required Action" column and return the completed form to the laboratory.

Hole Number	Sample			Test Type	Reason for Restriction	Required Action
	Number	Depth (m)	Type			
TP-16005	2	0.40	B	Dry density/ moisture content	Unsuitable material for test - too granular	Entire sample used for PSD CANCEL TEST

For electronic reporting a form of electronic signature or printed name is acceptable

Laboratory Signature	Project Manager Signature
Joseph Nicholl	Neil Haggan
Date	Date
04 October 2022	04 October 2022

LABORATORY RESTRICTION REPORT

Project Reference	21-1682	To	Neil Haggan
Project Name	Eastern and Midlands Region WSP GI - Lot 1 Pipeline Section Only	Position	Project Manager
TR reference	21-1682 / G19	From	Joseph Nicholl
		Position	Laboratory Quality Manager

The following sample(s) and test(s) are restricted as detailed below. Could you please complete the "Required Action" column and return the completed form to the laboratory.

Hole Number	Sample			Test Type	Reason for Restriction	Required Action
	Number	Depth (m)	Type			
TP-28411	1	0.20	B	CBR	>25% retained on 20mm test sieve (61.6%)	CANCEL

For electronic reporting a form of electronic signature or printed name is acceptable

Laboratory Signature	Project Manager Signature
Joseph Nicholl	Neil Haggan
Date	Date
25 October 2022	

LABORATORY RESTRICTION REPORT

Project Reference	21-1682	To	Neil Haggan
Project Name	Eastern and Midlands Region WSP GI - Lot 1 Pipeline Section Only	Position	Project Manager
TR reference	21-1682 / R01	From	Joseph Nicholl
		Position	Laboratory Quality Manager

The following sample(s) and test(s) are restricted as detailed below. Could you please complete the "Required Action" column and return the completed form to he laboratory.

Hole Number	Sample			Test Type	Reason for Restriction	Required Action
	Number	Depth (m)	Type			
BH-30722		3.70 - 5.20	C	Oedometer	No suitable specimen for test - material was too granular	No alternate test required CANCEL TEST
BH-30722		3.70 - 5.20	C	UU Triaxial (multistage)	No suitable specimen for test - material was too granular	Specimen recovered at 6.40-6.70m in lieu **New presures (120/240/480kPa)**
BH-31910B		5.20 - 6.69	C	UU Triaxial (multistage)	No suitable sized intact specimen for test	No alternate test required CANCEL TEST
BH-31910B	3	6.20	C	Oedometer	Sample was too granular to obtain test specimen	No suitable alternate sample available CANCEL TEST
BH-32020A		6.70 - 8.20	C	UCS	No suitable sized intact specimen for test	Additional PL specimen taken at 5.90m in lieu **Origianal PL sufficient NO NEED TO TEST**
BH-32319		5.20 - 6.70	C	UCS	No suitable sized intact specimen for test	Original PL specimen taken at 5.20m and tested
BH-35202		8.40 - 8.70	C	UU Triaxial (multistage)	Unable to form test specimin, sample too brittle	No suitable alternate sample available CANCEL TEST
BH-35473		5.20 - 6.70	C	Oedometer	No suitable specimen for test - material was too granular	No alternate test required CANCEL TEST

For electronic reporting a form of electronic signature or printed name is acceptable

Laboratory Signature Joseph Nicholl	Project Manager Signature Neil Haggan
Date 16 August 2022	Date 23 August 2022

LABORATORY RESTRICTION REPORT

Project Reference	21-1682	To	Neil Haggan
Project Name	Eastern and Midlands Region WSP GI - Lot 1 Pipeline Section Only	Position	Project Manager
TR reference	21-1682 / R02	From	Joseph Nicholl
		Position	Laboratory Quality Manager

The following sample(s) and test(s) are restricted as detailed below. Could you please complete the "Required Action" column and return the completed form to he laboratory.

Hole Number	Sample			Test Type	Reason for Restriction	Required Action
	Number	Depth (m)	Type			
BH-29923A	1	2.85	C	UU Triaxial (multistage)	Sample was too granular to form test specimen	No suitable alternate sample CANCEL TEST
BH-30066		6.70 - 8.20	C	UU Triaxial	No suitable sized intact specimen for test	No alternate test required CANCEL TEST
BH-30414		5.20 - 6.70	C	UU Triaxial	No suitable sized intact specimen for test	No alternate test required CANCEL TEST
BH-30600	3	5.00	C	Oedometer	Sample was too granular to form test specimen	No suitable alternate sample CANCEL TEST
BH-30599	2	4.55	C	UU Triaxial	Sample was too granular to form test specimen	No suitable alternate sample CANCEL TEST
BH-30600	4	5.20	C	UU Triaxial (multistage)	Sample was too granular to form test specimen	No alternate test required CANCEL TEST
BH-30600		5.20 - 6.70	C	UCS	No suitable sized intact specimen for test	Additional PL specimen taken at 6.20m in lieu **TEST PL SAMPLE TAKEN**
BH-30600		8.20 - 9.70	C	UCS	No suitable sized intact specimen for test	Additional PL specimen taken at 9.30m in lieu **TEST PL SAMPLE TAKEN**

For electronic reporting a form of electronic signature or printed name is acceptable

Laboratory Signature Joseph Nicholl	Project Manager Signature Neil Haggan
Date 16 August 2022	Date 16 August 2022

LABORATORY RESTRICTION REPORT

Project Reference	21-1682	To	Neil Haggan
Project Name	Eastern and Midlands Region WSP GI - Lot 1 Pipeline Section Only	Position	Project Manager
TR reference	21-1682 / R03	From	Joseph Nicholl
		Position	Laboratory Quality Manager

The following sample(s) and test(s) are restricted as detailed below. Could you please complete the "Required Action" column and return the completed form to the laboratory.

Hole Number	Sample			Test Type	Reason for Restriction	Required Action
	Number	Depth (m)	Type			
BH-2247		7.00-8.50	C	Oedometer	Material was too granular to obtain test specimen	Next possible specimen taken at 9.75-9.90m

For electronic reporting a form of electronic signature or printed name is acceptable

Laboratory Signature	Project Manager Signature
Joseph Nicholl	Neil Haggan
Date	Date
31 August 2022	31 August 2022

LABORATORY RESTRICTION REPORT

Project Reference	21-1682	To	Neil Haggan
Project Name	Eastern and Midlands Region WSP GI - Lot 1 Pipeline Section Only	Position	Project Manager
TR reference	21-1682 / R04	From	Joseph Nicholl
		Position	Laboratory Quality Manager

The following sample(s) and test(s) are restricted as detailed below. Could you please complete the "Required Action" column and return the completed form to the laboratory.

Hole Number	Sample			Test Type	Reason for Restriction	Required Action
	Number	Depth (m)	Type			
BH-2886A		2.20	C	UU triaxial (single stage)	Material was too granular to obtain test specimen	Alternative test, suitable sample from 8.75-8.95m. Test pressures 180kpa.

REDACTED

For electronic reporting a form of electronic signature or printed name is acceptable

Laboratory Signature	Project Manager Signature
Joseph Nicholl	Neil Haggan
Date	Date
06 September 2022	07 September 2022

LABORATORY RESTRICTION REPORT

Project Reference	21-1682	To	Neil Haggan
Project Name	Eastern and Midlands Region WSP GI - Lot 1 Pipeline Section Only	Position	Project Manager
TR reference	21-1682 / R08	From	Joseph Nicholl
		Position	Laboratory Quality Manager

The following sample(s) and test(s) are restricted as detailed below. Could you please complete the "Required Action" column and return the completed form to the laboratory.

Hole Number	Sample			Test Type	Reason for Restriction	Required Action
	Number	Depth (m)	Type			
BH-1922	1	6.00	C	UU triaxial (multistage)	Unable to obtain test specimen - material was too granular	CANCEL TEST
BH-1922	2	6.25	C	Oedometer	Unable to obtain test specimen - material was too granular	CANCEL TEST

For electronic reporting a form of electronic signature or printed name is acceptable

Laboratory Signature	Project Manager Signature
Joseph Nicholl	Neil Haggan
Date	Date
11 October 2022	11 October 2022

LABORATORY RESTRICTION REPORT

Project Reference	21-1682	To	Neil Haggan
		Position	Project Manager
Project Name	Eastern and Midlands Region WSP GI - Lot 1 Pipeline Section Only	From	Joseph Nicholl
TR reference	21-1682 / R09	Position	Laboratory Quality Manager

The following sample(s) and test(s) are restricted as detailed below. Could you please complete the "Required Action" column and return the completed form to the laboratory.

Hole Number	Sample			Test Type	Reason for Restriction	Required Action
	Number	Depth (m)	Type			
BH-5478		14.90 - 15.10	C	UCS	No suitable sepcimen of required dimensions	2 Point Loads taken in lieu
BH-6886		7.00 - 8.50	C	UCS	No suitable sepcimen of required dimensions	2 Point Loads taken in lieu
BH-7282	3	9.00	C	UU triaxial (multistage)	Unable to form suitable test specimen due to the high gravel content throughout sample.	Assuming the full strata is deemed unsuitable for testing then CANCEL TEST
BH-7282	4	9.25	C	Oedometer	Unable to form suitable test specimen due to the high gravel content throughout sample.	Assuming the full strata is deemed unsuitable for testing then CANCEL TEST

For electronic reporting a form of electronic signature or printed name is acceptable

Laboratory Signature	Project Manager Signature
Joseph Nicholl	Neil Haggan
Date	Date
26 September 2022	04 October 2022

LABORATORY RESTRICTION REPORT

Project Reference	21-1682	To	Neil Haggan
Project Name	Eastern and Midlands Region WSP GI - Lot 1 Pipeline Section Only	Position	Project Manager
		From	Joseph Nicholl
TR reference	21-1682 / R11	Position	Laboratory Quality Manager

The following sample(s) and test(s) are restricted as detailed below. Could you please complete the "Required Action" column and return the completed form to the laboratory.

Hole Number	Sample			Test Type	Reason for Restriction	Required Action
	Number	Depth (m)	Type			
BH-7320	3	6.20	C	Oedometer	Unable to form suitable test specimen due to the high gravel content throughout sample.	No alternative required. CANCEL TEST

For electronic reporting a form of electronic signature or printed name is acceptable

Laboratory Signature	Project Manager Signature
Joseph Nicholl	Neil Haggan
Date	Date
18 October 2022	19 October 2022

LABORATORY RESTRICTION REPORT

Project Reference	21-1682	To	Neil Haggan
Project Name	Eastern and Midlands Region WSP GI - Lot 1 Pipeline Section Only	Position	Project Manager
TR reference	21-1682 / R12	From	Joseph Nicholl
		Position	Laboratory Quality Manager

The following sample(s) and test(s) are restricted as detailed below. Could you please complete the "Required Action" column and return the completed form to the laboratory.

Hole Number	Sample			Test Type	Reason for Restriction	Required Action
	Number	Depth (m)	Type			
BH-22776		3.70-5.20m	C	UCS	No suitable intact specimen	2 PLs completed in lieu

For electronic reporting a form of electronic signature or printed name is acceptable

Laboratory Signature	Project Manager Signature
Joseph Nicholl	Neil Haggan
Date	Date
17 October 2022	18 October 2022

LABORATORY RESTRICTION REPORT

Project Reference	21-1682	To	Neil Haggan
Project Name	Eastern and Midlands Region WSP GI - Lot 1 Pipeline Section Only	Position	Project Manager
TR reference	21-1682 / R13	From	Joseph Nicholl
		Position	Laboratory Quality Manager

The following sample(s) and test(s) are restricted as detailed below. Could you please complete the "Required Action" column and return the completed form to the laboratory.

Hole Number	Sample			Test Type	Reason for Restriction	Required Action
	Number	Depth (m)	Type			
BH-19057A		5.25-6.65m	C	UCS	No suitable intact specimen	2 PLs completed in lieu
BH-19807		5.20-6.70m	C	UCS	No suitable intact specimen	2 PLs completed in lieu

For electronic reporting a form of electronic signature or printed name is acceptable

Laboratory Signature	Project Manager Signature
Joseph Nicholl	Neil Haggan
Date	Date
19 October 2022	20 October 2022

LABORATORY RESTRICTION REPORT

Project Reference	21-1682	To	Neil Haggan
Project Name	Eastern and Midlands Region WSP GI - Lot 1 Pipeline Section Only	Position	Project Manager
TR reference	21-1682 / R15	From	Joseph Nicholl
		Position	Laboratory Quality Manager

The following sample(s) and test(s) are restricted as detailed below. Could you please complete the "Required Action" column and return the completed form to the laboratory.

Hole Number	Sample			Test Type	Reason for Restriction	Required Action
	Number	Depth (m)	Type			
BH-13100		4.70-4.90m	C	UUT (Multistage)	No suitable intact specimen	CANCEL TEST
BH-18231B		4.00-5.50m	C	UCS	No suitable intact specimen	2 PLs completed in lieu
BH-26135		5.20-6.70m	C	UCS	No suitable intact specimen	2 PLs completed in lieu

For electronic reporting a form of electronic signature or printed name is acceptable

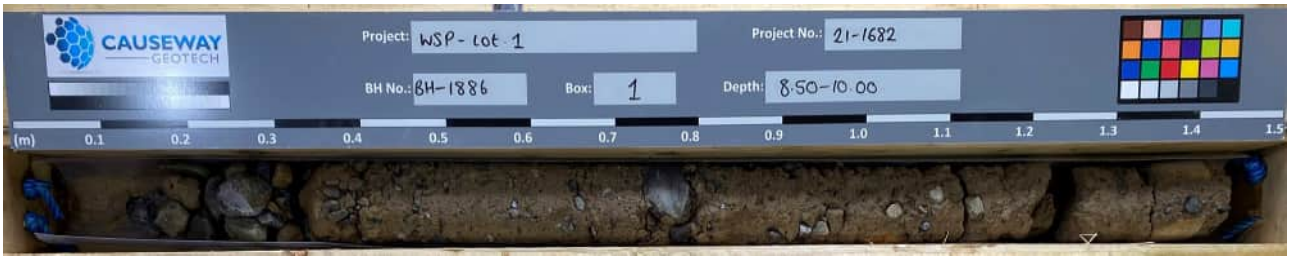
Laboratory Signature	Project Manager Signature
Joseph Nicholl	Neil Haggan
Date	Date
20 October 2022	21 October 2022

CAUSEWAY GEOTECH

APPENDIX 4I

CORE PHOTOGRAPHS
TRIAL PIT PHOTOGRAPHS
SLIT TRENCH PHOTOGRAPHS

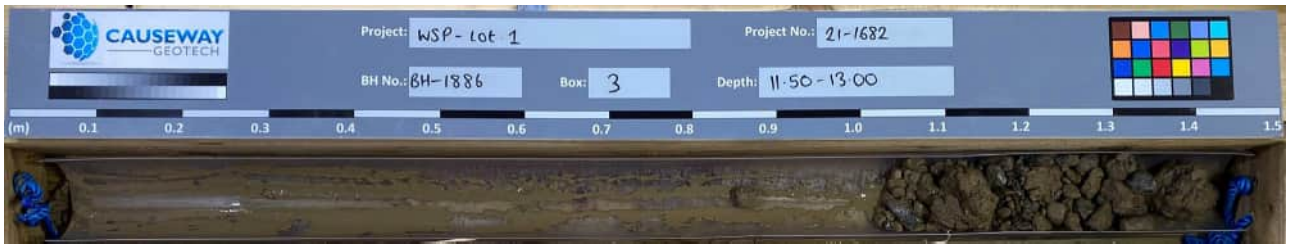




BH-1886 Box 1 (8.50-10.00m)



BH-1886 Box 2 (10.00-11.50m)



BH-1886 Box 3 (11.50-13.00m)



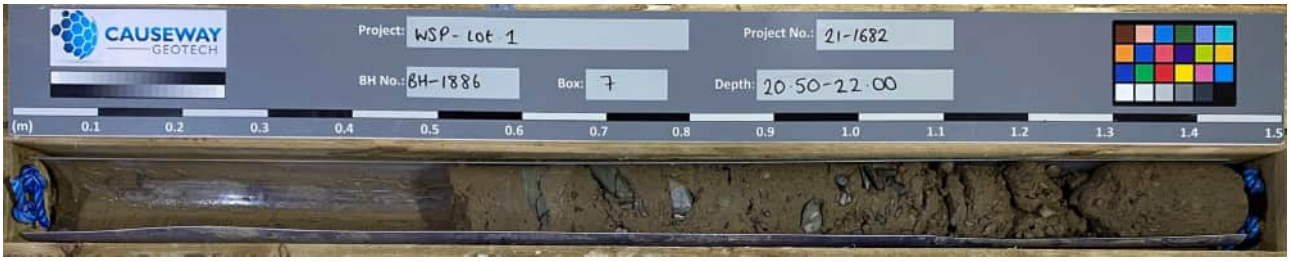
BH-1886 Box 4 (13.00-14.50m)



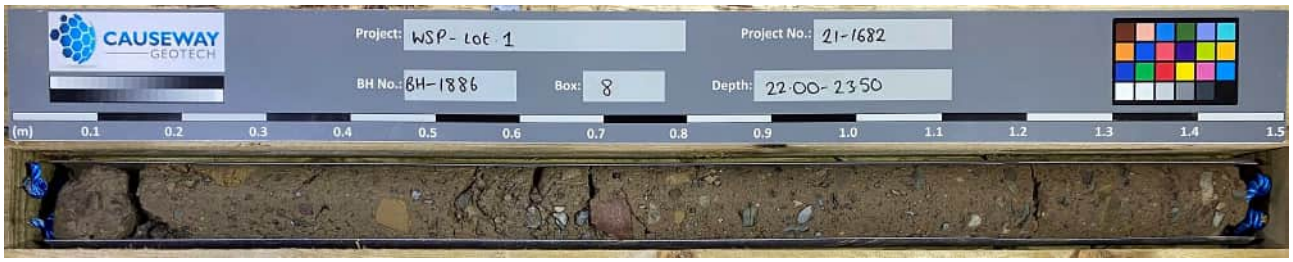
BH-1886 Box 5 (14.50-16.00m)



BH-1886 Box 6 (19.00-20.50m)



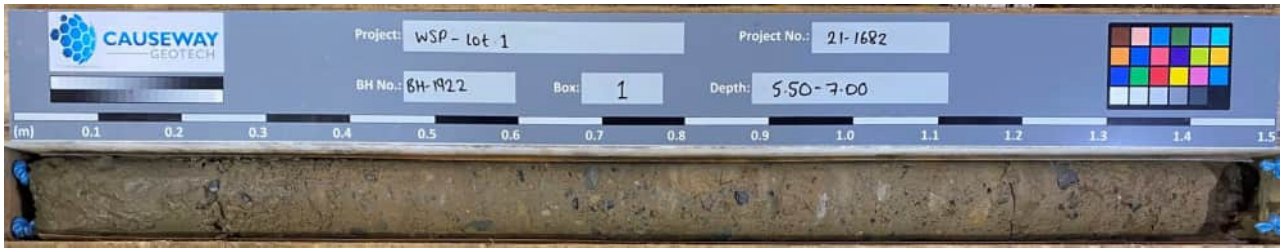
BH-1886 Box 7 (20.50-22.00m)



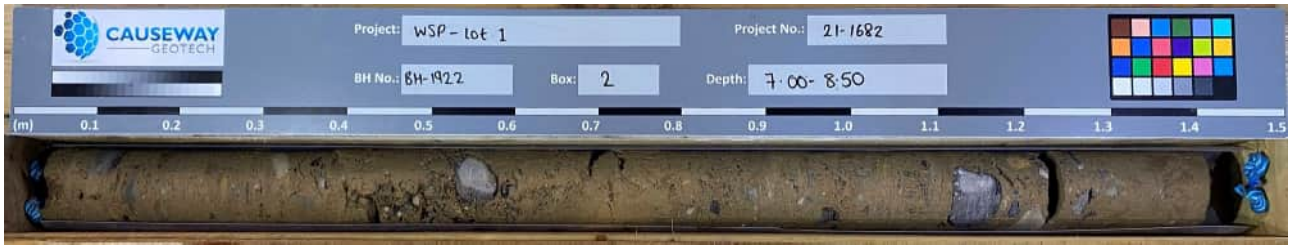
BH-1886 Box 8 (22.00-23.50m)



BH-1886 Box 9 (23.50-25.00m)



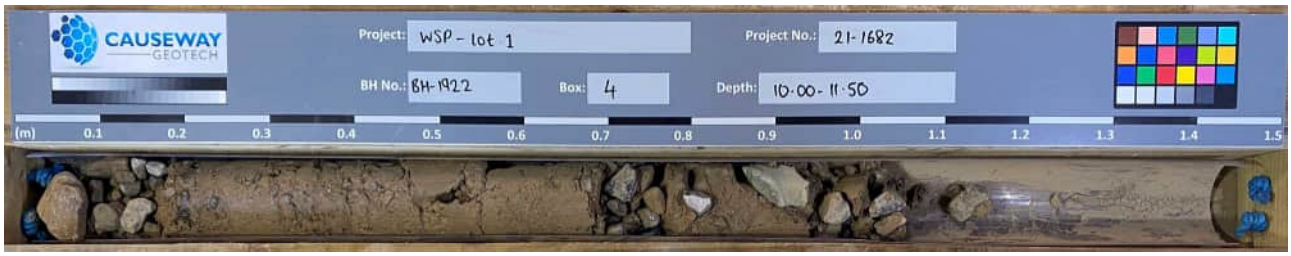
BH-1922 Box 1 (5.50-7.00m)



BH-1922 Box 2 (7.00-8.50m)



BH-1922 Box 3 (8.50-10.00m)

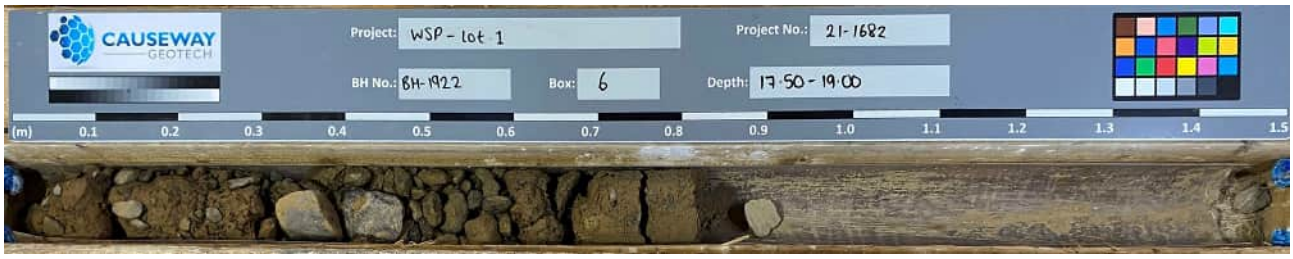


BH-1922 Box 4 (10.00-11.50m)

No Core Recovery between 11.50-16.00m – sands washed out with flush



BH-1922 Box 5 (16.00-17.50m)



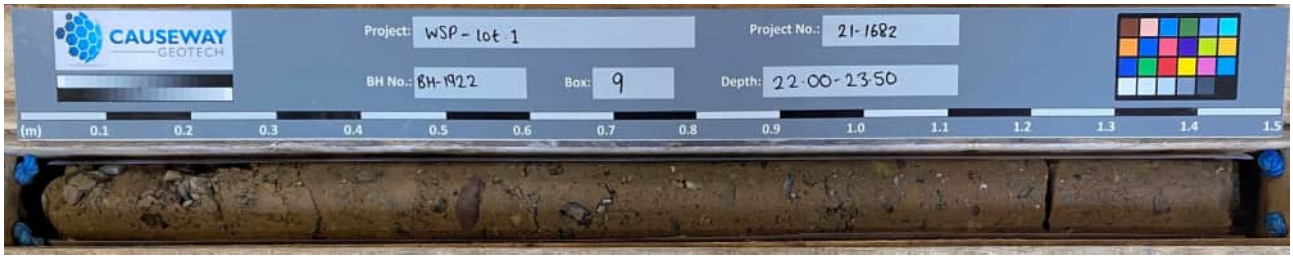
BH-1922 Box 6 (17.50-19.00m)



BH-1922 Box 7 (19.00-20.50m)



BH-1922 Box 8 (20.50-22.00m)



BH-1922 Box 9 (22.00-23.50m)



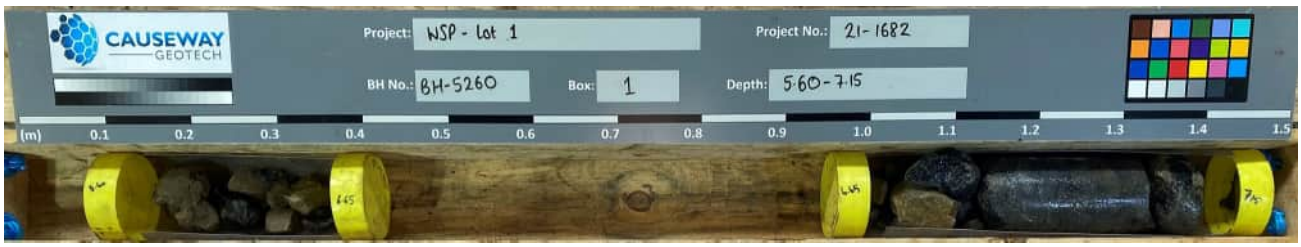
BH-1922 Box 10 (23.50-25.00m)



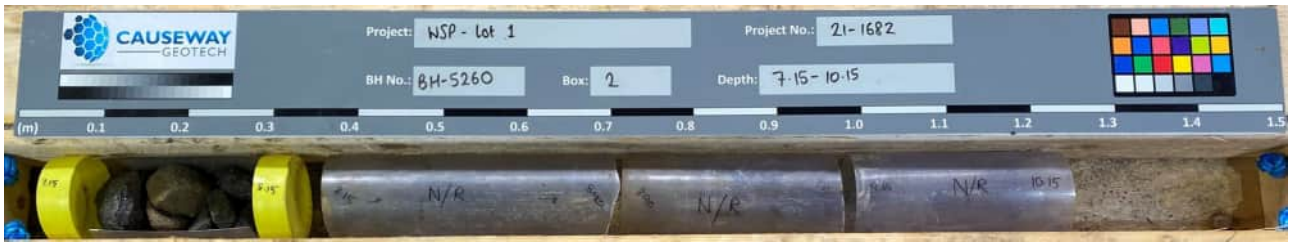
BH-2247 Box 1 (7.00-8.50m)



BH-2247 Box 2 (8.50-10.00m)



BH-5260 Box 1 (5.60-7.15m)



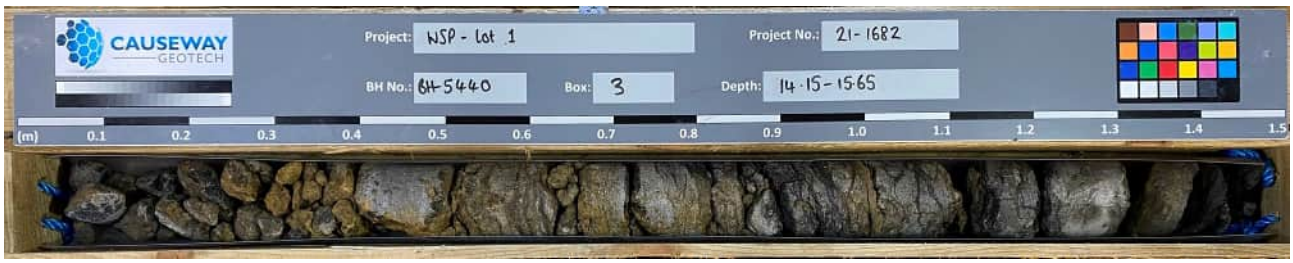
BH-5260 Box 2 (7.15-10.15m)



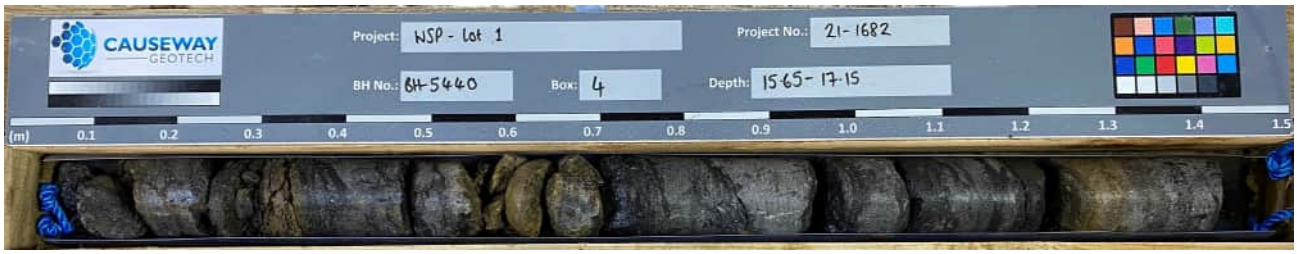
BH-5440 Box 1 (10.10-12.65m)



BH-5440 Box 2 (12.65-14.15m)



BH-5440 Box 3 (14.15-15.65m)



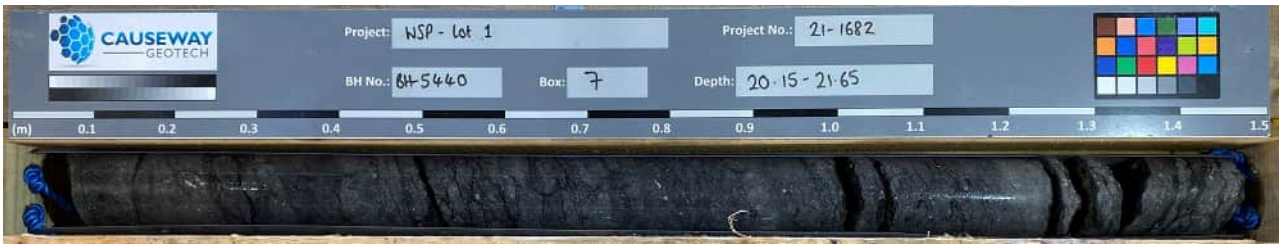
BH-5440 Box 4 (15.65-17.15m)



BH-5440 Box 5 (17.15-18.65m)



BH-5440 Box 6 (18.65-20.15m)



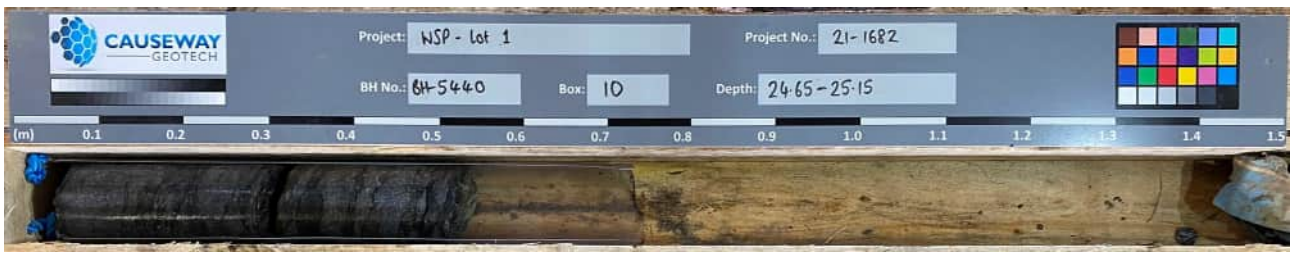
BH-5440 Box 7 (20.15-21.65m)



BH-5440 Box 8 (21.65-23.15m)



BH-5440 Box 9 (23.15-24.65m)



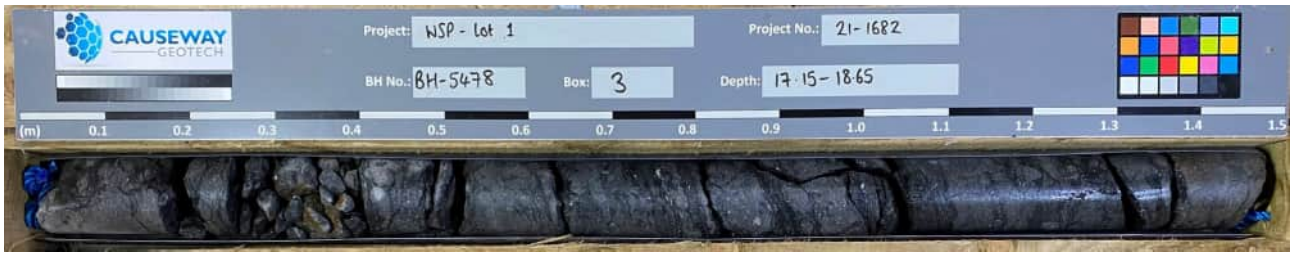
BH-5440 Box 10 (24.65-25.15m)



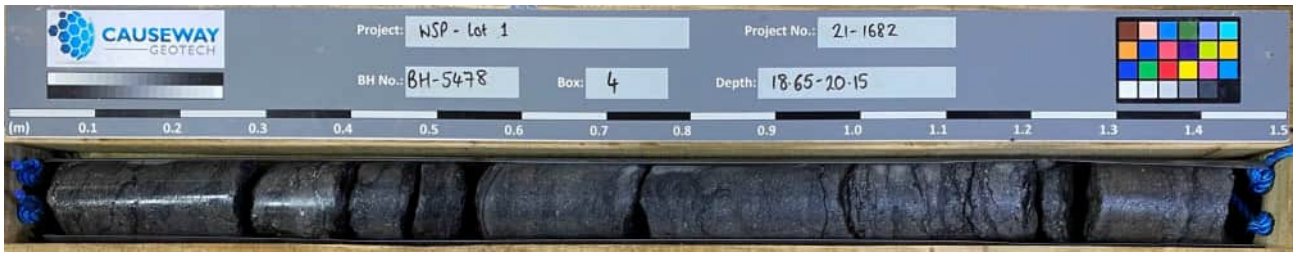
BH-5478 Box 1 (14.60-15.65m)



BH-5478 Box 2 (15.65-17.15m)



BH-5478 Box 2 (17.15-18.65m)



BH-5478 Box 4 (18.65-20.15m)



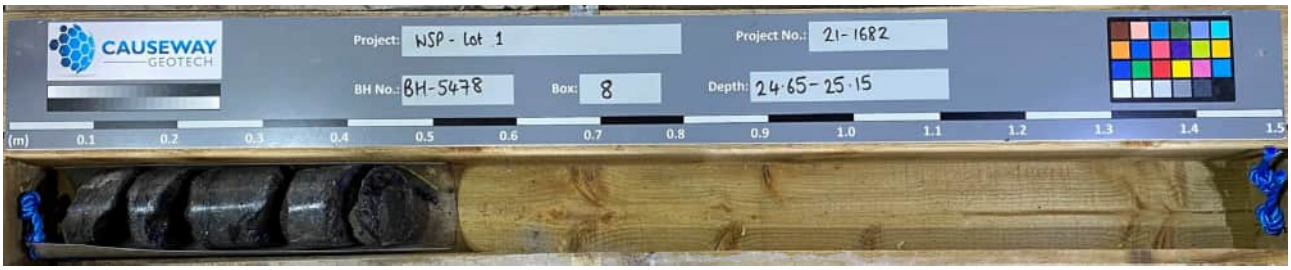
BH-5478 Box 5 (20.15-21.65m)



BH-5478 Box 6 (21.65-23.15m)



BH-5478 Box 7 (23.15-24.65m)



BH-5478 Box 8 (24.65-25.15m)



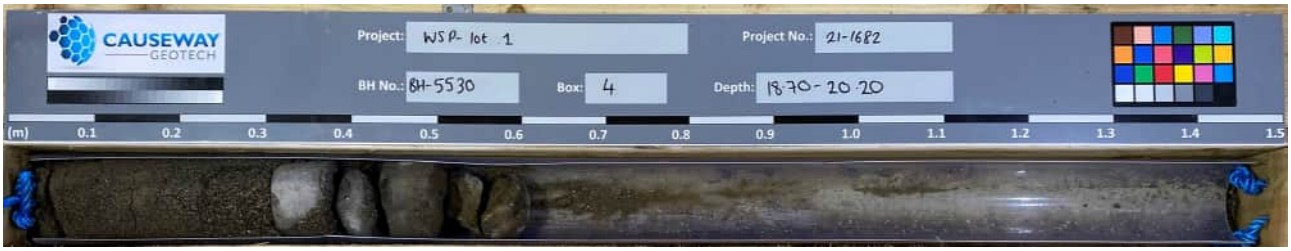
BH-5530 Box 1 (14.20-15.70m)



BH-5530 Box 2 (15.70-17.20m)



BH-5530 Box 3 (17.20-18.70m)



BH-5530 Box 4 (18.70-20.20m)



BH-5530 Box 5 (20.20-21.70m)



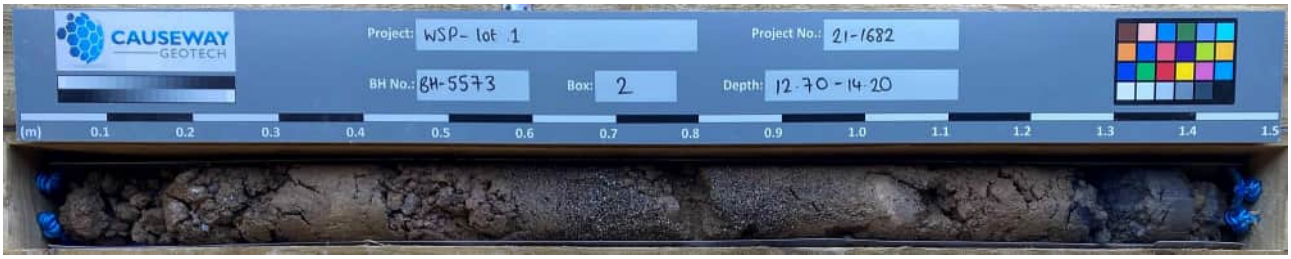
BH-5530 Box 6 (21.70-23.20m)



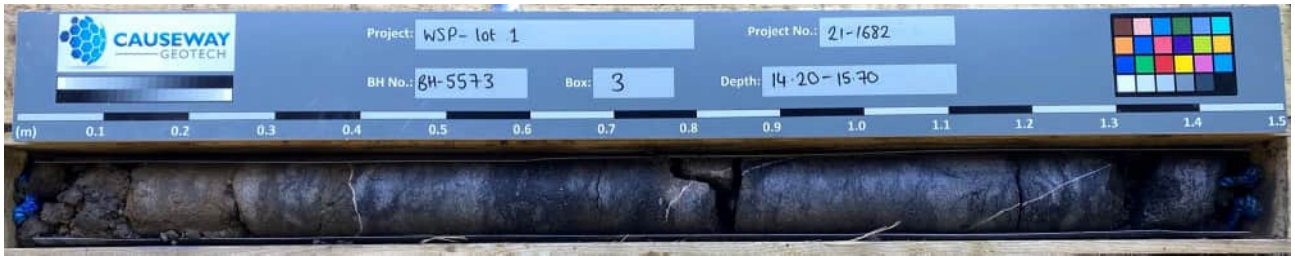
BH-5530 Box 7 (23.20-24.70m)



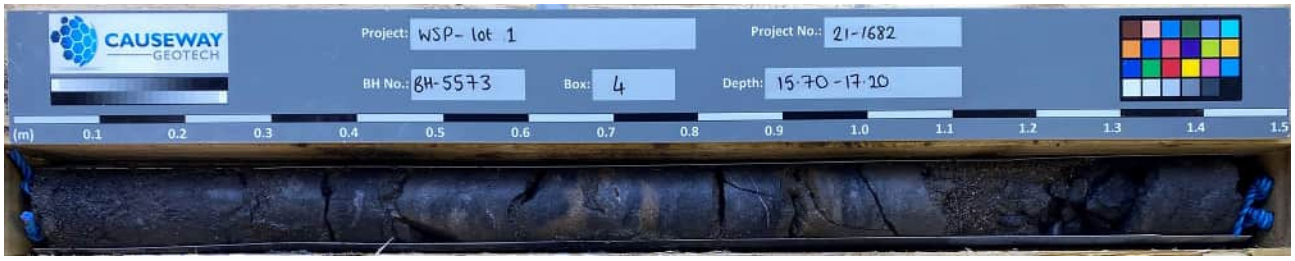
BH-5573 Box 1 (11.20-12.70m)



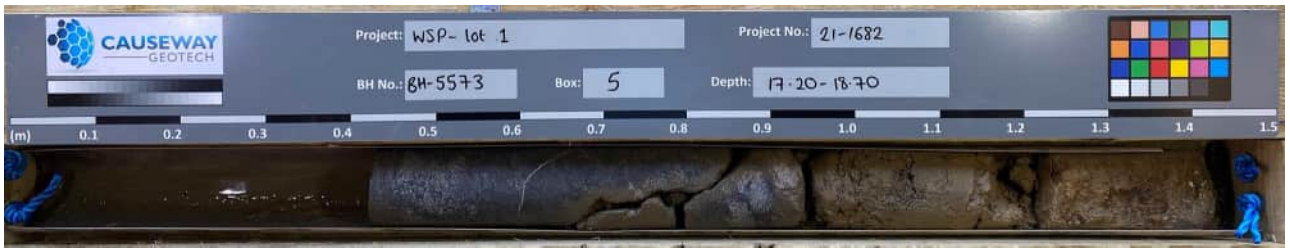
BH-5573 Box 2 (12.70-14.20m)



BH-5573 Box 3 (14.20-15.70m)



BH-5573 Box 4 (15.70-17.20m)



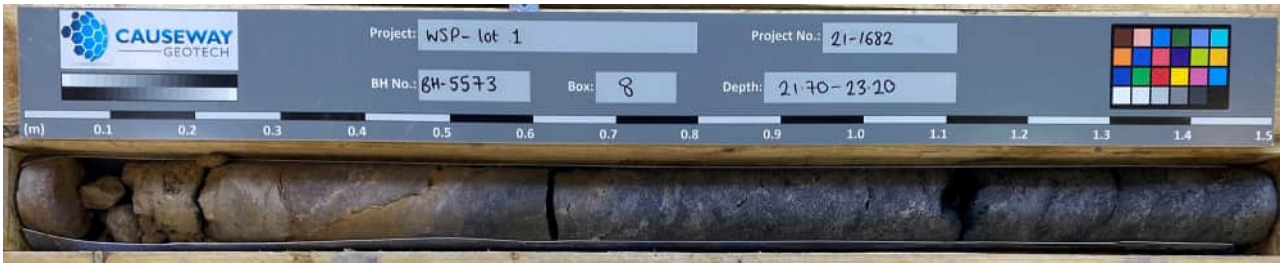
BH-5573 Box 5 (17.20-18.70m)



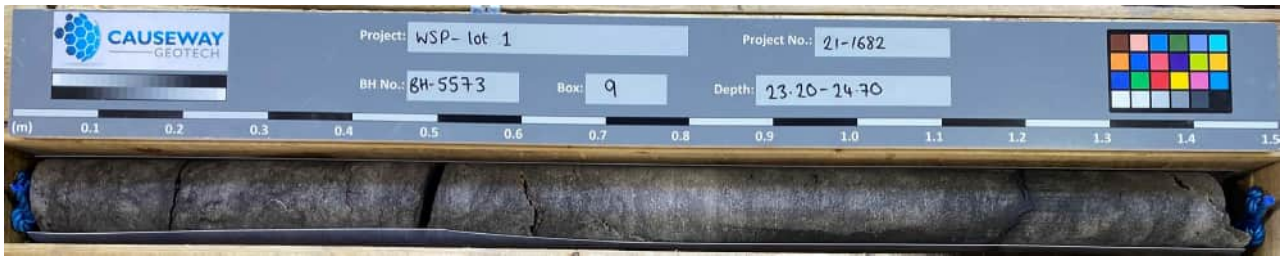
BH-5573 Box 6 (18.70-20.20m)



BH-5573 Box 7 (20.20-21.70m)



BH-5573 Box 8 (21.70-23.20m)



BH-5573 Box 9 (23.20-24.70m)



BH-6016 Box 1 (12.70-14.20m)



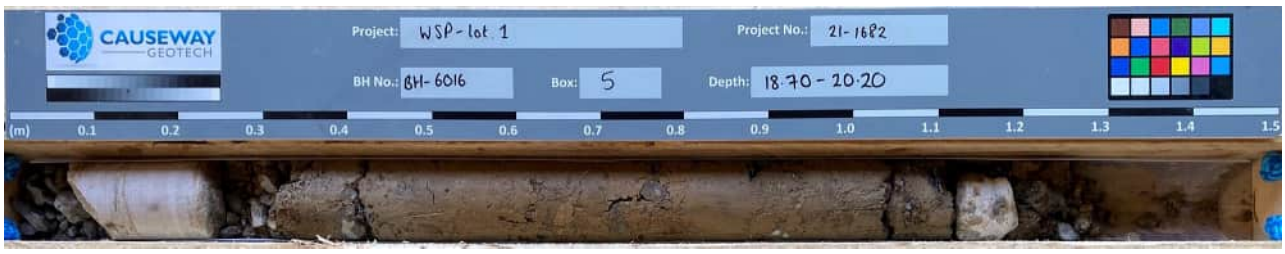
BH-6016 Box 2 (14.20-15.70m)



BH-6016 Box 3 (15.70-17.20m)



BH-6016 Box 4 (17.20-18.70m)



BH-6016 Box 5 (18.70-20.20m)



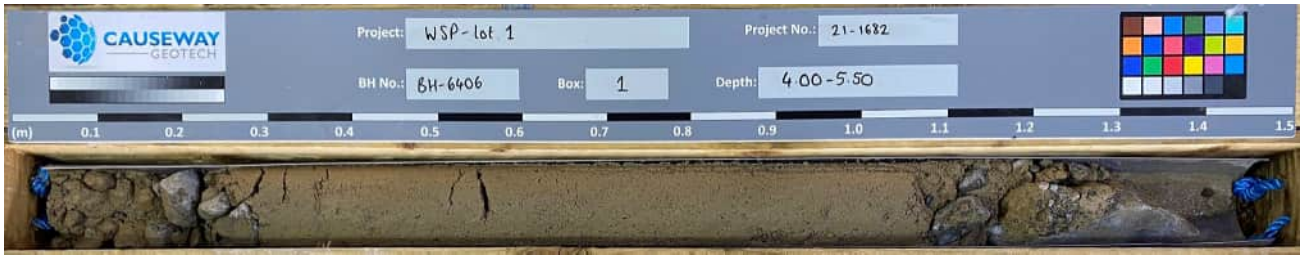
BH-6016 Box 6 (20.20-21.70m)



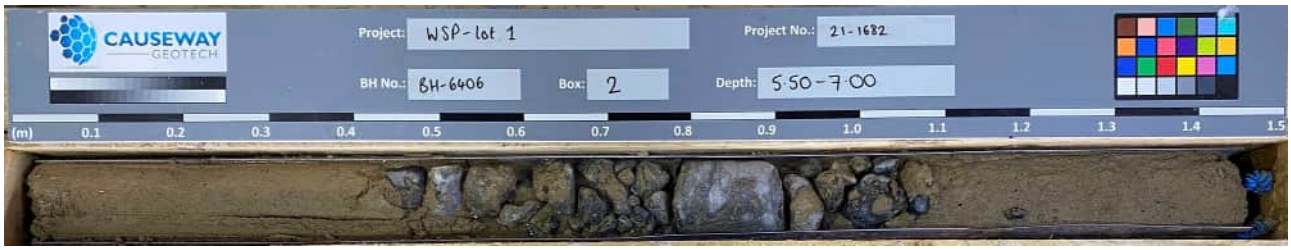
BH-6016 Box 7 (21.70-23.20m)



BH-6016 Box 8 (23.20-24.70m)



BH-6406 Box 1 (4.00-5.50m)



BH-6406 Box 2 (5.50-7.00m)



BH-6406 Box 3 (7.00-8.50m)



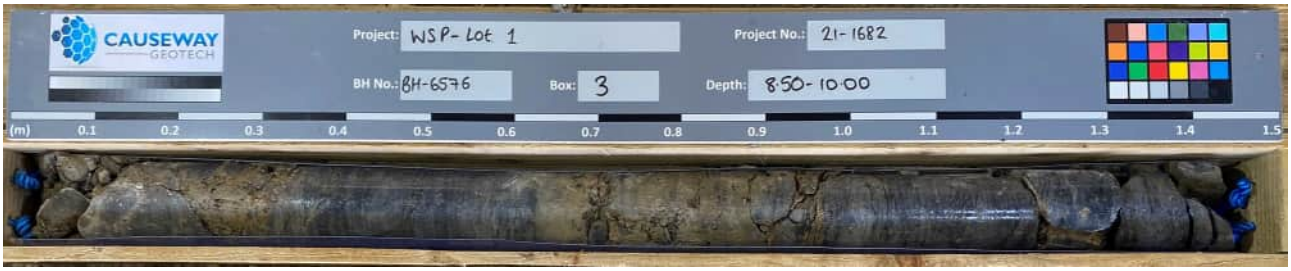
BH-6406 Box 4 (8.50-10.00m)



BH-6576 Box 1 (5.50-7.00m)



BH-6576 Box 2 (7.00-8.50m)



BH-6576 Box 3 (8.50-10.00m)



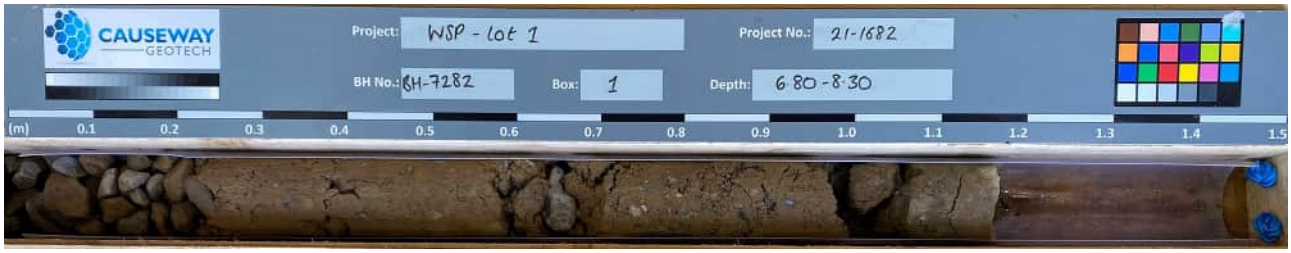
BH-6886 Box 1 (5.50-7.00m)



BH-6886 Box 2 (7.00-8.50m)



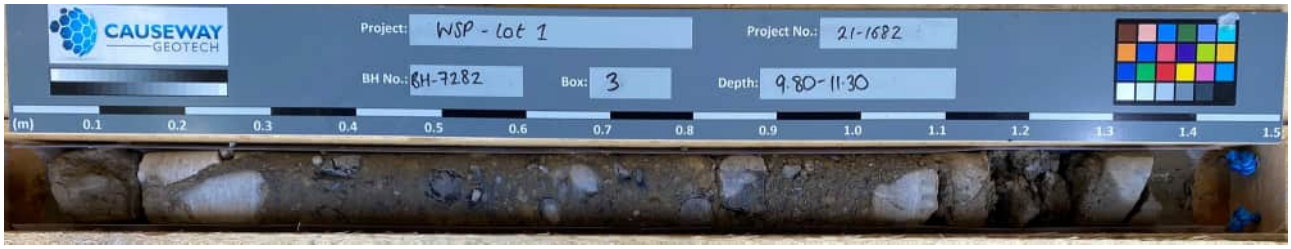
BH-6886 Box 3 (8.50-10.00m)



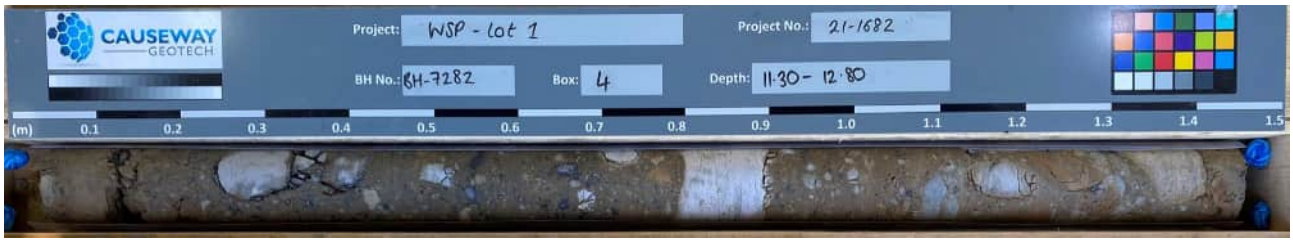
BH-7282 Box 1 (6.80-8.30m)



BH-7282 Box 2 (8.30-9.80m)



BH-7282 Box 3 (9.80-11.30m)



BH-7282 Box 4 (11.30-12.80m)



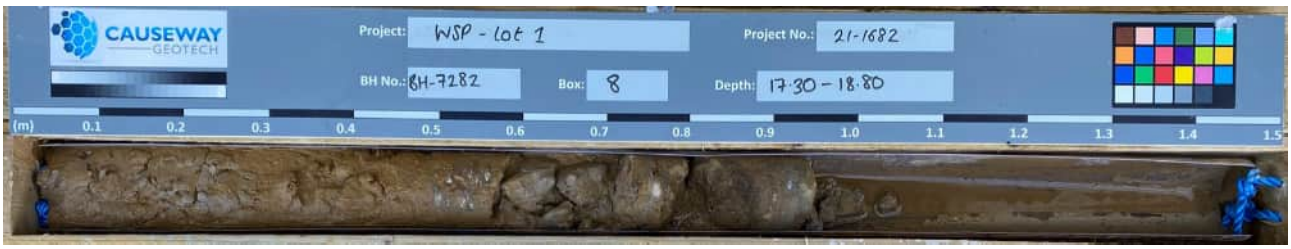
BH-7282 Box 5 (12.80-14.30m)



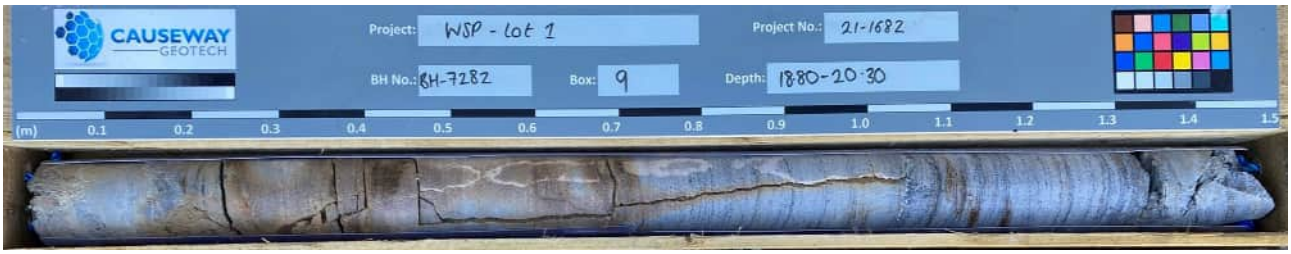
BH-7282 Box 6 (14.30-15.80m)



BH-7282 Box 7 (15.80-17.30m)



BH-7282 Box 8 (17.30-18.80m)



BH-7282 Box 9 (18.80-20.30m)



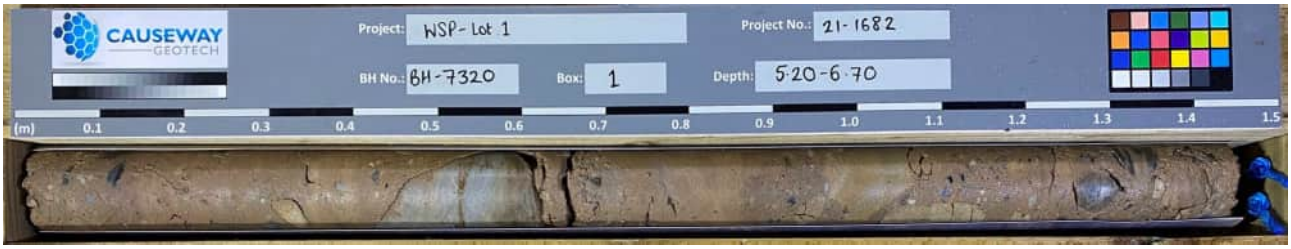
BH-7282 Box 10 (20.30-21.80m)



BH-7282 Box 11 (21.80-23.30m)



BH-7282 Box 12 (23.20-24.80m)



BH-7320 Box 1 (5.20-6.70m)



BH-7320 Box 2 (6.70-8.20m)



BH-7320 Box 3 (8.20-9.70m)



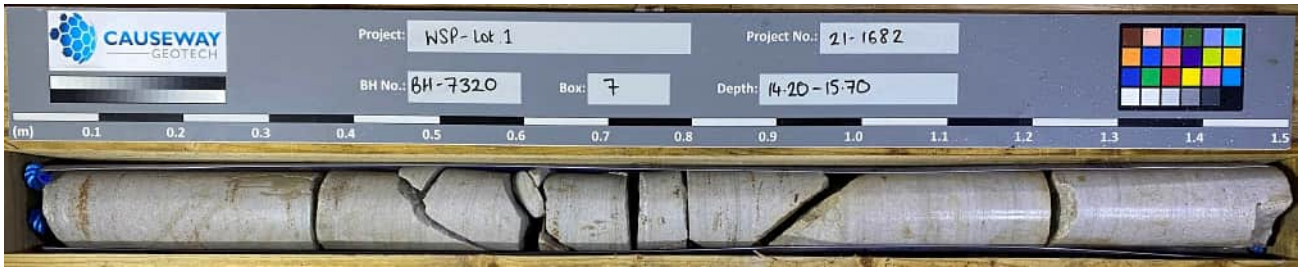
BH-7320 Box 4 (9.70-11.20m)



BH-7320 Box 5 (11.20-12.70m)



BH-7320 Box 6 (12.70-14.20m)



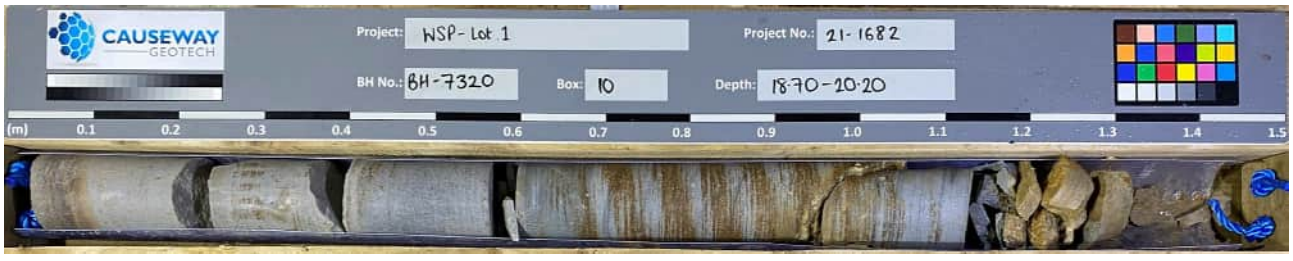
BH-7320 Box 7 (14.20-15.70m)



BH-7320 Box 8 (15.70-17.20m)



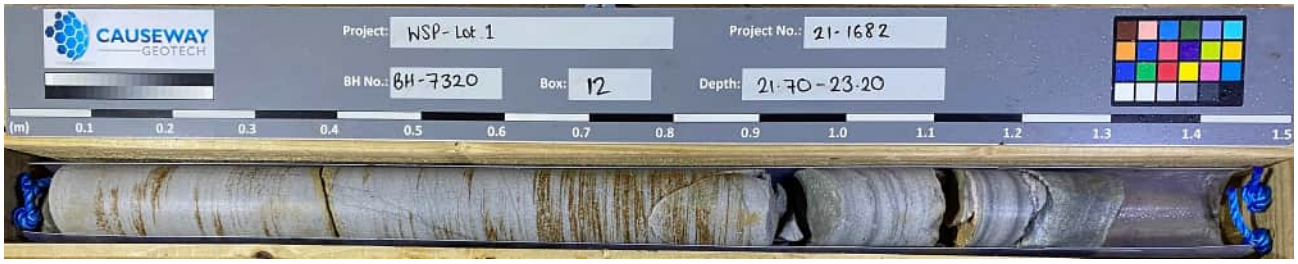
BH-7320 Box 9 (17.20-18.70m)



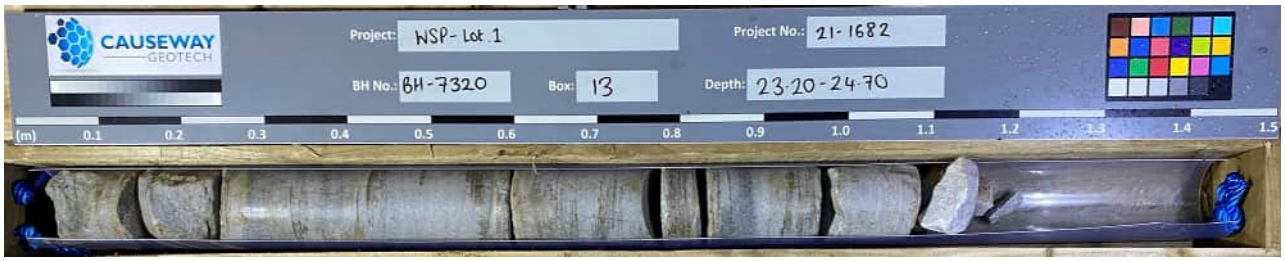
BH-7320 Box 10 (18.70-20.20m)



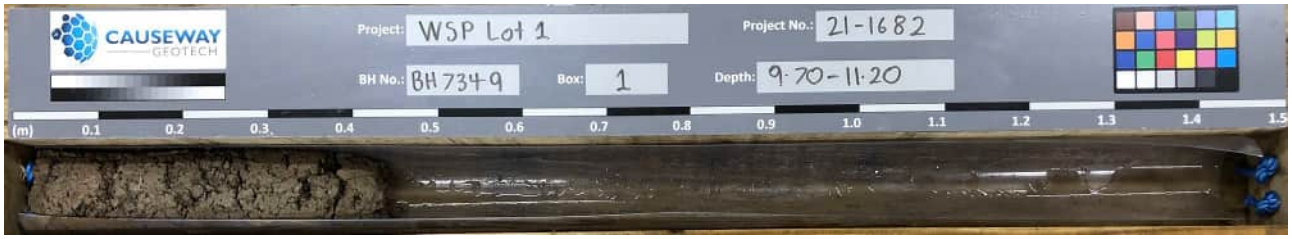
BH-7320 Box 11 (20.20-21.70m)



BH-7320 Box 12 (21.70-23.20m)



BH-7320 Box 13 (23.20-24.20m)



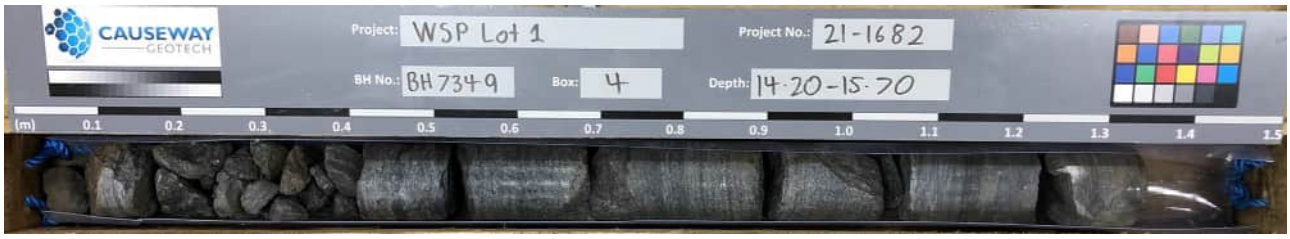
BH-7349 Box 1 (9.70-11.20m)



BH-7349 Box 2 (11.20-12.70m)



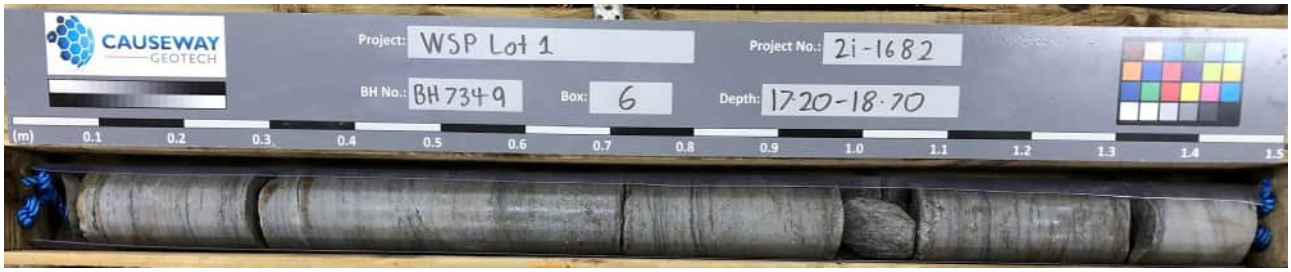
BH-7349 Box 3 (12.70-14.20m)



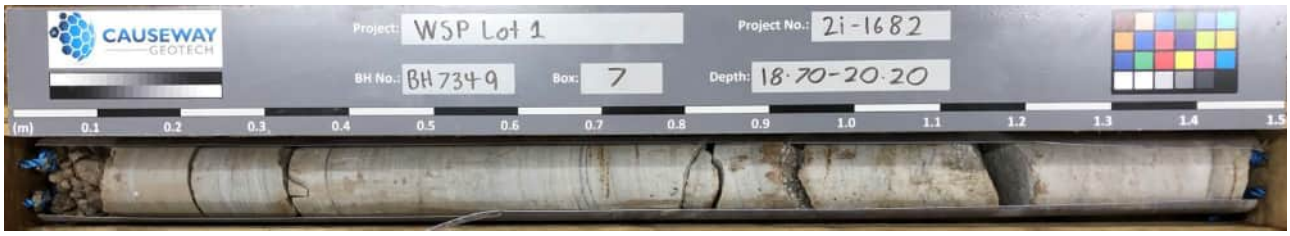
BH-7349 Box 4 (14.20-15.70m)



BH-7349 Box 5 (15.70-17.20m)



BH-7349 Box 6 (17.20-18.70m)



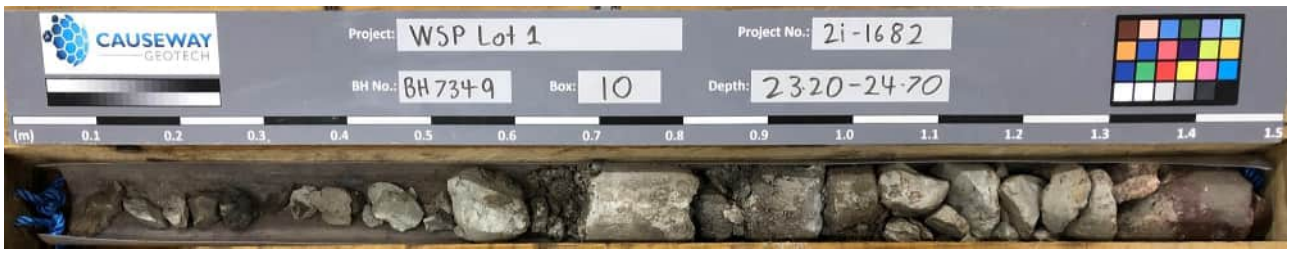
BH-7349 Box 7 (18.70-20.20m)



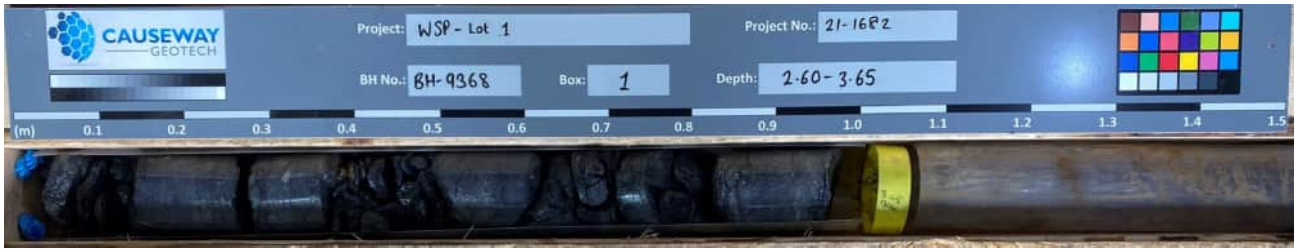
BH-7349 Box 8 (20.20-21.70m)



BH-7349 Box 9 (21.70-23.20m)



BH-7349 Box 10 (23.20-24.70m)



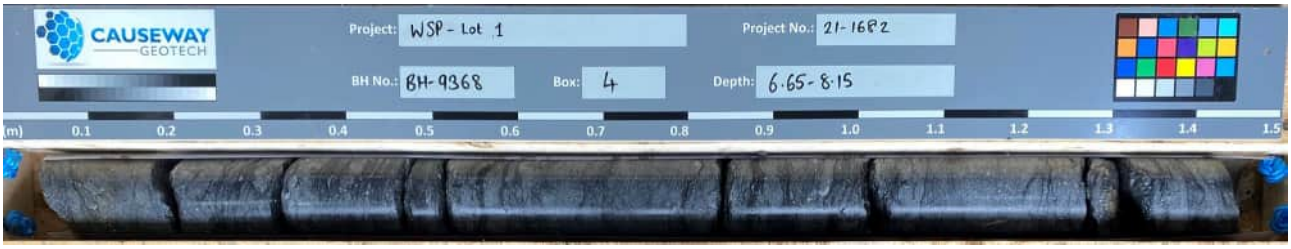
BH-9368 Box 1 (2.60-3.65m)



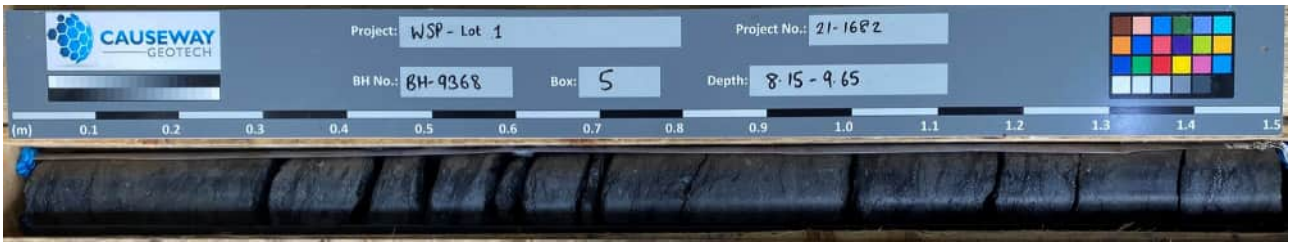
BH-9368 Box 2 (3.65-5.15m)



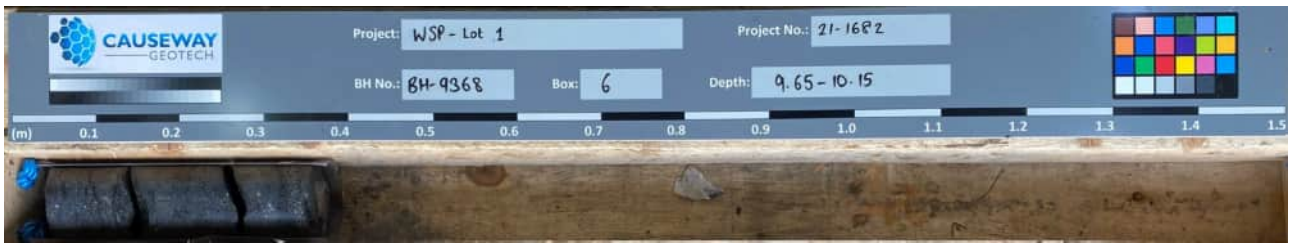
BH-9368 Box 3 (5.15-6.65m)



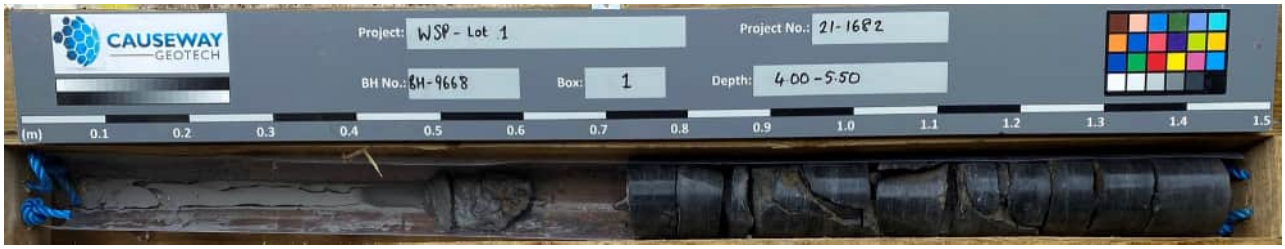
BH-9368 Box 4 (6.65-8.15m)



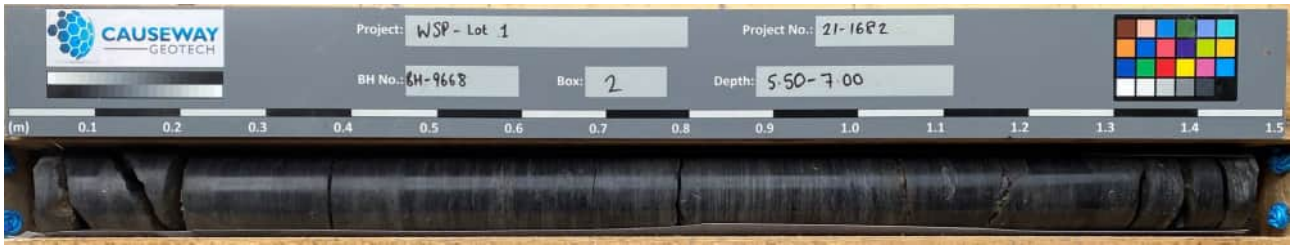
BH-9368 Box 5 (8.15-9.65m)



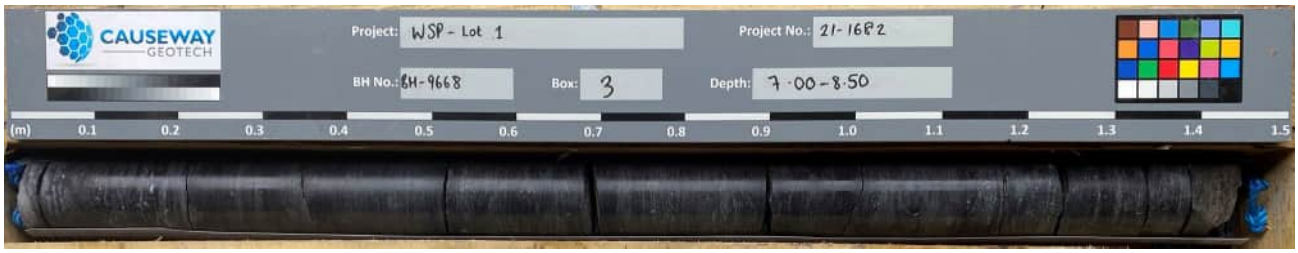
BH-9368 Box 6 (9.65-10.15m)



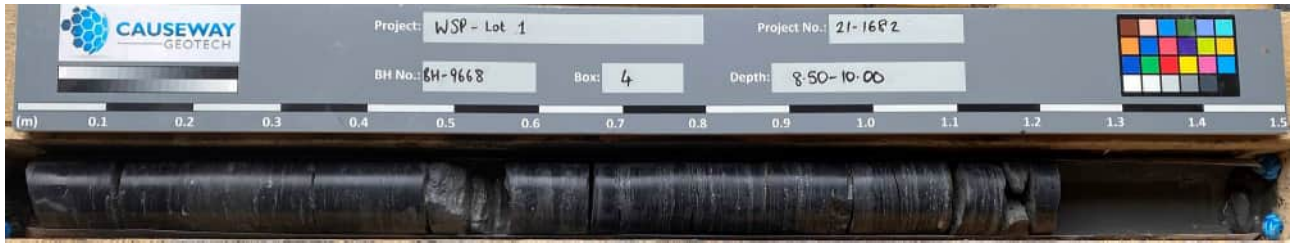
BH-9668 Box 1 (4.00-5.50m)



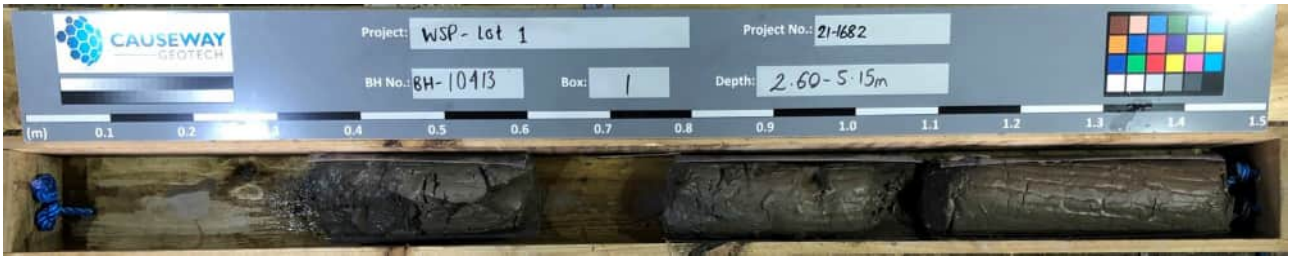
BH-9668 Box 2 (5.50-7.00m)



BH-9668 Box 3 (7.00-8.50m)



BH-9668 Box 4 (8.50-10.00m)



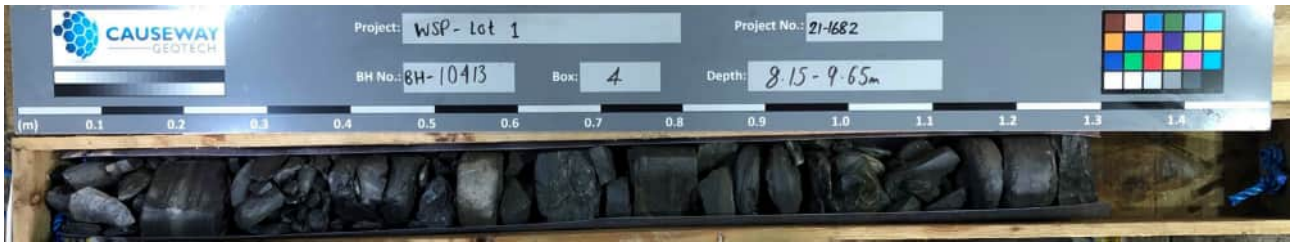
BH-10413 Box 1 (2.60-5.15m)



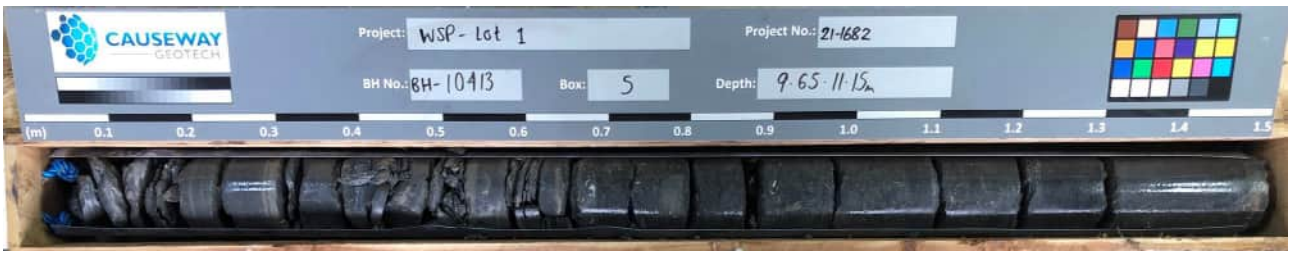
BH-10413 Box 2 (5.15-7.40m)



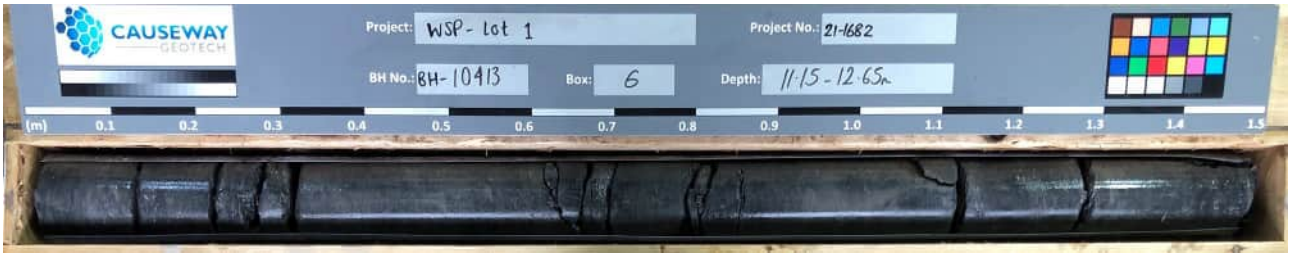
BH-10413 Box 3 (7.40-8.15m)



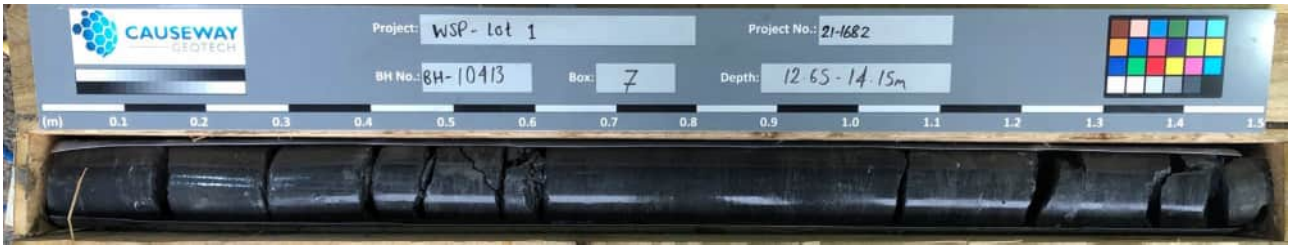
BH-10413 Box 4 (8.15-9.65m)



BH-10413 Box 5 (9.65-11.15m)



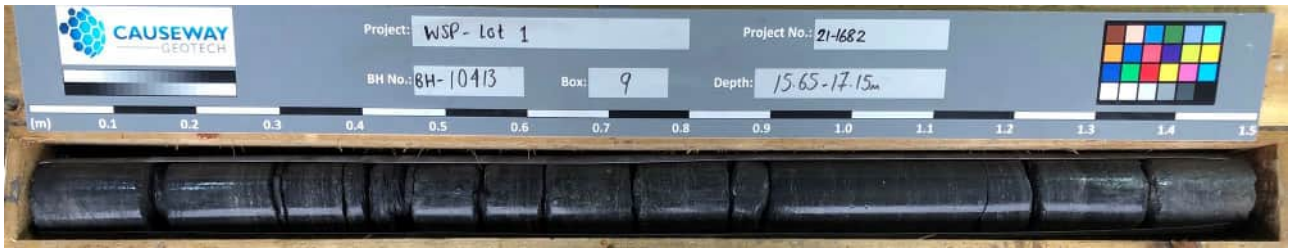
BH-10413 Box 6 (11.15-12.65m)



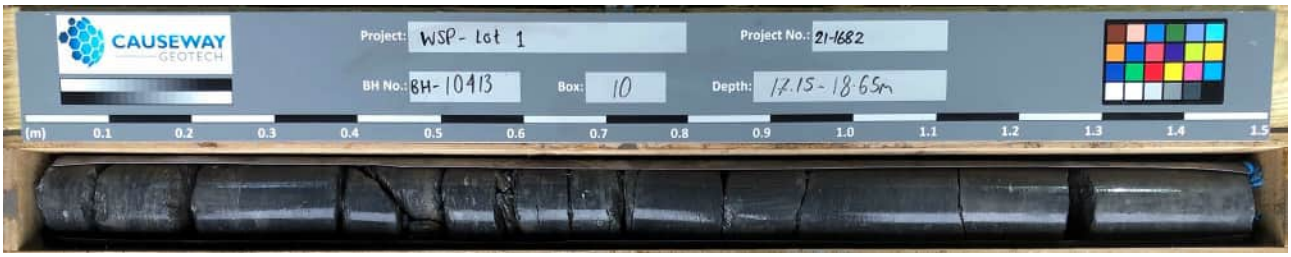
BH-10413 Box 7 (12.65-14.15m)



BH-10413 Box 8 (14.15-15.65m)



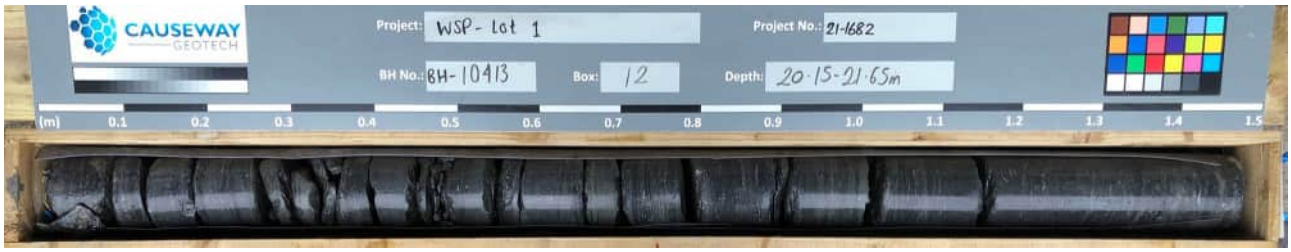
BH-10413 Box 9 (15.65-17.15m)



BH-10413 Box 10 (17.15-18.65m)



BH-10413 Box 11 (18.65-20.15m)



BH-10413 Box 12 (20.15-21.65m)



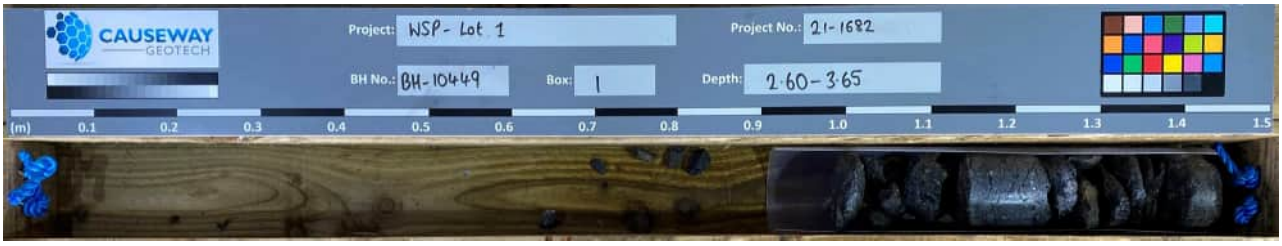
BH-10413 Box 13 (21.65-23.15m)



BH-10413 Box 14 (23.15-24.65m)



BH-10413 Box 15 (24.65-25.00m)



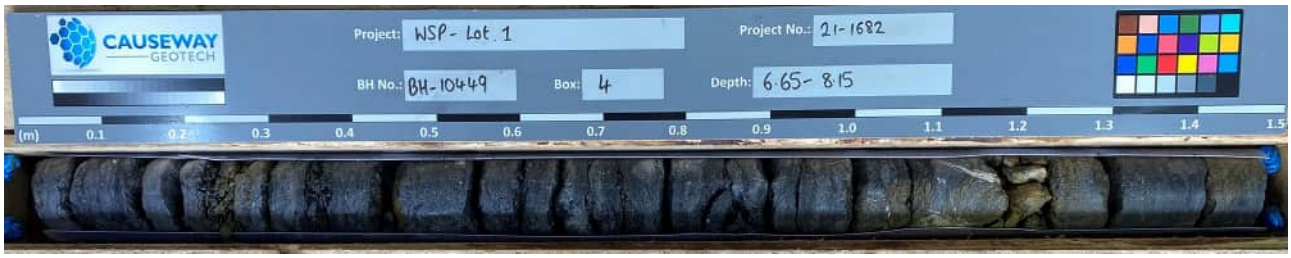
BH-10449 Box 1 (2.60-3.65m)



BH-10449 Box 2 (4.10-5.15m)



BH-10449 Box 3 (5.15-6.65m)



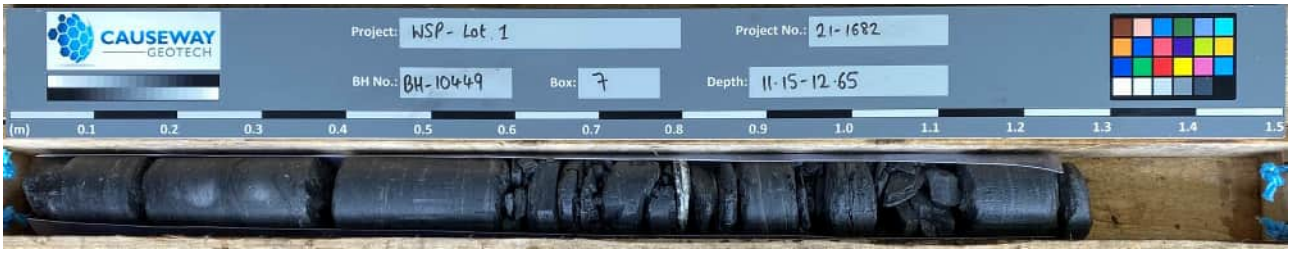
BH-10449 Box 4 (6.65-8.15m)



BH-10449 Box 5 (8.15-9.65m)



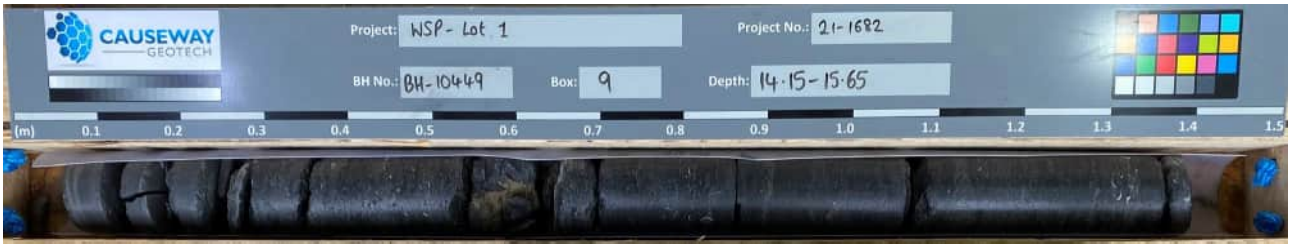
BH-10449 Box 6 (9.65-11.15m)



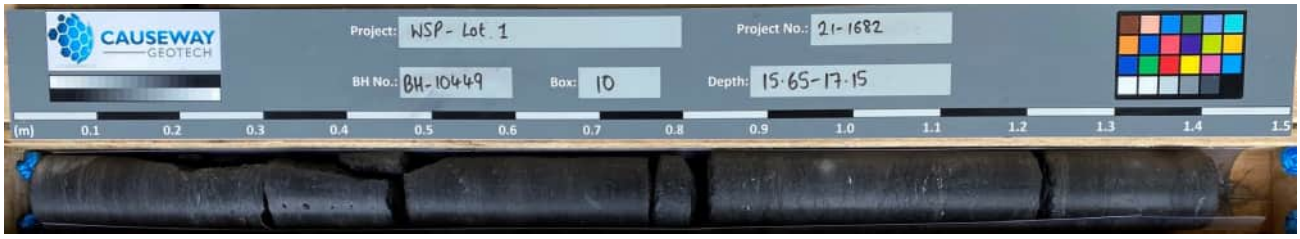
BH-10449 Box 7 (11.15-12.65m)



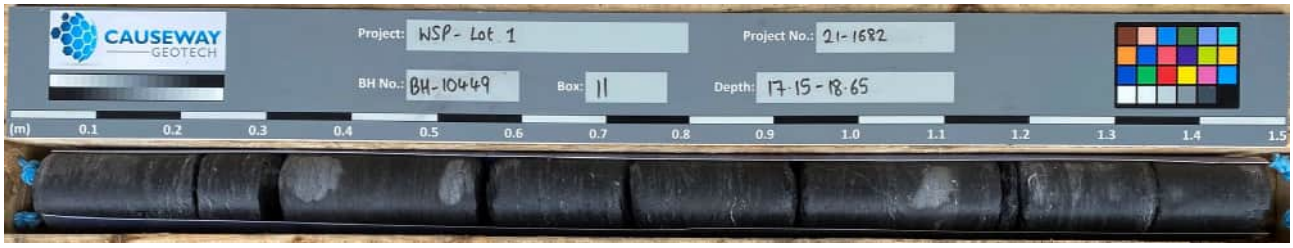
BH-10449 Box 8 (12.65-14.15m)



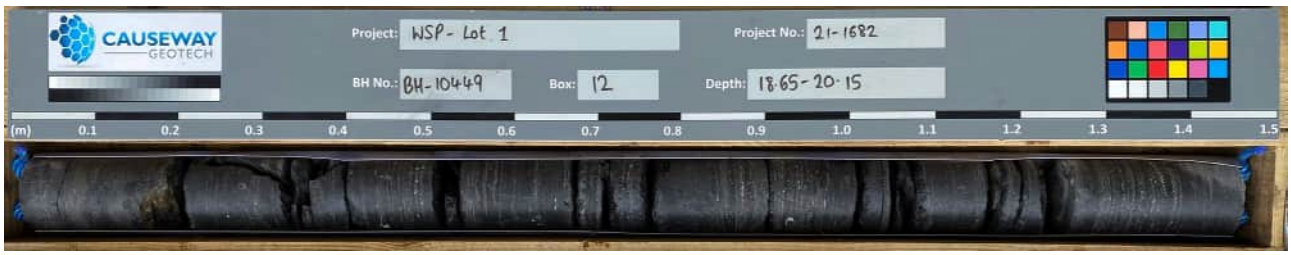
BH-10449 Box 9 (14.15-15.65m)



BH-10449 Box 10 (15.65-17.15m)



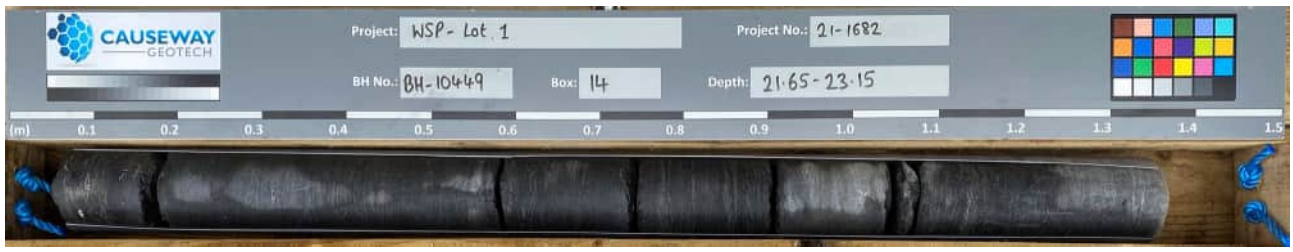
BH-10449 Box 11 (17.15-18.65m)



BH-10449 Box 12 (18.65-20.15m)



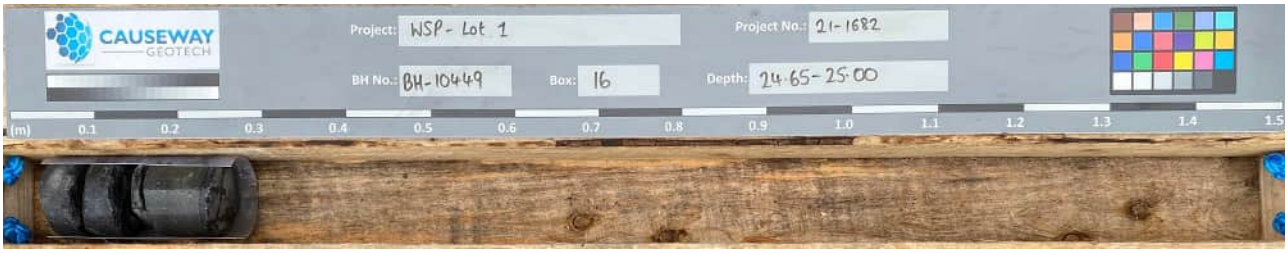
BH-10449 Box 13 (20.15-21.65m)



BH-10449 Box 14 (21.65-23.15m)



BH-10449 Box 15 (23.15-24.65m)



BH-10449 Box 16 (24.65-25.00m)



BH-10475 Box 1 (4.10-5.95m)



BH-10475 Box 2 (5.95-6.65m)



BH-10475 Box 3 (6.65-8.15m)



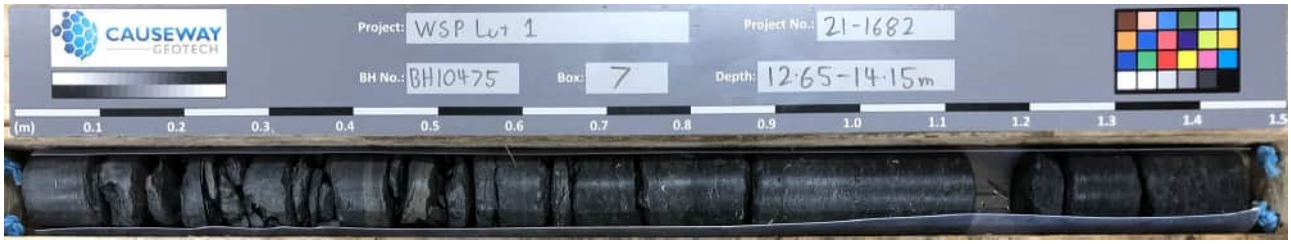
BH-10475 Box 4 (8.15-9.65m)



BH-10475 Box 5 (9.65-11.15m)



BH-10475 Box 6 (11.15-12.65m)



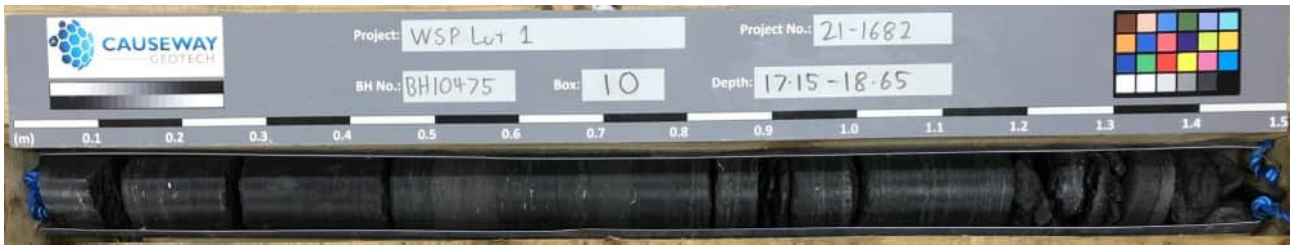
BH-10475 Box 7 (12.65-14.15m)



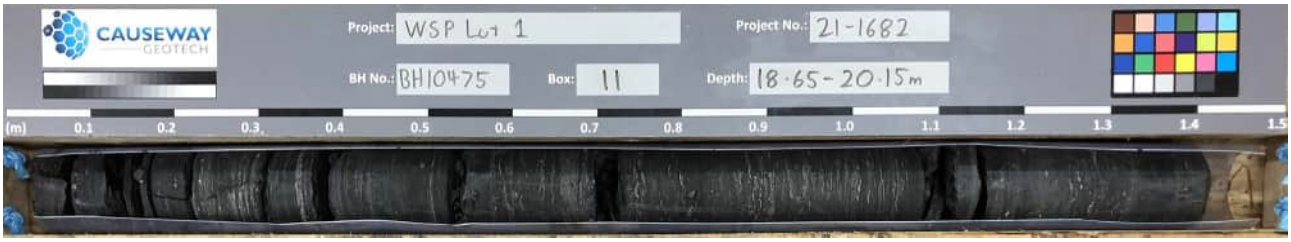
BH-10475 Box 8 (14.15-15.65m)



BH-10475 Box 9 (15.65-17.15m)



BH-10475 Box 10 (17.15-18.65m)



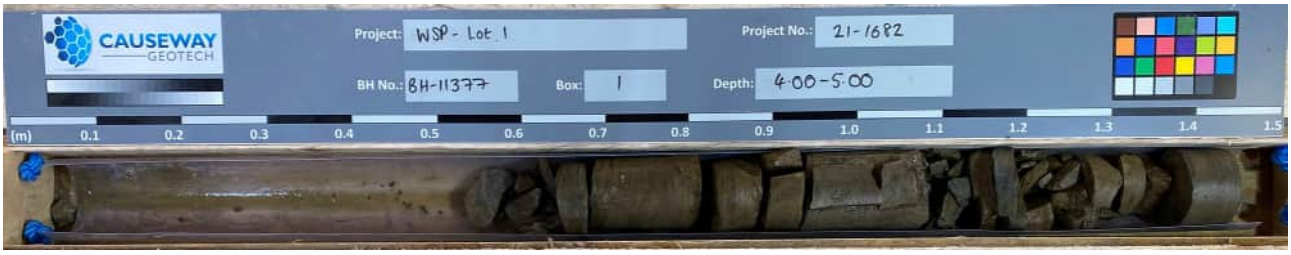
BH-10475 Box 11 (18.65-20.15m)



BH-10475 Box 12 (20.15-21.65m)



BH-10475 Box 13 (21.65-23.15m)



BH-11377 Box 1 (4.00-5.00m)



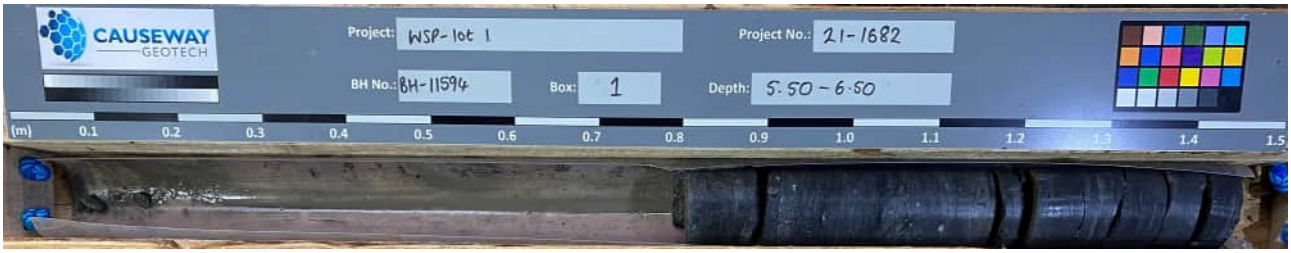
BH-11377 Box 2 (5.00-6.50m)



BH-11377 Box 3 (6.50-8.00m)



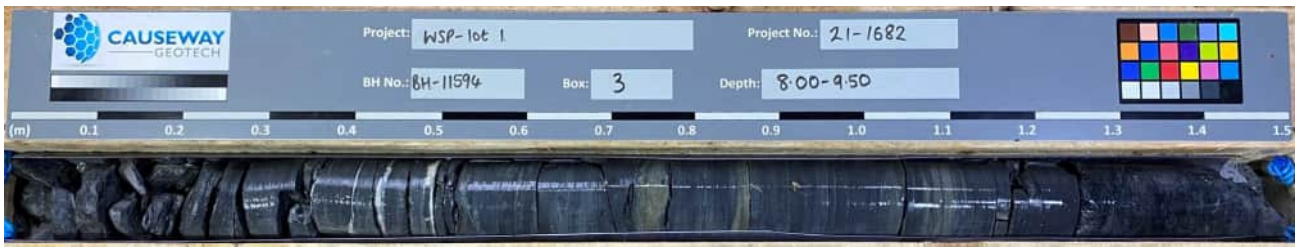
BH-11377 Box 4 (8.00-9.50m)



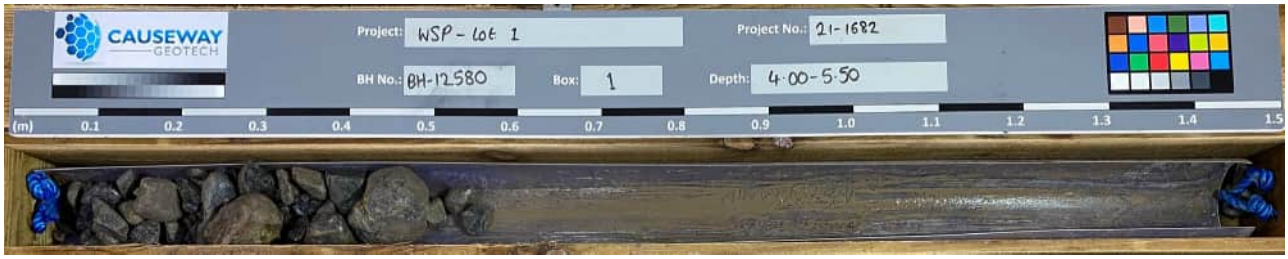
BH-11594 Box 1 (5.50-6.50m)



BH-11594 Box 2 (6.50-8.00m)



BH-11594 Box 3 (8.00-9.50m)



BH-12580 Box 1 (4.00-5.50m)

No recovery (5.50-7.00m)

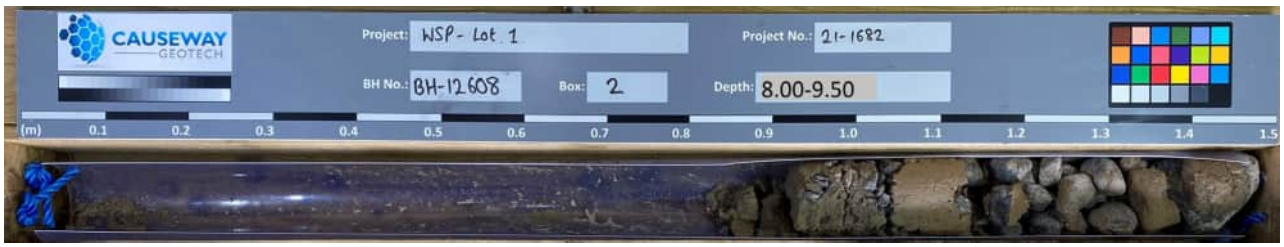


BH-12580 Box 2 (7.00-8.50m)

No recovery (8.50-10.00m)

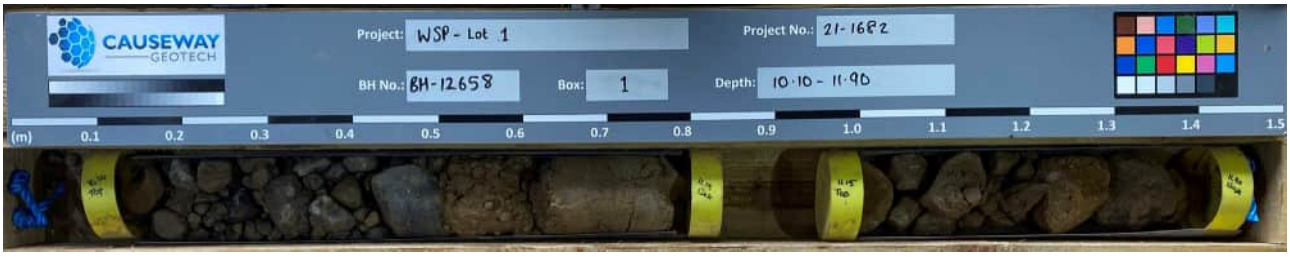


BH-12608 Box 1 (7.00-8.00m)



BH-12608 Box 2 (8.00-9.50m)

No recovery (9.50-20.00m)



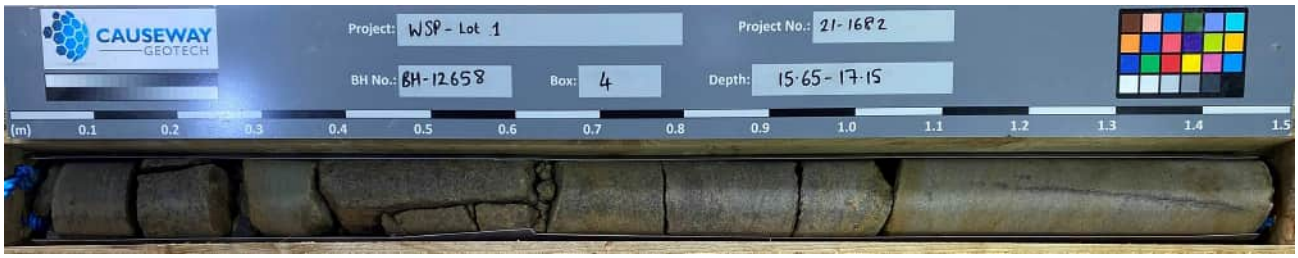
BH-12658 Box 1 (10.10-11.90m)



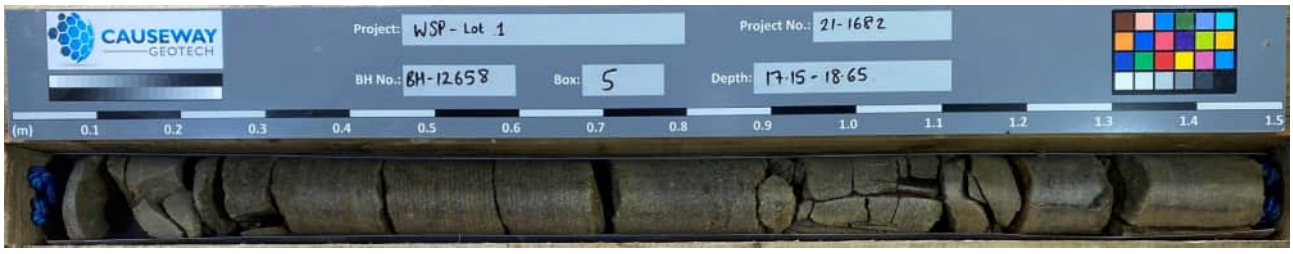
BH-12658 Box 2 (11.90-14.15m)



BH-12658 Box 3 (14.15-15.65m)



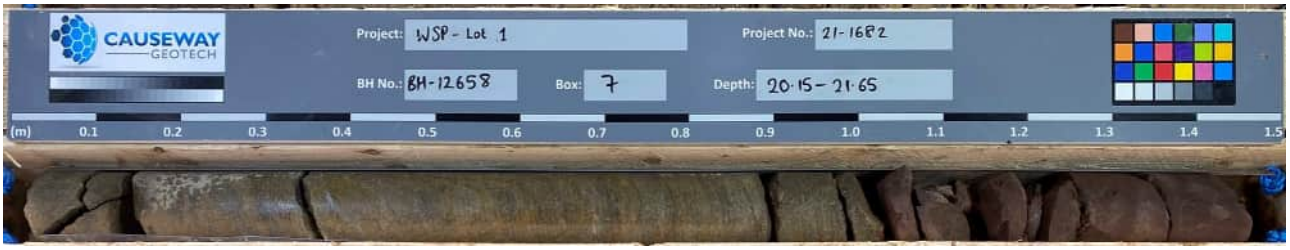
BH-12658 Box 4 (15.65-17.15m)



BH-12658 Box 5 (17.15-18.65m)



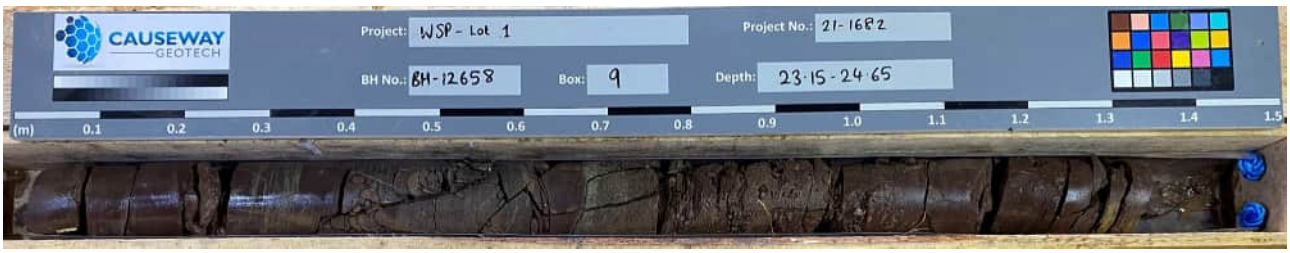
BH-12658 Box 6 (18.65-20.15m)



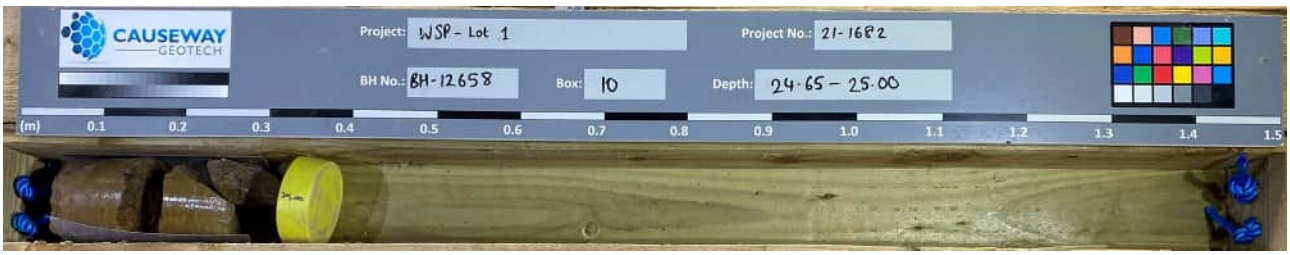
BH-12658 Box 7 (20.15-21.65m)



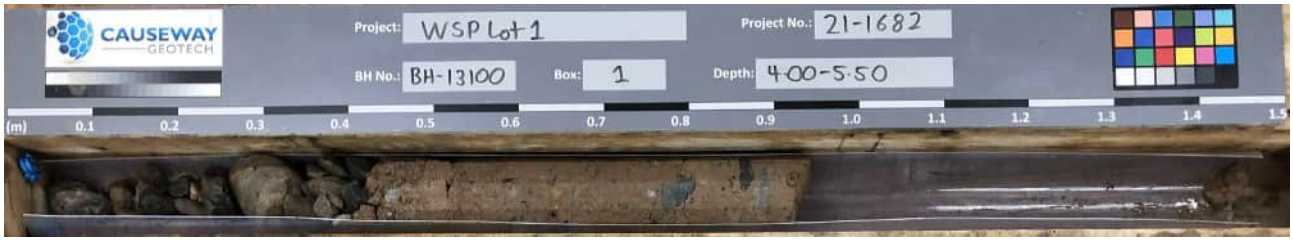
BH-12658 Box 8 (21.65-23.15m)



BH-12658 Box 9 (23.15-24.65m)



BH-12658 Box 10 (24.65-25.00m)



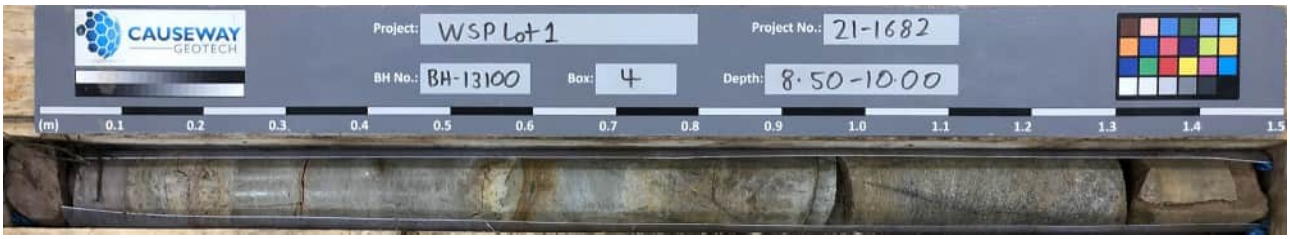
BH-13100 Box 1 (4.00-5.50m)



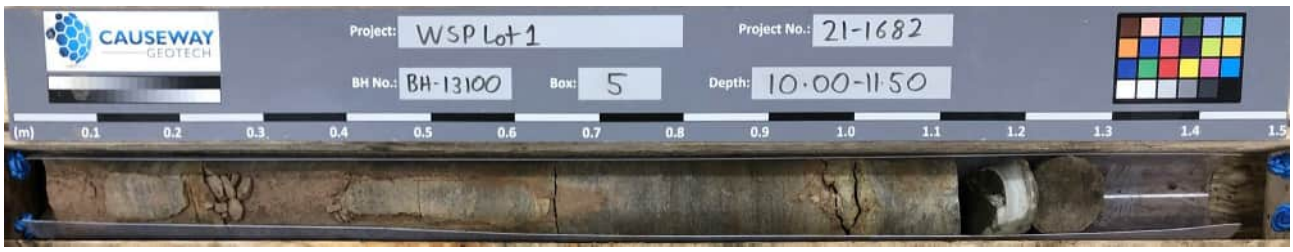
BH-13100 Box 2 (5.50-7.00m)



BH-13100 Box 3 (7.00-8.50m)



BH-13100 Box 4 (8.50-10.00m)



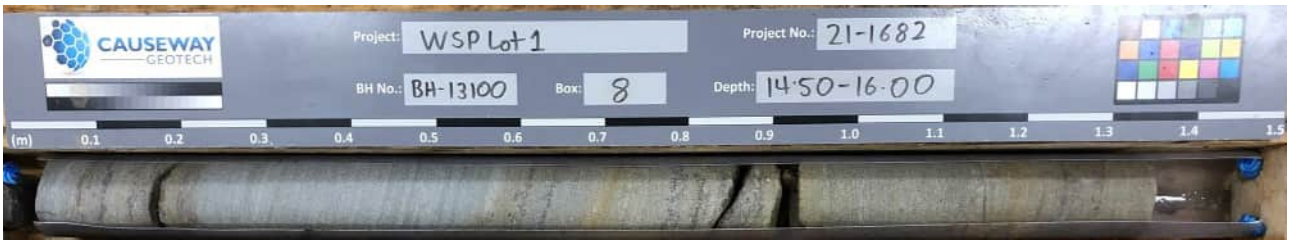
BH-13100 Box 5 (10.00-11.50m)



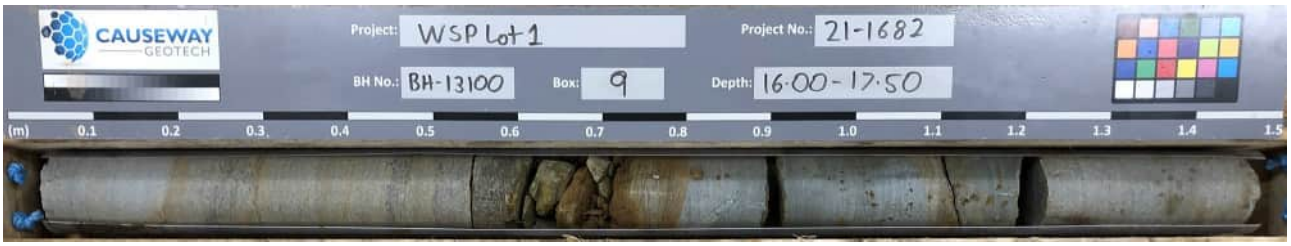
BH-13100 Box 6 (11.50-13.00m)



BH-13100 Box 7 (13.00-14.50m)



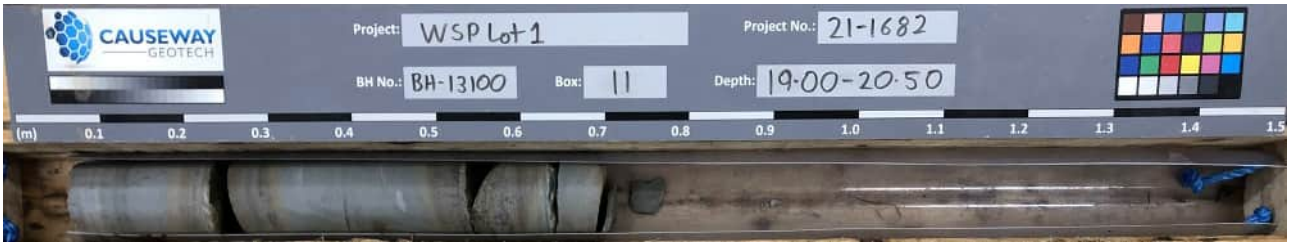
BH-13100 Box 8 (14-50-16.00m)



BH-13100 Box 9 (16.00-17.50m)



BH-13100 Box 10 (17.50-19.00m)



BH-13100 Box 11 (19.00-20.50m)



BH-13100 Box 12 (22.00-23.50m)

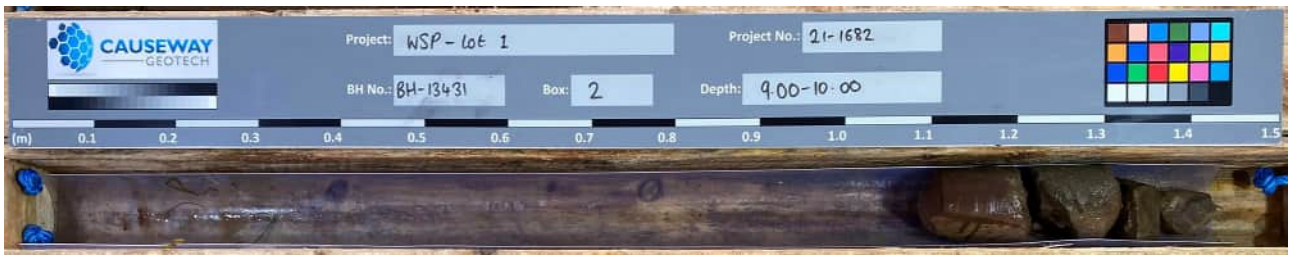


BH-13100 Box 13 (23.50-25.00m)



BH-13431 Box 1 (4.50-6.00m)

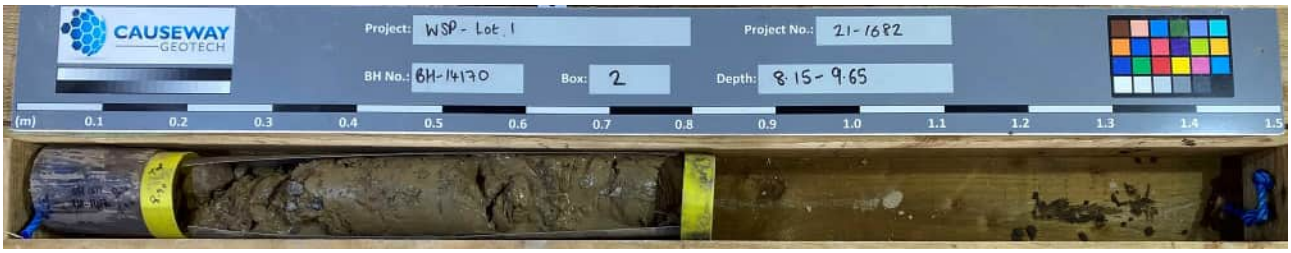
No recovery (6.00-9.00m)



BH-13431 Box 2 (9.00-10.00m)



BH-14170 Box 1 (5.60-8.15m)



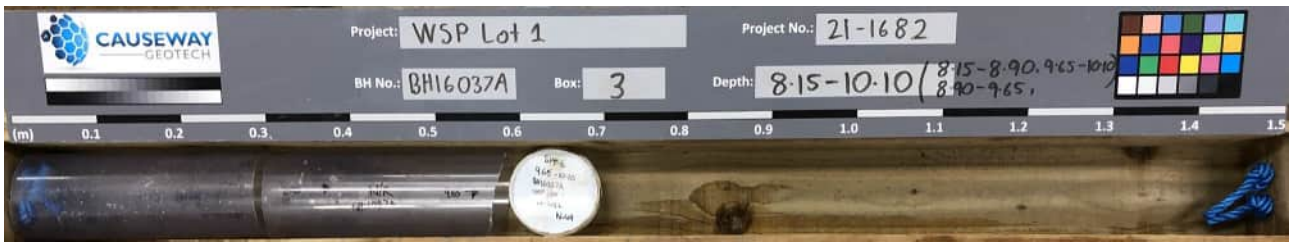
BH-14170 Box 2 (8.15-9.55m)



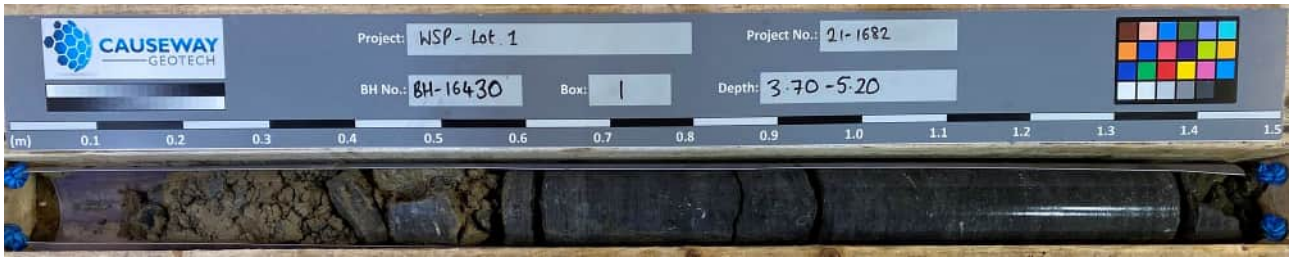
BH-16037A Box 1 (2.60-5.15m)



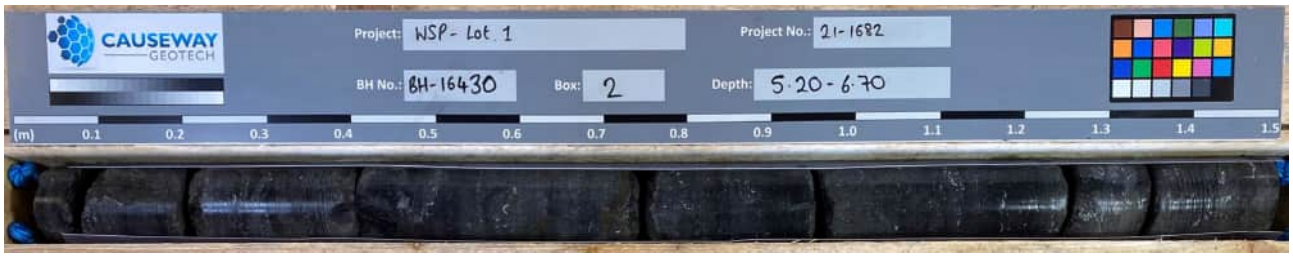
BH-16037A Box 2 (5.15-8.15m)



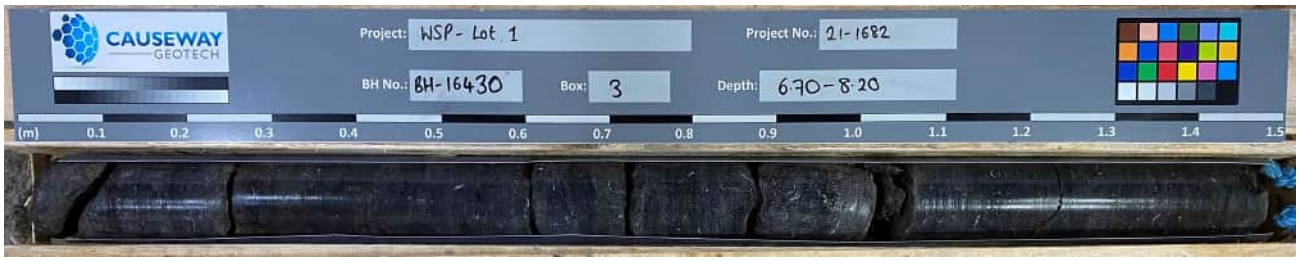
BH-16037A Box 3 (8.15-10.10m)



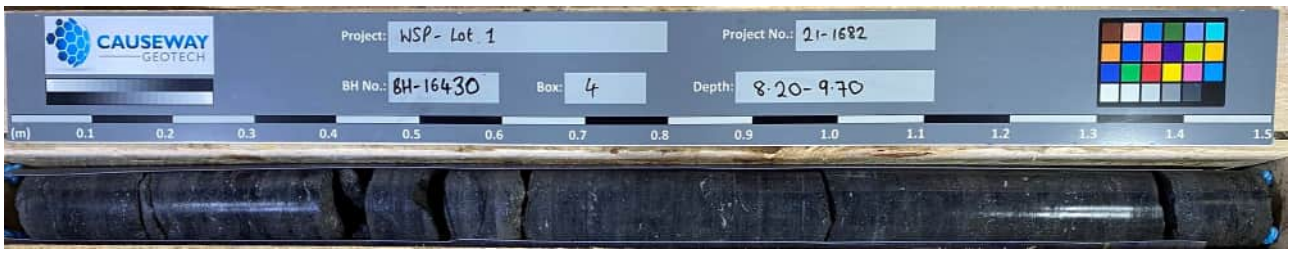
BH-16430 Box 1 (3.70-5.20m)



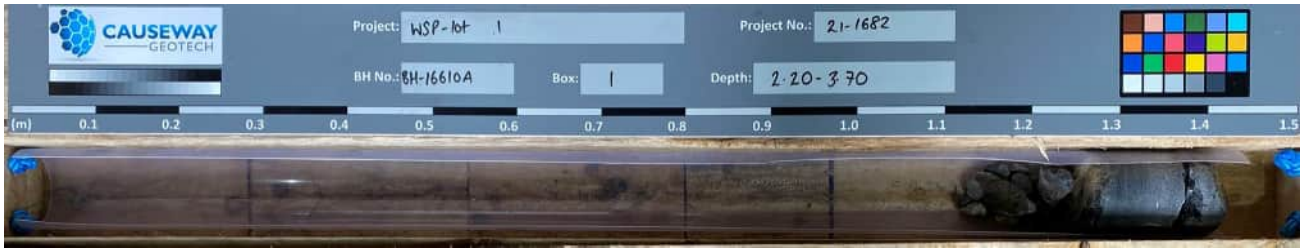
BH-16430 Box 2 (5.20-6.70m)



BH-16430 Box 3 (6.70-8.20m)



BH-16430 Box 4 (8.20-9.70m)



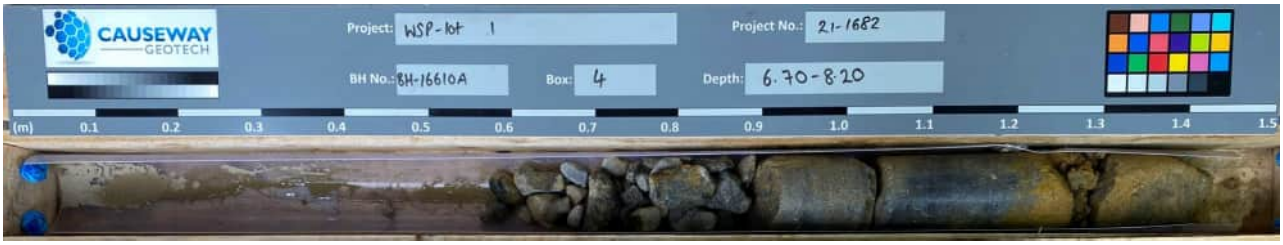
BH-16610A Box 1 (2.20-3.70m)



BH-16610A Box 2 (3.70-5.20m)



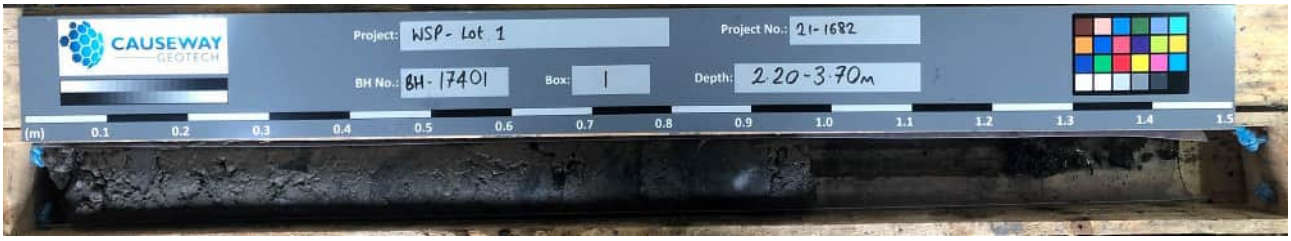
BH-16610A Box 3 (5.20-6.70m)



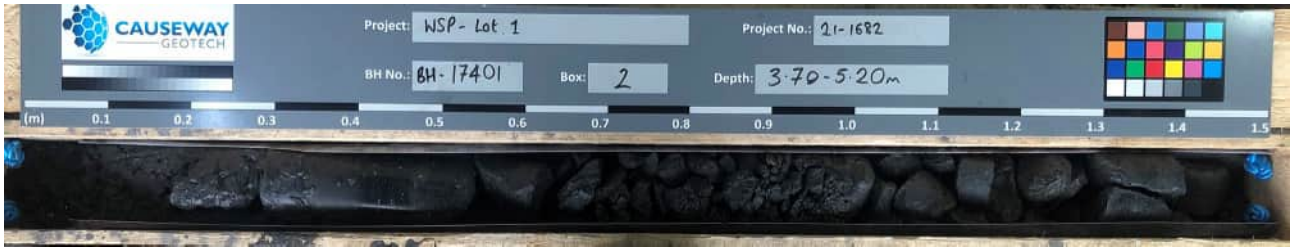
BH-16610A Box 4 (6.70-8.20m)



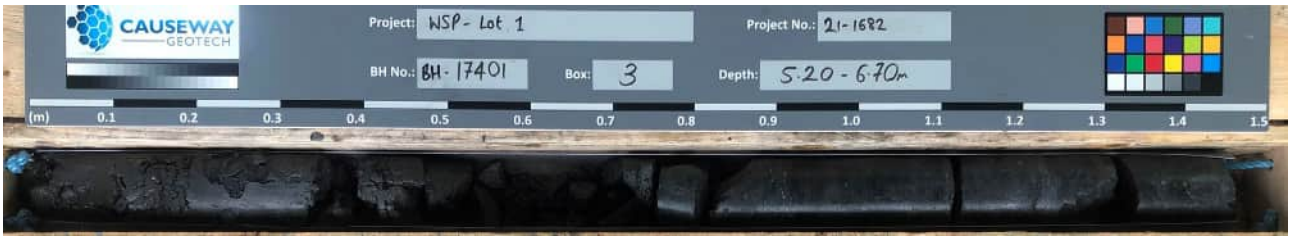
BH-16610A Box 5 (8.20-9.70m)



BH-17401 Box 1 (2.20-3.70m)



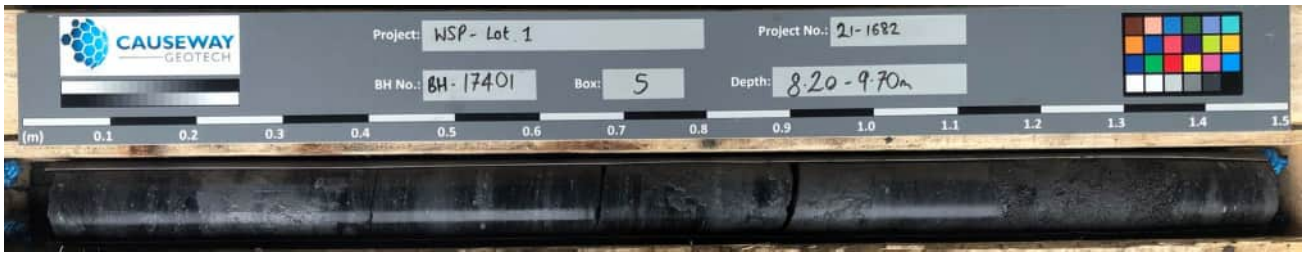
BH-17401 Box 2 (3.70-5.20m)



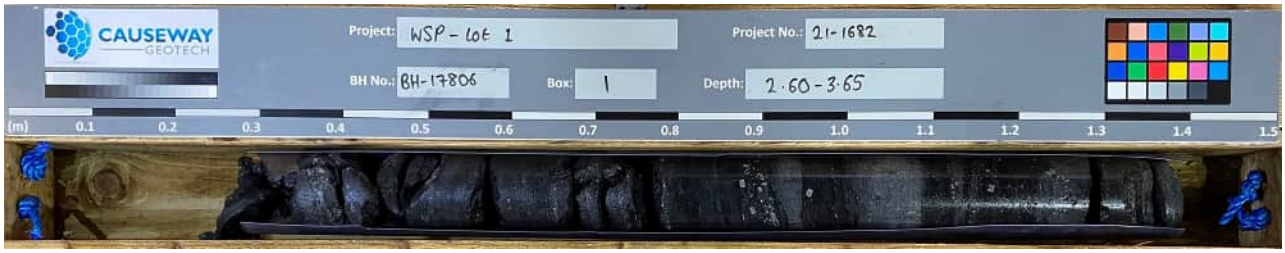
BH-17401 Box 3 (5.20-6.70m)



BH-17401 Box 4 (6.70-8.20m)



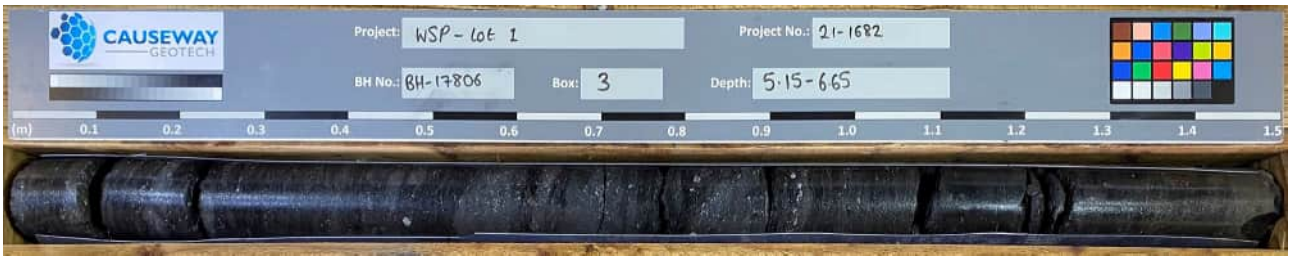
BH-17401 Box 5 (8.20-9.70m)



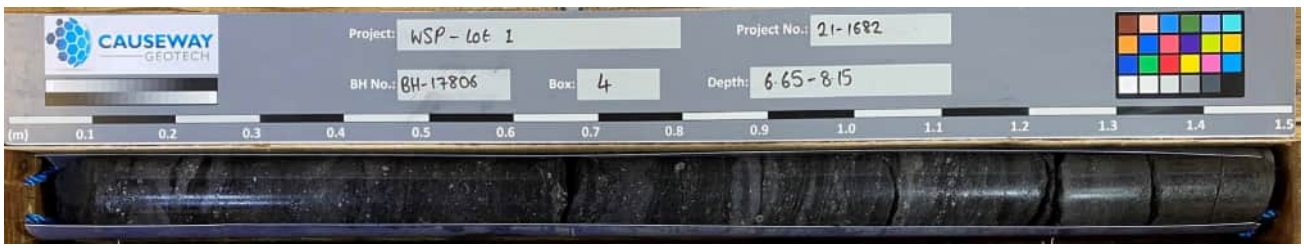
BH-17806 Box 1 (2.60-3.65m)



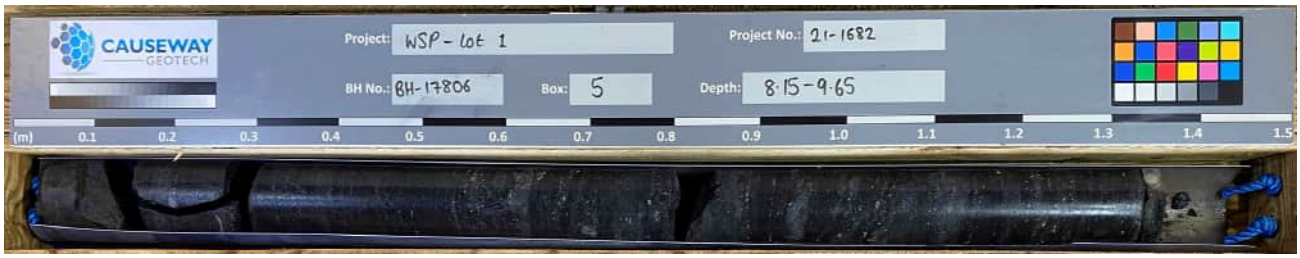
BH-17806 Box 2 (3.65-5.15m)



BH-17806 Box 3 (5.15-6.65m)



BH-17806 Box 4 (6.65-8.15m)



BH-17806 Box 5 (8.15-9.65m)



BH-17806 Box 6 (9.65-10.00m)



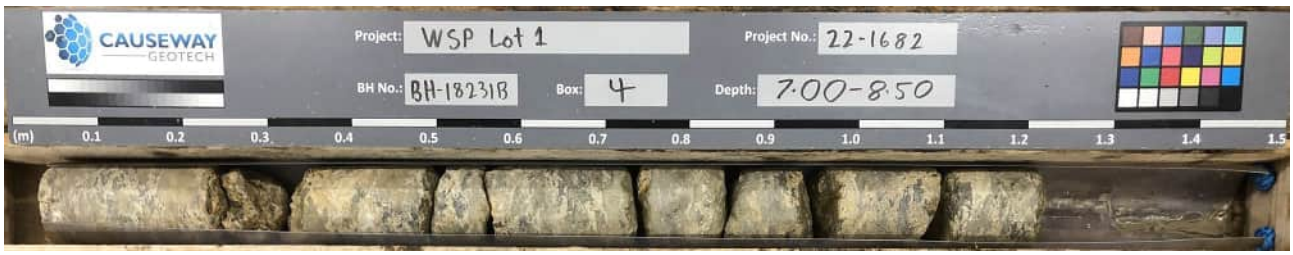
BH-18231B Box 1 (2.50-4.00m)



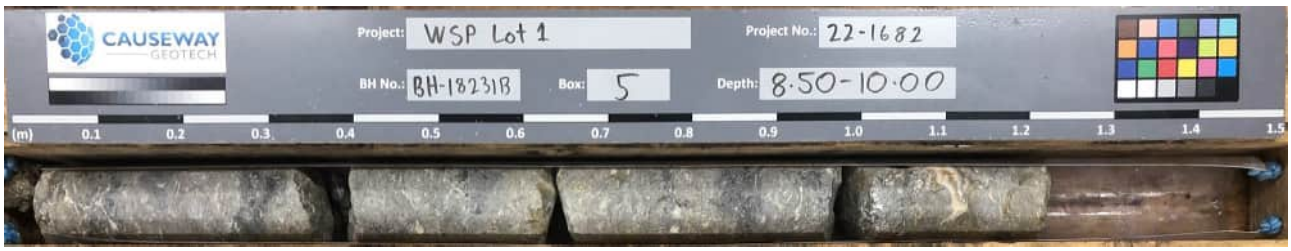
BH-18231B Box 2 (4.00-5.50m)



BH-18231B Box 3 (5.50-7.00m)



BH-18231B Box 4 (7.00-8.50m)



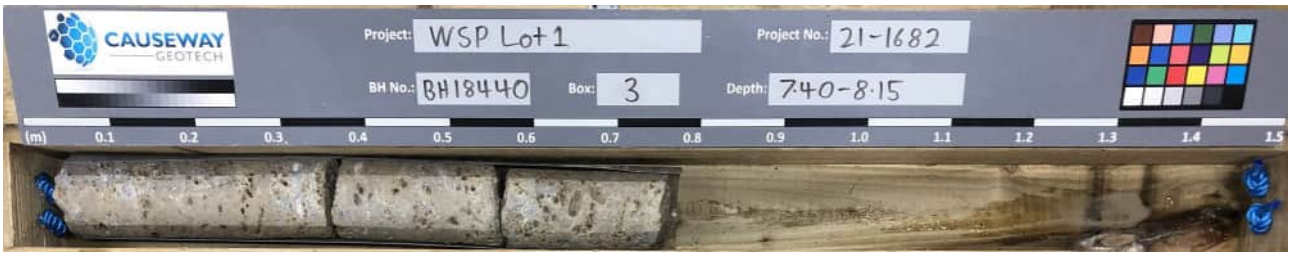
BH-18231B Box 5 (8.50-10.00m)



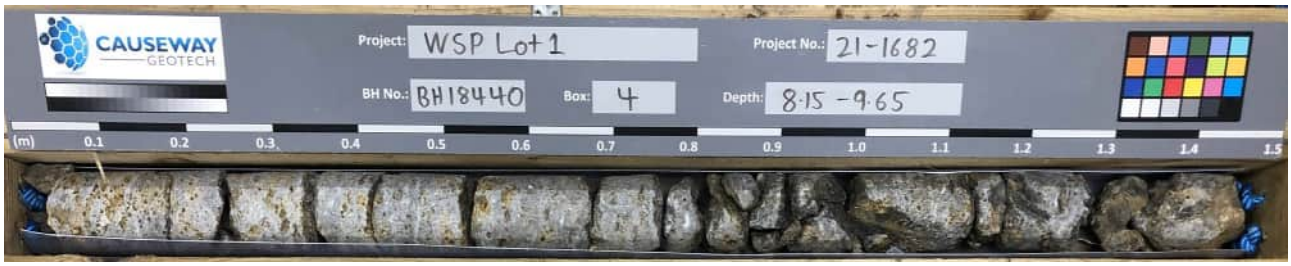
BH-18440 Box 1 (4.10-6.65m)



BH-18440 Box 2 (6.65-7.40m)



BH-18440 Box 3 (7.40-8.15m)



BH-18440 Box 4 (8.15-9.65m)



BH-18440 Box 5 (9.65-11.15m)



BH-18440 Box 6 (11.15-12.65m)



BH-18440 Box 7 (12.65-14.15m)



BH-18440 Box 8 (14.15-15.65m)



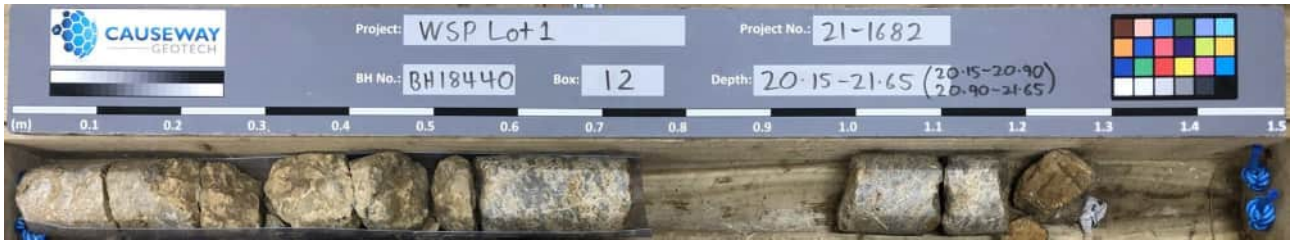
BH-18440 Box 9 (15.65-17.15m)



BH-18440 Box 10 (17.15-18.65m)



BH-18440 Box 11 (18.65-20.15m)



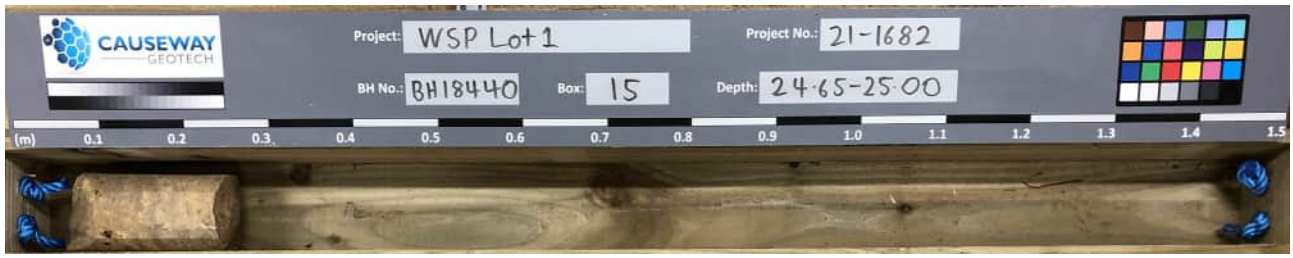
BH-18440 Box 12 (20.15-21.65m)



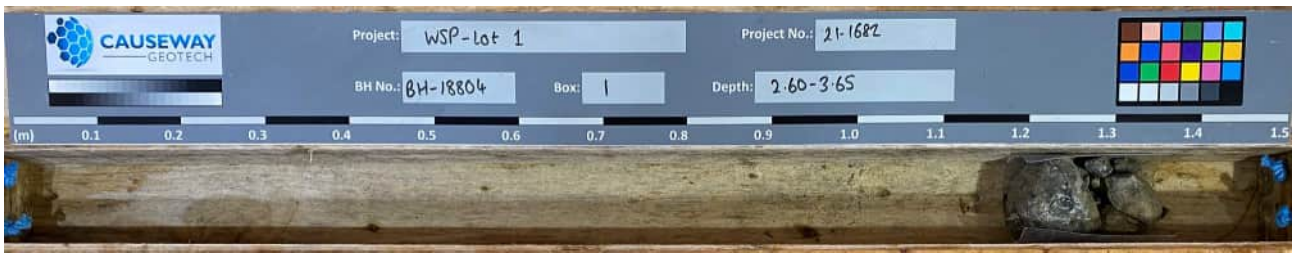
BH-18440 Box 13 (21.65-23.15m)



BH-18440 Box 14 (23.15-24.65m)



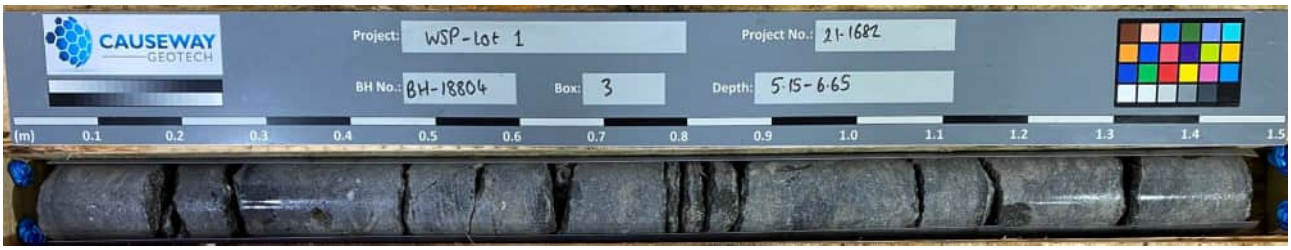
BH-18440 Box 15 (24.65-25.00m)



BH-18804 Box 1 (2.60-3.65m)



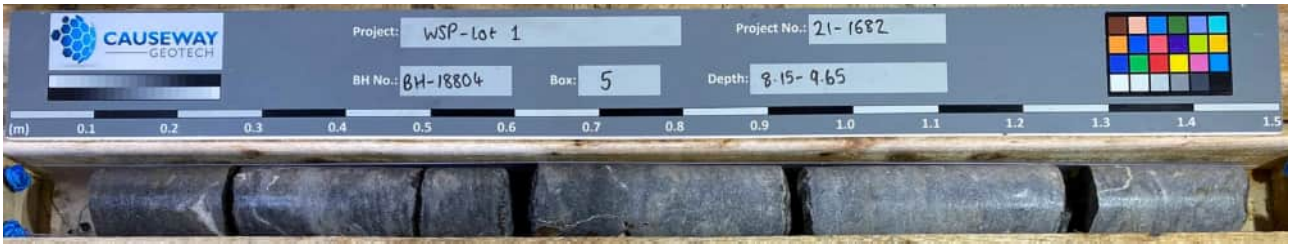
BH-18804 Box 2 (3.65-5.15m)



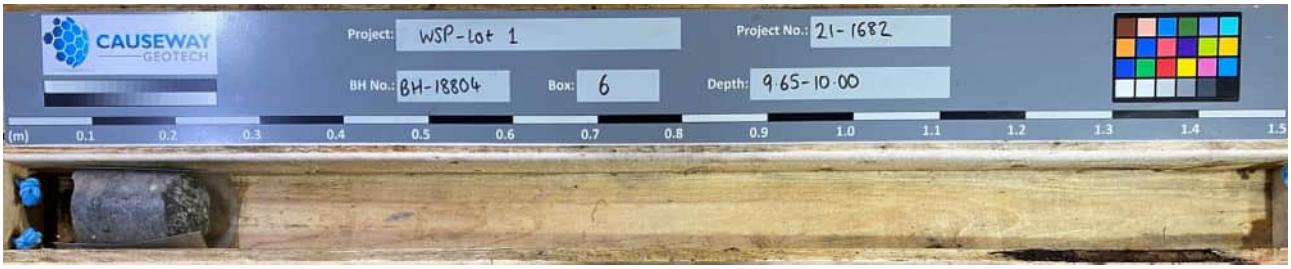
BH-18804 Box 3 (5.15-6.65m)



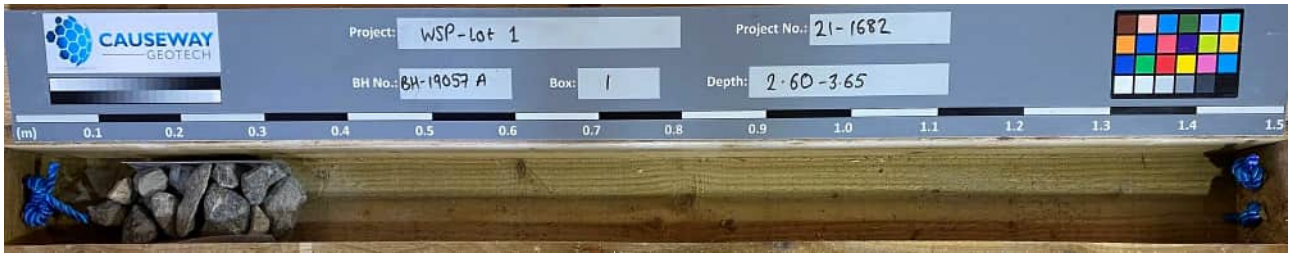
BH-18804 Box 4 (6.65-8.15m)



BH-18804 Box 5 (8.15-9.65m)



BH-18804 Box 6 (9.65-10.00m)



BH-19057A Box 1 (2.60-3.65m)



BH-19057A Box 2 (3.65-5.15m)



BH-19057A Box 3 (5.15-6.65m)



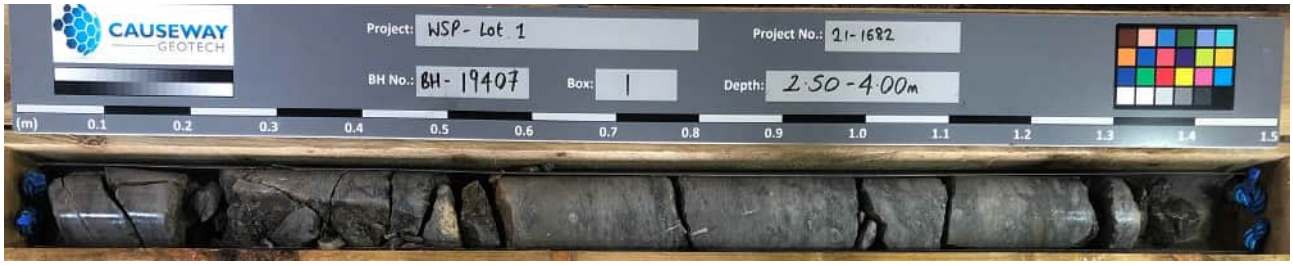
BH-19057A Box 4 (6.65-8.15m)



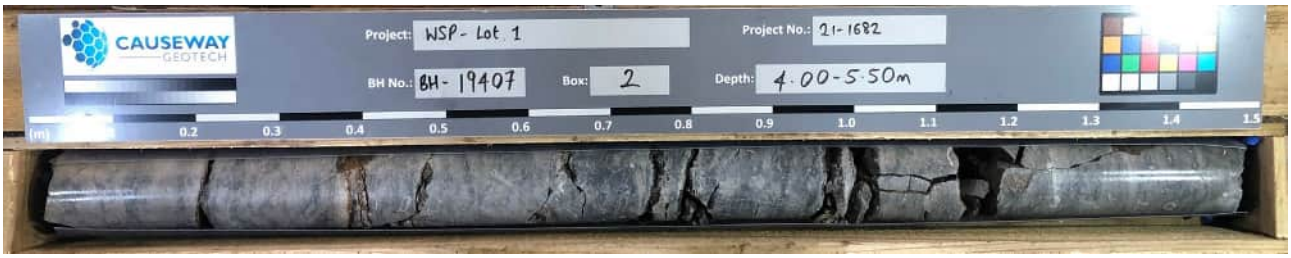
BH-19057A Box 5 (8.15-9.65m)



BH-19057A Box 6 (9.65-10.00m)



BH-19407 Box 1 (2.50-4.00m)



BH-19407 Box 2 (4.00-5.50m)



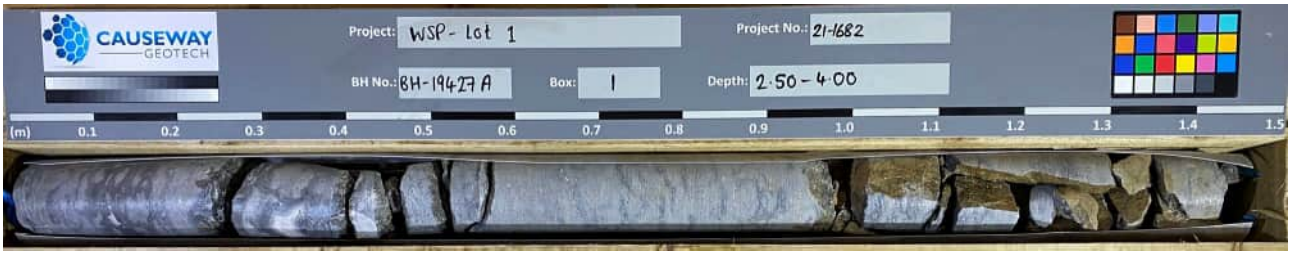
BH-19407 Box 3 (5.50-7.00m)



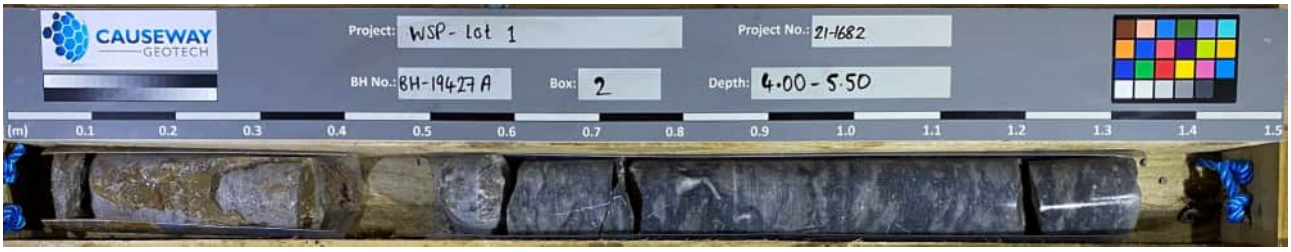
BH-19407 Box 4 (7.00-8.50m)



BH-19407 Box 5 (8.50-10.00m)



BH-19427A Box 1 (2.50-4.00m)



BH-19427A Box 2 (4.00-5.50m)



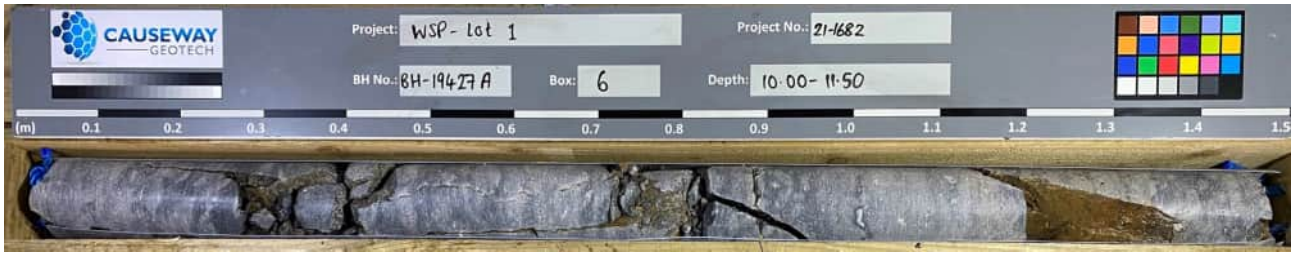
BH-19427A Box 3 (5.50-7.00m)



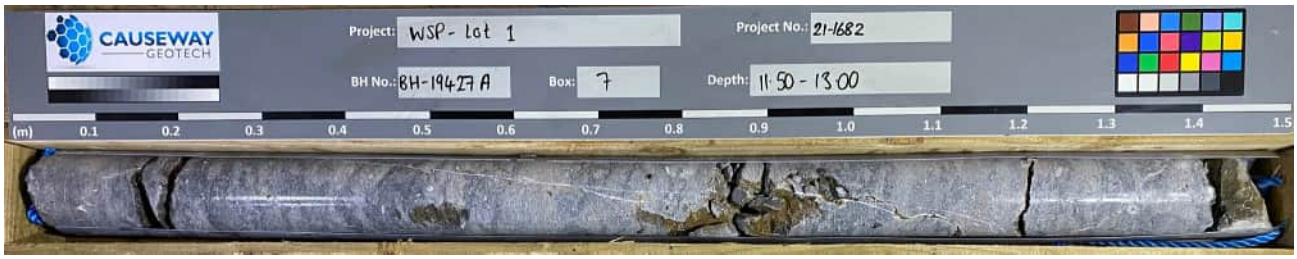
BH-19427A Box 4 (7.00-8.50m)



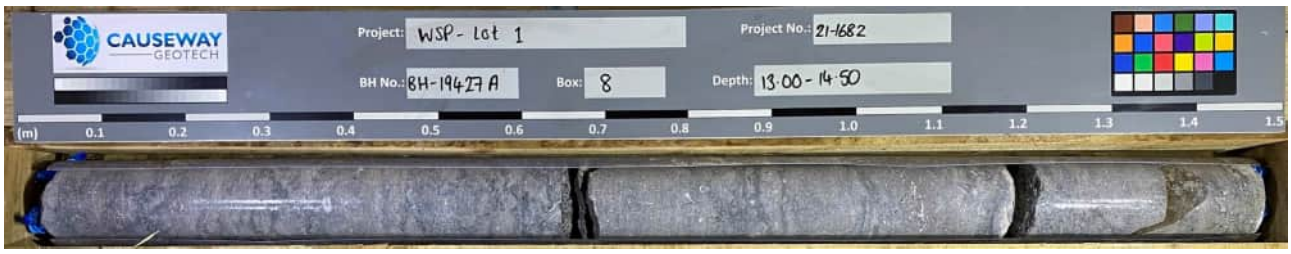
BH-19427A Box 5 (8.50-10.00m)



BH-19427A Box 6 (10.00-11.50m)



BH-19427A Box 7 (11.50-13.00m)



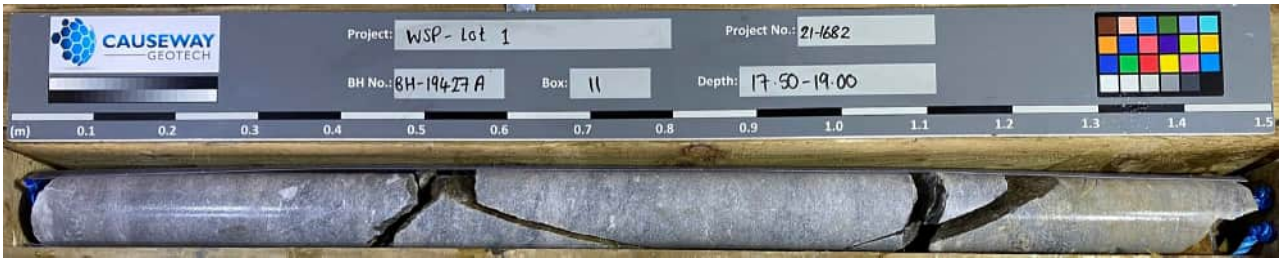
BH-19427A Box 8 (13.00-14.50m)



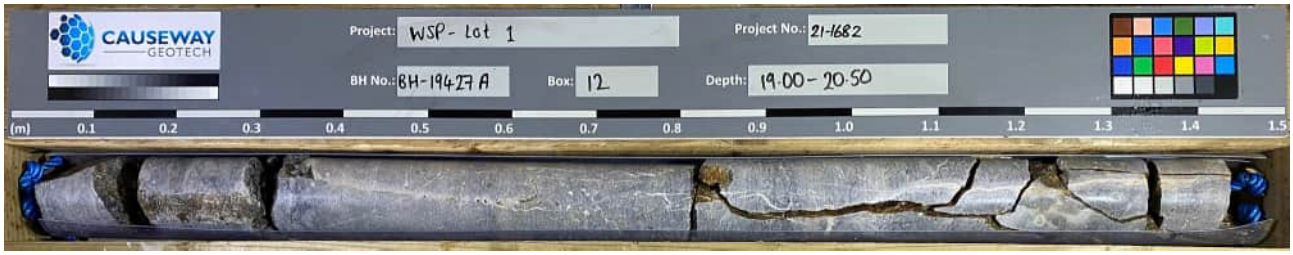
BH-19427A Box 9 (14.50-16.00m)



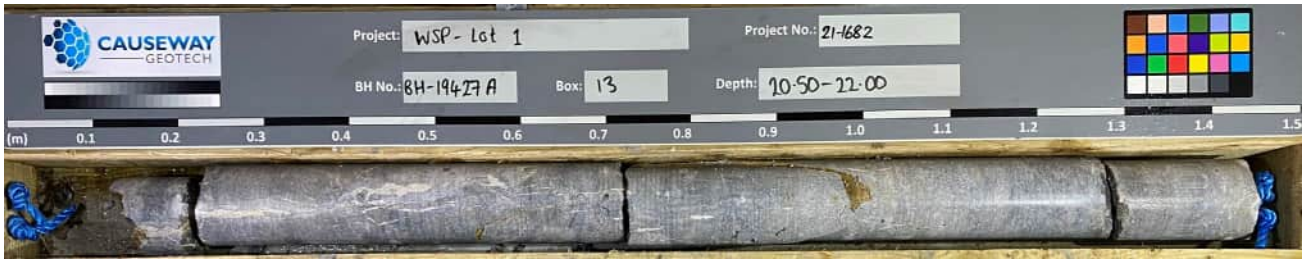
BH-19427A Box 10 (16.00-17.50m)



BH-19427A Box 11 (17.50-19.00m)



BH-19427A Box 12 (19.00-20.50m)



BH-19427A Box 13 (20.50-22.00m)



BH-19427A Box 14 (22.00-23.50m)



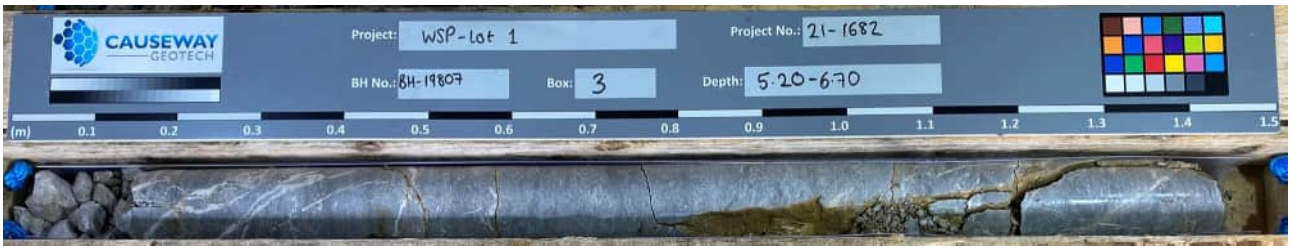
BH-19427A Box 15 (23.50-25.00m)



BH-19807 Box 1 (2.20-3.70m)



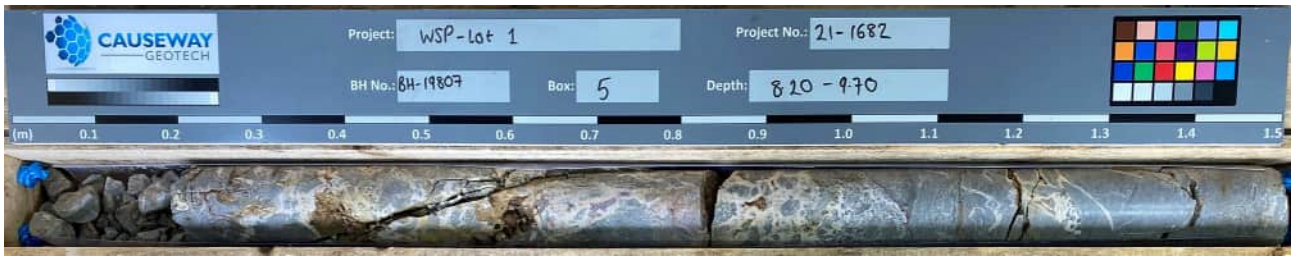
BH-19807 Box 2 (3.70-5.20m)



BH-19807 Box 3 (5.20-6.70m)



BH-19807 Box 4 (6.70-8.20m)



BH-19807 Box 5 (8.20-9.70m)



BH-20655 Box 1 (4.00-5.00m)



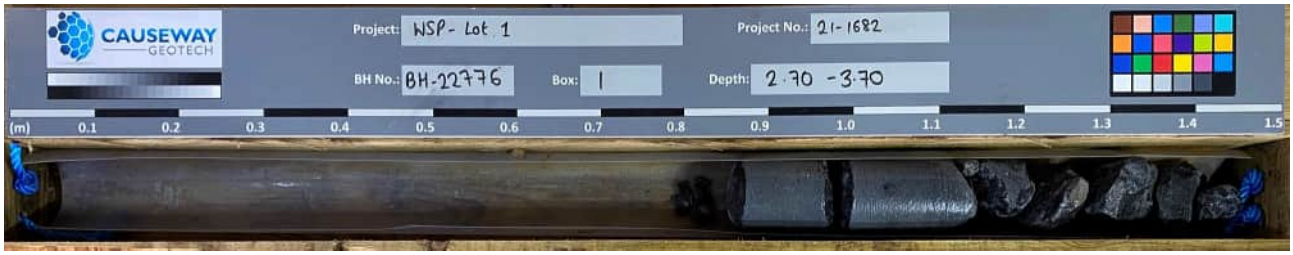
BH-20655 Box 2 (5.00-6.50m)



BH-20655 Box 3 (6.50-8.00m)



BH-20655 Box 4 (8.00-9.50m)



BH-22776 Box 1 (2.70-3.70m)



BH-22776 Box 2 (3.70-5.20m)



BH-22776 Box 3 (5.20-6.70m)



BH-22776 Box 4 (6.70-8.20m)



BH-22776 Box 5 (8.20-9.70m)



BH-22776 Box 6 (9.70-10.00m)



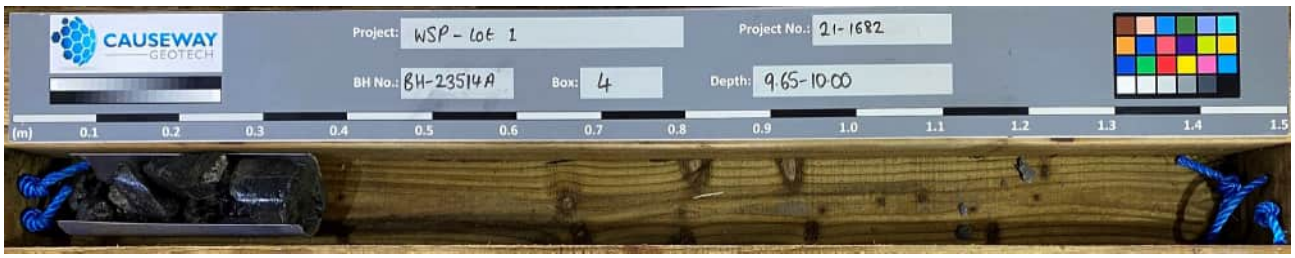
BH-23514A Box 1 (2.60-5.15m)



BH-23514A Box 2 (5.15-8.15m)



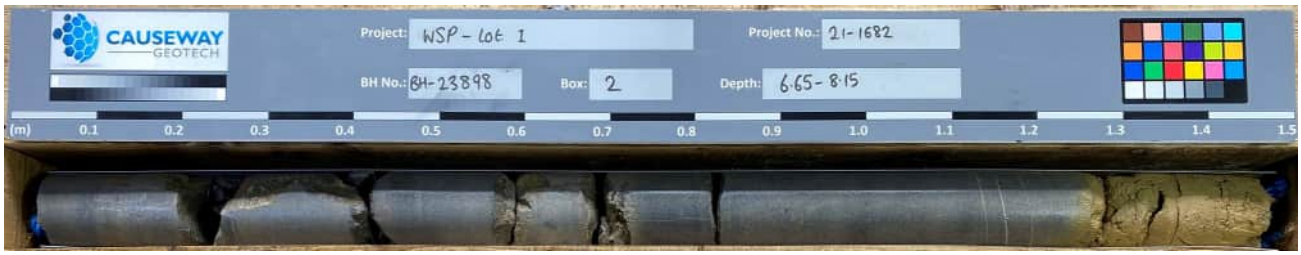
BH-23514A Box 3 (8.15-9.65m)



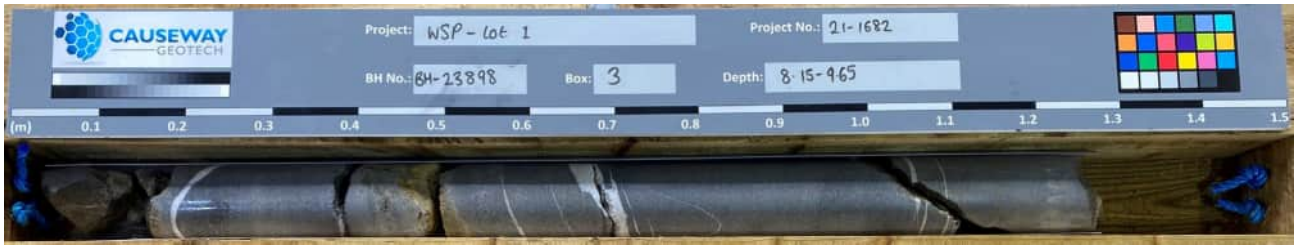
BH-23514A Box 4 (9.65-10.00m)



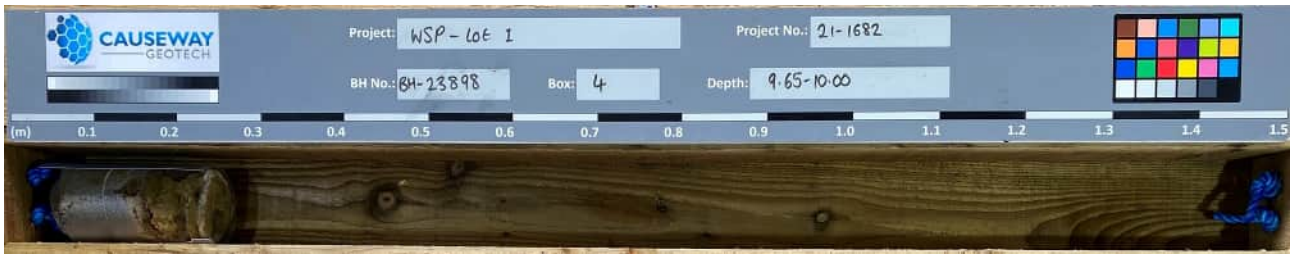
BH-23898 Box 1 (5.60-6.65m)



BH-23898 Box 2 (6.65-8.15m)



BH-23898 Box 3 (8.15-9.65m)



BH-23898 Box 4 (9.65-10.00m)



BH-24410A Box 1 (2.10-3.65m)



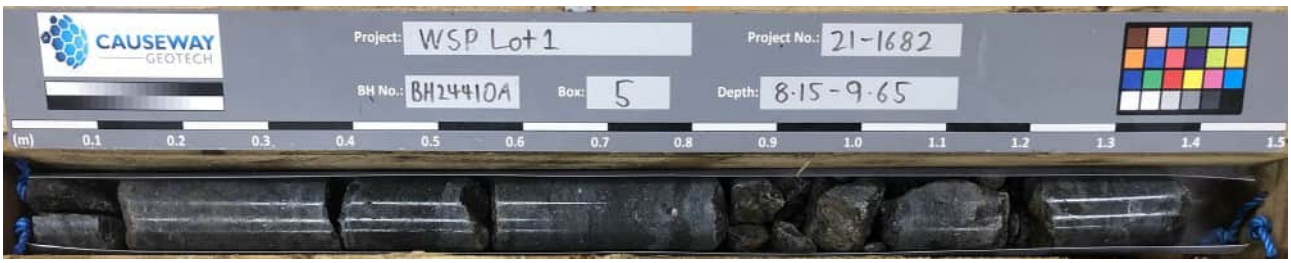
BH-24410A Box 2 (3.65-5.15m)



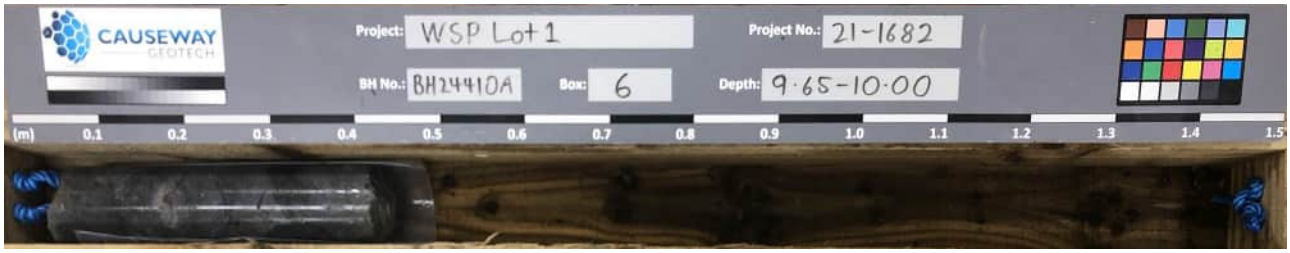
BH-24410A Box 3 (5.15-6.65m)



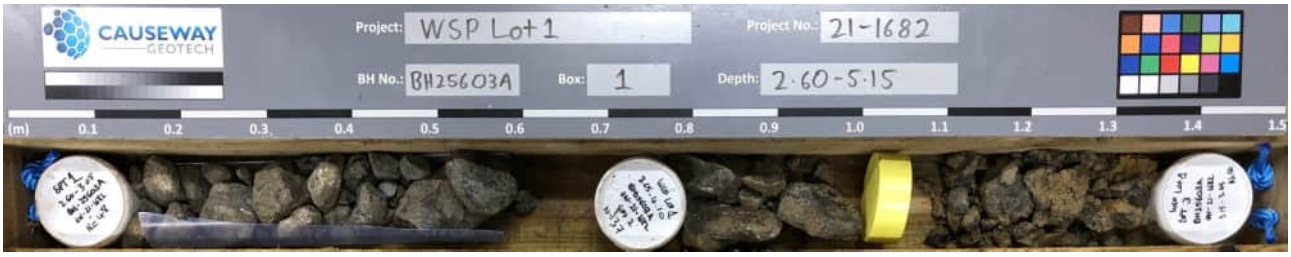
BH-24410A Box 4 (6.65-8.15m)



BH-24410A Box 5 (8.15-9.65m)



BH-24410A Box 6 (9.65-10.00m)



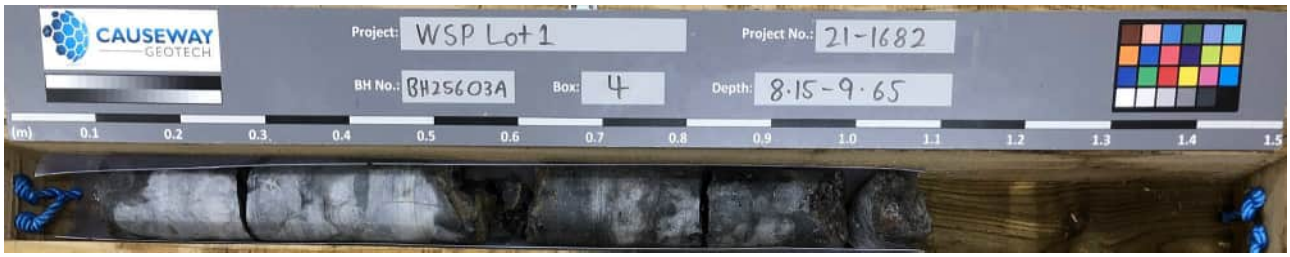
BH-25603A Box 1 (2.60-5.15m)



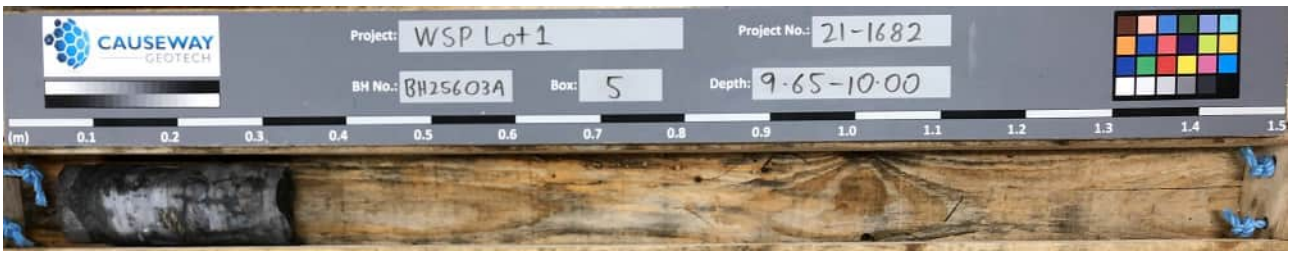
BH-25603A Box 2 (5.15-6.65m)



BH-25603A Box 3 (6.65-8.15m)



BH-25603A Box 4 (8.15-9.65m)



BH-25603A Box 5 (9.65-10.00m)



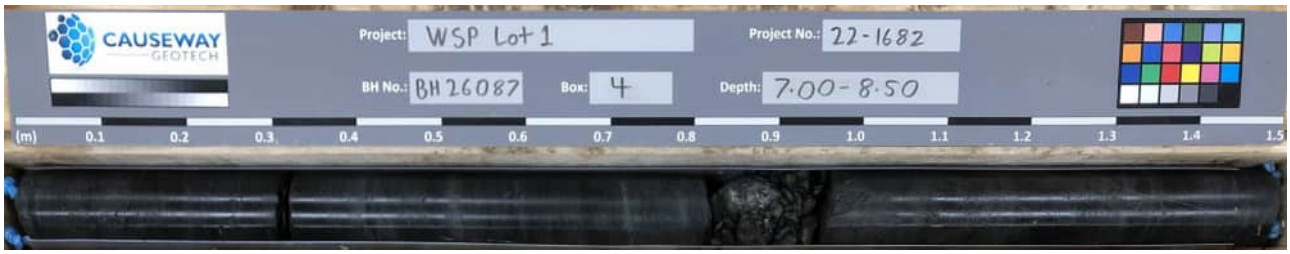
BH-26087 Box 1 (2.50-4.00m)



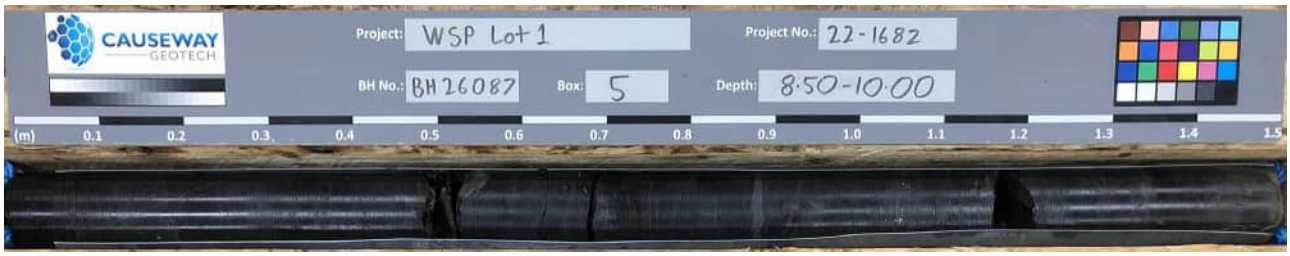
BH-26087 Box 2 (4.00-5.50m)



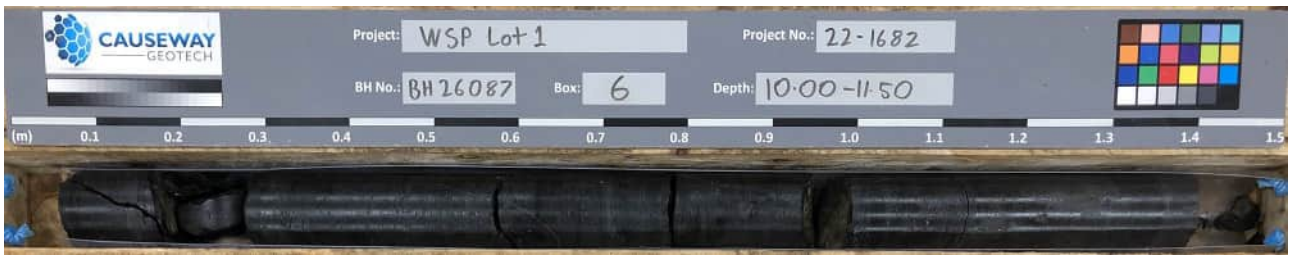
BH-26087 Box 3 (5.50-7.00m)



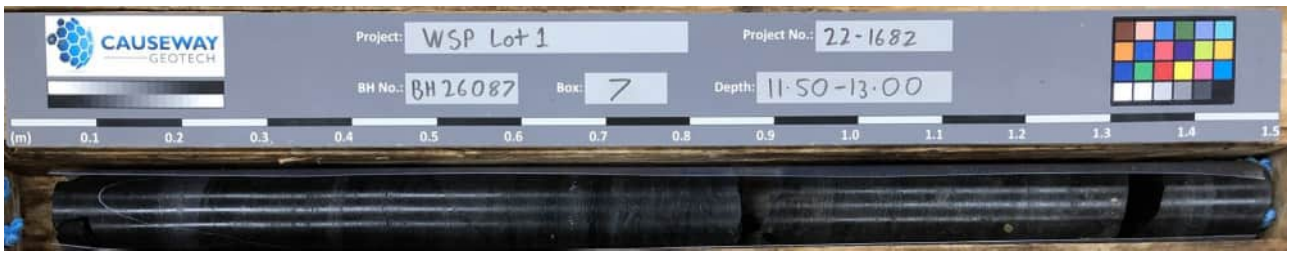
BH-26087 Box 4 (7.00-8.50m)



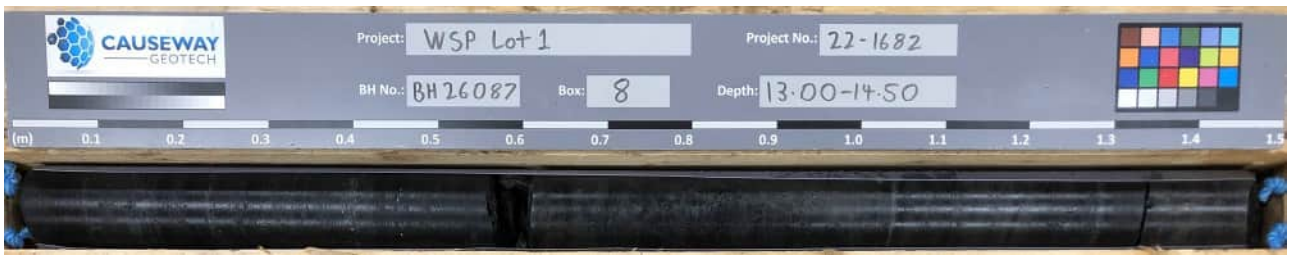
BH-26087 Box 5 (8.50-10.00m)



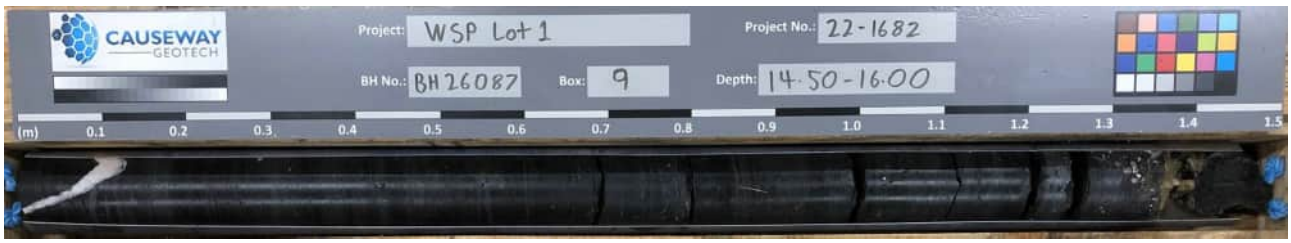
BH-26087 Box 6 (10.00-11.50m)



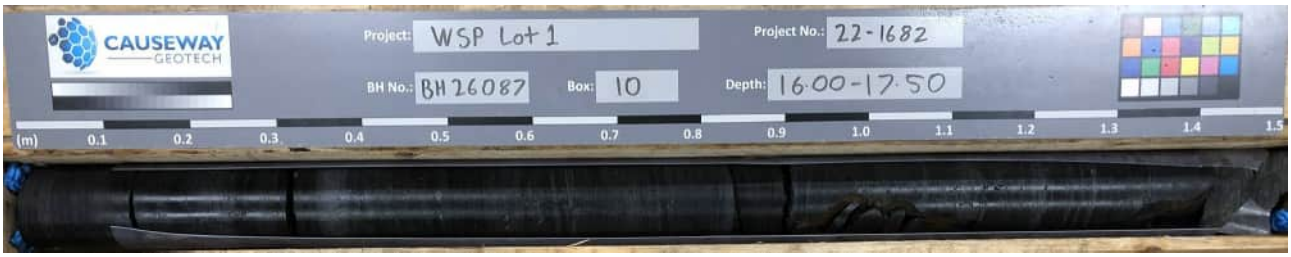
BH-26087 Box 7 (11.50-13.00m)



BH-26087 Box 8 (13.00-14.50m)



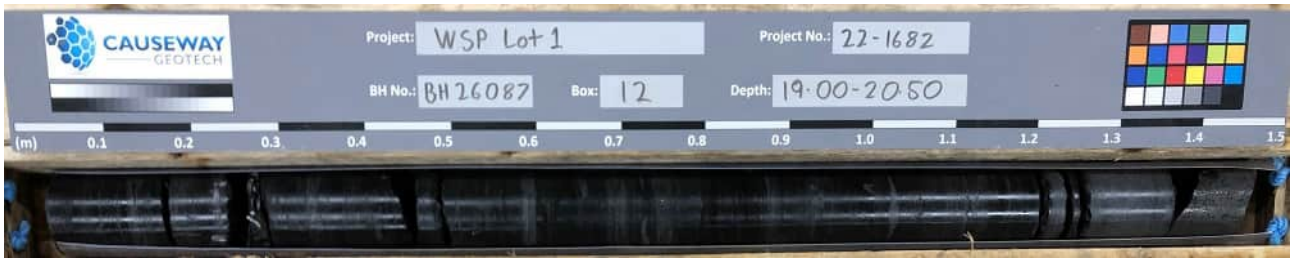
BH-26087 Box 9 (14.50-16.00m)



BH-26087 Box 10 (16.00-17.50m)



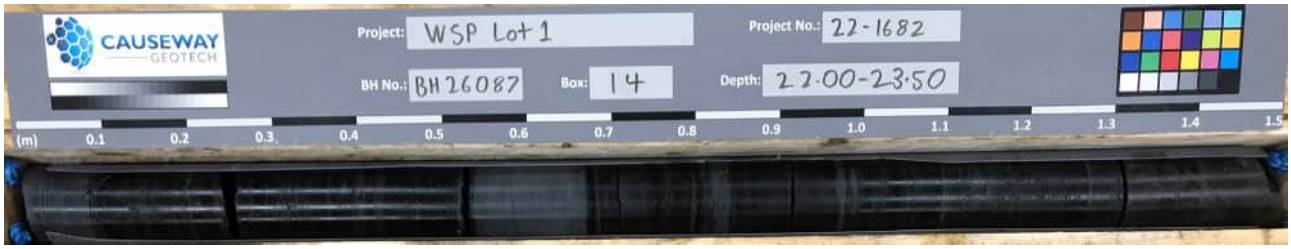
BH-26087 Box 11 (17.50-19.00m)



BH-26087 Box 12 (19.00-20.50m)



BH-26087 Box 13 (20.50-22.00m)



BH-26087 Box 14 (22.00-23.50m)



BH-26087 Box 15 (23.50-25.00m)



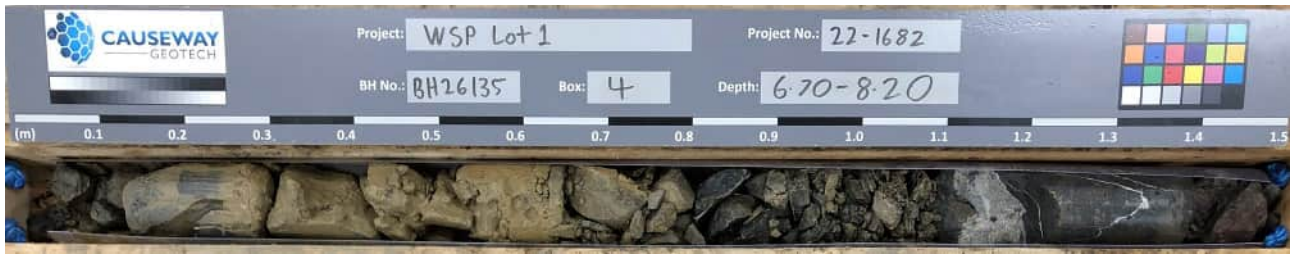
BH-26135 Box 1 (2.20-3.70m)



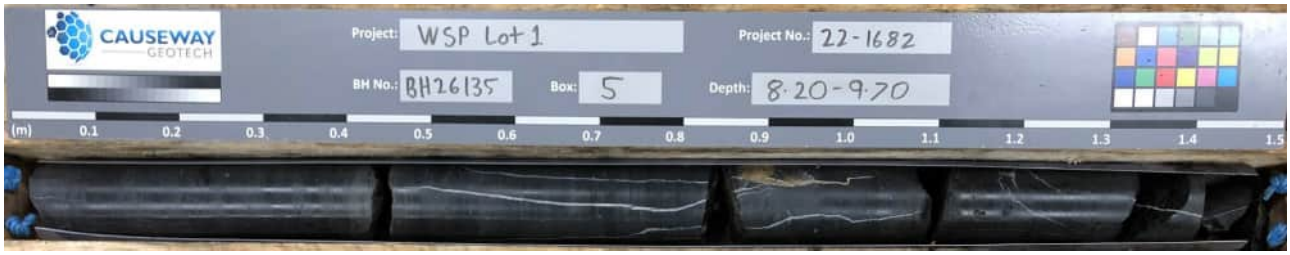
BH-26135 Box 2 (3.70-5.20m)



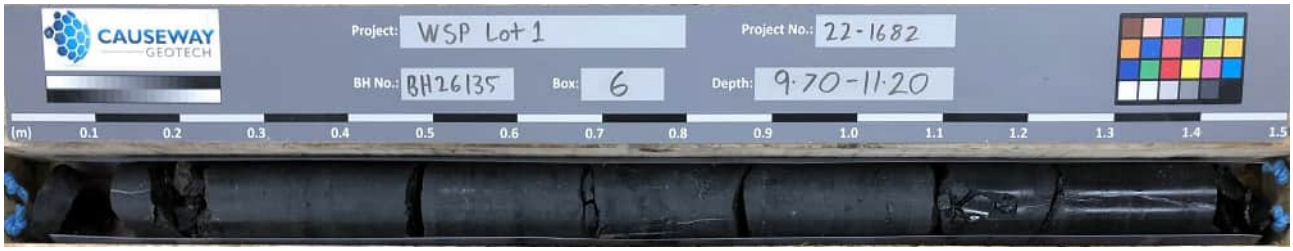
BH-26135 Box 3 (5.20-6.70m)



BH-26135 Box 4 (6.70-8.20m)



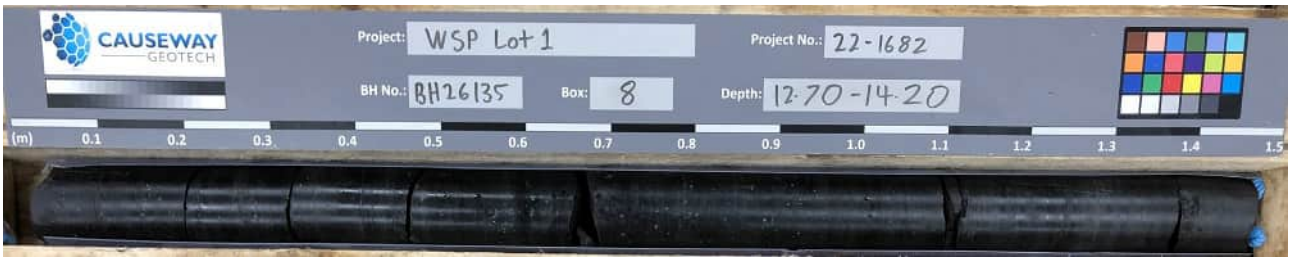
BH-26135 Box 5 (8.20-9.70m)



BH-26135 Box 6 (9.70-11.20m)



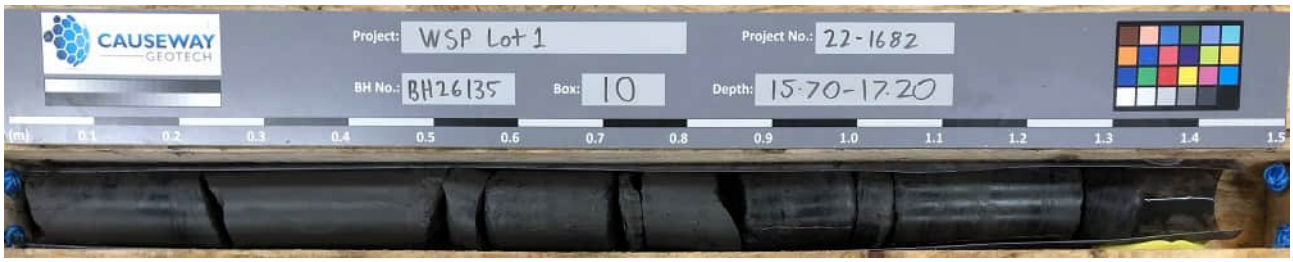
BH-26135 Box 7 (11.20-12.70m)



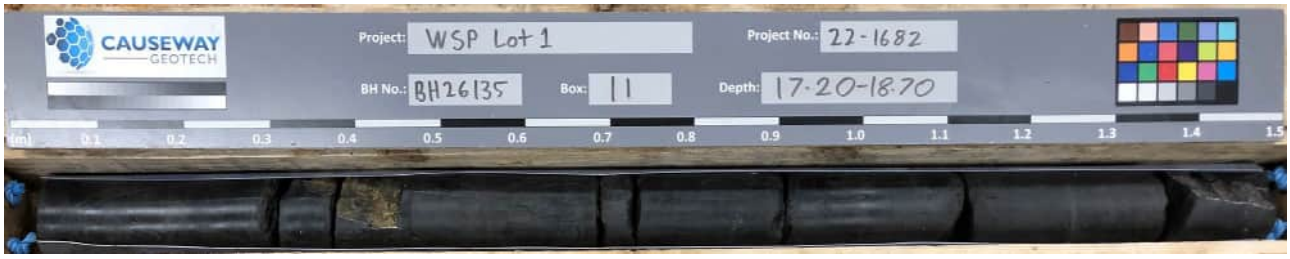
BH-26135 Box 8 (12.70-14.20m)



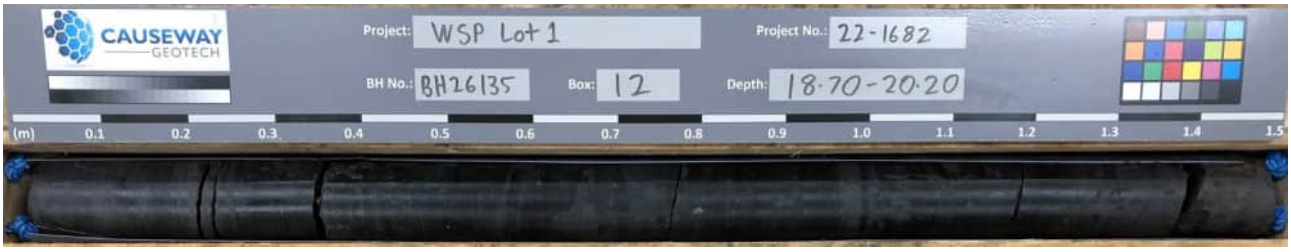
BH-26135 Box 9 (14.20-15.70m)



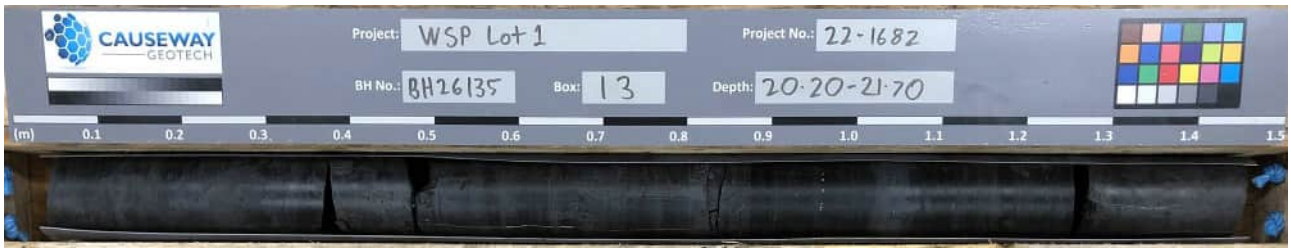
BH-26135 Box 10 (15.70-17.20m)



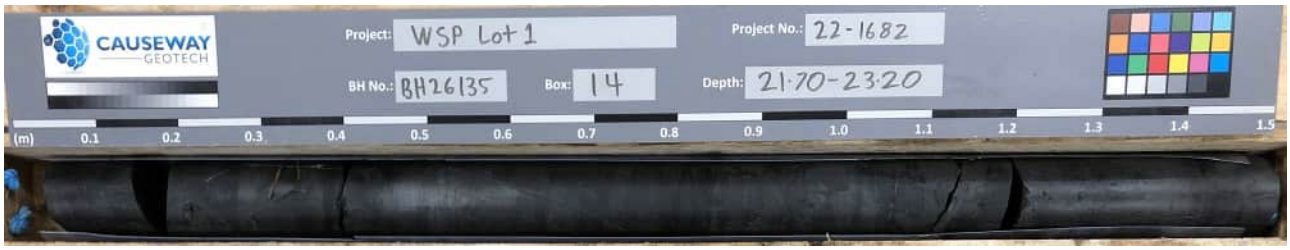
BH-26135 Box 11 (17.20-18.70m)



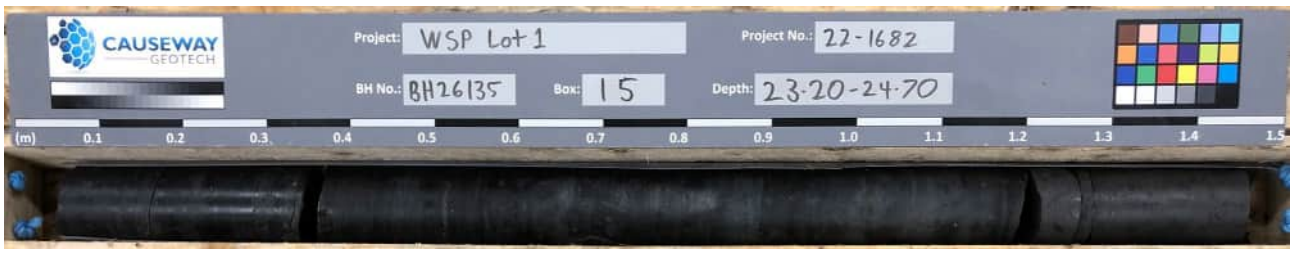
BH-26135 Box 12 18.70-20.20m)



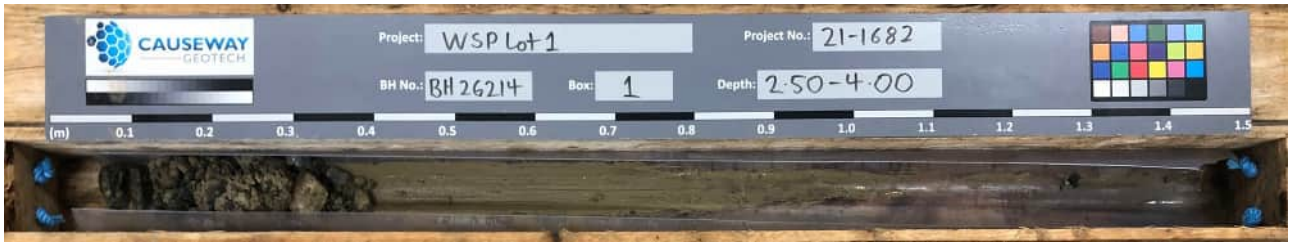
BH-26135 Box 13 (20.20-21.70m)



BH-26135 Box 14 (21.70-23.20m)



BH-26135 Box 15 (23.20-24.70m)



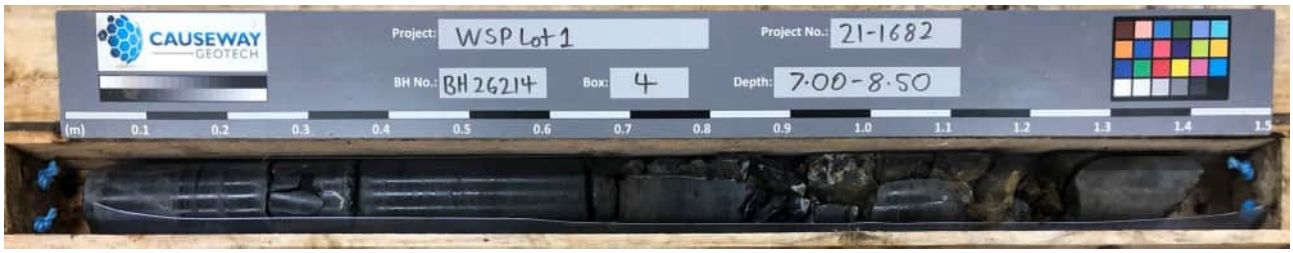
BH-26214 Box 1 (2.50-4.00m)



BH-26214 Box 2 (4.00-5.50m)



BH-26214 Box 3 (5.50-7.00m)



BH-26214 Box 4 (7.00-8.50m)



BH-26214 Box 5 (8.50-10.00m)



BH-26554A Box 1 (2.60-3.65m)



BH-26554A Box 2 (3.65-5.15m)



BH-26554A Box 3 (5.15-6.65m)



BH-26554A Box 4 (6.65-8.15m)



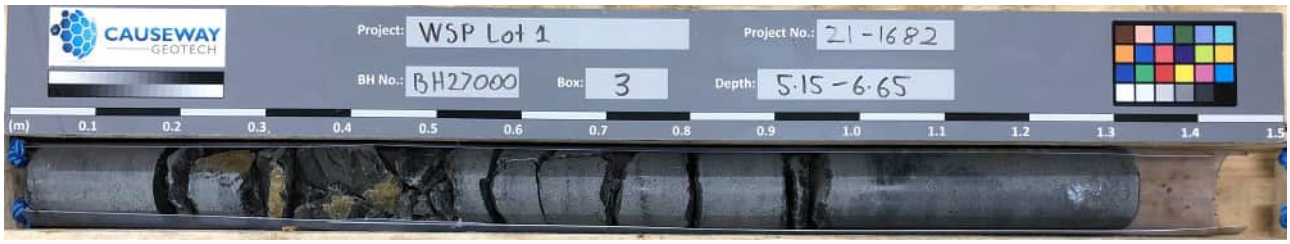
BH-26554A Box 5 (8.15-9.65m)



BH-27000 Box 1 (2.60-3.65m)



BH-27000 Box 2 (3.65-5.15m)



BH-27000 Box 3 (5.15-6.65m)



BH-27000 Box 4 (6.65-8.15m)



BH-27000 Box 5 (8.15-9.65m)



BH-27000 Box 6 (9.65-10.00m)



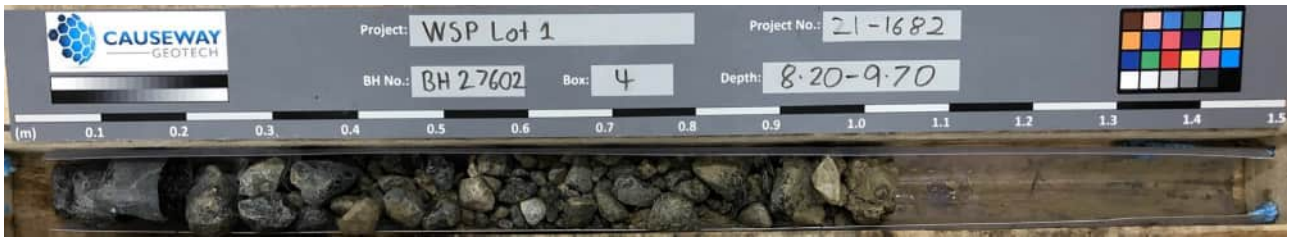
BH-27602 Box 1 (3.70-5.20m)



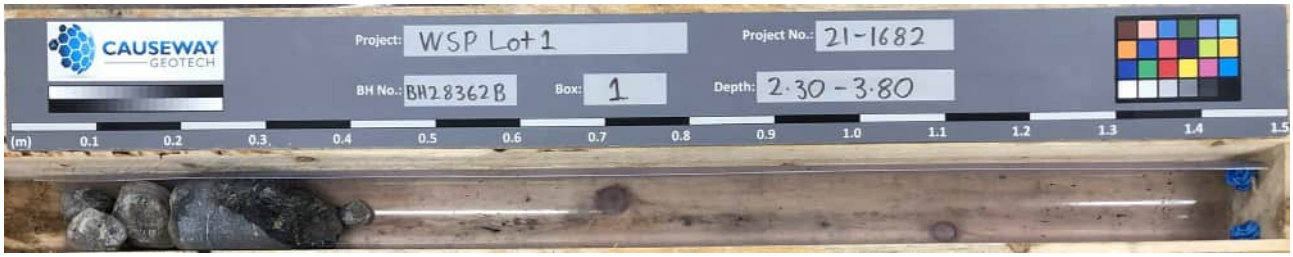
BH-27602 Box 2 (5.20-6.70m)



BH-27602 Box 3 (6.70-8.20m)



BH-27602 Box 4 (8.20-9.70m)



BH-28362B Box 1 (2.30-3.80m)

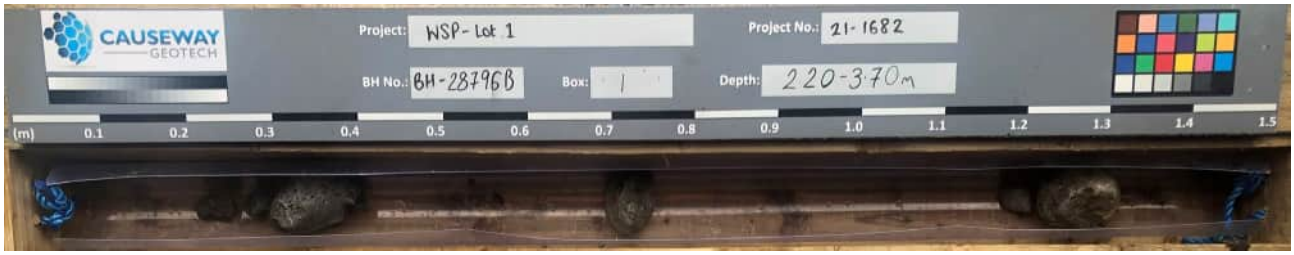


BH-28362B Box 2 (3.80-5.30m)



BH-28362B Box 3 (5.30-6.80m)

No recovery (6.80-9.80m)



BH-28796B Box 1 (2.20-3.70m)



BH-28796B Box 2 (3.70-5.20m)



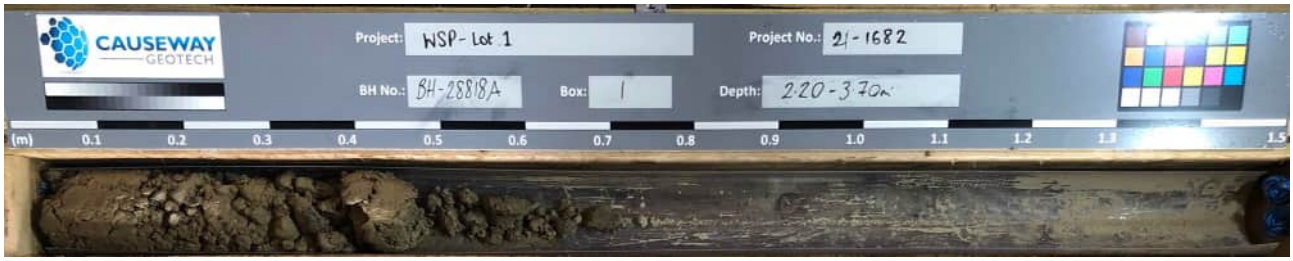
BH-28796B Box 3 (5.20-6.70m)



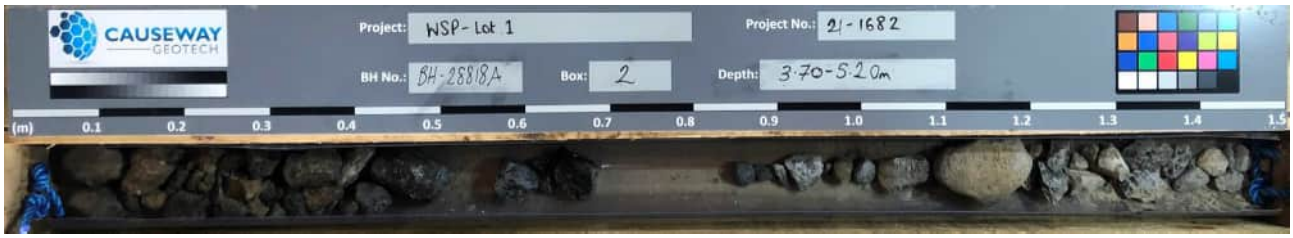
BH-28796B Box 4 (6.70-8.20m)



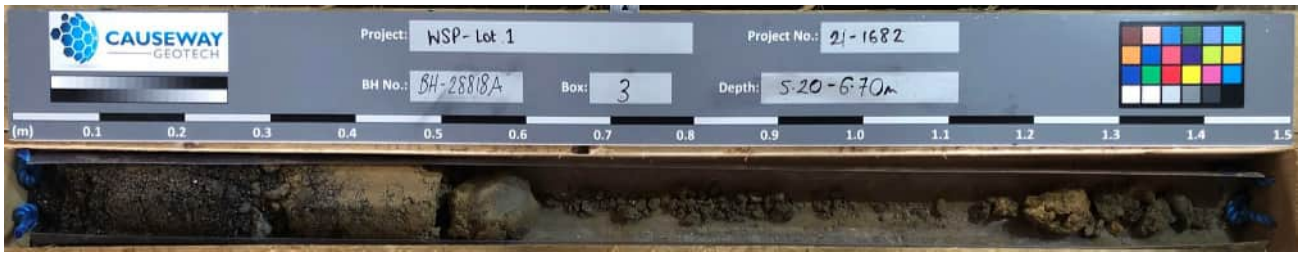
BH-28796B Box 5 (8.20-9.70m)



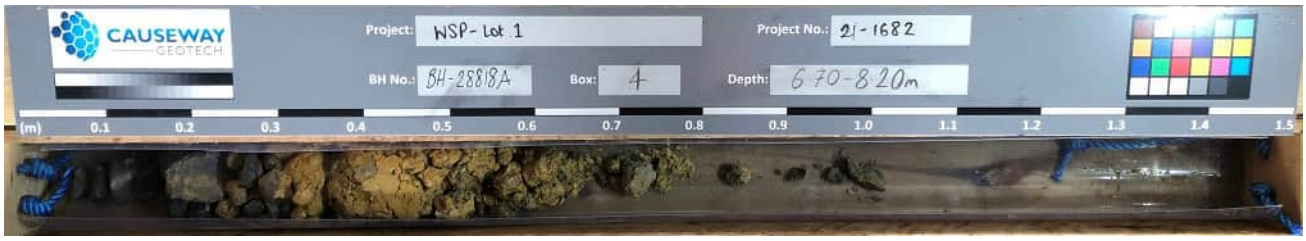
BH-28818A Box 1 (2.20-3.70m)



BH-28818A Box 2 (3.70-5.20m)



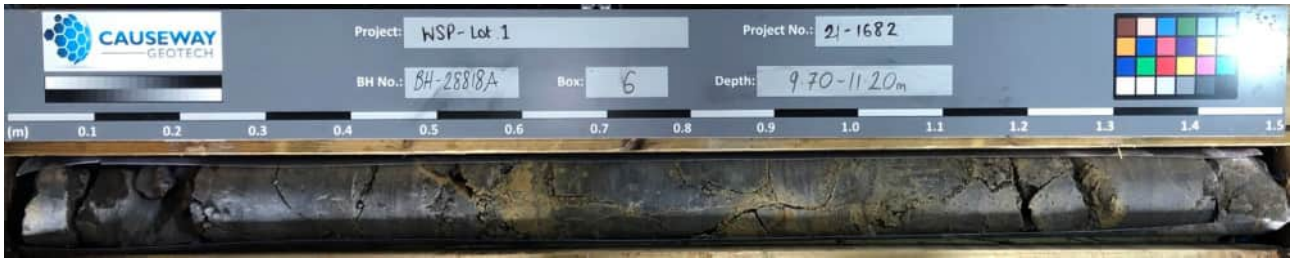
BH-28818A Box 3 (5.20-6.70m)



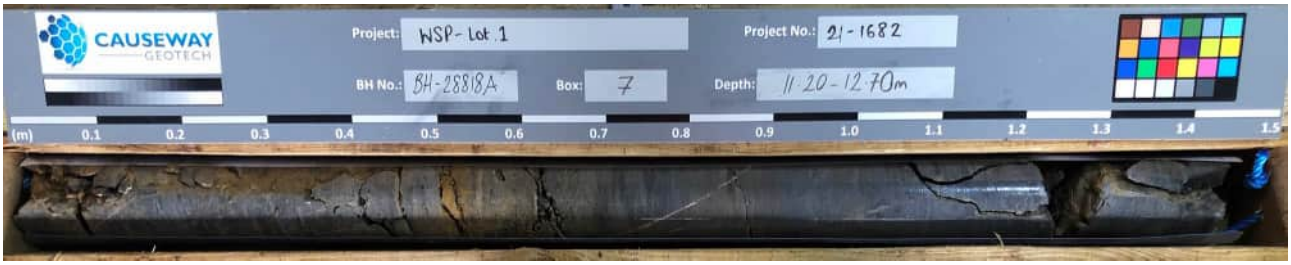
BH-28818A Box 4 (6.70-8.20m)



BH-28818A Box 5 (8.20-9.70m)



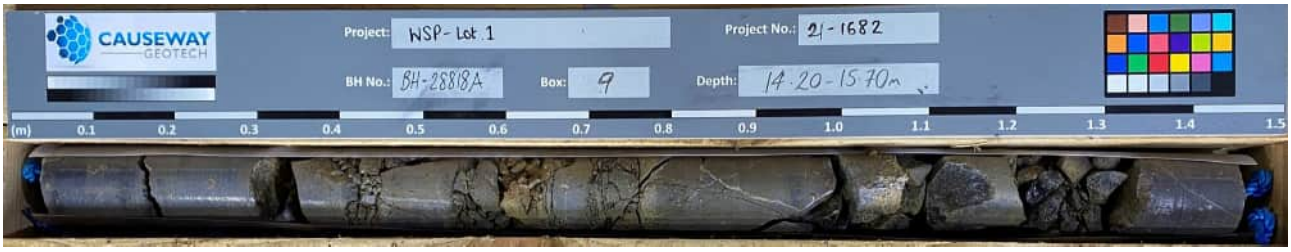
BH-28818A Box 6 (9.70-11.20m)



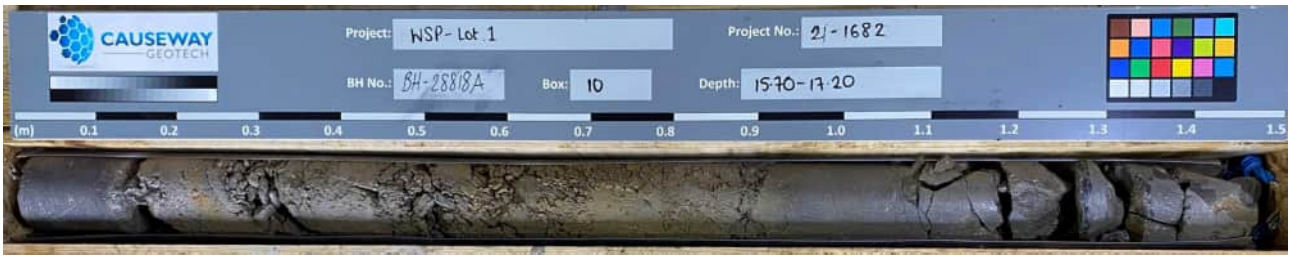
BH-28818A Box 7 (11.20-12.70m)



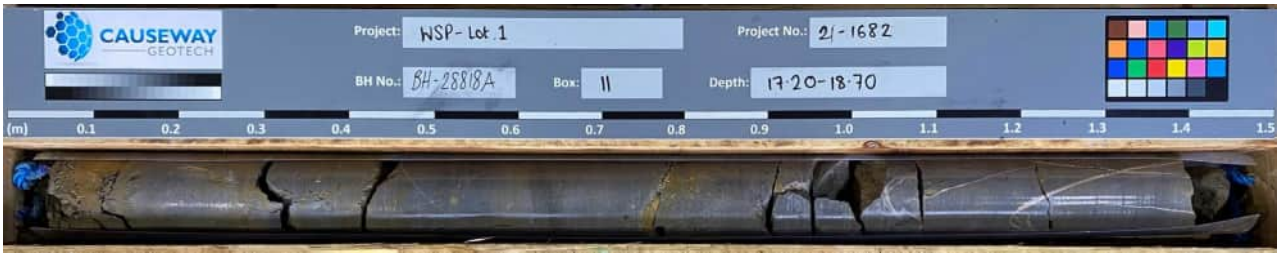
BH-28818A Box 8 (12.70-14.20m)



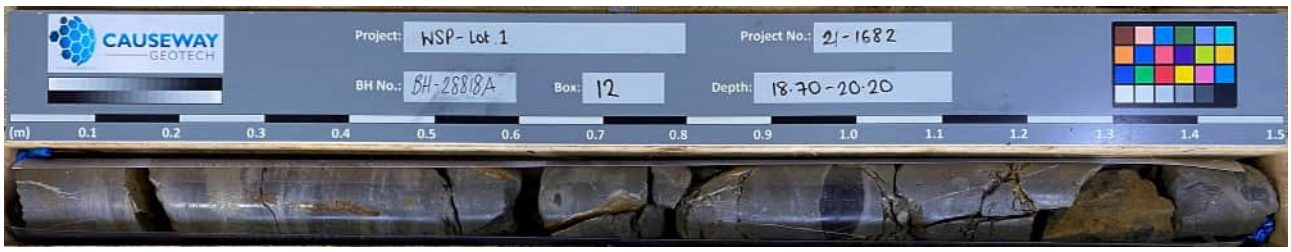
BH-28818A Box 9 (14.20-15.70m)



BH-28818A Box 10 (15.70-17.20m)



BH-28818A Box 11 (17.20-18.70m)



BH-28818A Box 12 (18.70-20.20m)



BH-28818A Box 13 (20.20-21.70m)



BH-28818A Box 14 (21.70-23.20m)



BH-28818A Box 14 (23.20-24.70m)



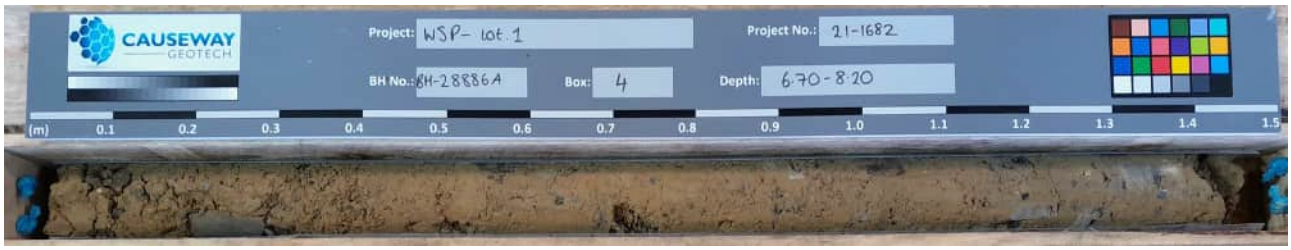
BH-28886A Box 1 (2.20-3.70m)



BH-28886A Box 2 (3.70-5.20m)



BH-28886A Box 3 (5.20-6.70m)



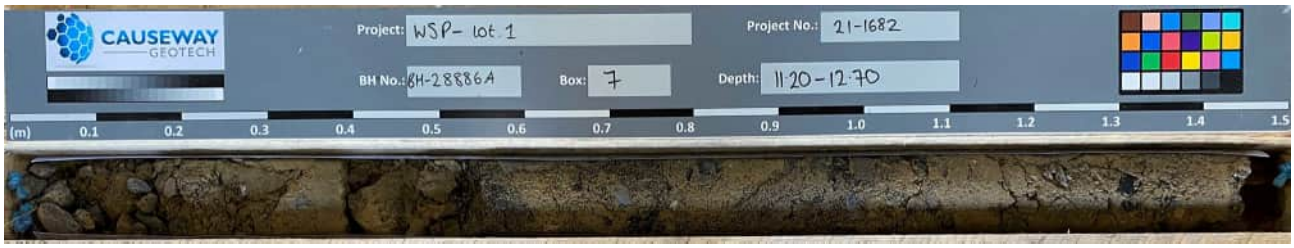
BH-28886A Box 4 (6.70-8.20m)



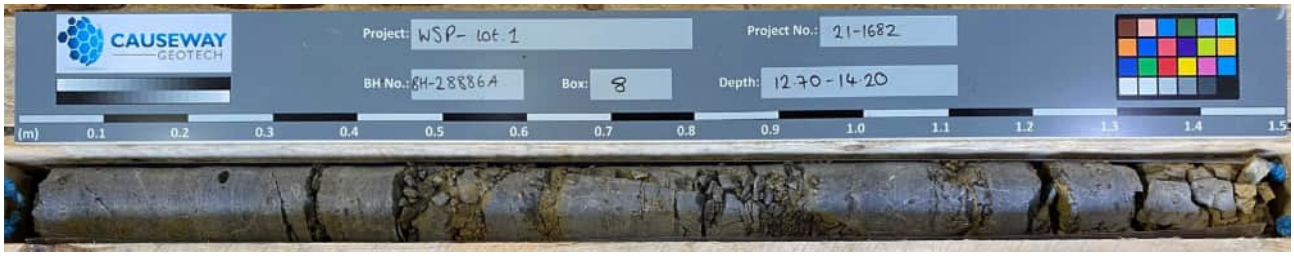
BH-28886A Box 5 (8.20-9.70m)



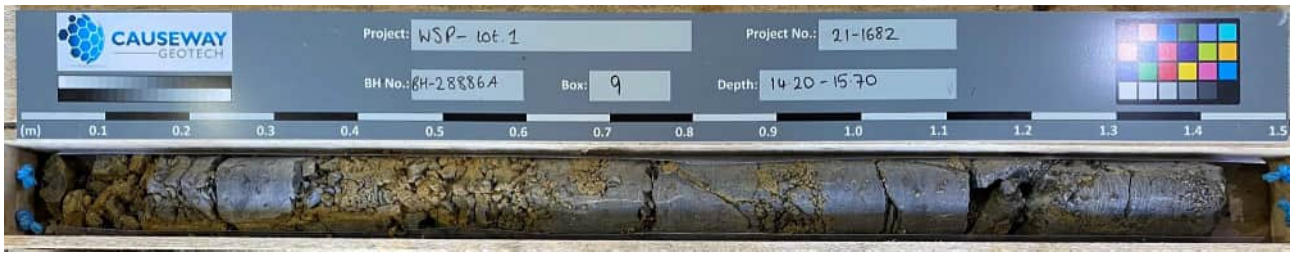
BH-28886A Box 6 (9.70-11.20m)



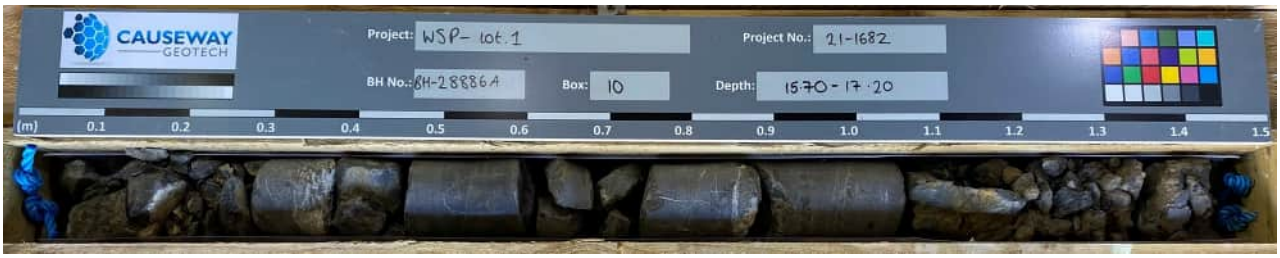
BH-28886A Box 7 (11.20-12.70m)



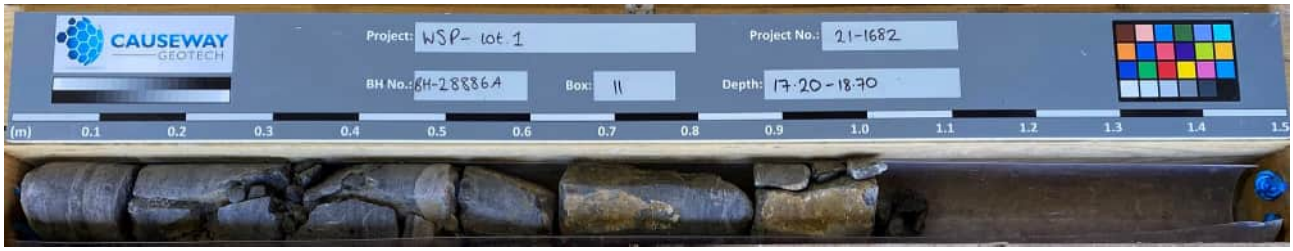
BH-28886A Box 8 (12.70-14.20m)



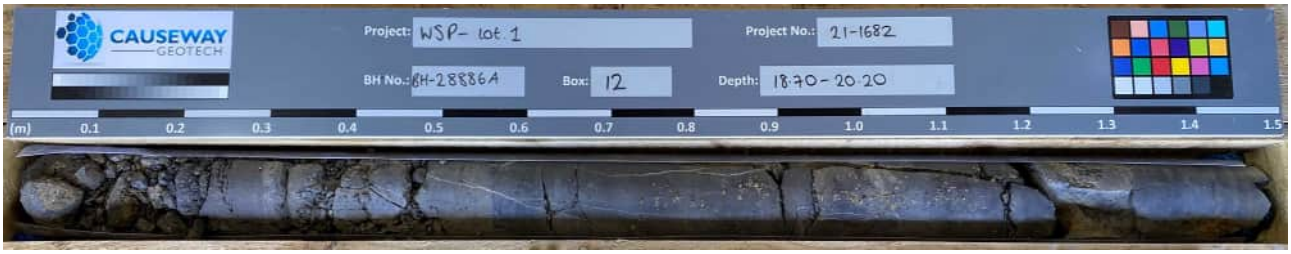
BH-28886A Box 9 (14.20-15.70m)



BH-28886A Box 10 (15.70-17.20m)



BH-28886A Box 11 (17.20-18.70m)



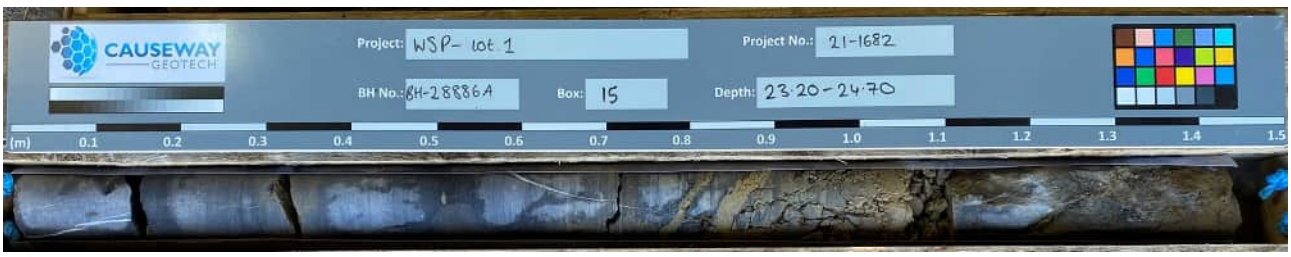
BH-28886A Box 12 (18.70-20.20m)



BH-28886A Box 13 (20.20-21.70m)



BH-28886A Box 14 (21.70-23.20m)



BH-28886A Box 15 (23.20-24.70m)



BH-28924A Box 1 (2.20-3.70m)



BH-28924A Box 2 (3.70-5.20m)



BH-28924A Box 3 (5.20-6.70m)



BH-28924A Box 4 (6.70-8.20m)



BH-28924A Box 5 (8.20-9.70m)



BH-29130 Box 1 (5.20-6.70m)



BH-29130 Box 2 (6.70-8.20m)



BH-29130 Box 3 (8.20-9.70m)



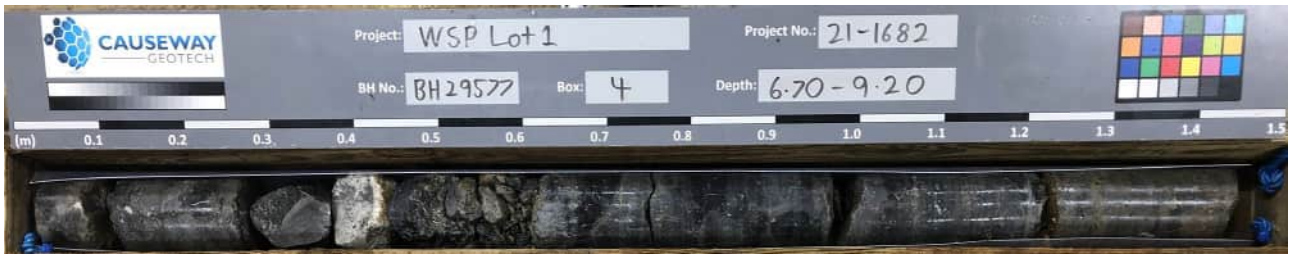
BH-29577 Box 1 (2.20-3.70m)



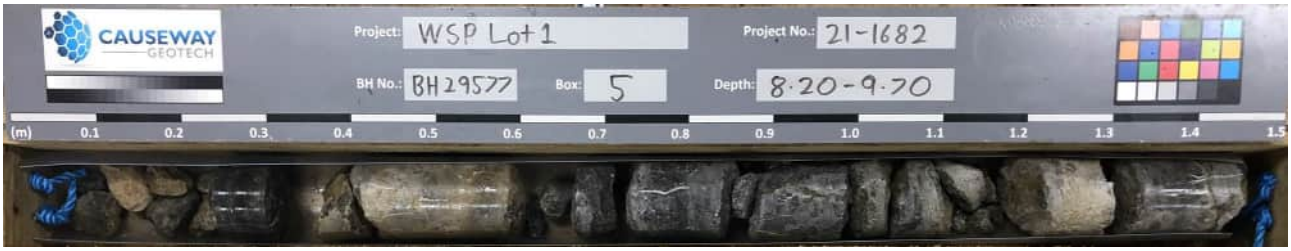
BH-29577 Box 2 (3.70-5.20m)



BH-29577 Box 3 (5.20-6.70m)



BH-29577 Box 4 (6.70-8.20m)



BH-29577 Box 5 (8.20-9.70m)



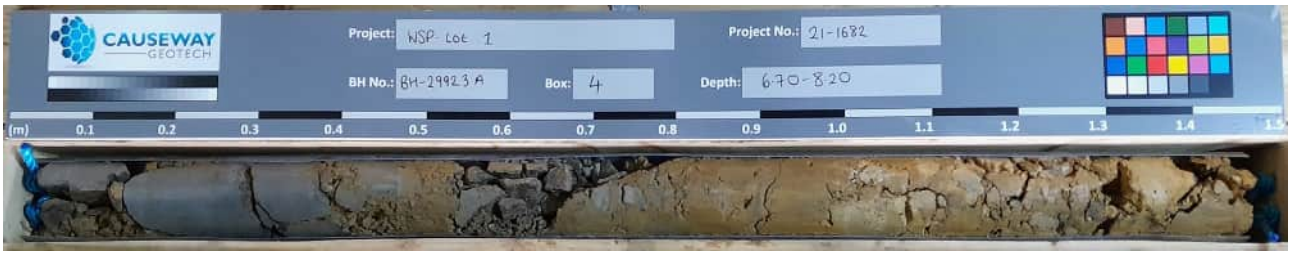
BH-29923A Box 1 (2.20-3.70m)



BH-29923A Box 2 (3.70-5.20m)



BH-29923A Box 3 (5.20-6.70m)



BH-29923A Box 4 (6.70-8.20m)



BH-29923A Box 5 (8.20-9.70m)



BH-30066 Box 1 (5.20-6.70m)



BH-30066 Box 2 (6.70-8.20m)



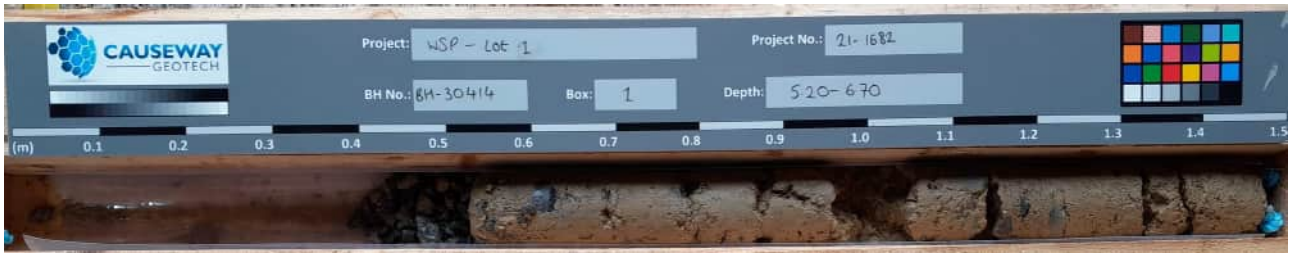
BH-30066 Box 3 (8.20-9.70m)



BH-30066 Box 4 (9.70-11.20m)



BH-30066 Box 5 (11.20-12.70m)



BH-30414 Box 1 (5.20-6.70m)



BH-30414 Box 2 (6.70-8.20m)



BH-30414 Box 3 (8.20-9.70m)



BH-30414 Box 4 (9.70-11.20m)



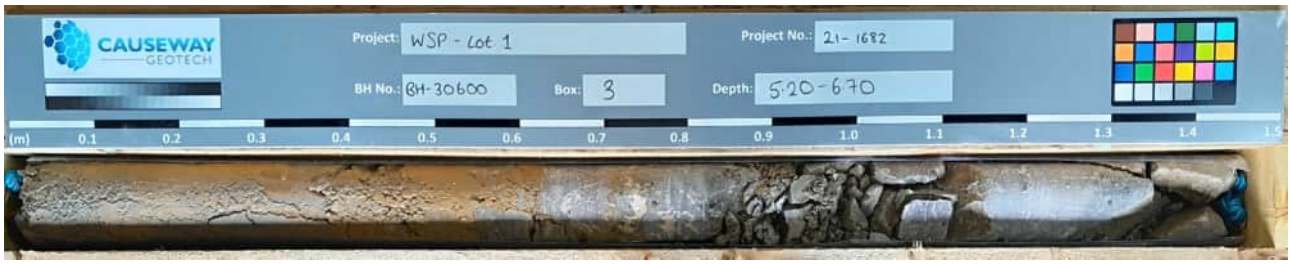
BH-30414 Box 5 (11.20-12.70m)



BH-30600 Box 1 (2.20-3.70m)



BH-30600 Box 2 (3.70-5.20m)



BH-30600 Box 3 (5.20-6.70m)



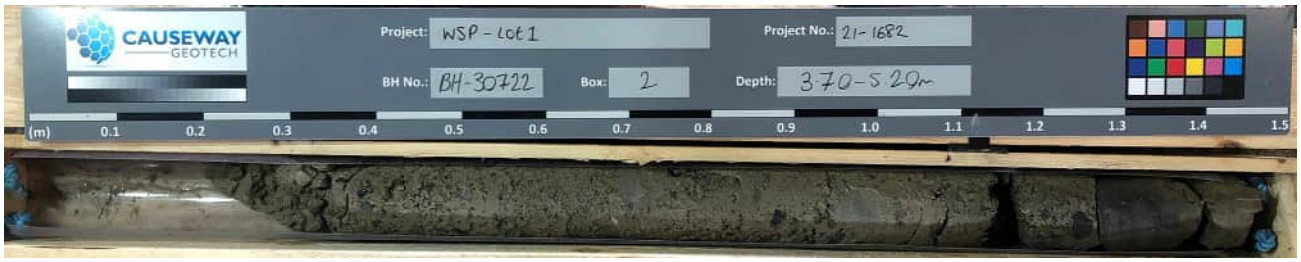
BH-30600 Box 4 (6.70-8.20m)



BH-30600 Box 5 (8.20-9.70m)



BH-30722 Box 1 (2.20-3.70m)



BH-30722 Box 2 (3.70-5.20m)



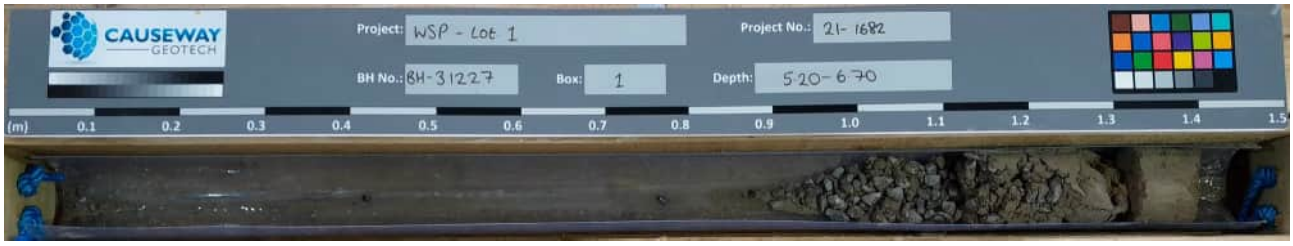
BH-30722 Box 3 (5.20-6.70m)



BH-30722 Box 4 (6.70-8.20m)



BH-30722 Box 5 (8.20-9.70m)



BH-31227 Box 1 (5.20-6.70m)



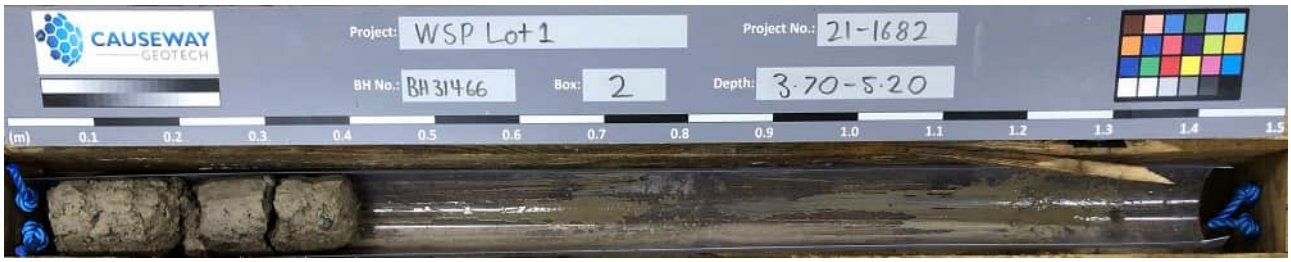
BH-31227 Box 2 (6.70-8.20m)



BH-31227 Box 3 (8.20-9.70m)



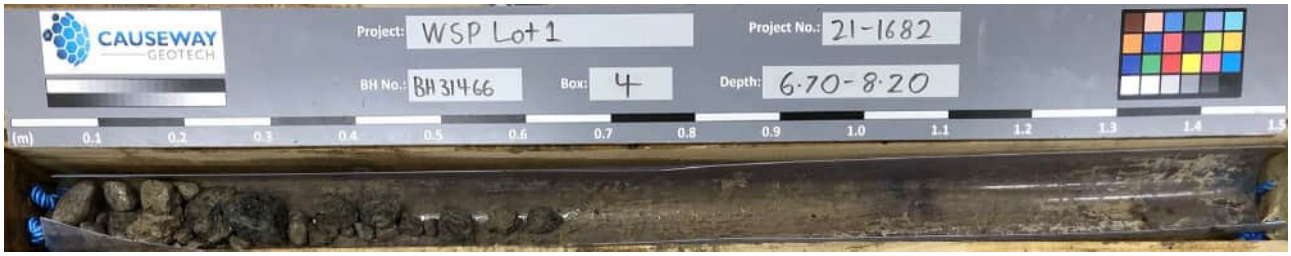
BH-31466 Box 1 (2.20-3.70m)



BH-31466 Box 2 (3.70-5.20m)



BH-31466 Box 3 (5.20-6.70m)



BH-31466 Box 4 (6.70-8.20m)



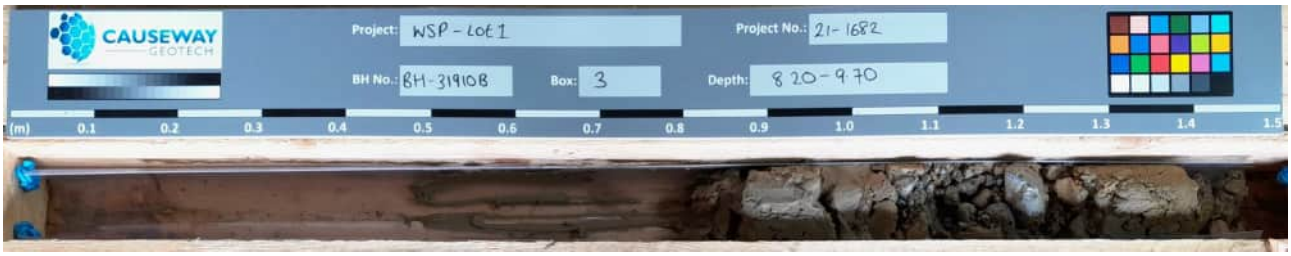
BH-31466 Box 5 (8.20-9.70m)



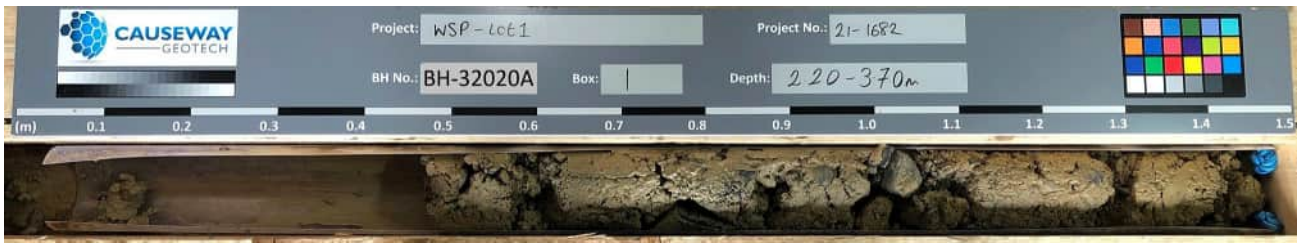
BH-31910B Box 1 (5.20-6.70m)



BH-31910B Box 2 (6.70-8.20m)



BH-31910B Box 3 (8.20-9.70m)



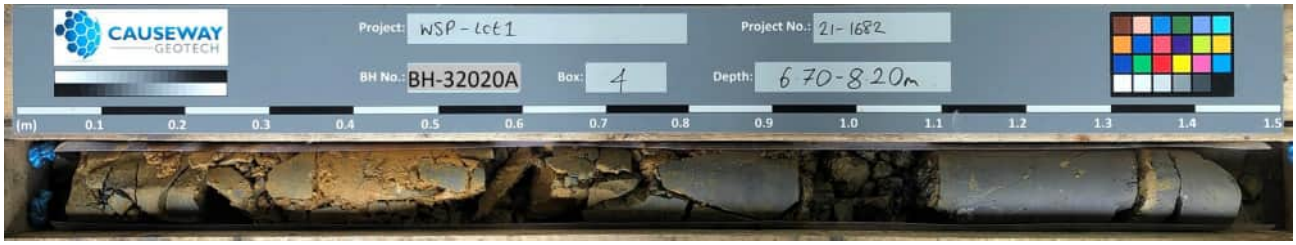
BH-32020A Box 1 (2.20-3.70m)



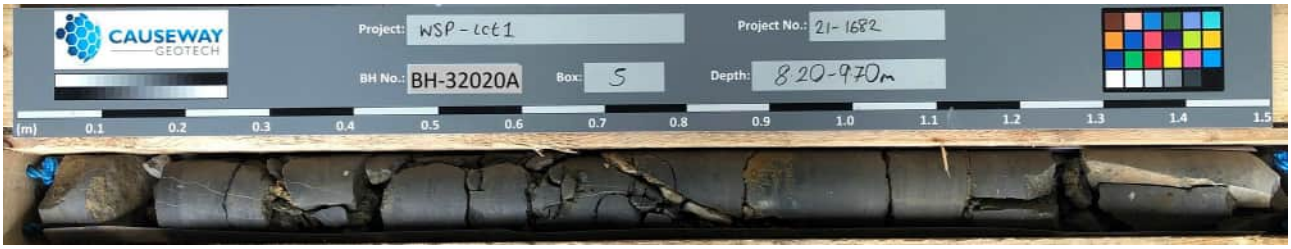
BH-32020A Box 2 (3.70-5.20m)



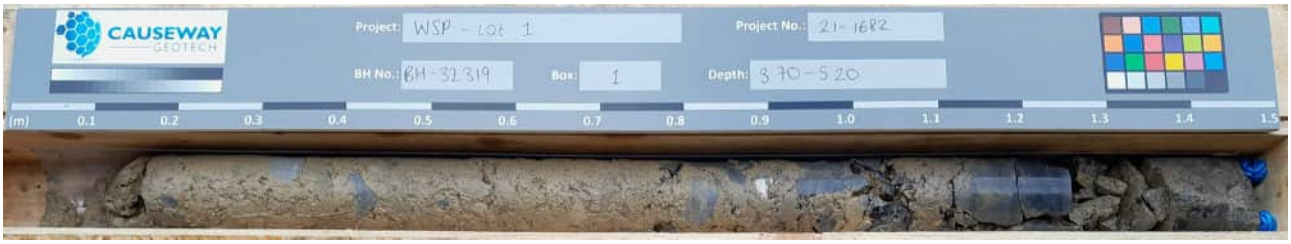
BH-32020A Box 3 (5.20-6.70m)



BH-32020A Box 4 (6.70-8.20m)



BH-32020A Box 5 (8.20-9.70m)



BH-32319 Box 1 (3.70-5.20m)



BH-32319 Box 2 (5.20-6.70m)



BH-32319 Box 3 (6.70-8.20m)



BH-32319 Box 4 (8.20-9.70m)



BH-32601 Box 1 (2.20-3.70m)



BH-32601 Box 2 (3.70-5.20m)



BH-32601 Box 3 (5.20-6.70m)



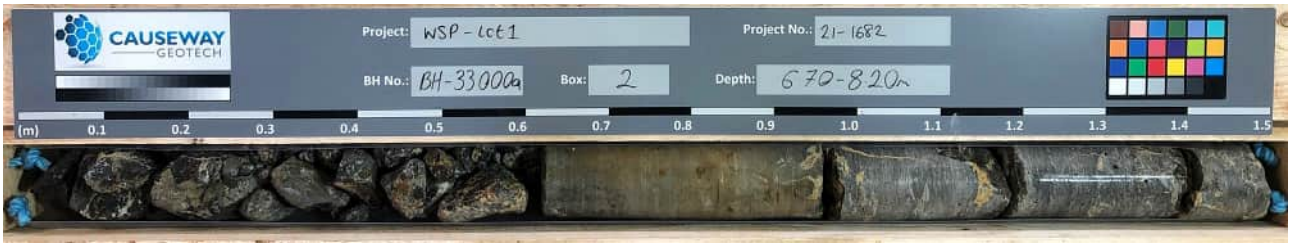
BH-32601 Box 4 (6.70-8.20m)



BH-32601 Box 5 (8.20-9.70m)



BH-33000A Box 1 (5.20-6.70m)



BH-33000A Box 2 (6.70-8.20m)



BH-33000A Box 3 (8.20-9.70m)



BH-34598A Box 1 (4.60-6.10m)



BH-34598A Box 2 (6.10-7.60m)



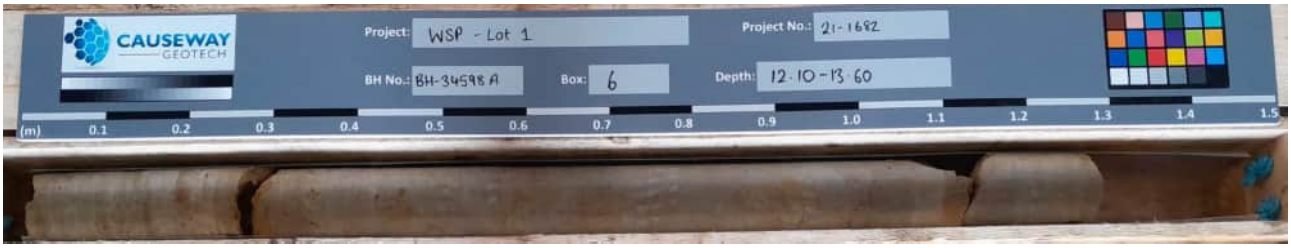
BH-34598A Box 3 (7.60-9.10m)



BH-34598A Box 4 (9.10-10.60m)



BH-34598A Box 5 (10.60-12.10m)



BH-34598A Box 6 (12.10-13.60m)



BH-34598A Box 7 (13.60-15.10m)



BH-34598A Box 8 (15.10-16.60m)



BH-34598A Box 9 (16.60-18.10m)



BH-34598A Box 10 (18.10-19.60m)



BH-34598A Box 11 (19.60-21.10m)



BH-34598A Box 12 (21.10-22.60m)



BH-34598A Box 13 (22.60-24.10m)



BH-34598A Box 14 (24.10-25.60m)



BH-34816B Box 1 (2.20-3.20m)



BH-34816B Box 2 (3.20-4.70m)



BH-34816B Box 3 (4.70-6.00m)



BH-34816B Box 4 (6.00-7.50m)



BH-34816B Box 5 (7.50-8.70m)



BH-34816B Box 6 (8.70-10.00m)



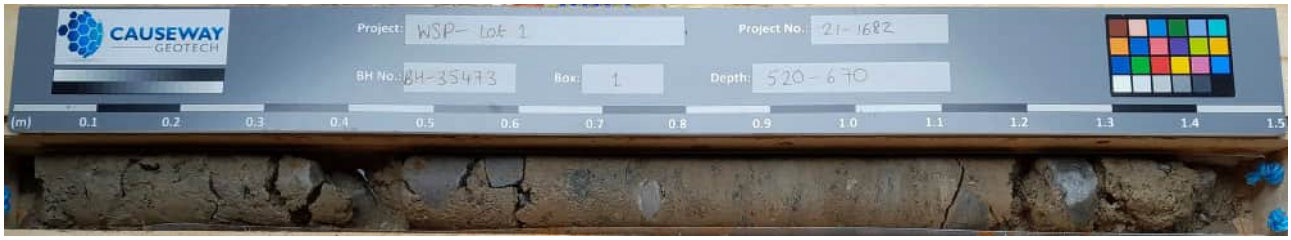
BH-35202 Box 1 (5.20-6.70m)



BH-35202 Box 2 (6.70-8.20m)



BH-35202 Box 3 (8.20-9.70m)



BH-35473 Box 1 (5.20-6.70m)



BH-35473 Box 2 (6.70-8.20m)



BH-35473 Box 3 (8.20-9.70m)


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 16/08/22
EH No.: TP-2007
(m) 0.1 0.2 0.3 0.4 0.5

TP-2007



TP-2007

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 16/08/22
EH No.: TP-2007

TP-2007



TP-2007


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 16/08/22
EH No.: TP-2007
(m) 0.1 0.2 0.3 0.4 0.5

TP-2007


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 16/08/22
EH No.: TP-2140
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TP-2140


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 16/08/22
EH No.: TP-2140
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TP-2140


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 16/08/22
EH No.: TP-2140
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(m)

TP-2140



TP-2140



TP-2140

CAUSEWAY GEOTECH



TP-2219

CAUSEWAY GEOTECH



TP-2219

CAUSEWAY GEOTECH



TP-2219

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 16/08/22
EH No.: TP-2219
(m) 0.1 0.2 0.3 0.4 0.5

TP-2219


CAUSEWAY
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Project: WSP
Project No.: 21-1682
Date: 16/08/22
EH No.: TP-2219
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TP-2219


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 16/08/22
EH No.: TP-2219
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TP-2219



TP-2219A

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 16/08/22
EH No.: TP-2219A
(m) 0.1 0.2 0.3 0.4 0.5

TP-2219A



TP-2219A

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 16/08/22
EH No.: TP-2219A
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TP-2219A


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 16/08/22
EH No.: TP-2219A
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TP-2219A



TP-2349

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 17/08/22
EH No.: TP-2349
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TP-2349



TP-2349

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 17/08/22
EH No.: TP-2349
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TP-2349


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 17/08/22
EH No.: TP-2349
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TP-2349


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 17/08/22
EH No.: TP-2349
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TP-2349



TP-2701

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 17/08/22
EH No.: TP-2701
(m) 0.1 0.2 0.3 0.4 0.5

TP-2701


CAUSEWAY
GEOTECH
Project:
WSP
Project No.:
21-1682
Date:
17/08/22
EH No.:
TP-2701

TP-2701


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 17/08/22
EH No.: TP-2701
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TP-2701


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 17/08/22
EH No.: TP-2701
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TP-2701



TP-2701


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 17/08/22
EH No.: TP-3302
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TP-3302


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 17/08/22
EH No.: TP-3302

TP-3302



TP-3302

CAUSEWAY GEOTECH


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Project: WSP
Project No.: 21-1682
Date: 17/08/22
EH No.: TP-3302
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TP-3302



TP-3302


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TP-3302


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Project: WSP
Project No.: 21-1682
Date: 17/08/22
EH No.: TP-3504
(m) 0.1 0.2 0.3 0.4 0.5

TP-3504



TP-3504

CAUSEWAY GEOTECH



TP-3504

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 17/08/22
EH No.: TP-3504
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TP-3504



TP-3504

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 17/08/22
EH No.: TP-3504
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TP-3504



TP-3978

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 22/08/22
EH No.: TP-3978
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TP-3978



TP-3978

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 22/08/22
EH No.: TP-3978

TP-3978


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 22/08/22
EH No.: TP-3978
(m) 0.1 0.2 0.3 0.4 0.5

TP-3978



TP-3978

CAUSEWAY GEOTECH



TP-4112

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 17/08/22
EH No.: TP-4112
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TP-4112



TP-4112

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 17/08/22
EH No.: TP-4112
(m) 0.1 0.2 0.3 0.4

TP-4112



TP-4112

CAUSEWAY GEOTECH



TP-5303

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 22/08/22
EH No.: TP-5303

TP-5303


CAUSEWAY
GEOTECH
Project:
WSP
Project No.:
21-1682
Date:
22/08/22
Exp. No.:
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TP-5303


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 22/08/22
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TP-5303



TP-5303

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 22/08/22
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TP-5303


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Project: WSP
Project No.: 21-1682
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EH No.: TP-5303
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TP-5303


CAUSEWAY
Project: WSP
Project No.: 21-1682
Date: 22/08/22
TP-5387
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TP-5387



TP-5387

CAUSEWAY GEOTECH



TP-5387

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 22/08/22
EH No.: TP-5387

TP-5387


CAUSEWAY
GEOTECH
Project: WSP
Date: 22/08/22
Project No.: 21-1682
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(m)

TP-5387


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 22/08/22
EH No.: TP-5387
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TP-5387



TP-5387

CAUSEWAY GEOTECH


CAUSEWAY
Project: WSP
Project No.: 21-1682
Date: 22/08/22
EH No.: TP-5703
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TP-5703


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 22/08/22
EH No.: TP-5703
(m) 0.1 0.2 0.3 0.4 0.5

TP-5703



TP-5703

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 22/08/22
EH No.: TP-5703
(m) 0.1 0.2 0.3 0.4 0.5

TP-5703



TP-5703


UIG 546
CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 22/08/22
EH No.: TP-5703
(m) 0.1 0.2 0.3 0.4 0.5

TP-5703


CAUSEWAY
Project: WSP
Project No.: 21-1682
Date: 22/08/22
EH No.: TP-5703
(m) 0.1 0.2 0.3 0.4 0.5

TP-5703



TP-5803

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project:
WSP
Date:
22/08/22
EH No.:
TP-5803
Project No.:
21-1682

TP-5803



TP-5803

CAUSEWAY GEOTECH



TP-5803

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 22/08/22
EH No.: TP-5803

TP-5803



TP-5803

CAUSEWAY GEOTECH



TP-5803

CAUSEWAY GEOTECH



TP-5903

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 22/08/22
EH No.: TP-5903

TP-5903



TP-5903

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 22/08/22
EH No.: TP-5903
(m) 0.1 0.2 0.3 0.4 0.5

TP-5903



TP-5903

CAUSEWAY GEOTECH



TP-5903


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 22/08/22
EH No.: TP - 6016
0.1
0.2
0.3
0.4
0.5

TP-6016


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 22/08/22
EH No.: TP-6016
(m) 0.1 0.2 0.3 0.4 0.5

TP-6016



TP-6016

CAUSEWAY GEOTECH



TP-6016


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 22/08/22
EH No.: TP-6016
(m) 0.1 0.2 0.3 0.4 0.5

TP-6016



TP-6016

CAUSEWAY GEOTECH



TP-6105

CAUSEWAY GEOTECH



TP-6105

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 22/08/22
EH No.: TP-6105

TP-6105



TP-6105


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 22/08/22
EH No.: TP-6105
(m) 0.1 0.2 0.3 0.4 0.5

TP-6105



TP-6105

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 22/08/22
EH No.: TP-6207
(m) 0.1 0.2 0.3 0.4 0.5

TP-6207



TP-6207

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 22/08/22
EH No.: TP-6207
(m) 0.1 0.2 0.3 0.4 0.5

TP-6207



TP-6207

CAUSEWAY GEOTECH



TP-6207

CAUSEWAY GEOTECH



TP-6408

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 18/08/22
EH No.: TP-6408

TP-6408


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 18/08/22
EH No.: TP-6408

TP-6408



TP-6408

CAUSEWAY GEOTECH



TP-6408

CAUSEWAY GEOTECH



TP-6505

CAUSEWAY GEOTECH



TP-6505



TP-6505

CAUSEWAY GEOTECH



TP-6505

CAUSEWAY GEOTECH



TP-6505

CAUSEWAY GEOTECH



TP-6575

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 18/08/22
EH No.: TP-6575
(m) 0.1 0.2 0.3 0.4 0.5

TP-6575



TP-6575

CAUSEWAY GEOTECH



TP-6575

CAUSEWAY GEOTECH



TP-6575

CAUSEWAY GEOTECH



TP-6663

CAUSEWAY GEOTECH



TP-6663

CAUSEWAY GEOTECH



TP-6663

CAUSEWAY GEOTECH



TP-6663

CAUSEWAY GEOTECH



TP-6663

CAUSEWAY GEOTECH



TP-6663

CAUSEWAY GEOTECH



TP-6832

CAUSEWAY GEOTECH



TP-6832

CAUSEWAY GEOTECH



TP-6832

CAUSEWAY GEOTECH



TP-6832

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project No.: 21-1682
WSP
EH No.: TP-6906
19/08/22
0.3
0.4
0.5

TP-6906



TP-6906



CAUSEWAY GEOTECH



TP-6997

CAUSEWAY GEOTECH



TP-6997

CAUSEWAY GEOTECH


CAUSEWAY
Project: WSP
Project No.: 21-1682
Date: 19/08/22
TP-6997
(m) 0.1 0.2 0.3 0.4 0.5

TP-6997



TP-6997

CAUSEWAY GEOTECH



TP-7207

CAUSEWAY GEOTECH



TP-7207

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 22/08/22
EH No.: TP-7207
(m) 0.1 0.2 0.3 0.4 0.5

TP-7207


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 22/08/22
EH No.: TP-7207
(m) 0.1 0.2 0.3 0.4 0.5

TP-7207



TP-7207



TP-7305

CAUSEWAY GEOTECH



TP-7305

CAUSEWAY GEOTECH



TP-7305

CAUSEWAY GEOTECH



TP-7305

CAUSEWAY GEOTECH



TP-7373

CAUSEWAY GEOTECH



TP-7373

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 19/08/22
EH No.: TP-7373
(m) 0.1 0.2 0.3 0.4 0.5

TP-7373



TP-7373

CAUSEWAY GEOTECH



TP-7373

November 2022

CAUSEWAY GEOTECH



TP-7373

CAUSEWAY GEOTECH



TP-9011

CAUSEWAY GEOTECH



TP-9011

CAUSEWAY GEOTECH



TP-9011

CAUSEWAY GEOTECH



TP-9011



TP-9011

CAUSEWAY GEOTECH



TP-9011

CAUSEWAY GEOTECH



TP-9094

CAUSEWAY GEOTECH



TP-9094

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 24/08/22
EH No.: TP-9094

TP-9094



TP-9094



TP-9094

CAUSEWAY GEOTECH



TP-9094

CAUSEWAY GEOTECH



TP-9115

CAUSEWAY GEOTECH



TP-9115

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TP-9115



TP-9115

CAUSEWAY GEOTECH



TP-9115

CAUSEWAY GEOTECH



TP-9206

CAUSEWAY GEOTECH



TP-9206

CAUSEWAY GEOTECH



TP-9206

CAUSEWAY GEOTECH



TP-9206

CAUSEWAY GEOTECH



TP-9206

CAUSEWAY GEOTECH



TP-9206

CAUSEWAY GEOTECH



TP-9305

CAUSEWAY GEOTECH



TP-9305

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 24/08/22
EH No.: TP-9305
(m) 0.1 0.2 0.3 0.4 0.5

TP-9305



TP-9305



TP-9305

CAUSEWAY GEOTECH



TP-9305

CAUSEWAY GEOTECH



TP-9370

CAUSEWAY GEOTECH



TP-9370

CAUSEWAY GEOTECH



TP-9370

CAUSEWAY GEOTECH



TP-9370

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TP-9370

CAUSEWAY GEOTECH



TP-9505

CAUSEWAY GEOTECH



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CAUSEWAY GEOTECH



TP-9505

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 25/08/22
EH No.: TP-9603
(m) 0.1 0.2 0.3 0.4 0.5

TP-9603



TP-9603



TP-9603

CAUSEWAY GEOTECH



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TP-9603

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TP-9603

CAUSEWAY GEOTECH



TP-9603A



TP-9603A

CAUSEWAY GEOTECH



TP-9603A



TP-9603A

CAUSEWAY GEOTECH



TP-9705

CAUSEWAY GEOTECH



TP-9705

CAUSEWAY GEOTECH



TP-9705

CAUSEWAY GEOTECH



TP-9705

CAUSEWAY GEOTECH



TP-9705

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project Name
WSP
Project Number
21-1682
Date
25/08/22
EH Number
TP-9830
(m) 0.1 0.2 0.3 0.4 0.5

TP-9830



TP-9830

CAUSEWAY GEOTECH



TP-9830

CAUSEWAY GEOTECH



TP-9830

CAUSEWAY GEOTECH



TP-9830

CAUSEWAY GEOTECH



TP-12107

CAUSEWAY GEOTECH



TP-12107



TP-12107



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CAUSEWAY GEOTECH



TP-12107

CAUSEWAY GEOTECH



TP-12203

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TP-12306



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TP-12507

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TP-12507

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TP-12507

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project Name
WSP
Project Number
21-1682
Date
30/08/2022
EH Number
TP-12507
(m)
0.1
0.2
0.3
0.4
0.5

TP-12507



TP-12569



TP-12569



TP-12569



TP-12569

CAUSEWAY GEOTECH



TP-12569



TP-12580



TP-12580



TP-12580

CAUSEWAY GEOTECH



TP-12580

CAUSEWAY GEOTECH



TP-12580



TP-12581



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CAUSEWAY GEOTECH



TP-12581



TP-12582



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TP-12582



TP-12582

CAUSEWAY GEOTECH



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TP-12589



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CAUSEWAY GEOTECH



TP-12589

CAUSEWAY GEOTECH



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CAUSEWAY GEOTECH



TP-12590



TP-12595



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CAUSEWAY GEOTECH



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CAUSEWAY GEOTECH



TP-12595



TP-12601



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CAUSEWAY GEOTECH



TP-12601

CAUSEWAY GEOTECH



TP-12638

CAUSEWAY GEOTECH



TP-12638



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TP-12638

CAUSEWAY GEOTECH



TP-12639



TP-12639



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TP-12639

CAUSEWAY GEOTECH



TP-12639



TP-12650



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CAUSEWAY GEOTECH



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CAUSEWAY GEOTECH



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TP-12688



TP-12688

CAUSEWAY GEOTECH



TP-12688



TP-12688



TP-12688



TP-12689



TP-12689



TP-12689



TP-12689



TP-12689



TP-12701



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TP-12701

CAUSEWAY GEOTECH



TP-12701



TP-12726



TP-12726

CAUSEWAY GEOTECH



TP-12726



TP-12726



TP-12726



TP-12737



TP-12737

CAUSEWAY GEOTECH



TP-12737

CAUSEWAY GEOTECH



TP-12737



TP-12737



TP-12738



TP-12738



TP-12738



TP-12738

CAUSEWAY GEOTECH



TP-12738

CAUSEWAY GEOTECH



TP-12750



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TP-12750

CAUSEWAY GEOTECH



TP-12750



TP-12775



TP-12775

CAUSEWAY GEOTECH



TP-12775



TP-12775

CAUSEWAY GEOTECH



TP-12775



TP-12786



TP-12786



TP-12786



TP-12786

CAUSEWAY GEOTECH



TP-12786



TP-12787



TP-12787



TP-12787



TP-12787

CAUSEWAY GEOTECH



TP-12787



TP-12800



TP-12800



TP-12800



TP-12800



TP-12800



TP-12801



TP-12801

CAUSEWAY GEOTECH



TP-12801

CAUSEWAY GEOTECH



TP-12801

CAUSEWAY GEOTECH



TP-12801



TP-12823

CAUSEWAY GEOTECH



TP-12823



TP-12823



TP-12823



TP-12823

CAUSEWAY GEOTECH



TP-12823



TP-13208



TP-13208

CAUSEWAY GEOTECH



TP-13208



TP-13208

CAUSEWAY GEOTECH



TP-13208



TP-13291



TP-13291

CAUSEWAY GEOTECH



TP-13291

CAUSEWAY GEOTECH



TP-13291

CAUSEWAY GEOTECH



TP-13291



TP-13433

CAUSEWAY GEOTECH



TP-13433

CAUSEWAY GEOTECH



TP-13433

CAUSEWAY GEOTECH



TP-13433

CAUSEWAY GEOTECH



TP-13509



TP-13509



TP-13509

CAUSEWAY GEOTECH



TP-13509

CAUSEWAY GEOTECH



TP-13509



TP-13605

CAUSEWAY GEOTECH



TP-13605



TP-13605



TP-13605

CAUSEWAY GEOTECH



TP-13605



TP-13988

CAUSEWAY GEOTECH



TP-13988

CAUSEWAY GEOTECH



TP-13988

CAUSEWAY GEOTECH



TP-13988

CAUSEWAY GEOTECH



TP-13988

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project Name
WSP
Project Number
21-1682
Date
30/08/2022
EH Number
TP-14105
(m)
0.1
0.2
0.3
0.4
0.5

TP-14105



TP-14105

CAUSEWAY GEOTECH



TP-14105

CAUSEWAY GEOTECH



TP-14105

CAUSEWAY GEOTECH



TP-14105

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project Name
WSP
Project Number
21-1682
Date
30/08/2022
EH Number
TP-14105
(m)
0.1
0.2
0.3
0.4
0.5

TP-14105


CAUSEWAY
GEOTECH
Project Name
WSP
Project Number
21-1682
Date
30/08/2022
EH Number
TP-14170
(m)
0.1
0.2
0.3
0.4
0.5

TP-14170


CAUSEWAY
GEOTECH
Project Name
WSP
Project Number
21-1682
Date
30/08/2022
EH Number
TP-14170
(m)
0.1
0.2
0.3
0.4
0.5

TP-14170



TP-14170

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project Name
WSP
Project Number
21-1682
Date
30/08/2022
EH Number
TP-14170
(m) 0.1 0.2 0.3 0.4 0.5

TP-14170



TP-14170

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project Name
WSP
Project Number
21-1682
Date
30/08/2022
EH Number
TP-14170
(m)
0.1
0.2
0.3
0.4
0.5

TP-14170



TP-14307

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project Name
WSP
Project Number
21-1682
Date
31/08/2022
EH Number
TP-14307
(m)
0.1
0.2
0.3
0.4
0.5

TP-14307



TP-14307

CAUSEWAY GEOTECH



TP-14307

CAUSEWAY GEOTECH



TP-14307

CAUSEWAY GEOTECH



TP-14307

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project Name
WSP
Project Number
21-1682
Date
31/08/2022
EH Number
TP-14409
(m)
0.1
0.2
0.3
0.4
0.5

TP-14409


CAUSEWAY
GEOTECH
Project Name
WSP
Project Number
21-1682
Date
31/08/2022
EH Number
TP-14409
(m)
0.1
0.2
0.3
0.4
0.5

TP-14409


CAUSEWAY
GEOTECH
Project Name
WSP
Project Number
21-1682
Date
31/08/2022
EH Number
TP-14409
(m) 0.1 0.2 0.3 0.4 0.5

TP-14409


CAUSEWAY
GEOTECH
Project Name
WSP
Project Number
21-1682
Date
31/08/2022
EH Number
TP-14409
(m) 0.1 0.2 0.3 0.4 0.5

TP-14409


CAUSEWAY
GEOTECH
Project Name
WSP
Project Number
21-1682
Date
31/08/2022
EH Number
TP-14409
(m)
0.1
0.2
0.3
0.4
0.5

TP-14409


CAUSEWAY
GEOTECH
Project Name
WSP
Project Number
21-1682
Date
31/08/2022
EH Number
TP-14409
(m)
0.1
0.2
0.3
0.4
0.5

TP-14409


CAUSEWAY
GEOTECH
Project Name
WSP
Project Number
21-1682
Date
31/08/2022
EH Number
TP-16005
(m) 0.1 0.2 0.3 0.4 0.5

TP-16005


CAUSEWAY
GEOTECH
Project Name
WSP
Project Number
21-1682
Date
31/08/2022
EH Number
TP-16005
(m)
0.1
0.2
0.3
0.4
0.5

TP-16005



TP-16109

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project Name
WSP
Project Number
21-1682
Date
31/08/2022
EH Number
TP-16109
(m)
0.1
0.2
0.3
0.4
0.5

TP-16109


CAUSEWAY
GEOTECH
Project Name
WSP
Project Number
21-1682
Date
31/08/2022
EH Number
TP-16109
(m) 0.1 0.2 0.3 0.4 0.5

TP-16109



TP-16109

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project Name
WSP
Project Number
21-1682
Date
31/08/2022
EH Number
TP-16109
(m) 0.1 0.2 0.3 0.4 0.5

TP-16109


CAUSEWAY
GEOTECH
Project Name
WSP
Project Number
21-1682
Date
31/08/2022
EH Number
TP-16109
(m)
0.1
0.2
0.3
0.4
0.5

TP-16109


CAUSEWAY
GEOTECH
Project Name
WSP
Project Number
21-1682
Date
31/08/2022
EH Number
TP-16208
(m) 0.1 0.2 0.3 0.4 0.5

TP-16208



TP-16208

CAUSEWAY GEOTECH



TP-16208

CAUSEWAY GEOTECH



TP-16208

CAUSEWAY GEOTECH



TP-16208

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project Name
WSP
Project Number
21-1682
Date
31/08/2022
EH Number
TP-16208
(m) 0.1 0.2 0.3 0.4 0.5

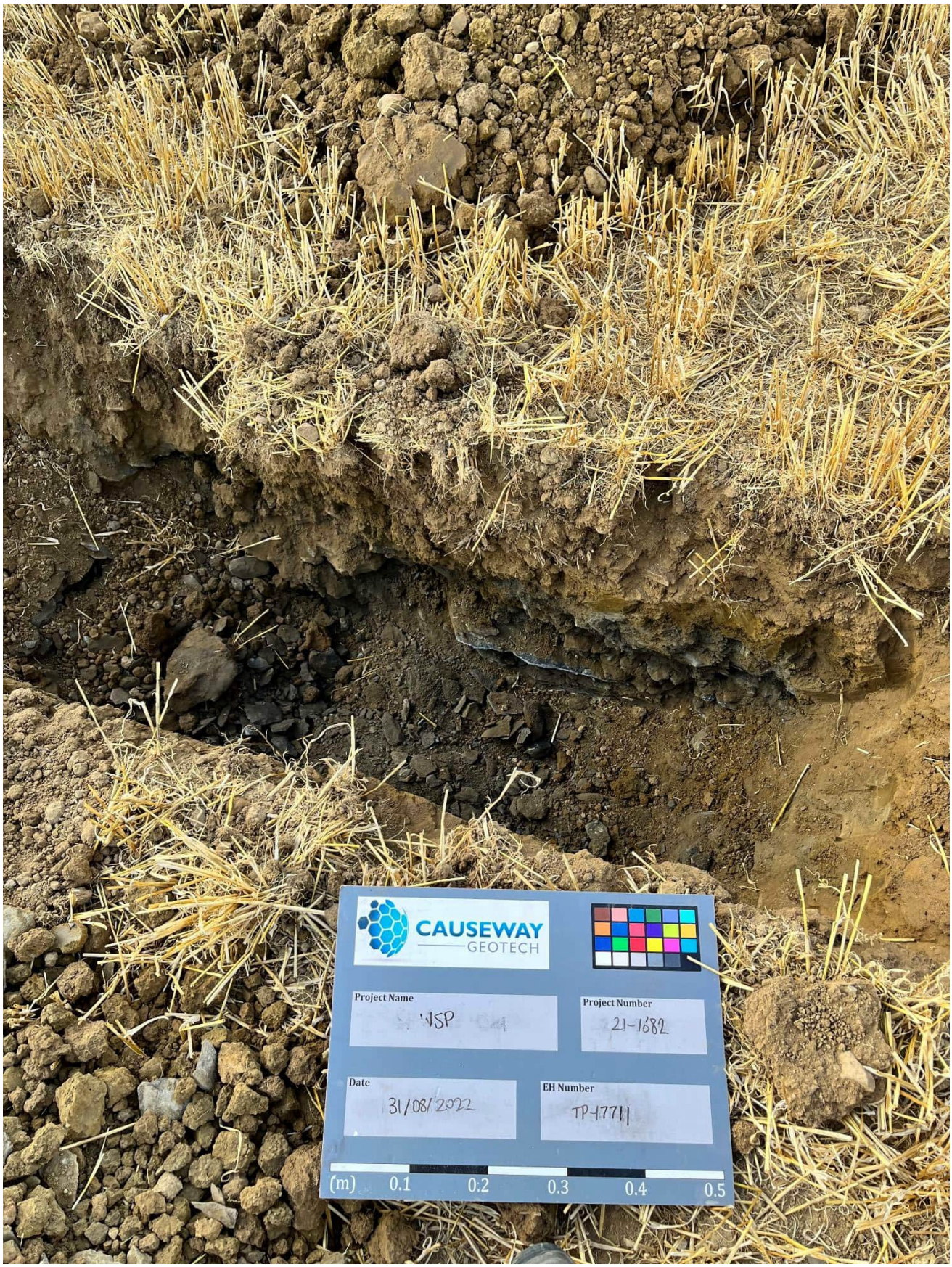
TP-16208


CAUSEWAY
GEOTECH
Project Name
WSP
Project Number
21-1682
Date
31/08/2022
EH Number
TP-17711
(m) 0.1 0.2 0.3 0.4 0.5

TP-17711

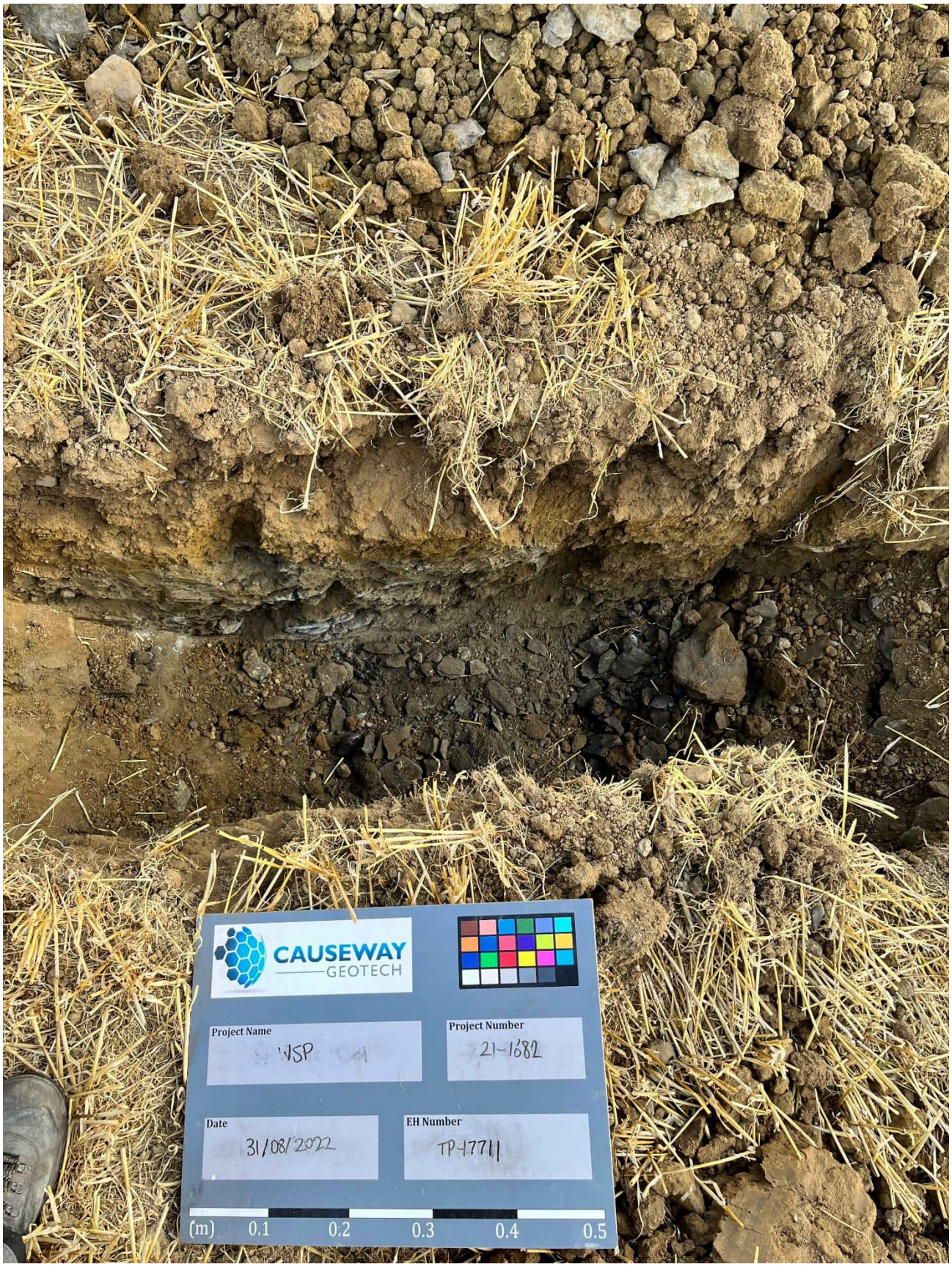

CAUSEWAY
GEOTECH
Project Name
WSP
Project Number
21-1682
Date
31/08/2022
EH Number
TP-17711
(m)
0.1
0.2
0.3
0.4
0.5

TP-17711



TP-17711

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project Name
WSP
Project Number
21-1682
Date
31/08/2022
EH Number
TP-17711
(m) 0.1 0.2 0.3 0.4 0.5

TP-17711



TP-17711

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project Name
WSP
Project Number
21-1682
Date
01/09/2022
EH Number
TP-17894
(m) 0.1 0.2 0.3 0.4 0.5

TP-17894



TP-17894

CAUSEWAY GEOTECH



TP-17894

CAUSEWAY GEOTECH



TP-17894

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project Name
WSP
Project Number
21-1682
Date
01/09/2022
EH Number
TP-17894
(m)
0.1
0.2
0.3
0.4
0.5

TP-17894


CAUSEWAY
GEOTECH
Project Name
WSP
Project Number
21-1682
Date
01/09/2022
EH Number
TP-18187
(m) 0.1 0.2 0.3 0.4 0.5

TP-18187



TP-18187

CAUSEWAY GEOTECH



TP-18187

CAUSEWAY GEOTECH



TP-18187

CAUSEWAY GEOTECH



TP-18187

CAUSEWAY GEOTECH



TP-18307

CAUSEWAY GEOTECH



TP-18307

CAUSEWAY GEOTECH



TP-18307

CAUSEWAY GEOTECH



TP-18307

CAUSEWAY GEOTECH



TP-18307

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project Name
WSP
Project Number
21-1682
Date
01/09/2022
EH Number
TP-18411
(m)
0.1
0.2
0.3
0.4
0.5

TP-18411



TP-18411

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project Name
WSP
Project Number
21-1682
Date
01/09/2022
EH Number
TP-18411
(m) 0.1 0.2 0.3 0.4 0.5

TP-18411



TP-18411

CAUSEWAY GEOTECH



TP-18411

CAUSEWAY GEOTECH


CAUSEWAY
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Project Name
WSP
Project Number
21-1682
Date
01/09/2022
EH Number
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TP-18411



TP-18505

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TP-18505

CAUSEWAY GEOTECH


CAUSEWAY
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Project Name
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Project Number
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Date
02/09/2022
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TP-18505



TP-18505

CAUSEWAY GEOTECH



TP-18505

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project Name
WSP
Project Number
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Date
01/09/2022
EH Number
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TP-18604


CAUSEWAY
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Project Name
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Project Number
21-1682
Date
01/09/2022
EH Number
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TP-18604


CAUSEWAY
GEOTECH
Project Name
WSP
Project Number
21-1682
Date
01/09/2022
EH Number
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0.4
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TP-18604



TP-18604

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project Name
WSP
Project Number
21-1682
Date
01/09/2022
EH Number
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TP-18604



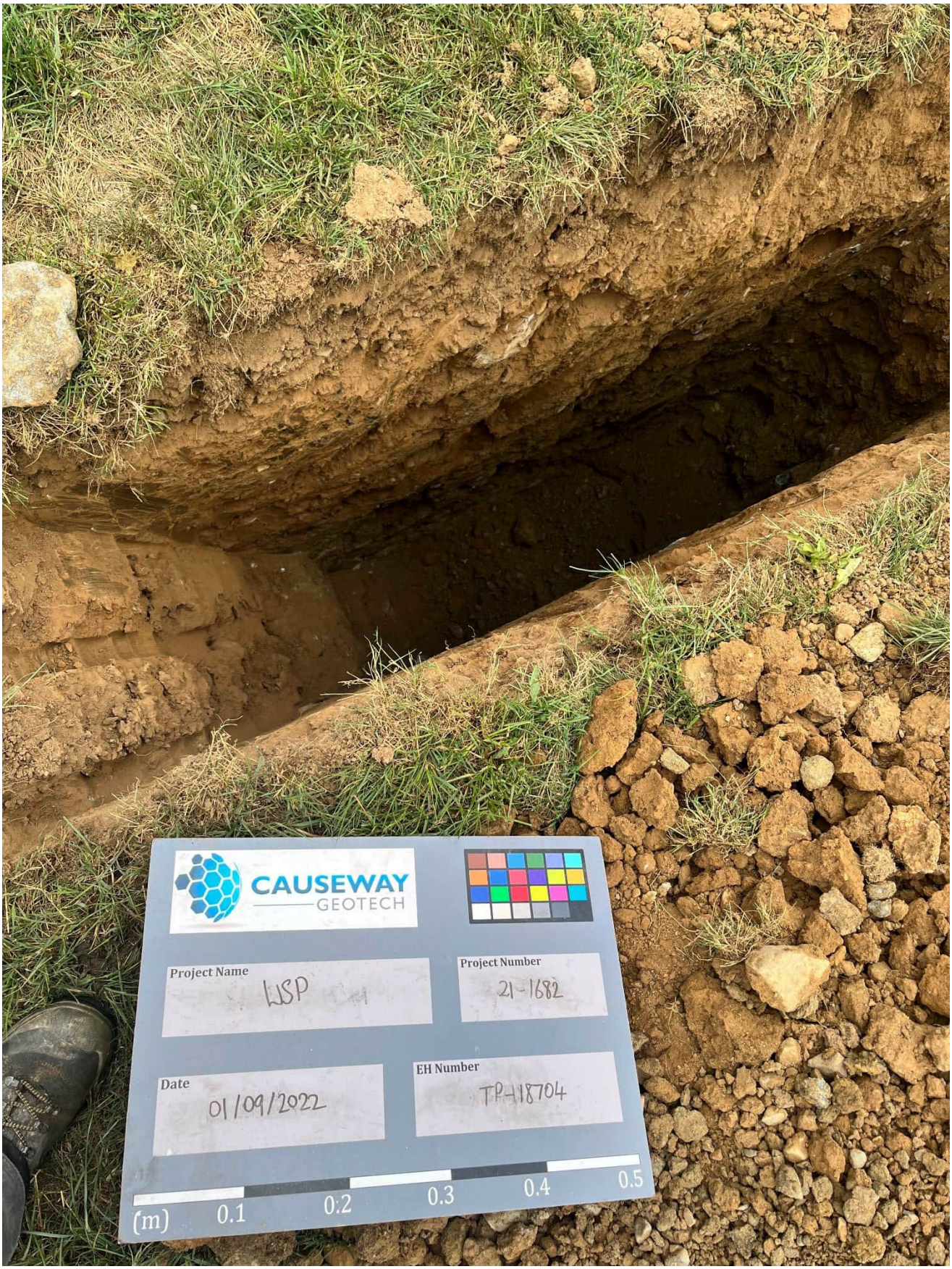
TP-18704

CAUSEWAY GEOTECH



TP-18704

CAUSEWAY GEOTECH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21-1682
Date
01/09/2022
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TP-18704



TP-18704

CAUSEWAY GEOTECH



TP-18704

CAUSEWAY GEOTECH



TP-18802

CAUSEWAY GEOTECH



TP-18802

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TP-18802

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TP-18906



TP-18906

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TP-19088

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TP-19088

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TP-23202

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TP-23202

CAUSEWAY GEOTECH


CAUSEWAY
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Project Number
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Project Name
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EH Number
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TP-23202



TP-23307

CAUSEWAY GEOTECH



TP-23307

CAUSEWAY GEOTECH



TP-23307

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TP-23307

CAUSEWAY GEOTECH



TP-23307

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TP-23401

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TP-23401

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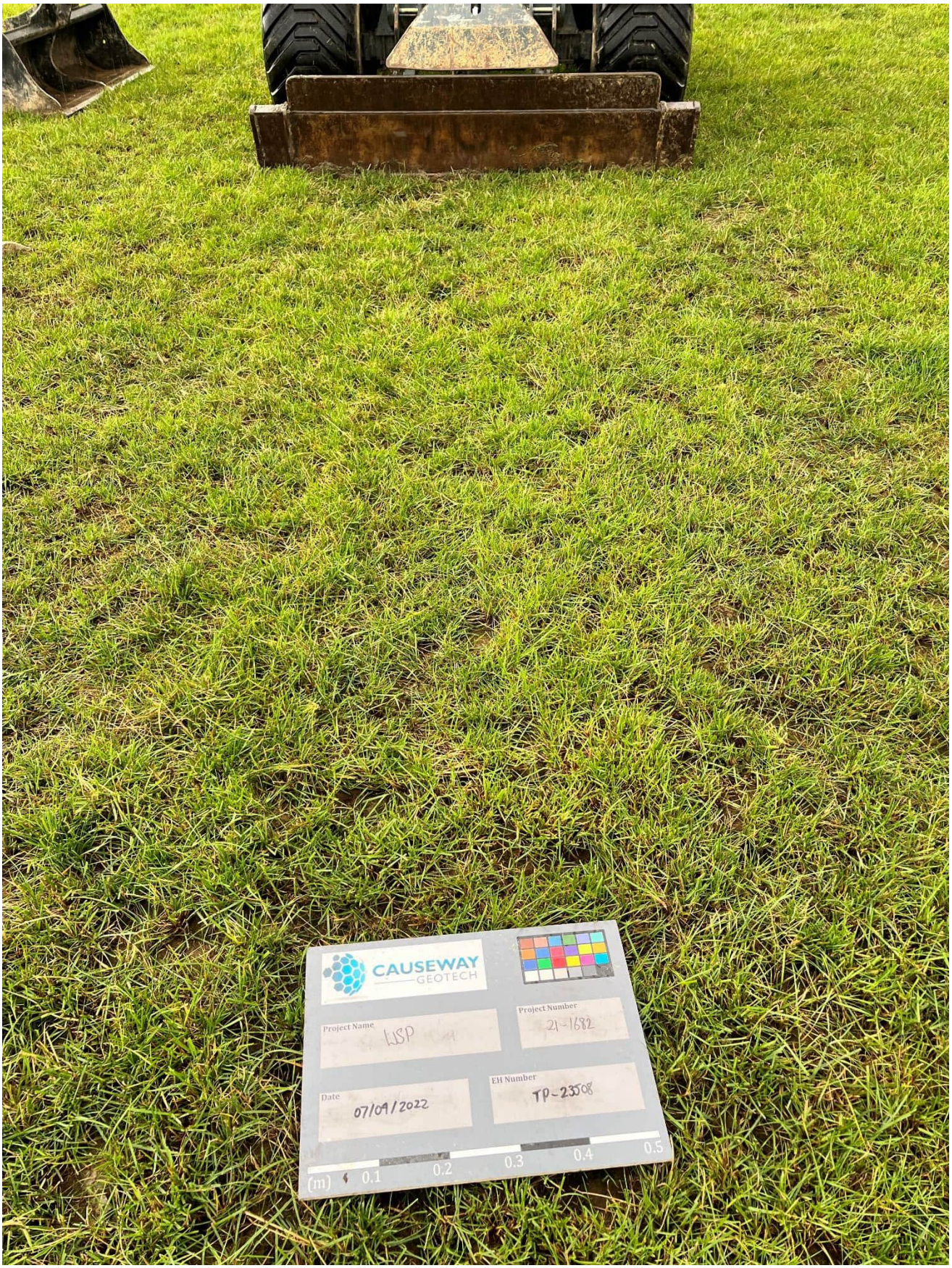
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TP-23508



TP-23508

CAUSEWAY GEOTECH



TP-23508

CAUSEWAY GEOTECH



TP-23508

CAUSEWAY GEOTECH



TP-23508

CAUSEWAY GEOTECH


CAUSEWAY
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Project Name
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Project Number
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Date
07/09/2022
EH Number
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TP-23608



TP-23608

CAUSEWAY GEOTECH



TP-23608

CAUSEWAY GEOTECH



TP-23608

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
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TP-23608



TP-23707

CAUSEWAY GEOTECH



TP-23707

CAUSEWAY GEOTECH



TP-23707

CAUSEWAY GEOTECH



TP-23707

CAUSEWAY GEOTECH



TP-23707

CAUSEWAY GEOTECH



TP-23810

CAUSEWAY GEOTECH



TP-23810

CAUSEWAY GEOTECH



TP-23810

CAUSEWAY GEOTECH



TP-23810

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project Name
WSP
Project Number
21-1682
Date
06/09/2022
EH Number
TP-23810
(m)
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TP-23810


CAUSEWAY
GEOTECH
Project Name
WSP
Project Number
21-1682
Date
07/09/2022
EH Number
TP-23910
(m) 0.1 0.2 0.3 0.4 0.5

TP-23910



TP-23910

CAUSEWAY GEOTECH



TP-23910

CAUSEWAY GEOTECH



TP-23910

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TP-23910

CAUSEWAY GEOTECH



TP-24008

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TP-24008

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TP-24008

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TP-24008

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TP-24008

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TP-24008

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TP-24110

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CAUSEWAY GEOTECH



TP-24110

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TP-24110

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TP-24110

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project Name
WSP
Project Number
21-1682
Date
07/09/2022
EH Number
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TP-24209



TP-24209

CAUSEWAY GEOTECH



TP-24209

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project Name
WSP
Project Number
21-1682
Date
07/09/2022
EH Number
TP-24209

TP-24209



TP-24209

CAUSEWAY GEOTECH



TP-25504

CAUSEWAY GEOTECH



TP-25504

CAUSEWAY GEOTECH



TP-25504

CAUSEWAY GEOTECH



TP-25504

CAUSEWAY GEOTECH



TP-25504

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project Name
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Project Number
21-1682
Date
08/09/2022
EH Number
TP-25504
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TP-25604



TP-25604

CAUSEWAY GEOTECH



TP-25604

CAUSEWAY GEOTECH



TP-25604

CAUSEWAY GEOTECH



TP-25604

CAUSEWAY GEOTECH


CAUSEWAY
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Project Name
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Project Number
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Date
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TP-26512


CAUSEWAY
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08/09/2022
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(m)
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TP-26512



TP-26512

CAUSEWAY GEOTECH



TP-26512

CAUSEWAY GEOTECH



TP-26512

CAUSEWAY GEOTECH


CAUSEWAY
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Project Name
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21-1682
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TP-26600



TP-26600

CAUSEWAY GEOTECH



TP-26600

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TP-26600

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TP-26600

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project Name
WSP
Project Number
21-1682
Date
08/09/2022
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TP-26702



TP-26702

CAUSEWAY GEOTECH


CAUSEWAY
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Project Name
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Project Number
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Date
08/09/2022
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TP-26702


CAUSEWAY
GEOTECH
Project Name
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Project Number
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Date
08/09/2022
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TP-26702


CAUSEWAY
GEOTECH
Project Name
WSP
Project Number
21-1682
Date
08/09/2022
EH Number
TP-26702
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TP-26702


CAUSEWAY
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Project Name
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Project Number
21-1682
Date
08/09/2022
EH Number
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TP-26785



TP-26785

CAUSEWAY GEOTECH


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Project Name
WSP
Project Number
21-1682
Date
08/09/2022
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TP-26785


CAUSEWAY
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Project Name
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Project Number
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TP-26785



TP-26785

CAUSEWAY GEOTECH



TP-27781

CAUSEWAY GEOTECH



TP-27781

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TP-27781

CAUSEWAY GEOTECH



TP-27781

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project Name
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Project Number
21-1682
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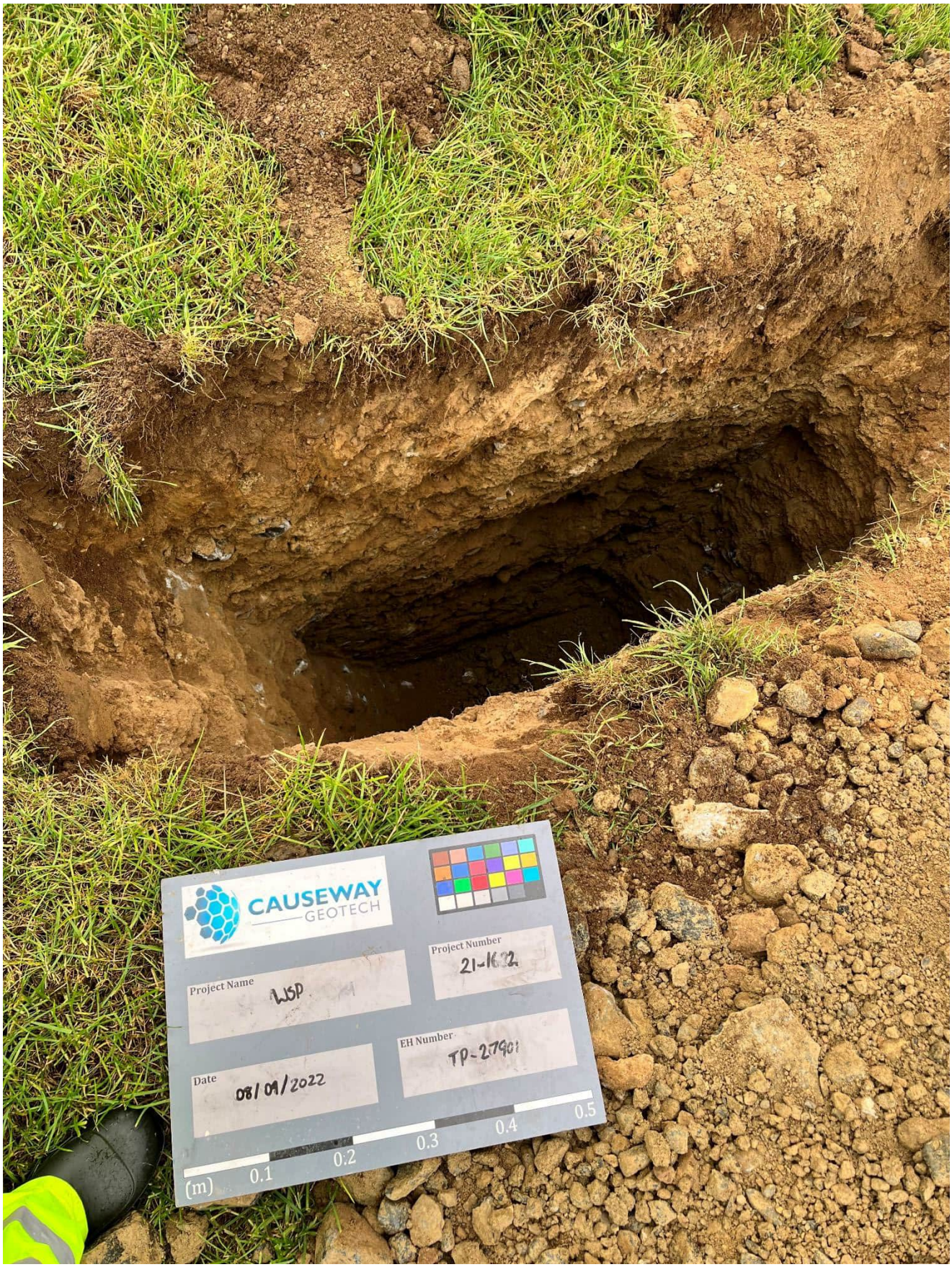

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TP-27901


CAUSEWAY
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Project Name
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Project Number
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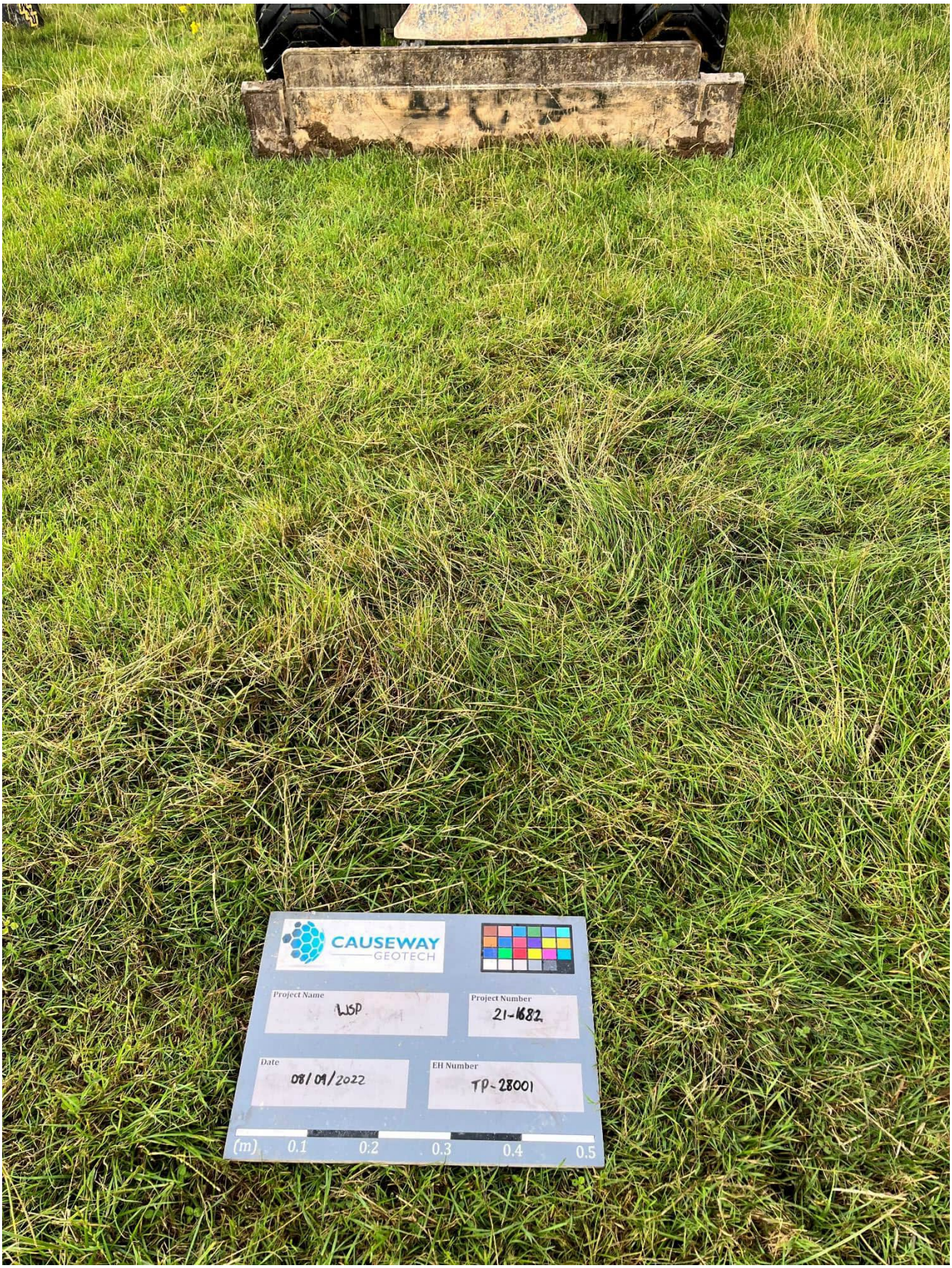

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TP-28001

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TP-28001

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TP-28001

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CAUSEWAY
GEOTECH
Project Name
WSP
Project Number
21-1682
Date
08/09/2022
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TP-28001



TP-28102



TP-28102



TP-28102

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TP-28102

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TP-28199



TP-28302



TP-28302

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TP-28302



TP-28411



TP-28411



TP-28411

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TP-28411



TP-28505



TP-28505

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TP-28709

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TP-28752



TP-28752



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TP-30103



TP-30103



TP-30103



TP-30103

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TP-30103



TP-30204



TP-30204



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TP-30303



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TP-30417



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TP-30602



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TP-30818



TP-30818

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TP-30901



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TP-31002



TP-31002

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TP-31603



TP-31603



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TP-31705

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TP-31705



TP-31705

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TP-31705



TP-31805



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TP-31805



TP-31805

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TP-31805



TP-32013



TP-32013



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TP-32103



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TP-32201



TP-32201

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TP-32201



TP-32201



TP-32320



TP-32320



TP-32320



TP-32320



TP-32320



TP-32401



TP-32401



TP-32401



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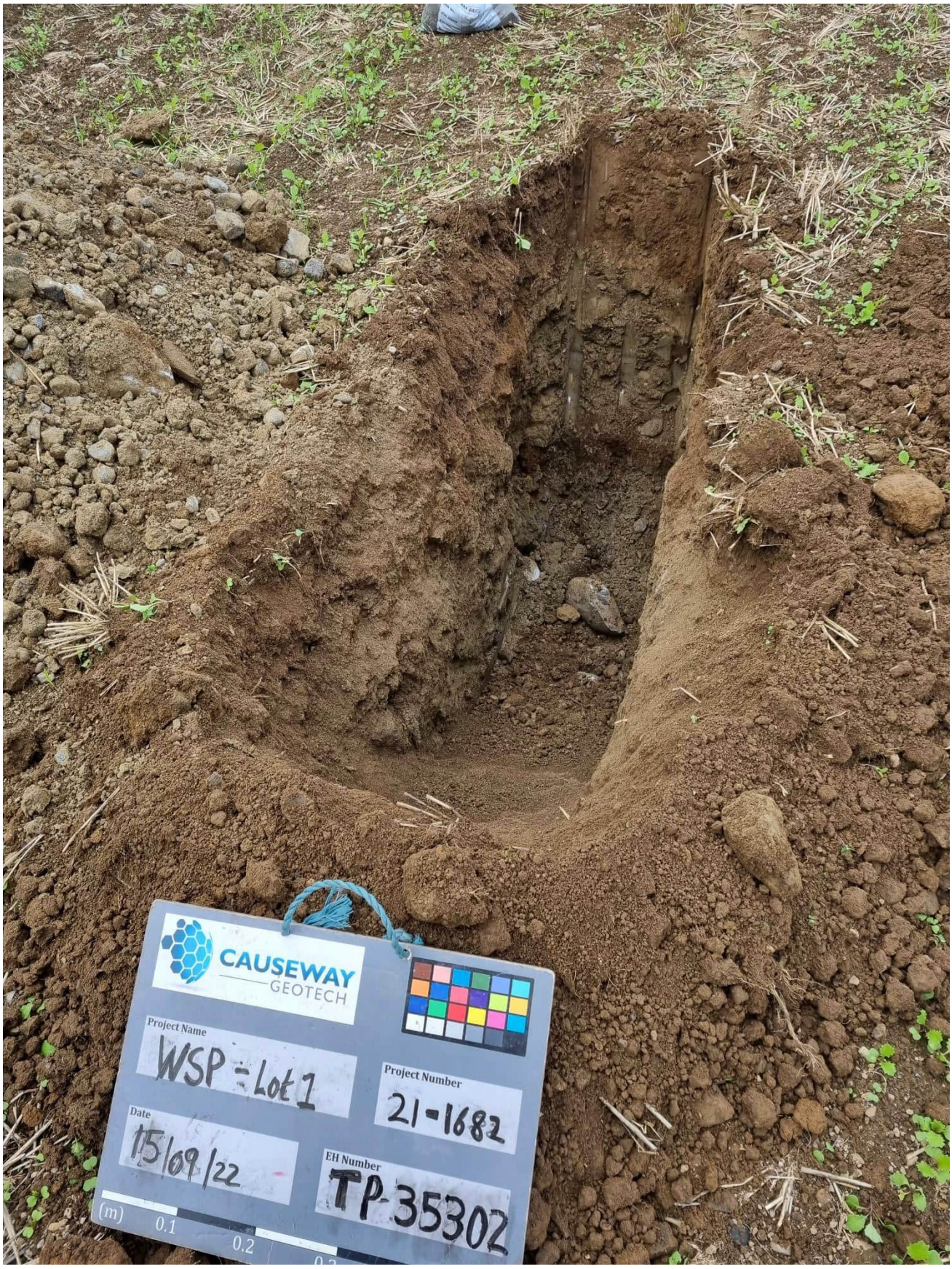
TP-35302

CAUSEWAY GEOTECH



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TP-35302

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TP-35302

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Project Number
21-1682
EH Number
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Date
15/09/22

TP-35435



TP-35435

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TP-35435

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TP-35435

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ST-0540



ST-0540

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ST-0540

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ST-1900A

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ST-1900A

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ST-1900A

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ST-1900A

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ST-1900B



ST-6000

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ST-6000

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ST-6000

CAUSEWAY GEOTECH



ST-6000


CAUSEWAY
GEOTECH
Project Name
WSP
Project Number
21-1682
Date
19/08/22
EH Number
ST6000
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ST-6000



ST-6000

CAUSEWAY GEOTECH



ST-6600

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ST-6600



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ST-6600



ST-6600

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ST-8325

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ST-8325



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ST-9400



ST-9400

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ST-14550

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ST-16850

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ST-16850

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GEOTECH
Project Name
WSP - Lot 1
Date
22/09/22
Project Number
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ST-16850

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ST-18450



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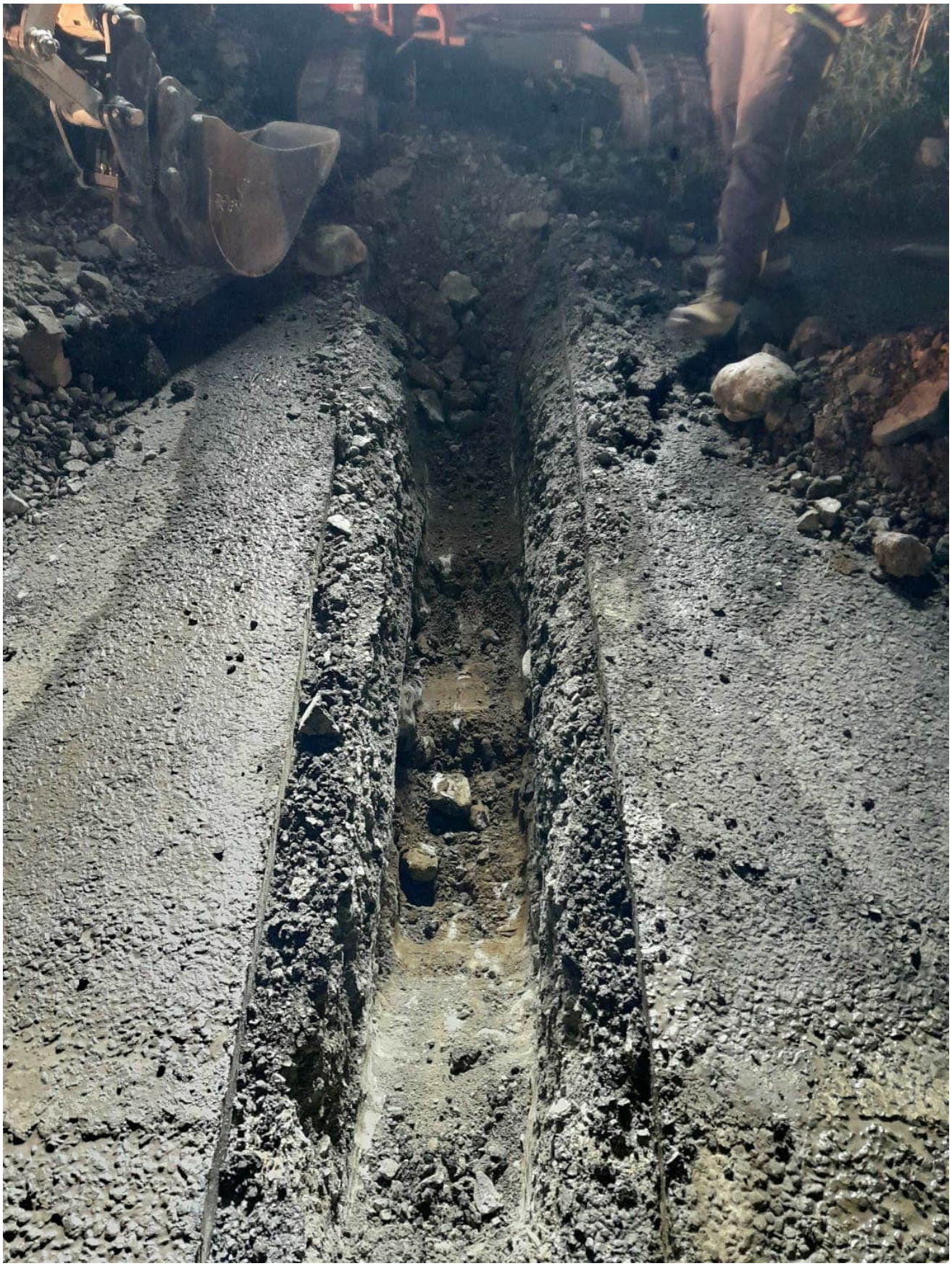

ST-18450



ST-18450



ST-18450

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ST-20650

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ST-20650



ST-20650

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ST-20650



ST-21400

CAUSEWAY GEOTECH



ST-21400

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ST-21400

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ST-21400

CAUSEWAY GEOTECH


CAUSEWAY
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Project Name
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CAUSEWAY
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ST-22300



ST-22300

CAUSEWAY GEOTECH



ST-22300

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ST-23880

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ST-23880



ST-23880

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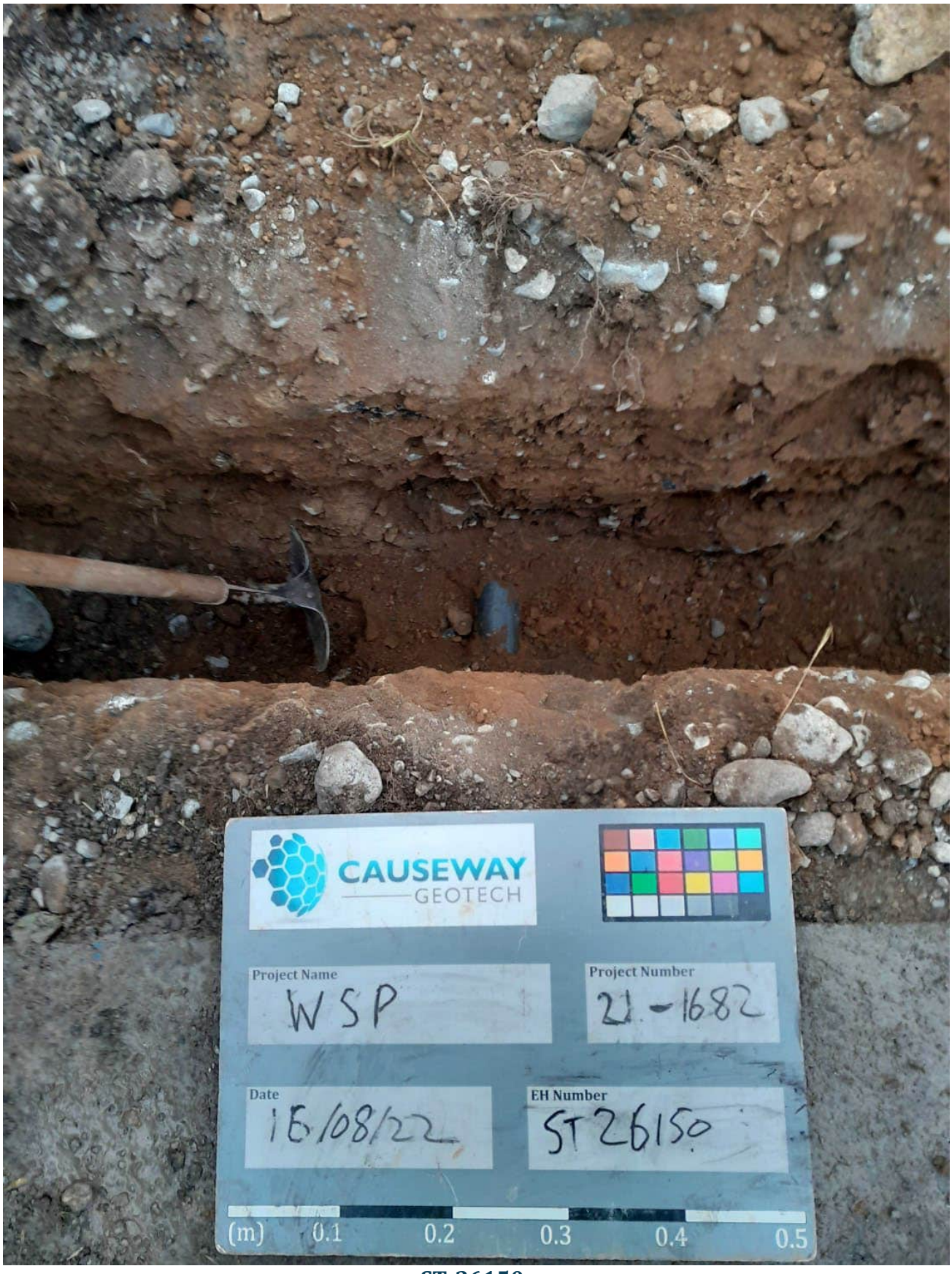
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ST-26150



ST-26150

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ST-27700

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ST-27700

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ST-30075

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ST-31300



ST-31300

CAUSEWAY GEOTECH


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15/08/22
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ST-31300



ST-31300

CAUSEWAY GEOTECH



ST-31300

CAUSEWAY GEOTECH



ST-31300

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project: WSP
Project No.: 21-1682
Date: 15/08/22
EH No.: ST-33350
(m) 0.1 0.2 0.3 0.4 0.5

ST-33350



ST-33350

CAUSEWAY GEOTECH



ST-33350



ST-34600



ST-34600

CAUSEWAY GEOTECH



ST-34600

CAUSEWAY GEOTECH



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ST-35300

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CAUSEWAY GEOTECH



ST-35510



ST-35510



ST-35510

CAUSEWAY GEOTECH



ST-35510

CAUSEWAY GEOTECH


CAUSEWAY
GEOTECH
Project Name
WSP
Project Number
21-1682
Date
15/08/22
EH Number
ST35625
(m) 0.1 0.2 0.3 0.4 0.5

ST-35625


CAUSEWAY
GEOTECH
Project Name
WSP
Project Number
21-1682
Date
15/08/22
EH Number
ST35625
(m) 0.1 0.2 0.3 0.4 0.5

ST-35625



ST-35625

CAUSEWAY GEOTECH

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APPENDIX 4J

GROUND WATER MONITORING DATA



Project No.: 21-1682
Project: Eastern and Midlands Region WSP GI - Lot 1 Pipeline

Groundwater Monitoring Results - Siteworks period

EH No.	Install date	Base of pipe	Dipped base of pipe	4.6.22	12.6.22	19.6.22	26.6.22	4.7.22	7.7.22	14.7.22	20.7.22	28.7.22	30.08.22	15.09.22	29.09.22
BH-3588	25/06/2022	6.50	6.35	-	-	-	-	3.55	3.60	3.62	3.64	3.68	3.74	3.78	3.80
BH-6886	16/08/2022	6.00	6.00	-	-	-	-	-	-	-	-	-	3.90	3.65	3.72
BH-12658	23/08/2022	7.00	7.00	-	-	-	-	-	-	-	-	-	1.70	1.70	1.70
BH-19057A	17/09/2022	3.50	3.50	-	-	-	-	-	-	-	-	-	-	-	1.15
BH-30066	21/06/2022	7.00	7.03	-	-	-	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
BH-33000A	02/06/2022	4.50	4.52	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
BH-34598A	31/05/2022	7.00	6.85	1.93	1.88	1.90	1.86	1.86	1.88	1.88	1.89	1.89	1.89	1.90	1.89

Job No: 21-1682

Job Name: Eastern & Midlands Region - Ground Investigation - WSP Lot 1

Groundwater Monitoring Results - Post Siteworks period

EH No:	Depth to base at end of fieldwork (mbgl)	Water Level (mbgl)						
		ROUND 1 04.10.2022	ROUND 2 15.11.2022	ROUND 3 13.12.2022	ROUND 4 19.01.2023	ROUND 5 xx.04.2023	ROUND 6 xx.07.2023	ROUND 7 xx.10.2023
BH-3588 (rz 4.50-7.00mbgl)	6.35m	3.82	3.23	3.17	3.35			
BH-6886 (rz 2.50-6.20mbgl)	6.00m	3.70	1.57	1.55	1.70			
BH-12658 (rz 1.00-7.50mbgl)	7.00m	1.70	1.05	1.48	1.36			
BH-19057A (rz 2.50-4.00mbgl)	3.50m	1.20	0.30	0.38	0.13			
BH-30066 (rz 4.50-7.50mbgl)	7.03m	DRY	no access (cattle)	**TRASHED/ REMOVED**	-	-	-	-
BH-33000A (rz 3.00-5.00mbgl)	4.52m	DRY	no access (cattle)	DRY	0.40			
BH-34598A (rz 4.50-7.50mbgl)	6.85m	1.88	no access (cattle)	0.83	0.52			

Site:	WSP Lot 1 GI
Project No.:	21-1682
Date:	04/10/2022
Weather:	Showers, mild
Engineer:	CN

Equipment:		Geotechnical Instruments GA5000				
Ambient Conditions	Barometric Pressure	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
Before:	1007	0.0	0.1	21.2	0	0
After:	1009	0.0	0.0	21.3	0	0

BH-3588	Gas readings				
Time (sec)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
30	0.0	0.1	21.1	0	0
60	0.0	0.1	21.1	0	0
90	0.0	0.1	21.1	0	0
120	0.0	0.1	21.1	0	0
150	0.0	0.1	21.1	0	0
180	0.0	0.1	21.1	0	0
240	0.0	0.1	21.1	0	0
300	0.0	0.1	21.1	0	0

Flow rates	
Time (sec)	Flow (l/h)
30	0.2
60	0.2
90	0.2
120	0.2
150	0.2
180	0.2
240	0.2
300	0.2

Groundwater monitoring	mbgl
Depth to top of water	3.82
Depth to bottom of BH	6.25
Sample collected (Y/N)	N/A
Sample depth	N/A

BH-6886	Gas readings				
Time (sec)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
30	0.0	0.3	20.8	0	0
60	0.0	0.3	20.8	0	0
90	0.0	0.3	20.8	0	0
120	0.0	0.3	20.8	0	0
150	0.0	0.3	20.8	0	0
180	0.0	0.3	20.8	0	0
240	0.0	0.3	20.8	0	0
300	0.0	0.3	20.8	0	0

Flow rates	
Time (sec)	Flow (l/h)
30	0.1
60	0.1
90	0.1
120	0.1
150	0.1
180	0.1
240	0.1
300	0.1

Groundwater monitoring	mbgl
Depth to top of water	3.70
Depth to bottom of BH	5.85
Sample collected (Y/N)	N/A
Sample depth	N/A

BH-12658	Gas readings				
Time (sec)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
30	0.0	0.3	20.9	0	0
60	0.0	0.3	20.9	0	0
90	0.0	0.3	20.9	0	0
120	0.0	0.3	20.9	0	0
150	0.0	0.3	20.9	0	0
180	0.0	0.3	20.9	0	0
240	0.0	0.3	20.9	0	0
300	0.0	0.3	20.9	0	0

Flow rates	
Time (sec)	Flow (l/h)
30	0.2
60	0.2
90	0.2
120	0.2
150	0.1
180	0.1
240	0.1
300	0.1

Groundwater monitoring	mbgl
Depth to top of water	1.70
Depth to bottom of BH	6.88
Sample collected (Y/N)	N/A
Sample depth	N/A

BH-19057A	Gas readings				
Time (sec)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
30	0.0	0.2	20.7	0	0
60	0.0	0.2	20.7	0	0
90	0.0	0.2	20.7	0	0
120	0.0	0.2	20.7	0	0
150	0.0	0.2	20.7	0	0
180	0.0	0.2	20.7	0	0
240	0.0	0.2	20.7	0	0
300	0.0	0.2	20.7	0	0

Flow rates	
Time (sec)	Flow (l/h)
30	0.2
60	0.2
90	0.2
120	0.2
150	0.2
180	0.2
240	0.2
300	0.2

Groundwater monitoring	mbgl
Depth to top of water	1.20
Depth to bottom of BH	3.53
Sample collected (Y/N)	N/A
Sample depth	N/A

BH-30066	Gas readings				
Time (sec)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
30	0.0	0.1	21.1	0	0
60	0.0	0.1	21.1	0	0
90	0.0	0.1	21.1	0	0
120	0.0	0.1	21.1	0	0
150	0.0	0.1	21.1	0	0
180	0.0	0.1	21.1	0	0
240	0.0	0.1	21.1	0	0
300	0.0	0.1	21.1	0	0

Flow rates	
Time (sec)	Flow (l/h)
30	0.1
60	0.1
90	0.1
120	0.1
150	0.1
180	0.1
240	0.1
300	0.1

Groundwater monitoring	mbgl
Depth to top of water	DRY
Depth to bottom of BH	7.03
Sample collected (Y/N)	N/A
Sample depth	N/A

CAUSEWAY GEOTECH

Site:	WSP Lot 1 GI
Project No.:	21-1682
Date:	04/10/2022
Weather:	Showers, mild
Engineer:	CN

Equipment:		**Geotechnical Instruments GA5000**				
Ambient Conditions	**Barometric Pressure**	**CH_4 (%)**	**CO_2 (%)**	**O_2 (%)**	**CO (ppm)**	**H_2S (ppm)**
Before:	1007	0.0	0.1	21.2	0	0
After:	1009	0.0	0.0	21.3	0	0

BH-33000A	**Gas readings**				
Time (sec)	**CH_4 (%)**	**CO_2 (%)**	**O_2 (%)**	**CO (ppm)**	**H_2S (ppm)**
30	0.0	0.0	21.3	0	0
60	0.0	0.0	21.3	0	0
90	0.0	0.0	21.3	0	0
120	0.0	0.0	21.3	0	0
150	0.0	0.0	21.3	0	0
180	0.0	0.0	21.3	0	0
240	0.0	0.0	21.3	0	0
300	0.0	0.0	21.3	0	0

Flow rates	
Time (sec)	**Flow (l/h)**
30	0.2
60	0.2
90	0.2
120	0.2
150	0.2
180	0.2
240	0.2
300	0.2

Groundwater monitoring	**mbgl**
Depth to top of water	DRY
Depth to bottom of BH	4.52
Sample collected (Y/N)	N/A
Sample depth	N/A

BH-34598A	**Gas readings**				
Time (sec)	**CH_4 (%)**	**CO_2 (%)**	**O_2 (%)**	**CO (ppm)**	**H_2S (ppm)**
30	0.0	0.4	20.8	0	0
60	0.0	0.4	20.8	0	0
90	0.0	0.4	20.8	0	0
120	0.0	0.4	20.8	0	0
150	0.0	0.4	20.8	0	0
180	0.0	0.4	20.8	0	0
240	0.0	0.4	20.8	0	0
300	0.0	0.4	20.8	0	0

Flow rates	
Time (sec)	**Flow (l/h)**
30	0.2
60	0.2
90	0.1
120	0.1
150	0.1
180	0.1
240	0.1
300	0.1

Groundwater monitoring	**mbgl**
Depth to top of water	1.88
Depth to bottom of BH	6.80
Sample collected (Y/N)	N/A
Sample depth	N/A

CAUSEWAY GEOTECH

Site:	WSP Lot 1 GI
Project No.:	21-1682
Date:	15/11/2022
Weather:	Sunny, mild
Engineer:	CN

Equipment:		Geotechnical Instruments GA5000				
Ambient Conditions	Barometric Pressure	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
Before:	979	0.0	0.1	20.8	0	0
After:	979	0.0	0.0	20.9	0	0

BH-3588	Gas readings				
Time (sec)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
30	0.0	0.1	20.7	0	0
60	0.0	0.1	20.7	0	0
90	0.0	0.1	20.7	0	0
120	0.0	0.1	20.7	0	0
150	0.0	0.1	20.7	0	0
180	0.0	0.1	20.7	0	0
240	0.0	0.1	20.7	0	0
300	0.0	0.1	20.7	0	0

Flow rates	
Time (sec)	Flow (l/h)
30	0.1
60	0.1
90	0.1
120	0.1
150	0.1
180	0.1
240	0.1
300	0.1

Groundwater monitoring	mbgl
Depth to top of water	3.23
Depth to bottom of BH	6.11
Sample collected (Y/N)	N/A
Sample depth	N/A

BH-6886	Gas readings				
Time (sec)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
30	0.0	0.2	19.3	0	0
60	0.0	0.2	19.3	0	0
90	0.0	0.2	19.3	0	0
120	0.0	0.2	19.3	0	0
150	0.0	0.2	19.3	0	0
180	0.0	0.2	19.3	0	0
240	0.0	0.2	19.3	0	0
300	0.0	0.2	19.3	0	0

Flow rates	
Time (sec)	Flow (l/h)
30	0.1
60	0.1
90	0.1
120	0.1
150	0.1
180	0.1
240	0.1
300	0.1

Groundwater monitoring	mbgl
Depth to top of water	1.57
Depth to bottom of BH	5.75
Sample collected (Y/N)	N/A
Sample depth	N/A

BH-12658	Gas readings				
Time (sec)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
30	0.0	0.4	18.8	0	0
60	0.0	0.4	18.8	0	0
90	0.0	0.4	18.8	0	0
120	0.0	0.4	18.8	0	0
150	0.0	0.4	18.8	0	0
180	0.0	0.4	18.8	0	0
240	0.0	0.4	18.8	0	0
300	0.0	0.4	18.8	0	0

Flow rates	
Time (sec)	Flow (l/h)
30	0.1
60	0.1
90	0.1
120	0.1
150	0.1
180	0.1
240	0.1
300	0.1

Groundwater monitoring	mbgl
Depth to top of water	1.05
Depth to bottom of BH	6.72
Sample collected (Y/N)	N/A
Sample depth	N/A

BH-19057A	Gas readings				
Time (sec)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
30	0.0	0.1	19.8	0	0
60	0.0	0.1	19.8	0	0
90	0.0	0.1	19.8	0	0
120	0.0	0.1	19.8	0	0
150	0.0	0.1	19.8	0	0
180	0.0	0.1	19.8	0	0
240	0.0	0.1	19.8	0	0
300	0.0	0.1	19.8	0	0

Flow rates	
Time (sec)	Flow (l/h)
30	0.1
60	0.1
90	0.1
120	0.1
150	0.1
180	0.1
240	0.1
300	0.1

Groundwater monitoring	mbgl
Depth to top of water	0.30
Depth to bottom of BH	3.62
Sample collected (Y/N)	N/A
Sample depth	N/A

BH-30066	Gas readings				
Time (sec)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
30					
60					
90	Bull in field - no access to standpipe				
120					
150					
180					
240					
300					

Flow rates	
Time (sec)	Flow (l/h)
30	-
60	-
90	-
120	-
150	-
180	-
240	-
300	-

Groundwater monitoring	mbgl
Depth to top of water	-
Depth to bottom of BH	-
Sample collected (Y/N)	N/A
Sample depth	N/A

CAUSEWAY GEOTECH

Site:	WSP Lot 1 GI
Project No.:	21-1682
Date:	15/11/2022
Weather:	Sunny, mild
Engineer:	CN

Equipment:		**Geotechnical Instruments GA5000**				
Ambient Conditions	**Barometric Pressure**	**CH_4 (%)**	**CO_2 (%)**	**O_2 (%)**	**CO (ppm)**	**H_2S (ppm)**
Before:	979	0.0	0.1	20.8	0	0
After:	979	0.0	0.0	20.9	0	0

BH-33000A	**Gas readings**				
Time (sec)	**CH_4 (%)**	**CO_2 (%)**	**O_2 (%)**	**CO (ppm)**	**H_2S (ppm)**
30					
60					
90	Bull in field - no access to standpipe				
120					
150					
180					
240					
300					

Flow rates	
Time (sec)	**Flow (l/h)**
30	-
60	-
90	-
120	-
150	-
180	-
240	-
300	-

Groundwater monitoring	**mbgl**
Depth to top of water	-
Depth to bottom of BH	-
Sample collected (Y/N)	N/A
Sample depth	N/A

BH-34598A	**Gas readings**				
Time (sec)	**CH_4 (%)**	**CO_2 (%)**	**O_2 (%)**	**CO (ppm)**	**H_2S (ppm)**
30					
60					
90	Bull in field - no access to standpipe				
120					
150					
180					
240					
300					

Flow rates	
Time (sec)	**Flow (l/h)**
30	-
60	-
90	-
120	-
150	-
180	-
240	-
300	-

Groundwater monitoring	**mbgl**
Depth to top of water	-
Depth to bottom of BH	-
Sample collected (Y/N)	N/A
Sample depth	N/A

CAUSEWAY GEOTECH

Site:	WSP Lot 1 GI
Project No.:	21-1682
Date:	13/12/2022
Weather:	Cold, Dry, 0°C
Engineer:	TMCA

Equipment:		Geotechnical Instruments GA5000				
Ambient Conditions	Barometric Pressure	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
Before:	1009	0.0	0.2	21.2	0	0
After:	1009	0.0	0.2	21.2	0	0

BH-3588	Gas readings				
Time (sec)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
30	0.0	0.2	20.8	0	0
60	0.0	0.2	20.8	0	0
90	0.0	0.2	20.8	0	0
120	0.0	0.2	20.8	0	0
150	0.0	0.2	20.8	0	0
180	0.0	0.2	20.8	0	0
240	0.0	0.2	20.8	0	0
300	0.0	0.2	20.8	0	0

Flow rates	
Time (sec)	Flow (l/h)
30	0.1
60	0.1
90	0.1
120	0.1
150	0.1
180	0.1
240	0.1
300	0.1

Groundwater monitoring	mbgl
Depth to top of water	3.17
Depth to bottom of BH	6.11
Sample collected (Y/N)	N/A
Sample depth	N/A

BH-6886	Gas readings				
Time (sec)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
30	0.0	0.2	19.3	0	0
60	0.0	0.2	19.3	0	0
90	0.0	0.2	19.3	0	0
120	0.0	0.2	19.2	0	0
150	0.0	0.2	19.2	0	0
180	0.0	0.2	19.2	0	0
240	0.0	0.2	19.2	0	0
300	0.0	0.2	19.2	0	0

Flow rates	
Time (sec)	Flow (l/h)
30	0.1
60	0.1
90	0.1
120	0.1
150	0.1
180	0.1
240	0.1
300	0.1

Groundwater monitoring	mbgl
Depth to top of water	1.55
Depth to bottom of BH	5.75
Sample collected (Y/N)	N/A
Sample depth	N/A

BH-12658	Gas readings				
Time (sec)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
30	0.0	0.4	18.8	0	0
60	0.0	0.4	18.8	0	0
90	0.0	0.4	18.8	0	0
120	0.0	0.4	18.8	0	0
150	0.0	0.4	18.8	0	0
180	0.0	0.4	18.8	0	0
240	0.0	0.4	18.8	0	0
300	0.0	0.4	18.8	0	0

Flow rates	
Time (sec)	Flow (l/h)
30	0.1
60	0.1
90	0.1
120	0.1
150	0.0
180	0.0
240	0.0
300	0.0

Groundwater monitoring	mbgl
Depth to top of water	1.48
Depth to bottom of BH	6.72
Sample collected (Y/N)	N/A
Sample depth	N/A

BH-19057A	Gas readings				
Time (sec)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
30	0.0	0.1	19.8	0	0
60	0.0	0.1	19.8	0	0
90	0.0	0.1	19.8	0	0
120	0.0	0.1	19.8	0	0
150	0.0	0.1	19.8	0	0
180	0.0	0.1	19.8	0	0
240	0.0	0.1	19.8	0	0
300	0.0	0.1	19.8	0	0

Flow rates	
Time (sec)	Flow (l/h)
30	0.1
60	0.1
90	0.1
120	0.1
150	0.1
180	0.1
240	0.1
300	0.1

Groundwater monitoring	mbgl
Depth to top of water	0.38
Depth to bottom of BH	3.62
Sample collected (Y/N)	N/A
Sample depth	N/A

BH-30066	Gas readings				
Time (sec)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
30					
60					
90	Standpipe has been destroyed by cattle or possibly removed by the landowner; evidence of recent muck spreading operations in the field during this monitoring round				
120					
150					
180					
240					
300					

Flow rates	
Time (sec)	Flow (l/h)
30	
60	
90	
120	
150	
180	
240	
300	

Groundwater monitoring	mbgl
Depth to top of water	-
Depth to bottom of BH	-
Sample collected (Y/N)	-
Sample depth	-

CAUSEWAY GEOTECH

Site:	WSP Lot 1 GI
Project No.:	21-1682
Date:	13/12/2022
Weather:	Cold, Dry, 0°C
Engineer:	TMCA

Equipment:		Geotechnical Instruments GA5000				
Ambient Conditions	Barometric Pressure	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
Before:	1009	0.0	0.2	21.2	0	0
After:	1009	0.0	0.2	21.2	0	0

BH-33000A	Gas readings				
Time (sec)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
30	0.0	0.1	19.8	0	0
60	0.0	0.1	19.8	0	0
90	0.0	0.1	19.8	0	0
120	0.0	0.1	19.8	0	0
150	0.0	0.1	19.8	0	0
180	0.0	0.1	19.8	0	0
240	0.0	0.1	19.8	0	0
300	0.0	0.1	19.8	0	0

Flow rates	
Time (sec)	Flow (l/h)
30	0.1
60	0.1
90	0.0
120	0.0
150	0.0
180	0.0
240	0.0
300	0.0

Groundwater monitoring	mbgl
Depth to top of water	DRY
Depth to bottom of BH	4.52
Sample collected (Y/N)	N/A
Sample depth	N/A

BH-34598A	Gas readings				
Time (sec)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
30	0.0	0.2	19.8	0	0
60	0.0	0.2	19.8	0	0
90	0.0	0.2	19.8	0	0
120	0.0	0.2	19.8	0	0
150	0.0	0.1	19.8	0	0
180	0.0	0.1	19.8	0	0
240	0.0	0.1	19.8	0	0
300	0.0	0.1	19.8	0	0

Flow rates	
Time (sec)	Flow (l/h)
30	0.0
60	0.1
90	0.1
120	0.1
150	0.1
180	0.1
240	0.1
300	0.1

Groundwater monitoring	mbgl
Depth to top of water	0.83
Depth to bottom of BH	6.80
Sample collected (Y/N)	N/A
Sample depth	N/A

CAUSEWAY GEOTECH

Site:	WSP Lot 1 GI
Project No.:	21-1682
Date:	19/01/2023
Weather:	Cold, dry, ice
Engineer:	NP

Equipment:		Geotechnical Instruments GA5000				
Ambient Conditions	Barometric Pressure	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
Before:	1010	0.0	0.2	20.9	0	0
After:	1009	0.0	0.2	20.9	0	0

BH-3588	Gas readings				
Time (sec)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
30	0.0	0.2	20.7	0	0
60	0.0	0.2	20.7	0	0
90	0.0	0.2	20.7	0	0
120	0.0	0.2	20.7	0	0
150	0.0	0.2	20.7	0	0
180	0.0	0.2	20.7	0	0
240	0.0	0.2	20.7	0	0
300	0.0	0.2	20.7	0	0

Flow rates	
Time (sec)	Flow (l/h)
30	0.1
60	0.1
90	0.1
120	0.1
150	0.1
180	0.1
240	0.1
300	0.1

Groundwater monitoring	mbgl
Depth to top of water	3.35
Depth to bottom of BH	6.10
Sample collected (Y/N)	N/A
Sample depth	N/A

BH-6886	Gas readings				
Time (sec)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
30	0.0	0.2	19.1	0	0
60	0.0	0.2	19.1	0	0
90	0.0	0.2	19.0	0	0
120	0.0	0.2	19.0	0	0
150	0.0	0.2	19.0	0	0
180	0.0	0.2	19.0	0	0
240	0.0	0.2	19.0	0	0
300	0.0	0.2	18.9	0	0

Flow rates	
Time (sec)	Flow (l/h)
30	0.0
60	0.0
90	0.0
120	0.0
150	0.0
180	0.0
240	0.0
300	0.0

Groundwater monitoring	mbgl
Depth to top of water	1.70
Depth to bottom of BH	5.75
Sample collected (Y/N)	N/A
Sample depth	N/A

BH-12658	Gas readings				
Time (sec)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
30	0.0	0.4	18.6	0	0
60	0.0	0.4	18.6	0	0
90	0.0	0.4	18.6	0	0
120	0.0	0.4	18.6	0	0
150	0.0	0.4	18.6	0	0
180	0.0	0.4	18.6	0	0
240	0.0	0.4	18.6	0	0
300	0.0	0.4	18.6	0	0

Flow rates	
Time (sec)	Flow (l/h)
30	0.1
60	0.1
90	0.1
120	0.1
150	0.1
180	0.1
240	0.1
300	0.1

Groundwater monitoring	mbgl
Depth to top of water	1.36
Depth to bottom of BH	6.70
Sample collected (Y/N)	N/A
Sample depth	N/A

BH-19057A	Gas readings				
Time (sec)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
30	0.0	0.2	19.8	0	0
60	0.0	0.2	19.9	0	0
90	0.0	0.2	19.9	0	0
120	0.0	0.2	19.9	0	0
150	0.0	0.2	19.9	0	0
180	0.0	0.2	19.9	0	0
240	0.0	0.2	19.9	0	0
300	0.0	0.2	19.9	0	0

Flow rates	
Time (sec)	Flow (l/h)
30	0.0
60	0.0
90	0.0
120	0.0
150	0.0
180	0.0
240	0.0
300	0.0

Groundwater monitoring	mbgl
Depth to top of water	0.13
Depth to bottom of BH	3.62
Sample collected (Y/N)	N/A
Sample depth	N/A

BH-30066	Gas readings				
Time (sec)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
30					
60					
90	Standpipe has been destroyed by cattle or possibly removed by the landowner; evidence of recent muck spreading operations in the field during this monitoring round				
120					
150					
180					
240					
300					

Flow rates	
Time (sec)	Flow (l/h)
30	
60	
90	
120	
150	
180	
240	
300	

Groundwater monitoring	mbgl
Depth to top of water	-
Depth to bottom of BH	-
Sample collected (Y/N)	-
Sample depth	-

CAUSEWAY GEOTECH

Site:	WSP Lot 1 GI
Project No.:	21-1682
Date:	19/01/2023
Weather:	Cold, dry, ice
Engineer:	NP

Equipment:		Geotechnical Instruments GA5000				
Ambient Conditions	Barometric Pressure	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
Before:	1010	0.0	0.2	20.9	0	0
After:	1009	0.0	0.2	20.9	0	0

BH-33000A	Gas readings				
Time (sec)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
30	0.0	0.2	20.0	0	0
60	0.0	0.2	20.0	0	0
90	0.0	0.2	19.9	0	0
120	0.0	0.2	19.9	0	0
150	0.0	0.2	19.9	0	0
180	0.0	0.2	19.9	0	0
240	0.0	0.2	19.9	0	0
300	0.0	0.2	19.9	0	0

Flow rates	
Time (sec)	Flow (l/h)
30	0.1
60	0.1
90	0.1
120	0.1
150	0.1
180	0.1
240	0.1
300	0.1

Groundwater monitoring	mbgl
Depth to top of water	0.40
Depth to bottom of BH	4.50
Sample collected (Y/N)	N/A
Sample depth	N/A

BH-34598A	Gas readings				
Time (sec)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
30	0.0	0.2	19.7	0	0
60	0.0	0.2	19.7	0	0
90	0.0	0.2	19.7	0	0
120	0.0	0.2	19.7	0	0
150	0.0	0.2	19.7	0	0
180	0.0	0.2	19.7	0	0
240	0.0	0.2	19.7	0	0
300	0.0	0.2	19.7	0	0

Flow rates	
Time (sec)	Flow (l/h)
30	0.1
60	0.1
90	0.0
120	0.0
150	0.0
180	0.0
240	0.0
300	0.0

Groundwater monitoring	mbgl
Depth to top of water	0.52
Depth to bottom of BH	6.80
Sample collected (Y/N)	N/A
Sample depth	N/A

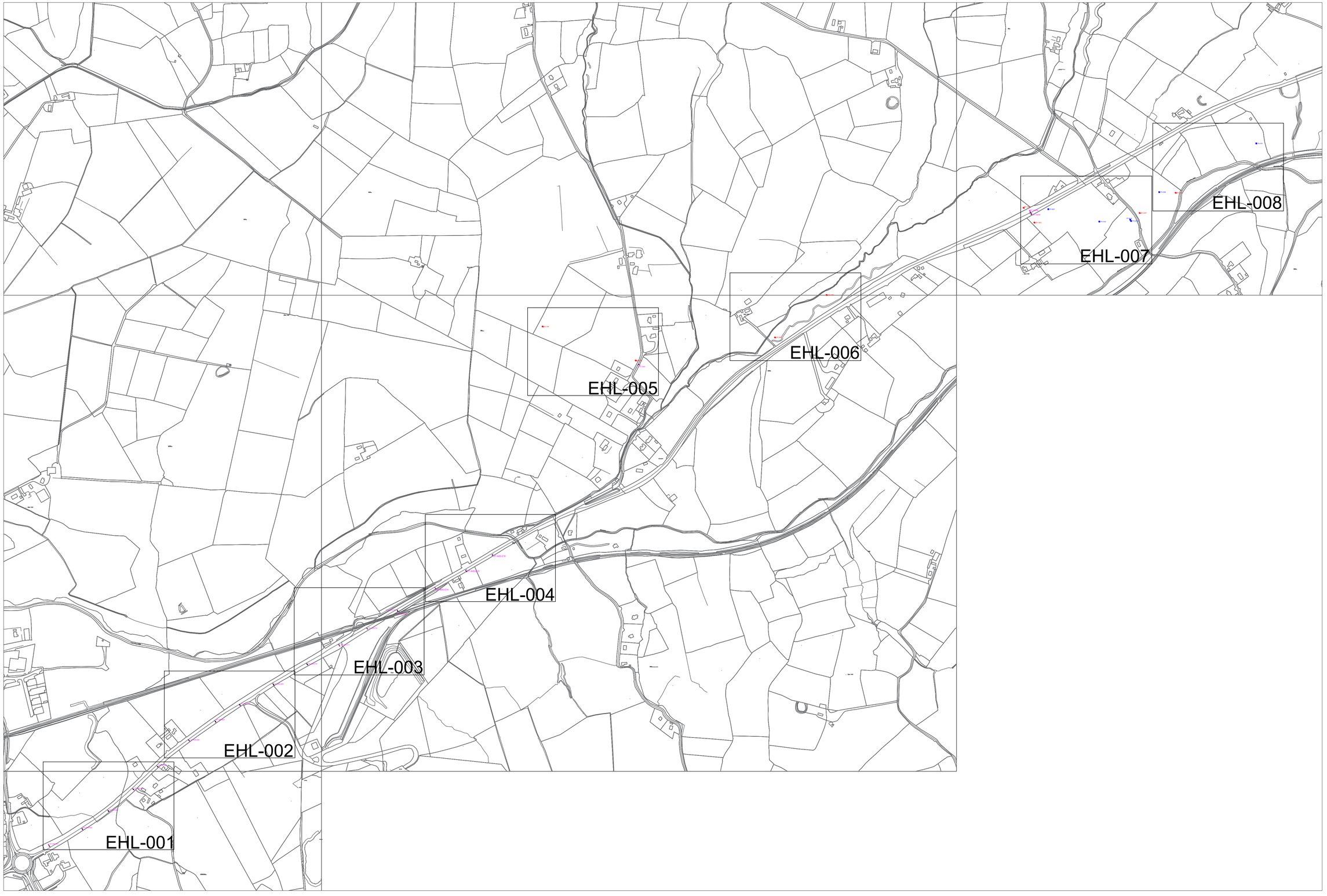
CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

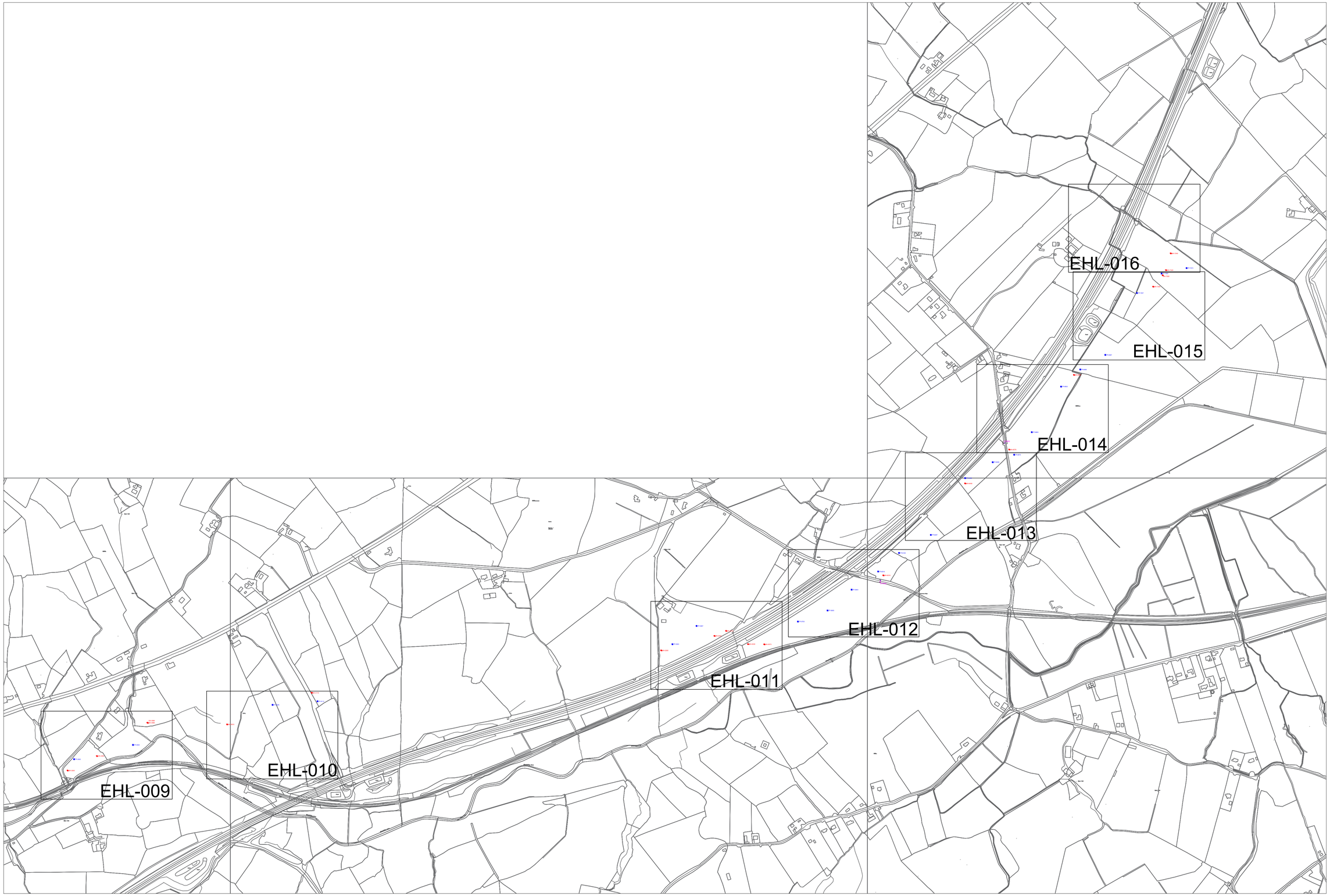
APPENDIX 4K

DRAWINGS





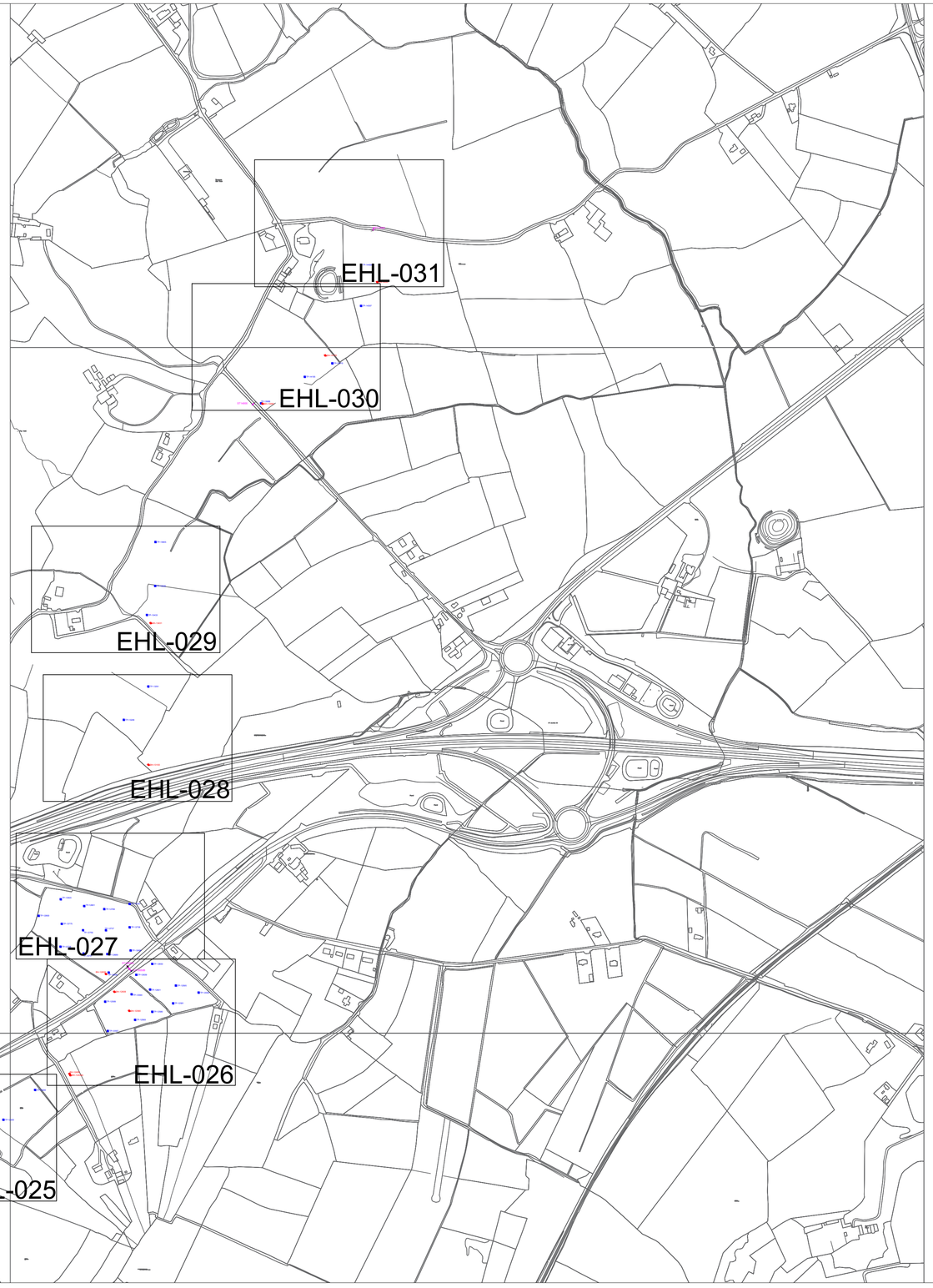
PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: NTS A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 1 of 10	SHEET : 21-1682-EHL-OW-001



PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Rotasian Core, Slit Trench, Peat Probe	SCALE: NTS A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 2 of 10	SHEET : 21-1682-EHL-OW-002



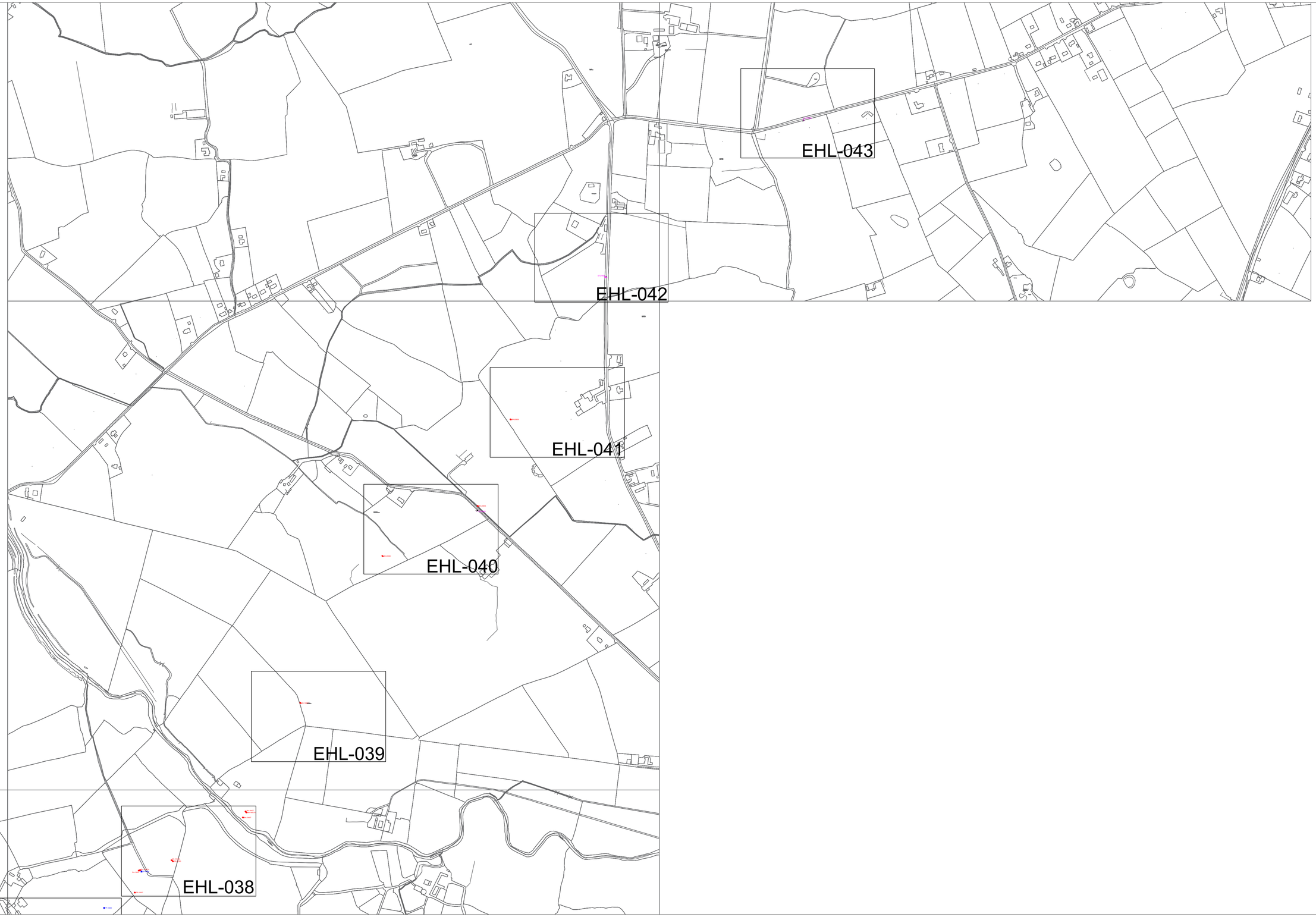
PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: NTS A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 3 of 10	SHEET : 21-1682-EHL-OW-003



PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: NTS A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 4 of 10	SHEET : 21-1682-EHL--OW-004



PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Rotasian Core, Slit Trench, Peat Probe	SCALE: NTS A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 5 of 10	SHEET : 21-1682-EHL-OW-005



PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Pnail Probe	SCALE: NTS A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS / CHCK: NH	SERIES: 6 of 10	SHEET : 21-1682-EHL-OW-006



PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Rotational Core, Slit Trench, Peat Probe	SCALE: NTS A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 7 of 10	SHEET : 21-1682-EHL-OW-007



PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: NTS A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 8 of 10	SHEET : 21-1682-EHL-008



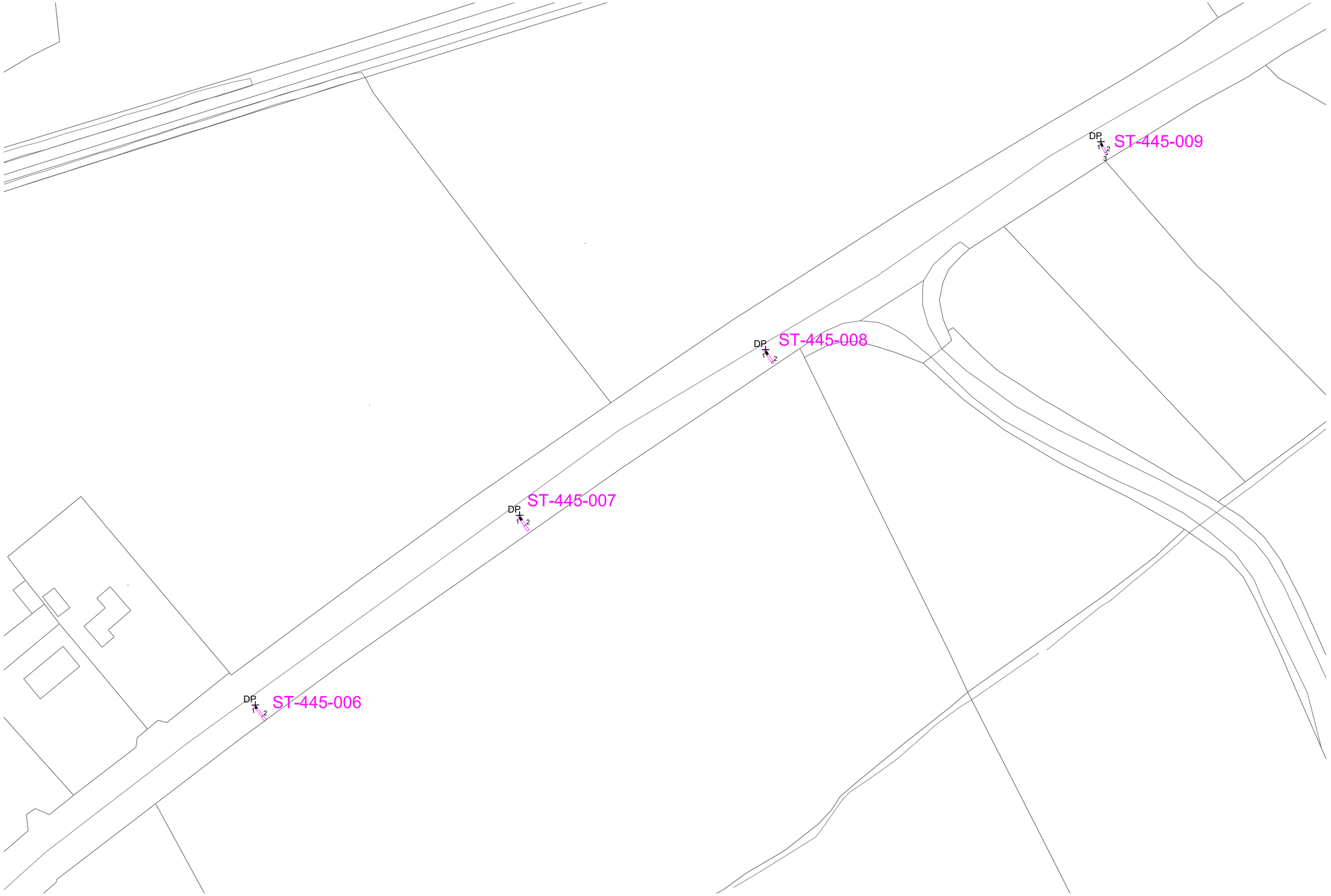
PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: NTS A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 9 of 10	SHEET : 21-1682-EHL-OW-009



PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Pearl Probe	SCALE: NTS A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 10 of 10	SHEET : 21-1682-EHL_OW-010



PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 1 of 69	SHEET : 21-1682-EHL-001



PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 2 of 69	SHEET : 21-1682-EHL-002

ST-445-013A

DP

DP

ST-445-013B

MP

DP

1

ST-445-012

DP

1

ST-445-011

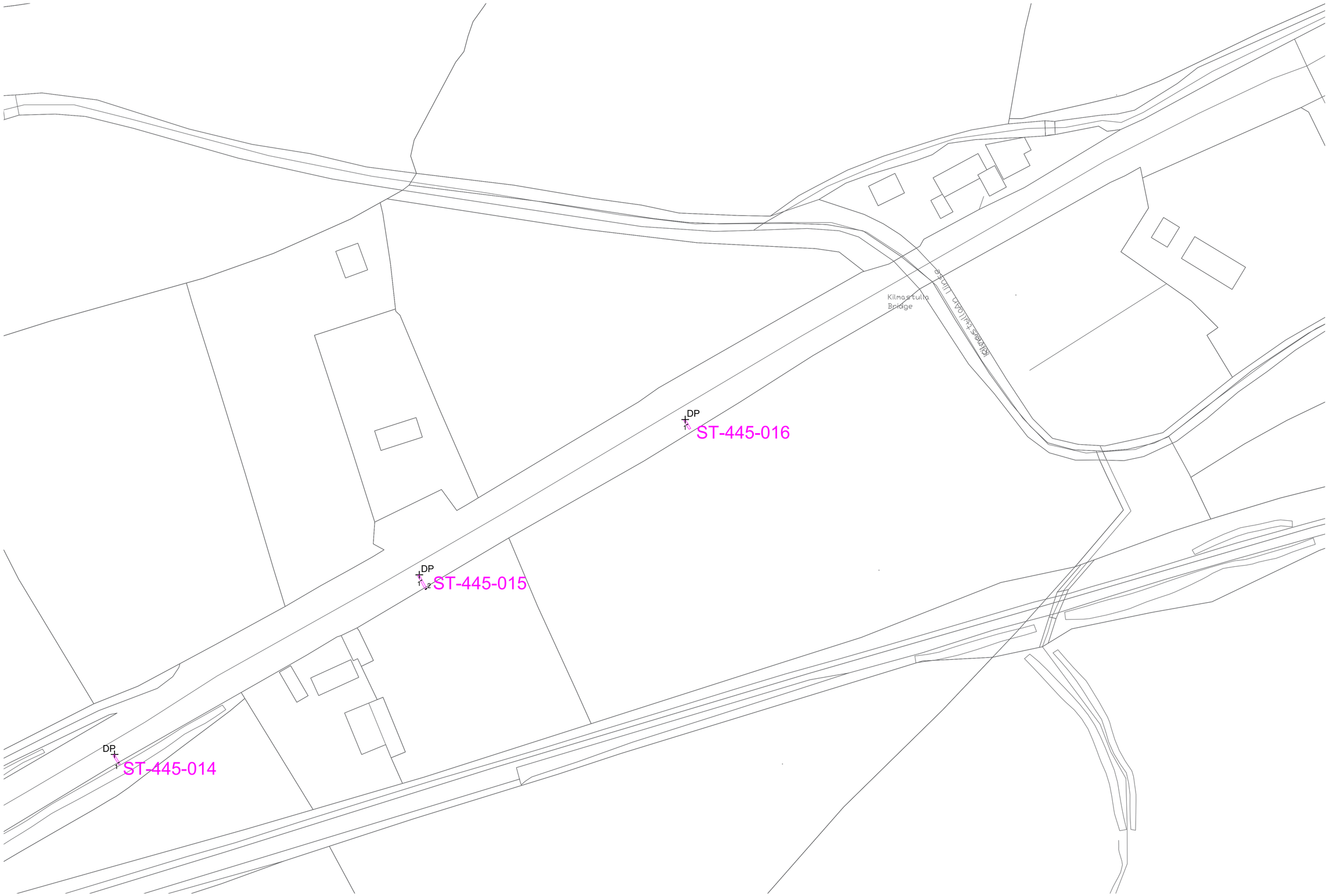
DP

1 2

ST-445-010

Pond

PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 3 of 69	SHEET : 21-1682-EHL-003



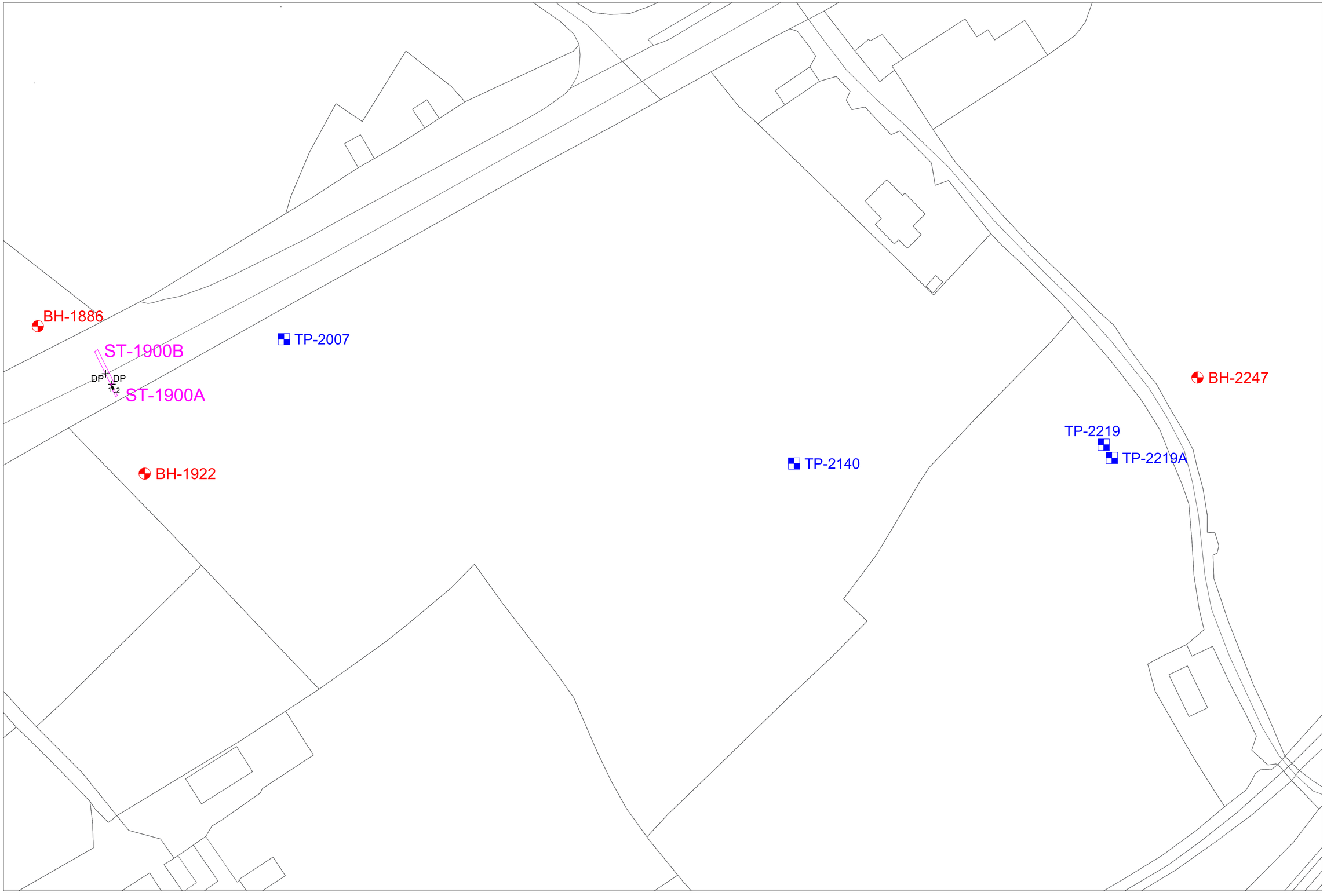
PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Rotasian Core, Dill Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 4 of 69	SHEET : 21-1682-EHL-004



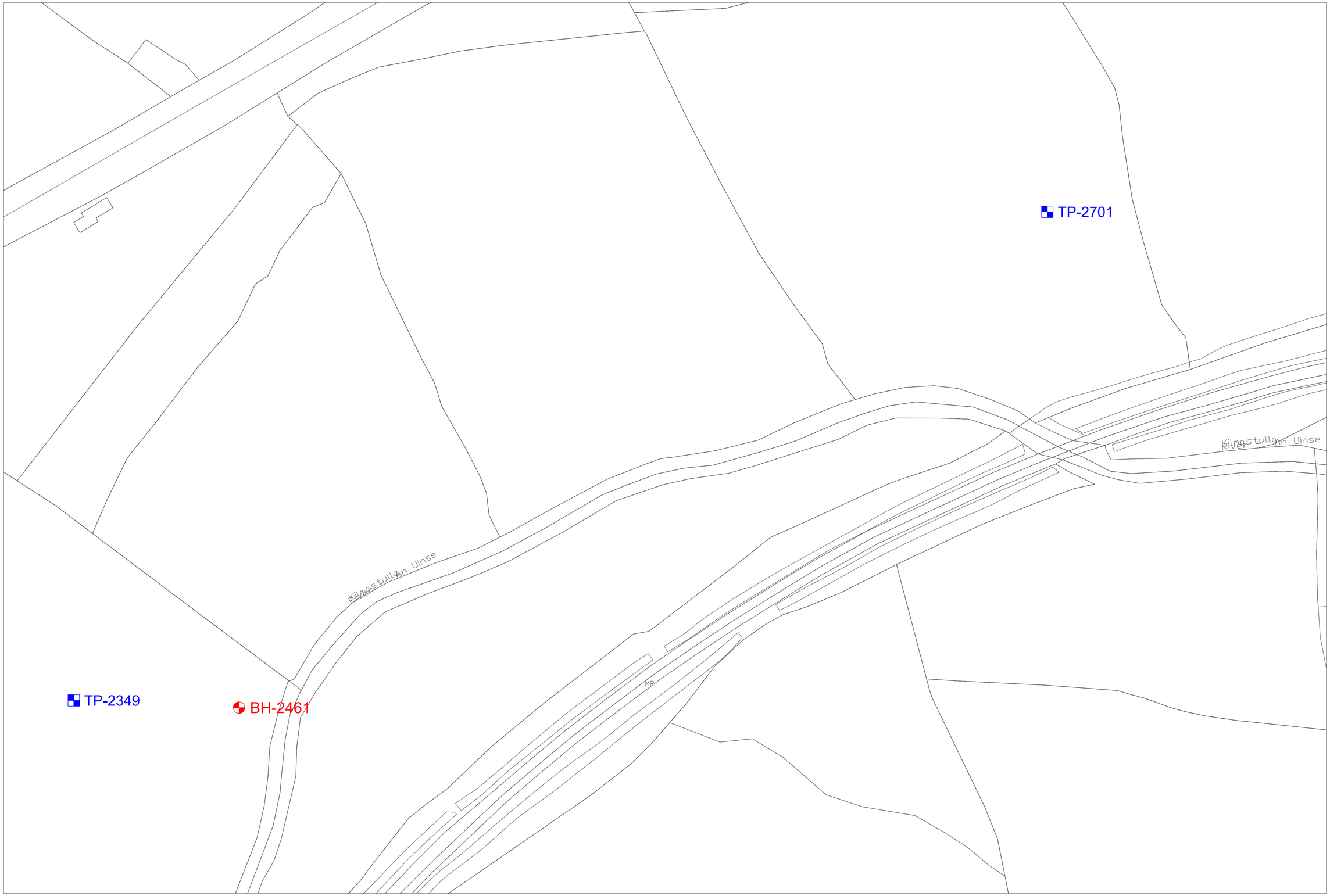
PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 5 of 69	SHEET : 21-1682-EHL-005



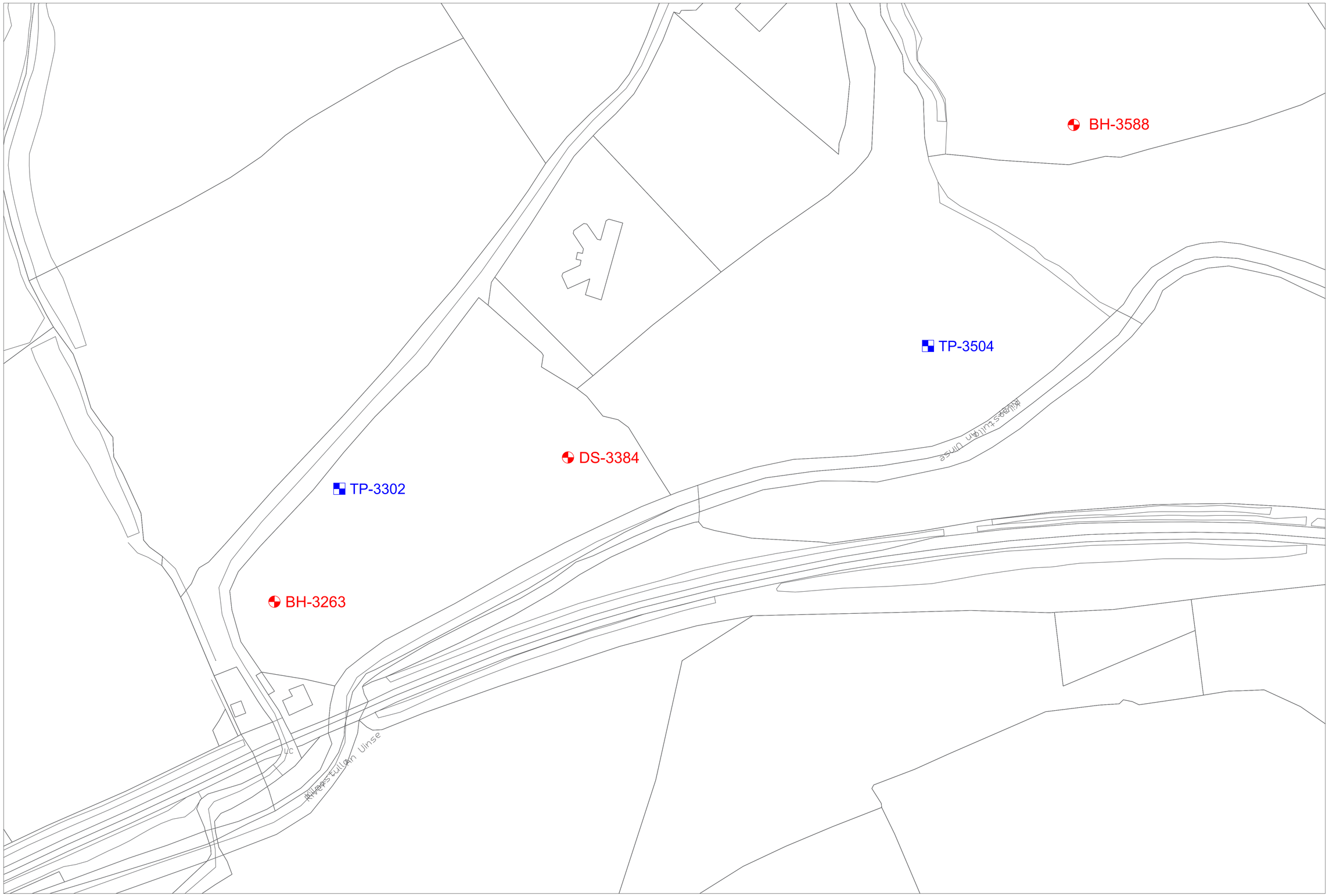
PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 21/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 6 of 69	SHEET : 21-1682-EHL-006



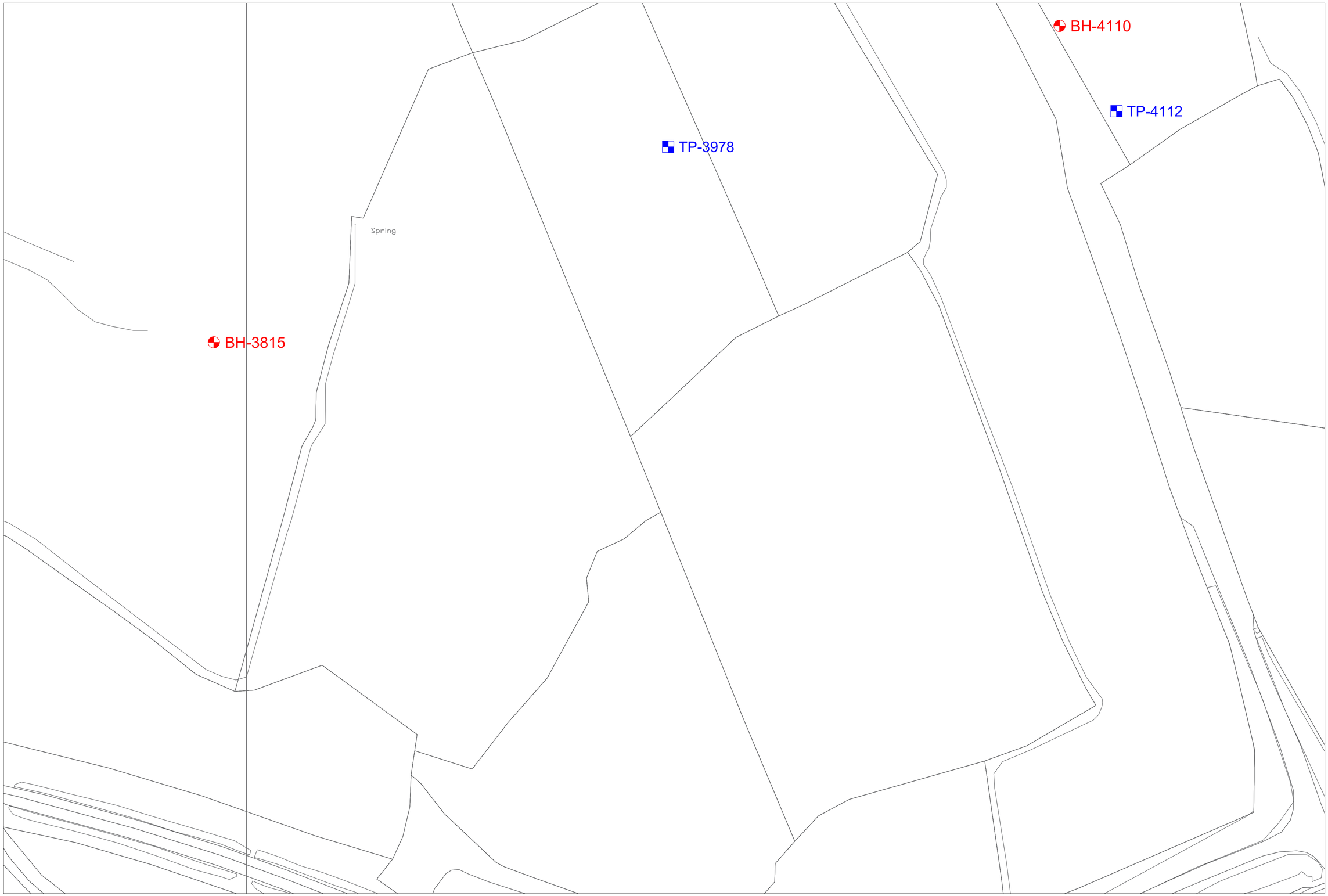
PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Pivat Probe	SCALE: 1:500 A1	DATE: 21/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 7 of 69	SHEET : 21-1682-EHL-007



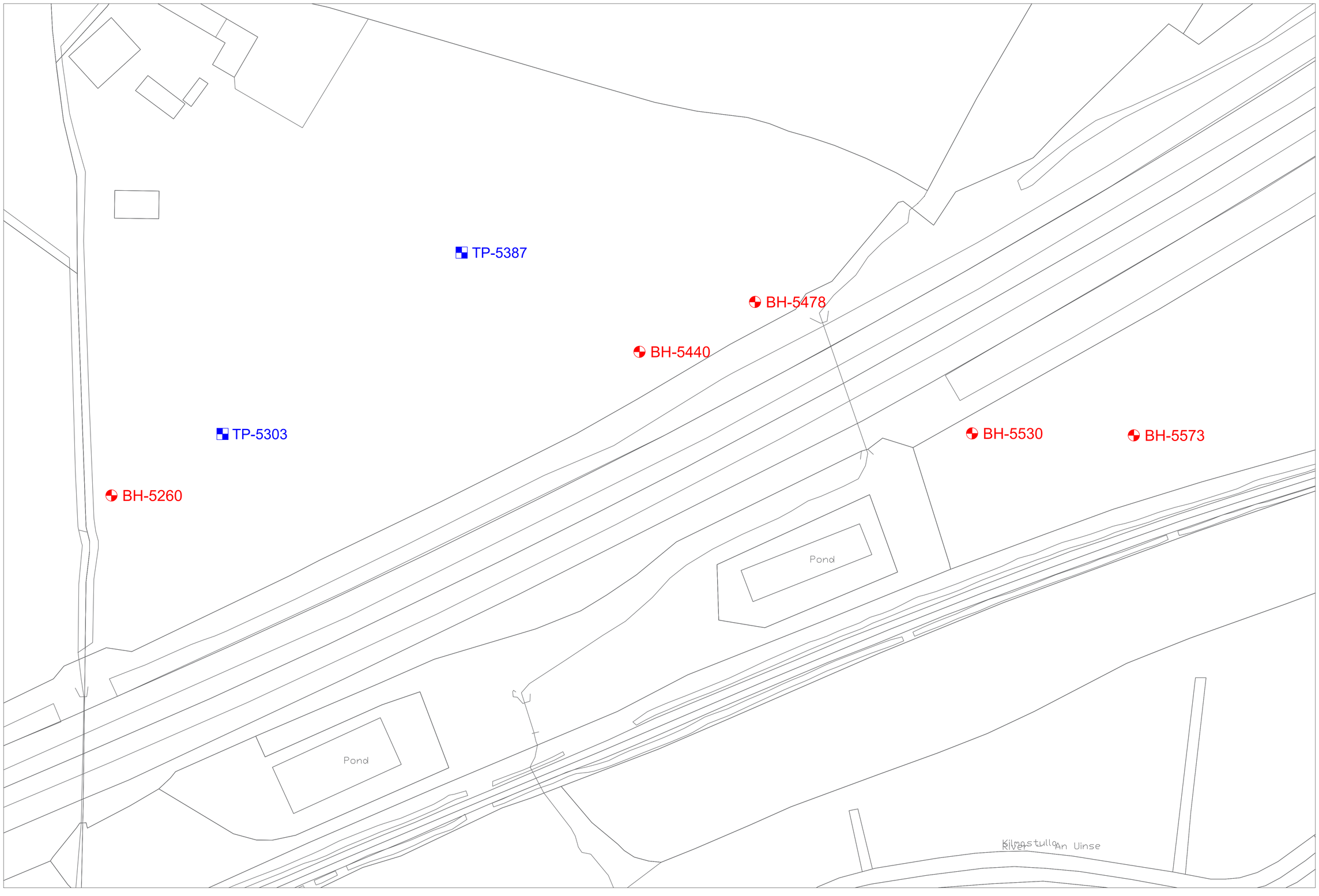
PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 8 of 69	SHEET : 21-1682-EHL-008



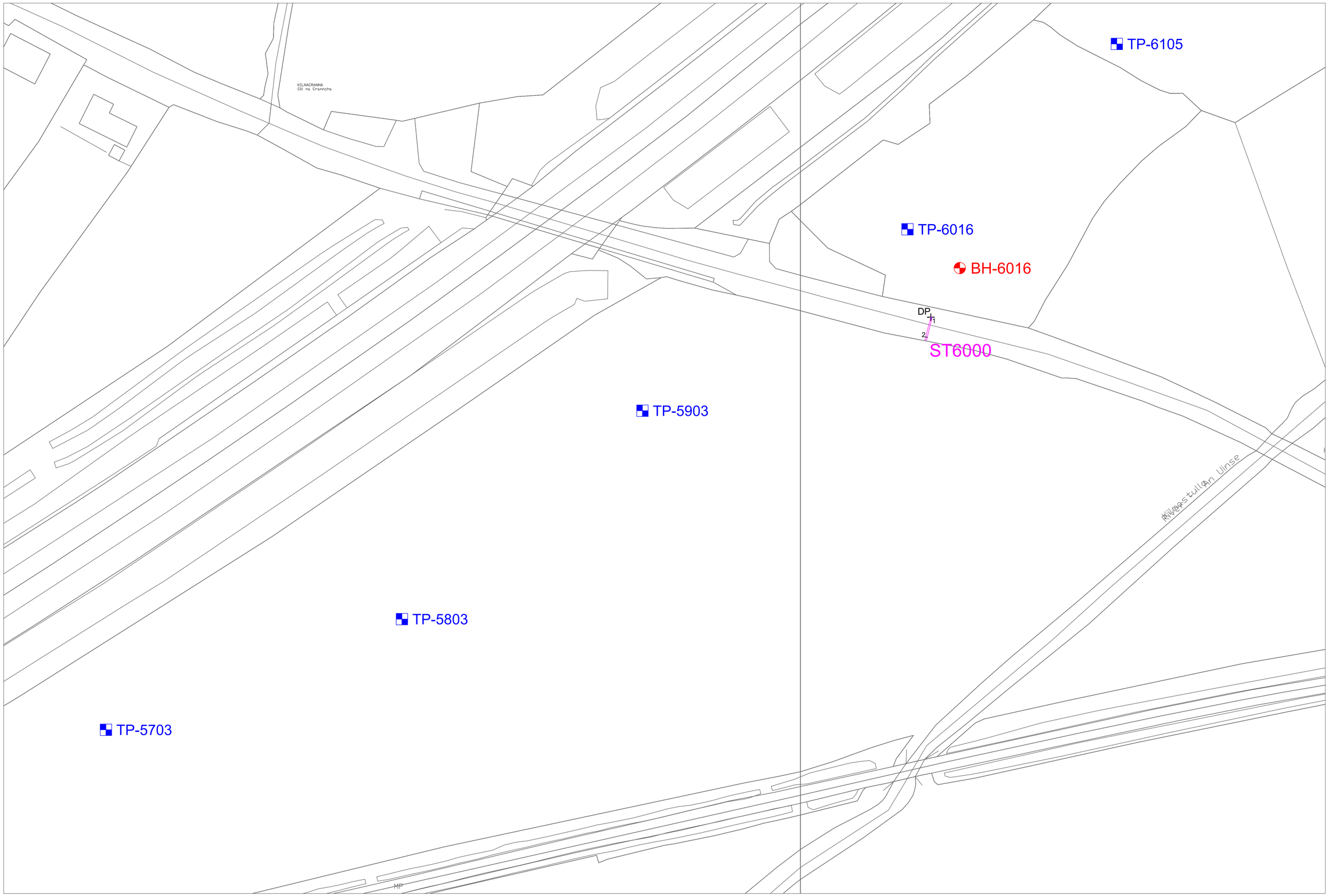
PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Silt Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS / CHCK: NH	SERIES: 9 of 69 / SHEET: 21-1682-EHL-009	



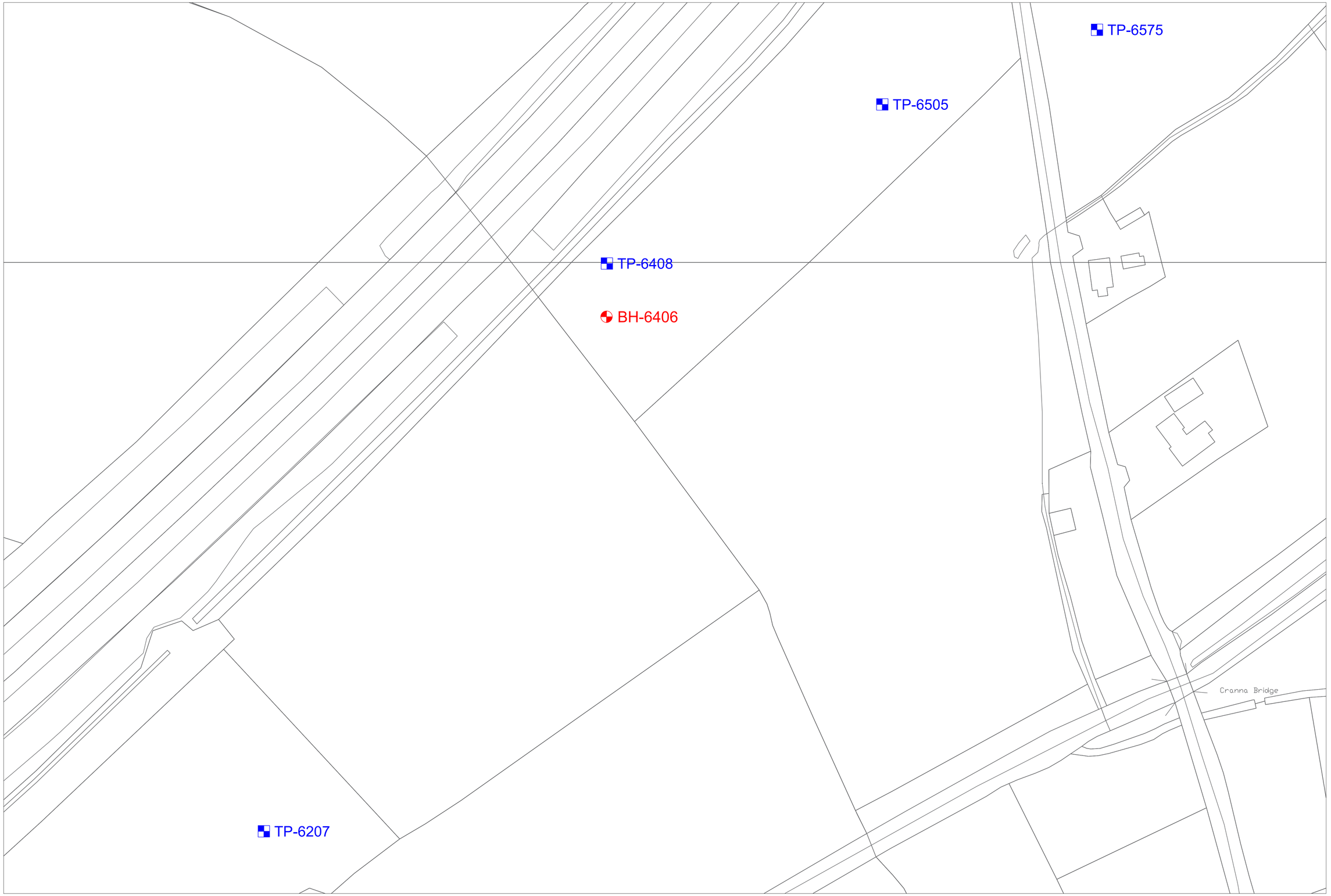
PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Rotasian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 10 of 69	SHEET : 21-1682-EHL-010



PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 11 of 69	SHEET : 21-1682-EHL-011



PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 12 of 69	SHEET : 21-1682-EHL-012



PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 13 of 69	SHEET : 21-1682-EHL-013

TP-6906

BH-6886

TP-6832

CASTLECRANNA
Caisleán na Crannchа

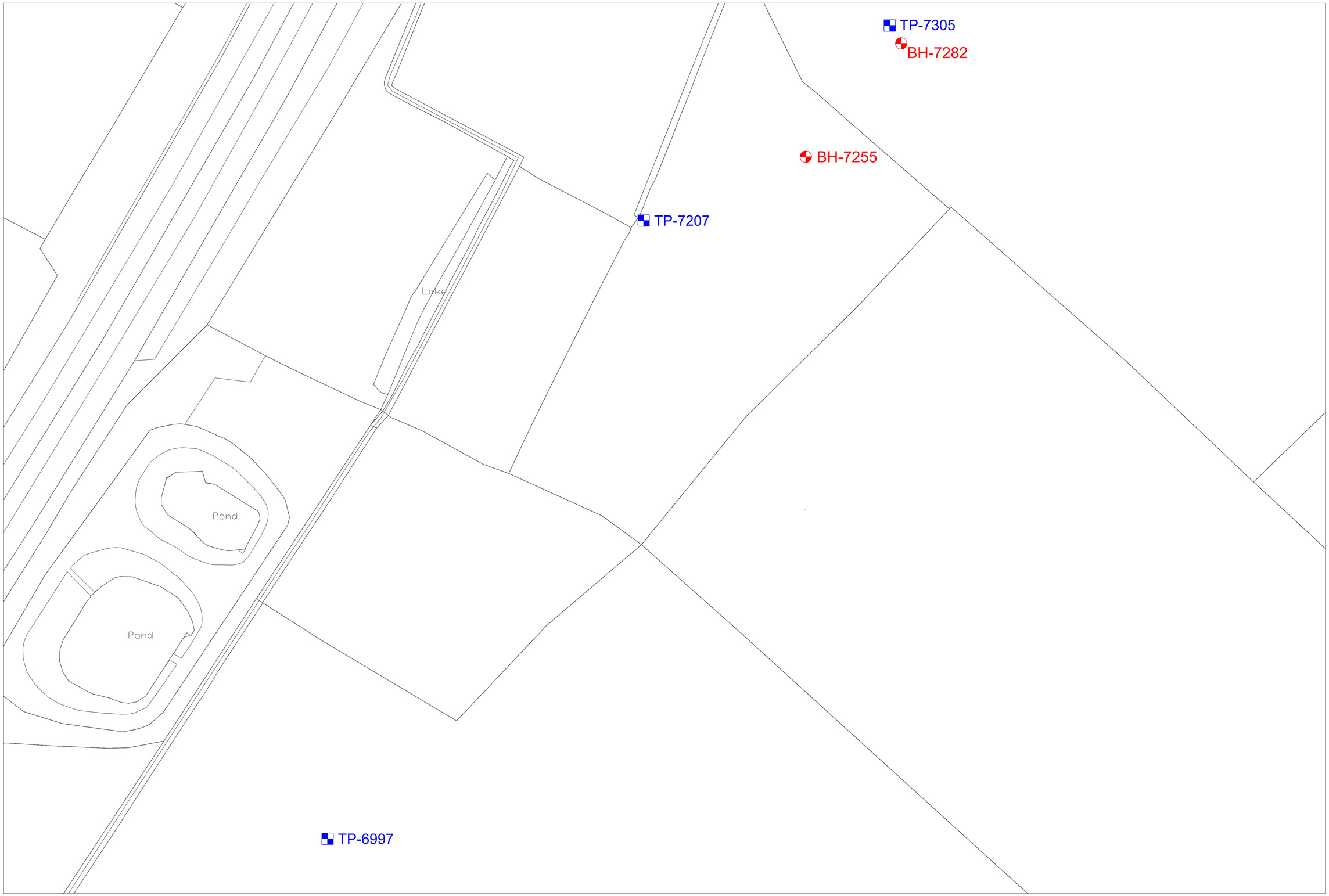
TP-6663

ST6600

DP 1 2 3

BH-6576

PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Pisol Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS / CHCK: NH	SERIES: 14 of 69 / SHEET: 21-1682-EHL-014	



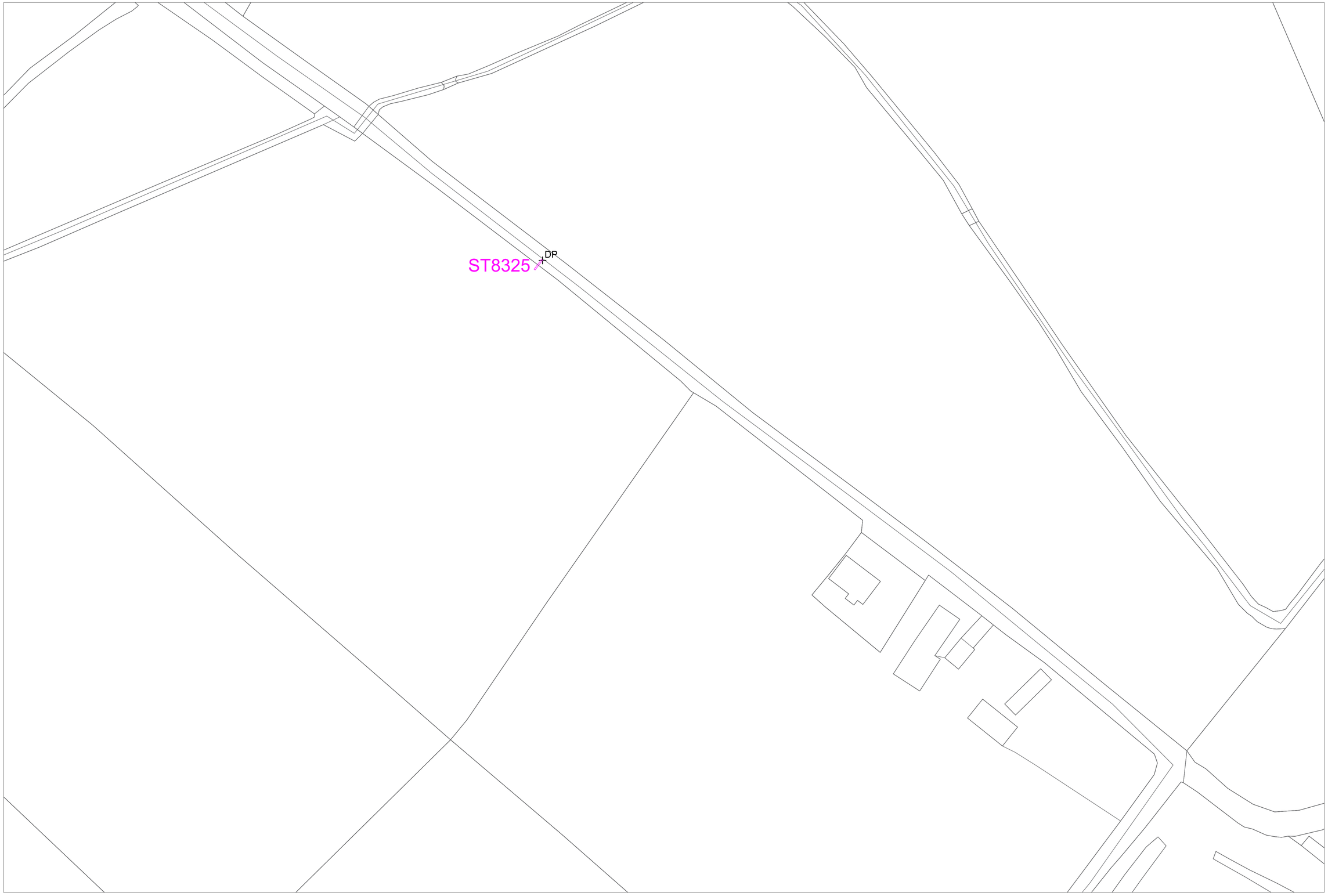
PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 15 of 69	SHEET : 21-1682-EHL-015

BH-7349

TP-7373

BH-7320

PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Pearl Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 16 of 69	SHEET : 21-1682-EHL-016



PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 17 of 69 SHEET : 21-1682-EHL-017

NOTES:

TP-9206

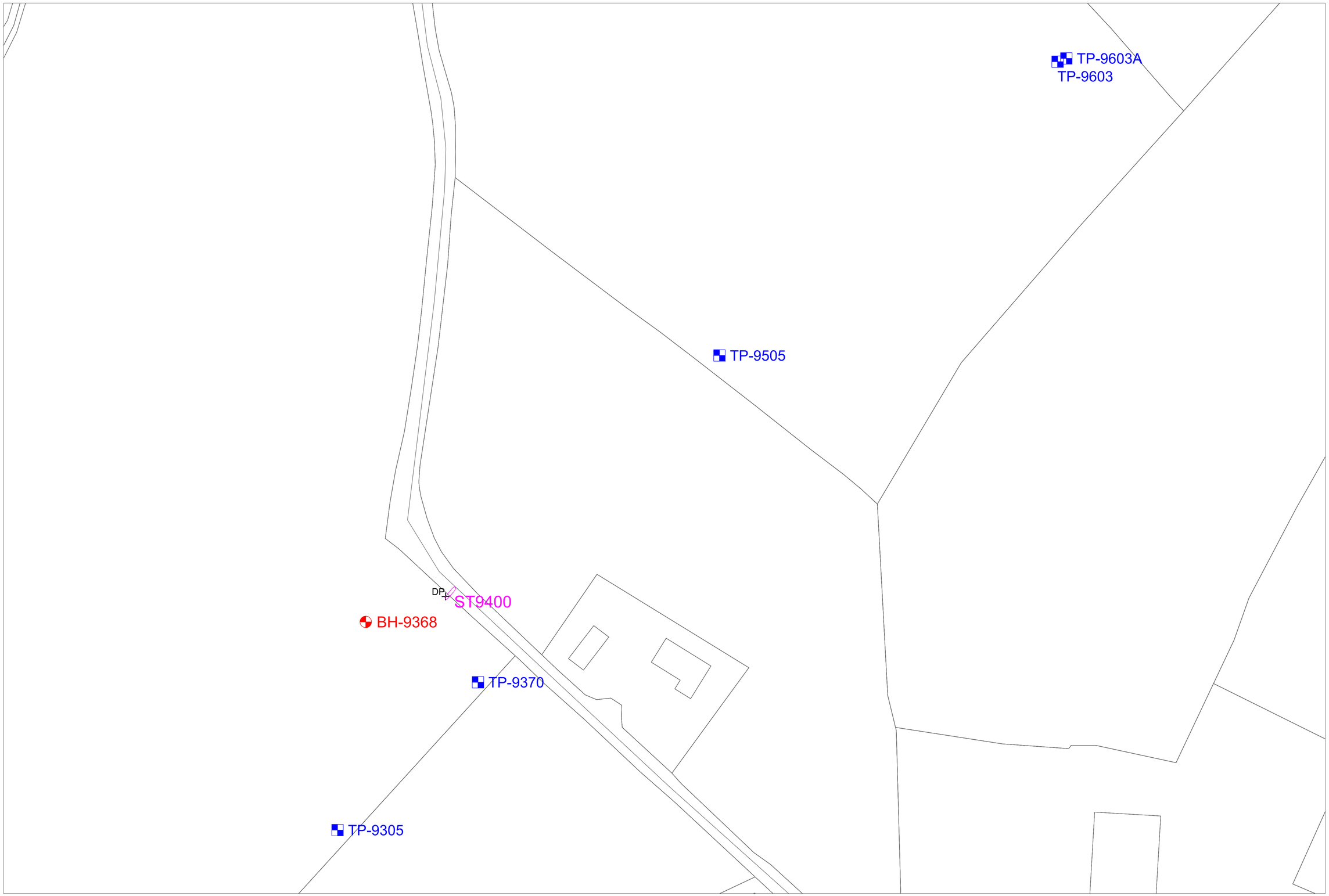
TP-9094

TP-9115

TP-9011

BH-8940

PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 18 of 69	SHEET : 21-1682-EHL-018



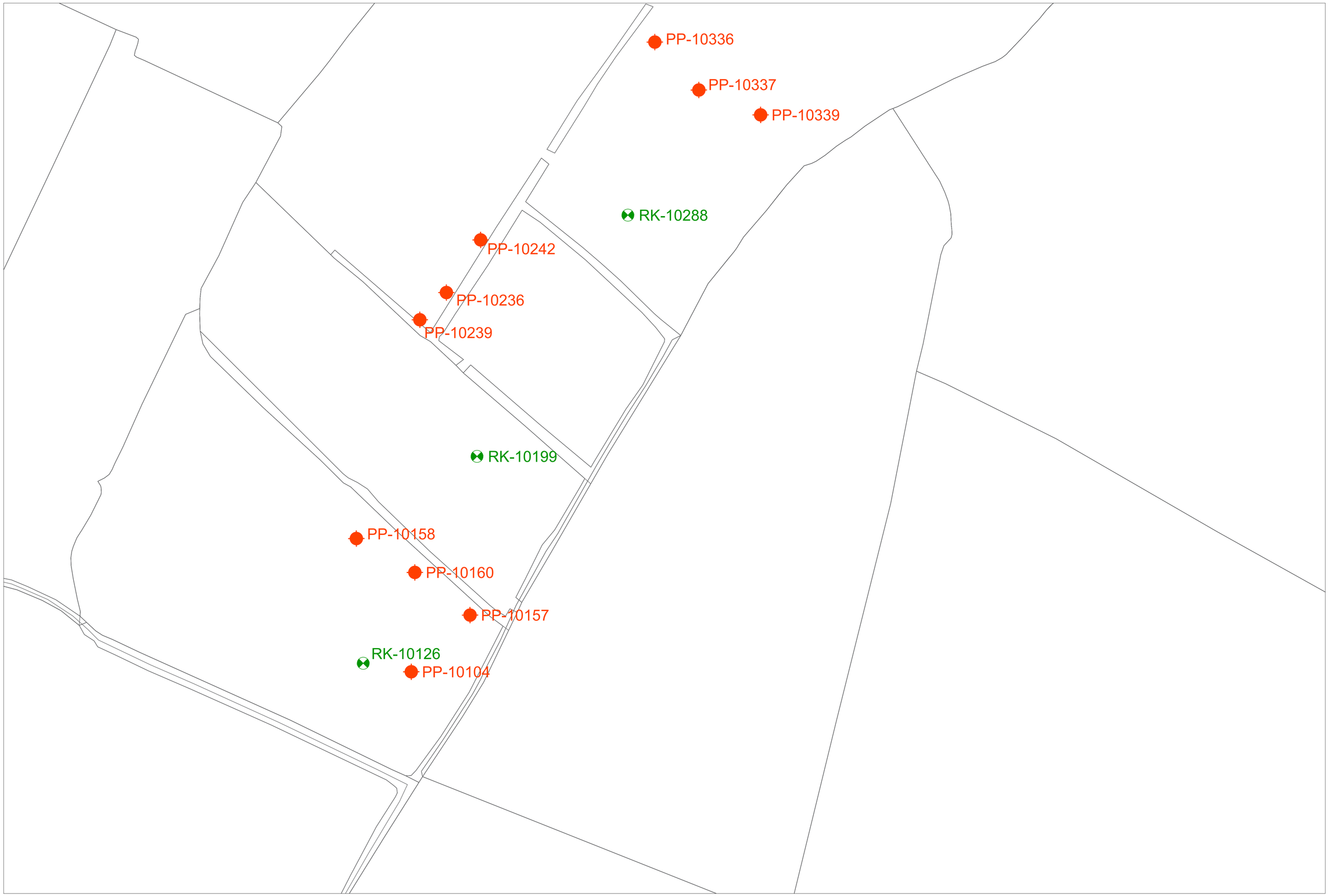
PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 19 of 69	SHEET : 21-1682-EHL-019

TP-9830

TP-9705

BH-9668

PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 20 of 69	SHEET : 21-1682-EHL-020



PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Pivat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 21 of 69	SHEET : 21-1682-EHL-021

BH-10475

BH-10449

PP-10422

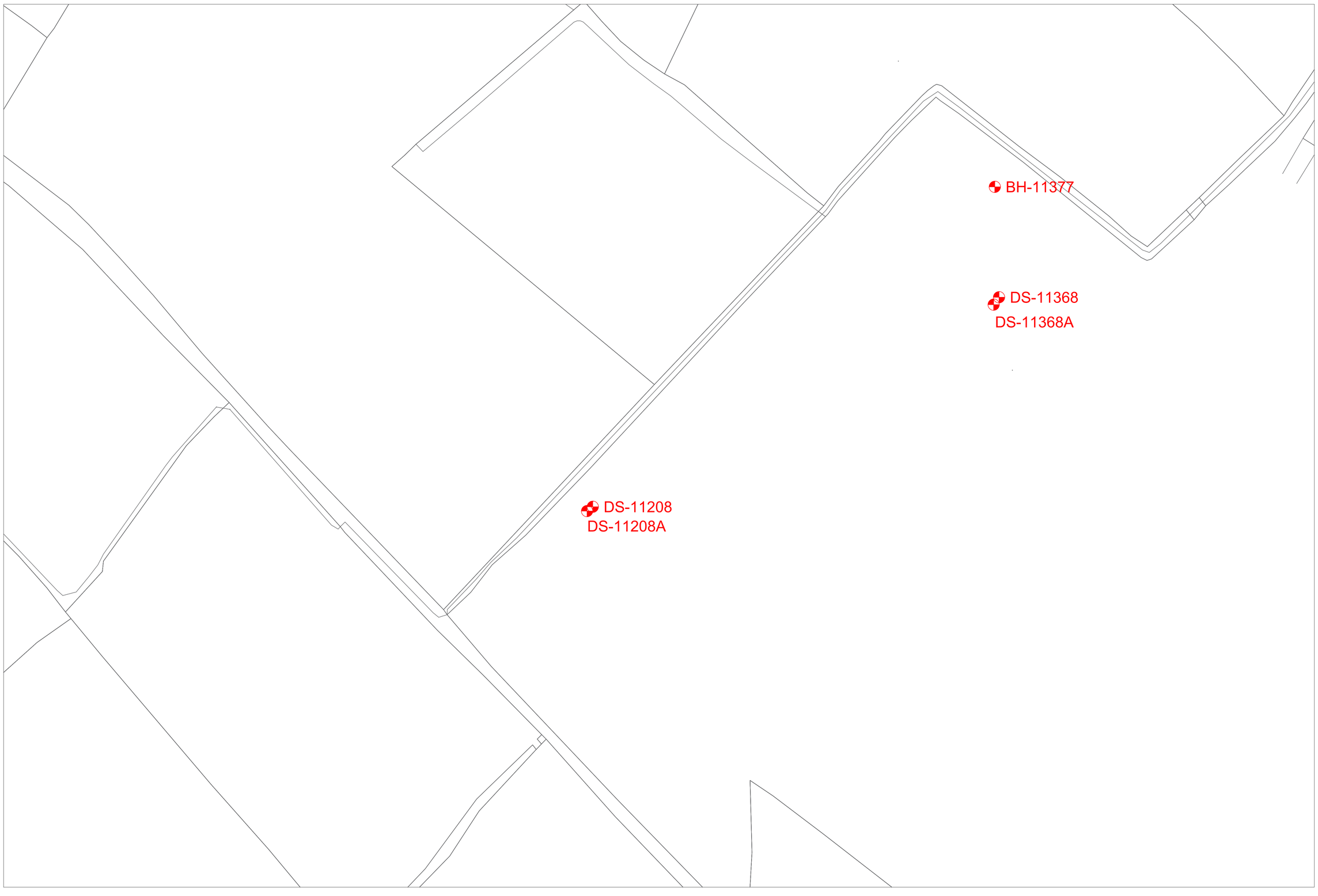
PP-10424

PP-10433

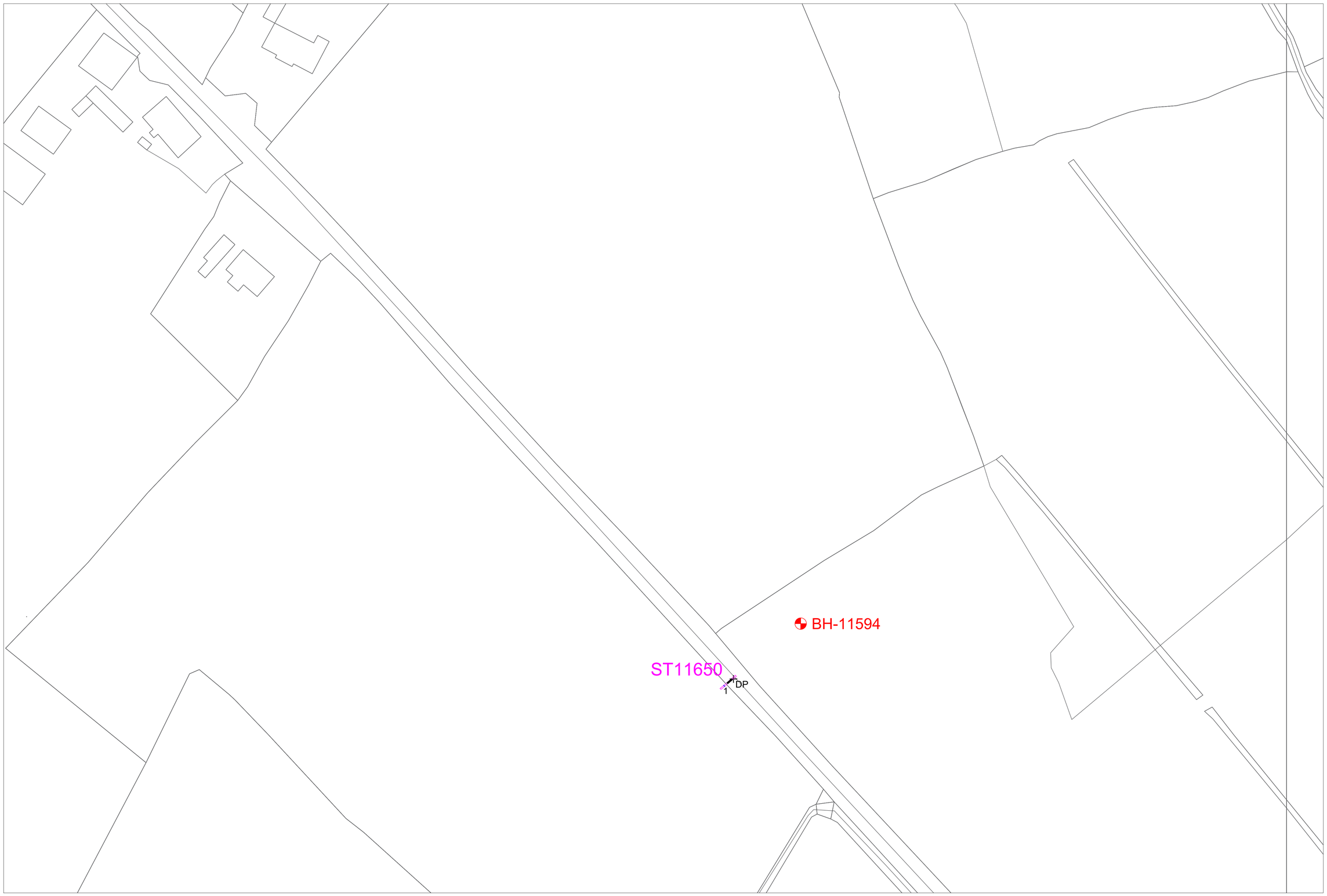
RK-10381

BH-10413

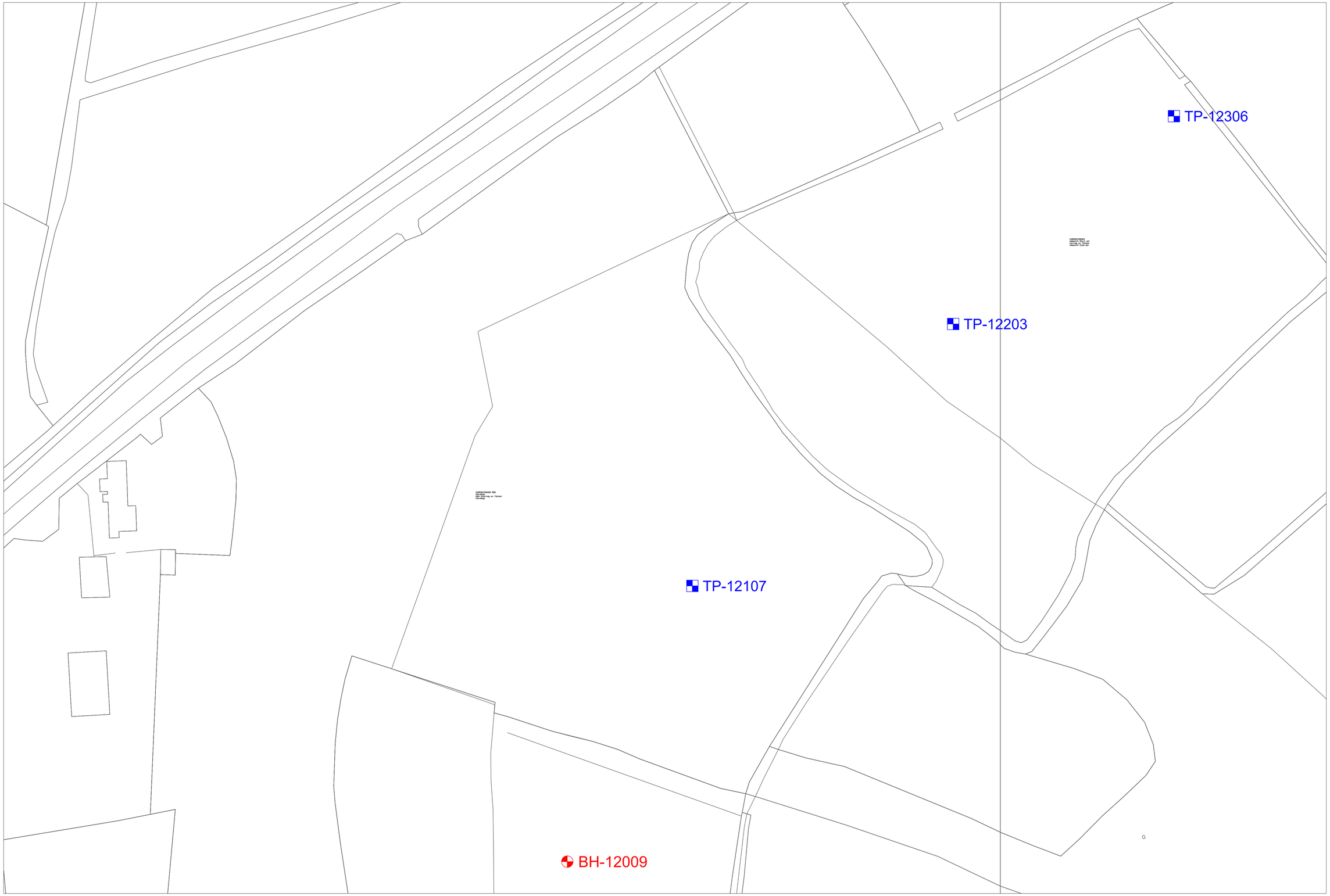
PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 22 of 69	SHEET : 21-1682-EHL-022



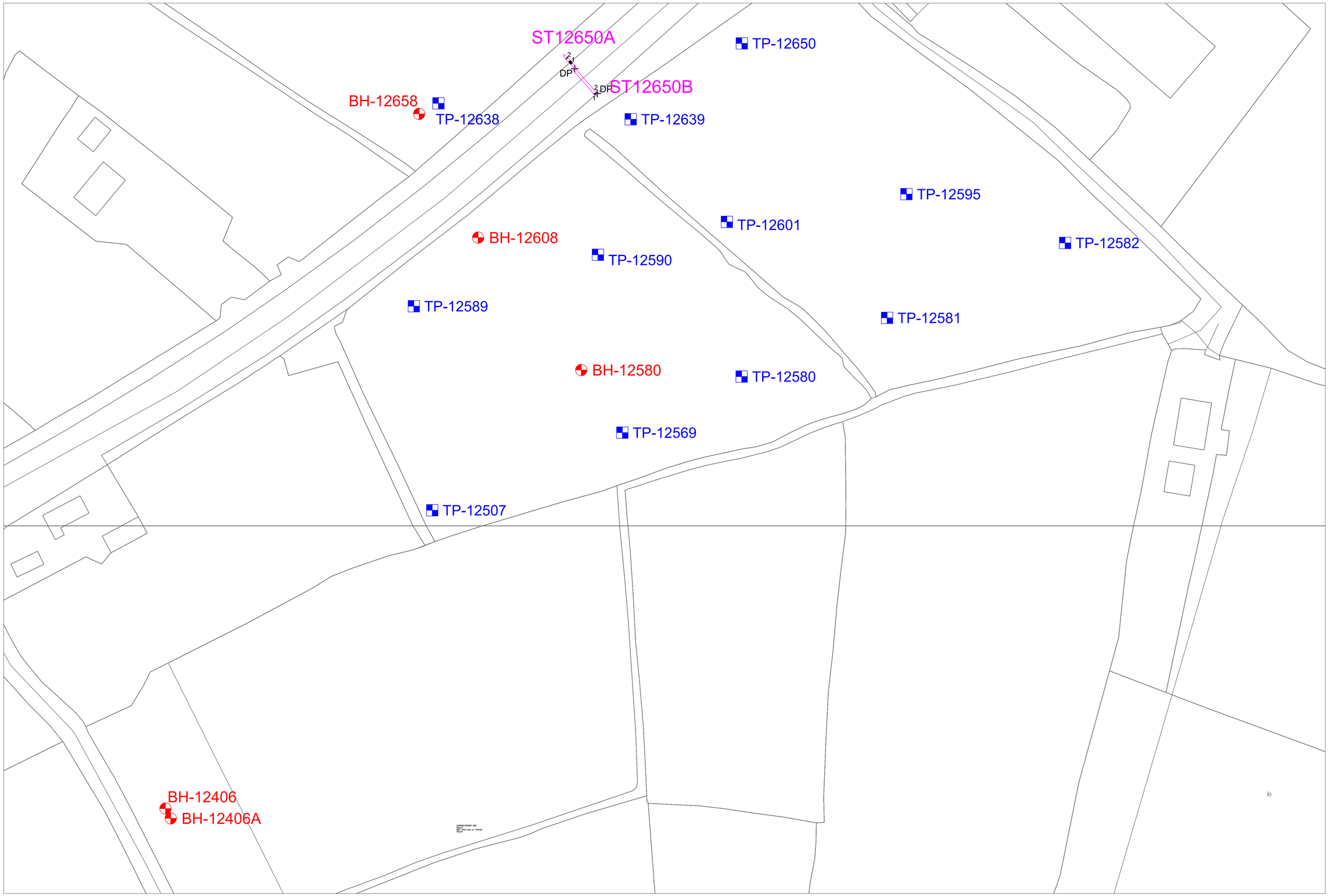
PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Pivot Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 23 of 69	SHEET : 21-1682-EHL-023



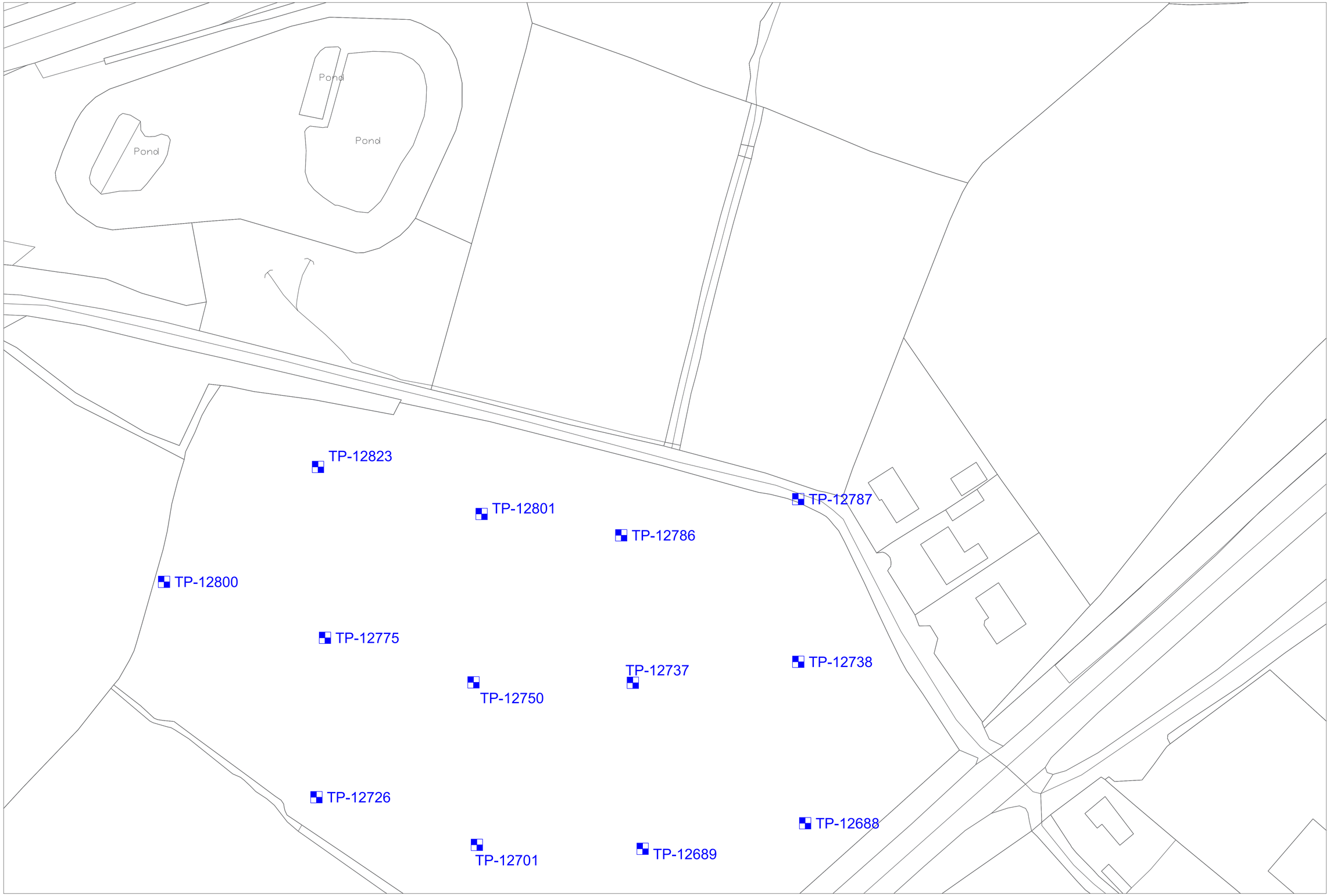
PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Pilot Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 24 of 69	SHEET : 21-1682-EHL-024



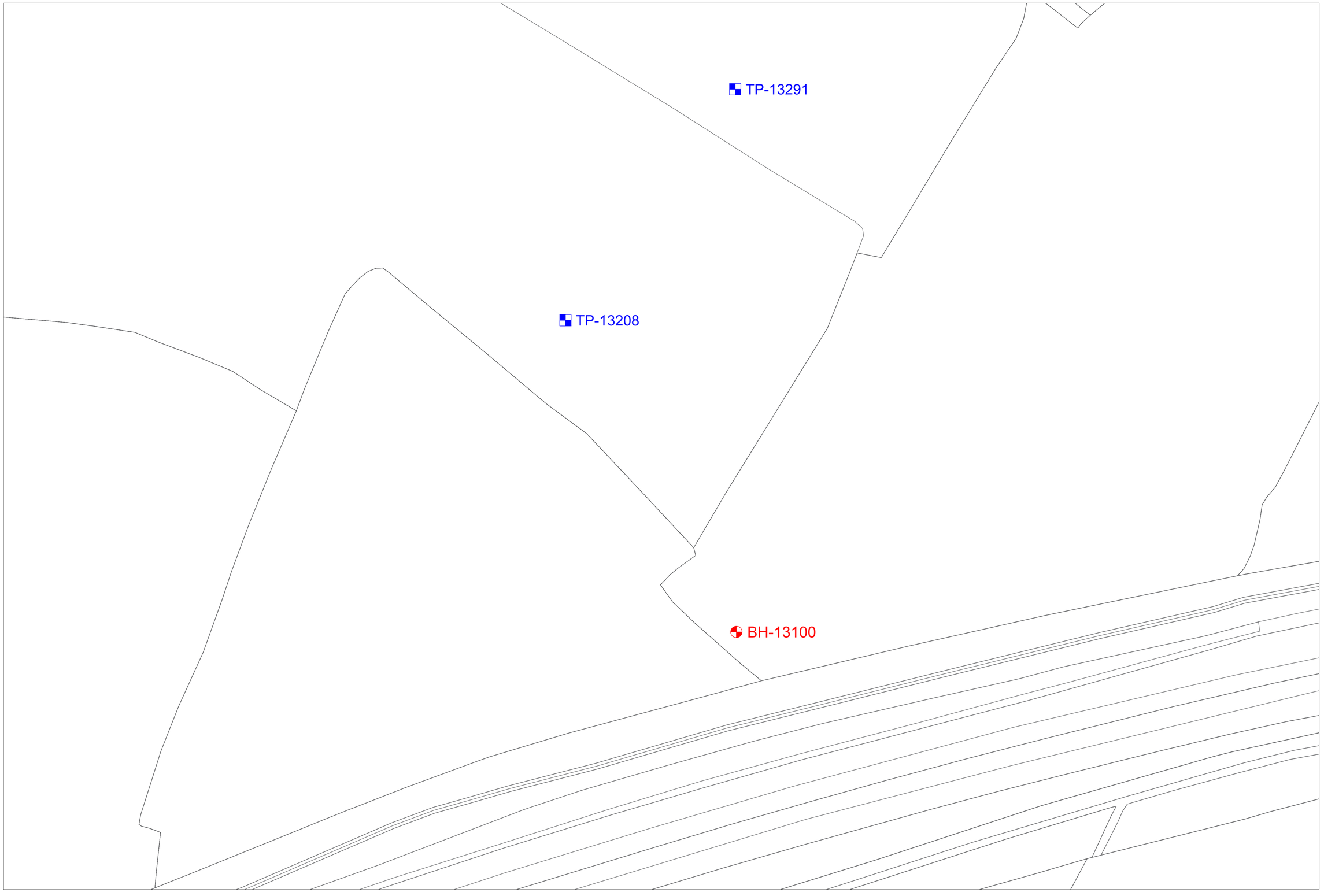
PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS / CHCK: NH	SERIES: 25 of 69	SHEET : 21-1682-EHL-025



PROJECT: Water Supply Project	CLIENT: Irish Water	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:	
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald	CAUSEWAY GEOTECH	DRWN: BS	SERIES: 26 of 69	SHEET : 21-1682-EHL-026	
			CHCK: NH			



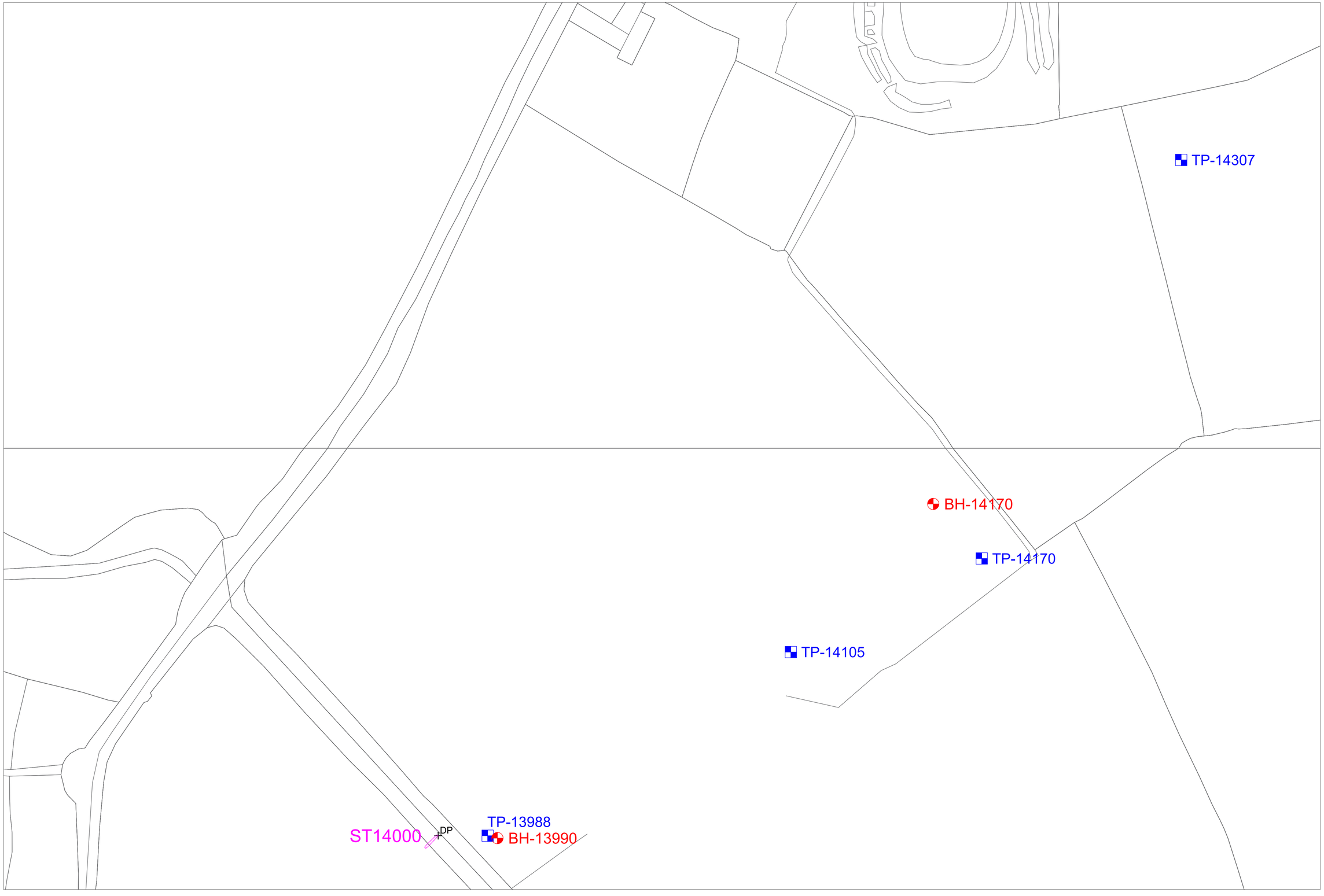
PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 27 of 69	SHEET : 21-1682-EHL-027



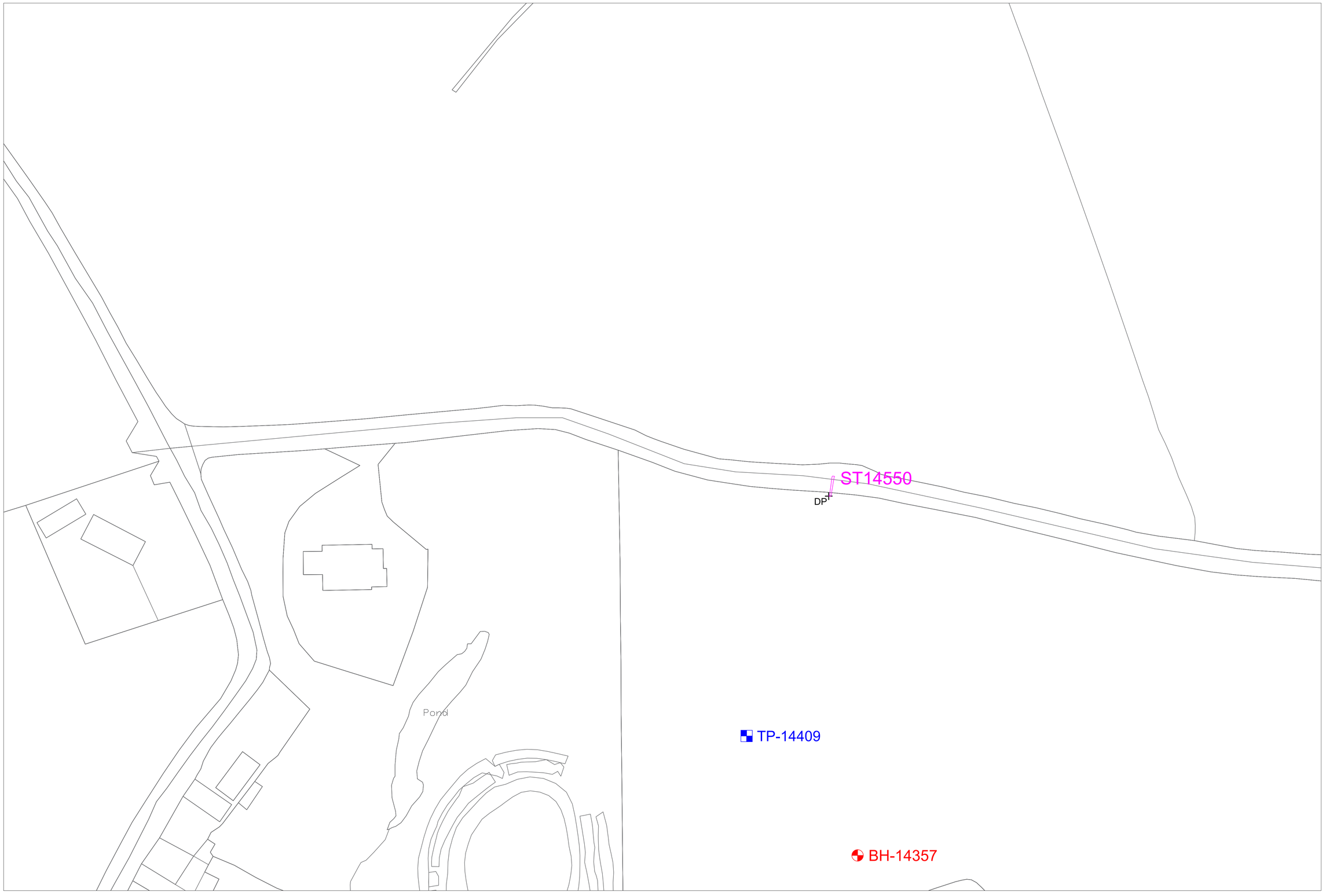
PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 28 of 69	SHEET : 21-1682-EHL-028



PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Pilcel Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 29 of 69	SHEET : 21-1682-EHL-029

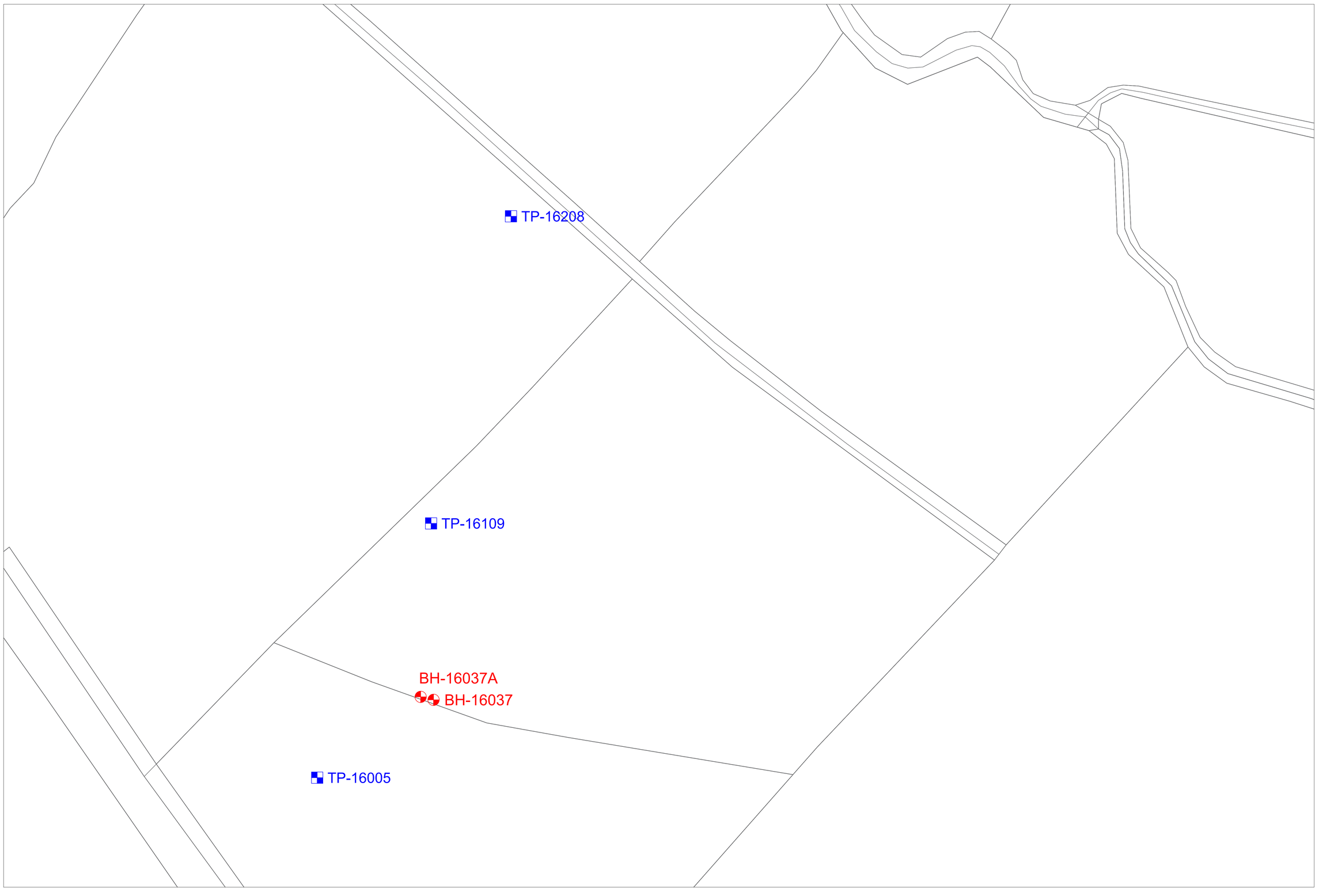


PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 30 of 69	SHEET : 21-1682-EHL-030



PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 31 of 69 SHEET : 21-1682-EHL-031

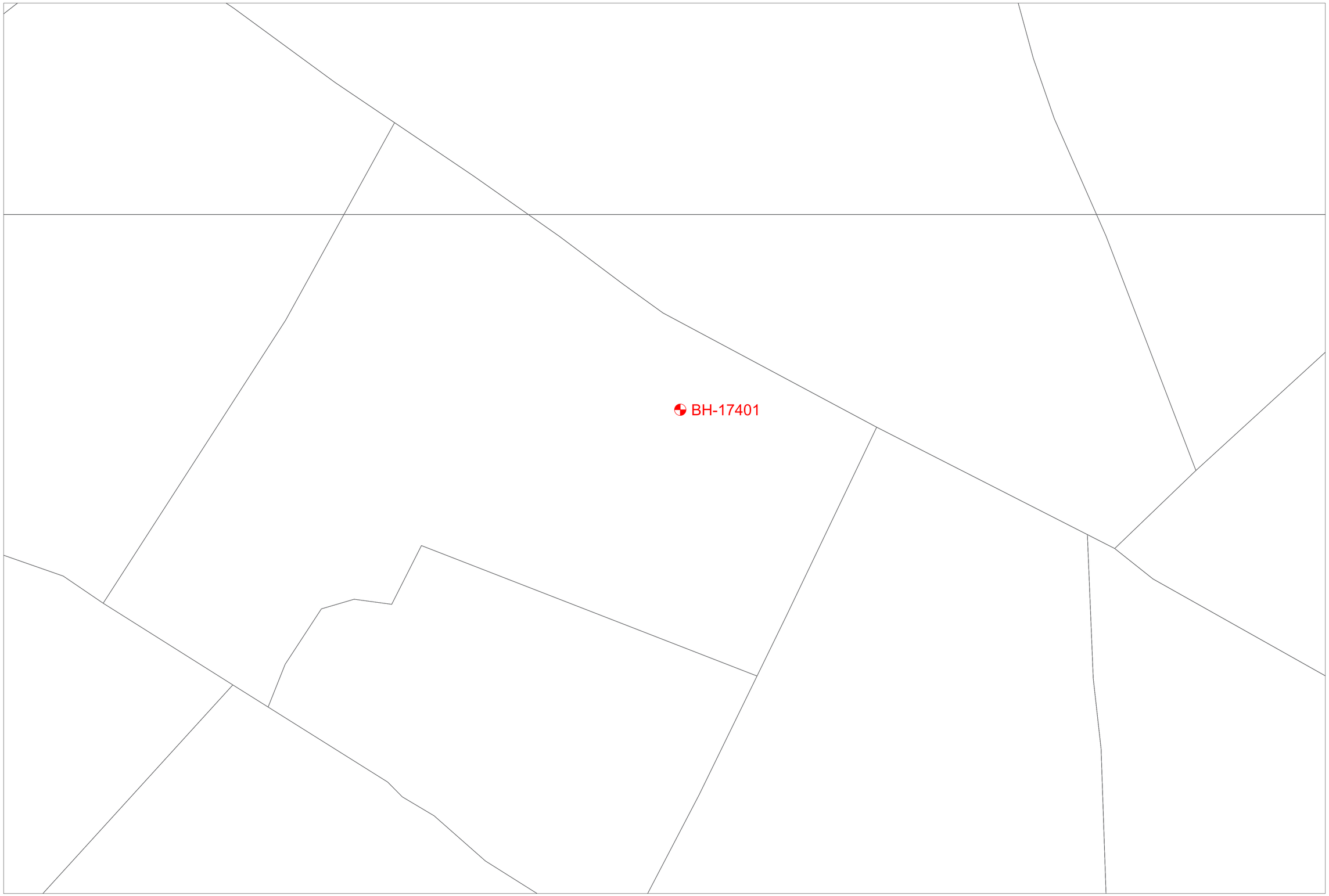
NOTES:



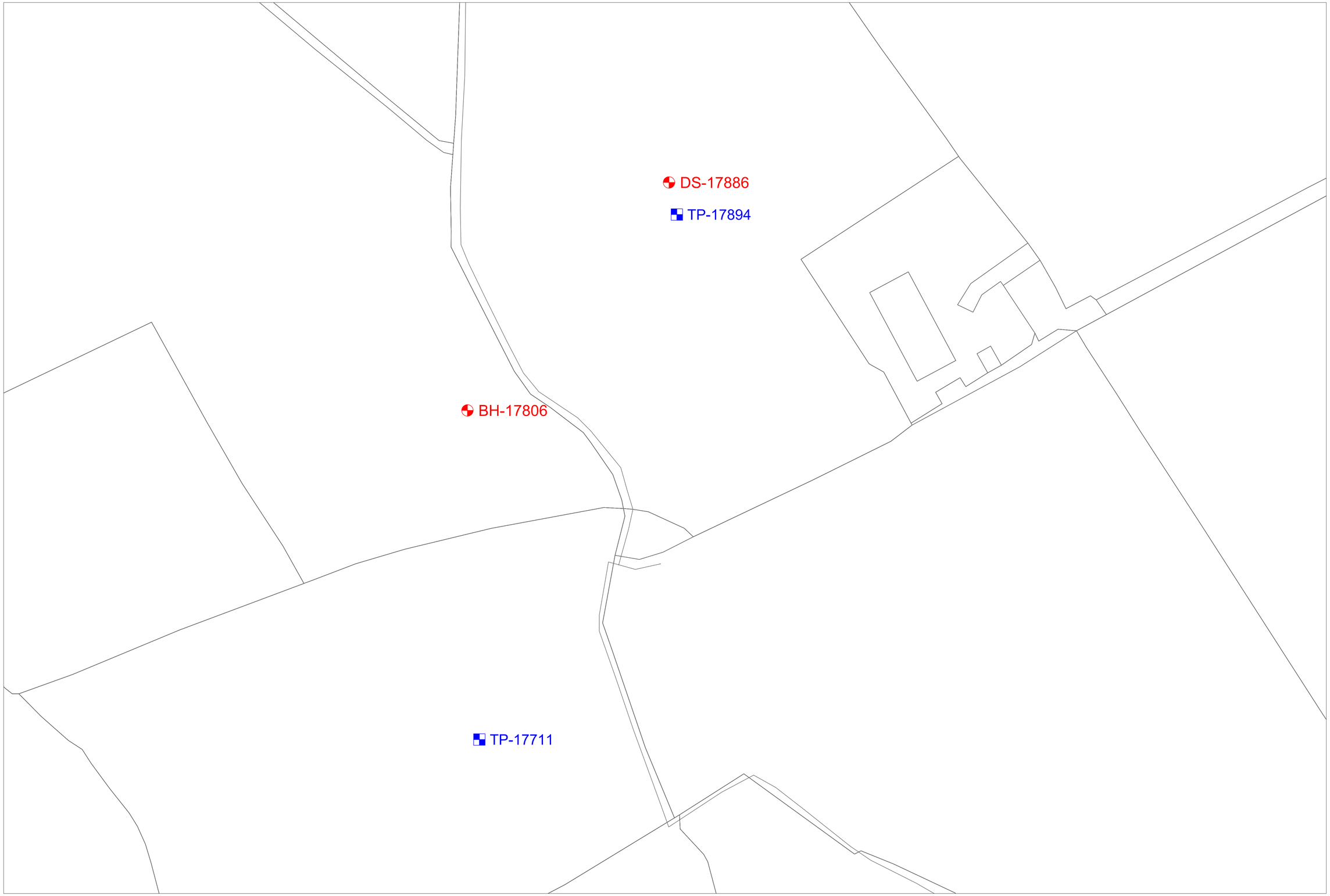
PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Pilot Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 32 of 69	SHEET : 21-1682-EHL-032



PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 33 of 69	SHEET : 21-1682-EHL-033



PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 34 of 69	SHEET : 21-1682-EHL-034



PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 35 of 69	SHEET : 21-1682-EHL-035

BOGLAGELAGH
An Bhuaile Ghaelach

TP-18411

DP

ST18450

BH-18440

TP-18307

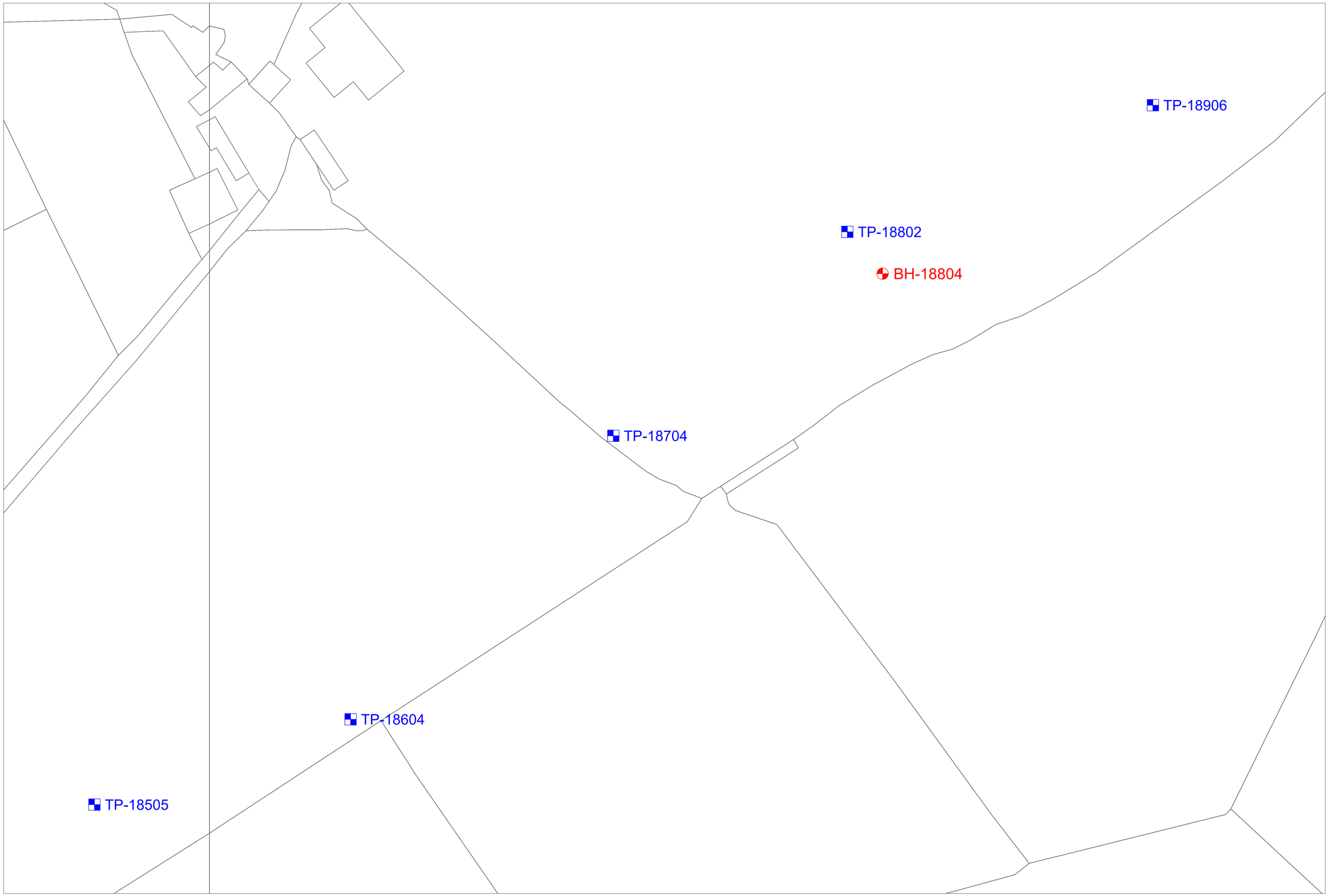
BH-18231B

BH-18231A

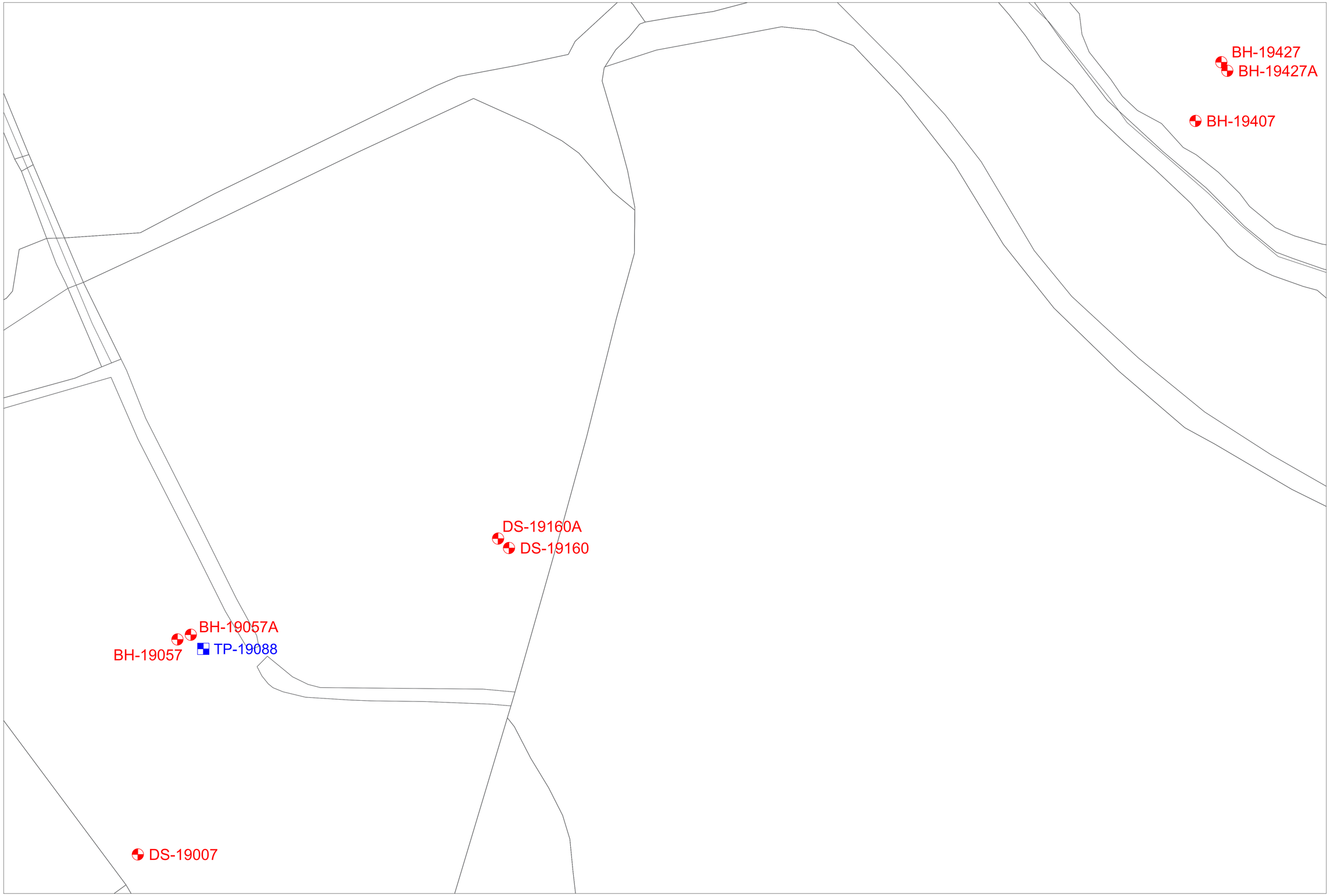
BH-18231

TP-18187

PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Pivat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 36 of 69	SHEET : 21-1682-EHL-036



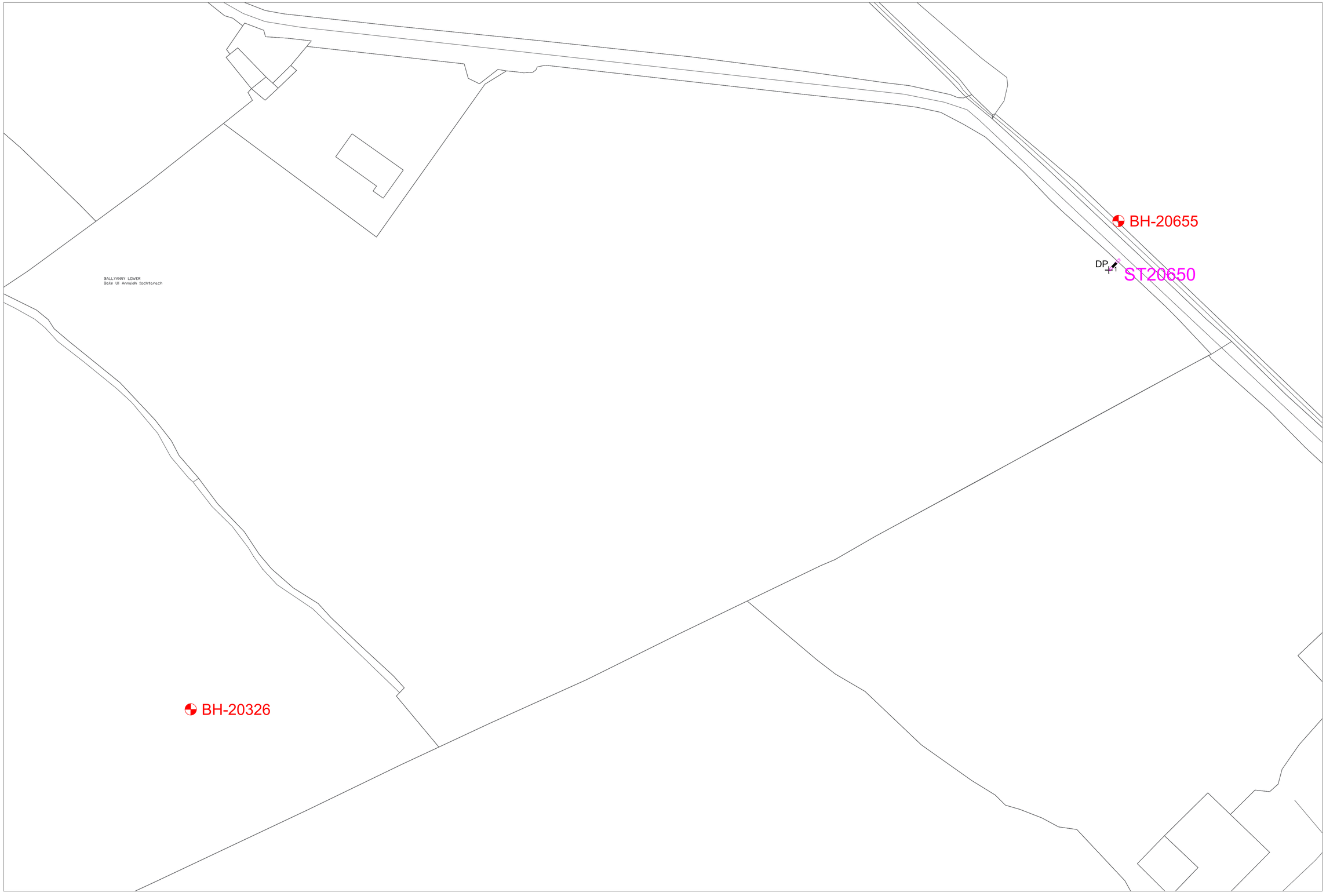
PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 37 of 69	SHEET : 21-1682-EHL-037



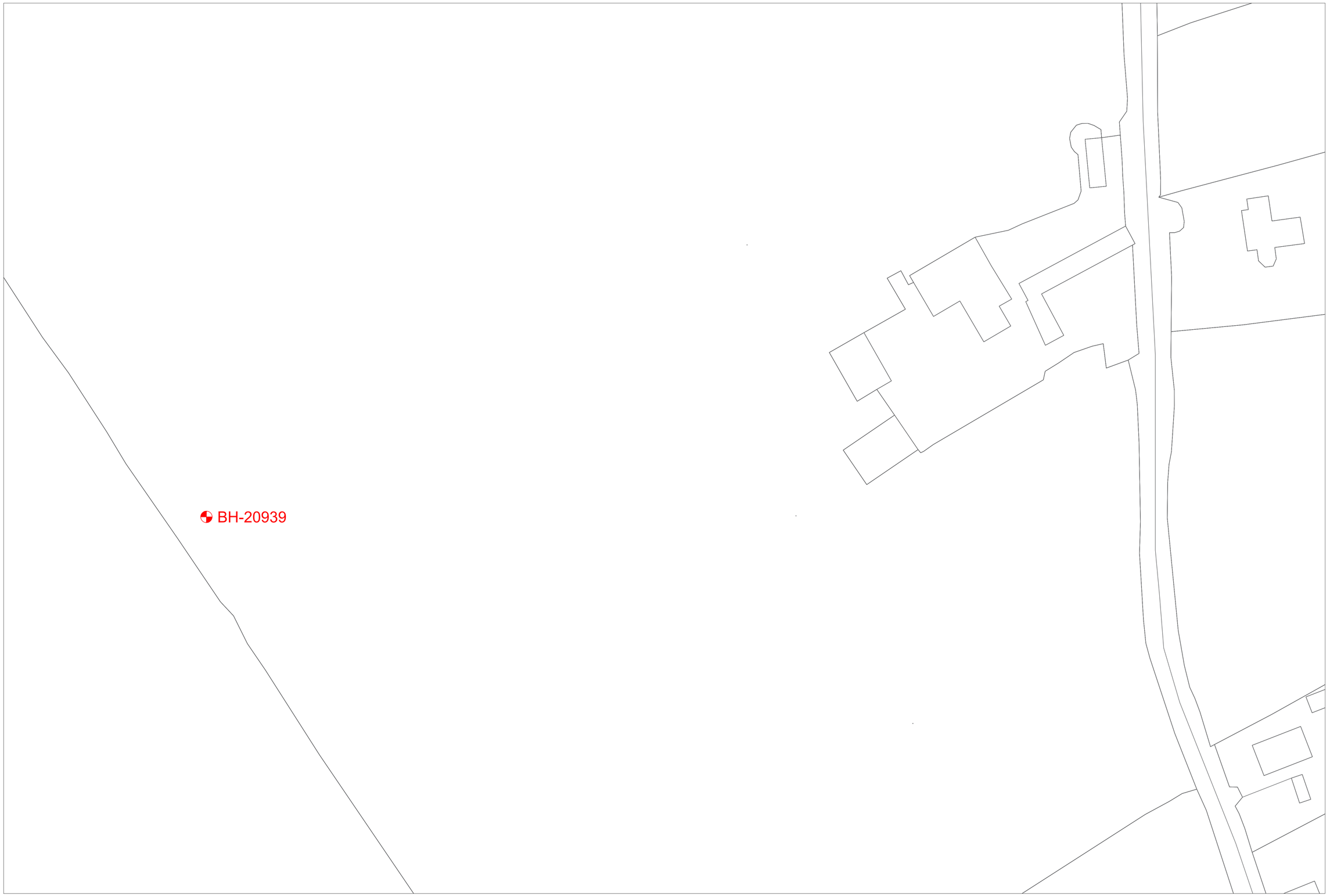
PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 38 of 69	SHEET : 21-1682-EHL-038



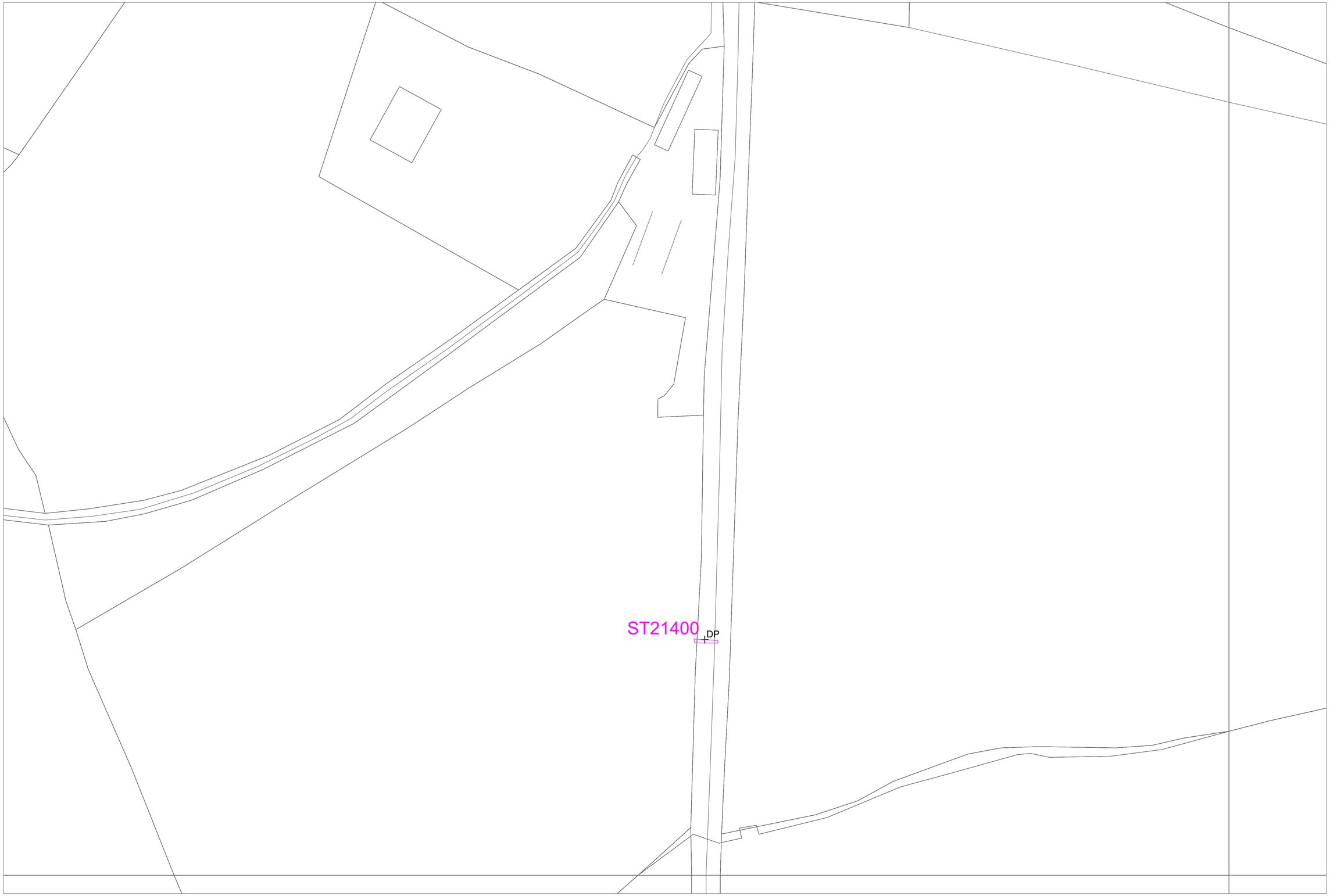
PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 39 of 69	SHEET : 21-1682-EHL-039



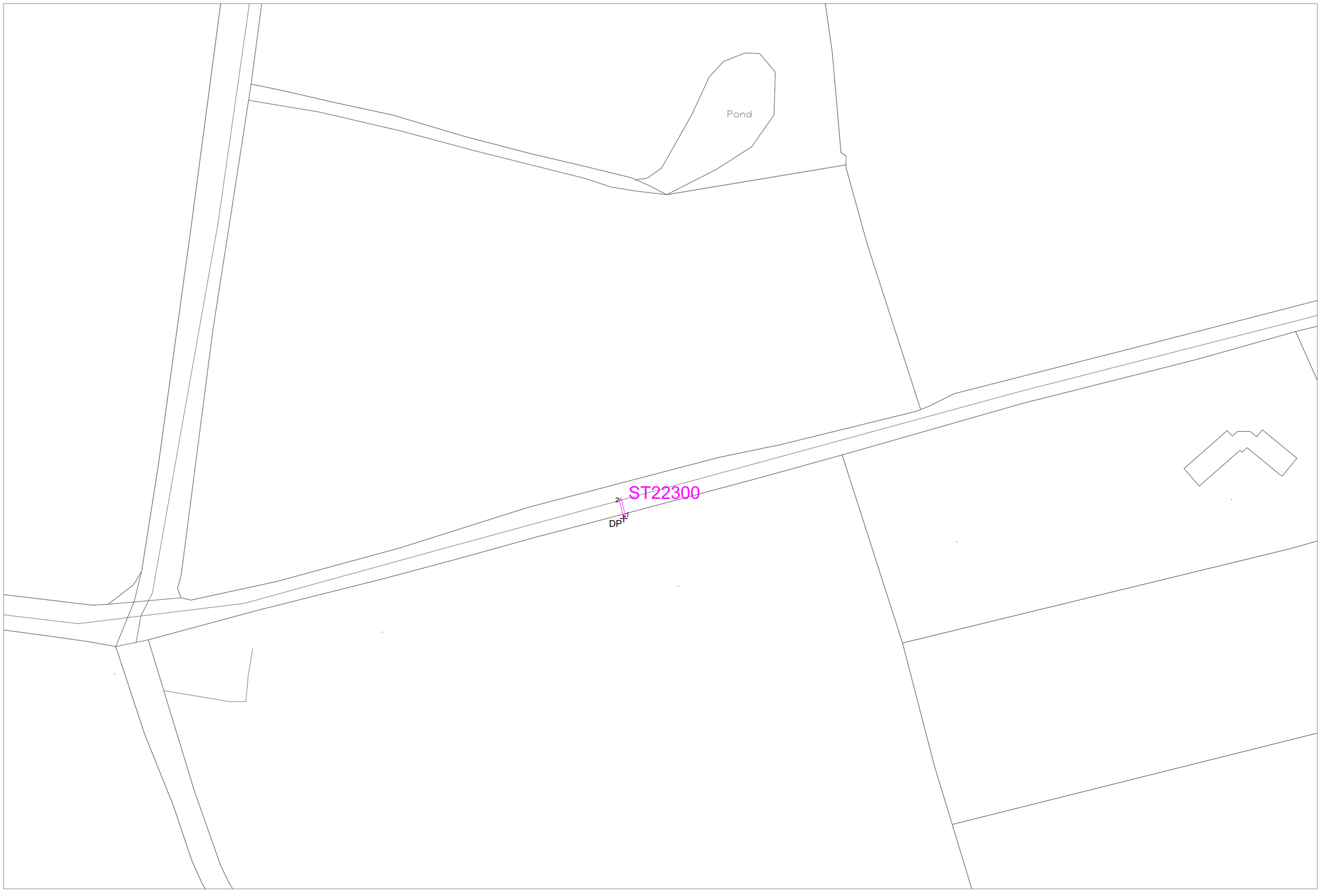
PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 40 of 69	SHEET : 21-1682-EHL-040



PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 41 of 69	SHEET : 21-1682-EHL-041



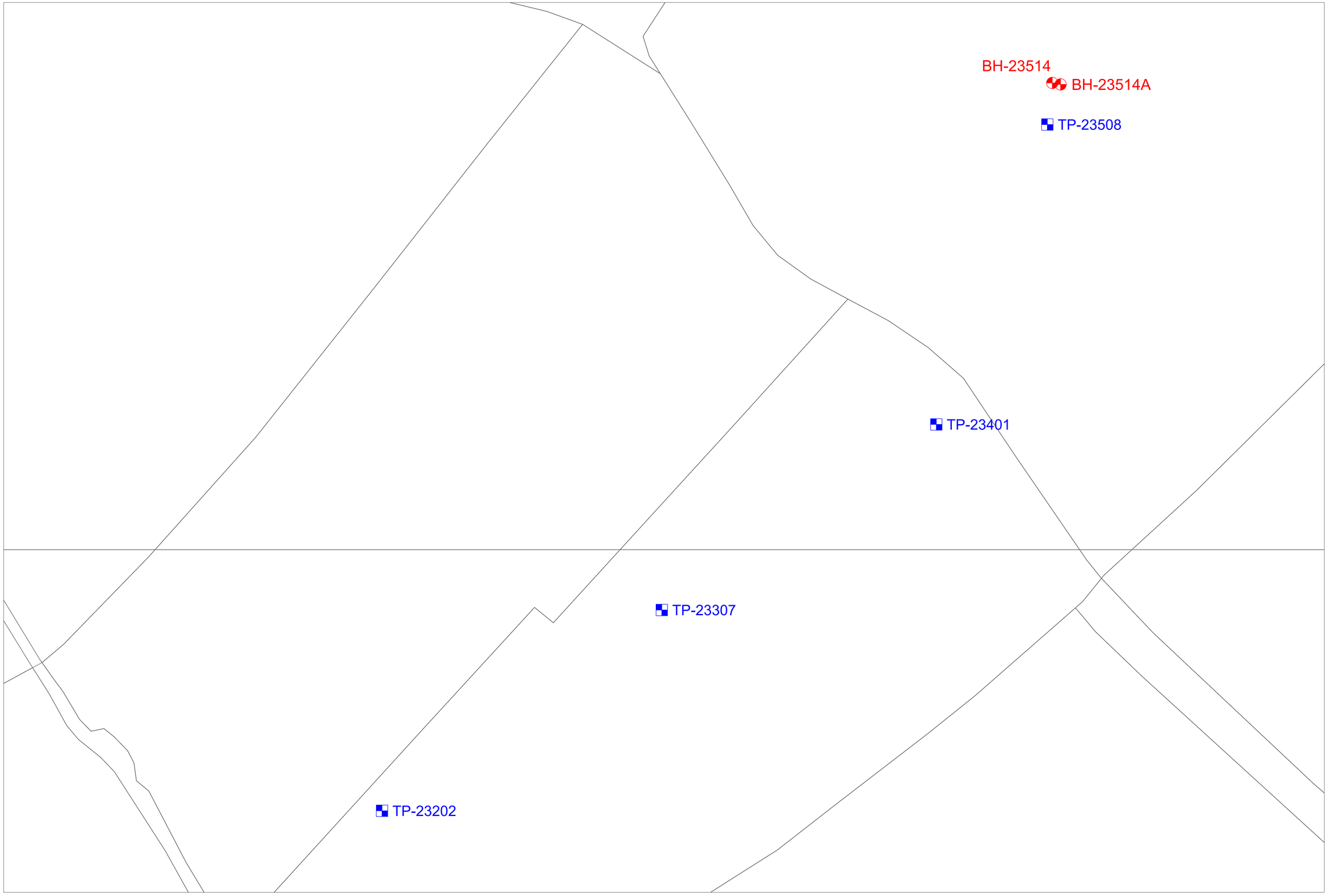
PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 42 of 69	SHEET : 21-1682-EHL-042



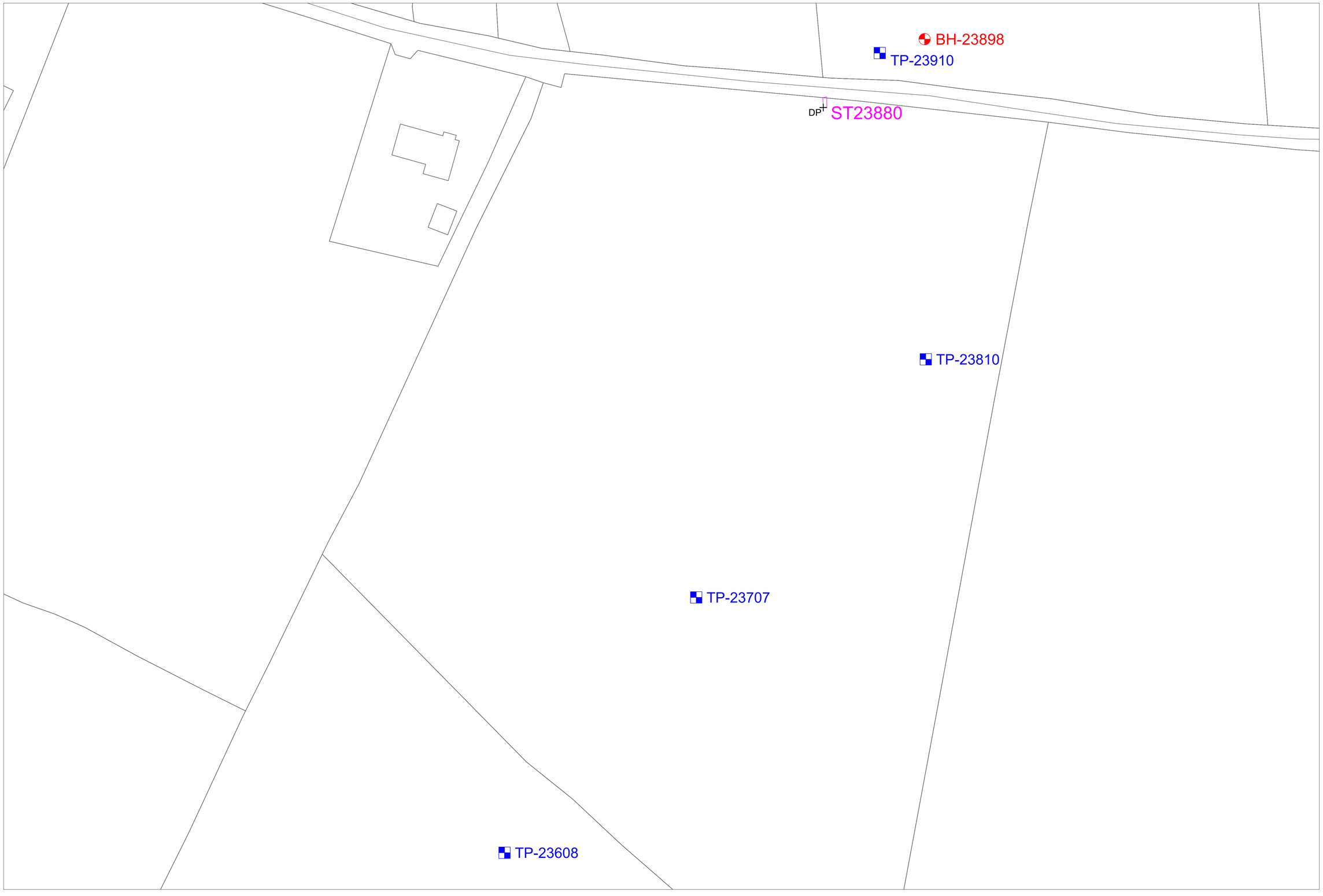
PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 43 of 69	SHEET : 21-1682-EHL-043



PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 44 of 69	SHEET : 21-1682-EHL-044



PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Rusalan Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 45 of 69	SHEET : 21-1682-EHL-045



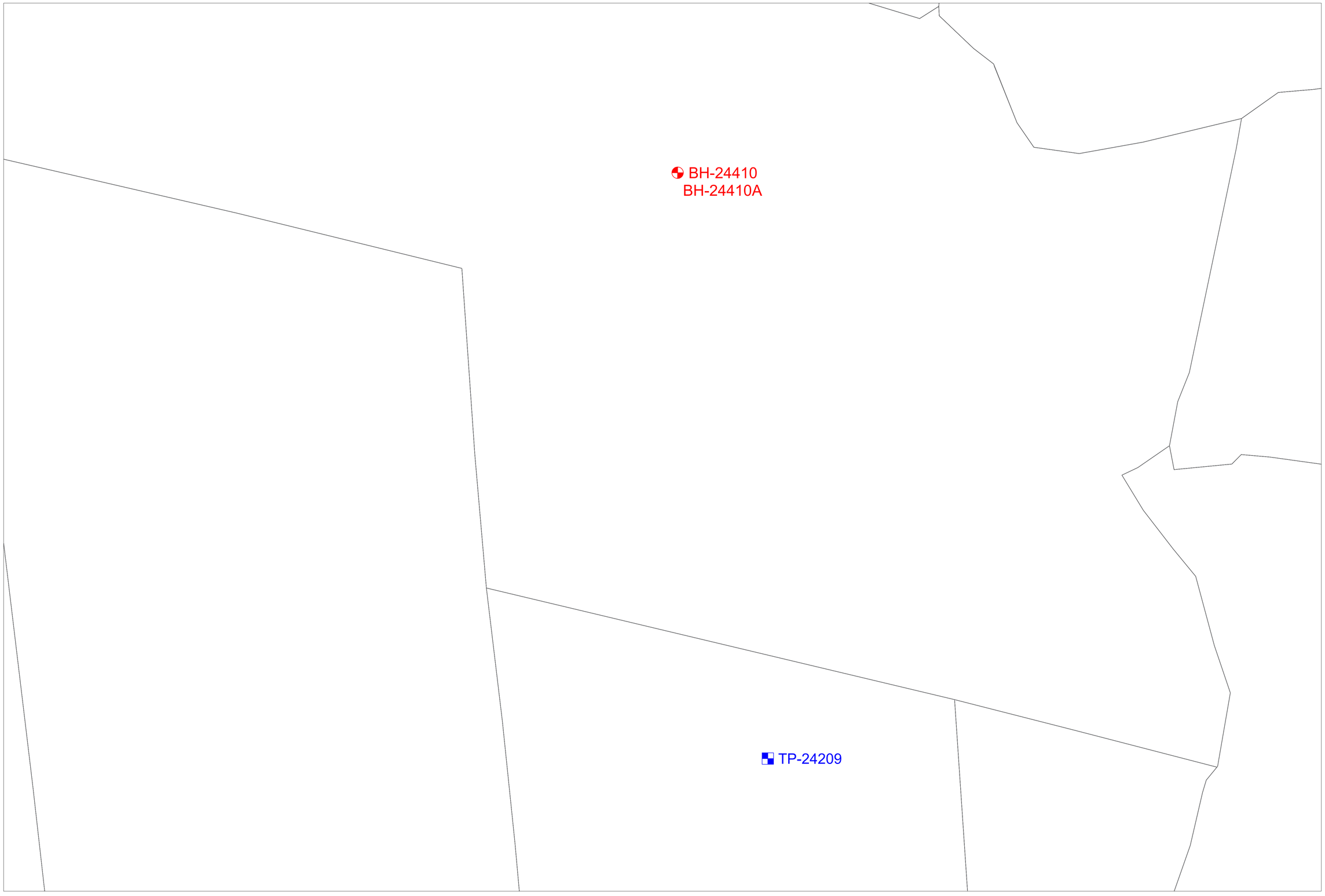
PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 46 of 69	SHEET : 21-1682-EHL-046

DRUMINASCART
Dromainn na Scairte

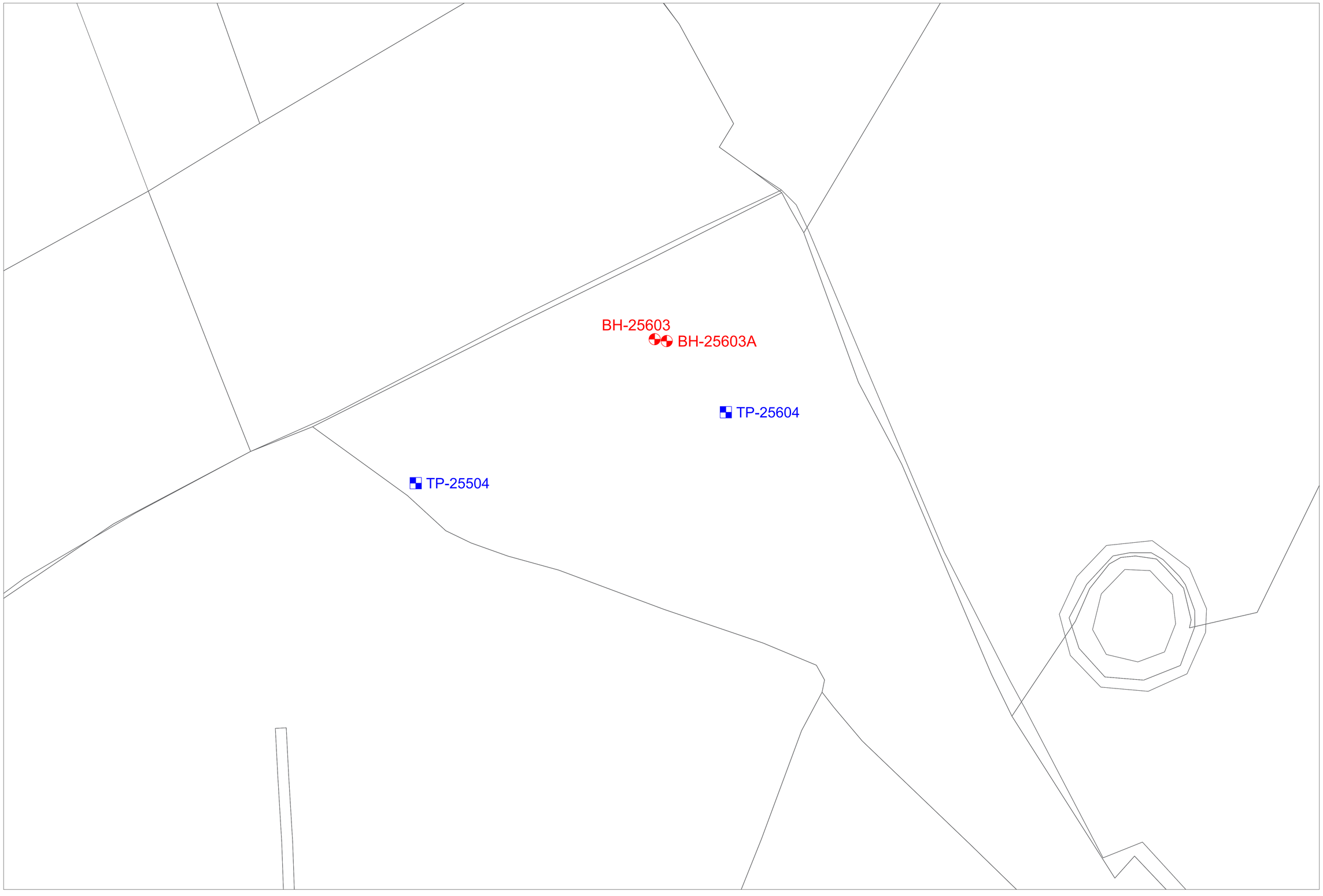
TP-24110

TP-24008

PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 47 of 69	SHEET : 21-1682-EHL-047



PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 48 of 69	SHEET : 21-1682-EHL-048



PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Pearl Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 49 of 69	SHEET : 21-1682-EHL-049

BH-26135

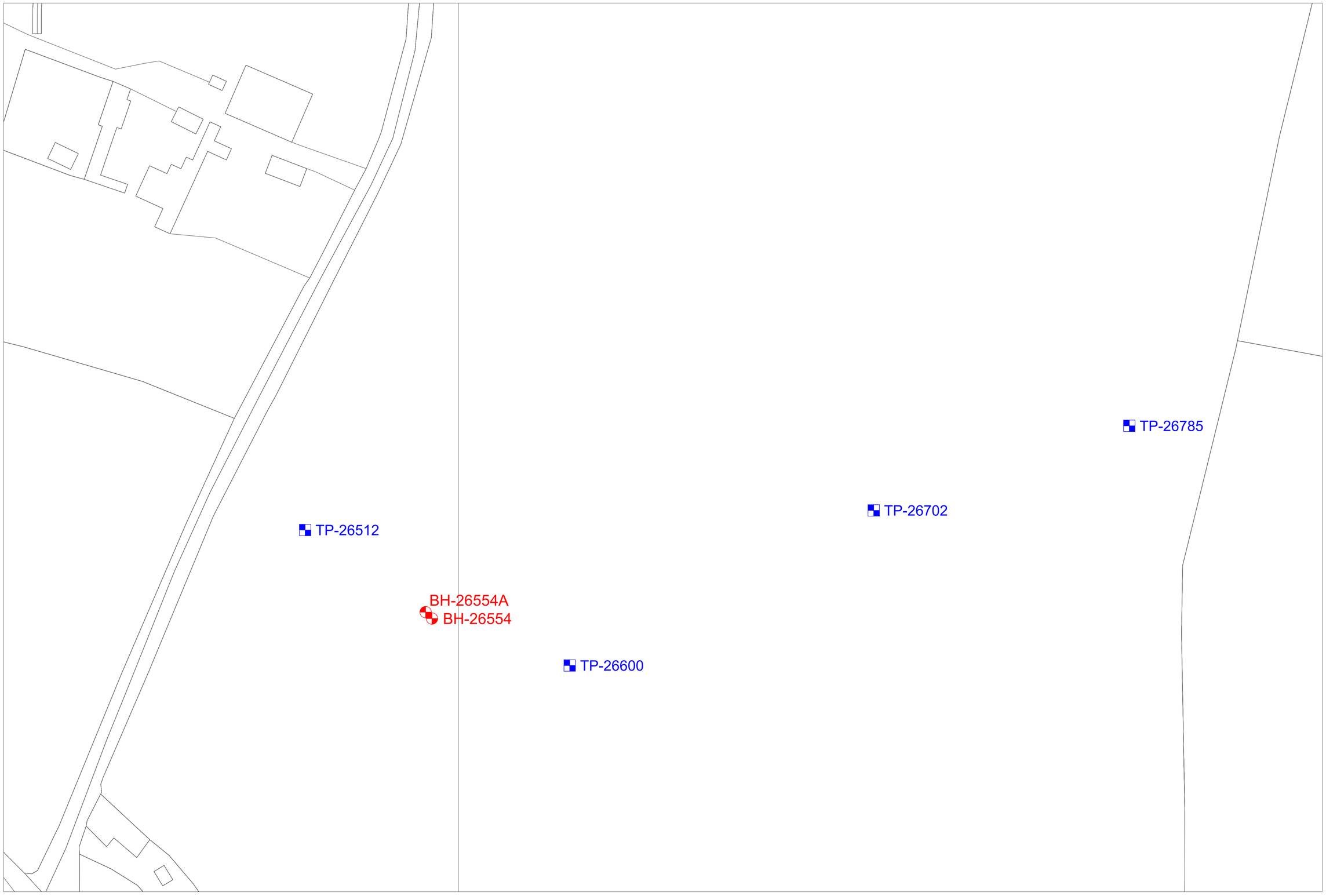
ST26150

BH-26214

DP

BH-26087

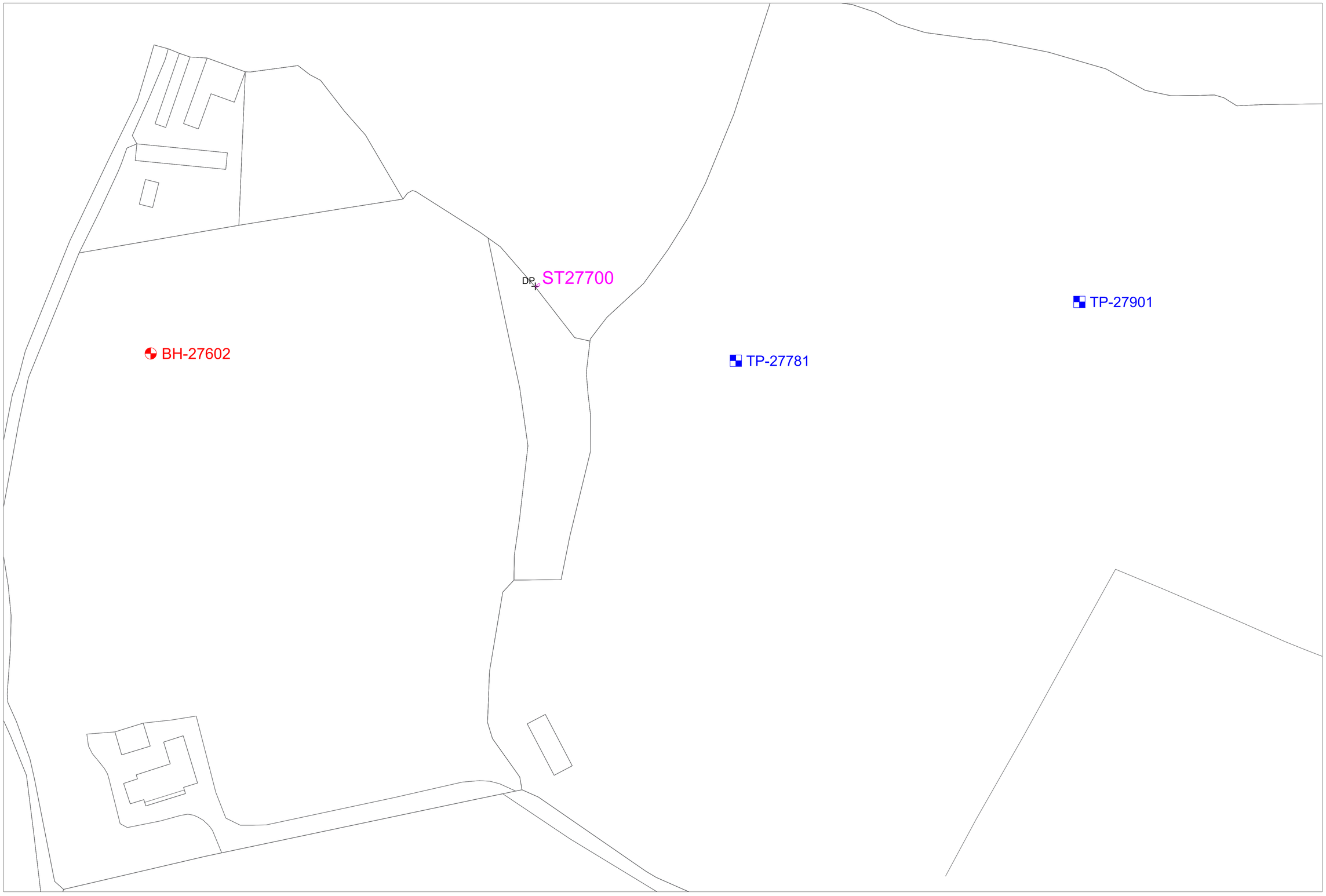
PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 50 of 69	SHEET : 21-1682-EHL-050



PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Pivat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 51 of 69	SHEET : 21-1682-EHL-051

BH-27000

PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 52 of 69	SHEET : 21-1682-EHL-052



PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Pivat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 53 of 69	SHEET : 21-1682-EHL-053

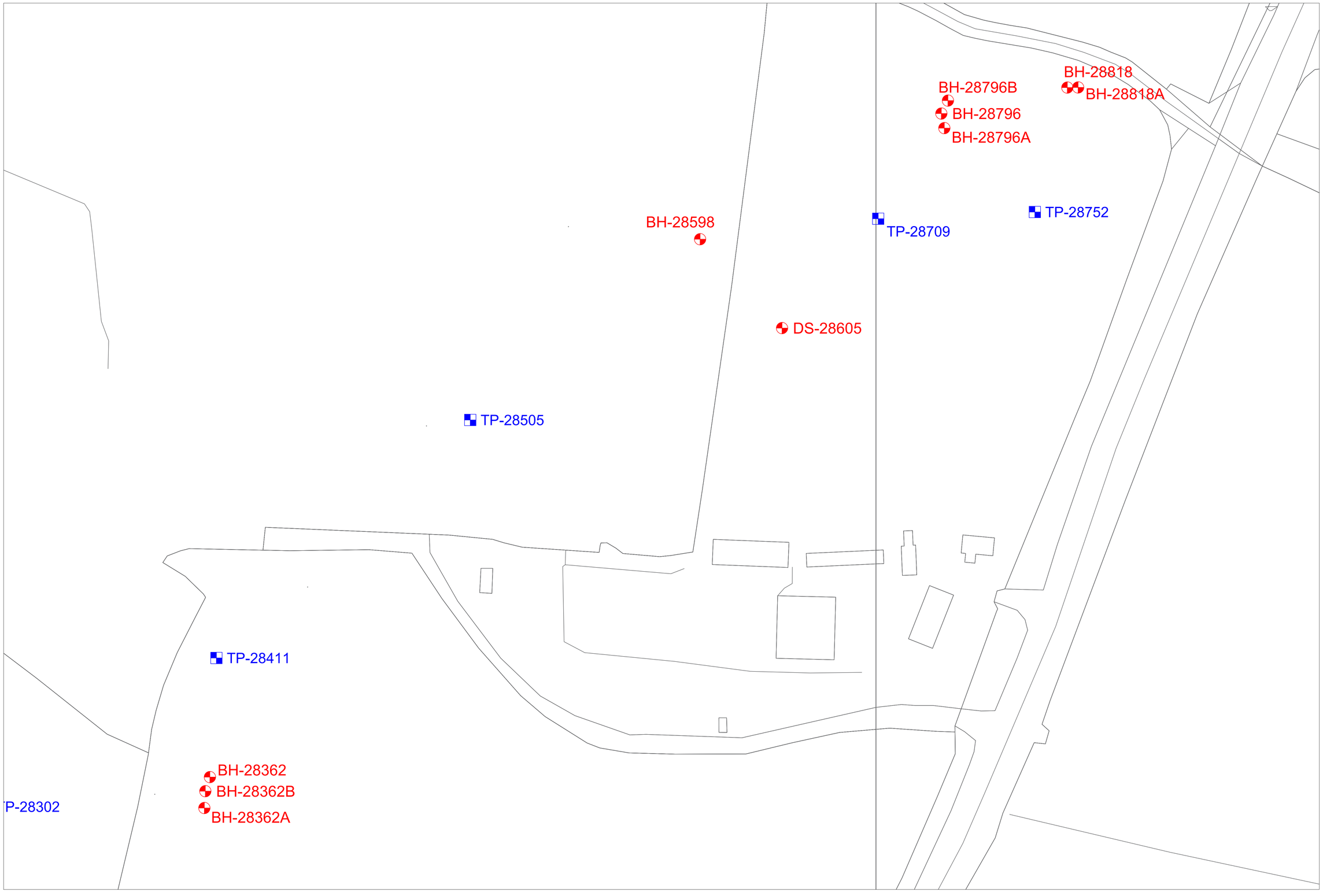
TP-28302

TP-28001
BH-28001

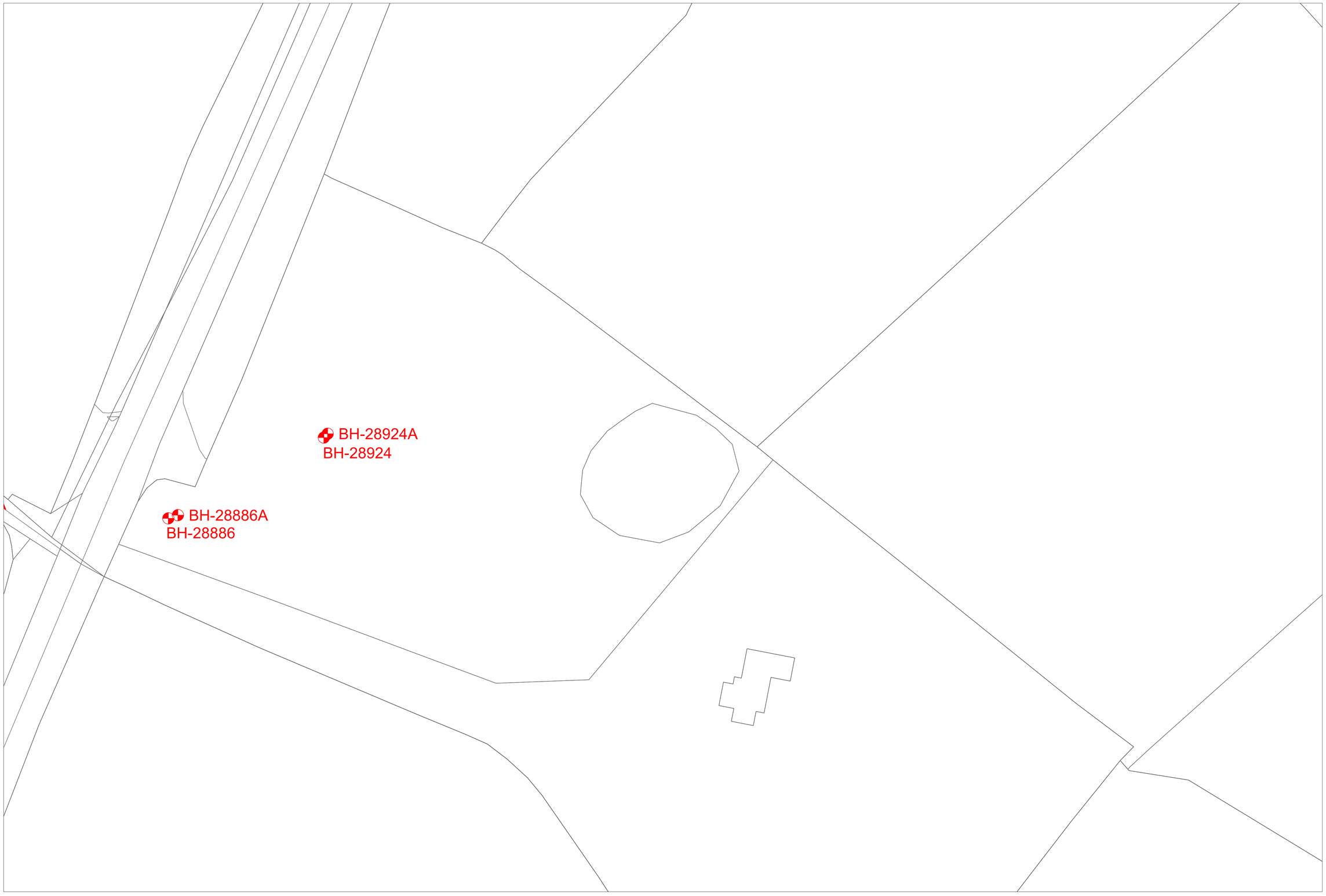
TP-28102

TP-28199

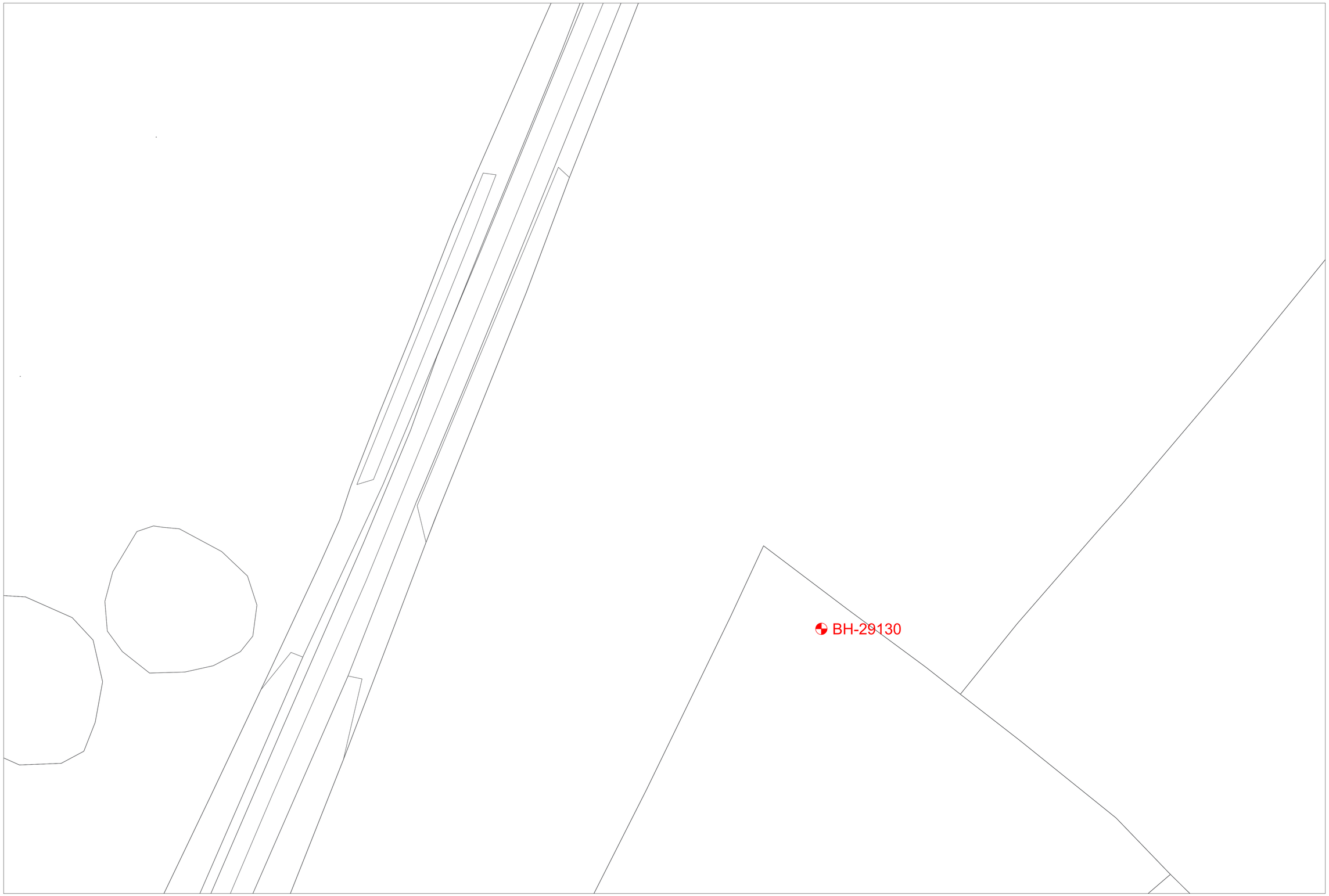
PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 54 of 69	SHEET : 21-1682-EHL-054



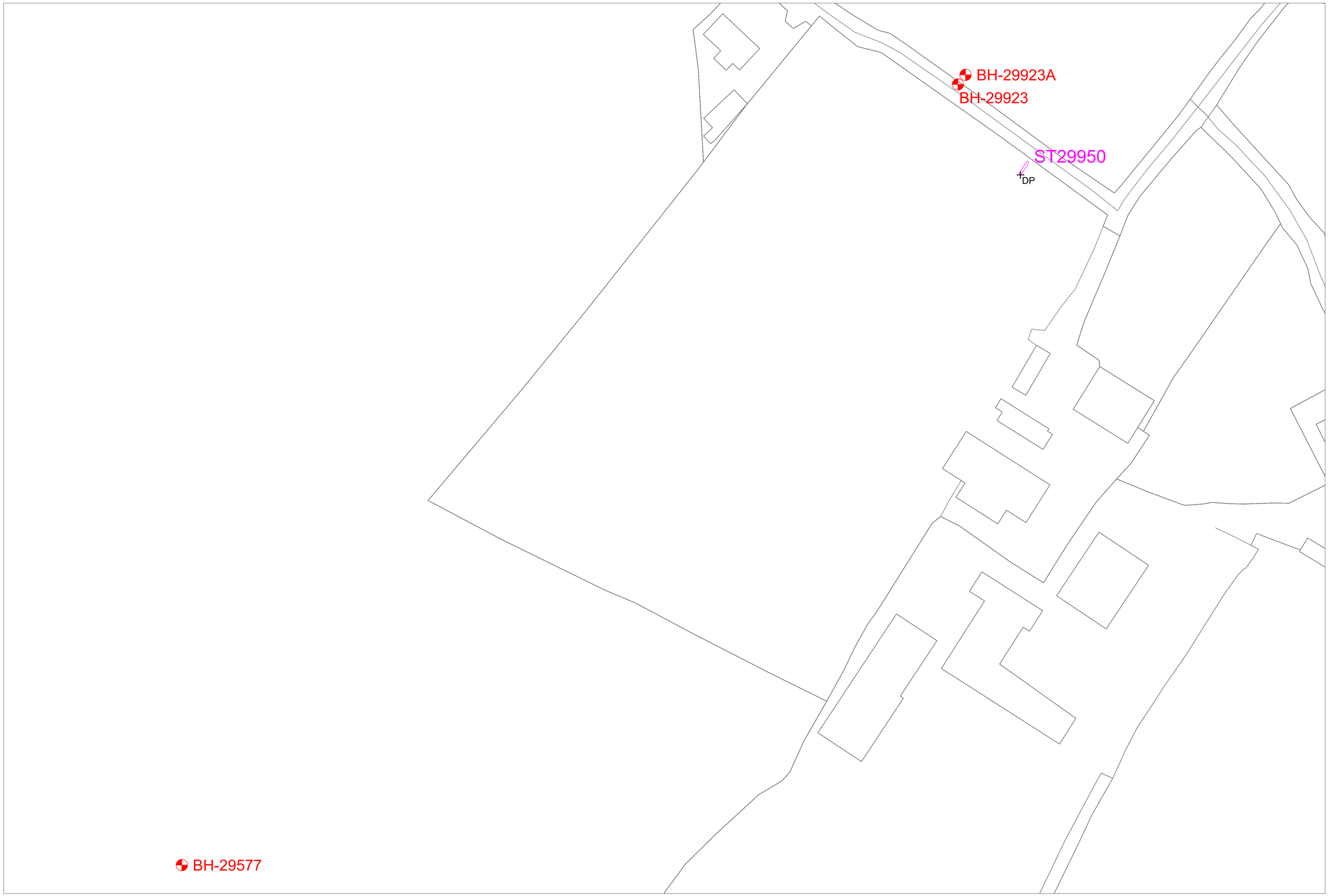
PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Pearl Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 55 of 69	SHEET : 21-1682-EHL-055



PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 56 of 69	SHEET : 21-1682-EHL-056



PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 57 of 69	SHEET : 21-1682-EHL-057



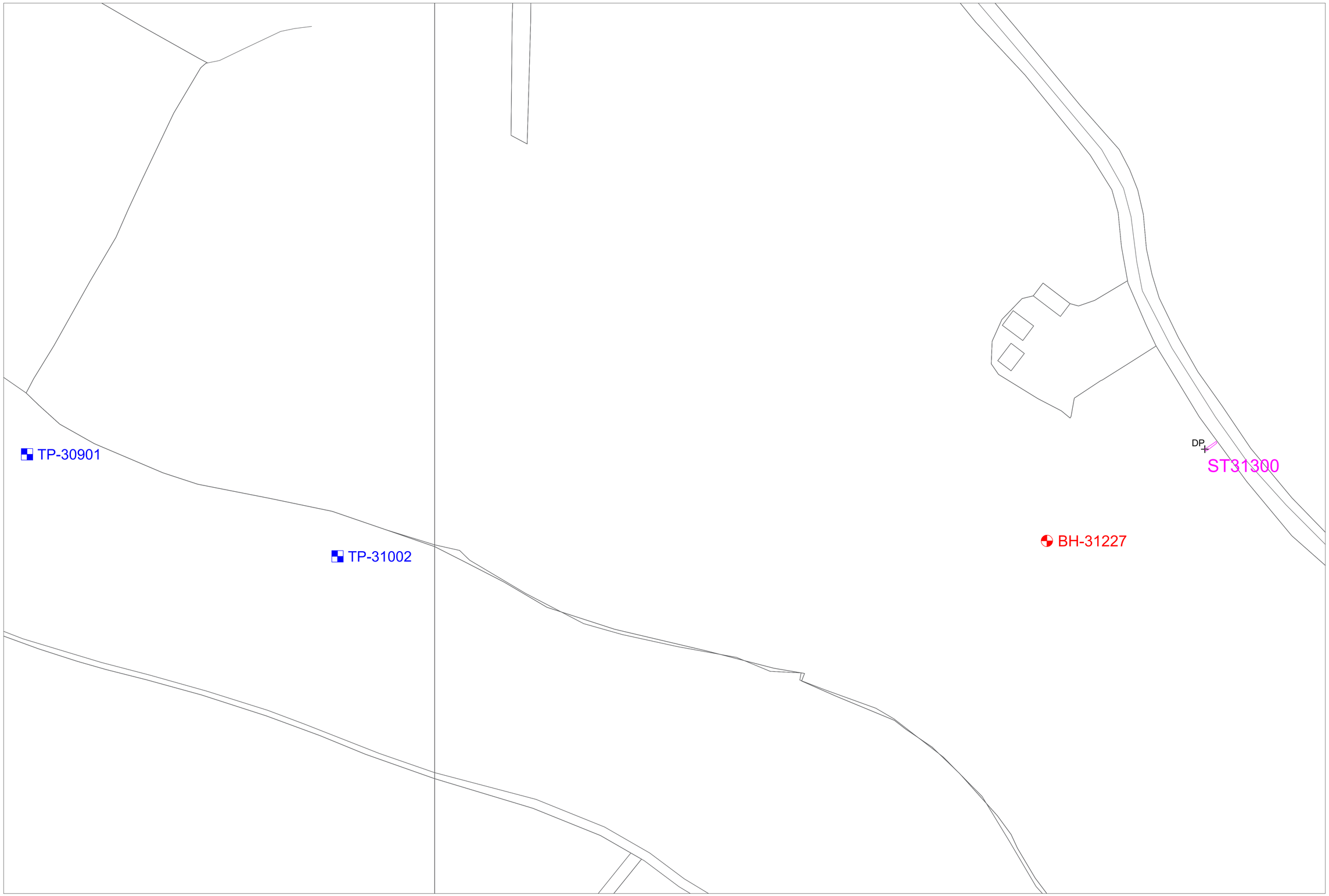
PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 58 of 69	SHEET : 21-1682-EHL-058



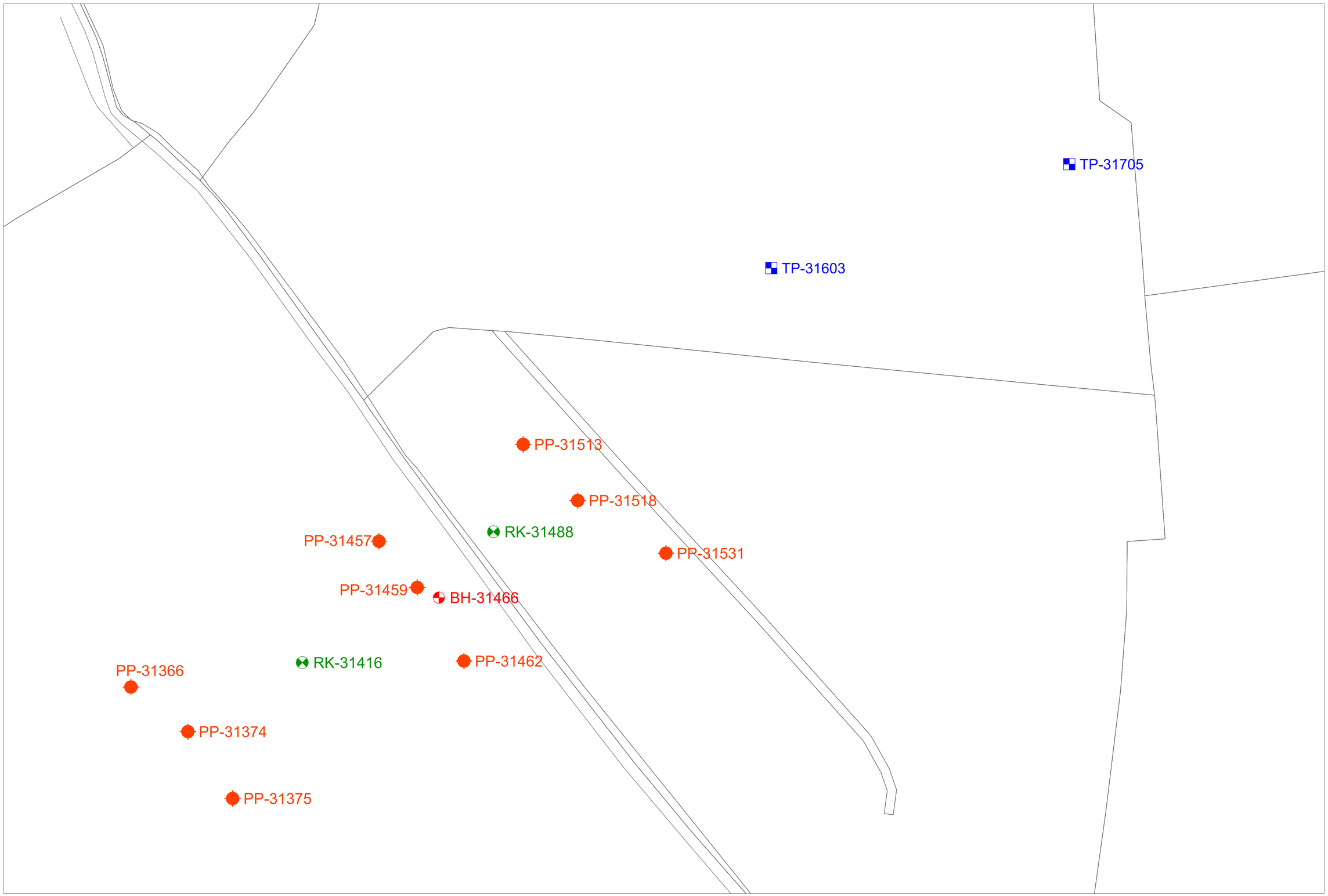
PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 59 of 69	SHEET : 21-1682-EHL-059



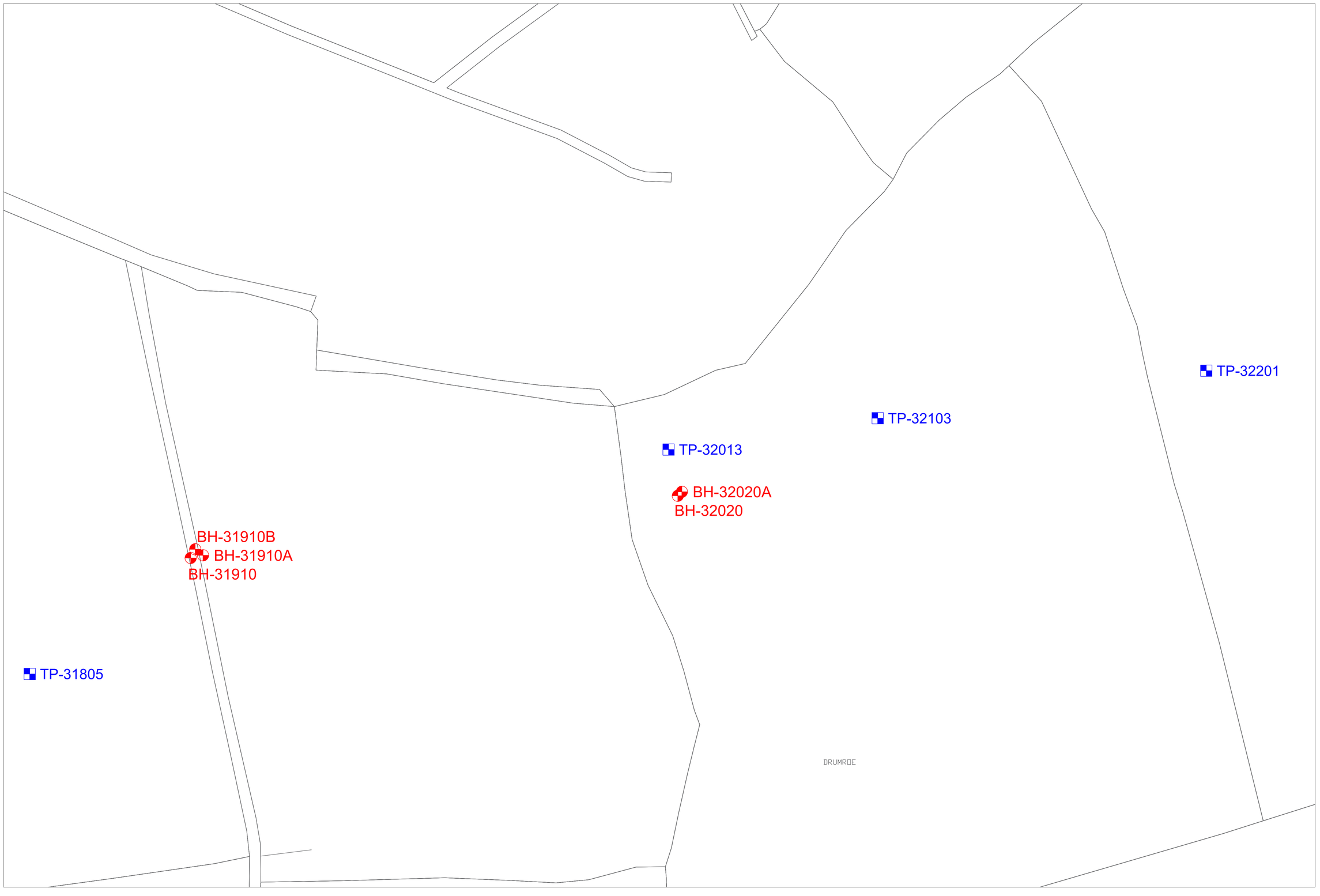
PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Pivat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 60 of 69	SHEET : 21-1682-EHL-060



PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS / CHCK: NH	SERIES: 61 of 69	SHEET : 21-1682-EHL-061



PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 62 of 69	SHEET : 21-1682-EHL-062



PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 63 of 69	SHEET : 21-1682-EHL-063

TP-32401

PP-32643

BH-32601

BH-32319

PP-32691

TP-32320

PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 64 of 69	SHEET : 21-1682-EHL-064

PP-32774

RK-32740

PP-32791

PP-32722

PP-32893

RK-32842

PP-32816

PP-32894

PP-32895

RK-32942

PP-32995

BH-33000

BH-33000A

PP-32991

RK-33039

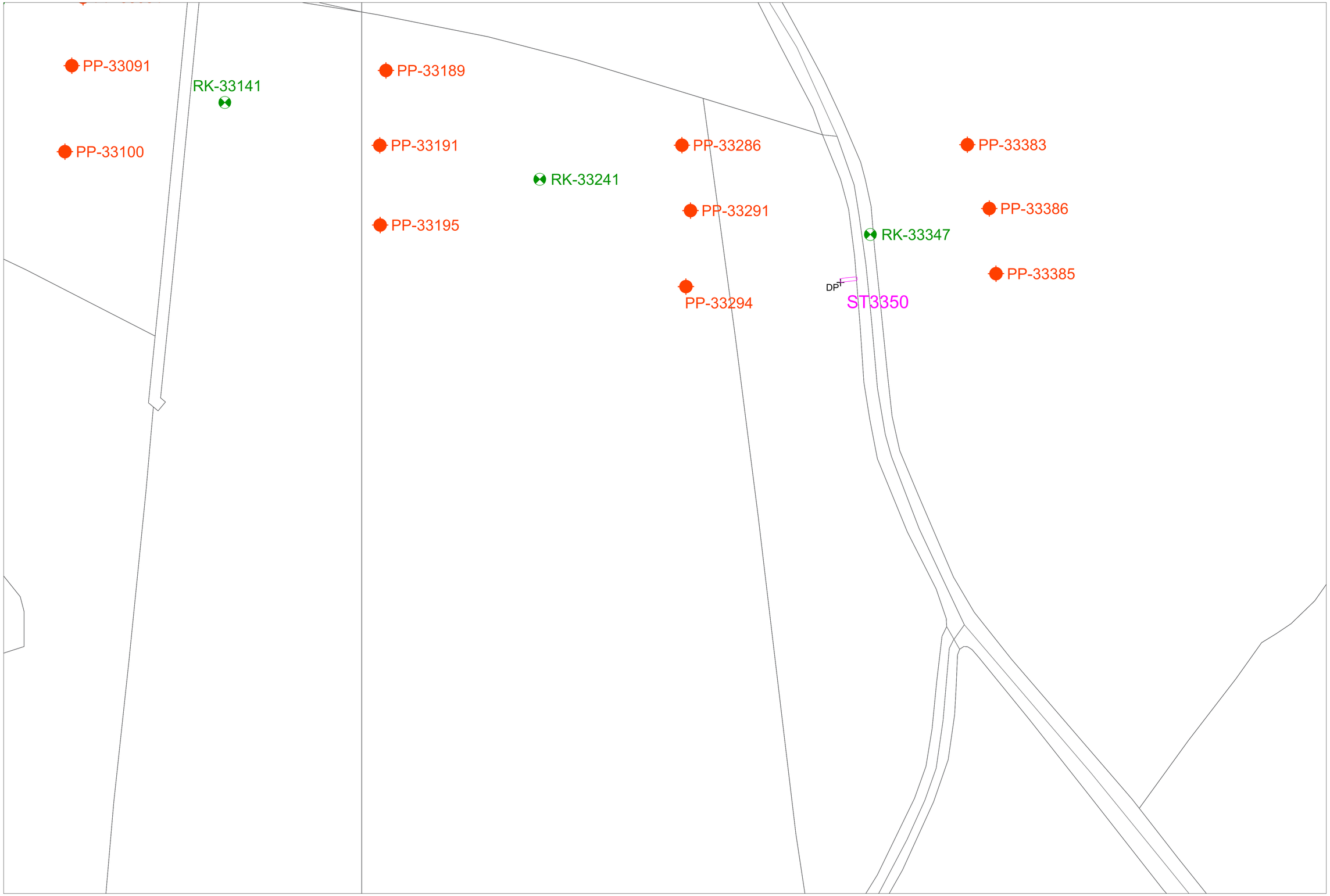
PP-33084

PP-32998

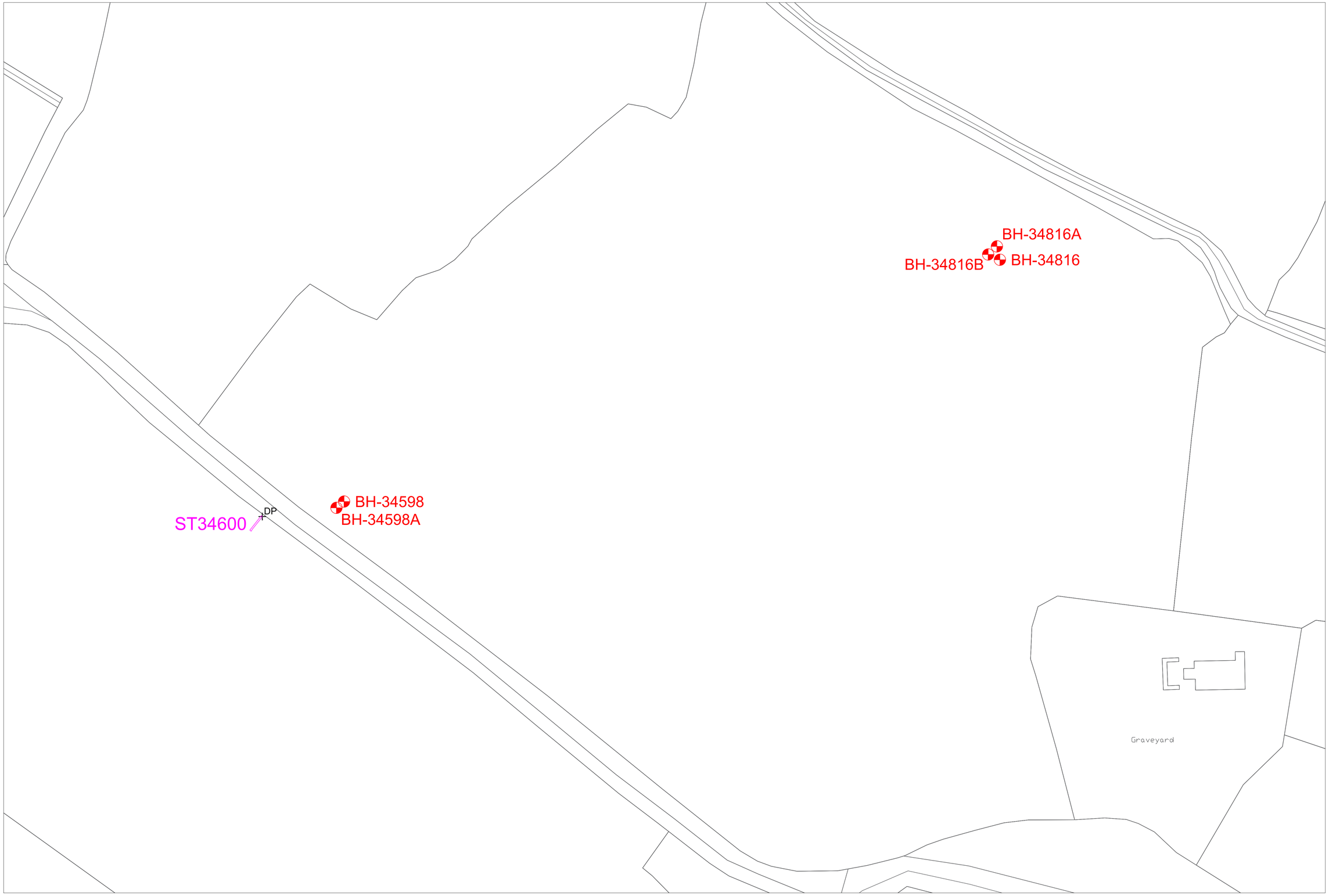
PP-33091

RK-33141

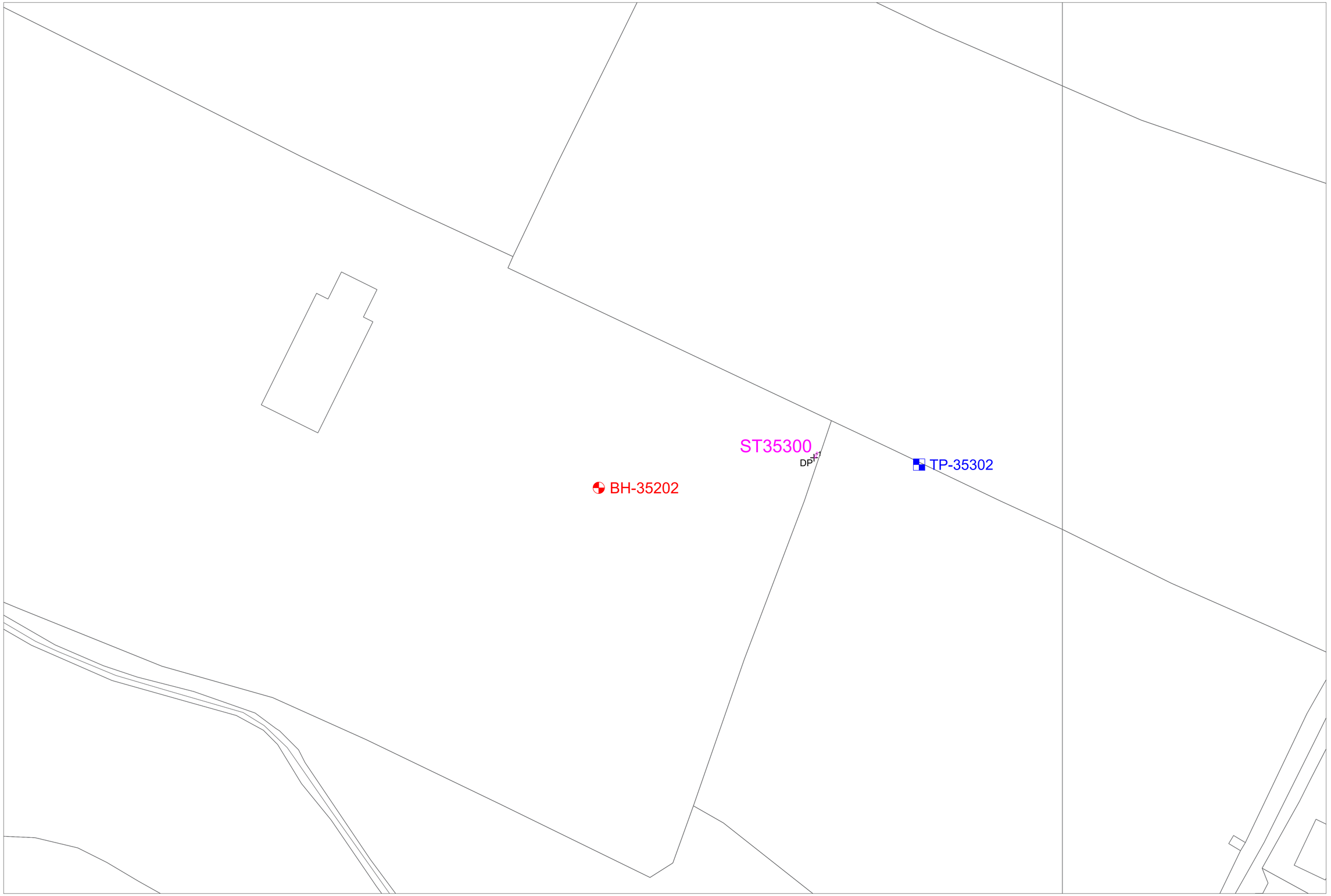
PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022		NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS	SERIES: 65 of 69	SHEET : 21-1682-EHL-065	
				CHCK: NH			



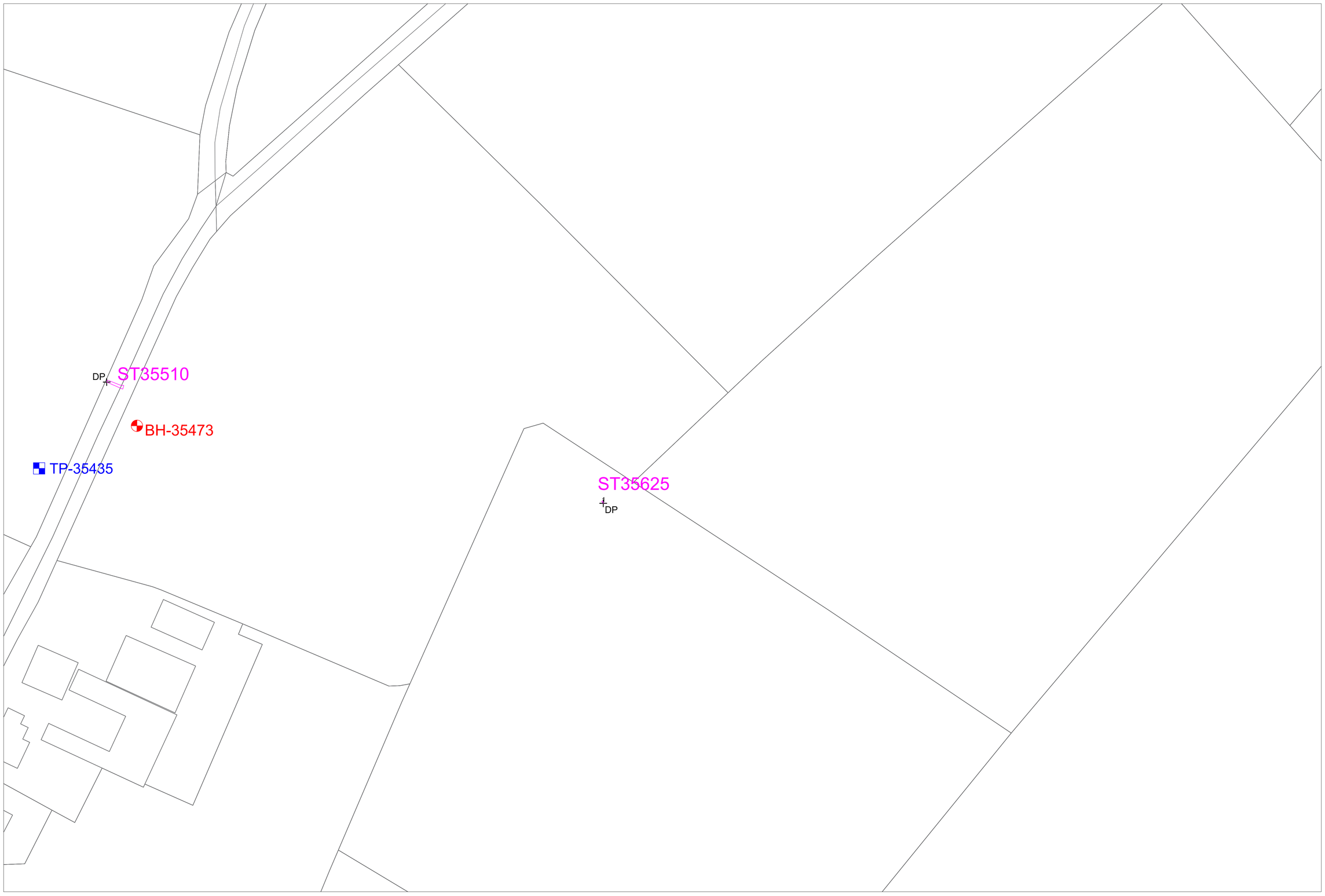
PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 66 of 69	SHEET : 21-1682-EHL-066



PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Pilot Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 67 of 69	SHEET : 21-1682-EHL-067



PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Pivat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 68 of 69	SHEET : 21-1682-EHL-068



PROJECT: Water Supply Project	CLIENT: Irish Water	CAUSEWAY GEOTECH	KEY: Borehole, Trial Pit, Russian Core, Slit Trench, Peat Probe	SCALE: 1:500 A1	DATE: 22/12/2022	NOTES:
TITLE: Exploratory hole location plan	ENGINEER: Mott MacDonald			DRWN: BS CHCK: NH	SERIES: 69 of 69	SHEET : 21-1682-EHL-069