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Ground Investigations Ireland

Mill Road

Ground Investigation Report

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GROUND INVESTIGATIONS IRELAND

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APPENDICES

1.0 Preamble

On the instructions of DBFL Consulting Engineers, a site investigation was carried out by Ground Investigations Ireland Ltd., between May and June 2018 at the site of the proposed residential development at Mill Road, Drogheda, Co. Louth.

2.0 Overview

2.1. Background

It is proposed to construct a new residential development with associated services, access roads and car parking at the proposed site. The site is currently greenfield, with a small area of hardstanding and a disused agricultural building near the entrance. It is situated on the eastern outskirts of Drogheda Town. The proposed construction is envisaged to consist of conventional foundations and pavement make up with some local excavations for services and plant.

2.2. Purpose and Scope

The purpose of the site investigation was to investigate subsurface conditions utilising a variety of investigative methods in accordance with the project specification. The scope of the work undertaken for this project included the following:

- Visit project site to observe existing conditions
- Carry out 21 No. Trial Pits to a maximum depth of 3.5m BGL
- Carry out 1 No. Cable Percussion boreholes to a maximum depth of 4.7m BGL
- Carry out 13 No. Rotary Core Boreholes to a maximum depth of 15.6m BGL
- Installation of 1 No. Groundwater monitoring wells
- Geotechnical & Environmental Laboratory testing
- Report with recommendations

3.0 Subsurface Exploration

3.1. General

During the ground investigation a programme of intrusive investigation specified by the Consulting Engineer was undertaken to determine the sub surface conditions at the proposed site. Regular sampling and in-situ testing was undertaken in the exploratory holes to facilitate the geotechnical descriptions and to enable laboratory testing to be carried out on the soil samples recovered during excavation and drilling.
The procedures used in this site investigation are in accordance with Eurocode 7 Part 2: Ground Investigation and testing (ISEN 1997 – 2:2007) and B.S. 5930:2015.

3.2. Trial Pits

The trial pits were excavated using a JCB 3CX tracked excavator at the locations shown in the exploratory hole location plan in Appendix 1. The locations were checked using a CAT scan to minimise the potential for encountering services during the excavation. The trial pits were sampled, logged and photographed by a Geotechnical Engineer/Engineering Geologist prior to backfilling with arisings. Notes were made of any services, inclusions, pit stability, groundwater encountered and the characteristics of the strata encountered and are presented on the trial pit logs which are provided in Appendix 2 of this Report.

3.3. Cable Percussion Boreholes

The Cable Percussion Boreholes were drilled using a Dando 2000 drilling rig with regular in-situ testing and sampling undertaken to facilitate the production of geotechnical logs and laboratory testing.
The standard method of boring in soil for site investigation is known as the Cable Percussion method. It consists of using a Shell in non cohesive soils and a clay cutter in cohesive soils, both operated on a wire cable. Very hard soils, boulders and other hard obstructions are broken up by chiselling and the fragments removed with the Shell. Where ground conditions made it necessary, the borehole was lined with 200mm diameter steel casing. While the use of the Cable Percussion method of boring gives the maximum data on soil conditions, some mixing of laminated soil is inevitable. For this reason, thin lenses of granular material may not be noticed. Disturbed samples were taken from the boring tools at suitable depths, so that there is a representative sample at the top of each change in stratum and thereafter at regular intervals down the borehole until the next stratum was encountered. The disturbed samples were then sealed and sent to the laboratory where they were visually examined to confirm the description of the relevant strata.
Standard Penetration Tests were carried out in the boreholes. The results of these tests, together with the depths at which the tests were taken are shown on the accompanying borehole records. The test consists of a thick wall sampler tube, 50mm external diameter, being driven into the soil by a monkey weighing 63.5kg and with a free drop of 760mm. For gravels and glacial till the driving shoe was replaced by a solid 60º cone. The Standard Penetration Test number referred to as the 'N' value is the number of blows required to drive the tube 300mm, after an initial penetration of 150mm. The number gives a guide to the consistency of the soil and can also be used to estimate the relative strength/density at the depth of the test and also to estimate the bearing capacity and compressibility of the soil. The cable percussion borehole logs are provided in Appendix 3 of this Report.

3.4. Rotary Boreholes

The rotary coring was carried out by a track mounted T44 Beretta rig at the locations shown on the location plan in Appendix 1. The rotary boreholes were completed from the ground surface or alternatively, where noted on the individual borehole log, from the base of the cable percussion borehole where a temporary liner was installed to facilitate follow-on rotary coring.
The T44 Beretta is equipped with rubber tracks which allow for short travel on pavement surfaces avoiding any damage to the surface. The T44 Beretta utilises a triple tube core barrel system operated using a

wireline drilling process. The outer barrel is rotated by the drill rods and at its lower end, carries the coring bit. The inner barrel is mounted on a swivel so that it does not rotate during the process. The third barrel or liner is placed within the second one to retain the core intact and to preserve as much as possible the fabric of the drilling stratum. The core is cut by the coring bit and passes to the inner liner. The core is brought up to the surface within the inner barrel on a small diameter wire rope or line attached to the "overshoot" recovery tool which is then placed into a core box in order of recovery. A drilling fluid, typically air mist or water flush is passed from the surface through hollow drill rods to the drill bit, and is used to cool the drill bit. Temporary casing is used in some situations to support unstable ground or to seal off fissures or voids. It should be noted that the rotary coring can only achieve limited recovery in overburden, particularly granular or weakly cemented strata due to the flushing medium washing away the cohesive fraction during coring. The recovery achieved, where required is noted on the borehole logs and core photographs are provided to allow assessment of the core recovered. The rotary borehole logs are provided in Appendix 4 of this Report.

3.5. Insitu Plate Bearing Test

The plate bearing tests were carried out using a 305mm or 450mm diameter plate at the locations shown on the site plan in Appendix 1. The plate was loaded in increments using a hydraulic jack and an excavator to provide a reaction and the displacement was monitored in accordance with BS1377 Part 9 using independently mounted digital strain gauges. The constrained modulus and equivalent CBR are calculated in accordance with HD29/75 and are provided on the test reports in Appendix 5 of this Report.

3.6. Laboratory Testing

Samples were selected from the exploratory holes for a range of geotechnical and environmental testing to assist in the classification of soils and to provide information for the proposed design.

Environmental testing, including pH and sulphate testing was carried out by Jones Environmental Laboratory in the UK.

Geotechnical testing consisting of moisture content, Atterberg limits, Particle Size Distribution (PSD), hydrometer and Moisture Condition Value (MCV) tests were carried out in NMTL's Geotechnical Laboratory in Carlow.

Rock strength testing including Atterburg limits, acid soluble sulphate, sulfur content, water soluble sulphate, LA abrasion, flakiness index and water absorption of aggregate testing was carried out in Prosoils Lab in Doncaster.

The results of the laboratory testing are included in Appendix 6 of this Report.

4.0 Ground Conditions

4.1. General

The ground conditions encountered during the investigation are summarised below with reference to insitu and laboratory test results. The full details of the strata encountered during the ground investigation are provided in the exploratory hole logs included in the appendices of this report.

The sequence of strata encountered were consistent across the site and are generally comprised;

- Topsoil
- Made Ground
- Granular Deposits
- Cohesive Deposits

TOPSOIL: Topsoil was encountered in almost all the exploratory holes and was present to a maximum depth of 0.7m BGL.

MADE GROUND: Made Ground deposits were encountered from the surface in TP02 and TP04 and was present to a relatively consistent depth of between 0.5m and 0.6m BGL. These deposits were described generally as *brown slightly sandy gravelly Clay with occasional cobbles, red brick and ceramic fragments.*

COHESIVE DEPOSITS: Cohesive deposits were encountered beneath the Made Ground or Topsoil and were described typically as *firm brown sandy slightly gravelly CLAY with occasional cobbles* generally overlying a *firm or firm to stiff grey/brown slightly sandy gravelly CLAY with occasional cobbles and boulders*. The secondary sand and gravel constituents varied across the site and with depth, with granular lenses occasionally present in the glacial till matrix. The strength of the cohesive deposits typically increased with depth and was soft to firm to 1.5m BGL becoming firm to stiff or stiff below this depth in the majority of the exploratory holes. These deposits had some, occasional or frequent cobble and boulder content where noted on the exploratory hole logs.

GRANULAR DEPOSITS: The granular deposits were encountered generally at the base of the cohesive deposits and were typically described as *Greyish brown clayey sandy subangular to subrounded fine to coarse Gravel with many subangular to subrounded cobbles and occasional boulders* or *Grey/brown clayey very gravelly fine to coarse SAND with many subangular to rounded cobbles and occasional boulders*. The secondary sand/gravel and clay constituents varied across the site and with depth while occasional or frequent cobble and boulder content also present where noted on the exploratory hole logs.

WEATHERED BEDROCK: In TP10 and TP20 weathered rock was encountered which was digable with the JCB 3CX to a depth of up to 0.6m below the top of the stratum. The trial pits were terminated upon encountering the more competent bedrock, in which further excavation became more difficult. This material was recovered typically as angular gravel and cobbles of Limestone however there was some variability in

the fracture spacing and the ease at which the excavator could progress. Some clay and sand were also present with the rock mass either from weathering or as infilling to fractures which were opened upon excavation.

BEDROCK: The rotary core boreholes recovered Weak to medium strong dark grey fine grained fossiliferous LIMESTONE interbedded with weak black fine grained laminated Mudstone. This is typical of the Mornington Formation, which is noted on the geological mapping of the proposed site.
The depth to rock varies from 2.0m BGL in RC08 to a maximum of 11.2m BGL in RC02 at the south eastern side of the site. The total core recovery is good, typically 100% with some of the uppermost runs dropping to 80 or 90%. The SCR and RQD both are relatively poor in the upper weathered zone, often recovered as non-intact, however both indices show an increase with depth.

4.2. Groundwater

Groundwater strikes are noted on the exploratory hole logs where they occurred and where possible excavation was suspended for twenty minutes to allow the subsequent rise in groundwater to be recorded. We would point out that these exploratory holes did not remain open for sufficiently long periods of time to establish the hydrogeological regime and groundwater levels would be expected to vary with the tide, time of year, rainfall, nearby construction and other factors. For this reason a standpipe was installed in RC05 to allow the equilibrium groundwater level to be determined. The groundwater monitoring is included in Appendix 6 of this Report.

4.3. Laboratory Testing

The geotechnical testing carried out on soil samples recovered generally confirm the descriptions on the logs with the primary constituent of the cohesive deposits found to be a CLAY of low to intermediate plasticity, while the rock was non plastic. The Particle Size Distribution tests confirm that generally the cohesive deposits are well-graded with percentages of sands and gravels ranging between 6.7% and 48.8% generally with fines contents of 15.8 to 63.3%.
The pH and sulphate testing carried out indicate that pH results are near neutral and that the water soluble sulphate results is low when compared to the guideline values from BRE Special Digest 1:2005. The samples tested classify the soil as a Design Sulphate Level DS-1.
The results of the Waste Acceptance Criterial Test Suite are presented with the individual parameter limits for “Inert” “Non Hazardous” and “Hazardous” as outlined within European Council Directive 1999 131/EC Article 16 Annex II, “Criteria and procedures for the acceptance of waste at landfills”. The intended disposal site should be consulted to ensure compliance with their specific requirements.
The results indicate that the results are below the inert limits, all spoil disposed of off-site should be sent to a suitably licenced facility. The possibility for contamination, not revealed by the testing undertaken should be borne in mind particularly where Made Ground deposits are present or the previous site use or location indicate a risk of environmental variation.
The results from the completed laboratory testing is included in Appendix 6 of this report.

5.0 Recommendations & Conclusions

5.1. General

The recommendations given and opinions expressed in this report are based on the findings as detailed in the exploratory hole records. Where an opinion is expressed on the material between exploratory hole locations, this is for guidance only and no liability can be accepted for its accuracy. No responsibility can be accepted for conditions which have not been revealed by the exploratory holes. Limited information has been provided at the ground investigation stage and any designs based on the recommendations or conclusions should be completed in accordance with the current design codes, taking into account the variation and the specific details contained within the exploratory hole logs.

5.2. Foundations

An allowable bearing capacity of 100 kN/m^2 is recommended for conventional strip or pad foundations on the firm to stiff cohesive deposits or medium dense granular deposits at a depth of 2.2m BGL. Where the cohesive deposits are deeper, such as at the location of BH01 and RC02, lean mix trench fill to a depth of 3.7m BGL is recommended to achieve the recommended allowable bearing capacity.

In any part of the site, should part of the foundation be on rock we would recommend that all the foundations of the unit in question be lowered to the competent rock stratum to avoid differential settlement.

The pH and sulphate testing completed on samples recovered from the trial pits indicates the pH results are near neutral and the sulphate results are low, when compared to the guideline values from BRE Special Digest 1:2005. No special precautions are required for concrete foundations to prevent sulphate attack.

5.3. External Pavements

The proposed pavements are recommended to be designed in accordance with the CBR test results included in the Appendixes of this Report. The low CBR test results indicate that a capping layer or a sufficient depth of crushed stone fill may be required. Plate bearing tests are recommended at the time of construction to verify the design assumptions for the proposed pavement make up and to verify adequate compaction has been achieved.
The use of a geogrid and separation membrane may improve the performance of the proposed pavement and enable a more economical pavement design to be achieved, a specialist supplier is recommended to advise of the required strength, depth and type of geotextile for the proposed design.

5.4. Excavations

Short term temporary excavations in the cohesive deposits will remain stable for a limited time only and will require to be appropriately battered or the sides supported if the excavation is below 1.25m BGL or is required to permit man entry.

Any excavations which penetrate the granular deposits will require to be appropriately battered or the sides supported and are likely to require dewatering due to the groundwater seepages noted in the exploratory hole logs in the Appendices of this Report.
The groundwater and stability noted on the trial pit logs should be consulted when determining the most appropriate construction methods for excavations. Generally, where significant excavations are required in water bearing granular deposits a cut-off wall may be more cost effective than extensive dewatering. An assessment by a specialist dewatering contractor is recommended to determine the most cost effective approach to the proposed excavation.

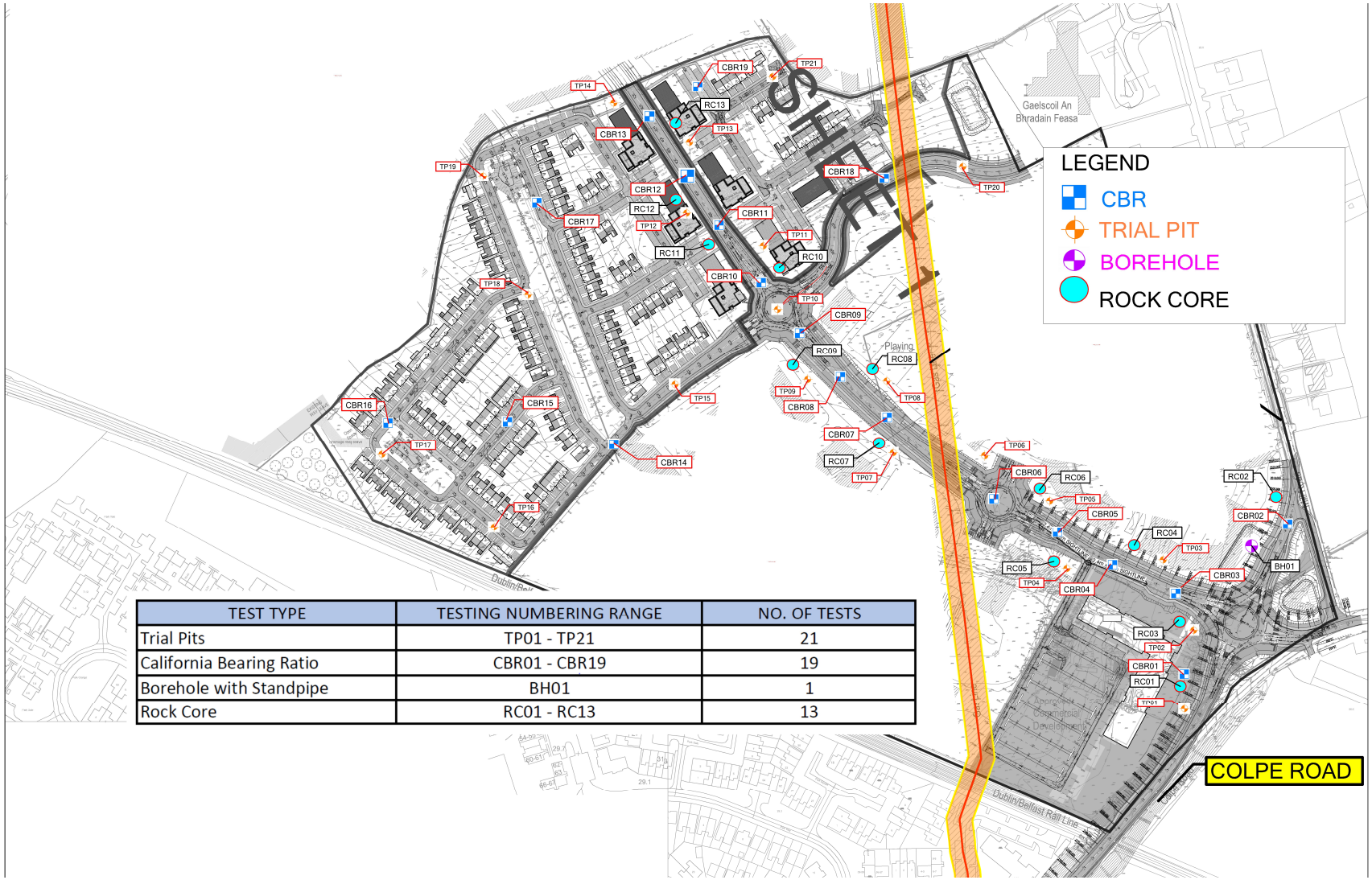
Excavations in the upper cohesive and weathered rock deposits are expected to be excavatable with conventional excavation equipment, with zones of more intact bedrock below this depth requiring rock breaking techniques. Based on the fracture spacing, the rock strength testing and Pettifer & Fookes (1994) Revised Excavatability Graph, the Limestone ranges from hard digging to hard ripping, however the zones recovered as non-intact should be easy to hard digging. The JCB 3CX was generally able to excavate to depths of up to 0.6m below the top of the weathered rock in places, and became difficult to excavate within the confines of the trial pit on encountering the more competent rock
Any material to be removed off site should be disposed of to a suitably licensed landfill.

5.5. Soil Reuse

The classification testing indicates that all the cohesive samples tested would be classified as Class 2 General Cohesive Fill, suitable for general earthworks but not suitable for structural fill, capping or road base material. The grading dominates this particular classification with none of the PSDs returned a fines content of less than 15%.
The upper firm or firm to stiff cohesive deposits would require treatment during the earthworks to reduce the moisture content to an acceptable level for use as Class 2 Fill. If used as fill for purposes other than landscaping, the moisture content should be carefully monitored and controlled to ensure it is within +/- 2% of the OMC. The MCV testing at NMC varies with most falling below 8 which, for glacial till soils, is considered the value at which material is suitable for reuse. With reduction of the moisture content to within the OMC levels an increase in the MCV and CBRs can result which would then deem the material suitable for reuse as Class 2 Fill.

The rock testing results confirm the material complies with 6F2 (Capping) of Specification for Road Works Series 600, Annex E of SR21:2014 + A1:2016 and the requirements of Clause 808 of Specification for Road Works Series 800 – Road Pavements – Unbound and Cement Bound Mixtures, with the exception of the flakiness index which exceeds the Clause 808 specification of 35.
Any material to be removed off site should be disposed of to a suitably licenced landfill.

APPENDIX 1 - Site Location Plan



TEST TYPE	TESTING NUMBERING RANGE	NO. OF TESTS
Trial Pits	TP01 - TP21	21
California Bearing Ratio	CBR01 - CBR19	19
Borehole with Standpipe	BH01	1
Rock Core	RC01 - RC13	13

APPENDIX 2 – Trial Pit Records

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Site Mill Road, Drogheda, Co. Meath			**Trial Pit Number** TP01
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions**	**Ground Level (mOD)**	**Client**	**Job Number** 8660-04-19
	Location	**Dates** 01/05/2019-02/05/2019	**Engineer** DBFL	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30)	Dark brown sandy TOPSOIL		
					0.30	Firm dark grey/black slightly sandy gravelly CLAY with many angular cobbles of Limestone. Gravel is angular to subrounded		
					(1.30)			
			Slow seepage(1) at 1.60m.		1.60	Obstruction: Boulder/rockhead Complete at 1.60m		▽1

Plan

Remarks

Trial Pit stable
Groundwater seepage at 1.60m BGL
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	JD	8660-04-19.TP01

Ground Investigations Ireland Ltd
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Site Mill Road, Drogheda, Co. Meath			**Trial Pit Number** TP02
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions**	**Ground Level (mOD)**	**Client**	**Job Number** 8660-04-19
	Location	**Dates** 01/05/2019-02/05/2019	**Engineer** DBFL	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.50)	POSSIBLE MADE GROUND: Dark brown slightly sandy gravelly Clay with some rootlets		
0.50	B				0.50	Firm brown mottled grey sandy slightly gravelly CLAY with occasional angular to subangular cobbles of Limestone		
					(1.10)			
1.50	B				1.60	Grey clayey gravelly fine to coarse SAND with many angular cobbles of Limestone		▽1
			Fast ingress(1) at 1.70m.		(0.30)			
					1.90	Obstruction: Boulder/rockhead		
						Complete at 1.90m		

Plan

Remarks

Trial pit unstable below 1.60m BGL
Groundwater encountered at 1.70m BGL, fast ingress
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	JD	8660-04-19.TP02

Ground Investigations Ireland Ltd
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Site Mill Road, Drogheda, Co. Meath			**Trial Pit Number** TP03
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions**	**Ground Level (mOD)**	**Client**	**Job Number** 8660-04-19
	Location	**Dates** 01/05/2019-02/05/2019	**Engineer** DBFL	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.70)	Brown sandy TOPSOIL with rootlets		
					0.70			
1.00	B				(1.20)	Soft to firm light brown sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles of Limestone		
					1.90			
2.00	B				(1.10)	Firm brown mottled grey sandy slightly gravelly CLAY with some subangular to subrounded cobbles of Limestone		
					3.00			
3.20	B				(0.50)	Stiff grey slightly sandy gravelly CLAY with many angular to subangular cobbles and occasional subrounded boulders of Limestone		
			Slow seepage(1) at 3.50m.		3.50	Complete at 3.50m		▽1

Plan

Remarks

Trial Pit stable
Groundwater seepage at 3.50m BGL
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	JD	8660-04-19.TP03

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Site Mill Road, Drogheda, Co. Meath			**Trial Pit Number** TP04
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions**	**Ground Level (mOD)**	**Client**	**Job Number** 8660-04-19
	Location	**Dates** 01/05/2019-02/05/2019	**Engineer** DBFL	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20) 0.20	MADE GROUND: Grey sandy angular fine to coarse Gravel with many angular cobbles		
					(0.40) 0.60	MADE GROUND: Brown slightly sandy gravelly Clay with occasional cobbles, red brick and ceramic fragments		
0.50	B				(1.60) 2.20	Firm sandy slightly gravelly CLAY with many angular to subangular cobbles and occasional angular to subangular boulders of Limestone		
2.00	B				(1.20) 3.40	Greyish brown clayey sandy subangular to subrounded fine to coarse GRAVEL with many subangular to subrounded cobbles and occasional subrounded boulders of Limestone		
3.00	B		Slow seepage(1) at 3.00m.			Complete at 3.40m		▽1

Plan

Remarks

Trial pit unstable below 2.20m BGL
Groundwater seepage at 3.00m BGL
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	JD	8660-04-19.TP04

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Site Mill Road, Drogheda, Co. Meath			**Trial Pit Number** TP05
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions**	**Ground Level (mOD)**	**Client**	**Job Number** 8660-04-19
	Location	**Dates** 01/05/2019-02/05/2019	**Engineer** DBFL	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.10) 0.10	Brown sandy TOPSOIL		
					(0.60)	Firm brown slightly sandy gravelly CLAY with occasional subangular cobbles of Limestone. Gravel is fine to coarse angular to subangular		
					0.70	Grey very sandy angular to subrounded fine to coarse GRAVEL with occasional subangular cobbles of Limestone		
1.50	B							
					(2.80)			
2.50	B							
			Slow seepage(1) at 3.10m.					▽1
					3.50	Complete at 3.50m		

Plan

Remarks

Trial Pit unstable below 0.70m BGL
Groundwater seepage at 3.10m BGL
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	JD	8660-04-19.TP05

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Site Mill Road, Drogheda, Co. Meath			**Trial Pit Number** TP06
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions**	**Ground Level (mOD)**	**Client**	**Job Number** 8660-04-19
	Location	**Dates** 01/05/2019-02/05/2019	**Engineer** DBFL	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30)	Light brown TOPSOIL		
					0.30	Firm brown slightly sandy gravelly CLAY with many subangular to subrounded cobbles of Limestone. Gravel is fine to coarse angular to subangular		
0.50	B							
					(2.40)			
2.00	B							
					2.70	Stiff brown slightly sandy gravelly CLAY with many angular to subangular cobbles of Limestone and lenses of brown fine to coarse Sand		
					(0.30)			
					3.00	Obstruction: Boulder/rockhead		
						Complete at 3.00m		

Plan

Remarks

Trial Pit stable
No groundwater encountered
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	JD	8660-04-19.TP06

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Site Mill Road, Drogheda, Co. Meath			**Trial Pit Number** TP07
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions**	**Ground Level (mOD)**	**Client**	**Job Number** 8660-04-19
	Location	**Dates** 01/05/2019-02/05/2019	**Engineer** DBFL	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.10) 0.10	Light brown TOPSOIL		
						Firm brown sandy slightly gravelly CLAY with many angular to subangular cobbles, occasional rounded boulders of Limestone and lenses of brown/grey Sand. Gravel is angular to subangular		
0.50	B							
					(2.50)			
1.50	B							
					2.60	Obstruction: Boulder/rockhead		
						Complete at 2.60m		

Plan

Remarks

Trial Pit stable
No groundwater encountered
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	JD	8660-04-19.TP07

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Site Mill Road, Drogheda, Co. Meath			**Trial Pit Number** TP08
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions**	**Ground Level (mOD)**	**Client**	**Job Number** 8660-04-19
	Location	**Dates** 01/05/2019-02/05/2019	**Engineer** DBFL	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.40) 0.40	Dark brown sandy TOPSOIL with rootlets and timber		
0.50	B				(1.20)	Firm brown sandy slightly gravelly CLAY with occasional angular to subrounded cobbles and subangular boulders of Limestone		
1.50	B				1.60	Obstruction: Boulders/rockhead Complete at 1.60m		

Plan

Remarks

Trial Pit stable
No groundwater encountered
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	JD	8660-04-19.TP08

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Site Mill Road, Drogheda, Co. Meath			**Trial Pit Number** TP09
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions**	**Ground Level (mOD)**	**Client**	**Job Number** 8660-04-19
	Location	**Dates** 01/05/2019-02/05/2019	**Engineer** DBFL	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	Dark brown TOPSOIL		
					0.20	Firm brown sandy slightly gravelly CLAY with occasional subangular cobbles of Limestone		
0.50	B				(0.70)			
					0.90	Firm to stiff greyish brown slightly sandy gravelly CLAY with many angular to subangular cobbles of Limestone		
1.50	B				(0.90)			
					1.80	Obstruction: Boulders/rockhead		
						Complete at 1.80m		

Plan

Remarks

Trial Pit stable
No groundwater encountered
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	JD	8660-04-19.TP09

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Site Mill Road, Drogheda, Co. Meath			**Trial Pit Number** TP10
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions**	**Ground Level (mOD)**	**Client**	**Job Number** 8660-04-19
	Location	**Dates** 01/05/2019-02/05/2019	**Engineer** DBFL	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20) 0.20	Brown TOPSOIL		
0.50	B				(0.80)	Firm brown sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles of Limestone		
					1.00			
1.50	B				(1.10)	Grey/brown clayey very gravelly fine to coarse SAND with many subangular to rounded cobbles, occasional subangular boulders of Limestone and pockets of dark grey slightly sandy gravelly Clay		
					2.10			
					(0.60)	Grey/brown angular to subangular COBBLES and BOULDERS with pockets of brown and grey slightly sandy gravelly Clay. (Hard digging)		
					2.70	Obstruction: Boulder/Rockhead		
						Complete at 2.70m		

Plan

Remarks

Trial Pit unstable below 1.00m BGL
No groundwater encountered
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	JD	8660-04-19.TP10

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Site Mill Road, Drogheda, Co. Meath			**Trial Pit Number** TP11
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions**	**Ground Level (mOD)**	**Client**	**Job Number** 8660-04-19
	Location	**Dates** 01/05/2019-02/05/2019	**Engineer** DBFL	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20) 0.20	Brown TOPSOIL		
0.50	B				(0.80)	Firm brown sandy slightly gravelly CLAY with occasional subangular cobbles		
					1.00			
					(1.00)	Firm to stiff brown slightly sandy gravelly CLAY with many angular to subangular cobbles of Limestone		
2.00	B				2.00			
2.50	B				(1.30)	Stiff brown slightly sandy gravelly CLAY with many angular to subangular cobbles of Limestone		
					3.30	Complete at 3.30m		

Plan

Remarks

Trial Pit stable
No groundwater encountered
Trial Pit backfilled upon completon

Scale (approx)	Logged By	Figure No.
1:25	JD	8660-04-19.TP11

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Site Mill Road, Drogheda, Co. Meath			**Trial Pit Number** TP12
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions**	**Ground Level (mOD)**	**Client**	**Job Number** 8660-04-19
	Location	**Dates** 01/05/2019-02/05/2019	**Engineer** DBFL	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20) 0.20	Brown TOPSOIL		
0.50	B				(0.80) 1.00	Soft to firm sandy slightly gravelly CLAY with occasional subangular cobbles		
					(0.90) 1.90	Firm brown slightly sandy gravelly CLAY with occasional subangular cobbles		
2.20	B				(1.10) 3.00	Firm to stiff grey/brown slightly sandy gravelly CLAY with many angular to subangular cobbles and boulders of Limestone and pockets of grey fine to coarse Sand. Gravel is fine to coarse angular to subangular		
						Obstruction: Boulder/rockhead		
						Complete at 3.00m		

Plan

Remarks

Trial Pit stable
No groundwater encountered
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	JD	8660-04-19.TP12

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Site Mill Road, Drogheda, Co. Meath			**Trial Pit Number** TP13
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions**	**Ground Level (mOD)**	**Client**	**Job Number** 8660-04-19
	Location	**Dates** 01/05/2019-02/05/2019	**Engineer** DBFL	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	Brown TOPSOIL		
					0.20			
					(0.20)	Soft brown sandy slightly gravelly CLAY with many rounded to subrounded cobbles		
					0.40			
0.50	B				(0.90)	Grey/brown very sandy clayey angular to subangular fine to coarse. GRAVEL with many angular to subangular cobbles and boulders of Limestone and pockets of brown sandy slightly gravelly Clay		
					1.30			
1.50	B				(0.70)	Firm to stiff brown slightly sandy gravelly CLAY with many angular to subrounded cobbles, occasional boulders of Limestone and pockets of angular to subangular fine to coarse sandy Gravel		
					2.00	Obstruction: Boulder/rockhead		
						Complete at 2.00m		

Plan

Remarks

Trial Pit stable
No groundwater encountered
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	JD	8660-04-19.TP13

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Site Mill Road, Drogheda, Co. Meath			**Trial Pit Number** TP14
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions**	**Ground Level (mOD)**	**Client**	**Job Number** 8660-04-19
	Location	**Dates** 01/05/2019-02/05/2019	**Engineer** DBFL	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20) 0.20	Brown TOPSOIL		
0.50	B				(1.20)	Firm brown sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles		
1.50	B				1.40 (0.50)	Firm to stiff greyish brown slightly sandy gravelly CLAY with many angular to subangular cobbles and occasional boulders of Limestone		
2.00	B				1.90 (0.60)	Stiff greyish brown slightly sandy gravelly CLAY with many angular cobbles and occasional boulders of Limestone		
					2.50	Obstruction: Boulder/rockhead Complete at 2.50m		

Plan

Remarks

Trial Pit stable
No groundwater encountered
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	JD	8660-04-19.TP14

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Site Mill Road, Drogheda, Co. Meath			**Trial Pit Number** TP15
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions**	**Ground Level (mOD)**	**Client**	**Job Number** 8660-04-19
	Location	**Dates** 01/05/2019-02/05/2019	**Engineer** DBFL	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.10) 0.10	Brown TOPSOIL		
						Firm brown sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles		
0.50	B				(1.20)			
					1.30	Firm to stiff brown slightly sandy gravelly CLAY with many angular to subangular cobbles of Limestone and occasional lenses of grey fine to coarse Sand		
1.50	B				(0.90)			
			Slow seepage(1) at 2.20m.		2.20	Obstruction: Boulder/rockhead		▽1
						Complete at 2.20m		

Plan

Remarks

Trial Pit stable
Groundwater seepage at 2.20m BGL
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	JD	8660-04-19.TP15

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Site Mill Road, Drogheda, Co. Meath			**Trial Pit Number** TP16
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions**	**Ground Level (mOD)**	**Client**	**Job Number** 8660-04-19
	Location	**Dates** 01/05/2019-02/05/2019	**Engineer** DBFL	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20) 0.20	Brown sandy TOPSOIL with rootlets		
0.50	B				(0.80)	Firm brown sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles		
					1.00	Fim to stiff grey/brown slightly sandy gravelly CLAY with many angular to subangular cobbles and occasional angular to subangular boulders of Limestone and occasional lenses of grey Sand		
1.50	B		Slow seepage(1) at 2.00m.		(2.00)			▽1
					3.00	Obstruction: Boulders/rockhead		
						Complete at 3.00m		

Plan

Remarks

Trial Pit unstable below 2.00m BGL
Consistent groundwater seepage below 2.00m BGL
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	JD	8660-04-19.TP16

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Site	Trial Pit Number
Mill Road, Drogheda, Co. Meath	TP17

Machine : JCB 3CX Method : Trial Pit	Dimensions	Ground Level (mOD)	Client	Job Number
				8660-04-19
	Location	Dates 01/05/2019-02/05/2019	Engineer DBFL	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20) 0.20	Brown sandy TOPSOIL		
						Firm brown sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles of Limestone		
0.50	B				(0.70) 0.90			
						Firm to stiff grey slightly sandy gravelly CLAY with many angular to subangular cobbles, occasional angular to subangular boulders of Limestone		
1.50	B				(1.20)			
			Slow seepage(1) at 2.10m.		2.10	Obstruction: Boulder/rockhead		▽1
						Complete at 2.10m		

Plan

Remarks

Trial Pit stable
Groundwater seepage at 2.10m BGL
Trial pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	JD	8660-04-19.TP17

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Site Mill Road, Drogheda, Co. Meath			**Trial Pit Number** TP18
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions**	**Ground Level (mOD)**	**Client**	**Job Number** 8660-04-19
	Location	**Dates** 01/05/2019-02/05/2019	**Engineer** DBFL	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20) 0.20	Brown TOPSOIL		
0.50	B				(0.80)	Soft to firm brown sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles		
					1.00			
					(1.00)	Firm to stiff brown slightly sandy gravelly CLAY with many angular to subrounded cobbles and boulders of Limestone		
2.00	B				2.00	Obstruction: Boulder/rockhead		
						Complete at 2.00m		

Plan

Remarks

Trial Pit stable
No groundwater encountered
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	JD	8660-04-19.TP18

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Site Mill Road, Drogheda, Co. Meath			**Trial Pit Number** TP19
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions**	**Ground Level (mOD)**	**Client**	**Job Number** 8660-04-19
	Location	**Dates** 01/05/2019-02/05/2019	**Engineer** DBFL	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.10) 0.10	Brown TOPSOIL		
					(0.40)	Soft to firm brown sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles		
0.50	B				0.50	Firm to stiff brown sandy slightly gravelly CLAY with many angular to subangular cobbles, some angular boulders of Limestone and lenses of brown fine to coarse Sand		
					(1.60)			
2.00	B				2.10	Obstruction: Boulder/rockhead		
						Complete at 2.10m		

Plan

Remarks

Trial Pit stable
No groundwater encountered
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	JD	8660-04-19.TP19

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Site Mill Road, Drogheda, Co. Meath			**Trial Pit Number** TP20
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions**	**Ground Level (mOD)**	**Client**	**Job Number** 8660-04-19
	Location	**Dates** 01/05/2019-02/05/2019	**Engineer** DBFL	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.10) 0.10	Brown TOPSOIL		
0.50	B				(1.70)	Brown clayey gravelly fine SAND with many angular to subrounded cobbles, occasional subangular to subrounded boulders of Limestone		
1.50	B				1.80 (0.30) 2.10	Grey/brown angular to subrounded COBBLES of Limestone with some finer material (Hard digging) Obstruction: Boulder/rockhead		
						Complete at 2.10m		

Plan

Remarks

Trial pit unstable below 0.10m BGL
No groundwater encountered
Trial pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	JD	8660-04-19.TP20

Ground Investigations Ireland Ltd
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Site Mill Road, Drogheda, Co. Meath			**Trial Pit Number** TP21
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions**	**Ground Level (mOD)**	**Client**	**Job Number** 8660-04-19
	Location	**Dates** 01/05/2019-02/05/2019	**Engineer** DBFL	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30)	Brown TOPSOIL		
					0.30	Firm brown sandy slightly gravelly CLAY with occasional subangular cobbles		
0.50	B				(0.70)			
					1.00	Firm to stiff brown slightly sandy gravelly CLAY with many angular to subangular cobbles and lenses of grey fine to coarse Sand		
1.50	B				(1.30)			
					2.30	Obstruction: Boulder/rockhead		
						Complete at 2.30m		

Plan

Remarks

Trial Pit stable
No groundwater encountered
Trial pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	JD	8660-04-19.TP21

TP01

TP02

TP03

TP04

TP05

TP06

TP07

TP08

TP09

TP10

TP11

TP12

TP13

TP14

TP15

TP16

TP17

TP18

TP19

TP20

TP21

APPENDIX 3 – Cable Percussion Borehole Records

Ground Investigations Ireland Ltd
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Site Mill Road, Drogheda, Co. Meath			**Borehole Number** BH01
Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm cased to 4.70m	**Ground Level (mOD)**	**Client**	**Job Number** 8660-04-19
	Location	**Dates** 04/06/2019	**Engineer** DBFL	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						(0.30)	Brown sandy TOPSOIL with rootlets		
						0.30	Soft brown slightly sandy gravelly CLAY with occasional subangular cobbles of limestone		
0.50	B								
						(1.10)			
1.00-1.45 1.00	SPT(C) N=7 B			1,1/2,1,2,2					
						1.40	Soft greyish brown sandy slightly gravelly CLAY with occasional subangular cobbles of limestone		
1.50	B								
2.00-2.45 2.00	SPT(C) N=6 B			1,0/1,2,2,1					
						(2.60)			
3.00-3.45 3.00	SPT(C) N=5 B			1,0/0,1,2,2					
						4.00	Stiff greyish brown sandy gravelly CLAY with occasional subangular cobbles of limestone		
4.00-4.45 4.00	SPT(C) N=18 B			1,2/2,4,6,6					
						(0.70)			
						4.70	Obstruction: Boulder/rockhead		
							Complete at 4.70m		

Remarks
No groundwater encountered
Borehole backfilled on completion
Chiselling from 4.70m to 4.70m for 1 hour.

Scale (approx)	Logged By
1:50	JD

Figure No. 8660-04-19.BH01

APPENDIX 4 - Rotary Borehole Records

Ground Investigations Ireland Ltd
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Site Mill Road, Drogheda, Co. Meath			**Borehole Number** RC01
Machine : Beretta T44 **Flush :** Water **Core Dia :** 68 mm **Method :** Rotary Cored	**Casing Diameter** 100mm cased to 7.70m	**Ground Level (mOD)**	**Client**	**Job Number** 8660-04-19
	Location	**Dates** 07/06/2019	**Engineer** DBFL	**Sheet** 1/1

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00	27	-			1,1/2,1,2,1 SPT(C) N=6		(2.20)	Soft to firm dark brown slightly sandy slightly gravelly CLAY with occasional rootlets. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse		
2.20 2.20-2.65	63	40	8	>25			2.20	Weak to medium strong dark grey fine grained fossilferous LIMESTONE with calcite veins interbedded with weak black very fine thinly laminated Mudstone. Partially weathered 2.20-3.70 - Very closely spaced sub-horizontal to 10 degrees, undulating rough		
3.70	100	85	0	>25			(5.50)	3.70-5.20 - Very closely spaced sub-horizontal to 10 degrees, undulating rough		
5.20	100	87	47	16				5.70-6.70 - Close to medium spaced sub-horizontal to 10 degrees, undulating rough		
6.70	90	69	0	>25				6.70-7.70 - Very closely spaced sub-horizontal to 10 degrees undulating rough		
7.70							7.70	Complete at 7.70m		

Remarks
Borehole backfilled upon completion
No groundwater encountered

Scale (approx)	Logged By
1:50	MMC

Figure No. 8660-04-19.RC01

Ground Investigations Ireland Ltd
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Site Mill Road, Drogheda, Co. Meath			**Borehole Number** RC02
Machine : Beretta T44 **Flush :** Water **Core Dia :** 68 mm **Method :** Rotary Cored	**Casing Diameter** 100mm cased to 15.60m	**Ground Level (mOD)**	**Client**	**Job Number** 8660-04-19
	Location	**Dates** 10/06/2019	**Engineer** DBFL	**Sheet** 1/2

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00										
	67						(2.20)	Soft to firm brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse		
2.20 2.20-2.65	83				1,1/2,3,2,1 SPT(C) N=8		2.20 (1.50)	Firm grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse		
3.70 3.70-4.15	13				3,3/4,4,5,5 SPT(C) N=18		3.70 (1.50)	Poor Recovery: Recovery consists of grey angular cobbles. Driller notes Clay (Stiff)		
5.20 5.20-5.50	63				10,10/14,36 SPT(C) 50/150		5.20	Very stiff grey slightly sandy gravelly CLAY with subangular to subrounded cobbles. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse		
6.70 6.70-6.85	73				25/50 SPT(C) 25*/80 50/70		(4.50)			
8.20 8.20-8.43	40	7	7	NI	12,19/50 SPT(C) 50/80					
9.70 9.70-9.85					25/50 50/70 SPT(C) 25*/80		9.70	Weak grey very fine grained fossiliferous LIMESTONE with rare calcite veins interbedded with weak black fine grained		

Remarks
Borehole backfilled upon completion

Scale (approx)	Logged By
1:50	MMC

Figure No. 8660-04-19.RC02

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Site Mill Road, Drogheda, Co. Meath			**Borehole Number** RC02
Machine : Beretta T44 **Flush :** Water **Core Dia :** 68 mm **Method :** Rotary Cored	**Casing Diameter** 100mm cased to 15.60m	**Ground Level (mOD)**	**Client**	**Job Number** 8660-04-19
	Location	**Dates** 10/06/2019	**Engineer** DBFL	**Sheet** 2/2

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	43	0	0				(1.50)	thinly laminated Mudstone. Distinctly weathered 9.70-11.20 - Non Intact		
11.20	100	54	23	21			11.20	Weak to medium strong grey very fine grained fossiliferous LIMESTONE with rare calcite veins interbedded with weak black fine grained thinly laminated Mudstone. Partially weathered		
12.50	100	93	75	7			(4.40)			
13.50				20				11.20-15.60 - Close to medium spaced sub-horizontal to 20 degrees, planar rough		
14.00	100	50	22							
14.50				17						
15.60							15.60	Complete at 15.60m		

Remarks

Scale (approx)	Logged By
1:50	MMC

Figure No. 8660-04-19.RC02

Ground Investigations Ireland Ltd
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Site Mill Road, Drogheda, Co. Meath			**Borehole Number** RC03
Machine : Beretta T44 **Flush :** Water **Core Dia :** 68 mm **Method :** Rotary Cored	**Casing Diameter** 100mm cased to 9.10m	**Ground Level (mOD)**	**Client**	**Job Number** 8660-04-19
	Location	**Dates** 07/06/2019-10/06/2019	**Engineer** DBFL	**Sheet** 1/1

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00	32	-			1,1/2,2,3,1 SPT(C) N=8		(3.70)	Soft to firm brown sandy gravelly CLAY with subangular to subrounded cobbles. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse		
2.20 2.20-2.65	73	-								
3.70	92	62	39	6			3.70	Medium strong grey very fine to fine grained fossilferous LIMESTONE with calcite veins interbedded with weak black very fine grained thinly laminated Mudstone, partially weathered with some clay smearing 3.70-5.00 - Two fracture sets. F1: Medium spaced sub-horizontal to 15 degrees, undulating rough. F2: Widely spaced sub-vertical to 85 degrees, unudulating rough		
5.00	93	79	68	4				5.00-6.00 - Medium spaced sub-horizontal to 15 degrees, undulating rough		
6.00 6.40	97	91	39	19			(5.40)	6.00-7.00 - Two fracture sets. F1: Closely spaced sub-horizontal to 10 degrees, undulating rough. F2: Widely spaced sub-vertical to 80 degrees, undulating rough		
7.00				18				7.00-8.00 - Two fracture sets. F1: Closely spaced sub-horizontal to 10 degrees, undulating rough. F2: Widely spaced sub-vertical to 80 degrees, undulating rough		
8.00	100	59	20	>25				8.00-9.10 - Two fracture sets. F1: Closely spaced sub-horizontal to 10 degrees, undulating rough. F2: Widely spaced sub-vertical to 80 degrees, undulating rough		
9.10							9.10	Complete at 9.10m		

Remarks
Borehole backfilled upon completion

Scale (approx)	Logged By
1:50	MMC

Figure No. 8660-04-19.RC03

Ground Investigations Ireland Ltd
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Site Mill Road, Drogheda, Co. Meath			**Borehole Number** RC04
Machine : Beretta T44 **Flush :** Water **Core Dia :** 68 mm **Method :** Rotary Cored	**Casing Diameter** 100mm cased to 8.20m	**Ground Level (mOD)**	**Client**	**Job Number** 8660-04-19
	Location	**Dates** 11/06/2019	**Engineer** DBFL	**Sheet** 1/1

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00	34	-					(2.20)	Soft to firm brown sandy gravelly CLAY with subangular to subrounded boulders. Sand is fine to coarse. Gravel is subangular to subrounded fine to coase		
2.20 2.20-2.65	36	-			2,2/4,5,6,6 SPT(C) N=21		2.20 (1.40)	Stiff brown sandy gravelly CLAY with subangular to subrounded boulders. Sand is fine to coarse. Gravel is subangular to subrounded fine to coase		
3.60 3.60-4.05	100	69	41	12	3,4/7,5,7,7 SPT(C) N=26		3.60	Medium strong grey very fine to fine grained fossiliferous LIMESTONE with calcite veins interbedded with weak black very fine grained thinly laminated Mudstone. Partially weathered with clay smearing 3.60-4.60 - Two fracture sets. F1: Closely spaced sub-horizontal to 10 degrees, undulating rough. F2: Widely spaced sub-vertical to 80 degrees, undulating rough		
4.60				20				4.60-5.60 - Two fracture sets. F1: Closely spaced sub-horizontal to 10 degrees, undulating rough. F2: Widely spaced sub-vertical to 85 degrees, undulating rough		
5.20 5.60	93	43	27	15			(4.60)	5.60-6.70 - Two fracture sets. F1: Closely spaced sub-horizontal to 30 degrees, undulating rough. F2: Widely spaced sub-vertical to 70 degrees, undulating rough		
6.70	93	77	44	20				6.70-8.20 - Closely spaced sub-horizontal to 40 degrees, undulating rough		
8.20							8.20	Complete at 8.20m		

Remarks
Borehole backfilled upon completion

Scale (approx)	Logged By
1:50	MMC

Figure No. 8660-04-19.RC04

Ground Investigations Ireland Ltd
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Site Mill Road, Drogheda, Co. Meath			**Borehole Number** RC05
Machine : T44 **Flush :** **Core Dia:** mm **Method :** Rotary Cored	**Casing Diameter**	**Ground Level (mOD)**	**Client**	**Job Number** 8660-04-19
	Location	**Dates** 06/06/2019	**Engineer** DBFL	**Sheet** 1/2

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00											
	32	-					(2.20)	Poor Recovery: Recovery consists of grey angular to subangular cobbles. Driller notes brown Clay			
2.20							2.20				
2.20-2.35	30	-			25/50 SPT(C) 25*/75 50/75			Poor Recovery: Recovery consists of grey angular to subangular cobbles with some clay smearing. Driller notes brown Clay (Stiff)			
3.60	43	3					(3.40)				
5.20											
5.60	77	9	0	NI			5.60 (1.10)	Weak grey fine grained fossiliferous LIMESTONE interbedded with weak black very fine grained thinly laminated Mudstone. Destructed weathering 5.60-6.70 - Non Intact			
6.70	100	47	30	>25			6.70	Medium strong grey very fine to fine grained fossiliferous LIMESTONE interbedded with weak black very fine grained thinly laminated Mudstone. Partially to distinctly weathered with clay smearing 6.70-7.80 - Non intact in places but pattern indicates two fracture sets. F1: Sub-horizontal to 10 degrees, undulating rough, stepped. F2: Sub-vertical to 80 degrees, undulating rough			
7.80											
8.20	100	53	43	13				7.80-8.90 - Two fracture sets. F1: Closely spaced sub-horizontal to 10 degrees, undulating rough. F2: Widely spaced sub-vertical to 65 degrees, undulating rough			
8.90				15			(4.50)	8.90-9.70 - Two fracture sets. F1: Closely spaced sub-horizontal to 15 degrees, undulating rough. F2: Widely spaced sub-vertical to 75 degrees, undulating rough			
9.70				NI							
9.90											

Remarks
Slotted pipe installed from 8.00-1.00m BGL with gravel surround. Plain pipe installed from 1.00m BGL to ground level with bentonite seal

Scale (approx)	Logged By
1:50	MMC

Figure No. 8660-04-19.RC05

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Site Mill Road, Drogheda, Co. Meath			**Borehole Number** RC05
Machine : T44 **Flush :** **Core Dia :** mm **Method :** Rotary Cored	**Casing Diameter**	**Ground Level (mOD)**	**Client**	**Job Number** 8660-04-19
	Location	**Dates** 06/06/2019	**Engineer** DBFL	**Sheet** 2/2

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
	100	80	63	11				9.70-11.20 - Two fracture sets. F1: Closely spaced sub-horizontal to 15 degrees, undulating rough, stepped. F2: Widely spaced sub-vertical to 70 degrees, undulating rough			
11.20							11.20	Complete at 11.20m			

Remarks

Scale (approx)	Logged By
1:50	MMC

Figure No. 8660-04-19.RC05

Ground Investigations Ireland Ltd
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Site Mill Road, Drogheda, Co. Meath			**Borehole Number** RC06
Machine : Beretta T44 **Flush :** Water **Core Dia :** 68 mm **Method :** Rotary Cored	**Casing Diameter** 100mm cased to 6.20m	**Ground Level (mOD)**	**Client**	**Job Number** 8660-04-19
	Location	**Dates** 11/06/2019	**Engineer** DBFL	**Sheet** 1/1

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00	45						(2.20)	Poor Recovery: Recovery consists of soft to firm brown sandy gravelly Clay with angular to subrounded cobbles		
2.20 2.20-2.65	20				4,6/6,7,7,8 SPT(C) N=28		2.20	Poor Recovery: Recovery consists of very stiff brown sandy gravelly CLAY with angular to subrounded cobbles and occasional angular to subangular boulders (Stiff)		
3.70 3.70-4.08	27				12,10/15,17,18 SPT(C) 50/225		(4.00)			
5.20 5.20-5.40	100				25/50 SPT(C) 50/50					
6.20							6.20	Complete at 6.20m		

Remarks
Borehole backfilled upon completion

Scale (approx)	Logged By
1:50	MMC

Figure No. 8660-04-19.RC06

Ground Investigations Ireland Ltd
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Site Mill Road, Drogheda, Co. Meath			**Borehole Number** RC07
Machine : Beretta T44 **Flush :** Water **Core Dia :** 68 mm **Method :** Rotary Cored	**Casing Diameter** 100mm cased to 5.00m	**Ground Level (mOD)**	**Client**	**Job Number** 8660-04-19
	Location	**Dates** 11/06/2019	**Engineer** DBFL	**Sheet** 1/1

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00	77						(2.60)	Firm brown sandy gravelly CLAY with subangular to subrounded boulders. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse		
2.20 2.20-2.65	33				25/50 SPT(C) N=50		2.60 (1.10)	Poor Recovery: Driller notes stiff brown sandy gravelly CLAY with subangular to subrounded boulders. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse (Stiff)		
3.70 3.70-4.15	0				11,12/14,36 SPT(C) N=50		3.70 (1.30)	No Recovery: Driller notes brown sandy gravelly Clay (Stiff)		
5.00 5.00-5.30					10,12/14,36 SPT(C) 50/150		5.00	Complete at 5.00m		

Remarks
Borehole backfilled upon completion

Scale (approx)	Logged By
1:50	MMC

Figure No. 8660-04-19.RC07

Ground Investigations Ireland Ltd
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Site Mill Road, Drogheda, Co. Meath			**Borehole Number** RC08
Machine : Beretta T44 **Flush :** Water **Core Dia :** 68 mm **Method :** Rotary Cored	**Casing Diameter** 100mm cased to 5.00m	**Ground Level (mOD)**	**Client**	**Job Number** 8660-04-19
	Location	**Dates** 12/06/2019	**Engineer** DBFL	**Sheet** 1/1

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00	45						(1.50) 1.50	Soft to firm brown slightly sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is angular to subangular fine to coarse		
							(0.50) 2.00	OVERBURDEN: Stiff brown slightly sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is angular to subangular fine to coarse		
2.00	81	24	24	13				Weak dark grey very fine to fine grained fossiliferous LIMESTONE with calcite veins interbedded with weak black very fine grained thinly laminated Mudstone. Destructed weathering with clay smearing		
3.00				6			(3.00)	2.00-4.00 - Two fracture sets. F1: Medium spaced sub-horizontal to 15 degrees, undulating rough. F2: Widely spaced sub-vertical to 80 degrees, undulating rough		
4.00	75	0	0	NI				4.00-5.00 - Non Intact		
5.00							5.00	Complete at 5.00m		

Remarks
Borehole backfilled upon completion

Scale (approx)	Logged By
1:50	MMC

Figure No. 8660-04-19.RC08

Ground Investigations Ireland Ltd
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Site Mill Road, Drogheda, Co. Meath			**Borehole Number** RC09
Machine : Beretta T44 **Flush :** Water **Core Dia :** 68 mm **Method :** Rotary Cored	**Casing Diameter** 100mm cased to 5.20m	**Ground Level (mOD)**	**Client**	**Job Number** 8660-04-19
	Location	**Dates** 12/06/2019	**Engineer** DBFL	**Sheet** 1/1

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00										
	55	-					(0.90)	Soft to firm brown slightly sandy gravelly silty CLAY with occasional subangular to subrounded cobbles. Sand is fine to coarse. Gravel is angular to subangular fine to coarse		
							0.90			
							(1.80)	Soft to firm brown slightly sandy gravelly silty CLAY with occasional subangular to subrounded cobbles. Sand is fine to coarse. Gravel is angular to subangular fine to coarse		
2.20 2.20-2.64					5,6/6,7,10,27 SPT(C) 50/290					
2.70	66	15	11				2.70	Weak dark grey very fine to fine grained fossiliferous LIMESTONE with calcite veins interbedded with weak black very fine grained thinly laminated Mudstone. Distinctly weathered with clay smearing		
3.70	100	24	13	NI			(2.50)	2.70-5.20 - Non Intact		
5.20							5.20	Complete at 5.20m		

Remarks
Borehole backfilled upon completion

Scale (approx)	Logged By
1:50	MMC

Figure No. 8660-04-19.RC09

Ground Investigations Ireland Ltd
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Site Mill Road, Drogheda, Co. Meath			**Borehole Number** RC10
Machine : Beretta T44 **Flush :** Water **Core Dia :** 68 mm **Method :** Rotary Cored	**Casing Diameter** 100mm cased to 5.00m	**Ground Level (mOD)**	**Client**	**Job Number** 8660-04-19
	Location	**Dates** 13/06/2019	**Engineer** DBFL	**Sheet** 1/1

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00										
	36	-					(1.00)	Soft to firm brown slightly sandy gravelly silty CLAY with occasional subangular to subrounded cobbles. Sand is fine to coarse. Gravel is angular to subangular fine to coarse		
							1.00	Stiff brown slightly sandy gravelly silty CLAY with occasional subangular to subrounded cobbles. Sand is fine to coarse. Gravel is angular to subangular fine to coarse		
2.20 2.20-2.65	23	-			4,4/5,8,9,8 SPT(C) N=30		(2.70)			
3.70 3.70-3.70	92	45	15	15	25/50 SPT(C)		3.70 (1.30)	Weak to medium strong dark grey very fine to fine grained fossiliferous LIMESTONE interbedded with weak black very fine grained thinly laminated Mudstone. Partially weathered with clay smearing 3.70-5.00 - Two fracture sets. F1: Closely spaced sub-horizontal to 40 degrees, undulating rough. F2: Widely spaced sub-vertical to 85 degrees, undulating rough		
5.00							5.00	Complete at 5.00m		

Remarks
Borehole backfilled upon completion

Scale (approx)	Logged By
1:50	MMC

Figure No. 8660-04-19.RC10

Ground Investigations Ireland Ltd
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Site Mill Road, Drogheda, Co. Meath			**Borehole Number** RC11
Machine : Beretta T44 **Flush :** Water **Core Dia :** 68 mm **Method :** Rotary Cored	**Casing Diameter** 100mm cased to 5.00m	**Ground Level (mOD)**	**Client**	**Job Number** 8660-04-19
	Location	**Dates** 13/06/2019	**Engineer** DBFL	**Sheet** 1/1

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00										
	43						(1.00)	Soft to firm brown slightly sandy gravelly silty CLAY with occasional angular to subrounded cobbles. Sand is fine to coarse. Gravel is angular to angular fine to coarse		
							1.00			
							(1.00)	Firm to stiff brown slightly sandy gravelly silty CLAY with occasional angular to subrounded cobbles. Sand is fine to coarse. Gravel is angular to angular fine to coarse		
							2.00			
2.20 2.20-2.65	44				4,4/5,8,9,8 SPT(C) N=30		(1.70)	Stiff brown slightly sandy gravelly silty CLAY with occasional angular to subrounded cobbles. Sand is fine to coarse. Gravel is angular to subangular fine to coarse		
3.70 3.70-3.85	46				25/50 SPT(C) 25*/75 50/75		3.70 (1.30)	Stiff grey slightly sandy gravelly silty CLAY with occasional angular to subrounded cobbles. Sand is fine to coarse. Gravel is angular to subangular fine to coarse		
5.00							5.00	Complete at 5.00m		

Remarks
Borehole backfilled upon completion

Scale (approx)	Logged By
1:50	MMC

Figure No. 8660-04-19.RC11

Ground Investigations Ireland Ltd
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Site Mill Road, Drogheda, Co. Meath			**Borehole Number** RC12
Machine : Beretta T44 **Flush :** Water **Core Dia :** 68 mm **Method :** Rotary Cored	**Casing Diameter** 100mm cased to 5.00m	**Ground Level (mOD)**	**Client**	**Job Number** 8660-04-19
	Location	**Dates** 13/06/2019	**Engineer** DBFL	**Sheet** 1/1

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00	36	-			25/50 SPT(C) 25*/75 50/75		(2.20)	Poor Recovery: Driller notes soft to firm brown slightly sandy gravelly silty CLAY with subangular to subrounded cobbles and boulders. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.		
2.20 2.20-2.35	100	33	17	NI			2.20 (1.50)	Weak dark grey very fine to fine grained fossiliferous LIMESTONE with calcite veins. Destructed weathering with brown gravelly clay bands 2.20-3.70 - Non Intact		
3.70	77	54	50	8			3.70 (1.30)	Weak to medium strong very fine to fine grained fossiliferous LIMESTONE with calcite veins interbedded with weak black very fine laminated Mudstone. Partially weathered with black mud smearing 3.70-5.00 - Two fracture sets. F1: Close to medium spaced sub-horizontal to 20 degrees, undulating rough. F2: Widely spaced sub-vertical to 80 degrees, undulating rough		
5.00							5.00	Complete at 5.00m		

Remarks
Borehole backfilled upon completion

Scale (approx)	Logged By
1:50	MMC

Figure No. 8660-04-19.RC12

Ground Investigations Ireland Ltd
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Site Mill Road, Drogheda, Co. Meath			**Borehole Number** RC13
Machine : Beretta T44 **Flush :** Water **Core Dia :** 68 mm **Method :** Rotary Cored	**Casing Diameter** 100mm cased to 5.20m	**Ground Level (mOD)**	**Client**	**Job Number** 8660-04-19
	Location	**Dates** 13/06/2019	**Engineer** DBFL	**Sheet** 1/1

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00										
	43						(2.00)	Soft to firm brown sandy gravelly CLAY with occasional subangular to subrounded and cobbles. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse		
2.00							2.00			
2.20 2.20-2.58	100				6,9/10,12,28 SPT(C) 50/225		(1.35)	Very stif brown sandy gravelly CLAY with subangular to subrounded and boulders. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse		
3.35							3.35			
	73	32	30	12			(1.85)	Weak to medium strong dark grey very fine to fine fossiliferous LIMESTONE with calcite veins interbedded with weak black very fine laminated Mudstone. Partially to distinctly weathering with clay smearing 3.35-5.00 - Two fracture sets. F1: Close to medium spaced sub-horizontal to 20 degrees, undulating rough. F2: Widely spaced sub-vertical to 80 degrees, undulating rough		
5.20							5.20	Complete at 5.20m		

Remarks
Borehole backfilled upon completion

Scale (approx)	Logged By
1:50	MMC

Figure No. 8660-04-19.RC13

Mill Road, Drogheda
Rotary Core Photos

RC01

RC01

RC02


GROUND INVESTIGATIONS IRELAND
Client: DBFL
Site: DROGHEDA PORT - COLPE EAST
Borehole ref: RC02
Box No: 1 of 4
Job Ref: 8060-04-19
Date: 10-06-19
Depth: From 0.00 to 3.70
0.00
2.20
3.70

RC02


GROUND INVESTIGATIONS IRELAND
Client: DBFL
Site: DROGHEDA PORT - COLPE EAST
Borehole ref: RC02
Box No: 2 of 4
Job Ref: 8060-04-19
Date: 10-06-19
Depth: From 3.70 to 9.70
5.20
6.70
8.20
9.70

RC02


GROUND INVESTIGATIONS IRELAND
Client: DBFL
Site: DROGHEDA PORT - COLPE EAST
Borehole ref: RC02
Box No: 3 of 4
Job Ref: 8060-04-19
Date: 10-06-19
Depth: From 9.70 to 13.20
cm 10 20 30 40 50 60 70 80 90 100
11.20
12.50

RC02


GROUND INVESTIGATIONS IRELAND
Client: DBFL
Site: DROGHEDA PORT - COLPE EAST
Borehole ref: RC02
Box No: 4 of 4
Job Ref: 8060-04-19
Date: 10-06-19
Depth: From 13.20 to 15.60
cm 10 20 30 40 50 60 70 80 90 100
14.00
15.60

RC03


GROUND INVESTIGATIONS IRELAND
Client: DBFL
Site: DROGHEDA PORT - COLPE EAST
Borehole ref: RC03
Box No: 1 of 3
Job Ref: 8060-04-19
Date: 07-06-19
Depth: From 0.00 to 4.70
cm 10 20 30 40 50 60 70 80 90 100
0.00
2.20
3.70

RC03


GROUND INVESTIGATIONS IRELAND
Client: DBFL
Site: DROGHEDA PORT - COLPE EAST
Borehole ref: RC03
Box No: 2 of 3
Job Ref: 8060-04-19
Date: 07-06-19
Depth: From 4.70 to 7.70
cm 10 20 30 40 50 60 70 80 90 100
5.00
6.40

RC03


GROUND INVESTIGATIONS IRELAND
Client: DBFL
Site: Drogheda Port - Colpe East
Borehole ref: RC03
Box No: 3 of 3
Job Ref: 8060-04-19
Date: 07-06-19
Depth: From 7.70 to 9.10
cm 10 20 30 40 50 60 70 80 90 100
8.00
9.10

RC04


GROUND INVESTIGATIONS IRELAND
Client: DBFL
Site: Drogheda Port - Colpe East
Borehole ref: RC04
Box No: 1 of 2
Job Ref: 8060-04-19
Date: 11-06-19
Depth: From 0.00 to 5.20
cm 10 20 30 40 50 60 70 80 90 100
0.00
2.20
3.60
5.20

RC04


GROUND INVESTIGATIONS IRELAND
Client: DBFL
Site: Drogheda Rect - Colpe East
Borehole ref: RC04
Box No: 2 of 2
Job Ref: 8060-04-19
Date: 11-06-19
Depth: From 5.20 to 8.20
cm 10 20 30 40 50 60 70 80 90 100
6.70
8.20

RC05


GROUND INVESTIGATIONS IRELAND
Client: DBFL
Site: Drogheda Rect - Colpe East
Borehole ref: RC05
Box No: 1 of 3
Job Ref: 8060-04-19
Date: 06-06-19
Depth: From 0.00 to 6.70
cm 10 20 30 40 50 60 70 80 90 100
0.00
3.70
5.20
6.70

RC05


GROUND INVESTIGATIONS IRELAND
Client: DBFL
Site: DROGHEDA PORT - COLPE EAST
Borehole ref: RC05
Box No: 2 of 3
Job Ref: 8060-04-19
Date: 06-06-19
Depth: From 6.70 to 9.40
6.70
8.20

RC05


GROUND INVESTIGATIONS IRELAND
Client: DBFL
Site: DROGHEDA PORT - COLPE EAST
Borehole ref: RC05
Box No: 3 of 3
Job Ref: 8060-04-19
Date: 06-06-19
Depth: From 9.40 to 11.20
9.70
11.20

RC06


GROUND INVESTIGATIONS IRELAND
Client: DBFL
Site: DROGHEDA M1 - COLPE EAST
Borehole ref: RC06
Box No: 1 of 1
Job Ref: 8060-04-19
Date: 11-06-19
Depth: From 0.00 to 6.20
cm 10 20 30 40 50 60 70 80 90 100
0.00
2.20
3.70
5.20
6.20

RC07


GROUND INVESTIGATIONS IRELAND
Client: DBFL
Site: DROGHEDA M1 - COLPE EAST
Borehole ref: RC07
Box No: 1 of 1
Job Ref: 8060-04-19
Date: 12-06-19
Depth: From 0.00 to 3.70
cm 10 20 30 40 50 60 70 80 90 100
0.00
2.20
3.70
5.00

RC08


GROUND INVESTIGATIONS IRELAND
Colour Chart #14
Grey Scale #14
Client: DBFL
Job Ref: 8060-04-19
Site: DROGHEDA PORT - COLPE EAST
Date: 12-06-19
Borehole ref: RC08
Depth: From 0.00 to 4.00
Box No: 1 of 2
cm 10 20 30 40 50 60 70 80 90 100
0.00
2.20
4.00

RC08


GROUND INVESTIGATIONS IRELAND
Colour Chart #14
Grey Scale #14
Client: DBFL
Job Ref: 8060-04-19
Site: DROGHEDA PORT - COLPE EAST
Date: 12-06-19
Borehole ref: RC08
Depth: From 4.00 to 5.00
Box No: 2 of 2
cm 10 20 30 40 50 60 70 80 90 100
5.00

RC09


GROUND INVESTIGATIONS IRELAND
Client: DBFL
Site: DROGHEDA M1 - COLPE EAST
Borehole ref: RC09
Box No: 1 of 2
Job Ref: 8660-04-19
Date: 12-06-19
Depth: From 0.00 to 4.00
cm 10 20 30 40 50 60 70 80 90 100
2.30
3.70

RC09


GROUND INVESTIGATIONS IRELAND
Client: DBFL
Site: DROGHEDA M1 - COLPE EAST
Borehole ref: RC09
Box No: 2 of 2
Job Ref: 8660-04-19
Date: 12-06-19
Depth: From 4.00 to 5.20
cm 10 20 30 40 50 60 70 80 90 100
5.20

RC10


GROUND INVESTIGATIONS IRELAND
Client: DBFL
Site: Drogheda Port - Colpe East
Borehole ref: RC10
Box No: 1 of 1
Job Ref: 8060-04-19
Date: 13-06-19
Depth: From 0.00 to 5.00
cm 10 20 30 40 50 60 70 80 90 100
0.00
2.20
3.70
5.00

RC11


GROUND INVESTIGATIONS IRELAND
Client: DBFL
Site: Drogheda Port - Colpe East
Borehole ref: RC11
Box No: 1 of 1
Job Ref: 8060-04-19
Date: 13-06-19
Depth: From 0.00 to 5.00
cm 10 20 30 40 50 60 70 80 90 100
0.00
2.20
3.70
5.00

RC12


GROUND INVESTIGATIONS IRELAND
Client: DBFL
Site: DROGHEDA PORT - COLPE EAST
Borehole ref: RC12
Box No: 1 of 2
Job Ref: 8060-04-19
Date: 14-06-19
Depth: From 0.00 to 3.70
cm 10 20 30 40 50 60 70 80 90 100
000
220
370

RC12


GROUND INVESTIGATIONS IRELAND
Client: DBFL
Site: DROGHEDA PORT - COLPE EAST
Borehole ref: RC12
Box No: 2 of 2
Job Ref: 8060-04-19
Date: 14-06-19
Depth: From 3.70 to 5.00
cm 10 20 30 40 50 60 70 80 90 100
5.00

RC13


GROUND INVESTIGATIONS IRELAND
Client: DBFL
Site: DROGHEDA PORT - COLPE EAST
Borehole ref: RC13
Box No: 1 of 2
Job Ref: 8060-04-19
Date: 14-06-19
Depth: From 0.00 to 3.70
0.00
2.20
3.70

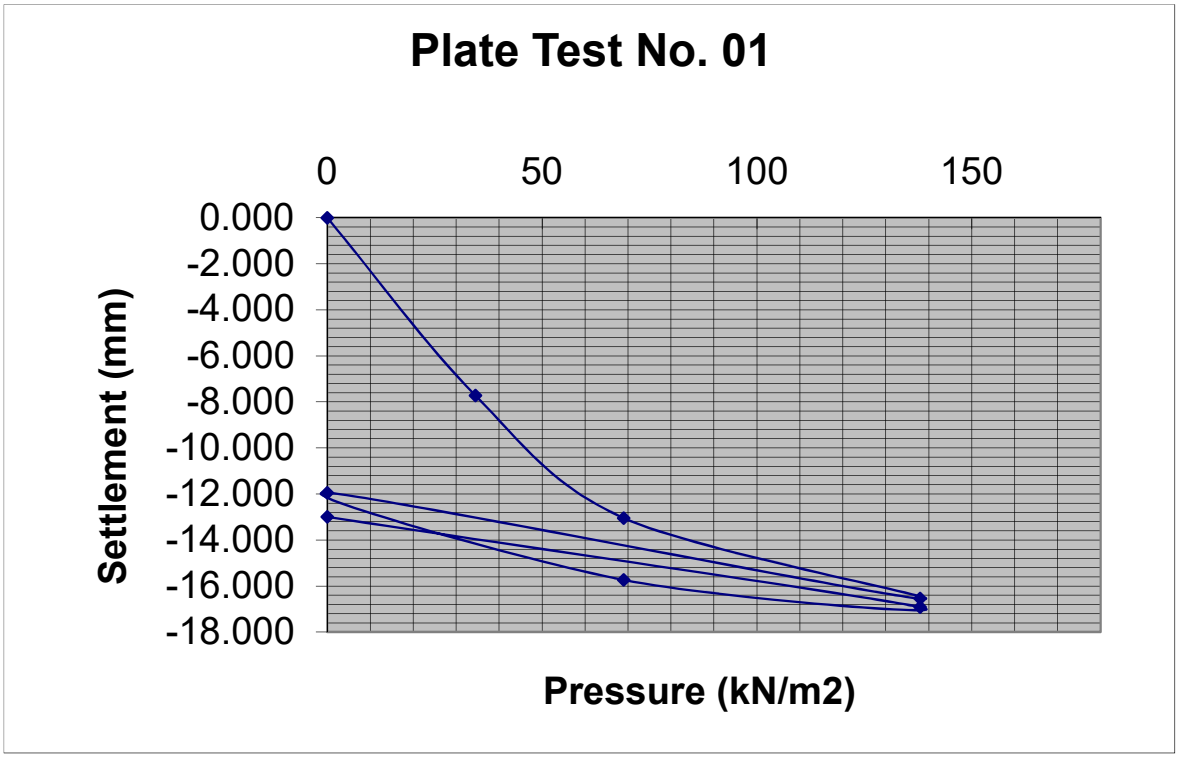
RC13


GROUND INVESTIGATIONS IRELAND
Client: DBFL
Site: DROGHEDA PORT - COLPE EAST
Borehole ref: RC13
Box No: 2 of 2
Job Ref: 8060-04-19
Date: 14-06-19
Depth: From 3.70 to 5.20
5.20

APPENDIX 5 – Plate Test Results

Applied Load	Gauge settlement
0	**0.000**
34.5	-7.73
69	-13.05
138	-16.55
0	-11.95
69	-15.74
138	-16.92
0	-13

LOCATION	Mill Road, Drogheda	**MATERIAL**	Brown slightly sandy slightly gravelly CLAY
CONTRACT NO.	8660-04-19		
DATE	01-03/05/2019		
CLIENT	DBFL	**DEPTH**	0.30m
PLATE DIAMETER	457mm	**NOTES**	
TEST NO.	Test 01	**SAMPLES**	



Modulus of subgrade reaction, K (Initial) = **3.57 MN/m2/m**

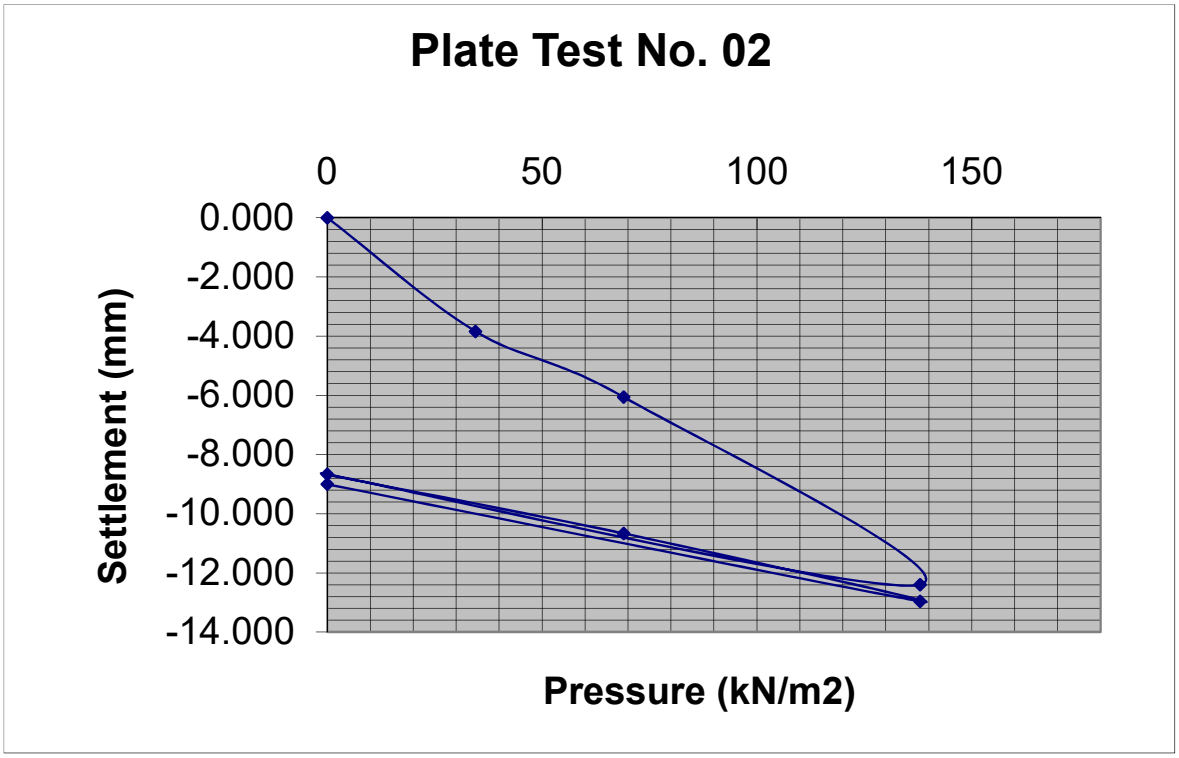
Modulus of subgrade reaction, K (Reload) = **12.30 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.09 %**

Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **0.75 %**

Applied Load	Gauge settlement
0	**0.000**
34.5	-3.84
69	-6.06
138	-12.4
0	-8.67
69	-10.67
138	-12.96
0	-9.01

LOCATION	Mill Road, Drogheda	**MATERIAL**	Dark brown slightly sandy slightly gravelly CLAY.
CONTRACT NO.	8660-04-19		
DATE	01-03/05/2019		
CLIENT	DBFL	**DEPTH**	0.30m
PLATE DIAMETER	457mm	**NOTES**	
TEST NO.	Test 02	**SAMPLES**	



Modulus of subgrade reaction, K (Initial) = **7.69 MN/m2/m**

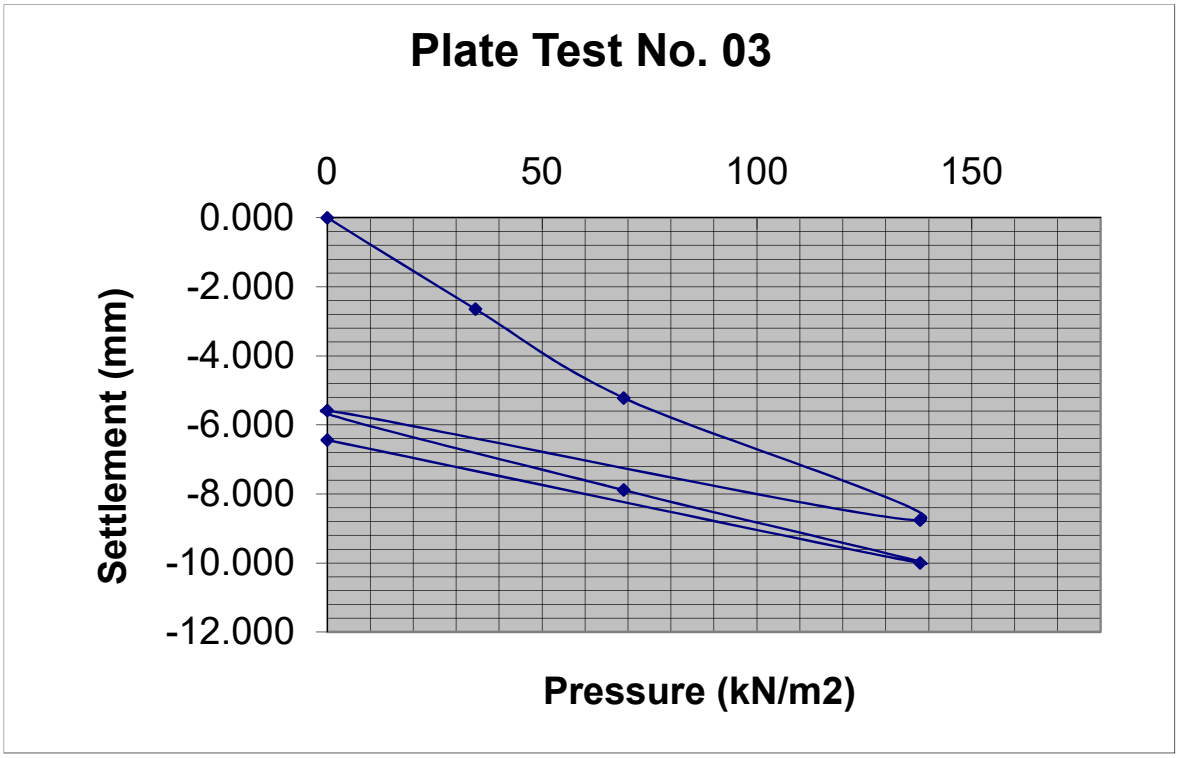
Modulus of subgrade reaction, K (Reload) = **23.31 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.33 %**

Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **2.26 %**

Applied Load	Gauge settlement
0	**0.000**
34.5	-2.65
69	-5.22
138	-8.76
0	-5.59
69	-7.89
138	-10
0	-6.44

LOCATION	Mill Road, Drogheda	**MATERIAL**	Brown slightly sandy slightly gravelly CLAY with occasional cobbles.
CONTRACT NO.	8660-04-19		
DATE	01-03/05/2019		
CLIENT	DBFL	**DEPTH**	0.30m
PLATE DIAMETER	457mm	**NOTES**	
TEST NO.	Test 03	**SAMPLES**	



Modulus of subgrade reaction, K (Initial) = **8.93 MN/m2/m**

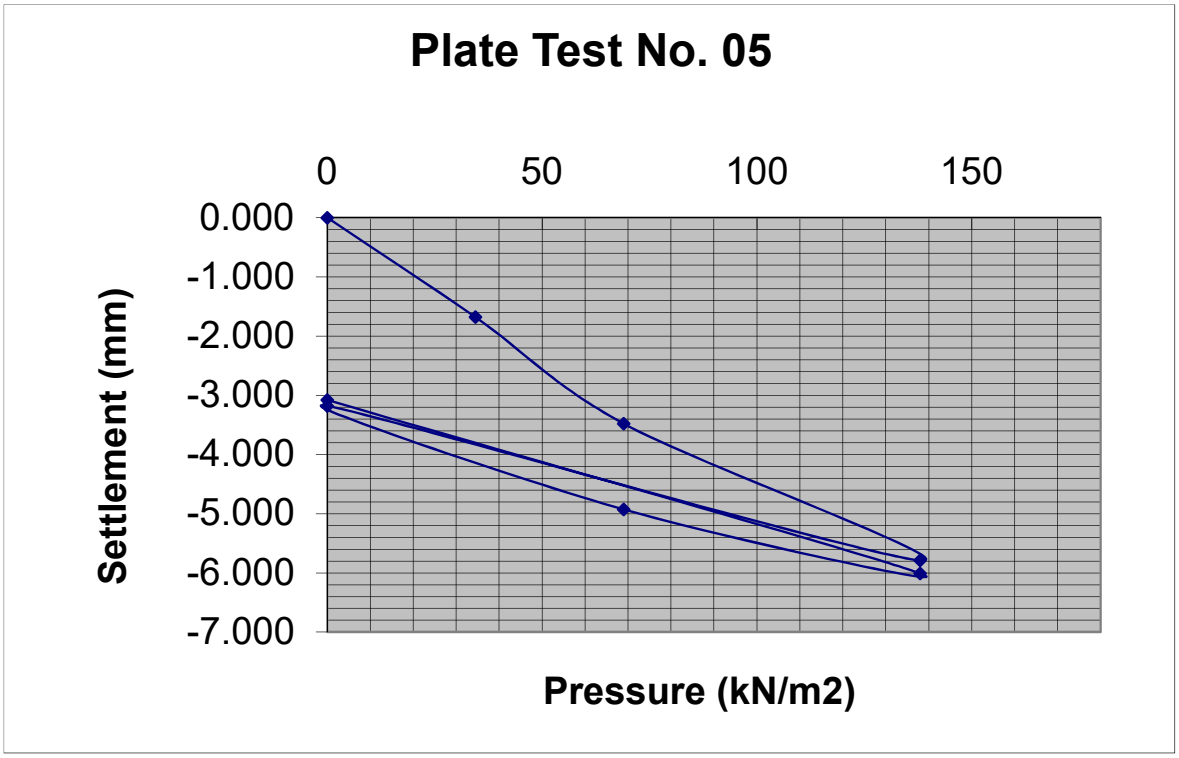
Modulus of subgrade reaction, K (Reload) = **20.27 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.43 %**

Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **1.77 %**

Applied Load	Gauge settlement
0	**0.000**
34.5	-1.68
69	-3.48
138	-5.79
0	-3.18
69	-4.93
138	-6.01
0	-3.08

LOCATION	Mill Road, Drogheda	**MATERIAL**	Brown slightly sandy slightly gravelly CLAY
CONTRACT NO.	8660-04-19		
DATE	01-03/05/2019		
CLIENT	DBFL	**DEPTH**	0.30m
PLATE DIAMETER	457mm	**NOTES**	
TEST NO.	Test 05	**SAMPLES**	



Modulus of subgrade reaction, K (Initial) = **13.40 MN/m2/m**

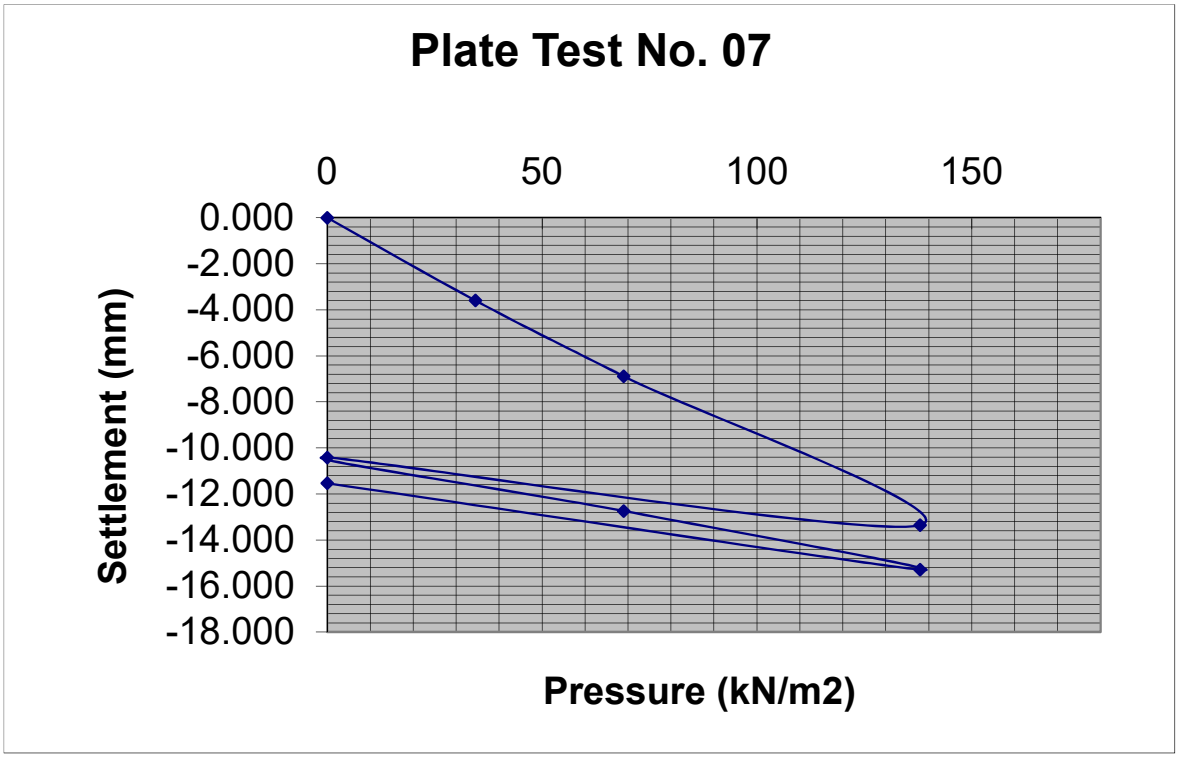
Modulus of subgrade reaction, K (Reload) = **26.64 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.87 %**

Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **2.85 %**

Applied Load	Gauge settlement
0	**0.000**
34.5	-3.6
69	-6.89
138	-13.36
0	-10.42
69	-12.74
138	-15.29
0	-11.54

LOCATION	Mill Road, Drogheda	**MATERIAL**	Brown slightly sandy slightly gravelly CLAY
CONTRACT NO.	8660-04-19		
DATE	01-03/05/2019		
CLIENT	DBFL	**DEPTH**	0.30m
PLATE DIAMETER	457mm	**NOTES**	
TEST NO.	Test 07	**SAMPLES**	



Modulus of subgrade reaction, K (Initial) = **6.77 MN/m2/m**

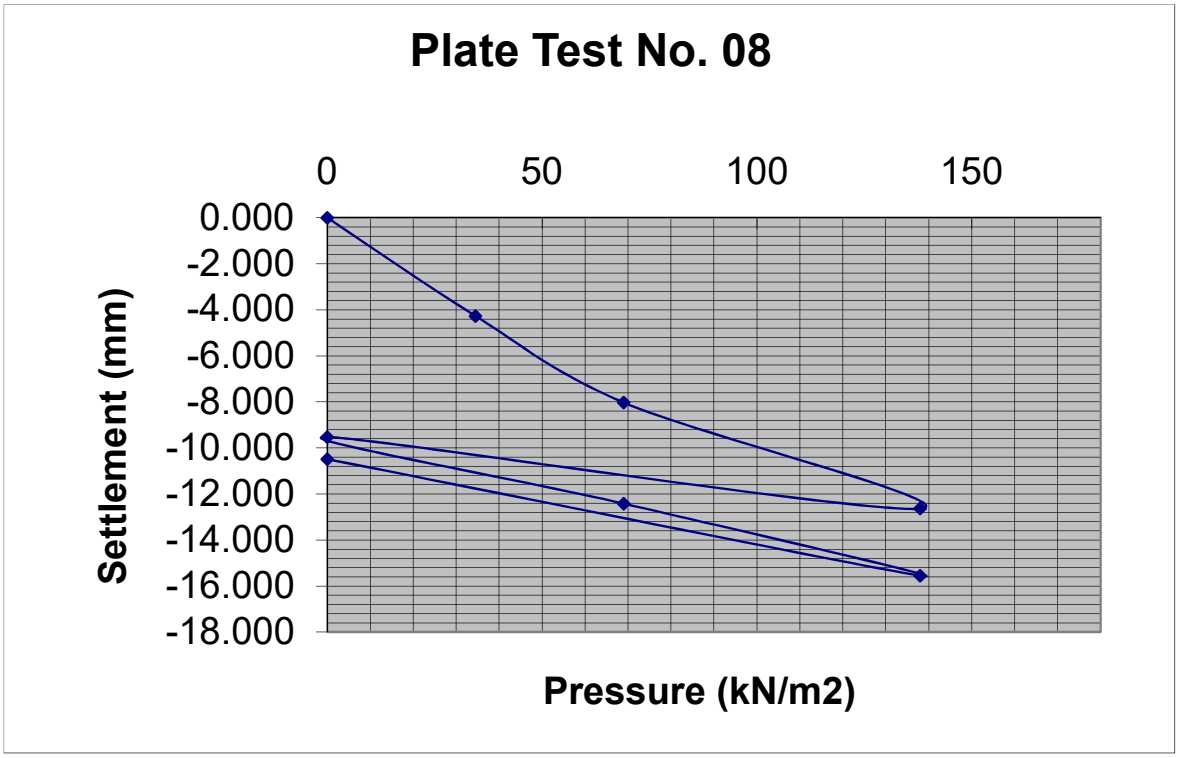
Modulus of subgrade reaction, K (Reload) = **20.10 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.27 %**

Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **1.75 %**

Applied Load	Gauge settlement
0	**0.000**
34.5	-4.27
69	-8.03
138	-12.64
0	-9.53
69	-12.42
138	-15.55
0	-10.49

LOCATION	Mill Road, Drogheda	**MATERIAL**	Brown slightly sandy slightly gravelly CLAY
CONTRACT NO.	8660-04-19		
DATE	01-03/05/2019		
CLIENT	DBFL	**DEPTH**	0.30m
PLATE DIAMETER	457mm	**NOTES**	
TEST NO.	Test 08	**SAMPLES**	



Modulus of subgrade reaction, K (Initial) = **5.81 MN/m2/m**

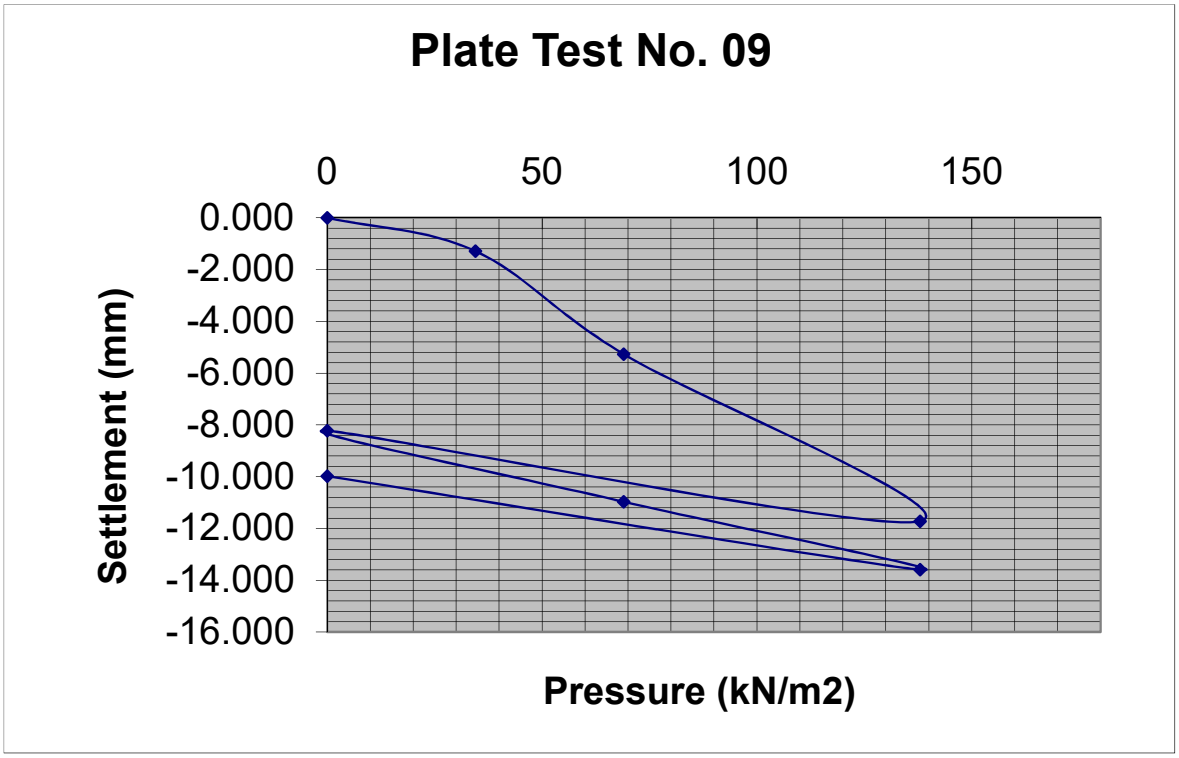
Modulus of subgrade reaction, K (Reload) = **16.13 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.20 %**

Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **1.19 %**

Applied Load	Gauge settlement
0	**0.000**
34.5	-1.29
69	-5.27
138	-11.72
0	-8.23
69	-10.97
138	-13.59
0	-9.98

LOCATION	Mill Road, Drogheda	**MATERIAL**	Brown slightly sandy slightly gravelly CLAY
CONTRACT NO.	8660-04-19		
DATE	01-03/05/2019		
CLIENT	DBFL	**DEPTH**	0.30m
PLATE DIAMETER	457mm	**NOTES**	
TEST NO.	Test 09	**SAMPLES**	



Modulus of subgrade reaction, K (Initial) = **8.85 MN/m2/m**

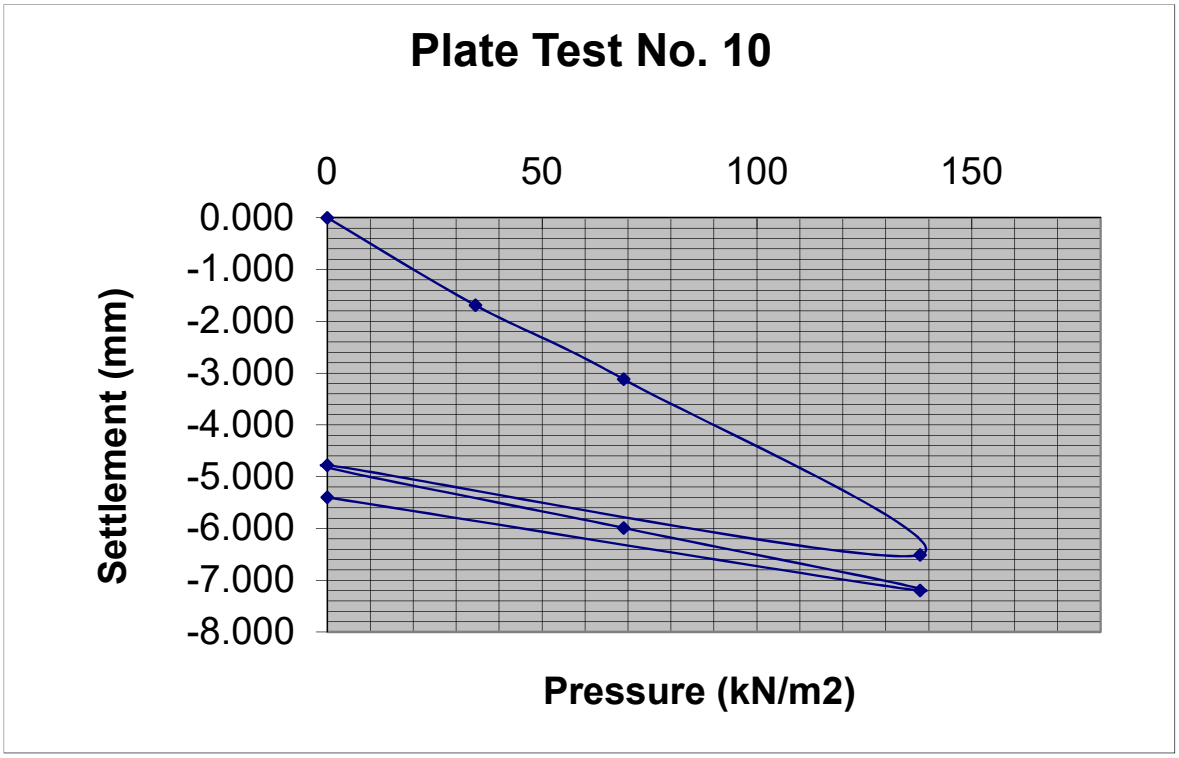
Modulus of subgrade reaction, K (Reload) = **17.02 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.42 %**

Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **1.31 %**

Applied Load	Gauge settlement
0	**0.000**
34.5	-1.69
69	-3.12
138	-6.51
0	-4.78
69	-5.99
138	-7.2
0	-5.4

LOCATION	Mill Road, Drogheda	**MATERIAL**	Stripped
CONTRACT NO.	8660-04-19		
DATE	01-03/05/2019		
CLIENT	DBFL	**DEPTH**	0.30m
PLATE DIAMETER	457mm	**NOTES**	
TEST NO.	Test 10	**SAMPLES**	



Modulus of subgrade reaction, K (Initial) = **14.94 MN/m2/m**

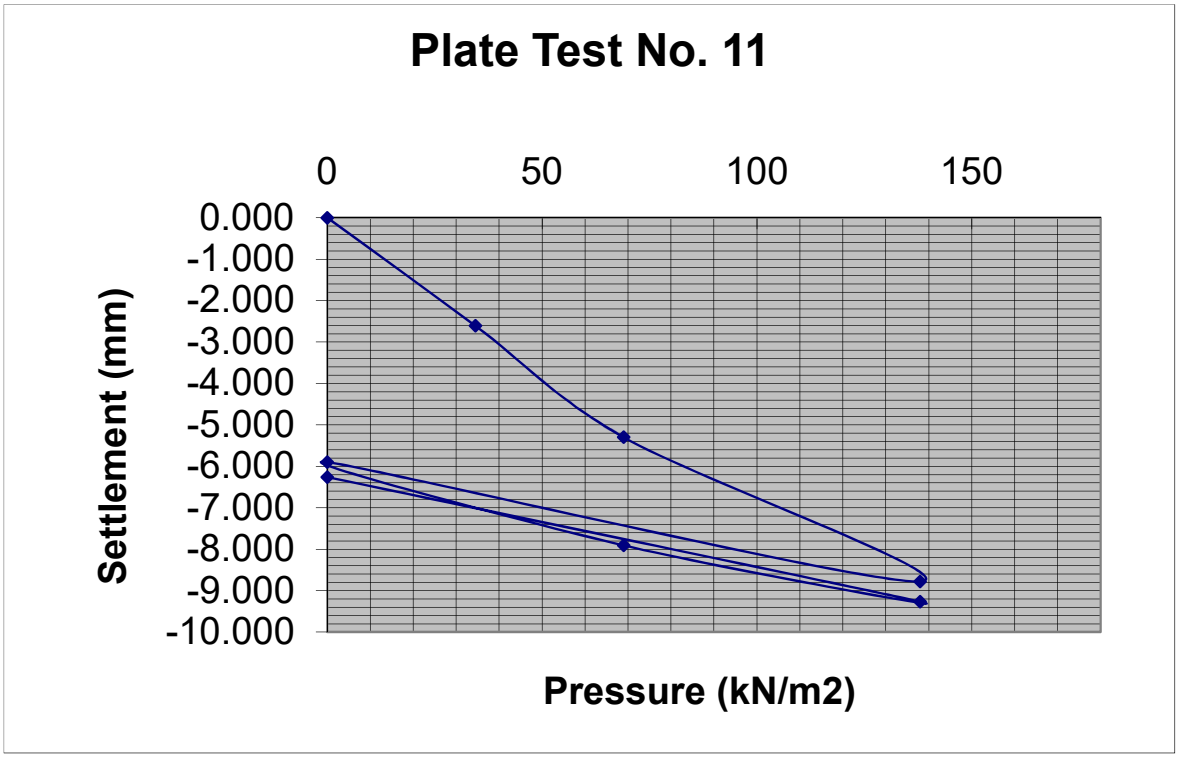
Modulus of subgrade reaction, K (Reload) = **38.53 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **1.05 %**

Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **5.40 %**

Applied Load	Gauge settlement
0	**0.000**
34.5	-2.61
69	-5.3
138	-8.78
0	-5.9
69	-7.91
138	-9.27
0	-6.26

LOCATION	Mill Road, Drogheda	**MATERIAL**	Brown slightly sandy slightly gravelly CLAY
CONTRACT NO.	8660-04-19		
DATE	01-03/05/2019		
CLIENT	DBFL	**DEPTH**	0.20m
PLATE DIAMETER	457mm	**NOTES**	
TEST NO.	Test 11	**SAMPLES**	



Modulus of subgrade reaction, K (Initial) = **8.80 MN/m2/m**

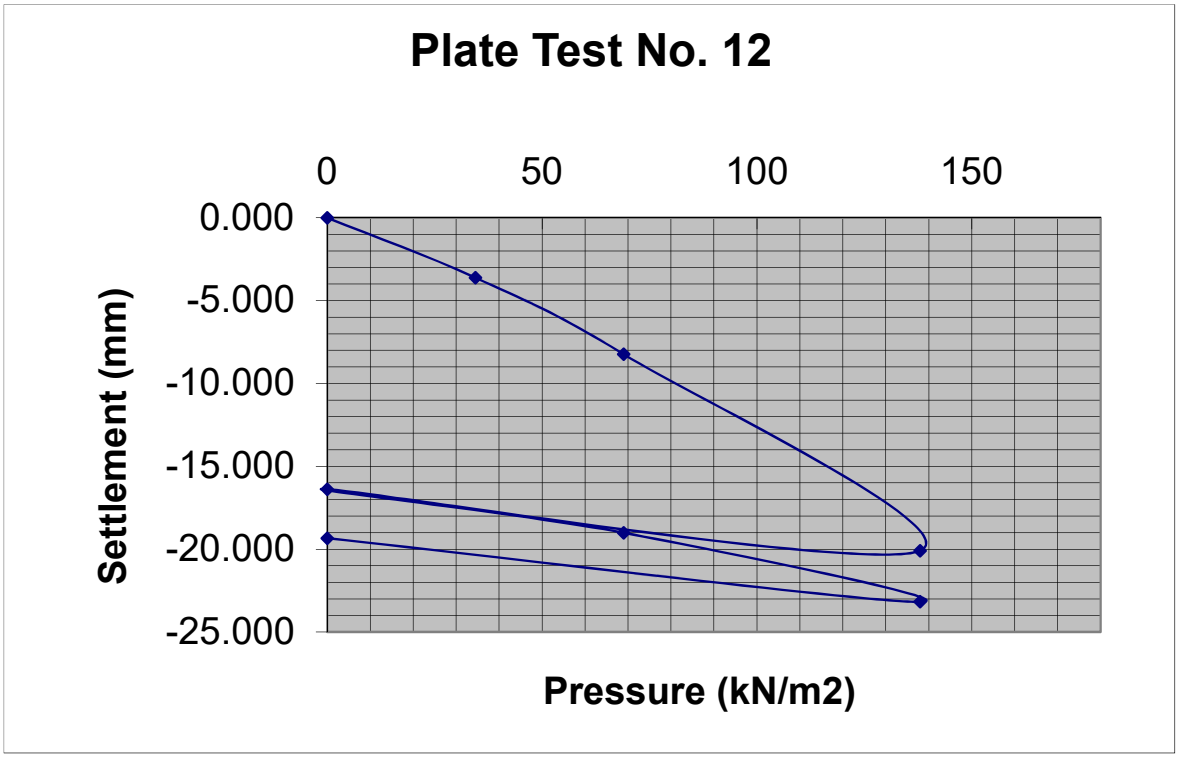
Modulus of subgrade reaction, K (Reload) = **23.20 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.42 %**

Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **2.24 %**

Applied Load	Gauge settlement
0	**0.000**
34.5	-3.62
69	-8.24
138	-20.09
0	-16.38
69	-19.01
138	-23.18
0	-19.34

LOCATION	Mill Road, Drogheda	**MATERIAL**	Brown slightly sandy slightly gravelly CLAY
CONTRACT NO.	8660-04-19		
DATE	01-03/05/2019		
CLIENT	DBFL	**DEPTH**	0.20m
PLATE DIAMETER	457mm	**NOTES**	
TEST NO.	Test 12	**SAMPLES**	



Modulus of subgrade reaction, K (Initial) = **5.66 MN/m2/m**

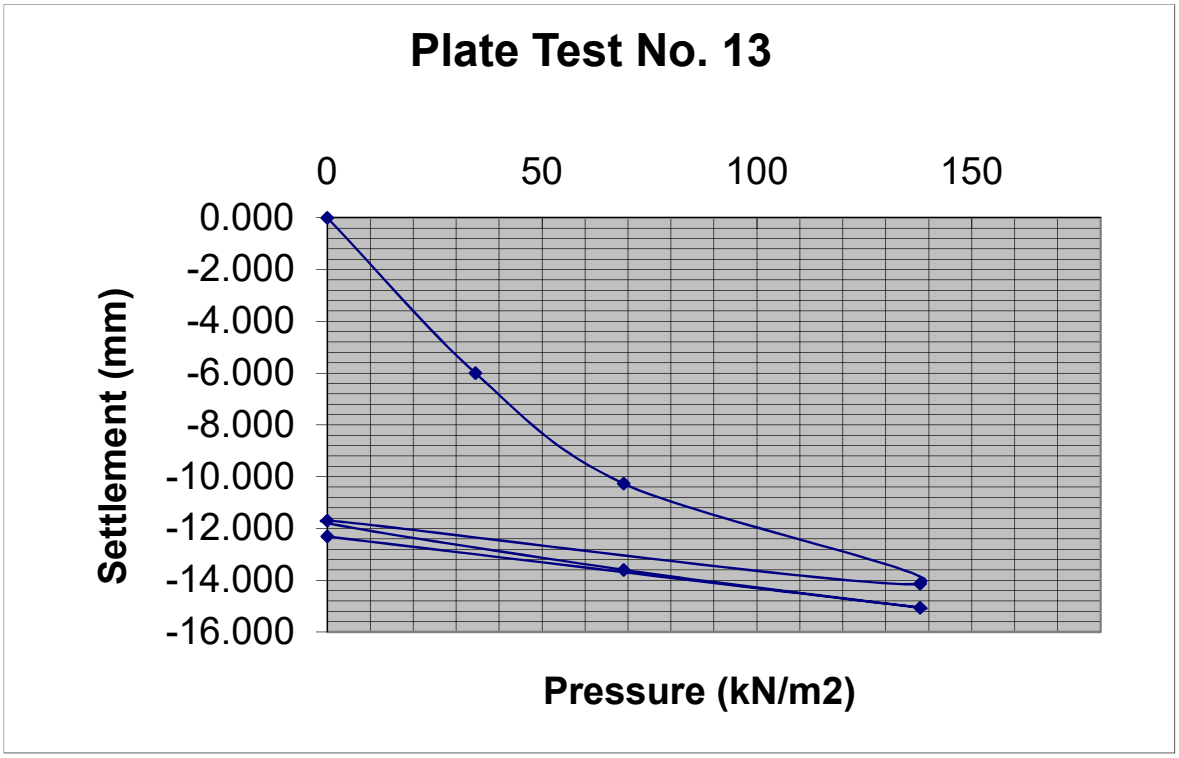
Modulus of subgrade reaction, K (Reload) = **17.73 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.19 %**

Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **1.41 %**

Applied Load	Gauge settlement
0	**0.000**
34.5	-6
69	-10.27
138	-14.14
0	-11.7
69	-13.6
138	-15.06
0	-12.31

LOCATION	Mill Road, Drogheda	**MATERIAL**	Brown slightly sandy slightly gravelly CLAY
CONTRACT NO.	8660-04-19		
DATE	01-03/05/2019		
CLIENT	DBFL	**DEPTH**	0.30m
PLATE DIAMETER	457mm	**NOTES**	
TEST NO.	Test 13	**SAMPLES**	



Modulus of subgrade reaction, K (Initial) = **4.54 MN/m2/m**

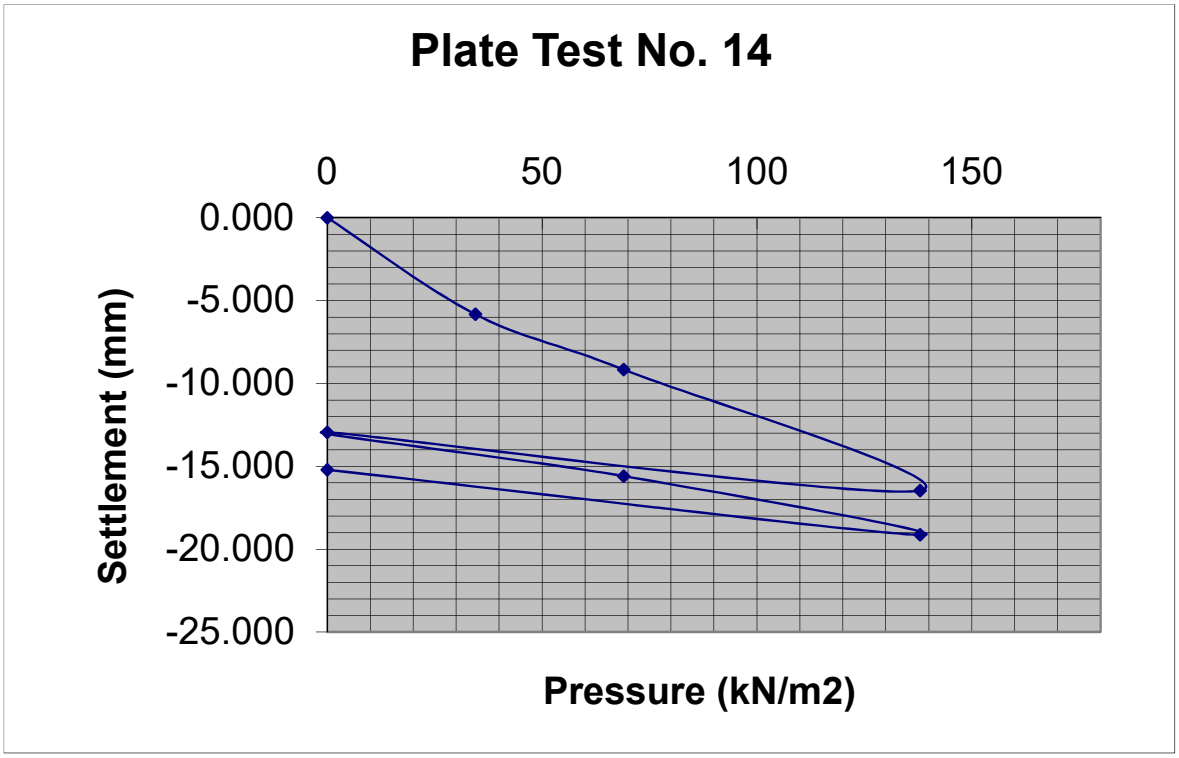
Modulus of subgrade reaction, K (Reload) = **24.54 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.13 %**

Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **2.47 %**

Applied Load	Gauge settlement
0	**0.000**
34.5	-5.83
69	-9.17
138	-16.46
0	-12.95
69	-15.59
138	-19.14
0	-15.21

LOCATION	Mill Road, Drogheda	**MATERIAL**	Brown slightly sandy slightly gravelly CLAY
CONTRACT NO.	8660-04-19		
DATE	01-03/05/2019		
CLIENT	DBFL	**DEPTH**	0.30m
PLATE DIAMETER	457mm	**NOTES**	
TEST NO.	Test 14	**SAMPLES**	



Modulus of subgrade reaction, K (Initial) = **5.08 MN/m2/m**

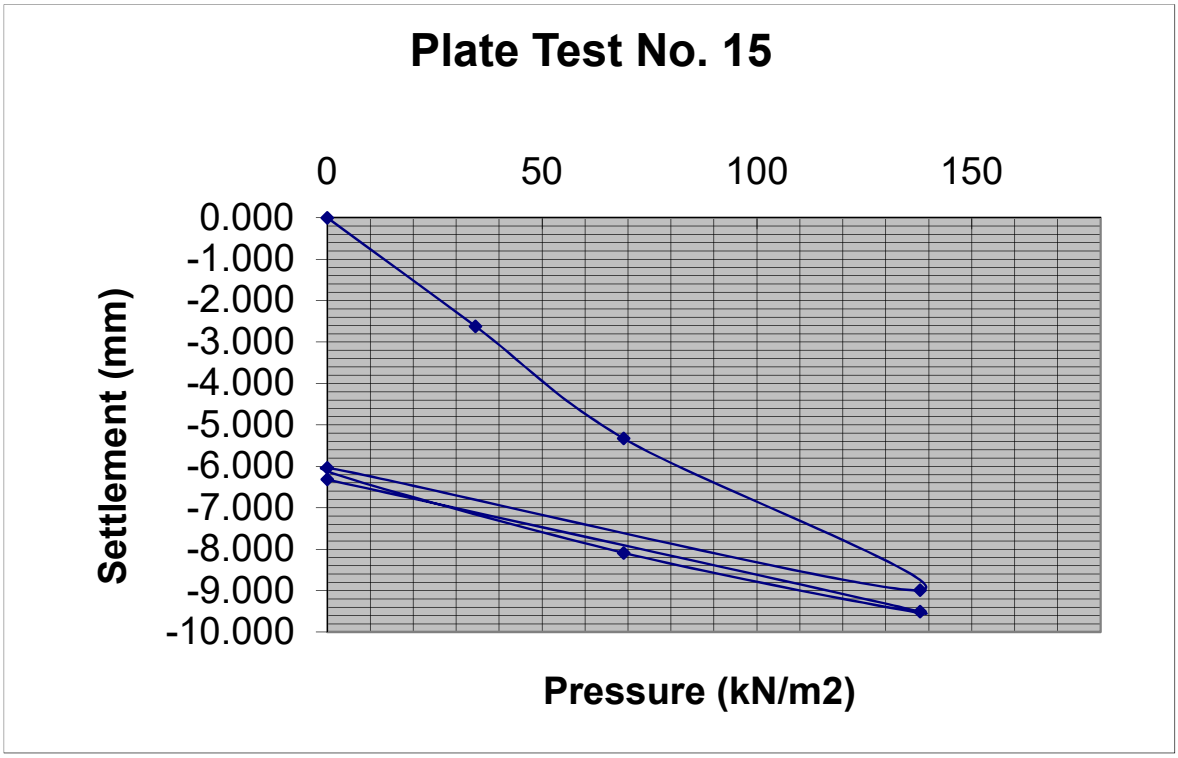
Modulus of subgrade reaction, K (Reload) = **17.66 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.16 %**

Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **1.40 %**

Applied Load	Gauge settlement
0	**0.000**
34.5	-2.62
69	-5.33
138	-8.99
0	-6.04
69	-8.09
138	-9.51
0	-6.32

LOCATION	Mill Road, Drogheda	**MATERIAL**	Brown slightly sandy slightly gravelly CLAY
CONTRACT NO.	8660-04-19		
DATE	01-03/05/2019		
CLIENT	DBFL	**DEPTH**	0.30m
PLATE DIAMETER	457mm	**NOTES**	
TEST NO.	Test 15	**SAMPLES**	



Modulus of subgrade reaction, K (Initial) = **8.75 MN/m2/m**

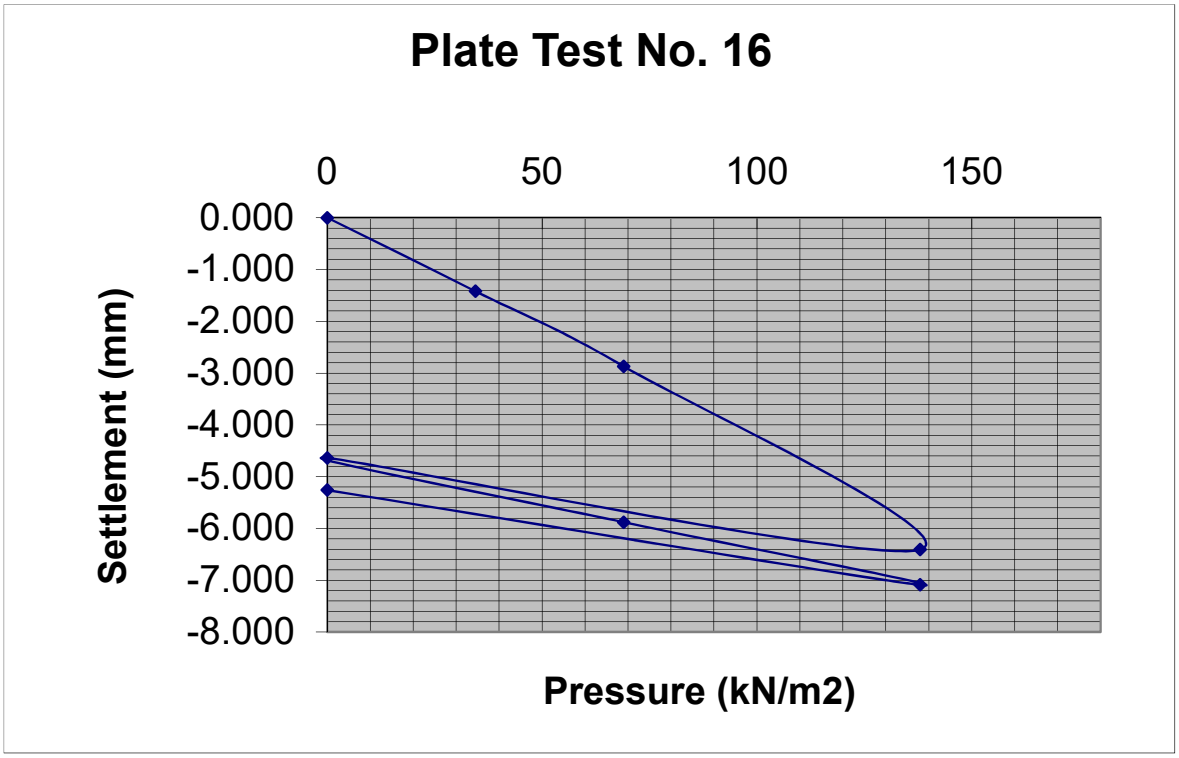
Modulus of subgrade reaction, K (Reload) = **22.74 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.41 %**

Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **2.17 %**

Applied Load	Gauge settlement
0	**0.000**
34.5	-1.42
69	-2.87
138	-6.41
0	-4.64
69	-5.88
138	-7.09
0	-5.26

LOCATION	Mill Road, Drogheda	**MATERIAL**	Brown slightly sandy slightly gravelly CLAY
CONTRACT NO.	8660-04-19		
DATE	01-03/05/2019		
CLIENT	DBFL	**DEPTH**	0.30m
PLATE DIAMETER	457mm	**NOTES**	
TEST NO.	Test 16	**SAMPLES**	



Modulus of subgrade reaction, K (Initial) = **16.25 MN/m2/m**

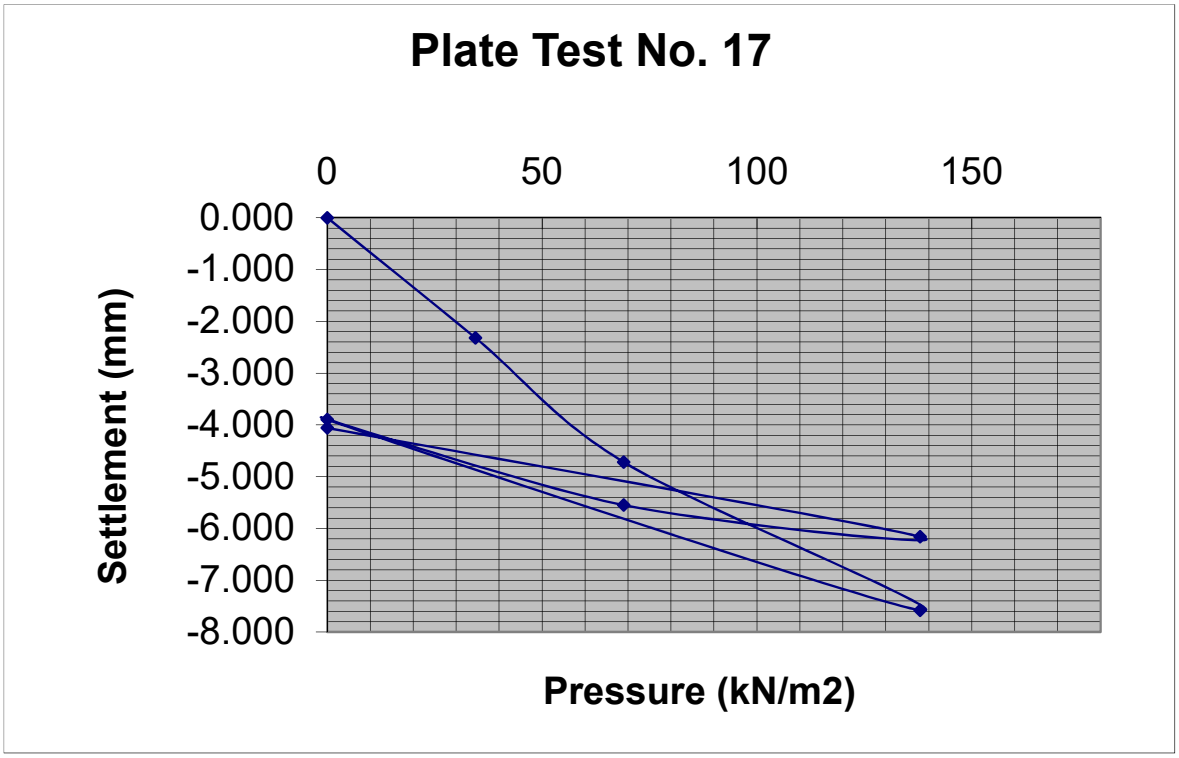
Modulus of subgrade reaction, K (Reload) = **37.60 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **1.21 %**

Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **5.18 %**

Applied Load	Gauge settlement
0	**0.000**
34.5	-2.32
69	-4.72
138	-7.58
0	-3.9
69	-5.55
138	-6.16
0	-4.06

LOCATION	Mill Road, Drogheda	**MATERIAL**	Brown slightly sandy slightly gravelly CLAY
CONTRACT NO.	8660-04-19		
DATE	01-03/05/2019		
CLIENT	DBFL	**DEPTH**	0.30m
PLATE DIAMETER	457mm	**NOTES**	
TEST NO.	Test 17	**SAMPLES**	



Modulus of subgrade reaction, K (Initial) = **9.88 MN/m2/m**

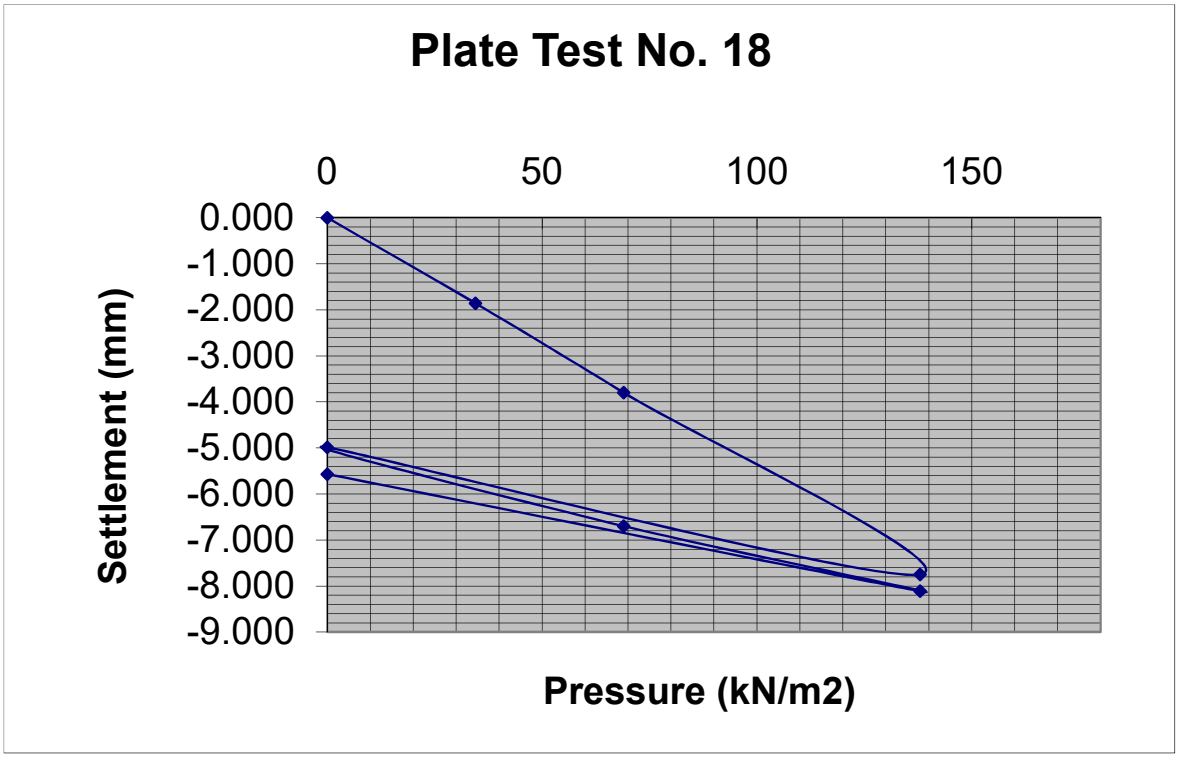
Modulus of subgrade reaction, K (Reload) = **28.26 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.51 %**

Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **3.16 %**

Applied Load	Gauge settlement
0	**0.000**
34.5	-1.86
69	-3.8
138	-7.75
0	-4.99
69	-6.7
138	-8.11
0	-5.57

LOCATION	Mill Road, Drogheda	**MATERIAL**	Brown slightly sandy slightly gravelly CLAY
CONTRACT NO.	8660-04-19		
DATE	01-03/05/2019		
CLIENT	DBFL	**DEPTH**	0.30m
PLATE DIAMETER	457mm	**NOTES**	
TEST NO.	Test 18	**SAMPLES**	



Modulus of subgrade reaction, K (Initial) = **12.27 MN/m2/m**

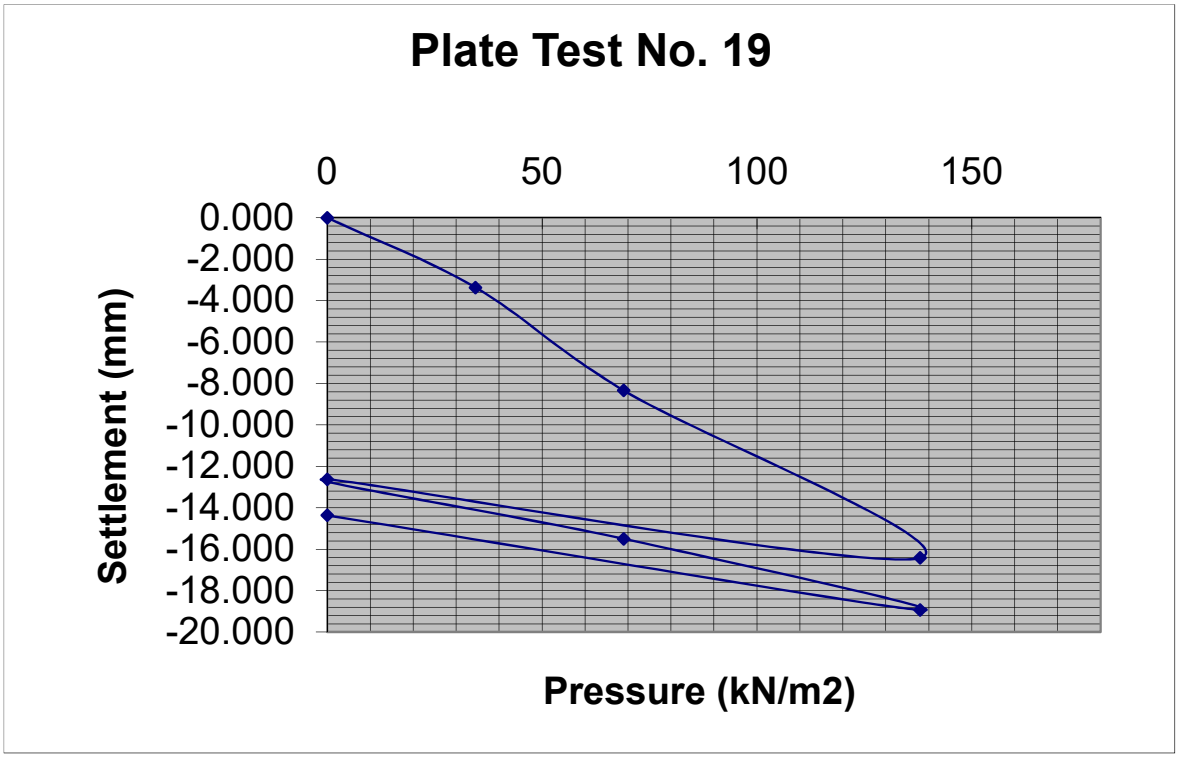
Modulus of subgrade reaction, K (Reload) = **27.27 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.74 %**

Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **2.97 %**

Applied Load	Gauge settlement
0	**0.000**
34.5	-3.37
69	-8.34
138	-16.42
0	-12.63
69	-15.5
138	-18.94
0	-14.37

LOCATION	Mill Road, Drogheda	**MATERIAL**	Brown slightly sandy slightly gravelly CLAY
CONTRACT NO.	8660-04-19		
DATE	01-03/05/2019		
CLIENT	DBFL	**DEPTH**	0.30m
PLATE DIAMETER	457mm	**NOTES**	
TEST NO.	Test 19	**SAMPLES**	



Modulus of subgrade reaction, K (Initial) = **5.59 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **16.25 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.19 %**

Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **1.21 %**

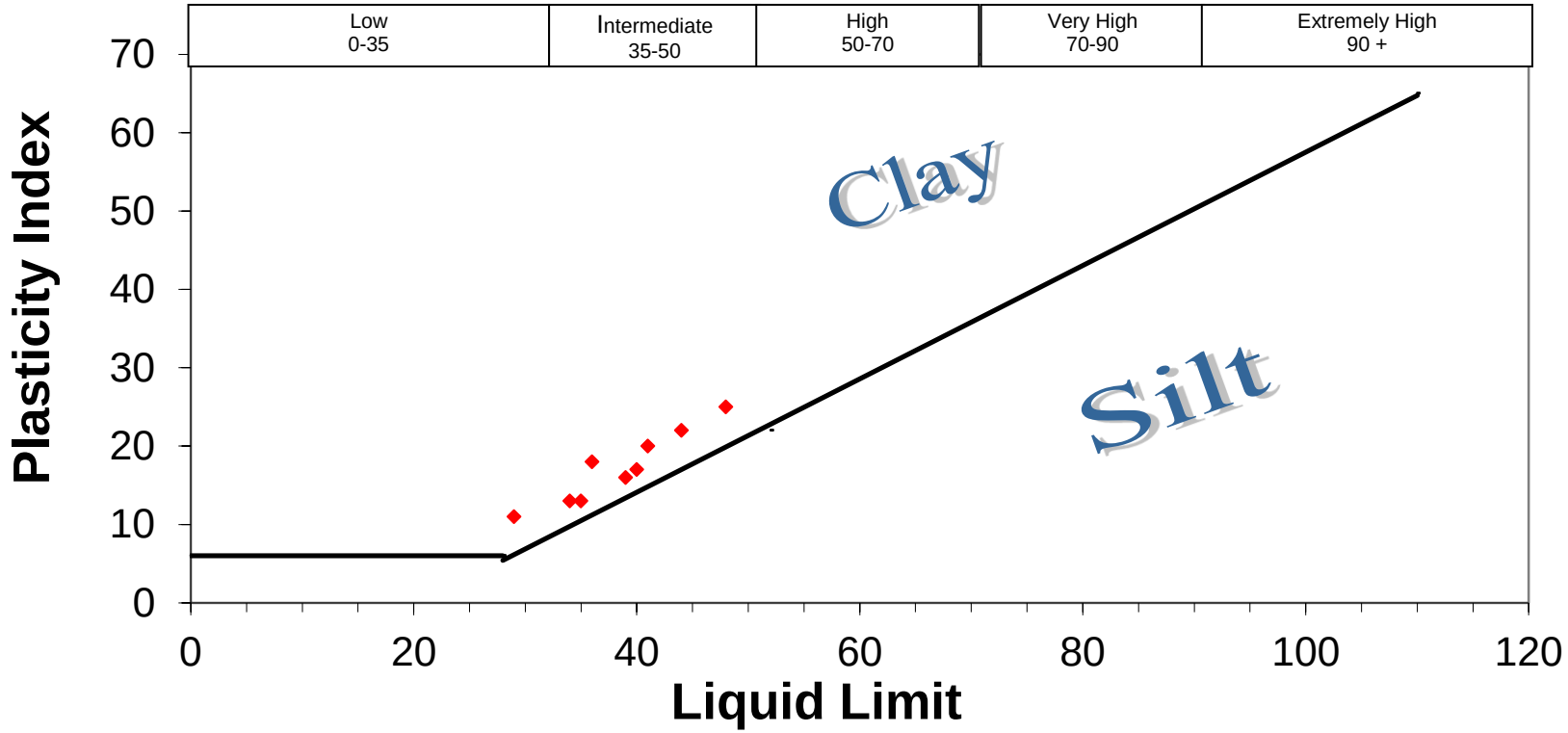
APPENDIX 6 – Laboratory Testing

National Materials Testing Laboratory Ltd.

SUMMARY OF TEST RESULTS

				Particle			Index Properties		Bulk	Cell	Undrained Triaxial Tests		Lab	
BH/TP	Depth	sample	Moisture	Density	<425um	LL	PL	PI	Density	Presssure	Compressive	Strain at	Vane	Remarks
No	m	No.	%	Mg/m3	%	%	%	%	Mg/m3	kPa	Stress kPa	Failure %	kPa	
TP01	0.50	B	20.5	2.64	21.9	40	23	17						
TP02	0.50	B	30.6	2.59	86.2	48	23	25						
TP03	1.00	B	22.2	2.63	85.7	39	23	16						
TP06	0.50	B	15.3	2.67	67.5	44	22	22						
TP07	0.50	B	21.3	2.65	69.1	41	21	20						
TP08	0.50	B	16.7	2.64	82.4	29	18	11						
TP09	0.50	B	25.2	2.67	71.8	34	21	13						
TP11	0.50	B	18.6	2.63	73.1	36	18	18						
TP12	0.50	B	19.8	2.63	71.3	35	22	13						
NMTL		Notes :									Job ref No.	NMTL	GII Project ID:	8660-04-19
		1. All BS tests carried out using preferred (definitive) method unless otherwise stated.									Location	Mill Road, Drogheda		

NMTL LTD	**Contract:** Mill Road, Drogheda
Unit 18c, Tullow Industrial Estate	**Client:** Ground Investigations Ireland Ltd
Tullow	**Engineer:** Aisling McDonnell
County Carlow	**GII Project ID** 8660-04-19
Tel: 00353 59 9180822	**Date:** 09/07/2019
Mob: 00353 872575508	**Tested By:** Sb **Checked:** Bc
billa@nmtl.ie	**Job ref No.** NMTL

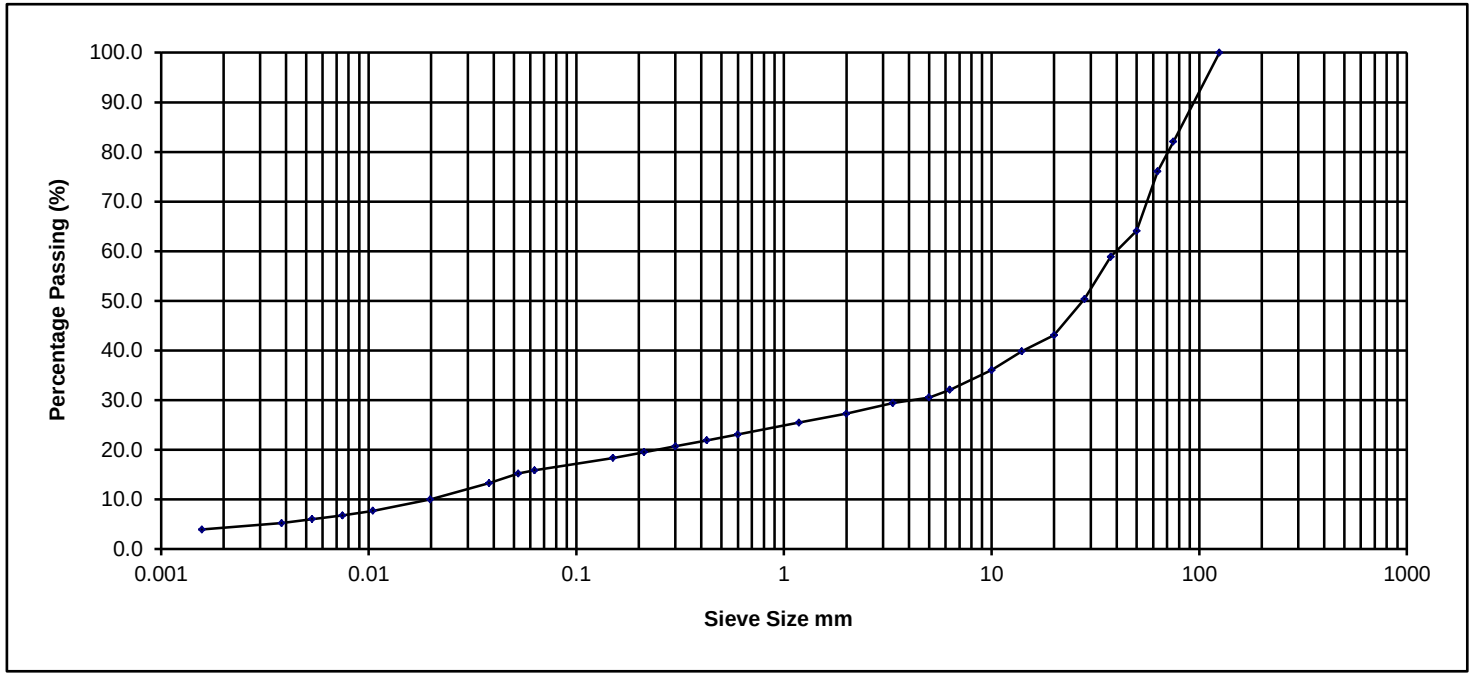


NMTL Ltd

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5

Sieve Size mm	% Passing
125.000	100.0
75.000	82.1
63.000	76.1
50.000	64.1
37.500	58.9
28.000	50.4
20.000	43.1
14.000	39.8
10.000	36.0
6.300	32.1
5.000	30.5
3.350	29.4
2.000	27.3
1.180	25.5
0.600	23.1
0.425	21.9
0.300	20.7
0.212	19.5
0.150	18.4
0.063	15.9
0.053	15.2
0.038	13.3
0.020	10.0
0.010	7.7
0.007	6.8
0.005	6.1
0.004	5.2
0.002	3.9



Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
		Silt			Sand			Gravel			
3.9		11.9			11.4			48.8		23.9	0.0

Sample Description	Grey brown sandy clayey/silty fine to coarse GRAVEL with many cobbles.	Project No.	NMTL 2932
		BH/TP No.	TP01
Project	Mill Road, Drogheda GII PROJECT ID: 8660-04-19	Sample No.	B
Operator Tzr	Checked Nc / Approved Bc / Date sample tested 25/06/2019	Depth	0.50m

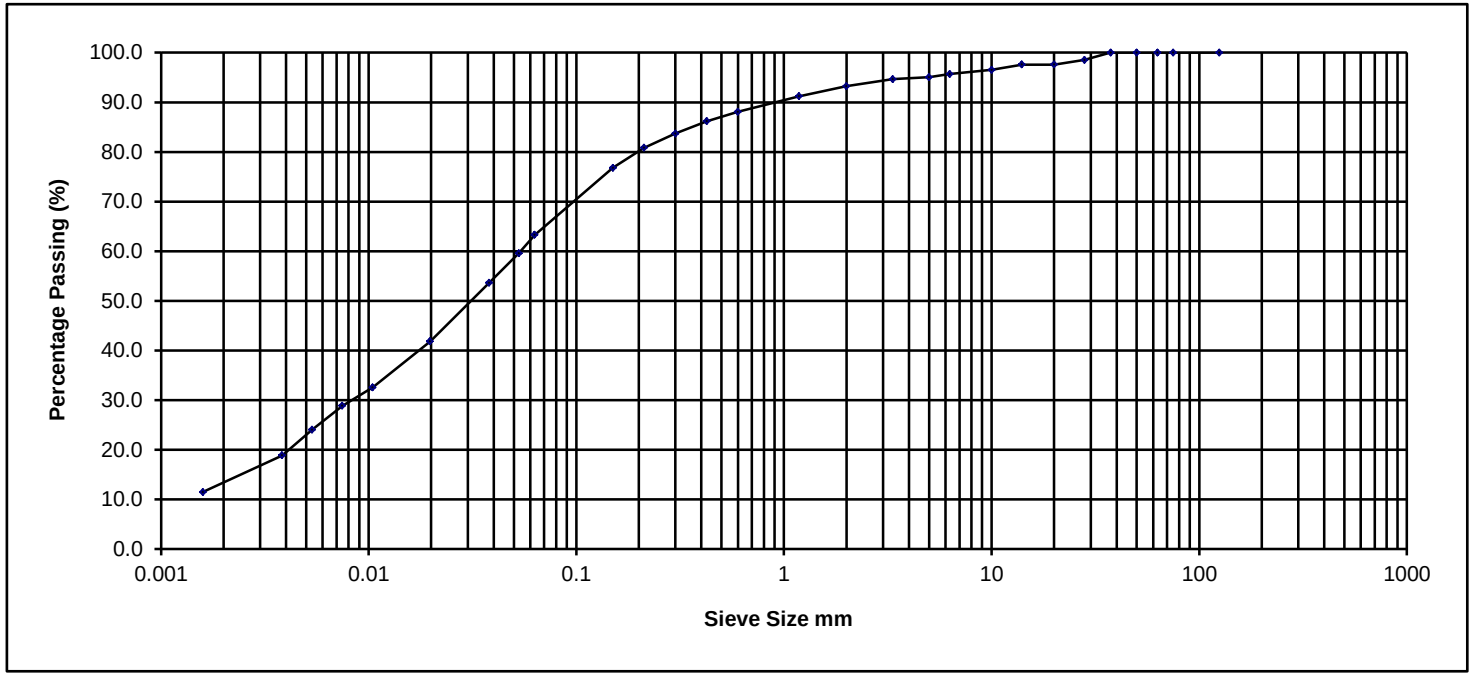
NM TL Ltd

NMTL Ltd

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	100.0
37.500	100.0
28.000	98.5
20.000	97.6
14.000	97.6
10.000	96.5
6.300	95.7
5.000	95.0
3.350	94.7
2.000	93.3
1.180	91.2
0.600	88.1
0.425	86.2
0.300	83.7
0.212	80.8
0.150	76.8
0.063	63.3
0.053	59.6
0.038	53.7
0.020	41.8
0.010	32.6
0.007	28.9
0.005	24.1
0.004	18.9
0.002	11.5



Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
		Silt			Sand			Gravel			
11.5		51.8			30.0			6.7		0.0	0.0

Sample Description	Brown slightly sandy slightly gravelly silty CLAY.					Project No.	NMTL 2932
						BH/TP No.	TP02
Project	Mill Road, Drogheda			GII PROJECT ID: 8660-04-19		Sample No.	B
Operator	Tzr	Checked	Nc	Approved	Bc	Depth	0.50m

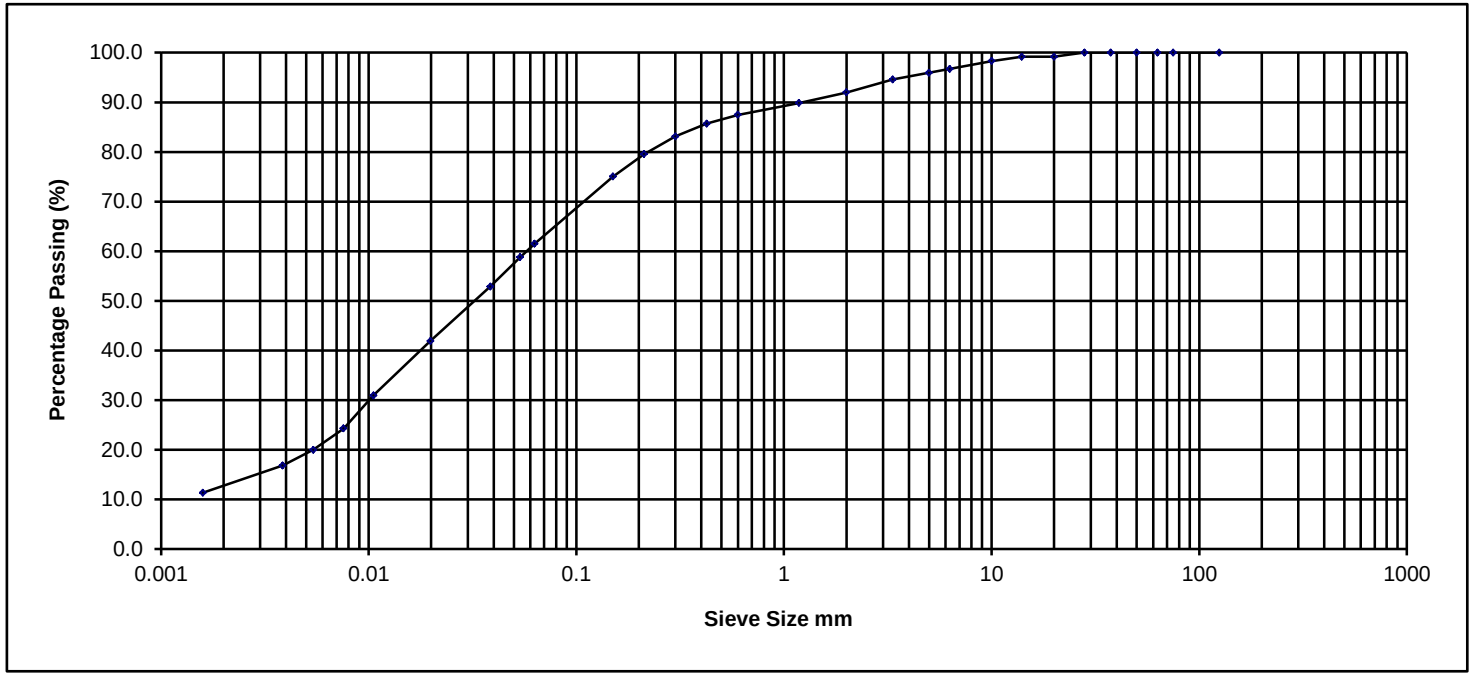
Date sample tested 26/06/2019

NMTL Ltd

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	100.0
37.500	100.0
28.000	100.0
20.000	99.2
14.000	99.2
10.000	98.3
6.300	96.7
5.000	96.0
3.350	94.6
2.000	92.0
1.180	89.9
0.600	87.5
0.425	85.7
0.300	83.1
0.212	79.5
0.150	75.0
0.063	61.5
0.054	58.8
0.039	52.9
0.020	41.9
0.011	31.0
0.008	24.3
0.005	20.0
0.004	16.8
0.002	11.4



Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
		Silt			Sand			Gravel			
11.4		50.1			30.5			8.0		0.0	0.0

Sample Description	Brown slightly sandy slightly gravelly silty CLAY.					Project No.	NMTL 2932
						BH/TP No.	TP03
Project	Mill Road, Drogheda			GII PROJECT ID: 8660-04-19		Sample No.	B
Operator	Tzr	Checked	Nc	Approved	Bc	Depth	1.00m

Date sample tested 26/06/2019

NM TL Ltd

NMTL Ltd

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	100.0
37.500	98.7
28.000	97.0
20.000	93.4
14.000	89.5
10.000	86.8
6.300	83.4
5.000	81.5
3.350	79.4
2.000	75.7
1.180	73.0
0.600	69.6
0.425	67.5
0.300	64.7
0.212	61.3
0.150	57.5
0.063	48.9
0.053	46.8
0.038	42.5
0.020	36.0
0.010	29.2
0.007	25.2
0.005	22.8
0.004	20.9
0.002	17.2

Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
		Silt			Sand			Gravel			
17.2		31.7			26.8			24.3		0.0	0.0

Sample Description	Brown/dark grey slightly gravelly slightly sandy silty CLAY.					Project No.	NMTL 2932
						BH/TP No.	TP06
Project	Mill Road, Drogheda				GII PROJECT ID: 8660-04-19	Sample No.	B
Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	26/06/2019	Depth	0.50m

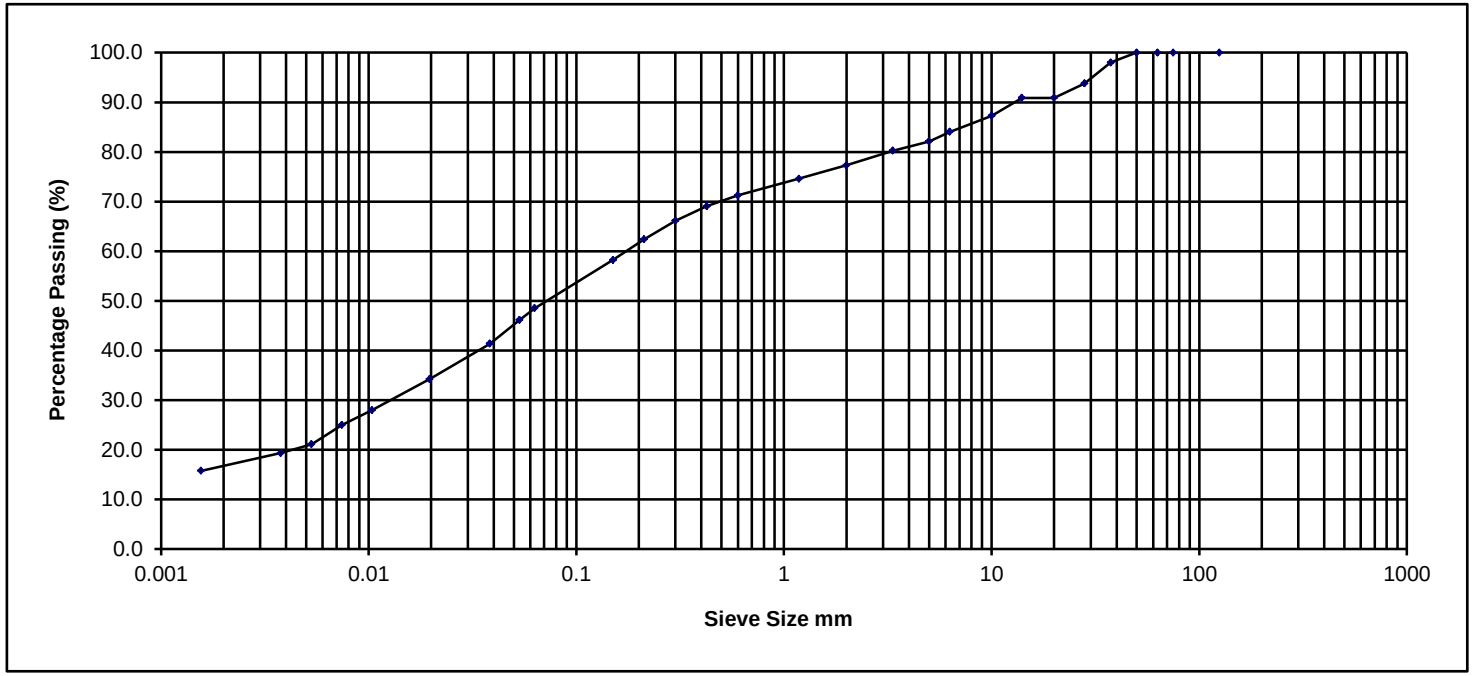
NM TL Ltd

NMTL Ltd

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	100.0
37.500	98.0
28.000	93.8
20.000	90.9
14.000	90.9
10.000	87.3
6.300	84.0
5.000	82.1
3.350	80.3
2.000	77.3
1.180	74.6
0.600	71.3
0.425	69.1
0.300	66.1
0.212	62.4
0.150	58.2
0.063	48.5
0.053	46.1
0.038	41.4
0.020	34.2
0.010	28.0
0.007	25.0
0.005	21.1
0.004	19.4
0.002	15.8



Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
		Silt			Sand			Gravel			
15.8		32.7			28.8			22.7		0.0	0.0

Sample Description	Brown slightly gravelly slightly sandy silt CLAY.					Project No.	NMTL 2932
						BH/TP No.	TP07
Project	Mill Road, Drogheda			GII PROJECT ID: 8660-04-19		Sample No.	B
Operator	Tzr	Checked	Nc	Approved	Bc	Depth	0.50m
				Date sample tested	25/06/2019		

NM TL Ltd

NMTL Ltd

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	100.0
37.500	100.0
28.000	100.0
20.000	98.0
14.000	98.0
10.000	97.7
6.300	95.2
5.000	93.9
3.350	93.1
2.000	90.8
1.180	88.0
0.600	84.5
0.425	82.4
0.300	79.7
0.212	76.2
0.150	71.7
0.063	57.3
0.054	53.4
0.039	46.3
0.020	36.4
0.011	29.0
0.008	25.1
0.005	20.9
0.004	17.7
0.002	13.4

Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
		Silt			Sand			Gravel			
13.4		43.9			33.5			9.2		0.0	0.0

Sample Description	Brown slightly gravelly slightly sandy silty CLAY.					Project No.	NMTL 2932
						BH/TP No.	TP08
Project	Mill Road, Drogheda			GII PROJECT ID: 8660-04-19		Sample No.	B
Operator	Tzr	Checked	Nc	Approved	Bc	Depth	0.50m

Date sample tested 26/06/2019

NMTL Ltd

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	100.0
37.500	97.6
28.000	94.7
20.000	93.3
14.000	91.2
10.000	88.2
6.300	86.1
5.000	83.8
3.350	82.1
2.000	80.1
1.180	77.6
0.600	74.1
0.425	71.8
0.300	68.6
0.212	64.5
0.150	59.9
0.063	48.8
0.053	46.1
0.038	43.1
0.020	34.3
0.010	26.0
0.008	21.0
0.005	17.7
0.004	13.6
0.002	9.2

Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
		Silt			Sand			Gravel			
9.2		39.6			31.3			19.9		0.0	0.0

Sample Description	Brown slightly gravelly slightly sandy silty CLAY.					Project No.	NMTL 2932
						BH/TP No.	TP09
Project	Mill Road, Drogheda			GII PROJECT ID: 8660-04-19		Sample No.	B
Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	25/06/2019	Depth	0.50m

NM TL Ltd

NMTL Ltd

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	100.0
37.500	98.3
28.000	97.8
20.000	96.8
14.000	93.8
10.000	91.8
6.300	88.0
5.000	86.1
3.350	84.9
2.000	82.4
1.180	79.7
0.600	75.8
0.425	73.1
0.300	69.4
0.212	64.6
0.150	58.9
0.063	45.3
0.053	42.6
0.038	38.5
0.020	32.0
0.010	27.4
0.007	24.9
0.005	22.8
0.004	20.9
0.002	17.1

Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
		Silt			Sand			Gravel			
17.1		28.2			37.1			17.6		0.0	0.0

Sample Description	Brown slightly gravelly slightly sandy silty CLAY.					Project No.	NMTL 2932
						BH/TP No.	TP11
Project	Mill Road, Drogheda			GII PROJECT ID: 8660-04-19		Sample No.	B
Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	28/06/2019
						Depth	0.50m

NM TL Ltd

NMTL Ltd

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	100.0
37.500	98.3
28.000	96.9
20.000	94.2
14.000	93.3
10.000	88.8
6.300	86.5
5.000	84.5
3.350	82.9
2.000	80.3
1.180	77.8
0.600	74.0
0.425	71.3
0.300	67.6
0.212	62.9
0.150	57.3
0.063	45.6
0.054	41.8
0.039	36.7
0.020	27.2
0.011	19.5
0.008	16.6
0.005	13.8
0.004	10.9
0.002	6.0

Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
		Silt			Sand			Gravel			
6.0		39.5			34.7			19.7		0.0	0.0

Sample Description	Brown slightly gravelly slightly sandy silt CLAY.			Project No.	NMTL 2932
				BH/TP No.	TP12
Project	Mill Road, Drogheda		GII PROJECT ID: 8660-04-19	Sample No.	B
Operator Tzr	Checked Nc	Approved Bc	Date sample tested 25/06/2019	Depth	0.50m

NM TL Ltd

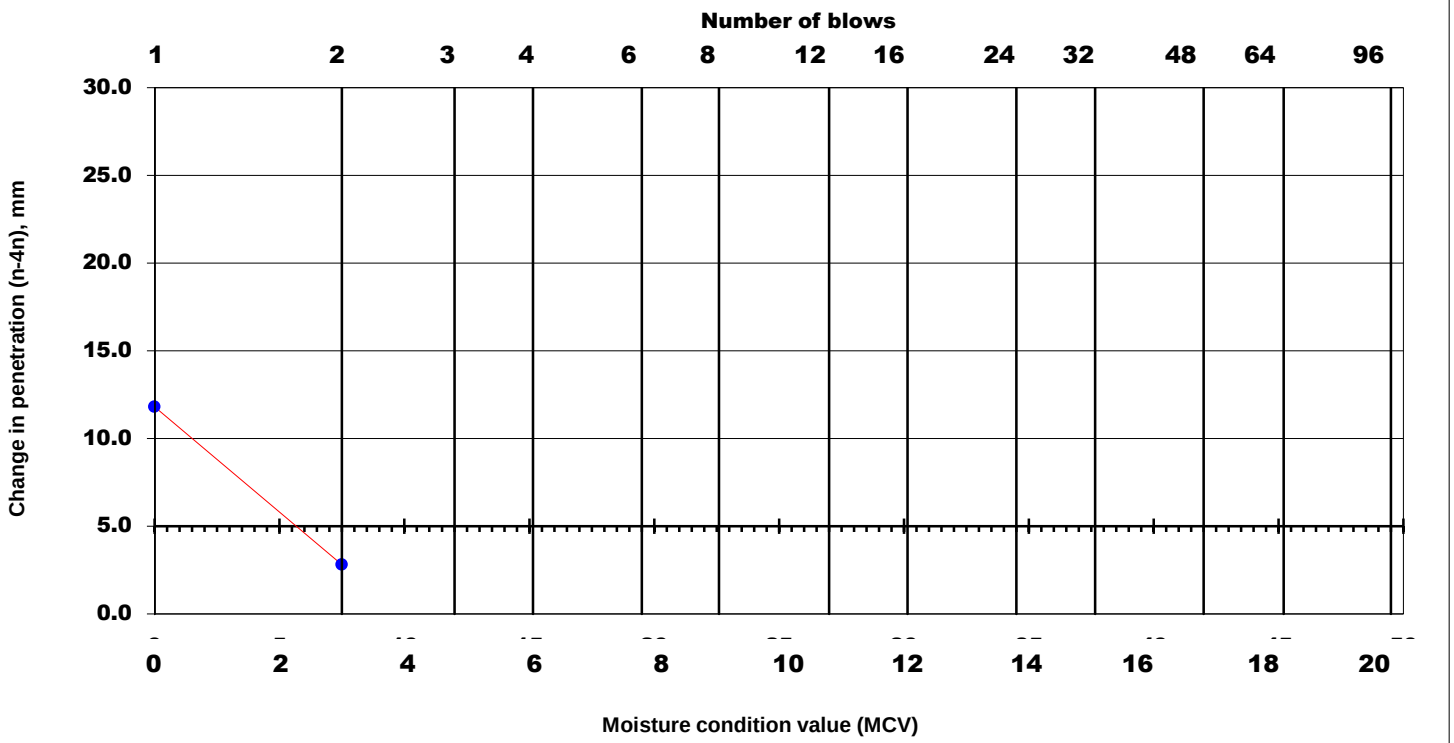
SINGLE POINT MOISTURE CONDITION VALUE TEST

Single sample mass		
Initial sample mass	1489.49	g
Moisture content	20.5	%
Dry mass	1236.2	g
Mass retained on 20mm sieve	g 56.9	%

* Delete as appropriate

Project Name:	GII Project ID: 8660-04-19	Job ref.	NMTL_2932
Mill Road, Drogheda		Borehole/ Pit No.	TP01
Soil description:		Sample no.	B
Brown slightly sandy slightly gravelly SILT/CLAY		Depth	1.50m
Test method	BS 1377 : Part 4 : 1990 : 5	Date Tested	25/06/2019
		Date Sampled	N/A
MCV	**2.3** **Natural**	Date Received	11/06/2019

Total number of blows n	Penetration or protrusion mm	Change in penetration n to 4n mm
1	55.6	11.8
2	46.3	2.8
3	44.0	
4	43.8	
6	43.6	
8	43.5	
12		
16		
24		
32		
48		
64		
96		
128		
192		
256		



Operator	Checked	Approved
Tch	Nc	Bc

NMTL Ltd

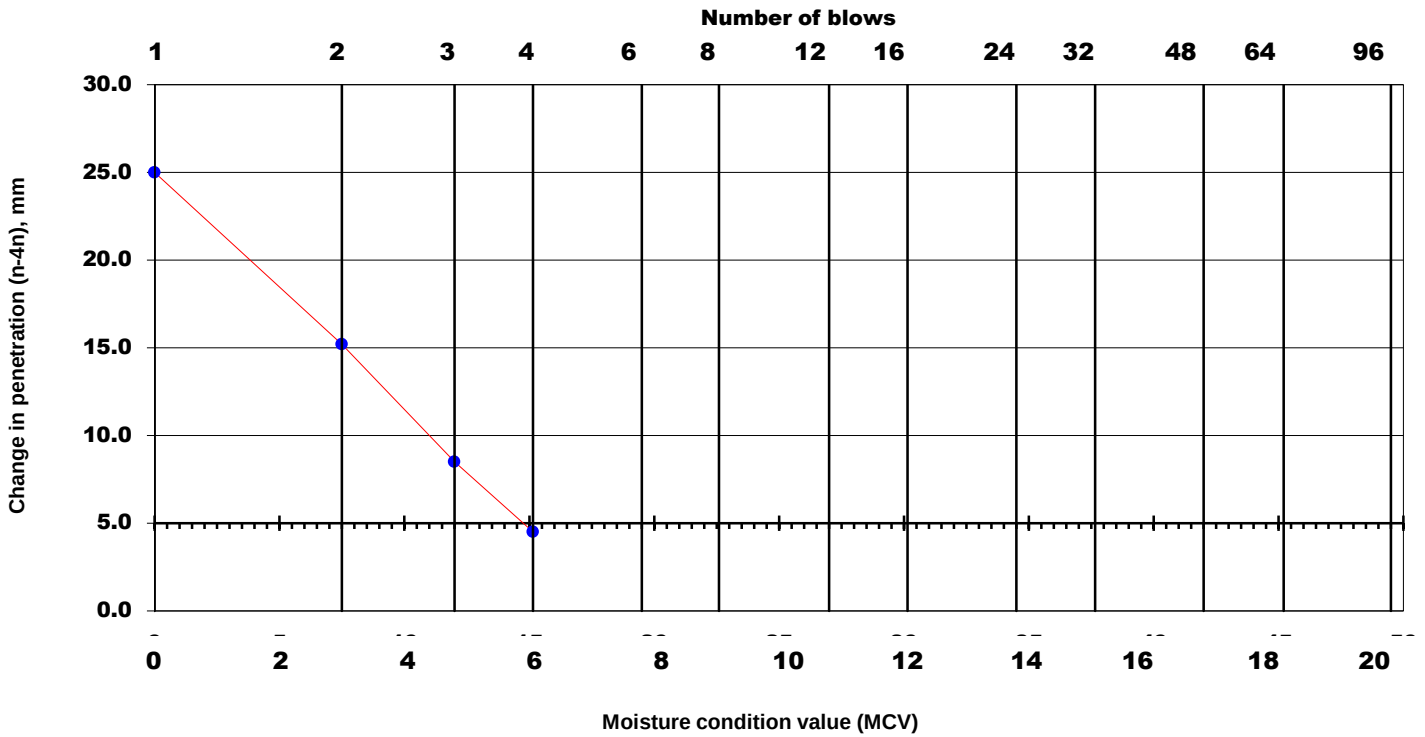
SINGLE POINT MOISTURE CONDITION VALUE TEST

Single sample mass		
Initial sample mass	1492.45	g
Moisture content	22.2	%
Dry mass	1221.6	g
Mass retained on 20mm sieve	g	0.8 %

* Delete as appropriate

Project Name:	GII Project ID: 8660-04-19	Job ref.	NMTL_2932
Mill Road, Drogheda		Borehole/ Pit No.	TP03
Soil description:		Sample no.	B
Brown slightly gravelly slightly sandy silty CLAY.		Depth	1.00m
Test method	BS 1377 : Part 4 : 1990 : 5	Date Tested	25/06/2019
		Date Sampled	N/A
MCV	**5.9** **Natural**	Date Received	11/06/2019

Total number of blows n	Penetration or protrusion mm	Change in penetration n to 4n mm
1	75.2	25.0
2	61.4	15.2
3	54.4	8.5
4	50.2	4.5
6	46.7	
8	46.2	
12	45.9	
16	45.7	
24		
32		
48		
64		
96		
128		
192		
256		



Operator	Checked	Approved
Tch	Nc	Bc

NMTL Ltd

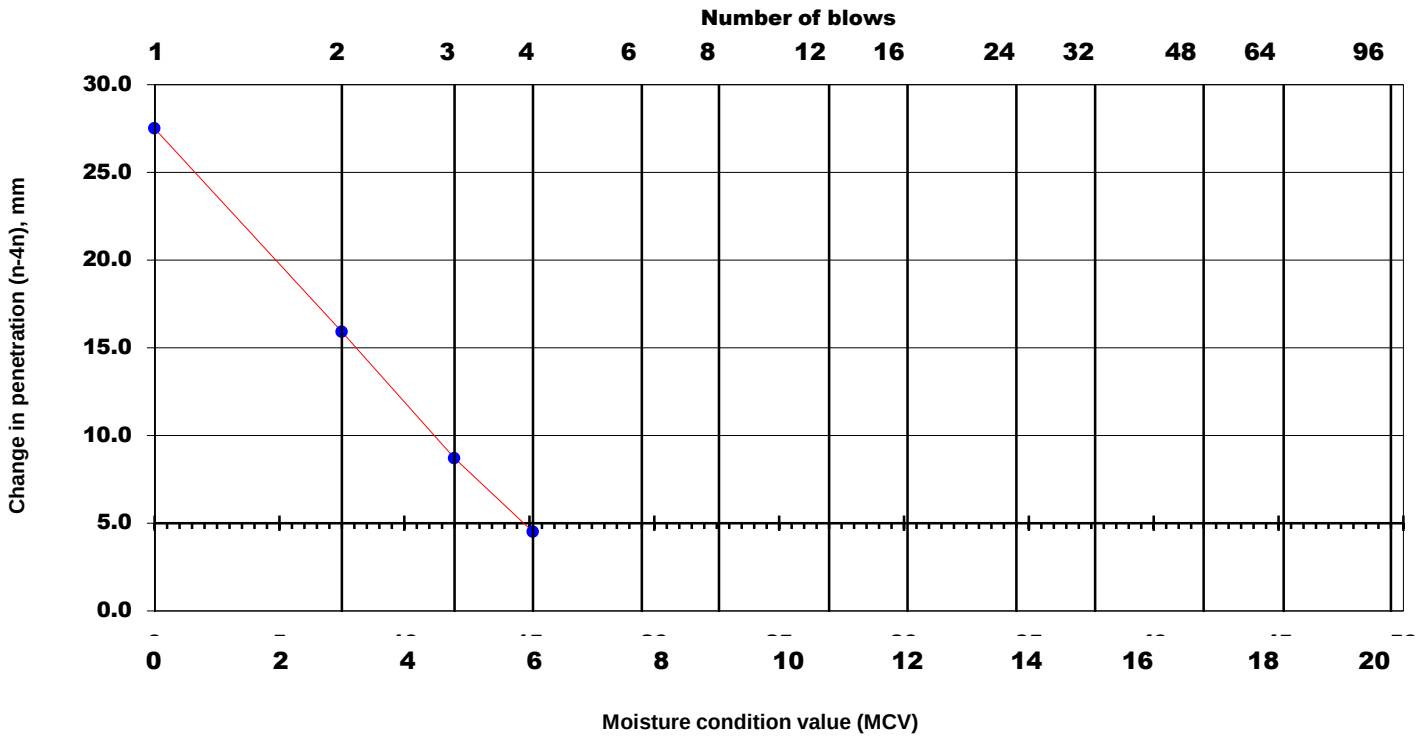
SINGLE POINT MOISTURE CONDITION VALUE TEST

Single sample mass		
Initial sample mass	1491.16	g
Moisture content	21.2	%
Dry mass	1230.0	g
Mass retained on 20mm sieve	g	9.1 %

* Delete as appropriate

Project Name:	GII Project ID: 8660-04-19	Job ref.	NMTL_2932
Mill Road, Drogheda		Borehole/ Pit No.	TP07
Soil description:		Sample no.	B
Brown slightly gravelly slightly sandy silty CLAY.		Depth	0.50m
Test method	BS 1377 : Part 4 : 1990 : 5	Date Tested	25/06/2019
		Date Sampled	N/A
MCV	**5.9** **Natural**	Date Received	11/06/2019

Total number of blows n	Penetration or protrusion mm	Change in penetration n to 4n mm
1	76.2	27.5
2	60.5	15.9
3	53.0	8.7
4	48.7	4.5
6	45.1	
8	44.6	
12	44.3	
16	44.2	
24		
32		
48		
64		
96		
128		
192		
256		



Operator	Checked	Approved
Tch	Nc	Bc

NMTL Ltd

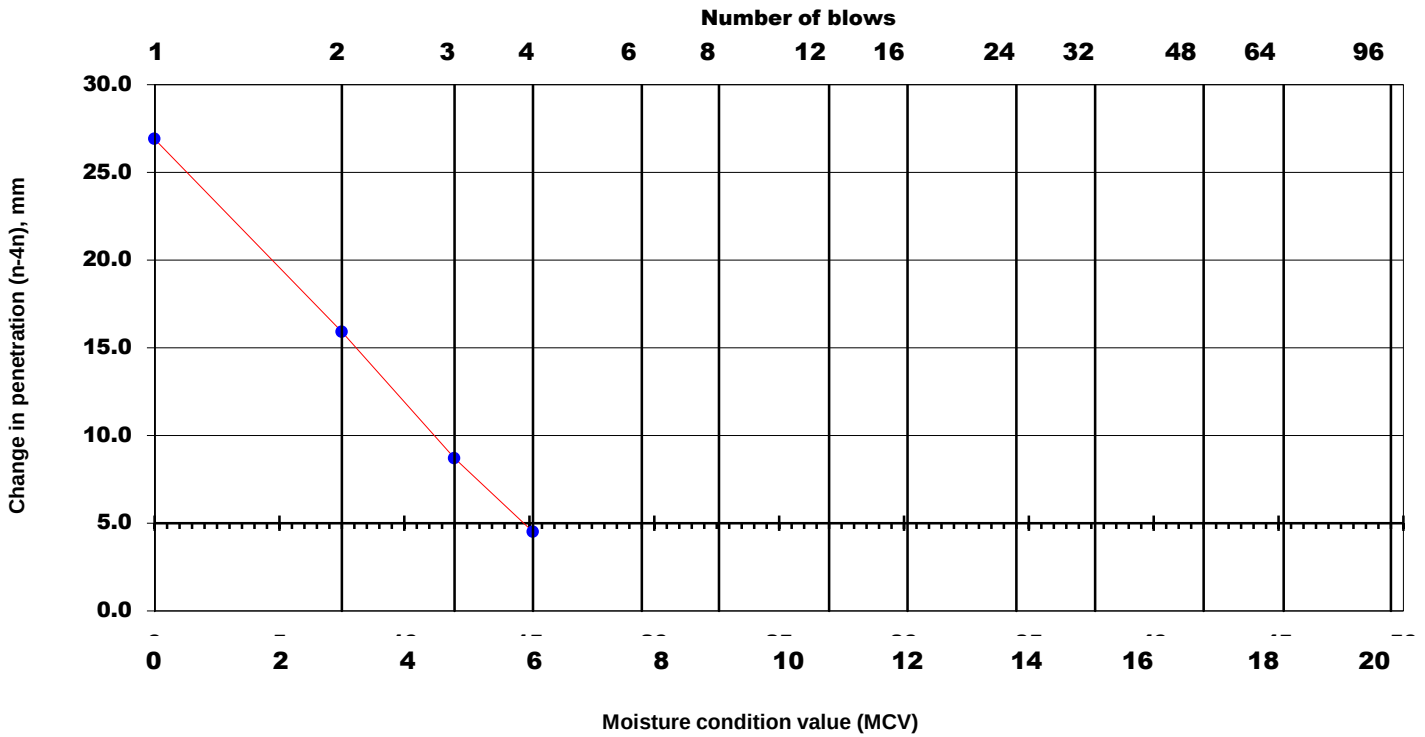
SINGLE POINT MOISTURE CONDITION VALUE TEST

Single sample mass		
Initial sample mass	1490.67	g
Moisture content	25.2	%
Dry mass	1190.2	g
Mass retained on 20mm sieve	g	6.7 %

* Delete as appropriate

Project Name:	GII Project ID: 8660-04-19	Job ref.	NMTL_2932
Mill Road, Drogheda		Borehole/ Pit No.	TP09
Soil description:		Sample no.	B
Brown slightly gravelly slightly sandy silty CLAY.		Depth	0.50m
Test method	BS 1377 : Part 4 : 1990 : 5	Date Tested	25/06/2019
		Date Sampled	N/A
MCV	**5.9** **Natural**	Date Received	11/06/2019

Total number of blows n	Penetration or protrusion mm	Change in penetration n to 4n mm
1	75.6	26.9
2	60.5	15.9
3	53.0	8.7
4	48.7	4.5
6	45.1	
8	44.6	
12	44.3	
16	44.2	
24		
32		
48		
64		
96		
128		
192		
256		



Operator	Checked	Approved
Tch	Nc	Bc

NMTL Ltd

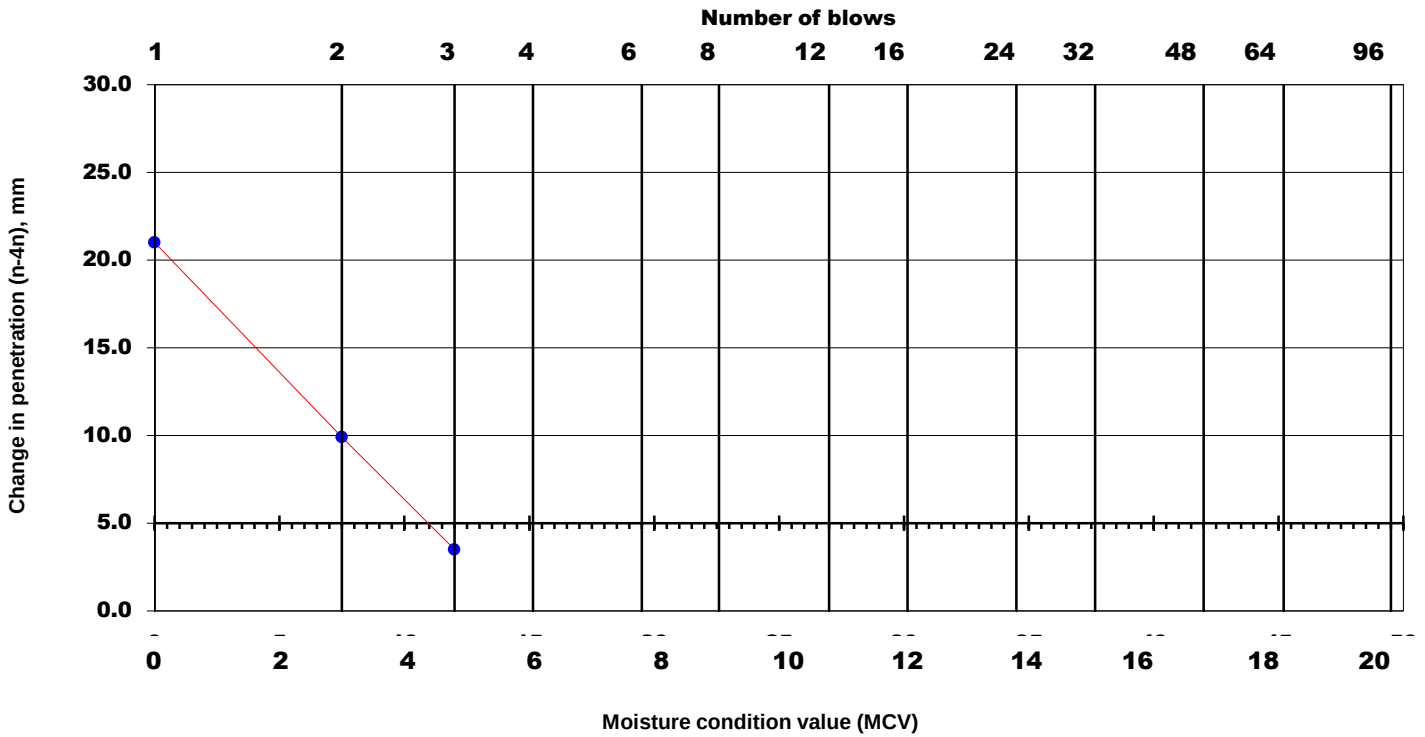
SINGLE POINT MOISTURE CONDITION VALUE TEST

Single sample mass		
Initial sample mass	1495.94	g
Moisture content	19.8	%
Dry mass	1249.1	g
Mass retained on 20mm sieve	g	5.8 %

* Delete as appropriate

Project Name:	GII Project ID: 8660-04-19	Job ref.	NMTL_2932
Mill Road, Drogheda		Borehole/ Pit No.	TP12
Soil description:		Sample no.	B
Brown slightly gravelly slightly sandy silty CLAY.		Depth	0.50m
Test method	BS 1377 : Part 4 : 1990 : 5	Date Tested	25/06/2019
		Date Sampled	N/A
MCV	**4.4** **Natural**	Date Received	11/06/2019

Total number of blows n	Penetration or protrusion mm	Change in penetration n to 4n mm
1	66.2	21.0
2	54.1	9.9
3	47.7	3.5
4	45.2	
6	44.2	
8	44.2	
12	44.2	
16		
24		
32		
48		
64		
96		
128		
192		
256		



Operator	Checked	Approved
Tch	Nc	Bc

NMTL Ltd

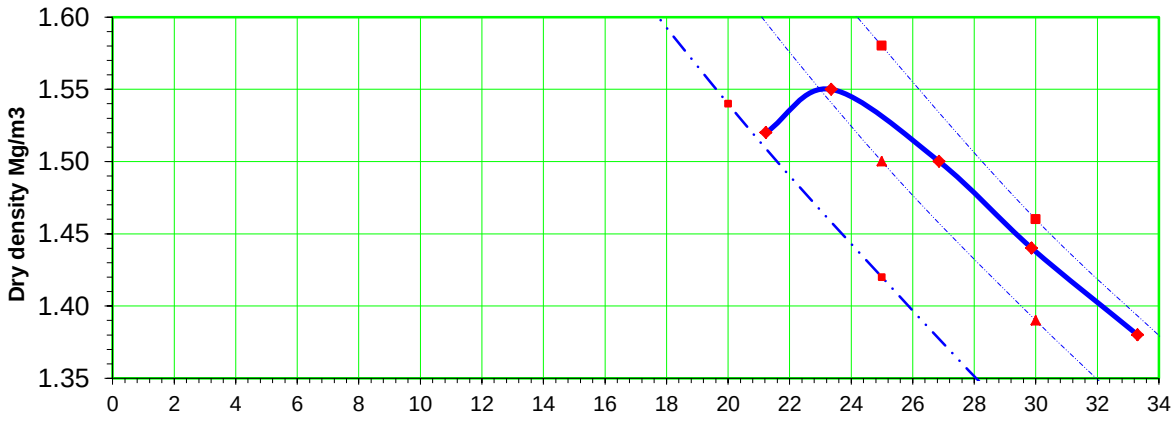
Determination of dry density / moisture content relationship
BS 1377: Part 4: 1990 : Clause 3.4
and
Determination of the California Bearing Ratio Test
BS 1377 : Part : 4 Clause 7 : 1990
and
Tested in accordance with BS 1377: Part 4 : 1990.Clause 5.5-Moisture Condition Value

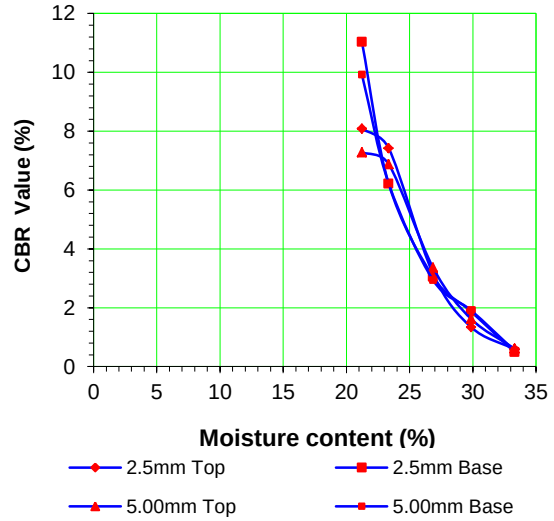
Soil description: **Brown slightly gravelly slightly sandy silty CLAY.**

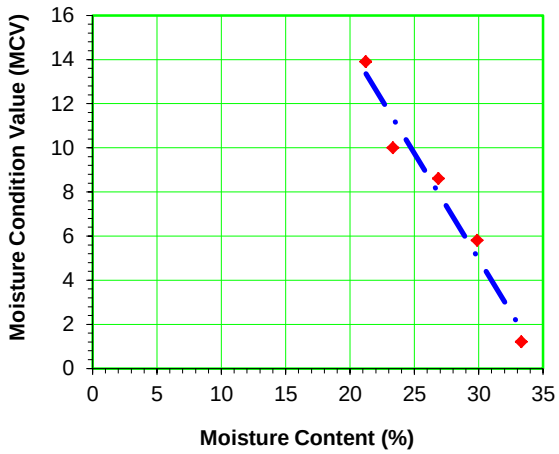
Optimum Moisture Content 25.0 %

Maximum Dry density 1.55 Mg/m3

Moisture Content %	Dry Density Mg/m3		CBR Top 2.5mm	CBR Base 2.5mm	MCV	CBR Top 5.0mm	CBR Base 5.0mm
21.23	1.52		8.08	11.03	13.90	7.28	9.92
23.35	1.55		7.42	6.21	10.00	6.88	6.22
26.86	1.50		3.15	3.05	8.60	3.36	2.94
29.87	1.44		1.34	1.87	5.80	1.62	1.91
33.31	1.38	At natural moisture.	0.59	0.49	1.20	0.61	0.54







NM TL Ltd		Project:	Mill Road, Drogheda			Job No	NMTL 2932
						Trial Pit No.	TP02
			GII Project No. 8660-04-19			Sample No.	B
Operator	Tch	Checked	Nc	Approved	Bc 09/07/2019	Depth	0.50m

Determination of dry density / moisture content relationship

BS 1377: Part 4: 1990 : Clause 3.4

and

Determination of the California Bearing Ratio Test

BS 1377 : Part : 4 Clause 7 : 1990

and

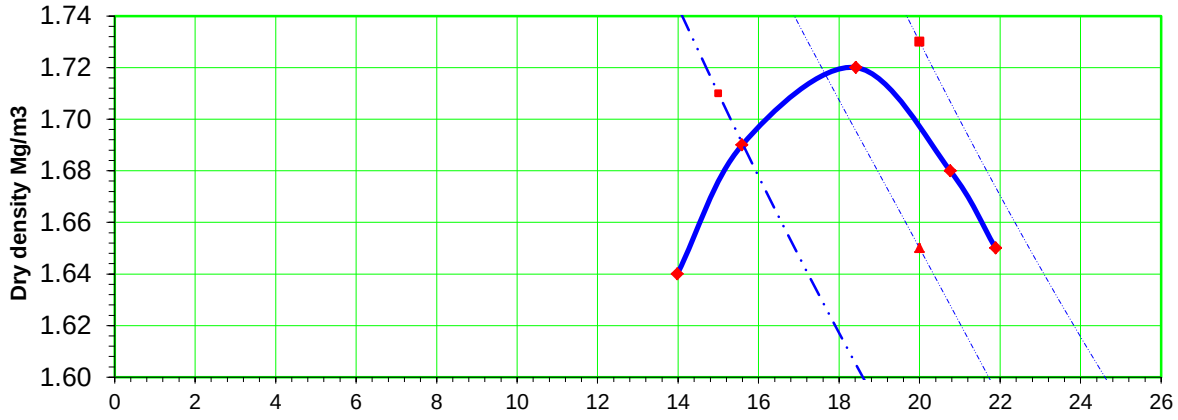
Tested in accordance with BS 1377: Part 4 : 1990.Clause 5.5-Moisture Condition Value

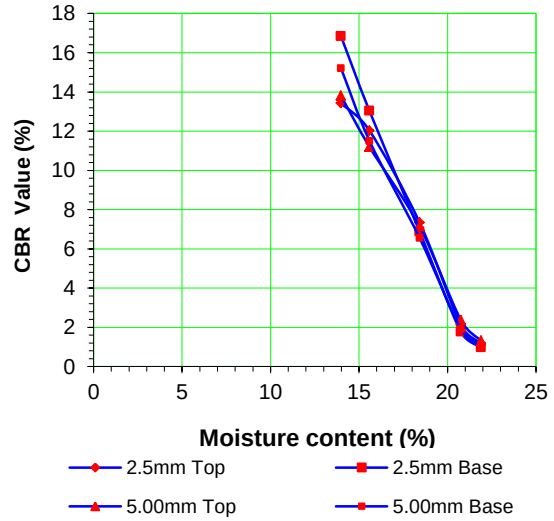
Soil description: **Brown slightly gravelly slightly sandy silty CLAY.**

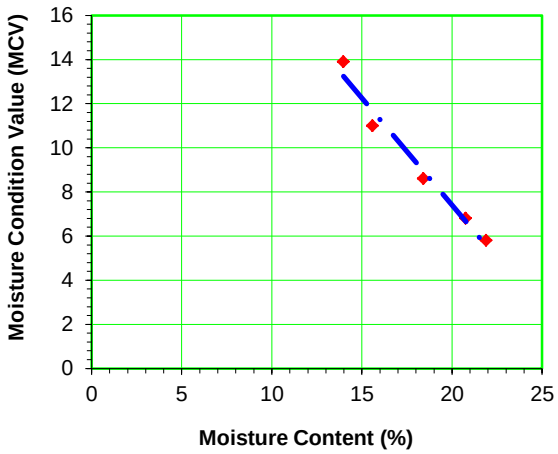
Optimum Moisture Content 18.4 %

Maximum Dry density 1.72 Mg/m3

Moisture Content %	Dry Density Mg/m3		CBR Top 2.5mm	CBR Base 2.5mm	MCV	CBR Top 5.0mm	CBR Base 5.0mm
13.98	1.64		13.43	16.84	13.90	13.80	15.21
15.59	1.69		12.03	13.03	11.00	11.20	11.51
18.42	1.72		7.35	6.89	8.60	7.14	6.56
20.76	1.68	At natural moisture.	2.10	1.77	6.80	2.36	1.91
21.89	1.65		1.18	0.98	5.80	1.32	1.08







NM TL Ltd		Project:	Mill Road, Drogheda			Job No	NMTL 2932
						Trial Pit No.	TP06
			GII Project No. 8660-04-19			Sample No.	B
Operator	Tch	Checked	Nc	Approved	Bc 09/07/2019	Depth	0.50m

Determination of dry density / moisture content relationship

BS 1377: Part 4: 1990 : Clause 3.4

and

Determination of the California Bearing Ratio Test

BS 1377 : Part : 4 Clause 7 : 1990

and

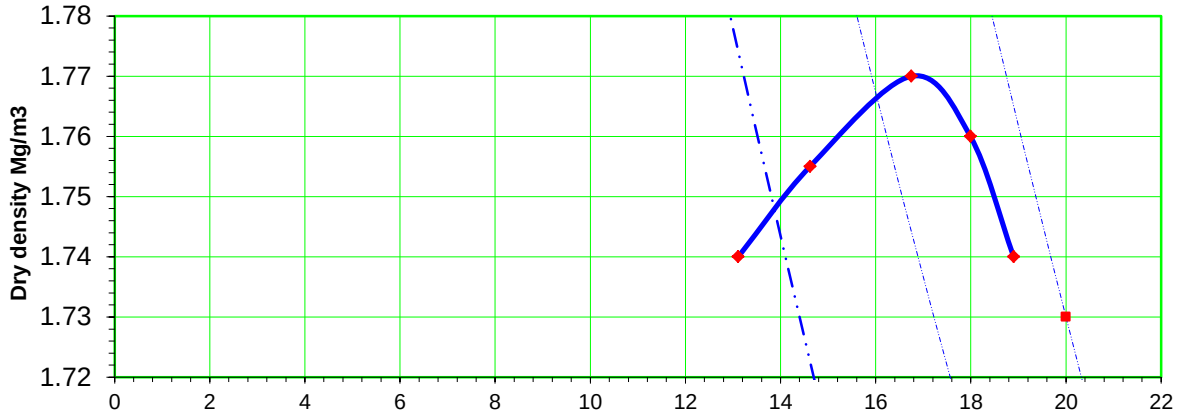
Tested in accordance with BS 1377: Part 4 : 1990.Clause 5.5-Moisture Condition Value

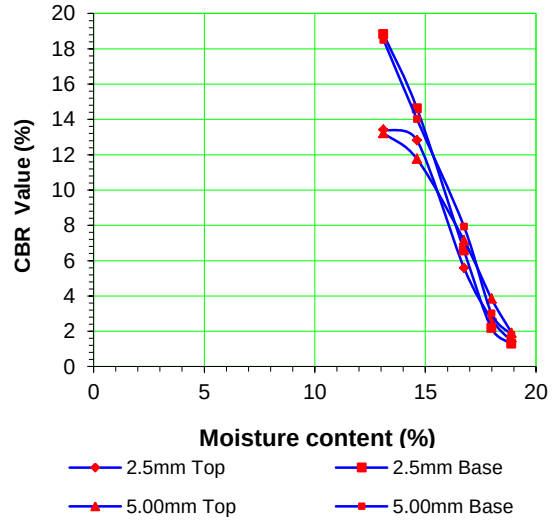
Soil description: **Brown slightly gravelly slightly sandy silty CLAY.**

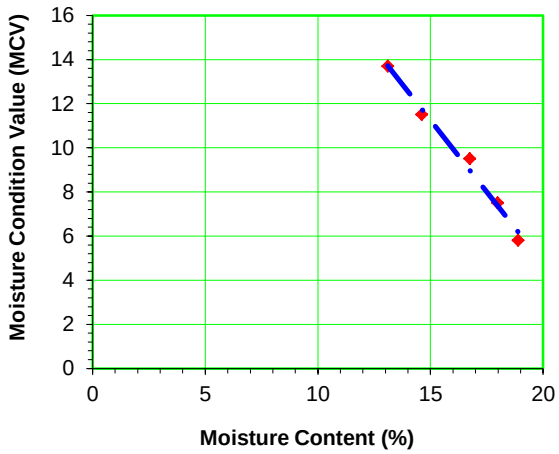
Optimum Moisture Content 16.8 %

Maximum Dry density 1.77 Mg/m3

Moisture Content %	Dry Density Mg/m3		CBR Top 2.5mm	CBR Base 2.5mm	MCV	CBR Top 5.0mm	CBR Base 5.0mm
13.11	1.74		13.42	18.82	13.70	13.22	18.50
14.62	1.76		12.81	14.62	11.50	11.76	14.01
16.75	1.77	At natural moisture.	5.58	6.56	9.50	7.14	7.92
17.99	1.76		2.69	2.17	7.50	3.85	3.01
18.90	1.74		1.41	1.28	5.80	1.91	1.80







NM TL Ltd		Project:	Mill Road, Drogheda			Job No	NMTL 2932
						Trial Pit No.	TP08
			GII Project No. 8660-04-19			Sample No.	B
Operator	Tch	Checked	Nc	Approved	Bc 09/07/2019	Depth	0.50m

Determination of dry density / moisture content relationship

BS 1377: Part 4: 1990 : Clause 3.4

and

Determination of the California Bearing Ratio Test

BS 1377 : Part : 4 Clause 7 : 1990

and

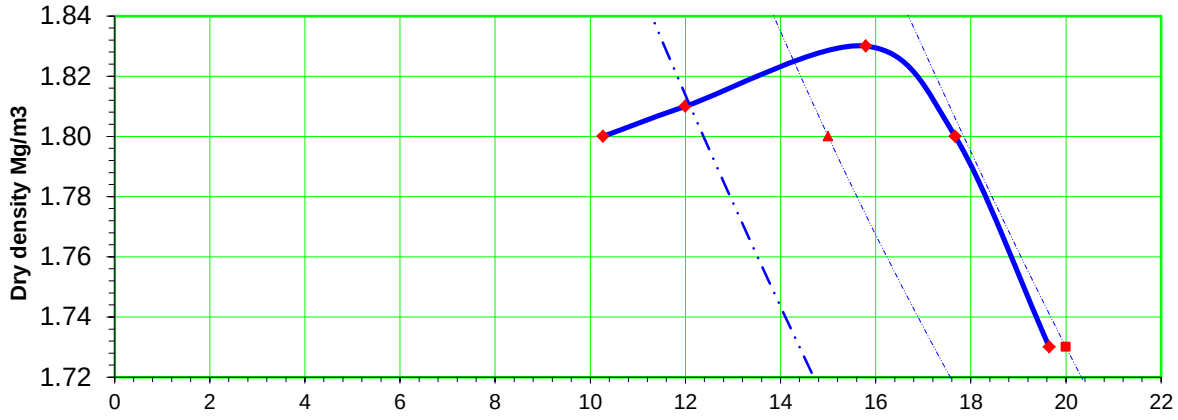
Tested in accordance with BS 1377: Part 4 : 1990.Clause 5.5-Moisture Condition Value

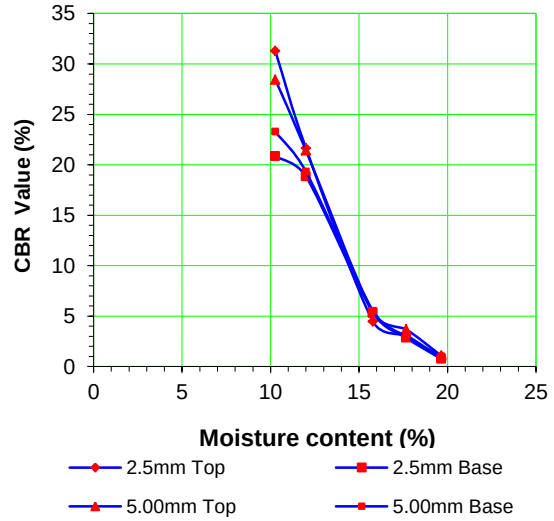
Soil description: **Brown slightly gravelly slightly sandy silty CLAY.**

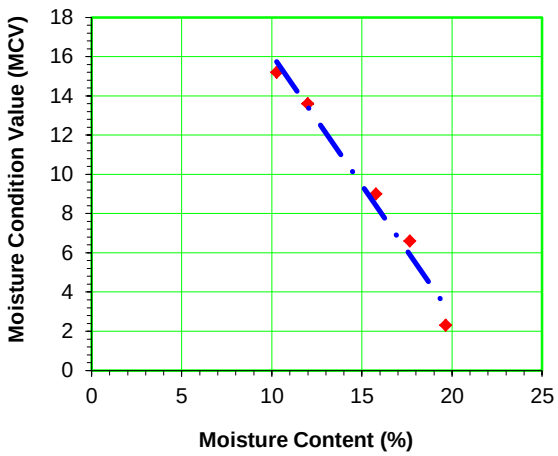
Optimum Moisture Content 15.8 %

Maximum Dry density 1.83 Mg/m3

Moisture Content %	Dry Density Mg/m3		CBR Top 2.5mm	CBR Base 2.5mm	MCV	CBR Top 5.0mm	CBR Base 5.0mm
10.27	1.80		31.27	20.85	15.20	28.44	23.28
12.00	1.81		21.65	18.84	13.60	21.43	19.32
15.79	1.83		4.46	5.35	9.00	5.35	5.52
17.67	1.80		3.08	2.85	6.60	3.68	2.99
19.65	1.73	At natural moisture.	0.82	0.75	2.30	1.08	1.00







NM TL Ltd		Project:	Mill Road, Drogheda			Job No	NMTL 2932
						Trial Pit No.	TP11
			GII Project No. 8660-04-19			Sample No.	B
Operator	Tch	Checked	Nc	Approved	Bc 09/07/2019	Depth	0.50m

LABORATORY REPORT

4043

Contract Number: PSL19/4273

Report Date: 02 August 2019

Client's Reference: 2469150

Client Name: Ground Investigations Ireland Ltd
Catherinestown House
Hazelhatch Road
Newcastle
Co Durham

For the attention of: Stephen Kealy

Contract Title: Mill Road, Drogheda

Date Received: 12/7/2019
Date Commenced: 12/7/2019
Date Completed:

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

R Gunson (Director)	A Watkins (Director)	R Berriman (Quality Manager)
L Knight (Senior Technician)	S Eyre (Senior Technician)	R Cowles (Senior Technician)

5 – 7 Hexthorpe Road, Hexthorpe,
Doncaster DN4 0AR
tel: +44 (0)844 815 6641
fax: +44 (0)844 815 6642
e-mail: rgunson@prosoils.co.uk
awatkins@prosoils.co.uk

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
RC01		B	2.20	7.70	Grey GRAVEL
RC13		B	3.35	5.20	Grey GRAVEL

UKAS TESTING
4043

PSL
Professional Soils Laboratory

Mill Road, Drogheda

Contract No:
PSL19/4273
Client Ref:
8660-04-19

SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Moisture Content % Clause 3.2	Linear Shrinkage % Clause 6.5	Particle Density Mg/m^3 Clause 8.2	Liquid Limit % Clause 4.3/4	Plastic Limit % Clause 5.3	Plasticity Index % Clause 5.4	Passing .425mm %	Remarks
RC01		B	2.20	7.70	0.3				NP			
RC13		B	3.35	5.20	0.7				NP			

SYMBOLS : **NP : Non Plastic** *** : Liquid Limit and Plastic Limit Wet Sieved.**

UKAS TESTING 4043

PSL Professional Soils Laboratory

Mill Road, Drogheda

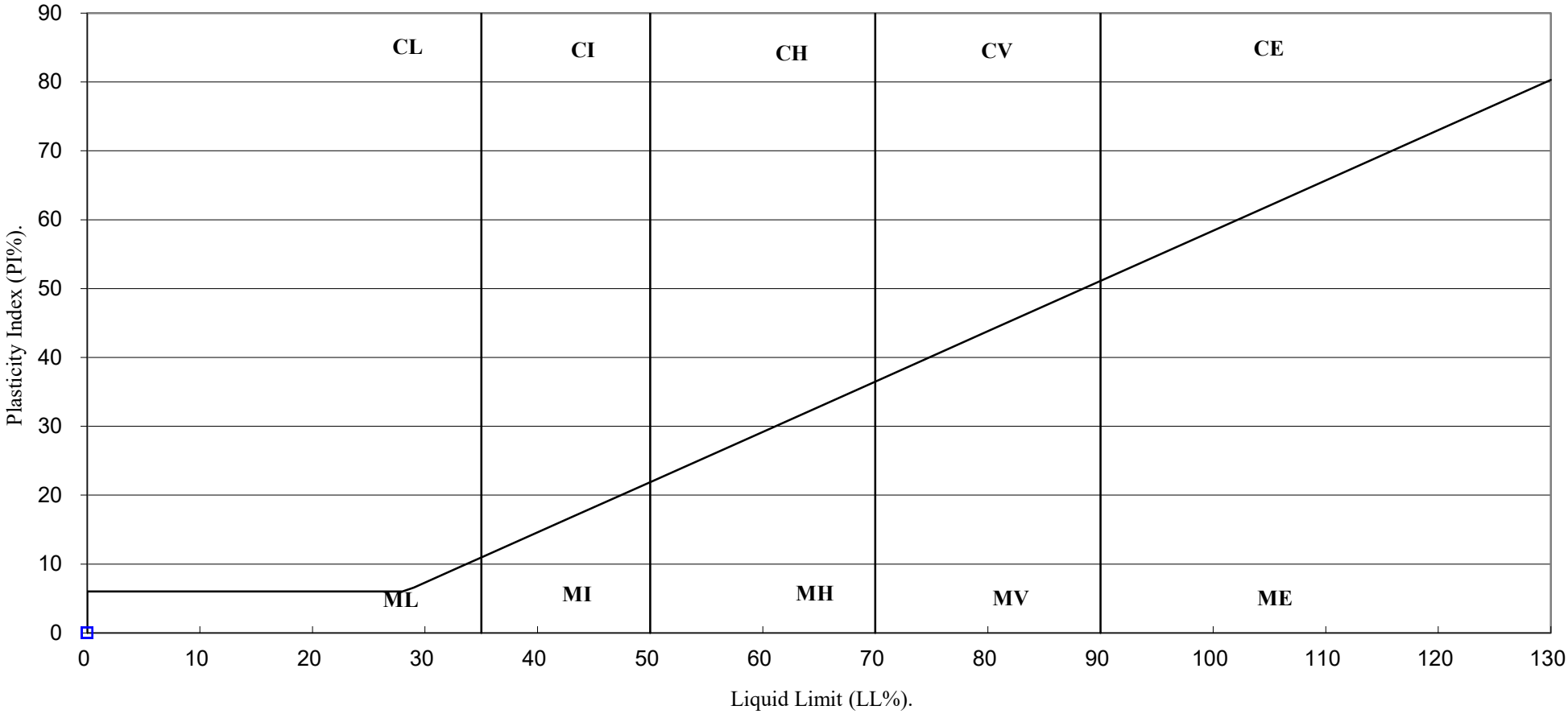
Contract No:

PSL19/4273

Client Ref:

8660-04-19

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



UKAS TESTING 4043	PSL Professional Soils Laboratory	Mill Road, Drogheda	Contract No: PSL19/4273 Client Ref: 8660-04-19

DETERMINATION OF LOS ANGELES COEFFICIENT

BS EN ISO 1097 Part 2 : 2010

Hole Number:	**RC01**	**Top Depth (m):**	**2.20**
Sample Number:		**Base Depth (m):**	**7.70**
Sample Type:	**BB**	**Sample Date:**	
Sample Description:	**See summary of soil descriptions**		

Test Specimen Details:	**Mass (g)**	**Mass (%)**
Passing 14mm sieve	5000	100
Retained 12.5mm sieve	1902	38
Retained 10mm sieve	3098	62
Retained 1.6mm sieve post rotation and washing	4080	n/a

Test Results:	
LA Coefficient	**18**

Remarks:

DETERMINATION OF LOS ANGELES COEFFICIENT

BS EN ISO 1097 Part 2 : 2010

Hole Number:	**RC13**	**Top Depth (m):**	**3.35**
Sample Number:		**Base Depth (m):**	**5.20**
Sample Type:	**BB**	**Sample Date:**	
Sample Description:	**See summary of soil descriptions**		

Test Specimen Details:	**Mass (g)**	**Mass (%)**
Passing 14mm sieve	5000	100
Retained 12.5mm sieve	1921	38
Retained 10mm sieve	3079	62
Retained 1.6mm sieve post rotation and washing	4122	n/a

Test Results:	
LA Coefficient	**18**

Remarks:

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INDEPENDENT MATERIALS TESTING I DIAMOND DRILLING & SAWING

Professional Soils Laboratory
5 - 7 Hexthorpe Road
Hexthorpe
Doncaster
West Yorkshire
DN4 0AR

Date: 06 August 2019
Test Report Ref: TR 685980

Order No: PSL19/4273

Contract: Mill Road, Drogheda

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Acid Soluble Sulfate of an Aggregate Sample in accordance with **BS EN 1744-1 : 2009 + A1 : 2012 Clause 12**

SAMPLE DETAILS:

Certificate of sampling received:	**No**
Laboratory Ref. No:	**S82152**
Client Ref. No:	**RC01**
Date and Time of Sampling:	**Unknown**
Date of Receipt at Lab:	**26/07/2019**
Date of Start of Test:	**02/08/2019**
Sampling Location:	**RC01 @ 2.2 - 7.7m**
Name of Source:	**Unknown**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Rock Cores**
Target Specification:	**N/A**

RESULTS:

Acid Soluble Sulfate Content (SO_3) (%) =		**<0.1 (nearest 0.1%)**
*95% Confidence limit**	:	*<0.09% - <0.11%*

Comments	Report checked and approved by:
95% confidence limit calculation:- Test Result ± expanded uncertainty. *Expanded uncertainty = combined uncertainty multiplied by a factor (k) of 2.*	Meical Owen Soils Team Manager

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INDEPENDENT MATERIALS TESTING I DIAMOND DRILLING & SAWING

Professional Soils Laboratory
5 - 7 Hexthorpe Road
Hexthorpe
Doncaster
West Yorkshire
DN4 0AR

Date: 06 August 2019
Test Report Ref: TR 685982

Order No: PSL19/4273

Contract: Mill Road, Drogheda

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Total Sulfur Content of an Aggregate Sample in accordance with **BS EN 1744-1 : 2009 + A1 : 2012 : Clause 11**

SAMPLE DETAILS:

Certificate of sampling received:	**No**
Laboratory Ref. No:	**S82152**
Client Ref. No:	**RC01**
Date and Time of Sampling:	**Unknown**
Date of Receipt at Lab:	**26/07/2019**
Date of Start of Test:	**02/08/2019**
Sampling Location:	**RC01 @ 2.2 - 7.7m**
Name of Source:	**Unknown**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Rock Cores**
Target Specification:	**N/A**

RESULTS:

Total Sulfur Content as S (%) =		**<0.1**
*95% Confidence limit**	=	*<0.06% - <0.14%*

Comments / Departure from specified Procedure	Report checked and approved by:
*95% Confidence limit is the expanded uncertainty which is the combined uncertainty standard multiplied by a factor (k) of 2	Meical Owen Soils Team Manager

Professional Soils Laboratory
5 - 7 Hexthorpe Road
Hexthorpe
Doncaster
West Yorkshire
DN4 0AR

Date: 06 August 2019
Test Report Ref: TR 685985

Order No: PSL19/4273

Contract: Mill Road, Drogheda

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Water Soluble Sulfate of Natural and Manufactured Aggregate in accordance with **BS EN 1744-1 : 2009 + A1 : 2012 : Clause 10.1**

SAMPLE DETAILS:

Certificate of sampling received:	**No**
Laboratory Ref. No:	**S82152**
Client Ref. No:	**RC01**
Date and Time of Sampling:	**Unknown**
Date of Receipt at Lab:	**26/07/2019**
Date of Start of Test:	**02/08/2019**
Sampling Location:	**RC01 @ 2.2 - 7.7m**
Name of Source:	**Unknown**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Rock Cores**
Target Specification:	**N/A**

RESULTS:

	Result	*95% Confidence limit**
Water Soluble Sulfate Content (SO_3) (%) =	**<0.01**	*<0.007% - <0.013%*
Water Soluble Sulfate Content (SO_4) (%) =	**<0.01**	*<0.007% - <0.013%*

Comments / Departure from specified Procedure	Report checked and approved by:
95% confidence limit calculation:- Test Result ± expanded uncertainty. *Expanded uncertainty = combined uncertainty multiplied by a factor (k) of 2.*	Meical Owen Soils Team Manager

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INDEPENDENT MATERIALS TESTING I DIAMOND DRILLING & SAWING

Professional Soils Laboratory
5 - 7 Hexthorpe Road
Hexthorpe
Doncaster
West Yorkshire
DN4 0AR

Date: 06 August 2019
Test Report Ref: TR 685986

Order No: PSL19/4273

Contract: Mill Road, Drogheda

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine Flakiness Index of Aggregate Sample in accordance with **BS EN 933-3: 2012**

SAMPLE DETAILS:

Certificate of sampling received:	**No**
Laboratory Ref. No:	**S82152**
Client Ref. No:	**RC01**
Date and Time of Sampling:	**Unknown**
Date of Receipt at Lab:	**26/07/2019**
Date of Start of Test:	**30/07/2019**
Sampling Location:	**RC01 @ 2.2 - 7.7m**
Name of Source:	**Unknown**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Rock Cores**
Target Specification:	**N/A**

RESULTS:

Mass of Test Portion =	**5061 g**
Flakiness Index (FI) =	**47**

Comments:	Report checked and approved by:
None	Meical Owen Soils Team Manager

celtest
INDEPENDENT MATERIALS TESTING I DIAMOND DRILLING & SAWING

Professional Soils Laboratory
5 - 7 Hexthorpe Road
Hexthorpe
Doncaster
West Yorkshire
DN4 0AR

Date: 06 August 2019
Test Report Ref: TR 685988

Order No: PSL19/4273

Contract: Mill Road, Drogheda

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Density and water absorption for aggregate sample between 4 mm and 31.5mm, in accordance with **BS EN 1097-6: 2013 Clause 8**

SAMPLE DETAILS:

Certificate of sampling received:	**No**
Laboratory Ref. No:	**S82152**
Client Ref. No:	**RC01**
Date and Time of Sampling:	**Unknown**
Date of Receipt at Lab:	**26/07/2019**
Date of Start of Test:	**31/07/2019**
Sampling Location:	**RC01 @ 2.2 - 7.7m**
Name of Source:	**Unknown**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Rock Cores**
Target Specification:	**N/A**

RESULTS:

Particle density on an oven-dried basis =	**2.65 Mg/m³**
Particle density on a saturated and surface-dried basis =	**2.66 Mg/m³**
Apparent Particle density =	**2.68 Mg/m³**
Water absorption (of dry mass) =	**0.4%**

Comments:	Report checked and approved by:
None	Meical Owen Soils Team Manager

celtest
INDEPENDENT MATERIALS TESTING I DIAMOND DRILLING & SAWING

Professional Soils Laboratory
5 - 7 Hexthorpe Road
Hexthorpe
Doncaster
West Yorkshire
DN4 0AR

Date: 06 August 2019
Test Report Ref: TR 685990

Order No: PSL19/4273

Contract: Mill Road, Drogheda

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Acid Soluble Sulfate of an Aggregate Sample in accordance with **BS EN 1744-1 : 2009 + A1 : 2012 Clause 12**

SAMPLE DETAILS:

Certificate of sampling received:	**No**
Laboratory Ref. No:	**S82152**
Client Ref. No:	**RC13**
Date and Time of Sampling:	**Unknown**
Date of Receipt at Lab:	**26/07/2019**
Date of Start of Test:	**02/08/2019**
Sampling Location:	**RC13 @3.35 - 5.2m**
Name of Source:	**Unknown**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Rock Cores**
Target Specification:	**N/A**

RESULTS:

Acid Soluble Sulfate Content (SO_3) (%) =		**0.1 (nearest 0.1%)**
*95% Confidence limit**	:	*0.09% - 0.11%*

Comments	Report checked and approved by:
95% confidence limit calculation:- Test Result ± expanded uncertainty. *Expanded uncertainty = combined uncertainty multiplied by a factor (k) of 2.*	Meical Owen Soils Team Manager

celtest
INDEPENDENT MATERIALS TESTING I DIAMOND DRILLING & SAWING

Professional Soils Laboratory
5 - 7 Hexthorpe Road
Hexthorpe
Doncaster
West Yorkshire
DN4 0AR

Date: 06 August 2019
Test Report Ref: TR 685992

Order No: PSL19/4273

Contract: Mill Road, Drogheda

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Total Sulfur Content of an Aggregate Sample in accordance with **BS EN 1744-1 : 2009 + A1 : 2012 : Clause 11**

SAMPLE DETAILS:

Certificate of sampling received:	**No**
Laboratory Ref. No:	**S82152**
Client Ref. No:	**RC13**
Date and Time of Sampling:	**Unknown**
Date of Receipt at Lab:	**26/07/2019**
Date of Start of Test:	**02/08/2019**
Sampling Location:	**RC13 @3.35 - 5.2m**
Name of Source:	**Unknown**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Rock Cores**
Target Specification:	**N/A**

RESULTS:

Total Sulfur Content as S (%) =		**0.1**
*95% Confidence limit**	=	*0.06% - 0.14%*

Comments / Departure from specified Procedure	Report checked and approved by:
*95% Confidence limit is the expanded uncertainty which is the combined uncertainty standard multiplied by a factor (k) of 2	Meical Owen Soils Team Manager

Professional Soils Laboratory
5 - 7 Hexthorpe Road
Hexthorpe
Doncaster
West Yorkshire
DN4 0AR

Date: 06 August 2019
Test Report Ref: TR 685995

Order No: PSL19/4273

Contract: Mill Road, Drogheda

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Water Soluble Sulfate of Natural and Manufactured Aggregate in accordance with **BS EN 1744-1 : 2009 + A1 : 2012 : Clause 10.1**

SAMPLE DETAILS:

Certificate of sampling received:	**No**
Laboratory Ref. No:	**S82152**
Client Ref. No:	**RC13**
Date and Time of Sampling:	**Unknown**
Date of Receipt at Lab:	**26/07/2019**
Date of Start of Test:	**02/08/2019**
Sampling Location:	**RC13 @3.35 - 5.2m**
Name of Source:	**Unknown**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Rock Cores**
Target Specification:	**N/A**

RESULTS:

	Result	*95% Confidence limit**
Water Soluble Sulfate Content (SO_3) (%) =	**<0.01**	*<0.007% - <0.013%*
Water Soluble Sulfate Content (SO_4) (%) =	**<0.01**	*<0.007% - <0.013%*

Comments / Departure from specified Procedure	Report checked and approved by:
95% confidence limit calculation:- Test Result ± expanded uncertainty. *Expanded uncertainty = combined uncertainty multiplied by a factor (k) of 2.*	Meical Owen Soils Team Manager

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INDEPENDENT MATERIALS TESTING I DIAMOND DRILLING & SAWING

Professional Soils Laboratory
5 - 7 Hexthorpe Road
Hexthorpe
Doncaster
West Yorkshire
DN4 0AR

Date: 06 August 2019
Test Report Ref: TR 685996

Order No: PSL19/4273

Contract: Mill Road, Drogheda

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine Flakiness Index of Aggregate Sample in accordance with **BS EN 933-3: 2012**

SAMPLE DETAILS:

Certificate of sampling received:	**No**
Laboratory Ref. No:	**S82152**
Client Ref. No:	**RC13**
Date and Time of Sampling:	**Unknown**
Date of Receipt at Lab:	**26/07/2019**
Date of Start of Test:	**30/07/2019**
Sampling Location:	**RC13 @3.35 - 5.2m**
Name of Source:	**Unknown**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Rock Cores**
Target Specification:	**N/A**

RESULTS:

Mass of Test Portion =	**5030 g**
Flakiness Index (FI) =	**38**

Comments:	Report checked and approved by:
None	Meical Owen Soils Team Manager

celtest
INDEPENDENT MATERIALS TESTING I DIAMOND DRILLING & SAWING

Professional Soils Laboratory
5 - 7 Hexthorpe Road
Hexthorpe
Doncaster
West Yorkshire
DN4 0AR

Date: 06 August 2019
Test Report Ref: TR 685998

Order No: PSL19/4273

Contract: Mill Road, Drogheda

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Density and water absorption for aggregate sample between 4 mm and 31.5mm, in accordance with **BS EN 1097-6: 2013 Clause 8**

SAMPLE DETAILS:

Certificate of sampling received:	**No**
Laboratory Ref. No:	**S82152**
Client Ref. No:	**RC13**
Date and Time of Sampling:	**Unknown**
Date of Receipt at Lab:	**26/07/2019**
Date of Start of Test:	**31/07/2019**
Sampling Location:	**RC13 @3.35 - 5.2m**
Name of Source:	**Unknown**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Rock Cores**
Target Specification:	**N/A**

RESULTS:

Particle density on an oven-dried basis =	**2.62 Mg/m³**
Particle density on a saturated and surface-dried basis =	**2.64 Mg/m³**
Apparent Particle density =	**2.67 Mg/m³**
Water absorption (of dry mass) =	**0.8%**

Comments:	Report checked and approved by:
None	Meical Owen Soils Team Manager

Exova Jones Environmental

Registered Office: Exova Environmental UK Limited, 10 Lower Grosvenor Place, London, SW1W 0EN. Reg No. 11371415

Unit 3 Deeside Point
Zone 3
Deeside Industrial Park
Deeside
CH5 2UA

Tel: +44 (0) 1244 833780
Fax: +44 (0) 1244 833781

Ground Investigations Ireland
Catherinestown House
Hazelhatch Road
Newcastle
Co. Dublin
Ireland

Attention :	Aisling McDonnell
Date :	22nd May, 2019
Your reference :	8660-04-19
Our reference :	Test Report 19/7701 Batch 1
Location :	Mill Road, Drogheda
Date samples received :	13th May, 2019
Status :	Final report
Issue :	1

Twenty samples were received for analysis on 13th May, 2019 of which twenty were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Where Waste Acceptance Criteria Suite (EC Decision of 19 December 2002 (2003/33/EC)) has been requested, all analyses have been performed using the relevant EN methods where they exist.

Compiled By:

Bruce Leslie
Project Manager

Client Name: Ground Investigations Ireland
Reference: 8660-04-19
Location: Mill Road, Drogheda
Contact: Aisling McDonnell
JE Job No.: 19/7701

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	LOD/LOR	Units	Method No.
Sample ID	TP01	TP02	TP03	TP04	TP06	TP07	TP08	TP09	TP10	TP11			
Depth	0.50	0.50	1.00	0.50	0.50	0.50	0.50	0.50	0.50	0.50			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	30/04/2019	30/04/2019	30/04/2019	30/04/2019	30/04/2019	30/04/2019	01/05/2019	01/05/2019	01/05/2019	01/05/2019			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019			
Antimony	3	2	3	3	4	4	5	2	3	3	<1	mg/kg	TM30/PM15
Arsenic #	9.4	8.6	11.9	17.5	19.7	24.8	19.8	11.0	20.3	20.7	<0.5	mg/kg	TM30/PM15
Barium #	38	237	96	84	103	127	85	73	154	103	<1	mg/kg	TM30/PM15
Cadmium #	1.4	2.6	1.5	1.1	1.2	1.8	1.2	0.9	1.8	1.7	<0.1	mg/kg	TM30/PM15
Chromium #	17.0	50.1	56.1	57.5	65.7	58.4	48.1	55.7	53.1	41.4	<0.5	mg/kg	TM30/PM15
Copper #	21	30	28	37	46	55	53	23	51	52	<1	mg/kg	TM30/PM15
Lead #	9	22	19	28	23	23	28	21	22	22	<5	mg/kg	TM30/PM15
Mercury #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM30/PM15
Molybdenum #	5.0	2.8	3.0	3.8	4.6	5.6	6.7	4.2	4.1	5.4	<0.1	mg/kg	TM30/PM15
Nickel #	46.6	49.8	53.7	54.5	67.0	73.5	56.4	34.0	74.6	68.6	<0.7	mg/kg	TM30/PM15
Selenium #	<1	2	1	1	3	3	3	1	2	2	<1	mg/kg	TM30/PM15
Zinc #	94	109	72	88	76	84	82	72	96	79	<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	0.27	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04	<0.04	0.13	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Phenanthrene #	<0.03	<0.03	<0.03	1.82	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	<0.04	<0.04	0.35	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Fluoranthene #	<0.03	<0.03	<0.03	2.96	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Pyrene #	<0.03	<0.03	<0.03	2.41	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	<0.06	<0.06	<0.06	1.09	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	mg/kg	TM4/PM8
Chrysene #	<0.02	<0.02	<0.02	1.21	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	<0.07	<0.07	<0.07	1.93	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	<0.04	<0.04	<0.04	1.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	<0.04	<0.04	<0.04	0.65	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04	<0.04	0.14	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	<0.04	<0.04	<0.04	0.60	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Coronene	<0.04	<0.04	<0.04	0.13	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
PAH 6 Total #	<0.22	<0.22	<0.22	7.19	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	mg/kg	TM4/PM8
PAH 17 Total	<0.64	<0.64	<0.64	14.74	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	<0.05	<0.05	<0.05	1.39	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	<0.02	<0.02	<0.02	0.54	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(j)fluoranthene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	mg/kg	TM4/PM8
PAH Surrogate % Recovery	86	93	78	95	96	98	95	81	86	91	<0	%	TM4/PM8
Mineral Oil (C10-C40)	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	mg/kg	TM5/PM8/PM16

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland
Reference: 8660-04-19
Location: Mill Road, Drogheda
Contact: Aisling McDonnell
JE Job No.: 19/7701

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	LOD/LOR	Units	Method No.
Sample ID	TP01	TP02	TP03	TP04	TP06	TP07	TP08	TP09	TP10	TP11			
Depth	0.50	0.50	1.00	0.50	0.50	0.50	0.50	0.50	0.50	0.50			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	30/04/2019	30/04/2019	30/04/2019	30/04/2019	30/04/2019	30/04/2019	01/05/2019	01/05/2019	01/05/2019	01/05/2019			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019			
TPH CWG													
Aliphatics													
>C5-C6 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C6-C8 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C8-C10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C12 #	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 #	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	mg/kg	TM5/PM8/PM16
>C16-C21 #	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>C21-C35 #	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>C35-C40	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-40	<26	<26	<26	<26	<26	<26	<26	<26	<26	<26	<26	mg/kg	TM5/TM36/PM8/PM12/PM16
>C6-C10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C25	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM8/PM16
>C25-C35	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM8/PM16
Aromatics													
>C5-EC7 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC7-EC8 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC8-EC10 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC12 #	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 #	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 #	<7	<7	<7	22	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 #	<7	<7	<7	56	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>EC35-EC40	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-40	<26	<26	<26	78	<26	<26	<26	<26	<26	<26	<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics(C5-40)	<52	<52	<52	78	<52	<52	<52	<52	<52	<52	<52	mg/kg	TM5/TM36/PM8/PM12/PM16
>EC6-EC10 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC25	<10	<10	<10	45	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM8/PM16
>EC25-EC35	<10	<10	<10	40	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM8/PM16
MTBE #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
Benzene #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
Toluene #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
Ethylbenzene #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
m/p-Xylene #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
o-Xylene #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
PCB 28 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 52 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 101 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 118 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 138 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 153 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 180 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
Total 7 PCBs #	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	ug/kg	TM17/PM8

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland
Reference: 8660-04-19
Location: Mill Road, Drogheda
Contact: Aisling McDonnell
JE Job No.: 19/7701

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	LOD/LOR	Units	Method No.
Sample ID	TP01	TP02	TP03	TP04	TP06	TP07	TP08	TP09	TP10	TP11			
Depth	0.50	0.50	1.00	0.50	0.50	0.50	0.50	0.50	0.50	0.50			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	30/04/2019	30/04/2019	30/04/2019	30/04/2019	30/04/2019	30/04/2019	01/05/2019	01/05/2019	01/05/2019	01/05/2019			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019			
Natural Moisture Content	24.4	26.9	21.4	18.3	18.8	21.9	22.4	27.2	24.3	19.8	<0.1	%	PM4/PM0
Moisture Content (% Wet Weight)	19.6	21.2	17.6	15.4	15.8	18.0	18.3	21.4	19.6	16.5	<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	mg/kg	TM38/PM20
Chromium III	17.0	50.1	56.1	57.5	65.7	58.4	48.1	55.7	53.1	41.4	<0.5	mg/kg	NONE/NONE
Total Organic Carbon #	0.43	0.91	0.35	0.76	0.33	0.35	0.56	0.68	0.60	0.38	<0.02	%	TM21/PM24
pH #	8.61	8.15	8.09	8.44	7.98	7.65	8.26	6.49	7.63	7.51	<0.01	pH units	TM73/PM11
Mass of raw test portion	0.1102	0.1139	0.1096	0.1107	0.1079	0.1119	0.1065	0.1136	0.1144	0.1054		kg	NONE/PM17
Mass of dried test portion	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09		kg	NONE/PM17

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland
Reference: 8660-04-19
Location: Mill Road, Drogheda
Contact: Aisling McDonnell
JE Job No.: 19/7701

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	31-33	34-36	37-39	40-42	43-45	46-48	49-51	52-54	55-57	58-60	LOD/LOR	Units	Method No.
Sample ID	TP12	TP13	TP14	TP15	TP16	TP17	TP18	TP19	TP20	TP21			
Depth	0.50	1.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	01/05/2019	01/05/2019	01/05/2019	01/05/2019	01/05/2019	01/05/2019	01/05/2019	01/05/2019	01/05/2019	01/05/2019			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019			
Antimony	2	2	3	3	3	2	3	3	2	3	<1	mg/kg	TM30/PM15
Arsenic #	13.6	12.7	9.7	18.0	14.4	12.3	17.0	18.1	11.3	12.6	<0.5	mg/kg	TM30/PM15
Barium #	76	67	101	125	155	145	97	128	59	90	<1	mg/kg	TM30/PM15
Cadmium #	0.9	0.8	1.0	1.6	1.2	0.4	1.7	1.6	1.3	1.0	<0.1	mg/kg	TM30/PM15
Chromium #	39.1	32.3	52.2	49.5	54.8	43.1	56.7	47.5	45.1	48.0	<0.5	mg/kg	TM30/PM15
Copper #	27	37	18	52	52	20	41	40	29	27	<1	mg/kg	TM30/PM15
Lead #	24	13	18	24	47	18	21	21	15	20	<5	mg/kg	TM30/PM15
Mercury #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM30/PM15
Molybdenum #	3.7	1.7	3.7	3.4	3.8	2.6	4.6	4.5	4.2	3.8	<0.1	mg/kg	TM30/PM15
Nickel #	31.2	41.2	29.1	65.8	36.5	43.2	64.6	63.8	37.0	42.0	<0.7	mg/kg	TM30/PM15
Selenium #	2	<1	2	2	2	1	2	2	1	1	<1	mg/kg	TM30/PM15
Zinc #	69	58	79	88	87	54	84	86	64	74	<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Phenanthrene #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Fluoranthene #	<0.03	<0.03	<0.03	<0.03	0.06	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Pyrene #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	mg/kg	TM4/PM8
Chrysene #	<0.02	<0.02	<0.02	<0.02	0.06	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	<0.07	<0.07	<0.07	<0.07	0.14	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	<0.04	<0.04	<0.04	<0.04	0.06	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	<0.04	<0.04	<0.04	<0.04	0.06	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Coronene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
PAH 6 Total #	<0.22	<0.22	<0.22	<0.22	0.32	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	mg/kg	TM4/PM8
PAH 17 Total	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	<0.05	<0.05	<0.05	<0.05	0.10	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	<0.02	<0.02	<0.02	<0.02	0.04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(j)fluoranthene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	mg/kg	TM4/PM8
PAH Surrogate % Recovery	92	91	95	94	97	83	95	91	98	93	<0	%	TM4/PM8
Mineral Oil (C10-C40)	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	mg/kg	TM5/PM8/PM16

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland
Reference: 8660-04-19
Location: Mill Road, Drogheda
Contact: Aisling McDonnell
JE Job No.: 19/7701

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	31-33	34-36	37-39	40-42	43-45	46-48	49-51	52-54	55-57	58-60	LOD/LOR	Units	Method No.
Sample ID	TP12	TP13	TP14	TP15	TP16	TP17	TP18	TP19	TP20	TP21			
Depth	0.50	1.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	01/05/2019	01/05/2019	01/05/2019	01/05/2019	01/05/2019	01/05/2019	01/05/2019	01/05/2019	01/05/2019	01/05/2019			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019			
TPH CWG													
Aliphatics													
>C5-C6 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C6-C8 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C8-C10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C12 #	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 #	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	mg/kg	TM5/PM8/PM16
>C16-C21 #	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>C21-C35 #	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>C35-C40	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-40	<26	<26	<26	<26	<26	<26	<26	<26	<26	<26	<26	mg/kg	TM5/TM36/PM8/PM12/PM16
>C6-C10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C25	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM8/PM16
>C25-C35	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM8/PM16
Aromatics													
>C5-EC7 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC7-EC8 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC8-EC10 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC12 #	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 #	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 #	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 #	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>EC35-EC40	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-40	<26	<26	<26	<26	<26	<26	<26	<26	<26	<26	<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics(C5-40)	<52	<52	<52	<52	<52	<52	<52	<52	<52	<52	<52	mg/kg	TM5/TM36/PM8/PM12/PM16
>EC6-EC10 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC25	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM8/PM16
>EC25-EC35	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM8/PM16
MTBE #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
Benzene #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
Toluene #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
Ethylbenzene #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
m/p-Xylene #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
o-Xylene #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
PCB 28 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 52 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 101 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 118 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 138 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 153 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 180 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
Total 7 PCBs #	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	ug/kg	TM17/PM8

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland
Reference: 8660-04-19
Location: Mill Road, Drogheda
Contact: Aisling McDonnell
JE Job No.: 19/7701

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	31-33	34-36	37-39	40-42	43-45	46-48	49-51	52-54	55-57	58-60	LOD/LOR	Units	Method No.
Sample ID	TP12	TP13	TP14	TP15	TP16	TP17	TP18	TP19	TP20	TP21			
Depth	0.50	1.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	01/05/2019	01/05/2019	01/05/2019	01/05/2019	01/05/2019	01/05/2019	01/05/2019	01/05/2019	01/05/2019	01/05/2019			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019			
Natural Moisture Content	23.7	14.2	17.0	20.6	28.1	24.0	17.8	20.3	13.7	18.2	<0.1	%	PM4/PM0
Moisture Content (% Wet Weight)	19.1	12.4	14.5	17.1	21.9	19.3	15.1	16.9	12.0	15.4	<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	mg/kg	TM38/PM20
Chromium III	39.1	32.3	52.2	49.5	54.8	43.1	56.7	47.5	45.1	48.0	<0.5	mg/kg	NONE/NONE
Total Organic Carbon #	0.91	0.13	0.48	0.49	1.54	0.46	0.42	0.50	0.24	0.70	<0.02	%	TM21/PM24
pH #	6.38	8.62	7.50	7.26	6.91	7.51	7.34	7.87	8.59	8.07	<0.01	pH units	TM73/PM11
Mass of raw test portion	0.1106	0.1017	0.1049	0.1082	0.1124	0.1089	0.1056	0.1102	0.1027	0.1093		kg	NONE/PM17
Mass of dried test portion	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09		kg	NONE/PM17

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland
Reference: 8660-04-19
Location: Mill Road, Drogheda
Contact: Aisling McDonnell
JE Job No.: 19/7701

Report : CEN 10:1 1 Batch

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	LOD/LOR	Units	Method No.
Sample ID	TP01	TP02	TP03	TP04	TP06	TP07	TP08	TP09	TP10	TP11			
Depth	0.50	0.50	1.00	0.50	0.50	0.50	0.50	0.50	0.50	0.50			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	30/04/2019	30/04/2019	30/04/2019	30/04/2019	30/04/2019	30/04/2019	01/05/2019	01/05/2019	01/05/2019	01/05/2019			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019			
Dissolved Antimony #	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	mg/l	TM30/PM17
Dissolved Antimony (A10) #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM30/PM17
Dissolved Arsenic #	0.0039	<0.0025	<0.0025	0.0050	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	mg/l	TM30/PM17
Dissolved Arsenic (A10) #	0.039	<0.025	<0.025	0.050	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	mg/kg	TM30/PM17
Dissolved Barium #	<0.003	0.004	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.011	0.004	<0.003	mg/l	TM30/PM17
Dissolved Barium (A10) #	<0.03	0.04	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.11	0.04	<0.03	mg/kg	TM30/PM17
Dissolved Cadmium #	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	mg/l	TM30/PM17
Dissolved Cadmium (A10) #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	mg/kg	TM30/PM17
Dissolved Chromium #	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	mg/l	TM30/PM17
Dissolved Chromium (A10) #	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	mg/kg	TM30/PM17
Dissolved Copper #	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	mg/l	TM30/PM17
Dissolved Copper (A10) #	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	mg/kg	TM30/PM17
Dissolved Lead #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	mg/l	TM30/PM17
Dissolved Lead (A10) #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM30/PM17
Dissolved Molybdenum #	0.006	<0.002	0.004	0.017	<0.002	<0.002	0.002	<0.002	<0.002	0.003	<0.002	mg/l	TM30/PM17
Dissolved Molybdenum (A10) #	0.06	<0.02	0.04	0.17	<0.02	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	mg/kg	TM30/PM17
Dissolved Nickel #	<0.002	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	<0.002	<0.002	<0.002	mg/l	TM30/PM17
Dissolved Nickel (A10) #	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM30/PM17
Dissolved Selenium #	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	mg/l	TM30/PM17
Dissolved Selenium (A10) #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM30/PM17
Dissolved Zinc #	<0.003	<0.003	0.003	0.004	0.005	0.005	0.005	0.004	<0.003	<0.003	<0.003	mg/l	TM30/PM17
Dissolved Zinc (A10) #	<0.03	<0.03	0.03	0.04	0.05	0.05	0.05	0.04	<0.03	<0.03	<0.03	mg/kg	TM30/PM17
Mercury Dissolved by CVAF #	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	mg/l	TM61/PM0
Mercury Dissolved by CVAF #	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	mg/kg	TM61/PM0
Phenol	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l	TM26/PM0
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM26/PM0
Fluoride	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	0.8	<0.3	mg/l	TM173/PM0
Fluoride	<3	<3	<3	<3	<3	<3	<3	<3	<3	8	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	<0.5	0.5	0.5	0.7	3.3	2.2	<0.5	1.3	2.7	1.5	<0.5	mg/l	TM38/PM0
Sulphate as SO4 #	<5	5	5	7	33	22	<5	13	27	15	<5	mg/kg	TM38/PM0
Chloride #	0.9	0.3	0.3	0.4	<0.3	0.4	0.3	0.3	0.6	1.0	<0.3	mg/l	TM38/PM0
Chloride #	9	3	3	4	<3	4	<3	<3	6	10	<3	mg/kg	TM38/PM0
Dissolved Organic Carbon	<2	3	5	<2	2	3	3	4	<2	<2	<2	mg/l	TM60/PM0
Dissolved Organic Carbon	<20	30	50	<20	20	30	30	40	<20	<20	<20	mg/kg	TM60/PM0
pH	8.38	7.88	7.57	8.15	7.72	7.42	7.32	6.03	7.09	7.45	<0.01	pH units	TM73/PM0
Total Dissolved Solids #	49	67	38	72	<35	40	44	38	114	36	<35	mg/l	TM20/PM0
Total Dissolved Solids #	490	670	380	720	<350	400	440	380	1140	360	<350	mg/kg	TM20/PM0

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland
Reference: 8660-04-19
Location: Mill Road, Drogheda
Contact: Aisling McDonnell
JE Job No.: 19/7701

Report : CEN 10:1 1 Batch

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	31-33	34-36	37-39	40-42	43-45	46-48	49-51	52-54	55-57	58-60	LOD/LOR	Units	Method No.
Sample ID	TP12	TP13	TP14	TP15	TP16	TP17	TP18	TP19	TP20	TP21			
Depth	0.50	1.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	01/05/2019	01/05/2019	01/05/2019	01/05/2019	01/05/2019	01/05/2019	01/05/2019	01/05/2019	01/05/2019	01/05/2019			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019			
Dissolved Antimony #	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	<0.002	<0.002	<0.002	<0.002	mg/l	TM30/PM17
Dissolved Antimony (A10) #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM30/PM17
Dissolved Arsenic #	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	mg/l	TM30/PM17
Dissolved Arsenic (A10) #	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	mg/kg	TM30/PM17
Dissolved Barium #	<0.003	<0.003	<0.003	<0.003	0.005	<0.003	<0.003	0.010	<0.003	0.005	<0.003	mg/l	TM30/PM17
Dissolved Barium (A10) #	<0.03	<0.03	<0.03	<0.03	0.05	<0.03	<0.03	0.10	<0.03	0.05	<0.03	mg/kg	TM30/PM17
Dissolved Cadmium #	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	mg/l	TM30/PM17
Dissolved Cadmium (A10) #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	mg/kg	TM30/PM17
Dissolved Chromium #	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	mg/l	TM30/PM17
Dissolved Chromium (A10) #	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	mg/kg	TM30/PM17
Dissolved Copper #	<0.007	<0.007	<0.007	<0.007	0.009	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	mg/l	TM30/PM17
Dissolved Copper (A10) #	<0.07	<0.07	<0.07	<0.07	0.09	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	mg/kg	TM30/PM17
Dissolved Lead #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	mg/l	TM30/PM17
Dissolved Lead (A10) #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM30/PM17
Dissolved Molybdenum #	<0.002	0.004	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	<0.002	0.002	<0.002	mg/l	TM30/PM17
Dissolved Molybdenum (A10) #	<0.02	0.04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM30/PM17
Dissolved Nickel #	0.002	<0.002	<0.002	<0.002	0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	mg/l	TM30/PM17
Dissolved Nickel (A10) #	0.02	<0.02	<0.02	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM30/PM17
Dissolved Selenium #	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	mg/l	TM30/PM17
Dissolved Selenium (A10) #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM30/PM17
Dissolved Zinc #	<0.003	<0.003	<0.003	<0.003	0.003	<0.003	0.003	<0.003	<0.003	<0.003	<0.003	mg/l	TM30/PM17
Dissolved Zinc (A10) #	<0.03	<0.03	<0.03	<0.03	0.03	<0.03	0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM30/PM17
Mercury Dissolved by CVAF #	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	mg/l	TM61/PM0
Mercury Dissolved by CVAF #	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	mg/kg	TM61/PM0
Phenol	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l	TM26/PM0
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM26/PM0
Fluoride	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	0.4	<0.3	mg/l	TM173/PM0
Fluoride	<3	<3	<3	<3	<3	<3	<3	<3	<3	4	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	<0.5	1.0	0.5	1.5	0.7	1.6	2.4	1.4	<0.5	0.5	<0.5	mg/l	TM38/PM0
Sulphate as SO4 #	<5	10	5	15	7	16	24	14	<5	<5	<5	mg/kg	TM38/PM0
Chloride #	0.5	0.4	<0.3	0.4	0.6	<0.3	<0.3	<0.3	0.4	0.4	<0.3	mg/l	TM38/PM0
Chloride #	5	4	<3	4	6	<3	<3	<3	4	4	<3	mg/kg	TM38/PM0
Dissolved Organic Carbon	3	<2	3	3	5	3	3	2	<2	2	<2	mg/l	TM60/PM0
Dissolved Organic Carbon	30	<20	30	30	50	30	30	<20	<20	<20	<20	mg/kg	TM60/PM0
pH	7.47	7.99	7.81	7.52	7.19	7.23	7.08	7.70	7.72	7.79	<0.01	pH units	TM73/PM0
Total Dissolved Solids #	<35	50	61	50	59	53	35	82	43	89	<35	mg/l	TM20/PM0
Total Dissolved Solids #	<350	500	610	500	590	530	350	820	430	890	<350	mg/kg	TM20/PM0

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland
Reference: 8660-04-19
Location: Mill Road, Drogheda
Contact: Aisling McDonnell
JE Job No.: 19/7701

Report : EN12457_2

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

J E Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30						
Sample ID	TP01	TP02	TP03	TP04	TP06	TP07	TP08	TP09	TP10	TP11						
Depth	0.50	0.50	1.00	0.50	0.50	0.50	0.50	0.50	0.50	0.50						
COC No / misc																
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T						
Sample Date	30/04/2019	30/04/2019	30/04/2019	30/04/2019	30/04/2019	30/04/2019	01/05/2019	01/05/2019	01/05/2019	01/05/2019						
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil						
Batch Number	1	1	1	1	1	1	1	1	1	1	Inert	Stable Non-reactive	Hazardous	LOD LOR	Units	Method No.
Date of Receipt	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019						
Solid Waste Analysis																
Total Organic Carbon #	0.43	0.91	0.35	0.76	0.33	0.35	0.56	0.68	0.60	0.38	3	5	6	<0.02	%	TM21/PM24
Sum of BTEX	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	6	-	-	<0.025	mg/kg	TM31/PM12
Sum of 7 PCBs #	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	1	-	-	<0.035	mg/kg	TM17/PM8
Mineral Oil	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	500	-	-	<30	mg/kg	TM5/PM8/PM16
PAH Sum of 6 #	<0.22	<0.22	<0.22	7.19	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	-	-	-	<0.22	mg/kg	TM4/PM8
PAH Sum of 17	<0.64	<0.64	<0.64	14.74	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	100	-	-	<0.64	mg/kg	TM4/PM8
CEN 10:1 Leachate																
Arsenic #	0.039	<0.025	<0.025	0.050	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.5	2	25	<0.025	mg/kg	TM30/PM17
Barium #	<0.03	0.04	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.11	0.04	20	100	300	<0.03	mg/kg	TM30/PM17
Cadmium #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.04	1	5	<0.005	mg/kg	TM30/PM17
Chromium #	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	0.5	10	70	<0.015	mg/kg	TM30/PM17
Copper #	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	2	50	100	<0.07	mg/kg	TM30/PM17
Mercury #	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.01	0.2	2	<0.0001	mg/kg	TM61/PM0
Molybdenum #	0.06	<0.02	0.04	0.17	<0.02	<0.02	<0.02	<0.02	<0.02	0.03	0.5	10	30	<0.02	mg/kg	TM30/PM17
Nickel #	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.4	10	40	<0.02	mg/kg	TM30/PM17
Lead #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.5	10	50	<0.05	mg/kg	TM30/PM17
Antimony #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.06	0.7	5	<0.02	mg/kg	TM30/PM17
Selenium #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.1	0.5	7	<0.03	mg/kg	TM30/PM17
Zinc #	<0.03	<0.03	0.03	0.04	0.05	0.05	0.05	0.04	<0.03	<0.03	4	50	200	<0.03	mg/kg	TM30/PM17
Total Dissolved Solids #	490	670	380	720	<350	400	440	380	1140	360	4000	60000	100000	<350	mg/kg	TM20/PM0
Dissolved Organic Carbon	<20	30	50	<20	20	30	30	40	<20	<20	500	800	1000	<20	mg/kg	TM60/PM0
Mass of raw test portion	0.1102	0.1139	0.1096	0.1107	0.1079	0.1119	0.1065	0.1136	0.1144	0.1054	-	-	-		kg	NONE/PM17
Dry Matter Content Ratio	81.6	78.9	82.4	81.5	83.2	80.3	84.2	79.0	79.0	85.4	-	-	-	<0.1	%	NONE/PM4
Leachant Volume	0.88	0.876	0.881	0.879	0.882	0.878	0.883	0.876	0.876	0.885	-	-	-		l	NONE/PM17
Eluate Volume	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.82	0.55	0.6	-	-	-		l	NONE/PM17
pH #	8.61	8.15	8.09	8.44	7.98	7.65	8.26	6.49	7.63	7.51	-	-	-	<0.01	pH units	TM73/PM11
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1	-	-	<0.1	mg/kg	TM26/PM0
Fluoride	<3	<3	<3	<3	<3	<3	<3	<3	<3	8	-	-	-	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	<5	5	5	7	33	22	<5	13	27	15	1000	20000	50000	<5	mg/kg	TM38/PM0
Chloride #	9	3	3	4	<3	4	<3	<3	6	10	800	15000	25000	<3	mg/kg	TM38/PM0

Client Name: Ground Investigations Ireland
Reference: 8660-04-19
Location: Mill Road, Drogheda
Contact: Aisling McDonnell
JE Job No.: 19/7701

Report : EN12457_2

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

J E Sample No.	31-33	34-36	37-39	40-42	43-45	46-48	49-51	52-54	55-57	58-60						
Sample ID	TP12	TP13	TP14	TP15	TP16	TP17	TP18	TP19	TP20	TP21						
Depth	0.50	1.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50						
COC No / misc																
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T						
Sample Date	01/05/2019	01/05/2019	01/05/2019	01/05/2019	01/05/2019	01/05/2019	01/05/2019	01/05/2019	01/05/2019	01/05/2019						
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil						
Batch Number	1	1	1	1	1	1	1	1	1	1	Inert	Stable Non-reactive	Hazardous	LOD LOR	Units	Method No.
Date of Receipt	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019	13/05/2019						
Solid Waste Analysis																
Total Organic Carbon #	0.91	0.13	0.48	0.49	1.54	0.46	0.42	0.50	0.24	0.70	3	5	6	<0.02	%	TM21/PM24
Sum of BTEX	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	6	-	-	<0.025	mg/kg	TM31/PM12
Sum of 7 PCBs #	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	1	-	-	<0.035	mg/kg	TM17/PM8
Mineral Oil	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	500	-	-	<30	mg/kg	TM5/PM8/PM16
PAH Sum of 6 #	<0.22	<0.22	<0.22	<0.22	0.32	<0.22	<0.22	<0.22	<0.22	<0.22	-	-	-	<0.22	mg/kg	TM4/PM8
PAH Sum of 17	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	100	-	-	<0.64	mg/kg	TM4/PM8
CEN 10:1 Leachate																
Arsenic #	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.5	2	25	<0.025	mg/kg	TM30/PM17
Barium #	<0.03	<0.03	<0.03	<0.03	0.05	<0.03	<0.03	0.10	<0.03	0.05	20	100	300	<0.03	mg/kg	TM30/PM17
Cadmium #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.04	1	5	<0.005	mg/kg	TM30/PM17
Chromium #	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	0.5	10	70	<0.015	mg/kg	TM30/PM17
Copper #	<0.07	<0.07	<0.07	<0.07	0.09	<0.07	<0.07	<0.07	<0.07	<0.07	2	50	100	<0.07	mg/kg	TM30/PM17
Mercury #	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.01	0.2	2	<0.0001	mg/kg	TM61/PM0
Molybdenum #	<0.02	0.04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.5	10	30	<0.02	mg/kg	TM30/PM17
Nickel #	0.02	<0.02	<0.02	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	0.4	10	40	<0.02	mg/kg	TM30/PM17
Lead #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.5	10	50	<0.05	mg/kg	TM30/PM17
Antimony #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.02	0.06	0.7	5	<0.02	mg/kg	TM30/PM17
Selenium #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.1	0.5	7	<0.03	mg/kg	TM30/PM17
Zinc #	<0.03	<0.03	<0.03	<0.03	0.03	<0.03	0.03	<0.03	<0.03	<0.03	4	50	200	<0.03	mg/kg	TM30/PM17
Total Dissolved Solids #	<350	500	610	500	590	530	350	820	430	890	4000	60000	100000	<350	mg/kg	TM20/PM0
Dissolved Organic Carbon	30	<20	30	30	50	30	30	<20	<20	<20	500	800	1000	<20	mg/kg	TM60/PM0
Mass of raw test portion	0.1106	0.1017	0.1049	0.1082	0.1124	0.1089	0.1056	0.1102	0.1027	0.1093	-	-	-		kg	NONE/PM17
Dry Matter Content Ratio	81.6	88.1	85.5	83.3	80.3	82.4	85.4	81.3	87.7	82.7	-	-	-	<0.1	%	NONE/PM4
Leachant Volume	0.88	0.888	0.885	0.882	0.878	0.881	0.885	0.879	0.887	0.881	-	-	-		l	NONE/PM17
Eluate Volume	0.82	0.78	0.85	0.85	0.82	0.81	0.85	0.7	0.8	0.85	-	-	-		l	NONE/PM17
pH #	6.38	8.62	7.50	7.26	6.91	7.51	7.34	7.87	8.59	8.07	-	-	-	<0.01	pH units	TM73/PM11
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1	-	-	<0.1	mg/kg	TM26/PM0
Fluoride	<3	<3	<3	<3	<3	<3	<3	<3	<3	4	-	-	-	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	<5	10	5	15	7	16	24	14	<5	<5	1000	20000	50000	<5	mg/kg	TM38/PM0
Chloride #	5	4	<3	4	6	<3	<3	<3	4	4	800	15000	25000	<3	mg/kg	TM38/PM0

Client Name: Ground Investigations Ireland **Matrix : Solid**
Reference: 8660-04-19
Location: Mill Road, Drogheda
Contact: Aisling McDonnell

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	EPH Interpretation
19/7701	1	TP01	0.50	1-3	No interpretation possible
19/7701	1	TP02	0.50	4-6	No interpretation possible
19/7701	1	TP03	1.00	7-9	No interpretation possible
19/7701	1	TP04	0.50	10-12	PAH's
19/7701	1	TP06	0.50	13-15	No interpretation possible
19/7701	1	TP07	0.50	16-18	No interpretation possible
19/7701	1	TP08	0.50	19-21	No interpretation possible
19/7701	1	TP09	0.50	22-24	No interpretation possible
19/7701	1	TP10	0.50	25-27	No interpretation possible
19/7701	1	TP11	0.50	28-30	No interpretation possible
19/7701	1	TP12	0.50	31-33	No interpretation possible
19/7701	1	TP13	1.50	34-36	No interpretation possible
19/7701	1	TP14	0.50	37-39	No interpretation possible
19/7701	1	TP15	0.50	40-42	No interpretation possible
19/7701	1	TP16	0.50	43-45	No interpretation possible
19/7701	1	TP17	0.50	46-48	No interpretation possible
19/7701	1	TP18	0.50	49-51	No interpretation possible
19/7701	1	TP19	0.50	52-54	No interpretation possible
19/7701	1	TP20	0.50	55-57	No interpretation possible
19/7701	1	TP21	0.50	58-60	No interpretation possible

Client Name: Ground Investigations Ireland
Reference: 19/04/8660
Location: Mill Road, Drogheda
Contact: Aisling McDonnell

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level less than 0.1%, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:

Ryan Butterworth
Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
19/7701	1	TP01	0.50	2	17/05/2019	**General Description (Bulk Analysis)**	soil-stones
					17/05/2019	**Asbestos Fibres**	NAD
					17/05/2019	**Asbestos ACM**	NAD
					17/05/2019	**Asbestos Type**	NAD
					17/05/2019	**Asbestos Level Screen**	NAD
19/7701	1	TP02	0.50	5	17/05/2019	**General Description (Bulk Analysis)**	soil-stones
					17/05/2019	**Asbestos Fibres**	NAD
					17/05/2019	**Asbestos ACM**	NAD
					17/05/2019	**Asbestos Type**	NAD
					17/05/2019	**Asbestos Level Screen**	NAD
19/7701	1	TP03	1.00	8	17/05/2019	**General Description (Bulk Analysis)**	soil-stones
					17/05/2019	**Asbestos Fibres**	NAD
					17/05/2019	**Asbestos ACM**	NAD
					17/05/2019	**Asbestos Type**	NAD
					17/05/2019	**Asbestos Level Screen**	NAD
19/7701	1	TP04	0.50	11	17/05/2019	**General Description (Bulk Analysis)**	soil-stones
					17/05/2019	**Asbestos Fibres**	NAD
					17/05/2019	**Asbestos ACM**	NAD
					17/05/2019	**Asbestos Type**	NAD
					17/05/2019	**Asbestos Level Screen**	NAD
19/7701	1	TP06	0.50	14	17/05/2019	**General Description (Bulk Analysis)**	soil-stones
					17/05/2019	**Asbestos Fibres**	NAD
					17/05/2019	**Asbestos ACM**	NAD
					17/05/2019	**Asbestos Type**	NAD
					17/05/2019	**Asbestos Level Screen**	NAD
19/7701	1	TP07	0.50	17	17/05/2019	**General Description (Bulk Analysis)**	Soil/Stone
					17/05/2019	**Asbestos Fibres**	NAD
					17/05/2019	**Asbestos ACM**	NAD
					17/05/2019	**Asbestos Type**	NAD
					17/05/2019	**Asbestos Level Screen**	NAD
19/7701	1	TP08	0.50	20	17/05/2019	**General Description (Bulk Analysis)**	soil.stones
					17/05/2019	**Asbestos Fibres**	NAD
					17/05/2019	**Asbestos ACM**	NAD

Client Name: Ground Investigations Ireland
Reference: 19/04/8660
Location: Mill Road, Drogheda
Contact: Aisling McDonnell

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
19/7701	1	TP08	0.50	20	17/05/2019	**Asbestos Type**	NAD
					17/05/2019	**Asbestos Level Screen**	NAD
19/7701	1	TP09	0.50	23	17/05/2019	**General Description (Bulk Analysis)**	soil.stones
					17/05/2019	**Asbestos Fibres**	NAD
					17/05/2019	**Asbestos ACM**	NAD
					17/05/2019	**Asbestos Type**	NAD
					17/05/2019	**Asbestos Level Screen**	NAD
19/7701	1	TP10	0.50	26	17/05/2019	**General Description (Bulk Analysis)**	Soil/Stone
					17/05/2019	**Asbestos Fibres**	NAD
					17/05/2019	**Asbestos ACM**	NAD
					17/05/2019	**Asbestos Type**	NAD
					17/05/2019	**Asbestos Level Screen**	NAD
19/7701	1	TP11	0.50	29	17/05/2019	**General Description (Bulk Analysis)**	Soil/Stone
					17/05/2019	**Asbestos Fibres**	NAD
					17/05/2019	**Asbestos ACM**	NAD
					17/05/2019	**Asbestos Type**	NAD
					17/05/2019	**Asbestos Level Screen**	NAD
19/7701	1	TP12	0.50	32	17/05/2019	**General Description (Bulk Analysis)**	Soil/Stone
					17/05/2019	**Asbestos Fibres**	NAD
					17/05/2019	**Asbestos ACM**	NAD
					17/05/2019	**Asbestos Type**	NAD
					17/05/2019	**Asbestos Level Screen**	NAD
19/7701	1	TP13	1.50	35	17/05/2019	**General Description (Bulk Analysis)**	Soil/Stone
					17/05/2019	**Asbestos Fibres**	NAD
					17/05/2019	**Asbestos ACM**	NAD
					17/05/2019	**Asbestos Type**	NAD
					17/05/2019	**Asbestos Level Screen**	NAD
19/7701	1	TP14	0.50	38	17/05/2019	**General Description (Bulk Analysis)**	soil-stones
					17/05/2019	**Asbestos Fibres**	NAD
					17/05/2019	**Asbestos ACM**	NAD
					17/05/2019	**Asbestos Type**	NAD
					17/05/2019	**Asbestos Level Screen**	NAD
19/7701	1	TP15	0.50	41	17/05/2019	**General Description (Bulk Analysis)**	Soil/Stone
					17/05/2019	**Asbestos Fibres**	NAD
					17/05/2019	**Asbestos ACM**	NAD
					17/05/2019	**Asbestos Type**	NAD
					17/05/2019	**Asbestos Level Screen**	NAD
19/7701	1	TP16	0.50	44	17/05/2019	**General Description (Bulk Analysis)**	Soil/Stone
					17/05/2019	**Asbestos Fibres**	NAD
					17/05/2019	**Asbestos ACM**	NAD
					17/05/2019	**Asbestos Type**	NAD
					17/05/2019	**Asbestos Level Screen**	NAD
19/7701	1	TP17	0.50	47	17/05/2019	**General Description (Bulk Analysis)**	Soil/Stone
					17/05/2019	**Asbestos Fibres**	NAD

Client Name: Ground Investigations Ireland
Reference: 19/04/8660
Location: Mill Road, Drogheda
Contact: Aisling McDonnell

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
19/7701	1	TP17	0.50	47	17/05/2019	**Asbestos ACM**	NAD
					17/05/2019	**Asbestos Type**	NAD
					17/05/2019	**Asbestos Level Screen**	NAD
19/7701	1	TP18	0.50	50	17/05/2019	**General Description (Bulk Analysis)**	soil-stones
					17/05/2019	**Asbestos Fibres**	NAD
					17/05/2019	**Asbestos ACM**	NAD
					17/05/2019	**Asbestos Type**	NAD
					17/05/2019	**Asbestos Level Screen**	NAD
19/7701	1	TP19	0.50	53	17/05/2019	**General Description (Bulk Analysis)**	Soil/Stone
					17/05/2019	**Asbestos Fibres**	NAD
					17/05/2019	**Asbestos ACM**	NAD
					17/05/2019	**Asbestos Type**	NAD
					17/05/2019	**Asbestos Level Screen**	NAD
19/7701	1	TP20	0.50	56	17/05/2019	**General Description (Bulk Analysis)**	Soil/Stone
					17/05/2019	**Asbestos Fibres**	NAD
					17/05/2019	**Asbestos ACM**	NAD
					17/05/2019	**Asbestos Type**	NAD
					17/05/2019	**Asbestos Level Screen**	NAD
19/7701	1	TP21	0.50	59	17/05/2019	**General Description (Bulk Analysis)**	Soil/Stone
					17/05/2019	**Asbestos Fibres**	NAD
					17/05/2019	**Asbestos ACM**	NAD
					17/05/2019	**Asbestos Type**	NAD
					17/05/2019	**Asbestos Level Screen**	NAD

Client Name: Ground Investigations Ireland

Reference: 8660-04-19

Location: Mill Road, Drogheda

Contact: Aisling McDonnell

Matrix : Solid

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
19/7701	1	TP01	0.50	1-3	EPH, PAH, PCB	Sample holding time exceeded
19/7701	1	TP02	0.50	4-6	EPH, PAH, PCB	Sample holding time exceeded
19/7701	1	TP03	1.00	7-9	EPH, PAH, PCB	Sample holding time exceeded
19/7701	1	TP04	0.50	10-12	EPH, PAH, PCB	Sample holding time exceeded
19/7701	1	TP06	0.50	13-15	EPH, PAH, PCB	Sample holding time exceeded
19/7701	1	TP07	0.50	16-18	EPH, PAH, PCB	Sample holding time exceeded
19/7701	1	TP08	0.50	19-21	EPH, PAH, PCB	Sample holding time exceeded
19/7701	1	TP09	0.50	22-24	EPH, PAH, PCB	Sample holding time exceeded
19/7701	1	TP10	0.50	25-27	EPH, PAH, PCB	Sample holding time exceeded
19/7701	1	TP11	0.50	28-30	EPH, PAH, PCB	Sample holding time exceeded
19/7701	1	TP12	0.50	31-33	EPH, PAH, PCB	Sample holding time exceeded
19/7701	1	TP13	1.50	34-36	EPH, PAH, PCB	Sample holding time exceeded
19/7701	1	TP14	0.50	37-39	EPH, PAH, PCB	Sample holding time exceeded
19/7701	1	TP15	0.50	40-42	EPH, PAH, PCB	Sample holding time exceeded
19/7701	1	TP16	0.50	43-45	EPH, PAH, PCB	Sample holding time exceeded
19/7701	1	TP17	0.50	46-48	EPH, PAH, PCB	Sample holding time exceeded
19/7701	1	TP18	0.50	49-51	EPH, PAH, PCB	Sample holding time exceeded
19/7701	1	TP19	0.50	52-54	EPH, PAH, PCB	Sample holding time exceeded
19/7701	1	TP20	0.50	55-57	EPH, PAH, PCB	Sample holding time exceeded
19/7701	1	TP21	0.50	58-60	EPH, PAH, PCB	Sample holding time exceeded

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 19/7701

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to an Exova Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

Appendix - Methods used for WAC (2003/33/EC)

JE Job No.: 19/7701

Leachate tests	
10l/kg; 4mm	I.S. EN 12457-2:2002 Specified particle size; water added to L/S ratio; capped; agitated for 24 ± 0.5 hours; eluate settled and filtered over 0.45 µm membrane filter.
Eluate analysis	
As	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Ba	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Cd	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Cr total	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Cu	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Hg	I.S. EN 13370 rec. EN 1483 (CVAAS)
Mo	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Ni	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Pb	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Sb	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Se	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Zn	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Chloride	I.S. EN 12506 rec. EN ISO 10304-part 1 (liquid chromatography of ions)
Fluoride	I.S. EN 12506 rec. EN ISO 10304-part 1 (liquid chromatography of ions)
Sulphate	I.S. EN 12506 rec. EN ISO 10304-part 1 (liquid chromatography of ions)
Phenol index	I.S. EN 13370 rec. ISO 6439 (4-Aminoantipyrine spectrometic methods after distillation)* (BY HPLC - Jones Env)
DOC	I.S. EN 1484
TDS	I.S. EN 15216
Compositional analysis	
TOC	I.S. EN 13137 Method B: carbonates removed with acid; TOC by combustion.
BTEX	GC-FID
PCB7**	I.S. EN 15308 analysis by GC-ECD.
Mineral oil	I.S. EN 14039 C10 to C40 analysis by GC-FID.
PAH17***	I.S. EN 15527 PAH17 analysis by GC-MS
Metals	I.S. EN 13657 - Aqua regia digestion: EN ISO 11885 (ICP-OES)
Other	
Dry matter	I.S. EN 14346 sample is dried to a constant mass in an oven at 105 ± 3 °C; Method B Water content by direct Karl-Fischer-titration and either volumetric or coulometric detection.
LOI	I.S. EN 15169 Difference in mass after heating in a furnace up to 550 ± 25 °C.
ANC	CEN/TS 15364 Determined by amouns of acid or base needed to cover the pH range

Notes:

*If not suitable due to LOD, precision, etc., any other suitable method can be used, e.g. AFS, ICP-MS
**PCB-28, PCB-52, PCB-101, PCB-118, PCB-138, PCB-153 and PCB-180

***Naphthalene, Acenaphthylene, Acenaphthene, Anthracene, Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(g,h,i)perylene, Benzo(a)pyrene, Chrysene, Coronene, Dibenzo(a,h)anthracene, Fluorene, Fluoranthene, Indeno(1,2,3-c,d)pyrene, Phenanthrene and Pyrene.

JE Job No: 19/7701

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM17	Modified US EPA method 8270. Determination of specific Polychlorinated Biphenyl congeners by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM20	Modified BS 1377-3: 1990/USEPA 160.3 Gravimetric determination of Total Dissolved Solids/Total Solids	PM0	No preparation is required.	Yes		AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.	Yes		AD	Yes

JE Job No: 19/7701

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.			AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM17	Modified method BS EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.	Yes		AR	Yes
TM31	Modified USEPA 8015B. Determination of Methyltertbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM31	Modified USEPA 8015B. Determination of Methyltertbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results can be confirmed using GCMS.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results can be confirmed using GCMS.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM0	No preparation is required.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes

JE Job No: 19/7701

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM60	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060, APHA Standard Methods for Examination of Water and Wastewater 5310B, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.			AR	Yes
TM61	Modified US EPA methods 245.7 and 200.7. Determination of Mercury by Cold Vapour Atomic Fluorescence.	PM0	No preparation is required.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.			AR	Yes
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
TM173	Analysis of fluoride by ISE (Ion Selective Electrode) using modified ISE method 340.2	PM0	No preparation is required.			AR	Yes
NONE	No Method Code	NONE	No Method Code			AD	Yes
NONE	No Method Code	PM17	Modified method BS EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.				
NONE	No Method Code	PM17	Modified method BS EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.			AR	
NONE	No Method Code	PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.			AR	

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Attention :	Aisling McDonnell
Date :	20th June, 2019
Your reference :	8660-04-19
Our reference :	Test Report 19/9329 Batch 1
Location :	Mill Road Drogheda
Date samples received :	10th June, 2019
Status :	Final report
Issue :	1

Nine samples were received for analysis on 10th June, 2019 of which nine were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Compiled By:

Phil Sommerton BSc
Senior Project Manager

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 8660-04-19
Location: Mill Road Drogheda
Contact: Aisling McDonnell
EMT Job No: 19/9329

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1	2	3	4	5	6	7	8	9		LOD/LOR	Units	Method No.
Sample ID	TP01	TP02	TP03	TP06	TP07	TP08	TP09	TP10	TP11				
Depth	0.50	0.50	1.00	0.50	0.50	0.50	0.50	0.50	0.50				
COC No / misc													
Containers	T	T	T	T	T	T	T	T	T				
Sample Date	30/04/2019	30/04/2019	30/04/2019	30/04/2019	30/04/2019	01/05/2019	01/05/2019	01/05/2019	01/05/2019				
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil				
Batch Number	1	1	1	1	1	1	1	1	1				
Date of Receipt	10/06/2019	10/06/2019	10/06/2019	10/06/2019	10/06/2019	10/06/2019	10/06/2019	10/06/2019	10/06/2019				
Sulphate as SO4 (2:1 Ext) #	0.0027	0.0167	0.0025	0.0155	0.0108	0.0079	0.0125	0.0106	0.0152		<0.0015	g/l	TM38/PM20
pH #	8.63	8.13	8.17	8.05	7.91	8.23	6.77	7.70	6.69		<0.01	pH units	TM73/PM11

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland

Reference: 8660-04-19

Location: Mill Road Drogheda

Contact: Aisling McDonnell

Matrix : Solid

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
19/9329	1	TP01	0.50	1	pH, Sulphate	Sample holding time exceeded prior to receipt
19/9329	1	TP02	0.50	2	pH, Sulphate	Sample holding time exceeded prior to receipt
19/9329	1	TP03	1.00	3	pH, Sulphate	Sample holding time exceeded prior to receipt
19/9329	1	TP06	0.50	4	pH, Sulphate	Sample holding time exceeded prior to receipt
19/9329	1	TP07	0.50	5	pH, Sulphate	Sample holding time exceeded prior to receipt
19/9329	1	TP08	0.50	6	pH, Sulphate	Sample holding time exceeded prior to receipt
19/9329	1	TP09	0.50	7	pH, Sulphate	Sample holding time exceeded prior to receipt
19/9329	1	TP10	0.50	8	pH, Sulphate	Sample holding time exceeded prior to receipt
19/9329	1	TP11	0.50	9	pH, Sulphate	Sample holding time exceeded prior to receipt

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No: 19/9329

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

EMT Job No: 19/9329

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No

APPENDIX 7 – Groundwater Monitoring

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GROUNDWATER MONITORING

Mill Road Drogheda

BOREHOLE	DATE	TIME	GROUNDWATER (mBGL)	Comments
RC05	16/07/2019	3.57pm	3.57	
RC05	02/08/2019	3.55pm	3.75	