PROPOSED HOUSING DEVELOPMENT AT CORNAMADDY, ATHLONE, CO. WESTMEATH

SERVICES DESIGN REPORT

CLIENT.	WESTMEATH COUNTY COUNCIL
PROJECT NO.	23188
DOCUMENT NO.	23188-SDS-XX-RP-C-0001-01
DATE	NOVEMBER 2025

REV. 01

DOCUMENT TITLE SHEET

Client:	Westmeath County Council, Aras An Chontae, Mount Street, Mullingar, N91 FH4N.
Project Description:	The proposed development at Cornamaddy, Athlone, Co. Westmeath. The Construction of 94no. residential units comprising of the following: (55no. 2 bed (4 person) terraced houses (c.86m2 each), 14no. 3 bed terraced houses (c. 100 m2 each) and 2 no. 4 bed 2 story semi detached houses (c. 120m2 each) and 15 no. 4 bed 3 story semi detached houses (c. 148m2 each) all with associated private gardens.4no. 1 Bed Ground floor Apartments, 2 Person UD / Age Friendly (c. 51.5m2) and = 4no. 1 Bed first floor apartments, 2 Person (c. 51.5m2) with private amenity spaces on ground floor terraces or first floor balconies) and connection to existing services together with all ancillary site development works.
Project. No.	23188

DISCLAIMER

DOCUMENT CONTROL SHEET

PROJECT No:	23188				
PROJECT NAME:	Proposed Housing Development at Cornamaddy, Athlone, Co.Westmeath				
DOCUMENT REF:	P:\2023\23188 - Westmeath CoCo - Housing Scheme - Cornamaddy Athlone\Design\04 Service Design Report				
REVISION	**DATE**	**DESCRIPTION**	Services Design Report		
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1 INSTRUCTION

SDS Design Engineers have been appointed by the Client Westmeath County Council, to prepare a Services Design Report to accompany a Planning Application to Westmeath County Council for the proposed development, Cornamaddy, Athlone, Co. Westmeath.

2 PROJECT DETAILS

The proposed development at Cornamaddy, Athlone, Co. Westmeath comprises of the development of residential dwellings.

The proposed development comprises of the following:

- Formation of new development entrance
- The Construction of 94no. residential units comprising of the following:
  (55no. 2 bed (4 person) terraced houses (c.86m2 each), 14no. 3 bed terraced houses (c. 100 m2 each) and 2 no. 4 bed 2 story semi detached houses (c. 120m2 each) and 15 no. 4 bed 3 story semi detached houses (c. 148m2 each) all with associated private gardens.4no. 1 Bed Ground floor Apartments, 2 Person UD / Age Friendly (c. 51.5m2) and = 4no. 1 Bed first floor apartments, 2 Person (c. 51.5m2) with private amenity spaces on ground floor terraces or first floor balconies) and connection to existing services together with all ancillary site development works.
- all ancillary site development works

Figure 2.1 shows the proposed site layout plan for the new development.

Figure 2.1 – Proposed Site Layout Plan

3 SITE LOCATION, SITE DESCRIPTION

The application site is a greenfield site located in the townland of Cornamaddy, Athlone, Co. Westmeath. (Figure 3.1). The site is Located off the Ballymahon Road to the northeast of Athlone town centre. The site has an area of approximately 6.51 hectares (65,106.24m^2 | 16.08 acres). This application includes all the required drawings for the drainage and Sustainable urban Drainage Design Systems (SuDS), foul, and watermain works.

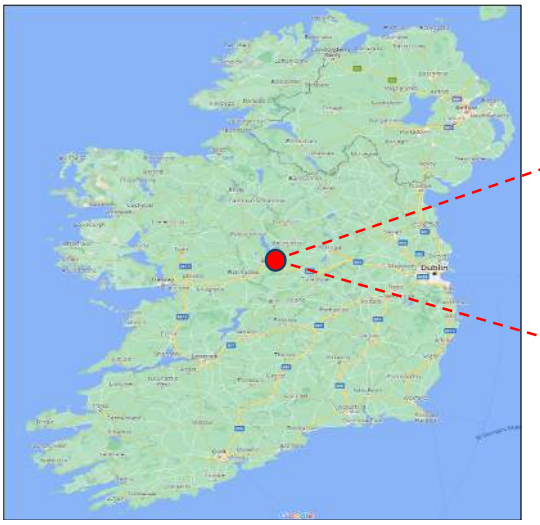

Figure 3.1 - Site Location *(image courtesy of Google Maps)*

Figure 3.2 – Site location at Cornamaddy, Athlone, Co. Westmeath (*image courtesy of)*

Figure 3.3 – Areal view of proposed site *(image courtesy of Google Maps*

4 BACKGROUND SURVEYS

4.1.1 Site Topography

A topographical survey was conducted by Erkina Surveys. in June 2024.. Topographical survey of the existing site is presented in Appendix A.

4.1.2 GROUND CONDITIONS

In order to assertain the existing ground counditions a site investigation was carried out by Site Investigations Ireland Ltd on the September 2024. The site invesigation includes the following elements:

- 12 No. Trial Pits
- 12 No. Boreholes
- 10 No. Plate Tests
- 5 No. Soakaway Tests
- Ground Probing Radar Survey

Figure 4.1 below shows the extend of the site investigation. Soil stratification was detrmined from TP01, to TP11 with topsoil overlying light grey, brown slightly sandy slightly gravelly clayey SILT**.** Made ground was identified at TP12. Infiltration testing was carried out in accrodance with BRE Digest 365 *Soakway Design*. Site testing yielded poor infiltration rates in four of the soakaway tests. However INF02 was completed. Refer to Appendix B for Site Investigations Ireland site investigation report.

Figure 4.1 Site investigation locations (Source: Site Investigations Ireland LTD)

5 FLOOD RISK

To establish if there is a risk of flooding to the proposed development and its location a desktop-based flood risk study was undertaken. As part of this study, several informative reports, studies, and records were reviewed to determine if risk of flooding was an issue. The following sources of information was used in order to determine if the proposed site poses a flood risk:

- Historic flood maps and reports from OPW (www.floodinfo.ie)
- Western Catchment Flood Risk Assessment and Management (CFRAM)
- Galway County Council Development Plan 2022-2028.

5.1 Historic Flooding

Figure 5.1 below shows the past flood events within 2.0 km zone of the site. Flooding was noted in January 2014; the extent of the flooding is unknown.

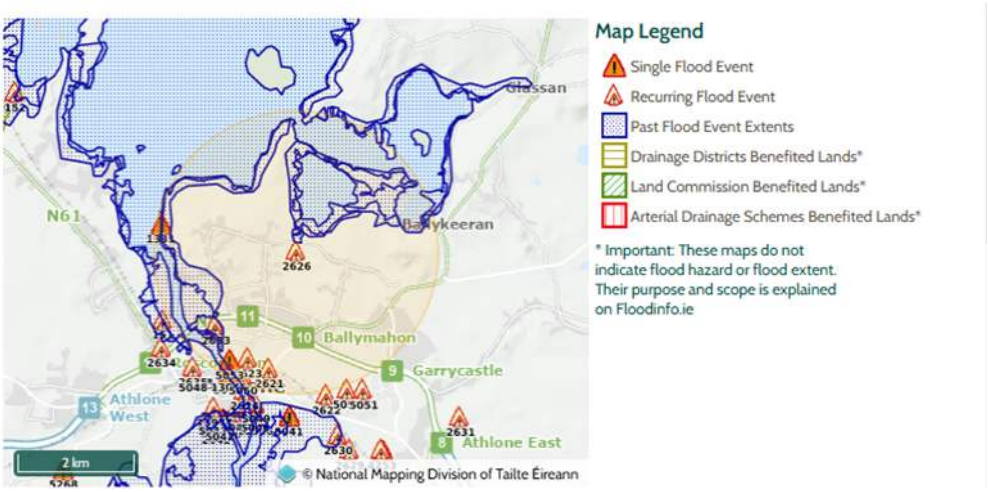

Figure 5.1 – Past flood events within 2.0Km of proposed site (Source: www.floodinfo.ie)

5.2 Flood Maps

Based on a review of the Western Catchment Flood Risk Assessment and Management (CFRAM) study it can be noted that proposed site is located within Flood Zone C (where the probability of flooding from rivers and the sea is low (less than. 0.1% or 1 in 1000 for both river and coastal flooding). Figure 5.2 below shows the flood map for the proposed site with the location of the proposed site marked with a red X.

Figure 5.2 – Flood Map (Source: County Mayo Strategic Flood Risk Assessment 2022)

5.3 Mitigating Risks

The proposed storm network strategy will pose a minimal risk to the proposed site and surrounding area. Thus, the following mitigating measures include:

1. The proposed drainage network including the SuDS features which shall be maintained on a regular basis to reduce the risk of a blockage.
2. The runoff from the site will be controlled through three separate hydrobrakes. The runoff from the site will be discharged into the existing stream with the final Hydrobrake on the site restricting the flow to 7.2 l/s
3. SuDS features are designed in accordance with Greater Dublin Strategic Drainage Study recommendations (1 in 100-year flood event plus 30% climate change due to global warming).

6 LOCAL AUTHORITY

Westmeath County Council will be provided with the relevant drawings and the associated design calculations for the services proposed for this development for consideration.

7 SURFACE WATER STRAGETY

The following section outlines the hierarchy of options when considering the removal and disposal of surface water from site, before outlining a host of potential sustainable urban drainage system (SuDS) techniques considered when designing the surface water collection system for the proposed site. The proposed surface strategy was designed in accordance with the following guidelines/polices:

- The SUDS Manual (C754,2015)
- Galway County Council Development Plan 2022-2028.
- Greater Dublin Strategic Drainage Study (GDSDS)

It is proposed that SuDS techniques are implemented wherever possible to manage surface water runoff from the development. Surface water management proposals for the site have been articulated to mimic the natural drainage patterns of the existing site.

7.1 HIERARCHY OF DISPOSAL

Generally, when designing a proposed surface water collection system, the philosophy of the design should be to prioritise the below methods of discharging surface water run off as much as reasonably practicable, from 1 (most desirable) to 5 (least desirable):

1. Collect for Re-Use
2. into the ground (infiltration),
3. To a surface waterbody,
4. To a surface water sewer, highway drain, or other drainage systems,
5. To a combined sewer.

Table 6.1 below shows a summary of the hierarchy of disposal for the proposed development. The surface water hierarchy of disposal will be based on a priority level 4 due to site constraints.

Table 6.1: Hierarchy of Disposal

Hierarchy	Priority Level	Discharge Location	Availability Y/N	Comments
	1	Collect for Use	N	Rainwater harvesting is deemed unpracticable due to the low water demand.
	2	Into the ground - Infiltration	N	Infiltration testing was carried out and results show that the poor infiltration rates and therefore infiltration has been disregarded.
	3	To a Surface Waterbody	Y	The surface water from this site is to be discharged into an existing stream at the north of the site.
	4	Discharge to a surface water sewer, highway drain, or another drainage system	N	Not considered as surface water is discharged to a nearby stream.
	5	Discharge to a combined sewer	N	According to Uisce Eireann records a combined sewer is not present.

1. COLLECT FOR Re-USE

The low water demand for the proposed development does not warrant rain harvesting system as it would involve pumping of water which would outweigh the cost saving and therefore the scheme does not include collection for reuse.

2. INTO THE GROUND - INFILTRATION

Infiltration testing was carried out on 5 no. trial pits in accordance with BRE Digest 365 and yielded poor infiltration rates. As a result of this, such findings consequently make infiltration an unviable option for the surface water treatment of the proposed development, therefore making controlled discharge and storage the proposed treatment option.

3. TO A SURFACE WATERBODY

The surface water from this site is to be discharged into an existing stream at the north of the site. It is proposed to discharge the runoff from the site into the nearby stream with a controlled discharge rate of 7.2l/s.

4. DISCHARGE TO A SURFACE WATER, HIGHWAY DRAIN, OR ANOTHER DRAINAGE SYSTEM

According to Uisce Eireann records an existing surface water network is not present on site.

5. DISCHARGE TO A COMBINED SEWER

According to Uisce Eireann records a combined sewer is not present near the site.

7.2 COMPLINACE WITH SuDS PRINCIPLES

7.2.1 Compliance with C573 SuDS Manual

The C573 SuDS Manual explains that the primary function of SuDS measures is to protect watercourses from any impact due to the new development. However, SuDS can also improve the quality of life in a new development and urban spaces by making them more vibrant, visually attractive, sustainable and more resilient to change. This document explains the wider social context of SuDS and how SuDS can deliver high quality drainage while supporting urban areas to cope better with sever rainfall both now and in the future. There four pillars of SuDS include:

1. Water Quantity (mitigate flood risk & protect natural water cycle)
2. Water Quality (manage the quality of the runoff to prevent pollution)
3. Amenity (create and sustain better places for people)
4. Biodiversity (create and sustain better places for nature)

7.2.2 SuDS Management Train

The SuDS measures proposed are usually linked in series, and this is commonly known as a SuDS Management Train, (SMT). The SMT ensures that surface runoff is captured, conveyed, stored, intercepted, and removed of pollutant correctly and efficiently before it is discharged back into the surrounding watercourse/network. This approach will ensure that the most effective measures are utilised in the correct sequence throughout the site. Table 26.7 (Figure 7.1) (CIRIA, SuDS Manual 2015) demonstrates the effectiveness of each SuDS measure along the SMT.

TABLE 26.7 Indicative suitability of SuDS components within the Management Train

SuDS component	Interception[1]	Close to source/ primary treatment	Secondary treatment	Tertiary treatment
Rainwater harvesting	Y			
Filter strip	Y	Y		
Swale	Y	Y	Y	
Filter drain	Y		Y	
Permeable pavement	Y	Y		
Bioretention	Y	Y	Y	
Green roof	Y	Y		
Detention basin	Y	Y	Y	
Pond	[3]	Y[2]	Y	Y
Wetland	[3]	Y[2]	Y	Y
Infiltration system (soakaways/ trenches/ blankets/basins)	Y	Y	Y	Y
Attenuation storage tanks	Y[4]			
Catchpits and gullies		Y		
Proprietary treatment systems		Y[5]	Y[5]	Y[5]

Figure 7.1 CIRIA C573 SuDS Manual Table (Source: The SUDS Manual C754,2015)

7.3 SUSTAINABLE URBAN DRAINAGE SYSTEMS

The following section outlines the potential SuDS techniques considered for the proposed site, with proposals such as green roofs, Soakaways, swales, and modular systems all being discussed herein.

7.3.1 RAINWATER HARVESTING

Rainwater harvesting (RWH) is the collection of rainwater runoff for use. Runoff can be collected from roofs and other impermeable areas, stored, treated (where required) and then used as a supply water for domestic, commercial and/or institutional properties. As previously discussed RWH will be disproportionate in terms of cost and function with regards to the proposed development features (toilet, sinks etc.) Therefore, rainwater harvesting has been disregarded for this design.

7.3.2 GREEN ROOFS

Green roofs comprise a multi-layered system that covers the roof of a building or podium structure with vegetation cover, over a drainage layer. They are designed to intercept and retain precipitation, reducing the volume of run-off and attenuating peak flows. Due to the A-frame roof for the proposed dwellings green roofs have been disregarded.

7.3.3 SOAKAWAYS

Soakaways are square or circular excavations either filled with rubble or lined with brickwork, precast concrete or polyethylene rings/perforated storage structures surrounded by granular backfill. They can be grouped and linked together to drain large areas including highways. The supporting structure and backfill can be substituted by modular geo-cellular units. Soakaways provide storm water attenuation, storm water treatment and groundwater recharge. Soakaways have been disregarded due to poor infiltration rates encountered during site testing.

7.3.4 SWALES

Swales are linear vegetated drainage features in which surface water can be stored or conveyed. They can be designed to allow infiltration, where appropriate. They should promote low flow velocities to allow much of the suspended particulate load in the storm water runoff to settle out, thus providing effective pollutant removal. Swales have not been considered for this development.

7.3.5 TREE PITS

Tree pits are beneficial for bioretention as they intercept precipitation, allow water to evaporate from relief surfaces, facilitate infiltration and groundwater recharge due to their root systems, provide shade, and provide further amenity and biodiversity benefits. However, with alternative methods of surface water treatment being proposed site-wide, tree pits have been disregarded for this development.

7.3.6 PERVIOUS PAVEMENTS

Pervious pavements provide a pavement suitable for pedestrian and/or vehicular traffic while allowing rainwater to infiltrate through the surface and into the underlying layers. The water is temporarily stored between infiltration to the ground, reuse or discharge to a watercourse or other drainage system. Pavements with aggregate sub-bases can provide good water quality treatment. When permeable paving for car parking bays is used, the stone sub-base not only stores and slows down the rate of discharge but also raises the water quality. Pervious pavements have been proposed as a method of achieving interception and treatment for this site before being discharged into the proposed network.

7.3.7 GEO-CELLULAR / MODULAR SYSTEMS

Modular plastic geo-cellular systems with a high void ratio can be used to create a below ground storage structure. Modular tanks can be used for runoff attenuation but require silt trap protection and a suitable means of access for cleaning and inspection. Three geo-cellular systems have been adopted as an attenuation system with the three attenuation tanks. Tank 1 and 2 will each provide storage of 162m3 while tank three will provide storage of 225m3. This totals a combined storage for the site of 549m3. This will provide adequate storage for the proposed site.

7.3.8 PONDS / RAIN GARDENS / INFILTRATION BASINS

Ponds can provide both storm water attenuation and treatment. They are designed to support emergent and submerged aquatic vegetation along their shoreline. Runoff from each rain event is detained and treated in the pool. The retention time promotes removal of silt through sedimentation and the opportunity for biological uptake mechanisms to reduce nutrient concentrations. As the proposed site is residential and ponds have not been considered as it would pose a risk of drowning.

7.3.9 EXISTING SURFACE WATER

Currently, there is no existing surface water infrastructure serving the proposed site. Refer to Appendix B for Uisce Eireann map records. The surface water will be discharged to a nearby stream.

7.4 PROPOSED SURFACE WATER COLLECTION SYSTEM

The proposal for this development is to provide a new surface water collection network, collecting surface water run-off through roof gutters, & downpipes.

The surface water drainage is broken up into three sections.
In drainage area 1 the surface water will be routed directly into the proposed surface water network towards S8.0 where it will pass through a klargester NSBE015 petrol and oil separator before entering the proposed attenuation tank 1 in the centre of the site. A hydrobrake located in S9.0 which will restrict the outflow from this area of the site, limiting the surface water flow from this area to a discharge of 20.5 l/s.

From here the surface water will continue to make its way through drainage area 2 again with all surface water in this area being directed directly into the proposed surface water network towards S12.0 where it will pass through a klargester NSBE010 petrol and oil separator before entering the proposed attenuation tank 2 in the centre of the site. A hydrobrake located in S13.0 which will restrict the outflow from this area of the site, limiting the surface water flow from this area to a discharge of 4.8 l/s.

From here the surface water will continue into drainage area 3 the surface water will be routed directly into the proposed surface water network towards S16.0 where it will pass through a klargester NSBE015 petrol and oil separator before entering the proposed attenuation tank 3 in the north of the site. A hydrobrake located in S17.0 which will restrict the outflow from this area of the site, limiting the surface water flow from this rea to a discharge of 7.2 l/s.

7.4.1 OUTFLOW FROM SITE

Three HydroBrake Optimum by Hydro International (or similar equivalent) will be provided within proposed surface water drainage. These will be provided in S9.0, S13.0 & S17.0 to limit the outflow as outlined above. Refer to drawing no drawing 23188-3035-P1 for proposed discharge location.

7.4.2 SURFACE WATER ATTENUATION SYSTEM

As previously mentioned, the surface water attenuation system includes a Graf EcoBloc attenuation system. In total, this SuDS feature provides a cumulative surface water storage volume of approx. 549m3. This has been designed to provide storage for the surface water generated in a 1 in 100-year rainfall event. The rainfall generated in such an event will be increased by an allowance of 30% to cater for predicted climate change due to global warming as per GDSDS requirements. This storage volume of 549m3 will be adequate in terms of treating and storing surface water in the event of the aforementioned rainfall event. For calculations regarding surface water attenuation system design, please see appendix C, where a maximum rainfall volume to treat of 522.3m3 is calculated. Whilst carrying out the surface water

attenuation design, rainfall return period data was utilised from Met Eireann, which is viewable in Appendix D.

PROPOSED SUDS STRATEGY

The proposed SuDS features will be integrated into the surface water drainage network for the proposed development, with the main objective of controlling the quantity of surface water runoff, managing the quality of runoff to prevent pollution, and creating sustaining local ecosystems. The proposed SuDS strategy for the site include the following:

- 3 No. Graf EcoBloc Attenuation Tank – The proposed attenuation tanks shall assist with providing optimal surface water storage on site.
- 3 No. Hydrobrake – The proposed hydro brakes shall restrict the discharge from the site into the existing surface water network.
- 3 No. Petrol Interceptor – The proposed class 1 petrol interceptors shall cleanse the surface water prior to discharging into the existing surface water network.

8 FOUL EFFLUENT

The proposed development will be serviced by 1 main foul sewer pipe. This 225mm uPVC foul sewer pipe will connect into existing foul sewer (225mm dia.) network identified at the North of the site. For further illustrations of the proposed foul network and the connections to the existing foul network please see drawing 23188-3030-P1 to 23188-3036-P1.

8.1 PROPOSED FOUL SEWER SYSTEM

It is proposed to use a gravity sewer for the new development. A 225mm uPVC foul main between F1.0 and F16.0 where it will connect to the exiting 225mm dia. Foul network.

The new foul sewer system will be constructed within the site in accordance with the following:

- BS EN 752:2008 – Drain & Sewer Systems Outside Buildings,
- Building Regulations - TGD Part H – Drainage and Wastewater Disposal.
- IW Standard Details

8.2 **WASTEWATER** LOADING RATES

The estimated wastewater discharge rates are summarised for both residential and commercial are shown in Table 8.1 below.

Table 8.1 - Estimated Foul Demand

Residential/Commercial Foul Demand						
Use	No. of Units	Occupancy Rate (persons/dwelling)	Population (P)	Average daily domestic demand (l/day)	Average Flow (l/s)	Peak Flow (l/s)
Residential/ commercial	94	2.7	253.8	38,070	0.441	2.65

The overall daily wastewater loading is 38,070 litres/day or 38.070m^3 day. As mentioned above, the proposed foul sewer system will be connected to the existing foul sewer network to the north of the proposed development. Additionally, it must be noted that a pre-connection application has been submitted to Irish Water for this proposed development, with the corresponding reference number for this application being CDS24008612. Refer to Appendix E for pre-connection enquiry application.

9 Potable Water Supply

9.1 Existing Water Supply

Following the review of the Uisce Eireann ArcGIS Web viewer there is an existing 160mm PE watermain situated in the footbath to the northeast of the proposed development. This can be seen in figure 9.1 below.

Figure 9.1 - Extract from ArcGIS Usice Eireann web viewer showing existing watermains

9.2 Proposed Water Supply

The proposed development will be connected to the existing public watermain via 160mm dia which runs to the north east of the proposed application site. The water demand is calculated in accordance with Code of Practice for Water Infrastructure, Connections and Developer Services, Design & Construction Requirements for Self-Lay Developments, July 2020 (Revision 2)', Section 3.7.2. The total peak average flow for residential use will be 0.048 l/s with a peak flow of 0.288l/s.

The proposed connection for the proposed development will be made in accordance with Irish Water Standard Details for Non-Mechanical Meter Chamber (40-250mm diameter): Ref. STD-W-26-Rev 03. Please refer to drawing 23188-3040-P2 to 23188-3045-P1 for the location and details of the proposed watermains network and fire hydrants proposed for this new site layout. A pre-connection application has been submitted to Uisce Eireann for this proposed development, with the corresponding reference number for this application being CDS24008612.

Table 9.1 - Estimated Water Demand

Residential/Commercial Water Demand						
Use	No. of Units	Occupancy Rate (persons/dwelling)	Population (P)	Average daily domestic demand (l/day)	Average Flow (l/s)	Peak Flow (l/s)
Residential/ commercial	94	2.7	253.8	41,877	0.048	0..288

9.3 Fire Hydrants

It is proposed to use 10 No. fire hydrants on the loop main. Hydrants shall comply with the requirements of BS 750:2012 and shall be installed in accordance with Irish Waters Code of Practice and Standard Details.

10 SUMMARY AND CONCLUSIONS

SURFACE WATER

The proposed surface water network on site consists of series of roof gutters and downpipes, and Graf EcoBloc Attenuation Tank. These SuDS features are to work in tandem to provide a cumulative surface water storage capacity of circa 549m^3, with three HydroBrake flow control devices. The final hydrobrake on the proposed network will discharge the runoff from the site at a rate of 7.2 l/s. This proposed design achieves compliance with all previously stated regulations whilst considering the constraints of the site.

FOUL EFFLUENT

The total wastewater loading from the site will be 38.070/day, with a peak flow of 2.65/s.

WATERMAINS

The total volume of water required by the proposed development will be circa 41.877m^3/day, with a peak flow of 0.288l/s.

APPENDIX A – TOPGRAPHICAL SURVEY

Existing Topographical Site Layout

1 : 1000

Legend

Site Extents shown outlined in RED

- Gateway
- Deciduous Tree Drawn to Size
- Sewer Manhole and details
- Inspection Chamber
- Gully and details
- Fence
- Parapet Top: 63.18 — Parapet and Elevation
- CLAD BTM: 58.80 — Bottom of Cladding and Elevation
- 199.997 — Spotheight and Elevation
- Armstrong Joint
- Stop Valves
- Fire Hydrant
- Railing
- Building
- ESB/Eircom Pole and Cable
- Trees/Treeline
- Ditchline
- Hedgeline
- Scrubline
- Plantline
- Tree Area
- Wall
- Embankment
- Flowerbed

I/A	INACCESSABLE
TOC	CONCRETE TOP
KT	KERB TOP
UP	UTILITY PIPE

STAGE 2 APPROVAL

Not For Construction

Do not scale drawings.
Use figured dimensions only.

Revision Schedule

Rev No.	Rev Description	Rev Date	Issued by	Issued to
P01	Issue for Information	13.05.2025	WCC	DT

Tionscadal Éireann
Project Ireland
2040

WESTMEATH COUNTY COUNCIL
Comhairle Chontae na hIarmhí

WESTMEATH HOUSING DESIGN TEAM
CIVIC CENTRE, CHURCH ST, ATHLONE, N37 P2T5
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PROJECT:
CONSTRUCTION OF 94 RESIDENTIAL UNITS AT CORNAMADDY, ATHLONE

TITLE:
SITE -
EXISITNG TOPOGRAPHICAL SITE SURVEY

Drawing No: 127-WCC- ZZ- ZZ- DR- A- 0002		**Scale:** As indicated @ A1	**Designed** WCC
Stage: Stage 02		**Datum:** MALIN	**Drawn** AC
Status S2	**Rev** P01	**Date:** 06/09/23	**Checked** BmC
			Approved -

File Name and Directory:
H:\CAPITAL HOUSING DESIGN TEAM\1-Capital Schemes\127-Cornamaddy\4. Stage 2\Stage 2 -2025\Revit\127-WCC-ZZ-ZZ-M3-A-0001.rvt

APPENDIX B – SITE INVESTIGATION REPORT

S.I. Ltd Contract No: 6338

Client:	Westmeath County Council
Engineer:	SDS Design Engineers
Contractor:	Site Investigations Ltd

Cornamaddy Residential Development, Athlone, Co. Westmeath Site Investigation Report

Prepared by:

.....

Stephen Letch

Issue Date:	18/10/2024
Status	Final
Revision	0

Contents:

Appendices:

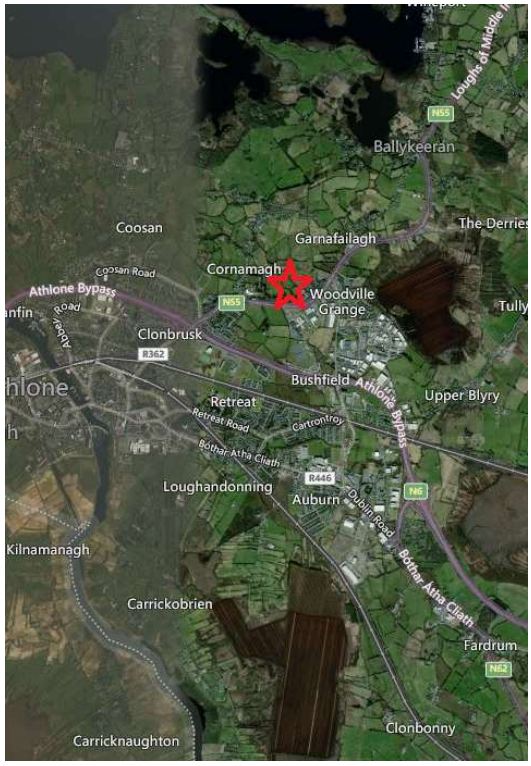
1. Introduction

On the instructions of SDS Design Engineers, Site Investigations Ltd (SIL) was appointed to complete a ground investigation at Cornamaddy, Athlone, Co. Westmeath. The investigation was for a residential development on the site and was completed on behalf of the Client, Westmeath County Council. This investigation was completed in September 2024.

This report presents the factual geotechnical data obtained from the field and laboratory testing with interpretation of the ground conditions discussed.

2. Site Location

The site is located off the Ballymahon Road to the north east of Athlone town centre. The first map below shows the location of Athlone in the midlands and the second map shows the location of the site to the north east of the town centre.



3. Fieldwork

All fieldwork was carried out in accordance with BS 5930:2015, Engineers Ireland GI Specification and Related Document 2nd Edition 2016 and Eurocode 7: Geotechnical Design. The fieldworks comprised of the following:

- 12 No. cable percussive boreholes
- 12 No. trial pits
- 5 No. soakaway tests
- 10 No. plate load tests
- Ground Probing Radar Survey

3.1. Cable Percussive Boreholes

Cable percussion boring was undertaken at 12 No. locations using Dando 2000 rigs and constructed 200mm diameter boreholes. Three attempts were made at BH03 to advance the borehole as shallow obstructions were encountered at 2.00mbgl and 1.50mbgl before advancing to 7.30mbgl on the third attempt. The boreholes terminated at depths ranging from 5.80mbgl at BH04 to 10.20mbgl at BH10. It was not possible to collect undisturbed samples due to the granular soils encountered so bulk disturbed samples were recovered at regular intervals.

To test the strength of the stratum, Standard Penetration Tests (SPT's) were performed at 1.00m intervals in accordance with BS 1377 (1990). In soils with high gravel and cobble content it is appropriate to use a solid cone (60°) (CPT) instead of the split spoon and this was used throughout the testing. The test is completed over 450mm and the cone is driven 150mm into the stratum to ensure that the test is conducted over an undisturbed zone. The cone is then driven the remaining 300mm and the blows recorded to report the N-Value. The report shows the N-Value with the 75mm incremental blows listed in brackets (e.g., BH01 at 1.00mbgl where N=8-(1,1/1,2,2,3)). Where refusal of 50 blows across the test zone was encountered was achieved during testing, the penetration depth is also reported (e.g., BH01 at 4.00mbgl where N=50-(25 for 140mm/50 for 50mm)).

At BH1 and BH11, a groundwater monitoring standpipe was installed to allow for equalisation of groundwater in the standpipe with a gravel response zone and bentonite seals at the top to prevent downward migration of water from the surface.

The cable percussive borehole logs are presented in Appendix 1.

3.2. Trial Pits

12 No. trial pits were excavated using a tracked excavator. The pits were logged and photographed by SIL geotechnical engineer and representative disturbed bulk samples were recovered as the pits were excavated, which were returned to the laboratory for geotechnical testing. Any groundwater ingresses and pit wall stability were logged as the pits were excavated and then they were backfilled with the arisings upon completion.

The trial pit logs and photographs are presented in Appendix 2.

3.3. Soakaway Tests

At 5 No. locations, soakaway tests were completed and logged by SIL geotechnical engineer. BRE Special Digest 365 stipulates that the pit should be filled three times and that the final cycle is used to provide the infiltration rate. The time taken for the water level to fall from 75% volume to 25% volume is required to calculate the rate of infiltration. However, if the water level does not fall at a steady rate, then the test is deemed to have failed and the area is unsuitable for storm water drainage.

The soakaway test results and photographs are presented in Appendix 3.

3.4. Plate Load Tests

At 10 No. locations, plate tests were completed to provide a California Bearing Ratio value for pavement design. The tests were completed at 0.50mbgl, using the excavator as kentledge. Pressure is then added to a 600mm diameter plate, via a hydraulic jack, with the settlement of the plate measured using gauges. A correction value is then applied to the rate of settlement and this is used to calculate the CBR value for 1.25mm settlement of a 762mm plate.

The plate load test results are presented in Appendix 4.

3.5. Ground Probing Radar Survey

An underground service investigation has been completed using ground probing radar techniques by Metroscan. Surveys were completed at 10 No. areas as specified by the Engineer.

The Metroscan drawings are presented in Appendix 5.

3.6. Surveying

Following completion of all the fieldworks, a survey of the exploratory hole locations was completed using a GeoMax GPS Rover. The data is supplied on each individual log and along with a site plan in Appendix 9.

4. Laboratory Testing

Geotechnical laboratory testing was completed on representative soil samples in accordance with BS 1377 (1990). Testing included:

- 6 No. Moisture contents
- 6 No. Atterberg limits
- 6 No. Particle size gradings
- 6 No. pH, sulphate and chloride content

Environmental testing was completed by ALS Environmental Ltd. and this allows for a Waste Classification report to be produced. The environmental testing consists of the following:

- 6 No. Suite I analysis

The geotechnical laboratory test results are presented in Appendix 6 with the environmental test results and Waste Classification report presented in Appendix 7 and 8 respectively.

5. Ground Conditions

5.1. Overburden

MADE GROUND was recorded in BH12 to 1.80mbgl and consisted of grey silty sandy gravel with high cobble content.

The natural ground conditions generally consist of cohesive CLAY and SILT soils overlying GRAVEL and occasionally SAND soils. With the boundary between the soil types between 1.50mbgl and 4.80mbgl. BH04 to the west of the site and BH12 to the south of the site only recorded cohesive CLAY soils throughout the borehole profile. The trial pits recorded similar conditions with CLAY and SILT initially encountered and GRAVEL encountered at TP02, TP03 and TP07, at 2.50mbgl, 2.00mbgl and 1.30mbgl respectively.

The SPT N-values vary across the site with values of 8 to 16 at 1.00mbgl and then 9 to 32 at 2.00mbgl, 13 to 36 at 3.00mbgl and 14 to 39 at 4.00mbgl.

Laboratory tests of the shallow cohesive soils from the boreholes confirm that CLAY soils dominate the site with low to high plasticity indexes of 11% to 26% recorded. The particle size distribution curves were poorly sorted straight-line curves with 26% to 84% fines content in the cohesive soils.

5.2. Groundwater

Groundwater ingresses were recorded in six of the boreholes, with ingresses recorded from 1.70mbgl at BH04 to 3.80mbgl at BH01 and BH08. The initial strikes at BH04 and BH10 sealed off and then water re-entered both boreholes at 4.50mbgl and 5.50mbgl respectively.

Three trial pits, TP02, TP03 and TP05, recorded groundwater ingresses at 2.50mbgl, 2.00mbgl and 1.40mbgl, with ingress rates recorded as seepages.

6. Recommendations and Conclusions

Please note the following caveats:

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 the exploratory hole locations or below the final level of excavation, this is for guidance only and no liability can be accepted for its accuracy. No responsibility can be accepted for adjacent unexpected conditions that have not been revealed by the exploratory holes. It is further recommended that all bearing surfaces when excavated should be inspected by a suitably qualified Engineer to verify the information given in this report.

Excavated surfaces in clay strata should be kept dry to avoid softening prior to foundation placement. Foundations should always be taken to a minimum depth of 0.50mBGL to avoid the effects of frost action and possible seasonal shrinkage/swelling.

If it is intended that on-site materials are to be used as fill, then the necessary laboratory testing should be specified by the Client to confirm the suitability. Also, relevant lab testing should be specified where stability of side slopes to excavations is a concern, or where contamination may be an issue.

6.1. Shallow Foundations

Due to the unknown depth of foundation and no longer-term groundwater information, this analysis assumes the groundwater will not influence the construction or performance of these foundations.

MADE GROUND was encountered at BH12 to 1.80mbgl. SIL do not recommend that narrow shallow foundations are placed on fill material due to the unknown compaction methods used during laying of man-made material. This unknown could result in softer spots and differential settlement once construction is completed. If shallow foundations are to be used and man-made soils are encountered below foundation level, then the soil should be removed and replaced with engineered fill which is compacted to the required standard.

For cohesive soils, a correlation proposed by Stroud and Butler between SPT N-values and plasticity indices can be used to calculate the undrained shear strength. Dependent on the plasticity index at each site, the Stroud and Butler correlation is C_u=4 to 6N. With the low to high plasticity indexes recorded in the laboratory for the soils on this site, the correlation chosen is C_u=5N. The C_u value can then be used to calculate the ultimate bearing capacity, which is the total loading that the soil could withstand but then a factor of safety is used to ensure that failure of the soils does not occur. A factor of safety of 3 has been chosen for this site.

In granular soils, the N_{100} value is used to correlate the SPT N-value. The SPT N-value can then be used to calculate the allowable bearing capacity, as per Terzaghi and Peck, using the correlation of SPT N-value x 10 = ABC.

The table below shows the SPT N-value, C_u, the ultimate bearing capacity and finally, the allowable bearing capacities at 1.00mbgl, 2.00mbgl and 3.00mbgl. For the refusals, no bearing capacity is calculated. The C_u, ultimate bearing capacity and allowable bearing capacities are in kN/m^2.

Depth	BH01				BH02				BH03B			
	N-Value	Cu	UBC	ABC	N-Value	Cu	UBC	ABC	N-Value	Cu	UBC	ABC
1.00	8	40	222	**74**	11	55	299	**100**	15	75	401	**134**
2.00	19	95	521	**174**	11	55	317	**106**	19	-	-	**190**
3.00	36	180	972	**324**	14	70	411	**137**	31	-	-	**310**
Depth	BH04				BH05				BH06			
	N-Value	Cu	UBC	ABC	N-Value	Cu	UBC	ABC	N-Value	Cu	UBC	ABC
1.00	12	60	324	**108**	8	40	222	**74**	13	65	350	**117**
2.00	15	75	419	**140**	15	75	419	**140**	29	-	-	**290**
3.00	22	110	615	**205**	13	65	386	**129**	-[1]	-[1]	-[1]	-[1]
Depth	BH07				BH08				BH09			
	N-Value	Cu	UBC	ABC	N-Value	Cu	UBC	ABC	N-Value	Cu	UBC	ABC
1.00	12	60	324	**108**	11	55	299	**100**	15	75	401	**134**
2.00	13	65	368	**123**	-[1]	-[1]	-[1]	-[1]	32	-	-	**320**
3.00	20	100	564	**188**	34	-	-	**340**	34	-	-	**340**
Depth	BH10				BH11				BH12			
	N-Value	Cu	UBC	ABC	N-Value	Cu	UBC	ABC	N-Value	Cu	UBC	ABC
1.00	16	80	426	**142**	9	45	248	**83**	-[2]	-[2]	-[2]	-[2]
2.00	15	75	419	**140**	9	45	266	**89**	21	105	572	**191**
3.00	21	-	-	**210**	15	75	437	**146**	15	75	437	146

Key:

-[1]: Refusal

-[2]: MADE GROUND

It would be recommended that all founding strata be inspected by a suitably qualified Engineer prior to pouring the foundations and additional insitu testing completed if required to confirm the soils are suitable for the final foundation design.

The following assumptions were made as part of these analyses. If any of these assumptions are not in accordance with detailed design or observations made during construction these recommendations should be re-evaluated.

- Foundations are to be constructed on a level formation of uniform material type.
- All man-made or filled material is to be removed prior to construction.
- The bulk unit weight of the material in this stratum has a minimum density of 19kN/m^3.
- Based on groundwater observations this analysis assumes the groundwater will not influence the construction or performance of these foundations.
- All bearing capacity calculations allow for 25mm settlement.

The trial pit walls generally remained stable but recorded minor pit all instability, with only three locations remaining stable throughout the excavation. Therefore, it would be recommended that all excavations should be checked immediately and battered back accordingly with regular inspection of temporary excavations completed during construction to ensure that all slopes are stable. Temporary support should be considered on any excavation that will be left open for an extended period.

6.2. Groundwater

The caveats below relating to interpretation of groundwater levels should be noted:
There is always considerable uncertainty as to the likely rates of water ingress into excavations in clayey soil sites due to the possibility of localised unforeseen sand and gravel lenses acting as permeable conduits for unknown volumes of water.

Furthermore, water levels noted on the borehole and trial pit logs do not generally give an accurate indication of the actual groundwater conditions as the borehole or trial pit is rarely left open for sufficient time for the water level to reach equilibrium.

Also, during boring procedures, a permeable stratum may have been sealed off by the borehole casing, or water may have been added to aid drilling. Therefore, an extended period of groundwater monitoring using any constructed standpipes is required to provide more accurate information regarding groundwater conditions. Finally, groundwater levels vary with time of year, rainfall, nearby construction and tides.

Pumping tests would be required to determine likely seepage rates and persistence into excavations taken below the groundwater level. Deep trial pits also aid estimation of seepage rates.

As discussed previously, groundwater was recorded in six of the twelve boreholes and three of the twelve trial pits during the fieldworks. There is always considerable uncertainty as to the

likely rates of water ingress into excavations in cohesive soil sites due to the possibility of localised unforeseen sand and gravel lenses acting as permeable conduits for unknown volumes of water. Based on this information at the exploratory hole locations to date, it is considered likely that any shallow ingress (less than 2.00mbgl) into excavations of the CLAY will be slow. If granular lenses are encountered in shallow excavations, then the possibility of water ingressing into an excavation increase with a higher ingress rate.

If groundwater is encountered during excavations then mechanical pumps will be required to remove the groundwater from sumps. Sumps should be carefully located and constructed to ensure that groundwater is efficiently removed from excavations and trenches.

6.3. Soakaway Test

Four of the soakaway tests failed the specification as the water level did not fall sufficiently enough to complete the test. The BRE Digest stipulates that the pit should half empty within 24hrs, and extrapolation indicates this condition would not be satisfied. The tests were terminated at the end of the first (of a possible three) fill/empty cycle since further testing would give even slower fall rates due to increased soil saturation.

INF02 was completed in shallow GRAVEL soils and this recorded a f-value of 4.11×10^{-5}m/s. It would be recommended that any soakaways are targeted to areas with shallow granular soils.

6.4. Pavement Design

The plate tests completed on the natural CLAY soils recorded values ranging from 8.5% to 20.4%. PLT09 was completed on MADE GROUND consisting of gravel and this records a higher value of 37.6%

Inspection of the formation strata should be completed prior to construction of the pavement. Once the exact formation levels are finalised then additional in-situ testing could be completed to assist with the detailed pavement design.

6.5. Contamination

Environmental testing was completed on six samples from the investigation and the results are provided in Appendix 7. For material to be removed from site, Suite I testing was carried out to determine if the material is hazardous or non-hazardous and then the leachate results were compared with the published waste acceptance limits of BS EN 12457-2 to determine whether the material on the site could be accepted as ‘inert material’ by an Irish landfill.

The Waste Classification report created using HazWasteOnline™ software shows that the material tested can be classified as non-hazardous material.

Following this analysis of the solid test results, the leachate disposal suite results showed that the determinands remained within the Inert waste thresholds. The sample from TP11 recorded a Total Organic Carbon value 0.16% above the inert threshold but this could be from natural sources and therefore may not be as a result of any contamination.

Six samples were tested for analysis but it cannot be discounted that any localised contamination may have been missed. Any MADE GROUND excavated on site should be stockpiled separately to natural soils to avoid any potential cross contamination of the soils. Additional testing of these soils may be requested by the individual landfill before acceptance and a testing regime designed by an environmental engineer would be recommended to satisfy the landfill.

6.6. Aggressive Ground Conditions

The chemical test results in Appendix 6 indicate a general pH value between 8.79 and 9.07, which is close to neutral and below the level of 9, therefore no special precautions are required.

The maximum value obtained for water soluble sulphate was 133mg/l as SO_3. The BRE Special Digest 1:2005 – '*Concrete in Aggressive Ground'* guidelines require SO_4 values and after conversion ($SO_4 = SO_3 \times 1.2$), the maximum value of 160mg/l shows Class 1 conditions and no special precautions are required.

6.7. Radon Gas

The Environmental Protection Agency (EPA) has recently updated the Radon gas exposure map and this is available to view on the EPA website. This shows the possible exposure to radon gas with the bedrock geology, subsoil geology, soil permeability and aquifer type analysed to produce the map. The map below shows that the site falls within the medium level of 1 in 10 homes have possible radon exposure. Measures should be taken in the form of radon protection barriers to protect from radon exposure in the new structure.

EPA map identifying possible Radon exposure.

https://gis.epa.ie/EPAMaps/Radon?&lid=EPA:RadonRiskMapofIreland

Appendix 1

Cable Percussive Borehole Logs

Contract No: 6338	**Cable Percussion Borehole Log**	Borehole No: **BH01**

Contract:	Cornamaddy Housing Development	Easting:	605924.007	Date Started:	10/09/2024
Location:	Athlone, Co. Westmeath	Northing:	742865.924	Date Completed:	10/09/2024
Client:	Westmeath County Council	Elevation:	43.97	Drilled By:	J. O'Toole
Engineer:	SDS Design Engineers	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
	0.20	TOPSOIL.			43.77					
0.5		Brown slightly sandy slightly gravelly silty CLAY.		43.5						
	0.60				43.37					
1.0		Firm brown grey slightly sandy slightly gravelly silty CLAY.		43.0		1.00	B	JOT35		
	1.20				42.77	1.00	C	N=8 (1,1/1,2,2,3)		
1.5		Firm grey slightly sandy slightly gravelly silty CLAY.		42.5						
	1.80				42.17					
2.0		Stiff becoming very stiff grey blue slightly sandy slightly gravelly silty CLAY.		42.0		2.00	B	JOT36		
2.5				41.5		2.00	C	N=19 (2,3/4,5,5,5)		
3.0				41.0		3.00	B	JOT37		
3.5				40.5		3.00	C	N=36 (2,5/7,9,9,11)		
	3.80				40.17					
4.0		Grey slightly sandy slightly gravelly silty CLAY with low cobble content.		40.0		4.00	B	JOT38		
4.5				39.5		4.00	C	50 (25 for 140mm/50 for 50mm)		
	4.80				39.17					
5.0		Dense grey brown silty sandy GRAVEL with high cobble content.		39.0		5.00	B	JOT39		
5.5				38.5		5.00	C	N=50 (6,11/50 for 255mm)		
6.0				38.0		6.00	B	JOT40		
	6.20	Obstruction - possible boulders.			37.77	6.00	C	50 (25 for 135mm/50 for 95mm)		
6.5	6.40	End of Borehole at 6.40m		37.5	37.57	6.40	C	50 (25 for 5mm/50 for 5mm)		
7.0				37.0						
7.5				36.5						
8.0				36.0						
8.5				35.5						
9.0				35.0						
9.5				34.5						
10.0				34.0						
10.5				33.5						

Chiselling:

From:	To:	Time:
4.20	4.40	01:00
6.20	6.40	01:30

Water Strikes:

Strike:	Rose:	Depth Sealed
3.80	3.60	NS

Water Details:

Date:	Hole Depth:	Water Depth:
10/09	6.40	1.80

Installation:

From:	To:	Pipe:

Backfill:

From:	To:	Type:
0.00	6.40	Arisings

Remarks:

Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 6338	**Cable Percussion Borehole Log**				Borehole No: **BH02**
Contract:	Cornamaddy Housing Development	Easting:	605877.411	Date Started:	09/09/2024
Location:	Athlone, Co. Westmeath	Northing:	742952.515	Date Completed:	09/09/2024
Client:	Westmeath County Council	Elevation:	44.02	Drilled By:	D. Clarke
Engineer:	SDS Design Engineers	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
0.5	0.40	TOPSOIL.		43.5	43.62					
1.0		Firm grey brown slightly sandy slightly gravelly silty CLAY with low cobble content.		43.0		1.00 1.00	B C	DC27 N=11 (2,3/3,2,3,3)		
1.5	1.50	Firm grey slightly sandy slightly gravelly clayey SILT.		42.5	42.52					
2.0				42.0		2.00 2.00	B C	DC28 N=11 (2,2/3,3,2,3)		
2.5				41.5						
3.0				41.0		3.00 3.00	B C	DC29 N=14 (2,3/3,3,4,4)		
3.5				40.5						
4.0	3.90	Medium dense grey silty sandy GRAVEL with high cobble content.		40.0	40.12	4.00 4.00	B C	DC30 N=19 (4,4/4,5,5,5)		
4.5	4.60	Dense grey brown silty sandy GRAVEL with high cobble content.		39.5	39.42					
5.0				39.0		5.00 5.00	B C	DC31 N=29 (6,7/7,7,7,8)		
5.5				38.5						
6.0				38.0		6.00 6.00	B C	DC32 N=31 (5,6/7,7,8,9)		
6.5				37.5						
7.0				37.0		7.00 7.00	B C	DC33 N=29 (6,6/7,7,7,8)		
7.5				36.5						
8.0				36.0		8.00 8.00	B C	DC34 N=35 (5,6/8,8,9,10)		
8.5				35.5						
9.0				35.0		9.00 9.00 9.40	B C C	DC35 50 (7,8/50 for 125mm) 50 (25 for 5mm/50 for 5mm)		
9.5	9.30 9.40	Obstruction - possible boulders. End of Borehole at 9.40m		34.5	34.72 34.62					
10.0				34.0						
10.5				33.5						

Chiselling:

From:	To:	Time:
3.70	3.80	01:00
7.50	7.70	01:00
9.30	9.40	01:30

Water Strikes:

Strike:	Rose:	Depth Sealed

Water Details:

Date:	Hole Depth:	Water Depth:
09/09	9.40	Dry

Installation:

From:	To:	Pipe:

Backfill:

From:	To:	Type:
0.00	9.40	Arisings

Remarks: Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 6338	**Cable Percussion Borehole Log**				Borehole No: **BH03**
Contract:	Cornamaddy Housing Development	Easting:	606014.395	Date Started:	30/08/2024
Location:	Athlone, Co. Westmeath	Northing:	742728.004	Date Completed:	30/08/2024
Client:	Westmeath County Council	Elevation:	45.34	Drilled By:	D. Clarke
Engineer:	SDS Design Engineers	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
	0.20	TOPSOIL.			45.14					
0.5		Brown slightly sandy slightly gravelly silty CLAY with low cobble content.		45.0						
	0.70				44.64					
1.0		Stiff light brown slightly sandy slightly gravelly silty CLAY with low cobble content.		44.5		1.00	B	DC01		
						1.00	C	N=16 (2,4/5,4,4,3)		
1.5				44.0						
	1.60				43.74					
	1.80	Grey silty sandy GRAVEL with high cobble content.			43.54					
2.0	2.00	Obstruction - boulders.		43.5	43.34	2.00	C	50 (25 for 5mm/50 for 5mm)		
		End of Borehole at 2.00m								
2.5				43.0						
3.0				42.5						
3.5				42.0						
4.0				41.5						
4.5				41.0						
5.0				40.5						
5.5				40.0						
6.0				39.5						
6.5				39.0						
7.0				38.5						
7.5				38.0						
8.0				37.5						
8.5				37.0						
9.0				36.5						
9.5				36.0						
10.0				35.5						
10.5				35.0						
				34.5						

Chiselling:			Water Strikes:			Water Details:			Installation:			Backfill:			Remarks:
From:	To:	Time:	Strike:	Rose:	Depth Sealed	Date:	Hole Depth:	Water Depth:	From:	To:	Pipe:	From:	To:	Type:	
1.80	2.00	02:00				30/08	2.00	Dry				0.00	2.00	Arisings	Borehole terminated due to obstruction, borehole relocated and reattempt made.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 6338	**Cable Percussion Borehole Log**	Borehole No: **BH03A**

Contract:	Cornamaddy Housing Development	Easting:	606014.819	Date Started:	30/08/2024
Location:	Athlone, Co. Westmeath	Northing:	742726.802	Date Completed:	30/08/2024
Client:	Westmeath County Council	Elevation:	45.36	Drilled By:	D. Clarke
Engineer:	SDS Design Engineers	Borehole Diameter:	200mm	Status:	FINAL

Depth (m)		Stratum Description	Legend	Level (mOD)		Samples and Insitu Tests			Water Strike	Backfill
Scale	Depth			Scale	Depth	Depth	Type	Result		
	0.20	TOPSOIL.			45.16					
		Brown slightly sandy slightly gravelly silty CLAY with low cobble content.		45.0						
0.5										
	0.90			44.5	44.46	1.00	C	N=50 (2,3/50 for 245mm)		
1.0		Stiff light brown slightly sandy slightly gravelly silty CLAY with low cobble content.								
	1.40			44.0	43.96					
1.5	1.50	Obstruction - boulders.			43.86	1.50	C	50 (25 for 5mm/50 for 5mm)		
		End of Borehole at 1.50m								
2.0				43.5						
2.5				43.0						
3.0				42.5						
3.5				42.0						
4.0				41.5						
4.5				41.0						
5.0				40.5						
5.5				40.0						
6.0				39.5						
6.5				39.0						
7.0				38.5						
7.5				38.0						
8.0				37.5						
8.5				37.0						
9.0				36.5						
9.5				36.0						
10.0				35.5						
10.5				35.0						
				34.5						

Chiselling:			Water Strikes:			Water Details:			Installation:			Backfill:			Remarks:
From:	To:	Time:	Strike:	Rose:	Depth Sealed	Date:	Hole Depth:	Water Depth:	From:	To:	Pipe:	From:	To:	Type:	
1.40	1.50	02:00				30/08	1.50	Dry				0.00	1.50	Arisings	Borehole terminated due to obstruction, borehole relocated and reattempt made.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 6338	**Cable Percussion Borehole Log**	Borehole No: **BH03B**

Contract:	Cornamaddy Housing Development	Easting:	606015.542	Date Started:	02/09/2024
Location:	Athlone, Co. Westmeath	Northing:	742725.737	Date Completed:	02/09/2024
Client:	Westmeath County Council	Elevation:	45.37	Drilled By:	D. Clarke
Engineer:	SDS Design Engineers	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
	0.20	TOPSOIL.			45.17					
0.5	0.40	Brown slightly sandy slightly gravelly silty CLAY with high cobble content.		45.0	44.97					
	0.80	Brown slightly sandy slightly gravelly silty CLAY with low cobble content.		44.5	44.57					
1.0		Firm brown slightly sandy slightly gravelly silty CLAY with low cobble content.				1.00 1.00	B C	DC02 N=15 (2,2/4,4,4,3)		
1.5				44.0						
	1.80	Medium dense brown silty sandy GRAVEL with low cobble content.		43.5	43.57	2.00 2.00	B C	DC03 N=19 (4,5/5,5,4,5)		
2.0										
2.5	2.60	Dense grey brown silty sandy GRAVEL with high cobble content.		43.0	42.77					
3.0				42.5		3.00 3.00	B C	DC04 N=31 (6,6/7,8,8,8)		
3.5				42.0						
4.0				41.5		4.00 4.00	B C	DC05 N=32 (5,7/9,8,8,7)		
4.5				41.0						
5.0				40.5		5.00 5.00	B C	DC06 N=33 (6,6/7,8,9,9)		
5.5				40.0						
6.0				39.5		6.00 6.00	B C	DC07 N=36 (7,8/8,9,9,10)		
6.5				39.0						
7.0	7.10			38.5	38.27	7.00	B	DC08		
	7.30	Obstruction - possible boulders. End of Borehole at 7.30m		38.0	38.07	7.00 7.30	C C	50 (25 for 95mm/50 for 25mm) 50 (25 for 5mm/50 for 5mm)		
7.5										
8.0				37.5						
8.5				37.0						
9.0				36.5						
9.5				36.0						
10.0				35.5						
10.5				35.0						
				34.5						

Chiselling:

From:	To:	Time:
2.50	2.70	01:00
4.70	4.90	01:00
7.10	7.30	01:30

Water Strikes:

Strike:	Rose:	Depth Sealed

Water Details:

Date:	Hole Depth:	Water Depth:
02/09	7.30	Dry

Installation:

From:	To:	Pipe:

Backfill:

From:	To:	Type:
0.00	7.30	Arisings

Remarks:
Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 6338	**Cable Percussion Borehole Log**	Borehole No: **BH04**

Contract:	Cornamaddy Housing Development	Easting:	605856.386	Date Started:	10/09/2024
Location:	Athlone, Co. Westmeath	Northing:	742828.473	Date Completed:	10/09/2024
Client:	Westmeath County Council	Elevation:	44.01	Drilled By:	D. McEoin
Engineer:	SDS Design Engineers	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
	0.20	TOPSOIL.			43.81					
0.5		Brown slightly sandy slightly gravelly silty CLAY with low cobble content.		43.5						
	0.70				43.31					
1.0		Firm brown grey slightly sandy slightly gravelly silty CLAY with medium cobble content.		43.0		1.00	B	DMc01		
						1.00	C	N=12 (1,2/2,3,3,4)		
1.5				42.5						
	1.70				42.31					
2.0		Firm becoming stiff brown grey slightly sandy slightly gravelly silty CLAY with low cobble content.		42.0		2.00	B	DMc02		
						2.00	C	N=15 (2,2/3,4,4,4)		
2.5				41.5						
3.0				41.0		3.00	B	DMc03		
						3.00	C	N=22 (3,2/5,6,6,5)		
3.5				40.5						
4.0				40.0		4.00	B	DMc04		
						4.00	C	N=30 (2,5/8,7,8,7)		
4.5				39.5						
	4.80				39.21					
5.0		Very stiff grey slightly sandy gravelly silty CLAY with medium cobble content.		39.0		5.00	B	DMc05		
						5.00	C	50 (5,8/50 for 225mm)		
5.5				38.5						
	5.60	Obstruction - possible boulders.			38.41					
	5.80	End of Borehole at 5.80m			38.21	5.80	C	50 (25 for 5mm/50 for 5mm)		
6.0				38.0						
6.5				37.5						
7.0				37.0						
7.5				36.5						
8.0				36.0						
8.5				35.5						
9.0				35.0						
9.5				34.5						
10.0				34.0						
10.5				33.5						

Chiselling: From:	To:	Time:	Water Strikes: Strike:	Rose:	Depth Sealed	Water Details: Date:	Hole Depth:	Water Depth:	Installation: From:	To:	Pipe:	Backfill: From:	To:	Type:	Remarks:
5.60	5.80	01:30	1.70 4.50	1.30 4.00	2.50 5.20	10/09	5.80	Dry				0.00	5.80	Arisings	Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 6338	**Cable Percussion Borehole Log**			Borehole No: **BH05**
Contract:	Cornamaddy Housing Development	Easting:	605888.970	Date Started: 10/09/2024
Location:	Athlone, Co. Westmeath	Northing:	742863.148	Date Completed: 10/09/2024
Client:	Westmeath County Council	Elevation:	43.94	Drilled By: D. Clarke
Engineer:	SDS Design Engineers	Borehole Diameter:	200mm	Status: FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
0.5	0.20	TOPSOIL.		43.5	43.74					
		Firm grey brown slightly sandy slightly gravelly silty CLAY with low cobble content.				1.00	B	DC36		
1.0				43.0		1.00	C	N=8 (2,2/2,2,2,2)		
1.5	1.60			42.5	42.34					
		Firm grey slightly sandy slightly gravelly clayey SILT.				2.00	B	DC37		
2.0				42.0		2.00	C	N=15 (2,3/3,4,4,4)		
2.5				41.5						
3.0				41.0		3.00	B	DC38		
						3.00	C	N=13 (3,3/3,3,4,3)		
3.5				40.5						
4.0	3.80	Medium dense grey silty sandy GRAVEL with high cobble content.		40.0	40.14	4.00	B	DC39		
						4.00	C	N=26 (4,5/6,6,7,7)		
4.5	4.40	Medium dense becoming dense grey brown silty sandy GRAVEL with high cobble content.		39.5	39.54					
5.0				39.0		5.00	B	DC40		
						5.00	C	N=27 (5,6/6,7,7,7)		
5.5				38.5						
6.0				38.0		6.00	B	DC41		
						6.00	C	N=31 (6,7/8,8,7,8)		
6.5				37.5						
7.0				37.0		7.00	B	DC42		
						7.00	C	N=38 (5,7/8,9,10,11)		
7.5				36.5						
8.0				36.0		8.00	B	DC43		
						8.00	C	N=34 (8,9/8,8,9,9)		
8.5				35.5						
	8.70				35.24					
9.0	8.90	Obstruction - possible boulders.		35.0	35.04	8.90	C	50 (25 for 5mm/50 for 5mm)		
		End of Borehole at 8.90m								
9.5				34.5						
10.0				34.0						
10.5				33.5						

Chiselling:

From:	To:	Time:
3.60	3.70	01:00
8.70	8.90	01:30

Water Strikes:

Strike:	Rose:	Depth Sealed

Water Details:

Date:	Hole Depth:	Water Depth:
10/09	8.90	Dry

Installation:

From:	To:	Pipe:

Backfill:

From:	To:	Type:
0.00	8.90	Arisings

Remarks: Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 6338	**Cable Percussion Borehole Log**	Borehole No: **BH06**

Contract:	Cornamaddy Housing Development	Easting:	605898.822	Date Started:	05/09/2024
Location:	Athlone, Co. Westmeath	Northing:	742785.271	Date Completed:	05/09/2024
Client:	Westmeath County Council	Elevation:	44.21	Drilled By:	J. O'Toole
Engineer:	SDS Design Engineers	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
0	0.20	TOPSOIL.		44.0	44.01					
		Firm brown slightly sandy slightly gravelly silty CLAY.		43.5						
1.0				43.0		1.00	B	JOT17		
						1.00	C	N=13 (1,2/3,3,3,4)		
1.5	1.60			42.5	42.61				▼	
		Brown grey slightly sandy slightly gravelly silty CLAY with high cobble content.							▽	
2.0	2.00			42.0	42.21	2.00	B	JOT18		
		Medium dense becoming dense grey brown silty sandy GRAVEL with high cobble content.				2.00	C	N=29 (2,5/7,9,7,6)		
3.0				41.5		3.00	B	JOT19		
				41.0		3.00	C	50 (5,7/50 for 100mm)		
4.0				40.5		4.00	B	JOT20		
				40.0		4.00	C	N=33 (3,5/7,7,9,10)		
5.0				39.5		5.00	B	JOT21		
				39.0		5.00	C	50 (25 for 125mm/50 for 20mm)		
6.0	6.10			38.5	38.11	6.00	B	JOT22		
		Obstruction - possible boulders.		38.0		6.00	C	50 (25 for 105mm/50 for 15mm)		
	6.20	End of Borehole at 6.20m			38.01	6.20	C	50 (25 for 5mm/50 for 5mm)		
7.0				37.5						
				37.0						
8.0				36.5						
				36.0						
9.0				35.5						
				35.0						
10.0				34.5						
				34.0						
				33.5						

Chiselling:

From:	To:	Time:
1.80	2.00	01:00
4.60	5.00	01:00
6.10	6.20	01:30

Water Strikes:

Strike:	Rose:	Depth Sealed
1.80	1.60	NS

Water Details:

Date:	Hole Depth:	Water Depth:
05/09	6.20	1.50

Installation:

From:	To:	Pipe:

Backfill:

From:	To:	Type:
0.00	6.20	Arisings

Remarks:

Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 6338	**Cable Percussion Borehole Log**	Borehole No: **BH07**

Contract:	Cornamaddy Housing Development	Easting:	605831.519	Date Started:	06/09/2024
Location:	Athlone, Co. Westmeath	Northing:	742793.085	Date Completed:	06/09/2024
Client:	Westmeath County Council	Elevation:	44.20	Drilled By:	J. O'Toole
Engineer:	SDS Design Engineers	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
0	0.20	TOPSOIL.		44.0	44.00					
		Firm brown slightly sandy slightly gravelly silty CLAY.		43.5						
1.0				43.0		1.00	B	JOT23		
						1.00	C	N=12 (1,1/2,3,3,4)		
1.5	1.60			42.5	42.60					
		Grey silty sandy GRAVEL with high cobble content.								
2.0	2.00			42.0	42.20	2.00	B	JOT24		
		Stiff brown slightly sandy slightly gravelly silty CLAY with low cobble content.				2.00	C	N=13 (1,2/2,3,4,4)		
3.0				41.5		3.00	B	JOT25		
				41.0		3.00	C	N=20 (2,3/5,5,5,5)		
4.0				40.5		4.00	B	JOT26		
				40.0		4.00	C	N=28 (2,4/5,7,7,9)		
4.5	4.50			39.5	39.70					
		Dense grey brown silty sandy GRAVEL with high cobble content.				5.00	B	JOT27		
5.0				39.0		5.00	C	50 (25 for 100mm/50 for 30mm)		
5.5				38.5						
6.0				38.0		6.00	B	JOT28		
						6.00	C	50 (25 for 130mm/50 for 40mm) 50 (25 for 5mm/50 for 5mm)		
	6.30	Obstruction - possible boulders.			37.90					
6.5	6.50	End of Borehole at 6.50m			37.70	6.50	C			
7.0				37.5						
7.5				37.0						
8.0				36.5						
8.5				36.0						
9.0				35.5						
9.5				35.0						
10.0				34.5						
10.5				34.0						
				33.5						

Chiselling:

From:	To:	Time:
1.90	2.00	01:00
4.50	4.70	01:00
6.30	6.50	01:30

Water Strikes:

Strike:	Rose:	Depth Sealed
2.00	1.70	NS

Water Details:

Date:	Hole Depth:	Water Depth:
06/09	6.50	1.60

Installation:

From:	To:	Pipe:

Backfill:

From:	To:	Type:
0.00	6.50	Arisings

Remarks: Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 6338	**Cable Percussion Borehole Log**				Borehole No: **BH08**
Contract:	Cornamaddy Housing Development	Easting:	605829.184	Date Started:	09/09/2024
Location:	Athlone, Co. Westmeath	Northing:	742873.111	Date Completed:	09/09/2024
Client:	Westmeath County Council	Elevation:	44.01	Drilled By:	J. O'Toole
Engineer:	SDS Design Engineers	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
0	0.20	TOPSOIL.		43.81						
0.5		Brown slightly sandy slightly gravelly silty CLAY.		43.5						
	0.80			43.21						
1.0		Firm brown grey slightly sandy slightly gravelly silty CLAY.		43.0		1.00	B	JOT29		
						1.00	C	N=11 (1,1/2,2,3,4)		
1.5				42.5						
2.0	2.10			42.0	41.91	2.00	B	JOT30		
		Dense grey brown silty sandy GRAVEL with high cobble content.				2.00	C	50 (25 for 110mm/50 for 25mm)		
2.5				41.5						
3.0				41.0		3.00	B	JOT31		
						3.00	C	N=34 (2,5/7,7,9,11)		
3.5				40.5						
4.0				40.0		4.00	B	JOT32		
						4.00	C	50 (3,7/50 for 125mm)		
4.5				39.5						
5.0				39.0		5.00	B	JOT33		
						5.00	C	50 (9,14/50 for 100mm)		
5.5				38.5						
6.0				38.0		6.00	B	JOT34		
						6.00	C	50 (8,9/50 for 190mm)		
	6.30				37.71					
6.5	6.50	Obstruction - possible boulders.		37.5	37.51	6.50	C	50 (25 for 5mm/50 for 5mm)		
		End of Borehole at 6.50m								
7.0				37.0						
7.5				36.5						
8.0				36.0						
8.5				35.5						
9.0				35.0						
9.5				34.5						
10.0				34.0						
10.5				33.5						

Chiselling:

From:	To:	Time:
2.10	2.30	01:00
4.80	5.00	01:00
6.30	6.50	01:30

Water Strikes:

Strike:	Rose:	Depth Sealed
3.80	3.50	NS

Water Details:

Date:	Hole Depth:	Water Depth:
09/09	6.50	1.80

Installation:

From:	To:	Pipe:

Backfill:

From:	To:	Type:
0.00	6.50	Arisings

Remarks:

Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 6338	**Cable Percussion Borehole Log**			Borehole No: **BH09**
Contract:	Cornamaddy Housing Development	Easting:	605943.123	Date Started: 04/09/2024
Location:	Athlone, Co. Westmeath	Northing:	742698.203	Date Completed: 04/09/2024
Client:	Westmeath County Council	Elevation:	46.66	Drilled By: D. Clarke
Engineer:	SDS Design Engineers	Borehole Diameter:	200mm	Status: FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
	0.30	TOPSOIL.		46.5	46.36					
0.5		Firm brown slightly sandy gravelly silty CLAY with high cobble content.		46.0		1.00	B	DC09		
1.0				45.5		1.00	C	N=15 (2,3/3,4,4,4)		
1.5	1.50	Dense brown silty slightly gravelly SAND with low cobble content.		45.0	45.16					
2.0				44.5		2.00	B	DC10		
2.5						2.00	C	N=32 (7,8/8,8,8,8)		
	2.80	Brown silty sandy GRAVEL with high cobble content.		44.0	43.86					
3.0	3.10	Dense grey brown silty sandy GRAVEL with high cobble content.		43.5	43.56	3.00	B	DC11		
3.5						3.00	C	N=34 (6,7/8,7,9,10)		
4.0				43.0		4.00	B	DC12		
4.5				42.5		4.00	C	N=39 (7,7/8,9,10,12)		
5.0				42.0		5.00	B	DC13		
5.5				41.5		5.00	C	N=32 (5,7/7,8,8,9)		
6.0				41.0		6.00	B	DC14		
6.5				40.5		6.00	C	N=30 (6,6/7,7,7,9)		
7.0				40.0		7.00	B	DC15		
7.5				39.5		7.00	C	N=33 (7,9/8,8,8,9)		
8.0				39.0		8.00	B	DC16		
8.5				38.5		8.00	C	N=31 (8,8/7,8,8,8)		
9.0				38.0		9.00	B	DC17		
9.5				37.5		9.00	C	N=32 (7,8/7,8,8,9)		
	9.70			37.0	36.96					
	9.80	Obstruction - possible boulders. End of Borehole at 9.80m			36.86	9.80	C	50 (25 for 5mm/50 for 5mm)		
10.0				36.5						
10.5				36.0						

Chiselling:

From:	To:	Time:
0.50	0.70	01:00
2.80	2.90	01:00
9.70	9.80	01:30

Water Strikes:

Strike:	Rose:	Depth Sealed

Water Details:

Date:	Hole Depth:	Water Depth:
04/09	9.80	Dry

Installation:

From:	To:	Pipe:

Backfill:

From:	To:	Type:
0.00	9.80	Arisings

Remarks: Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 6338	**Cable Percussion Borehole Log**	Borehole No: **BH10**

Contract:	Cornamaddy Housing Development	Easting:	605946.997	Date Started:	03/09/2024
Location:	Athlone, Co. Westmeath	Northing:	742786.081	Date Completed:	04/09/2024
Client:	Westmeath County Council	Elevation:	44.27	Drilled By:	J. O'Toole
Engineer:	SDS Design Engineers	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
0.5		Brown grey slightly sandy slightly gravelly silty CLAY.		43.47					
1.0	0.80	Medium dense light grey sandy SILT.			1.00	B	JOT07		
					1.00	C	N=16 (2,3/4,4,4,4)		
1.5	1.50	Brown grey slightly sandy slightly gravelly silty CLAY.		42.77					
2.0	1.80	Firm dark grey slightly sandy slightly gravelly silty CLAY.		42.47	2.00	B	JOT08		
					2.00	C	N=15 (1,2/2,3,5,5)		
2.5									
3.0	3.00	Medium dense grey silty sandy GRAVEL with high cobble content.		41.27	3.00	B	JOT09		
					3.00	C	N=21 (2,4/4,5,6,6)		
3.5									
4.0					4.00	B	JOT10		
					4.00	C	50 (3,5/50 for 180mm)		
4.5	4.50	Medium dense grey silty slightly gravelly SAND.		39.77					
5.0					5.00	B	JOT11		
					5.00	C	N=25 (2,4/6,9,5,5)		
5.5	5.50	Firm grey slightly sandy slightly gravelly silty CLAY.		38.77					
6.0					6.00	B	JOT12		
					6.00	C	N=14 (1,2/3,3,4,4)		
6.5									
7.0	7.10	Dense grey silty slightly gravelly SAND.		37.17	7.00	B	JOT13		
					7.00	C	N=43 (2,5/7,11,11,14)		
7.5	7.50	Firm grey slightly sandy slightly gravelly silty CLAY.		36.77					
8.0	7.90	Stiff grey slightly sandy slightly gravelly silty CLAY with low cobble content.		36.37	8.00	B	JOT14		
					8.00	C	N=18 (2,3/4,4,5,5)		
8.5									
9.0					9.00	B	JOT15		
	9.20	Dense grey brown silty sandy GRAVEL with high cobble content.		35.07	9.00	C	N=31 (3,5/9,9,6,7)		
9.5									
10.0					10.00	B	JOT16		
	10.10	Obstruction - possible boulders.		34.17	10.00	C	50 (25 for 105mm/50 for 20mm)		
	10.20	End of Borehole at 10.20m		34.07	10.20	C	50 (25 for 5mm/50 for 5mm)		
10.5									

Chiselling:

From:	To:	Time:
2.80	3.00	01:00
4.30	4.50	01:00
10.10	10.20	01:30

Water Strikes:

Strike:	Rose:	Depth Sealed
2.80	1.80	3.50
5.50	4.80	NS

Water Details:

Date:	Hole Depth:	Water Depth:
04/09	10.20	5.50

Installation:

From:	To:	Pipe:
0.00	1.50	Solid
1.50	10.00	Slotted

Backfill:

From:	To:	Type:
0.00	1.00	Bentonite
1.00	10.20	Gravel

Remarks:
Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 6338	**Cable Percussion Borehole Log**	Borehole No: **BH11**

Contract:	Cornamaddy Housing Development	Easting:	605834.396	Date Started:	06/09/2024
Location:	Athlone, Co. Westmeath	Northing:	742928.180	Date Completed:	06/09/2024
Client:	Westmeath County Council	Elevation:	43.97	Drilled By:	D. Clarke
Engineer:	SDS Design Engineers	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
0.5	0.40	TOPSOIL.		43.5	43.57					
1.0		Firm grey brown slightly sandy slightly gravelly silty CLAY with low cobble content.		43.0		1.00	B	DC18		
						1.00	C	N=9 (2,2/2,2,3,2)		
1.5	1.40	Firm grey slightly sandy slightly gravelly clayey SILT.		42.5	42.57					
2.0				42.0		2.00	B	DC19		
						2.00	C	N=9 (1,2/2,3,2,2)		
2.5				41.5						
3.0				41.0		3.00	B	DC20		
						3.00	C	N=15 (3,3/3,3,4,5)		
3.5				40.5						
4.0	3.80	Medium dense brown silty sandy GRAVEL with low cobble content.		40.0	40.17	4.00	B	DC21		
						4.00	C	N=27 (5,6/7,6,6,8)		
4.5	4.50	Dense grey brown silty sandy GRAVEL with high cobble content.		39.5	39.47					
5.0				39.0		5.00	B	DC22		
						5.00	C	N=36 (7,8/9,9,9,9)		
5.5				38.5						
6.0				38.0		6.00	B	DC23		
						6.00	C	N=38 (8,8/8,9,10,11)		
6.5				37.5						
7.0				37.0		7.00	B	DC24		
						7.00	C	N=32 (7,7/6,8,9,9)		
7.5				36.5						
8.0				36.0		8.00	B	DC25		
						8.00	C	N=40 (7,8/9,10,11,10)		
8.5				35.5						
9.0				35.0		9.00	B	DC26		
						9.00	C	N=37 (8,8/9,10,9,9)		
9.5	9.60	Obstruction - possible boulders.		34.5	34.37					
	9.70	End of Borehole at 9.70m			34.27	9.70	C	50 (25 for 5mm/50 for 5mm)		
10.0				34.0						
10.5				33.5						

Chiselling:

From:	To:	Time:
3.80	3.90	01:00
6.70	6.90	01:00
9.60	9.70	01:30

Water Strikes:

Strike:	Rose:	Depth Sealed

Water Details:

Date:	Hole Depth:	Water Depth:
06/09	9.70	Dry

Installation:

From:	To:	Pipe:
0.00	1.50	Solid
1.50	6.50	Slotted

Backfill:

From:	To:	Type:
0.00	1.00	Bentonite
1.00	9.70	Gravel

Remarks:

Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 6338	**Cable Percussion Borehole Log**	Borehole No: **BH12**

Contract:	Cornamaddy Housing Development	Easting:	606086.872	Date Started:	30/08/2024
Location:	Athlone, Co. Westmeath	Northing:	742615.273	Date Completed:	30/08/2024
Client:	Westmeath County Council	Elevation:	57.69	Drilled By:	J. O'Toole
Engineer:	SDS Design Engineers	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
0.5	0.30	MADE GROUND: concrete.		57.5	57.39					
	0.50	MADE GROUND: grey silty sandy gravel.			57.19					
1.0		MADE GROUND: grey silty sandy gravel with high cobble content.		57.0		1.00	B	JOT01		
				56.5		1.00	C	50 (25 for 105mm/50 for 20mm)		
1.5				56.0						
	1.80				55.89					
2.0		Stiff brown grey slightly sandy slightly gravelly silty CLAY with low cobble content.				2.00	B	JOT02		
				55.5		2.00	C	N=21 (2,4/4,5,6,6)		
2.5				55.0						
3.0						3.00	B	JOT03		
				54.5		3.00	C	N=15 (2,3/3,4,4,4)		
3.5				54.0						
	3.80				53.89					
4.0		Firm brown grey slightly sandy slightly gravelly silty CLAY.				4.00	B	JOT04		
				53.5		4.00	C	N=14 (1,2/3,3,4,4)		
4.5	4.50				53.19					
		Stiff black slightly sandy slightly gravelly silty CLAY.		53.0						
5.0						5.00	B	JOT05		
				52.5		5.00	C	N=16 (2,2/3,4,4,5)		
5.5				52.0						
6.0						6.00	B	JOT06		
				51.5		6.00	C	50 (6,14/50 for 155mm)		
6.5	6.50				51.19					
	6.80	Stiff black slightly sandy slightly gravelly silty CLAY with high cobble content.		51.0	50.89					
7.0	7.00	Obstruction - possible boulders.			50.69	7.00	C	50 (25 for 5mm/50 for 5mm)		
		End of Borehole at 7.00m		50.5						
7.5										
8.0				50.0						
8.5				49.5						
9.0				49.0						
9.5				48.5						
10.0				48.0						
10.5				47.5						
				47.0						

Chiselling:

From:	To:	Time:
0.60	0.80	01:15
6.80	7.00	01:30

Water Strikes:

Strike:	Rose:	Depth Sealed

Water Details:

Date:	Hole Depth:	Water Depth:
30/08	7.00	Dry

Installation:

From:	To:	Pipe:

Backfill:

From:	To:	Type:
0.00	7.00	Arisings

Remarks:

Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Appendix 2

Trial Pit Logs and Photographs

Contract No: 6338	**Trial Pit Log**				Trial Pit No: **TP01**
Contract:	Cornamaddy Housing Development	Easting:	605990.760	Date:	05/09/2024
Location:	Athlone, Co. Westmeath	Northing:	742736.565	Excavator:	8T Tracked Excavator
Client:	Westmeath County Council	Elevation:	44.96	Logged By:	M. Kaliski
Engineer:	SDS Design Engineers	Dimensions (LxWxD) (m):	4.20 x 0.70 x 2.60	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
		TOPSOIL.							
	0.20	Firm light brown slightly sandy slightly gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are subangular to subrounded of limestone.			44.76				
0.5				44.5					
1.0				44.0		1.00	B	MK01	
1.5				43.5					
	1.70	Firm becoming stiff light grey brown slightly sandy slightly gravelly clayey SILT with medium cobble and boulder content and occasional sand laminas. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles and boulders are subangular to subrounded of limestone (up to 600mm diameter).			43.26				
2.0				43.0		2.00	B	MK02	
2.5				42.5					
	2.60	Obstruction - boulders.			42.36				
		Pit terminated at 2.60m							
3.0				42.0					
3.5				41.5					
				41.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - boulders.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 6338	**Trial Pit Log**				Trial Pit No: **TP02**
Contract:	Cornamaddy Housing Development	Easting:	605955.185	Date:	05/09/2024
Location:	Athlone, Co. Westmeath	Northing:	742728.880	Excavator:	8T Tracked Excavator
Client:	Westmeath County Council	Elevation:	44.66	Logged By:	M. Kaliski
Engineer:	SDS Design Engineers	Dimensions (LxWxD) (m):	4.30 x 0.70 x 3.00	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
		TOPSOIL.		44.5					
	0.30	Firm light brown slightly sandy slightly gravelly clayey SILT. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone.			44.36				
0.5				44.0					
1.0						1.00	B	MK03	
1.5				43.5					
2.0				43.0					
	2.20	Firm light brown slightly sandy slightly gravelly clayey SILT with high cobble and low boulder content and occasional sand laminas. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles and boulders are subangular to subrounded of limestone (up to 300mm diameter).		42.5	42.46				
2.5	2.50	Grey slightly silty sandy fine to coarse, subangular to subrounded GRAVEL with high cobble and medium boulder content. Sand is fine to coarse. Cobbles and boulders are subangular to subrounded of limestone (up to 400mm diameter).			42.16	2.40	ES	MK04	▼
				42.0					
3.0	3.00	Obstruction - boulders.			41.66	3.00	B	MK05	
		Pit terminated at 3.00m		41.5					
3.5				41.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - boulders.	Minor collapse below 1.50mbgl.	2.50 Seepage	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 6338	**Trial Pit Log**				Trial Pit No: **TP03**
Contract:	Cornamaddy Housing Development	Easting:	605949.948	Date:	05/09/2024
Location:	Athlone, Co. Westmeath	Northing:	742770.653	Excavator:	8T Tracked Excavator
Client:	Westmeath County Council	Elevation:	44.32	Logged By:	M. Kaliski
Engineer:	SDS Design Engineers	Dimensions (LxWxD) (m):	4.60 x 0.70 x 3.00	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
		TOPSOIL.							
	0.30	Firm light grey brown slightly sandy slightly gravelly clayey SILT. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone.		44.0	44.02				
0.5						0.50	ES	MK06	
				43.5					
1.0						1.00	B	MK07	
				43.0					
1.5									
	1.80	Firm grey brown slightly sandy slightly gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles and boulders are subangular to subrounded of limestone (up to 800mm diameter).		42.5	42.52	1.90	B	MK08	
2.0	2.00	Grey slightly silty sandy fine to coarse, subangular to subrounded GRAVEL with high cobble and medium boulder content. Sand is fine to coarse. Cobbles and boulders are subangular to subrounded of limestone (up to 450mm diameter).			42.32				
				42.0					
2.5						2.50	B	MK09	
				41.5					
3.0	3.00	Obstruction - boulders.			41.32				
		Pit terminated at 3.00m							
				41.0					
3.5									
				40.5					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - boulders.	Pit walls stable.	2.00 Seepage	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 6338	**Trial Pit Log**				Trial Pit No: **TP04**
Contract:	Cornamaddy Housing Development	Easting:	605913.450	Date:	05/09/2024
Location:	Athlone, Co. Westmeath	Northing:	742839.098	Excavator:	8T Tracked Excavator
Client:	Westmeath County Council	Elevation:	43.87	Logged By:	M. Kaliski
Engineer:	SDS Design Engineers	Dimensions (LxWxD) (m):	3.80 x 0.70 x 3.40	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
		TOPSOIL.							
	0.20	Firm light grey brown slightly sandy slightly gravelly clayey SILT. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone.			43.67				
0.5				43.5					
				43.0					
1.0						1.00	B	MK10	
				42.5					
1.5									
				42.0					
2.0	2.00	Firm grey slightly sandy slightly gravelly clayey SILT with occasional sand laminas. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone.			41.87				
				41.5					
2.5						2.50	B	MK11	
				41.0					
3.0									
	3.40	**Pit terminated at 3.40m**		40.5	40.47				
3.5									
				40.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - boulders.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 6338	**Trial Pit Log**				Trial Pit No: **TP05**
Contract:	Cornamaddy Housing Development	Easting:	605837.423	Date:	06/09/2024
Location:	Athlone, Co. Westmeath	Northing:	742825.893	Excavator:	8T Tracked Excavator
Client:	Westmeath County Council	Elevation:	44.08	Logged By:	M. Kaliski
Engineer:	SDS Design Engineers	Dimensions (LxWxD) (m):	4.40 x 0.70 x 3.50	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
	0.15	TOPSOIL.		44.0	43.93				
		Firm light grey brown slightly sandy slightly gravelly clayey SILT. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone.							
0.5						0.50	ES	MK29	
	0.60	Firm grey brown slightly sandy slightly gravelly clayey SILT with frequent sand laminas. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone.		43.5	43.48				
1.0						1.00	B	MK30	▼
				43.0					
1.5				42.5					
2.0				42.0					
2.5				41.5		2.50	B	MK31	
3.0				41.0					
3.5	3.50	Pit terminated at 3.50m		40.5	40.58				

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - boulders.	Pit walls stable.	1.40 Seepage	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 6338	**Trial Pit Log**				Trial Pit No: **TP06**
Contract:	Cornamaddy Housing Development	Easting:	605877.537	Date:	06/09/2024
Location:	Athlone, Co. Westmeath	Northing:	742812.037	Excavator:	8T Tracked Excavator
Client:	Westmeath County Council	Elevation:	44.07	Logged By:	M. Kaliski
Engineer:	SDS Design Engineers	Dimensions (LxWxD) (m):	4.10 x 0.70 x 3.00	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
		TOPSOIL.		44.0					
	0.20				43.87				
		Firm light grey brown slightly sandy slightly gravelly clayey SILT. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone.		43.5					
0.5									
	0.80				43.27				
		Firm grey brown slightly sandy slightly gravelly clayey SILT. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone.				1.00	B	MK32	
1.0				43.0					
1.5				42.5					
	1.90				42.17				
		Firm grey brown slightly sandy slightly gravelly clayey SILT with frequent sand laminas. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone.		42.0					
2.0									
2.5				41.5		2.50	B	MK33	
	3.00	**Pit terminated at 3.00m**			41.07				
3.0				41.0					
3.5				40.5					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - boulders.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 6338	**Trial Pit Log**				Trial Pit No: **TP07**
Contract:	Cornamaddy Housing Development	Easting:	605858.334	Date:	05/09/2024
Location:	Athlone, Co. Westmeath	Northing:	742941.324	Excavator:	8T Tracked Excavator
Client:	Westmeath County Council	Elevation:	44.14	Logged By:	M. Kaliski
Engineer:	SDS Design Engineers	Dimensions (LxWxD) (m):	3.80 x 0.70 x 3.00	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
		TOPSOIL.		44.0					
	0.20				43.94				
		Firm light grey brown slightly sandy slightly gravelly clayey SILT. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone.							
0.5				43.5		0.50	ES	MK17	
1.0						1.00	B	MK18	
				43.0					
	1.30				42.84				
		Grey slightly silty sandy fine to coarse, subangular to subrounded GRAVEL with high cobble and medium boulder content. Sand is fine to coarse. Cobbles and boulders are subangular to subrounded of limestone (up to 350mm diameter).							
1.5				42.5					
2.0						2.00	B	MK19	
				42.0					
2.5				41.5					
3.0	3.00	Obstruction - boulders.			41.14				
		Pit terminated at 3.00m		41.0					
3.5				40.5					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - boulders.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 6338	**Trial Pit Log**				Trial Pit No: **TP08**
Contract:	Cornamaddy Housing Development	Easting:	605853.542	Date:	06/09/2024
Location:	Athlone, Co. Westmeath	Northing:	742860.716	Excavator:	8T Tracked Excavator
Client:	Westmeath County Council	Elevation:	43.94	Logged By:	M. Kaliski
Engineer:	SDS Design Engineers	Dimensions (LxWxD) (m):	4.30 x 0.70 x 3.00	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
		TOPSOIL.							
	0.20	Firm light grey brown slightly sandy slightly gravelly clayey SILT. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone.			43.74				
0.5				43.5					
1.0				43.0		1.00	B	MK26	
	1.30	Firm grey brown slightly sandy slightly gravelly clayey SILT with frequent sand laminas. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone.			42.64				
1.5				42.5		1.50	B	MK27	
2.0				42.0					
2.5				41.5					
3.0	3.00	**Pit terminated at 3.00m**		41.0	40.94	3.00	B	MK28	
3.5				40.5					
				40.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - boulders.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 6338	**Trial Pit Log**				Trial Pit No: **TP09**
Contract:	Cornamaddy Housing Development	Easting:	605907.329	Date:	05/09/2024
Location:	Athlone, Co. Westmeath	Northing:	742877.109	Excavator:	8T Tracked Excavator
Client:	Westmeath County Council	Elevation:	44.08	Logged By:	M. Kaliski
Engineer:	SDS Design Engineers	Dimensions (LxWxD) (m):	4.40 x 0.70 x 3.20	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
	0.10	TOPSOIL.		44.0	43.98				
		Firm light grey brown slightly sandy slightly gravelly clayey SILT. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone.							
0.5				43.5		0.50	ES	MK12	
1.0				43.0		1.00	B	MK13	
1.5				42.5					
	1.90	Firm light grey slightly sandy slightly gravelly clayey SILT with occasional sand laminas. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone.			42.18				
2.0				42.0		2.00	B	MK14	
2.5				41.5		2.50	B	MK15	
	2.90	Stiff grey slightly sandy slightly gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are subangular to subrounded of limestone.			41.18				
3.0				41.0		3.00	B	MK16	
	3.20	**Pit terminated at 3.20m**			40.88				
3.5				40.5					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - boulders.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 6338	**Trial Pit Log**				Trial Pit No: **TP10**
Contract:	Cornamaddy Housing Development	Easting:	605836.265	Date:	05/09/2024
Location:	Athlone, Co. Westmeath	Northing:	742908.803	Excavator:	8T Tracked Excavator
Client:	Westmeath County Council	Elevation:	43.92	Logged By:	M. Kaliski
Engineer:	SDS Design Engineers	Dimensions (LxWxD) (m):	3.90 x 0.70 x 1.80	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
		TOPSOIL.							
	0.15	Firm light grey brown slightly sandy slightly gravelly clayey SILT. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone.			43.77				
0.5				43.5		0.50	ES	MK20	
1.0				43.0		1.00	B	MK21	
1.5	1.50	Firm grey brown sandy slightly gravelly silty CLAY with high cobble and boulder content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles and boulders are subangular to subrounded of limestone (up to 900mm diameter).		42.5	42.42	1.70	B	MK22	
	1.80	Obstruction - boulders.			42.12				
2.0		**Pit terminated at 1.80m**		42.0					
2.5				41.5					
3.0				41.0					
3.5				40.5					
				40.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - boulders.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 6338	**Trial Pit Log**				Trial Pit No: **TP11**
Contract:	Cornamaddy Housing Development	Easting:	606086.092	Date:	06/09/2024
Location:	Athlone, Co. Westmeath	Northing:	742605.677	Excavator:	8T Tracked Excavator
Client:	Westmeath County Council	Elevation:	57.93	Logged By:	M. Kaliski
Engineer:	SDS Design Engineers	Dimensions (LxWxD) (m):	3.90 x 0.70 x 3.00	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
		TOPSOIL.							
	0.20				57.73				
		Grey brown silty very sandy fine to coarse, subangular to subrounded GRAVEL with high cobble and medium boulder content. Sand is fine to coarse. Cobbles and boulders are subangular to subrounded of limestone (up to 800mm diameter).		57.5		0.50	ES	MK34	
0.5									
	0.70				57.23				
		Firm grey brown slightly sandy slightly gravelly clayey SILT. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone.		57.0		1.00	B	MK35	
1.0									
1.5				56.5					
2.0				56.0					
				55.5		2.50	B	MK36	
2.5									
				55.0					
3.0	3.00	**Pit terminated at 3.00m**			54.93				
3.5				54.5					
				54.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - boulders.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 6338	**Trial Pit Log**				Trial Pit No: **TP12**
Contract:	Cornamaddy Housing Development	Easting:	605854.602	Date:	05/09/2024
Location:	Athlone, Co. Westmeath	Northing:	742884.667	Excavator:	8T Tracked Excavator
Client:	Westmeath County Council	Elevation:	43.95	Logged By:	M. Kaliski
Engineer:	SDS Design Engineers	Dimensions (LxWxD) (m):	4.10 x 0.70 x 3.10	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
		TOPSOIL.							
	0.20	Firm light grey brown slightly sandy slightly gravelly clayey SILT. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone.			43.75				
0.5				43.5					
1.0				43.0		1.00	B	MK23	
1.5				42.5					
	1.80	Firm grey brown slightly sandy slightly gravelly clayey SILT. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone.			42.15				
2.0				42.0		2.00	B	MK24	
2.5				41.5					
	2.90	Stiff grey slightly sandy slightly gravelly silty CLAY with high cobble and medium boulder content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles and boulders are subangular to subrounded of limestone (up to 700mm diameter).		41.0	41.05	3.00	B	MK25	
3.0	3.10				40.85				
		Pit terminated at 3.10m							
3.5				40.5					
				40.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - boulders.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

TP01 Sidewall

TP01 Spoil

TP02 Sidewall

TP02 Spoil

TP03 Sidewall

TP03 Spoil

TP04 Sidewall

TP04 Spoil

TP05 Sidewall

TP05 Spoil

TP06 Sidewall

TP06 Spoil

TP07 Sidewall

TP07 Spoil

TP08 Sidewall

TP08 Spoil

TP09 Sidewall

TP09 Spoil

TP10 Sidewall

TP10 Spoil

TP11 Sidewall

TP11 Spoil

TP12 Sidewall

TP12 Spoil

Appendix 3

Soakaway Test Results and Photographs

SOAKAWAY TEST

Project Reference:	6338
Contract name:	Cornamaddy
Location:	Athlone, Co. Westmeath
Test No:	INF01
Date:	05/09/2024

Ground Conditions

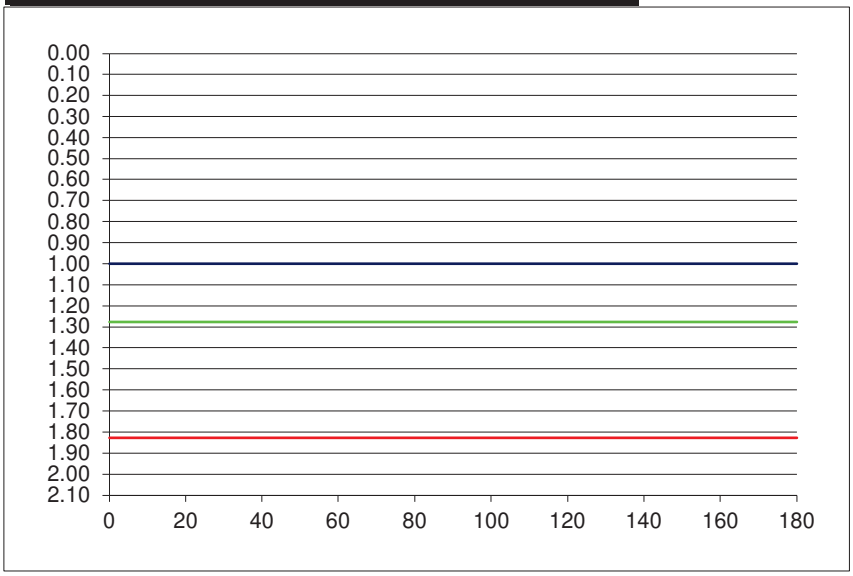
From	To	
0.00	0.20	TOPSOIL.
0.20	0.60	Firm light brown grey slightly sandy SILT.
0.60	1.90	Firm light grey slightly sandy slightly gravelly SILT with occasional sand laminas.
1.90	2.10	Firm grey slightly sandy SILT.

Remarks:

-

Elapsed Time (mins)	Fall of Water (m)
0	1.00
0.5	1.00
1	1.00
1.5	1.00
2	1.00
2.5	1.00
3	1.00
3.5	1.00
4	1.00
4.5	1.00
5	1.00
6	1.00
7	1.00
8	1.00
9	1.00
10	1.00
12	1.00
14	1.00
16	1.00
18	1.00
20	1.00
25	1.00
30	1.00
40	1.00
50	1.00
60	1.00
75	1.00
90	1.00
120	1.00
150	1.00
180	1.00

Pit Dimensions (m)		
Length (m)	3.10	m
Width (m)	0.70	m
Depth	2.10	m
Water		
Start Depth of Water	1.00	m
Depth of Water	1.10	m
75% Full	1.28	m
25% Full	1.83	m
75%-25%	0.55	m
Volume of water (75%-25%)	**1.19**	m3
Area of Drainage	**15.96**	m2
Area of Drainage (75%-25%)	**6.35**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec



f = **Fail** m/min or **Fail** m/s

SOAKAWAY TEST

Project Reference:	6338
Contract name:	Cornamaddy
Location:	Athlone, Co. Westmeath
Test No:	INF02
Date:	06/09/2024

Ground Conditions

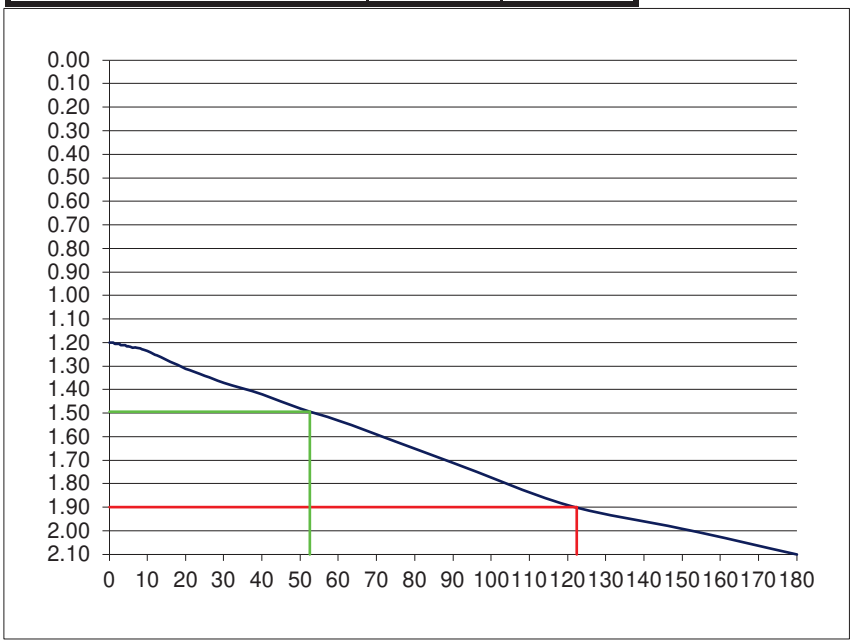
From	To	
0.00	0.20	TOPSOIL.
0.20	1.50	Firm light grey brown slightly sandy clayey SILT.
1.50	2.10	Grey silty sandy GRAVEL with high cobble and medium boulder content.

Remarks:

-

Elapsed Time (mins)	Fall of Water (m)
0	1.20
0.5	1.20
1	1.20
1.5	1.21
2	1.21
2.5	1.21
3	1.21
3.5	1.21
4	1.21
4.5	1.22
5	1.22
6	1.22
7	1.22
8	1.23
9	1.23
10	1.24
12	1.25
14	1.27
16	1.28
18	1.30
20	1.31
25	1.34
30	1.37
40	1.42
50	1.48
60	1.53
75	1.62
90	1.71
120	1.89
150	1.99
180	2.10

Pit Dimensions (m)		
Length (m)	4.10	m
Width (m)	0.70	m
Depth	2.10	m
Water		
Start Depth of Water	1.29	m
Depth of Water	0.81	m
75% Full	1.49	m
25% Full	1.90	m
75%-25%	0.41	m
Volume of water (75%-25%)	**1.16**	m3
Area of Drainage	**20.16**	m2
Area of Drainage (75%-25%)	**6.76**	m2
Time		
75% Full	52.5	min
25% Full	122.25	min
Time 75% to 25%	**69.75**	min
Time 75% to 25% (sec)	**4185**	sec



f = 0.00247 m/min or **4.11E-05 m/s**

SOAKAWAY TEST

Project Reference:	6338
Contract name:	Cornamaddy
Location:	Athlone, Co. Westmeath
Test No:	INF03
Date:	05/09/2024

Ground Conditions

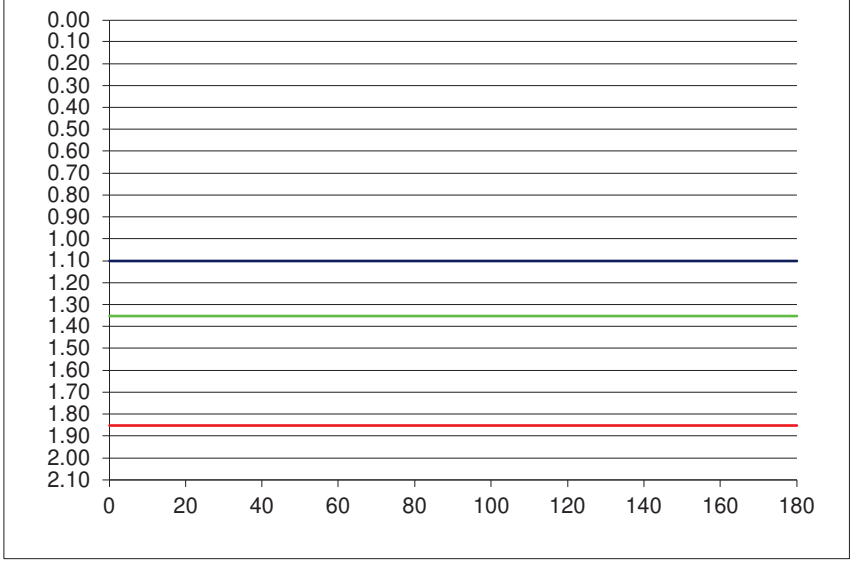
From	To	
0.00	0.30	TOPSOIL.
0.30	1.30	Firm light brown grey slightly sandy SILT with occasional sand laminas.
1.30	2.10	Firm grey brown slightly sandy slightly gravelly silty CLAY with high cobble and medium boulder content.

Remarks:

-

Elapsed Time (mins)	Fall of Water (m)
0	1.10
0.5	1.10
1	1.10
1.5	1.10
2	1.10
2.5	1.10
3	1.10
3.5	1.10
4	1.10
4.5	1.10
5	1.10
6	1.10
7	1.10
8	1.10
9	1.10
10	1.10
12	1.10
14	1.10
16	1.10
18	1.10
20	1.10
25	1.10
30	1.10
40	1.10
50	1.10
60	1.10
75	1.10
90	1.10
120	1.10
150	1.10
180	1.10

Pit Dimensions (m)		
Length (m)	4.10	m
Width (m)	0.70	m
Depth	2.10	m
Water		
Start Depth of Water	1.10	m
Depth of Water	1.00	m
75% Full	1.35	m
25% Full	1.85	m
75%-25%	0.50	m
Volume of water (75%-25%)	**1.44**	m3
Area of Drainage	**20.16**	m2
Area of Drainage (75%-25%)	**7.67**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec



f = **Fail** **m/min** or **Fail** **m/s**

SOAKAWAY TEST

Project Reference:	6338
Contract name:	Cornamaddy
Location:	Athlone, Co. Westmeath
Test No:	INF04
Date:	06/09/2024

Ground Conditions

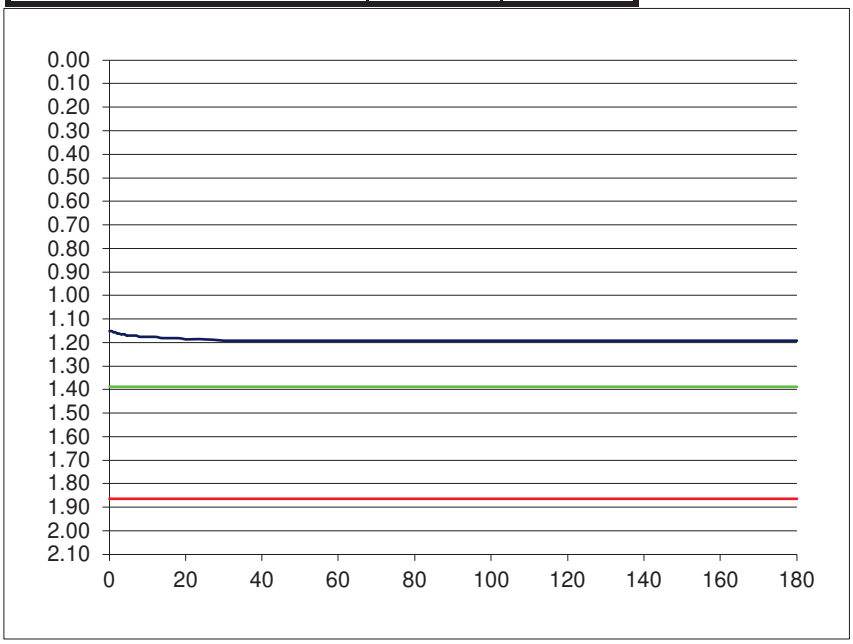
From	To	
0.00	0.30	TOPSOIL.
0.30	1.20	Grey silty sandy GRAVEL with high cobble and medium boulder content.
1.20	2.10	Firm grey brown slightly sandy slightly gravelly SILT.

Remarks:

-

Elapsed Time (mins)	Fall of Water (m)
0	1.15
0.5	1.15
1	1.16
1.5	1.16
2	1.16
2.5	1.16
3	1.17
3.5	1.17
4	1.17
4.5	1.17
5	1.17
6	1.17
7	1.17
8	1.18
9	1.18
10	1.18
12	1.18
14	1.18
16	1.18
18	1.18
20	1.19
25	1.19
30	1.19
40	1.19
50	1.19
60	1.19
75	1.19
90	1.19
120	1.19
150	1.19
180	1.19

Pit Dimensions (m)		
Length (m)	3.60	m
Width (m)	0.70	m
Depth	2.10	m
Water		
Start Depth of Water	1.15	m
Depth of Water	0.95	m
75% Full	1.39	m
25% Full	1.86	m
75%-25%	0.48	m
Volume of water (75%-25%)	**1.20**	m3
Area of Drainage	**18.06**	m2
Area of Drainage (75%-25%)	**6.61**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec



f = **Fail** m/min or **Fail** m/s

SOAKAWAY TEST

Project Reference:	6338
Contract name:	Cornamaddy
Location:	Athlone, Co. Westmeath
Test No:	INF05
Date:	05/09/2024

Ground Conditions

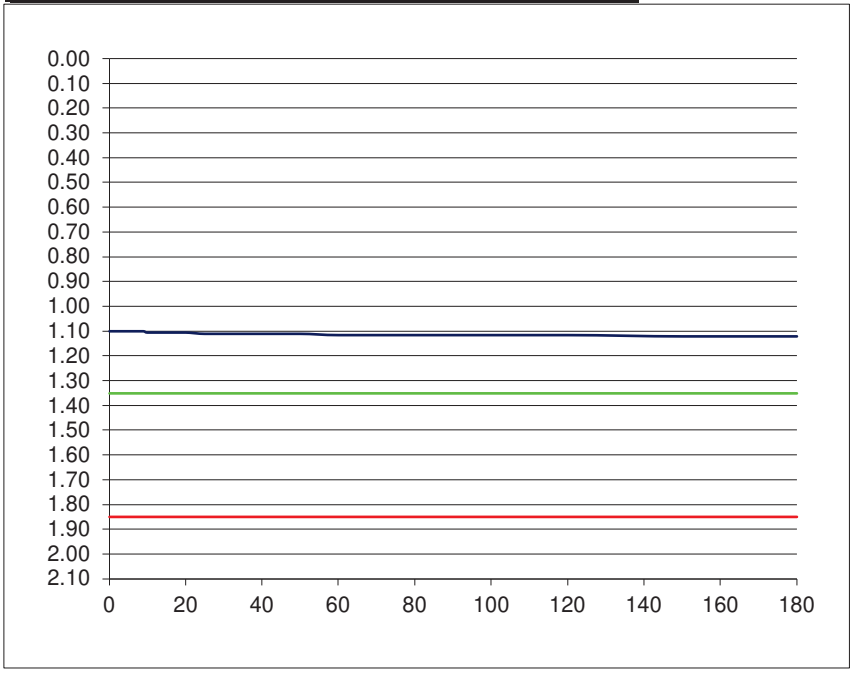
From	To	
0.00	0.10	TOPSOIL.
0.10	2.10	Firm grey brown slightly sandy SILT.

Remarks:

-

Elapsed Time (mins)	Fall of Water (m)
0	1.10
0.5	1.10
1	1.10
1.5	1.10
2	1.10
2.5	1.10
3	1.10
3.5	1.10
4	1.10
4.5	1.10
5	1.10
6	1.10
7	1.10
8	1.10
9	1.10
10	1.11
12	1.11
14	1.11
16	1.11
18	1.11
20	1.11
25	1.11
30	1.11
40	1.11
50	1.11
60	1.12
75	1.12
90	1.12
120	1.12
150	1.12
180	1.12

Pit Dimensions (m)		
Length (m)	3.20	m
Width (m)	0.70	m
Depth	2.10	m
Water		
Start Depth of Water	1.10	m
Depth of Water	1.00	m
75% Full	1.35	m
25% Full	1.85	m
75%-25%	0.50	m
Volume of water (75%-25%)	**1.12**	m3
Area of Drainage	**16.38**	m2
Area of Drainage (75%-25%)	**6.14**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec



f = **Fail** m/min or **Fail** m/s

INF01 Sidewall

INF01 Spoil

INF02 Sidewall

INF02 Spoil

INF03 Sidewall

INF03 Spoil

INF04 Sidewall

INF04 Spoil

INF05 Sidewall

INF05 Spoil

Appendix 4

Plate Load Test Results

Plate Bearing Test in accordance with BS 1377: Part 9 and Part 2 HD 25/94

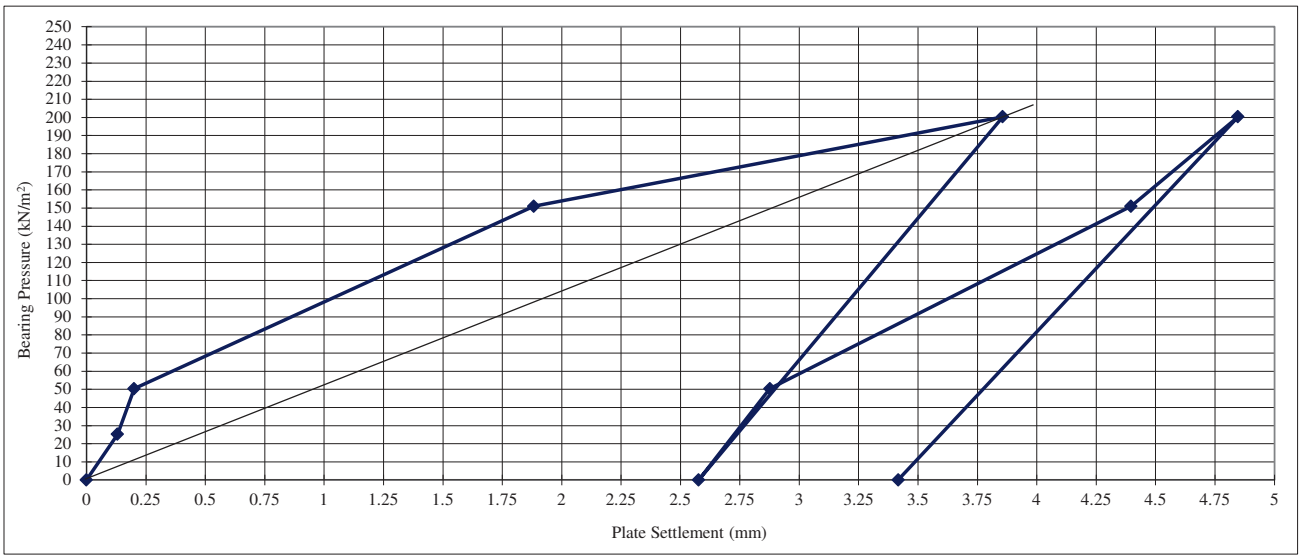
Site Investigations Ltd., Carhugar The Grange, 12th Lock Road, Lucan, Co. Dublin Tel: 01 6108768 Email:info@siteinvestigations.ie

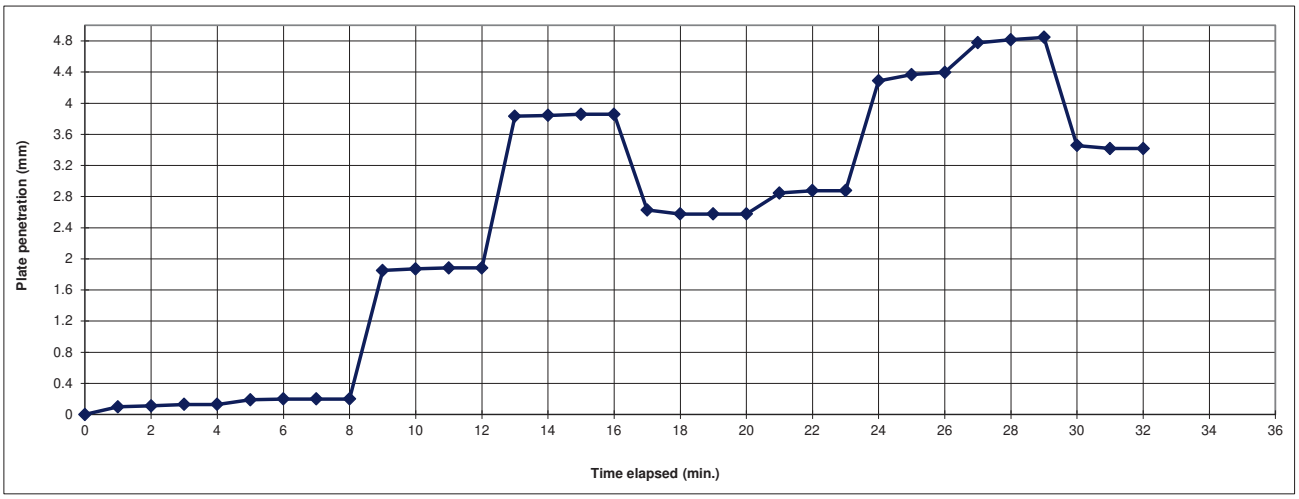
Client	Westmeath County Council
Site	Cornamaddy Housing Development, Athlone, Co. Westmeath
Test Date	29-Aug-24
Location:	PLT01
Plate Diameter:	*600mm*
Type of reaction Load	*13tonne tracked excavator*
Material Type:	*Brown slightly sandy slightly gravelly silty CLAY*
Depth test carried out:	*0.50m BGL*
CBR value is as per specification for 762mm Plate	

1.25mm settlement (graph) for 762mm Plate (kPa)	**65**
Equivalent CBR Value-Initial loading (%)	**13.4**
Mod. of subgrade Reaction k for 600mm Plate(kPa)	**55**
Correction factor for 600mm Plate	**0.85**

Pressure Stages	Bearing Pressure (kN/m^2)	Plate Settlement (mm)
Initial	0.0	0.00
	25	0.13
	50	0.20
	151	1.88
	200	3.86
	0.0	2.58
Reload	50	2.88
	151	4.40
	200	4.85
Final Condition	0.0	3.42

ITM Co-ords	Easting	Northing	Level





09/10/2024

Site Investigatins Ltd.

Plate Bearing Test in accordance with BS 1377: Part 9 and Part 2 HD 25/94

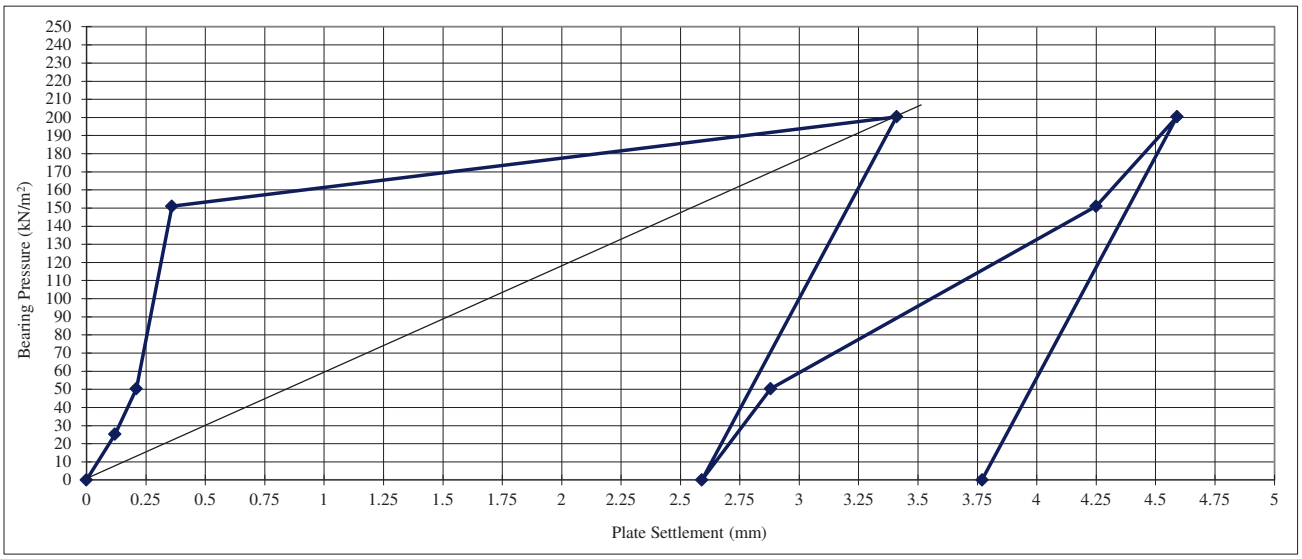
Site Investigations Ltd., Carhugar The Grange, 12th Lock Road, Lucan, Co. Dublin Tel: 01 6108768 Email:info@siteinvestigations.ie

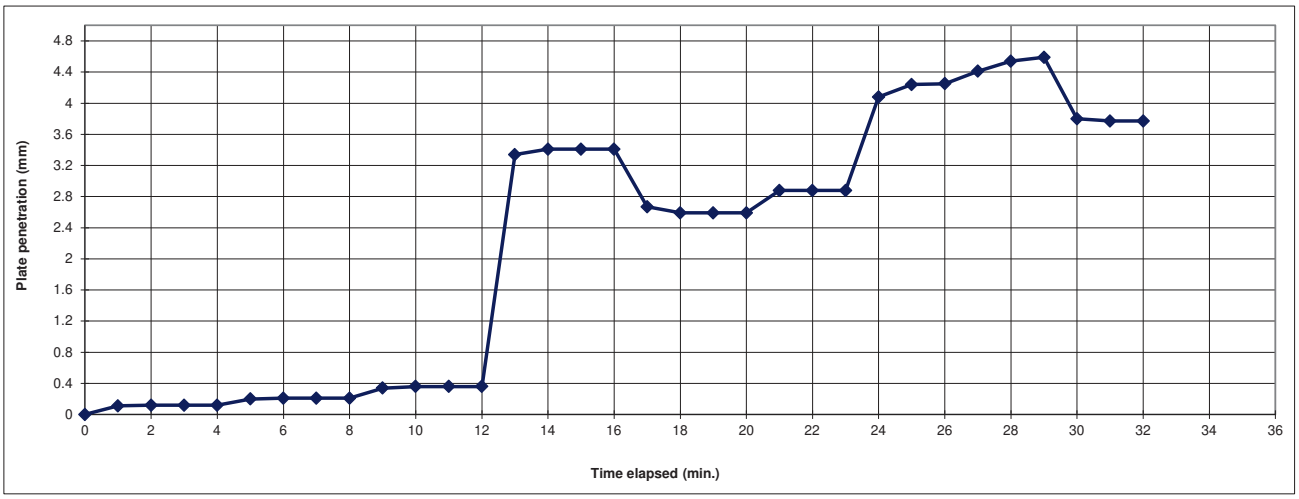
Client	Westmeath County Council
Site	Cornamaddy Housing Development, Athlone, Co. Westmeath
Test Date	29-Aug-24
Location:	PLT01
Plate Diameter:	*600mm*
Type of reaction Load	*13tonne tracked excavator*
Material Type:	*Brown slightly sandy slightly gravelly silty CLAY*
Depth test carried out:	*0.50m BGL*
CBR value is as per specification for 762mm Plate	

1.25mm settlement (graph) for 762mm Plate (kPa)	**73**
Equivalent CBR Value-Initial loading (%)	**16.3**
Mod. of subgrade Reaction k for 600mm Plate(kPa)	**62**
Correction factor for 600mm Plate	**0.85**

Pressure Stages	Bearing Pressure (kN/m^2)	Plate Settlement (mm)
Initial	0.0	0.00
	25	0.12
	50	0.21
	151	0.36
	200	3.41
	0.0	2.59
Reload	50	2.88
	151	4.25
	200	4.59
Final Condition	0.0	3.77

ITM Co-ords	Easting	Northing	Level





09/10/2024

Site Investigatins Ltd.

Plate Bearing Test in accordance with BS 1377: Part 9 and Part 2 HD 25/94

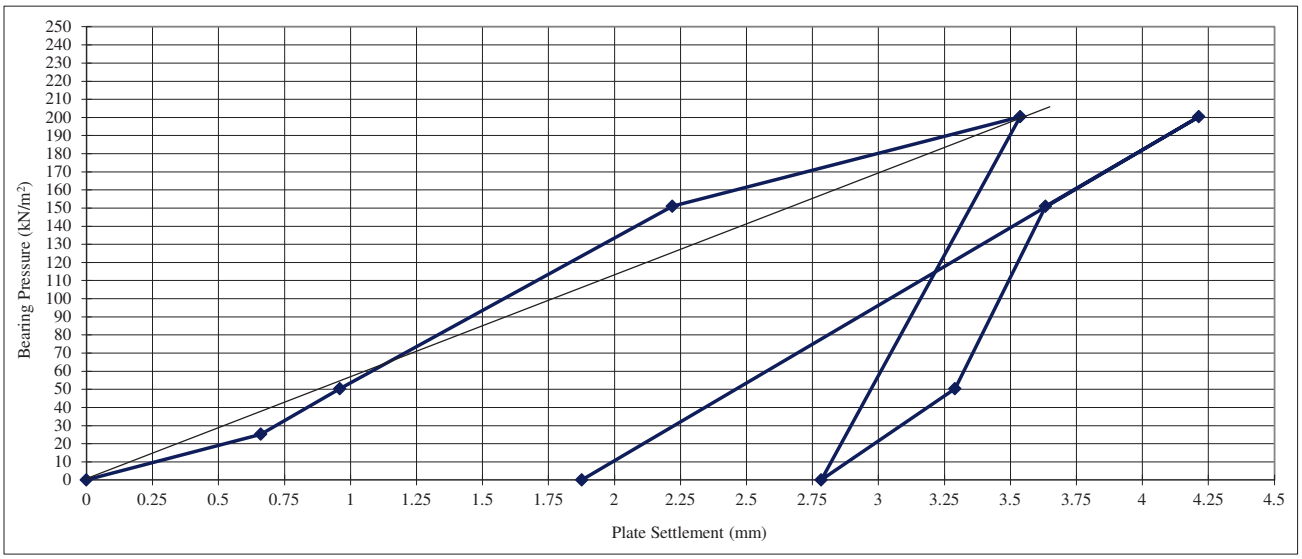
Site Investigations Ltd., Carhugar The Grange, 12th Lock Road, Lucan, Co. Dublin Tel: 01 6108768 Email:info@siteinvestigations.ie

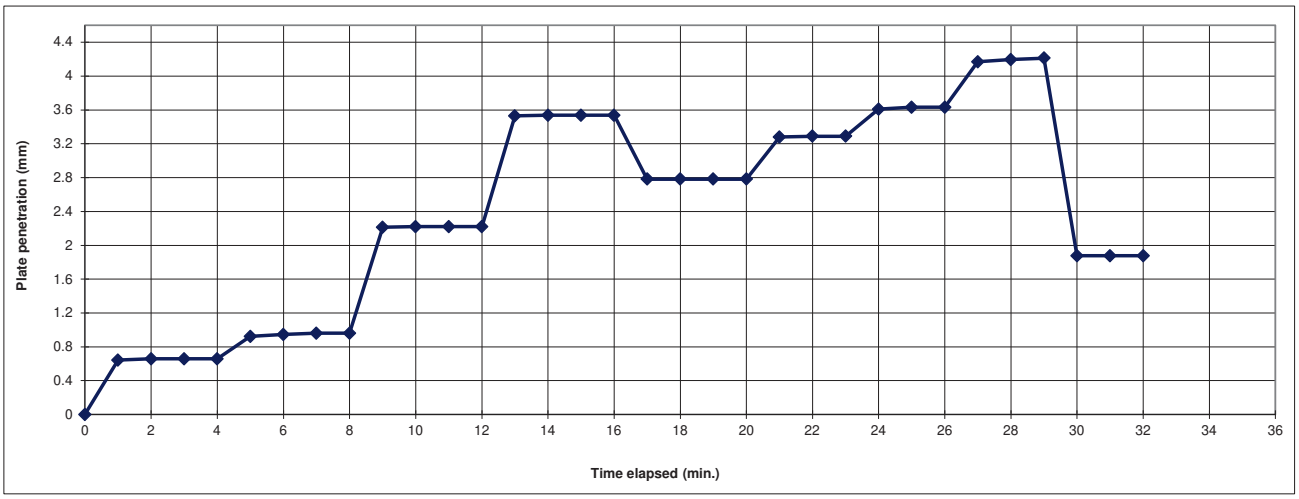
Client	Westmeath County Council
Site	Cornamaddy Housing Development, Athlone, Co. Westmeath
Test Date	29-Aug-24
Location:	PLT03
Plate Diameter:	*600mm*
Type of reaction Load	*13tonne tracked excavator*
Material Type:	*Brown slightly sandy slightly gravelly silty CLAY*
Depth test carried out:	*0.50m BGL*
CBR value is as per specification for 762mm Plate	

1.25mm settlement (graph) for 762mm Plate (kPa)	**70**
Equivalent CBR Value-Initial loading (%)	**15.2**
Mod. of subgrade Reaction k for 600mm Plate(kPa)	**60**
Correction factor for 600mm Plate	**0.85**

Pressure Stages	Bearing Pressure (kN/m^2)	Plate Settlement (mm)
Initial	0.0	0.00
	25	0.66
	50	0.96
	151	2.22
	200	3.54
	0.0	2.78
Reload	50	3.29
	151	3.63
	200	4.21
Final Condition	0.0	1.88

ITM Co-ords	Easting	Northing	Level





09/10/2024

Site Investigatins Ltd.

Plate Bearing Test in accordance with BS 1377: Part 9 and Part 2 HD 25/94

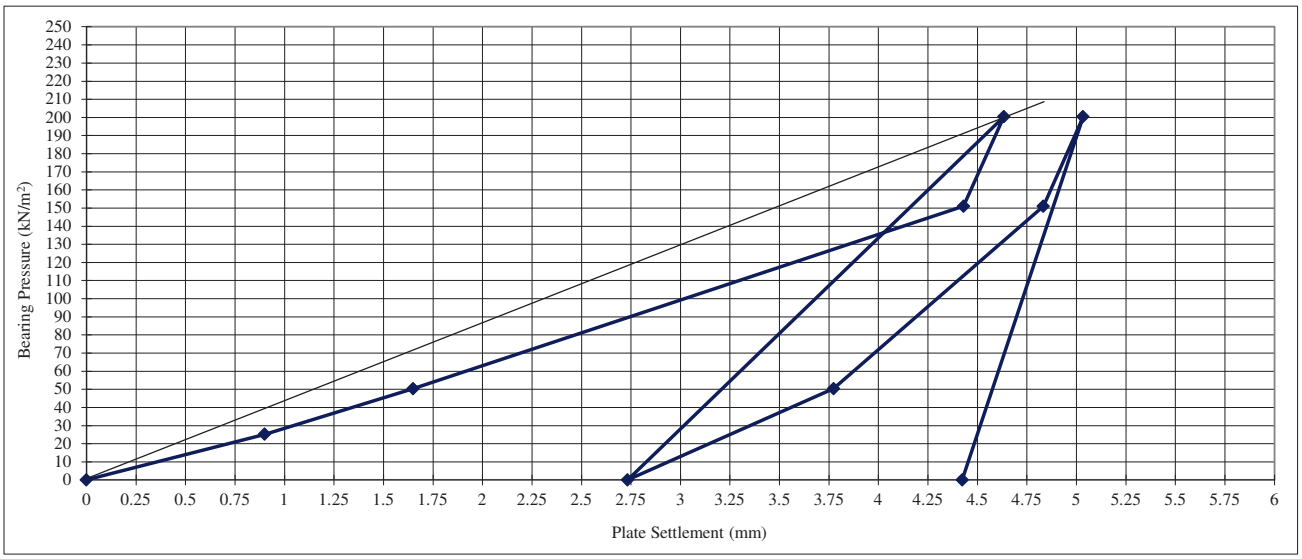
Site Investigations Ltd., Carhugar The Grange, 12th Lock Road, Lucan, Co. Dublin Tel: 01 6108768 Email:info@siteinvestigations.ie

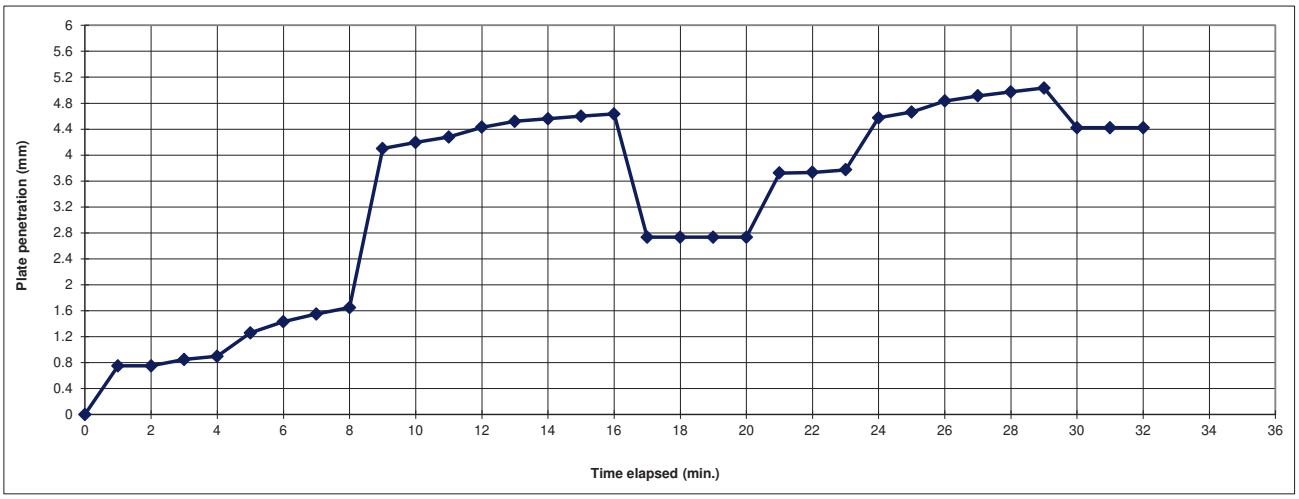
Client	Westmeath County Council
Site	Cornamaddy Housing Development, Athlone, Co. Westmeath
Test Date	29-Aug-24
Location:	PLT04
Plate Diameter:	*600mm*
Type of reaction Load	*13tonne tracked excavator*
Material Type:	*Brown slightly sandy slightly gravelly silty CLAY*
Depth test carried out:	*0.50m BGL*
CBR value is as per specification for 762mm Plate	

1.25mm settlement (graph) for 762mm Plate (kPa)	**54**
Equivalent CBR Value-Initial loading (%)	**9.7**
Mod. of subgrade Reaction k for 600mm Plate(kPa)	**46**
Correction factor for 600mm Plate	**0.85**

Pressure Stages	Bearing Pressure (kN/m^2)	Plate Settlement (mm)
Initial	0.0	0.00
	25	0.90
	50	1.65
	151	4.43
	200	4.63
	0.0	2.73
Reload	50	3.77
	151	4.83
	200	5.03
Final Condition	0.0	4.42

ITM Co-ords	Easting	Northing	Level





09/10/2024

Site Investigatins Ltd.

Plate Bearing Test in accordance with BS 1377: Part 9 and Part 2 HD 25/94

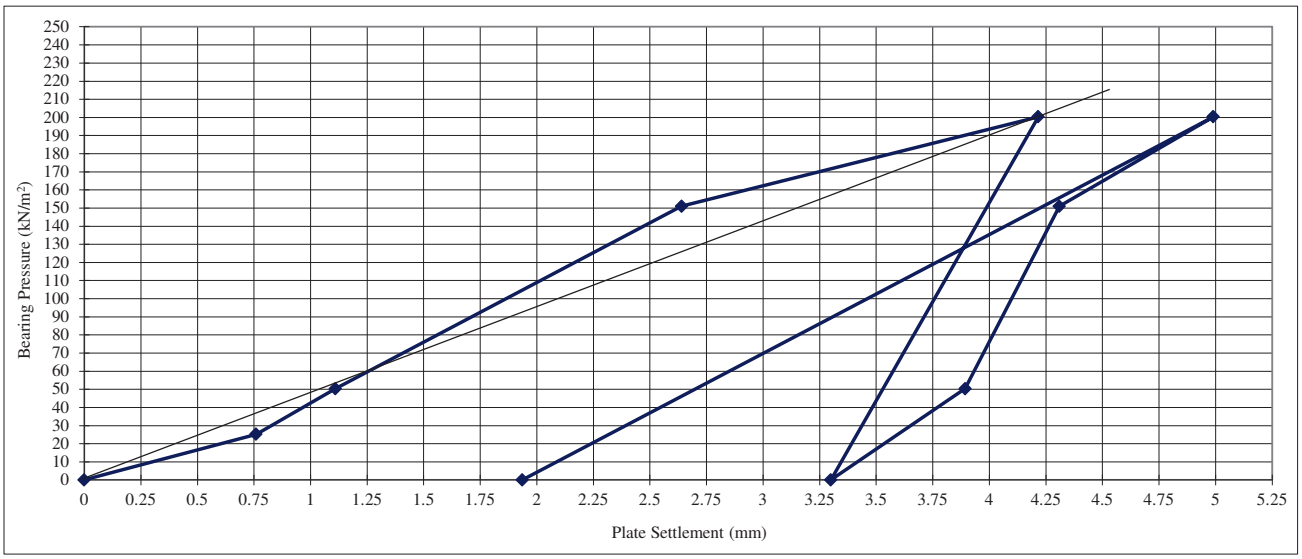
Site Investigations Ltd., Carhugar The Grange, 12th Lock Road, Lucan, Co. Dublin Tel: 01 6108768 Email:info@siteinvestigations.ie

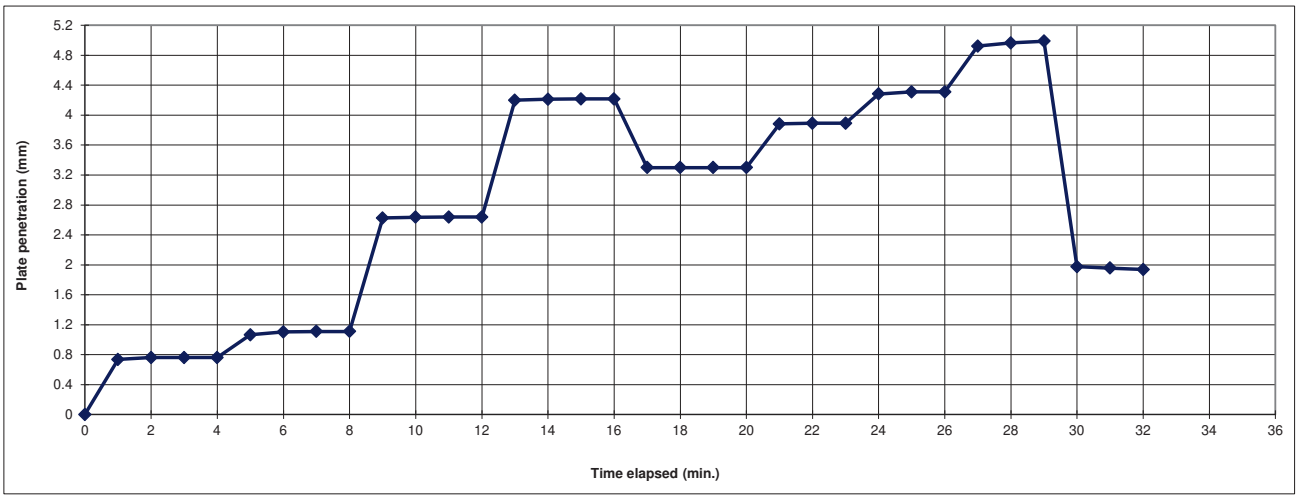
Client	Westmeath County Council
Site	Cornamaddy Housing Development, Athlone, Co. Westmeath
Test Date	29-Aug-24
Location:	PLT05
Plate Diameter:	*600mm*
Type of reaction Load	*13tonne tracked excavator*
Material Type:	*Brown slightly sandy slightly gravelly silty CLAY*
Depth test carried out:	*0.50m BGL*
CBR value is as per specification for 762mm Plate	

1.25mm settlement (graph) for 762mm Plate (kPa)	**59**
Equivalent CBR Value-Initial loading (%)	**11.3**
Mod. of subgrade Reaction k for 600mm Plate(kPa)	**50**
Correction factor for 600mm Plate	**0.85**

Pressure Stages	Bearing Pressure (kN/m^2)	Plate Settlement (mm)
Initial	0.0	0.00
	25	0.76
	50	1.11
	151	2.64
	200	4.22
	0.0	3.30
Reload	50	3.89
	151	4.31
	200	4.99
Final Condition	0.0	1.94

ITM Co-ords	Easting	Northing	Level





09/10/2024

Site Investigatins Ltd.

Plate Bearing Test in accordance with BS 1377: Part 9 and Part 2 HD 25/94

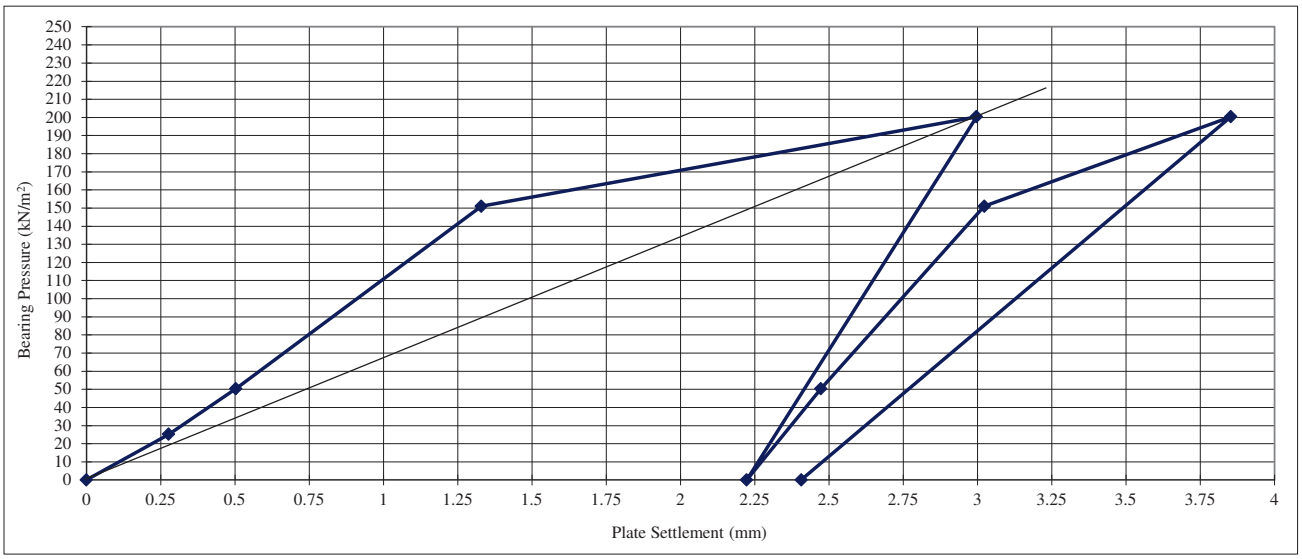
Site Investigations Ltd., Carhugar The Grange, 12th Lock Road, Lucan, Co. Dublin Tel: 01 6108768 Email:info@siteinvestigations.ie

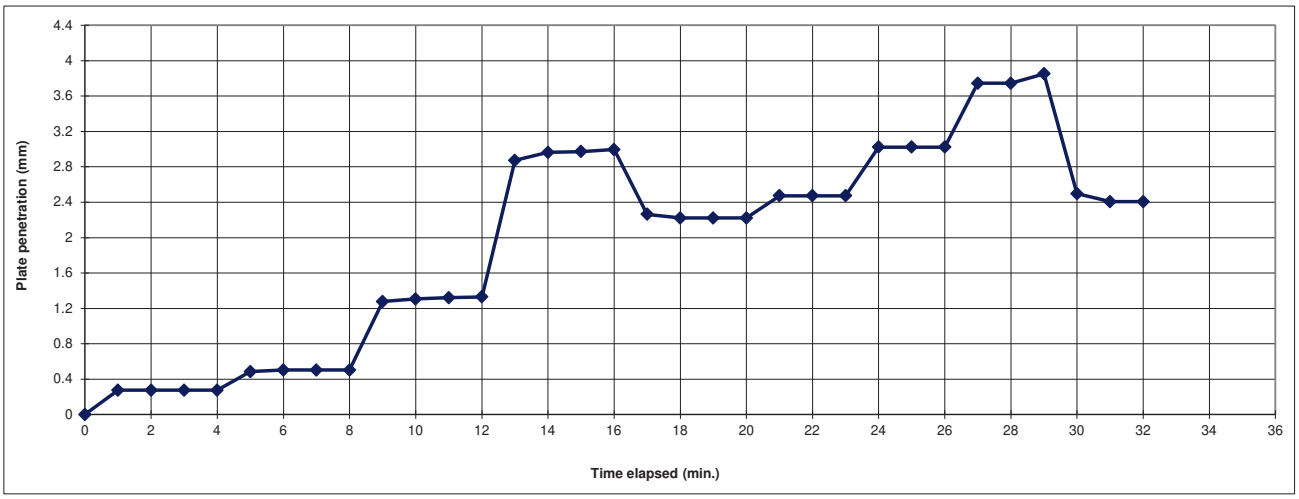
Client	Westmeath County Council
Site	Cornamaddy Housing Development, Athlone, Co. Westmeath
Test Date	30-Aug-24
Location:	PLT06
Plate Diameter:	*600mm*
Type of reaction Load	*13tonne tracked excavator*
Material Type:	*Brown slightly sandy slightly gravelly silty CLAY*
Depth test carried out:	*0.50m BGL*
CBR value is as per specification for 762mm Plate	

1.25mm settlement (graph) for 762mm Plate (kPa)	**83**
Equivalent CBR Value-Initial loading (%)	**20.4**
Mod. of subgrade Reaction k for 600mm Plate(kPa)	**71**
Correction factor for 600mm Plate	**0.85**

Pressure Stages	Bearing Pressure (kN/m^2)	Plate Settlement (mm)
Initial	0.0	0.00
	25	0.28
	50	0.50
	151	1.33
	200	3.00
	0.0	2.22
Reload	50	2.47
	151	3.02
	200	3.85
Final Condition	0.0	2.41

ITM Co-ords	Easting	Northing	Level





09/10/2024

Site Investigatins Ltd.

Plate Bearing Test in accordance with BS 1377: Part 9 and Part 2 HD 25/94

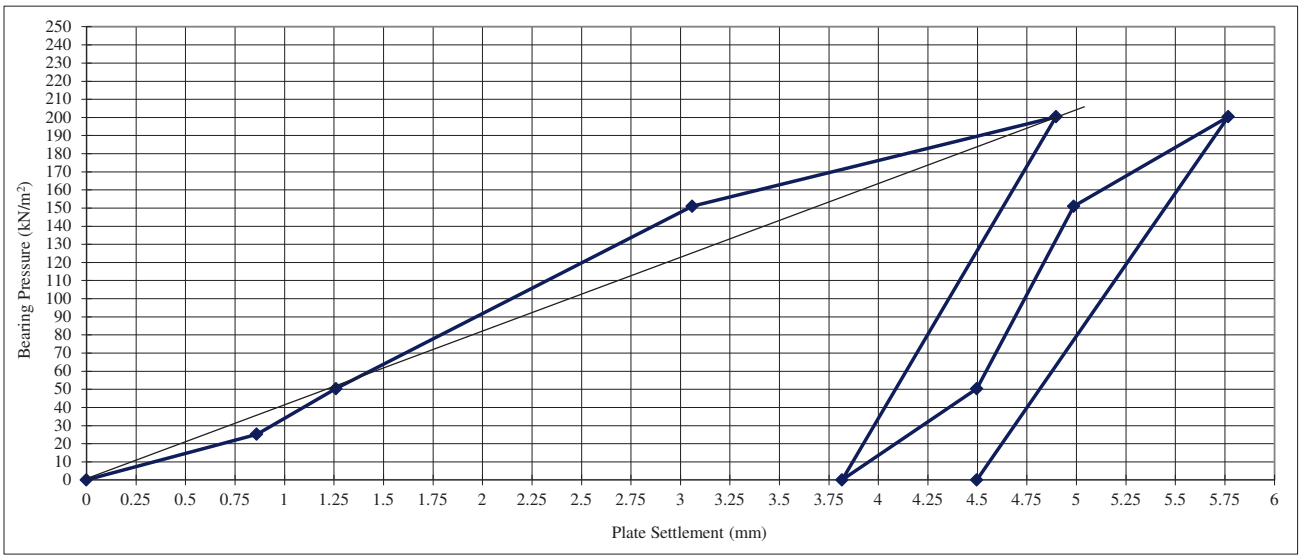
Site Investigations Ltd., Carhugar The Grange, 12th Lock Road, Lucan, Co. Dublin Tel: 01 6108768 Email:info@siteinvestigations.ie

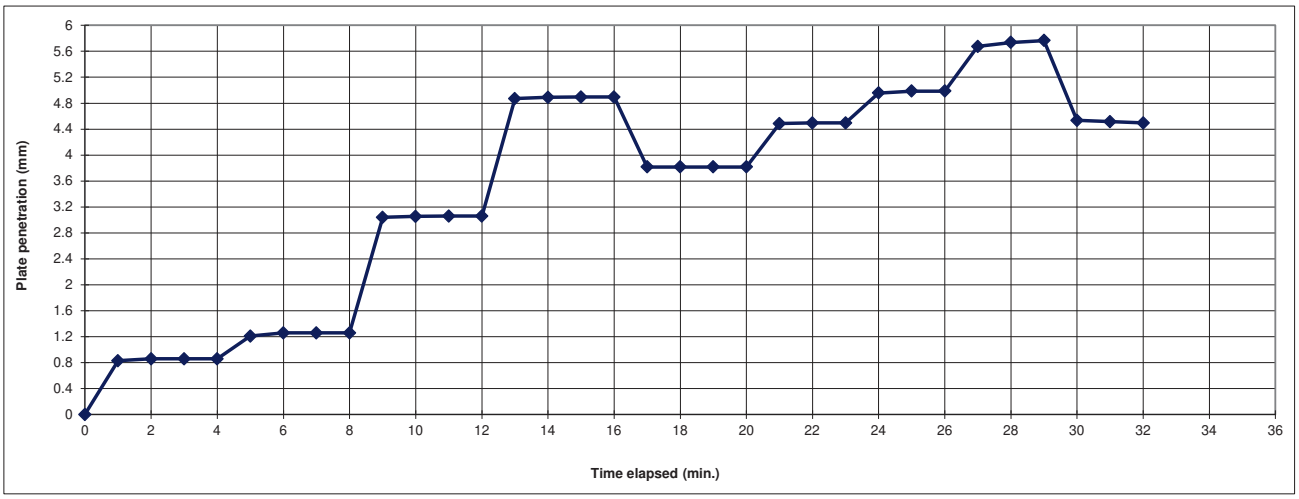
Client	Westmeath County Council
Site	Cornamaddy Housing Development, Athlone, Co. Westmeath
Test Date	30-Aug-24
Location:	PLT07
Plate Diameter:	*600mm*
Type of reaction Load	*13tonne tracked excavator*
Material Type:	*Brown slightly sandy slightly gravelly silty CLAY*
Depth test carried out:	*0.50m BGL*
CBR value is as per specification for 762mm Plate	

1.25mm settlement (graph) for 762mm Plate (kPa)	**51**
Equivalent CBR Value-Initial loading (%)	**8.8**
Mod. of subgrade Reaction k for 600mm Plate(kPa)	**43**
Correction factor for 600mm Plate	**0.85**

Pressure Stages	Bearing Pressure (kN/m^2)	Plate Settlement (mm)
Initial	0.0	0.00
	25	0.86
	50	1.26
	151	3.06
	200	4.90
	0.0	3.82
Reload	50	4.50
	151	4.99
	200	5.77
Final Condition	0.0	4.50

ITM Co-ords	Easting	Northing	Level





09/10/2024

Site Investigatins Ltd.

Plate Bearing Test in accordance with BS 1377: Part 9 and Part 2 HD 25/94

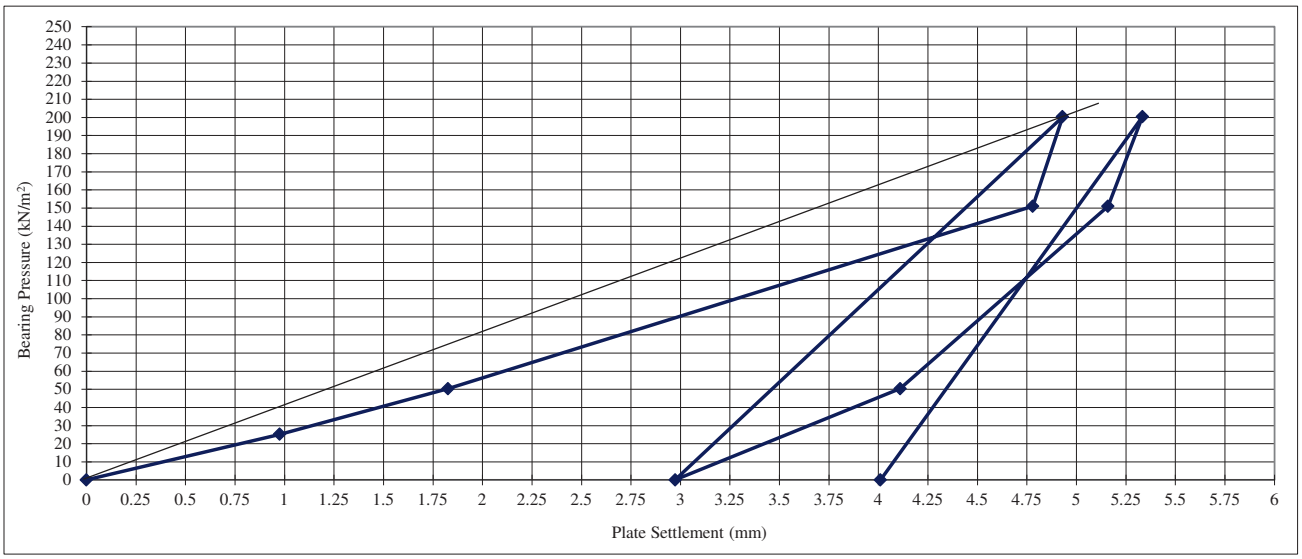
Site Investigations Ltd., Carhugar The Grange, 12th Lock Road, Lucan, Co. Dublin Tel: 01 6108768 Email:info@siteinvestigations.ie

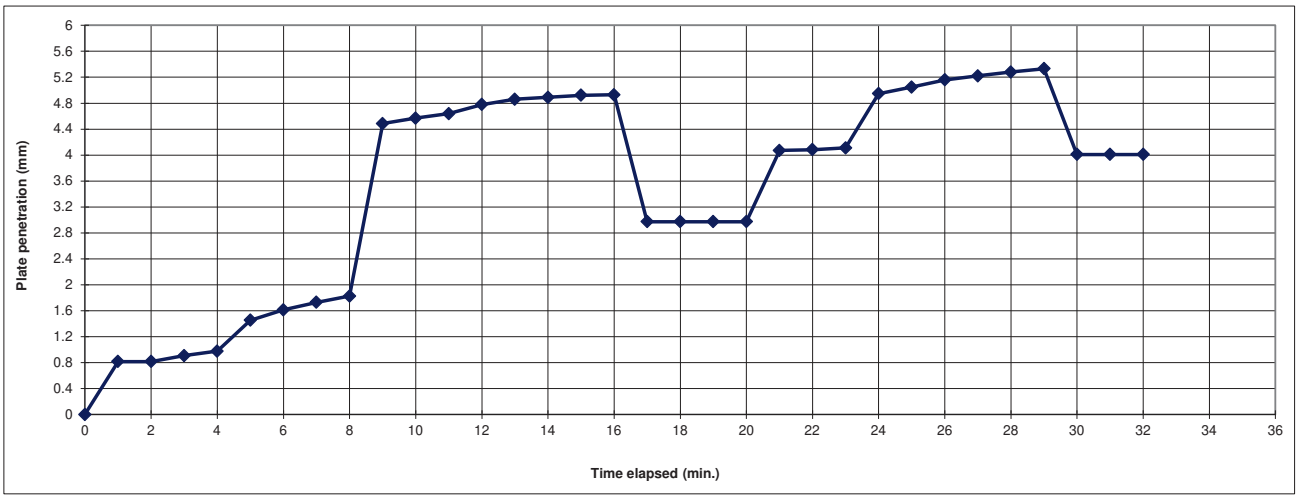
Client	Westmeath County Council
Site	Cornamaddy Housing Development, Athlone, Co. Westmeath
Test Date	30-Aug-24
Location:	PLT08
Plate Diameter:	*600mm*
Type of reaction Load	*13tonne tracked excavator*
Material Type:	*Brown slightly sandy slightly gravelly silty CLAY*
Depth test carried out:	*0.50m BGL*
CBR value is as per specification for 762mm Plate	

1.25mm settlement (graph) for 762mm Plate (kPa)	**50**
Equivalent CBR Value-Initial loading (%)	**8.5**
Mod. of subgrade Reaction k for 600mm Plate(kPa)	**43**
Correction factor for 600mm Plate	**0.85**

Pressure Stages	Bearing Pressure (kN/m^2)	Plate Settlement (mm)
Initial	0.0	0.00
	25	0.98
	50	1.83
	151	4.78
	200	4.93
	0.0	2.97
Reload	50	4.11
	151	5.16
	200	5.33
Final Condition	0.0	4.01

ITM Co-ords	Easting	Northing	Level





09/10/2024

Site Investigatins Ltd.

Plate Bearing Test in accordance with BS 1377: Part 9 and Part 2 HD 25/94

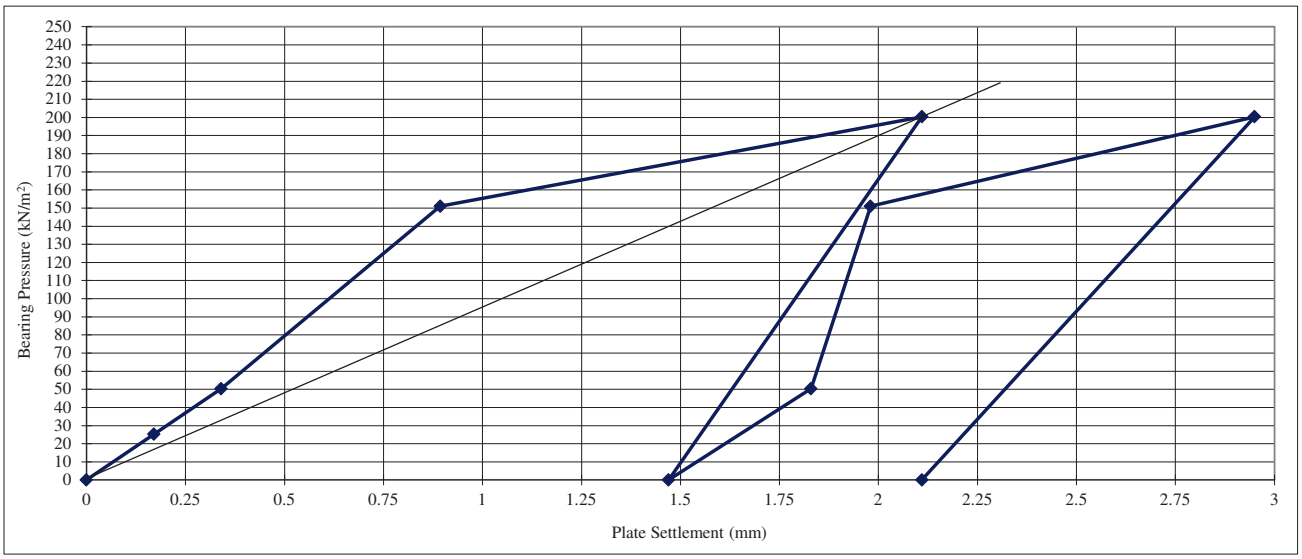
Site Investigations Ltd., Carhugar The Grange, 12th Lock Road, Lucan, Co. Dublin Tel: 01 6108768 Email:info@siteinvestigations.ie

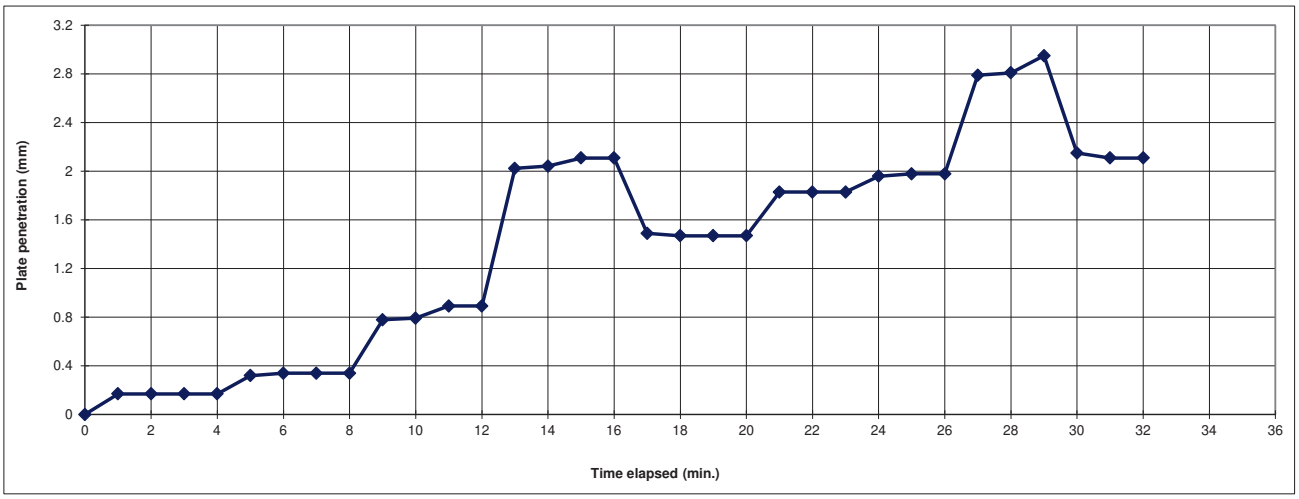
Client	Westmeath County Council
Site	Cornamaddy Housing Development, Athlone, Co. Westmeath
Test Date	30-Aug-24
Location:	PLT09
Plate Diameter:	*600mm*
Type of reaction Load	*13tonne tracked excavator*
Material Type:	*grey silty sandy GRAVEL stonefill*
Depth test carried out:	*0.50m BGL*
CBR value is as per specification for 762mm Plate	

1.25mm settlement (graph) for 762mm Plate (kPa)	**118**
Equivalent CBR Value-Initial loading (%)	**37.6**
Mod. of subgrade Reaction k for 600mm Plate(kPa)	**100**
Correction factor for 600mm Plate	**0.85**

Pressure Stages	Bearing Pressure (kN/m^2)	Plate Settlement (mm)
Initial	0.0	0.00
	25	0.17
	50	0.34
	151	0.89
	200	2.11
	0.0	1.47
Reload	50	1.83
	151	1.98
	200	2.95
Final Condition	0.0	2.11

ITM Co-ords	Easting	Northing	Level





09/10/2024

Site Investigatins Ltd.

Plate Bearing Test in accordance with BS 1377: Part 9 and Part 2 HD 25/94

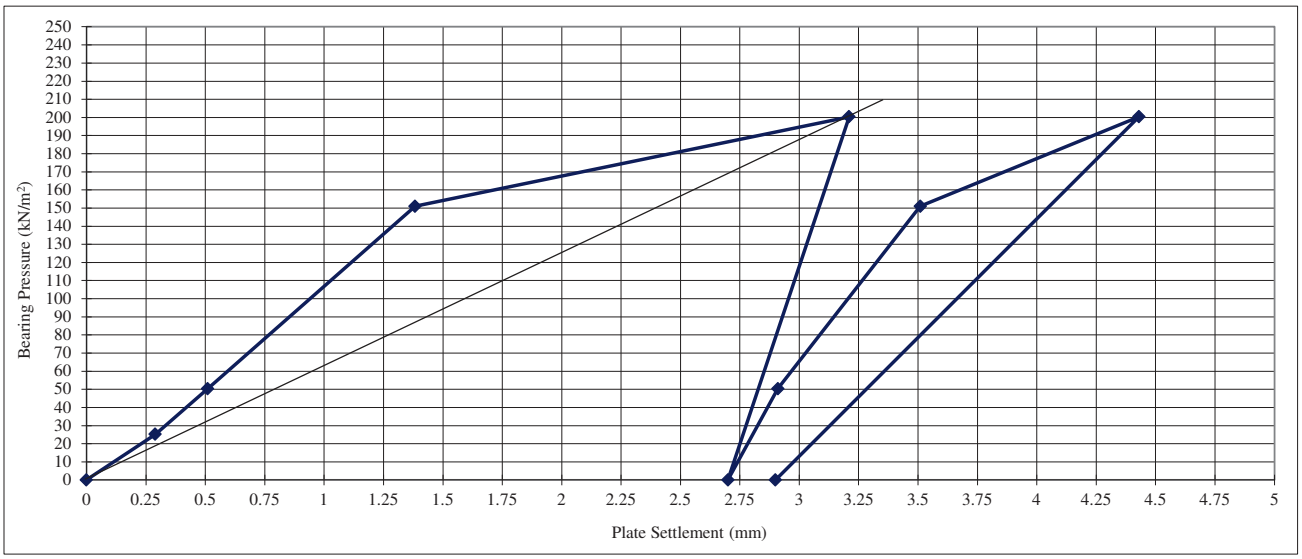
Site Investigations Ltd., Carhugar The Grange, 12th Lock Road, Lucan, Co. Dublin Tel: 01 6108768 Email:info@siteinvestigations.ie

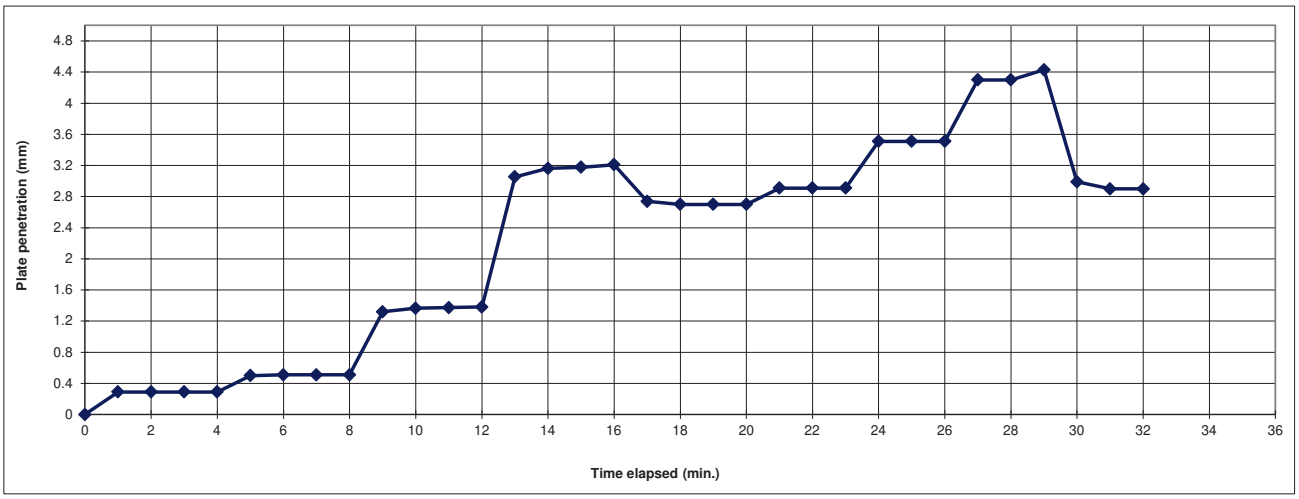
Client	Westmeath County Council
Site	Cornamaddy Housing Development, Athlone, Co. Westmeath
Test Date	30-Aug-24
Location:	PLT10
Plate Diameter:	*600mm*
Type of reaction Load	*13tonne tracked excavator*
Material Type:	*Brown slightly sandy slightly gravelly silty CLAY*
Depth test carried out:	*0.50m BGL*
CBR value is as per specification for 762mm Plate	

1.25mm settlement (graph) for 762mm Plate (kPa)	**78**
Equivalent CBR Value-Initial loading (%)	**18.3**
Mod. of subgrade Reaction k for 600mm Plate(kPa)	**66**
Correction factor for 600mm Plate	**0.85**

Pressure Stages	Bearing Pressure (kN/m^2)	Plate Settlement (mm)
Initial	0.0	0.00
	25	0.29
	50	0.51
	151	1.38
	200	3.21
	0.0	2.70
Reload	50	2.91
	151	3.51
	200	4.43
Final Condition	0.0	2.90

ITM Co-ords	Easting	Northing	Level





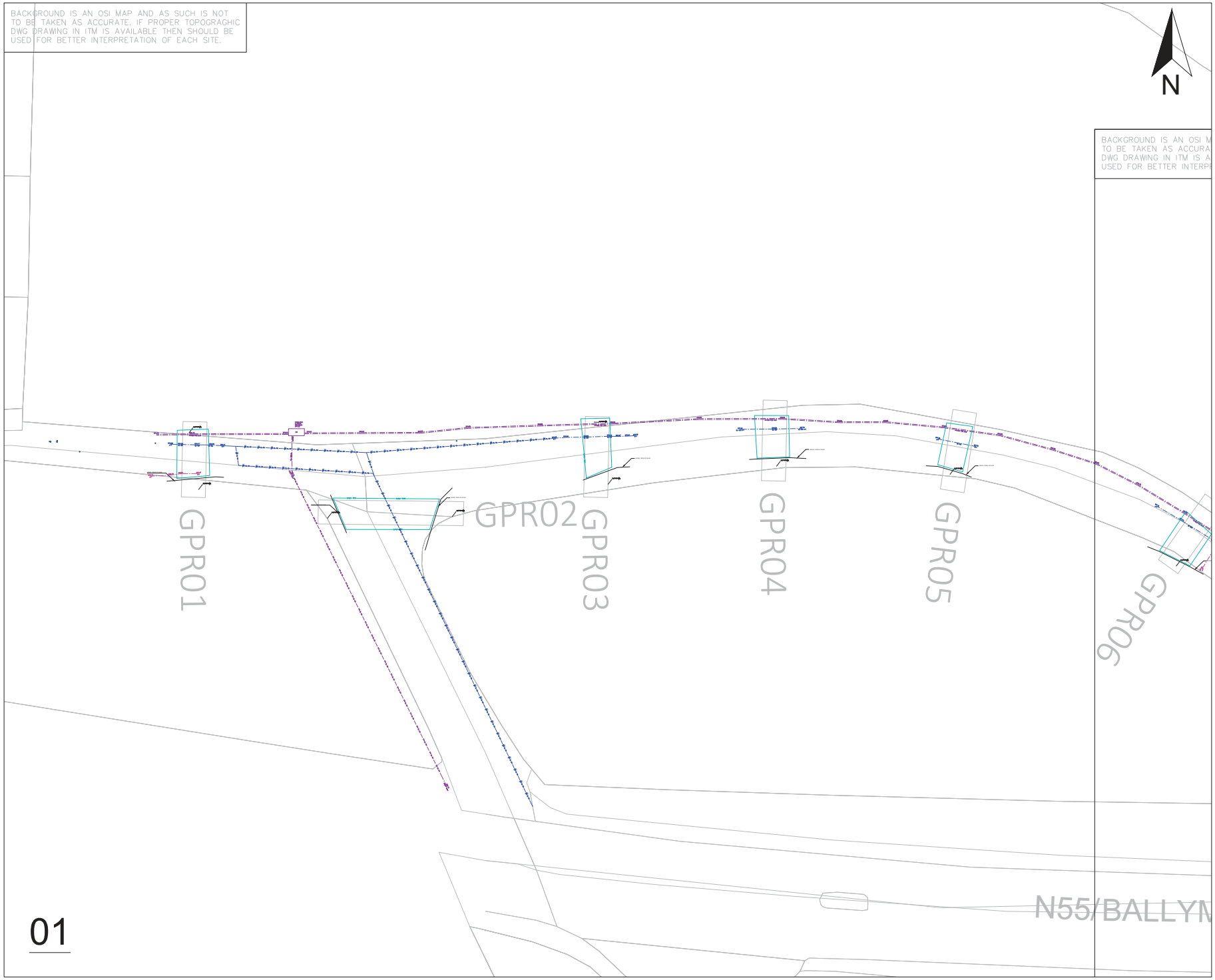
09/10/2024

Site Investigatins Ltd.

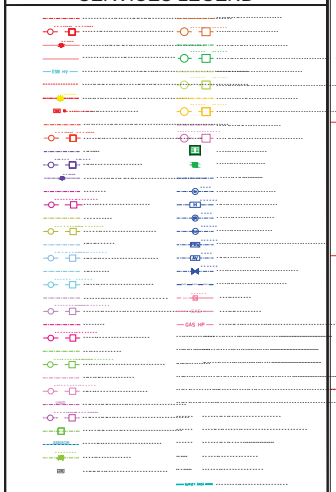
Appendix 5

Ground Probing Radar Survey Drawings

BACKGROUND IS AN OSI MAP AND AS SUCH IS NOT TO BE TAKEN AS ACCURATE. IF PROPER TOPOGRAGHIC DWG DRAWING IN ITM IS AVAILABLE THEN SHOULD BE USED FOR BETTER INTERPRETATION OF EACH SITE.



SERVICES LEGEND



SITE LOCATION

Please note that the absence of services on this drawing is not solid proof that these services are not present in the ground. While every method of underground utility locating has been adhered to in this survey, some services may lie outside the range of the GPR and electro-magnetic locator signal. Poor ground conditions and or services situated underneath other services can also prove impossible to locate. Due to the fact that not all Utility Service Plans were provided to Metroscan by the contractor,Metroscan cannot be held responsible for any services that have not been identified. The contractor should not assume that all services have been identified and must exercise a duty of care when excavating.
Hand / vacuum excavation is advised to determine exact depth and position of service prior to excavation commencing.
Please note that the drawing provided is valid for 60 days from date stated below.
Drawing is intended solely for use of the contractor named below.

Accuracy Levels

In ideal conditions the accuracy levels of the EML is +/-5% whilst the GPR outputs accuracy levels of 10% up to 2.5m depth.
These accuracy levels can vary depending on ground conditions, depths of services, congestion of services (may cause signal to bleed on to other services).
Depths noted on drawings should be taken as indicative and hand / vacuum excavation is advised where exact depth are required.
Diameter of services will be given where direct access is available through visual inspection, eg manhole.
All Cover level elevations for Manholes / Inspection Chambers will be taken from topographical survey if supplied

Survey Limitations
Non-conductible services pose a difficult task to identify. Direct buried fibre optic cables are difficult to identify with GPR.
They can easily be traced when placed in a conduit by the means of a sonde or cobra reel.
PE gas mains can also prove difficult to identify.

If Metroscan cannot get an accurate signal from a service, it will be noted on the drawing that the service is Taken from records QL-B4
If manholes cannot be opened on site, they will be marked on the drawing as UTO (unable to open).
Excluded from the survey unless otherwise stated :
Domestic services. Services above ground. Disconnected services where no signal can be obtained.

Notes

1. GPR equipment :
   Detector Duo, DS2000,
   Stream C, Mala EL Core
   scanning frequency 250 and 700 mhz
   Depth of investigation 2.5m, self calibrating.
2. Radio detection equipment:
   Vivax Metrotech VLoc Pro3 / RD7000
3. GPR scanning limited to smooth surfaces only no obstruction.
   Survey area marked on drawing
4. All depths stated are an indication of depth
   caution required when excavating.
5. All Utilities are classified QL- B2 unless noted otherwise.

PAS 128

Survey Type		Quality Level	Location Accuracy		Supporting Data
			Horizontal	vertical	
D	Desktop utility record search	QL-D	Undefined	Undefined	
C	Site Reconnaissance	QL-C	Undefined	Undefined	A segment of utility whose location is demonstrated by visual reference to street furniture, topographical features or evidence of previous street works
B	Detection	QL-B4	Undefined	Undefined	A utility segment which is suspected to exist but has not been detected and is therefor shown as an assumed route
		QL-B3 QL-B3*	plus/minus 500mm	Undefined (no reliable depth)	Horizontal location only of the utility detected by one of the geophysical techniques used
		QL-B2 QL-B2*	plus/minus 250mm of the detected depth	Plus/minus 40% of the detected depth	Horizontal and vertical location of the utility detected by one of the geophysical techniques used
		QL-B1 QL-B1*	plus/minus 150mm of the detected depth	plus/minus 15% of the detected depth	Horizontal and vertical location of the utility detected by multiple geophysical techniques used
A	Verification	QL-A	plus/minus 50mm	plus/minus 15mm	Horizontal and vertical location of the top and/or bottom of the utility through trial hole/dig/trench method

Client: Site Investigations Ltd

Site Address: Athlone East Rural ED, Moate, County Westmeath

Drawing Title: MUL1830_Site Investigations Ltd_Athlone

Drwg No: 1
Sheet No: 01
Rev No:

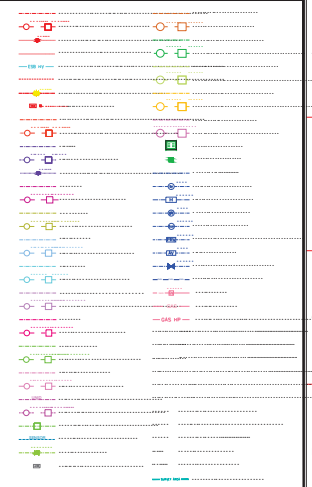
Site Completion Date: 17/09/2024
Scale: 1:200 @ A1
Coordinates: ITM

METROSCAN UTILITY LOCATING LTD.
Address: Carrick Road, Carrick, Edenderry, Co Kildare R45WD32
Email: info@metroscan.ie
Website: www.metroscan.ie

BACKGROUND IS AN OSI MAP AND AS SUCH IS NOT TO BE TAKEN AS ACCURATE. IF PROPER TOPOGRAGHIC DWG DRAWING IN ITM IS AVAILABLE THEN SHOULD BE USED FOR BETTER INTERPRETATION OF EACH SITE.

02

SERVICES LEGEND



SITE LOCATION

Please note that the absence of services on this drawing is not solid proof that these services are not present in the ground. While every method of underground utility locating has been adhered to in this survey, some services may lie outside the range of the GPR and electro-magnetic locator signal. Poor ground conditions and or services situated underneath other services can also prove impossible to locate. Due to the fact that not all Utility Service Plans were provided to Metroscan by the contractor,Metroscan cannot be held responsible for any services that have not been identified. The contractor should not assume that all services have been identified and must exercise a duty of care when excavating.
Hand / vacuum excavation is advised to determine exact depth and position of service prior to excavation commencing.
Please note that the drawing provided is valid for 60 days from date stated below.
Drawing is intended solely for use of the contractor named below.

Accuracy Levels

In ideal conditions the accuracy levels of the EML is +1.6% whilst the GPR outputs accuracy levels of 10% up to 2.5m depth.
These accuracy levels can vary depending on ground conditions, depths of services, congestion of services (may cause signal to bleed on to other services).
Depths noted on drawings should be taken as indicative and hand / vacuum excavation is advised where exact depth are required.
Diameter of services will be given where direct access is available through visual inspection, eg manhole.
All Cover level elevations for Manholes / Inspection Chambers will be taken from topographical survey if supplied

Survey Limitations
Non-conductible services pose a difficult task to identify. Direct buried fibre optic cables are difficult to identify with GPR.
They can easily be traced when placed in a conduit by the means of a sonde or cobra reel.
PE gas mains can also prove difficult to identify.

If Metroscan cannot get an accurate signal from a service, it will be noted on the drawing that the service is Taken from records QL-B4.
If manholes cannot be opened on site, they will be marked on the drawing as UTO (unable to open).
Excluded from the survey unless otherwise stated :
Domestic services, Services above ground, Disconnected services where no signal can be obtained.

Notes

1. GPR equipment :
   Detector Duo, DS2000,
   Stream C, Mala EL Core
   scanning frequency 250 and 700 mhz
   Depth of investigation 2.5m, self calibrating.
2. Radio detection equipment:
   Vivax Metrotech VLoc Pro3 / RD7000
3. GPR scanning limited to smooth surfaces only no obstruction.
   Survey area marked on drawing
4. All depths stated are an indication of depth
   caution required when excavating.
5. All Utilities are classified QL- B2 unless noted otherwise.

PAS 128

Survey Type		Quality Level	Location Accuracy		Supporting Data
			Horizontal	vertical	
D	Desktop utility record search	QL-D	Undefined	Undefined	
C	Site Reconnaissance	QL-C	Undefined	Undefined	A segment of utility whose location is demonstrated by visual reference to street furniture, topographical features or evidence of previous street works
B	Detection	QL-B4	Undefined	Undefined	A utility segment which is suspected to exist but has not been detected and is therefor shown as an assumed route
		QL-B3 QL-B3*	plus/minus 500mm	Undefined (no reliable depth)	Horizontal location only of the utility detected by one of the geophysical techniques used
		QL-B2 QL-B2*	plus/minus 250mm of the detected depth	Plus/minus 40% of the detected depth	Horizontal and vertical location of the utility detected by one of the geophysical techniques used
		QL-B1 QL-B1*	plus/minus 150mm of the detected depth	plus/minus 15% of the detected depth	Horizontal and vertical location of the utility detected by multiple geophysical techniques used
A	Verification	QL-A	plus/minus 50mm	plus/minus 15mm	Horizontal and vertical location of the top and/or bottom of the utility through trial hole/slit trench method

Client: Site Investigations Ltd

Site Address: Athlone East Rural ED, Moate, County Westmeath

Drawing Title: MUL1830_Site Investigations Ltd_Athlone

Drwg No: 1
Sheet No: 02
Rev No:

Site Completion Date:	Scale:	Coordinates:
17/09/2024	1:200 @ A1	ITM

METROSCAN
UTILITY LOCATING LTD.
Address: Carrick Road, Carrick, Edenderry, Co Kildare R45WD32
Email: info@metroscan.ie
Website: www.metroscan.ie

Appendix 6

Geotechnical Laboratory Test Results

Classification Tests
In accordance with BS 1377: Part 2

Client	Westmeath County Council
Site	Cornamaddy Housing Development, Athlone
S.I. File No	6338 / 24
Test Lab	Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email:info@siteinvestigations.ie
Report Date	4th October 2024

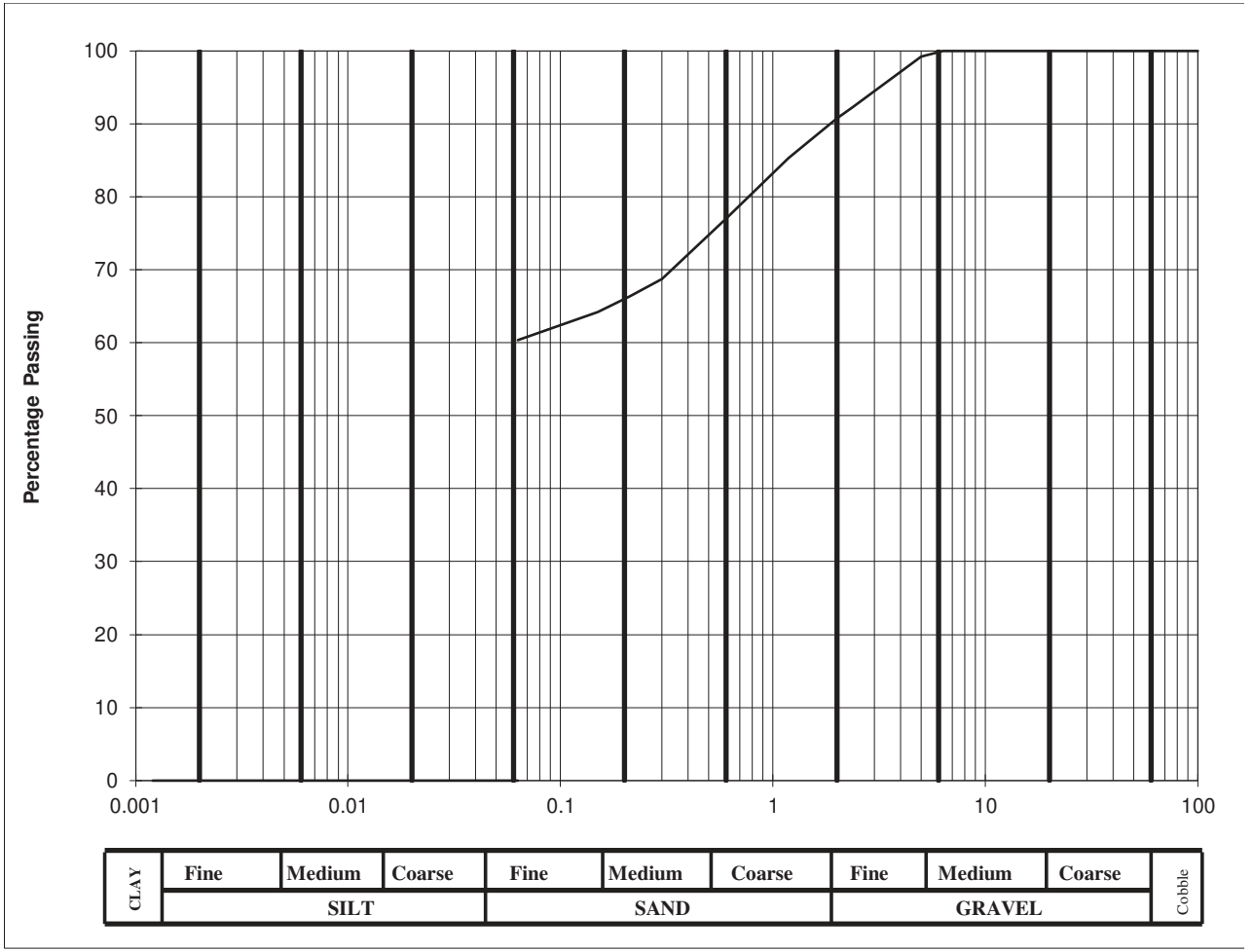
Hole ID	Depth	Sample No	Lab Ref No.	Sample Type	Natural Moisture Content %	Liquid Limit %	Plastic Limit %	Plastic Index %	Max. Density Mg/m^2	Bulk Density Mg/m^3	% passing 425um	Comments	**Remarks** **C**=Clay; **M**=Silt **Plasticity**: **L**=Low; **I**=Intermediate; **H**=High; **V**=Very High; **E**=Extremely High
BH02	1.00	DC27	24/1294	B	19.0	38	21	17			72.8		CI
BH05	1.00	DC36	24/1295	B	20.1	43	21	22			86.3		CI
BH06	1.00	JOT17	24/1296	B	20.4	44	20	24			84.0		CI
BH08	1.00	JOT29	24/1297	B	16.8	48	25	23			87.8		CI
BH09	1.00	DC09	24/1298	B	6.3	31	20	11			38.7		CL
BH12	2.00	JOT02	24/1299	B	17.7	52	26	26			88.4		CH

BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5.0	99.2		
2.36	92.2		
2.00	90.7		
1.18	85.3		
0.600	76.9		
0.425	72.8		
0.300	68.7		
0.212	66.3		
0.150	64.2		
0.063	60		

Cobbles, %	0
Gravel, %	9
Sand, %	31
Clay / Silt, %	60



Client :	Westmeath County Council
Project :	Cornamaddy Housing Development, Athlone

Lab. No :	24/1294
Sample No :	DC27

Hole ID :	BH 02
Depth, m :	1.00

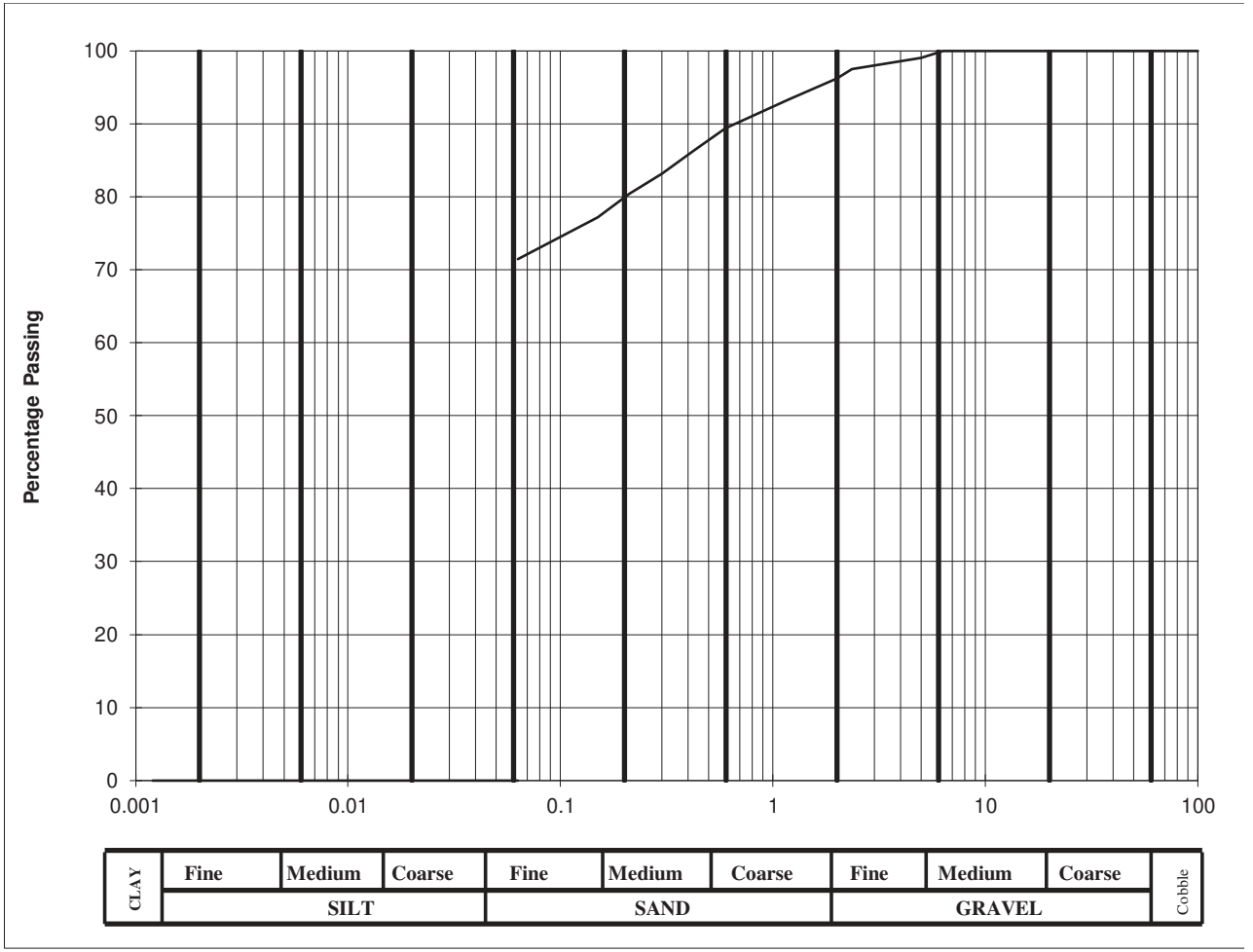
Material description :	slightly sandy slightly gravelly silty CLAY
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5.0	99		
2.36	97.5		
2.00	96.2		
1.18	93.3		
0.600	89.4		
0.425	86.3		
0.300	83.1		
0.212	80.4		
0.150	77.2		
0.063	72		

Cobbles, %	0
Gravel, %	4
Sand, %	24
Clay / Silt, %	72



Client :	Westmeath County Council		Lab. No :	24/1295	Hole ID :	BH 05
Project :	Cornamaddy Housing Development, Athlone		Sample No :	DC36	Depth, m :	1.00

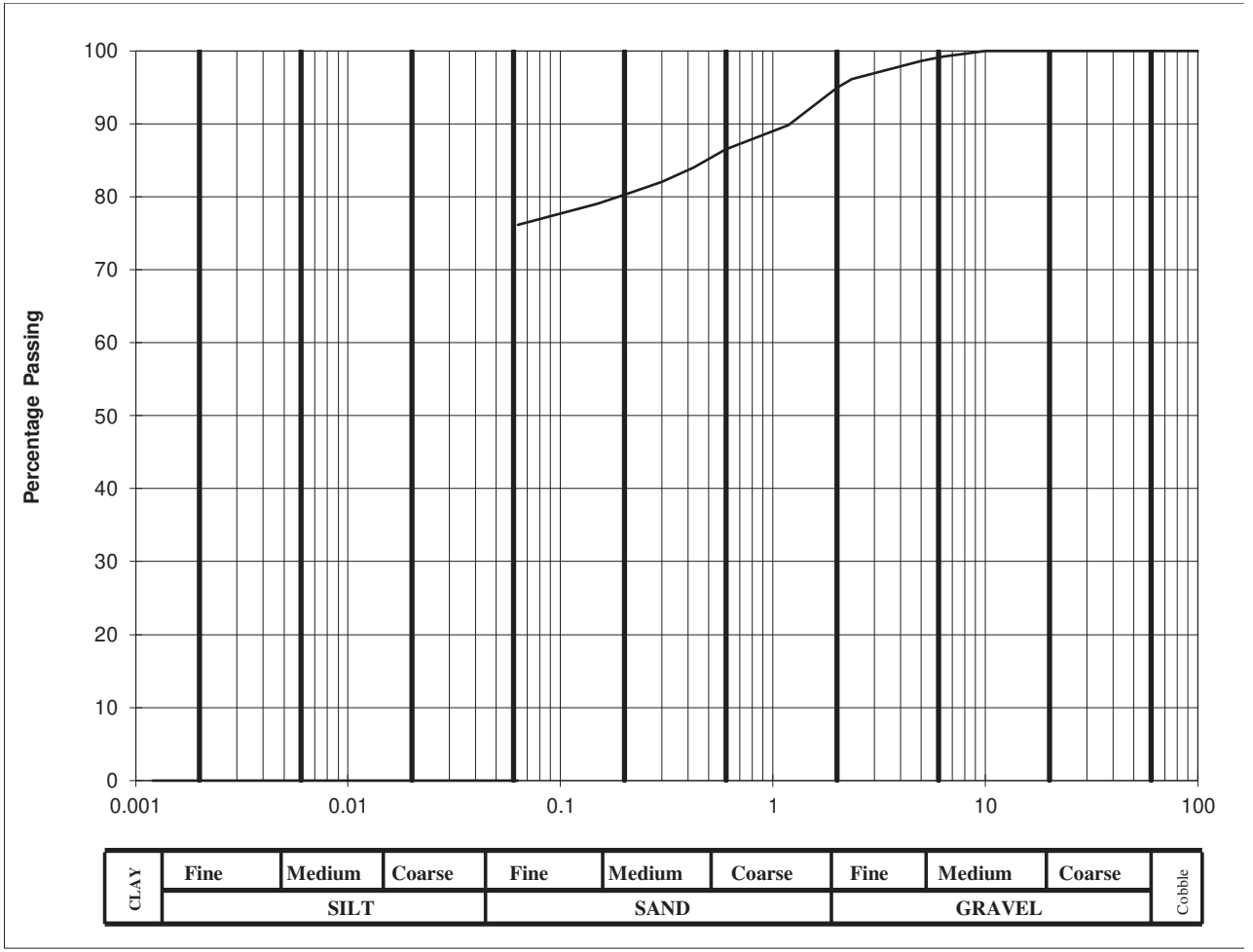
Material description :	slightly sandy slightly gravelly silty CLAY
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	99.2		
5.0	98.6		
2.36	96.1		
2.00	94.9		
1.18	89.8		
0.600	86.5		
0.425	84		
0.300	82		
0.212	80.5		
0.150	79		
0.063	76		

Cobbles, %	0
Gravel, %	5
Sand, %	19
Clay / Silt, %	76



Client :	Westmeath County Council		Lab. No :	24/1296	Hole ID :	BH 06
Project :	Cornamaddy Housing Development, Athlone		Sample No :	JOT17	Depth, m :	1.00

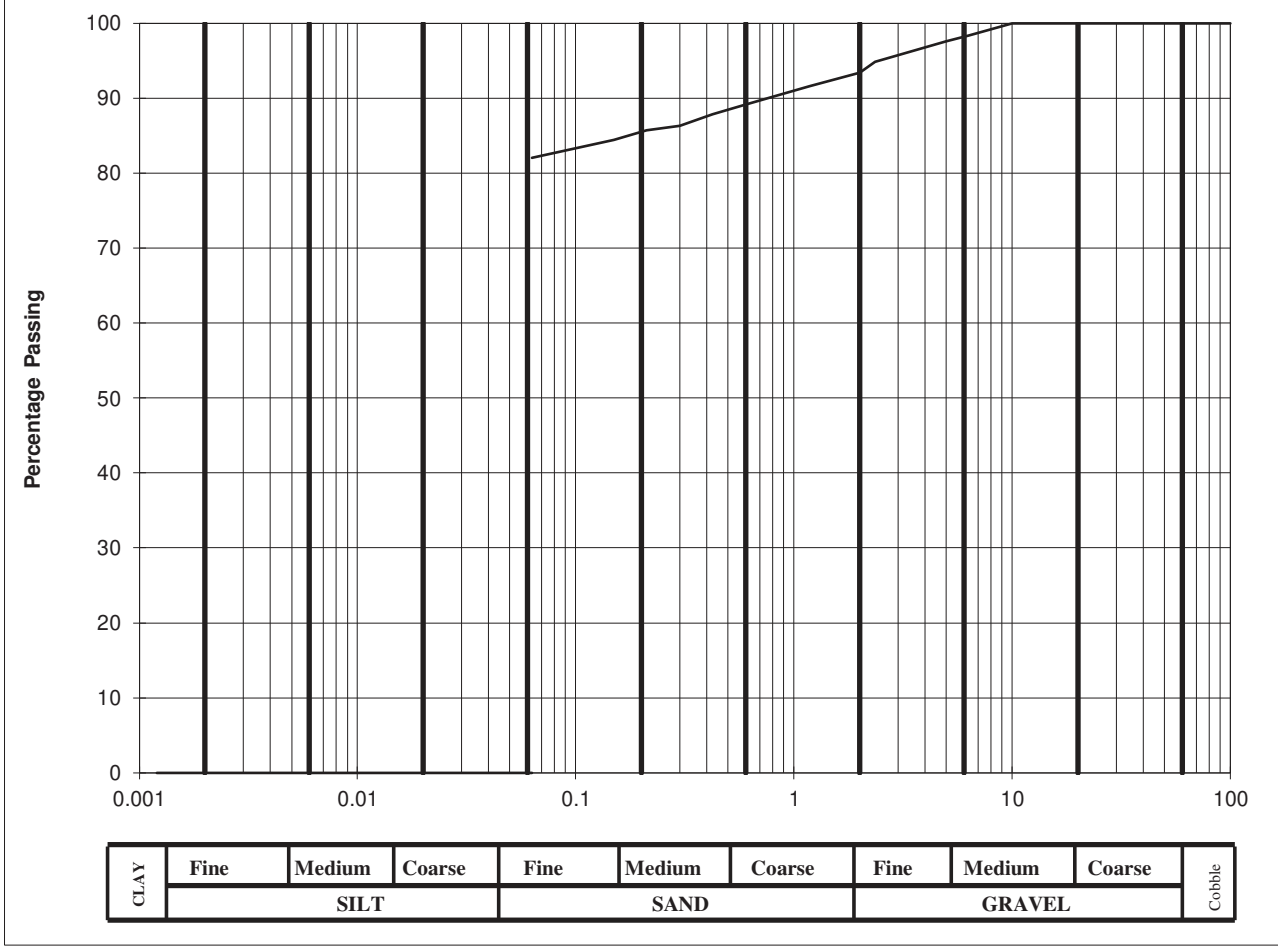
Material description :	slightly sandy slightly gravelly silty CLAY
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	98.3		
5.0	97.6		
2.36	94.8		
2.00	93.4		
1.18	91.6		
0.600	89.1		
0.425	87.8		
0.300	86.3		
0.212	85.7		
0.150	84.4		
0.063	82		

Cobbles, %	0
Gravel, %	7
Sand, %	11
Clay / Silt, %	82



Client :	Westmeath County Council		Lab. No :	24/1297	Hole ID :	BH 08
Project :	Cornamaddy Housing Development, Athlone		Sample No :	JOT29	Depth, m :	1.00

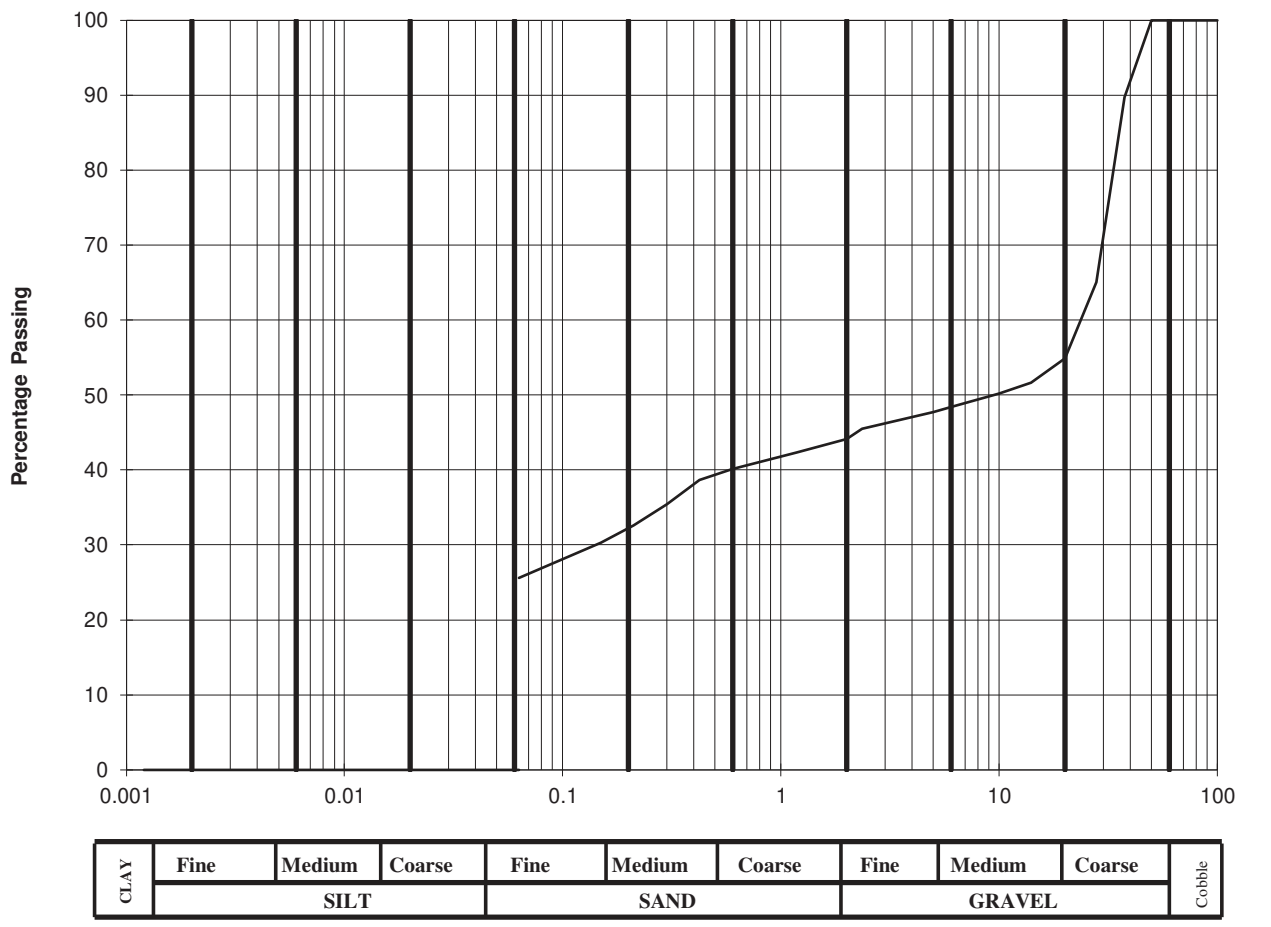
Material description :	slightly sandy slightly gravelly silty CLAY
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	89.7		
28	65		
20	54.9		
14	51.6		
10	50.2		
6.3	48.6		
5.0	47.7		
2.36	45.5		
2.00	44.1		
1.18	42.3		
0.600	40.1		
0.425	38.7		
0.300	35.4		
0.212	32.6		
0.150	30.3		
0.063	26		

Cobbles, %	0
Gravel, %	56
Sand, %	18
Clay / Silt, %	26



Client :	Westmeath County Council
Project :	Cornamaddy Housing Development, Athlone

Lab. No :	24/1298
Sample No :	DC09

Hole ID :	BH 09
Depth, m :	1.00

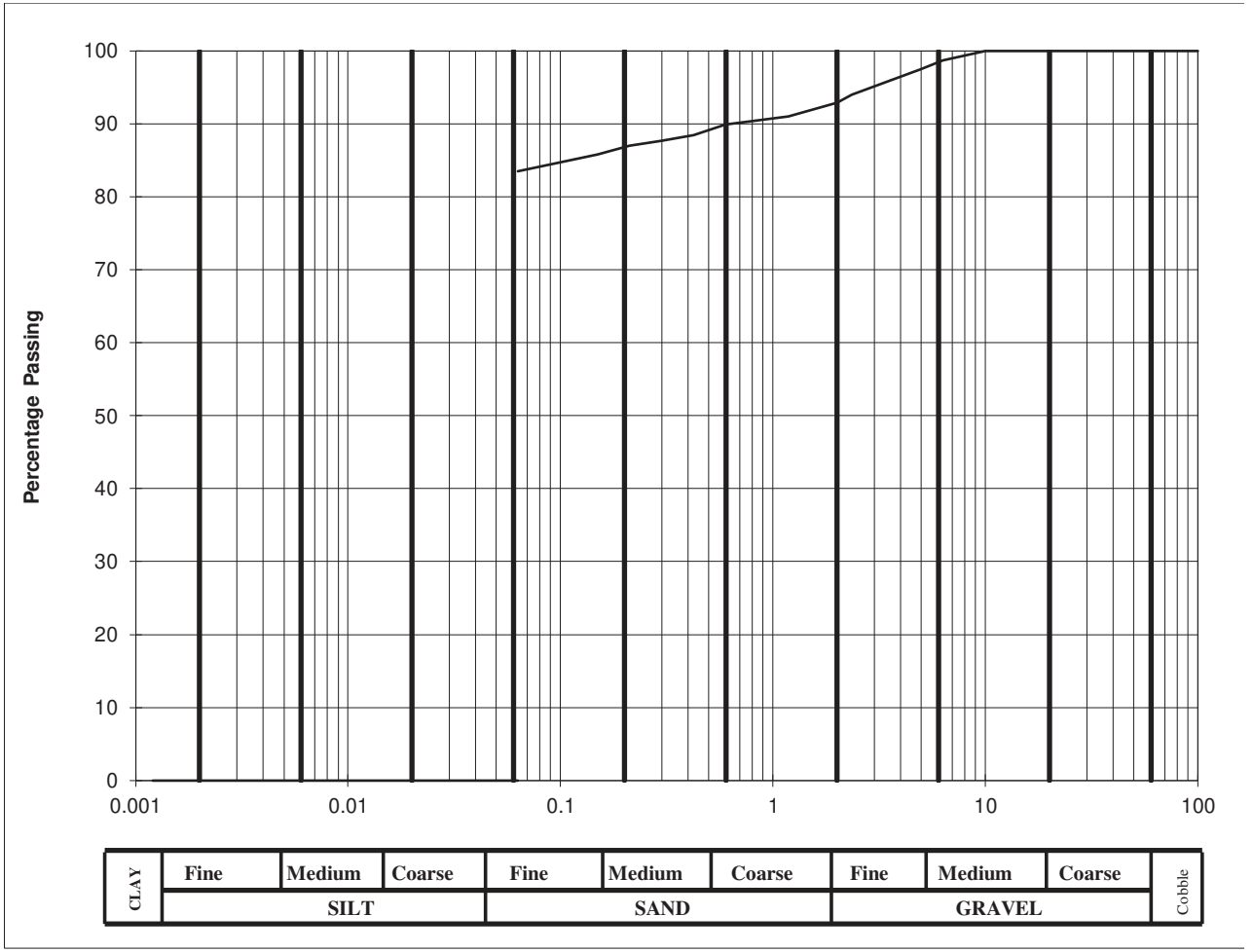
Material description :	slightly sandy gravelly silty CLAY
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	98.7		
5.0	97.5		
2.36	94		
2.00	92.9		
1.18	91		
0.600	89.9		
0.425	88.4		
0.300	87.7		
0.212	87		
0.150	85.8		
0.063	84		

Cobbles, %	0
Gravel, %	7
Sand, %	9
Clay / Silt, %	84



Client :	Westmeath County Council	Lab. No :	24/1299	Hole ID :	BH 12
Project :	Cornamaddy Housing Development, Athlone	Sample No :	JOT02	Depth, m :	2.00

Material description :	slightly sandy slightly gravelly silty CLAY
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

Chemical Testing
In accordance with BS 1377: Part 3

Client	Westmeath County Council
Site	Cornamaddy Housing Development, Athlone
S.I. File No	6338 / 24
Test Lab	Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email:info@siteinvestigations.ie
Report Date	4th October 2024

Hole Id	Depth (mBGL)	Sample No	Lab Ref	pH Value	Water Soluble Sulphate Content (2:1 Water-soil extract) (SO_3) g/L	Water Soluble Sulphate Content (2:1 Water-soil extract) (SO_3) %	Acid Soluble Sulphate Content (2:1 Water-soil extract) (SO_3) g/L	Acid Soluble Sulphate Content (2:1 Water-soil extract) (SO_3) %	Chloride ion Content (water:soil ratio 2:1) %	% passing 2mm
BH02	1.00	DC27	24/1294	8.79	0.130	0.118				90.7
BH05	1.00	DC36	24/1295	9.01	0.126	0.121				96.2
BH06	1.00	JOT17	24/1296	8.94	0.131	0.125				94.9
BH08	1.00	JOT29	24/1297	8.85	0.133	0.124				93.4
BH09	1.00	DC09	24/1298	8.90	0.122	0.054				44.1
BH12	2.00	JOT02	24/1299	9.07	0.130	0.121				92.9

Appendix 7

Environmental Laboratory Test Results

Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US
Tel: (01244) 528777
email: hawardencustomerservices@alsglobal.com
Website: www.alsenvironmental.co.uk

Site Investigations Ltd
The Grange
Carhugar
12th Lock Road
Lucan
Co. Dublin

Attention: Stephen Letch

CERTIFICATE OF ANALYSIS

Date of report Generation:	25 September 2024
Customer:	Site Investigations Ltd
Sample Delivery Group (SDG):	240916-47
Your Reference:	6338
Location:	Cornamaddy Athlone
Report No:	741825
Order Number:	35/B/24

We received 6 samples on Monday September 16, 2024 and 6 of these samples were scheduled for analysis which was completed on Wednesday September 25, 2024. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.
Incorrect sampling dates and/or sample information will affect the validity of results.

Approved By:

Lauren Ellis
General Manager Western Europe Environmental

1291

CERTIFICATE OF ANALYSIS

SDG: 240916-47 **Report Number:** 741825 **Superseded Report:**
Client Ref.: 6338 **Location:** Cornamaddy Athlone

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
30368625	TH 3		0.50 - 0.50	13/09/2024
30368626	TH 5		0.50 - 0.50	13/09/2024
30368627	TH 7		0.50 - 0.50	13/09/2024
30368628	TH 9		0.50 - 0.50	13/09/2024
30368629	TH 10		0.50 - 0.50	13/09/2024
30368630	TH 11		0.50 - 0.50	13/09/2024

Only received samples which have had analysis scheduled will be shown on the following pages.

Validated

CERTIFICATE OF ANALYSIS

SDG: 240916-47 **Report Number:** 741825 **Superseded Report:**
Client Ref.: 6338 **Location:** Cornamaddy Athlone

Results Legend

X Test

N No Determination Possible

Sample Types -
S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water
Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

			Lab Sample No(s)	30368625	30368626	30368627	30368628	30368629	30368630
			Customer Sample Reference	TH 3	TH 5	TH 7	TH 9	TH 10	TH 11
			AGS Reference						
			Depth (m)	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50
			Container	1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	60g VOC (ALE215)
			Sample Type	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Anions by Kone (w)	All	NDPs: 0 Tests: 6		X			X			X			X			X			X		
CEN Readings	All	NDPs: 0 Tests: 6		X			X			X			X			X			X		
Chromium III	All	NDPs: 0 Tests: 6			X			X			X			X			X			X	
Coronene	All	NDPs: 0 Tests: 6			X			X			X			X			X			X	
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 6		X			X			X			X			X			X		
Dissolved Organic/Inorganic Carbon	All	NDPs: 0 Tests: 6		X			X			X			X			X			X		
EPH by GCxGC-FID	All	NDPs: 0 Tests: 6			X			X			X			X			X			X	
EPH CWG GC (S)	All	NDPs: 0 Tests: 6			X			X			X			X			X			X	
Fluoride	All	NDPs: 0 Tests: 6		X			X			X			X			X			X		
GRO by GC-FID (S)	All	NDPs: 0 Tests: 6				X			X			X			X			X			X
Hexavalent Chromium (s)	All	NDPs: 0 Tests: 6			X			X			X			X			X			X	
Loss on Ignition in soils	All	NDPs: 0 Tests: 6			X			X			X			X			X			X	
Mercury Dissolved	All	NDPs: 0 Tests: 6		X			X			X			X			X			X		
Metals in solid samples by OES	All	NDPs: 0 Tests: 6			X			X			X			X			X			X	
PAH 16 & 17 Calc	All	NDPs: 0 Tests: 6			X			X			X			X			X			X	

Validated

CERTIFICATE OF ANALYSIS

SDG: 240916-47 **Report Number:** 741825 **Superseded Report:**
Client Ref.: 6338 **Location:** Cornamaddy Athlone

Results Legend

X Test

N No Determination Possible

Sample Types -
S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water
Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

			Lab Sample No(s)	Customer Sample Reference	AGS Reference	Depth (m)	Container	Sample Type
PAH by GCMS	All	NDPs: 0 Tests: 6	30368625	TH 3		0.50 - 0.50	250g Amber Jar (ALE210)	S
			30368626	TH 5		0.50 - 0.50	250g Amber Jar (ALE210)	S
			30368627	TH 7		0.50 - 0.50	250g Amber Jar (ALE210)	S
			30368628	TH 9		0.50 - 0.50	250g Amber Jar (ALE210)	S
			30368629	TH 10		0.50 - 0.50	250g Amber Jar (ALE210)	S
			30368630	TH 11		0.50 - 0.50	250g Amber Jar (ALE210)	S
PCBs by GCMS	All	NDPs: 0 Tests: 6	30368625	TH 3		0.50 - 0.50	250g Amber Jar (ALE210)	S
			30368626	TH 5		0.50 - 0.50	250g Amber Jar (ALE210)	S
			30368627	TH 7		0.50 - 0.50	250g Amber Jar (ALE210)	S
			30368628	TH 9		0.50 - 0.50	250g Amber Jar (ALE210)	S
			30368629	TH 10		0.50 - 0.50	250g Amber Jar (ALE210)	S
			30368630	TH 11		0.50 - 0.50	250g Amber Jar (ALE210)	S
pH	All	NDPs: 0 Tests: 6	30368625	TH 3		0.50 - 0.50	250g Amber Jar (ALE210)	S
			30368626	TH 5		0.50 - 0.50	250g Amber Jar (ALE210)	S
			30368627	TH 7		0.50 - 0.50	250g Amber Jar (ALE210)	S
			30368628	TH 9		0.50 - 0.50	250g Amber Jar (ALE210)	S
			30368629	TH 10		0.50 - 0.50	250g Amber Jar (ALE210)	S
			30368630	TH 11		0.50 - 0.50	250g Amber Jar (ALE210)	S
pH Value of Filtered Water	All	NDPs: 0 Tests: 6	30368625	TH 3		0.50 - 0.50	1kg TUB with Handle (ALE260)	S
			30368626	TH 5		0.50 - 0.50	1kg TUB with Handle (ALE260)	S
			30368627	TH 7		0.50 - 0.50	1kg TUB with Handle (ALE260)	S
			30368628	TH 9		0.50 - 0.50	1kg TUB with Handle (ALE260)	S
			30368629	TH 10		0.50 - 0.50	1kg TUB with Handle (ALE260)	S
			30368630	TH 11		0.50 - 0.50	1kg TUB with Handle (ALE260)	S
Phenols by HPLC (W)	All	NDPs: 0 Tests: 6	30368625	TH 3		0.50 - 0.50	1kg TUB with Handle (ALE260)	S
			30368626	TH 5		0.50 - 0.50	1kg TUB with Handle (ALE260)	S
			30368627	TH 7		0.50 - 0.50	1kg TUB with Handle (ALE260)	S
			30368628	TH 9		0.50 - 0.50	1kg TUB with Handle (ALE260)	S
			30368629	TH 10		0.50 - 0.50	1kg TUB with Handle (ALE260)	S
			30368630	TH 11		0.50 - 0.50	1kg TUB with Handle (ALE260)	S
Sample description	All	NDPs: 0 Tests: 6	30368625	TH 3		0.50 - 0.50	250g Amber Jar (ALE210)	S
			30368626	TH 5		0.50 - 0.50	250g Amber Jar (ALE210)	S
			30368627	TH 7		0.50 - 0.50	250g Amber Jar (ALE210)	S
			30368628	TH 9		0.50 - 0.50	250g Amber Jar (ALE210)	S
			30368629	TH 10		0.50 - 0.50	250g Amber Jar (ALE210)	S
			30368630	TH 11		0.50 - 0.50	250g Amber Jar (ALE210)	S
Total Organic Carbon	All	NDPs: 0 Tests: 6	30368625	TH 3		0.50 - 0.50	250g Amber Jar (ALE210)	S
			30368626	TH 5		0.50 - 0.50	250g Amber Jar (ALE210)	S
			30368627	TH 7		0.50 - 0.50	250g Amber Jar (ALE210)	S
			30368628	TH 9		0.50 - 0.50	250g Amber Jar (ALE210)	S
			30368629	TH 10		0.50 - 0.50	250g Amber Jar (ALE210)	S
			30368630	TH 11		0.50 - 0.50	250g Amber Jar (ALE210)	S
TPH CWG GC (S)	All	NDPs: 0 Tests: 6	30368625	TH 3		0.50 - 0.50	250g Amber Jar (ALE210)	S
			30368626	TH 5		0.50 - 0.50	250g Amber Jar (ALE210)	S
			30368627	TH 7		0.50 - 0.50	250g Amber Jar (ALE210)	S
			30368628	TH 9		0.50 - 0.50	250g Amber Jar (ALE210)	S
			30368629	TH 10		0.50 - 0.50	250g Amber Jar (ALE210)	S
			30368630	TH 11		0.50 - 0.50	250g Amber Jar (ALE210)	S
VOC MS (S)	All	NDPs: 0 Tests: 6	30368625	TH 3		0.50 - 0.50	60g VOC (ALE215)	S
			30368626	TH 5		0.50 - 0.50	60g VOC (ALE215)	S
			30368627	TH 7		0.50 - 0.50	60g VOC (ALE215)	S
			30368628	TH 9		0.50 - 0.50	60g VOC (ALE215)	S
			30368629	TH 10		0.50 - 0.50	60g VOC (ALE215)	S
			30368630	TH 11		0.50 - 0.50	60g VOC (ALE215)	S

CERTIFICATE OF ANALYSIS

SDG: 240916-47 **Report Number:** 741825 **Superseded Report:**
Client Ref.: 6338 **Location:** Cornamaddy Athlone

Sample Descriptions

Grain Sizes

very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm

Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Inclusions	Inclusions 2
30368625	TH 3	0.50 - 0.50	Light Brown	Sandy Clay Loam	Stones	Vegetation
30368626	TH 5	0.50 - 0.50	Dark Brown	Sandy Clay Loam	None	None
30368627	TH 7	0.50 - 0.50	Dark Brown	Sandy Clay Loam	Stones	Vegetation
30368628	TH 9	0.50 - 0.50	Dark Brown	Sandy Clay Loam	None	None
30368629	TH 10	0.50 - 0.50	Dark Brown	Sandy Clay Loam	Vegetation	None
30368630	TH 11	0.50 - 0.50	Dark Brown	Loamy Sand	Stones	Vegetation

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally ocurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

CERTIFICATE OF ANALYSIS

SDG: 240916-47 **Report Number:** 741825 **Superseded Report:**
Client Ref.: 6338 **Location:** Cornamaddy Athlone

Results Legend
- # ISO17025 accredited.
- M mCERTS accredited.
- aq Aqueous / settled sample.
- diss.filt Dissolved / filtered sample.
- tot.unfilt Total / unfiltered sample.
- * Subcontracted - refer to subcontractor report for accreditation status.
- ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
- (F) Trigger breach confirmed
- 1-4+§@ Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	TH 3	TH 5	TH 7	TH 9	TH 10	TH 11
			Depth (m)	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50
			Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
			Date Sampled	13/09/2024	13/09/2024	13/09/2024	13/09/2024	13/09/2024	13/09/2024
			Sample Time	-	-	-	-	-	-
			Date Received	16/09/2024	16/09/2024	16/09/2024	16/09/2024	16/09/2024	16/09/2024
			SDG Ref	240916-47	240916-47	240916-47	240916-47	240916-47	240916-47
			Lab Sample No.(s)	30368625	30368626	30368627	30368628	30368629	30368630
			AGS Reference						
Moisture Content Ratio (% of as received sample)	%	PM024		15	17	14	17	17	7.6
Loss on ignition	<0.7 %	TM018		3.34 M	2.87 M	3.07 M	3.26 M	3.42 M	1.07 M
Organic Carbon, Total	<0.2 %	TM132		0.767 M	0.546 M	0.319 M	0.301 M	0.435 M	3.16 M
pH	1 pH Units	TM133		8.52 M	8.73 M	8.75 M	8.65 M	8.39 M	8.81 M
Chromium, Hexavalent	<0.6 mg/kg	TM151		<0.6 M	<0.6 M	<0.6 M	<0.6 M	<0.6 M	<1.2 M
PCB congener 28	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 52	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 101	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 118	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 138	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 153	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 180	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
Sum of detected PCB 7 Congeners	<21 µg/kg	TM168		<21	<21	<21	<21	<21	<21
Chromium, Trivalent	<0.9 mg/kg	TM181		11.8	19.9	18.7	23.6	22.7	2.27
Antimony	<0.6 mg/kg	TM181		<0.6 #	<0.6 #	<0.6 #	<0.6 #	1.01 #	<0.6 #
Arsenic	<0.6 mg/kg	TM181		7.47 M	10 M	11.9 M	11.5 M	13.9 M	2.74 M
Barium	<0.6 mg/kg	TM181		31.6 #	68.6 #	65 #	73.9 #	82.3 #	8.16 #
Cadmium	<0.02 mg/kg	TM181		0.899 M	0.631 M	1.13 M	0.913 M	0.937 M	0.367 M
Chromium	<0.9 mg/kg	TM181		11.8 M	19.9 M	18.7 M	23.6 M	22.7 M	2.27 M
Copper	<1.4 mg/kg	TM181		15.4 M	22.5 M	24.4 M	28.9 M	30.7 M	4.57 M
Lead	<0.7 mg/kg	TM181		13.3 M	19.8 M	19.2 M	21.1 M	27 M	2.95 M
Mercury	<0.1 mg/kg	TM181		<0.1 M	<0.1 M	<0.1 M	<0.1 M	<0.1 M	<0.1 M
Molybdenum	<0.1 mg/kg	TM181		0.741 #	0.868 #	0.901 #	1.29 #	1.57 #	0.351 #
Nickel	<0.2 mg/kg	TM181		35.2 M	45.4 M	57 M	73.8 M	62.2 M	8.88 M
Selenium	<1 mg/kg	TM181		1.49 #	<1 #	1.04 #	<1 #	<1 #	1.98 #
Zinc	<1.9 mg/kg	TM181		54.4 M	86.8 M	85.3 M	124 M	125 M	19.6 M
PAH Total 17 (inc Coronene) Moisture Corrected	<10 mg/kg	TM410		<10	<10	<10	<10	<10	<10
Coronene	<200 µg/kg	TM410		<200	<200	<200	<200	<200	<200
Mineral Oil >C10-C40 (EH_2D_AL)	<5 mg/kg	TM415		<5	<5	<5	<5	<5	<5

CERTIFICATE OF ANALYSIS

SDG: 240916-47 **Report Number:** 741825 **Superseded Report:**
Client Ref.: 6338 **Location:** Cornamaddy Athlone

PAH by GCMS

Results Legend
- # ISO17025 accredited.
- M mCERTS accredited.
- aq Aqueous / settled sample.
- diss.filt Dissolved / filtered sample.
- tot.unfilt Total / unfiltered sample.
- * Subcontracted - refer to subcontractor report for accreditation status.
- ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
- (F) Trigger breach confirmed
- 1-4+§@ Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	TH 3	TH 5	TH 7	TH 9	TH 10	TH 11
			Depth (m)	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50
			Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
			Date Sampled	13/09/2024	13/09/2024	13/09/2024	13/09/2024	13/09/2024	13/09/2024
			Sample Time	-	-	-	-	-	-
			Date Received	16/09/2024	16/09/2024	16/09/2024	16/09/2024	16/09/2024	16/09/2024
			SDG Ref	240916-47	240916-47	240916-47	240916-47	240916-47	240916-47
			Lab Sample No.(s)	30368625	30368626	30368627	30368628	30368629	30368630
			AGS Reference						
Naphthalene	<9 µg/kg	TM218		<9 M	<9 M	<9 M	<9 M	<9 M	<9 M
Acenaphthylene	<12 µg/kg	TM218		<12 M	<12 M	<12 M	<12 M	<12 M	<12 M
Acenaphthene	<8 µg/kg	TM218		<8 M	<8 M	<8 M	<8 M	<8 M	<8 M
Fluorene	<10 µg/kg	TM218		<10 M	<10 M	<10 M	<10 M	<10 M	<10 M
Phenanthrene	<15 µg/kg	TM218		<15 M	<15 M	<15 M	<15 M	<15 M	<15 M
Anthracene	<16 µg/kg	TM218		<16 M	<16 M	<16 M	<16 M	<16 M	<16 M
Fluoranthene	<17 µg/kg	TM218		<17 M	<17 M	<17 M	<17 M	<17 M	24.5 M
Pyrene	<15 µg/kg	TM218		<15 M	<15 M	<15 M	<15 M	<15 M	23 M
Benz(a)anthracene	<14 µg/kg	TM218		<14 M	<14 M	<14 M	<14 M	<14 M	17.5 M
Chrysene	<10 µg/kg	TM218		<10 M	<10 M	<10 M	<10 M	<10 M	14.1 M
Benzo(b)fluoranthene	<15 µg/kg	TM218		<15 M	<15 M	<15 M	<15 M	<15 M	23.7 M
Benzo(k)fluoranthene	<14 µg/kg	TM218		<14 M	<14 M	<14 M	<14 M	<14 M	<14 M
Benzo(a)pyrene	<15 µg/kg	TM218		<15 M	<15 M	<15 M	<15 M	<15 M	18.4 M
Indeno(1,2,3-cd)pyrene	<18 µg/kg	TM218		<18 M	<18 M	<18 M	<18 M	<18 M	<18 M
Dibenzo(a,h)anthracene	<23 µg/kg	TM218		<23 M	<23 M	<23 M	<23 M	<23 M	<23 M
Benzo(g,h,i)perylene	<24 µg/kg	TM218		<24 M	<24 M	<24 M	<24 M	<24 M	<24 M
PAH, Total Detected USEPA 16	<118 µg/kg	TM218		<118	<118	<118	<118	<118	121

CERTIFICATE OF ANALYSIS

SDG: 240916-47 **Report Number:** 741825 **Superseded Report:**
Client Ref.: 6338 **Location:** Cornamaddy Athlone

TPH CWG (S)

Results Legend
- # ISO17025 accredited.
- M mCERTS accredited.
- aq Aqueous / settled sample.
- diss.filt Dissolved / filtered sample.
- tot.unfilt Total / unfiltered sample.
- * Subcontracted - refer to subcontractor report for accreditation status.
- ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
- (F) Trigger breach confirmed
- 1-4+§@ Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	TH 3	TH 5	TH 7	TH 9	TH 10	TH 11
			Depth (m)	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50
			Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
			Date Sampled	13/09/2024	13/09/2024	13/09/2024	13/09/2024	13/09/2024	13/09/2024
			Sample Time	-	-	-	-	-	-
			Date Received	16/09/2024	16/09/2024	16/09/2024	16/09/2024	16/09/2024	16/09/2024
			SDG Ref	240916-47	240916-47	240916-47	240916-47	240916-47	240916-47
			Lab Sample No.(s)	30368625	30368626	30368627	30368628	30368629	30368630
			AGS Reference						
GRO Surrogate % recovery**	%	TM089		96.1	93.4	92	91.9	95	93
Aliphatics >C5-C6 (HS_1D_AL)	<10 µg/kg	TM089		<10	<10	<10	<10	<10	<10
Aliphatics >C6-C8 (HS_1D_AL)	<10 µg/kg	TM089		<10	<10	<10	<10	<10	<10
Aliphatics >C8-C10 (HS_1D_AL)	<10 µg/kg	TM089		<10	<10	<10	<10	<10	<10
Aliphatics >C10-C12 (EH_2D_AL_#1)	<1000 µg/kg	TM414		<1000 #	<1000 #	<1000 #	<1000 #	<1000 #	<1000 #
Aliphatics >C12-C16 (EH_2D_AL_#1)	<1000 µg/kg	TM414		<1000 #	<1000 #	<1000 #	<1000 #	<1000 #	<1000 #
Aliphatics >C16-C21 (EH_2D_AL_#1)	<1000 µg/kg	TM414		<1000 #	<1000 #	<1000 #	<1000 #	<1000 #	<1000 #
Aliphatics >C21-C35 (EH_2D_AL_#1)	<1000 µg/kg	TM414		<1000 #	<1000 #	<1000 #	<1000 #	<1000 #	1650 #
Aliphatics >C35-C44 (EH_2D_AL_#1)	<1000 µg/kg	TM414		<1000	<1000	<1000	<1000	<1000	<1000
Total Aliphatics >C10-C44 (EH_2D_AR_#1)	<5000 µg/kg	TM414		<5000	<5000	<5000	<5000	<5000	<5000
Total Aliphatics & Aromatics >C10-C44 (EH_2D_Total_#1)	<10000 µg/kg	TM414		<10000	<10000	<10000	<10000	<10000	<10000
Aromatics >EC5-EC7 (HS_1D_AR)	<10 µg/kg	TM089		<10	<10	<10	<10	<10	<10
Aromatics >EC7-EC8 (HS_1D_AR)	<10 µg/kg	TM089		<10	<10	<10	<10	<10	<10
Aromatics >EC8-EC10 (HS_1D_AR)	<10 µg/kg	TM089		<10	<10	<10	<10	<10	<10
Aromatics > EC10-EC12 (EH_2D_AR_#1)	<1000 µg/kg	TM414		<1000 #	<1000 #	<1000 #	<1000 #	<1000 #	<1000 #
Aromatics > EC12-EC16 (EH_2D_AR_#1)	<1000 µg/kg	TM414		<1000 #	<1000 #	<1000 #	<1000 #	<1000 #	<1000 #
Aromatics > EC16-EC21 (EH_2D_AR_#1)	<1000 µg/kg	TM414		<1000 #	<1000 #	<1000 #	<1000 #	<1000 #	<1000 #
Aromatics > EC21-EC35 (EH_2D_AR_#1)	<1000 µg/kg	TM414		<1000 #	<1000 #	<1000 #	<1000 #	<1000 #	<1000 #
Aromatics >EC35-EC44 (EH_2D_AR_#1)	<1000 µg/kg	TM414		<1000	<1000	<1000	<1000	<1000	<1000
Aromatics > EC40-EC44 (EH_2D_AR_#1)	<1000 µg/kg	TM414		<1000	<1000	<1000	<1000	<1000	<1000
Total Aromatics > EC10-EC44 (EH_2D_AR_#1)	<5000 µg/kg	TM414		<5000	<5000	<5000	<5000	<5000	<5000
Total Aliphatics & Aromatics >C5-C44 (EH_2D_Total_#1+HS_1D_Total)	<10000 µg/kg	TM414		<10000	<10000	<10000	<10000	<10000	<10000
GRO >C5-C6 (HS_1D)	<20 µg/kg	TM089		<20	<20	<20	<20	<20	<20
GRO >C6-C7 (HS_1D)	<20 µg/kg	TM089		<20	<20	<20	<20	<20	<20
GRO >C7-C8 (HS_1D)	<20 µg/kg	TM089		<20	<20	<20	<20	<20	<20
GRO >C8-C10 (HS_1D)	<20 µg/kg	TM089		<20	<20	<20	<20	<20	<20
GRO >C10-C12 (HS_1D)	<20 µg/kg	TM089		<20	<20	<20	<20	<20	<20
Total Aliphatics >C5-C10 (HS_1D_AL_TOTAL)	<50 µg/kg	TM089		<50	<50	<50	<50	<50	<50
Total Aromatics >EC5-EC10 (HS_1D_AR_TOTAL)	<50 µg/kg	TM089		<50	<50	<50	<50	<50	<50
GRO >C5-C10 (HS_1D_TOTAL)	<20 µg/kg	TM089		<20	<20	<20	<20	<20	<20

CERTIFICATE OF ANALYSIS

SDG: 240916-47 **Report Number:** 741825 **Superseded Report:**
Client Ref.: 6338 **Location:** Cornamaddy Athlone

VOC MS (S)

Results Legend

#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-4+§@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	TH 3	TH 5	TH 7	TH 9	TH 10	TH 11
			Depth (m)	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50
			Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
			Date Sampled	13/09/2024	13/09/2024	13/09/2024	13/09/2024	13/09/2024	13/09/2024
			Sample Time	-	-	-	-	-	-
			Date Received	16/09/2024	16/09/2024	16/09/2024	16/09/2024	16/09/2024	16/09/2024
			SDG Ref	240916-47	240916-47	240916-47	240916-47	240916-47	240916-47
			Lab Sample No.(s)	30368625	30368626	30368627	30368628	30368629	30368630
			AGS Reference						
Dibromofluoromethane**	%	TM116		107	106	106	109	108	108
Toluene-d8**	%	TM116		93.5	94.6	95.8	96.3	100	97.8
4-Bromofluorobenzene**	%	TM116		99.7	94.3	105	102	95.4	101
Methyl Tertiary Butyl Ether	<0.5 µg/kg	TM116		<0.5 M	<0.5 M	<0.5 M	<0.5 M	<0.5 M	<0.5 M
Benzene	<1 µg/kg	TM116		<1 M	<1 M	<1 M	<1 M	<1 M	<1 M
Toluene	<1 µg/kg	TM116		<1 M	<1 M	<1 M	<1 M	<1 M	<1 M
Ethylbenzene	<1 µg/kg	TM116		<1 M	<1 M	<1 M	<1 M	<1 M	<1 M
p/m-Xylene	<2 µg/kg	TM116		<2 #	<2 #	<2 #	<2 #	<2 #	<2 #
o-Xylene	<2 µg/kg	TM116		<2 M	<2 M	<2 M	<2 M	<2 M	<2 M

Validated

CERTIFICATE OF ANALYSIS

SDG: 240916-47 **Report Number:** 741825 **Superseded Report:**
Client Ref.: 6338 **Location:** Cornamaddy Athlone

CEN 10:1 SINGLE STAGE LEACHATE TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference		**Site Location**	Cornamaddy Athlone
Mass Sample taken (kg)	0.105	**Natural Moisture Content (%)**	16.2
Mass of dry sample (kg)	0.090	**Dry Matter Content (%)**	86.1
Particle Size <4mm	>95%		

Case	
SDG	240916-47
Lab Sample Number(s)	30368625
Sampled Date	13-Sep-2024
Customer Sample Ref.	TH 3
Depth (m)	0.50 - 0.50

Solid Waste Analysis	**Result**	**Landfill Waste Acceptance Criteria Limits**		
		Inert Waste Landfill	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon (%)	0.767	3	5	6
Loss on Ignition (%)	3.34	-	-	10
Sum of BTEX (mg/kg)	-	-	-	-
Sum of 7 PCBs (mg/kg)	<0.021	1	-	-
Mineral Oil (mg/kg) (EH_2D_AL)	<5	500	-	-
PAH Sum of 17 (mg/kg)	<10	100	-	-
pH (pH Units)	8.52	-	>6	-
ANC to pH 6 (mol/kg)	-	-	-	-
ANC to pH 4 (mol/kg)	-	-	-	-

Eluate Analysis	**C_2 Concⁿ in 10:1 eluate (mg/l)**		**A_2 10:1 concⁿ leached (mg/kg)**		**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg**		
	Result	**Limit of Detection**	**Result**	**Limit of Detection**			
Arsenic	<0.0005	<0.0005	<0.005	<0.005	0.5	2	25
Barium	0.00343	<0.0002	0.0343	<0.002	20	100	300
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	0.04	1	5
Chromium	<0.001	<0.001	<0.01	<0.01	0.5	10	70
Copper	0.00103	<0.0003	0.0103	<0.003	2	50	100
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	0.01	0.2	2
Molybdenum	0.00978	<0.003	0.0978	<0.03	0.5	10	30
Nickel	0.000568	<0.0004	0.00568	<0.004	0.4	10	40
Lead	0.000394	<0.0002	0.00394	<0.002	0.5	10	50
Antimony	<0.001	<0.001	<0.01	<0.01	0.06	0.7	5
Selenium	<0.001	<0.001	<0.01	<0.01	0.1	0.5	7
Zinc	0.00322	<0.001	0.0322	<0.01	4	50	200
Chloride	<2	<2	<20	<20	800	15000	25000
Fluoride	<0.5	<0.5	<5	<5	10	150	500
Sulphate (soluble)	<2	<2	<20	<20	1000	20000	50000
Total Dissolved Solids	52.9	<10	529	<100	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	-
Dissolved Organic Carbon	<3	<3	<30	<30	500	800	1000

Leach Test Information

Date Prepared	18-Sep-2024
pH (pH Units)	8.49
Conductivity (µS/cm)	69
Volume Leachant (Litres)	0.885

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
Leachates prepared in accordance with BS EN 12457 will be carried out at room temperature (20±5°C)
Stated limits are for guidance only and ALS Laboratories (UK) Limited cannot be held responsible for any discrepancies with current legislation

25/09/2024 16:28:16

16:28:09 25/09/2024

Validated

CERTIFICATE OF ANALYSIS

SDG: 240916-47 **Report Number:** 741825 **Superseded Report:**
Client Ref.: 6338 **Location:** Cornamaddy Athlone

CEN 10:1 SINGLE STAGE LEACHATE TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference		**Site Location**	Cornamaddy Athlone
Mass Sample taken (kg)	0.103	**Natural Moisture Content (%)**	14.7
Mass of dry sample (kg)	0.090	**Dry Matter Content (%)**	87.2
Particle Size <4mm	>95%		

Case	
SDG	240916-47
Lab Sample Number(s)	30368626
Sampled Date	13-Sep-2024
Customer Sample Ref.	TH 5
Depth (m)	0.50 - 0.50

Solid Waste Analysis	**Result**	**Landfill Waste Acceptance Criteria Limits**		
		Inert Waste Landfill	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon (%)	0.546	3	5	6
Loss on Ignition (%)	2.87	-	-	10
Sum of BTEX (mg/kg)	-	-	-	-
Sum of 7 PCBs (mg/kg)	<0.021	1	-	-
Mineral Oil (mg/kg) (EH_2D_AL)	<5	500	-	-
PAH Sum of 17 (mg/kg)	<10	100	-	-
pH (pH Units)	8.73	-	>6	-
ANC to pH 6 (mol/kg)	-	-	-	-
ANC to pH 4 (mol/kg)	-	-	-	-

Eluate Analysis	**C_2 Concⁿ in 10:1 eluate (mg/l)**		**A_2 10:1 concⁿ leached (mg/kg)**		**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg**		
	Result	**Limit of Detection**	**Result**	**Limit of Detection**			
Arsenic	<0.0005	<0.0005	<0.005	<0.005	0.5	2	25
Barium	0.00402	<0.0002	0.0402	<0.002	20	100	300
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	0.04	1	5
Chromium	<0.001	<0.001	<0.01	<0.01	0.5	10	70
Copper	0.00182	<0.0003	0.0182	<0.003	2	50	100
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	0.01	0.2	2
Molybdenum	<0.003	<0.003	<0.03	<0.03	0.5	10	30
Nickel	0.000787	<0.0004	0.00787	<0.004	0.4	10	40
Lead	<0.0002	<0.0002	<0.002	<0.002	0.5	10	50
Antimony	<0.001	<0.001	<0.01	<0.01	0.06	0.7	5
Selenium	<0.001	<0.001	<0.01	<0.01	0.1	0.5	7
Zinc	0.0015	<0.001	0.015	<0.01	4	50	200
Chloride	<2	<2	<20	<20	800	15000	25000
Fluoride	<0.5	<0.5	<5	<5	10	150	500
Sulphate (soluble)	<2	<2	<20	<20	1000	20000	50000
Total Dissolved Solids	69.4	<10	694	<100	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	-
Dissolved Organic Carbon	3.32	<3	33.2	<30	500	800	1000

Leach Test Information

Date Prepared	17-Sep-2024
pH (pH Units)	8.53
Conductivity (µS/cm)	91
Volume Leachant (Litres)	0.887

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
Leachates prepared in accordance with BS EN 12457 will be carried out at room temperature (20±5°C)
Stated limits are for guidance only and ALS Laboratories (UK) Limited cannot be held responsible for any discrepancies with current legislation

25/09/2024 16:28:16

16:28:09 25/09/2024

Validated

CERTIFICATE OF ANALYSIS

SDG: 240916-47 **Report Number:** 741825 **Superseded Report:**
Client Ref.: 6338 **Location:** Cornamaddy Athlone

CEN 10:1 SINGLE STAGE LEACHATE TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference		**Site Location**	Cornamaddy Athlone
Mass Sample taken (kg)	0.105	**Natural Moisture Content (%)**	15.7
Mass of dry sample (kg)	0.090	**Dry Matter Content (%)**	86.5
Particle Size <4mm	>95%		

Case	
SDG	240916-47
Lab Sample Number(s)	30368627
Sampled Date	13-Sep-2024
Customer Sample Ref.	TH 7
Depth (m)	0.50 - 0.50

Solid Waste Analysis	**Result**	**Landfill Waste Acceptance Criteria Limits**		
		Inert Waste Landfill	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon (%)	0.319	3	5	6
Loss on Ignition (%)	3.07	-	-	10
Sum of BTEX (mg/kg)	-	-	-	-
Sum of 7 PCBs (mg/kg)	<0.021	1	-	-
Mineral Oil (mg/kg) (EH_2D_AL)	<5	500	-	-
PAH Sum of 17 (mg/kg)	<10	100	-	-
pH (pH Units)	8.75	-	>6	-
ANC to pH 6 (mol/kg)	-	-	-	-
ANC to pH 4 (mol/kg)	-	-	-	-

Eluate Analysis	**C_2 Concⁿ in 10:1 eluate (mg/l)**		**A_2 10:1 concⁿ leached (mg/kg)**		**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg**		
	Result	**Limit of Detection**	**Result**	**Limit of Detection**			
Arsenic	<0.0005	<0.0005	<0.005	<0.005	0.5	2	25
Barium	0.00369	<0.0002	0.0369	<0.002	20	100	300
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	0.04	1	5
Chromium	<0.001	<0.001	<0.01	<0.01	0.5	10	70
Copper	0.0013	<0.0003	0.013	<0.003	2	50	100
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	0.01	0.2	2
Molybdenum	0.00309	<0.003	0.0309	<0.03	0.5	10	30
Nickel	0.000589	<0.0004	0.00589	<0.004	0.4	10	40
Lead	0.000233	<0.0002	0.00233	<0.002	0.5	10	50
Antimony	<0.001	<0.001	<0.01	<0.01	0.06	0.7	5
Selenium	<0.001	<0.001	<0.01	<0.01	0.1	0.5	7
Zinc	<0.001	<0.001	<0.01	<0.01	4	50	200
Chloride	<2	<2	<20	<20	800	15000	25000
Fluoride	<0.5	<0.5	<5	<5	10	150	500
Sulphate (soluble)	<2	<2	<20	<20	1000	20000	50000
Total Dissolved Solids	66	<10	660	<100	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	-
Dissolved Organic Carbon	4.47	<3	44.7	<30	500	800	1000

Leach Test Information

Date Prepared	17-Sep-2024
pH (pH Units)	8.48
Conductivity (µS/cm)	86
Volume Leachant (Litres)	0.885

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
Leachates prepared in accordance with BS EN 12457 will be carried out at room temperature (20±5°C)
Stated limits are for guidance only and ALS Laboratories (UK) Limited cannot be held responsible for any discrepancies with current legislation

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Validated

CERTIFICATE OF ANALYSIS

SDG: 240916-47 **Report Number:** 741825 **Superseded Report:**
Client Ref.: 6338 **Location:** Cornamaddy Athlone

CEN 10:1 SINGLE STAGE LEACHATE TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference		**Site Location**	Cornamaddy Athlone
Mass Sample taken (kg)	0.102	**Natural Moisture Content (%)**	14.2
Mass of dry sample (kg)	0.090	**Dry Matter Content (%)**	87.6
Particle Size <4mm	>95%		

Case	
SDG	240916-47
Lab Sample Number(s)	30368628
Sampled Date	13-Sep-2024
Customer Sample Ref.	TH 9
Depth (m)	0.50 - 0.50

Solid Waste Analysis	**Result**	**Landfill Waste Acceptance Criteria Limits**		
		Inert Waste Landfill	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon (%)	0.301	3	5	6
Loss on Ignition (%)	3.26	-	-	10
Sum of BTEX (mg/kg)	-	-	-	-
Sum of 7 PCBs (mg/kg)	<0.021	1	-	-
Mineral Oil (mg/kg) (EH_2D_AL)	<5	500	-	-
PAH Sum of 17 (mg/kg)	<10	100	-	-
pH (pH Units)	8.65	-	>6	-
ANC to pH 6 (mol/kg)	-	-	-	-
ANC to pH 4 (mol/kg)	-	-	-	-

Eluate Analysis	**C_2 Concⁿ in 10:1 eluate (mg/l)**		**A_2 10:1 concⁿ leached (mg/kg)**		**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg**		
	Result	**Limit of Detection**	**Result**	**Limit of Detection**			
Arsenic	<0.0005	<0.0005	<0.005	<0.005	0.5	2	25
Barium	0.00364	<0.0002	0.0364	<0.002	20	100	300
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	0.04	1	5
Chromium	<0.001	<0.001	<0.01	<0.01	0.5	10	70
Copper	0.0017	<0.0003	0.017	<0.003	2	50	100
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	0.01	0.2	2
Molybdenum	0.00875	<0.003	0.0875	<0.03	0.5	10	30
Nickel	0.000903	<0.0004	0.00903	<0.004	0.4	10	40
Lead	0.000428	<0.0002	0.00428	<0.002	0.5	10	50
Antimony	<0.001	<0.001	<0.01	<0.01	0.06	0.7	5
Selenium	<0.001	<0.001	<0.01	<0.01	0.1	0.5	7
Zinc	0.00204	<0.001	0.0204	<0.01	4	50	200
Chloride	<2	<2	<20	<20	800	15000	25000
Fluoride	<0.5	<0.5	<5	<5	10	150	500
Sulphate (soluble)	<2	<2	<20	<20	1000	20000	50000
Total Dissolved Solids	68	<10	680	<100	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	-
Dissolved Organic Carbon	3.46	<3	34.6	<30	500	800	1000

Leach Test Information

Date Prepared	17-Sep-2024
pH (pH Units)	8.61
Conductivity (µS/cm)	89
Volume Leachant (Litres)	0.888

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
Leachates prepared in accordance with BS EN 12457 will be carried out at room temperature (20±5°C)
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CERTIFICATE OF ANALYSIS

SDG: 240916-47 **Report Number:** 741825 **Superseded Report:**
Client Ref.: 6338 **Location:** Cornamaddy Athlone

CEN 10:1 SINGLE STAGE LEACHATE TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference		**Site Location**	Cornamaddy Athlone
Mass Sample taken (kg)	0.107	**Natural Moisture Content (%)**	19.1
Mass of dry sample (kg)	0.090	**Dry Matter Content (%)**	84
Particle Size <4mm	>95%		

Case	
SDG	240916-47
Lab Sample Number(s)	30368629
Sampled Date	13-Sep-2024
Customer Sample Ref.	TH 10
Depth (m)	0.50 - 0.50

Solid Waste Analysis	**Result**	**Landfill Waste Acceptance Criteria Limits**		
		Inert Waste Landfill	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon (%)	0.435	3	5	6
Loss on Ignition (%)	3.42	-	-	10
Sum of BTEX (mg/kg)	-	-	-	-
Sum of 7 PCBs (mg/kg)	<0.021	1	-	-
Mineral Oil (mg/kg) (EH_2D_AL)	<5	500	-	-
PAH Sum of 17 (mg/kg)	<10	100	-	-
pH (pH Units)	8.39	-	>6	-
ANC to pH 6 (mol/kg)	-	-	-	-
ANC to pH 4 (mol/kg)	-	-	-	-

Eluate Analysis	**C_2 Concⁿ in 10:1 eluate (mg/l)**		**A_2 10:1 concⁿ leached (mg/kg)**		**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg**		
	Result	**Limit of Detection**	**Result**	**Limit of Detection**			
Arsenic	<0.0005	<0.0005	<0.005	<0.005	0.5	2	25
Barium	0.00862	<0.0002	0.0862	<0.002	20	100	300
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	0.04	1	5
Chromium	<0.001	<0.001	<0.01	<0.01	0.5	10	70
Copper	0.000742	<0.0003	0.00742	<0.003	2	50	100
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	0.01	0.2	2
Molybdenum	<0.003	<0.003	<0.03	<0.03	0.5	10	30
Nickel	<0.0004	<0.0004	<0.004	<0.004	0.4	10	40
Lead	<0.0002	<0.0002	<0.002	<0.002	0.5	10	50
Antimony	<0.001	<0.001	<0.01	<0.01	0.06	0.7	5
Selenium	<0.001	<0.001	<0.01	<0.01	0.1	0.5	7
Zinc	<0.001	<0.001	<0.01	<0.01	4	50	200
Chloride	<2	<2	<20	<20	800	15000	25000
Fluoride	<0.5	<0.5	<5	<5	10	150	500
Sulphate (soluble)	<2	<2	<20	<20	1000	20000	50000
Total Dissolved Solids	64.3	<10	643	<100	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	-
Dissolved Organic Carbon	3.18	<3	31.8	<30	500	800	1000

Leach Test Information

Date Prepared	17-Sep-2024
pH (pH Units)	8.64
Conductivity (µS/cm)	84
Volume Leachant (Litres)	0.883

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
Leachates prepared in accordance with BS EN 12457 will be carried out at room temperature (20±5°C)
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CERTIFICATE OF ANALYSIS

SDG: 240916-47 **Report Number:** 741825 **Superseded Report:**
Client Ref.: 6338 **Location:** Cornamaddy Athlone

CEN 10:1 SINGLE STAGE LEACHATE TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference		**Site Location**	Cornamaddy Athlone
Mass Sample taken (kg)	0.098	**Natural Moisture Content (%)**	8.97
Mass of dry sample (kg)	0.090	**Dry Matter Content (%)**	91.8
Particle Size <4mm	>95%		

Case	
SDG	240916-47
Lab Sample Number(s)	30368630
Sampled Date	13-Sep-2024
Customer Sample Ref.	TH 11
Depth (m)	0.50 - 0.50

Solid Waste Analysis	**Result**	**Landfill Waste Acceptance Criteria Limits**		
		Inert Waste Landfill	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon (%)	3.16	3	5	6
Loss on Ignition (%)	1.07	-	-	10
Sum of BTEX (mg/kg)	-	-	-	-
Sum of 7 PCBs (mg/kg)	<0.021	1	-	-
Mineral Oil (mg/kg) (EH_2D_AL)	<5	500	-	-
PAH Sum of 17 (mg/kg)	<10	100	-	-
pH (pH Units)	8.81	-	>6	-
ANC to pH 6 (mol/kg)	-	-	-	-
ANC to pH 4 (mol/kg)	-	-	-	-

Eluate Analysis	**C_2 Concⁿ in 10:1 eluate (mg/l)**		**A_2 10:1 concⁿ leached (mg/kg)**		**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg**		
	Result	**Limit of Detection**	**Result**	**Limit of Detection**			
Arsenic	0.00296	<0.0005	0.0296	<0.005	0.5	2	25
Barium	0.00274	<0.0002	0.0274	<0.002	20	100	300
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	0.04	1	5
Chromium	<0.001	<0.001	<0.01	<0.01	0.5	10	70
Copper	0.00227	<0.0003	0.0227	<0.003	2	50	100
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	0.01	0.2	2
Molybdenum	0.00636	<0.003	0.0636	<0.03	0.5	10	30
Nickel	0.000731	<0.0004	0.00731	<0.004	0.4	10	40
Lead	<0.0002	<0.0002	<0.002	<0.002	0.5	10	50
Antimony	<0.001	<0.001	<0.01	<0.01	0.06	0.7	5
Selenium	<0.001	<0.001	<0.01	<0.01	0.1	0.5	7
Zinc	<0.001	<0.001	<0.01	<0.01	4	50	200
Chloride	3.1	<2	31	<20	800	15000	25000
Fluoride	<0.5	<0.5	<5	<5	10	150	500
Sulphate (soluble)	<2	<2	<20	<20	1000	20000	50000
Total Dissolved Solids	83.2	<10	832	<100	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	-
Dissolved Organic Carbon	3.09	<3	30.9	<30	500	800	1000

Leach Test Information

Date Prepared	17-Sep-2024
pH (pH Units)	9.38
Conductivity (µS/cm)	109
Volume Leachant (Litres)	0.892

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
Leachates prepared in accordance with BS EN 12457 will be carried out at room temperature (20±5°C)
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Table of Results - Appendix

Method No	Description
TM104	Determination of Fluoride using the Kone Analyser
TM183	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry
TM184	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM414	Determination of Speciated Extractable Petroleum Hydrocarbons in Soils by GCxGC-FID
PM024	Soil preparation including homogenisation, moisture, screens of soils for Asbestos Containing Material
PM115	Leaching Procedure for CEN One Stage Leach Test 2:1 & 10:1 1 Step
TM018	Determination of Loss on Ignition
TM090	Determination of Total Organic Carbon/Total Inorganic Carbon in Water and Waste Water
TM116	Determination of Volatile Organic Compounds by Headspace / GC-MS
TM132	ELTRA CS800 Operators Guide
TM133	Determination of pH in Soil and Water using the GLpH pH Meter
TM259	Determination of Phenols in Waters and Leachates by HPLC
TM410	Determination of Coronene in soils by GCMS
TM089	Determination of Gasoline Range Hydrocarbons (GRO) by Headspace GC-FID (C4-C12)
TM151	Determination of Hexavalent Chromium using Kone analyser
TM181	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES
TM152	Analysis of Aqueous Samples by ICP-MS
TM168	Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Soils
TM218	The determination of PAH in soil samples by GC-MS
TM256	Determination of pH, EC, TDS and Alkalinity in Aqueous samples
TM415	Determination of Extractable Petroleum Hydrocarbons in Soils by GCxGC-FID

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden (Method codes TM).

CERTIFICATE OF ANALYSIS

SDG: 240916-47 **Report Number:** 741825 **Superseded Report:**
Client Ref.: 6338 **Location:** Cornamaddy Athlone

Test Completion Dates

Lab Sample No(s)	30368625	30368626	30368627	30368628	30368629	30368630
Customer Sample Ref.	TH 3	TH 5	TH 7	TH 9	TH 10	TH 11
AGS Ref.						
Depth	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50
Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
Anions by Kone (w)	20-Sep-2024	19-Sep-2024	19-Sep-2024	19-Sep-2024	19-Sep-2024	19-Sep-2024
CEN 10:1 Leachate (1 Stage)	18-Sep-2024	18-Sep-2024	18-Sep-2024	18-Sep-2024	18-Sep-2024	18-Sep-2024
CEN Readings	20-Sep-2024	20-Sep-2024	20-Sep-2024	20-Sep-2024	20-Sep-2024	20-Sep-2024
Chromium III	24-Sep-2024	24-Sep-2024	24-Sep-2024	24-Sep-2024	24-Sep-2024	25-Sep-2024
Coronene	20-Sep-2024	20-Sep-2024	20-Sep-2024	20-Sep-2024	20-Sep-2024	20-Sep-2024
Dissolved Metals by ICP-MS	20-Sep-2024	24-Sep-2024	23-Sep-2024	24-Sep-2024	19-Sep-2024	19-Sep-2024
Dissolved Organic/Inorganic Carbon	20-Sep-2024	20-Sep-2024	20-Sep-2024	20-Sep-2024	20-Sep-2024	20-Sep-2024
EPH by GCxGC-FID	19-Sep-2024	19-Sep-2024	19-Sep-2024	19-Sep-2024	20-Sep-2024	19-Sep-2024
EPH CWG GC (S)	19-Sep-2024	19-Sep-2024	19-Sep-2024	19-Sep-2024	19-Sep-2024	19-Sep-2024
Fluoride	20-Sep-2024	20-Sep-2024	20-Sep-2024	20-Sep-2024	20-Sep-2024	20-Sep-2024
GRO by GC-FID (S)	18-Sep-2024	20-Sep-2024	20-Sep-2024	20-Sep-2024	20-Sep-2024	20-Sep-2024
Hexavalent Chromium (s)	20-Sep-2024	20-Sep-2024	20-Sep-2024	20-Sep-2024	20-Sep-2024	20-Sep-2024
Loss on Ignition in soils	19-Sep-2024	20-Sep-2024	20-Sep-2024	20-Sep-2024	20-Sep-2024	20-Sep-2024
Mercury Dissolved	23-Sep-2024	23-Sep-2024	23-Sep-2024	23-Sep-2024	23-Sep-2024	23-Sep-2024
Metals in solid samples by OES	24-Sep-2024	24-Sep-2024	24-Sep-2024	25-Sep-2024	25-Sep-2024	25-Sep-2024
Moisture at 105C	18-Sep-2024	17-Sep-2024	17-Sep-2024	17-Sep-2024	17-Sep-2024	17-Sep-2024
PAH 16 & 17 Calc	20-Sep-2024	23-Sep-2024	23-Sep-2024	23-Sep-2024	23-Sep-2024	23-Sep-2024
PAH by GCMS	19-Sep-2024	23-Sep-2024	23-Sep-2024	23-Sep-2024	23-Sep-2024	23-Sep-2024
PCBs by GCMS	19-Sep-2024	24-Sep-2024	24-Sep-2024	24-Sep-2024	24-Sep-2024	24-Sep-2024
pH	20-Sep-2024	20-Sep-2024	20-Sep-2024	20-Sep-2024	20-Sep-2024	20-Sep-2024
pH Value of Filtered Water	20-Sep-2024	20-Sep-2024	20-Sep-2024	20-Sep-2024	20-Sep-2024	20-Sep-2024
Phenols by HPLC (W)	20-Sep-2024	23-Sep-2024	23-Sep-2024	23-Sep-2024	23-Sep-2024	23-Sep-2024
Sample description	17-Sep-2024	18-Sep-2024	18-Sep-2024	18-Sep-2024	18-Sep-2024	18-Sep-2024
Total Organic Carbon	20-Sep-2024	23-Sep-2024	23-Sep-2024	23-Sep-2024	23-Sep-2024	23-Sep-2024
TPH CWG GC (S)	19-Sep-2024	20-Sep-2024	20-Sep-2024	20-Sep-2024	20-Sep-2024	20-Sep-2024
VOC MS (S)	18-Sep-2024	19-Sep-2024	19-Sep-2024	19-Sep-2024	19-Sep-2024	19-Sep-2024

Appendix

1. Results are expressed on a dry weight basis (dried at 35ºC) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 15 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of 15 days after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

General

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as “mixed hydrocarbons”. Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. **Sample Deviations**

If a sample is classed as deviated then the associated results may be compromised.

1	**Container with Headspace provided for volatiles analysis**
2	**Incorrect container received**
3	**Deviation from method**
4	**Matrix interference**
♦	**Sample holding time exceeded in laboratory**
@	**Sample holding time exceeded due to late arrival of instructions or samples**
§	**Sampled on date not provided**

20. **Asbestos**

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as “Not detected”. If no asbestos fibre types are found all will be reported as “Not detected” and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials andd soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

Appendix 8

Waste Classification Report

HazWasteOnline™

Waste Classification Report

HazWasteOnline™ classifies waste as either **hazardous** or **non-hazardous** based on its chemical composition, related legislation and the rules and data defined in the current UK or EU technical guidance (Appendix C) (note that HP 9 Infectious is not assessed). It is the responsibility of the classifier named below to:

a) understand the origin of the waste
b) select the correct List of Waste code(s)
c) confirm that the list of determinands, results and sampling plan are fit for purpose
d) select and justify the chosen metal species (Appendix B)
e) correctly apply moisture correction and other available corrections
f) add the meta data for their user-defined substances (Appendix A)
g) check that the classification engine is suitable with respect to the national destination of the waste (Appendix C)

To aid the reviewer, the laboratory results, assumptions and justifications managed by the classifier are highlighted in pale yellow.

VQB9S-HGDGT-X1LVK

Job name

6338

Description/Comments

Client: Westmeath County Council
Engineer: SDS Design Engineers

Project

Cornamaddy Residential Development

Site

Athlone, Co. Westmeath

Classified by

Name:
Stephen Letch
Date:
09 Oct 2024 10:11 GMT
Telephone:
00353 86817 9449

Company:
Site Investigations Ltd
The Grange
12th Lock Road
Lucan
K78 F598

HazWasteOnline™ provides a two day, hazardous waste classification course that covers the use of the software and both basic and advanced waste classification techniques. Certification has to be renewed every 3 years.

HazWasteOnline™ Certification: **CERTIFIED**

Course	Date
Hazardous Waste Classification	09 Oct 2019
Most recent 3 year Refresher	04 Oct 2022

Next 3 year Refresher due by Oct 2025

Purpose of classification

2 - Material Characterisation

Address of the waste

Athlone, Co. Westmeath **Post Code** N/A

SIC for the process giving rise to the waste

43130 Test drilling and boring

Description of industry/producer giving rise to the waste

Site Investigation

Description of the specific process, sub-process and/or activity that created the waste

Soils recovered for environmental testing

Description of the waste

Natural soils

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	WAC Results		Page
					Inert	Non Haz	
1	TP10-0.50	0.50	Non Hazardous		Pass	Pass	5
2	TP11-0.50	0.50	Non Hazardous		Fail	Pass	9
3	TP03-0.50	0.50	Non Hazardous		Pass	Pass	13
4	TP05-0.50	0.50	Non Hazardous		Pass	Pass	17
5	TP07-0.50	0.50	Non Hazardous		Pass	Pass	21
6	TP09-0.50	0.50	Non Hazardous		Pass	Pass	25

Related documents

#	Name	Description
1	240916-47.hwol	ALS Hawarden .hwol file used to populate the Job
2	Rilta Suite NEW	waste stream template used to create this Job

WAC results

WAC Settings: samples in this Job constitute a single population.

WAC limits used to evaluate the samples in this Job: "Ireland"
The WAC used in this report are the WAC defined for the inert and non-hazardous classes of landfill in the Republic of Ireland. You should check the actual acceptance criteria when the disposal site is identified as they may differ from the generic WAC used in this report.

Report

Created by: Stephen Letch

Created date: 09 Oct 2024 10:11 GMT

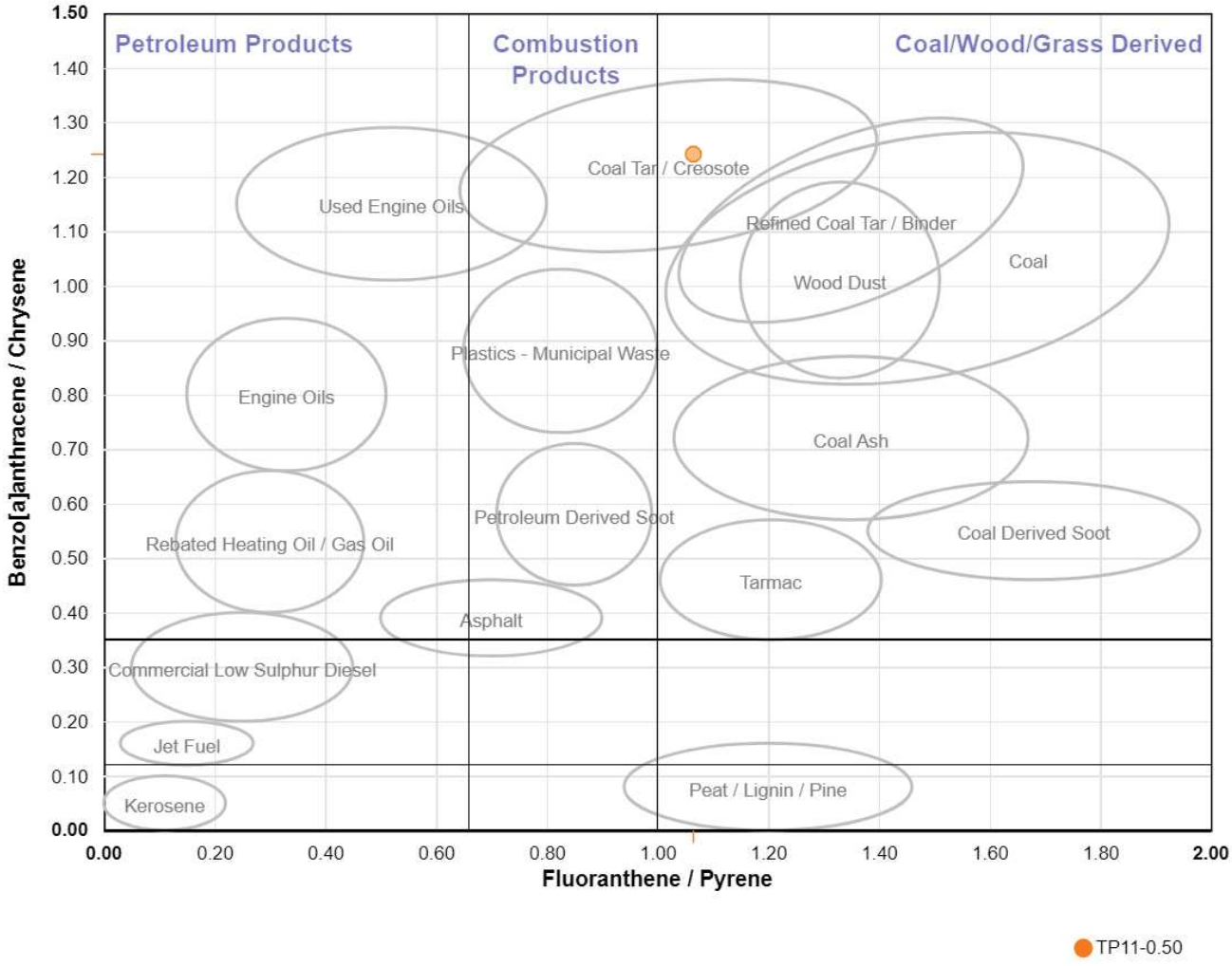
PAH Double Ratio Plots

Disclaimer

The domains, oval areas and the plotted points are **indicators only** and must be combined with other lines of evidence to form conclusions. Samples marked with an empty circle are not plotted as they fall outside of the graph's boundaries.

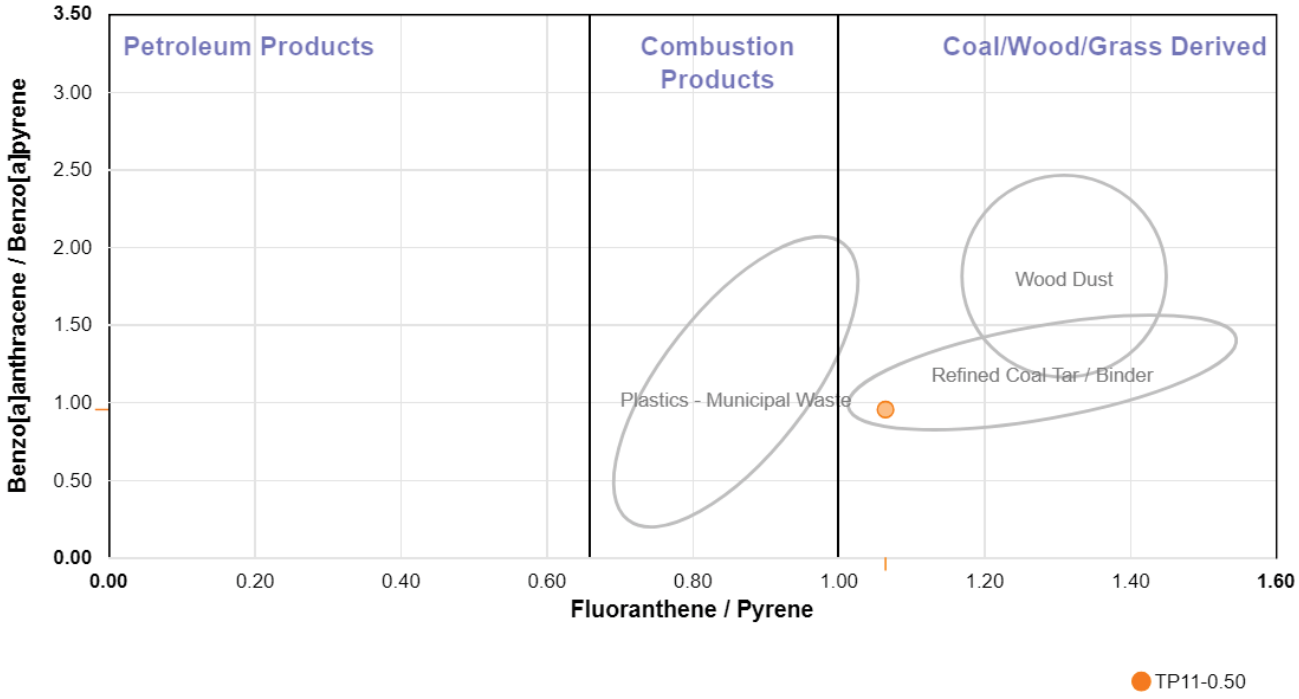
Credits

The domains and the horizontal and vertical lines are derived from Yunker et al. 2002 (Organic Geochemistry 33, 489-515)



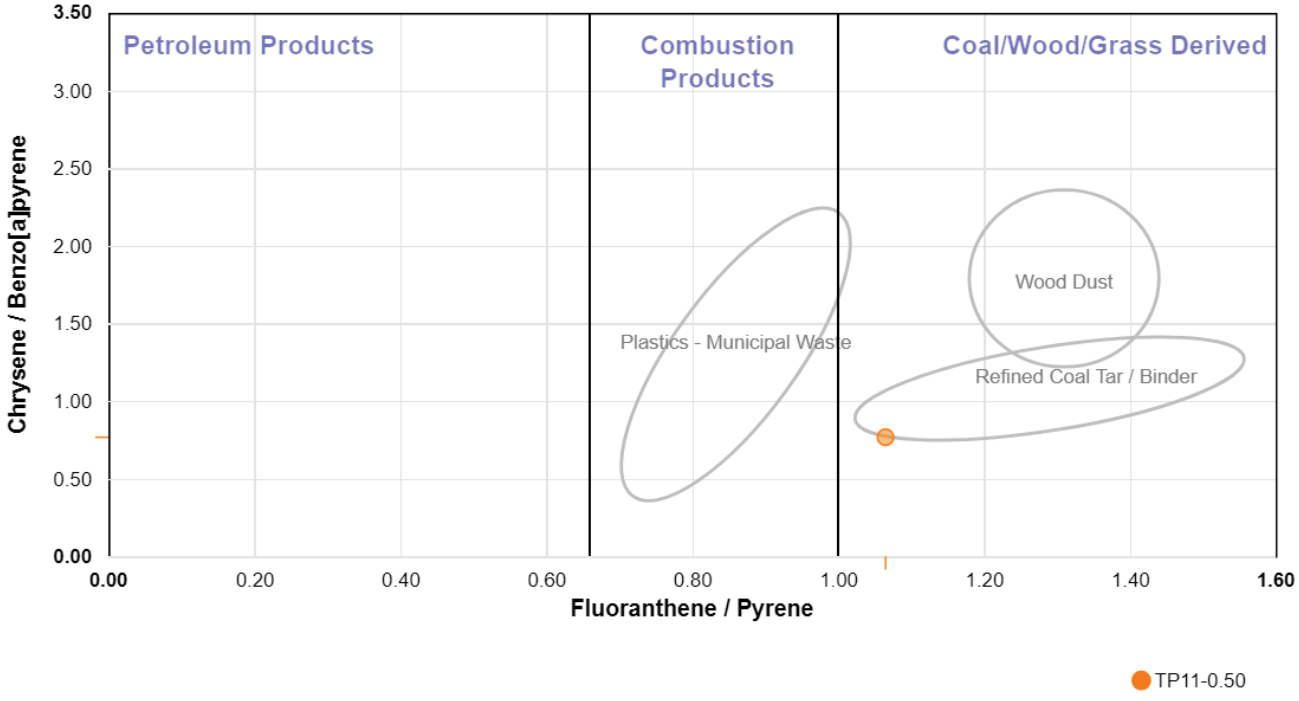
Credits for the oval areas and labels

HazWasteOnline, 2023; Jones Environmental Forensics, 2014



Credits for the oval areas and labels

HazWasteOnline, 2023



Credits for the oval areas and labels

HazWasteOnline, 2023

Classification of sample: TP10-0.50

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
TP10-0.50
Sample Depth:
0.50 m
Moisture content:
17%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 17% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	TPH (C6 to C40) petroleum group			TPH		<10 mg/kg		<10 mg/kg	<0.001 %		**<LOD**
2	confirm TPH has NOT arisen from diesel or petrol					☑					
3	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		1.01 mg/kg	1.197	1.004 mg/kg	0.0001 %	✓	
4	arsenic { arsenic pentoxide }	033-004-00-6	215-116-9	1303-28-2		13.9 mg/kg	1.534	17.696 mg/kg	0.00177 %	✓	
5	barium { barium sulphide }	016-002-00-X	244-214-4	21109-95-5		82.3 mg/kg	1.233	84.259 mg/kg	0.00843 %	✓	
6	cadmium { cadmium sulfate }	048-009-00-9	233-331-6	10124-36-4		0.937 mg/kg	1.855	1.442 mg/kg	0.000144 %	✓	
7	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		30.7 mg/kg	1.126	28.689 mg/kg	0.00287 %	✓	
8	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	27 mg/kg		22.41 mg/kg	0.00224 %	✓	
9	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		**<LOD**
10	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		1.57 mg/kg	1.5	1.955 mg/kg	0.000195 %	✓	
11	nickel { nickel sulfate }	028-009-00-5	232-104-9	7786-81-4		62.2 mg/kg	2.637	136.121 mg/kg	0.0136 %	✓	
12	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %		**<LOD**
13	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		125 mg/kg	2.469	256.19 mg/kg	0.0256 %	✓	
14	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		22.7 mg/kg	1.462	27.537 mg/kg	0.00275 %	✓	

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
15		chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.6	mg/kg	1.923	<1.154	mg/kg	<0.000115 %		<LOD
		024-001-00-0	215-607-8	1333-82-0									
16		naphthalene				<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
17		acenaphthylene				<0.012	mg/kg		<0.012	mg/kg	<0.0000012 %		<LOD
			205-917-1	208-96-8									
18		acenaphthene				<0.008	mg/kg		<0.008	mg/kg	<0.0000008 %		<LOD
			201-469-6	83-32-9									
19		fluorene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
			201-695-5	86-73-7									
20		phenanthrene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
			201-581-5	85-01-8									
21		anthracene				<0.016	mg/kg		<0.016	mg/kg	<0.0000016 %		<LOD
			204-371-1	120-12-7									
22		fluoranthene				<0.017	mg/kg		<0.017	mg/kg	<0.0000017 %		<LOD
			205-912-4	206-44-0									
23		pyrene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
			204-927-3	129-00-0									
24		benzo[a]anthracene				<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
		601-033-00-9	200-280-6	56-55-3									
25		chrysene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
26		benzo[b]fluoranthene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
		601-034-00-4	205-911-9	205-99-2									
27		benzo[k]fluoranthene				<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
		601-036-00-5	205-916-6	207-08-9									
28		benzo[a]pyrene; benzo[def]chrysene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
		601-032-00-3	200-028-5	50-32-8									
29		indeno[123-cd]pyrene				<0.018	mg/kg		<0.018	mg/kg	<0.0000018 %		<LOD
			205-893-2	193-39-5									
30		dibenz[a,h]anthracene				<0.023	mg/kg		<0.023	mg/kg	<0.0000023 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
31		benzo[ghi]perylene				<0.024	mg/kg		<0.024	mg/kg	<0.0000024 %		<LOD
			205-883-8	191-24-2									
32		polychlorobiphenyls; PCB				<0.021	mg/kg		<0.021	mg/kg	<0.0000021 %		<LOD
		602-039-00-4	215-648-1	1336-36-3									
33		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.0005	mg/kg		<0.0005	mg/kg	<0.00000005 %		<LOD
		603-181-00-X	216-653-1	1634-04-4									
34		benzene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
		601-020-00-8	200-753-7	71-43-2									
35		toluene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
		601-021-00-3	203-625-9	108-88-3									
36		ethylbenzene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
37		coronene				<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
			205-881-7	191-07-1									
38		pH				8.39	pH		8.39	pH	8.39 pH		
				PH									
39		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]				<0.004	mg/kg		<0.004	mg/kg	<0.0000004 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
										Total:	0.059 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

WAC results for sample: TP10-0.50

WAC Settings: samples in this Job constitute a single population.

WAC limits used to evaluate this sample: "Ireland"
The WAC used in this report are the WAC defined for the inert and non-hazardous classes of landfill in the Republic of Ireland. You should check the actual acceptance criteria when the disposal site is identified as they may differ from the generic WAC used in this report.

The sample PASSES the Inert (Inert waste landfill) criteria.

The sample PASSES the Non Haz (Non hazardous waste landfill) criteria.

WAC Determinands

Solid Waste Analysis				Landfill Waste Acceptance Criteria Limits	
#	Determinand		User entered data	Inert waste landfill	Non hazardous waste landfill
1	TOC (total organic carbon)	%	0.435	3	5
2	LOI (loss on ignition)	%	3.42	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.007	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.021	1	-
5	Mineral oil (C10 to C40)	mg/kg	<5	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<10	100	-
7	pH	pH	8.39	-	>6
8	ANC (acid neutralisation capacity)	mol/kg		-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	<0.005	0.5	2
10	barium	mg/kg	0.0862	20	100
11	cadmium	mg/kg	<0.0008	0.04	1
12	chromium	mg/kg	<0.01	0.5	10
13	copper	mg/kg	0.0074	2	50
14	mercury	mg/kg	<0.0001	0.01	0.2
15	molybdenum	mg/kg	<0.03	0.5	10
16	nickel	mg/kg	<0.004	0.4	10
17	lead	mg/kg	<0.002	0.5	10
18	antimony	mg/kg	<0.01	0.06	0.7
19	selenium	mg/kg	<0.01	0.1	0.5
20	zinc	mg/kg	<0.01	4	50
21	chloride	mg/kg	<20	800	15,000
22	fluoride	mg/kg	<5	10	150
23	sulphate	mg/kg	<20	1,000	20,000
24	phenol index	mg/kg	<0.16	1	-
25	DOC (dissolved organic carbon)	mg/kg	31.8	500	800
26	TDS (total dissolved solids)	mg/kg	643	4,000	60,000

Key

User supplied data

Classification of sample: TP11-0.50

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
TP11-0.50
Sample Depth:
0.50 m
Moisture content:
7.6%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 7.6% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	TPH (C6 to C40) petroleum group			TPH		<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
2	confirm TPH has NOT arisen from diesel or petrol					☑					
3	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		<0.6 mg/kg	1.197	<0.718 mg/kg	<0.0000718 %		<LOD
4	arsenic { arsenic pentoxide }	033-004-00-6	215-116-9	1303-28-2		2.74 mg/kg	1.534	3.883 mg/kg	0.000388 %	✓	
5	barium { barium sulphide }	016-002-00-X	244-214-4	21109-95-5		8.16 mg/kg	1.233	9.3 mg/kg	0.00093 %	✓	
6	cadmium { cadmium sulfate }	048-009-00-9	233-331-6	10124-36-4		0.367 mg/kg	1.855	0.629 mg/kg	0.0000629 %	✓	
7	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		4.57 mg/kg	1.126	4.754 mg/kg	0.000475 %	✓	
8	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	2.95 mg/kg		2.726 mg/kg	0.000273 %	✓	
9	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
10	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		0.351 mg/kg	1.5	0.487 mg/kg	0.0000487 %	✓	
11	nickel { nickel sulfate }	028-009-00-5	232-104-9	7786-81-4		8.88 mg/kg	2.637	21.634 mg/kg	0.00216 %	✓	
12	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				1.98 mg/kg	1.405	2.57 mg/kg	0.000257 %	✓	
13	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		19.6 mg/kg	2.469	44.72 mg/kg	0.00447 %	✓	
14	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		2.27 mg/kg	1.462	3.066 mg/kg	0.000307 %	✓	

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
15		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<1.2	mg/kg	1.923	<2.308	mg/kg	<0.000231 %		<LOD
16		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
17		acenaphthylene		205-917-1	208-96-8		<0.012	mg/kg		<0.012	mg/kg	<0.0000012 %		<LOD
18		acenaphthene		201-469-6	83-32-9		<0.008	mg/kg		<0.008	mg/kg	<0.0000008 %		<LOD
19		fluorene		201-695-5	86-73-7		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
20		phenanthrene		201-581-5	85-01-8		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
21		anthracene		204-371-1	120-12-7		<0.016	mg/kg		<0.016	mg/kg	<0.0000016 %		<LOD
22		fluoranthene		205-912-4	206-44-0		0.0245	mg/kg		0.0226	mg/kg	0.00000226 %	✓	
23		pyrene		204-927-3	129-00-0		0.023	mg/kg		0.0213	mg/kg	0.00000213 %	✓	
24		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.0175	mg/kg		0.0162	mg/kg	0.00000162 %	✓	
25		chrysene	601-048-00-0	205-923-4	218-01-9		0.0141	mg/kg		0.013	mg/kg	0.0000013 %	✓	
26		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.0237	mg/kg		0.0219	mg/kg	0.00000219 %	✓	
27		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
28		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.0184	mg/kg		0.017	mg/kg	0.0000017 %	✓	
29		indeno[123-cd]pyrene		205-893-2	193-39-5		<0.018	mg/kg		<0.018	mg/kg	<0.0000018 %		<LOD
30		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.023	mg/kg		<0.023	mg/kg	<0.0000023 %		<LOD
31		benzo[ghi]perylene		205-883-8	191-24-2		<0.024	mg/kg		<0.024	mg/kg	<0.0000024 %		<LOD
32		polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.021	mg/kg		<0.021	mg/kg	<0.0000021 %		<LOD
33		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.0005	mg/kg		<0.0005	mg/kg	<0.00000005 %		<LOD
34		benzene	601-020-00-8	200-753-7	71-43-2		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
35		toluene	601-021-00-3	203-625-9	108-88-3		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
36		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
37		coronene		205-881-7	191-07-1		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
38		pH			PH		8.81	pH		8.81	pH	8.81 pH		
39		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.004	mg/kg		<0.004	mg/kg	<0.0000004 %		<LOD
											Total:	0.0107 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

WAC results for sample: TP11-0.50

WAC Settings: samples in this Job constitute a single population.

WAC limits used to evaluate this sample: "Ireland"
The WAC used in this report are the WAC defined for the inert and non-hazardous classes of landfill in the Republic of Ireland. You should check the actual acceptance criteria when the disposal site is identified as they may differ from the generic WAC used in this report.

The sample FAILS the Inert (Inert waste landfill) criteria.

The sample PASSES the Non Haz (Non hazardous waste landfill) criteria.

WAC Determinands

Solid Waste Analysis				Landfill Waste Acceptance Criteria Limits	
#	Determinand		User entered data	Inert waste landfill	Non hazardous waste landfill
1	TOC (total organic carbon)	%	3.16	3	5
2	LOI (loss on ignition)	%	1.07	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.007	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.021	1	-
5	Mineral oil (C10 to C40)	mg/kg	<5	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<10	100	-
7	pH	pH	8.81	-	>6
8	ANC (acid neutralisation capacity)	mol/kg		-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	0.0296	0.5	2
10	barium	mg/kg	0.0274	20	100
11	cadmium	mg/kg	<0.0008	0.04	1
12	chromium	mg/kg	<0.01	0.5	10
13	copper	mg/kg	0.0227	2	50
14	mercury	mg/kg	<0.0001	0.01	0.2
15	molybdenum	mg/kg	0.0636	0.5	10
16	nickel	mg/kg	0.0073	0.4	10
17	lead	mg/kg	<0.002	0.5	10
18	antimony	mg/kg	<0.01	0.06	0.7
19	selenium	mg/kg	<0.01	0.1	0.5
20	zinc	mg/kg	<0.01	4	50
21	chloride	mg/kg	31	800	15,000
22	fluoride	mg/kg	<5	10	150
23	sulphate	mg/kg	<20	1,000	20,000
24	phenol index	mg/kg	<0.16	1	-
25	DOC (dissolved organic carbon)	mg/kg	30.9	500	800
26	TDS (total dissolved solids)	mg/kg	832	4,000	60,000

Key

	User supplied data
	Inert WAC criteria fail

Classification of sample: TP03-0.50

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
TP03-0.50
Sample Depth:
0.50 m
Moisture content:
15%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 15% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	TPH (C6 to C40) petroleum group			TPH		<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
2	confirm TPH has NOT arisen from diesel or petrol					☑					
3	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		<0.6 mg/kg	1.197	<0.718 mg/kg	<0.0000718 %		<LOD
4	arsenic { arsenic pentoxide }	033-004-00-6	215-116-9	1303-28-2		7.47 mg/kg	1.534	9.739 mg/kg	0.000974 %	✓	
5	barium { barium sulphide }	016-002-00-X	244-214-4	21109-95-5		31.6 mg/kg	1.233	33.132 mg/kg	0.00331 %	✓	
6	cadmium { cadmium sulfate }	048-009-00-9	233-331-6	10124-36-4		0.899 mg/kg	1.855	1.417 mg/kg	0.000142 %	✓	
7	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		15.4 mg/kg	1.126	14.738 mg/kg	0.00147 %	✓	
8	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	13.3 mg/kg		11.305 mg/kg	0.00113 %	✓	
9	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
10	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		0.741 mg/kg	1.5	0.945 mg/kg	0.0000945 %	✓	
11	nickel { nickel sulfate }	028-009-00-5	232-104-9	7786-81-4		35.2 mg/kg	2.637	78.89 mg/kg	0.00789 %	✓	
12	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				1.49 mg/kg	1.405	1.779 mg/kg	0.000178 %	✓	
13	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		54.4 mg/kg	2.469	114.18 mg/kg	0.0114 %	✓	
14	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		11.8 mg/kg	1.462	14.659 mg/kg	0.00147 %	✓	

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
15		chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.6	mg/kg	1.923	<1.154	mg/kg	<0.000115 %		<LOD
		024-001-00-0	215-607-8	1333-82-0									
16		naphthalene				<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
17		acenaphthylene				<0.012	mg/kg		<0.012	mg/kg	<0.0000012 %		<LOD
			205-917-1	208-96-8									
18		acenaphthene				<0.008	mg/kg		<0.008	mg/kg	<0.0000008 %		<LOD
			201-469-6	83-32-9									
19		fluorene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
			201-695-5	86-73-7									
20		phenanthrene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
			201-581-5	85-01-8									
21		anthracene				<0.016	mg/kg		<0.016	mg/kg	<0.0000016 %		<LOD
			204-371-1	120-12-7									
22		fluoranthene				<0.017	mg/kg		<0.017	mg/kg	<0.0000017 %		<LOD
			205-912-4	206-44-0									
23		pyrene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
			204-927-3	129-00-0									
24		benzo[a]anthracene				<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
		601-033-00-9	200-280-6	56-55-3									
25		chrysene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
26		benzo[b]fluoranthene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
		601-034-00-4	205-911-9	205-99-2									
27		benzo[k]fluoranthene				<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
		601-036-00-5	205-916-6	207-08-9									
28		benzo[a]pyrene; benzo[def]chrysene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
		601-032-00-3	200-028-5	50-32-8									
29		indeno[123-cd]pyrene				<0.018	mg/kg		<0.018	mg/kg	<0.0000018 %		<LOD
			205-893-2	193-39-5									
30		dibenz[a,h]anthracene				<0.023	mg/kg		<0.023	mg/kg	<0.0000023 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
31		benzo[ghi]perylene				<0.024	mg/kg		<0.024	mg/kg	<0.0000024 %		<LOD
			205-883-8	191-24-2									
32		polychlorobiphenyls; PCB				<0.021	mg/kg		<0.021	mg/kg	<0.0000021 %		<LOD
		602-039-00-4	215-648-1	1336-36-3									
33		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.0005	mg/kg		<0.0005	mg/kg	<0.00000005 %		<LOD
		603-181-00-X	216-653-1	1634-04-4									
34		benzene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
		601-020-00-8	200-753-7	71-43-2									
35		toluene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
		601-021-00-3	203-625-9	108-88-3									
36		ethylbenzene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
37		coronene				<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
			205-881-7	191-07-1									
38		pH				8.52	pH		8.52	pH	8.52 pH		
				PH									
39		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]				<0.004	mg/kg		<0.004	mg/kg	<0.0000004 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
										Total:	0.0293 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

WAC results for sample: TP03-0.50

WAC Settings: samples in this Job constitute a single population.

WAC limits used to evaluate this sample: "Ireland"
The WAC used in this report are the WAC defined for the inert and non-hazardous classes of landfill in the Republic of Ireland. You should check the actual acceptance criteria when the disposal site is identified as they may differ from the generic WAC used in this report.

The sample PASSES the Inert (Inert waste landfill) criteria.

The sample PASSES the Non Haz (Non hazardous waste landfill) criteria.

WAC Determinands

Solid Waste Analysis				Landfill Waste Acceptance Criteria Limits	
#	Determinand		User entered data	Inert waste landfill	Non hazardous waste landfill
1	TOC (total organic carbon)	%	0.767	3	5
2	LOI (loss on ignition)	%	3.34	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.007	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.021	1	-
5	Mineral oil (C10 to C40)	mg/kg	<5	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<10	100	-
7	pH	pH	8.52	-	>6
8	ANC (acid neutralisation capacity)	mol/kg		-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	<0.005	0.5	2
10	barium	mg/kg	0.0343	20	100
11	cadmium	mg/kg	<0.0008	0.04	1
12	chromium	mg/kg	<0.01	0.5	10
13	copper	mg/kg	0.0103	2	50
14	mercury	mg/kg	<0.0001	0.01	0.2
15	molybdenum	mg/kg	0.0978	0.5	10
16	nickel	mg/kg	0.0056	0.4	10
17	lead	mg/kg	0.0039	0.5	10
18	antimony	mg/kg	<0.01	0.06	0.7
19	selenium	mg/kg	<0.01	0.1	0.5
20	zinc	mg/kg	0.0322	4	50
21	chloride	mg/kg	<20	800	15,000
22	fluoride	mg/kg	<5	10	150
23	sulphate	mg/kg	<20	1,000	20,000
24	phenol index	mg/kg	<0.16	1	-
25	DOC (dissolved organic carbon)	mg/kg	<30	500	800
26	TDS (total dissolved solids)	mg/kg	529	4,000	60,000

Key

User supplied data

Classification of sample: TP05-0.50

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
TP05-0.50
Sample Depth:
0.50 m
Moisture content:
17%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 17% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	TPH (C6 to C40) petroleum group			TPH		<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
2	confirm TPH has NOT arisen from diesel or petrol					☑					
3	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		<0.6 mg/kg	1.197	<0.718 mg/kg	<0.0000718 %		<LOD
4	arsenic { arsenic pentoxide }	033-004-00-6	215-116-9	1303-28-2		10 mg/kg	1.534	12.731 mg/kg	0.00127 %	✓	
5	barium { barium sulphide }	016-002-00-X	244-214-4	21109-95-5		68.6 mg/kg	1.233	70.233 mg/kg	0.00702 %	✓	
6	cadmium { cadmium sulfate }	048-009-00-9	233-331-6	10124-36-4		0.631 mg/kg	1.855	0.971 mg/kg	0.0000971 %	✓	
7	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		22.5 mg/kg	1.126	21.026 mg/kg	0.0021 %	✓	
8	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	19.8 mg/kg		16.434 mg/kg	0.00164 %	✓	
9	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
10	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		0.868 mg/kg	1.5	1.081 mg/kg	0.000108 %	✓	
11	nickel { nickel sulfate }	028-009-00-5	232-104-9	7786-81-4		45.4 mg/kg	2.637	99.356 mg/kg	0.00994 %	✓	
12	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %		<LOD
13	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		86.8 mg/kg	2.469	177.898 mg/kg	0.0178 %	✓	
14	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		19.9 mg/kg	1.462	24.141 mg/kg	0.00241 %	✓	

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
15		chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.6	mg/kg	1.923	<1.154	mg/kg	<0.000115 %		<LOD
		024-001-00-0	215-607-8	1333-82-0									
16		naphthalene				<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
17		acenaphthylene				<0.012	mg/kg		<0.012	mg/kg	<0.0000012 %		<LOD
			205-917-1	208-96-8									
18		acenaphthene				<0.008	mg/kg		<0.008	mg/kg	<0.0000008 %		<LOD
			201-469-6	83-32-9									
19		fluorene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
			201-695-5	86-73-7									
20		phenanthrene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
			201-581-5	85-01-8									
21		anthracene				<0.016	mg/kg		<0.016	mg/kg	<0.0000016 %		<LOD
			204-371-1	120-12-7									
22		fluoranthene				<0.017	mg/kg		<0.017	mg/kg	<0.0000017 %		<LOD
			205-912-4	206-44-0									
23		pyrene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
			204-927-3	129-00-0									
24		benzo[a]anthracene				<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
		601-033-00-9	200-280-6	56-55-3									
25		chrysene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
26		benzo[b]fluoranthene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
		601-034-00-4	205-911-9	205-99-2									
27		benzo[k]fluoranthene				<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
		601-036-00-5	205-916-6	207-08-9									
28		benzo[a]pyrene; benzo[def]chrysene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
		601-032-00-3	200-028-5	50-32-8									
29		indeno[123-cd]pyrene				<0.018	mg/kg		<0.018	mg/kg	<0.0000018 %		<LOD
			205-893-2	193-39-5									
30		dibenz[a,h]anthracene				<0.023	mg/kg		<0.023	mg/kg	<0.0000023 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
31		benzo[ghi]perylene				<0.024	mg/kg		<0.024	mg/kg	<0.0000024 %		<LOD
			205-883-8	191-24-2									
32		polychlorobiphenyls; PCB				<0.021	mg/kg		<0.021	mg/kg	<0.0000021 %		<LOD
		602-039-00-4	215-648-1	1336-36-3									
33		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.0005	mg/kg		<0.0005	mg/kg	<0.00000005 %		<LOD
		603-181-00-X	216-653-1	1634-04-4									
34		benzene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
		601-020-00-8	200-753-7	71-43-2									
35		toluene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
		601-021-00-3	203-625-9	108-88-3									
36		ethylbenzene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
37		coronene				<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
			205-881-7	191-07-1									
38		pH				8.73	pH		8.73	pH	8.73 pH		
				PH									
39		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]				<0.004	mg/kg		<0.004	mg/kg	<0.0000004 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
										Total:	0.0438 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

WAC results for sample: TP05-0.50

WAC Settings: samples in this Job constitute a single population.

WAC limits used to evaluate this sample: "Ireland"
The WAC used in this report are the WAC defined for the inert and non-hazardous classes of landfill in the Republic of Ireland. You should check the actual acceptance criteria when the disposal site is identified as they may differ from the generic WAC used in this report.

The sample PASSES the Inert (Inert waste landfill) criteria.

The sample PASSES the Non Haz (Non hazardous waste landfill) criteria.

WAC Determinands

Solid Waste Analysis				Landfill Waste Acceptance Criteria Limits	
#	Determinand		User entered data	Inert waste landfill	Non hazardous waste landfill
1	TOC (total organic carbon)	%	0.546	3	5
2	LOI (loss on ignition)	%	2.87	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.007	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.021	1	-
5	Mineral oil (C10 to C40)	mg/kg	<5	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<10	100	-
7	pH	pH	8.73	-	>6
8	ANC (acid neutralisation capacity)	mol/kg		-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	<0.005	0.5	2
10	barium	mg/kg	0.0402	20	100
11	cadmium	mg/kg	<0.0008	0.04	1
12	chromium	mg/kg	<0.01	0.5	10
13	copper	mg/kg	0.0182	2	50
14	mercury	mg/kg	<0.0001	0.01	0.2
15	molybdenum	mg/kg	<0.03	0.5	10
16	nickel	mg/kg	0.0078	0.4	10
17	lead	mg/kg	<0.002	0.5	10
18	antimony	mg/kg	<0.01	0.06	0.7
19	selenium	mg/kg	<0.01	0.1	0.5
20	zinc	mg/kg	0.015	4	50
21	chloride	mg/kg	<20	800	15,000
22	fluoride	mg/kg	<5	10	150
23	sulphate	mg/kg	<20	1,000	20,000
24	phenol index	mg/kg	<0.16	1	-
25	DOC (dissolved organic carbon)	mg/kg	33.2	500	800
26	TDS (total dissolved solids)	mg/kg	694	4,000	60,000

Key

User supplied data

Classification of sample: TP07-0.50

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
TP07-0.50
Sample Depth:
0.50 m
Moisture content:
14%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 14% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	TPH (C6 to C40) petroleum group			TPH		<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
2	confirm TPH has NOT arisen from diesel or petrol					☑					
3	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		<0.6 mg/kg	1.197	<0.718 mg/kg	<0.0000718 %		<LOD
4	arsenic { arsenic pentoxide }	033-004-00-6	215-116-9	1303-28-2		11.9 mg/kg	1.534	15.698 mg/kg	0.00157 %	✓	
5	barium { barium sulphide }	016-002-00-X	244-214-4	21109-95-5		65 mg/kg	1.233	68.952 mg/kg	0.0069 %	✓	
6	cadmium { cadmium sulfate }	048-009-00-9	233-331-6	10124-36-4		1.13 mg/kg	1.855	1.802 mg/kg	0.00018 %	✓	
7	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		24.4 mg/kg	1.126	23.626 mg/kg	0.00236 %	✓	
8	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	19.2 mg/kg		16.512 mg/kg	0.00165 %	✓	
9	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
10	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		0.901 mg/kg	1.5	1.162 mg/kg	0.000116 %	✓	
11	nickel { nickel sulfate }	028-009-00-5	232-104-9	7786-81-4		57 mg/kg	2.637	129.25 mg/kg	0.0129 %	✓	
12	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				1.04 mg/kg	1.405	1.257 mg/kg	0.000126 %	✓	
13	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		85.3 mg/kg	2.469	181.143 mg/kg	0.0181 %	✓	
14	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		18.7 mg/kg	1.462	23.505 mg/kg	0.00235 %	✓	

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
15		chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.6	mg/kg	1.923	<1.154	mg/kg	<0.000115 %		<LOD
		024-001-00-0	215-607-8	1333-82-0									
16		naphthalene				<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
17		acenaphthylene				<0.012	mg/kg		<0.012	mg/kg	<0.0000012 %		<LOD
			205-917-1	208-96-8									
18		acenaphthene				<0.008	mg/kg		<0.008	mg/kg	<0.0000008 %		<LOD
			201-469-6	83-32-9									
19		fluorene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
			201-695-5	86-73-7									
20		phenanthrene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
			201-581-5	85-01-8									
21		anthracene				<0.016	mg/kg		<0.016	mg/kg	<0.0000016 %		<LOD
			204-371-1	120-12-7									
22		fluoranthene				<0.017	mg/kg		<0.017	mg/kg	<0.0000017 %		<LOD
			205-912-4	206-44-0									
23		pyrene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
			204-927-3	129-00-0									
24		benzo[a]anthracene				<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
		601-033-00-9	200-280-6	56-55-3									
25		chrysene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
26		benzo[b]fluoranthene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
		601-034-00-4	205-911-9	205-99-2									
27		benzo[k]fluoranthene				<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
		601-036-00-5	205-916-6	207-08-9									
28		benzo[a]pyrene; benzo[def]chrysene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
		601-032-00-3	200-028-5	50-32-8									
29		indeno[123-cd]pyrene				<0.018	mg/kg		<0.018	mg/kg	<0.0000018 %		<LOD
			205-893-2	193-39-5									
30		dibenz[a,h]anthracene				<0.023	mg/kg		<0.023	mg/kg	<0.0000023 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
31		benzo[ghi]perylene				<0.024	mg/kg		<0.024	mg/kg	<0.0000024 %		<LOD
			205-883-8	191-24-2									
32		polychlorobiphenyls; PCB				<0.021	mg/kg		<0.021	mg/kg	<0.0000021 %		<LOD
		602-039-00-4	215-648-1	1336-36-3									
33		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.0005	mg/kg		<0.0005	mg/kg	<0.00000005 %		<LOD
		603-181-00-X	216-653-1	1634-04-4									
34		benzene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
		601-020-00-8	200-753-7	71-43-2									
35		toluene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
		601-021-00-3	203-625-9	108-88-3									
36		ethylbenzene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
37		coronene				<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
			205-881-7	191-07-1									
38		pH				8.75	pH		8.75	pH	8.75 pH		
				PH									
39		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]				<0.004	mg/kg		<0.004	mg/kg	<0.0000004 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
										Total:	0.0475 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

WAC results for sample: TP07-0.50

WAC Settings: samples in this Job constitute a single population.

WAC limits used to evaluate this sample: "Ireland"
The WAC used in this report are the WAC defined for the inert and non-hazardous classes of landfill in the Republic of Ireland. You should check the actual acceptance criteria when the disposal site is identified as they may differ from the generic WAC used in this report.

The sample PASSES the Inert (Inert waste landfill) criteria.

The sample PASSES the Non Haz (Non hazardous waste landfill) criteria.

WAC Determinands

Solid Waste Analysis				Landfill Waste Acceptance Criteria Limits	
#	Determinand		User entered data	Inert waste landfill	Non hazardous waste landfill
1	TOC (total organic carbon)	%	0.319	3	5
2	LOI (loss on ignition)	%	3.07	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.007	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.021	1	-
5	Mineral oil (C10 to C40)	mg/kg	<5	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<10	100	-
7	pH	pH	8.75	-	>6
8	ANC (acid neutralisation capacity)	mol/kg		-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	<0.005	0.5	2
10	barium	mg/kg	0.0369	20	100
11	cadmium	mg/kg	<0.0008	0.04	1
12	chromium	mg/kg	<0.01	0.5	10
13	copper	mg/kg	0.013	2	50
14	mercury	mg/kg	<0.0001	0.01	0.2
15	molybdenum	mg/kg	0.0309	0.5	10
16	nickel	mg/kg	0.0058	0.4	10
17	lead	mg/kg	0.0023	0.5	10
18	antimony	mg/kg	<0.01	0.06	0.7
19	selenium	mg/kg	<0.01	0.1	0.5
20	zinc	mg/kg	<0.01	4	50
21	chloride	mg/kg	<20	800	15,000
22	fluoride	mg/kg	<5	10	150
23	sulphate	mg/kg	<20	1,000	20,000
24	phenol index	mg/kg	<0.16	1	-
25	DOC (dissolved organic carbon)	mg/kg	44.7	500	800
26	TDS (total dissolved solids)	mg/kg	660	4,000	60,000

Key

User supplied data

Classification of sample: TP09-0.50

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
TP09-0.50
Sample Depth:
0.50 m
Moisture content:
17%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 17% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	TPH (C6 to C40) petroleum group			TPH		<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
2	confirm TPH has NOT arisen from diesel or petrol					☑					
3	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		<0.6 mg/kg	1.197	<0.718 mg/kg	<0.0000718 %		<LOD
4	arsenic { arsenic pentoxide }	033-004-00-6	215-116-9	1303-28-2		11.5 mg/kg	1.534	14.641 mg/kg	0.00146 %	✓	
5	barium { barium sulphide }	016-002-00-X	244-214-4	21109-95-5		73.9 mg/kg	1.233	75.659 mg/kg	0.00757 %	✓	
6	cadmium { cadmium sulfate }	048-009-00-9	233-331-6	10124-36-4		0.913 mg/kg	1.855	1.405 mg/kg	0.000141 %	✓	
7	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		28.9 mg/kg	1.126	27.007 mg/kg	0.0027 %	✓	
8	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	21.1 mg/kg		17.513 mg/kg	0.00175 %	✓	
9	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
10	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		1.29 mg/kg	1.5	1.606 mg/kg	0.000161 %	✓	
11	nickel { nickel sulfate }	028-009-00-5	232-104-9	7786-81-4		73.8 mg/kg	2.637	161.507 mg/kg	0.0162 %	✓	
12	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %		<LOD
13	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		124 mg/kg	2.469	254.14 mg/kg	0.0254 %	✓	
14	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		23.6 mg/kg	1.462	28.629 mg/kg	0.00286 %	✓	

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
15		chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.6	mg/kg	1.923	<1.154	mg/kg	<0.000115 %		<LOD
		024-001-00-0	215-607-8	1333-82-0									
16		naphthalene				<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
17		acenaphthylene				<0.012	mg/kg		<0.012	mg/kg	<0.0000012 %		<LOD
			205-917-1	208-96-8									
18		acenaphthene				<0.008	mg/kg		<0.008	mg/kg	<0.0000008 %		<LOD
			201-469-6	83-32-9									
19		fluorene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
			201-695-5	86-73-7									
20		phenanthrene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
			201-581-5	85-01-8									
21		anthracene				<0.016	mg/kg		<0.016	mg/kg	<0.0000016 %		<LOD
			204-371-1	120-12-7									
22		fluoranthene				<0.017	mg/kg		<0.017	mg/kg	<0.0000017 %		<LOD
			205-912-4	206-44-0									
23		pyrene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
			204-927-3	129-00-0									
24		benzo[a]anthracene				<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
		601-033-00-9	200-280-6	56-55-3									
25		chrysene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
26		benzo[b]fluoranthene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
		601-034-00-4	205-911-9	205-99-2									
27		benzo[k]fluoranthene				<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
		601-036-00-5	205-916-6	207-08-9									
28		benzo[a]pyrene; benzo[def]chrysene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
		601-032-00-3	200-028-5	50-32-8									
29		indeno[123-cd]pyrene				<0.018	mg/kg		<0.018	mg/kg	<0.0000018 %		<LOD
			205-893-2	193-39-5									
30		dibenz[a,h]anthracene				<0.023	mg/kg		<0.023	mg/kg	<0.0000023 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
31		benzo[ghi]perylene				<0.024	mg/kg		<0.024	mg/kg	<0.0000024 %		<LOD
			205-883-8	191-24-2									
32		polychlorobiphenyls; PCB				<0.021	mg/kg		<0.021	mg/kg	<0.0000021 %		<LOD
		602-039-00-4	215-648-1	1336-36-3									
33		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.0005	mg/kg		<0.0005	mg/kg	<0.00000005 %		<LOD
		603-181-00-X	216-653-1	1634-04-4									
34		benzene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
		601-020-00-8	200-753-7	71-43-2									
35		toluene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
		601-021-00-3	203-625-9	108-88-3									
36		ethylbenzene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
37		coronene				<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
			205-881-7	191-07-1									
38		pH				8.65	pH		8.65	pH	8.65 pH		
				PH									
39		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]				<0.004	mg/kg		<0.004	mg/kg	<0.0000004 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
										Total:	0.0596 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

WAC results for sample: TP09-0.50

WAC Settings: samples in this Job constitute a single population.

WAC limits used to evaluate this sample: "Ireland"
The WAC used in this report are the WAC defined for the inert and non-hazardous classes of landfill in the Republic of Ireland. You should check the actual acceptance criteria when the disposal site is identified as they may differ from the generic WAC used in this report.

The sample PASSES the Inert (Inert waste landfill) criteria.

The sample PASSES the Non Haz (Non hazardous waste landfill) criteria.

WAC Determinands

Solid Waste Analysis				Landfill Waste Acceptance Criteria Limits	
#	Determinand		User entered data	Inert waste landfill	Non hazardous waste landfill
1	TOC (total organic carbon)	%	0.301	3	5
2	LOI (loss on ignition)	%	3.26	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.007	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.021	1	-
5	Mineral oil (C10 to C40)	mg/kg	<5	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<10	100	-
7	pH	pH	8.65	-	>6
8	ANC (acid neutralisation capacity)	mol/kg		-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	<0.005	0.5	2
10	barium	mg/kg	0.0364	20	100
11	cadmium	mg/kg	<0.0008	0.04	1
12	chromium	mg/kg	<0.01	0.5	10
13	copper	mg/kg	0.017	2	50
14	mercury	mg/kg	<0.0001	0.01	0.2
15	molybdenum	mg/kg	0.0875	0.5	10
16	nickel	mg/kg	0.009	0.4	10
17	lead	mg/kg	0.0042	0.5	10
18	antimony	mg/kg	<0.01	0.06	0.7
19	selenium	mg/kg	<0.01	0.1	0.5
20	zinc	mg/kg	0.0204	4	50
21	chloride	mg/kg	<20	800	15,000
22	fluoride	mg/kg	<5	10	150
23	sulphate	mg/kg	<20	1,000	20,000
24	phenol index	mg/kg	<0.16	1	-
25	DOC (dissolved organic carbon)	mg/kg	34.6	500	800
26	TDS (total dissolved solids)	mg/kg	680	4,000	60,000

Key

User supplied data

Appendix A: Classifier defined and non EU CLP determinands

TPH (C6 to C40) petroleum group (CAS Number: TPH)

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: Flam. Liq. 3; H226 , Asp. Tox. 1; H304 , STOT RE 2; H373 , Muta. 1B; H340 , Carc. 1B; H350 , Repr. 2; H361d , Aquatic Chronic 2; H411

confirm TPH has NOT arisen from diesel or petrol

Description/Comments: Chapter 3, section 4b requires a positive confirmation for benzo[a]pyrene to be used as a marker in evaluating Carc. 1B; H350 (HP 7) and Muta. 1B; H340 (HP 11)
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: None.

barium sulphide (EC Number: 244-214-4, CAS Number: 21109-95-5)

EU CLP index number: 016-002-00-X
Description/Comments:
Additional Hazard Statement(s): EUH031 >= 0.8 %
Reason for additional Hazards Statement(s):
14 Dec 2015 - EUH031 >= 0.8 % hazard statement sourced from: WM3, Table C12.2

lead compounds with the exception of those specified elsewhere in this Annex (worst case)

EU CLP index number: 082-001-00-6
Description/Comments: Worst Case: IARC considers lead compounds Group 2A; Probably carcinogenic to humans; Lead REACH Consortium, following CLP protocols, considers lead compounds from smelting industries, flue dust and similar to be Carcinogenic category 1A
Additional Hazard Statement(s): Carc. 1A; H350
Reason for additional Hazards Statement(s):
03 Jun 2015 - Carc. 1A; H350 hazard statement sourced from: IARC Group 2A (Sup 7, 87) 2006; Lead REACH Consortium www.reach-lead.eu/substanceinformation.html (worst case lead compounds). Review date 29/09/2015

chromium(III) oxide (worst case) (EC Number: 215-160-9, CAS Number: 1308-38-9)

Description/Comments: Data from C&L Inventory Database
Data source: https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/33806
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4; H332 , Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Resp. Sens. 1; H334 , Skin Sens. 1; H317 , Repr. 1B; H360FD , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

acenaphthylene (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4; H302 , Acute Tox. 1; H330 , Acute Tox. 1; H310 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315

acenaphthene (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Aquatic Chronic 2; H411

fluorene (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

phenanthrene (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Carc. 2; H351 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Skin Irrit. 2; H315

- **anthracene** (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

- **fluoranthene** (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Acute Tox. 4; H302 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

- **pyrene** (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

- **indeno[123-cd]pyrene** (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Carc. 2; H351

- **benzo[ghi]perylene** (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 23 Jul 2015
Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

- **polychlorobiphenyls; PCB** (EC Number: 215-648-1, CAS Number: 1336-36-3)

EU CLP index number: 602-039-00-4
Description/Comments: Worst Case: IARC considers PCB Group 1; Carcinogenic to humans;

POP specific threshold from ATP1 (Regulation 756/2010/EU) to POPs Regulation (Regulation 850/2004/EC). Where applicable, the calculation method laid down in European standards EN 12766-1 and EN 12766-2 shall be applied.
Additional Hazard Statement(s): Carc. 1A; H350
Reason for additional Hazards Statement(s):
29 Sep 2015 - Carc. 1A; H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

- **ethylbenzene** (EC Number: 202-849-4, CAS Number: 100-41-4)

EU CLP index number: 601-023-00-4
Description/Comments:
Additional Hazard Statement(s): Carc. 2; H351
Reason for additional Hazards Statement(s):
03 Jun 2015 - Carc. 2; H351 hazard statement sourced from: IARC Group 2B (77) 2000

- **coronene** (EC Number: 205-881-7, CAS Number: 191-07-1)

Description/Comments: Data from C&L Inventory Database; no entries in Registered Substances or Pesticides Properties databases; SDS: Sigma Aldrich, 1907/2006 compliant, dated 2012 - no entries; IARC – Group 3, not carcinogenic.
Data source: http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=17010&HarmOnly=no?fc=true&lang=en
Data source date: 16 Jun 2014
Hazard Statements: STOT SE 2; H371

- **pH** (CAS Number: PH)

Description/Comments: Appendix C4
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: None.

Appendix B: Rationale for selection of metal species

antimony {antimony trioxide}

Worst case scenario.

arsenic {arsenic pentoxide}

Arsenic pentoxide used as most hazardous species.

barium {barium sulphide}

Chromium VI at limits of detection. Barium sulphide used as the next most hazardous species. No chromate present.

cadmium {cadmium sulfate}

Cadmium sulphate used as the most hazardous species.

copper {dicopper oxide; copper (I) oxide}

Reasonable case CLP species based on hazard statements/molecular weight and insolubility in water. Worse case copper sulphate is very soluble and likely to have been leached away if ever present and/or not enough soluble sulphate detected.

lead {lead compounds with the exception of those specified elsewhere in this Annex (worst case)}

Chromium VI at limits of detection. Lead compounds used as the next most hazardous species. No chromate present.

mercury {mercury dichloride}

Worst case CLP species based on hazard statements/molecular weight

molybdenum {molybdenum(VI) oxide}

Worst case CLP species based on hazard statements/molecular weight.

nickel {nickel sulfate}

Chromium VI at limits of detection. Nickel sulphate used as the next most hazardous species. No chromate present.

selenium {selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex}

Harmonised group entry used as most reasonable case. Pigment cadmium sulphoselenide not likely to be present in this soil. No evidence for the other CLP entries: sodium selenite, nickel II selenite and nickel selenide, to be present in this soil.

zinc {zinc sulphate}

Chromium VI at limits of detection. Zinc sulphate used as the next most hazardous species. No chromate present.

chromium in chromium(III) compounds {chromium(III) oxide (worst case)}

Reasonable case species based on hazard statements/molecular weight. Industrial sources include: tanning, pigment in paint, inks and glass

chromium in chromium(VI) compounds {chromium(VI) oxide}

Worst case CLP species based on hazard statements/molecular weight. Industrial sources include: production stainless steel, electroplating, wood preservation, anti-corrosion agents or coatings, pigments.

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.1.NI - Jan 2021
HazWasteOnline Classification Engine Version: 2024.281.6280.11501 (07 Oct 2024)
HazWasteOnline Database: 2024.281.6280.11501 (07 Oct 2024)

This classification utilises the following guidance and legislation:
WM3 v1.1.NI - Waste Classification - 1st Edition v1.1.NI - Jan 2021
CLP Regulation - Regulation 1272/2008/EC of 16 December 2008
1st ATP - Regulation 790/2009/EC of 10 August 2009
2nd ATP - Regulation 286/2011/EC of 10 March 2011
3rd ATP - Regulation 618/2012/EU of 10 July 2012
4th ATP - Regulation 487/2013/EU of 8 May 2013
Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013
5th ATP - Regulation 944/2013/EU of 2 October 2013
6th ATP - Regulation 605/2014/EU of 5 June 2014
WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014
Revised List of Waste 2014 - Decision 2014/955/EU of 18 December 2014
7th ATP - Regulation 2015/1221/EU of 24 July 2015
8th ATP - Regulation (EU) 2016/918 of 19 May 2016
9th ATP - Regulation (EU) 2016/1179 of 19 July 2016
10th ATP - Regulation (EU) 2017/776 of 4 May 2017
HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017
13th ATP - Regulation (EU) 2018/1480 of 4 October 2018
14th ATP - Regulation (EU) 2020/217 of 4 October 2019
15th ATP - Regulation (EU) 2020/1182 of 19 May 2020
The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1567 of 16th December 2020
The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1540 of 16th December 2020
17th ATP - Regulation (EU) 2021/849 of 11 March 2021
18th ATP - Regulation (EU) 2022/692 of 16 February 2022
19th ATP - Regulation (EU) 2023/1434 of 25 April 2023
20th ATP - Regulation (EU) 2023/1435 of 2 May 2023
21st ATP - Regulation (EU) 2024/197 of 19 October 2023

Appendix 9

Survey Data

Survey Data

Location	Irish Transverse Mercator		Elevation	Irish National Grid	
	Easting	Northing		Easting	Northing
Cable Percussive Boreholes					
BH01	605924.007	742865.924	43.97	205974.539	242840.939
BH02	605877.411	742952.515	44.02	205927.932	242927.548
BH03	606014.395	742728.004	45.34	206064.947	242702.989
BH03A	606014.819	742726.802	45.36	206065.371	242701.787
BH03B	606015.542	742725.737	45.37	206066.094	242700.722
BH04	605856.386	742828.473	44.01	205906.903	242803.479
BH05	605888.970	742863.148	43.94	205939.494	242838.162
BH06	605898.822	742785.271	44.21	205949.349	242760.268
BH07	605831.519	742793.085	44.20	205882.031	242768.083
BH08	605829.184	742873.111	44.01	205879.695	242848.127
BH09	605943.123	742698.203	46.66	205993.660	242673.182
BH10	605946.997	742786.081	44.27	205997.534	242761.078
BH11	605834.396	742928.180	43.97	205884.908	242903.207
BH12	606086.872	742615.273	57.69	206137.440	242590.234
Trial Pits					
TP01	605990.760	742736.565	44.96	206041.307	242711.552
TP02	605955.185	742728.880	44.66	206005.724	242703.865
TP03	605949.948	742770.653	44.32	206000.486	242745.647
TP04	605913.450	742839.098	43.87	205963.980	242814.107
TP05	605837.423	742825.893	44.08	205887.936	242800.898
TP06	605877.537	742812.037	44.07	205928.059	242787.040
TP07	605858.334	742941.324	44.14	205908.851	242916.354
TP08	605853.542	742860.716	43.94	205904.058	242835.729
TP09	605907.329	742877.109	44.08	205957.857	242852.126
TP10	605836.265	742908.803	43.92	205886.778	242883.826
TP11	606086.092	742605.677	57.93	206136.660	242580.636
TP12	605854.602	742884.667	43.95	205905.119	242859.685
Soakaway Tests					
INF01	605900.846	742831.947	43.86	205951.373	242806.954
INF02	605854.660	742899.283	43.83	205905.177	242874.304
INF03	605942.814	742762.030	44.20	205993.350	242737.022
INF04	606098.845	742606.519	58.02	206149.416	242581.479
INF05	605900.984	742918.186	43.96	205951.511	242893.212
Plate Tests					
PLT01	605934.593	742813.850	44.06	205985.127	242788.853
PLT02	605926.272	742806.102	44.03	205976.805	242781.104
PLT03	605840.270	742911.983	43.90	205890.783	242887.007
PLT04	605856.461	742789.654	44.22	205906.978	242764.652

Survey Data

Location	Irish Transverse Mercator		Elevation	Irish National Grid	
	Easting	Northing		Easting	Northing
PLT05	605939.847	742755.320	44.24	205990.383	242730.311
PLT06	605995.664	742721.485	45.29	206046.212	242696.469
PLT07	605882.389	742936.034	43.98	205932.911	242911.063
PLT08	605848.393	742854.541	44.01	205898.908	242829.553
PLT09	606072.976	742601.057	57.53	206123.541	242576.015
PLT10	605906.042	742865.448	43.98	205956.570	242840.462

Contract No:	6338	Client:	Westmeath County Council	Legend Key
Contract:	Cornamaddy Housing Development	Engineer:	SDS Design Engineers	Locations By Type - CBR
Location:	Athlone, Co. Westmeath	Scale:	1:1750	Locations By Type - CP
Title:	Site Plan	Drawn By:	SL	Locations By Type - IP

APPENDIX C – MICRODRAINAGE OUTPUTS

Summary of Results for 100 year Return Period (+30%)

Half Drain Time : 68 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	42.856	0.556	0.0	20.5	20.5	79.2	O K
30 min Summer	43.049	0.749	0.0	20.5	20.5	106.7	O K
60 min Summer	43.198	0.898	0.0	20.5	20.5	128.0	O K
120 min Summer	43.246	0.946	0.0	20.5	20.5	134.8	O K
180 min Summer	43.231	0.931	0.0	20.5	20.5	132.6	O K
240 min Summer	43.192	0.892	0.0	20.5	20.5	127.2	O K
360 min Summer	43.088	0.788	0.0	20.5	20.5	112.3	O K
480 min Summer	42.984	0.684	0.0	20.5	20.5	97.5	O K
600 min Summer	42.888	0.588	0.0	20.5	20.5	83.8	O K
720 min Summer	42.803	0.503	0.0	20.5	20.5	71.6	O K
960 min Summer	42.671	0.371	0.0	20.4	20.4	52.8	O K
1440 min Summer	42.530	0.230	0.0	19.4	19.4	32.8	O K
2160 min Summer	42.475	0.175	0.0	15.9	15.9	24.9	O K
2880 min Summer	42.451	0.151	0.0	13.2	13.2	21.5	O K
4320 min Summer	42.425	0.125	0.0	9.9	9.9	17.8	O K
5760 min Summer	42.411	0.111	0.0	8.1	8.1	15.7	O K
7200 min Summer	42.401	0.101	0.0	6.9	6.9	14.3	O K
8640 min Summer	42.393	0.093	0.0	6.0	6.0	13.3	O K
10080 min Summer	42.388	0.088	0.0	5.4	5.4	12.5	O K
15 min Winter	42.933	0.633	0.0	20.5	20.5	90.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	81.655	0.0	97.1	22
30 min Summer	56.745	0.0	135.0	34
60 min Summer	37.335	0.0	178.0	60
120 min Summer	23.646	0.0	225.4	94
180 min Summer	17.956	0.0	256.8	130
240 min Summer	14.725	0.0	280.8	164
360 min Summer	11.108	0.0	317.8	230
480 min Summer	9.079	0.0	346.3	294
600 min Summer	7.759	0.0	370.0	354
720 min Summer	6.822	0.0	390.3	414
960 min Summer	5.565	0.0	424.5	528
1440 min Summer	4.173	0.0	477.5	752
2160 min Summer	3.129	0.0	537.2	1104
2880 min Summer	2.550	0.0	583.7	1468
4320 min Summer	1.909	0.0	655.2	2200
5760 min Summer	1.552	0.0	710.8	2912
7200 min Summer	1.322	0.0	756.6	3616
8640 min Summer	1.159	0.0	796.1	4400
10080 min Summer	1.037	0.0	830.8	5048
15 min Winter	81.655	0.0	108.8	23

Summary of Results for 100 year Return Period (+30%)

	Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30	min Winter	43.159	0.859	0.0	20.5	20.5	122.4	O K
60	min Winter	43.332	1.032	0.0	20.5	20.5	147.1	O K
120	min Winter	43.379	1.079	0.0	20.5	20.5	153.7	O K
180	min Winter	43.348	1.048	0.0	20.5	20.5	149.3	O K
240	min Winter	43.286	0.986	0.0	20.5	20.5	140.6	O K
360	min Winter	43.110	0.810	0.0	20.5	20.5	115.5	O K
480	min Winter	42.935	0.635	0.0	20.5	20.5	90.5	O K
600	min Winter	42.788	0.488	0.0	20.5	20.5	69.5	O K
720	min Winter	42.672	0.372	0.0	20.4	20.4	53.1	O K
960	min Winter	42.534	0.234	0.0	19.5	19.5	33.4	O K
1440	min Winter	42.471	0.171	0.0	15.5	15.5	24.4	O K
2160	min Winter	42.439	0.139	0.0	11.7	11.7	19.8	O K
2880	min Winter	42.423	0.123	0.0	9.6	9.6	17.5	O K
4320	min Winter	42.403	0.103	0.0	7.2	7.2	14.7	O K
5760	min Winter	42.392	0.092	0.0	5.8	5.8	13.0	O K
7200	min Winter	42.384	0.084	0.0	5.0	5.0	11.9	O K
8640	min Winter	42.378	0.078	0.0	4.4	4.4	11.1	O K
10080	min Winter	42.373	0.073	0.0	3.9	3.9	10.4	O K

	Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30	min Winter	56.745	0.0	151.3	35
60	min Winter	37.335	0.0	199.3	62
120	min Winter	23.646	0.0	252.5	100
180	min Winter	17.956	0.0	287.7	138
240	min Winter	14.725	0.0	314.5	178
360	min Winter	11.108	0.0	355.9	248
480	min Winter	9.079	0.0	387.9	312
600	min Winter	7.759	0.0	414.4	370
720	min Winter	6.822	0.0	437.2	424
960	min Winter	5.565	0.0	475.5	524
1440	min Winter	4.173	0.0	534.8	744
2160	min Winter	3.129	0.0	601.7	1104
2880	min Winter	2.550	0.0	653.8	1468
4320	min Winter	1.909	0.0	733.9	2176
5760	min Winter	1.552	0.0	796.1	2888
7200	min Winter	1.322	0.0	847.5	3608
8640	min Winter	1.159	0.0	891.6	4376
10080	min Winter	1.037	0.0	930.5	5064

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	14.500	Shortest Storm (mins)	15
Ratio R	0.277	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.636

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	0.212	4	8	0.212	8	12	0.212

Model Details

Storage is Online Cover Level (m) 44.420

Cellular Storage Structure

Invert Level (m) 42.300 Safety Factor 1.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	150.0	0.0	1.321	0.0	0.0
1.320	150.0	0.0	2.120	0.0	0.0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0196-2050-1320-2050
Design Head (m)	1.320
Design Flow (l/s)	20.5
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	196
Invert Level (m)	42.300
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1500

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.320	20.5
Flush-Flo™	0.406	20.5
Kick-Flo®	0.892	17.0
Mean Flow over Head Range	-	17.6

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	6.8	1.200	19.6	3.000	30.4	7.000	45.7
0.200	18.4	1.400	21.1	3.500	32.7	7.500	47.2
0.300	20.2	1.600	22.5	4.000	34.9	8.000	48.7
0.400	20.5	1.800	23.8	4.500	36.9	8.500	50.2
0.500	20.3	2.000	25.0	5.000	38.8	9.000	51.6
0.600	20.0	2.200	26.2	5.500	40.7	9.500	53.0
0.800	18.6	2.400	27.3	6.000	42.4		
1.000	18.0	2.600	28.3	6.500	44.1		

Summary of Results for 100 year Return Period (+30%)

Half Drain Time : 275 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	42.362	0.412	0.0	4.8	4.8	58.7	O K
30 min Summer	42.515	0.565	0.0	4.8	4.8	80.5	O K
60 min Summer	42.668	0.718	0.0	4.8	4.8	102.4	O K
120 min Summer	42.802	0.852	0.0	4.8	4.8	121.4	O K
180 min Summer	42.856	0.906	0.0	4.8	4.8	129.2	O K
240 min Summer	42.877	0.927	0.0	4.8	4.8	132.0	O K
360 min Summer	42.883	0.933	0.0	4.8	4.8	133.0	O K
480 min Summer	42.877	0.927	0.0	4.8	4.8	132.1	O K
600 min Summer	42.864	0.914	0.0	4.8	4.8	130.3	O K
720 min Summer	42.848	0.898	0.0	4.8	4.8	128.0	O K
960 min Summer	42.809	0.859	0.0	4.8	4.8	122.4	O K
1440 min Summer	42.706	0.756	0.0	4.8	4.8	107.7	O K
2160 min Summer	42.546	0.596	0.0	4.8	4.8	84.9	O K
2880 min Summer	42.414	0.464	0.0	4.8	4.8	66.1	O K
4320 min Summer	42.232	0.282	0.0	4.7	4.7	40.2	O K
5760 min Summer	42.131	0.181	0.0	4.5	4.5	25.8	O K
7200 min Summer	42.076	0.126	0.0	4.1	4.1	17.9	O K
8640 min Summer	42.046	0.096	0.0	3.9	3.9	13.7	O K
10080 min Summer	42.033	0.083	0.0	3.5	3.5	11.9	O K
15 min Winter	42.415	0.465	0.0	4.8	4.8	66.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	81.655	0.0	63.8	25
30 min Summer	56.745	0.0	88.7	39
60 min Summer	37.335	0.0	116.7	68
120 min Summer	23.646	0.0	147.8	126
180 min Summer	17.956	0.0	168.4	182
240 min Summer	14.725	0.0	184.1	240
360 min Summer	11.108	0.0	208.4	304
480 min Summer	9.079	0.0	227.1	368
600 min Summer	7.759	0.0	242.6	436
720 min Summer	6.822	0.0	256.0	506
960 min Summer	5.565	0.0	278.4	646
1440 min Summer	4.173	0.0	313.2	918
2160 min Summer	3.129	0.0	352.2	1296
2880 min Summer	2.550	0.0	382.7	1648
4320 min Summer	1.909	0.0	429.6	2340
5760 min Summer	1.552	0.0	466.0	3008
7200 min Summer	1.322	0.0	496.0	3688
8640 min Summer	1.159	0.0	521.9	4408
10080 min Summer	1.037	0.0	544.8	5136
15 min Winter	81.655	0.0	71.4	25

Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	42.590	0.640	0.0	4.8	4.8	91.2	O K
60 min Winter	42.769	0.819	0.0	4.8	4.8	116.8	O K
120 min Winter	42.924	0.974	0.0	4.8	4.8	138.8	O K
180 min Winter	42.992	1.042	0.0	4.8	4.8	148.5	O K
240 min Winter	43.023	1.073	0.0	4.8	4.8	152.9	O K
360 min Winter	43.033	1.083	0.0	4.8	4.8	154.3	O K
480 min Winter	43.020	1.070	0.0	4.8	4.8	152.5	O K
600 min Winter	43.001	1.051	0.0	4.8	4.8	149.8	O K
720 min Winter	42.976	1.026	0.0	4.8	4.8	146.2	O K
960 min Winter	42.913	0.963	0.0	4.8	4.8	137.2	O K
1440 min Winter	42.757	0.807	0.0	4.8	4.8	115.0	O K
2160 min Winter	42.486	0.536	0.0	4.8	4.8	76.4	O K
2880 min Winter	42.300	0.350	0.0	4.8	4.8	49.8	O K
4320 min Winter	42.109	0.159	0.0	4.4	4.4	22.6	O K
5760 min Winter	42.043	0.093	0.0	3.8	3.8	13.3	O K
7200 min Winter	42.025	0.075	0.0	3.2	3.2	10.7	O K
8640 min Winter	42.014	0.064	0.0	2.9	2.9	9.1	O K
10080 min Winter	42.006	0.056	0.0	2.5	2.5	8.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	56.745	0.0	99.3	39
60 min Winter	37.335	0.0	130.7	68
120 min Winter	23.646	0.0	165.6	124
180 min Winter	17.956	0.0	188.6	180
240 min Winter	14.725	0.0	206.2	236
360 min Winter	11.108	0.0	233.4	340
480 min Winter	9.079	0.0	254.4	386
600 min Winter	7.759	0.0	271.8	464
720 min Winter	6.822	0.0	286.8	542
960 min Winter	5.565	0.0	311.8	698
1440 min Winter	4.173	0.0	350.8	1006
2160 min Winter	3.129	0.0	394.5	1364
2880 min Winter	2.550	0.0	428.8	1704
4320 min Winter	1.909	0.0	481.3	2340
5760 min Winter	1.552	0.0	522.0	2944
7200 min Winter	1.322	0.0	555.6	3672
8640 min Winter	1.159	0.0	584.6	4368
10080 min Winter	1.037	0.0	610.2	5144

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	14.500	Shortest Storm (mins)	15
Ratio R	0.277	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.417

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	0.139	4	8	0.139	8	12	0.139

Model Details

Storage is Online Cover Level (m) 44.000

Cellular Storage Structure

Invert Level (m) 41.950 Safety Factor 1.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	150.0	0.0	1.321	0.0	0.0
1.320	150.0	0.0	2.050	0.0	0.0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0099-4800-1320-4800
Design Head (m)	1.320
Design Flow (l/s)	4.8
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	99
Invert Level (m)	41.925
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.320	4.8
Flush-Flo™	0.397	4.8
Kick-Flo®	0.815	3.8
Mean Flow over Head Range	-	4.2

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.2	1.200	4.6	3.000	7.0	7.000	10.5
0.200	4.4	1.400	4.9	3.500	7.6	7.500	10.9
0.300	4.7	1.600	5.2	4.000	8.1	8.000	11.2
0.400	4.8	1.800	5.5	4.500	8.5	8.500	11.5
0.500	4.7	2.000	5.8	5.000	9.0	9.000	11.9
0.600	4.6	2.200	6.1	5.500	9.4	9.500	12.2
0.800	3.9	2.400	6.3	6.000	9.8		
1.000	4.2	2.600	6.6	6.500	10.2		

Summary of Results for 100 year Return Period (+30%)

Half Drain Time : 254 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	42.040	0.440	0.0	7.2	7.2	83.5	O K
30 min Summer	42.203	0.603	0.0	7.2	7.2	114.6	O K
60 min Summer	42.367	0.767	0.0	7.2	7.2	145.7	O K
120 min Summer	42.503	0.903	0.0	7.2	7.2	171.5	O K
180 min Summer	42.554	0.954	0.0	7.2	7.2	181.3	O K
240 min Summer	42.570	0.970	0.0	7.2	7.2	184.3	O K
360 min Summer	42.575	0.975	0.0	7.2	7.2	185.2	O K
480 min Summer	42.566	0.966	0.0	7.2	7.2	183.5	O K
600 min Summer	42.551	0.951	0.0	7.2	7.2	180.6	O K
720 min Summer	42.532	0.932	0.0	7.2	7.2	177.0	O K
960 min Summer	42.487	0.887	0.0	7.2	7.2	168.5	O K
1440 min Summer	42.373	0.773	0.0	7.2	7.2	146.9	O K
2160 min Summer	42.191	0.591	0.0	7.2	7.2	112.3	O K
2880 min Summer	42.047	0.447	0.0	7.2	7.2	85.0	O K
4320 min Summer	41.858	0.258	0.0	7.1	7.1	48.9	O K
5760 min Summer	41.761	0.161	0.0	6.6	6.6	30.5	O K
7200 min Summer	41.712	0.112	0.0	6.2	6.2	21.3	O K
8640 min Summer	41.693	0.093	0.0	5.6	5.6	17.6	O K
10080 min Summer	41.680	0.080	0.0	5.0	5.0	15.2	O K
15 min Winter	42.097	0.497	0.0	7.2	7.2	94.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	81.655	0.0	91.3	25
30 min Summer	56.745	0.0	126.9	39
60 min Summer	37.335	0.0	167.0	68
120 min Summer	23.646	0.0	211.7	124
180 min Summer	17.956	0.0	241.1	182
240 min Summer	14.725	0.0	263.6	234
360 min Summer	11.108	0.0	298.4	294
480 min Summer	9.079	0.0	325.1	358
600 min Summer	7.759	0.0	347.4	428
720 min Summer	6.822	0.0	366.4	498
960 min Summer	5.565	0.0	398.6	638
1440 min Summer	4.173	0.0	448.3	914
2160 min Summer	3.129	0.0	504.1	1280
2880 min Summer	2.550	0.0	548.0	1644
4320 min Summer	1.909	0.0	615.3	2332
5760 min Summer	1.552	0.0	667.2	3000
7200 min Summer	1.322	0.0	710.2	3680
8640 min Summer	1.159	0.0	747.3	4408
10080 min Summer	1.037	0.0	780.0	5136
15 min Winter	81.655	0.0	102.3	25

Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	42.284	0.684	0.0	7.2	7.2	129.9	O K
60 min Winter	42.473	0.873	0.0	7.2	7.2	166.0	O K
120 min Winter	42.632	1.032	0.0	7.2	7.2	196.1	O K
180 min Winter	42.699	1.099	0.0	7.2	7.2	208.9	O K
240 min Winter	42.726	1.126	0.0	7.2	7.2	214.0	O K
360 min Winter	42.728	1.128	0.0	7.2	7.2	214.3	O K
480 min Winter	42.714	1.114	0.0	7.2	7.2	211.7	O K
600 min Winter	42.690	1.090	0.0	7.2	7.2	207.1	O K
720 min Winter	42.659	1.059	0.0	7.2	7.2	201.1	O K
960 min Winter	42.585	0.985	0.0	7.2	7.2	187.2	O K
1440 min Winter	42.409	0.809	0.0	7.2	7.2	153.7	O K
2160 min Winter	42.109	0.509	0.0	7.2	7.2	96.7	O K
2880 min Winter	41.914	0.314	0.0	7.2	7.2	59.6	O K
4320 min Winter	41.732	0.132	0.0	6.4	6.4	25.2	O K
5760 min Winter	41.689	0.089	0.0	5.4	5.4	16.9	O K
7200 min Winter	41.672	0.072	0.0	4.7	4.7	13.7	O K
8640 min Winter	41.661	0.061	0.0	4.1	4.1	11.7	O K
10080 min Winter	41.654	0.054	0.0	3.7	3.7	10.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	56.745	0.0	142.2	39
60 min Winter	37.335	0.0	187.1	66
120 min Winter	23.646	0.0	237.0	122
180 min Winter	17.956	0.0	270.0	180
240 min Winter	14.725	0.0	295.2	234
360 min Winter	11.108	0.0	334.1	330
480 min Winter	9.079	0.0	364.2	378
600 min Winter	7.759	0.0	389.1	458
720 min Winter	6.822	0.0	410.6	536
960 min Winter	5.565	0.0	446.5	692
1440 min Winter	4.173	0.0	502.1	998
2160 min Winter	3.129	0.0	564.9	1348
2880 min Winter	2.550	0.0	613.8	1676
4320 min Winter	1.909	0.0	689.0	2296
5760 min Winter	1.552	0.0	747.2	2944
7200 min Winter	1.322	0.0	795.5	3672
8640 min Winter	1.159	0.0	836.7	4408
10080 min Winter	1.037	0.0	873.6	5136

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	14.500	Shortest Storm (mins)	15
Ratio R	0.277	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.597

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.199	4	8	0.199	8	12	0.199

Model Details

Storage is Online Cover Level (m) 44.100

Cellular Storage Structure

Invert Level (m) 41.600 Safety Factor 1.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	200.0	0.0	1.321	0.0	0.0
1.320	200.0	0.0	2.500	0.0	0.0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0121-7200-1320-7200
Design Head (m)	1.320
Design Flow (l/s)	7.2
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	121
Invert Level (m)	41.565
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.320	7.2
Flush-Flo™	0.393	7.2
Kick-Flo®	0.828	5.8
Mean Flow over Head Range	-	6.3

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.3	1.200	6.9	3.000	10.6	7.000	15.9
0.200	6.7	1.400	7.4	3.500	11.4	7.500	16.4
0.300	7.1	1.600	7.9	4.000	12.1	8.000	16.9
0.400	7.2	1.800	8.3	4.500	12.8	8.500	17.4
0.500	7.1	2.000	8.7	5.000	13.5	9.000	17.9
0.600	7.0	2.200	9.1	5.500	14.1	9.500	18.4
0.800	6.0	2.400	9.5	6.000	14.7		
1.000	6.3	2.600	9.9	6.500	15.3		

APPENDIX D – MET ÉIREANN RAINFALL RETURN PERIOD DATA

Met Eireann
Return Period Rainfall Depths for sliding Durations
Irish Grid: Easting: 205910, Northing: 242778,

	Interval		Years												
DURATION	6months,	1year,	2,	3,	4,	5,	10,	20,	30,	50,	75,	100,	150,	200,	250,	500,
5 mins	2.5,	3.4,	3.9,	4.6,	5.1,	5.4,	6.5,	7.8,	8.6,	9.8,	10.8,	11.5,	12.7,	13.6,	14.3,	N/A ,
10 mins	3.5,	4.8,	5.4,	6.4,	7.0,	7.5,	9.1,	10.9,	12.0,	13.6,	15.0,	16.1,	17.7,	18.9,	19.9,	N/A ,
15 mins	4.2,	5.6,	6.4,	7.5,	8.3,	8.9,	10.7,	12.8,	14.1,	16.0,	17.6,	18.9,	20.8,	22.3,	23.5,	N/A ,
30 mins	5.5,	7.3,	8.3,	9.7,	10.6,	11.3,	13.6,	16.1,	17.7,	19.9,	21.9,	23.3,	25.6,	27.3,	28.7,	N/A ,
1 hours	7.3,	9.6,	10.8,	12.5,	13.6,	14.5,	17.2,	20.3,	22.2,	24.8,	27.1,	28.9,	31.5,	33.5,	35.2,	N/A ,
2 hours	9.6,	12.5,	14.0,	16.1,	17.5,	18.5,	21.9,	25.5,	27.8,	30.9,	33.6,	35.7,	38.8,	41.2,	43.1,	N/A ,
3 hours	11.3,	14.6,	16.2,	18.6,	20.2,	21.4,	25.1,	29.1,	31.7,	35.1,	38.1,	40.4,	43.8,	46.4,	48.5,	N/A ,
4 hours	12.7,	16.3,	18.1,	20.7,	22.4,	23.7,	27.7,	32.0,	34.8,	38.5,	41.7,	44.1,	47.8,	50.5,	52.8,	N/A ,
6 hours	14.9,	19.0,	21.1,	24.0,	25.9,	27.3,	31.8,	36.6,	39.7,	43.8,	47.3,	50.0,	53.9,	57.0,	59.4,	N/A ,
9 hours	17.6,	22.2,	24.5,	27.8,	30.0,	31.6,	36.6,	41.9,	45.2,	49.8,	53.6,	56.6,	60.9,	64.2,	66.9,	N/A ,
12 hours	19.7,	24.8,	27.3,	30.9,	33.2,	34.9,	40.4,	46.1,	49.7,	54.5,	58.6,	61.8,	66.4,	69.9,	72.7,	N/A ,
18 hours	23.2,	29.0,	31.8,	35.8,	38.4,	40.3,	46.4,	52.7,	56.7,	62.0,	66.5,	69.9,	75.0,	78.8,	81.9,	N/A ,
24 hours	26.1,	32.4,	35.4,	39.8,	42.6,	44.7,	51.2,	58.0,	62.2,	67.9,	72.7,	76.4,	81.7,	85.8,	89.1,	100.0,
2 days	32.4,	39.3,	42.6,	47.2,	50.1,	52.3,	59.0,	65.9,	70.2,	75.9,	80.7,	84.3,	89.5,	93.5,	96.6,	107.1,
3 days	38.0,	45.3,	48.8,	53.7,	56.8,	59.1,	66.1,	73.2,	77.6,	83.4,	88.3,	91.9,	97.2,	101.1,	104.3,	114.8,
4 days	43.0,	50.8,	54.5,	59.6,	62.9,	65.3,	72.5,	79.9,	84.4,	90.4,	95.3,	99.0,	104.4,	108.4,	111.6,	122.1,
6 days	52.1,	60.8,	64.8,	70.4,	73.9,	76.5,	84.2,	92.0,	96.8,	103.0,	108.2,	112.0,	117.6,	121.7,	125.0,	135.8,
8 days	60.6,	69.9,	74.3,	80.2,	83.9,	86.7,	94.9,	103.1,	108.0,	114.5,	119.9,	123.9,	129.6,	133.9,	137.2,	148.3,
10 days	68.6,	78.5,	83.2,	89.5,	93.4,	96.2,	104.8,	113.4,	118.5,	125.3,	130.8,	134.9,	140.8,	145.2,	148.7,	159.9,
12 days	76.3,	86.8,	91.7,	98.3,	102.3,	105.3,	114.3,	123.2,	128.5,	135.5,	141.2,	145.4,	151.4,	155.9,	159.5,	171.0,
16 days	91.0,	102.5,	107.8,	114.9,	119.3,	122.6,	132.1,	141.6,	147.2,	154.6,	160.6,	165.0,	171.4,	176.0,	179.7,	191.7,
20 days	105.1,	117.5,	123.2,	130.8,	135.4,	138.9,	149.0,	158.9,	164.9,	172.5,	178.8,	183.4,	190.0,	194.8,	198.6,	211.0,
25 days	122.2,	135.5,	141.6,	149.8,	154.7,	158.4,	169.1,	179.6,	185.8,	193.8,	200.4,	205.1,	212.0,	217.0,	221.0,	233.7,

NOTES:
N/A Data not available
These values are derived from a Depth Duration Frequency (DDF) Model
For details refer to:
'Fitzgerald D. L. (2007), Estimates of Point Rainfall Frequencies, Technical Note No. 61, Met Eireann, Dublin',
Available for download at www.met.ie/climate/dataproducts/Estimation-of-Point-Rainfall-Frequencies_TN61.pdf

M5_60mins = 14.5
M5_2days = 52.3

r = 14.5/52.3
r = 0.277

APPENDIX E – UISCE EIREANN PRE-CONNECTION ENQUIRY

Pre-connection enquiry form

Business developments, mixed use developments, housing developments

This form is to be filled out by applicants enquiring about the feasibility of a water and/or wastewater connection to Irish Water infrastructure. If completing this form by hand, please use BLOCK CAPITALS and black ink.
Please note that this is a digital PDF form and can be filled in electronically

Please refer to the **Guide to completing the pre-connection enquiry form** on page 14 of this document when completing the form.

*** Denotes mandatory/ required field. Please note, if mandatory fields are not completed the application will be returned.**

Section A | Applicant details

1 *Applicant details:

Registered company name (if applicable):

Trading name (if applicable):

Company registration number (if applicable):

Parent company registered company name (if applicable):

Parent company registration number (if applicable):

If you are not a registered company/business, please provide the applicant's name:

*Contact name:

*Postal address:

*Eircode:

Please provide either a landline or a mobile number

Landline:

*Mobile:

*Email:

2 Agent details (if applicable):

The fields marked with * in this section are mandatory if using an agent

*Contact name: CONNOR DALY

Company name (if applicable): SDS

*Postal address: UNIT 9, N5 BUSINESS PARK

CASTLEBAR, CO. MAYO

*Eircode: F23E283

Please provide either a landline or a mobile number

Landline: 0949034914

*Mobile 0876459256

*Email: cdaly@structuraldesign.ie

3 *Please indicate whether it is the applicant or agent who should receive future correspondence in relation to the enquiry:

Applicant ☐ Agent ☐

Section B | Site details

4 *Site address 1 (include Site name/Building name/Building number):

***Address 2**

***Address 3**

***City/Town**

***County** **Eircode**

5 *Irish Grid co-ordinates (proposed connection point):

Eastings (X) Northings (Y)

Note: Values for Eastings must be between 015,900 and 340,000. Northings, between 029,000 and 362,000
Eg. co-ordinates of GPO, O'Connell St., Dublin: E(X) 315,878 N(Y) 234,619

6 *Local Authority where proposed development is located:

WESTMEATH COUNTY COUNCIL

7 *Has full planning permission been granted? Yes ☐ No ☑

If 'Yes', please provide the current or previous planning reference number:

8 ***Is this development affiliated with a government body/agency?** Yes ☑ No ☐

If 'Yes', please specify the body/agency:

W	E	S	T	M	E	A	T	H		C	O	U	N	T	Y		C	O	U	N	C	I	L							

Eg. IDA, HSE, LDA, etc.

Section C | Development details

9 ***Please outline the domestic and/or industry/business use proposed:**

Domestic:

Property type	Number of units	Property type	Number of units
House		Apartments	
Duplex		Number of Apartment Blocks	

Industry/business:

Property type	Number of units	Property type	Number of units
Agricultural		Brewery / Distillery	
Restaurant / Café / Pub		Car Wash / Valeting	
Creche		Data Centre	
Fire Hydrant		Fire Station	
Food Processing		Hotel Accommodation	
Industrial / Manufacturing		Laundry / Laundrette	
Office		Primary Care Centre	
Residential / Nursing Care Home		Retail	
School		Sports Facility	
Student Accommodation		Warehouse	

Other (please specify type)		No. of Units	

9.1 Please provide additional details if your proposed business use are in the Food Processing, Industrial unit/ Manufacturing, Sports Facility or Other Categories.

9.2 Please provide the maximum expected occupancy in number of people, according to the proposed development you selected, e.g. Number of office workers, number of nursing home residents, maximum pub occupancy, number of hotel beds, number of retail workers:

10 ***Approximate start date of proposed development:**

0	1	/	1	2	/	2	0	2	3

11 ***Is the development multi-phased?** Yes ☐ No ☑

If 'Yes', application must include a master-plan identifying the development phases and the current phase number.

If 'Yes', please provide details of variations in water demand volumes and wastewater discharge loads due to phasing requirements.

12 ***Please indicate the type of connection required by ticking the appropriate box below:**

Both Water and Wastewater ● Please complete both Sections D and E

Water only ☐ Please go to Section D

Wastewater only ☐ Please go to Section E

Reason for only applying for one service (if applicable):

Section D | Water connection and demand details

13 ***Is there an existing connection to public water mains at the site?** Yes ☐ No ☑

13.1 If yes, is this enquiry for an additional connection to one already installed? Yes ☐ No ☐

13.2 If yes, is this enquiry to increase the size of an existing connection? Yes ☐ No ☐

14 **Approximate date water connection is required:** 0 1 / 1 2 / 2 0 2 3

15 ***What diameter of water connection is required to service the development?** 1 5 0 mm

16 ***Is more than one connection required to the public infrastructure to service this development?** Yes ☐ No ☑

If 'Yes', how many? ☐☐

17 **Please indicate the business water demand (shops, offices, schools, hotels, restaurants, etc.):**

Post-development peak hour water demand	3.71	**l/s**
Post-development average hour water demand	0.618	**l/s**

Please include calculations on the attached sheet provided. Where there will be a daily/weekly/seasonal variation in the water demand profile, please provide all such details.

18 **Please indicate the industrial water demand (industry-specific water requirements):**

Post-development peak hour water demand		**l/s**
Post-development average hour water demand		**l/s**

Please include calculations on the attached sheet provided. Where there will be a daily/weekly/seasonal variation in the water demand profile, please provide all such details.

19 **What is the existing ground level at the property boundary at connection point (if known) above Malin Head Ordnance Datum?** ☐☐☐☐☐ m

20 **What is the highest finished floor level of the proposed development above Malin Head Ordnance Datum?** 4 6 . 0 ☐ m

21 **Is on-site water storage being provided?** Yes ☑ No ☐

Please include calculations on the attached sheet provided.

22 **Are there fire flow requirements?** Yes ☐ No ☑

Additional fire flow requirements over and above those identified in Q17-18		l/s

Please include calculations on the attached sheet provided, and include confirmation of requirements from the Fire Authority.

23 **Do you propose to supplement your potable water supply from other sources?** Yes ☐ No ☑

If 'Yes', please indicate how you propose to supplement your potable water supply from other sources (see **Guide to completing the application form** on page 15 of this document for further details):

Section E | Wastewater connection and discharge details

24 ***Is there an existing connection to a public sewer at the site?** Yes ☐ No ☑

24.1 If yes, is this enquiry for an additional connection to the one already installed? Yes ☐ No ☐

24.2 If yes, is this enquiry to increase the size of an existing connection? Yes ☐ No ☐

25 ***Approximate date that wastewater connection is required:** 0 1 / 1 2 / 2 0 2 3

26 ***What diameter of wastewater connection is required to service the development?** 2 2 5 mm

27 ***Is more than one connection required to the public infrastructure to service this development?** Yes ☐ No ☑

If 'Yes', how many?

28 **Please indicate the commercial wastewater hydraulic load (shops, offices, schools, hotels, restaurants, etc.):**

Post-development peak discharge	0.68	**l/s**
Post-development average discharge	4.08	**l/s**

Please include calculations on the attached sheet provided.

29 **Please indicate the industrial wastewater hydraulic load (industry-specific discharge requirements):**

Post-development peak discharge		**l/s**
Post-development average discharge		**l/s**

Please include calculations on the attached sheet provided.

30 Wastewater organic load:

Characteristic	Max concentration (mg/l)	Average concentration (mg/l)	Maximum daily load (kg/day)
Biochemical oxygen demand (BOD)			
Chemical oxygen demand (COD)			
Suspended solids (SS)			
Total nitrogen (N)			
Total phosphorus (P)			
Other			

Temperature range	
pH range	

31 *Storm water run-off will only be accepted from brownfield sites that already have a storm/surface water connection to a combined sewer. In the case of such brownfield sites, please indicate if the development intends discharging surface water to the combined wastewater collection system:

Yes ☐ No ☑

If 'Yes', please give reason for discharge and comment on adequacy of SUDS/attenuation measures proposed.

Please submit detailed calculations on discharge volumes, peak flows and attenuation volumes with this application

32 *Do you propose to pump the wastewater? Yes ☐ No ☑

If 'Yes', please include justification for your pumped solution with this application.

33 What is the existing ground level at the property boundary at connection point (if known) above Malin Head Ordnance Datum?

m

34 What is the lowest finished floor level on site above Malin Head Ordnance Datum? 44.0 m

35 What is the proposed invert level of the pipe exiting the property to the public road?

41.50 m

Section F | Supporting documentation

Please provide the following additional information (all mandatory):

> Site location map: A site location map to a scale of 1:1000, which clearly identifies the land or structure to which the enquiry relates. The map shall include the following details: ☑

i. The scale shall be clearly indicated on the map.

ii. The boundaries shall be delineated in red.

iii. The site co-ordinates shall be marked on the site location map.

> Details of planning and development exemptions (if applicable). ☑

> Calculations (calculation sheets provided below). ☑

> Site layout map to a scale of 1:500 showing layout of proposed development, water network and wastewater network layouts, additional water/wastewater infrastructure if proposed, connection points to Irish Water infrastructure. ☑

> Conceptual design of the connection asset from the proposed development to the existing Irish Water infrastructure, including service conflicts, gradients, pipe sizes and invert levels. ☑

> Any other information that might help Irish Water assess this pre-connection enquiry. ☑

Section G | Declaration

I/We hereby make this application to Irish Water for a water and/or wastewater connection as detailed on this form.

I/We understand that any alterations made to this application must be declared to Irish Water.

The details that I/we have given with this application are accurate.

I/We have enclosed all the necessary supporting documentation.

Any personal data you provide will be stored and processed by Irish Water and may be transferred to third parties for the purposes of the water and/or wastewater connection process. I hereby give consent to Irish Water to store and process my personal data and to transfer my personal data to third parties, if required, for the purposes of the connection process.

If you wish to revoke consent at any time or wish to see Irish Water's full Data Protection Notice, please see **https://www.water.ie/privacy-notice/**

Signature: Date: / /

Your full name (in BLOCK CAPITALS):

Irish Water will carry out a formal assessment based on the information provided on this form.
Any future connection offer made by Irish Water will be based on the information that has been provided here.

Please submit the completed form to **newconnections@water.ie** or alternatively, post to:

Irish Water
PO Box 860
South City Delivery Office
Cork City

Please note that if you are sending us your application form and any associated documentation by email, the maximum file size that we can receive in any one email is 35MB.

Please note, if mandatory fields are not completed the application will be returned.

Irish Water is subject to the provisions of the Freedom of Information Act 2014 ("FOIA") and the codes of practice issued under FOIA as may be amended, updated or replaced from time to time. The FOIA enables members of the public to obtain access to records held by public bodies subject to certain exemptions such as where the requested records may not be released, for example to protect another individual's privacy rights or to protect commercially sensitive information. Please clearly label any document or part thereof which contains commercially sensitive information. Irish Water accepts no responsibility for any loss or damage arising as a result of its processing of freedom of information requests.

Calculations

Water demand

OVERALL DEVELOPMENT

TOTAL 132 UNITS

POPULATION DENSITY OF 2.7 PERSONS PER UNIT (PER IW CODE OF PRACTICE)

2.7PE x 150 L/DAY x 132 UNITS =53,460 l/day

AVERAGE HOUR WATER DEMAND = 53,460 l/day * (1 day/24 hrs) * (1 hr/3600s) = 0.618 l/s

PEAK HOUR WATER DEMAND = 0.618 l/s * 6 = 3.71 l/s

On-site storage

Fire flow requirements

OVERALL DEVELOPMENT

TOTAL 132 UNITS

POPULATION DENSITY OF 2.7 PERSONS PER UNIT (PER IW CODE OF PRACTICE)

ALLOW 10% ADDITIONAL FOR INFILTRATION

2.7PE x 150 L/DAY x 1.10 x 132 UNITS =58,806 l/day

AVERAGE DISCHARGE = 58,806 l/day * (1 day/24 hrs) * (1 hr/3600s) = 0.68 l/s

PEAK DISCHARGE = 0.68 l/s * 6 = 4.08 l/s

Guide to completing the pre-connection enquiry form

This form should be completed by applicants enquiring about the feasibility of a water and/or wastewater connection to Irish Water infrastructure.

The Irish Water Codes of Practice are available at **www.water.ie** for reference.

Section A | Applicant Details

Question 1: This question requires the applicant or company enquiring about the feasibility of a connection to identify themselves, their postal address, and to provide their contact details.

Question 2: If the applicant has employed a consulting engineer or an agent to manage the enquiry on their behalf, the agent's address and contact details should be recorded here.

Question 3: Please indicate whether it is the applicant or the agent who should receive future correspondence in relation to the enquiry.

Section B | Site details

Question 4: This is the address of the site requiring the water/wastewater service connection and for which this enquiry is being made.

Question 5: Please provide the Irish Grid co-ordinates of the proposed site. Irish grid positions on maps are expressed in two dimensions as Eastings (E or X) and Northings (N or Y) relative to an origin. You will find these coordinates on your Ordnance Survey map which is required to be submitted with an application.

Question 6: Please identify the Local Authority that is or will be dealing with your planning application, for example Cork City Council.

Question 7: Please indicate if planning permission has been granted for this application, and if so, please provide the planning permission reference number.

Question 8: Please indicate if this development is affiliated with a government body/agency, and if so, specify

Section C | Development details

Question 9: Please specify the number of different property/premises types by filling in the tables provided.

Question 9.1: Please provide additional details if your proposed business use are in the Food Processing, Industrial unit/ Manufacturing, Sports Facility or Other Categories.

Question 9.2: Please indicate the maximum expected occupancy in numbers of people according to the proposed development you selected.

Question 10: Please indicate the approximate commencement date of works on the development.

Question 11: Please indicate if a phased building approach is to be adopted when developing the site. If so, please provide details of the phase master-plan and the proposed variation in water demand/wastewater discharge as a result of the phasing of the development.

Question 12: Please indicate the type of connection required by ticking the appropriate box and proceed to complete the appropriate section or sections.

Section D | Water connection and demand details

Question 13: Please indicate if a water connection already exists for this site.

Question 13.1: Please indicate if this enquiry concerns an additional connection to one already installed on the site.

Question 13.2: Please indicate if you are proposing to upgrade the water connection to facilitate an increase in water demand. Irish Water will determine what impact this will have on our infrastructure.

Question 14: Please indicate the approximate date that the proposed connection to the water infrastructure will be required.

Question 15: Please indicate what diameter of water connection is required to service this development.

Question 16: Please indicate if more than one connection is required to service this development. Please note that the connection size provided may be used to determine the connection charge.

Question 17: If this connection enquiry concerns a business premises, please provide calculations for the water demand and include your calculations on the calculation sheet provided. Business premises include shops, offices, hotels, schools, etc. Demand rates (peak and average) are site specific. Average demand is the total daily volume divided by a 24-hour time period and expressed in litres per second (l/s). For design purposes, please refer to the Irish Water Codes of Practice for Water Infrastructure.

Question 18: If this connection enquiry is for an industrial premises, please calculate the water demand and include your calculations on the calculation sheet provided. Demand rates (peak and average) are site specific. Average demand is the total daily volume divided by a 24-hour time period and expressed in litres per second (l/s). The peak demand for sizing of the pipe network will be as per the specific business production requirements. For design purposes, please refer to the Irish Water Codes of Practice for Water Infrastructure.

Question 19: Please specify the ground level at the location where connection to the public water mains will be made. This is required in order to determine if there is sufficient pressure in the existing water infrastructure to serve your proposed development. Levels should be quoted in metres relative to Malin Head Ordnance Datum.

Question 20: Please specify the highest finished floor level on site. This is required in order to determine if there is sufficient pressure in the existing water infrastructure to serve your proposed development. Levels should be quoted in metres relative to Malin Head Ordnance Datum.

Question 21: If storage is required, water storage capacity of 24-hour water demand must usually be provided at the proposed site. In some cases, 24-hour storage capacity may not be required, for example 24-hour storage for a domestic house would be provided in an attic storage tank. Please calculate the 24-hour water storage requirements and include your calculations on the attached sheet provided. Please also confirm that on-site storage is being provided by ticking the appropriate box.

Question 22: The water supply system shall be designed and constructed to reliably convey the water flows that are required of the development including fire flow requirements by the Fire Authority. The Fire Authority will provide the requirement for fire flow rates that the water supply system will have to carry. Please note that while flows in excess of your required demand may be achieved in the Irish Water network and could be utilised in the event of a fire, Irish Water cannot guarantee a flow rate to meet your fire flow requirement. To guarantee a flow to meet the Fire Authority requirements, you should provide adequate fire storage capacity within your development. Please include your calculations on the attached sheet provided, and further provide confirmation of the Fire Authority requirements.

Question 23: Please identify proposed additional water supply sources, that is, do you intend to connect to the public water mains or the public mains and supplement from other sources? If supplementing public water supply with a supply from another source, please provide details as to how the potable water supply is to be protected from cross contamination at the premises.

Section E | Wastewater connection and discharge details

Question 24: Please indicate if a wastewater connection to a public sewer already exists for this site.

Question 24.1: Please indicate if this enquiry relates to an additional wastewater connection to one already installed.

Question 24.2: Please indicate if you are proposing to upgrade the wastewater connection to facilitate an increased discharge. Irish Water will determine what impact this will have on our infrastructure.

Question 25: Please specify the approximate date that the proposed connection to the wastewater infrastructure will be required.

Question 26: Please indicate what diameter of wastewater connection is required to service this development.

Question 27: Please indicate if more than one connection is required to service this development. Please indicate number required.

Question 28: If this enquiry relates to a business premises, please provide calculations for the wastewater discharge and include your calculations on the attached sheet provided. Business premises include shops, offices, hotels, schools, etc. Discharge rates (peak and average) are site specific. Average discharge is the total daily volume divided by a 24-hour time period and expressed in litres per second (l/s). For design purposes, please refer to the Irish Water Codes of Practice for Wastewater Infrastructure.

Question 29: If this enquiry relates to an industrial premises, please provide calculations for the wastewater discharge and include your calculations on the calculation sheet provided. Discharge rates (peak and average) are site specific. Average discharge is the total daily volume divided by a 24-hour time period and expressed in litres per second (l/s). The peak discharge for sizing of the pipe network will be as per the specific business production requirements. For design purposes, please refer to the Irish Water Codes of Practice for Wastewater Infrastructure.

Question 30: Please specify the maximum and average concentrations and the maximum daily load of each of the wastewater characteristics listed in the wastewater organic load table (if not domestic effluent), and also specify if any other significant concentrations are expected in the effluent. Please complete the table and provide additional supporting documentation if relevant. Note that the concentration shall be in mg/l and the load shall be in kg/day. Note that for business premises (shops, offices, schools, hotels, etc.) for which only domestic effluent will be discharged (excluding discharge from canteens/ restaurants which would require a Trade Effluent Discharge licence), there is no need to complete this question.

Question 31: In exceptional circumstances, such as brownfield sites, where the only practical outlet for storm/ surface water is to a combined sewer, Irish Water will consider permitting a restricted attenuated flow to the combined sewer. Storm/surface water will only be accepted from brownfield sites that already have a storm/surface water connection to a combined sewer and the applicant must demonstrate how the storm/surface water flow from the proposed site is minimised using sustainable urban drainage system (SUDS). This type of connection will only be considered on a case by case basis. Please advise if the proposed development intends discharging surface water to the combined wastewater collection system.

Question 32: Please specify if the development needs to pump its wastewater discharge to gain access to Irish Water infrastructure.

Question 33: Please specify the ground level at the location where connection to the public sewer will be made. This is required to determine if the development can be connected to the public sewer via gravity discharge. Levels should be quoted in metres relative to Malin Head Ordnance Datum.

Question 34: Please specify the lowest floor level of the proposed development. This is required in order to determine if the development can be connected to the public sewer via gravity discharge. Levels should be quoted in metres relative to Malin Head Ordnance Datum.

Question 35: Please specify the proposed invert level of the pipe exiting the property to the public road.

Section F | Supporting documentation

Please provide additional information as listed.

Section G | Declaration

Please review the declaration, sign, and return the completed application form to Irish Water by email or by post using the contact details provided in Section G.

Notes