ENNIS LRD

VOLUME III | PART II

Appendices

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ENNIS LRD

VOLUME III | **Contents**
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Ground Investigations Ireland

Site Investigation Ennis

Glenveagh

Ground Investigation Report

September 2021

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DOCUMENT CONTROL SHEET

Project Title	Site Investigation Ennis
Engineer	AKM
Client	Glenveagh
Project No	10809-06-21
Document Title	Ground Investigation Report

Rev.	Status	Author(s)	Reviewed By	Approved By	Office of Origin	Issue Date
A	Final	A. Mc Donnell	M. Sutton	F. Mc Namara	Dublin	27 September 2021

Ground Investigations Ireland Ltd. present the results of the fieldworks and laboratory testing in accordance with the specification and related documents provided by or on behalf of the client The possibility of variation in the ground and/or groundwater conditions between or below exploratory locations or due to the investigation techniques employed must be taken into account when this report and the appendices inform designs or decisions where such variation may be considered relevant. Ground and/or groundwater conditions may vary due to seasonal, man-made or other activities not apparent during the fieldworks and no responsibility can be taken for such variation. The data presented and the recommendations included in this report and associated appendices are intended for the use of the client and the client's geotechnical representative only and any duty of care to others is excluded unless approved in writing.

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APPENDICES

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1.0 Preamble

On the instructions of AKM Consulting Engineers, a site investigation was carried out by Ground Investigations Ireland Ltd., between July and September 2021 at the site of the proposed Development in Ennis Co Clare.

2.0 Overview

2.1. Background

It is proposed to construct a new residential development associated services, access roads and car parking at the proposed site. The site is currently greenfield and is situated to the west of Ennis Town. The proposed construction is envisaged to consist of conventional foundations and pavement make up with some local excavations for services and plant.

2.2. Purpose and Scope

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

- Visit project site to observe existing conditions
- Carry out 16 No. Trial Pits to a maximum depth of 3.20m BGL
- Carry out 3 No. Soakaways to determine a soil infiltration value to BRE digest 365
- Carry out 63 No. Dynamic Probes to determine soil strength/density characteristics
- Carry out 4 No. Cable Percussion boreholes to a maximum depth of 1.0m BGL
- Carry out 4 No. Rotary Core Boreholes to a maximum depth of 6.90m BGL
- Geotechnical & Environmental Laboratory testing
- Report with recommendations

3.0 Subsurface Exploration

3.1. General

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

3.2. Trial Pits

The trial pits were excavated using a 13T tracked excavator at the locations shown in the exploratory hole location plan in Appendix 1. The locations were checked using a CAT scan to minimise the potential for encountering services during the excavation. The trial pits were sampled, logged and photographed by a Geotechnical Engineer/Engineering Geologist prior to backfilling with arisings. Notes were made of any services, inclusions, pit stability, groundwater encountered and the characteristics of the strata encountered and are presented on the trial pit logs which are provided in Appendix 2 of this Report.

3.3. Soakaway Testing

The soakaway testing was carried out in selected trial pits at the locations shown in the exploratory hole location plan in Appendix 1. These pits were carefully excavated and filled with water to assess the infiltration characteristics of the proposed site. The pits were allowed to drain and the drop in water level was recorded over time as required by BRE Digest 365. The pits were logged prior to completing the soakaway test and were backfilled with arising's upon completion. The soakaway test results are provided in Appendix 5 of this Report.

3.4. Dynamic Probing

The dynamic probe tests (DPH) were carried out at the locations shown in the location plan in Appendix 1 in accordance with B.S. 1377: Part 9 1990. The test consists of mechanically driving a cone with a 50kg weight in 100mm intervals and monitoring the number of blows required. An equivalent Standard Penetration Test (SPT) 'N' value may be calculated by dividing the total number of blows over a 300mm drive length by 1.5. The dynamic probe logs are provided in Appendix 3 of this Report.

3.5. Cable Percussion Boreholes

The Cable Percussion Boreholes were drilled using a Dando 2000 drilling rig with regular in-situ testing and sampling undertaken to facilitate the production of geotechnical logs and laboratory testing.
The standard method of boring in soil for site investigation is known as the Cable Percussion method. It consists of using a Shell in non cohesive soils and a clay cutter in cohesive soils, both operated on a wire cable. Very hard soils, boulders and other hard obstructions are broken up by chiselling and the fragments removed with the Shell. Where ground conditions made it necessary, the borehole was lined with 200mm diameter steel casing. While the use of the Cable Percussion method of boring gives the maximum data on soil conditions, some mixing of laminated soil is inevitable. For this reason, thin lenses of granular material may not be noticed. Disturbed samples were taken from the boring tools at suitable depths, so that there is a representative sample at the top of each change in stratum and thereafter at regular intervals down the borehole until the next stratum was encountered. The disturbed samples were then sealed and sent to the laboratory where they were visually examined to confirm the description of the relevant strata.

Standard Penetration Tests were carried out in the boreholes. The results of these tests, together with the depths at which the tests were taken are shown on the accompanying borehole records. The test consists of a thick wall sampler tube, 50mm external diameter, being driven into the soil by a monkey weighing 63.5kg and with a free drop of 760mm. For gravels and glacial till the driving shoe was replaced by a solid 60º cone. The Standard Penetration Test number referred to as the 'N' value is the number of blows required to drive the tube 300mm, after an initial penetration of 150mm. The number gives a guide to the consistency of the soil and can also be used to estimate the relative strength/density at the depth of the test and also to estimate the bearing capacity and compressibility of the soil. The cable percussion borehole logs are provided in Appendix 6 of this Report.

3.6. Rotary Boreholes

The rotary coring was carried out by a track mounted T44 Beretta rig at the locations shown on the location plan in Appendix 1. The rotary boreholes were completed from the ground surface or alternatively, where noted on the individual borehole log, from the base of the cable percussion borehole where a temporary liner was installed to facilitate follow-on rotary coring.

The T44 Beretta is equipped with rubber tracks which allow for short travel on pavement surfaces avoiding any damage to the surface. The T44 Beretta utilises a triple tube core barrel system operated using a wireline drilling process. The outer barrel is rotated by the drill rods and at its lower end, carries the coring bit. The inner barrel is mounted on a swivel so that it does not rotate during the process. The third barrel or liner is placed within the second one to retain the core intact and to preserve as much as possible the fabric of the drilling stratum. The core is cut by the coring bit and passes to the inner liner. The core is brought up to the surface within the inner barrel on a small diameter wire rope or line attached to the "overshoot" recovery tool which is then placed into a core box in order of recovery. A drilling fluid, typically air mist or water flush is passed from the surface through hollow drill rods to the drill bit, and is used to cool the drill bit. Temporary casing is used in some situations to support unstable ground or to seal off fissures or voids. It should be noted that the rotary coring can only achieve limited recovery in overburden, particularly granular or weakly cemented strata due to the flushing medium washing away the cohesive fraction during coring. The recovery achieved, where required is noted on the borehole logs and core photographs are provided to allow assessment of the core recovered. The rotary borehole logs are provided in Appendix 7 of this Report.

3.7. Surveying

The exploratory hole locations have been recorded using a Trimble R10 GNSS System which records the coordinates and elevation of the locations to ITM or Irish National Grid as required by the project specification. The coordinates and elevations are provided on the exploratory hole logs in the appendices of this Report.

3.8. Insitu Plate Bearing Test

The plate bearing tests were carried out using a 457mm diameter plate at the locations shown on the site plan in Appendix 1. The plate was loaded in increments using a hydraulic jack and an excavator to provide a reaction and the displacement was monitored in accordance with BS1377 Part 9 using independently mounted digital strain gauges. The constrained modulus and equivalent CBR are calculated in accordance with HD29/75 and are provided on the test reports in Appendix 4 of this Report.

3.9. Laboratory Testing

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

Environmental & Chemical testing as required by the specification, including the Rilta Suite testing was carried out by Element Materials Technology Laboratory in the UK. The Rilta suite testing includes both Solid Waste and Leachate Waste Acceptance Criteria.

The results of the laboratory testing are included in Appendix 8 of this Report.

4.0 Ground Conditions

4.1. General

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

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

- Topsoil
- Cohesive Deposits
- Weathered Bedrock
- Bedrock

TOPSOIL: Topsoil was encountered in all the exploratory holes and was present to a maximum depth of 0.3m BGL.

COHESIVE DEPOSITS: Cohesive deposits were encountered beneath the topsoil and were described typically as *brown sandy gravelly SILT or CLAY with occasional cobbles and boulders*. The secondary sand and gravel constituents varied across the site and with depth, with granular lenses occasionally present in the glacial till matrix. The strength of the cohesive deposits was generally Firm below the topsoil but occasionally was soft to firm. These deposits had some, occasional or frequent cobble and boulder content where noted on the exploratory hole logs.

WEATHERED BEDROCK: In some of the exploratory holes weathered rock was encountered which was digable with the large excavator to a depth of up to 1.0m below the top of the stratum in one of the pits. The trial pits were terminated upon encountering the more competent bedrock, in which further excavation became more difficult. This material was recovered typically as angular gravel and cobbles of however there was some variability in the fracture spacing and the ease at which the excavator could progress. Some clay and sand were also present with the rock mass either from weathering or as infilling to fractures which were opened upon excavation.

BEDROCK: The rotary core boreholes recovered Strong massive grey fine to medium grained. This is typical of the Allwee Member, which is noted on the geological underlying the proposed site.
The depth to rock varies from 1.06m BGL in RC04 to a maximum of 2.6m BGL in RC03. The total core recovery is good, typically 100% The SCR and RQD both mostly ok across the site due to rock type massive.

4.2. Insitu Strength Testing

The correlated DPH blow counts indicate that the overburden deposits are Firm to depth of 1.0m and become firm or firm to stiff with depth. DP24, DP25, DP39, DP45, DP47, DP49 and DP53, , had low blow counts in the soft to firm cohesive deposits to a depth of 1.5m, 1.10m, 1.80m, 1.90m, 1.20m, 1.70m, 1.0m BGL consecutively.

4.3. Groundwater

No groundwater was noted during the investigation however we would point out that these exploratory holes did not remain open for sufficiently long periods of time to establish the hydrogeological regime and groundwater levels would be expected to vary with the time of year, rainfall, nearby construction and other factors.

4.4. Laboratory Testing

4.4.1. Environmental Laboratory Testing

A number of samples were analysed for a suite of parameters which allows for the assessment of the sampled material in terms of total pollutant content for classification of materials as *hazardous* or *non-hazardous*. The suite also allows for the assessment of the sampled material in terms of suitability for placement at licenced landfills (inert, stable non-reactive, hazardous etc.). The parameter list for the suite includes analysis of the solid samples for arsenic, barium, cadmium, chromium, copper, cyanide, lead, nickel, mercury, zinc, speciated aliphatic and aromatic petroleum hydrocarbons, pH, sulphate, sulphide, moisture content, soil organic matter and an asbestos screen.
The suite also includes those parameters specified in the EU Council Decision establishing criteria for the acceptance of waste at Landfills (Council Decision 2003/33/EC), which for the solid samples are total

organic carbon (TOC), speciated aliphatic and aromatic petroleum hydrocarbons, BTEX, phenol, polychlorinated biphenyls (PCB) and PAH.
As part of the suite a leachate is generated from the solid sample which is analysed for antimony, arsenic, barium, cadmium, chromium, copper, lead, mercury, molybdenum, nickel, selenium, zinc, chloride, fluoride, soluble sulphate, sulphide, phenols, dissolved organic carbon (DOC) and total dissolved solids (TDS).
While the laboratory report provides a comparison with the waste acceptance criteria limits it does not provide a waste classification of the material sampled nor does it comment on any potentially hazardous properties of the materials tested. The possibility for contamination, not revealed by the testing undertaken should be borne in mind particularly where Made Ground deposits are present or the previous site use or location indicate a risk of environmental variation. A waste classification report is recommended to be carried out to provide an interpretation of the laboratory data should any material be required to be disposed of off site.

The results from the completed laboratory testing is included in Appendix 8 of this report.

5.0 Recommendations & Conclusions

5.1. General

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

5.2. Foundations

An allowable bearing capacity of 200 kN/m^2 is recommended for conventional strip or pad foundations on the weathered rock or rock at a depth of between 0.45- 1.9m BGL across most of the site. Where the soft to firm cohesive deposits are deeper, such as at the location of TP7 and TP10, lean mix trench fill to a depth of 3.2m and 2.4m consecutively is recommended to achieve the recommended allowable bearing capacity at the location. It should be noted that TP12 did not encounter the weathered rock within the Trial Pit however the surrounding Dynamic Probes DP54, 57, 58, 59 and 60 all reached refusal mostly between 1.3-1.8m with DP58 the exception which reached refusal at 3.3m BGL.

The possibility for variation in the depth of the soft ground and the depth of rock in the vicinity of these foundations should be considered and foundation inspections should be carried out. Any soft spots encountered at the proposed foundation depths should be excavated and replaced with lean mix concrete.

A ground bearing floor slab is recommended to be based on the firm to stiff cohesive deposits with an appropriate depth of compacted hardcore specified by the consulting engineer and in accordance with the limits and guidelines in SR21:2014 +A1:2016 and/or NRA SRW CL808 Type E granular stone fill. Where the depth of Soft deposits exceeds 0.9m then suspended floor slabs should be considered.

5.3. External Pavements

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

5.4. Excavations

Short term temporary excavations in the cohesive deposits will remain stable for a limited time only and will require to be appropriately battered or the sides supported if the excavation is below 1.25m BGL or is required to permit man entry.
Excavations in the soft Cohesive Deposits will require to be appropriately battered or the sides supported due to the low strength of these deposits.
Any excavations which penetrate the granular deposits will require to be appropriately battered or the sides supported.
The groundwater and stability noted on the trial pit logs should be consulted when determining the most appropriate construction methods for excavations.

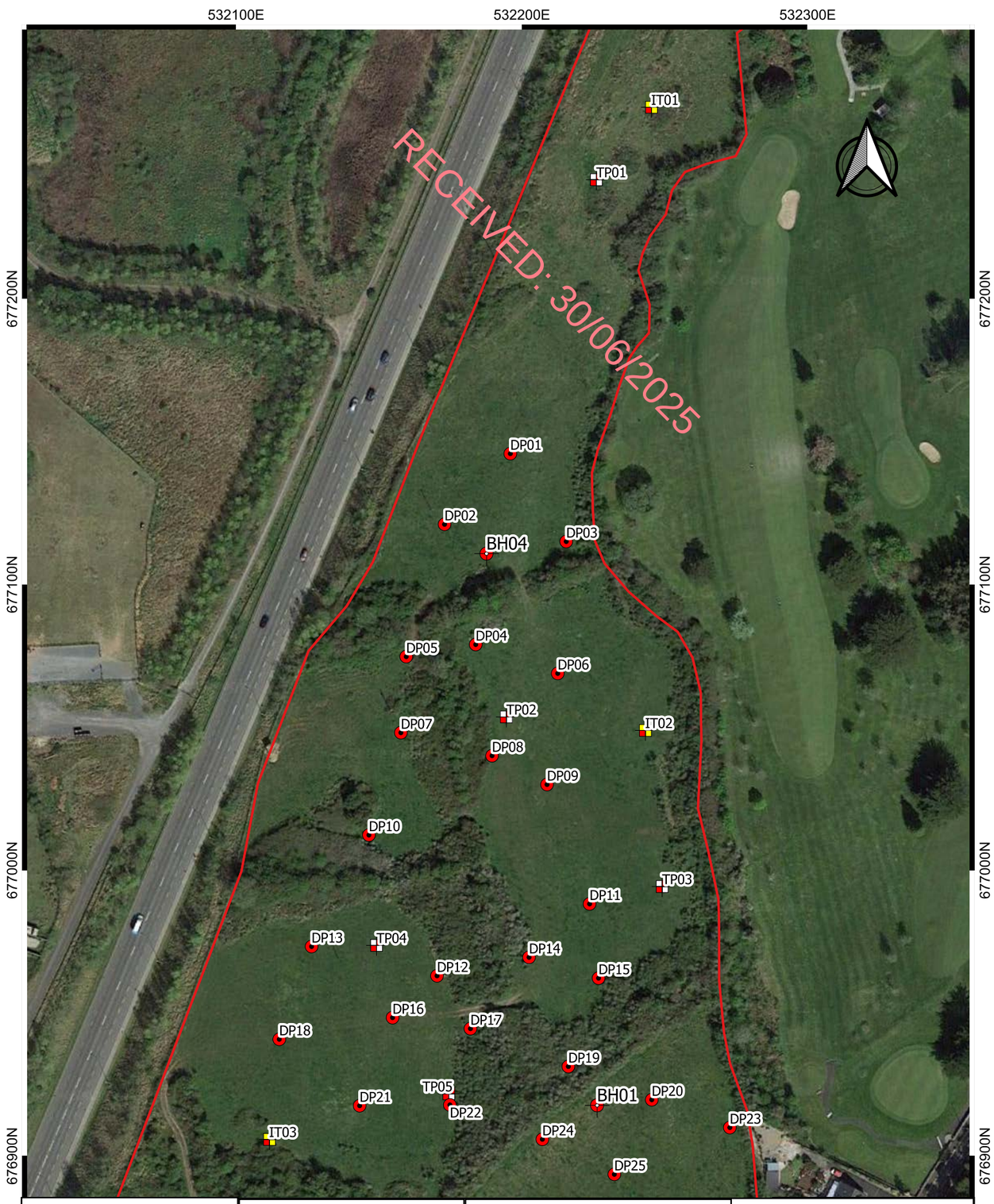
Excavations in the weathered rock deposits are expected to be excavatable with conventional excavation equipment, with zones of more intact bedrock below this depth requiring rock breaking techniques The 13T excavator was generally able to excavate to depths of 0.45m to 1.05m below the top of the weathered rock, and became difficult to excavate within the confines of the trial pit on encountering the more competent rock.
Any waste material to be removed off site should be disposed of to a suitably licenced landfill.

5.5. Soakaway Design

Infiltration rates of f=3.82 x 10^{-5} m/s, 3.91x 10^{-5} m/s and 2.16 x 10^{-5} m/s respectively were calculated for the soakaway locations IT01, IT02 and IT03.

The recommendations provided in this report should be verified in the design of the proposed buildings, using the full details of the loading conditions and taking into consideration the allowable tolerable settlements/movements that the building can accommodate. The founding strata should be inspected and verified by a suitably qualified engineer prior to construction of the building foundations.

APPENDIX 1 - Site Location Plan



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Client:

AKM

0 10 20 30 40 50 m

Project Title:
Site Investigation Ennis

Drawing Title:
Figure 1 Site Location

GII Project Reference:
10809-06-21

Drawn By:
CB

Date:
27/07/2021

- Probes
- Trial Pit
- Boreholes
- Soakaway
- Site Boundary

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Drawn By:
CB

Date:
27/07/2021

- Probes
- Trial Pit
- Boreholes
- Soakaway
- Site Boundary

APPENDIX 2 – Trial Pit Records

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Machine : 13T Digger **Method :** Trial Pit	**Dimensions** 1.90 x 0.90 x 1.30	**Ground Level (mOD)** 10.26	**Client** AKM Design
	Location 532245.3 E 677266.6 N	**Dates** 15/07/2021	**Engineer**

Site
Site Investigation Ennis

Trial Pit Number
IT01

Job Number
10809-06-21

Sheet
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				10.06	(0.20) 0.20	Brown slightly sandy slightly gravelly TOPSOIL with rootlets.		
				9.86	(0.20) 0.40	Firm light brown slightly sandy slightly gravelly clayey SILT with occasional subangular to subrounded cobbles.		
					(0.90)	Firm greyish brown slightly sandy slightly gravelly clayey SILT with occasional boulders,		
				8.96	1.30	Refusal at 1.30m		

Plan

Remarks

No groundwater encountered during excavation.
Slight spalling of trial pit wall.
Soakaway test IT01 undertaken in pit.
Trial pit backfilled upon completion.

Scale (approx)	Logged By	Figure No.
1:25	C. Byrne	10809-06-21.IT01

Ground Investigations Ireland Ltd
www.gii.ie

Machine : 13T Digger **Method :** Trial Pit	**Dimensions** 2.30 x 0.90 x 1.30	**Ground Level (mOD)** 15.10	**Client** AKM Design
	Location 532243.2 E 677048.6 N	**Dates** 15/07/2021	**Engineer**

Site
Site Investigation Ennis

Trial Pit Number
IT02

Job Number
10809-06-21

Sheet
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				14.90	(0.20) 0.20	Brown slightly sandy slightly gravelly TOPSOIL with rootlets.		
					(1.10)	Firm light brown slightly sandy slightly gravelly clayey SILT with occasional subangular to subrounded cobbles and boulders.		
				13.80	1.30	Refusal at 1.30m		

Plan

Remarks

No groundwater encountered during excavation.
Slight spalling of trial pit wall.
Soakaway test IT02 undertaken in pit.
Trial pit backfilled upon completion.

Scale (approx)	Logged By	Figure No.
1:25	C. Byrne	10809-06-21.IT02

Ground Investigations Ireland Ltd
www.gii.ie

Machine : 13T Digger **Method :** Trial Pit	**Dimensions** 1.90 x 0.90 x 1.50	**Ground Level (mOD)** 21.19	**Site** Site Investigation Ennis
	Location 532111.6 E 676905.4 N	**Dates** 15/07/2021	**Client** AKM Design
			Engineer

Trial Pit Number: IT03
Job Number: 10809-06-21
Sheet: 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				20.99	(0.20) 0.20	Brown slightly sandy slightly gravelly TOPSOIL with rootlets.		
					(1.30)	Firm light brown slightly sandy slightly gravelly clayey SILT with occasional subangular to subrounded cobbles and boulders.		
				19.69	1.50	Complete at 1.50m		

Plan

Remarks

No groundwater encountered during excavation.
Slight spalling of trial pit wall.
Soakaway test IT03 undertaken in pit.
Trial pit backfilled upon completion.

Scale (approx)	Logged By	Figure No.
1:25	C. Byrne	10809-06-21.IT03

Ground Investigations Ireland Ltd
www.gii.ie

Machine : 13T Digger **Method :** Trial Pit	**Dimensions** 2.30 x 0.90 x 1.90	**Ground Level (mOD)** 12.50	**Site** Site Investigation Ennis
	Location 532226.1 E 677241.3 N	**Dates** 15/07/2021	**Client** AKM Design
			Engineer

Trial Pit Number: TP01
Job Number: 10809-06-21
Sheet: 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				12.40	(0.10) 0.10	Dark brown slightly sandy slightly organic TOPSOIL with rootlets.		
					(0.25)	Firm light brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles and boulders.		
				12.15	0.35	Firm greyish brown slightly sandy slightly gravelly clayey SILT with occasional subangular to subrounded cobbles and boulders.		
0.50	B							
					(1.55)			
1.50	B							
				10.60	1.90	Refusal: possible rock or boulder.		
						Refusal at 1.90m		

Plan

Remarks

No groundwater encountered during excavation.
Slight spalling of trial pit wall.
Trial pit backfilled upon completion.

Scale (approx)	Logged By	Figure No.
1:25	C. Byrne	10809-06-21.TP01

Ground Investigations Ireland Ltd
www.gii.ie

Machine : 13T Digger **Method :** Trial Pit	**Dimensions** 2.90 x 0.90 x 0.95	**Ground Level (mOD)** 16.10	**Client** AKM Design
	Location 532194.6 E 677053.3 N	**Dates** 15/07/2021	**Engineer**

Site
Site Investigation Ennis

Trial Pit Number
TP02

Job Number
10809-06-21

Sheet
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				16.00	(0.10) 0.10	Brown slightly sandy slightly gravelly TOPSOIL with rootlets.		
						Firm greyish brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles and boulders.		
					(0.85)			
				15.15	0.95	Refusal: possible rock or boulder.		
						Refusal at 0.95m		

Plan

Remarks

No groundwater encountered during excavation.
Slight spalling of trial pit wall.
Trial pit backfilled upon completion.

Scale (approx)	Logged By	Figure No.
1:25	C. Byrne	10809-06-21.TP02

Ground Investigations Ireland Ltd
www.gii.ie

Machine : 13T Digger **Method :** Trial Pit	**Dimensions** 2.20 x 0.70 x 0.85	**Ground Level (mOD)** 18.83	**Client** AKM Design
	Location 532249.1 E 676993.9 N	**Dates** 15/07/2021	**Engineer**

Site
Site Investigation Ennis

Trial Pit Number
TP03

Job Number
10809-06-21

Sheet
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				18.73	(0.10) 0.10	Brown slightly sandy slightly gravelly TOPSOIL with rootlets.		
						Firm greyish brown slightly sandy slightly gravelly clayey SILT with occasional subangular to subrounded cobbles.		
0.50 0.50	B B				(0.75)			
				17.98	0.85	Refusal: possible rock or boulder.		
						Refusal at 0.85m		

Plan

Remarks

No groundwater encountered during excavation.
Slight spalling of trial pit wall.
Trial pit backfilled upon completion.

Scale (approx)	Logged By	Figure No.
1:25	C. Byrne	10809-06-21.TP03

Ground Investigations Ireland Ltd
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Machine : 13T Digger **Method :** Trial Pit	**Dimensions** 2.10 x 0.90 x 1.25	**Ground Level (mOD)** 19.57	**Site** Site Investigation Ennis
	Location 532149.2 E 676973.3 N	**Dates** 15/07/2021	**Client** AKM Design
			Engineer
			Trial Pit Number **TP04**
			Job Number 10809-06-21
			Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30)	Brown slightly sandy slightly gravelly TOPSOIL with rootlets.		
				19.27	0.30	WEATHERED ROCK: Brown/grey slightly sandy clayey coarse angular GRAVEL with some angular cobbles and boulders.		
1.00	B				(0.95)			
				18.32	1.25	Refusal: rock.		
						Refusal at 1.25m		

Plan

Remarks

No groundwater encountered during excavation.
Slight spalling of trial pit wall.
Trial pit backfilled upon completion.

Scale (approx)	Logged By	Figure No.
1:25	C. Byrne	10809-06-21.TP04

Ground Investigations Ireland Ltd
www.gii.ie

Machine : 13T Digger **Method :** Trial Pit	**Dimensions** 2.10 x 0.70 x 0.60	**Ground Level (mOD)** 20.75	**Site** Site Investigation Ennis
	Location 532174.4 E 676921.4 N	**Dates** 15/07/2021	**Client** AKM Design
			Engineer
			Trial Pit Number **TP05**
			Job Number 10809-06-21
			Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.15)	Brown slightly sandy slightly gravelly TOPSOIL with rootlets.		
				20.60	0.15	WEATHERED ROCK: Brown/grey slightly sandy clayey coarse angular GRAVEL with occasional angular cobbles and boulders.		
					(0.45)			
				20.15	0.60	Refusal: rock.		
						Refusal at 0.60m		

Plan

Remarks

Two attempts made at digging to depth. Refusal at 0.55m BGL and 0.60m BGL.
No groundwater encountered during excavation.
Slight spalling of trial pit wall.
Trial pit backfilled upon completion.

Scale (approx)	Logged By	Figure No.
1:25	C. Byrne	10809-06-21.TP05

Ground Investigations Ireland Ltd
www.gii.ie

Site Site Investigation Ennis			**Trial Pit Number** TP06
Machine : 13T Digger **Method :** Trial Pit	**Dimensions** 2.50 x 0.60 x 0.45	**Ground Level (mOD)** 25.01	**Client** AKM Design	**Job Number** 10809-06-21
	Location 532162.4 E 676829.3 N	**Dates** 14/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				24.91	(0.10) 0.10	Brown slightly sandy slightly gravelly TOPSOIL with rootlets.		
					(0.35)	Firm light brown slightly sandy slightly gravelly clayey SILT with occasional subangular to subrounded cobbles.		
				24.56	0.45	Refusal: possible rock or boulder.		
						Refusal at 0.45m		

Plan

Remarks

Two attempts made at digging to depth. Refusal at 0.35m BGL and 0.45m BGL.
No groundwater encountered during excavation.
Slight spalling of trial pit wall.
Trial pit backfilled upon completion.

Scale (approx)	Logged By	Figure No.
1:25	C. Byrne	10809-06-21.TP06

Ground Investigations Ireland Ltd
www.gii.ie

Site Site Investigation Ennis			**Trial Pit Number** TP07
Machine : 13T Digger **Method :** Trial Pit	**Dimensions** 3.90 x 0.60 x 3.20	**Ground Level (mOD)** 26.15	**Client** AKM Design	**Job Number** 10809-06-21
	Location 532207.9 E 676840.3 N	**Dates** 14/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30)	Brown slightly sandy slightly gravelly TOPSOIL with rootlets.		
				25.85	0.30	Firm light brown slightly sandy slightly gravelly silty CLAY.		
					(0.30)			
0.50	B			25.55	0.60	Firm greyish brown slightly sandy slightly gravelly clayey SILT with occasional subangular to subrounded cobbles and boulders.		
1.50	B							
					(2.60)			
2.50	B							
				22.95	3.20	Refusal: possible rock or boulder.		
						Refusal at 3.20m		

Plan

Remarks

No groundwater encountered during excavation.
Slight spalling of trial pit wall.
Trial pit backfilled upon completion.

Scale (approx)	Logged By	Figure No.
1:25	C. Byrne	10809-06-21.TP07

Ground Investigations Ireland Ltd
www.gii.ie

Machine : 13T Digger **Method :** Trial Pit	**Dimensions** 3.70 x 0.60 x 0.80	**Ground Level (mOD)** 24.59	**Client** AKM Design
	Location 532089.8 E 676824.1 N	**Dates** 14/07/2021	**Engineer**

Site
Site Investigation Ennis

Trial Pit Number
TP08

Job Number
10809-06-21

Sheet
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				24.44	(0.15) 0.15	Brown slightly sandy slightly gravelly TOPSOIL with rootlets.		
0.50	B				(0.65)	Soft to firm light brown slightly sandy slightly gravelly clayey SILT with occasional subangular to subrounded cobbles.		
				23.79	0.80	Refusal: possible rock or boulder.		
						Refusal at 0.80m		

Plan

Remarks

Two attempts made at digging to depth. Refusal at 0.60m BGL and 0.80m BGL.
No groundwater encountered during excavation.
Slight spalling of trial pit wall.
Trial pit backfilled upon completion.

Scale (approx)	Logged By	Figure No.
1:25	C. Byrne	10809-06-21.TP08

Ground Investigations Ireland Ltd
www.gii.ie

Machine : 13T Digger **Method :** Trial Pit	**Dimensions** 2.20 x 0.70 x 1.40	**Ground Level (mOD)** 27.09	**Client** AKM Design
	Location 532157.1 E 676781.6 N	**Dates** 14/07/2021	**Engineer**

Site
Site Investigation Ennis

Trial Pit Number
TP09

Job Number
10809-06-21

Sheet
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				26.89	(0.20) 0.20	Brown slightly sandy slightly gravelly TOPSOIL with rootlets.		
0.50 0.50	B B				(1.20)	Firm greyish brown slightly sandy slightly gravelly clayey SILT with occasional subangular to subrounded cobbles and boulders.		
				25.69	1.40	Refusal: possible rock or boulder.		
						Refusal at 1.40m		

Plan

Remarks

No groundwater encountered during excavation.
Slight spalling of trial pit wall.
Trial pit backfilled upon completion.

Scale (approx)	Logged By	Figure No.
1:25	C. Byrne	10809-06-21.TP09

Ground Investigations Ireland Ltd
www.gii.ie

Machine : 13T Digger **Method :** Trial Pit	**Dimensions** 3.40 x 0.70 x 2.40	**Ground Level (mOD)** 29.65	**Client** AKM Design
	Location 532073.8 E 676772.3 N	**Dates** 14/07/2021	**Engineer**

Site
Site Investigation Ennis

Trial Pit Number
TP10

Job Number
10809-06-21

Sheet
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	Brown slightly sandy slightly gravelly TOPSOIL with rootlets.		
				29.45	0.20	Firm light brown slightly sandy slightly gravelly silty CLAY with occasional subangular to subrounded cobbles and boulders.		
					(0.40)			
0.50	B			29.05	0.60	Firm greyish brown slightly sandy slightly gravelly clayey SILT with occasional subangular to subrounded cobbles and boulders.		
1.50	B				(1.80)			
				27.25	2.40	Refusal at 2.40m		

Plan

Remarks

No groundwater encountered during excavation.
Trial pit sidewall collapsing.
Trial pit backfilled upon completion.

Scale (approx)	Logged By	Figure No.
1:25	C. Byrne	10809-06-21.TP10

Ground Investigations Ireland Ltd
www.gii.ie

Machine : 13T Digger **Method :** Trial Pit	**Dimensions** 2.60 x 0.60 x 1.40	**Ground Level (mOD)** 26.84	**Client** AKM Design
	Location 532218.4 E 676711 N	**Dates** 14/07/2021	**Engineer**

Site
Site Investigation Ennis

Trial Pit Number
TP11

Job Number
10809-06-21

Sheet
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	Brown slightly sandy slightly gravelly TOPSOIL with rootlets.		
				26.64	0.20	Firm light brown slightly sandy slightly gravelly clayey SILT with occasional subangular to subrounded cobbles.		
					(0.15)			
				26.49	0.35	Firm greyish brown slightly sandy slightly gravelly clayey SILT with occasional subangular to subrounded cobbles.		
0.50	B				(1.05)			
				25.44	1.40	Refusal: possible rock or boulder.		
						Refusal at 1.40m		

Plan

Remarks

No groundwater encountered during excavation.
Slight spalling of trial pit wall.
Trial pit backfilled upon completion.

Scale (approx)	Logged By	Figure No.
1:25	C. Byrne	10809-06-21.TP11

Ground Investigations Ireland Ltd
www.gii.ie

Machine : 13T Digger **Method :** Trial Pit	**Dimensions** 3.20 x 0.60 x 3.00	**Ground Level (mOD)** 28.54	**Client** AKM Design
	Location 532125.9 E 676658.4 N	**Dates** 14/07/2021	**Engineer**

Site
Site Investigation Ennis

Trial Pit Number
TP12

Job Number
10809-06-21

Sheet
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				28.34	(0.20) 0.20	Brown slightly sandy slightly gravelly TOPSOIL with rootlets.		
0.50 0.50	B B					Firm light brown slightly sandy slightly gravelly silty CLAY with occasional subangular to subrounded cobbles and boulders.		
					(1.00)			
				27.34	1.20	Soft to firm greyish brown slightly sandy slightly gravelly clayey SILT with occasional subangular to subrounded cobbles and boulders.		
1.50 1.50	B B							
					(1.80)			
2.50 2.50	B B							
				25.54	3.00	Abandoned at 3.00m		

Plan

Remarks

No groundwater encountered during excavation.
Trial pit sidewall collapsing.
Trial pit backfilled upon completion.

Scale (approx)	Logged By	Figure No.
1:25	C. Byrne	10809-06-21.TP12

Ground Investigations Ireland Ltd
www.gii.ie

Machine : 13T Digger **Method :** Trial Pit	**Dimensions** 2.20 x 0.60 x 0.60	**Ground Level (mOD)** 26.72	**Client** AKM Design
	Location 532152.6 E 676628 N	**Dates** 14/07/2021	**Engineer**

Site
Site Investigation Ennis

Trial Pit Number
TP13

Job Number
10809-06-21

Sheet
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.15)	Brown slightly sandy slightly gravelly TOPSOIL with rootlets.		
				26.57	0.15	Firm light brown slightly sandy slightly gravelly clayey SILT with occasional subangular to subrounded cobbles.		
					(0.45)			
				26.12	0.60	Refusal: possible rock or boulder.		
						Refusal at 0.60m		

Plan

Remarks

Two attempts made at digging to depth. Refusal at 0.60m BGL and 0.55m BGL.
No groundwater encountered during excavation.
Slight spalling of trial pit wall.
Trial pit backfilled upon completion.

Scale (approx)	Logged By	Figure No.
1:25	C. Byrne	10809-06-21.TP13

Trial Pit Photographs – Site Investigation Ennis
AKM Design – 10809-06-21

TP01

Trial Pit Photographs – Site Investigation Ennis
AKM Design – 10809-06-21

TP02

Trial Pit Photographs – Site Investigation Ennis
AKM Design – 10809-06-21

TP03

Trial Pit Photographs – Site Investigation Ennis
AKM Design – 10809-06-21

TP04

Trial Pit Photographs – Site Investigation Ennis
AKM Design – 10809-06-21

TP05




Trial Pit Photographs – Site Investigation Ennis
AKM Design – 10809-06-21

TP06






Trial Pit Photographs – Site Investigation Ennis
AKM Design – 10809-06-21

TP07

Trial Pit Photographs – Site Investigation Ennis
AKM Design – 10809-06-21

TP08



Trial Pit Photographs – Site Investigation Ennis
AKM Design – 10809-06-21

TP09

Trial Pit Photographs – Site Investigation Ennis
AKM Design – 10809-06-21

TP10

Trial Pit Photographs – Site Investigation Ennis
AKM Design – 10809-06-21

TP11




Trial Pit Photographs – Site Investigation Ennis
AKM Design – 10809-06-21

TP12






Trial Pit Photographs – Site Investigation Ennis
AKM Design – 10809-06-21

TP13

Soakaway Photographs – Site Investigation Ennis
AKM Design – 10809-06-21

IT01

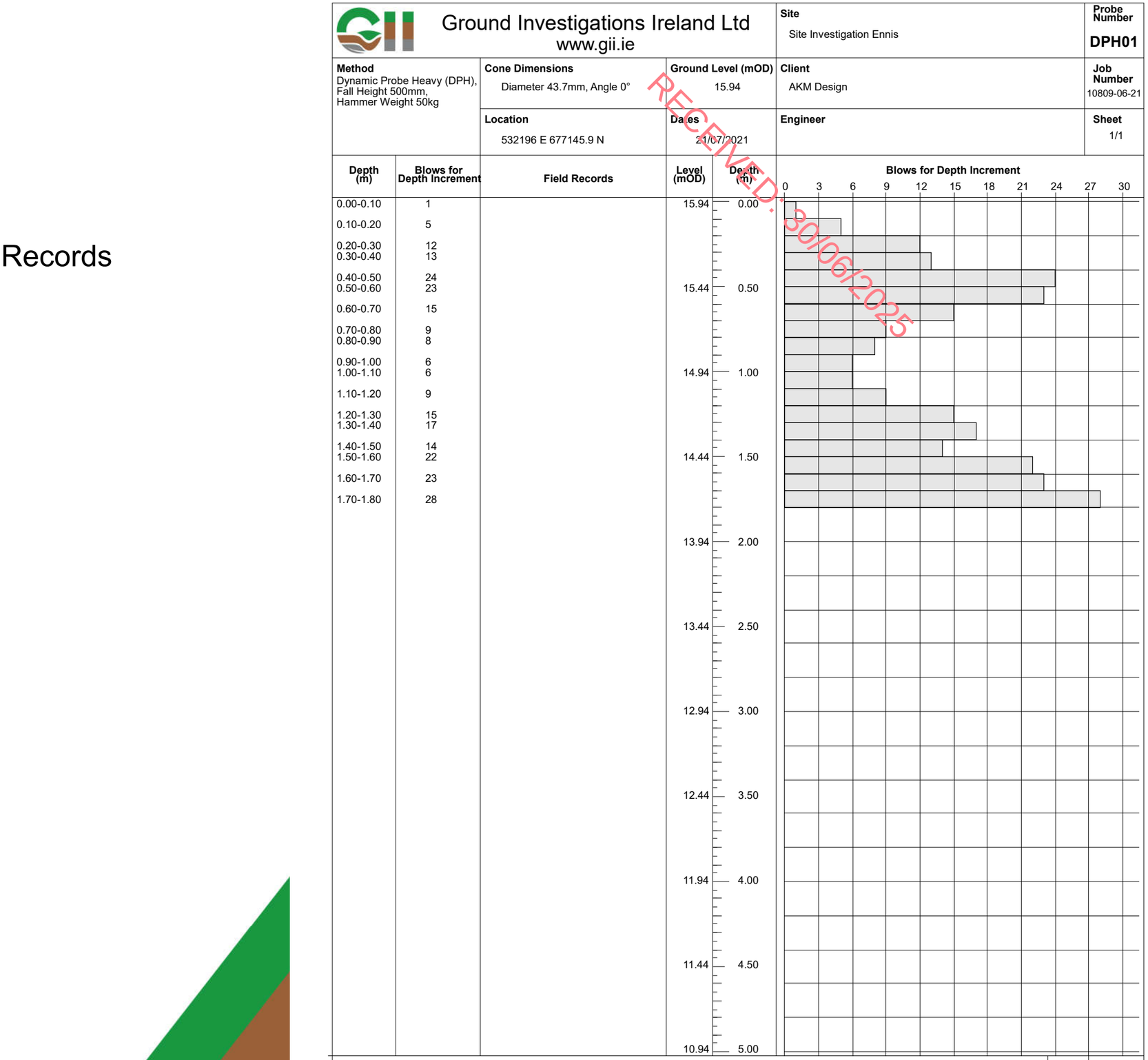
Soakaway Photographs – Site Investigation Ennis
AKM Design – 10809-06-21

IT02

Soakaway Photographs – Site Investigation Ennis
AKM Design – 10809-06-21

IT03

APPENDIX 3 – Dynamic Probe Records



Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH02

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	16.13	AKM Design	10809-06-21
	Location 532173 E 677121.2 N	**Dates** 21/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	1		16.13	0.00
0.10-0.20	3			
0.20-0.30	4			
0.30-0.40	91		15.63	0.50
0.40-0.50	7			
0.50-0.60	40			
0.60-0.70	33			
0.70-0.80	26		15.13	1.00
0.80-0.90	28			
0.90-1.00	25			
			14.63	1.50
			14.13	2.00
			13.63	2.50
			13.13	3.00
			12.63	3.50
			12.13	4.00
			11.63	4.50
			11.13	5.00

Blows for Depth Increment: 0 10 20 30 40 50 60 70 80 90 100

Remarks
Refusal at 1.00m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH02

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH03

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	15.53	AKM Design	10809-06-21
	Location 532215.6 E 677115.2 N	**Dates** 21/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	2		15.53	0.00
0.10-0.20	5			
0.20-0.30	11			
0.30-0.40	13		15.03	0.50
0.40-0.50	10			
0.50-0.60	9			
0.60-0.70	10		14.53	1.00
0.70-0.80	29			
0.80-0.90	24			
0.90-1.00	27		14.03	1.50
1.00-1.10	26			
			13.53	2.00
			13.03	2.50
			12.53	3.00
			12.03	3.50
			11.53	4.00
			11.03	4.50
			10.53	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 1.10m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH03

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH04

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	16.64	AKM Design	10809-06-21
	Location 532183.9 E 677079.1 N	**Dates** 21/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	2		16.64	0.00
0.10-0.20	2			
0.20-0.30	3			
0.30-0.40	4			
0.40-0.50	9		16.14	0.50
0.50-0.60	7			
0.60-0.70	9			
0.70-0.80	13			
0.80-0.90	34			
0.90-1.00	25		15.64	1.00
1.00-1.10	25			
			15.14	1.50
			14.64	2.00
			14.14	2.50
			13.64	3.00
			13.14	3.50
			12.64	4.00
			12.14	4.50
			11.64	5.00

Blows for Depth Increment: 0 4 8 12 16 20 24 28 32 36 40

Remarks
Refusal at 1.10m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH04

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH05

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	16.63	AKM Design	10809-06-21
	Location 532159.6 E 677074.9 N	**Dates** 21/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	2		16.63	0.00
0.10-0.20	8			
0.20-0.30	14			
0.30-0.40	14			
0.40-0.50	14		16.13	0.50
0.50-0.60	19			
0.60-0.70	17			
0.70-0.80	20			
0.80-0.90	29			
0.90-1.00	25		15.63	1.00
			15.13	1.50
			14.63	2.00
			14.13	2.50
			13.63	3.00
			13.13	3.50
			12.63	4.00
			12.13	4.50
			11.63	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 1.00m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH05

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH06

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	16.16	AKM Design	10809-06-21
	Location 532212.6 E 677069.1 N	**Dates** 21/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	3		16.16	0.00
0.10-0.20	7			
0.20-0.30	9			
0.30-0.40	17			
0.40-0.50	20			
0.50-0.60	25		15.66	0.50
			15.16	1.00
			14.66	1.50
			14.16	2.00
			13.66	2.50
			13.16	3.00
			12.66	3.50
			12.16	4.00
			11.66	4.50
			11.16	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 1.60m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH06

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH07

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	17.44	AKM Design	10809-06-21
	Location 532157.7 E 677048.3 N	**Dates** 21/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	2		17.44	0.00
0.10-0.20	7			
0.20-0.30	14			
0.30-0.40	15			
0.40-0.50	22			
0.50-0.60	26		16.94	0.50
0.60-0.70	17			
0.70-0.80	12			
0.80-0.90	16			
0.90-1.00	12			
1.00-1.10	10		16.44	1.00
1.10-1.20	12			
1.20-1.30	13			
1.30-1.40	17			
1.40-1.50	21			
1.50-1.60	20		15.94	1.50
1.60-1.70	24			
1.70-1.80	29			
			15.44	2.00
			14.94	2.50
			14.44	3.00
			13.94	3.50
			13.44	4.00
			12.94	4.50
			12.44	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 1.80m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH07

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH08

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	15.82	AKM Design	10809-06-21
	Location 532189.6 E 677040.3 N	**Dates** 21/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	1		15.82	0.00
0.10-0.20	2			
0.20-0.30	4			
0.30-0.40	11			
0.40-0.50	13			
0.50-0.60	15		15.32	0.50
0.60-0.70	13			
0.70-0.80	25			
0.80-0.90	29			
0.90-1.00	23			
1.00-1.10	17		14.82	1.00
1.10-1.20	20			
1.20-1.30	9			
1.30-1.40	6			
1.40-1.50	24			
1.50-1.60	25		14.32	1.50
			13.82	2.00
			13.32	2.50
			12.82	3.00
			12.32	3.50
			11.82	4.00
			11.32	4.50
			10.82	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 1.60m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH08

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH09

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	15.91	AKM Design	10809-06-21
	Location 532208.9 E 677030.1 N	**Dates** 21/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	1		15.91	0.00
0.10-0.20	2			
0.20-0.30	5			
0.30-0.40	8			
0.40-0.50	8			
0.50-0.60	10		15.41	0.50
0.60-0.70	22			
0.70-0.80	28			
			14.91	1.00
			14.41	1.50
			13.91	2.00
			13.41	2.50
			12.91	3.00
			12.41	3.50
			11.91	4.00
			11.41	4.50
			10.91	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 0.80m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

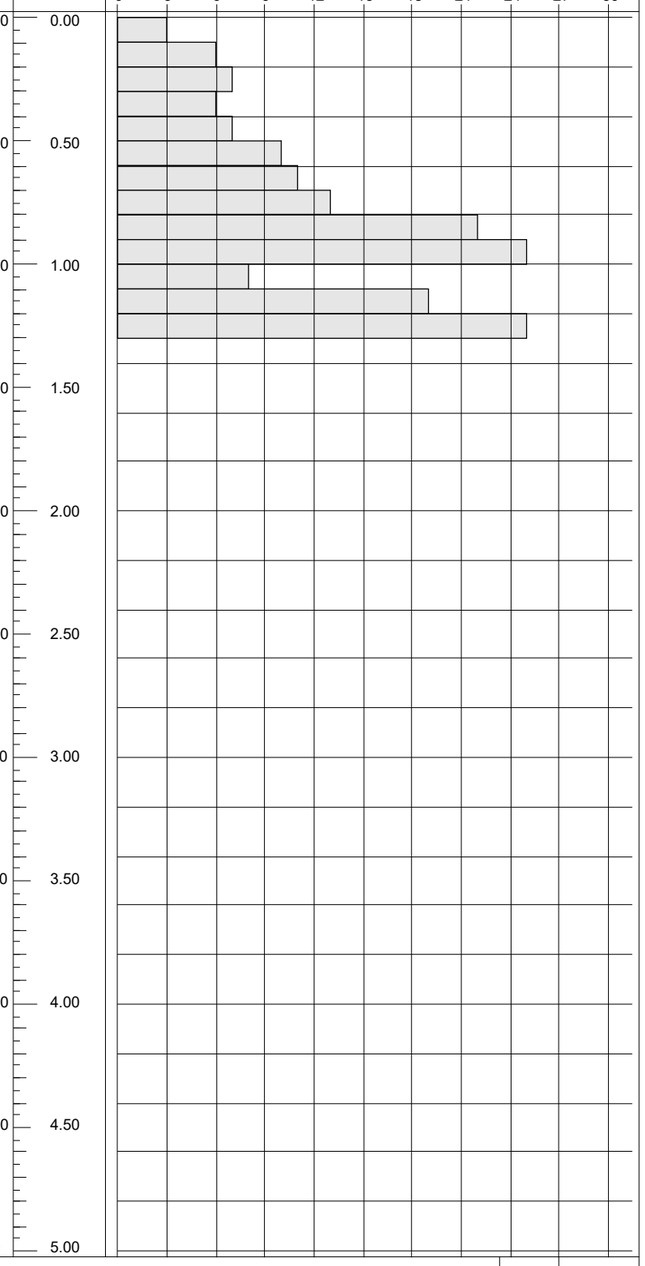
Figure No.
10809-06-21.DPH09

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH10

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	14.70	AKM Design	10809-06-21
	Location	**Dates**	**Engineer**	**Sheet**
	532146.5 E 677012.4 N	21/07/2021		1/1

Depth (m)	Blows for Depth Increment	Field Records
0.00-0.10	3	
0.10-0.20	6	
0.20-0.30	7	
0.30-0.40	6	
0.40-0.50	7	
0.50-0.60	10	
0.60-0.70	11	
0.70-0.80	13	
0.80-0.90	22	
0.90-1.00	25	
1.00-1.10	8	
1.10-1.20	19	
1.20-1.30	25	



Remarks
Refusal at 1.30m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

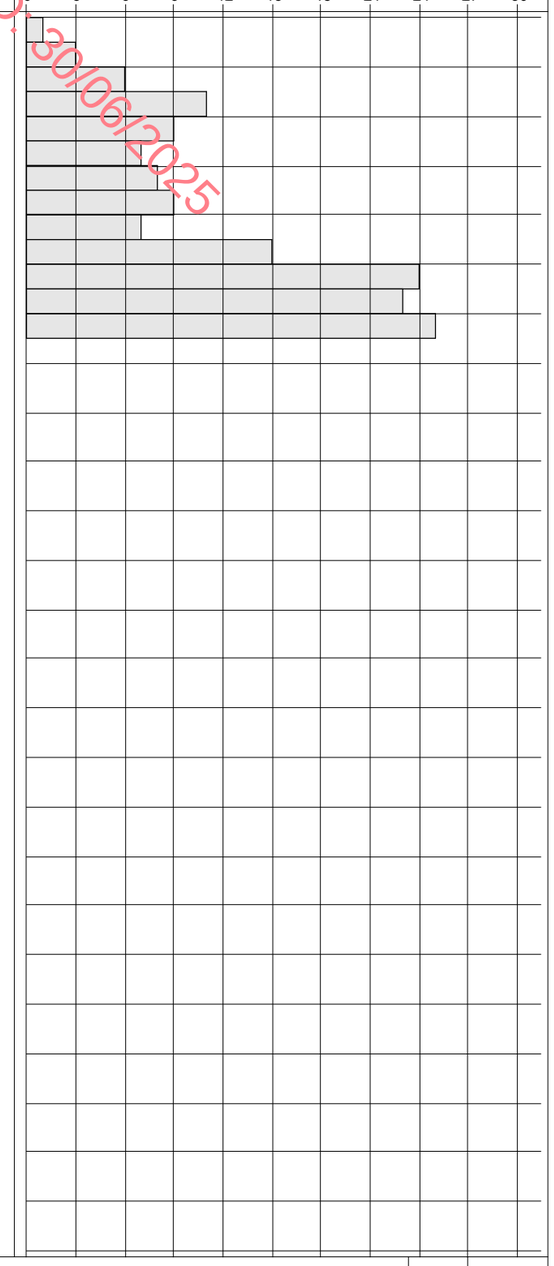
Figure No.
10809-06-21.DPH10

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH11

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	18.30	AKM Design	10809-06-21
	Location	**Dates**	**Engineer**	**Sheet**
	532223.8 E 676988.4 N	21/07/2021		1/1

Depth (m)	Blows for Depth Increment	Field Records
0.00-0.10	1	
0.10-0.20	3	
0.20-0.30	6	
0.30-0.40	11	
0.40-0.50	9	
0.50-0.60	7	
0.60-0.70	8	
0.70-0.80	9	
0.80-0.90	7	
0.90-1.00	15	
1.00-1.10	24	
1.10-1.20	23	
1.20-1.30	25	



Remarks
Refusal at 1.30m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH11

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH12

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	19.52	AKM Design	10809-06-21
	Location 532170.4 E 676963.2 N	**Dates** 21/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	1		19.52	0.00
0.10-0.20	3			
0.20-0.30	8			
0.30-0.40	12			
0.40-0.50	19		19.02	0.50
0.50-0.60	25			
			18.52	1.00
			18.02	1.50
			17.52	2.00
			17.02	2.50
			16.52	3.00
			16.02	3.50
			15.52	4.00
			15.02	4.50
			14.52	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 0.60m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH12

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH13

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	20.29	AKM Design	10809-06-21
	Location 532126.4 E 676973.4 N	**Dates** 21/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	4		20.29	0.00
0.10-0.20	6			
0.20-0.30	9			
0.30-0.40	10			
0.40-0.50	10			
0.50-0.60	15		19.79	0.50
0.60-0.70	12			
0.70-0.80	4			
0.80-0.90	3			
0.90-1.00	14			
1.00-1.10	16		19.29	1.00
1.10-1.20	27			
1.20-1.30	25			
			18.79	1.50
			18.29	2.00
			17.79	2.50
			17.29	3.00
			16.79	3.50
			16.29	4.00
			15.79	4.50
			15.29	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 1.30m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH13

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH14

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	18.90	AKM Design	10809-06-21
	Location 532202.6 E 676969.7 N	**Dates** 21/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	1		18.90	0.00
0.10-0.20	5			
0.20-0.30	9			
0.30-0.40	9			
0.40-0.50	13		18.40	0.50
0.50-0.60	34			
0.60-0.70	25			
			17.90	1.00
			17.40	1.50
			16.90	2.00
			16.40	2.50
			15.90	3.00
			15.40	3.50
			14.90	4.00
			14.40	4.50
			13.90	5.00

Blows for Depth Increment: 0 4 8 12 16 20 24 28 32 36 40

Remarks
Refusal at 0.70m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH14

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH15

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	18.86	AKM Design	10809-06-21
	Location 532226.9 E 676962.4 N	**Dates** 21/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	2		18.86	0.00
0.10-0.20	9			
0.20-0.30	16			
0.30-0.40	9			
0.40-0.50	3		18.36	0.50
0.50-0.60	5			
0.60-0.70	6			
0.70-0.80	2			
0.80-0.90	10		17.86	1.00
0.90-1.00	25			
			17.36	1.50
			16.86	2.00
			16.36	2.50
			15.86	3.00
			15.36	3.50
			14.86	4.00
			14.36	4.50
			13.86	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 1.00m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH15

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH16

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	20.93	AKM Design	10809-06-21
	Location 532154.8 E 676948.6 N	**Dates** 21/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	2		20.93	0.00
0.10-0.20	6			
0.20-0.30	12			
0.30-0.40	18			
0.40-0.50	14		20.43	0.50
0.50-0.60	16			
0.60-0.70	22			
0.70-0.80	22		19.93	1.00
0.80-0.90	25			
			19.43	1.50
			18.93	2.00
			18.43	2.50
			17.93	3.00
			17.43	3.50
			16.93	4.00
			16.43	4.50
			15.93	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 0.90m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH16

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH17

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	20.03	AKM Design	10809-06-21
	Location 532182.1 E 676944.7 N	**Dates** 21/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	2		20.03	0.00
0.10-0.20	2			
0.20-0.30	5			
0.30-0.40	9			
0.40-0.50	12			
0.50-0.60	24		19.53	0.50
0.60-0.70	20			
0.70-0.80	27		19.03	1.00
			18.53	1.50
			18.03	2.00
			17.53	2.50
			17.03	3.00
			16.53	3.50
			16.03	4.00
			15.53	4.50
			15.03	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 0.80m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH17

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH18

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	21.45	AKM Design	10809-06-21
	Location 532115.1 E 676941 N	**Dates** 22/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	2		21.45	0.00
0.10-0.20	4			
0.20-0.30	7			
0.30-0.40	11			
0.40-0.50	15		20.95	0.50
0.50-0.60	9			
0.60-0.70	9			
0.70-0.80	17			
0.80-0.90	25		20.45	1.00
			19.95	1.50
			19.45	2.00
			18.95	2.50
			18.45	3.00
			17.95	3.50
			17.45	4.00
			16.95	4.50
			16.45	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 0.90m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH18

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH19

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	0.00	AKM Design	10809-06-21
	Location 532216.3 E 676931.4 N	**Dates** 21/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	2		0.00	0.00
0.10-0.20	3			
0.20-0.30	5			
0.30-0.40	4			
0.40-0.50	5		-0.50	0.50
0.50-0.60	3			
0.60-0.70	7			
0.70-0.80	18			
0.80-0.90	13		-1.00	1.00
0.90-1.00	7			
1.00-1.10	11			
1.10-1.20	18		-1.50	1.50
1.20-1.30	23			
1.30-1.40	24		-2.00	2.00
1.40-1.50	21			
			-2.50	2.50
			-3.00	3.00
			-3.50	3.50
			-4.00	4.00
			-4.50	4.50
			-5.00	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 1.50m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH19

Ground Investigations Ireland Ltd
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Site	Probe Number
Site Investigation Ennis	DPH20

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	23.05	AKM Design	10809-06-21
	Location 532245.5 E 676919.8 N	**Dates** 21/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	1		23.05	0.00
0.10-0.20	5			
0.20-0.30	14			
0.30-0.40	10			
0.40-0.50	11			
0.50-0.60	14		22.55	0.50
0.60-0.70	18			
0.70-0.80	10			
0.80-0.90	8			
0.90-1.00	11			
1.00-1.10	9		22.05	1.00
1.10-1.20	28			
1.20-1.30	13			
1.30-1.40	10			
1.40-1.50	8			
1.50-1.60	8		21.55	1.50
1.60-1.70	9			
1.70-1.80	16			
1.80-1.90	10			
1.90-2.00	14			
2.00-2.10	20		21.05	2.00
2.10-2.20	17			
2.20-2.30	23			
2.30-2.40	25			
			20.55	2.50
			20.05	3.00
			19.55	3.50
			19.05	4.00
			18.55	4.50
			18.05	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 2.40m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH20

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH21

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	22.14	AKM Design	10809-06-21
	Location 532143.3 E 676917.8 N	**Dates** 21/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	1		22.14	0.00
0.10-0.20	4			
0.20-0.30	7			
0.30-0.40	11			
0.40-0.50	13			
0.50-0.60	14		21.64	0.50
0.60-0.70	13			
0.70-0.80	12			
0.80-0.90	26			
0.90-1.00	25		21.14	1.00
			20.64	1.50
			20.14	2.00
			19.64	2.50
			19.14	3.00
			18.64	3.50
			18.14	4.00
			17.64	4.50
			17.14	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 1.00m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH21

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH22

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	0.00	AKM Design	10809-06-21
	Location 532174.9 E 676918 N	**Dates** 21/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	2		0.00	0.00
0.10-0.20	4			
0.20-0.30	11			
0.30-0.40	8			
0.40-0.50	12		-0.50	0.50
0.50-0.60	12			
0.60-0.70	20			
0.70-0.80	16			
0.80-0.90	19			
0.90-1.00	27		-1.00	1.00
1.00-1.10	25			
			-1.50	1.50
			-2.00	2.00
			-2.50	2.50
			-3.00	3.00
			-3.50	3.50
			-4.00	4.00
			-4.50	4.50
			-5.00	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 0.80m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH22

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH23

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	25.46	AKM Design	10809-06-21
	Location 532272.8 E 676910.1 N	**Dates** 22/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	2		25.46	0.00
0.10-0.20	4			
0.20-0.30	5			
0.30-0.40	6			
0.40-0.50	7		24.96	0.50
0.50-0.60	8			
0.60-0.70	11			
0.70-0.80	12			
0.80-0.90	11			
0.90-1.00	11		24.46	1.00
1.00-1.10	10			
1.10-1.20	10			
1.20-1.30	9			
1.30-1.40	9			
1.40-1.50	8		23.96	1.50
1.50-1.60	10			
1.60-1.70	14			
1.70-1.80	16			
1.80-1.90	11			
1.90-2.00	10		23.46	2.00
2.00-2.10	8			
2.10-2.20	7			
2.20-2.30	9			
2.30-2.40	15			
2.40-2.50	11		22.96	2.50
2.50-2.60	6			
2.60-2.70	7			
2.70-2.80	6			
2.80-2.90	8			
2.90-3.00	12		22.46	3.00
3.00-3.10	17			
3.10-3.20	28			
3.20-3.30	25			
			21.96	3.50
			21.46	4.00
			20.96	4.50
			20.46	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 3.30m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH23

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH24

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	21.22	AKM Design	10809-06-21
	Location 532207.2 E 676906 N	**Dates** 21/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	1		21.22	0.00
0.10-0.20	3			
0.20-0.30	4			
0.30-0.40	4			
0.40-0.50	3			
0.50-0.60	2		20.72	0.50
0.60-0.70	2			
0.70-0.80	1			
0.80-0.90	0			
0.90-1.00	1			
1.00-1.10	2		20.22	1.00
1.10-1.20	0			
1.20-1.30	0			
1.30-1.40	0			
1.40-1.50	5			
1.50-1.60	25		19.72	1.50
			19.22	2.00
			18.72	2.50
			18.22	3.00
			17.72	3.50
			17.22	4.00
			16.72	4.50
			16.22	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 1.60m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH24

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH25

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	24.56	AKM Design	10809-06-21
	Location 532232.4 E 676893.8 N	**Dates** 22/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	2		24.56	0.00
0.10-0.20	4			
0.20-0.30	2			
0.30-0.40	0			
0.40-0.50	1			
0.50-0.60	0		24.06	0.50
0.60-0.70	0			
0.70-0.80	1			
0.80-0.90	1			
0.90-1.00	1			
1.00-1.10	5		23.56	1.00
1.10-1.20	5			
1.20-1.30	6			
1.30-1.40	8			
1.40-1.50	7			
1.50-1.60	4		23.06	1.50
1.60-1.70	4			
1.70-1.80	9			
1.80-1.90	10			
1.90-2.00	7			
2.00-2.10	5		22.56	2.00
2.10-2.20	8			
2.20-2.30	9			
2.30-2.40	16			
2.40-2.50	25		22.06	2.50
			21.56	3.00
			21.06	3.50
			20.56	4.00
			20.06	4.50
			19.56	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 2.50m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH25

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH26

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	26.41	AKM Design	10809-06-21
	Location 532262.3 E 676874.7 N	**Dates** 22/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	2		26.41	0.00
0.10-0.20	3			
0.20-0.30	5			
0.30-0.40	5			
0.40-0.50	8			
0.50-0.60	7		25.91	0.50
0.60-0.70	11			
0.70-0.80	16			
0.80-0.90	17			
0.90-1.00	14			
1.00-1.10	15		25.41	1.00
1.10-1.20	21			
1.20-1.30	18			
1.30-1.40	19			
1.40-1.50	25		24.91	1.50
			24.41	2.00
			23.91	2.50
			23.41	3.00
			22.91	3.50
			22.41	4.00
			21.91	4.50
			21.41	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 1.50m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH26

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH27

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	24.69	AKM Design	10809-06-21
	Location 532199.9 E 676867.7 N	**Dates** 21/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	3		24.69	0.00
0.10-0.20	6			
0.20-0.30	8			
0.30-0.40	5			
0.40-0.50	4			
0.50-0.60	5		24.19	0.50
0.60-0.70	6			
0.70-0.80	6			
0.80-0.90	9			
0.90-1.00	9			
1.00-1.10	12		23.69	1.00
1.10-1.20	23			
1.20-1.30	20			
1.30-1.40	21			
1.40-1.50	27		23.19	1.50
			22.69	2.00
			22.19	2.50
			21.69	3.00
			21.19	3.50
			20.69	4.00
			20.19	4.50
			19.69	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 1.50m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH27

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH28

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	26.13	AKM Design	10809-06-21
	Location 532227.9 E 676856.9 N	**Dates** 22/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	2		26.13	0.00
0.10-0.20	3			
0.20-0.30	5			
0.30-0.40	4			
0.40-0.50	3			
0.50-0.60	2		25.63	0.50
0.60-0.70	3			
0.70-0.80	2			
0.80-0.90	8			
0.90-1.00	15			
1.00-1.10	13		25.13	1.00
1.10-1.20	18			
1.20-1.30	25			
			24.63	1.50
			24.13	2.00
			23.63	2.50
			23.13	3.00
			22.63	3.50
			22.13	4.00
			21.63	4.50
			21.13	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 1.30m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH28

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH29

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	23.52	AKM Design	10809-06-21
	Location 532083.6 E 676845.1 N	**Dates** 20/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	2		23.52	0.00
0.10-0.20	2			
0.20-0.30	11			
0.30-0.40	7			
0.40-0.50	25		23.02	0.50
			22.52	1.00
			22.02	1.50
			21.52	2.00
			21.02	2.50
			20.52	3.00
			20.02	3.50
			19.52	4.00
			19.02	4.50
			18.52	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 0.50m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH29

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH30

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	23.42	AKM Design	10809-06-21
	Location 532113.9 E 676842.9 N	**Dates** 20/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	2		23.42	0.00
0.10-0.20	5			
0.20-0.30	5			
0.30-0.40	4			
0.40-0.50	2		22.92	0.50
0.50-0.60	6			
0.60-0.70	10			
0.70-0.80	21			
0.80-0.90	15			
0.90-1.00	25		22.42	1.00
			21.92	1.50
			21.42	2.00
			20.92	2.50
			20.42	3.00
			19.92	3.50
			19.42	4.00
			18.92	4.50
			18.42	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 1.00m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH30

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH31

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	25.36	AKM Design	10809-06-21
	Location 532187.1 E 676839.8 N	**Dates** 21/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	2		25.36	0.00
0.10-0.20	4			
0.20-0.30	5			
0.30-0.40	5			
0.40-0.50	13		24.86	0.50
0.50-0.60	17			
0.60-0.70	18			
0.70-0.80	20			
0.80-0.90	18			
0.90-1.00	12			
1.00-1.10	8		24.36	1.00
1.10-1.20	10			
1.20-1.30	8			
1.30-1.40	9			
1.40-1.50	25		23.86	1.50
			23.36	2.00
			22.86	2.50
			22.36	3.00
			21.86	3.50
			21.36	4.00
			20.86	4.50
			20.36	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 1.50m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH31

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH32

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	27.21	AKM Design	10809-06-21
	Location 532259.2 E 676831.7 N	**Dates** 22/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	1		27.21	0.00
0.10-0.20	4			
0.20-0.30	5			
0.30-0.40	7			
0.40-0.50	11		26.71	0.50
0.50-0.60	10			
0.60-0.70	6			
0.70-0.80	5			
0.80-0.90	5			
0.90-1.00	5			
1.00-1.10	8		26.21	1.00
1.10-1.20	13			
1.20-1.30	11			
1.30-1.40	13			
1.40-1.50	13			
1.50-1.60	17		25.71	1.50
1.60-1.70	14			
1.70-1.80	14			
1.80-1.90	32			
1.90-2.00	25		25.21	2.00
			24.71	2.50
			24.21	3.00
			23.71	3.50
			23.21	4.00
			22.71	4.50
			22.21	5.00

Blows for Depth Increment: 0 4 8 12 16 20 24 28 32 36 40

Remarks
Refusal at 2.00m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH21

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH33

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	26.60	AKM Design	10809-06-21
	Location 532071.3 E 676818.3 N	**Dates** 20/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	1		26.60	0.00
0.10-0.20	3			
0.20-0.30	8			
0.30-0.40	11			
0.40-0.50	19		26.10	0.50
0.50-0.60	25			
			25.60	1.00
			25.10	1.50
			24.60	2.00
			24.10	2.50
			23.60	3.00
			23.10	3.50
			22.60	4.00
			22.10	4.50
			21.60	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 0.60m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH33

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH34

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	25.21	AKM Design	10809-06-21
	Location 532109.3 E 676814.4 N	**Dates** 20/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	2		25.21	0.00
0.10-0.20	4			
0.20-0.30	5			
0.30-0.40	14			
0.40-0.50	16		24.71	0.50
0.50-0.60	25			
			24.21	1.00
			23.71	1.50
			23.21	2.00
			22.71	2.50
			22.21	3.00
			21.71	3.50
			21.21	4.00
			20.71	4.50
			20.21	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 0.60m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH34

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH35

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	26.32	AKM Design	10809-06-21
	Location 532177.3 E 676816.8 N	**Dates** 21/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	2		26.32	0.00
0.10-0.20	2			
0.20-0.30	6			
0.30-0.40	10			
0.40-0.50	11		25.82	0.50
0.50-0.60	11			
0.60-0.70	18			
0.70-0.80	15			
0.80-0.90	8		25.32	1.00
0.90-1.00	8			
1.00-1.10	13			
1.10-1.20	11			
1.20-1.30	9		24.82	1.50
1.30-1.40	15			
1.40-1.50	25			
			24.32	2.00
			23.82	2.50
			23.32	3.00
			22.82	3.50
			22.32	4.00
			21.82	4.50
			21.32	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 1.50m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH35

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH36

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	27.07	AKM Design	10809-06-21
	Location 532216.6 E 676811.8 N	**Dates** 22/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	2		27.07	0.00
0.10-0.20	3			
0.20-0.30	6			
0.30-0.40	6			
0.40-0.50	4		26.57	0.50
0.50-0.60	4			
0.60-0.70	13			
0.70-0.80	13			
0.80-0.90	14			
0.90-1.00	16		26.07	1.00
1.00-1.10	15			
1.10-1.20	17			
1.20-1.30	19			
1.30-1.40	22			
1.40-1.50	25		25.57	1.50
			25.07	2.00
			24.57	2.50
			24.07	3.00
			23.57	3.50
			23.07	4.00
			22.57	4.50
			22.07	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 1.50m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH36

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH37

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	25.60	AKM Design	10809-06-21
	Location 532144.2 E 676801.4 N	**Dates** 20/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	2		25.60	0.00
0.10-0.20	4			
0.20-0.30	4			
0.30-0.40	2			
0.40-0.50	2		25.10	0.50
0.50-0.60	6			
0.60-0.70	23			
0.70-0.80	21			
0.80-0.90	25		24.60	1.00
			24.10	1.50
			23.60	2.00
			23.10	2.50
			22.60	3.00
			22.10	3.50
			21.60	4.00
			21.10	4.50
			20.60	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 0.90m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH37

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH38

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	27.30	AKM Design	10809-06-21
	Location 532246.7 E 676796.4 N	**Dates** 22/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	2		27.30	0.00
0.10-0.20	4			
0.20-0.30	4			
0.30-0.40	5			
0.40-0.50	4			
0.50-0.60	5		26.80	0.50
0.60-0.70	9			
0.70-0.80	13			
0.80-0.90	17			
0.90-1.00	15			
1.00-1.10	14		26.30	1.00
1.10-1.20	16			
1.20-1.30	15			
1.30-1.40	15			
1.40-1.50	21			
1.50-1.60	24		25.80	1.50
1.60-1.70	25			
			25.30	2.00
			24.80	2.50
			24.30	3.00
			23.80	3.50
			23.30	4.00
			22.80	4.50
			22.30	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 1.70m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH38

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH39

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	29.06	AKM Design	10809-06-21
	Location 532064.3 E 676791.9 N	**Dates** 20/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	3		29.06	0.00
0.10-0.20	5			
0.20-0.30	6			
0.30-0.40	5			
0.40-0.50	5			
0.50-0.60	3		28.56	0.50
0.60-0.70	2			
0.70-0.80	2			
0.80-0.90	2			
0.90-1.00	0			
1.00-1.10	1		28.06	1.00
1.10-1.20	0			
1.20-1.30	1			
1.30-1.40	2			
1.40-1.50	3			
1.50-1.60	3		27.56	1.50
1.60-1.70	2			
1.70-1.80	3			
1.80-1.90	7			
1.90-2.00	25		27.06	2.00
			26.56	2.50
			26.06	3.00
			25.56	3.50
			25.06	4.00
			24.56	4.50
			24.06	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 2.00m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH39

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH40

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	27.61	AKM Design	10809-06-21
	Location 532093.3 E 676787.8 N	**Dates** 21/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	1		27.61	0.00
0.10-0.20	4			
0.20-0.30	8			
0.30-0.40	5			
0.40-0.50	3			
0.50-0.60	2		27.11	0.50
0.60-0.70	3			
0.70-0.80	3			
0.80-0.90	4			
0.90-1.00	4			
1.00-1.10	7		26.61	1.00
1.10-1.20	7			
1.20-1.30	7			
1.30-1.40	4			
1.40-1.50	6			
1.50-1.60	8		26.11	1.50
1.60-1.70	15			
1.70-1.80	12			
1.80-1.90	12			
1.90-2.00	17			
2.00-2.10	16		25.61	2.00
2.10-2.20	20			
2.20-2.30	20			
2.30-2.40	25			
			25.11	2.50
			24.61	3.00
			24.11	3.50
			23.61	4.00
			23.11	4.50
			22.61	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 2.40m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH40

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH41

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	27.52	AKM Design	10809-06-21
	Location 532203.5 E 676779.9 N	**Dates** 22/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	2		27.52	0.00
0.10-0.20	4			
0.20-0.30	5			
0.30-0.40	4			
0.40-0.50	5			
0.50-0.60	10		27.02	0.50
0.60-0.70	11			
0.70-0.80	16			
0.80-0.90	5			
0.90-1.00	6			
1.00-1.10	6		26.52	1.00
1.10-1.20	8			
1.20-1.30	20			
1.30-1.40	25			
			26.02	1.50
			25.52	2.00
			25.02	2.50
			24.52	3.00
			24.02	3.50
			23.52	4.00
			23.02	4.50
			22.52	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 1.40m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH41

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH42

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	27.44	AKM Design	10809-06-21
	Location 532234.8 E 676769.6 N	**Dates** 22/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	2		27.44	0.00
0.10-0.20	4			
0.20-0.30	4			
0.30-0.40	3			
0.40-0.50	3		26.94	0.50
0.50-0.60	4			
0.60-0.70	8			
0.70-0.80	8			
0.80-0.90	11		26.44	1.00
0.90-1.00	11			
1.00-1.10	12			
1.10-1.20	13			
1.20-1.30	14		25.94	1.50
1.30-1.40	19			
1.40-1.50	18			
1.50-1.60	25			
			25.44	2.00
			24.94	2.50
			24.44	3.00
			23.94	3.50
			23.44	4.00
			22.94	4.50
			22.44	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 1.60m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH42

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH43

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	27.15	AKM Design	10809-06-21
	Location 532127 E 676770.1 N	**Dates** 20/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	2		27.15	0.00
0.10-0.20	3			
0.20-0.30	3			
0.30-0.40	5			
0.40-0.50	18		26.65	0.50
0.50-0.60	15			
0.60-0.70	18			
0.70-0.80	29			
0.80-0.90	21		26.15	1.00
0.90-1.00	23			
1.00-1.10	25			
			25.65	1.50
			25.15	2.00
			24.65	2.50
			24.15	3.00
			23.65	3.50
			23.15	4.00
			22.65	4.50
			22.15	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 1.10m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH43

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH44

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	30.12	AKM Design	10809-06-21
	Location 532053.8 E 676768.1 N	**Dates** 20/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	2		30.12	0.00
0.10-0.20	3			
0.20-0.30	4			
0.30-0.40	4			
0.40-0.50	5			
0.50-0.60	3		29.62	0.50
0.60-0.70	3			
0.70-0.80	11			
0.80-0.90	11			
0.90-1.00	9			
1.00-1.10	7		29.12	1.00
1.10-1.20	7			
1.20-1.30	11			
1.30-1.40	10			
1.40-1.50	8			
1.50-1.60	10		28.62	1.50
1.60-1.70	9			
1.70-1.80	11			
1.80-1.90	12			
1.90-2.00	12			
2.00-2.10	15		28.12	2.00
2.10-2.20	16			
2.20-2.30	21			
2.30-2.40	20			
2.40-2.50	23			
2.50-2.60	25		27.62	2.50
			27.12	3.00
			26.62	3.50
			26.12	4.00
			25.62	4.50
			25.12	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 2.60m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH44

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH45

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	29.51	AKM Design	10809-06-21
	Location 532090.5 E 676764.1 N	**Dates** 21/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	2		29.51	0.00
0.10-0.20	3			
0.20-0.30	4			
0.30-0.40	4			
0.40-0.50	4			
0.50-0.60	5		29.01	0.50
0.60-0.70	7			
0.70-0.80	16			
0.80-0.90	7			
0.90-1.00	8			
1.00-1.10	5		28.51	1.00
1.10-1.20	5			
1.20-1.30	4			
1.30-1.40	5			
1.40-1.50	4			
1.50-1.60	5		28.01	1.50
1.60-1.70	5			
1.70-1.80	6			
1.80-1.90	10			
1.90-2.00	11			
2.00-2.10	13		27.51	2.00
2.10-2.20	10			
2.20-2.30	16			
2.30-2.40	18			
2.40-2.50	15			
2.50-2.60	22		27.01	2.50
2.60-2.70	25			
			26.51	3.00
			26.01	3.50
			25.51	4.00
			25.01	4.50
			24.51	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 2.70m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH45

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH46

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	27.62	AKM Design	10809-06-21
	Location 532154.6 E 676751.6 N	**Dates** 20/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	1		27.62	0.00
0.10-0.20	4			
0.20-0.30	4			
0.30-0.40	10			
0.40-0.50	15			
0.50-0.60	12		27.12	0.50
0.60-0.70	12			
0.70-0.80	13			
0.80-0.90	18			
0.90-1.00	16			
1.00-1.10	7		26.62	1.00
1.10-1.20	25			
			26.12	1.50
			25.62	2.00
			25.12	2.50
			24.62	3.00
			24.12	3.50
			23.62	4.00
			23.12	4.50
			22.62	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 1.20m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH46

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH47

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	30.36	AKM Design	10809-06-21
	Location 532078.3 E 676739.7 N	**Dates** 20/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	2		30.36	0.00
0.10-0.20	3			
0.20-0.30	5			
0.30-0.40	4			
0.40-0.50	2			
0.50-0.60	3		29.86	0.50
0.60-0.70	2			
0.70-0.80	3			
0.80-0.90	2			
0.90-1.00	3			
1.00-1.10	2		29.36	1.00
1.10-1.20	4			
1.20-1.30	13			
1.30-1.40	6			
1.40-1.50	3			
1.50-1.60	25		28.86	1.50
			28.36	2.00
			27.86	2.50
			27.36	3.00
			26.86	3.50
			26.36	4.00
			25.86	4.50
			25.36	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 1.60m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH47

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH48

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	28.66	AKM Design	10809-06-21
	Location 532115.1 E 676735.9 N	**Dates** 21/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	2		28.66	0.00
0.10-0.20	4			
0.20-0.30	5			
0.30-0.40	6			
0.40-0.50	6			
0.50-0.60	9		28.16	0.50
0.60-0.70	7			
0.70-0.80	7			
0.80-0.90	14			
0.90-1.00	11		27.66	1.00
			27.16	1.50
			26.66	2.00
			26.16	2.50
			25.66	3.00
			25.16	3.50
			24.66	4.00
			24.16	4.50
			23.66	5.00

Blows for Depth Increment: 0 2 4 6 8 10 12 14 16 18 20

Remarks
Refusal at 1.00m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH48

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH49

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	27.15	AKM Design	10809-06-21
	Location 532225.8 E 676740.9 N	**Dates** 22/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	2		27.15	0.00
0.10-0.20	6			
0.20-0.30	8			
0.30-0.40	6			
0.40-0.50	8			
0.50-0.60	9		26.65	0.50
0.60-0.70	10			
0.70-0.80	10			
0.80-0.90	12			
0.90-1.00	13			
1.00-1.10	10		26.15	1.00
1.10-1.20	10			
1.20-1.30	15			
1.30-1.40	21			
1.40-1.50	21			
1.50-1.60	25		25.65	1.50
			25.15	2.00
			24.65	2.50
			24.15	3.00
			23.65	3.50
			23.15	4.00
			22.65	4.50
			22.15	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 1.60m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH49

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH50

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	30.38	AKM Design	10809-06-21
	Location 532026.9 E 676735.3 N	**Dates** 20/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	2		30.38	0.00
0.10-0.20	3			
0.20-0.30	3			
0.30-0.40	2			
0.40-0.50	2			
0.50-0.60	3		29.88	0.50
0.60-0.70	3			
0.70-0.80	3			
0.80-0.90	3			
0.90-1.00	3			
1.00-1.10	3		29.38	1.00
1.10-1.20	5			
1.20-1.30	3			
1.30-1.40	3			
1.40-1.50	3			
1.50-1.60	3		28.88	1.50
1.60-1.70	5			
1.70-1.80	5			
1.80-1.90	25			
			28.38	2.00
			27.88	2.50
			27.38	3.00
			26.88	3.50
			26.38	4.00
			25.88	4.50
			25.38	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 1.90m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH50

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH51

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	30.92	AKM Design	10809-06-21
	Location 532044.4 E 676712.8 N	**Dates** 20/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	2		30.92	0.00
0.10-0.20	3			
0.20-0.30	7			
0.30-0.40	5			
0.40-0.50	9			
0.50-0.60	11		30.42	0.50
0.60-0.70	21			
0.70-0.80	26			
0.80-0.90	18			
0.90-1.00	20			
1.00-1.10	21		29.92	1.00
1.10-1.20	24			
			29.42	1.50
			28.92	2.00
			28.42	2.50
			27.92	3.00
			27.42	3.50
			26.92	4.00
			26.42	4.50
			25.92	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 1.20m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH51

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH52

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	27.32	AKM Design	10809-06-21
	Location 532143.1 E 676721.8 N	**Dates** 20/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	2		27.32	0.00
0.10-0.20	2			
0.20-0.30	3			
0.30-0.40	4			
0.40-0.50	8		26.82	0.50
0.50-0.60	2			
0.60-0.70	1			
0.70-0.80	0			
0.80-0.90	25		26.32	1.00
			25.82	1.50
			25.32	2.00
			24.82	2.50
			24.32	3.00
			23.82	3.50
			23.32	4.00
			22.82	4.50
			22.32	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 0.90m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH52

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH53

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	29.87	AKM Design	10809-06-21
	Location 532103.4 E 676709.9 N	**Dates** 20/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	2		29.87	0.00
0.10-0.20	3			
0.20-0.30	4			
0.30-0.40	3			
0.40-0.50	3		29.37	0.50
0.50-0.60	4			
0.60-0.70	8			
0.70-0.80	5			
0.80-0.90	3		28.87	1.00
0.90-1.00	2			
1.00-1.10	5			
1.10-1.20	7			
1.20-1.30	8			
1.30-1.40	5		28.37	1.50
1.40-1.50	4			
1.50-1.60	4			
1.60-1.70	3			
1.70-1.80	2			
1.80-1.90	4			
1.90-2.00	5		27.87	2.00
2.00-2.10	4			
2.10-2.20	4			
2.20-2.30	2			
2.30-2.40	3			
2.40-2.50	5		27.37	2.50
2.50-2.60	4			
2.60-2.70	6			
2.70-2.80	10			
2.80-2.90	13		26.87	3.00
2.90-3.00	25			
			26.37	3.50
			25.87	4.00
			25.37	4.50
			24.87	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 3.00m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH53

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH54

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	28.18	AKM Design	10809-06-21
	Location 532131.8 E 676692.6 N	**Dates** 20/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	1		28.18	0.00
0.10-0.20	2			
0.20-0.30	3			
0.30-0.40	3			
0.40-0.50	3			
0.50-0.60	7		27.68	0.50
0.60-0.70	6			
0.70-0.80	4			
0.80-0.90	4			
0.90-1.00	7			
1.00-1.10	18		27.18	1.00
1.10-1.20	26			
1.20-1.30	25			
			26.68	1.50
			26.18	2.00
			25.68	2.50
			25.18	3.00
			24.68	3.50
			24.18	4.00
			23.68	4.50
			23.18	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 1.30m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH54

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH55

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	27.57	AKM Design	10809-06-21
	Location 532168.3 E 676694.8 N	**Dates** 20/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	2		27.57	0.00
0.10-0.20	2			
0.20-0.30	3			
0.30-0.40	3			
0.40-0.50	8			
0.50-0.60	9		27.07	0.50
0.60-0.70	6			
0.70-0.80	5			
0.80-0.90	5			
0.90-1.00	6			
1.00-1.10	9		26.57	1.00
1.10-1.20	5			
1.20-1.30	4			
1.30-1.40	7			
1.40-1.50	6			
1.50-1.60	7		26.07	1.50
1.60-1.70	15			
1.70-1.80	18			
1.80-1.90	24			
1.90-2.00	25			
			25.57	2.00
			25.07	2.50
			24.57	3.00
			24.07	3.50
			23.57	4.00
			23.07	4.50
			22.57	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 2.00m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH55

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH56

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	30.94	AKM Design	10809-06-21
	Location 532062.2 E 676692.1 N	**Dates** 20/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	1		30.94	0.00
0.10-0.20	3			
0.20-0.30	4			
0.30-0.40	7			
0.40-0.50	8			
0.50-0.60	10		30.44	0.50
0.60-0.70	8			
0.70-0.80	11			
0.80-0.90	9			
0.90-1.00	5			
1.00-1.10	7		29.94	1.00
1.10-1.20	6			
1.20-1.30	5			
1.30-1.40	5			
1.40-1.50	5			
1.50-1.60	6		29.44	1.50
1.60-1.70	7			
1.70-1.80	7			
1.80-1.90	7			
1.90-2.00	10			
2.00-2.10	13		28.94	2.00
2.10-2.20	25			
			28.44	2.50
			27.94	3.00
			27.44	3.50
			26.94	4.00
			26.44	4.50
			25.94	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 2.20m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH56

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH57

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	30.42	AKM Design	10809-06-21
	Location 532082.3 E 676671.4 N	**Dates** 20/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	1		30.42	0.00
0.10-0.20	2			
0.20-0.30	2			
0.30-0.40	4			
0.40-0.50	5			
0.50-0.60	5		29.92	0.50
0.60-0.70	9			
0.70-0.80	4			
0.80-0.90	5			
0.90-1.00	3			
1.00-1.10	10		29.42	1.00
1.10-1.20	14			
1.20-1.30	14			
1.30-1.40	27			
1.40-1.50	22			
1.50-1.60	25		28.92	1.50
			28.42	2.00
			27.92	2.50
			27.42	3.00
			26.92	3.50
			26.42	4.00
			25.92	4.50
			25.42	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 1.60m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

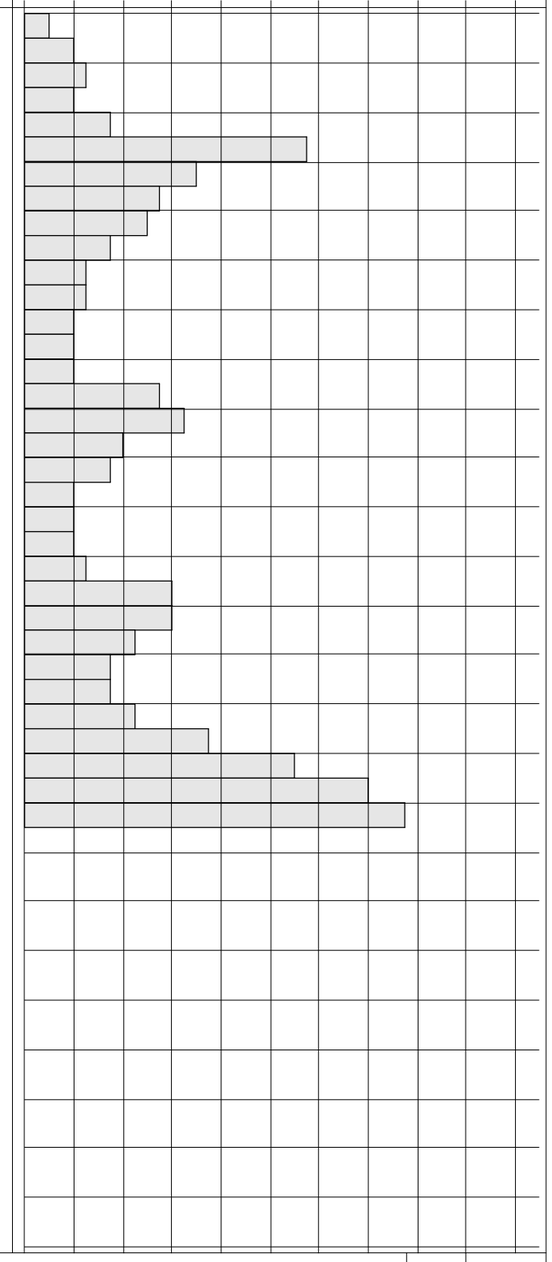
Figure No.
10809-06-21.DPH57

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH58

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	27.24	AKM Design	10809-06-21
	Location 532159.6 E 676669.4 N	**Dates** 20/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	2		27.24	0.00
0.10-0.20	4			
0.20-0.30	5			
0.30-0.40	4			
0.40-0.50	7			
0.50-0.60	23		26.74	0.50
0.60-0.70	14			
0.70-0.80	11			
0.80-0.90	10			
0.90-1.00	7			
1.00-1.10	5		26.24	1.00
1.10-1.20	5			
1.20-1.30	4			
1.30-1.40	4			
1.40-1.50	4			
1.50-1.60	11		25.74	1.50
1.60-1.70	13			
1.70-1.80	8			
1.80-1.90	7			
1.90-2.00	4			
2.00-2.10	4		25.24	2.00
2.10-2.20	4			
2.20-2.30	5			
2.30-2.40	12			
2.40-2.50	12			
2.50-2.60	9		24.74	2.50
2.60-2.70	7			
2.70-2.80	7			
2.80-2.90	9			
2.90-3.00	15			
3.00-3.10	22		24.24	3.00
3.10-3.20	28			
3.20-3.30	31			
			23.74	3.50
			23.24	4.00
			22.74	4.50
			22.24	5.00



Remarks
Refusal at 3.30m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

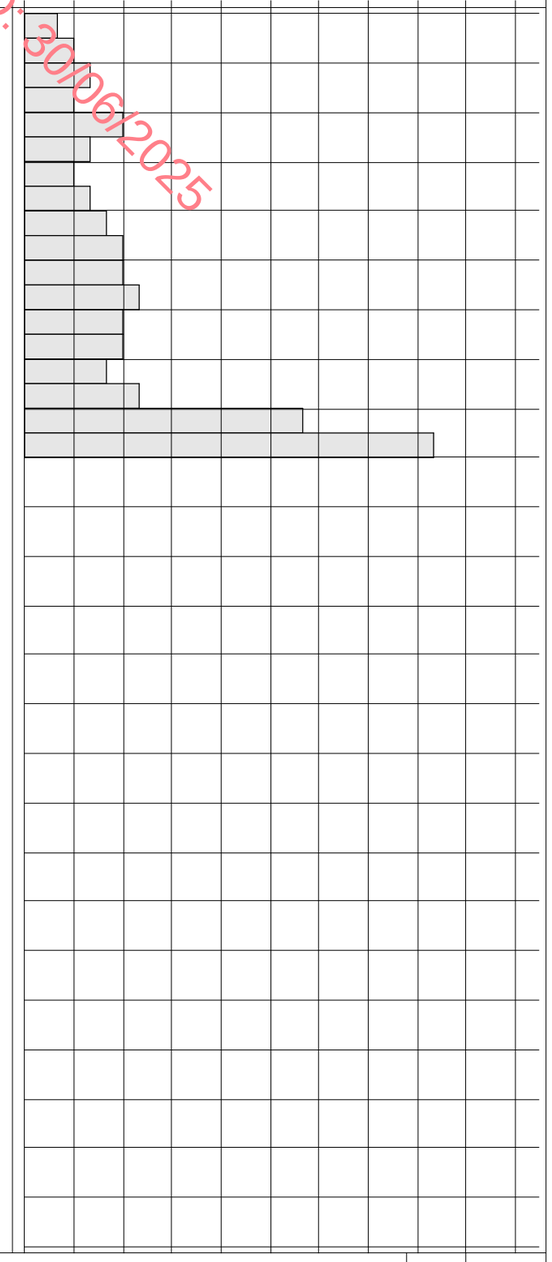
Figure No.
10809-06-21.DPH58

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH59

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	29.18	AKM Design	10809-06-21
	Location 532100.8 E 676648.9 N	**Dates** 20/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	2		29.18	0.00
0.10-0.20	3			
0.20-0.30	4			
0.30-0.40	3			
0.40-0.50	6			
0.50-0.60	4		28.68	0.50
0.60-0.70	3			
0.70-0.80	4			
0.80-0.90	5			
0.90-1.00	6			
1.00-1.10	6		28.18	1.00
1.10-1.20	7			
1.20-1.30	6			
1.30-1.40	6			
1.40-1.50	5			
1.50-1.60	7		27.68	1.50
1.60-1.70	17			
1.70-1.80	25			
			27.18	2.00
			26.68	2.50
			26.18	3.00
			25.68	3.50
			25.18	4.00
			24.68	4.50
			24.18	5.00



Remarks
Refusal at 1.80m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH59

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH60

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	28.01	AKM Design	10809-06-21
	Location 532118.8 E 676629.1 N	**Dates** 20/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	1		28.01	0.00
0.10-0.20	3			
0.20-0.30	3			
0.30-0.40	2			
0.40-0.50	9		27.51	0.50
0.50-0.60	8			
0.60-0.70	8			
0.70-0.80	7			
0.80-0.90	7			
0.90-1.00	8		27.01	1.00
1.00-1.10	8			
1.10-1.20	7			
1.20-1.30	7			
1.30-1.40	6			
1.40-1.50	6		26.51	1.50
1.50-1.60	9			
1.60-1.70	11			
1.70-1.80	13			
1.80-1.90	25			
			26.01	2.00
			25.51	2.50
			25.01	3.00
			24.51	3.50
			24.01	4.00
			23.51	4.50
			23.01	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 1.90m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

Figure No.
10809-06-21.DPH60

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH61

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	26.18	AKM Design	10809-06-21
	Location 532184.9 E 676622.3 N	**Dates** 20/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	1		26.18	0.00
0.10-0.20	3			
0.20-0.30	4			
0.30-0.40	4			
0.40-0.50	8			
0.50-0.60	5		25.68	0.50
0.60-0.70	6			
0.70-0.80	7			
0.80-0.90	16			
0.90-1.00	25		25.18	1.00
			24.68	1.50
			24.18	2.00
			23.68	2.50
			23.18	3.00
			22.68	3.50
			22.18	4.00
			21.68	4.50
			21.18	5.00

Blows for Depth Increment: 0 3 6 9 12 15 18 21 24 27 30

Remarks
Refusal at 1.00m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

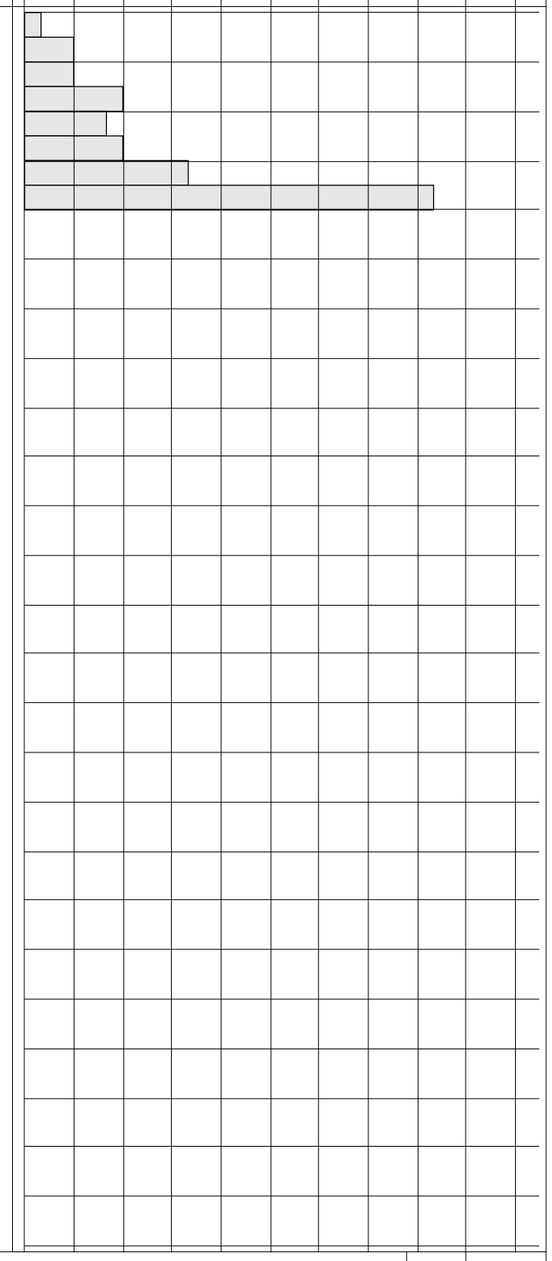
Figure No.
10809-06-21.DPH61

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH62

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	26.55	AKM Design	10809-06-21
	Location 532137.8 E 676604.4 N	**Dates** 20/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	1		26.55	0.00
0.10-0.20	3			
0.20-0.30	3			
0.30-0.40	6		26.05	0.50
0.40-0.50	5			
0.50-0.60	6			
0.60-0.70	10		25.55	1.00
0.70-0.80	25			
			25.05	1.50
			24.55	2.00
			24.05	2.50
			23.55	3.00
			23.05	3.50
			22.55	4.00
			22.05	4.50
			21.55	5.00



Remarks
Refusal at 0.80m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

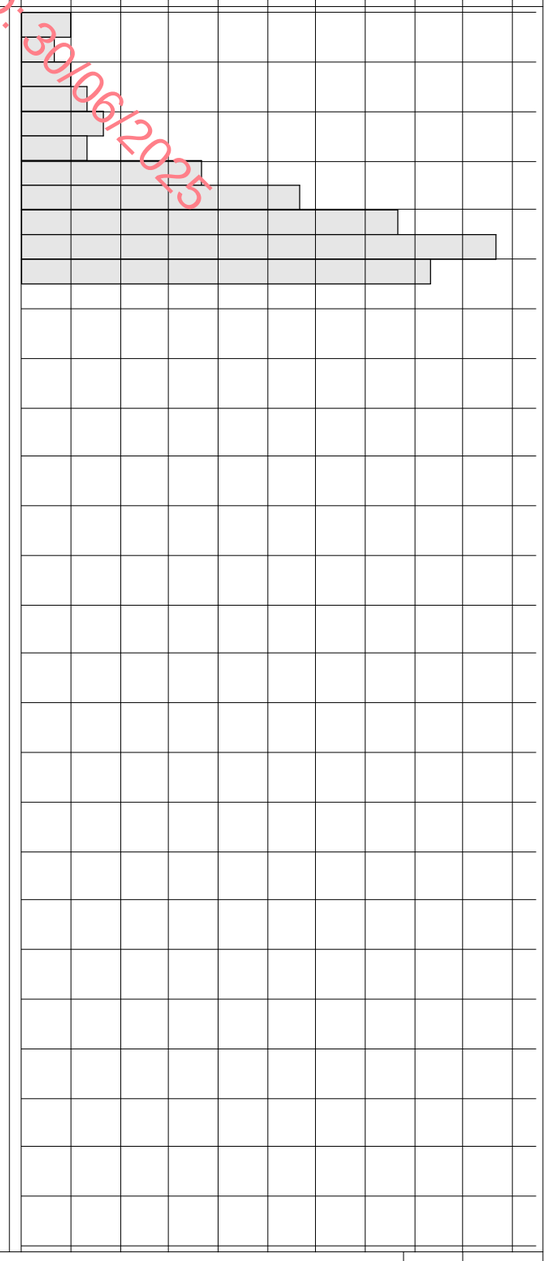
Figure No.
10809-06-21.DPH62

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Site Investigation Ennis	DPH63

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe Heavy (DPH), Fall Height 500mm, Hammer Weight 50kg	Diameter 43.7mm, Angle 0°	26.33	AKM Design	10809-06-21
	Location 532157.8 E 676622.5 N	**Dates** 20/07/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	3		26.33	0.00
0.10-0.20	2			
0.20-0.30	3			
0.30-0.40	4		25.83	0.50
0.40-0.50	5			
0.50-0.60	4			
0.60-0.70	11		25.33	1.00
0.70-0.80	17			
0.80-0.90	23			
0.90-1.00	29		24.83	1.50
1.00-1.10	25			
			24.33	2.00
			23.83	2.50
			23.33	3.00
			22.83	3.50
			22.33	4.00
			21.83	4.50
			21.33	5.00



Remarks
Refusal at 1.10m BGL.

Scale (approx)	Logged By
1:25	C. Byrne

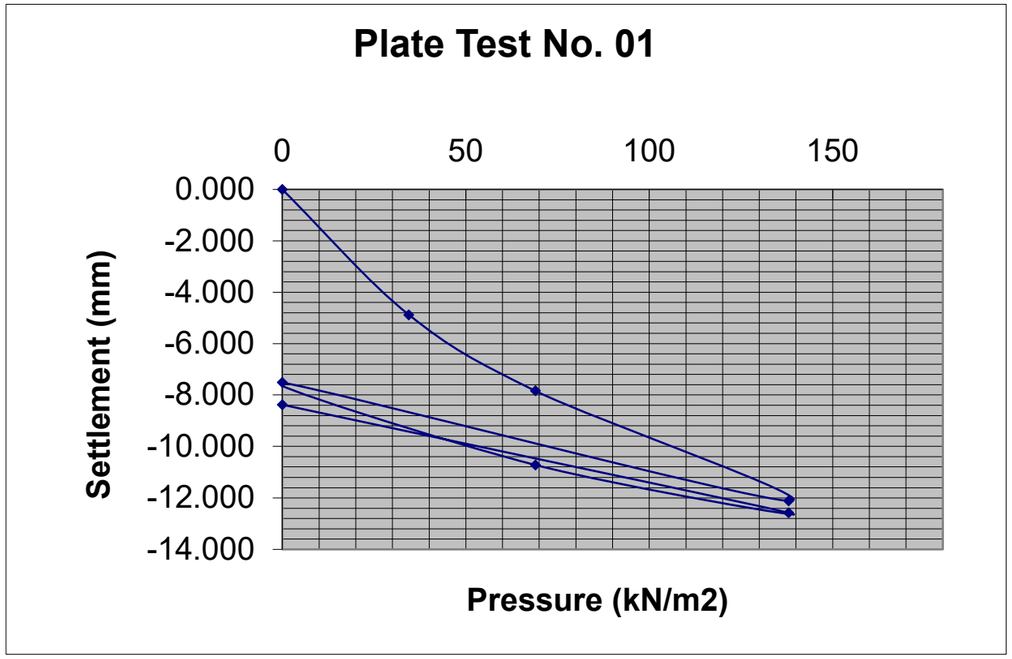
Figure No.
10809-06-21.DPH63

APPENDIX 4 – Plate Test Records

Applied Load	Gauge settlement
0	**0.000**
34.5	-4.88
69	-7.835
138	-12.115
0	-7.515
69	-10.72
138	-12.58
0	-8.375

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Site Investigation Ennis	**MATERIAL**	Light brown slightly sandy slightly gravelly CLAY.
CONTRACT NO.	10809-06-21		
DATE	15/07/2021		
CLIENT	AKM	**DEPTH**	0.25m
PLATE DIAMETER	457mm	**NOTES**	
TEST NO.	CBR-01	**SAMPLES**	



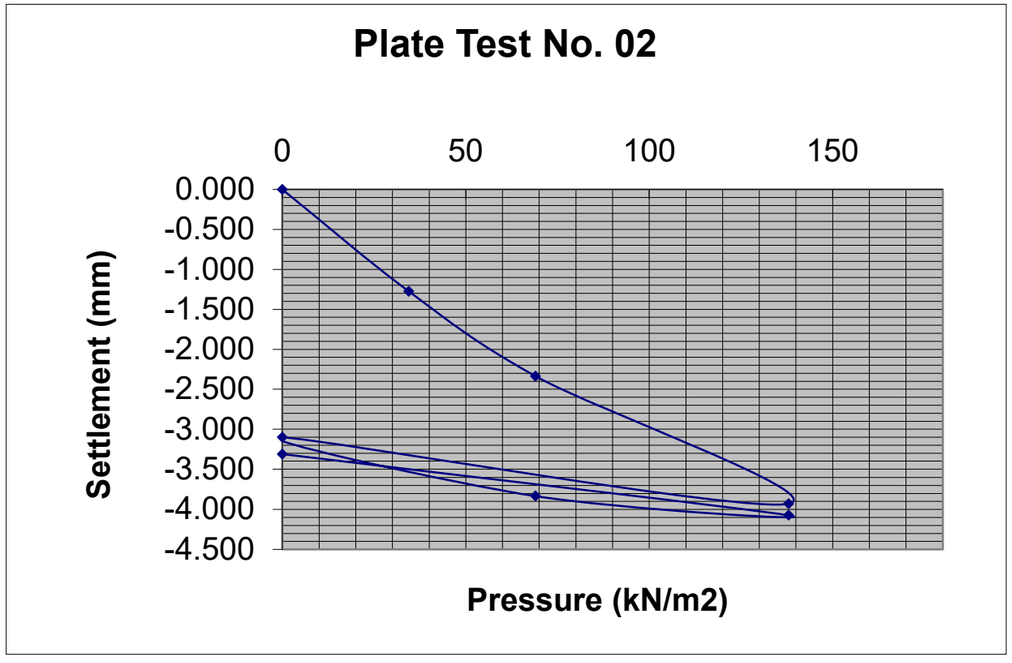
Modulus of subgrade reaction, K (Initial) = **5.95 MN/m2/m**
Modulus of subgrade reaction, K (Reload) = **14.55 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.21 %**
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **1.00 %**

Applied Load	Gauge settlement
0	**0.000**
34.5	-1.275
69	-2.335
138	-3.93
0	-3.1
69	-3.835
138	-4.075
0	-3.31

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Site Investigation Ennis	**MATERIAL**	Light brown slightly sandy slightly gravelly CLAY.
CONTRACT NO.	10809-06-21		
DATE	15/07/2021		
CLIENT	AKM	**DEPTH**	0.30m
PLATE DIAMETER	457mm	**NOTES**	
TEST NO.	CBR-02	**SAMPLES**	



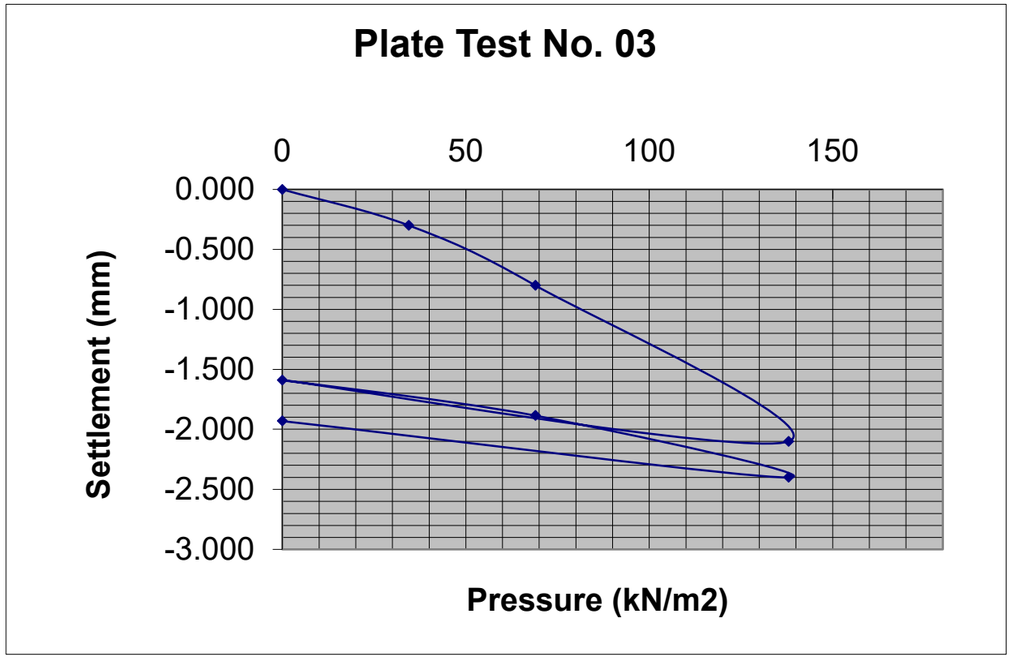
Modulus of subgrade reaction, K (Initial) = **19.97 MN/m2/m**
Modulus of subgrade reaction, K (Reload) = **63.43 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **1.73 %**
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **12.82 %**

Applied Load	Gauge settlement
0	**0.000**
34.5	-0.3
69	-0.8
138	-2.1
0	-1.59
69	-1.885
138	-2.4
0	-1.93

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Site Investigation Ennis	**MATERIAL**	Light brown slightly sandy slightly gravelly CLAY.
CONTRACT NO.	10809-06-21		
DATE	15/07/2021		
CLIENT	AKM	**DEPTH**	0.20m
PLATE DIAMETER	457mm	**NOTES**	
TEST NO.	CBR-03	**SAMPLES**	



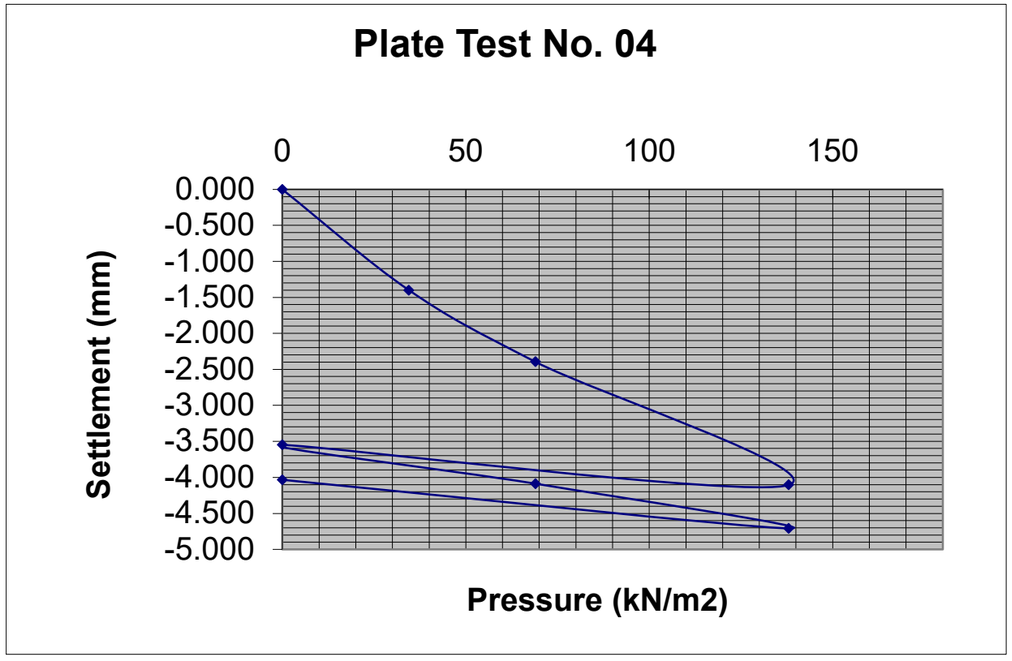
Modulus of subgrade reaction, K (Initial) = **58.28 MN/m2/m**
Modulus of subgrade reaction, K (Reload) = **158.05 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **11.07 %**
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **62.35 %**

Applied Load	Gauge settlement
0	**0.000**
34.5	-1.4
69	-2.395
138	-4.105
0	-3.55
69	-4.09
138	-4.71
0	-4.035

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Site Investigation Ennis	**MATERIAL**	Light brown slightly sandy slightly gravelly CLAY.
CONTRACT NO.	10809-06-21		
DATE	15/07/2021		
CLIENT	AKM	**DEPTH**	0.35m
PLATE DIAMETER	457mm	**NOTES**	
TEST NO.	CBR-04	**SAMPLES**	



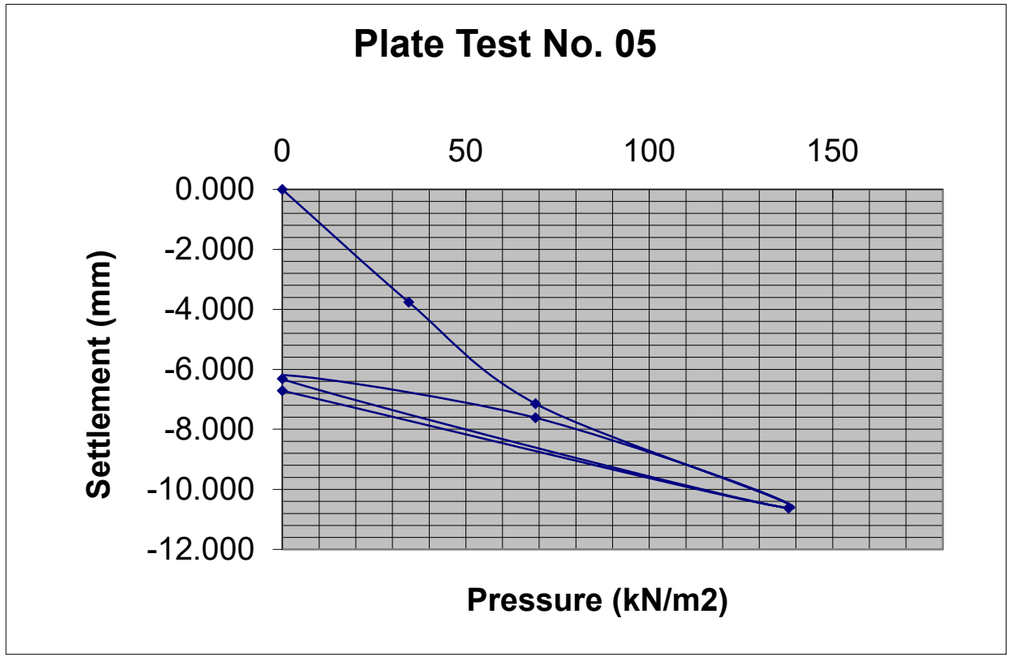
Modulus of subgrade reaction, K (Initial) = **19.47 MN/m2/m**
Modulus of subgrade reaction, K (Reload) = **86.34 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **1.65 %**
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **21.87 %**

Applied Load	Gauge settlement
0	**0.000**
34.5	-3.765
69	-7.145
138	-10.625
0	-6.32
69	-7.615
138	-10.63
0	-6.715

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Site Investigation Ennis	**MATERIAL**	Light brown slightly sandy slightly gravelly CLAY.
CONTRACT NO.	10809-06-21		
DATE	15/07/2021		
CLIENT	AKM	**DEPTH**	0.35m
PLATE DIAMETER	457mm	**NOTES**	
TEST NO.	CBR-05	**SAMPLES**	



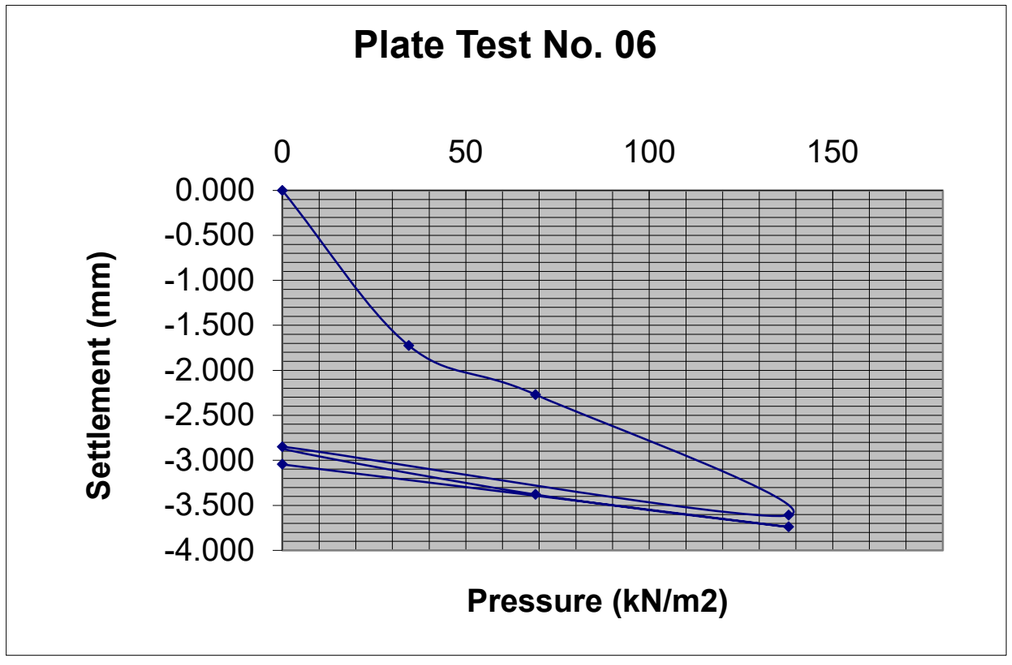
Modulus of subgrade reaction, K (Initial) = **6.53 MN/m2/m**
Modulus of subgrade reaction, K (Reload) = **36.00 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.25 %**
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **4.80 %**

Applied Load	Gauge settlement
0	**0.000**
34.5	-1.725
69	-2.27
138	-3.61
0	-2.85
69	-3.38
138	-3.74
0	-3.045

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Site Investigation Ennis	**MATERIAL**	Light brown slightly sandy slightly gravelly CLAY.
CONTRACT NO.	10809-06-21		
DATE	15/07/2021		
CLIENT	AKM	**DEPTH**	0.35m
PLATE DIAMETER	457mm	**NOTES**	
TEST NO.	CBR-06	**SAMPLES**	



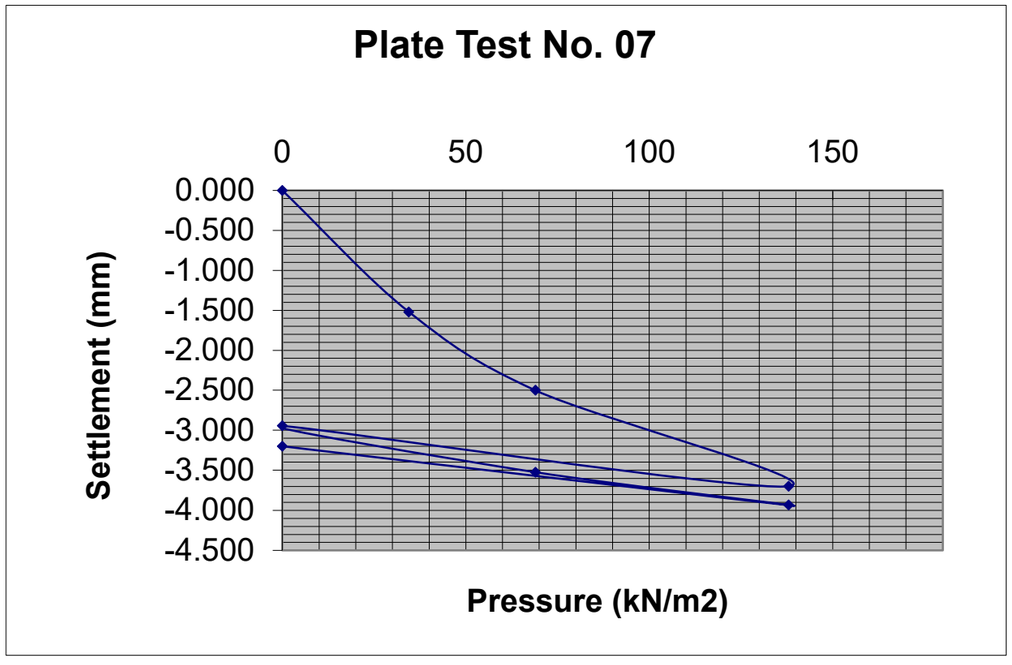
Modulus of subgrade reaction, K (Initial) = **20.54 MN/m2/m**
Modulus of subgrade reaction, K (Reload) = **87.97 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **1.82 %**
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **22.59 %**

Applied Load	Gauge settlement
0	**0.000**
34.5	-1.52
69	-2.5
138	-3.7
0	-2.945
69	-3.525
138	-3.935
0	-3.2

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Site Investigation Ennis	**MATERIAL**	Light brown slightly sandy slightly gravelly CLAY.
CONTRACT NO.	10809-06-21		
DATE	15/07/2021		
CLIENT	AKM	**DEPTH**	0.35m
PLATE DIAMETER	457mm	**NOTES**	
TEST NO.	CBR-07	**SAMPLES**	



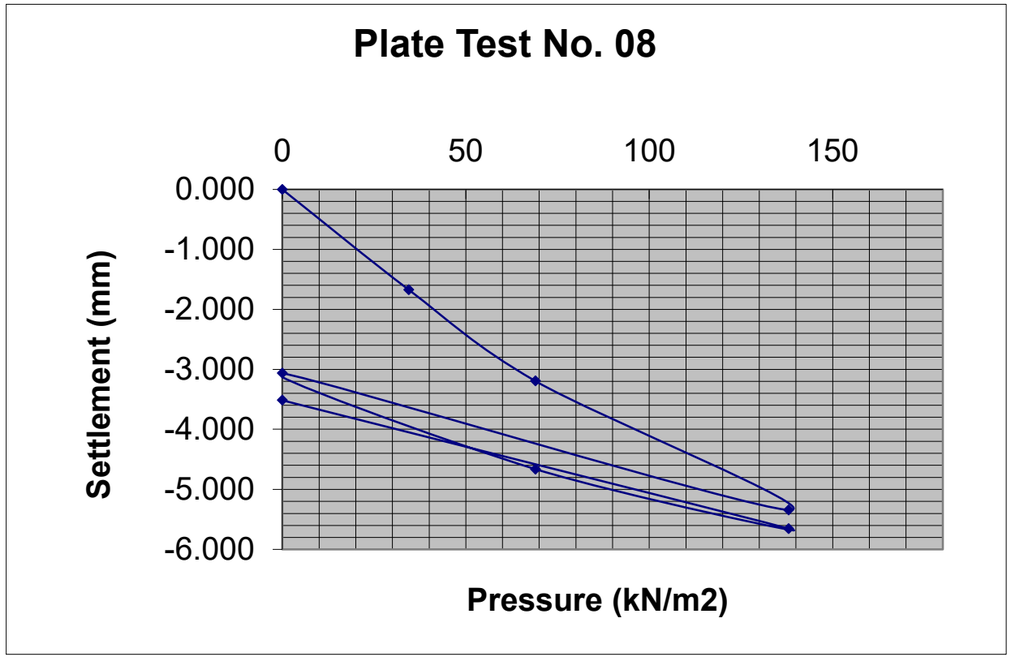
Modulus of subgrade reaction, K (Initial) = **18.65 MN/m2/m**
Modulus of subgrade reaction, K (Reload) = **80.39 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **1.54 %**
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **19.32 %**

Applied Load	Gauge settlement
0	**0.000**
34.5	-1.675
69	-3.195
138	-5.345
0	-3.065
69	-4.665
138	-5.655
0	-3.515

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Site Investigation Ennis	**MATERIAL**	Light brown slightly sandy slightly gravelly CLAY.
CONTRACT NO.	10809-06-21		
DATE	15/07/2021		
CLIENT	AKM	**DEPTH**	0.30m
PLATE DIAMETER	457mm	**NOTES**	
TEST NO.	CBR-08	**SAMPLES**	



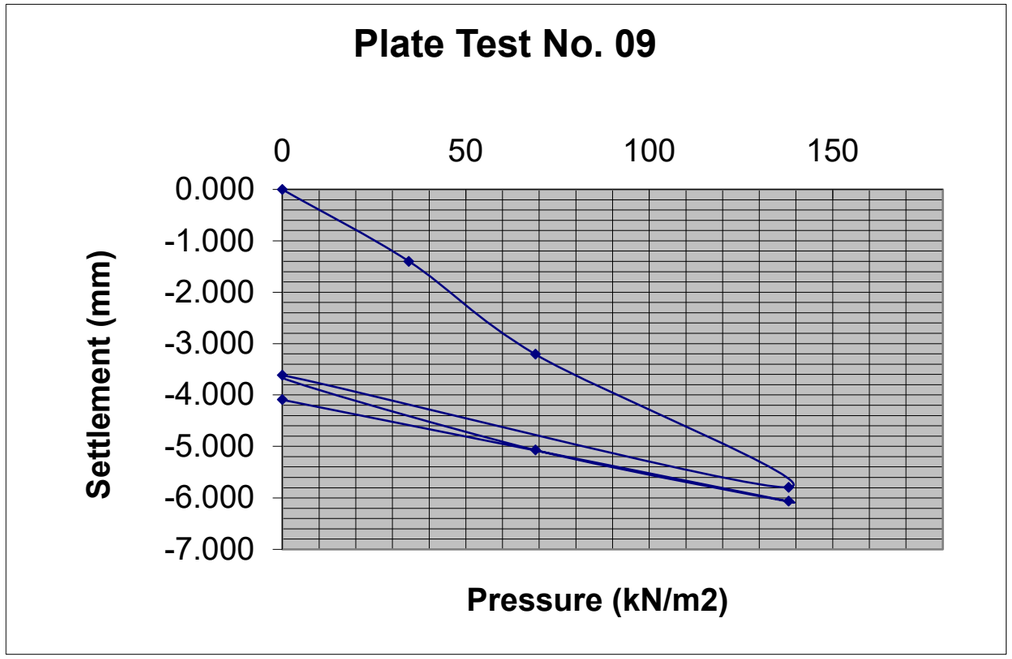
Modulus of subgrade reaction, K (Initial) = **14.59 MN/m2/m**
Modulus of subgrade reaction, K (Reload) = **29.14 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **1.00 %**
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **3.33 %**

Applied Load	Gauge settlement
0	**0.000**
34.5	-1.4
69	-3.205
138	-5.795
0	-3.615
69	-5.07
138	-6.065
0	-4.09

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Site Investigation Ennis	**MATERIAL**	Light brown slightly sandy slightly gravelly CLAY.
CONTRACT NO.	10809-06-21		
DATE	14/07/2021		
CLIENT	AKM	**DEPTH**	0.30m
PLATE DIAMETER	457mm	**NOTES**	
TEST NO.	CBR-09	**SAMPLES**	



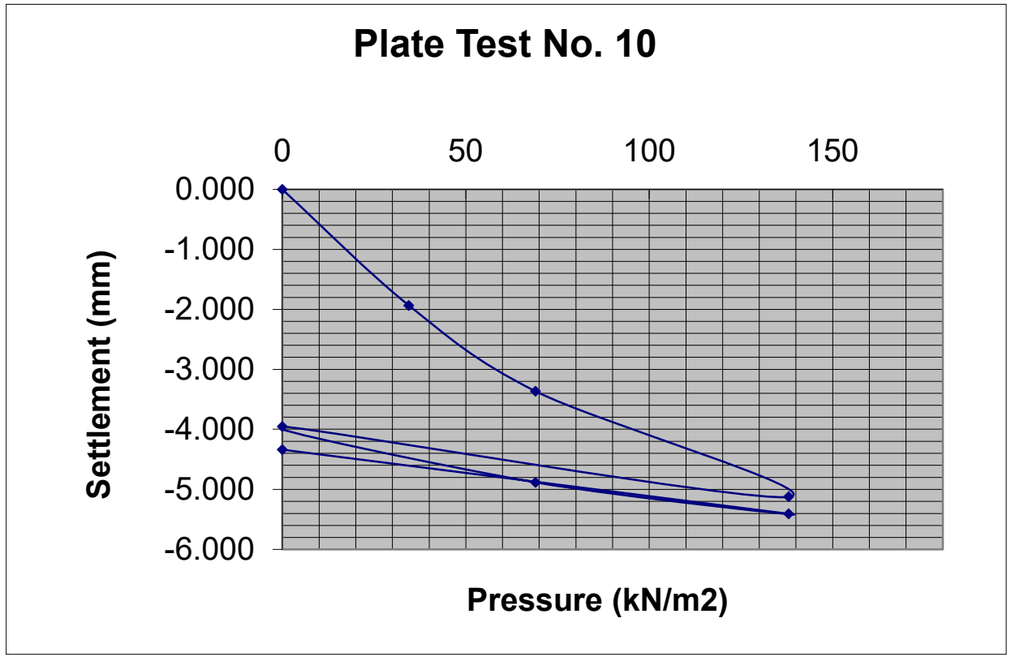
Modulus of subgrade reaction, K (Initial) = **14.55 MN/m2/m**
Modulus of subgrade reaction, K (Reload) = **32.04 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **1.00 %**
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **3.92 %**

Applied Load	Gauge settlement
0	**0.000**
34.5	-1.935
69	-3.365
138	-5.125
0	-3.955
69	-4.885
138	-5.41
0	-4.34

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Site Investigation Ennis	**MATERIAL**	Light brown slightly sandy slightly gravelly CLAY.
CONTRACT NO.	10809-06-21		
DATE	15/07/2021		
CLIENT	AKM	**DEPTH**	0.25m
PLATE DIAMETER	457mm	**NOTES**	
TEST NO.	CBR-10	**SAMPLES**	



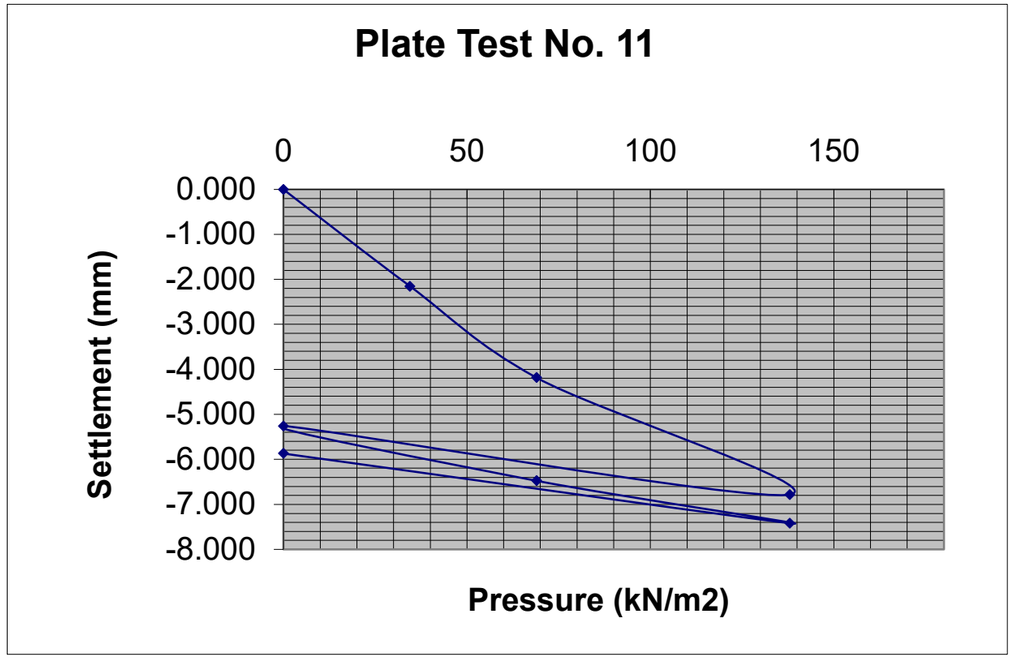
Modulus of subgrade reaction, K (Initial) = **13.86 MN/m2/m**
Modulus of subgrade reaction, K (Reload) = **50.13 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.92 %**
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **8.52 %**

Applied Load	Gauge settlement
0	**0.000**
34.5	-2.155
69	-4.185
138	-6.785
0	-5.26
69	-6.475
138	-7.42
0	-5.87

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Site Investigation Ennis	**MATERIAL**	Light brown slightly sandy slightly gravelly CLAY.
CONTRACT NO.	10809-06-21		
DATE	14/07/2021		
CLIENT	AKM	**DEPTH**	0.35m
PLATE DIAMETER	457mm	**NOTES**	
TEST NO.	CBR-11	**SAMPLES**	



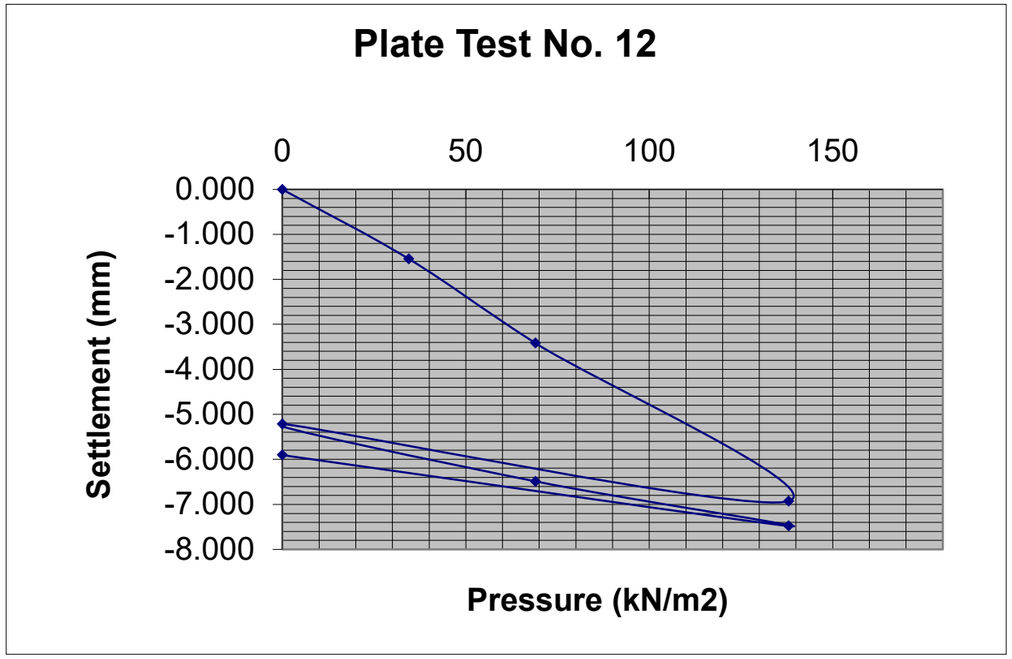
Modulus of subgrade reaction, K (Initial) = **11.14 MN/m2/m**
Modulus of subgrade reaction, K (Reload) = **38.37 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.63 %**
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **5.36 %**

Applied Load	Gauge settlement
0	**0.000**
34.5	-1.545
69	-3.415
138	-6.93
0	-5.215
69	-6.49
138	-7.48
0	-5.905

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Site Investigation Ennis	**MATERIAL**	Light brown slightly sandy slightly gravelly CLAY.
CONTRACT NO.	10809-06-21		
DATE	14/07/2021		
CLIENT	AKM	**DEPTH**	0.30m
PLATE DIAMETER	457mm	**NOTES**	
TEST NO.	CBR-12	**SAMPLES**	



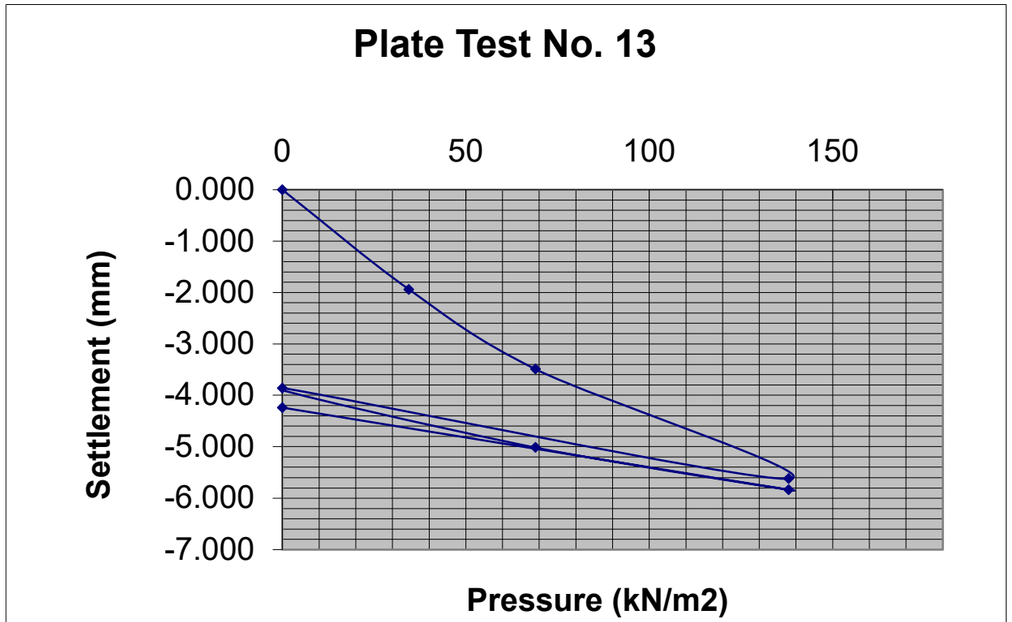
Modulus of subgrade reaction, K (Initial) = **13.65 MN/m2/m**
Modulus of subgrade reaction, K (Reload) = **36.57 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.89 %**
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **4.93 %**

Applied Load	Gauge settlement
0	**0.000**
34.5	-1.94
69	-3.49
138	-5.62
0	-3.86
69	-5.015
138	-5.835
0	-4.24

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Site Investigation Ennis	**MATERIAL**	Light brown slightly sandy slightly gravelly CLAY.
CONTRACT NO.	10809-06-21		
DATE	14/07/2021		
CLIENT	AKM	**DEPTH**	0.30m
PLATE DIAMETER	457mm	**NOTES**	
TEST NO.	CBR-13	**SAMPLES**	



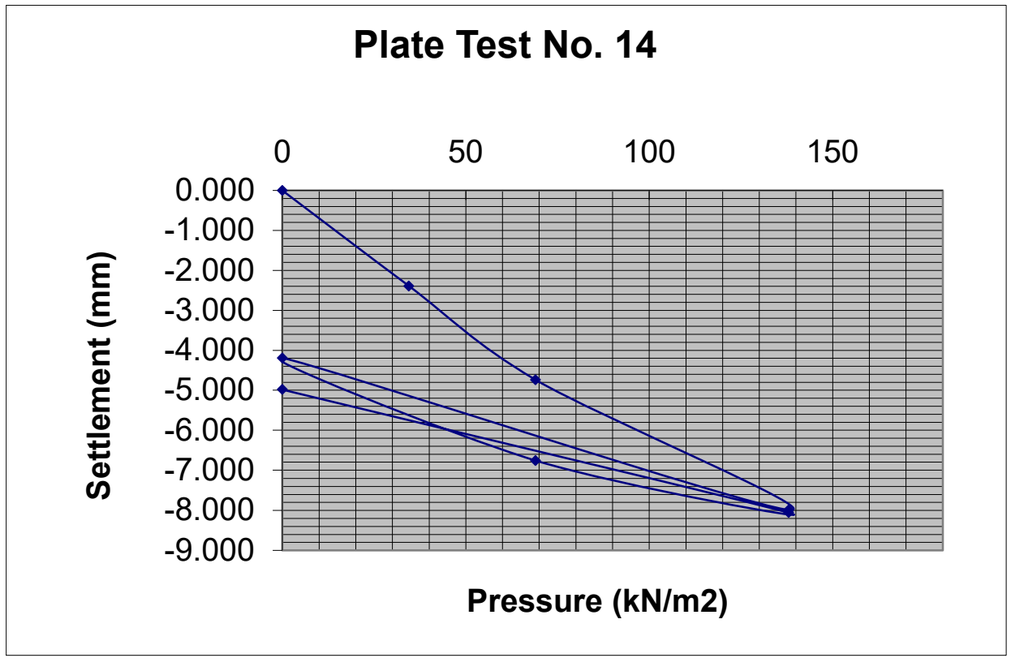
Modulus of subgrade reaction, K (Initial) = **13.36 MN/m2/m**
Modulus of subgrade reaction, K (Reload) = **40.37 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.86 %**
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **5.86 %**

Applied Load	Gauge settlement
0	**0.000**
34.5	-2.39
69	-4.735
138	-7.99
0	-4.19
69	-6.755
138	-8.06
0	-4.98

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Site Investigation Ennis	**MATERIAL**	Light brown slightly sandy slightly gravelly CLAY.
CONTRACT NO.	10809-06-21		
DATE	14/07/2021		
CLIENT	AKM	**DEPTH**	0.25m
PLATE DIAMETER	457mm	**NOTES**	
TEST NO.	CBR-14	**SAMPLES**	



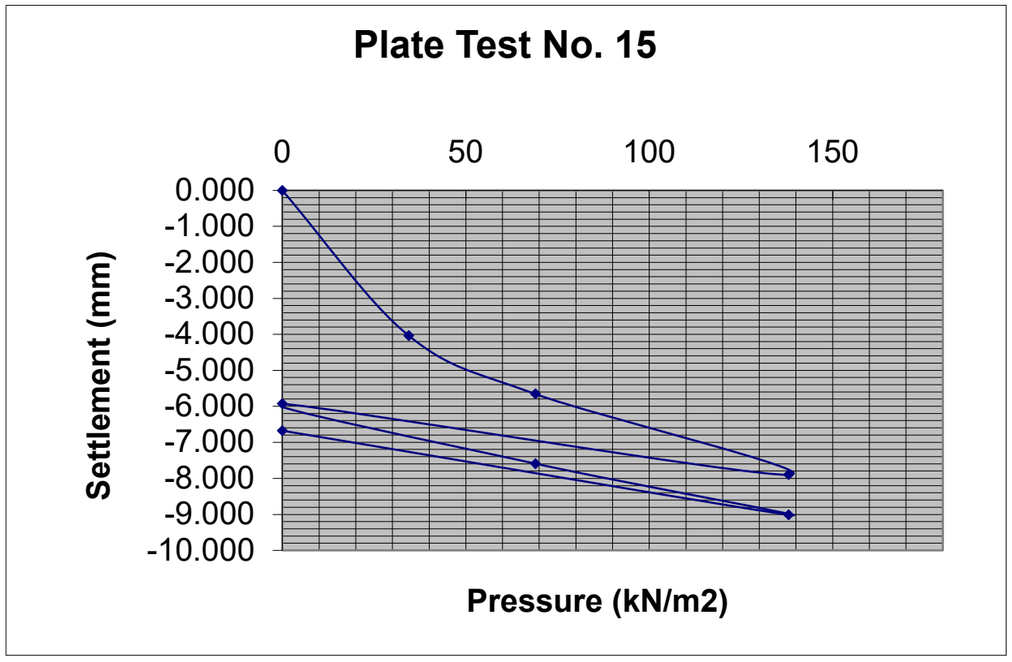
Modulus of subgrade reaction, K (Initial) = **9.85 MN/m2/m**
Modulus of subgrade reaction, K (Reload) = **18.18 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.51 %**
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **1.47 %**

Applied Load	Gauge settlement
0	**0.000**
34.5	-4.04
69	-5.655
138	-7.9
0	-5.93
69	-7.595
138	-9.015
0	-6.675

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Site Investigation Ennis	**MATERIAL**	Light brown slightly sandy slightly gravelly CLAY.
CONTRACT NO.	10809-06-21		
DATE	14/07/2021		
CLIENT	AKM	**DEPTH**	0.30m
PLATE DIAMETER	457mm	**NOTES**	
TEST NO.	CBR-15	**SAMPLES**	



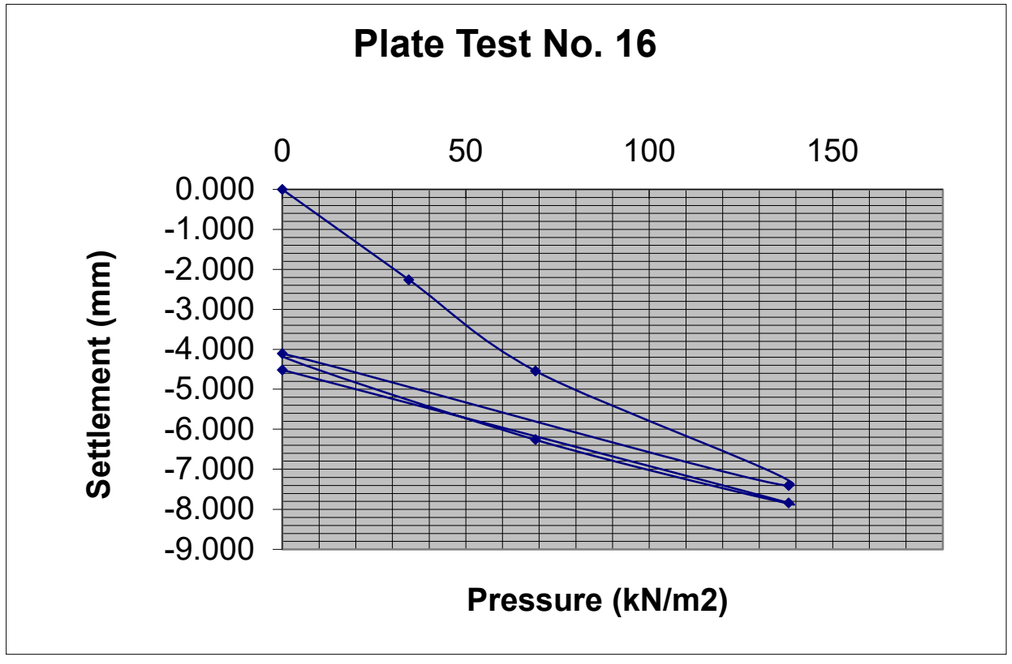
Modulus of subgrade reaction, K (Initial) = **8.24 MN/m2/m**
Modulus of subgrade reaction, K (Reload) = **28.00 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.37 %**
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **3.11 %**

Applied Load	Gauge settlement
0	**0.000**
34.5	-2.26
69	-4.54
138	-7.41
0	-4.11
69	-6.26
138	-7.84
0	-4.515

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Site Investigation Ennis	**MATERIAL**	Light brown slightly sandy slightly gravelly CLAY.
CONTRACT NO.	10809-06-21		
DATE	14/07/2021		
CLIENT	AKM	**DEPTH**	0.30m
PLATE DIAMETER	457mm	**NOTES**	
TEST NO.	CBR-16	**SAMPLES**	



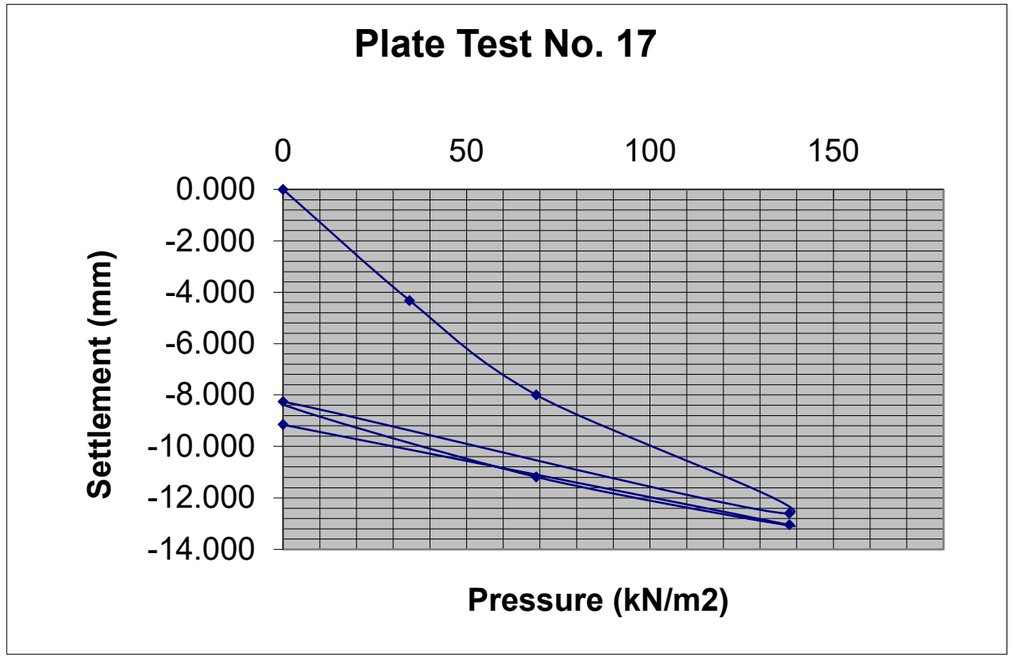
Modulus of subgrade reaction, K (Initial) = **10.27 MN/m2/m**
Modulus of subgrade reaction, K (Reload) = **21.69 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.55 %**
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **1.99 %**

Applied Load	Gauge settlement
0	**0.000**
34.5	-4.325
69	-7.995
138	-12.605
0	-8.26
69	-11.185
138	-13.05
0	-9.15

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Site Investigation Ennis	**MATERIAL**	Light brown slightly sandy slightly gravelly CLAY.
CONTRACT NO.	10809-06-21		
DATE	14/07/2021		
CLIENT	AKM	**DEPTH**	0.25m
PLATE DIAMETER	457mm	**NOTES**	
TEST NO.	CBR-17	**SAMPLES**	



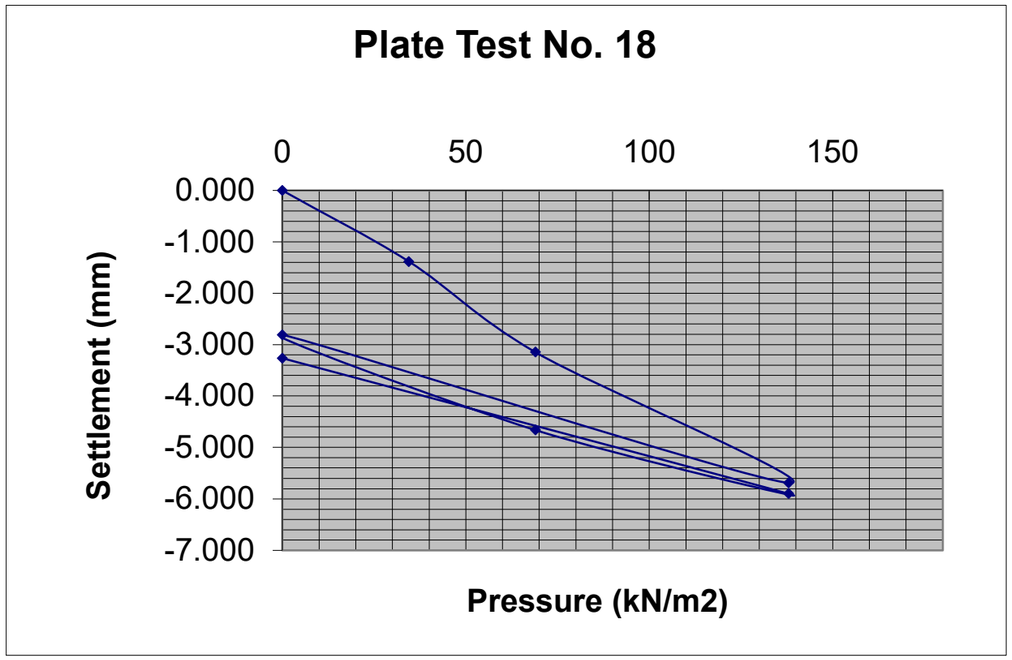
Modulus of subgrade reaction, K (Initial) = **5.83 MN/m2/m**
Modulus of subgrade reaction, K (Reload) = **15.94 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.20 %**
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **1.17 %**

Applied Load	Gauge settlement
0	**0.000**
34.5	-1.385
69	-3.145
138	-5.69
0	-2.81
69	-4.66
138	-5.9
0	-3.265

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Site Investigation Ennis	**MATERIAL**	Light brown slightly sandy slightly gravelly CLAY.
CONTRACT NO.	10809-06-21		
DATE	14/07/2021		
CLIENT	AKM	**DEPTH**	0.25m
PLATE DIAMETER	457mm	**NOTES**	
TEST NO.	CBR-18	**SAMPLES**	



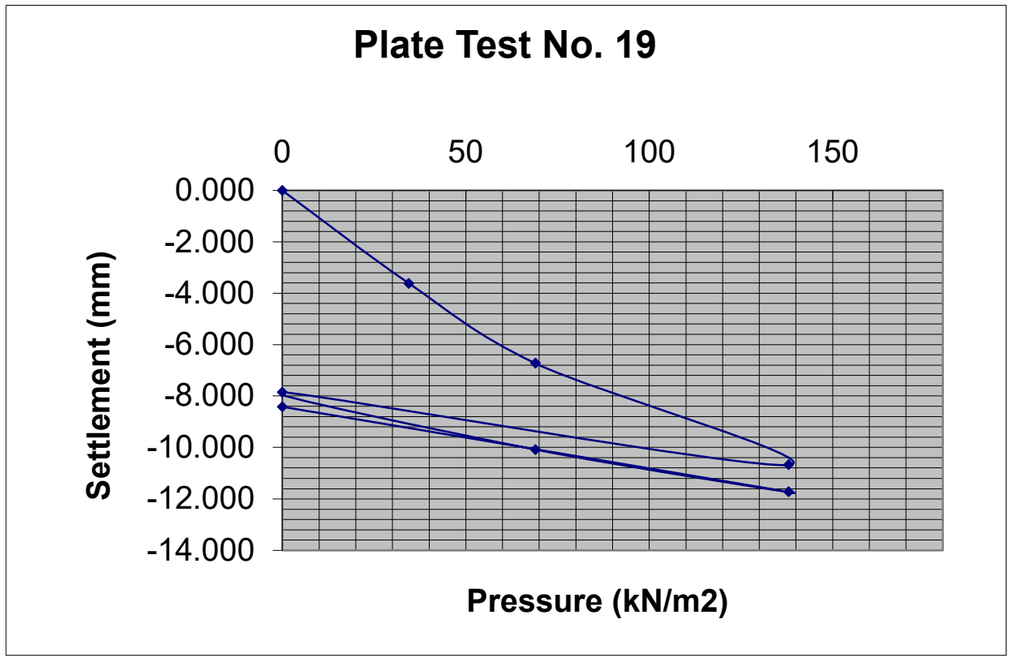
Modulus of subgrade reaction, K (Initial) = **14.82 MN/m2/m**
Modulus of subgrade reaction, K (Reload) = **25.20 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **1.03 %**
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **2.59 %**

Applied Load	Gauge settlement
0	**0.000**
34.5	-3.62
69	-6.725
138	-10.675
0	-7.85
69	-10.085
138	-11.725
0	-8.42

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Site Investigation Ennis	**MATERIAL**	Light brown slightly sandy slightly gravelly CLAY.
CONTRACT NO.	10809-06-21		
DATE	14/07/2021		
CLIENT	AKM	**DEPTH**	0.30m
PLATE DIAMETER	457mm	**NOTES**	
TEST NO.	CBR-19	**SAMPLES**	



Modulus of subgrade reaction, K (Initial) = **6.93 MN/m2/m**
Modulus of subgrade reaction, K (Reload) = **20.86 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.28 %**
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **1.87 %**

APPENDIX 5 – Soakaway Results

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

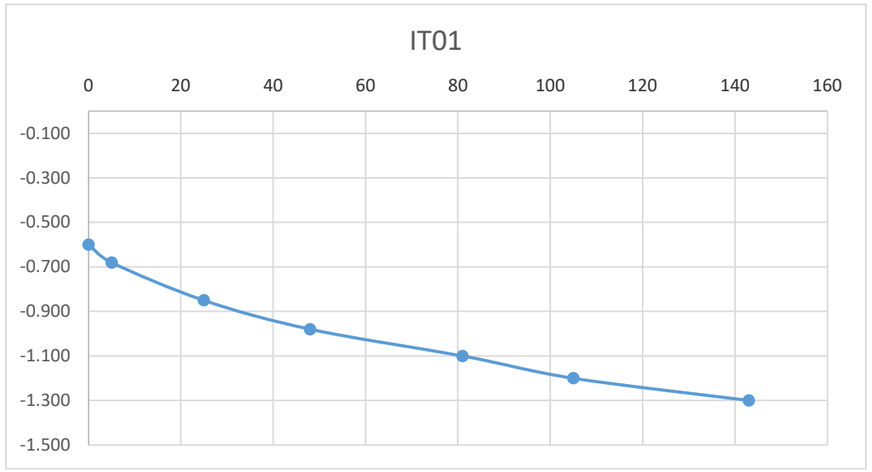
Catherinestown House,
Hazelhatch Road,
Newcastle,
Co. Dublin.
D22 YD52

Tel: 01 601 5175 / 5176
Email: info@gii.ie
Web: www.gii.ie

IT01
Soakaway Test to BRE Digest 365
Trial Pit Dimensions: 1.90m x 0.90m 1.30m (L x W x D)

Date	Time	Water level (m bgl)
15/07/2021	0	-0.600
15/07/2021	5	-0.680
15/07/2021	25	-0.850
15/07/2021	48	-0.980
15/07/2021	81	-1.100
15/07/2021	105	-1.200
15/07/2021	143	-1.300

Start depth	Depth of Pit		Diff	75% full	25%full
0.60	**1.300**		**0.700**	**0.775**	**1.125**
Length of pit (m)	Width of pit (m)			75-25Ht (m)	Vp75-25 (m3)
1.900	0.900			0.350	0.60
Tp75-25 (from graph) (s)		**4260**		50% Eff Depth	ap50 (m2)
				0.350	3.67
f =	**3.828E-05**	**m/s**			



GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

Catherinestown House,
Hazelhatch Road,
Newcastle,
Co. Dublin.
D22 YD52

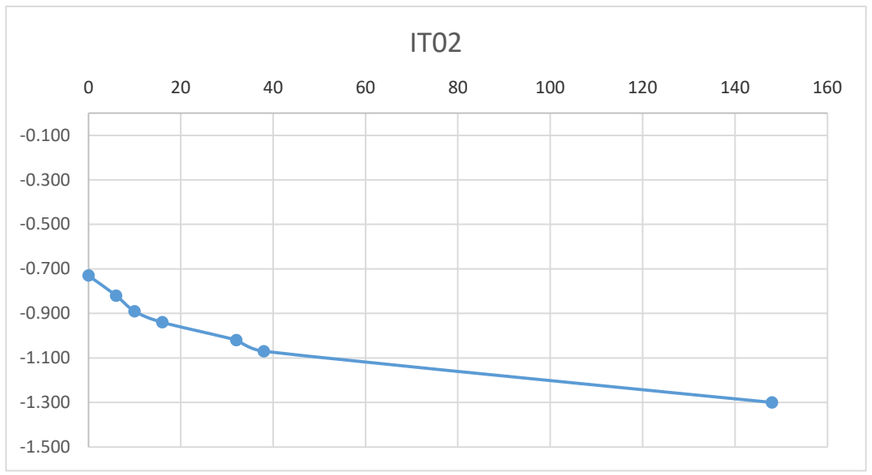
Tel: 01 601 5175 / 5176
Email: info@gii.ie
Web: www.gii.ie

IT02

Soakaway Test to BRE Digest 365
Trial Pit Dimensions: 2.30m x 0.90m 1.30m (L x W x D)

Date	Time	Water level (m bgl)
15/07/2021	0	-0.730
15/07/2021	6	-0.820
15/07/2021	10	-0.890
15/07/2021	16	-0.940
15/07/2021	32	-1.020
15/07/2021	38	-1.070
15/07/2021	148	-1.300

Start depth	Depth of Pit		Diff	75% full	25%full
0.73	1.300		0.570	0.8725	1.1575
Length of pit (m)	Width of pit (m)			75-25Ht (m)	Vp75-25 (m3)
2.300	0.900			0.285	0.59
Tp75-25 (from graph) (s)		3870		50% Eff Depth	ap50 (m2)
				0.285	3.894
f =	3.915E-05	m/s			



Site Investigation Ennis | Ground Investigations Ireland | Soakaway Test Report

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

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Tel: 01 601 5175 / 5176
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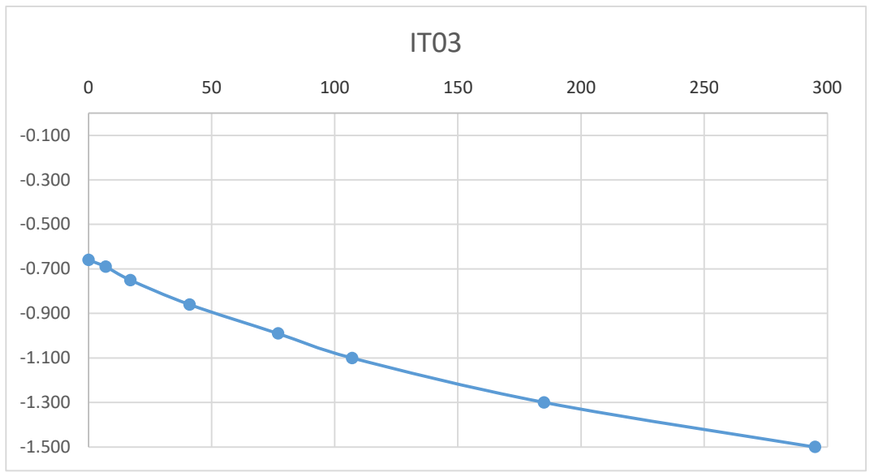
IT03

Soakaway Test to BRE Digest 365
Trial Pit Dimensions: 1.90m x 0.90m 1.50m (L x W x D)

Date	Time	Water level (m bgl)
15/07/2021	0	-0.660
15/07/2021	7	-0.690
15/07/2021	17	-0.750
15/07/2021	41	-0.860
15/07/2021	77	-0.990
15/07/2021	107	-1.100
15/07/2021	185	-1.300
15/07/2021	295	-1.500

Start depth	Depth of Pit		Diff	75% full	25%full
0.66	1.500		0.840	0.87	1.29
Length of pit (m)	Width of pit (m)			75-25Ht (m)	Vp75-25 (m3)
1.900	0.900			0.420	0.72
Tp75-25 (from graph) (s)		8160		50% Eff Depth	ap50 (m2)
				0.420	4.062
f =	2.167E-05	m/s			



APPENDIX 6 – Cable Percussion Records

Ground Investigations Ireland Ltd
www.gii.ie

Site Site Investigation Ennis			**Borehole Number** BH01
Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm cased to 0.50m	**Ground Level (mOD)** 21.17	**Client** AKM Design	**Job Number** 10809-06-21
	Location 523226.3 E 676917.6 N	**Dates** 17/08/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50	B				20.87 20.67	(0.30) 0.30 (0.20) 0.50	Brown slightly sandy slightly gravelly TOPSOIL with rootlets. Reddish brown slightly sandy silty CLAY with occasional subangular to subrounded cobbles and boulders. Refusal: Boulder. Refusal at 0.50m		

Remarks
Borehole refusal at 0.50m BGL
No groundwater encountered during drilling.
Chiselling from 0.50m to 0.50m for 1 hour.

Scale (approx)	Logged By
1:50	C. Byrne

Figure No. 10809-06-21.BH01

Ground Investigations Ireland Ltd
www.gii.ie

Site Site Investigation Ennis			**Borehole Number** BH02
Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm cased to 1.00m	**Ground Level (mOD)** 23.64	**Client** AKM Design	**Job Number** 10809-06-21
	Location 532163.8 E 676846.4 N	**Dates** 16/08/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					23.34	(0.30) 0.30	Brown slightly sandy slightly gravelly TOPSOIL with rootlets.		
0.50	B					(0.70)	Reddish brown slightly sandy slightly gravelly silty CLAY with occasional subangular to subrounded cobbles and boulders.		
1.00-1.00	SPT(C) 25*/0 50/0			25/50	22.64	1.00	Refusal: Boulder.		
1.00	B						Refusal at 1.00m		

Remarks
Borehole refusal at 1.00m BGL
No groundwater encountered during drilling.
Chiselling from 0.90m to 1.00m for 1 hour.

Scale (approx)	Logged By
1:50	C. Byrne

Figure No. 10809-06-21.BH02

Ground Investigations Ireland Ltd
www.gii.ie

Site Site Investigation Ennis			**Borehole Number** BH03
Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm cased to 0.30m	**Ground Level (mOD)** 30.42	**Client** AKM Design	**Job Number** 10809-06-21
	Location 532064.1 E 676755.9 N	**Dates** 17/08/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					30.12	(0.30) 0.30	Brown slightly sandy slightly gravelly TOPSOIL with rootlets.		
0.30	B						Refusal: Boulder.		
							Refusal at 0.30m		

Remarks
Borehole refusal at 0.30m BGL
No groundwater encountered during drilling.
Chiselling from 0.30m to 0.30m for 1 hour.

Scale (approx)	Logged By
1:50	C. Byrne

Figure No. 10809-06-21.BH03

Ground Investigations Ireland Ltd
www.gii.ie

Site Site Investigation Ennis			**Borehole Number** BH04
Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm cased to 0.30m	**Ground Level (mOD)** 16.62	**Client** AKM Design	**Job Number** 10809-06-21
	Location 532187.6 E 677110.7 N	**Dates** 17/08/2021	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.30	B				16.32	(0.30) 0.30	Brown slightly sandy slightly gravelly TOPSOIL with rootlets. Refusal: Boulder. Refusal at 0.30m		

Remarks
Borehole refusal at 0.30m BGL
No groundwater encountered during drilling.
Chiselling from 0.30m to 0.30m for 1 hour.

Scale (approx)	Logged By
1:50	C. Byrne

Figure No. 10809-06-21.BH03

APPENDIX 7 – Rotary Borehole Records

Ground Investigations Ireland Ltd
www.gii.ie

Site Site Investigation Ennis			**Borehole Number** RC01
Machine : Beretta T44 **Flush :** Water **Core Dia :** 96 mm **Method :** Rotary Cored	**Casing Diameter**	**Ground Level (mOD)** 21.17	**Client** AKM Design
	Location 532226.3 E 676917.6 N	**Dates** 01/09/2021	**Engineer** AKM Design
			Job Number 10809-06-21
			Sheet 1/1

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						20.87	(0.30) 0.30	MADE GROUND: Topsoil with rootlets.		
	58						(1.00)	Poor recovery of stiff brown slightly sandy slightly gravelly CLAY. Tiller notes: Clay.		
1.30						19.87	1.30			
	100	100	58	5				Strong massive grey fine to coarse grained LIMESTONE. Slightly weathered. Fossiliferous. 1.3-5.0m BGL: One fracture set. F1: 10-50 degrees, rough, undulating with clay infill. Closely to medium spaced.		
2.30										
	100	100	100				(4.00)			
3.90										
	100	100	94							
5.30						15.87	5.30	Complete at 5.30m		

Remarks

Scale (approx)	Logged By
1:50	SK

Figure No. 10809-06-21.RC01

Ground Investigations Ireland Ltd
www.gii.ie

Site Site Investigation Ennis			**Borehole Number** RC02
Machine : Beretta T44 **Flush :** Water **Core Dia :** 96 mm **Method :** Rotary Cored	**Casing Diameter**	**Ground Level (mOD)** 23.64	**Client** AKM Design
	Location 532163.8 E 676846.4 N	**Dates** 01/09/2021	**Engineer** AKM Design
			Job Number 10809-06-21
			Sheet 1/1

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						23.34	(0.30) 0.30	MADE GROUND: Topsoil with rootlets.		
	32						(1.00)	Recovery consists of coarse angular to subrounded GRAVELS and cobbles (Stiff). Driller notes: CLAY		
1.10						22.34	1.30			
	100	100	82	4				Strong massive grey fine to coarse grained LIMESTONE. Slightly weathered. Fossiliferous. 1.3-5.0m BGL: One fracture set. F1: 15-45 degrees, rough, undulating with clay infill. Closely to medium spaced.		
2.20										
	100	100	88				(3.90)			
3.80										
	100	100	96							
5.20						18.44	5.20	Complete at 5.20m		

Remarks

Scale (approx)	Logged By
1:50	SK

Figure No. 10809-06-21.RC01

Ground Investigations Ireland Ltd
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Site Site Investigation Ennis			**Borehole Number** RC03
Machine : Beretta T44 **Flush :** Water **Core Dia :** 96 mm **Method :** Rotary Cored	**Casing Diameter**	**Ground Level (mOD)** 30.42	**Client** AKM Design
	Location 532064.1 E 676755.9 N	**Dates** 01/09/2021	**Engineer** AKM Design
			Job Number 10809-06-21
			Sheet 1/1

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						30.22	(0.20) 0.20	MADE GROUND: Topsoil with rootlets.		
	100						(2.40)	Recovery consists of coarse angular to subrounded GRAVELS and cobbles (Stiff). Driller notes: CLAY		
2.60						27.82	2.60	Strong massive grey fine to coarse grained LIMESTONE. Slightly weathered. Fossiliferous. 2.6-6.9m BGL: One fracture set. F1: 15-45 degrees, rough, undulating with clay infill. Closely to medium spaced.		
	100	94	100							
3.70										
	100	94	94	3			(4.30)			
5.30										
	100	100	94							
6.90						23.52	6.90	Complete at 6.90m		

Remarks

Scale (approx)	Logged By
1:50	SK

Figure No. 10809-06-21.RC03

Ground Investigations Ireland Ltd
www.gii.ie

Site Site Investigation Ennis			**Borehole Number** RC04
Machine : Beretta T44 **Flush :** Water **Core Dia :** 96 mm **Method :** Rotary Cored	**Casing Diameter**	**Ground Level (mOD)** 16.62	**Client** AKM Design
	Location 532187.6 E 677110.7 N	**Dates** 01/09/2021	**Engineer** AKM Design
			Job Number 10809-06-21
			Sheet 1/1

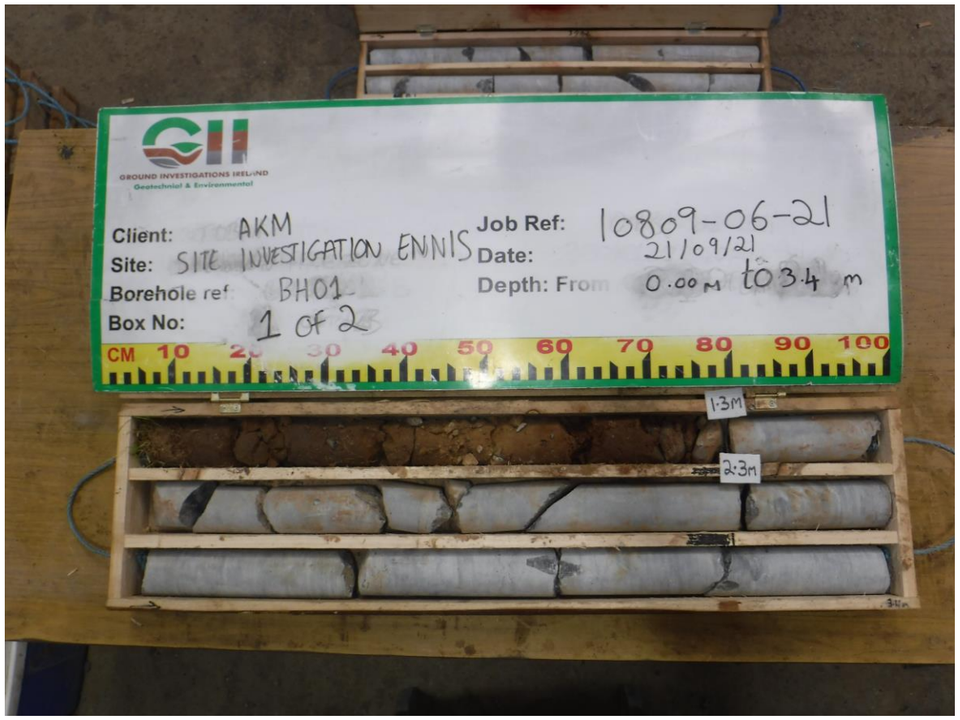
Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						16.56	0.06	MADE GROUND: Topsoil with rootlets.		
	25						(1.00)	Recovery consists of coarse angular to subrounded GRAVELS and cobbles (Stiff). Driller notes: CLAY		
1.60						15.56	1.06	Strong massive grey fine to coarse grained LIMESTONE. Slightly weathered. Fossiliferous. 1.3-5.0m BGL: One fracture set. F1: 15-45 degrees, rough, undulating with clay infill. Closely to medium spaced with occasional clay bands.		
	100	69	69	6						
2.40										
	92	92	92	4			(5.04)			
3.60										
4.00										
	100	97	75	1						
5.00										
5.20				5						
	100	100	74							
6.10						10.52	6.10	Complete at 6.10m		

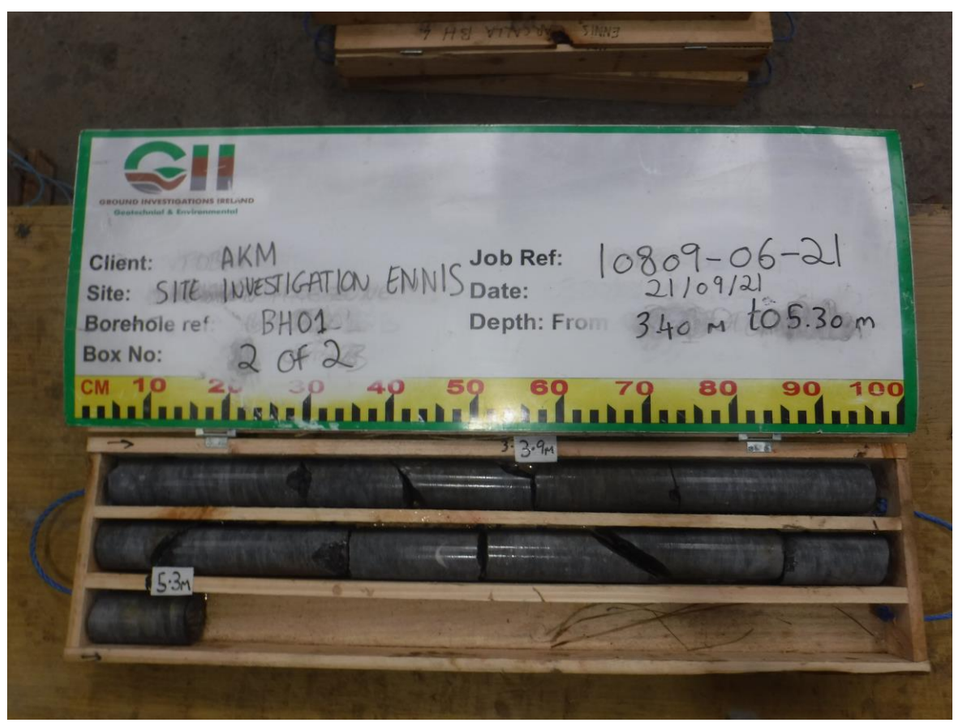
Remarks

Scale (approx)	Logged By
1:50	SK

Figure No. 10809-06-21.RC04

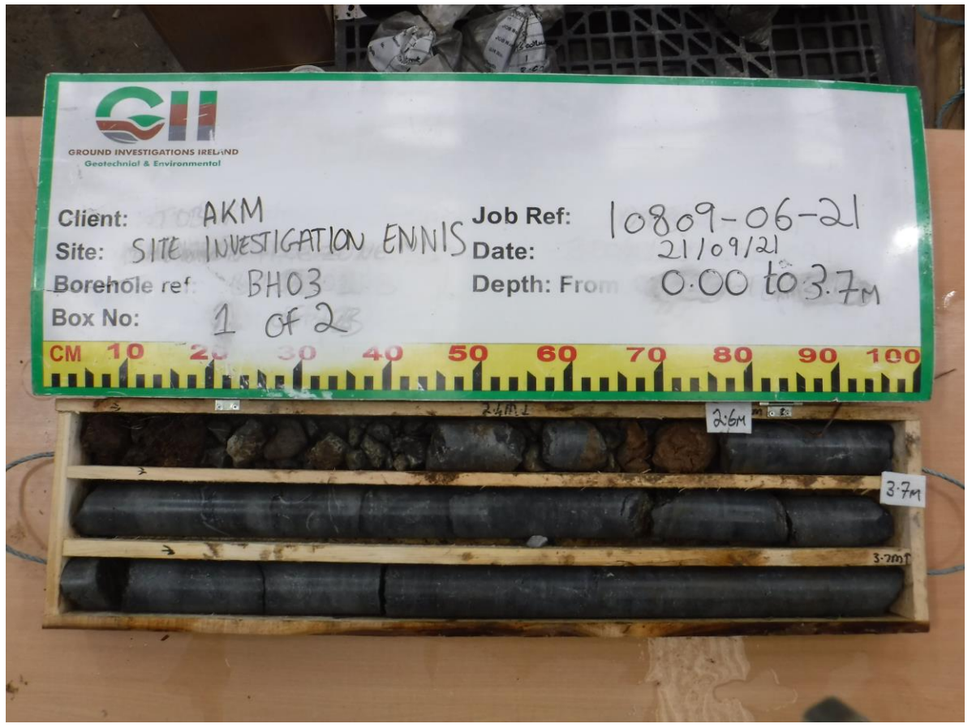
BH01



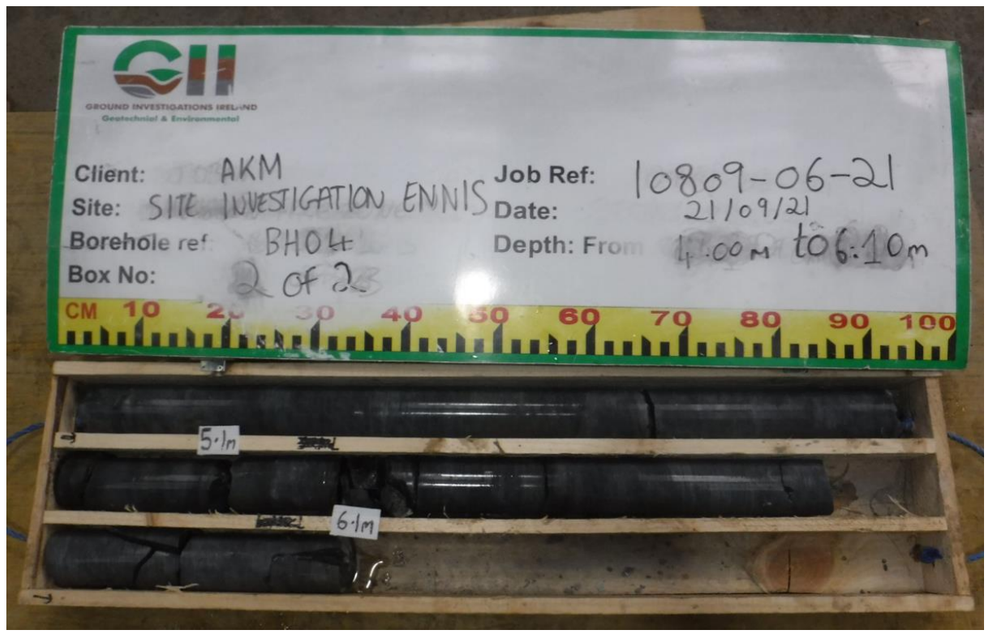


BH02

BH03



BH04



APPENDIX 8 – Laboratory Testing

element

Element Materials Technology
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Ground Investigations Ireland
Catherinestown House
Hazelhatch Road
Newcastle
Co. Dublin
Ireland

Attention :	Aisling McDonnell
Date :	10th August, 2021
Your reference :	10809-06-21
Our reference :	Test Report 21/11667 Batch 1
Location :	Site Investigation Ennis
Date samples received :	30th July, 2021
Status :	Final Report
Issue :	1

Ten samples were received for analysis on 30th July, 2021 of which ten were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

Bruce Leslie
Project Manager

Element Materials Technology Environmental UK Limited
Registered in England and Wales
Registered Office: 10 Lower Grosvenor Place, London, SW1W 0EN
Company Registration No: 11371415

Client Name: Ground Investigations Ireland
Reference: 10809-06-21
Location: Site Investigation Ennis
Contact: Aisling McDonnell
EMT Job No: 21/11667

Report : Solid

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

EMT Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	LOD/LOR	Units	Method No.
Sample ID	TP01	TP03	TP07	TP07	TP08	TP09	TP10	TP10	TP11	TP12			
Depth	0.50	0.50	0.50	1.50	0.50	0.50	0.50	1.50	0.50	0.50			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	28/07/2021	28/07/2021	28/07/2021	28/07/2021	28/07/2021	28/07/2021	28/07/2021	28/07/2021	28/07/2021	28/07/2021			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	30/07/2021	30/07/2021	30/07/2021	30/07/2021	30/07/2021	30/07/2021	30/07/2021	30/07/2021	30/07/2021	30/07/2021			
Antimony	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	mg/kg	TM30/PM15
Arsenic #	3.3	2.6	4.0	2.9	7.6	3.6	4.5	4.9	3.8	6.6	<0.5	mg/kg	TM30/PM15
Barium #	14	12	26	23	35	25	29	32	25	37	<1	mg/kg	TM30/PM15
Cadmium #	0.5	2.2	0.7	0.3	0.5	0.4	0.6	0.4	0.6	0.9	<0.1	mg/kg	TM30/PM15
Chromium #	22.0	20.8	54.8	32.3	66.4	34.6	55.0	26.7	40.5	65.2	<0.5	mg/kg	TM30/PM15
Copper #	5	6	7	5	7	6	10	9	7	12	<1	mg/kg	TM30/PM15
Lead #	<5	7	7	<5	18	6	7	7	6	16	<5	mg/kg	TM30/PM15
Mercury #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM30/PM15
Molybdenum #	1.3	1.2	3.4	1.9	4.9	2.0	3.4	1.5	2.4	4.2	<0.1	mg/kg	TM30/PM15
Nickel #	11.5	10.9	13.6	8.9	25.0	12.5	16.0	15.1	13.9	24.4	<0.7	mg/kg	TM30/PM15
Selenium #	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	mg/kg	TM30/PM15
Zinc #	12	53	17	13	46	16	20	21	17	34	<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Phenanthrene #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Fluoranthene #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Pyrene #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	mg/kg	TM4/PM8
Chrysene #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Coronene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
PAH 6 Total #	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	mg/kg	TM4/PM8
PAH 17 Total	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(j)fluoranthene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	mg/kg	TM4/PM8
PAH Surrogate % Recovery	92	91	104	111	110	108	114	109	111	107	<0	%	TM4/PM8
Mineral Oil (C10-C40) (EH_CU_1D_AL)	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	mg/kg	TM5/PM8/PM16

Please see attached notes for all abbreviations and acronyms

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 10809-06-21
Location: Site Investigation Ennis
Contact: Aisling McDonnell
EMT Job No: 21/11667

Report : Solid

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

EMT Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	LOD/LOR	Units	Method No.
Sample ID	TP01	TP03	TP07	TP07	TP08	TP09	TP10	TP10	TP11	TP12			
Depth	0.50	0.50	0.50	1.50	0.50	0.50	0.50	1.50	0.50	0.50			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	28/07/2021	28/07/2021	28/07/2021	28/07/2021	28/07/2021	28/07/2021	28/07/2021	28/07/2021	28/07/2021	28/07/2021			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	30/07/2021	30/07/2021	30/07/2021	30/07/2021	30/07/2021	30/07/2021	30/07/2021	30/07/2021	30/07/2021	30/07/2021			
TPH CWG													
Aliphatics													
>C5-C6 (HS_1D_AL) #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C6-C8 (HS_1D_AL) #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C8-C10 (HS_1D_AL)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C12 (EH_CU_1D_AL) #	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 (EH_CU_1D_AL) #	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	mg/kg	TM5/PM8/PM16
>C16-C21 (EH_CU_1D_AL) #	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>C21-C35 (EH_CU_1D_AL) #	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>C35-C40 (EH_1D_AL)	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-40 (EH+HS_1D_AL)	<26	<26	<26	<26	<26	<26	<26	<26	<26	<26	<26	mg/kg	TM5/TM36/PM8/PM12/PM16
>C6-C10 (HS_1D_AL)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C25 (EH_1D_AL)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM8/PM16
>C25-C35 (EH_1D_AL)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM8/PM16
Aromatics													
>C5-EC7 (HS_1D_AR) #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC7-EC8 (HS_1D_AR) #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC8-EC10 (HS_1D_AR) #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC12 (EH_CU_1D_AR) #	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 (EH_CU_1D_AR) #	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 (EH_CU_1D_AR) #	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 (EH_CU_1D_AR) #	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>EC35-EC40 (EH_1D_AR)	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-40 (EH+HS_1D_AR)	<26	<26	<26	<26	<26	<26	<26	<26	<26	<26	<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics(C5-40) (EH+HS_CU_1D_Total)	<52	<52	<52	<52	<52	<52	<52	<52	<52	<52	<52	mg/kg	TM5/TM36/PM8/PM12/PM16
>EC6-EC10 (HS_1D_AR) #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC25 (EH_1D_AR)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM8/PM16
>EC25-EC35 (EH_1D_AR)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM8/PM16
MTBE #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM36/PM12
Benzene #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM36/PM12
Toluene #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM36/PM12
Ethylbenzene #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM36/PM12
m/p-Xylene #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM36/PM12
o-Xylene #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM36/PM12
PCB 28 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 52 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 101 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 118 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 138 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 153 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 180 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
Total 7 PCBs #	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	ug/kg	TM17/PM8

Please see attached notes for all abbreviations and acronyms

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 10809-06-21
Location: Site Investigation Ennis
Contact: Aisling McDonnell
EMT Job No: 21/11667

Report : Solid

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

EMT Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	LOD/LOR	Units	Method No.
Sample ID	TP01	TP03	TP07	TP07	TP08	TP09	TP10	TP10	TP11	TP12			
Depth	0.50	0.50	0.50	1.50	0.50	0.50	0.50	1.50	0.50	0.50			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	28/07/2021	28/07/2021	28/07/2021	28/07/2021	28/07/2021	28/07/2021	28/07/2021	28/07/2021	28/07/2021	28/07/2021			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	30/07/2021	30/07/2021	30/07/2021	30/07/2021	30/07/2021	30/07/2021	30/07/2021	30/07/2021	30/07/2021	30/07/2021			
Natural Moisture Content	9.4	6.6	9.8	8.1	13.9	9.5	14.6	10.1	8.7	14.6	<0.1	%	PM4/PM0
Moisture Content (% Wet Weight)	8.6	6.2	9.0	7.5	12.2	8.6	12.8	9.2	8.0	12.8	<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	mg/kg	TM38/PM20
Chromium III	22.0	20.8	54.8	32.3	66.4	34.6	55.0	26.7	40.5	65.2	<0.5	mg/kg	NONE/NONE
Total Organic Carbon #	0.21	0.28	0.20	0.03	0.57	0.18	0.14	0.13	0.13	0.40	<0.02	%	TM21/PM24
pH #	8.62	8.62	8.55	8.94	8.30	8.70	8.48	8.76	8.79	8.50	<0.01	pH units	TM73/PM11
Mass of raw test portion	0.0988	0.0963	0.1021	0.0971	0.1032	0.0988	0.1075	0.1044	0.0979	0.1444		kg	NONE/PM17
Mass of dried test portion	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09		kg	NONE/PM17

Please see attached notes for all abbreviations and acronyms

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 10809-06-21
Location: Site Investigation Ennis
Contact: Aisling McDonnell
EMT Job No: 21/11667

Report : CEN 10:1 1 Batch

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

EMT Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	LOD/LOR	Units	Method No.
Sample ID	TP01	TP03	TP07	TP07	TP08	TP09	TP10	TP10	TP11	TP12			
Depth	0.50	0.50	0.50	1.50	0.50	0.50	0.50	1.50	0.50	0.50			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	28/07/2021	28/07/2021	28/07/2021	28/07/2021	28/07/2021	28/07/2021	28/07/2021	28/07/2021	28/07/2021	28/07/2021			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	30/07/2021	30/07/2021	30/07/2021	30/07/2021	30/07/2021	30/07/2021	30/07/2021	30/07/2021	30/07/2021	30/07/2021			
Dissolved Antimony #	<0.002	<0.002	0.003	0.003	<0.002	0.003	<0.002	<0.002	<0.002	0.002	<0.002	mg/l	TM30/PM17
Dissolved Antimony (A10) #	<0.02	<0.02	0.03	0.03	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM30/PM17
Dissolved Arsenic #	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	mg/l	TM30/PM17
Dissolved Arsenic (A10) #	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	mg/kg	TM30/PM17
Dissolved Barium #	0.004	<0.003	<0.003	<0.003	<0.003	<0.003	0.003	<0.003	<0.003	<0.003	<0.003	mg/l	TM30/PM17
Dissolved Barium (A10) #	0.04	<0.03	<0.03	<0.03	<0.03	<0.03	0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM30/PM17
Dissolved Cadmium #	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	mg/l	TM30/PM17
Dissolved Cadmium (A10) #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	mg/kg	TM30/PM17
Dissolved Chromium #	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	mg/l	TM30/PM17
Dissolved Chromium (A10) #	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	mg/kg	TM30/PM17
Dissolved Copper #	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	0.016	<0.007	<0.007	<0.007	mg/l	TM30/PM17
Dissolved Copper (A10) #	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	0.16	<0.07	<0.07	<0.07	mg/kg	TM30/PM17
Dissolved Lead #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	mg/l	TM30/PM17
Dissolved Lead (A10) #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM30/PM17
Dissolved Molybdenum #	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	mg/l	TM30/PM17
Dissolved Molybdenum (A10) #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM30/PM17
Dissolved Nickel #	0.005	<0.002	<0.002	<0.002	<0.002	0.008	0.003	<0.002	<0.002	0.003	<0.002	mg/l	TM30/PM17
Dissolved Nickel (A10) #	0.05	<0.02	<0.02	<0.02	<0.02	0.08	0.03	<0.02	<0.02	0.03	<0.02	mg/kg	TM30/PM17
Dissolved Selenium #	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	mg/l	TM30/PM17
Dissolved Selenium (A10) #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM30/PM17
Dissolved Zinc #	0.009	0.003	<0.003	<0.003	0.007	0.004	0.043	0.016	0.005	0.006	<0.003	mg/l	TM30/PM17
Dissolved Zinc (A10) #	0.09	0.03	<0.03	<0.03	0.07	0.04	0.43	0.16	0.05	0.06	<0.03	mg/kg	TM30/PM17
Mercury Dissolved by CVAF #	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	mg/l	TM61/PM0
Mercury Dissolved by CVAF #	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	mg/kg	TM61/PM0
Phenol	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l	TM26/PM0
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM26/PM0
Fluoride	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	mg/l	TM173/PM0
Fluoride	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	mg/l	TM38/PM0
Sulphate as SO4 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	mg/kg	TM38/PM0
Chloride #	0.8	<0.3	0.4	<0.3	0.9	0.3	0.6	0.3	0.3	0.7	<0.3	mg/l	TM38/PM0
Chloride #	8	<3	4	<3	9	3	6	3	<3	7	<3	mg/kg	TM38/PM0
Dissolved Organic Carbon	4	2	2	<2	3	3	3	<2	3	3	<2	mg/l	TM60/PM0
Dissolved Organic Carbon	40	20	<20	<20	30	30	30	<20	30	30	<20	mg/kg	TM60/PM0
pH	8.41	8.65	8.71	8.53	8.56	8.50	8.31	8.31	8.26	8.38	<0.01	pH units	TM73/PM0
Total Dissolved Solids #	51	42	46	<35	66	46	61	45	50	74	<35	mg/l	TM20/PM0
Total Dissolved Solids #	510	420	460	<350	660	460	610	450	500	740	<350	mg/kg	TM20/PM0

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland
Reference: 10809-06-21
Location: Site Investigation Ennis
Contact: Aisling McDonnell
EMT Job No: 21/11667

Report : EN12457_2

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

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	Inert	Stable Non-reactive	Hazardous	LOD LOR	Units	Method No.
Sample ID	TP01	TP03	TP07	TP07	TP08	TP09	TP10	TP10	TP11	TP12						
Depth	0.50	0.50	0.50	1.50	0.50	0.50	0.50	1.50	0.50	0.50						
COC No / misc																
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T						
Sample Date	28/07/2021	28/07/2021	28/07/2021	28/07/2021	28/07/2021	28/07/2021	28/07/2021	28/07/2021	28/07/2021	28/07/2021						
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil						
Batch Number	1	1	1	1	1	1	1	1	1	1						
Date of Receipt	30/07/2021	30/07/2021	30/07/2021	30/07/2021	30/07/2021	30/07/2021	30/07/2021	30/07/2021	30/07/2021	30/07/2021						
Solid Waste Analysis																
Total Organic Carbon #	0.21	0.28	0.20	0.03	0.57	0.18	0.14	0.13	0.13	0.40	3	5	6	<0.02	%	TM21/PM24
Sum of BTEX	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	6	-	-	<0.025	mg/kg	TM36/PM12
Sum of 7 PCBs #	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	1	-	-	<0.035	mg/kg	TM17/PM8
Mineral Oil	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	500	-	-	<30	mg/kg	TM5/PM8/PM16
PAH Sum of 6 #	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	-	-	-	<0.22	mg/kg	TM4/PM8
PAH Sum of 17	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	100	-	-	<0.64	mg/kg	TM4/PM8
CEN 10:1 Leachate																
Arsenic #	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.5	2	25	<0.025	mg/kg	TM30/PM17
Barium #	0.04	<0.03	<0.03	<0.03	<0.03	<0.03	0.03	<0.03	<0.03	<0.03	20	100	300	<0.03	mg/kg	TM30/PM17
Cadmium #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.04	1	5	<0.005	mg/kg	TM30/PM17
Chromium #	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	0.5	10	70	<0.015	mg/kg	TM30/PM17
Copper #	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	0.16	<0.07	<0.07	2	50	100	<0.07	mg/kg	TM30/PM17
Mercury #	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.01	0.2	2	<0.0001	mg/kg	TM61/PM0
Molybdenum #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.5	10	30	<0.02	mg/kg	TM30/PM17
Nickel #	0.05	<0.02	<0.02	<0.02	<0.02	0.08	0.03	<0.02	<0.02	0.03	0.4	10	40	<0.02	mg/kg	TM30/PM17
Lead #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.5	10	50	<0.05	mg/kg	TM30/PM17
Antimony #	<0.02	<0.02	0.03	0.03	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	0.06	0.7	5	<0.02	mg/kg	TM30/PM17
Selenium #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.1	0.5	7	<0.03	mg/kg	TM30/PM17
Zinc #	0.09	0.03	<0.03	<0.03	0.07	0.04	0.43	0.16	0.05	0.06	4	50	200	<0.03	mg/kg	TM30/PM17
Total Dissolved Solids #	510	420	460	<350	660	460	610	450	500	740	4000	60000	100000	<350	mg/kg	TM20/PM0
Dissolved Organic Carbon	40	20	<20	<20	30	30	30	<20	30	30	500	800	1000	<20	mg/kg	TM60/PM0
Dry Matter Content Ratio	90.9	93.5	88.5	92.6	87.4	90.9	84.1	86.2	92.1	62.1	-	-	-	<0.1	%	NONE/PM4
pH #	8.62	8.62	8.55	8.94	8.30	8.70	8.48	8.76	8.79	8.50	-	-	-	<0.01	pH units	TM73/PM11
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1	-	-	<0.1	mg/kg	TM26/PM0
Fluoride	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	-	-	-	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	1000	20000	50000	<5	mg/kg	TM38/PM0
Chloride #	8	<3	4	<3	9	3	6	3	<3	7	800	15000	25000	<3	mg/kg	TM38/PM0

EPH Interpretation Report

Client Name: Ground Investigations Ireland
Reference: 10809-06-21
Location: Site Investigation Ennis
Contact: Aisling McDonnell

Matrix : Solid

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	EPH Interpretation
21/11667	1	TP01	0.50	1-3	No Interpretation Possible
21/11667	1	TP03	0.50	4-6	No Interpretation Possible
21/11667	1	TP07	0.50	7-9	No Interpretation Possible
21/11667	1	TP07	1.50	10-12	No Interpretation Possible
21/11667	1	TP08	0.50	13-15	No Interpretation Possible
21/11667	1	TP09	0.50	16-18	No Interpretation Possible
21/11667	1	TP10	0.50	19-21	No Interpretation Possible
21/11667	1	TP10	1.50	22-24	No Interpretation Possible
21/11667	1	TP11	0.50	25-27	No Interpretation Possible
21/11667	1	TP12	0.50	28-30	No Interpretation Possible

Client Name: Ground Investigations Ireland
Reference: 10809-06-21
Location: Site Investigation Ennis
Contact: Aisling McDonnell

Note:

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

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

Where the sample is not taken by a Element Materials Technology consultant, Element Materials Technology cannot be responsible for inaccurate or unrepresentative sampling.

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
21/11667	1	TP01	0.50	2	05/08/2021	**General Description (Bulk Analysis)**	soil/stones
					05/08/2021	**Asbestos Fibres**	NAD
					05/08/2021	**Asbestos ACM**	NAD
					05/08/2021	**Asbestos Type**	NAD
					05/08/2021	**Asbestos Level Screen**	NAD
21/11667	1	TP03	0.50	5	05/08/2021	**General Description (Bulk Analysis)**	soil/stones
					05/08/2021	**Asbestos Fibres**	NAD
					05/08/2021	**Asbestos ACM**	NAD
					05/08/2021	**Asbestos Type**	NAD
					05/08/2021	**Asbestos Level Screen**	NAD
21/11667	1	TP07	0.50	8	05/08/2021	**General Description (Bulk Analysis)**	soil/stones
					05/08/2021	**Asbestos Fibres**	NAD
					05/08/2021	**Asbestos ACM**	NAD
					05/08/2021	**Asbestos Type**	NAD
					05/08/2021	**Asbestos Level Screen**	NAD
21/11667	1	TP07	1.50	11	05/08/2021	**General Description (Bulk Analysis)**	soil
					05/08/2021	**Asbestos Fibres**	NAD
					05/08/2021	**Asbestos ACM**	NAD
					05/08/2021	**Asbestos Type**	NAD
					05/08/2021	**Asbestos Level Screen**	NAD
21/11667	1	TP08	0.50	14	05/08/2021	**General Description (Bulk Analysis)**	soil
					05/08/2021	**Asbestos Fibres**	NAD
					05/08/2021	**Asbestos ACM**	NAD
					05/08/2021	**Asbestos Type**	NAD
					05/08/2021	**Asbestos Level Screen**	NAD
21/11667	1	TP09	0.50	17	05/08/2021	**General Description (Bulk Analysis)**	soil
					05/08/2021	**Asbestos Fibres**	NAD
					05/08/2021	**Asbestos ACM**	NAD
					05/08/2021	**Asbestos Type**	NAD
					05/08/2021	**Asbestos Level Screen**	NAD
21/11667	1	TP10	0.50	20	05/08/2021	**General Description (Bulk Analysis)**	soil/stones
					05/08/2021	**Asbestos Fibres**	NAD
					05/08/2021	**Asbestos ACM**	NAD

Element Materials Technology — Asbestos Analysis

Client Name: Ground Investigations Ireland
Reference: 10809-06-21
Location: Site Investigation Ennis
Contact: Aisling McDonnell

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
21/11667	1	TP10	0.50	20	05/08/2021	**Asbestos Type**	NAD
					05/08/2021	**Asbestos Level Screen**	NAD
21/11667	1	TP10	1.50	23	05/08/2021	**General Description (Bulk Analysis)**	Soil/Stones
					05/08/2021	**Asbestos Fibres**	NAD
					05/08/2021	**Asbestos ACM**	NAD
					05/08/2021	**Asbestos Type**	NAD
					05/08/2021	**Asbestos Level Screen**	NAD
21/11667	1	TP11	0.50	26	05/08/2021	**General Description (Bulk Analysis)**	Soil/Stones
					05/08/2021	**Asbestos Fibres**	NAD
					05/08/2021	**Asbestos ACM**	NAD
					05/08/2021	**Asbestos Type**	NAD
					05/08/2021	**Asbestos Level Screen**	NAD
21/11667	1	TP12	0.50	29	05/08/2021	**General Description (Bulk Analysis)**	soil/stones
					05/08/2021	**Asbestos Fibres**	NAD
					05/08/2021	**Asbestos ACM**	NAD
					05/08/2021	**Asbestos Type**	NAD
					05/08/2021	**Asbestos Level Screen**	NAD

Element Materials Technology

Notification of Deviating Samples

Client Name: Ground Investigations Ireland
Reference: 10809-06-21
Location: Site Investigation Ennis
Contact: Aisling McDonnell

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 21/11667						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.
Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 21/11667

SOILS

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

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

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

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

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

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

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

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

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

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

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

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

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

WATERS

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

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

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

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

DEVIATING SAMPLES

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

SURROGATES

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

DILUTIONS

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

BLANKS

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

NOTE

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

EMT Job No.: 21/11667

REPORTS FROM THE SOUTH AFRICA LABORATORY

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

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

ABBREVIATIONS and ACRONYMS USED

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

HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

EMT Job No: 21/11667

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM17	Modified US EPA method 8270D v5:2014. Determination of specific Polychlorinated Biphenyl congeners by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM20	Modified BS 1377-3:1990/USEPA 160.1/3 (TDS/TS: 1971) Gravimetric determination of Total Dissolved Solids/Total Solids	PM0	No preparation is required.	Yes		AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.	Yes		AD	Yes

EMT Job No: 21/11667

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.			AR	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.			AD	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM17	Modified method BS EN12457-2:2002 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.	Yes		AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013I	PM0	No preparation is required.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013I	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM60	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060A (2002), APHA SMEWW 5310B:1999 22nd Edition, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.			AR	Yes
TM61	Determination of Mercury by Cold Vapour Atomic Fluorescence - WATERS: Modified USEPA Method 245.7, Rev 2, Feb 2005. SOILS: Modified USEPA Method 7471B, Rev.2, Feb 2007	PM0	No preparation is required.	Yes		AR	Yes

EMT Job No: 21/11667

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM65	Asbestos Bulk Identification method based on HSG 248 First edition (2006)	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.			AR	Yes
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
TM173	Analysis of fluoride by ISE (Ion Selective Electrode) using modified ISE method 9214 - 340.2 (EPA 1998)	PM0	No preparation is required.			AR	Yes
NONE	No Method Code	NONE	No Method Code			AD	Yes
NONE	No Method Code	PM17	Modified method BS EN12457-2:2002 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.			AR	
NONE	No Method Code	PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.			AR	

APPENDIX 7-2 Greenfield run-off rate

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Michael Naughton
Site name:	Drumbiggle
Site location:	Ennis

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013) , the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:	52.83795° N
Longitude:	9.00643° W
Reference:	4152562179
Date:	Jan 22 2025 13:09

Runoff estimation approach

IH124

Site characteristics

Total site area (ha):	8.57

Methodology

Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Soil characteristics

	Default	Edited
SOIL type:	3	3
HOST class:	N/A	N/A
SPR/SPRHOST:	0.37	0.37

Hydrological characteristics

	Default	Edited
SAAR (mm):	1225	1225
Hydrological region:	13	13
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 30 years:	1.65	1.65
Growth curve factor 100 years:	1.95	1.95
Growth curve factor 200 years:	2.15	2.15

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates

	Default	Edited
Q_{BAR} (l/s):	47.38	47.38
1 in 1 year (l/s):	40.28	40.28
1 in 30 years (l/s):	78.18	78.18
1 in 100 year (l/s):	92.4	92.4
1 in 200 years (l/s):	101.88	101.88

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement , which can both be found at www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.

APPENDIX 7-3 Confirmation of Feasibility

Andy Kotze
Block S, Eastpoint Business Park
Alfie Byrne Road
Dublin 3
Co. Dublin
D03H3F4

Uisce Éireann
Bosca OP 448
Oifig Sheachadta na
Cathrach Theas
Cathair Chorcaí

Irish Water
PO Box 448,
South City
Delivery Office,
Cork City.

www.water.ie

26 November 2021

Re: CDS21003780 pre-connection enquiry - Subject to contract | Contract denied

Connection for Housing Development of 330 unit(s) at Golf Links Road, Ennis, Clare

Dear Sir/Madam,

Irish Water has reviewed your pre-connection enquiry in relation to a Water & Wastewater connection at Golf Links Road, Ennis, Clare (the **Premises**). Based upon the details you have provided with your pre-connection enquiry and on our desk top analysis of the capacity currently available in the Irish Water network(s) as assessed by Irish Water, we wish to advise you that your proposed connection to the Irish Water network(s) can be facilitated at this moment in time.

SERVICE	OUTCOME OF PRE-CONNECTION ENQUIRY **THIS IS NOT A CONNECTION OFFER. YOU MUST APPLY FOR A CONNECTION(S) TO THE IRISH WATER NETWORK(S) IF YOU WISH TO PROCEED.**
Water Connection	Feasible without infrastructure upgrade by Irish Water
Wastewater Connection	Feasible Subject to upgrades
SITE SPECIFIC COMMENTS	
Water Connection	There is sufficient capacity in the Irish Water assets to facilitate the proposed development.
Wastewater Connection	Feasible subject to minor upgrades at the WWTP. WW network extension required with likely upgrades of the existing Irish Water owned pumping station and rising main also required. Further details can be discussed prior to connection application stage.

The design and construction of the Water & Wastewater pipes and related infrastructure to be installed in this development shall comply with the Irish Water Connections and Developer Services Standard Details and Codes of Practice that are available on the Irish Water website. Irish Water reserves the right to supplement these requirements with Codes of Practice and these will be issued with the connection agreement.

General Notes:

1) The initial assessment referred to above is carried out taking into account water demand and wastewater discharge volumes and infrastructure details on the date of the assessment. **The availability of capacity may change at any date after this assessment.**
2) This feedback does not constitute a contract in whole or in part to provide a connection to any Irish Water infrastructure. All feasibility assessments are subject to the constraints of the Irish Water Capital Investment Plan.
3) The feedback provided is subject to a Connection Agreement/contract being signed at a later date.
4) A Connection Agreement will be required to commencing the connection works associated with the enquiry this can be applied for at https://www.water.ie/connections/get-connected/
5) A Connection Agreement cannot be issued until all statutory approvals are successfully in place.
6) Irish Water Connection Policy/ Charges can be found at https://www.water.ie/connections/information/connection-charges/
7) Please note the Confirmation of Feasibility does not extend to your fire flow requirements.
8) Irish Water is not responsible for the management or disposal of storm water or ground waters. You are advised to contact the relevant Local Authority to discuss the management or disposal of proposed storm water or ground water discharges
9) To access Irish Water Maps email datarequests@water.ie
10) All works to the Irish Water infrastructure, including works in the Public Space, shall have to be carried out by Irish Water.

If you have any further questions, please contact Shane Mcmanus from the design team by email to shane.mcmanus@water.ie For further information, visit **www.water.ie/connections.**

Yours sincerely,

Yvonne Harris

Yvonne Harris

Head of Customer Operations

CHAPTER EIGHT

MATERIAL ASSETS: WASTE

APPENDIX 8-1 Resource Waste Management Plan
APPENDIX 8-2 Operational Waste Management Plan

McCutcheon Halley
CHARTERED PLANNING CONSULTANTS

APPENDIX 8-1 Resource Waste Management Plan

REPORT

Trinity Consultants

awnconsulting

Draft Resource & Waste Management Plan

Project Title: Residential and Crèche Development at Ballymacaula, Drumbiggle, Keelty, Circular Road, Ennis, Co. Clare

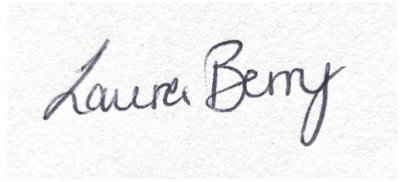
CLIENT	DOCUMENT REFERENCE	DATE
Glenveagh Homes Ltd	R247501.0709WMR01	23/05/2025

AWN Consulting Ltd, The Tecpro Building, IDA Business & Technology Park, Clonshaugh, Dublin 17, D17 XD90

DOCUMENT CONTROL SHEET

Document Control Sheet	
Our Reference	R247501.0709WMR01
Original Issue Date	23/05/2025
Client:	Glenveagh Homes Ltd
Client Address:	Block C, Maynooth Business Campus, Straffan Road, Maynooth, Co. Kildare

Revision	Revision Date	Description

Details	Written by	Approved by
Signature		
Name	Laura Berry	Chonaill Bradley
Title	Environmental Consultant	Associate
Date	23/05/2025	23/05/2025

Disclaimer
This report considers the specific instructions and requirements of our client. It is not intended for third-party use or reliance, and no responsibility is accepted for any third party. The provisions in this report apply solely to this project and should not be assumed applicable to other developments without review and modification.

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1. INTRODUCTION

AWN Consulting, a Trinity Consultants Company, has prepared this Construction and Demolition (C&D) Resource & Waste Management Plan (RWMP) on behalf of Glenveagh Homes Ltd. The proposed development will principally consist of the construction of 300 no. residential units and a crèche at Ballymacaula, Drumbiggle, Keelty, Circular Road, Ennis, Co. Clare.

This plan provides information necessary to ensure that the management of C&D waste at the site is undertaken in accordance with the current legal and industry standards including the *Waste Management Act 1996* as amended and associated Regulations [1], *Environmental Protection Agency Act 1992* as amended [2], *Litter Pollution Act 1997* as amended [3], the *National Waste Management Plan for a Circular Economy 2024 - 2030* (NWMPCE) (2024) [4]. In particular, this plan aims to ensure maximum recycling, reuse and recovery of waste with diversion from landfill, wherever possible. It also provides appropriate measures in relation to the collection and transport of waste from the site to prevent issues associated with litter or more serious environmental pollution (e.g. contamination of soil and/or water).

This RWMP includes information on the legal and policy framework for C&D waste management in Ireland, estimates of the type and quantity of waste to be generated by the proposed development and prescribes measures for the management of different waste streams. The RWMP should be viewed as a live document and will be regularly revisited throughout the project's lifecycle so that opportunities to maximise waste reduction / efficiencies are exploited throughout, and that data is collected on an ongoing basis so that it is as accurate as possible.

2. OVERVIEW OF WASTE MANAGEMENT IN IRELAND

2.1 National level

The Irish Government issued a policy statement in September 1998*, Changing Our Ways* [5], which identified objectives for the prevention, minimisation, reuse, recycling, recovery and disposal of waste in Ireland. The target for C&D waste in this report was to recycle at least 50% of C&D waste within a five year period (by 2003), with a progressive increase to at least 85% over fifteen years (i.e. 2018).

In response to the *Changing Our Ways* report, a task force (Task Force B4) representing the waste sector of the already established Forum for the Construction Industry, released a report entitled '*Recycling of Construction and Demolition Waste'* [6] concerning the development and implementation of a voluntary construction industry programme to meet the Government's objectives for the recovery of C&D waste.

In September 2020, the Irish Government published a policy document outlining a new action plan for Ireland to cover the period of 2020-2025. This plan, *'A Waste Action Plan for a Circular Economy'* [7] (WAPCE), replaces the previous national waste management plan, *"A Resource Opportunity"* (2012), and was prepared in response to the 'European Green Deal' which sets a roadmap for a transition to an altered economical model, where climate and environmental challenges are turned into opportunities.

The WAPCE sets the direction for waste planning and management in Ireland up to 2025. This reorientates policy from a focus on managing waste to a much greater focus on creating circular patterns of production and consumption. Other policy statements of a number of public bodies already acknowledge the circular economy as a national policy priority.

The policy document contains over 200 measures across various waste areas including circular economy, municipal waste, consumer protection and citizen engagement, plastics and packaging, construction and demolition, textiles, green public procurement and waste enforcement.

One of the first actions to be taken was the development of the *Whole of Government Circular Economy Strategy 2022-2023 'Living More, Using Less'* (2021) [8] to set a course for Ireland to transition across all sectors and at all levels of Government toward circularity and was issued in December 2021. It is anticipated that the Strategy will be updated in full every 18 months to 2 years.

The *Circular Economy and Miscellaneous Provisions Act 2022* [9] was signed into law in July 2022. The Act underpins Ireland's shift from a "take-make-waste" linear model to a more sustainable pattern of production and consumption, that retains the value of resources in our economy for as long as possible and that will work to significantly reduce our greenhouse gas emissions. The Act defines Circular Economy for the first time in Irish law, incentivises the use of recycled and reusable alternatives to wasteful, single-use disposable packaging, introduces a mandatory segregation and incentivised charging regime for commercial waste, streamlines the national processes for End-of-Waste and By-Products decisions, tackling the delays which can be encountered by industry, and supporting the availability of recycled secondary raw materials in the Irish market, and tackles illegal fly-tipping and littering.

The Environmental Protection Agency (EPA) of Ireland issued '*Best Practice Guidelines for the Preparation of Resource & Waste Management Plans for Construction & Demolition Projects' in November 2021* [10]*.* These guidelines replace the previous 2006 guidelines issued by The National Construction and Demolition Waste Council (NCDWC) and the Department of the Environment, Heritage and Local Government (DoEHLG) in 2006 [11]. The guidelines provide a practical approach which is informed by best practice in the prevention and management of C&D wastes and resources from design to construction of a project, including consideration of the deconstruction of a project. These guidelines have been followed in the preparation of this document and include the following elements:

- Predicted C&D wastes and procedures to prevent, minimise, recycle and reuse wastes;
- Design teams roles and approach;
- Relevant EU, national and local waste policy, legislation and guidelines;
- Waste disposal/recycling of C&D wastes at the site;
- Provision of training for Resource Waste Manager (RM) and site crew;
- Details of proposed record keeping system;
- Details of waste audit procedures and plan; and
- Details of consultation with relevant bodies i.e. waste recycling companies, Local Authority, etc.

Section 3 of the Guidelines identifies thresholds above which there is a requirement for the preparation of a bespoke RWMP for developments. The new guidance classifies developments on a two-tiered system. Developments which do not exceed any of the following thresholds may be classed as Tier 1 development, which require a simplified RWMP:

- New residential development of less than 10 dwellings.
- Retrofit of 20 dwellings or less.
- New commercial, industrial, infrastructural, institutional, educational, health and other developments with an aggregate floor area less than 1,250m2.
- Retrofit of commercial, industrial, infrastructural, institutional, educational, health and other developments with an aggregate floor area less than 2,000m2; and
- Demolition projects generating in total less than 100m3 in volume of C&D waste.

A development which exceeds one or more of these thresholds is classed as Tier-2 development.

This development requires a RWMP as a Tier 2 development as it is above following criterion:

- New residential development of less than 10 dwellings.

The Department of Housing, Local Government and Heritage authored *Sustainable Residential Development and Compact Settlements - Guidelines for Planning Authorities (2024)* [12]. Suggest the below thresholds at which the need for supplemental information such as the RWMP should be considered.

- 30 or more residential units.

Other guidelines followed in the preparation of this report include *'Construction and Demolition Waste Management – a handbook for Contractors and Site Managers'* [13] , published by FÁS and the Construction Industry Federation in 2002 and the previous guidelines, 'Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects' (2006).

These guidance documents are considered to define best practice for C&D projects in Ireland and describe how C&D projects are to be undertaken such that environmental impacts and risks are minimised and maximum levels of waste recycling are achieved.

2.2 Regional Level

The proposed development is located in the Local Authority area of Clare County Council (CCC).

The *Southern Region Waste Management Plan 2015 – 2021*, which previously governed waste management policy in the CCC area, has been superseded as of March 2024 by the NWMPCE 2024 – 2030, the new national waste management plan for Ireland.

The NWMPCE does not dissolve the three regional waste areas. The NWCPCE sets the ambition of the plan to have a 0% total waste growth per person over the life of the Plan with an emphasis on non-household wastes including waste from commercial activities and the construction and demolition sector. This Plan seeks to influence sustainable consumption and prevent the generation of waste, improve the capture of materials to optimise circularity and enable compliance with policy and legislation.
The national plan sets out the following strategic targets for waste management in the country that are relevant to the development:

National Targets

1B. (Construction Materials) 12% Reduction in Construction & Demolition Waste Generated by 2030.

3B. (Reuse Facilities) Provide for reuse at 10 Civic Amenity Sites, minimum

Municipal landfill charges in Ireland are based on the weight of waste disposed. In the Leinster Region, charges are approximately €140 - €160 per tonne of waste which includes an €85 per tonne landfill levy introduced under the *Waste Management (Landfill Levy) (Amendment) Regulations 2015 (as amended)* [14]. *The Circular Economy (Waste Recovery Levy) Regulations 2024* [15] will also incur a levy of €10 per tonne for waste accepted for recovery. This will include backfilling at authorised recovery sites and at municipal waste landfills.

The Clare County Development Plan 2023-2029 [16] sets out a number of objectives for Clare County in line with national and regional plans, including the current regional waste management plan and the Waste Action Plan for a Circular Economy. Waste management has been addressed under Chapter 11 Physical Infrastructure, Environment and Energy. Waste objectives with a particular relevance to this proposed development are as follows:

Objectives:

CDP11.35 Waste Management:
a) To support and facilitate the implementation of the EU Circular Economy Action Plan 'A New Circular Economy Action Plan for a Cleaner More Competitive Europe' (2020), the EU Raw Material Initiative, A Waste Action Plan for a Circular Economy – Ireland's National Waste Policy 2020- 2025 and the Southern Region Waste Management Plan 2015-2021;
b) To support and promote circular economy principles prioritising prevention, reuse, recycling and recovery, to support a healthy environment, economy and society;
c) To encourage and facilitate the development of new options and technological advances in relation to waste management;
e) To promote environmental awareness measures and action programmes to ensure good environmental awareness and practices, the recycling of waste, water management, and energy conservation;

CDP11.37 Litter Management:
It is an objective of Clare County Council: To implement the provisions of the Clare County Litter Management Plan 2022-2024 and any updated version of this Plan.

2.3 Legislative Requirements

The primary legislative instruments that govern waste management in Ireland and applicable to the development are:

- *Waste Management Act 1996 as amended;*
- *Environmental Protection Agency Act 1992 as amended;*

- *Litter Pollution Act 1997 as amended;*
- *Planning and Development Act 2000 as amended* [17]*;*
- *Circular Economy and Miscellaneous Provisions Act 2022.*

One of the guiding principles of European waste legislation, which has in turn been incorporated into the *Waste Management Act 1996* as amended and subsequent Irish legislation, is the principle of *"Duty of Care"*. This implies that the waste producer is responsible for waste from the time it is generated through until its legal recycling, recovery or disposal (including its method of disposal). As it is not practical in most cases for the waste producer to physically transfer all waste from where it is produced to the final destination, waste contractors will be employed to physically transport waste to the final destination. Following on from this is the concept of *"Polluter Pays"* whereby the waste producer is liable to be prosecuted for pollution incidents, which may arise from the incorrect management of waste produced, including the actions of any contractors engaged (e.g. for transportation and disposal/recovery/recycling of waste).

It is therefore imperative that the Developer ensures that the waste contractors engaged by construction contractors are legally compliant with respect to waste transportation, recycling, recovery and disposal. This includes the requirement that a contractor handle, transport and recycle/recover/dispose of waste in a manner that ensures that no adverse environmental impacts occur as a result of any of these activities.

A collection permit to transport waste must be held by each waste contractor which is issued by the National Waste Collection Permit Office (NWCPO). Waste receiving facilities must also be appropriately permitted or licensed. Operators of such facilities cannot receive any waste, unless in possession of a Certificate of Registration (COR) or waste permit granted by the relevant Local Authority under the *Waste Management (Facility Permit & Registration) Regulations 2007 as amended* or a Waste Licence granted by the EPA. The COR / permit / licence held will specify the type and quantity of waste able to be received, stored, sorted, recycled, recovered and/or disposed of at the specified site

3. DESIGN APPROACH

The client and the design team have integrated the *'Best Practice Guidelines for the Preparation of Resource & Waste Management Plans for Construction & Demolition Projects'* guidelines into the design workshops, to help review processes, identify and evaluate resource reduction measures and investigate the impact on cost, time, quality, buildability, second life and management post construction. Further details on these design principals can be found within the aforementioned guidance document.

The design team have undertaken the design process in line with the international best practice principles to firstly prevent wastes, reuse where possible and thereafter sustainably reduce and recover materials. The below sections have been the focal point of the design process and material selections and will continued to be analysed and investigated throughout the design process and when selecting material.

As noted in the EPA guidelines, the approaches presented are based on international principles of optimizing resources and reducing waste on construction projects through:

- *Prevention;*
- *Reuse;*
- *Recycling;*
- *Green Procurement Principles;*
- *Off-Site Construction;*
- *Materials Optimisation; and*
- *Flexibility and Deconstruction.*

3.1 Designing For Prevention, Reuse and Recycling

Undertaken at the outset and during project feasibility and evaluation the Client and Design Team considered:

- Establishing the potential for any reusable site assets (buildings, structures, equipment, materials, soils, etc.);
- The potential for refurbishment and refit of existing structures or buildings rather than demolition and new build;
- Assessing any existing buildings on the site that can be refurbished either in part or wholly to meet the Client requirements; and
- Enabling the optimum recovery of assets on site.

3.2 Designing for Green Procurement

Waste prevention and minimisation pre-procurement have been discussed and will be further discussed in this section. The Design Team will discuss proposed design solutions, encourage innovation in tenders and incentivise competitions to recognise sustainable approaches. They will also discuss options for packaging reduction with the main Contractor and subcontractors/suppliers using measures such as 'Just-in-Time' delivery and use ordering procedures that avoid excessive waste. The Green procurement extends from the planning stage into the detailed design and tender stage and will be an ongoing part of the long-term design and selection process for this development.

3.3 Designing for Off-Site Construction

Use of off-site manufacturing has been shown to reduce residual wastes by up to 90% (volumetric building versus traditional). The decision to use offsite construction is typically cost led but there are significant benefits for resource management. Some further considerations for procurement which are being investigated as part of the planning stage design process are listed as follows:

- Modular buildings as these can displace the use of concrete and the resource losses associated with concrete blocks such as broken blocks, mortars, etc.;
  - Modular buildings are typically pre-fitted with fixed plasterboard and installed insulation, eliminating these residual streams from site.
- Use of pre-cast structural concrete panels which can reduce the residual volumes of concrete blocks, mortars, plasters, etc.;
- The use of prefabricated composite panels for walls and roofing to reduce residual volumes of insulation and plasterboards;
- Using pre-cast hollow-core flooring instead of in-situ ready mix flooring or timber flooring to reduce the residual volumes of concrete/formwork and wood/packaging, respectively; and
- Designing for the preferential use of offsite modular units.

3.4 Designing for Materials Optimisation During Construction

To ensure manufacturers and construction companies adopt lean production models, including maximising the reuse of materials onsite as outlined in section 3.1, structures should be designed with the intent of designing out waste. This helps to reduce the environmental impacts associated with transportation of materials and from waste management activities. This includes investigating the use of standardised sizes for certain materials to help reduce the amount of offcuts produced on site, focusing on promotion and development of off-site manufacture.

3.5 Designing for Flexibility and Deconstruction

Design flexibility has and will be investigated throughout the design process to ensure that where possible products (including buildings) only contain materials that can be recycled and are designed to be easily disassembled. Material efficiency is being considered for the duration and end of life of a building project to produce; flexible, adaptable spaces that enable a resource-efficient, low-waste future change of use; durability of materials and how they can be recovered effectively when maintenance and refurbishment are undertaken and during disassembly/deconstruction.

4. DESCRIPTION OF THE DEVELOPMENT

4.1 Location, Size and Scale of the Development

The proposed development seeks permission for construction of 300 no. residential units, an 80 no. child crèche, and all associated ancillary site development works including vehicular access, parking, footpaths, drainage, amenity areas, and a wastewater treatment plant. A full description of the development is provided in the statutory notices and in Chapter 2 of the EIAR submitted with the application. Figure 4.1 presents the site location, indicated by the redline boundary. Figure 4.2 presents the proposed site layout plan.

Figure 4.1 Site Location Map (Source: Deady Gahan no. 24150/P/002A)

Figure 4.2 Site Layout Plan (Source: Deady Gahan no. 24150/P/003)

4.2 Details of the Non-Hazardous Wastes to be Produced

There will be soil and stones excavated to facilitate construction of new foundations and installation of underground services. The project engineers (TOBIN) have estimated that 15,000 m^3 of material will need to be excavated to do so. It is currently envisaged that 13,500 m^3 will be able to be retained and reused onsite for landscaping and fill, the remaining material, will need to be removed offsite. This will be taken for appropriate offsite reuse, recovery, recycling and / or disposal.

During the construction phase there may be a surplus of building materials, such as timber off-cuts, broken concrete blocks, cladding, plastics, metals and tiles generated. There may also be excess concrete during construction which will need to be disposed of. Plastic and cardboard waste from packaging and supply of materials will also be generated. The contractor will be required to ensure that oversupply of materials is kept to a minimum and opportunities for reuse of suitable materials is maximised.

Waste will also be generated from construction workers e.g. organic / food waste, dry mixed recyclables (waste paper, newspaper, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons), mixed non-recyclables and potentially sewage sludge from temporary welfare facilities provided on site during the construction phase. Waste printer / toner cartridges, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated infrequently from site offices.

4.3 Potential Hazardous Wastes Arising

4.3.1 Contaminated Soil

A site investigation was undertaken by Ground Investigations Ireland Ltd., between July and September 2021 at the proposed site in Ennis, Co Clare to investigate the subsurface conditions utilising a variety of methods such as trial pits, soakaways, dynamic probes, cable percussion, and rotary core boreholes. Geotechnical and environmental laboratory testing including the Rilta Suite testing was carried out by Element Materials Technology Laboratory in the UK. Ten (10 no.) samples were tested and were found to be under the inert waste criteria when compared to the waste acceptance limits.

If any potentially contaminated material is encountered, it will need to be segregated from clean / inert material, tested and classified as either non-hazardous or hazardous in accordance with the EPA publication entitled *'Waste Classification: List of Waste & Determining if Waste is Hazardous or Non-Hazardous'* [18] using the *HazWasteOnline* application (or similar approved classification method). The material will then need to be classified as clean, inert, non-hazardous or hazardous in accordance with the *EC Council Decision 2003/33/EC* [19], which establishes the criteria for the acceptance of waste at landfills.

In the event that Asbestos Containing Materials (ACMs) are found within the excavated material, the removal will only be carried out by a suitably permitted waste contractor, in accordance with *the Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations 2006-2010 and the Best Practice Guidance for Handling Asbestos (2023)* [20]. All asbestos will be taken to a suitably licensed or permitted facility.

In the event that hazardous soil, or historically deposited waste is encountered during the construction phase, the contractor will notify CCC and provide a Hazardous / Contaminated Soil Management Plan, to include estimated tonnages, description of location, any relevant mitigation, destination for disposal / treatment, in addition to information on the authorised waste collector(s).

4.3.2 Fuel/Oils

Fuels and oils are classed as hazardous materials; any on-site storage of fuel / oil, and all storage tanks and all draw-off points will be bunded and located in a dedicated, secure area of the site. Provided that these requirements are adhered to and the site crew are trained in the appropriate refuelling techniques, it is not expected that there will be any fuel / oil waste generated at the site.

4.3.3 Invasive Plant Species

A site invasive species surveys will be done prior to the commencement of work on site. This will include a site walkover survey of the entire site, and around part of the outside perimeter to search for any invasive species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended).

4.3.4 Asbestos

The site is a greenfield site and there is no demolition proposed for the proposed development so it is unlikely that asbestos or ACMs will be located on site.

In the unlikely event that ACMs are located onsite removal of asbestos or ACMs will be carried out by a suitably qualified contractor and ACMs will only be removed from site by a suitably permitted / licenced waste contractor, in accordance with the *Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations 2006-2010 and the Best Practice Guidance for Handling Asbestos (2023).* All material will be taken to a suitably licensed or permitted facility.

4.3.5 Other Known Hazardous Substances

Paints, glues, adhesives and other known hazardous substances will be stored in designated areas. They will generally be present in small volumes only and associated waste volumes generated will be kept to a minimum. Wastes will be stored in appropriate receptacles pending collection by an authorised waste contractor.

In addition, WEEE (containing hazardous components), printer toner / cartridges, batteries (Lead, Ni-Cd or Mercury) and / or fluorescent tubes and other mercury containing waste may be generated from during C&D activities or temporary site offices. These wastes, if generated, will be stored in appropriate receptacles in designated areas of the site pending collection by an authorised waste contractor.

5. ROLES AND RESPONSIBILITIES

The *Best Practice Guidelines on the Preparation of Resource Waste Management Plans for Construction and Demolition Projects* promotes that a suitably qualified Resource Manager (RM) with expertise in waste and resource management to implement the RWMP should be appointed. The RM may be performed by number of different individuals over the life-cycle of the project, however it is intended to be a reliable person chosen from within the Planning/Design/Contracting Team, who is technically competent and appropriately trained, who takes the responsibility to ensure that the objectives and measures within the Project RWMP are complied with. The RM is assigned the requisite authority to meet the objective and obligations of the RWMP. The role will include the important activities of conducting waste checks/audits and adopting construction methodology that is designed to facilitate maximum reuse and/or recycling of waste.

5.1 Role of the Client

The Client are the body establishing the aims and the performance targets for the project.

- The Client has commissioned the preparation and submission of this RWMP as part of the design and planning submission;
- The Client is to commission the preparation and submission of an updated RWMP as part of the construction tendering process;
- The Client will ensure that the RWMP is agreed on and submitted to the local authority and their agreement obtained prior to commencement of works on site;
- The Client will request the end-of-project RWMP from the Contractor.

5.2 Role of the Client Advisory Team

The Client Advisory Team or Design Team is formed of architects, consultants, quantity surveyors and engineers and is responsible for:

- Drafting and maintaining the RWMP through the design, planning and procurement phases of the project;
- Appointing a RM to track and document the design process, inform the Design Team and prepare the RWMP.
- Including details and estimated quantities of all projected waste streams with the support of environmental consultants/scientists. This will also include data on waste types (e.g. waste characterisation data, contaminated land assessments, site investigation information) and prevention mechanisms (such as by-products) to illustrate the positive circular economy principles applied by the Design Team;
- Handing over of the RWMP to the selected Contractor upon commencement of construction of the development, in a similar fashion to how the safety file is handed over to the Contractor;
- Working with the Contractor as required to meet the performance targets for the project.

5.3 Future Role of the Contractor

The future construction Contractors have not yet been decided upon for this RWMP. However, once select they will have major roles to fulfil. They will be responsible for:

- Preparing, implementing and reviewing the RWMP throughout the construction phases (including the management of all suppliers and sub-contractors) as per the requirements of the EPA guidelines;
- Identifying a designated and suitably qualified RM who will be responsible for implementing the RWMP;
- Identifying all hauliers to be engaged to transport each of the resources / wastes off-site;

- Implementing waste management policies whereby waste materials generated on site are to be segregated as far as practicable;
- Renting and operating a mobile-crusher to crush concrete for temporary reuse onsite during construction and reduce the amount of HGV loads required to remove material from site;
- Applying for the appropriate waste permit to crush concrete onsite;
- Identifying all destinations for resources taken off-site. As above, any resource that is legally classified as a 'waste' must only be transported to an authorised waste facility;
- End-of-waste and by-product notifications addressed with the EPA where required;
- Clarification of any other statutory waste management obligations, which could include on-site processing;
- Full records of all resources (both wastes and other resources) will be maintained for the duration of the project; and
- Preparing a RWMP Implementation Review Report at project handover.

6. KEY MATERIALS & QUANTITIES

6.1 Project Resource Targets

Project specific resource and waste management targets for the site have not yet been set and this information will be updated for these targets once these targets have been confirmed by the client. However, where feasible, projects of this nature are expected to ensure that at least 70% of waste is fully re-used, recycled, or recovered. Target setting will inform the setting of project-specific benchmarks to track target progress. Typical Key Performance Indicators (KPIs) that will be used to set targets include (as per guidelines):

- Weight (tonnes) or Volume (m3) of waste generated per construction value;
- Weight (tonnes) or Volume (m3) of waste generated per construction floor area (m2);
- Fraction of resource reused on site;
- Fraction of resource notified as by-product;
- Fraction of waste segregated at source before being sent off-site for recycling/recovery; and
- Fraction of waste recovered, fraction of waste recycled, or fraction of waste disposed.

6.2 Main Construction and Demolition Waste Categories

The main non-hazardous and hazardous waste streams that could be generated by the construction activities at a typical site are shown in Table 6.1. The List of Waste (LoW) code (2018) for each waste stream is also shown.

Table 6.1 Typical waste types generated and LoW codes (individual waste types may contain hazardous substances)

Waste Material	LoW Code
Concrete, bricks, tiles, ceramics	17 01 01-03 & 07
Wood, glass and plastic	17 02 01-03
Treated wood, glass, plastic, containing hazardous substances	17-02-04*
Bituminous mixtures, coal tar and tarred products	17 03 01*, 02 & 03*
Metals (including their alloys) and cable	17 04 01-11
Soil and stones	17 05 03* & 04
Gypsum-based construction material	17 08 01* & 02
Paper and cardboard	20 01 01
Mixed C&D waste	17 09 04
Green waste	20 02 01
Electrical and electronic components	20 01 35 & 36
Batteries and accumulators	20 01 33 & 34
Liquid fuels	13 07 01-10
Chemicals (solvents, pesticides, paints, adhesives, detergents etc.)	20 01 13, 19, 27-30
Insulation materials	17 06 04
Organic (food) waste	20 01 08
Mixed Municipal Waste	20 03 01

* Individual waste type may contain hazardous substances

6.3 Demolition Waste Generation

There is no demolition associated with this proposed application.

6.4 Construction Waste Generation

Table 6.2 shows the breakdown of C&D waste types produced on a typical site based on data from the EPA *National Waste Reports* [21] and *the joint EPA & GMIT study* [22].

Table 6.2 Waste materials generated on a typical Irish construction site

Waste Types	%
Mixed C&D	33
Timber	28
Plasterboard	10
Metals	8
Concrete	6
Other	15
Total	100

Table 6.3, below, shows the estimated construction waste generation for the proposed Project based on the gross floor area of construction and other information available to date, along with indicative targets for management of the waste streams. The estimated amounts for the main waste types (with the exception of soils and stones) are based on an average large-scale development waste generation rate per m^2, using the waste breakdown rates shown in Table 6.2. These have been calculated from the schedule of development areas provided by the architect.

Table 6.3 Predicted on and off-site reuse, recycle and disposal rates for construction waste

Waste Type	Tonnes	Reuse		Recycle / Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Mixed C&D	618.3	10	61.8	80	494.6	10	61.8
Timber	524.6	40	209.8	55	288.5	5	26.2
Plasterboard	187.4	30	56.2	60	112.4	10	18.7
Metals	149.9	5	7.5	90	134.9	5	7.5
Concrete	112.4	30	33.7	65	73.1	5	5.6
Other	281.0	20	56.2	60	168.6	20	56.2
Total	**1873.6**		**425.3**		**1272.2**		**176.1**

In addition to the waste streams in Table 6.4 there will be c. 15,000 m^3 of soil and stones excavated to facilitate construction of new foundations, underground services, and the installation of the proposed basements. Any suitable excavated material will be temporarily stockpiled for reuse as fill, where possible, it is currently envisaged that 1,500 m^3 is expected to be removed off-site for appropriate reuse, recovery and / or disposal.

It should be noted that until final materials and detailed construction methodologies have been confirmed, it is difficult to predict with a high level of accuracy the construction waste that will be generated from the proposed works as the exact materials and quantities may be subject to some degree of change and variation during the detailed design and construction process.

6.5 Proposed Resource and Waste Management Options

Waste materials generated will be segregated on-site, where it is practical. Where the on-site segregation of certain wastes types is not practical, off-site segregation will be carried out. There will be skips and receptacles provided to facilitate segregation at source, where feasible. All waste receptacles leaving the site will be covered or enclosed. The appointed waste contractor will collect and transfer the wastes as receptacles are filled. There are numerous waste contractors in the Dublin region that provide this service.

All waste arisings will be handled by an approved waste contractor holding a current waste collection permit. All waste arisings requiring disposal off-site will be reused, recycled, recovered or disposed of at a facility holding the appropriate registration, permit or licence, as required.

National End-of-Waste Decision EoW-N001/2023 (Regulation 28) published by the EPA in September 2023, establishes criteria determining when recycled aggregate resulting from a recovery operation ceases to be waste. Material from this proposed development will be investigated to see if it can cease to be a waste under the requirements of the National End of Waste Criteria for Aggregates.

During construction, some of the sub-contractors on site will generate waste in relatively low quantities. The transportation of non-hazardous waste by persons who are not directly involved with the waste business, at weights less than or equal to 2 tonnes, and in vehicles not designed for the carriage of waste, are exempt from the requirement to have a waste collection permit (per Article 30 (1) (b) of the Waste Collection Permit Regulations 2007, as amended). Any sub-contractors engaged that do not generate more than 2 tonnes of waste at any one time can transport this waste off-site in their work vehicles (which are not designed for the carriage of waste). However, they are required to ensure that the receiving facility has the appropriate COR / permit / licence.

Written records will be maintained by the contractor(s), detailing the waste arising throughout the C&D phases, the classification of each waste type, waste collection permits for all waste contactors who collect waste from the site and COR / permit / licence for the receiving waste facility for all waste removed off-site for appropriate reuse, recycling, recovery and / or disposal.

Dedicated bunded storage containers will be provided for hazardous wastes which may arise, such as batteries, paints, oils, chemicals, if required.

The anticipated management of the main waste streams is outlined as follows:

Soil & Stones

The waste hierarchy states that the preferred option for waste management is prevention and minimisation of waste, followed by preparing for reuse and recycling / recovery, energy recovery (i.e. incineration) and, least favoured of all, disposal. The excavations are required to facilitate construction works so the preferred option (prevention and minimisation) cannot be accommodated for the excavation phase.

It is anticipated that 90% (c. 13,500 m^3) excavated topsoil and subsoil will be reused on site. It is anticipated that 10% (c. 1,500 m^3) of subsoil material will need to be removed offsite for appropriate reuse, recovery and/or disposal. If material is removed off-site it could be reused as a by-product (and not as a waste). If this is done, it will be done in accordance with Regulation 27 of the European Communities (Waste Directive) Regulations 2011, as amended, which requires that certain conditions are met and that by-product notifications are made to the EPA via their online notification form. Excavated material should not be removed from site until approval from the EPA has been received. The potential to reuse material as a by-product will be confirmed during the course of the excavation works, with the objective of eliminating any unnecessary disposal of material.

The next option (beneficial reuse) may be appropriate for the excavated material, pending environmental testing to classify the material as hazardous or non-hazardous in accordance with the EPA *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous* publication. Clean inert material may be used as fill material in other construction projects or engineering fill for waste licensed sites. Beneficial reuse of surplus excavation material as engineering fill may be subject to further testing to determine if materials meet the specific engineering standards for their proposed end use.

Any nearby sites requiring clean fill/capping material will be contacted to investigate reuse opportunities for clean and inert material. If any of the material is to be reused on another site as a by-product (and not as a waste), this will be done in accordance with Regulation 27. Similarly, if any soils/stones are imported onto the site from another construction site as a by-product, this will also be done in accordance with Regulation 27. Regulation 27 will be investigated to see if the material can be imported onto this site for beneficial reuse instead of using virgin materials.

If the material is deemed to be a waste, then removal and reuse / recovery / disposal of the material will be carried out in accordance with the Waste Framework Directive (Directive 2008/98/EC), the *Waste Management Act 1996* as amended, the *Waste Management (Collection Permit) Regulations 2007* as amended and the *Waste Management (Facility Permit & Registration) Regulations 2007* as amended. Once all available beneficial reuse options have been exhausted, the options of recycling and recovery at waste permitted and licensed sites will be considered.

In the event that contaminated material is encountered and subsequently classified as hazardous, this material will be stored separately to any non-hazardous material. It will require off-site treatment at a suitable facility or disposal abroad via Transfrontier Shipment of Wastes (TFS).

Bedrock

While it is not envisaged that bedrock will be encountered, if bedrock is encountered, it is anticipated that it will not be crushed on site. Any excavated rock is expected to be removed off-site for appropriate reuse, recovery and / or disposal. If bedrock is to be crushed on-site, the appropriate mobile waste facility permit will be obtained from CCC.

Silt & Sludge

During the construction phase, silt and petrochemical interception will be carried out on run-off and pumped water from site works, where required. Sludge and silt will then be collected by a suitably licensed contractor and removed off-site.

Concrete Blocks, Bricks, Tiles & Ceramics

The majority of concrete blocks, bricks, tiles and ceramics generated as part of the construction works are expected to be clean, inert material and will be recycled, where possible. If concrete is to be crushed on-site, the appropriate mobile waste facility permit will be obtained from CCC.

Hard Plastic

As hard plastic is a highly recyclable material, much of the plastic generated will be primarily from material off-cuts. All recyclable plastic will be segregated and recycled, where possible.

Timber

Timber that is uncontaminated, i.e. free from paints, preservatives, glues, etc., will be disposed of in a separate skip and recycled off-site.

Metal

Metals will be segregated, where practical, and stored in skips. Metal is highly recyclable and there are numerous companies that will accept these materials.

Plasterboard

There are currently a number of recycling services for plasterboard in Ireland. Plasterboard from the construction phases will be stored in a separate skip, pending collection for recycling. The site Manager will ensure that oversupply of new plasterboard is carefully monitored to minimise waste.

Glass

Glass materials will be segregated for recycling, where possible.

Waste Electrical & Electronic Equipment (WEEE)

Any WEEE will be stored in dedicated covered cages / receptacles / pallets pending collection for recycling.

Other Recyclables

Where any other recyclable wastes, such as cardboard and soft plastic, are generated, these will be segregated at source into dedicated skips and removed off-site.

Non-Recyclable Waste

C&D waste which is not suitable for reuse or recovery, such as polystyrene, some plastics and some cardboards, will be placed in separate skips or other receptacles. Prior to removal from site, the non-recyclable waste skip / receptacle will be examined by a member of the waste team (see Section 8) to determine if recyclable materials have been placed in there by mistake. If this is the case, efforts will be made to determine the cause of the waste not being segregated correctly and recyclable waste will be removed and placed into the appropriate receptacle.

Asbestos Containing Materials

In the unlikely event asbestos is encountered, any asbestos or ACM found on-site will be removed by a suitably competent contractor and disposed of as asbestos waste before the works begin. All asbestos removal work or encapsulation work must be carried out in accordance with the *Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations 2006-2010.*

Other Hazardous Wastes

On-site storage of any hazardous wastes produced (i.e. contaminated soil if encountered and / or waste fuels) will be kept to a minimum, with removal off-site organised on a regular basis. Storage of all hazardous wastes on-site will be undertaken so as to minimise exposure to on-site personnel and the public and to also minimise potential for environmental impacts. Hazardous wastes will be recovered, wherever possible, and failing this, disposed of appropriately.

On-Site Crushing

It is currently not envisaged that the crushing of waste materials will occur on-site. However, if the crushing of material is to be undertaken, a mobile waste facility permit will first be obtained from CCC and the destination of the accepting waste facility or if an application under regulation 28 will be made using *National End-of-Waste Decision EoW-N001/2023*, will be supplied to the CCC waste unit.

It should be noted that until a construction contractor is appointed it is not possible to provide information on the specific destinations of each construction waste stream. Prior to commencement of construction

and removal of any waste offsite, details of the proposed destination of each waste stream will be provided to CCC by the project team.

6.6 Tracking and Documentation Procedures for Off-Site Waste

All waste will be documented prior to leaving the site. Waste will be weighed by the contractor, either by a weighing mechanism on the truck or at the receiving facility. These waste records will be maintained on site by the nominated project RM (see Section 8).

All movement of waste and the use of waste contractors will be undertaken in accordance with the Waste Framework Directive (Directive 2008/98/EC), the *Waste Management Act 1996* as amended, *Waste Management (Collection Permit) Regulations 2007* as amended and *Waste Management (Facility Permit & Registration) Regulations 2007* and amended. This includes the requirement for all waste contractors to have a waste collection permit issued by the NWCPO. The nominated project RM (see Section 8) will maintain a copy of all waste collection permits on-site.

If the waste is being transported to another site, a copy of the Local Authority waste COR / permit or EPA Waste Licence for that site will be provided to the nominated project Waste Manager (see Section 8). If the waste is being shipped abroad, a copy of the Transfrontier Shipping (TFS) notification document will be obtained from DCC (as the relevant authority on behalf of all Local Authorities in Ireland) and kept on-site along with details of the final destination (COR, permits, licences, etc.). A receipt from the final destination of the material will be kept as part of the on-site waste management records.

All information will be entered in a waste management recording system to be maintained on-site.

7. ESTIMATED COST OF WASTE MANAGEMENT

An outline of the costs associated with different aspects of waste management is outlined below. The total cost of C&D waste management will be measured and will take into account handling costs, storage costs, transportation costs, revenue from rebates and disposal costs.

7.1 Reuse

By reusing materials on site, there will be a reduction in the transport and recycle / recovery / disposal costs associated with the requirement for a waste contractor to take the material off-site. Clean and inert soils, gravel, stones, etc., which cannot be reused on-site may be used as access roads or capping material for landfill sites, etc. This material is often taken free of charge or at a reduced fee for such purposes, reducing final waste disposal costs.

7.2 Recycling

Salvageable metals will earn a rebate, which can be offset against the costs of collection and transportation of the skips.

Clean, uncontaminated cardboard and certain hard plastics can also be recycled. Waste contractors will charge considerably less to take segregated wastes, such as recyclable waste, from a site than mixed waste.

Timber can be recycled as chipboard. Again, waste contractors will charge considerably less to take segregated wastes, such as timber, from a site than mixed waste.

7.3 Disposal

Landfill charges are currently at around €140 - €160 per tonne which includes an €85 per tonne landfill levy introduced under the *Waste Management (Landfill Levy) (Amendment) Regulations 2015* (as amended) 14. The *Circular Economy (Waste Recovery Levy) Regulations 2024* [15] will also incur a levy of €10 per tonne for waste accepted for recovery. This will include backfilling at authorised recovery sites and at municipal waste landfills. In addition to disposal costs, waste contractors will also charge a collection fee for skips.

Collection of segregated C&D waste usually costs less than municipal waste. Specific C&D waste contractors take the waste off-site to a licensed or permitted facility and, where possible, remove salvageable items from the waste stream before disposing of the remainder to landfill. Clean soil, rubble, etc., is also used as fill / capping material, wherever possible.

8. TRAINING PROVISIONS

A member of the construction team will be appointed as the RM to ensure commitment, operational efficiency and accountability in relation to waste management during the C&D phases of the development.

8.1 Resource Manager Training and Responsibilities

The nominated RM will be given responsibility and authority to select a waste team if required, i.e. members of the site crew that will aid them in the organisation, operation and recording of the waste management system implemented on site.

The RM will have overall responsibility to oversee, record and provide feedback to the client on everyday waste management at the site. Authority will be given to the Waste Manager to delegate responsibility to sub-contractors, where necessary, and to coordinate with suppliers, service providers and sub-contractors to prioritise waste prevention and material salvage.

The RM will be trained in how to set up and maintain a record keeping system, how to perform an audit and how to establish targets for waste management on site. The RM will also be trained in the best methods for segregation and storage of recyclable materials, have information on the materials that can be reused on site and be knowledgeable in how to implement this RWMP.

8.2 Site Crew Training

Training of site crew in relation to waste is the responsibility of the RM and, as such, a waste training program will be organised. A basic awareness course will be held for all site crew to outline the RWMP and to detail the segregation of waste materials at source. This may be incorporated with other site training needs such as general site induction, health and safety awareness and manual handling.

This basic course will describe the materials to be segregated, the storage methods and the location of the Waste Storage Areas (WSAs). A sub-section on hazardous wastes will be incorporated into the training program and the particular dangers of each hazardous waste will be explained.

9. TRACKING AND TRACING / RECORD KEEPING

Records will be kept for all waste material which leaves the site, either for reuse on another site, recycling or disposal. A recording system will be put in place to record the waste arisings on Site.

A waste tracking log will be used to track each waste movement from the site. On exit from the site, the waste collection vehicle driver will stop at the site office and sign out as a visitor and provide the security personnel or RM with a waste docket (or Waste Transfer Form (WTF) for hazardous waste) for the waste load collected. At this time, the security personnel will complete and sign the Waste Tracking Register with the following information:

- Date
- Time
- Waste Contractor
- Company waste contractor appointed by, e.g. Contractor or subcontractor name
- Collection Permit No.
- Vehicle Reg.
- Driver Name
- Docket No.
- Waste Type
- LoW
- Weight/Quantity

The waste vehicle will be checked by security personal or the RM to ensure it has the waste collection permit no. displayed and a copy of the waste collection permit in the vehicle before they are allowed to remove the waste from the site.

The waste transfer dockets will be transferred to the RM on a weekly basis and can be placed in the Waste Tracking Log file. This information will be forwarded onto the CCC Waste Regulation Unit when requested.

Each subcontractor that has engaged their own waste contractor will be required to maintain a similar waste tracking log with the waste dockets / WTF maintained on file and available for inspection on site by the main contractor as required. These subcontractor logs will be merged with the main waste log.

Waste receipts from the receiving waste facility will also be obtained by the site contractor(s) and retained. A copy of the Waste Collection Permits, CORs, Waste Facility Permits and Waste Licences will be maintained on site at all times and will be periodically reviewed by the RM. Subcontractors who have engaged their own waste contractors, will provide the main contractor with a copy of the waste collection permits and COR / permit / licence for the receiving waste facilities and maintain a copy on file, available for inspection on site as required.

10. OUTLINE WASTE AUDIT PROCEDURE

10.1 Responsibility for Waste Audit

The appointed RM will be responsible for conducting a waste audit at the site during the C&D phase of the proposed Project. Contact details for the nominated RM will be provided to the CCC Waste Regulation Unit after the main contractor is appointed and prior to any material being removed from site.

10.2 Review of Records and Identification of Corrective Actions

A review of all waste management costs and the records for the waste generated and transported off-site will be undertaken mid-way through the construction phase of the proposed Project.

If waste movements are not accounted for, the reasons for this will be established in order to see if and why the record keeping system has not been maintained. The waste records will be compared with the established recovery / reuse / recycling targets for the site. Each material type will be examined, in order to see where the largest percentage waste generation is occurring. The waste management methods for each material type will be reviewed in order to highlight how the targets can be achieved.

Upon completion of the C&D phase, a final report will be prepared, summarizing the outcomes of waste management processes adopted and the total recycling / reuse / recovery figures for the development.

11. CONSULTATION WITH RELEVANT BODIES

11.1 Local Authority

Once construction contractors have been appointed and have appointed waste contractors, and prior to removal of any C&D waste materials off-site, details of the proposed destination of each waste stream will be provided to the CCC Waste Regulation Unit.

CCC will also be consulted, as required, throughout the excavation and construction phases in order to ensure that all available waste reduction, reuse and recycling opportunities are identified and utilised and that compliant waste management practices are carried out.

11.2 Recycling / Salvage Companies

The appointed waste contractor for the main waste streams managed by the construction contractors will be audited in order to ensure that relevant and up-to-date waste collection permits and facility registrations / permits / licences are held. In addition, information will be obtained regarding the feasibility of recycling each material, the costs of recycling / reclamation, the means by which the wastes will be collected and transported off-site, and the recycling / reclamation process each material will undergo off-site.

12. SUMMARY AND CONCLUSION

Adherence to this plan will also ensure that waste management during the construction phase at the proposed development is carried out in accordance with the requirements in the EPA's *Best Practice Guidelines for the Preparation of Resource & Waste Management Plans for Construction & Demolition Projects* and the CCC Waste Bye-Laws and the NWMPCE.

13. REFERENCES

1. Waste Management Act 1996 as amended.
2. Environmental Protection Agency Act 1992 as amended.
3. Litter Pollution Act 1997 (S.I. No. 12 of 1997) as amended
4. Regional Waste Management Planning Offices, *The National Waste Management Plan for a Circular Economy 2024 – 2030 (2024).*
5. Department of Environment and Local Government (DoELG) *Waste Management – Changing Our Ways, A Policy Statement* (1998).
6. Forum for the Construction Industry – *Recycling of Construction and Demolition Waste.*
7. Department of Communications, Climate Action and Environment (DCCAE), *Waste Action Plan for the Circular Economy - Ireland's National Waste Policy 2020-2025* (Sept 2020).
8. DCCAE, *Whole of Government Circular Economy Strategy 2022-2023 'Living More, Using Less'* (2021)
9. Circular Economy and Miscellaneous Provisions Act 2022.
10. Environmental Protection Agency (EPA) *'Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects' (2021)*
11. Department of Environment, Heritage and Local Government, *Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects* (2006).
12. Department of Housing, Local Government and Heritage authored *Sustainable Residential Development and Compact Settlements - Guidelines for Planning Authorities (2024)*
13. FÁS and the Construction Industry Federation (CIF), *Construction and Demolition Waste Management – a handbook for Contractors and* site *Managers* (2002).
14. Waste Management (Landfill Levy) Regulations 2015 (as amended)
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16. Clare County Council*, Clare County Development Plan 2023-2029 (2023).*
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18. EPA, *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous* (2018)
19. Local Government Ireland, *Best practice guidance for handling asbestos (2023)*
20. Council Decision 2003/33/EC, establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC.
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APPENDIX 8-2 Operational Waste Management Plan

REPORT

Trinity Consultants

awnconsulting

Operational Waste Management Plan

Project Title: Residential Development at Ballymacaula, Drumbiggle, Keelty, Circular Road, Ennis, Co. Clare

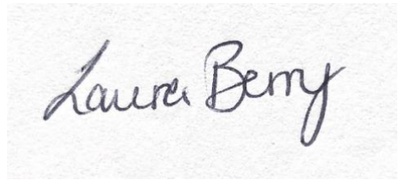
CLIENT	DOCUMENT REFERENCE	DATE
Glenveagh Homes Ltd	R247501.0709WMR02	27/05/2025

AWN Consulting Ltd, The Tecpro Building, IDA Business & Technology Park, Clonshaugh, Dublin 17, D17 XD90

DOCUMENT CONTROL SHEET

Document Control Sheet	
Our Reference	R247501.0709WMR02
Original Issue Date	27/05/2025
Client:	Glenveagh Homes Ltd
Client Address:	Block C, Maynooth Business Campus, Straffan Road, Maynooth, Co. Kildare

Revision	Revision Date	Description

Details	Written by	Approved by
Signature		
Name	Laura Berry	Chonaill Bradley
Title	Environmental Consultant	Associate
Date	27/05/2025	27/05/2025

Disclaimer
This report considers the specific instructions and requirements of our client. It is not intended for third-party use or reliance, and no responsibility is accepted for any third party. The provisions in this report apply solely to this project and should not be assumed applicable to other developments without review and modification.

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1. INTRODUCTION

AWN Consulting, a Trinity Consultants Company, has prepared this Operational Waste Management Plan (OWMP) on behalf of Glenveagh Homes Ltd. The proposed development will principally consist of the construction of 300 no. residential units and a crèche at Ballymacaula, Drumbiggle, Keelty, Circular Road, Ennis, Co. Clare.

This OWMP has been prepared to ensure that the management of waste during the operational phase of the proposed development is undertaken in accordance with the current legal and industry standards including, the Waste Management Act 1996 as amended and associated Regulations [1], *Environmental Protection Agency Act 1992* as amended [2], *Litter Pollution Act 1997 as amended* [3], the *National Waste Management Plan for a Circular Economy 2024 - 2030 (NWMPCE) (2024)* [4] and Clare County Council (CCC) *County Clare Waste Management Bye-Laws, 2018* [5]. In particular, this OWMP aims to provide a robust strategy for the storage, handling, collection and transport of the wastes generated at the proposed site.

This OWMP aims to ensure maximum recycling, reuse and recovery of waste with diversion from landfill, wherever possible. The OWMP also seeks to provide guidance on the appropriate collection and transport of waste to prevent issues associated with litter or more serious environmental pollution (e.g. contamination of soil or water resources). The plan estimates the type and quantity of waste to be generated from the proposed development during the operational phase and provides a strategy for managing the different waste streams.

At present, there are no specific national guidelines in Ireland for the preparation of OWMPs. Therefore, in preparing this document, consideration has been given to the requirements of national and regional waste policy, legislation and other guidelines.

2. OVERVIEW OF WASTE MANAGEMENT IN IRELAND

2.1 National level

The Irish Government issued a policy statement in September 1998 entitled '*Changing Our Ways*' [6], which identified objectives for the prevention, minimisation, reuse, recycling, recovery and disposal of waste in Ireland. A heavy emphasis was placed on reducing reliance on landfill and finding alternative methods for managing waste. Amongst other things, Changing Our Ways stated a target of at least 35% recycling of municipal (i.e. household, commercial and non-process industrial) waste.

A further policy document, '*Preventing and Recycling Waste – Delivering Change'* was published in 2002[7]. This document proposed a number of programmes to increase recycling of waste and allow diversion from landfill. The need for waste minimisation at source was considered a priority.

This view was also supported by a review of sustainable development policy in Ireland and achievements to date, which was conducted in 2002, entitled '*Making Irelands Development Sustainable – Review, Assessment and Future Action*' [8]. This document also stressed the need to decouple economic growth and waste generation, again through waste minimisation and reuse of discarded material.

In order to establish the progress of the Government policy document Changing Our Ways, a review document was published in April 2004 entitled '*Taking Stock and Moving Forward'* [9]. Covering the period 1998 – 2003, the aim of this document was to assess progress to date with regard to waste management in Ireland, to consider developments since the policy framework and the local authority waste management plans were put in place, and to identify measures that could be undertaken to further support progress towards the objectives outlined in *Changing Our Ways*.

In particular, *Taking Stock and Moving Forward* noted a significant increase in the amount of waste being brought to local authority landfills. The report noted that one of the significant challenges in the coming years was the extension of the dry recyclable collection services.

In September 2020, the Irish Government published a new policy document outlining a new action plan for Ireland to cover the period of 2020-2025. This plan *'A Waste Action Plan for a Circular Economy'* [10] (WAPCE), was prepared in response to the 'European Green Deal' which sets a roadmap for a transition to a new economy, where climate and environmental challenges are turned into opportunities, replacing the previous national waste management plan *"A Resource Opportunity"* (2012).

The WAPCE sets the direction for waste planning and management in Ireland up to 2025. This reorientates policy from a focus on managing waste to a much greater focus on creating circular patterns of production and consumption. Other policy statements of a number of public bodies already acknowledge the circular economy as a national policy priority.

The policy document contains over 200 measures across various waste areas including circular economy, municipal waste, consumer protection and citizen engagement, plastics and packaging, construction and demolition, textiles, green public procurement and waste enforcement.

One of the first actions to be taken was the development of the Whole of Government Circular Economy Strategy 2022-2023 '*Living More, Using Less'* (2021) [11] to set a course for Ireland to transition across all sectors and at all levels of Government toward circularity and was issued in December 2021. It is anticipated that the Strategy will be updated in full every 18 months to 2 years.

The *Circular Economy and Miscellaneous Provisions Act 2022* [12] was signed into law in July 2022. The Act underpins Ireland's shift from a "take-make-waste" linear model to a more sustainable pattern of production and consumption, that retains the value of resources in our economy for as long as possible and that will to significantly reduce our greenhouse gas emissions. The Act defines Circular Economy for the first time in Irish law, incentivises the use of recycled and reusable alternatives to wasteful, single-use disposable packaging, introduces a mandatory segregation and incentivised charging regime for commercial waste, streamlines the national processes for End-of-Waste and By-Products decisions, tackling the delays which can be encountered by industry, and supporting the availability of recycled secondary raw materials in the Irish market, and tackles illegal fly-tipping and littering.

The Department of Housing, Local Government and Heritage authored *Sustainable Residential Development and Compact Settlements - Guidelines for Planning Authorities* (2024) [13], suggests the below thresholds at which the need for the supplemental information such as the OWMP should be considered.

- 30 or more residential units

Since 1998, the Environmental Protection Agency (EPA) has produced periodic '*National Waste (Database) Reports*' which as of 2023 have been renamed *Circular Economy and Waste Statistics Highlight Reports* [14] detailing, among other things, estimates for household and commercial (municipal) waste generation in Ireland and the level of recycling, recovery and disposal of these materials. The 2024 National Circular Economy and Waste Statistics web resource, which is the most recent study published, along with the national waste statistics web resource (2024) reported the following key statistics for 2022:

- Generated – Ireland produced 3,190,000 t of municipal waste in 2022. This is a slight increase since 2021. Of this, 55% came from households and 45% came from commercial and public service sources.
- Managed –In 2022, a total of 1.76 million Household waste collected and treated by the waste industry.
- Unmanaged – An estimated 36,970 tonnes of household waste was unmanaged waste i.e., not disposed of in the correct manner in 2022.
- Recovered – A rounded 1.3 million tonnes of Ireland's municipal waste went for incineration with energy recovery in 2022. This tonnage is 43% of municipal waste managed and a marginal increase on the 42% achieved in 2021.
- Recycled –Some 1.3 million tonnes of municipal waste generated in Ireland was recycled in 2022, resulting in a recycling rate of 41% . This indicates that we face significant challenges to meet the upcoming EU recycling targets for 2025 to 2035
- Of the municipal waste recycled in 2022, over 825,000 tonnes went for material recycling (approximately the same as 2021) and over 480,000 tonnes were treated by composting/anaerobic digestion (approximately the same as 2021 but up 37% on 2020). The large increase of composted/anaerobically digested biowaste from 2020 is mainly due to a change in our way of estimating home composting.
- Disposed – Ireland's landfill rate for municipal waste managed was 15% in 2022. This is a 1% decrease from 2021's rate of 16%.
- Reuse – 54,800 tonnes of second-hand products we estimated by the EPA to have been reused in Ireland in 2021. The average annual Reuse rate per person in Ireland is 10.6 kg per person.

2.2 Regional Level

The proposed development is located in the Local Authority administrative area of Clare County Council (CCC).

The *Southern Region Waste Management Plan 2015 – 2021*, which previously governed waste management policy in the CCC area, has been superseded as of March 2024 by the *NWMPCE 2024 – 2030*, the new national waste management plan for Ireland.

The NWMPCE does not dissolve the three regional waste areas. The NWCPCE sets the ambition of the plan to have a 0% total waste growth per person over the life of the Plan with an emphasis on non-household wastes including waste from commercial activities and the construction and demolition sector. This Plan seeks to influence sustainable consumption and prevent the generation of waste, improve the capture of materials to optimise circularity and enable compliance with policy and legislation.

This Plan seeks to influence sustainable consumption and prevent the generation of waste, improve the capture of materials to optimise circularity and enable compliance with policy and legislation.

The national plan sets out the following strategic targets for waste management in the country that are relevant to the development:

National Targets

1A. (Residual Municipal Waste) 6% Reduction in Residual Municipal Waste per person by 2030

2A. (Contamination of Materials) 90% of Material in Compliance in the Dry Recycling Bin

2B. (Material Compliance Residual) 10% per annum increase in Material Compliance in the residual bin. (90% by the end of 2030)

3A. (Reuse of Materials) 20kg Per person / year – Reuse of materials like cloths or furniture to prevent waste.

Municipal landfill charges in Ireland are based on the weight of waste disposed. In the Leinster Region, charges are approximately €140-160 per tonne of waste, which includes a €85 per tonne landfill levy introduced under the *Waste Management (Landfill Levy) (Amendment) Regulations 2015*.

The *Clare County Development Plan 2023 – 2029* [15] sets out a number of objectives for Clare County in line with national and regional plans, including the current regional waste management plan and the Waste Action Plan for a Circular Economy. Waste management has been addressed under Chapter 11 Physical Infrastructure, Environment and Energy. Waste policies and objectives with a particular relevance to this proposed development are as follows:

Objectives:

CDP11.35 Waste Management:

a) To support and facilitate the implementation of the EU Circular Economy Action Plan 'A New Circular Economy Action Plan for a Cleaner More Competitive Europe' (2020), the EU Raw Material Initiative, A Waste Action Plan for a Circular Economy – Ireland's National Waste Policy 2020- 2025 and the Southern Region Waste Management Plan 2015-2021;
b) To support and promote circular economy principles prioritising prevention, reuse, recycling and recovery, to support a healthy environment, economy and society;
c) To encourage and facilitate the development of new options and technological advances in relation to waste management;
e) To promote environmental awareness measures and action programmes to ensure good environmental awareness and practices, the recycling of waste, water management, and energy conservation;

CDP11.37 Litter Management:
It is an objective of Clare County Council: To implement the provisions of the Clare County Litter Management Plan 2022-2024 and any updated version of this Plan.

2.3 Legislative Requirements

The primary legislative instruments that govern waste management in Ireland and applicable to the proposed development are:

- *Waste Management Act 1996 as amended;*
- *Environmental Protection Agency Act 1992 as amended;*
- *Litter Pollution Act 1997 as amended;*
- *Planning and Development Act 2000 as amended* [16];
- *Circular Economy and Miscellaneous Provisions Act 2022.*

These Acts and subordinate Regulations transpose the relevant European Union Policy and Directives into Irish law.

One of the guiding principles of European waste legislation, which has in turn been incorporated into the *Waste Management Act 1996* as amended and subsequent Irish legislation, is the principle of "Duty of Care". This implies that the waste producer is responsible for waste from the time it is generated through until its legal disposal (including its method of disposal). As it is not practical in most cases for the waste producer to physically transfer all waste from where it is produced to the final disposal area, waste contractors will be employed to physically transport waste to the final waste disposal site.

It is, therefore, imperative that the residents and the crèche staff undertake on-site management of waste in accordance with all legal requirements and that residents and crèche operator employ suitably permitted / licenced contractors to undertake off-site management of their waste in accordance with all legal requirements. This includes the requirement that a waste contactor handle, transport and reuse / recover / recycle / dispose of waste in a manner that ensures that no adverse environmental impacts occur as a result of any of these activities.

A collection permit to transport waste must be held by each waste contractor which is issued by the National Waste Collection Permit Office (NWCPO). Waste receiving facilities must also be appropriately permitted or licensed. Operators of such facilities cannot receive any waste, unless in possession of a Certificate of Registration (COR) or waste permit granted by the relevant Local Authority under the *Waste Management (Facility Permit & Registration) Regulations 2007, as amended*, or a Waste Licence granted by the EPA. The COR / permit / licence held will specify the type and quantity of waste able to be received, stored, sorted, recycled, recovered and / or disposed of at the specified site.

2.3.1 Clare County Council Waste Management Bye-Laws

The CCC "*County Clare Waste Management Bye-Laws, 2018*" were brought into force by CCC in 2018. The Bye-Laws set a number of enforceable requirements on waste holders with regard to storage, management, presentation and collection of waste of all homes and businesses within Clare County. Key requirements under these Bye-Laws of relevance to the proposed development include the following:

- *The principal requirement of the bye-laws is for all homes and businesses to ensure that waste arising from that property/business is collected by an authorised waste collector.*
- *Waste is stored in a wheeled bin. (An alternative means of waste storage may be permitted in certain limited circumstances. Any such arrangements are subject to prior approval by the Council).*
- *Home and business owners must avail of and use dedicated, separate wheeled bins for dry recyclable, organic/food waste and residual waste streams.*
- *Bins presented in a public area for collection by the authorised waste collector may only be presented for a short term, specified time, i.e. wheeled bins should not be presented before*

6.00pm the day before a designated collection, and bins must be removed no later than 9.00pm on the day of a designated collection.

The full text of the bye-laws is available from the Clare County Council website.

2.4 Regional Waste Management Service Providers and Facilities

Various contractors offer waste collection services for the residential sector in the CCC region. Details of waste collection permits (granted, pending and withdrawn) for the region are available from the NWCPO.

There is only one active landfill in the Southern Region, at Powerstown in Co. Carlow, which is also now a civic amenity centre. There are two other landfills in the region with capacity for landfilling waste but neither are carrying out landfilling activity. Both sites, however, operate as recycling facilities.

Ennis Recycling Centre at Gort Rd, Dulick, Ennis, Co. Clare, located c. 2.93 km to the north-east of the development site, which can be utilised by the residents of the proposed development for other household waste streams while a bottle bank can be found c. 2.17 km to the north east at the at the Active Ennis Leisure Centre, Sandfield Park, Ennis, Co. Clare.

A copy of all CORs and waste permits issued by the Local Authorities are available from the NWCPO website and all Waste Licenses issued are available from the EPA.

3. DESCRIPTION OF THE DEVELOPMENT

3.1 Location, Size and Scale of the Development

The proposed development seeks permission for construction of 300 no. residential units (121 no. detached/semi-detached houses, 159 no. townhouses and 20 no. bungalows), an 80 no. child crèche, and all associated ancillary site development works including vehicular access, parking, footpaths, drainage, amenity areas, and a wastewater treatment plant. A full description of the development is provided in the statutory notices and in Chapter 2 of the EIAR submitted with the application.

3.2 Typical Waste Categories

The typical non-hazardous and hazardous wastes that will be generated at the proposed development will include the following:

- Dry Mixed Recyclables (DMR) - includes waste paper (including newspapers, magazines, brochures, catalogues, leaflets), cardboard and plastic packaging, metal cans, plastic bottles, aluminium cans, tins and Tetra Pak cartons;
- Organic waste – food waste and green waste generated from internal plants / flowers;
- Glass; and
- Mixed Non-Recyclable (MNR) / General Waste.

In addition to the typical waste materials that will be generated at the development on a daily basis, there will be some additional waste types generated less frequently / in smaller quantities which will need to be managed separately including:

- Drink Cans and Bottles (Deposit Return Scheme)
- Green / garden waste may be generated from external landscaping;
- Batteries (both hazardous and non-hazardous);
- Waste electrical and electronic equipment (WEEE) (both hazardous and non-hazardous);
- Printer cartridges / toners;
- Chemicals (paints, adhesives, resins, detergents, etc.);
- Light bulbs;
- Textiles;
- Waste cooking oil (if any generated by the residents and crèche staff);
- Furniture (and, from time to time, other bulky wastes); and
- Abandoned bicycles.

Wastes should be segregated into the above waste types to ensure compliance with waste legislation and guidance while maximising the re-use, recycling and recovery of waste with diversion from landfill wherever possible.

3.3 List of Waste Codes

In 1994, the *European Waste Catalogue* [17] and *Hazardous Waste List* [18] were published by the European Commission. In 2002, the EPA published a document titled the *European Waste Catalogue and Hazardous Waste List* [19], which was a condensed version of the original two documents and their subsequent amendments. This document has recently been replaced by the EPA '*Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous*' [20] 2018. This waste classification system applies across the EU and is the basis for all national and international waste reporting, such as those associated with waste collection permits, COR's, permits and licences and EPA National Waste Database.

Under the classification system, different types of wastes are fully defined by a code. The List of Waste (LoW) code for typical waste materials expected to be generated during the operation of the proposed development are provided in Table 3.1 below.

Table 3.1 Typical Waste Types Generated and LoW Codes

Waste Material	LoW Code
Paper and Cardboard	20 01 01
Plastics	20 01 39
Metals	20 01 40
Mixed Non-Recyclable Waste	20 03 01
Glass	20 01 02
Biodegradable Kitchen Waste	20 01 08
Oils and Fats	20 01 25
Textiles	20 01 11
Batteries and Accumulators*	20 01 33* - 34
Printer Toner/Cartridges*	20 01 27* - 28
Green Waste	20 02 01
WEEE*	20 01 35*-36
Chemicals (solvents, pesticides, paints & adhesives, detergents, etc.) *	20 01 13*/19*/27*/28/29*30
Fluorescent tubes and other mercury containing waste*	20 01 21*
Bulky Wastes	20 03 07

* Individual waste type may contain hazardous materials

4. ESTIMATED WASTE ARISING

A waste generation model (WGM) developed by AWN has been used to predict waste types, weights and volumes expected to arise from operations within the proposed development. The WGM incorporates building area and use and combines these with other data, including Irish and US EPA waste generation rates.

The estimated quantum / volume of waste that will be generated from the residential units has been determined based on the predicted occupancy of the units. While the floor area usage (m^2) has been used to estimate the waste arising from the crèche.

The estimated waste generation for the proposed development for the main waste types is presented in Tables 4.1 – 4.2.

Table 4.1 Estimated Waste Generation for individual residential units

Waste Type	Waste Volume (m^3 / week)			
	1-bed Bungalow	2-bed House / Bungalow	3-bed House	4-bed House
Organic Waste	0.01	0.02	0.02	0.02
DMR	0.08	0.11	0.13	0.17
Glass	0.00	0.00	0.00	0.00
MNR	0.05	0.07	0.08	0.10
Total	0.14	0.20	0.23	0.29

Table 4.2 Estimated Waste Generation for the crèche unit

Waste Type	Waste Volume (m^3 / week)
	Crèche
Organic Waste	0.04
DMR	1.47
Glass	0.01
MNR	0.80
Total	2.32

BS5906:2005 Waste Management in Buildings – Code of Practice [21] has been considered in the calculations of waste estimates. AWN's modelling methodology is based on recently published data and data from numerous other similar developments in Ireland and is based on AWN's experience, it provides a more representative estimate of the likely waste arisings from the proposed development.

5. WASTE STORAGE AND COLLECTION

This section provides information on how waste generated within the site will be stored and collected. This has been prepared with due consideration of the proposed site layout as well as best practice standards, local and national waste management requirements, including those of CCC. In particular, consideration has been given to the following documents:

- *BS 5906:2005 Waste Management in Buildings – Code of Practice*,
- The *NWMPCE (2024)*;
- The *Clare County Development Plan 2023 – 2029* (2023);
- *County Clare Waste Management Bye-Laws (2018);* and
- DoHLGH, *Sustainable Urban Housing: Design Standards for New Apartments, Guidelines for Planning Authorities* (2023) [22].

Waste Storage Areas

Locations of all Waste Storage Areas (WSAs) can be viewed on the drawings submitted with the planning application under separate cover and in Appendix 1 of this plan.

Residential Units (Individual WSAs)

Residential units will have their own individual WSAs allocated at the rear of their home where external access to the rear yard is possible. When external access to the rear of the property is unavailable, bins will be stored at the front of the unit, shielded from view of the road.

Crèche

One (1 no.) WSA has been allocated within the proposed development design for the crèche. This has been strategically located at ground floor level, in close proximity to the stair and lift cores.

Using the estimated waste generation volumes in Tables 4.1 – 4.2 above, the waste receptacle requirements for MNR, DMR, organic waste and glass have been established for the WSA. It is envisaged that all waste types will be collected on a weekly basis.

Waste Storage Requirements

Estimated waste storage requirements for the operational phase of the proposed development are detailed in Table 5.1, below.

Table 5.1 Waste storage requirements for the proposed development

Area/Use	Bins Required			
	MNR[1]	DMR[2]	Glass	Organic
Residential Units (Individual WSAs)	1 no. 240L	1 no. 240L	Bottle Bank	1 no. 240L
Crèche	1 no. 1100 L	1 no. 1100 L 2 no. 240L	1 no. 120 L	1 no. 120 L

Note: [1] *= Mixed Non-Recyclables*
[2] *= Dry Mixed Recyclables*

The waste receptacle requirements have been established from distribution of the total weekly waste generation estimate into the holding capacity of each receptacle type.

Waste storage receptacles as per Table 5.1 above (or similar appropriate approved containers) will be obtained by the residents and the crèche operator.

The types of bins used will vary in size, design and colour dependent on the appointed waste contractor. However, examples of typical receptacles to be provided in the WSAs are shown in Figure 5.1. All waste receptacles used will comply with the SIST EN 840-1:2020 and SIST EN 840-2:2020 as the standards for performance requirements of mobile waste containers, where appropriate.

Figure 5-1. Typical waste receptacles of varying size (240L and 1100L)

Residential units with individual WSAs will be required to obtain their own waste receptacles from their selected waste contractor. The crèche operator will be required to obtain their our waste receptacles prior to the crèche becoming operational. Training will be provided to the relevant staff on the implementation of the Plan, as required.

This Plan will be provided to each resident and the crèche staff from first occupation of the proposed development i.e. once the crèche is operational or the first residential unit is occupied.

This Plan will be supplemented, as required, by the crèche operator with any new information on waste segregation, storage, reuse and recycling initiatives that are subsequently introduced.

5.1 Operational Phase Waste Storage – Residential Units

Residents of the proposed development will be required to segregate their waste into the following waste categories within their own units:

- DMR;
- MNR;
- Glass; and
- Organic waste.

It is anticipated that residents with external access to the rear of their property will store waste in bins at the back of the units. For units with no external access to the rear, a dedicated shielded area for storage of 3 no. 240l litre wheelie bins have been allocated at the front or side of the property. The locations of houses with dedicated shielded areas for waste storage can be viewed on the drawings submitted with the planning application under separate cover and in Appendix A of this report.

Other waste materials such as textiles, batteries, printer toner/cartridges and WEEE may be generated infrequently by the residents. Residents will be required to identify suitable temporary storage areas for these waste items within their own units and dispose of them appropriately. Further details on additional waste types can be found in Section 5.4.

5.2 Waste Storage – Crèche

The crèche staff will be required to segregate waste within their own unit into the following main waste types:

- DMR;
- MNR;
- Glass; and
- Organic waste.

The crèche staff will be required to take their segregated waste materials to their designated WSA and deposit their segregated waste into the appropriate bins. The location of the crèche WSA is illustrated in the drawings submitted with the planning application under separate cover and in Appendix A of this plan.

Suppliers for the crèche should be requested by the staff to make deliveries in reusable containers, minimize packaging or remove any packaging after delivery, where possible, to reduce waste generated by the proposed development.

It is important that adequate provision is made for the storage and transfer of waste from a kitchen (if installed) to the WSA. It is anticipated that waste will be generated in the kitchen throughout the day, primarily at the following locations:

- Food Storage Areas (i.e. cold stores, dry store, freezer stores and stores for decanting of deliveries);
- Meat Preparation Area;
- Vegetable Preparation Area;
- Cooking Area;
- Dish-wash and Glass-wash Area.

Small bins will be placed adjacent to each of these areas for temporary storage of waste generated during the day. Waste will then be transferred from each of these areas to the appropriate waste store within their unit.

All bins / containers in the crèche as well as in the crèche WSA will be clearly labelled and colour coded to avoid cross contamination of the different waste streams. Signage will be posted above or on the bins to show exactly which wastes can be put in each.

Other waste materials such as textiles, batteries, lightbulbs, WEEE, cooking oil and printer toner / cartridges will be generated less frequently. The crèche staff will be required to store these waste types within their own unit and arrange collection with an appropriately licensed waste contractor. Facilties management may arrange collection, depending on the agreement. Further details on additional waste types can be found in Section 5.4.

5.3 Waste Collection

There are numerous private contractors that provide waste collection services in the Clare County area. All waste contractors servicing the proposed development must hold a valid waste collection permit for the specific waste types collected. All waste collected must be transported to registered / permitted / licensed facilities only.

Residents with their own individual WSAs will be responsible for moving their waste receptacles to and from the curb before and after collection.

Bins from the crèche will be brought directly to the waste trucks by the waste contractor or crèche staff, depending on agreement, immediately prior to collection.

Suitable access and egress has been provided to enable the bins to be moved easily from the temporary staging area to the waste collection vehicles on the appropriate days. Waste will be collected at agreed days and times by the nominated waste contractors. The vehicle tracking for refuse trucks can be viewed on the drawings submitted with the planning application under separate cover and in Appendix B of this report.

All waste receptacles should be clearly identified as required by waste legislation and the requirements of the CCC *Waste Bye-Laws*. Waste will be presented for collection in a manner that will not endanger health, create a risk to traffic, harm the environment or create a nuisance through odours or litter.

It is recommended that bin collection times are staggered to reduce the number of bins required to be emptied at once and the time the waste vehicle is on-site. This will be determined during the process of appointment of a waste contractor.

5.4 Additional Waste Materials

In addition to the typical waste materials that are generated on a daily basis, there will be some additional waste types generated from time to time that will need to be managed separately. A non-exhaustive list is presented below.

<u>Deposit Return Scheme</u>
Most drinks containers can be recycled via the deposit return scheme, such as bottles, cans and tins made from plastic, aluminium or steel can be returned once they are between 150ml and 3 litres in size and have the Re-turn logo on them.

At the shops you can either return the containers:

- Using a Reverse Vending Machine (RVM)
- Manually in the shop

If a shop does not have a RVM but they sell containers with the Re-turn logo, the shop may allow you to manually return containers in store, unless they have a take back exemption.

Locations of RVM machines can be found via the Re-turn website (www.re-turn.ie)

<u>Green Waste</u>
Green waste may be generated from gardens, external landscaping and internal plants / flowers. Green waste generated from landscaping of external areas will be removed by external landscape contractors. Green waste generated from gardens and internal plants / flowers can be placed in the organic waste bins.

<u>Batteries</u>
A take-back service for waste batteries and accumulators (e.g. rechargeable batteries) is in place in order to comply with the *S.I. No. 283/2014 - European Union (Batteries and Accumulators) Regulations 2014*, as amended. In accordance with these regulations, consumers are able to bring their waste batteries to their local civic amenity centre or can return them free of charge to retailers which supply the equivalent type of battery, regardless of whether or not the batteries were purchased at the retail outlet and regardless of whether or not the person depositing the waste battery purchases any product or products from the retail outlet.

The crèche staff cannot use the civic amenity centre. They must segregate their waste batteries and either avail of the take-back service provided by retailers or arrange for recycling / recovery of their waste batteries by a suitably permited / licenced contractor. Facilties management may arrange collection, depending on the agreement.

Waste Electrical and Electronic Equipment (WEEE)
The *WEEE Directive (Directive 2002/96/EC)* and associated *Waste Management (WEEE) Regulations* have been enacted to ensure a high level of recycling of electronic and electrical equipment. In accordance with the regulations, consumers can bring their waste electrical and electronic equipment to their local recycling centre. In addition, consumers can bring back WEEE within 15 days to retailers when they purchase new equipment on a like for like basis. Retailers are also obliged to collect WEEE within 15 days of delivery of a new item, provided the item is disconnected from all mains, does not pose a health and safety risk and is readily available for collection.

As noted above, the crèche staff cannot use the civic amenity centre. They must segregate their WEEE and either avail of the take-back / collection service provided by retailers or arrange for recycling / recovery of their WEEE by a suitably permited / licenced contractor. Facilties management may arrange collection, depending on the agreement.

Printer Cartridge / Toners
It is recommended that a printer cartridge / toner bin is provided in the crèche unit, where appropriate. The crèche staff will be required to store this waste within their unit and arrange for return to retailers or collection by an authorised waste contractor, as required.

Waste printer cartridge / toners generated by residents can usually be returned to the supplier free of charge or can be brought to a civic amenity centre.

Chemicals
Chemicals (such as solvents, paints, adhesives, resins, detergents, etc) are largely generated from building maintenance works. Such works are usually completed by external contractors who are responsible for the off-site removal and appropriate recovery / recycling / disposal of any waste materials generated.

Any waste cleaning products or waste packaging from cleaning products generated in the crèche staff that is classed as hazardous (if they arise) will be appropriately stored within the crèche. The crèche operator may arrange collection, depending on the agreement.

Any waste cleaning products or waste packaging from cleaning products that are classed as hazardous (if they arise) generated by the residents should be brought to a civic amenity centre.

Light Bulbs
Waste light bulbs (fluorescent, incandescent and LED) may be generated by lighting at the crèche. It is anticipated that crèche staff will be responsible for the off-site removal and appropriate recovery / disposal of these wastes. The crèche operator may arrange collection, depending on the agreement.

Light bulbs generated by residents should be taken to the nearest civic amenity centre for appropriate storage and recovery / disposal.

Textiles
Where possible, waste textiles should be recycled or donated to a charity organisation for reuse. crèche staff and residents will be responsible for disposing of waste textiles appropriately.

Waste Cooking Oil
If cooking oil is used in the crèche, waste cooking oil will need to be stored within the unit on a bunded area or spill pallet and regular collections by a dedicated waste contractor will need to be organised as required. Under sink grease traps will be installed in any cooking space.

If the residents generate waste cooking oil, this can be brought to a civic amenity centre.

Furniture & Other Bulky Waste Items
Furniture and other bulky waste items (such as carpet, etc.) may occasionally be generated by the crèche staff. The collection of bulky waste will be arranged, as required by the crèche operator. If residents wish to dispose of furniture, this can be brought a civic amenity centre.

Abandoned Bicycles
Bicycle parking areas are planned for the development. As happens in other developments, residents sometimes abandon faulty or unused bicycles, and it can be difficult to determine their ownership. Abandoned bicycles should be donated to charity if they arise or facilties management may arrange collection by a licensed waste contractor.

5.5 Waste Storage Area Design

The crèche WSA should be designed and fitted-out to meet the requirements of relevant design Standards, including:

- Be fitted with a non-slip floor surface;
- Provide ventilation to reduce the potential for generation of odours with a recommended 6-10 air changes per hour for a mechanical system for internal WSAs;
- Provide suitable lighting – a minimum Lux rating of 400 is recommended;
- Be easily accessible for people with limited mobility;
- Be restricted to access by nominated personnel only;
- Be supplied with hot or cold water for disinfection and washing of bins;
- Be fitted with suitable power supply for power washers;
- Have a sloped floor to a central foul drain for bins washing run-off;
- Have appropriate signage placed above and on bins indicating correct use;
- Have access for potential control of vermin, if required; and
- Be fitted with CCTV for monitoring.

The crèche staff and residents will be required to maintain the residential and crèche bins and storage areas in good condition as required by the CCC Waste Bye-Laws.

5.6 Pest Management

A pest control operator will be appointed as required to manage pests onsite during the operational phase of this development. All waste generated within the development will be stored in closed waste receptacles both within units and within the WSAs. Any waste receptacles will be carefully managed to prevent leaks, odours and pest problems.

The crèche WSA will have access for potential control of vermin, if required, be supplied with hot or cold water, drainage point and will be regularly inspected by the crèche staff to deter pests.

6. SUMMARY AND CONCLUSION

In summary, this OWMP presents a waste strategy that addresses all legal requirements, waste policies and best practice guidelines and demonstrates that the required storage areas have been incorporated into the design of the proposed development.

Implementation of this OWMP will ensure a high level of recycling, reuse and recovery at the development. All recyclable materials will be segregated at source to reduce long-term operational expenses, reduce waste contractor costs and ensure maximum diversion of materials from landfill, thus contributing to the targets set out in *the NWMPCE*.

Adherence to this plan will also ensure that waste management at the development is carried out in accordance with the requirements of the *CCC Waste Bye-Laws.*

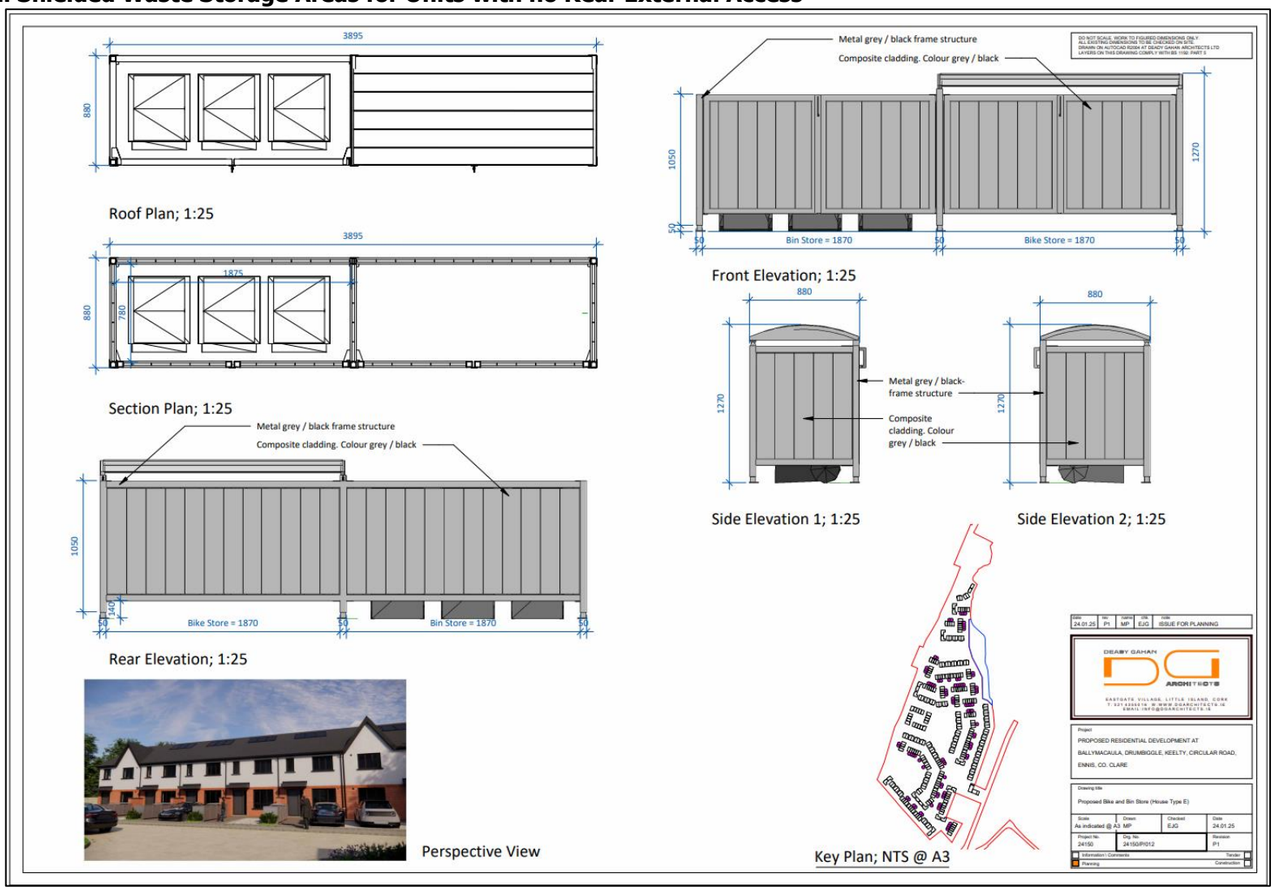
The waste strategy presented in this document will provide sufficient storage capacity for the estimated quantity of segregated waste. The designated areas for waste storage will provide sufficient room for the required receptacles in accordance with the details of this strategy.

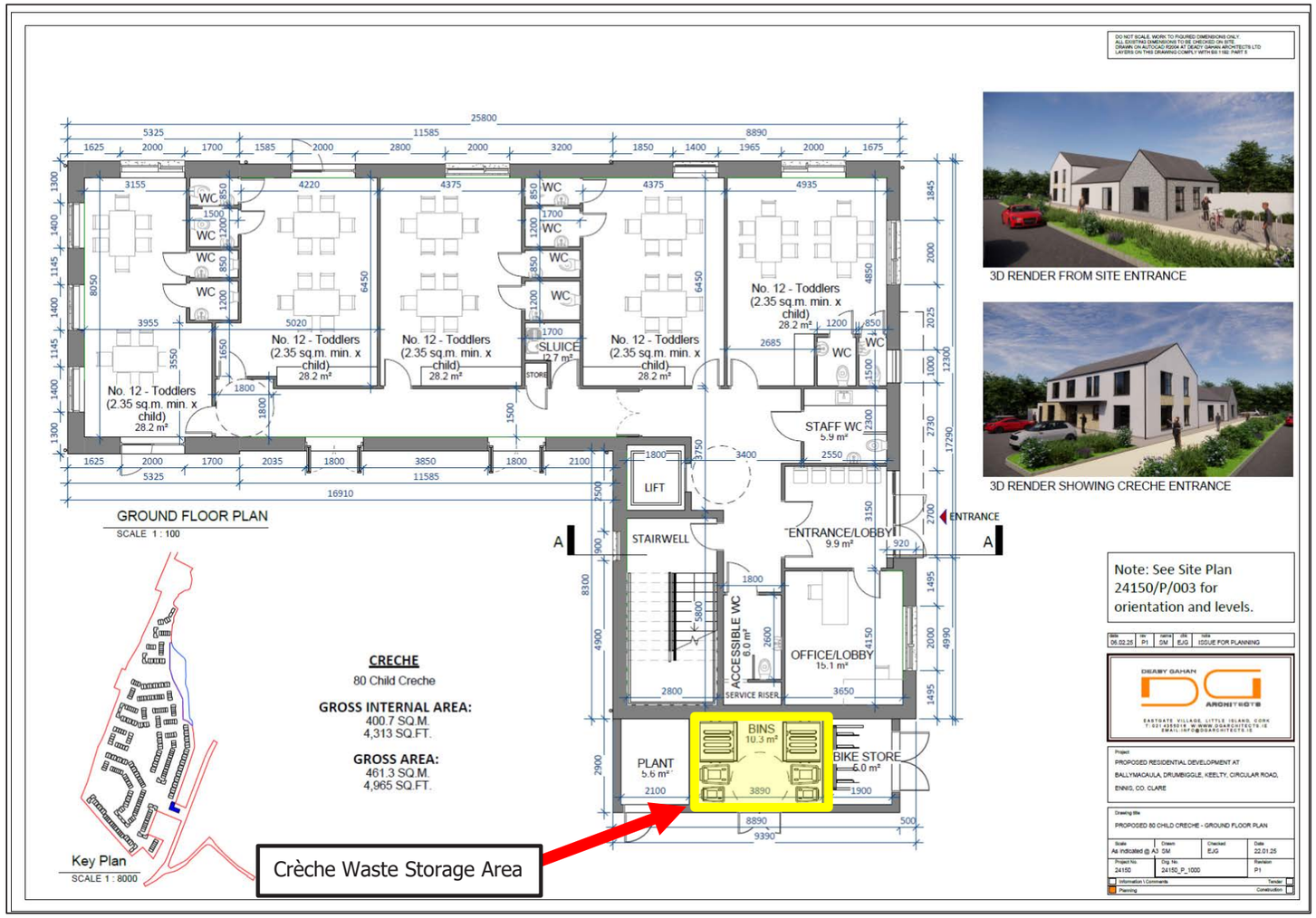
7. REFERENCES

1. Waste Management Act 1996 as amended.
2. Environmental Protection Agency Act 1992 as amended.
3. Litter Pollution Act 1997 as amended;
4. Regional Waste Management Planning Offices, *The National Waste Management Plan for a Circular Economy 2024 - 2030 (2024).*
5. Clare County Council, *County Clare Waste Management Bye-Laws, (2018)*
6. Department of Environment and Local Government (DoELG) *Waste Management – Changing Our Ways, A Policy Statement* (1998)
7. Department of Environment, Heritage and Local Government (DoEHLG) *Preventing and Recycling Waste - Delivering Change* (2002)
8. DoELG, *Making Ireland's Development Sustainable – Review, Assessment and Future Action (World Summit on Sustainable Development)* (2002)
9. DoEHLG, *Taking Stock and Moving Forward* (2004)
10. Department of Communications, Climate Action and Environment (DCCAE), *Waste Action Plan for the Circular Economy - Ireland's National Waste Policy 2020-2025* (2020).
11. DCCAE, *Whole of Government Circular Economy Strategy 2022-2023 'Living More, Using Less'* (2021).
12. Department of Housing, Local Government and Heritage authored *Sustainable Residential Development and Compact Settlements - Guidelines for Planning Authorities (2024)*
13. Environmental Protection Agency (EPA), *National Waste Database Reports 1998 – 2020* and the *Circular Economy and National Waste Database Report 2021 – 2022 (2024)*
14. Circular Economy and Miscellaneous Provisions Act 2022
15. CCC*, Clare County Development Plan 2023-2029 (2023).*
16. Planning and Development Act 2000 (S.I. No. 30 of 2000) as amended
17. European Waste Catalogue - Council Decision 94/3/EC (as per Council Directive 75/442/EC).
18. Hazardous Waste List - Council Decision 94/904/EC (as per Council Directive 91/689/EEC).
19. EPA, *European Waste Catalogue and Hazardous Waste List* (2002)
20. EPA, *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous* (2018)
21. BS 5906:2005 Waste Management in Buildings – Code of Practice.
22. Department of Housing Local Government and Heritage *(*DoHLGH), *Sustainable Urban Housing: Design Standards for New Apartments, Guidelines for Planning Authorities* (2023).

APPENDIX A. WASTE STORAGE AREAS

Residential Shielded Waste Storage Areas for Units with no Rear External Access





APPENDIX B. WASTE TRUCK AUTO TRACK ANALYSIS

THE INFORMATION ON THIS DRAWING IS TO THE TAILTE ÉIREANN - SURVEYING ITM COORDINATE SYSTEM

LEGEND:

- Applicant Ownership
- Site Boundary
- Shared Surface with Delineation
- Tactile Paving
- Dropped Kerb
- 'STOP' Junction Road Marking as per Traffic Sign Manual - Chapter 7
- Permeable Pavement
- Raised Crossing/Ramp

NOTES:

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING.
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE.
3. ENGINEER/EMPLOYERS REPRESENTATIVE, AS APPROPRIATE, TO BE INFORMED BY THE CONTRACTOR OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES.
4. THE CONTRACTOR SHALL UNDERTAKE A THOROUGH CHECK FOR THE ACTUAL LOCATION OF ALL SERVICES/UTILITIES, ABOVE AND BELOW GROUND, BEFORE ANY WORK COMMENCES.
5. ALL LEVELS SHOWN RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD.

Rev	Date	Description	By	Chkd
DFI	31.03.2025	First Issue	TA	RB

Client: Glenveagh Homes

Project: Residential Developement, Ennis, Co. Clare

Title: Autotrack Analysis Refuse Truck Sheet 2 of 3

Scale @ A1: 1:500/@A3 1:1000

Prepared by:	Checked by:	Date:
TA	RB	MAR 2025

Drawing Status: Planning

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Drawing No.: 11269-2219

Revision: D01

RECEIVED: 30/06/2025