

Proposed Large Scale Residential
Development at Rathgowan, Mullingar,
Co. Westmeath
Applicant: Marina Quarter Ltd.

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CHAPTER 5 Land, Soils & Geology
Appendix 5.1 Site Investigation Report

Volume III

Appendices



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Appendix 5.1

Site Investigation Report

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HOUSING DEVELOPMENT
RATHGOWAN MULLINGAR
COUNTY WESTMEATH
GLENVEAGH HOMES LTD

TOBIN
CONSULTING ENGINEERS

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FOREWORD

The following Conditions and Notes on Site Investigation Procedures should be read in conjunction with this report.

General.

Recommendations made, and opinions expressed in the report are based on the strata observed in the exploratory holes, together with the results of in-situ and laboratory tests. No responsibility can be held for conditions which have not been revealed by exploratory work, or which occur between exploratory hole locations. Whilst the report may suggest the likely configuration of strata, both between exploratory hole locations, or below the maximum depth of the investigation, this is only indicative, and liability cannot be accepted for its accuracy.

Unless specifically stated, no account has been taken of possible subsidence due to mineral extraction below or close to the site.

Boring Procedures.

Unless otherwise stated, the 'Shell and Auger' technique of soft ground boring has been employed. All boring operations sampling and/or logging of soils and in-situ testing complies with the recommendations of the British Standard Code of Practice BS 5930 (1981), 'Site Investigation' and BS 1377:1990, 'Methods of test for soils for civil engineering purposes'.

Whilst the technique allows the maximum data to be obtained in soft ground, some disturbance and variation of soft and layered soils is unavoidable. Attention is drawn to this condition, whenever it is suspected. Where cobbles and boulders are recorded, no conclusion should be drawn concerning the size, presence, lithological nature, or numbers per unit volume of ground.

Where peat has been encountered during siteworks, samples have been logged in accordance with the Von Post Classification (ref. Von Post, L. 1992. Sveriges Gologiska Undersoknings torvinventering och nogra av dess hittills vunna resultat (SGU peat inventory and some preliminary results) Svenska Mosskulturforeningens Tidskrift, Jonkoping, Swedden, 36, 1-37 & Hobbs N. B. Mire morphology and the properties of some British and foreign peats. QJEG, Vol. 19, 1986).

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Routine Sampling.

Undisturbed samples of soils, predominantly cohesive in nature are obtained unless otherwise stated by a 104mm diameter open-drive tube sampler. In granular soils, and where undisturbed sampling is inappropriate, disturbed samples are collected. Smaller disturbed samples are also recovered at intervals to allow a visual examination of the full strata section.

In-Situ Testing.

Standard penetration tests, utilising either the standard split spoon sampler or solid cone and automatic trip-hammer are conducted unless otherwise where required by instruction. Subsequent to a seating drive of 150mm, a summation for the number of blows for 300mm penetration is recorded on the boring records together with the blow count for each 75mm penetration. In cases where incomplete penetration is obtained, the number of blows for the recorded value of penetration are noted. In coarse granular soils, a cone end is fitted to the sampler and a similar procedure adopted.

Groundwater.

The depth of entry of any influx of groundwater is recorded during the course of boring operations. However, the normal rate of boring does not usually permit the recording of an equilibrium level for any one water strike. Where possible drilling is suspended for a period of twenty minutes to monitor the subsequent rise in water level.

Groundwater conditions observed in the borings or pits are those appertaining to the period of investigation. It should be noted however, that groundwater levels are subject to diurnal, seasonal and climatic variations and can also be affected by drainage condition, tidal variation or other causes.

Retention of Samples.

After satisfactory completion of all the scheduled laboratory tests on any sample, the remaining material is discarded unless a period of retention of samples is agreed, it is our normal practice to discard all soil samples one month after submission of our final report.

**REPORT ON A SITE INVESTIGATION
FOR A PROPOSED HOUSING DEVELOPMENT
AT RATHGOWAN. MULLINGAR
FOR
GLENVEAGH HOMES LTD**

**TOBIN
CONSULTING ENGINEERS**

Report No. 22611

October 2020

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I Introduction

A major new housing development is proposed for a site located at Rathgowan, Mullingar. County Westmeath.

An investigation of sub soil conditions in the area of the new development has been carried out by IGSL for TOBIN Consulting Engineers, on behalf of Glenveagh Homes Limited.

Following tender process and submission of appropriate documentation a purchase order was raised by the client (GHP09811).

The site investigation included the following elements.

* Cable Percussion Boreholes	13 nr.
• Trial Pits	14 nr.
• CBR by Plate Test	11 nr.
• Infiltration Test to BRE Digest 365	8 nr
• Slit Trench	1 nr.
• Heavy Duty Dynamic Probes	40 nr.
• Archaeological attendance	
• Geotechnical Laboratory Testing	
• Environmental Laboratory Testing	

This report includes all factual data from completed field and laboratory operations and discusses these findings relative to the proposed new development.

An archaeological assessment of the site was carried out using excavation equipment provided by IGSL. The findings on this aspect of the works are presented independently of this geotechnical report.

II Fieldwork

This development is to take place on a site located at Rathgowan, Mullingar, County Westmeath.

The development area is divided by the R394 and is north of Ashe Road. An existing housing development is located to the east and north east of the site.

The surface is generally greenfield with some variation in ground level from about 98 to 104 metres OD.

The exploratory locations are noted on the drawings enclosed in Appendix VIII. Locations were marked out by IGSL on site and were surveyed to National Grid and Ordinance Levels were established.

The various elements of the investigation are detailed in the following paragraphs. All field works were supervised by experienced geotechnical engineers who carefully recorded stratification, took photographs as necessary, recovered samples as required and prepared detailed records.

Close liaison was maintained throughout with Consulting Engineer and Client. All appropriate documentation was submitted and approved prior to site commencement.

HS safety regulations pertaining to the COVID 19 pandemic were strictly adhered to during the course of this investigation.

Each location was scanned electronically (CAT) to ensure that existing services were not damaged. A shallow trial pit was also opened by hand at borehole locations to confirm this.

Boreholes

The exploratory holes (BH01 to BH13) were bored with conventional 200mm cable-tool methods using a Dando Exploratory Rig. An additional hole (BH03A) was bored following shallow refusal at the original BH03 location.

Detailed geotechnical records are contained in Appendix I to this report - the records give details of stratification, sampling, in-situ testing and groundwater. Note is also taken of any obstructions to normal boring requiring the use of the heavy chisel for advancement.

The boreholes note surface topsoil and soft loamy clay overlying a stratum of firm brown sandy gravelly SILT/CLAY (Boulder Clay). This stratum becomes stiff in consistency with depth with colour change to grey black in places. A zone of sandy GRAVEL was noted at the base of BH02. A thin layer of MADE GROUND was also noted from GL to 1.20 metres at BH03.

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Borehole refusal was recorded at varying depths in the boreholes following a period of abortive chiselling. Refusals may be indicative of boulder obstruction or possibly the bedrock horizon. Proof coring was not carried out to confirm bedrock parameters on this site. Ground water ingress was noted in four boreholes, the remaining boreholes were dry during the course of the investigation.

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The borehole data is summarised as follows, all measured in metres BGL.

Ref.	Firm Clay.	Stiff CLAY	Sand / Gravel	Ground Water
BH01	0.70 – 2.00	2.00 – 6.70		Dry
BH02	0.50 – 1.10	1.20 – 4.10	4.10 – 4.90	4.50
BH03	(Fill)	1.20 – 2.60		2.60
BH03A	0.20 – 1.90	1.90 – 6.20		Dry
BH04		0.80 – 5.30		4.30
BH05	0.20 – 0.70	0.70 – 4.40		Dry
BH06		0.50 – 4.70		Dry
BH07	1.00 – 1.50	1.50 – 4.60		4.20
BH08	0.50 – 1.90	1.90 – 4.10		Dry
BH09	0.50 – 1.00	1.10 – 4.70		Dry
BH10		0.50 – 3.20		Dry
BH11	0.50 – 1.30	1.30 – 4.40		Dry
BH12	0.50 – 3.30	3.30 – 5.70		Dry
BH13	0.50 – 1.30	1.30 – 4.80		Dry

Trial Pits

Fourteen Trial Pits were excavated using a 7 tonne tracked excavator under engineering supervision. Detailed trial pit logs are enclosed in Appendix II. Trial Pits are referenced TP01 to TP14. Each excavation has been photographed and photos are included with the trial pit logs.

The records present a fairly high degree of consistency, with surface topsoil overlying gravelly SILT/ CLAY. This stratum increases in strength with depth from soft to firm to stiff.

One exception to the general pattern occurred at TP13 where SAND and GRAVEL extended from 0.50 to the final depth of 2.70 metres

Most trial excavations were dry and generally stable during the course of the investigation. Minor seepage was noted at TP04.

Trial excavations were backfilled with compacted arisings and ground surfaces were reinstated on completion.

Trial Pit data is summarised as follows:

TP No.	Soft	Firm	Stiff	Final Depth	Water
TP01	0 – 0.80	0.80 – 1.50	1.50 – 2.50	2.50	Dry
TP02	0 – 0.60	0.60 – 1.80	1.80 – 2.60	2.60	Dry
TP03	0 – 0.20	0.20 – 0.70	0.70 – 2.50	2.50	Dry
TP04	0 – 0.50	0.50 – 0.80	0.80 – 2.50	2.50	2.20
TP05	0 – 0.45	0.45 – 1.30	1.30 – 2.50	2.50	Dry
TP06	0 – 0.40	0.40 – 1.20	1.20 – 2.50	2.50	Dry
TP07	0 – 0.20	0.20 – 0.80	0.80 – 2.50	2.50	Dry
TP08	0 – 0.70	0.70 – 1.80	1.80 – 2.50	2.50	Dry
TP09	0 – 0.80	0.80 – 1.75	1.75 – 2.50	2.50	Dry
TP10	0 – 0.60	0.60 – 1.20	1.20 – 2.65	2.65	Dry
TP11	0 – 0.70		0.70 – 2.60	2.60	Dry
TP12	0 – 0.50		0.50 – 2.60	2.60	Dry
TP13	0 – 0.50.	(SAND AND GRAVEL FROM 0.50 – 2.70)			Dry
TP14	0 – 0.50	0.50 – 0.70	0.70 – 2.60	2.60	Dry

The findings from both boreholes and trial pits are extremely consistent and confirm that the subsoils encountered are GLACIAL TILL deposits, locally referred to as BOULDER CLAY. The presence of an isolated sand/gravel zone at TP13 would be typical of the glacial stratification.

In Situ CBR by Plate Bearing Test

The CBR value of the soils at shallow depth was established at eleven locations using Plate Bearing Test Apparatus. Tests were carried out at proposed roads or pavement areas. A steel plate is loaded and off-loaded incrementally over two stages and the deflection under load and recovery under off-load is measured by a system of dial gauges. The data is processed and load settlement graphs are prepared. An equivalent CBR value is calculated in accordance with NRA HD25-26/10. At each location testing was carried out at 0.50 metres BGL

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Results are summarised in the following table and details are presented in Appendix III

Test No.	Depth	CBR at Load Cycle (%)	CBR @ Re-Load (%)
PBT 01	0.50	2.7	3.4
PBT 02	0.50	2.8	3.3
PBT 03	0.50	3.6	9.0
PBT 04	0.50	2.1	2.6
PBT 05	0.50	2.0	2.6
PBT 06	0.50	4.8	9.3
PBT 07	0.50	2.2	3.1
PBT 08	0.50	1.7	2.2
PBT 09	0.50	0.9	1.3
PBT 10	0.50	0.8	1.3
PBT 11	0.50	1.4	2.9
Average		2.3	3.7

Infiltration Tests

Infiltration testing was performed in accordance with BRE Digest 365 'Soakaway Design' at eight locations. Details are presented in Appendix IV. The Test Pits were opened to approximately 1.50 metres deep and a detailed log was prepared. The sub soils generally comprised brown/grey gravelly SILT/CLAY

To obtain a measure of the infiltration rate of the sub-soils, water is poured into the test pit, and records taken of the fall in water level against time. The test is carried out over two cycles following initial soakage. The infiltration rate is the volume of water dispersed per unit-exposed area per unit of time, and is generally expressed as metres/minute or metres/second. In these calculations the exposed area is the sum of the base area and the average internal area of the pit sides over the test duration.

Test data is presented as follows:

Test No.	Depth	Stratum	Infiltration Rate (f) m/m/hr	
			Cycle 1	Cycle 2
SA01	1.50	Gravelly SILT/CLAY	0.00015	0.002
SA02	1.50	Gravelly SILT/CLAY	0.0015	0.00157
SA03	1.50	Gravelly SIL/CLAY	0.00304	0.0023
SA04	1.50	Gravelly SILT/CLAY	0.00016	0.0001
SA05	1.50	Gravelly SILT/CLAY	0.0000	0.0000
SA06	1.50	Gravelly SILT/CLAY	0.00017	0.00013
SA07	1.50	Gravelly SILT/CLAY	0.00366	0.00105
SA08	1.50	Gravelly SILT/CLAY	0.00049	0.00066

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Slit Trench

One slit trench was opened in a specified location to establish the location of a 225mm diameter sewer pipe.

Trench details with depth, length and width noted are presented in Appendix V, all referenced to National Grid. Photographs are also included on this record sheet. The relevant pipe was located and its' location is shown on the slit trench log.

Heavy Duty Dynamic Probes

Heavy Duty Dynamic Probes were taken at forty locations spread over the site area. Probes were referenced DP01 to DP40.

Probing was in accordance with the heavy-duty probe specification of BS 1377: Part 9: 1990. In these tests, the soil resistance is measured in terms of the number of drop-hammer blows required to drive the test probe through each 100 mm increment of penetration. Probing is terminated when the blow count exceeds 25/100mm to avoid damage to the apparatus. Where loose material is present a single blow count may drive the apparatus in excess of 100mm. In this instance blow counts of zero may be recorded. Individual probe records are contained in Appendix VI.

Probe data is summarised in the following table. A DP resistance of $N_{100} = 4$ is indicative an allowable bearing pressure of 125 KPa. This should be adequate for traditional two-storey house foundations.

Ref.No.	Depth to $N_{100} = 4$	Refusal Depth
DP01	0.80	1.30
DP02	0.50	3.20
DP03	1.40	2.70
DP04	0.50	2.20
DP05	0.60	1.20
DP06	1.10	1.60
DP07	0.50	2.30
DP08	0.60	2.60
DP09	0.50	1.90
DP10	0.50	1.90
DP11	0.50	2.20
DP12	1.70	3.60
DP13	1.20	2.30
DP14	0.90	3.50
DP15	1.00	3.70
DP16	1.20	4.00
DP17	1.30	1.80
DP18	1.10	2.10
DP19	1.20	1.60
DP20	0.80	2.90
DP21	1.30	2.20
DP22	1.30	3.60
DP23	1.60	2.30
DP24	0.80	2.10
DP25	1.10	3.10
DP26	0.70	2.30
DP27	1.40	1.70
DP28	0.70	2.40
DP29	0.90	2.50
DP30	0.50	1.30
DP31	1.50	2.90
DP32	1.30	3.20
DP33	1.00	2.80
DP34	0.80	1.60
DP35	1.30	3.40
DP36	1.70	2.50
DP37	1.00	2.30
DP38	0.90	3.50
DP39	1.40	2.60
DP40	0.90	2.30

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III. Testing

(a) In Situ Standard penetration Tests

Standard penetration tests were carried out at approximate 1.00 metre intervals in the geotechnical boreholes to measure relative in-situ soil strength. N values are noted in the right-hand column of the boring records, representing the blow count required to drive the standard sampler 300mm into the soil, following initial seating blows. Where full test penetration was not achieved the blow count for a specific penetration is recorded, or refusal is indicated where appropriate. The results of the tests are summarised as follows:

STRATUM	N VALUE RANGE.	AVERAGE	COMMENT
Gravelly SILT/CLAY			
1.00 metres BGL	9 to 43	19	Firm to Hard
2.00 metres BGL	13 to 51	30	Stiff to Hard
3.00 metres BGL	12 to 50	31	Stiff to Hard
4.00 metres BGL	31 to 50	42	Very Stiff / Hard

Several limited penetration SPT tests were recorded on boulders or cobbles within the generally granular stratum

(b) Laboratory Tests

A programme of laboratory testing was scheduled following completion of site operations. Geotechnical testing was carried out by IGSL in it's INAB-Accredited laboratory. Environmental and chemical testing was carried out in the UK by EUROFINS / CHEMTEST Ltd. The test programme included the following elements:

- Liquid and Plastic Limits / Moisture Content IGSL
- PSD Grading by wet sieve and hydrometer. IGSL
- Sulphate / Chloride and pH CHEMTEST
- RILTA Suite Environmental CHEMTEST

Liquid and Plastic Limits

Several samples of the cohesive soils from the trial pits and boreholes have had Liquid and Plastic Limits established. The results indicate some variation in soil composition, from SILT matrix to CLAY matrix. The results plot in the CL/CI and ML/MI zones of the standard soil classification chart. The pattern of classification is very typical of the local boulder clay deposition.

Natural Moisture Contents generally range from 10 to 20% with occasional values in excess of this.

PSD Grading

The particle size distribution curves for selected samples were established using wet sieve analysis and hydrometer analysis as appropriate.

Grading curves for the cohesive soils are typically straight line with smooth particle distribution from the clay to gravel fraction. This pattern is typical of boulder clay or glacial till deposition. In a number of the samples the fines content is lower than normal, in these instances the material is described as silt or clay bound sandy GRAVEL

Samples from TP13 were graded as slightly silty sandy GRAVEL / slightly silty gravelly SAND. This confirms the stratification identified in this location on site by the geotechnical engineer.

RILTA (WAC)

Six samples of soil were submitted in two batches for detailed environmental analysis to RILTA Suite (WAC) parameters. The results confirm that no elevated levels of contaminants were found and that the material can be classified as INERT. Material excavated during construction may be safely disposed of either on-site or to a suitably licensed local Landfill Facility. No traces of ASBESTOS were found during routine screening.

Chemical

Twelve samples have been analysed to determine sulphate, chloride and pH values. Sulphate concentrations (SO₄ 2:1 extract) of < 0.010 g/l were established with pH values of 7.9 to 8.6. Water Soluble Chloride contents of < 0.010 g/l were also determined.

A sulphate design class of DS-1 (ACEC Classification for Concrete) is indicated for sulphate concentrations lower than 0.5 g/l. No special precautions are therefore deemed necessary for protection of below ground concrete.

IV. Discussion:

This new housing development is to be located on a greenfield site as indicated on the attached site plans. It is assumed that traditional two-storey construction is proposed.

A detailed investigation has been carried out under the direction of TOBIN Consulting Engineers for Glenveagh Homes Limited. The factual data from field and laboratory is presented in Sections I to III of this report.

SUMMARY STRATIFICATION

The findings from the boreholes and trial pits present a high degree of consistency.

Below thin superficial deposits of topsoil and sandy CLAY the overburden comprises GLACIAL TILL or BOULDER CLAY. The characteristic of this local till are very well documented and field and laboratory data is consistent with published findings.

Minor variations in the glacial till composition have been noted with consequent differences in soil description. (Sandy gravelly silty CLAY / sandy gravelly clayey SILT / silty clayey sandy GRAVEL).

In one location (TP13) a deposit of SAND / GRAVEL was identified from 0.50 to 2.00 metres. Such random granular zones are typical of the regional glacial till

The overburden extends to depth generally between 4.00 and 6.00 metres, the consistency in borehole refusal depth may reflect the presence of Limestone bedrock.

Proof core drilling to confirm rock parameters was not carried out for this project.

The majority of boreholes and trial pits were dry, with minor water seepages noted in BHs 02, 03, 04 and 07 and TP04.

Long term ground water observation was not required for this project.

ALLOWABLE BEARING PRESSURES

The strength of the soils has been established by In-Situ Standard Penetration Tests in the boreholes and by the extensive programme of Heavy-Duty Probing.

Visual assessment of the ground during trial pit operations by experienced IGSL personnel has also been considered in establishing allowable bearing pressures. Geotechnical laboratory testing has confirmed soil classification and behavioural characteristics.

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Standard Penetration Tests in the brown gravelly silt/clay stratum in the zone 1.00 to 2.00 metres indicate N values ranging from about 10 to 50.

An SPT value of N= 10 is indicative of an allowable bearing pressure of 100 KPa. Increasing the SPT to N=12 will increase allowable bearing to 125 KPa.

A HD Dynamic Probe resistance of $N_{100} = 4$ equates to an SPT value of N = 12.

Finally, visual assessment of the soils during excavation places the gravelly SILT/CLAY at approximately 1.00 metre BGL in the firm to stiff range with allowable bearing pressures ranging from 100 to 150 KPa.

Traditional Shallow Foundations

We would recommend adopting an allowable bearing pressure of 120 kN/sq.m. for conventional reinforced strip or pad foundations placed nominally at a depth of 0.80 to 1.00 metre.

The founding depth may vary in places, the detailed table of probe results indicates that foundation depths may increase to 1.70 metres in places.

Settlement of the order of 10 mm can be expected in the stiff boulder clay under the above-recommended loads.

The heterogeneous nature of the glacial till or boulder clay is emphasised. Variations in composition and strength can occur over short distances and granular (often water bearing) zones can occur.

We therefore strongly recommend visual inspection of foundation excavations by experienced personnel to ensure uniformity and suitability of the founding medium. Any soft or suspect material should be removed and where necessary replaced with low-grade concrete.

High Column Loads

Soil strength increases rapidly with depth and an average SPT value of N=30 is noted below about 2.50 metres in stiff to hard grey black boulder clay. An allowable bearing pressure of 275 to 300 KPa will be available at this depth.

Ground Water

Water ingress to shallow foundation excavations is not expected. Should minor seepages occur they will be readily controlled by light pumping.

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Excavation

No difficulties are envisaged in excavation in the boulder clay deposits and excavations should remain stable during the short term.

Statutory safety regulations should be noted however. These prohibit personnel entering an unsupported trench excavation deeper than 1.20 metres, irrespective of apparent stability.

Proposed Roads / Paved Areas

CBR values have been established by Plate Bearing Test. An average CBR of about 3.0 % can be adopted for design purposes. The CBR tests were taken at 0.50 metres BGL in wettish weather conditions. It is likely that CBR values will increase rapidly with penetration depth and in drier weather conditions. Additional testing at construction stage on specific roadways should be considered to determine if an increased CBR value can be adopted.

Visual inspection of excavated formation is strongly advised to ensure that all organic or unsuitable fill material is removed.

Infiltration

Low infiltration rates were established by BRE Digest 365 tests. Results are typical of cohesive glacial till material. The soils may not be suitable for conventional soakaways.

Disposal of storm / surface water to a suitable local watercourse or the use of the local authority storm water system can be considered.

Environmental Test Data

Environmental tests confirm that the soils on site are INERT and no issues arise as to disposal of excavated material, either on-site or to a recognised and licensed landfill facility. No problems arise as to safety of personnel on site. No asbestos traces were found

Foundation Concrete

Low sulphate and chloride levels and near neutral pH values confirm that foundation concrete will be free from aggressive chemical attack.

IGSL/JC
October 2020

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Appendix I Boring Records

 GEOTECHNICAL BORING RECORD										REPORT NUMBER	
CONTRACT Rathgowan, Mullingar, Co. Westmeath										BOREHOLE NO. BH01	
CO-ORDINATES 642,443.06 E 753,762.36 N					RIG TYPE DANDO 2000					SHEET Sheet 1 of 1	
GROUND LEVEL (m AOD) 101.14					BOREHOLE DIAMETER (mm) 200					DATE COMMENCED 01/07/2020	
					BOREHOLE DEPTH (m) 6.70					DATE COMPLETED 01/07/2020	
CLIENT Glenveagh Properties					SPT HAMMER REF. NO.					BORED BY W. CAHILL	
ENGINEER Tobins C.E.					ENERGY RATIO (%)					PROCESSED BY F.C.	
Depth (m)	Description	Legend	Elevation	Depth (m)	Samples				Field Test Results	Standpipe Details	
					Ref. Number	Sample Type	Depth (m)	Recovery			
0	TOPSOIL		100.94	0.20							
	Light brown sandy SILT/CLAY with occasional gravel		100.44	0.70							
1	Firm to stiff dark brown sandy gravelly SILT/CLAY with occasional cobbles				AA130924	B	1.00		N = 18 (3, 4, 4, 5, 4, 5)		
2					AA130925	B	2.00		N = 14 (3, 3, 3, 3, 4, 4)		
3					AA130926	B	3.00		N = 20 (4, 4, 5, 4, 5, 6)		
4	Stiff to very stiff dark brown sandy gravelly silty CLAY with some cobbles and occasional boulders		97.34	3.80	AA130927	B	4.00		N = 29 (3, 4, 6, 6, 9, 8)		
5					AA130928	B	5.00		N = 16 (2, 3, 3, 4, 4, 5)		
6					AA130929	B	6.00		N = 29 (2, 4, 6, 6, 8, 9)		
7	Obstruction End of Borehole at 6.70 m		94.44	6.70					N = 50/75 mm (18, 27, 50)		
8											
9											
HARD STRATA BORING/CHISELLING					WATER STRIKE DETAILS						
From (m)	To (m)	Time (h)	Comments		Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments	
4	4.2	0.75									
6.4	6.7	2								No water strike	
INSTALLATION DETAILS					GROUNDWATER PROGRESS						
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments		
REMARKS 1hr Setting up Covid 19 Safe Working Area. Hand dug inspection pit carried out.					Sample Legend D - Small Disturbed (tub) B - Bulk Disturbed LB - Large Bulk Disturbed Env - Environmental Sample (Jar + Vial + Tub) UT - Undisturbed 100mm Diameter Sample P - Undisturbed Piston Sample W - Water Sample						

IGSL BH LOG 22611.GPJ IGSL GDT 28/7/20

RECORDED
 14/08/2023

	GEOTECHNICAL BORING RECORD	REPORT NUMBER <div style="font-size: 1.5em; font-weight: bold;">22611</div>								
CONTRACT Rathgowan, Mullingar, Co. Westmeath		BOREHOLE NO. BH02 SHEET Sheet 1 of 1								
CO-ORDINATES 642,464.84 E 753,698.76 N GROUND LEVEL (m AOD) 99.56	RIG TYPE DANDO 2000 BOREHOLE DIAMETER (mm) 200 BOREHOLE DEPTH (m) 4.90	DATE COMMENCED 30/06/2020 DATE COMPLETED 30/06/2020								
CLIENT Glenveagh Properties ENGINEER Tobins C.E.	SPT HAMMER REF. NO. ENERGY RATIO (%)	BORED BY W. CAHILL PROCESSED BY F.C.								
<div style="writing-mode: vertical-rl; transform: rotate(180deg); font-size: 0.8em; font-weight: bold;"> IGSL BH LOG 22611.GPJ IGSL.GDT 28/7/20 </div>	<div style="writing-mode: vertical-rl; transform: rotate(180deg); font-size: 0.8em; font-weight: bold; color: red;"> RECORDED 24/08/2023 </div>									
Depth (m)	Description	Legend	Elevation	Depth (m)	Samples				Field Test Results	Standpipe Details
0	TOPSOIL		99.36	0.20						
	Soft dark brown sandy SILT/CLAY with occasional gravel									
1	Stiff brown sandy gravelly CLAY with occasional cobbles		98.46	1.10	AA130919	B	1.00		N = 9 (2, 2, 2, 3, 2, 2)	
2					AA130920	B	2.00		N = 13 (2, 3, 3, 3, 4, 3)	
3					AA130921	B	3.00		N = 15 (3, 3, 3, 3, 5, 4)	
4	Dense grey fine to coarse silty sandy GRAVEL with some cobbles		95.46	4.10	AA130922	B	4.00		N = 38 (6, 9, 9, 9, 10, 10)	
5	Obstruction End of Borehole at 4.90 m		94.66	4.90					N = 50/75 mm (12, 21, 50)	
6										
7										
8										
9										
HARD STRATA BORING/CHISELLING				WATER STRIKE DETAILS						
From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments	
4.4	4.5	0.5		4.50	4.50	No	3.20	20	Moderate	
4.8	4.9	1.5								
INSTALLATION DETAILS				GROUNDWATER PROGRESS						
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments	
REMARKS 1hr Setting up Covid 19 Safe Working Area. Hand dug inspection pit carried out.					Sample Legend D - Small Disturbed (tub) Sample G - Bulk Disturbed LB - Large Bulk Disturbed Env - Environmental Sample (Jar + Vial + Tub) UT - Undisturbed 100mm Diameter Sample P - Undisturbed Piston Sample W - Water Sample					

CONTRACT Rathgowan, Mullingar, Co. Westmeath		BOREHOLE NO. BH03
CO-ORDINATES 642,312.87 E 753,672.59 N		SHEET Sheet 1 of 1
GROUND LEVEL (m AOD) 102.44	RIG TYPE DANDO 2000 BOREHOLE DIAMETER (mm) 200 BOREHOLE DEPTH (m) 2.60	DATE COMMENCED 01/07/2020 DATE COMPLETED 01/07/2020
CLIENT Glenveagh Properties ENGINEER Tobins C.E	SPT HAMMER REF. NO. ENERGY RATIO (%)	BORED BY W. CAHILL PROCESSED BY F.G.

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples				Field Test Results	Standpipe Details
					Ref. Number	Sample Type	Depth (m)	Recovery		
0	TOPSOIL Dark brown sandy SILT/CLAY with occasional gravel and rare red brick fragments (Possibly Made Ground)		102.29	0.15						
1	Stiff to very stiff dark brown sandy gravelly silty CLAY with some cobbles and occasional boulders		101.24	1.20	AA130130	B	1.00	N = 10 (2, 3, 3, 2, 2, 3)		
2					AA130131	B	2.00	N = 27 (4, 6, 7, 8, 1, 11)		
3	Obstruction End of Borehole at 2.60 m		99.84	2.60						

HARD STRATA BORING/CHISELLING				WATER STRIKE DETAILS					
From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
2.5	2.6	1.5							No water strike

INSTALLATION DETAILS					Date	Hole Depth	Casing Depth	Depth to Water	Comments
Date	Tip Depth	RZ Top	RZ Base	Type					

REMARKS 1hr Setting up Covid 19 Safe Working Area. Hand dug inspection pit carried out.	Sample Legend D - Small Disturbed (tub) S - Bulk Disturbed LB - Large Bulk Disturbed Env - Environmental Sample (Jar + Vat + Tub) UT - Undisturbed 100mm Diameter Sample P - Undisturbed Piston Sample W - Water Sample
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CONTRACT Rathgowan, Mullingar, Co. Westmeath		BOREHOLE NO. BH04
		SHEET Sheet 1 of 1
CO-ORDINATES 642,352.65 E 753,584.61 N	RIG TYPE DANDO 2000	DATE COMMENCED 02/07/2020
GROUND LEVEL (m AOD) 100.17	BOREHOLE DIAMETER (mm) 200	DATE COMPLETED 02/07/2020
BOREHOLE DEPTH (m) 5.30		
CLIENT Glenevagh Properties	SPT HAMMER REF. NO.	BORED BY W. CAHILL
ENGINEER Tobins C.E	ENERGY RATIO (%)	PROCESSED BY F.O

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples				Field Test Results	Standpipe Details
					Ref. Number	Sample Type	Depth (m)	Recovery		
0	TOPSOIL		100.02	0.15						
	Dark brown sandy SILT/CLAY with occasional gravel		99.87	0.30						
	Cream sandy SILT/CLAY (Possibly Marl)		99.37	0.80						
1	Stiff dark brown sandy gravelly silty CLAY with occasional cobbles				AA130935	B	1.00	N = 20 (2, 3, 5, 5, 6, 4)		
2					AA130936	B	2.00	N = 26 (3, 4, 7, 7, 6, 6)		
3			96.87	3.30	AA130937	B	3.00	N = 17 (3, 3, 3, 4, 4, 6)		
4	Very stiff dark brown sandy gravelly silty CLAY with some cobbles and occasional boulders				AA130938	B	4.00	N = 31 (4, 6, 6, 7, 10, 8)		
5			94.87	5.30	AA130939	B	5.00	N = 50/225 mm (8, 11, 15, 21, 14)		
	End of Borehole at 5.30 m									

HARD STRATA BORING/CHISELLING				WATER STRIKE DETAILS					
From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
4.2	4.4	1.25		4.30	4.30	No	4.00	20	Slow
5.1	5.3	2							

INSTALLATION DETAILS					Date	Hole Depth	Casing Depth	Depth to Water	Comments
Date	Tip Depth	RZ Top	RZ Base	Type					

REMARKS 1hr Setting up Covid 19 Safe Working Area. Hand dug inspection pit carried out.	Sample Legend D - Small Disturbed (tub) B - Bulk Disturbed LB - Large Bulk Disturbed Env - Environmental Sample (Jar + Vial + Tub) UT - Undisturbed 100mm Diameter Sample P - Undisturbed Piston Sample W - Water Sample
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 1934	GEOTECHNICAL BORING RECORD	REPORT NUMBER 22611								
CONTRACT Rathgowan, Mullingar, Co. Westmeath		BOREHOLE NO. BH05 SHEET Sheet 1 of 1								
CO-ORDINATES 642,280.94 E 753,556.30 N GROUND LEVEL (m AOD) 101.89	RIG TYPE DANDO 2000 BOREHOLE DIAMETER (mm) 200 BOREHOLE DEPTH (m) 4.40	DATE COMMENCED 03/07/2020 DATE COMPLETED 06/07/2020								
CLIENT Glenveagh Properties ENGINEER Tobins C.E.	SPT HAMMER REF. NO. ENERGY RATIO (%)	BORED BY W. CAHILL PROCESSED BY F.C.								
Depth (m)	Description	Legend	Elevation	Depth (m)	Samples				Field Test Results	Standpipe Details
0	TOPSOIL		101.74	0.15						
1	Firm brown SILT/CLAY with some fine gravel		101.19	0.70						
1	Very stiff dark brown sandy gravelly SILT/CLAY with some cobbles and occasional boulders				AA130945	B	1.00		N = 38 (4, 6, 8, 8, 10, 12)	
2					AA130946	B	2.00		N = 48 (8, 8, 10, 11, 14, 13)	
3					AA130947	B	3.00		N = 31 (4, 6, 6, 8, 8, 9)	
4					AA130948	B	4.00		N = 50/226 mm (10, 12, 16, 18, 16)	
4	Obstruction End of Borehole at 4.40 m		97.49	4.40						
5										
6										
7										
8										
9										
HARD STRATA BORING/CHISELLING				WATER STRIKE DETAILS						
From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments	
4.2	4.4	1.5							No water strike	
				GROUNDWATER PROGRESS						
INSTALLATION DETAILS				Date	Hole Depth	Casing Depth	Depth to Water	Comments		
Date	Tip Depth	RZ Top	RZ Base	Type						
REMARKS 1hr Setting up Covid 19 Safe Working Area. Hand dug inspection pit carried out.					Sample Legend D - Small Disturbed (tub) B - Bulk Disturbed LB - Large Bulk Disturbed Env - Environmental Sample (Jar + Vial + Tub)			UT - Undisturbed 100mm Diameter Sample P - Undisturbed Piston Sample W - Water Sample		

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 IGSL	<h1 style="margin: 0;">GEOTECHNICAL BORING RECORD</h1>	REPORT NUMBER <h2 style="margin: 0;">22611</h2>																																																											
CONTRACT Rathgowan, Mullingar, Co. Westmeath		BOREHOLE NO. BH06 SHEET Sheet 1 of 1																																																											
CO-ORDINATES 642,329.38 E 753,498.70 N GROUND LEVEL (m AOD) 99.61	RIG TYPE DANDO 2000 BOREHOLE DIAMETER (mm) 200 BOREHOLE DEPTH (m) 4.70	DATE COMMENCED 03/07/2020 DATE COMPLETED 03/07/2020																																																											
CLIENT Glenveagh Properties ENGINEER Tobins C.E.	SPT HAMMER REF. NO. ENERGY RATIO (%)	BORED BY W. CAHILL PROCESSED BY F.C.																																																											
Depth (m) 0 1 2 3 4 5 6 7 8 9	Description TOPSOIL Dark brown sandy SILT/CLAY with some gravel and occasional cobbles (Possibly Made Ground) Multicoloured very silty/clayey GRAVEL (Possibly Made Ground) Stiff to very stiff dark brown sandy gravelly silty CLAY with some cobbles and occasional boulders Obstruction End of Borehole at 4.70 m	<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>Legend</th> <th>Elevation</th> <th>Depth (m)</th> </tr> <tr> <td></td> <td>99.46</td> <td>0.15</td> </tr> <tr> <td></td> <td>99.31</td> <td>0.30</td> </tr> <tr> <td></td> <td>99.11</td> <td>0.50</td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>94.91</td> <td>4.70</td> </tr> </table>	Legend	Elevation	Depth (m)		99.46	0.15		99.31	0.30		99.11	0.50					94.91	4.70	<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th colspan="4">Samples</th> <th rowspan="2">Field Test Results</th> <th rowspan="2">Standpipe Details</th> </tr> <tr> <th>Ref. Number</th> <th>Sample Type</th> <th>Depth (m)</th> <th>Recovery</th> </tr> <tr> <td>AA130941</td> <td>B</td> <td>1.00</td> <td></td> <td>N = 21 (3, 3, 4, 4, 6, 7)</td> <td></td> </tr> <tr> <td>AA130942</td> <td>B</td> <td>2.00</td> <td></td> <td>N = 31 (7, 8, 10, 8, 6, 7)</td> <td></td> </tr> <tr> <td>AA130943</td> <td>B</td> <td>3.00</td> <td></td> <td>N = 44 (4, 6, 11, 13, 10, 10)</td> <td></td> </tr> <tr> <td>AA130944</td> <td>B</td> <td>4.00</td> <td></td> <td>N = 50/225 mm (6, 11, 16, 17, 17)</td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>N = 50/75 mm (12, 18, 50)</td> <td></td> </tr> </table>	Samples				Field Test Results	Standpipe Details	Ref. Number	Sample Type	Depth (m)	Recovery	AA130941	B	1.00		N = 21 (3, 3, 4, 4, 6, 7)		AA130942	B	2.00		N = 31 (7, 8, 10, 8, 6, 7)		AA130943	B	3.00		N = 44 (4, 6, 11, 13, 10, 10)		AA130944	B	4.00		N = 50/225 mm (6, 11, 16, 17, 17)						N = 50/75 mm (12, 18, 50)	
Legend	Elevation	Depth (m)																																																											
	99.46	0.15																																																											
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Samples				Field Test Results	Standpipe Details																																																								
Ref. Number	Sample Type	Depth (m)	Recovery																																																										
AA130941	B	1.00		N = 21 (3, 3, 4, 4, 6, 7)																																																									
AA130942	B	2.00		N = 31 (7, 8, 10, 8, 6, 7)																																																									
AA130943	B	3.00		N = 44 (4, 6, 11, 13, 10, 10)																																																									
AA130944	B	4.00		N = 50/225 mm (6, 11, 16, 17, 17)																																																									
				N = 50/75 mm (12, 18, 50)																																																									
HARD STRATA BORING/CHISELLING				WATER STRIKE DETAILS																																																									
From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments																																																				
3.3	3.4	1							No water strike																																																				
4.5	4.7	2																																																											
INSTALLATION DETAILS				GROUNDWATER PROGRESS																																																									
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments																																																				
REMARKS 1hr Setting up Covid 19 Safe Working Area. Hand dug inspection pit carried out.				Sample Legend																																																									
				D - Small Disturbed (tub) B - Bulk Disturbed LB - Large Bulk Disturbed Env - Environmental Sample (Jar + Vial + Tub)			UT - Undisturbed 100mm Diameter Sample P - Undisturbed Piston Sample W - Water Sample																																																						

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GEOTECHNICAL BORING RECORD

REPORT NUMBER

22611

CONTRACT Rathgowan, Mullingar, Co. Westmeath		BOREHOLE NO. BH07
CO-ORDINATES 642,412.37 E 753,437.23 N		SHEET Sheet 1 of 1
GROUND LEVEL (m AOD) 99.36	RIG TYPE DANDO 2000	DATE COMMENCED 09/07/2020
	BOREHOLE DIAMETER (mm) 200	DATE COMPLETED 10/07/2020
CLIENT Glenveagh Properties	SPT HAMMER REF. NO.	BORED BY W. CAHILL
ENGINEER Tobins C.E	ENERGY RATIO (%)	PROCESSED BY E.O.

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples				Field Test Results	Sample Details
					Ref. Number	Sample Type	Depth (m)	Recovery		
0	TOPSOIL		99.11	0.25						
	Dark brown sandy SILT/CLAY with occasional gravel		98.86	0.50						
1	Soft to firm mottled light brown/grey/purple sandy SILT/CLAY with occasional gravel				AA135920	B	1.00		N = 8 (1, 1, 2, 2, 2, 2)	
2	Stiff to very stiff dark brown sandy gravelly silty CLAY with some cobbles and occasional cobbles		97.76	1.60	AA135921	B	2.00		N = 27 (2, 2, 4, 6, 8, 9)	
3					AA135922	B	3.00		N = 38 (6, 6, 7, 9, 10, 12)	
4	Hard grey/brown very gravelly sandy silty CLAY with some cobbles		95.46	3.90	AA135923	B	4.00		N = 50/225 mm (8, 10, 13, 15, 22)	
4	Obstruction End of Borehole at 4.60 m		94.76	4.60						

HARD STRATA BORING/CHISELLING				WATER STRIKE DETAILS					
From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
3.4	3.6	0.75		4.20	4.20	No	3.90	20	Slow
4.2	4.6	1.5							

INSTALLATION DETAILS					Date	Hole Depth	Casing Depth	Depth to Water	Comments
Date	Tip Depth	RZ Top	RZ Base	Type					

REMARKS 1hr Setting up Covid 19 Safe Working Area. Hand dug inspection pit carried out.	Sample Legend D - Small Disturbed (tub) B - Bulk Disturbed LB - Large Bulk Disturbed Env - Environmental Sample (Jar + Vial + Tub) UT - Undisturbed 100mm Diameter Sample P - Undisturbed Piston Sample W - Water Sample
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CONTRACT Rathgowan, Mullingar, Co. Westmeath		BOREHOLE NO. BH08
CO-ORDINATES 642,479.99 E 753,564.01 N		SHEET Sheet 1 of 1
GROUND LEVEL (m AOD) 98.76	RIG TYPE DANDO 2000 BOREHOLE DIAMETER (mm) 200 BOREHOLE DEPTH (m) 4.10	DATE COMMENCED 10/07/2020 DATE COMPLETED 10/07/2020
CLIENT Glenveagh Properties ENGINEER Tobins C.E.	SPT HAMMER REF. NO. ENERGY RATIO (%)	BORED BY W. CAHILL PROCESSED BY E.C.

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples				Field Test Results	Standpipe Details
					Ref. Number	Sample Type	Depth (m)	Recovery		
0	TOPSOIL		98.56	0.20						
1	Firm to stiff mottled dark purple/brown sandy SILT/CLAY with some fine gravel				AA315924	B	1.00		N = 12 (2, 2, 2, 3, 3, 4)	
2	Very stiff dark brown sandy gravelly silty CLAY with some cobbles and occasional boulders		96.86	1.90	AA315925	B	2.00		N = 39 (6, 8, 8, 9, 11, 11)	
3					AA315926	B	3.00		N = 48 (7, 7, 8, 8, 13, 19)	
4	Obstruction End of Borehole at 4.10 m		94.66	4.10					N = 50/75 mm (18, 32, 50)	

HARD STRATA BORING/CHISELLING				WATER STRIKE DETAILS					
From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
4	4.1	1.5							No water strike

INSTALLATION DETAILS					GROUNDWATER PROGRESS				
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments

REMARKS 1hr Setting up Covid 19 Safe Working Area. Hand dug inspection pit carried out.

Sample Legend
 D - Small Disturbed (Tub)
 B - Bulk Disturbed
 LB - Large Bulk Disturbed
 Env - Environmental Sample (Jar + Vial + Tub)

UT - Undisturbed 100mm Diameter Sample
 P - Undisturbed Piston Sample
 W - Water Sample

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CONTRACT Rathgowan, Mullingar, Co. Westmeath		BOREHOLE NO. BH09 SHEET Sheet 1 of 1
CO-ORDINATES 642,558.98 E 753,541.90 N GROUND LEVEL (m AOD) 100.41	RIG TYPE DANDO 2000 BOREHOLE DIAMETER (mm) 200 BOREHOLE DEPTH (m) 4.70	DATE COMMENCED 09/07/2020 DATE COMPLETED 09/07/2020
CLIENT Glenveagh Properties ENGINEER Tobins C.E.	SPT HAMMER REF. NO. ENERGY RATIO (%)	BORED BY W. CAHILL PROCESSED BY F.C.

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples				Field Test Results	Standpipe Details
					Ref. Number	Sample Type	Depth (m)	Recovery		
0	TOPSOIL		100.31	0.10						
0.1 - 1.8	Firm to stiff dark brown sandy SILT/CLAY with some gravel and occasional cobbles				AA135916	B	1.00		N = 17 (2, 2, 3, 3, 4, 7)	
1.8 - 4.7	Very stiff dark brown sandy gravelly silty CLAY with some cobbles and occasional boulders		98.61	1.80	AA135917	B	2.00		N = 48 (8, 11, 11, 13, 14, 10)	
					AA135918	B	3.00		N = 40 (6, 6, 8, 10, 10, 12)	
					AA135919	B	4.00		N = 50/225 mm (8, 12, 14, 17, 19)	
4.7 - 5.0	Obstruction End of Borehole at 4.70 m		95.71	4.70						

HARD STRATA BORING/CHISELLING				WATER STRIKE DETAILS					
From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
2.1	2.4	1							No water strike
3.3	3.4	0.75							
4.5	4.7	1.5							

INSTALLATION DETAILS					GROUNDWATER PROGRESS				
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments

REMARKS 1hr Setting up Covid 19 Safe Working Area. Hand dug inspection pit carried out.

Sample Legend
 D - Small Disturbed (lub)
 B - Bulk Disturbed
 LB - Large Bulk Disturbed
 Env - Environmental Sample (Jar + Vial + Tub)
 UT - Undisturbed 100mm Diameter Sample
 P - Undisturbed Piston Sample
 W - Water Sample

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CONTRACT Rathgowan, Mullingar, Co. Westmeath		BOREHOLE NO. BH10
CO-ORDINATES 642,609.48 E 753,615.39 N		SHEET Sheet 1 of 1
GROUND LEVEL (m AOD) 99.19	RIG TYPE DANDO 2000	DATE COMMENCED 06/07/2020
	BOREHOLE DIAMETER (mm) 200	DATE COMPLETED 06/07/2020
	BOREHOLE DEPTH (m) 3.20	
CLIENT Glenveagh Properties	SPT HAMMER REF. NO.	BORED BY W. CAHILL
ENGINEER Tobins C.E	ENERGY RATIO (%)	PROCESSED BY F.O

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples				Field Test Results	Standpipe Details
					Ref. Number	Sample Type	Depth (m)	Recovery		
0	TOPSOIL		98.94	0.25						
	Soft to firm brown SILT/CLAY with occasional fine gravel		98.69	0.50						
1	Very stiff to hard dark brown sandy gravelly SILT/CLAY with occasional cobbles and boulders				AA135901	B	1.00		N = 43 (4, 6, 8, 11, 12, 12)	
2					AA135902	B	2.00		N = 51 (10, 11, 11, 11, 13, 16)	
3	Obstruction End of Borehole at 3.20 m		95.99	3.20					N = 50/150 mm (8, 10, 19, 31)	
4										
5										
6										
7										
8										
9										

HARD STRATA BORING/CHISELLING				WATER STRIKE DETAILS					
From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
1.8	1.9	0.5							No water strike
3	3.2	1.5							

INSTALLATION DETAILS					GROUNDWATER PROGRESS				
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments

REMARKS 1hr Setting up Covid 19 Safe Working Area. Hand dug inspection pit carried out.

Sample Legend
 D - Small Disturbed (tub)
 B - Bulk Disturbed
 LB - Large Bulk Disturbed
 Env - Environmental Sample (Jar + Vial + Tub)
 UT - Undisturbed 100mm Diameter Sample
 P - Undisturbed Piston Sample
 W - Water Sample

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CONTRACT Rathgowan, Mullingar, Co. Westmeath		BOREHOLE NO. BH11
CO-ORDINATES 642,687.31 E 753,513.45 N		SHEET Sheet 1 of 1
GROUND LEVEL (m AOD) 102.19	RIG TYPE DANDO 2000	DATE COMMENCED 06/07/2020
	BOREHOLE DIAMETER (mm) 200	DATE COMPLETED 06/07/2020
CLIENT Glenveagh Properties	SPT HAMMER REF. NO.	BORED BY W. CAHILL
ENGINEER Tobins C.E	ENERGY RATIO (%)	PROCESSED BY E.O

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples				Field Test Results	Standpipe Details
					Ref. Number	Sample Type	Depth (m)	Recovery		
0	TOPSOIL		101.99	0.20						
0.20 - 1.00	Firm dark brown sandy SILT/CLAY with occasional cobbles				AA135903	B	1.00		N = 17 (3, 3, 3, 4, 4, 6)	
1.00 - 4.40	Very stiff dark brown sandy gravelly silty CLAY with some cobbles and occasional boulders		100.89	1.30	AA135904	B	2.00		N = 32 (4, 5, 5, 7, 9, 11)	
					AA135905	B	3.00		N = 50 (8, 11, 11, 14, 13, 12)	
					AA135906	B	4.00		N = 50/225 mm (10, 14, 17, 21, 12)	
4.40	Obstruction End of Borehole at 4.40 m		97.79	4.40						

HARD STRATA BORING/CHISELLING				WATER STRIKE DETAILS					
From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
3.3	3.5	0.75							No water strike
4.2	4.4	1.5							

INSTALLATION DETAILS					Date	Hole Depth	Casing Depth	Depth to Water	Comments
Date	Tip Depth	RZ Top	RZ Base	Type					

REMARKS 1hr Setting up Covid 19 Safe Working Area. Hand dug inspection pit carried out.

Sample Legend
 D - Small Disturbed (tub)
 B - Bulk Disturbed
 LB - Large Bulk Disturbed
 Env - Environmental Sample (Jar + Vial + Tub)
 UT - Undisturbed 100mm Diameter Sample
 P - Undisturbed Piston Sample
 W - Water Sample

IGSL BH LOG 22611.GPJ IGSL.GDT 28/7/20

CONTRACT Rathgowan, Mullingar, Co. Westmeath

BOREHOLE NO. BH12
SHEET Sheet 1 of 1

CO-ORDINATES 642,576.47 E
753,479.01 N
GROUND LEVEL (m AOD) 103.07

RIG TYPE DANDO 2000
BOREHOLE DIAMETER (mm) 200
BOREHOLE DEPTH (m) 5.70

CLIENT Glenveagh Properties
ENGINEER Tobins C.E

SPT HAMMER REF. NO.
ENERGY RATIO (%)

BORED BY W. CAHILL
PROCESSED BY F.O.

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples				Field Test Results	Standpipe Details
					Ref. Number	Sample Type	Depth (m)	Recovery		
0	TOPSOIL		102.92	0.15						
	Soft brown SILT/CLAY with occasional fine gravel		102.67	0.40						
	Firm dark brown sandy SILT/CLAY with occasional gravel				AA135907	B	1.00	N = 13 (2, 2, 3, 3, 3, 4)		
					AA135908	B	2.00	N = 15 (2, 2, 3, 3, 4, 5)		
			99.77	3.30	AA135909	B	3.00	N = 17 (2, 3, 3, 4, 4, 6)		
	Stiff to very stiff dark brown sandy gravelly silty CLAY with some cobbles and occasional boulders				AA135910	B	4.00	N = 25 (4, 5, 5, 6, 7, 7)		
					AA135911	B	5.00	N = 50/225 mm (8, 11, 14, 17, 19)		
			97.37	5.70						
6	Obstruction End of Borehole at 5.70 m									

HARD STRATA BORING/CHISELLING				WATER STRIKE DETAILS					
From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
3.6	3.7	0.75							No water strike
5.4	5.7	2							

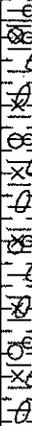
INSTALLATION DETAILS					Date	Hole Depth	Casing Depth	Depth to Water	Comments
Date	Tip Depth	RZ Top	RZ Base	Type					

REMARKS 1hr Setting up Covid 19 Safe Working Area. Hand dug inspection pit carried out.

Sample Legend
 D - Small Disturbed (tub)
 B - Bulk Disturbed
 LB - Large Bulk Disturbed
 Env - Environmental Sample (Jar + Vial + Tub)
 UT - Undisturbed 100mm Diameter Sample
 P - Undisturbed Piston Sample
 W - Water Sample

IGSL BH LOG 22611.GPJ IGSL.GDT 28/7/20

CONTRACT Rathgowan, Mullingar, Co. Westmeath		BOREHOLE NO. BH13
CO-ORDINATES 642,619.99 E 753,433.08 N		SHEET Sheet 1 of 1
GROUND LEVEL (m AOD) 104.71	RIG TYPE DANDO 2000	DATE COMMENCED 08/07/2020
	BOREHOLE DIAMETER (mm) 200	DATE COMPLETED 08/07/2020
	BOREHOLE DEPTH (m) 4.80	
CLIENT Glenveagh Properties	SPT HAMMER REF. NO.	BORED BY W. CAHILL
ENGINEER Tobins C.E	ENERGY RATIO (%)	PROCESSED BY E.O

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples				Field Test Results	Sample Details
					Ref. Number	Sample Type	Depth (m)	Recovery		
0	TOPSOIL		104.51	0.20						
0.20 - 1.00	Firm dark brown sandy SILT/CLAY with occasional gravel				AA135912	B	1.00		N = 21 (2, 3, 3, 4, 6, 8)	
1.00 - 4.80	Stiff to very stiff dark brown sandy gravelly silty CLAY with occasional cobbles and some boulders		103.41	1.30	AA135913	B	2.00		N = 20 (4, 5, 5, 5, 6, 4)	
					AA135914	B	3.00		N = 31 (3, 4, 6, 6, 8, 11)	
					AA135915	B	4.00		N = 34 (4, 6, 7, 7, 9, 11)	
4.80	Obstruction End of Borehole at 4.80 m		99.91	4.80					N = 50/75 mm (17, 35, 50)	

HARD STRATA BORING/CHISELLING				WATER STRIKE DETAILS					
From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
4.6	4.8	2							No water strike

INSTALLATION DETAILS					GROUNDWATER PROGRESS				
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments

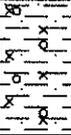
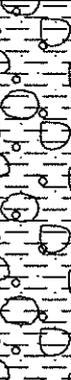
REMARKS 1hr Setting up Covid 19 Safe Working Area. Hand dug inspection pit carried out.	Sample Legend D - Small Disturbed (tub) B - Bulk Disturbed LB - Large Bulk Disturbed Env - Environmental Sample (Jar + Vial + Tub) UT - Undisturbed 100mm Diameter Sample P - Undisturbed Piston Sample W - Water Sample
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IGSL BH LOG 22611.GPJ IGSL.GDT 28/7/20

RECEIVED: 24/08/2023

Appendix II Trial Pit Logs

CONTRACT Rathgowan, Mullingar, Co. Westmeath	TRIAL PIT NO. TP01 SHEET Sheet 1 of 1
LOGGED BY S. Cunningham	CO-ORDINATES 642,511.71 E 753,773.39 N
CLIENT Glenveagh Properties ENGINEER Tobins C.E.	GROUND LEVEL (m) 99.08 DATE STARTED 02/07/2020 DATE COMPLETED 02/07/2020 EXCAVATION METHOD 7T Tracked Machine

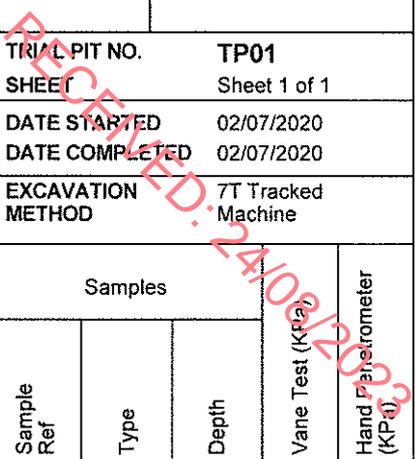
Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples			Vane Test (KPa)	Hand Penetrometer (KPa)
						Sample Ref	Type	Depth		
0.0	TOPSOIL		0.20	98.88						
	Soft to firm grey mottled brown slightly sandy gravelly SILT/CLAY with a low cobble content. Sand is fine to coarse. Gravel is fine to coarse, subrounded to subangular. Cobbles and boulders are subrounded.		0.80	98.28		AA134351	B	0.50		
1.0	Firm to stiff greyish brown very sandy gravelly SILT/CLAY with a medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, subrounded to subangular. Cobble is subrounded.		2.50	96.58		AA134352	B	1.10		
	End of Trial Pit at 2.50m					AA134353	B	2.40		

Groundwater Conditions
 Dry

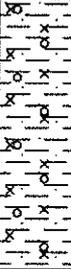
Stability
 Stable

General Remarks

IGSL TP LOG 22611.GPJ IGSL.GDT 28/7/20



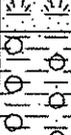
CONTRACT Rathgowan, Mullingar, Co. Westmeath		TRIAL PIT NO. TP02 SHEET Sheet 1 of 1	
LOGGED BY S. Cunningham	CO-ORDINATES 642,453.82 E 753,730.10 N	DATE STARTED 02/07/2020 DATE COMPLETED 02/07/2020	
CLIENT ENGINEER Glenveagh Properties Tobins C.E.	GROUND LEVEL (m) 100.59	EXCAVATION METHOD 7T Tracked Machine	

	Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples			Vane Test (KPa)	Hand Penetrometer (KPa)
						Sample Ref	Type	Depth		
0.0	TOPSOIL									
	Soft to firm brownish grey sandy gravelly SILT/CLAY with a low cobble content and occasional boulders. Sand is fine to coarse. Gravel is fine to coarse, subrounded to subangular. Cobbles and boulders are subrounded.		0.20	100.39						
1.0						AA134357	B	0.80		
	Firm to stiff greyish brown sandy gravelly SILT/CLAY with a medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, subrounded to subangular. Cobble and boulders are subrounded.		1.40	99.19						
2.0						AA134358	B	1.60		
2.60	End of Trial Pit at 2.60m		2.60	97.99		AA134359	B	2.50		
3.0										
4.0										

Groundwater Conditions
Dry

Stability
Stable

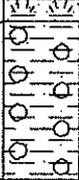
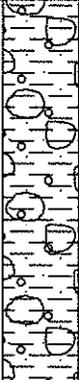
General Remarks

 TRIAL PIT RECORD		REPORT NUMBER							
CONTRACT Rathgowan, Mullingar, Co. Westmeath		TRIAL PIT NO. TP03 SHEET Sheet 1 of 1							
LOGGED BY S. Cunningham		CO-ORDINATES 642,368.75 E 753,739.16 N							
CLIENT ENGINEER Glenveagh Properties Tobins C.E.		GROUND LEVEL (m) 102.21							
		DATE STARTED 02/07/2020 DATE COMPLETED 02/07/2020							
		EXCAVATION METHOD 7T Tracked Machine							
Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples			Vane Test (KPa)	Hand Penetrometer (KPa)
					Sample Ref	Type	Depth		
0.0 TOPSOIL									
Firm brown slightly sandy gravelly SILT/CLAY with a low cobble content. Sand is fine to coarse. Gravel is fine to coarse, subrounded to subangular. Cobbles are subrounded to subangular.		0.15	102.06						
Firm to stiff greyish brown sandy gravelly SILT/CLAY with a medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, subrounded to subangular. Cobbles and boulders are subrounded to subangular.		0.70	101.51		AA134354	B	0.60		
					AA134355	B	1.20		
End of Trial Pit at 2.50m		2.50	99.71		AA134356	B	2.40		
Groundwater Conditions Dry									
Stability Stable									
General Remarks									

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CONTRACT Rathgowan, Mullingar, Co. Westmeath	TRIAL PIT NO. TP04 SHEET Sheet 1 of 1
LOGGED BY S. Cunningham	CO-ORDINATES 642,418.30 E 753,628.42 N
CLIENT Glenveagh Properties ENGINEER Tobins C.E	GROUND LEVEL (m) 98.61 DATE STARTED 03/07/2020 DATE COMPLETED 03/07/2020 EXCAVATION METHOD 7T Tracked Machine

Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples			Vane Test (KPa)	Hand Permeameter (KPa)
						Sample Ref	Type	Depth		
0.0	TOPSOIL		0.10	98.51						
	Soft to firm grey mottled brown slightly sandy gravelly SILT/CLAY with a low cobble content. Sand is fine to coarse. Gravel is fine to coarse, subrounded to subangular. Cobbles and boulders are subrounded.					AA134369	B	0.50		
1.0	Stiff greyish brown sandy gravelly SILT/CLAY with a medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, subrounded to subangular. Cobbles and boulders are subrounded to subangular.		0.80	97.81		AA134370	B	1.20		
2.0					 (See page)					
2.50	End of Trial Pit at 2.50m		2.50	96.11		AA134371	B	2.40		

Groundwater Conditions
 Seepage at 2.2mbgl

Stability
 Unstable at 1.3mbgl

General Remarks

IGSL TP LOG 22611.GPJ IGSL.GDT 28/7/20



TRIAL PIT RECORD

REPORT NUMBER

22611

CONTRACT Rathgowan, Mullingar, Co. Westmeath

TRIAL PIT NO. TP06

SHEET Sheet 1 of 1

LOGGED BY S. Cunningham

CO-ORDINATES 642,387.42 E
753,536.64 N

DATE STARTED 03/07/2020

DATE COMPLETED 03/07/2020

CLIENT Glenveagh Properties
ENGINEER Tobins C.E

GROUND LEVEL (m) 99.04

EXCAVATION METHOD 7T Tracked Machine

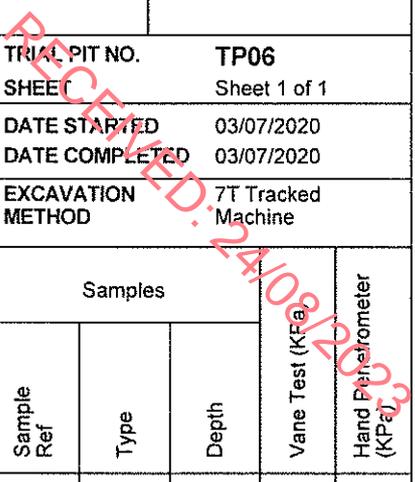
Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples			Vane Test (KPa)	Hand Permeometer (KPa)
					Sample Ref	Type	Depth		
0.0 TOPSOIL Soft brown SILT/CLAY									
Firm to stiff grey sandy very gravelly SILT/CLAY with a medium cobble and medium boulder content. Sand is fine to coarse. Gravel is fine to coarse, subrounded to subangular. Cobbles and boulders are subrounded to subangular.		0.40	98.64						
					AA134366	B	0.70		
					AA134367	B	1.60		
					AA134368	B	2.20		
End of Trial Pit at 2.50m		2.50	96.54						

Groundwater Conditions
Dry

Stability
Stable

General Remarks

IGSL TP LOG 22611.GPJ IGSL GDT 28/7/20



CONTRACT Rathgowan, Mullingar, Co. Westmeath	TRIAL PIT NO. TP07 SHEET Sheet 1 of 1
LOGGED BY S. Cunningham	CO-ORDINATES 642,263.31 E 753,531.05 N
CLIENT ENGINEER Glenveagh Properties Tobins C.E	GROUND LEVEL (m) 102.05 EXCAVATION METHOD 7T Tracked Machine

Depth (m)	Elevation	Water Strike	Samples			Vane Test (KPa)	Hand Penetrometer (KPa)
			Sample Ref	Type	Depth		
0.0							
	0.10						
	0.80		AA134364	B	0.60		
1.0							
	1.50		AA134365	B	1.50		
2.0							
	2.50						
3.0	99.55						
4.0							

Groundwater Conditions
Dry

Stability
Stable

General Remarks

IGSL TP LOG 22611.GPJ IGSL.GDT 28/7/20

CONTRACT Rathgowan, Mullingar, Co. Westmeath	TRIAL PIT NO. TP08	SHEET Sheet 1 of 1
LOGGED BY S. Cunningham	CO-ORDINATES 642,443.41 E 753,497.47 N	DATE STARTED 07/07/2020
CLIENT ENGINEER Glenveagh Properties Tobins C.E	GROUND LEVEL (m) 100.02	DATE COMPLETED 07/07/2020
		EXCAVATION METHOD 7T Tracked Machine

Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples			Vane Test (Kpa)	Hand Penetrometer (Kpa)
						Sample Ref	Type	Depth		
0.0	TOPSOIL		0.15	99.87						
	Soft to firm light brown mottled grey slightly sandy gravelly SILT/CLAY. Sand is fine to coarse. Gravel is fine to coarse, subrounded to subangular.					AA134388	B	0.45		
	Firm light brown very sandy gravelly SILT/CLAY with a medium cobble and low boulder content.		0.75	99.27						
1.0						AA134389	B	1.20		
	Firm to stiff greyish brown sandy gravelly SILT/CLAY with a medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, subrounded to subangular. Cobbles and boulders are subrounded to subangular.		1.80	98.22						
2.0						AA134390	B	2.30		
	End of Trial Pit at 2.50m		2.50	97.52						
3.0										
4.0										

Groundwater Conditions
Dry

Stability
Stable

General Remarks

CONTRACT Rathgowan, Mullingar, Co. Westmeath	TRIAL PIT NO. TP09 SHEET Sheet 1 of 1
LOGGED BY S. Cunningham	CO-ORDINATES 642,478.79 E 753,442.19 N
CLIENT Glenveagh Properties ENGINEER Tobins C.E	GROUND LEVEL (m) 101.00 DATE STARTED 07/07/2020 DATE COMPLETED 07/07/2020 EXCAVATION METHOD 7T Tracked Machine

Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples			Vane Test (KPa)	Hand Penetrometer (KPa)
						Sample Ref	Type	Depth		
0.0	TOPSOIL		0.10	100.90						
	Soft brown SILT/CLAY									
	Soft to firm light brown mottled grey slightly sandy gravelly SILT/CLAY. Sand is fine to coarse. Gravel is fine to coarse, subrounded to subangular.		0.40	100.60						
1.0						AA134385	B	1.00		
	Firm to stiff greyish brown very sandy gravelly SILT/CLAY with a medium cobble and medium boulder content. Sand is fine to coarse. Gravel is fine to coarse, subrounded to subangular. Cobbles and boulders are subrounded to subangular.		1.40	99.60						
2.0						AA134386	B	1.60		
						AA134387	B	2.30		
2.50	End of Trial Pit at 2.40m		2.50	98.50						
3.0										
4.0										

Groundwater Conditions
Dry

Stability
Stable

General Remarks

IGSL TP LOG 22611.GPJ IGSL.GDT 28/7/20

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TRIAL PIT RECORD

REPORT NUMBER

22611

CONTRACT Rathgowan, Mullingar, Co. Westmeath

TRIAL PIT NO. TP10
SHEET Sheet 1 of 1

LOGGED BY S. Cunningham

CO-ORDINATES 642,581.03 E
753,587.36 N

DATE STARTED 07/07/2020
DATE COMPLETED 07/07/2020

CLIENT ENGINEER Glenveagh Properties
Tobins C.E

GROUND LEVEL (m) 99.26

EXCAVATION METHOD 7T Tracked Machine

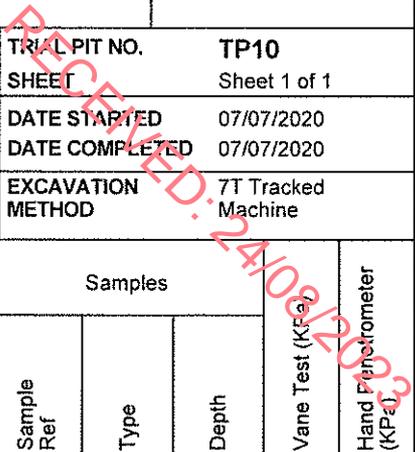
Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples			Vane Test (kPa)	Hand Penetrometer (kPa)
						Sample Ref	Type	Depth		
0.0	TOPSOIL Soft to firm light brown mottled grey slightly sandy gravelly SILT/CLAY. Sand is fine to coarse. Gravel is fine to coarse, subrounded to subangular.		0.10	99.16						
						AA13437	B	0.60		
1.0	Firm to stiff greyish brown sandy gravelly SILT/CLAY with a medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, subrounded to subangular. Cobbles and boulders are subrounded to subangular.		0.85	98.41						
						AA134372	B	1.40		
2.0										
						AA134373	B	2.50		
2.65	End of Trial Pit at 2.65m		2.65	96.61						
3.0										
4.0										

Groundwater Conditions
Dry

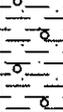
Stability
Stable

General Remarks

IGSL TP LOG 22611.GP.3 IGSL.GDT 26/7/20



CONTRACT Rathgowan, Mullingar, Co. Westmeath	TRIAL PIT NO. TP11
	SHEET Sheet 1 of 1
LOGGED BY S. Cunningham	CO-ORDINATES 642,717.94 E 753,554.83 N
	DATE STARTED 07/07/2020
	DATE COMPLETED 07/07/2020
CLIENT Glenveagh Properties	GROUND LEVEL (m) 99.91
ENGINEER Tobins C.E	EXCAVATION METHOD 7T Tracked Machine

Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples			Vane Test (KPa)	Hand Penetrometer (KPa)
						Sample Ref	Type	Depth		
0.0	TOPSOIL		0.15	99.76						
	Soft dark brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse, subrounded to subangular.									
1.0	Stiff greyish brown sandy gravelly SILT/CLAY with a medium cobble and medium boulder content. Sand is fine to coarse. Gravel is fine to coarse, subrounded to subangular. Cobbles and boulders are subrounded to subangular.		0.70	99.21		AA134374	B	0.80		
2.0										
						AA134375	B	2.30		
2.60	End of Trial Pit at 2.60m		2.60	97.31						
3.0										
4.0										

Groundwater Conditions
Dry

Stability
Stable

General Remarks

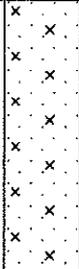
IGSL TP LOG 22611.GPJ IGSL.GDT 28/7/20

		TRIAL PIT RECORD					REPORT NUMBER 22611		
CONTRACT Rathgowan, Mullingar, Co. Westmeath			TRIAL PIT NO. TP12		SHEET Sheet 1 of 1				
LOGGED BY S. Cunningham		CO-ORDINATES 642,607.02 E 753,508.37 N		DATE STARTED 07/07/2020		DATE COMPLETED 07/07/2020			
CLIENT ENGINEER Glenveagh Properties Tobins C.E		GROUND LEVEL (m) 101.97		EXCAVATION METHOD 7T Tracked Machine					
Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples			Vane Test (KPa)	Hand Penetrometer (KPa)
					Sample Ref	Type	Depth		
0.0 TOPSOIL		0.15	101.82						
Soft light brown mottled grey sandy gravelly SILT/CLAY. Sand is fine to coarse. Gravel is fine to coarse, subrounded to subangular.		0.50	101.47						
Stiff greyish brown sandy gravelly SILT/CLAY with a medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, subrounded to subangular. Cobbles and boulders are subrounded to subangular.					AA134382	B	0.50		
					AA134383	B	1.00		
					AA134384	B	2.00		
End of Trial Pit at 2.60m		2.60	99.37						
Groundwater Conditions Dry									
Stability Stable									
General Remarks									

IGSL TP LOG 22611.GPJ IGSL_GDT 28/7/20

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 24/10/2020

CONTRACT Rathgowan, Mullingar, Co. Westmeath	TRIAL PIT NO. TP13 SHEET Sheet 1 of 1
LOGGED BY S. Cunningham	CO-ORDINATES 642,677.08 E 753,453.61 N
CLIENT Glenveagh Properties ENGINEER Tobins C.E.	GROUND LEVEL (m) 104.10 DATE STARTED 07/07/2020 DATE COMPLETED 07/07/2020 EXCAVATION METHOD 7T Tracked Machine

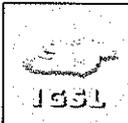
Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples			Vane Test (kPa)	Hand Penetrometer (kPa)
						Sample Ref	Type	Depth		
0.0	TOPSOIL		0.15	103.95						
	Soft light brown sandy gravelly SILT/CLAY. Sand is fine to coarse. Gravel is fine to coarse, subrounded to subangular.		0.50	103.60						
	Loose to medium dense silty fine grained SAND.					AA134376	B	0.80		
1.0										
	Medium dense gravelly SAND with a low cobble content. Sand is fine to coarse. Gravel is fine to coarse, subrounded to subangular. Cobbles and boulders are subrounded to subangular.		1.70	102.40		AA134377	B	2.00		
2.0										
	End of Trial Pit at 2.70m		2.70	101.40		AA134378	B	2.70		
3.0										
4.0										

Groundwater Conditions
 Dry

Stability
 Stable

General Remarks

IGSL TP LOG 22611.GPJ IGSL_GDT 28/7/20



TRIAL PIT RECORD

REPORT NUMBER
22611

CONTRACT Rathgowan, Mullingar, Co. Westmeath

LOGGED BY S. Cunningham

CLIENT ENGINEER Glenveagh Properties
Tobins C.E

CO-ORDINATES 642,601.50 E
753,425.17 N

GROUND LEVEL (m) 104.39

TRIAL PIT NO. TP14

SHEET Sheet 1 of 1

DATE STARTED 07/07/2020

DATE COMPLETED 07/07/2020

EXCAVATION METHOD 7T Tracked Machine

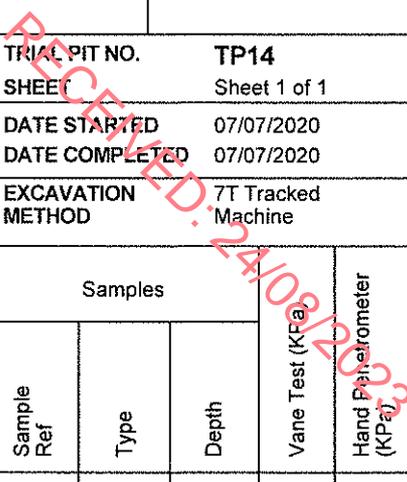
Depth (m)	Elevation	Water Strike	Samples			Vane Test (KPa)	Hand Proctorometer (KPa)
			Sample Ref	Type	Depth		
0.0							
0.10	104.29						
0.70	103.69		AA134379	B	0.40		
1.0			AA134380	B	1.00		
2.10			AA134381	B	2.10		
2.60	101.79						

Groundwater Conditions
Dry

Stability
Stable

General Remarks

IGSL TP LOG 22611.GPJ IGSL.GDT 28/7/20



TRIAL PIT PHOTOGRAPHY

TP01 – 1 of 3

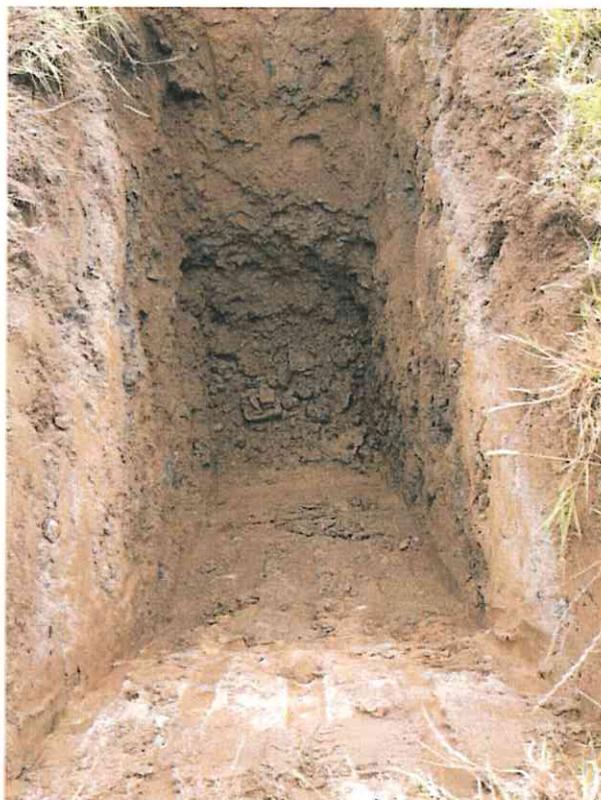


TP01 – 2 of 3



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TP01 – 3 of 3

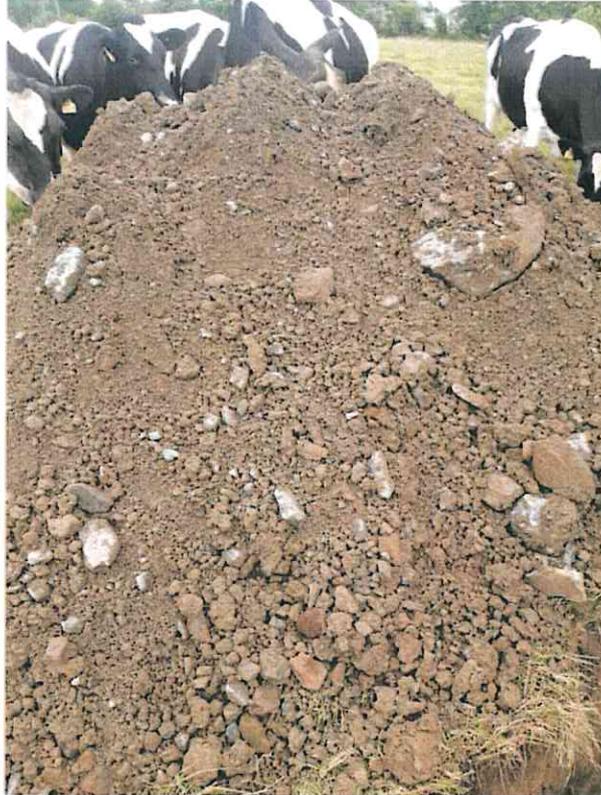


TP02 – 1 of 3



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TP02 – 2 of 3



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TP02 – 3 of 3



TP03 – 1 of 3



TP03 – 2 of 3



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TP03 – 3 of 3



RECEIVED: 24/08/2023

TP04 – 1 of 2



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TP05 - 1 of 3



TP05 – 2 of 3



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TP06 – 1 of 4



TP06 – 2 of 4



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TP06 – 3 of 4



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TP07 – 1 of 3

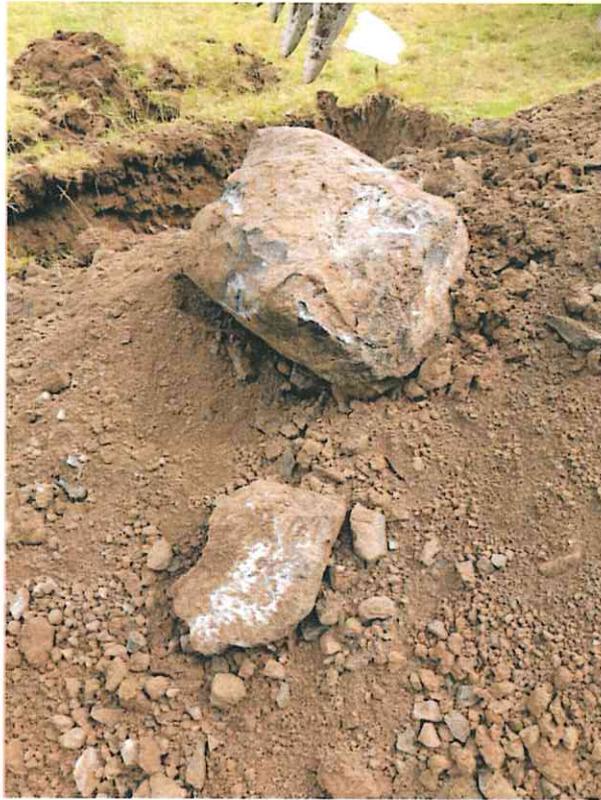


TP07 – 2 of 3



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TP07 – 3 of 3



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TP08 – 1 of 3



TP08 – 2 of 3



TP08 – 3 of 3



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TP09 – 1 of 3



TP09 – 2 of 3



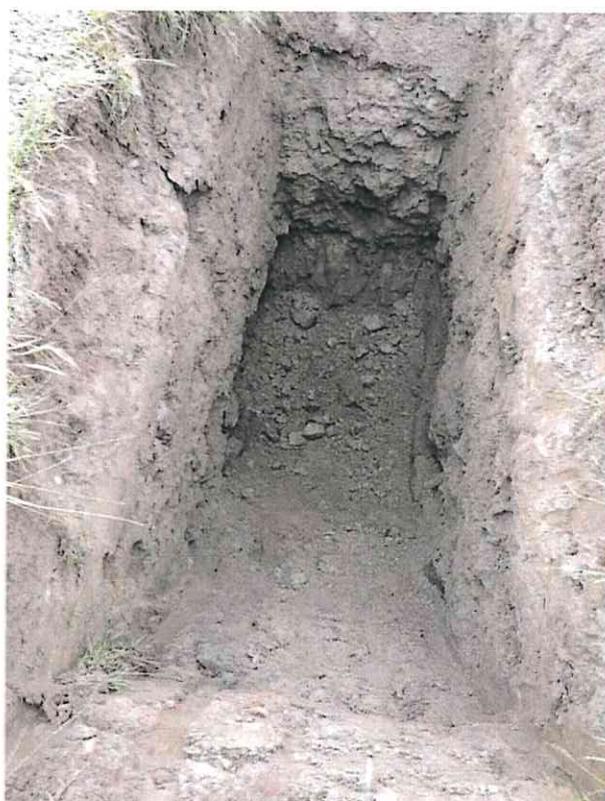
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TP09 – 3 of 3



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TP10 – 1 of 3



TP10 – 2 of 3



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TP11 - 1 of 3



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RECEIVED: 24/08/2023

TP12 – 1 of 3



TP12 – 2 of 3



TP12 – 3 of 3



RECEIVED: 24/08/2023

TP13 - 1 of 3



TP13 - 2 of 3



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TP13 – 3 of 3

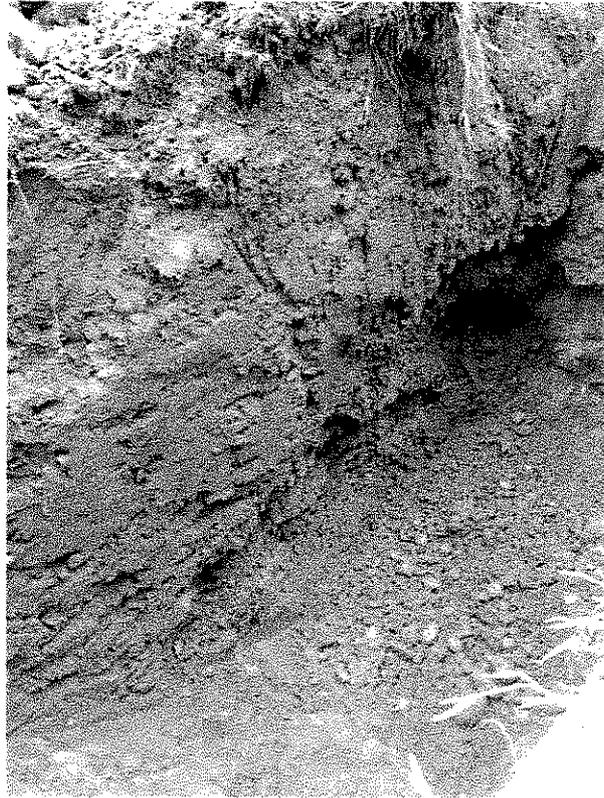
RECEIVED: 24/08/2023



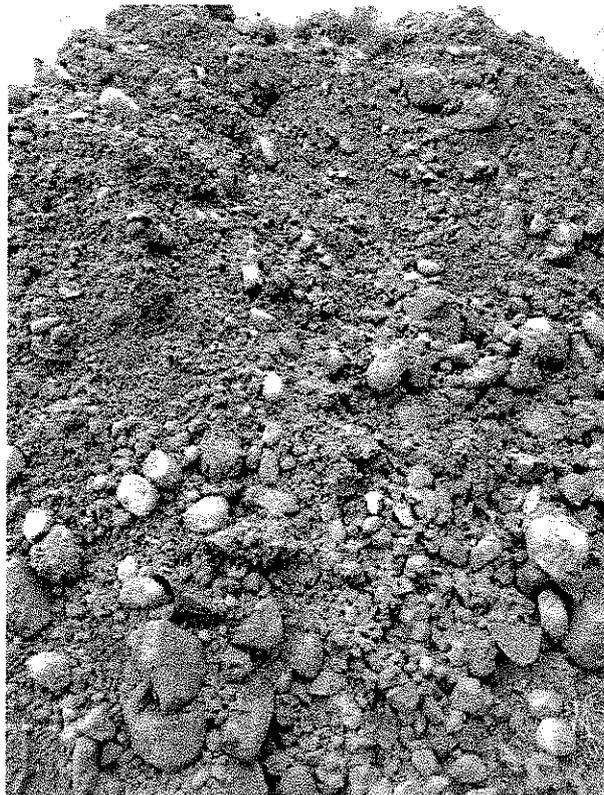
TP14 – 1 of 3



TP14 – 2 of 3



TP14 – 3 of 3



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SOAKAWAY PHOTOGRAPHY

SA01 - 1 of 2

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SA01 - 2 of 2



SA02 – 1 of 2



SA02 – 2 of 2



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SA03 – 1 of 2



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SA04 – 1 of 2



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SA04 – 2 of 2



SA05 – 1 of 2



SA05 – 2 of 2



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SA06 – 1 of 2



SA06 – 2 of 2



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SA07 – 1 of 2



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SA08 – 1 of 3



SA08 – 2 of 3



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SLIT TRENCH PHOTOGRAPHY

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Chamber is 2m deep and located in close proximity to slit trench location

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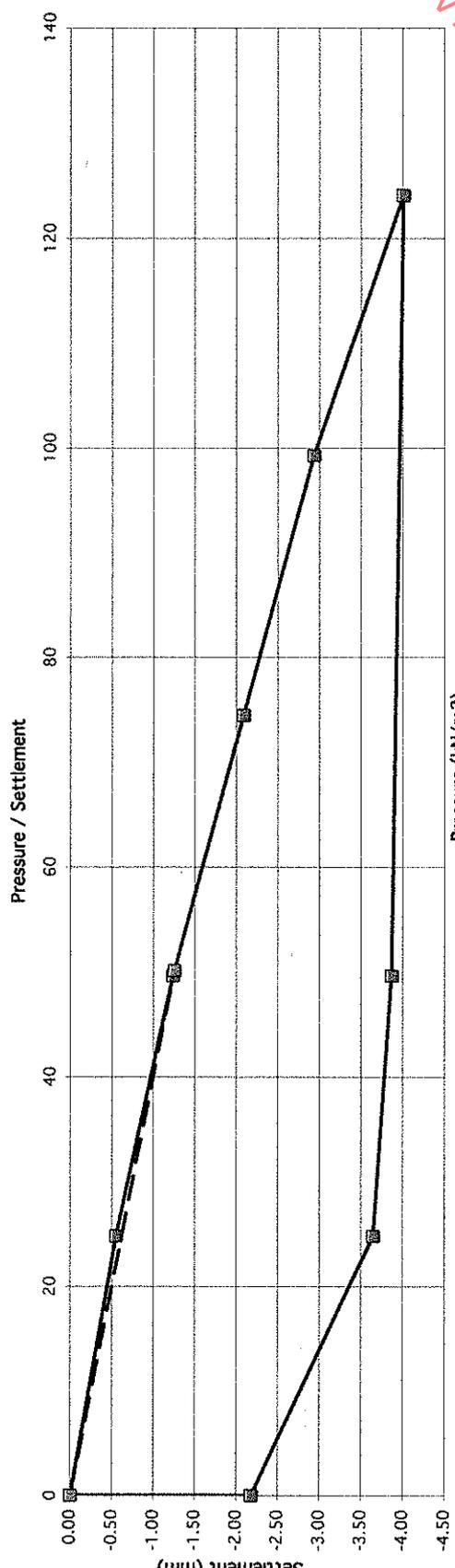
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Appendix III CBR by Plate Bearing Tests

PLATE TEST REPORT SHEET (F3.1)		Applied Pressure/Settlement Curve	
Reference No.	R112856	Description of soil under test (natural soil, placed fill, sub-base) Brown mottled grey sandy gravely SILT/CLAY	Sample Ref No. _____ m bgl Depth _____
Contract	22611 - Rathigowan, Mullingar		
Test No.	CBR01 - Load	 	
Location	See Map for Reference		
Depth	0.5mbgl		
Client	Glenveagh Properties		
Plate Diameter:	450 mm		
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test		
Technician	S.Cunningham		
Authorised by			
Date	09/07/2020		

Settlement (mm)



Settlement (mm)	Pressure (kN/m ²)
0.00	0
-0.50	20
-1.00	40
-1.50	60
-2.00	80
-3.00	100
-3.50	120
-4.00	140

Pressure / Settlement

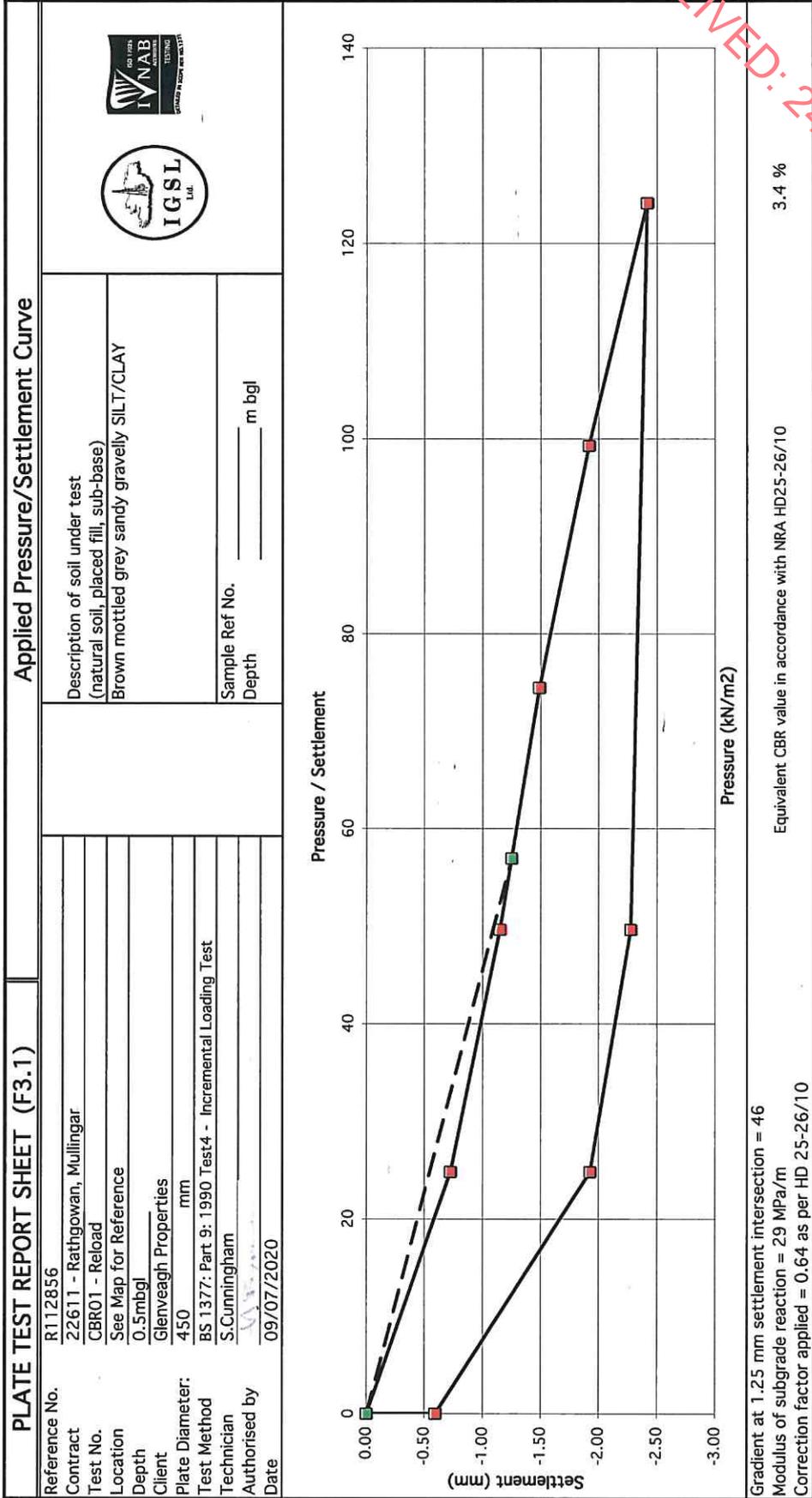
Pressure (kN/m²)

Equivalent CBR value in accordance with NRA HD25-26/10

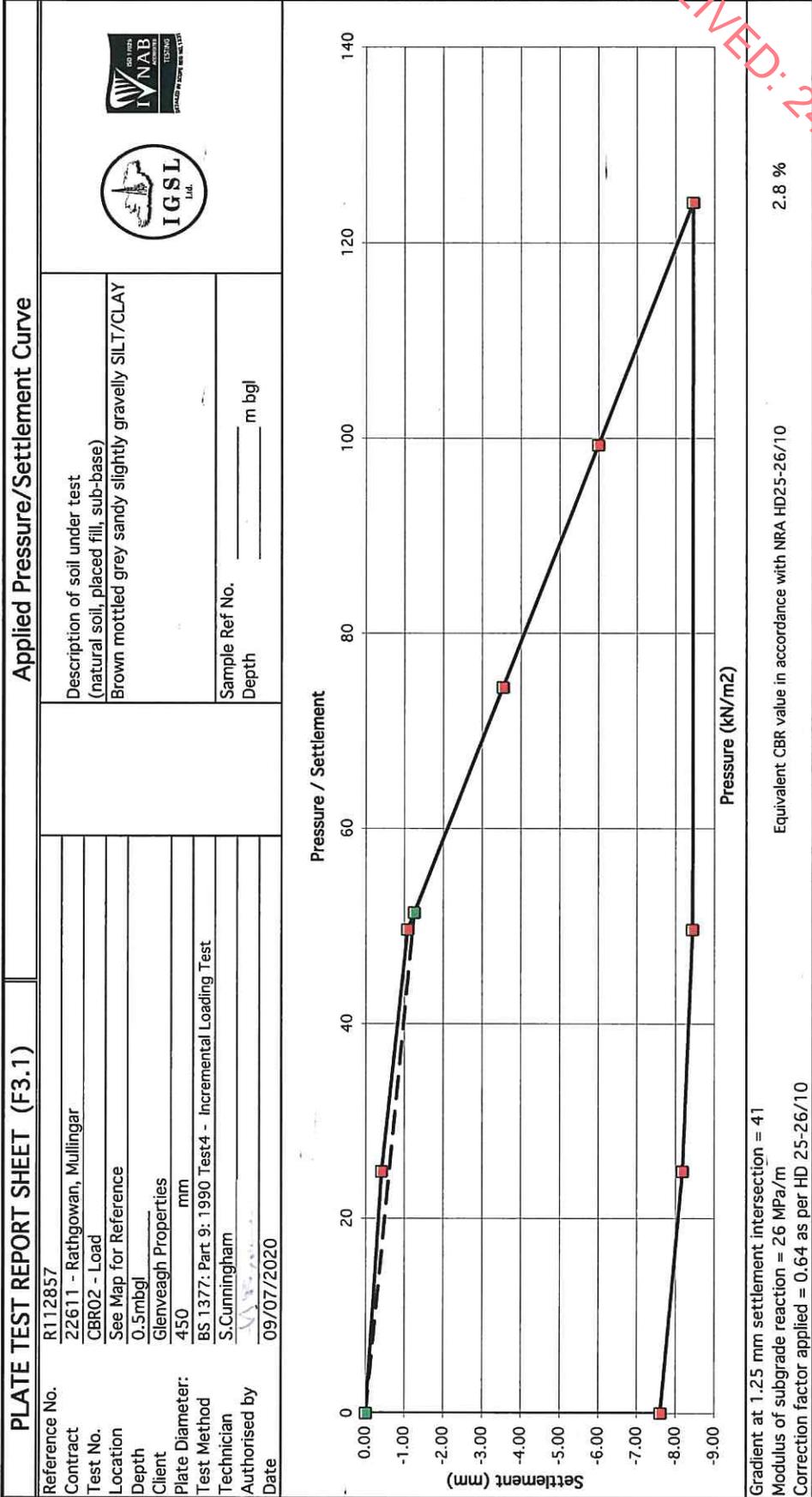
2.7 %

Gradient at 1.25 mm settlement intersection = 40
 Modulus of subgrade reaction = 2.6 MPa/m
 Correction factor applied = 0.64 as per HD 25-26/10

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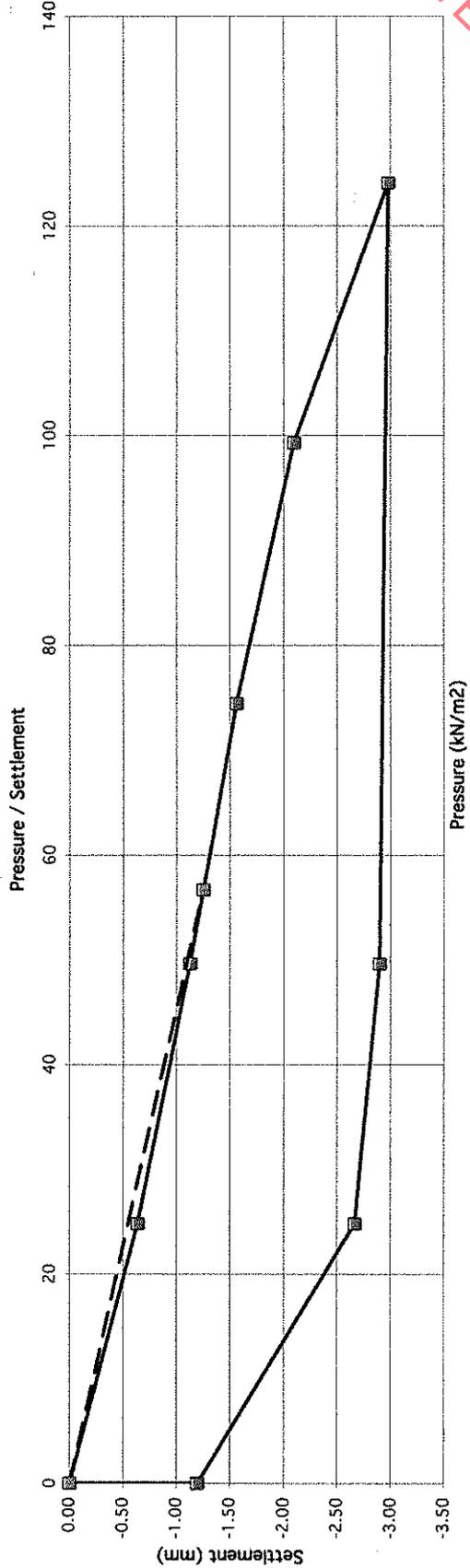


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PLATE TEST REPORT SHEET (F3.1)		Applied Pressure/Settlement Curve	
Reference No.	R112857	Description of soil under test (natural soil, placed fill, sub-base)	Sample Ref No.
Contract	22611 - Rathgowan, Mullingar		
Test No.	CBR02 - Reload	Brown mottled grey sandy slightly gravelly SILT/CLAY	Depth
Location	See Map for Reference		
Depth	0.5mbgl		
Client	Glenveagh Properties		
Plate Diameter:	450 mm		
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test		
Technician	S.Cunningham		
Authorised by			
Date	09/07/2020		



Gradient at 1.25 mm settlement intersection = 45
 Modulus of subgrade reaction = 29 MPa/m
 Correction factor applied = 0.64 as per HD 2.5-26/10
 Equivalent CBR value in accordance with NRA HD25-26/10
 3.3 %

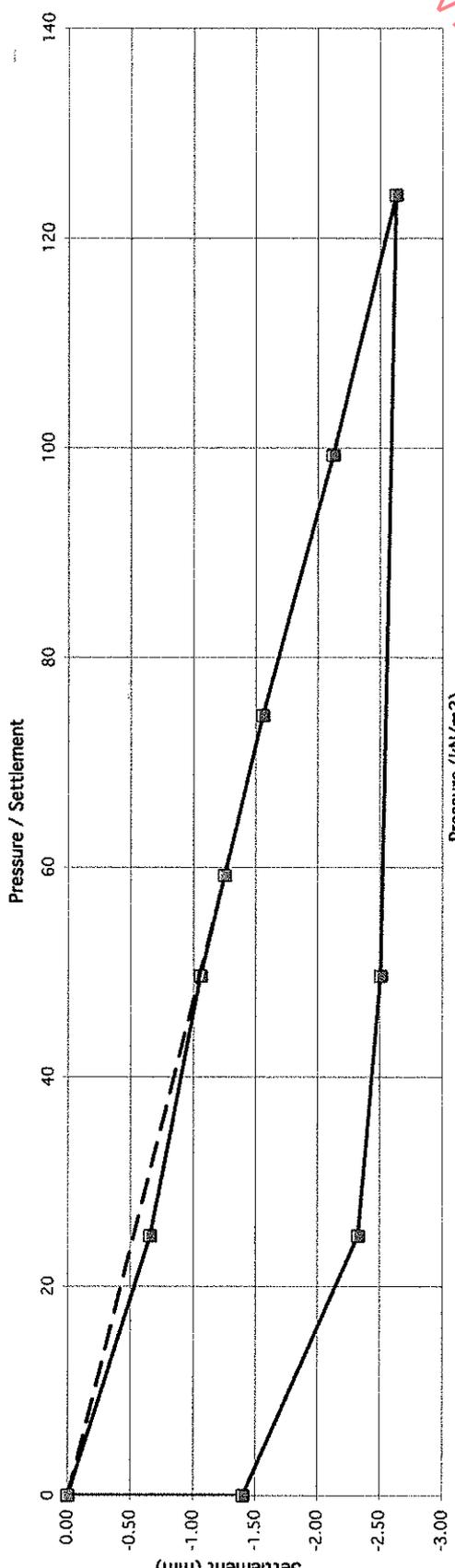
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PLATE TEST REPORT SHEET (F3.1)		Applied Pressure/Settlement Curve	
Reference No.	R1122858	Description of soil under test (natural soil, placed fill, sub-base) Brown slightly sandy slightly gravelly SILT/CLAY	Sample Ref No. _____ Depth _____ m bgl
Contract	Z2611 - Rathgowan, Mullingar		
Test No.	CBR03 - Load		
Location	See Map for Reference		
Depth	0.5mbgl		
Client	Glensveagh Properties		
Plate Diameter:	450 mm		
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test		
Technician	S.Cunningham		
Authorised by			
Date	09/07/2020		




Equivalent CBR value in accordance with NRA HD25-26/10

3.6 %



Pressure (kN/m ²)	Settlement (mm)
0.00	0.00
25.00	-0.50
50.00	-1.00
75.00	-1.50
100.00	-2.00
125.00	-2.50
140.00	-3.00

Gradient at 1.25 mm settlement intersection = 47

Modulus of subgrade reaction = 30 MPa/m

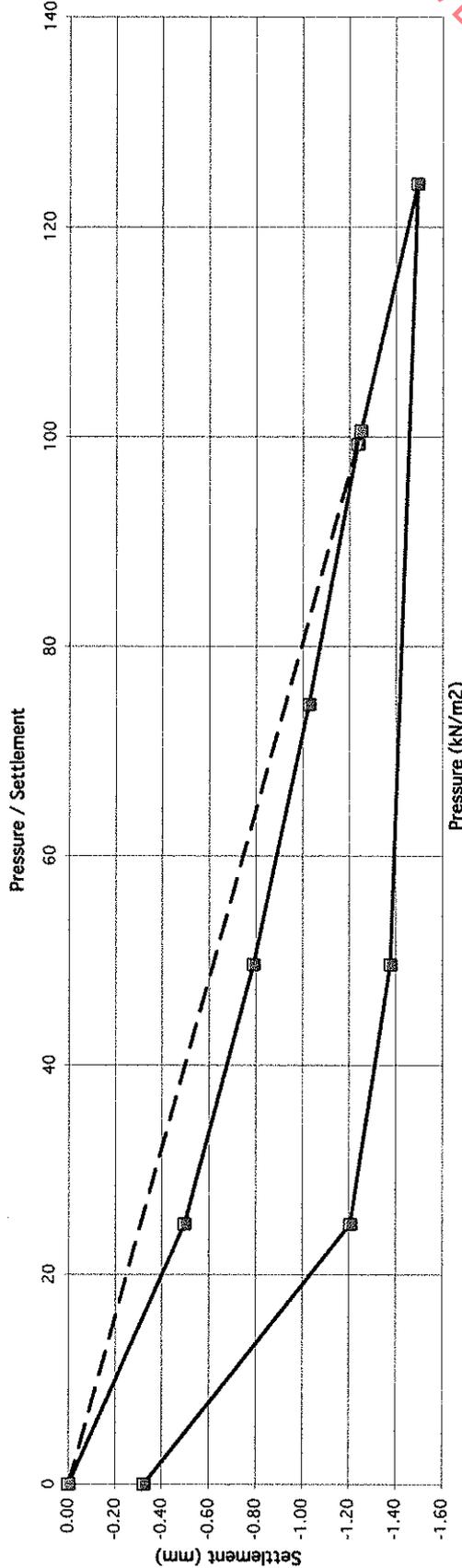
Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10

3.6 %

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PLATE TEST REPORT SHEET (F3.1)		Applied Pressure/Settlement Curve	
Reference No.	R1122858	Description of soil under test (natural soil, placed fill, sub-base)	Sample Ref No.
Contract	22611 - Rathgowan, Mullingar		
Test No.	CBR03 - Reload	Brown slightly sandy slightly gravelly SILT/CLAY	Depth _____ m bgl
Location	See Map for Reference		
Depth	0.5mbgl		
Client	Glenveagh Properties		
Plate Diameter:	450 mm		
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test		
Technician	S.Cunningham		
Authorised by			
Date	09/07/2020		



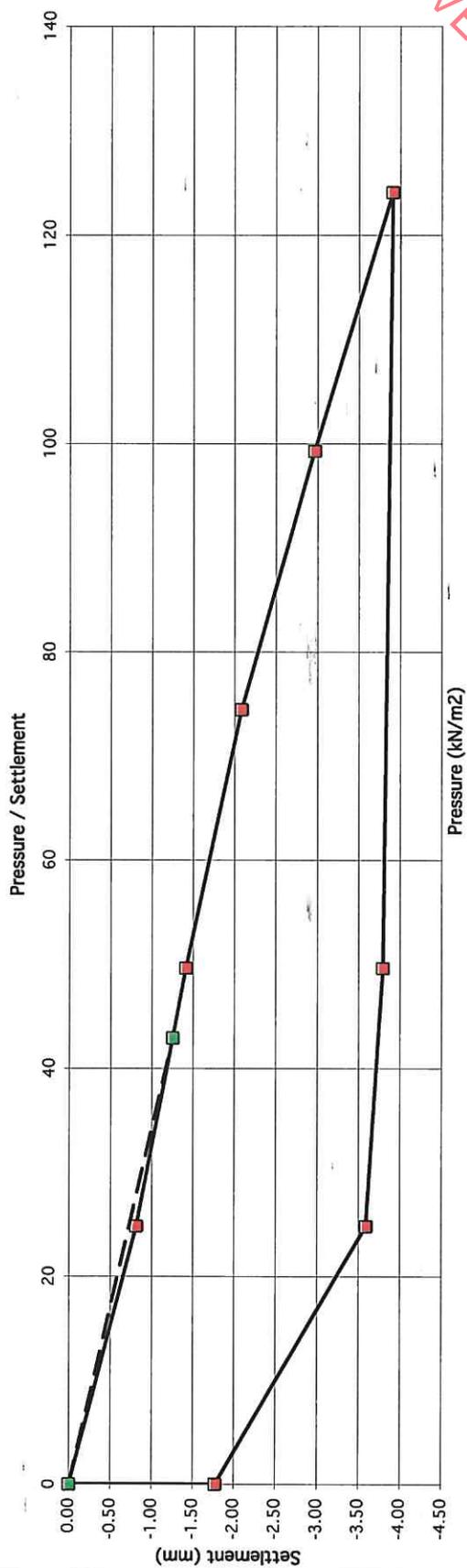
Gradient at 1.25 mm settlement intersection = 80
 Modulus of subgrade reaction = 52 MPa/m
 Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10

9.0 %

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PLATE TEST REPORT SHEET (F3.1)		Applied Pressure/Settlement Curve	
Reference No.	R112859	Description of soil under test (natural soil, placed fill, sub-base)	Sample Ref No.
Contract	22611 - Rathgowan, Mullingar		
Test No.	CBR04 - Load	Brown slightly sandy slightly gravelly SILT/CLAY	Depth _____ m bgl
Location	See Map for Reference		
Depth	0.5mbgl		
Client	Glenveagh Properties		
Plate Diameter:	450 mm		
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test		
Technician	S.Cunningham		
Authorised by			
Date	09/07/2020		



Gradient at 1.25 mm settlement intersection = 34
 Modulus of subgrade reaction = 22 MPa/m
 Correction factor applied = 0.64 as per HD 25-26/10
 Equivalent CBR value in accordance with NRA HD25-26/10
 2.1 %

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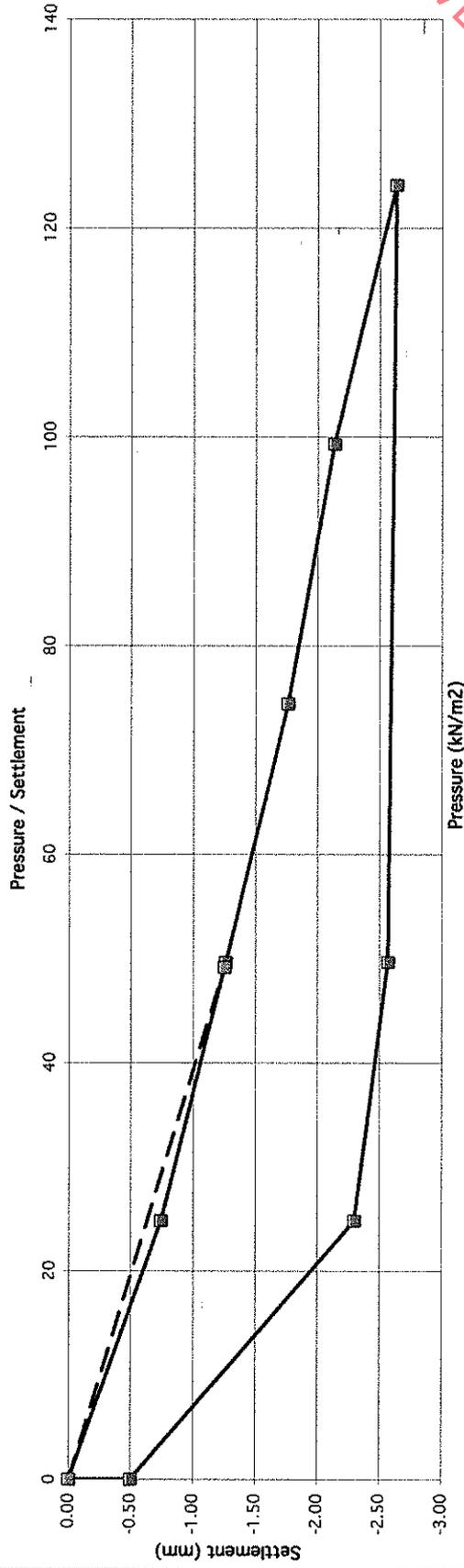
PLATE TEST REPORT SHEET (F3.1)

Applied Pressure/Settlement Curve

Reference No. R112859
 Contract 22611 - Rathgowan, Mullingar
 Test No. CBR04 - Reload
 Location See Map for Reference
 Depth 0.5mbgl
 Client Glenveagh Properties
 Plate Diameter: 450 mm
 Test Method BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
 Technician S.Cunningham
 Authorised by
 Date 09/07/2020

Description of soil under test
 (natural soil, placed fill, sub-base)
 Brown slightly sandy slightly gravelly SILT/CLAY

Sample Ref No. _____ m bgl
 Depth _____



Gradient at 1.25 mm settlement intersection = 39
 Modulus of subgrade reaction = 25 MPa/m
 Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 2.6 %

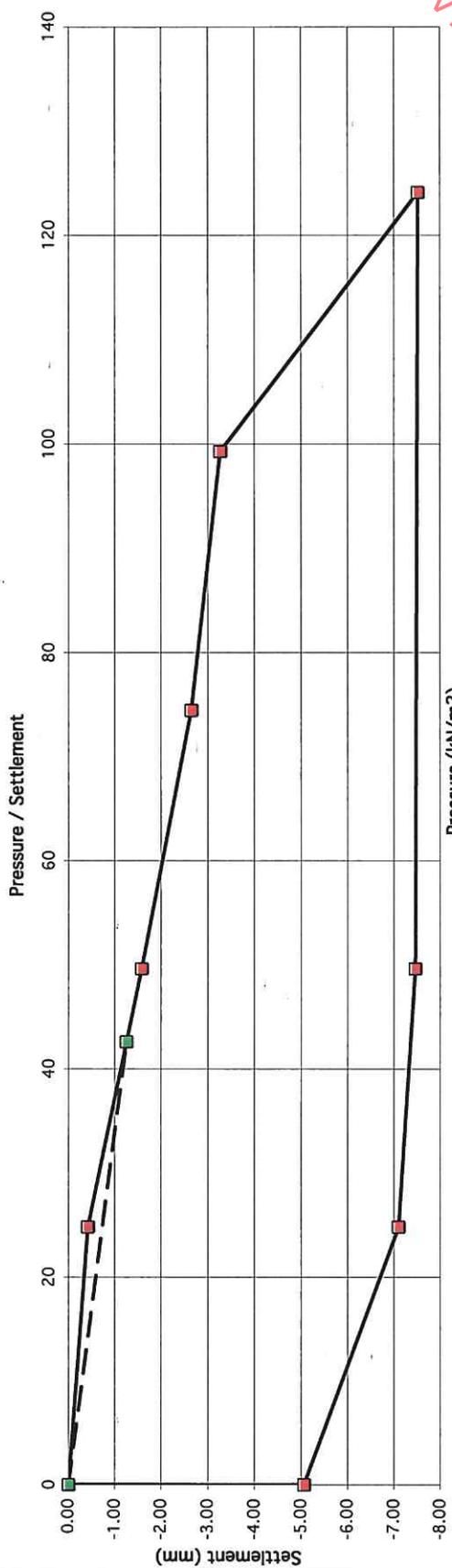
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PLATE TEST REPORT SHEET (F3.1)		Applied Pressure/Settlement Curve	
Reference No.	R112860	Description of soil under test (natural soil, placed fill, sub-base)	Sample Ref No. _____ m bgl
Contract	22611 - Rathgowan, Mullingar		
Test No.	CBR05 - Load	Brown slightly sandy slightly gravelly SILT/CLAY	Depth _____ m bgl
Location	See Map for Reference		
Depth	0.5mbgl		
Client	Glenveagh Properties		
Plate Diameter:	450 mm		
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test		
Technician	S.Cunningham		
Authorised by			
Date	09/07/2020		




Equivalent CBR value in accordance with NRA HD25-26/10

2.0 %



Pressure (kN/m ²)	Settlement (mm)
0.00	0.00
25.00	-1.00
43.00	-1.50
50.00	-2.00
75.00	-3.00
100.00	-4.50
125.00	-7.00
125.00	-7.50
50.00	-7.00
25.00	-7.00
0.00	-5.00

Gradient at 1.25 mm settlement intersection = 34

Modulus of subgrade reaction = 22 MPa/m

Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10

2.0 %

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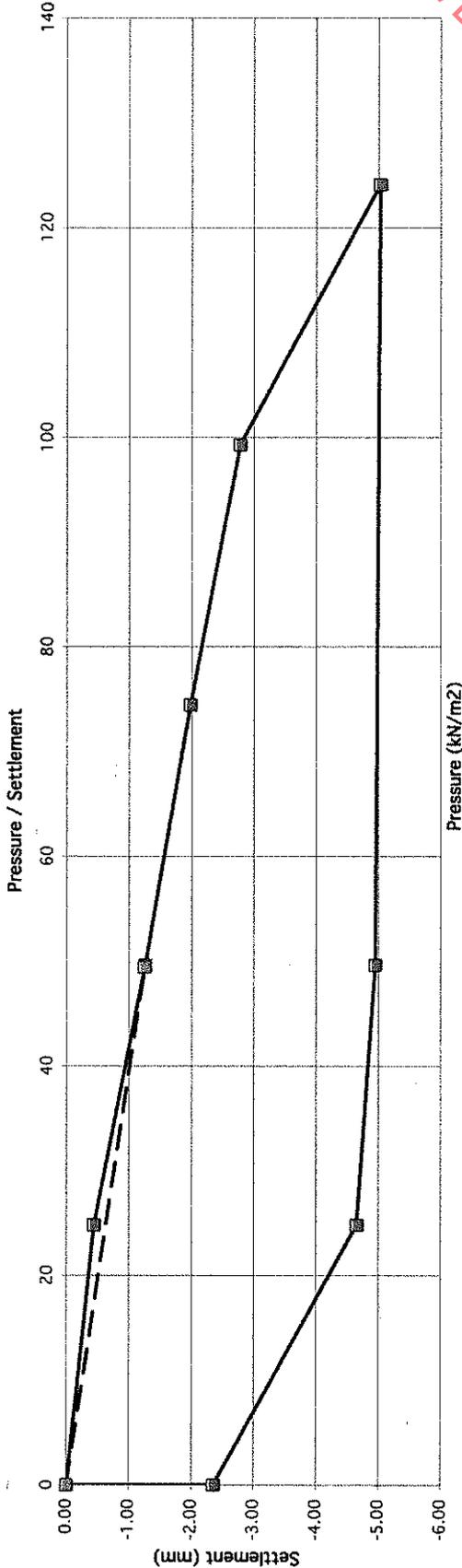
PLATE TEST REPORT SHEET (F3.1)

Reference No. R112860
 Contract 22611 - Rathgowan, Mullingar
 Test No. CBR05 - Reload
 Location See Map for Reference
 Depth 0.5mbgl
 Client Glenveagh Properties
 Plate Diameter: 450 mm
 Test Method BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
 Technician S.Cunningham
 Authorised by
 Date 09/07/2020

Applied Pressure/Settlement Curve

Description of soil under test
 (natural soil, placed fill, sub-base)
 Brown slightly sandy slightly gravelly SILT/CLAY

Sample Ref No. _____ m bgl
 Depth _____ m bgl



Gradient at 1.25 mm settlement intersection = 40
 Modulus of subgrade reaction = 25 MPa/m
 Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10

2.6 %

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PLATE TEST REPORT SHEET (F3.1)		Applied Pressure/Settlement Curve	
Reference No.	R112861	Description of soil under test (natural soil, placed fill, sub-base)	Sample Ref No.
Contract	22611 - Rathgowan, Mullingar		
Test No.	CBR06 - Load	Brown slightly sandy slightly gravelly SILT/CLAY	Depth _____ m bgl
Location	See Map for Reference		
Depth	0.5mbgl		
Client	Glenveagh Properties		
Plate Diameter:	450 mm		
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test		
Technician	S.Cunningham		
Authorised by			
Date	09/07/2020		




Equivalent CBR value in accordance with NRA HD25-26/10 **4.8 %**

Pressure (kN/m ²)	Settlement (mm)
0	0.00
25	-0.50
50	-1.00
75	-1.50
100	-2.00
125	-2.50

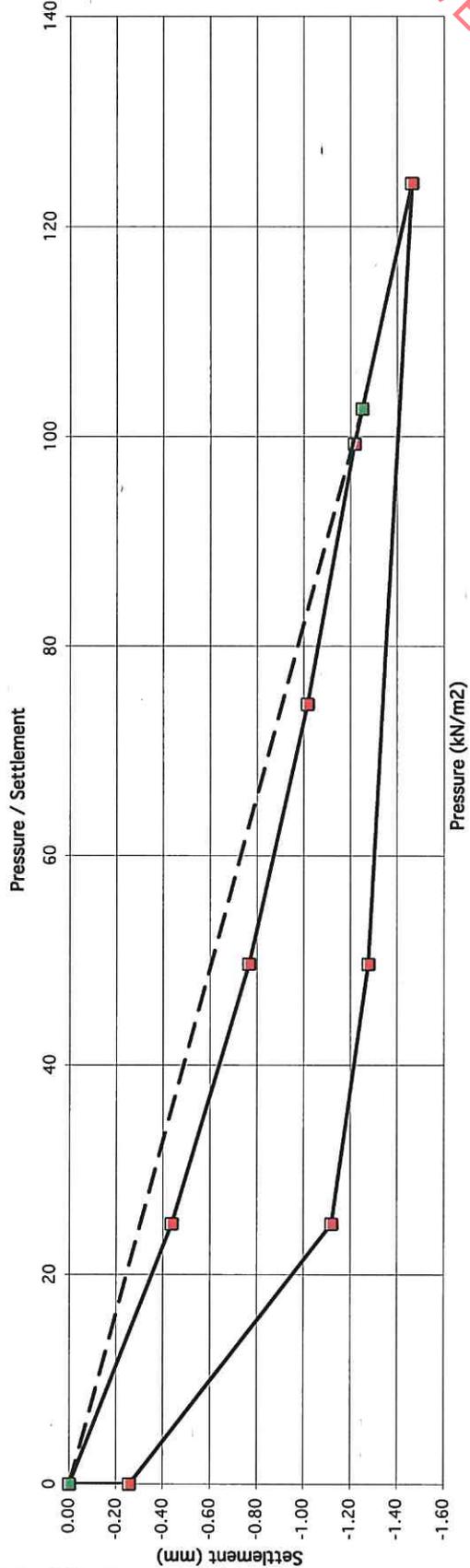
Gradient at 1.25 mm settlement intersection = 56
 Modulus of subgrade reaction = 36 MPa/m
 Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 **4.8 %**

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PLATE TEST REPORT SHEET (F3.1)		Applied Pressure/Settlement Curve	
Reference No.	R112861	Description of soil under test (natural soil, placed fill, sub-base)	Sample Ref No. _____ m bgl
Contract	22611 - Rathgowan, Mullingar		
Test No.	CBR06 - Reload	Brown slightly sandy slightly gravelly SILT/CLAY	Depth _____ m bgl
Location	See Map for Reference		
Depth	0.5m bgl		
Client	Glenveagh Properties		
Plate Diameter:	450 mm		
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test		
Technician	S.Cunningham		
Authorised by			
Date	09/07/2020		



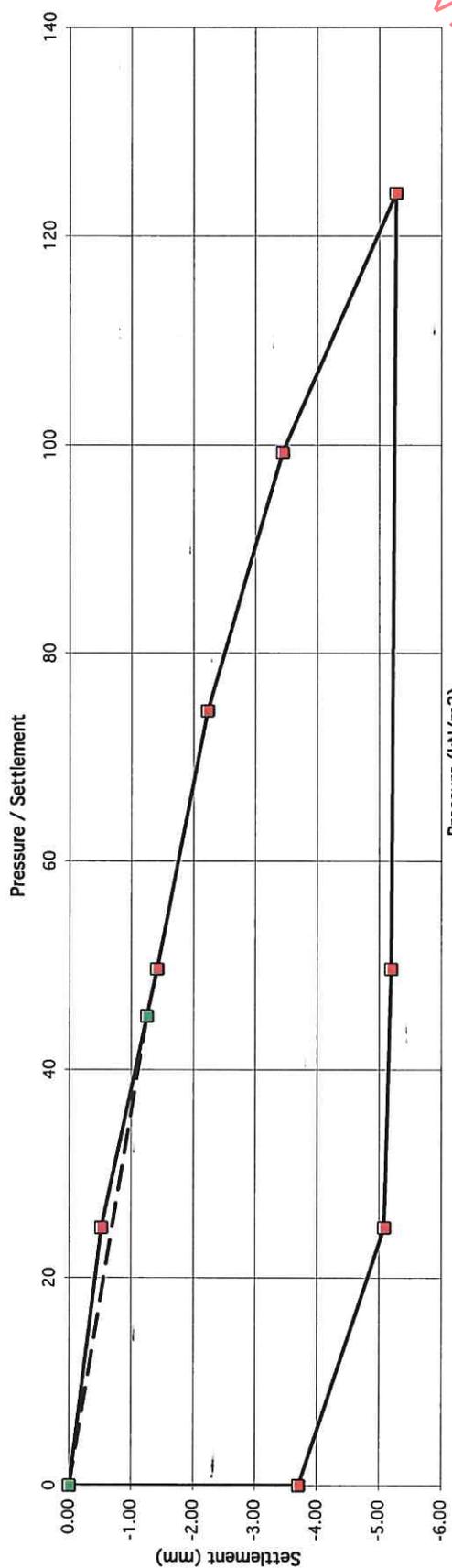
Gradient at 1.25 mm settlement intersection = 82
 Modulus of subgrade reaction = 53 MPa/m
 Correction factor applied = 0.64 as per HD 25-26/10
 Equivalent CBR value in accordance with NRA HD25-26/10
 9.3 %

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PLATE TEST REPORT SHEET (F3.1)		Applied Pressure/Settlement Curve	
Reference No.	R112862	Description of soil under test (natural soil, placed fill, sub-base)	Sample Ref No.
Contract	22611 - Rathgowan, Mullingar		
Test No.	CBR07 - Load	Brown slightly sandy slightly gravelly SILT/CLAY	Depth _____ m bgl
Location	See Map for Reference		
Depth	0.5mbgl		
Client	Glenveagh Properties		
Plate Diameter:	450 mm		
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test		
Technician	S.Cunningham		
Authorised by			
Date	09/07/2020		




Equivalent CBR value in accordance with NRA HD25-26/10 **2.2 %**



Pressure (kN/m ²)	Settlement (mm)
0.00	0.00
25.00	-0.80
45.00	-1.20
50.00	-1.50
75.00	-2.20
100.00	-3.50
125.00	-5.00

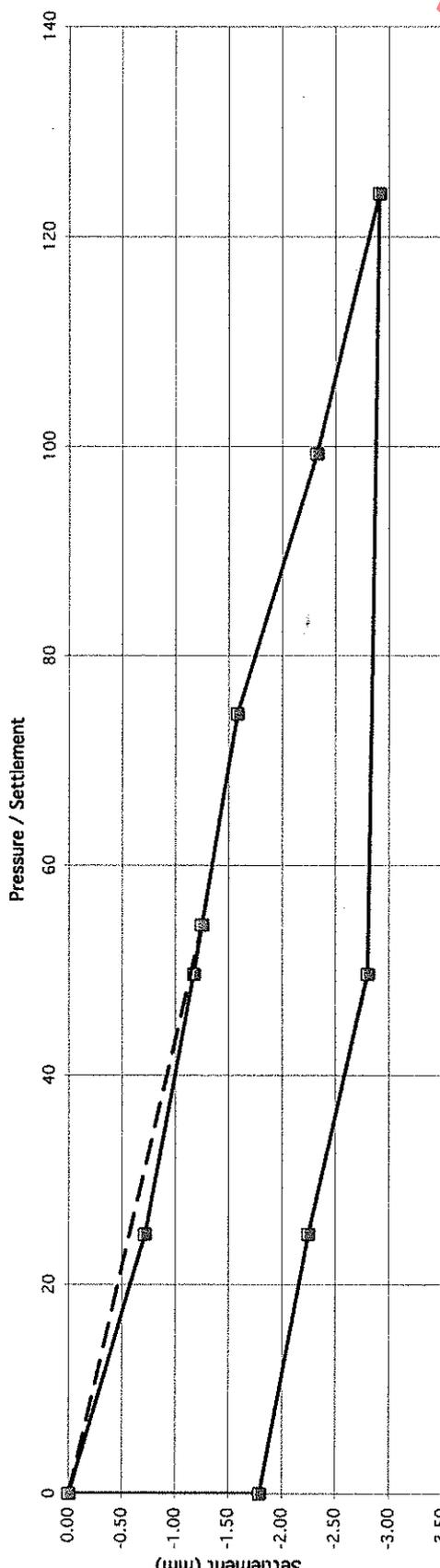
Gradient at 1.25 mm settlement intersection = 36
 Modulus of subgrade reaction = 23 MPa/m
 Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 **2.2 %**

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PLATE TEST REPORT SHEET (F3.1)		Applied Pressure/Settlement Curve	
Reference No.	R112862		
Contract	22611 - Rathgowan, Mullingar	Description of soil under test (natural soil, placed fill, sub-base) Brown slightly sandy slightly gravelly SILT/CLAY	
Test No.	CBR07 - Reload		
Location	See Map for Reference	Sample Ref No. _____ m bgl Depth _____	
Depth	0.5mbgl		
Client	Glenveagh Properties	 	
Plate Diameter:	450 mm		
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test		
Technician	S.Cunningham		
Authorised by			
Date	09/07/2020		

Pressure / Settlement



Pressure (kN/m ²)	Settlement (mm)
0	0.00
20	-0.50
40	-1.00
60	-1.25
80	-1.50
100	-2.00
125	-3.10

Settlement (mm)

Equivalent CBR value in accordance with NRA HD25-26/10

3.1 %

Gradient at 1.25 mm settlement intersection = 43

Modulus of subgrade reaction = 28 MPa/m

Correction factor applied = 0.64 as per HD 25-26/10

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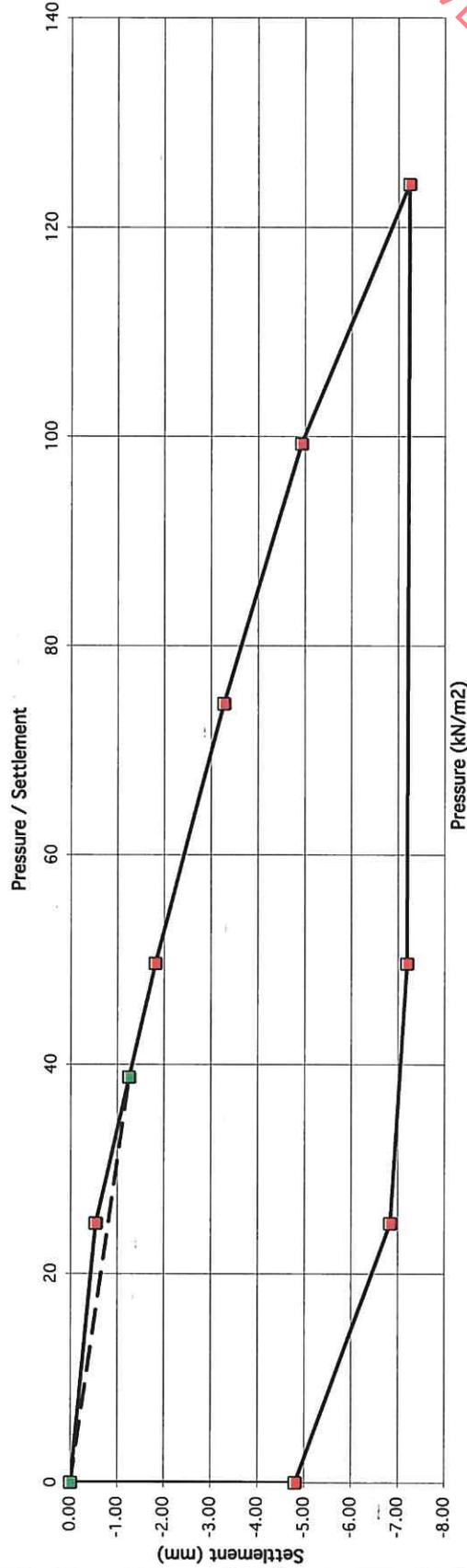
PLATE TEST REPORT SHEET (F3.1)

Applied Pressure/Settlement Curve

Reference No. R112863
 Contract 22611 - Rathgowan, Mullingar
 Test No. CBR08 - Load
 Location See Map for Reference
 Depth 0.5mbgl
 Client Glenveagh Properties
 Plate Diameter: 450 mm
 Test Method BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
 Technician S.Cunningham
 Authorised by
 Date 09/07/2020

Description of soil under test
 (natural soil, placed fill, sub-base)
 Brown slightly sandy slightly gravelly CLAY

Sample Ref No. _____ m bgl
 Depth _____ m bgl



Gradient at 1.25 mm settlement intersection = 31
 Modulus of subgrade reaction = 20 MPa/m
 Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10

1.7 %

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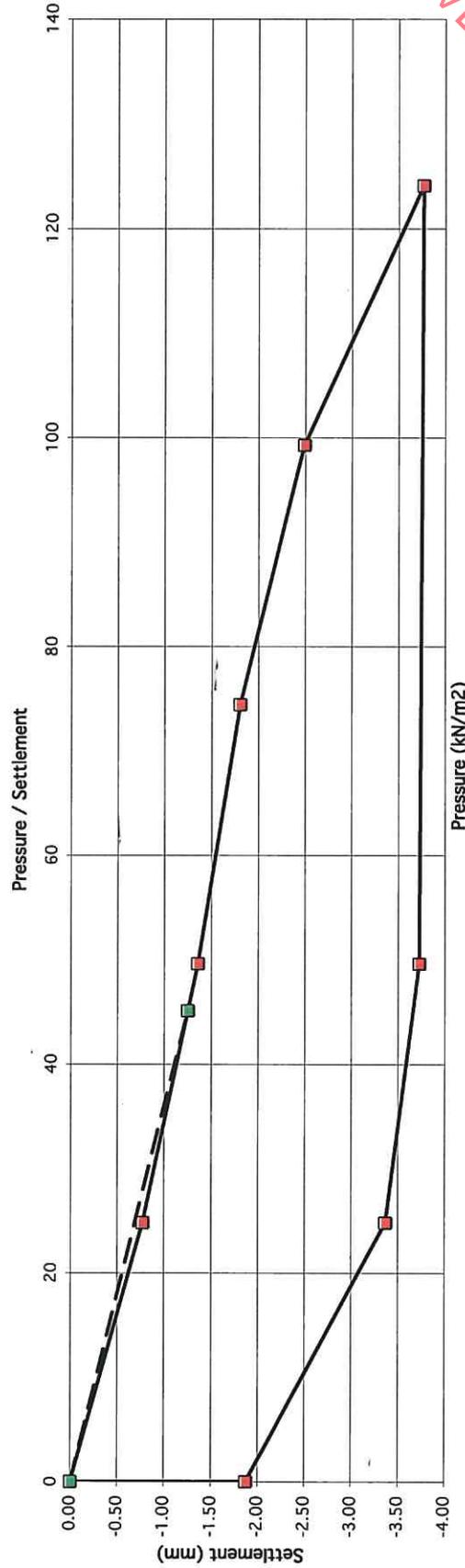
PLATE TEST REPORT SHEET (F3.1)

Applied Pressure/Settlement Curve

Reference No. R112863
 Contract 22611 - Rathgowan, Mullingar
 Test No. CBR08 - Reload
 Location See Map for Reference
 Depth 0.5mbgl
 Client Glenveagh Properties
 Plate Diameter: 450 mm
 Test Method BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
 Technician S.Cunningham
 Authorised by
 Date 09/07/2020

Description of soil under test
 (natural soil, placed fill, sub-base)
 Brown slightly sandy slightly gravelly CLAY

Sample Ref No. _____ m bgl
 Depth _____



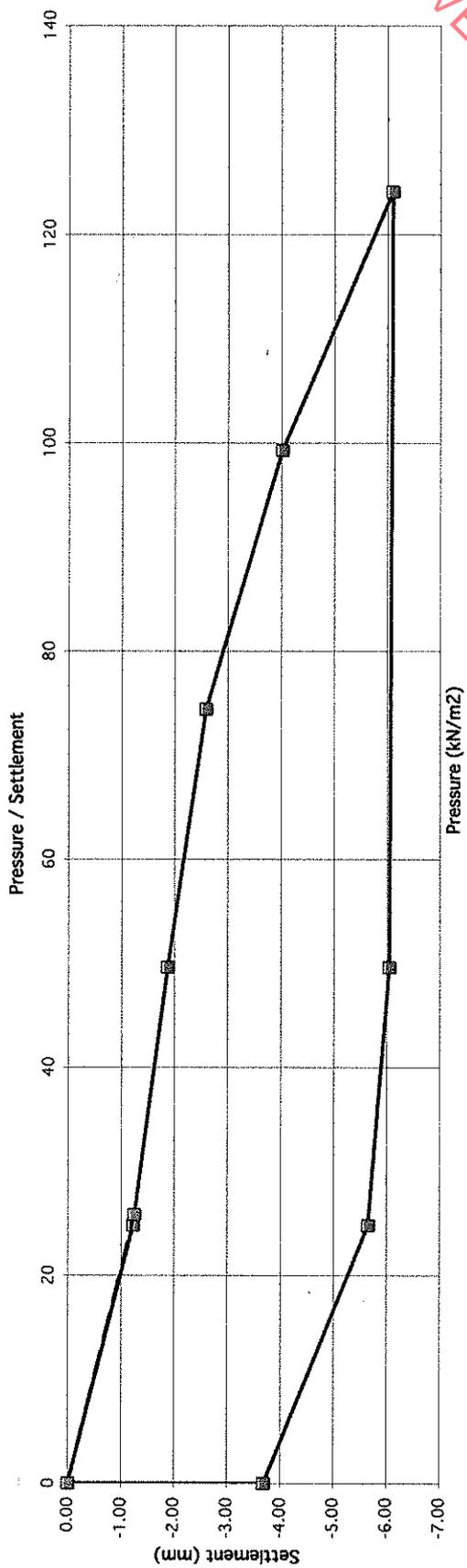
Gradient at 1.25 mm settlement intersection = 36
 Modulus of subgrade reaction = 23 MPa/m
 Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10

2.2 %

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PLATE TEST REPORT SHEET (F3.1)		Applied Pressure/Settlement Curve	
Reference No.	R112864	Description of soil under test (natural soil, placed fill, sub-base)	Sample Ref No.
Contract	22611 - Rathgowan, Mullingar		
Test No.	CBR09 - Load	Brown slightly sandy slightly gravelly CLAY	Depth _____ m bgl
Location	See Map for Reference		
Depth	0.5mbgl		
Client	Glenveagh Properties		
Plate Diameter:	450 mm		
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test		
Technician	S.Cunningham		
Authorised by			
Date	09/07/2020		



Gradient at 1.25 mm settlement intersection = 21
 Modulus of subgrade reaction = 13 MPa/m
 Correction factor applied = 0.64 as per HD 25-26/10
 Equivalent CBR value in accordance with NRA HD25-26/10 0.9 %

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PLATE TEST REPORT SHEET (F3.1)		Applied Pressure/Settlement Curve	
Reference No.	R112864		
Contract	22611 - Rathgowan, Mullingar	Description of soil under test (natural soil, placed fill, sub-base) Brown slightly sandy slightly gravelly CLAY	
Test No.	CBR09 - Rebad		
Location	See Map for Reference	Sample Ref No. _____ m bgl Depth _____ m bgl	
Depth	0.5mbgl		
Client	Glenveagh Properties	IGSL Ltd.	
Plate Diameter:	450 mm		
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test	100 YEARS IYNAB 1912-2012 ESTABLISHED BY ROYAL WARRANT	
Technician	S. Cunningham		
Authorised by			
Date	09/07/2020		

Pressure (kN/m ²)	Settlement (mm)
0.00	0.00
10.00	-8.00
25.00	-2.50
50.00	-1.50
75.00	-3.50
100.00	-6.50
125.00	-10.50

Gradient at 1.25 mm settlement intersection = 26
 Modulus of subgrade reaction = 17 MPa/m
 Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10

1.3 %

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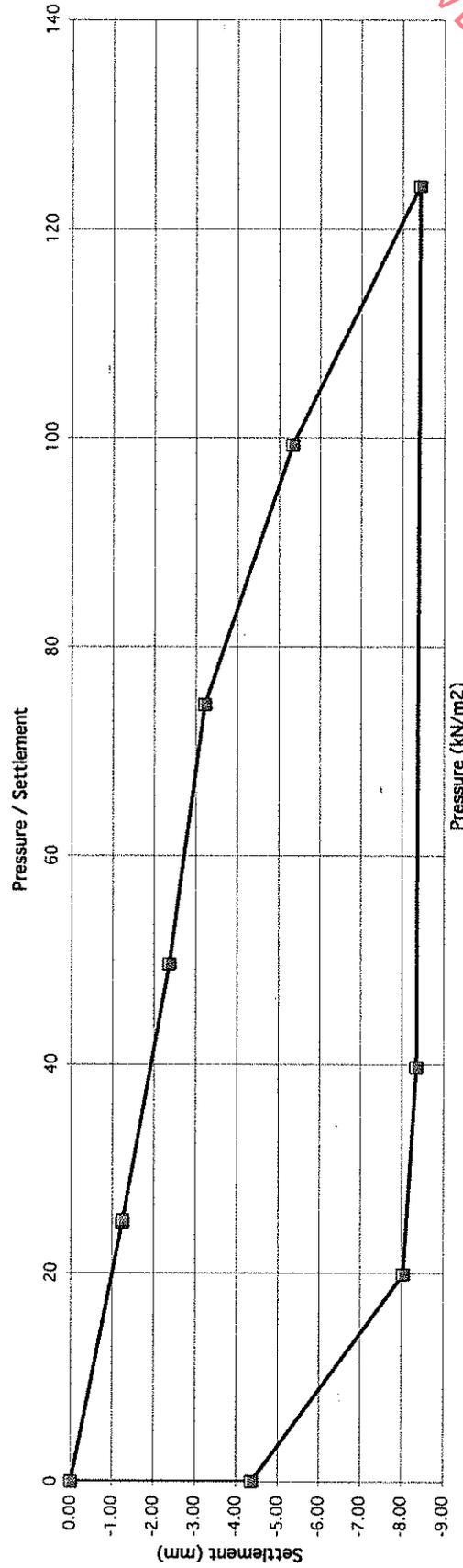
PLATE TEST REPORT SHEET (F3.1)

Reference No. R112865
 Contract 22611 - Rathgowan, Mullingar
 Test No. CBR10 - Load
 Location See Map for Reference
 Depth 0.5mbgl
 Client Glenveagh Properties
 Plate Diameter: 450 mm
 Test Method BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
 Technician S.Cunningham
 Authorised by
 Date 09/07/2020

Applied Pressure/Settlement Curve

Description of soil under test
 (natural soil, placed fill, sub-base)
 Brown sandy slightly gravelly CLAY

Sample Ref No. _____ m bgl
 Depth _____ m bgl



Gradient at 1.25 mm settlement intersection = 20
 Modulus of subgrade reaction = 13 MPa/m
 Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 0.8 %

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