Proposed Large Scale Residential Development at Rathgowan, Mullingar, PECEIJED. 24081223 Co. Westmeath Applicant: Marina Quarter Ltd.

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

# Volume III Appendices



August 2023

## Appendix 5.1

Site Investigation Report







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 R. CH 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 hittils 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).

#### **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.

PECEINE

#### 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.

# PECEINED: Nauos 2023 **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

#### 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.
٠	Trial Pits	14 nr.
٠	CBR by Plate Test	11 nr.
٠	Infiltration Test to BRE Digest 365	8 nr
•	Slit Trench	1 nr.
•	Heavy Duty Dynamic Probes	40 nr.
٠	Archaeological attendance	
٠	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 sur-Westmeath. The development area is divided by the R394 and is north of Ashe Road. An existing bousing development is located to the east and north east of the site.

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 cabletool 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.

Borehole refusal was recorded at varying depths in the abortive chiselling. Refusals may be indicative of boulder obstruction of 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.

Ref.	Firm Clay.	Stiff CLAY	Sand / Gravel	Ground Water
BH01		2.00 - 6.70		Dry
BH02	0.50 - 1.10	1.20 - 4.10	4.10 - 4.90	4.50
BH03 BH03A	(Fill) 0.20 – 1.90	1.20 - 2.60 1.90 - 6.20		2.60 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.

24/08/2023 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.

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 GR	AVEL FROM	0.50 - 2.70)	Dry
TP14	0 - 0.50	0.50 - 0.70	0.70 - 2.60	2.60	Dry
					-

Trial Pit data is summarised as follows:

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.

PECEN, 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 -24/08/10/3 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

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
	Ave	erage 2.3	3.7

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

### 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:

SA02 SA03 SA04	Depth	Stratum	Infiltration Rat	e (f) m/m/m
			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 drophammer 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  $h_{100} = 4$  is indicative an allowable bearing pressure of 125 KPa. This should be adequate for traditional two-storey house foundations.

traditional	two-storey house foundatio	ns.	KIL .
Ref.No.	<b>Depth</b> to $N_{100} = 4$	Refusal Depth	
DP01	0.80	1.30	
DP02	0.50	3.20	0
DP03	1.40	2.70	$\sim$
DP04	0.50	2.20	ారు
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	
	0.70	2.50	

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 boring records, representing the blow count required to the soil following initial seating blows. Where the solution 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/CL	AY		
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
٠	Sulphate / Chloride and pH	CHEMTEST
•	RILTA Suite Environmental	CHEMTEST

#### Liquid and Plastic Limits

Several samples of the cohesive some same variants and Plastic Limits established. The results indicate some variants from SILT matrix to CLAY matrix. The results plot in the CL/CI and ML/MI zones on the standard soil classification chart. The pattern of classification is very typical of the boulder clay deposition.

P.C.

#### 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:**

PECEIL 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.

210001013 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 1 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 gravely 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.

24/08/2023 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.

#### Excavation

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

2<sup>100</sup>001013 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

															REPORT NUMBER	
]	dit.				GE	OTECH	INICA	IL BOH	RING	RECO	JRD		•		22611	
col	NTRAC	T R	athgo	wan,N	Aullingar , C	o.Westme	ath						BOREH		). BH01 Sheet 1 of 1	
	CO-ORDINATES 642,443.06 E RIG TYPE 753,762.36 N BOREHOI GROUND LEVEL (m AOD) 101.14 BOREHOI									mm)	DANDO 2 200	2000	DATE C	OMMEN	NCED 01/07/2020	
CLI	ENT	G	lenve	agh P	roperties		SPT HA	ole dep Mmer re	F. NO.		6.70		BORED	BY	W.CAHILL	
	SINEER	T	obins	C.E			ENERG	Y RATIO (	%) 	1		Sa	PROCES mples	SSED B	Y · F.C	<b></b>
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Dept								Legend	Flevation	Depth (m)	Ref. Number	Sample Type	(m)	Recovery	Results	Standpipe Details
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					CLAY with		-		100.44	0.70						
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									-						(3, 4, 4, 5, 4, 5)	
Ē																
2								×			AA130925	в	2.00		N ≖ 14 (3, 3, 3, 3, 4, 4)	
Ē																
								$\overline{Q}$						ſ	N = 20	
- 3								Å-			AA130926	В	3.00		(4, 4, 5, 4, 5, 6)	
									97.34	3.80						
<u> </u>	Stiff to with se	very some co	tiff da bbles	rk bro and o	wn sandy g ccasional b	ravelly silty oulders	CLAY				AA130927	8	4.00		N = 29 (3, 4, 6, 6, 9, 8)	
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5											AA130928	в	5.00		N ≕ 16 (2, 3, 3, 4, 4, 5)	
-6											AA 130929	в	6.00		N = 29	
								2 A							(2, 4, 6, 6, 8, 9)	
	Obstru								94.44	6.70					N = 50/75 mm (18, 27, 50)	
	End of	Boreh	ole at	6.70 ו	m											
- 8																
Ē												1				
- 9									-							
	PD CT			GICUI	SELLING			<u> </u>		<u> </u>			1			
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6.	4	6.7		2											NU WALES SUIKE	
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	[ALLA]	ION DE	ETAIL	í.				Dai	e	Hole Depth	Casing Depth	De	pth to (	Comme	·	011200
	Date	Tip De	pth F	RZ Top	RZ Base	Тур	e	_		Jepui		- V.	- 4101			
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REM	IARKS	inspec	etting ction p	up Co pit carr	vid 19 Safe ied out .	Working A	vrea.Han	d dug		8 - Bulk	Die Legen Disturbed (tub) Disturbed			UT - U Samo	Undisturbed 100mm Diameter Ne	
<u>}</u>										ELB - Lard	je Bulk Disturbed vironmental San	d Nole (Jar	+ Vial + Tub)	P - Ur W - W	ile ndisturbed Piston Sample Vater Sample	

	2000 - 2000 2000 - 2000 - 2000								•••••••					REPORT NUMBER	
ر ار	551	<b>a</b> l-		GE	OTECHN	ICA	L BOF	ring i	RECO	RD		~		22611	
со	NTRAC	TR	athgowa	n,Mullingar , C	o.Westmeath							волено	LE NO.		
CO-ORDINATES         642,464.84 E         RIG TYPE           753,698.76 N         BOREHOL           GROUND LEVEL (m AOD)         99.56         BOREHOL						DLE DIAM		זm) מו	DANDO 2 200 4.90	2000	SHEET DATE CO DATE CO				
	ENT GINEEF		lenveagh obins C.E	Properties			MMER RE RATIO (9					BORED B		W.CAHILL	
Ê									Ê		T	mples	. <u>.</u>	- R	Ð
Depth (m)			[	Description			Legend	Elevation	Depth (m)	Ref. Number	Sample Type	(m)	Recovery	Field Test Results	Standpipe Details
- 0	TOPS Soft		wn sand	y SILT/CLAY v	with occasiona			99.36	0.20						50
	grave			y 0121702717	nin occasiona	`									
-								98.46	1.10	AA130919	8	1.00		N.≂9	
	Stiff b	rown sa es	andy grav	elly CLAY with	occasional					1		1.00		(2, 2, 2, 3, 2, 2)	
2							Ō_			AA130920	в	2.00		N = 13	
							s D.							(2, 3, 3, 3, 4, 3)	
3										AA130921	8	3.00		N = 15 (3, 3, 3, 3, 5, 4)	
							<u> </u>							(0, 0, 0, 0, 0, 0, 1)	
Ì						ł	0-								
4	Dense	e arev fi	ne to coa	urse silty sandy	GRAVEL with	F		95.46	4.10	AA130922	в	4.00		N = 38 (6, 9, 9, 9, 10, 10)	
	some	cobbles	5	,											
	0							94.66	4.90					N = 50/75 mm	
5	Obstru End o	f Boreh	ole at 4.9	m 0										(12, 21, 50)	
						ŀ									
6															
7															
1															
8															
-															
9															
								5							
HAI	RD ST	ATA B	ORING/C	HISELLING			I			l			WA	TER STRIKE DETA	AILS
rom	ı (m) 1	"o (m)	Time (h)	Comments			Wate Strike			ealed At	Ris To		e c	comments	
4.		4.5	0.5				4.50			No	3.2			Moderate	
4.	°	4.9	1.5												
Net		TION DE		1					Hole	Casing	De	oth to		DUNDWATER PROC	GRESS
	ate			op  RZ Base	Туре		Date		epth	Depth	<u>                                     </u>	pth to /ater Co	ommen	115	
REM	IARKS	1hr Se	tting up C	Covid 19 Safe	Working Area.	Hand	l dua		Samol	e Legend	1				***************
		inspec	tion pit ca	arried out .	÷		2		D - Small ( 8 - Bulk Di	Disturbed (tub)			Sample	ndisturbed 100mm Diameter s tisturbed Piston Sample	
									Env - Envir	onmental Sam	ple (Jar	+ Vial + Tub)	W Wa	aler Sample	

													REPORT NUMBER		
*	<u>े</u> इन्हे			GE	OTECHNIC	AL BOF	ring i	RECO	RD		~		22611		
СС	ONTRAC	r Rati	hgowan,M	ullingar , C	o.Westmeath						BOREN		D. BH03 Sheet 1 of 1		
	D-ORDIN ROUND L	ATES EVEL (m	753.6	12.87 E 72.59 N 102.44		'PE HOLE DIAN HOLE DEP1		nm) 2	DANDO 2 200 2.60	2000	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	OMMEN	ICED 01/07/2020		
-	IENT		nveagh Pr ins C.E	operties		AMMER RE BY RATIO ('					BORED PROCES		W.CAHILL Y <u>F</u> 3		
Ê								<u> </u>	ļ		nples		N.	Ð	
Depth (m)	1		Des	cription		Legend	Elevation	Depth (m)	Ref. Number	Sample Type	(m) Depth	Recovery	Field Test Results	Details	
	TOPS		ndy Sli T/	1 AY with	occasional gravel		102.29	0.15						53	
Ē	and ra	re red bri	ick fragme	nts (Possib	ly Made Ground)	. X									
						×			AA130130	8	1.00		N ≃ 10		
Ę	Stiff to	very stiff	dark brov	vn sandy gr	avelly silty CLAY		101.24	1.20	130130		1.00		(2, 3, 3, 2, 2, 3)		
Ē	with os	me cobb	les and o	ccasional b	oulders	- <del>C</del>									
- 2						₹Z			AA130131	в	2.00		N = 27		
1-1-1							99.84	2.00					(4, 6, 7, 8, 1, 11)		
-	Obstru						1 99.84	2.60	1						
-3	End of	Borehole	e at 2.60 n	n											
ŀ															
Ę															
4															
ł															
- 5															
F															
Ē															
-6															
Ē															
É,															
- 7															
Ę															
- 8											5				
Ę															
È															
- 9															
ŀ															
Ê											1				
Н	ARD STR	ATA BOI	RING/CHIS	ELLING			<u> </u>		II	l	1		ATER STRIKE DET	AILS	
Fro	m (m) T	o (m)	Time (h) C	omments		Wate Strik		sing S pth	ealed At	Ris To		ime	Comments		
28/1/20	2.5	2.6	1.5					F	<u>,, n</u>				No water strike		
601															
ICSL			<u> </u>					Hole	Casing		unth to		OUNDWATER PRO	GRESS	
	Date	ION DET. Tip Dept		RZ Base	Туре	Dat		Depth	Depth		pth to vater	Comme	nts		
226															
	MARKS	1hr Setti inspectio	ng up Cov on pit carri	id 19 Safe ed out .	Working Area.Ha	nd dug		D - Small [	e Legeno	d		UT - Undisturbed 100mm Diameter Sample			
ଞ						D - Small Disturbed (tub) 8 - Bulk Disturbed 18 - Large Bulk Disturbed EnvEnvironmental Sample (Jar + Via) + Tut					+ Vial + Tub)	Sample P - Undisturbed Piston Sample			

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, 4 <sup>-1</sup>	$2M^{2,2,2} = -1$
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### GEOTECHNICAL BORING RECORD

	951			G				NG I	VECO	κD		•		22611	
со	NTRA	CT R	tathgowa	n,Mullingar , (	Co.Westme	eath		·		******		BOREH			
		NATES	(m AOD)				PE OLE DIAME OLE DEPTH		nm) 2	DANDO 2 200 3.20	2000	SHEET DATE C DATE C	OMMEN	·	
	ENT GINEEI		lenveagh obins C.E	Properties			MMER REF. Y RATIO (%)					BORED		W.CAHILL	
Ê								-	Ê	L	r	iples	1 <	- 8	e
Depth (m)			(	Description			Legend	Elevation	Depth (m)	Ref. Number	Sample Type	(m) (m)	Recovery	Field Test Results	Standpipe
0	TOP		and Oll				<u> </u>		0.20	-					50
1	rum	brown s	andy SiL	T/CLAY with	occasionai	gravei			. 1.90	AA131709	В	1.00		N = 10 (2, 2, 3, 2, 2, 3)	
-2	Stiff ( cobb		tiff brown	gravelly CLA	Y with son	ne				AA131710 AA131711		2.00		N = 22 (2, 4, 4, 5, 4, 9) N = 50/225 m/n	
4	Very	stiff blac	ck sandy	gravelly CLA	Y with some	9			3.90	AA131712		4.00		(8, 10, 13, 16, 21) N = 42	
5	cobb	les								AA131713	B	5.00		(6, 6, 8, 9, 11, 14) N = 46 (10, 15, 14, 11, 10, 11)	
6		ruction	iole at 6.2	0 m					6.20	AA131714	В	6.00		N = 50/225 mm (12, 14, 16, 14, 20)	
-7 8															
HA	RD ST	RATA B	BORING/C	HISELLING			<u></u>			<u> </u>		1	W	ATER STRIKE DET	AILS
ron	1 (m)	To (m)	Time (h)	Comments			Water Strike		sing S pth	Sealed At	Rise To		me ( nin)	Comments	
	.2	3.5 6.2	1 2						-	-				No water strike	
<u>.</u>	<u> </u>			<u> </u>					Hole	Cooler	1 ~			OUNDWATER PRO	GRES
	TALLA	TION D		op  RZ Base	Tyr		Date		Depth	Casing Depth		oth to ater	Comme	ents	
			- <u>1</u> ( )4-		······································	<u></u>									
REN	ARKS	hr Se inspec	etting up ( ction pit c	Covid 19 Safe arried out .	• Working .	Area.Har	D - Small Disturbed (tub) UT - Undisturbed 100mm Diamet B - Bulk Disturbed Sample LB - Large Bulk Disturbed P - Undisturbed Piston Sample					sle			

										<u></u>				REPORT NUMBER	
	نگی اععا			GE	OTECHNIC	AL E	BOR	RING I	RECO	RD				22611	
co	NTRACT	Rath	gowan,M	ullingar , C	o.Westmeath						•		IOLE NO		
co	ORDINAT	ES		52.65 E	RIG T					DANDO 2	000	SHEE	COMMEN	Sheet 1 of 1 VCED 02/07/2020	
GR	OUND LE	/EL (m		84.61 N 100.17		HOLE		ETER (n H (m)		200 5.30			OMPLE		
	IENT GINEER		veagh Pr is C.E	operties	SPT H ENER								BY SSED B	W.CAHILL	
Ê									Ê			mples		- 7	é
Depth (m)			Des	cription			Legend	Elevation	Depth (m)	Ref. Number	Sample Type	Depth	Recovery	Field Test Results	Details
- 0	TOPSOI		dy SILT/C		ccasional gravel		<u></u>	100.02 99.87	0.15	-				:	50
				(Possibly I		-∕[==		99.37	0.80						
- 1	Stiff dark	brown	sandy gr	avelly silty (	CLAY with	1		00.07	0.00	- AA130935	8	1.00		N = 20	
	00023101		103				X(							(2, 3, 5, 5, 6, 4)	
- - 2						Ī				AA130936	8	2.00		N = 26 (3, 4, 7, 7, 6, 6)	
						Q								(0, 4, 7, 7, 0, 0)	
- 3						Ð	 	00.07		AA130937	8	3.00		N = 17 (3, 3, 3, 4, 4, 6)	
				dy gravelly onal bould	silty CLAY with	- X		96.87	3.30					(0, 0, 0, 1, 1, 0)	
- 4	some co	obies a	no occasi	onal doulo	ərs		<u>≁_x</u> ⊂ ∵?							NaOd	
-4						- Ali	\$			AA130938	8	4.00		N = 31 (4, 6, 6, 7, 10, 8)	
						X	2-0-								
5						4	ð	94,87	5.30	AA130939	в	5.00		N = 50/225 mm (8, 11, 15, 21, 14)	
	End of B	orehole	at 5.30 n	'n				34,01	0.00	-					
- - - 6															
7															
- - 8															
•															
-9															
НА	ARD STRA		· · · · · ·	SELLING				l	L					ATER STRIKE DET	AILS
<u> </u>	m (m) To	(m)	<u>(n)</u>	omments			Wate Strike	e De	pth	Sealed At	Ris Te	o(	lime min)	Comments	
4 5	4.2 4 5.1 5	.4 .3	1.25 2				4.30	4.	30	No	4.0	00	20	Slow	
															ODERG
INS	TALLATIC	N DET	AILS				Dat	e :	Hole	Casing	De	epth to Vater	Comme	ROUNDWATER PRO	GRESS
				RZ Base	Туре				Depth	Depth		valei			
RE	MARKS 1	nr Settii	 ng up Cov	/id 19 Safe	Working Area.Ha	and due	g	1	Samn	le Legend	1			,	
INS REI			n pit carri						D - Small 8 Bulk D LB - Large	Disturbed (tub) listurbed a Bulk Disturbed	1		Sam P-U	Undisturbed 100mm Diameter ple Indisturbed Piston Sample	
L									Env - Envi	ironmental Sarr	ple (Jar	+ Vial + Tub		Water Sample	

	17.05 C											·· · ·		REPORT NUMBER	Ł
يد ر	विद्रा	a a a a a a a a a a a a a a a a a a a		GE	OTECHN	IICA	L BOR	ING I	RECO	RD				22611	
со	NTRA	CT R	athgowan	,Mullingar , C	o.Westmeath	1						BOKE			
		NATES LEVEL	642 753 (m AOD)	2,280.94 E 3,556.30 N 101.89	BC		E DLE DIAM DLE DEPT		nm) 2	DANDO 2 200	2000	SHEET DATE ( DATE (	COMME		
сп	ENT SINEE	G		Properties	SF	PT HAN	MMER REF RATIO (%	. NO.				BORED	) BY	W.CAHILL	
ε								~	6			mples		X	Φ
Depth			C	Description			Legend	Elevation	Depth (m)	Ref. Number	Sample Tvpe	Depth	Recoverv	Field Test Results	Standpipe
- 0	TOP		SILT/CLAY	with some fi	ne gravel			101.74	0.15	1					<b>V</b> U
					-	.941.	X(	101.19	0.70	4					
- 1	some	e cobble	s and occ	andy gravelly asional bould	SILI/CLAY W ers	/ITN				AA130945	в	1.00		N = 38 (4, 6, 8, 8, 10, 12)	
2										AA 130946	В	2.00		N = 48 (8, 8, 10, 11, 14, 13)	
- 3										AA130947	В	3.00		N = 31 (4, 6, 6, 8, 8, 9)	
4	Obst	ruction						97.49	4.40	AA 130948	8	4.00		N = 50/225 mm (10, 12, 16, 18, 16)	
5	End	of Boreh	ole at 4.4	0 m											
7															
8															
9															
НА	RD ST	RATA B		HISELLING		J		l		I		1		NATER STRIKE DET	AILS
		To (m)	Time (h)	Comments			Wate Strike		sing S pth	ealed At	Ris To		Time min)	Comments	
4.	.2	4.4	1.5											No water strike	
<b>.</b>			<b></b>					L	Hole	Casing				ROUNDWATER PRO	GRESS
	TALLA Date	Tip De		op  RZ Base	Туре		Date		Depth	Casing Depth		epth to Vater	Comm	ents	
-		1		THE DOUG											
REN	ARKS	5 1hr Se inspec	etting up C ction pit ca	Covid 19 Safe urried out .	Working Area	a.Hand	l dug	I	8 - Bulk Di L8 - Large	e Legen( Disturbed (tub) sturbed Bulk Disturbed onmental Sam	:	<b> </b>	San P-1	- Undisturbed 100mm Diameter nple Undisturbed Piston Sample Water Sample	

												Γ	REPORT NUMBER	
×.	<u>। दडा</u>			GE	OTECHNICA		lng f	RECO	RD		~		22611	
co	NTRA	CT R	athgowan	,Mullingar , C	o.Westmeath						волен		+	
co	-ORDI	VATES		,329.38 E	RIG TY				DANDO 2	2000	SHEET		Sheet 1 of 1	
GR	OUND	LEVEL	753 (m AOD)	498.70 N 99.61		OLE DIAM			200 4.70		DATE C		•	
	IENT GINEEI		lenveagh obins C.E	Properties		MMER REI Y RATIO (9					BORED		W.CAHILL	
					and they the					Sa	nples		T T	
Depth (m)			D	escription		Legend	Elevation	Depth (m)	Ref. Number	Sample Type	Depth (m)	Recovery	Field Test Results	Standpipe Details
	Occa Multio Made Stiff t with s	brown s sional co colourec Ground o very s some co	bbles (Po Very silty d)	ssibly Made ( //clayey GRA) own sandy gr occasional b	ome gravel and Ground) /EL (Possiby avelly silty CLAY oulders		99.46 99.31 99.11 99.11	0.15 0.30 0.50	AA130941 AA130942 AA130943 AA130944	B	1.00 2.90 3.00 4.00		N = 21 (3, 3, 4, 4, 6, 7) N = 31 (7, 8, 10, 8, 6, 7) N = 44 (4, 6, 11, 13, 10, 10) N = 50/225 mm (8, 11, 16, 17, 17) N = 50/75 mm (12, 18, 50)	
HA	ARD ST	RATA B	ORING/CI	ISELLING									ATER STRIKE DETA	AILS
Fror	m (m)	To (m)	Time (h)	Comments		Wate		sing S pth	Sealed At	Ris Ta		ma	Comments	
	3.3 4.5	3.4 4.7	1 2								- <u> </u>		No water strike	
	TA11 A	TION D			·····			Hole	Casing	De	pth to		OUNDWATER PRO	GRESS
	Date			op [RZ Base]	Туре	Dat		Depth	Depth	<u>1 v</u>	vater (	Commer	nis	
g		5 1hr Se		ovid 19 Safe	Working Area.Har	and dug Sample Legend D - Smail Disturbed UB - Large Bulk Disturbed Env - Environmental Sample (Jar + Vial + Tub)			Sampi P - Un	UT - Undisturbed 100mm Diameter Sample P - Undisturbed Piston Sample W- Water Sample				

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785 <sub>00</sub>	19	
-	1.22	

#### **GEOTECHNICAL BORING RECORD**

	537			ÚĽ.										2	2611	
со	NTRAC	T Ra	athgowan	,Mullingar , C	o.Westme	ath					1	BOREN		р. В	H07	
	-ORDIN	ATES	CA?	2,412.37 E						DANDO 2	2000	SHEE	- <u></u>	Sł	neet 1 of 1	
		LEVEL (	753	,412.37 E 3,437.23 N 99.36		BOREH	OLE DIAM		nm) 2	200 4.60		DATE C DATE C	/	-	)/07/2020 )/07/2020	
CLI	ENT	Gl	enveagh	Properties		SPT HA	MMER RE	F. NO.				BORED	BY	V.W	CAHILL	
EN	GINEER		bins C.E		-		Y RATIO (S					PROCE				
											San	nples			×	
느			Г	escription			g	tion	L E	je	e		ery	Field	d Test	° pip
Depth (m)			-				Legend	Elevation	Depth (m)	Ref. Number	Sample Type	Depth	Recovery	Re	sults	Details
	TOPS							ļ	ļ	αz	ωF	5	- <u>~</u>			100
Ê			andy SII	CCLAY with o	ocasional	aravel	<u></u>	<u>} • • • • • •</u>	0.25	-						<b>`</b> 0
	Soft to	o firm mo	ottled ligh	t brown/grey				98.86	0.50	-						
E	SILT/	CLAY wi	th occasi	onal gravel		•	- O. C								N - 0	
- 1 -							A R	-		AA135920	В	1.00			N = 8 2, 2, 2, 2)	
							<u></u> → ×	97.76	1.60							
	Stiff to	o very sti	iff dark bi	own sandy g	ravelly silty	CLAY	Ø									
2	WILLI S		Dies and	Occasional C	onniez					AA135921	в	2.00			N = 27 . 4. 6. 8, 9)	
E														(=, =,		
-3							X			AA135922	в	3.00			V ≈ 38	
Ē							$\Theta^{-}$							(6, 6, 7	7, 9, 10, 12)	
Ŀ	Hard			ravelly sandy	- III OLAN	/		95.46	3.90	_		:			0005	
4	some	cobbles	wii very č	naveny sandy	Sity CLAT	with	Ľ®			AA135923	В	4.00			0/225 mm 13, 15, 22)	
E								94.76	4.60							
	Obstru End o		ble at 4.6	) m							ļ					
- 5	Enu U	Dorent	ne al 4.00	7 111												
Ē																
													1			
- 6																
Ē																
Ē														ļ		
E																
E																
F								:								
F 8																
F																
Ē																
- 9																
F																
HA	RD ST	RATA BO		ISELLING					£	A		J	M	VATER ST	RIKE DET	AILS
Fron	n (m)	ľo (m)	Time (h)	Comments			Wate Strike		sing S epth	Sealed At	Ris To		ີime ກin)	Comment	ts	
	.4	3.6	0.75				4.20		.20	No	3.9		20	Slow		
4	2	4.6	1.5													
		ľ														
													GF	ROUNDW	ATER PRO	GRESS
3 4 INS <sup>-</sup> REN	TALLA	TION DE	TAILS				Dat		Hole Depth	Casing Depth	De	oth to ater	Comme	ents		
	Date	Tip Der	oth RZ T	op RZ Base	Тур	e	-	···   '		Серия		4.01				
					L											
REN	IARKS	1hr Set	tting up C	ovid 19 Safe rried out	Working A	rea.Han	D - Small Disturbed (tub)				UT - Undisturbed 100mm Diameter					
							8 - Bulk Disturbed LB - Large Bulk Disturbed					G i - Undisturbed Tuumm Diameter Sample P - Undisturbed Piston Sample e (Jar + Viai + Tub) W - Water Sample				

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10000	(CONSTRUCTION OF	ard Maria	
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IGSL BH LOG 22611.GPJ IGSL.GDT 28/7/20

REPORT NUMBER

	531			GE	OTEC	HNICA	LBOR	(ING	REC	:01	RD		•			22611	
со	NTRAC	T Rath	gowan,I	Aullingar , C	o.Westme	eath							BOREH	OLE NO		BH08	
	-ORDIN OUND I	ATES _EVEL (m /	753.	479.99 E 564.01 N 98.76		RIG TYPE BOREHO BOREHO	LE DIAM		(mm)	20	ANDO 2 00 .10	2000	DATE C		NCED	Sheet 1 of 1 10/07/2020 10/07/2020	
1	ENT		veagh F is C.E	roperties		SPT HAN ENERGY	MER RE	F. NO.					BORED			W.CAHILL	
										,			nples			X	
Depth (m)			De	scription			Legend	1	Elevation Denth (m)		Ref. Number	Sample Type	(m)	Recovery	Fie	eld Test esults	Standpipe
- 0	TOPS		led dark	purple/brov	un condu		<u></u>	98.56	3 0.2	0			1				50
- 1	SILT	CLAY with	some fi	ne gravel	vir sanay	-	~	00.00			AA315924	B	1.00		(2,	N = 12 2, 2, 3, 3, 4)	
2	Very s some	tiff dark br cobbles ar	own sar nd occa:	ndy gravelly sional bould	silty CLAY ers	' with		96.86	<u>3 1.9</u>		AA315925	В	2.00		N = 39 (6, 8, 8, 9, 11, 11)		
3											AA315926	В	3.00		(7, 7	N = 48 7, 8, 8, 13, 19)	
4	Obstru End of	uction f Borehole	at 4.10	m			1.5	94,66	5 4.1	0						= 50/75 mm 18, 32, 50)	
- 5																	
7																	
9											:						
~~~~~	T		ime [				Wate	r I C	asing	S	aled	Ris	e   Ti	me		STRIKE DET	AILS
	1 (m) 1 1	0 (iii)	(h) 1.5	Comments			Strike		Depth	ļ	At	To		nin)	Comme		
														ter strike			
INS'	TALLA7		ILS				Date		Hole		Casing	De	oth to	GF Comme		VATER PRO	GRESS
	Date		-	RZ Base	Тур		~	Depth		Depth	_W	ater 1					
REN	IARKS	1hr Settin inspectior	g up Co i pit cari	vid 19 Safe ied out .	Working /	Area.Hand	dug	L	Sar D-Si B-Bi	nple nall Dist alk Dist	Legend sturbed (tub) urbed	1 1 1		Sam		100mm Diameter	
						w			Env -	Enviro	iulk Disturbed	iple (Jar I	Vial + Tub)	W-V	Nater Sample	iston aampie	

an at inc.	
Manager and Martin	
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and the second	i.

#### NE 18 11/

"6 <sub>8</sub>	1551			G	EUIEC	HNICA		ang i	RECU	IRD		~		22611	
со	NTRA	CT R	athgowar	, Mullingar ,	Co.Westm	eath						BOREHC	LE NO	BH09 Sheet 1 of	1
		NATES LEVEL (		2,558.98 E 3,541.90 N 100.41			PE OLE DIAM OLE DEPT		nm) 2	DANDO 2 200 4.70	2000	DATE CO		ICED 09/07/2020	)
	IENT GINEEI		lenveagh obins C.E	Properties			MMER REI Y RATIO (%		1			BORED E		W.CAHILL Y EC	
Ê								-	Ê		· · ·	nples	<del></del>	- ×	ω
Depth (m)			E	Description			Legend	Elevation	Depth (m)	Ref. Number	Sample Type	(m)	Recovery	Field Test Results	Standpipe
0	TOP		ark browr	sandy SILT	/CLAY with	some	<u>xo</u>	100 31	0.10	/		1			0
<sup>~</sup> 1	grave	and oc	casional	cobbles						AA135916	B	1.00		N = 17 (2, 2, 3, 3, 4, 7)	
2	Very some	stiff dark cobbles	brown s and occ	andy gravelly asional boul	/ silty CLA` ders	r with		98.61	1.80	AA135917	в	2.00		N = 48 (8, 11, 11, 13, 14, 10	))
з										AA135918	в	3.00		N = 40 (6, 6, 8, 10, 10, 12)	
4								95.71	4.70	AA135919	в	4.00		N = 50/225 mm (8, 12, 14, 17, 19)	
5		uction of Boreh	ole at 4.7	0 m											
6															
7															
8															
9															
НА	RD ST	RATA B		HISELLING	·····						L	I		ATER STRIKE DE	TAILS
		To (m)	Time (h)	Comments			Wate Strike		sing S pth	Sealed At	Rise To			Comments	
3	.1 .3 .5	2.4 3.4 4.7	1 0.75 1.5											No water strike	
										Conier			GR	OUNDWATER PR	OGRESS
		TION DE		on 197 9			Date		Hole Depth	Casing Depth		oth to cater	ommer	nts	
<u>L</u>	<u>Date</u>			op RZ Base	<u>Tyj</u>	<u></u>									
REA	MARKS	1hr Se inspec	tting up C tion pit ca	Covid 19 Safe arried out .	Working	Area.Han	d dug		8 - Bulk Di L8 - Large	e Legen( Disturbed (lub) sturbed Bulk Disturbed	đ	- Vial + Tubl	Sampi P - Un	Indisturbed 100mm Diameter ie disturbed Piston Sample äter Sample	

Ser - me	
LEEL	

IGSL BH LOG 22611.GPJ 1GSL GDT 28/7/20

#### GEOTECHNICAL BORING RECORD

	55L			ninio <i>r</i> a									22611			
	NTRAC	T Path	nowon M	ullingar , C	o Mostmo								OKEHOI		BH10	
		·	jowan,w		o.westine	<b>.</b>						s	HEET	IIV.	Sheet 1 of 1	
	-ORDIN OUND L	ATES .EVEL (m /	753.6	09.48 E 15.39 N 99.19			DLE DIAM	DANDO 2000 LE DIAMETER (mm) 200 LE DEPTH (m) 3.20					ATE CO	CED 06/07/2020		
	ENT		/eagh Pri	operties			AMER REI					в	ORED B	W.CAHILL		
EN	GINEER						RATIO (S						ROCESS			
Ê								_	2	Sai		·····	imples			e
Depth (m)			Des	cription			Legend	Elevation	Depth (m)	Ref.	Sample	Type	(m)	Recovery	Field Test Results	Details
- 0	TOPS	OIL		<u>.</u> ,			<u>25 82 9</u>	98.94	0.25							~~~
	Soft to grave	firm brow	n SILT/C	LAY with o	ccasional	fine	<u> </u>	98.69	0.50							
1 5 3 1 1 Å 1 1 4 5 5 1 J	Very stiff to hard dark brown sandy gravelly SILT/CLAY with occasional cobbles and boulders									AA 135	901	8	1.00		N ≈ 43 (4, 6, 8, 11, 12, 12)	
2										AA135	902	в	2.00		N ≕ 51 (10, 11, 11, 11, 13, 16)	
3	Obstruction End of Borehole at 3.20 m						2A	95.99	3.20						N = 50/150 mm (8, 10, 19, 31)	
4	Епа о	i poleuole	at 3.20 m	]												
- 5																
- 6																
7																
8																
9																
:		3474 800	NOICH													
~~~~~	n (m) 1		ime c	omments			Wate	r Ca	sing	Sealed	i	Rise	Tin	ne C	ATER STRIKE DETA	AILS
1	.8	1.9	0.5				Strike	<u> De</u>	epth	At	+	To	<u>(mi</u>	<u> </u>		
:	3 3.2 1.5													No water strike		
								·····l ·····					·····	GR	OUNDWATER PROC	GRESS
	NSTALLATION DETAILS					Dat	e	Hole Depth			Dept Wa	epth to Water Comm				
	Date Tip Depth RZ Top RZ Base Type															
REI	EMARKS 1hr Setting up Covid 19 Safe Working Area.Han inspection pit carried out .						D - Small Disturbed (tub)						Sampl	UT - Undislurbed 100mm Diameter Sample		
				B - Bulk Disturbed Sample LB - Large Bulk Disturbed P - Undisturbed Piston Sample Env - Environmental Sample (Jar + Vial + Tub) W - Water Sample												

	· · · ·	·					· · · ·							REPORT NUMBER		
	।दवन ह			GE	OTECI	HNICA	L BOR	RING I	RECO	RD				22611		
со	NTRAC	T R	athgowan.	Mullingar , C	o.Westme	eath							IOLE NO			
co	-ORDI	ATES	642	,687.31 E		<b>RIG TY</b>	PE			DANDO	2000	SHEE		Sheet 1 of 1		
GR	OUND	LEVEL (	753 (m AOD)	,513.45 N 102.19			ole diam Ole dept			200 1.40			COMPLE	VCED         06/07/2020           CED         06/07/2020		
	IENT GINEEF		lenveagh obins C.E	Properties			MMER REI Y RATIO (%					BORED	BY SSED B	W.CAHILL BY EO		
Ê								_	6			mples			υ	
Depth (m)			D	escription			Legend	Elevation	Depth (m)	Ref. Number	Sample Type	Depth (m)	Recovery	Field Test Results	Standpipe Details	
	cobbl	dark bro les	·	SILT/CLAY v indy gravelly isional bould			× × ×	101.99 100.89		AA135903		1.00		N = 17 (3, 3, 3, 4, 4, 6) N = 32	<del>ر</del> ي -	
3										AA135905	В	3.00		(4, 5, 5, 7, 9, 11) N = 50 (8, 11, 11, 14, 13, 12)		
4 5		uction of Boreh	ole at 4.40	) m				97.79	4.40	AA135906	8	4.00		N = 50/225 mm (10, 14, 17, 21, 12)		
L 6 7 8																
	RD ST	RATA B	ORING/CI-	IISELLING									w	VATER STRIKE DETA	AILS	
	1	To (m)	Time (h)	Comments			Wate Strike		sing S pth	Sealed	Ris		ĩime	Comments		
3 4	.3	3.5 4.4	0.75 1.5				<u> </u>	<u>= 106</u>	<u>ptii</u>	At		<u> </u>	min)	No water strike		
					<u></u>				L				GR	OUNDWATER PRO	GRESS	
INS	TALLA	TION DE					Dat		Hole Depth	Casing Depth	De	epth to Vater	Comme	ents		
	Date			p RZ Base	Тур											
	MARKS	inspec	etting up C tion pit ca	ovid 19 Safe rried out .	Working /	Area.Han	d dug		8 - Bulk Di LB - Large	e Legen Disturbed (tub) isturbed Bulk Disturber (onmental San	d	+ Vial + Tub)	Samp P - U	Undisturbed 100mm Diameter ple ndisturbed Piston Sample Vater Sample		

		Τ												REPORT NUMBER		
¥.	لمر لاتك			GE	OTECH	INICA	L BOR	RING	RECC	RD				22611		
со	NTRACT	Rath	ngowan,N	lullingar , Co	.Westme	ath						BURCHOLE NO. BH12				
co	-ORDINA	TES		576.47 E		RIG TYP				DANDO 2	000	ATE COMMENCED 06/06/2020				
GR	OUND LE	EVEL (m	753,4 AOD)	79.01 N 103.07			OLE DIAM			200 5.70		DATE COMPLETED 06/06/2020				
	ENT GINEER		iveagh Pi ns C.E	roperties		SPT HAI	MMER REI ( RATIO ( 9	F. NO.				BORED		W.CAHILL BY <u>F.</u> O		
e									2		Sa	mples		R R	Ð	
Depth (m)			Des	scription			Legend	Elevation	E	Ref. Number	Sample Tvpe	Depth (m)	Recovery	Field Test Results	Details	
- 0	TOPSOIL Soft brown SILT/CLAY with occasional fine gravel						<u></u>	102.92 102.67	0.15	-					53	
Ē				ILT/CLAY w												
- 1 - 1 										AA135907	В	1.00		N = 13 (2, 2, 3, 3, 3, 4)		
2	2									AA135908	B	2.00		N = 15 (2, 2, 3, 3, 4, 5)		
	Stiff to	von/ ctiff	dark bro	un condu ar				99.77	3.30	AA135909	8	3.00		N = 17 (2, 3, 3, 4, 4, 6)		
4	Stiff to very stiff dark brown sandy gravelly silty CLAY with some cobbles and occasional boulders									AA135910	8	4.00		N = 25 (4, 5, 5, 6, 7, 7)		
5								97.37	5.70	AA135911	8	5.00		N = 50/225 mm (8, 11, 14, 17, 19)		
6	Obstruc End of		e at 5.70 i	m												
7									3							
8	- - -												-			
	DDetD		DINGIOU	SELLING					<u> </u>							
	· · · · · · · · · · · · · · · · · · ·	o (m)	Time	Comments			Wate		asing epth	Sealed At	Ri T		Fimo I	Comments		
0T 28/7/20	3.6 3.7 0.75 5.4 5.7 2							711	1	<u>~ (</u>	1111137	No water strike				
SL.GL													G	ROUNDWATER PRO	GRESS	
្ធ ភ្លូ INS	TALLAT	ION DET	AILS				Dai	e	Hole Depth	Casing Depth		epth to Vater	Comm			
22611.0	Date	Tip Dept	h RZ Toj	RZ Base	Тур	00										
IGSL BH LOG 22611.GPJ IGSL.GDT 28/7/20	MARKS	1hr Setti inspectio	ing up Co on pit carr	vid 19 Safe ied out .	Working /	Area.Har	l dug		D - Sma B - Bulk LB - Lar	Die Legen I Disturbed (lub) Disturbed ge Bulk Disturbe vironmental Sar	d	r + Vjal + Tub	San P - I	- Undisturbed 100mm Diameter npte Undisturbed Piston Sample Water Sample		

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### GEOTECHNICAL BORING RECORD

1.1	331			GL	UIEUI	INICA									22611	
co	NTRAC	T R	athgowan	,Mullingar , C	o.Westme							BOREH SHEET			BH13 Sheet 1 of 1	
	-ordin Ound		642 753 (m AOD)	2,619.99 E 3,433.08 N 104.71			e Dle Diam Dle Dept		nm) 🛛	DANDO 2 200 4.80	2000	DATE C	OMMEN	NCED	08/07/2020 08/07/2020	
1	ent Gineef		lenveagh bbins C.E	Properties			/MER REI ' RATIO (%					BORED PROCES			W.CAHILL	
									(		Sam	ples			'A'	ø
Depth (m)			D	escription			Legend	Elevation	1	Ref. Number	Sample Type	(m) (m)	Recovery	Fi	eld Testo Results	Standpipe Details
- 0	TOPS							104.51	0.20	-			1			53
****	grave			SILT/CLAY				103.41	1.30	AA135912	в	1.00		(2	N = 21 , 3, 3, 4, 6, 8)	
2	Stiff to with c	o very sl iccasion	liff dark bi al cobble	rown sandy g s and some b	ravelly silty oulders	( CLAY				AA135913	В	2.00		(4	N = 20 , 5, 5, 5, 6, 4)	
3										AA 135914	В	3.00		(3,	N = 31 4, 6, 6, 8, 11)	
4										AA 135915	в	4.00		{4.	N = 34 6, 7, 7, 9, 11)	
- 5		uction If Boreh	ole at 4.8	0 m			<u>-0_7</u> _	99.91	4.80					N	t = 50/75 mm (17, 35, 50)	
L																
7																
- - -																
9																
E HA	RD ST		ORINGIC	HISELLING			L	L	1					IATED	STRIKE DET	
<u> </u>		To (m)	Time	Comments			Wate			Sealed	Ris		ime	Comme		-1120
<b></b>	.6	4.8	<u>(h)</u> 2		******		Strik	e De	epth	At	<u> </u>	(r	nin)		ater strike	
													GF		WATER PRC	GRESS
INS	TALLA	TION DI	ETAILS	J		·····	Dat	e	Hole	Casing	De	pth to ater	Comme		• 77-1 1 have 1 1 1 1 1 1	
	Date			op  RZ Base	Тур	e			Depth	Depth		aler				
INS REF	MARKS	1 1hr Se inspec	tting up C tion pit ca	L Covid 19 Safe arried out .	Working /	Area Han	d dug	1	B - Bulk LB - Larg	I Disturbed (tub Disturbed (tub Disturbed pe Bulk Disturbed vironmental Sar	d	+ Vial + Tubi	Sam P+U	iple	d 100mm Diameter Piston Sample sle	



# Appendix II Trial Pit Logs

												REPORT NUMBER		
<u>ک</u> ۱	555	Т	RIAL PIT	RECO	RD			~		22611				
CON	TRACT	Rathgowan,Mullingar , Co.Westme	eath					TRIAL PIT NO. TP01 SHEET Sheet 1 of 1			-			
LOG	GED BY	S.Cunningham		CO-ORDINATES 642,511.71 E 753,773.39 N					DATE STARTED 02/07/24 DATE COMPLETED 02/07/24					
CLIE	NT INEER	Glenveagh Properties Tobins C.E	GROUND LEVEL (m) 99.08					EXCAVATION 7T Tracked METHOD Machine						
									Samples	<u> </u>	00	ometer		
		Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Type	Depth	Vane Test (KPa)	Hand Panelrometer (KPat)		
0.0	TOPSO			<u> 11. 11.</u> 1. 11. 1	0.20	98.88								
	coarse. subangi	irm grey mottled brown slightly sand AY with a low cobble content. Sand Gravel is fine to coarse, subrounded ular. Cobbles and boulders are subro stiff greyish brown very sandy gravel	l to ounded.		0.80	98.28		AA134351	В	0.50				
- - - - - -	with a m fine to c	edium cobble and low boulder conte oarse. Gravel is fine to coarse, subr ular. Cobble is subrounded.	ent. Sand is					AA134352	В	1.10				
* 2.0	End of 1	Frial Pit at 2.50m			2.50	96.58		AA134353	в	2.40				
3.0														
- - - - - - -														
- Grou	Indwater (	Conditions												
Stab Stab								A. 4000						
Dry Dry Stab	eneral Remarks													

							REPORT NUMBER						
	سمر. ماتت	-	TRIAL PIT	RECO	RD			~		22611			
CON	TRACT	Rathgowan,Mullingar , Co.Westm	neath						RIAL PIT NO. TP02 HEET Sheet 1 of 1				
LOG	GED BY	S.Cunningham	CO-ORDINAT		642,4 753,7	53.82 E 30.10 N		SHEET DATE S DATE C					
CLIE ENGI	NT NEER	Glenveagh Properties Tobins C.E	GROUND LE	GROUND LEVEL (m) 100.59					EXCAVATION 7T Tracked METHOD 7T Tracked				
									Sample	s	0	meter	
		Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Type	Depth	Vane Test (K	Hand Percirometer (KP.0)	
0.0	fine to c	IL irm brownish grey sandy gravelly SI bble content and occasional boulde oarse. Gravel is fine to coarse, sub ular. Cobbles and boulders are sub	rounded to		0.20	100.39	***						
- 1.0								AA134357	В	0.80			
2.0	a mediu coarse.	stiff greyish brown sandy gravelly S m cobble and low boulder content. Gravel is fine to coarse, subrounde Ilar. Cobble and boulders are subro	Sand is fine to d to		1.40	99.19		AA134358	В	1.60			
- 	End of T	rial Pit at 2.60m			2.60	97.99		AA134359	В	2.50			
3.0													
- - - -													
Groui Dry	ndwater C	Conditions											
Stabi	lity												
Stable	table												
Gene	eneral Remarks												

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LOG	

								F	REPORTN	UMBER			
1	551	1	FRIAL PIT	RECO	RD			~		22611			
CON	TRACT	Rathgowan,Mullingar , Co.Westm	neath					TRADPIT NO. TP03 SHEET Sheet 1 of 1					
LOG	GED BY	S.Cunningham	CO-ORDINAT		753,7	68.75 E 39.16 N		SHEET         Sheet 1 of 1           DATE STARTED         02/07/2020           DATE COMPLETED         02/07/2020					
CLIE ENGI	NT NEER	Glenveagh Properties Tobins C.E	GROUND LE	GROUND LEVEL (m) 102.21					EXCAVATION 7T Tracked METHOD Machine				
	r -								Samples	, Â	0	meter	
		Geotechnical Description		Legend	(m) (m)	Elevation	Water Strike	Sample Ref	Type	Depth	Vane Test (K	Hand Penalrometer (KP0	
0.0	TOPSO			<u>NIZ NIZ</u>	0.15	102.06							
-	cobble ( coarse,	own slightly sandy gravelly SILT/CL/ content. Sand is fine to coarse. Grav subrounded to subangular. Cobble: ided to subangular.	/el is fine to	0 0 0	0.10	102.00							
- - - 1.0	a mediu coarse.	stiff greyish brown sandy gravelly Si m cobble and low boulder content. Gravel is fine to coarse, subrounde ular. Cobbles and boulders are subr	Sand is fine to d to		0.70	101.51		AA134354	В	0.60			
-	subangi	ular.						AA134355	В	1.20			
-													
2.0					2.50	99.71		AA134356	в	2.40			
- -	End of T	rial Pit at 2.50m			2.50	00.71							
3.0													
-													
4.0 - -													
Grou Dry	ndwater (	Conditions											
<b>Stabi</b> Stabl	lity e	·····											
Gene	ral Rema	rks	T-177-174-114-2-1-4						••••••••••••••••••••••••••••••••••••••				

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

									REPORT NUMBER			
	ل 32	Т	RIAL PIT	RECO	RD			~		22	611	
CON	ITRACT	Rathgowan,Mullingar , Co.Westm	eath							TPO		
LOG	GED BY	S.Cunningham	CO-ORDINAT		642,4 753,6	18.30 E 28.42 N		DATE S	TARTEE	03/0	et 1 of 1 7/2020 7/2020	
CLIE ENG	INEER	Glenveagh Properties Tobins C.E	GROUND LE	VEL (m)	98.61			EXCAV/ METHO		7T T Maci	racked hine	
									Sample	s	O P	neter
		Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Type	Depth	Vane Test (KRa	Hand Performeter (KP40
0.0	TOPSO			34.34	0.10	98.51						
	SILT/CL coarse. subangi	irm grey mottled brown slightly sand AY with a low cobble content. Sand Gravel is fine to coarse, subrounded ular. Cobbles and boulders are subr	is fine to I to ounded.	8  0  0  0  0	0.80	97.81		AA134369	В	0.50		
1.0 	coarse.	yish brown sandy gravelly SILT/CLA cobble and low boulder content. Sa Gravel is fine to coarse, subrounded ular. Cobbles and boulders are subrular.	to		- - - -			AA134370	в	1.20		
2.0	End of 1			2.50	96.11	(Seepage)	AA134371	В	2.40			
- - - - - -												
-												
4.0												
-												
		Conditions		<u> </u>			L					
Seep	bage at 2.2	Zmbgl										
Stab Unst	ility able at 1.3	3mbgl										
Stab Unst	eral Rema	rks										

	TRIAL PIT RECORD									REPORT NUMBER		
ے۔ ا	531		~		22	611						
CON	ITRACT	Rathgowan,Mullingar, Co.Westn	neath							TPO	)5 et 1 of 1	
LOG	GED BY	S.Cunningham	CO-ORDINAT			89.18 E 24.32 N	·•••	DATE S	TAPTED	02/0	7/2020 7/2020	
CLIE	NT INEER	Glenveagh Properties Tobins C.E	GROUND LE	VEL (m)	102.6	2		EXCAVA METHO	ATION D	7T T Mac	racked hine	
									Samples	3	00	meter
		Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Type	Depth	Vane Test (Kro	Hand Panetrometer (KP40
0.0	TOPSO	IL y mottled brown slightly sandy sligh	fly gravally	<u> 112</u> 111	0.15	102.47						
	SILT/CL coarse, Firm bro cobble c	AY. Sand is fine to coarse. Gravel i subrounded to subangular. wn slightly sandy gravelly SILT/CL content. Sand is fine to coarse. Gra	is fine to AY with a low vel is fine to		0.45	102.17		AA134361	в	0.50		
1.0	coarse, subroun Firm to s a mediu coarse.	subrounded to subangular. Cobble ded to subangular. stiff greyish brown sandy gravelly S m cobble and low boulder content. Gravel is fine to coarse, subrounde lar. Cobbles and boulders are subr	s are ILT/CLAY with Sand is fine to d to		1.10	101.52						
2.0	End of T	rial Pit at 2.50m			2.50	100.12		AA134362 AA134363		1.70 2.30		
3.0		na / n a 2.30m										
4.0												
	oundwater Conditions											
Dry												
Stabi Stabl												
Gene	ral Remar	ks										

									F	REPORT NUMBER		
	53L	Т	RIAL PIT	RECO	RD					22	611	
CON	TRACT	Rathgowan,Mullingar, Co.Westmo	eath					TRIAL P		TPO		
LOG	GED BY	S.Cunningham	CO-ORDINAT		753,5	37.42 E 36.64 N	<del></del>	- SHEE DATE S DATE C	· · · · · · · · · · · · · · · · · · ·	03/0	et 1 of 1 7/2020 7/2020	
CLIE	NT INEER	Glenveagh Properties Tobins C.E	GROUND LE	/EL (m)	99.04			EXCAVA METHO		O 7T T Maci	racked nine	
									Samples	, y	e O	meter
		Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Type	Depth	Vane Test (KFa	Hand Performeter (KPat
Q.0	Firm to s medium to coars	wn SILT/CLAY stiff grey sandy very gravelly SILT/Cl cobble and medium boulder conten e. Gravel is fine to coarse, subround lar. Cobbles and boulders are subr	led to		0.40	98.64		AA134366	в	0.70		
1.0								AA 134367	в	1.60		
2.0	End of T	rial Pit at 2.50m			2.50	96.54		AA134368	В	2.20		
- - - - - -												
- - - - - - - - - - -												
Grou	Groundwater Conditions											
Stabi Stabi			884899-88-14									
Dry Stabi Stabi	eral Remai	ks										

2.50 99.55												REPORT NUMBER		
LOGGED BY     S. Cunningham     CO-ORDINATES     642.263.31 E 753.331.05 N     Steps 1 of 1 753.331.05 N       CLENT     Clenvesgh Properties     GROUND LEVEL (m)     102.05     DATE SAMPLER (model and the complete participation)     DATE SAMPLER (model and the complete participation)     Tarket Addition       00     Ceolechnical Description     0     0     0     102.05     Samples     0       01     Ceolechnical Description     0     0     0     101.95     0     0       02     Ceolechnical Description     0     0     0     101.95     0     0       02     Ceolechnical Description     0     0     0     101.95     0     0       03     Ceolechnical Description     0     0     0     101.95     0     0       04     Ceolechnical Description     0     0     0     101.95     0     0       05     Ceolechnical Description     0     0     0     0     0     0       05     Ceolechnical Description     0     0     0     0     0     0       04     Ceolechnical Description     0     0     0     0     0     0       05     Ceolechnical Description     0     0     0     0     0<	1	554		TRIAL PIT	RECO	RD			~		22	611		
LOGGED EV     S. Cunningham     CO-ONDINATES     642, 263 31 E 753, 531 08 N     DATE SCARPED DU2072020 DATE COMPLETED DU2072020 DATE COMPLETED DU2072020       CLENT CLENT CONDERER Tobine C.E     Clenveagh Propertios     GROUND LEVEL (m)     192.05     DATE SCARPED DU2072020 DU2072020       CLENT Complete EXCAVATION Complete Complete Subardiance     Geoleschnical Description     g g g g g g g g g g g g g g g g g g g	CON	TRACT	Rathgowan,Mullingar , Co.West	meath										
CLENT     Generating Mogeness       Geolechnical Description     Image: Clent State Sta	LOG	GED BY	S.Cunningham						DATE S	ARTED	02/0	7/2020		
00     TOPSOL     10     101.95     0.10     101.95       00     Common slightly sandy gravelly SILT/CLAY with a low cobie content. Sand is fine to coarse. Gravel is fine to coarse. Gravelly SILT/CLAY with a medium cobie and low boulder content. Sand is fine to coarse. Gravelly SILT/CLAY with a medium cobie and low boulder content. Sand is fine to coarse. Gravelly SILT/CLAY with a medium cobie and low boulder content. Sand is fine to coarse. Gravelly SILT/CLAY with a medium cobie and low boulder content. Sand is fine to coarse. Gravelly SILT/CLAY with a medium cobie and low boulder content. Sand is fine to coarse. Gravelly SILT/CLAY with a medium cobie and low boulders are subrounded to subangular.     0.80     101.25     An134364     B     0.60       101     Suff greyth brown sandy gravelly SILT/CLAY with a medium cobie and low boulder content. Sand is fine to coarse. Gravel is fine to coarse. Subcurded to subangular.     0.80     101.25     An134365     B     1.60       2.0     End of Trial Pit at 2.50m     2.50     99.55     99.55     An134365     B     1.60       3.0     End of Trial Pit at 2.50m     Image: Conduct and the subangular conduct anduct and the subangular conduct anduct and the subangular				GROUND LE	VEL (m)	102.0	5		EXCAVA METHOI					
00     TOPSOL     10     101.95     0.10     101.95       00     Common slightly sandy gravelly SILT/CLAY with a low cobie content. Sand is fine to coarse. Gravel is fine to coarse. Gravelly SILT/CLAY with a medium cobie and low boulder content. Sand is fine to coarse. Gravelly SILT/CLAY with a medium cobie and low boulder content. Sand is fine to coarse. Gravelly SILT/CLAY with a medium cobie and low boulder content. Sand is fine to coarse. Gravelly SILT/CLAY with a medium cobie and low boulder content. Sand is fine to coarse. Gravelly SILT/CLAY with a medium cobie and low boulder content. Sand is fine to coarse. Gravelly SILT/CLAY with a medium cobie and low boulders are subrounded to subangular.     0.80     101.25     An134364     B     0.60       101     Suff greyth brown sandy gravelly SILT/CLAY with a medium cobie and low boulder content. Sand is fine to coarse. Gravel is fine to coarse. Subcurded to subangular.     0.80     101.25     An134365     B     1.60       2.0     End of Trial Pit at 2.50m     2.50     99.55     99.55     An134365     B     1.60       3.0     End of Trial Pit at 2.50m     Image: Conduct and the subangular conduct anduct and the subangular conduct anduct and the subangular										Samples	×.	0	neter	
Firm Drown slightly sandy gravelly SILT/CLAY with a low coates, starbunded to subangular.       0.10       101.95         Stiff gravia brown sandy dravelly SILT/CLAY with a low coates, starbunded to subangular.       0.80       101.25         Stiff gravia brown sandy dravelly SILT/CLAY with a low coates, starbunded to subangular.       0.80       101.25         Stiff gravia brown sandy dravelly SILT/CLAY with a low coates, starbunded to subangular.       0.80       101.25         Stiff gravia brown sandy dravelly SILT/CLAY with a low coates, starbunded to subangular.       0.80       101.25         Stiff gravia brown sandy dravelly SILT/CLAY with a low coates, starbunded to subangular.       0.80       101.25         Subangular.       Ax13435       B       1.50         Subangular.       Ax13435       B       1.50         Subangular.       Coates, starbunded to subangular.       Coates, starbunded to subangular.       Ax13435       B       1.50         Subangular.       Coates, starbunded to subangular.       Coates, starbunded to subangular.       Starbunded to suba			Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Type	Depth	Vane Test (KR	Hand Peneror (KP4)	
The medium cobble and low boulder content. Sand is fine to coarse. Subounded to subangular. Cobbles and boulders are subrounded to subangular.	0.0	Firm bro cobble c coarse, subroun	wn slightly sandy gravelly SILT/CL content. Sand is fine to coarse. Gra subrounded to subangular. Cobble ded to subangular.	avel is fine to as are					AA134364	В	0.60			
ao a	- 1.0	medium coarse. subangu	cobble and low boulder content. S Gravel is fine to coarse, subround lar. Cobbles and boulders are sub	Sand is fine to ed to					AA134365	В	1.50			
Groundwater Conditions Dry Stability	3.0	End of T	rial Pit at 2.50m			2.50	99.55							
Dry Stability Stable	4.0													
Dry Stability Stable	Grou	ndwater C	onditions											
Stable	Dry													
Seneral Remarks							798776-76-76-76-8							
	Gene	aral Remarks												

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Mund L	15L		TRIAL PIT	RECO	RD			~		22	611		
CON	TRACT	Rathgowan,Mullingar , Co.Westr	neath					TRIALP		TPC			
LOG	GED BY	S.Cunningham	CO-ORDINAT		642,4 753,4	43.41 E 97.47 N		DATE S		07/0	et 1 of 1 7/2020 7/2020		
CLIE ENGI	NT NEER	Glenveagh Properties Tobins C.E	GROUND LE	VEL (m)	100.0	2		EXCAVA METHO		7T T Mac	racked		
									Samples	×	0	meter	
		Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Type	Depth	Vane Test (Kto	Hand Penerometer (KP.0)	
0.0	SILT/CL	IL irm light brown mottled grey slightly .AY. Sand is fine to coarse. Gravel subrounded to subangular.	r sandy gravelly is fine to		0.15	99.87		AA134388	В	0.45			
- 	Firm ligh medium	nt brown very sandy gravelly SILT/( cobble and low boulder content.	CLAY with a		0.75	99.27		AA134389	в	1.20			
2.0	coarse,	stiff greyish brown sandy gravelly S m cobble and low boulder content. Gravel is fine to coarse, subrounde Ilar. Cobbles and boulders are sub Ilar.	ed to		1.80	98.22			5				
	End of T	rial Pit at 2.50m			2.50	97.52		AA134390	B	2.30			
3.0													
4.0													
<b>Grou</b> Dry	ndwater C	Conditions						~I					
Stabil Stable										******			
Gene	ral Remar	al Remarks											

										REPORT NUMBER			
Nour	TRIAL PIT RECORD										22611		
CON	TRACT	Rathgowan,Mullingar , Co.Westr	meath					TRU/L P		TPC			
LOG	GED BY	S.Cunningham	CO-ORDINAT		753,4	78.79 E 42.19 N		3	IARTED	07/0	et 1 of 1 7/2020 7/2020		
CLIE	ENT	Glenveagh Properties Tobins C.E	GROUND LE	VEL (m)	101.0	0		EXCAVA METHO		7T T Mac	racked hine		
									Samples	; ; ;	0	andrometer	
		Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Type	Depth	Vane Test (KRa)	Hand Panelic (KPet)	
0.0	TOPSO Soft bro	IL wn SILT/CLAY			0.10	100.90							
	Soft to fi SILT/CL	irm light brown mottled grey slightly AY. Sand is fine to coarse. Gravel subrounded to subangular.	/ sandy gravelly is fine to		0.40	100.60							
								AA134385	В	1.00			
2.0	I is fine to	stiff greyish brown very sandy grav- ledium cobble and medium boulde occarse. Gravel is fine to coarse, s lar. Cobbles and boulders are sub lar.	ubrounded to		1.40	99.60		AA134386	В	1.60			
-	End of T	rial Pit at 2.40m			2.50	98.50		AA134387	В	2.30			
3.0						с 							
4.0													
	Indwater C	Conditions	······							L			
Stab Stab			<u>_</u>		<u>,</u>								
Dry Stabi Stabi	eral Remarks												
L													

									F	REPORT NUMBER		
	JEE		TRIAL PIT	RECO	RD					22	611	
CON	TRACT	Rathgowan,Mullingar, Co.West	neath					TRIALP		TP1		
LOG	GED BY	S.Cunningham	CO-ORDINA1		642,58 753,58	31.03 E 37.36 N		DATE S		07/0	et 1 of 1 7/2020 7/2020	
CLIE ENGI	NT	Glenveagh Properties Tobins C.E	GROUND LE	VEL (m)	99.26			EXCAVA METHOI	ATION D	O 7T T Macl	racked hine	
									Samples	, X	00	meter
		Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Type	Depth	Vane Test (KF	Hand Punctrometer (KPat)
0.0	TOPSO Soft to f SILT/CL coarse,	IL irm light brown mottled grey slightly AY. Sand is fine to coarse. Gravel subrounded to subangular.	y sandy gravelly is fine to		0.10	99.16	*****	AA134371	в	0.60		
- - - - - -	coarse.	stiff greyish brown sandy gravelly S m cobble and low boulder content Gravel is fine to coarse, subround Ilar. Cobbles and boulders are sub Ilar.	ed to		0.85	98.41		AA134372		1.40		
- - - 2.0 - - -												
- - - 3.0	End of T	rial Pit at 2.65m			2.65	96.61		AA134373	В	2.50		
3.U					::							
4.0												
Grou	iroundwater Conditions											
	nuwaiti l											
<b>Stabi</b> Stabl									******			
Dry Stabi Stabi Gene	ral Remarks											

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TRIAL PIT RECORD 22611												
CON	TRACT	Rathgowan,Mullingar , Co.Westm	eath					TRICEP	IT NO.	TP1		
LOG	GED BY	S.Cunningham	CO-ORDINAT		753,5	17.94 E 54.83 N			NARTED OMPLET	07/0	et 1 of 1 7/2020 7/2020	
CLIE ENGI	NT NEER	Glenveagh Properties Tobins C.E	GROUND LE	VEL (m)	99.91			EXCAV/ METHO		O 7T T Maci	racked hine	
									Samples	<b>`</b> ₹	Ce.	meter
		Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Type	Depth	Vane Test (KR	Hand Penetrometer (KP=0
0.0	TOPSO			<u>Nr Mr</u>	0.15	99.76						
	Sand is	k brown slightly sandy slightly grave fine to coarse.Gravel is fine to coars ded to subangular.	IIy CLAY. se,									
- - - - - -	to coars	vish brown sandy gravelly SILT/CLA cobble and medium boulder conter e. Gravel is fine to coarse, subround ilar. Cobbles and boulders are subr ilar.	ded to		0.70	99.21		AA134374	В	0.80		
- 2.0	0											
-	End of T	rial Pit at 2.60m			2.60	97.31		AA134375	в	2.30		
i. - -												
3.0												
4.0												
Grou Dry	ndwater C	Conditions	1-99-92.56.000.00109.00.100 1100	J		<u>i</u>		L		<u> </u>	<u> </u>	L
Stabi Stabl	lity e											
Gene	ral Remar	ks										
												-

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Sound 1 S	551	Т	~		22611							
CON	TRACT	Rathgowan,Mullingar , Co.Westmo	eath							TP1		
LOG	GED BY	S.Cunningham	CO-ORDINAT		753,50	07.02 E 08.37 N		DATE S		07/07	t 1 of 1 7/2020 7/2020	
CLIE ENGI	NT	Glenveagh Properties Tobins C.E	GROUND LEV	VEL (m)	101.9	7		EXCAVA METHO		7T TI Mach	racked nine	
								1	Samples	×	0	ometer
		Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Type	Depth	Vane Test (K	Hand Perfrometer (KPa)
0.0	TOPSC Soft lig	ht brown mottled grey sandy gravelly	SILT/CLAY.	<u> </u>	0.15	101.82						
2 	subrou Stiff gre mediun coarse	i fine to coarse. Gravel is fine to coar inded to subangular. ayish brown sandy gravelly SILT/CLA in cobble and low boulder content. Sa Gravel is fine to coarse, subrounded	Y with a ind is fine to to		0.50	101.47		AA134382	В	0.50		
- - 1.0 -	subang	ular. Cobbles and boulders are subroular.	ounded to					AA134383	В	1.00		
2.0								AA134384	В	2.00		
	End of	Trial Pit at 2.60m			2.60	99.37						
3.0												
4.0 4.0	4.0											
<b>Grou</b> Dry	roundwater Conditions y											
Stabi Stabi	ility le									<u></u>		
Gene	eral Rem	arks										

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

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	551	Т	RIAL PIT I	RECO	RD			~		22	611	
CON	TRACT	Rathgowan,Mullingar , Co.Westmi	eath					TRIALP		TP1		
LOG	GED BY	S.Cunningham	CO-ORDINAT		753,4	77.08 E 53.61 N		- SHEE DATE S DATE C		07/0	et 1 of 1 7/2020 7/2020	
CLIE	NT NEER	Glenveagh Properties Tobins C.E	GROUND LEV	/EL (m)	104.1	0		EXCAVA METHOI	ATION D	7T T Maci	racked	
									Samples	×	600	ometer
		Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Type	Depth	Vane Test (KPa)	Hand Peretrometer (KPa)
0.0	TOPSO			<u>31, 31,</u>	0.15	103.95					-	
	coarse. subangi	It brown sandy gravelly SILT/CLAY. Gravel is fine to coarse, subrounded	5 and is fine to i to									
-		o medium dense silty fine grained SA	AND.	×	0.50	103.60						
- - - - -				× × × ×				AA134376	в	0.80		
-	Medium Sand is	dense gravelly SAND with a low cof	bble content.	×××	1.70	102.40						
2.0	Medium dense gravelly SAND with a low cobble conter Sand is fine to coarse. Gravel is fine to coarse, subrounded to subangular. Cobbles and boulders are subrounded to subangular.		ulders are					AA134377	В	2.00		
	End of T	Frial Pit at 2.70m		0	2.70	101.40		AA134378	в	2.70		
3.0												
-												
4.0 - -												
-  -  -												
-												
	ndwater (	Conditions										
Stabi Stabi												
Gene	ral Rema	rks										
Dry Stabi Stabi												

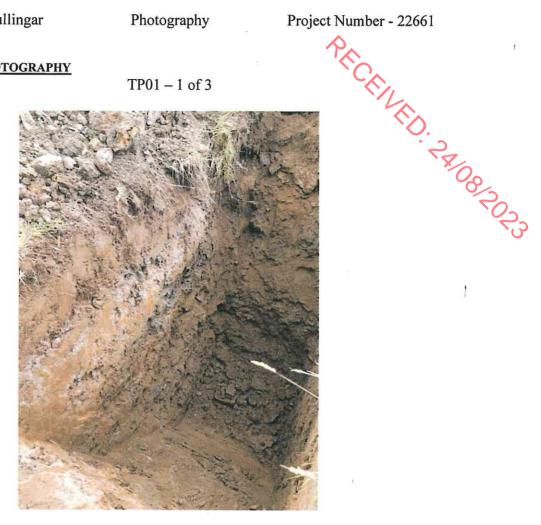
											REPORT NUMBER		
											611		
CON	TRACT	Rathgowan,Mullingar, Co.Westm	eath					TRIAL P	IT NO.	TP1	<b>4</b> et 1 of 1		
LOG	GED BY	S.Cunningham	CO-ORDINAT		642,6 753,4	01.50 E 25.17 N		DATE S	TARTED	07/0	7/2020 7/2020		
CLIE ENGI	NT INEER	Glenveagh Properties Tobins C.E	GROUND LE	VEL (m)	104.3	9		EXCAVA METHOI	ATION C	7T T Maci	racked hine		
									Samples	×	OB	meter	
		Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Type	Depth	Vane Test (KRa	Hand Performeter (KPat	
0.0	SILT/CL coarse. subangu	rm grey mottled brown slightly sand AY with a low cobble content. Sand Gravel is fine to coarse, subrounded lar. Cobbles and boulders are subro	is fine to I to bunded.		0.10	104.29		AA134379	B	0.40			
1.0	medium coarse.	vish brown sandy gravelly SILT/CLA cobble and low boulder content. Sa Gravel is fine to coarse, subrounded lar. Cobbles and boulders are subro lar.	nd is fine to		0.70	103.69		AA134380	В	1.00			
- - - - - -					2.60	101.79		AA134381	В	2.10			
3.0	End of T	irial Pit at 2.60m			2.00								
4.0													
		Conditions				<b></b>							
<b>Stabi</b> Stabl							-						
Dry Stabi Stabi	eral Remar	ks							****				

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## TRIAL PIT PHOTOGRAPHY

TP01 – 1 of 3



TP01 – 2 of 3



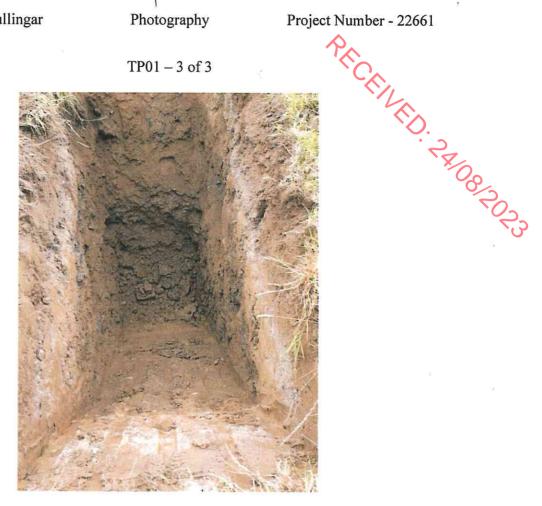
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Rathgowan, Mullingar

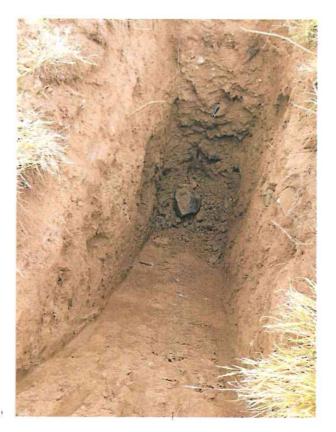
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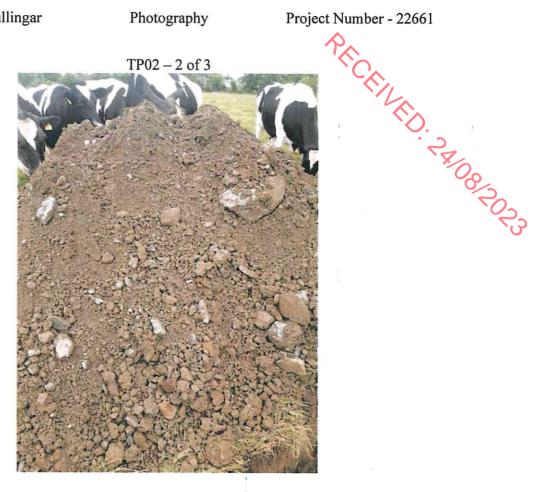
Project Number - 22661

TP01 – 3 of 3



TP02 – 1 of 3





TP02 – 3 of 3



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TP03 – 3 of 3

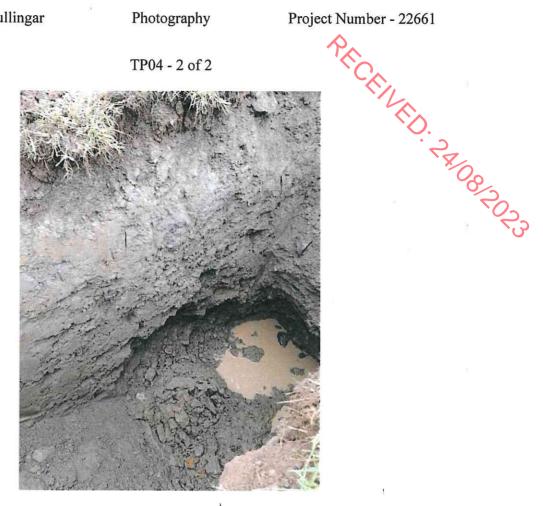


TP04 – 1 of 2

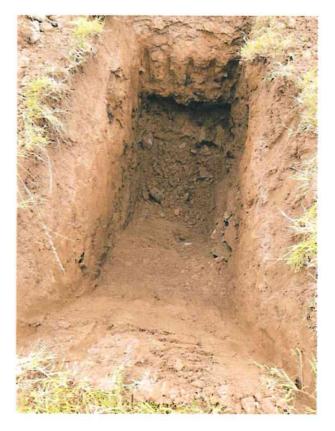


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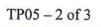


TP05 – 1 of 3



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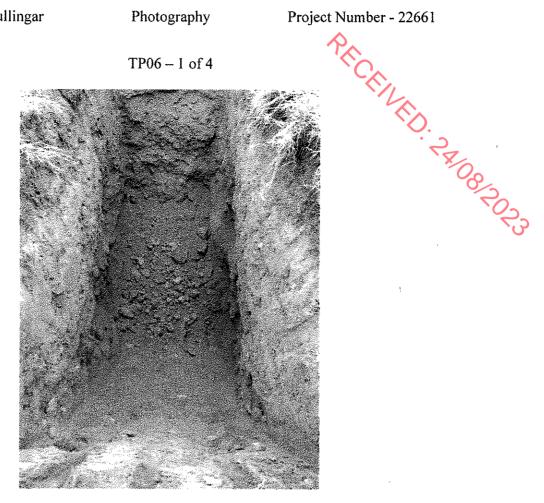


TP05 - 3 of 3



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TP06 – 2 of 4



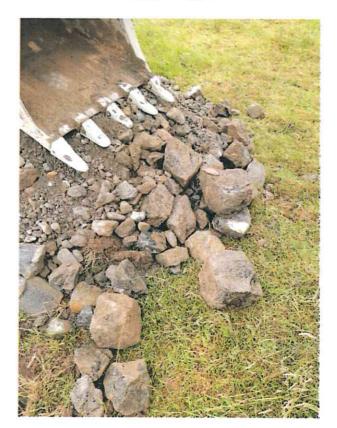
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TP06 – 3 of 4



TP06 – 4 of 4

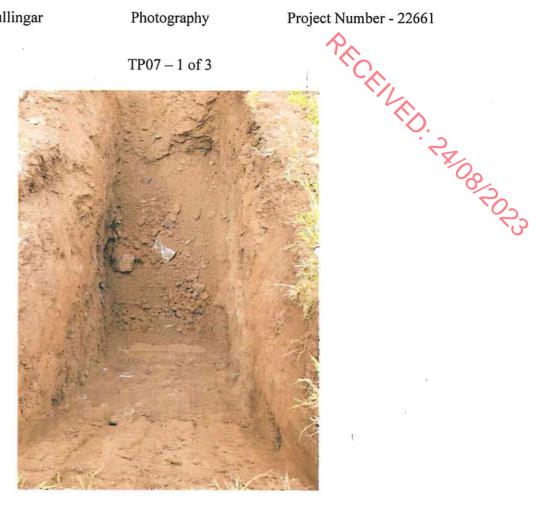
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TP07 – 1 of 3



TP07 – 2 of 3



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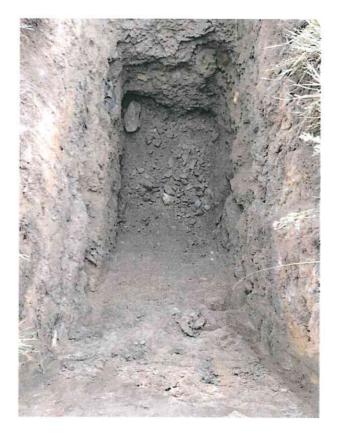
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## Rathgowan, Mullingar

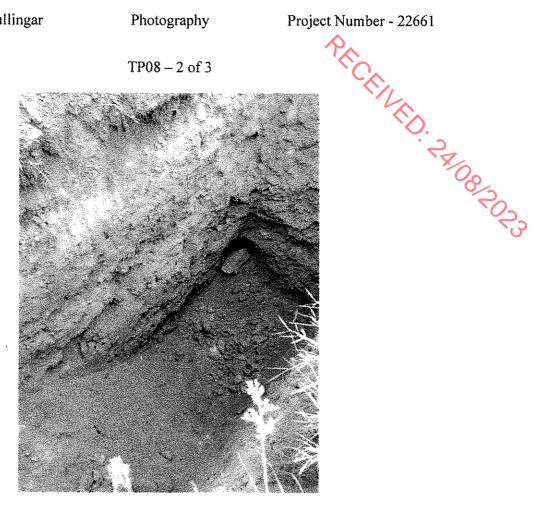
TP07 – 3 of 3



TP08 – 1 of 3



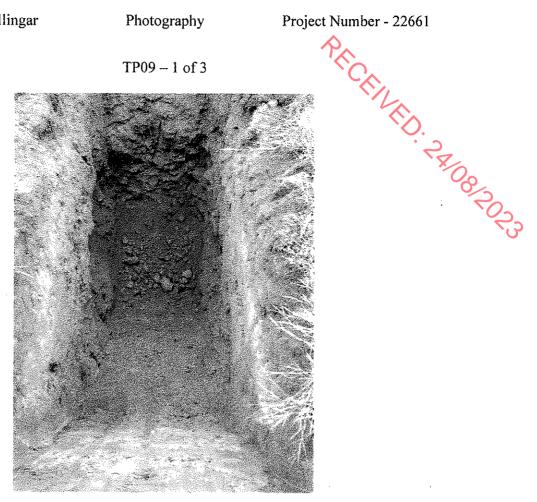




TP08 – 3 of 3







TP09 – 2 of 3

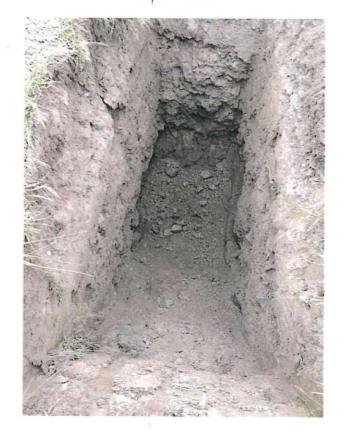


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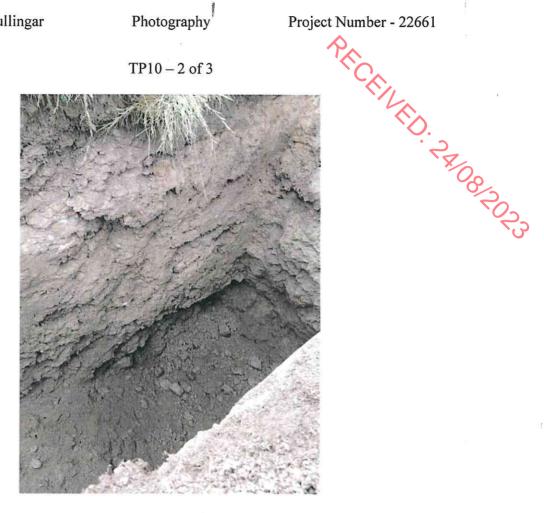
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 $TP_{10} - 1 \text{ of } 3$ 







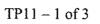
TP10 – 3 of 3

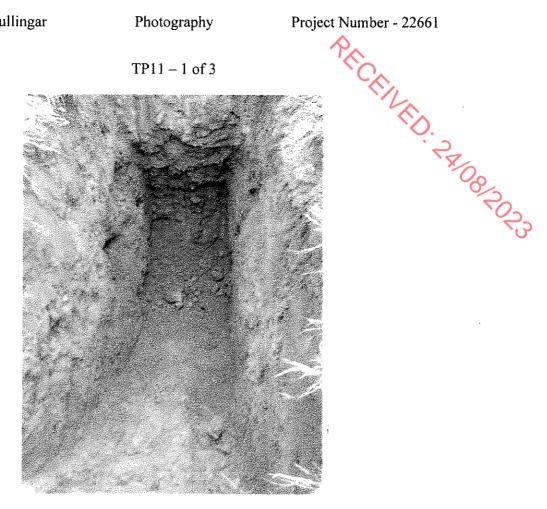


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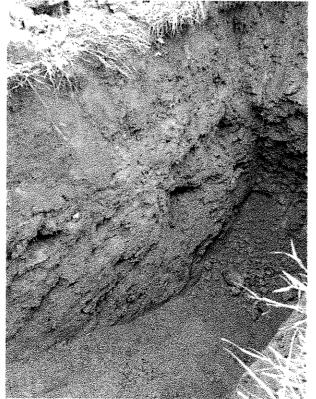
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Project Number - 22661

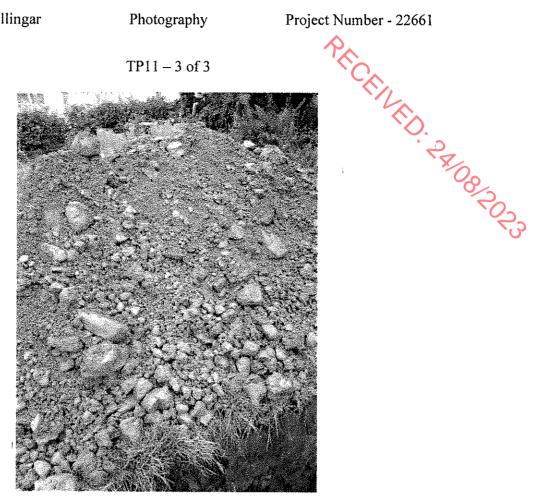




TP11 – 2 of 3



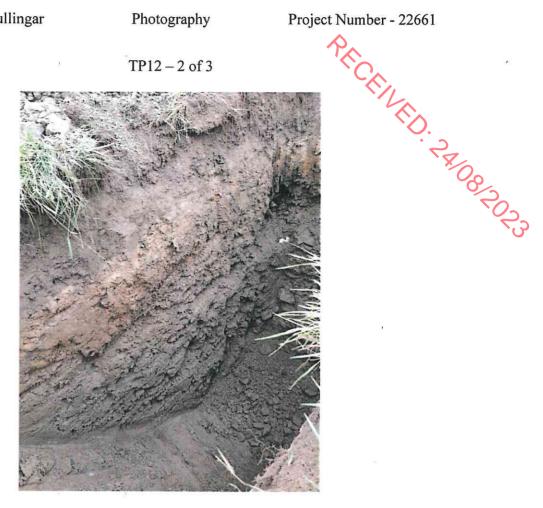




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TP12 – 2 of 3



TP12 – 3 of 3



Photography

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TP13 – 1 of 3



TP13 – 2 of 3



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TP13 – 3 of 3



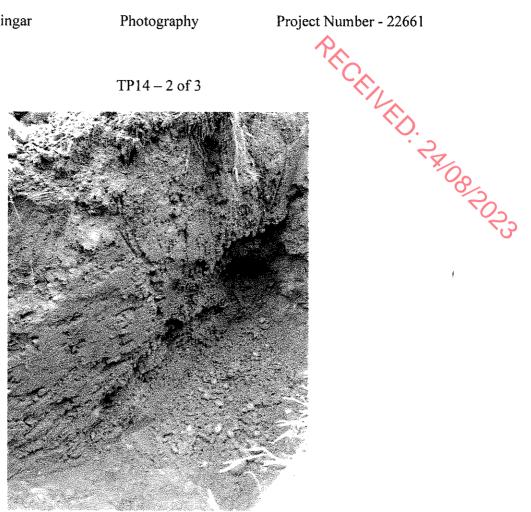


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Photography

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## SOAKAWAY PHOTOGRAPHY

SA01 - 1 of 2



SA01 – 2 of 2



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SA02 – 1 of 2



SA02 – 2 of 2



## Rathgowan, Mullingar

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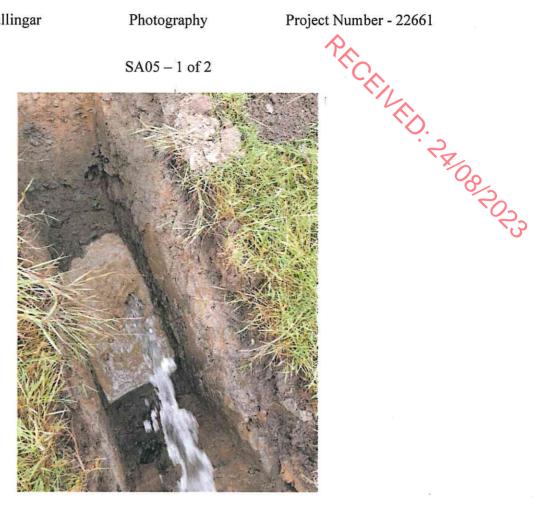


SA04 – 2 of 2

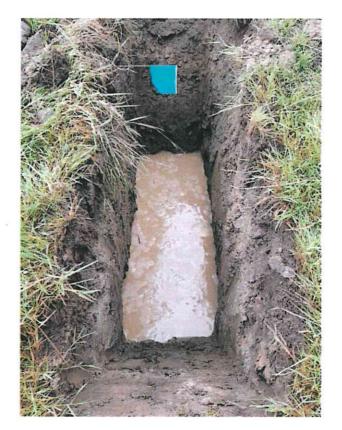


## Rathgowan, Mullingar

SA05 – 1 of 2



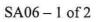
SA05 – 2 of 2



Photography

Project Number - 22661

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SA06 - 2 of 2







SA07 – 2 of 2







SA08 – 2 of 3



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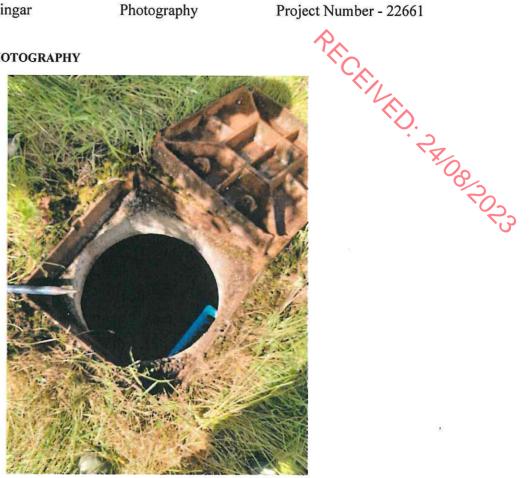
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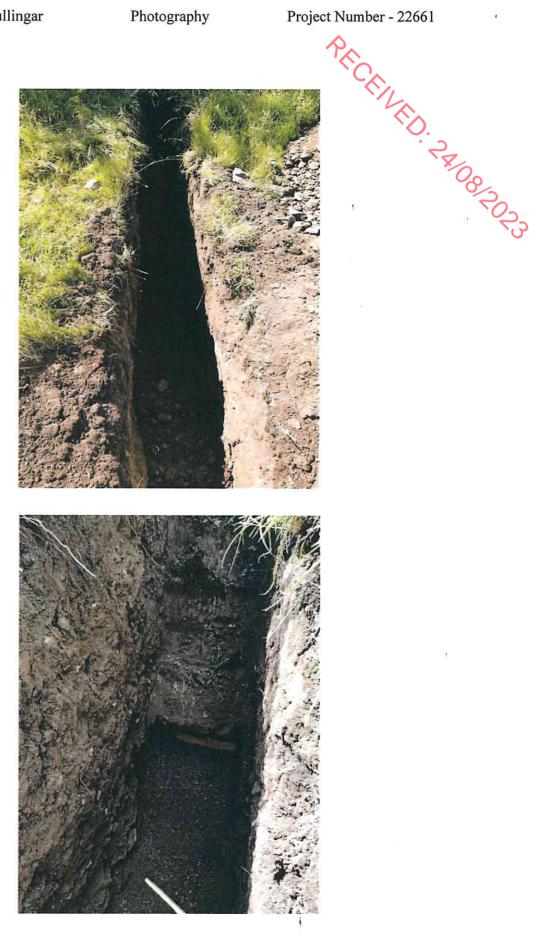
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## SLIT TRENCH PHOTOGRAPHY





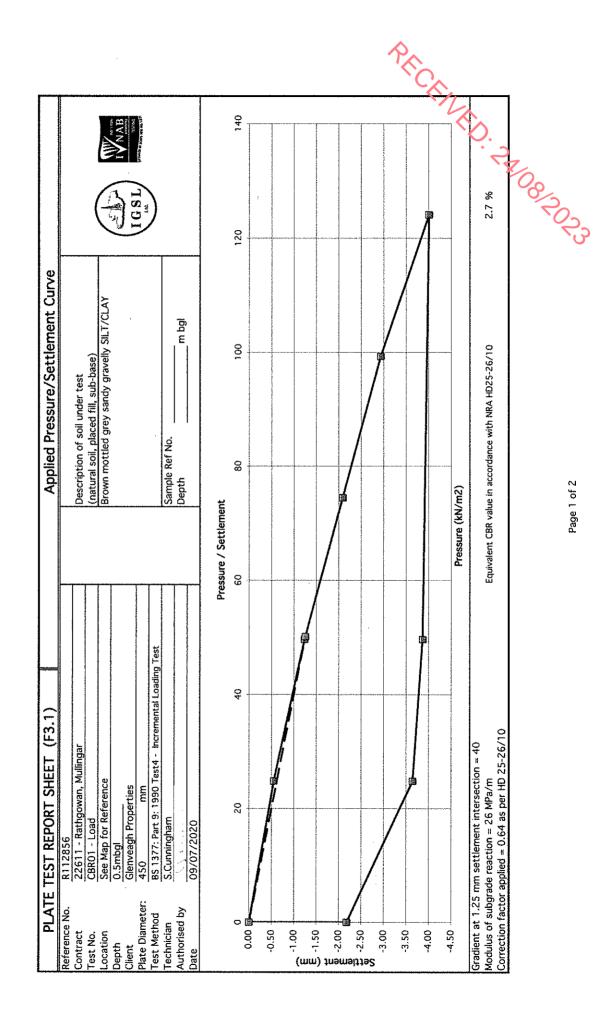
Chamber is 2m deep and located in close proximity to slit trench location

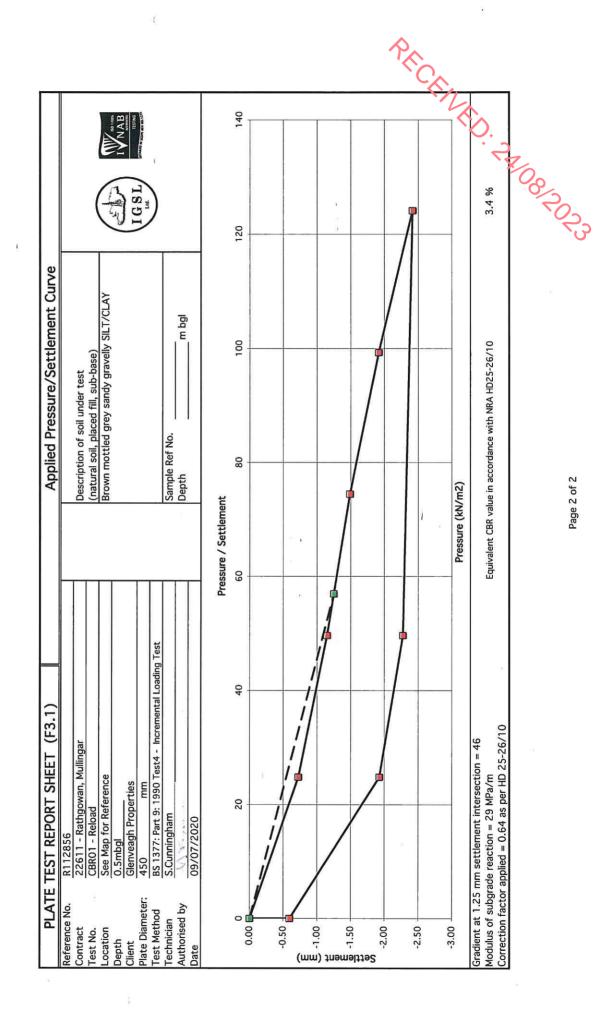


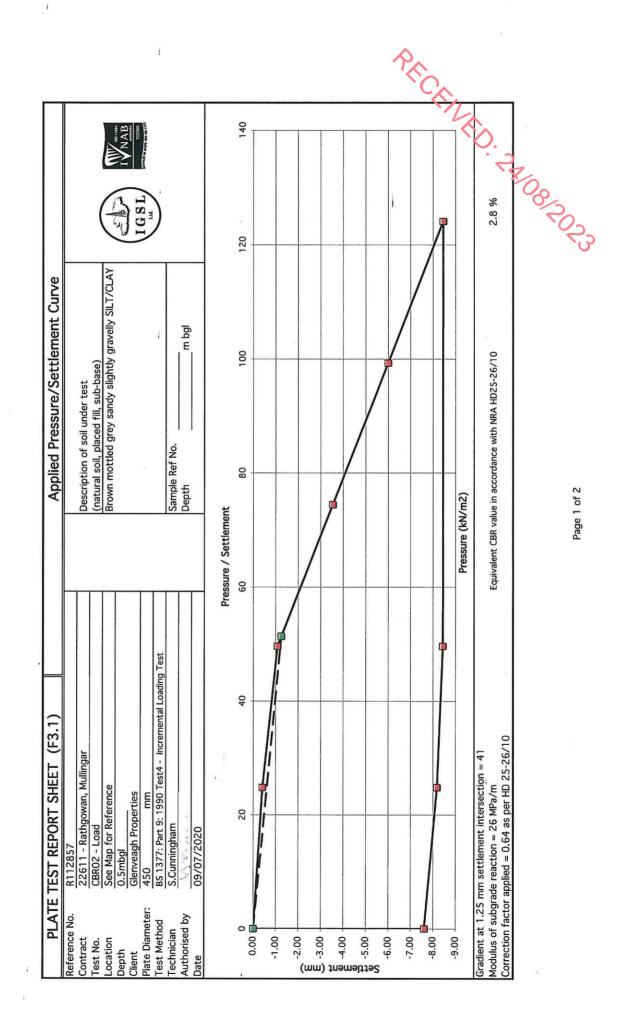




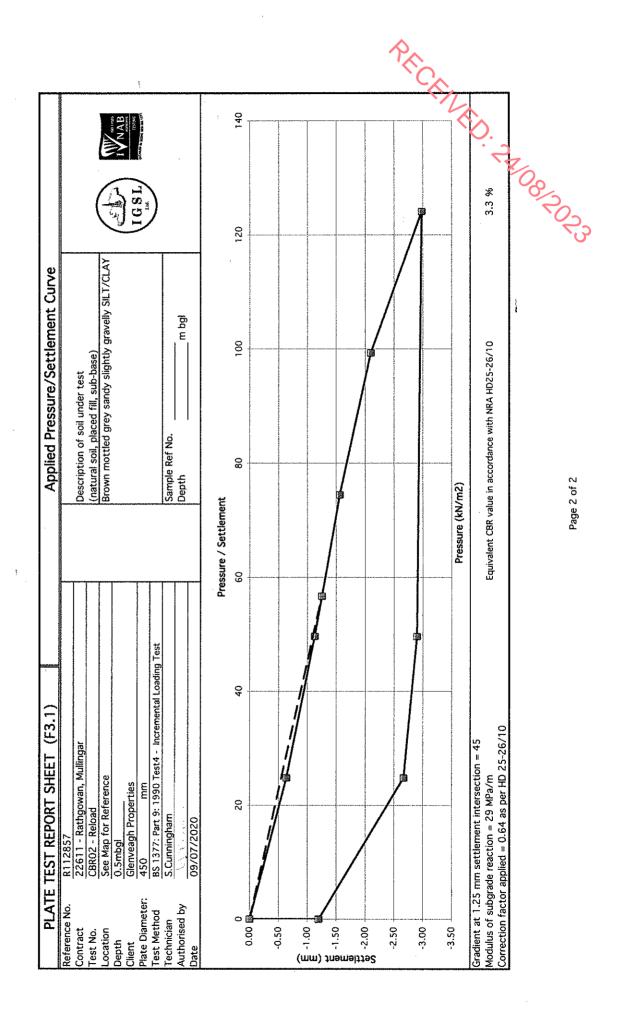
## Appendix III CBR by Plate Bearing Tests

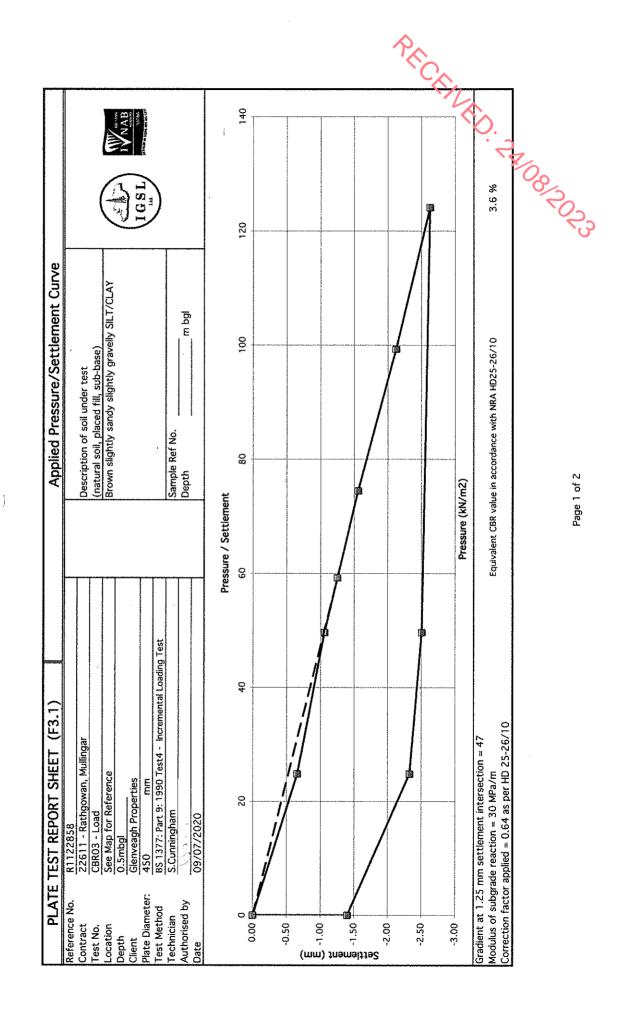


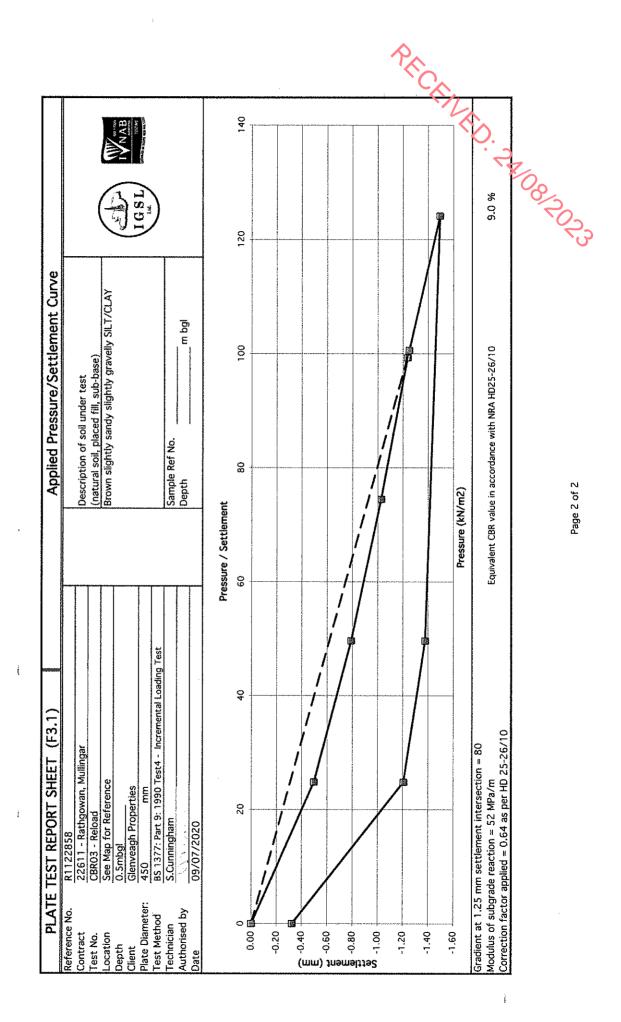


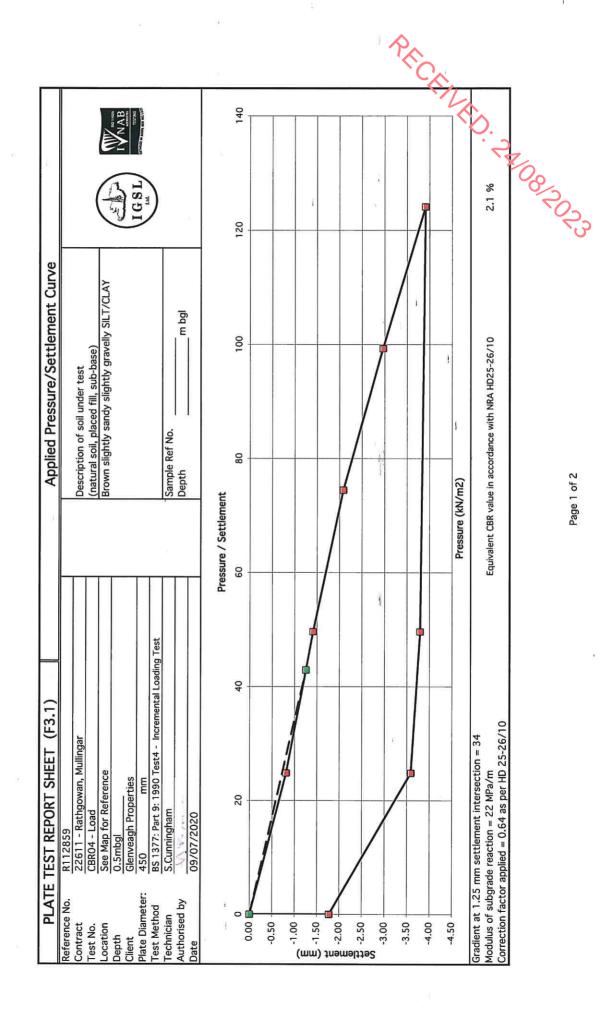


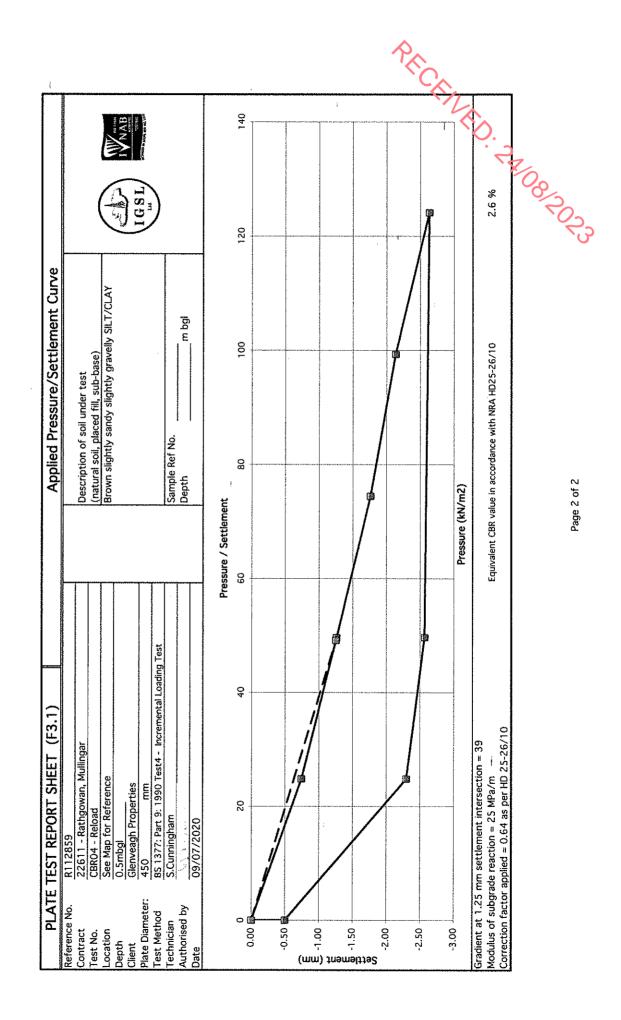
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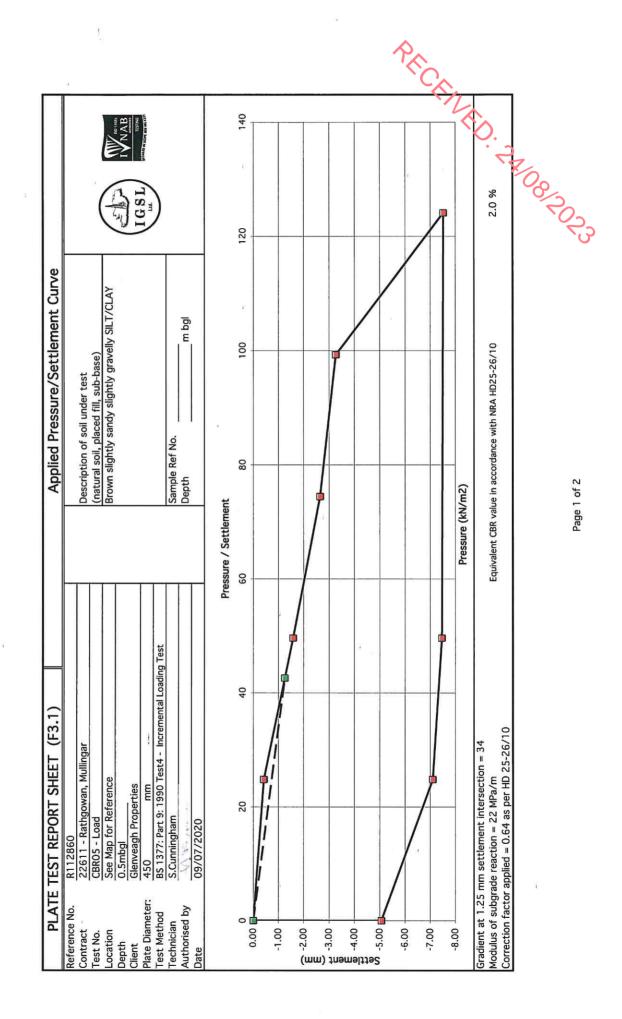








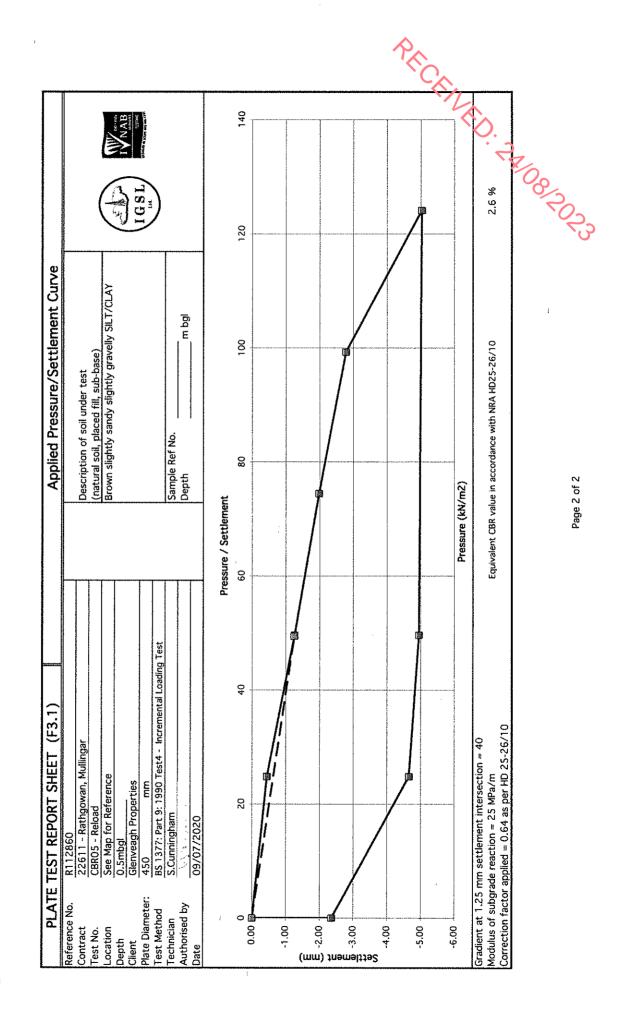
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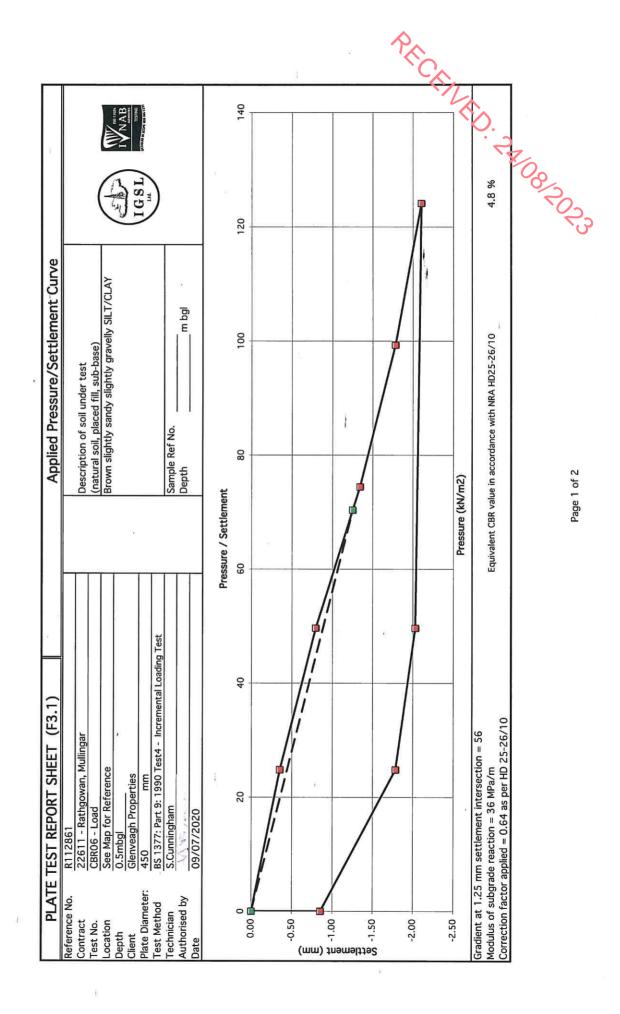


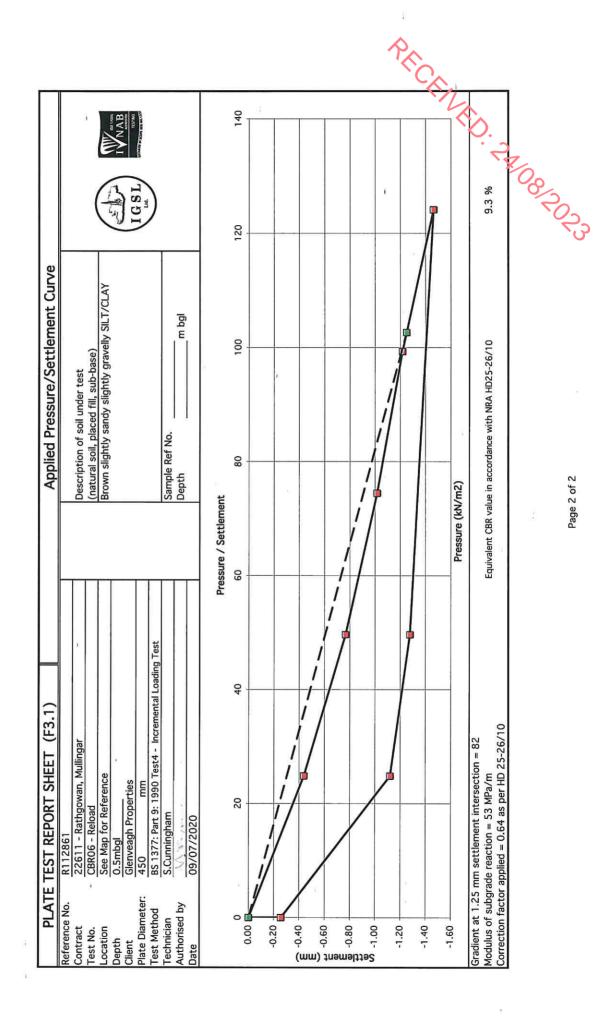
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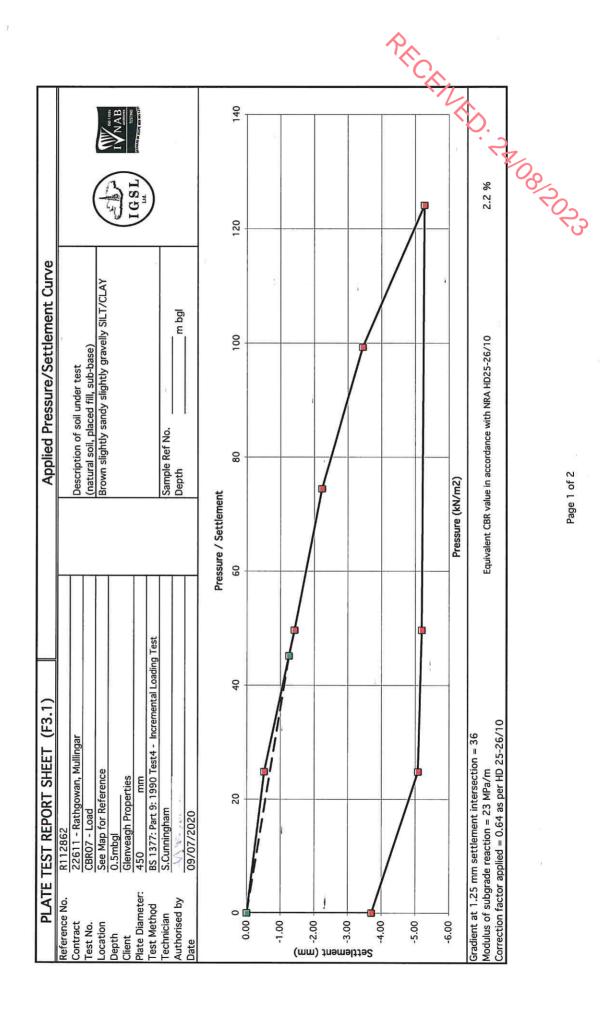
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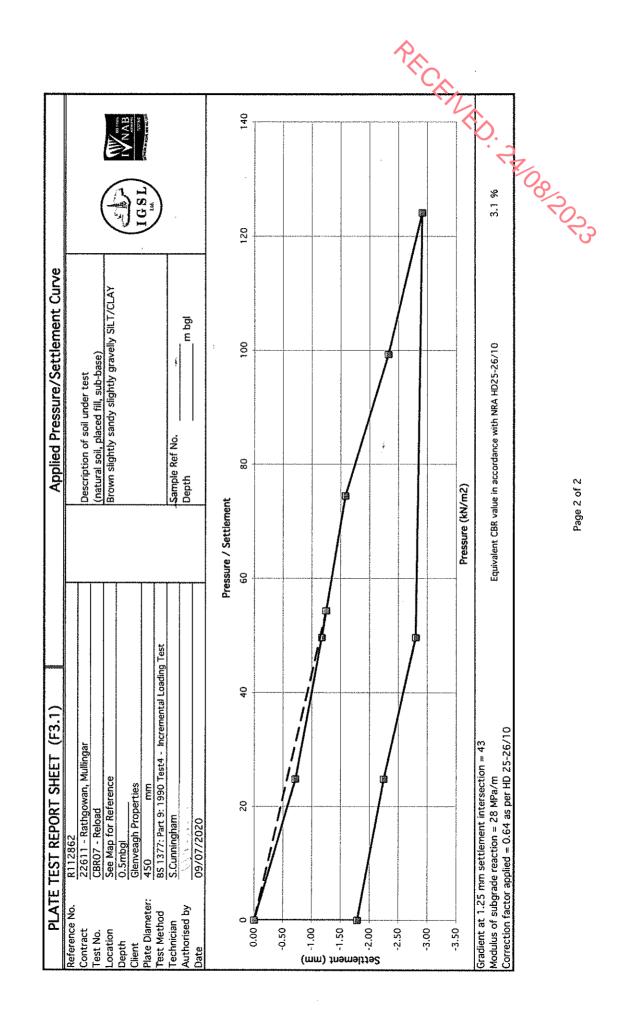
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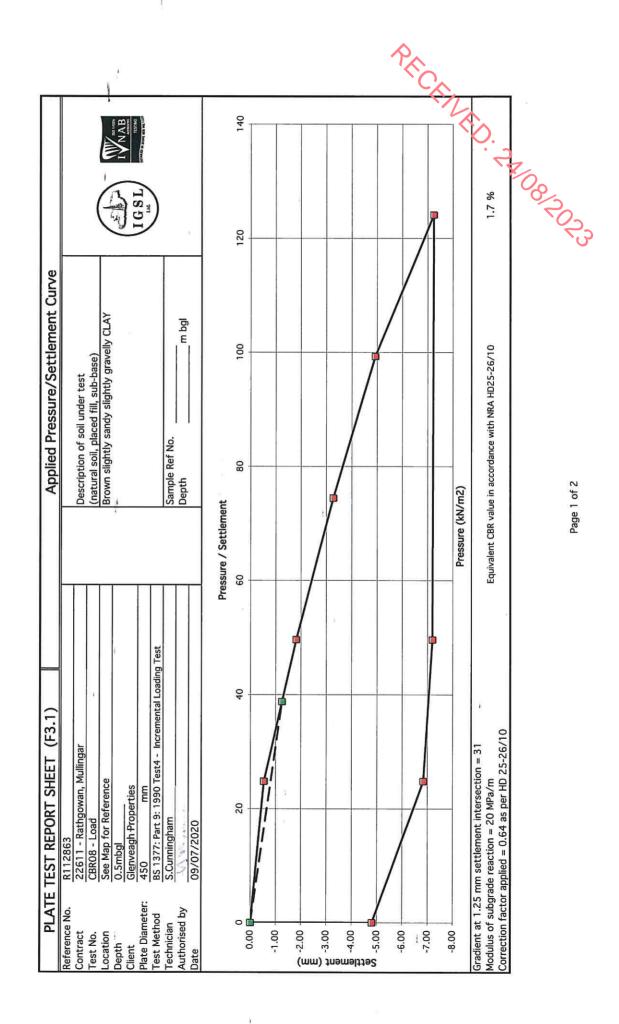


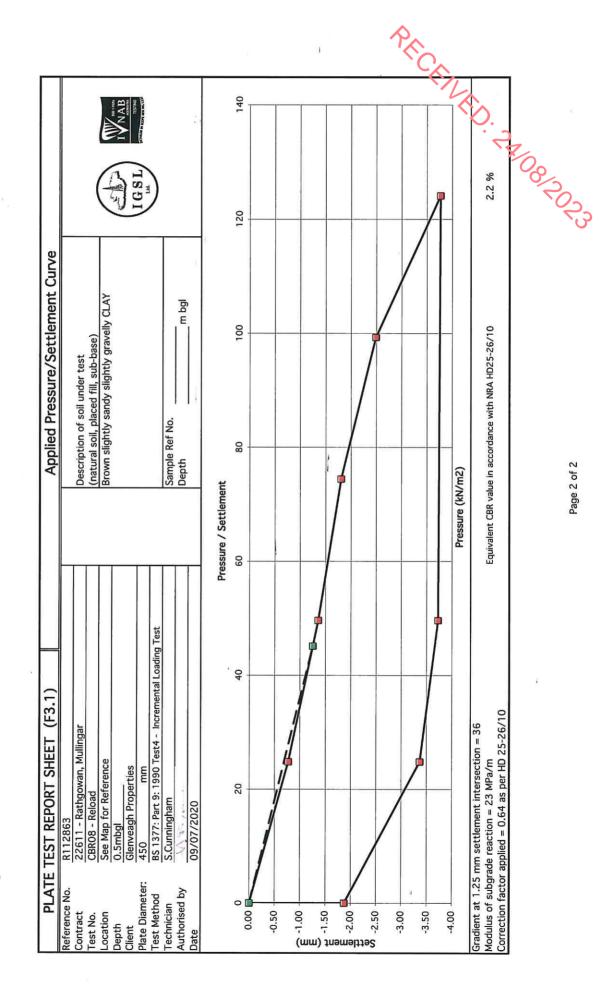




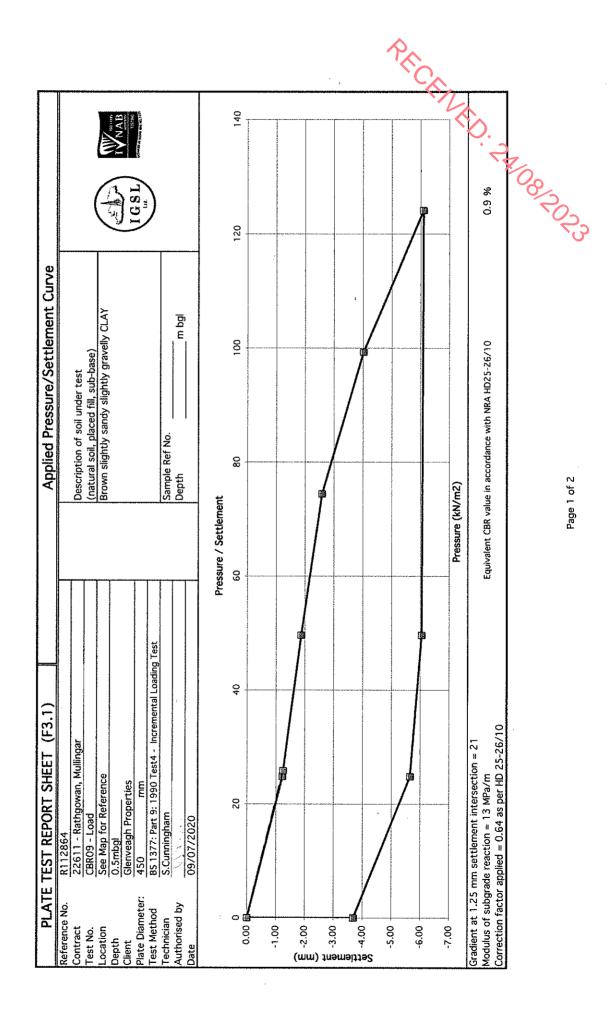


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