PROPOSED DEVELOPMENT
ACTIVE TRAVEL ROADWAY
MONAGHAN
MONAGHAN CO. COUNCIL

DBFL
CONSULTING ENGINEERS

CONTENTS

APPENDICES

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.

Standards

The ground investigation works for this project have been carried out by IGSL in accordance with Eurocode 7 - Part 2: Ground Investigation & Testing (EN 1997-2:2007). This has been used together with complementary documents such as BS 5930 (1999), BS 1377 (Parts 1 to 9) and Engineers Ireland Specification & Related Documents for Ground Investigation in Ireland (2006). The following Irish (IS) and European Standards or Norms are referenced:

- IS EN 1997-2 Eurocode 7: 2007 – Geotechnical Design – Part 2: Ground Investigation & Testing
- IS EN ISO 22475-1:2006 Geotechnical Investigation and Sampling – Sampling Methods & Groundwater Measurements
- IS EN ISO 14688-1:2002 Geotechnical Investigation and Testing – Identification and Classification of Soil, Part 1: Identification and Description
- IS EN ISO 14688-2:2004 Geotechnical Investigation and Testing – Identification and Classification of Soil, Part 2: Classification Principles

Routine Sampling.

Undisturbed samples of soils, predominantly cohesive in nature are obtained unless otherwise stated by a 104mm diameter open-drive tube sampler or Piston 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 were conducted strictly in accordance with Section 4.6 of IS EN 1997-2:2007. The SPT equipment (hammer energy test) has been calibrated in accordance with EN ISO 22476-3:2005 to obtain the Energy Ratio (E_r) of each hammer. A calibration certificate is available upon request. The E_r is defined as the ratio of the actual energy E_{meas} (measured energy during calibration) delivered to the drive weight assembly into the drive rod below the anvil, to the theoretical energy (E_{theor}) as calculated from the drive weight assembly. The recorded number of blows (N) reported on the engineering logs are uncorrected. In sands, the energy losses due to rod length and the effect of the overburden pressure should be taken into account (see IS EN ISO 22476-3:2005).

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 conditions, tidal variations etc.

Engineering Logging

Soil and rock identification has been based on the examination of the samples recovered and conforms with IS EN ISO 14688-1:2002 and IS EN ISO 14689-1:2004.

Where peat has been encountered during site works, 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).

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.

Reporting

Recommendations made and opinions expressed in this 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 by IGSL Ltd for ground conditions between exploratory hole locations.

The engineering logs provide ground profiles and configuration of strata relevant to the investigation depths achieved and caution should be taken when extrapolating between exploratory points. No liability is accepted for ground conditions extraneous to the investigation points. Unless specifically stated, no account has been taken of possible subsidence due to mineral extraction, mining works or karstification below or close to the site.

This report has been prepared for the project client and the information should not be used without prior written permission. Any recommendations developed in this report specifically relate to the proposed development. IGSL Ltd accepts no responsibility or liability for this document being used other than for the purposes for which it was intended.

REPORT ON A SITE INVESTIGATION

ACTIVE TRAVEL PROJECT
FOR
MONAGHAN COUNTY COUNCIL

DBFL
CONSULTING ENGINEERS

Report No. 24665 / 1 **July 2023**

I Introduction

A major new development is proposed for Monaghan Town involving construction of new roads to augment existing routes.

An investigation of sub soil conditions in the various areas of the new development has been carried out by IGSL for DBFL, Consulting Engineers, on behalf of Monaghan County Council.

The scheduled site investigation included the following elements.

*	Cable Percussion Boreholes	2 nr.
•	Rotary Core Holes	2 nr.
•	Standpipe Installations	2 nr.
•	Trial Pits	9 nr.
•	CBR by Plate Test	9 nr.
•	BRE Digest 365 Infiltration Tests	4 nr.
•	Slit Trenches	3 nr.
•	Vane Shear Tests	3 nr.
•	Geotechnical Soil and Rock Laboratory Tests	
*	Chemical and Environmental LaboratoryTests	

This report includes all factual data from field and laboratory operations and discusses these findings relative to foundation and infrastructural design for the proposed new developments.

II Fieldwork

This development is to take place along new access roadways in Monaghan Town.

The exploratory locations are noted on the drawings enclosed in Appendix IX and were marked out by IGSL on site. All locations have been referenced to national grid and ground levels established.

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

Close liaison was maintained throughout with DBFL Consulting Engineers and Monaghan County Council personnel.

All appropriate documentation was submitted and approved prior to site commencement. 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 / corehole locations to confirm this.

Drawings from the various utilities have been examined to ensure that major services were avoided.

Statutory HSE safety precautions relating to general safety and COVID 19 were strictly observed, with working areas restricted to IGSL personnel only, to ensure safety of the general public.

Boreholes

Boreholes were 200mm diameter and were constructed using conventional cable percussion equipment. Holes were referenced BH01 and BH02. A trial pit was opened at each borehole location to 1.00 metre deep to ensure that underground services were not damaged.

The holes were located either side of the existing canal, where a new bridge is proposed. Commencing surface in both locations was topsoil / grass.

BH02 was relocated slightly northwards because of safety of access at the original position.

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. It was not possible to recover undisturbed samples because of the hard and granular nature of the strata encountered.

BH01 on the northern side of the stream encountered soft to firm slightly gravelly SILT/CLAY to a depth of 3.20 metres. Stiff grey gravelly SILY/CLAY extends from 3.20 to 4.00 metres and overlies dense sandy GRAVEL from 4.00 to 4.60 metre. Boring was terminated on boulder obstruction following a period of chiselling at 4.60 metres BGL.

At **BH02** stiff brown sandy gravelly CLAY , typically containing cobble and boulder material, is encountered at 1.20 metres below variable FILL. This stratum continues to about 3.50 metres where dense GRAVEL is again encountered. This borehole was terminated on boulder obstructions in the gravel at 4.40 metres.

The stiff brown or grey gravelly CLAY encountered in both boreholes is a GLACIAL TILL or BOULDER CLAY with the high percentage of coarse material typical of the stratum.

The final refusal depths are **NOT** indicative of rock horizon.

Ground water ingress was noted in both locations, in association with the GRAVEL stratum Details are noted on the individual records.

Rotary Core Drilling

Rotary core drilling was employed at the borehole locations to advance investigation depth, establish bedrock horizon and recover representative rock core.

A BT-44 drilling rig was used to drill in each location using triple tube core drilling technique and an air-mist coolant. Symmetrix open hole drilling (100mm diameter) was used through the overburden deposits.

Detailed drilling records are presented in Appendix II with accompanying core photographs. The records note Total and Solid Core Recovery (TCR / SCR) and provide a detailed geological description of the bedrock.

Drilling continued in stiff gravelly CLAY (Boulder Clay) in each location to respective depths of 7.50 metres, with numerous boulders noted.

Bedrock was noted at 7.50 metres and 3.00 metres of solid core was recovered Strong to very strong blue grey fine grained LIMESTONE has been identified by the geologist.

A slotted PVC standpipe was installed in both locations to facilitate on-going monitoring of ground water level. The installations were sealed at surface and protected by a steel cover. While no free water was noted during drilling, water level was noted in the standpipes at the end of drilling.

Sub samples of the core were selected for Point Load Test in the laboratory.

The rotary core findings are summarised in the following table.

Hole No.	Overburden	Core Recovered	Standpipe Water Level
RC01 R	0 – 7.50	7.50 – 10.50	0 – 10.50 (6.55 m BG)
RC02 R	0 – 7.50	7.50 – 10.50	0 – 10.50 (4.85 m BG)

Trial Pits

Trial Pits were scheduled in nine locations widely spaced along the new routes and referenced TP01R to TP09R. A tracked excavator was used under engineering supervision. Detailed records with supporting photographs for each location are presented in Appendix III. These records note the soil stratification and record sampling and ground water details.

Trial Pits TP01 to TP05 located in the lower southern area encountered MADE GROUND deposits to varying depths overlying soils varying from very soft SILT (TP01) to soft to firm brown sandy gravelly CLAY (TP03 to TP05). TP02 encountered MADE GROUND to the full-excavated depth of 2.50 metres.

Trial Pits TP06 to TP09 all noted topsoil overlying brown gravelly CLAY (boulder clay). The stratum is initially soft to firm, increasing in strength with penetration to firm/stiff. Excavation depths varied from 1.50 to 2.30 metres, with boulder obstructions preventing advancement. Ground water was noted in several locations.

Trial Pit details are summarised as follows:

Ref No.	Fill	Soft Silt Clay	Firm Stiff gravelly CLAY	Water
TP01R	0 – 2.10	2.10 – 2.60		2.10
TP02R	0 – 2.50			Dry
TP03R	0 – 1.70	1.79 – 2.20	2.20 – 3.00	Dry
TP04R	0 – 1.40	1.40 – 2.00	2.00 – 3.00	Dry
TP05R	0 – 1.70		1.70 – 1.80	Dry

Ref No.	Topsoil	Soft gravelly Clay	Firm gravelly CLAY	Water
TP06R	0 – 0.20	0.20 – 0.50	0.50 – 1.70	1.00
TP07R	0 – 0.20	0.20 – 0.50	0.50 – 2.30	Dry
TP08R	0 – 0.25	0.25 – 0.85	0.85 – 1.80	1.80
TP09R	0 – 0.25	0.25 – 0.50	0.50 – 1.50	0.50

Trial Pits were backfilled with the excavated spoil, compacted in layers, the disturbed areas were levelled and coarse material was removed.

BRE Digest 365 Test

Infiltration testing was performed at six locations as specified in accordance with BRE Digest 365 'Soakaway Design'. Tests are referenced SA01R to SA06R. Detailed data is presented in Appendix IV. All locations have been surveyed with co-ordinates provided.

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. In these calculations the exposed area is the sum of the base area and the average internal area of the permeable stratum over the test duration. Design is based on the slowest infiltration rate, which has been calculated from the final cycle.

The stratification in the test areas comprised Topsoil over either MADE GROUND or soft to firm brown gravelly CLAY. Details are noted with photographs on the individual records.

Results are summarised as follows:

Test No.	Depth	Soil Type	Infiltration Rate (f) (Metres/ Minute)
SA01R	1.70	MADE GROUND	0.0000 (Fail)
SA02R	1.30	MADE GROUND	4E-05
SA03R	1.70	MADE GROUND	0.0000 (Fail)
SA04R	1.60	MADE GROUND	0.00102
SAO5R	1.40	Gravelly CLAY	0.00028
SA06R	1.60	Gravelly CLAY	0.0000 (Fail)

The results confirm zero to very low permeability for the cohesive gravelly clay soils present on the site.

Plate Bearing Tests

In situ CBR value and Modulus of Subgrade Reaction was established by Plate Bearing Test. Tests are referenced PBT01R to PBT 09R and were located at the similarly numbered Trial Pit locations.

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.

Results are summarised in the following table and individual test records are found in Appendix V.

Test No.	Depth	Soil Type	CBR at Load Cycle (%)	CBR at Reload (%)
PBT 01	0.50	FILL	1.3	2.3
PBT 02	0.50	FILL	1.1	1.5
PBT 03	0.60	FILL	1.0	1.3
PBT 04	0.60	FILL	1.1	1.2
PBT 05	0.50	FILL	3.1	3.5
PBT 06	0.60	Clay	1.1	10.6
PBT 07	0.60	Clay	2.3	2.9
PBT 08	0.60	Clay	1.3	3.8
PBT 09	0.60	Clay	3.8	9.5

Slit Trenches

Four slit trenches were opened in specified locations and are referenced ST01 to ST04.

Trenches were opened using a combination of machine and hand excavation. Hard surfaces were saw cut prior to removal of surfacing. Trenches were 0.50 or 1.00 metres wide and were excavated to depths between 1.30 and 1.80 metres.

Detailed records of each excavation are presented in Appendix VI. These note the trench dimensions, record all services encountered and note the stratification. Photographs of each excavation are also included with the detailed records.

Trench lengths were respectively 12.50 metres, 12.10 metres, 14.85 metres and 14.50 metres.

Shear Vane Tests

Shear vane tests were scheduled at three locations along the canal greenway. A GEONOR H-10 Vane was employed (130mm long X 65mm wide).

Tests were attempted at three depths in each location. In all instances refusal of apparatus was recorded on dense coarse subsoil/fill. Data for each vane test is presented in Appendix VII. Tests are referenced SV01 to SV03.

The stratification was established by Window Sampling and the detailed geotechnical records for each location are presented with the Vane Test data.

In addition HD Dynamic Probes were driven at each location to establish a strength depth pattern for the sub soils. Probe records are also included with the Vane Shear data

MADE GROUND was noted in each location, extending to at least 2.00 metres at SV01 with refusal noted at this depth. Heavy duty probing suggests that variable FILL material may extend to in excess of 3.00 metres in places.

At SV02 and SV03 coarse dense FILL of gravelly CLAY extended to respective depths of 2.50 and 2.00 metres. Stiff gravelly SILT/CLAY was noted below the FILL.

III. Testing

In Situ

Standard penetration tests were carried out at approximate 1.00 metre intervals in the geotechnical boreholes and at 1.50 metres in the Rotary Core Holes to measure relative in-situ soil strength. N values are noted in the right hand column of the individual 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	COMMENT
Gravelly CLAY (Boulder Clay)		
1.00 m BGL	6 to 13	Soft to Firm
2.00 m BGL	10 to 29	Firm to Stiff
3.00 m BGL	26 to 50	Stiff to Hard
4.00 m BGL	> 50	Hard
4.00 to 15.00 m BGL (Rotary Holes)	40 to >50	Hard

Limited penetration SPT tests with refusal were recorded on numerous occasions, reflecting a high concentration of cobble / boulder material in the glacial till

Laboratory

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. Chemical and environmental 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
MCV	IGSL
CBR	IGSL
Compaction	IGSL
Point Load Tests	IGSL
Organic Content	EUROFINS
Sulphate / Chloride / pH	EUROFINS
RILTA Suite Environmental	EUROFINS

All laboratory data is presented in Appendices VIIIa and VIIIb and individual tests are discussed briefly as follows:

Index Properties / Natural Moisture Content

Classification tests have been carried out on samples of the cohesive soils from borehole and trial pit locations.

The results indicate some variation in composition of the soils from CLAY to SILT matrix. The SILT matrix till generally occurs at shallow depth below the topsoil while the CLAY dominant till is noted at greater depth and represents glacial till or boulder clay deposition.

The gravelly CLAY plots in the CI/CL zone of the standard Classification chart indicative of low plasticity soil. Natural Moisture Content ranges from 12 to 26%.

Grading

Wet sieve and hydrometer analysis has been carried out on samples of the cohesive soils from both boreholes and trial pits. The graphs are typically straight line, grading from the fine clay to coarse gravel fraction. The pattern is very typical of glacial till or boulder clay deposition. One sample from the base of BH02 confirms the stratum as clean well-graded fine to coarse GRAVEL with less than 4% passing to the sand fraction

MCV/CBR/Compaction

Four large bulk samples were selected from Trial Pits 04 / 06 / 08 and 09 and a series of tests were scheduled to establish the soil characteristics relative to re-use during the new development.

The tests carried out included MCV (Moisture Condition Value), CBR (California Bearing Ratio), Dry Density / Moisture Content relationship.

The results are summarised as follows:

Ref No.	**TP04R**	**TP06R**	**TP08R**	**TP09R**
Depth	1.70	0.70	0.70	0.60
Natural MC (%)	16	20	23	17
MCV	5.4	4.6	5.7	6.8
CBR (%)	1.25	0.9	1.45	1.9
Max. Dry Density (mg/cu.m.)	2.01	1.89	1.80	1.84
Optimum Moisture (%)	8.1	11	11	11

Organic Content

Three samples of the soils from the site had organic contents established. Samples were generally taken from shallow depths below the topsoil. Values of 1.3 and 2.0% were determined for two locations indicative of very low to negligible organic content. One elevated level of 9.1% was recoded in the FILL material in TP01R.

Point Load Tests

Sub samples of the recovered limestone core have been selected for Diametrial Testing in The Point Load Apparatus. A total of 6 tests were performed and equivalent UCS values have been calculated. Rock strength (UCS) varies from 60 to 136 MPa (with an average value of 101 MPa). This confirms the medium strong to strong classification by the engineering geologist during detailed core logging.

Chemical Suite (Sulphate Chloride pH)

Four samples were sent for analysis to BRE Chemical Suite parameters.
Sulphate concentrations (SO4 2:1 extract) of <0.010 g/l were established with pH values ranging from 8.1 to 8.3. Chloride concentrations (<0.010 to 0.016 g/l) were also determined.

The results indicate a design class of DS-1 (ACEC Classification for Concrete) for sulphate concentrations below 0.5 g/l. No special precautions are necessary to protect below ground foundation concrete.

RILTA Environmental Suite

Seven samples of the sub soils were sent to specialist environmental laboratory EUROFINS and testing was carried out in accordance with RILTA requirements to establish Landfill Waste Acceptance Criteria (WAC).

Detailed results are presented in Appendix VIIIb. In three samples elevated levels of Total Organic Carbon (TOC), Hydrocarbon (Total WAC) and Total Dissolved Solids were established. These are highlighted on the detailed laboratory data sheets.

The elevated levels were obtained from samples from the lower levels of the site where significant depths of MADE GROUND occur. Tests on samples from the higher natural ground to the north of the site were all classed as INERT.

A comprehensive Waste Characterisation Assessment (WCA) will be required by landfill operators. This can be prepared by specialist environmental consultants using the factual data from field and laboratory as presented in this report.

Asbestos screening was carried out on all RILTA samples with no traces of Asbestos noted.

IV. Discussion:

A major development is being undertaken at this site in Monaghan. A new CIVIC CENTRE is to be constructed for Monaghan County Council and a NEW ROAD is to be provided to access the Civic Centre.

A detailed geotechnical investigation has been carried out by IGSL under the direction of DBFL Consulting Engineers.

The factual data from the field and laboratory operations is presented in Sections 1 to III of this report.

This part of the report comments on the various findings with various recommendations for the proposed construction programme.

For the purposes of this report the investigation has been sub-divided into a number of parts as follows:

A; Section from Roosky Vale Eastwards to Proposed New Bridge

B New Bridge

C Proposed Road North from new bridge to proposed CIVIC CENTRE

D Roadway north of CIVIC CENTRE to temporary turning area.

A: NEW ROADWAY Rooskey Vale to New Bridge

This section is parallel to the Ulster Canal Greenway on level ground (OD 56 to 57 metres)

On this section of the proposed development MADE GROUND has been identified in Trial Pits, Window Samples and Slit Trenches extending to depths in excess of 2.00 metres.

Firm grey brown gravelly SILT/CLAY (TILL) was noted in places below the FILL.

The MADE GROUND is variable in composition and in strength with brick, plastic, timber and concrete fragments in a gravelly SILT/CLAY matrix. CBR values of 1 to 2% were recorded at 0.50 metres BGL.

Environmental test data indicates that the MADE GROUND contains elevated levels of contaminated material and may NOT be classed as INERT.

Road construction should comply with current NRA specifications and guidelines. A general discussion of pavement construction on MADE GROUND is included on Page 14 of this document.

The construction programme should included Plate Bearing Tests at intervals to confirm acceptable CBR values on the placed granular fill.

B; NEW BRIDGE

The ground conditions at either side of the stream have been determined by Borehole and Rotary Core Drilling.

At BH01 firm grey gravelly CLAY is noted from 1.10 to 3.20 metres overlying very stiff gravelly CLAY and dense GRAVEL from 4.00 to 4.60 metres. Proof core drilling has established solid limestone bedrock at 7.50 metres BGL, proof cored to 10.50 metres.

BH02 penetrated MADE GROUND to 2.20 metres overlying stiff grey gravelly CLAY and GRAVEL from 3.50 to 4.40 metres. Bedrock was again confirmed from 7.50 to 10.50 metres BGL .

Ground water ingress was noted in both locations in association with the GRAVEL stratum Standpipes were installed to allow long term ground water observation.

In-situ tests have indicated a stratum of stiff grey gravelly CLAY (Boulder Clay) in both boreholes at respective depths of 3.20 and 2.20 metres with an allowable bearing pressure of 150 kPa at 3.00 metre BGL.

Construction of conventionally excavated abutments can be considered, however the depth of excavation (> 3.00 metres) and the presence of ground water suggests that PILING may present a more suitable option from both an engineering and economic viewpoint. LIMESTONE bedrock was confirmed by core drilling at 7.50 metres and will provide the founding medium for PILING.

Specialist Piling contractors should be consulted to establish the most suitable piling technique for this particular location.

C: ROADWAY FROM BRIDGE NW TO CIVIC OFFICES SITE

Trial Pits and CBR tests 4, 5 and 7 were constructed along this section, with ground level increasing from 56 metres OD (TP04R and TP05R) to 72 metres OD (TP07).

The lower part of the route comprises MADE GROUND (1.50 to 1.70 metres) overlying firm grey brown sandy gravelly CLAY (TILL).

TP07R at the NW end encountered virgin soils with Stiff BROWN BOULDER CLAY penetrated from 0.50 to 1.50 metres.

CBR values of 1% to 3% were recorded at 0.50 metres BGL.

A significant increase in CBR values would be expected in the stiff gravelly CLAY encountered in the vicinity of TP07.

It should be noted that an elevated level of Total Organic Carbon was identified in a sample of MADE GROUND from TP05R.

Construction in this area will be similar to that outlined in Area A. The reduced thickness of MADE GROUND in this area is noted and the removal of this material prior to road construction may be an economic option.

D: ROADWAY FROM TP07 TO TP09

This final section slopes steeply (72 to 82 OD approximately) in GLACIAL TILL deposits. The stratification is of topsoil with a thin soft clay layer (GL to 0.50 metres) overlying firm to stiff grey brown gravelly CLAY. A CBR of at least 3% can be assumed at 0.50 metres BGL. CBR values should increase significantly in the stiff gravelly boulder clay. The firm/stiff boulder clay will be quite suitable for road construction.

Given the variations in site levels it is likely that significant cut and fill operations will be required. No major issues will arise with excavation, other than the presence of boulder obstructions and possibly water ingress if gravel zones are encountered.

A detailed programme of laboratory testing has been carried out to establish soil parameters relative to the suitability of excavated material for re-use as engineered fill.

The results reflect a high degree of consistency in the boulder clay over the site area and will allow the appointed contractor to design a suitable programme for earthworks on this site.

GENERAL COMMENTS ON PAVEMENT CONSTRUCTION PARTICULARLY ON MADE GROUND

The trial pits revealed Made Ground to depths in excess of 2.5 metres.

The Made Ground should be assumed to be a heterogeneous material that has not been placed or compacted in an engineering manner, and therefore, variations in its composition and degree of compaction should be anticipated. Organic matter was also noted within the Made Ground in some trial pits.

In view of the anticipated variations within the Made Ground, the capping thicknesses should be designed in accordance with NRA HD 25-26/10 with reference to Section 3.23 ("Soft Subgrades").

In accordance with the aforementioned design manual, soft subgrades can either be improved (e.g. using lime) or removed and replaced with a more suitable material. The thickness removed will typically be between 0.5 and 1.0 m. Although the new material may be of good quality, the new subgrade should be assumed to be equivalent to one of a CBR of 2.5%.

For this site, close inspection of the prepared formation in conjunction with plate bearing tests will be essential to verify the design CBR value and to identify any soft, loose or organic zones. Any residual zones of soft or organic subgrade should be removed and replaced with 6F capping or starter layer material (Class 6A / 6B). Where the soft ground is deep, the removal and replacement of up to 1 metre of subgrade can be expected.

Due to the anticipated high variability of the formation soils, a geotextile separator at subgrade level and geogrid reinforcement within the capping layer would be recommended.

Stripped subgrade should be protected from surface water ingress or disturbance from unnecessary pedestrian or vehicular traffic. The time between stripping to formation level and placement of the capping layer should be minimised.

Any proof rolling of the natural subgrade soils should be performed statically using a smooth roller in order to avoid vibratory disturbance. Initial placement of the capping or starter layer should also be carried out using a static roller for the same reason.

It is important that argillaceous sedimentary rocks (i.e. muddy limestone, calcareous mudstone, shale, etc.) are not used in sub-base, capping or as a starter layer. These have high potential to give rise to degradation (i.e. poor durability and soundness) and slaking and therefore would not be suitable. All granular fills (particularly Series 600 and 800 material) should be thoroughly examined, tested and approved in advance of being used in the pavement construction.

ENVIRONMENTAL

Where elevated contaminant levels occur (generally associated with the FILL deposits over the lower portion of the site) special precautions may be required in off-site disposal of excavated material. It is unlikely that excavated material will be accepted in an INERT facility.

Environmental tests on samples from the boulder clays north of TP 06 indicate that this material can be classed as INERT with no issues arising as to disposal of excavated material either on or off the site.

A waste Characterisation Assessment (WCA) is likely to be required where FILL material is to be disposed of and should be carried out by environmental specialists. This WCA should be submitted to the relevant waste management facility, to confirm suitability for acceptance.

BRE DIGEST 365 TESTS

The test results reflect very low permeability characteristics in the gravelly CLAY soils. This is very typical of the local boulder clays. Clay matrix material is generally unsuited to dispersion of storm or surface water and consideration should be given to the use of a suitable local water course or the Local Authority Drainage System for this development.

FOUNDATION CONCRETE

No special precautions are necessary for protection of below ground concrete.

Appendix I Boring Records

GEOTECHNICAL BORING RECORD

REPORT NUMBER 24665

CONTRACT	Monaghan Active Travel - Road & Bridge project	**BOREHOLE NO.**	**BH01R**
		SHEET	Sheet 1 of 1
CO-ORDINATES	667,653.00 E 833,742.61 N	**RIG TYPE**	Dando 2000
		BOREHOLE DIAMETER (mm)	200
GROUND LEVEL (m AOD)	56.30	**BOREHOLE DEPTH (m)**	4.60
		DATE COMMENCED	17/05/2023
		DATE COMPLETED	17/05/2023
CLIENT	Monaghan Co.Co.	**SPT HAMMER REF. NO.**	
ENGINEER	DBFL	**ENERGY RATIO (%)**	
		BORED BY	P.Allan
		PROCESSED BY	F.C

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples: Ref. Number	Sample Type	Depth (m)	Recovery	Field Test Results	Standpipe Details
0	TOPSOIL		56.20	0.10						
	Soft brown SILT/CLAY with occasional fine gravel				AA192926 AA197907	B B	0.50 0.50		N = 50/75 mm (25, 50)	
1			55.20	1.10	AA197908	B	1.00		N = 12 (2, 2, 1, 2, 3, 6)	
	Firm grey sandy SILT/CLAY with some gravel									
2					AA197909	B	2.00		N = 10 (15, 5, 2, 2, 2, 4)	
3			53.10	3.20	AA197910	B	3.00		N = 14 (1, 2, 3, 2, 2, 7)	
	Very stiff grey very sandy very gravelly SILT									
4			52.30	4.00					N = 50/150 mm (9, 16, 30, 20)	
	Dense grey fine to coarse GRAVEL with some cobbles									
			51.70	4.60						
5	Obstruction End of Borehole at 4.60 m									
6										
7										
8										
9										

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (h)	Comments
4.4	4.6	1.5	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
4.00	4.00	No	3.00	20	Moderate

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments
17-05-23	4.60	Nil	3.00	End of BH

REMARKS CATscanned location and hand dug inspection pit was 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 24665 - BRIDGE & ROAD SITE.GPJ IGSL.GDT 24/7/23

GEOTECHNICAL BORING RECORD

REPORT NUMBER 24665

CONTRACT	Monaghan Active Travel - Road & Bridge project	**BOREHOLE NO.**	**BH02R**
		SHEET	Sheet 1 of 1
CO-ORDINATES	667,668.30 E 833,709.23 N	**RIG TYPE**	Dando 2000
		BOREHOLE DIAMETER (mm)	200
GROUND LEVEL (m AOD)	56.07	**BOREHOLE DEPTH (m)**	4.40
		DATE COMMENCED	10/05/2023
		DATE COMPLETED	10/05/2023
CLIENT	Monaghan Co.Co.	**SPT HAMMER REF. NO.**	
ENGINEER	DBFL	**ENERGY RATIO (%)**	
		BORED BY	P.Allan
		PROCESSED BY	F.C

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples: Ref. Number	Samples: Sample Type	Samples: Depth (m)	Samples: Recovery	Field Test Results	Standpipe Details
0	TOPSOIL		55.97	0.10						
	MADE GROUND (Comprised of hardcore road fill)		55.87	0.20						
	MADE GROUND (Comprised of brown gravelly clay fill)									
1			54.87	1.20	AA192927	B	1.00		N = 33 (2, 6, 8, 10, 6, 9)	
	Soft to firm sandy gravelly SILT/CLAY (Possibly Made Ground)									
2			53.87	2.20	AA192928	B	2.00		N = 5 (3, 2, 1, 1, 2, 1)	
	Stiff grey gravelly CLAY									
3					AA192929	B	3.00		N = 22 (3, 6, 10, 3, 6, 3)	
			52.57	3.50						
	Dense grey fine to coarse GRAVEL with some cobbles									
4					AA192930	B	4.00		N = 50/150 mm (19, 40, 10) N = 50/75 mm (25, 50)	
			51.67	4.40						
	Obstruction End of Borehole at 4.40 m									
5										
6										
7										
8										
9										

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (h)	Comments
1.4	1.6	1	
4.2	4.4	1.5	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
2.00	2.00	No	1.50	20	Moderate
4.00	4.00	No	2.50	20	Moderate

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments
10-05-23	4.40	Nil	3.00	End of BH

REMARKS CATscanned location and hand dug inspection pit was 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 24665 - BRIDGE & ROAD SITE.GPJ IGSL.GDT 24/7/23

Appendix II Rotary Core Logs Photographs

GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER 24665

CONTRACT	Monaghan Active Travel - Road & Bridge project	**DRILLHOLE NO**	**RC01R**
		SHEET	Sheet 1 of 2
CO-ORDINATES		**DATE DRILLED**	28/05/2023
GROUND LEVEL (mOD)		**DATE LOGGED**	30/05/2023
RIG TYPE	Beretta T44		
FLUSH	Air/Mist		
CLIENT	Monaghan Co.Co.	**DRILLED BY**	IGSL - JK
ENGINEER	DBFL	**LOGGED BY**	D.O'Shea
INCLINATION (deg)	-90		
CORE DIAMETER (mm)	78		

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing Log (mm) 0 250 500	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
0								SYMMETRIX DRILLING: No recovery, observed by driller as returns of gravelly CLAY with occasional boulders.				
1												
2												
3		0	0	0								N = 37 (3, 5, 7, 8, 11, 11)
4												
5												N = 63 (7, 10, 18, 21, 11, 13)
6												
7	7.50								7.50			N = 57 (9, 11, 11, 13, 16, 17)
8		100	79	71				Strong to very strong, thickly to thinly bedded, light blue/grey, fine-grained, LIMESTONE (calci-siltite, sandy limestone with a black argillaceous muddy layer at 9.10-9.30m) , fresh to slightly weathered.				
9	9.00							Discontinuities are wide to closely spaced, smooth to very locally rough, planar to irregular. Apertures are tight to locally moderately open, calcite-veined (1-3mm thick), locally clay smeared, slight iron oxide staining. Dips are subhorizontal to locally 30°.				
		100	66	66								

REMARKS

Hole cased from 0.00-7.50m

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					No water strike recorded

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type
30-05-23	10.50	1.00	10.50	50mm SP

GROUNDWATER DETAILS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER 24665

CONTRACT	Monaghan Active Travel - Road & Bridge project	**DRILLHOLE NO**	**RC01R**
		SHEET	Sheet 2 of 2
CO-ORDINATES		**DATE DRILLED**	28/05/2023
GROUND LEVEL (mOD)		**DATE LOGGED**	30/05/2023
CLIENT	Monaghan Co.Co.	**DRILLED BY**	IGSL - JK
ENGINEER	DBFL	**LOGGED BY**	D.O'Shea
RIG TYPE	Beretta T44		
FLUSH	Air/Mist		
INCLINATION (deg)	-90		
CORE DIAMETER (mm)	78		

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing Log (mm) 0 250 500	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
10	10.50							End of Borehole at 10.50 m	10.50			
11												
12												
13												
14												
15												
16												
17												
18												
19												

REMARKS

Hole cased from 0.00-7.50m

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					No water strike recorded

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type
30-05-23	10.50	1.00	10.50	50mm SP

GROUNDWATER DETAILS

Date	Hole Depth	Casing Depth	Depth to Water	Comments
30-05-23	10.50	7.50	6.55	Water levels recorded 5 mins after end of drilling.

IGSL RC FI 10M 24665 - BRIDGE & ROAD SITE.GPJ IGSL.GDT 6/8/23

GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER 24665

CONTRACT	Monaghan Active Travel - Road & Bridge project
DRILLHOLE NO	RC02R
SHEET	Sheet 1 of 2
CO-ORDINATES	
GROUND LEVEL (mOD)	
RIG TYPE	Beretta T44
FLUSH	Air/Mist
INCLINATION (deg)	-90
CORE DIAMETER (mm)	78
DATE DRILLED	31/05/2023
DATE LOGGED	01/06/2023
CLIENT	Monaghan Co.Co.
ENGINEER	DBFL
DRILLED BY	IGSL - JK
LOGGED BY	D.O'Shea

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing Log (mm) 0 250 500	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
0								SYMMETRIX DRILLING: No recovery, observed by driller as returns of CLAY.				
1												
2												
3									3.00			
4		0	0	0				SYMMETRIX DRILLING: No recovery, observed by driller as returns of gravelly CLAY.				N = 27 (3, 4, 5, 8, 7, 7)
5												N = 38 (4, 7, 7, 10, 9, 12)
6												
7	7.50											N = 47 (7, 8, 13, 11, 13, 10)
8		100	23	10				Weak, thinly bedded to structureless, dark grey, fine-grained, LIMESTONE (argillaceous), slightly weathered. Discontinuities are closely spaced, smooth, planar. Apertures are tight, locally claysmeared. Dips are subhorizontal to locally 45°.	7.50 8.00			
9	9.00	100	90	92								

REMARKS

Hole cased from 0.00-7.50m

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					No water strike recorded

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type
01-06-23	10.50	1.00	10.50	50mm SP

GROUNDWATER DETAILS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

IGSL RC FI 10M 24665 - BRIDGE & ROAD SITE.GPJ IGSL.GDT 6/8/23

GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER 24665

CONTRACT	Monaghan Active Travel - Road & Bridge project	**DRILLHOLE NO**	**RC02R**
		SHEET	Sheet 2 of 2
CO-ORDINATES		**DATE DRILLED**	31/05/2023
GROUND LEVEL (mOD)		**DATE LOGGED**	01/06/2023
CLIENT	Monaghan Co.Co.	**DRILLED BY**	IGSL - JK
ENGINEER	DBFL	**LOGGED BY**	D.O'Shea
RIG TYPE	Beretta T44		
FLUSH	Air/Mist		
INCLINATION (deg)	-90		
CORE DIAMETER (mm)	78		

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing Log (mm) 0 250 500	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
10	10.50							Strong to very strong, thickly to thinly bedded, light blue/grey, fine-grained, LIMESTONE (argillaceous muddy), fresh to slightly weathered. Discontinuities are wide to closely spaced, smooth to very locally rough, planar to irregular. Apertures are tight to locally moderately open, calcite-veined (1-3mm thick), locally clay smeared, slight iron oxide staining. Dips are subhorizontal to locally 45°. *(continued)* End of Borehole at 10.50 m	10.50			
11												
12												
13												
14												
15												
16												
17												
18												
19												

REMARKS

Hole cased from 0.00-7.50m

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					No water strike recorded

INSTALLATION DETAILS

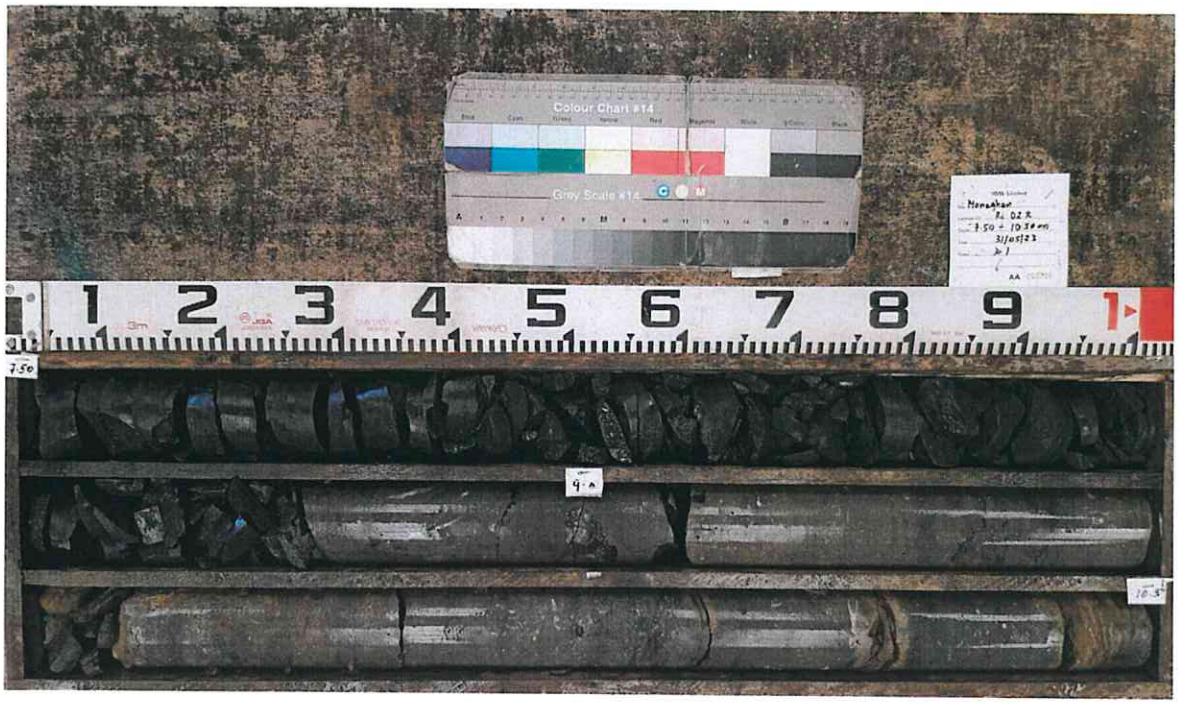
Date	Tip Depth	RZ Top	RZ Base	Type
01-06-23	10.50	1.00	10.50	50mm SP

GROUNDWATER DETAILS

Date	Hole Depth	Casing Depth	Depth to Water	Comments
01-06-23	10.50	7.50	4.85	Water levels recorded 5 mins after end of drilling.

RC01R – Box 1 of 1 – 7.50-10.50m

RC02R – Box 1 of 1 – 7.50-10.50m



Appendix III Trial Pit Records
Photographs

TRIAL PIT RECORD

REPORT NUMBER 24665

CONTRACT	Monaghan Active Travel	**TRIAL PIT NO.**	**TP01R**
		SHEET	Sheet 1 of 1
LOGGED BY	I.Reder	**CO-ORDINATES**	667,612.60 E 833,657.82 N
		DATE STARTED	02/05/2023
		DATE COMPLETED	02/05/2023
CLIENT	Monaghan Co.Co.	**GROUND LEVEL (m)**	56.08
ENGINEER	DBFL/Cora	**EXCAVATION METHOD**	3T Tracked machine

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL									
MADE GROUND (comprised of brown/grey sandy gravelly clay, angular stones, red brick pieces, roots)		0.10	55.98		AA205155	B	0.60		
1.0 MADE GROUND (comprised of soft grey/dark brown/brown sandy gravelly clay/silt, angular cobbles and boulders, organic matter)		1.00	55.08		AA205156	B	1.60		
2.0 Soft, grey, slightly sandy SILT/CLAY (possible original ground)		2.10	53.98	(Slow)	AA205157	B	2.50		
End of Trial Pit at 2.60m		2.60	53.48						
3.0									
4.0									

Groundwater Conditions
Slow water flow at 2.1m

Stability
TP stable

General Remarks
TP done for Active Travel Road project. PBT01R done in location at 0.5m depth

IGSL TP LOG 24665.GPJ IGSL.GDT 10/5/23

TRIAL PIT RECORD

REPORT NUMBER 24665

CONTRACT	Monaghan Active Travel	**TRIAL PIT NO.**	**TP02R**
		SHEET	Sheet 1 of 1
LOGGED BY	I.Reder	**CO-ORDINATES**	667,669.21 E 833,702.33 N
		DATE STARTED	02/05/2023
		DATE COMPLETED	02/05/2023
CLIENT	Monaghan Co.Co.	**GROUND LEVEL (m)**	56.19
ENGINEER	DBFL/Cora	**EXCAVATION METHOD**	3T Tracked machine

	Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0	TOPSOIL		0.10	56.09						
	MADE GROUND (comprised of brown/grey sandy gravelly clay, angular stones, red brick pieces, roots, timber pieces, occasional plastic rubbish, old steel wires, boulders, concrete pieces)									
1.0						AA205159	B	1.00		
2.0						AA205160	B	2.00		
	TP terminated at 2.5m due to many boulders End of Trial Pit at 2.50m		2.50	53.69						
3.0										
4.0										

Groundwater Conditions
TP dry

Stability
TP unstable

General Remarks
TP done for Active Travel Road project. PBT02R done in location at 0.6m depth

IGSL TP LOG 24665.GPJ IGSL.GDT 10/5/23

TRIAL PIT RECORD

REPORT NUMBER 24665

CONTRACT	Monaghan Active Travel	**TRIAL PIT NO.**	**TP03R**
		SHEET	Sheet 1 of 1
LOGGED BY	I.Reder	**CO-ORDINATES**	667,627.81 E 833,761.65 N
		DATE STARTED	03/05/2023
		DATE COMPLETED	03/05/2023
CLIENT	Monaghan Co.Co.	**GROUND LEVEL (m)**	56.94
ENGINEER	DBFL/Cora	**EXCAVATION METHOD**	3T Tracked machine

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL		0.15	56.79						
MADE GROUND (comprised of brown sandy gravelly clay, many cobbles and boulders, red brick pieces)		0.60	56.34		AA205161	B	0.60		
MADE GROUND (comprised of soft grey/dark grey slightly sandy gravelly silty clay, concrete pieces, steel rubbish, many organic pieces, timber pieces, old wires)					AA205162	B	1.40		
1.0									
Soft to firm, grey, slightly sandy gravelly silty CLAY with medium cobbles and organic matter content. Sand is fine to coarse, gravel is fine to coarse subangular to subrounded, cobbles are subangular to subrounded.		1.70	55.24		AA205163	B	2.30		
2.0									
3.0 End of Trial Pit at 3.00m		3.00	53.94						
4.0									

Groundwater Conditions
TP dry

Stability
TP slightly unstable

General Remarks
TP done for Active Travel Road project. PBT03R done in location at 0.6m depth

IGSL TP LOG 24665.GPJ IGSL.GDT 10/5/23

TRIAL PIT RECORD

REPORT NUMBER 24665

CONTRACT	Monaghan Active Travel	**TRIAL PIT NO.**	**TP04R**
		SHEET	Sheet 1 of 1
LOGGED BY	I.Reder	**CO-ORDINATES**	667,651.63 E 833,752.38 N
		DATE STARTED	03/05/2023
		DATE COMPLETED	03/05/2023
CLIENT	Monaghan Co.Co.	**GROUND LEVEL (m)**	56.52
ENGINEER	DBFL/Cora	**EXCAVATION METHOD**	3T Tracked machine

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL									
MADE GROUND (comprised of brown/grey sandy gravelly clay, cobbles, red brick pieces)		0.30	56.22		AA205164	B	0.70		
1.0									
Soft to firm, brown/grey mottled, slightly sandy gravelly slightly silty CLAY with medium cobbles content. Sand is fine to coarse, gravel is fine to coarse subangular to subrounded, cobbles are small subangular to subrounded. (possible original ground)		1.40	55.12		AA205165	B	1.70		
2.0									
					AA205166	B	2.70		
3.0 End of Trial Pit at 3.00m		3.00	53.52						
4.0									

Groundwater Conditions
TP dry

Stability
TP stable

General Remarks
TP done for Active Travel Road project. PBT04R done in location at 0.6m depth

IGSL TP LOG 24665.GPJ IGSL.GDT 10/5/23

TRIAL PIT RECORD

REPORT NUMBER 24665

CONTRACT	Monaghan Active Travel	**TRIAL PIT NO.**	**TP05R**
		SHEET	Sheet 1 of 1
LOGGED BY	I.Reder	**CO-ORDINATES**	667,594.17 E 833,778.20 N
		DATE STARTED	03/05/2023
		DATE COMPLETED	03/05/2023
CLIENT	Monaghan Co.Co.	**GROUND LEVEL (m)**	57.02
ENGINEER	DBFL/Cora	**EXCAVATION METHOD**	3T Tracked machine

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL		0.15	56.87						
MADE GROUND (comprised of brown sandy gravelly clay, cobbles, boulders, red brick pieces, concrete rubble, roots, occasional plastic rubbish)					AA205167	B	0.50		
1.0					AA205168	B	1.50		
Firm, brown, sandy very gravelly CLAY with high cobbles content. Sand is fine to coarse, gravel is fine to coarse subangular to subrounded, cobbles are subangular to subrounded		1.70	55.32						
2.0 TP terminated at 1.9m due to boulders End of Trial Pit at 1.90m		1.90	55.12						
3.0									
4.0									

Groundwater Conditions
TP dry

Stability
TP unstable

General Remarks
TP done for Active Travel Road project. PBT05R done in location at 0.5m depth

IGSL TP LOG 24665.GPJ IGSL.GDT 10/5/23

TRIAL PIT RECORD

REPORT NUMBER 24665

CONTRACT	Monaghan Active Travel	**TRIAL PIT NO.**	**TP06R**
		SHEET	Sheet 1 of 1
LOGGED BY	I.Reder	**CO-ORDINATES**	667,471.46 E 833,759.97 N
		DATE STARTED	03/05/2023
		DATE COMPLETED	03/05/2023
CLIENT	Monaghan Co.Co.	**GROUND LEVEL (m)**	72.31
ENGINEER	DBFL/Cora	**EXCAVATION METHOD**	3T Tracked machine

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL		0.20	72.11						
Soft, brown, slightly sandy slighlty gravelly CLAY with low cobbles content. Sand is fine to coarse, gravel is fine to coarse subangular to subrounded, cobbles are small subangular to subrounded.		0.50	71.81						
Soft to firm, greyish brown to brown, slightly sandy very gravelly slightly silty CLAY with high cobbles and boulders content. Sand is fine to coarse, gravel is fine to coarse subangular to angular, cobbles and boulders are subangular to angular.				1 (Seepage)	AA205171	B	0.70		
				2 (Slow)	AA205172	B	1.50		
TP terminated at 1.7m due to boulders or rock End of Trial Pit at 1.70m		1.70	70.61						
1.0									
2.0									
3.0									
4.0									

Groundwater Conditions
Seepage at 1.1m, slow water flow at 1.7m

Stability
TP stable

General Remarks
TP done for Active Travel Road project. PBT06R done in location at 0.6m depth

IGSL TP LOG 24665.GPJ IGSL.GDT 10/5/23

TRIAL PIT RECORD

REPORT NUMBER 24665

CONTRACT	Monaghan Active Travel	**TRIAL PIT NO.**	**TP07R**
		SHEET	Sheet 1 of 1
LOGGED BY	I.Reder	**CO-ORDINATES**	667,498.03 E 833,810.31 N
		DATE STARTED	03/05/2023
		DATE COMPLETED	03/05/2023
CLIENT	Monaghan Co.Co.	**GROUND LEVEL (m)**	72.18
ENGINEER	DBFL/Cora	**EXCAVATION METHOD**	3T Tracked machine

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL									
Soft to firm, brown, slightly sandy CLAY with low gravel and hair roots content. Sand is fine to coarse, gravel is fine to coarse subangular to subrounded.		0.20	71.98						
Firm to stiff, brownish grey, slightly sandy gravelly silty CLAY with high cobbles and boulders content. Sand is fine to coarse, gravel is fine to coarse subangular to subrounded, cobbles and boulders are subangular to angular.		0.50	71.68		AA205169	B	0.90		
1.0									
2.0					AA205170	B	1.90		
TP terminated at 2.3m due to many boulders End of Trial Pit at 2.30m		2.30	69.88						
3.0									
4.0									

Groundwater Conditions
TP dry

Stability
TP unstable

General Remarks
TP done for Active Travel Road project. PBT07R done in location at 0.6m depth

TRIAL PIT RECORD

REPORT NUMBER 24665

CONTRACT	Monaghan Active Travel	**TRIAL PIT NO.**	**TP08R**
		SHEET	Sheet 1 of 1
LOGGED BY	I.Reder	**CO-ORDINATES**	667,509.66 E 833,891.93 N
		DATE STARTED	04/05/2023
		DATE COMPLETED	04/05/2023
CLIENT	Monaghan Co.Co.	**GROUND LEVEL (m)**	73.83
ENGINEER	DBFL/Cora	**EXCAVATION METHOD**	3T Tracked machine

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL		0.25	73.58						
Soft to firm, brown, slightly sandy slighlty gravelly CLAY with low cobbles and hair roots content. Sand is fine to coarse, gravel is fine to coarse subangular to subrounded, cobbles are subangular to subrounded.		0.85	72.98		AA205180	B	0.70		
1.0 Firm to stiff, brownish grey, slightly sandy very gravelly slightly silty CLAY with high cobbles and boulders content. Sand is fine to coarse, gravel is fine to coarse subangular to subrounded, cobbles and boulders are subangular to angular.									
TP terminated at 1.8m due to boulders or rock End of Trial Pit at 1.80m		1.80	72.03	1 (Seepage)	AA205181	B	1.70		
2.0									
3.0									
4.0									

Groundwater Conditions
Seppage flow at 1.8m

Stability
TP stable

General Remarks
TP done for Active Travel Road project. PBT08R done in location at 0.6m depth

TRIAL PIT RECORD

REPORT NUMBER 24665

CONTRACT	Monaghan Active Travel	**TRIAL PIT NO.**	**TP09R**
		SHEET	Sheet 1 of 1
LOGGED BY	I.Reder	**CO-ORDINATES**	667,458.08 E 834,009.19 N
		DATE STARTED	04/05/2023
		DATE COMPLETED	04/05/2023
CLIENT	Monaghan Co.Co.	**GROUND LEVEL (m)**	82.75
ENGINEER	DBFL/Cora	**EXCAVATION METHOD**	3T Tracked machine

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
TOPSOIL		0.25	82.50						
Soft, brown, slightly sandy slighlty slightly gravelly CLAY with low cobbles and hair roots content. Sand is fine to coarse, gravel is fine to coarse subangular to subrounded, cobbles are subangular to subrounded.		0.50	82.25	(Seepage)	AA205182	B	0.60		
Firm to stiff, brown, slightly sandy very gravelly CLAY with high cobbles and boulders content. Sand is fine to coarse, gravel is fine to coarse subangular to subrounded, cobbles and boulders are subangular to angular.		1.50	81.25		AA205183	B	1.40		
TP terminated at 1.5m due to boulders End of Trial Pit at 1.50m									

Groundwater Conditions
Slightly seppage flow at 0.5m

Stability
TP stable

General Remarks
TP done for Active Travel Road project. PBT09R done in location at 0.6m depth

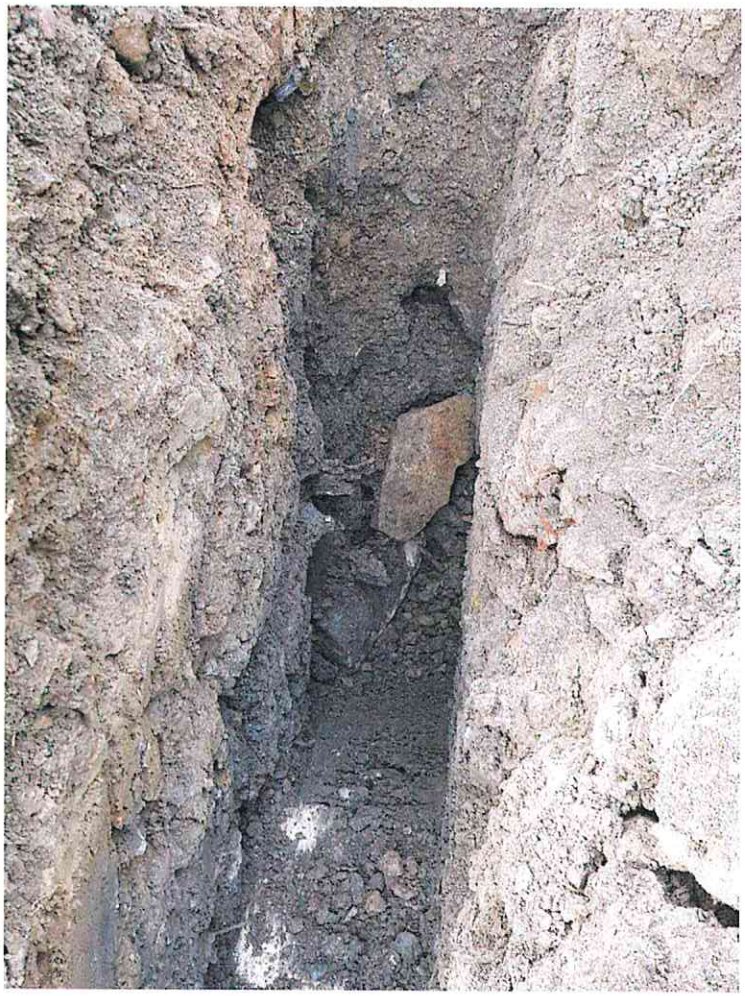
Project Number: 24665
Site: Monaghan Active Travel
Project Engineer: DBFL/CORA

TRIAL PIT PHOTOGRAPHY RECORD
TP 01R

TP 01R – spoil

Project Number: 24665
Site: Monaghan Active Travel
Project Engineer: DBFL/CORA

TRIAL PIT PHOTOGRAPHY RECORD
TP 02R



TP 02R – spoil

Project Number: 24665
Site: Monaghan Active Travel
Project Engineer: DBFL/CORA

TRIAL PIT PHOTOGRAPHY RECORD
TP 03R

TP 03R – spoil

Project Number: 24665
Site: Monaghan Active Travel
Project Engineer: DBFL/CORA

TRIAL PIT PHOTOGRAPHY RECORD
TP 04R

TP 04R – spoil

Project Number: 24665
Site: Monaghan Active Travel
Project Engineer: DBFL/CORA

TRIAL PIT PHOTOGRAPHY RECORD
TP 05R

TP 05R – spoil

Project Number: 24665
Site: Monaghan Active Travel
Project Engineer: DBFL/CORA

TRIAL PIT PHOTOGRAPHY RECORD
TP 06R

TP 06R – spoil

Project Number: 24665
Site: Monaghan Active Travel
Project Engineer: DBFL/CORA

TRIAL PIT PHOTOGRAPHY RECORD
TP 07R

TP 07R – spoil

Project Number: 24665
Site: Monaghan Active Travel
Project Engineer: DBFL/CORA

TRIAL PIT PHOTOGRAPHY RECORD
TP 08R

TP 08R – spoil

Project Number: 24665
Site: Monaghan Active Travel
Project Engineer: DBFL/CORA

TRIAL PIT PHOTOGRAPHY RECORD
TP 09R

TP 09R – spoil

Appendix IV BRE DIGEST 365

Soakaway Design f -value from field tests

IGSL

Contract: Monaghan, Active Travel
Test No. SA01R
Engineer DBFL
Date: 02/05/2023

24665

Summary of ground conditions

from	to	Description	Ground water
0.00	0.10	TOPSOIL	
0.10	0.80	MADE GROUND (brown/grey sandy gravelly clay, cobbles, occ. plastic rubbish)	
0.80	1.70	Firm to stiff, yellowish brown, slightly sandy slightly gravelly CLAY with low	DRY
		cobbles content (possible original ground)	

Location: E: 667646.368; N:833692.439; G.L. 55.627mOD
Notes: SA01R done for Active Travel Road project

Field Data

Depth to Water (m)	Elapsed Time (min)
0.530	0.00
0.530	1.00
0.530	2.00
0.530	3.00
0.530	4.00
0.530	5.00
0.530	6.00
0.530	7.00
0.530	8.00
0.530	9.00
0.530	10.00
0.530	12.00
0.530	14.00
0.530	16.00
0.530	18.00
0.530	20.00
0.530	25.00
0.530	30.00
0.530	40.00
0.530	50.00
0.530	60.00

Field Test

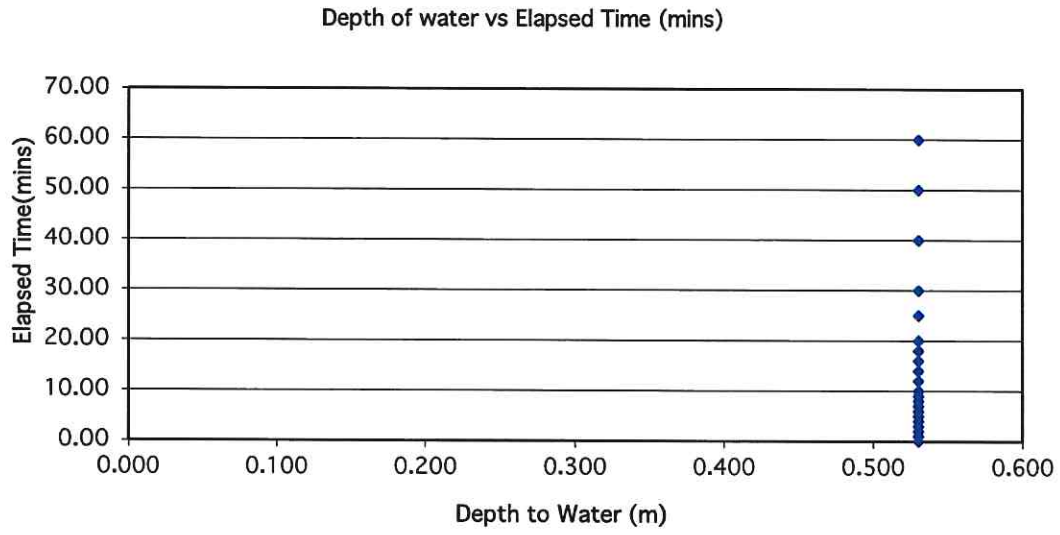
Depth of Pit (D)	1.70	m
Width of Pit (B)	0.50	m
Length of Pit (L)	1.70	m
Initial depth to Water =	0.53	m
Final depth to water =	0.530	m
Elapsed time (mins)=	60.00	
Top of permeable soil		m
Base of permeable soil		m

No Water Movement

Base area=	0.85	m2
*Av. side area of permeable stratum over test perio	5.148	m2
Total Exposed area =	5.998	m2

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 0 m/min or 0 m/sec



Soakaway Design f -value from field tests

IGSL

Contract: Monaghan, Active Travel
Test No. SA02R
Engineer DBFL
Date: 03/05/2023

24665

Summary of ground conditions

from	to	Description	Ground water
0.00	0.10	TOPSOIL	DRY
0.10	1.30	MADE GROUND (brown/grey sandy gravelly clay, angular cobbles and boulders, roots, occasional plastic rubbish)	
1.30		Obstruction - boulders	

Location: E:667701.127; N:833726.306; G.L. 56.054mOD
Notes: SA02R done for Active Travel Road project

Field Data

Depth to Water (m)	Elapsed Time (min)
0.550	0.00
0.550	1.00
0.550	2.00
0.550	3.00
0.560	4.00
0.560	5.00
0.560	6.00
0.560	7.00
0.560	8.00
0.560	9.00
0.560	10.00
0.560	12.00
0.560	14.00
0.560	16.00
0.560	18.00
0.560	20.00
0.560	25.00
0.560	30.00
0.560	40.00
0.560	50.00
0.560	60.00

Field Test

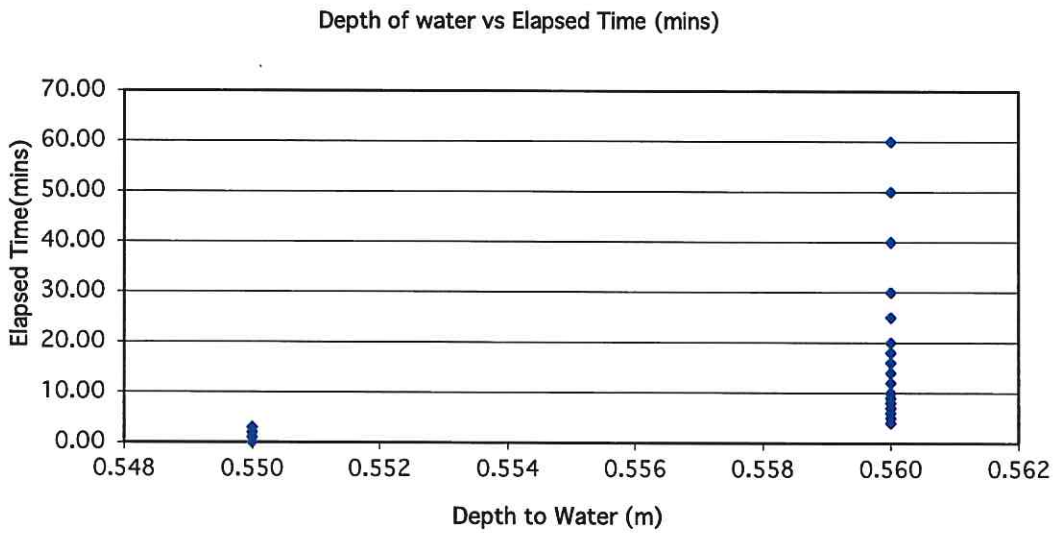
Depth of Pit (D)	1.30	m
Width of Pit (B)	0.70	m
Length of Pit (L)	1.50	m
Initial depth to Water =	0.55	m
Final depth to water =	0.560	m
Elapsed time (mins)=	60.00	
Top of permeable soil		m
Base of permeable soil		m

Water Movement stoped at 0.56m

Base area=	1.05	m2
*Av. side area of permeable stratum over test perio	3.278	m2
Total Exposed area =	4.328	m2

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 4E-05 m/min or 6.73906E-07 m/sec



Soakaway Design f -value from field tests

IGSL

Contract: Monaghan, Active Travel
Test No. SA03R
Engineer DBFL
Date: 03/05/2023

24665

Summary of ground conditions

from	to	Description	Ground water
0.00	0.15	TOPSOIL	DRY
0.15	1.70	MADE GROUND (brown sandy gravelly clay, angular cobbles, boulders, red brick pieces, roots)	

Location: E:667632.653; N:833757.907; G.L. 57.157mOD
Notes: SA03R done for Active Travel Road project

Field Data

Depth to Water (m)	Elapsed Time (min)
0.530	0.00
0.530	1.00
0.530	2.00
0.530	3.00
0.530	4.00
0.530	5.00
0.530	6.00
0.530	7.00
0.530	8.00
0.530	9.00
0.530	10.00
0.530	12.00
0.530	14.00
0.530	16.00
0.530	18.00
0.530	20.00
0.530	25.00
0.530	30.00
0.530	40.00
0.530	50.00
0.530	60.00

Field Test

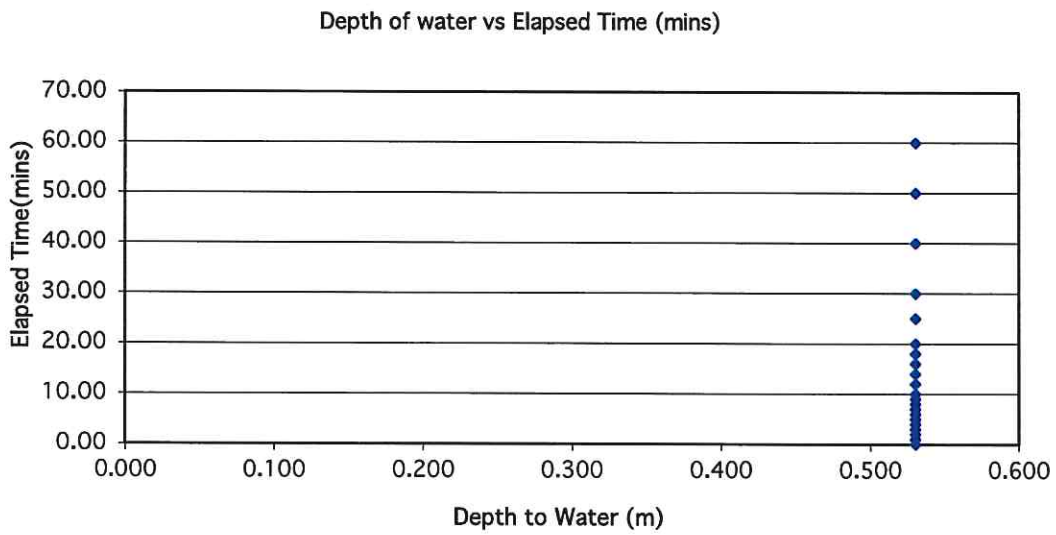
Depth of Pit (D)	1.70	m
Width of Pit (B)	0.50	m
Length of Pit (L)	1.50	m
Initial depth to Water =	0.53	m
Final depth to water =	0.530	m
Elapsed time (mins)=	60.00	
Top of permeable soil		m
Base of permeable soil		m

No Water Movement

Base area=	0.75	m2
*Av. side area of permeable stratum over test perio	4.68	m2
Total Exposed area =	5.43	m2

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 0 m/min or 0 m/sec



Soakaway Design f -value from field tests

IGSL

Contract: Monaghan, Active Travel
Test No. SA04R
Engineer DBFL
Date: 03/05/2023

24665

Summary of ground conditions

from	to	Description	Ground water
0.00	0.10	TOPSOIL	DRY
0.10	1.50	MADE GROUND (dark brown/brown sandy gravelly clay, angular cobbles, boulders	
		red brick pieces, roots)	
1.50	1.60	Firm, brown, slightly sandy slightly gravelly CLAY with many cobbles	
1.60		Obstruction - boulders	

Location: E:667598.995; N:833793.538; G.L. 56.986mOD
Notes: SA04R done for Active Travel Road project

Field Data

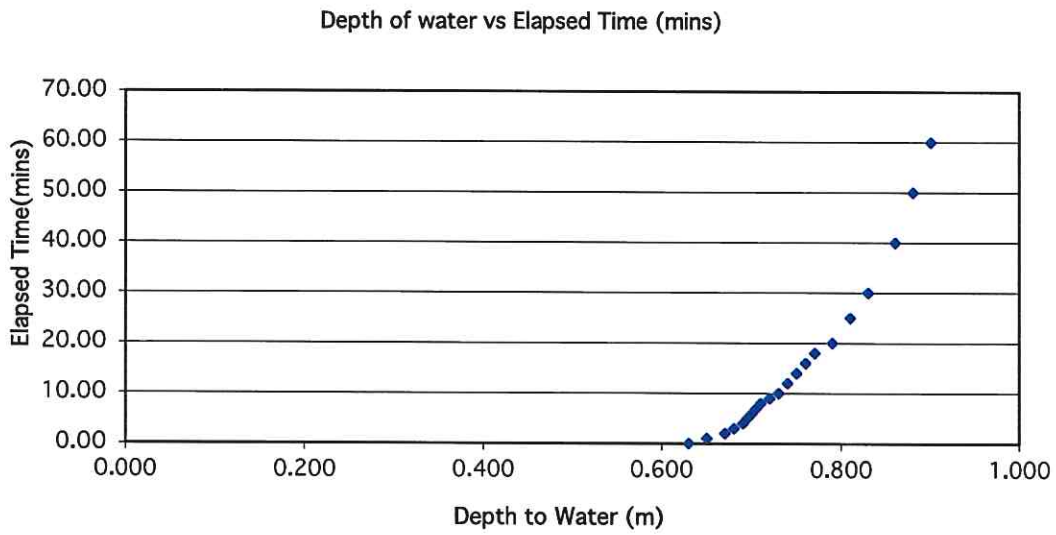
Depth to Water (m)	Elapsed Time (min)
0.630	0.00
0.650	1.00
0.670	2.00
0.680	3.00
0.690	4.00
0.695	5.00
0.700	6.00
0.705	7.00
0.710	8.00
0.720	9.00
0.730	10.00
0.740	12.00
0.750	14.00
0.760	16.00
0.770	18.00
0.790	20.00
0.810	25.00
0.830	30.00
0.860	40.00
0.880	50.00
0.900	60.00

Field Test

Depth of Pit (D)	1.60	m
Width of Pit (B)	0.70	m
Length of Pit (L)	1.60	m
Initial depth to Water =	0.63	m
Final depth to water =	0.900	m
Elapsed time (mins)=	60.00	
Top of permeable soil		m
Base of permeable soil		m
Base area=	1.12	m2
*Av. side area of permeable stratum over test perio	3.841	m2
Total Exposed area =	4.961	m2

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 0.00102 m/min or 1.69321E-05 m/sec



Soakaway Design f -value from field tests

IGSL

Contract: Monaghan, Active Travel
Test No. SA05R
Engineer DBFL
Date: 03/05/2023

24665

Summary of ground conditions

from	to	Description	Ground water
0.00	0.20	TOPSOIL	Slow water at 1.3m
0.20	1.10	Soft to firm, brown, sandy gravelly silty CLAY with low cobbles content	
1.10	1.40	Firm, brown, slightly sandy gravelly silty CLAY with high angular cobbles content	
1.40		Obstruction - boulders or rock	

Location: E:667509.452; N:833780.041; G.L. 69.077mOD
Notes: SA05R done for Active Travel Road project

Field Data

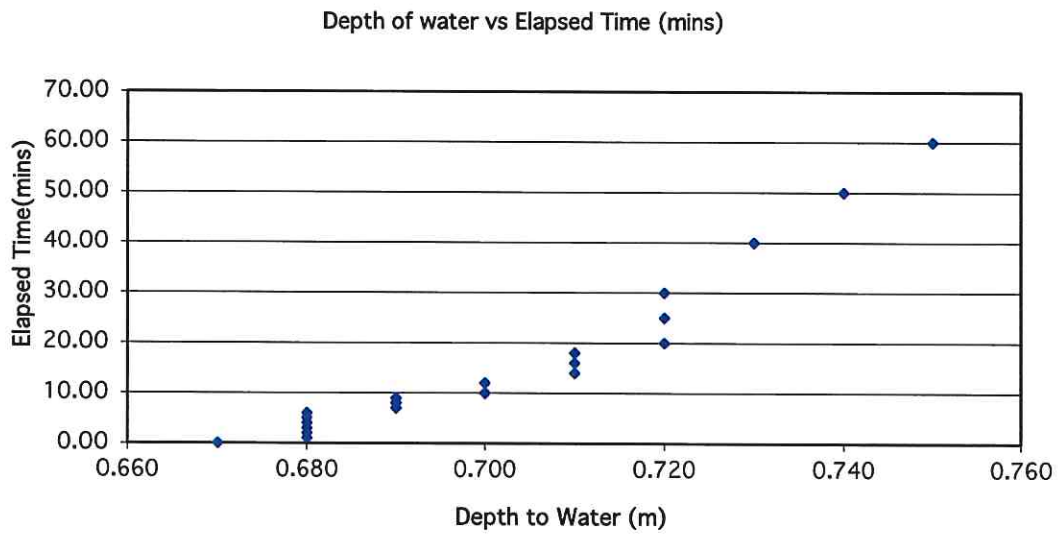
Depth to Water (m)	Elapsed Time (min)
0.670	0.00
0.680	1.00
0.680	2.00
0.680	3.00
0.680	4.00
0.680	5.00
0.680	6.00
0.690	7.00
0.690	8.00
0.690	9.00
0.700	10.00
0.700	12.00
0.710	14.00
0.710	16.00
0.710	18.00
0.720	20.00
0.720	25.00
0.720	30.00
0.730	40.00
0.740	50.00
0.750	60.00

Field Test

Depth of Pit (D)	1.40	m
Width of Pit (B)	0.50	m
Length of Pit (L)	1.50	m
Initial depth to Water =	0.67	m
Final depth to water =	0.750	m
Elapsed time (mins)=	60.00	
Top of permeable soil		m
Base of permeable soil		m
Base area=	0.75	m2
*Av. side area of permeable stratum over test perio	2.76	m2
Total Exposed area =	3.51	m2

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 0.00028 m/min or 4.74834E-06 m/sec



Soakaway Design f -value from field tests

IGSL

Contract: Monaghan, Active Travel
Test No. SA06R
Engineer DBFL
Date: 04/05/2023

24665

Summary of ground conditions

from	to	Description	Ground water
0.00	0.20	TOPSOIL	
0.20	0.90	Soft to firm, brown, slightly sandy slightly gravelly CLAY with low cobbles conten	
0.90	1.60	Firm to stiff, brown, slightly sandy gravelly CLAY with high angular cobbles conte	DRY

Location: E:667522.727; N:833925.614; G.L. 73.67mOD
Notes: SA06R done for Active Travel Road project

Field Data

Depth to Water (m)	Elapsed Time (min)
0.730	0.00
0.730	1.00
0.730	2.00
0.730	3.00
0.730	4.00
0.730	5.00
0.730	6.00
0.730	7.00
0.730	8.00
0.730	9.00
0.730	10.00
0.730	12.00
0.730	14.00
0.730	16.00
0.730	18.00
0.730	20.00
0.730	25.00
0.730	30.00
0.730	40.00
0.730	50.00
0.730	60.00

Field Test

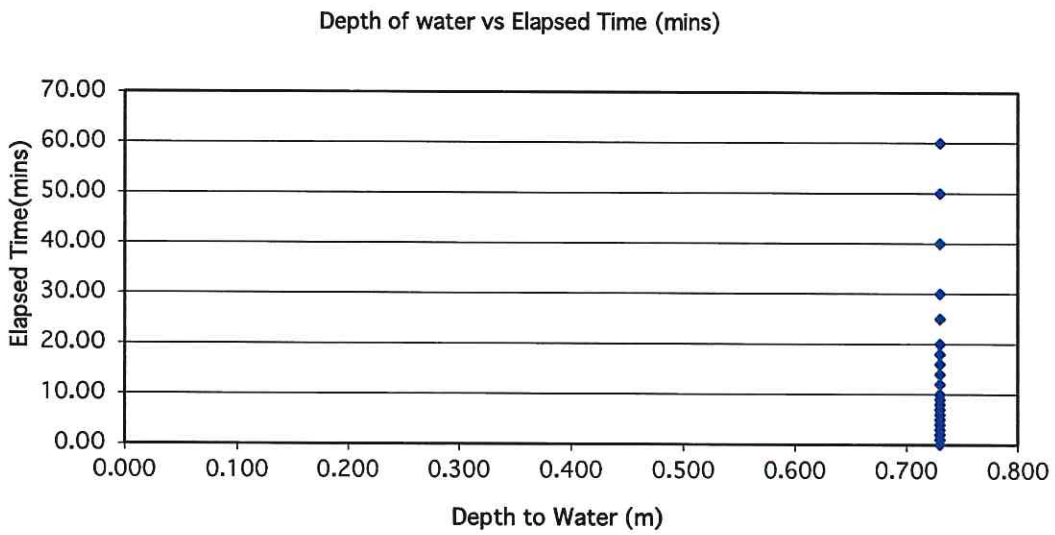
Depth of Pit (D)	1.60	m
Width of Pit (B)	0.50	m
Length of Pit (L)	2.00	m
Initial depth to Water =	0.73	m
Final depth to water =	0.730	m
Elapsed time (mins)=	60.00	
Top of permeable soil		m
Base of permeable soil		m

No Water Movement

Base area=	1	m2
*Av. side area of permeable stratum over test perio	4.35	m2
Total Exposed area =	5.35	m2

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 0 m/min or 0 m/sec



Project Number: 24665
Site: Monaghan Active Travel
Project Engineer: DBFL/CORA

TRIAL PIT PHOTOGRAPHY RECORD
SA 01R

SA 01R – spoil

Project Number: 24665
Site: Monaghan Active Travel
Project Engineer: DBFL/CORA

TRIAL PIT PHOTOGRAPHY RECORD
SA 02R

SA 02R – spoil

Project Number: 24665
Site: Monaghan Active Travel
Project Engineer: DBFL/CORA

TRIAL PIT PHOTOGRAPHY RECORD
SA 03R

SA 03R – spoil

Project Number: 24665
Site: Monaghan Active Travel
Project Engineer: DBFL/CORA

TRIAL PIT PHOTOGRAPHY RECORD
SA 04R

SA 04R – spoil

Project Number: 24665
Site: Monaghan Active Travel
Project Engineer: DBFL/CORA

TRIAL PIT PHOTOGRAPHY RECORD
SA 05R

SA 05R – spoil

Project Number: 24665
Site: Monaghan Active Travel
Project Engineer: DBFL/CORA

TRIAL PIT PHOTOGRAPHY RECORD
SA 06R

SA 06R – spoil

Appendix V CBR by Plate Test

PLATE TEST REPORT SHEET (F3.1)

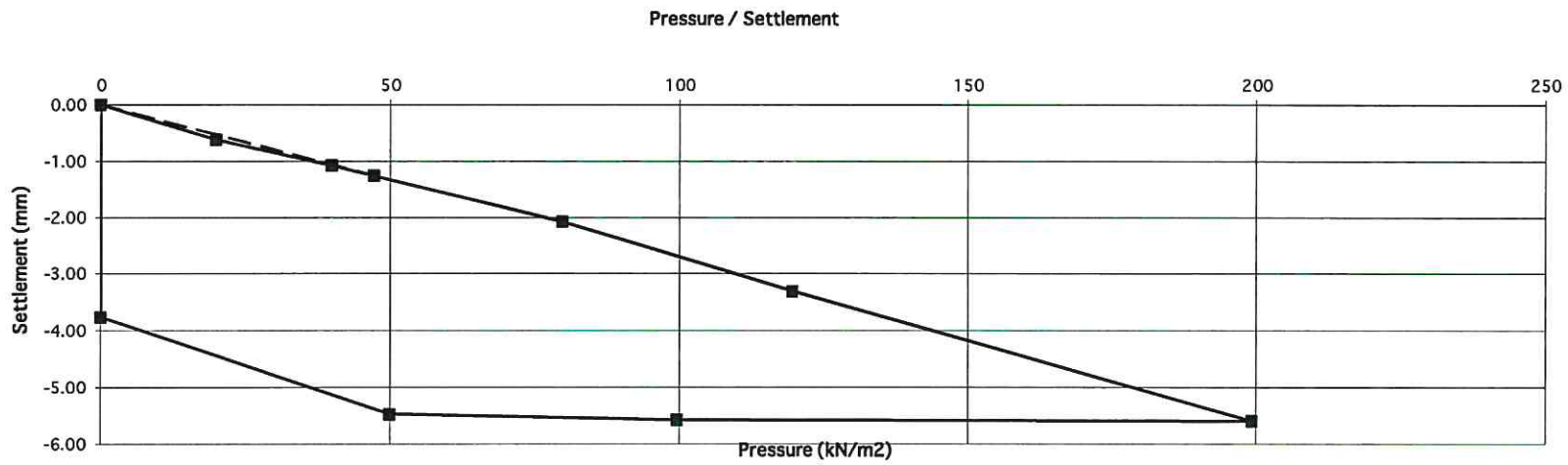
Applied Pressure/Settlement Curve

Reference No.	R144697
Contract	Monaghan Active Travel
Test No.	PBT01 - load
Location	TP01R
Depth	0.5m bgl
Client	DBFL
Plate Diameter:	300 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	I.Reder
Authorised by	
Date	02/05/2023

Description of soil under test
(natural soil, placed fill, sub-base)
MADE GROUND (sandy gravelly clay, angular cobbles)

Easting (m)
Northing (m)
Ground Level (mOD)

Sample Ref No. N/A
Depth 0.00 m bgl



Gradient at 1.25 mm settlement intersection = 38
Modulus of subgrade reaction = 17 MPa/m
Correction factor applied = 0.46 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 1.3 %

PLATE TEST REPORT SHEET (F3.1)

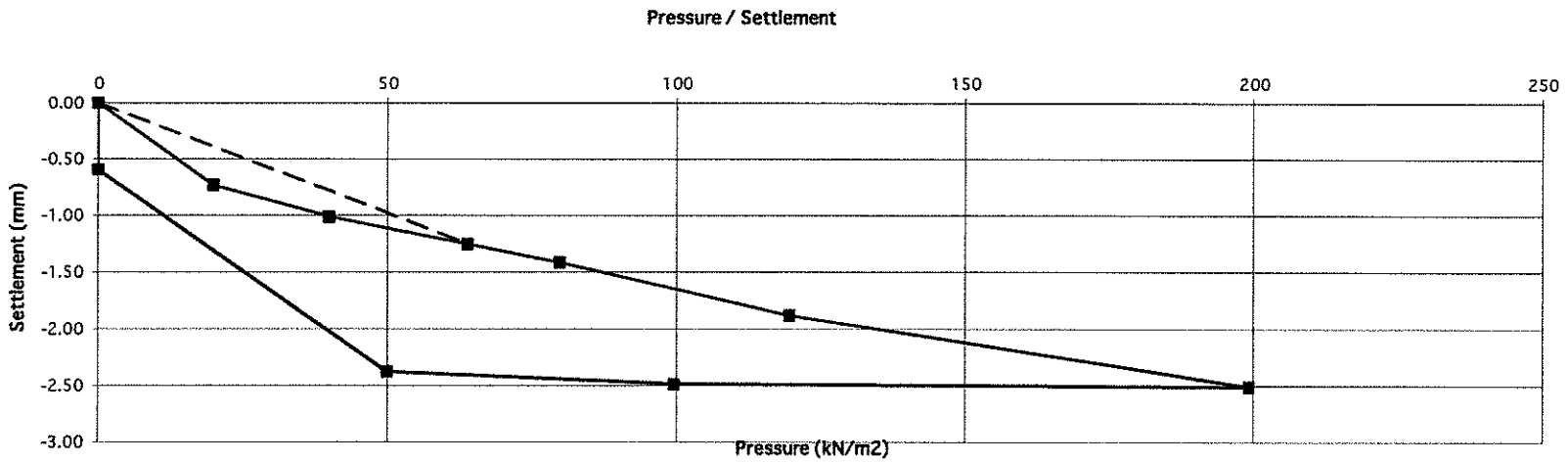
Applied Pressure/Settlement Curve

Reference No.	R144697
Contract	Monaghan Active Travel
Test No.	PBT01 - Reload
Location	TP01R
Depth	0.5m bgl
Client	DBFL
Plate Diameter:	300 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	I.Reder
Authorised by	
Date	02/05/2023

Description of soil under test
(natural soil, placed fill, sub-base)
MADE GROUND (sandy gravelly clay, angular cobbles)

Easting (m)
Northing (m)
Ground Level (mOD)

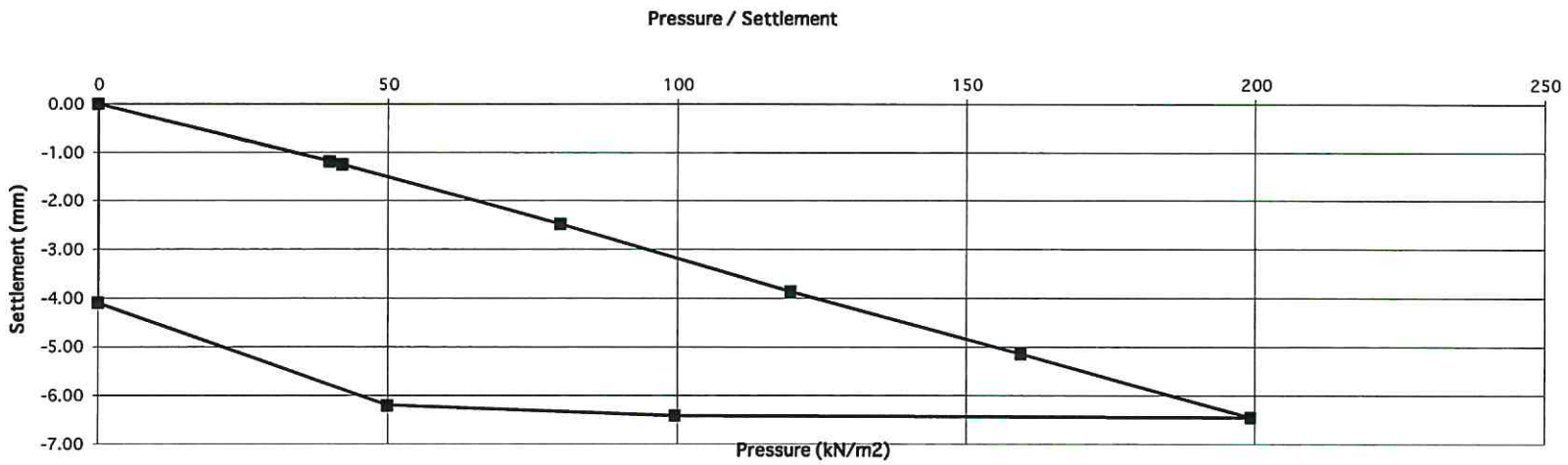
Sample Ref No. N/A
Depth 0.00 m bgl



Gradient at 1.25 mm settlement intersection = 51
Modulus of subgrade reaction = 23 MPa/m
Correction factor applied = 0.46 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 2.3 %

PLATE TEST REPORT SHEET (F3.1)		Applied Pressure/Settlement Curve	
Reference No.	R144698		
Contract	Monaghan Active Travel	Description of soil under test (natural soil, placed fill, sub-base)	
Test No.	PBT02 - load	MADE GROUND (sandy gravelly clay, angular cobbles)	
Location	TP02R		
Depth	0.5m bgl	Easting (m)	
Client	DBFL	Northing (m)	
Plate Diameter:	300 mm	Ground Level (mOD)	
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test	Sample Ref No. N/A	
Technician	I.Reder	Depth 0.00 m bgl	
Authorised by			
Date	02/05/2023		



Gradient at 1.25 mm settlement intersection = 34
Modulus of subgrade reaction = 15 MPa/m
Correction factor applied = 0.46 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 1.1 %

PLATE TEST REPORT SHEET (F3.1)

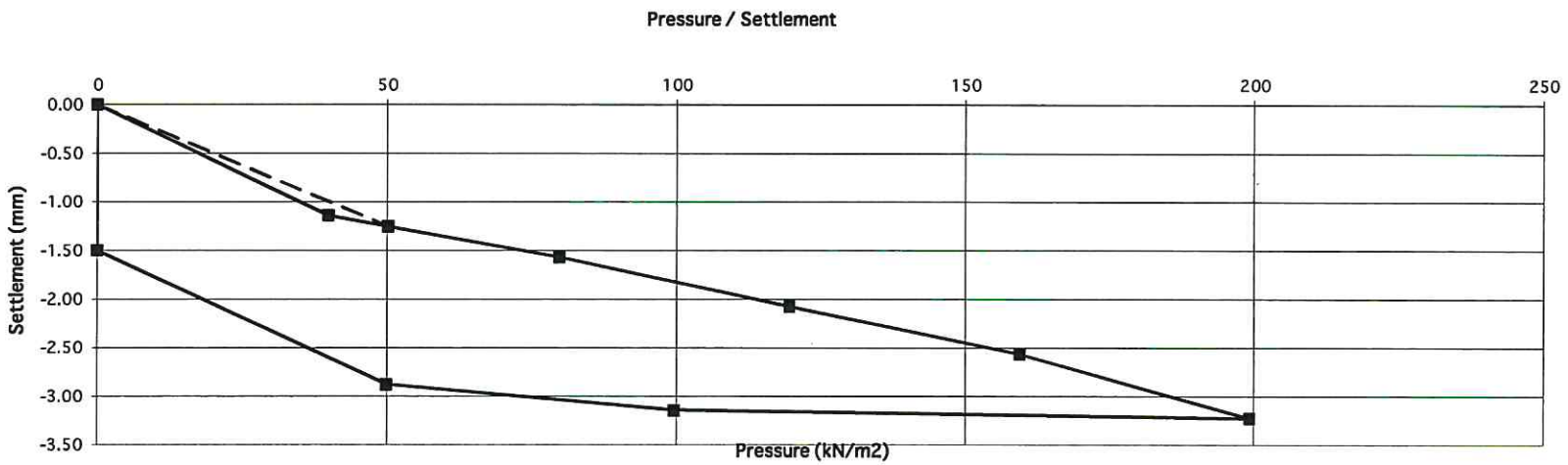
Applied Pressure/Settlement Curve

Reference No.	R144698
Contract	Monaghan Active Travel
Test No.	PBT02 - Reload
Location	TP02R
Depth	0.5m bgl
Client	DBFL
Plate Diameter:	300 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	I.Reder
Authorised by	
Date	02/05/2023

Description of soil under test
(natural soil, placed fill, sub-base)
MADE GROUND (sandy gravelly clay, angular cobbles)

Easting (m)
Northing (m)
Ground Level (mOD)

Sample Ref No. N/A
Depth 0.00 m bgl



Gradient at 1.25 mm settlement intersection = 40
Modulus of subgrade reaction = 18 MPa/m
Correction factor applied = 0.46 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 1.5 %

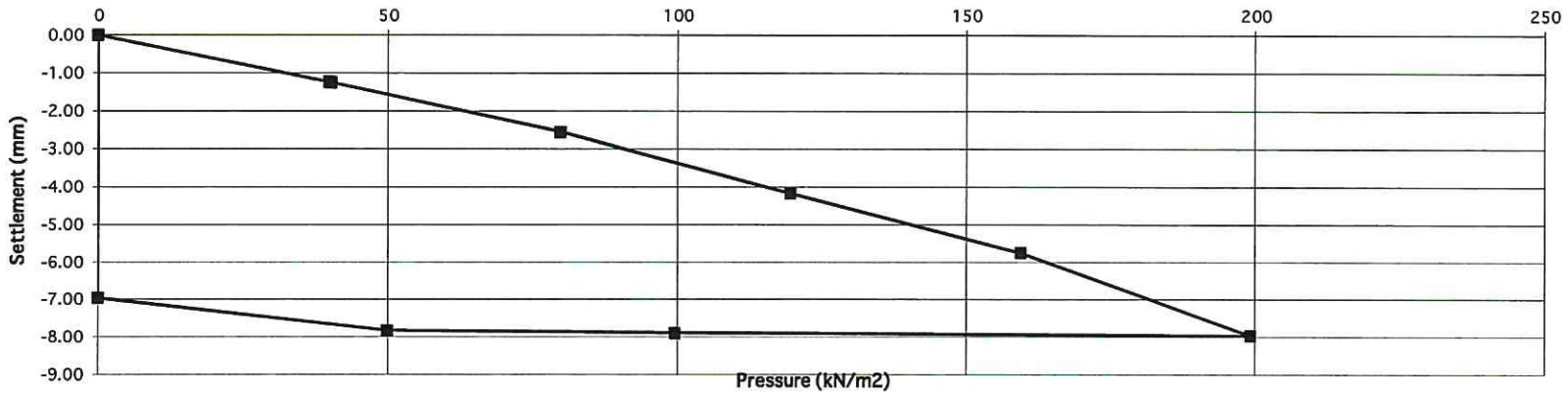
PLATE TEST REPORT SHEET (F3.1)

Applied Pressure/Settlement Curve

Reference No.	R144699
Contract	Monaghan Active Travel
Test No.	PBT03 - load
Location	TP03R
Depth	0.6m bgl
Client	DBFL
Plate Diameter:	300 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	I.Reder
Authorised by	
Date	03/05/2023

Description of soil under test
(natural soil, placed fill, sub-base)
MADE GROUND (sandy gravelly clay, angular cobbles, orga

Easting (m)
Northing (m)
Ground Level (mOD)
Sample Ref No. N/A
Depth 0.00 m bgl

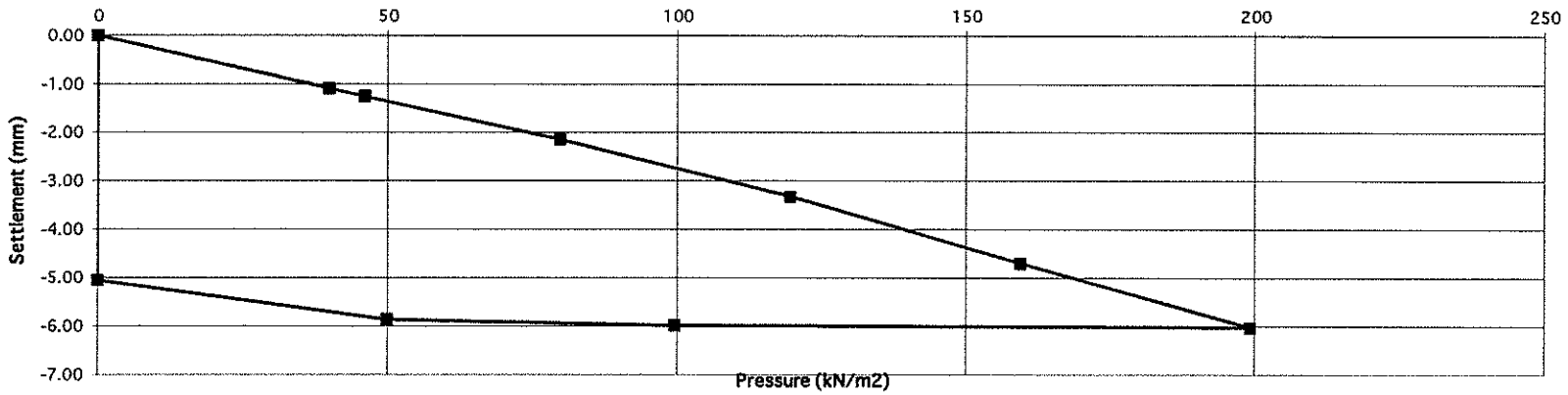


Gradient at 1.25 mm settlement intersection = 32
Modulus of subgrade reaction = 15 MPa/m
Correction factor applied = 0.46 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 1.0 %

PLATE TEST REPORT SHEET (F3.1)		Applied Pressure/Settlement Curve
Reference No.	R144699	
Contract	Monaghan Active Travel	
Test No.	PBT03 - Reload	
Location	TP03R	
Depth	0.6m bgl	
Client	DBFL	
Plate Diameter:	300 mm	
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test	
Technician	I.Reder	
Authorised by		
Date	03/05/2023	

Description of soil under test (natural soil, placed fill, sub-base)	MADE GROUND (sandy gravelly clay, angular cobbles, orga
Easting (m)	
Northing (m)	
Ground Level (mOD)	
Sample Ref No.	N/A
Depth	0.00 m bgl



Gradient at 1.25 mm settlement intersection = 37
Modulus of subgrade reaction = 17 MPa/m
Correction factor applied = 0.46 as per HD 25-26/10

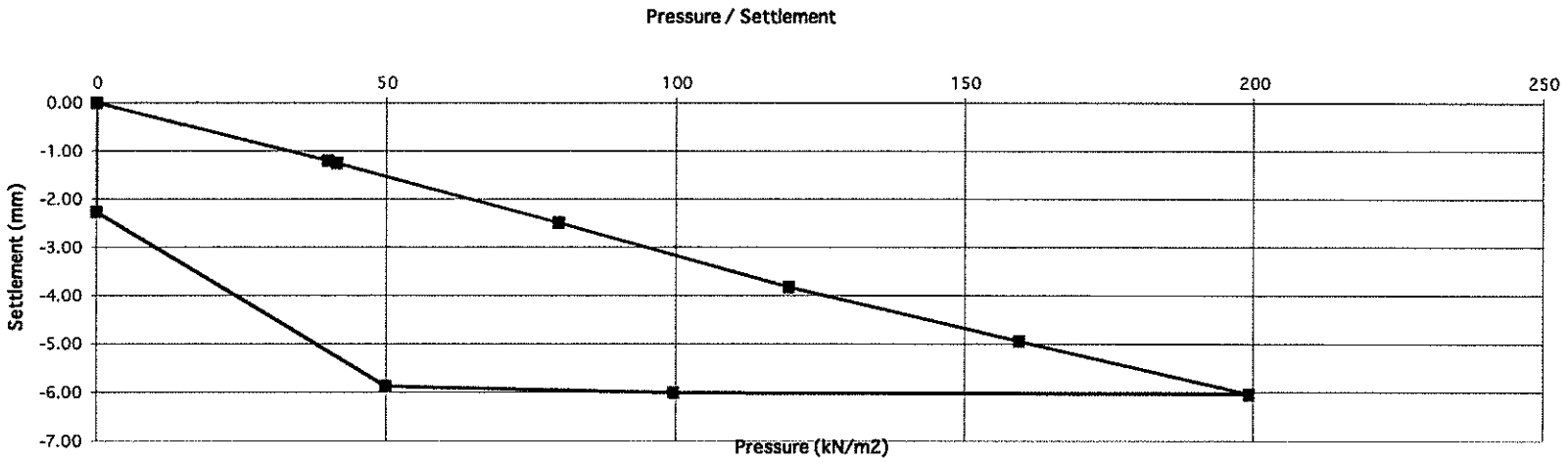
Equivalent CBR value in accordance with NRA HD25-26/10 1.3 %

PLATE TEST REPORT SHEET (F3.1)

Applied Pressure/Settlement Curve

Reference No.	R144700
Contract	Monaghan Active Travel
Test No.	PBT04 - load
Location	TP04R
Depth	0.6m bgl
Client	DBFL
Plate Diameter:	300 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	I.Reder
Authorised by	
Date	03/05/2023

Description of soil under test (natural soil, placed fill, sub-base)	MADE GROUND (sandy gravelly clay, angular cobbles, orga
Easting (m)	
Northing (m)	
Ground Level (mOD)	
Sample Ref No.	N/A
Depth	0.00 m bgl



Gradient at 1.25 mm settlement intersection = 33
Modulus of subgrade reaction = 15 MPa/m
Correction factor applied = 0.46 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 1.1 %

PLATE TEST REPORT SHEET (F3.1)

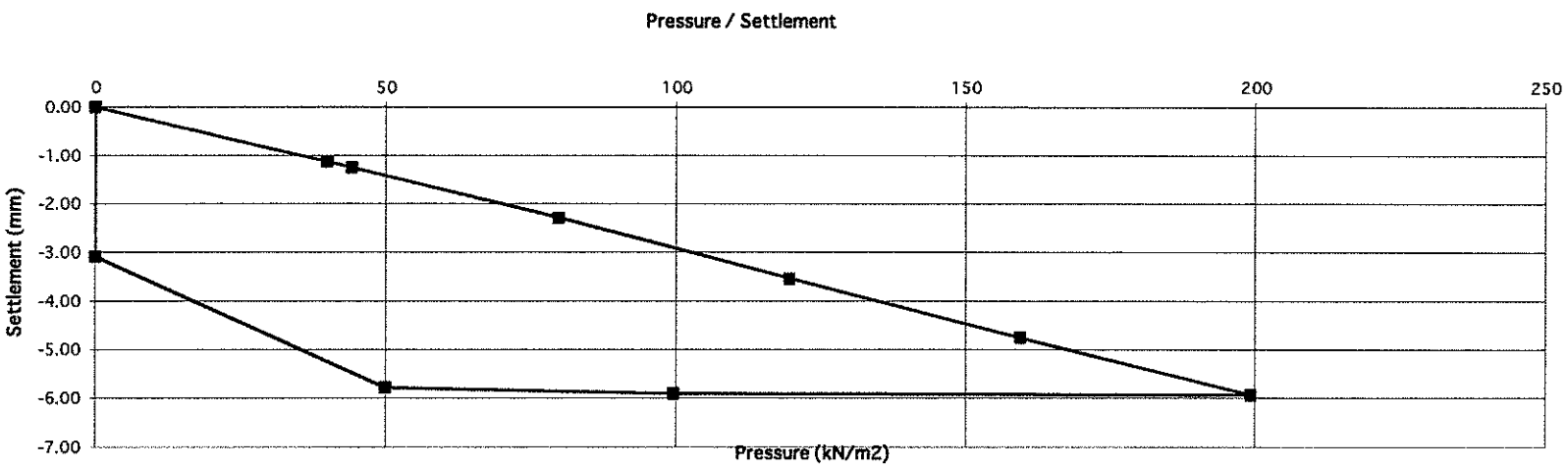
Applied Pressure/Settlement Curve

Reference No.	R144700
Contract	Monaghan Active Travel
Test No.	PBT04 - Reload
Location	TP04R
Depth	0.6m bgl
Client	DBFL
Plate Diameter:	300 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	I.Reder
Authorised by	
Date	03/05/2023

Description of soil under test
(natural soil, placed fill, sub-base)
MADE GROUND (sandy gravelly clay, angular cobbles, orga

Easting (m)
Northing (m)
Ground Level (mOD)

Sample Ref No. N/A
Depth 0.00 m bgl



Gradient at 1.25 mm settlement intersection = 35
Modulus of subgrade reaction = 16 MPa/m
Correction factor applied = 0.46 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 1.2 %

PLATE TEST REPORT SHEET (F3.1)

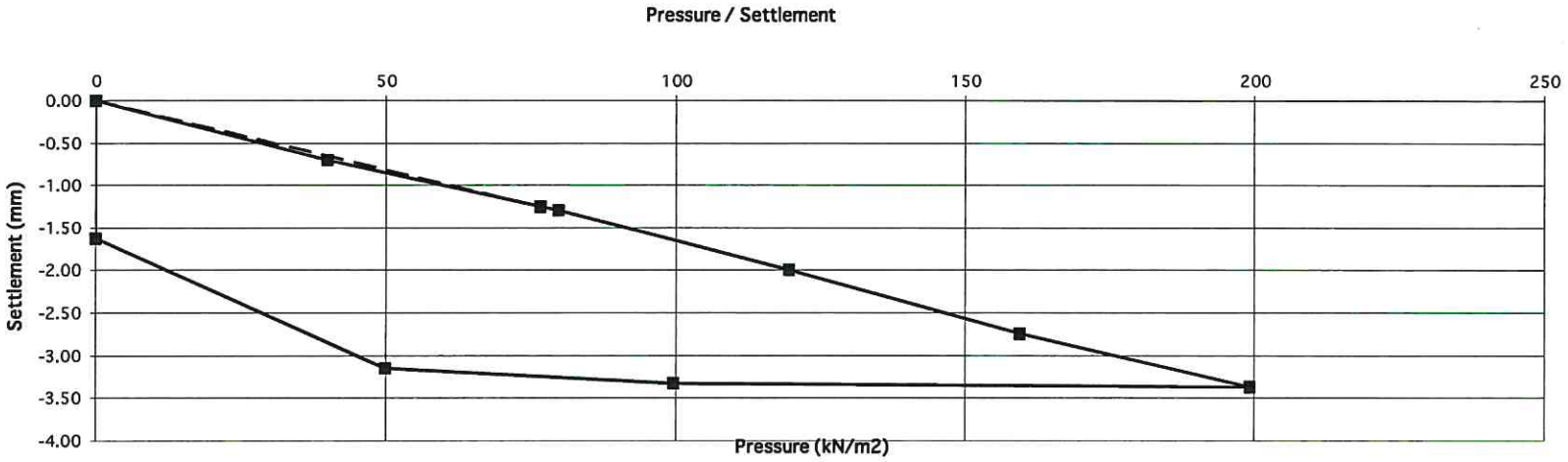
Applied Pressure/Settlement Curve

Reference No.	R144701
Contract	Monaghan Active Travel
Test No.	PBT05 - load
Location	TP05R
Depth	0.5m bgl
Client	DBFL
Plate Diameter:	300 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	I.Reder
Authorised by	
Date	03/05/2023

Description of soil under test
(natural soil, placed fill, sub-base)
MADE GROUND (sandy gravelly clay, angular cobbles, bou

Easting (m)
Northing (m)
Ground Level (mOD)

Sample Ref No. N/A
Depth 0.00 m bgl



Gradient at 1.25 mm settlement intersection = 61
Modulus of subgrade reaction = 28 MPa/m
Correction factor applied = 0.46 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 3.1 %

PLATE TEST REPORT SHEET (F3.1)

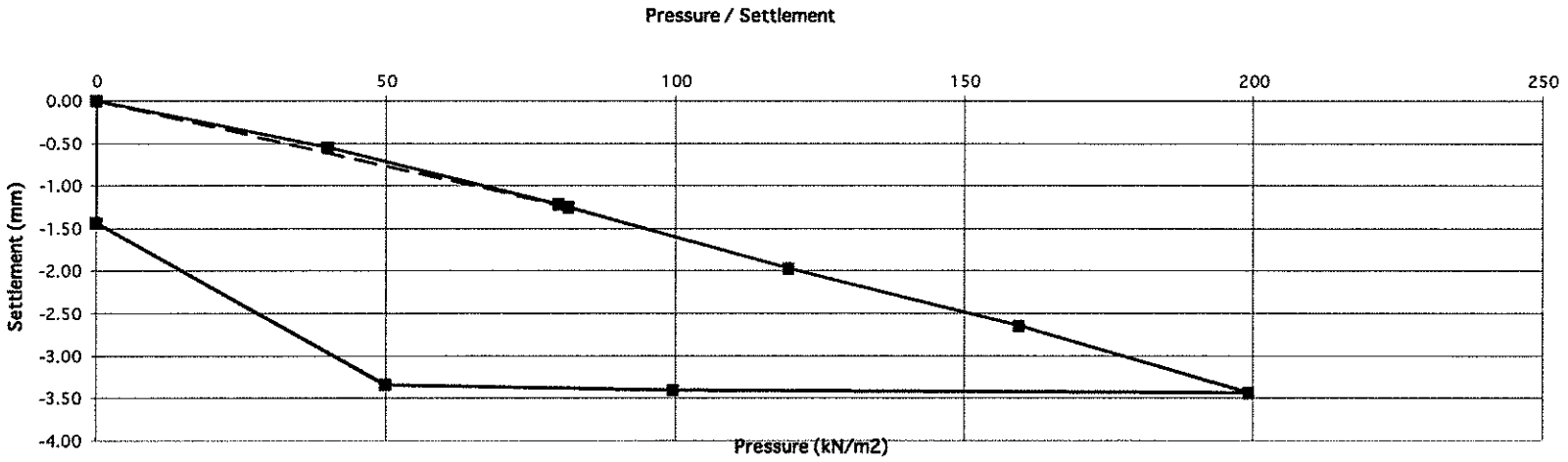
Applied Pressure/Settlement Curve

Reference No.	R144701
Contract	Monaghan Active Travel
Test No.	PBT05 - Reload
Location	TP05R
Depth	0.5m bgl
Client	DBFL
Plate Diameter:	300 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	I.Reder
Authorised by	
Date	03/05/2023

Description of soil under test
(natural soil, placed fill, sub-base)
MADE GROUND (sandy gravelly clay, angular cobbles, bou

Easting (m)
Northing (m)
Ground Level (mOD)

Sample Ref No. N/A
Depth 0.00 m bgl



Gradient at 1.25 mm settlement intersection = 65
Modulus of subgrade reaction = 30 MPa/m
Correction factor applied = 0.46 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 3.5 %

PLATE TEST REPORT SHEET (F3.1)

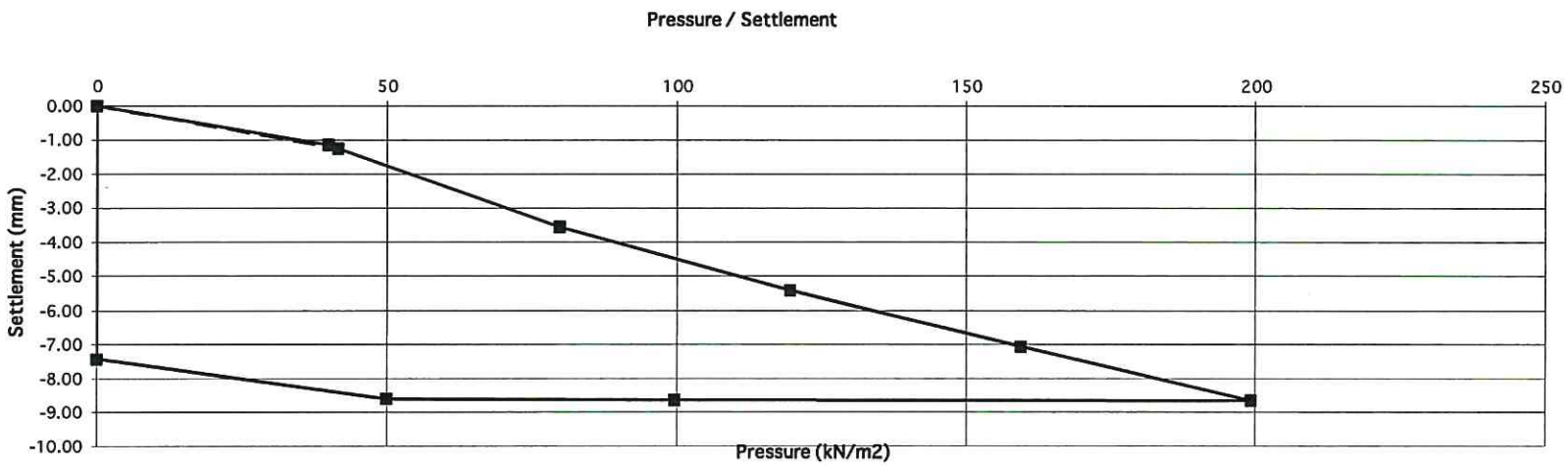
Applied Pressure/Settlement Curve

Reference No.	R144702
Contract	Monaghan Active Travel
Test No.	PBT06 - load
Location	TP06R
Depth	0.6m bgl
Client	DBFL
Plate Diameter:	300 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	I.Reder
Authorised by	
Date	03/05/2023

Description of soil under test
(natural soil, placed fill, sub-base)
Greyish brown, slightly sandy gravelly CLAY with cobbles

Easting (m)
Northing (m)
Ground Level (mOD)

Sample Ref No. N/A
Depth 0.00 m bgl



Gradient at 1.25 mm settlement intersection = 33
Modulus of subgrade reaction = 15 MPa/m
Correction factor applied = 0.46 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 1.1 %

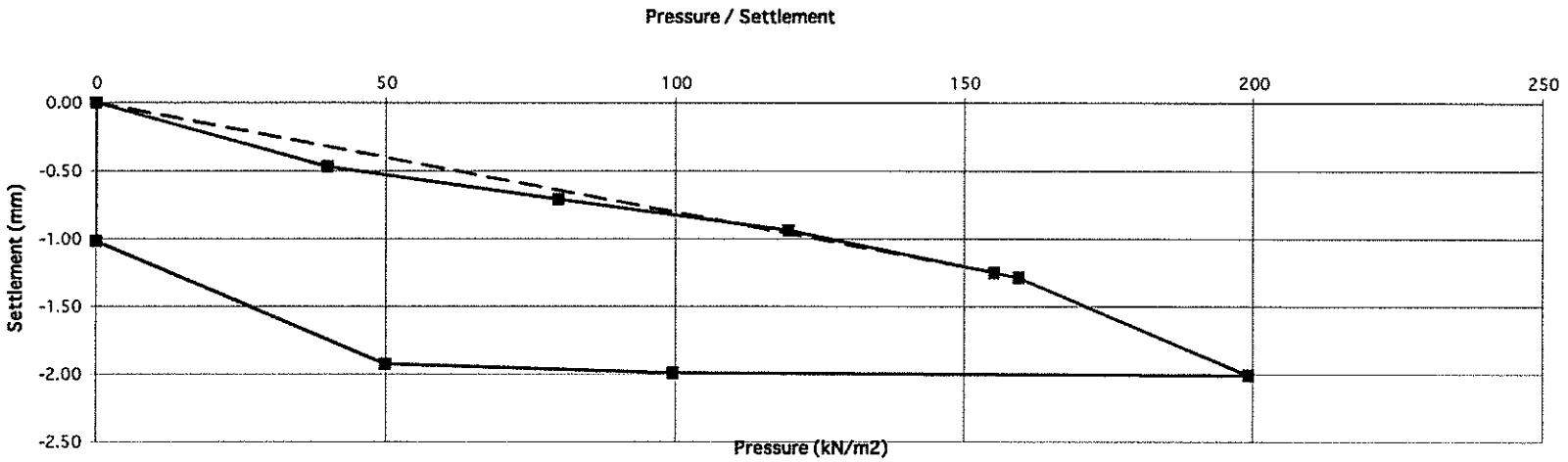
PLATE TEST REPORT SHEET (F3.1)

Applied Pressure/Settlement Curve

Reference No.	R144702
Contract	Monaghan Active Travel
Test No.	PBT06 - Reload
Location	TP06R
Depth	0.6m bgl
Client	DBFL
Plate Diameter:	300 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	I.Reder
Authorised by	
Date	03/05/2023

Description of soil under test
(natural soil, placed fill, sub-base)
Greyish brown, slightly sandy gravelly CLAY with cobbles

Easting (m)
Northing (m)
Ground Level (mOD)
Sample Ref No. N/A
Depth 0.00 m bgl

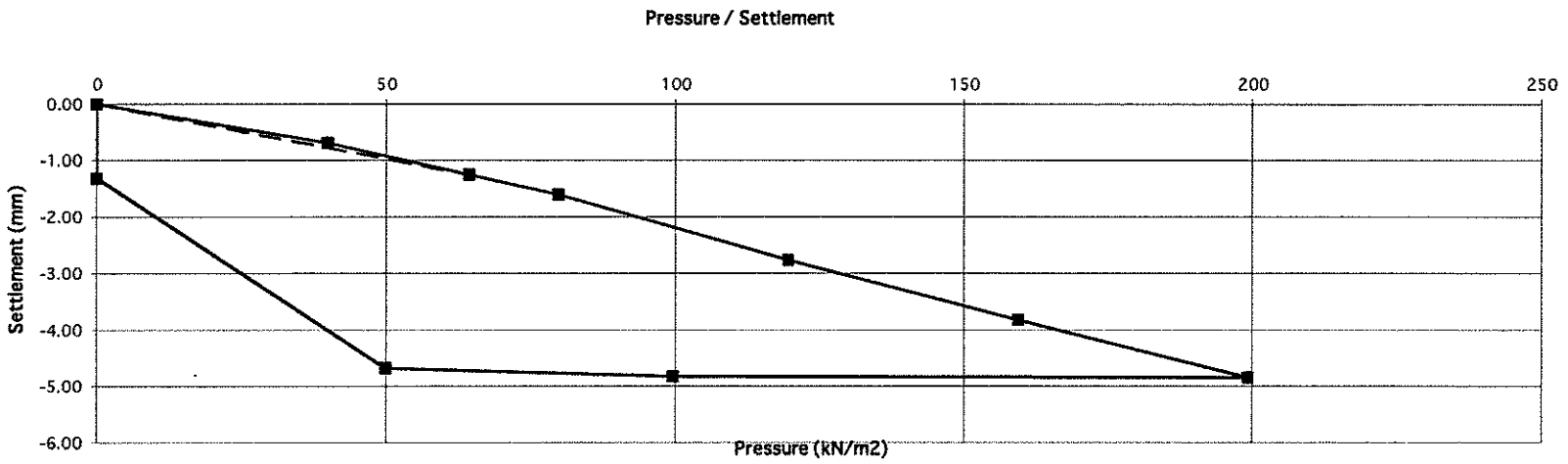


Gradient at 1.25 mm settlement intersection = 124
Modulus of subgrade reaction = 57 MPa/m
Correction factor applied = 0.46 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 10.6 %

PLATE TEST REPORT SHEET (F3.1)		Applied Pressure/Settlement Curve
Reference No.	R144703	
Contract	Monaghan Active Travel	
Test No.	PBT07 - load	
Location	TP07R	
Depth	0.6m bgl	
Client	DBFL	
Plate Diameter:	300 mm	
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test	
Technician	I.Reder	
Authorised by		
Date	03/05/2023	

Description of soil under test (natural soil, placed fill, sub-base)	Brownish grey, slightly sandy gravelly silty CLAY with cob
Easting (m)	
Northing (m)	
Ground Level (mOD)	
Sample Ref No.	N/A
Depth	0.00 m bgl



Gradient at 1.25 mm settlement intersection = 51
Modulus of subgrade reaction = 24 MPa/m
Correction factor applied = 0.46 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 2.3 %

PLATE TEST REPORT SHEET (F3.1)

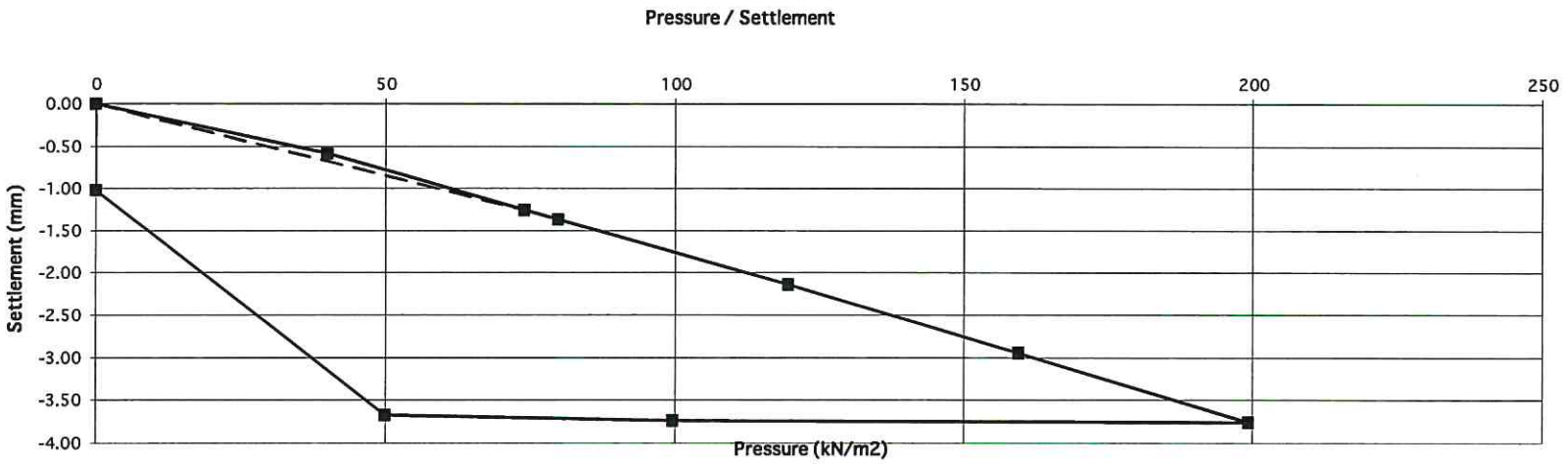
Applied Pressure/Settlement Curve

Reference No.	R144703
Contract	Monaghan Active Travel
Test No.	PBT07 - Reload
Location	TP07R
Depth	0.6m bgl
Client	DBFL
Plate Diameter:	300 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	I.Reder
Authorised by	
Date	03/05/2023

Description of soil under test
(natural soil, placed fill, sub-base)
Brownish grey, slightly sandy gravelly silty CLAY with cob

Easting (m)
Northing (m)
Ground Level (mOD)

Sample Ref No. N/A
Depth 0.00 m bgl



Gradient at 1.25 mm settlement intersection = 59
Modulus of subgrade reaction = 27 MPa/m
Correction factor applied = 0.46 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 2.9 %

PLATE TEST REPORT SHEET (F3.1)

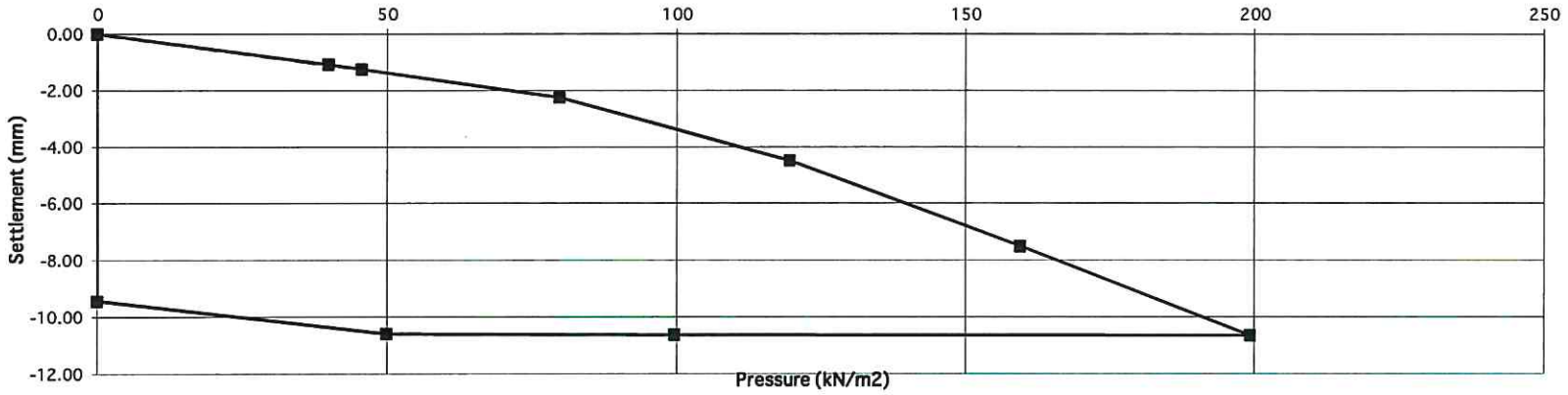
Applied Pressure/Settlement Curve

Reference No.	R144704
Contract	Monaghan Active Travel
Test No.	PBT08 - load
Location	TP08R
Depth	0.6m bgl
Client	DBFL
Plate Diameter:	300 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	I.Reder
Authorised by	
Date	04/05/2023

Description of soil under test
(natural soil, placed fill, sub-base)
Brownish grey, sl. sandy sl. gravelly CLAY with occ. cobbl

Easting (m)
Northing (m)
Ground Level (mOD)

Sample Ref No. N/A
Depth 0.00 m bgl



Gradient at 1.25 mm settlement intersection = 36
Modulus of subgrade reaction = 17 MPa/m
Correction factor applied = 0.46 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 1.3 %

PLATE TEST REPORT SHEET (F3.1)

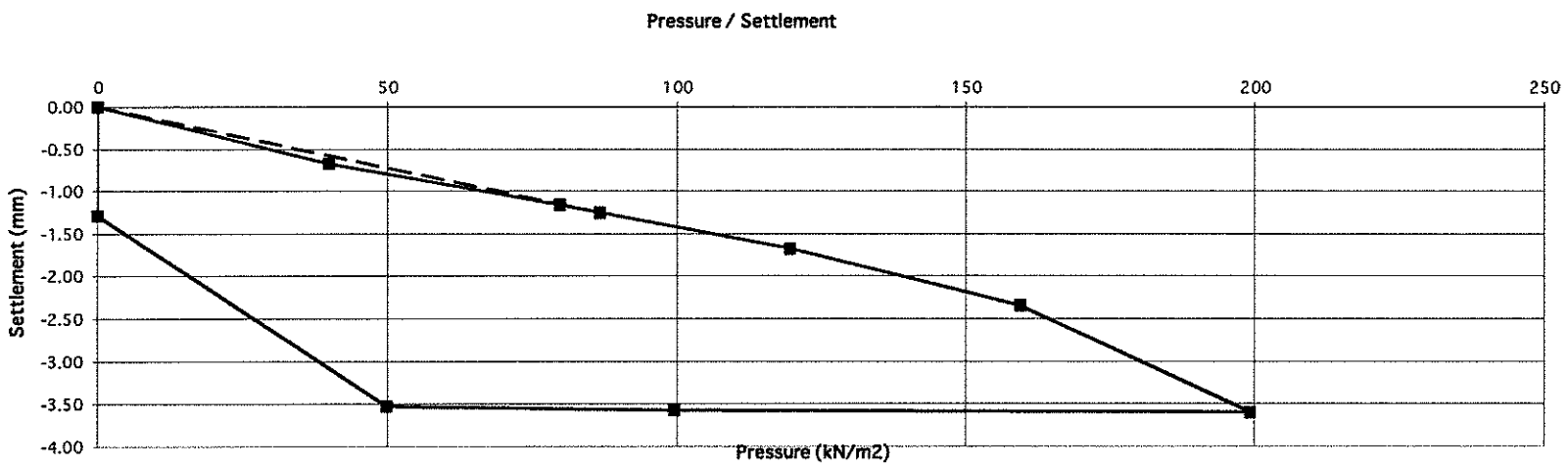
Applied Pressure/Settlement Curve

Reference No.	R144704
Contract	Monaghan Active Travel
Test No.	PBT08 - Reload
Location	TP08R
Depth	0.6m bgl
Client	DBFL
Plate Diameter:	300 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	I.Reder
Authorised by	
Date	04/05/2023

Description of soil under test
(natural soil, placed fill, sub-base)
Brownish grey, sl. sandy sl. gravelly CLAY with occ. cobbl

Easting (m)
Northing (m)
Ground Level (mOD)

Sample Ref No. N/A
Depth 0.00 m bgl



Gradient at 1.25 mm settlement intersection = 69
Modulus of subgrade reaction = 32 MPa/m
Correction factor applied = 0.46 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 3.8 %

PLATE TEST REPORT SHEET (F3.1)

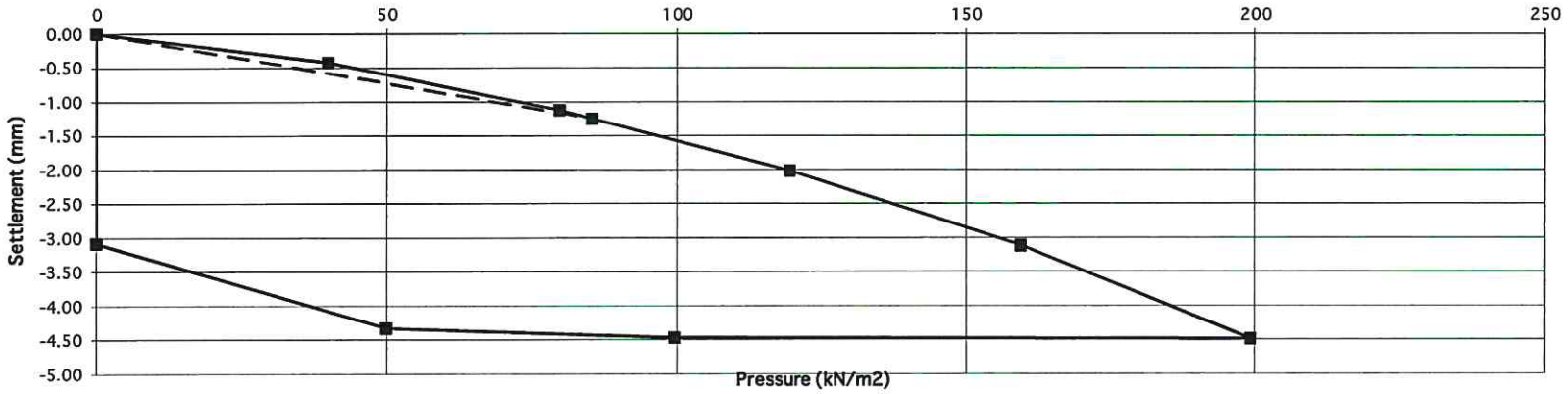
Applied Pressure/Settlement Curve

Reference No.	R144705
Contract	Monaghan Active Travel
Test No.	PBT09 - load
Location	TP09R
Depth	0.6m bgl
Client	DBFL
Plate Diameter:	300 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	I.Reder
Authorised by	
Date	04/05/2023

Description of soil under test
(natural soil, placed fill, sub-base)
Brown, sl. sandy very gravelly CLAY with occ. cobbles

Easting (m)
Northing (m)
Ground Level (mOD)

Sample Ref No. N/A
Depth 0.00 m bgl



Gradient at 1.25 mm settlement intersection = 68
Modulus of subgrade reaction = 31 MPa/m
Correction factor applied = 0.46 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 3.8 %

PLATE TEST REPORT SHEET (F3.1)

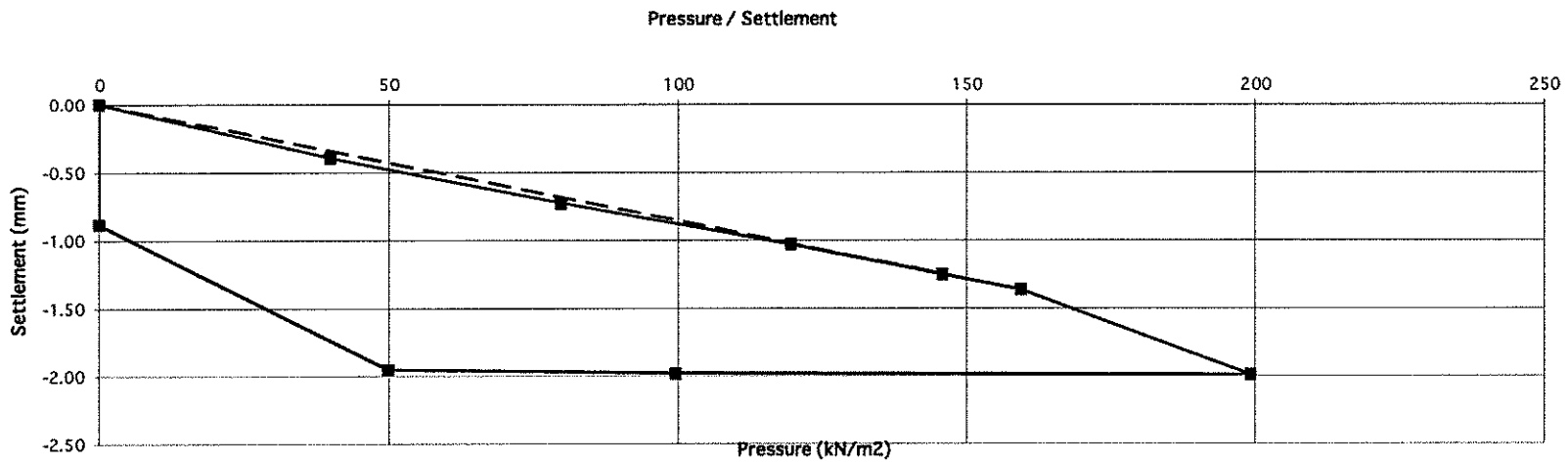
Applied Pressure/Settlement Curve

Reference No.	R144705
Contract	Monaghan Active Travel
Test No.	PBT09 - Reload
Location	TP09R
Depth	0.6m bgl
Client	DBFL
Plate Diameter:	300 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	I.Reder
Authorised by	
Date	04/05/2023

Description of soil under test
(natural soil, placed fill, sub-base)
Brown, sl. sandy very gravelly CLAY with occ. cobbles

Easting (m)
Northing (m)
Ground Level (mOD)

Sample Ref No. N/A
Depth 0.00 m bgl



Gradient at 1.25 mm settlement intersection = 117
Modulus of subgrade reaction = 53 MPa/m
Correction factor applied = 0.46 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 9.5 %

Appendix VI Slit Trenches

Report No. 24665	SLIT TRENCH RECORD	FACING DIRECTION: N W E S	IGSL

		Survey				
Project: Monaghan Active Travel		Easting (m)	Northing (m)	Elevation (mOD)	Slit Trench No.	ST01
Engineer: DBFL					Sheet	1 of 1
Crew: I.R. /Flanagans	Start of Trench				Date Commenced	08/05/2023
	End of Trench				Date Completed	08/05/2023

Ground Conditions

From (m)	To (m)	Soil Description
0.00	0.12	TARMAC
0.12	0.55	MADE GROUND (comprised of brown slightly clayey slightly sandy angular gravel and cobbles)
0.55	1.1	MADE GROUND (comprised of grey slightly sandy fine to coarse angular gravel)
1.1	1.5	MADE GROUND (comprised of brown/dark brown, slightly sandy slightly gravelly clay, red brick, timber pieces, pottery pieces, very occasional steel rubbish)

Photograph

Trench Dimensions	
LHS of Trench (m)	0.0
RHS of Trench (m)	12.5
Trench Depth (m)	1.5
Trench Width (m)	1.0

Location

Facing Direction	East
Facing Features	Road
Groundwater	Dry

SAMPLES

0.8m (B) Ref.No AA205190

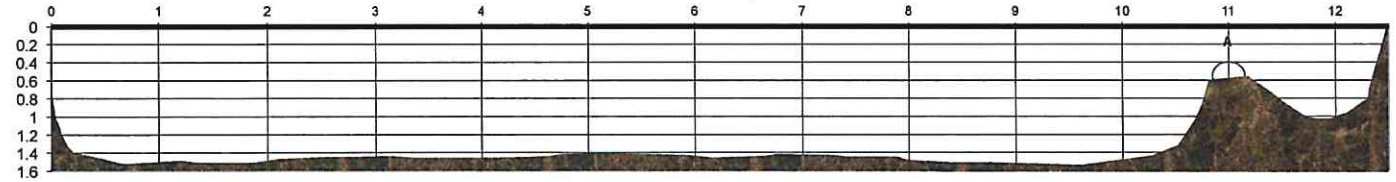
Excavation Quantities

Surface	Length (m)	Material
Road	12.5	
Path (LHS)		
Path (RHS)		
Grass Verge (LHS)		
Grass Verge (RHS)		
Other		
Total Length	12.5	

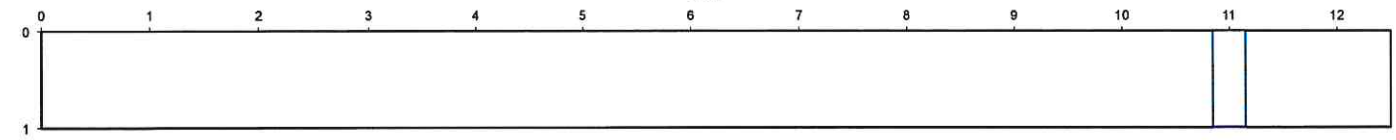
Zero Metres Taken As: Kerb at parking pay station side

X-Section

Road and car park spaces



Plan



	Diameter (mm)	Material	Description	Distance (m)	Depth to crown (m)	Angle (deg.)
Service A	300	Concrete	Stormwater pipe	11	0.4	90
Service B						
Service C						
Service D						
Service E						
Service F						
Service G						
Service H						
Service I						
Service J						
Service K						
Service L						
Service M						

Report No. 24665	SLIT TRENCH RECORD	FACING DIRECTION: N W E S	IGSL

		Survey				
Project: Monaghan Active Travel		Easting (m)	Northing (m)	Elevation (mOD)	Slit Trench No.	ST02
Engineer: DBFL					Sheet	1 of 1
Crew: I.R. /Flanagans	Start of Trench				Date Commenced	09/05/2023
	End of Trench				Date Completed	09/05/2023

Ground Conditions

From (m)	To (m)	Soil Description
0.00	0.18	TARMAC
0.18	0.35	MADE GROUND (comprised of grey slightly sandy fine to coarse angular gravel and lean-mix)
0.35	0.9	MADE GROUND (comprised of grey slightly sandy fine to coarse angular gravel and cobbles)
0.9	1.3	MADE GROUND (comprised of brown/grey, sandy gravelly clay, cobbles, boulders, angular gravel)

Photograph

Trench Dimensions	
LHS of Trench (m)	0.0
RHS of Trench (m)	12.1
Trench Depth (m)	1.3
Trench Width (m)	1.0
Facing Direction	East
Facing Features	Road
Groundwater	Dry

Location

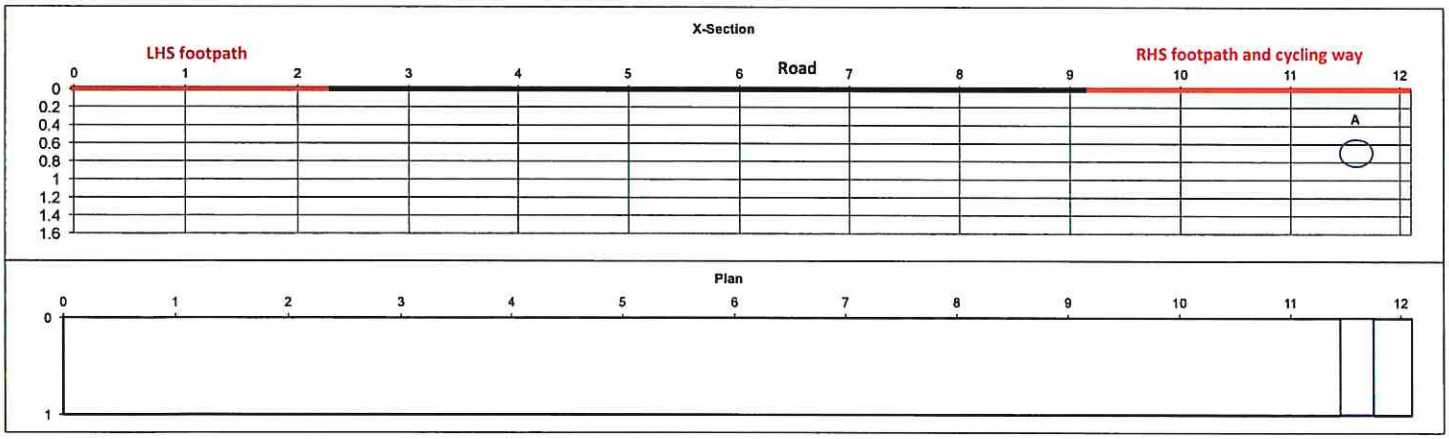
SAMPLES

1.0m (B) Ref.No AA205191

Excavation Quantities

Surface	Length (m)	Material
Road	6.9	
Path (LHS)	2.2	
Path (RHS)	3.0	
Grass Verge (LHS)		
Grass Verge (RHS)		
Other		
Total Length	12.1	

Zero Metres Taken As: Timber fence at footpath



	Diameter (mm)	Material	Description	Distance (m)	Depth to crown (m)	Angle (deg.)
Service A	300	Cast Iron	Unknown	11.6	0.55	90
Service B						
Service C						
Service D						
Service E						
Service F						
Service G						
Service H						
Service I						
Service J						
Service K						
Service L						
Service M						

Report No. 24665	SLIT TRENCH RECORD	FACING DIRECTION: N / W / E / S	IGSL

		Survey				
Project: Monaghan Active Travel		Easting (m)	Northing (m)	Elevation (mOD)	Slit Trench No.	ST03
Engineer: DBFL					Sheet	1 of 1
Crew: I.R. /Flanagans	Start of Trench				Date Commenced	02/05/2023
	End of Trench				Date Completed	02/05/2023

Ground Conditions

From (m)	To (m)	Soil Description
0.00	0.05	TOPSOIL
0.05	0.9	MADE GROUND (comprised of grey/brown sandy gravelly clay, angular stones, red brick, occasional plastic rubbish)
0.9	1.8	MADE GROUND (comprised of grey sandy gravelly clay, cobbles, organic matter) - possible backfilled old canal

Photograph

Trench Dimensions	
LHS of Trench (m)	0.0
RHS of Trench (m)	14.85
Trench Depth (m)	1.8
Trench Width (m)	0.5
Facing Direction	142° South East
Facing Features	Canal Green way
Groundwater	Dry

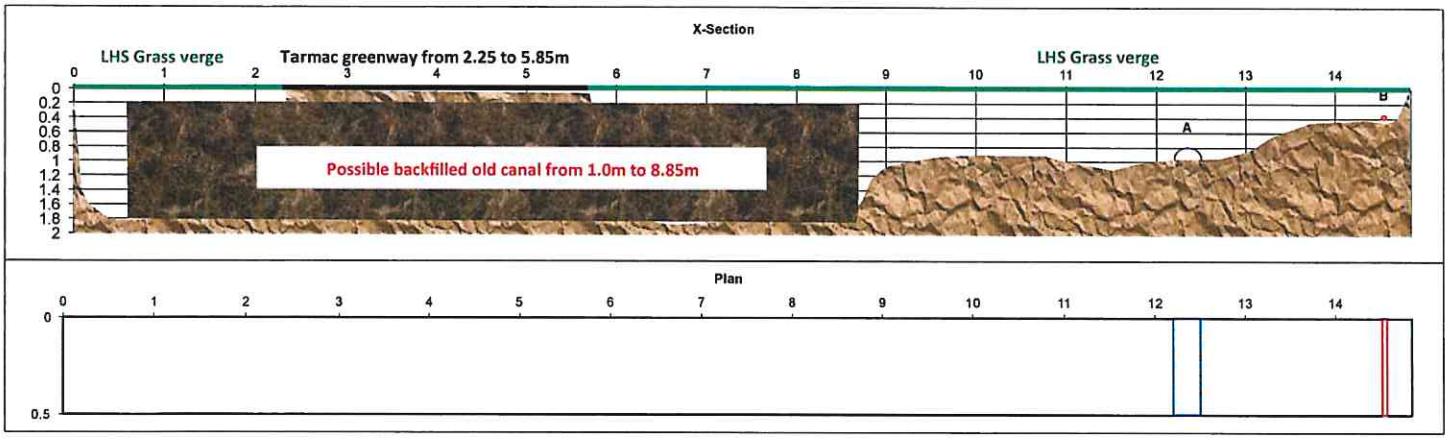
Location

SAMPLES

Excavation Quantities

Surface	Length (m)	Material
Greenway	3.6	
Path (LHS)		
Path (RHS)		
Grass Verge (LHS)	2.25	
Grass Verge (RHS)	9.0	
Other		
Total Length	14.85	

Zero Metres Taken As: timber fence



	Diameter (mm)	Material	Description	Distance (m)	Depth to crown (m)	Angle (deg.)
Service A	300	Cast Iron	Unknown	12.35	0.8	90
Service B	50	PVC	Cable Duct	14.55	0.35	90
Service C						
Service D						
Service E						
Service F						
Service G						
Service H						
Service I						
Service J						
Service K						
Service L						
Service M						

Report No. 24665	SLIT TRENCH RECORD	FACING DIRECTION: N / W / E / S	IGSL

		Survey				
Project: Monaghan Active Travel		Easting (m)	Northing (m)	Elevation (mOD)	Slit Trench No.	ST04
Engineer: DBFL					Sheet	1 of 1
Crew: I.R. /Flanagans	Start of Trench				Date Commenced	02/05/2023
	End of Trench				Date Completed	02/05/2023

Ground Conditions

From (m)	To (m)	Soil Description
0.00	0.10	TOPSOIL
0.1	1.6	MADE GROUND (comprised of firm to stiff grey/brown sandy gravelly clay with cobbles, angular stones, red brick, occasional plastic rubbish)
1.6		Obstruction - big boulders or rubble

Photograph

Trench Dimensions	
LHS of Trench (m)	0.0
RHS of Trench (m)	14.5
Trench Depth (m)	1.6
Trench Width (m)	0.5

Facing Direction	147° South East
Facing Features	Canal Greenway
Groundwater	Dry

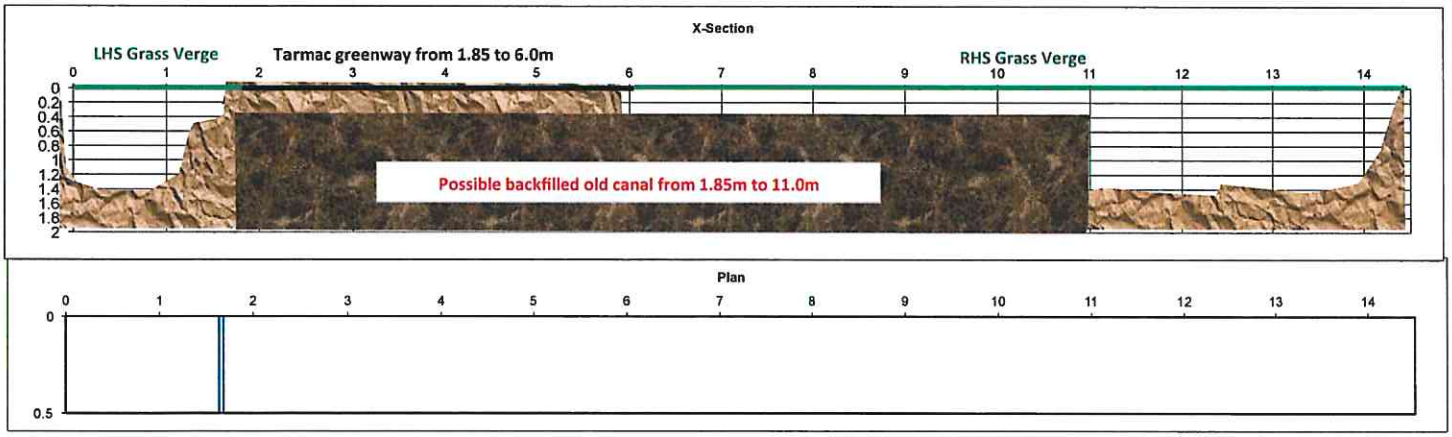
Location

SAMPLES

Excavation Quantities

Surface	Length (m)	Material
Greenway	4.15	
Path (LHS)		
Path (RHS)		
Grass Verge (LHS)	1.85	
Grass Verge (RHS)	8.5	
Other		
Total Length	14.5	

Zero Metres Taken As: timber fence



	Diameter (mm)	Material	Description	Distance (m)	Depth to crown (m)	Angle (deg.)
Service A	50	PVC	Lights cable duct	1.66	0.45	90
Service B						
Service C						
Service D						
Service E						
Service F						
Service G						
Service H						
Service I						
Service J						
Service K						
Service L						
Service M						

Appendix VII Vane Shear Tests

a. Vane Shear Test Data
b. Window Sample Logs
c. Dynamic Probe Logs

Vane Shear Strength from Field Measurement

Project No.	24665
Project Title:	Monaghan Active Travel - road and bridge project
Client:	Monaghan Co. Co.
Borehole No.	SV01 (WS01)

Easting (m)	667616.276
Northing (m)	833670.874
Ground Level (mOD)	55.657

Vane Type	Geonor H-10
Vane Length (mm)	130
Vane Width (mm)	65
Rotational Speed of Vane	0.1 deg/sec (1 rev/sec at rotary handle)

Depth (m)	**Peak Vane Shear Strength (kPa)**			**Residual Shear Strength (kPa)**	
	Gauge Reading	Peak Vane Shear Strength* (kPa)	Time to Reach Peak Shear (sec)	Gauge Reading	Residual Shear Strength* (kPa)
0.5 (Attempt 1)	Ground resistance too high or too cobbly to extract vane from housing				
1.0 (Attempt 2)	Ground resistance too high or too cobbly to extract vane from housing				
1.5 (Attempt 3)	Ground resistance too high or too cobbly to extract vane from housing				

* shear strength calculated using instrument's calibration chart

Vane Shear Strength from Field Measurement

Project No.	24665
Project Title:	Monaghan Active Travel - road and bridge project
Client:	Monaghan Co. Co.
Borehole No.	SV02 (WS02)

Easting (m)	667636.425
Northing (m)	833686.243
Ground Level (mOD)	55.518

Vane Type	Geonor H-10
Vane Length (mm)	130
Vane Width (mm)	65
Rotational Speed of Vane	0.1 deg/sec (1 rev/sec at rotary handle)

Depth (m)	**Peak Vane Shear Strength (kPa)**			**Residual Shear Strength (kPa)**	
	Gauge Reading	Peak Vane Shear Strength* (kPa)	Time to Reach Peak Shear (sec)	Gauge Reading	Residual Shear Strength* (kPa)
0.5 (Attempt 1)	Ground resistance too high or too cobbly to extract vane from housing				
1.5 (Attempt 2)	Ground resistance too high or too cobbly to extract vane from housing				
2.5 (Attempt 3)	Ground resistance too high or too cobbly to extract vane from housing				

* shear strength calculated using instrument's calibration chart

Vane Shear Strength from Field Measurement

Project No.	24665
Project Title:	Monaghan Active Travel - road and bridge project
Client:	Monaghan Co. Co.
Borehole No.	SV03 (WS03)

Easting (m)	667660.367
Northing (m)	833703.834
Ground Level (mOD)	55.87

Vane Type	Geonor H-10
Vane Length (mm)	130
Vane Width (mm)	65
Rotational Speed of Vane	0.1 deg/sec (1 rev/sec at rotary handle)

Depth (m)	**Peak Vane Shear Strength (kPa)**			**Residual Shear Strength (kPa)**	
	Gauge Reading	Peak Vane Shear Strength* (kPa)	Time to Reach Peak Shear (sec)	Gauge Reading	Residual Shear Strength* (kPa)
0.5 (Attempt 1)	Ground resistance too high or too cobbly to extract vane from housing				
1.5 (Attempt 2)	Ground resistance too high or too cobbly to extract vane from housing				
2.5 (Attempt 3)	Ground resistance too high or too cobbly to extract vane from housing				

* shear strength calculated using instrument's calibration chart

WINDOW SAMPLE RECORD

REPORT NUMBER 24665

CONTRACT	Monaghan Active Travel - Road & Bridge project
CO-ORDINATES	
GROUND LEVEL (mOD)	
CLIENT	Monaghan Co.Co.
ENGINEER	DBFL
PROBE NO.	WS01(SV01)
SHEET	Sheet 1 of 1
DATE DRILLED	04/05/2023
DATE LOGGED	04/05/2023
SAMPLED BY	C.Kavanagh
LOGGED BY	I.Reder

Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Depth of Sample Run (m)	Recovery (%)	Blowcount	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0	TOPSOIL		0.10							
	MADE GROUND (comprised of brown/grey mottled sandy gravelly clay, cobbles, angular stones, roots, organic matter)					0.00-1.00	80	114 blows		
1.0	MADE GROUND (comprised of grey/dark greysandy gravelly clay/silt, cobbles, angular stones, organic matter)		1.10							
						1.00-2.00	90	184 blows		
2.0	Obstruction - possible boulders Final Depth 2.00m		2.00							
3.0										
4.0										
5.0										

General Remarks
WS done for set of Shear Vane tests - for all details see SV01 log

Installations

WINDOW SAMPLE RECORD

REPORT NUMBER 24665

CONTRACT	Monaghan Active Travel - Road & Bridge project
CO-ORDINATES	
GROUND LEVEL (mOD)	
CLIENT	Monaghan Co.Co.
ENGINEER	DBFL
PROBE NO.	WS02(SV02)
SHEET	Sheet 1 of 1
DATE DRILLED	04/05/2023
DATE LOGGED	04/05/2023
SAMPLED BY	C.Kavanagh
LOGGED BY	I.Reder

Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Depth of Sample Run (m)	Recovery (%)	Blowcount	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0	TOPSOIL		0.10							
	MADE GROUND (comprised of brown/grey mottled sandy gravelly clay, cobbles, angular stones, roots, organic matter)					0.00-1.00	100	59 blows		
1.0	Firm, grey/dark grey, slightly sandy gravelly SILT/CLAY with some subangular to subrounded cobbles and organic matter (possible fill)		1.00			1.00-2.00	100	62 blows		
2.0	Firm to stiff, grey sandy very gravelly SILT with some cobbels content		2.50			2.00-3.00	90	199 blows		
3.0	Final Depth 3.00m		3.00							
4.0										
5.0										

General Remarks
WS done for set of Shear Vane tests - for all details see SV02 log

Installations

IGSL WS LOG 24665 - BRIDGE & ROAD SITE.GPJ IGSL.GDT 20/7/23

WINDOW SAMPLE RECORD

REPORT NUMBER 24665

CONTRACT	Monaghan Active Travel - Road & Bridge project
CO-ORDINATES	
GROUND LEVEL (mOD)	
CLIENT	Monaghan Co.Co.
ENGINEER	DBFL
PROBE NO.	WS03(SV03)
SHEET	Sheet 1 of 1
DATE DRILLED	04/05/2023
DATE LOGGED	04/05/2023
SAMPLED BY	C.Kavanagh
LOGGED BY	I.Reder

Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Depth of Sample Run (m)	Recovery (%)	Blowcount	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0	TOPSOIL		0.10							
	MADE GROUND (comprised of brown/grey mottled sandy gravelly clay, cobbles, angular stones, roots, organic matter)					0.00-1.00	100	84 blows		
1.0										
	Firm, grey/dark grey, slightly sandy gravelly SILT/CLAY with some subangular to subrounded cobbles and organic matter (possible fill)		1.30							
						1.00-2.00	100	126 blows		
2.0	Firm to stiff, grey sandy very gravelly SILT with some cobbels content		2.00							
						2.00-3.00	100	177 blows		
3.0	Final Depth 3.00m		3.00							
4.0										
5.0										

General Remarks
WS done for set of Shear Vane tests - for all details see SV03 log

Installations

IGSL WS LOG 24665 - BRIDGE & ROAD SITE.GPJ IGSL.GDT 20/7/23

DYNAMIC PROBE RECORD

REPORT NUMBER 24665

CONTRACT	Monaghan Active Travel - Road & Bridge project	PROBE NO.	SV01 (DP01)
		SHEET	Sheet 1 of 1
CO-ORDINATES	667,615.64 E 833,674.91 N	DATE DRILLED	04/05/2023
GROUND LEVEL (mOD)		DATE LOGGED	04/05/2023
CLIENT	Monaghan Co.Co.	HAMMER MASS (kg)	50
ENGINEER	DBFL	INCREMENT SIZE (mm)	100
		FALL HEIGHT (mm)	500
		PROBE TYPE	DPH

Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation (mOD)	Water	Depth (m)	Probe Readings (Blows/Increment)
0.0						0.00	0
						0.10	0
						0.20	0
						0.30	10
						0.40	10
						0.50	8
						0.60	4
						0.70	5
						0.80	3
						0.90	4
1.0						1.00	4
						1.10	4
						1.20	12
						1.30	18
						1.40	14
						1.50	13
						1.60	11
						1.70	5
						1.80	3
						1.90	3
2.0						2.00	3
						2.10	4
						2.20	4
						2.30	3
						2.40	4
						2.50	5
						2.60	4
						2.70	2
						2.80	2
						2.90	2
3.0						3.00	1
						3.10	3
						3.20	3
						3.30	3
						3.40	3
						3.50	9
						3.60	18
						3.70	25
						3.80	25
	End of Probe at 3.90 m						
4.0							

Graphic Probe Record: 0 5 10 15 20 25

GROUNDWATER OBSERVATIONS

REMARKS

IGSL DP LOG 100MM INCREMENTS 24665 - BRIDGE & ROAD SITE.GPJ IGSL.GDT 24/7/23

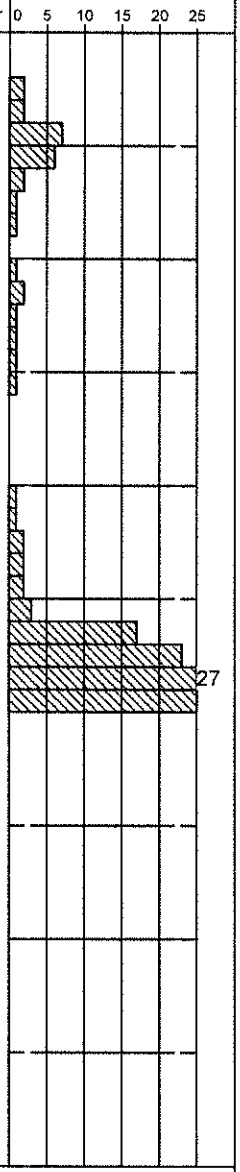
DYNAMIC PROBE RECORD

REPORT NUMBER 24665

CONTRACT	Monaghan Active Travel - Road & Bridge project	PROBE NO.	SV02 (DP02)
		SHEET	Sheet 1 of 1
CO-ORDINATES	667,635.84 E 833,687.59 N	DATE DRILLED	04/05/2023
GROUND LEVEL (mOD)		DATE LOGGED	04/05/2023
CLIENT	Monaghan Co.Co.	HAMMER MASS (kg)	50
ENGINEER	DBFL	INCREMENT SIZE (mm)	100
		FALL HEIGHT (mm)	500
		PROBE TYPE	DPH

Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation (mOD)	Water	Depth (m)	Probe Readings (Blows/Increment)
0.0						0.00	0
						0.10	0
						0.20	2
						0.30	2
						0.40	7
						0.50	6
						0.60	2
						0.70	1
						0.80	1
						0.90	0
1.0						1.00	1
						1.10	2
						1.20	1
						1.30	1
						1.40	1
						1.50	1
						1.60	0
						1.70	0
						1.80	0
						1.90	0
2.0						2.00	1
						2.10	1
						2.20	2
						2.30	2
						2.40	2
						2.50	3
						2.60	17
						2.70	23
						2.80	27
						2.90	25
3.0	End of Probe at 3.00 m						
4.0							

Graphic Probe Record



GROUNDWATER OBSERVATIONS

REMARKS

IGSL DP LOG 100MM INCREMENTS 24665 - BRIDGE & ROAD SITE.GPJ IGSL.GDT 24/7/23

DYNAMIC PROBE RECORD

REPORT NUMBER 24665

CONTRACT	Monaghan Active Travel - Road & Bridge project	PROBE NO.	SV03 (DP03)
		SHEET	Sheet 1 of 1
CO-ORDINATES	667,659.58 E 833,705.59 N	DATE DRILLED	04/05/2023
GROUND LEVEL (mOD)		DATE LOGGED	04/05/2023
CLIENT	Monaghan Co.Co.	HAMMER MASS (kg)	50
ENGINEER	DBFL	INCREMENT SIZE (mm)	100
		FALL HEIGHT (mm)	500
		PROBE TYPE	DPH

Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation (mOD)	Water	Depth (m)	Probe Readings (Blows/Increment)
0.0						0.00	0
						0.10	2
						0.20	0
						0.30	0
						0.40	2
						0.50	6
						0.60	3
						0.70	2
						0.80	7
						0.90	3
1.0						1.00	9
						1.10	3
						1.20	2
						1.30	1
						1.40	3
						1.50	1
						1.60	0
						1.70	1
						1.80	2
						1.90	0
2.0						2.00	14
						2.10	12
						2.20	12
						2.30	16
						2.40	22
						2.50	19
						2.60	19
						2.70	21
						2.80	24
						2.90	25
3.0	End of Probe at 3.00 m						
4.0							

Graphic Probe Record: 0 5 10 15 20 25

GROUNDWATER OBSERVATIONS

REMARKS

IGSL DP LOG 100MM INCREMENTS 24665 - BRIDGE & ROAD SITE.GPJ IGSL.GDT 24/7/23

Appendix VIIIa Geotechnical Laboratory Data

IGSL Ltd
Materials Laboratory
Unit J5, M7 Business Park
Newhall, Naas
Co. Kildare
045 846176

Test Report

Determination of Moisture Content, Liquid & Plastic Limits

Tested in accordance with BS1377:Part 2:1990, clauses 3.2, 4.3, 4.4 & 5.3**

Report No. **R146534** Contract No. 24665/2 Contract Name: Monaghan Town Active Travel Development Site - Road & Bridge Site

Customer CORA

Samples Received: 13/06/23 Date Tested: 13/06/23

BH/TP*	Sample No.	Depth* (m)	Lab. Ref	Sample Type*	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity Index	% <425µm	Preparation	Liquid Limit Clause	Classification (BS5930)	Description
BH01	AA197908	1.0	A23/17668	B	18	39	16	23	65	WS	4.4	C I	Brown sandy gravelly CLAY
BH01	AA197910	3.0	A23/1769	B	18	28	NP	NP	71	WS	4.4		Brown very sandy gravelly SILT
BH02	AA192929	3.0	A23/1770	B	13	32	NP	NP	33	WS	4.4		Grey/brown slightly sandy, gravelly, SILT
TP01R	AA205157	2.5	A23/1772	B	26	36	NP	NP	56	WS	4.4		Grey/brown sandy gravelly SILT
TP03R	AA205163	2.3	A23/1773	B	17	32	13	19	54	WS	4.4	C L	Brown sandy gravelly CLAY
TP04R	AA205165	1.7	A23/1774	B	12	42	17	25	54	WS	4.4	C I	Brown sandy gravelly CLAY
TP05R	AA205168	1.5	A23/1775	B	20	55	NP	NP	47	WS	4.4		Greybrown sandy gravelly SILT
TP06R	AA205171	0.7	A23/1776	B	19	35	NP	NP	37	WS	4.4		Brown sandy gravelly SILT
TP08R	AA205180	0.7	A23/1778	B	25	35	16	19	79	WS	4.4	C L	Brown sandy gravelly CLAY
TP09R	AA205182	0.6	A23/1779	B	16	38	14	24	61	WS	4.4	C I	Grey/brown sandy gravelly CLAY

Preparation: WS - Wet sieved
AR - As received
NP - Non plastic

Liquid Limit Clause: 4.3 Cone Penetrometer definitive method
4.4 Cone Penetrometer one point method

Sample Type: B - Bulk Disturbed
U - Undisturbed

Remarks:
Results relate only to the specimen tested,in as received condition unless otherwise noted.
NOTE: **These clauses have been superceded by EN 17892-1 and EN17892-12.
Opinions and interpretations are outside the scope of accreditation. * denotes Customer supplied information.

IGSL Ltd Materials Laboratory

Persons authorized to approve reports
H Byrne (Laboratory Manager)

Approved by | Date: 18/07/23 | Page: 1 of 1

TEST REPORT

Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5**

(note: Sedimentation stage not accredited)

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO.133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	95	
28	90	
20	81	
14	75	
10	71	
6.3	64	
5	61	
3.35	57	
2	52	
1.18	48	SAND
0.6	42	
0.425	40	
0.3	36	
0.15	30	
0.063	21	SILT/CLAY
0.038	16	
0.027	14	
0.018	12	
0.010	11	
0.007	10	
0.005	8	
0.002	6	

Contract No. 24665/2 Report No. R146536

Contract Name : Monaghan Town Active Travel Development Site - Road & Bridges

BH/TP No. BH02

Sample No.* AA192929 Lab. Sample No. A23/1770

Sample Type: B

Depth* (m) 3.00 Customer: CORA

Date Received 13/06/2023 Date Testing started 13/06/2023

Description: Grey/brown slightly sandy, gravelly, SILT

Remarks Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 .

Results relate only to the specimen tested in as received condition unless otherwise noted. * denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.

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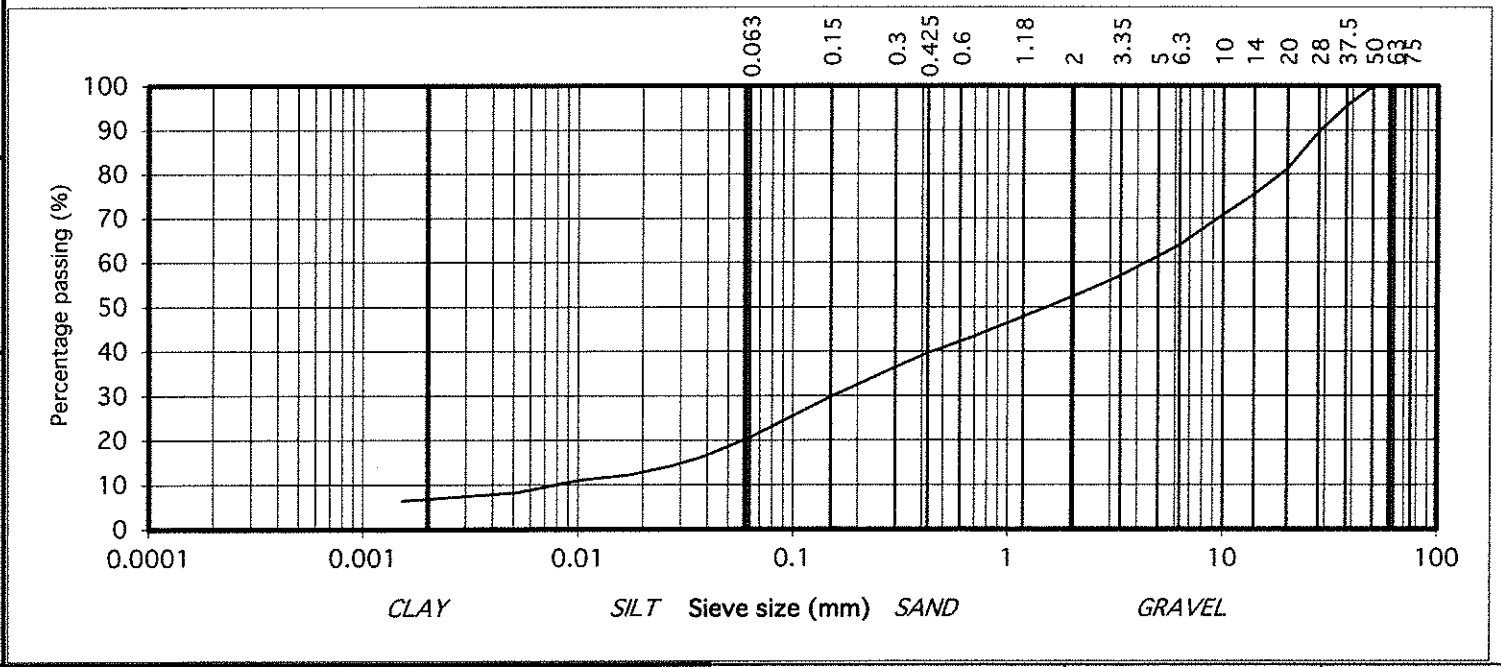

IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
	18/07/23	1 of 1

Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT

Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5**

(note: Sedimentation stage not accredited)

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	77	COBBLES
63	77	
50	77	GRAVEL
37.5	55	
28	30	
20	19	
14	11	
10	7	
6.3	5	
5	4	
3.35	3	
2	3	
1.18	2	SAND
0.6	2	
0.425	1	
0.3	1	
0.15	1	
0.063	1	SILT/CLAY

Contract No. 24665/2 Report No. R146537

Contract Name : Monaghan Town Active Travel Development Site - Road & Bridges

BH/TP No. BH02

Sample No.* AA192930 Lab. Sample No. A23/1771

Sample Type: B

Depth* (m) 4.00 Customer: CORA

Date Received 13/06/2023 Date Testing started 13/06/2023

Description: Brown slightly clayey/silty, slightly sandy, GRAVEL with many cobbles

Remarks Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377

Results relate only to the specimen tested in as received condition unless otherwise noted. * denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.

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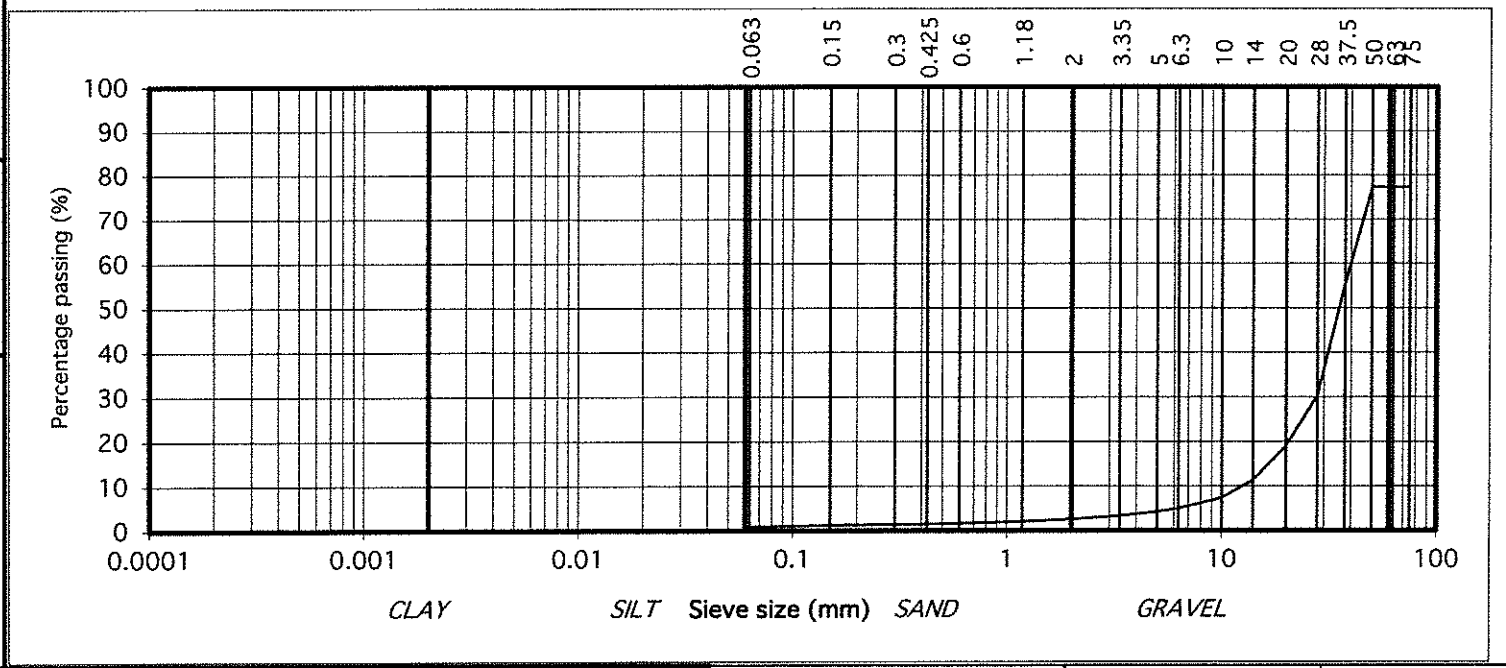

IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
	18/07/23	1 of 1

Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT

Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5**

(note: Sedimentation stage not accredited)

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	91	GRAVEL
37.5	91	
28	88	
20	86	
14	85	
10	83	
6.3	80	
5	79	
3.35	76	
2	73	
1.18	69	SAND
0.6	65	
0.425	63	
0.3	60	
0.15	53	
0.063	45	SILT/CLAY
0.038	36	
0.027	33	
0.017	28	
0.010	24	
0.007	21	
0.005	18	
0.002	13	

Contract No. 24665/2 Report No. R146535

Contract Name : Monaghan Town Active Travel Development Site - Road & Bridges

BH/TP No. TP07R

Sample No.* AA205170 Lab. Sample No. A23/1777

Sample Type: B

Depth* (m) 1.90 Customer: CORA

Date Received 13/06/2023 Date Testing started 13/06/2023

Description: Brown slightly sandy, slightly gravelly, SILT/CLAY

Remarks Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 .

Results relate only to the specimen tested in as received condition unless otherwise noted. * denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.

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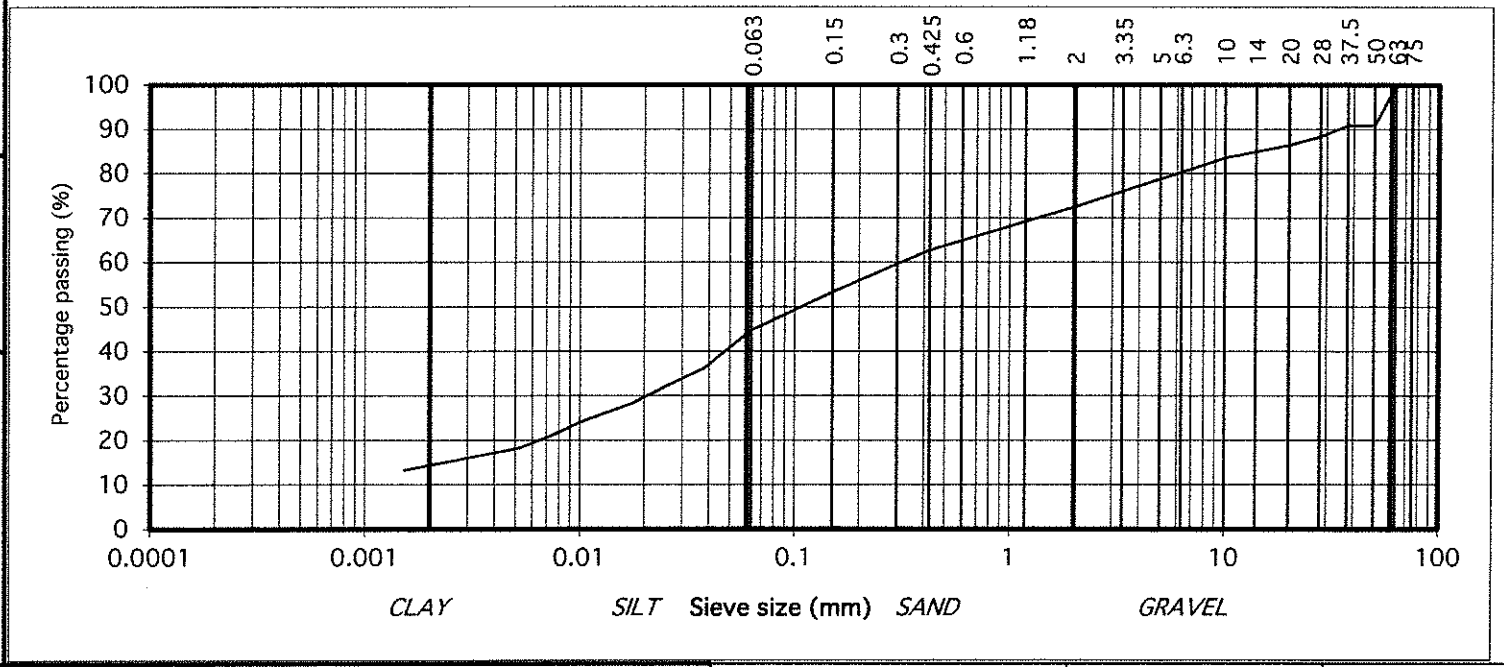

IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
	18/07/23	1 of 1

Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

IGSL Ltd
Materials Laboratory
Unit J5,M7 Business Park
Naas
Co. Kildare
045 899324

Test Report

Determination of Moisture Condition Value at Natural Moisture Content

Tested in accordance with BS1377:Part 4:1990, clause 5.4

Report No.	**R146540**
Contract No.	24665/2
Contract Name:	Monaghan Town Active Travel Development - Roads & Bridges
Customer:	CORA
BH/TP*	TP04R
Sample No.*	AA205165
Depth* (m)	1.70
Sample Type:	B
Lab Sample No.	A23/1772
Source* (if applicable)	N/A
Material Type* (if applicable):	B
Sample Received:	13/06/23
Date Tested:	15/06/23
Sample Cert:	Not Provided
Moisture Content (%):	16
% Particles > 20mm (By dry mass):	17
MCV:	5.4
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Brown sandy gravelly CLAY

Results relate only to the specimen tested, in as received condition unless otherwise noted.
Opinions and interpretations are outside the scope of accreditation.
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Persons authorised to approve reports
J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

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		18/07/23	1 of 1

IGSL Ltd
Materials Laboratory
Unit J5,M7 Business Park
Naas
Co. Kildare
045 899324

Test Report

Determination of Moisture Condition Value at Natural Moisture Content

Tested in accordance with BS1377:Part 4:1990, clause 5.4

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 1337

Report No.	**R205171**
Contract No.	24665/2
Contract Name:	Monaghan Town Active Travel Development - Roads & Bridges
Customer:	CORA
BH/TP*	TP06R
Sample No.*	AA205171
Depth* (m)	0.70
Sample Type:	B
Lab Sample No.	A23/1776
Source* (if applicable)	N/A
Material Type* (if applicable):	B
Sample Received:	13/06/23
Date Tested:	17/06/23
Sample Cert:	Not Provided
Moisture Content (%):	20
% Particles > 20mm (By dry mass):	45
MCV:	4.6
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Brown sandy gravelly SILT

Results relate only to the specimen tested, in as received condition unless otherwise noted.
Opinions and interpretations are outside the scope of accreditation.
* denotes Customer supplied information.
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Persons authorised to approve reports
J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory	Approved by	Date	Page
		18/07/23	1 of 1

IGSL Ltd
Materials Laboratory
Unit J5,M7 Business Park
Naas
Co. Kildare
045 899324

Test Report

Determination of Moisture Condition Value at Natural Moisture Content

Tested in accordance with BS1377:Part 4:1990, clause 5.4

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO.1337

Report No.	**R146542**
Contract No.	24665/2
Contract Name:	Monaghan Town Active Travel Development - Roads & Bridges
Customer:	CORA
BH/TP*	TP08R
Sample No.*	AA205180
Depth* (m)	0.70
Sample Type:	B
Lab Sample No.	A23/1778
Source* (if applicable)	N/A
Material Type* (if applicable):	B
Sample Received:	13/06/23
Date Tested:	15/06/23
Sample Cert:	Not Provided
Moisture Content (%):	23
% Particles > 20mm (By dry mass):	10
MCV:	5.7
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Brown sandy gravelly CLAY

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Persons authorised to approve reports
J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory	Approved by	Date	Page
		18/07/23	1 of 1

IGSL Ltd
Materials Laboratory
Unit J5,M7 Business Park
Naas
Co. Kildare
045 899324

Test Report

Determination of Moisture Condition Value at Natural Moisture Content

Tested in accordance with BS1377:Part 4:1990, clause 5.4

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

Report No.	**R146543**
Contract No.	24665/2
Contract Name:	Monaghan Town Active Travel Development - Roads & Bridges
Customer:	CORA
BH/TP*	TP09R
Sample No.*	AA205182
Depth* (m)	0.60
Sample Type:	B
Lab Sample No.	A23/1779
Source* (if applicable)	N/A
Material Type* (if applicable):	B
Sample Received:	13/06/23
Date Tested:	16/06/23
Sample Cert:	Not provided
Moisture Content (%):	17
% Particles > 20mm (By dry mass):	23
MCV:	6.8
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Grey brown sandy gravelly CLAY

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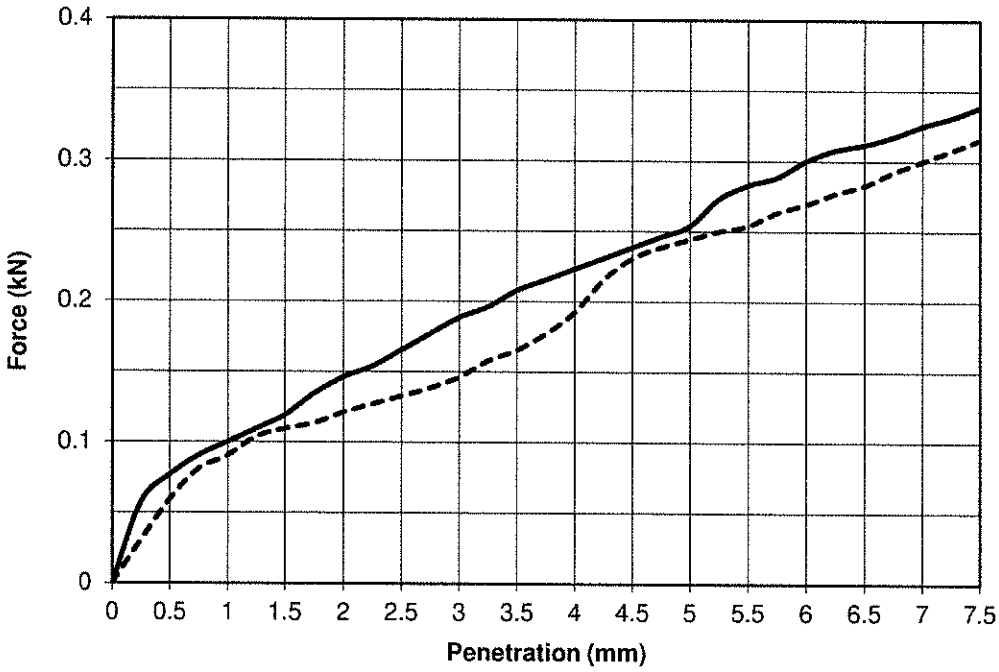
		18/07/23	1 of 1

IGSL Ltd Materials Laboratory Unit J5,M7 Business Park Naas Co.Kildare 045 899324	TEST REPORT Determination of California Bearing Ratio (CBR) Tested in accordance with BS1377:Part 4:1990, clause 7	ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

Report No.	R146544	Contract	Monaghan Town Active Travel Development Site - Road & Bridges
Contract No.	24665 / 2	Customer	CORA
Date received	13/06/23	Date Tested	15/06/23
BH/TP No.*	TP 04R	Sample No.*	AA205165 Type: B
Depth* (m)	1.70	Lab sample No.	A23/1772



Key: ———— Top ---------- Base

Description:	Brown sandy gravelly CLAY		
Initial Condition:	Unsoaked		
Moisture Content (%):	16	Bulk Density (Mg/m^3):	2.14
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.85
% Material >20mm:	15		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**1.3**	**1.2**
Moisture Content %	16	16

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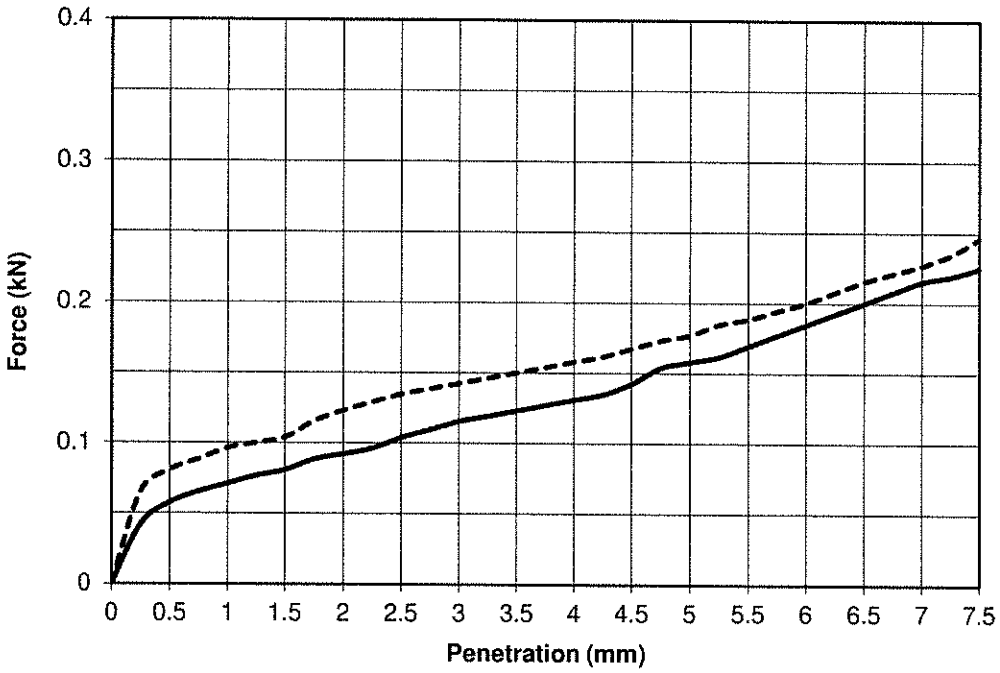
IGSL Ltd Materials Laboratory	Approved by	Date	Page No.
	H Byrne	18/07/23	1 of 1

IGSL Ltd Materials Laboratory Unit J5,M7 Business Park Naas Co.Kildare 045 899324	TEST REPORT Determination of California Bearing Ratio (CBR) Tested in accordance with BS1377:Part 4:1990, clause 7	ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

Report No.	R146545	Contract	Monaghan Town Active Travel Development Site - Road & Bridges
Contract No.	24665 / 2	Customer	CORA
Date received	13/06/23	Date Tested	16/06/23
BH/TP No.*	TP06R	Sample No.*	AA205171 Type: B
Depth* (m)	0.70	Lab sample No.	A23/1776



Key: ———— Top ---------- Base

Description:	Brown sandy gravelly SILT		
Initial Condition:	Unsoaked		
Moisture Content (%):	20	Bulk Density (Mg/m^3):	2.04
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.70
% Material >20mm:	37		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**0.8**	**1.0**
Moisture Content %	20	20

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IGSL Ltd Materials Laboratory	Approved by	Date	Page No.
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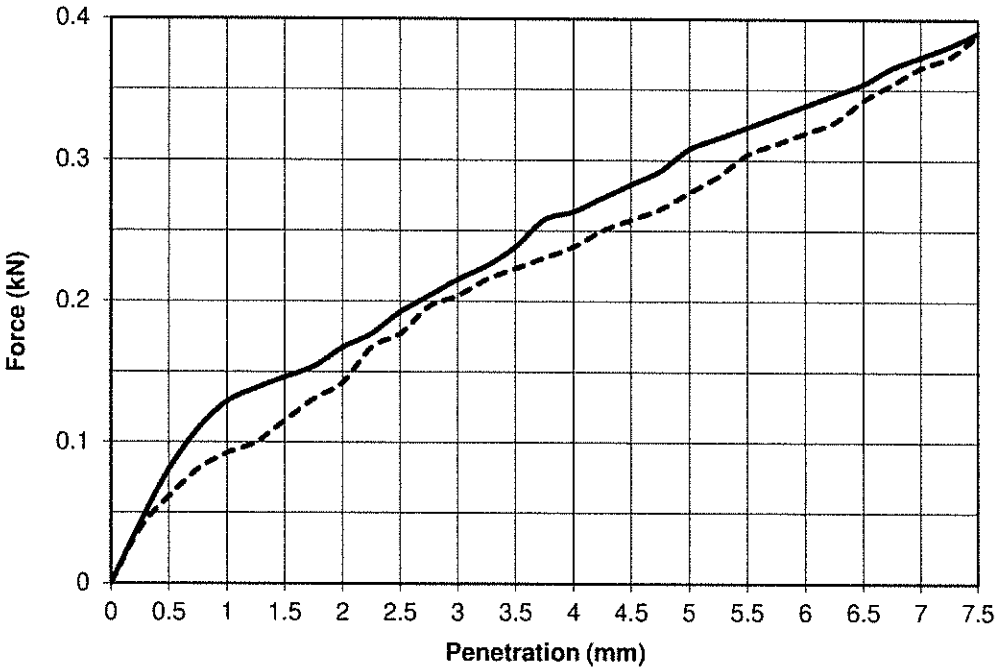
IGSL Ltd Materials Laboratory Unit J5,M7 Business Park Naas Co.Kildare 045 899324	TEST REPORT Determination of California Bearing Ratio (CBR) Tested in accordance with BS1377:Part 4:1990, clause 7	ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 1337

Report No.	R146546	Contract	Monaghan Town Active Travel Development Site - Road & Bridges
Contract No.	24665 / 2	Customer	CORA
Date received	13/06/23	Date Tested	15/06/23
BH/TP No.*	TP08R	Sample No.*	AA205180 Type: B
Depth* (m)	0.70	Lab sample No.	A23/1778



Key: ———— Top ---------- Base

Description:	Brown sandy gravelly CLAY		
Initial Condition:	Unsoaked		
Moisture Content (%):	23	Bulk Density (Mg/m^3):	1.98
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.61
% Material >20mm:	8.4		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**1.5**	**1.4**
Moisture Content %	23	23

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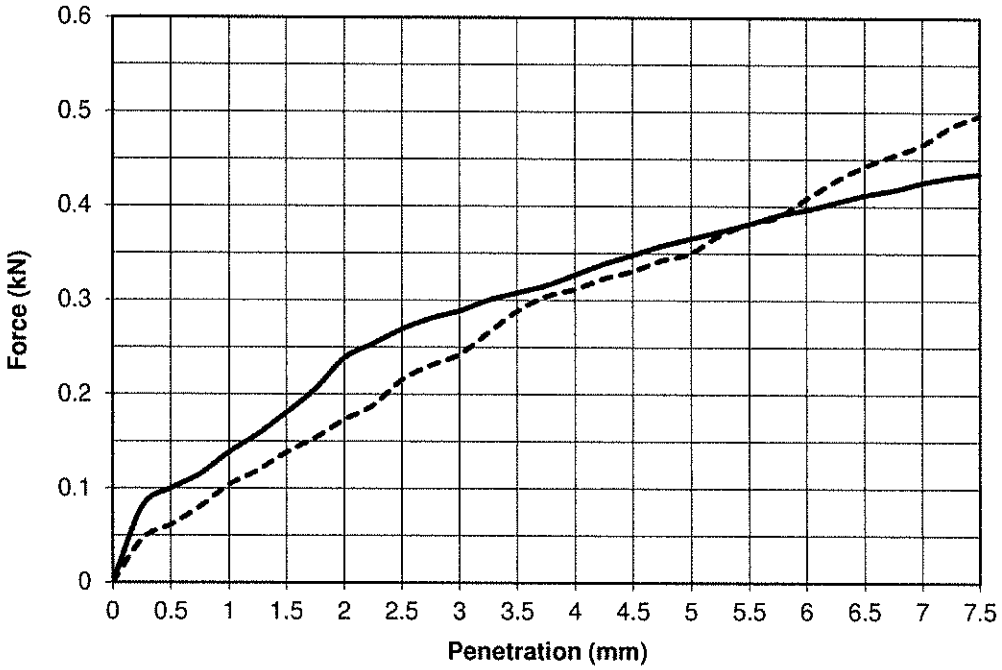
IGSL Ltd Materials Laboratory Unit J5,M7 Business Park Naas Co.Kildare 045 899324	TEST REPORT Determination of California Bearing Ratio (CBR) Tested in accordance with BS1377:Part 4:1990, clause 7	ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO.1331

Report No.	R146547	Contract	Monaghan Town Active Travel Development Site - Road & Bridges
Contract No.	24665 / 2	Customer	CORA
Date received	13/06/23	Date Tested	16/06/23
BH/TP No.*	TP09R	Sample No.*	AA205182 Type: B
Depth* (m)	0.60	Lab sample No.	A23/1779



Key: ———— Top ---------- Base

Description:	Grey/brown sandy gravelly CLAY		
Initial Condition:	Unsoaked		
Moisture Content (%):	17	Bulk Density (Mg/m^3):	2.07
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.77
% Material >20mm:	19		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**2.0**	**1.8**
Moisture Content %	17	17

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IGSL Ltd
Materials Laboratory
M7 Business Park
Naas
Co. Kildare

Test Report

Dry Density/Moisture Content Relationship

Tested in accordance with BS1377:Part 4:1990

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

Report No. R146548 Contract No. 24665/2

Contract Name: Monaghan Town Active Travel Development - Road & Bridges

Location*: TP04R

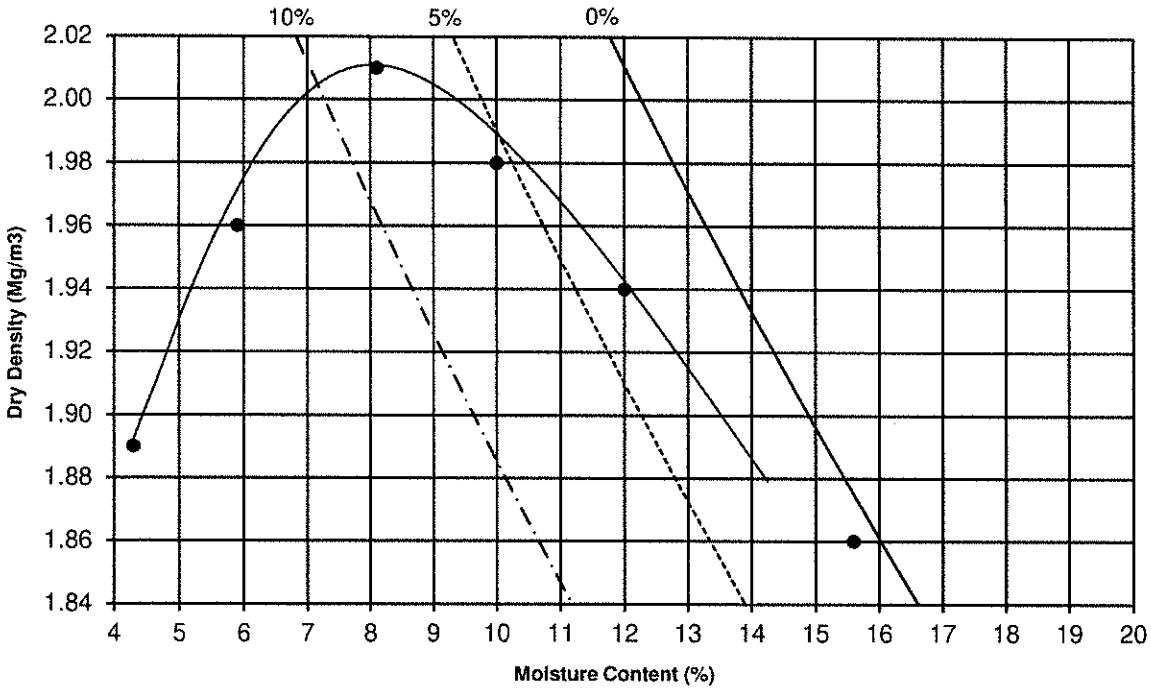
Sample No*. AA205165 Depth* (m) 1.7 Material Type B

Lab sample no. A23/1774 Customer: CORA

Date Received: 13/06/2023 Test Method: 2.5 Kg Rammer

Date Tested: 15/06/2023 BS1377:Part 4:1990 3.3

Dry Density (Mg/m^3)	1.86	2.01	1.98	1.94	1.89	1.96	
Moisture Content (%)	16	8.1	10	12	4.3	5.9	



Maximum Dry Density (Mg/m^3): 2.01 Optimum Moisture Content (%): 8.1

Description: Brown sandy gravelly CLAY

Sample Preparation: Material passing 20mm ~~Single~~ / Separate samples used

Particle Density (Mg/m^3): 2.65 Particle Density: Assumed

% retained on 20/37.5mm sieve: 15

Results relate only to the specimen tested, in as received condition unless otherwise noted.
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IGSL Ltd
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M7 Business Park
Naas
Co. Kildare

Test Report

Dry Density/Moisture Content Relationship

Tested in accordance with BS1377:Part 4:1990

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 1391

Report No. R146549 Contract No. 24665/2

Contract Name: Monaghan Town Active Travel Development - Road & Bridges

Location*: TP06R

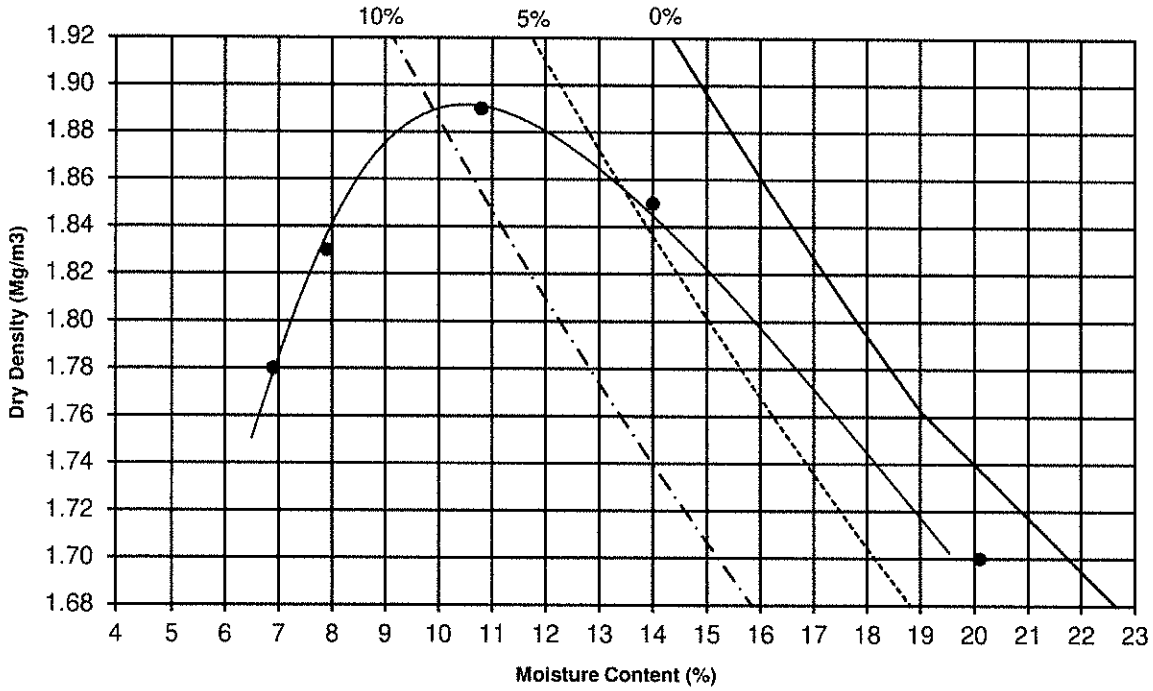
Sample No*. AA205171 Depth* (m) 0.7 Material Type B

Lab sample no. A23/1776 Customer: CORA

Date Received: 13/06/2023 Test Method: 2.5 Kg Rammer

Date Tested: 16/06/2023 BS1377:Part 4:1990 3.3

Dry Density (Mg/m^3)	1.70	1.78	1.85	1.89	1.83		
Moisture Content (%)	20	6.9	14	11	7.9	0	



Maximum Dry Density (Mg/m^3): 1.89 Optimum Moisture Content (%): 11

Description: Brown sandy gravelly SILT

Sample Preparation: Material passing 20mm ~~Single~~ / Separate samples used

Particle Density (Mg/m^3): 2.65 Particle Density: Assumed

% retained on 20/37.5mm sieve: 37

Results relate only to the specimen tested, in as received condition unless otherwise noted.
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IGSL Materials Laboratory	Approved by	Date	Page
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IGSL Ltd
Materials Laboratory
M7 Business Park
Naas
Co. Kildare

Test Report

Dry Density/Moisture Content Relationship

Tested in accordance with BS1377:Part 4:1990

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

Report No. R146560 Contract No. 24665/2

Contract Name: Monaghan Town Active Travel Development - Road & Bridges

Location*: TP08R

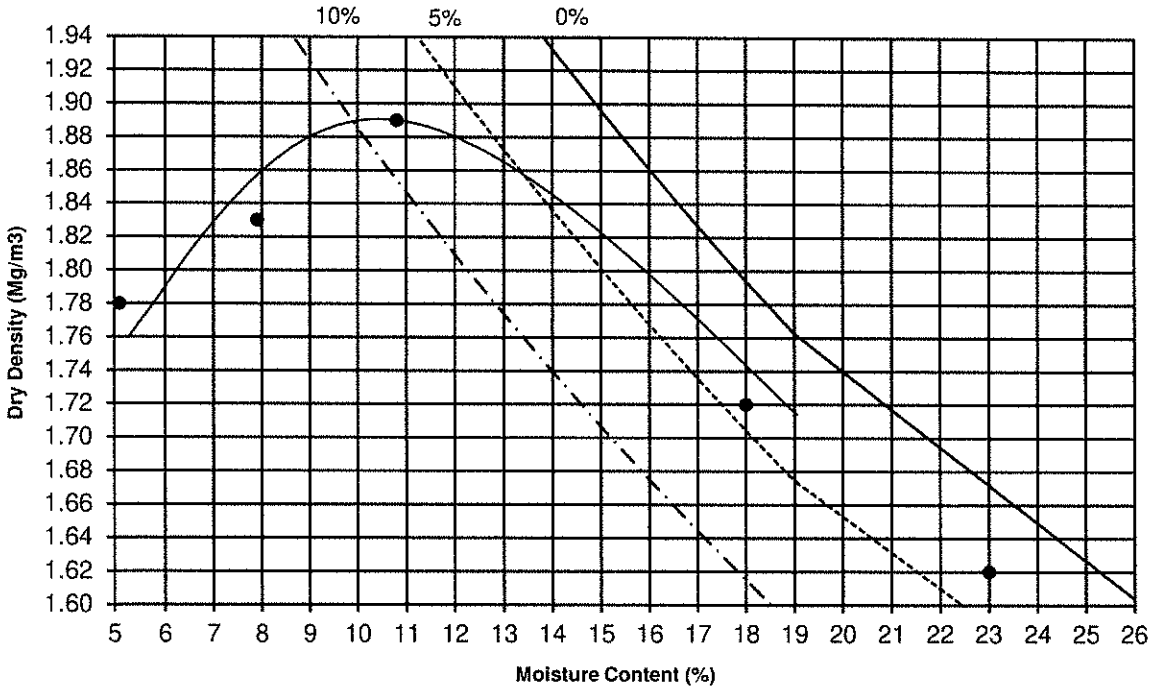
Sample No*. AA205180 Depth* (m) 0.7 Material Type B

Lab sample no. A23/1778 Customer: CORA

Date Received: 13/06/2023 Test Method: 2.5 Kg Rammer

Date Tested: 15/06/2023 BS1377:Part 4:1990 3.3

Dry Density (Mg/m^3)	1.62	1.72	1.78	1.89	1.83		
Moisture Content (%)	23	18	5.1	11	7.9	0	



Maximum Dry Density (Mg/m^3): 1.80 Optimum Moisture Content (%): 11

Description: Brown sandy gravelly CLAY

Sample Preparation: Material passing 20mm ~~Single~~ / Separate samples used

Particle Density (Mg/m^3): 2.65 Particle Density: Assumed

% retained on 20/37.5mm sieve: 37

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IGSL Materials Laboratory	Approved by	Date	Page
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IGSL Ltd
Materials Laboratory
M7 Business Park
Naas
Co. Kildare

Test Report

Dry Density/Moisture Content Relationship

Tested in accordance with BS1377:Part 4:1990

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 1331

Report No. R146551 Contract No. 24665/2

Contract Name: Monaghan Town Active Travel Development - Road & Bridges

Location*: TP09R

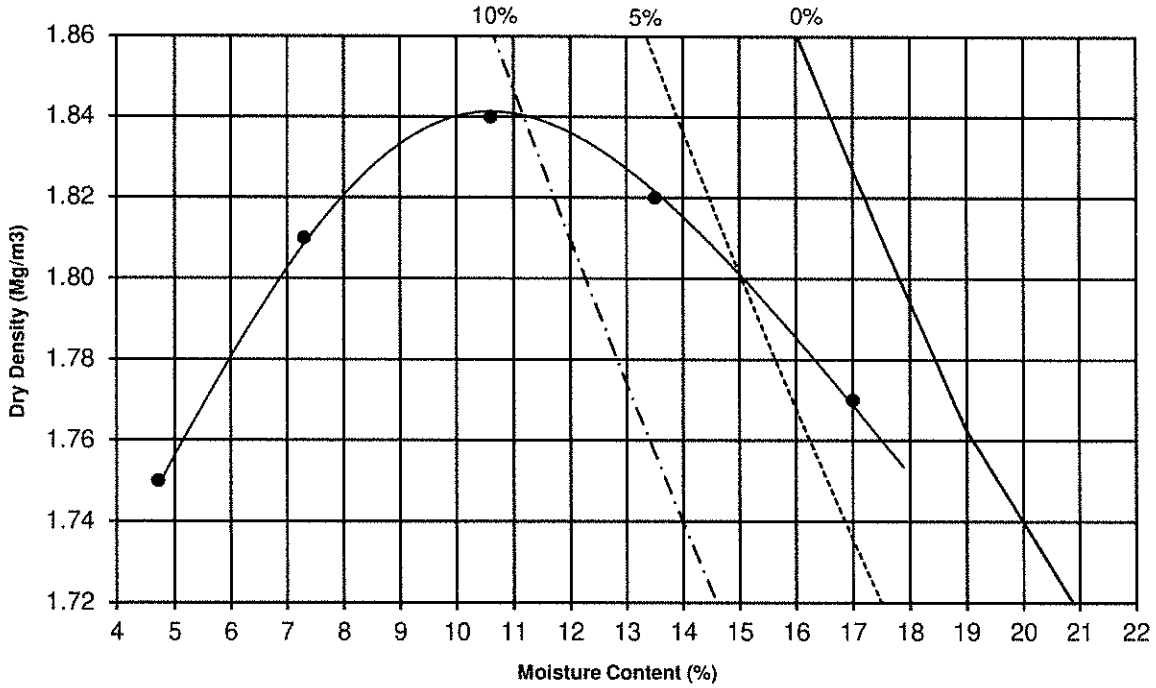
Sample No*. AA205182 Depth* (m) 0.6 Material Type B

Lab sample no. A23/1779 Customer: CORA

Date Received: 13/06/2023 Test Method: 2.5 Kg Rammer

Date Tested: 16/06/2023 BS1377:Part 4:1990 3.3

Dry Density (Mg/m^3)	1.77	1.82	1.84	1.81	1.75		
Moisture Content (%)	17	14	11	7.3	4.7	0	



Maximum Dry Density (Mg/m^3): 1.84 Optimum Moisture Content (%): 11

Description: Grey/brown sandy gravelly CLAY

Sample Preparation: Material passing 20mm ~~Single~~ / Separate samples used

Particle Density (Mg/m^3): 2.65 Particle Density: Assumed

% retained on 20/37.5mm sieve: 19

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IGSL Materials Laboratory	Approved by	Date	Page
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(Diametrial) POINT LOAD STRENGTH INDEX TEST DATA

Contract: Monaghan town (Active Travel) - E
Contract no. 24665

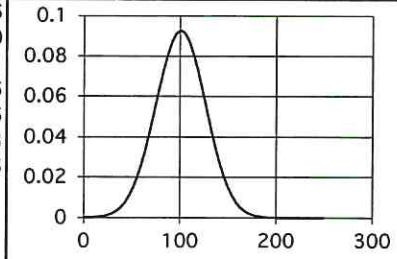
Sample Type: Core
Date of test: 08/06/2023

RC No.	Depth m	D (Diameter) mm	P (failure load) kN	F	Is (index strength) Mpa	Is(50) (index strength) Mpa	*UCS MPa	Type	Orienation
RC01R	8.2	78	26.4	1.222	4.34	5.30	106	d	//
	8.7	78	15.0	1.222	2.47	3.01	60	d	//
	10.4	78	33.8	1.222	5.55	6.78	136	d	//
RC02R	8.7	78	23.2	1.222	3.81	4.65	93	d	//
	9.4	78	22.6	1.222	3.72	4.54	91	d	//
	10.3	78	29.5	1.222	4.85	5.92	118	d	//
								d	//
								d	//
								d	//
								d	//

Statistical Summary Data	Is(50)	UCS*
Number of Samples Tested	6	6
Minimum	3.01	60
Average	5.03	101
Maximum	6.78	136
Standard Dev.	1.29	26
Upper 95% Confidence Limit	7.57	151.43
Lower 95% Confidence Limit	2.50	49.95

Comments:
*UCS taken as k x Point Load Is(50): k= 20

*UCS Normal Distribution Curve



Abbreviations	
i	irregular
a	axial
b	block
d	diametral

approx. orientation to planes of weakness/bedding

U	unknown
P	perpendicular
//	parallel

Appendix VIIIb Chemical / Environmental Laboratory Data

eurofins | Chemtest
Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

UKAS TESTING
2183

Final Report

Report No.:	23-19442-1
Initial Date of Issue:	19-Jun-2023
Re-Issue Details:	
Client	IGSL
Client Address:	M7 Business Park Naas County Kildare Ireland
Contact(s):	Darren Keogh
Project	24665 / 2 Monaghan Town Active Travel Development Site
Quotation No.:	Q20-19951
Order No.:	
No. of Samples:	13
Turnaround (Wkdays):	7
Date Approved:	19-Jun-2023
Approved By:	
Details:	Stuart Henderson, Technical Manager

Date Received:	08-Jun-2023
Date Instructed:	08-Jun-2023
Results Due:	16-Jun-2023

Results - Leachate

Project: 24665 / 2 Monaghan Town Active Travel Development

Site:

Client: IGSL					**Chemtest Job No.:**	23-19442	23-19442	23-19442	23-19442	23-19442	23-19442	23-19442	23-19442
Quotation No.: Q20-19951					**Chemtest Sample ID.:**	1653336	1653338	1653339	1653341	1653342	1653344	1653345	1653348
					Client Sample ID.:	AA197907	AA192927	AA205155	AA205160	AA205162	AA205164	AA205167	AA205182
					Sample Location:	BH01	BH02	TP01R	TP02R	TP03R	TP04R	TP05R	TP09R
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	0.50	1.00	0.60	2.00	1.40	0.70	0.50	0.60
Determinand	**Accred.**	**SOP**	**Type**	**Units**	**LOD**								
pH	U	1010	10:1		N/A	8.6	8.8	8.1	8.4	8.2	8.6	8.8	8.9
Ammonium	U	1220	10:1	mg/l	0.050	0.18	0.11	0.18	0.12	0.26	0.12	0.13	0.24
Ammonium	N	1220	10:1	mg/kg	0.10	2.2	1.5	1.9	1.3	2.8	1.5	1.8	3.5
Boron (Dissolved)	U	1455	10:1	mg/kg	0.01	< 0.01	0.12	0.16	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo[j]fluoranthene	N	1800	10:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010

Results - Soil

Project: 24665 / 2 Monaghan Town Active Travel Development

Site

Client: IGSL				Chemtest Job No.:	23-19442	23-19442	23-19442	23-19442	23-19442	23-19442	23-19442	23-19442	23-19442
Quotation No.: Q20-19951				Chemtest Sample ID.:	1653336	1653337	1653338	1653339	1653340	1653341	1653342	1653343	1653344
				Client Sample ID.:	AA197907	AA197908	AA192927	AA205155	AA205157	AA205160	AA205162	AA205163	AA205164
				Sample Location:	BH01	BH01	BH02	TP01R	TP01R	TP02R	TP03R	TP03R	TP04R
				Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	0.50	1.00	1.00	0.60	2.50	2.00	1.40	2.30	0.70
				Asbestos Lab:	DURHAM		DURHAM	DURHAM		DURHAM	DURHAM		DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
ACM Type	U	2192		N/A	-		-	-		-	-		-
Asbestos Identification	U	2192		N/A	No Asbestos Detected		No Asbestos Detected	No Asbestos Detected		No Asbestos Detected	No Asbestos Detected		No Asbestos Detected
Moisture	N	2030	%	0.020	12	15	8.7	17	18	18	17	11	14
pH (2.5:1)	N	2010		4.0		[A] 8.2						[A] 8.1	
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	[A] < 0.40		[A] < 0.40	[A] 2.8		[A] 1.9	[A] 1.9		[A] < 0.40
Magnesium (Water Soluble)	N	2120	g/l	0.010		[A] < 0.010						[A] < 0.010	
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010		[A] < 0.010						[A] < 0.010	
Total Sulphur	U	2175	%	0.010		[A] 0.13						[A] 0.22	
Sulphur (Elemental)	U	2180	mg/kg	1.0	[A] 5.6		[A] 57	[A] 5.6		[A] 130	[A] 29		[A] 3.1
Chloride (Water Soluble)	U	2220	g/l	0.010		[A] < 0.010						[A] 0.016	
Nitrate (Water Soluble)	N	2220	g/l	0.010		< 0.010						0.082	
Cyanide (Total)	U	2300	mg/kg	0.50	[A] < 0.50		[A] 6.5	[A] 150		[A] < 0.50	[A] < 0.50		[A] < 0.50
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	[A] 14		[A] 9.8	[A] 5.6		[A] 5.8	[A] 9.6		[A] 18
Ammonium (Water Soluble)	U	2220	g/l	0.01		< 0.01						< 0.01	
Sulphate (Acid Soluble)	U	2430	%	0.010	[A] 0.12	[A] 0.064	[A] 0.057	[A] 0.064		[A] 0.072	[A] 0.032	[A] 0.069	[A] 0.073
Arsenic	U	2455	mg/kg	0.5	4.6		3.6	3.9		5.1	3.5		4.0
Barium	U	2455	mg/kg	0	60		42	61		60	28		45
Cadmium	U	2455	mg/kg	0.10	< 0.10		< 0.10	< 0.10		< 0.10	< 0.10		< 0.10
Chromium	U	2455	mg/kg	0.5	21		19	15		21	12		21
Molybdenum	U	2455	mg/kg	0.5	< 0.5		< 0.5	< 0.5		< 0.5	< 0.5		< 0.5
Antimony	N	2455	mg/kg	2.0	< 2.0		< 2.0	< 2.0		< 2.0	< 2.0		< 2.0
Copper	U	2455	mg/kg	0.50	16		21	13		22	10		23
Mercury	U	2455	mg/kg	0.05	< 0.05		0.06	0.09		0.25	0.06		0.07
Nickel	U	2455	mg/kg	0.50	34		34	24		31	19		39
Lead	U	2455	mg/kg	0.50	15		36	29		54	20		47
Selenium	U	2455	mg/kg	0.25	< 0.25		< 0.25	< 0.25		< 0.25	< 0.25		< 0.25
Zinc	U	2455	mg/kg	0.50	42		50	64		75	44		56
Chromium (Trivalent)	N	2490	mg/kg	1.0	21		19	15		21	12		21
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50		< 0.50	< 0.50		< 0.50	< 0.50		< 0.50
Organic Matter	U	2625	%	0.40				[A] 9.1	[A] 2.0			[A] 1.3	
Mineral Oil (TPH Calculation)	N	2670	mg/kg	10	< 10		< 10	55		46	< 10		< 10
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	[A] < 1.0		[A] < 1.0	[A] 43		[A] 46	[A] < 1.0		[A] < 1.0
Aliphatic TPH >C8-C10	N	2680	mg/kg	1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0
Aliphatic TPH >C10-C12	N	2680	mg/kg	1.0	[A] < 1.0		[A] 4.6	[A] 12		[A] < 1.0	[A] < 1.0		[A] < 1.0
Aliphatic TPH >C12-C16	N	2680	mg/kg	1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0
Aliphatic TPH >C16-C21	N	2680	mg/kg	1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0

Results - Soil

Project: 24665 / 2 Monaghan Town Active Travel Development
Site:

Client: IGSL					Chemtest Job No.:	23-19442	23-19442	23-19442	23-19442	23-19442	23-19442	23-19442	23-19442	23-19442
Quotation No.: Q20-19951					Chemtest Sample ID.:	1653336	1653337	1653338	1653339	1653340	1653341	1653342	1653343	1653344
					Client Sample ID.:	AA197907	AA197908	AA192927	AA205155	AA205157	AA205160	AA205162	AA205163	AA205164
					Sample Location:	BH01	BH01	BH02	TP01R	TP01R	TP02R	TP03R	TP03R	TP04R
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	0.50	1.00	1.00	0.60	2.50	2.00	1.40	2.30	0.70
					Asbestos Lab:	DURHAM		DURHAM	DURHAM		DURHAM	DURHAM		DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**										
Aliphatic TPH >C21-C35	N	2680	mg/kg	1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	[A] < 5.0		[A] < 5.0	[A] 55		[A] 46	[A] < 5.0		[A] < 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0
Aromatic TPH >C8-C10	N	2680	mg/kg	1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0
Aromatic TPH >C10-C12	N	2680	mg/kg	1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0
Aromatic TPH >C12-C16	N	2680	mg/kg	1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0
Aromatic TPH >C16-C21	N	2680	mg/kg	1.0	[A] < 1.0		[A] < 1.0	[A] 25		[A] 120	[A] < 1.0		[A] < 1.0
Aromatic TPH >C21-C35	N	2680	mg/kg	1.0	[A] < 1.0		[A] 41	[A] 180		[A] 450	[A] 75		[A] < 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	[A] < 5.0		[A] 41	[A] 200		[A] 570	[A] 75		[A] < 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	[A] < 10		[A] 46	[A] 260		[A] 610	[A] 75		[A] < 10
Benzene	U	2760	µg/kg	1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0
Toluene	U	2760	µg/kg	1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0
Ethylbenzene	U	2760	µg/kg	1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0
m & p-Xylene	U	2760	µg/kg	1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0
o-Xylene	U	2760	µg/kg	1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0
Methyl Tert-Butyl Ether	U	2760	µg/kg	1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0
Naphthalene	N	2800	mg/kg	0.010	[A] < 0.010		[A] 0.13	[A] 0.71		[A] < 0.010	[A] < 0.010		[A] < 0.010
Acenaphthylene	N	2800	mg/kg	0.010	[A] < 0.010		[A] 0.12	[A] 1.3		[A] < 0.010	[A] < 0.010		[A] < 0.010
Acenaphthene	N	2800	mg/kg	0.010	[A] < 0.010		[A] 0.11	[A] 0.13		[A] < 0.010	[A] < 0.010		[A] < 0.010
Fluorene	N	2800	mg/kg	0.010	[A] < 0.010		[A] 0.11	[A] 0.69		[A] < 0.010	[A] < 0.010		[A] < 0.010
Phenanthrene	N	2800	mg/kg	0.010	[A] < 0.010		[A] 0.49	[A] 5.6		[A] < 0.010	[A] 0.16		[A] < 0.010
Anthracene	N	2800	mg/kg	0.010	[A] < 0.010		[A] 0.31	[A] 1.9		[A] < 0.010	[A] < 0.010		[A] < 0.010
Fluoranthene	N	2800	mg/kg	0.010	[A] < 0.010		[A] 1.6	[A] 14		[A] < 0.010	[A] 0.29		[A] < 0.010
Pyrene	N	2800	mg/kg	0.010	[A] < 0.010		[A] 1.5	[A] 12		[A] < 0.010	[A] 0.29		[A] < 0.010
Benzo[a]anthracene	N	2800	mg/kg	0.010	[A] < 0.010		[A] 0.96	[A] 7.6		[A] < 0.010	[A] < 0.010		[A] < 0.010
Chrysene	N	2800	mg/kg	0.010	[A] < 0.010		[A] 0.97	[A] 7.7		[A] < 0.010	[A] < 0.010		[A] < 0.010
Benzo[b]fluoranthene	N	2800	mg/kg	0.010	[A] < 0.010		[A] 1.1	[A] 10		[A] < 0.010	[A] < 0.010		[A] < 0.010
Benzo[k]fluoranthene	N	2800	mg/kg	0.010	[A] < 0.010		[A] 0.41	[A] 4.1		[A] < 0.010	[A] < 0.010		[A] < 0.010
Benzo[a]pyrene	N	2800	mg/kg	0.010	[A] < 0.010		[A] 0.91	[A] 7.8		[A] < 0.010	[A] < 0.010		[A] < 0.010
Indeno(1,2,3-c,d)Pyrene	N	2800	mg/kg	0.010	[A] < 0.010		[A] 0.54	[A] 5.9		[A] < 0.010	[A] < 0.010		[A] < 0.010
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.010	[A] < 0.010		[A] < 0.010	[A] 1.1		[A] < 0.010	[A] < 0.010		[A] < 0.010
Benzo[g,h,i]perylene	N	2800	mg/kg	0.010	[A] < 0.010		[A] 0.50	[A] 4.6		[A] < 0.010	[A] < 0.010		[A] < 0.010
Coronene	N	2800	mg/kg	0.010	[A] < 0.010		[A] < 0.010	[A] < 0.010		[A] < 0.010	[A] < 0.010		[A] < 0.010
Total Of 17 PAH's	N	2800	mg/kg	0.20	[A] < 0.20		[A] 9.8	[A] 85		[A] < 0.20	[A] 0.74		[A] < 0.20
PCB 28	N	2815	mg/kg	0.0010	[A] < 0.0010		[A] < 0.0010	[A] < 0.0010		[A] < 0.0010	[A] < 0.0010		[A] < 0.0010

Results - Soil

Project: 4665 / 2 Monaghan Town Active Travel Development

Site:

Client: IGSL					Chemtest Job No.:	23-19442	23-19442	23-19442	23-19442	23-19442	23-19442	23-19442	23-19442	23-19442
Quotation No.: Q20-19951					Chemtest Sample ID.:	1653336	1653337	1653338	1653339	1653340	1653341	1653342	1653343	1653344
					Client Sample ID.:	AA197907	AA197908	AA192927	AA205155	AA205157	AA205160	AA205162	AA205163	AA205164
					Sample Location:	BH01	BH01	BH02	TP01R	TP01R	TP02R	TP03R	TP03R	TP04R
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	0.50	1.00	1.00	0.60	2.50	2.00	1.40	2.30	0.70
					Asbestos Lab:	DURHAM		DURHAM	DURHAM		DURHAM	DURHAM		DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**										
PCB 52	N	2815	mg/kg	0.0010	[A] < 0.0010		[A] < 0.0010	[A] < 0.0010		[A] < 0.0010	[A] < 0.0010		[A] < 0.0010
PCB 90+101	N	2815	mg/kg	0.0010	[A] < 0.0010		[A] < 0.0010	[A] < 0.0010		[A] < 0.0010	[A] < 0.0010		[A] < 0.0010
PCB 118	N	2815	mg/kg	0.0010	[A] < 0.0010		[A] < 0.0010	[A] < 0.0010		[A] < 0.0010	[A] < 0.0010		[A] < 0.0010
PCB 153	N	2815	mg/kg	0.0010	[A] < 0.0010		[A] < 0.0010	[A] < 0.0010		[A] < 0.0010	[A] < 0.0010		[A] < 0.0010
PCB 138	N	2815	mg/kg	0.0010	[A] < 0.0010		[A] < 0.0010	[A] < 0.0010		[A] < 0.0010	[A] < 0.0010		[A] < 0.0010
PCB 180	N	2815	mg/kg	0.0010	[A] < 0.0010		[A] < 0.0010	[A] < 0.0010		[A] < 0.0010	[A] < 0.0010		[A] < 0.0010
Total PCBs (7 congeners)	N	2815	mg/kg	0.0010	[A] < 0.0010		[A] < 0.0010	[A] < 0.0010		[A] < 0.0010	[A] < 0.0010		[A] < 0.0010
Total Phenols	U	2920	mg/kg	0.10	< 0.10		< 0.10	< 0.10		< 0.10	< 0.10		< 0.10

Results - Soil

Project: 24665 / 2 Monaghan Town Active Travel Development
Site:

Client: IGSL				Chemtest Job No.:	23-19442	23-19442	23-19442	23-19442
Quotation No.: Q20-19951				Chemtest Sample ID.:	1653345	1653346	1653347	1653348
				Client Sample ID.:	AA205167	AA205168	AA205169	AA205182
				Sample Location:	TP05R	TP05R	TP07R	TP09R
				Sample Type:	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	0.50	1.50	0.90	0.60
				Asbestos Lab:	DURHAM			DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**				
ACM Type	U	2192		N/A	-			-
Asbestos Identification	U	2192		N/A	No Asbestos Detected			No Asbestos Detected
Moisture	N	2030	%	0.020	13	14	15	14
pH (2.5:1)	N	2010		4.0		[A] 8.3	[A] 8.1	
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	[A] < 0.40			[A] 0.47
Magnesium (Water Soluble)	N	2120	g/l	0.010		[A] < 0.010	[A] < 0.010	
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010		[A] < 0.010	[A] < 0.010	
Total Sulphur	U	2175	%	0.010		[A] 0.093	[A] 0.037	
Sulphur (Elemental)	U	2180	mg/kg	1.0	[A] 2.4			[A] 3.3
Chloride (Water Soluble)	U	2220	g/l	0.010		[A] < 0.010	[A] < 0.010	
Nitrate (Water Soluble)	N	2220	g/l	0.010		0.013	0.012	
Cyanide (Total)	U	2300	mg/kg	0.50	[A] 1.3			[A] < 0.50
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	[A] 7.7			[A] 14
Ammonium (Water Soluble)	U	2220	g/l	0.01		< 0.01	< 0.01	
Sulphate (Acid Soluble)	U	2430	%	0.010	[A] 0.058	[A] 0.036	[A] 0.095	[A] 0.064
Arsenic	U	2455	mg/kg	0.5	3.3			5.8
Barium	U	2455	mg/kg	0	54			60
Cadmium	U	2455	mg/kg	0.10	< 0.10			< 0.10
Chromium	U	2455	mg/kg	0.5	14			19
Molybdenum	U	2455	mg/kg	0.5	< 0.5			< 0.5
Antimony	N	2455	mg/kg	2.0	< 2.0			< 2.0
Copper	U	2455	mg/kg	0.50	13			22
Mercury	U	2455	mg/kg	0.05	0.09			0.32
Nickel	U	2455	mg/kg	0.50	21			31
Lead	U	2455	mg/kg	0.50	26			56
Selenium	U	2455	mg/kg	0.25	< 0.25			< 0.25
Zinc	U	2455	mg/kg	0.50	60			86
Chromium (Trivalent)	N	2490	mg/kg	1.0	14			19
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50			< 0.50
Organic Matter	U	2625	%	0.40				
Mineral Oil (TPH Calculation)	N	2670	mg/kg	10	< 10			< 10
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	[A] < 1.0			[A] < 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	[A] < 1.0			[A] < 1.0
Aliphatic TPH >C8-C10	N	2680	mg/kg	1.0	[A] < 1.0			[A] < 1.0
Aliphatic TPH >C10-C12	N	2680	mg/kg	1.0	[A] < 1.0			[A] < 1.0
Aliphatic TPH >C12-C16	N	2680	mg/kg	1.0	[A] < 1.0			[A] < 1.0
Aliphatic TPH >C16-C21	N	2680	mg/kg	1.0	[A] < 1.0			[A] < 1.0

Results - Soil

Project: 24665 / 2 Monaghan Town Active Travel Development

Site:

Client: IGSL					**Chemtest Job No.:**	23-19442	23-19442	23-19442	23-19442
Quotation No.: Q20-19951					**Chemtest Sample ID.:**	1653345	1653346	1653347	1653348
					Client Sample ID.:	AA205167	AA205168	AA205169	AA205182
					Sample Location:	TP05R	TP05R	TP07R	TP09R
					Sample Type:	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	0.50	1.50	0.90	0.60
					Asbestos Lab:	DURHAM			DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
Aliphatic TPH >C21-C35	N	2680	mg/kg	1.0	[A] < 1.0				[A] < 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	[A] < 1.0				[A] < 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	[A] < 5.0				[A] < 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	[A] < 1.0				[A] < 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	[A] < 1.0				[A] < 1.0
Aromatic TPH >C8-C10	N	2680	mg/kg	1.0	[A] < 1.0				[A] < 1.0
Aromatic TPH >C10-C12	N	2680	mg/kg	1.0	[A] < 1.0				[A] < 1.0
Aromatic TPH >C12-C16	N	2680	mg/kg	1.0	[A] < 1.0				[A] < 1.0
Aromatic TPH >C16-C21	N	2680	mg/kg	1.0	[A] 26				[A] < 1.0
Aromatic TPH >C21-C35	N	2680	mg/kg	1.0	[A] 280				[A] < 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	[A] < 1.0				[A] < 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	[A] 310				[A] < 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	[A] 310				[A] < 10
Benzene	U	2760	µg/kg	1.0	[A] < 1.0				[A] < 1.0
Toluene	U	2760	µg/kg	1.0	[A] < 1.0				[A] < 1.0
Ethylbenzene	U	2760	µg/kg	1.0	[A] < 1.0				[A] < 1.0
m & p-Xylene	U	2760	µg/kg	1.0	[A] < 1.0				[A] < 1.0
o-Xylene	U	2760	µg/kg	1.0	[A] < 1.0				[A] < 1.0
Methyl Tert-Butyl Ether	U	2760	µg/kg	1.0	[A] < 1.0				[A] < 1.0
Naphthalene	N	2800	mg/kg	0.010	[A] 0.37				[A] < 0.010
Acenaphthylene	N	2800	mg/kg	0.010	[A] 0.84				[A] < 0.010
Acenaphthene	N	2800	mg/kg	0.010	[A] 0.10				[A] < 0.010
Fluorene	N	2800	mg/kg	0.010	[A] 0.42				[A] < 0.010
Phenanthrene	N	2800	mg/kg	0.010	[A] 3.5				[A] < 0.010
Anthracene	N	2800	mg/kg	0.010	[A] 2.0				[A] < 0.010
Fluoranthene	N	2800	mg/kg	0.010	[A] 14				[A] < 0.010
Pyrene	N	2800	mg/kg	0.010	[A] 11				[A] < 0.010
Benzo[a]anthracene	N	2800	mg/kg	0.010	[A] 7.2				[A] < 0.010
Chrysene	N	2800	mg/kg	0.010	[A] 6.1				[A] < 0.010
Benzo[b]fluoranthene	N	2800	mg/kg	0.010	[A] 7.8				[A] < 0.010
Benzo[k]fluoranthene	N	2800	mg/kg	0.010	[A] 3.1				[A] < 0.010
Benzo[a]pyrene	N	2800	mg/kg	0.010	[A] 6.6				[A] < 0.010
Indeno(1,2,3-c,d)Pyrene	N	2800	mg/kg	0.010	[A] 4.0				[A] < 0.010
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.010	[A] 0.85				[A] < 0.010
Benzo[g,h,i]perylene	N	2800	mg/kg	0.010	[A] 3.0				[A] < 0.010
Coronene	N	2800	mg/kg	0.010	[A] < 0.010				[A] < 0.010
Total Of 17 PAH's	N	2800	mg/kg	0.20	[A] 71				[A] < 0.20
PCB 28	N	2815	mg/kg	0.0010	[A] < 0.0010				[A] < 0.0010

Results - Soil

Project: 24665 / 2 Monaghan Town Active Travel Development
Site

Client: IGSL				Chemtest Job No.:	23-19442	23-19442	23-19442	23-19442
Quotation No.: Q20-19951				Chemtest Sample ID.:	1653345	1653346	1653347	1653348
				Client Sample ID.:	AA205167	AA205168	AA205169	AA205182
				Sample Location:	TP05R	TP05R	TP07R	TP09R
				Sample Type:	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	0.50	1.50	0.90	0.60
				Asbestos Lab:	DURHAM			DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**				
PCB 52	N	2815	mg/kg	0.0010	[A] < 0.0010			[A] < 0.0010
PCB 90+101	N	2815	mg/kg	0.0010	[A] < 0.0010			[A] < 0.0010
PCB 118	N	2815	mg/kg	0.0010	[A] < 0.0010			[A] < 0.0010
PCB 153	N	2815	mg/kg	0.0010	[A] < 0.0010			[A] < 0.0010
PCB 138	N	2815	mg/kg	0.0010	[A] < 0.0010			[A] < 0.0010
PCB 180	N	2815	mg/kg	0.0010	[A] < 0.0010			[A] < 0.0010
Total PCBs (7 congeners)	N	2815	mg/kg	0.0010	[A] < 0.0010			[A] < 0.0010
Total Phenols	U	2920	mg/kg	0.10	< 0.10			< 0.10

Results - Single Stage WAC

Project: 24665 / 2 Monaghan Town Active Travel Development Site

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	23-19442						
Chemtest Sample ID:	1653336						
Sample Ref:							
Sample ID:	AA197907				**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Sample Location:	BH01						
Top Depth(m):	0.50						
Bottom Depth(m):							
Sampling Date:							
Determinand	**SOP**	**Accred.**	**Units**				
Total Organic Carbon	2625	U	%	[A] 2.0	3	5	6
Loss On Ignition	2610	U	%	7.8	--	--	10
Total BTEX	2760	U	mg/kg	[A] < 0.010	6	--	--
Total PCBs (7 congeners)	2815	N	mg/kg	[A] < 0.0010	1	--	--
TPH Total WAC	2670	U	mg/kg	[A] < 10	500	--	--
Total Of 17 PAH's	2800	N	mg/kg	[A] < 0.20	100	--	--
pH	2010	U		8.0	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.0050	--	To evaluate	To evaluate
Eluate Analysis			**10:1 Eluate mg/l**	**10:1 Eluate mg/kg**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0003	0.0030	0.5	2	25
Barium	1455	U	< 0.005	< 0.050	20	100	300
Cadmium	1455	U	< 0.00011	< 0.0011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0050	0.5	10	70
Copper	1455	U	< 0.0005	< 0.0050	2	50	100
Mercury	1455	U	< 0.00005	< 0.00050	0.01	0.2	2
Molybdenum	1455	U	0.0007	0.0073	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0050	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0050	0.5	10	50
Antimony	1455	U	< 0.0005	< 0.0050	0.06	0.7	5
Selenium	1455	U	0.0010	0.0099	0.1	0.5	7
Zinc	1455	U	< 0.003	< 0.025	4	50	200
Chloride	1220	U	1.1	11	800	15000	25000
Fluoride	1220	U	0.092	< 1.0	10	150	500
Sulphate	1220	U	3.1	31	1000	20000	50000
Total Dissolved Solids	1020	N	52	520	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	3.4	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	12

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - Single Stage WAC

Project: 24665 / 2 Monaghan Town Active Travel Development Site

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	23-19442						
Chemtest Sample ID:	1653338						
Sample Ref:							
Sample ID:	AA192927						
Sample Location:	BH02						
Top Depth(m):	1.00						
Bottom Depth(m):							
Sampling Date:							
Determinand	**SOP**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	U	%	[A] 3.5	3	5	6
Loss On Ignition	2610	U	%	4.0	--	--	10
Total BTEX	2760	U	mg/kg	[A] < 0.010	6	--	--
Total PCBs (7 congeners)	2815	N	mg/kg	[A] < 0.0010	1	--	--
TPH Total WAC	2670	U	mg/kg	[A] 670	500	--	--
Total Of 17 PAH's	2800	N	mg/kg	[A] 9.8	100	--	--
pH	2010	U		8.0	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.016	--	To evaluate	To evaluate
Eluate Analysis			**10:1 Eluate mg/l**	**10:1 Eluate mg/kg**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0020	0.020	0.5	2	25
Barium	1455	U	0.006	0.061	20	100	300
Cadmium	1455	U	< 0.00011	< 0.0011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0050	0.5	10	70
Copper	1455	U	0.0019	0.019	2	50	100
Mercury	1455	U	< 0.00005	< 0.00050	0.01	0.2	2
Molybdenum	1455	U	0.0027	0.027	0.5	10	30
Nickel	1455	U	0.0006	0.0063	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0050	0.5	10	50
Antimony	1455	U	0.0007	0.0067	0.06	0.7	5
Selenium	1455	U	0.0010	0.010	0.1	0.5	7
Zinc	1455	U	0.005	0.052	4	50	200
Chloride	1220	U	1.4	14	800	15000	25000
Fluoride	1220	U	0.083	< 1.0	10	150	500
Sulphate	1220	U	20	200	1000	20000	50000
Total Dissolved Solids	1020	N	62	620	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	3.5	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	8.7

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - Single Stage WAC

Project: 24665 / 2 Monaghan Town Active Travel Development Site

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	23-19442						
Chemtest Sample ID:	1653339						
Sample Ref:							
Sample ID:	AA205155						
Sample Location:	TP01R						
Top Depth(m):	0.60						
Bottom Depth(m):							
Sampling Date:							
Determinand	**SOP**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	U	%	[A] 5.3	3	5	6
Loss On Ignition	2610	U	%	9.5	--	--	10
Total BTEX	2760	U	mg/kg	[A] < 0.010	6	--	--
Total PCBs (7 congeners)	2815	N	mg/kg	[A] < 0.0010	1	--	--
TPH Total WAC	2670	U	mg/kg	[A] 800	500	--	--
Total Of 17 PAH's	2800	N	mg/kg	[A] 85	100	--	--
pH	2010	U		7.4	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.018	--	To evaluate	To evaluate
Eluate Analysis			**10:1 Eluate mg/l**	**10:1 Eluate mg/kg**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0006	0.0061	0.5	2	25
Barium	1455	U	0.027	0.27	20	100	300
Cadmium	1455	U	< 0.00011	< 0.0011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0050	0.5	10	70
Copper	1455	U	0.0035	0.035	2	50	100
Mercury	1455	U	< 0.00005	< 0.00050	0.01	0.2	2
Molybdenum	1455	U	0.0017	0.017	0.5	10	30
Nickel	1455	U	0.0010	0.010	0.4	10	40
Lead	1455	U	0.0006	0.0056	0.5	10	50
Antimony	1455	U	< 0.0005	< 0.0050	0.06	0.7	5
Selenium	1455	U	0.0005	0.0050	0.1	0.5	7
Zinc	1455	U	0.007	0.071	4	50	200
Chloride	1220	U	8.0	80	800	15000	25000
Fluoride	1220	U	0.094	< 1.0	10	150	500
Sulphate	1220	U	110	1100	1000	20000	50000
Total Dissolved Solids	1020	N	220	2200	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	8.5	85	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	17

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - Single Stage WAC

Project: 24665 / 2 Monaghan Town Active Travel Development Site

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	23-19442						
Chemtest Sample ID:	1653341						
Sample Ref:							
Sample ID:	AA205160						
Sample Location:	TP02R						
Top Depth(m):	2.00						
Bottom Depth(m):							
Sampling Date:							
Determinand	**SOP**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	U	%	[A] 1.2	3	5	6
Loss On Ignition	2610	U	%	4.0	--	--	10
Total BTEX	2760	U	mg/kg	[A] < 0.010	6	--	--
Total PCBs (7 congeners)	2815	N	mg/kg	[A] < 0.0010	1	--	--
TPH Total WAC	2670	U	mg/kg	[A] 220	500	--	--
Total Of 17 PAH's	2800	N	mg/kg	[A] < 0.20	100	--	--
pH	2010	U		7.9	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.015	--	To evaluate	To evaluate
Eluate Analysis			**10:1 Eluate mg/l**	**10:1 Eluate mg/kg**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0019	0.019	0.5	2	25
Barium	1455	U	0.009	0.087	20	100	300
Cadmium	1455	U	< 0.00011	< 0.0011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0050	0.5	10	70
Copper	1455	U	0.0010	0.0098	2	50	100
Mercury	1455	U	< 0.00005	< 0.00050	0.01	0.2	2
Molybdenum	1455	U	0.0014	0.014	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0050	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0050	0.5	10	50
Antimony	1455	U	< 0.0005	< 0.0050	0.06	0.7	5
Selenium	1455	U	< 0.0005	< 0.0050	0.1	0.5	7
Zinc	1455	U	0.003	0.030	4	50	200
Chloride	1220	U	< 1.0	< 10	800	15000	25000
Fluoride	1220	U	0.080	< 1.0	10	150	500
Sulphate	1220	U	37	370	1000	20000	50000
Total Dissolved Solids	1020	N	91	910	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	3.0	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	18

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - Single Stage WAC

Project: 24665 / 2 Monaghan Town Active Travel Development Site

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	23-19442						
Chemtest Sample ID:	1653342						
Sample Ref:							
Sample ID:	AA205162						
Sample Location:	TP03R						
Top Depth(m):	1.40						
Bottom Depth(m):							
Sampling Date:							
Determinand	**SOP**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	U	%	[A] 2.2	3	5	6
Loss On Ignition	2610	U	%	6.7	--	--	10
Total BTEX	2760	U	mg/kg	[A] < 0.010	6	--	--
Total PCBs (7 congeners)	2815	N	mg/kg	[A] < 0.0010	1	--	--
TPH Total WAC	2670	U	mg/kg	[A] 140	500	--	--
Total Of 17 PAH's	2800	N	mg/kg	[A] 0.74	100	--	--
pH	2010	U		7.8	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.013	--	To evaluate	To evaluate
Eluate Analysis			**10:1 Eluate mg/l**	**10:1 Eluate mg/kg**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0005	0.0050	0.5	2	25
Barium	1455	U	0.008	0.085	20	100	300
Cadmium	1455	U	< 0.00011	< 0.0011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0050	0.5	10	70
Copper	1455	U	0.0010	0.0097	2	50	100
Mercury	1455	U	< 0.00005	< 0.00050	0.01	0.2	2
Molybdenum	1455	U	0.0010	0.011	0.5	10	30
Nickel	1455	U	0.0006	0.0062	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0050	0.5	10	50
Antimony	1455	U	< 0.0005	< 0.0050	0.06	0.7	5
Selenium	1455	U	< 0.0005	< 0.0050	0.1	0.5	7
Zinc	1455	U	0.004	0.044	4	50	200
Chloride	1220	U	< 1.0	< 10	800	15000	25000
Fluoride	1220	U	0.088	< 1.0	10	150	500
Sulphate	1220	U	13	130	1000	20000	50000
Total Dissolved Solids	1020	N	59	590	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	< 2.5	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	17

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - Single Stage WAC

Project: 24665 / 2 Monaghan Town Active Travel Development Site;

Chemtest Job No:	23-19442				Landfill Waste Acceptance Criteria Limits		
Chemtest Sample ID:	1653344						
Sample Ref:							
Sample ID:	AA205164						
Sample Location:	TP04R						
Top Depth(m):	0.70						
Bottom Depth(m):							
Sampling Date:							
Determinand	**SOP**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	U	%	[A] 2.6	3	5	6
Loss On Ignition	2610	U	%	6.4	--	--	10
Total BTEX	2760	U	mg/kg	[A] < 0.010	6	--	--
Total PCBs (7 congeners)	2815	N	mg/kg	[A] < 0.0010	1	--	--
TPH Total WAC	2670	U	mg/kg	[A] < 10	500	--	--
Total Of 17 PAH's	2800	N	mg/kg	[A] < 0.20	100	--	--
pH	2010	U		8.3	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.021	--	To evaluate	To evaluate
Eluate Analysis			**10:1 Eluate mg/l**	**10:1 Eluate mg/kg**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	< 0.0002	< 0.0020	0.5	2	25
Barium	1455	U	< 0.005	< 0.050	20	100	300
Cadmium	1455	U	< 0.00011	< 0.0011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0050	0.5	10	70
Copper	1455	U	< 0.0005	< 0.0050	2	50	100
Mercury	1455	U	< 0.00005	< 0.00050	0.01	0.2	2
Molybdenum	1455	U	0.0007	0.0070	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0050	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0050	0.5	10	50
Antimony	1455	U	< 0.0005	< 0.0050	0.06	0.7	5
Selenium	1455	U	0.0005	0.0054	0.1	0.5	7
Zinc	1455	U	< 0.003	< 0.025	4	50	200
Chloride	1220	U	< 1.0	< 10	800	15000	25000
Fluoride	1220	U	0.14	1.4	10	150	500
Sulphate	1220	U	< 1.0	< 10	1000	20000	50000
Total Dissolved Solids	1020	N	33	320	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	3.2	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	14

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - Single Stage WAC

Project: 24665 / 2 Monaghan Town Active Travel Development Site

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	23-19442						
Chemtest Sample ID:	1653345						
Sample Ref:							
Sample ID:	AA205167						
Sample Location:	TP05R						
Top Depth(m):	0.50						
Bottom Depth(m):							
Sampling Date:							
Determinand	**SOP**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	U	%	[A] 3.2	3	5	6
Loss On Ignition	2610	U	%	3.1	--	--	10
Total BTEX	2760	U	mg/kg	[A] < 0.010	6	--	--
Total PCBs (7 congeners)	2815	N	mg/kg	[A] < 0.0010	1	--	--
TPH Total WAC	2670	U	mg/kg	[A] 240	500	--	--
Total Of 17 PAH's	2800	N	mg/kg	[A] 71	100	--	--
pH	2010	U		8.2	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.019	--	To evaluate	To evaluate
Eluate Analysis			**10:1 Eluate mg/l**	**10:1 Eluate mg/kg**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0005	0.0051	0.5	2	25
Barium	1455	U	< 0.005	< 0.050	20	100	300
Cadmium	1455	U	< 0.00011	< 0.0011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0050	0.5	10	70
Copper	1455	U	0.0017	0.017	2	50	100
Mercury	1455	U	< 0.00005	< 0.00050	0.01	0.2	2
Molybdenum	1455	U	0.0013	0.013	0.5	10	30
Nickel	1455	U	0.0005	0.0053	0.4	10	40
Lead	1455	U	0.0009	0.0088	0.5	10	50
Antimony	1455	U	< 0.0005	< 0.0050	0.06	0.7	5
Selenium	1455	U	< 0.0005	< 0.0050	0.1	0.5	7
Zinc	1455	U	0.005	0.052	4	50	200
Chloride	1220	U	< 1.0	< 10	800	15000	25000
Fluoride	1220	U	0.12	1.2	10	150	500
Sulphate	1220	U	< 1.0	< 10	1000	20000	50000
Total Dissolved Solids	1020	N	42	420	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	4.4	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	13

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request.The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
1653336		AA197907	BH01		A	Amber Glass 250ml
1653336		AA197907	BH01		A	Plastic Tub 500g
1653337		AA197908	BH01		A	Amber Glass 250ml
1653337		AA197908	BH01		A	Plastic Tub 500g
1653338		AA192927	BH02		A	Amber Glass 250ml
1653338		AA192927	BH02		A	Plastic Tub 500g
1653339		AA205155	TP01R		A	Amber Glass 250ml
1653339		AA205155	TP01R		A	Plastic Tub 500g
1653340		AA205157	TP01R		A	Amber Glass 250ml
1653340		AA205157	TP01R		A	Plastic Tub 500g
1653341		AA205160	TP02R		A	Amber Glass 250ml
1653341		AA205160	TP02R		A	Plastic Tub 500g
1653342		AA205162	TP03R		A	Amber Glass 250ml
1653342		AA205162	TP03R		A	Plastic Tub 500g
1653343		AA205163	TP03R		A	Amber Glass 250ml
1653343		AA205163	TP03R		A	Plastic Tub 500g
1653344		AA205164	TP04R		A	Amber Glass 250ml
1653344		AA205164	TP04R		A	Plastic Tub 500g
1653345		AA205167	TP05R		A	Amber Glass 250ml
1653345		AA205167	TP05R		A	Plastic Tub 500g
1653346		AA205168	TP05R		A	Amber Glass 250ml
1653346		AA205168	TP05R		A	Plastic Tub 500g

Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request.The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
1653347		AA205169	TP07R		A	Amber Glass 250ml
1653347		AA205169	TP07R		A	Plastic Tub 500g
1653348		AA205182	TP09R		A	Amber Glass 250ml
1653348		AA205182	TP09R		A	Plastic Tub 500g

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-MS	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Pentane extraction / GCMS detection
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2010	pH Value of Soils	pH	pH Meter
2015	Acid Neutralisation Capacity	Acid Reserve	Titration
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2180	Sulphur (Elemental) in Soils by HPLC	Sulphur	Dichloromethane extraction / HPLC with UV detection
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2220	Water soluble Chloride in Soils	Chloride	Aqueous extraction and measuremernt by 'Aquakem 600' Discrete Analyser using ferric nitrate / mercuric thiocyanate.
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Alkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N–dimethyl-p-phenylenediamine.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2455	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.

Test Methods

SOP	Title	Parameters included	Method summary
2610	Loss on Ignition	loss on ignition (LOI)	Determination of the proportion by mass that is lost from a soil by ignition at 550°C.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenz[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.
640	Characterisation of Waste (Leaching C10)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

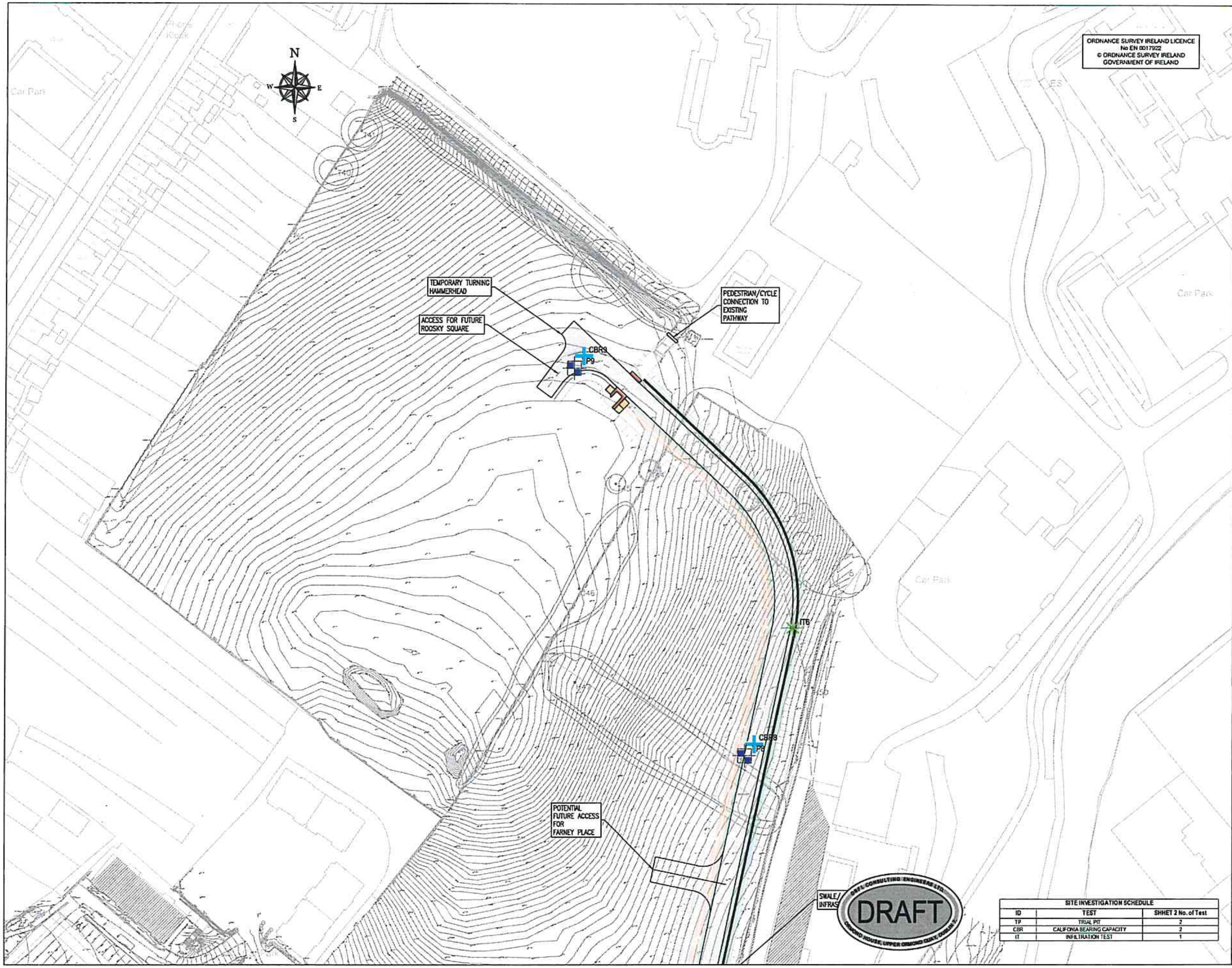
A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

Appendix IX Site Plans



SITE INVESTIGATION SCHEDULE		
ID	TEST	SHHET 2 No. of Test
TP	TRIAL PIT	2
CBR	CALIFONIA BEARING CAPACITY	2
IT	INFILTRATION TEST	1

ON ORIGINAL

NOTES:

1. ALL DRAWINGS TO BE CHECKED BY CONTRACTOR ON SITE AND ENGINEER INFORMED OF DISCREPENCIES BEFORE WORK COMMENCES.
2. ALL DIMENSIONS AND LEVELS ARE IN METRES UNLESS NOTED OTHERWISE.
3. ALL LEVELS ARE IN METERS AND ARE RELATED TO ORDNANCE DATUM. CO-ORDINATES RELATE TO ITM.
4. CONTRACTOR TO UNDERTAKE INVESTIGATION IN THE VICINITY OF PROPOSED TEST LOCATIONS TO MINIMISE THE POTENTIAL FOR ENCOUNTERING EXISTING SERVICES DURING EXCAVATION (INCLUDING BUT NOT LIMITED TO USE OF CAT TYPE CABLE DETECTION DEVICE) AND OBTAIN AND REVIEW RELEVANT UTILITY OPERATOR RECORD DRAWINGS.
5. CBRs TO BE PLATE BEARING TESTS UNDERTAKEN AT SUBSOIL LEVEL. (I.E. TOPSOIL REMOVED FROM SURFACE.)
6. TRIAL PITS UP TO 3m DEPTH.
7. CONTRACTOR TO BACKFILL ALL EXCAVATIONS ON COMPLETION ON INVESTIGATIONS.
8. THIS DRAWING IS BASED ON TOPO SURVEY BY MURPHY SURVEYS DATED 13/10/2018
9. CONTRACTOR TO CONFIRM GROUND LEVEL AND COORDINATES FOR AS BUILT LOCATIONS OF SI

LEGEND:

Symbol	Description
TP1	Trial Pit
BH1	Borehole
IT1	Infiltration Test
CBR1	CBR
BH STP1	Borehole with Standpipe
ST1	Slit Trench
VST1	Vane Shear Test

KEY PLAN

rev	date	description	by	chkd

STATUS CODES

purpose	acceptance
P1 - INFORMATION	S - ISSUED

DBFL Consulting Engineers
Civil, Structural & Transportation Engineering

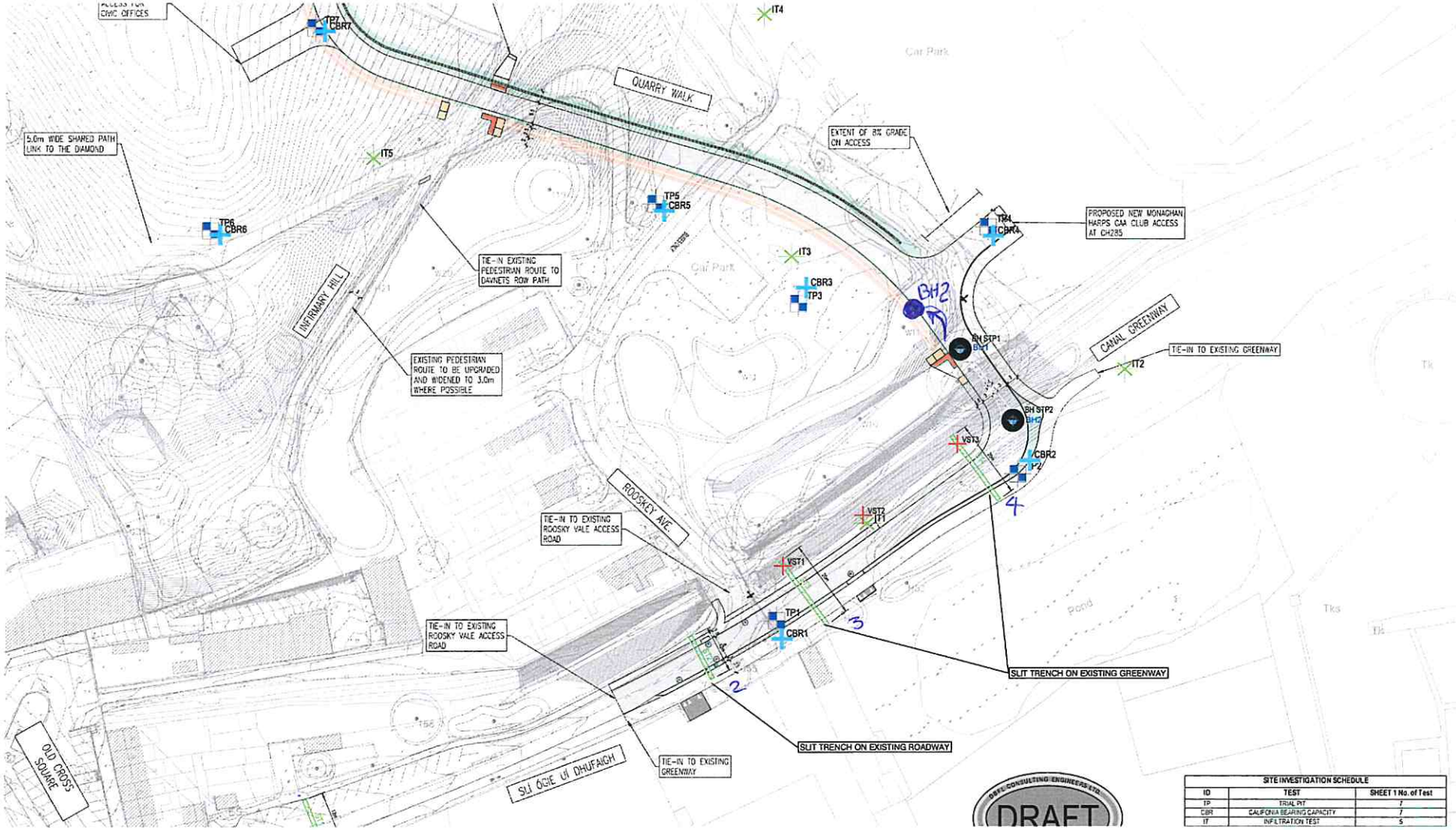
project ref: MONAGHAN TOWN ACTIVE TRAVEL

drawing title: SITE INVESTIGATION PLAN SHEET 2

client: MONAGHAN COUNTY COUNCIL

designed by	author	scale	sheet size
KB/M	KB/M	1:500	A1

drawing no.	revision
220084-RY-04-Z00-L00-SK-DBFL-CE-7002	0

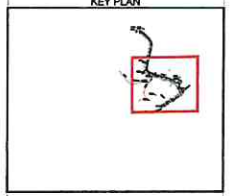


5. CBRs TO BE PLATE BEARING TESTS UNDERTAKEN AT SUBSOIL LEVEL (I.E. TOPSOIL REMOVED FROM SURFACE.)
6. TRIAL PITS UP TO 3m DEPTH.
7. CONTRACTOR TO BACKFILL ALL EXCAVATIONS ON COMPLETION OF INVESTIGATIONS.
8. THIS DRAWING IS BASED ON TOPO SURVEY BY MURPHY SURVEYS DATED 13/10/2016
9. CONTRACTOR TO CONFIRM GROUND LEVEL AND COORDINATES FOR AS BUILT LOCATIONS OF SI

LEGEND:

- TP1 — Trial Pit
- BH1 — Borehole
- IT1 — Infiltration Test
- CBR1 — CBR
- BH STP1 — Borehole with Standpipe
- ST1 — Slit Trench
- VST1 — Vane Shear Test

KEY PLAN



SITE INVESTIGATION SCHEDULE		
ID	TEST	SHEET 1 No. of Test
TP	TRIAL PIT	7
CBR	CALIFORNIA BEARING CAPACITY	7
IT	INFILTRATION TEST	5

STATUS CODES
P1 - INFORMATION
S - ISSUED

DBFL Consulting Engineers

MONAGHAN TOWN ACTIVE TRAVEL

SITE INVESTIGATION PLAN SHEET 1


Monaghan
Harps GAA Club
Gatehouse Monaghan,
Adult Education Centre
Temporarily closed
Sli Óg le hUíDhubhfaigh
Ulster Canal
Ulster Canal Greenway
Ulster Canal Greenway
Ulster Canal Greenway
KellysPitstop Monaghan
Ulster Canal Greenway
Google