IGSL Ltd

Kildare County Council
Maintenance Depot

Ground Investigation Report

Project No. 20636

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TABLE OF CONTENTS

FIGURES

TABLES

APPENDICES

FOREWORD
The following conditions and notes on the geotechnical site investigation procedures should be read in conjunction with this report.

Standards
The ground investigation works for this project (Kildare County Council Maintenance Depot) 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 (2015) and BS 1377 (Parts 1 to 9) and the following European Norms:

- EN 1997-2 Eurocode 7: 2007 – Geotechnical Design – Part 2: Ground Investigation & Testing
- EN ISO 22475-1:2006 Geotechnical Investigation and Sampling – Sampling Methods & Groundwater Measurements
- EN ISO 14688-1:2002 Geotechnical Investigation and Testing – Identification and Classification of Soil, Part 1: Identification and Description
- EN ISO 14688-2:2004 Geotechnical Investigation and Testing – Identification and Classification of Soil, Part 2: Classification Principles
- EN ISO 14689-1:2004 Geotechnical Investigation and Testing - Identification & Classification of Rock, Part 1: Identification & Description

Reporting
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.

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Boring Procedures
Where required, 'shell and auger' or cable percussive boring technique is employed as defined by Section 6.3 of IS EN ISO 22475-1:2006. The boring operations, sampling and in-situ testing meet with the recommendations set out in IS EN 1997-2:2007 and BS 1377:1990 and EN ISO 22476-3:2005. The shell and auger boring technique allows for continuous sampling in clay and silt above the water table and sand and gravel below the water table (Table 2 of IS EN ISO 22475-1:2006).

It is highlighted that some disturbance and variation is unavoidable in particular ground (e.g. blowing sands, gravel / cobble dominant glacial deposits etc). Attention is drawn to this condition, whenever it is suspected. Where cobbles and boulders are recorded, no conclusion should be drawn concerning the size, presence, lithological nature, or numbers per unit volume of ground.

In-Situ Testing
Where required, Standard Penetration Tests (SPT's) are 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 and the Energy Ratio (E_r). 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 measured 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).

Soil Sampling
Three categories of sampling methods are outlined in EN ISO 22475-1:2006. The categories are referenced A, B and C for any given ground conditions and are shown in Tables 1 and 2 of EN ISO 22475-1:2006. Reference should be made to EN 1997-2:2002 for guidelines on sample class and quality for strength and compressibility testing. Samples of quality classes 1 or 2 can only be obtained by using Category A sampling methods.

Class 1 thin wall undisturbed tube samples (UT100) were obtained in fine grained soils and strictly meet the requirements of EN 1997-2:2002 and EN ISO 22475-1:2006. Soil samples for laboratory tests are divided into five classes with respect to the soil properties that are assumed to remain unchanged during sampling, handling transport and storage. The minimum sample quality required for testing purposes to Eurocode 7 compatibility (EN 1997-2:2002) is shown in Table A.

Table A – Details of Sample Quality Requirements

EN 1997 Clause	Test	Minimum Sample Quality Class
5.5.3	Water Content	3
5.5.4	Bulk Density	2
5.5.5	Particle Density	N/S
5.5.6	Particle Size Analysis	N/S
5.5.7	Consistency Limits	4
5.5.8	Density Index	N/S
5.5.9	Soil Dispersivity	N/S
5.5.10	Frost Susceptibility	N/S
5.6.2	Organic Content	4
5.6.3	Carbonate Content	3
5.6.4	Sulphate Content	3
5.6.5	pH	3
5.6.6	Chloride Content	3
5.7	Strength Index	1
5.8	Strength Tests	1
5.9	Compressibility Tests	1
5.10	Compaction Tests	N/S
5.11	Permeability	2

N/S – not stated. Presume a representative sample of appropriate size.

Samples recovered from trial pits or trenches meet the requirements of IS EN ISO 22475-1. It is highlighted that unforeseen circumstances such as variations in geological strata may lead to lower quality sample classes being obtained.

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. Rock weathering classification conforms to IS EN ISO 14689-1:2003 while discontinuities (bedding planes, joints, cleavages, faults etc) are classified in accordance with 4.3.3 of IS EN ISO 14689-1:2003. Rock mechanical indices (TCR, SCR, RQD) are defined in accordance with IS EN ISO 22475-1:2006.

Where peat has been encountered, 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 and Hobbs N. B. Mire morphology and the properties of some British and foreign peats. QJEG, Vol. 19, 1986.

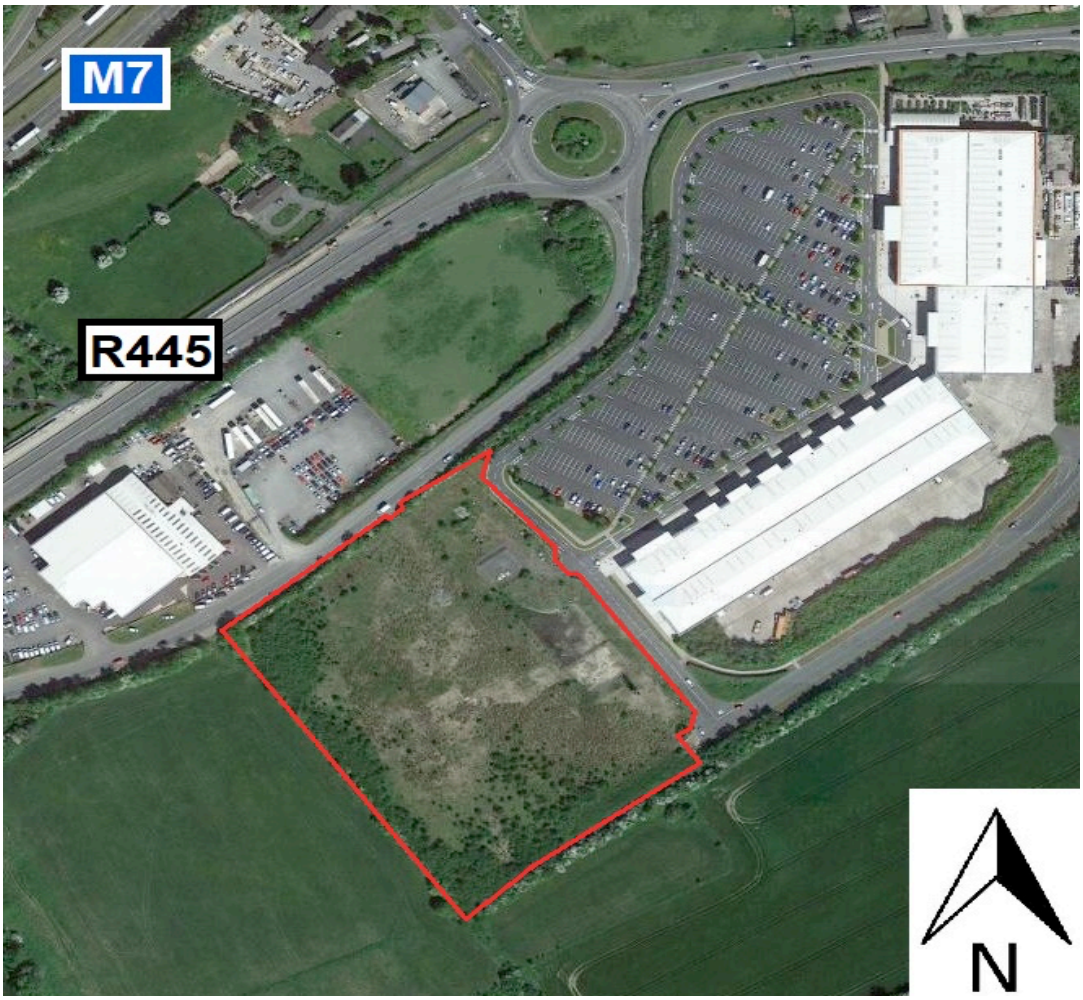
Retention of Samples

After satisfactory completion of all the scheduled laboratory tests on any sample, the remaining material will be 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.

1. INTRODUCTION

At the instruction of Kilgallen & Partners IGSL has undertaken a programme of geotechnical investigations for a proposed maintenance depot, machinery yard, offices and possible salt barn at Newhall, Naas, Co. Kildare. The site is located off the slip road for the M7 and encompasses an area of 2 Ha (illustrated in Figure 1). The site topography is characterized by an undulating or irregular surface with ground elevations typically ranging from c84 to 86.6m OD. The ground elevation at the site is generally 2.5 to 3m higher than the M7 slip road and this is attributable to filling works which took place during the construction works at the adjacent Newhall Retail Park.

Figure 1 – Site Location (boundary shown in red)



Reproduced from Google Maps (2018)

The geotechnical investigations comprised cable percussive boreholes, trial pits, soakaway tests and slit trenches. The investigations were executed in accordance with BS 5930, Code of Practice for Site Investigations (2015) and EN 1997-2 Eurocode 7 Part 2 Ground Investigation & Testing. The fieldworks were supervised by an IGSL geotechnical engineer.

Geotechnical laboratory testing was carried out on selected samples and included classification tests, earthworks and modification / stabilization testing and sulphate. Environmental tests (WAC analysis) were also performed on samples to classify the soils for off-site disposal. The 'as-built' co-ordinates and ground levels are shown on the exploratory hole logs with locations plotted on the exploratory hole plan (Appendix 8).

This report presents an evaluation of the geotechnical field and laboratory test data. A discussion of the ground conditions and engineering properties ('ground assessment') are presented. Recommendations are provided on foundation solutions, earthworks, ground improvement, pavement construction and buried concrete.

2. FIELDWORKS

2.1 General

The geotechnical investigations were carried out in December 2017 and January 2018 and comprised the following:

- Cable percussive boreholes (6 No.)
- Trial pits (20 No.)
- Slit trenches (5 No.)
- Soakaway tests (2 No.)
- Surveying of exploratory hole locations

2.2 Cable Percussive Boreholes

Cable percussive boring (200mm diameter) was undertaken at six locations using a Dando 2000 rig. The boreholes are denoted BH01 to BH06 and extended to a depths ranging from 7.0m to 8.50m. Boring commenced after scanning (CAT & Jenny) to verify the presence or absence of service ducts. Disturbed bulk samples were recovered at 1m intervals or change of strata during boring and these are denoted 'B' on the engineering logs.

Standard Penetration Tests (SPT's) were performed in the boreholes and given the nature of the soils, a solid cone was used. It is noted that the SPT N-Values reported are the number of blows for 300mm increment penetration (e.g. BH01 at 1.0m where N=11). These exclude the seating blow values, which represent the initial 150mm depth of penetration. Where partial penetration was achieved during testing, the number of blows is shown for the actual penetration depth achieved (e.g. BH1 at 7.50m where N=50//90mm). In accordance with Eurocode 7, the SPT hammer has been calibrated and the energy ratio (Er) value is incorporated on the engineering logs. It is highlighted that the SPT N-Values reported on the engineering logs are uncorrected for energy ratio.

Standpipes were installed in three boreholes (BH 1, 4 and 6) and included 50mm diameter plain and slotted sections with pea gravel response zones and cement / bentonite pellet seals. Upright protective headwork covers were concreted in place. Descriptions of the soils encountered, in-situ tests undertaken and samples recovered are presented on the borehole records in Appendix 1. Details of groundwater strikes and hard strata boring (i.e. chiselling) are also presented on the aforementioned records.

2.3 Trial Pits

Trial pitting was carried out using a 7T tracked excavator. The trial pits were logged and sampled by an IGSL geotechnical engineer in accordance with BS 5930 (2015). Bulk disturbed samples (typically 30 to 40 kg) were taken as the pits progressed. The bulk samples were placed in heavy-duty polyethylene bags and sealed before being transported to Naas for laboratory testing.

The trial pits were backfilled with the as-dug arisings and reinstated to the satisfaction of IGSL's site representative. The trial pit logs and photos are presented in Appendix 2 and include descriptions of the soils encountered, groundwater conditions and stability of the pit sidewalls.

2.4 Slit Trenches

Slit trenches were excavated at five locations using a combination of hand digging and tracked excavator. The trenches were formed through MADE GROUND and soft or firm gravelly CLAY / SILT soils. The slit trench records are presented in Appendix 3 and include detailed measurements of utilities / ducts and photographs.

2.5 Soakaway Testing & Groundwater Monitoring

Two infiltration tests were undertaken to assess the capability of the sub-soils for dispersion of storm water through a soakaway system. The infiltration testing was performed in accordance with BRE Digest 365 'Soakaway Design'. To obtain a measure of the infiltration rate of the sub-soils, water is

poured into each test pit, and records taken of the fall in water level against time. This procedure is repeated to ensure saturation of the sub-soils. The infiltration rate is the volume of water dispersed per unit of exposed area per unit of time, and is generally expressed as metres / minute or metres / second. Designs are based on the slowest infiltration rate, which is generally calculated from the final cycle. The soakaway record is presented in Appendix 4. Standpipes were installed in three boreholes (namely BH's 1, 4 and 6) and groundwater measurements are presented in Appendix 5.

2.6 Surveying of Exploratory Hole Locations

Following completion of the exploratory works, surveying was carried out using GPS techniques. Co-ordinates (x, y) were measured to Irish National Grid and ground levels (z) established to Malin Head. The co-ordinates and ground levels are shown on the exploratory hole logs with the approximate locations plotted on the exploratory hole plan in Appendix 8.

3. LABORATORY TESTING

Geotechnical laboratory testing was carried out on selected trial pit and cable percussive borehole samples. The testing included moisture content, Atterberg Limits (Liquid / Plastic Limits), sieve analysis, California Bearing Ratio (CBR), Moisture Condition Value (MCV) and Proctor compactions.

In addition to this, trial mix modification and stabilization tests were undertaken using lime (calcium oxide supplied by Clogrennane) and cement (Ordinary Portland Cement supplied by Lagan). The MCV tests were performed after mixing the binder and air curing for approximately 2 hours. CBR mould samples were prepared and tested under soaked (immersed in water at 20 degree centigrade conditions after curing for 3 and 14 days. Sulphate and sulphur contents were measured on 14 day samples modified with lime. Frost susceptibility tests were also commissioned to evaluate potential heave. The geotechnical laboratory test results are presented in Appendix 6.

Finally, environmental analysis was undertaken on four samples to assess landfill disposal in accordance with the criteria set out in the 2002 European Council Directive (2003/33/EC). The environmental test results are presented in Appendix 7.

4. GROUND CONDITIONS & GROUNDWATER

4.1 Ground Profile

The ground profile at the site can be categorized as follows:

- MADE GROUND / FILL
- TOPSOIL
- Dark grey and grey brown slightly sandy or gravelly CLAY / SILT with high cobble content
- Brown and grey brown slightly clayey or silty sandy GRAVEL with high cobble content
- Brownish grey slightly gravelly fine to coarse SAND

4.2 Superficial Deposits

4.2.1 Anthropogenic Soils (Made Ground)

The site is mantled by a prominent layer of MADE GROUND / FILL (anthropogenic soils). These consist of re-worked brown and grey brown sandy gravelly clay or silt with occasional pockets of organics, wire, concrete and plastic. The MADE GROUND was found to be most extensive within the vicinity of TP 6 where It extended to depths of up to 3.60m bgl (82.91m OD). The trial pits show that the MADE GROUND effectively forms a 'dome shape' across the site, thinning out to the north-west, west and south. Organic content tests produced values ranging from 0.4 to 1%. In strength terms, the MADE GROUND varies from soft to firm and stiff with SPT N-Values typically ranging from 5 to 15. The Atterberg Limit tests show the made ground material is mainly low plasticity clay (CL). Plasticity indices range from 8 to 10% although some samples were found to be non-plastic. The particle size distributions demonstrate well graded material.

Figure 2 - Images showing MADE GROUND Deposits (Trial Pits 6, 7 and 11)


Harvey Norman

4.2.2 Topsoil

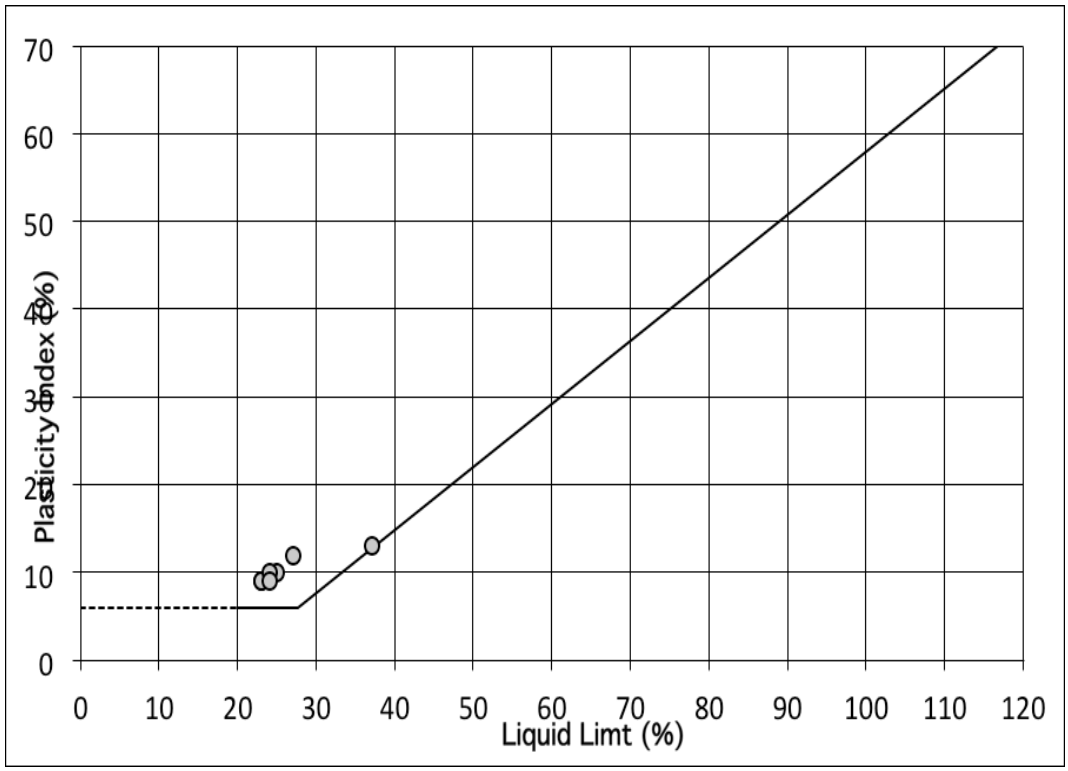
Topsoil (c300mm in thickness) was found beneath the made ground deposit. It appears that filling works took place directly on to the original ground surface and this has surcharged the topsoil layer.

4.2.3 Glacial Soils

Underlying the made ground and topsoil are glacially derived soils referred to as glacial till or 'boulder clay'. The fine grained or cohesive glacial till material is described as grey and grey brown slightly sandy gravelly SILT or CLAY with a medium cobble content. Horizons of silty or clayey GRAVEL and fine to coarse SAND were also encountered in a number of trial pits (i.e. TP's 2, 5, 7, 8 and 9) and boreholes (i.e. BH's 2, 4 ,5 and 6.). The granular glacial soils appear to be impersistent or discontinuous and typical of intra-glacial or fluvio-glacial deposits.

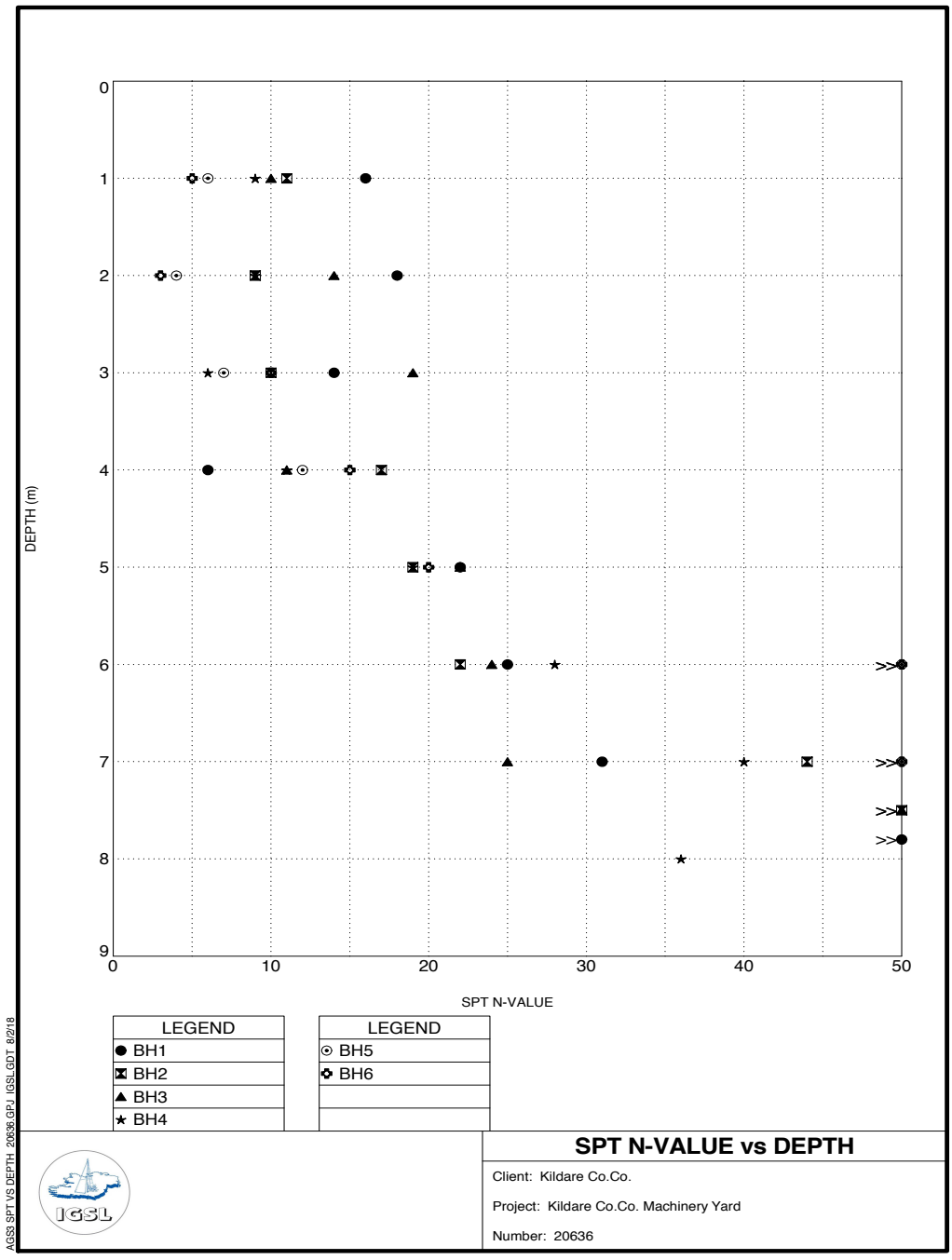
A series of index or classification tests were carried out on the borehole samples and results are presented in Appendix 6. Moisture contents are quite consistent with the majority in the 10 to 14% envelope. The particle size distributions show the glacial soils to be well graded with typical 'straight-line' type profiles. Fines contents (<425micron) are largely between 52 and 65%. The Atterberg Limits show the fine grained soils to be largely low plasticity CLAY (CL) with Plasticity Indices ranging from 9 to 13% (refer to Figure 3) though some samples were found to be non-plastic.

Figure 3 – Atterberg Limit Plot for Glacial Soils



Standard Penetration Tests (SPT's) were carried out in the cable percussive boreholes to establish shear strength. An SPT data plot has been prepared and is presented in Figure 4. The fine grained glacial till or boulder clay is typically firm and firm / stiff while the granular glacial soils are medium dense and dense. The SPT's show an increase in strength with depth and the glacial material is characteristic of an over-consolidated glacial till ('boulder clay'). Using the correlation between SPT N-Value and undrained shear strength (Stroud & Butler where Cu ≈ 4 to 6N) the indigenous fine grained glacial till soils are classed as initially firm or firm / stiff (i.e. undrained shear strength of c75 to 90 kN/m^2) becoming stiff and very stiff with depth.

Figure 4 – SPT Data Plot (N-Values v Depth)



4.3 Bedrock

Reference to the GSI bedrock map for the area shows that the site is underlain by greywacke and siltstone (Carrighill Formation). It is noted that rotary coring was not undertaken during the investigation. The cable percussive boreholes terminated ('refused') at depths of 7.0 to 8.5m but it is uncertain as to whether this represents cobble / boulder obstructions or possible upper bedrock.

4.4 Groundwater

Groundwater strikes or seepages were encountered in a number of the trial pits and cable percussive boreholes. In the case of the trial pits, groundwater was intercepted in TP's 2, 3, 4, 6, 7, 8, 9, 11, 13, 15, 16, 17 and 18 respectively. Inflows ranged from minor or slow seepages to copious inflows (e.g. TP 17 at 1.40m). Sidewall was impacted by groundwater ingress with instability associated with the more moderate or copious inflows.

Standpipes were installed in three of the six cable percussive boreholes (i.e. BH1, 4 and 6) and details are provided in Appendix 5. The standpipes showed standing water levels in mid January of 3.10 to 3.40m bgl (83.05 to 83.24m OD). The standpipes were dipped again on 16tth February and showed a very slight decrease in standing water levels (3.20 to 3.48m bgl). The soakaway tesst produced infiltration rates (f) of 3.09×10^{-7} and 9.5×10^{-7} m/s.

5. GROUND ASSESSMENT & ENGINEERING RECOMMENDATIONS

5.1 General

On foot of the findings from the ground investigations, the following issues are discussed and recommendations provided:

- Foundations
- Floor Slabs
- Earthworks & Ground Improvement
- Slopes / batters
- Pavement construction
- Buried concrete
- Classification of soils for off site disposal (Waste Acceptance Criteria evaluation)

5.2 Foundations

The ground investigations show that a prominent layer of anthropogenic soils (made up ground) mantle the site. This consists of re-worked glacial till and is underlain by a thin layer of topsoil and glacial soils. The MADE GROUND varies from soft / firm to stiff in consistency while the indigenous fine grained soils are typically firm / stiff and the granular soils are dense.

For the office buildings and salt barn conventional foundations (pads and footings) could be used and founded on the firm / stiff glacial till. On the basis of the SPT N-Values and soil descriptors, the glacial till at an elevation of 81.5 to 82mOD should provide a safe or allowable bearing pressure of 150 kN/m^2.

With a finished floor level of 83.75m OD for the offices / administration and workshop of 83.75m and salt barn of 84.45m OD a significant amount of excavation will be required. In any case, taking the aforementioned finished floor levels, excavate and replace with lean mix concrete would be required and necessitate excavation depths of up to 2.5m below a platform level of say 83 to 83.5m. The key challenge with forming conventional pad and footing foundations will be groundwater. The trial pits intercepted prominent perched groundwater (e.g. TP 3, 4, 7, 8,) within the made ground sequence. Groundwater was also encountered at the base of the made ground or interface zone with the indigenous soils. Groundwater control (pumping) measures would need to be implemented to ensure that formations can be protected and lean mix or low-grade concrete placed under pad or strip footing foundations.

An alternative to constructing pads on the firm / stiff glacial till and to deal with floor slab loadings at the salt barn (potentially up to 100 kN/m^2) would be to excavate the made ground and re-engineer with lime or lime and cement and produce a high strength engineered fill. Based on historical experience of lime stabilization, similar glacial till material can be engineered to produce shear strengths of 300 to 400 kN/m^2. Conservatively, pads could be designed for a safe or allowable bearing pressure of at least 300 kN/m^2 while ground bearing floor slab could be designed for a modulus of sub-reaction (Ks) of 75 MPa/m or CBR of approximately 15%.

As a guideline, the formation (before ground improvement works commence) should achieve a CBR value of 3% as determined by plate test method. A CBR value of 3% would equate to an undrained shear strength of the order of 50 to 60 kN/m^2. Hand shear vane testing could be used in conjunction with plate load tests to demonstrate competency of the formation before ground improvement works commence (i.e. first layer of lime stabilized fill is placed or in-situ treatment of the agreed formation with lime). By forming a high strength / stiffness fill with lime or cement modified soils, the loads from the structure will effectively be accommodated in this material. (akin to a raft type foundation).

It is noted that in most applications where glacial till is engineered with lime, it tends to produce very high stiffness characteristics and presents a challenge with excavation works for foundations or

utility trenches. Settlement for pads (UDL of say 300 to 400 kN/m^2) founded on or in stabilized fill would be expected to be small and certainly <5mm. A network of settlement plates (minimum of 4 No.) are recommended to measure settlement as filling works progress (i.e. to determine settlement induced on the indigenous glacial soils). The settlement plates should be positioned at strategic locations across the fill areas. Surveying should be undertaken weekly and time v settlement plots prepared to evaluate settlement as loadings from filling works progress.

5.3 Floor Slabs

As noted previously, loadings on the salt barn floor slab may be up to 100 kN/m^2. In the event that ground improvement is not used then a suspended floor slab is advised. A ground bearing floor slab (on the made ground) is not recommended due to the expected loading magnitudes and likelihood of differential settlement (giving rise to cracking). Ground bearing floor slabs may be satisfactory for the office / administration buildings but not for a workshop where maintenance of heavy plant is expected. If ground bearing floor slabs are selected (lighter structures) then the formation should be proof rolled using a smooth drum (roller with a mass per metre width of roll of not less than 5400kg) to ensue a sub-grade stiffness of not less than 3%. Under no circumstance should vibratory or dynamic rolling be used on the formation soils as this may lead to dilation and produce 'cow-bellying'.

An enhanced modulus layer (c600mm of T0 Hardcore to SR21) should be considered to provide a competent foundation layer beneath a ground floor slab on the made ground material. It is recommended that T0 Struc and T1 Struc hardcore be used under concrete floor slabs and external concrete yard areas. The hardcore materials should meet the requirements of Annex E SR21:2014+A1;2016. The hardcore fills should be tested (independent of the quarry source) to ensure that they meet the physical, durability, chemical and mineralogical characteristics as set out in the aforementioned Annex E of SR 21;2014+A1;2016. Independent testing on samples of the proposed source hardcore is strongly recommended in advance of the material being used on the site. As a minimum, particle size gradings, chemical tests (total sulphur and acid soluble sulphate) and geological classification / simplified petrology are advised to screen the material and independently assess compliance with Annex E, SR21;2014+A1;2016. Plate bearing tests are recommended to demonstrate compaction of Annex E hardcore materials – as a guideline the compacted hardcore should achieve a CBR value of at least 15% or Ks of 75 MPa/m on each layer.

5.4 Earthworks & Ground Improvement

Moisture Condition Value (MCV), California Bearing Ratio (CBR) and Proctor compaction tests (2.5kg rammer) were carried out on made ground samples retrieved from the trial pits. The MCV and CBR tests were conducted on samples at their received moisture content and following the mixing and curing with lime and lime / cement binders. The lime used in the trial mixes was supplied by Clogrennane (calcium oxide). For the MCV tests, the lime was mixed with the soil and allowed to air cure in the laboratory (temperature of the order of 15 to 16°C) for a period of 2 hours. The samples were then placed in the MCV apparatus and tested.

The MCV tests at 'natural moisture content produced values ranging from <1 to 9.7. For general cohesive fill (Class 2) a minimum MCV of 7 is normally required for glacial clay (Class 2C soils) to be re-used in earthworks (mainly embankments). The tests show that only two samples achieved an MCV >7. The MCV results and strength descriptors show that the made ground / fill in its natural state has limited capability or potential to produce acceptable Class 2 fill. However, the addition of 1 or 2% lime achieved a significant increase in MCV. With the exception of samples from TP 13 the MCV's are in excess of 8.4 with the addition of 1 or 2% lime.

The CBR tests were performed on soaked samples (20 degrees in water tank) after curing for 3, 7 and 14 days respectively. Summary details of the stabilization tests are presented in Table 1. The CBR values at natural moisture content range from 0.5 to 4.2%. Not unexpectedly, the CBR tests showed a dramatic increase following mixing and curing with lime or a combination of lime and

cement. The laboratory trial mix tests demonstrate that a CBR value of 15% (generally specified for structural applications such as heavily loaded floor slabs or pads) can be achieved by modification and stabilization. The percentage of binder will depend on weather conditions (very wet weather would soften the soils and require a higher binder content to be applied) and drainage.

Table 1 – Summary Details of CBR Tests on Lime / Cement Treated Samples

Sample Location	Sample Depth (m bgl)	Moisture Content (%)	CBR At NMC	CBR (%) (1% lime)	CBR (2% Lime)	CBR (!1% Lime & 1% Cement)
TP 2	0.9 / 1.9	15	0.6%		23% (3 day)	
TP 2	0.9 / 1.9	16			16% (14 day)	
TP 4	1.0 / 2.0	13	3.2%			
TP 4	1.0 / 2.0	11		36% (3 day)		
TP 4	1.0 / 2.0	12		37% (14 day)		
TP 6	1.0/2.0/3.0	12	2.8%			
TP 10	1.0/2.0/3.0	12	4.2%			
TP 12	1.0/2.0	14		21% (3 day)		
TP 12	1.0 / 2.0	14		15% (14 day)		
TP 12	1.0 / 2.0	14			22% (3 day)	
TP 12	1.0 / 2.0	13			49% (14 day)	
TP 13	0.7/1.2/2.8	14	0.5%			
TP 13	0.7/1.2/2.8	14			19% (3 day)	
TP 13	0.7/2.8	14			22% (14 day)	
TP 13	0.7/1.2/2.8	13				17% (3 day)
TP 13	0.7/2.8	13				38% (7 day)
TP 20	1.0 / 2.0	16	2.0%			
TP 20	1.0 / 2.0	15			32% (3 day)	
TP 20	1.0 / 2.0	15			34% (14 day)	

Notations:
NMC (Natural Moisture Content)
S = Soaked CBR Sample at duration shown

Compaction tests (Proctor method using the 2.5kg rammer) were carried out on samples to establish optimum moisture content and maximum dry density. Maximum dry densities range from 1.84 to 2.02 Mg/m^3 while optimum moisture contents varied from 9 to 13%. The compaction tests show that the material is slightly wet of optimum (typically 2 to 3%) which is favourable from a modification / stabilization perspective. For ground improvement projects the percentage of lime or cement binder to be added would be at the direction of the specialist contractor and governed by MCV at natural moisture content and weather conditions (temperature, moisture and humidity). Control of air voids in engineered fill is critical, especially where structural loads and ground bearing floor slabs are proposed. A maximum air voids content of 5% is recommended and the engineered fill should be compacted to achieve 95% of Proctor optimum (based on the 2.5kg rammer method).

The earthworks contractor should appreciate that the fine-grained glacial soils at the site will be particularly susceptible to degradation under trafficking (rutting) with rubber wheeled dump trucks (e.g. Volvo A25 or similar). Rutting will present a significant challenge for the earthworks contractor as successive layers are placed and compacted. Where the glacial till material (acceptable Class 2 to Series 600 of the NRA SRW) is used without modification, static rolling (without vibration) is advised using a smooth drum roller with a mass per metre width of roll of not less than 5400 kg. If vibration during rolling is proposed, then care must be taken not to induce excess pore water

pressures as this would lead to 'cow-bellying' and prominent rutting. A minimum of 6 roller passes is recommended with the aforementioned roller.

Geotechnical quality assurance testing is a vital component of ground improvement works, especially where structures are to be built or founded on lime or cement engineered fill. Testing during the course of ground improvement / earthworks should include MCV, in-situ density, TRL DCP and plate load. The testing frequency should be agreed with the ground improvement specialist but should be sufficiently detailed to allow sign off on the key properties (CBR, air voids and relative compaction). Frost heave tests were carried out on two samples in accordance with BS 812:Part 124:2009 – Annex B. The tests produced mean frost heave values of 0.3 and 1.5mm. The lime modified material is classed as non frost susceptible (<15mm) in accordance with Series 800 of the UK Specification for Highway Works (SHW).

5.5 Pavement Construction

CBR values for the indigenous soils were established by laboratory test methods (samples re-compacted at their natural moisture content) and summary details are shown in Table 2. The CBR values on the glacial till from the borehole samples (indigenous soils) vary from 4.1 to 6.4%.

Table 2 – Summary Details of Laboratory CBR Tests on Borehole Samples

Location	Sample Depth (m bgl)	Soil Type	Moisture Content (%)	CBR (%)
BH 2	4.0	Glacial Till	10	5.2
BH 3	4.0	Glacial Till	20	4.9
BH 5	4.0	Glacial Till	12	6.4
BH 6	3.0	Glacial Till	19	4.1

In accordance with the Design Guidance for Road Pavement (HD 25), the lower-end equilibrium CBR values should be used to determine appropriate capping layer thickness. Based on the CBR tests on the Made Ground or Fill samples a CBR value of 2% would not be unreasonable for determination of capping and sub-base thickness or make-up. If pavements were to be constructed on the upper indigeneous glacial till a CBR value of 4% could be adopted. It is highlighted that the CBR value on the indigenous soil formation would depend greatly on the effectiveness of drainage and water management. If drainage is not adequate then the sub-grade stiffness would diminish greatly and a greater thickness of capping (or the use of a starter layer) would have to be implemented.

Taking a design CBR value of 4% for the firm glacial till, then a minimum 6F capping thickness of 400mm with a sub-base thickness of 200mm should be adequate to support the road pavements. However, given the sensitivity of the fine grained glacial till soils to degradation and potential for rutting ('traffickability') with rubber wheeled dump trucks, consideration should be given to using a starter layer (NRA 6B/6C granular fill). In cut areas and haul roads, approximately 500mm of Class 6A / 6B material could be used in conjunction with 300mm of 6F capping.

5.6 Slopes / Batters

A slope angle of 1V to 2H (26º) is recommended for long term cut slopes or batters formed within the firm / stiff made ground or re-worked soils. Given the potential for perched water within the made ground it would be prudent to consider the use of herringbone drains in the Made Ground batters. The purpose of this would be to manage surface water run-off and prevent wash-out of the fine grained soils.

For confined area excavation works (e.g. service trenches etc), the glacial till soils will be susceptible to instability and sidewall collapse and spalling, therefore ground support measures (e.g.

trench box) are advised to ensure safe excavation works. Site operatives or personnel should not enter unsupported excavations and should be informed of the potential risks. Where site operatives or engineering staff work in close proximity to temporary slopes or batters, these should be inspected daily by a suitably experienced civil engineer.

5.7 Buried Concrete

Sulphate ($S0_4$) was determined on lime modified samples following curing for 14 days (after completion of the CBR tests). The sulphate aqueous extract (as SO_4) and acid soluble sulphate (total sulphate) contents are very low. The total sulphur contents are very low in three of the four samples tested (0.03%). A total sulphur content of 0.37% was measured on the sample from TP 2 treated with 2% lime.

The chemical tests demonstrate no adverse reaction (in terms of generation of sulphates) between lime (calcium oxide) and the Made Ground soils (re-worked glacial till). If concrete structures or pipes are to be built or constructed adjacent to or within lime or lime / cement modified /fill, then Design Sulphate Class DS-1 would be appropriate (in accordance with BRE SD1). In terms of concrete to I.S. EN 206-1:2013 the chemical testing demonstrates that the concrete could be manufactured to Class XA1.

5.8 Classification of Soils for Off-Site Disposal

Samples were selected from trial pits for environmental testing. The samples were analysed for their compliance with the criteria set out in the 2002 European Council Decision (2003/33/EC) and the results are presented in Appendix 8. The samples analysed proved compliant with inert Waste Acceptance Criteria.

References

1. BS 5930 (2015) Code of Practice for Site Investigation, British Standards Institution (BSI).

2. BS 1377 (1990) Methods of Testing of Soils for Civil Engineering Purposes, BSI.

3. BRE Special Digest SD 1, Concrete in Aggressive Ground, 2005

4. Eurocode 7, Part 2: Ground Investigation & Testing (EN 1997-2:2007)

5. Geological Survey of Ireland, Geology of Kildare – Wicklow, Sheet 16 !:100,000 Series

6. IS EN 13242:2002+A1:2007 – Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction

7. Site Investigation Practice: Assessing BS 5930 (1986), Geological Society Special Publication, No. 2.

8. Standard Recommendation SR21:2014:+A1:2016, NSAI

9. Stroud, M.A & Butler, F.G (1975) 'The SPT and the Engineering properties of Glacial Materials". Proceedings of the Symposium on Engineering Behaviour of Glacial Materials, Birmingham

10. Tomlinson, M.J. Foundation Design & Construction, 7th Ed

Appendix 1

Cable Percussive Borehole Records

GEOTECHNICAL BORING RECORD

REPORT NUMBER 20636

CONTRACT	Kildare Co.Co. Machinery Yard	**BOREHOLE NO.**	**BH1**
		SHEET	Sheet 1 of 1
CO-ORDINATES	686,484.87 E 718,363.44 N	**RIG TYPE**	Dando 2000
		BOREHOLE DIAMETER (mm)	200
GROUND LEVEL (m AOD)	86.25	**BOREHOLE DEPTH (m)**	7.80
		DATE COMMENCED	03/01/2018
		DATE COMPLETED	03/01/2018
CLIENT	Kildare Co.Co.	**SPT HAMMER REF. NO.**	SPT1
ENGINEER	Kilgallen and Partners	**ENERGY RATIO (%)**	51
		BORED BY	J.O'Toole
		PROCESSED BY	I.Reder

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples: Ref. Number	Sample Type	Depth (m)	Recovery	Field Test Results	Standpipe Details
0	TOPSOIL		86.20	0.05						
	MADE GROUND (comprised of firm to stiff brown to greyish brown sandy gravelly clay, subangular to subrounded cobbles, organic pieces)				AA73535	B	1.00-1.00		N = 16 (2, 3, 3, 4, 4, 5)	
1										
					AA73536	B	2.00-2.00		N = 18 (1, 2, 4, 5, 5, 4)	
2										
					AA73537	B	3.00-3.00		N = 14 (2, 3, 3, 4, 3, 4)	
3			82.45	3.80						
	Soft, dark brown, sandy CLAY with organic pieces (possible original topsoil level)		82.25	4.00						
4					AA73538	B	4.00-4.00		N = 6 (0, 1, 2, 1, 1, 2)	
	Firm, grey sandy very gravelly SILT/CLAY		81.45	4.80						
	Stiff to very stiff, dark grey to grey sandy very gravelly silty CLAY with high subangular to subrounded cobbles content				AA73539	B	5.00-5.00		N = 22 (1, 4, 5, 5, 6, 6)	
5										
					AA73540	B	6.00-6.00		N = 25 (2, 4, 5, 6, 7, 7)	
6										
					AA73541	B	7.00-7.00		N = 31 (2, 4, 6, 6, 10, 9)	
7			78.45	7.80						
	End of Borehole at 7.80 m				AA73542	B	7.80-7.80		N = 50/160 mm (3, 9, 12, 15, 23)	
8										
9										

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (h)	Comments
7.5	7.6	0.5	
7.7	7.8	1.5	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
7.50	7.50	7.60	NO	20	Seepage

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type
03-01-18	7.80	1.50	7.80	50mm SP

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

REMARKS CAT scan and inspection pit completed . Tracked dumper required to move rig into position.

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

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GEOTECHNICAL BORING RECORD

REPORT NUMBER 20636

CONTRACT	Kildare Co.Co. Machinery Yard	**BOREHOLE NO.**	**BH2**
		SHEET	Sheet 1 of 1
CO-ORDINATES	686,512.10 E 718,381.98 N	**RIG TYPE**	Dando 2000
		BOREHOLE DIAMETER (mm)	200
GROUND LEVEL (m AOD)	86.00	**BOREHOLE DEPTH (m)**	7.50
		DATE COMMENCED	02/01/2018
		DATE COMPLETED	02/01/2018
CLIENT	Kildare Co.Co.	**SPT HAMMER REF. NO.**	SPT1
ENGINEER	Kilgallen and Partners	**ENERGY RATIO (%)**	51
		BORED BY	J.O'Toole
		PROCESSED BY	I.Reder

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples: Ref. Number	Sample Type	Depth (m)	Recovery	Field Test Results	Standpipe Details
0	TOPSOIL		85.90	0.10						
	MADE GROUND (comprised of firm brown sandy gravelly clay with subangular cobbles, organic pieces)				AA78502	B	1.00-1.00		N = 11 (1, 2, 2, 3, 3, 3)	
1			84.70	1.30						
	MADE GROUND (comprised of firm grey to brownish grey sandy gravelly clay with subangular cobbles, organic pieces)				AA78503	B	2.00-2.00		N = 9 (1, 1, 2, 2, 2, 3)	
2										
					AA78504	B	3.00-3.00		N = 10 (2, 2, 2, 3, 3, 2)	
3			82.20	3.80						
	Soft, dark brown, sandy SILT/CLAY with organic pieces (possible original topsoil level)		82.00	4.00	AA78505	B	4.00-4.00		N = 17 (1, 2, 3, 4, 4, 6)	
4	Firm, dark grey to grey sandy very gravelly silty CLAY with high subangular to subrounded cobbles content									
					AA78506	B	5.00-5.00		N = 19 (2, 4, 6, 4, 5, 4)	
5			80.20	5.80						
	Stiff, brown sandy very gravelly silty CLAY with high subangular to subrounded cobbles content and occasional clayey gravel lenses				AA78507	B	6.00-6.00		N = 22 (3, 4, 4, 5, 6, 7)	
6										
			79.00	7.00						
	Dense, brown, very clayey sandy coarse GRAVEL with high subangular to subrounded cobbles and boulders content. (possible very sandy very gravelly clay)		78.50	7.50	AA78508	B	7.00-7.00		N = 44 (7, 9, 11, 9, 12, 12)	
7					AA78509	B	7.50-7.50		N = 50/90 mm (10, 13, 10, 40)	
	End of Borehole at 7.50 m									
8										
9										

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (h)	Comments
4	4.2	0.5	
6.8	7	0.5	
7.4	7.5	1.5	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
5.80	5.80	NO	4.10	20	Rapid

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS CAT scan and inspection pit completed . Tracked dumper required to move rig into position.

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

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GEOTECHNICAL BORING RECORD

REPORT NUMBER 20636

CONTRACT	Kildare Co.Co. Machinery Yard	**BOREHOLE NO.**	**BH3**
		SHEET	Sheet 1 of 1
CO-ORDINATES	686,520.24 E 718,322.50 N	**RIG TYPE**	Dando 2000
		BOREHOLE DIAMETER (mm)	200
GROUND LEVEL (m AOD)	86.46	**BOREHOLE DEPTH (m)**	7.50
		DATE COMMENCED	04/01/2018
		DATE COMPLETED	05/01/2018
CLIENT	Kildare Co.Co.	**SPT HAMMER REF. NO.**	SPT1
ENGINEER	Kilgallen and Partners	**ENERGY RATIO (%)**	51
		BORED BY	J.O'Toole
		PROCESSED BY	I.Reder

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples: Ref. Number	Sample Type	Depth (m)	Recovery	Field Test Results	Standpipe Details
0	TOPSOIL		86.36	0.10						
	MADE GROUND (comprised of firm brown sandy gravelly clay with subangular cobbles, organic pieces)									
1			85.26	1.20	AA73543	B	1.00-1.00		N = 10 (1, 1, 2, 2, 3, 3)	
	MADE GROUND (comprised of firm grey to brownish grey sandy gravelly clay with subangular cobbles, organic pieces)									
2					AA73544	B	2.00-2.00		N = 14 (2, 2, 3, 3, 4, 4)	
3					AA73545	B	3.00-3.00		N = 19 (2, 2, 4, 6, 4, 5)	
			82.76	3.70						
	Soft, dark brown, sandy SILT/CLAY with organic pieces (possible original topsoil level)		82.46	4.00						
4					AA73546	B	4.00-4.00		N = 11 (0, 1, 3, 2, 3, 3)	
	Stiff, dark grey to grey sandy very gravelly silty CLAY with high subangular to subrounded cobbles content									
5					AA73547	B	5.00-5.00		N = 22 (3, 4, 5, 5, 6, 6)	
6			80.26	6.20	AA73548	B	6.00-6.00		N = 24 (3, 4, 5, 6, 7, 6)	
	Stiff to very stiff, brown/grey mottled sandy very gravelly silty CLAY with high subangular to subrounded cobbles and lowsubangular boulders content									
7					AA73549	B	7.00-7.00		N = 25 (2, 4, 6, 6, 7, 6)	
			78.96	7.50						
	End of Borehole at 7.50 m				AA73550	B	7.50-7.50		N = 50/90 mm (10, 12, 10, 40)	
8										
9										

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (h)	Comments
6.8	7.2	0.5	
7.4	7.5	1	

WATER STRIKE DETAILS

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

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

REMARKS CAT scan and inspection pit completed . Tracked dumper required to move rig into position.

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

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GEOTECHNICAL BORING RECORD

REPORT NUMBER 20636

CONTRACT	Kildare Co.Co. Machinery Yard	**BOREHOLE NO.**	**BH4**
		SHEET	Sheet 1 of 1
CO-ORDINATES	686,548.69 E 718,345.22 N	**RIG TYPE**	Dando 2000
		BOREHOLE DIAMETER (mm)	200
GROUND LEVEL (m AOD)	86.63	**BOREHOLE DEPTH (m)**	8.50
		DATE COMMENCED	05/01/2018
		DATE COMPLETED	08/01/2018
CLIENT	Kildare Co.Co.	**SPT HAMMER REF. NO.**	SPT1
ENGINEER	Kilgallen and Partners	**ENERGY RATIO (%)**	51
		BORED BY	J.O'Toole
		PROCESSED BY	I.Reder

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples: Ref. Number	Sample Type	Depth (m)	Recovery	Field Test Results	Standpipe Details
0	TOPSOIL		86.53	0.10						
	MADE GROUND (comprised of soft brown sandy gravelly clay with subangular cobbles, organic pieces)				AA78510	B	1.00-1.00		N = 9 (0, 1, 2, 1, 3, 3)	
1										
2					AA78511	B	2.00-2.00		N = 9 (1, 1, 2, 3, 2, 2)	
3					AA78512	B	3.00-3.00		N = 6 (0, 1, 1, 2, 1, 2)	
			82.93	3.70						
	Soft, dark brown, sandy CLAY with organic pieces (possible original topsoil level)		82.73	3.90						
4	Firm, grey, sandy SILT/CLAY with occasional gravel		82.13	4.50	AA78513	B	4.00-4.00		N = 11 (1, 2, 2, 2, 3, 4)	
	Firm, dark grey to grey sandy very gravelly silty CLAY with high subangular to subrounded cobbles content				AA78514	B	5.00-5.00		N = 19 (2, 3, 4, 4, 5, 6)	
5			81.03	5.60						
	Medium dense to dense, brown, very clayey sandy coarse GRAVEL with high subangular to subrounded cobbles and boulders content. (possible very sandy very gravelly clay)				AA78515	B	6.00-6.00		N = 28 (4, 6, 7, 7, 7, 7)	
6										
7					AA78516	B	7.00-7.00		N = 40 (3, 7, 9, 9, 10, 12)	
8					AA78517	B	8.00-8.00		N = 36 (4, 7, 9, 8, 10, 9)	
			78.13	8.50						
	End of Borehole at 8.50 m									
9										

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (h)	Comments
7.2	7.3	0.5	
8.2	8.5	1.5	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
5.50	5.50	NO	4.80	20	Moderate

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type
08-01-18	8.50	1.50	8.50	50mm SP

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

REMARKS CAT scan and inspection pit completed . Tracked dumper required to move rig into position.

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

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GEOTECHNICAL BORING RECORD

REPORT NUMBER 20636

CONTRACT	Kildare Co.Co. Machinery Yard	**BOREHOLE NO.**	**BH5**
		SHEET	Sheet 1 of 1
CO-ORDINATES	686,539.51 E 718,298.27 N	**RIG TYPE**	Dando 2000
		BOREHOLE DIAMETER (mm)	200
GROUND LEVEL (m AOD)	86.51	**BOREHOLE DEPTH (m)**	7.00
		DATE COMMENCED	10/01/2018
		DATE COMPLETED	10/01/2018
CLIENT	Kildare Co.Co.	**SPT HAMMER REF. NO.**	SPT1
ENGINEER	Kilgallen and Partners	**ENERGY RATIO (%)**	51
		BORED BY	J.O'Toole
		PROCESSED BY	I.Reder

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples: Ref. Number	Sample Type	Depth (m)	Recovery	Field Test Results	Standpipe Details
0	TOPSOIL		86.41	0.10						
	MADE GROUND (comprised of firm brown sandy gravelly clay with subangular cobbles, organic pieces)									
1					AA78526	B	1.00-1.00		N = 6 (0, 1, 1, 2, 2, 1)	
2					AA78527	B	2.00-2.00		N = 4 (0, 1, 1, 0, 2, 1)	
3					AA78528	B	3.00-3.00		N = 7 (0, 1, 1, 2, 2, 2)	
			82.81	3.70						
4	Soft, dark brown, sandy SILT/CLAY with organic pieces (possible original topsoil level)		82.51	4.00	AA78529	B	4.00-4.00		N = 12 (1, 2, 2, 3, 4, 3)	
	Firm to stiff, dark grey to grey sandy very gravelly silty CLAY with high subangular to subrounded cobbles content									
5					AA78530	B	5.00-5.00		N = 22 (1, 2, 2, 4, 7, 9)	
			81.01	5.50						
6	Dense to very dense, brown, very clayey sandy coarse GRAVEL with high subangular to subrounded cobbles and boulders content. (possible very sandy very gravelly clay)				AA78531	B	6.00-6.00		N = 50/240 mm (3, 7, 11, 11, 10, 18)	
			79.51	7.00						
7	End of Borehole at 7.00 m				AA78532	B	7.00-7.00		N = 50/95 mm (11, 14, 22, 28)	
8										
9										

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (h)	Comments
6.2	6.4	1.25	
6.8	7	1.75	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
5.80	5.80	NO	4.20	20	Rapid

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS CAT scan and inspection pit completed . Tracked dumper required to move rig into position.

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

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GEOTECHNICAL BORING RECORD

REPORT NUMBER 20636

CONTRACT	Kildare Co.Co. Machinery Yard	**BOREHOLE NO.**	**BH6**
		SHEET	Sheet 1 of 1
CO-ORDINATES	686,577.55 E 718,319.99 N	**RIG TYPE**	Dando 2000
		BOREHOLE DIAMETER (mm)	200
GROUND LEVEL (m AOD)	86.34	**BOREHOLE DEPTH (m)**	7.00
		DATE COMMENCED	09/01/2018
		DATE COMPLETED	09/01/2018
CLIENT	Kildare Co.Co.	**SPT HAMMER REF. NO.**	SPT1
ENGINEER	Kilgallen and Partners	**ENERGY RATIO (%)**	51
		BORED BY	J.O'Toole
		PROCESSED BY	I.Reder

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples: Ref. Number	Sample Type	Depth (m)	Recovery	Field Test Results	Standpipe Details
0	TOPSOIL		86.24	0.10						
	MADE GROUND (comprised of firm brown sandy gravelly clay with subangular cobbles, organic pieces)				AA78518	B	1.00-1.00		N = 5 (1, 1, 1, 2, 1, 1)	
1										
2					AA78519	B	2.00-2.00		N = 3 (0, 0, 0, 1, 1, 1)	
			83.54	2.80						
	Soft to firm, dark brown, sandy SILT/CLAY with organic pieces (possible original topsoil level)				AA78520	B	3.00-3.00		N = 10 (0, 0, 1, 2, 3, 4)	
3			82.44	3.90						
	Firm to stiff, brown sandy very gravelly silty CLAY with middle subangular to subrounded cobbles content				AA78521	B	4.00-4.00		N = 15 (2, 2, 3, 4, 4, 4)	
4										
5					AA78522	B	5.00-5.00		N = 20 (1, 2, 3, 5, 6, 6)	
			80.84	5.50						
	Dense to very dense, brown, very silty clayey sandy coarse GRAVEL with high subangular to subrounded cobbles and boulders content. (possible very sandy very gravelly clay)				AA78523	B	6.00-6.00		N = 50/175 mm (4, 7, 9, 11, 30)	
6										
			79.34	7.00						
7	End of Borehole at 7.00 m				AA78524	B	7.00-7.00		N = 50/90 mm (10, 15, 10, 40)	
8										
9										

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (h)	Comments
5.9	6	1.25	
6.8	7	1.5	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
5.20	5.20	NO	4.10	20	Rapid

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type
09-01-18	7.00	1.50	7.00	50mm SP

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

REMARKS CAT scan and inspection pit completed . Tracked dumper required to move rig into position.

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 20636.GPJ IGSL.GDT 18/1/18

Appendix 2

Trial Pit Records & Photographs

TRIAL PIT RECORD

REPORT NUMBER 20636

CONTRACT	Kildare Co.Co. Machinery Yard	**TRIAL PIT NO.**	**TP01**
		SHEET	Sheet 1 of 1
LOGGED BY	I.Reder	**CO-ORDINATES**	686,543.01 E 718,257.72 N
		DATE STARTED	15/12/2017
		DATE COMPLETED	15/12/2017
CLIENT	Kildare Co.Co.	**GROUND LEVEL (m)**	84.09
ENGINEER	Kilgallen and Partners	**EXCAVATION METHOD**	7T Track Machine

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
TOPSOIL		0.10	83.99						
MADE GROUND (comprised of firm to stiff brown sandy gravelly silty CLAY, subangular to subrounded cobbles, tree roots)		0.80	83.29		AA77703	B	0.70-0.70		
Firm to stiff, brownish light greyslightly sandy gravelly SILT/CLAY with middle cobbles and low small organic pieces content. Sand if fine to coarse, gravel is fine to coarse subangular to subrounded, cobbles are subangular to subrounded of various lithology.		1.80	82.29		AA77704	B	1.60-1.60		
Firm to stiff, dark grey, slightly sandy gravelly silty CLAY with high cobbles middle boulders and low small organic pieces content. Sand is fine to coarse, gravel is fine to coarse subrounded to subangular, cobbles and boulders are subangular to subrouneded of various lithology.					AA77705	B	2.60-2.60		
End of Trial Pit at 3.20m		3.20	80.89						

Groundwater Conditions
TP dry

Stability
TP unstable from 1.8m

General Remarks

IGSL TP LOG 20636.GPJ IGSL.GDT 18/12/17

TRIAL PIT RECORD

REPORT NUMBER 20636

CONTRACT	Kildare Co.Co. Machinery Yard	**TRIAL PIT NO.**	**TP02**
		SHEET	Sheet 1 of 1
LOGGED BY	I.Reder	**CO-ORDINATES**	686,566.62 E 718,292.06 N
		DATE STARTED	15/12/2017
		DATE COMPLETED	15/12/2017
CLIENT	Kildare Co.Co.	**GROUND LEVEL (m)**	86.22
ENGINEER	Kilgallen and Partners	**EXCAVATION METHOD**	7T Track 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	86.12						
MADE GROUND (comprised of soft brown sandy gravelly silty clay, subangular to subrounded cobbles, small organic pieces)		0.80	85.42						
MADE GROUND (comprised of soft brownish grey sandy gravelly clay, subangular to subrounded cobbles, occasional subangular boulders, small oganic pieces)		1.50	84.72	1 (Slow)	AA72749	B	0.90-0.90		
MADE GROUND (comprised of very stiff dark grey slightly sandy gravelly silty clay, subangular to subrounded cobbles and boulders					AA72750	B	1.90-1.90		
MADE GROUND (comprised of soft dark grey sandy gravelly silty clay, timber pieces, cobbles, tree roots and branches)		2.40	83.82						
Firm, dark brown, sandy silty CLAY with many organic pieces (possible original topsoil level)		2.80	83.42						
3.0 Medium dense, grey to brownish grey, very silty slightly gravelly fine to coarse SAND with high sandy silt pockets content		3.00	83.22	2 (Moderate)	AA77701	B	2.90-2.90		
End of Trial Pit at 3.90m		3.90	82.32		AA77702	B	3.90-3.90		
4.0									

Groundwater Conditions
Slow water flow at 1.0m, moderate water flow at 3.2m

Stability
TP very unstable from G.L. to 1.5m

General Remarks

TRIAL PIT RECORD

REPORT NUMBER 20636

CONTRACT	Kildare Co.Co. Machinery Yard	**TRIAL PIT NO.**	**TP03**
		SHEET	Sheet 1 of 1
LOGGED BY	I.Reder	**CO-ORDINATES**	686,607.15 E 718,323.20 N
		DATE STARTED	15/12/2017
		DATE COMPLETED	15/12/2017
CLIENT	Kildare Co.Co.	**GROUND LEVEL (m)**	85.71
ENGINEER	Kilgallen and Partners	**EXCAVATION METHOD**	7T Track Machine

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
TOPSOIL		0.05	85.66						
MADE GROUND (comprised of firm to stiff brown sandy gravelly silty clay, subangular to subrounded cobbles, small organic pieces)		0.70	85.01		AA72738	B	0.60-0.60		
MADE GROUND (comprised of soft to firm brown/grey mottled sandy gravelly silty clay, subangular to subrounded cobbles, subangular boulders, small oganic pieces, very occasional plastic rubbish)		1.70	84.01		AA72739	B	1.70-1.70		
MADE GROUND (comprised of firm dark brown sandy clay with organic pieces, grey angular coarse gravel and cobbles - possible edge of trench for drainage pipe)		2.30	83.41	1 (Slow)					
Firm, light greyish brown, sandy gravelly SILT with middle cobbles content. Sand is fine to coarse, gravel is fine to coarse subangular to subrounded, cobbles are subangular to subrounded of various lithology.		3.00	82.71		AA72740	B	2.70-2.70		
Firm, grey, slightly sandy gravelly silty CLAY with middle cobbles and boulders content. Sand is fine to coarse, gravel is fine to coarse subangular to subrounded, cobbles and boulders are subangular to subrounded of various lithology.		3.50	82.21		AA72741	B	3.50-3.50		
TP terminated due to many big boulders End of Trial Pit at 3.50m									

Groundwater Conditions
Slow water flow at 2.4m

Stability
TP stable

General Remarks

TRIAL PIT RECORD

REPORT NUMBER 20636

CONTRACT	Kildare Co.Co. Machinery Yard	**TRIAL PIT NO.**	**TP04**
		SHEET	Sheet 1 of 1
LOGGED BY	I.Reder	**CO-ORDINATES**	686,585.80 E 718,334.36 N
		DATE STARTED	15/12/2017
		DATE COMPLETED	15/12/2017
CLIENT	Kildare Co.Co.	**GROUND LEVEL (m)**	86.47
ENGINEER	Kilgallen and Partners	**EXCAVATION METHOD**	7T Track Machine

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
TOPSOIL		0.05	86.42						
MADE GROUND (comprised of stiff brown sandy gravelly silty clay, subangular to subrounded cobbles, very small organic pieces)				1 (Seepage)	AA72742	B	1.00-1.00		
MADE GROUND (comprised of firm brown/grey mottled sandy gravelly silty clay, subangular to subrounded cobbles, subangular boulders, small oganic pieces)		1.20	85.27		AA72743	B	2.00-2.00		
Firm, dark brown, sandy silty CLAY with many organic pieces (possible original topsoil level)		2.80	83.67						
Firm, grey, very sandy gravelly SILT with middle cobbles and low organic pieces content. Sand is fine to coarse, gravel is fine to coarse subangular to subrounded, cobbles are small subangular to subrounded.		3.00	83.47	2 (Rapid)	AA72744	B	3.00-3.00		
End of Trial Pit at 3.80m		3.80	82.67						

Groundwater Conditions
Seepage flow at 1.2m; Rapid water flow at 3.5m

Stability
TP stable

General Remarks

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TRIAL PIT RECORD

REPORT NUMBER 20636

CONTRACT	Kildare Co.Co. Machinery Yard	**TRIAL PIT NO.**	**TP05**
		SHEET	Sheet 1 of 1
LOGGED BY	I.Reder	**CO-ORDINATES**	686,569.13 E 718,354.64 N
		DATE STARTED	11/12/2017
		DATE COMPLETED	11/12/2017
CLIENT	Kildare Co.Co.	**GROUND LEVEL (m)**	86.50
ENGINEER	Kilgallen and Partners	**EXCAVATION METHOD**	7T Track 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		0.05	86.45						
MADE GROUND (comprised of stiff brown sandy gravelly clay, subangular to subrounded cobbles, occasional very small organic pieces)					AA76740	B	0.80-0.80		
1.0									
MADE GROUND (comprised of soft to firm grey sandy gravelly silty clay, subangular to subrounded cobbles, occasional timber pieces, very occasional plastic rubbish)		1.30	85.20		AA76741	B	1.80-1.80		
2.0									
Medium dense, brownish grey, silty slightly gravelly fine to coarse SAND with middle sandy gravelly clsy/silt lenses and roots - possible fill		2.30	84.20		AA76742	B	2.80-2.80		
3.0									
Stiff, brown/grey mottled sandy gravelly SILT with low cobbles content. Sand is fine to coarse, gravel is fine to coarse subangular to subrounded, cobbles are subangular to subrounded		3.60	82.90						
		3.80	82.70		AA76743	B	3.80-3.80		
4.0 End of Trial Pit at 3.80m									

Groundwater Conditions
TP dry

Stability
TP slightly unstable from 2.5m

General Remarks

TRIAL PIT RECORD

REPORT NUMBER 20636

CONTRACT	Kildare Co.Co. Machinery Yard	**TRIAL PIT NO.**	**TP06**
		SHEET	Sheet 1 of 1
LOGGED BY	I.Reder	**CO-ORDINATES**	686,530.05 E 718,340.19 N
		DATE STARTED	11/12/2017
		DATE COMPLETED	11/12/2017
CLIENT	Kildare Co.Co.	**GROUND LEVEL (m)**	86.51
ENGINEER	Kilgallen and Partners	**EXCAVATION METHOD**	7T Track 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		0.05	86.46						
MADE GROUND (comprised of firm to stiff brown sandy gravelly clay, subangular to subrounded cobbles, small organic pieces, timber pieces)									
1.0					AA76744	B	1.00-1.00		
MADE GROUND (comprised of soft to firm brown/grey mottled sandy gravelly silty clay, subangular to subrounded cobbles and boulders, occasional small organic pieces)		1.30	85.21						
2.0					AA76745	B	2.00-2.00		
3.0					AA76746	B	3.00-3.00		
Firm, dark brown, sandy silty CLAY with many organic pieces (possible original topsoil level)		3.60	82.91						
		3.80	82.71	1 (Moderate)					
Firm, grey, sandy SILT with some small organic pieces. Sand if fine to coarse		4.00	82.51						
4.0 End of Trial Pit at 4.00m					AA76747	B	4.00-4.00		

Groundwater Conditions
Moderate water flow at 3.8m

Stability
TP stable

General Remarks

TRIAL PIT RECORD

REPORT NUMBER 20636

CONTRACT	Kildare Co.Co. Machinery Yard	**TRIAL PIT NO.**	**TP07**
		SHEET	Sheet 1 of 1
LOGGED BY	I.Reder	**CO-ORDINATES**	686,506.18 E 718,317.91 N
		DATE STARTED	12/12/2017
		DATE COMPLETED	12/12/2017
CLIENT	Kildare Co.Co.	**GROUND LEVEL (m)**	86.39
		EXCAVATION METHOD	7T Track Machine
ENGINEER	Kilgallen and Partners		

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
TOPSOIL		0.05	86.34						
MADE GROUND (comprised of stiff brown sandy gravelly clay, subangular to subrounded cobbles, small organic pieces)		0.60	85.79						
MADE GROUND (comprised of soft to firm brown/grey mottled sandy gravelly silty clay, subangular to subrounded cobbles and boulders, some small organic pieces)				1 (Seepage)	AA72729	B	1.00-1.00		
					AA72730	B	2.00-2.00		
MADE GROUND (comprised of dark brown to brown sadny slightly gravelly organic clay, very occasional plastic rubbish)		2.40	83.99	2 (Seepage)					
					AA72731	B	3.00-3.00		
Soft, dark brown, sandy silty CLAY with many organic pieces (possible original topsoil level)		3.40	82.99						
Medium dense, light grey, very silty slightly gravelly fine to coarse SAND with middle sandy silt pockets and samll organic pieces		3.70	82.69	3 (Moderate)					
					AA72732	B	4.00-4.00		
End of Trial Pit at 4.20m		4.20	82.19						

Groundwater Conditions
Seepage flow at 1.2m, 2.4m; Moderate water flow at 3.8m

Stability
TP slightly unstable

General Remarks

TRIAL PIT RECORD

REPORT NUMBER 20636

CONTRACT	Kildare Co.Co. Machinery Yard	**TRIAL PIT NO.**	**TP08**
		SHEET	Sheet 1 of 1
LOGGED BY	I.Reder	**CO-ORDINATES**	686,525.76 E 718,293.47 N
		DATE STARTED	15/12/2017
		DATE COMPLETED	15/12/2017
CLIENT	Kildare Co.Co.	**GROUND LEVEL (m)**	86.18
		EXCAVATION METHOD	7T Track Machine
ENGINEER	Kilgallen and Partners		

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL		0.05	86.13						
MADE GROUND (comprised of firm to stiff brown sandy gravelly clay, subangular to subrounded cobbles, small organic pieces)									
		0.80	85.38		AA72745	B	0.70-0.70		
MADE GROUND (comprised of firm to stiff brownish grey sandy gravelly clay, subangular to subrounded cobbles and boulders, some small organic pieces)									
1.0				1 (Seepage)					
		1.50	84.68						
MADE GROUND (comprised of soft dark grey sandy gravelly silty clay, subangular to subrounded cobbles and boulders, many organic and timber pieces, very occasional plastic rubbish)					AA72746	B	1.70-1.70		
2.0									
					AA72747	B	2.70-2.70		
3.0 Soft to firm, dark brown, sandy CLAY with many organic pieces (possible original topsoil level)		3.00	83.18	2 (Seepage)					
		3.20	82.98						
Dense, grey, very silty sandy fine to coarse subangular to subrounded GRAVEL with high sandy gravelly silt pockets and middle cobbles content. Cobbles are small subangular to subrounded of various lithology.					AA72748	B	3.70-3.70		
4.0 End of Trial Pit at 4.00m		4.00	82.18						

Groundwater Conditions
Seepage flow at 1.5m and 3.0m

Stability
TP slightly unstable

General Remarks

TRIAL PIT RECORD

REPORT NUMBER 20636

CONTRACT	Kildare Co.Co. Machinery Yard	**TRIAL PIT NO.**	**TP09**
		SHEET	Sheet 1 of 1
LOGGED BY	I.Reder	**CO-ORDINATES**	686,482.92 E 718,343.33 N
		DATE STARTED	12/12/2017
		DATE COMPLETED	12/12/2017
CLIENT	Kildare Co.Co.	**GROUND LEVEL (m)**	85.01
ENGINEER	Kilgallen and Partners	**EXCAVATION METHOD**	7T Track Machine

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
TOPSOIL		0.05	84.96						
MADE GROUND (comprised of soft to firm brown sandy gravelly clay, subangular to subrounded cobbles, tree roots)					AA72733	B	0.70-0.70		
MADE GROUND (comprised of soft grey sandy gravelly silty clay, subangular to subrounded cobbles and boulders, some small organic pieces, very occasional plastic rubbish)		1.20	83.81		AA72734	B	1.70-1.70		
Firm, dark brown, sandy silty CLAY with many organic pieces (possible original topsoil level)		2.40	82.61	(Slow)					
Firm, light grey, very sandy gravelly SILT. Sand is fine to coarse, gravel is fine to coarse subangular to subrounded.		2.70	82.31		AA72735	B	2.80-2.80		
Medium dense, light grey, very silty gravelly fine to coarse SAND with middle sandy silt pockets. Gravel is fine to coarse subangular to subrounded of various litholgy.		3.20	81.81						
End of Trial Pit at 3.70m		3.70	81.31		AA73736	B	3.70-3.70		

Groundwater Conditions
Slow water flow at 2.4m

Stability
TP unstable

General Remarks

TRIAL PIT RECORD

REPORT NUMBER 20636

CONTRACT	Kildare Co.Co. Machinery Yard	**TRIAL PIT NO.**	**TP10**
		SHEET	Sheet 1 of 1
LOGGED BY	I.Reder	**CO-ORDINATES**	686,505.85 E 718,360.92 N
		DATE STARTED	12/12/2017
		DATE COMPLETED	12/12/2017
CLIENT	Kildare Co.Co.	**GROUND LEVEL (m)**	86.42
ENGINEER	Kilgallen and Partners	**EXCAVATION METHOD**	7T Track Machine

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
TOPSOIL		0.05	86.37						
MADE GROUND (comprised of firm to stiff brown sandy gravelly clay, subangular to subrounded cobbles)									
		0.70	85.72		AA72724	B	0.60-0.60		
MADE GROUND (comprised of soft brown/grey mottled sandy gravelly silty clay, subangular to subrounded cobbles and boulders, some small organic pieces)									
					AA72725	B	1.60-1.60		
					AA72726	B	2.60-2.60		
		3.50	82.92						
Firm, dark brown, sandy silty CLAY with many organic pieces (possible original topsoil level)		3.70	82.72						
Firm, light grey, very sandy gravelly SILT. Sand is fine to coarse, gravel is fine to coarse subangular to subrounded. (possible very silty gravelly sand)					AA72727	B	3.80-3.80		
		4.20	82.22						
Firm to stiff, dark grey, sandy gravelly silty CLAY with high cobbles. Sand is fine to coarse, gravel is fine to coarse subrounded to subangular, cobbles are subangular to subrounded of various lithology.		4.40	82.02		AA72728	B	4.40-4.40		
End of Trial Pit at 4.40m									

Groundwater Conditions
TP dry

Stability
TP slightly unstable

General Remarks

TRIAL PIT RECORD

REPORT NUMBER 20636

CONTRACT	Kildare Co.Co. Machinery Yard	**TRIAL PIT NO.**	**TP11**
		SHEET	Sheet 1 of 2
LOGGED BY	I.Reder	**CO-ORDINATES**	686,527.40 E 718,365.52 N
		DATE STARTED	12/12/2017
		DATE COMPLETED	12/12/2017
CLIENT	Kildare Co.Co.	**GROUND LEVEL (m)**	86.42
ENGINEER	Kilgallen and Partners	**EXCAVATION METHOD**	7T Track Machine

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
TOPSOIL		0.05	86.37						
MADE GROUND (comprised of stiff brown sandy gravelly clay, subangular to subrounded cobbles, occasional small organic pieces)					AA76748	B	0.80-0.80		
MADE GROUND (comprised of firm to stiff grey sandy gravelly silty clay, subangular to subrounded cobbles and boulders, some small organic pieces and tree roots, very occasional builders rubbish - concrete pipe piece)		1.30	85.12		AA76749	B	1.80-1.80		
					AA76750	B	2.80-2.80		
Firm, dark brown, sandy CLAY with many organic pieces (possible original topsoil level)		3.50	82.92						
Firm to stiff, light grey, sandy gravelly SILT with low cobbles content. Sand is fine to coarse, gravel is fine to coarse subangular to subrounded, cobbles are subangular to subrounded of various lithology.		3.70	82.72	1 (Slow)	AA72721	B	3.80-3.80		
Soft to firm, light grey - dark grey mottled, very sandy gravelly SILT/CLAY with low cobbles content. Sand is fine to coarse, gravel is fine to coarse subangular to subrounded, cobbles are subangular to subrounded of various lithology.		4.40	82.02	2	AA72722	B	4.80-4.80		

Groundwater Conditions
Slow water flow at 3.9m; seepage flow at 5.0m

Stability
TP stable

General Remarks
1m deep platform for digger has been dug to get final depth.

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TRIAL PIT RECORD

REPORT NUMBER 20636

CONTRACT	Kildare Co.Co. Machinery Yard	**TRIAL PIT NO.**	**TP11**
		SHEET	Sheet 2 of 2
LOGGED BY	I.Reder	**CO-ORDINATES**	686,527.40 E 718,365.52 N
		DATE STARTED	12/12/2017
		DATE COMPLETED	12/12/2017
CLIENT	Kildare Co.Co.	**GROUND LEVEL (m)**	86.42
ENGINEER	Kilgallen and Partners	**EXCAVATION METHOD**	7T Track Machine

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples			Vane Test (KPa)	Hand Penetrometer (KPa)
					Sample Ref	Type	Depth		
End of Trial Pit at 5.40m		5.40	81.02	(Seepage)	AA72723	B	5.40-5.40		

Groundwater Conditions
Slow water flow at 3.9m; seepage flow at 5.0m

Stability
TP stable

General Remarks
1m deep platform for digger has been dug to get final depth.

TRIAL PIT RECORD

REPORT NUMBER 20636

CONTRACT	Kildare Co.Co. Machinery Yard	**TRIAL PIT NO.**	**TP12**
		SHEET	Sheet 1 of 1
LOGGED BY	I.Reder	**CO-ORDINATES**	686,504.83 E 718,397.32 N
		DATE STARTED	11/12/2017
		DATE COMPLETED	11/12/2017
CLIENT	Kildare Co.Co.	**GROUND LEVEL (m)**	85.60
ENGINEER	Kilgallen and Partners	**EXCAVATION METHOD**	7T Track 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		0.05	85.55						
MADE GROUND (comprised of firm to stiff brown sandy gravelly clay, subangular to subrounded cobbles, occasional small organic and timber pieces, very occasional plastic rubbish)		0.90	84.70						
1.0 MADE GROUND (comprised of soft to firm brownish grey to brown sandy gravelly clay, subangular to subrounded cobbles and boulders, some small organic pieces)					AA76723	B	1.00-1.00		
2.0					AA76734	B	2.00-2.00		
		2.90	82.70						
3.0 Firm, dark brown, sandy CLAY with many organic pieces (possible original topsoil level)		3.10	82.50		AA76725	B	3.00-3.00		
Firm to stiff, brownish grey to grey, sandy gravelly SILT/CLAY with middle cobbles content. Sand is fine to coarse, gravel is fine to coarse subangular to subrounded, cobbles are subangular to subrounded of various lithology.									
		3.90	81.70		AA76726	B	3.80-3.80		
4.0 End of Trial Pit at 3.90m									

Groundwater Conditions
TP dry

Stability
TP stable

General Remarks

TRIAL PIT RECORD

REPORT NUMBER 20636

CONTRACT	Kildare Co.Co. Machinery Yard	**TRIAL PIT NO.**	**TP13**
		SHEET	Sheet 1 of 1
LOGGED BY	DE	**CO-ORDINATES**	686,489.14 E 718,383.56 N
		DATE STARTED	12/12/2017
		DATE COMPLETED	12/12/2017
CLIENT	Kildare Co.Co.	**GROUND LEVEL (m)**	86.01
		EXCAVATION METHOD	7T Track Machine
ENGINEER	Kilgallen and Partners		

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 MADE GROUND (comprised of firm brown silty (medium-coarse) sandy very gravelly (fine-medium, subangular-angular) clay with occasional rootlets and twigs)					AA76143	B	0.70-0.80		
1.0 MADE GROUND (comprised of soft-firm brown/grey slightly organic sandy (medium-coarse) gravelly (fine-coarse, subangular-angular) very silty clay with medium cobble and low boulder content and occasional plastic, wood and rootlets)		1.00	85.01		AA71145	B	1.20-1.30		
2.0									
3.0					AA76145	B	2.80-2.90		
Soft, dark brown/grey, gravelly (fine-medium, subangular) clayey very sandy (fine) SILT		3.20	82.81		AA76146	B	3.20-3.30		
Soft, grey, sandy (medium-coarse) silty very gravelly (medium, subangular) CLAY		3.60	82.41	(Moderate)					
4.0 End of Trial Pit at 3.90m		4.00	82.01		AA71146	B	3.90-4.00		

Groundwater Conditions
Moderate water flow at 3.7m

Stability
TP stable

General Remarks

TRIAL PIT RECORD

REPORT NUMBER 20636

CONTRACT	Kildare Co.Co. Machinery Yard	**TRIAL PIT NO.**	**TP14**
		SHEET	Sheet 1 of 1
LOGGED BY	DE	**CO-ORDINATES**	686,469.63 E 718,371.71 N
		DATE STARTED	12/12/2017
		DATE COMPLETED	12/12/2017
CLIENT	Kildare Co.Co.	**GROUND LEVEL (m)**	85.25
ENGINEER	Kilgallen and Partners	**EXCAVATION METHOD**	7T Track Machine

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 MADE GROUND (comprised of firm brown silty (medium-coarse) sandy very gravelly (fine-medium, subangular-angular) clay with occasional rootlets and twigs)									
1.0					AA76147	B	1.00-1.10		
MADE GROUND (comprised of soft-firm brown/grey slightly organic sandy (medium-coarse) gravelly (fine-coarse, subangular-angular) very silty clay with medium cobble and low boulder content and occasional rebar, plastic, logs, wood and rootlets)		1.70	83.55						
2.0					AA71147	B	2.00-2.10		
3.0 Medium dense, light grey, clayey gravelly (fine-coarse, subrounded-angular) very silty SAND (fine-medium)		3.00	82.25		AA71148	B	3.10-3.20		
Firm, grey, sandy (medium) gravelly (fine-medium, subrounded-subangular) very silty CLAY with medium cobble and low boulder content and occasional rootlets and twigs		3.60	81.65		AA71149	B	3.70-3.80		
4.0 End of Trial Pit at 3.90m		3.90	81.35						

Groundwater Conditions
TP dry

Stability
TP stable

General Remarks

TRIAL PIT RECORD

REPORT NUMBER 20636

CONTRACT	Kildare Co.Co. Machinery Yard	**TRIAL PIT NO.**	**TP15**
		SHEET	Sheet 1 of 1
LOGGED BY	I.Reder	**CO-ORDINATES**	686,453.61 E 718,392.59 N
		DATE STARTED	15/12/2017
		DATE COMPLETED	15/12/2017
CLIENT	Kildare Co.Co.	**GROUND LEVEL (m)**	83.83
ENGINEER	Kilgallen and Partners	**EXCAVATION METHOD**	7T Track 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	83.73						
MADE GROUND (comprised of firm brown sandy gravelly clay, subangular to subrounded cobbles, tree roots)		0.50	83.33						
Soft to firm, dark brown, sandy CLAY with many organic pieces (possible original topsoil level)		0.75	83.08						
Firm, brown/grey mottled sandy gravelly silty CLAY with high cobbles content. Sand is fine to coarse, gravel is fine to coarse subangular to subrounded, cobbles are subrounded to subangular of various lithology.					AA77709	B	0.80-0.80		
1.0									
2.0					AA77710	B	1.80-1.80		
Firm to stiff, dark grey, slightly sandy gravelly SILT/CLAY with high cobbles low small organic pieces content. Sand is fine to coarse, gravel is fine to coarse subrounded to subangular, cobbles are subangular to subrounded of various lithology.		2.40	81.43						
3.0					AA77711	B	2.80-2.80		
Soft, grey, sandy gravelly silty CLAY. Sand is fine to coarse, gravel is fine to coarse subangular to subrounded.		3.80	80.03						
4.0		4.00	79.83		AA77712	B	3.90-3.90		
End of Trial Pit at 4.00m									

Groundwater Conditions
Slightly seepage flow at 1.0m

Stability
TP slightly unstable from 3.0m

General Remarks

TRIAL PIT RECORD

REPORT NUMBER 20636

CONTRACT	Kildare Co.Co. Machinery Yard	**TRIAL PIT NO.**	**TP16**
		SHEET	Sheet 1 of 1
LOGGED BY	DE	**CO-ORDINATES**	686,489.81 E 718,417.69 N
		DATE STARTED	12/12/2017
		DATE COMPLETED	12/12/2017
CLIENT	Kildare Co.Co.	**GROUND LEVEL (m)**	84.05
ENGINEER	Kilgallen and Partners	**EXCAVATION METHOD**	7T Track Machine

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 MADE GROUND (comprised of firm brown silty (medium-coarse) sandy very gravelly (fine-medium, subangular-angular) clay with occasional rootlets and twigs)					AA76141	B	0.50-0.60		
MADE GROUND (comprised of soft-firm brown/grey slightly organic sandy (medium-coarse) gravelly (fine-coarse, subangular-angular) very silty clay with medium cobble and low boulder content and occasional rebar, plastic, logs, wood and rootlets.		0.80	83.25		AA71141	B	1.20-1.30		
2.0 Stiff, grey, sandy (medium) gravelly (fine-medium, subrounded-subangular) very silty CLAY with medium cobble and low boulder content		2.10	81.95		AA76142	B	2.20-2.30		
Soft, grey, sandy (medium) gravelly (fine-medium, subrounded-subangular) very silty CLAY with medium cobble and low boulder content		2.35	81.70						
3.0					AA71142	B	3.20-3.30		
Soft to firm, brown, sandy (medium) silty very gravelly (medium, subrounded-subangular) CLAY with medium cobble and low boulder content		3.60	80.45	1 (Moderate)					
		3.90	80.15		AA71143	B	3.80-3.90		
4.0 End of Trial Pit at 4.00m									

Groundwater Conditions
Moderate water flow at 3.8m

Stability
TP stable

General Remarks

IGSL TP LOG 20636.GPJ IGSL.GDT 18/12/17

TRIAL PIT RECORD

REPORT NUMBER 20636

CONTRACT	Kildare Co.Co. Machinery Yard	**TRIAL PIT NO.**	**TP17**
		SHEET	Sheet 1 of 1
LOGGED BY	I.Reder	**CO-ORDINATES**	686,516.57 E 718,449.80 N
		DATE STARTED	15/12/2017
		DATE COMPLETED	15/12/2017
CLIENT	Kildare Co.Co.	**GROUND LEVEL (m)**	84.68
ENGINEER	Kilgallen and Partners	**EXCAVATION METHOD**	7T Track Machine

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
TOPSOIL		0.05	84.63						
MADE GROUND (comprised of firm brown sandy gravelly clay, subangular to subrounded cobbles, occasional small organic pieces)					AA77706	B	0.50-0.50		
		0.70	83.98						
MADE GROUND (comprised of soft to firm brown/grey mottled sandy gravelly clay, subangular to subrounded cobbles and boulders, some small organic pieces)					AA77707	B	1.20-1.20		
		1.40	83.28	1 (Very Rapid)					
MADE GROUND (comprised of slighty clayey slightly sabdy coarse gravel with high subrounded to rounded cobbles and boulders content - possible soakage area)					AA77708	B	1.50-1.50		
		1.70	82.98						
TP terminated due to major instability in gravels and very rapid water flow End of Trial Pit at 1.70m									

Groundwater Conditions
Rapid water flow at 1.4m

Stability
TP unstable from 1.4m

General Remarks
TP terminated due to major instability in gravels and very rapid water flow - possible soakage area

TRIAL PIT RECORD

REPORT NUMBER 20636

CONTRACT	Kildare Co.Co. Machinery Yard	**TRIAL PIT NO.**	**TP18**
		SHEET	Sheet 1 of 1
LOGGED BY	I.Reder	**CO-ORDINATES**	686,531.75 E 718,423.65 N
		DATE STARTED	11/12/2017
		DATE COMPLETED	11/12/2017
CLIENT	Kildare Co.Co.	**GROUND LEVEL (m)**	85.03
ENGINEER	Kilgallen and Partners	**EXCAVATION METHOD**	7T Track 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		0.05	84.98						
MADE GROUND (comprised of firm to stiff brown sandy gravelly clay, subangular to subrounded cobbles, occasional small organic and big timber pieces)					AA76732	B	0.80-0.80		
1.0 MADE GROUND (comprised of soft to firm brownnish grey sandy gravelly clay, subangular to subrounded cobbles and boulders, some small organic pieces, timber pieces)		1.10	83.93	1 (Seepage)	AA76733	B	1.80-1.80		
2.0 Stiff to very stiff, brown/grey mottled sandy gravelly SILT with high cobbles and middle boulders content. Sand is fine to coarse, gravel is fine to coarse subangular to subrounded, cobbles and boulders are subangular to subrounded of various lithology.		2.00	83.03		AA76734	B	2.40-2.40		
Soft to firm, grey, slightly sandy gravelly silty CLAY with high cobbles and middle boulders content. Sand is fine to coarse, gravel is fine to coarse subangular to subrounded, cobbles and boulders are subangular to subrounded of various lithology.		2.60	82.43						
3.0					AA76735	B	3.40-3.40		
End of Trial Pit at 3.80m		3.80	81.23						
4.0									

Groundwater Conditions
Seepage flow at 1.4m

Stability
TP stable

General Remarks

TRIAL PIT RECORD

REPORT NUMBER 20636

CONTRACT	Kildare Co.Co. Machinery Yard	**TRIAL PIT NO.**	**TP19**
		SHEET	Sheet 1 of 1
LOGGED BY	I.Reder	**CO-ORDINATES**	686,516.77 E 718,411.33 N
		DATE STARTED	11/12/2017
		DATE COMPLETED	11/12/2017
CLIENT	Kildare Co.Co.	**GROUND LEVEL (m)**	85.34
ENGINEER	Kilgallen and Partners	**EXCAVATION METHOD**	7T Track Machine

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
TOPSOIL		0.05	85.29						
MADE GROUND (comprised of firm to stiff brown sandy gravelly clay, subangular to subrounded cobbles, occasional small organic pieces)		0.60	84.74						
MADE GROUND (comprised of soft to firm brownish grey sandy gravelly clay, subangular to subrounded cobbles and boulders, some small organic pieces, very occasional plastic rubbish)					AA76727	B	0.70-0.70		
					AA76728	B	1.70-1.70		
Stiff to very stiff, greyish brown very sandy gravelly SILT with middle cobbles content. Sand is fine to coarse, gravel is fine to coarse subangular to subrounded, cobbles are subangular to subrounded of various lithology.		2.50	82.84						
					AA76730	B	2.70-2.70		
Firm to stiff, dark grey, slightly sandy very gravelly silty CLAY with high cobbles and middle boulders content. Sand is fine to coarse, gravel is fine to coarse subangular to subrounded, cobbles and boulders are subangular to subrounded of various lithology.		3.00	82.34						
					AA76731	B	3.70-3.70		
End of Trial Pit at 3.90m		3.90	81.44						

Groundwater Conditions
TP dry

Stability
TP stable

General Remarks

TRIAL PIT RECORD

REPORT NUMBER 20636

CONTRACT	Kildare Co.Co. Machinery Yard	**TRIAL PIT NO.**	**TP20**
		SHEET	Sheet 1 of 1
LOGGED BY	I.Reder	**CO-ORDINATES**	686,545.02 E 718,385.82 N
		DATE STARTED	11/12/2017
		DATE COMPLETED	11/12/2017
CLIENT	Kildare Co.Co.	**GROUND LEVEL (m)**	86.02
ENGINEER	Kilgallen and Partners	**EXCAVATION METHOD**	7T Track 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		0.05	85.97						
MADE GROUND (comprised of firm to stiff brown sandy gravelly clay, subangular to subrounded cobbles, small organic pieces)									
1.0					AA76736	B	1.00-1.00		
MADE GROUND (comprised of soft to firm brownish grey sandy gravelly clay, subangular to subrounded cobbles and boulders, some small organic pieces)		1.30	84.72						
2.0					AA76737	B	2.00-2.00		
Stiff to very stiff, brownish grey sandy gravelly SILT with high cobbles and low boulders content. Sand is fine to coarse, gravel is fine to coarse subangular to subrounded, cobbles and boulders are subangular to subrounded of various lithology.		2.90	83.12						
3.0					AA76738	B	3.00-3.00		
Very stiff, grey, slightly sandy very gravelly silty CLAY with high cobbles and low boulders content. Sand is fine to coarse, gravel is fine to coarse subangular to subrounded, cobbles and boulders are subangular to subrounded of various lithology.		3.60	82.42						
		3.80	82.22		AA76739	B	3.80-3.80		
4.0 End of Trial Pit at 3.80m									

Groundwater Conditions
TP dry

Stability
TP stable

General Remarks

Project Number: 20636
Site: Naas Co. Co. Machinery Yard
Project Engineer: Kilgallen & Partners

TRIAL PIT PHOTOGRAPHY RECORD

TP 01

TP 01 – spoil

Project Number: 20636
Site: Naas Co. Co. Machinery Yard
Project Engineer: Kilgallen & Partners

TRIAL PIT PHOTOGRAPHY RECORD

TP 02

TP 02 – spoil

Project Number: 20636
Site: Naas Co. Co. Machinery Yard
Project Engineer: Kilgallen & Partners

TRIAL PIT PHOTOGRAPHY RECORD

TP 03

TP 03 – spoil

Project Number: 20636
Site: Naas Co. Co. Machinery Yard
Project Engineer: Kilgallen & Partners

TRIAL PIT PHOTOGRAPHY RECORD

TP 04

TP 04 – spoil

Project Number: 20636
Site: Naas Co. Co. Machinery Yard
Project Engineer: Kilgallen & Partners

TRIAL PIT PHOTOGRAPHY RECORD

TP 05

TP 05 – spoil

Project Number: 20636
Site: Naas Co. Co. Machinery Yard
Project Engineer: Kilgallen & Partners

TRIAL PIT PHOTOGRAPHY RECORD

TP 06

TP 06 – spoil

Project Number: 20636
Site: Naas Co. Co. Machinery Yard
Project Engineer: Kilgallen & Partners

TRIAL PIT PHOTOGRAPHY RECORD

TP 07

TP 07 – spoil

Project Number: 20636
Site: Naas Co. Co. Machinery Yard
Project Engineer: Kilgallen & Partners

TRIAL PIT PHOTOGRAPHY RECORD

TP 08

TP 08 – spoil

Project Number: 20636
Site: Naas Co. Co. Machinery Yard
Project Engineer: Kilgallen & Partners

TRIAL PIT PHOTOGRAPHY RECORD

TP 09

TP 09 – spoil

Project Number: 20636
Site: Naas Co. Co. Machinery Yard
Project Engineer: Kilgallen & Partners

TRIAL PIT PHOTOGRAPHY RECORD

TP 10

TP 10 – spoil

Project Number: 20636
Site: Naas Co. Co. Machinery Yard
Project Engineer: Kilgallen & Partners

TRIAL PIT PHOTOGRAPHY RECORD

TP 11

TP 11 – spoil

Project Number: 20636
Site: Naas Co. Co. Machinery Yard
Project Engineer: Kilgallen & Partners

TRIAL PIT PHOTOGRAPHY RECORD

TP 12

TP 12 – spoil

Project Number: 20636
Site: Naas Co. Co. Machinery Yard
Project Engineer: Kilgallen & Partners

TRIAL PIT PHOTOGRAPHY RECORD

TP 13

TP 13 – spoil

Project Number: 20636
Site: Naas Co. Co. Machinery Yard
Project Engineer: Kilgallen & Partners

TRIAL PIT PHOTOGRAPHY RECORD

TP 14

TP 14 – spoil

Project Number: 20636
Site: Naas Co. Co. Machinery Yard
Project Engineer: Kilgallen & Partners

TRIAL PIT PHOTOGRAPHY RECORD

TP 15

TP 15 – spoil

Project Number: 20636
Site: Naas Co. Co. Machinery Yard
Project Engineer: Kilgallen & Partners

TRIAL PIT PHOTOGRAPHY RECORD

TP 16

TP 16 – spoil

Project Number: 20636
Site: Naas Co. Co. Machinery Yard
Project Engineer: Kilgallen & Partners

TRIAL PIT PHOTOGRAPHY RECORD

TP 17

TP 17 – spoil

Project Number: 20636
Site: Naas Co. Co. Machinery Yard
Project Engineer: Kilgallen & Partners

TRIAL PIT PHOTOGRAPHY RECORD

TP 18

TP 18 – spoil

Project Number: 20636
Site: Naas Co. Co. Machinery Yard
Project Engineer: Kilgallen & Partners

TRIAL PIT PHOTOGRAPHY RECORD

TP 19

TP 19 – spoil

Project Number: 20636
Site: Naas Co. Co. Machinery Yard
Project Engineer: Kilgallen & Partners

TRIAL PIT PHOTOGRAPHY RECORD

TP 20

TP 20 – spoil

Appendix 3

Slit Trench Records

Report No. 20636	SLIT TRENCH RECORD	FACING DIRECTION: N / W / E / S	IGSL

		Survey				
Project: Naas, Co. Co. Machinery Yard		Easting (m)	Northing (m)	Elevation (mOD)	Slit Trench No.	ST2
Engineer: Kilgallen & Partners					Sheet	1 of 1
Crew: IGSL	Start of Trench				Date Commenced	05/01/2018
	End of Trench				Date Completed	05/01/2018

Ground Conditions

From (m)	To (m)	Soil Description
0.00	0.10	TOPSOIL
0.1	0.7	MADE GROUND (comprised of brown sandy gravelly clay, cobbles, tree roots, boulders)
0.7	0.8	Soft, dark brown, sandy CLAY with organic pieces (possible original topsoil level)
0.8	1.4	Firm, brown/grey mottled, sandy gravelly SILT/CLAY with some subangular to subrounded cobbles

Photograph

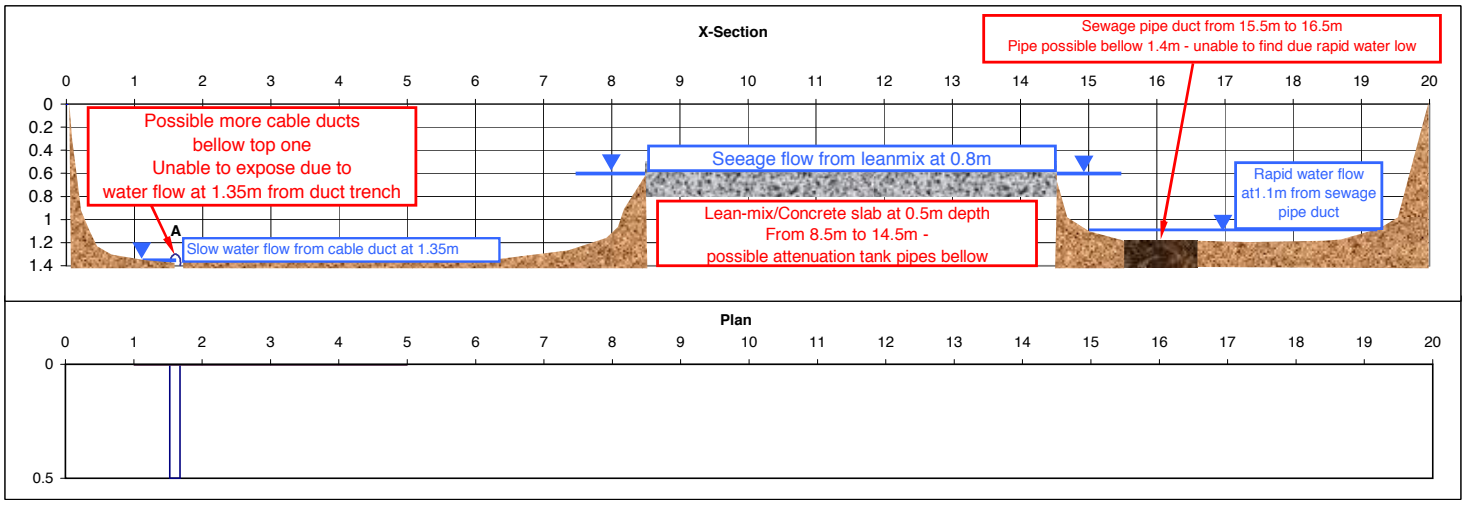
Trench Dimensions	
LHS of Trench (m)	0.0
RHS of Trench (m)	20.0
Trench Depth (m)	1.4
Trench Width (m)	0.5
Facing Direction	North West
Facing Features	Green Field
Groundwater	Rapid water flow at 1.1m (from sewage pipe duct)

Location

SAMPLES

Excavation Quantities		
Surface	**Length (m)**	**Material**
Road		
Path (LHS)		
Path (RHS)		
Grass Verge (LHS)		
Grass Verge (RHS)		
Green Field	20.0	
Total Length	20.0	

Zero Metres Taken As: Edge of the field



	Diameter (mm)	Material	Description	Distance (m)	Depth to crown (m)	Angle (deg.)
Service A	150	PVC	ESB Cable duct	1.6	1.3	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. 20636	SLIT TRENCH RECORD	FACING DIRECTION: N / W / E / S	IGSL

		Survey				
Project: Naas, Co. Co. Machinery Yard		Easting (m)	Northing (m)	Elevation (mOD)	Slit Trench No.	ST3
Engineer: Kilgallen & Partners					Sheet	1 of 1
Crew: IGSL	Start of Trench				Date Commenced	04/01/2018
	End of Trench				Date Completed	04/01/2018

Ground Conditions

From (m)	To (m)	Soil Description
0.00	0.10	TOPSOIL
0.1	1.3	MADE GROUND (comprised of brown sandy gravelly clay, cobbles, tree roots, timber pieces)

Photograph

Trench Dimensions	
LHS of Trench (m)	0.0
RHS of Trench (m)	3.5
Trench Depth (m)	1.4
Trench Width (m)	0.5
Facing Direction	North East
Facing Features	Green Field
Groundwater	Slow water flow at 1.3m (from ESB cable duct)

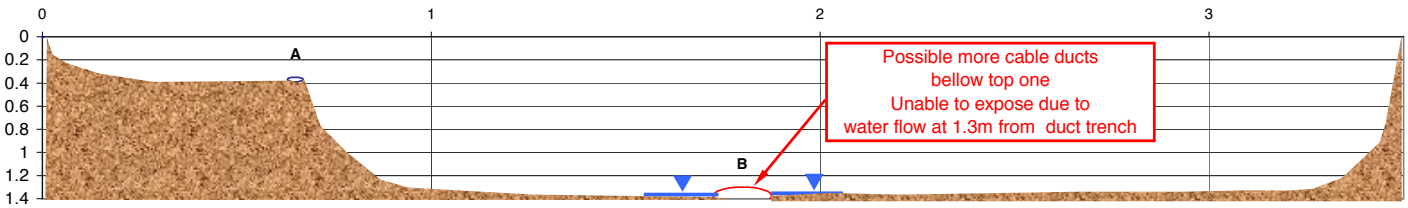
Location

SAMPLES

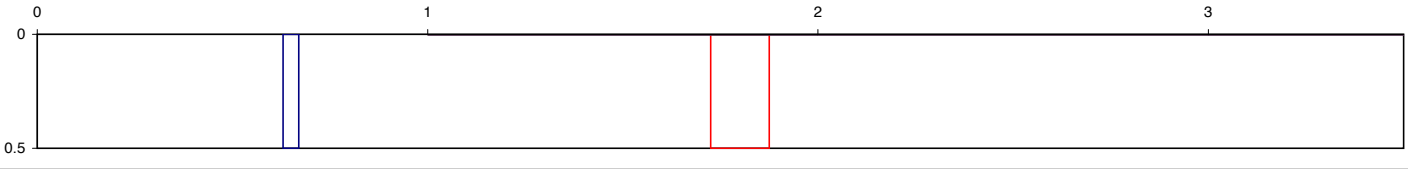
Excavation Quantities		
Surface	**Length (m)**	**Material**
Road		
Path (LHS)		
Path (RHS)		
Grass Verge (LHS)		
Grass Verge (RHS)		
Green Field	3.5	
Total Length	3.5	

Zero Metres Taken As: 2.0m outside trees

X-Section



Plan



	Diameter (mm)	Material	Description	Distance (m)	Depth to crown (m)	Angle (deg.)
Service A	40	PVC	Possible old water pipe?	0.65	0.35	90
Service B	150	PVC	ESB Cable duct	1.8	1.3	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. 20636	SLIT TRENCH RECORD	FACING DIRECTION: N / W / E / S	IGSL

		Survey				
Project: Naas, Co. Co. Machinery Yard		Easting (m)	Northing (m)	Elevation (mOD)	Slit Trench No.	ST4
Engineer: Kilgallen & Partners					Sheet	1 of 1
Crew: IGSL	Start of Trench				Date Commenced	04/01/2018
	End of Trench				Date Completed	04/01/2018

Ground Conditions

From (m)	To (m)	Soil Description
0.00	0.05	TOPSOIL
0.05	0.6	MADE GROUND (comprised of brown sandy gravelly clay, cobbles, tree roots)
0.6	0.7	Soft, dark brown, sandy CLAY with many organic pieces (possible original topsoil level)
0.7	1.3	Firm to stiff, grey to brownish grey sandy very gravelly silty CLAY with middle small cobbles content

Photograph

Trench Dimensions	
LHS of Trench (m)	0.0
RHS of Trench (m)	3.2
Trench Depth (m)	1.3
Trench Width (m)	0.5
Facing Direction	North East
Facing Features	Green Field
Groundwater	Slow water flow at 1.2m (from ESB cable duct)

Location

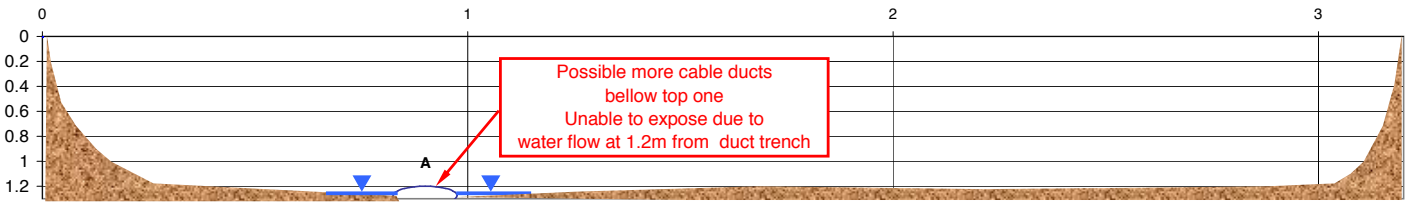
SAMPLES

Excavation Quantities

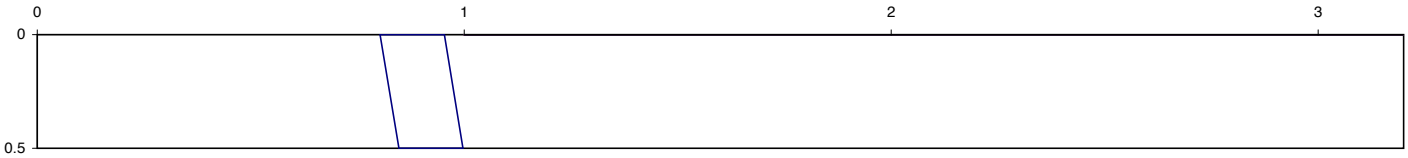
Surface	Length (m)	Material
Road		
Path (LHS)		
Path (RHS)		
Grass Verge (LHS)		
Grass Verge (RHS)		
Green Field	3.2	
Total Length	3.2	

Zero Metres Taken As: 1.0m outside trees

X-Section



Plan



	Diameter (mm)	Material	Description	Distance (m)	Depth to crown (m)	Angle (deg.)
Service A	150	PVC	ESB Cable duct	0.9	1.2	95
Service B						
Service C						
Service D						
Service E						
Service F						
Service G						
Service H						
Service I						
Service J						
Service K						
Service L						
Service M						

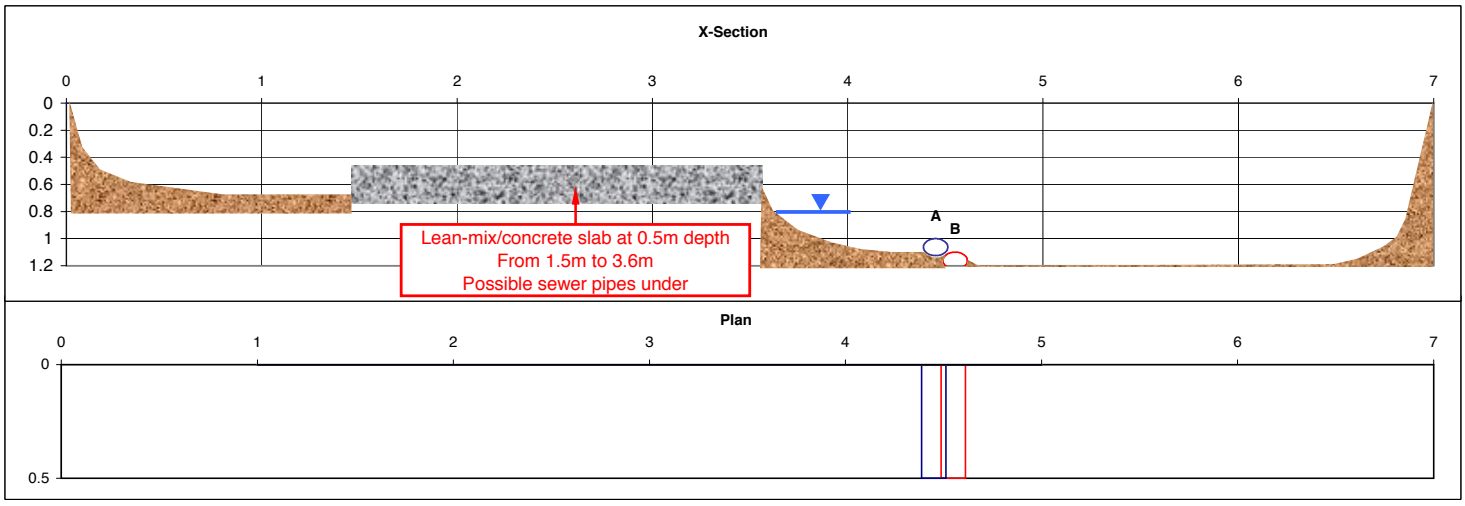
Report No. 20636	SLIT TRENCH RECORD	FACING DIRECTION: N / W / E / S	IGSL

		Survey				
Project: Naas, Co. Co. Machinery Yard		Easting (m)	Northing (m)	Elevation (mOD)	Slit Trench No.	ST5
Engineer: Kilgallen & Partners					Sheet	1 of 1
Crew: IGSL	Start of Trench				Date Commenced	04/01/2018
	End of Trench				Date Completed	04/01/2018

Ground Conditions

From (m)	To (m)	Soil Description	Photograph
0.00	0.05	TOPSOIL	
0.05	1.0	MADE GROUND (comprised of stiff brown/grey mottled sandy gravelly clay, cobbles, timber pieces)	
1.0	1.2	Firm, brown/grey mottled sandy slightly gravelly SILT/CLAY with middle cobbles content)possible original ground)	

Trench Dimensions		Location	Excavation Quantities		
LHS of Trench (m)	0.0		Surface	Length (m)	Material
RHS of Trench (m)	7.0		Road		
Trench Depth (m)	1.2		Path (LHS)		
Trench Width (m)	0.5		Path (RHS)		
			Grass Verge (LHS)		
			Grass Verge (RHS)		
Facing Direction	South East	SAMPLES	Green Field	7.5	
Facing Features	Green Field		Total Length	7.5	
Groundwater	Slow water flow at 0.8m		Zero Metres Taken As: boundry timber fence		



	Diameter (mm)	Material	Description	Distance (m)	Depth to crown (m)	Angle (deg.)
Service A	125	PVC	Possible Cable duct (no signal)	4.45	1	90
Service B	125	PVC	Possible Cable duct (no signal)	4.55	1.1	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. 20636	SLIT TRENCH RECORD	FACING DIRECTION: N / W / E / S	IGSL

		Survey				
Project: Naas, Co. Co. Machinery Yard		Easting (m)	Northing (m)	Elevation (mOD)	Slit Trench No.	ST6
Engineer: Kilgallen & Partners					Sheet	1 of 1
Crew: IGSL	Start of Trench				Date Commenced	04/01/2018
	End of Trench				Date Completed	04/01/2018

Ground Conditions

From (m)	To (m)	Soil Description
0.00	0.05	TOPSOIL
0.05	1.0	MADE GROUND (comprised of stiff brown to greyish brown sandy gravelly clay, cobbles, organic pieces)
1.0	1.7	Firm, brown/grey mottled sandy slightly gravelly SILT/CLAY with middle cobbles content

Photograph

Trench Dimensions	
LHS of Trench (m)	0.0
RHS of Trench (m)	9.0
Trench Depth (m)	1.7
Trench Width (m)	0.5
Facing Direction	South East
Facing Features	Green Field
Groundwater	Moderate water flow at 0.6m

Location

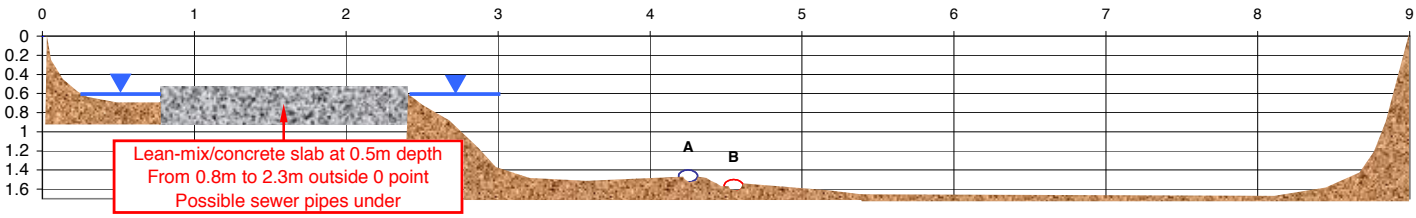
SAMPLES

Excavation Quantities

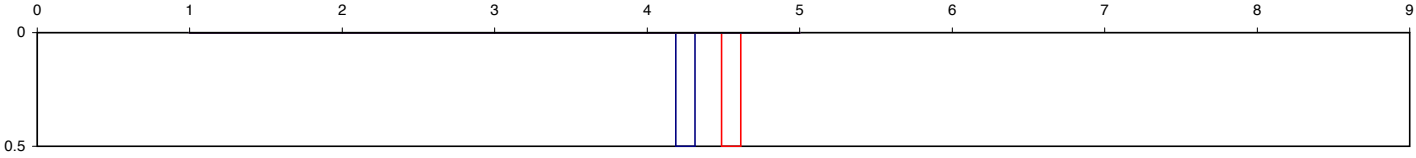
Surface	Length (m)	Material
Road		
Path (LHS)		
Path (RHS)		
Grass Verge (LHS)		
Grass Verge (RHS)		
Green Field	9.0	
Total Length	9.0	

Zero Metres Taken As: boundry timber fence

X-Section



Plan



	Diameter (mm)	Material	Description	Distance (m)	Depth to crown (m)	Angle (deg.)
Service A	125	PVC	Possible Cable duct (no signal)	4.25	1.4	90
Service B	125	PVC	Possible Cable duct (no signal)	4.55	1.5	90
Service C						
Service D						
Service E						
Service F						
Service G						
Service H						
Service I						
Service J						
Service K						
Service L						
Service M						

Appendix 4

Soakaway Test Records

Soakaway Design f -value from field tests IGSL

Contract: Kildare Co.Co. Machinery Yard Contract No. 20636
Test No. SA1
Engineer Kilgallen & Partners
Date: 19/12/2017

Summary of ground conditions

from	to	Description	Ground water
0.00	0.05	TOPSOIL	
0.05	1.10	MADE GROUND (comprised of soft brown sandy gravelly clay, cobbles,	
		occasional organic pieces	DRY
1.10	1.70	MADE GROUND (comprised of soft grey sandy gravelly clay, cobbles,	
		boulders, occasional organic pieces)	

Notes:

Field Data

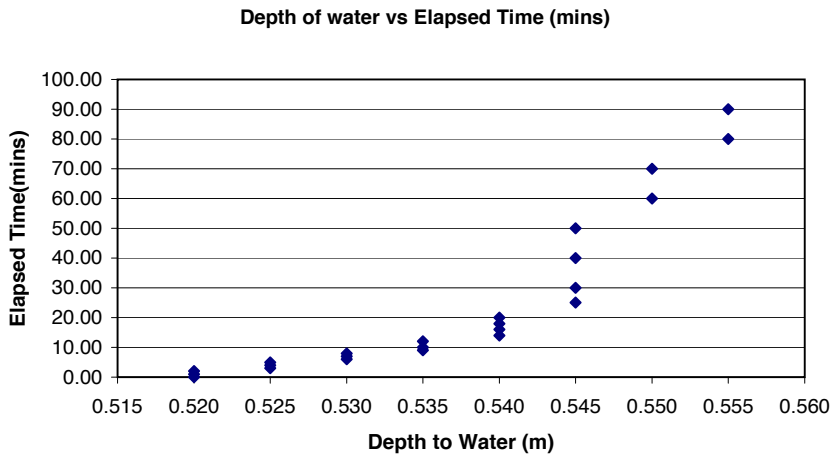
Depth to Water (m)	Elapsed Time (min)
0.520	0.00
0.520	1.00
0.520	2.00
0.525	3.00
0.525	4.00
0.525	5.00
0.530	6.00
0.530	7.00
0.530	8.00
0.535	9.00
0.535	10.00
0.535	12.00
0.540	14.00
0.540	16.00
0.540	18.00
0.540	20.00
0.545	25.00
0.545	30.00
0.545	40.00
0.545	50.00
0.550	60.00
0.550	70.00
0.555	80.00
0.555	90.00

Field Test

Depth of Pit (D)	1.70	m
Width of Pit (B)	0.50	m
Length of Pit (L)	2.00	m
Initial depth to Water =	0.52	m
Final depth to water =	0.555	m
Elapsed time (mins)=	90.00	
Top of permeable soil		m
Base of permeable soil		m
Base area=	1	m2
*Av. side area of permeable stratum over test p	5.8125	m2
Total Exposed area =	6.8125	m2

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

f= 5.7E-05 m/min or 9.5141E-07 m/sec



Soakaway Design f -value from field tests IGSL

Contract: Kildare Co.Co. Machinery Yard Contract No. 20636
Test No. SA2
Engineer Kilgallen & Partners
Date: 19/12/2017

Summary of ground conditions

from	to	Description	Ground water
0.00	0.05	TOPSOIL	
0.05	0.60	MADE GROUND (comprised of soft brown sandy gravelly clay, cobbles,	
		occasional organic pieces	DRY
0.60	1.60	MADE GROUND (comprised of soft grey sandy gravelly clay, cobbles,	
		boulders, occasional organic pieces)	

Notes:

Field Data

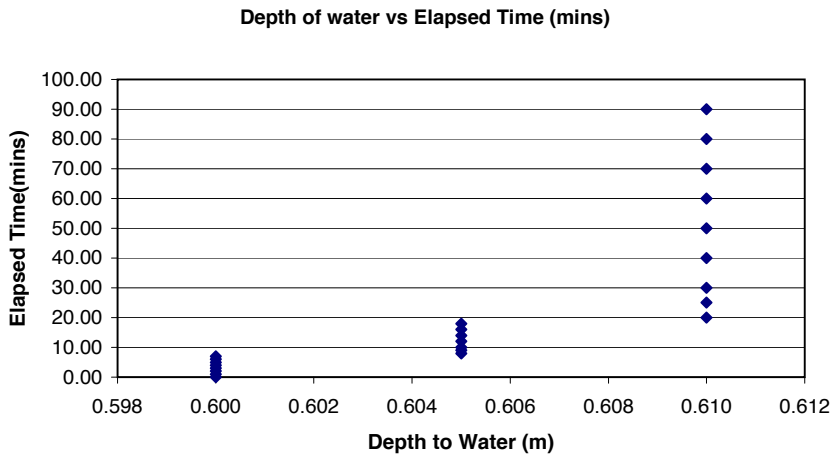
Depth to Water (m)	Elapsed Time (min)
0.600	0.00
0.600	1.00
0.600	2.00
0.600	3.00
0.600	4.00
0.600	5.00
0.600	6.00
0.600	7.00
0.605	8.00
0.605	9.00
0.605	10.00
0.605	12.00
0.605	14.00
0.605	16.00
0.605	18.00
0.610	20.00
0.610	25.00
0.610	30.00
0.610	40.00
0.610	50.00
0.610	60.00
0.610	70.00
0.610	80.00
0.610	90.00

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 =	0.60	m
Final depth to water =	0.610	m
Elapsed time (mins)=	90.00	
Top of permeable soil		m
Base of permeable soil		m
Base area=	1	m2
*Av. side area of permeable stratum over test p	4.975	m2
Total Exposed area =	5.975	m2

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

f= 1.9E-05 m/min or 3.09933E-07 m/sec



Appendix 5

Groundwater Monitoring Records

Project No. 20636	GROUNDWATER MONITORING DATA SHEET	*IGSL Ltd*

Project: Kildare Co.Co. Machinery Yard, Naas
Engineer: Kilgallen & Partners

Exploratory Hole No.	Hole Depth (m bgl)	Response Zone Top (m bgl)	Response Zone Base (m bgl)	Groundwater Level (m bgl) (18/01/2018)	Groundwater Level (m bgl) (16/02/2018)	Groundwater Level (m bgl)	Comments
BH1	7.80	1.50	7.80	3.20	3.33		
BH4	8.50	7.50	8.50	3.40	3.48		
BH6	7.00	1.50	7.00	3.10	3.20		

Remarks: Water levels measured using electric dipmeter
BH - denotes cable percussion borehole
WS - denotes window sample hole

Appendix 6

Geotechnical Laboratory Test Records

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

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

Report No. **R84406** Contract No. 20636 Contract Name: Kildare Co.Co. Machinery Yard

Customer Kilgallen/Kildare Co.Co.

Samples Received: 05/01/18 Date Tested: 09/01/18

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
TP12	AA76723/24	1.00/2.00	A18/0040	B	12	25	17	8	59	WS	4.4	C L	Mottled brown slightly sandy, gravelly, CLAY with some cobbles
TP13	AA76143/44/45	0.70/1.20/2.80	A17/0041	B	16	26	NP	NP	46	WS	4.4		Mottled brown silty, very sandy, GRAVEL
TP10	AA76748/49/50	0.80/1.80/2.80	A18/0043	B	16	22	NP	NP	63	WS	4.4		Brown slightly sandy, slightly gravelly, SILT
TP20	AA76736/37	1.00/2.00	A18/0044	B	12	26	16	10	63	WS	4.4	C L	Mottled brown slightly sandy, gravelly, CLAY
TP06	6744/45/461.00/2.00	0.0	A18/0045	B	8.7	22	NP	NP	31	WS	4.4		Brown slightly sandy, gravelly, SILT
TP04	AA72742/43	1.00/2.00	A18/0047	B	14	26	16	10	62	WS	4.4	C L	Mottled brown slightly sandy, slightly gravelly, CLAY
TP02	AA72749/50	0.90/1.90	A18/0048	B	13	26	17	9	64	WS	4.4	C L	Dark brown slightly sandy, slightly gravelly, CLAY

Notes: 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:

NOTE: *Clause 3.2 of BS1377 is a "withdrawn" standard due to publication of ISO17892-1:2014

Opinions and interpretations are outside the scope of accreditation.

The results relate to the specimens tested. Any remaining material will be retained for one month.

IGSL Ltd Materials Laboratory

Persons authorized to approve reports

H Byrne (Laboratory Manager)

Approved by	Date	Page
H Byrne	11/01/18	1 of 1

TEST REPORT
Determination of Particle Size Distribution

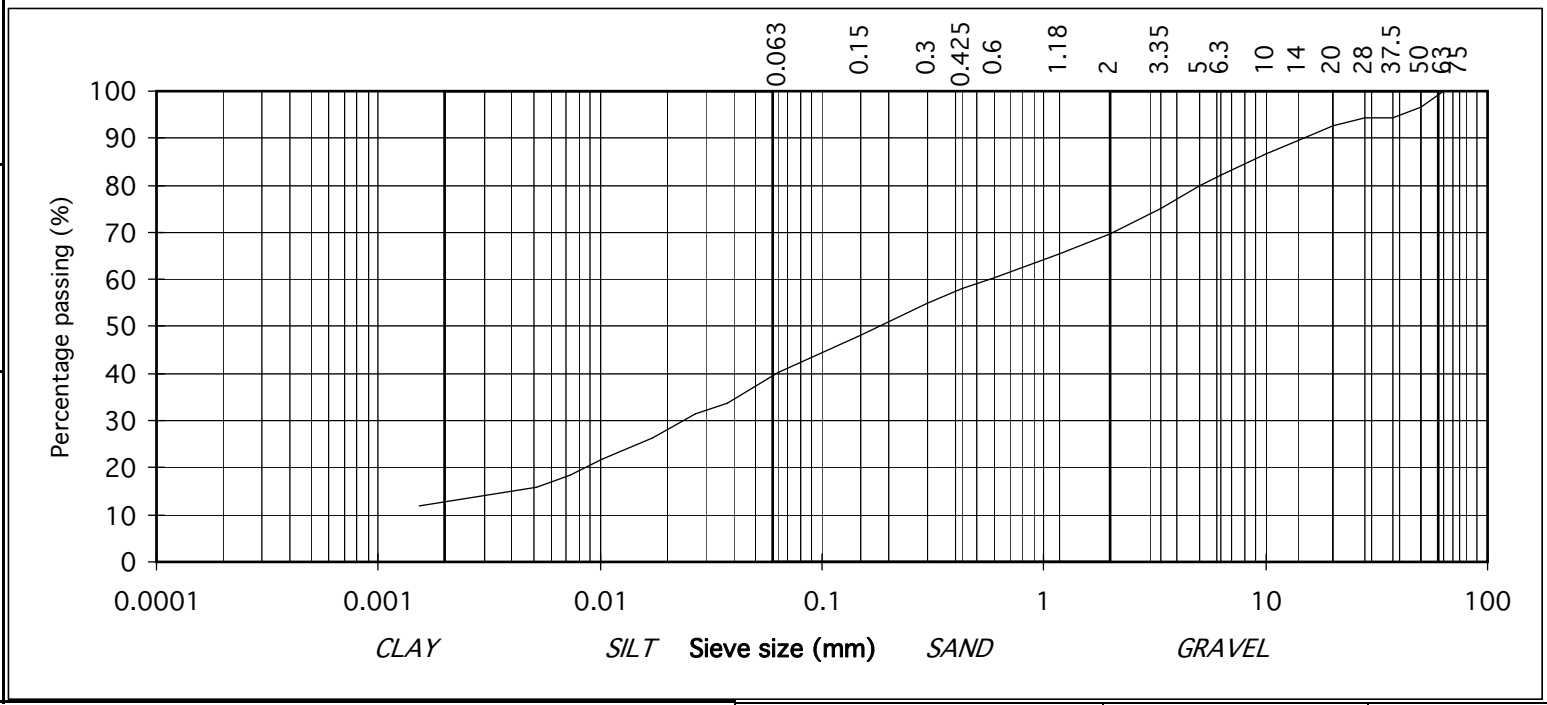
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5
(note: Sedimentation stage not accredited)

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

particle size	% passing	
75	100	COBBLES
63	100	
50	97	GRAVEL
37.5	94	
28	94	
20	93	
14	90	
10	87	
6.3	82	
5	80	
3.35	75	
2	70	
1.18	65	SAND
0.6	60	
0.425	58	
0.3	55	
0.15	48	
0.063	40	SILT/CLAY
0.037	34	
0.027	31	
0.017	26	
0.010	22	
0.007	18	
0.005	16	
0.002	12	

Contract No: 20636 Report No. R84755
Contract: Kildare Co.Co. Machinery Yard
BH/TP : TP02
Sample No. AA72749/50 Lab. Sample No. A18/0048
Sample Type: B
Depth (m) 0.90/1.90 Customer: Kilgallen/Kildare Co.Co
Date Received 05/01/2018 Date Testing started 09/01/2018
Description: Dark brown slightly sandy, slightly gravelly, CLAY

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



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	23/01/18	1 of 1

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

TEST REPORT
Determination of Particle Size Distribution

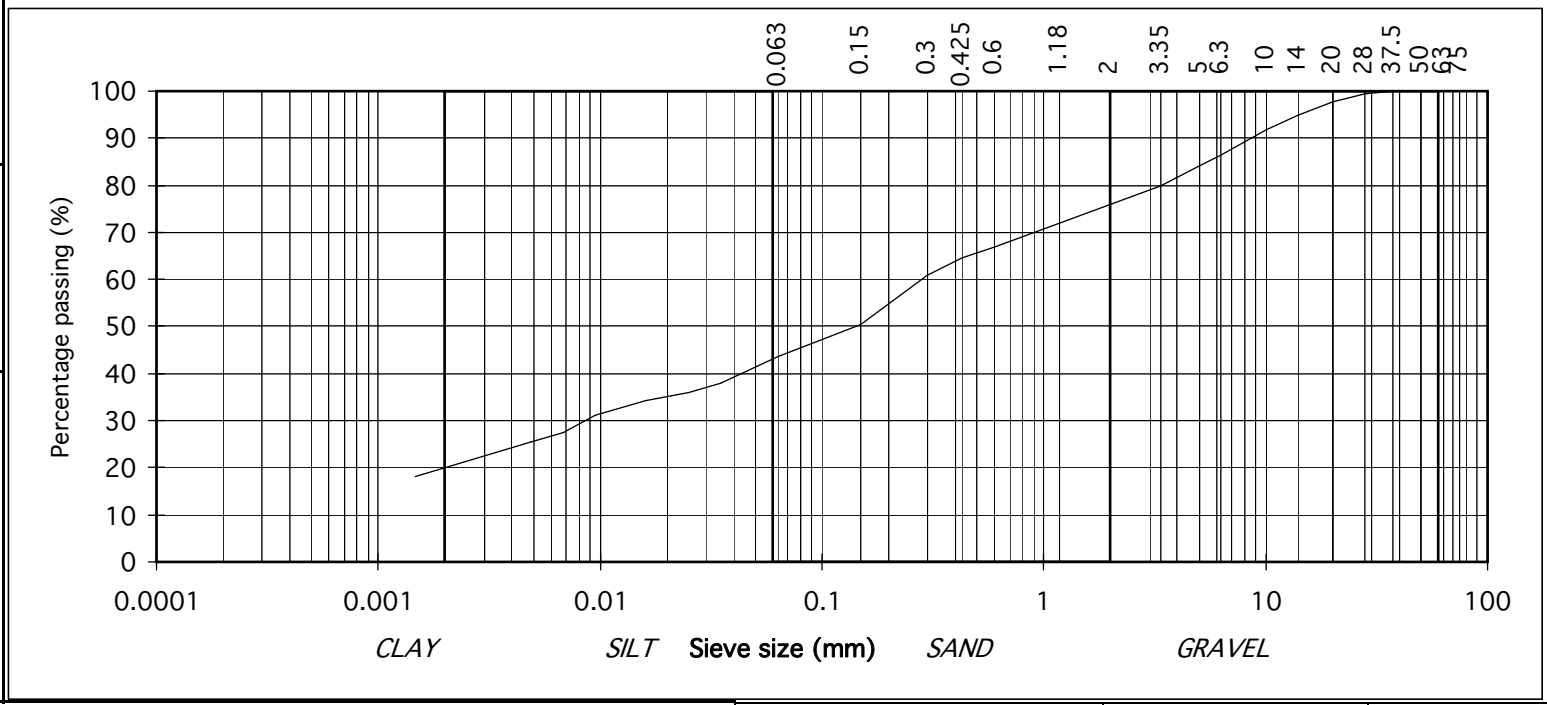
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5
(note: Sedimentation stage not accredited)

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 1317

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	99	
20	98	
14	95	
10	92	
6.3	86	
5	84	
3.35	80	
2	76	
1.18	72	SAND
0.6	67	
0.425	65	
0.3	61	
0.15	50	
0.063	44	SILT/CLAY
0.035	38	
0.025	36	
0.016	34	
0.009	31	
0.007	28	
0.005	25	
0.001	18	

Contract No: 20636 Report No. R84580
Contract: Kildare Co.Co. Machinery Yard
BH/TP : TP04
Sample No. AA72742/43 Lab. Sample No. A18/0047
Sample Type: B
Depth (m) 1.00/2.00m Customer: Kilgallen/Kildare Co.Co
Date Received 05/01/2018 Date Testing started 09/01/2018
Description: Mottled brown slightly sandy, slightly gravelly, CLAY

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



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	02/02/18	1 of 1

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

TEST REPORT
Determination of Particle Size Distribution

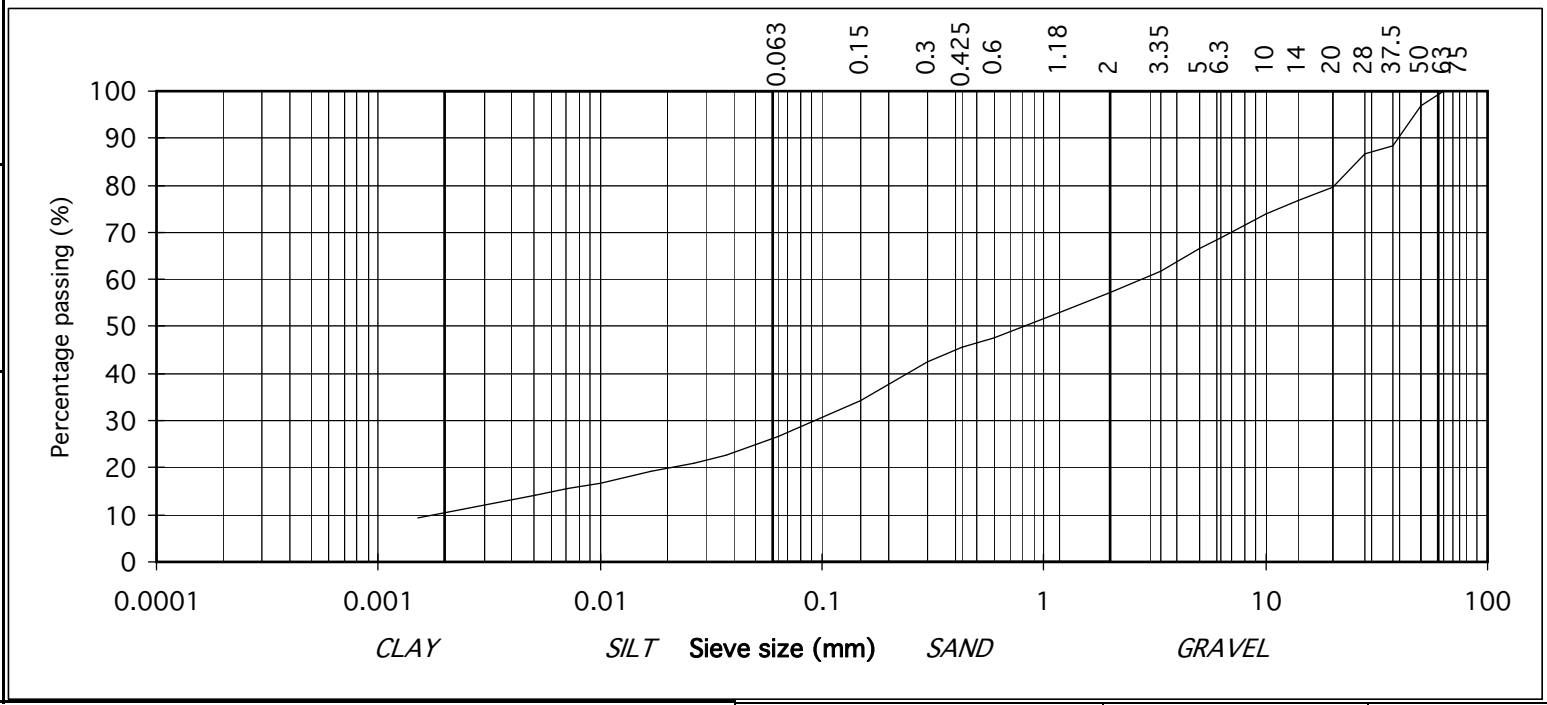
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5
(note: Sedimentation stage not accredited)

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 13/37

particle size	% passing	
75	100	COBBLES
63	100	
50	97	GRAVEL
37.5	88	
28	87	
20	80	
14	77	
10	74	
6.3	69	
5	66	
3.35	62	
2	57	
1.18	53	SAND
0.6	48	
0.425	45	
0.3	42	
0.15	34	
0.063	27	SILT/CLAY
0.037	23	
0.027	21	
0.017	19	
0.010	17	
0.007	16	
0.005	14	
0.002	9	

Contract No: 20636 Report No. R84579
Contract: Kildare Co.Co. Machinery Yard
BH/TP : TP06
Sample No. AA76744/5/6 Lab. Sample No. A18/0045
Sample Type: B
Depth (m) 1.00,2.00,3.00m Customer: Kilgallen/Kildare Co.Co
Date Received 05/01/2018 Date Testing started 09/01/2018
Description: 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



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	02/02/18	1 of 1

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

TEST REPORT
Determination of Particle Size Distribution

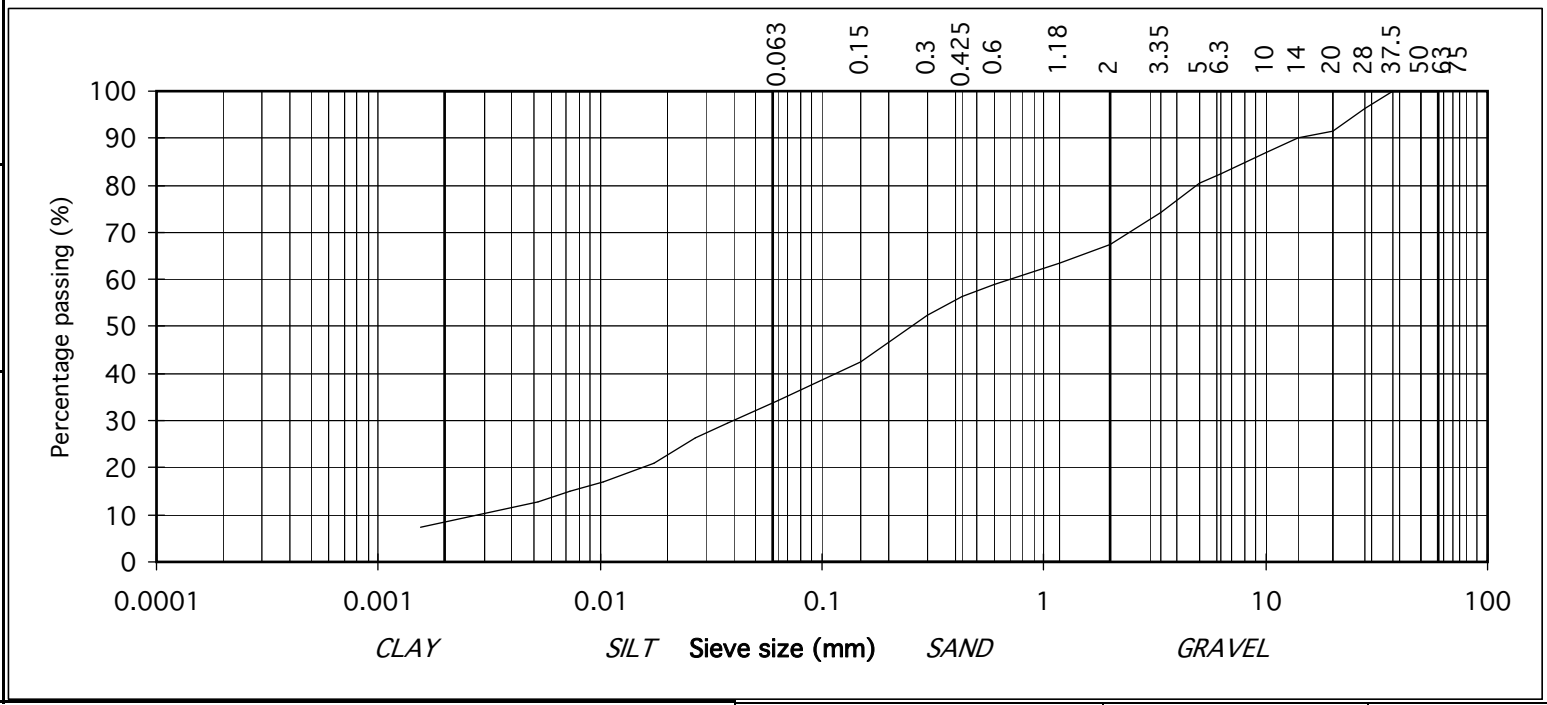
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5
(note: Sedimentation stage not accredited)

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 1317

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	96	
20	91	
14	90	
10	87	
6.3	83	
5	80	
3.35	74	
2	68	
1.18	63	SAND
0.6	59	
0.425	56	
0.3	52	
0.15	43	
0.063	34	SILT/CLAY
0.037	30	
0.027	26	
0.017	21	
0.010	17	
0.007	15	
0.005	13	
0.002	7	

Contract No: 20636 Report No. R84756
Contract: Kildare Co.Co. Machinery Yard
BH/TP : TP10
Sample No. AA76736/37 Lab. Sample No. A18/0043
Sample Type: B
Depth (m) 0.80/1.80/2.80 Customer: Kilgallen/Kildare Co.Co
Date Received 05/01/2018 Date Testing started 09/01/2018
Description: Brown slightly sandy, slightly gravelly, SILT

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



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	23/01/18	1 of 1

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

TEST REPORT
Determination of Particle Size Distribution

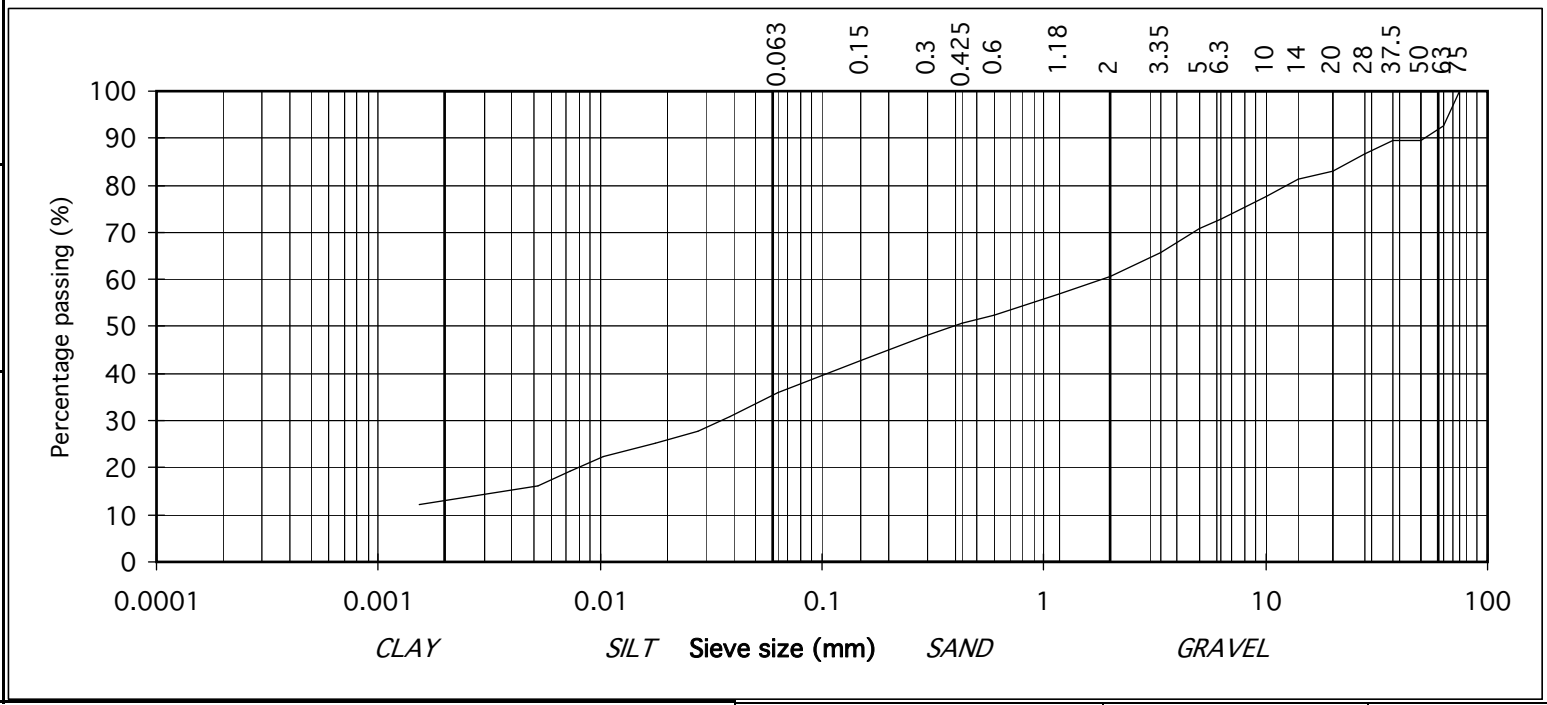
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5
(note: Sedimentation stage not accredited)

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 137T

particle size	% passing	
75	100	COBBLES
63	93	
50	90	GRAVEL
37.5	90	
28	87	
20	83	
14	81	
10	78	
6.3	73	
5	71	
3.35	66	
2	61	
1.18	57	SAND
0.6	53	
0.425	51	
0.3	48	
0.15	43	
0.063	36	SILT/CLAY
0.039	31	
0.028	28	
0.018	25	
0.010	23	
0.007	19	
0.005	16	
0.002	12	

Contract No: 20636 Report No. R84757
Contract: Kildare Co.Co. Machinery Yard
BH/TP : TP12
Sample No. AA76723/24 Lab. Sample No. A18/0040
Sample Type: B
Depth (m) 1.00/2.00 Customer: Kilgallen/Kildare Co.Co
Date Received 05/01/2018 Date Testing started 09/01/2018
Description: Mottled brown slightly sandy, gravelly, CLAY with some cobbles

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



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	23/01/18	1 of 1

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

TEST REPORT
Determination of Particle Size Distribution

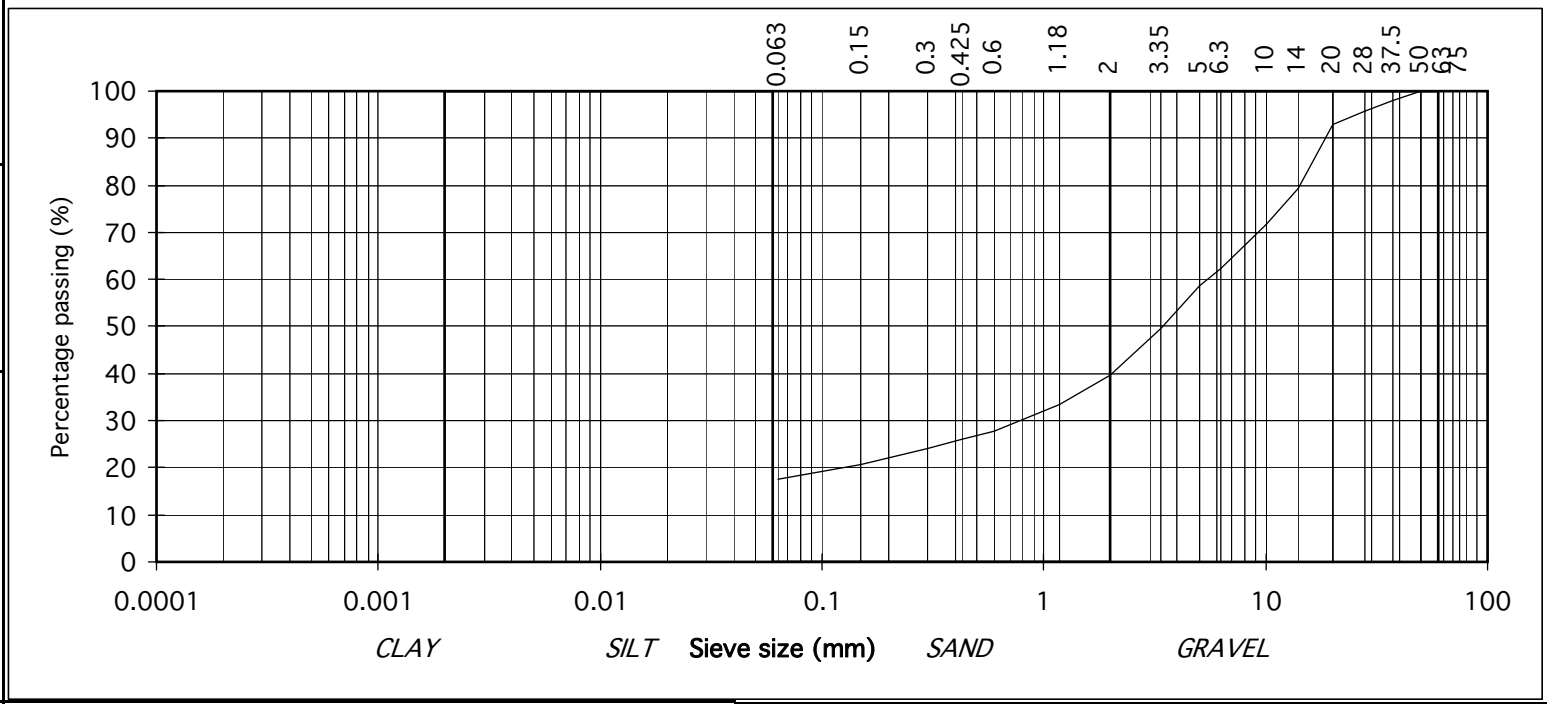
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5
(note: Sedimentation stage not accredited)

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 137T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	98	
28	96	
20	93	
14	79	
10	72	
6.3	62	
5	59	
3.35	50	
2	40	
1.18	33	SAND
0.6	28	
0.425	26	
0.3	24	
0.15	21	
0.063	18	SILT/CLAY

Contract No: 20636 Report No. R84772
Contract: Kildare Co.Co. Machinery Yard
BH/TP : TP13
Sample No. AA76143/44 Lab. Sample No. A18/0041
Sample Type: B
Depth (m) 0.70/1.20/2.80 Customer: Kilgallen/Kildare Co.Co
Date Received 05/01/2018 Date Testing started 09/01/2018
Description: Mottled brown silty, very sandy, GRAVEL

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



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	24/01/18	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)

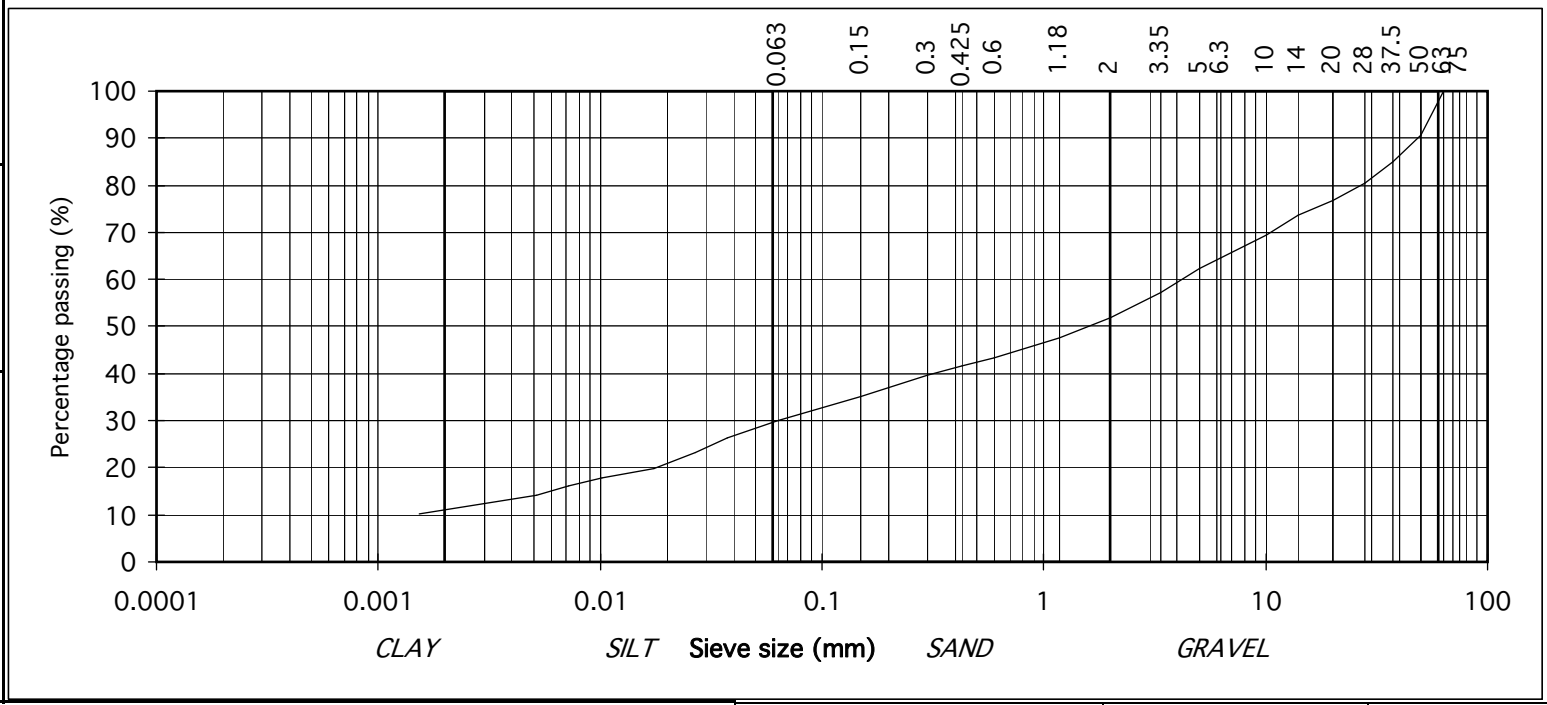
ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	91	GRAVEL
37.5	85	
28	80	
20	77	
14	74	
10	69	
6.3	65	
5	62	
3.35	57	
2	52	
1.18	48	SAND
0.6	43	
0.425	42	
0.3	40	
0.15	35	
0.063	30	SILT/CLAY
0.037	26	
0.027	23	
0.017	20	
0.010	18	
0.007	16	
0.005	14	
0.002	10	

Contract No:	20636	Report No.	R84758
Contract:	Kildare Co.Co. Machinery Yard		
BH/TP :	TP20		
Sample No.	AA76736/37	Lab. Sample No.	A18/0044
Sample Type:	B		
Depth (m)	1.00/2.00	Customer:	Kilgallen/Kildare Co.Co
Date Received	05/01/2018	Date Testing started	09/01/2018
Description:	Mottled brown slightly sandy, gravelly, CLAY		

Remarks

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



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	23/01/18	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

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

Report No.	**R84781**
Contract No.	20636
Contract Name:	Kildare Co.Co. - Machinery Yard
Customer:	Kilgallen/Kildare Co.Co.
BH/TP	TP02
Sample No.	AA72749/50
Depth (m)	0.90/1.90
Sample Type:	B
Lab Sample No.	A18/0048
Source (if applicable)	unknown
Material Type (if applicable):	B
Sample Received:	05/01/18
Date Tested:	23/01/18
Sample Cert:	N/A
Moisture Content (%):	15
% Particles > 20mm (By dry mass):	17
MCV:	2.4
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Dark brown slightly sandy, slightly gravelly, CLAY

The result relates to the specimen tested.
Any remaining material will be retained for one month.
Sampling and opinions and interpretations are outside the scope of accreditation.

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

IGSL Ltd Materials Laboratory	Approved by	Date	Page
	H Byrne	24/01/18	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. 133T

Report No.	**R84782**
Contract No.	20636
Contract Name:	Kildare Co.Co. - Machinery Yard
Customer:	Kilgallen/Kildare Co.Co.
BH/TP	TP02
Sample No.	AA72749/50
Depth (m)	0.90/1.90
Sample Type:	B
Lab Sample No.	A18/0048
Source (if applicable)	unknown
Material Type (if applicable):	B - 2% Lime - Air Cured 2hrs
Sample Received:	05/01/18
Date Tested:	23/01/18
Sample Cert:	N/A
Moisture Content (%):	13
% Particles > 20mm (By dry mass):	17
MCV:	8.4
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Dark brown slightly sandy, slightly gravelly, CLAY

The result relates to the specimen tested.
Any remaining material will be retained for one month.
Sampling and opinions and interpretations are outside the scope of accreditation.

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

IGSL Ltd Materials Laboratory	Approved by	Date	Page
	H Byrne	24/01/18	1 of 1

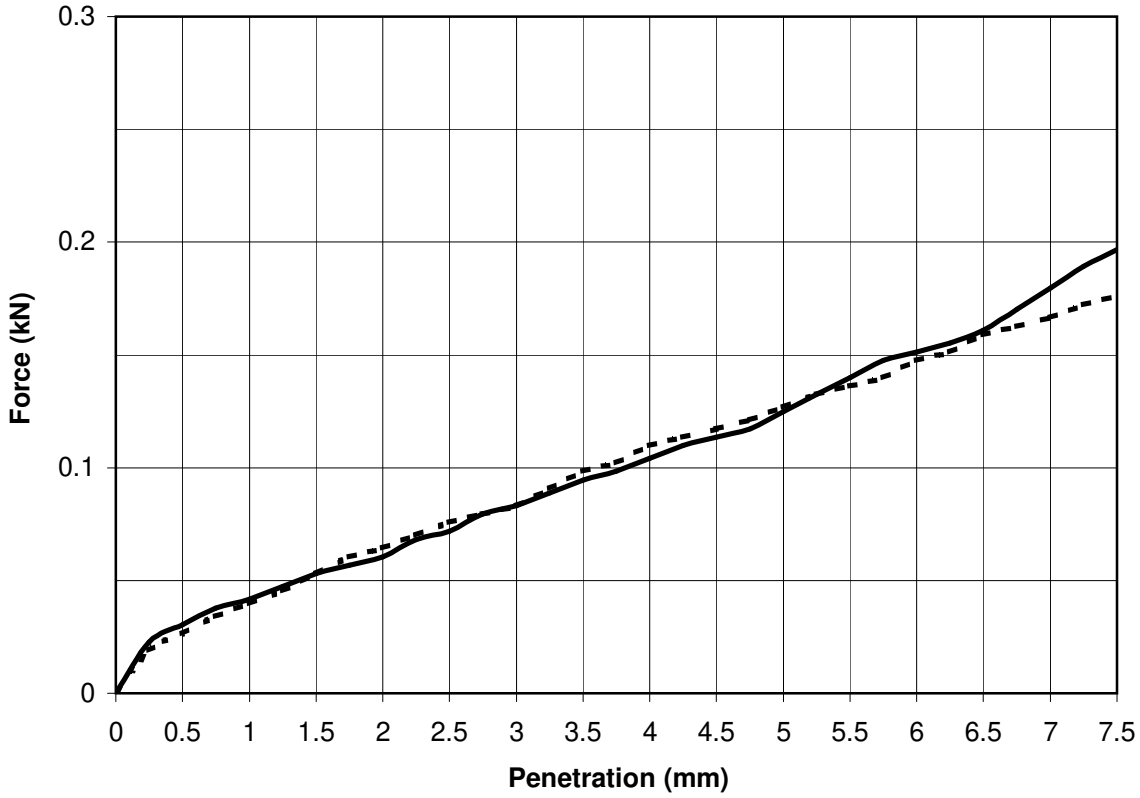
IGSL Ltd
Materials Laboratory
Unit J5,M7 Business Park
Naas Co.Kildare
045 899324

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.1337

Report No.	R84800	Contract	Kildare Co.Co. - Machinery Yard
Contract No.	20636	Customer	Kilgallen/Kildare Co.Co
Date received	05/01/18	Date Tested	23/01/18
BH/TP No.	TP02	Sample No.	AA72749/50 Type: B
Depth (m)	0.90/1.90	Lab sample No.	A18/0048



Key: ———— Top ---------- Base

Description:	Dark brown slightly sandy, slightly gravelly, CLAY		
Initial Condition:	Unsoaked		
Moisture Content (%):	15	Bulk Density (Mg/m^3):	2.22
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.94
% Material >20mm:	15		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**0.6**	**0.6**
Moisture Content %	15	15

Persons authorized to approve reports

J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory

Approved by	Date	Page No.
H Byrne	24/01/18	1 of 1

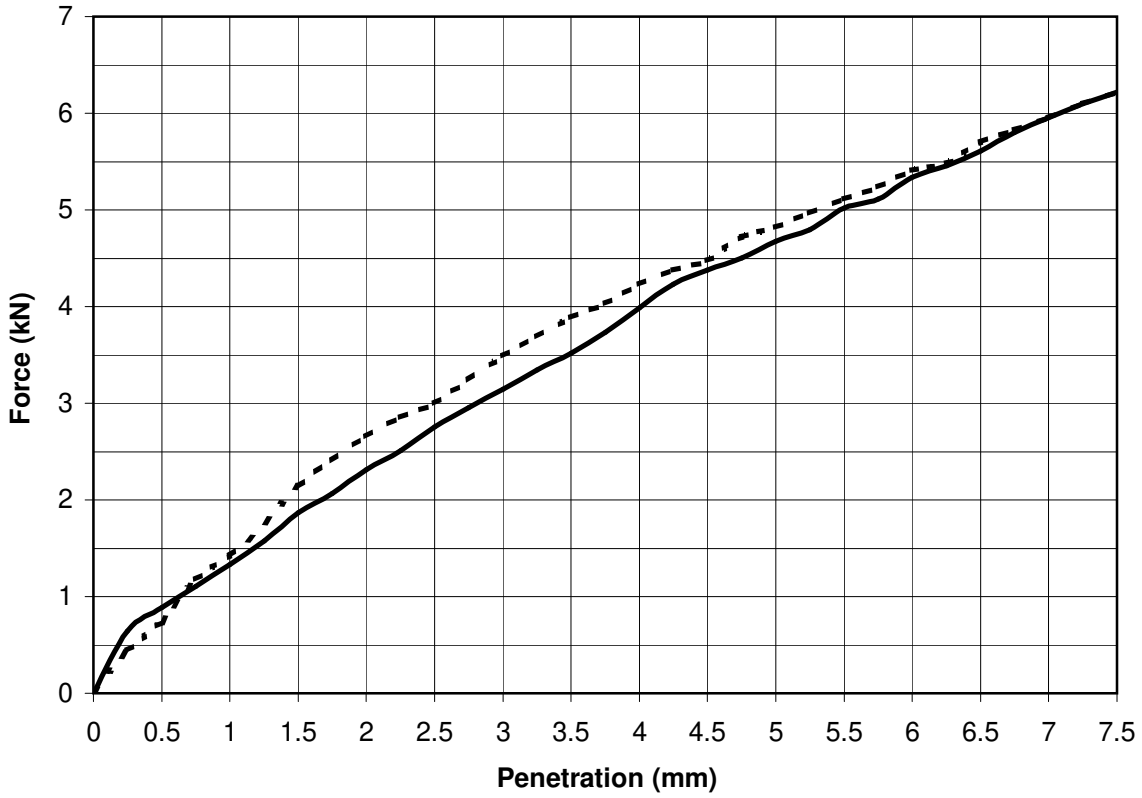
IGSL Ltd
Materials Laboratory
Unit J5,M7 Business Park
Naas Co.Kildare
045 899324

TEST REPORT
Determination of California Bearing Ratio (CBR)

Tested in accordance with BS1377:Part 4:1990, clause 7

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

Report No.	R85036	Contract	Kildare Co.Co. - Machinery Yard
Contract No.	20636	Customer	Kilgallen/Kildare Co.Co
Date received	05/01/18	Date Tested	27/01/18
BH/TP No.	TP02	Sample No.	AA72749/50 Type: B
Depth (m)	0.90/1.90	Lab sample No.	A18/0048



Key: ———— Top ---------- Base

Description:	Dark brown slightly sandy, slightly gravelly, CLAY		
Initial Condition:	2% Lime - 3 Day Soaked		
Moisture Content (%):	13	Bulk Density (Mg/m^3):	2.22
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.96
% Material >20mm:	15		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**23**	**24**
Moisture Content %	13	13

Persons authorized to approve reports

J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory

Approved by	Date	Page No.
H Byrne	06/02/18	1 of 1

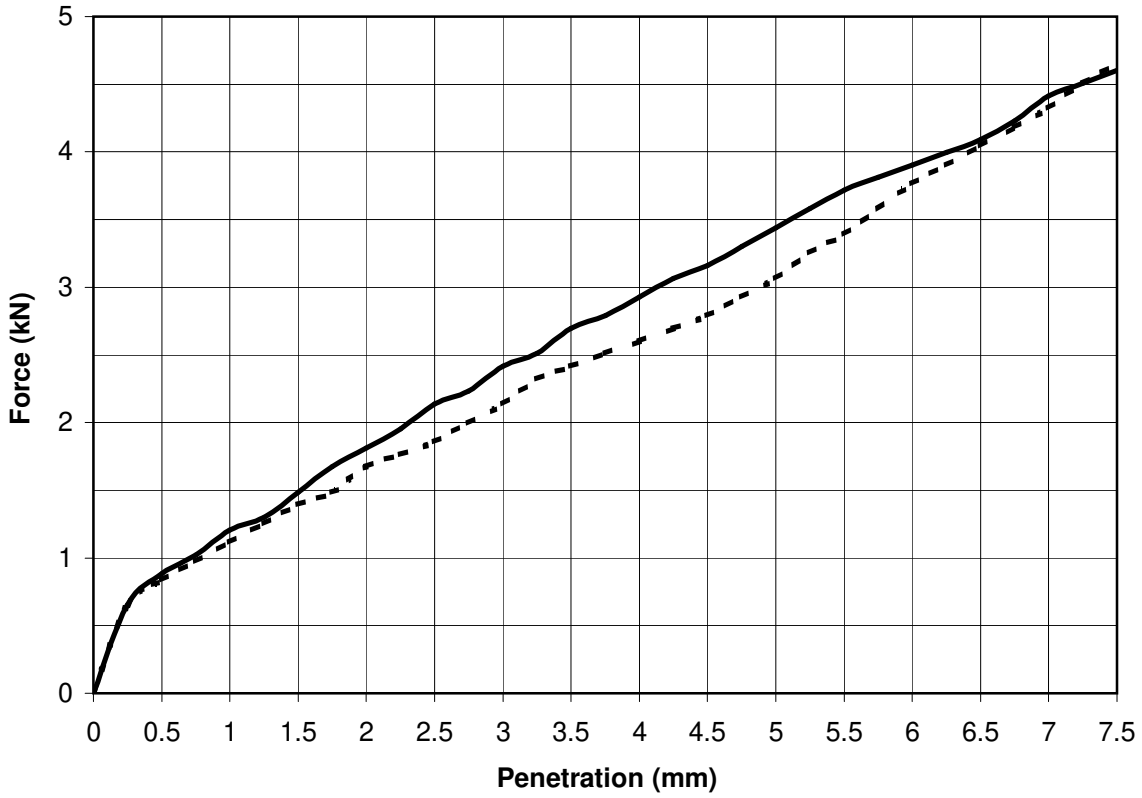
IGSL Ltd
Materials Laboratory
Unit J5,M7 Business Park
Naas Co.Kildare
045 899324

TEST REPORT
Determination of California Bearing Ratio (CBR)

Tested in accordance with BS1377:Part 4:1990, clause 7

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

Report No.	R85144	Contract	Kildare Co.Co. - Machinery Yard
Contract No.	20636	Customer	Kilgallen/Kildare Co.Co
Date received	05/01/18	Date Tested	07/02/18
BH/TP No.	TP02	Sample No.	AA72749/50 Type: B
Depth (m)	0.90/1.90	Lab sample No.	A18/0048



Key: ———— Top ---------- Base

Description:	Dark brown slightly sandy, slightly gravelly, CLAY		
Initial Condition:	2% Lime - 14 Day Soaked		
Moisture Content (%):	14	Bulk Density (Mg/m^3):	2.24
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.97
% Material >20mm:	15		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**17**	**15**
Moisture Content %	14	14

Persons authorized to approve reports

J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory

Approved by	Date	Page No.
H Byrne	06/02/18	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.	**R84783**
Contract No.	20636
Contract Name:	Kildare Co.Co. - Machinery Yard
Customer:	Kilgallen/Kildare Co.Co.
BH/TP	TP04
Sample No.	AA7272/43
Depth (m)	1.00/2.00
Sample Type:	B
Lab Sample No.	A18/0047
Source (if applicable)	unknown
Material Type (if applicable):	B - Natural
Sample Received:	05/01/18
Date Tested:	22/01/18
Sample Cert:	N/A
Moisture Content (%):	13
% Particles > 20mm (By dry mass):	14
MCV:	7.3
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Mottled brown slightly sandy, slightly gravelly, CLAY

The result relates to the specimen tested.
Any remaining material will be retained for one month.
Sampling and opinions and interpretations are outside the scope of accreditation.

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

IGSL Ltd Materials Laboratory	Approved by	Date	Page
	H Byrne	24/01/18	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.	**R84784**
Contract No.	20636
Contract Name:	Kildare Co.Co. - Machinery Yard
Customer:	Kilgallen/Kildare Co.Co.
BH/TP	TP04
Sample No.	AA7272/43
Depth (m)	1.00/2.00
Sample Type:	B
Lab Sample No.	A18/0047
Source (if applicable)	unknown
Material Type (if applicable):	B - 1% Lime - Air Cured 2hrs
Sample Received:	05/01/18
Date Tested:	23/01/18
Sample Cert:	N/A
Moisture Content (%):	13
% Particles > 20mm (By dry mass):	14
MCV:	10
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Mottled brown slightly sandy, slightly gravelly, CLAY

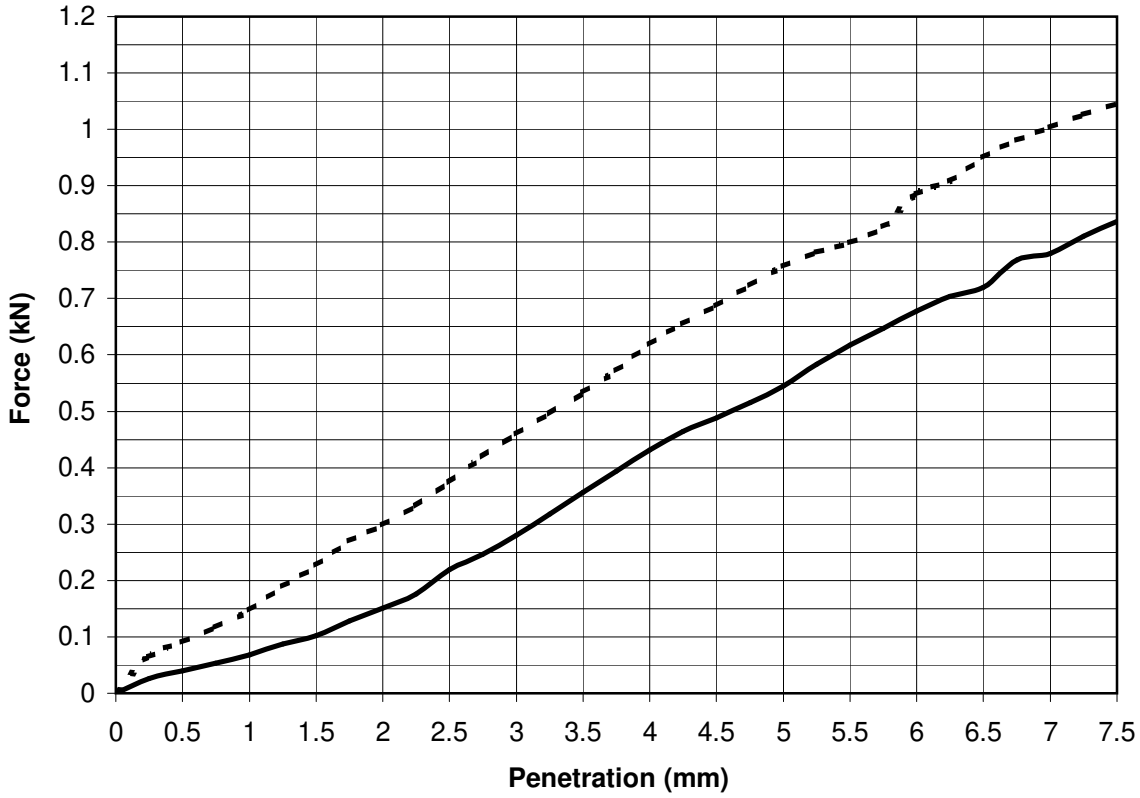
The result relates to the specimen tested.
Any remaining material will be retained for one month.
Sampling and opinions and interpretations are outside the scope of accreditation.

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

IGSL Ltd Materials Laboratory	Approved by	Date	Page
	H Byrne	24/01/18	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.1337

Report No.	R84801	Contract	Kildare Co.Co. - Machinery Yard
Contract No.	20636	Customer	Kilgallen/Kildare Co.Co
Date received	05/01/18	Date Tested	22/01/18
BH/TP No.	TP04	Sample No.	AA72742/43 Type: B
Depth (m)	1.00/2.00	Lab sample No.	A18/0047



Key: ———— Top ---------- Base

Description:	Mottled brown slightly sandy, slightly gravelly, CLAY		
Initial Condition:	Unsoaked		
Moisture Content (%):	13	Bulk Density (Mg/m^3):	2.23
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.97
% Material >20mm:	12		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**2.7**	**3.8**
Moisture Content %	13	13

Persons authorized to approve reports

J Barrett (Quality Manager)

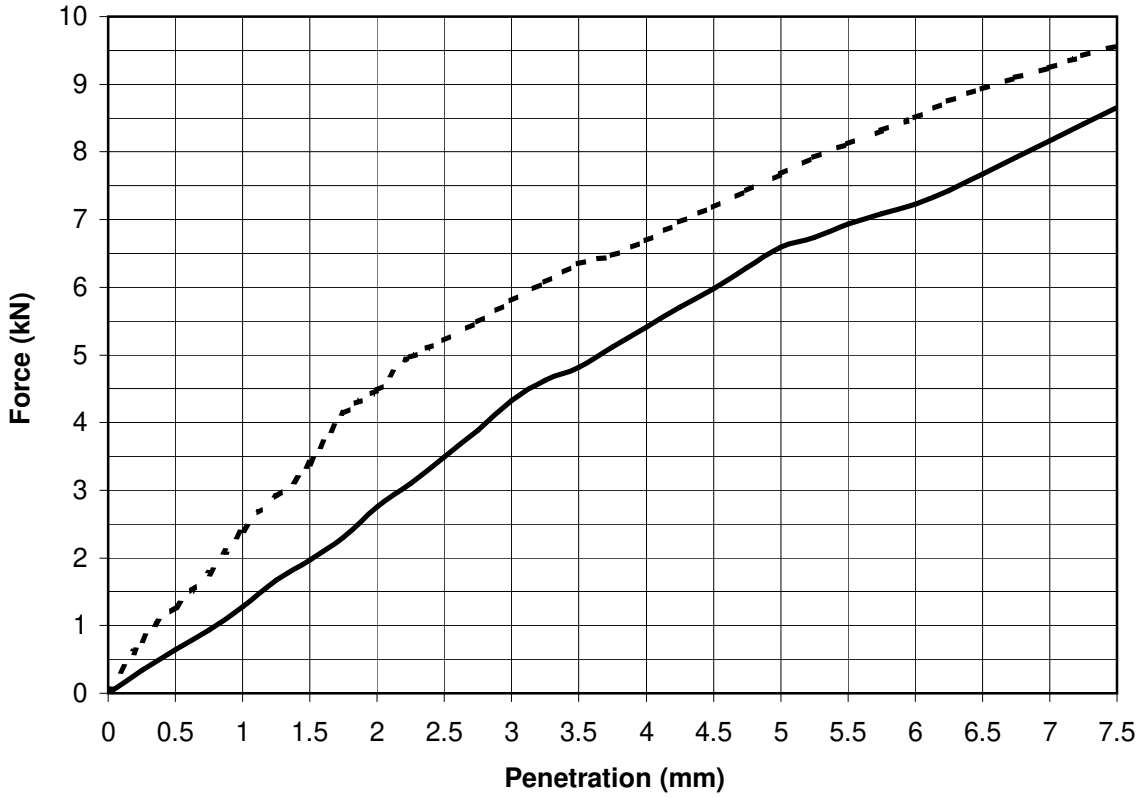
H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory

Approved by	Date	Page No.
H Byrne	24/01/18	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.1337

Report No.	R84856	Contract	Kildare Co.Co. - Machinery Yard
Contract No.	20636	Customer	Kilgallen/Kildare Co.Co
Date received	05/01/18	Date Tested	26/01/18
BH/TP No.	TP04	Sample No.	AA72742/43 Type: B
Depth (m)	1.00/2.00	Lab sample No.	A18/0047



Key: ———— Top ---------- Base

Description:	Mottled brown slightly sandy, slightly gravelly, CLAY		
Initial Condition:	1% Lime - 3 Day Soaked		
Moisture Content (%):	12	Bulk Density (Mg/m^3):	2.23
Surcharge (kg):	4	Dry Density (Mg/m^3):	2.00
% Material >20mm:	20		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**33**	**39**
Moisture Content %	11	12

Persons authorized to approve reports

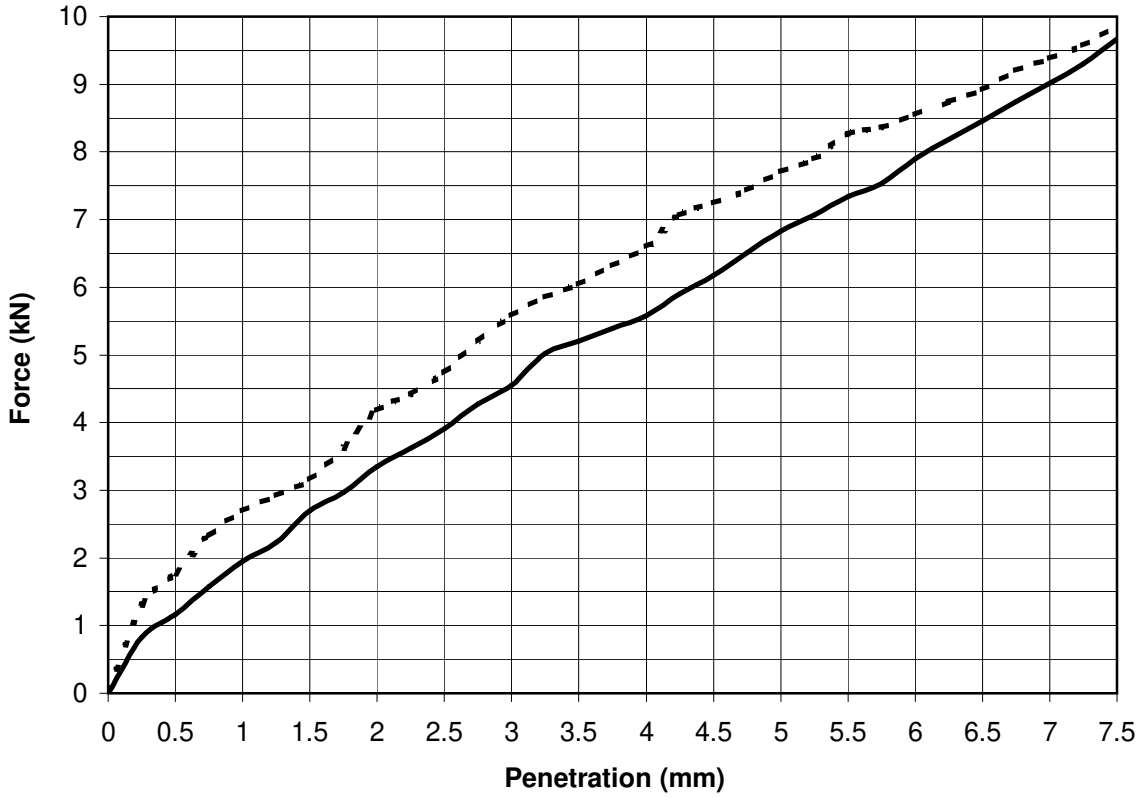
J Barrett (Quality Manager)

H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory	Approved by	Date	Page No.
	H Byrne	29/01/18	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.1337

Report No.	R85130	Contract	Kildare Co.Co. - Machinery Yard
Contract No.	20636	Customer	Kilgallen/Kildare Co.Co
Date received	05/01/18	Date Tested	06/02/18
BH/TP No.	TP04	Sample No.	AA72742/43 Type: B
Depth (m)	1.00/2.00	Lab sample No.	A18/0047



Key: ———— Top ---------- Base

Description:	Mottled brown slightly sandy, slightly gravelly, CLAY		
Initial Condition:	1% Lime - 14 Day Soaked		
Moisture Content (%):	12	Bulk Density (Mg/m^3):	2.23
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.99
% Material >20mm:	12		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**34**	**39**
Moisture Content %	12	12

Persons authorized to approve reports

J Barrett (Quality Manager)

H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory	Approved by	Date	Page No.
	H Byrne	07/02/18	1 of 1

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. R85127 Contract No. 20636

Contract Name: Kildare Co.Co. - Machinery Yard

Lab Contract No. 20636 Location: TP04

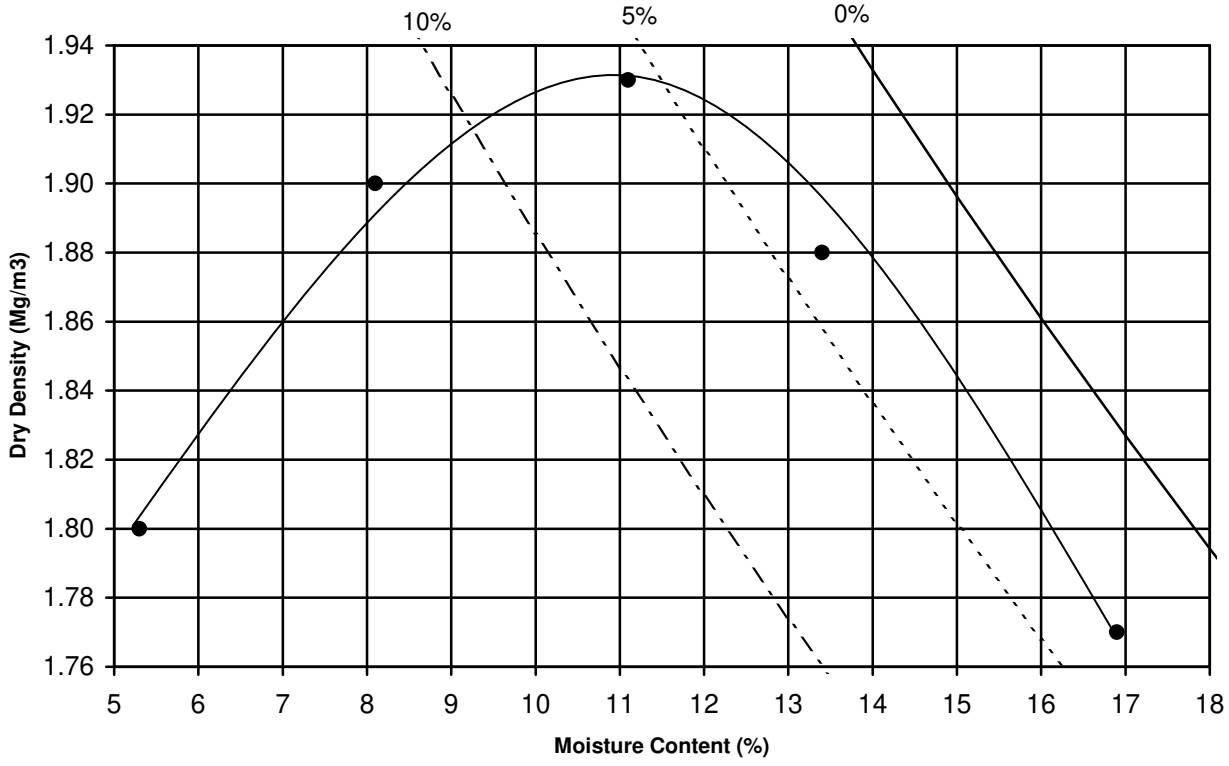
Sample No. AA72742/43 Depth (m) 1.00/2.00 Material Type B

Lab sample no. A18/0047 Customer: Kilgallen & Ptnrs/Kildare Co.Co.

Date Received: 05/01/2018 Test Method: 2.5 KG Rammer

Date Tested: 01/02/2018 BS1377:Part 4:1990 3.3

Dry Density (Mg/m^3)	1.88	1.80	1.90	1.93	1.77	0.00	
Moisture Content (%)	13	5.3	8.1	11	17	0	



Maximum Dry Density (Mg/m^3): 1.93 Optimum Moisture Content (%): 11

Description: Mottled brown slightly sandy, slightly gravelly, CLAY 1% Lime added

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: 12

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

The result relates to the specimen tested.
Opinions and interpretations are outside the scope of accreditation

IGSL Materials Laboratory	Approved by	Date	Page
	H Byrne	08/02/17	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. 133T

Report No.	**R84784**
Contract No.	20636
Contract Name:	Kildare Co.Co. - Machinery Yard
Customer:	Kilgallen/Kildare Co.Co.
BH/TP	TP06
Sample No.	AA76744/45/46
Depth (m)	1.00/2.00/3.00
Sample Type:	B
Lab Sample No.	A18/0045
Source (if applicable)	unknown
Material Type (if applicable):	B - Natural
Sample Received:	05/01/18
Date Tested:	22/01/18
Sample Cert:	N/A
Moisture Content (%):	12
% Particles > 20mm (By dry mass):	15
MCV:	6.7
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Brown slightly sandy, gravelly, SILT

The result relates to the specimen tested.
Any remaining material will be retained for one month.
Sampling and opinions and interpretations are outside the scope of accreditation.

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

IGSL Ltd Materials Laboratory	Approved by	Date	Page
	H Byrne	24/01/18	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. 133T

Report No.	**R84786**
Contract No.	20636
Contract Name:	Kildare Co.Co. - Machinery Yard
Customer:	Kilgallen/Kildare Co.Co.
BH/TP	TP06
Sample No.	AA76744/45/46
Depth (m)	1.00/2.00/3.00
Sample Type:	B
Lab Sample No.	A18/0045
Source (if applicable)	unknown
Material Type (if applicable):	B - 1% Lime - Air Cured
Sample Received:	05/01/18
Date Tested:	23/01/18
Sample Cert:	N/A
Moisture Content (%):	13
% Particles > 20mm (By dry mass):	15
MCV:	9.6
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Brown slightly sandy, gravelly, SILT

The result relates to the specimen tested.
Any remaining material will be retained for one month.
Sampling and opinions and interpretations are outside the scope of accreditation.

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

IGSL Ltd Materials Laboratory	Approved by	Date	Page
	H Byrne	24/01/18	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. 133T

Report No.	**R84787**
Contract No.	20636
Contract Name:	Kildare Co.Co. - Machinery Yard
Customer:	Kilgallen/Kildare Co.Co.
BH/TP	TP06
Sample No.	AA76744/45/46
Depth (m)	1.00/2.00/3.00
Sample Type:	B
Lab Sample No.	A18/0045
Source (if applicable)	unknown
Material Type (if applicable):	B - 2% Lime - Air Cured
Sample Received:	05/01/18
Date Tested:	23/01/18
Sample Cert:	N/A
Moisture Content (%):	13
% Particles > 20mm (By dry mass):	15
MCV:	10.1
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Brown slightly sandy, gravelly, SILT

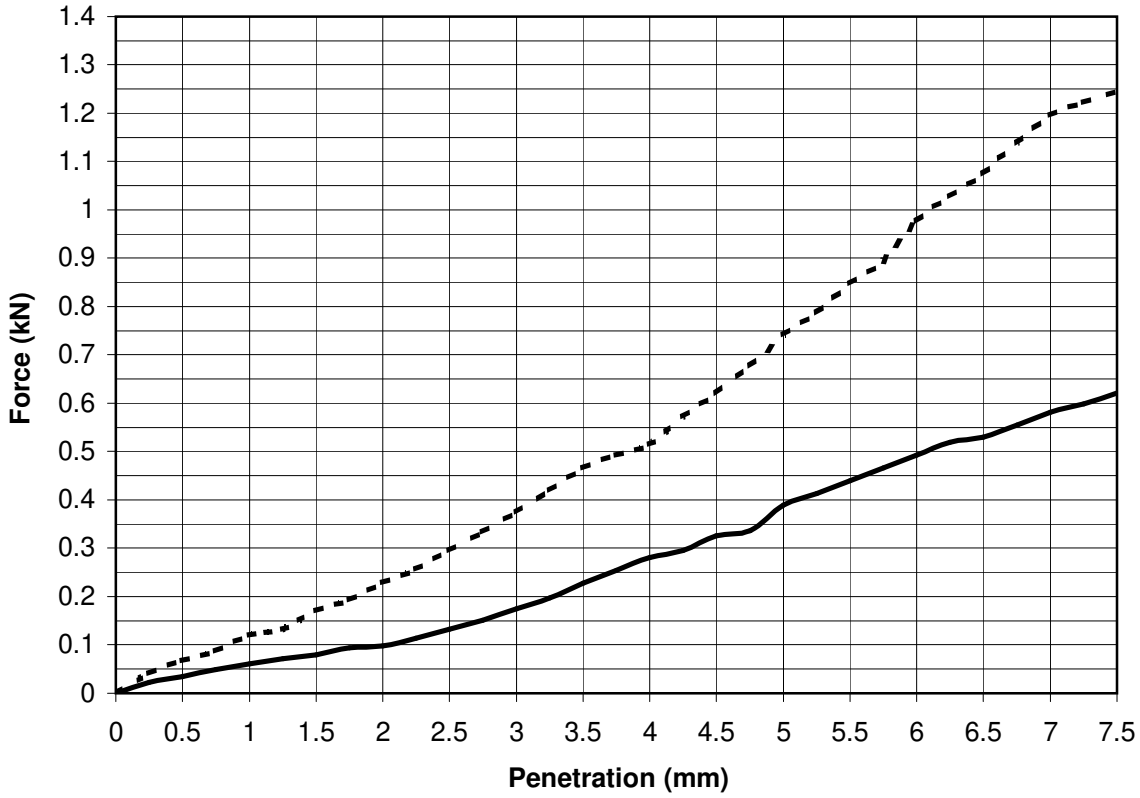
The result relates to the specimen tested.
Any remaining material will be retained for one month.
Sampling and opinions and interpretations are outside the scope of accreditation.

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

IGSL Ltd Materials Laboratory	Approved by	Date	Page
	H Byrne	24/01/18	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.1337

Report No.	R84802	Contract	Kildare Co.Co. - Machinery Yard
Contract No.	20636	Customer	Kilgallen/Kildare Co.Co
Date received	05/01/18	Date Tested	22/01/18
BH/TP No.	TP06	Sample No.	A76744/45/4 Type: B
Depth (m)	1.00/2.00/3.00	Lab sample No.	A18/0045



Key: ———— Top ---------- Base

Description:	Brown slightly sandy, gravelly, SILT		
Initial Condition:	Unsoaked		
Moisture Content (%):	12	Bulk Density (Mg/m^3):	2.24
Surcharge (kg):	4	Dry Density (Mg/m^3):	2.01
% Material >20mm:	14		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**2.0**	**3.7**
Moisture Content %	12	12

Persons authorized to approve reports

J Barrett (Quality Manager)

H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory	Approved by	Date	Page No.
	H Byrne	24/01/18	1 of 1

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. R85128 Contract No. 20636

Contract Name: Kildare Co.Co. - Machinery Yard

Lab Contract No. 20636 Location: TP06

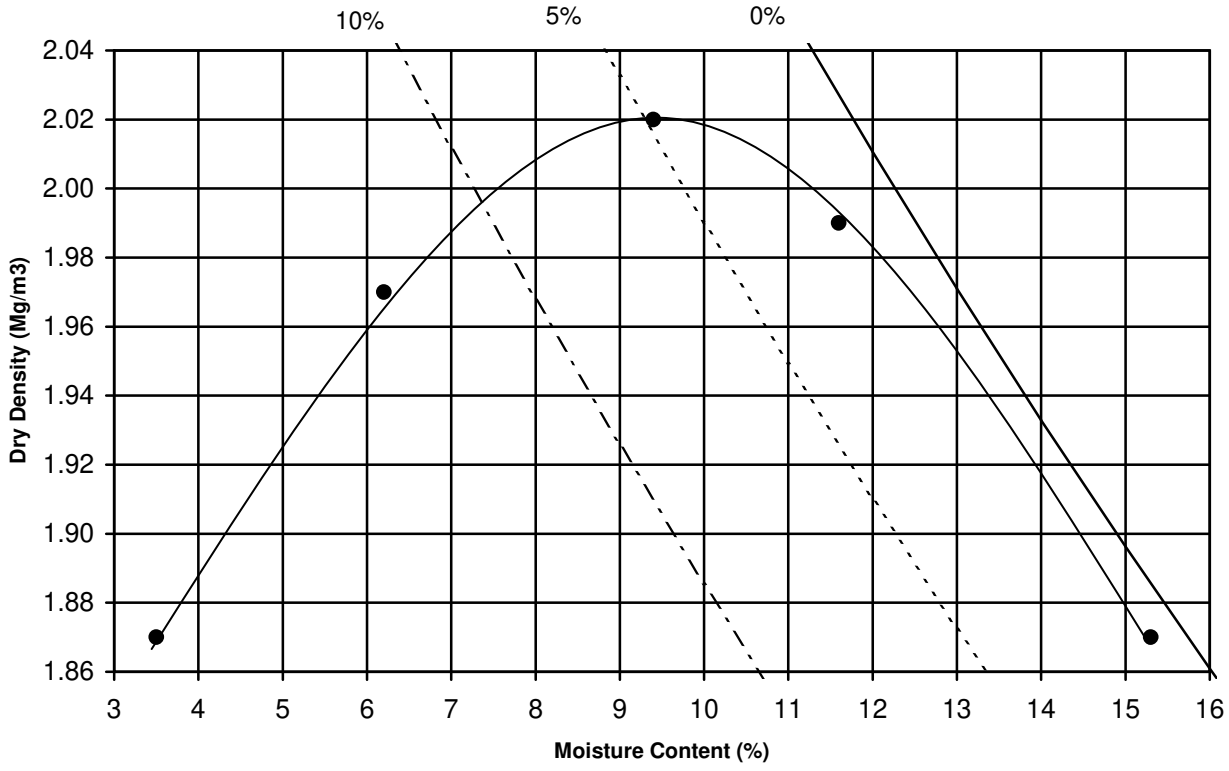
Sample No. AA76744/46 Depth (m) 1.00/2.00/3.00 Material Type B

Lab sample no. A18/0045 Customer: Kilgallen & Ptnrs/Kildare Co.Co.

Date Received: 05/01/2018 Test Method: 2.5 KG Rammer

Date Tested: 01/02/2018 BS1377:Part 4:1990 3.3

Dry Density (Mg/m^3)	1.99	1.87	1.97	2.02	1.87	0.00	
Moisture Content (%)	12	3.5	6.2	9.4	15	0	



Maximum Dry Density (Mg/m^3): 2.02 Optimum Moisture Content (%): 9

Description: Brown slightly 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: 13

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

The result relates to the specimen tested.
Opinions and interpretations are outside the scope of accreditation

IGSL Materials Laboratory	Approved by	Date	Page
		08/02/17	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. 133T

Report No.	**R84791**
Contract No.	20636
Contract Name:	Kildare Co.Co. - Machinery Yard
Customer:	Kilgallen/Kildare Co.Co.
BH/TP	TP12
Sample No.	AA76723/24
Depth (m)	1.00/2.00
Sample Type:	B
Lab Sample No.	A18/0040
Source (if applicable)	unknown
Material Type (if applicable):	B -Natural
Sample Received:	05/01/18
Date Tested:	22/01/18
Sample Cert:	N/A
Moisture Content (%):	13
% Particles > 20mm (By dry mass):	9.3
MCV:	9.7
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Mottled brown slightly sandy, gravelly, CLAY with some cobbles

The result relates to the specimen tested.
Any remaining material will be retained for one month.
Sampling and opinions and interpretations are outside the scope of accreditation.

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

IGSL Ltd Materials Laboratory	Approved by	Date	Page
	H Byrne	24/01/18	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. 133T

Report No.	**R84792**
Contract No.	20636
Contract Name:	Kildare Co.Co. - Machinery Yard
Customer:	Kilgallen/Kildare Co.Co.
BH/TP	TP12
Sample No.	AA76723/24
Depth (m)	1.00/2.00
Sample Type:	B
Lab Sample No.	A18/0040
Source (if applicable)	unknown
Material Type (if applicable):	B - 1% Lime - Air Cured 2hrs
Sample Received:	05/01/18
Date Tested:	23/01/18
Sample Cert:	N/A
Moisture Content (%):	14
% Particles > 20mm (By dry mass):	9.3
MCV:	11.5
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Mottled brown slightly sandy, gravelly, CLAY with some cobbles

The result relates to the specimen tested.
Any remaining material will be retained for one month.
Sampling and opinions and interpretations are outside the scope of accreditation.

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

IGSL Ltd Materials Laboratory	Approved by	Date	Page
	H Byrne	24/01/18	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. 133T

Report No.	**R84793**
Contract No.	20636
Contract Name:	Kildare Co.Co. - Machinery Yard
Customer:	Kilgallen/Kildare Co.Co.
BH/TP	TP12
Sample No.	AA76723/24
Depth (m)	1.00/2.00
Sample Type:	B
Lab Sample No.	A18/0040
Source (if applicable)	unknown
Material Type (if applicable):	B - 2% Lime - Air Cured 2hrs
Sample Received:	05/01/18
Date Tested:	23/01/18
Sample Cert:	N/A
Moisture Content (%):	14
% Particles > 20mm (By dry mass):	9.3
MCV:	11.9
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Mottled brown slightly sandy, gravelly, CLAY with some cobbles

The result relates to the specimen tested.
Any remaining material will be retained for one month.
Sampling and opinions and interpretations are outside the scope of accreditation.

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

IGSL Ltd Materials Laboratory	Approved by	Date	Page
	H Byrne	24/01/18	1 of 1

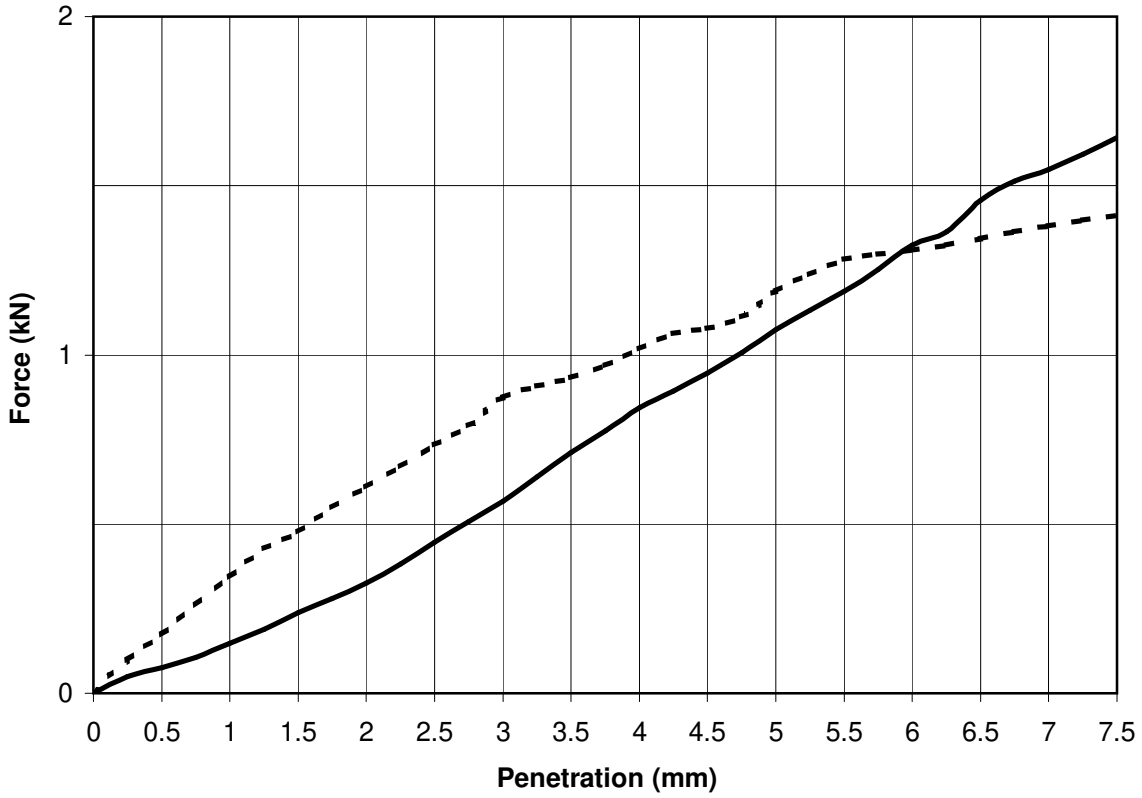
IGSL Ltd
Materials Laboratory
Unit J5,M7 Business Park
Naas Co.Kildare
045 899324

TEST REPORT
Determination of California Bearing Ratio (CBR)

Tested in accordance with BS1377:Part 4:1990, clause 7

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

Report No.	R84803	Contract	Kildare Co.Co. - Machinery Yard
Contract No.	20636	Customer	Kilgallen/Kildare Co.Co
Date received	05/01/18	Date Tested	22/01/18
BH/TP No.	TP10	Sample No.	A76748/49/5 Type: B
Depth (m)	1.00/2.00/3.00	Lab sample No.	A18/0043



Key: ———— Top ---------- Base

Description:	Mottled brown slightly sandy, gravelly, CLAY with some cobbles		
Initial Condition:	Unsoaked		
Moisture Content (%):	12	Bulk Density (Mg/m^3):	2.21
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.97
% Material >20mm:	16		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**2.8**	**5.7**
Moisture Content %	12	12

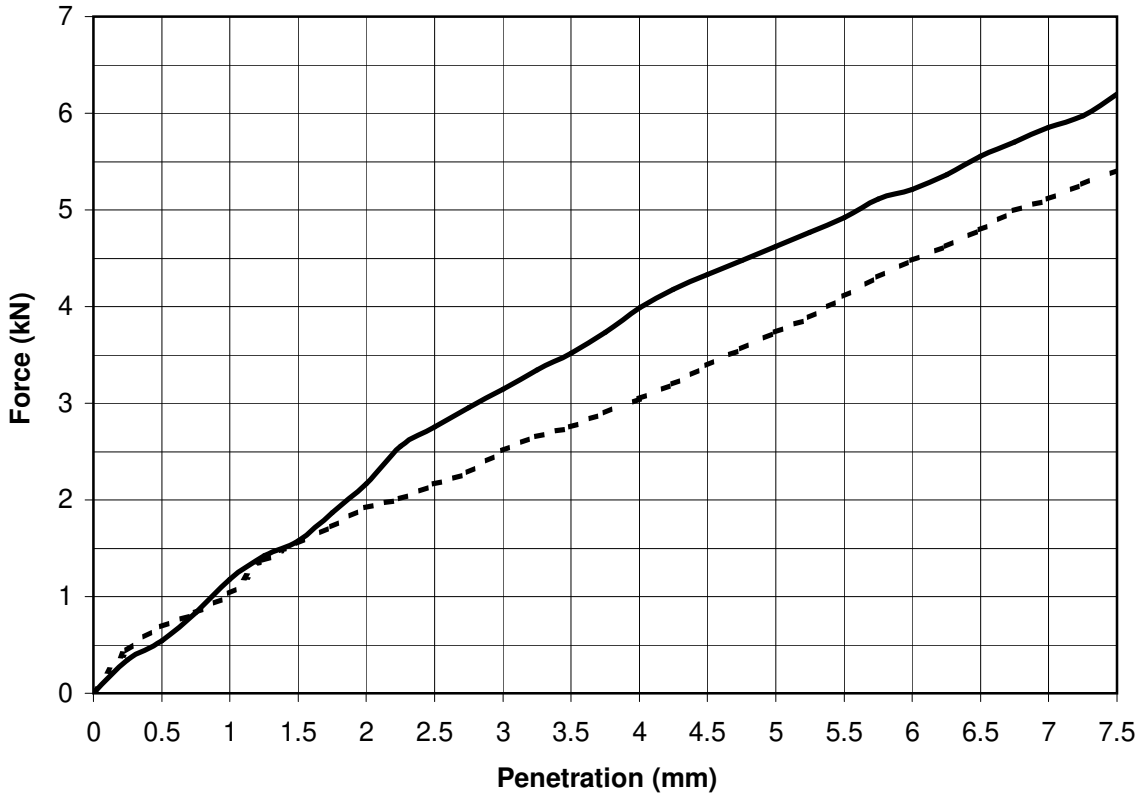
Persons authorized to approve reports
J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory

Approved by	Date	Page No.
H Byrne	24/01/18	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.1337

Report No.	R85040	Contract	Kildare Co.Co. - Machinery Yard
Contract No.	20636	Customer	Kilgallen/Kildare Co.Co
Date received	05/01/18	Date Tested	27/01/18
BH/TP No.	TP12	Sample No.	AA76723-24 Type: B
Depth (m)	1.00-2.00	Lab sample No.	A18/0040



Key: ———— Top ---------- Base

Description:	Mottled brown slightly sandy, gravelly, CLAY with some cobbles		
Initial Condition:	1% Lime - 3 Day Soaked		
Moisture Content (%):	14	Bulk Density (Mg/m^3):	2.13
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.87
% Material >20mm:	18		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**23**	**19**
Moisture Content %	14	14

Persons authorized to approve reports

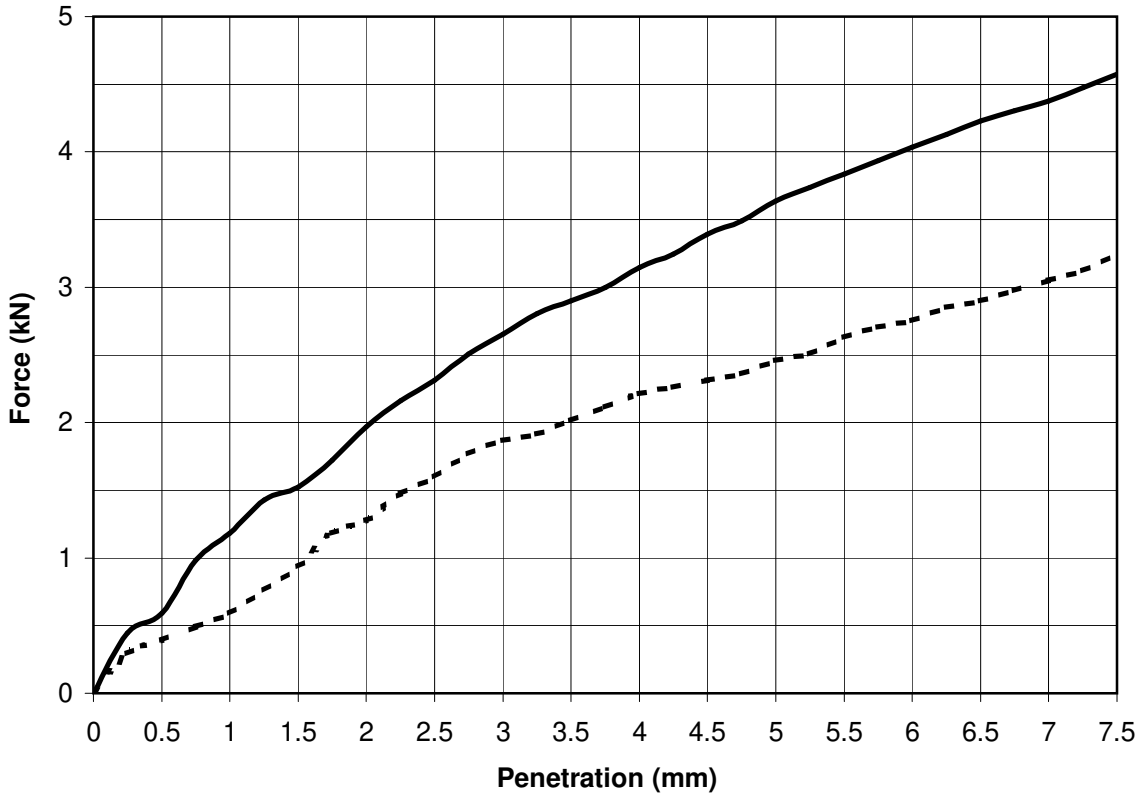
J Barrett (Quality Manager)

H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory	Approved by	Date	Page No.
	H Byrne	06/02/18	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 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO.1337

Report No.	R85147	Contract	Kildare Co.Co. - Machinery Yard
Contract No.	20636	Customer	Kilgallen/Kildare Co.Co
Date received	05/01/18	Date Tested	07/02/18
BH/TP No.	TP12	Sample No.	AA76723-24 Type: B
Depth (m)	1.00-2.00	Lab sample No.	A18/0040



Key: ———— Top ---------- Base

Description:	Mottled brown slightly sandy, gravelly, CLAY with some cobbles		
Initial Condition:	1% Lime - 14 Day soaked		
Moisture Content (%):	15	Bulk Density (Mg/m^3):	2.21
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.93
% Material >20mm:	18		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**18**	**12**
Moisture Content %	14	15

Persons authorized to approve reports

J Barrett (Quality Manager)

H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory	Approved by	Date	Page No.
	H Byrne	08/02/18	1 of 1

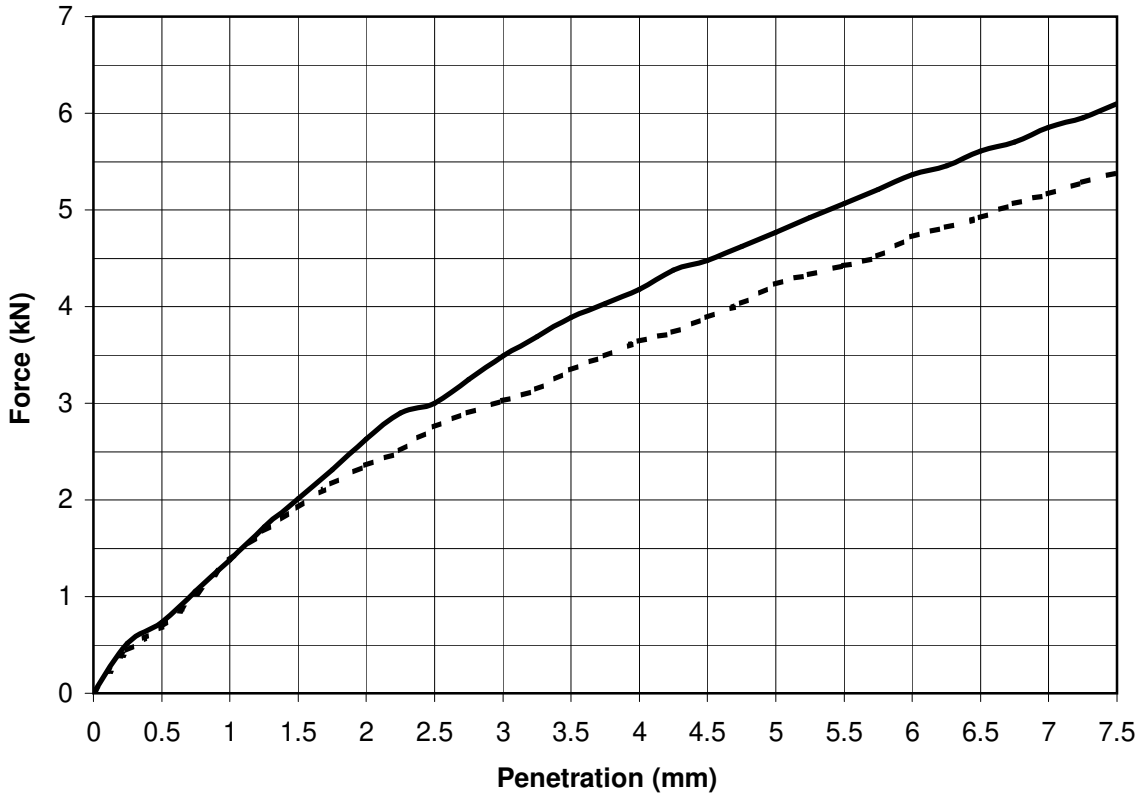
IGSL Ltd
Materials Laboratory
Unit J5,M7 Business Park
Naas Co.Kildare
045 899324

TEST REPORT
Determination of California Bearing Ratio (CBR)

Tested in accordance with BS1377:Part 4:1990, clause 7

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

Report No.	R85039	Contract	Kildare Co.Co. - Machinery Yard
Contract No.	20636	Customer	Kilgallen/Kildare Co.Co
Date received	05/01/18	Date Tested	27/01/18
BH/TP No.	TP12	Sample No.	AA76723-24 Type: B
Depth (m)	1.00-2.00	Lab sample No.	A18/0040



Key: ———— Top ---------- Base

Description:	Mottled brown slightly sandy, gravelly, CLAY with some cobbles		
Initial Condition:	2% Lime - 3 Day Soaked		
Moisture Content (%):	14	Bulk Density (Mg/m^3):	2.25
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.98
% Material >20mm:	18		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**24**	**21**
Moisture Content %	14	14

Persons authorized to approve reports

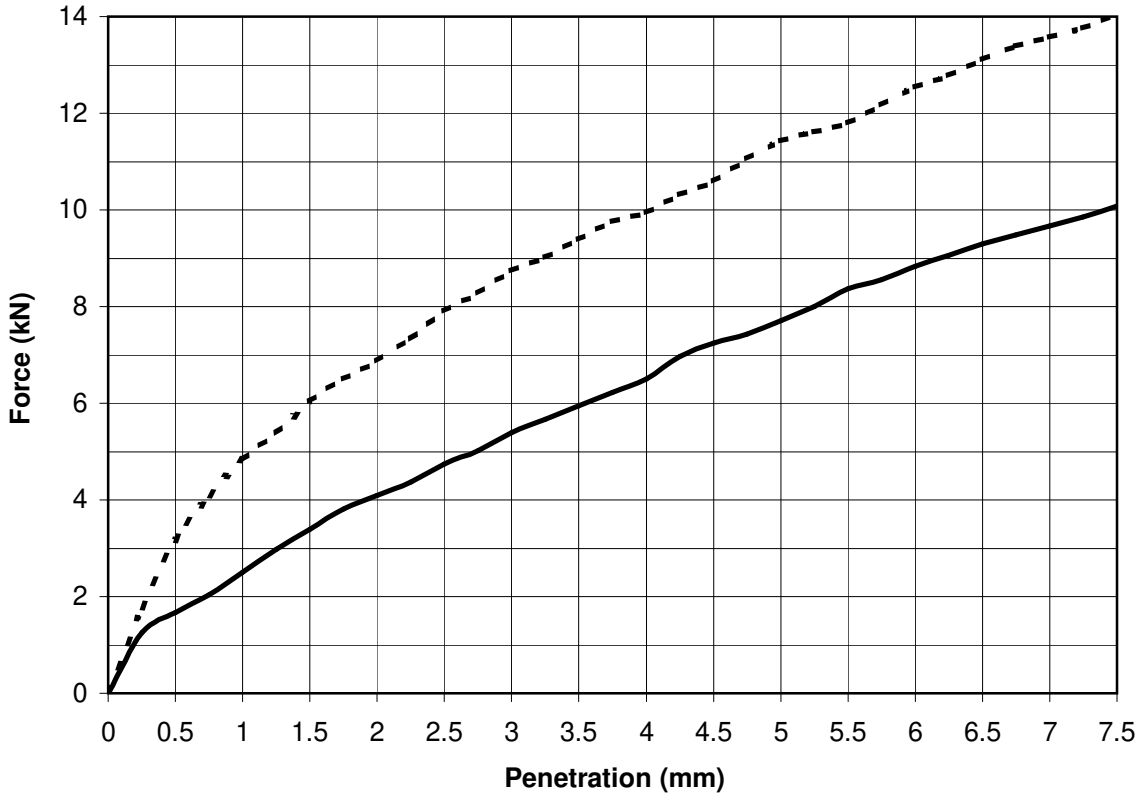
J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory

Approved by	Date	Page No.
H Byrne	06/02/18	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.1337

Report No.	R85147	Contract	Kildare Co.Co. - Machinery Yard
Contract No.	20636	Customer	Kilgallen/Kildare Co.Co
Date received	05/01/18	Date Tested	07/02/18
BH/TP No.	TP12	Sample No.	AA76723-24 Type: B
Depth (m)	1.00-2.00	Lab sample No.	A18/0040



Key: ———— Top ---------- Base

Description:	Mottled brown slightly sandy, gravelly, CLAY with some cobbles		
Initial Condition:	2% Lime - 14 Day soaked		
Moisture Content (%):	13	Bulk Density (Mg/m^3):	2.27
Surcharge (kg):	4	Dry Density (Mg/m^3):	2.00
% Material >20mm:	18		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**39**	**60**
Moisture Content %	13	14

Persons authorized to approve reports

J Barrett (Quality Manager)

H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory	Approved by	Date	Page No.
	H Byrne	08/02/18	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. 1331

Report No.	**R84794**
Contract No.	20636
Contract Name:	Kildare Co.Co. - Machinery Yard
Customer:	Kilgallen/Kildare Co.Co.
BH/TP	TP13
Sample No.	AA76143/44/45
Depth (m)	0.70/1.20/2.80
Sample Type:	B
Lab Sample No.	A18/0041
Source (if applicable)	unknown
Material Type (if applicable):	B - Natural
Sample Received:	05/01/18
Date Tested:	22/01/18
Sample Cert:	N/A
Moisture Content (%):	14
% Particles > 20mm (By dry mass):	24
MCV:	<1
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Mottled brown silty, very sandy, GRAVEL

The result relates to the specimen tested.
Any remaining material will be retained for one month.
Sampling and opinions and interpretations are outside the scope of accreditation.

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

IGSL Ltd Materials Laboratory	Approved by	Date	Page
	H Byrne	24/01/18	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. 1331

Report No.	**R84795**
Contract No.	20636
Contract Name:	Kildare Co.Co. - Machinery Yard
Customer:	Kilgallen/Kildare Co.Co.
BH/TP	TP13
Sample No.	AA76143/44/45
Depth (m)	0.70/1.20/2.80
Sample Type:	B
Lab Sample No.	A18/0041
Source (if applicable)	unknown
Material Type (if applicable):	B - 1% Lime - 2hrs Air Cured
Sample Received:	05/01/18
Date Tested:	23/01/18
Sample Cert:	N/A
Moisture Content (%):	13
% Particles > 20mm (By dry mass):	24
MCV:	4.8
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Mottled brown silty, very sandy, GRAVEL

The result relates to the specimen tested.
Any remaining material will be retained for one month.
Sampling and opinions and interpretations are outside the scope of accreditation.

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

IGSL Ltd Materials Laboratory	Approved by	Date	Page
	H Byrne	24/01/18	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. 133T

Report No.	**R84796**
Contract No.	20636
Contract Name:	Kildare Co.Co. - Machinery Yard
Customer:	Kilgallen/Kildare Co.Co.
BH/TP	TP13
Sample No.	AA76143/44/45
Depth (m)	0.70/1.20/2.80
Sample Type:	B
Lab Sample No.	A18/0041
Source (if applicable)	unknown
Material Type (if applicable):	B - 2% Lime - 2hrs Air Cured
Sample Received:	05/01/18
Date Tested:	23/01/18
Sample Cert:	N/A
Moisture Content (%):	14
% Particles > 20mm (By dry mass):	24
MCV:	7
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Mottled brown silty, very sandy, GRAVEL

The result relates to the specimen tested.
Any remaining material will be retained for one month.
Sampling and opinions and interpretations are outside the scope of accreditation.

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

IGSL Ltd Materials Laboratory	Approved by	Date	Page
	H Byrne	24/01/18	1 of 1

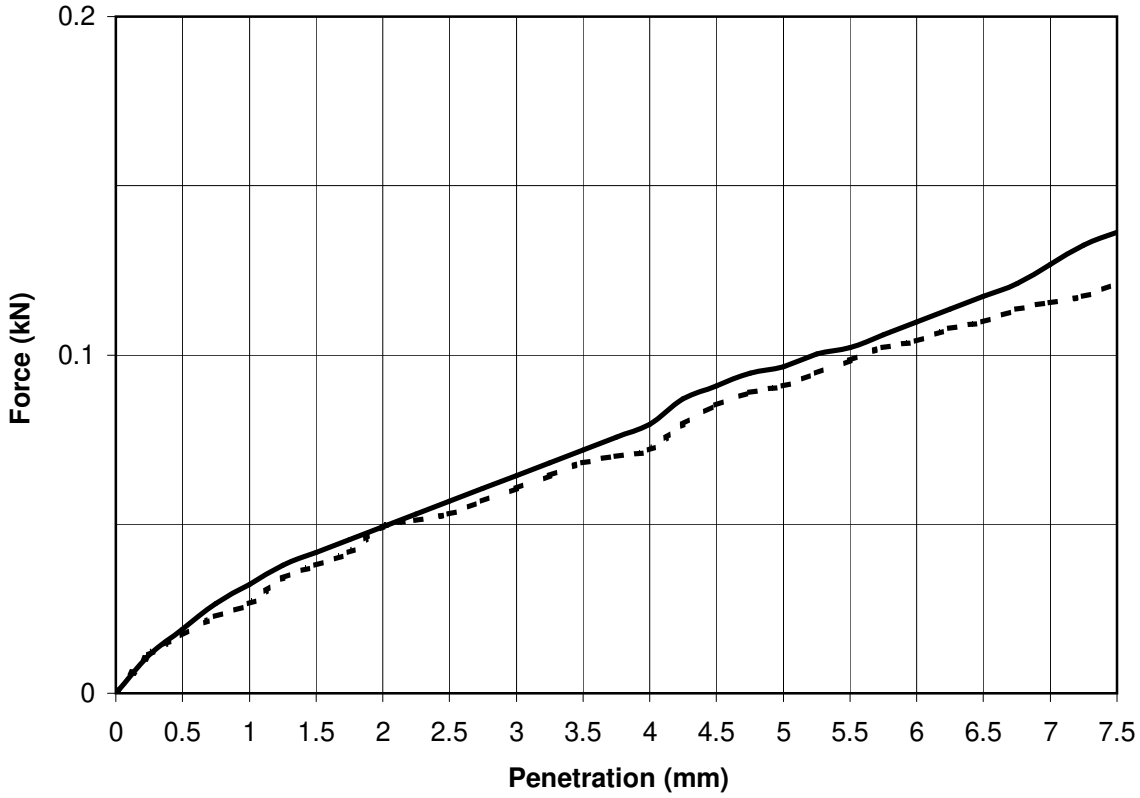
IGSL Ltd
Materials Laboratory
Unit J5,M7 Business Park
Naas Co.Kildare
045 899324

TEST REPORT
Determination of California Bearing Ratio (CBR)

Tested in accordance with BS1377:Part 4:1990, clause 7

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

Report No.	R84805	Contract	Kildare Co.Co. - Machinery Yard
Contract No.	20636	Customer	Kilgallen/Kildare Co.Co
Date received	05/01/18	Date Tested	22/01/18
BH/TP No.	TP13	Sample No.	A76143/44/4 Type: B
Depth (m)	0.70/1.20/2.80	Lab sample No.	A18/0041



Key: ———— Top ---------- Base

Description:	Mottled brown silty, very sandy, GRAVEL		
Initial Condition:	Unsoaked		
Moisture Content (%):	14	Bulk Density (Mg/m^3):	2.23
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.96
% Material >20mm:	21		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**0.5**	**0.5**
Moisture Content %	14	14

Persons authorized to approve reports

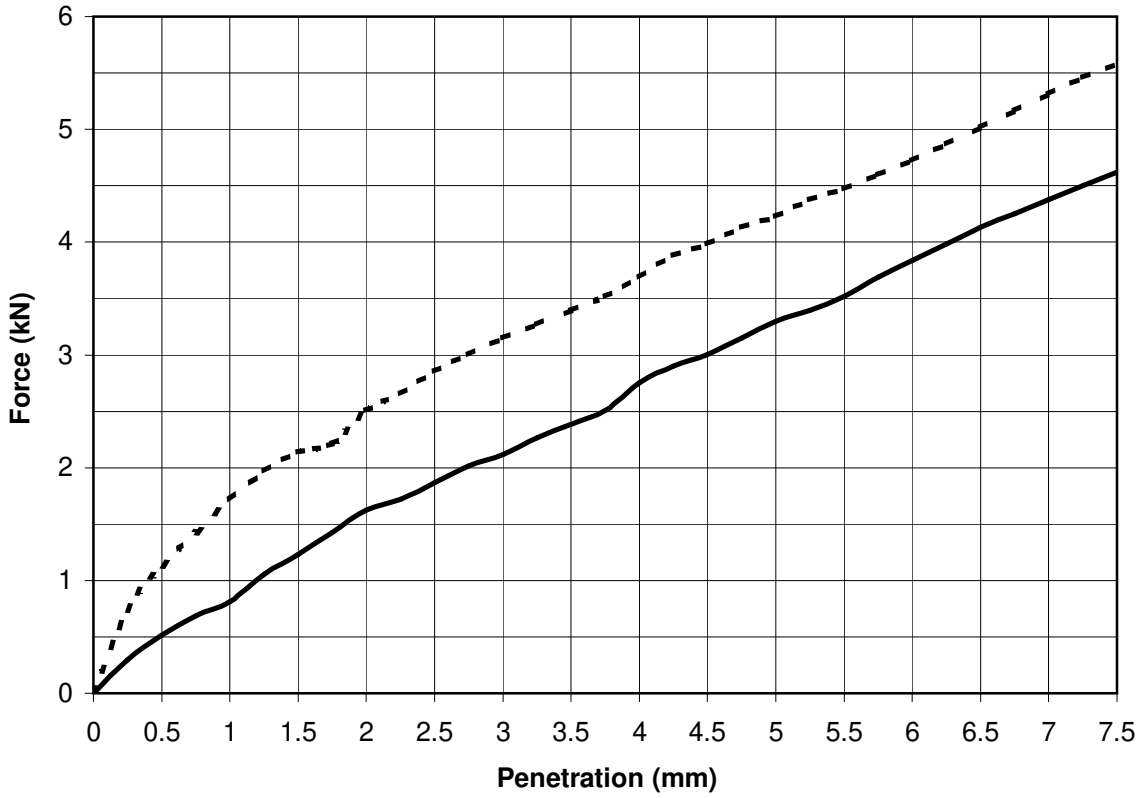
J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory

Approved by	Date	Page No.
H Byrne	24/01/18	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.1337

Report No.	R84805	Contract	Kildare Co.Co. - Machinery Yard
Contract No.	20636	Customer	Kilgallen/Kildare Co.Co
Date received	05/01/18	Date Tested	26/01/18
BH/TP No.	TP13	Sample No.	A76143/44/4 Type: B
Depth (m)	0.70/1.20/2.80	Lab sample No.	A18/0041



Key: ———— Top ---------- Base

Description:	Mottled brown silty, very sandy, GRAVEL		
Initial Condition:	2% Lime - 3 Day soaked		
Moisture Content (%):	14	Bulk Density (Mg/m^3):	2.23
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.96
% Material >20mm:	21		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**17**	**22**
Moisture Content %	14	14

Persons authorized to approve reports

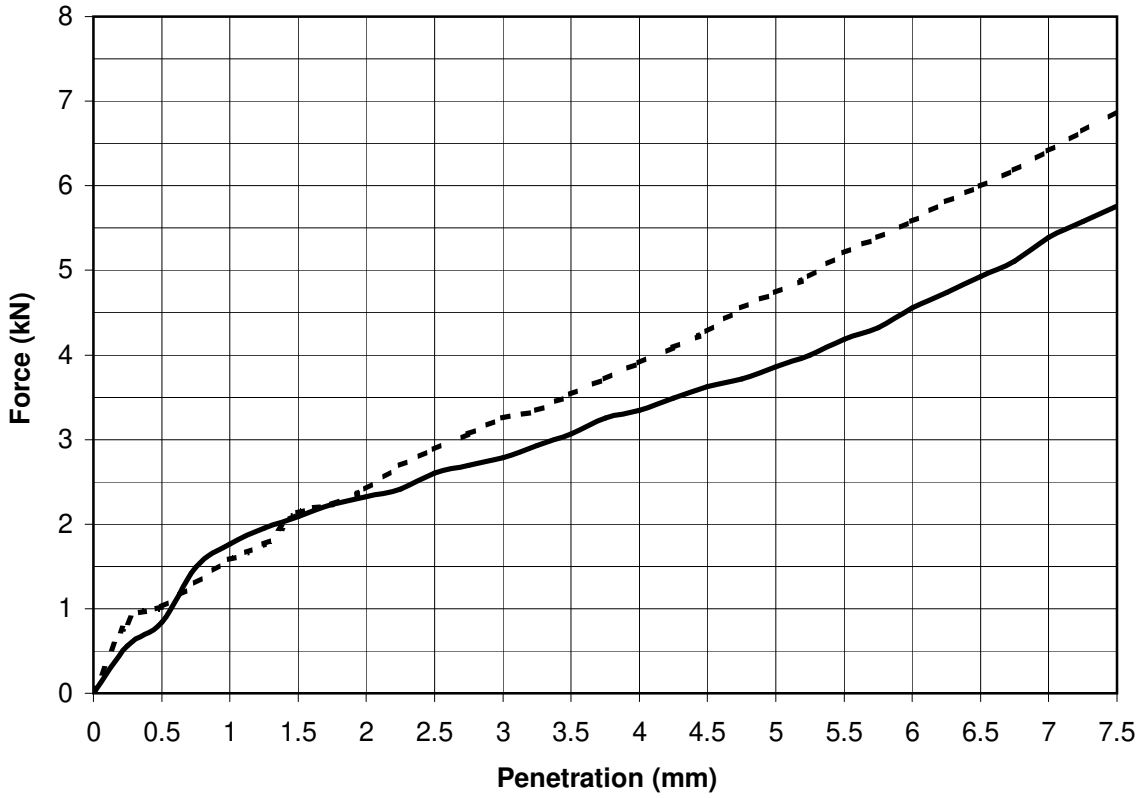
J Barrett (Quality Manager)

H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory	Approved by	Date	Page No.
	H Byrne	24/01/18	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.1337

Report No.	R85132	Contract	Kildare Co.Co. - Machinery Yard
Contract No.	20636	Customer	Kilgallen/Kildare Co.Co
Date received	05/01/18	Date Tested	06/02/18
BH/TP No.	TP13	Sample No.	AA76143-45 Type: B
Depth (m)	0.70-2.80	Lab sample No.	A18/0041



Key: ———— Top ---------- Base

Description:	Mottled brown silty, very sandy, GRAVEL		
Initial Condition:	2% Lime - 14 Day Soaked		
Moisture Content (%):	14	Bulk Density (Mg/m^3):	2.24
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.97
% Material >20mm:	21		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**20**	**24**
Moisture Content %	14	13

Persons authorized to approve reports

J Barrett (Quality Manager)

H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory	Approved by	Date	Page No.
	H Byrne	07/02/18	1 of 1

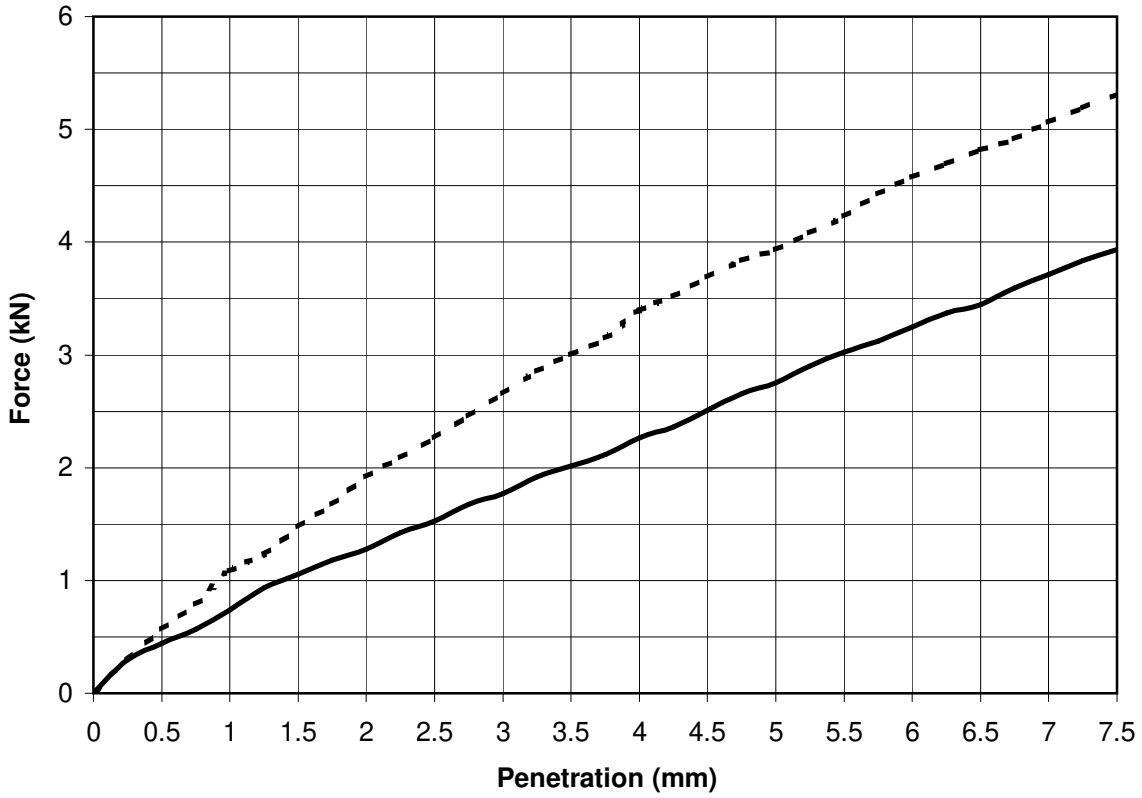
IGSL Ltd
Materials Laboratory
Unit J5,M7 Business Park
Naas Co.Kildare
045 899324

TEST REPORT
Determination of California Bearing Ratio (CBR)

Tested in accordance with BS1377:Part 4:1990, clause 7

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

Report No.	R84805	Contract	Kildare Co.Co. - Machinery Yard
Contract No.	20636	Customer	Kilgallen/Kildare Co.Co
Date received	05/01/18	Date Tested	26/01/18
BH/TP No.	TP13	Sample No.	A76143/44/4 Type: B
Depth (m)	0.70/1.20/2.80	Lab sample No.	A18/0041



Key: ———— Top ---------- Base

Description:	Mottled brown silty, very sandy, GRAVEL		
Initial Condition:	1% Lime , 1% Cement - 3 Day soaked		
Moisture Content (%):	14	Bulk Density (Mg/m^3):	2.20
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.94
% Material >20mm:	21		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**14**	**20**
Moisture Content %	14	13

Persons authorized to approve reports

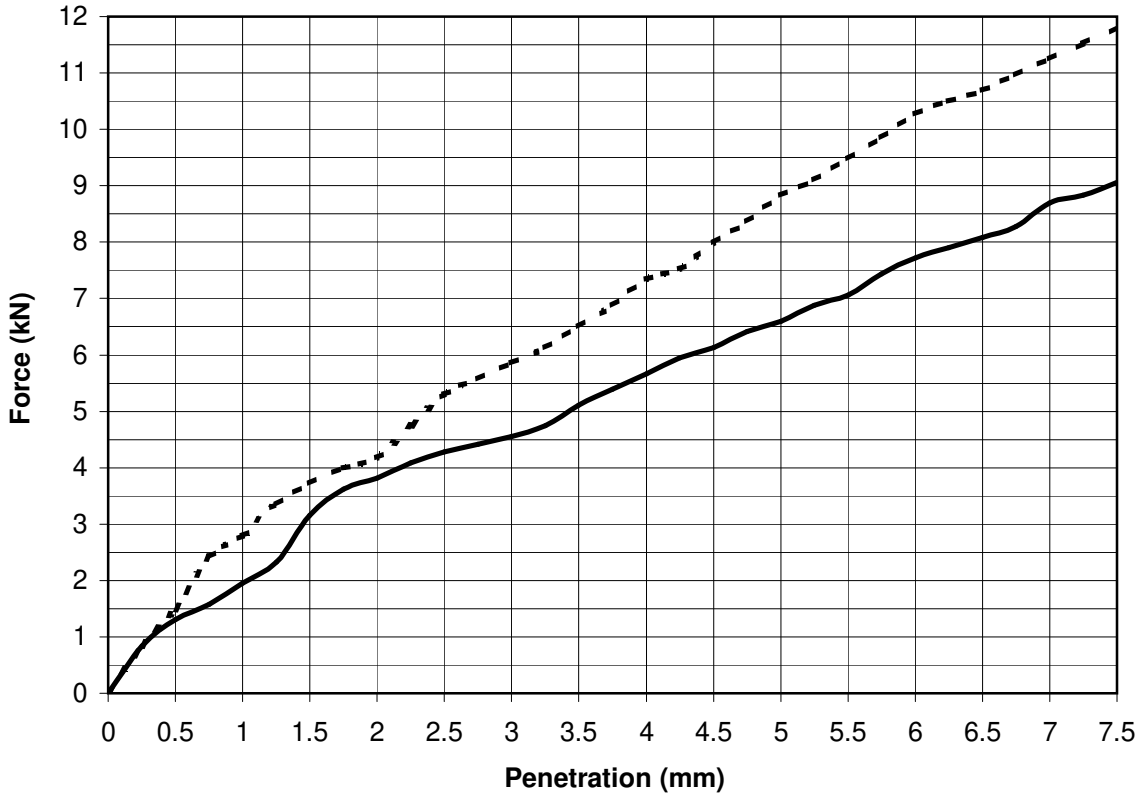
J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory

Approved by	Date	Page No.
H Byrne	24/01/18	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.1337

Report No.	R85131	Contract	Kildare Co.Co. - Machinery Yard
Contract No.	20636	Customer	Kilgallen/Kildare Co.Co
Date received	05/01/18	Date Tested	06/02/18
BH/TP No.	TP13	Sample No.	AA76143-45 Type: B
Depth (m)	0.70-2.80	Lab sample No.	A18/0041



Key: ———— Top ---------- Base

Description:	Mottled brown silty, very sandy, GRAVEL		
Initial Condition:	1% Lime,1% Cement .7 Day Soaked		
Moisture Content (%):	14	Bulk Density (Mg/m^3):	2.26
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.99
% Material >20mm:	21		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**33**	**44**
Moisture Content %	13	14

Persons authorized to approve reports

J Barrett (Quality Manager)

H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory	Approved by	Date	Page No.
	H Byrne	07/02/18	1 of 1

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. R85193 Contract No. 20636

Contract Name: Kildare Co.Co. - Machinery Yard

Lab Contract No. 20636 Location: TP13

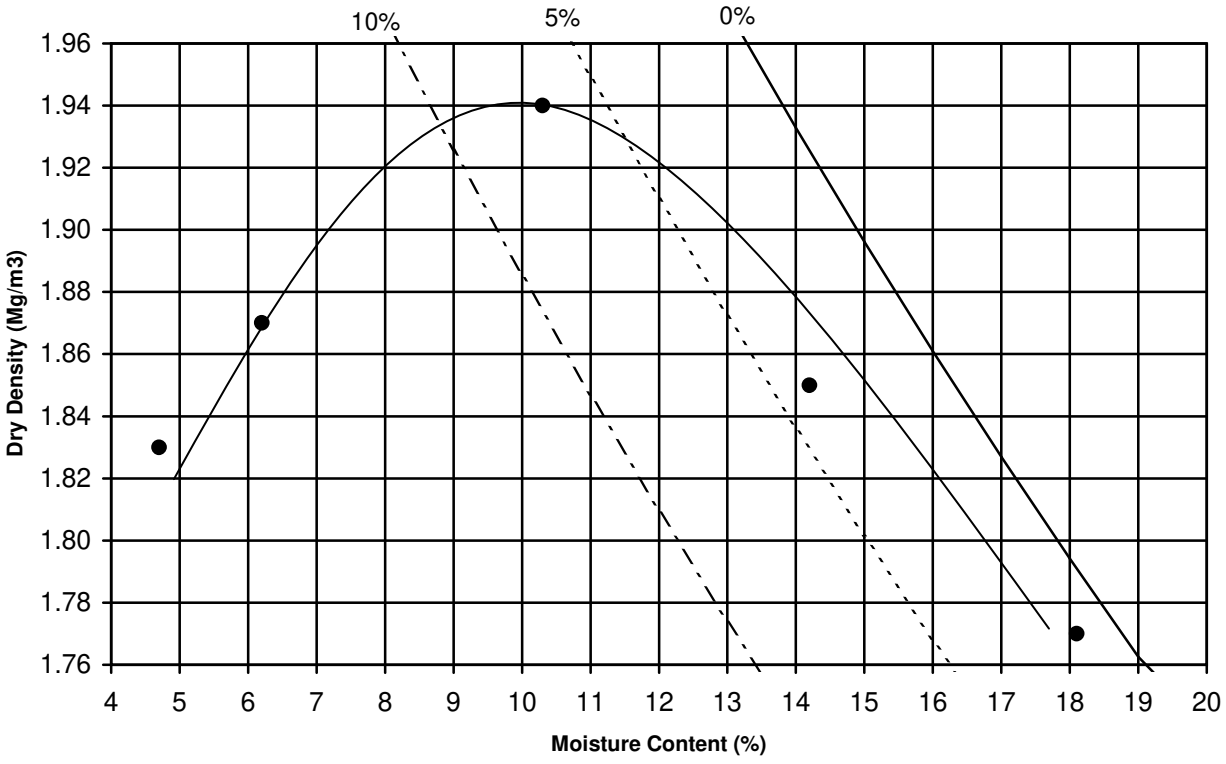
Sample No. AA6143/44/45/43 Depth (m) 0.7/1.2/2.8m Material Type B

Lab sample no. A18/0041 Customer: Kilgallen & Ptnrs/Kildare Co.Co.

Date Received: 05/01/2018 Test Method: 2.5 KG Rammer

Date Tested: 01/02/2018 BS1377:Part 4:1990 3.3

Dry Density (Mg/m^3)	1.83	1.87	1.94	1.85	1.77	0.00	
Moisture Content (%)	5	6.2	10.3	14	18	0	



Maximum Dry Density (Mg/m^3): 1.94 Optimum Moisture Content (%): 10

Description: Mottled brown silty, very sandy, GRAVEL

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: 21

The result relates to the specimen tested.
Opinions and interpretations are outside the scope of accreditation

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

IGSL Materials Laboratory	Approved by	Date	Page
	H Byrne	08/02/17	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. 133T

Report No.	**R84797**
Contract No.	20636
Contract Name:	Kildare Co.Co. - Machinery Yard
Customer:	Kilgallen/Kildare Co.Co.
BH/TP	TP20
Sample No.	AA76736/37
Depth (m)	1.00/2.00
Sample Type:	B
Lab Sample No.	A18/0044
Source (if applicable)	unknown
Material Type (if applicable):	B - Natural
Sample Received:	05/01/18
Date Tested:	22/01/18
Sample Cert:	N/A
Moisture Content (%):	16
% Particles > 20mm (By dry mass):	18
MCV:	6
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Mottled brown slightly sandy, gravelly, CLAY

The result relates to the specimen tested.
Any remaining material will be retained for one month.
Sampling and opinions and interpretations are outside the scope of accreditation.

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

IGSL Ltd Materials Laboratory	Approved by	Date	Page
	H Byrne	24/01/18	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. 133T

Report No.	**R84798**
Contract No.	20636
Contract Name:	Kildare Co.Co. - Machinery Yard
Customer:	Kilgallen/Kildare Co.Co.
BH/TP	TP20
Sample No.	AA76736/37
Depth (m)	1.00/2.00
Sample Type:	B
Lab Sample No.	A18/0044
Source (if applicable)	unknown
Material Type (if applicable):	B - 1% Lime - 2hrs Air Cured
Sample Received:	05/01/18
Date Tested:	23/01/18
Sample Cert:	N/A
Moisture Content (%):	15
% Particles > 20mm (By dry mass):	18
MCV:	10
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Mottled brown slightly sandy, gravelly, CLAY

The result relates to the specimen tested.
Any remaining material will be retained for one month.
Sampling and opinions and interpretations are outside the scope of accreditation.

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

IGSL Ltd Materials Laboratory	Approved by	Date	Page
	H Byrne	24/01/18	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. 133T

Report No.	**R84799**
Contract No.	20636
Contract Name:	Kildare Co.Co. - Machinery Yard
Customer:	Kilgallen/Kildare Co.Co.
BH/TP	TP20
Sample No.	AA76736/37
Depth (m)	1.00/2.00
Sample Type:	B
Lab Sample No.	A18/0044
Source (if applicable)	unknown
Material Type (if applicable):	B - 2% Lime - 2hrs Air Cured
Sample Received:	05/01/18
Date Tested:	23/01/18
Sample Cert:	N/A
Moisture Content (%):	15
% Particles > 20mm (By dry mass):	18
MCV:	11
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Mottled brown slightly sandy, gravelly, CLAY

The result relates to the specimen tested.
Any remaining material will be retained for one month.
Sampling and opinions and interpretations are outside the scope of accreditation.

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

IGSL Ltd Materials Laboratory	Approved by	Date	Page
	H Byrne	24/01/18	1 of 1

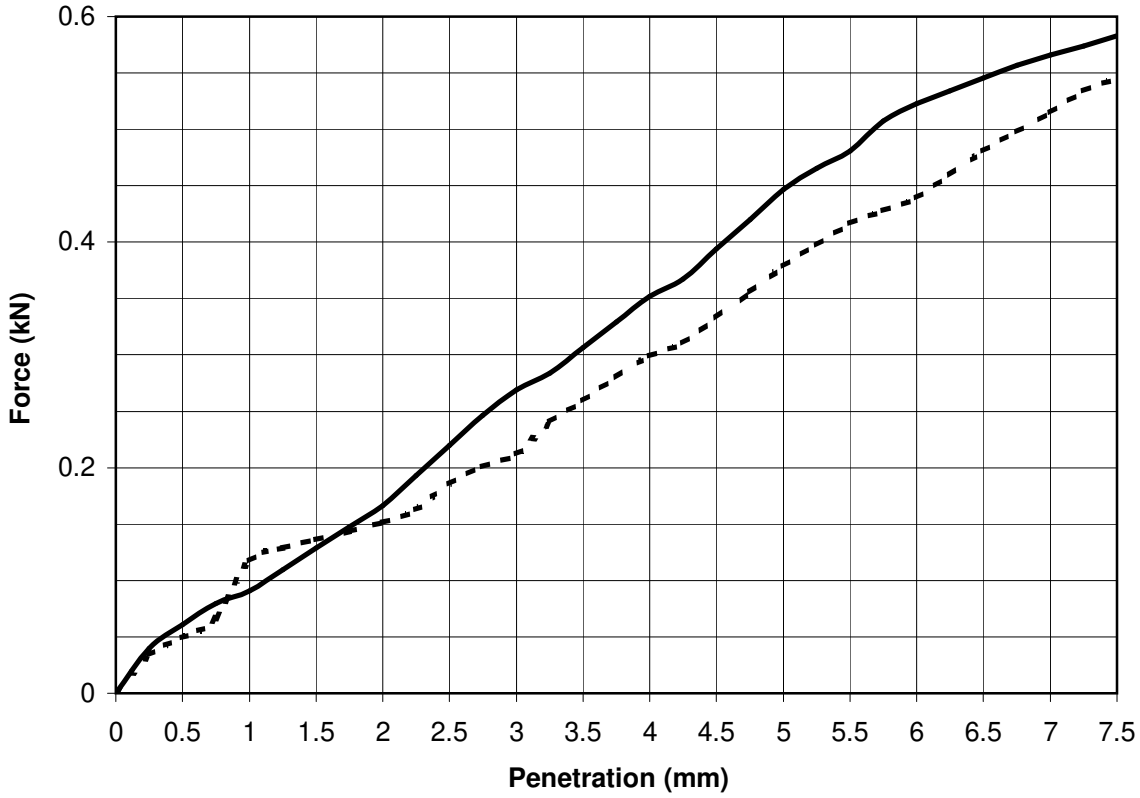
IGSL Ltd
Materials Laboratory
Unit J5,M7 Business Park
Naas Co.Kildare
045 899324

TEST REPORT
Determination of California Bearing Ratio (CBR)

Tested in accordance with BS1377:Part 4:1990, clause 7

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

Report No.	R84806	Contract	Kildare Co.Co. - Machinery Yard
Contract No.	20636	Customer	Kilgallen/Kildare Co.Co
Date received	05/01/18	Date Tested	22/01/18
BH/TP No.	TP20	Sample No.	AA76736/37 Type: B
Depth (m)	1.00/2.00	Lab sample No.	A18/0044



Key: ———— Top ---------- Base

Description:	Mottled brown slightly sandy, gravelly, CLAY		
Initial Condition:	Unsoaked		
Moisture Content (%):	16	Bulk Density (Mg/m^3):	2.16
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.87
% Material >20mm:	15		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**2.2**	**1.9**
Moisture Content %	16	16

Persons authorized to approve reports

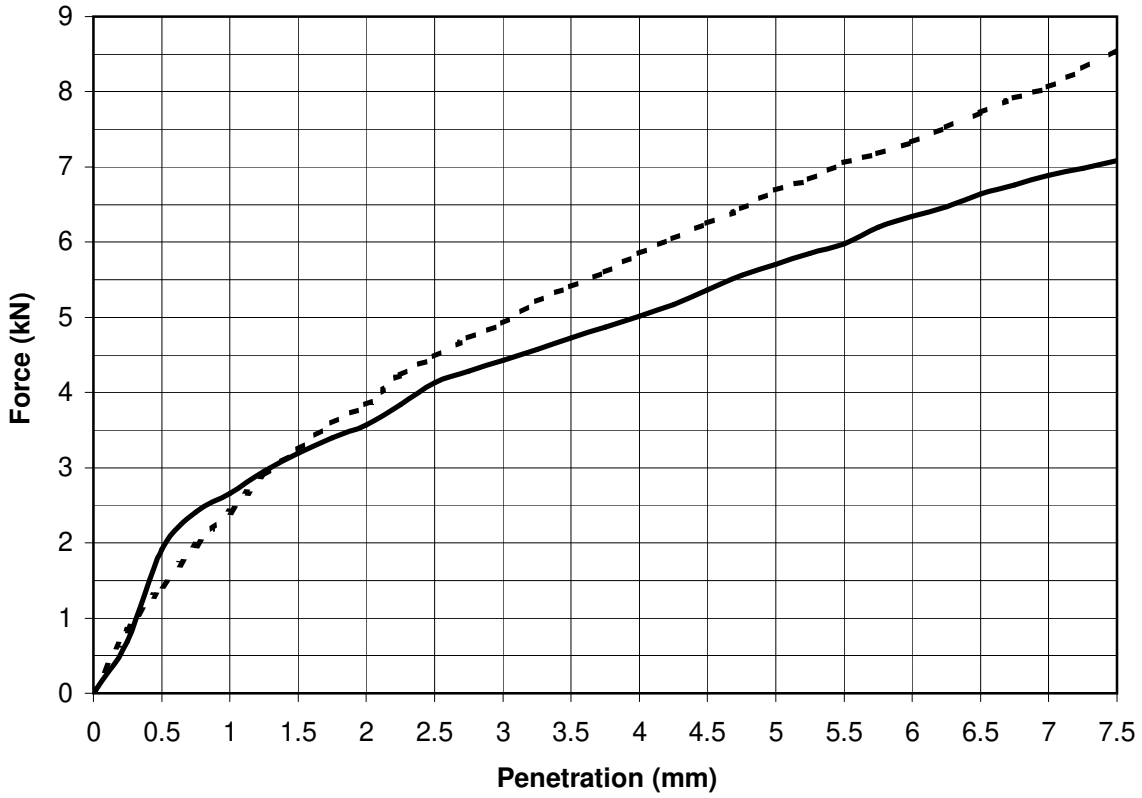
J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory

Approved by	Date	Page No.
H Byrne	24/01/18	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.1337

Report No.	R85041	Contract	Kildare Co.Co. - Machinery Yard
Contract No.	20636	Customer	Kilgallen/Kildare Co.Co
Date received	05/01/18	Date Tested	30/01/18
BH/TP No.	TP20	Sample No.	AA76736/37 Type: B
Depth (m)	1.00/2.00	Lab sample No.	A18/0044



Key: ———— Top ---------- Base

Description:	Mottled brown slightly sandy, gravelly, CLAY		
Initial Condition:	2% Lime - 3 Day Soaked		
Moisture Content (%):	15	Bulk Density (Mg/m^3):	2.19
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.90
% Material >20mm:	15.3		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**31**	**34**
Moisture Content %	15	15

Persons authorized to approve reports

J Barrett (Quality Manager)

H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory	Approved by	Date	Page No.
	H Byrne	06/02/18	1 of 1

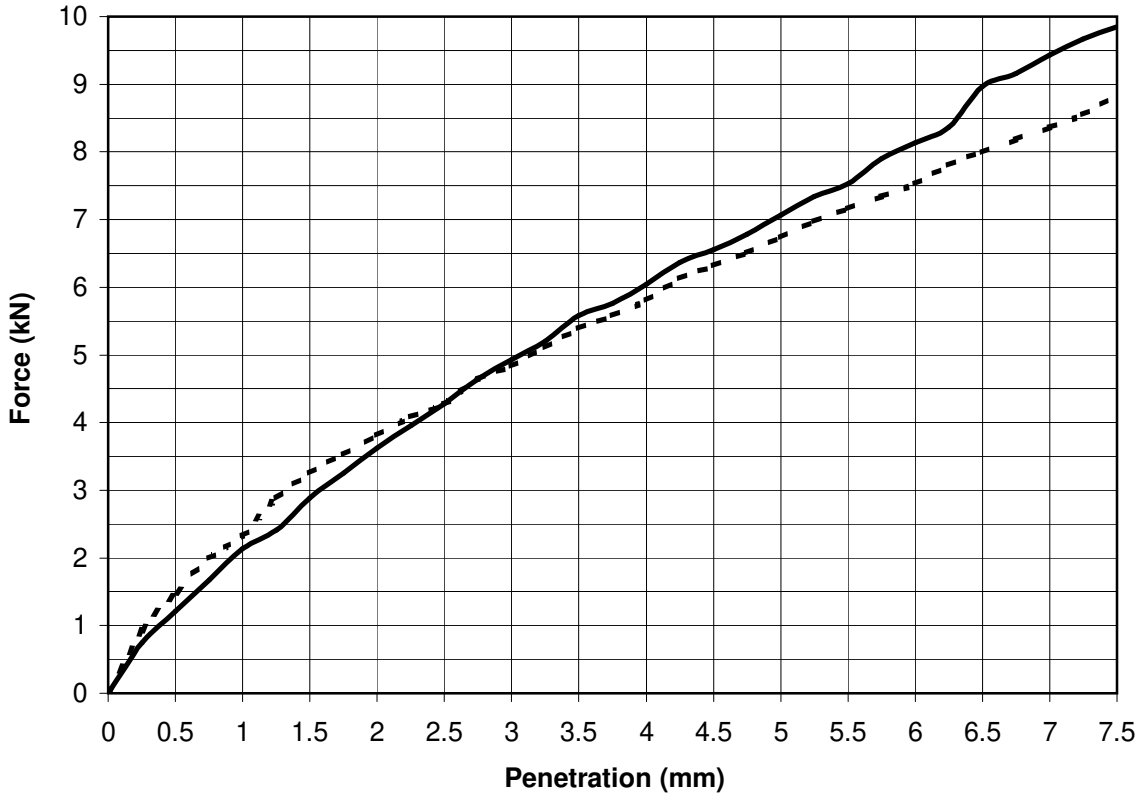
IGSL Ltd
Materials Laboratory
Unit J5,M7 Business Park
Naas Co.Kildare
045 899324

TEST REPORT
Determination of California Bearing Ratio (CBR)

Tested in accordance with BS1377:Part 4:1990, clause 7

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

Report No.	R85149	Contract	Kildare Co.Co. - Machinery Yard
Contract No.	20636	Customer	Kilgallen/Kildare Co.Co
Date received	05/01/18	Date Tested	07/02/18
BH/TP No.	TP20	Sample No.	AA76736/37 Type: B
Depth (m)	1.00/2.00	Lab sample No.	A18/0044



Key: ———— Top ---------- Base

Description:	Mottled brown slightly sandy, gravelly, CLAY		
Initial Condition:	2% Lime - 14 Day Soaked		
Moisture Content (%):	15	Bulk Density (Mg/m^3):	2.23
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.94
% Material >20mm:	15		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**35**	**34**
Moisture Content %	15	15

Persons authorized to approve reports

J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory

Approved by	Date	Page No.
H Byrne	08/02/18	1 of 1

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. R85129 Contract No. 20636

Contract Name: Kildare Co.Co. - Machinery Yard

Lab Contract No. 20636 Location: TP20

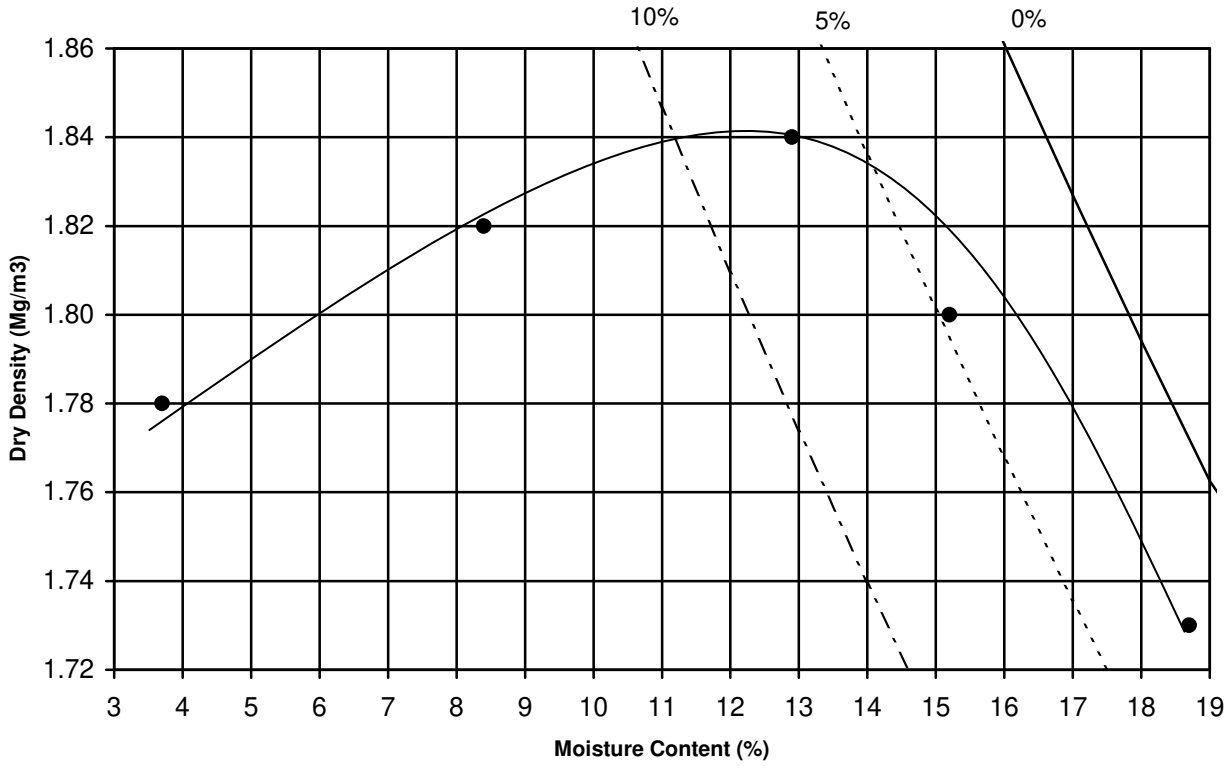
Sample No. AA76736/37 Depth (m) 1.00/2.00 Material Type B

Lab sample no. A18/0044 Customer: Kilgallen & Ptnrs/Kildare Co.Co.

Date Received: 05/01/2018 Test Method: 2.5 KG Rammer

Date Tested: 01/02/2018 BS1377:Part 4:1990 3.3

Dry Density (Mg/m^3)	1.84	1.78	1.82	1.80	1.73	0.00	
Moisture Content (%)	13	3.7	8.4	15	19	0	



Maximum Dry Density (Mg/m^3): 1.84 Optimum Moisture Content (%): 13

Description: Mottled brown slightly sandy, gravelly, CLAY 2% Lime added

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

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

The result relates to the specimen tested.
Opinions and interpretations are outside the scope of accreditation

IGSL Materials Laboratory	Approved by	Date	Page
	H Byrne	08/02/17	1 of 1

Chemtest
The right chemistry to deliver results
Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.co.uk

UKAS TESTING
2183

Final Report

Report No.:	18-00707-1
Initial Date of Issue:	17-Jan-2018
Client	IGSL
Client Address:	M7 Business Park Naas County Kildare Ireland
Contact(s):	Darren Keogh
Project	KCC

Quotation No.:		**Date Received:**	11-Jan-2018
Order No.:		**Date Instructed:**	11-Jan-2018
No. of Samples:	7		
Turnaround (Wkdays):	5	**Results Due:**	17-Jan-2018
Date Approved:	17-Jan-2018		

Approved By:

Details: Robert Monk, Technical Manager

Chemtest
The right chemistry to deliver results

Results - Soil

Project: KCC

Client: IGSL					**Chemtest Job No.:**	18-00707	18-00707	18-00707	18-00707	18-00707	18-00707	18-00707
Quotation No.:					**Chemtest Sample ID.:**	562064	562065	562066	562067	562068	562069	562070
					Client Sample ID.:	TP2	TP4	TP6	TP10	TP12	TP13	TP20
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	0.70	1.00	1.00	0.80	1.00	0.70	1.00
					Bottom Depth (m):	1.90	2.00	3.00	1.80	2.00	2.90	2.00
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
Moisture	N	2030	%	0.020		15	14	13	11	13	12	13
Organic Matter	U	2625	%	0.40		[A] 0.64	[A] 0.71	[A] 0.60	[A] < 0.40	[A] 0.57	[A] 0.62	[A] 1.0

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 ID:	Sample Ref:	Sample ID:	Sampled Date:	Deviation Code(s):	Containers Received:
562064		TP2		A	Amber Glass 250ml
562065		TP4		A	Amber Glass 250ml
562066		TP6		A	Amber Glass 250ml
562067		TP10		A	Amber Glass 250ml
562068		TP12		A	Amber Glass 250ml
562069		TP13		A	Amber Glass 250ml
562070		TP20		A	Amber Glass 250ml

Test Methods

SOP	Title	Parameters included	Method summary
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.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.

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"

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 45 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.co.uk

Certificate of Analysis

Certificate Number	18-03406
	14-Feb-18
Client	IGSL Ltd Unit J5 M7 Business Park Newhall Naas Co. Kildare
Our Reference	18-03406
Client Reference	20636
Order No	13049
Contract Title	Kildare Co Co
Description	4 Soil samples.
Date Received	12-Feb-18
Date Started	12-Feb-18
Date Completed	14-Feb-18
Test Procedures	Identified by prefix DETSn (details on request).
Notes	Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Adam Fenwick
Contracts Manager

UKAS TESTING
2139

Summary of Chemical Analysis
Soil Samples

Our Ref 18-03406
Client Ref 20636
Contract Title Kildare Co Co

			Lab No	1296845	1296846	1296847	1296848
			Sample ID	A18/0040	A18/0044	A18/0047	A18/0048
			Depth	1.00-2.00	1.00-2.00	1.00-2.00	0.90-1.90
			Other ID	TP12	TP20	TP04	TP02
			Sample Type	SOIL	SOIL	SOIL	SOIL
			Sampling Date	n/s	n/s	n/s	n/s
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Inorganics							
Organic matter	DETSC 2002#	0.1	%	0.5	0.4	0.3	0.3
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	< 10	< 10	31	< 10
Sulphur as S, Total	DETSC 2320	0.01	%	0.03	0.03	0.03	0.37
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.08	0.06	0.08	0.04

Key: # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Information in Support of the Analytical Results

Our Ref 18-03406
Client Ref 20636
Contract Kildare Co Co

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1296845	A18/0040 1.00-2.00 SOIL		PU	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), Organic Matter (Manual) (28 days)	
1296846	A18/0044 1.00-2.00 SOIL		PU	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), Organic Matter (Manual) (28 days)	
1296847	A18/0047 1.00-2.00 SOIL		PU	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), Organic Matter (Manual) (28 days)	
1296848	A18/0048 0.90-1.90 SOIL		PU	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), Organic Matter (Manual) (28 days)	

Key: P-Plastic U-Tube

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

I.G.S.L. Ltd
Unit J5, M7 Business Park
Newhall, NAAS
Co Kildare
Rep of Ireland
Vat No. IE9795751O

Date: 09 March 2018
Test Report Ref: STR 573774

Order No: 12882

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Frost Heave of Unbound Aggregate in accordance with **BS 812: Part 124: 2009 - Annex B (Use of Comparator Specimens)**

SAMPLE DETAILS:

Certificate of sampling received:	**No**
Laboratory Ref. No:	**S70555**
Client Ref. No:	**A18/0042**
Date and Time of Sampling:	**Unknown**
Date of Receipt at Lab:	**16/01/2018**
Date of Start of Test:	**23/01/2018**
Sampling Location:	**TP14 @ 1.0-2.0m**
Name of Source:	**Kildare CC Machinery Yard**
Method of Sampling:	**Unknown**
Sampled By:	**Client**
Material Description:	**Soil + 1% Lime**
Target Specification	**SHW Series 800: clause 801.8**

RESULTS:

Were any unrepresentative lumps present? No

Frost Heave Test Result:

Comparator Specimen - Maximum Heave Observed in 96 hours (mm)		
Comparator Specimen 1	12.5	*(nearest 0.5mm)*
Comparator Specimen 2	13.0	*(nearest 0.5mm)*
Comparator Specimen 3	10.0	*(nearest 0.5mm)*
Mean	**11.8**	*(nearest 0.1mm)*
		(limits: 13.6 +/- 4mm)
Test Specimen - Maximum Heave Observed in 96 hours (mm)		
Test Specimen 1	0.0	*(nearest 0.5mm)*
Test Specimen 2	1.0	*(nearest 0.5mm)*
Test Specimen 3	3.5	*(nearest 0.5mm)*
Range of Test Specimens Maximum Heave	3.5	*(should not exceed 6mm)*
Mean Frost Heave	**1.5**	*(nearest 0.1mm)*

In accordance with SHW Series 800: clause 801.8 the sample is classified as being
Non Frost Susceptible (mean frost heave ≤ 15mm)

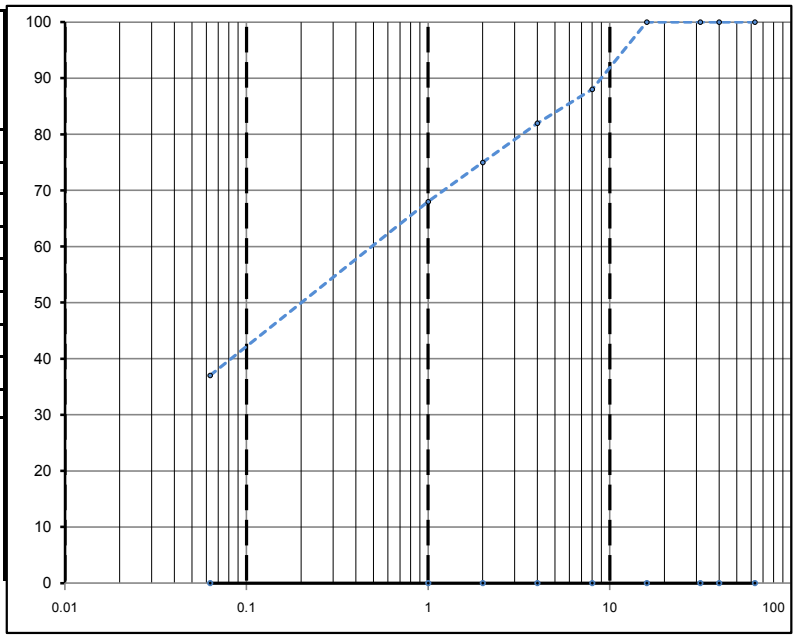
RESULTS CONTINUED:

Laboratory Dry Density & Water Content Test Result

Maximum Dry Density	2 Mg/m3
Optimum Water Content	11 %
Actual Dry Density	2 Mg/m3
Actual Water Content	11 %

Particle Size Distribution Test Result

BS Test Sieve Nominal Aperture	As Received Test Portion % Passing	Stable Test Portion % Passing
63.0 mm	100	N/A
40.0 mm	100	N/A
31.5 mm	100	N/A
16.0 mm	100	N/A
8.0 mm	88	N/A
4.0 mm	82	N/A
2.0 mm	75	N/A
1.0 mm	68	N/A
0.063 mm	37	N/A



Comments:
Lime supplied by client.
Specimens cured for 24 hours prior to testing.

Report checked and approved by:
N. Hughes
Neil Hughes
Aggregate Team Coordinator

I.G.S.L. Ltd
Unit J5, M7 Business Park
Newhall, NAAS
Co Kildare
Rep of Ireland
Vat No. IE9795751O

Date: 09 March 2018
Test Report Ref: STR 573786

Order No: 12882

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Frost Heave of Unbound Aggregate in accordance with **BS 812: Part 124: 2009 - Annex B (Use of Comparator Specimens)**

SAMPLE DETAILS:

Certificate of sampling received:	**No**
Laboratory Ref. No:	**S70555**
Client Ref. No:	**A18/0046**
Date and Time of Sampling:	**Unknown**
Date of Receipt at Lab:	**16/01/2018**
Date of Start of Test:	**23/01/2018**
Sampling Location:	**TP05 @ 0.8-1.8m**
Name of Source:	**Kildare CC Machinery Yard**
Method of Sampling:	**Unknown**
Sampled By:	**Client**
Material Description:	**Soil + 2% Lime**
Target Specification	**SHW Series 800: clause 801.8**

RESULTS:

Were any unrepresentative lumps present? No

Frost Heave Test Result:

Comparator Specimen - Maximum Heave Observed in 96 hours (mm)		
Comparator Specimen 1	12.5	*(nearest 0.5mm)*
Comparator Specimen 2	13.0	*(nearest 0.5mm)*
Comparator Specimen 3	10.0	*(nearest 0.5mm)*
Mean	**11.8**	*(nearest 0.1mm)*
		(limits: 13.6 +/- 4mm)
Test Specimen - Maximum Heave Observed in 96 hours (mm)		
Test Specimen 1	0.0	*(nearest 0.5mm)*
Test Specimen 2	1.0	*(nearest 0.5mm)*
Test Specimen 3	0.0	*(nearest 0.5mm)*
Range of Test Specimens Maximum Heave	1.0	*(should not exceed 6mm)*
Mean Frost Heave	**0.3**	*(nearest 0.1mm)*

In accordance with SHW Series 800: clause 801.8 the sample is classified as being
Non Frost Susceptible (mean frost heave ≤ 15mm)

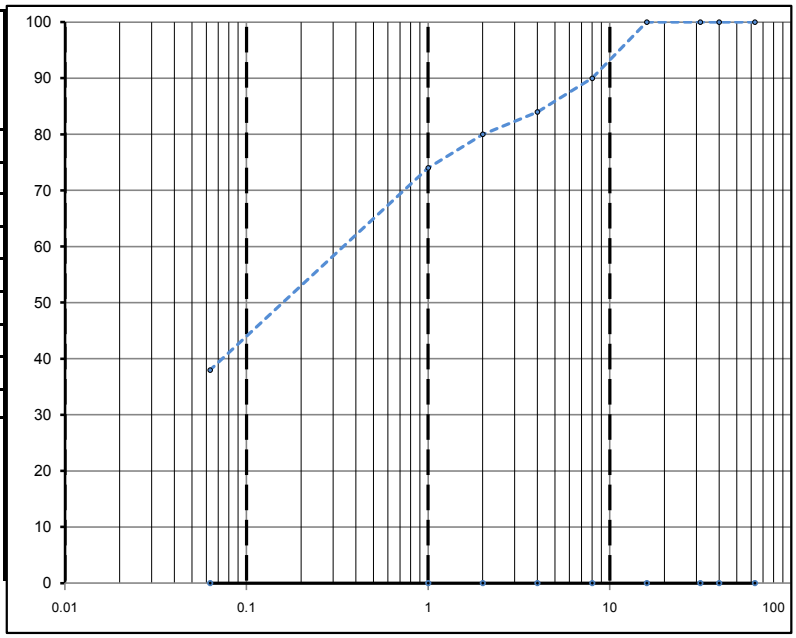
RESULTS CONTINUED:

Laboratory Dry Density & Water Content Test Result

Maximum Dry Density	1.97 Mg/m3
Optimum Water Content	11 %
Actual Dry Density	1.97 Mg/m3
Actual Water Content	11 %

Particle Size Distribution Test Result

BS Test Sieve Nominal Aperture	As Received Test Portion % Passing	Stable Test Portion % Passing
63.0 mm	100	N/A
40.0 mm	100	N/A
31.5 mm	100	N/A
16.0 mm	100	N/A
8.0 mm	90	N/A
4.0 mm	84	N/A
2.0 mm	80	N/A
1.0 mm	74	N/A
0.063 mm	38	N/A



Comments:
Lime supplied by client.
Specimens cured for 24 hours prior to testing.

Report checked and approved by:
N. Hughes
Neil Hughes
Aggregate Team Coordinator

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

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

Report No. **R84701** Contract No. 20636 Contract Name: Kildare Co.Co. - Machinery Yard

Customer Kilgallens/Kildare Co.Co.

Samples Received: 17/01/18 Date Tested: 29/01/18

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	AA73539	5.0	A18/0293	B	12	23	14	9	59	WS	4.4	C L	Dark brown/grey slightly sandy, slightly gravelly, CLAY
BH02	AA78505	4.0	A18/0294	B	14	25	15	10	55	WS	4.4	C L	Dark brown/grey slightly sandy, gravelly, CLAY with some cobbles
BH02	AA78506	5.0	A18/0295	B	12	23	14	9	54	WS	4.4	C L	Dark brown/grey slightly sandy, gravelly, CLAY
BH03	AA73546	4.0	A18/0296	B	14	32	NP	NP	63	WS	4.4		Mottled brown slightly sandy, slightly gravelly, SILT
BH03	AA73548	6.0	A18/0297	B	10	24	14	10	68	WS	4.4	C L	Mottled brown slightly sandy, gravelly, CLAY
BH04	AA78513	4.0	A18/0298	B	29	37	24	13	65	WS	4.4	C I	Brown sandy, slightly gravelly, CLAY
BH04	AA78514	5.0	A18/0299	B	11	27	15	12	49	WS	4.4	C L	Mottled dark brown slightly sandy, gravelly, CLAY
BH05	AA78529	4.0	A18/0300	B	20	28	NP	NP	52	WS	4.4		Grey/brown sandy, slightly gravelly, SILT
BH06	AA78520	3.0	A18/0302	B	19	30	NP	NP	71	WS	4.4		Dark brown slightly sandy, slightly gravelly, SILT
BH06	AA78521	4.0	A18/0303	B	10	23	14	9	60	WS	4.4	C L	Mottled dark brown slightly sandy, gravelly, CLAY with some cobbles

Notes:
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:
NOTE: *Clause 3.2 of BS1377 is a "withdrawn" standard due to publication of ISO17892-1:2014
Opinions and interpretations are outside the scope of accreditation.
The results relate to the specimens tested. Any remaining material will be retained for one month.

IGSL Ltd Materials Laboratory

Persons authorized to approve reports
H Byrne (Laboratory Manager)

Approved by | Date | Page
12/2/18 | 1 of 1

TEST REPORT
Determination of Particle Size Distribution

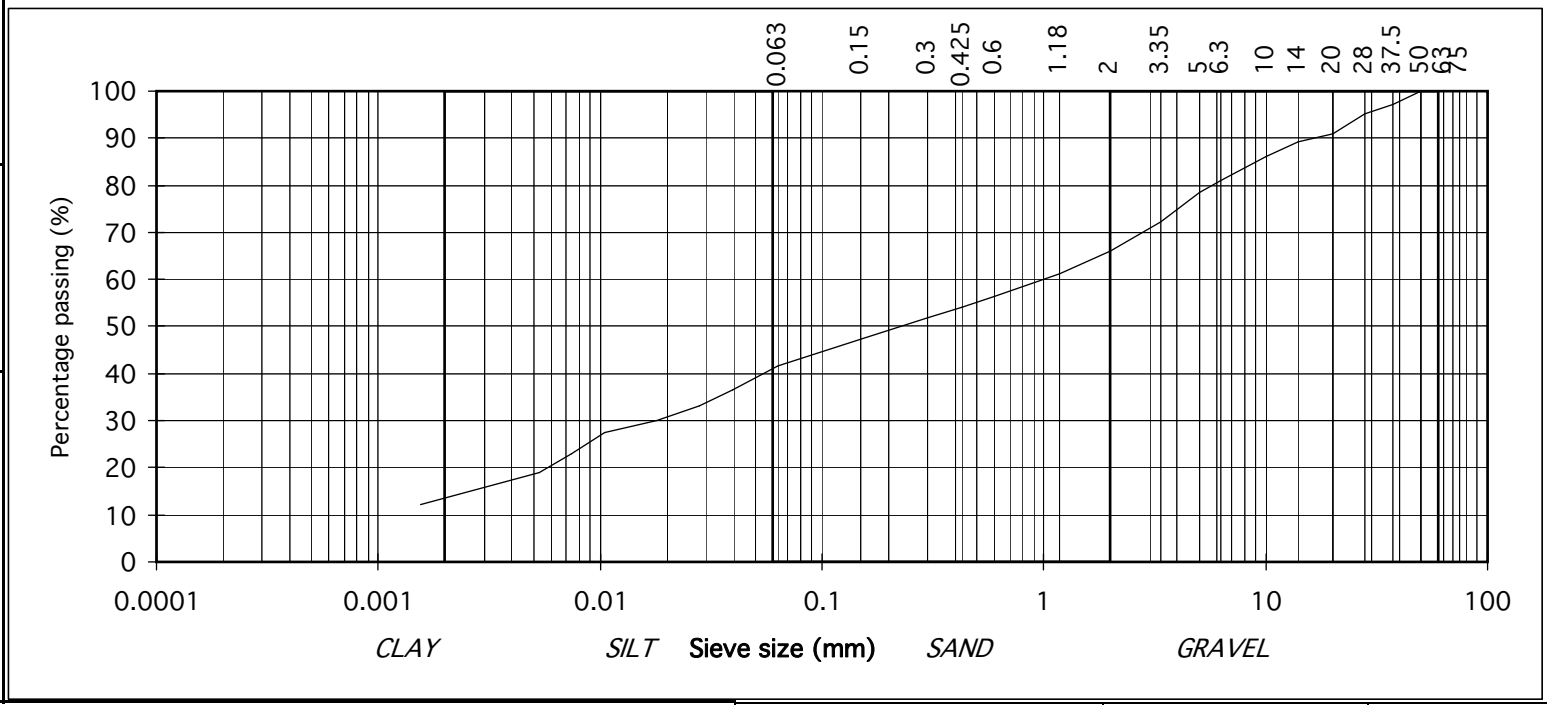
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5
(note: Sedimentation stage not accredited)

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 1317

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	97	
28	95	
20	91	
14	89	
10	86	
6.3	81	
5	78	
3.35	72	
2	66	
1.18	61	SAND
0.6	56	
0.425	54	
0.3	52	
0.15	47	
0.063	42	SILT/CLAY
0.039	37	
0.028	33	
0.018	30	
0.010	28	
0.007	23	
0.005	19	
0.002	12	

Contract No: 20636 Report No. R85025
Contract: Kildare Co.Co. Machinery Yard
BH/TP : BH01
Sample No. AA73539 Lab. Sample No. A18/0293
Sample Type: B
Depth (m) 5.00 Customer: Kilgallen/Kildare Co.Co
Date Received 17/01/2018 Date Testing started 29/01/2018
Description: Dark brown/grey slightly sandy, slightly gravelly, CLAY

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



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Approved by:	Date:	Page no:
H Byrne	05/02/17	1 of 1

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

TEST REPORT
Determination of Particle Size Distribution

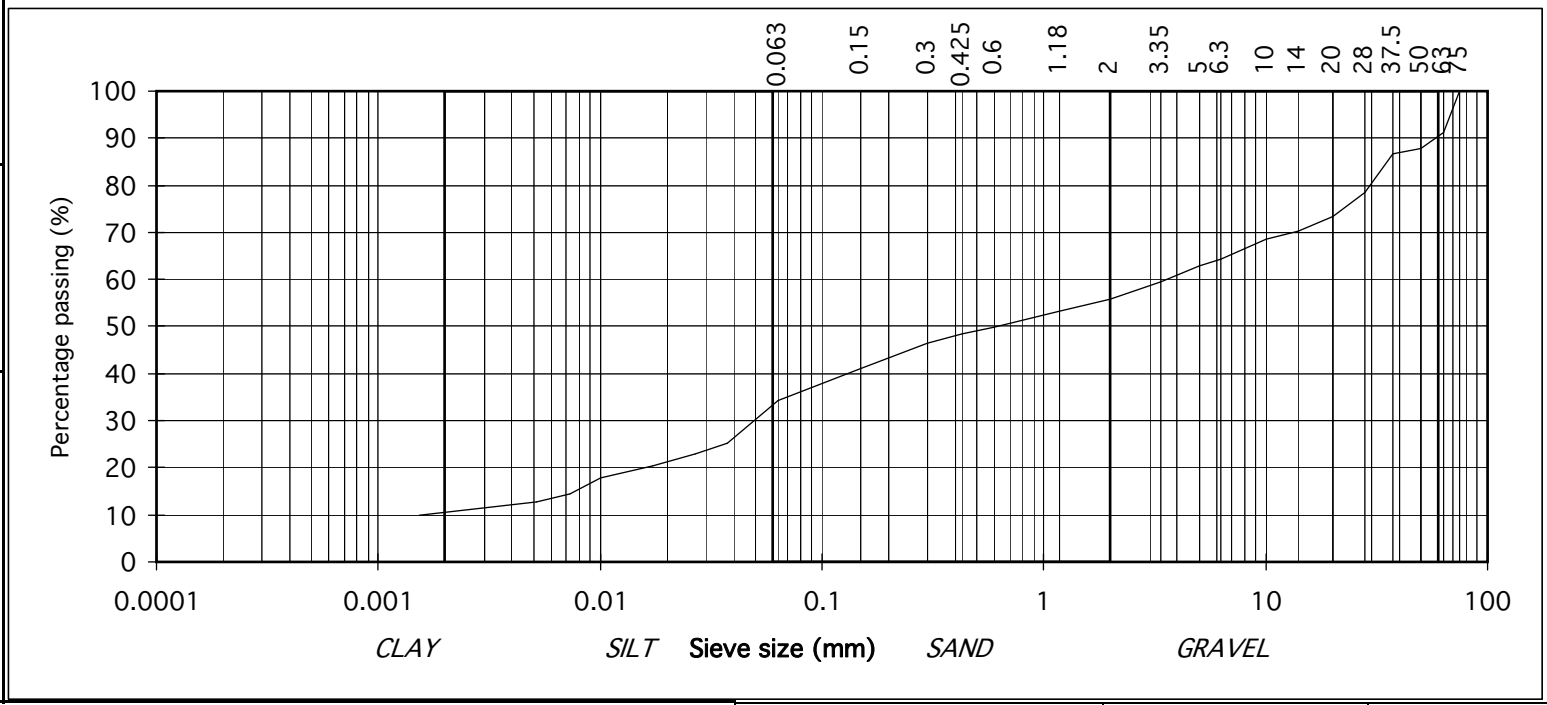
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5
(note: Sedimentation stage not accredited)

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 1317

particle size	% passing	
75	100	COBBLES
63	91	
50	88	GRAVEL
37.5	87	
28	78	
20	73	
14	70	
10	68	
6.3	64	
5	63	
3.35	59	
2	56	
1.18	53	SAND
0.6	50	
0.425	48	
0.3	46	
0.15	41	
0.063	34	SILT/CLAY
0.037	25	
0.027	23	
0.017	20	
0.010	18	
0.007	14	
0.005	13	
0.002	10	

Contract No: 20636 Report No. R85026
Contract: Kildare Co.Co. Machinery Yard
BH/TP : BH02
Sample No. AA78505 Lab. Sample No. A18/0294
Sample Type: B
Depth (m) 4.00 Customer: Kilgallen/Kildare Co.Co
Date Received 17/01/2018 Date Testing started 29/01/2018
Description: Dark brown/grey slightly sandy, gravelly, CLAY with some cobbles

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



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Approved by:	Date:	Page no:
H Byrne	05/02/17	1 of 1

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TEST REPORT
Determination of Particle Size Distribution

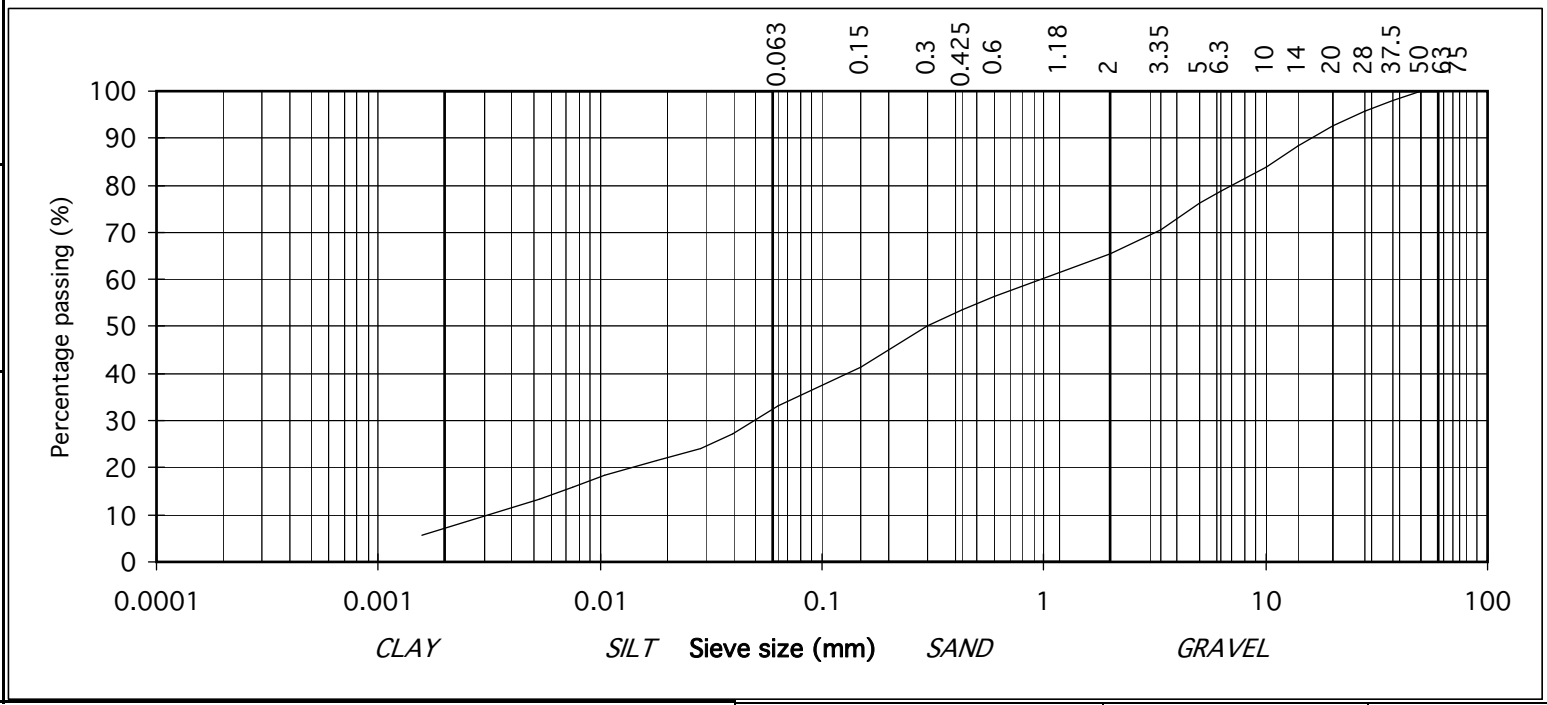
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5
(note: Sedimentation stage not accredited)

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 1317

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	98	
28	96	
20	93	
14	88	
10	84	
6.3	79	
5	76	
3.35	71	
2	65	
1.18	61	SAND
0.6	56	
0.425	54	
0.3	50	
0.15	41	
0.063	33	SILT/CLAY
0.040	27	
0.028	24	
0.018	22	
0.011	18	
0.007	16	
0.005	13	
0.002	6	

Contract No: 20636 Report No. R85028
Contract: Kildare Co.Co. Machinery Yard
BH/TP : BH03
Sample No. AA73546 Lab. Sample No. A18/0296
Sample Type: B
Depth (m) 4.00 Customer: Kilgallen/Kildare
Date Received 17/01/2018 Date Testing started 29/01/2018
Description: Mottled brown slightly sandy, slightly gravelly, SILT

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



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Approved by:	Date:	Page no:
H Byrne	05/02/17	1 of 1

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TEST REPORT
Determination of Particle Size Distribution

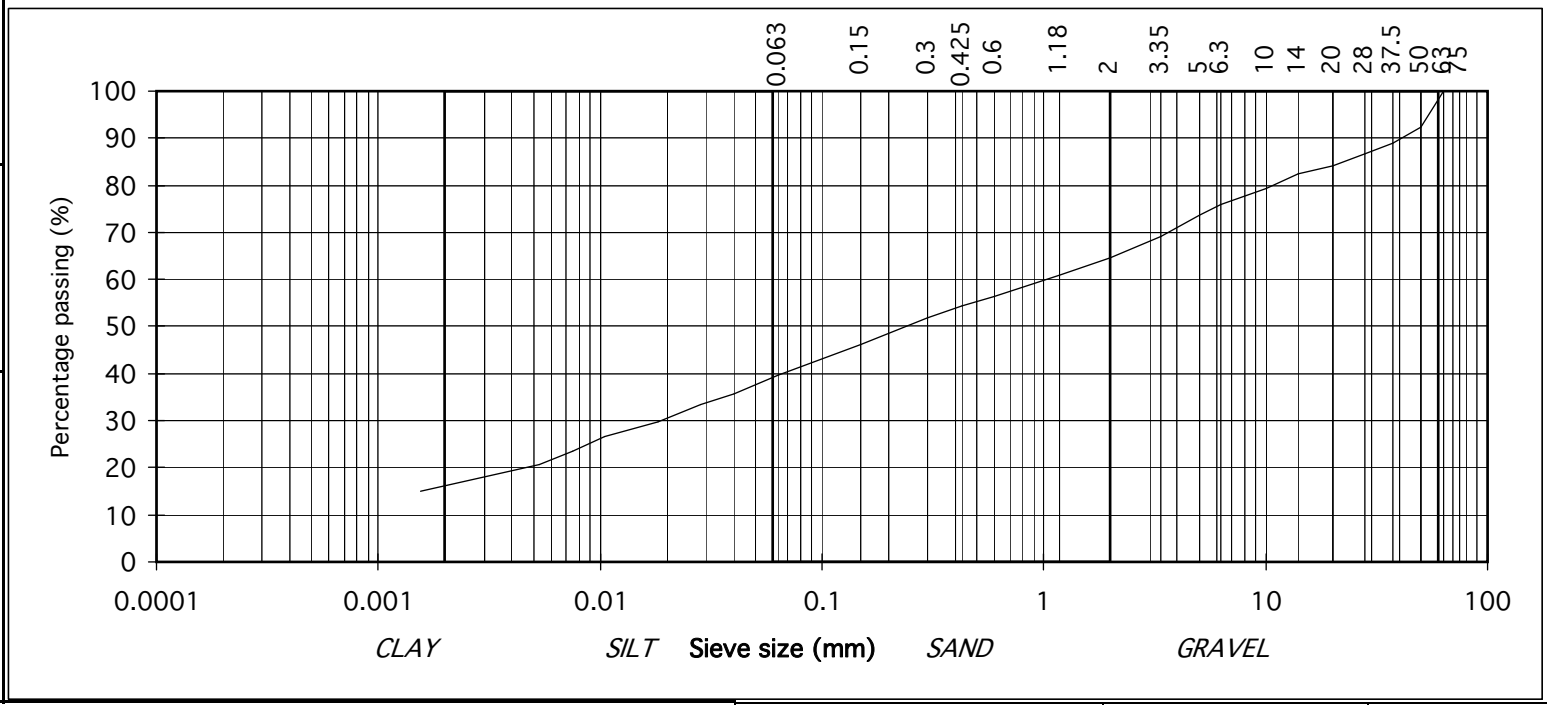
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5
(note: Sedimentation stage not accredited)

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 1317

particle size	% passing	
75	100	COBBLES
63	100	
50	92	GRAVEL
37.5	89	
28	87	
20	84	
14	82	
10	79	
6.3	76	
5	74	
3.35	69	
2	65	
1.18	61	SAND
0.6	56	
0.425	54	
0.3	52	
0.15	46	
0.063	40	SILT/CLAY
0.040	36	
0.028	33	
0.018	30	
0.011	27	
0.007	24	
0.005	21	
0.002	15	

Contract No: 20636 Report No. R85029
Contract: Kildare Co.Co. Machinery Yard
BH/TP : BH03
Sample No. AA73548 Lab. Sample No. A18/0297
Sample Type: B
Depth (m) 6.00 Customer: Kilgallen/Kildare Co.Co
Date Received 17/01/2018 Date Testing started 29/01/2018
Description: Mottled brown slightly sandy, gravelly, CLAY

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



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Approved by:	Date:	Page no:
H Byrne	05/02/17	1 of 1

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TEST REPORT
Determination of Particle Size Distribution

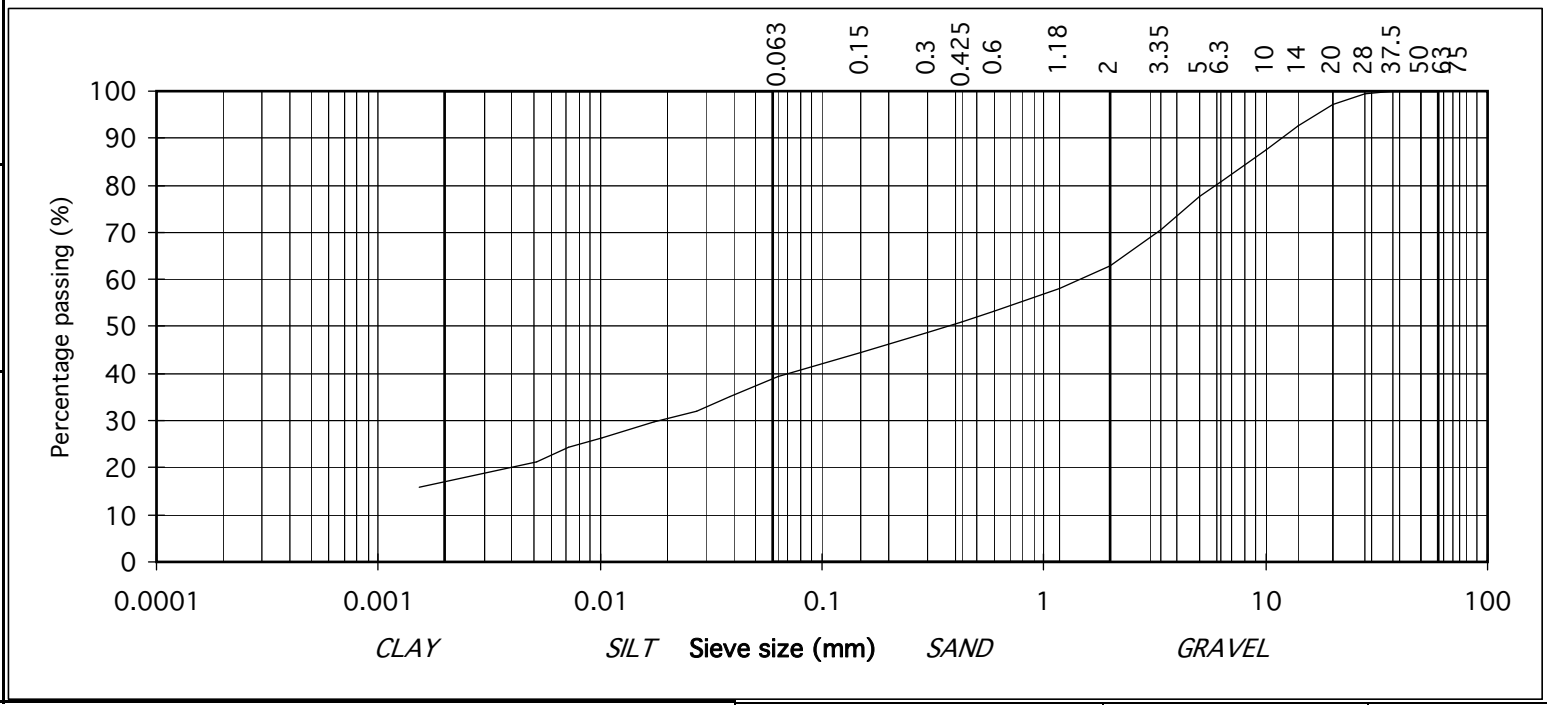
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5
(note: Sedimentation stage not accredited)

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 13/37

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	99	
20	97	
14	93	
10	88	
6.3	81	
5	78	
3.35	71	
2	63	
1.18	58	SAND
0.6	53	
0.425	51	
0.3	49	
0.15	44	
0.063	39	SILT/CLAY
0.038	35	
0.027	32	
0.017	30	
0.010	26	
0.007	24	
0.005	21	
0.002	16	

Contract No: 20636 Report No. R85027
Contract: Kildare Co.Co. Machinery Yard
BH/TP : BH02
Sample No. AA78506 Lab. Sample No. A18/0295
Sample Type: B
Depth (m) 5.00 Customer: Kilgallen/Kildare Co.Co
Date Received 17/01/2018 Date Testing started 29/01/2018
Description: Dark brown/grey slightly sandy, gravelly, CLAY

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



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Approved by:	Date:	Page no:
H Byrne	05/02/17	1 of 1

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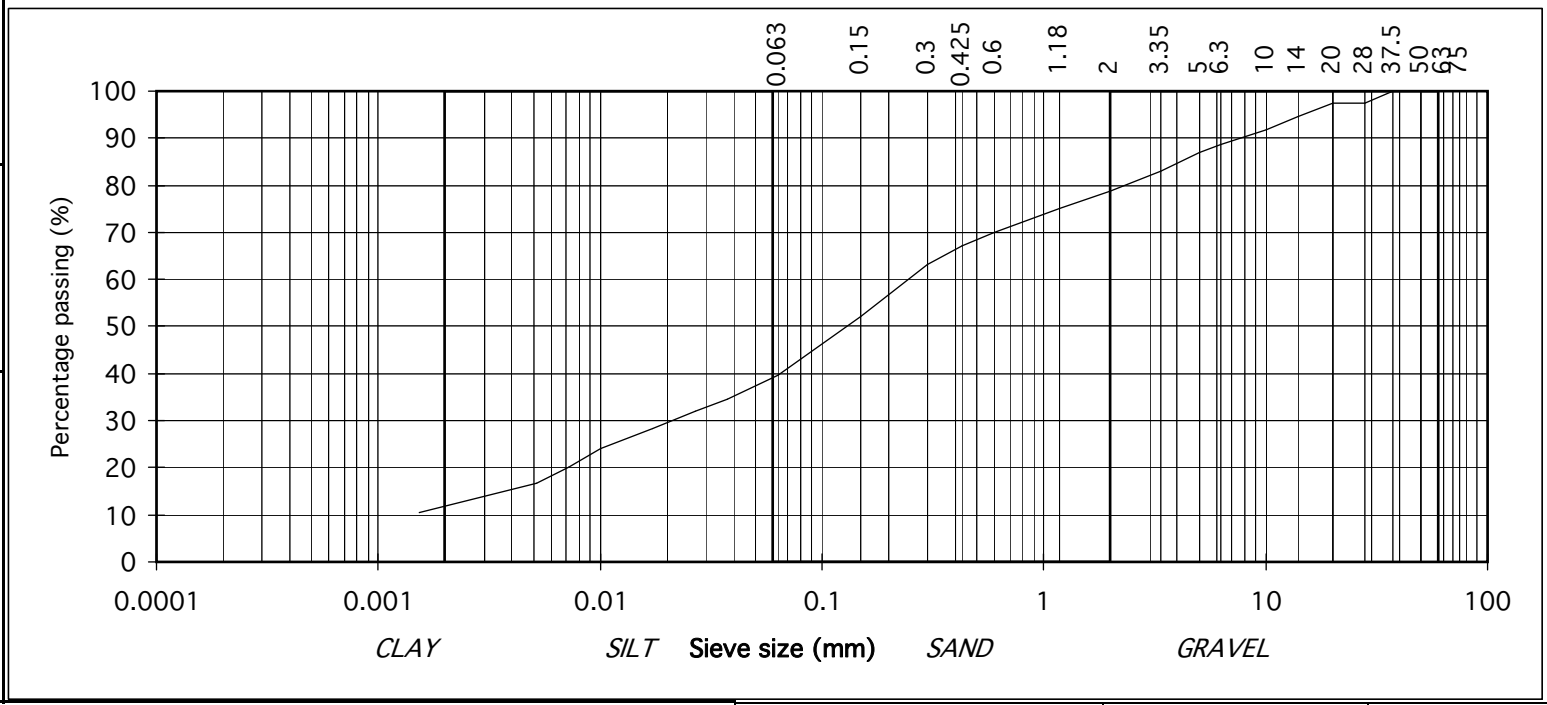
TEST REPORT
Determination of Particle Size Distribution
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5
(note: Sedimentation stage not accredited)

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

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	97	
20	97	
14	95	
10	92	
6.3	89	
5	87	
3.35	83	
2	79	
1.18	75	SAND
0.6	70	
0.425	67	
0.3	63	
0.15	52	
0.063	40	SILT/CLAY
0.037	34	
0.027	32	
0.017	28	
0.010	24	
0.007	20	
0.005	17	
0.002	10	

Contract No:	20636	Report No.	R85030
Contract:	Kildare Co.Co. Machinery Yard		
BH/TP :	BH04		
Sample No.	AA78513	Lab. Sample No.	A18/0298
Sample Type:	B		
Depth (m)	4.00	Customer:	Kilgallen/Kildare Co.Co
Date Received	17/01/2018	Date Testing started	29/01/2018
Description:	Brown sandy, slightly gravelly, CLAY		

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



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Approved by:	Date:	Page no:
H Byrne	05/02/17	1 of 1

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TEST REPORT
Determination of Particle Size Distribution

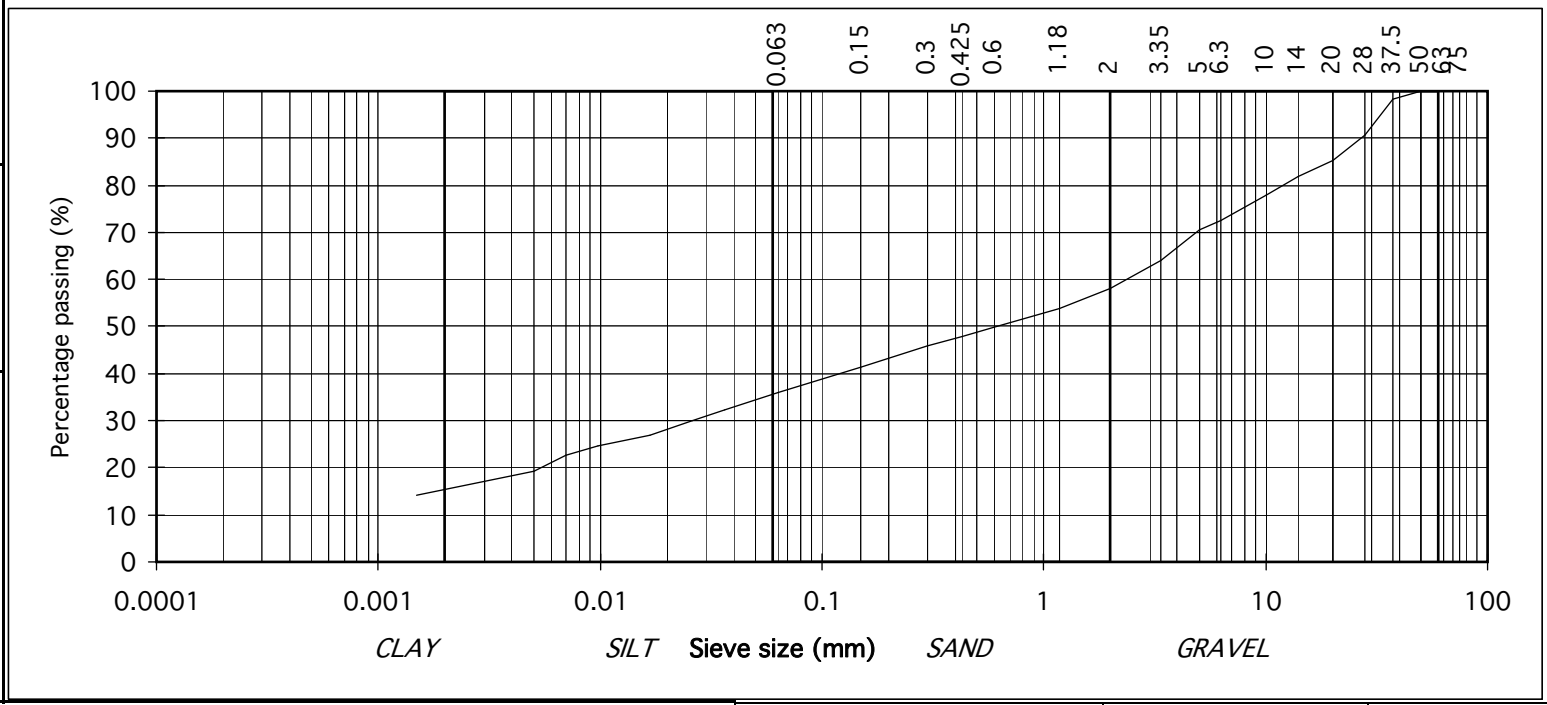
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5
(note: Sedimentation stage not accredited)

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 1317

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	98	
28	91	
20	85	
14	82	
10	78	
6.3	73	
5	70	
3.35	64	
2	58	
1.18	54	SAND
0.6	50	
0.425	48	
0.3	46	
0.15	41	
0.063	36	SILT/CLAY
0.036	32	
0.026	30	
0.017	27	
0.010	25	
0.007	23	
0.005	19	
0.001	14	

Contract No: 20636 Report No. R85031
Contract: Kildare Co.Co. Machinery Yard
BH/TP : BH04
Sample No. AA78514 Lab. Sample No. A18/0299
Sample Type: B
Depth (m) 5.00 Customer: Kilgallen/Kildare Co.Co
Date Received 17/01/2018 Date Testing started 29/01/2018
Description: Mottled dark brown slightly sandy, gravelly, CLAY

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



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Approved by:	Date:	Page no:
H Byrne	05/02/17	1 of 1

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TEST REPORT
Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5
(note: Sedimentation stage not accredited)

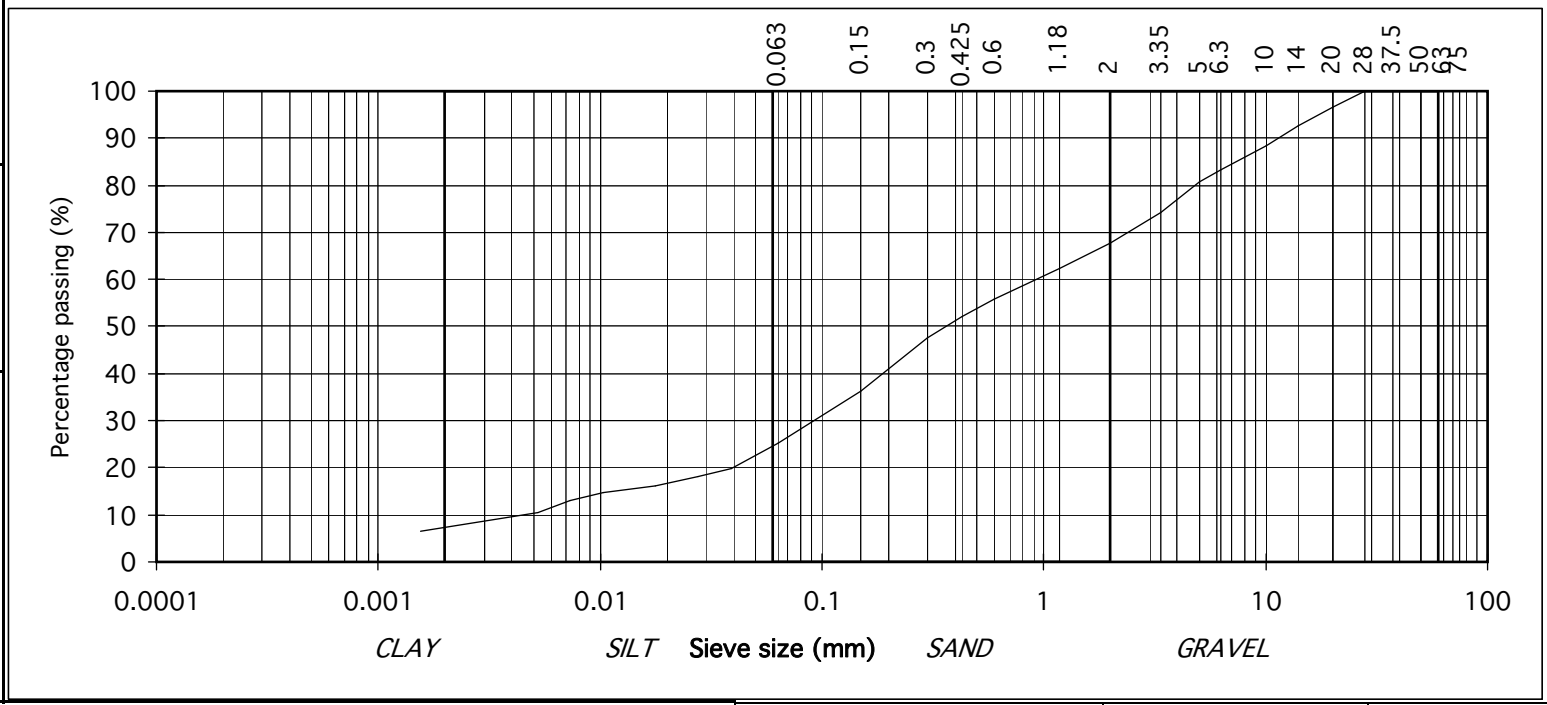
ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 1387

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	100	
20	97	
14	93	
10	88	
6.3	83	
5	81	
3.35	74	
2	68	
1.18	62	SAND
0.6	56	
0.425	52	
0.3	48	
0.15	36	
0.063	25	SILT/CLAY
0.039	20	
0.028	18	
0.018	16	
0.010	15	
0.007	13	
0.005	10	
0.002	7	

Contract No: 20636 Report No. R85032
Contract: Kildare Co.Co. Machinery Yard
BH/TP : BH05
Sample No. AA78529 Lab. Sample No. A18/0300
Sample Type: B
Depth (m) 4.00 Customer: Kilgallen/Kildare Co.Co
Date Received 17/01/2018 Date Testing started 29/01/2018
Description: Grey/brown sandy, slightly gravelly, SILT

Remarks

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



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Approved by:	Date:	Page no:
H Byrne	05/02/17	1 of 1

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TEST REPORT
Determination of Particle Size Distribution

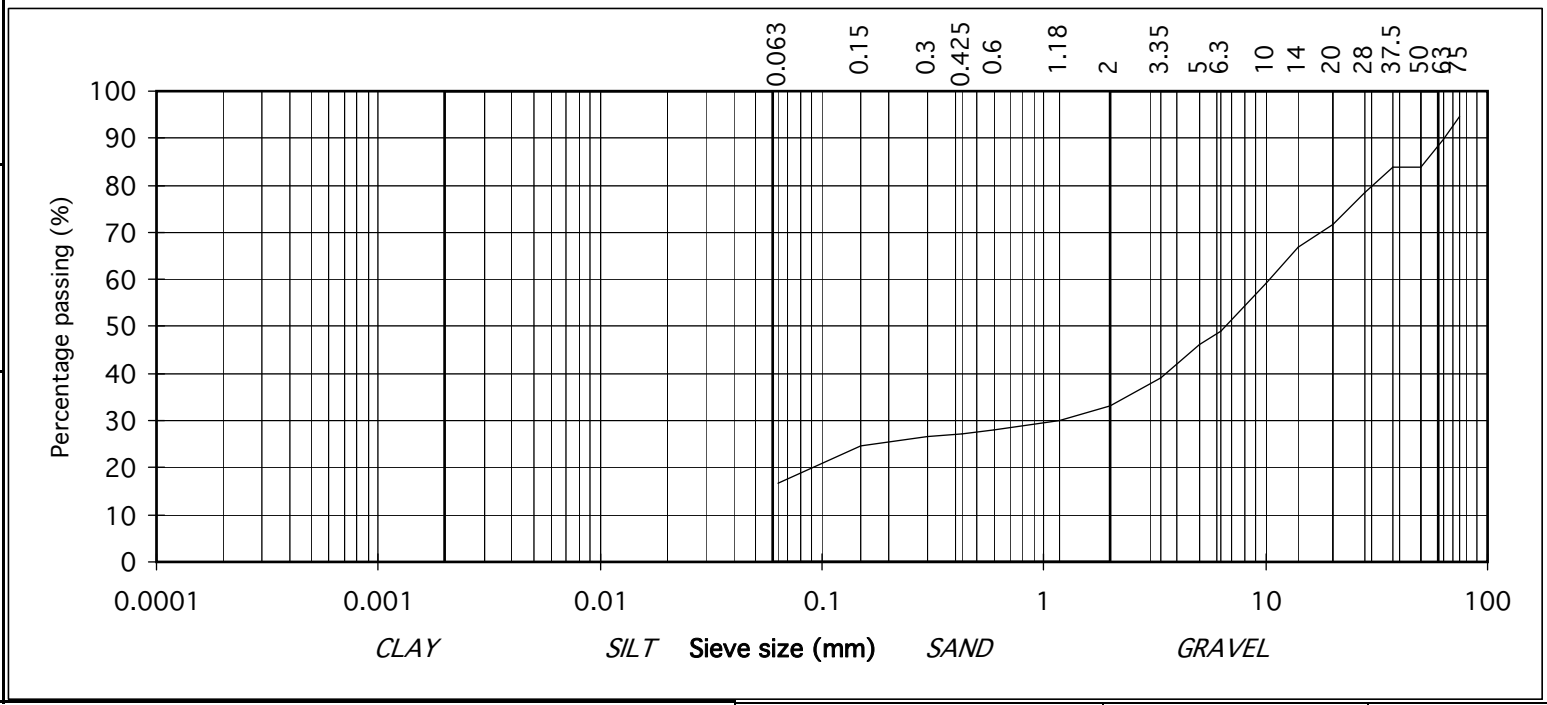
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5
(note: Sedimentation stage not accredited)

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 137T

particle size	% passing	
75	95	COBBLES
63	90	
50	84	GRAVEL
37.5	84	
28	79	
20	72	
14	67	
10	59	
6.3	49	
5	46	
3.35	39	
2	33	
1.18	30	SAND
0.6	28	
0.425	27	
0.3	27	
0.15	25	
0.063	17	SILT/CLAY

Contract No: 20636 Report No. R85033
Contract: Kildare Co.Co. Machinery Yard
BH/TP : BH05
Sample No. AA78531 Lab. Sample No. A18/0301
Sample Type: B
Depth (m) 6.00 Customer: Kilgallen/Kildare Co.Co
Date Received 17/01/2018 Date Testing started 29/01/2018
Description: Brown clayey/silty, sandy, GRAVEL with some cobbles

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



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Approved by:	Date:	Page no:
H Byrne	05/02/17	1 of 1

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

TEST REPORT
Determination of Particle Size Distribution

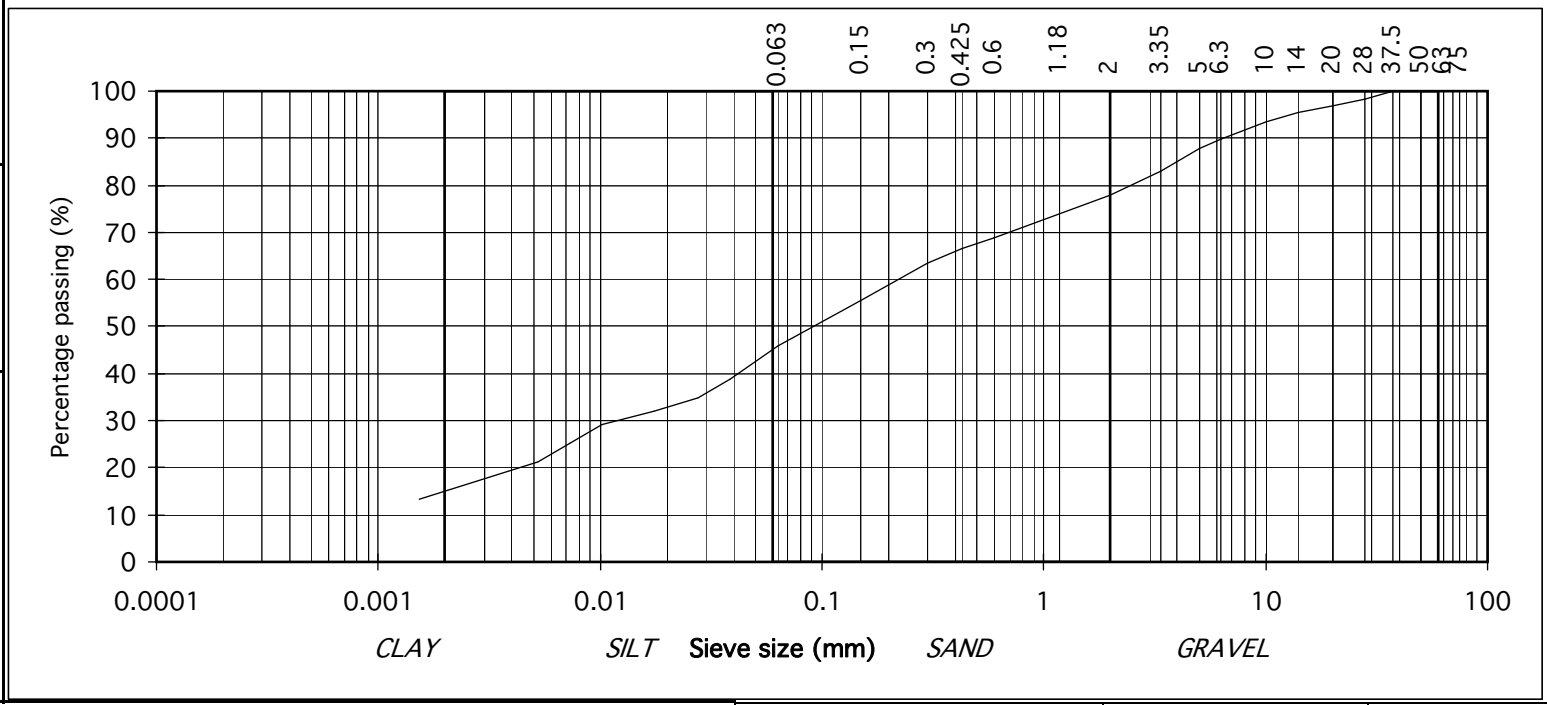
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5
(note: Sedimentation stage not accredited)

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 1317

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	98	
20	97	
14	96	
10	93	
6.3	90	
5	88	
3.35	83	
2	78	
1.18	74	SAND
0.6	69	
0.425	66	
0.3	63	
0.15	55	
0.063	46	SILT/CLAY
0.038	39	
0.027	35	
0.018	32	
0.010	29	
0.007	25	
0.005	21	
0.002	13	

Contract No: 20636 Report No. R85034
Contract: Kildare Co.Co. Machinery Yard
BH/TP : BH06
Sample No. AA78520 Lab. Sample No. A18/0302
Sample Type: B
Depth (m) 3.00 Customer: Kilgallen/Kildare Co.Co
Date Received 17/01/2018 Date Testing started 29/01/2018
Description: Dark brown slightly sandy, slightly gravelly, SILT

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



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Approved by:	Date:	Page no:
H Byrne	05/02/17	1 of 1

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

TEST REPORT
Determination of Particle Size Distribution

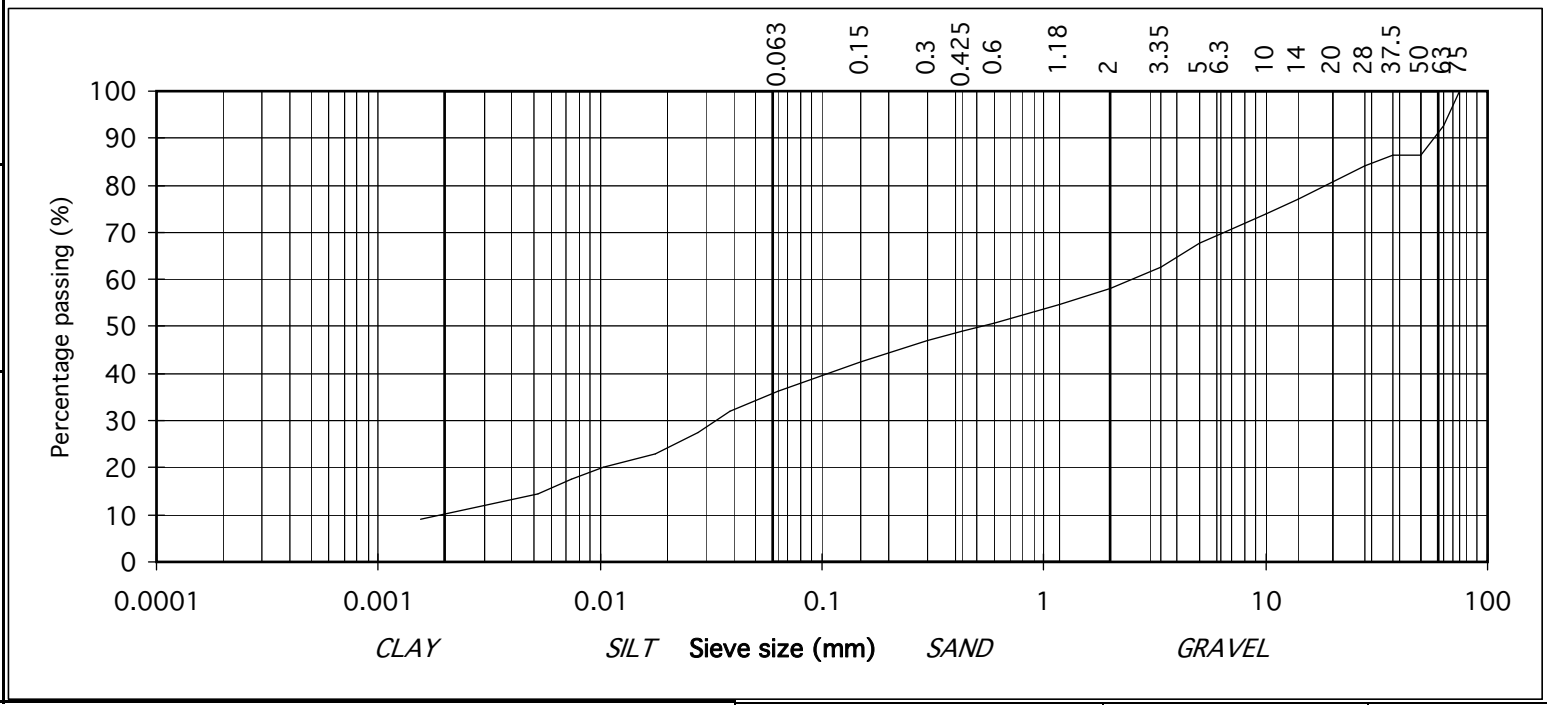
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5
(note: Sedimentation stage not accredited)

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 13ST

particle size	% passing	
75	100	COBBLES
63	93	
50	86	GRAVEL
37.5	86	
28	84	
20	81	
14	77	
10	74	
6.3	70	
5	68	
3.35	63	
2	58	
1.18	55	SAND
0.6	51	
0.425	49	
0.3	47	
0.15	42	
0.063	36	SILT/CLAY
0.038	32	
0.028	28	
0.018	23	
0.010	20	
0.007	17	
0.005	14	
0.002	9	

Contract No: 20636 Report No. R85035
Contract: Kildare Co.Co. Machinery Yard
BH/TP : BH06
Sample No. AA78521 Lab. Sample No. A18/0303
Sample Type: B
Depth (m) 4.00 Customer: Kilgallen/Kildare Co.Co
Date Received 17/01/2018 Date Testing started 29/01/2018
Description: Mottled dark brown slightly sandy, gravelly, CLAY with some cobbles

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



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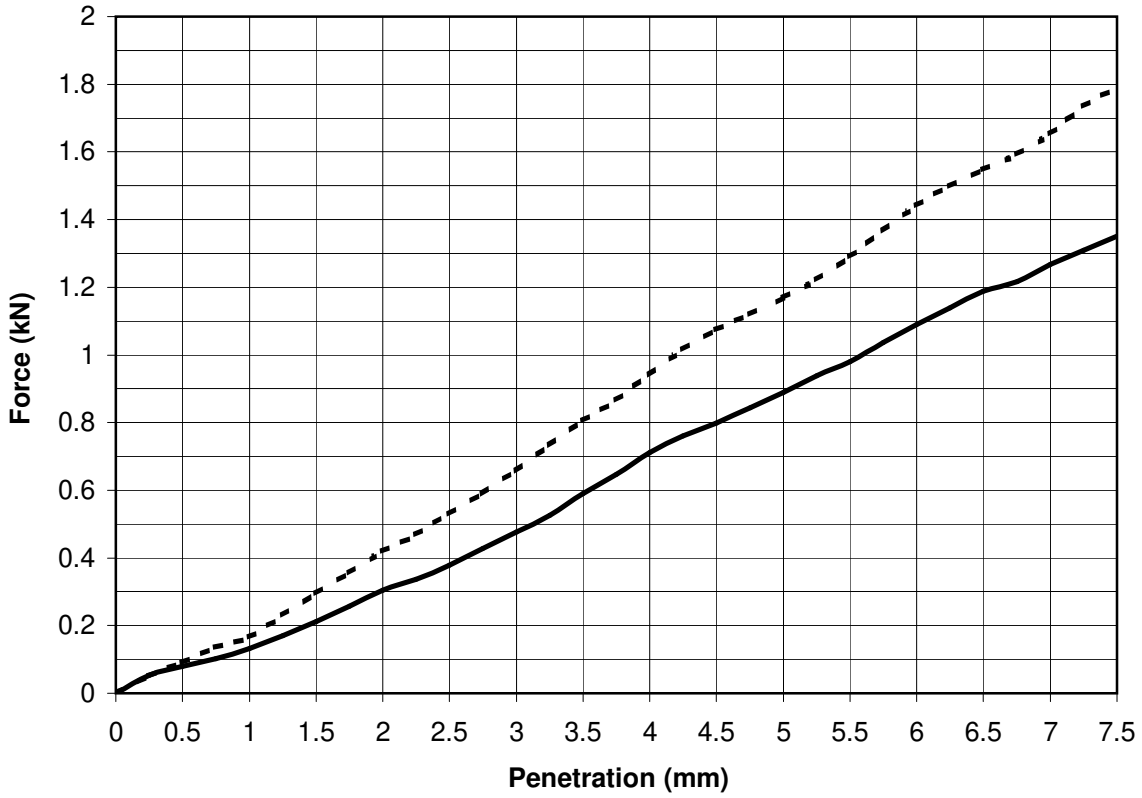
Approved by:	Date:	Page no:
H Byrne	05/02/17	1 of 1

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 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.	R85273	Contract	Kildare Co.Co. - Machinery Yard
Contract No.	20636	Customer	Kilgallen/Kildare Co.Co
Date received	05/01/18	Date Tested	13/02/18
BH/TP No.	BH02	Sample No.	AA78505 Type: B
Depth (m)	4.00	Lab sample No.	A18/0294



Key: ———— Top ---------- Base

Description:	Dark brown/grey slightly sandy, gravelly, CLAY with some cobbles		
Initial Condition:	Natural		
Moisture Content (%):	10	Bulk Density (Mg/m^3):	2.19
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.99
% Material >20mm:	35		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**4.5**	**5.9**
Moisture Content %	10	10

Persons authorized to approve reports

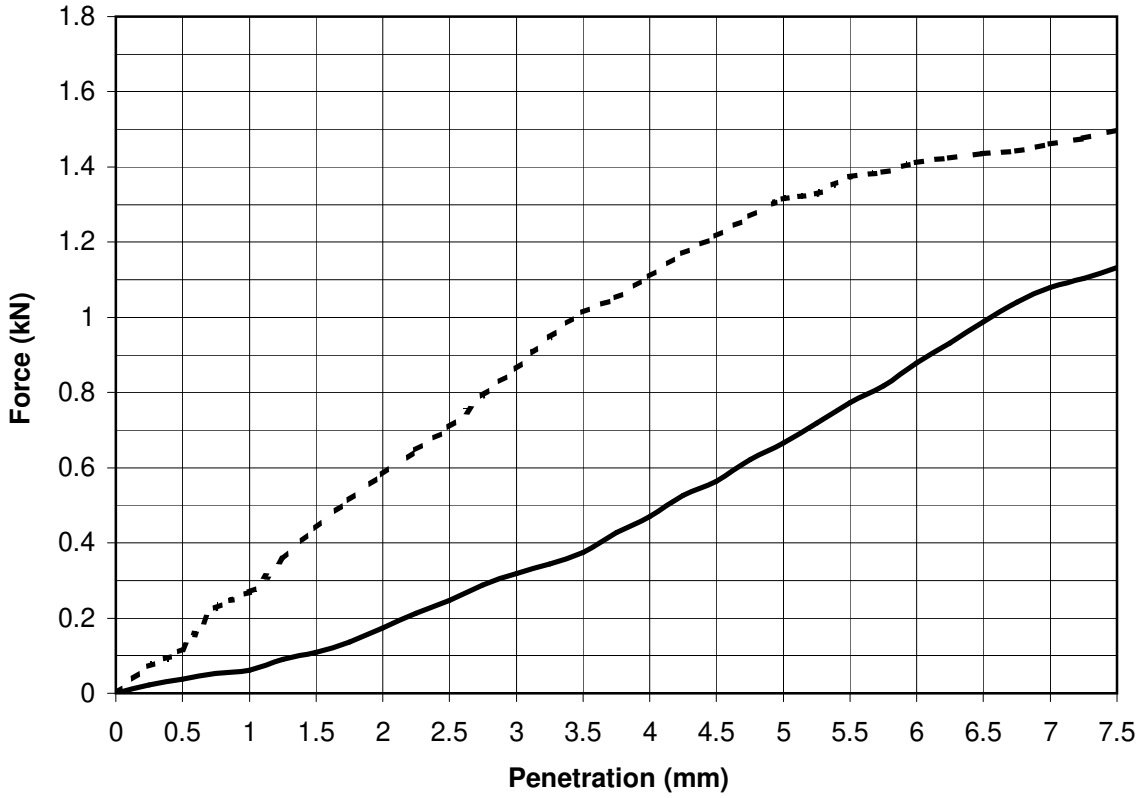
J Barrett (Quality Manager)

H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory	Approved by	Date	Page No.
	H Byrne	14/02/18	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.1337

Report No.	R85274	Contract	Kildare Co.Co. - Machinery Yard
Contract No.	20636	Customer	Kilgallen/Kildare Co.Co
Date received	05/01/18	Date Tested	13/02/18
BH/TP No.	BH03	Sample No.	AA73546 Type: B
Depth (m)	4.00	Lab sample No.	A18/0296



Key: ———— Top ---------- Base

Description:	Mottled brown slightly sandy, slightly gravelly, SILT		
Initial Condition:	Natural		
Moisture Content (%):	20	Bulk Density (Mg/m^3):	2.01
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.67
% Material >20mm:	20		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**3.3**	**6.6**
Moisture Content %	21	20

Persons authorized to approve reports

J Barrett (Quality Manager)

H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory	Approved by	Date	Page No.
	H Byrne	14/02/18	1 of 1

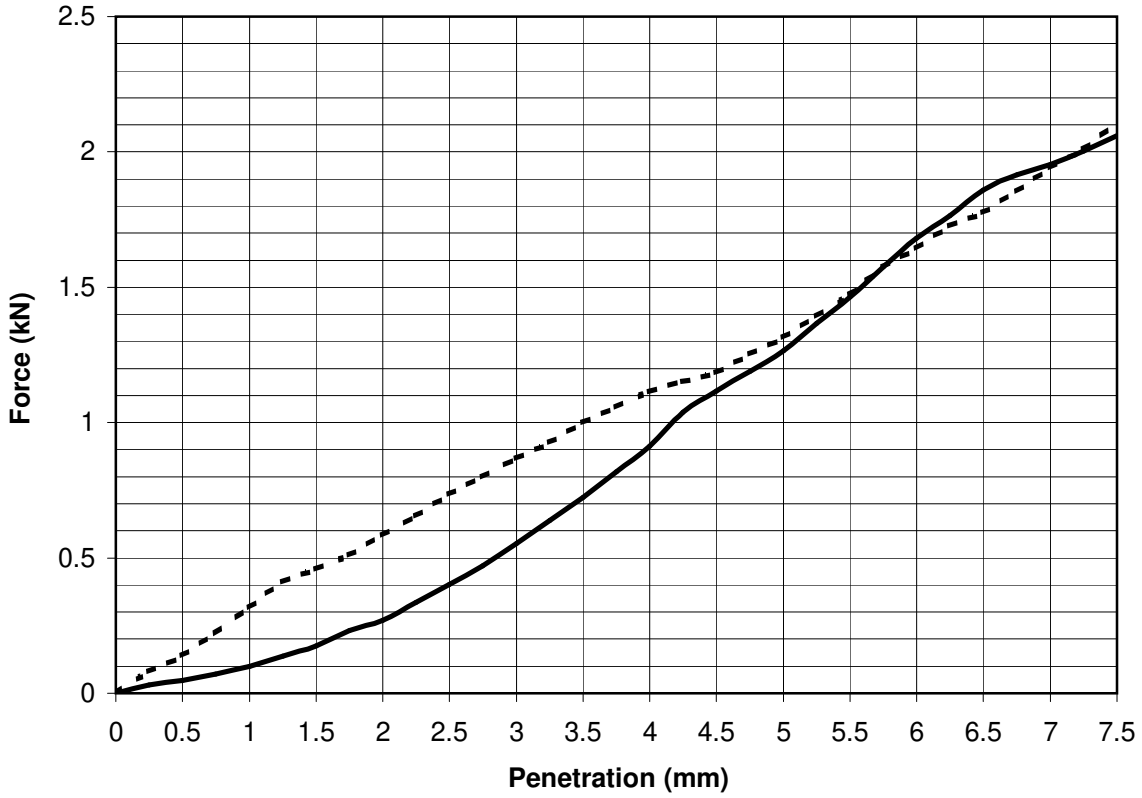
IGSL Ltd
Materials Laboratory
Unit J5,M7 Business Park
Naas Co.Kildare
045 899324

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.1337

Report No.	R85275	Contract	Kildare Co.Co. - Machinery Yard
Contract No.	20636	Customer	Kilgallen/Kildare Co.Co
Date received	05/01/18	Date Tested	13/02/18
BH/TP No.	BH05	Sample No.	AA78529 Type: B
Depth (m)	4.00	Lab sample No.	A18/0300



Key: ———— Top ---------- Base

Description:	Grey/brown sandy, slightly gravelly, SILT		
Initial Condition:	Natural		
Moisture Content (%):	12	Bulk Density (Mg/m^3):	2.25
Surcharge (kg):	4	Dry Density (Mg/m^3):	2.02
% Material >20mm:	7.4		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**6.3**	**6.6**
Moisture Content %	12	12

Persons authorized to approve reports

J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory

Approved by	Date	Page No.
H Byrne	14/02/18	1 of 1

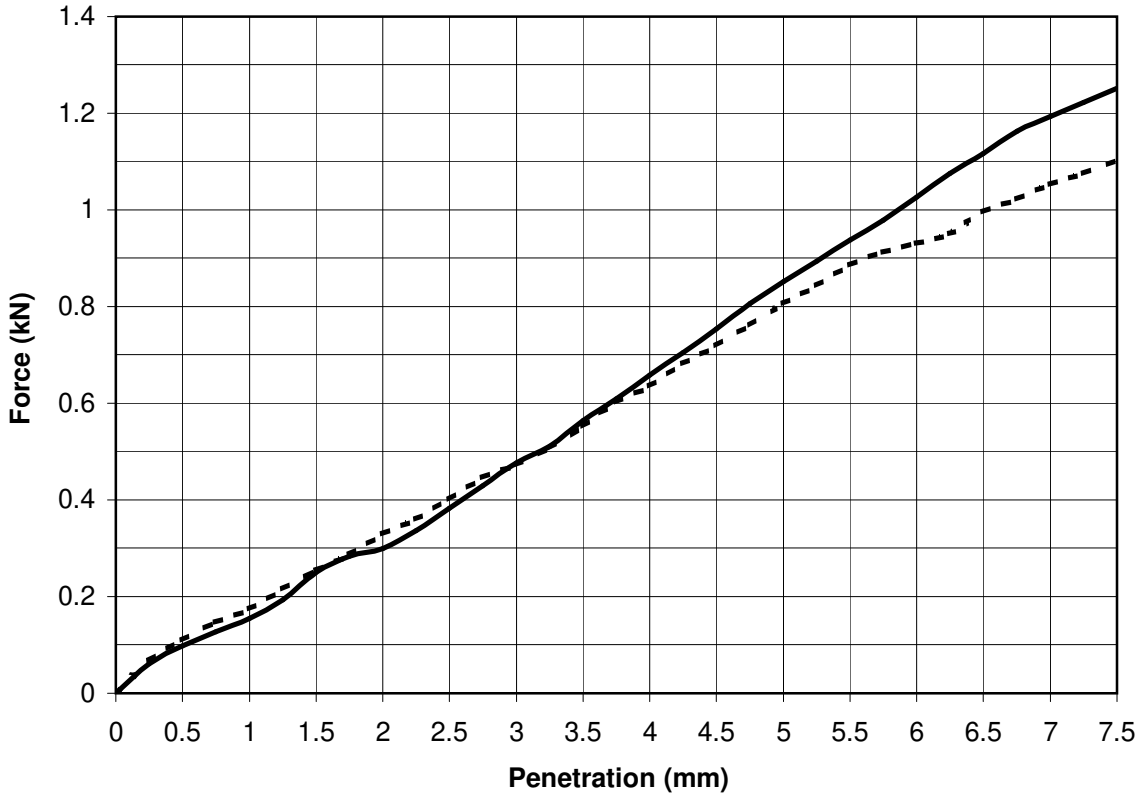
IGSL Ltd
Materials Laboratory
Unit J5,M7 Business Park
Naas Co.Kildare
045 899324

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.1337

Report No.	R85276	Contract	Kildare Co.Co. - Machinery Yard
Contract No.	20636	Customer	Kilgallen/Kildare Co.Co
Date received	05/01/18	Date Tested	13/02/18
BH/TP No.	BH06	Sample No.	AA78520 Type: B
Depth (m)	3.00	Lab sample No.	A18/0302



Key: ———— Top ---------- Base

Description:	Dark brown slightly sandy, slightly gravelly, SILT		
Initial Condition:	Natural		
Moisture Content (%):	20	Bulk Density (Mg/m^3):	2.04
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.71
% Material >20mm:	32		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**4.3**	**4.0**
Moisture Content %	19	20

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

IGSL Ltd Materials Laboratory

Approved by	Date	Page No.
H Byrne	14/02/18	1 of 1

Appendix 7

Environmental I Laboratory Test Records

Chemtest
The right chemistry to deliver results
Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.co.uk

UKAS TESTING
2183

Final Report

Report No.:	18-02367-1
Initial Date of Issue:	02-Feb-2018
Client	IGSL
Client Address:	M7 Business Park Naas County Kildare Ireland
Contact(s):	Darren Keogh
Project	KCC Yard

Quotation No.:		**Date Received:**	26-Jan-2018
Order No.:		**Date Instructed:**	26-Jan-2018
No. of Samples:	4		
Turnaround (Wkdays):	5	**Results Due:**	01-Feb-2018
Date Approved:	02-Feb-2018		

Approved By:

Details: Martin Dyer, Laboratory Manager

Chemtest
The right chemistry to deliver results

Results - Leachate

Project: KCC Yard

Client: IGSL				**Chemtest Job No.:**	18-02367	18-02367	18-02367	18-02367
Quotation No.:				**Chemtest Sample ID.:**	569858	569859	569860	569861
				Client Sample ID.:	TP05	TP06	TP10	TP12
				Sample Type:	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	0.80	1.00	0.80	1.00
				Bottom Depth (m):	1.80	3.40	2.00	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**				
Ammonium	U	1220	mg/l	0.010	0.19	0.39	0.26	0.32
Ammonium	N	1220	mg/kg	0.10	1.9	3.9	2.6	3.2
Boron (Dissolved)	U	1450	µg/l	20	30	< 20	< 20	< 20
Boron (Dissolved)	U	1450	mg/kg	0.20	0.30	< 0.20	< 0.20	< 0.20

Chemtest
The right chemistry to deliver results

Results - Soil

Project: KCC Yard

Client: IGSL					**Chemtest Job No.:**	18-02367	18-02367	18-02367
Quotation No.:					**Chemtest Sample ID.:**	569858	569859	569860	569861
					Client Sample ID.:	TP05	TP06	TP10	TP12
					Sample Type:	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	0.80	1.00	0.80	1.00
					Bottom Depth (m):	1.80	3.40	2.00	
					Asbestos Lab:	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
ACM Type	U	2192		N/A	-	-	-	-
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	0.094	0.073	< 0.020	< 0.020
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	< 0.40	< 0.40	< 0.40	< 0.40
Sulphur (Elemental)	U	2180	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Cyanide (Total)	U	2300	mg/kg	0.50	[A] < 0.50	[A] < 0.50	[A] < 0.50	[A] < 0.50
Sulphide (Easily Liberatable)	U	2325	mg/kg	0.50	[A] 0.95	[A] 2.5	[A] 0.83	[A] 2.9
Sulphate (Acid Soluble)	U	2430	%	0.010	[A] 0.019	[A] 0.024	[A] 0.030	[A] 0.017
Arsenic	U	2450	mg/kg	1.0	27	26	27	27
Barium	U	2450	mg/kg	10	61	60	66	49
Cadmium	U	2450	mg/kg	0.10	1.9	2.0	2.5	1.8
Chromium	U	2450	mg/kg	1.0	19	22	21	22
Molybdenum	U	2450	mg/kg	2.0	< 2.0	2.6	2.2	< 2.0
Antimony	N	2450	mg/kg	2.0	< 2.0	2.3	< 2.0	< 2.0
Copper	U	2450	mg/kg	0.50	19	20	20	18
Mercury	U	2450	mg/kg	0.10	0.15	0.34	0.26	0.23
Nickel	U	2450	mg/kg	0.50	41	46	49	44
Lead	U	2450	mg/kg	0.50	27	32	32	28
Selenium	U	2450	mg/kg	0.20	0.66	0.76	0.48	0.35
Zinc	U	2450	mg/kg	0.50	110	120	120	110
Chromium (Trivalent)	N	2490	mg/kg	1.0	19	22	21	22
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Total Organic Carbon	U	2625	%	0.20	[A] 0.45	[A] 0.49	[A] 0.46	[A] 0.35
Mineral Oil	N	2670	mg/kg	10	< 10	< 10	< 10	< 10
Aliphatic TPH >C5-C6	N	2680	mg/kg	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] < 1.0	[A] < 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	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
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	[A] < 5.0	[A] < 5.0	[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
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0

Chemtest
The right chemistry to deliver results

Results - Soil

Project: KCC Yard

Client: IGSL			**Chemtest Job No.:**		18-02367	18-02367	18-02367	18-02367
Quotation No.:			**Chemtest Sample ID.:**		569858	569859	569860	569861
			Client Sample ID.:		TP05	TP06	TP10	TP12
			Sample Type:		SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.80	1.00	0.80	1.00
			Bottom Depth (m):		1.80	3.40	2.00	
			Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**				
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[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
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	[A] < 5.0	[A] < 5.0	[A] < 5.0	[A] < 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	[A] < 10	[A] < 10	[A] < 10	[A] < 10
Benzene	U	2760	µg/kg	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
Ethylbenzene	U	2760	µg/kg	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
o-Xylene	U	2760	µg/kg	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
Naphthalene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Anthracene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Pyrene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Chrysene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Coronene	N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Of 17 PAH's	N	2800	mg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0
PCB 28	U	2815	mg/kg	0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010
PCB 52	U	2815	mg/kg	0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010
PCB 90+101	U	2815	mg/kg	0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010
PCB 118	U	2815	mg/kg	0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010
PCB 153	U	2815	mg/kg	0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010
PCB 138	U	2815	mg/kg	0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010
PCB 180	U	2815	mg/kg	0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010
Total PCBs (7 Congeners)	N	2815	mg/kg	0.10	[A] < 0.10	[A] < 0.10	[A] < 0.10	[A] < 0.10
Total Phenols	U	2920	mg/kg	0.30	< 0.30	< 0.30	< 0.30	< 0.30

Results - Single Stage WAC

Project: KCC Yard

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	18-02367						
Chemtest Sample ID:	569858						
Sample Ref:							
Sample ID:	TP05						
Top Depth(m):	0.80						
Bottom Depth(m):	1.80						
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] 0.45	3	5	6
Loss On Ignition	2610	U	%	1.5	--	--	10
Total BTEX	2760	U	mg/kg	[A] < 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg	< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg	[A] < 10	500	--	--
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100	--	--
pH	2010	U		8.5	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.16	--	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	1450	U	< 0.0010	< 0.050	0.5	2	25
Barium	1450	U	0.0035	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.010	0.04	1	5
Chromium	1450	U	0.0019	< 0.050	0.5	10	70
Copper	1450	U	< 0.0010	< 0.050	2	50	100
Mercury	1450	U	< 0.00050	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	0.0035	< 0.050	0.5	10	30
Nickel	1450	U	< 0.0010	< 0.050	0.4	10	40
Lead	1450	U	< 0.0010	< 0.010	0.5	10	50
Antimony	1450	U	< 0.0010	< 0.010	0.06	0.7	5
Selenium	1450	U	0.0018	0.018	0.1	0.5	7
Zinc	1450	U	< 0.0010	< 0.50	4	50	200
Chloride	1220	U	1.9	19	800	15000	25000
Fluoride	1220	U	0.29	2.9	10	150	500
Sulphate	1220	U	9.4	94	1000	20000	50000
Total Dissolved Solids	1020	N	50	500	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	9.5	95	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	0.094

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: KCC Yard

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	18-02367						
Chemtest Sample ID:	569859						
Sample Ref:							
Sample ID:	TP06						
Top Depth(m):	1.00						
Bottom Depth(m):	3.40						
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] 0.49	3	5	6
Loss On Ignition	2610	U	%	2.1	--	--	10
Total BTEX	2760	U	mg/kg	[A] < 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg	< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg	[A] < 10	500	--	--
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100	--	--
pH	2010	U		8.3	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.062	--	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	1450	U	< 0.0010	< 0.050	0.5	2	25
Barium	1450	U	0.0029	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.010	0.04	1	5
Chromium	1450	U	0.0013	< 0.050	0.5	10	70
Copper	1450	U	< 0.0010	< 0.050	2	50	100
Mercury	1450	U	< 0.00050	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	0.0029	< 0.050	0.5	10	30
Nickel	1450	U	< 0.0010	< 0.050	0.4	10	40
Lead	1450	U	< 0.0010	< 0.010	0.5	10	50
Antimony	1450	U	< 0.0010	< 0.010	0.06	0.7	5
Selenium	1450	U	< 0.0010	< 0.010	0.1	0.5	7
Zinc	1450	U	< 0.0010	< 0.50	4	50	200
Chloride	1220	U	< 1.0	< 10	800	15000	25000
Fluoride	1220	U	0.23	2.3	10	150	500
Sulphate	1220	U	1.1	11	1000	20000	50000
Total Dissolved Solids	1020	N	65	650	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	18	180	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	0.073

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: KCC Yard

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	18-02367						
Chemtest Sample ID:	569860						
Sample Ref:							
Sample ID:	TP10						
Top Depth(m):	0.80						
Bottom Depth(m):	2.00						
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] 0.46	3	5	6
Loss On Ignition	2610	U	%	1.9	--	--	10
Total BTEX	2760	U	mg/kg	[A] < 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg	< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg	[A] < 10	500	--	--
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100	--	--
pH	2010	U		8.4	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.053	--	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	1450	U	< 0.0010	< 0.050	0.5	2	25
Barium	1450	U	0.0028	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.010	0.04	1	5
Chromium	1450	U	0.0021	< 0.050	0.5	10	70
Copper	1450	U	< 0.0010	< 0.050	2	50	100
Mercury	1450	U	< 0.00050	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	0.0033	< 0.050	0.5	10	30
Nickel	1450	U	< 0.0010	< 0.050	0.4	10	40
Lead	1450	U	< 0.0010	< 0.010	0.5	10	50
Antimony	1450	U	< 0.0010	< 0.010	0.06	0.7	5
Selenium	1450	U	0.0010	0.010	0.1	0.5	7
Zinc	1450	U	< 0.0010	< 0.50	4	50	200
Chloride	1220	U	< 1.0	< 10	800	15000	25000
Fluoride	1220	U	0.26	2.6	10	150	500
Sulphate	1220	U	2.7	27	1000	20000	50000
Total Dissolved Solids	1020	N	48	480	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	17	170	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	< 0.020

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: KCC Yard

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	18-02367						
Chemtest Sample ID:	569861						
Sample Ref:							
Sample ID:	TP12						
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] 0.35	3	5	6
Loss On Ignition	2610	U	%	1.6	--	--	10
Total BTEX	2760	U	mg/kg	[A] < 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg	< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg	[A] < 10	500	--	--
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100	--	--
pH	2010	U		8.4	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.11	--	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	1450	U	< 0.0010	< 0.050	0.5	2	25
Barium	1450	U	0.0020	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.010	0.04	1	5
Chromium	1450	U	0.0020	< 0.050	0.5	10	70
Copper	1450	U	< 0.0010	< 0.050	2	50	100
Mercury	1450	U	< 0.00050	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	0.0025	< 0.050	0.5	10	30
Nickel	1450	U	< 0.0010	< 0.050	0.4	10	40
Lead	1450	U	< 0.0010	< 0.010	0.5	10	50
Antimony	1450	U	< 0.0010	< 0.010	0.06	0.7	5
Selenium	1450	U	< 0.0010	< 0.010	0.1	0.5	7
Zinc	1450	U	< 0.0010	< 0.50	4	50	200
Chloride	1220	U	< 1.0	< 10	800	15000	25000
Fluoride	1220	U	0.26	2.6	10	150	500
Sulphate	1220	U	3.5	35	1000	20000	50000
Total Dissolved Solids	1020	N	60	600	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	16	160	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	< 0.020

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 ID:	Sample Ref:	Sample ID:	Sampled Date:	Deviation Code(s):	Containers Received:
569858		TP05		A	Amber Glass 250ml
569858		TP05		A	Amber Glass 60ml
569859		TP06		A	Amber Glass 250ml
569859		TP06		A	Amber Glass 60ml
569860		TP10		A	Amber Glass 250ml
569860		TP10		A	Amber Glass 60ml
569861		TP12		A	Amber Glass 250ml
569861		TP12		A	Amber Glass 60ml

Test Methods

SOP	Title	Parameters included	Method summary
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.
1450	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
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.
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2180	Sulphur (Elemental) in Soils by HPLC	Sulphur	Dichloromethane extraction / HPLC with UV detection
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline 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.
2450	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.
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

Test Methods

SOP	Title	Parameters included	Method summary
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.

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"

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 45 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.co.uk

Appendix 8

Exploratory Hole Location Plan

North

Site Location

S&A Borehole Location

Trial Pit Location

ST03 Slit Trench Location

IGSL Limited
Unit F M7 Business Park, Naas, Co.Kildare
Tel: 045 846176 Fax: 045 846187
E-mail: info@igsl.ie

SITE INVESTIGATION & GEOTECHNICAL SPECIALISTS

Rev	By	Date	Description
0	CK	02/18	Layout Plan

Project:	Kildare County Council Maintenance Depot
Component:	Ground Investigation Contract
Title:	Location Plan

Designed:	CK	Date: 08/02	File Name: 20636	Drawing No:	20636-000-101
Drawn:	CK	Date: 08/02	Original Scale: 1:750 @A3		
Checked:	JL	Date: 08/02	Date: 08/02/2018		