

HOLLYVILLE HOUSING

CORK CITY

DRA CONSULTING ENGS

CONTENTS

I	INTRODUCTION
II	FIELDWORK
III	TESTING
III	DISCUSSION

APPENDICES

I	BORING RECORDS
II	TRIAL PIT LOGS
III	LABORATORY DATA
IV	SITE PLAN

FOREWORD

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

General.

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

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

Standards

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

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

Routine Sampling.

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

In-Situ Testing.

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

Groundwater

The depth of entry of any influx of groundwater is recorded during the course of boring operations. However, the normal rate of boring does not usually permit the recording of an equilibrium level for any one water strike. Where possible drilling is suspended for a period of twenty minutes to monitor the subsequent rise in water level. Groundwater conditions observed in the borings or pits are those appertaining to the period of investigation. It should be noted however, that groundwater levels are subject to diurnal, seasonal and climatic variations and can also be affected by drainage conditions, tidal variations etc.

Engineering Logging

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

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

Retention of Samples.

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

Reporting

Recommendations made and opinions expressed in this report are based on the strata observed in the exploratory holes, together with the results of in-situ and laboratory tests. No responsibility can be held by IGSL Ltd for ground conditions between exploratory hole locations.

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

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

**REPORT ON A SITE INVESTIGATION
FOR A RESIDENTIAL DEVELOPMENT
AT HOLLYVILLE
CORK CITY**

**FOR
DRA CONSULTING ENGINEERS**

Report No. 24755

JULY 2023

I Introduction

A new residential development is proposed for a site located at Holyville in Cork.

An investigation of sub soil conditions in the area of the proposed development has been carried out by IGSL for the DRA Consulting Engineers, on behalf of their client.

The site investigation included the following elements:

- * Cable Percussion Boreholes 3 nr.
- * Trial Pits 2 nr.
- Geotechnical Laboratory Testing
- Environmental and Chemical Laboratory Testing

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

II Fieldwork

The site and the exploratory locations are noted on the site plan provided by DRA and enclosed in Appendix IV to this report.

The various elements of the investigation are detailed in the following paragraphs. All field works were completed by an experienced geotechnical operator who carefully recorded stratification and recovered samples as required.

Each location was scanned electronically (CAT) to ensure that existing services were not damaged. Hand excavation was also carried out to a depth of 1.00 metre at borehole locations to ensure that underground services were not damaged.

All site operations were carried out in accordance with HSE safety regulations.

Boreholes

Three exploratory holes (BH01 to BH03) were bored with conventional 200mm cable-tool methods using a Dando Exploratory Rig..

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

Topsoil was noted at BH01 and BH03 overlying firm brown gravelly SILT/CLAY. MADE GROUND was however noted in BH02 to a depth of 1.30 metres.

Below the topsoil at BH01 and BH03 and below the Made Ground in BH02 a stratum of firm to stiff brown gravelly SILT or gravelly CLAY was encountered. The stratum contains occasional cobbles. Boreholes were terminated at depths between 1.90 and 3.80 metres on boulder obstructions or possible bedrock, following a period of abortive heavy duty chiselling.

The brown gravelly SILT/CLAY represent GLACIAL TILL deposition, locally referred to as Boulder Clay.

The findings are summarised as follows:

Ref No.	Topsoil/ Fill	Brown Boulder Clay	Final Depth	Water
BH01	0 – 0.10	0.10 – 1.90	1.90	Dry
BH02	0 – 1.30	1.30 – 3.80	3.80	Dry
BH03	0 – 0.10	0.10 – 3.20	3.20	Dry

Trial Pits

Trial Pits were opened at two locations and referenced TP01 and TP02. A tracked excavator was used under engineering supervision. Detailed records for each location are presented in Appendix II with supporting photographs. These records note the soil stratification and record sampling and ground water details.

The records indicate that some MADE GROUND is present overlying stiff gravelly silty CLAY, with clay-bound gravel noted below 2.00 metres in TP01.

Excavations were terminated with refusal of excavator, possibly indication bedrock. Proof core drilling to confirm rock parameters was not scheduled for this investigation.

Samples were taken at intervals for laboratory inspection. Trial Pits were dry and stable during the investigation.

Trial Pits were carefully backfilled using the excavated material and disturbed areas were levelled. Trial Pit details are summarised as follows:

Ref No.	Made Ground	Gravelly SILT/CLAY	Water
TP01	0 – 0.40	0.40 – 2.70	Dry
TP02	0 – 0.60	0.60 – 2.40	Dry

III Testing

(a) In-Situ :

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

STRATUM	N VALUE RANGE	COMMENT
Brown Gravelly Clay		
1.00 m BGL	13 to 19	Firm to Stiff
2.00 m BGL	10 to 19	Firm to Stiff
3.00 m BGL	42 to 50	Stiff to Very Stiff

b. Laboratory :

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

Classification Tests / Moisture Content	IGSL
Grading (Wet Sieve and Hydrometer)	IGSL
CBR	IGSL
Sulphate / Chloride / pH	EUROFINS
RILTA Suite Environmental	EUROFINS

All laboratory data is presented in Appendix III. Individual tests are discussed as follows:

Classification and Moisture Content

Liquid and plastic limits were determined for samples of the overburden. Results reflect low plasticity material of similar origin, with predominant SILT or CLAY matrix, plotting as both plastic and non-plastic material in the Casagrande Classification Chart. Natural moisture contents range from 11 to 14%.

Particle Size Distribution

Two samples had PSD values established by wet sieve and hydrometer analysis. The grading curves have a similar pattern with particle distribution from the fine clay to the coarser gravel fraction indicative of glacially deposited material (Boulder Clay). The graphs confirm the heterogeneous nature of the glacial TILL with material described as sandy gravelly SILT/CLAY or clay-silt bound sandy GRAVEL.

CBR

Two samples from the Trial Pits had CBR and Moisture Content determined in the laboratory. Testing was in accordance with BS1377 Part 4, Clause 7. The samples were taken from shallow depth in TP01 and TP02. Results are as follows:

TP01	1.00 metres	CBR	4.1 %	M/C	17 %
TP02	1.00 metres	CBR	0.50	M/C	23.0

Sulphate Chloride and pH

One sample was selected for sulphate and pH analysis. A Sulphate concentration (SO₄ 2:1 extract) of 0.021 g/l was established with a pH values of 8.4. Chloride content was also low (< 0.013 g/l). No special precautions are necessary to protect foundation concrete from sulphate aggression. A sulphate design class of DS-1 (ACEC Classification for Concrete) is indicated for concentrations less than 0.5 g/l.,

RILTA Environmental Suite

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

No elevated levels of the various contaminants was noted. The results confirm that the soils can be classified as INERT in accordance with Landfill Waste Acceptance Criteria. Excavated material can be disposed of to a suitably licensed Landfill Facility or can be utilised on site for non-engineering purposes.

No ASBESTOS traces were found during routine screening.

IV. Discussion:

The new residential development is to be carried out on a site at Hollyville in Cork.

A detailed investigation of ground conditions has been carried out by IGSL under the direction of DRA Consulting Engineers.

The results of the investigation confirm the presence of glacial till or boulder clay deposits underlying shallow surface fill. Drilling continued to a maximum depth of 3.80 metres with refusal then recorded.

For traditional two-storey house construction an allowable bearing pressure of 150 KPa will be appropriate.

Standard Penetration Tests at 1.00 metre BGL range from N=13 to N=19 with an allowable bearing pressure of at least 150 KPa available.

The use of traditional reinforced strip or pad foundations is therefore recommended, with foundations placed below the surface FILL on the brown gravelly SILT/CLAY stratum, nominally at a depth of about 1.00 metre.

Settlement in the brown gravelly clay under this loading intensity will be of the order of 10 mm. Differential movement should be negligible.

There is no significant increase in soil strength in the brown gravelly CLAY up to a depth of 3.00 metres. At 3.00 metres an allowable bearing pressure of 250 KPa is available. This would be suitable for higher loading associated with multi storey apartment construction.

The boulder clay will be sensitive to moisture content variation and should be protected from rainfall by blinding. Visual inspection of excavated formation by experienced personnel is also recommended to ensure uniformity and suitability of the founding medium. Any soft zones encountered should be removed and replaced with low-grade concrete.

Ground Water

No ground water was encountered in either boreholes or trial pits. Shallow foundation excavations should be dry during construction.

Pavements

CBR values in the trial pits varied from 0.50 to 4.1%. The brown gravelly CLAY should be satisfactory for site roads and parking areas. Visual assessment of the excavated formation is advised to ensure suitability. All suspect material (particularly organics) should be removed. Imported granular fill should fully comply with current NRA Guidelines.

Concrete

No special precautions are necessary to protect foundation concrete from chemical aggression.

Environmental

RILTA tests confirmed an INERT Classification for the soils encountered on the site. Excavated material can be disposed of in a suitably licensed Landfill facility.

IGSL/JC
July 2023

Appendix I Boring Records



GEOTECHNICAL BORING RECORD

REPORT NUMBER

24755

CONTRACT Holyville , Hollyhill , Co.Cork			BOREHOLE NO. BH01	
CO-ORDINATES			SHEET Sheet 1 of 1	
GROUND LEVEL (m AOD)		RIG TYPE Dando 2000	DATE COMMENCED 14/06/2023	
		BOREHOLE DIAMETER (mm) 200	DATE COMPLETED 14/06/2023	
		BOREHOLE DEPTH (m) 1.90		
CLIENT ENGINEER DRA C.E		SPT HAMMER REF. NO. ENERGY RATIO (%)		BORED BY J.Cosgrave PROCESSED BY F.C

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples				Field Test Results	Standpipe Details
					Ref. Number	Sample Type	Depth (m)	Recovery		
0	TOPSOIL			0.20						
0.20 - 1.90	Firm brown SILT/CLAY with occasional fine gravel				AA187211	B	1.00		N = 19 (3, 4, 4, 5, 5, 5)	
1.90	Obstruction End of Borehole at 1.90 m								N = 50/150 mm (25, 25, 25)	
2										
3										
4										
5										
6										
7										
8										
9										

HARD STRATA BORING/CHISELLING				WATER STRIKE DETAILS					
From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
1.6	1.9	1.5							No water strike

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

REMARKS CAT scanned location and hand dug inspection pit was carried out .	Sample Legend D - Small Disturbed (tub) B - Bulk Disturbed LB - Large Bulk Disturbed Env - Environmental Sample (Jar + Vial + Tub)	UT - Undisturbed 100mm Diameter Sample P - Undisturbed Piston Sample W - Water Sample
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IGSL BH LOG 24755.GPJ IGSL.GDT 20/6/23



GEOTECHNICAL BORING RECORD

REPORT NUMBER

24755

CONTRACT Holyville , Hollyhill , Co.Cork		BOREHOLE NO. BH02
CO-ORDINATES		SHEET Sheet 1 of 1
GROUND LEVEL (m AOD)	RIG TYPE Dando 2000	DATE COMMENCED 14/06/2023
	BOREHOLE DIAMETER (mm) 200	DATE COMPLETED 15/06/2023
	BOREHOLE DEPTH (m) 3.80	
CLIENT	SPT HAMMER REF. NO.	BORED BY J.Cosgrave
ENGINEER DRA C.E	ENERGY RATIO (%)	PROCESSED BY F.C

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples				Field Test Results	Standpipe Details
					Ref. Number	Sample Type	Depth (m)	Recovery		
0	TOPSOIL			0.20						
0	MADE GROUND (Comprised of brown slighly gravelly clayey fill)									
1				1.30	AA187208	B	1.00		N = 13 (3, 4, 4, 3, 3, 3)	
2	Firm light brown sandy SILT/CLAY with occasional gravel				AA187209	B	2.00		N = 10 (1, 2, 2, 3, 2, 3)	
3	Very stiff brown slightly gravelly CLAY with occasional angular cobbles			2.70						
3					AA187210	B	3.00		N = 42 (4, 5, 7, 7, 10, 18)	
4	Obstruction End of Borehole at 3.80 m			3.80					N = 50/150 mm (25, 25, 25)	
5										
6										
7										
8										
9										

HARD STRATA BORING/CHISELLING				WATER STRIKE DETAILS					
From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
3.6	3.8	1.5							No water strike

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

REMARKS CAT scanned location and hand dug inspection pit was carried out .	Sample Legend D - Small Disturbed (tub) B - Bulk Disturbed LB - Large Bulk Disturbed Env - Environmental Sample (Jar + Vial + Tub) UT - Undisturbed 100mm Diameter Sample P - Undisturbed Piston Sample W - Water Sample
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IGSL BH LOG 24755.GPJ IGSL_GDT 20/6/23



GEOTECHNICAL BORING RECORD

REPORT NUMBER

24755

CONTRACT Holyville , Hollyhill , Co.Cork

BOREHOLE NO. BH03
SHEET Sheet 1 of 1

CO-ORDINATES
GROUND LEVEL (m AOD)

RIG TYPE Dando 2000
BOREHOLE DIAMETER (mm) 200
BOREHOLE DEPTH (m) 3.20

DATE COMMENCED 15/06/2023
DATE COMPLETED 15/06/2023

CLIENT ENGINEER DRA C.E

SPT HAMMER REF. NO.
ENERGY RATIO (%)

BORED BY J.Cosgrave
PROCESSED BY F.C

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples				Field Test Results	Standpipe Details
					Ref. Number	Sample Type	Depth (m)	Recovery		
0	TOPSOIL			0.20						
0	Firm brown SILT/CLAY with occasional fine gravel				AA187212	B	1.00		N = 14 (3, 3, 3, 4, 4, 3)	
1				1.50						
1	Firm brown slightly gravelly CLAY with occasional amnr cobbles				AA187213	B	2.00		N = 19 (4, 4, 5, 4, 5, 5)	
2				2.70						
2	Very stiff brown slightly gravelly CLAY with some angular cobbles				AA187214	B	3.00		N = 25/75 mm (25, 25)	
3	Obstruction End of Borehole at 3.20 m			3.20						
4										
5										
6										
7										
8										
9										

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

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

REMARKS CAT scanned location and hand dug inspection pit was carried out .

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

IGSL BH LOG 24755.GPJ IGSL.GDT 20/6/23

APPENDIX II TRIAL PIT LOGS
PHOTOGRAPHS



TRIAL PIT RECORD

REPORT NUMBER

CONTRACT Hollyhill	TRIAL PIT NO. TP01
LOGGED BY MB	SHEET Sheet 1 of 1
CLIENT ENGINEER DRA Consulting	CO-ORDINATES
	GROUND LEVEL (m)
	DATE STARTED 15/06/2023
	DATE COMPLETED 15/06/2023
	EXCAVATION METHOD 5T

Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples			Vane Test (kPa)	Hand Penetrometer (kPa)
						Sample Ref	Type	Depth		
0.0	TOPSOIL (Firm brown sandy gravelly CLAY)		0.10							
	MADE GROUND (Firm brown sandy gravelly CLAY with plastic and clay pipe particles. Sand is fine to coarse. Gravel is fine to coarse subangular to subrounded.)		0.40							
	Stiff to very stiff brown sandy gravelly CLAY with a medium cobble content. Sand is fine to coarse. Gravel is fine to coarse subangular to subrounded. Cobbles are subangular to subrounded.					AA191114	B	0.50		
1.0	Hard Digging					AA191115	B	1.00		
2.0	Medium dense brown sandy clayey GRAVEL with a medium cobble content. Sand is fine to coarse. Gravel is fine to coarse subangular to subrounded. Cobbles are subrounded to rounded		2.00			AA191116	B	2.00		
	Possible rock		2.70							
3.0										
4.0										

Groundwater Conditions
Dry

Stability
Stable

General Remarks

IGSL TP LOG 24755 TP.GPJ IGSL_GDT_23/6/23



TRIAL PIT RECORD

REPORT NUMBER

CONTRACT Hollyhill	TRIAL PIT NO. TP02	SHEET Sheet 1 of 1
LOGGED BY MB	CO-ORDINATES	
CLIENT ENGINEER DRA Consulting	GROUND LEVEL (m)	
	DATE STARTED 15/06/2023	DATE COMPLETED 15/06/2023
	EXCAVATION METHOD 5T	

Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples			Vane Test (KPa)	Hand Penetrometer (KPa)
						Sample Ref	Type	Depth		
0.0	TOPSOIL (Firm brown sandy gravelly CLAY) MADE GROUND (Firm brown sandy gravelly CLAY with plastic, bricks and clay pipe particles. Sand is fine to coarse. Gravel is fine to coarse subangular to subrounded.)									
0.60	Stiff orange brown sandy gravelly to very gravelly CLAY with a medium cobble content. Sand is fine to coarse. Gravel is fine to coarse subangular to subrounded. Cobbles are subangular to subrounded.		0.60			AA191111	B	0.50		
1.00			1.00			AA191112	B	1.00		
2.00						AA191113	B	2.00		
2.40	Possible rock		2.40							

Groundwater Conditions
Dry

Stability
Stable

General Remarks

IGSL TP LOG 24755 TP.GPJ IGSL GDT 23/6/23

TP01 – 1 of 3



TP01 – 2 of 3



TP01 – 3 of 3



TP02 – 1 of 3



TP02 – 2 of 3



TP02 – 3 of 3



APPENDIX III Laboratory Data

TEST REPORT

Determination of Particle Size Distribution

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

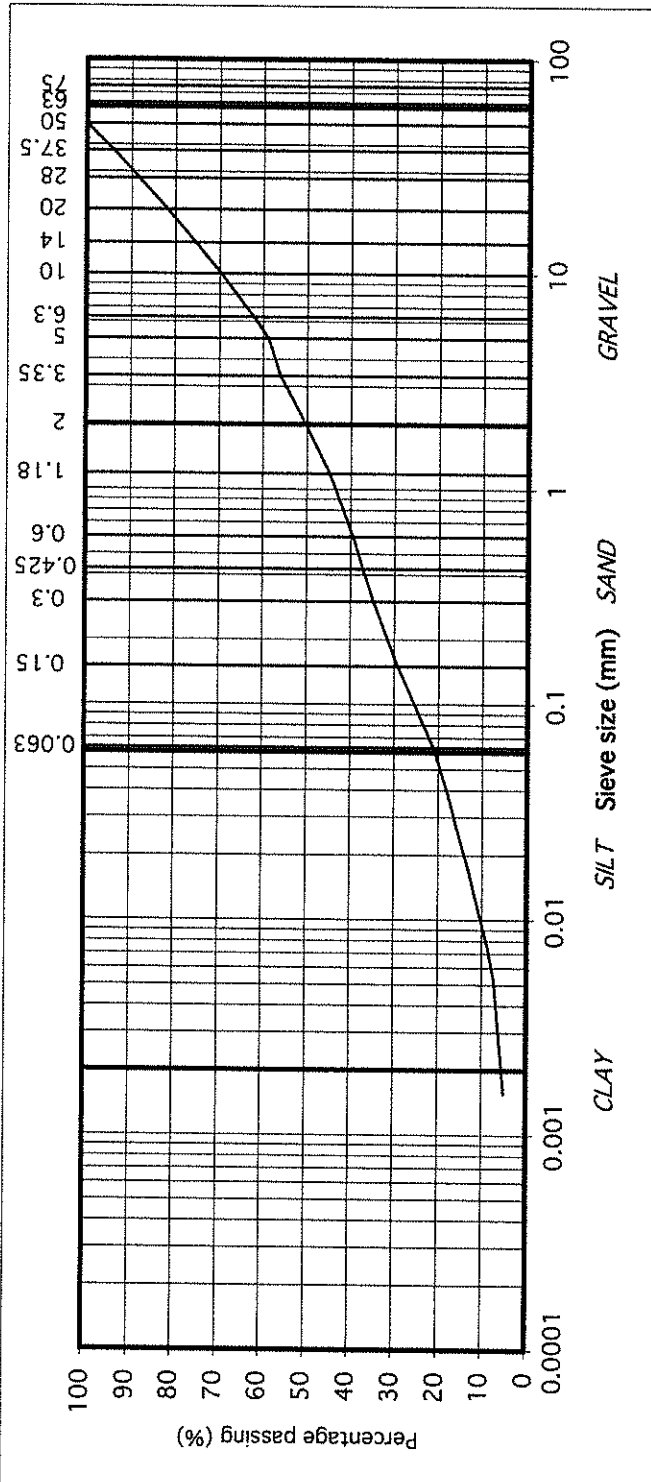


Contract No.	24755	Report No.	R148255
Contract Name :	Holyville, Holyhill Cork		
BH/TP No.	BH02		
Sample No.*	AA187210	Lab. Sample No.	A23/2439
Sample Type:	B		
Depth* (m)	3.00	Customer:	DRA
Date Received	30/06/2023	Date Testing started	30/06/2023
Description:	Brown slightly sandy, gravelly, SILT		

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

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



particle size	% passing
75	100
63	100
50	100
37.5	94
28	88
20	82
14	76
10	70
6.3	62
5	59
3.35	56
2	50
1.18	45
0.6	39
0.425	37
0.3	35
0.15	29
0.063	21
0.039	18
0.028	16
0.018	13
0.010	11
0.007	9
0.005	7
0.002	5

IGSL Ltd Materials Laboratory

Approved by:	Date:
<i>[Signature]</i>	28/07/23
Page no: 1 of 1	

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

TEST REPORT

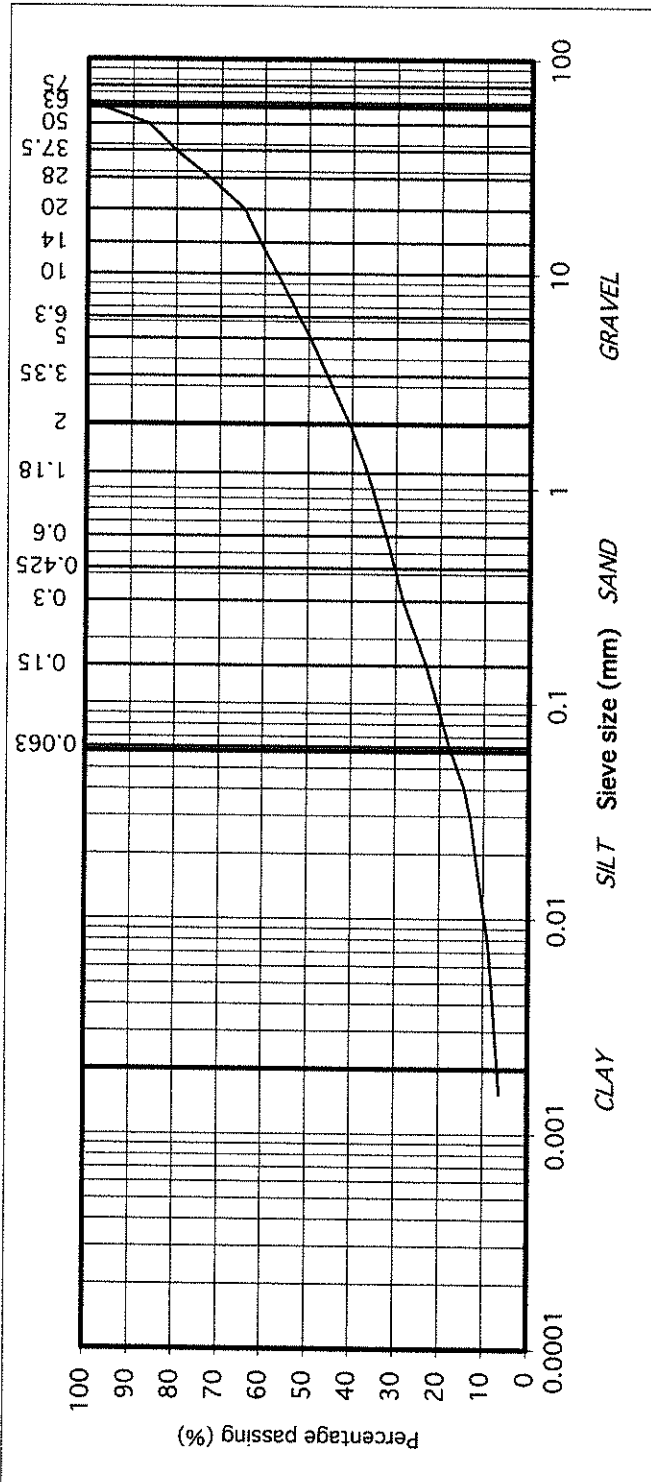
Determination of Particle Size Distribution

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



Contract No.	24755	Report No.	R148254
Contract Name :	Holyville, Holyhill Cork		
BH/TP No.	BH03		
Sample No.*	AA187214	Lab. Sample No.	A23/2441
Sample Type:	B		
Depth* (m)	3.00	Customer:	DRA
Date Received	30/06/2023 Date Testing started		
Description:	Brown silty, very sandy, GRAVEL		
Remarks	Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377		

Results relate only to the specimen tested in as received condition unless otherwise noted. * denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.
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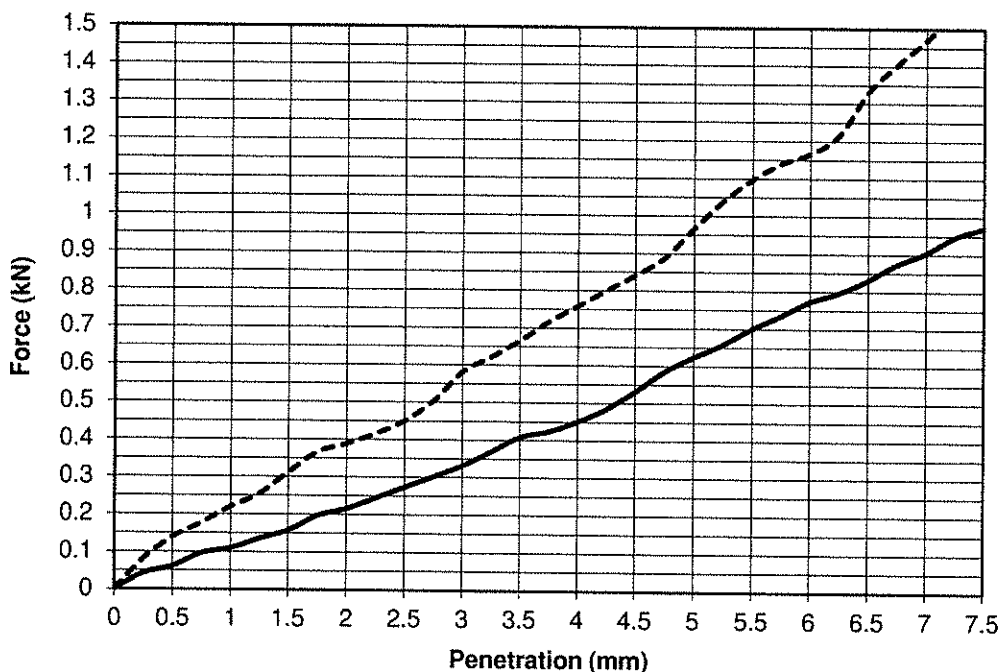
IGSL Ltd Materials Laboratory	Approved by:	Date:	Page no:
	<i>J Barrett</i>	28/07/23	1 of 1
Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)			

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

TEST REPORT
 Determination of California Bearing
 Ratio (CBR)
 Tested in accordance with BS1377:Part 4:1990, clause 7



Report No.	R147366	Contract	Holyville , Holyhill , Cork
Contract No.	24755	Customer	DRA
Date received	30/06/23	Date Tested	20/07/23
BH/TP No.*	BH01	Sample No.*	AA187211 Type: B
Depth* (m)	1.00	Lab sample No.	A23/2437



Key: ————— Top - - - - - Base

Description: Brown sandy gravelly SILT			
Initial Condition:		Unsoaked	
Moisture Content (%):	17	Bulk Density (Mg/m ³):	2.06
Surcharge (kg):	4	Dry Density (Mg/m ³):	1.75
% Material >20mm:	40		
Method of compaction: Static Compaction Method 2			

Test Result	Top	Base
CBR %	3.4	4.8
Moisture Content %	18	17

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

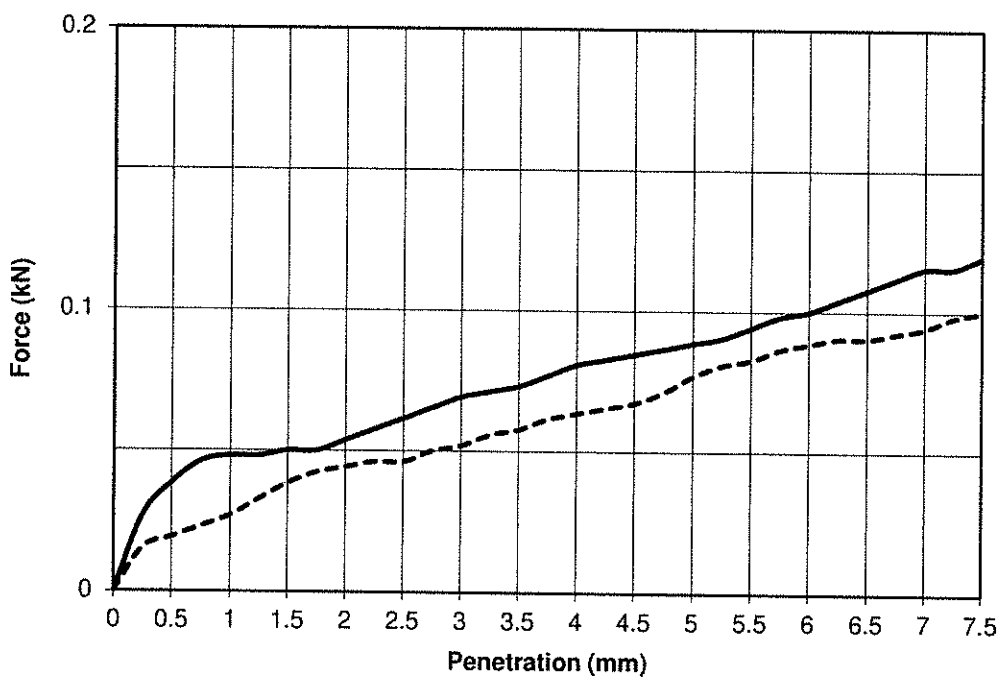
IGSL Ltd Materials Laboratory	Approved by	Date	Page No.
	<i>H Byrne</i>	28/07/23	1 of 1

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

TEST REPORT
 Determination of California Bearing
 Ratio (CBR)
 Tested in accordance with BS1377:Part 4:1990, clause 7



Report No.	R147367	Contract	Holyville , Holyhill , Cork
Contract No.	24755	Customer	DRA
Date received	30/06/23	Date Tested	20/07/23
BH/TP No.*	BH03	Sample No.*	AA187212 Type: B
Depth* (m)	1.00	Lab sample No.	A23/2440



Key: ————— Top - - - - - Base

Description: Brown sandy gravelly SILT/CLAY			
Initial Condition:		Unsoaked	
Moisture Content (%):	23	Bulk Density (Mg/m ³):	1.99
Surcharge (kg):	4	Dry Density (Mg/m ³):	1.62
% Material >20mm:	25		
Method of compaction: Static Compaction Method 2			

Test Result	Top	Base
CBR %	0.5	0.4
Moisture Content %	23	22

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

IGSL Ltd Materials Laboratory	Approved by	Date	Page No.
	<i>H Byrne</i>	28/07/23	1 of 1



Final Report

Report No.: 23-21631-1

Initial Date of Issue: 04-Jul-2023

Re-Issue Details:

Client IGSL

Client Address: M7 Business Park
Naas
County Kildare
Ireland

Contact(s): Darren Keogh

Project 24755 Hollyville, Holyhill Cork (DRA)

Quotation No.: Q20-21693

Date Received: 26-Jun-2023

Order No.:

Date Instructed: 26-Jun-2023

No. of Samples: 3

Turnaround (Wkdays): 7

Results Due: 04-Jul-2023

Date Approved: 04-Jul-2023

Approved By:

Details: Stuart Henderson, Technical
Manager

Results - Leachate

Project: 24755 Hollyville, Hollyhill Cork (DRA)

Client: IGSL	Chemtest Job No.:	23-21631	23-21631			
Quotation No.: Q20-21693	Chemtest Sample ID.:	1664311	1664312			
Order No.:	Client Sample Ref.:	AA187208	AA187212			
	Sample Location:	BH02	BH03			
	Sample Type:	SOIL	SOIL			
	Top Depth (m):	1.00	1.00			
Determinand	Accred.	SOP	Type	Units	LOD	
pH	U	1010	10:1		N/A	8.1
Ammonium	U	1220	10:1	mg/l	0.050	< 0.050
Ammonium	N	1220	10:1	mg/kg	0.10	0.32
Boron (Dissolved)	U	1455	10:1	mg/kg	0.01	0.41
Benzol[j]fluoranthene	N	1800	10:1	µg/l	0.010	< 0.010

Results - Soil

Project: 24755 Hollyville, Hollyhill Cork (DRA)

Client: IGS		Chemtest Job No.: 23-21631		23-21631		23-21631	
Quotation No.: Q20-21693		Chemtest Sample ID.: 1664310		1664310		1664312	
Order No.:		Client Sample Ref.: AA187211		AA187208		AA187212	
		Sample Location: BH01		BH02		BH03	
		Sample Type: SOIL		SOIL		SOIL	
		Top Depth (m): 1.00		1.00		1.00	
		Asbestos Lab: COVENTRY		NEW-ASB		NEW-ASB	
Determinand	Accred.	SOP	LOD				
ACM Type	U	2192	N/A				
Asbestos Identification	U	2192	N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	20	21	20
pH (2.5:1)	N	2010		4.0	[A] 8.4		
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40		[A] 2.3	[A] 0.77
Magnesium (Water Soluble)	N	2120	g/l	0.010	[A] < 0.010		
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	[A] 0.21		
Total Sulphur	U	2175	%	0.010	[A] 0.054		
Sulphur (Elemental)	U	2180	mg/kg	1.0		[A] 6.4	[A] 1.1
Chloride (Water Soluble)	U	2220	g/l	0.010	[A] 0.013		
Nitrate (Water Soluble)	N	2220	g/l	0.010	0.12		
Cyanide (Total)	U	2300	mg/kg	0.50		[A] 0.50	[A] < 0.50
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50		[A] 1.6	[A] 1.9
Ammonium (Water Soluble)	U	2220	g/l	0.01	< 0.01		
Sulphate (Acid Soluble)	U	2430	%	0.010	[A] 0.060	[A] 0.096	[A] 0.076
Arsenic	U	2455	mg/kg	0.5		14	16
Barium	U	2455	mg/kg	0		44	53
Cadmium	U	2455	mg/kg	0.10		0.27	< 0.10
Chromium	U	2455	mg/kg	0.5		11	15
Molybdenum	U	2455	mg/kg	0.5		0.8	0.5
Antimony	N	2455	mg/kg	2.0		< 2.0	< 2.0
Copper	U	2455	mg/kg	0.50		37	46
Mercury	U	2455	mg/kg	0.05		0.10	0.11
Nickel	U	2455	mg/kg	0.50		20	20
Lead	U	2455	mg/kg	0.50		89	91
Selenium	U	2455	mg/kg	0.25		1.1	0.74
Zinc	U	2455	mg/kg	0.50		83	86
Chromium (Trivalent)	N	2490	mg/kg	1.0		11	15
Chromium (Hexavalent)	N	2490	mg/kg	0.50		< 0.50	< 0.50
Mineral Oil (TPH Calculation)	N	2670	mg/kg	10		< 10	< 10
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0		[A] < 1.0	[A] < 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0		[A] < 1.0	[A] < 1.0
Aliphatic TPH >C8-C10	N	2680	mg/kg	1.0		[A] < 1.0	[A] < 1.0
Aliphatic TPH >C10-C12	N	2680	mg/kg	1.0		[A] < 1.0	[A] < 1.0
Aliphatic TPH >C12-C16	N	2680	mg/kg	1.0		[A] < 1.0	[A] < 1.0
Aliphatic TPH >C16-C21	N	2680	mg/kg	1.0		[A] < 1.0	[A] < 1.0
Aliphatic TPH >C21-C35	N	2680	mg/kg	1.0		[A] < 1.0	[A] < 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0		[A] < 1.0	[A] < 1.0

Results - Soil

Project: 24755 Hollyville, Hollyhill Cork (DRA)

Client: IGSL	Chemtest Job No.:		23-21631		23-21631		23-21631		
	Quotation No.: Q20-21693	Chemtest Sample ID.:	1664310	1664311	1664310	1664311	1664312	1664312	
Order No.:	Client Sample Ref.:	AA187211	AA187208	AA187212	BH02	BH03	SOIL	NEW-ASB	
	Sample Location:	BH01	SOIL	SOIL	SOIL	SOIL	SOIL	NEW-ASB	
	Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	NEW-ASB	
	Top Depth (m):	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
		Asbestos Lab:		COVENTRY		NEW-ASB		NEW-ASB	
Determinand	Accred.	SOP	Units	LOD					
Total Aliphatic Hydrocarbons	N	2680	mg/kg	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
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0			[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C8-C10	N	2680	mg/kg	1.0			[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C10-C12	N	2680	mg/kg	1.0			[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C12-C16	N	2680	mg/kg	1.0			[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C16-C21	N	2680	mg/kg	1.0			[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C21-C35	N	2680	mg/kg	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
Total Aromatic Hydrocarbons	N	2680	mg/kg	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
Benzene	U	2760	µg/kg	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
Ethylbenzene	U	2760	µg/kg	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
o-Xylene	U	2760	µg/kg	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
Naphthalene	N	2800	mg/kg	0.010			[A] < 0.010	[A] < 0.010	[A] < 0.010
Acenaphthylene	N	2800	mg/kg	0.010			[A] < 0.010	[A] < 0.010	[A] < 0.010
Acenaphthene	N	2800	mg/kg	0.010			[A] < 0.010	[A] < 0.010	[A] < 0.010
Fluorene	N	2800	mg/kg	0.010			[A] < 0.010	[A] < 0.010	[A] < 0.010
Phenanthrene	N	2800	mg/kg	0.010			[A] < 0.010	[A] < 0.010	[A] < 0.010
Anthracene	N	2800	mg/kg	0.010			[A] < 0.010	[A] < 0.010	[A] < 0.010
Fluoranthene	N	2800	mg/kg	0.010			[A] < 0.010	[A] < 0.010	[A] < 0.010
Pyrene	N	2800	mg/kg	0.010			[A] < 0.010	[A] < 0.010	[A] < 0.010
Benzo[a]anthracene	N	2800	mg/kg	0.010			[A] < 0.010	[A] < 0.010	[A] < 0.010
Chrysene	N	2800	mg/kg	0.010			[A] < 0.010	[A] < 0.010	[A] < 0.010
Benzo[b]fluoranthene	N	2800	mg/kg	0.010			[A] < 0.010	[A] < 0.010	[A] < 0.010
Benzo[k]fluoranthene	N	2800	mg/kg	0.010			[A] < 0.010	[A] < 0.010	[A] < 0.010
Benzo[a]pyrene	N	2800	mg/kg	0.010			[A] < 0.010	[A] < 0.010	[A] < 0.010
Indeno[1,2,3-c,d]Pyrene	N	2800	mg/kg	0.010			[A] < 0.010	[A] < 0.010	[A] < 0.010
Dibenz[a,h]Anthracene	N	2800	mg/kg	0.010			[A] < 0.010	[A] < 0.010	[A] < 0.010
Benzo[g,h,i]perylene	N	2800	mg/kg	0.010			[A] < 0.010	[A] < 0.010	[A] < 0.010
Coronene	N	2800	mg/kg	0.010			[A] < 0.010	[A] < 0.010	[A] < 0.010
Total Of 17 PAH's	N	2800	mg/kg	0.20			[A] 0.20	[A] 0.46	[A] 0.46
PCB 28	N	2815	mg/kg	0.0010			[A] < 0.0010	[A] < 0.0010	[A] < 0.0010
PCB 52	N	2815	mg/kg	0.0010			[A] < 0.0010	[A] < 0.0010	[A] < 0.0010
PCB 90+101	N	2815	mg/kg	0.0010			[A] < 0.0010	[A] < 0.0010	[A] < 0.0010
PCB 118	N	2815	mg/kg	0.0010			[A] < 0.0010	[A] < 0.0010	[A] < 0.0010

Results - Soil

Project: 24755_Hollyville_Holyhill Cork (DRA)

Client: IGSL		Chemtest Job No.: 23-21631		23-21631		23-21631	
Quotation No.: Q20-21693		Chemtest Sample ID.: 1664310		1664311		1664312	
Order No.:		Client Sample Ref.: AA187211		AA187208		AA187212	
		Sample Location: BH01		BH02		BH03	
		Sample Type: SOIL		SOIL		SOIL	
		Top Depth (m): 1.00		1.00		1.00	
		Asbestos Lab: COVENTRY		NEW-ASB		NEW-ASB	
Determinand	Accred.	SOP	Units	LOD			
PCB 153	N	2815	mg/kg	0.0010	[A] < 0.0010	[A] < 0.0010	[A] < 0.0010
PCB 138	N	2815	mg/kg	0.0010	[A] < 0.0010	[A] < 0.0010	[A] < 0.0010
PCB 180	N	2815	mg/kg	0.0010	[A] < 0.0010	[A] < 0.0010	[A] < 0.0010
Total PCBs (7 congeners)	N	2815	mg/kg	0.0010	[A] < 0.0010	[A] < 0.0010	[A] < 0.0010
Total Phenols	U	2920	mg/kg	0.10	< 0.10	< 0.10	< 0.10

Results - Single Stage WAC

Project: 24755 Hollyville, Hollyhill, Cork (DRA) Chemtest Job No: 23-21631 Chemtest Sample ID: 1664311 Sample Ref: AA187208 Sample ID: BH02 Sample Location: 1.00 Top Depth(m): Bottom Depth(m): Sampling Date:		SOP 2625 2610 2760 2815 2670 2800 2010 2015		Units % % mg/kg mg/kg mg/kg mg/kg mol/kg		Accred. U U U N U N U N		Landfill Waste Acceptance Criteria Limits Inert Waste Landfill Stable, Non-reactive hazardous waste in non-hazardous Landfill Hazardous Waste Landfill		
Determinand Total Organic Carbon Loss On Ignition Total BTEX Total PCBs (7 congeners) TPH Total WAC Total Of 17 PAH's pH Acid Neutralisation Capacity Eluate Analysis Arsenic Barium Cadmium Chromium Copper Mercury Molybdenum Nickel Lead Antimony Selenium Zinc Chloride Fluoride Sulphate Total Dissolved Solids Phenol Index Dissolved Organic Carbon		[A] 0.61 3.7 [A] < 0.010 [A] < 0.0010 [A] < 10 [A] 0.20 8.2 0.0020 0.036 0.10 < 0.0011 0.0068 0.068 < 0.00050 0.020 0.022 0.036 0.013 0.0079 0.21 13 1.9 280 1200 < 0.30 95		10:1 Eluate mg/l 10:1 Eluate mg/kg Limit values for compliance using BS EN 12457 at L/S 10 l/kg 0.5 20 0.04 0.5 2 0.01 0.5 0.4 0.5 0.06 0.1 0.21 1.3 0.19 28 120 < 0.030 9.5		To evaluate To evaluate To evaluate 2 100 1 10 50 0.2 10 10 10 0.7 0.5 4 50 15000 150 20000 60000 1 500 800 25 300 5 70 100 2 30 40 50 5 7 200 25000 500 50000 100000 - 1000				

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	21

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: 24755 Hollyville, Hollyhill Cork (DRA)		23-21631				
Chemtest Job No: 1664312		AA187212				
Sample Ref: BH03		1.00				
Sample ID: 2010		2015				
Sample Location: 2625		2610				
Top Depth(m): 2760		2815				
Bottom Depth(m): 2870		2800				
Sampling Date: 2010		2015				
Determinand	SOP	Accred.	Units	Landfill Waste Acceptance Criteria Limits		
Total Organic Carbon	2625	U	%	[A] 1.1	3	6
Loss On Ignition	2610	U	%	3.6	--	10
Total BTEX	2760	U	mg/kg	[A] < 0.010	--	--
Total PCBs (7 congeners)	2815	N	mg/kg	[A] < 0.0010	1	--
TPH Total WAC	2870	U	mg/kg	[A] < 10	500	--
Total Of 17 PAH's	2800	N	mg/kg	[A] 0.46	100	--
pH	2010	U		6.8	--	--
Acid Neutralisation Capacity	2015	N	mol/kg	< 0.0020	--	--
Eluate Analysis			10:1 Eluate mg/l	< 0.0020	To evaluate	To evaluate
Arsenic	1455	U	0.0038	0.039	0.5	25
Barium	1455	U	0.006	0.059	20	300
Cadmium	1455	U	< 0.00011	< 0.0011	0.04	1
Chromium	1455	U	0.0017	0.017	0.5	10
Copper	1455	U	0.0060	0.060	2	50
Mercury	1455	U	< 0.00005	< 0.00050	0.01	0.2
Molybdenum	1455	U	0.0012	0.012	0.5	10
Nickel	1455	U	0.0018	0.018	0.4	10
Lead	1455	U	0.0057	0.058	0.5	10
Antimony	1455	U	0.0006	0.0059	0.06	0.7
Selenium	1455	U	0.0006	0.0065	0.1	0.5
Zinc	1455	U	0.028	0.28	4	50
Chloride	1220	U	1.4	14	800	15000
Fluoride	1220	U	0.15	1.5	10	150
Sulphate	1220	U	11	110	1000	20000
Total Dissolved Solids	1020	N	71	710	4000	60000
Phenol Index	1920	U	< 0.030	< 0.30	1	--
Dissolved Organic Carbon	1610	U	12	120	500	800

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	20

Waste Acceptance Criteria

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

Deviations

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

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
1664310	AA187211		BH01		A	Amber Glass 250ml
1664310	AA187211		BH01		A	Plastic Tub 500g
1664311	AA187208		BH02		A	Amber Glass 250ml
1664311	AA187208		BH02		A	Plastic Tub 500g
1664312	AA187212		BH03		A	Amber Glass 250ml
1664312	AA187212		BH03		A	Plastic Tub 500g

Test Methods

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

Test Methods

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

Report Information

Key

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

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

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

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

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

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

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

Appendix IV Site Plan

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ORDNANCE SURVEY MAPS REPRODUCED UNDER
PERMISSION OF THE COUNCIL OF THE
MAPPING AGENCY, GOVERNMENT OF IRELAND.

LEGEND

- SITE BOUNDARY
- PROPOSED AIRPHONE LOCATION
- PROPOSED TRAFFIC LIGHT LOCATION
- LOCATION OF PROPOSED HOUSING UNITS



PROPOSED SITE PLAN - SITE INVESTIGATION WORKS
SCALE 1:100

SITE INVESTIGATION

DRA
CONSULTING ENGINEERS

NSAI
REGISTERED ENGINEERS

0 4027415 | 0 4027416 | 0 4027417 | 0 4027418
0 4027415 | 0 4027416 | 0 4027417 | 0 4027418
www.draconsulting.ie

KENNETH HENNESSY ARCHITECTS

00P-CORK/CITY HOUSING
HOLLYVILLE
CORK

PROPOSED SITE PLAN - SITE INVESTIGATION WORKS

REV	DESCRIPTION	PROJ	DATE
1			

NO.	DATE	BY	CHK	APP	DATE
1					

22245-SI-001

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REPORT No: 24755