

**IGSL Ltd**

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**Oxigen Site at Derryarkin,  
Co. Offaly**

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**Ground Investigation  
Report  
FACTUAL**

**Project No. 23072**

**April 2021**



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## DOCUMENT ISSUE REGISTER

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## 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 (**Oxigen Site at Derryarkin, Co. Offaly**) have been carried out by IGSL Limited 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 14688-1:2017 Geotechnical Investigation and Testing – Identification and Classification of Soil, Part 1: Identification and Description
- EN ISO 14688-2:2017 Geotechnical Investigation and Testing – Identification and Classification of Soil, Part 2: Principles for a classification
- EN ISO 14689-1:2017 Geotechnical Investigation and Testing – Identification, description & classification of rock

## 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.

This report has been prepared for Oxigen and Fehily Timoney & Company Consultants and the information should not be used without their prior written permission. IGSL Ltd accepts no responsibility or liability for this document being used other than for the purposes for which it was intended.

## Boring Procedures

Unless otherwise stated, 'shell and auger' or cable percussive boring technique has been employed as defined by Section 6.3 of IS EN ISO 22475-1:2006. The boring operations, sampling and in-situ testing complies with the recommendations of 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

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 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.

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## 1. INTRODUCTION

IGSL has undertaken a programme of geotechnical site investigation works at a c. 1.9 acre site for a proposed Oxigen Facility in the townland of Derryarkin, Croghan, Tullamore, County Offaly. Agricultural sheds and a slatted unit occupy the current site with concrete hardstanding to the north of the livestock housing unit. The site is located approximately 1.5km southwest of the R400 Regional Road linking Rochfortbridge in the northwest with the town of Rhode in the southeast. The site is bounded by agricultural pastureland with raised bogland locally. An operational sand and gravel pit is situated to the west of the site. Access was gained to the site via a gravel track leading off the R400 road.

**Figure 1 – Site Location Plan** (boxed area denotes the area of investigation)



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The investigation comprised machine-excavated trial pitting, cable percussion boring with rotary open-hole drilling activities. Groundwater monitoring wells were installed in each of the four constructed rotary drillholes. 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 and supervised by an IGSL engineering geologist.



Geotechnical, chemical and environmental laboratory testing was scheduled on a range of soil samples. The geotechnical testing on soils includes moisture contents, Atterberg Limits and Particle Size Distribution [PSD] classification tests. Chemical analysis comprised BRE SD1 testing (i.e. total sulfur, sulfate contents) undertaken by Chemtest Laboratories. Environmental testing was undertaken on soils in accordance with the *Rilta* waste acceptance parameters. This report presents the factual geotechnical data acquired from the 2021 investigation.

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## 2. FIELDWORK

### 2.1 General

The fieldworks were undertaken during January and February 2021. The works which form this report comprise the following:

- Trial Pitting (5 No.)
- Cable Percussion Boring (6 No.)
- Rotary Open-Hole Drillholes (4 No.)
- Groundwater Monitoring
- Surveying of Exploratory Hole Locations

### 2.2 Trial Pits

Trial pitting was undertaken at five locations across the site. The trial pits were excavated, logged and sampled under the direction of an IGSL geotechnical engineer in accordance with BS 5930 (1999+A2:2010). Bulk disturbed samples (typically 20 to 30kg) were taken as the pits progressed. In addition, environmental samples were taken at shallow depths in each trial pit. Soil samples, stored in glass jars, were transported to the selected environmental laboratory in cooler boxes.

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 geotechnical engineer. The trial pit logs and photos are presented in Appendix 1 and include descriptions of the soils encountered, groundwater conditions and stability of the pit sidewalls.

### 2.3 Cable Percussion Boreholes

Cable percussion boring (200mm diameter) was undertaken at six locations using a Dando 2000 rig. The boreholes extended to depths of between 5.20m and 8.50m below ground level. Boring commenced through hand-dug services inspection pits excavated to 1.20m. Each service pit was excavated only after undertaking a careful CAT [Cable Avoidance Tool] survey and following consultation of all available utility plans. 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 2.0m where N=21). 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. BH01 at 6.0m where N=50/75mm). 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.

Descriptions of the soils encountered and samples recovered are presented on the borehole records in Appendix 2. Details of groundwater strikes and hard strata boring (i.e. chiselling) are also presented on the aforementioned records.

### 2.4 Rotary Open-Hole Drillholes

Rotary Open-Hole (holes denoted RC\_) drilling was carried out at four locations on site. The holes were constructed using a tracked Casagrande top-drive drill rig. Symmetrex open-hole drilling was utilised within the overlying superficial deposits and extended to a depth of 12.0m bgl in each of the four holes.

Standard Penetration Tests (SPT's) were performed during overburden drilling 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. RC01 at 3.0m where N=7). 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. RC03 at 9.0m where N=62/210mm). 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.

Groundwater monitoring standpipes were installed in each of the four drillholes. The standpipes consisted of 50mm diameter HDPE pipework with proprietary 1mm slots and incorporated a pea gravel filter pack and cement / bentonite grout seal. Headwork covers were concreted in place. The drilling records are presented in Appendix 3.

### **2.5 Groundwater Monitoring**

Groundwater monitoring was undertaken following rotary drilling works. Groundwater levels were measured using an electric dipmeter. The levels recorded are shown in Appendix 4.

### **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 Transverse Mercator and ground levels (z) established to Malin Head. The co-ordinates and ground levels are shown on the exploratory hole logs with locations shown on the exploratory hole plan in Appendix 7.

### 3. LABORATORY TESTING

Geotechnical laboratory testing was performed at IGSL's INAB-accredited laboratory in accordance with the methods set out in BS1377; British Standard Methods of Test for Soils for Civil Engineering Purposes; British Standards Institute:1990. Soils testing included moisture content and Atterberg Limit (Liquid / Plastic Limits) determination along with analysis of particle size distribution [PSD]. The results from geotechnical testing on selected borehole and trial pit soils are presented in Appendix 5.

Chemical testing of soils to BRE SD1 test suite was also completed. The results feature in the Chemtest report in Appendix 6. Soil samples were selected from boreholes for specialist Waste Acceptance Criteria (WAC) analysis. The results can be used to classify the material with regard to its potential for disposal to landfill. These results are also presented in the Chemtest report in Appendix 6.

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## REFERENCES

- 1.0 BS 5930 (1999 + A2:2010) Code of Practice for Site Investigation, British Standards Institution (BSI).
- 2.0 BS 1377 (1990) Methods of Testing of Soils for Civil Engineering Purposes, BSI.
- 3.0 Eurocode 7, Part 2: Ground Investigation & Testing (EN 1997-2:2007)
- 4.0 Site Investigation Practice: Assessing BS 5930 (1986), Geological Society Special Publication, No. 2.

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## Appendix 1

### Trial Pit Records & Photographs

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# TRIAL PIT RECORD

**REPORT NUMBER**

**23072**

<b>CONTRACT</b> Oxigen Site at Derryarkin, Co.Offaly		<b>TRIAL PIT NO.</b> <b>TP1</b>
<b>LOGGED BY</b> I.Reder		<b>SHEET</b> Sheet 1 of 1
<b>CO-ORDINATES</b> 648,518.96 E 736,830.93 N		<b>DATE STARTED</b> 20/01/2021
<b>GROUND LEVEL (m)</b> 80.03		<b>DATE COMPLETED</b> 20/01/2021
<b>CLIENT ENGINEER</b> Oxigen Fehily Timoney & Company	<b>EXCAVATION METHOD</b> 8T tracked excavator	

Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples			Vane Test (KPa)	Hand Penetrometer (KPa)
						Sample Ref	Type	Depth		
0.0	CONCRETE		0.12	79.91						
	(Dense) Grey sandy subrounded to subangular fine to coarse GRAVEL (FILL)		0.50	79.53		AA142155	Env	0.50-1.00		
	(Medium dense) Brownish grey silty/clayey sandy subangular to subrounded fine to coarse GRAVEL with some organic matter		1.10	78.93		AA142156	B	1.20		
	(Medium dense) Grey very sandy subangular to subrounded fine to coarse GRAVEL with some subrounded cobbles and occasional lenses of fine to medium sand					AA142457	B	2.20		
					↓ (Rapid)					
						AA142158	B	3.20		
	End of Trial Pit at 3.50m		3.50	76.53						

**Groundwater Conditions**  
Rapid water flow at 2.70m

**Stability**  
Poor from 2.70m

**General Remarks**

IGSL TP LOG 23072.GPJ IGSL.GDT 16/4/21

Comhairle Contae Uíbhíall  
Offaly County Council

PLANNING

PL2 / 22 / 490

21 / 09 / 2022



# TRIAL PIT RECORD

**REPORT NUMBER**

**23072**

<b>CONTRACT</b> Oxigen Site at Derryarkin, Co.Offaly		<b>TRIAL PIT NO.</b> <b>TP2</b>
<b>LOGGED BY</b> I.Reder		<b>SHEET</b> Sheet 1 of 1
<b>CO-ORDINATES</b> 648,493.83 E 736,808.82 N		<b>DATE STARTED</b> 20/01/2021
<b>GROUND LEVEL (m)</b> 80.02		<b>DATE COMPLETED</b> 20/01/2021
<b>CLIENT ENGINEER</b> Oxigen Fehily Timoney & Company	<b>EXCAVATION METHOD</b> 8T tracked excavator	

Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples			Vane Test (KPa)	Hand Penetrometer (KPa)	
						Sample Ref	Type	Depth			
0.0	TOPSOIL (MADE GROUND)		0.15	79.87							
	Dark brown gravelly organic CLAY with rare pieces of plastic sheeting and rubber tyre (MADE GROUND)						AA142151	Env	0.50-0.90		
1.0	(Medium dense) Grey sandy subangular to subrounded fine to coarse GRAVEL		0.90	79.12							
							AA142152	B	1.00		
2.0							AA142153	B	2.00		
	(Dense) Grey sandy subangular to subrounded fine to coarse GRAVEL with many subrounded cobbles		2.50	77.52	↓ (Rapid)						
3.0	End of Trial Pit at 3.00m			3.00	77.02						
						AA142154	B	3.00			

**Groundwater Conditions**  
Rapid water flow at 2.50m

**Stability**  
Poor from 2.50m

**General Remarks**

IGSL TP LOG 23072.GPJ IGSL.GDT 16/4/21

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PL2 / 22 / 490

21 / 09 / 2022





# TRIAL PIT RECORD

**REPORT NUMBER**

**23072**

<b>CONTRACT</b> Oxigen Site at Derryarkin, Co.Offaly		<b>TRIAL PIT NO.</b> <b>TP3</b>
<b>LOGGED BY</b> I.Reeder		<b>SHEET</b> Sheet 1 of 1
<b>CO-ORDINATES</b> 648,502.48 E 736,788.50 N		<b>DATE STARTED</b> 20/01/2021
<b>GROUND LEVEL (m)</b> 80.14		<b>DATE COMPLETED</b> 20/01/2021
<b>CLIENT ENGINEER</b> Oxigen Fehily Timoney & Company	<b>EXCAVATION METHOD</b> 8T tracked excavator	

Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples			Vane Test (KPa)	Hand Penetrometer (KPa)
						Sample Ref	Type	Depth		
0.0	<b>TOPSOIL</b> Soft dark brown to black mottled grey sandy very gravelly organic <b>CLAY</b>		0.10	80.04						
	(Dense) Brown mottled dark brown and grey slightly clayey sandy subangular to subrounded fine to coarse <b>GRAVEL</b> with organic matter		0.35	79.79		AA142159	Env	0.40-0.80		
1.0	(Medium dense) Grey gravelly fine to coarse <b>SAND</b>		1.20	78.94		AA142160	B	1.00		
2.0	(Dense) Grey sandy subangular to subrounded fine to coarse <b>GRAVEL</b> with some subrounded cobbles		2.20	77.94		AA142161	B	1.80		
3.0	End of Trial Pit at 3.20m		3.20	76.94	 (Moderate)	AA142162	B	2.80		

**Groundwater Conditions**  
Moderate water flow at 2.80m

**Stability**  
Poor from 2.80m

**General Remarks**

IGSL TP LOG 23072.GPJ IGSL GDT 16/4/21



# TRIAL PIT RECORD

**REPORT NUMBER**

**23072**

**CONTRACT** Oxigen Site at Derryarkin, Co.Offaly

**TRIAL PIT NO.** **TP4**  
**SHEET** Sheet 1 of 1

**LOGGED BY** I.Reeder

**CO-ORDINATES** 648,531.75 E  
736,779.47 N

**DATE STARTED** 20/01/2021  
**DATE COMPLETED** 20/01/2021

**CLIENT ENGINEER** Oxigen  
Fehily Timoney & Company

**GROUND LEVEL (m)** 80.14

**EXCAVATION METHOD** 8T tracked excavator

Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples			Vane Test (KPa)	Hand Penetrometer (KPa)
						Sample Ref	Type	Depth		
0.0	CONCRETE									
0.20	(Medium dense) Brown mottled grey sandy subangular to subrounded fine to coarse GRAVEL with occasional subrounded cobbles and organic matter (possible MADE GROUND)		0.20	79.94		AA142167	Env	0.30-0.80		
0.90	(Medium dense) Grey slightly clayey fine to medium SAND with some subrounded gravel		0.90	79.24						
1.20	(Medium dense to dense) Grey sandy subangular to subrounded fine to coarse GRAVEL with some subrounded cobbles		1.20	78.94		AA142168	B	1.10		
1.80						AA142169	B	1.80		
2.80						AA142170	B	2.80		
3.50	End of Trial Pit at 3.50m		3.50	76.64	↓ (Moderate)					

**Groundwater Conditions**  
Moderate water flow at 3.20m

**Stability**  
Slightly unstable from 3.20m

**General Remarks**

IGSL TP LOG 23072.GPJ IGSL GDT 16/4/21



# TRIAL PIT RECORD

**REPORT NUMBER**

**23072**

<b>CONTRACT</b> Oxigen Site at Derryarkin, Co.Offaly		<b>TRIAL PIT NO.</b> <b>TP5</b>
<b>LOGGED BY</b> I.Reder		<b>SHEET</b> Sheet 1 of 1
<b>CO-ORDINATES</b> 648,519.00 E 736,748.52 N		<b>DATE STARTED</b> 20/01/2021
<b>GROUND LEVEL (m)</b> 80.12		<b>DATE COMPLETED</b> 20/01/2021
<b>CLIENT ENGINEER</b> Oxigen Fehily Timoney & Company	<b>EXCAVATION METHOD</b> 8T tracked excavator	

	Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples			Vane Test (KPa)	Hand Penetrometer (KPa)
						Sample Ref	Type	Depth		
0.0	Grey angular gravel and cobbles (Possible Cl.804 FILL) (MADE GROUND) Brown grey sandy GRAVEL with rare concrete fragments and steel wire (MADE GROUND)		0.15	79.97		AA142163	Env	0.20-0.70		
	(Medium dense to dense) Grey and dark grey clayey sandy subangular to subrounded fine to coarse GRAVEL with occasional subrounded cobbles (possible buried natural ground)		0.70	79.42	↓ (Seepage)					
1.0	0.70m - Plastic sheeting (Medium dense to dense) Brownish grey clayey sandy subangular to subrounded fine to coarse GRAVEL with occasional subrounded cobbles		1.10	79.02		AA142164	B	1.00		
2.0	(Medium dense) Grey very sandy subangular to subrounded fine to coarse GRAVEL (possibly very gravelly Sand)		1.70	78.42		AA142165	B	2.00		
3.0	(Dense) Grey sandy subangular to subrounded fine to coarse GRAVEL with subrounded cobbles		2.60	77.52						
			3.00		↓ (Slow)	AA142166	B	3.00		
	End of Trial Pit at 3.50m		3.50	76.62						
4.0										

**Groundwater Conditions**  
Seepage at 0.70m; Slow water flow observed at 3.20m

**Stability**  
Slightly unstable

**General Remarks**

IGSL TP LOG 23072.GPJ IGSL GDT 16/4/21

Trial Pit TP1 – 1 of 2



Trial Pit TP1 – 2 of 2



Trial Pit TP2 – 1 of 2



Trial Pit TP2 – 2 of 2



Trial Pit TP3 – 1 of 2



Trial Pit TP3 – 2 of 2



Trial Pit TP4 – 1 of 2



Trial Pit TP4 – 2 of 2



Trial Pit TP5 – 1 of 2



Trial Pit TP5 – 2 of 2





## Appendix 2

### Cable Percussion Borehole Records

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# GEOTECHNICAL BORING RECORD

**REPORT NUMBER**

**23072**

<b>CONTRACT</b> Oxigen Site at Derryarkin, Co.Offaly				<b>BOREHOLE NO.</b> BH01	
<b>CO-ORDINATES</b> 648,499.94 E 736,842.73 N		<b>RIG TYPE</b> Dando 2000		<b>SHEET</b> Sheet 1 of 1	
<b>GROUND LEVEL (m AOD)</b> 80.07		<b>BOREHOLE DIAMETER (mm)</b> 200		<b>DATE COMMENCED</b> 20/01/2021	
		<b>BOREHOLE DEPTH (m)</b> 6.50		<b>DATE COMPLETED</b> 20/01/2021	
<b>CLIENT</b> Oxigen <b>ENGINEER</b> Fehily Timoney & Company			<b>SPT HAMMER REF. NO.</b> <b>ENERGY RATIO (%)</b>		<b>BORED BY</b> P.Allan <b>PROCESSED BY</b> FC

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples				Field Test Results	Standpipe Details
					Ref. Number	Sample Type	Depth (m)	Recovery		
0	CONCRETE		79.87	0.20						
0	Medium dense grey fine to coarse very sandy GRAVEL with some cobbles (Possibly very gravelly Sand)				AA139284	B	1.00		N = 22 (2, 3, 4, 6, 6, 6)	
1					AA139285	B	2.00		N = 21 (2, 3, 6, 8, 3, 4)	
2					AA139286	B	3.00		N = 15 (2, 2, 3, 3, 4, 5)	
3					AA139287	B	4.00		N = 19 (3, 4, 6, 5, 4, 4)	
4			75.27	4.80						
5	Grey SILT		75.07	5.00	AA139288	B	5.00		N = 53 (4, 6, 10, 12, 13, 18)	
5	Dense fine to coarse grey sandy GRAVEL with some cobbles and occasional boulders				AA139289	B	6.00		N = 50/75 mm (25, 50)	
6			73.57	6.50						
7	Obstruction End of Borehole at 6.50 m									

HARD STRATA BORING/CHISELLING				WATER STRIKE DETAILS					
From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
5.3	5.5	1.5		0.20	0.20	No	No	20	Seepage
6.3	6.5	2		1.80	1.80	No	1.10	20	Moderate

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

**REMARKS** 1hr Erecting Covid 19 Safe Working Area. CAT scanned location and hand dug inspection pit carried out.

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

Offaly County Council  
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# GEOTECHNICAL BORING RECORD

**REPORT NUMBER**

**23072**

<b>CONTRACT</b> Oxigen Site at Derryarkin, Co.Offaly				<b>BOREHOLE NO.</b> BH02	
<b>CO-ORDINATES</b> 648,533.72 E 736,843.59 N		<b>RIG TYPE</b> Dando 2000		<b>SHEET</b> Sheet 1 of 1	
<b>GROUND LEVEL (m AOD)</b> 80.01		<b>BOREHOLE DIAMETER (mm)</b> 200		<b>DATE COMMENCED</b> 22/01/2021	
		<b>BOREHOLE DEPTH (m)</b> 6.30		<b>DATE COMPLETED</b> 25/01/2021	
<b>CLIENT ENGINEER</b> Oxigen Fehily Timoney & Company			<b>SPT HAMMER REF. NO.</b>		<b>BORED BY</b> P.Allan
			<b>ENERGY RATIO (%)</b>		<b>PROCESSED BY</b> FC

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples				Field Test Results	Standpipe Details
					Ref. Number	Sample Type	Depth (m)	Recovery		
0	CONCRETE		79.81	0.20						
1	Medium dense grey fine to coarse very sandy GRAVEL with occasional cobbles (Possibly very gravelly Sand)				AA139290	B	0.50			
					AA139291	B	1.00		N = 13 (2, 3, 3, 4, 3, 3)	
2	Medium dense large COBBLES		77.91	2.10	AA139292	B	2.00		N = 15 (6, 3, 4, 3, 3, 5)	
	Medium dense grey fine to coarse very sandy GRAVEL with occasional cobbles (Possibly very gravelly Sand)		77.61	2.40						
3					AA139293	B	3.00		N = 14 (2, 2, 3, 3, 3, 5)	
4	Medium dense to dense grey fine to coarse sandy clayey GRAVEL with some cobbles		76.01	4.00	AA139294	B	4.00		N = 37 (6, 5, 8, 7, 10, 12)	
	Dense grey fine to coarse GRAVEL with cobbles		75.31	4.70						
5					AA139295	B	5.00		N = 37 (6, 8, 5, 8, 10, 14)	
6	Obstruction End of Borehole at 6.30 m		73.71	6.30					N = 50/75 mm (25, 50)	
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
2.1	2.4	1							No water strike
4.3	4.6	1							
6.1	6.3	1.5							

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

**REMARKS** 1hr Erecting Covid 19 Safe Working Area. CAT scanned location and hand dug inspection pit carried out.

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

UT - Undisturbed 100 Sample  
 P - Undisturbed Pisto  
 W - Water Sample

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# GEOTECHNICAL BORING RECORD

**REPORT NUMBER**

**23072**

<b>CONTRACT</b> Oxigen Site at Derryarkin, Co.Offaly				<b>BOREHOLE NO.</b> BH03	
<b>CO-ORDINATES</b> 648,543.44 E 736,808.91 N		<b>RIG TYPE</b> Dando 2000		<b>SHEET</b> Sheet 1 of 1	
<b>GROUND LEVEL (m AOD)</b> 79.90		<b>BOREHOLE DIAMETER (mm)</b> 200		<b>DATE COMMENCED</b> 15/01/2021	
		<b>BOREHOLE DEPTH (m)</b> 7.30		<b>DATE COMPLETED</b> 18/01/2021	
<b>CLIENT</b> Oxigen		<b>SPT HAMMER REF. NO.</b>		<b>BORED BY</b> P.Allan	
<b>ENGINEER</b> Fehily Timoney & Company		<b>ENERGY RATIO (%)</b>		<b>PROCESSED BY</b> FC	

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples				Field Test Results	Standpipe Details
					Ref. Number	Sample Type	Depth (m)	Recovery		
0	MADE GROUND		79.40	0.50						
	Grey very sandy SILT/CLAY with occasional gravel				AA141309	B	0.50			
1			78.70	1.20	AA141310	B	1.00			N = 19 (2, 3, 4, 5, 4, 6)
	Medium dense fine to coarse grey sandy GRAVEL with occasional cobbles				AA141311	B	2.00			N = 18 (3, 4, 5, 5, 4, 4)
2					AA141312	B	3.00			N = 19 (4, 4, 3, 6, 5, 5)
3					AA141313	B	4.00			N = 19 (3, 4, 4, 5, 5, 5)
4			75.20	4.70						
5	Firm grey sandy SILT with some fine gravel				AA141314	B	5.00			N = 11 (1, 1, 2, 3, 2, 4)
6			73.90	6.00	AA141315	B	6.00			N = 28 (6, 6, 9, 6, 5, 8)
7	Dense fine to coarse grey sandy GRAVEL with some cobbles and occasional boulders				AA141316	B	7.00			N = 50/75 mm (15, 25, 50) N = 50/75 mm (25, 50)
8	Obstruction End of Borehole at 7.30 m			72.60						

HARD STRATA BORING/CHISELLING				WATER STRIKE DETAILS					
From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
3.7	3.9	1							No water strike
7.1	7.3	2							

INSTALLATION DETAILS					GROUNDWATER PROGRESS				
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments
					19-01-21	2.20	Nil	1.00	Final Water Level

<b>REMARKS</b> 1hr Erecting Covid 19 Safe Working Area. CAT scanned location and hand dug inspection pit carried out.	<b>Sample Legend</b> D - Small Disturbed (tub) B - Bulk Disturbed LB - Large Bulk Disturbed Env - Environmental Sample (Jar + Vial + Tub)	<b>UT</b> - Undisturbed 100 Sample <b>P</b> - Undisturbed Pisto <b>W</b> - Water Sample
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# GEOTECHNICAL BORING RECORD

**REPORT NUMBER**

23072

<b>CONTRACT</b> Oxigen Site at Derryarkin, Co.Offaly				<b>BOREHOLE NO.</b> BH04	
<b>CO-ORDINATES</b> 648,509.95 E 736,769.71 N		<b>RIG TYPE</b> Dando 2000		<b>SHEET</b> Sheet 1 of 1	
<b>GROUND LEVEL (m AOD)</b> 80.11		<b>BOREHOLE DIAMETER (mm)</b> 200		<b>DATE COMMENCED</b> 26/01/2021	
		<b>BOREHOLE DEPTH (m)</b> 5.20		<b>DATE COMPLETED</b> 26/01/2021	
<b>CLIENT</b> Oxigen <b>ENGINEER</b> Fehily Timoney & Company			<b>SPT HAMMER REF. NO.</b> <b>ENERGY RATIO (%)</b>		<b>BORED BY</b> P.Allan <b>PROCESSED BY</b> FC

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples				Field Test Results	Standpipe Details
					Ref. Number	Sample Type	Depth (m)	Recovery		
0	CONCRETE		79.91	0.20						
0	Medium dense to dense grey very sandy GRAVEL with some cobbles (Possibly very gravelly Sand)				AA141317	B	1.00		N = 29 (4, 6, 8, 9, 6, 6)	
1					AA141318	B	2.00		N = 36 (3, 4, 6, 8, 10, 12)	
2					AA141319	B	3.00		N = 23 (3, 4, 5, 6, 6, 6)	
3					AA141320	B	4.00		N = 20 (3, 4, 5, 5, 5, 5)	
4					AA141321	B	5.00		N = 50/150 mm (7, 9, 12, 38)	
5	Obstruction End of Borehole at 5.20 m		74.91	5.20						
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
2.5	2.7	1							No water strike
3.7	4	0.75							
5.1	5.2	1.5							

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

**REMARKS** 1hr Erecting Covid 19 Safe Working Area. CAT scanned location and hand dug inspection pit carried out.

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

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# GEOTECHNICAL BORING RECORD

**REPORT NUMBER**

23072

<b>CONTRACT</b> Oxigen Site at Derryarkin, Co.Offaly				<b>BOREHOLE NO.</b> BH05	
<b>CO-ORDINATES</b> 648,550.02 E 736,769.68 N		<b>RIG TYPE</b> Dando 2000		<b>SHEET</b> Sheet 1 of 1	
<b>GROUND LEVEL (m AOD)</b> 79.63		<b>BOREHOLE DIAMETER (mm)</b> 200		<b>DATE COMMENCED</b> 25/01/2021	
		<b>BOREHOLE DEPTH (m)</b> 6.50		<b>DATE COMPLETED</b> 26/01/2021	
<b>CLIENT</b> Oxigen <b>ENGINEER</b> Fehily Timoney & Company			<b>SPT HAMMER REF. NO.</b> <b>ENERGY RATIO (%)</b>		<b>BORED BY</b> P.Allan <b>PROCESSED BY</b> FC

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples				Field Test Results	Standpipe Details
					Ref. Number	Sample Type	Depth (m)	Recovery		
0	TOPSOIL (MADE GROUND)		79.43	0.20						
	MADE GROUND		79.13	0.50						
1	Medium dense to dense grey fine to coarse very sandy GRAVEL with some cobbles (Possibly very gravelly Sand)				AA116301	B	1.00		N = 16 (2, 2, 3, 4, 5, 4)	
2					AA116302	B	2.00		N = 18 (3, 4, 5, 6, 4, 3)	
3					AA116303	B	3.00		N = 16 (2, 3, 3, 4, 5, 4)	
4					AA116304	B	4.00		N = 18 (3, 4, 5, 4, 4, 5)	
5					AA116305	B	5.00		N = 31 (4, 6, 8, 7, 7, 9)	
6					AA116306	B	6.00		N = 21 (4, 5, 5, 6, 5, 5)	
7	Obstruction End of Borehole at 6.50 m		73.13	6.50						

HARD STRATA BORING/CHISELLING				WATER STRIKE DETAILS					
From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
5.3	5.5	1							No water strike
6.3	6.5	1.5							

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

**REMARKS** 1hr Erecting Covid 19 Safe Working Area. CAT scanned location and hand dug inspection pit carried out.

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

UT - Undisturbed 100 Sample  
 P - Undisturbed Pisto  
 W - Water Sample

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# GEOTECHNICAL BORING RECORD

**REPORT NUMBER**

**23072**

<b>CONTRACT</b> Oxigen Site at Derryarkin, Co.Offaly				<b>BOREHOLE NO.</b> BH06	
<b>CO-ORDINATES</b> 648,510.62 E 736,728.93 N				<b>SHEET</b> Sheet 1 of 1	
<b>GROUND LEVEL (m AOD)</b> 79.66		<b>RIG TYPE</b> Dando 2000		<b>DATE COMMENCED</b> 19/01/2021	
		<b>BOREHOLE DIAMETER (mm)</b> 200		<b>DATE COMPLETED</b> 20/01/2021	
<b>CLIENT</b> Oxigen		<b>SPT HAMMER REF. NO.</b>		<b>BORED BY</b> P.Allan	
<b>ENGINEER</b> Fehily Timoney & Company		<b>ENERGY RATIO (%)</b>		<b>PROCESSED BY</b> FC	

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples				Field Test Results	Standpipe Details
					Ref. Number	Sample Type	Depth (m)	Recovery		
0	TOPSOIL (MADE GROUND)		79.56	0.10						
	MADE GROUND		79.16	0.50						
	Brown very sandy SILT/CLAY with occasional gravel				AA141317	B	0.50			
1			78.46	1.20	AA141318	B	1.00		N = 24 (2, 3, 6, 8, 5, 5)	
	Medium dense to dense fine to coarse grey very sandy GRAVEL (Possibly very gravelly Sand)				AA141319	B	2.00		N = 29 (4, 4, 6, 9, 8, 6)	
2					AA141320	B	3.00		N = 22 (2, 3, 6, 5, 5, 6)	
3					AA141321	B	4.00		N = 50/150 mm (10, 15, 25, 25)	
4			74.86	4.80						
5	Medium dense fine to coarse grey silty sandy GRAVEL with occasional cobbles				AA141322	B	5.00		N = 14 (2, 2, 4, 3, 3, 4)	
6					AA141323	B	6.00		N = 13 (2, 3, 2, 4, 2, 5)	
7					AA141324	B	7.00		N = 17 (2, 2, 3, 4, 5, 5)	
8	Very stiff grey sandy gravelly CLAY with occasional cobbles		71.66	8.00	AA141325	B	8.00		N = 50/75 mm (15, 25, 50)	
9	Obstruction End of Borehole at 8.50 m		71.16	8.50					N = 50/75 mm (25, 50)	

HARD STRATA BORING/CHISELLING				WATER STRIKE DETAILS					
From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
4.1	4.4	1.5							No water strike
8.3	8.5	2							

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

<b>REMARKS</b> 1hr Erecting Covid 19 Safe Working Area. CAT scanned location and hand dug inspection pit carried out.	<b>Sample Legend</b> D - Small Disturbed (tub) B - Bulk Disturbed LB - Large Bulk Disturbed Env - Environmental Sample (Jar + Vial + Tub)	<b>UT - Undisturbed 100 Sample</b> P - Undisturbed Pisto W - Water Sample
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### Appendix 3

#### Rotary Open-Hole Drillhole Logs

Offaly County Council, Planning Dept. - Inspection Purposes Only





# OPEN HOLE DRILLING RECORD

**REPORT NUMBER**

23072

<b>CONTRACT</b> Oxigen Site at Derryarkin, Co.Offaly		<b>DRILLHOLE NO</b> RC01
<b>CO-ORDINATES</b> 648,485.73 E 736,851.16 N		<b>SHEET</b> Sheet 1 of 2
<b>GROUND LEVEL (mOD)</b> 80.30	<b>RIG TYPE</b> Casagrande	<b>DATE DRILLED</b> 08/02/2021
<b>CLIENT</b> Oxigen	<b>INCLINATION (deg)</b> -90	<b>DATE LOGGED</b> 09/02/2021
<b>ENGINEER</b> Fehily Timoney & Company	<b>HOLE DIAMETER (mm)</b> 78	<b>DRILLED BY</b> IGSL

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Zones (m)	Fracture Spacing Min Avg Max (mm)	Fracture Spacing Log (mm)	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
0							0 250 500		SYMMETRIX DRILLING; No recovery, observed by driller as returns of CLAY				
1	1.50	0	0	0									N = 5 (1, 0, 1, 2, 1, 1)
2		0	0	0									
3	3.00								SYMMETRIX DRILLING; No recovery, observed by driller as returns of clayey GRAVEL	3.00	77.30		N = 7 (2, 1, 2, 1, 1, 3)
4		0	0	0									
5	4.50												N = 20 (3, 3, 2, 5, 7, 6)
6		0	0	0									
7	6.00												N = 27 (3, 5, 7, 7, 5, 8)
8		0	0	0									
9	7.50												N = 37/60 mm (3, 37, 37)
		0	0	0									
	9.00												N = 39 (7, 5, 8, 11, 7, 13)
		0	0	0									

<b>REMARKS</b> Rock and soil descriptions are based on examination of drilling returns. These samples can be heavily disturbed and fragmented, with a loss of fines. Typical fragments of 2 to 3 mm are recovered. Accurate descriptions are not, therefore, possible. Similarly, it is not possible to accurately assess soil stratification or rock condition/structure.  Hole cased 0.0-12.0m. Covid 19 Safe Zone erection - 1hr					<b>WATER STRIKE DETAILS</b>				
					Water Strike	Casing Depth	Sealed At	Rise To	Time (min)
					No water strike recorded				
<b>INSTALLATION DETAILS</b>					<b>GROUNDWATER DETAILS</b>				
					Date	Hole Depth	Casing Depth	Depth to Water	Comments
Date	Tip Depth	RZ Top	RZ Base	Type					
09-02-21	12.00	1.80	12.00	50mm SP					

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# OPEN HOLE DRILLING RECORD

**REPORT NUMBER**

23072

<b>CONTRACT</b> Oxigen Site at Derryarkin, Co.Offaly		<b>DRILLHOLE NO</b> RC01
<b>CO-ORDINATES</b> 648,485.73 E 736,851.16 N		<b>SHEET</b> Sheet 2 of 2
<b>GROUND LEVEL (mOD)</b> 80.30	<b>RIG TYPE</b> Casagrande	<b>DATE DRILLED</b> 08/02/2021
<b>CLIENT</b> Oxigen	<b>INCLINATION (deg)</b> -90	<b>DATE LOGGED</b> 09/02/2021
<b>ENGINEER</b> Fehily Timoney & Company	<b>HOLE DIAMETER (mm)</b> 78	<b>DRILLED BY</b> IGSL

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Zones (m)	Fracture Spacing Min Avg Max (mm)	Fracture Spacing Log (mm)	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
10	10.50						0 250 500		SYMMETRIX DRILLING; No recovery, observed by driller as returns of clayey GRAVEL ( <i>continued</i> )				N = 45 (4, 7, 9, 12, 12, 12)
11		0	0	0									
12	12.00								End of Borehole at 12.00 m	12.00	68.30		
13													
14													
15													
16													
17													
18													
19													

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<b>REMARKS</b> Rock and soil descriptions are based on examination of drilling returns. These samples can be heavily disturbed and fragmented, with a loss of fines. Typical fragments of 2 to 3 mm are recovered. Accurate descriptions are not, therefore, possible. Similarly, it is not possible to accurately assess soil stratification or rock condition/structure.  Hole cased 0.0-12.0m. Covid 19 Safe Zone erection - 1hr					<b>WATER STRIKE DETAILS</b>				
					Water Strike	Casing Depth	Sealed At	Rise To	Time (min)
					No water strike recorded				
					<b>GROUNDWATER DETAILS</b>				
<b>INSTALLATION DETAILS</b>					Date	Hole Depth	Casing Depth	Depth to Water	Comments
Date	Tip Depth	RZ Top	RZ Base	Type	09-02-21	12.00	12.00	11.50	Water level recorded 5 mins after end of drilling.
09-02-21	12.00	1.80	12.00	50mm SP					

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# OPEN HOLE DRILLING RECORD

**REPORT NUMBER**

23072

<b>CONTRACT</b> Oxigen Site at Derryarkin, Co.Offaly		<b>DRILLHOLE NO</b> RC02
<b>CO-ORDINATES</b> 648,543.11 E 736,850.60 N		<b>SHEET</b> Sheet 1 of 2
<b>GROUND LEVEL (mOD)</b> 79.77	<b>RIG TYPE</b> Casagrande	<b>DATE DRILLED</b> 09/02/2021
<b>CLIENT</b> Oxigen	<b>INCLINATION (deg)</b> -90	<b>DATE LOGGED</b> 10/02/2021
<b>ENGINEER</b> Fehily Timoney & Company	<b>HOLE DIAMETER (mm)</b> 78	<b>DRILLED BY</b> IGSL

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Zones (m)	Fracture Spacing Min Avg Max (mm)	Fracture Spacing Log (mm)	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
0									SYMMETRIX DRILLING; No recovery, observed by driller as returns of CLAY				
1	1.50	0	0	0					SYMMETRIX DRILLING; No recovery, observed by driller as returns of gravelly CLAY	1.50	78.27		N = 7 (1, 2, 1, 1, 2, 3)
2		0	0	0									
3	3.00	0	0	0					SYMMETRIX DRILLING; No recovery, observed by driller as returns of clayey GRAVEL	3.00	76.77		N = 26 (3, 5, 5, 7, 9, 5)
4		0	0	0									
5	4.50	0	0	0									N = 34 (2, 4, 7, 7, 9, 11)
6		0	0	0									
7	6.00	0	0	0									N = 23 (4, 4, 4, 7, 7, 5)
8		0	0	0									
9	7.50	0	0	0									N = 44 (9, 11, 9, 8, 12, 15)
	9.00	0	0	0									N = 46 (7, 8, 11, 11, 11, 13)

<b>REMARKS</b> Rock and soil descriptions are based on examination of drilling returns. These samples can be heavily disturbed and fragmented, with a loss of fines. Typical fragments of 2 to 3 mm are recovered. Accurate descriptions are not, therefore, possible. Similarly, it is not possible to accurately assess soil stratification or rock condition/structure. Hole cased 0.0-12.0m. Covid 19 Safe Zone erection - 1hr					<b>WATER STRIKE DETAILS</b>					
					Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
										No water strike recorded
<b>INSTALLATION DETAILS</b>					<b>GROUNDWATER DETAILS</b>					
					Date	Hole Depth	Casing Depth	Depth to Water	Comments	
Date	Tip Depth	RZ Top	RZ Base	Type						
10-02-21	12.00	1.00	12.00	50mm SP						

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IGSL RC OPEN HOLE 23072.GPJ IGSL.GDT 16/4/21



# OPEN HOLE DRILLING RECORD

REPORT NUMBER

23072

<b>CONTRACT</b> Oxigen Site at Derryarkin, Co.Offaly		<b>DRILLHOLE NO</b> RC02
<b>CO-ORDINATES</b> 648,543.11 E 736,850.60 N		<b>SHEET</b> Sheet 2 of 2
<b>GROUND LEVEL (mOD)</b> 79.77	<b>RIG TYPE</b> Casagrande	<b>DATE DRILLED</b> 09/02/2021
<b>CLIENT</b> Oxigen	<b>INCLINATION (deg)</b> -90	<b>DATE LOGGED</b> 10/02/2021
<b>ENGINEER</b> Fehily Timoney & Company	<b>HOLE DIAMETER (mm)</b> 78	<b>DRILLED BY</b> IGSL

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Zones (m)	Fracture Spacing Min Avg Max (mm)	Fracture Spacing Log (mm)	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
10	10.50						0 250 500		SYMMETRIX DRILLING; No recovery, observed by driller as returns of clayey GRAVEL ( <i>continued</i> )				N = 45 (5, 8, 11, 10, 11, 13)
11		0	0	0									
12	12.00								End of Borehole at 12.00 m	12.00	67.77		N = 47 (9, 8, 11, 12, 9, 15)
13													
14													
15													
16													
17													
18													
19													



<b>REMARKS</b>					<b>WATER STRIKE DETAILS</b>					
Rock and soil descriptions are based on examination of drilling returns. These samples can be heavily disturbed and fragmented, with a loss of fines. Typical fragments of 2 to 3 mm are recovered. Accurate descriptions are not, therefore, possible. Similarly, it is not possible to accurately assess soil stratification or rock condition/structure. Hole cased 0.0-12.0m. Covid 19 Safe Zone erection - 1hr					Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
										No water strike recorded
<b>INSTALLATION DETAILS</b>					<b>GROUNDWATER DETAILS</b>					
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments	
10-02-21	12.00	1.00	12.00	50mm SP	10-02-21	12.00	12.00	10.80	Water level recorded 5 mins after end of drilling.	

IGSL RC OPEN HOLE 23072.GPJ IGSL GDT 16/4/21



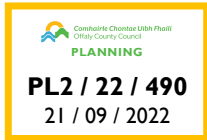
# OPEN HOLE DRILLING RECORD

REPORT NUMBER

23072

<b>CONTRACT</b> Oxigen Site at Derryarkin, Co.Offaly		<b>DRILLHOLE NO</b> RC03
<b>CO-ORDINATES</b> 648,493.94 E 736,788.74 N		<b>SHEET</b> Sheet 1 of 2
<b>GROUND LEVEL (mOD)</b> 80.01	<b>RIG TYPE</b> Casagrande	<b>DATE DRILLED</b> 10/02/2021
<b>CLIENT</b> Oxigen	<b>INCLINATION (deg)</b> -90	<b>DATE LOGGED</b> 11/02/2021
<b>ENGINEER</b> Fehily Timoney & Company	<b>HOLE DIAMETER (mm)</b> 78	<b>DRILLED BY</b> IGSL

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Zones (m)	Fracture Spacing Min Avg Max (mm)	Fracture Spacing Log (mm)	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
0							0 250 500		SYMMETRIX DRILLING; No recovery, observed by driller as returns of gravelly CLAY				
1	1.50	0	0	0					SYMMETRIX DRILLING; No recovery, observed by driller as returns of gravelly cobbly SAND	1.50	78.51		N = 53/225 mm (5, 12, 14, 14, 25)
2		0	0	0					SYMMETRIX DRILLING; No recovery, observed by driller as returns of sandy GRAVEL	3.00	77.01		N = 40 (4, 7, 9, 9, 12, 10)
3	3.00	0	0	0					SYMMETRIX DRILLING; No recovery, observed by driller as returns of clayey GRAVEL	6.00	74.01		N = 35 (5, 6, 7, 7, 9, 12)
4		0	0	0						7.50			N = 41 (3, 7, 9, 10, 11, 11)
5	4.50	0	0	0						9.00			N = 32/41 mm (3, 32)
6	6.00	0	0	0									N = 62/210 mm (10, 5, 12, 21, 29)
7	7.50	0	0	0									
8	9.00	0	0	0									
9		0	0	0									



<b>REMARKS</b>					<b>WATER STRIKE DETAILS</b>					
Rock and soil descriptions are based on examination of drilling returns. These samples can be heavily disturbed and fragmented, with a loss of fines. Typical fragments of 2 to 3 mm are recovered. Accurate descriptions are not, therefore, possible. Similarly, it is not possible to accurately assess soil stratification or rock condition/structure.  Hole cased 0.0-12.0m. Covid 19 Safe Zone erection - 1hr					Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					9.50	9.50	N/S			Slow
<b>INSTALLATION DETAILS</b>					<b>GROUNDWATER DETAILS</b>					
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments	
11-02-21	12.00	2.00	12.00	50mm SP						

IGSL RC OPEN HOLE 23072.GPJ | IGSL GDT - 16/4/21



# OPEN HOLE DRILLING RECORD

**REPORT NUMBER**

**23072**

<b>CONTRACT</b> Oxigen Site at Derryarkin, Co.Offaly		<b>DRILLHOLE NO</b> <b>RC03</b>
<b>CO-ORDINATES</b> 648,493.94 E 736,788.74 N		<b>SHEET</b> Sheet 2 of 2
<b>GROUND LEVEL (mOD)</b> 80.01	<b>RIG TYPE</b> Casagrande	<b>DATE DRILLED</b> 10/02/2021
<b>CLIENT</b> Oxigen	<b>INCLINATION (deg)</b> -90	<b>DATE LOGGED</b> 11/02/2021
<b>ENGINEER</b> Fehily Timoney & Company	<b>HOLE DIAMETER (mm)</b> 78	<b>DRILLED BY</b> IGSL

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Zones (m)	Fracture Spacing Min Avg Max (mm)	Fracture Spacing Log (mm)	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
10	10.50						0 250 500		SYMMETRIX DRILLING; No recovery, observed by driller as returns of clayey GRAVEL ( <i>continued</i> )				N = 58 (10, 11, 12, 15, 17, 14)
11		0	0	0									
12	12.00								End of Borehole at 12.00 m	12.00	68.01		N = 53/187 mm (8, 12, 11, 15, 27)
13													
14													
15													
16													
17													
18													
19													



<b>REMARKS</b> Rock and soil descriptions are based on examination of drilling returns. These samples can be heavily disturbed and fragmented, with a loss of fines. Typical fragments of 2 to 3 mm are recovered. Accurate descriptions are not, therefore, possible. Similarly, it is not possible to accurately assess soil stratification or rock condition/structure. Hole cased 0.0-12.0m. Covid 19 Safe Zone erection - 1hr					<b>WATER STRIKE DETAILS</b>					
					Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					9.50	9.50	N/S			Slow
<b>INSTALLATION DETAILS</b>					<b>GROUNDWATER DETAILS</b>					
					Date	Hole Depth	Casing Depth	Depth to Water	Comments	
Date	Tip Depth	RZ Top	RZ Base	Type						
11-02-21	12.00	2.00	12.00	50mm SP	11-02-21	12.00	12.00	11.70	Water level recorded 5 mins after end of drilling.	

IGSL RC OPEN HOLE - 23072.GPJ IGSL GDT - 16/4/21



# OPEN HOLE DRILLING RECORD

**REPORT NUMBER**

23072

<b>CONTRACT</b> Oxigen Site at Derryarkin, Co.Offaly		<b>DRILLHOLE NO</b> <b>RC04</b>
<b>CO-ORDINATES</b> 648,525.52 E 736,728.88 N		<b>SHEET</b> Sheet 1 of 2
<b>GROUND LEVEL (mOD)</b> 79.80	<b>RIG TYPE</b> Casagrande	<b>DATE DRILLED</b> 11/02/2021
<b>CLIENT</b> Oxigen	<b>INCLINATION (deg)</b> -90	<b>DATE LOGGED</b> 12/02/2021
<b>ENGINEER</b> Fehily Timoney & Company	<b>HOLE DIAMETER (mm)</b> 78	<b>DRILLED BY</b> IGSL

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Zones (m)	Fracture Spacing Min Avg Max (mm)	Fracture Spacing Log (mm)	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
0							0 250 500		SYMMETRIX DRILLING; No recovery, observed by driller as returns of sandy GRAVEL				
1	1.50	0	0	0					SYMMETRIX DRILLING; No recovery, observed by driller as returns of gravelly SAND	1.50	78.30		N = 15 (1, 2, 3, 3, 2, 7)
2		0	0	0									
3	3.00	0	0	0					SYMMETRIX DRILLING; No recovery, observed by driller as returns of sandy GRAVEL	3.00	76.80		N = 18 (3, 4, 3, 4, 6, 5)
4		0	0	0									
5	4.50	0	0	0					SYMMETRIX DRILLING; No recovery, observed by driller as returns of CLAY	4.50	75.30		N = 37 (2, 5, 7, 9, 9, 12)
6		0	0	0									
7	6.00	0	0	0									N = 37 (5, 7, 7, 9, 9, 12)
8		0	0	0									
9	7.50	0	0	0									N = 33 (4, 4, 7, 9, 9, 8)
	9.00	0	0	0									N = 49 (2, 7, 11, 11, 12, 15)

<b>REMARKS</b> Rock and soil descriptions are based on examination of drilling returns. These samples can be heavily disturbed and fragmented, with a loss of fines. Typical fragments of 2 to 3 mm are recovered. Accurate descriptions are not, therefore, possible. Similarly, it is not possible to accurately assess soil stratification or rock condition/structure. Hole cased 0.0-12.0m. Covid 19 Safe Zone erection - 1hr					<b>WATER STRIKE DETAILS</b>					
					Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
										No water strike recorded
<b>INSTALLATION DETAILS</b>					<b>GROUNDWATER DETAILS</b>					
					Date	Hole Depth	Casing Depth	Depth to Water	Comments	
Date	Tip Depth	RZ Top	RZ Base	Type						
12-02-21	12.00	2.00	12.00	50mm SP						

Offaly County Council  
PLANNING

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IGSL RC OPEN HOLE 23072.GPJ IGSL GDT 16/4/21



# OPEN HOLE DRILLING RECORD

**REPORT NUMBER**

**23072**

<b>CONTRACT</b> Oxigen Site at Derryarkin, Co.Offaly		<b>DRILLHOLE NO</b> <b>RC04</b>
<b>CO-ORDINATES</b> 648,525.52 E 736,728.88 N		<b>SHEET</b> Sheet 2 of 2
<b>GROUND LEVEL (mOD)</b> 79.80	<b>RIG TYPE</b> Casagrande	<b>DATE DRILLED</b> 11/02/2021
<b>CLIENT</b> Oxigen	<b>INCLINATION (deg)</b> -90	<b>DATE LOGGED</b> 12/02/2021
<b>ENGINEER</b> Fehily Timoney & Company	<b>HOLE DIAMETER (mm)</b> 78	<b>DRILLED BY</b> IGSL

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Zones (m)	Fracture Spacing	Fracture Spacing Log (mm)	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
10	10.50						0 250 500		SYMMETRIX DRILLING; No recovery, observed by driller as returns of CLAY ( <i>continued</i> )			0 10 20 30 40 50 60 70 80 90 100	N = 34 (3, 5, 5, 8, 10, 11)
11		0	0	0									
12	12.00								End of Borehole at 12.00 m	12.00	67.80		N = 44 (7, 8, 9, 11, 14, 10)
13													
14													
15													
16													
17													
18													
19													



<b>REMARKS</b> Rock and soil descriptions are based on examination of drilling returns. These samples can be heavily disturbed and fragmented, with a loss of fines. Typical fragments of 2 to 3 mm are recovered. Accurate descriptions are not, therefore, possible. Similarly, it is not possible to accurately assess soil stratification or rock condition/structure.  Hole cased 0.0-12.0m. Covid 19 Safe Zone erection - 1hr					<b>WATER STRIKE DETAILS</b>				
					Water Strike	Casing Depth	Sealed At	Rise To	Time (min)
					No water strike recorded				
<b>INSTALLATION DETAILS</b>					<b>GROUNDWATER DETAILS</b>				
					Date	Hole Depth	Casing Depth	Depth to Water	Comments
Date	Tip Depth	RZ Top	RZ Base	Type	Comments				
12-02-21	12.00	2.00	12.00	50mm SP	Water level recorded 5 mins after end of drilling.				

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**Appendix 4**

**Groundwater Monitoring Records**

Offaly County Council, Planning Dept. - Inspection Purposes Only

## Groundwater Monitoring



<b>Site Location</b>		Oxigen Site at Deryarkin, County Offaly					
<b>Project No.</b>		23072					
<b>Client</b>		Oxigen					
<b>Engineer</b>		Fehily Timoney & Company Consultants					
	Elevation (m OD)	<b>Date of Reading</b>					
		13/04/2021					
		m bgl	m OD	m bgl	m OD	m bgl	m OD
<b>RC01</b>	80.295	3.09	77.205				
<b>RC02</b>	79.772	2.72	77.052				
<b>RC03</b>	80.009	3.00	77.009				
<b>RC04</b>	79.797	3.00	76.797				
<b>NOTES</b>							



Offaly County Council, Planning Dept. - Inspection Purposes Only!

**Appendix 5**

**Geotechnical Laboratory Test Results - Soil**

Offaly County Council, Planning Dept. - Inspection Purposes Only

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

## Test Report

### Determination of Moisture Content, Liquid & Plastic Limits

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



Report No. **R119171** Contract No. 23070 Contract Name: Oxigen Development Sites - Site 3 Derrynarkin  
 Customer Oxigen / Fehily Timoney & Company Consulting  
 Samples Received: 01/02/21 Date Tested: 11/02/21

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
BH03	AA141314	5.0	A21/0748	B	5.8	17	NP	NP	36	WS	4.4		Brown silty, sandy, GRAVEL with some cobbles
BH06	AA141325	8.0	A21/0753	B	8.5	19	NP	NP	68	WS	4.4		Brown slightly sandy, gravelly, SILT

Notes: Preparation: WS - Wet sieved AR - As received NP - Non plastic  
 Liquid Limit 4.3 Cone Penetrometer definitive method  
 Clause: 4.4 Cone Penetrometer one point method

Sample Type: B - Bulk Disturbed U - Undisturbed

Remarks: Results apply to the sample as received.  
 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 *H Byrne* Date 01/03/21 Page 1 of 1

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 21 / 09 / 2022  
 Offaly County Council Planning

# TEST REPORT

## Determination of Particle Size Distribution

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

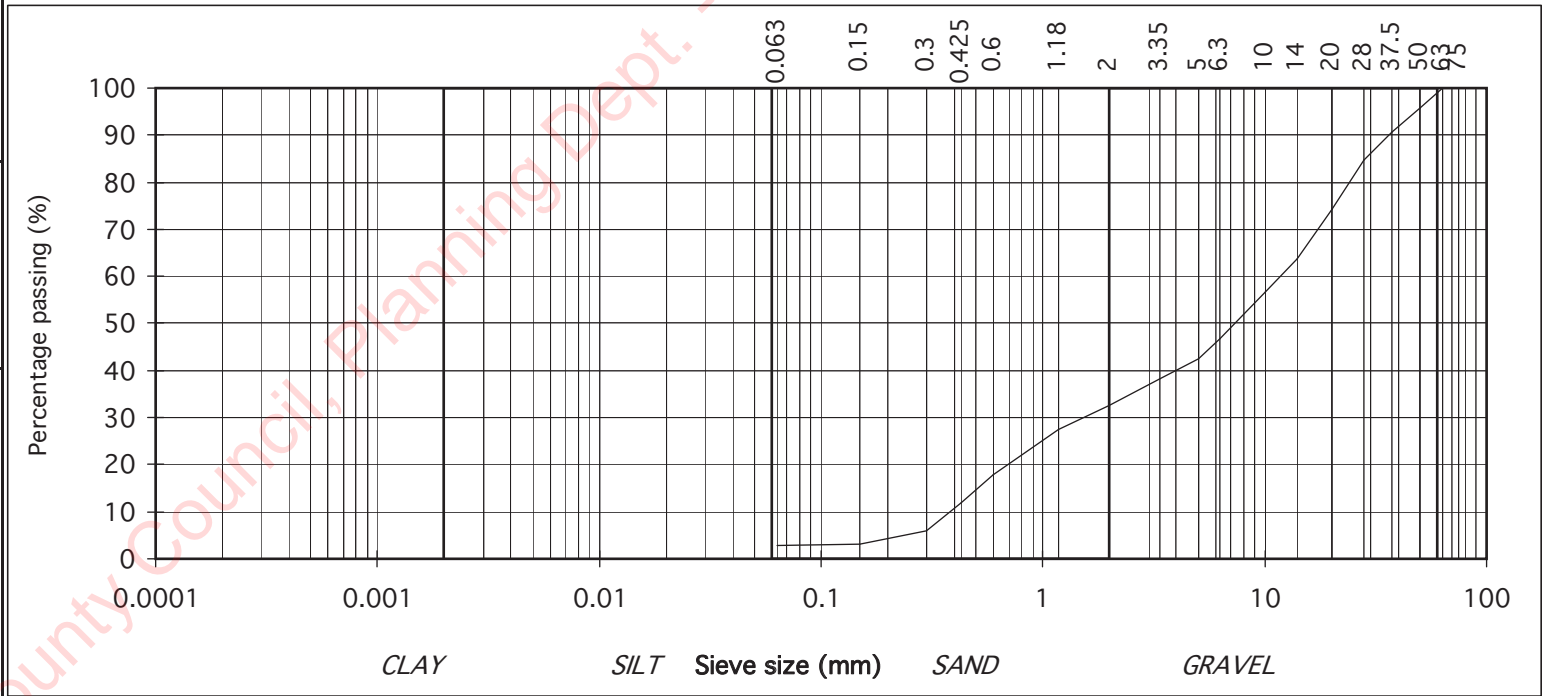


particle size	% passing	
75	100	COBBLES
63	100	
50	96	
37.5	91	
28	85	
20	74	
14	64	
10	57	
6.3	47	
5	42	
3.35	38	GRAVEL
2	33	
1.18	28	
0.6	18	
0.425	12	
0.3	6	SAND
0.15	3	
0.063	3	
		SILT/CLAY

Contract No. 23070 Report No. R119340  
 Contract Name: Oxigen Development Site - Site 3 Derryarkin  
 BH/TP : TP01  
 Sample No. AA142158 Lab. Sample No. A21/0740  
 Sample Type: B  
 Depth (m) 2.20 Customer: Oxigen / Fehily Timoney & Company Consulting  
 Date Received 01/02/2021 Date Testing started 11/02/2021  
 Description: Brown slightly clayey/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 . Results apply to sample as received.



**PL2 / 22 / 490**  
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 PLANNING

**IGSL Ltd Materials Laboratory**

Approved by:	Date:	Page no:
<i>H Byrne</i>	01/03/21	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)

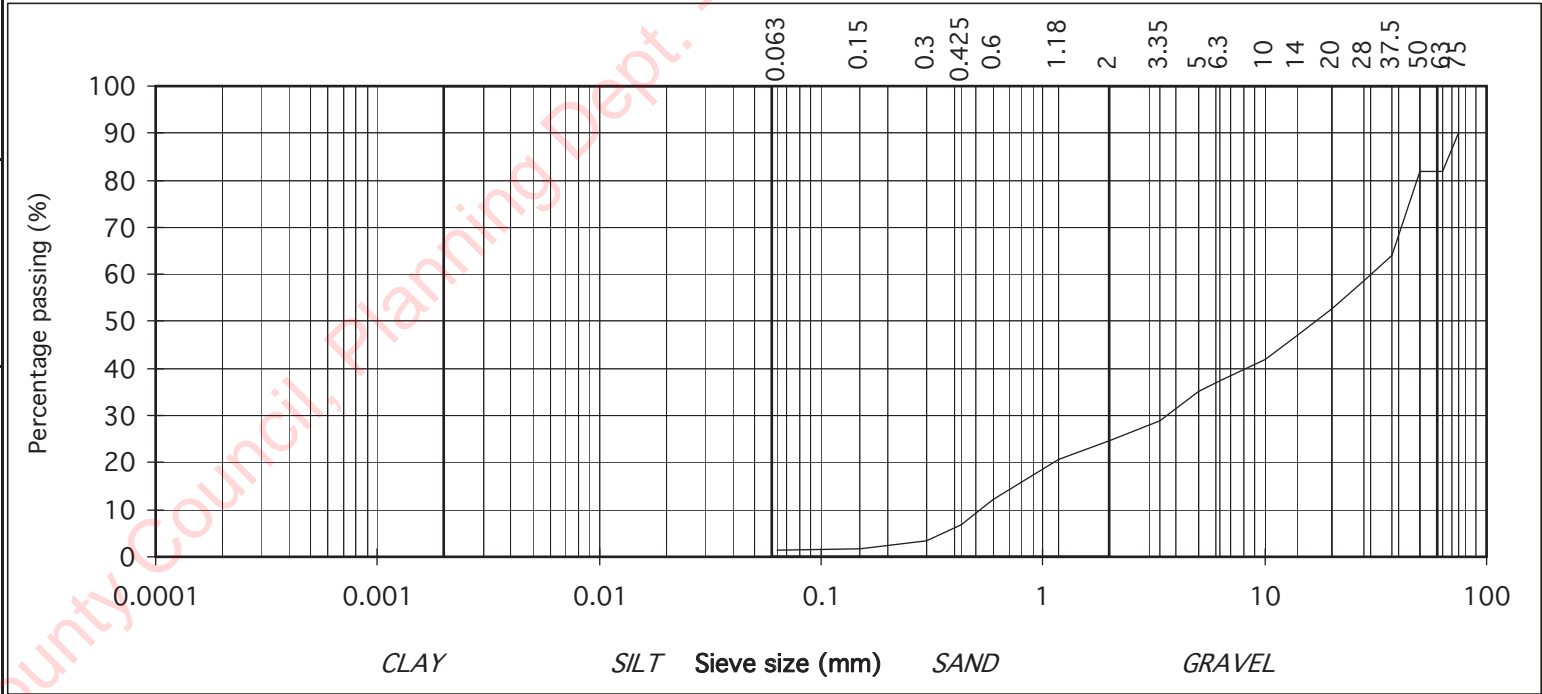


particle size	% passing	
75	90	COBBLES
63	82	
50	82	GRAVEL
37.5	64	
28	59	
20	53	
14	47	
10	42	
6.3	37	
5	35	
3.35	29	
2	25	
1.18	21	SAND
0.6	12	
0.425	7	
0.3	3	
0.15	2	SILT/CLAY
0.063	1	

Contract No. 23070 Report No. R119341  
 Contract Name: Oxigen Development Site - Site 3 Derryarkin  
 BH/TP : TP02  
 Sample No. AA142154 Lab. Sample No. A21/0741  
 Sample Type: B  
 Depth (m) 3.00 Customer: Oxigen / Fehily Timoney & Company Consulting  
 Date Received 01/02/2021 Date Testing started 11/02/2021  
 Description: Grey slightly clayey/silty, very 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 . Results apply to sample as received.



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 Offaly County Council  
 Planning

**IGSL Ltd Materials Laboratory**

Approved by:	Date:	Page no:
<i>H Byrne</i>	01/03/21	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)

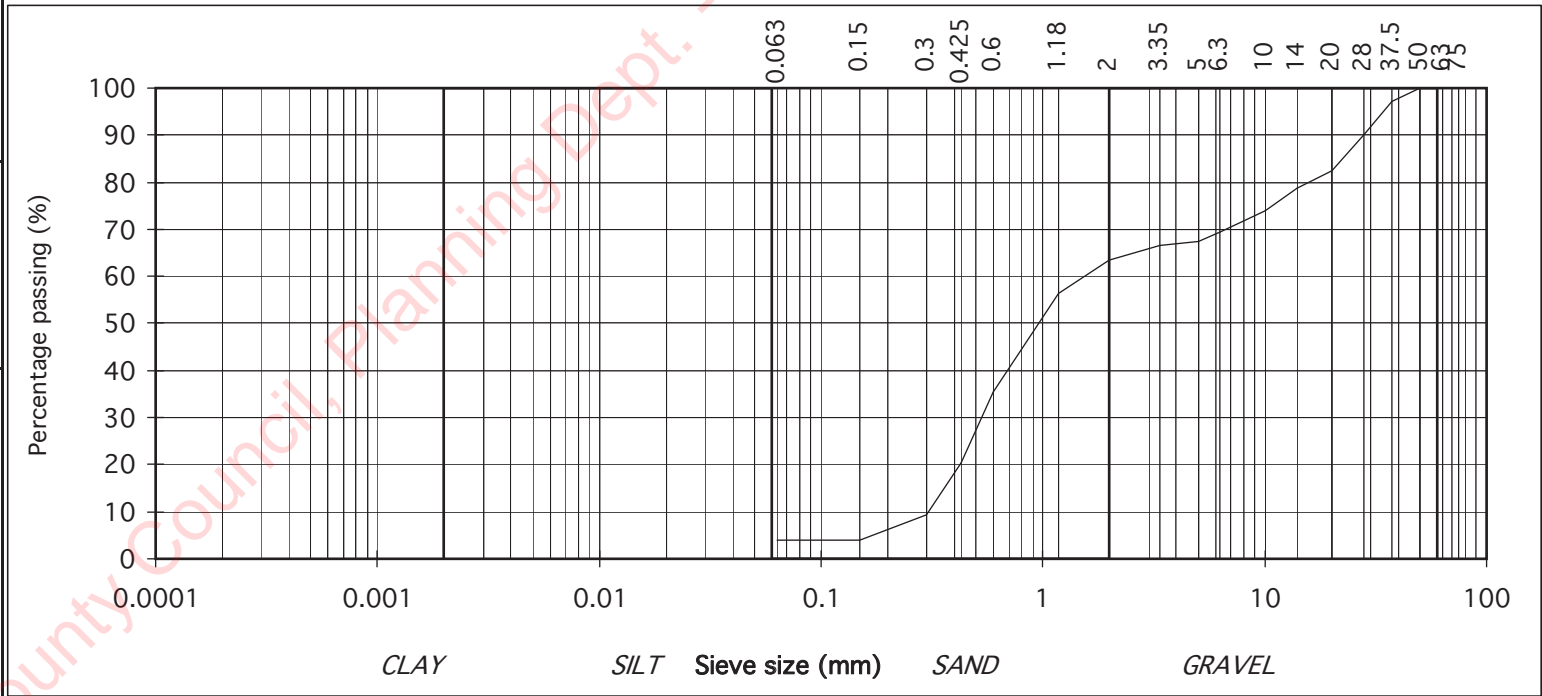


particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	97	
28	90	
20	83	
14	79	
10	74	
6.3	69	
5	67	
3.35	67	
2	63	
1.18	56	SAND
0.6	36	
0.425	21	
0.3	9	
0.15	4	SILT/CLAY
0.063	4	

Contract No. 23070 Report No. R119277  
 Contract Name: Oxigen Development Site - Site 3 Derryarkin  
 BH/TP : TP03  
 Sample No. AA142161 Lab. Sample No. A21/0742  
 Sample Type: B  
 Depth (m) 1.80 Customer: Oxigen / Fehily Timoney & Company Consulting  
 Date Received 01/02/2021 Date Testing started 11/02/2021  
 Description: Brown slightly clayey/silty, very gravelly, SAND

Remarks

Note: Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 . Results apply to sample as received.



**PL2 / 22 / 490**  
 21 / 09 / 2022  
 OFFICE OF  
 PLANNING  
 COUNTY OF  
 DUBLIN

**IGSL Ltd Materials Laboratory**

Approved by:	Date:	Page no:
<i>H Byrne</i>	01/03/21	1 of 1

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

# TEST REPORT

## Determination of Particle Size Distribution

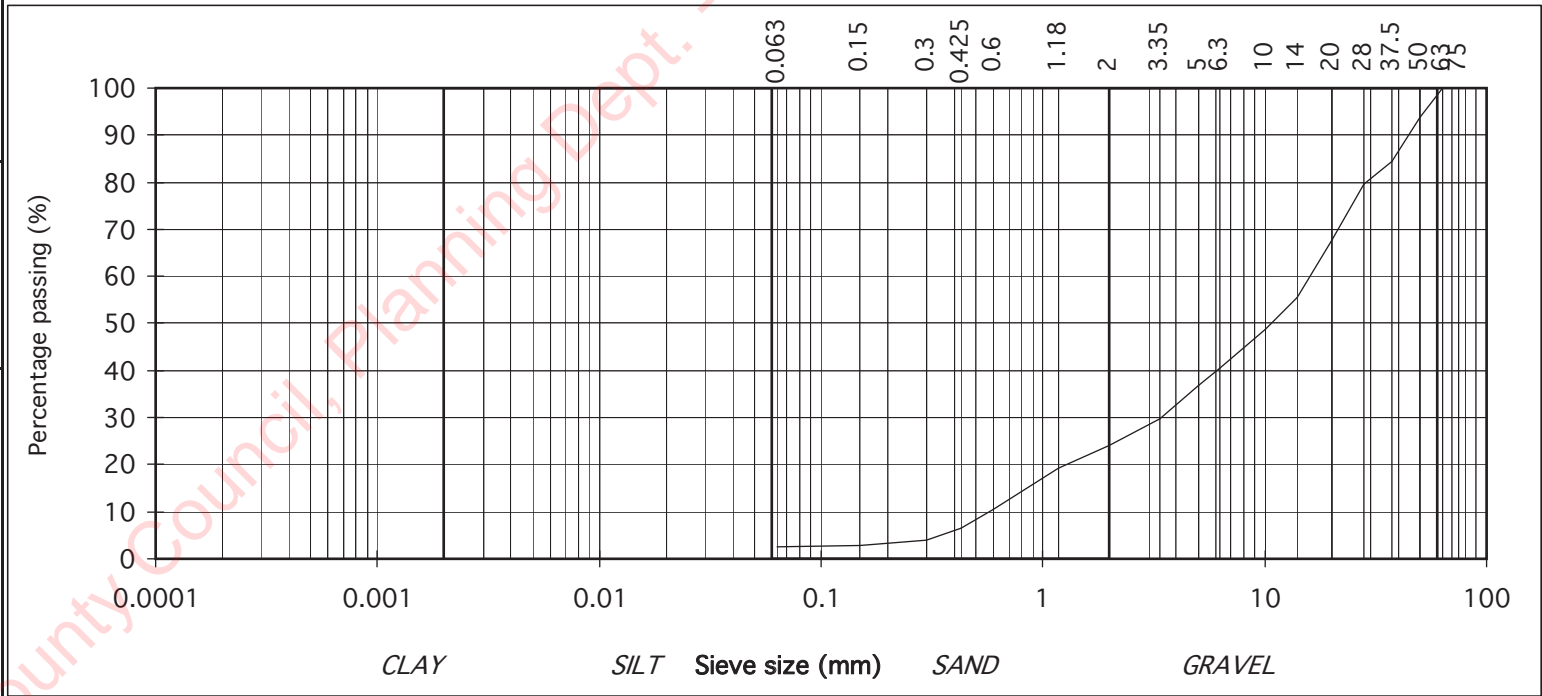
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5  
(note: Sedimentation stage not accredited)



particle size	% passing	
75	100	COBBLES
63	100	
50	94	GRAVEL
37.5	85	
28	80	
20	68	
14	55	
10	49	
6.3	40	
5	37	
3.35	30	
2	24	
1.18	19	
0.6	11	
0.425	7	
0.3	4	SILT/CLAY
0.15	3	
0.063	3	

Contract No. 23070 Report No. R119342  
 Contract Name: Oxigen Development Site - Site 3 Derryarkin  
 BH/TP : TP04  
 Sample No. AA142169 Lab. Sample No. A21/0743  
 Sample Type: B  
 Depth (m) 1.80 Customer: Oxigen / Fehily Timoney & Company Consulting  
 Date Received 01/02/2021 Date Testing started 11/02/2021  
 Description: Brown slightly clayey/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 . Results apply to sample as received.



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 Offaly County Council  
 Planning  
 Strategic Case for the  
 Offaly County Council  
 Planning

**IGSL Ltd Materials Laboratory**

Approved by:	Date:	Page no:
<i>H Byrne</i>	01/03/21	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)

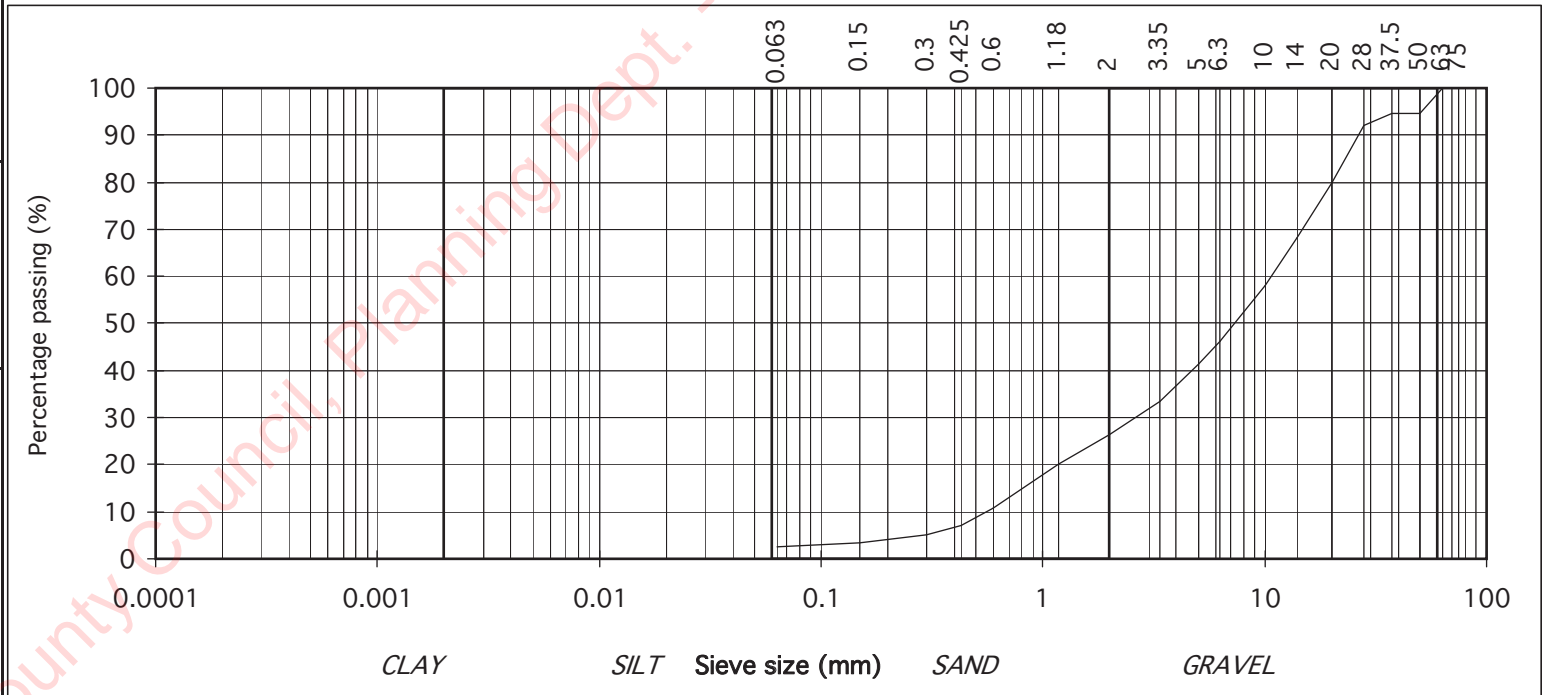


particle size	% passing	
75	100	COBBLES
63	100	
50	95	GRAVEL
37.5	95	
28	92	
20	80	
14	68	
10	58	
6.3	46	
5	41	
3.35	34	
2	26	
1.18	20	
0.6	11	
0.425	7	
0.3	5	SILT/CLAY
0.15	3	
0.063	3	

Contract No. 23070 Report No. R119278  
 Contract Name: Oxigen Development Site - Site 3 Derryarkin  
 BH/TP : TPO5  
 Sample No. AA142165 Lab. Sample No. A21/0744  
 Sample Type: B  
 Depth (m) 2.00 Customer: Oxigen / Fehily Timoney & Company Consulting  
 Date Received 01/02/2021 Date Testing started 11/02/2021  
 Description: Brown slightly clayey/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 . Results apply to sample as received.



**IGSL Ltd Materials Laboratory**

Approved by:	Date:	Page no:
<i>H Byrne</i>	01/03/21	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)

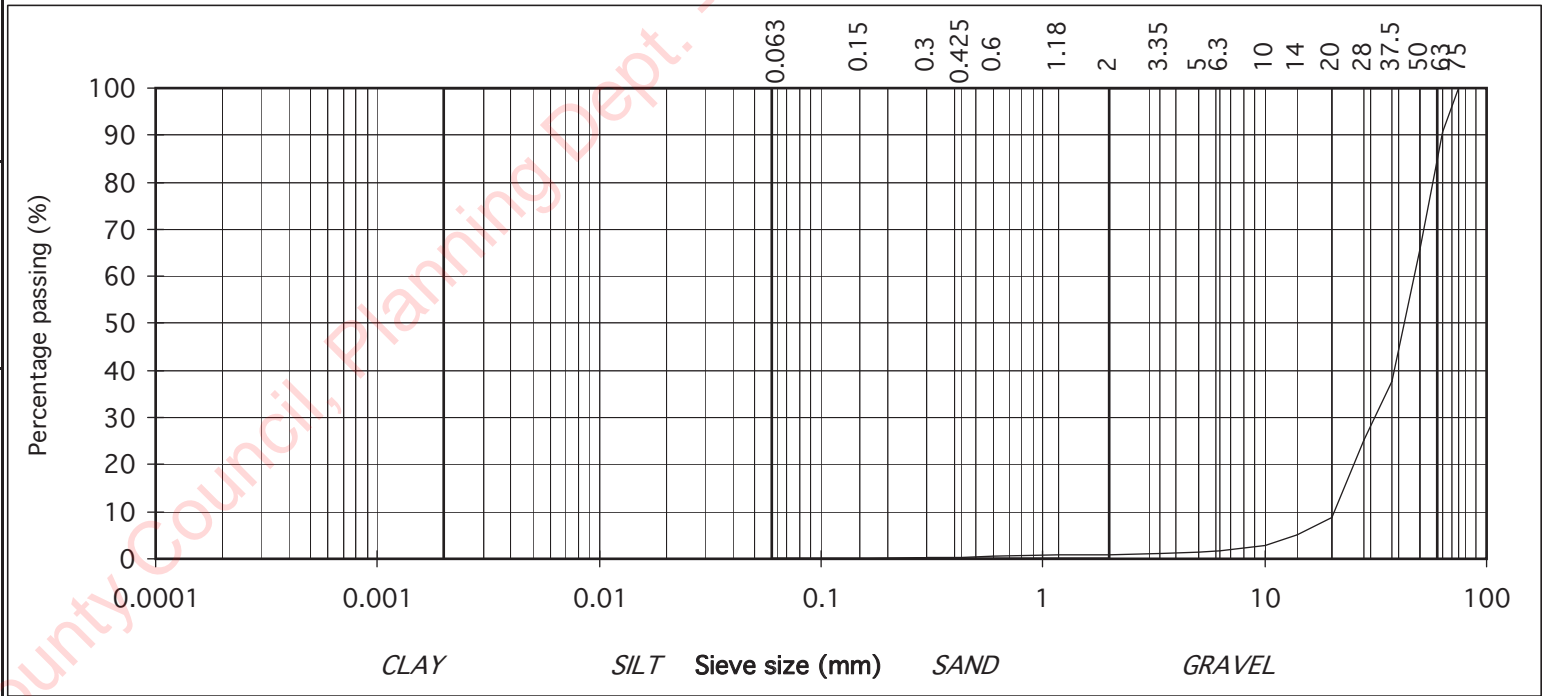


particle size	% passing	
75	100	COBBLES
63	91	
50	66	
37.5	38	
28	25	
20	9	
14	5	
10	3	
6.3	2	
5	1	
3.35	1	GRAVEL
2	1	
1.18	1	
0.6	0	
0.425	0	
0.3	0	SAND
0.15	0	
0.063	0	
		SILT/CLAY

Contract No. 23070 Report No. R119279  
 Contract Name: Oxigen Development Site - Site 3 Derryarkin  
 BH/TP : BH01  
 Sample No. AA139285 Lab. Sample No. A21/0745  
 Sample Type: B  
 Depth (m) 2.00 Customer: Oxigen / Fehily Timoney & Company Consulting  
 Date Received 01/02/2021 Date Testing started 11/02/2021  
 Description: Brown slightly 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 . Results apply to sample as received.



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

# TEST REPORT

## Determination of Particle Size Distribution

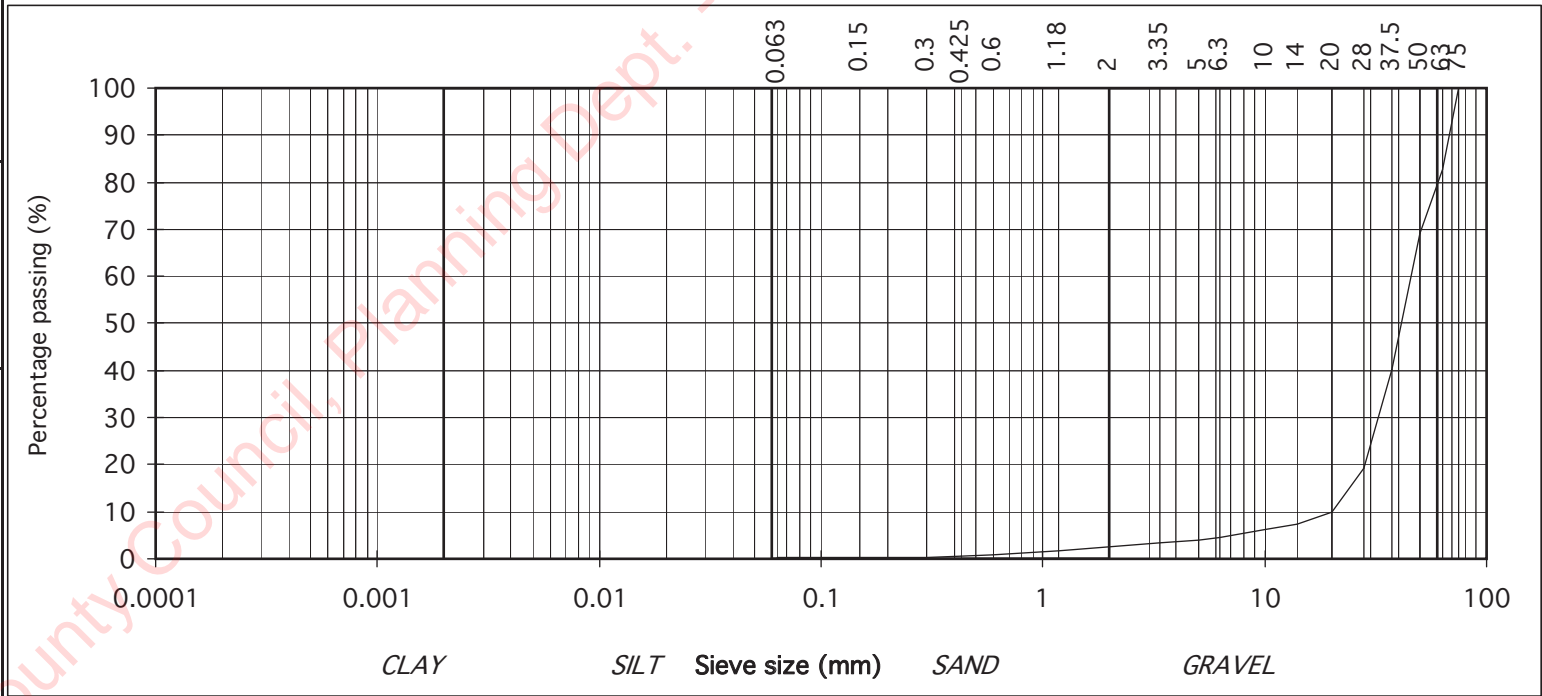
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5  
(note: Sedimentation stage not accredited)



particle size	% passing	
75	100	COBBLES
63	83	
50	69	GRAVEL
37.5	40	
28	19	
20	10	
14	7	
10	6	
6.3	5	
5	4	
3.35	3	
2	2	
1.18	2	SAND
0.6	1	
0.425	1	
0.3	0	SILT/CLAY
0.15	0	
0.063	0	

Contract No. 23070 Report No. R119280  
 Contract Name: Oxigen Development Site - Site 3 Derryarkin  
 BH/TP : BH01  
 Sample No. AA139289 Lab. Sample No. A21/0746  
 Sample Type: B  
 Depth (m) 6.00 Customer: Oxigen / Fehily Timoney & Company Consulting  
 Date Received 01/02/2021 Date Testing started 11/02/2021  
 Description: Grey slightly 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 . Results apply to sample as received. Sample size did not meet the requirements of BS1377



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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)

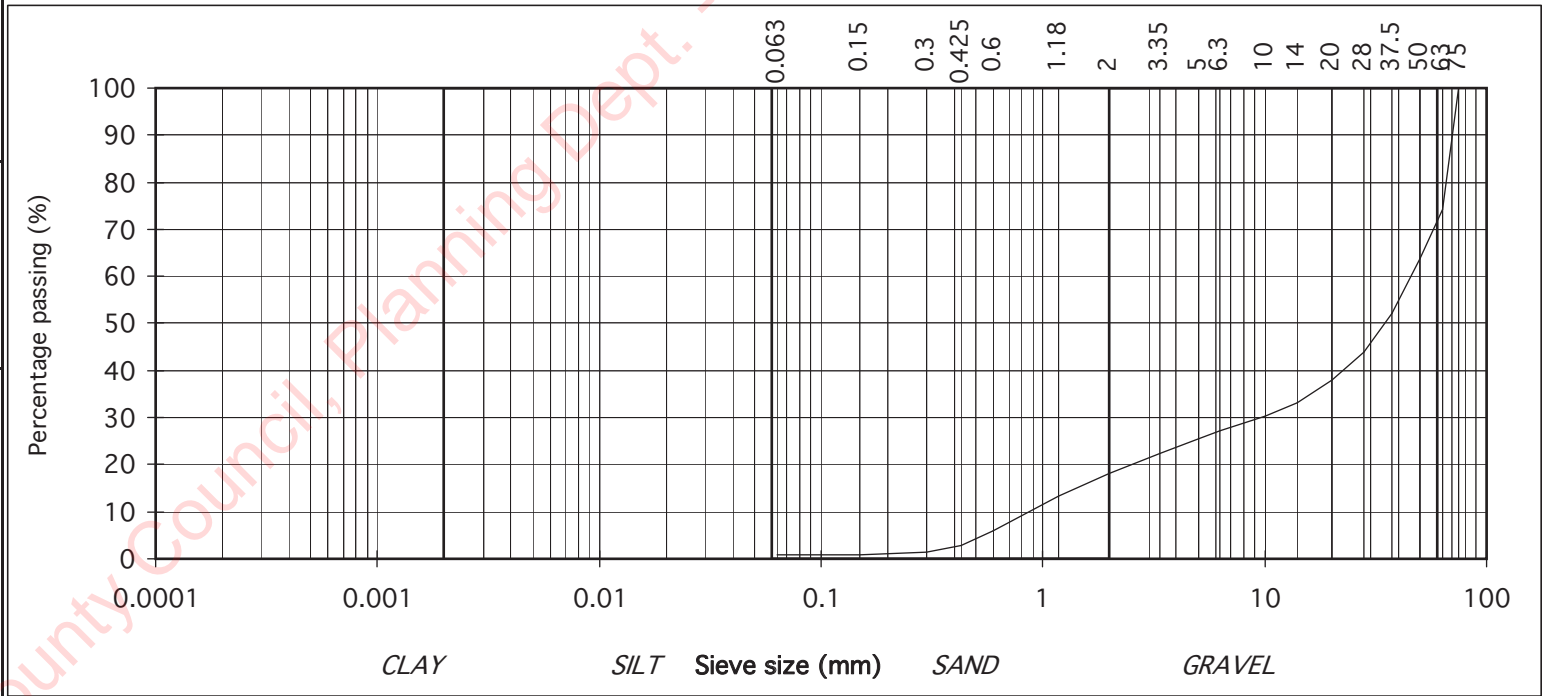


particle size	% passing	
75	100	COBBLES
63	74	
50	64	GRAVEL
37.5	52	
28	44	
20	38	
14	33	
10	30	
6.3	27	
5	25	
3.35	22	
2	18	
1.18	13	
0.6	6	
0.425	3	SILT/CLAY
0.3	1	
0.15	1	
0.063	1	

Contract No. 23070 Report No. R119343  
 Contract Name: Oxigen Development Site - Site 3 Derryarkin  
 BH/TP : BH03  
 Sample No. AA143132 Lab. Sample No. A21/0747  
 Sample Type: B  
 Depth (m) 3.00 Customer: Oxigen / Fehily Timoney & Company Consulting  
 Date Received 01/02/2021 Date Testing started 11/02/2021  
 Description: Brown slightly clayey/silty, sandy, GRAVEL with many cobbles

Remarks

Note: Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 . Results apply to sample as received. Sample size did not meet the requirements of BS1377



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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)

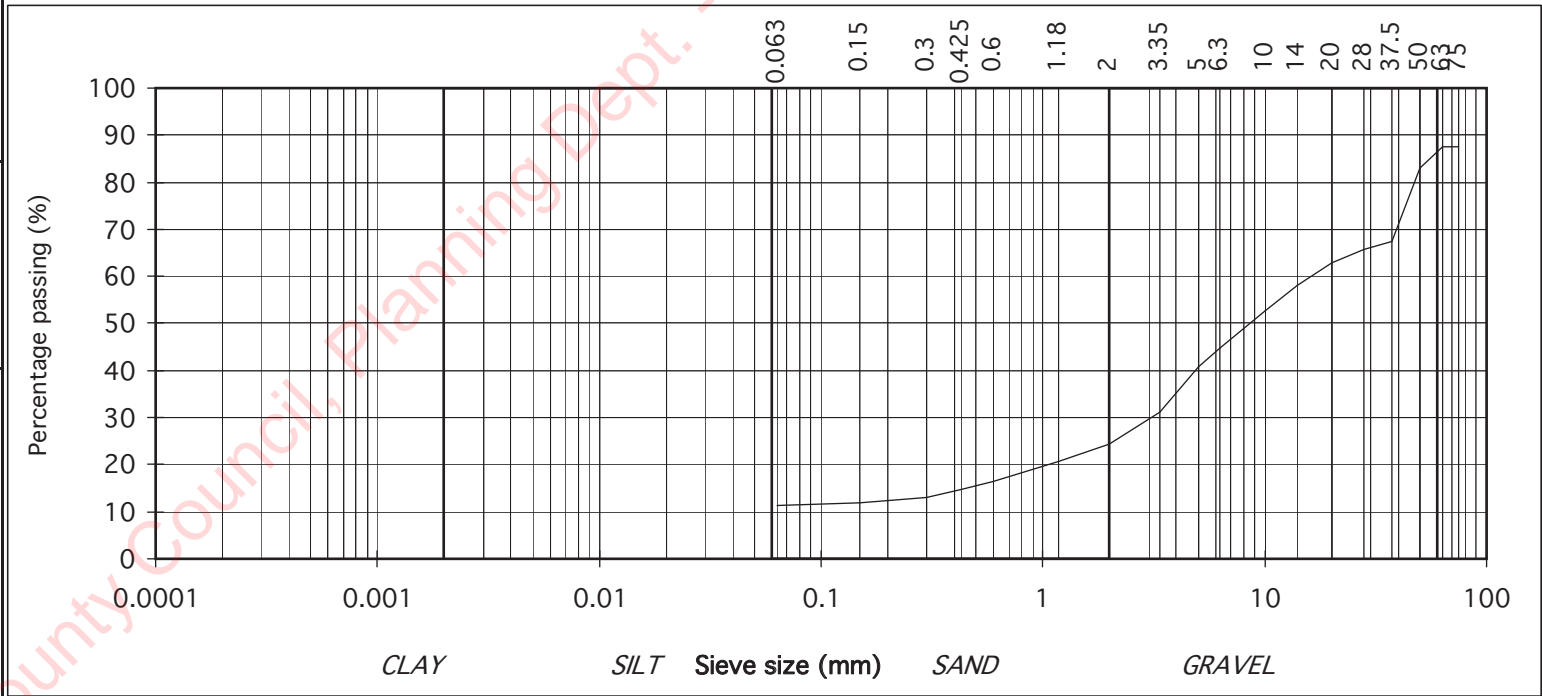


particle size	% passing	
75	87	COBBLES
63	87	
50	83	GRAVEL
37.5	67	
28	66	
20	63	
14	58	
10	53	
6.3	45	
5	41	
3.35	31	
2	24	
1.18	21	
0.6	16	
0.425	15	
0.3	13	SILT/CLAY
0.15	12	
0.063	11	

Contract No. 23070 Report No. R119281  
 Contract Name: Oxigen Development Site - Site 3 Derryarkin  
 BH/TP : BH03  
 Sample No. AA141314 Lab. Sample No. A21/0748  
 Sample Type: B  
 Depth (m) 5.00 Customer: Oxigen / Fehily Timoney & Company Consulting  
 Date Received 01/02/2021 Date Testing started 11/02/2021  
 Description: Brown 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 . Results apply to sample as received. Sample size did not meet the requirements of BS1377



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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)

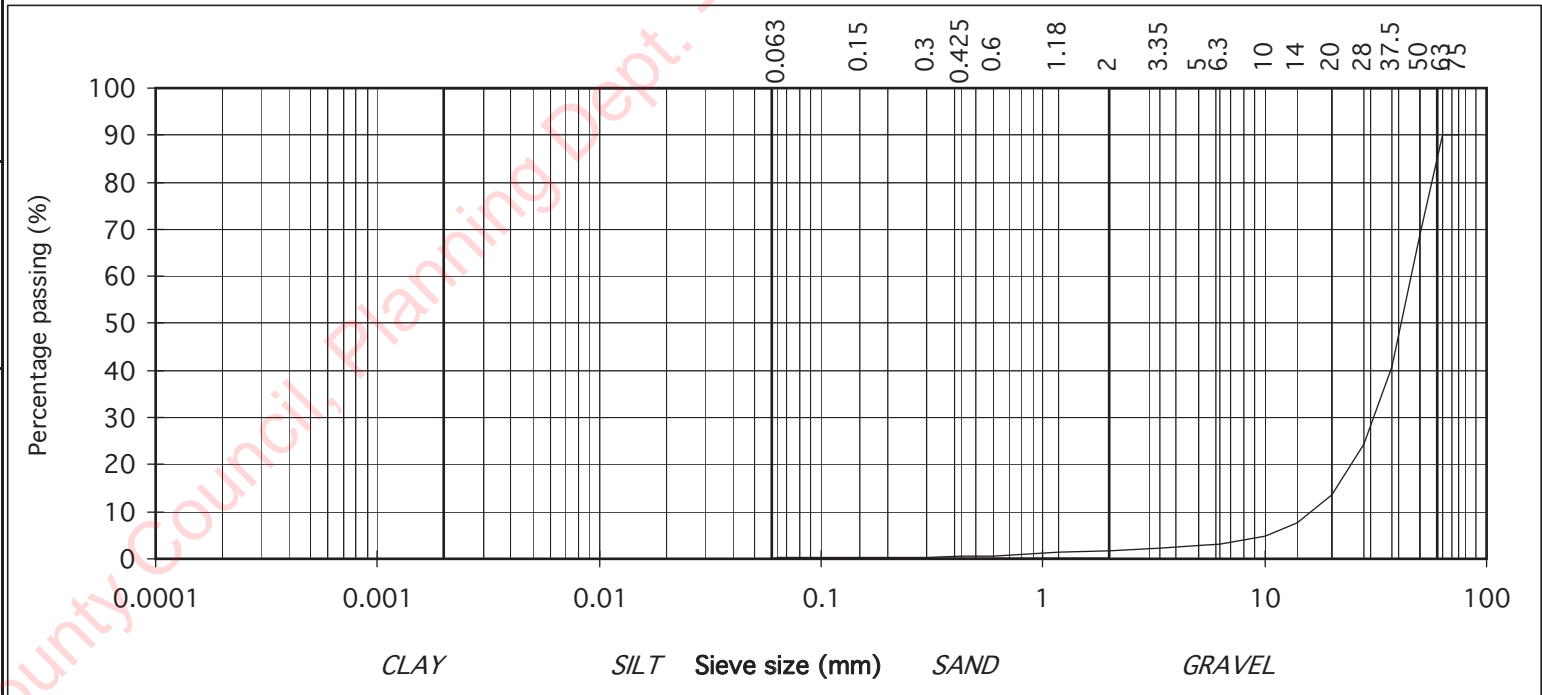


particle size	% passing	
75	90	COBBLES
63	90	
50	69	GRAVEL
37.5	41	
28	24	
20	13	
14	8	
10	5	
6.3	3	
5	3	
3.35	2	
2	2	
1.18	1	SAND
0.6	1	
0.425	1	
0.3	0	SILT/CLAY
0.15	0	
0.063	0	

Contract No. 23070 Report No. R119281  
 Contract Name: Oxigen Development Site - Site 3 Derryarkin  
 BH/TP : BH04  
 Sample No. AA141319 Lab. Sample No. A21/0749  
 Sample Type: B  
 Depth (m) 3.00 Customer: Oxigen / Fehily Timoney & Company Consulting  
 Date Received 01/02/2021 Date Testing started 11/02/2021  
 Description: Grey slightly 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 . Results apply to sample as received.



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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)

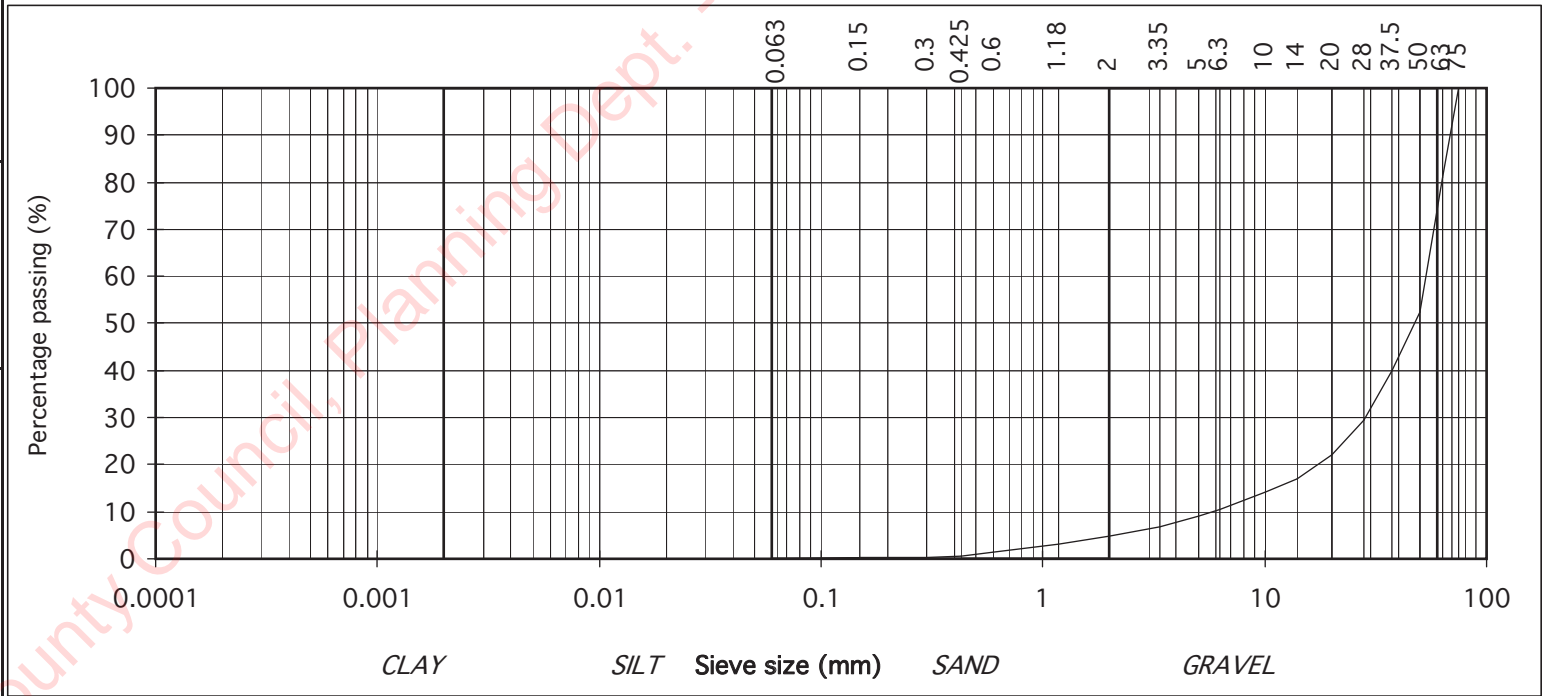


particle size	% passing	
75	100	COBBLES
63	81	
50	52	GRAVEL
37.5	40	
28	30	
20	22	
14	17	
10	14	
6.3	10	
5	9	
3.35	7	
2	5	
1.18	3	
0.6	1	
0.425	1	
0.3	0	SILT/CLAY
0.15	0	
0.063	0	

Contract No. 23070 Report No. R119283  
 Contract Name: Oxigen Development Site - Site 3 Derryarkin  
 BH/TP : BH05  
 Sample No. AA116303 Lab. Sample No. A21/0750  
 Sample Type: B  
 Depth (m) 3.00 Customer: Oxigen / Fehily Timoney & Company Consulting  
 Date Received 01/02/2021 Date Testing started 11/02/2021  
 Description: Grey slightly 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 . Results apply to sample as received. Sample size did not meet the requirements of BS1377



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# TEST REPORT

## Determination of Particle Size Distribution

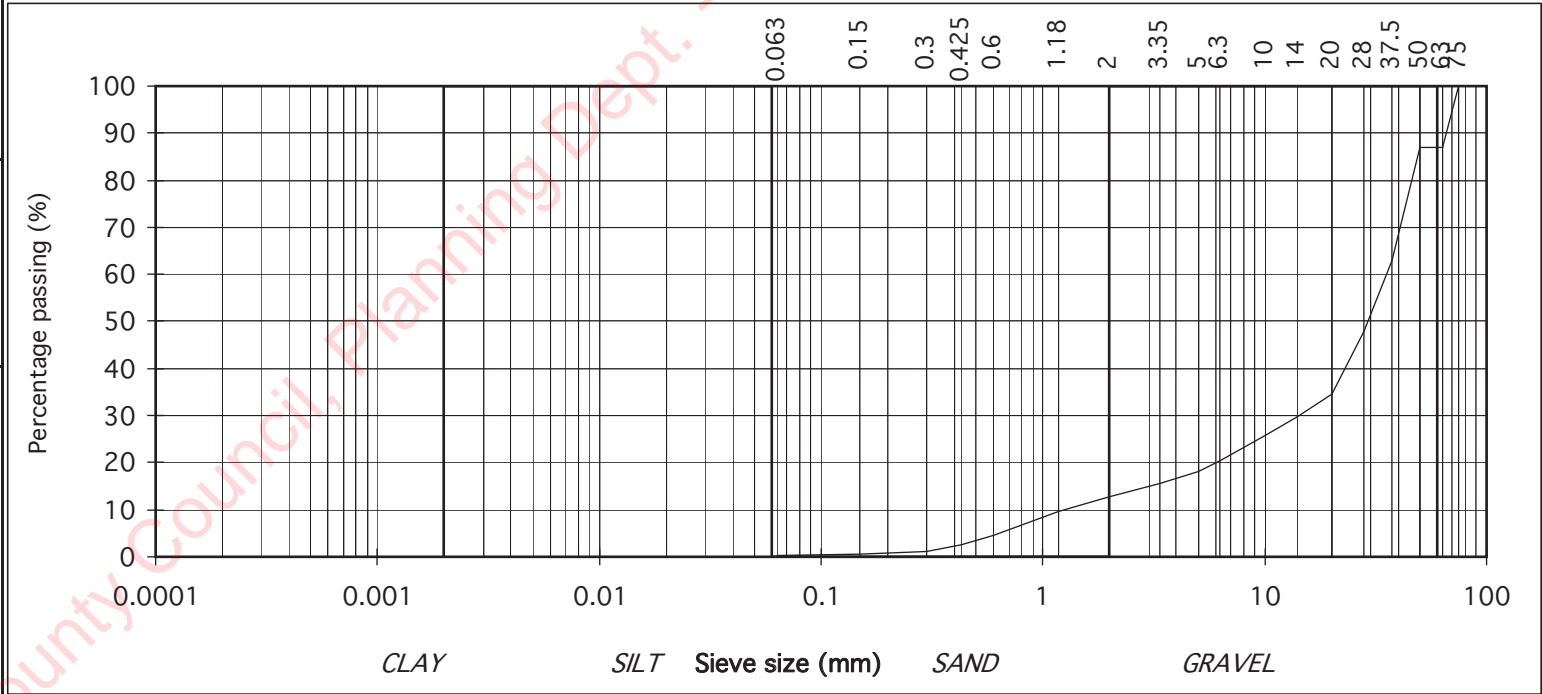
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5  
(note: Sedimentation stage not accredited)



particle size	% passing	
75	100	COBBLES
63	87	
50	87	
37.5	63	
28	48	
20	35	
14	30	
10	26	
6.3	20	
5	18	
3.35	16	GRAVEL
2	13	
1.18	10	
0.6	5	
0.425	2	
0.3	1	SAND
0.15	0	
0.063	0	
		SILT/CLAY

Contract No. 23070      Report No. R119344  
 Contract Name: Oxigen Development Site - Site 3 Derryarkin  
 BH/TP : BH06  
 Sample No. AA141319      Lab. Sample No. A21/0751  
 Sample Type: B  
 Depth (m) 2.00      Customer: Oxigen / Fehily Timoney & Company Consulting  
 Date Received 01/02/2021      Date Testing started 11/02/2021  
 Description: Grey 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 . Results apply to sample as received.      Sample size did not meet the requirements of BS1377



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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)

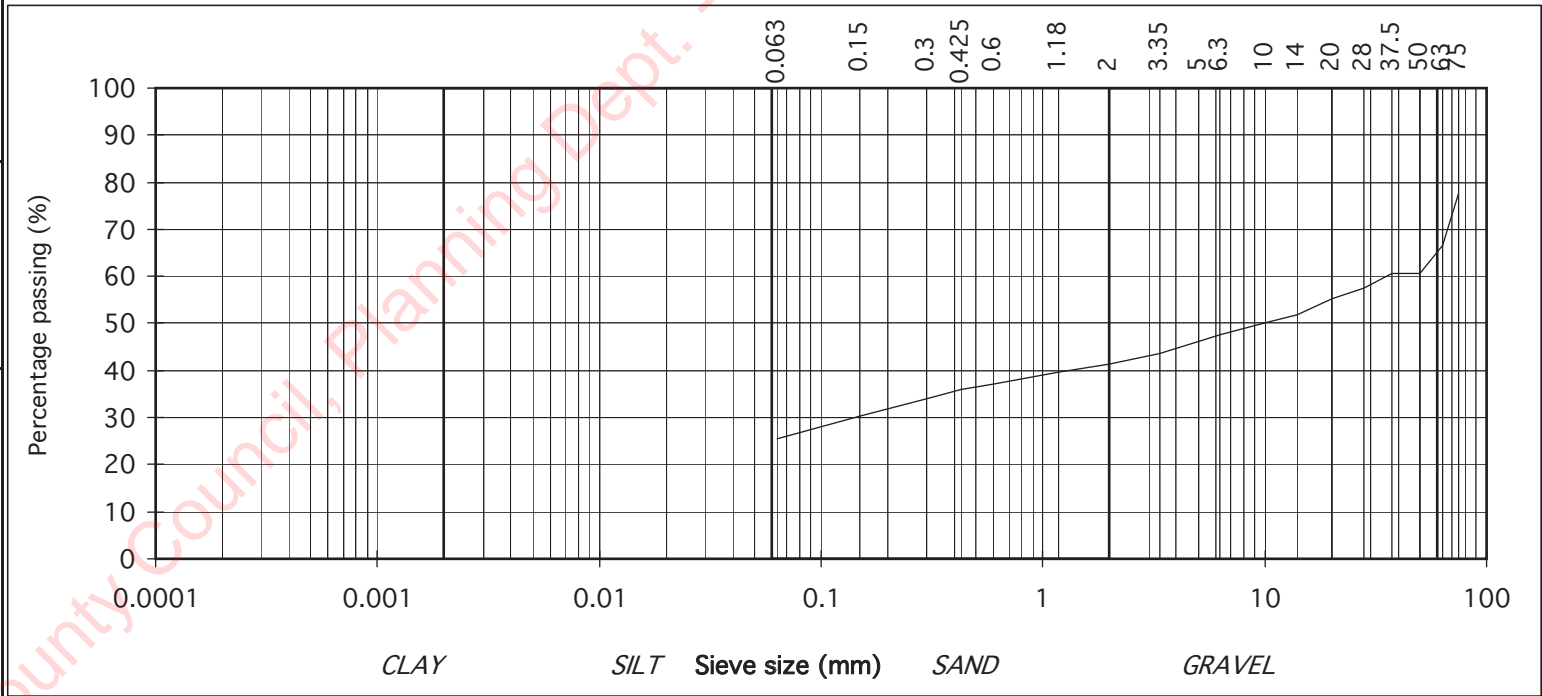


particle size	% passing	
75	78	COBBLES
63	67	
50	61	GRAVEL
37.5	61	
28	58	
20	55	
14	52	
10	50	
6.3	48	
5	46	SAND
3.35	44	
2	41	
1.18	40	
0.6	37	
0.425	36	
0.3	34	
0.15	30	SILT/CLAY
0.063	26	

Contract No. 23070 Report No. R119345  
 Contract Name: Oxigen Development Site - Site 3 Derryarkin  
 BH/TP : BH06  
 Sample No. AA141323 Lab. Sample No. A21/0752  
 Sample Type: B  
 Depth (m) 6.00 Customer: Oxigen / Fehily Timoney & Company Consulting  
 Date Received 01/02/2021 Date Testing started 11/02/2021  
 Description: Brown slightly sandy, gravelly, SILT/CLAY with many cobbles

Remarks

Note: Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 . Results apply to sample as received. Sample size did not meet the requirements of BS1377



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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)

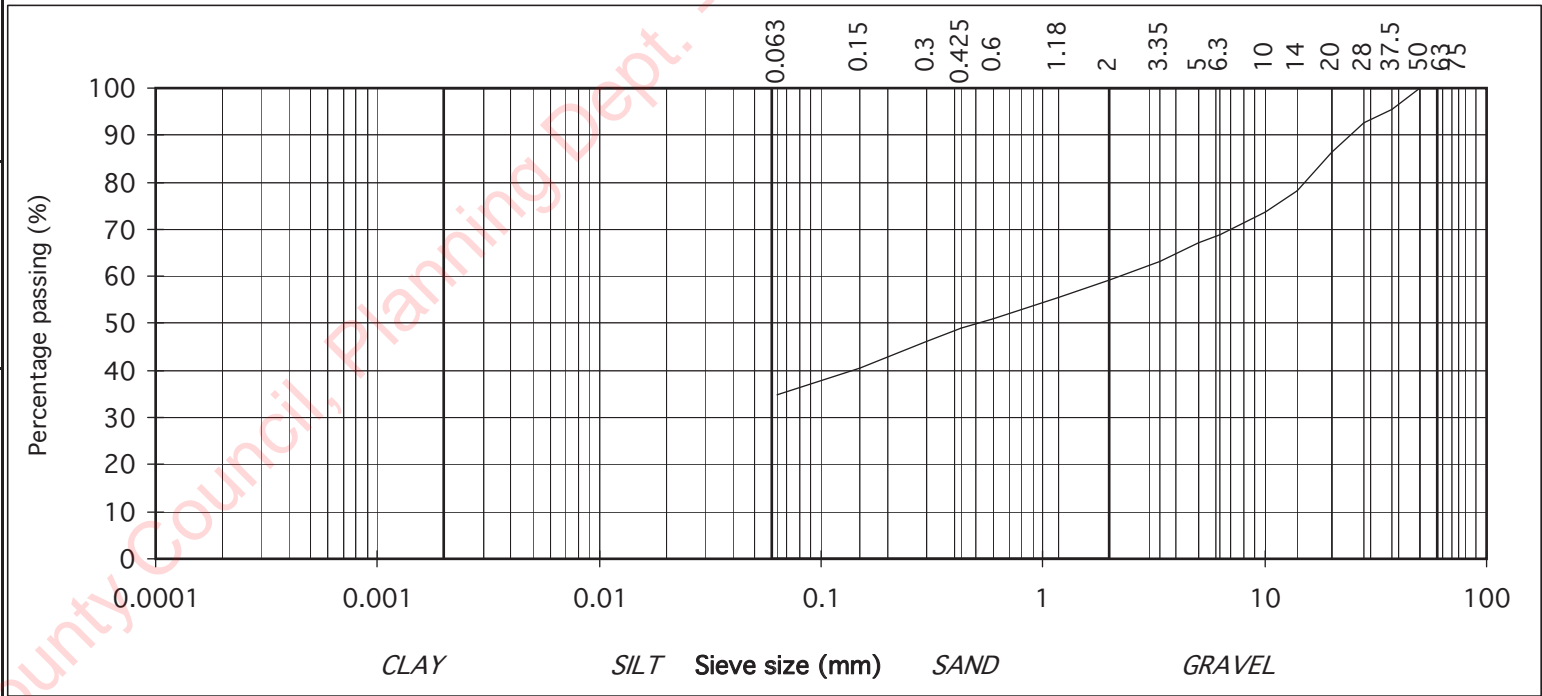


particle size	% passing	
75	100	COBBLES
63	100	
50	100	
37.5	95	GRAVEL
28	93	
20	86	
14	78	
10	74	
6.3	69	
5	67	
3.35	63	SAND
2	59	
1.18	55	
0.6	51	
0.425	49	SILT/CLAY
0.3	46	
0.15	41	
0.063	35	

Contract No. 23070 Report No. R119674  
 Contract Name: Oxigen Development Site - Site 3 Derryarkin  
 BH/TP : BH06  
 Sample No. AA141325 Lab. Sample No. A21/0753  
 Sample Type: B  
 Depth (m) 8.00 Customer: Oxigen / Fehily Timoney & Company Consulting  
 Date Received 01/02/2021 Date Testing started 11/02/2021  
 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 . Results apply to sample as received. Sample size did not meet the requirements of BS1377



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

**Appendix 6**

**Chemical / Environmental Test Records**

Offaly County Council, Planning Dept. - Inspection Purposes Only



# Final Report

**Report No.:** 21-04127-1  
**Initial Date of Issue:** 20-Feb-2021  
**Client:** IGSL  
**Client Address:** M7 Business Park  
Naas  
County Kildare  
Ireland  
**Contact(s):** Darren Keogh  
**Project:** 23070 Oxigen Development Sites - Site  
3 Derryarkin Offaly  
**Quotation No.:** Q20-21693  
**Date Received:** 11-Feb-2021  
**Order No.:**  
**Date Instructed:** 11-Feb-2021  
**No. of Samples:** 7  
**Turnaround (Wkdays):** 7  
**Results Due:** 19-Feb-2021  
**Date Approved:** 20-Feb-2021  
**Approved By:**  
  
**Details:** Glynn Harvey, Technical Manager

## Results - Leachate

**Project: 23070 Oxigen Development Sites - Site 3 Derryarkin**

**Offaly**

Client: IGSL		Chemtest Job No.:							
Quotation No.: Q20-21693		Chemtest Sample ID.:							
Order No.:		Client Sample Ref.:							
		Sample Location:							
		Sample Type:							
		Top Depth (m):							
		Bottom Depth (m):							
Determinand	Accred.	SOP	Type	Units	LOD	21-04127	21-04127	21-04127	21-04127
pH	U	1010	10:1		N/A	8.5	8.9	8.4	8.7
Ammonium	U	1220	10:1	mg/l	0.050	0.55	0.12	0.52	0.18
Ammonium	N	1220	10:1	mg/kg	0.10	6.4	1.7	5.9	2.4
Boron (Dissolved)	U	1450	10:1	mg/kg	0.20	< 0.20	< 0.20	< 0.20	< 0.20
Benzo[ <i>a</i> ]fluoranthene	N	1800	10:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010

Offaly County Council, Planning Dept. - Inspection Purposes Only!



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## Results - Soil

### Project: 23070 Oxigen Development Sites - Site 3 Derryarkin Offaly

Client: IGSL	Chemtest Job No.:		21-04127	21-04127	21-04127	21-04127	21-04127	21-04127	21-04127		
Quotation No.: Q20-21693	Chemtest Sample ID.:		1140116	1140117	1140118	1140119	1140120	1140121	1140122		
Order No.:	Client Sample Ref.:		142151	142163	124167	142163	143130	116301	141317		
	Sample Location:		TP2	TP3	TP4	TP5	BH3	BH5	BH6		
	Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL		
	Top Depth (m):		0.50	0.40	0.30	0.20	1.00	0.50	0.50		
	Bottom Depth (m):		0.90	0.80	0.80	0.70	1.00	0.50	0.50		
	Asbestos Lab:		DURHAM			DURHAM	DURHAM	DURHAM			
Determinand	Accred.	SOP	Units	LOD							
ACM Type	U	2192		N/A	-		-	-	-		
Asbestos Identification	U	2192		N/A	No Asbestos Detected		No Asbestos Detected	No Asbestos Detected	No Asbestos Detected		
ACM Detection Stage	U	2192		N/A	-		-	-	-		
Moisture	N	2030	%	0.020	9.1	9.7	9.2	7.0	16	8.2	8.5
pH (2.5:1)	N	2010		4.0		[A] 8.9	[A] 9.0				[A] 8.9
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	[A] 0.42			[A] < 0.40	[A] 0.42	[A] < 0.40	
Magnesium (Water Soluble)	N	2120	g/l	0.010		[A] < 0.010	[A] < 0.010				[A] < 0.010
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010		[A] < 0.010	[A] 0.14				[A] < 0.010
Total Sulphur	U	2175	%	0.010		[A] 0.026	[A] 0.030				[A] 0.032
Sulphur (Elemental)	U	2180	mg/kg	1.0	[A] 7.6			[A] 2.7	[A] < 1.0	[A] < 1.0	
Chloride (Water Soluble)	U	2220	g/l	0.010		[A] < 0.010	[A] < 0.010				[A] < 0.010
Nitrate (Water Soluble)	N	2220	g/l	0.010		0.017	0.019				< 0.010
Cyanide (Total)	U	2300	mg/kg	0.50	[A] < 0.50			[A] < 0.50	[A] < 0.50	[A] < 0.50	
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	[A] 2.8			[A] 2.4	[A] 5.0	[A] 4.7	
Ammonium (Water Soluble)	U	2120	g/l	0.01		< 0.01	< 0.01				< 0.01
Sulphate (Acid Soluble)	U	2430	%	0.010	[A] 0.011	[A] 0.012	[A] 0.023	[A] < 0.010	[A] 0.022	[A] < 0.010	[A] < 0.010
Arsenic	U	2450	mg/kg	1.0	21			29	12	21	
Barium	U	2450	mg/kg	10	21			20	18	19	
Cadmium	U	2450	mg/kg	0.10	0.27			0.51	0.36	0.42	
Chromium	U	2450	mg/kg	1.0	6.0			11	6.0	8.9	
Molybdenum	U	2450	mg/kg	2.0	< 2.0			< 2.0	< 2.0	< 2.0	
Antimony	N	2450	mg/kg	2.0	< 2.0			< 2.0	< 2.0	< 2.0	
Copper	U	2450	mg/kg	0.50	4.7			9.1	47	4.0	
Mercury	U	2450	mg/kg	0.10	< 0.10			< 0.10	< 0.10	< 0.10	
Nickel	U	2450	mg/kg	0.50	9.1			18	7.7	12	
Lead	U	2450	mg/kg	0.50	3.5			6.0	6.4	5.8	
Selenium	U	2450	mg/kg	0.20	< 0.20			< 0.20	< 0.20	< 0.20	
Zinc	U	2450	mg/kg	0.50	20			31	15	24	
Chromium (Trivalent)	N	2490	mg/kg	1.0	6.0			11	6.0	8.9	
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50			< 0.50	< 0.50	< 0.50	
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	



# Results - Soil

## Project: 23070 Oxigen Development Sites - Site 3 Derryarkin Offaly

Client: IGSL	Chemtest Job No.:		21-04127	21-04127	21-04127	21-04127	21-04127	21-04127	21-04127
Quotation No.: Q20-21693	Chemtest Sample ID.:		1140116	1140117	1140118	1140119	1140120	1140121	1140122
Order No.:	Client Sample Ref.:		142151	142163	124167	142163	143130	116301	141317
	Sample Location:		TP2	TP3	TP4	TP5	BH3	BH5	BH6
	Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):		0.50	0.40	0.30	0.20	1.00	0.50	0.50
	Bottom Depth (m):		0.90	0.80	0.80	0.70	1.00	0.50	0.50
	Asbestos Lab:		DURHAM			DURHAM	DURHAM	DURHAM	
Determinand	Accred.	SOP	Units	LOD					
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
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	N	2800	mg/kg	0.010	[A] < 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	[A] < 0.010
Acenaphthene	N	2800	mg/kg	0.010	[A] < 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	[A] < 0.010
Phenanthrene	N	2800	mg/kg	0.010	[A] 0.28		[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	[A] < 0.010
Fluoranthene	N	2800	mg/kg	0.010	[A] 0.22		[A] < 0.010	[A] < 0.010	[A] < 0.010
Pyrene	N	2800	mg/kg	0.010	[A] 0.26		[A] < 0.010	[A] < 0.010	[A] < 0.010
Benzo[a]anthracene	N	2800	mg/kg	0.010	[A] 0.15		[A] < 0.010	[A] < 0.010	[A] < 0.010
Chrysene	N	2800	mg/kg	0.010	[A] 0.11		[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	[A] < 0.010
Benzo[k]fluoranthene	N	2800	mg/kg	0.010	[A] < 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	[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	[A] < 0.010
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.010	[A] < 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	[A] < 0.010
Coronene	N	2800	mg/kg	0.010	[A] < 0.010		[A] < 0.010	[A] < 0.010	[A] < 0.010



## Results - Soil

**Project: 23070 Oxiqen Development Sites - Site 3 Derryarkin Offaly**

Client: IGSL		Chemtest Job No.:		21-04127	21-04127	21-04127	21-04127	21-04127	21-04127	21-04127
Quotation No.: Q20-21693		Chemtest Sample ID.:		1140116	1140117	1140118	1140119	1140120	1140121	1140122
Order No.:		Client Sample Ref.:		142151	142163	124167	142163	143130	116301	141317
		Sample Location:		TP2	TP3	TP4	TP5	BH3	BH5	BH6
		Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):		0.50	0.40	0.30	0.20	1.00	0.50	0.50
		Bottom Depth (m):		0.90	0.80	0.80	0.70	1.00	0.50	0.50
		Asbestos Lab:		DURHAM			DURHAM	DURHAM	DURHAM	
Determinand	Accred.	SOP	Units	LOD						
Total Of 17 PAH's	N	2800	mg/kg	0.20	[A] 1.0		[A] < 0.20	[A] < 0.20	[A] < 0.20	
PCB 28	N	2815	mg/kg	0.0010	[A] < 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	[A] < 0.0010	
PCB 90+101	N	2815	mg/kg	0.0010	[A] < 0.0010		[A] < 0.0010	[A] < 0.0010	[A] < 0.0010	
PCB 118	N	2815	mg/kg	0.0010	[A] < 0.0010		[A] < 0.0010	[A] < 0.0010	[A] < 0.0010	
PCB 153	N	2815	mg/kg	0.0010	[A] < 0.0010		[A] < 0.0010	[A] < 0.0010	[A] < 0.0010	
PCB 138	N	2815	mg/kg	0.0010	[A] < 0.0010		[A] < 0.0010	[A] < 0.0010	[A] < 0.0010	
PCB 180	N	2815	mg/kg	0.0010	[A] < 0.0010		[A] < 0.0010	[A] < 0.0010	[A] < 0.0010	
Total PCBs (7 congeners)	N	2815	mg/kg	0.0010	[A] < 0.0010		[A] < 0.0010	[A] < 0.0010	[A] < 0.0010	
Total Phenols	U	2920	mg/kg	0.30	< 0.30		< 0.30	< 0.30	< 0.30	





## Results - Single Stage WAC

Project: 23070 Oxigen Development Sites - Site 3 Derryarkin Offaly

Chemtest Job No: 21-04127 Chemtest Sample ID: 1140116 Sample Ref: 142151 Sample ID: Sample Location: TP2 Top Depth(m): 0.50 Bottom Depth(m): 0.90 Sampling Date:				Landfill Waste Acceptance Criteria Limits			
				Inert Waste Landfill	Stable, Non-reactive hazardous waste in non-hazardous Landfill	Hazardous Waste Landfill	
Determinand	SOP	Accred.	Units				
Total Organic Carbon	2625	U	%	[A] 0.89	3	5	6
Loss On Ignition	2610	U	%	2.8	--	--	10
Total BTEX	2760	U	mg/kg	[A] < 0.010	6	--	--
Total PCBs (7 congeners)	2815	N	mg/kg	[A] < 0.0010	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg	[A] < 10	500	--	--
Total Of 17 PAH's	2800	N	mg/kg	[A] 1.0	100	--	--
pH	2010	U		9.1	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.029	--	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	0.0027	< 0.050	0.5	2	25
Barium	1450	U	0.0070	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.010	0.04	1	5
Chromium	1450	U	< 0.0010	< 0.050	0.5	10	70
Copper	1450	U	0.0033	< 0.050	2	50	100
Mercury	1450	U	< 0.00050	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	0.0017	< 0.050	0.5	10	30
Nickel	1450	U	0.0012	< 0.050	0.4	10	40
Lead	1450	U	0.0012	0.012	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	0.011	< 0.50	4	50	200
Chloride	1220	U	1.1	11	800	15000	25000
Fluoride	1220	U	0.19	1.9	10	150	500
Sulphate	1220	U	< 1.0	< 10	1000	20000	50000
Total Dissolved Solids	1020	N	78	780	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	11	110	500	800	1000

### Solid Information

Dry mass of test portion/kg	0.090
Moisture (%)	9.1

### 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: 23070 Oxigen Development Sites - Site 3 Derryarkin Offaly

Chemtest Job No: 21-04127 Chemtest Sample ID: 1140119 Sample Ref: 142163 Sample ID: Sample Location: TP5 Top Depth(m): 0.20 Bottom Depth(m): 0.70 Sampling Date:				Landfill Waste Acceptance Criteria Limits			
				Inert Waste Landfill	Stable, Non-reactive hazardous waste in non-hazardous Landfill	Hazardous Waste Landfill	
Determinand	SOP	Accred.	Units				
Total Organic Carbon	2625	U	%	[A] 0.68	3	5	6
Loss On Ignition	2610	U	%	1.2	--	--	10
Total BTEX	2760	U	mg/kg	[A] < 0.010	6	--	--
Total PCBs (7 congeners)	2815	N	mg/kg	[A] < 0.0010	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg	[A] < 10	500	--	--
Total Of 17 PAH's	2800	N	mg/kg	[A] < 0.20	100	--	--
pH	2010	U		9.0	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.032	--	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	0.0011	< 0.050	0.5	2	25
Barium	1450	U	0.0054	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.010	0.04	1	5
Chromium	1450	U	< 0.0010	< 0.050	0.5	10	70
Copper	1450	U	0.0015	< 0.050	2	50	100
Mercury	1450	U	< 0.00050	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	< 0.0010	< 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	0.0095	< 0.50	4	50	200
Chloride	1220	U	1.2	12	800	15000	25000
Fluoride	1220	U	0.096	< 1.0	10	150	500
Sulphate	1220	U	< 1.0	< 10	1000	20000	50000
Total Dissolved Solids	1020	N	45	450	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	6.1	61	500	800	1000

### Solid Information

Dry mass of test portion/kg	0.090
Moisture (%)	7.0

### 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: 23070 Oxigen Development Sites - Site 3 Derryarkin Offaly

Chemtest Job No: 21-04127					Landfill Waste Acceptance Criteria Limits		
Chemtest Sample ID: 1140120					Inert Waste Landfill	Stable, Non-reactive hazardous waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample Ref: 143130							
Sample ID:							
Sample Location: BH3							
Top Depth(m): 1.00							
Bottom Depth(m): 1.00							
Sampling Date:							
Determinand	SOP	Accred.	Units				
Total Organic Carbon	2625	U	%	[A] 0.89	3	5	6
Loss On Ignition	2610	U	%	2.9	--	--	10
Total BTEX	2760	U	mg/kg	[A] < 0.010	6	--	--
Total PCBs (7 congeners)	2815	N	mg/kg	[A] < 0.0010	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg	[A] < 10	500	--	--
Total Of 17 PAH's	2800	N	mg/kg	[A] < 0.20	100	--	--
pH	2010	U		8.6	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.061	--	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	0.0023	< 0.050	0.5	2	25
Barium	1450	U	0.010	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.010	0.04	1	5
Chromium	1450	U	0.0023	< 0.050	0.5	10	70
Copper	1450	U	0.0034	< 0.050	2	50	100
Mercury	1450	U	< 0.00050	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	0.0028	< 0.050	0.5	10	30
Nickel	1450	U	0.0034	< 0.050	0.4	10	40
Lead	1450	U	0.0016	0.016	0.5	10	50
Antimony	1450	U	< 0.0010	< 0.010	0.06	0.7	5
Selenium	1450	U	0.0012	0.012	0.1	0.5	7
Zinc	1450	U	0.011	< 0.50	4	50	200
Chloride	1220	U	2.0	20	800	15000	25000
Fluoride	1220	U	0.15	1.5	10	150	500
Sulphate	1220	U	< 1.0	< 10	1000	20000	50000
Total Dissolved Solids	1020	N	85	840	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	22	220	500	800	1000

### Solid Information

Dry mass of test portion/kg	0.090
Moisture (%)	16

### 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: 23070 Oxigen Development Sites - Site 3 Derryarkin Offaly

Chemtest Job No: 21-04127 Chemtest Sample ID: 1140121 Sample Ref: 116301 Sample ID: Sample Location: BH5 Top Depth(m): 0.50 Bottom Depth(m): 0.50 Sampling Date:				Landfill Waste Acceptance Criteria Limits			
				Inert Waste Landfill	Stable, Non-reactive hazardous waste in non-hazardous Landfill	Hazardous Waste Landfill	
Determinand	SOP	Accred.	Units				
Total Organic Carbon	2625	U	%	[A] < 0.20	3	5	6
Loss On Ignition	2610	U	%	0.96	--	--	10
Total BTEX	2760	U	mg/kg	[A] < 0.010	6	--	--
Total PCBs (7 congeners)	2815	N	mg/kg	[A] < 0.0010	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg	[A] < 10	500	--	--
Total Of 17 PAH's	2800	N	mg/kg	[A] < 0.20	100	--	--
pH	2010	U		8.9	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.026	--	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	0.0015	< 0.050	0.5	2	25
Barium	1450	U	0.040	< 0.50	20	100	300
Cadmium	1450	U	0.00035	< 0.010	0.04	1	5
Chromium	1450	U	< 0.0010	< 0.050	0.5	10	70
Copper	1450	U	0.0055	0.055	2	50	100
Mercury	1450	U	< 0.00050	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	< 0.0010	< 0.050	0.5	10	30
Nickel	1450	U	0.0021	< 0.050	0.4	10	40
Lead	1450	U	0.013	0.13	0.5	10	50
Antimony	1450	U	< 0.0010	< 0.010	0.06	0.7	5
Selenium	1450	U	0.0012	0.012	0.1	0.5	7
Zinc	1450	U	0.010	< 0.50	4	50	200
Chloride	1220	U	1.6	16	800	15000	25000
Fluoride	1220	U	0.16	1.6	10	150	500
Sulphate	1220	U	< 1.0	< 10	1000	20000	50000
Total Dissolved Solids	1020	N	72	710	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	13	130	500	800	1000

### Solid Information

Dry mass of test portion/kg	0.090
Moisture (%)	8.2

### 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.

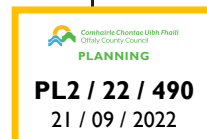
## Deviations

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:
1140116	142151		TP2		A	Amber Glass 250ml
1140116	142151		TP2		A	Plastic Tub 500g
1140117	142163		TP3		A	Amber Glass 250ml
1140117	142163		TP3		A	Plastic Tub 500g
1140118	124167		TP4		A	Amber Glass 250ml
1140118	124167		TP4		A	Plastic Tub 500g
1140119	142163		TP5		A	Amber Glass 250ml
1140119	142163		TP5		A	Plastic Tub 500g
1140120	143130		BH3		A	Amber Glass 250ml
1140120	143130		BH3		A	Plastic Tub 500g
1140121	116301		BH5		A	Amber Glass 250ml
1140121	116301		BH5		A	Plastic Tub 500g
1140122	141317		BH6		A	Amber Glass 250ml
1140122	141317		BH6		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.
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
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 easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Alkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N-dimethyl-p-phenylenediamine.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
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.



## 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**

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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**

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- 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**

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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.com](mailto:customerservices@chemtest.com)



## Appendix 7




### Exploratory Hole Location Plan

Offaly County Council, Planning Dept. - Inspection Purposes Only

# Oxygen Site at Derryarkin, Co. Offaly

Exploratory Hole Location Plan

## Legend

-  Cable Percussion Borehole
-  Rotary Open-Hole Drillhole
-  Trial Pit



PL2 / 22 / 490  
21 / 09 / 2022

