

Appendix III

Priority Geotechnical Reports

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**LONGFORD LANDFILLS
BALLYMULVEY
GROUND INVESTIGATION
REPORT No. P18159_BM_Rp_D01**



REPORT CONTROL SHEET

Client						
Engineer Representative	Fehily Timoney.					
Project Name	Longford Landfills- Ground Investigation					
Document Name	Longford Landfills- Ballymulvey Ground Investigation- Draft Report					
Project Number	P18159_BM					
This Report Comprises of	TOC	Text	No. of Volume	No. of Appendices	Drawings	Electronic data
	1	6	1	2	1	*.dwg, *.pdf

Revision	Status	Author(s)	Approved By	Issue Date
D01	Draft	JMS	GH	16/10/2018

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A) Introduction

A.1) Scope of Works

Priority Geotechnical Ltd. was instructed by Fehily Timoney to undertake a direct intrusive ground investigation at Ballymulvey Landfill, Co. Longford.

The direct intrusive works consisted of boreholes, trial pit excavations and in-situ permeability determination of ground conditions. The site is shown in Figure A.1 below.



Figure A.1 Background map showing survey location.

A.2) Objectives

The objectives were to provide information on the following:

- Lateral and vertical variations in overburden and bedrock type and thickness along the surveyed profiles.
- Extent and thickness of landfill material across along the surveyed profiles.

A.3) Site Topography

Site topography consists of a mostly grassy field. The perimeter of the site is comprised of densely vegetated ditches on the west, north and east sides of the site, while a metal fence with some vegetation makes up the southern perimeter. The site is flanked by a road to the north.

A.4) Coordinate System and Datum

All coordinates are given in Irish Transverse Mercator (ITM). All elevations are given in metres Ordnance Datum Malin (OD Malin). The locations are shown on the exploratory layout plans presented in **APPENDIX B**.

Location ID	Easting	Northing	Ground Level (mOD)	Final Depth (m bgl)	Date Start (DD/MM/YYYY)
BM-GW01	617084.9	758109.9	56.55	7.50	17/09/2018
BM-GW02	617223.8	758011.3	57.22	14.50	18/09/2018
BM-GW03	616953.1	757988.9	53.71	13.50	18/09/2018
BM-SA01	617136.7	758019.1	62.16	0.85	02/08/2018
BM-SA02	617102.1	757986.4	60.7	0.45	02/08/2018
BM-SA03	617047.9	758036.4	60.81	1.00	02/08/2018
BM-SA04	617084.2	758077.6	60.79	0.45	02/08/2018
BM-TP01	617136.8	758024.5	62.2	1.60	02/08/2018

A.5) Acronyms

bgl – below ground level

ITM – Irish Transverse Mercator

OD Malin – metres above Ordnance Datum Malin

PGL – Priority Geotechnical Ltd.

A.6) Site Geology

According to the GSI 100k Geology Map (Sheet 12) the study area is underlain by the Waulsortian Limestones (WA) Formation, described as Massive Unbedded Lime-Mudstones. To the southeast of the survey area lies the Ballysteen Formation, described as fossiliferous and argillaceous limestones with shale. These two formations are divided by a northeast-southwest fault.

According to the Quaternary Soils Map (see Fig. A.3) most of the study area is underlain by "Till derived from Carboniferous Sandstones cherts". Peat deposits are shown to the North east of the site with minor pockets of "Gravels derived from Limestones" also mapped in the area.

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B) Intrusive, direct investigation fieldworks

This direct investigation fieldworks were undertaken between the 02nd August and the 18th September, 2018 under the supervision of PGL, Engineering Geologist(s) in accordance with Eurocode 7- Geotechnical Design Part 2, ground investigation and testing (BS EN 1997-2: 2007) and the relevant British Standards (BS 5930 (2015) Code of Practice for Site Investigation and BS 1377, Method of Tests for Soil for Civil Engineering Purposes, *in situ* Tests Parts 1 to 9). Details of the plant and equipment used are detailed on the relevant exploratory records, attached herein.

B.1.i) Boreholes

Three (3) number rotary boreholes were bored to depths 7.5m bgl to 14.5m bgl using PGL's Deltabase 520 rotary rig. The records are presented in **APPENDIX A**.

Location	Depth (m bgl)	Date (dd/mm/yyyy)
BM-GW01	7.5	17/09/2018
BM-GW02	14.5	18/09/2018
BM-GW03	13.5	18/09/2018

B.1.ii) Trial Pits

A single (1) Trial Pit excavation was dug to a depth 1.6m bgl using a 14t tracked excavator. The exploratory log is included in **APPENDIX A**.

Location	Final Depth (m, bgl)	Date Start (dd/mm/yyyy)
BM-TP01	1.6	02/08/2018

B.1.iii) Soakaway Pits

Four (4) soakaway pits were excavated to depths 0.35m bgl to 0.5m bgl using a 13t tracked excavator. The exploratory logs are presented in **APPENDIX A** of this report.

Location	Depth (m bgl)	Date (dd/mm/yyyy)
BM-SA01	0.85	02/08/2018
BM-SA02	0.45	02/08/2018
BM-SA03	1.0	02/08/2018
BM-SA04	0.45	02/08/2018

B.2) In-Situ Testing

Four (4) number infiltration tests were carried out in general accordance with the BRE Digest 365, 2007 Soakaway Design Standards. Single (1) and double (2) cycles of infiltration/drainage was undertaken. Soakaway pits failed to drain in full over the test durations 60mins to 120mins. The data from the testing was presented accompanying the relevant exploratory soakaway pit records in **APPENDIX A**.

B.3) Lab Testing

Under the scope of works no laboratory testing was required.

B.4) Ground and Groundwater Conditions

The full details of the ground conditions encountered are provided for on the exploratory records accompanying this report. The records provide descriptions, in accordance with BS 5930 (2015) and Eurocode 7, Geotechnical Investigation and Testing, Identification and classification of soils, Part 1, Identification and description (EN ISO 14688-1: 2002),– Identification and Classification of Soil, Part 2: Classification Principles (EN ISO 14688-2:2004) and Identification and Classification of Rock, Part 1: Identification & Description (EN ISO 14689-1:2004) of the materials encountered, in situ testing and details of the samples taken, together with any observations made during the ground investigation.

Groundwater was recorded when encountered during boring over a period of 20 minutes, noting any changes that may occur. Groundwater levels were also monitored at start and end of drilling shifts.





It should be noted that the normal rate of boring may not permit the recording of equilibrium groundwater levels for any one groundwater water strike where casing may exclude low volume flows as the borehole progresses. The normal duration over which a trial excavation remains open may not allow for low volume flow to ingress in cohesive deposits. Groundwater conditions observed in the borings and the excavations, are those appertaining to the period of the investigation. Groundwater levels may be subject to diurnal, seasonal and climatic variations and can also be affected by drainage conditions, tidal variations etc.

Three (3) groundwater monitoring installations were constructed upon request of the engineer. The groundwater regime should be assessed from standpipe well installations, where available. A summary of groundwater is presented below.

Location	Depth Strike (m bgl)	Remarks	Standpipe (Y/N)
BM-GW01	5.0	See shift data.	Y
BM-GW02	6.5	See shift data.	Y
BM-GW03	6.0	See shift data.	Y
BM-SA01	-	None encountered.	N
BM-SA02	-	None encountered.	N
BM-SA03	-	None encountered.	N
BM-SA04	-	None encountered.	N
BM-TP01	-	None encountered.	N

Location	Depth Top (m bgl)	Depth Base (m bgl)	Diameter (mm)	Pipe Type
BM-GW01	0.0	3.0	90	PLAIN
BM-GW01	3.0	7.5	90	SLOTTED
BM-GW02	0.0	3.0	90	PLAIN
BM-GW02	3.0	13.0	90	SLOTTED
BM-GW03	0.0	3.5	90	PLAIN
BM-GW03	3.5	12	90	SLOTTED

Exploratory holes were backfilled upon instruction from the engineer. Backfill details are shown graphically on the exploratory logs accompanying this factual report.

 GRAVEL Backfill to installation/ borehole	 ARISINGS Backfill
 uPVC slotted pipe	 BENTONITE Backfill to installation/

APPENDIX A: EXPLORATORY LOGS AND PHOTOGRAPHIC RECORDS

Location ID
BM-GW01
BM-GW02
BM-GW03
BM-SA01
BM-SA02
BM-SA03
BM-SA04
BM-TP01

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KEY TO SYMBOLS ON EXPLORATORY HOLE RECORDS

All linear dimensions are in metres or millimetres

DESCRIPTIONS

** Drillers Description
Friable Easily crumbled

SAMPLES

U () Undisturbed 102mm diameter sample, () denotes number of blows to drive sampler
U ()F, U ()P F- not recovered, P-partially recovered
U38 Undisturbed 38mm diameter sample
P(F), (P) Piston sample - disturbed
B Bulk sample - disturbed
D Jar Sample - disturbed
W Water Sample
CBR California Bearing Ratio mould sample
ES Chemical Sample for Contamination Analysis
SPTLS Standard Penetration Test S lump sample from split sampler

CORE RECOVERY AND ROCK QUALITY

TCR Total Core Recovery (% of Core Run)
SCR Solid Core Recovery (length of core having at least one full diameter as % of core run)
RQD Rock Quality Designation (length of solid core greater than 100mm as % of core run)
Where there is insufficient space for the TCR, SCR and RQD, the results may be found in the remarks column
If Fracture Spacing in mm (Minimum/Average/Maximum) NI - non intact, NR - no recovery
AZCL Assumed Zone of Core Loss
NI Non intact

GROUNDWATER

▽ Groundwater strike
▼ Groundwater level after standing period
Date/Water Date of shift (day/month)/Depth to water at end of previous shift shown above the date and depth to water at beginning of shift given below the date

INSITU TESTING

S Standard Penetration Test - split barrel sampler
C Standard Penetration Test - solid 60° cone
SW Self Weight Penetration
Ivp, HVp (R) In Situ Vane Test, Hand Vane Test (R) demonstrates remoulded strength
K(F), (C), (R), (P) Permeability Test
HP Hand Penetrometer Test

MEASURED PROPERTIES

N Standard Penetration Test - blows required to drive 300mm after seating drive
x/y Denotes x blows for y mm within the Standard Penetration Test
x*/y Denotes x blows for y mm within the seating drive
c_u Undrained Shear Strength (kN/m²)
CBR California Bearing Ratio

ROTARY DRILLING SIZES

Index Letter	Nominal Diameter (mm)	
	Borehole	Core
N	75	54
H	99	76
P	120	92
S	146	113



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Drilled By:

KM

Logged By:

N/A

Borehole No.

BM-GW01

Sheet 1 of 1

Project Name: Longford Landfills - Ballymulvey	Project No.: P18159	Co-ords: 617085E - 758110N	Hole Type: Rotary open hole
Location: Co. Longford	Level: 56.55m OD	Scale: 1:50	
Client:		Dates: 17/09/2018	17/09/2018

Well	Water Strike (m)	Depth (m)	Type /Fs (min, max, avg)	Coring (%)			Depth (m) / FI (/m)	Level (mOD)	Legend	Stratum Description	
				TCR	SCR	RQD					
							1.50	55.05		Open hole boring. Driller described: Topsoil. Peat.	1
										Open hole boring. Driller described: Peat.	2
							4.50	52.05		Open hole boring. Driller described: Weathered Limestone bedrock.	3
							6.00	50.55		Open hole boring. Driller described: Limestone bedrock.	4
							7.50	49.05		End of Borehole at 7.500m	5
											6
											7
											8
											9

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Groundwater:				Hole Information:			Equipment: Deltabase 520	
Struck, m	Rose to	After, min	Sealed	Comment	Hole Depth (m)	Hole Dia (mm)	Casing Dia (mm)	Method: Compressed air mist.
5.00				See shift data.	7.50	131	131	

Remarks: Borehole terminated at 7.50m bgl, required depth. 90mm dia. standpipe installed. Response zone from 3.0m to 7.5m bgl.	Shift Data:	Groundwater	Shift	Hole Depth	Remarks
		5.0	17/09/2018 08:00 17/09/2018 18:00	0.00 7.50	Start of shift. End of borehole.



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Drilled By:

KM

Logged By:

N/A

Borehole No.

BM-GW02

Sheet 1 of 2

Project Name: Longford Landfills - Ballymulvey
Project No.: P18159
Co-ords: 617224E - 758011N
Hole Type: Rotary open hole

Location: Co. Longford
Level: 57.22m OD
Scale: 1:50

Client:
Dates: 18/09/2018 18/09/2018

Well	Water Strike (m)	Depth (m)	Type /Fs (min, max, avg)	Coring (%)			Depth (m) / FI (/m)	Level (mOD)	Legend	Stratum Description	
				TCR	SCR	RQD					
							0.50	56.72		Open hole boring. Driller described: Topsoil.	
										Open hole boring. Driller described: Silty Gravel.	1
											2
											3
							4.00	53.22		Open hole boring. Driller described: Boulder.	4
							4.50	52.72		Open hole boring. Driller described: Silty Gravel.	5
											6
											7
							7.50	49.72		Open hole boring. Driller described: Gravel.	8
											9

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Groundwater:				Hole Information:			Equipment:	
Struck, m	Rose to	After, min	Sealed	Comment	Hole Depth (m)	Hole Dia (mm)	Casing Dia (mm)	Deltabase 520
6.50				See shift data.	14.50	100	131	Method: Compressed air mist.

Remarks: Borehole terminated at 14.5m bgl. 90mm dia. standpipe installed. Response zone from 3.0m to 13.0m bgl.	Shift Data:	Groundwater	Shift	Hole Depth	Remarks
			18/09/2018 08:00		
		4.5	18/09/2018 18:00	14.50	End of borehole.



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Drilled By:

KM

Logged By:

N/A

Borehole No.

BM-GW02

Sheet 2 of 2

Project Name: Longford Landfills - Ballymulvey
Project No.: P18159
Co-ords: 617224E - 758011N
Hole Type: Rotary open hole

Location: Co. Longford
Level: 57.22m OD
Scale: 1:50

Client:
Dates: 18/09/2018 18/09/2018

Well	Water Strike (m)	Depth (m)	Type /Fs (min, max, avg)	Coring (%)			Depth (m) / FI (m)	Level (mOD)	Legend	Stratum Description
				TCR	SCR	RQD				
							10.50	46.72		Open hole boring. Driller described: Gravel.
							12.50	44.72		Open hole boring. Driller described: Weathered Limestone bedrock.
							14.50	42.72		Open hole boring. Driller described: Limestone.
										End of Borehole at 14.500m

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Groundwater:				Hole Information:			Equipment:	
Struck, m	Rose to	After, min	Sealed	Comment	Hole Depth (m)	Hole Dia (mm)	Casing Dia (mm)	Deltabase 520
6.50				See shift data.	14.50	100	131	Method: Compressed air mist.

Remarks: Borehole terminated at 14.5m bgl. 90mm dia. standpipe installed. Response zone from 3.0m to 13.0m bgl.	Shift Data:	Groundwater	Shift	Hole Depth	Remarks
		4.5	18/09/2018 08:00 18/09/2018 18:00	0.00 14.50	Start of shift. End of borehole.



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Drilled By:

KM

Logged By:

N/A

Borehole No.

BM-GW03

Sheet 1 of 2

Project Name: Longford Landfills - Ballymulvey
Project No.: P18159
Co-ords: 616953E - 757989N
Hole Type: Rotary open hole

Location: Co. Longford
Level: 53.71m OD
Scale: 1:50

Client:
Dates: 18/09/2018 19/09/2018

Well	Water Strike (m)	Depth (m)	Type /Fs (min, max, avg)	Coring (%)			Depth (m) / FI (m)	Level (mOD)	Legend	Stratum Description	
				TCR	SCR	RQD					
										Open hole boring. Driller described: Topsoil.	1
		1.50					52.21			Open hole boring. Driller described: Peat.	2
		3.00					50.71			Open hole boring. Driller described: Silt.	3
		4.50					49.21			Open hole boring. Driller described: Silty Gravel.	4
		6.00					47.71			Open hole boring. Driller described: Gravel.	5
		7.50					46.21			Open hole boring. Driller described: 'Wet' Silt.	6
		9.00					44.71				7
											8
											9

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Groundwater:				Hole Information:			Equipment: Deltabase 520	
Struck, m	Rose to	After, min	Sealed	Comment	Hole Depth (m)	Hole Dia (mm)	Casing Dia (mm)	Method: Compressed air mist.
6.00				See shift data.	13.50	100	131	

Remarks: Borehole terminated at 13.5m bgl, required depth. 90mm dia. standpipe installed. Response zone from 3.50m to 12.0m bgl.	Shift Data:	Groundwater	Shift	Hole Depth	Remarks
		4.8	18/09/2018 08:00	0.00	Start of shift.
		4.5	18/09/2018 18:00	12.00	End of shift.
		4.0	19/09/2018 08:00	12.00	Start of shift.
			19/09/2018 18:00	13.50	End of borehole.



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Drilled By:

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Logged By:

N/A

Borehole No.

BM-GW03

Sheet 2 of 2

Project Name: Longford Landfills - Ballymulvey
Project No.: P18159
Co-ords: 616953E - 757989N
Hole Type: Rotary open hole

Location: Co. Longford
Level: 53.71m OD
Scale: 1:50

Client:
Dates: 18/09/2018 19/09/2018

Well	Water Strike (m)	Depth (m)	Type /Fs (min, max, avg)	Coring (%)			Depth (m) / FI (/m)	Level (mOD)	Legend	Stratum Description	
				TCR	SCR	RQD					
							10.50	43.21	XXXXXX	Open hole boring. Driller described: 'Dry' Silt.	10
							12.00	41.71		Open hole boring. Driller described: Weathered Limestone bedrock.	11
							13.50	40.21		Open hole boring. Driller described: Limestone bedrock.	12
										End of Borehole at 13.500m	13
											14
											15
											16
											17
											18

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Groundwater:				Hole Information:			Equipment:	
Struck, m	Rose to	After, min	Sealed	Comment	Hole Depth (m)	Hole Dia (mm)	Casing Dia (mm)	Deltabase 520
6.00				See shift data.	13.50	100	131	Compressed air mist.

Remarks: Borehole terminated at 13.5m bgl, required depth. 90mm dia. standpipe installed. Response zone from 3.50m to 12.0m bgl.	Shift Data:		Groundwater	Shift	Hole Depth	Remarks
			4.8	18/09/2018 08:00	0.00	Start of shift.
			4.5	18/09/2018 18:00	12.00	End of shift.
			4.0	19/09/2018 08:00	12.00	Start of shift.
				19/09/2018 18:00	13.50	End of borehole.



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Trial Pit No
BM-TP01
 Sheet 1 of 1

Project Name: Longford Landfills - Ballymulvey
Project No.: P18159
Co-ords: 617137E - 758025N
Level: 62.20m OD
Date: 02/08/2018

Location: Co. Longford
Dimensions (m): 2.50
Scale: 1:25

Client:
Depth: 1.60m BGL
Logged PH:

Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.18			0.18	62.02		(TOPSOIL) Brown, sandy SILT. Sand is fine to coarse.
	0.50 - 1.00	B					Dark Grey black, well compacted FLY ASH.
	1.10 - 1.60	B		1.10	61.10		Grey, slightly clayey gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse, sub-angular to sub-rounded.
				1.60	60.60		Waste material. End of Pit at 1.600m

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Stability: Good
Plant: 14T Track machine
Backfill: Arisings.
Groundwater: None encountered.

Remarks: Trial pit terminated at 1.60m bgl at the require depth.



Number: BM-TP01	Project Longford Landfills - Ballymulvey Project No P18159 Engineer Fehily Timoney	
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Number:	BM-TP01	Project	Longford Landfills - Ballymulvey
		Project No	P18159
		Engineer	Fehily Timoney



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Trial Pit No
BM-SA01
 Sheet 1 of 1

Project Name: Longford Landfills - Ballymulvey

Project No.
 P18159

Co-ords: 617137E - 758019N
Level: 62.16m OD

Date
 02/08/2018

Location: Co. Longford

Dimensions (m):
 Depth: 0.85m BGL
 1.10
 1.40

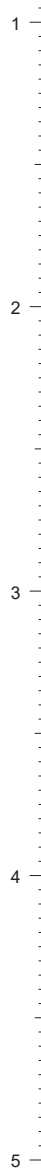
Scale
 1:25

Logged
 PH

Client:

Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.30 - 0.80	B		0.23	61.93		(TOPSOIL) brown, sandy SILT. sand is fine to coarse.
				0.85	61.31		(MADE GROUND) Dark grey, fly ash.
							End of Pit at 0.850m

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Stability: Good.
Plant: 14t tracked excavator.
Backfill: Arisings.

Groundwater: None encountered.

Remarks: Trial pit terminated at 0.85m bgl, at the required depth. Soakaway test carried out in pit.

P18159

Longford Landfills - Ballymulvey

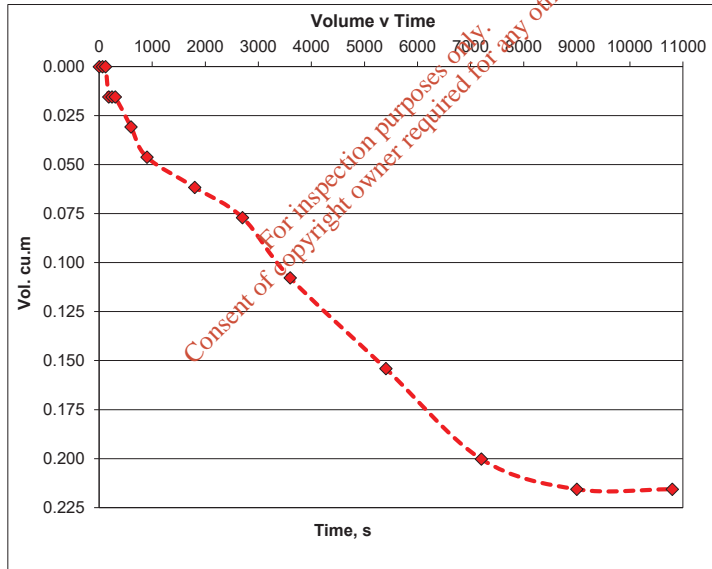
BM - SA01

02/08/2018

l, m 1.40 b, m 1.10 d, m 0.85
 l_base, m 1.40 d_eff, m 0.65
 l_eff, m 1.40 GW, m

Time, min	Measure, m bgl	Time, sec	Depth water, m	Fall, m	Volume
0	0.20	0	0.65	0.00	0.000
1	0.20	60	0.65	0.00	0.000
2	0.20	120	0.65	0.00	0.000
3	0.21	180	0.64	0.01	0.015
4	0.21	240	0.64	0.01	0.015
5	0.21	300	0.64	0.01	0.015
10	0.22	600	0.63	0.02	0.031
15	0.23	900	0.62	0.03	0.046
30	0.24	1800	0.61	0.04	0.062
45	0.25	2700	0.60	0.05	0.077
60	0.27	3600	0.58	0.07	0.108
90	0.30	5400	0.55	0.10	0.154
120	0.33	7200	0.52	0.13	0.200
150	0.34	9000	0.51	0.14	0.216
180	0.34	10800	0.51	0.14	0.216

Area 1.54 m² V_{p75-25 theory} volume 0.65 m³
 50% Area_eff, a_{p50} 3.67 m² V_{p 75 - 25 actual} volume 0.1078 m³
 50% Area_act, a_{p50} 1.89 m² t_{p 75-25 actual} time 4374.00 s
 Infiltration Coefficient, f 1.304E-05 ms⁻¹



NOTES:

See BM - SA01 for detailed overburden description. No groundwater encountered. Pit assumed unsaturated.



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Trial Pit No
BM-SA02
 Sheet 1 of 1

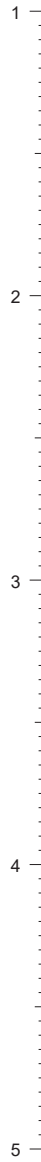
Project Name: Longford Landfills - Ballymulvey
Project No.: P18159
Co-ords: 617102E - 757986N
Level: 60.70m OD
Date: 02/08/2018

Location: Co. Longford
Dimensions (m): 1.00 x 1.80
Scale: 1:25

Client:
Depth: 0.45m BGL
Logged: PH

Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.20 - 0.45	B		0.16	60.54		(TOPSOIL) Brown, sandy SILT. Sand fine to coarse.
				0.45	60.25		(MADE GROUND) Dark grey, compacted FLY ASH.
							End of Pit at 0.450m

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Stability: Good.
Plant: 14t tracked excavator.
Backfill: Arisings.
Groundwater: None encountered.

Remarks: Trial pit terminated at .45m bgl, at the required depth. Soakaway test carried out in pit.

P18159

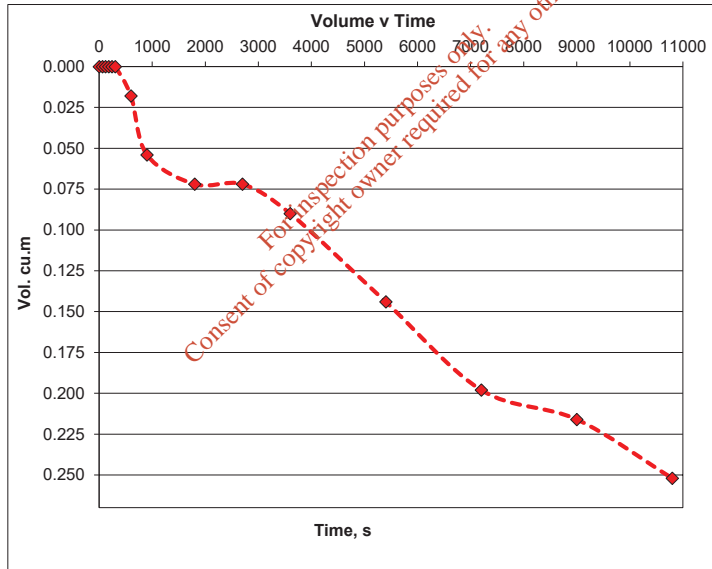
Longford Landfills - Ballymulvey

BM - SA02
02/08/2018

l, m 1.80 b, m 1.00 d, m 0.45
l_base, m 1.80 d_eff, m 0.36
l_eff, m 1.80 GW, m

Time, min	Measure, m bgl	Time, sec	Depth water, m	Fall, m	Volume
0	0.09	0	0.36	0.00	0.000
1	0.09	60	0.36	0.00	0.000
2	0.09	120	0.36	0.00	0.000
3	0.09	180	0.36	0.00	0.000
4	0.09	240	0.36	0.00	0.000
5	0.09	300	0.36	0.00	0.000
10	0.10	600	0.35	0.01	0.018
15	0.12	900	0.33	0.03	0.054
30	0.13	1800	0.32	0.04	0.072
45	0.13	2700	0.32	0.04	0.072
60	0.14	3600	0.31	0.05	0.090
90	0.17	5400	0.28	0.08	0.144
120	0.20	7200	0.25	0.11	0.198
150	0.21	9000	0.24	0.12	0.216
180	0.23	10800	0.22	0.14	0.252

Area 1.80 m² V_{p75-25 theory} volume 0.41 m³
 50% Area_eff, a_{p50} 3.06 m² V_{p 75 - 25 actual} volume 0.126 m³
 50% Area_act, a_{p50} 2.19 m² t_{p 75-25 actual} time 5576.00 s
 Infiltration Coefficient, f 1.031E-05 ms⁻¹



NOTES:

See BM - SA02 for detailed overburden description. No groundwater encountered. Pit assumed unsaturated.



Number: BM-SA02	Project Longford Landfills - Ballymulvey Project No P18159 Engineer Fehily Timoney	
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Number: BM-SA02	Project Longford Landfills - Ballymulvey Project No P18159 Engineer Fehily Timoney	
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Trial Pit No
BM-SA03
 Sheet 1 of 1

Project Name: Longford Landfills - Ballymulvey

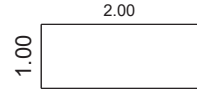
Project No.:
 P18159

Co-ords: 617048E - 758036N
Level: 60.81m OD

Date:
 02/08/2018

Location: Co. Longford

Dimensions (m):



Scale:
 1:25

Client:

Depth:
 1.00m BGL

Logged PH

Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
Water Strike & Backfill				0.22	60.59		(TOPSOIL) Brown, sandy SILT. Sand is fine to coarse.
	0.50 - 1.00	B					(MADE GROUND) Dark grey FLY ASH.
				1.00	59.81		(MADE GROUND) Dark grey, FLY ASH with major cobble content. Cobbles sub-angular to sub-rounded, 63mm o 200mm. End of Pit at 1.000m

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Stability: Good
Plant: 14t tracked excavator.
Backfill: Arisings.

Groundwater: None encountered.

Remarks: Trial pit terminated at 1.00m bgl at the required depth. Soakaway test carried out in pit.

P18159

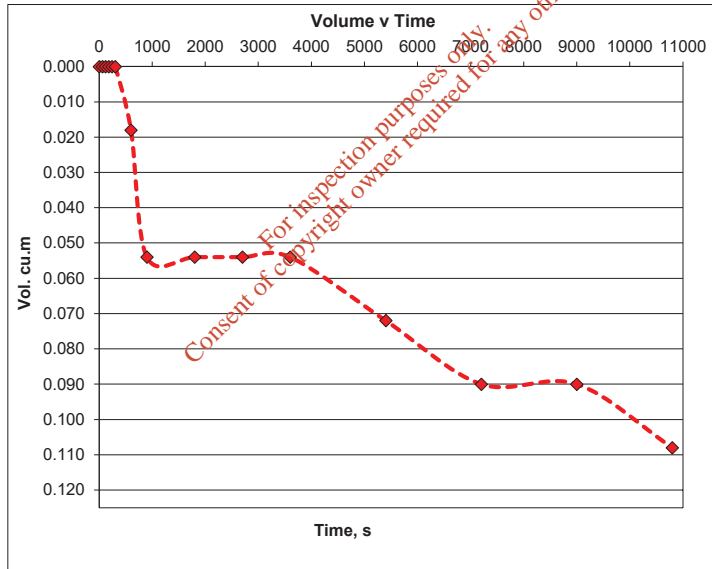
Longford Landfills - Ballymulvey

BM - SA03
02/08/2018

l, m 1.80 b, m 1.00 d, m 0.45
l_base, m 1.80 d_eff, m 0.25
l_eff, m 1.80 GW, m

Time, min	Measure, m bgl	Time, sec	Depth water, m	Fall, m	Volume
0	0.20	0	0.25	0.00	0.000
1	0.20	60	0.25	0.00	0.000
2	0.20	120	0.25	0.00	0.000
3	0.20	180	0.25	0.00	0.000
4	0.20	240	0.25	0.00	0.000
5	0.20	300	0.25	0.00	0.000
10	0.21	600	0.24	0.01	0.018
15	0.23	900	0.22	0.03	0.054
30	0.23	1800	0.22	0.03	0.054
45	0.23	2700	0.22	0.03	0.054
60	0.23	3600	0.22	0.03	0.054
90	0.24	5400	0.21	0.04	0.072
120	0.25	7200	0.20	0.05	0.090
150	0.25	9000	0.20	0.05	0.090
180	0.26	10800	0.19	0.06	0.108

Area 1.80 m² V_{p75-25 theory} volume 0.41 m³
 50% Area_eff, a_{p50} 3.06 m² V_{p 75 - 25 actual} volume 0.054 m³
 50% Area_act, a_{p50} 1.97 m² t_{p 75-25 actual} time 5625.00 s
 Infiltration Coefficient, f 4.878E-06 ms⁻¹



NOTES:

See BM - SA03 for detailed overburden description. No groundwater encountered. Pit assumed unsaturated.



Number: BM-SA03	Project Longford Landfills - Ballymulvey Project No P18159 Engineer Fehily Timoney	
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Number: BM-SA03	Project Longford Landfills - Ballymulvey Project No P18159 Engineer Fehily Timoney	
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Trial Pit No
BM-SA04
 Sheet 1 of 1

Project Name: Longford Landfills - Ballymulvey

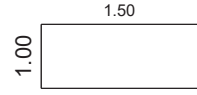
Project No.
 P18159

Co-ords: 617084E - 758078N
Level: 60.79m OD

Date
 02/08/2018

Location: Co. Longford

Dimensions (m):



Scale
 1:25

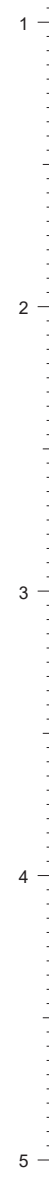
Client:

Depth:
 0.45m BGL

Logged
 PH

Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.20 - 0.45	B		0.10	60.69		(TOPSOIL)
				0.45	60.34		(MADE GROUND) Dark grey black, FLY ASH.
							End of Pit at 0.450m

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Stability: Good.
Plant: 14t tracked excavator.
Backfill: Arisings.

Groundwater: None encountered.

Remarks: Trial pit terminated at 0.45m bgl at the required depth.

P18159

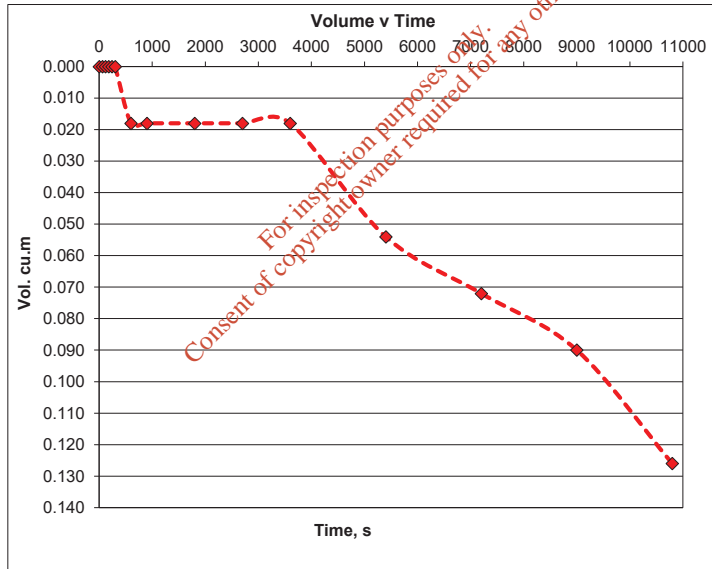
Longford Landfills - Ballymulvey

BM - SA04
02/08/2018

l, m 1.80 b, m 1.00 d, m 0.45
l_base, m 1.80 d_eff, m 0.27
l_eff, m 1.80 GW, m

Time, min	Measure, m bgl	Time, sec	Depth water, m	Fall, m	Volume
0	0.18	0	0.27	0.00	0.000
1	0.18	60	0.27	0.00	0.000
2	0.18	120	0.27	0.00	0.000
3	0.18	180	0.27	0.00	0.000
4	0.18	240	0.27	0.00	0.000
5	0.18	300	0.27	0.00	0.000
10	0.19	600	0.26	0.01	0.018
15	0.19	900	0.26	0.01	0.018
30	0.19	1800	0.26	0.01	0.018
45	0.19	2700	0.26	0.01	0.018
60	0.19	3600	0.26	0.01	0.018
90	0.21	5400	0.24	0.03	0.054
120	0.22	7200	0.23	0.04	0.072
150	0.23	9000	0.22	0.05	0.090
180	0.25	10800	0.20	0.07	0.126

Area 1.80 m² V_{p75-25 theory} volume 0.41 m³
 50% Area_eff, a_{p50} 3.06 m² V_{p 75 - 25 actual} volume 0.063 m³
 50% Area_act, a_{p50} 2.00 m² t_{p 75-25 actual} time 7932.00 s
 Infiltration Coefficient, f 3.979E-06 ms⁻¹



NOTES:

See BM - SA04 for detailed overburden description. No groundwater encountered. Pit assumed unsaturated.

APPENDIX B: DRAWINGS

Drawing Number	Description	Scale
N/A	Intrusive works Location Map	1:1800

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Project Id: P18159	Title: Site Plan	
Project Title: Longford Landfills - Ballymulvey	Scale: 1:1800	
Location: Co. Longford	Engineer: Fehily Timoney	
Client:	Contractor: PGL	

- Legend Key
- Locations By Type - Empty
 - ⊕ Locations By Type - RC
 - Locations By Type - RO
 - ⊞ Locations By Type - TP

