	рнот	OGRAPHIC LOG	Consultants in Engineering and Environmental Sciences www.fehilytimoney.ie
Client Name Monaghan C		Site Location: Killycard	Project Number: P1655
Photo No. 9	Date: 12/06/18	STATISTICS ATTAC	
Description: Northern sec site, looking westwards	ction of		
Photo No. 10 Description: Waste materia from northern adjacent to su ditch	al protruding boundary		<image/>

	РНОТ	OGRAPHIC LOG	Consultants in Engineering and Environmental Sciences www.fehilytimoney.ie FEHILY TIMONEY & COMPANY
Client Name Monaghan C	: o. Council	Site Location: Killycard	Project Number: P1655
Photo No. 11	Date: 12/06/18		
Description: Exposed was material at v boundary of Corrinshigo	ste western		
Photo No. 12 Description: Exposed was material at w boundary of Corrinshigo	ste western	-	

	рнот	OGRAPHIC LOG	Consultants in Engineering and Environmental Sciences www.fehilytimoney.ie
Client Name: Monaghan Co	o. Council	Site Location: Killycard	Project Number: P1655
Photo No. 13	Date: 12/06/18		
Description:			
Waste mater protruding fr surface			
Photo No.	Date:	et and the second secon	
14	12/06/18		A REAL PROPERTY OF
Description: Waste mater protruding fr surface	ial om soil		

Appendix II

Causeway Geotechnical Reports Consent for inspection purposes only any other use.











Monaghan Landfills Killycard – Ground Investigation

Client:

Monaghan County Council

Client's Representative: Fehily Timoney

Report No.:

Date:

Status:

October 2018

18-0838A

Final for Issue

Causeway Geotech Ltd

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stered in Northern Ireland. Company Number: NI610766 Approved: ISO 9001 • ISO 14001 • OHSAS 18001





CONTENTS

Document Control Sheet

Note on: Methods of describing soils and rocks & abbreviations used on exploratory hole logs

1	AUTH	IORITY	4
2	SCOP	Е	4
3	DESC	RIPTION OF SITE	4
4	SITE	OPERATIONS	5
	4.1	Summary of site works	5
	4.2	Boreholes	5
	4.3	Standpipe installations	5
	4.4	Trial Pits	6
	4.5	Variable head permeability testing	6
	4.6	Surveying	6
	4.7	Ground water and ground gas monitoring	6
5	LABO	ATORY WORK	7
0	5.1	Geotechnical laboratory testing of soils	7
	5.2	Environmental laboratory testing of soils	7
6	CDOU	IND CONDITIONS	7
0	6 1	Ceneral geology of the area	······ / 7
	6.2	Cround times an soundaring investigation of the site	/
	6.2		8
	6.3	Groundwater	8
7	REFE	Ground types encountered during investigation of the site Groundwater	9
		Consent	

APPENDICES

Appendix A	Site and exploratory hole location plans
Appendix B	Borehole logs
Appendix C	Trial pit logs
Appendix D	Trial pit photographs
Appendix E	Variable head permeability test results
Appendix F	Geotechnical laboratory test results
Appendix G	Environmental laboratory test results





Document Control Sheet

Report No.:		18-0838A					
Project Title:		Monaghan Landfills - Killycard					
Client:		Monaghan County Council					
Client's Repres	entative:	Fehily Timoney					
Revision: A00		Status:	Final for Issue	Issue Date:	16 October 2018		
Prepared by:		Reviewed by:		Approved by:			
hia	Ross.	Ma	tooses only any other use.	2. Jan Ollog.			
Sean Ross BSc MSc		Matthew Gilbert MEarthSci FGS	The strict of at	Darren O'Mahony BSc MSc MIEI			

The works were conducted in accordance with the more British Standard

British Standards Institute (2015) BS 5930:2015, Code of practice for site investigations.

BS EN 1997-2: 2007: Eurocode CGeotechnical design - Part 2 Ground investigation and testing.

Geotechnical Society of Ireland (2016), Specification & Related Documents for Ground Investigation in Ireland

Laboratory testing was conducted in accordance with:

British Standards Institute BS 1377:1990 parts 2, 4, 5, 7 and 9



METHODS OF DESCRIBING SOILS AND ROCKS

Soil and rock descriptions are based on the guidance in BS5930:2015, The Code of Practice for Site Investigation.

Abbreviations used	on exploratory hole logs
U	Nominal 100mm diameter undisturbed open tube sample (thick walled sampler)
UT	Nominal 100mm diameter undisturbed open tube sample (thin walled sampler)
Р	Nominal 100mm diameter undisturbed piston sample
В	Bulk disturbed sample
LB	Large bulk disturbed sample
D	Small disturbed sample
С	Core sub-sample (displayed in the Field Records column on the logs)
L	Liner sample from dynamic sampled borehole
W	Water sample
ES / EW	Soil sample for environmental testing / Water sample for environmental testing
SPT (s)	Standard penetration test using a split spoon sampler (small disturbed sample obtained)
SPT (c)	Standard penetration test using 60 degree solid cone
x,x/x,x,x,x	Blows per increment during the standard penetration test. The initial two values relate to the seating drive (150mm) and the remaining four to the 75mm increments of the test length. The length achieved is stated (mm) for any test increment less than 75mm
N=X	SPT blow count 'N' given by the summation of the blows 'X' required to drive the full test length (300mm)
N=X/Z	Incomplete standard penetration test where the full test length was not achieved. The blows 'X' represent the total blows for the given test length 'Z' (mm)
V VR	Shear vane test (borehole) Hand vane test (trial pit) Shear strength stated in kPa V: undisturbed vane shear strength VR: remoulded vane shear strength
dd/mm/yy: 1.0 dd/mm/yy: dry	Date & water level at the borehole depth at the end of shift and the start of the following shift
Abbreviations relating	g to rock core – reference Clause 36.4.4 of BS 5930: 2015
TCR (%)	Total Core Recovery: Ratio of rock/soil core recovered (both solid and non-intact) to the total length of core run.
SCR (%)	Solid Core Recovery: Ratio of solid core to the total length of core run. Solid core has a full diameter, uninterrupted by natural discontinuities, but not necessarily a full circumference and is measured along the core axis between natural fractures.
RQD (%)	Rock Quality Designation: Ratio of total length of solid core pieces greater than 100mm to the total length of core run.
FI	Fracture Index: Number of natural discontinuities per metre over an indicated length of core of similar intensity of fracturing.
NI	Non Intact: Used where the rock material was recovered fragmented, for example as fine to coarse gravel size particles.
AZCL	Assessed zone of core loss: The estimated depth range where core was not recovered.
DIF	Drilling induced fracture: A fracture of non-geological origin brought about by the rock coring.





Monaghan Landfills - Killycard

1 AUTHORITY

On the instructions of Fehily Timoney Consulting Engineers, ("the Client's Representative"), acting on the behalf of Monaghan County Council ("the Client"), a ground investigation was undertaken at the above location to provide geotechnical and environmental information to aid in the remediation of an old landfill site.

This report details the work carried out both on site and in the geotechnical and chemical testing laboratories; it contains a description of the site and the works undertaken, the exploratory hole logs and the laboratory test results.

All information given in this report is based upon the ground conditions encountered during the site investigation works, and on the results of the laboratory and field tests performed. However, there may be conditions at the site that have not been taken into account, such as unpredictable soil strata, contaminant concentrations, and water conditions between or below exploratory holes. It should be noted that groundwater levels usually vary due to seasonal and/or other effects and may at times differ to those recorded during the investigation. No responsibility can be aken for conditions not encountered through the scope of work commissioned, for example between exploratory hole points, or beneath the termination depths achieved.

This report was prepared by Causeway Georgen Ltd for the use of the Client and the Client's Representative in response to a particular set of instructions. Any other parties using the information contained in this report do so at their own risk and any duty of care to those parties is excluded.

2 SCOPE

The extent of the investigation, as instructed by the Client's Representative, included boreholes, trial pits, soil sampling, in-situ and laboratory testing, and the preparation of a factual report on the findings.

3 DESCRIPTION OF SITE

As shown on the site location plan in Appendix A, the works were conducted on the site of an old landfill north west of Castleblaney, just off the R183. The site is bordered to the east by industrial units, to the west by Malone's Lake and to the north by agricultural lands.

The site slopes gently downwards in the direction of Malone's Lake within the area of the old landfill.





4 SITE OPERATIONS

4.1 Summary of site works

Site operations, which were conducted between 20th September and 1st October 2018, comprised:

- three boreholes by rotary drilling methods;
- standpipe installation in all three boreholes;
- thirteen machine dug trial pits; and
- variable head permeability tests in all boreholes.

The exploratory holes and in-situ tests were located as instructed by the Client's Representative, as shown on the exploratory hole location plan in Appendix A.

4.2 Boreholes

Three boreholes (GW01 – GW03) were put to their completion by rotary drilling techniques only. The boreholes were completed using a Hanjin-8D tracked so tary rig.

Symmetrix-cased full hole rotary percussive drilling techniques were employed to advance the boreholes through overburden and bedrock to scheduled depths of 10m.

Any water strikes encountered during boring were recorded along with any changes in their levels as the borehole proceeded.

Where water was added to assist with boring, a note has been added to the log to account for same.

Appendix B presents the borehole logs.

4.3 Standpipe installations

A groundwater monitoring standpipe was installed in boreholes GW01 – GW03.

Details of the installations, including the depth range of the response zone, are provided in Appendix B on the individual borehole logs.





Trial Pits 44

Thirteen trial pits (TP01–TP13) were excavated using a 13t tracked excavator fitted with a 600mm wide bucket, to depths of 4.2 – 4.5m.

Environmental samples were taken at depths of 0.5m in TP04 and TP08.

Disturbed (bulk bag) samples were taken within the capping material of the landfill.

Any water strikes encountered during excavation were recorded along with any changes in their levels as the excavation proceeded. The stability of the trial pit walls was noted on completion.

Appendix C presents the trial pit logs with photographs of the pits and arising provided in Appendix D.

4.5 Variable head permeability testing

In-situ permeability tests were carried out in all boreholes by variable head permeability methods, following development of the wells. Testing was carried out in accordance with the guidance as set out in BS EN ISO 22282-2: 2012

The permeabilities were calculated using Hvorsley's formula k=A/FT as defined in BS 5930:1999 (pg 52). Juited

The results are presented in Appendix E.

4.6 Surveying

The results are presented in Appendix E. **Surveying**The as-built exploratory hole positions were surveyed following completion of site operations by a Site Engineer from Causeway Geotech Surveying was carried out using a Trimble R6 GPS system employing VRS and real time kinetic (RTK) techniques.

The plan coordinates (Irish National Grid) and ground elevation (mOD Malin) at each location are recorded on the individual exploratory hole logs. The exploratory hole plan presented in Appendix A shows these asbuilt positions.

4.7 Ground water and ground gas monitoring

Following completion of site works, ground water was conducted on one round. Ground water monitoring was carried out using a water interface probe.

The monitoring records are presented in Table 1 below.





Table 1 Results of groundwater monitoring undertaken on site

Date - 09/10/2018	Water Level (mbgl)
GW01	1.52
GW02	2.22
GW03	1.71

5 LABORATORY WORK

Upon their receipt in the laboratory, all disturbed samples were carefully examined and accurately described, and their descriptions incorporated into the borehole logs.

5.1 Geotechnical laboratory testing of soils

Laboratory testing of soils comprised:

• **soil classification:** moisture content measurement, Atterberg Limit tests and particle size distribution analysis.

Laboratory testing of soils samples was carried out in accordance with British Standards Institute: BS 1377, Methods of test for soils for civil engineering purposes; Part 1 (2016), and Parts 2-9 (1990).

The test results are presented in Appendix

5.2 Environmental laboratory testing of soils

Environmental testing, in the form of WAC testing was conducted on two environmental soil samples by Chemtest at its laboratory in Newmarket, Suffolk.

Results of environmental laboratory testing are presented in Appendix G.

6 GROUND CONDITIONS

6.1 General geology of the area

Published geological mapping indicate the superficial deposits underlying the site comprise peat and glacial till. These deposits are underlain by sandstone and microconglomerate of the Oghill Formation.





6.2 Ground types encountered during investigation of the site

A summary of the ground types encountered in the exploratory holes is listed below, in approximate stratigraphic order:

- **Topsoil:** encountered in all trial pits with thicknesses ranging between 50 100mm. Driller's logs record 500mm of topsoil, however as this was drilled via rotary percussion methods, depths are by visual observations of drilling returns.
- **Made Ground (sub-base):** 500mm of stone fill encountered in GWO1 within the hardstanding area of the site, however as this was drilled via rotary percussion methods, depths are by visual observations of drilling returns.
- **Made Ground (fill):** reworked clay/silt fill with localised pockets of glass, plastic, wood, red brick and steel encountered down to a depth of 4.4m in TP08.
- **Made Ground (general waste):** black general waste encountered to a depth of 3.4m in TP11.
- **Recent deposits (peat):** spongy brown fibrous peat encountered in all trial pits except TP11, to a maximum depth of 4.5m in TP08.
- **Glacial Till:** silty clay, soft to firm encountered underlying the peat stratum in all trial pits to the maximum extent of the trial pit.
- **Bedrock (Limestone):** Rockhead was encountered at depths ranging from 5.5m in GW03 to about 6m in boreholes GW01 and GW02 of the second sec

6.3 Groundwater

Groundwater was encountered during percussion boring through soil and trial pit excavations as water strikes as shown in Table 2 below.

GI Ref	Water Level (mbgl)	Comments
GW01	6.0	Very Strong
GW02	6.5	Very Strong
GW03	5.5	Very Strong
TP01	2.1	Fast flow
TP02	1.8	Flow
TP02	2.7	Fast flow
TP03	2.1	

Table 2 Groundwater strikes encountered during the ground investigation

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TP04	4.1	Seepage
TP06	1.2	Heavy flow
TP07	1.0	Seepage
TP10	1.6	Seepage
TP11	3.0	Fast flow
TP12	2.8	Seepage
TP13	2.1	Fast flow

Details of the individual groundwater strikes, along with any relative changes in levels as works proceeded, are presented on the exploratory hole logs for each location.

It should be noted that the casing used in supporting the borehole walls during drilling may have sealed out any additional groundwater strikes encountered.

It should be noted that any additional groundwater strikes within bedrock may have been masked by the fluid used as the drilling flush medium

Seasonal variation in groundwater levels should also be factored into design considerations. Continued monitoring of the three installed standpipes will give an indication of the seasonal variation in groundwater level.

7 REFERENCES

Person person of the difference of the differenc Geotechnical Society of Ireland (2016), specification & Related Documents for Ground Investigation in Ireland

IS EN 1997-2: 2007: Eurocode 7, Seotechnical design - Part 2 Ground investigation and testing.

BS 1377: 1990: Methods of test for soils for civil engineering purposes. British Standards Institution.

BS 5930: 2015: Code of practice for ground investigations. British Standards Institution.

BS EN ISO 14688-1:2018: Geotechnical investigation and testing. Identification and classification of soil. Part 1 Identification and description. British Standards Institution.

BS EN ISO 14688-2:2004+A1:2013: Geotechnical investigation and testing. Identification and classification of soil. Part 2 Principles for a classification.

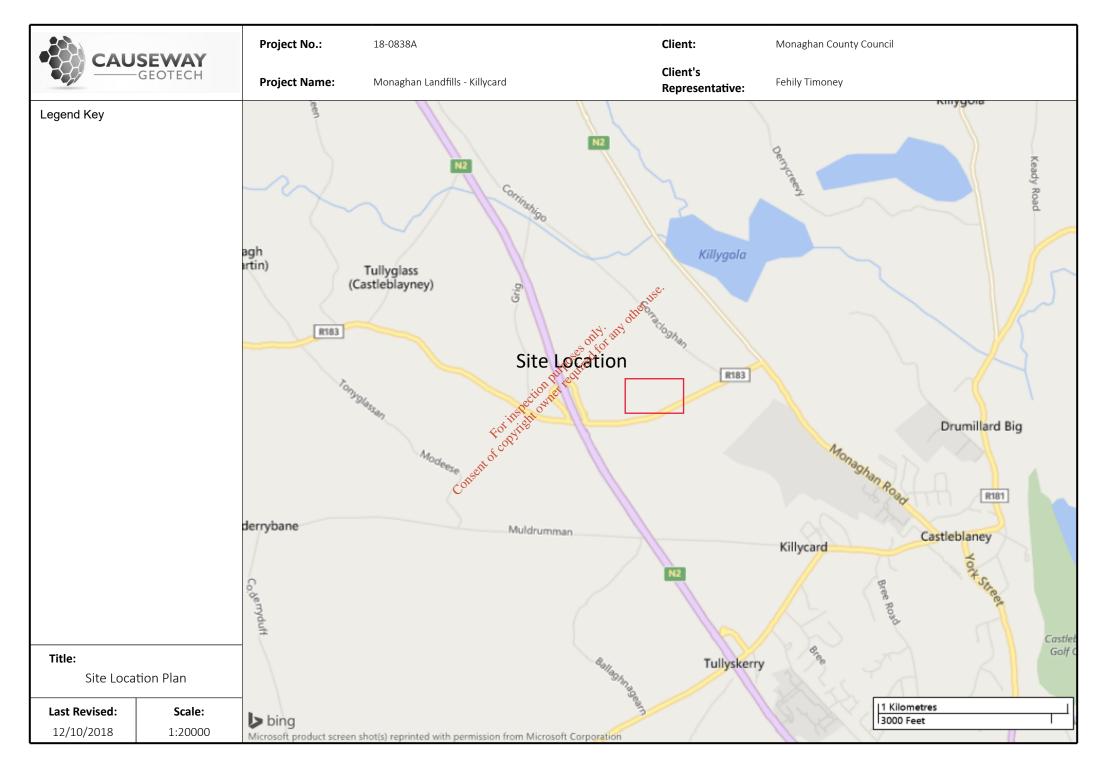
BS EN ISO 22476-3:2005+A1:2011: Geotechnical investigation and testing. Field testing. Standard penetration test.

BS EN ISO 22282-2: 2012: Geotechnical investigation and testing. Geohydraulic testing – Part 2: Water permeability tests in a borehole using open systems.



APPENDIX A SITE AND EXPLORATORY HOLE LOCATION PLANS









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APPENDIX B BOREHOLE LOGS

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APPENDIX C TRIAL PIT LOGS

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						Port of the and other use.		
				-		offe		
				-		only any		2.0 -
		Fast flow at 2.10m				A CONTRACTOR OF	T	
			91.71	2.20	k sile si	Sponsy brown fibrous PEAT.	-	
				-	alle alle Alle alle			
				F F				
				ant is	site site			2.5
				t of	alle alle 16 alle al			
				(1.20)	alle alle a alle al			
			~	ett	silie silie is silie si			
			Cor	-	, 316, 316, 316, 316, 31			3.0 -
				-	2 302 30 316 316 2 316 31			
					2 302 30 316 316 2 316 31			
			90.51	3.40	sile sile			
				-	×	Soft bluish grey silty CLAY.		3.5
				-	×			
				-	×_×_			
				-	×_×_			
				- (1.10)	<u></u>			
				-	×_×_			4.0
				-	× ×			
				-				
				-	×			
			89.41	4.50	<u> </u>	End of trial pit at 4.50m	-	4.5
				-				
				-				
				-				
				-				
marks	1			I	I	Water Strikes: St	ability:	
							nstable	
						2.10 Fast flow at 2.10m		
							Vidth:	1.00
	cheduled depth						ength:	2.80

			Project			Name:			Tri	al Pit	
K K	CAUS	EWAY	18-083			han Landfills - Killycard				TPC	12
S-C-	G	EWAY EOTECH	Co-ord	inates:	Client:					heet :	1 of 1
			28093	5.21 E		han County Council					
Method:			32045	0.28 N		Representative:			Sci	ale:	1:25
rial Pitting						Timoney					1.20
Plant:				Level:	Date:	2010			Lo	gger:	GH
L3T Tracked E Depth			93.85 Level	5 mOD Depth (m)	20/09/						
(m)	Sample / Tests	Field Records	(mOD)	(Thickness)	Legend		Description		Water		
			93.75	- (0.10) - 0.10		TOPSOIL MADE GROUND: Brown slightly	candy gravelly SIIT	with form papers			
						plastic and glass bottles. Sand is					
				-		coarse.					
				(0.60)							
.50	B1			-							0.5
			02.15	0.70		· ·					
			93.15	- 0.70		MADE GROUND: Black waste- 5 wood, foam, plastic, pipes, kitch					
				L -		woou, ioam, plastic, pipes, kitcr	ien kinne, metal Sti	aps, snoes, weilles.			
				-							1.0 -
				-							
				-							
				-							
				-							1.5
				(1.90)		ouposes only, any other use.					
		Flow at 1.80m		-		Lef 15				:	
				-		offle					
				-		only, any					2.0 -
				-		ses dior					
				-		UTP UITC					
				-		N 1001					
				-							
			04.25								2.5
		Fast flow at 2.70m	91.25	2,601	silie silie is silie si	Spongy brown fibrous PEAT.			_	:	
				tot cop	ર આર આ હોદ હોદ ૬ હોદ હો						
				ent	sile sile						
			Cor	-	ક કોદ કો કોદ કોદ						3.0 -
				-	اد ماد م ماد ماد						
				-	৯ আর আ আর আর						
				-	اد ماد م ماد ماد						
				- (1.60)	د مانه ما مانه مانه						
				-	6 ste st						3.5
				-	316 316 5 316 31						
				-	316 316 5 316 31						
				-	ઓદ હોદ હ હોદ હો	1					
				-	আৰু আৰু ৯ আৰু আ						4.0 -
					ماد ماد اد ماد م	1					
			89.65	4.20	<u></u>	Soft bluish grey silty CLAY.					
				(0.30)	×						
				-	×_×_						
			89.35	- 4.50		End o	of trial pit at 4.50m				4.5
				-							
				-							
				-							
				-							
emarks		1		1			Water	Strikes:	Stabilit	y:	
							Struck at (m):	Remarks:	Unstabl	e	
							1.80	Flow at 1.80m			
							2.70	Fast flow at 2.70m	Width	:	1.00
	scheduled depth	2							Length		3.30

		EWAY	Projec 18-083		Monag	t Name: han Landfills - Killycard		it No.: P03
H.	G	EWAY EOTECH	Co-ord		Client:		Shee	et 1 of 1
			28095	0.012		han County Council		
Method: Trial Pitting			32046	8.90 N		s Representative:	Scale:	1:25
Plant:			Crown	d Level:		Timoney		
13T Tracked Ex	cavator			5 mOD	Date: 20/09/	2018	Logge	r: GH
Donth	Sample / Tests	Field Records	Level	Depth (m)			Water	
(m)			(mOD)		-cgciid	TOPSOIL	- S	
0.30	B1		94.04 93.74	(0.10) 0.10 (0.30) 0.40		MADE GROUND: Firm brownish grey slightly sandy slightly gravelly SILT with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subrounded. MADE GROUND: Brownish black waste. 30% office waste, shredded paper, old clothes, mattress springs, zinc, wood, shoes, tiles, blankets and		0.5 —
				(1.90)		fertiliser bags.		10 — 11 — 15 —
		Fast flow at 2.10m	91.84	2.30	the other a shear shear shear a shear shear a shear shear a shear shear a shear shear a shear sh	engest of the and other use.	T	2.0
			েজ	[ev	2 300 30 30 30 30 2 30 30 30 30 30			3.0
			90.54	3.60 - (0.60)		Bluish grey silty CLAY.		3.5 — 4.0 —
			89.94	4.20	× <u>×</u>	End of trial pit at 4.20m		
				-				4.5 -
				-		 		
Remarks							bility:	
						Struck at (m): Remarks: Sta	ule	
						2.10 Fast flow at 2.10m	idth:	1.00
erminated on p	ossible bedroc	:k				Le	ngth:	4.10

			Project 18-083		-	t Name: han Landfills - Killycard			Tria	al Pit	
	CAUS	EWAY EOTECH	18-083 Co-ord		Client:					TPC	/4
		GEOTECH				han County Council			S	heet 1	1 of 1
Method:			28096	8.11 E		s Representative:					
Frial Pitting			32044	6.26 N		Timoney			Sca	le:	1:25
Plant:			Ground	d Level:	Date:	,					
13T Tracked E	xcavator			9 mOD	21/09/	2018			Log	ger:	GH
Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend		Description		Water		
()				(0.10) 0.10		TOPSOIL					
			94.19	0.10		MADE GROUND: Firm brown sl fragments of plastic. Sand is fin					
						coarse.			'		
				- (0.50)							
).50).50	B1 ES2			-							0.5
	E32		93.69	- 0.60		MADE GROUND: Black waste- 4	10%plasic, fertilser	bags, 10% glass bott	les,		
				-		shoes, clothes.					
				-							
				-							1.0 -
				-							
				-							
				(1.50)							
				-							1.5
				-		(15 ⁰ .					
				-		other					
				-		any any					2.0 -
			92.19	2.10		Spongy brown fibrous PEAT.					
					silie silie ie silie si	Spongy of Will Ibrous PEAL					
				-	sile sile	et tour					
				-							
				of it	strates ste	4					2.5
				teop	sslie sslie ie sslie ss	4					
				at of col	ssite ssite e ssite ss	4					
			- 5	POL	ssite ssite te ssite ss	4					
			Cos	-	ssite ssite te ssite ss	4					3.0 -
				(2.10)	ssite ssite te ssite ss	4					
				-	ssta ssta a ssta ss	4					
					sste sste e sste ss	4					
				-	ssta ssta a ssta ss	4					3.5
				-	ssta ssta a ssta ss	4					
				[sste sste e sste ss	4					
				-	یاد ماد ماد م						
				-	site site s site si						4.0 -
		Seepage at 4.10m		-	ماند ماند د ماند م				T		
			90.09	4.20	× <u> </u>	Soft bluish grey silty CLAY.					
				(0.30)	×_×_						
			89.79	- 4.50	<u>×_^</u> _	End.	of trial pit at 4.50m				4.5
				-			51 mai pil al 4.30M				
				-							
				-							
				-							
emarks								Chuile -	Stability	<i>r</i> :	
								Strikes:	Stable	-	
							Struck at (m): 4.10	Remarks: Seepage at 4.10m			
							4.10	Seepage at 4.1011	Width:		1.10
	scheduled dept	h							Length:		4.10

			Project		-	: Name:			Tria	Pit N	
\mathcal{H}		WAY	18-083 Co-ord		Monag	han Landfills - Killycard				TP0	5
	————GE	OTECH				han County Council			Sh	eet 1	L of 1
Method:			28097	8.92 E	-	s Representative:					
Trial Pitting			32041	3.57 N		Timoney			Scal	e:	1:25
Plant:			Ground	d Level:	Date:	,					
13T Tracked B	Excavator		93.88	8 mOD	20/09/	2018			Log	ger:	GH
Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend		Description		Water		
0.40	B1		93.83	($\theta_{:}\theta_{0}^{*}$) (0.45) (0.50		TOPSOIL MADE GROUND: Soft brownish plastic, old clothes, red brick, m Gravel is subangular fine to coa	ietal wires, blanket rse.	s. Sand is fine to coar	with se.		0.5 -
				(1.70)		MADE GROUND: Black waste-66 Wood, plastic bottles, metal pip		thes, 5% glass bottles	5.		1.0
			91.68	- 2.20		Pone for the formation of the second					1.5 — - 2.0 —
				Fort	a sila si sha sila a sila a sila sila sila sila sila a sila si sila sila sila sila a sila si	Spongy brown fibrous PEAT.					2.5 -
			Cor	(1.60) 	د مالد م مالد مالد د مالد م مالد مالد مالد مالد د مالد م مالد مالد د مالد م مالد مالد د مالد م مالد مالد مالد مالد						3.0
			90.08	- - 3.80 - - -	x and an and and x and an x x x x x	Firm blue silty CLAY.					4.0 —
			00.00	(0.70)							
			89.38	- 4.50 		End c	of trial pit at 4.50m				4.5 -
Remarks							14/-1	Strikes	Stability:		
	er encountered								Stable Stable		
							Struck at (m):	Remarks:			
									Width:	1	1.00
									Length:		3.10

	CAUS	EWAY	18-083			han Landfills - Killycard	T	P06
\mathcal{H}	G	EWAY EOTECH	Co-ord	inates:	Client:		Shee	et 1 of 1
-//			28099	5.49 E		han County Council		1
Nethod: rial Pitting			32038	0.12 N		s Representative:	Scale:	1:25
						limoney		
Plant: .3T Tracked Ex	xcavator			i Level: 5 mOD	Date: 20/09/	2018	Logge	r: GH
Depth	Sample / Tests	Field Records	Level	Depth (m)	Legend	Description	Water	
(m)				(Thickness) (0.10)		TOPSOIL	3	
0.50	B1		93.85	(0.10) 0.10 (0.70)		MADE GROUND: Firm brown slightly sandy slightly gravelly SILT with fragments of red brick, pipes, plastic, steel pipes, glass bottles. Sand is fine to coarse. Gravel is subangular fine to coarse.		0.5 -
		Significant flow at 1.20m	93.15	- 0.80 		MADE GROUND: Firm greyish black slightly sandy slightly gravelly CLAY with plastic, ropes, glass bottles and metal wires. Sand is fine to coarse. Gravel is subangular fine to coarse.	T	1.0
				(1.60)		W. Wolletuse.		1.5 -
			91.55	2.40	ste ste	Spongy brown fibrous PEAT.	-	2.0 =
			Cor	(1.60)	ان بالد با بنان بالد بن بنان بن بنان بنان بن بنان بنان بن بنان بنان			3.0 - 3.5
			89.95	- - - - - - - - - - - - - - - - - - -	8 316 3 316 316 8 316 31 316 316 8 316 31 8 316 31 X X		-	4.0 —
			89.45	- 4.50 -	× ×	End of trial pit at 4.50m		4.5 -
emarks				- - - -			bility:	
						Struck at (m): Remarks:	table	
						1.20 Significant flow at 1.20m Wi	dth:	0.90

			Project			Name:			Tria	al Pit	
H H	CAUS	EWAY EOTECH	18-083			han Landfills - Killycard				TPC)7
H	0	GEOTECH	Co-ord		Client:	han County Council			SI	neet 1	1 of 1
Method:			28103	2.63 E		s Representative:					
Trial Pitting			32039	2.34 N		Timoney			Sca	le:	1:25
Plant:			Groun	d Level:	Date:						CU
13T Tracked	Excavator	1		4 mOD	20/09/	2018				ger:	GH
Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend		Description		Water		
			94.04	(0.10) 0.10			and a second cut				
				-		MADE GROUND: Firm brown sa and fragments of red brick and					
				(0.50)		subangular fine to coarse.					
0.50	B1			-							0.5
			93.54	0.60		MADE GROUND: Firm greyish b	lack slightly sandy	slightly gravelly CLA	,		
				-		with fragments of plastic, old w Sand is fine to coarse. Gravel is			ns.		
				-							
		Seepage at 1.00m		-					T		1.0 -
				-							
				(1.30)							
				-							
				-							1.5
				-		_چې•					
				-		other use.					
			92.24	1.90	she she	Spongy brown fibrous PEAT.					
				-	n sila si sila sila	Spongy brewin fibrius PEAT.					2.0 -
				-	ده مثاله ما مثلاه مثلاه اه مثاله ما	ALL OSTICO					
				-	SIL SIL	en rece					
					20 3/10 3/10 3/						2.5
				- corif	alle alle al	4					2.5
				, col	silie silie ie silie si silie silie	la di la					
				(1.80)	5 316 316 316 316	4					
			COS	- -	e site si site site	la de la companya de					3.0 -
				-	e site si site site						
				-	is silis si silis silis						
				-	د ماد م ماد ماد د ماد م						
				- -	316 316 31 316 316 31						3.5
			00.11		silie silie is silie si						
			90.44	- 3.70	×	Firm bluish grey silty CLAY.					
				- -	×						
				-							4.0 -
				- (0.80) -	×						
				-	×						
				-	×_×_						
			89.64	- 4.50 -		End c	of trial pit at 4.50m				4.5
				-							
				-							
				-							
emarks							Water	Strikes:	Stability	:	
-							Struck at (m):	Remarks:	Unstable		
							1.00	Seepage at 1.00m			
									Width:		1.80
erminated at	scheduled dept	h							Length:		2.40

			Project 18-083			: Name: han Landfills - Killycard			Tri	al Pit TP(
	GE	: WAY	Co-ord		Client:				+		
	GE	OTECH	28101		Monag	han County Council			5	heet	1 of 1
Method:						Representative:					
Trial Pitting			32042	9.14 N	Fehily 1	Timoney			Sc	ale:	1:25
Plant:				d Level:	Date:						GH
13T Tracked	Excavator		-	2 mOD	21/09/	2018				gger:	бн
Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend		Description		Water		
			94.32	(0.10) 0.10		TOPSOIL					
			-	-		MADE GROUND: Firm brown sli cobble content. Sand is fine to c					
				- - (0.50)		Cobbles are angular.					
				(0.50)							
).50).50	B1 ES2			-							0.5
100	202		93.82	- 0.60		MADE GROUND: Black waste- p	lastic, wires and ro	opes.			
				-							
				- (0.50)							
				-							1.0 -
			93.32	- 1.10		MADE GROUND: Firm grey sligh	م sandy slightly ال	gravelly CLAY with			
				ŀ		medium cobble content. Sand is coarse. Cobbles are angular.			to		
				E		coarse. connies are angular.					
				_							1.5
				-		auposes only, any other use.					-
				-		USC.					
				-		ther					
				-		N. my					
				-		50 For at					2.0 -
				-		100 sited					
				-		Put redu					
				-		let .					
				(3,30) (3,30)							2.5
				FOL							
				- (3,30)							
			Cor	P -							3.0 -
				-							
				-							
				-							
				-							3.5
				-							
				-							
				-							4.0 -
				-							
			90.02	- - 4.40		Construction (1)					
			89.92	4.40 (0.10) 4.50	316 316 1	Spongy brown fibrous PEAT.	of trial pit at 4.50m				4.5
							י נומו אוג at 4.50M				
				-							
				ŀ							
				-							
emarks				-	1			I	Stabilit		
	ter encountered								Stabilit Stabe	у.	
							Struck at (m):	Remarks:			
									Width	:	1.00

			Project			Name:			Tria	al Pit	
	GE	WAY	18-083			han Landfills - Killycard				TPC	13
	————GE	OTECH	Co-ord		Client:	han County Council			s	heet î	1 of 1
Method:			28100	8.90 E		s Representative:					
Trial Pitting			32046	4.47 N		Timoney			Sca	le:	1:25
Plant:			Groun	d Level:	Date:						
13T Tracked Ex	xcavator			2 mOD	20/09/	2018				gger:	GH
Depth (m)	Sample / Tests	Field Records	Level (mOD)		Legend	TOPSOIL	Description		Water		
			94.42	- (0.10) - 0.10 -		MADE GROUND: Firm light brow fragments of plastic. Sand is fin			ith		
				- (0.50)							
0.50	B1		93.92	- - - 0.60							0.5 -
			93.92	- 0.60 - -		MADE GROUND: Brownish blac glass bottles and pipes.	k waste- 60 percer	t plastic, 10% clothe	s,		
				-							
				-							1.0
				-							
				-							
				-							1.5 -
				(2.10)		. 15 ^e .					
				-		other					
				-		5 only any					2.0 —
				-		ouposes only any other use.					
				-		et et					
				j\$							2.5 -
			91.82	2.700P		Spongy brown fibrous PEAT.					
				entor	ઝોર ઝોર ૬ ઝોર ઝો ઝોર ઝોર						
			Cos	- (0.00)	ય કોંધ કોં કોંધ કોંધ ય કોંધ કોં	4					3.0 —
				- (0.80)	ાં ગોંધ ગોંધ આ ગોંધ ગોંધ ગોંધ ગોંધ						
				-	૬ હોદ હો હોદ હોદ ૬ હોદ હો						
			91.02	- 3.50	<u></u>	Soft bluish grey silty CLAY.					3.5 -
				- -	×_^	4					
				-	×						
				(1.00)	<u></u>						4.0 —
				-		4					
				-	× ×						
			90.02	- 4.50	×	End o	of trial pit at 4.50m				4.5 -
				-							
				-							
				-							
lemarks Io groundwate	r encountered							Strikes:	Stability Stable	<i>;</i> :	
							Struck at (m):	Remarks:			
									Width:		1.10
erminated at s	cheduled depth								Length	: :	3.90

			Project			Name:			Trial	Pit No.:
	CAUS	EWAY	18-083			han Landfills - Killycard				TP10
	G	EWAY EOTECH	Co-ordi		Client:				Sh	eet 1 of :
Method:			280992			han County Council s Representative:				
Trial Pitting			320482	2.32 N		Fimoney			Scal	e: 1:2
Plant:			Ground	Level:	Date:	initione y				
13T Tracked E>	kcavator			5 mOD	20/09/	2018			Logg	ger: GH
Depth	Sample / Tests	Field Records	Level	Depth (m)	Legend		Description		Vater	
Depth (m)	Sample / Tests	Field Records	Level (mOD) 94.60 94.05 94.05	Depth (m) (Thickness) (0.65) (0.55) 0.60 (1.30) (1.30)	shte shte shte shte shte shte shte shte shte shte shte shte	TOPSOIL MADE GROUND: Firm brownish with low cobble content and fra Gravel is subangular fine to coa MADE GROUND: Black waste- 3 metal pipes. Spongy brewn fibrious PEAT.	grey slightly sandy agments of plastic. rse. Cobbles are ar 0% plastic, old clot	Sand is fine to coars	e.	0.5 1.0 1.5 2.0
			91.45	(1.30) FOR 3.20 (1.30)		Soft bluish grey silty CLAY.				2.5 3.0 3.5
Remarks			90.15	4.50	x x x x	End c	of trial pit at 4.50m	Strikes:	Stability:	4.5
								Remarks:	Stable	
							Struck at (m): 1.60	Remarks: Seepage at 1.60m		
									Width:	1.00
	cheduled depth								Length:	3.10

			Project		Project			Trial Pit	
	CAUS	EWAY	18-083			nan Landfills - Killycard		"	P11
5-C/	G	EWAY EOTECH	Co-ord		Client:			Sheet	:1 of 1
·			28103	6.50 E		nan County Council			
Method:			32049	8.35 N		Representative:		Scale:	1:25
Trial Pitting						imoney			1.23
Plant: 13.5T Tracked	Excavator			d Level: 7 mOD	Date: 20/09/	2018		Logger:	GH
Depth	Sample / Tests	Field Records	Level	Depth (m)		Description		Water	
(m)	Sample / Tests	Tielu Records	(mOD) 95.02	(Thickness) (၉.၉န္င)	Legend	TOPSOIL		Ň	
0.40	В1		94.57	(0.45) - (0.50		MADE GROUND: Firm brown slightly sandy slightly gr fine to coarse. Gravel is subrounded fine to coarse. MADE GROUND: - Black waste-50% plastic, 10% rubb Washing machines, cups, springs, coal bags, clothes,	per, 15% glass bottles.	-	- - - 0.5 —
						and fertiliser bags.	nets, planks of wood		
				(2.90)		uposes only any other use.			2.0
		Fast flow at 3.00m	دم» 91.67	- - - - - - - - - - - - - - - - - - -		Soft blue silty CLAY.		X	3.0 - - 3.5
				- - - (0.90) - - - -					- - 4.0 —
			90.77	4.30	× 	End of trial pit at 4.30m			- - 4.5 — -
				-					
						T	T		
Remarks						Water St		bility:	
						Struck at (m):	Remarks:	table	
							ast flow at 3.00m		
							Wi	dth:	1.80
unata se di l	to pit walls col	la nain a						ngth:	3.80

					Project Name: Monaghan Landfills - Killycard				Tr	Trial Pit No.: TP12	
CAUSEWAY GEOTECH Method: Trial Pitting Plant: 13T Tracked Excavator			Co-ordinates:		Client: Monaghan County Council					Sheet 1 of 1	
			28104	281045.85 E		Client's Representative:					
			220475 04 N		Fehily Timoney				Sc	ale:	1:25
			Ground	Ground Level:		Date:					
				1 mOD	20/09/2018				Lo	gger:	GH
Depth			Level	Depth (m)					fe		
(m)	Sample / Tests	Field Records	(mOD)	(Thickness)	Legend	TOPSOIL	Description		Water		
0.20	B1		95.16 94.91	($\theta; \theta \xi$) (0.25) 0.30		MADE GROUND: Firm light brow pieces of plastic. Sand is fine to fine to coarse. MADE GROUND: Soft brown slig plastic, glass bottles, planks of v Sand is fine to coarse. Gravel is :	coarse. Gravel is s ghtly sandy slightly wood, red brick, clo	ubangular to subrour gravelly CLAY with othes and fertiliser ba	nded		0.5 -
				(1.30)							1.0
		Seepage at 2.80m	93.61	1.60		MADE GROUND: Firm grey slightly sandy slightly gravelly CLAY with fragments of plastic pipe and wire. Sand is fine to coarse,. Gravel is subangular to subrounded fine to coarse.					2.0 —
				(1.10)		oupose difed t					2.5
			92.51	2.7000	ાત જાલ જોલ આ જોલ જો	Spongy brown fibrous PEAT.				<u>-</u>	
				- (1.00) - (1.00) 	ماند ماند ه ماند ما ماند ماند ه ماند ماند ه ماند ماند ه ماند ماند ه ماند ماند م ماند ماند						3.0 -
			91.51	- - - - - - -	2 3/2 3/ 3/2 3/2 3/2 2 3/2 3/2 3/2 3/2 3/2 3/2 3/2 3/2 3/2 3/2	Soft bluish grey silty CLAY.					4.0 -
				- (0.80) 							
			90.71	- 4.50 		End o	of trial pit at 4.50m				4.5
emarks									Stabili		
emarks							Struck at (m):	Strikes: Remarks:	Stabilit Stable	.y:	
							2.80	Seepage at 2.80m	Width		1.00
erminated at s	cheduled dept	h							Length	n:	4.10

CAUSEWAY GEOTECH		18-0838A Co-ordinates: 281077.69 E 320409.43 N Ground Level: 94.94 mOD		Project Name: Monaghan Landfills - Killycard			Trial Pit No.: TP13			
Method: Trial Pitting Plant:				Client: Monaghan County Council Client's Representative:				Sheet 1 of 1		
				Fehily Timoney			Scale:	1:25		
				Date:			Loggori	CU		
13T Tracked Excavator				21/09/2018			Logger:	GH		
Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description		Water		
0.50 E	B1		94.84 94.34 93.64	(0.10) 0.10 (0.50) 0.60 (0.70) 1.30 (1.10)		TOPSOIL MADE GROUND: Firm brown slightly gravelly sandy CLAY w plastic, milk cartons, glass bottles, coal bags and fertiliser b to coarse. Gravel is subangular fine to coarse. MADE GROUND: Black waste - steel pipes, 30% plastic, 10% MADE GROUND: Soft brownish grey slightly sandy gravelly cobble content. Sand is fine to coarse. Gravel is subangular Cobbles are angular.	ags. Sand is fine			
		Fast flow at 2.10	92.54 Cos	2.40 For the copy (1.40)	الله عليه الله الله الله الله الله الله الله ا	Spongy brown fibrous PEAT.		T	2.0	
			91.14	3.80	الا مالا الا مالا مالا الا مالا الم مالا الا مالا الم مالا مالامالا مالامالا مالامالا مالامالا	Soft bluish grey silty CLAY.			- - 4.0	
			90.44	- - - - - - - - - - - - -	× ×	End of trial pit at 4.50m			- 4.5 — - -	
Remarks						Water Strikes:		ility:		
						Struck at (m): Ren	Unst	able		
							w at 2.10	l+h.	1.40	
							Wic		1.40	
erminated at s	scheduled dept	۱ـــــــ					Len	gth:	4.30	



APPENDIX D TRIAL PIT PHOTOGRAPHS

post only any

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