M1 Business Park – Zones A & F



Environmental Impact Assessment

Report Volume 3: Appendices 7- 8

M1 Vida Ltd

April 2024

Appendix 7: Land, Soils and Geology

Geosyntec consultants

HazWasteOnline™

Waste Classification Report

HazWasteOnline™ classifies waste as either **hazardous** or **non-hazardous** based on its chemical composition, related legislation and the rules and data defined in the current UK or EU technical guidance (Appendix C) (note that HP 9 Infectious is not assessed). It is the responsibility of the classifier named below to:

a) understand the origin of the waste
b) select the correct List of Waste code(s)
c) confirm that the list of determinands, results and sampling plan are fit for purpose
d) select and justify the chosen metal species (Appendix B)
e) correctly apply moisture correction and other available corrections
f) add the meta data for their user-defined substances (Appendix A)
g) check that the classification engine is suitable with respect to the national destination of the waste (Appendix C)

To aid the reviewer, the laboratory results, assumptions and justifications managed by the classifier are highlighted in pale yellow.

AYUK0-0ZEDU-UP8SQ

Job name

Lands at Rowans Big and Rowans Little

Description/Comments

Two samples were taken during site investigations at agricultural land.

No asbestos detected in sample TP02 or TP06

Project

M1 Retail Park Zone A and Zone F

Site

Lands at Rowans Big and Rowans Little

Classified by

Name:
Stephen Coakley
Date:
25 Mar 2024 17:28 GMT
Telephone:

Company:
Geosyntec Consultants Ltd (Ireland)
Unit 10, Northwood Court
Northwood Crescent
Dublin
D09 W8DT

HazWasteOnline™ provides a two day, hazardous waste classification course that covers the use of the software and both basic and advanced waste classification techniques. Certification has to be renewed every 3 years.

HazWasteOnline™ Certification: **CERTIFIED**

Course	Date
Hazardous Waste Classification	09 Dec 2021

Next 3 year Refresher due by Dec 2024

Purpose of classification

7 - Disposal of Waste

Address of the waste

Rowans Big and Rowans Little Rathcoole County Dublin **Post Code** NA

Description of industry/producer giving rise to the waste

Agricultural land

Description of the specific process, sub-process and/or activity that created the waste

Excavations as part of site investigation at the site.

Description of the waste

Natural ground clayey soil.

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	WAC Results		Page
					Inert	Non Haz	
1	TP02		Non Hazardous		Pass	Pass	3
2	TP06		Non Hazardous		Pass	Pass	7

Related documents

#	Name	Description
1	RILTA 2016	waste stream template used to create this Job

WAC results

WAC Settings: samples in this Job constitute a single population.

WAC limits used to evaluate the samples in this Job: "Ireland"
The WAC used in this report are the WAC defined for the inert and non-hazardous classes of landfill in the Republic of Ireland. You should check the actual acceptance criteria when the disposal site is identified as they may differ from the generic WAC used in this report.

Report

Created by: Stephen Coakley

Created date: 25 Mar 2024 17:28 GMT

Classification of sample: TP02

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
TP02
Moisture content:
24.9%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 24.9% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		5 mg/kg	1.197	4.495 mg/kg	0.00045 %	✓	
2	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }	033-005-00-1				12.8 mg/kg	1.895	18.212 mg/kg	0.00182 %	✓	
3	barium { barium oxide }		215-127-9	1304-28-5		92 mg/kg	1.117	77.142 mg/kg	0.00771 %	✓	
4	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		3.8 mg/kg	1.142	3.26 mg/kg	0.000326 %	✓	
5	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		82 mg/kg	1.126	69.334 mg/kg	0.00693 %	✓	
6	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	21 mg/kg		15.771 mg/kg	0.00158 %	✓	
7	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		8.9 mg/kg	1.5	10.027 mg/kg	0.001 %	✓	
8	mercury { inorganic compounds of mercury with the exception of mercuric sulphide and those specified elsewhere in this Annex }	080-002-00-6			1	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<**LOD**
9	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		88 mg/kg	1.245	82.261 mg/kg	0.00823 %	✓	
10	phenol	604-001-00-2	203-632-7	108-95-2		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<**LOD**
11	nickel { nickel(II) oxide (nickel monoxide) }	028-003-00-2	215-215-7 [1] 234-323-5 [2] - [3]	1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]		78.3 mg/kg	1.273	74.833 mg/kg	0.00748 %	✓	
12	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		5 mg/kg	2.554	9.59 mg/kg	0.000959 %	✓	
13	boron { diboron trioxide }	005-008-00-8	215-125-8	1303-86-2	11	0.3 mg/kg	3.22	0.725 mg/kg	0.0000725 %	✓	
14	PAHs (total)					<0.64 mg/kg		<0.64 mg/kg	<0.000064 %		<**LOD**
15	TPH (C6 to C40) petroleum group			TPH		<26 mg/kg		<26 mg/kg	<0.0026 %		<**LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
16		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		603-181-00-X	216-653-1	1634-04-4									
17		benzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-020-00-8	200-753-7	71-43-2									
18		toluene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-021-00-3	203-625-9	108-88-3									
19		ethylbenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
20		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
21		xylene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
22		polychlorobiphenyls; PCB				<0.035	mg/kg		<0.035	mg/kg	<0.0000035 %		<LOD
		602-039-00-4	215-648-1	1336-36-3									
23		chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<0.3	mg/kg	2.27	<0.681	mg/kg	<0.0000681 %		<LOD
		024-017-00-8											
24		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				80.8	mg/kg	1.462	88.688	mg/kg	0.00887 %	✓	
			215-160-9	1308-38-9									
25		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<0.5	mg/kg	1.884	<0.942	mg/kg	<0.0000942 %		<LOD
		006-007-00-5											
26		asbestos				<			<		<		ND
		650-013-00-6	- - - - - - -	12001-28-4 132207-32-0 12172-73-5 77536-66-4 77536-68-6 77536-67-5 12001-29-5									
27		naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
28		acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
			201-469-6	83-32-9									
29		acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-917-1	208-96-8									
30		anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			204-371-1	120-12-7									
31		fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			201-695-5	86-73-7									
32		phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			201-581-5	85-01-8									
33		benzo[b]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		601-034-00-4	205-911-9	205-99-2									
34		benzo[bk]fluoranthene				<0.07	mg/kg		<0.07	mg/kg	<0.000007 %		<LOD
			[1] 205-911-9 [2] 205-916-6	[1] 205-99-2 [2] 207-08-9									
35		benzo[j]fluoranthene				<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
		601-035-00-X	205-910-3	205-82-3									
36		benzo[k]fluoranthene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-036-00-5	205-916-6	207-08-9									

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
37		fluoranthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
			205-912-4	206-44-0									
38		benzo[a]pyrene; benzo[def]chrysene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
		601-032-00-3	200-028-5	50-32-8									
39		indeno[123-cd]pyrene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
			205-893-2	193-39-5									
40		pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
			204-927-3	129-00-0									
41		chrysene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<**LOD**
		601-048-00-0	205-923-4	218-01-9									
42		benzo[a]anthracene				<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<**LOD**
		601-033-00-9	200-280-6	56-55-3									
43		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
44		benzo[e]pyrene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
		601-049-00-6	205-892-7	192-97-2									
45		coronene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
			205-881-7	191-07-1									
46		benzo[ghi]perylene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
			205-883-8	191-24-2									
										Total:	0.0485 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

WAC results for sample: TP02

WAC Settings: samples in this Job constitute a single population.

WAC limits used to evaluate this sample: "Ireland"
The WAC used in this report are the WAC defined for the inert and non-hazardous classes of landfill in the Republic of Ireland. You should check the actual acceptance criteria when the disposal site is identified as they may differ from the generic WAC used in this report.

The sample PASSES the Inert (Inert waste landfill) criteria.

The sample PASSES the Non Haz (Non hazardous waste landfill) criteria.

WAC Determinands

Solid Waste Analysis				Landfill Waste Acceptance Criteria Limits	
#	Determinand		User entered data	Inert waste landfill	Non hazardous waste landfill
1	TOC (total organic carbon)	%	1.46	3	5
2	LOI (loss on ignition)	%	17	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.03	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.035	1	-
5	Mineral oil (C10 to C40)	mg/kg	<30	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<0.064	100	-
7	pH	pH	7.92	-	>6
8	ANC (acid neutralisation capacity)	mol/kg		-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	<0.025	0.5	2
10	barium	mg/kg	<0.03	20	100
11	cadmium	mg/kg	<0.005	0.04	1
12	chromium	mg/kg	<0.015	0.5	10
13	copper	mg/kg	<0.07	2	50
14	mercury	mg/kg	<0.0001	0.01	0.2
15	molybdenum	mg/kg	<0.02	0.5	10
16	nickel	mg/kg	<0.02	0.4	10
17	lead	mg/kg	<0.05	0.5	10
18	antimony	mg/kg	<0.02	0.06	0.7
19	selenium	mg/kg	<0.03	0.1	0.5
20	zinc	mg/kg	<0.03	4	50
21	chloride	mg/kg	<3	800	15,000
22	fluoride	mg/kg	<3	10	150
23	sulphate	mg/kg	25	1,000	20,000
24	phenol index	mg/kg	<0.1	1	-
25	DOC (dissolved organic carbon)	mg/kg	<20	500	800
26	TDS (total dissolved solids)	mg/kg	<350	4,000	60,000

Key

User supplied data

Classification of sample: TP06

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
TP06
Moisture content:
17.1%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 17.1% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		4 mg/kg	1.197	3.97 mg/kg	0.000397 %	✓	
2	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }	033-005-00-1				24.5 mg/kg	1.895	38.479 mg/kg	0.00385 %	✓	
3	barium { barium oxide }		215-127-9	1304-28-5		100 mg/kg	1.117	92.558 mg/kg	0.00926 %	✓	
4	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		1.3 mg/kg	1.142	1.231 mg/kg	0.000123 %	✓	
5	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		51 mg/kg	1.126	47.601 mg/kg	0.00476 %	✓	
6	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	20 mg/kg		16.58 mg/kg	0.00166 %	✓	
7	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		7.9 mg/kg	1.5	9.825 mg/kg	0.000982 %	✓	
8	mercury { inorganic compounds of mercury with the exception of mercuric sulphide and those specified elsewhere in this Annex }	080-002-00-6			1	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		**<LOD**
9	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		74 mg/kg	1.245	76.358 mg/kg	0.00764 %	✓	
10	phenol	604-001-00-2	203-632-7	108-95-2		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		**<LOD**
11	nickel { nickel(II) oxide (nickel monoxide) }	028-003-00-2	215-215-7 [1] 234-323-5 [2] - [3]	1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]		48.7 mg/kg	1.273	51.377 mg/kg	0.00514 %	✓	
12	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		2 mg/kg	2.554	4.234 mg/kg	0.000423 %	✓	
13	boron { diboron trioxide }	005-008-00-8	215-125-8	1303-86-2	11	0.7 mg/kg	3.22	1.868 mg/kg	0.000187 %	✓	
14	PAHs (total)					<0.64 mg/kg		<0.64 mg/kg	<0.000064 %		**<LOD**
15	TPH (C6 to C40) petroleum group			TPH		<26 mg/kg		<26 mg/kg	<0.0026 %		**<LOD**

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
16		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
17		benzene	601-020-00-8	200-753-7	71-43-2		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
18		toluene	601-021-00-3	203-625-9	108-88-3		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
19		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
20		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
21		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
22		polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.035 mg/kg		<0.035 mg/kg	<0.0000035 %		<LOD
23		chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<0.3 mg/kg	2.27	<0.681 mg/kg	<0.0000681 %		<LOD
24		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		70.2 mg/kg	1.462	85.056 mg/kg	0.00851 %	✓	
25		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<0.5 mg/kg	1.884	<0.942 mg/kg	<0.0000942 %		<LOD
26		asbestos	650-013-00-6	- - - - - - -	12001-28-4 132207-32-0 12172-73-5 77536-66-4 77536-68-6 77536-67-5 12001-29-5		<		<	<		ND
27		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
28		acenaphthene		201-469-6	83-32-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
29		acenaphthylene		205-917-1	208-96-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
30		anthracene		204-371-1	120-12-7		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
31		fluorene		201-695-5	86-73-7		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
32		phenanthrene		201-581-5	85-01-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
33		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
34		benzo[bk]fluoranthene		[1] 205-911-9 [2] 205-916-6	[1] 205-99-2 [2] 207-08-9		<0.07 mg/kg		<0.07 mg/kg	<0.000007 %		<LOD
35		benzo[j]fluoranthene	601-035-00-X	205-910-3	205-82-3		<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
36		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
37		fluoranthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
			205-912-4	206-44-0									
38		benzo[a]pyrene; benzo[def]chrysene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
		601-032-00-3	200-028-5	50-32-8									
39		indeno[123-cd]pyrene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
			205-893-2	193-39-5									
40		pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
			204-927-3	129-00-0									
41		chrysene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<**LOD**
		601-048-00-0	205-923-4	218-01-9									
42		benzo[a]anthracene				<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<**LOD**
		601-033-00-9	200-280-6	56-55-3									
43		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
44		benzo[e]pyrene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
		601-049-00-6	205-892-7	192-97-2									
45		coronene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
			205-881-7	191-07-1									
46		benzo[ghi]perylene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
			205-883-8	191-24-2									
										Total:	0.0459 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

WAC results for sample: TP06

WAC Settings: samples in this Job constitute a single population.

WAC limits used to evaluate this sample: "Ireland"
The WAC used in this report are the WAC defined for the inert and non-hazardous classes of landfill in the Republic of Ireland. You should check the actual acceptance criteria when the disposal site is identified as they may differ from the generic WAC used in this report.

The sample PASSES the Inert (Inert waste landfill) criteria.

The sample PASSES the Non Haz (Non hazardous waste landfill) criteria.

WAC Determinands

Solid Waste Analysis				Landfill Waste Acceptance Criteria Limits	
#	Determinand		User entered data	Inert waste landfill	Non hazardous waste landfill
1	TOC (total organic carbon)	%	1.11	3	5
2	LOI (loss on ignition)	%	18.5	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.03	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.035	1	-
5	Mineral oil (C10 to C40)	mg/kg	<30	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<0.064	100	-
7	pH	pH	7	-	>6
8	ANC (acid neutralisation capacity)	mol/kg		-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	<0.025	0.5	2
10	barium	mg/kg	<0.03	20	100
11	cadmium	mg/kg	<0.005	0.04	1
12	chromium	mg/kg	<0.015	0.5	10
13	copper	mg/kg	<0.07	2	50
14	mercury	mg/kg	<0.0001	0.01	0.2
15	molybdenum	mg/kg	0.06	0.5	10
16	nickel	mg/kg	<0.02	0.4	10
17	lead	mg/kg	<0.05	0.5	10
18	antimony	mg/kg	<0.02	0.06	0.7
19	selenium	mg/kg	<0.03	0.1	0.5
20	zinc	mg/kg	<0.03	4	50
21	chloride	mg/kg	<3	800	15,000
22	fluoride	mg/kg	<3	10	150
23	sulphate	mg/kg	9	1,000	20,000
24	phenol index	mg/kg	<0.1	1	-
25	DOC (dissolved organic carbon)	mg/kg	<20	500	800
26	TDS (total dissolved solids)	mg/kg	410	4,000	60,000

Key

User supplied data

Appendix A: Classifier defined and non EU CLP determinands

- **barium oxide** (EC Number: 215-127-9, CAS Number: 1304-28-5)

Description/Comments: Data from ECHA's C&L Inventory Database, Sigma Aldrich SDS dated 6/2/20
Data source: https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/88825
Data source date: 02 Apr 2020
Hazard Statements: Acute Tox. 3; H301 , Skin Corr. 1B; H314 , Eye Dam. 1; H318 , Acute Tox. 1; H332

- **lead compounds with the exception of those specified elsewhere in this Annex (worst case)**

EU CLP index number: 082-001-00-6
Description/Comments: Worst Case: IARC considers lead compounds Group 2A; Probably carcinogenic to humans; Lead REACH Consortium, following CLP protocols, considers lead compounds from smelting industries, flue dust and similar to be Carcinogenic category 1A
Additional Hazard Statement(s): Carc. 1A; H350
Reason for additional Hazards Statement(s):
03 Jun 2015 - Carc. 1A; H350 hazard statement sourced from: IARC Group 2A (Sup 7, 87) 2006; Lead REACH Consortium www.reach-lead.eu/substanceinformation.html (worst case lead compounds). Review date 29/09/2015

- **PAHs (total)**

Description/Comments: Worst case scenario combining risk phrases and substance specific thresholds from benzo[a]pyrene (CLP# 601-032-00-3) and benzo[a]anthracene (CLP# 601-033-00-9)
Data source: 2008/1272/EC – Table 3.2 of Annex VI of regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures and 2009/790/EC Annex IV – Annex IV of regulation 2009/790/EC - 1st Adaptation to Technical Progress for European Regulation 1272/2008
Data source date: 16 Dec 2008
Hazard Statements: Skin Sens. 1; H317 , Carc. 1B; H350 , Carc. 1B; H350 >= 0.01 % , Muta. 1B; H340 , Aquatic Acute 1; H400 (M=100) , Aquatic Chronic 1; H410 (M=100) , Repr. 1B; H360FD

- **TPH (C6 to C40) petroleum group** (CAS Number: TPH)

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: Flam. Liq. 3; H226 , Asp. Tox. 1; H304 , STOT RE 2; H373 , Muta. 1B; H340 , Carc. 1B; H350 , Repr. 2; H361d , Aquatic Chronic 2; H411

- **ethylbenzene** (EC Number: 202-849-4, CAS Number: 100-41-4)

EU CLP index number: 601-023-00-4
Description/Comments:
Additional Hazard Statement(s): Carc. 2; H351
Reason for additional Hazards Statement(s):
03 Jun 2015 - Carc. 2; H351 hazard statement sourced from: IARC Group 2B (77) 2000

- **polychlorobiphenyls; PCB** (EC Number: 215-648-1, CAS Number: 1336-36-3)

EU CLP index number: 602-039-00-4
Description/Comments: Worst Case: IARC considers PCB Group 1; Carcinogenic to humans;

POP specific threshold from ATP1 (Regulation 756/2010/EU) to POPs Regulation (Regulation 850/2004/EC). Where applicable, the calculation method laid down in European standards EN 12766-1 and EN 12766-2 shall be applied.
Additional Hazard Statement(s): Carc. 1A; H350
Reason for additional Hazards Statement(s):
29 Sep 2015 - Carc. 1A; H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

- **chromium(III) oxide (worst case)** (EC Number: 215-160-9, CAS Number: 1308-38-9)

Description/Comments: Data from C&L Inventory Database
Data source: https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/33806
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4; H332 , Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Resp. Sens. 1; H334 , Skin Sens. 1; H317 , Repr. 1B; H360FD , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

- **salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex**

EU CLP index number: 006-007-00-5
Description/Comments: Conversion factor based on a worst case compound: sodium cyanide
Additional Hazard Statement(s): EUH032 >= 0.2 %
Reason for additional Hazards Statement(s):
14 Dec 2015 - EUH032 >= 0.2 % hazard statement sourced from: WM3, Table C12.2

- **acenaphthene** (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Aquatic Chronic 2; H411

- **acenaphthylene** (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4; H302 , Acute Tox. 1; H330 , Acute Tox. 1; H310 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315

- **anthracene** (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

- **fluorene** (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

- **phenanthrene** (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Carc. 2; H351 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Skin Irrit. 2; H315

- **benzo[bk]fluoranthene** (EC Number: [1] 205-911-9 [2] 205-916-6, CAS Number: [1] 205-99-2 [2] 207-08-9)

Description/Comments: Combined data from harmonised entries in CLP for benzo[b] and benzo[k]fluoranthene; C&L Inventory Database
Data source: https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 02 Mar 2017
Hazard Statements: Carc. 1B; H350 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

- **fluoranthene** (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Acute Tox. 4; H302 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

- **indeno[123-cd]pyrene** (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Carc. 2; H351

- **pyrene** (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

- **coronene** (EC Number: 205-881-7, CAS Number: 191-07-1)

Description/Comments: Data from C&L Inventory Database; no entries in Registered Substances or Pesticides Properties databases; SDS: Sigma Aldrich, 1907/2006 compliant, dated 2012 - no entries; IARC – Group 3, not carcinogenic.
Data source: http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=17010&HarmOnly=no?fc=true&lang=en
Data source date: 16 Jun 2014
Hazard Statements: STOT SE 2; H371

- **benzo[ghi]perylene** (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 23 Jul 2015
Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

Appendix B: Rationale for selection of metal species

antimony {antimony trioxide}

Default selection for test. No background information on source of material

arsenic {arsenic acid and its salts with the exception of those specified elsewhere in this Annex}

worst case

barium {barium oxide}

Default selection for test. No background information available.

cadmium {cadmium oxide}

Default selection for test. No background information available.

copper {dicopper oxide; copper (I) oxide}

Default selection for test. No background information available.

lead {lead compounds with the exception of those specified elsewhere in this Annex (worst case)}

Default selection for test. No background information available. Conservative

molybdenum {molybdenum(VI) oxide}

Default selection for test. No background information available.

mercury {inorganic compounds of mercury with the exception of mercuric sulphide and those specified elsewhere in this Annex}

Default selection for test. No background information available. mercury is assumed to be inorganic form.

zinc {zinc oxide}

Default selection for test. No background information available.

nickel {nickel(II) oxide (nickel monoxide)}

Default selection for test. No background information available.

selenium {nickel selenate}

worst case

boron {diboron trioxide}

Default selection for test. No background information available.

chromium in chromium(VI) compounds {chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex}

Worst case

chromium in chromium(III) compounds {chromium(III) oxide (worst case)}

speciated Cr data is available.

cyanides {salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex}

Default selection for test. No background information available.

Appendix C: Version

HazWasteOnline Classification Engine: EU WM3 1st Edition v1.1.NI using the EU LoW
HazWasteOnline Classification Engine Version: 2024.80.5988.11077 (20 Mar 2024)
HazWasteOnline Database: 2024.80.5988.11077 (20 Mar 2024)

This classification utilises the following guidance and legislation:
WM3 v1.1.NI - Waste Classification - 1st Edition v1.1.NI - Jan 2021
CLP Regulation - Regulation 1272/2008/EC of 16 December 2008
1st ATP - Regulation 790/2009/EC of 10 August 2009
2nd ATP - Regulation 286/2011/EC of 10 March 2011
3rd ATP - Regulation 618/2012/EU of 10 July 2012
4th ATP - Regulation 487/2013/EU of 8 May 2013
Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013
5th ATP - Regulation 944/2013/EU of 2 October 2013
6th ATP - Regulation 605/2014/EU of 5 June 2014
WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014
Revised List of Waste 2014 - Decision 2014/955/EU of 18 December 2014
7th ATP - Regulation 2015/1221/EU of 24 July 2015
8th ATP - Regulation (EU) 2016/918 of 19 May 2016
9th ATP - Regulation (EU) 2016/1179 of 19 July 2016
10th ATP - Regulation (EU) 2017/776 of 4 May 2017
HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017
13th ATP - Regulation (EU) 2018/1480 of 4 October 2018
14th ATP - Regulation (EU) 2020/217 of 4 October 2019
15th ATP - Regulation (EU) 2020/1182 of 19 May 2020
The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1567 of 16th December 2020
The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1540 of 16th December 2020
17th ATP - Regulation (EU) 2021/849 of 11 March 2021
18th ATP - Regulation (EU) 2022/692 of 16 February 2022
POPs Amendment 2022 - Regulation (EU) 2022/2400 of 23 November 2022
19th ATP - Regulation (EU) 2023/1434 of 25 April 2023
20th ATP - Regulation (EU) 2023/1435 of 2 May 2023

Element Materials Technology
Unit 3 Deeside Point
Zone 3
Deeside Industrial Park
Deeside
CH5 2UA

P: +44 (0) 1244 833780
F: +44 (0) 1244 833781
W: www.element.com

Geosyntec Consulting
Unit 10
Northwood Court
Northwood Crescent
Santry
Dublin
Ireland
D09 W8DT

Attention :	Stephen Coakley
Date :	17th July, 2023
Your reference :	-
Our reference :	Test Report 23/10858 Batch 1
Location :	M1 Business Park
Date samples received :	4th July, 2023
Status :	Final Report
Issue :	1

Six samples were received for analysis on 4th July, 2023 of which two were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

Paul Boden BSc
Senior Project Manager

Client Name: Geosyntec Consulting
Reference: -
Location: M1 Business Park
Contact: Stephen Coakley
EMT Job No: 23/10858

Report : **Solid**

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	5-8	21-24									LOD/LOR	Units	Method No.
Sample ID	TP02	TP06											
Depth													
COC No / misc													
Containers	V J T B	V J T B											
Sample Date	03/07/2023	03/07/2023											
Sample Type	Soil	Soil											
Batch Number	1	1											
Date of Receipt	04/07/2023	04/07/2023											
Antimony	5	4									<1	mg/kg	TM30/PM15
Arsenic #	12.6	24.5									<0.5	mg/kg	TM30/PM15
Barium #	92	100									<1	mg/kg	TM30/PM15
Cadmium #	3.8	1.3									<0.1	mg/kg	TM30/PM15
Chromium #	80.8	70.2									<0.5	mg/kg	TM30/PM15
Copper #	82	51									<1	mg/kg	TM30/PM15
Lead #	21	20									<5	mg/kg	TM30/PM15
Mercury #	<0.1	<0.1									<0.1	mg/kg	TM30/PM15
Molybdenum #	8.9	7.9									<0.1	mg/kg	TM30/PM15
Nickel #	78.3	48.7									<0.7	mg/kg	TM30/PM15
Selenium #	5	2									<1	mg/kg	TM30/PM15
Total Sulphate as SO4 #	112	327									<50	mg/kg	TM50/PM29
Water Soluble Boron #	0.3	0.7									<0.1	mg/kg	TM74/PM32
Zinc #	88	74									<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03									<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05									<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Phenanthrene #	<0.03	<0.03									<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Fluoranthene #	<0.03	<0.03									<0.03	mg/kg	TM4/PM8
Pyrene #	<0.03	<0.03									<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	<0.06	<0.06									<0.06	mg/kg	TM4/PM8
Chrysene #	<0.02	<0.02									<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	<0.07	<0.07									<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Coronene	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
PAH 6 Total #	<0.22	<0.22									<0.22	mg/kg	TM4/PM8
PAH 17 Total	<0.64	<0.64									<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	<0.05	<0.05									<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	<0.02	<0.02									<0.02	mg/kg	TM4/PM8
Benzo(j)fluoranthene	<1	<1									<1	mg/kg	TM4/PM8
PAH Surrogate % Recovery	94	91									<0	%	TM4/PM8
Mineral Oil (C10-C40) (EH_CU_1D_AL)	<30	<30									<30	mg/kg	TM5/PM8/PM16

Client Name: Geosyntec Consulting
Reference: -
Location: M1 Business Park
Contact: Stephen Coakley
EMT Job No: 23/10858

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	5-8	21-24									LOD/LOR	Units	Method No.
Sample ID	TP02	TP06											
Depth													
COC No / misc													
Containers	V J T B	V J T B											
Sample Date	03/07/2023	03/07/2023											
Sample Type	Soil	Soil											
Batch Number	1	1											
Date of Receipt	04/07/2023	04/07/2023											
TPH CWG													
Aliphatics													
>C5-C6 (HS_1D_AL)#	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>C6-C8 (HS_1D_AL)#	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>C8-C10 (HS_1D_AL)	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>C10-C12 (EH_CU_1D_AL)#	<0.2	<0.2									<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 (EH_CU_1D_AL)#	<4	<4									<4	mg/kg	TM5/PM8/PM16
>C16-C21 (EH_CU_1D_AL)#	<7	<7									<7	mg/kg	TM5/PM8/PM16
>C21-C35 (EH_CU_1D_AL)#	<7	<7									<7	mg/kg	TM5/PM8/PM16
>C35-C40 (EH_CU_1D_AL)	<7	<7									<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-40 (EH+HS_CU_1D_AL)	<26	<26									<26	mg/kg	TM5/TM36/PM8/PM12/PM16
>C6-C10 (HS_1D_AL)	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>C10-C25 (EH_1D_AL)	<10	<10									<10	mg/kg	TM5/PM8/PM16
>C25-C35 (EH_1D_AL)	<10	<10									<10	mg/kg	TM5/PM8/PM16
Aromatics													
>C5-EC7 (HS_1D_AR)#	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>EC7-EC8 (HS_1D_AR)#	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>EC8-EC10 (HS_1D_AR)#	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>EC10-EC12 (EH_CU_1D_AR)#	<0.2	<0.2									<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 (EH_CU_1D_AR)#	<4	<4									<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 (EH_CU_1D_AR)#	<7	<7									<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 (EH_CU_1D_AR)#	<7	<7									<7	mg/kg	TM5/PM8/PM16
>EC35-EC40 (EH_CU_1D_AR)	<7	<7									<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-40 (EH+HS_CU_1D_AR)	<26	<26									<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics(C5-40) (EH+HS_CU_1D_Total)	<52	<52									<52	mg/kg	TM5/TM36/PM8/PM12/PM16
>EC6-EC10 (HS_1D_AR)#	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>EC10-EC25 (EH_1D_AR)	<10	<10									<10	mg/kg	TM5/PM8/PM16
>EC25-EC35 (EH_1D_AR)	<10	<10									<10	mg/kg	TM5/PM8/PM16
MTBE#	<5	<5									<5	ug/kg	TM36/PM12
Benzene#	<5	<5									<5	ug/kg	TM36/PM12
Toluene#	<5	<5									<5	ug/kg	TM36/PM12
Ethylbenzene#	<5	<5									<5	ug/kg	TM36/PM12
m/p-Xylene#	<5	<5									<5	ug/kg	TM36/PM12
o-Xylene#	<5	<5									<5	ug/kg	TM36/PM12
PCB 28#	<5	<5									<5	ug/kg	TM17/PM8
PCB 52#	<5	<5									<5	ug/kg	TM17/PM8
PCB 101#	<5	<5									<5	ug/kg	TM17/PM8
PCB 118#	<5	<5									<5	ug/kg	TM17/PM8
PCB 138#	<5	<5									<5	ug/kg	TM17/PM8
PCB 153#	<5	<5									<5	ug/kg	TM17/PM8
PCB 180#	<5	<5									<5	ug/kg	TM17/PM8
Total 7 PCBs#	<35	<35									<35	ug/kg	TM17/PM8

Element Materials Technology

Client Name: Geosyntec Consulting
Reference: -
Location: M1 Business Park
Contact: Stephen Coakley
EMT Job No: 23/10858

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	5-8	21-24									LOD/LOR	Units	Method No.
Sample ID	TP02	TP06											
Depth													
COC No / misc													
Containers	V J T B	V J T B											
Sample Date	03/07/2023	03/07/2023											
Sample Type	Soil	Soil											
Batch Number	1	1											
Date of Receipt	04/07/2023	04/07/2023											
Phenol #	<0.01	<0.01									<0.01	mg/kg	TM26/PM21B
Natural Moisture Content	24.9	17.1									<0.1	%	PM4/PM0
Moisture Content (% Wet Weight)	19.9	14.6									<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	<0.3									<0.3	mg/kg	TM38/PM20
Chromium III	80.8	70.2									<0.5	mg/kg	NONE/NONE
Total Cyanide #	<0.5	<0.5									<0.5	mg/kg	TM89/PM45
Total Organic Carbon #	1.45	1.11									<0.02	%	TM21/PM24
Sulphide	<10	<10									<10	mg/kg	TM107/PM45
Elemental Sulphur	11	3									<1	mg/kg	TM108/PM114
pH #	7.92	7.00									<0.01	pH units	TM73/PM11

All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: Geosyntec Consulting
Reference: -
Location: M1 Business Park
Contact: Stephen Coakley
EMT Job No: 23/10858

Report : CEN 10:1 1 Batch

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	5-8	21-24									LOD/LOR	Units	Method No.
Sample ID	TP02	TP06											
Depth													
COC No / misc													
Containers	V J T B	V J T B											
Sample Date	03/07/2023	03/07/2023											
Sample Type	Soil	Soil											
Batch Number	1	1											
Date of Receipt	04/07/2023	04/07/2023											
Dissolved Antimony #	<0.002	<0.002									<0.002	mg/l	TM30/PM17
Dissolved Antimony (A10) #	<0.02	<0.02									<0.02	mg/kg	TM30/PM17
Dissolved Arsenic #	<0.0025	<0.0025									<0.0025	mg/l	TM30/PM17
Dissolved Arsenic (A10) #	<0.025	<0.025									<0.025	mg/kg	TM30/PM17
Dissolved Barium #	<0.003	<0.003									<0.003	mg/l	TM30/PM17
Dissolved Barium (A10) #	<0.03	<0.03									<0.03	mg/kg	TM30/PM17
Dissolved Boron #	<0.012	<0.012									<0.012	mg/l	TM30/PM17
Dissolved Boron (A10) #	<0.12	<0.12									<0.12	mg/kg	TM30/PM17
Dissolved Cadmium #	<0.0005	<0.0005									<0.0005	mg/l	TM30/PM17
Dissolved Cadmium (A10) #	<0.005	<0.005									<0.005	mg/kg	TM30/PM17
Dissolved Chromium #	<0.0015	<0.0015									<0.0015	mg/l	TM30/PM17
Dissolved Chromium (A10) #	<0.015	<0.015									<0.015	mg/kg	TM30/PM17
Dissolved Copper #	<0.007	<0.007									<0.007	mg/l	TM30/PM17
Dissolved Copper (A10) #	<0.07	<0.07									<0.07	mg/kg	TM30/PM17
Dissolved Lead #	<0.005	<0.005									<0.005	mg/l	TM30/PM17
Dissolved Lead (A10) #	<0.05	<0.05									<0.05	mg/kg	TM30/PM17
Dissolved Molybdenum #	<0.002	0.006									<0.002	mg/l	TM30/PM17
Dissolved Molybdenum (A10) #	<0.02	0.06									<0.02	mg/kg	TM30/PM17
Dissolved Nickel #	<0.002	<0.002									<0.002	mg/l	TM30/PM17
Dissolved Nickel (A10) #	<0.02	<0.02									<0.02	mg/kg	TM30/PM17
Dissolved Selenium #	<0.003	<0.003									<0.003	mg/l	TM30/PM17
Dissolved Selenium (A10) #	<0.03	<0.03									<0.03	mg/kg	TM30/PM17
Dissolved Zinc #	<0.003	<0.003									<0.003	mg/l	TM30/PM17
Dissolved Zinc (A10) #	<0.03	<0.03									<0.03	mg/kg	TM30/PM17
Mercury Dissolved by CVAF #	<0.00001	<0.00001									<0.00001	mg/l	TM61/PM0
Mercury Dissolved by CVAF #	<0.0001	<0.0001									<0.0001	mg/kg	TM61/PM0
Phenol	<0.01	<0.01									<0.01	mg/l	TM26/PM0
Phenol	<0.1	<0.1									<0.1	mg/kg	TM26/PM0
Fluoride	<0.3	<0.3									<0.3	mg/l	TM173/PM0
Fluoride	<3	<3									<3	mg/kg	TM173/PM0
Sulphate as SO4 #	2.5	0.9									<0.5	mg/l	TM38/PM0
Sulphate as SO4 #	25	9									<5	mg/kg	TM38/PM0
Mass of raw test portion	0.1145	0.1081										kg	NONE/PM17
Chloride #	<0.3	<0.3									<0.3	mg/l	TM38/PM0
Chloride #	<3	<3									<3	mg/kg	TM38/PM0
Mass of dried test portion	0.09	0.09										kg	NONE/PM17
Ammoniacal Nitrogen as N #	<0.03	<0.03									<0.03	mg/l	TM38/PM0

Element Materials Technology

Client Name: Geosyntec Consulting
Reference: -
Location: M1 Business Park
Contact: Stephen Coakley
EMT Job No: 23/10858

Report : CEN 10:1 1 Batch

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	5-8	21-24									LOD/LOR	Units	Method No.
Sample ID	TP02	TP06											
Depth													
COC No / misc													
Containers	V J T B	V J T B											
Sample Date	03/07/2023	03/07/2023											
Sample Type	Soil	Soil											
Batch Number	1	1											
Date of Receipt	04/07/2023	04/07/2023											
Ammoniacal Nitrogen as N #	<0.3	<0.3									<0.3	mg/kg	TM38/PM0
Dissolved Organic Carbon	<2	<2									<2	mg/l	TM60/PM0
Dissolved Organic Carbon	<20	<20									<20	mg/kg	TM60/PM0
Total Dissolved Solids #	<35	41									<35	mg/l	TM20/PM0
Total Dissolved Solids #	<350	410									<350	mg/kg	TM20/PM0

All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: Geosyntec Consulting
Reference: -
Location: M1 Business Park
Contact: Stephen Coakley

Matrix : Solid

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	EPH Interpretation
23/10858	1	TP02		5-8	No interpretation possible
23/10858	1	TP06		21-24	No interpretation possible

Client Name: Geosyntec Consulting
Reference: -
Location: M1 Business Park
Contact: Stephen Coakley

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Asbestos sub-samples are retained for not less than 6 months from the date of analysis unless specifically requested.

The LOQ of the Asbestos Quantification is 0.001% dry fibre of dry mass of sample.

Where the sample is not taken by a Element Materials Technology consultant, Element Materials Technology cannot be responsible for inaccurate or unrepresentative sampling.

Where trace asbestos is reported the amount of asbestos will be <0.1%.

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analyst Name	Date Of Analysis	Analysis	Result
23/10858	1	TP02		8	Emily Anderton	14/07/2023	**General Description (Bulk Analysis)**	Beige soil with stones
					Emily Anderton	14/07/2023	**Asbestos Fibres**	NAD
					Emily Anderton	14/07/2023	**Asbestos ACM**	NAD
					Emily Anderton	14/07/2023	**Asbestos Type**	NAD
23/10858	1	TP06		24	Emily Anderton	14/07/2023	**General Description (Bulk Analysis)**	Brown soil with stones
					Emily Anderton	14/07/2023	**Asbestos Fibres**	NAD
					Emily Anderton	14/07/2023	**Asbestos ACM**	NAD
					Emily Anderton	14/07/2023	**Asbestos Type**	NAD

Client Name: Geosyntec Consulting
Reference: -
Location: M1 Business Park
Contact: Stephen Coakley

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 23/10858						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.
Only analyses which are accredited are recorded as deviating if set criteria are not met.

EMT Job No.: 23/10858

SOILS and ASH

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 37°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a requirement of our Accreditation Body for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.
Laboratory records are kept for a period of no less than 6 years.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

Customer Provided Information

Sample ID and depth is information provided by the customer.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above quantitative calibration range. The result should be considered the minimum value and is indicative only. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

EMT Job No: 23/10858

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM17	Modified US EPA method 8270D v5:2014. Determination of specific Polychlorinated Biphenyl congeners by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM20	Modified BS 1377-3:1990/USEPA 160.1/3 (TDS/TS: 1971) Gravimetric determination of Total Dissolved Solids/Total Solids	PM0	No preparation is required.	Yes		AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Preparation of Soil and Marine Sediment Samples for Total Organic Carbon.	Yes		AD	Yes

EMT Job No: 23/10858

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.			AR	Yes
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM21B	As Received samples are extracted in Methanol: Water (60:40) by reciprocal shaker.	Yes		AR	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.			AD	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM17	Modified method BS EN12457-2:2002 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.	Yes		AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013I	PM0	No preparation is required.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013I	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM50	Acid soluble sulphate (Total Sulphate) analysed by ICP-OES	PM29	A hot hydrochloric acid digest is performed on a dried and ground sample, and the resulting liquor is analysed.	Yes		AD	Yes

EMT Job No: 23/10858

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM60	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060A (2002), APHA SMEWW 5310B:1999 22nd Edition, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.			AR	Yes
TM61	Determination of Mercury by Cold Vapour Atomic Fluorescence - WATERS: Modified USEPA Method 245.7, Rev 2, Feb 2005. SOILS: Modified USEPA Method 7471B, Rev.2, Feb 2007	PM0	No preparation is required.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248 Second edition (2021)	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
TM74	Analysis of water soluble boron (20:1 extract) by ICP-OES.	PM32	Hot water soluble boron is extracted from dried and ground samples using a 20:1 ratio.	Yes		AD	Yes
TM89	Modified USEPA method OIA-1667 (1999). Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide, Sulphide and Thiocyanate analysis.	Yes		AR	Yes
TM107	Determination of Sulphide/Thiocyanate by Skalar Continuous Flow Analyser	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide, Sulphide and Thiocyanate analysis.			AR	Yes
TM108	Determination of Elemental Sulphur by Reversed Phase High Performance Liquid Chromatography with Ultra Violet spectroscopy.	PM114	End over end extraction of dried and crushed soil samples for organic analysis. The solvent mix varies depending on analysis required			AD	Yes
TM173	Analysis of fluoride by ISE (Ion Selective Electrode) using modified ISE method 9214 - 340.2 (EPA 1998)	PM0	No preparation is required.			AR	Yes
NONE	No Method Code	NONE	No Method Code			AD	Yes

EMT Job No: 23/10858

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
NONE	No Method Code	PM17	Modified method BS EN12457-2:2002 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.				
NONE	No Method Code	PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.			AR	

S.I. Ltd Contract No: 6161A

Client: Vida M1 Limited

Engineer: Clifton Scannell Emerson Associates

Contractor: Site Investigations Ltd

M1 Business Park – Zone A, Balbriggan, Co. Dublin Site Investigation Report

Prepared by:

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Stephen Letch

Issue Date:	03/10/2023
Status	Final
Revision	0

Contents:

Appendices:

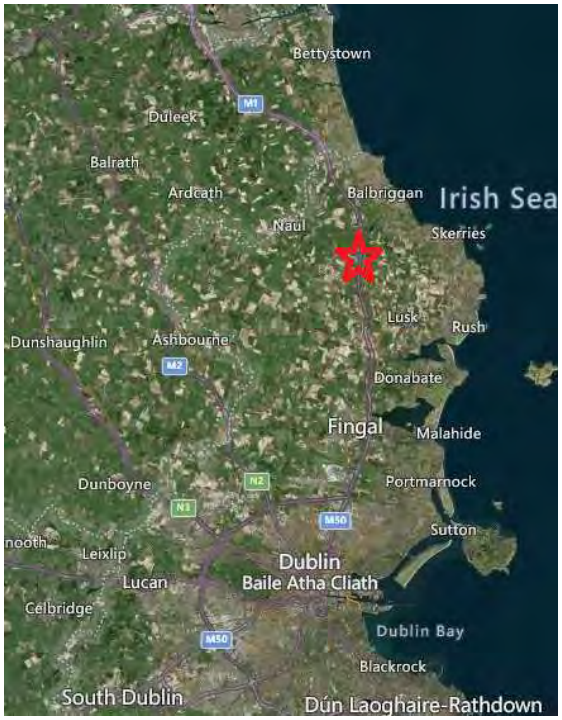
1. Introduction

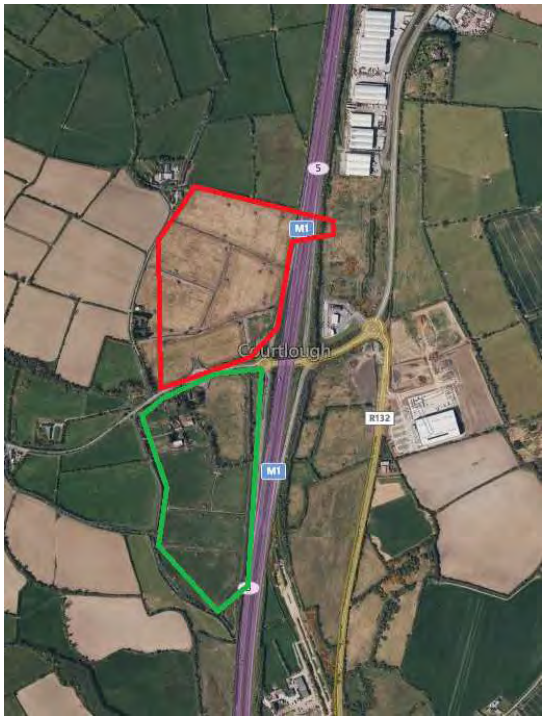
On the instructions of Clifton Scannell Emerson Associates, Site Investigations Ltd (SIL) was appointed to complete a ground investigation at Balbriggan, Co. Dublin. The investigation was completed for the M1 Business Park, Zone A and F and this report covers Zone A. The investigation was completed on behalf of the Client, Vida M1 Limited and the fieldworks were started in July and completed in August 2023.

This final report presents the factual geotechnical data obtained from the field and laboratory testing with interpretation of the ground conditions discussed.

2. Site Location

The site is located to the south west of Balbriggan town centre adjacent to Junction 5 of the M1 motorway. The first map below shows the location of the site to the north of Dublin city centre and the second map shows Zone A in red and Zone F in green.





3. Fieldwork

All fieldwork was carried out in accordance with BS 5930:2015, Engineers Ireland GI Specification and Related Document 2nd Edition 2016 and Eurocode 7: Geotechnical Design. The fieldworks comprised of the following:

- 8 No. cable percussive boreholes
- 1 No. rotary corehole
- 6 No. trial pits
- 5 No. soakaway tests
- 5 No. California Bearing Ratio tests

3.1. Cable Percussive Boreholes

Cable percussion boring was undertaken at 8 No. locations using a Dando 150 rig and constructed 200mm diameter boreholes. The boreholes terminated at depths ranging from 7.00mbgl (BH08) to 9.80mbgl (BH04) after 1.5hrs chiselling with no further progress. It was not possible to collect undisturbed samples due to the granular soils encountered so bulk disturbed samples were recovered at regular intervals.

To test the strength of the stratum, Standard Penetration Tests (SPT's) were performed at 1.00m intervals in accordance with BS 1377 (1990). In soils with high gravel and cobble content it is appropriate to use a solid cone (60°) (CPT) instead of the split spoon and this was used throughout the testing. The test is completed over 450mm and the cone is driven 150mm into the stratum to ensure that the test is conducted over an undisturbed zone. The cone is then driven the remaining 300mm and the blows recorded to report the N-Value. The report shows the N-Value with the 75mm incremental blows listed in brackets (e.g., BH01 at 1.00mbgl where N=6-(1,1/2,1,1,2)). Where refusal of 50 blows across the test zone was encountered was achieved during testing, the penetration depth is also reported (e.g., BH01 at 6.00mbgl where N=50-(7,14/50 for 225mm)).

At BH03, a groundwater monitoring standpipe was installed in the borehole and consisted of slotted pipe surrounded by a gravel response zone with bentonite seals. The standpipe cover was then fenced off for protection from machinery and livestock.

The cable percussive borehole logs are presented in Appendix 1.

3.2. Rotary Corehole

Adjacent to BH06, a rotary corehole was drilled to investigate the depth of bedrock. The rotary drilling was carried out using a Beretta T25 top drive rig and open hole drilling techniques were used to advance through the overburden. The corehole reached the scheduled depth of 15.00mbgl and no bedrock was encountered in the corehole. The rotary corehole log is presented in Appendix 2.

3.3. Trial Pits

8 No. trial pits were excavated using a wheeled excavator. The pits were logged and photographed by a SIL geotechnical engineer and representative disturbed bulk samples were

recovered as the pits were excavated, which were returned to the laboratory for testing. Groundwater ingresses and pit wall stability were recorded as the pits were excavated and the pits were backfilled with the arisings upon completion.

The trial pit logs and photographs are presented in Appendix 3.

3.4. Slit Trenches

Slit trenching was completed at 10 No. locations by hand digging with machine assistance where possible. The trenches were completed to check the location and depth of any services on site. The trenches were logged and the services photographed before they were backfilled with the arisings.

The slit trench logs and photographs are presented in Appendix 4.

3.5. Soakaway Tests

At 5 No. locations, soakaway tests were completed and logged by SIL geotechnical engineer. BRE Special Digest 365 stipulates that the pit should be filled three times and that the final cycle is used to provide the infiltration rate. The time taken for the water level to fall from 75% volume to 25% volume is required to calculate the rate of infiltration. However, if the water level does not fall at a steady rate, then the test is deemed to have failed and the area is unsuitable for storm water drainage.

The soakaway test results and photographs are presented in Appendix 5.

3.6. California Bearing Ratio tests

At 5 No. locations, undisturbed cylindrical mould samples were taken to complete California Bearing Ratio tests in the laboratory. The results facilitate the designing of the access roads and associated areas. These tests were completed to BS1377: 1990: Part 4, Clause 7 ‘Determination of California Bearing Ratio’.

The California Bearing Ratio test results are provided in Appendix 6.

3.7. Surveying

Following completion of all the fieldworks, a survey of the exploratory hole locations was completed using a GeoMax GPS Rover. The data is supplied on each individual log along with a site plan in Appendix 10.

4. Laboratory Testing

4.1. Geotechnical Testing

Geotechnical laboratory testing was completed on representative soil samples in accordance with BS 1377 (1990). Testing included:

- 6 No. Moisture contents
- 6 No. Atterberg limits
- 6 No. Particle size gradings with hydrometers
- 6 No. Remoulded CBR tests
- 6 No. Moisture Condition Value (MCV) tests
- 6 No. Compactions
- 6 No. pH, sulphate and chloride content tests

The geotechnical laboratory test results are presented in Appendix 7.

4.2. Environmental Testing

Environmental testing was completed by ALS Environmental Ltd. and this allows for a Waste Classification report to be produced. The environmental testing consists of the following:

- 6 No. Suite I analysis
- 6 No. loss on ignition tests

The environmental test results are presented in Appendix 8 with the Waste Classification report in Appendix 9.

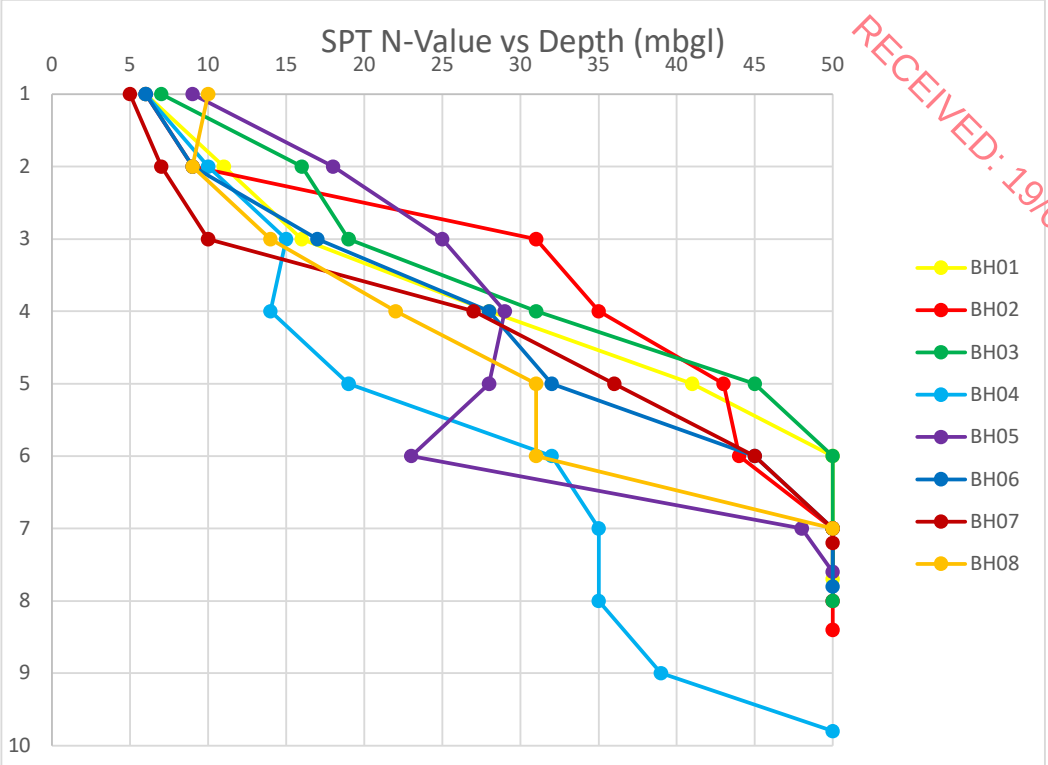
5. Ground Conditions

5.1. Overburden

The natural ground conditions in the boreholes and trial pits are consistent with brown overlying black slightly sandy slightly gravelly silty CLAY with cobbles and boulders. No bedrock was recorded at the corehole when the hole was terminated at 15.00mbgl.

These natural soils are over-consolidated lodgment till which is encountered across the North Dublin region with several papers discussing the engineering characteristics of the soil. The brown and brown grey soils are the weathered surface of the underlying black clays and the gravel and cobbles are generally angular to subrounded and predominantly limestone in origin.

The SPT N-values generally range from 5 to 10 at 1.00mbgl and then these increase to between 7 to 18 at 2.00mbgl and then 10 to 31 at 3.00mbgl and the values continue to increase with depth. The graph overleaf shows SPT N-values vs depth.



Laboratory tests of the shallow cohesive soils recorded CLAY soils with low and intermediate plasticity indices of 14% to 17% recorded. The particle size distribution curves were poorly sorted straight-line curves with 39% to 53% fines content.

5.2. Groundwater

Groundwater details in the boreholes and trial pits during the fieldworks are noted on the logs in Appendices 1 and 2. Groundwater ingresses were recorded in three boreholes, with shallow strikes of 1.70mbgl and 1.80mbgl recorded in BH03 and BH07. The water was sealed off in BH07 at 2.80mbgl and water then re-entered the borehole at 3.80mbgl. A deeper groundwater strike was recorded in BH05 at 6.60mbgl.

There were water ingresses into 3 No. trial pits across the site, at depths of 1.60mbgl (TP04) to 2.20mbgl (TP02 and TP03) with ingresses logged as slow.

6. Recommendations and Conclusions

Please note the following caveats:

The recommendations given, and opinions expressed in this report are based on the findings as detailed in the exploratory hole records. Where an opinion is expressed on the material between the exploratory hole locations or below the final level of excavation, this is for guidance only and no liability can be accepted for its accuracy. No responsibility can be accepted for adjacent unexpected conditions that have not been revealed by the exploratory holes. It is

further recommended that all bearing surfaces when excavated should be inspected by a suitably qualified Engineer to verify the information given in this report.

Excavated surfaces in clay strata should be kept dry to avoid softening prior to foundation placement. Foundations should always be taken to a minimum depth of 0.50mBGL to avoid the effects of frost action and possible seasonal shrinkage/swelling.

If it is intended that on-site materials are to be used as fill, then the necessary laboratory testing should be specified by the Client to confirm the suitability. Also, relevant lab testing should be specified where stability of side slopes to excavations is a concern, or where contamination may be an issue.

6.1. Shallow Foundations

Due to the unknown depth of foundation and no longer-term groundwater information, this analysis assumes the groundwater will not influence the construction or performance of these foundations.

The boreholes encountered soft to firm brown slightly sandy slightly gravelly silty CLAY at 1.00mbgl and the SPT N-value at this depth ranges from 5 to 10. Using a correlation proposed by Stroud and Butler between SPT N-values and plasticity indices, the SPT N-value can be used to calculate the undrained shear strength. With the low to intermediate plasticity indexes recorded in the laboratory for the soils encountered on site, this correlation is C_u=6N. Therefore, this indicates that the undrained shear strength range of the CLAY is 30kN/m^2 to 60kN/m^2. This can be used to calculate the ultimate bearing capacity, and this has been calculated to range from 171kN/m^2 to 324kN/m^2. Finally, a factor of safety is applied and with a factor of 3, an allowable bearing capacity range of 57kN/m^2 to 108kN/m^2 would be anticipated in these soils.

The SPT test values increase to 7 to 18 at 2.00mbgl, indicating an undrained shear strength range of 42kN/m^2 to 108kN/m^2, ultimate bearing capacity range of 250kN/m^2 to 585kN/m^2 and an allowable bearing capacity range of 83kN/m^2 to 195kN/m2.

The following assumptions were made as part of these analyses. If any of these assumptions are not in accordance with detailed design or observations made during construction these recommendations should be re-evaluated.

- Foundations are to be constructed on a level formation of uniform material type (described above).
- All man-made or filled material is to be removed prior to construction.
- The bulk unit weight of the material in this stratum has a minimum density of 19kN/m^3.

- Based on groundwater observations this analysis assumes the groundwater will not influence the construction or performance of these foundations.
- All founding strata to be inspected by a suitably qualified Engineer prior to pouring the foundations.
- All bearing capacity calculations allow for a settlement of 25mm.

The trial pits indicate that excavations in the cohesive soils should be stable but all slopes should be evaluated upon excavation and regular inspections should be completed during construction to ensure that all slopes are stable. Temporary support should be used on any excavation that will be left open for an extended period.

6.2. Groundwater

The caveats below relating to interpretation of groundwater levels should be noted:
There is always considerable uncertainty as to the likely rates of water ingress into excavations in clayey soil sites due to the possibility of localised unforeseen sand and gravel lenses acting as permeable conduits for unknown volumes of water.

Furthermore, water levels noted on the borehole and trial pit logs do not generally give an accurate indication of the actual groundwater conditions as the borehole or trial pit is rarely left open for sufficient time for the water level to reach equilibrium.

Also, during boring procedures, a permeable stratum may have been sealed off by the borehole casing, or water may have been added to aid drilling. Therefore, an extended period of groundwater monitoring using any constructed standpipes is required to provide more accurate information regarding groundwater conditions. Finally, groundwater levels vary with time of year, rainfall, nearby construction and tides.

Pumping tests would be required to determine likely seepage rates and persistence into excavations taken below the groundwater level. Deep trial pits also aid estimation of seepage rates.

As discussed previously, groundwater was encountered in three boreholes and three trial pits.

There is always considerable uncertainty as to the likely rates of water ingress into excavations in cohesive soil sites due to the possibility of localised unforeseen sand and gravel lenses acting as permeable conduits for unknown volumes of water. Based on this information at the exploratory hole locations to date, it is considered likely that any shallow ingress (less than 2.00mbgl) into excavations of the CLAY will be slow to medium. If granular soils are encountered in shallow excavations, then the possibility of water ingressing into an excavation increase.

If groundwater is encountered during excavations then mechanical pumps will be required to remove the groundwater from sumps. Sumps should be carefully located and constructed to ensure that groundwater is efficiently removed from excavations and trenches.

6.3. Soakaway Tests

The soakaway tests failed the specification as the water level did not fall sufficiently enough to complete the test. The BRE Digest stipulates that the pit should half empty within 24hrs, and extrapolation indicates this condition would not be satisfied. The tests were terminated at the end of the first (of a possible three) fill/empty cycle since further testing would give even slower fall rates due to increased soil saturation. The unsuitability of the soils for soakaways is further suggested by the soil descriptions of the materials in this area of the site where the soakaway was completed, i.e., well compacted clay soils.

6.4. Pavement Design

The CBR test results in Appendix 6 indicate CBR values ranging from 6.0% to 7.7% at 0.50mbgl and the remoulded CBR tests recorded values of 5.2% to 9.5% at 1.00mbgl.

The insitu CBR samples were recovered from 0.50mbgl and inspection of the formation strata should be completed prior to construction of the pavement. Once the exact formation levels are finalised then additional in-situ testing could be completed to assist with the detailed pavement design.

6.5. Contamination

Environmental testing was completed on six samples from the investigation and the results are presented in Appendix 8. For material to be removed from site, Suite I testing was carried out to determine if the material is hazardous or non-hazardous and then the leachate results were compared with the published waste acceptance limits of BS EN 12457-2 to determine whether the material on the site could be accepted as ‘inert material’ by an Irish landfill.

The Waste Classification report created using HazWasteOnline™ software shows that the material tested can mainly be classified as non-hazardous material.

Following this analysis of the solid test results, the leachate disposal suite results showed that the determinands generally remained within the Inert waste thresholds.

Overall, six samples were tested for analysis but it cannot be discounted that any localised contamination may have been missed. Any MADE GROUND excavated on site should be stockpiled separately to natural soils to avoid any potential cross contamination of the soils. Additional testing of these soils may be requested by the individual landfill before acceptance

and a testing regime designed by an environmental engineer would be recommended to satisfy the landfill.

6.6. Aggressive Ground Conditions

The chemical test results in Appendix 7 indicate a general pH value between 7.93 and 8.30 which is close to neutral and below the level of 9, therefore no special precautions are required.

The maximum value obtained for water soluble sulphate was 124mg/l as SO_3. The BRE Special Digest 1:2005 – '*Concrete in Aggressive Ground*' guidelines require SO_4 values and after conversion ($SO_4 = SO_3 \times 1.2$), the maximum value of 149mg/l shows Class 1 conditions and no special precautions are required.

6.7. Radon Gas

The Environmental Protection Agency (EPA) has recently updated the Radon gas exposure map and this is available to view on the EPA website. This shows the possible exposure to radon gas with the bedrock geology, subsoil geology, soil permeability and aquifer type analysed to produce the map. The values are based on residential properties and the map overleaf shows that the site falls within the low level of 1 in 20 homes have a possibility of high radon exposure. Measures should be taken in the form of radon protection barriers from radon exposure in the new structure.

EPA map identifying possible Radon exposure.
https://gis.epa.ie/EPAMaps/Radon?&lid=EPA:RadonRiskMapofIreland

Appendix 1

Cable Percussive Borehole Logs

Contract No: 6161A	**Cable Percussion Borehole Log**				Borehole No: **BH01**
Contract:	M1 Business Park - Zone A	Easting:	718270.062	Date Started:	19/07/2023
Location:	Balbriggan, Co. Dublin	Northing:	758944.563	Date Completed:	19/07/2023
Client:	Vida M1 Limited	Elevation:	39.27	Drilled By:	G. Macken
Engineer:	Clifton Scannell Emerson Associates	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
0.5	0.30	TOPSOIL. Soft brown grey slightly sandy slightly gravelly silty CLAY with low cobble content.		39.0	38.97					
1.0				38.5		1.00 1.00	B C	GM15 N=6 (1,1/2,1,1,2)		
1.5	1.60	Firm becoming stiff becoming very stiff black slightly sandy slightly gravelly silty CLAY with high cobble content.		38.0	37.67					
2.0				37.5		2.00 2.00	B C	GM16 N=11 (2,2/2,3,3,3)		
2.5				37.0						
3.0				36.5		3.00 3.00	B C	GM17 N=16 (2,3/3,4,4,5)		
3.5				36.0						
4.0				35.5		4.00 4.00	B C	GM18 N=28 (3,5/8,6,7,7)		
4.5				35.0						
5.0				34.5		5.00 5.00	B C	GM19 N=41 (3,8/10,10,11,10)		
5.5				34.0						
6.0				33.5		6.00 6.00	B C	GM20 50 (7,14/50 for 225mm)		
6.5				33.0						
7.0				32.5		7.00 7.00	B C	GM21 50 (8,13/50 for 200mm)		
7.5	7.60 7.70	Obstruction - boulders. End of Borehole at 7.70m		32.0	31.67 31.57	7.70	C	50 (25 for 5mm/50 for 5mm)		
8.0				31.5						
8.5				31.0						
9.0				30.5						
9.5				30.0						
				29.5						

Chiselling: From:	To:	Time:	Water Strikes: Strike:	Rose:	Depth Sealed	Water Details: Date:	Hole Depth:	Water Depth:	Installation: From:	To:	Pipe:	Backfill: From:	To:	Type:	Remarks:
7.60	7.70	01:30				19/07	7.70	Dry				0.00	7.70	Arisings	Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 6161A	**Cable Percussion Borehole Log**			Borehole No: **BH02**
Contract:	M1 Business Park - Zone A	Easting:	718317.392	Date Started: 20/07/2023
Location:	Balbriggan, Co. Dublin	Northing:	758955.904	Date Completed: 20/07/2023
Client:	Vida M1 Limited	Elevation:	38.61	Drilled By: G. Macken
Engineer:	Clifton Scannell Emerson Associates	Borehole Diameter:	200mm	Status: FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
	0.20	TOPSOIL.		38.5	38.41					
0.5		Soft brown grey slightly sandy slightly gravelly silty CLAY with low cobble content.		38.0						
1.0				37.5		1.00	B	GM22		
	1.40				37.21	1.00	C	N=6 (1,1/1,2,2,1)		
1.5		Firm becoming very stiff black slightly sandy gravelly silty CLAY with medium cobble content.		37.0						
2.0				36.5		2.00	B	GM23		
						2.00	C	N=9 (1,2/2,2,3,2)		
2.5				36.0						
3.0				35.5		3.00	B	GM24		
						3.00	C	N=31 (3,5/8,8,7,8)		
3.5				35.0						
4.0				34.5		4.00	B	GM25		
						4.00	C	N=35 (3,7/9,8,8,10)		
4.5	4.50	Dense black silty sandy GRAVEL with high cobble content.		34.0	34.11					
5.0				33.5		5.00	B	GM26		
						5.00	C	N=43 (5,8/10,12,10,11)		
5.5				33.0						
6.0				32.5		6.00	B	GM27		
						6.00	C	N=44 (7,9/9,11,11,13)		
6.5				32.0						
7.0				31.5		7.00	B	GM28		
						7.00	C	N=50 (8,10/50 for 255mm)		
7.5				31.0						
8.0				30.5		8.00	B	GM29		
	8.30				30.31	8.00	C	N=50 (4,6/50 for 265mm)		
8.5	8.40	Obstruction - boulders.			30.21	8.40	C	50 (25 for 5mm/50 for 5mm)		
		End of Borehole at 8.40m		30.0						
9.0				29.5						
9.5				29.0						

Chiselling: From:	To:	Time:	Water Strikes: Strike:	Rose:	Depth Sealed	Water Details: Date:	Hole Depth:	Water Depth:	Installation: From:	To:	Pipe:	Backfill: From:	To:	Type:	Remarks:
8.30	8.40	01:30	1.70	1.20	NS	20/07	8.40	2.4				0.00	8.40	Arisings	Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 6161A	**Cable Percussion Borehole Log**			Borehole No: **BH03**
Contract:	M1 Business Park - Zone A	Easting:	718149.632	Date Started: 18/07/2023
Location:	Balbriggan, Co. Dublin	Northing:	758957.492	Date Completed: 18/07/2023
Client:	Vida M1 Limited	Elevation:	42.51	Drilled By: G. Macken
Engineer:	Clifton Scannell Emerson Associates	Borehole Diameter:	200mm	Status: FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
	0.20	TOPSOIL.			42.31					
0.5		Soft brown grey slightly sandy slightly gravelly silty CLAY with low cobble content.		42.0						
1.0				41.5		1.00	B	GM08		
						1.00	C	N=7 (1,1/2,2,1,2)		
1.5				41.0						
	1.80				40.71					
2.0		Firm becoming stiff becoming very stiff black slightly sandy slightly gravelly silty CLAY with high cobble content.		40.5		2.00	B	GM09		
						2.00	C	N=16 (2,3/4,3,4,5)		
2.5				40.0						
3.0				39.5		3.00	B	GM10		
						3.00	C	N=19 (3,3/4,4,5,6)		
3.5				39.0						
4.0				38.5		4.00	B	GM11		
						4.00	C	N=31 (3,5/5,8,9,9)		
4.5				38.0						
5.0				37.5		5.00	B	GM12		
						5.00	C	N=45 (4,8/10,10,12,13)		
5.5				37.0						
6.0				36.5		6.00	B	GM13		
						6.00	C	50 (8,13/50 for 225mm)		
6.5				36.0						
7.0				35.5		7.00	B	GM14		
						7.00	C	50 (7,14/50 for 150mm)		
7.5				35.0						
	7.80				34.71					
8.0	8.00	Obstruction - boulders.		34.5	34.51	8.00	C	50 (25 for 5mm/50 for 5mm)		
		End of Borehole at 8.00m								
8.5				34.0						
9.0				33.5						
9.5				33.0						

Chiselling:

From:	To:	Time:
7.80	8.00	01:30

Water Strikes:

Strike:	Rose:	Depth Sealed

Water Details:

Date:	Hole Depth:	Water Depth:
18/07	8.00	Dry

Installation:

From:	To:	Pipe:
0.00	1.50	Solid
1.50	8.00	Slotted

Backfill:

From:	To:	Type:
0.00	1.00	Bentonite
1.00	8.00	Gravel

Remarks: Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 6161A	**Cable Percussion Borehole Log**				Borehole No: **BH04**
Contract:	M1 Business Park - Zone A	Easting:	718433.018	Date Started:	02/08/2023
Location:	Balbriggan, Co. Dublin	Northing:	758945.877	Date Completed:	02/08/2023
Client:	Vida M1 Limited	Elevation:	38.01	Drilled By:	D. Clarke
Engineer:	Clifton Scannell Emerson Associates	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
	0.10	TOPSOIL.			37.91					
0.5		Soft grey brown slightly sandy slightly gravelly silty CLAY with high cobble content.		37.5						
1.0				37.0		1.00	B	DC01		
						1.00	C	N=6 (1,1/1,2,2,1)		
1.5	1.50			36.5	36.51					
		Firm dark grey brown slightly sandy slightly gravelly silty CLAY with low cobble content.								
2.0				36.0		2.00	B	DC02		
						2.00	C	N=10 (1,2/2,3,3,2)		
2.5				35.5						
	2.70				35.31					
3.0		Firm grey brown slightly sandy slightly gravelly silty CLAY with high cobble content.		35.0		3.00	B	DC03		
						3.00	C	N=15 (2,2/3,4,4,4)		
3.5				34.5						
4.0				34.0		4.00	B	DC04		
						4.00	C	N=14 (2,2/4,4,3,3)		
4.5				33.5						
5.0	5.00			33.0	33.01	5.00	B	DC05		
		Stiff black slightly sandy slightly gravelly silty CLAY with low cobble content.				5.00	C	N=19 (2,2/3,3,6,7)		
5.5	5.60			32.5	32.41					
		Very stiff black slightly sandy slightly gravelly silty CLAY with high cobble content.								
6.0				32.0		6.00	B	DC06		
						6.00	C	N=32 (5,7/7,8,8,9)		
6.5				31.5						
7.0				31.0		7.00	B	DC07		
						7.00	C	N=35 (7,7/8,8,9,10)		
7.5				30.5						
8.0				30.0		8.00	B	DC08		
						8.00	C	N=35 (5,8/9,9,8,9)		
8.5				29.5						
9.0				29.0		9.00	B	DC09		
						9.00	C	N=39 (8,8/9,9,10,11)		
9.5				28.5						
	9.70				28.31					
	9.80	Obstruction - boulders.			28.21	9.80	C	50 (25 for 5mm/50 for 5mm)		
		End of Borehole at 9.80m								

Chiselling: From:	To:	Time:	Water Strikes: Strike:	Rose:	Depth Sealed	Water Details: Date:	Hole Depth:	Water Depth:	Installation: From:	To:	Pipe:	Backfill: From:	To:	Type:	Remarks:
9.70	9.80	01:30				02/08	9.80	Dry				0.00	9.80	Arisings	Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 6161A	**Cable Percussion Borehole Log**				Borehole No: **BH05**
Contract:	M1 Business Park - Zone A	Easting:	718027.659	Date Started:	21/07/2023
Location:	Balbriggan, Co. Dublin	Northing:	758791.222	Date Completed:	21/07/2023
Client:	Vida M1 Limited	Elevation:	52.61	Drilled By:	G. Macken
Engineer:	Clifton Scannell Emerson Associates	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
0		TOPSOIL.		52.5						
	0.30	Firm brown grey slightly sandy slightly gravelly silty CLAY with low cobble content.			52.31					
0.5				52.0						
1.0						1.00	B	GM30		
				51.5		1.00	C	N=9 (1,2/2,2,3,2)		
1.5	1.50	Stiff black slightly sandy gravelly silty CLAY with medium cobble content.		51.0	51.11					
2.0						2.00	B	GM31		
				50.5		2.00	C	N=18 (3,2/2,4,6,6)		
2.5				50.0						
3.0						3.00	B	GM32		
				49.5		3.00	C	N=25 (3,5/6,6,7,6)		
3.5				49.0						
4.0						4.00	B	GM33		
				48.5		4.00	C	N=29 (4,6/6,7,8,8)		
4.5				48.0						
5.0						5.00	B	GM34		
				47.5		5.00	C	N=28 (3,5/7,8,6,7)		
5.5	5.40	Very stiff black slightly sandy gravelly silty CLAY with high cobble content.		47.0	47.21					
6.0						6.00	B	GM35		
				46.5		6.00	C	N=23 (3,4/4,7,6,6)		
6.5				46.0						
7.0						7.00	B	GM36		
				45.5		7.00	C	N=48 (4,8/11,12,12,13)		
7.5	7.50				45.11					
	7.60	Obstruction - boulders. End of Borehole at 7.60m		45.0	45.01	7.60	C	50 (25 for 5mm/50 for 5mm)		
8.0				44.5						
8.5				44.0						
9.0				43.5						
9.5				43.0						

Chiselling: From:	To:	Time:	Water Strikes: Strike:	Rose:	Depth Sealed	Water Details: Date:	Hole Depth:	Water Depth:	Installation: From:	To:	Pipe:	Backfill: From:	To:	Type:	Remarks:
7.50	7.60	01:30	6.60	6.20	NS	21/07	7.60	6.00				0.00	7.60	Arisings	Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 6161A	**Cable Percussion Borehole Log**				Borehole No: **BH06**
Contract:	M1 Business Park - Zone A	Easting:	718153.144	Date Started:	17/07/2023
Location:	Balbriggan, Co. Dublin	Northing:	758744.248	Date Completed:	17/07/2023
Client:	Vida M1 Limited	Elevation:	47.46	Drilled By:	G. Macken
Engineer:	Clifton Scannell Emerson Associates	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
		TOPSOIL.			47.16					
0.5	0.30	Brown sandy slightly gravelly silty CLAY with low cobble content.		47.0						
1.0	0.90	Soft becoming firm brown grey slightly sandy slightly gravelly silty CLAY with low cobble content.		46.5	46.56	1.00 1.00	B C	GM01 N=6 (1,1/1,2,2,1)		
1.5				46.0						
2.0				45.5		2.00 2.00	B C	GM02 N=9 (2,2/1,3,2,3)		
2.5	2.50	Stiff becoming very stiff black slightly sandy slightly gravelly silty CLAY with high cobble content.		45.0	44.96					
3.0				44.5		3.00 3.00	B C	GM03 N=17 (2,3/4,4,4,5)		
3.5				44.0						
4.0				43.5		4.00 4.00	B C	GM04 N=28 (5,6/6,7,8,7)		
4.5				43.0						
5.0				42.5		5.00 5.00	B C	GM05 N=32 (7,7/7,8,8,9)		
5.5				42.0						
6.0				41.5		6.00 6.00	B C	GM06 N=45 (8,10/11,10,12,12)		
6.5				41.0						
7.0				40.5		7.00 7.00	B C	GM07 50 (7,11/50 for 125mm)		
7.5				40.0						
	7.70	Obstruction - boulders.			39.76	7.80	C	50 (25 for 5mm/50 for 5mm)		
8.0	7.80	End of Borehole at 7.80m		39.5	39.66					
8.5				39.0						
9.0				38.5						
9.5				38.0						

Chiselling: From:	To:	Time:	Water Strikes: Strike:	Rose:	Depth Sealed	Water Details: Date:	Hole Depth:	Water Depth:	Installation: From:	To:	Pipe:	Backfill: From:	To:	Type:	Remarks:
7.70	7.80	01:30				17/07	7.80	Dry				0.00	7.80	Arisings	Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 6161A	**Cable Percussion Borehole Log**				Borehole No: **BH07**
Contract:	M1 Business Park - Zone A	Easting:	718162.225	Date Started:	27/07/2023
Location:	Balbriggan, Co. Dublin	Northing:	758597.357	Date Completed:	27/07/2023
Client:	Vida M1 Limited	Elevation:	50.75	Drilled By:	G. Macken
Engineer:	Clifton Scannell Emerson Associates	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
	0.20	TOPSOIL.		50.5	50.55					
0.5		Brown slightly sandy slightly gravelly silty CLAY with low cobble content.								
	0.80			50.0	49.95					
1.0		Soft light brown slightly sandy slightly gravelly silty CLAY with high cobble content.				1.00 1.00	B C	GM43 N=5 (1,1/1,1,2,1)		
1.5				49.5						
2.0				49.0		2.00 2.00	B C	GM44 N=7 (1,2/2,1,2,2)		
	2.20			48.5	48.55					
2.5		Firm becoming stiff brown black slightly sandy slightly gravelly silty CLAY with medium cobble content.								
3.0				48.0		3.00 3.00	B C	GM45 N=10 (1,2/2,2,3,3)		
3.5				47.5						
	3.80			47.0	46.95					
4.0		Very dense dark grey silty sandy GRAVEL with medium cobble content and bands of sandy gravelly clay.				4.00 4.00	B C	GM46 N=27 (2,3/5,7,7,8)		
4.5				46.5						
5.0				46.0		5.00 5.00	B C	GM47 N=36 (3,6/9,8,8,11)		
5.5				45.5						
6.0				45.0		6.00 6.00	B C	GM48 N=45 (5,7/8,13,12,12)		
6.5				44.5						
7.0				44.0		7.00 7.00 7.20	B C C	GM49 50 (25 for 85mm/50 for 15mm) 50 (25 for 5mm/50 for 5mm)		
	7.10				43.65					
	7.20	Obstruction - boulders. End of Borehole at 7.20m		43.5	43.55					
7.5				43.0						
8.0				42.5						
8.5				42.0						
9.0				41.5						
9.5				41.0						

Chiselling: From:	To:	Time:	Water Strikes: Strike:	Rose:	Depth Sealed	Water Details: Date:	Hole Depth:	Water Depth:	Installation: From:	To:	Pipe:	Backfill: From:	To:	Type:	Remarks:
7.10	7.20	01:30	1.80	1.30	2.80	27/07	7.20	2				0.00	7.20	Arisings	Borehole terminated due to obstruction.
			3.80	2.80	NS	27/07	7.20	2							

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 6161A	**Cable Percussion Borehole Log**				Borehole No: **BH08**
Contract:	M1 Business Park - Zone A	Easting:	717972.469	Date Started:	24/07/2023
Location:	Balbriggan, Co. Dublin	Northing:	758566.068	Date Completed:	24/07/2023
Client:	Vida M1 Limited	Elevation:	51.77	Drilled By:	G. Macken
Engineer:	Clifton Scannell Emerson Associates	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
	0.20	TOPSOIL.		51.5	51.57					
0.5		Firm brown slightly sandy slightly gravelly silty CLAY with low cobble content.		51.0		1.00	B	GM37		
1.0						1.00	C	N=10 (1,2/3,2,2,3)		
1.5				50.5						
2.0				50.0		2.00	B	GM38		
	2.30			49.5	49.47	2.00	C	N=9 (2,2/2,3,2,2)		
2.5		Firm grey brown slightly sandy slightly gravelly silty CLAY with low cobble content.		49.0						
3.0						3.00	B	GM39		
3.5				48.5		3.00	C	N=14 (2,2/3,4,3,4)		
4.0				48.0		4.00	B	GM40		
	4.20			47.5	47.57	4.00	C	N=22 (3,4/5,4,7,6)		
4.5		Stiff becoming very stiff black slightly sandy slightly gravelly silty CLAY with medium cobble content.		47.0						
5.0						5.00	B	GM41		
5.5				46.5		5.00	C	N=31 (3,5/7,8,8,8)		
6.0				46.0		6.00	B	GM42		
6.5				45.5		6.00	C	N=31 (3,4/5,8,9,9)		
	6.90			45.0	44.87					
7.0	7.00	Obstruction - boulders. End of Borehole at 7.00m			44.77	7.00	C	50 (25 for 5mm/50 for 5mm)		
7.5				44.5						
8.0				44.0						
8.5				43.5						
9.0				43.0						
9.5				42.5						
				42.0						

Chiselling:

From:	To:	Time:
6.90	7.00	01:30

Water Strikes:

Strike:	Rose:	Depth Sealed

Water Details:

Date:	Hole Depth:	Water Depth:
24/07	7.00	Dry
24/07	7.00	Dry

Installation:

From:	To:	Pipe:

Backfill:

From:	To:	Type:
0.00	7.00	Arisings

Remarks: Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Appendix 2

Rotary Corehole Log

Contract No: 6161A	**Rotary Corehole Log**				Corehole No: **RC06**
Contract:	M1 Business Park - Zone A	Easting:	718153.353	Date Started:	03/08/2023
Location:	Balbriggan, Co. Dublin	Northing:	758742.779	Date Completed:	04/08/2023
Client:	Vida M1 Limited	Elevation:	40.74	Drilled By:	G. Macken
Engineer:	Clifton Scannell Emerson Associates	Rig Type:	Beratta T25	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples	Rock Indices TCR/%	SCR/%	RQD/%	Fi/m	Backfill
0.5 1.0 1.5 2.0 2.5	2.60	Open hole drilling: Driller reports returns of brown slightly sandy slightly gravelly silty CLAY with cobbles.		40.5 40.0 39.5 39.0 38.5	38.14						
3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 10.0 10.5 11.0 11.5 12.0 12.5 13.0 13.5 14.0	14.00	Open hole drilling: Driller reports returns of black slightly sandy slightly gravelly silty CLAY with cobbles.		38.0 37.5 37.0 36.5 36.0 35.5 35.0 34.5 34.0 33.5 33.0 32.5 32.0 31.5 31.0 30.5 30.0 29.5 29.0 28.5 28.0 27.5 27.0	26.74	N=48 (7,8/10,12,12,14) N=50 (9,10/50 for 245mm) 50 (10,12/50 for 175mm) 50 (25 for 135mm/50 for 150mm)					
14.5 15.0 15.5	15.00	Open hole drilling: Driller reports returns of brown slightly sandy slightly gravelly silty CLAY with cobbles. End of Corehole at 15.00m		26.5 26.0 25.5 25.0	25.74	50 (25 for 105mm/50 for 100mm)					

Installation: From:	To:	Pipe Type:	Backfill: From:	To:	Type:
			0.00	15.00	Arisings

Remarks:
-

Appendix 3

Trial Pit Logs and Photographs

Contract No: 6161A	**Trial Pit Log**				Trial Pit No: **TP01**
Contract:	M1 Business Park - Zone A	Easting:	718038.629	Date:	03/07/2023
Location:	Balbriggan, Co. Dublin	Northing:	758873.192	Excavator:	3CX
Client:	Vida M1 Limited	Elevation:	54.17	Logged By:	D. Monaghan
Engineer:	Clifton Scannell Emerson Associates	Dimensions (LxWxD) (m):	3.00 x 0.90 x 2.50	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
		TOPSOIL.		54.0					
	0.30	Firm becoming stiff brown slightly sandy slightly gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.			53.87				
0.5				53.5		0.50	ES	DM01	
1.0						1.00	B	DM02	
				53.0					
1.5									
	1.70	Stiff black slightly sandy slightly gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.		52.5	52.47				
2.0						2.00	B	DM03	
				52.0					
2.5	2.50	**Pit terminated at 2.50m**			51.67				
				51.5					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - boulders.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 6161A	**Trial Pit Log**				Trial Pit No: **TP02**
Contract:	M1 Business Park - Zone A	Easting:	718233.569	Date:	03/07/2023
Location:	Balbriggan, Co. Dublin	Northing:	758871.608	Excavator:	3CX
Client:	Vida M1 Limited	Elevation:	44.53	Logged By:	D. Monaghan
Engineer:	Clifton Scannell Emerson Associates	Dimensions (LxWxD) (m):	3.00 x 0.90 x 2.70	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
		TOPSOIL.		44.5					
	0.30	Firm brown sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone.			44.23				
0.5				44.0		0.50	ES	DM04	
	0.60	Firm light brown slightly sandy slightly gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.			43.93				
1.0				43.5		1.00	B	DM05	
	1.20	Stiff black slightly sandy slightly gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.			43.33				
1.5				43.0					
2.0				42.5		2.00	B	DM06	▼
2.5				42.0					
	2.70	**Pit terminated at 2.70m**			41.83				

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - boulders.	Pit walls stable.	2.20 Slow	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 6161A	**Trial Pit Log**				Trial Pit No: **TP03**
Contract:	M1 Business Park - Zone A	Easting:	718176.142	Date:	03/07/2023
Location:	Balbriggan, Co. Dublin	Northing:	758807.603	Excavator:	3CX
Client:	Vida M1 Limited	Elevation:	45.92	Logged By:	D. Monaghan
Engineer:	Clifton Scannell Emerson Associates	Dimensions (LxWxD) (m):	3.00 x 0.90 x 2.50	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
		TOPSOIL.							
	0.30	Firm light brown slightly sandy slightly gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.			45.62				
0.5				45.5		0.50	ES	DM07	
1.0				45.0		1.00	B	DM08	
	1.20	Stiff black slightly sandy slightly gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.			44.72				
1.5				44.5					
				44.0					
2.0						2.00	B	DM09	▼
				43.5					
2.5	2.50	**Pit terminated at 2.50m**			43.42				
				43.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - boulders.	Pit walls stable.	2.20 Slow	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 6161A	**Trial Pit Log**				Trial Pit No: **TP04**
Contract:	M1 Business Park - Zone A	Easting:	718217.971	Date:	03/07/2023
Location:	Balbriggan, Co. Dublin	Northing:	758767.433	Excavator:	3CX
Client:	Vida M1 Limited	Elevation:	48.99	Logged By:	D. Monaghan
Engineer:	Clifton Scannell Emerson Associates	Dimensions (LxWxD) (m):	3.00 x 0.90 x 2.70	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
		TOPSOIL.							
	0.30				48.69				
0.5		Firm light brown slightly sandy slightly gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.		48.5		0.50	ES	DM10	
1.0				48.0		1.00	B	DM11	
	1.10				47.89				
		Stiff black slightly sandy slightly gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.							▼
1.5				47.5					
2.0				47.0		2.00	B	DM12	
2.5				46.5					
	2.70	**Pit terminated at 2.70m**			46.29				

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - boulders.	Pit walls stable.	1.60 Slow	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 6161A	**Trial Pit Log**				Trial Pit No: **TP05**
Contract:	M1 Business Park - Zone A	Easting:	718164.432	Date:	03/07/2023
Location:	Balbriggan, Co. Dublin	Northing:	758683.626	Excavator:	3CX
Client:	Vida M1 Limited	Elevation:	46.89	Logged By:	D. Monaghan
Engineer:	Clifton Scannell Emerson Associates	Dimensions (LxWxD) (m):	3.00 x 0.90 x 1.80	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
		TOPSOIL.							
	0.30	Firm light brown slightly sandy slightly gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.			46.59				
0.5				46.5		0.50	ES	DM13	
1.0				46.0		1.00	B	DM14	
1.5				45.5					
	1.60	Stiff black slightly sandy slightly gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.			45.29				
	1.80	**Pit terminated at 1.80m**			45.09				
2.0				45.0					
				44.5					
2.5									
				44.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - boulders.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 6161A	**Trial Pit Log**				Trial Pit No: **TP06**
Contract:	M1 Business Park - Zone A	Easting:	718026.098	Date:	03/07/2023
Location:	Balbriggan, Co. Dublin	Northing:	758700.135	Excavator:	3CX
Client:	Vida M1 Limited	Elevation:	52.38	Logged By:	D. Monaghan
Engineer:	Clifton Scannell Emerson Associates	Dimensions (LxWxD) (m):	3.00 x 0.90 x 2.20	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
		TOPSOIL.							
	0.30				52.08				
0.5		Firm light brown slightly sandy slightly gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.		52.0		0.50	ES	DM15	
1.0				51.5		1.00	B	DM16	
	1.30				51.08				
1.5		Stiff black slightly sandy slightly gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.		51.0					
2.0				50.5		2.00	B	DM17	
	2.20	**Pit terminated at 2.20m**			50.18				
2.5				50.0					
				49.5					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - boulders.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

TP01 Sidewall

TP01 Spoil

TP02 Sidewall

TP02 Spoil

TP03 Sidewall

TP03 Spoil

TP04 Sidewall

TP04 Spoil

TP05 Sidewall

TP05 Spoil

TP06 Sidewall

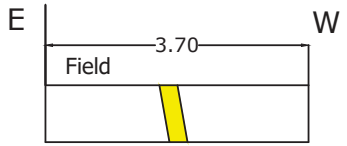
TP06 Spoil

Appendix 4

Slit Trench Logs and Photographs

ST01

Plan



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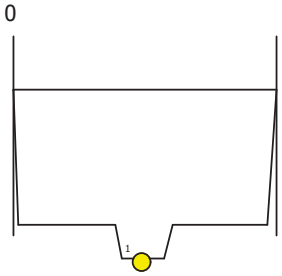


Services

No:	Diameter:	Colour:	Utility:	Distance:	Depth:	Alignment:
1	250mm	Yellow	Gas	1.80m	2.30m	80°

Ground Conditions

From:	To:	Description:
0.00m	0.30m	TOPSOIL.
0.30m	0.80m	Firm brown grey slightly sandy slightly gravelly silty CLAY with high cobble content.
0.80m	1.90m	Firm grey brown slightly sandy slightly gravelly silty CLAY with high cobble content and occasional gravel laminas.
Slight water seepages at 0.90mbgl, medium water ingress at 1.60mbgl.		

Trench Dimensions

Point:	Easting:	Northing:	Level:
Start	718088.835	758981.316	46.01
Gas Main	718086.829	758981.560	44.31
End	718084.890	758981.646	46.42

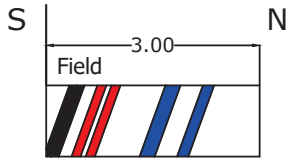
Length:	Width:	Depth:
3.70m	3.20m	1.90m

SITE INVESTIGATIONS LTD

Project:	M1 Business Park - Zone A	Logged by: M.Kaliski	Excavation Started: 25/07/2023	Excavation Finished: 25/07/2023	CONTRACT NUMBER
Client:	Vida M1 Limited	Scale: NOT TO SCALE, ALL DISTANCES IN m			6161A
Consultant:	Clifton Scannell Emerson Associates	DEPTH ARE TO THE TOP OF SERVICES			

ST02

Plan



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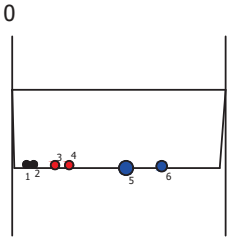


Services

No:	Diameter:	Colour:	Utility:	Distance:	Depth:	Alignment:
1	100mm	Grey	Telecom	0.20m	1.00m	110°
2	100mm	Grey	Telecom	0.30m	1.00m	110°
3	120mm	Red	ESB	0.60m	1.00m	110°
4	120mm	Red	ESB	0.80m	1.00m	110°
5	200mm	Blue	Water	1.60m	1.00m	110°
6	150mm	Blue	Water	2.10m	1.00m	110°

Ground Conditions

From:	To:	Description:
0.00m	0.30m	TOPSOIL.
0.30m	0.90m	MADE GROUND: brown slightly sandy slightly gravelly silty clay.
0.90m	1.00m	MADE GROUND: light brown sand.

Trench Dimensions

Point:	Easting:	Northing:	Level:
Start	718164.797	759008.024	43.17
End	718164.677	759004.658	43.06

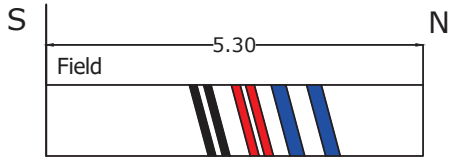
Length:	Width:	Depth:
3.00m	0.65m	0.35m

SITE INVESTIGATIONS LTD

Project:	M1 Business Park - Zone A	Logged by: D.Monaghan	Excavation Started: 04/07/2023	Excavation Finished: 04/07/2023	CONTRACT NUMBER
Client:	Vida M1 Limited	Scale: NOT TO SCALE, ALL DISTANCES IN m			6161A
Consultant:	Clifton Scannell Emerson Associates	DEPTH ARE TO THE TOP OF SERVICES			

ST03

Plan



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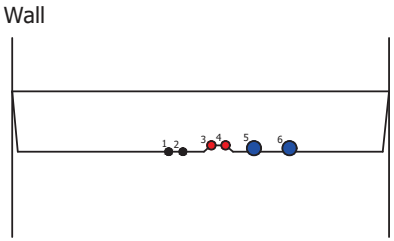


Services

No:	Diameter:	Colour:	Utility:	Distance:	Depth:	Alignment:
1	100mm	Grey	Telecom	2.20m	0.80m	75°
2	100mm	Grey	Telecom	2.40m	0.80m	75°
3	120mm	Red	ESB	2.80m	0.70m	75°
4	120mm	Red	ESB	3.00m	0.70m	75°
5	200mm	Blue	Water	3.40m	0.70m	75°
6	200mm	Blue	Water	3.90m	0.70m	75°

Ground Conditions

From:	To:	Description:
0.00m	0.30m	TOPSOIL.
0.30m	0.60m	MADE GROUND: brown slightly sandy slightly gravelly silty clay.
0.60m	0.80m	MADE GROUND: light brown sand.

Trench Dimensions

Point:	Easting:	Northing:	Level:
Start	718298.417	758978.657	45.94
End	718297.323	758975.252	45.99

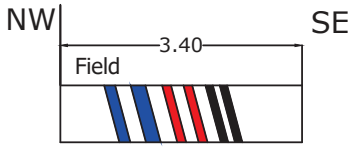
Length:	Width:	Depth:
5.50m	0.50m	0.80m

SITE INVESTIGATIONS LTD

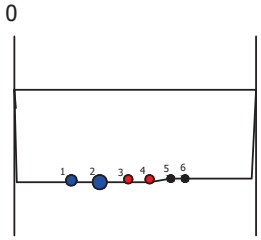
Project:	M1 Business Park - Zone A	Logged by: M. Kaliski	Excavation Started: 04/07/2023	Excavation Finished: 04/07/2023	CONTRACT NUMBER
Client:	Vida M1 Limited	Scale: NOT TO SCALE, ALL DISTANCES IN m			6161A
Consultant:	Clifton Scannell Emerson Associates	DEPTH ARE TO THE TOP OF SERVICES			

ST04

Plan



Cross Section



Services

No:	Diameter:	Colour:	Utility:	Distance:	Depth:	Alignment:
1	150mm	Blue	Water	0.80m	1.20m	75°
2	200mm	Blue	Water	1.20m	1.20m	75°
3	120mm	Red	ESB	1.60m	1.20m	75°
4	120mm	Red	ESB	1.90m	1.20m	75°
5	100mm	Grey	Telecom	2.20m	1.20m	75°
6	100mm	Grey	Telecom	2.40m	1.20m	75°

Ground Conditions

From:	To:	Description:
0.00m	0.30m	TOPSOIL.
0.30m	1.50m	Firm brown black sandy slightly gravelly silty CLAY with low cobble content.

Trench Dimensions

Point:	Easting:	Northing:	Level:
Start	718011.089	758950.553	48.08
End	718014.727	758949.355	47.89

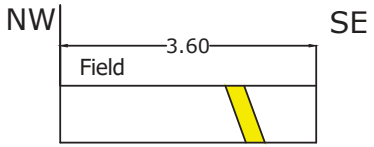
Length:	Width:	Depth:
3.40m	0.65m	1.20m

SITE INVESTIGATIONS LTD

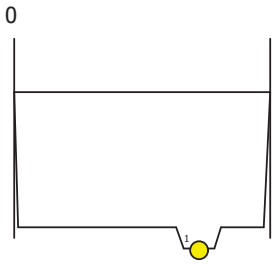
Project:	M1 Business Park - Zone A	Logged by: D.Monaghan	Excavation Started: 04/07/2023	Excavation Finished: 04/07/2023	CONTRACT NUMBER
Client:	Vida M1 Limited	Scale: NOT TO SCALE, ALL DISTANCES IN m			6161A
Consultant:	Clifton Scannell Emerson Associates	DEPTH ARE TO THE TOP OF SERVICES			

ST05

Plan



Cross Section



Services

No:	Diameter:	Colour:	Utility:	Distance:	Depth:	Alignment:
1	250mm	Yellow	Gas	2.60m	2.10m	70°

Ground Conditions

From:	To:	Description:
0.00m	0.30m	TOPSOIL.
0.30m	2.20m	Firm brown grey slightly sandy slightly gravelly silty CLAY with high cobble content and frequent gravel laminas.
Slight water seepages at 0.90mbgl, medium ingress at 1.90mbgl.		

Trench Dimensions

Point:	Easting:	Northing:	Level:
Start	718094.197	758924.514	44.02
Gas Main	718091.522	758925.381	42.20
End	718090.430	758925.575	44.34

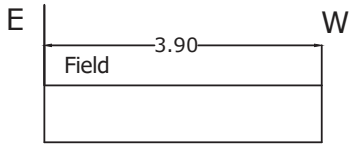
Length:	Width:	Depth:
3.60m	2.40m	2.20m

SITE INVESTIGATIONS LTD

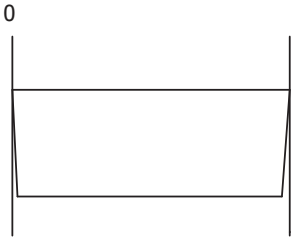
Project:	M1 Business Park - Zone A	Logged by: M.Kaliski	Excavation Started: 25/07/2023	Excavation Finished: 25/07/2023	CONTRACT NUMBER
Client:	Vida M1 Limited	Scale: NOT TO SCALE, ALL DISTANCES IN m			6161A
Consultant:	Clifton Scannell Emerson Associates	DEPTH ARE TO THE TOP OF SERVICES			

ST06

Plan



Cross Section



Services

No:	Diameter:	Colour:	Utility:	Distance:	Depth:	Alignment:
No services						

Ground Conditions

From:	To:	Description:
0.00m	0.20m	TOPSOIL.
0.20m	0.90m	Soft becoming firm brown sandy gravelly silty CLAY with low cobble content.
0.90m	1.50m	Firm dark grey slightly sandy gravelly silty CLAY with low cobble content.

Trench Dimensions

Point:	Easting:	Northing:	Level:
Start	718100.475	758851.457	43.71
End	718096.870	758853.313	43.94

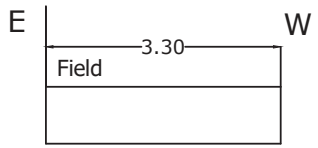
Length:	Width:	Depth:
3.90m	1.70m	1.50m

SITE INVESTIGATIONS LTD

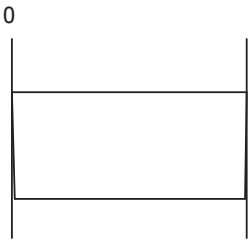
Project:	M1 Business Park - Zone A	Logged by: M.Kaliski	Excavation Started: 28/06/2023	Excavation Finished: 28/06/2023	CONTRACT NUMBER
Client:	Vida M1 Limited	Scale: NOT TO SCALE, ALL DISTANCES IN m			6161A
Consultant:	Clifton Scannell Emerson Associates	DEPTH ARE TO THE TOP OF SERVICES			

ST07

Plan



Cross Section



Services

No:	Diameter:	Colour:	Utility:	Distance:	Depth:	Alignment:
No services						

Ground Conditions

From:	To:	Description:
0.00m	0.30m	TOPSOIL with red brick fragments.
0.30m	1.20m	Soft grey brown sandy slightly gravelly silty CLAY with low cobble content.
1.20m	1.50m	Firm dark grey sandy slightly gravelly silty CLAY with low cobble content.
Water seepages at 1.50mbgl.		

Trench Dimensions

Point:	Easting:	Northing:	Level:
Start	718105.835	758769.948	42.05
End	718102.377	758771.783	42.27

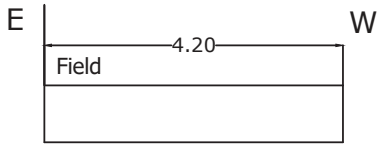
Length:	Width:	Depth:
3.30m	1.60m	1.50m

SITE INVESTIGATIONS LTD

Project:	M1 Business Park - Zone A	Logged by: M.Kaliski	Excavation Started: 28/06/2023	Excavation Finished: 28/06/2023	CONTRACT NUMBER
Client:	Vida M1 Limited	Scale: NOT TO SCALE, ALL DISTANCES IN m			6161A
Consultant:	Clifton Scannell Emerson Associates	DEPTH ARE TO THE TOP OF SERVICES			

ST08

Plan



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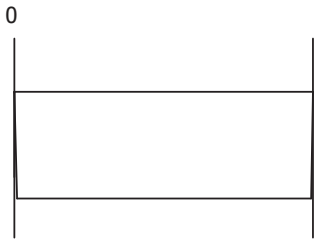


Services

No:	Diameter:	Colour:	Utility:	Distance:	Depth:	Alignment:
No services						

Ground Conditions

From:	To:	Description:
0.00m	0.30m	TOPSOIL.
0.30m	0.90m	Soft grey brown sandy slightly gravelly silty CLAY with medium cobble content.
1.20m	1.50m	Firm grey brown sandy slightly gravelly silty CLAY with low cobble content.

Trench Dimensions

Point:	Easting:	Northing:	Level:
Start	718111.848	758701.485	42.08
End	718108.136	758703.038	42.15

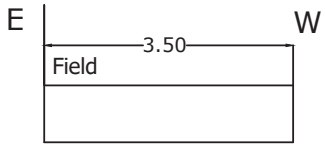
Length:	Width:	Depth:
4.20m	1.60m	1.50m

SITE INVESTIGATIONS LTD

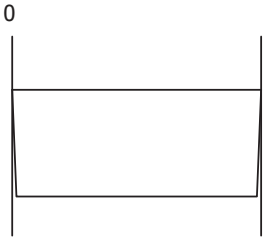
Project:	M1 Business Park - Zone A	Logged by: M.Kaliski	Excavation Started: 28/06/2023	Excavation Finished: 28/06/2023	CONTRACT NUMBER
Client:	Vida M1 Limited	Scale: NOT TO SCALE, ALL DISTANCES IN m			6161A
Consultant:	Clifton Scannell Emerson Associates	DEPTH ARE TO THE TOP OF SERVICES			

ST09

Plan



Cross Section



Services

No:	Diameter:	Colour:	Utility:	Distance:	Depth:	Alignment:
No services						

Ground Conditions

From:	To:	Description:
0.00m	0.30m	TOPSOIL.
0.30m	0.80m	Soft grey brown sandy slightly gravelly silty CLAY with low cobble content.
0.80m	1.50m	Firm dark grey sandy slightly gravelly silty CLAY with low cobble content.

Trench Dimensions

Point:	Easting:	Northing:	Level:
Start	718119.654	758622.515	42.52
End	718115.911	758622.019	42.34

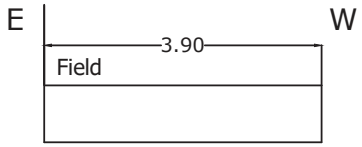
Length:	Width:	Depth:
3.50m	1.40m	1.50m

SITE INVESTIGATIONS LTD

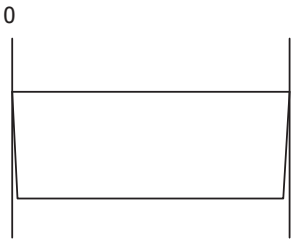
Project:	M1 Business Park - Zone A	Logged by: M.Kaliski	Excavation Started: 28/06/2023	Excavation Finished: 28/06/2023	CONTRACT NUMBER
Client:	Vida M1 Limited	Scale: NOT TO SCALE, ALL DISTANCES IN m			6161A
Consultant:	Clifton Scannell Emerson Associates	DEPTH ARE TO THE TOP OF SERVICES			

ST10

Plan



Cross Section



Services

No:	Diameter:	Colour:	Utility:	Distance:	Depth:	Alignment:
No services						

Ground Conditions

From:	To:	Description:
0.00m	0.30m	TOPSOIL.
0.30m	1.30m	Soft grey brown sandy slightly gravelly silty CLAY with low cobble content.
1.30m	1.50m	Firm grey brown sandy slightly gravelly silty CLAY with low cobble content.

Trench Dimensions

Point:	Easting:	Northing:	Level:
Start	718124.208	758555.427	41.84
End	718120.513	758555.005	41.90

Length:	Width:	Depth:
3.90m	1.50m	0.65m

SITE INVESTIGATIONS LTD

Project:	M1 Business Park - Zone A	Logged by: M.Kaliski	Excavation Started: 28/06/2023	Excavation Finished: 28/06/2023	CONTRACT NUMBER
Client:	Vida M1 Limited	Scale: NOT TO SCALE, ALL DISTANCES IN m			6161A
Consultant:	Clifton Scannell Emerson Associates	DEPTH ARE TO THE TOP OF SERVICES			

ST01 looking East

ST01 250 Gas Pipe

ST02 Sidewall

ST02 Spoil

ST03 Sidewall

ST03 Spoil

ST04 Sidewall

ST04 Spoil

ST05 looking South East

ST05 250 Gas Pipe

ST06 looking South East

ST06 Spoil

ST07 looking South East

ST07 Spoil

ST08 looking South East

ST08 Spoil

ST09 looking North East

ST09 Spoil

ST10 looking North East

ST10 Spoil

Appendix 5

Soakaway Test Results and Photographs

SOAKAWAY TEST

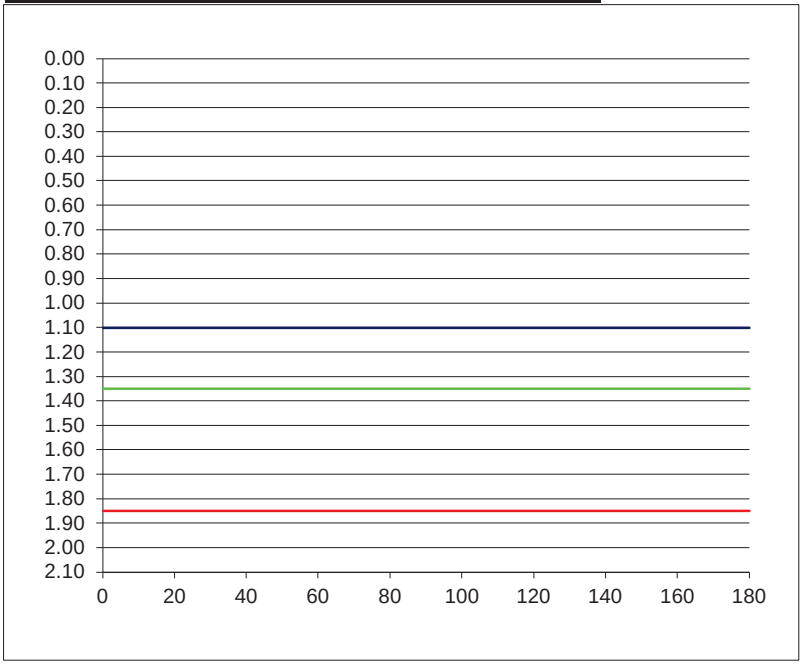
Project Reference:	6161A
Contract name:	M1 Business Park - Zone A
Location:	Balbriggan, Co. Dublin
Test No:	SA01
Date:	03/07/2023

Ground Conditions

From	To	
0.00	0.30	TOPSOIL.
0.30	1.60	Firm brown slightly sandy slightly gravelly silty CLAY with low cobble content.
1.60	2.10	Stiff black slightly sandy slightly gravelly silty CLAY with low cobble content.

Elapsed Time (mins)	Fall of Water (m)
0	1.10
0.5	1.10
1	1.10
1.5	1.10
2	1.10
2.5	1.10
3	1.10
3.5	1.10
4	1.10
4.5	1.10
5	1.10
6	1.10
7	1.10
8	1.10
9	1.10
10	1.10
12	1.10
14	1.10
16	1.10
18	1.10
20	1.10
25	1.10
30	1.10
40	1.10
50	1.10
60	1.10
75	1.10
90	1.10
120	1.10
150	1.10
180	1.10

Pit Dimensions (m)		
Length (m)	2.70	m
Width (m)	0.70	m
Depth	2.10	m
Water		
Start Depth of Water	1.10	m
Depth of Water	1.00	m
75% Full	1.35	m
25% Full	1.85	m
75%-25%	0.50	m
Volume of water (75%-25%)	**0.95**	m3
Area of Drainage	**14.28**	m2
Area of Drainage (75%-25%)	**5.29**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec



f = **Fail** **m/min** or **Fail** **m/s**

SOAKAWAY TEST

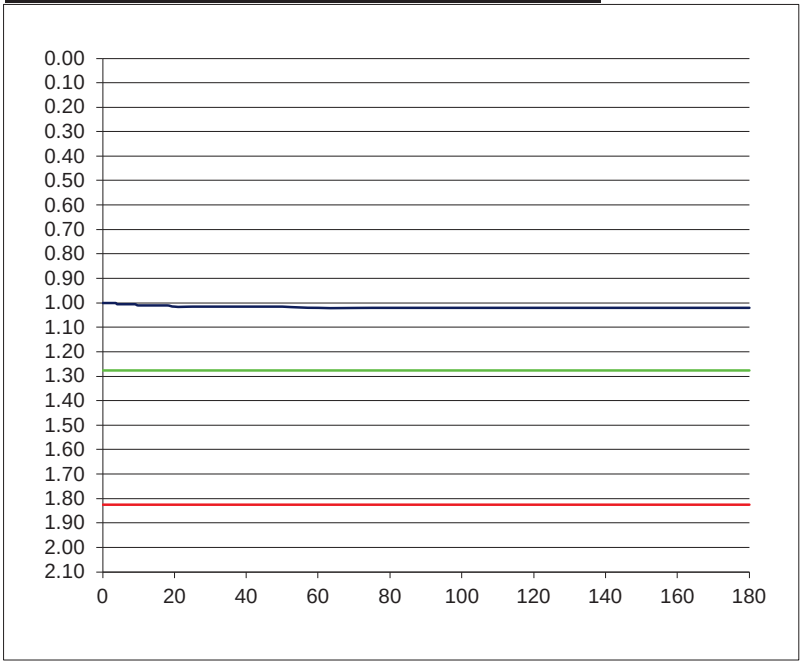
Project Reference:	6161A
Contract name:	M1 Business Park - Zone A
Location:	Balbriggan, Co. Dublin
Test No:	SA02
Date:	03/07/2023

Ground Conditions

From	To	
0.00	0.30	TOPSOIL.
0.30	2.10	Firm becoming stiff brown slightly sandy slightly gravelly silty CLAY with low cobble content.

Elapsed Time (mins)	Fall of Water (m)
0	1.00
0.5	1.00
1	1.00
1.5	1.00
2	1.00
2.5	1.00
3	1.00
3.5	1.00
4	1.01
4.5	1.01
5	1.01
6	1.01
7	1.01
8	1.01
9	1.01
10	1.01
12	1.01
14	1.01
16	1.01
18	1.01
20	1.02
25	1.02
30	1.02
40	1.02
50	1.02
60	1.02
75	1.02
90	1.02
120	1.02
150	1.02
180	1.02

Pit Dimensions (m)		
Length (m)	2.80	m
Width (m)	0.70	m
Depth	2.10	m
Water		
Start Depth of Water	1.00	m
Depth of Water	1.10	m
75% Full	1.28	m
25% Full	1.83	m
75%-25%	0.55	m
Volume of water (75%-25%)	**1.08**	m3
Area of Drainage	**14.70**	m2
Area of Drainage (75%-25%)	**5.81**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec



f = **Fail** m/min or **Fail** m/s

SOAKAWAY TEST

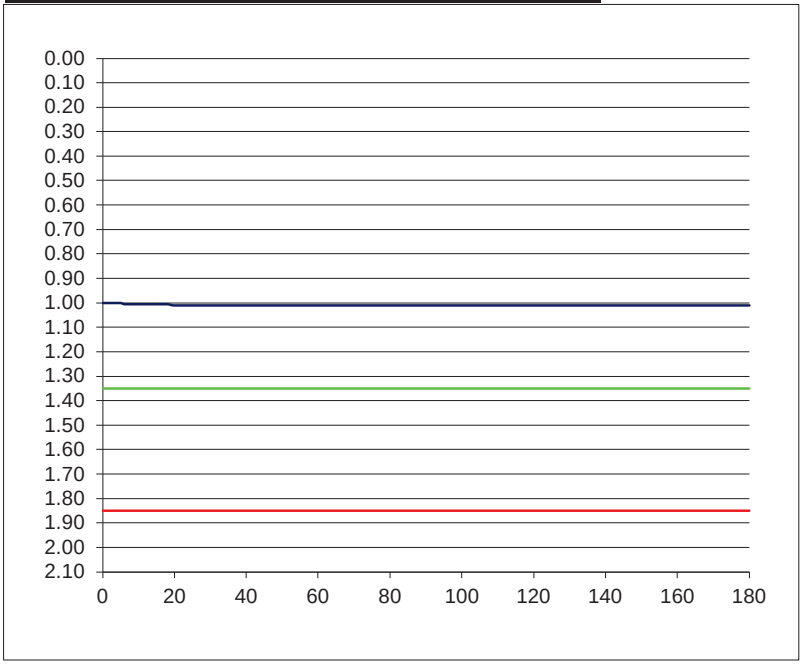
Project Reference:	6161A
Contract name:	M1 Business Park - Zone A
Location:	Balbriggan, Co. Dublin
Test No:	SA03
Date:	03/07/2023

Ground Conditions

From	To	
0.00	0.30	TOPSOIL.
0.30	2.10	Firm becoming stiff brown slightly sandy slightly gravelly silty CLAY with low cobble content.

Elapsed Time (mins)	Fall of Water (m)
0	1.00
0.5	1.00
1	1.00
1.5	1.00
2	1.00
2.5	1.00
3	1.00
3.5	1.00
4	1.00
4.5	1.00
5	1.00
6	1.01
7	1.01
8	1.01
9	1.01
10	1.01
12	1.01
14	1.01
16	1.01
18	1.01
20	1.01
25	1.01
30	1.01
40	1.01
50	1.01
60	1.01
75	1.01
90	1.01
120	1.01
150	1.01
180	1.01

Pit Dimensions (m)		
Length (m)	2.70	m
Width (m)	0.70	m
Depth	2.10	m
Water		
Start Depth of Water	1.10	m
Depth of Water	1.00	m
75% Full	1.35	m
25% Full	1.85	m
75%-25%	0.50	m
Volume of water (75%-25%)	**0.95**	m3
Area of Drainage	**14.28**	m2
Area of Drainage (75%-25%)	**5.29**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec



f = **Fail** m/min or **Fail** m/s

SOAKAWAY TEST

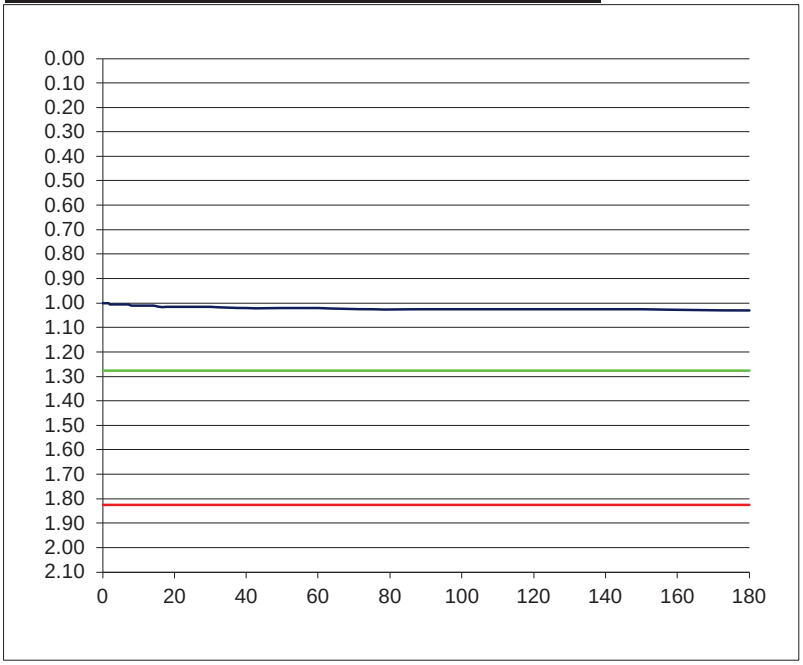
Project Reference:	6161A
Contract name:	M1 Business Park - Zone A
Location:	Balbriggan, Co. Dublin
Test No:	SA04
Date:	03/07/2023

Ground Conditions

From	To	
0.00	0.30	TOPSOIL.
0.30	1.80	Firm brown slightly sandy slightly gravelly silty CLAY with low cobble content.
1.80	2.10	Stiff black slightly sandy slightly gravelly silty CLAY with low cobble content.

Elapsed Time (mins)	Fall of Water (m)
0	1.00
0.5	1.00
1	1.00
1.5	1.00
2	1.01
2.5	1.01
3	1.01
3.5	1.01
4	1.01
4.5	1.01
5	1.01
6	1.01
7	1.01
8	1.01
9	1.01
10	1.01
12	1.01
14	1.01
16	1.02
18	1.02
20	1.02
25	1.02
30	1.02
40	1.02
50	1.02
60	1.02
75	1.03
90	1.03
120	1.03
150	1.03
180	1.03

Pit Dimensions (m)		
Length (m)	2.90	m
Width (m)	0.70	m
Depth	2.10	m
Water		
Start Depth of Water	1.00	m
Depth of Water	1.10	m
75% Full	1.28	m
25% Full	1.83	m
75%-25%	0.55	m
Volume of water (75%-25%)	**1.12**	m3
Area of Drainage	**15.12**	m2
Area of Drainage (75%-25%)	**5.99**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec



f = **Fail** m/min or **Fail** m/s

SOAKAWAY TEST

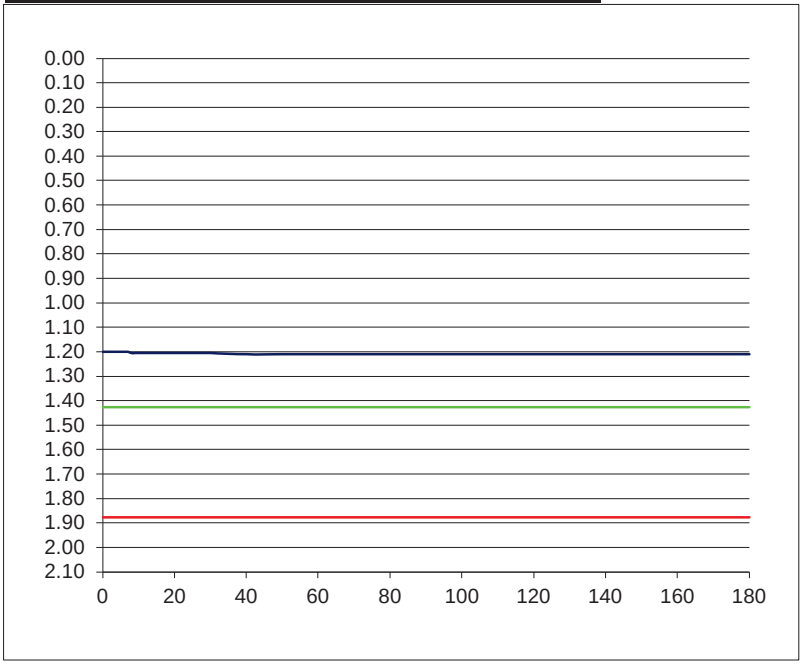
Project Reference:	6161A
Contract name:	M1 Business Park - Zone A
Location:	Balbriggan, Co. Dublin
Test No:	SA05
Date:	03/07/2023

Ground Conditions

From	To	
0.00	0.30	TOPSOIL.
0.30	2.10	Firm becoming stiff brown slightly sandy slightly gravelly silty CLAY with low cobble content.

Elapsed Time (mins)	Fall of Water (m)
0	1.20
0.5	1.20
1	1.20
1.5	1.20
2	1.20
2.5	1.20
3	1.20
3.5	1.20
4	1.20
4.5	1.20
5	1.20
6	1.20
7	1.20
8	1.21
9	1.21
10	1.21
12	1.21
14	1.21
16	1.21
18	1.21
20	1.21
25	1.21
30	1.21
40	1.21
50	1.21
60	1.21
75	1.21
90	1.21
120	1.21
150	1.21
180	1.21

Pit Dimensions (m)		
Length (m)	2.80	m
Width (m)	0.70	m
Depth	2.10	m
Water		
Start Depth of Water	1.20	m
Depth of Water	0.90	m
75% Full	1.43	m
25% Full	1.88	m
75%-25%	0.45	m
Volume of water (75%-25%)	**0.88**	m3
Area of Drainage	**14.70**	m2
Area of Drainage (75%-25%)	**5.11**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec



f = **Fail** **m/min** or **Fail** **m/s**

SA01 Sidewall

SA01 Spoil

SA02 Sidewall

SA02 Spoil

SA03 Sidewall

SA03 Spoil

SA04 Sidewall

SA04 Spoil

SA05 Sidewall

SA05 Spoil

Appendix 6

Insitu California Bearing Ratio Test Results

California Bearing Ratio (CBR) In accordance with BS1377: Part 4: Method 7

Client	Vida M1 Limited
Site	M1 Business Park -Zone A
S.I. File No	6161A / 23
Test Lab	Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email info@siteinvestigations.ie
Report Date	1st August 2023

CBR No	Depth (mBGL)	Sample No	Lab Ref	Sample Type	Moisture Content (%)	CBR Value (%)	Location / Remarks
1	0.50	DM40	23/873	B	26.5	6.7	
2	0.50	DM41	23/874	B	13.5	6.0	
3	0.50	DM42	23/875	B	23.9	6.9	
4	0.50	DM43	23/876	B	16.4	7.7	
5	0.50	DM44	23/877	B	28.9	6.2	

Appendix 7

Geotechnical Laboratory Test Results

Classification Tests
In accordance with BS 1377: Part 2

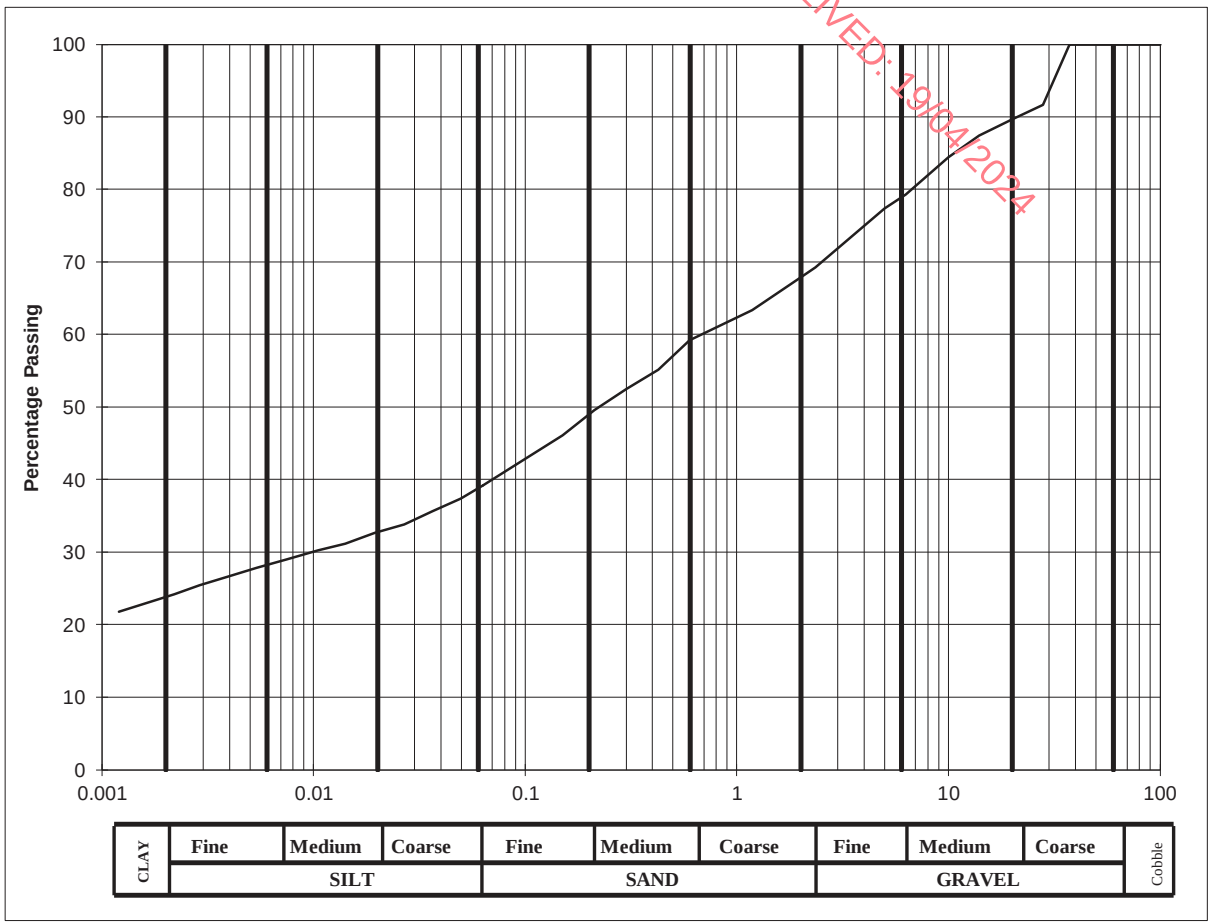
Client	Vida M1 Limited
Site	M1 Business Park -Zone A
S.I. File No	6161A / 23
Test Lab	Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email:info@siteinvestigations.ie
Report Date	1st August 2023

Hole ID	Depth	Sample No	Lab Ref No.	Sample Type	Natural Moisture Content %	Liquid Limit %	Plastic Limit %	Plastic Index %	Max. Density Mg/m^2	Bulk Density Mg/m^3	% passing 425um	Comments	**Remarks** **C**=Clay; **M**=Silt **Plasticity**: **L**=Low; **I**=Intermediate; **H**=High; **V**=Very High; **E**=Extremely High
TP01	1.00	DM02	23/839	B	13.3	33	19	14			55.1		CL
TP02	1.00	DM05	23/840	B	22.1	34	19	15			65.3		CL
TP03	1.00	DM08	23/841	B	24.8	37	20	17			72.9		CI
TP04	1.00	DM11	23/842	B	18.9	35	19	16			66.4		CL/CI
TP05	1.00	DM14	23/843	B	16.9	33	18	15			61.7		CL
TP06	1.00	DM16	23/844	B	14.7	37	21	16			67.0		CI

BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	39
90	100	**0.0200**	33
75	100	**0.0060**	28
63	100	**0.0020**	24
50	100		
37.5	100		
28	91.6		
20	89.6		
14	87.4		
10	84.4		
6.3	79.3		
5.0	77.4		
2.36	69.2		
2.00	67.8		
1.18	63.3		
0.600	59.2		
0.425	55.1		
0.300	52.5		
0.212	49.6		
0.150	46.1		
0.063	39		



Cobbles, %	0
Gravel, %	32
Sand, %	29
Silt, %	15
Clay, %	24

Client :	Vida M1 Limited
Project :	M1 Business Park -Zone A

Lab. No :	23/839
Sample No :	DM02

Hole ID :	TP 01
Depth, m :	1.00

Material description :	slightly sandy slightly gravelly silty CLAY
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

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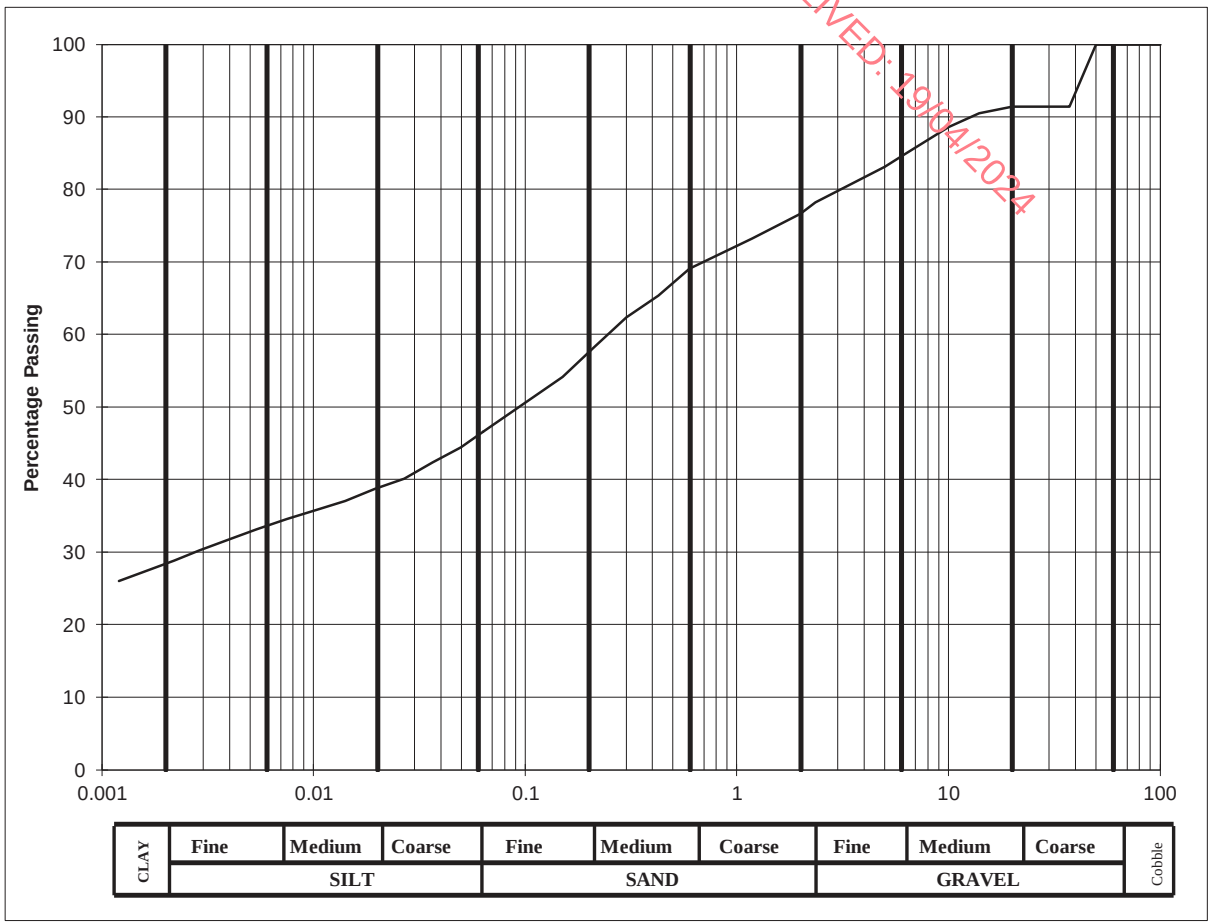
Site Investigations Ltd

BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	47
90	100	**0.0200**	39
75	100	**0.0060**	34
63	100	**0.0020**	28
50	100		
37.5	91.4		
28	91.4		
20	91.4		
14	90.5		
10	88.6		
6.3	84.9		
5.0	83.1		
2.36	78.2		
2.00	76.6		
1.18	73.2		
0.600	69.1		
0.425	65.3		
0.300	62.3		
0.212	58.3		
0.150	54.1		
0.063	47		



Cobbles, %	0
Gravel, %	23
Sand, %	30
Silt, %	19
Clay, %	28

Client :	Vida M1 Limited
Project :	M1 Business Park -Zone A

Lab. No :	23/840
Sample No :	DM05

Hole ID :	TP 02
Depth, m :	1.00

Material description :	slightly sandy slightly gravelly silty CLAY
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

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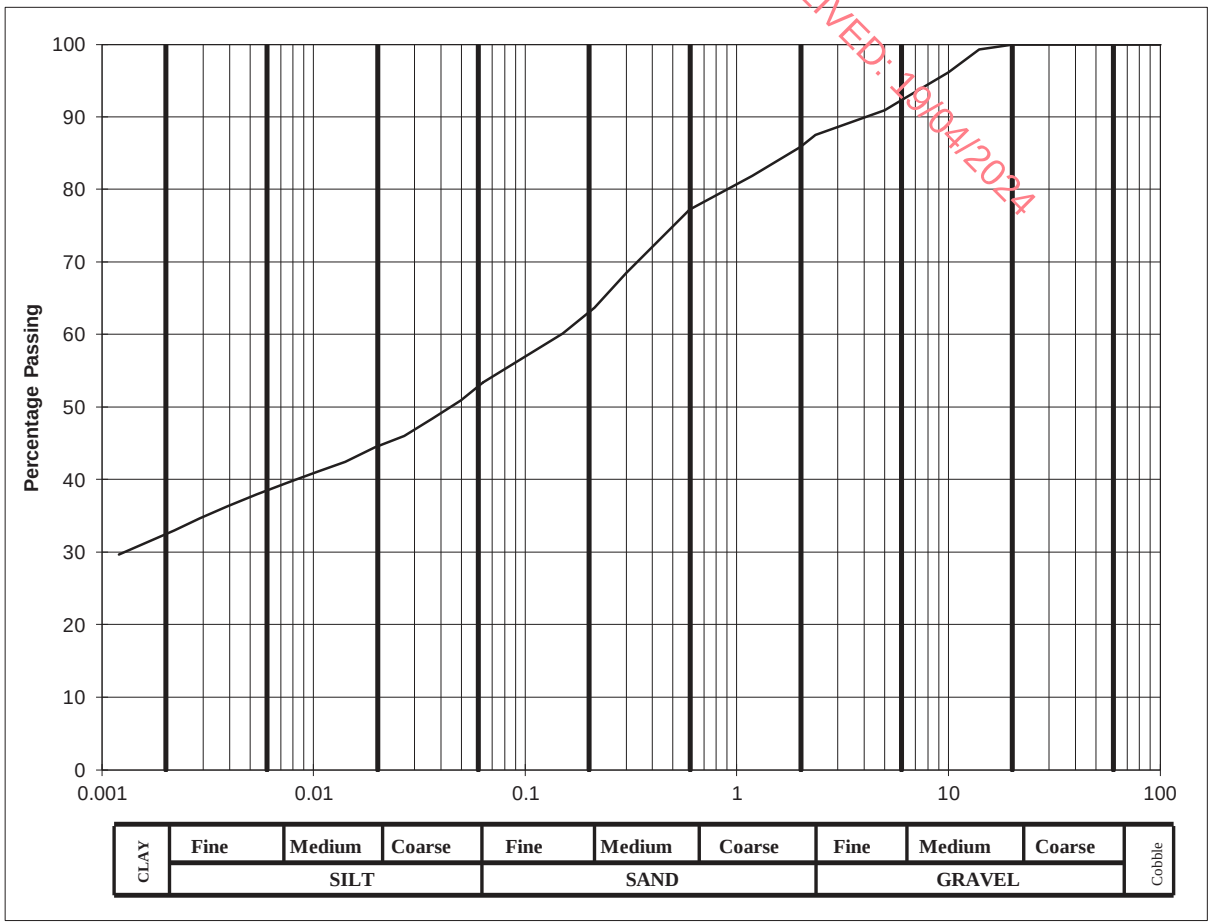
BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	53
90	100	**0.0200**	45
75	100	**0.0060**	39
63	100	**0.0020**	33
50	100		
37.5	100		
28	100		
20	100		
14	99.3		
10	96.1		
6.3	92.6		
5.0	90.9		
2.36	87.5		
2.00	85.8		
1.18	81.8		
0.600	77.2		
0.425	72.9		
0.300	68.5		
0.212	63.7		
0.150	60.1		
0.063	53		



Cobbles, %	0
Gravel, %	14
Sand, %	33
Silt, %	20
Clay, %	33

Client :	Vida M1 Limited
Project :	M1 Business Park -Zone A

Lab. No :	23/841
Sample No :	DM08

Hole ID :	TP 03
Depth, m :	1.00

Material description :	slightly sandy slightly gravelly silty CLAY
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

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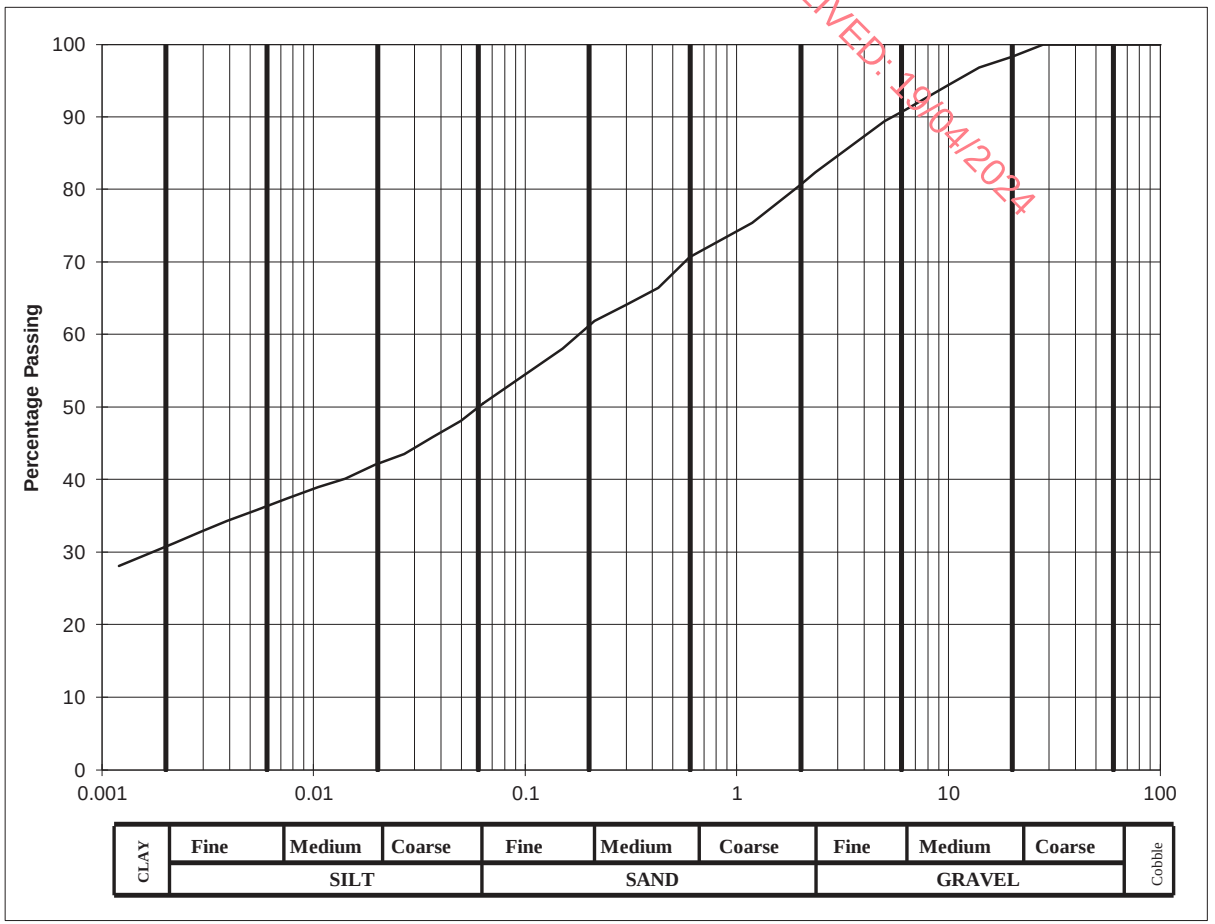
BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	51
90	100	**0.0200**	42
75	100	**0.0060**	37
63	100	**0.0020**	31
50	100		
37.5	100		
28	100		
20	98.3		
14	96.8		
10	94.4		
6.3	91		
5.0	89.4		
2.36	82.3		
2.00	80.6		
1.18	75.4		
0.600	70.6		
0.425	66.4		
0.300	64.1		
0.212	61.8		
0.150	58		
0.063	51		



Cobbles, %	0
Gravel, %	19
Sand, %	30
Silt, %	20
Clay, %	31

Client :	Vida M1 Limited
Project :	M1 Business Park -Zone A

Lab. No :	23/842
Sample No :	DM11

Hole ID :	TP 04
Depth, m :	1.00

Material description :	slightly sandy slightly gravelly silty CLAY
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

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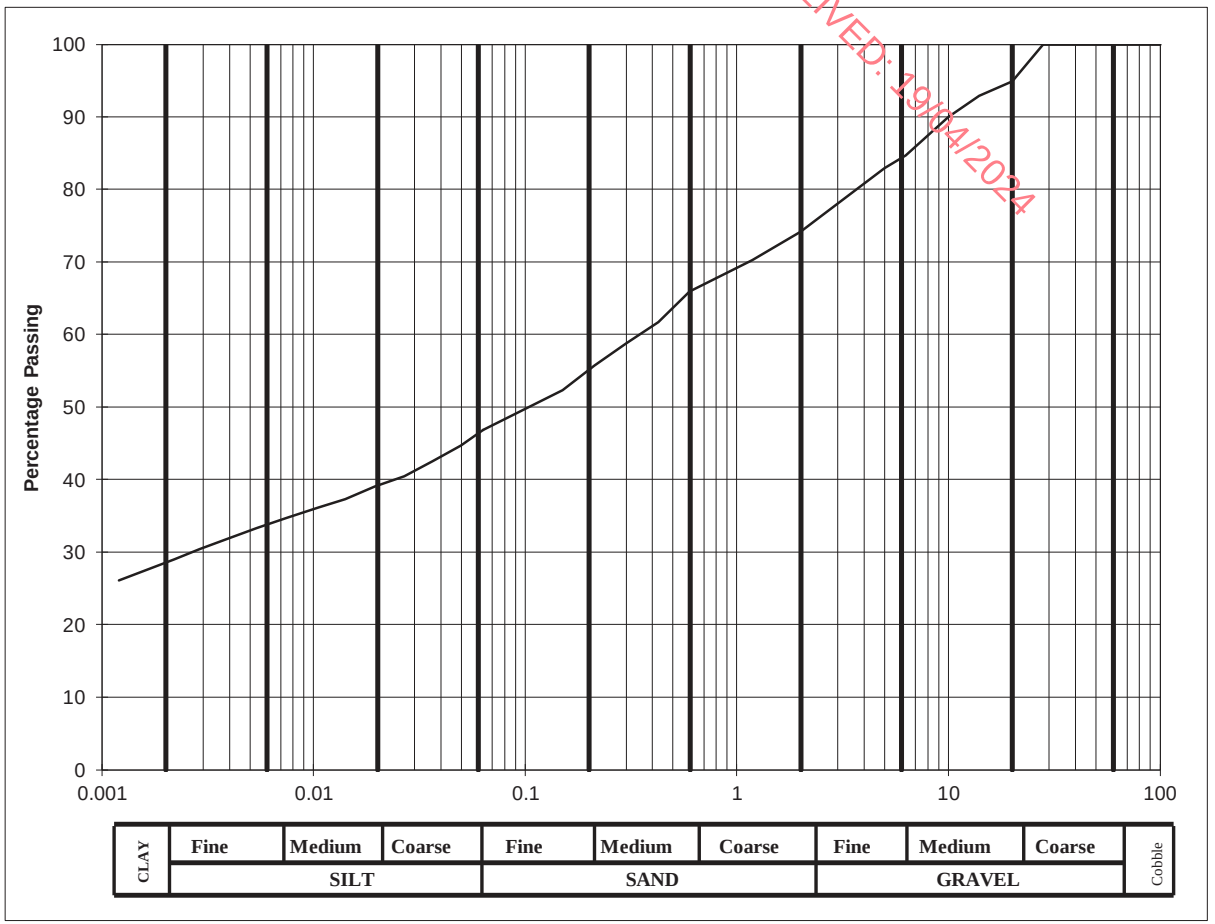
BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	47
90	100	**0.0200**	39
75	100	**0.0060**	34
63	100	**0.0020**	29
50	100		
37.5	100		
28	100		
20	94.9		
14	92.9		
10	90		
6.3	84.7		
5.0	82.9		
2.36	75.7		
2.00	74.1		
1.18	70.2		
0.600	65.9		
0.425	61.7		
0.300	58.8		
0.212	55.7		
0.150	52.3		
0.063	47		



Cobbles, %	0
Gravel, %	26
Sand, %	27
Silt, %	18
Clay, %	29

Client :	Vida M1 Limited
Project :	M1 Business Park -Zone A

Lab. No :	23/843
Sample No :	DM14

Hole ID :	TP 05
Depth, m :	1.00

Material description :	slightly sandy slightly gravelly silty CLAY
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

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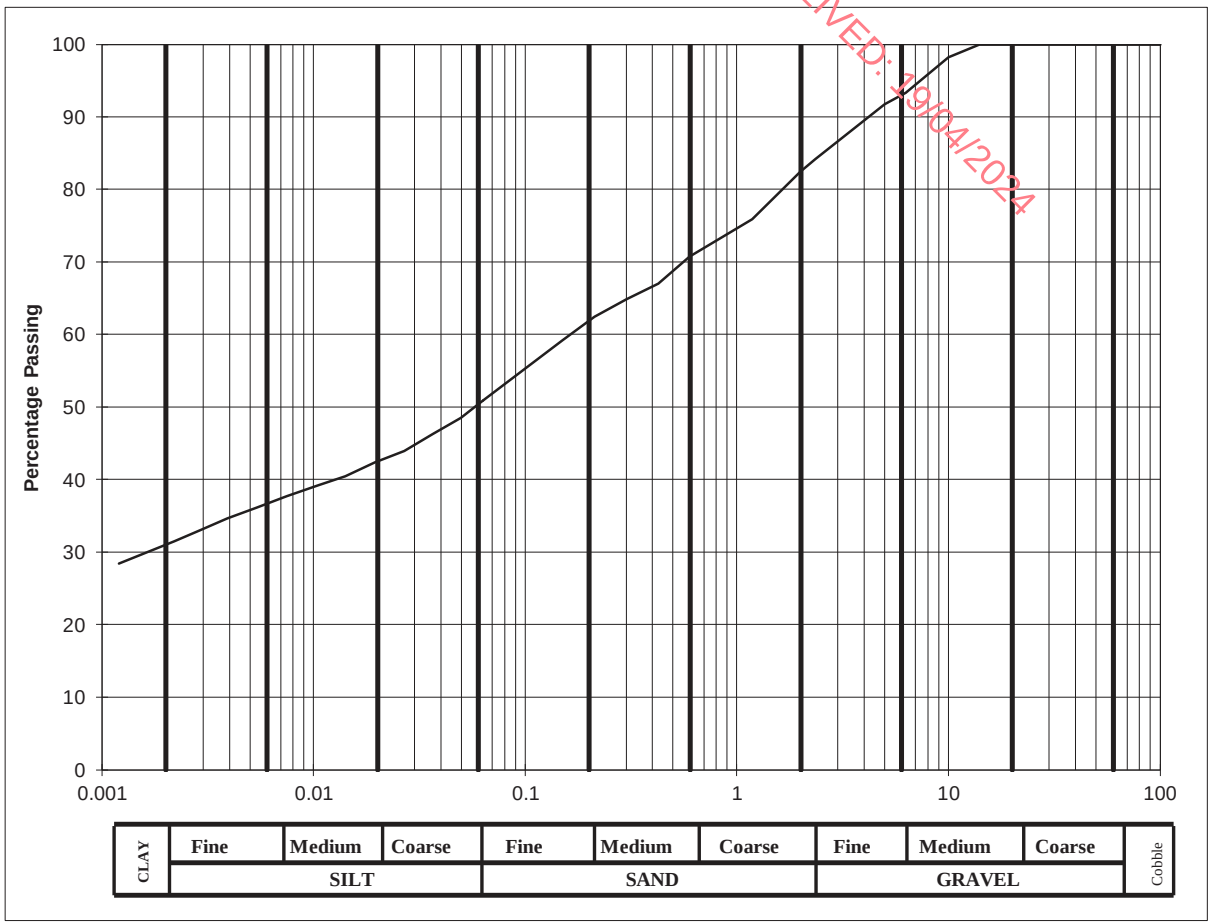
BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	51
90	100	**0.0200**	43
75	100	**0.0060**	37
63	100	**0.0020**	31
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	98.2		
6.3	93.3		
5.0	91.7		
2.36	84.2		
2.00	82.4		
1.18	75.9		
0.600	70.7		
0.425	67		
0.300	64.8		
0.212	62.4		
0.150	59.2		
0.063	51		



Cobbles, %	0
Gravel, %	18
Sand, %	31
Silt, %	20
Clay, %	31

Client :	Vida M1 Limited
Project :	M1 Business Park -Zone A

Lab. No :	23/844
Sample No :	DM16

Hole ID :	TP 06
Depth, m :	1.00

Material description :	slightly sandy slightly gravelly silty CLAY
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

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California Bearing Ratio (CBR) In accordance with BS1377: Part 4: Method 7

Client	Vida M1 Limited
Site	M1 Business Park -Zone A
S.I. File No	6161A / 23
Test Lab	Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email info@siteinvestigations.ie
Report Date	1st August 2023

CBR No	Depth (mBGL)	Sample No	Lab Ref	Sample Type	Moisture Content (%)	CBR Value (%)	Location / Remarks
TP01	1.00	DM02	23/839	B	13.3	8.8	
TP02	1.00	DM05	23/840	B	22.1	5.2	
TP03	1.00	DM08	23/841	B	24.8	7.2	
TP04	1.00	DM11	23/842	B	18.9	8.3	
TP05	1.00	DM14	23/843	B	16.9	7.3	
TP06	1.00	DM16	23/844	B	14.7	9.5	

Determination of Moisture Content BS 1377: Part 2: Method 3
Determination of Moisture Condition Value BS 1377: Part 4

Client	Vida M1 Limited
Site	M1 Business Park -Zone A
S.I.File No	6161A / 23
Test Lab	Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Email info@siteinvestigations.ie
Report date	1st August 2023

Hole ID	Depth	Sample No	Ref No.	Sample Type	Natural Moisture Content %	Moisture Condition Value	Remarks
TP01	1.00	DM02	23/839	B	13.3	7.3	
TP02	1.00	DM05	23/840	B	22.1	6.2	
TP03	1.00	DM08	23/841	B	24.8	6.8	
TP04	1.00	DM11	23/842	B	18.9	5.9	
TP05	1.00	DM14	23/843	B	16.9	7.1	
TP06	1.00	DM16	23/844	B	14.7	8.3	

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Site Investigations Ltd

Dry Density / Moiture Content relationship in accordance with BS 1377 : Part 4

Client	Vida M1 Limited
Site	M1 Business Park -Zone A
S.I.File No	6161A / 23
Test Lab	Site Investigations Ltd., Carhugar, The Grange, 12th Lock Rd., Lucan, Co. Dublin Tel 01 6108768
Report Date	1st August 2023

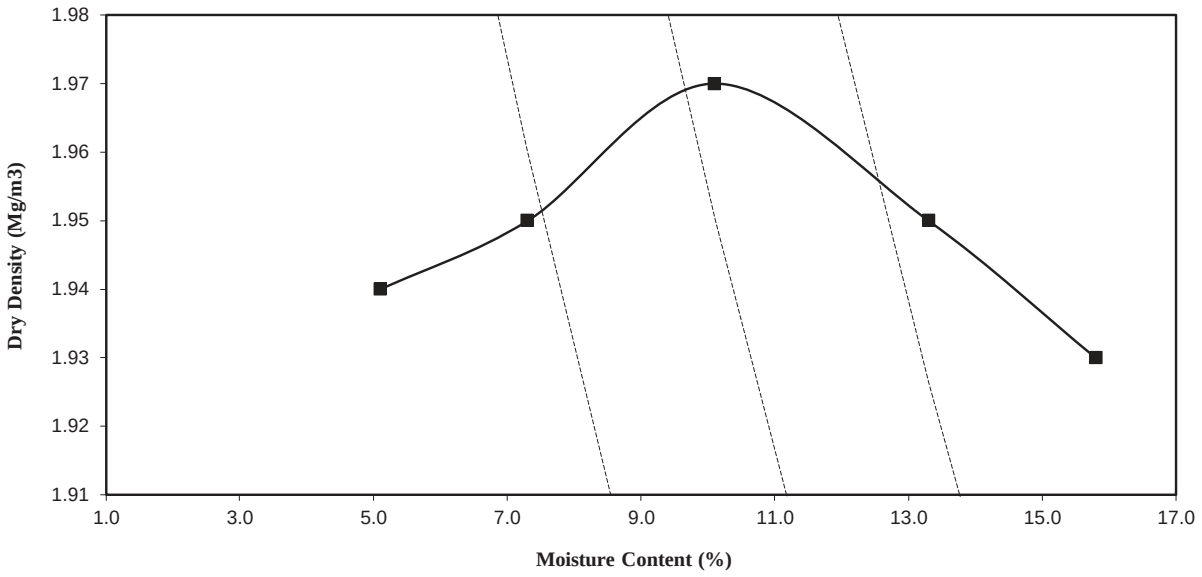
Hole Id:	TP01
Depth (mBGL):	1.00
Lab Ref:	23/839
Sample No	DM02

Particle Density
2.59
Assumed

Natural Moisture Content (%)	13.3
Rammer Used	2.5Kg
Maximum Dry Density (Mg/m^3)	1.97
Optimum Moisture Content (%)	10.1

Point Number	**1**	**2**	**3**	**4**	**5**
Moisture content	5.1	7.3	10.1	13.3	15.8
Dry Density (Mg/m3)	1.94	1.95	1.97	1.95	1.93

Material Description
slightly sandy slightly gravelly silty CLAY



Dry Density / Moiture Content relationship in accordance with BS 1377 : Part 4

Client	Vida M1 Limited
Site	M1 Business Park -Zone A
S.I.File No	6161A / 23
Test Lab	Site Investigations Ltd., Carhugar, The Grange, 12th Lock Rd., Lucan, Co. Dublin Tel 01 6108768
Report Date	1st August 2023

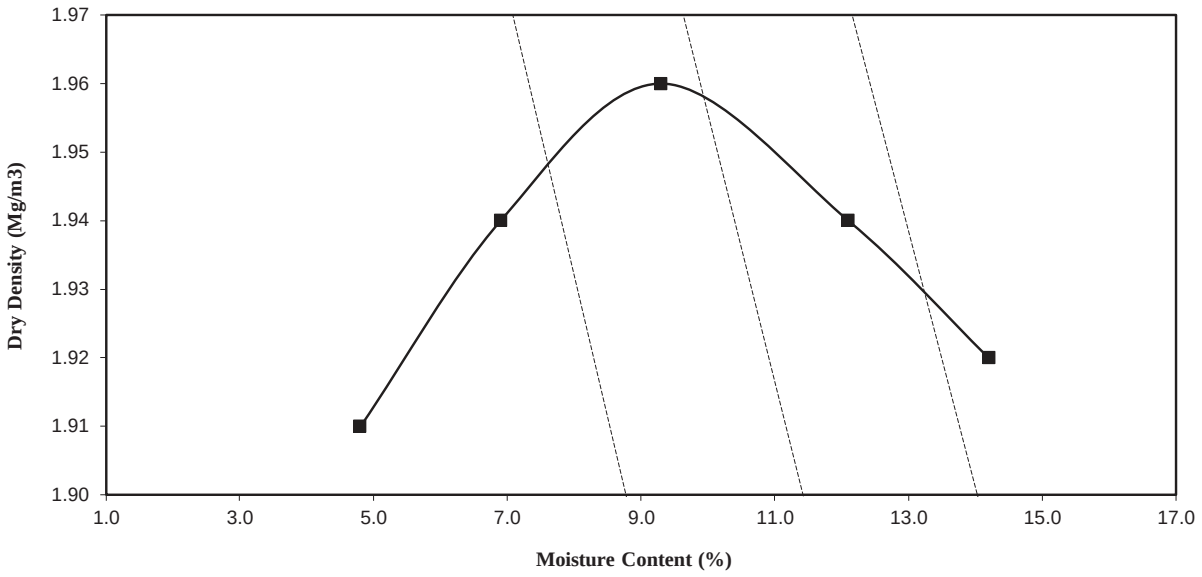
Hole Id:	TP02
Depth (mBGL):	1.00
Lab Ref:	23/840
Sample No	DM05

Particle Density
2.59
Assumed

Natural Moisture Content (%)	22.1
Rammer Used	2.5Kg
Maximum Dry Density (Mg/m^3)	1.96
Optimum Moisture Content (%)	9.3

Point Number	**1**	**2**	**3**	**4**	**5**
Moisture content	4.8	6.9	9.3	12.1	14.2
Dry Density (Mg/m3)	1.91	1.94	1.96	1.94	1.92

Material Description
slightly sandy slightly gravelly silty CLAY



Dry Density / Moiture Content relationship in accordance with BS 1377 : Part 4

Client	Vida M1 Limited
Site	M1 Business Park -Zone A
S.I.File No	6161A / 23
Test Lab	Site Investigations Ltd., Carhugar, The Grange, 12th Lock Rd., Lucan, Co. Dublin Tel 01 6108768
Report Date	1st August 2023

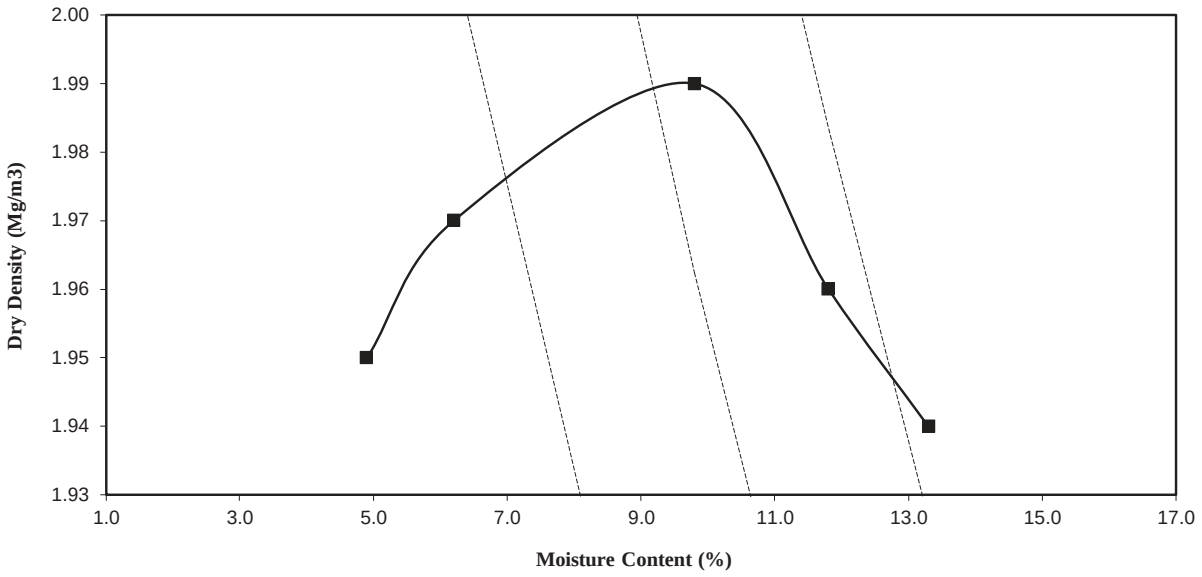
Hole Id:	TP03
Depth (mBGL):	1.00
Lab Ref:	23/841
Sample No	DM08

Particle Density
2.59
Assumed

Natural Moisture Content (%)	24.8
Rammer Used	2.5Kg
Maximum Dry Density (Mg/m^3)	1.99
Optimum Moisture Content (%)	9.6

Point Number	**1**	**2**	**3**	**4**	**5**
Moisture content	4.9	6.2	9.8	11.8	13.3
Dry Density (Mg/m3)	1.95	1.97	1.99	1.96	1.94

Material Description
slightly sandy slightly gravelly silty CLAY



Dry Density / Moiture Content relationship in accordance with BS 1377 : Part 4

Client	Vida M1 Limited
Site	M1 Business Park -Zone A
S.I.File No	6161A / 23
Test Lab	Site Investigations Ltd., Carhugar, The Grange, 12th Lock Rd., Lucan, Co. Dublin Tel 01 6108768
Report Date	1st August 2023

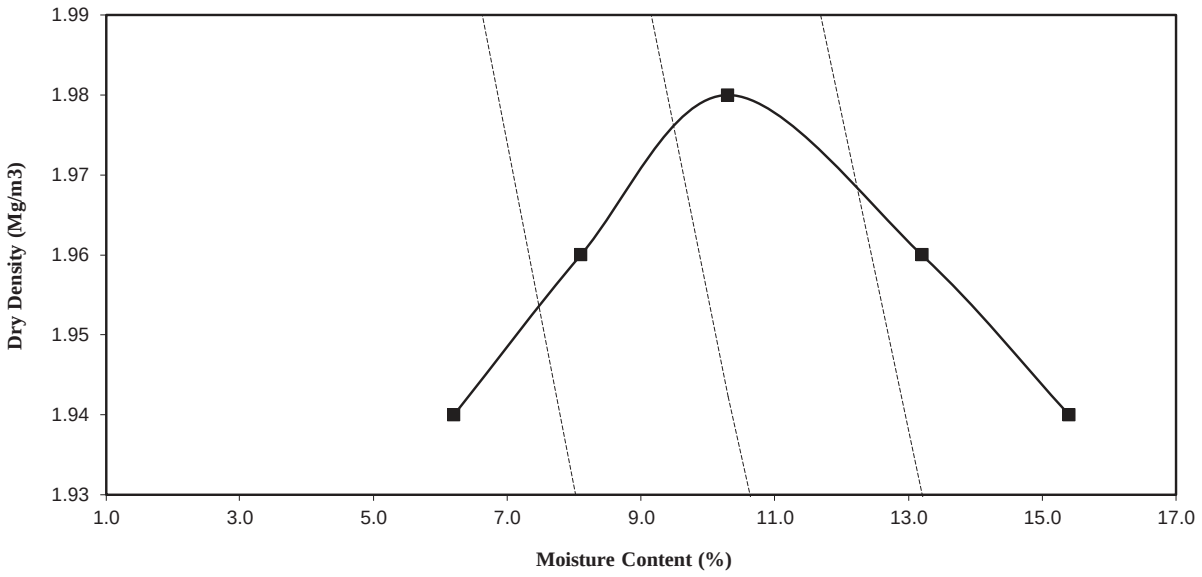
Hole Id:	TP04
Depth (mBGL):	1.00
Lab Ref:	23/842
Sample No	DM11

Particle Density
2.59
Assumed

Natural Moisture Content (%)	18.9
Rammer Used	2.5Kg
Maximum Dry Density (Mg/m^3)	1.98
Optimum Moisture Content (%)	10.3

Point Number	**1**	**2**	**3**	**4**	**5**
Moisture content	6.2	8.1	10.3	13.2	15.4
Dry Density (Mg/m3)	1.94	1.96	1.98	1.96	1.94

Material Description
slightly sandy slightly gravelly silty CLAY



Dry Density / Moiture Content relationship in accordance with BS 1377 : Part 4

Client	Vida M1 Limited
Site	M1 Business Park -Zone A
S.I.File No	6161A / 23
Test Lab	Site Investigations Ltd., Carhugar, The Grange, 12th Lock Rd., Lucan, Co. Dublin Tel 01 6108768
Report Date	1st August 2023

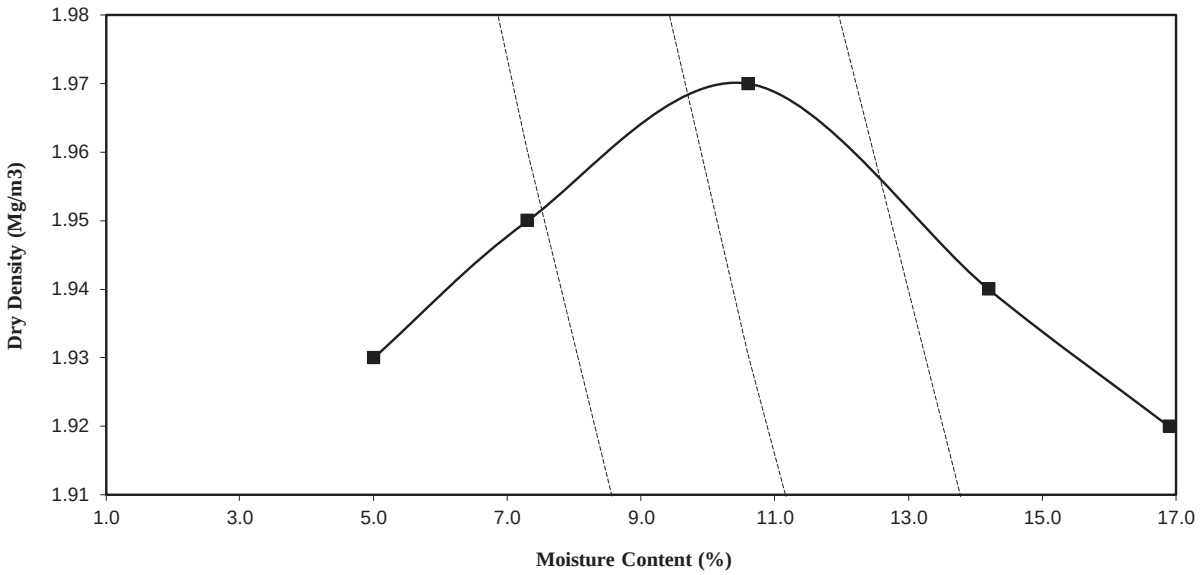
Hole Id:	TP05
Depth (mBGL):	1.00
Lab Ref:	23/843
Sample No	DM14

Particle Density
2.59
Assumed

Natural Moisture Content (%)	16.9
Rammer Used	2.5Kg
Maximum Dry Density (Mg/m^3)	1.97
Optimum Moisture Content (%)	10.4

Point Number	**1**	**2**	**3**	**4**	**5**
Moisture content	5.0	7.3	10.6	14.2	16.9
Dry Density (Mg/m3)	1.93	1.95	1.97	1.94	1.92

Material Description
slightly sandy slightly gravelly silty CLAY



Dry Density / Moiture Content relationship in accordance with BS 1377 : Part 4

Client	Vida M1 Limited
Site	M1 Business Park -Zone A
S.I.File No	6161A / 23
Test Lab	Site Investigations Ltd., Carhugar, The Grange, 12th Lock Rd., Lucan, Co. Dublin Tel 01 6108768
Report Date	1st August 2023

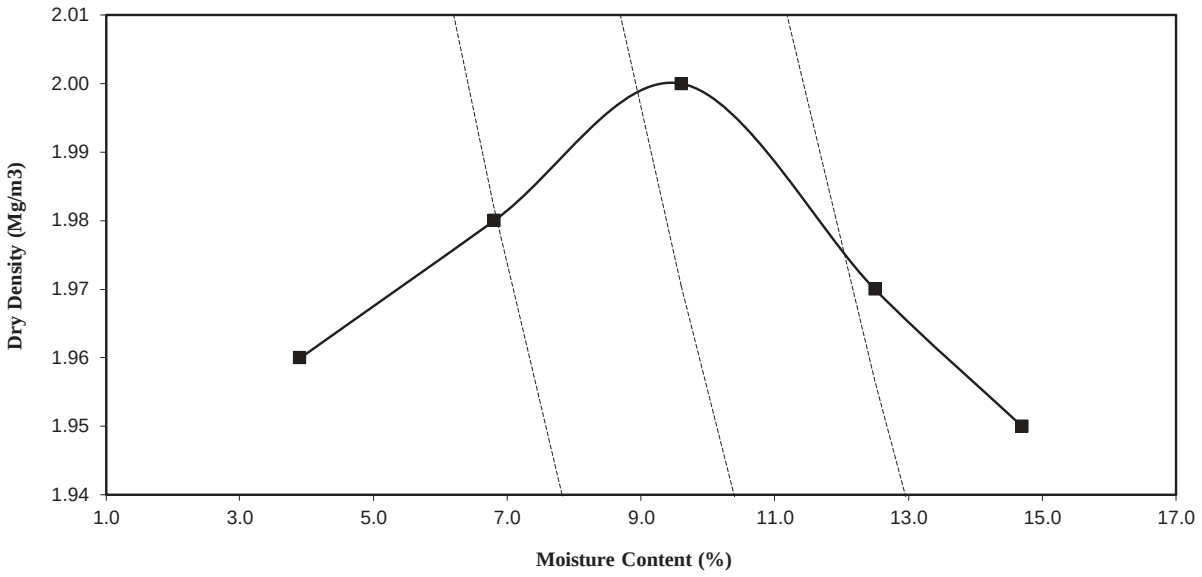
Hole Id:	TP06
Depth (mBGL):	1.00
Lab Ref:	23/844
Sample No	DM16

Particle Density
2.59
Assumed

Natural Moisture Content (%)	14.7
Rammer Used	2.5Kg
Maximum Dry Density (Mg/m^3)	2.00
Optimum Moisture Content (%)	9.4

Point Number	**1**	**2**	**3**	**4**	**5**
Moisture content	3.9	6.8	9.6	12.5	14.7
Dry Density (Mg/m3)	1.96	1.98	2.00	1.97	1.95

Material Description
slightly sandy slightly gravelly silty CLAY



Chemical Testing
In accordance with BS 1377: Part 3

Client	Vida M1 Limited
Site	M1 Business Park -Zone A
S.I. File No	6161A / 23
Test Lab	Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email:info@siteinvestigations.ie
Report Date	1st August 2023

Hole Id	Depth (mBGL)	Sample No	Lab Ref	pH Value	Water Soluble Sulphate Content (2:1 Water-soil extract) (SO_3) g/L	Water Soluble Sulphate Content (2:1 Water-soil extract) (SO_3) %	Acid Soluble Sulphate Content (2:1 Water-soil extract) (SO_3) g/L	Acid Soluble Sulphate Content (2:1 Water-soil extract) (SO_3) %	Chloride ion Content (water:soil ratio 2:1) **%**	% passing 2mm
TP01	1.00	DM02	23/839	7.93	0.123	0.083			0.16	67.8
TP02	1.00	DM05	23/840	8.19	0.122	0.093			0.15	76.6
TP03	1.00	DM08	23/841	8.30	0.123	0.106			0.17	85.8
TP04	1.00	DM11	23/842	8.25	0.122	0.098			0.15	80.6
TP05	1.00	DM14	23/843	8.11	0.124	0.092			0.18	74.1
TP06	1.00	DM16	23/844	8.07	0.124	0.103			0.11	82.4

Printed 10/08/2023

Site Investigations Ltd.

Appendix 8

Environmental Laboratory Test Results

Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US
Tel: (01244) 528777
email: hawardencustomerservices@alsglobal.com
Website: www.alsenvironmental.co.uk

Site Investigations Ltd
The Grange
Carhugar
12th Lock Road
Lucan
Co. Dublin

Attention: Stephen Letch

CERTIFICATE OF ANALYSIS

Date of report Generation:	26 July 2023
Customer:	Site Investigations Ltd
Sample Delivery Group (SDG):	230718-44
Your Reference:	6161
Location:	M1 Business Park - Zone A
Report No:	697982
Order Number:	41/A/23

We received 6 samples on Tuesday July 18, 2023 and 6 of these samples were scheduled for analysis which was completed on Tuesday July 25, 2023. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.
Incorrect sampling dates and/or sample information will affect the validity of results.
The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan
Operations Manager

CERTIFICATE OF ANALYSIS

SDG: 230718-44 **Report Number:** 697982 **Superseded Report:**
Client Ref.: 6161 **Location:** M1 Business Park - Zone A

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
28344642	TP01		0.50 - 0.50	17/07/2023
28344643	TP02		0.50 - 0.50	17/07/2023
28344644	TP03		0.50 - 0.50	17/07/2023
28344645	TP04		0.50 - 0.50	17/07/2023
28344646	TP05		0.50 - 0.50	17/07/2023
28344647	TP06		0.50 - 0.50	17/07/2023

Only received samples which have had analysis scheduled will be shown on the following pages.

CERTIFICATE OF ANALYSIS

SDG: 230718-44 **Report Number:** 697982 **Superseded Report:**
Client Ref.: 6161 **Location:** M1 Business Park - Zone A

Results Legend

X Test

N No Determination Possible

Sample Types -
S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water
Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

			Lab Sample No(s)	28344642	28344643	28344644	28344645	28344646	28344647
			Customer Sample Reference	TP01	TP02	TP03	TP04	TP05	TP06
			AGS Reference						
			Depth (m)	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50
			Container	1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	60g VOC (ALE215)
			Sample Type	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Anions by Kone (w)	All	NDPs: 0 Tests: 6		X			X			X			X			X			X		
CEN Readings	All	NDPs: 0 Tests: 6		X			X			X			X			X			X		
Chromium III	All	NDPs: 0 Tests: 6			X			X			X			X			X			X	
Coronene	All	NDPs: 0 Tests: 6			X			X			X			X			X			X	
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 6		X			X			X			X			X			X		
Dissolved Organic/Inorganic Carbon	All	NDPs: 0 Tests: 6		X			X			X			X			X			X		
EPH by GCxGC-FID	All	NDPs: 0 Tests: 6			X			X			X			X			X			X	
EPH CWG GC (S)	All	NDPs: 0 Tests: 6			X			X			X			X			X			X	
Fluoride	All	NDPs: 0 Tests: 6		X			X			X			X			X			X		
GRO by GC-FID (S)	All	NDPs: 0 Tests: 6				X			X			X			X			X			X
Hexavalent Chromium (s)	All	NDPs: 0 Tests: 6			X			X			X			X			X			X	
Loss on Ignition in soils	All	NDPs: 0 Tests: 6			X			X			X			X			X			X	
Mercury Dissolved	All	NDPs: 0 Tests: 6		X			X			X			X			X			X		
Metals in solid samples by OES	All	NDPs: 0 Tests: 6			X			X			X			X			X			X	
PAH 16 & 17 Calc	All	NDPs: 0 Tests: 6			X			X			X			X			X			X	

Validated

CERTIFICATE OF ANALYSIS

SDG: 230718-44 **Report Number:** 697982 **Superseded Report:**
Client Ref.: 6161 **Location:** M1 Business Park - Zone A

Results Legend

X Test

N No Determination Possible

Sample Types -
S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water
Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

			Lab Sample No(s)	28344642	28344643	28344644	28344645	28344646	28344647
			Customer Sample Reference	TP01	TP02	TP03	TP04	TP05	TP06
			AGS Reference						
			Depth (m)	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50
			Container	1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	60g VOC (ALE215)
			Sample Type	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
PAH by GCMS	All	NDPs: 0 Tests: 6			X			X			X			X			X			X	
PCBs by GCMS	All	NDPs: 0 Tests: 6			X			X			X			X			X			X	
pH	All	NDPs: 0 Tests: 6			X			X			X			X			X			X	
pH Value of Filtered Water	All	NDPs: 0 Tests: 6	X			X			X			X			X			X			
Phenols by HPLC (W)	All	NDPs: 0 Tests: 6	X			X			X			X			X			X			
Sample description	All	NDPs: 0 Tests: 6		X			X			X			X			X			X		
Total Dissolved Solids on Leachates	All	NDPs: 0 Tests: 6	X			X			X			X			X			X			
Total Organic Carbon	All	NDPs: 0 Tests: 6		X			X			X			X			X			X		
TPH CWG GC (S)	All	NDPs: 0 Tests: 6		X			X			X			X			X			X		
VOC MS (S)	All	NDPs: 0 Tests: 6			X			X			X			X			X				X

CERTIFICATE OF ANALYSIS

SDG: 230718-44 **Report Number:** 697982 **Superseded Report:**
Client Ref.: 6161 **Location:** M1 Business Park - Zone A

Sample Descriptions

Grain Sizes

very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm

Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Inclusions	Inclusions 2
28344642	TP01	0.50 - 0.50	Dark Brown	Silty Clay Loam	Stones	None
28344643	TP02	0.50 - 0.50	Light Brown	Sandy Clay Loam	Stones	None
28344644	TP03	0.50 - 0.50	Light Brown	Sandy Clay Loam	Stones	Vegetation
28344645	TP04	0.50 - 0.50	Light Brown	Clay	Vegetation	Stones
28344646	TP05	0.50 - 0.50	Dark Brown	Loamy Sand	Stones	Vegetation
28344647	TP06	0.50 - 0.50	Dark Brown	Loamy Sand	Stones	Vegetation

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally ocurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

Validated

CERTIFICATE OF ANALYSIS

SDG: 230718-44 **Report Number:** 697982 **Superseded Report:**
Client Ref.: 6161 **Location:** M1 Business Park - Zone A

Results Legend
ISO17025 accredited.
M mCERTS accredited.
aq Aqueous / settled sample.
diss.filt Dissolved / filtered sample.
tot.unfilt Total / unfiltered sample.
* Subcontracted - refer to subcontractor report for accreditation status.
** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F) Trigger breach confirmed
1-4+5@ Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	TP01	TP02	TP03	TP04	TP05	TP06
			Depth (m)	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50
			Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
			Date Sampled	17/07/2023	17/07/2023	17/07/2023	17/07/2023	17/07/2023	17/07/2023
			Sample Time	.	.	.	.	.	.
			Date Received	18/07/2023	18/07/2023	18/07/2023	18/07/2023	18/07/2023	18/07/2023
			SDG Ref	230718-44	230718-44	230718-44	230718-44	230718-44	230718-44
			Lab Sample No.(s)	28344642	28344643	28344644	28344645	28344646	28344647
			AGS Reference						
Moisture Content Ratio (% of as received sample)	%	PM024		12	17	16	15	11	11
Loss on ignition	<0.7 %	TM018		4.69 M	4.33 M	4.26 M	4.4 M	7.29 M	5.22 M
Organic Carbon, Total	<0.2 %	TM132		0.612 M	0.399 M	0.445 M	0.398 M	0.642 M	0.645 M
pH	1 pH Units	TM133		7.45 M	6.05 M	6.34 M	6.01 M	6.62 M	8.03 M
Chromium, Hexavalent	<0.6 mg/kg	TM151		<0.6 M	<0.6 M	<0.6 M	<0.6 M	<0.6 M	<0.6 M
PCB congener 28	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 52	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 101	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 118	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 138	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 153	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 180	<3 µg/kg	TM168		<3 M	<3 M	<3 M	<3 M	<3 M	<3 M
Sum of detected PCB 7 Congeners	<21 µg/kg	TM168		<21	<21	<21	<21	<21	<21
Chromium, Trivalent	<0.9 mg/kg	TM181		16.3	22.3	52.3	23.8	25.4	23.4
Antimony	<0.6 mg/kg	TM181		2.36 #	2.21 #	0.831 #	<0.6 #	2.45 #	2.77 #
Arsenic	<0.6 mg/kg	TM181		18.9 M	21.5 M	23.4 M	9.9 M	20.8 M	22.2 M
Barium	<0.6 mg/kg	TM181		77.1 #	66.1 #	90.3 #	64.4 #	98.1 #	80.2 #
Cadmium	<0.02 mg/kg	TM181		1.1 M	0.292 M	0.878 M	0.154 M	1.91 M	1.96 M
Chromium	<0.9 mg/kg	TM181		16.3 M	22.3 M	52.3 M	23.8 M	25.4 M	25 M
Copper	<1.4 mg/kg	TM181		43.6 M	31.7 M	27.9 M	19.5 M	68.4 M	60.3 M
Lead	<0.7 mg/kg	TM181		13.4 M	13.9 M	12.9 M	11.9 M	16.6 M	16.9 M
Mercury	<0.1 mg/kg	TM181		<0.1 M	<0.1 M	<0.1 M	<0.1 M	<0.1 M	<0.1 M
Molybdenum	<0.1 mg/kg	TM181		4.68 #	5.15 #	5.96 #	2.7 #	5.46 #	5.37 #
Nickel	<0.2 mg/kg	TM181		42.3 M	31 M	34.7 M	17.5 M	57.9 M	57 M
Selenium	<1 mg/kg	TM181		2.05 #	3.86 #	1.95 #	2 #	2.64 #	2.1 #
Zinc	<1.9 mg/kg	TM181		57.5 M	45.7 M	61.2 M	45.2 M	70.6 M	70.7 M
PAH Total 17 (inc Coronene) Moisture Corrected	<10 mg/kg	TM410		<10	<10	<10	<10	<10	<10
Coronene	<200 µg/kg	TM410		<200	<200	<200	<200	<200	<200
Mineral Oil >C10-C40 (EH_2D_AL)	<5 mg/kg	TM415		<5	<5	<5	<5	<5	<5

Validated

CERTIFICATE OF ANALYSIS

SDG: 230718-44 **Report Number:** 697982 **Superseded Report:**
Client Ref.: 6161 **Location:** M1 Business Park - Zone A

PAH by GCMS

Results Legend
- # ISO17025 accredited.
- M mCERTS accredited.
- aq Aqueous / settled sample.
- diss.filt Dissolved / filtered sample.
- tot.unfilt Total / unfiltered sample.
- * Subcontracted - refer to subcontractor report for accreditation status.
- ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
- (F) Trigger breach confirmed
- 1-4◆5@ Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	TP01	TP02	TP03	TP04	TP05	TP06
			Depth (m)	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50
			Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
			Date Sampled	17/07/2023	17/07/2023	17/07/2023	17/07/2023	17/07/2023	17/07/2023
			Sample Time	.	.	.	.	.	.
			Date Received	18/07/2023	18/07/2023	18/07/2023	18/07/2023	18/07/2023	18/07/2023
			SDG Ref	230718-44	230718-44	230718-44	230718-44	230718-44	230718-44
			Lab Sample No.(s)	28344642	28344643	28344644	28344645	28344646	28344647
			AGS Reference						
Naphthalene	<9 µg/kg	TM218		<9 M	<9 M	<9 M	<9 M	<9 M	<9 M
Acenaphthylene	<12 µg/kg	TM218		<12 M	<12 M	<12 M	<12 M	<12 M	<12 M
Acenaphthene	<8 µg/kg	TM218		<8 M	<8 M	<8 M	<8 M	<8 M	<8 M
Fluorene	<10 µg/kg	TM218		<10 M	<10 M	<10 M	<10 M	<10 M	<10 M
Phenanthrene	<15 µg/kg	TM218		<15 M	<15 M	<15 M	<15 M	<15 M	<15 M
Anthracene	<16 µg/kg	TM218		<16 M	<16 M	<16 M	<16 M	<16 M	<16 M
Fluoranthene	<17 µg/kg	TM218		<17 M	<17 M	<17 M	<17 M	<17 M	<17 M
Pyrene	<15 µg/kg	TM218		<15 M	<15 M	<15 M	<15 M	<15 M	<15 M
Benz(a)anthracene	<14 µg/kg	TM218		<14 M	<14 M	<14 M	<14 M	<14 M	<14 M
Chrysene	<10 µg/kg	TM218		<10 M	<10 M	<10 M	<10 M	<10 M	<10 M
Benzo(b)fluoranthene	<15 µg/kg	TM218		<15 M	<15 M	<15 M	<15 M	<15 M	<15 M
Benzo(k)fluoranthene	<14 µg/kg	TM218		<14 M	<14 M	<14 M	<14 M	<14 M	<14 M
Benzo(a)pyrene	<15 µg/kg	TM218		<15 M	<15 M	<15 M	<15 M	<15 M	<15 M
Indeno(1,2,3-cd)pyrene	<18 µg/kg	TM218		<18 M	<18 M	<18 M	<18 M	<18 M	<18 M
Dibenzo(a,h)anthracene	<23 µg/kg	TM218		<23 M	<23 M	<23 M	<23 M	<23 M	<23 M
Benzo(g,h,i)perylene	<24 µg/kg	TM218		<24 M	<24 M	<24 M	<24 M	<24 M	<24 M
PAH, Total Detected USEPA 16	<118 µg/kg	TM218		<118	<118	<118	<118	<118	<118

CERTIFICATE OF ANALYSIS

SDG: 230718-44 **Report Number:** 697982 **Superseded Report:**
Client Ref.: 6161 **Location:** M1 Business Park - Zone A

TPH CWG (S)

Results Legend
- # ISO17025 accredited.
- M mCERTS accredited.
- aq Aqueous / settled sample.
- diss.filt Dissolved / filtered sample.
- tot.unfilt Total / unfiltered sample.
- * Subcontracted - refer to subcontractor report for accreditation status.
- ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
- (F) Trigger breach confirmed
- 1-4+5@ Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	TP01	TP02	TP03	TP04	TP05	TP06
			Depth (m)	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50
			Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
			Date Sampled	17/07/2023	17/07/2023	17/07/2023	17/07/2023	17/07/2023	17/07/2023
			Sample Time	.	.	.	.	.	.
			Date Received	18/07/2023	18/07/2023	18/07/2023	18/07/2023	18/07/2023	18/07/2023
			SDG Ref	230718-44	230718-44	230718-44	230718-44	230718-44	230718-44
			Lab Sample No.(s)	28344642	28344643	28344644	28344645	28344646	28344647
			AGS Reference						
GRO Surrogate % recovery**	%	TM089		104	96.8	99.2	95	92.4	114
Aliphatics >C5-C6 (HS_1D_AL)	<10 µg/kg	TM089		<10	<10	<10	<10	<10	<10
Aliphatics >C6-C8 (HS_1D_AL)	<10 µg/kg	TM089		<10	<10	<10	<10	<10	<10
Aliphatics >C8-C10 (HS_1D_AL)	<10 µg/kg	TM089		<10	<10	<10	<10	<10	<10
Aliphatics >C10-C12 (EH_2D_AL_#1)	<1000 µg/kg	TM414		<1000 #	<1000 #	<1000 #	<1000 #	<1000 #	<1000 #
Aliphatics >C12-C16 (EH_2D_AL_#1)	<1000 µg/kg	TM414		<1000 #	<1000 #	<1000 #	<1000 #	<1000 #	<1000 #
Aliphatics >C16-C21 (EH_2D_AL_#1)	<1000 µg/kg	TM414		<1000 #	<1000 #	<1000 #	<1000 #	<1000 #	<1000 #
Aliphatics >C21-C35 (EH_2D_AL_#1)	<1000 µg/kg	TM414		<1000 #	<1000 #	<1000 #	<1000 #	<1000 #	<1000 #
Aliphatics >C35-C44 (EH_2D_AL_#1)	<1000 µg/kg	TM414		<1000	<1000	<1000	<1000	<1000	<1000
Total Aliphatics >C10-C44 (EH_2D_AR_#1)	<5000 µg/kg	TM414		<5000	<5000	<5000	<5000	<5000	<5000
Total Aliphatics & Aromatics >C10-C44 (EH_2D_Total_#1)	<10000 µg/kg	TM414		<10000	<10000	<10000	<10000	<10000	<10000
Aromatics >EC5-EC7 (HS_1D_AR)	<10 µg/kg	TM089		<10	<10	<10	<10	<10	<10
Aromatics >EC7-EC8 (HS_1D_AR)	<10 µg/kg	TM089		<10	<10	<10	<10	<10	<10
Aromatics >EC8-EC10 (HS_1D_AR)	<10 µg/kg	TM089		<10	<10	<10	<10	<10	<10
Aromatics > EC10-EC12 (EH_2D_AR_#1)	<1000 µg/kg	TM414		<1000 #	<1000 #	<1000 #	<1000 #	<1000 #	<1000 #
Aromatics > EC12-EC16 (EH_2D_AR_#1)	<1000 µg/kg	TM414		<1000 #	<1000 #	<1000 #	<1000 #	<1000 #	<1000 #
Aromatics > EC16-EC21 (EH_2D_AR_#1)	<1000 µg/kg	TM414		<1000 #	<1000 #	<1000 #	<1000 #	<1000 #	<1000 #
Aromatics > EC21-EC35 (EH_2D_AR_#1)	<1000 µg/kg	TM414		<1000 #	<1000 #	<1000 #	<1000 #	<1000 #	<1000 #
Aromatics >EC35-EC44 (EH_2D_AR_#1)	<1000 µg/kg	TM414		<1000	<1000	<1000	<1000	<1000	<1000
Aromatics > EC40-EC44 (EH_2D_AR_#1)	<1000 µg/kg	TM414		<1000	<1000	<1000	<1000	<1000	<1000
Total Aromatics > EC10-EC44 (EH_2D_AR_#1)	<5000 µg/kg	TM414		<5000	<5000	<5000	<5000	<5000	<5000
Total Aliphatics & Aromatics >C5-C44 (EH_2D_Total_#1+HS_1D_Total)	<10000 µg/kg	TM414		<10000	<10000	<10000	<10000	<10000	<10000
GRO >C5-C6 (HS_1D)	<20 µg/kg	TM089		<20	<20	<20	<20	<20	<20
GRO >C6-C7 (HS_1D)	<20 µg/kg	TM089		<20	<20	<20	<20	<20	<20
GRO >C7-C8 (HS_1D)	<20 µg/kg	TM089		<20	<20	<20	<20	<20	<20
GRO >C8-C10 (HS_1D)	<20 µg/kg	TM089		<20	<20	<20	<20	<20	<20
GRO >C10-C12 (HS_1D)	<20 µg/kg	TM089		<20	<20	<20	<20	<20	<20
Total Aliphatics >C5-C10 (HS_1D_AL_TOTAL)	<50 µg/kg	TM089		<50	<50	<50	<50	<50	<50
Total Aromatics >EC5-EC10 (HS_1D_AR_TOTAL)	<50 µg/kg	TM089		<50	<50	<50	<50	<50	<50
GRO >C5-C10 (HS_1D_TOTAL)	<20 µg/kg	TM089		<20	<20	<20	<20	<20	<20

CERTIFICATE OF ANALYSIS

SDG: 230718-44 **Report Number:** 697982 **Superseded Report:**
Client Ref.: 6161 **Location:** M1 Business Park - Zone A

VOC MS (S)

Results Legend
- # ISO17025 accredited.
- M mCERTS accredited.
- aq Aqueous / settled sample.
- diss.filt Dissolved / filtered sample.
- tot.unfilt Total / unfiltered sample.
- * Subcontracted - refer to subcontractor report for accreditation status.
- ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
- (F) Trigger breach confirmed
- 1-4 5@ Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	TP01	TP02	TP03	TP04	TP05	TP06
			Depth (m)	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50
			Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
			Date Sampled	17/07/2023	17/07/2023	17/07/2023	17/07/2023	17/07/2023	17/07/2023
			Sample Time	.	.	.	.	.	.
			Date Received	18/07/2023	18/07/2023	18/07/2023	18/07/2023	18/07/2023	18/07/2023
			SDG Ref	230718-44	230718-44	230718-44	230718-44	230718-44	230718-44
			Lab Sample No.(s)	28344642	28344643	28344644	28344645	28344646	28344647
			AGS Reference						
Dibromofluoromethane**	%	TM116		119	113	106	111	102	112
Toluene-d8**	%	TM116		100	102	101	102	100	101
4-Bromofluorobenzene**	%	TM116		94.7	99.4	98.7	93.4	95.3	93.1
Methyl Tertiary Butyl Ether	<0.5 µg/kg	TM116		<0.5 M	<0.5 M	<0.5 M	<0.5 M	<0.5 M	<0.5 M
Benzene	<1 µg/kg	TM116		<1 M	<1 M	<1 M	<1 M	<1 M	<1 M
Toluene	<1 µg/kg	TM116		<1 M	<1 M	<1 M	<1 M	<1 M	<1 M
Ethylbenzene	<1 µg/kg	TM116		<1 M	<1 M	<1 M	<1 M	<1 M	<1 M
p/m-Xylene	<2 µg/kg	TM116		<2 #	<2 #	<2 #	<2 #	<2 #	<2 #
o-Xylene	<2 µg/kg	TM116		<2 M	<2 M	<2 M	<2 M	<2 M	<2 M

Validated

CERTIFICATE OF ANALYSIS

SDG: 230718-44 Report Number: 697982 Superseded Report:
Client Ref.: 6161 Location: M1 Business Park - Zone A

CEN 10:1 SINGLE STAGE LEACHATE TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference		**Site Location**	M1 Business Park - Zone A
Mass Sample taken (kg)	0.107	**Natural Moisture Content (%)**	18.7
Mass of dry sample (kg)	0.090	**Dry Matter Content (%)**	84.2
Particle Size <4mm	>95%		

Case	
SDG	230718-44
Lab Sample Number(s)	28344642
Sampled Date	17-Jul-2023
Customer Sample Ref.	TP01
Depth (m)	0.50 - 0.50

Solid Waste Analysis	**Result**	**Landfill Waste Acceptance Criteria Limits**		
		Inert Waste Landfill	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon (%)	0.612	3	5	6
Loss on Ignition (%)	4.69	-	-	10
Sum of BTEX (mg/kg)	-	-	-	-
Sum of 7 PCBs (mg/kg)	<0.021	1	-	-
Mineral Oil (mg/kg) (EH_2D_AL)	<5	500	-	-
PAH Sum of 17 (mg/kg)	<10	100	-	-
pH (pH Units)	7.45	-	>6	-
ANC to pH 6 (mol/kg)	-	-	-	-
ANC to pH 4 (mol/kg)	-	-	-	-

Eluate Analysis	**C_2 Concⁿ in 10:1 eluate (mg/l)**		**A_2 10:1 concⁿ leached (mg/kg)**		**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg**		
	Result	**Limit of Detection**	**Result**	**Limit of Detection**			
Arsenic	<0.0005	<0.0005	<0.005	<0.005	0.5	2	25
Barium	0.0317	<0.0002	0.317	<0.002	20	100	300
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	0.04	1	5
Chromium	<0.001	<0.001	<0.01	<0.01	0.5	10	70
Copper	0.000428	<0.0003	0.00428	<0.003	2	50	100
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	0.01	0.2	2
Molybdenum	<0.003	<0.003	<0.03	<0.03	0.5	10	30
Nickel	0.000623	<0.0004	0.00623	<0.004	0.4	10	40
Lead	0.000313	<0.0002	0.00313	<0.002	0.5	10	50
Antimony	<0.001	<0.001	<0.01	<0.01	0.06	0.7	5
Selenium	<0.001	<0.001	<0.01	<0.01	0.1	0.5	7
Zinc	0.00872	<0.001	0.0872	<0.01	4	50	200
Chloride	2.5	<2	25	<20	800	15000	25000
Fluoride	<0.5	<0.5	<5	<5	10	150	500
Sulphate (soluble)	<2	<2	<20	<20	1000	20000	50000
Total Dissolved Solids	25.5	<10	255	<100	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	-
Dissolved Organic Carbon	3.3	<3	33	<30	500	800	1000

Leach Test Information

Date Prepared	19-Jul-2023
pH (pH Units)	7.58
Conductivity (µS/cm)	36
Volume Leachant (Litres)	0.883

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
Leachates prepared in accordance with BS EN 12457 will be carried out at room temperature (20±5°C)
Stated limits are for guidance only and ALS Laboratories (UK) Limited cannot be held responsible for any discrepancies with current legislation

26/07/2023 11:56:54

11:56:42 26/07/2023

Validated

CERTIFICATE OF ANALYSIS

SDG: 230718-44 Report Number: 697982 Superseded Report:
Client Ref.: 6161 Location: M1 Business Park - Zone A

CEN 10:1 SINGLE STAGE LEACHATE TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference		**Site Location**	M1 Business Park - Zone A
Mass Sample taken (kg)	0.112	**Natural Moisture Content (%)**	25.1
Mass of dry sample (kg)	0.090	**Dry Matter Content (%)**	79.9
Particle Size <4mm	>95%		

Case	
SDG	230718-44
Lab Sample Number(s)	28344643
Sampled Date	17-Jul-2023
Customer Sample Ref.	TP02
Depth (m)	0.50 - 0.50

Solid Waste Analysis	Result	Landfill Waste Acceptance Criteria Limits: Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
Total Organic Carbon (%)	0.399	3	5	6
Loss on Ignition (%)	4.33	-	-	10
Sum of BTEX (mg/kg)	-	-	-	-
Sum of 7 PCBs (mg/kg)	<0.021	1	-	-
Mineral Oil (mg/kg) (EH_2D_AL)	<5	500	-	-
PAH Sum of 17 (mg/kg)	<10	100	-	-
pH (pH Units)	6.05	-	>6	-
ANC to pH 6 (mol/kg)	-	-	-	-
ANC to pH 4 (mol/kg)	-	-	-	-

Eluate Analysis	C_2 Concⁿ in 10:1 eluate (mg/l)		A_2 10:1 concⁿ leached (mg/kg)		Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg		
	Result	Limit of Detection	Result	Limit of Detection			
Arsenic	<0.0005	<0.0005	<0.005	<0.005	0.5	2	25
Barium	0.000992	<0.0002	0.00992	<0.002	20	100	300
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	0.04	1	5
Chromium	<0.001	<0.001	<0.01	<0.01	0.5	10	70
Copper	<0.0003	<0.0003	<0.003	<0.003	2	50	100
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	0.01	0.2	2
Molybdenum	<0.003	<0.003	<0.03	<0.03	0.5	10	30
Nickel	<0.0004	<0.0004	<0.004	<0.004	0.4	10	40
Lead	<0.0002	<0.0002	<0.002	<0.002	0.5	10	50
Antimony	<0.001	<0.001	<0.01	<0.01	0.06	0.7	5
Selenium	0.00173	<0.001	0.0173	<0.01	0.1	0.5	7
Zinc	0.00169	<0.001	0.0169	<0.01	4	50	200
Chloride	<2	<2	<20	<20	800	15000	25000
Fluoride	<0.5	<0.5	<5	<5	10	150	500
Sulphate (soluble)	2.5	<2	25	<20	1000	20000	50000
Total Dissolved Solids	15.8	<10	158	<100	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	-
Dissolved Organic Carbon	<3	<3	<30	<30	500	800	1000

Leach Test Information

Date Prepared	19-Jul-2023
pH (pH Units)	6.92
Conductivity (µS/cm)	20
Volume Leachant (Litres)	0.878

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
Leachates prepared in accordance with BS EN 12457 will be carried out at room temperature (20±5°C)
Stated limits are for guidance only and ALS Laboratories (UK) Limited cannot be held responsible for any discrepancies with current legislation

26/07/2023 11:56:54

11:56:42 26/07/2023

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CERTIFICATE OF ANALYSIS

SDG: 230718-44 | Report Number: 697982 | Superseded Report:
Client Ref.: 6161 | Location: M1 Business Park - Zone A

CEN 10:1 SINGLE STAGE LEACHATE TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/2

RECEIVED: 19/04/2024

Client Reference		**Site Location**	M1 Business Park - Zone A
Mass Sample taken (kg)	0.111	**Natural Moisture Content (%)**	23
Mass of dry sample (kg)	0.090	**Dry Matter Content (%)**	81.3
Particle Size <4mm	>95%		

Case	
SDG	230718-44
Lab Sample Number(s)	28344644
Sampled Date	17-Jul-2023
Customer Sample Ref.	TP03
Depth (m)	0.50 - 0.50

Solid Waste Analysis	Result	Landfill Waste Acceptance Criteria Limits: Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
Total Organic Carbon (%)	0.445	3	5	6
Loss on Ignition (%)	4.26	-	-	10
Sum of BTEX (mg/kg)	-	-	-	-
Sum of 7 PCBs (mg/kg)	<0.021	1	-	-
Mineral Oil (mg/kg) (EH_2D_AL)	<5	500	-	-
PAH Sum of 17 (mg/kg)	<10	100	-	-
pH (pH Units)	6.34	-	>6	-
ANC to pH 6 (mol/kg)	-	-	-	-
ANC to pH 4 (mol/kg)	-	-	-	-

Eluate Analysis	C_2 Concⁿ in 10:1 eluate (mg/l)		A_2 10:1 concⁿ leached (mg/kg)		Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg		
	Result	Limit of Detection	Result	Limit of Detection			
Arsenic	<0.0005	<0.0005	<0.005	<0.005	0.5	2	25
Barium	0.0011	<0.0002	0.011	<0.002	20	100	300
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	0.04	1	5
Chromium	<0.001	<0.001	<0.01	<0.01	0.5	10	70
Copper	0.000584	<0.0003	0.00584	<0.003	2	50	100
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	0.01	0.2	2
Molybdenum	<0.003	<0.003	<0.03	<0.03	0.5	10	30
Nickel	<0.0004	<0.0004	<0.004	<0.004	0.4	10	40
Lead	<0.0002	<0.0002	<0.002	<0.002	0.5	10	50
Antimony	<0.001	<0.001	<0.01	<0.01	0.06	0.7	5
Selenium	<0.001	<0.001	<0.01	<0.01	0.1	0.5	7
Zinc	<0.001	<0.001	<0.01	<0.01	4	50	200
Chloride	<2	<2	<20	<20	800	15000	25000
Fluoride	<0.5	<0.5	<5	<5	10	150	500
Sulphate (soluble)	<2	<2	<20	<20	1000	20000	50000
Total Dissolved Solids	22.9	<10	229	<100	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	-
Dissolved Organic Carbon	<3	<3	<30	<30	500	800	1000

Leach Test Information

Date Prepared	19-Jul-2023
pH (pH Units)	7.13
Conductivity (µS/cm)	30
Volume Leachant (Litres)	0.879

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
Leachates prepared in accordance with BS EN 12457 will be carried out at room temperature (20±5°C)
Stated limits are for guidance only and ALS Laboratories (UK) Limited cannot be held responsible for any discrepancies with current legislation

26/07/2023 11:56:54

11:56:42 26/07/2023

Validated

CERTIFICATE OF ANALYSIS

SDG: 230718-44 Report Number: 697982 Superseded Report:
Client Ref.: 6161 Location: M1 Business Park - Zone A

CEN 10:1 SINGLE STAGE LEACHATE TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference		**Site Location**	M1 Business Park - Zone A
Mass Sample taken (kg)	0.110	**Natural Moisture Content (%)**	22.5
Mass of dry sample (kg)	0.090	**Dry Matter Content (%)**	81.6
Particle Size <4mm	>95%		

Case	
SDG	230718-44
Lab Sample Number(s)	28344645
Sampled Date	17-Jul-2023
Customer Sample Ref.	TP04
Depth (m)	0.50 - 0.50

Solid Waste Analysis	**Result**	**Landfill Waste Acceptance Criteria Limits**		
		Inert Waste Landfill	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon (%)	0.398	3	5	6
Loss on Ignition (%)	4.4	-	-	10
Sum of BTEX (mg/kg)	-	-	-	-
Sum of 7 PCBs (mg/kg)	<0.021	1	-	-
Mineral Oil (mg/kg) (EH_2D_AL)	<5	500	-	-
PAH Sum of 17 (mg/kg)	<10	100	-	-
pH (pH Units)	6.01	-	>6	-
ANC to pH 6 (mol/kg)	-	-	-	-
ANC to pH 4 (mol/kg)	-	-	-	-

Eluate Analysis	**C_2 Concⁿ in 10:1 eluate (mg/l)**		**A_2 10:1 concⁿ leached (mg/kg)**		**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg**		
	Result	**Limit of Detection**	**Result**	**Limit of Detection**			
Arsenic	<0.0005	<0.0005	<0.005	<0.005	0.5	2	25
Barium	0.000937	<0.0002	0.00937	<0.002	20	100	300
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	0.04	1	5
Chromium	<0.001	<0.001	<0.01	<0.01	0.5	10	70
Copper	0.000577	<0.0003	0.00577	<0.003	2	50	100
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	0.01	0.2	2
Molybdenum	<0.003	<0.003	<0.03	<0.03	0.5	10	30
Nickel	0.000401	<0.0004	0.00401	<0.004	0.4	10	40
Lead	<0.0002	<0.0002	<0.002	<0.002	0.5	10	50
Antimony	<0.001	<0.001	<0.01	<0.01	0.06	0.7	5
Selenium	<0.001	<0.001	<0.01	<0.01	0.1	0.5	7
Zinc	0.00577	<0.001	0.0577	<0.01	4	50	200
Chloride	<2	<2	<20	<20	800	15000	25000
Fluoride	<0.5	<0.5	<5	<5	10	150	500
Sulphate (soluble)	<2	<2	<20	<20	1000	20000	50000
Total Dissolved Solids	14	<10	140	<100	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	-
Dissolved Organic Carbon	<3	<3	<30	<30	500	800	1000

Leach Test Information

Date Prepared	19-Jul-2023
pH (pH Units)	7.20
Conductivity (µS/cm)	19
Volume Leachant (Litres)	0.880

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
Leachates prepared in accordance with BS EN 12457 will be carried out at room temperature (20±5°C)
Stated limits are for guidance only and ALS Laboratories (UK) Limited cannot be held responsible for any discrepancies with current legislation

26/07/2023 11:56:54

11:56:42 26/07/2023

Validated

CERTIFICATE OF ANALYSIS

SDG: 230718-44 Report Number: 697982 Superseded Report:
Client Ref.: 6161 Location: M1 Business Park - Zone A

CEN 10:1 SINGLE STAGE LEACHATE TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference		**Site Location**	M1 Business Park - Zone A
Mass Sample taken (kg)	0.106	**Natural Moisture Content (%)**	17.9
Mass of dry sample (kg)	0.090	**Dry Matter Content (%)**	84.8
Particle Size <4mm	>95%		

Case	
SDG	230718-44
Lab Sample Number(s)	28344646
Sampled Date	17-Jul-2023
Customer Sample Ref.	TP05
Depth (m)	0.50 - 0.50

Solid Waste Analysis	**Result**	**Landfill Waste Acceptance Criteria Limits**		
		Inert Waste Landfill	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon (%)	0.642	3	5	6
Loss on Ignition (%)	7.29	-	-	10
Sum of BTEX (mg/kg)	-	-	-	-
Sum of 7 PCBs (mg/kg)	<0.021	1	-	-
Mineral Oil (mg/kg) (EH_2D_AL)	<5	500	-	-
PAH Sum of 17 (mg/kg)	<10	100	-	-
pH (pH Units)	6.62	-	>6	-
ANC to pH 6 (mol/kg)	-	-	-	-
ANC to pH 4 (mol/kg)	-	-	-	-

Eluate Analysis	**C_2 Concⁿ in 10:1 eluate (mg/l)**		**A_2 10:1 concⁿ leached (mg/kg)**		**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg**		
	Result	**Limit of Detection**	**Result**	**Limit of Detection**			
Arsenic	<0.0005	<0.0005	<0.005	<0.005	0.5	2	25
Barium	0.0013	<0.0002	0.013	<0.002	20	100	300
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	0.04	1	5
Chromium	0.00362	<0.001	0.0362	<0.01	0.5	10	70
Copper	0.000575	<0.0003	0.00575	<0.003	2	50	100
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	0.01	0.2	2
Molybdenum	<0.003	<0.003	<0.03	<0.03	0.5	10	30
Nickel	<0.0004	<0.0004	<0.004	<0.004	0.4	10	40
Lead	<0.0002	<0.0002	<0.002	<0.002	0.5	10	50
Antimony	<0.001	<0.001	<0.01	<0.01	0.06	0.7	5
Selenium	<0.001	<0.001	<0.01	<0.01	0.1	0.5	7
Zinc	<0.001	<0.001	<0.01	<0.01	4	50	200
Chloride	<2	<2	<20	<20	800	15000	25000
Fluoride	<0.5	<0.5	<5	<5	10	150	500
Sulphate (soluble)	2.5	<2	25	<20	1000	20000	50000
Total Dissolved Solids	23.7	<10	237	<100	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	-
Dissolved Organic Carbon	3.3	<3	33	<30	500	800	1000

Leach Test Information

Date Prepared	18-Jul-2023
pH (pH Units)	7.43
Conductivity (µS/cm)	34
Volume Leachant (Litres)	0.884

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
Leachates prepared in accordance with BS EN 12457 will be carried out at room temperature (20±5°C)
Stated limits are for guidance only and ALS Laboratories (UK) Limited cannot be held responsible for any discrepancies with current legislation

26/07/2023 11:56:54

11:56:42 26/07/2023

Validated

CERTIFICATE OF ANALYSIS

SDG: 230718-44 Report Number: 697982 Superseded Report:
Client Ref.: 6161 Location: M1 Business Park - Zone A

CEN 10:1 SINGLE STAGE LEACHATE TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/2

RECEIVED: 19/04/2024

Client Reference		**Site Location**	M1 Business Park - Zone A
Mass Sample taken (kg)	0.104	**Natural Moisture Content (%)**	16.4
Mass of dry sample (kg)	0.090	**Dry Matter Content (%)**	85.9
Particle Size <4mm	>95%		

Case	
SDG	230718-44
Lab Sample Number(s)	28344647
Sampled Date	17-Jul-2023
Customer Sample Ref.	TP06
Depth (m)	0.50 - 0.50

Solid Waste Analysis	Result	Landfill Waste Acceptance Criteria Limits: Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
Total Organic Carbon (%)	0.645	3	5	6
Loss on Ignition (%)	5.22	-	-	10
Sum of BTEX (mg/kg)	-	-	-	-
Sum of 7 PCBs (mg/kg)	<0.021	1	-	-
Mineral Oil (mg/kg) (EH_2D_AL)	<5	500	-	-
PAH Sum of 17 (mg/kg)	<10	100	-	-
pH (pH Units)	8.03	-	>6	-
ANC to pH 6 (mol/kg)	-	-	-	-
ANC to pH 4 (mol/kg)	-	-	-	-

Eluate Analysis	C_2 Concⁿ in 10:1 eluate (mg/l)		A_2 10:1 concⁿ leached (mg/kg)		Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg		
	Result	Limit of Detection	Result	Limit of Detection			
Arsenic	<0.0005	<0.0005	<0.005	<0.005	0.5	2	25
Barium	0.00217	<0.0002	0.0217	<0.002	20	100	300
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	0.04	1	5
Chromium	0.00247	<0.001	0.0247	<0.01	0.5	10	70
Copper	0.00115	<0.0003	0.0115	<0.003	2	50	100
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	0.01	0.2	2
Molybdenum	0.0102	<0.003	0.102	<0.03	0.5	10	30
Nickel	<0.0004	<0.0004	<0.004	<0.004	0.4	10	40
Lead	<0.0002	<0.0002	<0.002	<0.002	0.5	10	50
Antimony	<0.001	<0.001	<0.01	<0.01	0.06	0.7	5
Selenium	<0.001	<0.001	<0.01	<0.01	0.1	0.5	7
Zinc	0.00347	<0.001	0.0347	<0.01	4	50	200
Chloride	<2	<2	<20	<20	800	15000	25000
Fluoride	0.722	<0.5	7.22	<5	10	150	500
Sulphate (soluble)	<2	<2	<20	<20	1000	20000	50000
Total Dissolved Solids	75.7	<10	757	<100	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	-
Dissolved Organic Carbon	<3	<3	<30	<30	500	800	1000

Leach Test Information

Date Prepared	18-Jul-2023
pH (pH Units)	8.38
Conductivity (µS/cm)	104
Volume Leachant (Litres)	0.885

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
Leachates prepared in accordance with BS EN 12457 will be carried out at room temperature (20±5°C)
Stated limits are for guidance only and ALS Laboratories (UK) Limited cannot be held responsible for any discrepancies with current legislation

26/07/2023 11:56:54

11:56:42 26/07/2023

Table of Results - Appendix

Method No	Description
TM104	Determination of Fluoride using the Kone Analyser
TM183	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry
TM184	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM414	Determination of Speciated Extractable Petroleum Hydrocarbons in Soils by GCxGC-FID
PM115	Leaching Procedure for CEN One Stage Leach Test 2:1 & 10:1 1 Step
TM018	Determination of Loss on Ignition
TM090	Determination of Total Organic Carbon/Total Inorganic Carbon in Water and Waste Water
TM116	Determination of Volatile Organic Compounds by Headspace / GC-MS
TM123	The Determination of Total Dissolved Solids in Water
TM132	ELTRA CS800 Operators Guide
TM133	Determination of pH in Soil and Water using the GLpH pH Meter
TM259	Determination of Phenols in Waters and Leachates by HPLC
TM410	Determination of Coronene in soils by GCMS
PM024	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material
TM089	Determination of Gasoline Range Hydrocarbons (GRO) by Headspace GC-FID (C4-C12)
TM151	Determination of Hexavalent Chromium using Kone analyser
TM181	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES
TM152	Analysis of Aqueous Samples by ICP-MS
TM168	Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Soils
TM218	The determination of PAH in soil samples by GC-MS
TM256	Determination of pH, EC, TDS and Alkalinity in Aqueous samples
TM415	Determination of Extractable Petroleum Hydrocarbons in Soils by GCxGC-FID

NA = not applicable.
Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden (Method codes TM).

CERTIFICATE OF ANALYSIS

SDG: 230718-44 **Report Number:** 697982 **Superseded Report:**
Client Ref.: 6161 **Location:** M1 Business Park - Zone A

Test Completion Dates

Lab Sample No(s)	28344642	28344643	28344644	28344645	28344646	28344647
Customer Sample Ref.	TP01	TP02	TP03	TP04	TP05	TP06
AGS Ref.						
Depth	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50
Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
Anions by Kone (w)	22-Jul-2023	22-Jul-2023	22-Jul-2023	22-Jul-2023	21-Jul-2023	21-Jul-2023
CEN 10:1 Leachate (1 Stage)	19-Jul-2023	19-Jul-2023	19-Jul-2023	19-Jul-2023	19-Jul-2023	19-Jul-2023
CEN Readings	21-Jul-2023	24-Jul-2023	24-Jul-2023	21-Jul-2023	21-Jul-2023	21-Jul-2023
Chromium III	24-Jul-2023	24-Jul-2023	24-Jul-2023	24-Jul-2023	20-Jul-2023	21-Jul-2023
Coronene	21-Jul-2023	24-Jul-2023	21-Jul-2023	21-Jul-2023	21-Jul-2023	21-Jul-2023
Dissolved Metals by ICP-MS	25-Jul-2023	24-Jul-2023	25-Jul-2023	24-Jul-2023	25-Jul-2023	25-Jul-2023
Dissolved Organic/Inorganic Carbon	22-Jul-2023	22-Jul-2023	22-Jul-2023	22-Jul-2023	22-Jul-2023	22-Jul-2023
EPH by GCxGC-FID	25-Jul-2023	25-Jul-2023	25-Jul-2023	25-Jul-2023	25-Jul-2023	21-Jul-2023
EPH CWG GC (S)	25-Jul-2023	25-Jul-2023	25-Jul-2023	25-Jul-2023	25-Jul-2023	25-Jul-2023
Fluoride	24-Jul-2023	24-Jul-2023	24-Jul-2023	24-Jul-2023	24-Jul-2023	24-Jul-2023
GRO by GC-FID (S)	21-Jul-2023	24-Jul-2023	24-Jul-2023	24-Jul-2023	19-Jul-2023	19-Jul-2023
Hexavalent Chromium (s)	24-Jul-2023	24-Jul-2023	24-Jul-2023	24-Jul-2023	19-Jul-2023	19-Jul-2023
Loss on Ignition in soils	21-Jul-2023	21-Jul-2023	21-Jul-2023	21-Jul-2023	19-Jul-2023	19-Jul-2023
Mercury Dissolved	25-Jul-2023	25-Jul-2023	25-Jul-2023	25-Jul-2023	21-Jul-2023	25-Jul-2023
Metals in solid samples by OES	21-Jul-2023	21-Jul-2023	21-Jul-2023	21-Jul-2023	21-Jul-2023	21-Jul-2023
Moisture at 105C	19-Jul-2023	19-Jul-2023	19-Jul-2023	19-Jul-2023	18-Jul-2023	18-Jul-2023
PAH 16 & 17 Calc	21-Jul-2023	24-Jul-2023	22-Jul-2023	21-Jul-2023	21-Jul-2023	21-Jul-2023
PAH by GCMS	21-Jul-2023	21-Jul-2023	21-Jul-2023	21-Jul-2023	21-Jul-2023	21-Jul-2023
PCBs by GCMS	24-Jul-2023	24-Jul-2023	24-Jul-2023	24-Jul-2023	21-Jul-2023	24-Jul-2023
pH	24-Jul-2023	24-Jul-2023	24-Jul-2023	24-Jul-2023	20-Jul-2023	20-Jul-2023
pH Value of Filtered Water	21-Jul-2023	24-Jul-2023	24-Jul-2023	21-Jul-2023	21-Jul-2023	21-Jul-2023
Phenols by HPLC (W)	24-Jul-2023	24-Jul-2023	24-Jul-2023	24-Jul-2023	24-Jul-2023	24-Jul-2023
Sample description	19-Jul-2023	19-Jul-2023	19-Jul-2023	19-Jul-2023	18-Jul-2023	18-Jul-2023
Total Dissolved Solids on Leachates	24-Jul-2023	24-Jul-2023	24-Jul-2023	24-Jul-2023	24-Jul-2023	24-Jul-2023
Total Organic Carbon	21-Jul-2023	21-Jul-2023	21-Jul-2023	21-Jul-2023	21-Jul-2023	21-Jul-2023
TPH CWG GC (S)	25-Jul-2023	25-Jul-2023	25-Jul-2023	25-Jul-2023	25-Jul-2023	25-Jul-2023
VOC MS (S)	20-Jul-2023	20-Jul-2023	20-Jul-2023	20-Jul-2023	19-Jul-2023	19-Jul-2023

Appendix

General

1. Results are expressed on a dry weight basis (dried at 35ºC) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 15 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as “mixed hydrocarbons”. Non-target compounds identified from VOC scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. **Sample Deviations**

If a sample is classed as deviated then the associated results may be compromised.

1	**Container with Headspace provided for volatiles analysis**
2	**Incorrect container received**
3	**Deviation from method**
4	**Matrix interference**
♦	**Sample holding time exceeded in laboratory**
@	**Sample holding time exceeded due to late arrival of instructions or samples**
§	**Sampled on date not provided**

20. **Asbestos**

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as “Not detected”. If no asbestos fibre types are found all will be reported as “Not detected” and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials andd soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US
Tel: (01244) 528777
email: hawardencustomerservices@alsglobal.com
Website: www.alsenvironmental.co.uk

Site Investigations Ltd
The Grange
Carhugar
12th Lock Road
Lucan
Co. Dublin

Attention: Stephen Letch

CERTIFICATE OF ANALYSIS

Date of report Generation:	07 August 2023
Customer:	Site Investigations Ltd
Sample Delivery Group (SDG):	230801-33
Your Reference:	6161A
Location:	M1 Business Park-Zone A
Report No:	699265
Order Number:	47/A/23

We received 6 samples on Monday July 31, 2023 and 6 of these samples were scheduled for analysis which was completed on Monday August 07, 2023. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.
Incorrect sampling dates and/or sample information will affect the validity of results.
The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan
Operations Manager

CERTIFICATE OF ANALYSIS

SDG: 230801-33 **Report Number:** 699265 **Superseded Report:**
Client Ref.: 6161A **Location:** M1 Business Park-Zone A

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
28412218	TP 01		1.00 - 1.00	28/07/2023
28412219	TP 02		1.00 - 1.00	28/07/2023
28412220	TP 03		1.00 - 1.00	28/07/2023
28412221	TP 04		1.00 - 1.00	28/07/2023
28412222	TP 05		1.00 - 1.00	28/07/2023
28412223	TP 06		1.00 - 1.00	28/07/2023

Only received samples which have had analysis scheduled will be shown on the following pages.

Validated

CERTIFICATE OF ANALYSIS

SDG: 230801-33 **Report Number:** 699265 **Superseded Report:**
Client Ref.: 6161A **Location:** M1 Business Park-Zone A

RECEIVED: 19/04/2024

Results Legend

X Test

N No Determination Possible

Sample Types -
S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water
Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

			Lab Sample No(s)	Customer Sample Reference	AGS Reference	Depth (m)	Container	Sample Type
			28412218	TP 01		1.00 - 1.00	250g Amber Jar (ALE210)	S
			28412219	TP 02		1.00 - 1.00	250g Amber Jar (ALE210)	S
			28412220	TP 03		1.00 - 1.00	250g Amber Jar (ALE210)	S
			28412221	TP 04		1.00 - 1.00	250g Amber Jar (ALE210)	S
			28412222	TP 05		1.00 - 1.00	250g Amber Jar (ALE210)	S
			28412223	TP 06		1.00 - 1.00	250g Amber Jar (ALE210)	S
Loss on Ignition in soils	All	NDPs: 0 Tests: 6	X	X	X	X	X	X
Sample description	All	NDPs: 0 Tests: 6	X	X	X	X	X	X

CERTIFICATE OF ANALYSIS

SDG: 230801-33 **Report Number:** 699265 **Superseded Report:**
Client Ref.: 6161A **Location:** M1 Business Park-Zone A

Sample Descriptions

Grain Sizes

very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm

Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Inclusions	Inclusions 2
28412218	TP 01	1.00 - 1.00	Dark Brown	Sandy Clay Loam	Stones	None
28412219	TP 02	1.00 - 1.00	Light Brown	Sandy Clay Loam	Stones	None
28412220	TP 03	1.00 - 1.00	Dark Brown	Silty Clay Loam	Stones	None
28412221	TP 04	1.00 - 1.00	Dark Brown	Clay	Stones	None
28412222	TP 05	1.00 - 1.00	Light Brown	Sandy Clay Loam	Stones	None
28412223	TP 06	1.00 - 1.00	Light Brown	Sandy Clay Loam	Stones	None

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally ocurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

Validated

CERTIFICATE OF ANALYSIS

SDG: 230801-33 **Report Number:** 699265 **Superseded Report:**
Client Ref.: 6161A **Location:** M1 Business Park-Zone A

Results Legend
- # ISO17025 accredited.
- M mCERTS accredited.
- aq Aqueous / settled sample.
- diss.filt Dissolved / filtered sample.
- tot.unfilt Total / unfiltered sample.
- * Subcontracted - refer to subcontractor report for accreditation status.
- ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
- (F) Trigger breach confirmed
- 1-4 5@ Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	TP 01	TP 02	TP 03	TP 04	TP 05	TP 06
			Depth (m)	1.00 - 1.00	1.00 - 1.00	1.00 - 1.00	1.00 - 1.00	1.00 - 1.00	1.00 - 1.00
			Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
			Date Sampled	28/07/2023	28/07/2023	28/07/2023	28/07/2023	28/07/2023	28/07/2023
			Sample Time	.	.	.	.	.	.
			Date Received	31/07/2023	31/07/2023	31/07/2023	31/07/2023	31/07/2023	31/07/2023
			SDG Ref	230801-33	230801-33	230801-33	230801-33	230801-33	230801-33
			Lab Sample No.(s)	28412218	28412219	28412220	28412221	28412222	28412223
			AGS Reference						
Moisture Content Ratio (% of as received sample)	%	PM024		12	20	19	17	14	14
Loss on ignition	<0.7 %	TM018		3.96 M	5.31 M	4.36 M	4.93 M	4.23 M	4.07 M

RECEIVED: 19/04/2024

CERTIFICATE OF ANALYSIS

SDG: 230801-33 **Report Number:** 699265 **Superseded Report:**
Client Ref.: 6161A **Location:** M1 Business Park-Zone A

Table of Results - Appendix

Method No	Description
PM024	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material
TM018	Determination of Loss on Ignition

NA = not applicable.
Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden (Method codes TM).

CERTIFICATE OF ANALYSIS

SDG: 230801-33 **Report Number:** 699265 **Superseded Report:**
Client Ref.: 6161A **Location:** M1 Business Park-Zone A

Test Completion Dates

Lab Sample No(s)	28412218	28412219	28412220	28412221	28412222	28412223
Customer Sample Ref.	TP 01	TP 02	TP 03	TP 04	TP 05	TP 06
AGS Ref.						
Depth	1.00 - 1.00	1.00 - 1.00	1.00 - 1.00	1.00 - 1.00	1.00 - 1.00	1.00 - 1.00
Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
Loss on Ignition in soils	04-Aug-2023	07-Aug-2023	07-Aug-2023	04-Aug-2023	07-Aug-2023	04-Aug-2023
Sample description	02-Aug-2023	02-Aug-2023	02-Aug-2023	02-Aug-2023	02-Aug-2023	02-Aug-2023

Appendix

General

1. Results are expressed on a dry weight basis (dried at 35ºC) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 15 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as “mixed hydrocarbons”. Non-target compounds identified from VOC scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. **Sample Deviations**

If a sample is classed as deviated then the associated results may be compromised.

1	**Container with Headspace provided for volatiles analysis**
2	**Incorrect container received**
3	**Deviation from method**
4	**Matrix interference**
♦	**Sample holding time exceeded in laboratory**
@	**Sample holding time exceeded due to late arrival of instructions or samples**
§	**Sampled on date not provided**

20. **Asbestos**

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as “Not detected”. If no asbestos fibre types are found all will be reported as “Not detected” and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials andd soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

Appendix 9

Waste Classification Report

HazWasteOnline™

Waste Classification Report

HazWasteOnline™ classifies waste as either **hazardous** or **non-hazardous** based on its chemical composition, related legislation and the rules and data defined in the current UK or EU technical guidance (Appendix C) (note that HP 9 Infectious is not assessed). It is the responsibility of the classifier named below to:

a) understand the origin of the waste
b) select the correct List of Waste code(s)
c) confirm that the list of determinands, results and sampling plan are fit for purpose
d) select and justify the chosen metal species (Appendix B)
e) correctly apply moisture correction and other available corrections
f) add the meta data for their user-defined substances (Appendix A)
g) check that the classification engine is suitable with respect to the national destination of the waste (Appendix C)

To aid the reviewer, the laboratory results, assumptions and justifications managed by the classifier are highlighted in pale yellow.

VGH16-LCB4P-F3TGS

Job name

6161A

Description/Comments

Client: Vida M1 Limited
Engineer: Clifton Scannell Emerson Associates

Project

M1 Business Park - Zone A

Site

Balbriggan, Co. Dublin

Classified by

Name:
Stephen Letch
Date:
10 Aug 2023 09:39 GMT
Telephone:
00353 86817 9449

Company:
Site Investigations Ltd
The Grange
12th Lock Road
Lucan
K78 F598

HazWasteOnline™ provides a two day, hazardous waste classification course that covers the use of the software and both basic and advanced waste classification techniques. Certification has to be renewed every 3 years.

HazWasteOnline™ Certification: CERTIFIED

Course	Date
Hazardous Waste Classification	09 Oct 2019
Most recent 3 year Refresher	04 Oct 2022

Next 3 year Refresher due by Oct 2025

Purpose of classification

2 - Material Characterisation

Address of the waste

M1 Business Park - Zone A, Balbriggan, Co. Dublin **Post Code** N/A

SIC for the process giving rise to the waste

43130 Test drilling and boring

Description of industry/producer giving rise to the waste

Site Investigation

Description of the specific process, sub-process and/or activity that created the waste

Soils recovered for environmental testing

Description of the waste

Natural soils

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	WAC Results		Page
					Inert	Non Haz	
1	TP01-0.50	0.50	Non Hazardous		Pass	Pass	3
2	TP02-0.50	0.50	Non Hazardous		Pass	Pass	7
3	TP03-0.50	0.50	Non Hazardous		Pass	Pass	11
4	TP04-0.50	0.50	Non Hazardous		Pass	Pass	15
5	TP05-0.50	0.50	Non Hazardous		Pass	Pass	19
6	TP06-0.50	0.50	Non Hazardous		Pass	Pass	23

Related documents

#	Name	Description
1	230718-44.hwol	ALS Hawarden .hwol file used to populate the Job
2	Rilta Suite NEW	waste stream template used to create this Job

WAC results

WAC Settings: samples in this Job constitute a single population.

WAC limits used to evaluate the samples in this Job: "Ireland"
The WAC used in this report are the WAC defined for the inert and non-hazardous classes of landfill in the Republic of Ireland. You should check the actual acceptance criteria when the disposal site is identified as they may differ from the generic WAC used in this report.

Report

Created by: Stephen Letch

Created date: 10 Aug 2023 09:39 GMT

Classification of sample: TP01-0.50

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
TP01-0.50
Sample Depth:
0.50 m
Moisture content:
12%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 12% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	TPH (C6 to C40) petroleum group			TPH		<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
2	confirm TPH has NOT arisen from diesel or petrol					☑					
3	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		2.36 mg/kg	1.197	2.486 mg/kg	0.000249 %	✓	
4	arsenic { arsenic pentoxide }	033-004-00-6	215-116-9	1303-28-2		18.9 mg/kg	1.534	25.511 mg/kg	0.00255 %	✓	
5	barium { barium sulphide }	016-002-00-X	244-214-4	21109-95-5		77.1 mg/kg	1.233	83.69 mg/kg	0.00837 %	✓	
6	cadmium { cadmium sulfate }	048-009-00-9	233-331-6	10124-36-4		1.1 mg/kg	1.855	1.795 mg/kg	0.00018 %	✓	
7	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		43.6 mg/kg	1.126	43.198 mg/kg	0.00432 %	✓	
8	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	13.4 mg/kg		11.792 mg/kg	0.00118 %	✓	
9	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
10	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		4.68 mg/kg	1.5	6.178 mg/kg	0.000618 %	✓	
11	nickel { nickel sulfate }	028-009-00-5	232-104-9	7786-81-4		42.3 mg/kg	2.637	98.148 mg/kg	0.00981 %	✓	
12	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				2.05 mg/kg	1.405	2.535 mg/kg	0.000253 %	✓	
13	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		57.5 mg/kg	2.469	124.946 mg/kg	0.0125 %	✓	
14	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		16.3 mg/kg	1.462	20.965 mg/kg	0.0021 %	✓	

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
15		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.6	mg/kg	1.923	<1.154	mg/kg	<0.000115 %		<LOD
16		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
17		acenaphthylene		205-917-1	208-96-8		<0.012	mg/kg		<0.012	mg/kg	<0.0000012 %		<LOD
18		acenaphthene		201-469-6	83-32-9		<0.008	mg/kg		<0.008	mg/kg	<0.0000008 %		<LOD
19		fluorene		201-695-5	86-73-7		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
20		phenanthrene		201-581-5	85-01-8		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
21		anthracene		204-371-1	120-12-7		<0.016	mg/kg		<0.016	mg/kg	<0.0000016 %		<LOD
22		fluoranthene		205-912-4	206-44-0		<0.017	mg/kg		<0.017	mg/kg	<0.0000017 %		<LOD
23		pyrene		204-927-3	129-00-0		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
24		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
25		chrysene	601-048-00-0	205-923-4	218-01-9		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
26		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
27		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
28		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
29		indeno[123-cd]pyrene		205-893-2	193-39-5		<0.018	mg/kg		<0.018	mg/kg	<0.0000018 %		<LOD
30		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.023	mg/kg		<0.023	mg/kg	<0.0000023 %		<LOD
31		benzo[ghi]perylene		205-883-8	191-24-2		<0.024	mg/kg		<0.024	mg/kg	<0.0000024 %		<LOD
32		polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.021	mg/kg		<0.021	mg/kg	<0.0000021 %		<LOD
33		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.0005	mg/kg		<0.0005	mg/kg	<0.00000005 %		<LOD
34		benzene	601-020-00-8	200-753-7	71-43-2		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
35		toluene	601-021-00-3	203-625-9	108-88-3		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
36		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
37		coronene		205-881-7	191-07-1		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
38		pH			PH		7.45	pH		7.45	pH	7.45 pH		
39		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.004	mg/kg		<0.004	mg/kg	<0.0000004 %		<LOD
											Total:	0.0433 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

WAC results for sample: TP01-0.50

WAC Settings: samples in this Job constitute a single population.

WAC limits used to evaluate this sample: "Ireland"
The WAC used in this report are the WAC defined for the inert and non-hazardous classes of landfill in the Republic of Ireland. You should check the actual acceptance criteria when the disposal site is identified as they may differ from the generic WAC used in this report.

The sample PASSES the Inert (Inert waste landfill) criteria.

The sample PASSES the Non Haz (Non hazardous waste landfill) criteria.

WAC Determinands

Solid Waste Analysis				Landfill Waste Acceptance Criteria Limits	
#	Determinand		User entered data	Inert waste landfill	Non hazardous waste landfill
1	TOC (total organic carbon)	%	0.612	3	5
2	LOI (loss on ignition)	%	4.69	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.007	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.021	1	-
5	Mineral oil (C10 to C40)	mg/kg	<5	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<10	100	-
7	pH	pH	7.45	-	>6
8	ANC (acid neutralisation capacity)	mol/kg		-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	<0.005	0.5	2
10	barium	mg/kg	0.317	20	100
11	cadmium	mg/kg	<0.0008	0.04	1
12	chromium	mg/kg	<0.01	0.5	10
13	copper	mg/kg	0.0042	2	50
14	mercury	mg/kg	<0.0001	0.01	0.2
15	molybdenum	mg/kg	<0.03	0.5	10
16	nickel	mg/kg	0.0062	0.4	10
17	lead	mg/kg	0.0031	0.5	10
18	antimony	mg/kg	<0.01	0.06	0.7
19	selenium	mg/kg	<0.01	0.1	0.5
20	zinc	mg/kg	0.0872	4	50
21	chloride	mg/kg	25	800	15,000
22	fluoride	mg/kg	<5	10	150
23	sulphate	mg/kg	<20	1,000	20,000
24	phenol index	mg/kg	<0.16	1	-
25	DOC (dissolved organic carbon)	mg/kg	33	500	800
26	TDS (total dissolved solids)	mg/kg	255	4,000	60,000

Key

User supplied data

Classification of sample: TP02-0.50

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
TP02-0.50
Sample Depth:
0.50 m
Moisture content:
17%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 17% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	TPH (C6 to C40) petroleum group			TPH		<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
2	confirm TPH has NOT arisen from diesel or petrol					☑					
3	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		2.21 mg/kg	1.197	2.196 mg/kg	0.00022 %	✓	
4	arsenic { arsenic pentoxide }	033-004-00-6	215-116-9	1303-28-2		21.5 mg/kg	1.534	27.372 mg/kg	0.00274 %	✓	
5	barium { barium sulphide }	016-002-00-X	244-214-4	21109-95-5		66.1 mg/kg	1.233	67.673 mg/kg	0.00677 %	✓	
6	cadmium { cadmium sulfate }	048-009-00-9	233-331-6	10124-36-4		0.292 mg/kg	1.855	0.449 mg/kg	0.0000449 %	✓	
7	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		31.7 mg/kg	1.126	29.623 mg/kg	0.00296 %	✓	
8	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	13.9 mg/kg		11.537 mg/kg	0.00115 %	✓	
9	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
10	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		5.15 mg/kg	1.5	6.413 mg/kg	0.000641 %	✓	
11	nickel { nickel sulfate }	028-009-00-5	232-104-9	7786-81-4		31 mg/kg	2.637	67.842 mg/kg	0.00678 %	✓	
12	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				3.86 mg/kg	1.405	4.501 mg/kg	0.00045 %	✓	
13	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		45.7 mg/kg	2.469	93.663 mg/kg	0.00937 %	✓	
14	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		22.3 mg/kg	1.462	27.052 mg/kg	0.00271 %	✓	

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
15		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.6	mg/kg	1.923	<1.154	mg/kg	<0.000115 %		<LOD
16		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
17		acenaphthylene		205-917-1	208-96-8		<0.012	mg/kg		<0.012	mg/kg	<0.0000012 %		<LOD
18		acenaphthene		201-469-6	83-32-9		<0.008	mg/kg		<0.008	mg/kg	<0.0000008 %		<LOD
19		fluorene		201-695-5	86-73-7		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
20		phenanthrene		201-581-5	85-01-8		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
21		anthracene		204-371-1	120-12-7		<0.016	mg/kg		<0.016	mg/kg	<0.0000016 %		<LOD
22		fluoranthene		205-912-4	206-44-0		<0.017	mg/kg		<0.017	mg/kg	<0.0000017 %		<LOD
23		pyrene		204-927-3	129-00-0		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
24		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
25		chrysene	601-048-00-0	205-923-4	218-01-9		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
26		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
27		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
28		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
29		indeno[123-cd]pyrene		205-893-2	193-39-5		<0.018	mg/kg		<0.018	mg/kg	<0.0000018 %		<LOD
30		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.023	mg/kg		<0.023	mg/kg	<0.0000023 %		<LOD
31		benzo[ghi]perylene		205-883-8	191-24-2		<0.024	mg/kg		<0.024	mg/kg	<0.0000024 %		<LOD
32		polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.021	mg/kg		<0.021	mg/kg	<0.0000021 %		<LOD
33		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.0005	mg/kg		<0.0005	mg/kg	<0.00000005 %		<LOD
34		benzene	601-020-00-8	200-753-7	71-43-2		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
35		toluene	601-021-00-3	203-625-9	108-88-3		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
36		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
37		coronene		205-881-7	191-07-1		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
38		pH			PH		6.05	pH		6.05	pH	6.05 pH		
39		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.004	mg/kg		<0.004	mg/kg	<0.0000004 %		<LOD
											Total:	0.035 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

WAC results for sample: TP02-0.50

WAC Settings: samples in this Job constitute a single population.

WAC limits used to evaluate this sample: "Ireland"
The WAC used in this report are the WAC defined for the inert and non-hazardous classes of landfill in the Republic of Ireland. You should check the actual acceptance criteria when the disposal site is identified as they may differ from the generic WAC used in this report.

The sample PASSES the Inert (Inert waste landfill) criteria.

The sample PASSES the Non Haz (Non hazardous waste landfill) criteria.

WAC Determinands

Solid Waste Analysis				Landfill Waste Acceptance Criteria Limits	
#	Determinand		User entered data	Inert waste landfill	Non hazardous waste landfill
1	TOC (total organic carbon)	%	0.399	3	5
2	LOI (loss on ignition)	%	4.33	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.007	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.021	1	-
5	Mineral oil (C10 to C40)	mg/kg	<5	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<10	100	-
7	pH	pH	6.05	-	>6
8	ANC (acid neutralisation capacity)	mol/kg		-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	<0.005	0.5	2
10	barium	mg/kg	0.0099	20	100
11	cadmium	mg/kg	<0.0008	0.04	1
12	chromium	mg/kg	<0.01	0.5	10
13	copper	mg/kg	<0.003	2	50
14	mercury	mg/kg	<0.0001	0.01	0.2
15	molybdenum	mg/kg	<0.03	0.5	10
16	nickel	mg/kg	<0.004	0.4	10
17	lead	mg/kg	<0.002	0.5	10
18	antimony	mg/kg	<0.01	0.06	0.7
19	selenium	mg/kg	0.0173	0.1	0.5
20	zinc	mg/kg	0.0169	4	50
21	chloride	mg/kg	<20	800	15,000
22	fluoride	mg/kg	<5	10	150
23	sulphate	mg/kg	25	1,000	20,000
24	phenol index	mg/kg	<0.16	1	-
25	DOC (dissolved organic carbon)	mg/kg	<30	500	800
26	TDS (total dissolved solids)	mg/kg	158	4,000	60,000

Key

User supplied data

Classification of sample: TP03-0.50

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
TP03-0.50
Sample Depth:
0.50 m
Moisture content:
16%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 16% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	TPH (C6 to C40) petroleum group			TPH		<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
2	confirm TPH has NOT arisen from diesel or petrol					☑					
3	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		0.831 mg/kg	1.197	0.836 mg/kg	0.0000836 %	✓	
4	arsenic { arsenic pentoxide }	033-004-00-6	215-116-9	1303-28-2		23.4 mg/kg	1.534	30.15 mg/kg	0.00301 %	✓	
5	barium { barium sulphide }	016-002-00-X	244-214-4	21109-95-5		90.3 mg/kg	1.233	93.563 mg/kg	0.00936 %	✓	
6	cadmium { cadmium sulfate }	048-009-00-9	233-331-6	10124-36-4		0.878 mg/kg	1.855	1.368 mg/kg	0.000137 %	✓	
7	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		27.9 mg/kg	1.126	26.386 mg/kg	0.00264 %	✓	
8	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	12.9 mg/kg		10.836 mg/kg	0.00108 %	✓	
9	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
10	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		5.96 mg/kg	1.5	7.511 mg/kg	0.000751 %	✓	
11	nickel { nickel sulfate }	028-009-00-5	232-104-9	7786-81-4		34.7 mg/kg	2.637	76.854 mg/kg	0.00769 %	✓	
12	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				1.95 mg/kg	1.405	2.301 mg/kg	0.00023 %	✓	
13	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		61.2 mg/kg	2.469	126.942 mg/kg	0.0127 %	✓	
14	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		52.3 mg/kg	1.462	64.209 mg/kg	0.00642 %	✓	

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
15		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.6	mg/kg	1.923	<1.154	mg/kg	<0.000115 %		<LOD
16		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
17		acenaphthylene		205-917-1	208-96-8		<0.012	mg/kg		<0.012	mg/kg	<0.0000012 %		<LOD
18		acenaphthene		201-469-6	83-32-9		<0.008	mg/kg		<0.008	mg/kg	<0.0000008 %		<LOD
19		fluorene		201-695-5	86-73-7		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
20		phenanthrene		201-581-5	85-01-8		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
21		anthracene		204-371-1	120-12-7		<0.016	mg/kg		<0.016	mg/kg	<0.0000016 %		<LOD
22		fluoranthene		205-912-4	206-44-0		<0.017	mg/kg		<0.017	mg/kg	<0.0000017 %		<LOD
23		pyrene		204-927-3	129-00-0		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
24		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
25		chrysene	601-048-00-0	205-923-4	218-01-9		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
26		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
27		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
28		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
29		indeno[123-cd]pyrene		205-893-2	193-39-5		<0.018	mg/kg		<0.018	mg/kg	<0.0000018 %		<LOD
30		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.023	mg/kg		<0.023	mg/kg	<0.0000023 %		<LOD
31		benzo[ghi]perylene		205-883-8	191-24-2		<0.024	mg/kg		<0.024	mg/kg	<0.0000024 %		<LOD
32		polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.021	mg/kg		<0.021	mg/kg	<0.0000021 %		<LOD
33		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.0005	mg/kg		<0.0005	mg/kg	<0.00000005 %		<LOD
34		benzene	601-020-00-8	200-753-7	71-43-2		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
35		toluene	601-021-00-3	203-625-9	108-88-3		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
36		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
37		coronene		205-881-7	191-07-1		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
38		pH			PH		6.34	pH		6.34	pH	6.34 pH		
39		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.004	mg/kg		<0.004	mg/kg	<0.0000004 %		<LOD
											Total:	0.0453 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

WAC results for sample: TP03-0.50

WAC Settings: samples in this Job constitute a single population.

WAC limits used to evaluate this sample: "Ireland"
The WAC used in this report are the WAC defined for the inert and non-hazardous classes of landfill in the Republic of Ireland. You should check the actual acceptance criteria when the disposal site is identified as they may differ from the generic WAC used in this report.

The sample PASSES the Inert (Inert waste landfill) criteria.

The sample PASSES the Non Haz (Non hazardous waste landfill) criteria.

WAC Determinands

Solid Waste Analysis				Landfill Waste Acceptance Criteria Limits	
#	Determinand		User entered data	Inert waste landfill	Non hazardous waste landfill
1	TOC (total organic carbon)	%	0.445	3	5
2	LOI (loss on ignition)	%	4.26	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.007	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.021	1	-
5	Mineral oil (C10 to C40)	mg/kg	<5	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<10	100	-
7	pH	pH	6.34	-	>6
8	ANC (acid neutralisation capacity)	mol/kg		-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	<0.005	0.5	2
10	barium	mg/kg	0.011	20	100
11	cadmium	mg/kg	<0.0008	0.04	1
12	chromium	mg/kg	<0.01	0.5	10
13	copper	mg/kg	0.0058	2	50
14	mercury	mg/kg	<0.0001	0.01	0.2
15	molybdenum	mg/kg	<0.03	0.5	10
16	nickel	mg/kg	<0.004	0.4	10
17	lead	mg/kg	<0.002	0.5	10
18	antimony	mg/kg	<0.01	0.06	0.7
19	selenium	mg/kg	<0.01	0.1	0.5
20	zinc	mg/kg	<0.01	4	50
21	chloride	mg/kg	<20	800	15,000
22	fluoride	mg/kg	<5	10	150
23	sulphate	mg/kg	<20	1,000	20,000
24	phenol index	mg/kg	<0.16	1	-
25	DOC (dissolved organic carbon)	mg/kg	<30	500	800
26	TDS (total dissolved solids)	mg/kg	229	4,000	60,000

Key

User supplied data

Classification of sample: TP04-0.50

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
TP04-0.50
Sample Depth:
0.50 m
Moisture content:
15%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 15% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	TPH (C6 to C40) petroleum group			TPH		<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
2	confirm TPH has NOT arisen from diesel or petrol					☑					
3	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		<0.6 mg/kg	1.197	<0.718 mg/kg	<0.0000718 %		<LOD
4	arsenic { arsenic pentoxide }	033-004-00-6	215-116-9	1303-28-2		9.9 mg/kg	1.534	12.908 mg/kg	0.00129 %	✓	
5	barium { barium sulphide }	016-002-00-X	244-214-4	21109-95-5		64.4 mg/kg	1.233	67.521 mg/kg	0.00675 %	✓	
6	cadmium { cadmium sulfate }	048-009-00-9	233-331-6	10124-36-4		0.154 mg/kg	1.855	0.243 mg/kg	0.0000243 %	✓	
7	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		19.5 mg/kg	1.126	18.662 mg/kg	0.00187 %	✓	
8	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	11.9 mg/kg		10.115 mg/kg	0.00101 %	✓	
9	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
10	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		2.7 mg/kg	1.5	3.443 mg/kg	0.000344 %	✓	
11	nickel { nickel sulfate }	028-009-00-5	232-104-9	7786-81-4		17.5 mg/kg	2.637	39.221 mg/kg	0.00392 %	✓	
12	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				2 mg/kg	1.405	2.389 mg/kg	0.000239 %	✓	
13	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		45.2 mg/kg	2.469	94.87 mg/kg	0.00949 %	✓	
14	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		23.8 mg/kg	1.462	29.567 mg/kg	0.00296 %	✓	

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
15		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.6	mg/kg	1.923	<1.154	mg/kg	<0.000115 %		<LOD
16		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
17		acenaphthylene		205-917-1	208-96-8		<0.012	mg/kg		<0.012	mg/kg	<0.0000012 %		<LOD
18		acenaphthene		201-469-6	83-32-9		<0.008	mg/kg		<0.008	mg/kg	<0.0000008 %		<LOD
19		fluorene		201-695-5	86-73-7		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
20		phenanthrene		201-581-5	85-01-8		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
21		anthracene		204-371-1	120-12-7		<0.016	mg/kg		<0.016	mg/kg	<0.0000016 %		<LOD
22		fluoranthene		205-912-4	206-44-0		<0.017	mg/kg		<0.017	mg/kg	<0.0000017 %		<LOD
23		pyrene		204-927-3	129-00-0		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
24		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
25		chrysene	601-048-00-0	205-923-4	218-01-9		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
26		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
27		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
28		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
29		indeno[123-cd]pyrene		205-893-2	193-39-5		<0.018	mg/kg		<0.018	mg/kg	<0.0000018 %		<LOD
30		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.023	mg/kg		<0.023	mg/kg	<0.0000023 %		<LOD
31		benzo[ghi]perylene		205-883-8	191-24-2		<0.024	mg/kg		<0.024	mg/kg	<0.0000024 %		<LOD
32		polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.021	mg/kg		<0.021	mg/kg	<0.0000021 %		<LOD
33		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.0005	mg/kg		<0.0005	mg/kg	<0.00000005 %		<LOD
34		benzene	601-020-00-8	200-753-7	71-43-2		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
35		toluene	601-021-00-3	203-625-9	108-88-3		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
36		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
37		coronene		205-881-7	191-07-1		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
38		pH			PH		6.01	pH		6.01	pH	6.01 pH		
39		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.004	mg/kg		<0.004	mg/kg	<0.0000004 %		<LOD
											Total:	0.0291 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

WAC results for sample: TP04-0.50

WAC Settings: samples in this Job constitute a single population.

WAC limits used to evaluate this sample: "Ireland"
The WAC used in this report are the WAC defined for the inert and non-hazardous classes of landfill in the Republic of Ireland. You should check the actual acceptance criteria when the disposal site is identified as they may differ from the generic WAC used in this report.

The sample PASSES the Inert (Inert waste landfill) criteria.

The sample PASSES the Non Haz (Non hazardous waste landfill) criteria.

WAC Determinands

Solid Waste Analysis				Landfill Waste Acceptance Criteria Limits	
#	Determinand		User entered data	Inert waste landfill	Non hazardous waste landfill
1	TOC (total organic carbon)	%	0.398	3	5
2	LOI (loss on ignition)	%	4.4	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.007	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.021	1	-
5	Mineral oil (C10 to C40)	mg/kg	<5	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<10	100	-
7	pH	pH	6.01	-	>6
8	ANC (acid neutralisation capacity)	mol/kg		-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	<0.005	0.5	2
10	barium	mg/kg	0.0093	20	100
11	cadmium	mg/kg	<0.0008	0.04	1
12	chromium	mg/kg	<0.01	0.5	10
13	copper	mg/kg	0.0057	2	50
14	mercury	mg/kg	<0.0001	0.01	0.2
15	molybdenum	mg/kg	<0.03	0.5	10
16	nickel	mg/kg	0.004	0.4	10
17	lead	mg/kg	<0.002	0.5	10
18	antimony	mg/kg	<0.01	0.06	0.7
19	selenium	mg/kg	<0.01	0.1	0.5
20	zinc	mg/kg	0.0577	4	50
21	chloride	mg/kg	<20	800	15,000
22	fluoride	mg/kg	<5	10	150
23	sulphate	mg/kg	<20	1,000	20,000
24	phenol index	mg/kg	<0.16	1	-
25	DOC (dissolved organic carbon)	mg/kg	<30	500	800
26	TDS (total dissolved solids)	mg/kg	140	4,000	60,000

Key

User supplied data

Classification of sample: TP05-0.50

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
TP05-0.50
Sample Depth:
0.50 m
Moisture content:
11%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 11% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	TPH (C6 to C40) petroleum group			TPH		<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
2	confirm TPH has NOT arisen from diesel or petrol					☑					
3	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		2.45 mg/kg	1.197	2.61 mg/kg	0.000261 %	✓	
4	arsenic { arsenic pentoxide }	033-004-00-6	215-116-9	1303-28-2		20.8 mg/kg	1.534	28.395 mg/kg	0.00284 %	✓	
5	barium { barium sulphide }	016-002-00-X	244-214-4	21109-95-5		98.1 mg/kg	1.233	107.695 mg/kg	0.0108 %	✓	
6	cadmium { cadmium sulfate }	048-009-00-9	233-331-6	10124-36-4		1.91 mg/kg	1.855	3.153 mg/kg	0.000315 %	✓	
7	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		68.4 mg/kg	1.126	68.54 mg/kg	0.00685 %	✓	
8	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	16.6 mg/kg		14.774 mg/kg	0.00148 %	✓	
9	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
10	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		5.46 mg/kg	1.5	7.29 mg/kg	0.000729 %	✓	
11	nickel { nickel sulfate }	028-009-00-5	232-104-9	7786-81-4		57.9 mg/kg	2.637	135.871 mg/kg	0.0136 %	✓	
12	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				2.64 mg/kg	1.405	3.301 mg/kg	0.00033 %	✓	
13	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		70.6 mg/kg	2.469	155.156 mg/kg	0.0155 %	✓	
14	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		25.4 mg/kg	1.462	33.04 mg/kg	0.0033 %	✓	

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
15		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.6	mg/kg	1.923	<1.154	mg/kg	<0.000115 %		<LOD
16		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
17		acenaphthylene		205-917-1	208-96-8		<0.012	mg/kg		<0.012	mg/kg	<0.0000012 %		<LOD
18		acenaphthene		201-469-6	83-32-9		<0.008	mg/kg		<0.008	mg/kg	<0.0000008 %		<LOD
19		fluorene		201-695-5	86-73-7		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
20		phenanthrene		201-581-5	85-01-8		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
21		anthracene		204-371-1	120-12-7		<0.016	mg/kg		<0.016	mg/kg	<0.0000016 %		<LOD
22		fluoranthene		205-912-4	206-44-0		<0.017	mg/kg		<0.017	mg/kg	<0.0000017 %		<LOD
23		pyrene		204-927-3	129-00-0		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
24		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
25		chrysene	601-048-00-0	205-923-4	218-01-9		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
26		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
27		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
28		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
29		indeno[123-cd]pyrene		205-893-2	193-39-5		<0.018	mg/kg		<0.018	mg/kg	<0.0000018 %		<LOD
30		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.023	mg/kg		<0.023	mg/kg	<0.0000023 %		<LOD
31		benzo[ghi]perylene		205-883-8	191-24-2		<0.024	mg/kg		<0.024	mg/kg	<0.0000024 %		<LOD
32		polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.021	mg/kg		<0.021	mg/kg	<0.0000021 %		<LOD
33		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.0005	mg/kg		<0.0005	mg/kg	<0.00000005 %		<LOD
34		benzene	601-020-00-8	200-753-7	71-43-2		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
35		toluene	601-021-00-3	203-625-9	108-88-3		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
36		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
37		coronene		205-881-7	191-07-1		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
38		pH			PH		6.62	pH		6.62	pH	6.62 pH		
39		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.004	mg/kg		<0.004	mg/kg	<0.0000004 %		<LOD
											Total:	0.0572 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

WAC results for sample: TP05-0.50

WAC Settings: samples in this Job constitute a single population.

WAC limits used to evaluate this sample: "Ireland"
The WAC used in this report are the WAC defined for the inert and non-hazardous classes of landfill in the Republic of Ireland. You should check the actual acceptance criteria when the disposal site is identified as they may differ from the generic WAC used in this report.

The sample PASSES the Inert (Inert waste landfill) criteria.

The sample PASSES the Non Haz (Non hazardous waste landfill) criteria.

WAC Determinands

Solid Waste Analysis				Landfill Waste Acceptance Criteria Limits	
#	Determinand		User entered data	Inert waste landfill	Non hazardous waste landfill
1	TOC (total organic carbon)	%	0.642	3	5
2	LOI (loss on ignition)	%	7.29	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.007	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.021	1	-
5	Mineral oil (C10 to C40)	mg/kg	<5	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<10	100	-
7	pH	pH	6.62	-	>6
8	ANC (acid neutralisation capacity)	mol/kg		-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	<0.005	0.5	2
10	barium	mg/kg	0.013	20	100
11	cadmium	mg/kg	<0.0008	0.04	1
12	chromium	mg/kg	0.0362	0.5	10
13	copper	mg/kg	0.0057	2	50
14	mercury	mg/kg	<0.0001	0.01	0.2
15	molybdenum	mg/kg	<0.03	0.5	10
16	nickel	mg/kg	<0.004	0.4	10
17	lead	mg/kg	<0.002	0.5	10
18	antimony	mg/kg	<0.01	0.06	0.7
19	selenium	mg/kg	<0.01	0.1	0.5
20	zinc	mg/kg	<0.01	4	50
21	chloride	mg/kg	<20	800	15,000
22	fluoride	mg/kg	<5	10	150
23	sulphate	mg/kg	25	1,000	20,000
24	phenol index	mg/kg	<0.16	1	-
25	DOC (dissolved organic carbon)	mg/kg	33	500	800
26	TDS (total dissolved solids)	mg/kg	237	4,000	60,000

Key

User supplied data

Classification of sample: TP06-0.50

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
TP06-0.50
Sample Depth:
0.50 m
Moisture content:
11%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 11% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	TPH (C6 to C40) petroleum group			TPH		<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
2	confirm TPH has NOT arisen from diesel or petrol					☑					
3	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		2.77 mg/kg	1.197	2.951 mg/kg	0.000295 %	✓	
4	arsenic { arsenic pentoxide }	033-004-00-6	215-116-9	1303-28-2		22.2 mg/kg	1.534	30.306 mg/kg	0.00303 %	✓	
5	barium { barium sulphide }	016-002-00-X	244-214-4	21109-95-5		80.2 mg/kg	1.233	88.044 mg/kg	0.0088 %	✓	
6	cadmium { cadmium sulfate }	048-009-00-9	233-331-6	10124-36-4		1.96 mg/kg	1.855	3.235 mg/kg	0.000324 %	✓	
7	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		60.3 mg/kg	1.126	60.423 mg/kg	0.00604 %	✓	
8	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	16.9 mg/kg		15.041 mg/kg	0.0015 %	✓	
9	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
10	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		5.37 mg/kg	1.5	7.17 mg/kg	0.000717 %	✓	
11	nickel { nickel sulfate }	028-009-00-5	232-104-9	7786-81-4		57 mg/kg	2.637	133.759 mg/kg	0.0134 %	✓	
12	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				2.1 mg/kg	1.405	2.626 mg/kg	0.000263 %	✓	
13	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		70.7 mg/kg	2.469	155.376 mg/kg	0.0155 %	✓	
14	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		23.4 mg/kg	1.462	30.438 mg/kg	0.00304 %	✓	

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
15		chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.6	mg/kg	1.923	<1.154	mg/kg	<0.000115 %		<LOD
		024-001-00-0	215-607-8	1333-82-0									
16		naphthalene				<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
17		acenaphthylene				<0.012	mg/kg		<0.012	mg/kg	<0.0000012 %		<LOD
			205-917-1	208-96-8									
18		acenaphthene				<0.008	mg/kg		<0.008	mg/kg	<0.0000008 %		<LOD
			201-469-6	83-32-9									
19		fluorene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
			201-695-5	86-73-7									
20		phenanthrene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
			201-581-5	85-01-8									
21		anthracene				<0.016	mg/kg		<0.016	mg/kg	<0.0000016 %		<LOD
			204-371-1	120-12-7									
22		fluoranthene				<0.017	mg/kg		<0.017	mg/kg	<0.0000017 %		<LOD
			205-912-4	206-44-0									
23		pyrene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
			204-927-3	129-00-0									
24		benzo[a]anthracene				<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
		601-033-00-9	200-280-6	56-55-3									
25		chrysene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
26		benzo[b]fluoranthene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
		601-034-00-4	205-911-9	205-99-2									
27		benzo[k]fluoranthene				<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
		601-036-00-5	205-916-6	207-08-9									
28		benzo[a]pyrene; benzo[def]chrysene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
		601-032-00-3	200-028-5	50-32-8									
29		indeno[123-cd]pyrene				<0.018	mg/kg		<0.018	mg/kg	<0.0000018 %		<LOD
			205-893-2	193-39-5									
30		dibenz[a,h]anthracene				<0.023	mg/kg		<0.023	mg/kg	<0.0000023 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
31		benzo[ghi]perylene				<0.024	mg/kg		<0.024	mg/kg	<0.0000024 %		<LOD
			205-883-8	191-24-2									
32		polychlorobiphenyls; PCB				<0.021	mg/kg		<0.021	mg/kg	<0.0000021 %		<LOD
		602-039-00-4	215-648-1	1336-36-3									
33		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.0005	mg/kg		<0.0005	mg/kg	<0.00000005 %		<LOD
		603-181-00-X	216-653-1	1634-04-4									
34		benzene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
		601-020-00-8	200-753-7	71-43-2									
35		toluene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
		601-021-00-3	203-625-9	108-88-3									
36		ethylbenzene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
37		coronene				<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
			205-881-7	191-07-1									
38		pH				8.03	pH		8.03	pH	8.03 pH		
				PH									
39		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]				<0.004	mg/kg		<0.004	mg/kg	<0.0000004 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
										Total:	0.0541 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

WAC results for sample: TP06-0.50

WAC Settings: samples in this Job constitute a single population.

WAC limits used to evaluate this sample: "Ireland"
The WAC used in this report are the WAC defined for the inert and non-hazardous classes of landfill in the Republic of Ireland. You should check the actual acceptance criteria when the disposal site is identified as they may differ from the generic WAC used in this report.

The sample PASSES the Inert (Inert waste landfill) criteria.

The sample PASSES the Non Haz (Non hazardous waste landfill) criteria.

WAC Determinands

Solid Waste Analysis				Landfill Waste Acceptance Criteria Limits	
#	Determinand		User entered data	Inert waste landfill	Non hazardous waste landfill
1	TOC (total organic carbon)	%	0.645	3	5
2	LOI (loss on ignition)	%	5.22	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.007	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.021	1	-
5	Mineral oil (C10 to C40)	mg/kg	<5	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<10	100	-
7	pH	pH	8.03	-	>6
8	ANC (acid neutralisation capacity)	mol/kg		-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	<0.005	0.5	2
10	barium	mg/kg	0.0217	20	100
11	cadmium	mg/kg	<0.0008	0.04	1
12	chromium	mg/kg	0.0247	0.5	10
13	copper	mg/kg	0.0115	2	50
14	mercury	mg/kg	<0.0001	0.01	0.2
15	molybdenum	mg/kg	0.102	0.5	10
16	nickel	mg/kg	<0.004	0.4	10
17	lead	mg/kg	<0.002	0.5	10
18	antimony	mg/kg	<0.01	0.06	0.7
19	selenium	mg/kg	<0.01	0.1	0.5
20	zinc	mg/kg	0.0347	4	50
21	chloride	mg/kg	<20	800	15,000
22	fluoride	mg/kg	7.22	10	150
23	sulphate	mg/kg	<20	1,000	20,000
24	phenol index	mg/kg	<0.16	1	-
25	DOC (dissolved organic carbon)	mg/kg	<30	500	800
26	TDS (total dissolved solids)	mg/kg	757	4,000	60,000

Key

User supplied data

Appendix A: Classifier defined and non EU CLP determinands

TPH (C6 to C40) petroleum group (CAS Number: TPH)

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: Flam. Liq. 3; H226 , Asp. Tox. 1; H304 , STOT RE 2; H373 , Muta. 1B; H340 , Carc. 1B; H350 , Repr. 2; H361d , Aquatic Chronic 2; H411

confirm TPH has NOT arisen from diesel or petrol

Description/Comments: Chapter 3, section 4b requires a positive confirmation for benzo[a]pyrene to be used as a marker in evaluating Carc. 1B; H350 (HP 7) and Muta. 1B; H340 (HP 11)
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: None.

barium sulphide (EC Number: 244-214-4, CAS Number: 21109-95-5)

EU CLP index number: 016-002-00-X
Description/Comments:
Additional Hazard Statement(s): EUH031 >= 0.8 %
Reason for additional Hazards Statement(s):
14 Dec 2015 - EUH031 >= 0.8 % hazard statement sourced from: WM3, Table C12.2

lead compounds with the exception of those specified elsewhere in this Annex (worst case)

EU CLP index number: 082-001-00-6
Description/Comments: Worst Case: IARC considers lead compounds Group 2A; Probably carcinogenic to humans; Lead REACH Consortium, following CLP protocols, considers lead compounds from smelting industries, flue dust and similar to be Carcinogenic category 1A
Additional Hazard Statement(s): Carc. 1A; H350
Reason for additional Hazards Statement(s):
03 Jun 2015 - Carc. 1A; H350 hazard statement sourced from: IARC Group 2A (Sup 7, 87) 2006; Lead REACH Consortium www.reach-lead.eu/substanceinformation.html (worst case lead compounds). Review date 29/09/2015

chromium(III) oxide (worst case) (EC Number: 215-160-9, CAS Number: 1308-38-9)

Description/Comments: Data from C&L Inventory Database
Data source: https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/33806
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4; H332 , Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Resp. Sens. 1; H334 , Skin Sens. 1; H317 , Repr. 1B; H360FD , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

acenaphthylene (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4; H302 , Acute Tox. 1; H330 , Acute Tox. 1; H310 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315

acenaphthene (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Aquatic Chronic 2; H411

fluorene (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

phenanthrene (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Carc. 2; H351 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Skin Irrit. 2; H315

anthracene (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

fluoranthene (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Acute Tox. 4; H302 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

pyrene (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

indeno[123-cd]pyrene (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Carc. 2; H351

benzo[ghi]perylene (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 23 Jul 2015
Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

polychlorobiphenyls; PCB (EC Number: 215-648-1, CAS Number: 1336-36-3)

EU CLP index number: 602-039-00-4
Description/Comments: Worst Case: IARC considers PCB Group 1; Carcinogenic to humans;

POP specific threshold from ATP1 (Regulation 756/2010/EU) to POPs Regulation (Regulation 850/2004/EC). Where applicable, the calculation method laid down in European standards EN 12766-1 and EN 12766-2 shall be applied.
Additional Hazard Statement(s): Carc. 1A; H350
Reason for additional Hazards Statement(s):
29 Sep 2015 - Carc. 1A; H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

ethylbenzene (EC Number: 202-849-4, CAS Number: 100-41-4)

EU CLP index number: 601-023-00-4
Description/Comments:
Additional Hazard Statement(s): Carc. 2; H351
Reason for additional Hazards Statement(s):
03 Jun 2015 - Carc. 2; H351 hazard statement sourced from: IARC Group 2B (77) 2000

coronene (EC Number: 205-881-7, CAS Number: 191-07-1)

Description/Comments: Data from C&L Inventory Database; no entries in Registered Substances or Pesticides Properties databases; SDS: Sigma Aldrich, 1907/2006 compliant, dated 2012 - no entries; IARC – Group 3, not carcinogenic.
Data source: http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=17010&HarmOnly=no?fc=true&lang=en
Data source date: 16 Jun 2014
Hazard Statements: STOT SE 2; H371

pH (CAS Number: PH)

Description/Comments: Appendix C4
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: None.

Appendix B: Rationale for selection of metal species

antimony {antimony trioxide}

Worst case scenario.

arsenic {arsenic pentoxide}

Arsenic pentoxide used as most hazardous species.

barium {barium sulphide}

Chromium VI at limits of detection. Barium sulphide used as the next most hazardous species. No chromate present.

cadmium {cadmium sulfate}

Cadmium sulphate used as the most hazardous species.

copper {dicopper oxide; copper (I) oxide}

Reasonable case CLP species based on hazard statements/molecular weight and insolubility in water. Worse case copper sulphate is very soluble and likely to have been leached away if ever present and/or not enough soluble sulphate detected.

lead {lead compounds with the exception of those specified elsewhere in this Annex (worst case)}

Chromium VI at limits of detection. Lead compounds used as the next most hazardous species. No chromate present.

mercury {mercury dichloride}

Worst case CLP species based on hazard statements/molecular weight

molybdenum {molybdenum(VI) oxide}

Worst case CLP species based on hazard statements/molecular weight.

nickel {nickel sulfate}

Chromium VI at limits of detection. Nickel sulphate used as the next most hazardous species. No chromate present.

selenium {selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex}

Harmonised group entry used as most reasonable case. Pigment cadmium sulphoselenide not likely to be present in this soil. No evidence for the other CLP entries: sodium selenite, nickel II selenite and nickel selenide, to be present in this soil.

zinc {zinc sulphate}

Chromium VI at limits of detection. Zinc sulphate used as the next most hazardous species. No chromate present.

chromium in chromium(III) compounds {chromium(III) oxide (worst case)}

Reasonable case species based on hazard statements/molecular weight. Industrial sources include: tanning, pigment in paint, inks and glass

chromium in chromium(VI) compounds {chromium(VI) oxide}

Worst case CLP species based on hazard statements/molecular weight. Industrial sources include: production stainless steel, electroplating, wood preservation, anti-corrosion agents or coatings, pigments.

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.1.NI - Jan 2021
HazWasteOnline Classification Engine Version: 2023.221.5713.10531 (09 Aug 2023)
HazWasteOnline Database: 2023.221.5713.10531 (09 Aug 2023)

This classification utilises the following guidance and legislation:
WM3 v1.1.NI - Waste Classification - 1st Edition v1.1.NI - Jan 2021
CLP Regulation - Regulation 1272/2008/EC of 16 December 2008
1st ATP - Regulation 790/2009/EC of 10 August 2009
2nd ATP - Regulation 286/2011/EC of 10 March 2011
3rd ATP - Regulation 618/2012/EU of 10 July 2012
4th ATP - Regulation 487/2013/EU of 8 May 2013
Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013
5th ATP - Regulation 944/2013/EU of 2 October 2013
6th ATP - Regulation 605/2014/EU of 5 June 2014
WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014
Revised List of Waste 2014 - Decision 2014/955/EU of 18 December 2014
7th ATP - Regulation 2015/1221/EU of 24 July 2015
8th ATP - Regulation (EU) 2016/918 of 19 May 2016
9th ATP - Regulation (EU) 2016/1179 of 19 July 2016
10th ATP - Regulation (EU) 2017/776 of 4 May 2017
HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017
13th ATP - Regulation (EU) 2018/1480 of 4 October 2018
14th ATP - Regulation (EU) 2020/217 of 4 October 2019
15th ATP - Regulation (EU) 2020/1182 of 19 May 2020
The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1567 of 16th December 2020
The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1540 of 16th December 2020
17th ATP - Regulation (EU) 2021/849 of 11 March 2021
18th ATP - Regulation (EU) 2022/692 of 16 February 2022

Appendix 10

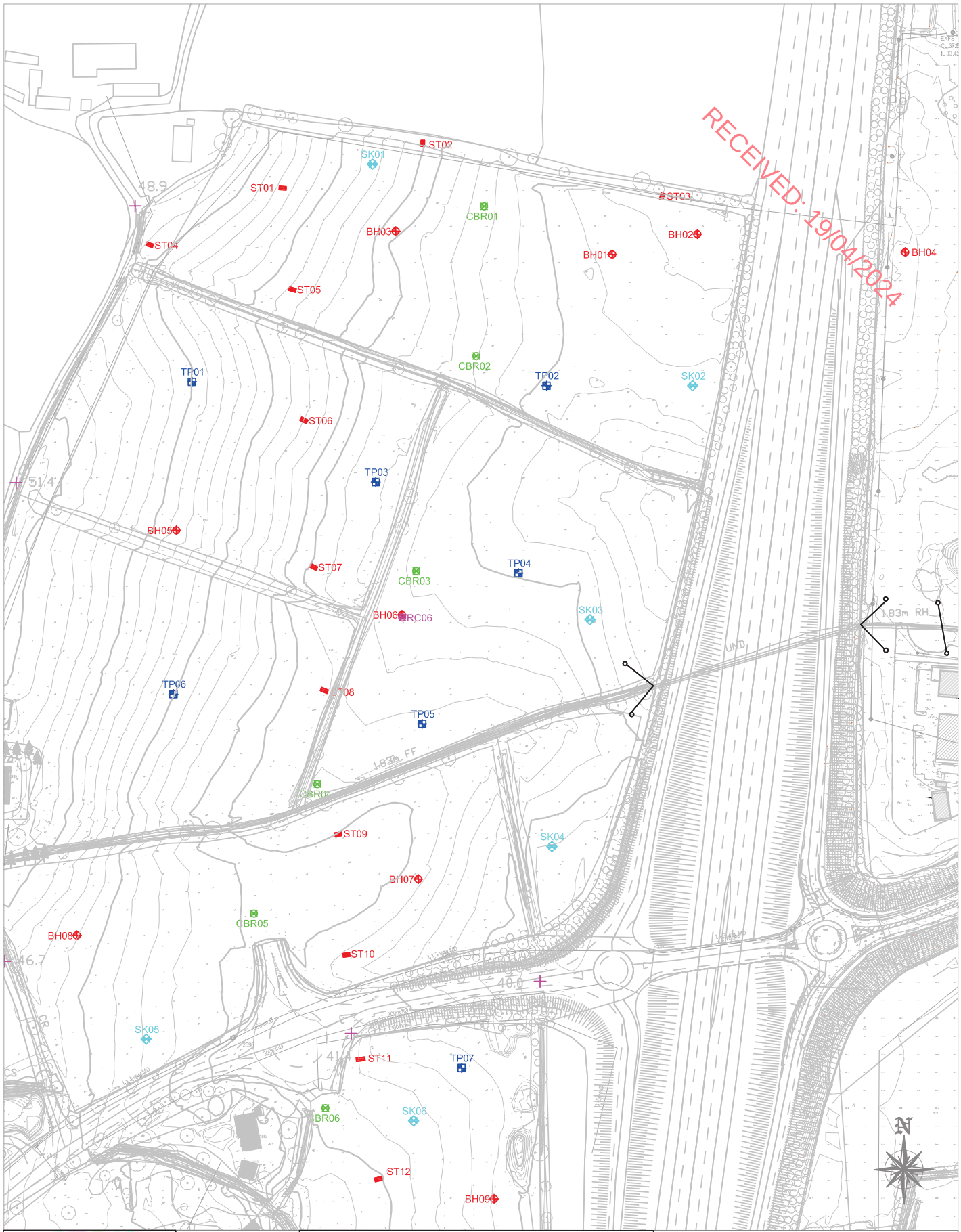
Survey Data

Survey Data

Location	Irish Transverse Mercator		Elevation	Irish National Grid	
	Easting	Northing		Easting	Northing
Cable Percussive Boreholes					
BH01	718270.062	758944.563	39.27	318344.713	258923.673
BH02	718317.392	758955.904	38.61	318392.053	258935.016
BH03	718149.632	758957.492	42.51	318224.257	258936.604
BH04	718433.018	758945.877	38.01	318507.703	258924.988
BH05	718027.659	758791.222	52.61	318102.260	258770.297
BH06	718153.144	758744.248	47.46	318227.772	258723.314
BH07	718162.225	758597.357	50.75	318236.857	258576.391
BH08	717972.469	758566.068	51.77	318047.061	258545.094
Rotary Corehole					
RC06	718153.353	758742.779	40.74	318227.981	258721.844
Trial Pits					
TP01	718038.629	758873.192	54.17	318113.232	258852.285
TP02	718233.569	758871.608	44.53	318308.213	258850.702
TP03	718176.142	758807.603	45.92	318250.774	258786.683
TP04	718217.971	758767.433	48.99	318292.613	258746.504
TP05	718164.432	758683.626	46.89	318239.063	258662.679
TP06	718026.098	758700.135	52.38	318100.700	258679.190
Soakaway Tests					
SA01	718136.823	758994.754	53.70	318211.445	258973.874
SA02	718314.851	758871.620	46.43	318389.512	258850.714
SA03	718257.797	758741.568	47.57	318332.447	258720.634
SA04	718236.532	758615.472	46.57	318311.179	258594.510
SA05	718010.975	758508.398	49.93	318085.575	258487.412
Slit Trenches					
ST01 - Start	718088.835	758981.316	46.01	318163.447	258960.432
ST01 - Gas Main	718086.829	758981.560	44.31	318161.441	258960.677
ST01 - End	718084.890	758981.646	46.42	318159.501	258960.763
ST02 - Start	718164.797	759008.024	43.17	318239.425	258987.147
ST02 - End	718164.677	759004.658	43.06	318239.305	258983.780
ST03 - Start	718298.417	758978.657	45.94	318373.073	258957.774
ST03 - End	718297.323	758975.252	45.99	318371.979	258954.368
ST04 - Start	718011.089	758950.553	48.08	318085.685	258929.662
ST04 - End	718014.727	758949.355	47.89	318089.324	258928.464
ST05 - Start	718094.197	758924.514	44.02	318168.811	258903.618
ST05 - Gas Main	718091.522	758925.381	42.20	318166.135	258904.485
ST05 - End	718090.430	758925.575	44.34	318165.043	258904.679
ST06 - Start	718100.475	758851.457	43.71	318175.091	258830.546
ST06 - End	718096.870	758853.313	43.94	318171.485	258832.402
ST07 - Start	718105.835	758769.948	42.05	318180.453	258749.019

Survey Data

Location	Irish Transverse Mercator		Elevation	Irish National Grid	
	Easting	Northing		Easting	Northing
ST07 - End	718102.377	758771.783	42.27	318176.994	258750.854
ST08 - Start	718111.848	758701.485	42.08	318186.468	258680.541
ST08 - End	718108.136	758703.038	42.15	318182.755	258682.094
ST09 - Start	718119.654	758622.515	42.52	318194.276	258601.554
ST09 - End	718115.911	758622.019	42.34	318190.532	258601.058
ST10 - Start	718124.208	758555.427	41.84	318198.832	258534.452
ST10 - End	718120.513	758555.005	41.90	318195.136	258534.030
California Bearing Ratio Tests					
CBR01	718198.884	758971.324	41.03	318273.519	258950.439
CBR02	718194.493	758888.082	47.16	318269.128	258867.179
CBR03	718161.079	758768.619	44.81	318235.709	258747.690
CBR04	718106.095	758650.148	50.26	318180.714	258629.193
CBR05	718070.858	758578.249	50.08	318145.470	258557.278



Site Investigations Ltd
The Grange
12th Lock Road
Lucan
Co. Dublin

T: 01 6108768
E: info@siteinvestigations.ie
www.siteinvestigations.ie

Client :	Vida M1 Limited		
Engineer :	Clifton Scannell Emerson Associates		
Project :	M1 Business Park - Zone A		
Date :	02-08-2023	**Scale :**	Not to Scale
Description :	Site Investigation	**Rev :**	1
Drawing No:	6161A:01/01	**Drawn by :**	MK

Legend:

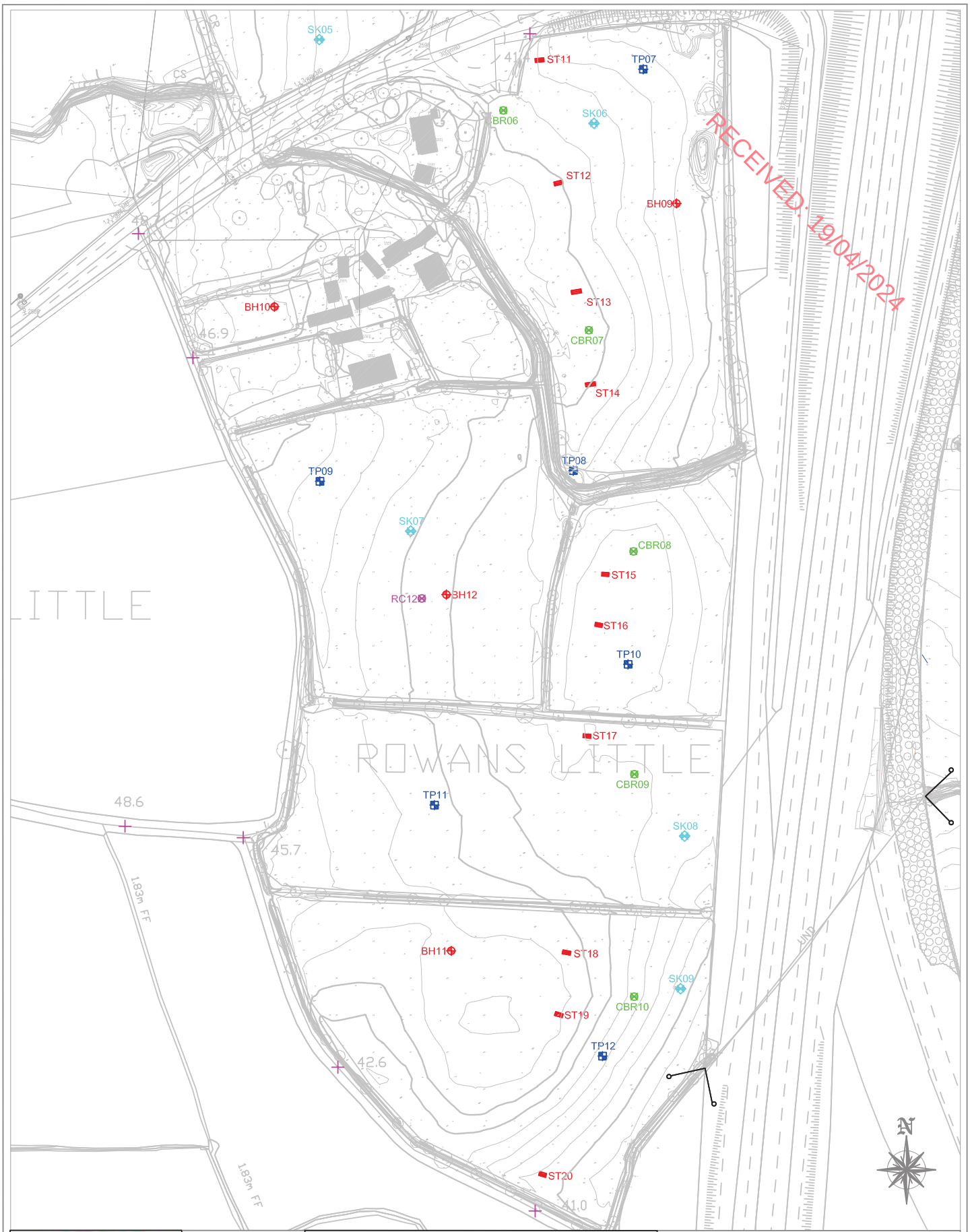
- Cable Percussion Borehole
- Trial Pit with Dynamic Probe
- Soakaway Test
- Slit Trench
- California Bearing Ratio Test

Survey Data

Location	Irish Transverse Mercator		Elevation	Irish National Grid	
	Easting	Northing		Easting	Northing
Cable Percussive Boreholes					
BH09	718204.443	758419.673	40.45	318279.085	258398.669
BH10	717986.639	758363.763	54.45	318061.240	258342.750
BH11	718082.368	758014.931	53.56	318156.990	257993.840
BH12	718079.765	758207.885	54.53	318154.380	258186.830
Rotary Corehole					
RC12	718066.484	758205.759	42.84	318141.099	258184.708
Trial Pits					
TP07	718186.356	758492.339	40.62	318260.994	258471.350
TP08	718148.548	758274.928	41.78	318223.180	258253.892
TP09	718011.299	758269.178	44.30	318085.902	258248.140
TP10	718178.184	758170.122	42.33	318252.823	258149.064
TP11	718073.335	758093.866	43.06	318147.953	258072.791
TP12	718164.353	757957.944	41.79	318238.992	257936.840
Soakaway Tests					
SA06	718159.686	758463.043	41.70	318234.318	258442.048
SA07	718060.438	758242.218	43.09	318135.052	258221.175
SA08	718208.759	758077.096	41.68	318283.406	258056.018
SA09	718206.587	757994.430	40.28	318281.234	257973.334
Slit Trenches					
ST11 - Start	718127.864	758496.993	41.51	318202.489	258476.005
ST11 - Gas Main	718130.063	758497.593	39.37	318204.689	258476.605
ST11 - End	718132.620	758497.497	41.18	318207.246	258476.509
ST12 - Start	718142.727	758431.240	42.49	318217.356	258410.238
ST12 - Gas Main	718141.190	758430.939	40.79	318215.819	258409.937
ST12 - End	718138.157	758430.150	42.69	318212.785	258409.148
ST13 - Start	718152.801	758372.316	42.77	318227.433	258351.301
ST13 - Gas Main	718150.722	758372.028	41.03	318225.353	258351.013
ST13 - End	718147.420	758371.438	42.82	318222.051	258350.423
ST14 - Start	718160.474	758322.024	42.50	318235.108	258300.999
ST14 - Gas Main	718158.762	758321.775	40.85	318233.396	258300.749
ST14 - End	718155.150	758321.344	42.55	318229.783	258300.318
ST15 - Start	718167.773	758218.735	42.31	318242.410	258197.687
ST15 - Gas Main	718165.400	758218.439	39.87	318240.036	258197.391
ST15 - End	718163.951	758218.935	42.32	318238.587	258197.887
ST16 - Start	718164.197	758191.024	42.35	318238.830	258169.970
ST16 - End	718160.311	758191.797	42.31	318234.950	258170.740
ST17 - Start	718157.987	758131.140	42.03	318232.620	258110.070
ST17 - End	718153.864	758131.430	42.16	318228.500	258110.360
ST18 - Start	718149.747	758051.479	42.76	318224.380	258030.400

Survey Data

Location	Irish Transverse Mercator		Elevation	Irish National Grid	
	Easting	Northing		Easting	Northing
ST18 - Gas Main	718144.825	758013.786	41.54	318219.459	257992.694
ST18 - End	718146.076	758051.747	42.63	318220.710	258030.660
ST19 - Start	718142.780	757979.761	43.55	318217.410	257958.660
ST19 - Gas Main	718141.523	757980.166	42.08	318216.160	257959.070
ST19 - End	718138.628	757981.018	43.78	318213.260	257959.920
ST20 - Start	718133.772	757893.297	40.48	318208.410	257872.180
ST20 - End	718130.018	757894.407	40.60	318204.650	257873.290
California Bearing Ratio Tests					
CBR06	718110.662	758470.028	42.12	318185.284	258449.034
CBR07	718156.992	758351.039	42.81	318231.625	258330.020
CBR08	718181.153	758231.273	42.19	318255.792	258210.228
CBR09	718181.599	758110.611	42.01	318256.240	258089.540
CBR10	718181.435	757990.200	41.70	318256.077	257969.103



Site Investigations Ltd
The Grange
12th Lock Road
Lucan
Co. Dublin

T: 01 6108768
E: info@siteinvestigations.ie
www.siteinvestigations.ie

Client :	Vida M1 Limited		
Engineer :	Clifton Scannell Emerson Associates		
Project :	M1 Business Park - Zone F		
Date :	02-08-2023	**Scale :**	Not to Scale
Description :	Site Investigation	**Rev :**	1
Drawing No:	6161B:01/01	**Drawn by :**	MK

Legend:

- Cable Percussion Borehole
- Trial Pit with Dynamic Probe
- Soakaway Test
- Slit Trench
- California Bearing Ratio Test

Appendix 8: Water, Hydrology & Hydrogeology

McCloy Consulting

Flood Risk Assessment

M1 Business Park - Zones A & F

M02103-02_DG08 | March 2024

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AUTHOR(S)	Andrew Snowling, Duncan Hartwick
BRANCH	DUBLIN Unit 12, The BEaT Centre, Stephenstown Industrial Estate, Balbriggan T: +353 (0)1 5138963 | W: www.mccloyconsulting.ie

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2	20/03/2024	AS	DH	PS	MINOR AMENDMENTS / SITE BOUNDARY UPDATED	ISSUED FOR INFORMATION

DISTRIBUTION

Recipient	Revision					
	1	2	3	4	5	6
FILE	✓	✓				
CLIENT	✓	✓				

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CONTENTS

LIST OF TABLES

LIST OF FIGURES

APPENDICES

1 INTRODUCTION

1.1 Terms of Reference

This Flood Risk Assessment report was commissioned by Clifton Scannell Emerson Associates on behalf of Vida M1 Limited (the applicant) to support a planning application for the M1 Business Park - Zones A & F. The proposed development site / Zones A & F as shown on drawings accompanying the application is hereafter referred to as 'the site'.

1.2 Statement of Authority

This report and assessment has been prepared and reviewed by qualified professionals with appropriate experience in the fields of flood risk, drainage, wastewater, and hydraulic modelling studies. The key staff members involved in this project are as follows:

- Andrew Snowling – Environmental Technician with experience in flood risk assessments, contaminated land risk assessments and surface water environments.
- Paul Singleton *BEng (Hons) MSc CEng MIEI* – Chartered Civil / Environmental Engineer with particular experience in drainage, SuDS and flood risk assessment, and a recognised industry professional having given industry training in these fields in Ireland and the UK.

1.3 Purpose

This report is intended to present a detailed site-specific FRA (SSFRA) to ensure all relevant issues related to flooding are addressed. This 'Stage 3' FRA will assess the adequacy of existing information and present analysis undertaken to supplement existing data.

The assessment will therefore determine potential sources of flooding at the site. This report will also determine flood zones relevant to planning policy guidelines specific to flood risk management planning and will provide a basis for appropriate design and mitigation measures to be considered as part of the proposed development.

1.4 Approach to the Assessment

Consideration has been given to the sources and extent of fluvial flooding at the site, as well as flooding to the site from pluvial sources, overland flow and ponding of localised rainfall within the site. A walk over survey of the site was conducted by McCloy Consulting Ltd to investigate all sources of potential flooding. During the visit a photograph survey of the site and adjacent lands was undertaken. A topographical survey of the site was also commissioned and undertaken by a third party.

The method of assessment complies with the Source-Pathway-Receptor model, allowing spatial assessment of flood risk to people, properties and the environment at the site. The assessment will investigate the existing runoff characteristics and the potential impact the proposed development will have on pluvial (surface water) runoff.

1.4.1 Hydraulic Model Status

For the purposes of this assessment, the primary stakeholders are the Office of Public Works (OPW) and Fingal County Council (FCC). OPW and FCC data is used to form the basis of this assessment and is presented in line with the relevant guidance and requirements.

The area of interest and surrounding environs are included within the OPW / FCC Fingal East Meath Flood Risk Assessment and Management Study (FEM FRAMS), and maps of fluvial flooding produced as part of the study are included in and considered by this assessment.

The FEM FRAMS model and associated maps were published in 2009. Flood models supporting FEM FRAMS are not known to be permitted to be made available to 3rd parties under licence or otherwise. Given the significant period of time since the FEM FRAMS was produced and published, there is potential for watercourse morphology to have varied and other changes to have taken place that would cause variation to FEM FRAMS results.

In addition, FEM FRAMS Flood Maps 'map disclaimer' states that "*the maps have been produced at a strategic, catchment level using an automated mapping process and…the maps should not be used to assess the flood risk associated with point locations or to replace detailed local flood risk assessment*".

Therefore, the watercourses affecting the area of interest have been re-modelled based on best available data and techniques to establish a revised flood baseline, intended to supersede FEM FRAMS mapping as a basis for local development planning subject to Fingal County Council (as local planning authority) agreement.

A report has been prepared to outline the inputs and results of the hydraulic modelling process; refer to the Flood Study (ref. M02103-02_DG01) submitted under separate cover. The Flood Study for lands at the M1 Business Park was originally undertaken by McCloy Consulting in 2018 (hereafter 'McCloy Flood Study'). The hydrological assessment and hydraulic model were reviewed as part of a Fingal CC Local Area Plan (LAP) for lands at 'Rowans Little' which included production of a Strategic Flood Risk Assessment (SFRA) in late 2022. Further site walkover and survey data was considered as part of this assessment in January 2024.

Subsequent work in 2022 and 2024 has shown that the 2018 Flood Study is still relevant / correctly represents flood extents and levels at the site. Therefore, hydrological estimates and hydraulic model results from the Flood Study and subsequent model update are deemed fit for the purpose of this SSFRA.

1.4.2 Planning Guidelines

The requirements for FRAs are generally as set out in the OPW's 'The Planning System and Flood Risk Management – Guidelines for Planning Authorities, Technical Appendix A' published by the OPW and Department of the Environment, Heritage and Local Government in November 2009 (hereafter referred to as the 'OPW Guidelines'). The OPW Guidelines are supplemented by 'Departmental Circular PL 2/2014', issued by the Department of Environment, Community and Local Government on 13th August 2014, which relates to the use of OPW flood mapping in assessing planning applications and provides clarifications of advice contained within the OPW Guidelines. Further guidance is also provided in the CIRIA Research Project 624 'Development and Flood Risk: Guidance for the Construction Industry'.

Planning Guidelines applicable to the area of interest are implemented in the Fingal Development Plan 2023-2029, and specifically through the Strategic Flood Risk Assessment (SFRA) for the Fingal Development Plan 2023-2029.

The Fingal SFRA was prepared in accordance with the requirements of the OPW Guidelines and adopts the same Flood Zone standard as the national planning guidelines. Flood Zones are defined by the predicted extents of a design flood event that determine the suitability of development from a flood risk point of view. They are defined in both the OPW Planning Guidelines and SFRA as follows:

- Flood Zone A – where the probability of flooding from rivers and the sea is highest (greater than 1% or 1 in 100 in any given year for river flooding or 0.5% or 1 in 200 in any given year for coastal flooding).
- Flood Zone B – where the probability of flooding from rivers and the sea is moderate (between 0.1% or 1 in 1000 in any given year and 1% or 1 in 100 in any given year for river flooding and between 0.1% or 1 in 1000 in any given year and 0.5% or 1 in 200 in any given year for coastal flooding).
- Flood Zone C – where the probability of flooding from rivers and the sea is low (less than 0.1% or 1 in 1000 in any given year for both river and coastal flooding).

The OPW Guidelines and Fingal SFRA specify that Flood Zones are to be used to determine the suitability of proposed developments and are to be derived from 'present day' hydrological estimates (i.e., without inclusion of climate change allowances), and without taking account of flood defences.

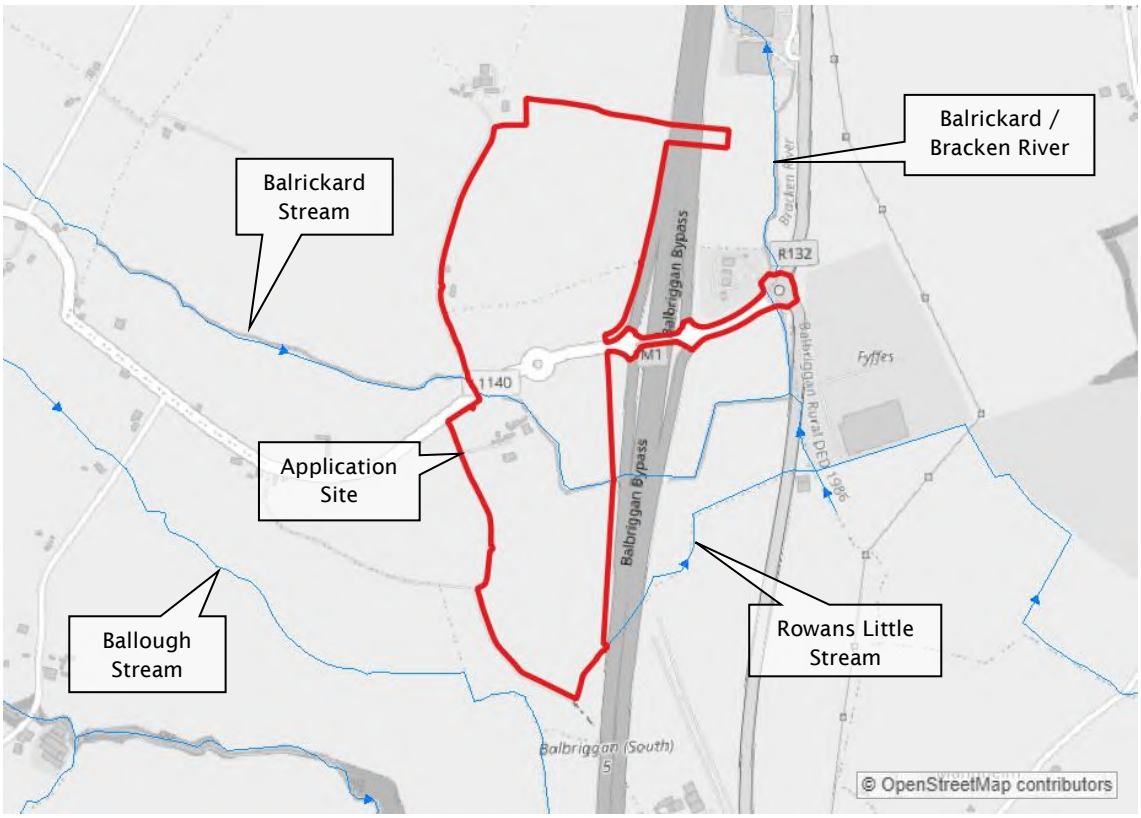
The OPW Guidelines also specify that proposed developments should be designed to be resilient to the effects of climate change.

2 DEVELOPMENT AND SITE DETAILS

2.1 Site Location

Figure 2.1: Site Location

Figure 2.2: Site Boundary and Affecting Watercourses



2.2 Existing Site Description

The site is located in the townlands of Rowans Big (Zone A) and Rowans Little (Zone F), approximately 5.3 km north-west of Lusk and 5.8 km south-west of Balbriggan, as shown in Figure 2.1. The M1 motorway runs adjacent to the eastern boundary and the site includes part of Junction 5 (Balbriggan). The L1140 local road (with a roundabout) runs through the centre of the Plan Area in an east-west direction and connects to the R132 regional road to the east of the M1 via a bridge.

The site currently primarily comprises agricultural land. There is one residential dwelling on the north side of the L1140 (Zone A) and three residential dwellings with adjacent agricultural buildings on the south side of the local road (Zone F), as shown in Figure 2.2.

2.3 Affecting Waterbodies

Figure 2.2 includes watercourses within and in the vicinity of the site shown on EPA and OPW watercourse datasets. The site is intersected by the Balrickard Stream, and the Rowans Little Stream flows adjacent to the southernmost boundary. Both watercourses are culverted beneath the M1 and flow into the Balrickard / Bracken River.

In addition to the EPA / OPW watercourses, a number of open field drains run through the site following the general fall of local topography from west to east.

2.4 Geology and Hydrogeology

Geological Survey of Ireland (GSI) data indicates the following in relation to the geology and hydrogeology of the site:

- Subsoil geology comprises primarily till derived from Namurian sandstones and shales in the western extent of the Plan Area and Irish Sea till derived from Lower Palaeozoic sandstones and shales in the eastern extent.
- The subsoil underlying the Plan Area has low permeability and low recharge capacity.
- Bedrock geology primarily comprises the Loughshinny Formation (limestone and shale) with Balrickard Formation (coarse sandstone and shale) with the Walshestown Formation (shale, sandstone, and limestone) in the north-west extent.
- There are no bedrock outcrops within the Plan Area.
- The Plan Area is within the Hynestown groundwater body (classified as bedrock with a poorly productive flow regime).
- The Plan Area is primarily underlain by a locally important aquifer (i.e., bedrock that is generally moderately productive) with a poor aquifer (i.e., bedrock that is generally unproductive except for local zones) in the north-west extent.
- Geotechnical boreholes drilled in the southern extent of the Plan Area and in the centre of the Plan Area at the L1140 roundabout (as well as along the M1 adjacent to the eastern Plan Area boundary) found that neither bedrock nor groundwater were met at depths up to 20 m.

As part of Site Investigation (SI) for the site, geotechnical boreholes drilled in August 2023 provided the following data:

- Zone A: No bedrock found within 15m, water-strike along eastern boundary (low-lying) 0.7-1.5m, water-strike along western boundary (high-lying) 6m.
- Zone F: No bedrock found within 15m, water-strike 3.5m depth recorded in BH located near Balrickard Stream and Rowans Little Stream.

2.5 Proposals for the Site

The proposed development described in the planning application that this FRA is intended to support is as follows:

> *Permission for a 10-year duration is sought under the Planning and Development Act, 2000 (as amended), by Vida M1 Limited for a Business Park Development which comprises of the demolition of all existing buildings on site, provision of internal roads and services infrastructure (surface water, foul and water supply) to facilitate the future development of the lands including public lighting, utility connections (power and telecommunications) and Sustainable Drainage Systems (SuDS). Provision of new access roads from 'Bhailsigh Road' (L1140) to Zone A and Zone F and new shared cycle and pedestrian routes over the M1 motorway via the (L1140) towards the R132. Upgrades and modifications to the existing roundabout along the L1140. All ancillary landscaping, road works, boundary treatments and site development works to support the development. All future developments will be subject to their own respective planning application approvals.*

A drawing showing the current proposals is provided in Appendix A of this report.

2.6 Vulnerability Classification

The vulnerability classification(s) of the proposed development are shown in Table 2.1, based on the classification criteria set out in the OPW Guidelines.

Table 2.1: Vulnerability Classification

Part	Use	Classification
Access Roads	Local Transport Infrastructure	Less Vulnerable
Green Areas	Open Amenity	Water Compatible

3 BACKGROUND INFORMATION REVIEW

As part of the data collection phase for this assessment, several available sources of information generally as set out in the OPW Guidelines were investigated in order to build an understanding of the potential risk of flooding to the site.

The following review highlights the key findings of the background information review.

3.1 Fingal County Council

3.1.1 Fingal County Development Plan 2023-2029

The Fingal County Development Plan 2023 – 2029 has been reviewed as part of this assessment with the following policies and objectives being the most relevant to this flood risk assessment:

- CAP11: Development proposals should demonstrate sustainable design principles for new buildings/services/site. The Council will promote and support development which is resilient to climate change. This would include "D: Reducing flood risk, damage to property from extreme events– residential, public and commercial".
- CAP29: Encourage the use of natural flood risk mitigation or nature-based solutions including integrated wetlands, green infrastructure, and Sustainable Drainage Systems (SuDS) as part of wider adaptation and mitigation responses to achieve flood resilience.
- IUO16: Have regard to the OPW Flood Risk Management Guidelines (2009), as revised by Circular PL 2/2014, when assessing planning applications and in the preparation of statutory and non-statutory plans and to require site specific flood risk assessments are to be considered for all new developments within the County. All development must prepare a Stage 1 Flood Risk Analysis and if the flooding risk is not screened out, they must prepare a Site Specific Flood Risk Assessment (SSFRA) for the development, where appropriate.
- IUO18: All Flood Risk Assessments must comply with the recommendations from the SFRA report.

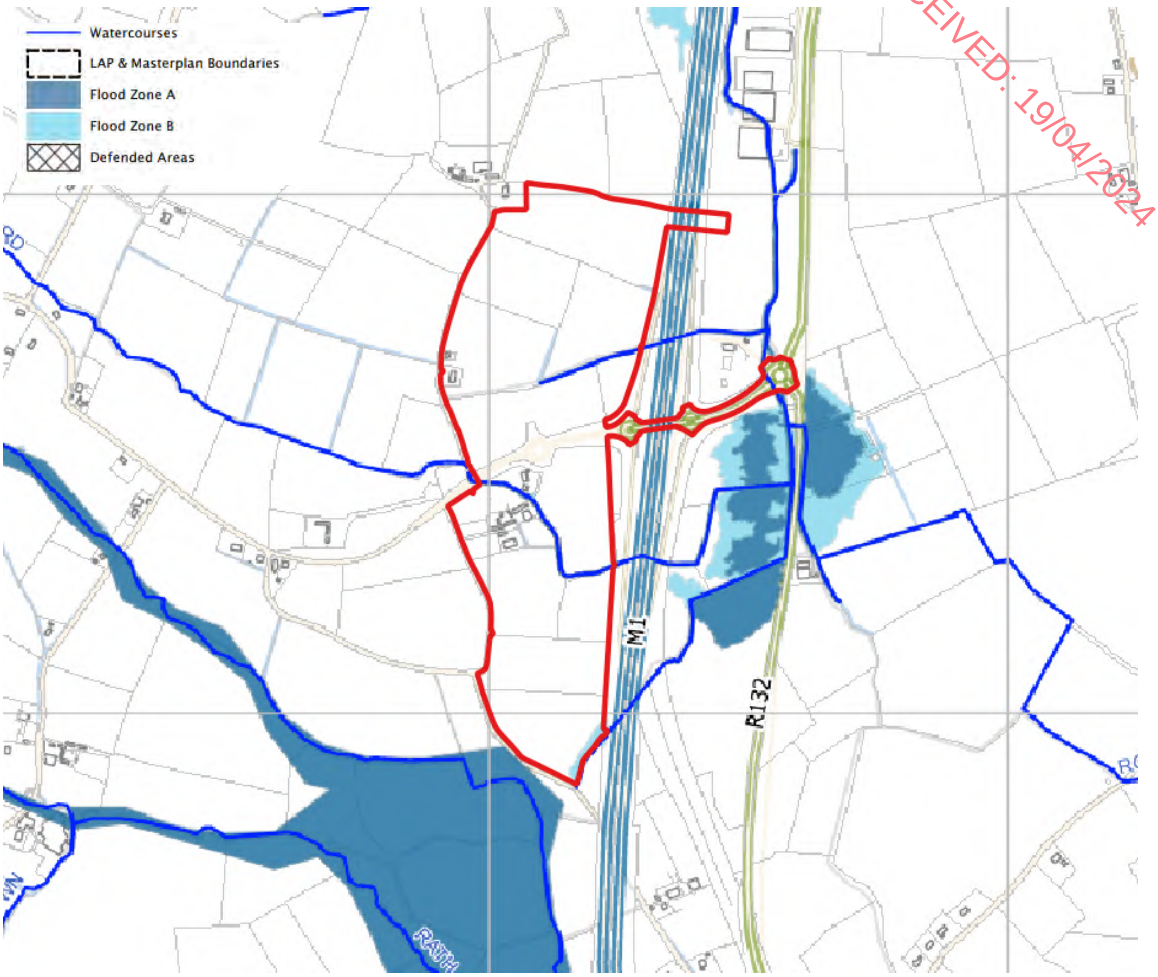
3.1.2 SFRA for Fingal Development Plan 2023-2029

The Fingal Development Plan SFRA 2023-2029 includes the following guidance which is considered pertinent to the FRA:

- Flood Zones represent flood extents for the existing, undefended present-day scenario.
- Climate change projections are to be applied depending on the receptor vulnerability; HEFS is to be considered for 'highly vulnerable' development and MRFS is to be considered for 'less vulnerable' development.
- A key mechanism for providing flood protection and resilience is the setting of Finished Floor Levels (FFLs), Finished Ground Levels (FGLs).
- Minimum fluvial flooding design levels for 'less vulnerable' development is the greater of the 1% AEP (present day / Flood Zone A) flood level + 500mm freeboard; *or* 1% AEP MRFS CC flood level + 250mm freeboard.
- In accordance with the OPW Guidelines, access to and egress from any development should be within Flood Zone C (i.e., outside the 0.1% AEP fluvial / coastal floodplain). Where this is not achievable due to on-site or off-site flood risk, a Flood Management Plan for the development will be required.

An extract from the Flood Zone mapping published as part of the Fingal SFRA is included in Figure 3.1. The relevant full flood map is included in Appendix B.

Figure 3.1: Fingal CC SFRA Flood Zone Mapping



3.2 Office of Public Works

3.2.1 OPW 'Past Flood Events'

OPW 'Past Flood Event' mapping (available through floodinfo.ie) shows a record of historic flooding in the vicinity of the site, on the east side of the M1 motorway, dated 31st March 2008. Photographs included within the accompanying flood report show flooding of agricultural land north of the existing M1 Business Park and shallow flooding within the M1 Business Park.

No evidence of historic flooding on the west side of the M1, affecting the site and surrounds, were found.

3.2.2 Preliminary Flood Risk Assessment

The first stage of the OPW's Catchment Flood Risk Assessment and Management (CFRAM) Programme comprised the national Preliminary Flood Risk Assessment (PFRA), which included flood mapping for the entire country based on available or readily derivable information. The purpose of the PFRA was to identify areas that may be susceptible to flooding to inform further CFRAM stages. PFRA flood mapping is considered indicative only and is therefore unsuitable for site-specific assessment.

The PFRA flood map indicates that a minor section of the site may be at risk of pluvial (surface water) flooding but no fluvial or groundwater flooding is shown. An extract of the original PFRA flood map is presented in Figure 3.2 and the full map is included in Appendix B.

While recent correspondence from the OPW has informed that the PFRA mapping is considered 'superseded', the PFRA is the best available pluvial flood data source for the site.

Figure 3.2: OPW PFRA Indicative Flood Mapping

3.2.3 FEM FRAMS

As a part of the CFRAM programme, the OPW commissioned a number of pilot studies. One such pilot study was the Fingal East Meath Flood Risk Assessment and Management Study (FEM FRAMS), undertaken in partnership with Fingal County Council and Meath County Council. The study was carried out to investigate flood risk in the Fingal East Meath area.

The FEM FRAMS flood study involved the production of flood maps for each study pilot area. One such study area was the Bracken River and the associated flood maps were used to inform the initial stages of the McCloy Flood Study. It is noted that the site is shown to not be affected by out-of-bank flooding by the FEM FRAMS flood maps, with the exception of a minor section of the south of the site, but that there is 'low confidence' (> 40 m) in modelled flood extents in the vicinity.

The FEM FRAMS flood extents are presented in Figure 3.3 and the full original map is included in Appendix B. As shown, the site is not predicted to be affected by flooding.

Figure 3.3: OPW FEM FRAMS Flood Mapping

3.3 Internet / Media / Background Search

A media search highlighted news articles with evidence of flooding at the M1 off-slip at Junction 5 was found on 12th December 2015 when fire crews had to rescue a trapped car[1,2].

[1] https://www.independent.ie/irish-news/storms/complete-mayhem-for-residents-as-river-breaks-bank-flooding-homes-with-water-34280989.html [accessed 12/02/2024]

[2] https://www.thesun.ie/archives/irish-news/115587/motorists-stranded-as-m1-motorway-slip-roads-flood/ [accessed 12/02/2024]

4 ASSESSMENT OF FLOOD MECHANISMS

4.1 Preamble

Development control procedures advise against inappropriate development in areas at risk of flooding and aim to avoid new development that increases flood risk elsewhere, in accordance with the OPW Guidelines.

The following assessment determines the flood hazards to life and property at the site to subsequently assess the site and proposed development based on the Flood Risk Framework outlined in the OPW Guidelines. Mitigation of flood hazards, where required, is detailed in Section 0.

4.2 Initial Assessment

The following is a record of the screening assessment of the development site for potential flooding mechanisms requiring subsequent detailed assessment, based on the information obtained from the background information review and consultations.

Table 4.1: Possible Flooding Mechanisms

Source/Pathway	Significant?	Reason
Fluvial Flooding	Yes	Watercourses are shown to flow through and in the vicinity of the site.
Coastal Flooding	No	OPW flood mapping indicates that tidal / coastal flooding does not affect the site. Predicted tidally influenced flooding at Balbriggan is not predicted to extend to subject site.
Urban Drainage	No	No indication of urban drainage flooding / sewer incapacity found in an initial evidence search and limited development exists in the vicinity of the site.
Surface Water Flooding	Possible	OPW PFRA flood mapping indicates that the site is potentially affected by surface water flooding and elevated areas do exist in the vicinity of the site.
Surface Water Discharge	Possible	Any development has the potential to increase the impermeable area at a site causing an increase in the rate and volume of surface water runoff from the site.
Groundwater	No	Underlying geology is till over shale and is not of a nature that would be susceptible to superficial deposit flooding. Site topography and bedrock geology are not of a nature that would be prone to clearwater groundwater flooding or impoundment of emergent groundwater.
Reservoirs/Canals/ Artificial Sources	No	A screening assessment based on OSI mapping indicates that there are no impoundments or reservoirs in close proximity to the site or that drain towards the site.

Flooding mechanisms screened as being potentially significant and requiring further assessment have been assessed further in the following sections.

4.3 Existing (Pre-Development) Fluvial Flooding

4.3.1 Preamble

As described in Section 1.4.1, the site-specific 'McCloy Flood Study' has been prepared to provide a more accurate and recent representation of flooding in the area. Refer to Flood Study M02103-02_DG01 submitted under separate cover for further information on flood modelling and hydrology methodologies. The McCloy Flood Study provides the baseline upon which this site-specific FRA is based.

4.3.2 Existing Scenario – Flood Zoning

An extract from the existing scenario, present day Flood Zone Map is shown in Figure 4.1 and demonstrates that, similar to the OPW FEM FRAMS, limited out of bank flooding occurs within the boundary. The only area of surface ponding of fluvial floodwater is adjacent to the M1 in the north east of the site at the downstream end of a local field drain. It is noted that a number of field drains are shown 'blue' (i.e. affected by flooding) despite not being classed as watercourses, including in the northern section of the site, and that flood extents are trimmed to the site boundary.

Flood levels at key locations are shown in Table 4.2. The full Flood Zone Map for the site is included in Appendix C.

Figure 4.1: Flood Zone Map – Existing Scenario Present Day

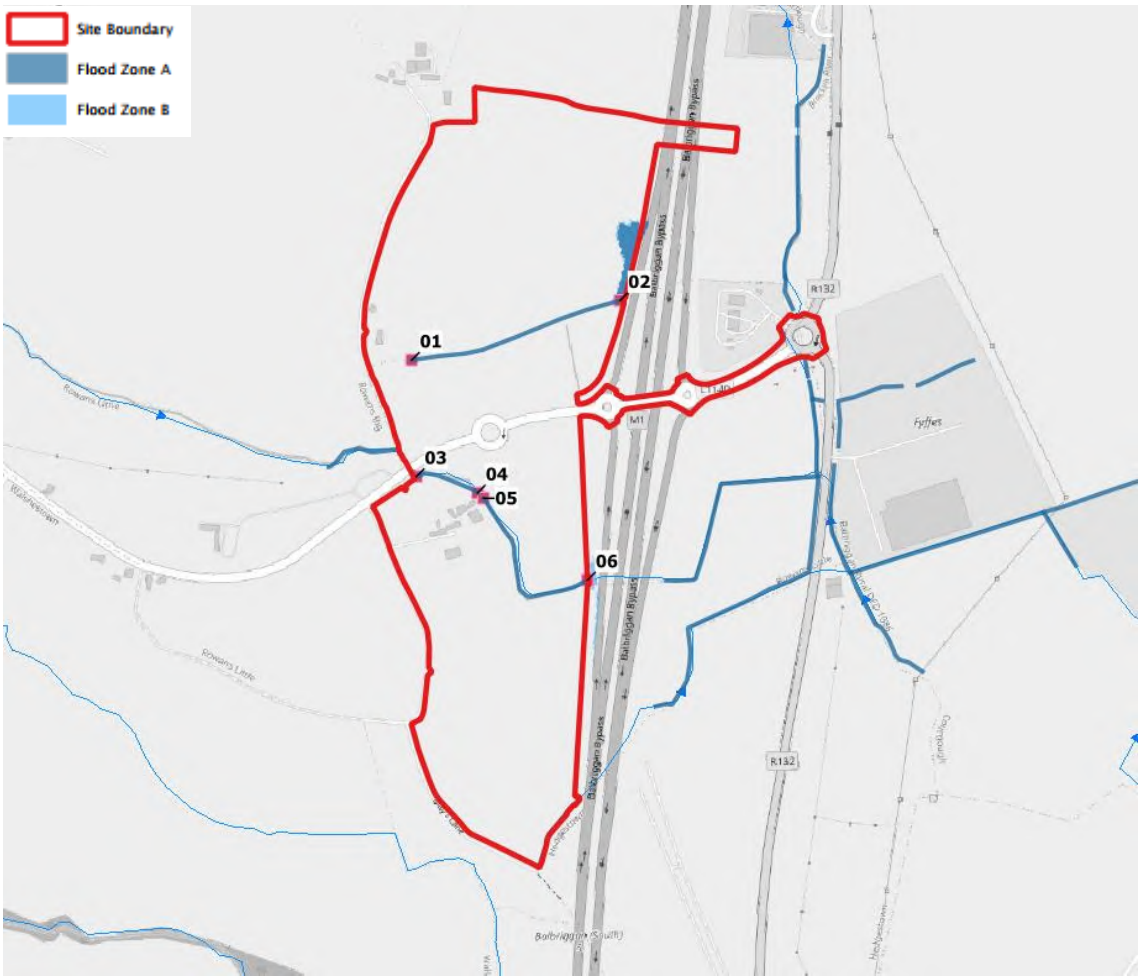


Table 4.2: Modelled Flood Levels – Existing Scenario Present Day

Model Node Reference	Location	Flood Zone A Level (mOD)	Flood Zone B Level (mOD)
01	Upstream extent of Land Drain in the north of the Site	42.16	42.25
02	Downstream extent of Land Drain in the north of the Site	38.64	38.69
03	Upstream extent of Balrickard Stream in the west of the Site	43.06	43.16
04	Upstream of existing crossing in the centre of the Site	42.14	42.46
05	Downstream of existing crossing in the centre of the Site	40.76	40.85
06	Downstream extent of Balrickard Stream in the east of the Site	38.53	39.28

4.4 Proposed Scenario (Post-Development) Fluvial Flooding

4.4.1 Preamble

Proposals for the site have been developed on the basis of the Flood Zone Map for the site in accordance with the OPW Guidelines and Fingal CC SFRA.

4.4.2 Effect of the Development

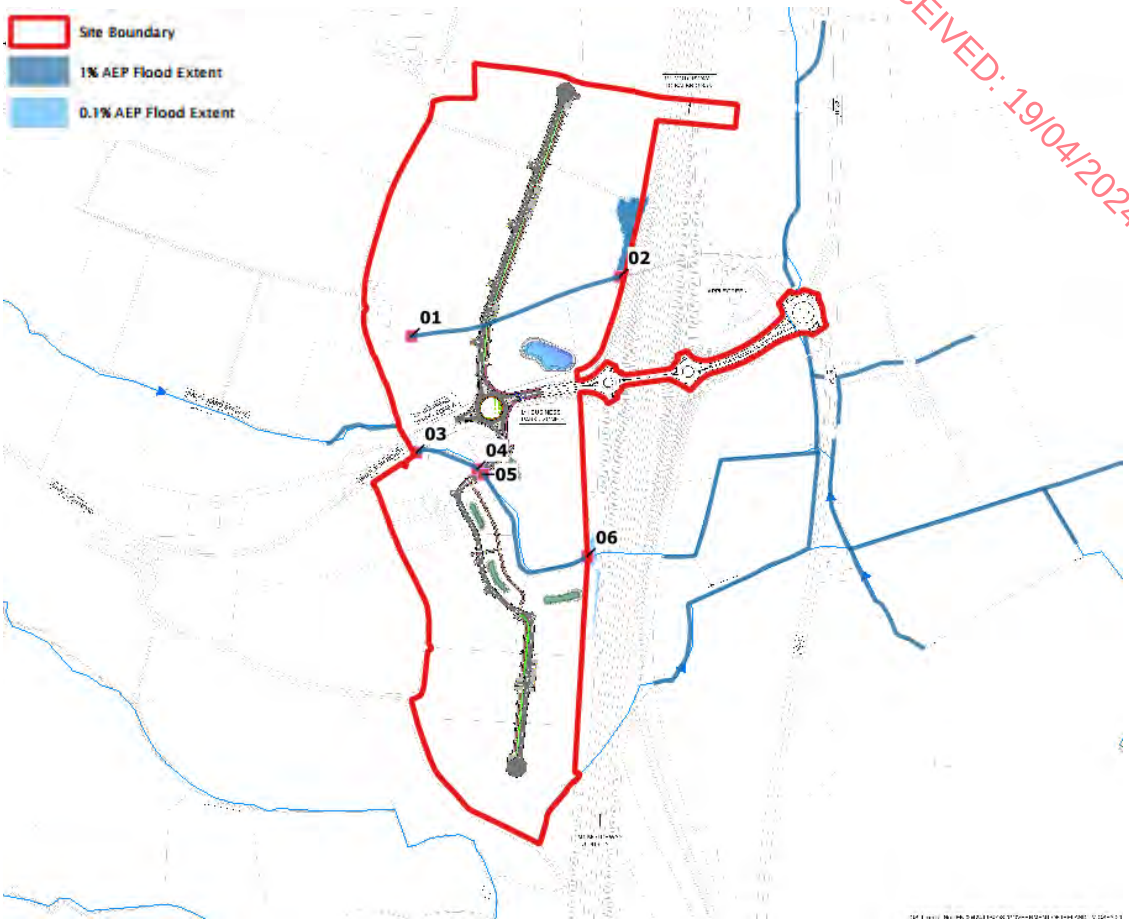
All proposed 'less vulnerable' development has been sited in Flood Zone C with the exception of part of the access track in the centre of the site where it crosses the Balrickard Stream. The watercourse crossing has been designed in line with OPW Section 50 requirements.

Therefore, there is no change to the existing scenario flood extents as shown in Figure 4.2. As such, the proposals have no impact on flood risk within the site or elsewhere in keeping with the requirements of the OPW Guidelines, as demonstrated by the proposed scenario flood levels in Table 4.3. The full proposed scenario flood extents map is included in Appendix C.

Table 4.3: Modelled Flood Levels – Proposed Scenario Present Day

Model Node Reference	Location	Flood Zone A Level (mOD)	Flood Zone B Level (mOD)
01	Upstream extent of Land Drain in the north of the Site	42.16	42.25
02	Downstream extent of Land Drain in the north of the Site	38.64	38.69
03	Upstream extent of Balrickard Stream in the west of the Site	43.06	43.16
04	Upstream of existing crossing in the centre of the Site	42.14	42.46
05	Downstream of existing crossing in the centre of the Site	40.76	40.85
06	Downstream extent of Balrickard Stream in the east of the Site	38.53	39.28

Figure 4.2: Flood Extents Map –Proposed Scenario Present Day



4.4.3 Proposed Flood Risk – Effect of Climate Change

The OPW Guidelines and Fingal SFRA require site-specific FRAs to consider increased flood risk to the proposed development under climate change (CC) scenarios. OPW guidance suggests using a Mid-Range Future Scenario, which represents a 20% increase in flood flows and / or 0.5 m increase in mean sea level, where applicable. An estimation of the effect of climate change on flooding at the site has been derived from the detailed site-specific hydraulic model by adding 20% to the present day design flows.

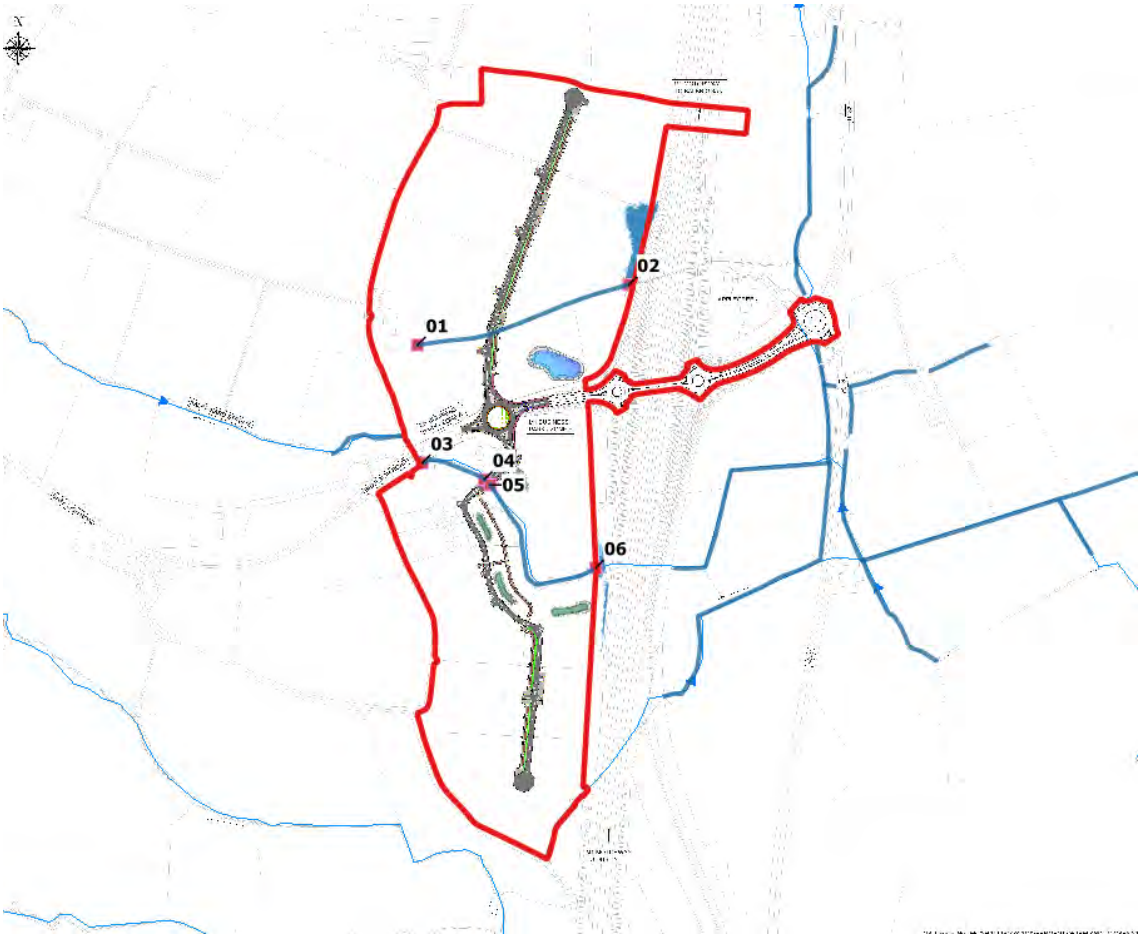
Table 4.4 shows the predicted post-development climate change flood levels at the site. Allowance for climate change causes a maximum increase in flood level of 0.66 m directly upstream of the M1 culvert at the south east of the site (due to capacity issues with the larger flow) and a maximum of 0.14 m at all other points.

The climate change flood extents, overlain on the proposed layout, are included in Figure 4.3: Flood Extents Map – Proposed Scenario Climate Change. As shown, there is little change in flood extents as a result of climate change and no new areas of out-of-bank flooding.

Table 4.4: Modelled Flood Levels – Proposed Scenario Climate Change

Model Node Reference	Location	Flood Zone A Level (mOD)	Flood Zone B Level (mOD)
01	Upstream extent of Land Drain in the north of the Site	42.19	42.29
02	Downstream extent of Land Drain in the north of the Site	38.66	38.71
03	Upstream extent of Balrickard Stream in the west of the Site	43.11	43.22
04	Upstream of existing crossing in the centre of the Site	42.28	42.56
05	Downstream of existing crossing in the centre of the Site	40.79	40.88
06	Downstream extent of Balrickard Stream in the east of the Site	39.19	39.35

Figure 4.3: Flood Extents Map – Proposed Scenario Climate Change



4.5 Surface Water Flooding

4.5.1 Pluvial Runoff onto Site

The OPW PFRA mapping indicates that the site may be at risk from surface water flooding. The site is situated at a higher or similar elevation than lands to the north, south and east. Therefore, surface water runoff from these areas will not pose a risk of pluvial flooding.

Lands at a higher elevation do exist to the west of the site so surface water from these areas may flow towards the site. It is noted that runoff from undeveloped / 'greenfield' lands to the west have been accounted for in the catchment hydrology estimates used as a basis for the hydraulic model and flows would be directed towards the preferential flow paths provided by watercourse and open drainage channels.

Therefore, risk of surface water flooding at the site is considered to be low. Mitigation of the residual risk of pluvial flooding, by providing adequate surface water drainage, is discussed in Section 0.

4.5.2 Pluvial Runoff from Site

All surface water runoff from the site would tend to drain towards watercourses and open channel drains within the site. There will be no potential for runoff from the site to flow towards neighbouring lands / properties.

Development at the site will increase the impermeable area of the site and cause an increase in the rate and volume of runoff from the site when compared to the existing scenario.

Mitigation of the residual impact of surface water from the development, by means of an effective surface water drainage network and surface water management, is discussed in Section 0.

5 SUMMARY OF FINDINGS AND RECOMMENDATIONS

5.1 Summary of Findings

It has been determined that while watercourses and open channel drains flows through and adjacent to the site, there is little out-of-bank flooding within the proposed development boundary. In relation to Flood Zones as defined by the OPW guidelines, the majority of the site lies in Flood Zone C with parts shown to lie in Flood Zone A and Zone B.

No other significant flood mechanisms exist at the site.

5.2 Design Considerations

The following section details measures incorporated within the proposal submitted in support of the planning application, and to be further developed in any detailed design post-determination of the planning application.

5.2.1 Land Use

All proposed 'less vulnerable' development has been sited in Flood Zone C with the exception of part of the access track in the centre of the site where crossing of the Balrickard Stream is unavoidable.

Therefore, the proposed development is compliant with the requirements of the OPW Guidelines and Fingal SFRA and a Justification Test is not required.

5.2.2 Design Levels

The majority of the proposed development is situated in Flood Zone C remote from the fluvial floodplain so minimum design levels do not apply with the exception of the watercourse crossing. The watercourse crossing will provide freeboard in line with OPW Section 50 requirements, thus ensuring no increase in flood risk elsewhere.

5.2.3 Access Levels

In line with the OPW Guidelines, access to and egress from the proposed development should be sited in Flood Zone C (i.e., outside the 0.1% AEP fluvial floodplain / Flood Zone B).

The majority of proposed access tracks, points and access / egress and connecting public roads are shown to be located in Flood Zone C so access / egress will be possible during an extreme flood event.

5.2.4 Drainage Design

Surface water drainage design should be as per the requirements of the Fingal Development Plan 2023 – 2029 and to the standards of Fingal County Council Water Services Department.

The proposed development crosses an existing open drainage channel in the northern part of the site. While not classed as a watercourse on EPA / OPW datasets, so not subject to Section 50 or forming a Flood Zone, the existing drainage function of the channel should be maintained. Details / sizing of required culvert and / or diversion to be confirmed at detailed design stage as part of surface water management design for the site.

Please refer to Engineering Planning Report (RPT-16_206A-012) Section 4 for details of the Surface Water Design and Surface Water Drainage Drawings 16_206A_CSE-GEN-XX-DR-C-1700 to 1705.

5.2.5 Proposed Watercourse Crossing

In order to facilitate crossing of the Balrickard Stream, a culvert will be required to facilitate access through the site. The proposed watercourse crossing is at the location of an existing culvert that is surcharged at the inlet in flood conditions which reduces flow downstream, protecting the M1 from additional flooding.

Therefore, the new culvert is similarly sized but increased to 900 mm (from 700 mm) dia. to meet OPW Section 50 requirements and provides 190 mm freeboard to the 1% + CC flood level. Hydraulic model testing of larger culverts, with additional freeboard, increases flood risk downstream which is not in keeping with other stated OPW / Fingal CC requirements. The proposed crossing has been shown not to increase flood risk upstream or downstream and Section 50 consent has been applied for on that basis.

Riparian maintenance requirements for culverts and watercourses are outlined in Section 5.3.1.

5.2.6 Future Development

The proposed development comprises the provision of key civil infrastructure to facilitate the future development of the lands for a commercial logistics / warehousing development. This development will become an extension of the existing M1 Business Park, situated at Courtlough, Co. Dublin.

All future developments shall be subject to their own planning applications in which the respective applicants will have to demonstrate compliance with the OPW Guidelines, Fingal CC SFRA and Development Plan as well as the Engineering Planning Report (RPT-16_206A-012) overall drainage methodology.

The flood maps included in the report are trimmed to the site boundary. However, flooding does spill from the site onto the M1 in the north east, adjacent to the only area of fluvial ponding. Therefore, any future development in that area should consider the opportunity to reduce flood risk within the site and onto the M1 as part of any proposed layout.

5.3 Maintenance Requirements

5.3.1 Watercourse Maintenance

The ultimate owner / occupier(s) of the site shall be required to include general watercourse / culvert maintenance which will reduce the risk of blockage at downstream culverts and screens and maintain the capacity of the channels. The following measures are intended to inform any future maintenance programme for watercourses and culverts:

- Maintenance should consist of removal of any items within the channel that can impede its flow including (small) trees, excess vegetation etc.
- River banks should be due adequate attention which would normally consist of removal of brambles, bushes and stiff vegetation; these reduce flow capacity and can encourage collection of debris increasing the risk of blockages. Grass and nettles do not always need removing as they will lay flat during high flows.
- Weed growth should be removed from the centre of the channel as this will impede the flow and increase water levels up stream. Hand picking is best but cutting off under the water level is acceptable if it is done on an annual basis.
- Build-up of silt in watercourse channels and at culvert inlets should be removed and disposed of appropriately.
- Cyclical (min. annual) visual inspection of culvert inlets and screens and removal of debris as required, ensuring debris removed is not deposited in an area likely to fall back into the channel.

5.3.2 Drainage System Maintenance

The ultimate owner / occupier(s) shall be responsible for maintenance of drainage networks at the site. Where any aspect was not ‘taken in charge’, the owner / occupier(s) is to ensure that maintenance of the drainage system is provided for as part of the overall management plan for the site.

Detailed drainage layout for the site is to ensure that key SuDS features requiring maintenance are located in accessible public locations.

Maintenance plans for drainage assets should include (where applicable):

- Cyclical (min. annual) check of any flow control device – in particular clearing of debris;
- Cyclical (min. annual) visual inspection of any surface or underground attenuation features – blockages and obstructions to be removed by jetting as required.

5.4 Summary of Flood Risk and Mitigation

Table 5.1 summarises the mechanisms of flooding identified in this assessment, their associated hazards / consequence (as set out in the OPW Guidelines), and proposed measures to mitigate the predicted risk.

Table 5.1: Summary of Risks and Mitigation

Identified Flood Mechanism	Consequence	Summary & Mitigating Measures
Fluvial flooding	Risk to life and property	All proposed development is sited in Flood Zone C with the exception of the watercourse crossing which will provide freeboard to the design flood level.
Effect of climate change	Risk to life and property	All proposed development will be outside the climate change floodplain.
Effect of the Development	Increased risk to adjacent lands and developments	All proposed development is in Flood Zone C and as such, can have no impact on flood risk elsewhere. Hydraulic modelling has demonstrated that the watercourse crossing will not impact flood risk elsewhere.
Pluvial / Surface Water flooding	Risk to property on site, risk to adjacent lands and property.	On-site surface water flooding shall be mitigated by a site drainage system to comply with local authority drainage standards. Off-site surface water effects shall be mitigated by provision of SuDS components and no increase in rate and volume of runoff of surface water from the site as a result of the development.

Appendix A

Site Drawings

DRAWING IS PRODUCED USING THE IRISH TRANSVERSE MERCATOR (ITM) GEOGRAPHIC COORDINATE SYSTEM

A1

LEGEND:

- SITE BOUNDARY
- PROPOSED BITUMINOUS CARRIAGEWAY
- PROPOSED BITUMINOUS FOOTPATH
- PROPOSED OFF ROAD TWO-WAY CYCLETRACK
- PROPOSED CONTROLLED PEDESTRIAN CROSSING TACTILE
- PROPOSED UNCONTROLLED PEDESTRIAN CROSSING TACTILE
- EXISTING UNCONTROLLED PEDESTRIAN CROSSING TACTILE
- PROPOSED UNCONTROLLED PEDESTRIAN CROSSING TACTILE
- PROPOSED SHARED PATH
- PROPOSED TARMAC (OVERRUN)
- PROPOSED LANDSCAPING
- PROPOSED TOUCAN CROSSING TRAFFIC SIGNALS
- PROPOSED ATTENUATION POND
- PROPOSED RAINGARDEN
- PROPOSED BIORETENTION AND LANDSCAPING AREAS

Rev	Description	Drawn	Checked	Date
P01	FOR INFORMATION	FO	LP	14/02/24

Clifton Scannell Emerson Associates

Clifton Scannell Emerson Associates Limited
Consulting Engineers,
3rd Floor The Highline,
Bakers Point, Pottery Road,
Dun Laoghaire, Co. Dublin,
Ireland, A96 KW29

T: +353 1 288 5006
F: +353 1 283 3466
E: info@csea.ie
W: www.csea.ie

VIDA M1 LIMITED

Client

M1 BUSINESS PARK
- ZONE A & F

Project

PROPOSED INTERNAL ROAD
LAYOUT OVERALL

Dwg. Title

Drawn By	Checked By	Date
FO	LP	FEB 2024

Project Code	Originator	Zone/ Phase	Level	Type	Role	Dwg. No.
16_206A	CSE	GEN	XX	DR	C	1610

Status Code	Suitability Description	Scale @ A1
S2	FOR INFORMATION	1:2500

Revision	Project Status	CSEA Job No.
P01	PLANNING	16_206A

Appendix B

OPW / Fingal CC Flood Maps

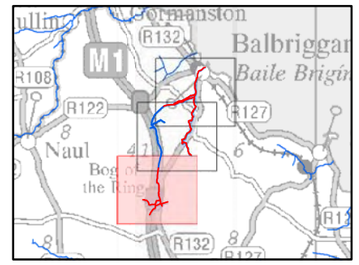
N

16Mab3116
16Ma5294
16Ma5726
16Ma6317
16Ma6492U
16Ma6654
16Ma6983U
16Ma8022D
16Ma7289D
16Ma7749
16Mae362
16Maf264
16Maf494
16Maf684U
16Maf798

Node Label	10% AEP Event		1% AEP Event		0.1% AEP Event	
	Water Level (mOD)	Flow (m3/s)	Water Level (mOD)	Flow (m3/s)	Water Level (mOD)	Flow (m3/s)
16Ma8022D	42.91	0.53	43.04	0.94	43.15	1.55
16Ma7749	38.90	0.57	38.99	1.01	39.09	1.67
16Ma7289D	34.58	0.61	35.09	1.06	35.38	1.77
16Ma6983U	34.11	1.50	34.73	2.40	35.32	3.57
16Ma6654	33.81		34.36		34.63	
16Ma6492U	33.21		33.54		33.95	
16Ma6317	33.15	2.37	33.42	3.94	33.74	6.11
16Ma5726D	33.05	4.53	33.33	6.64	33.68	9.03
16Ma5294	32.87		33.15		33.45	
16Mab3116	51.98	0.40	52.10	0.69	52.25	1.17
16Maf798	38.22	0.05	39.10	0.04	39.63	0.04
16Maf684U	37.95	0.10	39.10	0.14	39.63	0.29
16Maf494	35.54	0.10	35.58	0.14	35.70	0.29
16Maf264	34.50		35.14		35.38	
16Mae362	35.20	0.07	35.27	0.14	35.43	0.23

0.2 0.1 0 0.2
Kilometres

Location Plan :



EXTENT MAP

Legend:

- 10 % AEP Flood Extent (1 in 10 chance in any given year)
- 1 % AEP Flood Extent (1 in 100 chance in any given year)
- 0.1 % AEP Flood Extent (1 in 1000 chance in any given year)
- Defended area
- High Confidence (<20m) (10% AEP)
- Medium Confidence (<40m) (10% AEP)
- Low Confidence (>40m) (10% and 0.1% AEP)
- High Confidence (<20m) (1% AEP)
- Medium Confidence (<40m) (1% AEP)
- Low Confidence (>40m) (1% AEP)
- Modelled River Centreline
- Node Point
- 21Ma237 Node label with level data (refer to table)
- 21Ma237 Node level with flow & level data (refer to table)

High confidence
Medium confidence
Low confidence
refer to table

USER NOTE :

USERS OF THESE MAPS SHOULD REFER TO THE DETAILED DESCRIPTION OF THEIR DERIVATION, LIMITATIONS IN ACCURACY AND GUIDANCE AND CONDITIONS OF USE PROVIDED AT THE FRONT OF THIS BOUND VOLUME. IF THIS MAP DOES NOT FORM PART OF A BOUND VOLUME, IT SHOULD NOT BE USED FOR ANY PURPOSE.

HalcrowBarry
Tramway House
32 Dartry Road
Dublin 6
Tel: +353-1-4975716

Clients :

Fingal County Council
Meath County Council
OPW

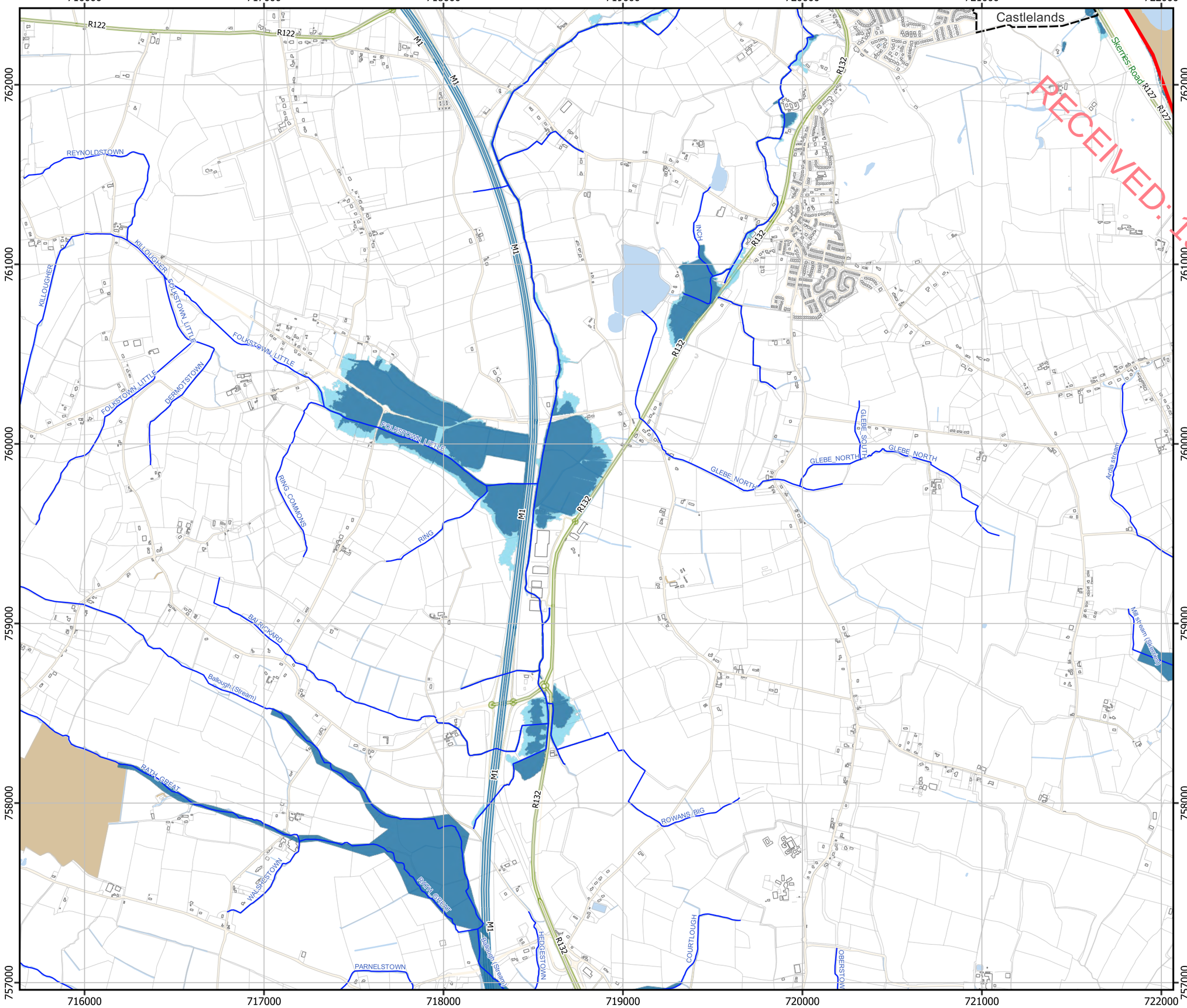
Project :
FEM FRAMS

Map :
THE BRACKEN MODEL FLOOD EXTENT

Map Type :	FLOOD EXTENT	
Source :	FLUVIAL FLOODING	
Map area :	HIGH PRIORITY WATERCOURSE	
Scenario :	CURRENT	
Figure By :	Mara Ruiz	Date : 3 November 2010
Checked By :	Sergio Herbón	Date : 3 November 2010
Approved By :	Clare Dewar	Date : 3 November 2010

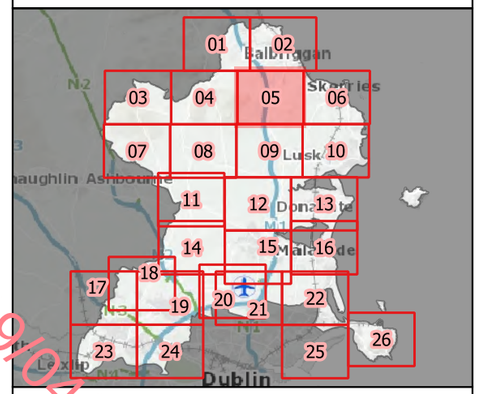
Figure No. : BRA/HPW/EXT/CURS/001
Revision 1

Drawing Scale : 1:10,000
Plot Scale : 1:1 @ A3



MAP SERIES	05 OF 26

KEY PLAN



LEGEND

- Fingal County Administrative Boundary
- Watercourses
- LAP & Masterplan Boundaries
- Flood Zone A
- Flood Zone B
- Defended Areas

REV:	NOTE:	
05	FOR INFORMATION	30/03/2023

Comhairle Contae Fhine Gall
Fingal County Council

McCloy Consulting
Unit 12, The Beat Centre,
Stephenstown Industrial Estate,
Balbriggan, Co. Dublin
T: +353 (0)1 5138963
E: info@mccloyconsulting.ie
W: www.mccloyconsulting.ie

MAP:	FLOOD ZONE MAP	
FLOOD PROBABILITY:	FLUVIAL: 1% / 0.1%	COASTAL: 0.5% / 0.1%
SOURCE CRS:		ITM EPSG:2157
DRAWN BY:	DL	DATE: 30/03/2023
CHECKED BY:	PS	DATE: 30/03/2023
APPROVED BY:	DKS	DATE: 30/03/2023
DRAWING NUMBER:	M02127-06_FIG_FL105	
DRAWING SCALE:	1:20000 @ A3	

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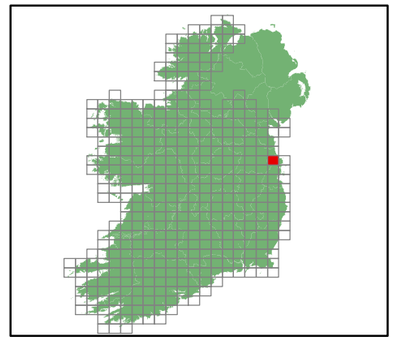

Legend:

Flood Extents

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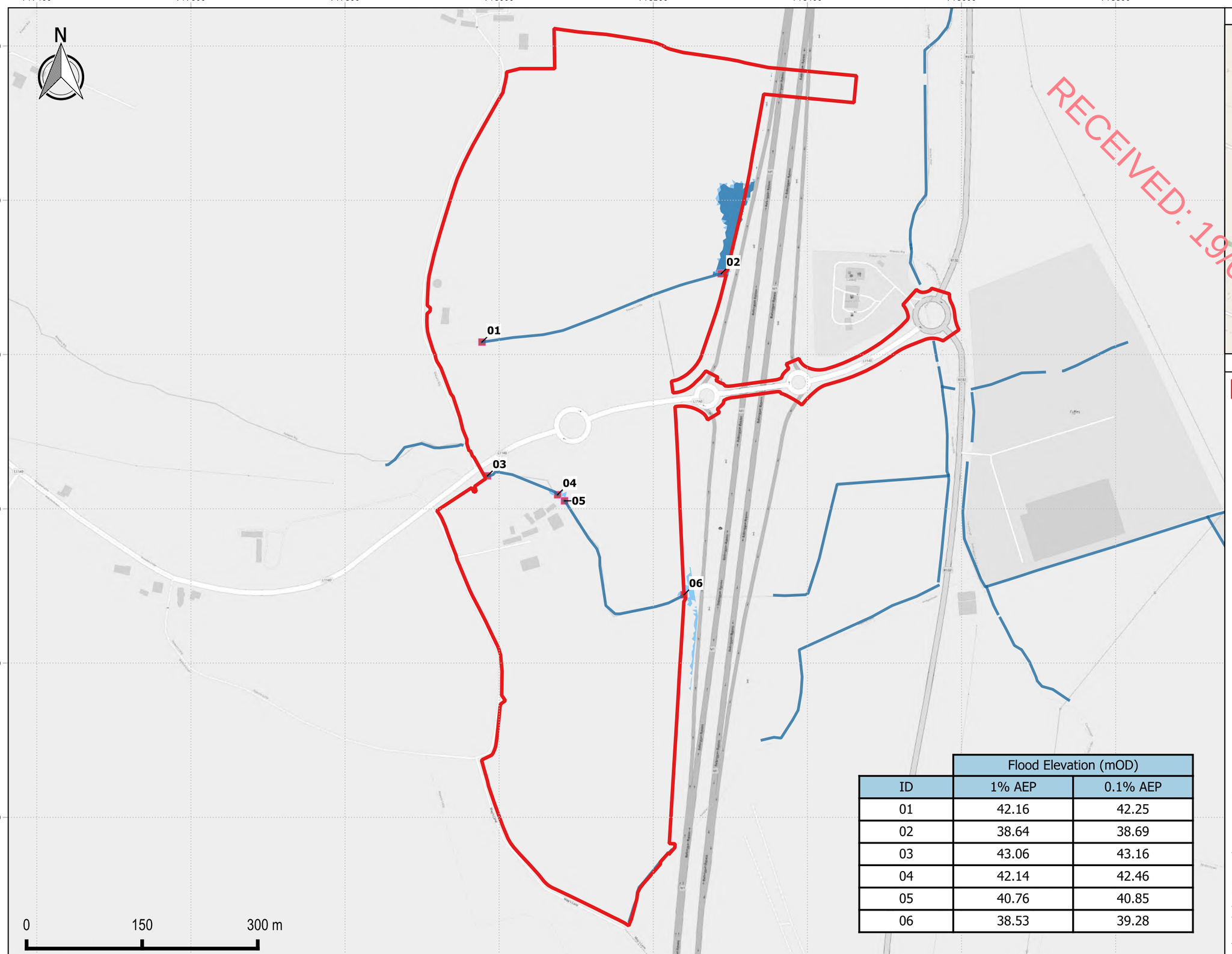
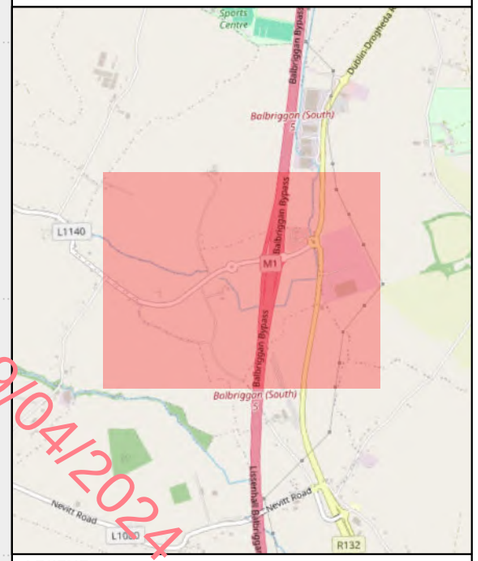
Appendix C

Site-Specific Flood Mapping



KEY PLAN



LEGEND

- Site Boundary
- Flood Zone A
- Flood Zone B

ID	Flood Elevation (mOD)	
	1% AEP	0.1% AEP
01	42.16	42.25
02	38.64	38.69
03	43.06	43.16
04	42.14	42.46
05	40.76	40.85
06	38.53	39.28

NOTES
1. ALL LEVELS INDICATED ARE TO ORDNANCE DATUM MALIN.

2.FLOOD EXTENTS WITHIN THE APPLICATION BOUNDARY ARE PLOTTED ON GROUND BASED TOPOGRAPHIC SURVEY.

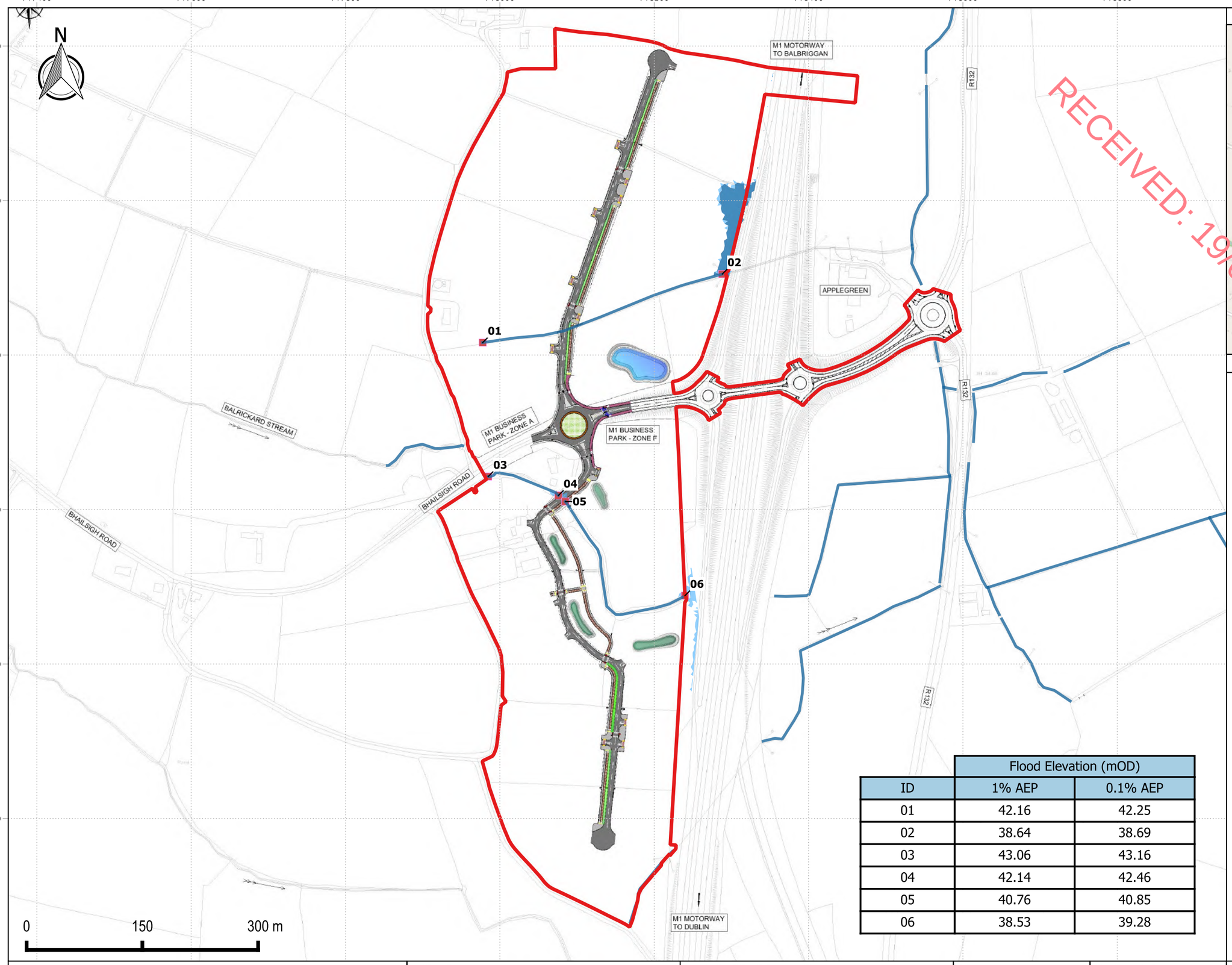
3.FLOOD EXTENTS SHOWN OUTWITH THE RED LINE BOUNDARY ARE PLOTTED ON A COMBINATION OF GROUND BASED TOPOGRAPHIC SURVEY AND LIDAR AND AS SUCH ARE NOT SUITABLE FOR PROPERTY LEVEL ASSESSMENT.

4.ALL GRID COORDINATE INFORMATION IS TO IRISH TRANSVERSE MERCATOR.

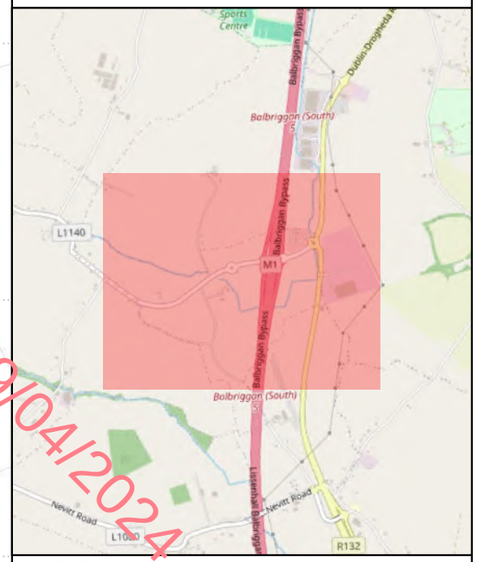
McCloy Consulting
Unit 12,
The Beat Centre,
Stephenstown Industrial Estate,
Balbriggan, Co. Dublin

T: +353 (0)1 5138963
E: info@mccloyconsulting.ie
W: www.mccloyconsulting.ie

PROJECT M1 BUSINESS PARK [ZONE A & F]		**HYDROLOGY SCENARIO** PRESENT DAY	**SCALE** AS SHOWN	**ORIGINAL SIZE** A3
MAP TYPE FLOOD ZONE MAP		**GEOMETRY SCENARIO** PRESENT DAY	**DRAWN BY** DL	**APPROVED BY** DKS
SOURCE FLUVIAL	**FLOOD EVENT** 1% / 0.1% AEP	**FIGURE NUMBER** M02103-02_FIG_FL2001	**REVISION** 1	**DATE** 19/03/2024



KEY PLAN



LEGEND

- Site Boundary
- 1% AEP Flood Extent
- 0.1% AEP Flood Extent

ID	Flood Elevation (mOD)	
	1% AEP	0.1% AEP
01	42.16	42.25
02	38.64	38.69
03	43.06	43.16
04	42.14	42.46
05	40.76	40.85
06	38.53	39.28

NOTES
1. ALL LEVELS INDICATED ARE TO ORDNANCE DATUM MALIN.

2.FLOOD EXTENTS WITHIN THE APPLICATION BOUNDARY ARE PLOTTED ON GROUND BASED TOPOGRAPHIC SURVEY.

3.FLOOD EXTENTS SHOWN OUTWITH THE RED LINE BOUNDARY ARE PLOTTED ON A COMBINATION OF GROUND BASED TOPOGRAPHIC SURVEY AND LIDAR AND AS SUCH ARE NOT SUITABLE FOR PROPERTY LEVEL ASSESSMENT.

4.ALL GRID COORDINATE INFORMATION IS TO IRISH TRANSVERSE MERCATOR.

McCloy Consulting
Unit 12,
The Beat Centre,
Stephenstown Industrial Estate,
Balbriggan, Co. Dublin

T: +353 (0)1 5138963
E: info@mccloyconsulting.ie
W: www.mccloyconsulting.ie

PROJECT M1 BUSINESS PARK [ZONE A & F]		**HYDROLOGY SCENARIO** PRESENT DAY	**SCALE** AS SHOWN	**ORIGINAL SIZE** A3
MAP TYPE FLOOD EXTENTS MAP		**GEOMETRY SCENARIO** PROPOSED	**DRAWN BY** DL	**APPROVED BY** DKS
SOURCE FLUVIAL	**FLOOD EVENT** 1% / 0.1% AEP	**FIGURE NUMBER** M02103-02_FIG_FL2002	**REVISION** 1	**DATE** 19/03/2024

Element Materials Technology
Unit 3 Deeside Point
Zone 3
Deeside Industrial Park
Deeside
CH5 2UA

P: +44 (0) 1244 833780
F: +44 (0) 1244 833781
W: www.element.com

Geosyntec Consulting
Unit 10
Northwood Court
Northwood Crescent
Santry
Dublin
Ireland
D09 W8DT

Attention :	Stephen Coakley
Date :	17th July, 2023
Your reference :	-
Our reference :	Test Report 23/10858 Batch 1
Location :	M1 Business Park
Date samples received :	4th July, 2023
Status :	Final Report
Issue :	1

Six samples were received for analysis on 4th July, 2023 of which two were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

Paul Boden BSc
Senior Project Manager

Client Name: Geosyntec Consulting
Reference: -
Location: M1 Business Park
Contact: Stephen Coakley
EMT Job No: 23/10858

Report : **Solid**

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	5-8	21-24									LOD/LOR	Units	Method No.
Sample ID	TP02	TP06											
Depth													
COC No / misc													
Containers	V J T B	V J T B											
Sample Date	03/07/2023	03/07/2023											
Sample Type	Soil	Soil											
Batch Number	1	1											
Date of Receipt	04/07/2023	04/07/2023											
Antimony	5	4									<1	mg/kg	TM30/PM15
Arsenic #	12.6	24.5									<0.5	mg/kg	TM30/PM15
Barium #	92	100									<1	mg/kg	TM30/PM15
Cadmium #	3.8	1.3									<0.1	mg/kg	TM30/PM15
Chromium #	80.8	70.2									<0.5	mg/kg	TM30/PM15
Copper #	82	51									<1	mg/kg	TM30/PM15
Lead #	21	20									<5	mg/kg	TM30/PM15
Mercury #	<0.1	<0.1									<0.1	mg/kg	TM30/PM15
Molybdenum #	8.9	7.9									<0.1	mg/kg	TM30/PM15
Nickel #	78.3	48.7									<0.7	mg/kg	TM30/PM15
Selenium #	5	2									<1	mg/kg	TM30/PM15
Total Sulphate as SO4 #	112	327									<50	mg/kg	TM50/PM29
Water Soluble Boron #	0.3	0.7									<0.1	mg/kg	TM74/PM32
Zinc #	88	74									<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03									<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05									<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Phenanthrene #	<0.03	<0.03									<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Fluoranthene #	<0.03	<0.03									<0.03	mg/kg	TM4/PM8
Pyrene #	<0.03	<0.03									<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	<0.06	<0.06									<0.06	mg/kg	TM4/PM8
Chrysene #	<0.02	<0.02									<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	<0.07	<0.07									<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Coronene	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
PAH 6 Total #	<0.22	<0.22									<0.22	mg/kg	TM4/PM8
PAH 17 Total	<0.64	<0.64									<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	<0.05	<0.05									<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	<0.02	<0.02									<0.02	mg/kg	TM4/PM8
Benzo(j)fluoranthene	<1	<1									<1	mg/kg	TM4/PM8
PAH Surrogate % Recovery	94	91									<0	%	TM4/PM8
Mineral Oil (C10-C40) (EH_CU_1D_AL)	<30	<30									<30	mg/kg	TM5/PM8/PM16

Client Name: Geosyntec Consulting
Reference: -
Location: M1 Business Park
Contact: Stephen Coakley
EMT Job No: 23/10858

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	5-8	21-24									LOD/LOR	Units	Method No.
Sample ID	TP02	TP06											
Depth													
COC No / misc													
Containers	V J T B	V J T B											
Sample Date	03/07/2023	03/07/2023											
Sample Type	Soil	Soil											
Batch Number	1	1											
Date of Receipt	04/07/2023	04/07/2023											
TPH CWG													
Aliphatics													
>C5-C6 (HS_1D_AL)#	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>C6-C8 (HS_1D_AL)#	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>C8-C10 (HS_1D_AL)	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>C10-C12 (EH_CU_1D_AL)#	<0.2	<0.2									<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 (EH_CU_1D_AL)#	<4	<4									<4	mg/kg	TM5/PM8/PM16
>C16-C21 (EH_CU_1D_AL)#	<7	<7									<7	mg/kg	TM5/PM8/PM16
>C21-C35 (EH_CU_1D_AL)#	<7	<7									<7	mg/kg	TM5/PM8/PM16
>C35-C40 (EH_CU_1D_AL)	<7	<7									<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-40 (EH+HS_CU_1D_AL)	<26	<26									<26	mg/kg	TM5/TM36/PM8/PM12/PM16
>C6-C10 (HS_1D_AL)	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>C10-C25 (EH_1D_AL)	<10	<10									<10	mg/kg	TM5/PM8/PM16
>C25-C35 (EH_1D_AL)	<10	<10									<10	mg/kg	TM5/PM8/PM16
Aromatics													
>C5-EC7 (HS_1D_AR)#	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>EC7-EC8 (HS_1D_AR)#	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>EC8-EC10 (HS_1D_AR)#	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>EC10-EC12 (EH_CU_1D_AR)#	<0.2	<0.2									<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 (EH_CU_1D_AR)#	<4	<4									<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 (EH_CU_1D_AR)#	<7	<7									<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 (EH_CU_1D_AR)#	<7	<7									<7	mg/kg	TM5/PM8/PM16
>EC35-EC40 (EH_CU_1D_AR)	<7	<7									<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-40 (EH+HS_CU_1D_AR)	<26	<26									<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics(C5-40) (EH+HS_CU_1D_Total)	<52	<52									<52	mg/kg	TM5/TM36/PM8/PM12/PM16
>EC6-EC10 (HS_1D_AR)#	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>EC10-EC25 (EH_1D_AR)	<10	<10									<10	mg/kg	TM5/PM8/PM16
>EC25-EC35 (EH_1D_AR)	<10	<10									<10	mg/kg	TM5/PM8/PM16
MTBE#	<5	<5									<5	ug/kg	TM36/PM12
Benzene#	<5	<5									<5	ug/kg	TM36/PM12
Toluene#	<5	<5									<5	ug/kg	TM36/PM12
Ethylbenzene#	<5	<5									<5	ug/kg	TM36/PM12
m/p-Xylene#	<5	<5									<5	ug/kg	TM36/PM12
o-Xylene#	<5	<5									<5	ug/kg	TM36/PM12
PCB 28#	<5	<5									<5	ug/kg	TM17/PM8
PCB 52#	<5	<5									<5	ug/kg	TM17/PM8
PCB 101#	<5	<5									<5	ug/kg	TM17/PM8
PCB 118#	<5	<5									<5	ug/kg	TM17/PM8
PCB 138#	<5	<5									<5	ug/kg	TM17/PM8
PCB 153#	<5	<5									<5	ug/kg	TM17/PM8
PCB 180#	<5	<5									<5	ug/kg	TM17/PM8
Total 7 PCBs#	<35	<35									<35	ug/kg	TM17/PM8

Element Materials Technology

Client Name: Geosyntec Consulting
Reference: -
Location: M1 Business Park
Contact: Stephen Coakley
EMT Job No: 23/10858

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	5-8	21-24									LOD/LOR	Units	Method No.
Sample ID	TP02	TP06											
Depth													
COC No / misc													
Containers	V J T B	V J T B											
Sample Date	03/07/2023	03/07/2023											
Sample Type	Soil	Soil											
Batch Number	1	1											
Date of Receipt	04/07/2023	04/07/2023											
Phenol #	<0.01	<0.01									<0.01	mg/kg	TM26/PM21B
Natural Moisture Content	24.9	17.1									<0.1	%	PM4/PM0
Moisture Content (% Wet Weight)	19.9	14.6									<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	<0.3									<0.3	mg/kg	TM38/PM20
Chromium III	80.8	70.2									<0.5	mg/kg	NONE/NONE
Total Cyanide #	<0.5	<0.5									<0.5	mg/kg	TM89/PM45
Total Organic Carbon #	1.45	1.11									<0.02	%	TM21/PM24
Sulphide	<10	<10									<10	mg/kg	TM107/PM45
Elemental Sulphur	11	3									<1	mg/kg	TM108/PM114
pH #	7.92	7.00									<0.01	pH units	TM73/PM11

All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: Geosyntec Consulting
Reference: -
Location: M1 Business Park
Contact: Stephen Coakley
EMT Job No: 23/10858

Report : CEN 10:1 1 Batch

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	5-8	21-24									LOD/LOR	Units	Method No.
Sample ID	TP02	TP06											
Depth													
COC No / misc													
Containers	V J T B	V J T B											
Sample Date	03/07/2023	03/07/2023											
Sample Type	Soil	Soil											
Batch Number	1	1											
Date of Receipt	04/07/2023	04/07/2023											
Dissolved Antimony #	<0.002	<0.002									<0.002	mg/l	TM30/PM17
Dissolved Antimony (A10) #	<0.02	<0.02									<0.02	mg/kg	TM30/PM17
Dissolved Arsenic #	<0.0025	<0.0025									<0.0025	mg/l	TM30/PM17
Dissolved Arsenic (A10) #	<0.025	<0.025									<0.025	mg/kg	TM30/PM17
Dissolved Barium #	<0.003	<0.003									<0.003	mg/l	TM30/PM17
Dissolved Barium (A10) #	<0.03	<0.03									<0.03	mg/kg	TM30/PM17
Dissolved Boron #	<0.012	<0.012									<0.012	mg/l	TM30/PM17
Dissolved Boron (A10) #	<0.12	<0.12									<0.12	mg/kg	TM30/PM17
Dissolved Cadmium #	<0.0005	<0.0005									<0.0005	mg/l	TM30/PM17
Dissolved Cadmium (A10) #	<0.005	<0.005									<0.005	mg/kg	TM30/PM17
Dissolved Chromium #	<0.0015	<0.0015									<0.0015	mg/l	TM30/PM17
Dissolved Chromium (A10) #	<0.015	<0.015									<0.015	mg/kg	TM30/PM17
Dissolved Copper #	<0.007	<0.007									<0.007	mg/l	TM30/PM17
Dissolved Copper (A10) #	<0.07	<0.07									<0.07	mg/kg	TM30/PM17
Dissolved Lead #	<0.005	<0.005									<0.005	mg/l	TM30/PM17
Dissolved Lead (A10) #	<0.05	<0.05									<0.05	mg/kg	TM30/PM17
Dissolved Molybdenum #	<0.002	0.006									<0.002	mg/l	TM30/PM17
Dissolved Molybdenum (A10) #	<0.02	0.06									<0.02	mg/kg	TM30/PM17
Dissolved Nickel #	<0.002	<0.002									<0.002	mg/l	TM30/PM17
Dissolved Nickel (A10) #	<0.02	<0.02									<0.02	mg/kg	TM30/PM17
Dissolved Selenium #	<0.003	<0.003									<0.003	mg/l	TM30/PM17
Dissolved Selenium (A10) #	<0.03	<0.03									<0.03	mg/kg	TM30/PM17
Dissolved Zinc #	<0.003	<0.003									<0.003	mg/l	TM30/PM17
Dissolved Zinc (A10) #	<0.03	<0.03									<0.03	mg/kg	TM30/PM17
Mercury Dissolved by CVAF #	<0.00001	<0.00001									<0.00001	mg/l	TM61/PM0
Mercury Dissolved by CVAF #	<0.0001	<0.0001									<0.0001	mg/kg	TM61/PM0
Phenol	<0.01	<0.01									<0.01	mg/l	TM26/PM0
Phenol	<0.1	<0.1									<0.1	mg/kg	TM26/PM0
Fluoride	<0.3	<0.3									<0.3	mg/l	TM173/PM0
Fluoride	<3	<3									<3	mg/kg	TM173/PM0
Sulphate as SO4 #	2.5	0.9									<0.5	mg/l	TM38/PM0
Sulphate as SO4 #	25	9									<5	mg/kg	TM38/PM0
Mass of raw test portion	0.1145	0.1081										kg	NONE/PM17
Chloride #	<0.3	<0.3									<0.3	mg/l	TM38/PM0
Chloride #	<3	<3									<3	mg/kg	TM38/PM0
Mass of dried test portion	0.09	0.09										kg	NONE/PM17
Ammoniacal Nitrogen as N #	<0.03	<0.03									<0.03	mg/l	TM38/PM0

Element Materials Technology

Client Name: Geosyntec Consulting
Reference: -
Location: M1 Business Park
Contact: Stephen Coakley
EMT Job No: 23/10858

Report : CEN 10:1 1 Batch

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	5-8	21-24									LOD/LOR	Units	Method No.
Sample ID	TP02	TP06											
Depth													
COC No / misc													
Containers	V J T B	V J T B											
Sample Date	03/07/2023	03/07/2023											
Sample Type	Soil	Soil											
Batch Number	1	1											
Date of Receipt	04/07/2023	04/07/2023											
Ammoniacal Nitrogen as N #	<0.3	<0.3									<0.3	mg/kg	TM38/PM0
Dissolved Organic Carbon	<2	<2									<2	mg/l	TM60/PM0
Dissolved Organic Carbon	<20	<20									<20	mg/kg	TM60/PM0
Total Dissolved Solids #	<35	41									<35	mg/l	TM20/PM0
Total Dissolved Solids #	<350	410									<350	mg/kg	TM20/PM0

All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: Geosyntec Consulting
Reference: -
Location: M1 Business Park
Contact: Stephen Coakley

Matrix : Solid

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	EPH Interpretation
23/10858	1	TP02		5-8	No interpretation possible
23/10858	1	TP06		21-24	No interpretation possible

Client Name: Geosyntec Consulting
Reference: -
Location: M1 Business Park
Contact: Stephen Coakley

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Asbestos sub-samples are retained for not less than 6 months from the date of analysis unless specifically requested.

The LOQ of the Asbestos Quantification is 0.001% dry fibre of dry mass of sample.

Where the sample is not taken by a Element Materials Technology consultant, Element Materials Technology cannot be responsible for inaccurate or unrepresentative sampling.

Where trace asbestos is reported the amount of asbestos will be <0.1%.

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analyst Name	Date Of Analysis	Analysis	Result
23/10858	1	TP02		8	Emily Anderton	14/07/2023	**General Description (Bulk Analysis)**	Beige soil with stones
					Emily Anderton	14/07/2023	**Asbestos Fibres**	NAD
					Emily Anderton	14/07/2023	**Asbestos ACM**	NAD
					Emily Anderton	14/07/2023	**Asbestos Type**	NAD
23/10858	1	TP06		24	Emily Anderton	14/07/2023	**General Description (Bulk Analysis)**	Brown soil with stones
					Emily Anderton	14/07/2023	**Asbestos Fibres**	NAD
					Emily Anderton	14/07/2023	**Asbestos ACM**	NAD
					Emily Anderton	14/07/2023	**Asbestos Type**	NAD

Client Name: Geosyntec Consulting
Reference: -
Location: M1 Business Park
Contact: Stephen Coakley

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 23/10858						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.
Only analyses which are accredited are recorded as deviating if set criteria are not met.

EMT Job No.: 23/10858

SOILS and ASH

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 37°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a requirement of our Accreditation Body for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.
Laboratory records are kept for a period of no less than 6 years.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

Customer Provided Information

Sample ID and depth is information provided by the customer.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above quantitative calibration range. The result should be considered the minimum value and is indicative only. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

EMT Job No: 23/10858

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM17	Modified US EPA method 8270D v5:2014. Determination of specific Polychlorinated Biphenyl congeners by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM20	Modified BS 1377-3:1990/USEPA 160.1/3 (TDS/TS: 1971) Gravimetric determination of Total Dissolved Solids/Total Solids	PM0	No preparation is required.	Yes		AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Preparation of Soil and Marine Sediment Samples for Total Organic Carbon.	Yes		AD	Yes

EMT Job No: 23/10858

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.			AR	Yes
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM21B	As Received samples are extracted in Methanol: Water (60:40) by reciprocal shaker.	Yes		AR	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.			AD	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM17	Modified method BS EN12457-2:2002 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.	Yes		AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013I	PM0	No preparation is required.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013I	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM50	Acid soluble sulphate (Total Sulphate) analysed by ICP-OES	PM29	A hot hydrochloric acid digest is performed on a dried and ground sample, and the resulting liquor is analysed.	Yes		AD	Yes

EMT Job No: 23/10858

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM60	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060A (2002), APHA SMEWW 5310B:1999 22nd Edition, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.			AR	Yes
TM61	Determination of Mercury by Cold Vapour Atomic Fluorescence - WATERS: Modified USEPA Method 245.7, Rev 2, Feb 2005. SOILS: Modified USEPA Method 7471B, Rev.2, Feb 2007	PM0	No preparation is required.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248 Second edition (2021)	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
TM74	Analysis of water soluble boron (20:1 extract) by ICP-OES.	PM32	Hot water soluble boron is extracted from dried and ground samples using a 20:1 ratio.	Yes		AD	Yes
TM89	Modified USEPA method OIA-1667 (1999). Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide, Sulphide and Thiocyanate analysis.	Yes		AR	Yes
TM107	Determination of Sulphide/Thiocyanate by Skalar Continuous Flow Analyser	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide, Sulphide and Thiocyanate analysis.			AR	Yes
TM108	Determination of Elemental Sulphur by Reversed Phase High Performance Liquid Chromatography with Ultra Violet spectroscopy.	PM114	End over end extraction of dried and crushed soil samples for organic analysis. The solvent mix varies depending on analysis required			AD	Yes
TM173	Analysis of fluoride by ISE (Ion Selective Electrode) using modified ISE method 9214 - 340.2 (EPA 1998)	PM0	No preparation is required.			AR	Yes
NONE	No Method Code	NONE	No Method Code			AD	Yes

EMT Job No: 23/10858

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
NONE	No Method Code	PM17	Modified method BS EN12457-2:2002 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.				
NONE	No Method Code	PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.			AR	