Moston Campus, Manchester

Site Completion Report



Job Number: LKC 23 1327

Date: June 2024

Client: Watson Construction Ltd

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DOCUMENT QUALITY ASSURANCE

Site Address	Moston Campus Princedom Street Manchester M9 4GU
Report Title	Site Completion Report
Job Number	LKC 23 1327
Client	Watson Construction Ltd

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Written By	Joe Walker / Rosie Cummings		
Approved By	Colin Crompton		

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1. Introduction

LK Consult Ltd (LKC) has been commissioned to provide a Site Completion Report for Moston Campus, Manchester (planning reference 128835/FO/2020).

The aim of the Site Completion Report will be to demonstrate to the Local Authority that the site has been suitably remediated in line with the Remediation Statement and in accordance with the National Planning Policy Framework (NPPF)[1], and the site is considered 'suitable for use' for the proposed development.

The Site Completion Report should be sufficient to discharge contaminated land planning conditions. Details are provided in the following sections.

Based on the findings of this report, an appropriate site investigation can be derived, if required.

A summary of the site details is presented in Table 1-1. Figure 1 indicates the site location and boundary plan. Figure 2 indicates the proposed development.

Location	At the eastern end of Princedom Street, Manchester M9 4GU. Centred at National Grid Reference 386700E , 401730N.
Area	1.38Ha.
Topography	84-86 metres above ordnance datum (AOD). Site is approximately level.
Current Site Use	Site area is the former site of Manchester College (Moston Campus).
Proposed Development	Erection of 50, two storey dwellinghouses and erection of three storey apartment building to form 10 apartments with associated car parking, boundary treatment and other associated works following demolition of existing college building.

Table 1-1: Summary of site details.

1.1. Summary of Previous Work

The following reports have been produced for the site:

- Preliminary Risk Assessment (PRA) undertaken by Curtins (Ref: LKC 17 1016-01, dated 13th January 2020).
- Final Phase 2 Ground Investigation undertaken by Curtins (Ref: 074971-CUR-00-XX-RP-GE-002, dated 17th January 2022).
- Remediation Strategy undertaken by Curtins (Ref. 074971-CUR-00-XX-RP-GE-003, dated 30th March 2022).
- Ground Gas Risk Assessment undertaken by LKC (Ref. LKC 23 1327_Gas Risk Assessment, dated 21st July 2023).

It should be noted that the remediation strategy for ground gas initially produced by Curtins has been superseded by the Ground Gas Risk Assessment produced by LKC. The updated assessment states there is a 'low risk' gas generation potential on the site, and that the ventilated sub-floor void incorporated into the building designs provides more than sufficient gas protection for the site setting. The report concludes that Characteristic Situation 1 is suitable for the development and no additional gas protection measures are required.

The updated Ground Gas Risk Assessment was accepted by Manchester City Council (email 22nd August 2024).

1.2. Summary of Required Validation Work

The requirement for remedial works across the site in the garden and communal soft landscaping areas are outlined in the Remediation Strategy carried out by Curtins (reference 074971-CUR-00-XX-RP-GE-003, dated 30th March 2022) and are shown in Plate 1-1.

The soft landscaping areas in the area of WS10 and WS14 refers to plots 20, 21, 43 and 44.

Selected photographs of the completed site are presented in Appendix A.

Location	Remedial Measures Required	Rationale
Soft Landscaped Areas in Areas of Residential Housing	Provision of a minimum **600mm** clean capping. The capping layer may comprise of a combination of suitable subsoil and topsoil but topsoil should be of a minimum 150mm thickness.	Remove potential for exposure of on-site receptors via direct contact, dermal uptake and soil and dust ingestion and inhalation.
Soft Landscaped Areas in Area of Residential for WS10 and WS14	Provision of a minimum **450mm** clean capping with underlying high visibility geotextile. The capping layer may comprise of a combination of suitable subsoil and topsoil but topsoil should be of a minimum 150mm thickness. The underlying geotextile should be high visibility to act as a warning to future ground workers. Alternatively, an aggregate break layer can be used to act as an anti dig layer instead of the geotextile which should be a minimum of 100mm thick which may form part of the overall capping thickness.	Remove potential for exposure of on-site receptors via direct contact, dermal uptake and soil and dust ingestion and inhalation.

Plate 1-1: Extract from Curtins report showing validation requirements.

Chemical validation of all imported materials to be used on site is required. Imported soils are to be accompanied by a certificate of analysis and source details.

An extract showing a summary of the required imported material sampling requirements are presented in Plate 1-2 from the Curtins report showing validation requirements.

Source	End Use	Testing Frequency
Imported Topsoil/Subsoil (Greenfield)	**Residential Gardens**	**Verification:** One sample every 200m^3 used (or a minimum of 3 No. samples whichever is greater), testing to be undertaken once material is imported to site.
	General Soft Landscaping	
Imported Topsoil/Subsoil (Remediated/ Brownfield/Unknown)	**Residential Gardens**	**Verification:** One sample every 50m^3 used (or a minimum of 3 No. samples whichever is greater), testing to be undertaken once material is imported to site.
	General Soft Landscaping	**Verification:** One sample every 150m^3 used (or a minimum of 3 No. samples whichever is greater), testing to be undertaken once material is imported to site.
Re-used/ Site Won Natural Soils	**Residential Gardens**	**Verification:** One sample every 50m^3 used (or a minimum of 3 No. samples whichever is greater), testing to be undertaken once material is imported to site.
	General Soft Landscaping	**Verification:** One sample every 150m^3 used (or a minimum of 3 No. samples whichever is greater), testing to be undertaken once material is imported to site.

Plate 1-2: Extract from Curtins report showing required testing frequency.

2. Imported Material for Garden Areas

Subsoil and Topsoil for use in the garden and landscaping areas was imported onto site from a greenfield site in Congleton by Cheshire Soil and Aggregates Ltd.

Approximately 270m^3 of topsoil and 800m^3 of subsoil were imported to site between June 2023 and October 2023. The supplier confirmed that the soil was from greenfield sources. The soils were then tested at the required sampling frequency.

The imported subsoil was tested on 28th June 2023 (referenced SS101, SS102 and SS103.

The imported topsoil was tested on 21st July 2023 (referenced TS1, TS2 and TS3.

Additional imported subsoil and topsoil was tested on 24th November 2023 (referenced SS104, SS105, SS106, SS107, TS104, TS105 and TS106.

The testing certificates for testing undertaken at source are provided in Appendix B. The testing certificates for testing undertaken on site are presented in Appendix C.

2.1. Soil Validation Criteria

When compared to soil screening criteria for imported capping material as presented in the Remediation Strategy (see Appendix D), no elevated contaminants were identified and the imported soil is considered suitable for use within the garden and communal soft landscaping capping layers.

2.2. Depth of Cover System

The required depth of topsoil and subsoil has been placed in all gardens and communal soft landscaping areas. Photographs of the depth measurements are provided in Appendix E and depths are summarised below in Table 3-1, Table 3-2 and Table 3-3.

2.3. Geotextile

A high visibility geotextile was required to be installed at the base of the cover system in Plots 20-21 and Plots 43-44. The specification is provided in Appendix F.

3. Summary of Validation Works

Table 3-1 below summarises the validation works completed on front gardens across all plots on the site.

Plot No.	Front / Rear	Topsoil Depth (mm)	Subsoil Depth (mm)	Total Depth (mm)	Total Required Depth (mm)	Compliance (✓ / x)
1	Front	250	450	700	600	✓
2	Front	200	500	700	600	✓
3	Front	175	525	700	600	✓
4 &5	Shared Front	150	450	600	600	✓
6 & 7	Shared Front	200	450	650	600	✓
8 & 9	Shared Front	200	450	650	600	✓
10 & 11	Shared Front	150	500	650	600	✓
12 & 13	Shared Front	150	350	500	600	✓
14 & 15	Shared Front	150	450	600	600	✓
16	Front	150	490	640	600	✓
17	Front	NA*	NA*	NA*	600	✓
18	Front	150	500	650	600	✓
19	Front	100	100	200*	600	✓
20	Front	150	550	700	450+geotextile	✓
21	Front	150	300	450	450+geotextile	✓
22	Front	NA*	NA*	NA*	600	✓
23	Front	NA*	NA*	NA*	600	✓
24	Front	150	550	700	600	✓
25	Front	150	450	600	600	✓
26	Front	300	400	700	600	✓
27	Front	350	250	600	600	✓
28	Front	150	500	600	600	✓
29 & 30	Shared Front	150	475	625	600	✓
31 &32	Shared Front	175	450	625	600	✓
33 & 34	Shared Front	300	375	675	600	✓
35 & 36	Shared Front	300	350	650	600	✓
37	Front	300	500	800	600	✓
38	Front	250	400	650	600	✓
39	Front	250	400	650	600	✓
40	Front	250	400	650	600	✓
41	Front	250	450	700	600	✓
42	Front	450	250	700	600	✓

Table 3-1: Summary of validation works undertaken on front gardens.

* Garden unable to be validated due to its small size and the presence of services.

Plot No.	Front / Rear	Topsoil Depth (mm)	Subsoil Depth (mm)	Total Depth (mm)	Total Required Depth (mm)	Compliance (✓ / x)
43	Front	300	550	850	450+geotextile	✓
44	Front	300	500	800	450+geotextile	✓
45	Front	300	500	800	600	✓
46	Front	300	600	900	600	✓
47	Front	300	600	900	600	✓
48	Front	300	500	800	600	✓
49	Front	300	500	800	600	✓
50	Front	300	600	900	600	✓

Table 3-1 (continued): Summary of validation works undertaken on front gardens.

The total depth of soil validated within the front gardens of Plots 17, 19, 22 and 23 was less than the remediation strategy depth of 600mm. Due to the small size of the gardens the depth of subsoil and topsoil was constrained by the presence of services and the encroachment of the adjacent foundations from walls and kerbs. Validation excavations were curtailed by compacted first generation gravel around the services and/ or wall and kerb foundations less than the proposed 600mm depth. Due to the small size of these gardens and location at the front of the property and the presence of compacted MOT / service gravel and concrete foundation acting as a physical break layer there is a reduced risk afforded of exposure to human health receptors to potentially contaminated soils.

Therefore the soils placed in these small garden area is considered suitable for its proposed use.

Table 3-2 summarises the validation works completed on rear gardens.

Plot No.	Front / Rear	Topsoil Depth (mm)	Subsoil Depth (mm)	Total Depth (mm)	Total Required Depth (mm)	Compliance (✓ / x)
1	Rear	200	500	700	600	✓
2	Rear	250	350	600	600	✓
3	Rear	225	650	875	600	✓
4	Rear	200	400	600	600	✓
5	Rear	200	425	625	600	✓
6	Rear	200	450	650	600	✓
7	Rear	200	400	600	600	✓
8	Rear	200	450	650	600	✓
9	Rear	200	475	675	600	✓
10	Rear	200	450	650	600	✓
11	Rear	200	500	700	600	✓
12	Rear	200	450	650	600	✓
13	Rear	200	525	725	600	✓
14	Rear	200	475	675	600	✓
15	Rear	200	400	600	600	
16	Rear	200	400	600	600	✓
17	Rear	200	425	625	600	✓
18	Rear	200	450	650	600	✓

Table 3-2: Summary of validation works undertaken on rear gardens.

Plot No.	Front / Rear	Topsoil Depth (mm)	Subsoil Depth (mm)	Total Depth (mm)	Total Required Depth (mm)	Compliance (✓ / x)
19	Rear	200	400	600	600	✓
20	Rear	150	400	550	450+membrane	✓
21	Rear	200	475	675	450+membrane	✓
22	Rear	200	450	650	600	✓
23	Rear	200	500	700	600	✓
24	Rear	200	450	650	600	✓
25	Rear	200	525	725	600	✓
26	Rear	200	475	675	600	✓
27	Rear	200	400	600	600	✓
28	Rear	200	400	600	600	✓
29	Rear	200	400	600	600	✓
30	Rear	200	450	650	600	✓
31	Rear	200	475	675	600	✓
32	Rear	200	450	560	600	✓
33	Rear	200	400	600	600	✓
34	Rear	200	450	650	600	✓
35	Rear	175	450	625	600	✓
36	Rear	150	450	600	600	✓
37	Rear	300	500	800	600	✓
38	Rear	250	400	650	600	✓
39	Rear	250	400	650	600	✓
40	Rear	250	400	650	600	✓
41	Rear	250	450	700	600	✓
42	Rear	450	250	700	600	✓
43	Rear	300	550	850	450+membrane	✓
44	Rear	300	500	800	450+membrane	✓
45	Rear	300	500	800	600	✓
46	Rear	300	600	900	600	✓
47	Rear	300	600	900	600	✓
48	Rear	300	500	800	600	✓
49	Rear	300	500	800	600	✓
50	Rear	300	600	900	600	✓

Table 3-2 (continued): Summary of validation works undertaken on rear gardens.

Table 3-3 summarises the validation works completed on communal soft landscaping areas.

Plot No.	Topsoil Depth (mm)	Subsoil Depth (mm)	Total Depth (mm)	Total Required Depth (mm)	Compliance (✓ / x)
Apartment – SA1	200	250	450	450	✓
Apartment – SA2	200	250	450	450	✓
Apartment – SA3	200	500	700	450	✓
Communal Area CA1	200	250	450	450	✓
Communal Area CA2	200	250	450	450	✓

Table 3-3: Summary of validation works undertaken on apartment landscaping and communal area.

4. Unexpected Contamination

LKC understand that no unexpected contamination was encountered during development works.

5. Conclusions

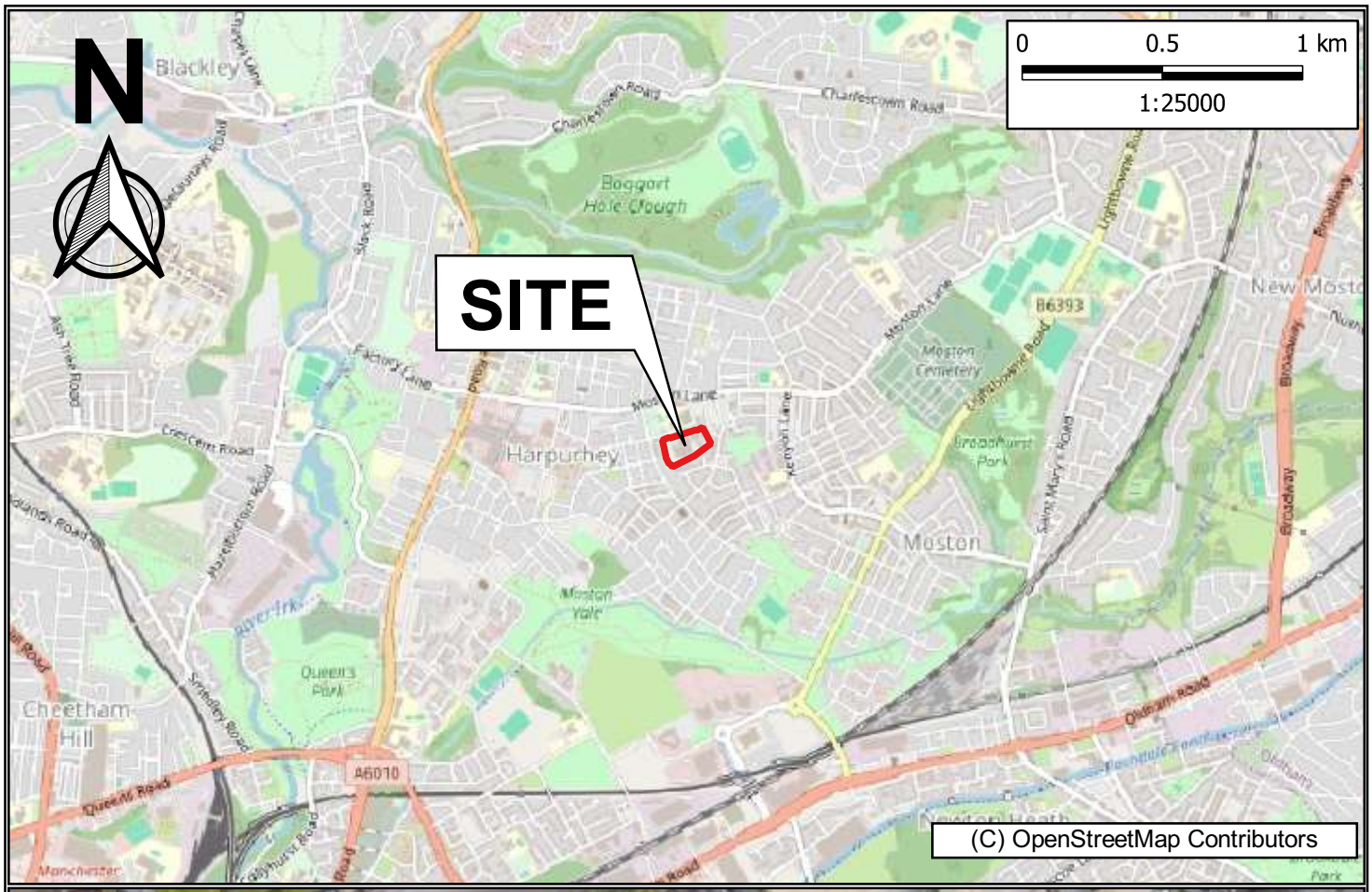
LKC has completed the validation works of the garden and communal soft landscaping areas at Moston Campus and conclude the following:

- Subsoil and topsoil has been imported to site and the sample results are within the appropriate soil screening criteria.
- A suitable geotextile has been installed has been installed in the required plots
- Suitable soil has been placed to an appropriate depth in the garden and communal soft landscaping areas.

Based on the above information LKC considers the Moston Campus development site is 'suitable for use' and appropriate remediation has been carried out in the garden and soft landscaping areas.

LKC considers there is sufficient information to support an application to discharge the outstanding contaminated land planning condition.

Figures





Client: Watson Construction Ltd				Title: Site Location & Boundary Plan	LK CONSULT
Site: Moston Campus, Manchester				Scale (see scale bar): 1:25,000 & 1:2,000 @ A4	Figure: 1 / Revision:
Job No.: LKC 23 1327	Drawn By: JW	Checked By: CC	Drawn: June 2024		



Extract From: TP Bennett
Drawing Ref: Proposed Site Plan, No.010, Rev:P3 (18/05/2021)

KEY

Site Boundary

Sampling Locations and features annotated by LK Consult Ltd are approximate and are based upon observed measurements unless otherwise stated. Do not scale from this drawing and work from marked dimensions only. All dimensions and features should be confirmed on site by the Contractor. Where this drawing includes information provided to LK Consult Ltd by others, LK Consult Ltd gives no warranty, representation or assurance as to the accuracy of such information.

LK CONSULT LIMITED

Client:	Watson Homes Ltd
Site:	Moston Campus
Title:	Proposed Development Plan

Job No.:	Scale (See Scale Bar):	Figure:	Revision:
LKC 23 1327	See Scale Bar	2	

Drawn By:	Checked By:	Drawn:
AC	RC	Jun 2024

Appendix B – Certificate of Analysis (Soil) – Source Testing

Dave B
Cheshire Soils and Aggregates Ltd
Unit 3B, Thelwall Lane
Warrington
Cheshire
WA4 1TB

e: dave@cheshiresoils.co.uk

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 23-11508

Project / Site name:	Congleton	**Samples received on:**	12/01/2023
Your job number:	229047	**Samples instructed on/ Analysis started on:**	12/01/2023
Your order number:		**Analysis completed by:**	19/01/2023
Report Issue Number:	1	**Report issued on:**	19/01/2023
Samples Analysed:	1 soil sample		

Signed:

Dominika Warjan
Junior Reporting Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

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The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number: 23-11508
Project / Site name: Congleton

Lab Sample Number				2552446
Sample Reference				0229047
Sample Number				None Supplied
Depth (m)				None Supplied
Date Sampled				11/01/2023
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**	
Stone Content	%	0.1	NONE	< 0.1
Moisture Content	%	0.01	NONE	28
Total mass of sample received	kg	0.001	NONE	2

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	PDO

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.3
Organic Matter (automated)	%	0.1	MCERTS	2.2

Speciated PAHs*

Naphthalene	mg/kg	0.05	NONE	< 0.05
Acenaphthylene	mg/kg	0.05	NONE	< 0.05
Acenaphthene	mg/kg	0.05	NONE	< 0.05
Fluorene	mg/kg	0.05	NONE	< 0.05
Phenanthrene	mg/kg	0.05	NONE	< 0.05
Anthracene	mg/kg	0.05	NONE	< 0.05
Fluoranthene	mg/kg	0.05	NONE	< 0.05
Pyrene	mg/kg	0.05	NONE	< 0.05
Benzo(a)anthracene	mg/kg	0.05	NONE	< 0.05
Chrysene	mg/kg	0.05	NONE	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	NONE	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	NONE	< 0.05
Benzo(a)pyrene	mg/kg	0.05	NONE	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	NONE	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	NONE	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	NONE	< 0.05

Total PAH*

Speciated Total EPA-16 PAHs	mg/kg	0.8	NONE	< 0.80

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	2.4
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.15
Boron (water soluble)	mg/kg	0.2	MCERTS	< 0.2
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8
Chromium (III)	mg/kg	1	NONE	4.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	5.1
Copper (aqua regia extractable)	mg/kg	1	MCERTS	8.9
Lead (aqua regia extractable)	mg/kg	1	MCERTS	10
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	3.7
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	6
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	14

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The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number: 23-11508
Project / Site name: Congleton

Lab Sample Number				2552446
Sample Reference				0229047
Sample Number				None Supplied
Depth (m)				None Supplied
Date Sampled				11/01/2023
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**	
Monoaromatics & Oxygenates				
Benzene	µg/kg	5	MCERTS	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0
p & m-xylene	µg/kg	5	MCERTS	< 5.0
o-xylene	µg/kg	5	MCERTS	< 5.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	< 5.0
Petroleum Hydrocarbons				
TPH-CWG - Aliphatic >EC5 - EC6 $_{HS_1D_AL}$	mg/kg	0.001	NONE	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8 $_{HS_1D_AL}$	mg/kg	0.001	NONE	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10 $_{HS_1D_AL}$	mg/kg	0.001	NONE	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12 $_{EH_CU_1D_AL}$	mg/kg	1	MCERTS	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16 $_{EH_CU_1D_AL}$	mg/kg	2	MCERTS	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21 $_{EH_CU_1D_AL}$	mg/kg	8	MCERTS	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35 $_{EH_CU_1D_AL}$	mg/kg	8	MCERTS	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35) $_{EH_CU+HS_1D_AL}$	mg/kg	10	NONE	< 10
TPH-CWG - Aromatic >EC5 - EC7 $_{HS_1D_AR}$	mg/kg	0.001	NONE	< 0.001
TPH-CWG - Aromatic >EC7 - EC8 $_{HS_1D_AR}$	mg/kg	0.001	NONE	< 0.001
TPH-CWG - Aromatic >EC8 - EC10 $_{HS_1D_AR}$	mg/kg	0.001	NONE	< 0.001
TPH-CWG - Aromatic >EC10 - EC12 $_{EH_CU_1D_AR}$	mg/kg	1	MCERTS	< 1.0
TPH-CWG - Aromatic >EC12 - EC16 $_{EH_CU_1D_AR}$	mg/kg	2	MCERTS	< 2.0
TPH-CWG - Aromatic >EC16 - EC21 $_{EH_CU_1D_AR}$	mg/kg	10	MCERTS	< 10
TPH-CWG - Aromatic >EC21 - EC35 $_{EH_CU_1D_AR}$	mg/kg	10	MCERTS	< 10
TPH-CWG - Aromatic (EC5 - EC35) $_{EH_CU+HS_1D_AR}$	mg/kg	10	NONE	< 10

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

*Data reported unaccredited due to quality control parameter failure associated with this result; other checks applied prior to reporting the data have been accepted. The result should be considered as being deviating and therefore may be unreliable.

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The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number : 23-11508
Project / Site name: Congleton

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2552446	229047	None Supplied	None Supplied	Brown loam and sand with gravel and vegetation.

Analytical Report Number : 23-11508
Project / Site name: Congleton

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS. Individual components MCERTS accredited	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Cr (III) in soil	In-house method by calculation from total Cr and Cr VI.	In-house method by calculation	L080-PL	W	NONE
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS

Analytical Report Number : 23-11508
Project / Site name: Congleton

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL or B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

Sample Deviation Report

Analytical Report Number : 23-11508
Project / Site name: Congleton

This deviation report indicates the sample and test deviations that apply to the samples submitted for analysis.Please note that the associated result(s) may be unreliable and should be interpreted with care.

Key: a - No sampling date b - Incorrect container c - Holding time d - Headspace e - Temperature

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
229047	None Supplied	S	2552446	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
229047	None Supplied	S	2552446	b	Speciated EPA-16 PAHs in soil	L064-PL	b
229047	None Supplied	S	2552446	b	TPHCWG (Soil)	L088/76-PL	b

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Analytical Report Number : 23-11508

Project / Site name:	Congleton	**Samples received on:**	12/01/2023
Your job number:	229047	**Samples instructed on/ Analysis started on:**	12/01/2023
Your order number:		**Analysis completed by:**	19/01/2023
Report Issue Number:	1	**Report issued on:**	19/01/2023
Samples Analysed:	1 soil sample		

Signed:

Dominika Warjan
Junior Reporting Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number: 23-11508
Project / Site name: Congleton

Lab Sample Number				2552446
Sample Reference				0229047
Sample Number				None Supplied
Depth (m)				None Supplied
Date Sampled				11/01/2023
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**	
Stone Content	%	0.1	NONE	< 0.1
Moisture Content	%	0.01	NONE	28
Total mass of sample received	kg	0.001	NONE	2

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	PDO

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.3
Organic Matter (automated)	%	0.1	MCERTS	2.2

Speciated PAHs*

Naphthalene	mg/kg	0.05	NONE	< 0.05
Acenaphthylene	mg/kg	0.05	NONE	< 0.05
Acenaphthene	mg/kg	0.05	NONE	< 0.05
Fluorene	mg/kg	0.05	NONE	< 0.05
Phenanthrene	mg/kg	0.05	NONE	< 0.05
Anthracene	mg/kg	0.05	NONE	< 0.05
Fluoranthene	mg/kg	0.05	NONE	< 0.05
Pyrene	mg/kg	0.05	NONE	< 0.05
Benzo(a)anthracene	mg/kg	0.05	NONE	< 0.05
Chrysene	mg/kg	0.05	NONE	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	NONE	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	NONE	< 0.05
Benzo(a)pyrene	mg/kg	0.05	NONE	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	NONE	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	NONE	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	NONE	< 0.05

Total PAH*

Speciated Total EPA-16 PAHs	mg/kg	0.8	NONE	< 0.80

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	2.4
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.15
Boron (water soluble)	mg/kg	0.2	MCERTS	< 0.2
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8
Chromium (III)	mg/kg	1	NONE	4.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	5.1
Copper (aqua regia extractable)	mg/kg	1	MCERTS	8.9
Lead (aqua regia extractable)	mg/kg	1	MCERTS	10
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	3.7
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	6
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	14

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Analytical Report Number: 23-11508
Project / Site name: Congleton

Lab Sample Number				2552446
Sample Reference				0229047
Sample Number				None Supplied
Depth (m)				None Supplied
Date Sampled				11/01/2023
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**	
Monoaromatics & Oxygenates				
Benzene	µg/kg	5	MCERTS	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0
p & m-xylene	µg/kg	5	MCERTS	< 5.0
o-xylene	µg/kg	5	MCERTS	< 5.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	< 5.0
Petroleum Hydrocarbons				
TPH-CWG - Aliphatic >EC5 - EC6 $_{HS_1D_AL}$	mg/kg	0.001	NONE	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8 $_{HS_1D_AL}$	mg/kg	0.001	NONE	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10 $_{HS_1D_AL}$	mg/kg	0.001	NONE	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12 $_{EH_CU_1D_AL}$	mg/kg	1	MCERTS	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16 $_{EH_CU_1D_AL}$	mg/kg	2	MCERTS	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21 $_{EH_CU_1D_AL}$	mg/kg	8	MCERTS	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35 $_{EH_CU_1D_AL}$	mg/kg	8	MCERTS	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35) $_{EH_CU+HS_1D_AL}$	mg/kg	10	NONE	< 10
TPH-CWG - Aromatic >EC5 - EC7 $_{HS_1D_AR}$	mg/kg	0.001	NONE	< 0.001
TPH-CWG - Aromatic >EC7 - EC8 $_{HS_1D_AR}$	mg/kg	0.001	NONE	< 0.001
TPH-CWG - Aromatic >EC8 - EC10 $_{HS_1D_AR}$	mg/kg	0.001	NONE	< 0.001
TPH-CWG - Aromatic >EC10 - EC12 $_{EH_CU_1D_AR}$	mg/kg	1	MCERTS	< 1.0
TPH-CWG - Aromatic >EC12 - EC16 $_{EH_CU_1D_AR}$	mg/kg	2	MCERTS	< 2.0
TPH-CWG - Aromatic >EC16 - EC21 $_{EH_CU_1D_AR}$	mg/kg	10	MCERTS	< 10
TPH-CWG - Aromatic >EC21 - EC35 $_{EH_CU_1D_AR}$	mg/kg	10	MCERTS	< 10
TPH-CWG - Aromatic (EC5 - EC35) $_{EH_CU+HS_1D_AR}$	mg/kg	10	NONE	< 10

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

*Data reported unaccredited due to quality control parameter failure associated with this result; other checks applied prior to reporting the data have been accepted. The result should be considered as being deviating and therefore may be unreliable.

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The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number : 23-11508
Project / Site name: Congleton

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2552446	229047	None Supplied	None Supplied	Brown loam and sand with gravel and vegetation.

Analytical Report Number : 23-11508
Project / Site name: Congleton

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS. Individual components MCERTS accredited	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Cr (III) in soil	In-house method by calculation from total Cr and Cr VI.	In-house method by calculation	L080-PL	W	NONE
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS

Analytical Report Number : 23-11508
Project / Site name: Congleton

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL or B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

Sample Deviation Report

Analytical Report Number : 23-11508
Project / Site name: Congleton

This deviation report indicates the sample and test deviations that apply to the samples submitted for analysis.Please note that the associated result(s) may be unreliable and should be interpreted with care.

Key: a - No sampling date b - Incorrect container c - Holding time d - Headspace e - Temperature

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
229047	None Supplied	S	2552446	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
229047	None Supplied	S	2552446	b	Speciated EPA-16 PAHs in soil	L064-PL	b
229047	None Supplied	S	2552446	b	TPHCWG (Soil)	L088/76-PL	b

Appendix C – Certificate of Analysis (Soil) – On Site Testing

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Derwentside Environmental Testing Services Ltd
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410

DETS Report No: 23-08379

Site Reference:	Moston Campus
Project / Job Ref:	LKC 23 1327
Order No:	LKC 23 1327-HM
Sample Receipt Date:	28/06/2023
Sample Scheduled Date:	28/06/2023
Report Issue Number:	1
Reporting Date:	05/07/2023

Authorised by:

Dave Ashworth
Technical Manager

Dates of laboratory activities for each tested analyte are available upon request.

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate						
DETS Report No: 23-08379	**Date Sampled**	22/06/23	22/06/23	22/06/23		
LK Consult Limited	**Time Sampled**	None Supplied	None Supplied	None Supplied		
Site Reference: Moston Campus	**TP / BH No**	SS101	SS102	SS103		
Project / Job Ref: LKC 23 1327	**Additional Refs**	None Supplied	None Supplied	None Supplied		
Order No: LKC 23 1327-HM	**Depth (m)**	None Supplied	None Supplied	None Supplied		
Reporting Date: 05/07/2023	**DETS Sample No**	660179	660180	660181		

Determinand	Unit	RL	Accreditation					
Asbestos Screen (S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected		
pH	pH Units	N/a	MCERTS	7.4	8.0	7.7		
Total Cyanide	mg/kg	< 1	NONE	< 1	< 1	< 1		
Free Cyanide	mg/kg	< 1	NONE	< 1	< 1	< 1		
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS	73	104	38		
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS	0.07	0.10	0.04		
Organic Matter (SOM)	%	< 0.1	MCERTS	1.1	1.2	1		
Arsenic (As)	mg/kg	< 2	MCERTS	6	6	6		
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	< 1		
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2	< 0.2	< 0.2		
Chromium (Cr)	mg/kg	< 2	MCERTS	14	13	15		
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2		
Copper (Cu)	mg/kg	< 4	MCERTS	11	10	11		
Lead (Pb)	mg/kg	< 3	MCERTS	8	7	7		
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1	< 1		
Nickel (Ni)	mg/kg	< 3	MCERTS	14	12	15		
Selenium (Se)	mg/kg	< 2	MCERTS	< 2	< 2	< 2		
Vanadium (V)	mg/kg	< 1	MCERTS	17	16	17		
Zinc (Zn)	mg/kg	< 3	MCERTS	30	28	29		
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2	< 2		

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)

DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - Speciated PAHs							
DETS Report No: 23-08379	**Date Sampled**	22/06/23	22/06/23	22/06/23		
LK Consult Limited	**Time Sampled**	None Supplied	None Supplied	None Supplied		
Site Reference: Moston Campus	**TP / BH No**	SS101	SS102	SS103		
Project / Job Ref: LKC 23 1327	**Additional Refs**	None Supplied	None Supplied	None Supplied		
Order No: LKC 23 1327-HM	**Depth (m)**	None Supplied	None Supplied	None Supplied		
Reporting Date: 05/07/2023	**DETS Sample No**	660179	660180	660181		

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6	< 1.6		

DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - TPH LQM Banded						
DETS Report No: 23-08379	**Date Sampled**	22/06/23	22/06/23	22/06/23		
LK Consult Limited	**Time Sampled**	None Supplied	None Supplied	None Supplied		
Site Reference: Moston Campus	**TP / BH No**	SS101	SS102	SS103		
Project / Job Ref: LKC 23 1327	**Additional Refs**	None Supplied	None Supplied	None Supplied		
Order No: LKC 23 1327-HM	**Depth (m)**	None Supplied	None Supplied	None Supplied		
Reporting Date: 05/07/2023	**DETS Sample No**	660179	660180	660181		

Determinand	Unit	RL	Accreditation					
Aliphatic >C5 - C6 : HS_1D_MS_AL	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01		
Aliphatic >C6 - C8 : HS_1D_MS_AL	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05		
Aliphatic >C8 - C10 : EH_CU_1D_AL	mg/kg	< 2	MCERTS	< 2	< 2	< 2		
Aliphatic >C10 - C12 : EH_CU_1D_AL	mg/kg	< 2	MCERTS	< 2	< 2	< 2		
Aliphatic >C12 - C16 : EH_CU_1D_AL	mg/kg	< 3	MCERTS	< 3	< 3	< 3		
Aliphatic >C16 - C35 : EH_CU_1D_AL	mg/kg	< 10	MCERTS	< 10	< 10	< 10		
Aliphatic >C35 - C44 : EH_CU_1D_AL	mg/kg	< 10	NONE	< 10	< 10	< 10		
Aliphatic (C5 - C44) : HS_1D_MS+EH_CU_1D_AL	mg/kg	< 30	NONE	< 30	< 30	< 30		
Aromatic >C5 - C7 : HS_1D_MS_AR	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01		
Aromatic >C7 - C8 : HS_1D_MS_AR	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05		
Aromatic >C8 - C10 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2	< 2	< 2		
Aromatic >C10 - C12 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2	< 2	< 2		
Aromatic >C12 - C16 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2	< 2	< 2		
Aromatic >C16 - C21 : EH_CU_1D_AR	mg/kg	< 3	MCERTS	< 3	< 3	< 3		
Aromatic >C21 - C35 : EH_CU_1D_AR	mg/kg	< 10	MCERTS	< 10	< 10	< 10		
Aromatic >C35 - C44 : EH_CU_1D_AR	mg/kg	< 10	NONE	< 10	< 10	< 10		
Aromatic (>C5 - C44) : HS_1D_MS+EH_CU_1D_AR	mg/kg	< 30	NONE	< 30	< 30	< 30		
Total >C5 - C44 : HS_1D_MS+EH_CU_1D_Total	mg/kg	< 60	NONE	< 60	< 60	< 60		

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Soil Analysis Certificate - BTEX / MTBE						
DETS Report No: 23-08379	**Date Sampled**	22/06/23	22/06/23	22/06/23		
LK Consult Limited	**Time Sampled**	None Supplied	None Supplied	None Supplied		
Site Reference: Moston Campus	**TP / BH No**	SS101	SS102	SS103		
Project / Job Ref: LKC 23 1327	**Additional Refs**	None Supplied	None Supplied	None Supplied		
Order No: LKC 23 1327-HM	**Depth (m)**	None Supplied	None Supplied	None Supplied		
Reporting Date: 05/07/2023	**DETS Sample No**	660179	660180	660181		

Determinand	Unit	RL	Accreditation					
Benzene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2		
Toluene : HS_1D_MS	ug/kg	< 5	MCERTS	< 5	< 5	< 5		
Ethylbenzene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2		
p & m-xylene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2		
o-xylene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2		
MTBE : HS_1D_MS	ug/kg	< 5	MCERTS	< 5	< 5	< 5		

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Soil Analysis Certificate - Sample Descriptions	
DETS Report No: 23-08379	
LK Consult Limited	
Site Reference: Moston Campus	
Project / Job Ref: LKC 23 1327	
Order No: LKC 23 1327-HM	
Reporting Date: 05/07/2023	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
660179	SS101	None Supplied	None Supplied	11.8	Light brown sandy clay
660180	SS102	None Supplied	None Supplied	11.9	Light brown sandy clay
660181	SS103	None Supplied	None Supplied	11.6	Light brown sandy clay with stones

Moisture content is part of procedure E003 & is not an accredited test
Insufficient Sample I/S
Unsuitable Sample U/S

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Soil Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 23-08379
LK Consult Limited
Site Reference: Moston Campus
Project / Job Ref: LKC 23 1327
Order No: LKC 23 1327-HM
Reporting Date: 05/07/2023

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 – C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	Fraction Organic Carbon (FOC)	Determination of TOC by combustion analyser.	E027
Soil	D	Organic Matter (SOM)	Determination of TOC by combustion analyser.	E027
Soil	D	TOC (Total Organic Carbon)	Determination of TOC by combustion analyser.	E027
Soil	AR	Exchangeable Ammonium	Determination of ammonium by discrete analyser.	E029
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received

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List of HWOL Acronyms and Operators
DETS Report No: 23-08379
LK Consult Limited
Site Reference: Moston Campus
Project / Job Ref: LKC 23 1327
Order No: LKC 23 1327-HM
Reporting Date: 05/07/2023

Acronym	**Description**
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
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det - Acronym
Benzene - HS_1D_MS
Ethylbenzene - HS_1D_MS
MTBE - HS_1D_MS
TPH CWG - Aromatic >C16 - C21 - EH_CU_1D_AR
TPH LQM - Aliphatic >C10 - C12 - EH_CU_1D_AL
TPH LQM - Aliphatic >C12 - C16 - EH_CU_1D_AL
TPH LQM - Aliphatic >C16 - C35 - EH_CU_1D_AL
TPH LQM - Aliphatic >C35 - C44 - EH_CU_1D_AL
TPH LQM - Aliphatic >C5 - C44 - HS_1D_MS+EH_CU_1D_AL
TPH LQM - Aliphatic >C5 - C6 - HS_1D_MS_AL
TPH LQM - Aliphatic >C6 - C8 - HS_1D_MS_AL
TPH LQM - Aliphatic >C8 - C10 - EH_CU_1D_AL
TPH LQM - Aromatic >C10 - C12 - EH_CU_1D_AR
TPH LQM - Aromatic >C12 - C16 - EH_CU_1D_AR
TPH LQM - Aromatic >C21 - C35 - EH_CU_1D_AR
TPH LQM - Aromatic >C35 - C44 - EH_CU_1D_AR
TPH LQM - Aromatic >C5 - C44 - HS_1D_MS+EH_CU_1D_AR
TPH LQM - Aromatic >C5 - C7 - HS_1D_MS_AR
TPH LQM - Aromatic >C7 - C8 - HS_1D_MS_AR
TPH LQM - Aromatic >C8 - C10 - EH_CU_1D_AR
TPH LQM - Total >C5 - C44 - HS_1D_MS+EH_CU_1D_Total
Toluene - HS_1D_MS
m & p-xylene - HS_1D_MS
o-Xylene - HS_1D_MS

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Derwentside Environmental Testing Services Ltd
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DETS Report No: 23-09553

Site Reference:	Moston Campus
Project / Job Ref:	LKC 23 1327
Order No:	LKC 23 1327-HM
Sample Receipt Date:	21/07/2023
Sample Scheduled Date:	21/07/2023
Report Issue Number:	1
Reporting Date:	28/07/2023

Authorised by:

Dave Ashworth
Technical Manager

Dates of laboratory activities for each tested analyte are available upon request.

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Soil Analysis Certificate						
DETS Report No: 23-09553	**Date Sampled**	20/07/23	20/07/23	20/07/23		
LK Consult Limited	**Time Sampled**	None Supplied	None Supplied	None Supplied		
Site Reference: Moston Campus	**TP / BH No**	TS1	TS2	TS3		
Project / Job Ref: LKC 23 1327	**Additional Refs**	None Supplied	None Supplied	None Supplied		
Order No: LKC 23 1327-HM	**Depth (m)**	None Supplied	None Supplied	None Supplied		
Reporting Date: 28/07/2023	**DETS Sample No**	665423	665424	665425		

Determinand	Unit	RL	Accreditation					
Asbestos Screen (S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected		
pH	pH Units	N/a	MCERTS	7.9	8.1	8.9		
Total Cyanide	mg/kg	< 1	NONE	< 1	< 1	< 1		
Free Cyanide	mg/kg	< 1	NONE	< 1	< 1	< 1		
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS	332	385	413		
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS	0.33	0.38	0.41		
Organic Matter (SOM)	%	< 0.1	MCERTS	2.9	2.7	2		
Arsenic (As)	mg/kg	< 2	MCERTS	8	6	5		
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	< 1		
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	0.3	0.5	0.6		
Chromium (Cr)	mg/kg	< 2	MCERTS	10	13	13		
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2		
Copper (Cu)	mg/kg	< 4	MCERTS	31	41	51		
Lead (Pb)	mg/kg	< 3	MCERTS	59	52	44		
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1	< 1		
Nickel (Ni)	mg/kg	< 3	MCERTS	10	15	12		
Selenium (Se)	mg/kg	< 2	MCERTS	< 2	< 2	< 2		
Vanadium (V)	mg/kg	< 1	MCERTS	14	14	13		
Zinc (Zn)	mg/kg	< 3	MCERTS	81	135	165		
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2	< 2		

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)

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Soil Analysis Certificate - Speciated PAHs							
DETS Report No: 23-09553	**Date Sampled**	20/07/23	20/07/23	20/07/23		
LK Consult Limited	**Time Sampled**	None Supplied	None Supplied	None Supplied		
Site Reference: Moston Campus	**TP / BH No**	TS1	TS2	TS3		
Project / Job Ref: LKC 23 1327	**Additional Refs**	None Supplied	None Supplied	None Supplied		
Order No: LKC 23 1327-HM	**Depth (m)**	None Supplied	None Supplied	None Supplied		
Reporting Date: 28/07/2023	**DETS Sample No**	665423	665424	665425		

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Phenanthrene	mg/kg	< 0.1	MCERTS	0.34	0.54	0.26		
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	0.13	< 0.1		
Fluoranthene	mg/kg	< 0.1	MCERTS	0.89	1.07	0.95		
Pyrene	mg/kg	< 0.1	MCERTS	0.80	0.92	0.88		
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	0.43	0.42	0.44		
Chrysene	mg/kg	< 0.1	MCERTS	0.52	0.49	0.50		
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	0.59	0.50	0.57		
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	0.19	0.15	0.17		
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	0.50	0.43	0.49		
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	0.33	0.27	0.32		
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	0.28	0.23	0.28		
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	4.9	5.1	4.9		

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Soil Analysis Certificate - TPH CWG Banded							
DETS Report No: 23-09553	**Date Sampled**	20/07/23	20/07/23	20/07/23		
LK Consult Limited	**Time Sampled**	None Supplied	None Supplied	None Supplied		
Site Reference: Moston Campus	**TP / BH No**	TS1	TS2	TS3		
Project / Job Ref: LKC 23 1327	**Additional Refs**	None Supplied	None Supplied	None Supplied		
Order No: LKC 23 1327-HM	**Depth (m)**	None Supplied	None Supplied	None Supplied		
Reporting Date: 28/07/2023	**DETS Sample No**	665423	665424	665425		

Determinand	Unit	RL	Accreditation					
Aliphatic >C5 - C6 : HS_1D_MS_AL	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01		
Aliphatic >C6 - C8 : HS_1D_MS_AL	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05		
Aliphatic >C8 - C10 : EH_CU_1D_AL	mg/kg	< 2	MCERTS	< 2	< 2	< 2		
Aliphatic >C10 - C12 : EH_CU_1D_AL	mg/kg	< 2	MCERTS	< 2	< 2	< 2		
Aliphatic >C12 - C16 : EH_CU_1D_AL	mg/kg	< 3	MCERTS	< 3	< 3	< 3		
Aliphatic >C16 - C21 : EH_CU_1D_AL	mg/kg	< 3	MCERTS	< 3	< 3	< 3		
Aliphatic >C21 - C34 : EH_CU_1D_AL	mg/kg	< 10	MCERTS	< 10	< 10	< 10		
Aliphatic >C34 - C44	mg/kg	< 10	NONE	< 10	< 10	< 10		
Aliphatic (C5 - C44) : HS_1D_MS+EH_CU_1D_AL	mg/kg	< 21	NONE	< 21	< 21	< 21		
Aromatic >C5 - C7 : HS_1D_MS_AR	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01		
Aromatic >C7 - C8 : HS_1D_MS_AR	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05		
Aromatic >C8 - C10 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2	< 2	< 2		
Aromatic >C10 - C12 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2	3	4		
Aromatic >C12 - C16 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2	< 2	< 2		
Aromatic >C16 - C21 : EH_CU_1D_AR	mg/kg	< 3	MCERTS	4	3	6		
Aromatic >C21 - C35 : EH_CU_1D_AR	mg/kg	< 10	MCERTS	< 10	15	< 10		
Aromatic >C35 - C44	mg/kg	< 10	NONE	< 10	< 10	< 10		
Aromatic (C5 - C44) : HS_1D_MS+EH_CU_1D_AR	mg/kg	< 21	NONE	< 21	21	< 21		
Total >C5 - C44 : HS_1D_MS+EH_CU_1D_Total	mg/kg	< 42	NONE	< 42	< 42	< 42		

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Soil Analysis Certificate - BTEX / MTBE						
DETS Report No: 23-09553	**Date Sampled**	20/07/23	20/07/23	20/07/23		
LK Consult Limited	**Time Sampled**	None Supplied	None Supplied	None Supplied		
Site Reference: Moston Campus	**TP / BH No**	TS1	TS2	TS3		
Project / Job Ref: LKC 23 1327	**Additional Refs**	None Supplied	None Supplied	None Supplied		
Order No: LKC 23 1327-HM	**Depth (m)**	None Supplied	None Supplied	None Supplied		
Reporting Date: 28/07/2023	**DETS Sample No**	665423	665424	665425		

Determinand	Unit	RL	Accreditation					
Benzene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2		
Toluene : HS_1D_MS	ug/kg	< 5	MCERTS	< 5	< 5	< 5		
Ethylbenzene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2		
p & m-xylene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2		
o-xylene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2		
MTBE : HS_1D_MS	ug/kg	< 5	MCERTS	< 5	< 5	< 5		

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Soil Analysis Certificate - Sample Descriptions	
DETS Report No: 23-09553	
LK Consult Limited	
Site Reference: Moston Campus	
Project / Job Ref: LKC 23 1327	
Order No: LKC 23 1327-HM	
Reporting Date: 28/07/2023	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
665423	TS1	None Supplied	None Supplied	11.4	Brown sandy clay with stones
665424	TS2	None Supplied	None Supplied	13.4	Brown sandy clay with stones
665425	TS3	None Supplied	None Supplied	11.8	Brown sandy clay with stones

Moisture content is part of procedure E003 & is not an accredited test
Insufficient Sample I/S
Unsuitable Sample U/S

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Soil Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 23-09553
LK Consult Limited
Site Reference: Moston Campus
Project / Job Ref: LKC 23 1327
Order No: LKC 23 1327-HM
Reporting Date: 28/07/2023

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 – C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	Fraction Organic Carbon (FOC)	Determination of TOC by combustion analyser.	E027
Soil	D	Organic Matter (SOM)	Determination of TOC by combustion analyser.	E027
Soil	D	TOC (Total Organic Carbon)	Determination of TOC by combustion analyser.	E027
Soil	AR	Exchangeable Ammonium	Determination of ammonium by discrete analyser.	E029
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received

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List of HWOL Acronyms and Operators
DETS Report No: 23-09553
LK Consult Limited
Site Reference: Moston Campus
Project / Job Ref: LKC 23 1327
Order No: LKC 23 1327-HM
Reporting Date: 28/07/2023

Acronym	**Description**
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
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det - Acronym
Benzene - HS_1D_MS
Ethylbenzene - HS_1D_MS
MTBE - HS_1D_MS
TPH CWG - Aliphatic >C10 - C12 - EH_CU_1D_AL
TPH CWG - Aliphatic >C12 - C16 - EH_CU_1D_AL
TPH CWG - Aliphatic >C16 - C21 - EH_CU_1D_AL
TPH CWG - Aliphatic >C21 - C34 - EH_CU_1D_AL
TPH CWG - Aliphatic >C5 - C44 - HS_1D_MS+EH_CU_1D_AL
TPH CWG - Aliphatic >C5 - C6 - HS_1D_MS_AL
TPH CWG - Aliphatic >C6 - C8 - HS_1D_MS_AL
TPH CWG - Aliphatic >C8 - C10 - EH_CU_1D_AL
TPH CWG - Aromatic >C10 - C12 - EH_CU_1D_AR
TPH CWG - Aromatic >C12 - C16 - EH_CU_1D_AR
TPH CWG - Aromatic >C16 - C21 - EH_CU_1D_AR
TPH CWG - Aromatic >C21 - C35 - EH_CU_1D_AR
TPH CWG - Aromatic >C5 - C44 - HS_1D_MS+EH_CU_1D_AR
TPH CWG - Aromatic >C5 - C7 - HS_1D_MS_AR
TPH CWG - Aromatic >C7 - C8 - HS_1D_MS_AR
TPH CWG - Aromatic >C8 - C10 - EH_CU_1D_AR
TPH CWG - Total >C5 - C44 - HS_1D_MS+EH_CU_1D_Total
Toluene - HS_1D_MS
m & p-xylene - HS_1D_MS
o-Xylene - HS_1D_MS

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DETS Report No: 23-14433

Site Reference:	Moston Campus
Project / Job Ref:	LKC 23 1327
Order No:	LKC 23 1327-HM
Sample Receipt Date:	24/11/2023
Sample Scheduled Date:	24/11/2023
Report Issue Number:	1
Reporting Date:	28/11/2023

Authorised by:

Steve Knight
Customer Support Manager

Dates of laboratory activities for each tested analyte are available upon request.

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Soil Analysis Certificate						
DETS Report No: 23-14433	**Date Sampled**	23/10/23	23/10/23	23/10/23	23/10/23	23/10/23
LK Consult Limited	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Moston Campus	**TP / BH No**	TS104	TS105	TS106	SS104	SS105
Project / Job Ref: LKC 23 1327	**Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: LKC 23 1327-HM	**Depth (m)**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Reporting Date: 28/11/2023	**DETS Sample No**	687107	687108	687109	687110	687111

Determinand	Unit	RL	Accreditation					
Asbestos Screen (S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
pH	pH Units	N/a	MCERTS	6.9	6.8	7.4	7.4	7.6
Total Cyanide	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Free Cyanide	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS	31	31	29	276	167
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS	0.03	0.03	0.03	0.28	0.17
Organic Matter (SOM)	%	< 0.1	MCERTS	4.6	4	3.4	2.6	1.6
Arsenic (As)	mg/kg	< 2	MCERTS	18	20	5	4	5
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	0.7	0.8	< 0.2	< 0.2	< 0.2
Chromium (Cr)	mg/kg	< 2	MCERTS	41	43	10	12	12
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
Copper (Cu)	mg/kg	< 4	MCERTS	53	54	13	14	12
Lead (Pb)	mg/kg	< 3	MCERTS	92	94	20	13	10
Mercury (Hg)	mg/kg	< 1	MCERTS	1.1	1.1	< 1	< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	27	28	7	10	11
Selenium (Se)	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Vanadium (V)	mg/kg	< 1	MCERTS	48	49	14	12	14
Zinc (Zn)	mg/kg	< 3	MCERTS	112	115	36	30	32
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)

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Soil Analysis Certificate						
DETS Report No: 23-14433	**Date Sampled**	23/10/23	23/10/23			
LK Consult Limited	**Time Sampled**	None Supplied	None Supplied			
Site Reference: Moston Campus	**TP / BH No**	SS106	SS107			
Project / Job Ref: LKC 23 1327	**Additional Refs**	None Supplied	None Supplied			
Order No: LKC 23 1327-HM	**Depth (m)**	None Supplied	None Supplied			
Reporting Date: 28/11/2023	**DETS Sample No**	687112	687113			

Determinand	**Unit**	**RL**	**Accreditation**					
Asbestos Screen (S)	N/a	N/a	**ISO17025**	Not Detected	Not Detected			
pH	pH Units	N/a	**MCERTS**	7.7	8.1			
Total Cyanide	mg/kg	< 1	NONE	< 1	< 1			
Free Cyanide	mg/kg	< 1	NONE	< 1	< 1			
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	**MCERTS**	199	55			
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	**MCERTS**	0.20	0.05			
Organic Matter (SOM)	%	< 0.1	**MCERTS**	1.5	2.6			
Arsenic (As)	mg/kg	< 2	**MCERTS**	5	6			
W/S Boron	mg/kg	< 1	NONE	< 1	< 1			
Cadmium (Cd)	mg/kg	< 0.2	**MCERTS**	< 0.2	0.3			
Chromium (Cr)	mg/kg	< 2	**MCERTS**	13	17			
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2			
Copper (Cu)	mg/kg	< 4	**MCERTS**	12	29			
Lead (Pb)	mg/kg	< 3	**MCERTS**	10	27			
Mercury (Hg)	mg/kg	< 1	**MCERTS**	< 1	< 1			
Nickel (Ni)	mg/kg	< 3	**MCERTS**	12	16			
Selenium (Se)	mg/kg	< 2	**MCERTS**	< 2	< 2			
Vanadium (V)	mg/kg	< 1	**MCERTS**	14	20			
Zinc (Zn)	mg/kg	< 3	**MCERTS**	32	68			
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2			

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)

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Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 23-14433	**Date Sampled**	23/10/23	23/10/23	23/10/23	23/10/23	23/10/23
LK Consult Limited	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Moston Campus	**TP / BH No**	TS104	TS105	TS106	SS104	SS105
Project / Job Ref: LKC 23 1327	**Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: LKC 23 1327-HM	**Depth (m)**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Reporting Date: 28/11/2023	**DETS Sample No**	687107	687108	687109	687110	687111

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6

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Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 23-14433	**Date Sampled**	23/10/23	23/10/23			
LK Consult Limited	**Time Sampled**	None Supplied	None Supplied			
Site Reference: Moston Campus	**TP / BH No**	SS106	SS107			
Project / Job Ref: LKC 23 1327	**Additional Refs**	None Supplied	None Supplied			
Order No: LKC 23 1327-HM	**Depth (m)**	None Supplied	None Supplied			
Reporting Date: 28/11/2023	**DETS Sample No**	687112	687113			

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6			

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Soil Analysis Certificate - TPH CWG Banded						
DETS Report No: 23-14433	**Date Sampled**	23/10/23	23/10/23	23/10/23	23/10/23	23/10/23
LK Consult Limited	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Moston Campus	**TP / BH No**	TS104	TS105	TS106	SS104	SS105
Project / Job Ref: LKC 23 1327	**Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: LKC 23 1327-HM	**Depth (m)**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Reporting Date: 28/11/2023	**DETS Sample No**	687107	687108	687109	687110	687111

Determinand	Unit	RL	Accreditation					
Aliphatic >C5 - C6 : HS_1D_MS_AL	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic >C6 - C8 : HS_1D_MS_AL	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic >C8 - C10 : EH_CU_1D_AL	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aliphatic >C10 - C12 : EH_CU_1D_AL	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aliphatic >C12 - C16 : EH_CU_1D_AL	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	< 3
Aliphatic >C16 - C21 : EH_CU_1D_AL	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	< 3
Aliphatic >C21 - C34 : EH_CU_1D_AL	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Aliphatic >C34 - C44	mg/kg	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aliphatic (C5 - C44) : HS_1D_MS+EH_CU_1D_AL	mg/kg	< 21	NONE	< 21	< 21	< 21	< 21	< 21
Aromatic >C5 - C7 : HS_1D_MS_AR	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic >C7 - C8 : HS_1D_MS_AR	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic >C8 - C10 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C10 - C12 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C12 - C16 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C16 - C21 : EH_CU_1D_AR	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	< 3
Aromatic >C21 - C35 : EH_CU_1D_AR	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Aromatic >C35 - C44	mg/kg	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aromatic (C5 - C44) : HS_1D_MS+EH_CU_1D_AR	mg/kg	< 21	NONE	< 21	< 21	< 21	< 21	< 21
Total >C5 - C44 : HS_1D_MS+EH_CU_1D_Total	mg/kg	< 42	NONE	< 42	< 42	< 42	< 42	< 42

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Soil Analysis Certificate - TPH CWG Banded						
DETS Report No: 23-14433	**Date Sampled**	23/10/23	23/10/23			
LK Consult Limited	**Time Sampled**	None Supplied	None Supplied			
Site Reference: Moston Campus	**TP / BH No**	SS106	SS107			
Project / Job Ref: LKC 23 1327	**Additional Refs**	None Supplied	None Supplied			
Order No: LKC 23 1327-HM	**Depth (m)**	None Supplied	None Supplied			
Reporting Date: 28/11/2023	**DETS Sample No**	687112	687113			

Determinand	Unit	RL	Accreditation					
Aliphatic >C5 - C6 : HS_1D_MS_AL	mg/kg	< 0.01	NONE	< 0.01	< 0.01			
Aliphatic >C6 - C8 : HS_1D_MS_AL	mg/kg	< 0.05	NONE	< 0.05	< 0.05			
Aliphatic >C8 - C10 : EH_CU_1D_AL	mg/kg	< 2	MCERTS	< 2	< 2			
Aliphatic >C10 - C12 : EH_CU_1D_AL	mg/kg	< 2	MCERTS	< 2	< 2			
Aliphatic >C12 - C16 : EH_CU_1D_AL	mg/kg	< 3	MCERTS	< 3	< 3			
Aliphatic >C16 - C21 : EH_CU_1D_AL	mg/kg	< 3	MCERTS	< 3	< 3			
Aliphatic >C21 - C34 : EH_CU_1D_AL	mg/kg	< 10	MCERTS	< 10	< 10			
Aliphatic >C34 - C44	mg/kg	< 10	NONE	< 10	< 10			
Aliphatic (C5 - C44) : HS_1D_MS+EH_CU_1D_AL	mg/kg	< 21	NONE	< 21	< 21			
Aromatic >C5 - C7 : HS_1D_MS_AR	mg/kg	< 0.01	NONE	< 0.01	< 0.01			
Aromatic >C7 - C8 : HS_1D_MS_AR	mg/kg	< 0.05	NONE	< 0.05	< 0.05			
Aromatic >C8 - C10 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2	< 2			
Aromatic >C10 - C12 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2	< 2			
Aromatic >C12 - C16 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2	< 2			
Aromatic >C16 - C21 : EH_CU_1D_AR	mg/kg	< 3	MCERTS	< 3	< 3			
Aromatic >C21 - C35 : EH_CU_1D_AR	mg/kg	< 10	MCERTS	< 10	< 10			
Aromatic >C35 - C44	mg/kg	< 10	NONE	< 10	< 10			
Aromatic (C5 - C44) : HS_1D_MS+EH_CU_1D_AR	mg/kg	< 21	NONE	< 21	< 21			
Total >C5 - C44 : HS_1D_MS+EH_CU_1D_Total	mg/kg	< 42	NONE	< 42	< 42			

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Soil Analysis Certificate - BTEX / MTBE						
DETS Report No: 23-14433	**Date Sampled**	23/10/23	23/10/23	23/10/23	23/10/23	23/10/23
LK Consult Limited	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Moston Campus	**TP / BH No**	TS104	TS105	TS106	SS104	SS105
Project / Job Ref: LKC 23 1327	**Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: LKC 23 1327-HM	**Depth (m)**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Reporting Date: 28/11/2023	**DETS Sample No**	687107	687108	687109	687110	687111

Determinand	Unit	RL	Accreditation					
Benzene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Toluene : HS_1D_MS	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Ethylbenzene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
p & m-xylene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
o-xylene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
MTBE : HS_1D_MS	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5

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Soil Analysis Certificate - BTEX / MTBE							
DETS Report No: 23-14433	**Date Sampled**	23/10/23	23/10/23				
LK Consult Limited	**Time Sampled**	None Supplied	None Supplied				
Site Reference: Moston Campus	**TP / BH No**	SS106	SS107				
Project / Job Ref: LKC 23 1327	**Additional Refs**	None Supplied	None Supplied				
Order No: LKC 23 1327-HM	**Depth (m)**	None Supplied	None Supplied				
Reporting Date: 28/11/2023	**DETS Sample No**	687112	687113				

Determinand	Unit	RL	Accreditation					
Benzene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2			
Toluene : HS_1D_MS	ug/kg	< 5	MCERTS	< 5	< 5			
Ethylbenzene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2			
p & m-xylene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2			
o-xylene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2			
MTBE : HS_1D_MS	ug/kg	< 5	MCERTS	< 5	< 5			

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Soil Analysis Certificate - Sample Descriptions	
DETS Report No: 23-14433	
LK Consult Limited	
Site Reference: Moston Campus	
Project / Job Ref: LKC 23 1327	
Order No: LKC 23 1327-HM	
Reporting Date: 28/11/2023	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
$ 687107	TS104	None Supplied	None Supplied	15.6	Brown sandy clay
$ 687108	TS105	None Supplied	None Supplied	14.9	Brown sandy clay
$ 687109	TS106	None Supplied	None Supplied	11.9	Brown sandy clay with stones
$ 687110	SS104	None Supplied	None Supplied	14.3	Brown sandy clay
$ 687111	SS105	None Supplied	None Supplied	15	Brown sandy clay
$ 687112	SS106	None Supplied	None Supplied	14.7	Brown sandy clay
$ 687113	SS107	None Supplied	None Supplied	17.3	Brown clay

Moisture content is part of procedure E003 & is not an accredited test
Insufficient Sample I/S
Unsuitable Sample U/S

$ samples exceeded recommended holding times

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Soil Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 23-14433
LK Consult Limited
Site Reference: Moston Campus
Project / Job Ref: LKC 23 1327
Order No: LKC 23 1327-HM
Reporting Date: 28/11/2023

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 – C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	Fraction Organic Carbon (FOC)	Determination of TOC by combustion analyser.	E027
Soil	D	Organic Matter (SOM)	Determination of TOC by combustion analyser.	E027
Soil	D	TOC (Total Organic Carbon)	Determination of TOC by combustion analyser.	E027
Soil	AR	Exchangeable Ammonium	Determination of ammonium by discrete analyser.	E029
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received

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List of HWOL Acronyms and Operators
DETS Report No: 23-14433
LK Consult Limited
Site Reference: Moston Campus
Project / Job Ref: LKC 23 1327
Order No: LKC 23 1327-HM
Reporting Date: 28/11/2023

Acronym	**Description**
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
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det - Acronym
Benzene - HS_1D_MS
Ethylbenzene - HS_1D_MS
MTBE - HS_1D_MS
TPH CWG - Aliphatic >C10 - C12 - EH_CU_1D_AL
TPH CWG - Aliphatic >C12 - C16 - EH_CU_1D_AL
TPH CWG - Aliphatic >C16 - C21 - EH_CU_1D_AL
TPH CWG - Aliphatic >C21 - C34 - EH_CU_1D_AL
TPH CWG - Aliphatic >C5 - C44 - HS_1D_MS+EH_CU_1D_AL
TPH CWG - Aliphatic >C5 - C6 - HS_1D_MS_AL
TPH CWG - Aliphatic >C6 - C8 - HS_1D_MS_AL
TPH CWG - Aliphatic >C8 - C10 - EH_CU_1D_AL
TPH CWG - Aromatic >C10 - C12 - EH_CU_1D_AR
TPH CWG - Aromatic >C12 - C16 - EH_CU_1D_AR
TPH CWG - Aromatic >C16 - C21 - EH_CU_1D_AR
TPH CWG - Aromatic >C21 - C35 - EH_CU_1D_AR
TPH CWG - Aromatic >C5 - C44 - HS_1D_MS+EH_CU_1D_AR
TPH CWG - Aromatic >C5 - C7 - HS_1D_MS_AR
TPH CWG - Aromatic >C7 - C8 - HS_1D_MS_AR
TPH CWG - Aromatic >C8 - C10 - EH_CU_1D_AR
TPH CWG - Total >C5 - C44 - HS_1D_MS+EH_CU_1D_Total
Toluene - HS_1D_MS
m & p-xylene - HS_1D_MS
o-Xylene - HS_1D_MS

Appendix D – Screening Criteria for Imported Capping Materials (Curtins Appendix B)

Appendix B – Screening Criteria for Imported Capping Materials

Adopted Soil Generic Assessment Criteria
Sandy loam with 6% SOM

Contaminants	Residential with home grown produce	Residential without home grown produce	Allotments	Commercial	Public open space near residential housing POS_{resi}	Public park POS_{park}
Metals						
Beryllium	*1.7*	*1.7*	*35*	*12*	*2.2*	*63*
Boron	*290*	*11,000*	*45*	*240,000*	*21,000*	*46,000*
Cadmium	**10**[13] 22	**85**[13] 150	**1.8** 3.9	**230** 410	*120* 220	*560* 880
Chromium III	*910*	*910*	*18,000*	*8,600*	*1,500*	*33,000*
Chromium VI	*6* 21	*6* 21	*1.8* 170	*33* 49	*7.7* 21	*220* 250
Lead	200	310	80	2,300	630	1,300
Mercury *(elemental)*	**1**	**1**	**26**	**26**	*16*	**26**[8] [*30*]
Mercury (inorganic)	**170**	**240**	**80**	**3600**	*120*	*240*
Nickel	*130*[10]	*180*[10]	*53*[11]	*980*[10]	*230*	*800*
Vanadium	*410*	*1200*	*91*	*9000*	*2000*	*5000*
Copper	*2400*	*7100*	*520*	*68000*	*12000*	*44000*
Zinc	*3700*	*40000*	*620*	*730000*	*81000*	*170000*
Semi-Metals and non-metals						
Arsenic	**32**[12] 37	**35**[12] 40	**43**[12] 49	**640**[12] 640	*79* 79	*170* 170
Antimony		***550***		***7500***	***1500***	***3300***
Selenium	**350**	**600**	**120**	**13000**	*1100*	*1800*
Inorganic chemicals						
Cyanide	34	34	34	34	34	34
Organic contaminants						
Aliphatic risk banded hydrocarbons - TPHCWG method						
$EC_{>5}$ - EC_6	*160*	*160*	*3900*	*12000*	*600000*	*180000*
$EC_{>6}$ - EC_8	*530*	*530*	*13000*	*40000*	*620000*	*320000*
$EC_{>8}$ - EC_{10}	*150*	*150*	*1700*	*11000*	*13000*	*21000*
EC_{10}-EC_{12}	*760*	*770*	*7300*	*47000*	*13000*	*24000*
EC_{12}-EC_{16}	*4300*	*4400*	*13000*	*90000*	*13000*	*26000*
$EC_{>16}$ - EC_{35}	*110000*	*110000*	*270000*	*1800000*	*250000*	*490000*
$EC_{>35}$ - EC_{44}	*110000*	*110000*	*270000*	*1800000*	*250000*	*490000*
Aromatic risk banded hydrocarbons - TPHCWG method						
$EC_{>5}$ - EC_7	*300*	*1400*	*57*	*86000*	*56000*	*92000*
$EC_{>7}$ - EC_8	*660*	*3900*	*120*	*180000*	*56000*	*100000*
$EC_{>8}$ - EC_{10}	*190*	*270*	*51*	*17000*	*5000*	*9300*
EC_{10} - EC_{12}	*380*	*1200*	*74*	*34000*	*5000*	*10000*
EC_{12} - EC_{16}	*660*	*2500*	*130*	*38000*	*5000*	*10000*
$EC_{>16}$ - EC_{21}	*930*	*1900*	*260*	*28000*	*3800*	*7800*
$EC_{>21}$ - EC_{35}	*1700*	*1900*	*1600*	*28000*	*3800*	*7900*
$EC_{>35}$ - EC_{44}	*1700*	*1900*	*1600*	*28000*	*3800*	*7900*
Aliph + Arom EC >44-70	*1900*	*1900*	*3000*	*28000*	3800	7900
Aromatic						
Benzene	**0.33** 0.87	**1.0** 3.3	**0.07** 0.18	**95** 98	*73* 140	*110* 230
Ethyl benzene	**350**	**840**	**90**	**2800**[8] [66000]	**2800**[8] [*25000*]	**2800**[8] [*27000*]
Toluene	**610**	**2700**	**120**	**4400**[8] [190000]	**4400**[8] [*56000*]	**4400**[8] [*100000*]
Xylene[9]	**230**	**290**	**160**	**2600**[8] [32000]	**2600**[8] [*43000*]	**2600**[8] [*31000*]
Phenol	**420**	**520**	**280**	**3200**[14] (38000)	**3200**[14] (*10000*)	**3200**[14] (*9300*)
Polycyclic Aromatic Hydrocarbons (PAH)						
Naphthalene	*13*	*13*	*24*	*1100*	*4900*	*3000*
Acenaphthylene	*920*	*6000*	*160*	*100000*	*15000*	*30000*
Acenaphthene	*1100*	*6000*	*200*	*100000*	*15000*	*30000*
Fluorene	*860*	*4500*	*160*	*71000*	*9900*	*20000*
Phenanthrene	*440*	*1500*	*90*	*23000*	*3100*	*6300*
Anthracene	*11000*	*37000*	*2200*	*540000*	*74000*	*150000*
Fluoranthene	*890*	*1600*	*290*	*23000*	*3100*	*6400*
Pyrene	*2000*	*3800*	*620*	*54000*	*7400*	*15000*
Benz(a)anthracene	*13*	*15*	*13*	*180*	*29*	*62*
Chrysene	*27*	*32*	*19*	*350*	*57*	*120*
Benzo(b)fluoranthene	*3.7*	*4.0*	*3.9*	*45*	*7.2*	*16.0*
Benzo(k)fluoranthene	*100*	*110*	*130*	*1200*	*190*	*440*
Benzo(a)pyrene	*3.0* 5.0	*3.2* 5.3	*3.5* 5.7	*36* 77	*5.7* 10	*13* 21
Indeno(123cd)pyrene	*41*	*46*	*39*	*510*	*82*	*180*
Dibenzo(ah)anthracene	*0.3*	*0.32*	*0.43*	*3.6*	*0.58*	*1.4*
Benzo(ghi)perylene	*350*	*360*	*640*	*4000*	*640*	*1600*
Chlorinated Aliphatic Hydrocarbons						
Vinyl chloride	*0.0014*	*0.0015*	*0.0018*	*0.12*	*3.5*	*5.4*
Trichloroethene (TCE)	*0.075*	*0.08*	*0.21*	*5.7*	*120*	*120*
1,1,1,2 Tetrachlorethane	*6.4*	*8.2*	*4.4*	*560*	*1400*	*2100*
Tetrachlorethene (PCE)	*0.90*	*0.92*	*3.6*	*95*	*1400*	*1500*
1,1,1 Trichlorethane	*39*	*40*	*240*	*3000*	*140000*	*100000*

Notes

1. All values above are in mg/kg
2. **Numbers in bold are SGVs or GAC that are derived based on SGV report input parameters**, *numbers in italics are S4ULs*, ***numbers in bold-italics are based on EIC/AGS/CL:AIRE numbers & input parameters*** and underlined numbers are C4SLs
3. Soil organic matter (SOM) is assumed to be 6% - DEFAULT VALUE
4. Soil type is assumed to be sandy loam - DEFAULT SOIL TYPE
5. For residential, the building type is conservatively assumed to be a small terrace house where the development includes bungalows change to more conservative bungalow setting in computer model
6. For commercial, the building type is conservatively assumed to be a pre 1970s office building, where the proposed development comprises houses, flat with living spaces changes setting in model accordingly
7. For classrooms consider increasing the dust loading fator in the 'Soil and Building Data' of the CLEA 1.04 model from 50 to 100µg m^{-3}
8. Based on vapour saturation limt as suggested by EA / [ ] model value
9. Lowest of o-, m- and p-xylene
10. Based on comparison of inhalation exposure with inhalation TDI
11. Based on comparison of oral, dermal, and inhalation exposure with the oral TDI
12. Based on a comparison of oral and dermal soil exposure with oral Index Dose only
13. Averaged over and based on lifetime exposure
14. Based on critical concentration for skin irritation in humans arising from contact with phenol in aqueous solution (number in brackets based on health effects following long term exposure for illustration)
15. NA: Not applicable

Adopted Soil Generic Assessment Criteria
Sandy loam with 2.5% SOM

Contaminants	Residential with home grown produce	Residential without home grown produce	Allotments	Commercial	Public open space near residential housing POS_{resi}	Public park POS_{park}
Metals						
Beryllium	*1.7*	*1.7*	*35*	*12*	*2.2*	*63*
Boron	*290*	*11,000*	*45*	*240,000*	*21,000*	*46,000*
Cadmium	**10**[13] 22	**85**[13] 150	**1.8** 3.9	**230** 410	*120* 220	*560* 880
Chromium III	*910*	*910*	*18,000*	*8,600*	*1,500*	*33,000*
Chromium VI	*6* 21	*6* 21	*1.8* 170	*33* 49	*7.7* 21	*220* 250
Lead	200	310	80	2,300	630	1,300
Mercury *(elemental)*	**1**	**1**	**26**	**26**	*16*	**26**[8] [*30*]
Mercury (inorganic)	**170**	**240**	**80**	**3600**	*120*	*240*
Nickel	*130*[10]	*180*[10]	*53*[11]	*980*[10]	*230*	*800*
Vanadium	*410*	*1200*	*91*	*9000*	*2000*	*5000*
Copper	*2400*	*7100*	*520*	*68000*	*12000*	*44000*
Zinc	*3700*	*40000*	*620*	*730000*	*81000*	*170000*
Semi-Metals and non-metals						
Arsenic	**32**[12] 37	**35**[12] 40	**43**[12] 49	**640**[12] 640	*79* 79	*170* 170
Antimony		***550***		***7500***	***1500***	***3300***
Selenium	**350**	**600**	**120**	**13000**	*1100*	*1800*
Inorganic chemicals						
Cyanide	34	34	34	34	34	34
Organic contaminants						
Aliphatic risk banded hydrocarbons - TPHCWG method						
$EC_{>5}$ - EC_6	*78*	*78*	*1700*	*5900*	*590000*	*130000*
$EC_{>6}$ - EC_8	*230*	*230*	*5600*	*17000*	*610000*	*220000*
$EC_{>8}$ - EC_{10}	*65*	*65*	*770*	*4800*	*13000*	*18000*
EC_{10}-EC_{12}	*330*	*330*	*4400*	*23000*	*13000*	*23000*
EC_{12}-EC_{16}	*2400*	*2400*	*13000*	*82000*	*13000*	*25000*
$EC_{>16}$ - EC_{35}	*92000*	*92000*	*270000*	*1700000*	*250000*	*480000*
$EC_{>35}$ - EC_{44}	*92000*	*92000*	*270000*	*1700000*	*250000*	*480000*
Aromatic risk banded hydrocarbons - TPHCWG method						
$EC_{>5}$ - EC_7	*140*	*690*	*27*	*46000*	*56000*	*84000*
$EC_{>7}$ - EC_8	*290*	*1800*	*51*	*110000*	*56000*	*95000*
$EC_{>8}$ - EC_{10}	*83*	*110*	*21*	*8100*	*5000*	*8500*
EC_{10} - EC_{12}	*180*	*590*	*31*	*28000*	*5000*	*9700*
EC_{12} - EC_{16}	*330*	*2300*	*57*	*37000*	*5100*	*10000*
$EC_{>16}$ - EC_{21}	*540*	*1900*	*110*	*28000*	*3800*	*7700*
$EC_{>21}$ - EC_{35}	*1500*	*1900*	*820*	*28000*	*3800*	*7800*
$EC_{>35}$ - EC_{44}	*1500*	*1900*	*820*	*28000*	*3800*	*7800*
Aliph + Arom EC >44-70	*1800*	*1900*	*2100*	*28000*	3800	7800
Aromatic						
Benzene	**0.16**	**0.49**	**0.035**	**50**	*72*	*100*
Ethyl benzene	**150**	**380**	**39**	**1200**[8] [35000]	**1200**[8] [*24000*]	**1200**[8] [*22000*]
Toluene	**270**	**1300**	**51**	**1900**[8] [110000]	**1900**[8] [*56000*]	**1900**[8] [*95000*]
Xylene[9]	**98**	**120**	**70**	**1200**[8] [14000]	**1200**[8] [*42000*]	**1200**[8] [*23000*]
Phenol	**290**	**420**	**140**	**1500**[14] (35000)	**1500**[14] (*10000*)	**1500**[14] (*8300*)
Polycyclic Aromatic Hydrocarbons (PAH)						
Naphthalene	*5.6*	*5.6*	*10*	*460*	*4900*	*1900*
Acenaphthylene	*420*	*4600*	*69*	*97000*	*15000*	*30000*
Acenaphthene	*510*	*4700*	*85*	*97000*	*15000*	*30000*
Fluorene	*400*	*3800*	*67*	*68000*	*9900*	*20000*
Phenanthrene	*220*	*1500*	*38*	*22000*	*3100*	*6200*
Anthracene	*5400*	*35000*	*950*	*540000*	*74000*	*150000*
Fluoranthene	*560*	*1600*	*130*	*23000*	*3100*	*6300*
Pyrene	*1200*	*3800*	*270*	*54000*	*7400*	*15000*
Benz(a)anthracene	*11*	*14*	*6.5*	*170*	*29*	*56*
Chrysene	*22*	*31*	*9.4*	*350*	*57*	*110*
Benzo(b)fluoranthene	*3.3*	*4.0*	*2.1*	*44*	*7.2*	*15*
Benzo(k)fluoranthene	*93*	*110*	*75*	*1200*	*190*	*410*
Benzo(a)pyrene	*2.7*	*3.2*	*2*	*35*	*5.7*	*12*
Indeno(123cd)pyrene	*36*	*46*	*21*	*510*	*82*	*170*
Dibenzo(ah)anthracene	*0.28*	*0.32*	*0.27*	*3.6*	*0.57*	*1.3*
Benzo(ghi)perylene	*340*	*360*	*470*	*4000*	*640*	*1500*
Chlorinated Aliphatic Hydrocarbons						
Vinyl chloride	*0.00087*	*0.001*	*0.001*	*0.077*	*3.5*	*5*
Trichloroethene (TCE)	*0.034*	*0.036*	*0.091*	*2.6*	*120*	*91*
1,1,1,2 Tetrachlorethane	*2.8*	*3.5*	*1.9*	*250*	*1400*	*1800*
Tetrachlorethene (PCE)	*0.39*	*0.4*	*1.5*	*42*	*1400*	*1100*
1,1,1 Trichlorethane	*18*	*18*	*110*	*1300*	*140000*	*76000*

Notes

1. All values above are in mg/kg
2. **Numbers in bold are SGVs or GAC that are derived based on SGV report input parameters**, *numbers in italics are S4ULs*, ***numbers in bold-italics are based on EIC/AGS/CL:AIRE numbers & input parameters*** and underlined numbers are C4SLs
3. Soil organic matter (SOM) is assumed to be 2.5% - DEFAULT VALUE
4. Soil type is assumed to be sandy loam - DEFAULT SOIL TYPE
5. For residential, the building type is conservatively assumed to be a small terrace house where the development includes bungalows change to more conservative bungalow setting in computer model
6. For commercial, the building type is conservatively assumed to be a pre 1970s office building, where the proposed development comprises houses, flat with living spaces changes setting in model accordingly
7. For classrooms consider increasing the dust loading fator in the 'Soil and Building Data' of the CLEA 1.04 model from 50 to 100µg m^{-3}
8. Based on vapour saturation limt as suggested by EA / [ ] model value
9. Lowest of o-, m- and p-xylene
10. Based on comparison of inhalation exposure with inhalation TDI
11. Based on comparison of oral, dermal, and inhalation exposure with the oral TDI
12. Based on a comparison of oral and dermal soil exposure with oral Index Dose only
13. Averaged over and based on lifetime exposure
14. Based on critical concentration for skin irritation in humans arising from contact with phenol in aqueous solution (number in brackets based on health effects following long term exposure for illustration)
15. NA: Not applicable

Adopted Soil Generic Assessment Criteria
Sandy loam with 1% SOM

Contaminants	Residential with home grown produce	Residential without home grown produce	Allotments	Commercial	Public open space near residential housing POS_{resi}	Public park POS_{park}
Metals						
Beryllium	*1.7*	*1.7*	*35*	*12*	*2.2*	*63*
Boron	*290*	*11,000*	*45*	*240,000*	*21,000*	*46,000*
Cadmium	**10**[13] 22	**85**[13] 150	**1.8** 3.9	**230** 410	*120* 220	*560* 880
Chromium III	*910*	*910*	*18,000*	*8,600*	*1,500*	*33,000*
Chromium VI	*6* 21	*6* 21	*1.8* 170	*33* 49	*7.7* 21	*220* 250
Lead	200	310	80	2,300	630	1,300
Mercury *(elemental)*	**1**	**1**	**26**	**26**	*16*	**26**[8] *[30]*
Mercury (inorganic)	**170**	**240**	**80**	**3600**	*120*	*240*
Nickel	*130*[10]	*180*[10]	*53*[11]	*980*[10]	*230*	*800*
Vanadium	*410*	*1200*	*91*	*9000*	*2000*	*5000*
Copper	*2400*	*7100*	*520*	*68000*	*12000*	*44000*
Zinc	*3700*	*40000*	*620*	*730000*	*81000*	*170000*
Semi-Metals and non-metals						
Arsenic	**32**[12] 37	**35**[12] 40	**43**[12] 49	**640**[12] 640	*79* 79	*170* 170
Antimony		***550***		***7500***	***1500***	***3300***
Selenium	**350**	**600**	**120**	**13000**	*1100*	*1800*
Inorganic chemicals						
Cyanide	34	34	34	34	34	34
Organic contaminants						
Aliphatic risk banded hydrocarbons - TPHCWG method						
$EC_{>5}$ - EC_6	*42*	*42*	*730*	*3200*	*570000*	*95000*
$EC_{>6}$ - EC_8	*100*	*100*	*2300*	*7800*	*600000*	*150000*
$EC_{>8}$ - EC_{10}	*27*	*27*	*320*	*2000*	*13000*	*14000*
EC_{10}-EC_{12}	*130*	*130*	*2200*	*9700*	*13000*	*21000*
EC_{12}-EC_{16}	*1100*	*1100*	*11000*	*59000*	*13000*	*25000*
$EC_{>16}$ - EC_{35}	*65000*	*65000*	*260000*	*1600000*	*250000*	*450000*
$EC_{>35}$ - EC_{44}	*65000*	*65000*	*260000*	*1600000*	*250000*	*450000*
Aromatic risk banded hydrocarbons - TPHCWG method						
$EC_{>5}$ - EC_7	*70*	*370*	*13*	*26000*	*56000*	*76000*
$EC_{>7}$ - EC_8	*130*	*860*	*22*	*56000*	*56000*	*87000*
$EC_{>8}$ - EC_{10}	*34*	*47*	*8.6*	*3500*	*5000*	*7200*
EC_{10} - EC_{12}	*74*	*250*	*13*	*16000*	*5000*	*9200*
EC_{12} - EC_{16}	*140*	*1800*	*23*	*36000*	*5100*	*10000*
$EC_{>16}$ - EC_{21}	*260*	*1900*	*46*	*28000*	*3800*	*7600*
$EC_{>21}$ - EC_{35}	*1100*	*1900*	*370*	*28000*	*3800*	*7800*
$EC_{>35}$ - EC_{44}	*1100*	*1900*	*370*	*28000*	*3800*	*7800*
Aliph + Arom EC >44-70	*1600*	*1900*	*1200*	*28000*	3800	7800
Aromatic						
Benzene	**0.08**	**0.3**	**0.017**	**28**	*72*	*90*
Ethyl benzene	**65**	**170**	**16**	**520**[8] [17000]	**520**[8] *[24000]*	**520**[8] *[17000]*
Toluene	**120**	**610**	**22**	**860**[8] [59000]	**860**[8] *[56000]*	**860**[8] *[87000]*
Xylene[9]	**41**	**53**	**28**	**480**[8] [69000]	**480**[8] *[41000]*	**480**[8] *[17000]*
Phenol	**180**	**310**	**66**	**760**[14] (31000)	**760**[14] *(10000)*	**760**[14] *(7600)*
Polycyclic Aromatic Hydrocarbons (PAH)						
Naphthalene	*2.3*	*2.3*	*4.1*	*190*	*4900*	*1200*
Acenaphthylene	*170*	*2900*	*28*	*83000*	*15000*	*29000*
Acenaphthene	*210*	*3000*	*34*	*84000*	*15000*	*29000*
Fluorene	*170*	*2800*	*27*	*63000*	*9900*	*20000*
Phenanthrene	*95*	*1300*	*15*	*22000*	*3100*	*6200*
Anthracene	*2400*	*31000*	*380*	*520000*	*74000*	*150000*
Fluoranthene	*280*	*1500*	*52*	*23000*	*3100*	*6300*
Pyrene	*620*	*3700*	*110*	*54000*	*7400*	*15000*
Benz(a)anthracene	*7.2*	*11*	*2.9*	*170*	*29*	*49*
Chrysene	*15*	*30*	*4.1*	*350*	*57*	*93*
Benzo(b)fluoranthene	*2.6*	*3.9*	*0.99*	*44*	*7.1*	*13*
Benzo(k)fluoranthene	*77*	*110*	*37*	*1200*	*190*	*370*
Benzo(a)pyrene	*2.2*	*3.2*	*0.97*	*35*	*5.7*	*11*
Indeno(123cd)pyrene	*27*	*45*	*9.5*	*500*	*82*	*150*
Dibenzo(ah)anthracene	*0.24*	*0.31*	*0.14*	*3.5*	*0.57*	*1.1*
Benzo(ghi)perylene	*320*	*360*	*290*	*3900*	*640*	*1400*
Chlorinated Aliphatic Hydrocarbons						
Vinyl chloride	*0.00064*	*0.00077*	*0.00055*	*0.059*	*3.5*	*4.8*
Trichloroethene (TCE)	*0.016*	*0.017*	*0.041*	*1.2*	*120*	*70*
1,1,1,2 Tetrachlorethane	*1.2*	*1.5*	*0.79*	*110*	*1400*	*1500*
Tetrachlorethene (PCE)	*0.18*	*0.18*	*0.65*	*19*	*1400*	*810*
1,1,1 Trichlorethane	*8.8*	*9*	*48*	*660*	*140000*	*57000*

Notes

1. All values above are in mg/kg
2. **Numbers in bold are SGVs or GAC that are derived based on SGV report input parameters**, *numbers in italics are S4ULs*, ***numbers in bold-italics are based on EIC/AGS/CL:AIRE numbers & input parameters*** and underlined numbers are C4SLs
3. Soil organic matter (SOM) is assumed to be 1% - DEFAULT VALUE
4. Soil type is assumed to be sandy loam - DEFAULT SOIL TYPE
5. For residential, the building type is conservatively assumed to be a small terrace house where the development includes bungalows change to more conservative bungalow setting in computer model
6. For commercial, the building type is conservatively assumed to be a pre 1970s office building, where the proposed development comprises houses, flat with living spaces changes setting in model accordingly
7. For classrooms consider increasing the dust loading fator in the 'Soil and Building Data' of the CLEA 1.04 model from 50 to 100µg m^{-3}
8. Based on vapour saturation limt as suggested by EA / [ ] model value
9. Lowest of o-, m- and p-xylene
10. Based on comparison of inhalation exposure with inhalation TDI
11. Based on comparison of oral, dermal, and inhalation exposure with the oral TDI
12. Based on a comparison of oral and dermal soil exposure with oral Index Dose only
13. Averaged over and based on lifetime exposure
14. Based on critical concentration for skin irritation in humans arising from contact with phenol in aqueous solution (number in brackets based on health effects following long term exposure for illustration)
15. NA: Not applicable

Appendix E – Photographs of Garden Depths

Plot 1 Rear Garden

	**Photograph 1:** View of soil in capping layer excavation in rear garden of Plot 1.
	**Photograph 2:** Depth measurement in rear garden of Plot 1.
	**Photograph 3:** View of rear garden of Plot 1.

Plot 1 Front Garden

	**Photograph 1:** View of soil in capping layer excavation in front garden of Plot 1.
	**Photograph 2:** Depth measurement in front garden of Plot 1.
	**Photograph 3:** View of front garden of Plot 1.

Plot 2 Rear Garden

	**Photograph 1:** View of soil in capping layer excavation in rear garden of Plot 2.
	**Photograph 2:** Depth measurement in rear garden of Plot 2.
	**Photograph 3:** View of rear garden of Plot 2.

Plot 2 Front Garden

	**Photograph 1:** View of soil in capping layer excavation in front garden of Plot 2.
	**Photograph 2:** Depth measurement in front garden of Plot 2.
	**Photograph 3:** View of rear garden of Plot 2.

Plot 3 Rear Garden

	**Photograph 1:** View of soil in capping layer excavation in rear garden of Plot 3.
	**Photograph 2:** Depth measurement in rear garden of Plot 3.
	**Photograph 3:** View of rear garden of Plot 3.

Plot 3 Front Garden

	**Photograph 1:** View of soil in capping layer excavation in front garden of Plot 3.
	**Photograph 2:** Depth measurement in front garden of Plot 3.
	**Photograph 3:** View of front garden of Plot 3.

Plots 4 & 5 Shared Front Gardens

	**Photograph 1:** View of soil in capping layer excavation in shared front gardens of plots 4 & 5.
	**Photograph 2:** Depth measurement in shared front gardens of plot 4 & 5.
	**Photograph 3:** View of shared front gardens of Plot 4 & 5.

Plot 4 Rear Garden

	**Photograph 1:** View of soil in capping layer excavation in rear garden of plot 4.
	**Photograph 2:** Depth measurement in rear garden of plot 4.
	**Photograph 3:** View of rear garden of plot 4.

Plot 5 Rear Garden

	**Photograph 1:** View of soil in capping layer excavation in rear garden of plot 5.
	**Photograph 2:** Depth measurement in rear garden of Plot 5.
	**Photograph 3:** View of rear garden of Plot 5.

Plots 6 & 7 Shared Front Gardens

	**Photograph 1:** View of soil in capping layer excavation in shared front gardens of plots 6 & 7.
	**Photograph 2:** Depth measurement in shared front gardens of plots 6 & 7.
	**Photograph 3:** View of shared front gardens of plots 6 & 7.

Plot 6 Rear Garden

	**Photograph 1:** View of soil in capping layer excavation in rear garden of plot 6.
	**Photograph 2:** Depth measurement in rear garden of plot 6.
	**Photograph 3:** View of rear garden of plot 6.

Plot 7 Rear Garden

	**Photograph 1:** View of soil in capping layer excavation in rear garden of plot 7.
	**Photograph 2:** Depth measurement in rear garden of plot 7.
	**Photograph 3:** View of rear garden of plot 7.

Plots 8 & 9 Shared Front Gardens

	**Photograph 1:** View of soil in capping layer excavation in shared front gardens of plots 8 & 9.
	**Photograph 2:** Depth measurement in front gardens of plots 8 & 9.
	**Photograph 3:** View of front gardens of plots 8 & 9.

Plot 8 Rear Garden

	**Photograph 1:** View of soil in capping layer excavation in rear garden of plot 8.
	**Photograph 2:** Depth measurement in rear garden of plot 8.
	**Photograph 3:** View of rear garden of plot 8.

Plot 9 Rear Garden

	**Photograph 1:** View of soil in capping layer excavation in rear garden of plot 9.
	**Photograph 2:** Depth measurement in rear garden of plot 9.
	**Photograph 3:** View of rear garden of plot 9.

Plots 10 & 11 Shared Front Gardens

	**Photograph 1:** View of soil in capping layer excavation in shared front gardens of plots 10 & 11.
	**Photograph 2:** Depth measurement in shared front gardens of plots 10 & 11.
	**Photograph 3:** View of shared front gardens of plots 10 & 11.

Plot 11 Rear Garden

	**Photograph 1:** View of soil in capping layer excavation in rear garden of plot 11.
	**Photograph 2:** Depth measurement in rear garden of plot 11.
	**Photograph 3:** View of rear garden of plot 11.

Plots 12 & 13 Shared Front Gardens

	**Photograph 1:** View of soil in capping layer excavation in shared front gardens of plots 12 & 13. Service encountered at 500mm, hand dug pit terminated.
	**Photograph 2:** Depth measurement in shared front gardens of plots 12 & 13.
	**Photograph 3:** View of shared front gardens of plots 12 & 13.

Plot 12 Rear Garden

	**Photograph 1:** View of soil in capping layer excavation in rear garden of plot 12.
	**Photograph 2:** Depth measurement in rear garden of plot 12.
	**Photograph 3:** View of rear garden of plot 12.

Plot 13 Rear Garden

	**Photograph 1:** View of soil in capping layer excavation in rear garden of plot 13.
	**Photograph 2:** Depth measurement in rear garden of plot 13.
	**Photograph 3:** View of rear garden of plot 13.

Plots 14 & 15 Shared Front Gardens

	**Photograph 1:** View of soil in capping layer excavation in shared front gardens of plots 14 & 15.
	**Photograph 2:** Depth measurement in shared front gardens of plots 14 & 15.
	**Photograph 3:** View of shared front gardens of plots 14 & 15.

Plot 14 Rear Garden

	**Photograph 1:** View of soil in capping layer excavation in rear garden of plot 14.
	**Photograph 2:** Depth measurement in rear garden of plot 14.
	**Photograph 3:** View of rear garden of plot 14.

Plot 15 Rear Garden

	**Photograph 1:** View of soil in capping layer excavation in rear garden of plot 15.
	**Photograph 2:** Depth measurement in rear garden of plot 15.
	**Photograph 3:** View of rear garden of plot 15.

Plot 16 Front Garden

	**Photograph 1:** View of soil in capping layer excavation in front garden of plot 16.
	**Photograph 2:** Depth measurement in front garden of plot 16.
	**Photograph 3:** View of front garden of plot 16.

Plot 16 Rear Garden

	**Photograph 1:** View of soil in capping layer excavation in rear garden of plot 16.
	**Photograph 2:** Depth measurement in rear garden of plot 16.
	**Photograph 3:** View of rear garden of plot 16.

Plot 17 Front Garden

	**Photograph 1:** View of in front garden of plot 17, showing the services present within the garden, in which it was deemed unsafe to dig.
	**Photograph 2:** View of in front garden of plot 17, further showing the services present within the garden, in which it was deemed unsafe to dig.

Plot 17 Rear Garden

	**Photograph 1:** View of soil in capping layer excavation in rear garden of plot 17.
	**Photograph 2:** Depth measurement in rear garden of plot 17.
	**Photograph 3:** View of rear garden of plot 17.

Plot 18 Front Garden

	**Photograph 1:** View of soil in capping layer excavation in front garden of plot 18.
	**Photograph 2:** Depth measurement in front garden of plot 18.
	**Photograph 3:** View of front garden of plot 18.

Plot 18 Rear Garden

	**Photograph 1:** View of soil in capping layer excavation in rear garden of plot 18.
	**Photograph 2:** Depth measurement in rear garden of plot 18.
	**Photograph 3:** View of rear garden of plot 18.

Plot 19 Front Garden

	**Photograph 1:** View of soil in capping layer excavation in front garden of plot 19.
	**Photograph 2:** Depth measurement in front garden of plot 19.
	**Photograph 3:** View of front garden of plot 19.

Plot 19 Rear Garden

	**Photograph 1:** View of soil in capping layer excavation in rear garden of plot 19.
	**Photograph 2:** Depth measurement in rear garden of plot 19.
	**Photograph 3:** View of rear garden of plot 19.

Plot 20 Front Garden

	**Photograph 1:** View of soil in capping layer excavation in front garden of plot 20.
	**Photograph 2:** Depth measurement in front garden of plot 20.
	**Photograph 3:** View of front garden of plot 20.

Plot 20 Rear Garden

	**Photograph 1:** View of orange membrane and soil in capping layer excavation in rear garden of plot 20.
	**Photograph 2:** Depth measurement in rear garden of plot 20.
	**Photograph 3:** View of rear garden of plot 20.

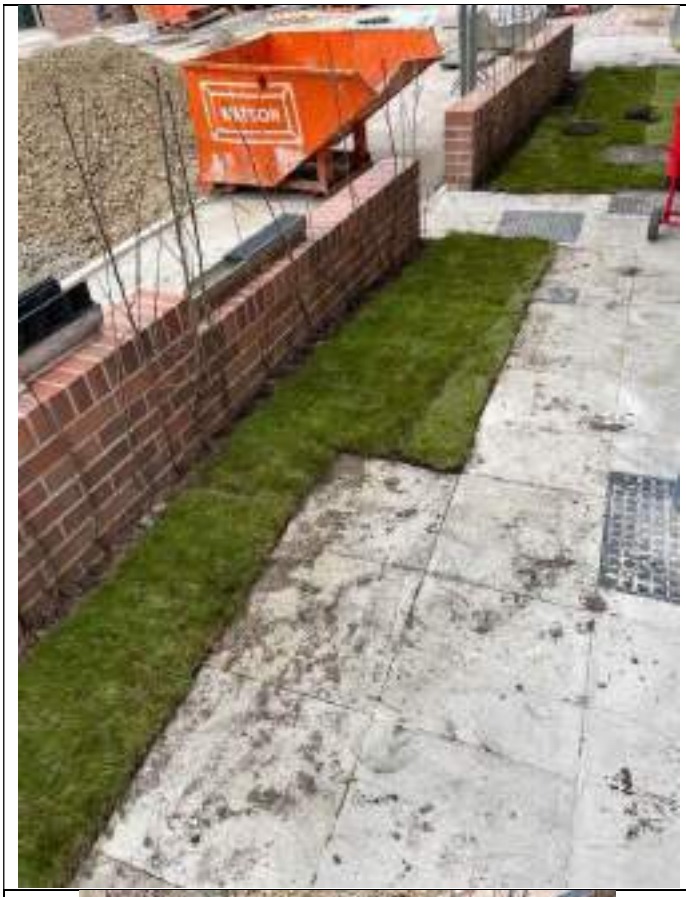
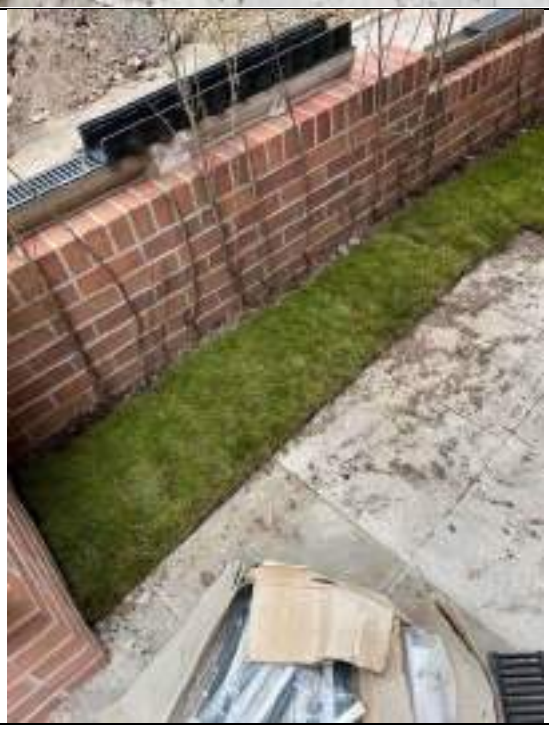
Plot 21 Front Garden

	**Photograph 1:** View of soil in capping layer excavation in front garden of plot 21.
	**Photograph 2:** Depth measurement in front garden of plot 21.
	**Photograph 3:** View of front garden of plot 21.

Plot 21 Rear Garden

	**Photograph 1:** View of orange membrane and the soil in the capping layer excavation in rear garden of plot 21.
	**Photograph 2:** Depth measurement in rear garden of plot 21.
	**Photograph 3:** View of rear garden of plot 21.

Plot 22 Front Garden

	**Photograph 1:** View showing size of front garden of plot 22.
	**Photograph 2:** View of front garden of plot 22.

Plot 22 Rear Garden

	**Photograph 1:** View of soil in capping layer excavation in rear garden of plot 22.
	**Photograph 2:** Depth measurement in rear garden of plot 22.
	**Photograph 3:** View of rear garden of plot 22.

Plot 23 Front Garden

	**Photograph 1:** View showing size of front garden of plot 23.

Plot 23 Rear Garden

	**Photograph 1:** View of soil in capping layer excavation in rear garden of plot 23.
	**Photograph 2:** Depth measurement in rear garden of plot 23.
	**Photograph 3:** View of rear garden of plot 23.

Plot 24 Front Garden

	**Photograph 1:** View of soil in capping layer excavation in front garden of plot 24.
	**Photograph 2:** Depth measurement in front garden of plot 24.
	**Photograph 3:** View of front garden of plot 24.

Plot 24 Rear Garden

	**Photograph 1:** View of soil in capping layer excavation in rear garden of plot 24.
	**Photograph 2:** Depth measurement in rear garden of plot 24.
	**Photograph 3:** View of rear garden of plot 24.

Plot 25 Front Garden

	**Photograph 1:** View of soil in capping layer excavation in front garden of plot 25.
	**Photograph 2:** Depth measurement in front garden of plot 25.
	**Photograph 3:** View of front garden of plot 25.

Plot 25 Rear Garden

	**Photograph 1:** View of soil in capping layer excavation in rear garden of plot 25.
	**Photograph 2:** Depth measurement in rear garden of plot 25.
	**Photograph 3:** View of rear garden of plot 25.

Plot 26 Front Garden

	**Photograph 1:** View of soil in capping layer excavation in front garden of plot 26.
	**Photograph 2:** Depth measurement in front garden of plot 26.
	**Photograph 3:** View of front garden of plot 26.

Plot 26 Rear Garden

	**Photograph 1:** View of soil in capping layer excavation in rear garden of plot 26.
	**Photograph 2:** Depth measurement in rear garden of plot 26.
	**Photograph 3:** View of rear garden of plot 26.

Plot 27 Front Garden

	**Photograph 1:** View of soil in capping layer excavation in front garden of plot 27.
	**Photograph 2:** Depth measurement in front garden of plot 27.
	**Photograph 3:** View of front garden of plot 27.

Plot 27 Rear Garden

	**Photograph 1:** View of soil in capping layer excavation in rear garden of plot 27.
	**Photograph 2:** Depth measurement in rear garden of plot 27.
	**Photograph 3:** View of rear garden of plot 27.

Plot 28 Front Garden

	**Photograph 1:** View of soil in capping layer excavation in front garden of plot 28.
	**Photograph 2:** Depth measurement in front garden of plot 28.
	**Photograph 3:** View of front garden of plot 28.

Plot 28 Rear Garden

	**Photograph 1:** View of soil in capping layer excavation in rear garden of plot 28.
	**Photograph 2:** Depth measurement in rear garden of plot 28.
	**Photograph 3:** View of rear garden of plot 28.

Plots 29 & 30 Shared Front Gardens

	**Photograph 1:** View of soil in capping layer excavation in shared front gardens of plots 29 & 30
	**Photograph 2:** Depth measurement in shared front gardens of plots 29 & 30.
	**Photograph 3:** View of shared front gardens of plots 29 & 30.

Plot 29 Rear Garden

	**Photograph 1:** View of soil in capping layer excavation in rear garden of plot 29.
	**Photograph 2:** Depth measurement in rear garden of plot 29.
	**Photograph 3:** View of rear garden of plot 29.

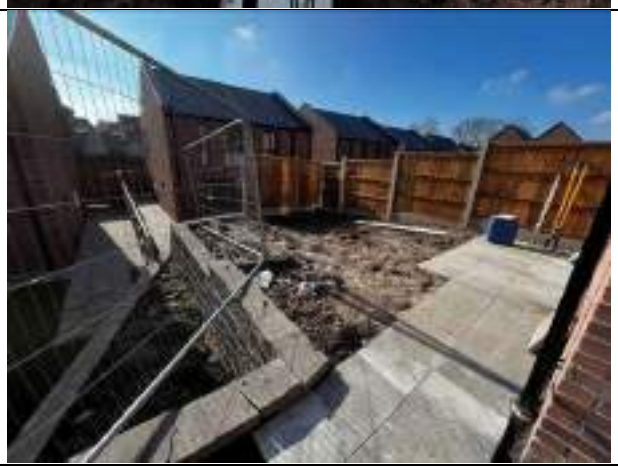
Plot 30 Rear Garden

	**Photograph 1:** View of soil in capping layer excavation in rear garden of plot 30.
	**Photograph 2:** Depth measurement in rear garden of plot 30.
	**Photograph 3:** View of rear garden of plot 30.

Plots 31 & 32 Shared Front Gardens

	**Photograph 1:** View of soil in capping layer excavation in front gardens of plots 31 & 32.
	**Photograph 2:** Depth measurement in front gardens of plots 31 & 32.
	**Photograph 3:** View of front gardens of plots 31 & 32.

Plot 31 Rear Garden

	**Photograph 1:** View of soil in capping layer excavation in rear garden of plot 31.
	**Photograph 2:** Depth measurement in rear garden of plot 31.
	**Photograph 3:** View of rear garden of plot 31.

Plot 32 Rear Garden

	**Photograph 1:** View of soil in capping layer excavation in rear garden of plot 32.
	**Photograph 2:** Depth measurement in rear garden of plot 32.
	**Photograph 3:** View of rear garden of plot 32.

Plots 33 & 34 Shared Front Gardens

	**Photograph 1:** View of soil in capping layer excavation in shared front gardens of plots 33 & 34.
	**Photograph 2:** Depth measurement in shared front gardens of plots 33 & 34.
	**Photograph 3:** View of shared front gardens of plots 33 & 34.

Plot 33 Rear Garden

	**Photograph 1:** View of soil in capping layer excavation in rear garden of plot 33.
	**Photograph 2:** Depth measurement in rear garden of plot 33.
	**Photograph 3:** View of rear garden of plot 33.

Plot 34 Rear Garden

	**Photograph 1:** View of soil in capping layer excavation in rear garden of plot 34.
	**Photograph 2:** Depth measurement in rear garden of plot 34.
	**Photograph 3:** View of rear garden of plot 34.

Plots 35 & 36 shared Front Gardens

	**Photograph 1:** View of soil in capping layer excavation in shared front gardens of plots 34 & 36.
	**Photograph 2:** Depth measurement in shared front gardens of plots 35 & 36.
	**Photograph 3:** View of shared front gardens of plots 35 & 36.

Plot 35 Rear Garden

	**Photograph 1:** View of soil in capping layer excavation in rear garden of plot 35.
	**Photograph 2:** Depth measurement in rear garden of plot 35.
	**Photograph 3:** View of front garden of plot 35.

Plot 36 Rear Garden

	**Photograph 1:** View of soil in capping layer excavation in rear garden of plot 36.
	**Photograph 2:** Depth measurement in rear garden of plot 36.
	**Photograph 3:** View of rear garden of plot 36.

Plot 37 Rear Garden

	**Photograph 1:** View of soil in capping layer excavation in rear garden of Plot 37.
	**Photograph 2:** Depth measurement in rear garden of Plot 37.
	**Photograph 3:** View of rear garden of Plot 37.

Plot 37 Front Garden

	**Photograph 1:** View of soil in capping layer excavation in front garden of Plot 37.
	**Photograph 2:** Depth measurement in front garden of Plot 37.
	**Photograph 3:** View of front garden of Plot 37.

Plot 38 Rear Garden

	**Photograph 1:** View of soil in capping layer excavation in rear garden of Plot 38.
	**Photograph 2:** Depth measurement in rear garden of Plot 38.
	**Photograph 3:** View of rear garden of Plot 38.

Plot 38 Front Garden

	**Photograph 1:** View of soil in capping layer excavation in front garden of Plot 38.
	**Photograph 2:** Depth measurement in front garden of Plot 38.
	**Photograph 3:** View of front garden of Plot 38.

Plot 39 Rear Garden

	**Photograph 1:** View of soil in capping layer excavation in rear garden of Plot 39.
	**Photograph 2:** Depth measurement in rear garden of Plot 39.
	**Photograph 3:** View of rear garden of Plot 39.

Plot 39 Front Garden

	**Photograph 1:** View of soil in capping layer excavation in front garden of Plot 39.
	**Photograph 2:** Depth measurement in front garden of Plot 39.
	**Photograph 3:** View of front garden of Plot 39.

Plot 40 Rear Garden

	**Photograph 1:** View of soil in capping layer excavation in rear garden of Plot 40.
	**Photograph 2:** Depth measurement in rear garden of Plot 40.
	**Photograph 3:** View of rear garden of Plot 40.

Plot 40 Front Garden

	**Photograph 1:** View of soil in capping layer excavation in front garden of Plot 40.
	**Photograph 2:** Depth measurement in front garden of Plot 40.
	**Photograph 3:** View of front garden of Plot 40.

Plot 41 Rear Garden

	**Photograph 1:** View of soil in capping layer excavation in rear garden of Plot 41.
	**Photograph 2:** Depth measurement in rear garden of Plot 41.
	**Photograph 3:** View of rear garden of Plot 41.

Plot 41 Front Garden

	**Photograph 1:** View of soil in capping layer excavation in front garden of Plot 41.
	**Photograph 2:** Depth measurement in front garden of Plot 41.
	**Photograph 3:** View of front garden of Plot 41.

Plot 42 Rear Garden

	**Photograph 1:** View of soil in capping layer excavation in rear garden of Plot 42
	**Photograph 2:** Depth measurement in rear garden of Plot 42.
	**Photograph 3:** View of rear garden of Plot 42.

Plot 42 Front Garden

	**Photograph 1:** View of soil in capping layer excavation in front garden of Plot 42
	**Photograph 2:** Depth measurement in front garden of Plot 42.
	**Photograph 3:** View of front garden of Plot 42.

Plot 43 Rear Garden

	**Photograph 1:** View of soil in capping layer excavation in rear garden of Plot 43. With orange geotextile membrane at base.
	**Photograph 2:** Depth measurement in rear garden of Plot 43.
	**Photograph 3:** View of rear garden of Plot 43.

Plot 43 Front Garden

	**Photograph 1:** View of soil in capping layer excavation in front garden of Plot 43. With orange geotextile membrane at base.
	**Photograph 2:** Depth measurement in front garden of Plot 43.
	**Photograph 3:** View of front garden of Plot 43.

Plot 44 Rear Garden

	**Photograph 1:** View of soil in capping layer excavation in rear garden of Plot 44. With Orange geotextile membrane at base.
	**Photograph 2:** Depth measurement in rear garden of Plot 44.
	**Photograph 3:** View of rear garden of Plot 44.

Plot 44 Front Garden

	**Photograph 1:** View of soil in capping layer excavation in front garden of Plot 44. With Orange geotextile membrane at base.
	**Photograph 2:** Depth measurement in front garden of Plot 44.
	**Photograph 3:** View of front garden of Plot 44.

Plot 45 Rear Garden

	**Photograph 1:** View of soil in capping layer excavation in rear garden of Plot 45.
	**Photograph 2:** Depth measurement in rear garden of Plot 45.
	**Photograph 3:** View of rear garden of Plot 45.

Plot 45 Front Garden

	**Photograph 1:** View of soil in capping layer excavation in front garden of Plot 45.
	**Photograph 2:** Depth measurement in front garden of Plot 45.
	**Photograph 3:** View of front garden of Plot 45.

Plot 46 Rear Garden

	**Photograph 1:** View of soil in capping layer excavation in rear garden of Plot 46.
	**Photograph 2:** Depth measurement in rear garden of Plot 46.
	**Photograph 3:** View of rear garden of Plot 46.

Plot 46 Front Garden

	**Photograph 1:** View of soil in capping layer excavation in front garden of Plot 46.
	**Photograph 2:** Depth measurement in front garden of Plot 46.
	**Photograph 3:** View of front garden of Plot 46.

Plot 47 Rear Garden

	**Photograph 1:** View of soil in capping layer excavation in rear garden of Plot 47.
	**Photograph 2:** Depth measurement in rear garden of Plot 47.
	**Photograph 3:** View of rear garden of Plot 47.

Plot 47 Front Garden

	**Photograph 1:** View of soil in capping layer excavation in front garden of Plot 47.
	**Photograph 2:** Depth measurement in front garden of Plot 47.
	**Photograph 3:** View of front garden of Plot 47.

Plot 48 Rear Garden

	**Photograph 1:** View of soil in capping layer excavation in rear garden of Plot 48.
	**Photograph 2:** Depth measurement in rear garden of Plot 48.
	**Photograph 3:** View of rear garden of Plot 48.

Plot 48 Front Garden

	**Photograph 1:** View of soil in capping layer excavation in front garden of Plot 48.
	**Photograph 2:** Depth measurement in front garden of Plot 48.
	**Photograph 3:** View of front garden of Plot 48.

Plot 49 Rear Garden

	**Photograph 1:** View of soil in capping layer excavation in rear garden of Plot 49.
	**Photograph 2:** Depth measurement in rear garden of Plot 49.
	**Photograph 3:** View of rear garden of Plot 49.

Plot 49 Front Garden

	**Photograph 1:** View of soil in capping layer excavation in front garden of Plot 49. Water observed in hand excavated trial pit.
	**Photograph 2:** Depth measurement in front garden of Plot 49.
	**Photograph 3:** View of front garden of Plot 49.

Plot 50 Rear Garden

	**Photograph 1:** View of soil in capping layer excavation in rear garden of Plot 50.
	**Photograph 2:** Depth measurement in rear garden of Plot 50.
	**Photograph 3:** View of rear garden of Plot 50.

Plot 50 Front Garden

	**Photograph 1:** View of soil in capping layer excavation in front garden of Plot 50.
	**Photograph 2:** Depth measurement in front garden of Plot 50.
	**Photograph 3:** View of front garden of Plot 50.

Apartment SA1

	**Photograph 1:** View of soil in capping layer excavation in Apartment SA1.
	**Photograph 2:** Depth measurement in Apartment SA1.
	**Photograph 3:** View of landscaping at Apartment SA1.

Apartment SA2

	**Photograph 1:** View of soil in capping layer excavation in Apartment SA2.
	**Photograph 2:** Depth measurement in Apartment SA2.
	**Photograph 3:** View of landscaping at Apartment SA2.

Apartment SA3

	**Photograph 1:** View of soil in capping layer excavation in Apartment SA3.
	**Photograph 2:** Depth measurement in Apartment SA3.
	**Photograph 3:** View of landscaping at Apartment SA3.

Communal Area CA1

	**Photograph 1:** View of soil in capping layer excavation in Communal Area CA1.
	**Photograph 2:** Depth measurement in Communal Area CA1.
	**Photograph 3:** View of landscaping at Communal Area CA1.

Communal Area CA2

	**Photograph 1:** View of soil in capping layer excavation in Communal Area CA1.
	**Photograph 2:** Depth measurement in Communal Area CA1.

Appendix F – Geotextile Membrane Specification



GEOTEC SIGNAL

WE'VE GOT YOU COVERED

Geotec Signal provides a cost effective warning barrier to alert of contaminated land or buried services.

This bright orange woven textile combines excellent separation performance with a highly visible appearance to make it an ideal indicator layer.



USES

- ✓ Separation layer
- ✓ Reinforcement
- ✓ Filtration
- ✓ Protection
- ✓ Drainage
- ✓ Indicator layer



PROPERTIES		
Tensile strength (kN/m)	EN 10319	16/13
Elongation at break MD (%)	EN 10319	10
Elongation at break XD (%)	EN 10319	10
CBR puncture (N)	EN ISO 12236	1800
Waterflow (l/m/s)	EN ISO 11058	13
Material		Polypropylene
Style		Orange woven polypropylene
Weight per roll (Nominal)		43kg (nominal)
Roll size		4.5 x 100m
Weight		25kg

Speak to our **SIG Construction Accessories Specialist Team TODAY** to find out more..

0330 123 0100

SIG DISTRIBUTION

Appendix E - References

[1] DCL (2019). “National Planning Policy Framework.” Department of Communities and Local Government.

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