Environmental
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PHASE 2

GEO-ENVIRONMENTAL REPORT

job number	C5257/25/E/8069
date	28/07/2025
site address	Land off Olney Street, Slaithwaite, Huddersfield, West Yorkshire, HD7 5EG
written by	S. Hale
checked by	T. Merry
issued by	T. Merry

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Report on a Phase 2 Geo-environmental Investigation

Location:	Land off Olney Street Olney Street, Slaithwaite, Huddersfield, West Yorkshire, HD7 5EG
For:	Paul Coletta
Report No.	C5257/25/E/8069 Report date: July 2025

For and on behalf of **Rogers Geotechnical Services Ltd**

Steven Hale BSc FGS Geo-environmental Technician	**Tobias Merry** MSci (Hons), FGS Geo-environmental Engineer

Report Summary[1]

Item	Comments	Section
Development	Construction of 2no. new residential properties with associated parking and soft landscaping.	1.
Geology	Superficial geology – None indicated. Solid geology – Marsden Formation.	5.
Strata Conditions	Nominal topsoil over lying gravel and clay anticipated to represent the most weathered fraction of the Marsden Formation.	6.
Groundwater	None encountered during investigation.	6.2
Foundation Design	Shallow foundation solution.	10.1
Effect of Sulphates	DC-1 concrete.	10.5
Contamination	Hotspot of lead contamination.	11.

[1] This summary should not be relied upon to provide a comprehensive review. All of the information contained in this document should be considered.

1. Introduction

It is understood that the land off Olney Street is to be developed by the construction of 2no. new residential properties with associated car parking and soft landscaping. Consequently, a site investigation has been undertaken in accordance with the instruction from the client. This work was required in order to determine the nature of the underlying soils, to assess their engineering properties and to assist in the design of safe and economical foundations for the proposed development. This investigation also takes into consideration the risk of any contamination present. This report describes the work undertaken, presents the data obtained and discusses the ground conditions in relation to the proposed works.

2. Limitations

The recommendations made and opinions expressed in this report are based on the ground conditions revealed by the site works, together with an assessment of the site and of the laboratory test results. Whilst opinions may be expressed relating to sub-soil conditions in parts of the site not investigated, for example between borehole positions, these are for guidance only and no liability can be accepted for their accuracy.

This report has been prepared in accordance with our understanding of current best practice. However, new information or legislation, or changes to best practice may necessitate revision of the report after the date of issue.

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The fieldworks were undertaken on the 17th June 2025 and included the following:

- Four windowless sample boreholes with standard penetration tests.
- Four dynamic probes.
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The investigatory locations are shown on the site plan which is presented in Appendix 1 to this report.

4.1 Windowless Sample Boreholes

These boreholes were sunk using a drive-in windowless sampler. The cores were undertaken in 1m lengths and reduced in diameter from 87mm for the first 1m through to 67mm for subsequent 1m increments. The recovered cores were sealed and returned to the laboratory for logging and subsequent testing. The soils were described in general accordance with BS5930: 2015 +A1: 2020 and full descriptions are given on the windowless sample records which are presented in Appendix 2. Also included on these records are the core diameters and percentages of core recovered.

4.2 Standard Penetration Tests

Standard penetration tests (SPT) were undertaken at regular depth increments within the windowless sample boreholes. The SPT was conducted in accordance with the procedures given in BS EN ISO 22476: Part 3: 2005 +A1: 2011, and the results are summarised on the borehole record. During this work an automatic trip hammer of 63.5kg falling through 750mm was employed to drive either a cone or split barrel sampler assembly into the ground and the recovered barrel samples were retained in air tight plastic containers.

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Dynamic penetration tests were undertaken adjacent to the windowless sample boreholes in accordance with the procedure given in BS EN ISO 22476: Part 2: 2005 +A1: 2011, using the super heavy penetrometer (DPSH). This probe consists of a 63.5kg mass falling through 750mm onto an anvil, which drives a 50mm diameter cone into the ground. The number of blows required to drive the cone through successive 100mm increments are recorded as the N_{100} values. The results of the dynamic penetration tests are tabulated and presented as bar charts of N_{100} values versus depth in Appendix 3.

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Gas monitoring standpipes were installed between 1.4m and 2.4m depth in three of the boreholes and the installation details are shown on the appropriate borehole records. In all cases, the monitoring standpipe consisted of a perforated pipe from the base of the borehole to 1.0m below surface, with a non-perforated pipe to ground level. The response zone was filled with pea gravel, with a bentonite seal at the base and above, and the installation was capped with a stop box cover in a concrete surround.

5. Geology

The available published geological data for the site has been examined and the following table presents the anticipated geology.

Table 1: Geological Data for the Site

Strata Type	Strata Name[2]	Previous Name[3]	Description[3]
Superficial Geology	-	-	None indicated to underlie the site.
Solid Geology	Marsden Formation	Middle Grit	Fine- to very coarse-grained and pebbly feldspathic sandstone, interbedded with grey siltstone and mudstone, and subordinate marine black shales, thin coals and seatearths.

6. Strata Conditions

In accordance with the geology of the area, the succession has been shown to include the following:

Table 2: Generalised Strata Profile

Depth m below ground level to underside of layer	**Strata Type**	**Positions Encountered**	**Groundwater Strikes** m below ground level
0.25	TOPSOIL (Dark brown, organic, clayey SAND)	BH02	None
+1.00 – 1.40	Orangish brown, very sandy GRAVEL. [WEATHERED MARSDEN FORMATION]	All	None
+2.00 – +2.45	Dark brownish grey, very gravelly CLAY. [WEATHERED MARSDEN FORMATION]	BH02, BH03 & BH04	None

'+' denotes that the strata extended below the termination depth of the investigated positions, thus the extent of the deposit is only proven to the depths indicated

6.1 General Strata

In general, the borehole records indicate that natural ground is present at the surface of the site with the exception of BH02. Within BH02, dark brown, organic clayey sand was encountered to a depth of 0.25m below ground level (begl). Beneath the topsoil and within all other boreholes, orangish brown, very sandy gravel was found overlying dark brownish grey, very gravelly clay.

Both the gravel and the clay are anticipated to represent the most weathered fraction of the underlying Marsden Formation. In particular, it is anticipated the gravel represents a sandstone member while the clay represents a mudstone member from the Marsden Formation.

[2] Sources: British Geological Survey (NERC) Map Sheet 77; Huddersfield; Solid and Drift Edition, and Geology of Britain Viewer [*online resource from www.bgs.ac.uk*]
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6.2 Groundwater

No groundwater strikes were observed during the site investigation. However, it should be appreciated that the normal rate of boring does not permit the recording of an equilibrium water level for any one strike, moreover, groundwater levels are subject to seasonal variation or changes on local drainage conditions.

7. Insitu Testing

7.1 Standard Penetration Tests

The standard penetration tests carried out are summarised in the following table:

Table 3: Summary of Standard Penetration Tests

Strata	Depth Range (m)	SPT 'N' (Blows/300mm)		Comments
		Granular soils	Cohesive soils	
Very sandy GRAVEL	1.0m to 1.45m	15 – 24	-	SPT's indicate a medium dense in-situ condition
Very gravelly CLAY	2.0m to 2.45m	-	50 - 59	SPT's indicate material is present in a very stiff in-situ condition

7.2 Dynamic Penetration Tests

Dynamic penetration tests were undertaken adjacent to the windowless sample borehole positions. A summary of the results is presented below:

Table 4: Summary of Dynamic Penetration Tests

Position	Blows/100mm			Refusal type (Effective/ Abrupt)[4]	Comments
	0 - 2	3 - 10	10+		
	Depth to which blow count range was observed (m)				
DP01	0.2	0.4 2.1	1.8 2.59	Abrupt	Initial low results rapidly increasing to moderate and then high. Locally moderate results between 1.8m and 2.1m with abrupt refusal indicated at 2.59m.
DP02	0.3	0.6 1.8	1.1 2.38	Abrupt	Initial low results rapidly increasing to moderate and then high. Locally moderate results between 1.1m and 1.7m with abrupt refusal indicated at 2.38m.
DP03		0.2 2.4	1.4 2.96	Abrupt	Initial moderate results increasing rapidly to high. Locally moderate results between 1.4m and 2.4m with abrupt refusal following at 2.96m.

[4] Abrupt refusal: obstruction or bedrock encountered. Effective refusal: +25 blows/100mm.

DP04		1.9	2.68	Abrupt	Initial moderate results increasing to high at 1.9m. Abrupt refusal following at 2.68m.

7.3 Gas and Water Level Monitoring

The standpipes were monitored between the 27th September and the 18th October 2016. The results of the gas monitoring undertaken to date are tabulated below and full results are presented in Appendix 4.

Table 5: Gas Monitoring

Location	Date	CH_4 (%)	CO_2 (%)	O_2 (%)	Flow (l/h)	Barometric Pressure (mb)	Water Level (m)	Standpipe Depth (m)
BH01	25.06.2025	0.0	0.9	20.0	0.0	1010 ↑	-	1.40
	03.07.2025	0.0	1.2	20.2	0.0	1026 ↑	-	
	09.07.2025	0.0	1.4	19.8	0.0	1021 ↑	-	
	16.07.2025	0.0	1.2	19.8	0.0	1015 ↑	-	
BH02	25.06.2025	0.0	1.9	19.4	0.0	1010 ↑	-	2.00
	03.07.2025	0.0	0.9	20.0	0.0	1026 ↑	-	
	09.07.2025	0.0	1.2	19.9	0.0	1021 ↑	-	
	16.07.2025	0.0	1.4	19.8	0.0	1015 ↑	-	
BH04	25.06.2025	0.0	0.7	20.2	0.0	1010 ↑	-	2.40
	03.07.2025	0.0	0.5	20.6	0.0	1026 ↑	-	
	09.07.2025	0.0	0.9	20.1	0.0	1021 ↑	-	
	16.07.2025	0.0	0.7	20.2	0.0	1015 ↑	-	

↑ - rising pressure ↓ - falling pressure ↔ -steady pressure

This work was undertaken using a GFM Series (serial No 13747/270525) which was last calibrated on the 27th May 2025

8. Laboratory Testing – Environmental

A suite of testing was conducted on samples from across the site and the following regime was undertaken.

- Metals – Cd, Cr^{VI}, Cu, Hg, Ni, Pb, V and Zn.
- Semi and Non-Metals - As, Se, Free CN^- and Phenols.
- Polycyclic aromatic hydrocarbons (PAHs).
- Petroleum hydrocarbons (TPHs).
- Others – pH, organic content and total/soluble SO_4^{2-}.
- Asbestos.

This testing was undertaken by i2 Analytical Ltd and the results of all of the chemical testing are presented in Appendix 5 of this report.

10. Discussion of Ground Conditions - Geotechnical

It is understood that the site is to be developed by the construction of 2no. new residential properties with associated car parking and soft landscaping. At the time of writing this report the precise layout and method of construction is not known, thus the discussion below is of a generalised nature.

As competent ground has been encountered at surface, it can be recommended that shallow strip or spread foundations be considered for this development. Foundations should not be constructed within any material resembling the topsoil encountered within BH02 as it is present in a weak and variable condition, such that excessive total and or differential settlement could occur under moderately light surface loading.

In light of the above, it is considered that strip or spread footings placed at least 1.20m within soil described as either medium-dense or very stiff will form suitable foundations for the proposed development. Indeed, the ground conditions encountered appear to represent the most weathered fraction of the underlying Marsden Formation, of which could possess a significant bearing capacity upon solid bedrock, potentially in excess of 250kN/m^2. Any settlements should remain within tolerable limits for the type of structure proposed provided that the underlying soils are carefully inspected immediately final trimming has taken place.

10.1 General Comments for Excavations

The stability of excavation faces cannot be guaranteed thus temporary support to the excavation faces may become necessary unless the foundations are constructed using trench-fill techniques. In this method the foundation trenches should be excavated, inspected and backfilled with concrete as a continuous operation. Under no circumstances should operatives be allowed to enter unsupported excavations.

Should the excavations be required to stand open, it is considered that a blinding layer of lean-mixed concrete be placed over the sub-grade. This expedient will reduce loosening or softening of the underling soil due to both physical disturbance and the ingress of surface water.

Should seepage of groundwater be encountered it is considered that it could be dealt with using a simple form of de-watering. Such a system could include the excavation of sumps from which the water could be pumped.

10.2 Ground-floors

On the basis of the relatively competent soils at shallow depth, it is considered that a ground bearing ground floor slab could be utilised at this site. In this instance it would be necessary to compact the sub-grade using a vibrating roller to ensure the near surface soils are adequately compacted. However, due to the volume change potential at the site, should the floor be placed within the zone of influence of any existing, or proposed, trees and shrubs, it would be necessary to provide a suitable void or utilise proprietary materials beneath the slab. Further guidance is available in the NHBC standards, although clearly if it were necessary to employ such provisions beneath the floor, it would probably have to be suspended.

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9.3 Hard-standing Areas

It is considered that any hard-standing at the site could be constructed employing traditional pavement design. A design California Bearing Ratio (CBR) of 3% could be employed in the pavement design[5]. However, it is recommended that proof rolling of the sub-grade be undertaken to establish the suitability of the soils, to expose any soft or weak ground and to ensure the sub-grade is well compacted prior to construction. Any areas of soft or weak ground should be remediated by increasing the sub-base thickness. Alternatively, weak material could be locally removed and replaced with a compacted granular capping layer. If construction were to be undertaken during the winter or after periods of prolonged rainfall, it may be prudent to employ a geotextile and/or a geogrid between the sub-base and sub-grade.

9.4 Effect of Sulphates

In view of the nature of the underlying soils it is considered that the design sulphate class be assessed with reference to Table C2[6], which is provided in BRE Special Digest 1, *Concrete in aggressive ground*: Part C. On the basis of this table and considering the soluble sulphate contents recorded, it can be shown that well compacted buried concrete should be designed in accordance with Class DS-2 requirements. Assuming static groundwater, the table also indicates that the aggressive chemical environment for concrete (ACEC) classification is AC-1s.

In order to evaluate the design chemical (DC) class for the buried concrete at this site reference should be made to Table D1[7], which can be found in Part D, *Specifying concrete for general cast-in-situ use,* of BRE Special Digest 1. From this table it may be shown that for an intended working life of at least 50 years the concrete design class DC-1 is required.

10. Discussion of Ground Conditions - Environmental

10.1 Discussion of Test Results

It is understood that the site is to be developed by the construction of 2no. new residential properties with associated car parking and soft landscaping. Consequently, the site may be classified as residential with plant uptake.

10.1.1 Soil Samples

The results of the chemical testing undertaken on soil samples obtained during this investigation have been compared to the ATRISK soil screening values (SSVs) as compiled by WS Atkins plc. With respect to the results it should be appreciated that the soil organic matter (SOM) content for the samples tested was found to range between 0.3% and 4.5%. On this basis, it is considered that the screening values associated with 6% SOM should be adopted. These values have been derived in such a way as to adhere to the principles within the revised CLEA model and include the most current release of the SGVs. A list of subscribers is provided within the website[8] and these include many local authorities.

[5] Table 11.1, *Reproduction of TRRL Report LR1132 (1984)*, Smith (2006), Smith's Elements of Soil Mechanics, 8th ed.
[6] Table C2, *Aggressive Chemical Environment for Concrete (ACEC) classification for brownfield locations*
[7] Table D1, *Selection of the DC Class and the number of APMs for concrete elements where the hydraulic gradient due to groundwater is 5 or less: for general in-situ use of concrete.*
[8] http://www.atrisksoil.co.uk/pages/general/subscribers.asp

A comparison of the results of the testing, together with the data given above, can be found within Appendix 5. These results indicate the following:

Table 6: Summary of Contaminated Areas

Location	Depth (m)	Contaminants found to be exceeding SSVs (Residential with plant uptake)
BH02	0.05	Lead, PAHs: Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Indeno(1,2,3-c,d)Pyrene, Dibenz(a,h)Anthracene & Benzo(g,h,i)perylene.
BH03	0.20	None.
BH04	0.40	None.

Concentrations of chromium^{VI}, mercury, free cyanide, phenols (total) and total petroleum hydrocarbons (aliphatic C5 to C21; aromatic C5 to C16) were below the detection limits for the tests. Detectable levels of all other contaminants were recorded, but these fell below the associated Atrisk Soil Screening Values. In addition, no asbestos was detected within the soil samples tested.

It should be appreciated that the soil screening values for PAHs and TPHs (where appropriate) represents vapour saturation limits. The inhalation of vapour pathway contributes less than 10% of total exposure, which is unlikely to significantly affect the combined assessment criterion[9]. In view of this, the ATRISK soil SSVs notes that the users may wish to consider using a combined assessment criterion if free product is not observed, the values for which are also provided on the summary of contamination analysis. It is therefore considered that the criteria for no free product should be adopted for the PAHs and TPHs at this site. The results of the contaminants found to exceed these screening values are tabulated below:

Table 7: Summary of Areas Contaminated by PAHs & TPHs

Location	Depth (m)	Contaminants found to be exceeding SSVs (Residential with Plant Uptake)
BH02	0.05	None.
BH03	0.20	None.
BH04	0.40	None.

On the basis of the above information, the results of the investigation have concluded that the topsoil encountered on the site is contaminated. Indeed, lead contamination has been observed to exceed the appropriate screening values by 20mg/kg (10% above appropriate SSV) within the position of BH02. As this contamination appears to be accompanied by with slightly elevated levels of arsenic and PAH's, it is reasoned that this contamination could be associated with coal ash fragments within the topsoil.

[9] Ref: ATRISK soil, SSVs derived using CLEA v1.071 for 1% SOM, Residential with home grown produce land use, 23.06.17.

10.1.2 Gas Concentrations

With respect to ground gas, the results of the monitoring visits indicated a maximum concentration of 0.5% methane, with concentrations of carbon dioxide ranging between 0.5% and 1.9%, in association with oxygen levels of between 19.4% and 20.6%. It should be appreciated that on non-contaminated sites there is generally about 20% by volume of oxygen, associated with low levels of carbon dioxide. In addition, a maximum flow rate of 0.0 litres per hour was recorded, as such, a flow rate of 0.1 litres per hour will be assumed in the following calculations.

The principal driving force for initiating the movement of gas in the ground is a change in barometric pressure. The most onerous gas condition on a site is usually observed on days of low or falling barometric pressure, preferably below 1000mb. It has been noted that measurements undertaken solely during high pressure conditions may be of lesser value. At this site the readings undertaken to date were at atmospheric pressures of between 1010mb and 1026mb.

In order to establish the gas screening value (GSV) for carbon dioxide or methane, the maximum gas concentration (expressed as a decimal) is multiplied by the borehole flow rate (l/hr). In this case 0.5% (0.005) methane was recorded along with 1.9% (0.019) carbon dioxide, in association with a maximum flow rate of 0.1 l/hr. This results in a GSV of 0.0005 l/hr for methane and a GSV of 0.0019 l/hr for carbon dioxide.

In accordance with Table 2 of BS8485: 2015*, Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings,* the site may be characterised as *Characteristic Situation Level 1*. It is therefore considered that there is a very low risk of harm to end users and site operatives and no special precautionary measures are required in accordance to Table 8.6, *Typical scope of gas protection measures,* of CIRIA report C665.

With regard to the number of monitoring visits required reference is made to Tables 5.5a and 5.5b of CIRIA report C665 (2007)[10]. Accepting that the proposed development is of high sensitivity and that the generation potential is very low, these tables suggest that 6 readings could be undertaken over a period of 2 months. However, C665 notes that *not all sites will require gas monitoring for the period and frequency indicated in Tables 5.5a and 5.5b.*

In this case, a total of 4 monitoring visits were undertaken over a four-week time period and for the purpose of this assessment, it is considered that the site can be classified as Characteristic Situation Level 1.

In this context, it should be noted that the gas screening value threshold for Characteristic Situation Level 1 is <0.07 l/hr. Assuming the flow rate remains constant at 0.1 l/hr the gas concentration of carbon dioxide would need to increase to 37% to move into the next risk band which is a nineteen-and-a-half-fold increase. Moreover, by keeping the concentration constant, the flow rate would need to increase to 3.7 l/hr to move into the next risk band, which is a thirty-seven-fold increase. We consider that these increases are not feasible as the fill is not deleterious, thus the site is not a generating source.

In view of the above, it is considered that with respect to gas monitoring, the site is fully characterised.

[10] Adapted from tables 5.5a and 5.5b of CIRIA C665, 2007, *Assessing risks posed by hazardous ground gas to buildings, p60.*

10.2 Site Specific Risk Assessment

10.2.1 Approach

The presence of contamination hazards and the risks associated with them should be assessed in accordance with industry practice and the 'suitable for use' approach. This has been conducted with reference to The Department for Environment, Food and Rural Affairs (DEFRA) and The Environment Agency[11] advice on the assessment of risks arising from the presence of contamination in soils and using the source-pathway-receptor approach.[12] This method dictates that there must be a risk of contaminant produced at a 'source' in sufficient concentration to cause harm and there must be a 'pathway' for the contaminant to reach an identifiable 'receptor' for the linkage to be proved and a contamination hazard to be considered present. Not all substances are contaminants and not all contaminants are considered to be a risk. Indeed, DEFRA and The Environment Agency state that 'a contaminant is a substance which has the potential to cause harm, while a risk itself is considered to exist if such a substance is present in sufficient concentration to cause harm and a pathway exists for a receptor to be exposed to the substance.'[13]

10.2.2 Conceptual Ground Model and Risk Assessment

In view of the results of the chemical testing undertaken the conceptual site model is presented accordingly as Table 8. Sources of contamination include the following:

On-site – Topsoil (Lead).

The preliminary risk assessment has been evaluated with reference to the following ratings and definitions:

N/A -	A source-pathway-receptor linkage is not considered to exist and therefore a risk assessment is not required.
Low -	A pollution linkage is unlikely and/or the likelihood of harm occurring is low and of minor consequence.
Moderate -	The linkage exists but the likelihood of harm occurring is not considered to be significant although remedial action may be necessary
High -	The linkage exists and the available data indicates that significant harm may be caused and remedial action could be necessary.

The results of the risk assessment are presented in Table 8.

[11] R&D Publication CLR 8, 'Assessment of Risks to Human Health from Land Contamination: An overview of the Development of Soil Guideline Values and Related Research'.
[12] The pollution linkage approach was developed by 'Circular 2/2000 Contaminated Land: Implementation of Part II of The Environmental Protection Act 1990' which provides meanings for the terms contained in The Environmental Protection Act 1990 Part IIA, the primary legislation for addressing the issues of contaminated land.
[13] See 'Circular 2/2000 Contaminated Land: Implementation of Part II of The Environmental Protection Act 1990', appendix A.

Table 8: Conceptual Site Model and Site-Specific Risk Assessment [Contamination: Lead]				
Conceptual Site Model			**Site Specific Risk Assessment**	
Pathways	**Receptor**	**Linkage Present?**	**Risk Rating**	**Notes**
Direct contact/dermal absorption/soil ingestion	Operative	Yes – contamination found to be present at the site and contact with soil likely during works.	High	Some contamination is present in the soils underlying the site. Precautionary measures will be required during the construction phase. Remediation will be required to either remove the contamination or break pathways. However, as the site is anticipated to be secured during the development phase, contamination is not anticipated to affect neighbours.
	End User	Yes – contamination found to be present at the site and site to be developed into residential properties with landscaped areas.	High	
	Neighbours	Yes – contamination found to be present at the site and a populated residential and commercial area surrounds the site.	Low	
Inhalation of Dust/Vapours	Operative	Yes – dust may be derived from contaminated soils.	High	Some contamination is present underlying the site. Precautionary measures will be required during the construction phase. Remediation will be required to either remove the contamination or break pathways.
	End User	Yes – dust may be derived from contaminated soils.	High	
	Neighbours	Yes – contamination found to be present at the site and residential properties present within close proximity to the site.	High	
Ingestion of fruit/vegetables and/or waters	Operative	No – no edible plants or contained water sources in the area of the proposed new works.	N/A	Some contamination is present underlying the site. Precautionary measures will be required during the construction phase. Remediation will be required to either remove the contamination or break pathways. However, the contamination at the site is considered to be of limited mobility, therefore the likelihood of contamination affecting neighbouring gardens is considered low risk.
	End User	Yes – contamination found to be present at the site and site to be developed into residential properties with landscaped areas.	High	
	Neighbours	Yes – contamination found to be present at the site and residential area adjoins the site.	Low	
Migration of hazardous gases via permeable strata or shallow mining activity	Operative	No – low concentrations of methane and carbon dioxide have been found to be present at the site (assuming *Characteristic Situation Level 1*).	Low	Low concentrations of harmful gases (methane and carbon dioxide) were detected at the site.
	End User		Low	

	Neighbours	No – whilst concentrations of ground gas have been found to be present at the site (assuming *Characteristic Situation Level 1*), no structures directly adjoin the site, therefore gases migrating from the site would vent to atmosphere before reaching neighbouring structures.	N/A	
Spillage/loss/run off direct to receiving water	Controlled Waters	Yes – known controlled waters within 250m. However, the site is underlain by cohesive soils of low permeability. Contamination by lead is not anticipated to be significantly mobile.	Low	Some contamination is present underlying the site. Remediation will be required to either remove the contamination or break pathways. Old services to be removed or capped.
Migration via permeable unsaturated strata	Controlled Waters	Yes – secondary A aquifers is present beneath the site. However, the site is underlain by cohesive soils of low permeability. Contamination by lead is not anticipated to be significantly mobile.	Low	
Run off via drainage/sewers etc	Controlled Waters	Yes – old services may be present on site. However, the site is underlain by cohesive soils of low permeability. Contamination by lead is not anticipated to be significantly mobile.	Low	
Direct contact with contaminated soils	Plants	Yes – contamination present at the site which may affect plants.	Moderate	Some contamination is present underlying the site. Remediation will be required to either remove the contamination or break pathways.
Uptake via root system			Moderate	
Direct contact with contaminated soils	Building Materials	Yes – elevated levels of PAHs revealed at the site may represent a significant risk to building materials or plastic water pipes. Moreover, testing indicates that the aggressive chemical environment for concrete classification is AC-1s.	Moderate (plastic services) Low (buried concrete)	Please see section 11.3.3 for information on good building practice.
Direct contact with contaminated groundwater				
Exposure to Radon	Operative	No – Not in a radon affected area.	N/A	Less than 1% of properties are above the action level. No radon protection measures required.
	End User			
UXO Risk	Operative	No – it is considered that the activities of the end users are unlikely to affect any UXO devices that may be present below the site.	Low	No further action required.
	End User			

10.3 Indicative Remediation Strategy

In view of the site-specific risk assessment it is considered that remediation will be required at this site. Such a strategy should include the following main elements.

10.3.1 Remediation Objectives

Based on the site-specific risk assessment the object of the remediation is likely to be as follows.

- To protect the site operatives during the construction process from the ingestion of soil or dust, dermal contact with the soil and inhalation of dust and vapours.
- To protect the end user from the ingestion of soil or dust, dermal contact with the soil and inhalation of dust and vapours.
- To protect the end user from the elevated levels of carbon dioxide.
- To protect neighbours from the inhalation and ingestion dust during the construction process.
- To protect operatives, end users and neighbours from the ingestion of contaminated fruit and vegetables.
- To protect plants from direct contact with contamination and prevent uptake via root system.
- To ensure that contamination cannot reach controlled waters via surface run-off or permeable strata.
- To ensure that contamination cannot enter the former services occupying the site which may return to controlled waters.
- To protect plastic services from being penetrated by, or degrading due to the presence of, contamination in the soil or groundwaters.

10.3.2 Development Requirements

Whilst the precise nature of this development has not been finalised it is understood that it is to be developed by the construction of 2no. new residential properties with associated car parking and soft landscaping. In view of the above a site-specific remediation strategy should be undertaken after the proposed development has been finalised. However, for preliminary design and costing the following remediation proposals are offered.

10.3.3 Outline Strategy

In order to fulfil the objectives defined above it is likely that the following remedial strategy could be utilised. It is recommended that a pragmatic approach be undertaken, with observational techniques being employed at each stage of the work.

Ground-works

During the ground-works phase of the development, protection to the site operatives is required. The risk to site operatives is considered under the Health and Safety at Work Act 1974, together with regulations made under the act, which includes the Control of Substances Hazardous to Health (COSHH) regulations. Therefore, the risks to site personnel must be considered under the Construction Design and Management (CDM) regulations at the planning stage and be included in the contractor's Health and Safety Plan and site-specific Method Statements. These documents should include the following main elements.

- Site operatives at all levels should be made aware of the hazards of working with contaminated soils and the potential hazards associated with materials containing volatile hydrocarbons.
- Personal hygiene facilities, including washing and messing, must be provided and site operatives be encouraged to use them.
- Where work is undertaken in dry weather the site should be dampened down to avoid dust. In addition, dust masks must be provided to all site operatives for use in dry weather.
- In order for contaminated soils to be disposed of to an appropriate landfill, it may be necessary to carry out Waste Acceptance Criteria (WAC) testing in accordance with BS EN 12457.
- Any stockpiles of contaminated soil on site should be sheeted over to prevent excessive amounts of airborne dust and cross contamination of imported fill.
- Where vehicles are transferring soil to the landfill site they should be covered to prevent contamination of the surrounding area by dust.
- Where work is undertaken in wet weather, vehicle and wheel washing facilities are required to ensure that the vehicles leaving the site do not transfer contamination to surrounding areas.

On completion of the ground-works a careful site inspection of the sub-grade would be required. Should visual or olfactory evidence of contamination be revealed then further testing may become necessary.

Construction

During the construction phase of the contract the following items are required to protect the end user from the potential contaminants revealed at this site.

- Beneath buildings, pavements and hard-standings clean inert granular sub-base should be employed.
- Any redundant services revealed at this site should be de-commissioned and piped services sealed. Any existing services that are to be employed in the new development should be carefully inspected to ensure that they are serviceable.
- New plastic services should be constructed in a surround of clean inert material and selected in accordance with the recommendation given in the United Kingdom Water Industry Research (UKWIR) website under Report Ref. No. 10/WM/03/21 - 'Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites'. The statutory water authority for the area in which site is located may have a risk assessment form to complete which allows these recommendations to be met. However, further determinand specification contamination testing may be necessary.
- For buried concrete the results of the sulphate and pH testing indicate that the design sulphate class for the site should be DS-1.

Landscaped Areas

It is understood that there is proposed to include soft landscaped areas with trees and shrubs around the perimeter of the development. In view of this and the potential contamination on site, it is considered that landscaped areas will require some remediation. This could include the provision of a clean cover system including a capping layer of say 500mm of inert material, which will put the contaminated ground out of the end users' dig range. At the base of this layer, a granular capillary break of say 100mm of free draining granular soil should be placed in order to prevent mobile contamination rising upward. This expedient should also provide a suitable root barrier to isolate the plants from the underlying contaminated ground.

Alternatively, given the relatively shallow depth of contaminated topsoil, this material could be removed from site leaving the uncontaminated natural material beneath. Following this, a provision of topsoil should be made that is a suitable growing medium for plants.

10.4 Fill Materials

It should also be appreciated that any fill material, either site-won or imported, to be employed at the site should be subjected to the following assessment to determine its suitability.

Fill materials should be initially screened, by a suitably qualified engineer to establish that:

- It is a suitable growing media if it is to be employed as such, including compliance with BS3882 (2015)
- It is free from obvious contamination i.e. visual or olfactory evidence
- It has not come from areas where Japanese Knotweed or other invasive or injurious plants are suspected to be growing
- It is not a statutory nuisance, such as being odorous
- It is free from unsuitable material i.e. whole bricks, brick ties, timber or glass.

It should also be appreciated that any fill should be subjected to validation testing to assess its suitability. The following table has been taken from YALPAG[14] documentation and may be used as a guide. Depending on the origin and nature of the material, not all fill will require the sampling frequency and testing indicated, although this should be in agreement with any regulatory bodies (such as the Local Authority).

Table 9: Validation Sampling and Testing

Fill Type	Frequency	Minimum Determinands
Virgin Quarried Material	1 or 2 depending on the type of stone utilised, to confirm the inert nature of the material.	Standard metals/metalloids (should include as a minimum As, Cd, Cr, CrVI, Cu, Hg, Ni, Pb, Se, Zn)
Crushed Hardcore, Stone, Brick	Minimum 1 per 500m³	Standard metals/metalloids (as above), PAH (16 USEPA speciation), asbestos, total TPH. Any additional analysis dependant on the history of the donor site (e.g. phenol, total cyanide, BTEX, MTBE).

[14] *YALPAG Technical Guidance for Developers, Landowners and Consultants – Verification Requirements for Cover Systems V4 .1* Appendix 1a, June 2021

Greenfield/ Manufactured Soils	**Minimum 3** **Dependent on source and receptor, between 1 per 50m^3 and 1 per 250m^3**	**Standard metals/metalloids (as above), PAH (16 USEPA speciation), asbestos, pH and soil organic matter (SOM) (or calculated from total organic carbon (TOC)).**
Brownfield/ Screened Soils	Minimum 6 Dependent on source and receptor, between 1 per 50m^3 and 1 per 100m^3	Standard metals/ metalloids (as above), PAH (16 USEPA speciation), TPH (CWG banded), asbestos, pH and SOM (or calculated from TOC). Any additional analysis dependant on the history of the donor site (e.g. phenol, total cyanide, BTEX, MTBE)..

The screening values for the above regime should also be agreed with any regulatory bodies; however, the following is recommended in the first instance.

Table 10: Fill Screening Values

Contaminant	Screening Value (Residential with Plant Uptake) (mg/kg)				Reference
	1% SOM		6% SOM		
As	37		37		Atrisk^{SOIL} SSVs
Cd	22.1		22.1		Atrisk^{SOIL} SSVs
Cr(VI)	3.62	20.5	3.63	20.5	Atrisk^{SOIL} SSVs
Cu	4730		4790		Atrisk^{SOIL} SSVs
Hg	8.81		15.8		Atrisk^{SOIL} SSVs
Ni	136		136		Atrisk^{SOIL} SSVs
Pb	200		200		Atrisk^{SOIL} SSVs
V	136		138		Atrisk^{SOIL} SSVs
Zn	20000		20300		Atrisk^{SOIL} SSVs

Please see summary sheet within Appendix 6 for full screening values including PAHs & TPHs.

The above screening values should be considered with respect to the Soil Organic Matter (SOM) of the subject material i.e. 1% SOM would be typical for granular fill and 6% SOM for topsoil. Testing should comply with UKAS and MCERTS, where applicable, and undertaken by an accredited laboratory.

Where the material has been derived from a commercial company, certificates or other industry quality protocol compliance i.e. WRAP should be obtained. However, it will be necessary to ensure that this documentation specifically related to the material being imported, it is no more than two months old and complies with the screening and frequency requirements given above.

Suitable fill materials should be either placed immediately or sufficiently quarantined to prevent cross-contamination. If it is necessary, the quarantined material should be placed on appropriate sheeting and covered to prevent it becoming mixed with contaminated soils or dust, or penetrated by mobile contaminants.

11. Recommendations for Further Work

- This report should be forwarded to the relevant authorities as soon as practicable to ensure they have sufficient time to review and discuss any issues.
- Discussions with ground work contractors in relation to the requirement for testing of materials to be disposed off-site (Waste Acceptance Criteria) and the suitability of imported materials.
- Discussions with service providers regarding suitable materials for pipe work given the nature of chemical determinands found within the soils on site.
- Produce a full remediation strategy to demonstrate how the geo-environmental risks discussed in this report will be mitigated once designs for the development are finalised.
- Produce a validation report to demonstrate that the geo-environmental risks discussed in this report have been mitigated.
- Detailed design of the sub-structure.

Clearly Rogers Geotechnical Services Ltd would be happy to offer advice with respect to the above and assist where necessary.

12. References

- British Geological Survey (NERC) (2025), BGS, Keyworth.
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  - Lexicon of Named Rock Units:
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  - Part C: *Assessing the aggressive chemical environment.*
  - Part D: *Specifying concrete for general cast-in-situ use.*
- Department for Environment, Food and Rural Affairs and the Environment Agency (2009) DEFRA Science Report – Final SC050021/SR2, *Human Health toxicological assessment of contaminants in soil*. Environment Agency, Bristol.
- Department for Environment, Food and Rural Affairs and the Environment Agency (2009) DEFRA Science Report – SC050021/SR3, *Updated technical background to the CLEA model*. Environment Agency, Bristol.
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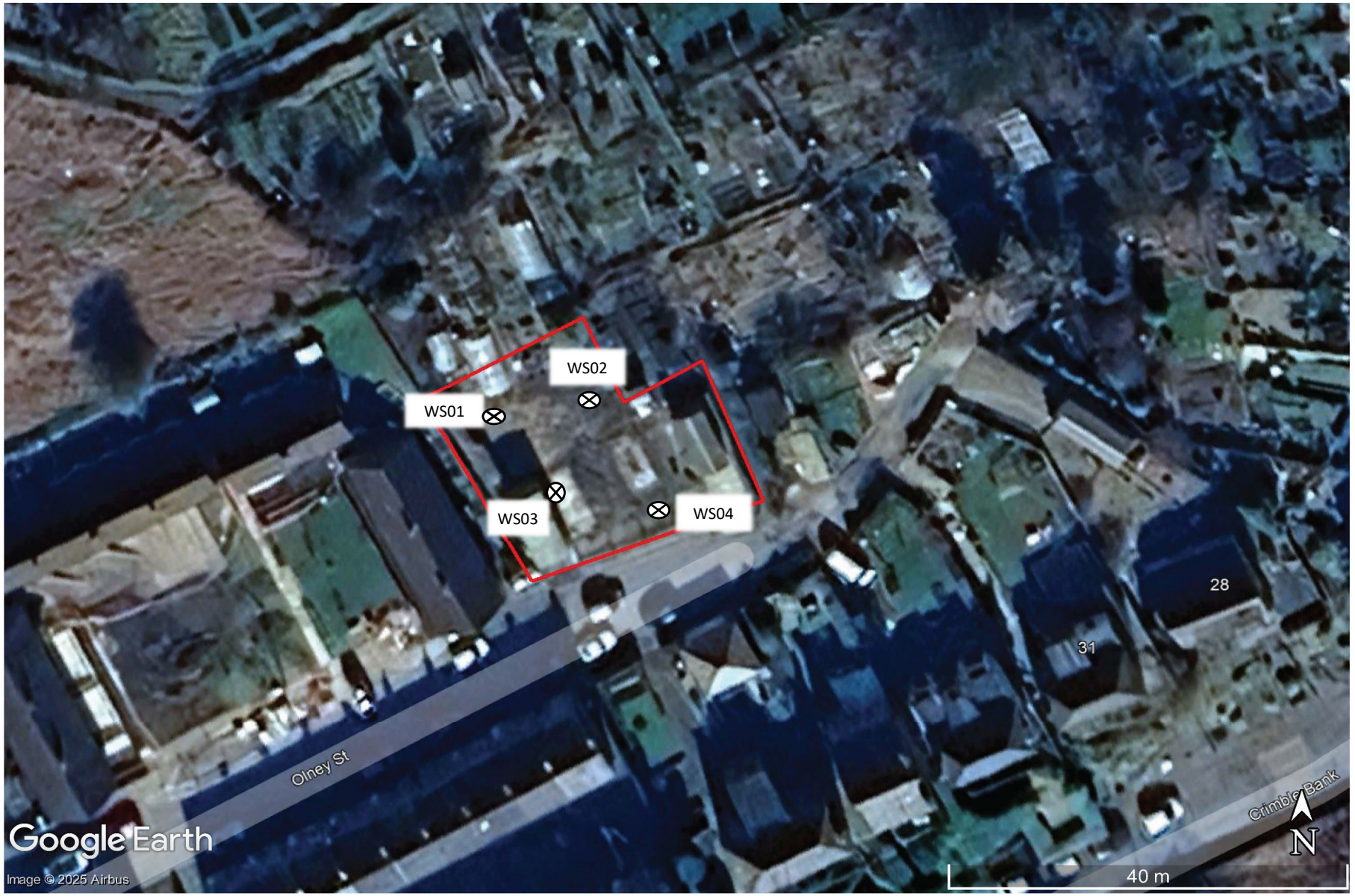
- Wilson S, Oliver S, Mallet H, Hutchings H, Card G, *Assessing risks posed by ground gasses to buildings,* CIRIA Report C665.

Appendix 1

Site Plan



Notes:

Investigation positions approximated from site operative's notes.

RGS Environmental Geotechnical Specialists

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Client:

Paul Coletta

Job Number:

C5257/25/E

Project Details:

Olney St, Slaithwaite

Scale: Not to scale - reference only

Appendix 2

Borehole Records

Borehole Log

Environmental Geotechnical Specialists

Borehole No. **BH01**

Sheet 1 of 1

Project Name:	Land off Olney Street	Project No. C5257/25/E/8069	Co-ords:	Hole Type WLS
Location:	Slaithwaite, Huddersfield HD7 5EG		Level:	Scale 1:25
Client:	Paul Coletta		Dates: 17/06/2025	Logged By RP

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	Results	Depth (m)	Level (m)	Legend	Stratum Description
				87	0					Medium dense orangish brown very sandy sub-angular and angular fine to coarse GRAVEL of sandstone. Low cobble content. WEATHERED MARSDEN FORMATION
		1.00	SPT			N=31 (4,5/6,7,8,10)	1.00			End of Borehole at 1.00m

1 2 3 4 5

Remarks

Sampler refused and liner shattered.

AGS

RGS Environmental Geotechnical Specialists

Borehole Log

Borehole No. **BH02**

Sheet 1 of 1

Project Name: Land off Olney Street	Project No. C5257/25/E/8069	Co-ords:	Hole Type WLS
Location: Slaithwaite, Huddersfield HD7 5EG		Level:	Scale 1:25
Client: Paul Coletta		Dates: 17/06/2025	Logged By RP

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.05	ES				0.25			TOPSOIL (Dark brown organic clayey SAND).
				87	100					Medium dense orangish brown very sandy sub-angular and angular fine to coarse GRAVEL of sandstone. Low cobble content. WEATHERED MARSDEN FORMATION
		1.00	SPT			N=18 (3,3/3,4,5,6)	1.20			
				67	100					Very stiff dark brownish grey very gravelly CLAY. Gravel is angular and tabular medium and coarse mudstone. WEATHERED MARSDEN FORMATION
		2.00	SPT			50 (13,16/50 for 150mm)	2.00			End of Borehole at 2.00m

1 2 3 4 5

Remarks

AGS

Borehole Log

Environmental Geotechnical Specialists

Borehole No. **BH03**

Sheet 1 of 1

Project Name: Land off Olney Street	Project No. C5257/25/E/8069	Co-ords:	Hole Type WLS
Location: Slaithwaite, Huddersfield HD7 5EG		Level:	Scale 1:25
Client: Paul Coletta		Dates: 17/06/2025	Logged By RP

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.20	ES	87	100					Medium dense orangish brown very sandy sub-angular and angular fine to coarse GRAVEL of sandstone. Low cobble content. WEATHERED MARSDEN FORMATION
		1.00	SPT			N=15 (5,6/5,5,3,2)				
				67	85		1.40			Very stiff dark brownish grey very gravelly CLAY. Gravel is angular and tabular medium and coarse mudstone. WEATHERED MARSDEN FORMATION
		2.00	SPT			N=50 (6,6/6,7,12,25)				
							2.45			End of Borehole at 2.45m

Remarks

AGS

Borehole Log

RGS Environmental Geotechnical Specialists

Borehole No. **BH04**

Sheet 1 of 1

Project Name:	Land off Olney Street	Project No. C5257/25/E/8069	Co-ords:	Hole Type WLS
Location:	Slaithwaite, Huddersfield HD7 5EG		Level:	Scale 1:25
Client:	Paul Coletta		Dates: 17/06/2025	Logged By RP

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.40	ES	87	100					Medium dense orangish brown very sandy sub-angular and angular fine to coarse GRAVEL of sandstone. Low cobble content. WEATHERED MARSDEN FORMATION
		1.00	SPT			N=24 (5,7/6,6,6,6)	1.20			Very stiff dark brownish grey very gravelly CLAY. Gravel is angular and tabular medium and coarse mudstone. WEATHERED MARSDEN FORMATION
				67	100					
		2.00	SPT			N=59 (4,5/7,9,23,20)	2.45			End of Borehole at 2.45m

Remarks

AGS

Appendix 3

Dynamic Probing Records

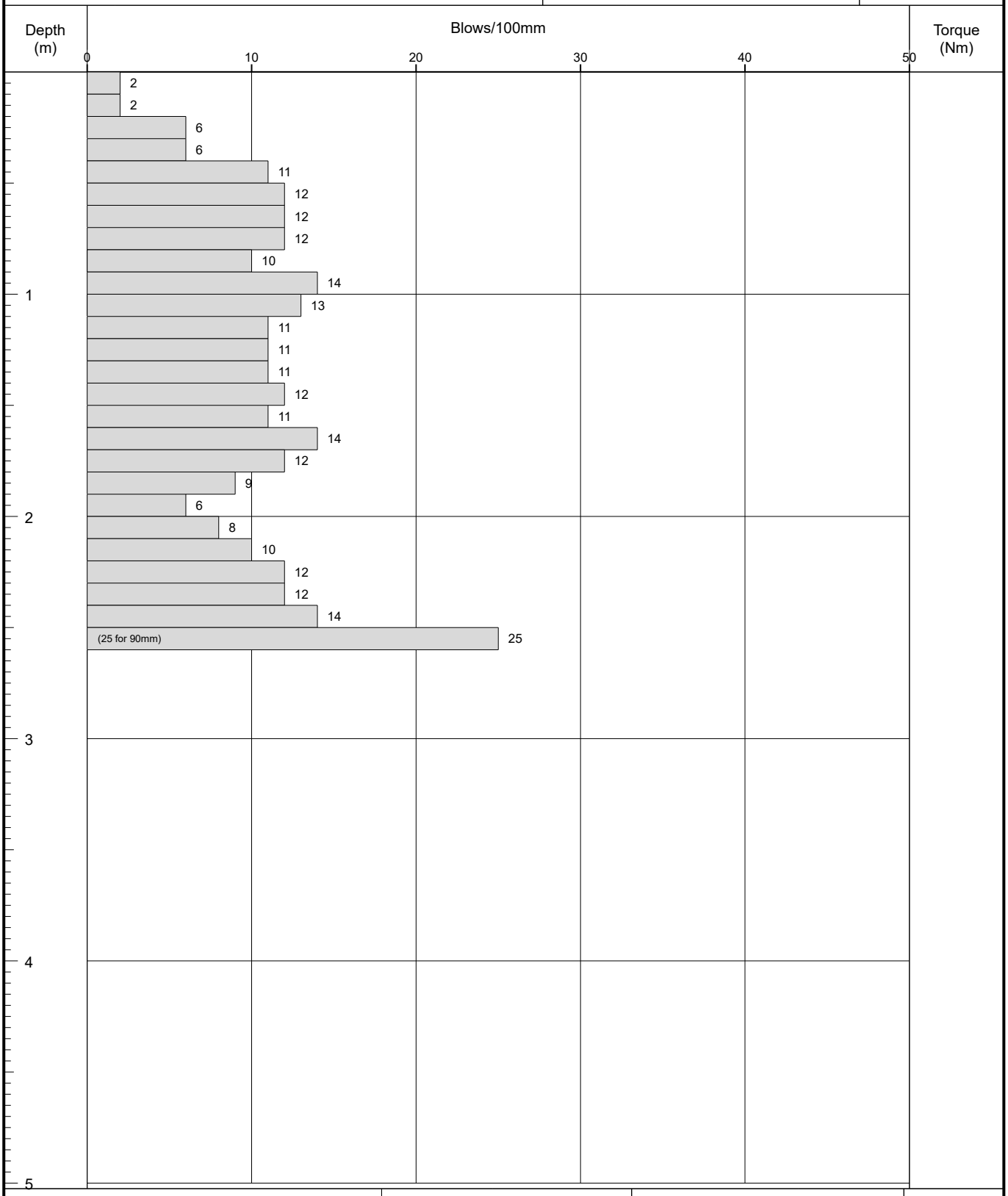
RGS Environmental Geotechnical Specialists

Probe Log

Probe No. **DP01**

Sheet 1 of 1

Project Name: Land off Olney Street	Project No. C5257/25/E/8069	Co-ords:	Hole Type DCP
Location: Slaithwaite, Huddersfield HD7 5EG		Level:	Scale 1:25
Client: Paul Coletta		Dates: 17/06/2025	Logged By AB



Remarks:

Fall Height	750mm	Cone Base Diameter	50.5mm
Hammer Wt	63.5kg	Final Depth	2.59m
Probe Type	DPSH-B		

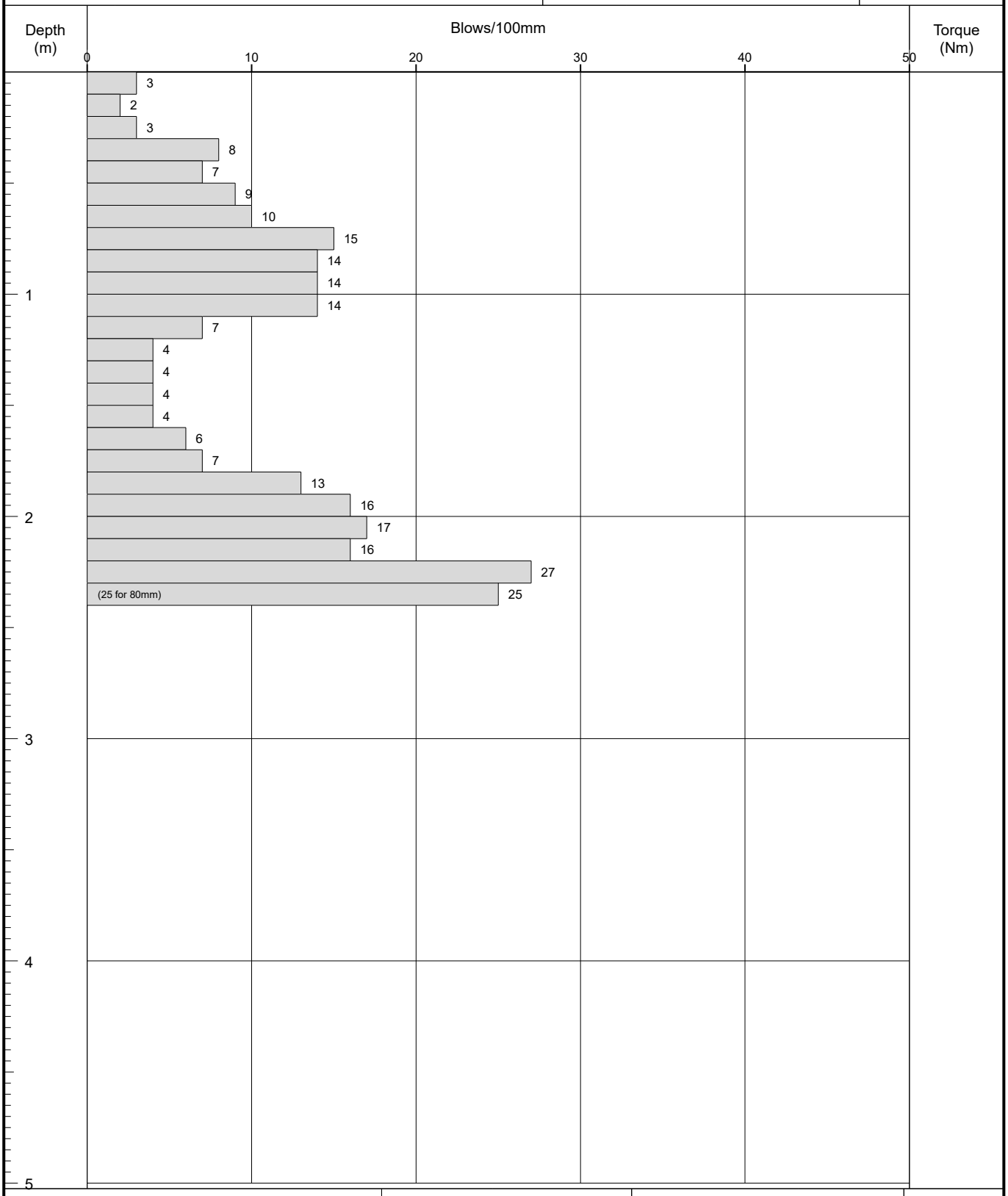
AGS

Environmental Geotechnical Specialists

Probe Log

Probe No.
DP02
Sheet 1 of 1

Project Name: Land off Olney Street	Project No. C5257/25/E/8069	Co-ords:	Hole Type DCP
Location: Slaithwaite, Huddersfield HD7 5EG		Level:	Scale 1:25
Client: Paul Coletta		Dates: 17/06/2025	Logged By AB



Remarks:

Fall Height	750mm	Cone Base Diameter	50.5mm
Hammer Wt	63.5kg	Final Depth	2.38m
Probe Type	DPSH-B		

AGS

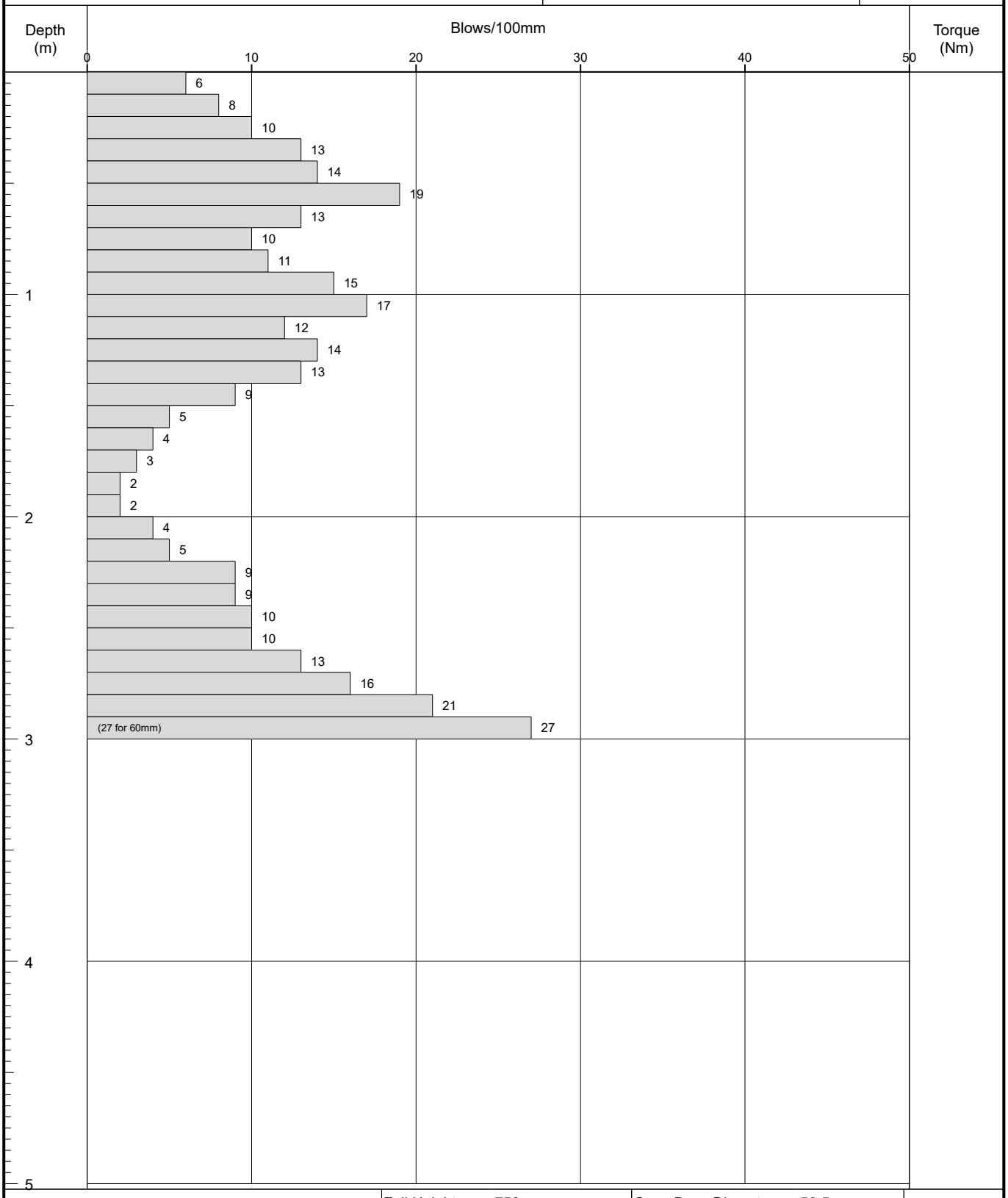
Probe Log

Environmental Geotechnical Specialists

Probe No. **DP03**

Sheet 1 of 1

Project Name: Land off Olney Street	Project No. C5257/25/E/8069	Co-ords:	Hole Type DCP
Location: Slaithwaite, Huddersfield HD7 5EG		Level:	Scale 1:25
Client: Paul Coletta		Dates: 17/06/2025	Logged By AB



Remarks:

Fall Height	750mm	Cone Base Diameter	50.5mm
Hammer Wt	63.5kg	Final Depth	2.96m
Probe Type	DPSH-B		

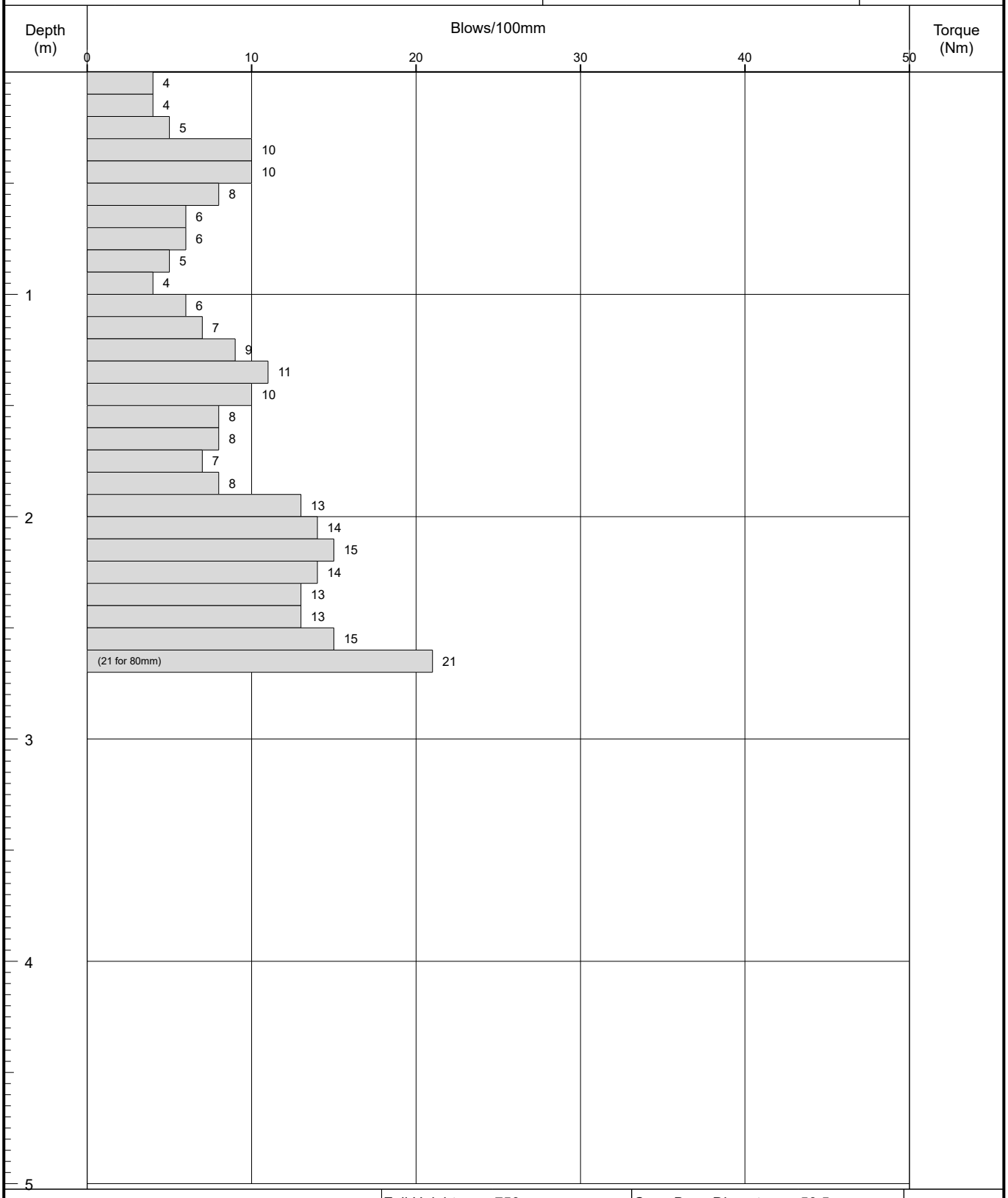
AGS

Environmental Geotechnical Specialists

Probe Log

Probe No.
DP04
Sheet 1 of 1

Project Name: Land off Olney Street	Project No. C5257/25/E/8069	Co-ords:	Hole Type DCP
Location: Slaithwaite, Huddersfield HD7 5EG		Level:	Scale 1:25
Client: Paul Coletta		Dates: 17/06/2025	Logged By AB



Remarks:

Fall Height	750mm	Cone Base Diameter	50.5mm
Hammer Wt	63.5kg	Final Depth	2.68m
Probe Type	DPSH-B		

AGS

Appendix 4

Gas Monitoring Sheets

Post Fieldworks Discrete Well Monitoring Site Record

Job No:	C/5257/25/E/8069	Client:	Paul Coletta	Visit:	1	Of	4
Site:	Olney Street, Huddersfield, HD7 5EG	Date:	25.06.2025				

RGS Environmental Geotechnical Specialists

Rogers Geotechnical Services Ltd , Offices 1 & 2 Barncliffe Business Park, Shelley, Huddersfield, HD8 8LU

Tel: 01484 604 354
enquiries@rogersgeotech.co.uk

Location ID	Methane (%)		Carbon Dioxide (%)		Carbon Monoxide (ppm)		Hydrogen Sulphide (ppm)		Oxygen (%)		VOCs (ppm)		Flowrate (l/hr)		Water Depth (m)	Well Depth (m)	Installed Depth (m)	Comments
	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Minimum	Steady	Peak	Steady	Peak				
1	0.0		0.9		0		0		20.0				0.0		DRY		1.52	
2	0.0		1.9		0		0		19.4				0.0		DRY		2.02	
4	0.0		0.7		0		0		20.2				0.0		DRY		2.49	
Max.	0.0	0.0	1.9	0.0	0	0	0	0	20.2	0.0	0	0	0.0	0.0	0.00			
Min.	0.0	0.0	0.7	0.0	0	0	0	0	19.4	0.0	0	0	0.0	0.0	0.00			

ND - Not detected DRY - No water in well NM - Not Monitored (State Reason in comments)

Meteorological & Site Information	
General Ground Condition	Wet
Precipitation	0.3l/m2 in last 6 hours
Wind	9
Temperature	16
Barometric Pressure	
Pressure Trend	

Monitor Technical Specifications								
Gas Monitor Used:	GFM Series							
Serial No:	13747/270525							
Monitor Gas Range	CH_4	5>60	CO_2	5<40	O_2	21.2		
Gas Flow Range	0-10 l/hr							
Date of Calibration	27.05.2025							
PID Monitor (If used)								
PID Monitor Serial No.								
Calibration Date.								

Monitoring Period Summary (All Visits)	Peak	Steady
Max CH_4	0.0	0.5
Max CO_2	1.9	1.4
Max CO	0	0
Max H_2S	0	0
Max O_2	20.6	20.2
Min O_2	20.0	19.8
Flow rate	0.0	0.0

	Start	End
Barometric Pressure	1010	1010

Operative Details.	M.Tuck

Post Fieldworks Discrete Well Monitoring Site Record

Job No:	C/5257/25/E/8069	Client:	Paul Coletta	Visit:	2	Of	4
Site:	Olney Street, Huddersfield, HD7 5EG	Date:	03.07.2025				

RGS Environmental Geotechnical Specialists

Rogers Geotechnical Services Ltd , Offices 1 & 2 Barncliffe Business Park, Shelley, Huddersfield, HD8 8LU

Tel: 01484 604 354
enquiries@rogersgeotech.co.uk

Location ID	Methane (%)		Carbon Dioxide (%)		Carbon Monoxide (ppm)		Hydrogen Sulphide (ppm)		Oxygen (%)		VOCs (ppm)		Flowrate (l/hr)		Water Depth (m)	Well Depth (m)	Installed Depth (m)	Comments
	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Minimum	Steady	Peak	Steady	Peak				
1	0.0		1.2		0		0		20.2				0.0		DRY		1.52	
2	0.0		0.9		0		0		20.0				0.0		DRY		2.02	
4	0.0		0.5		0		0		20.6				0.0		DRY		2.49	
Max.	0.0	0.0	1.2	0.0	0	0	0	0	20.6	0.0	0	0	0.0	0.0	0.00			
Min.	0.0	0.0	0.5	0.0	0	0	0	0	20.0	0.0	0	0	0.0	0.0	0.00			

ND - Not detected DRY - No water in well NM - Not Monitored (State Reason in comments)

Meteorological & Site Information	
General Ground Condition	DRY
Precipitation	0l/m2 in last 12 hours
Wind	No data
Temperature	20
Barometric Pressure	
Pressure Trend	

Monitor Technical Specifications								
Gas Monitor Used:	GFM Series							
Serial No:	13747/270525							
Monitor Gas Range	CH_4	5>60	CO_2	5<40	O_2	21.2		
Gas Flow Range	0-10 l/hr							
Date of Calibration	27.05.2025							
PID Monitor (If used)								
PID Monitor Serial No.								
Calibration Date.								

Monitoring Period Summary (All Visits)	Peak	Steady
Max CH_4	0.0	0.5
Max CO_2	1.4	1.4
Max CO	0	0
Max H_2S	0	0
Max O_2	20.6	20.2
Min O_2	20.0	19.8
Flow rate	0.0	0.0

	Start	End
Barometric Pressure	1026	1026

Operative Details.	H. Letch

Post Fieldworks Discrete Well Monitoring Site Record

Job No:	C/5257/25/E/8069	Client:	Paul Coletta	Visit:	3	Of	4
Site:	Olney Street, Huddersfield, HD7 5EG	Date:	09.07.2025				

RGS Environmental Geotechnical Specialists

Rogers Geotechnical Services Ltd , Offices 1 & 2 Barncliffe Business Park, Shelley, Huddersfield, HD8 8LU

Tel: 01484 604 354
enquiries@rogersgeotech.co.uk

Location ID	Methane (%)		Carbon Dioxide (%)		Carbon Monoxide (ppm)		Hydrogen Sulphide (ppm)		Oxygen (%)		VOCs (ppm)		Flowrate (l/hr)		Water Depth (m)	Well Depth (m)	Installed Depth (m)	Comments
	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Minimum	Steady	Peak	Steady	Peak				
1	0.0		1.4		0.0		0		19.8				0.0		DRY		1.52	
2	0.0		1.2		0.0		0		19.9				0.0		DRY		2.02	
4	0.0		0.9		0.0		0		20.1				0.0		DRY		2.49	
Max	0.0	0.0	1.4	0.0	0.0	0.0	0	0	20.1	0.0	0	0	0.0	0.0				
Min.	0.0	0.0	0.9	0.0	0.0	0.0	0	0	19.8	0.0	0	0	0.0	0.0				

ND - Not detected DRY - No water in well NM - Not Monitored (State Reason in comments)

Meteorological & Site Information	
General Ground Condition	Wet (dew)
Precipitation	0l/m2 in last 12 hours
Wind	No data, no observeable wind
Temperature	26
Barometric Pressure	
Pressure Trend	

Monitor Technical Specifications								
Gas Monitor Used:	GFM Series							
Serial No:	13747/270525							
Monitor Gas Range	CH_4	5>60	CO_2	5<40	O_2	21.2		
Gas Flow Range	0-10 l/hr							
Date of Calibration	27.05.2025							
PID Monitor (If used)								
PID Monitor Serial No.								
Calibration Date.								

Monitoring Period Summary (All Visits)		
	Peak	Steady
Max CH_4	0.0	0.5
Max CO_2	1.4	1.4
Max CO	0	0
Max H_2S	0	0
Max O_2	20.6	20.2
Min O_2	20.0	19.8
Flow rate	0.0	0.0

	Start	End
Barometric Pressure	1021	1021

Operative Details.	M.Tuck

Post Fieldworks Discrete Well Monitoring Site Record

Job No:	C/5257/25/E/8069	Client:	Paul Coletta	Visit:	4	Of	4
Site:	Olney Street, Huddersfield, HD7 5EG	Date:	16.07.2025				

RGS Environmental Geotechnical Specialists

Rogers Geotechnical Services Ltd , Offices 1 & 2 Barncliffe Business Park, Shelley, Huddersfield, HD8 8LU

Tel: 01484 604 354
enquiries@rogersgeotech.co.uk

Location ID	Methane (%)		Carbon Dioxide (%)		Carbon Monoxide (ppm)		Hydrogen Sulphide (ppm)		Oxygen (%)		VOCs (ppm)		Flowrate (l/hr)		Water Depth (m)	Well Depth (m)	Installed Depth (m)	Comments
	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Minimum	Steady	Peak	Steady	Peak				
1	0	0.5	1.2	1.4	0	0	0	0	19.9	19.8			0		DRY		1.52	
2	0	0	1.4	1.4	0	0	0	0	19.8	19.8			0		DRY		2.02	
4	0	0	0.7	0.7	0	0	0	0	20.2	20.2			0		DRY		2.49	
Max	0	0.5	1.4	1.4	0	0	0	0	20.2	20.2	0	0	0	0	0			
Min.	0	0	0.7	0.7	0	0	0	0	19.8	19.8	0	0	0	0	0			

ND - Not detected DRY - No water in well NM - Not Monitored (State Reason in comments)

Meteorological & Site Information	
General Ground Condition	Wet
Precipitation	3l/m2 in last 6 hours
Wind	11
Temperature	17
Barometric Pressure	
Pressure Trend	

Monitor Technical Specifications								
Gas Monitor Used:	GFM series							
Serial No:	13747/270525							
Monitor Gas Range	CH_4	5>60	CO_2	5<40	O_2	21.2		
Gas Flow Range	0-10 l/hr							
Date of Calibration	27.05.2025							
PID Monitor (If used)								
PID Monitor Serial No.								
Calibration Date.								

Monitoring Period Summary (All Visits)		
	Peak	Steady
Max CH_4	0.0	0.5
Max CO_2	1.4	1.4
Max CO	0	0
Max H_2S	0	0
Max O_2	20.6	20.2
Min O_2	20.0	19.8
Flow rate	0.0	0.0

	Start	End
Barometric Pressure	1015	1015

Operative Details.	M.Tuck

Appendix 5

Laboratory Testing

Rogers Geotechnical Services Ltd
Offices 1&2 Barncliffe Business Pk
Near Bank, Shelley
Huddersfield
West Yorkshire
HD8 8LU

t: 01484 604354

e: harry.letch@rogersgeotech.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 : 25-034711

Project / Site name:	Olney Street Slaithwaite	**Samples received on:**	27/06/2025
Your job number:	C5257 25 E 8069	**Samples instructed on/ Analysis started on:**	01/07/2025
Your order number:		**Analysis completed by:**	09/07/2025
Report Issue Number:	1	**Report issued on:**	09/07/2025
Samples Analysed:	3 soil samples - 2 leachate samples		

Signed:

Anna Goc
PL Head of Reporting Team
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
air	- once the analysis is complete

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Retention period for records and reports is minimum 6 years from the date of issue of the final report.
Some records may be kept for longer according to other legal/best practice requirements.

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.

Analytical Report Number: 25-034711
Project / Site name: Olney Street Slaithwaite

Lab Sample Number				599706	599707	599708
Sample Reference				BH02	BH03	BH04
Sample Number				None Supplied	None Supplied	None Supplied
Water Matrix				N/A	N/A	N/A
Depth (m)				0.05	0.2	0.4
Date Sampled				26/06/2025	26/06/2025	26/06/2025
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**			
Stone Content	%	0.1	NONE	45.3	39.6	37.7
Moisture Content	%	0.01	NONE	11	6.4	9.9
Total mass of sample received	kg	0.1	NONE	0.6	1.1	1.1
Asbestos						
Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	DKI	DKI	DKI
Analysis completed	N/A	N/A	N/A	07/07/2025	07/07/2025	07/07/2025
General Inorganics						
pH (L099)	pH Units	N/A	MCERTS	8.3	8.3	8.1
Free Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Total Sulphate as SO_4	%	0.005	MCERTS	0.068	0.021	0.024
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	60	50	39
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	29.7	25.1	19.3
Organic Matter (automated)	%	0.1	MCERTS	4.5	0.3	0.7
Total Phenols						
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Speciated PAHs						
Naphthalene	mg/kg	0.05	MCERTS	0.1	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	0.13	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	0.08	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	1.1	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	0.24	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	2.6	< 0.05	< 0.05
Pyrene	mg/kg	0.05	MCERTS	2.4	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	1.4	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	1.3	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	1.5	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.73	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.4	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.72	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.18	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.85	< 0.05	< 0.05
Total PAH						
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	14.6	< 0.80	< 0.80

Analytical Report Number: 25-034711
Project / Site name: Olney Street Slaithwaite

Lab Sample Number				599706	599707	599708
Sample Reference				BH02	BH03	BH04
Sample Number				None Supplied	None Supplied	None Supplied
Water Matrix				N/A	N/A	N/A
Depth (m)				0.05	0.2	0.4
Date Sampled				26/06/2025	26/06/2025	26/06/2025
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**			
Heavy Metals / Metalloids						
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	17	2.7	3.4
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.4	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	22	8.3	15
Copper (aqua regia extractable)	mg/kg	1	MCERTS	77	7.6	13
Lead (aqua regia extractable)	mg/kg	1	MCERTS	220	14	19
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	98	13	29
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	1.5	< 1.0	1.3
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	28	9.6	17
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	150	35	56
Petroleum Hydrocarbons						
TPHCWG - Aliphatic >EC5 - EC6 $_{HS\_1D\_AL}$	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010
TPHCWG - Aliphatic >EC6 - EC8 $_{HS\_1D\_AL}$	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010
TPHCWG - Aliphatic >EC8 - EC10 $_{HS\_1D\_AL}$	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010
TPHCWG - Aliphatic >EC10 - EC12 $_{EH\_CU\_1D\_AL}$	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
TPHCWG - Aliphatic >EC12 - EC16 $_{EH\_CU\_1D\_AL}$	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0
TPHCWG - Aliphatic >EC16 - EC21 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0
TPHCWG - Aliphatic >EC21 - EC35 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	32	< 8.0	< 8.0
TPHCWG - Aliphatic >EC5 - EC35 $_{EH\_CU+HS\_1D\_AL}$	mg/kg	10	NONE	32	< 10	< 10
TPHCWG - Aromatic >EC5 - EC7 $_{HS\_1D\_AR}$	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010
TPHCWG - Aromatic >EC7 - EC8 $_{HS\_1D\_AR}$	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010
TPHCWG - Aromatic >EC8 - EC10 $_{HS\_1D\_AR}$	mg/kg	0.02	MCERTS	< 0.020	< 0.020	< 0.020
TPHCWG - Aromatic >EC10 - EC12 $_{EH\_CU\_1D\_AR}$	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
TPHCWG - Aromatic >EC12 - EC16 $_{EH\_CU\_1D\_AR}$	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0
TPHCWG - Aromatic >EC16 - EC21 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	19	< 10	< 10
TPHCWG - Aromatic >EC21 - EC35 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	51	< 10	< 10
TPHCWG - Aromatic >EC5 - EC35 $_{EH\_CU+HS\_1D\_AR}$	mg/kg	10	NONE	70	< 10	< 10
VOCs						
Chloromethane	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
Chloroethane	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
Bromomethane	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
Vinyl Chloride	µg/kg	5	NONE	< 5.0	< 5.0	< 5.0
Trichlorofluoromethane	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
1,1-Dichloroethene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
Trans 1,2-dichloroethylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
1,1-Dichloroethane	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
2,2-Dichloropropane	µg/kg	5	NONE	< 5.0	< 5.0	< 5.0
Chloroform	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
1,1,1-Trichloroethane	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
1,2-Dichloroethane	µg/kg	7	MCERTS	< 7.0	< 7.0	< 7.0
1,1-Dichloropropene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
Cis-1,2-dichloroethene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0

Analytical Report Number: 25-034711
Project / Site name: Olney Street Slaithwaite

Lab Sample Number				599706	599707	599708
Sample Reference				BH02	BH03	BH04
Sample Number				None Supplied	None Supplied	None Supplied
Water Matrix				N/A	N/A	N/A
Depth (m)				0.05	0.2	0.4
Date Sampled				26/06/2025	26/06/2025	26/06/2025
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**			
Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
Carbontetrachloride	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
1,2-Dichloropropane	µg/kg	6	MCERTS	< 6.0	< 6.0	< 6.0
Trichloroethene	µg/kg	10	MCERTS	< 10	< 10	< 10
Dibromomethane	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
Bromodichloromethane	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
Cis-1,3-dichloropropene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
Trans-1,3-dichloropropene	µg/kg	10	MCERTS	< 10	< 10	< 10
Toluene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
1,1,2-Trichloroethane	µg/kg	6	MCERTS	< 6.0	< 6.0	< 6.0
1,3-Dichloropropane	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
Dibromochloromethane	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
Tetrachloroethene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
1,2-Dibromoethane	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
Chlorobenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
1,1,1,2-Tetrachloroethane	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
p & m-Xylene	µg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0
Styrene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
Bromoform	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
o-Xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
Isopropylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
1,1,2,2-Tetrachloroethane	µg/kg	5	NONE	< 5.0	< 5.0	< 5.0
Bromobenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
n-Propylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
2-Chlorotoluene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
4-Chlorotoluene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
1,3,5-Trimethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
tert-Butylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
1,2,4-Trimethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
sec-Butylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
1,3-Dichlorobenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
p-Isopropyltoluene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
1,4-Dichlorobenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
1,2-Dichlorobenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
Butylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
1,2-Dibromo-3-chloropropane	µg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0
1,2,4-Trichlorobenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
Hexachlorobutadiene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
1,2,3-Trichlorobenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0

Analytical Report Number: 25-034711
Project / Site name: Olney Street Slaithwaite

Lab Sample Number				599706	599707	599708
Sample Reference				BH02	BH03	BH04
Sample Number				None Supplied	None Supplied	None Supplied
Water Matrix				N/A	N/A	N/A
Depth (m)				0.05	0.2	0.4
Date Sampled				26/06/2025	26/06/2025	26/06/2025
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**			
VOCs TICs						
VOCs TICs Compound Name	N/A	N/A	NONE	ND	ND	ND
VOC % Match	%	N/A	NONE	ND	ND	ND

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

Analytical Report Number: 25-034711
Project / Site name: Olney Street Slaithwaite

Lab Sample Number				599707	599708
Sample Reference				BH03	BH04
Sample Number				None Supplied	None Supplied
Water Matrix				N/A	N/A
Depth (m)				0.2	0.4
Date Sampled				26/06/2025	26/06/2025
Time Taken				None Supplied	None Supplied
Analytical Parameter (Leachate Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**		
General Inorganics					
pH (automated)	pH Units	N/A	ISO 17025	7.3	6.9
Free Cyanide	µg/l	10	ISO 17025	< 10	< 10
Sulphate as SO_4	mg/l	0.045	ISO 17025	2.07	1.67
Dissolved Organic Carbon (DOC)	mg/l	0.1	NONE	7.3	8.2
Total Phenols					
Total Phenols (monohydric)	µg/l	10	ISO 17025	< 10	< 10
Speciated PAHs					
Naphthalene	µg/l	0.01	NONE	< 0.01	0.12
Acenaphthylene	µg/l	0.01	NONE	< 0.01	0.04
Acenaphthene	µg/l	0.01	NONE	< 0.01	0.04
Fluorene	µg/l	0.01	NONE	< 0.01	< 0.01
Phenanthrene	µg/l	0.01	NONE	< 0.01	< 0.01
Anthracene	µg/l	0.01	NONE	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	NONE	< 0.01	< 0.01
Pyrene	µg/l	0.01	NONE	< 0.01	< 0.01
Benzo(a)anthracene	µg/l	0.01	NONE	< 0.01	< 0.01
Chrysene	µg/l	0.01	NONE	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	NONE	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	NONE	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	NONE	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01	< 0.01
Total PAH					
Total EPA-16 PAHs	µg/l	0.16	NONE	< 0.16	0.2
Heavy Metals / Metalloids					
Arsenic (dissolved)	µg/l	1	ISO 17025	< 1.0	< 1.0
Cadmium (dissolved)	µg/l	0.08	ISO 17025	< 0.08	< 0.08
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0
Copper (dissolved)	µg/l	0.7	ISO 17025	2.3	5.1
Lead (dissolved)	µg/l	1	ISO 17025	2	2.6
Mercury (dissolved)	µg/l	0.5	ISO 17025	< 0.5	< 0.5
Nickel (dissolved)	µg/l	0.3	ISO 17025	0.8	0.4
Selenium (dissolved)	µg/l	4	ISO 17025	< 4.0	< 4.0
Vanadium (dissolved)	µg/l	1.7	ISO 17025	< 1.7	< 1.7
Zinc (dissolved)	µg/l	0.4	ISO 17025	2.7	2.4

Analytical Report Number: 25-034711
Project / Site name: Olney Street Slaithwaite

Lab Sample Number				599707	599708
Sample Reference				BH03	BH04
Sample Number				None Supplied	None Supplied
Water Matrix				N/A	N/A
Depth (m)				0.2	0.4
Date Sampled				26/06/2025	26/06/2025
Time Taken				None Supplied	None Supplied
Analytical Parameter (Leachate Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**		
Petroleum Hydrocarbons					
TPH - Aliphatic >EC5 - EC6 $_{HS\_1D\_AL}$	µg/l	1	NONE	< 1.0	< 1.0
TPH - Aliphatic >EC6 - EC8 $_{HS\_1D\_AL}$	µg/l	1	NONE	< 1.0	< 1.0
TPH - Aliphatic >EC8 - EC10 $_{HS\_1D\_AL}$	µg/l	1	NONE	< 1.0	< 1.0
TPH - Aliphatic >EC10 - EC12 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10
TPH - Aliphatic >EC12 - EC16 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10
TPH - Aliphatic >EC16 - EC21 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10
TPH - Aliphatic >EC21 - EC35 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10
TPH - Aliphatic >EC5 - EC35 $_{HS+EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10
TPH - Aromatic >EC5 - EC7 $_{HS\_1D\_AR}$	µg/l	1	NONE	< 1.0	< 1.0
TPH - Aromatic >EC7 - EC8 $_{HS\_1D\_AR}$	µg/l	1	NONE	< 1.0	< 1.0
TPH - Aromatic >EC8 - EC10 $_{EH\_1D\_AR\_MS}$	µg/l	1	NONE	< 1.0	< 1.0
TPH - Aromatic >EC10 - EC12 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10
TPH - Aromatic >EC12 - EC16 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10
TPH - Aromatic >EC16 - EC21 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10
TPH - Aromatic >EC21 - EC35 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10
TPH - Aromatic >EC6 - EC35 $_{HS+EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10
VOCs					
MTBE (Methyl Tertiary Butyl Ether)	µg/l	3	NONE	< 3.0	< 3.0
Benzene	µg/l	1	NONE	< 1.0	< 1.0
Toluene	µg/l	1	NONE	< 1.0	< 1.0
Ethylbenzene	µg/l	1	NONE	< 1.0	< 1.0
p & m-xylene	µg/l	1	NONE	< 1.0	< 1.0
o-xylene	µg/l	1	NONE	< 1.0	< 1.0

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

Analytical Report Number : 25-034711
Project / Site name: Olney Street Slaithwaite

* 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 *
599706	BH02	None Supplied	0.05	Brown loam and sand with vegetation and stones
599707	BH03	None Supplied	0.2	Brown sand with gravel and stones
599708	BH04	None Supplied	0.4	Brown clay and sand with gravel and stones

Analytical Report Number : 25-034711
Project / Site name: Olney Street Slaithwaite

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
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, 2021	A001B	D	ISO 17025
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
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.	L019B	D	NONE
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	L038B	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES	In-house method	L038B	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Sulphate, water soluble, in soil (16hr extraction)	In-house method	L038B	D	MCERTS
Speciated PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
BTEX and/or Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS	In-house method based on USEPA 8260	L073B	W	MCERTS
Tentatively identified compounds (VOC) in soil	Determination of volatile organic compounds total ion count in soil by headspace GC-MS followed by a full library scan	In-house method based on USEPA 8260	L073B	W	NONE
Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS with carbon banding aliphatic and aromatic	In-house method	L076B/L088-PL	D/W	MCERTS
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
Free cyanide in soil	Determination of free cyanide by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	MCERTS
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	MCERTS
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
Soil Descriptions	Textural classification	In-house method	L019B	W	NONE

Analytical Report Number : 25-034711
Project / Site name: Olney Street Slaithwaite

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Dissolved Organic Carbon in leachate	Determination of dissolved organic carbon in leachate by the measurement on a non-dispersive infrared analyser of carbon dioxide released by acidification	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037B	W	NONE
Metals by ICP-OES in leachate	Determination of metals in leachate by acidification followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L039B	W	ISO 17025
Total petroleum hydrocarbons with carbon banding by GC-MS/GC-MS HS in leachate	Determination of total petroleum hydrocarbons in leachate by GC-MS/GC-MS HS with carbon banding aliphatic and aromatic	In-house method	L070B/L088-PL	W	NONE
BTEX and/or Volatile organic compounds in leachate	Determination of volatile organic compounds in leachate by headspace GC-MS	In-house method based on USEPA 8260	L073B	W	NONE
Hexavalent chromium in leachate	Determination of hexavalent chromium in leachate by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	In-house method	L080-PL	W	ISO 17025
Free cyanide in leachate	Determination of free cyanide by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	ISO 17025
Monohydric phenols in leachate	Determination of phenols in leachate by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	ISO 17025
pH at 20°C in leachate (automated)	Determination of pH in leachate by electrometric measurement	In-house method	L099-PL	W	ISO 17025

Analytical Report Number : 25-034711
Project / Site name: Olney Street Slaithwaite

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Speciated PAHs and/or Semi-volatile organic compounds in leachate	SVOCs and PAHs in leachate	In-house method	L102B		NONE

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 - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

Quality control parameter failure associated with individual result applies to calculated sum of individuals.
The result for sum should be interpreted with caution

Appendix 6

Fill Screening Values

Rogers Geotechnical Services: Soil Screening Values Comparison Sheet

Rogers Geotechnical Services Ltd: Soil Screening Value (SSV) Comparison Sheet

Job Number	C5257/25/E/8069
Job Name	Land off Olney Street
Date	09.07.2025
Client	Paul Coletta

A = WS Atkins PLC, Atrisk Soil Screening Values.
A+ = Values updated June 2017.
A* = Atrisk's SSV is lower than i2's detectable limit for this compound.
B = health criterion values, which are available from toxicological reviews published in the C4SL project methodology report.
C = Category 4 Screening Levels (C4SLs) based on 6% soil organic matter.
D = Value provided is based on Methyl Mercury. Should elemental mercury be observed or a source be known then a limit of 102 should be used.

KEY
- Exceeds SSV
- Exceeds 2017, Below 2015
- Below limit of detection (LOD)

Determinand	Units	Ref	LOD	Residential With Plant Uptake 1%		Sample Location	BH02	BH03	BH04							
				Atrisk 2015 (No Free Product	Atrisk 2017	Depth Top	0.05	0.20	0.40							
						Depth Base										
Cadmium	mg/kg	C	0.2		22.1		0.40	< 0.2	< 0.2							
Chromium (Hexavalent)	mg/kg	B/C	1.8	20.5	3.62		< 1.8	< 1.8	< 1.8							
Copper	mg/kg	A+	1.0		4730		77.00	7.60	13.00							
Mercury	mg/kg	A/D	0.3		8.81		< 0.3	< 0.3	< 0.3							
Nickel	mg/kg	A+	1.0		136		98.00	13.00	29.00							
Lead	mg/kg	C	1.0		200		220.00	14.00	19.00							
Zinc	mg/kg	A+	1.0		20000		150.00	35.00	56.00							
Vanadium	mg/kg	A+	1.0		136		28.00	9.60	17.00							
Arsenic	mg/kg	C	1.0		37		17.00	2.70	3.40							
Selenium	mg/kg	A	1.0		375		1.50	< 1.0	1.30							
Cyanide (Free)	mg/kg	A	1.0		34		< 1.0	< 1.0	< 1.0							
Total Phenols	mg/kg	A	1.0		267		< 1.0	< 1.0	< 1.0							
Naphthalene	mg/kg	A+	0.05		0.829		0.10	< 0.05	< 0.05							
Acenaphthylene	mg/kg		0.05				0.05	< 0.05	< 0.05							
Acenaphthene	mg/kg	A+	0.05	608	157		0.13	< 0.05	< 0.05							
Fluorene	mg/kg	A+	0.05		735		0.08	< 0.05	< 0.05							
Phenanthrene	mg/kg		0.05				1.10	< 0.05	< 0.05							
Anthracene	mg/kg	A+	0.05		10200		0.24	< 0.05	< 0.05							
Fluoranthene	mg/kg	A+	0.05		983		2.60	< 0.05	< 0.05							
Pyrene	mg/kg	A+	0.05		668		2.40	< 0.05	< 0.05							
Benzo[a]anthracene	mg/kg	A	0.05	4.52	1.71		1.40	< 0.05	< 0.05							
Chrysene	mg/kg	A	0.05	585	0.44		1.30	< 0.05	< 0.05							
Benzo[b]fluoranthene	mg/kg	A	0.05	7.72	1.22		1.50	< 0.05	< 0.05							
Benzo[k]fluoranthene	mg/kg	A	0.05	84.4	0.686		0.73	< 0.05	< 0.05							
Benzo[a]pyrene	mg/kg	B/C	0.05	4.95	1.51		1.40	< 0.05	< 0.05							
Indeno(1,2,3-c,d)Pyrene	mg/kg	A*	0.05	7.31	0.0614		0.72	< 0.05	< 0.05							
Dibenz(a,h)Anthracene	mg/kg	A	0.05	0.838	0.00393		0.18	< 0.05	< 0.05							
Benzo[g,h,i]perylene	mg/kg	A	0.05	96.2	0.0187		0.85	< 0.05	< 0.05							
Total Of 16 PAH's	mg/kg		0.8				14.60	< 0.80	< 0.80							
Aliphatic TPH >C5-C6	mg/kg	A+	0.01		42.7		< 0.010	< 0.010	< 0.010							
Aliphatic TPH >C6-C8	mg/kg	A+	0.01		99.3		< 0.010	< 0.010	< 0.010							
Aliphatic TPH >C8-C10	mg/kg	A+	0.01		13.9		< 0.010	< 0.010	< 0.010							
Aliphatic TPH >C10-C12	mg/kg	A+	1.0	81.7	49.9		< 1.0	< 1.0	< 1.0							
Aliphatic TPH >C12-C16	mg/kg	A+	2.0	385	20.9		< 2.0	< 2.0	< 2.0							
Aliphatic TPH >C16-C21	mg/kg	A+	8.0		210000		< 8.0	< 8.0	< 8.0							
Aliphatic TPH >C21-C35	mg/kg	A+	8.0		210000		32.00	< 8.0	< 8.0							
Aliphatic TPH >C35-C44	mg/kg		10.0													
Total Aliphatic Hydrocarbons	mg/kg		10.0													
Aromatic TPH >C5-C7	mg/kg	A+	0.01		0.137		< 0.010	< 0.010	< 0.010							
Aromatic TPH >C7-C8	mg/kg	A+	0.01		113		< 0.010	< 0.010	< 0.010							
Aromatic TPH >C8-C10	mg/kg	A+	0.02		20.5		< 0.020	< 0.020	< 0.020							

Rogers Geotechnical Services: Soil Screening Values Comparison Sheet

Rogers Geotechnical Services Ltd: Soil Screening Value (SSV) Comparison Sheet

Job Number	C5257/25/E/8069			A = WS Atkins PLC, Atrisk Soil Screening Values. A+ = Values updated June 2017. A* = Atrisk's SSV is lower than i2's detectable limit for this compound. B = health criterion values, which are available from toxicological reviews published in the C4SL project methodology report. C = Category 4 Screening Levels (C4SLs) based on 6% soil organic matter. D = Value provided is based on Methyl Mercury. Should elemental mercury be observed or a source be known then a limit of 102 should be used.												
Job Name	Land off Olney Street															
Date	09.07.2025			**Sample Location**		BH02	BH03	BH04								
Client	Paul Coletta			Depth Top		0.05	0.20	0.40								
				Depth Base												
Determinand	**Units**	**Ref**	**LOD**	**Residential With Plant Uptake 1%**												
Aromatic TPH >C10-C12	mg/kg	A+	1.0		70	< 1.0	< 1.0	< 1.0								
Aromatic TPH >C12-C16	mg/kg	A+	2.0	165	155	< 2.0	< 2.0	< 2.0								
Aromatic TPH >C16-C21	mg/kg	A+	10.0		319	19.00	< 10	< 10								
Aromatic TPH >C21-C35	mg/kg	A+	10.0		1120	51.00	< 10	< 10								
Aromatic TPH >C35-C44	mg/kg		10.0													
Total Aromatic Hydrocarbons	mg/kg		10.0													
Total Petroleum Hydrocarbons	mg/kg		10.0													
pH			N/A			**8.30**	**8.30**	**8.10**								
Sulphate (2:1 Water Soluble) as SO4	g/l		0.00125			**0.030**	0.025	**0.019**								
ACM Type			N/A			Not detected	Not detected	Not detected								
Asbestos Identification	%					N/A	N/A	N/A								
ACM Detection Stage			N/A													
Moisture	%		0.01			11.00	6.40	9.90								
Soil Colour			N/A													
Other Material			N/A													
Soil Texture			N/A													
Sulphate (Total)	%		0.005													
Organic Matter	%		0.1			**4.50**	**0.30**	0.70								

KEY

- Exceeds SSV
- Exceeds 2017, Below 2015
- Below limit of detection (LOD)

Rogers Geotechnical Services Ltd.

Atkins ATRISK Soil Screening Values (SSVs) - Residential With Plant Uptake Landuse

Tox Data Report No.	Compound	Residential with Homegrown Produce Landuse (mg/kg)				Reference
	Metals	**SOM: 1%**		**SOM: 6%**		
3	Cadmium	22.1		22.1		C
4	Chromium VI	3.62	20.5	3.62	20.5	B/C
	Copper	4730		4790		A+
7	Mercury	8.81		15.80		A/D
8	Nickel	136		136		A+
	Lead	200		200		C
	Zinc	20000		20300		A+
	Vanadium	136		138		A+
	Semi and Non Metals					
1	Arsenic	37		37		C
10	Selenium	375		375		A
	Free Cyanide	34		34		A
9	Phenols (total)	267		1200		A
	Poly Aromatic Hydrocarbons	Free product	No free product	Free product	No free product	
20	Napthalene	0.829		12.2		A+
	Acenaphthene	157	608	2760		A+
	Fluorene	735		2610		A+
	Anthracene	10200		26200		A+
	Fluoranthene	983		2980		A+
	Pyrene	668		2120		A+
	Benzo(a)anthracene	1.71	4.52	8.54		A
2	Chrysene	0.44	585	2.64	927	A
2	Benzo(b)fluoranthene	1.22	7.72	7.29	9.86	A
2	Benzo(k)fluoranthene	0.686	84.4	4.12	100	A
2	Benzo(a)pyrene	1.51	4.95	0.998	5	B/C
2	Dibenzo(a,h)anthracene	0.00393	0.838	2.05	4.95	A*
2	Indeno(1,2,3-cd)pyrene	0.0614	7.31	0.368	9.75	A
2	Benzo(g,h,i)perylene	0.0187	96.2	0.112	103	A
	Petroleum Hydrocarbons					
	Aliphatic C5-C6	42.7		369		A+
	Aliphatic C6-C8	99.3		768	1240	A+
	Aliphatic C8-C10	13.9		204		A+
	Aliphatic C10-C12	49.9	81.7	297	1180	A+
	Aliphatic C12-C16	20.9	385	125	4130	A+
	Aliphatic C16-C21	210000		210100		A+
	Aliphatic C21-C35	210000		210100		A+
	Aromatic C5-C7 (Benzene)	0.137		0.871		A+
	Aromatic C7-C8 (Toluene)	113		780		A+
	Aromatic C8-C10	20.5		232		A+
	Aromatic C10-C12	70		468		A+
	Aromatic C12-C16	155	165	830		A+
	Aromatic C16-C21	319		1040		A+
	Aromatic C21-C35	1120		1710		A+

A+ = Values update June 2017.

A* Atrisk's SSV is lower than Chemtest's detectable limit for this compound.

B = Health Criterion Values (available from toxicological reviews published in the C4SL project methodology report).

C = Catergory 4 Screening Levels (C4SLs).

D = SSV provided is for Methyl Mercury.