Our Ref C3044/25/E/8416
17th September 2025

For the attention of

Ref: Updated Conceptual Site Model & Risk Assessment – Shelley Lodge, Kirkburton.

Further to the submission of the Phase 2 Geo-environmental Investigation report in April 2025, consultation from Kirklees Environmental Health has subsequently been issued on the 15th July 2025. The consultation requested clarification with regards to the gas monitoring programme, but also requested additional sampling as they consider that three samples did not provide sufficient confidence around the identified hot-spot of contamination.

Gas Monitoring

The Gas Monitoring results were presented as Table 3 in the geo-environmental report; see below.

Gas Monitoring

Location	Date	CH_4 (%)	CO_2 (%)	O_2 (%)	Flow (l/h)	Barometric Pressure (mb)	Water Level (m)	Standpipe Depth (m)
WS01	14.03.2025	0.4	1.1	20.6	0.0	1005 ↑	-	1.50
	21.03.2025	0.5	1.3	20.8	0.0	1000 ↓	-	
	28.03.2025	0.9	2.7	19.3	0.0	1000 ↑	-	
	04.04.2025	0.5	1.9	19.8	0.1	1024 ↔	-	
	10.04.2025	0.4	1.9	19.7	0.0	1028 ↓	-	
	17.04.2025	0.2	1.2	21.1	0.0	1010 ↔	-	
	25.04.2025	0.2	1.5	20.3	0.0	1024 ↔	-	
WS02	14.03.2025	0.0	0.4	20.7	0.0	1005 ↑	-	1.90
	21.03.2025	0.1	0.4	20.5	0.0	1000 ↓	-	
	28.03.2025	0.1	1.6	19.6	0.0	1000 ↑	-	
	04.04.2025	0.0	0.9	19.3	0.0	1024 ↔	-	
	10.04.2025	0.0	0.3	17.1	0.0	1028 ↓	-	
	17.04.2025	0.0	0.5	20.1	0.0	1010 ↔	-	
	25.04.2025	0.1	0.5	17.3	0.0	1024 ↔	-	

WS03	14.03.2025	0.0	0.1	19.5	0.0	1005 ↑	-	3.00
	21.03.2025	0.0	0.1	20.8	0.0	1000 ↓	-	
	28.03.2025	0.0	0.1	20.1	0.0	1000 ↑	2.93	
	04.04.2025	0.0	0.1	18.6	0.0	1024 ↔	2.98	
	10.04.2025	0.0	0.1	20.0	0.0	1028 ↓	2.98	
	17.04.2025	0.0	0.1	20.3	0.0	1010 ↔	2.99	
	25.04.2025	0.0	0.2	20.5	0.0	1024 ↔	-	

The information within Table 3 is correct. However, within section 9.1.2 of the report, the following was stated:

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 991mb and 1010mb.

There is clearly a discrepancy between the table and subsequent text as the atmospheric pressures were in fact between 1000mb and 1028mb. Notwithstanding this, as stated within the extract above, the most onerous gas condition on a site is usually observed on days of low or falling barometric pressure. For context, between the beginning of February 2025 and the end of August 2025, the atmospheric pressure has only fallen below 1000mb on 3 individual days. Whilst the pressure did not reach below 1000mb, it should be noted that historic data from a nearby weather station[1] indicates that the pressure trend in the area from the 17th March to the 21st March fell from 1030mb to 1000mb. This is a significant fall and rapid change in pressure over a 3 day period and the visit on the 21st March has captured the base of this pressure fall. As such, it is considered that 'worst-case' conditions have been captured during the monitoring programme and the low risk designated in the conceptual site model remains valid.

Soil Contamination

As highlighted within the consultation, some ambiguity remained over the nature of the current near surface soils. A brief timeline is presented below to provide the reader an insight of the events and investigation to date:

- July 2022 – RGS collect 2 samples of soil on the north and south of the barn. Contamination testing undertaken and a factual report (C2811/22/E/4315) issued for Roger Smith. 'Hot-spot' of contamination in south of site.
- September 2022 – Phase 1 desk study (C3044/22/E/4602) issued for Peter Armitage. Desk study refers to the testing undertaken for Roger Smith. Additional soil sampling around 'hot-spot' and gas monitoring recommended.
- Development occurs. The client informed us that site levels were reduced: *It is understood that site levels were reduced slightly and soils excavated and replaced locally; this was undertaken to remove the tree stumps that were observed during the phase one walkover. It is not clear how much soil was removed, but in the main most strata remain insitu and no additional soils have been brought on to site.* RGS cannot confirm how much material has been exported, however final levels are now to remain as is.
- April 2025 – Phase 2 geo-environmental investigation (C3044/25/E/7662) issued for Peter Armitage. Soils tested in this recent report are suitable for the end use. Report refers to the Roger Smith report but concludes that the 'hot-spot' is below the driveway area.

[1] https://www.weatheronline.co.uk/weather/maps/city

Whilst no further contamination was identified, the hot-spot of contamination had not been delineated between the driveway area and landscaped area, thus resulting in the Kirklees consultation.
In view of the above, RGS revisited site on the 20th August 2025. It had been ascertained that the soils within the most eastern soft landscaped area are suitable for the intended end use. However, the thin and central landscaped area had not been tested. As such, one trial pit (TPA) was situated within this soft landscaping area. Another trial pit (TPC) was sunk close to where the original contamination had been identified. In addition, a sample was then obtained from beneath the driveway area at a midpoint between the 'hot-spot' and soft landscaped area (TPB).

At TPA, topsoil was found to overlie the natural weathered fraction of the underlying rock. However, at TPB and TPC within the driveway area, the natural weathered fraction of the underlying rock was overlain by made ground. Most notably, at TPC the made ground was recorded to contain ash material.

With respect to the contamination results it should be appreciated that the soil organic matter (SOM) content for the samples tested was found to range between 1.3% and 3.5%. On this basis, screening values associated with 1% SOM have been 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[2] and these include many local authorities.

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

Table 1: Summary of Contaminated Areas

Location	Depth (m)	Contaminants found to be exceeding SSVs (Residential with plant uptake)
TPA	0.20	None.
TPB	0.60	PAHs (Benzo(g,h,i)perylene).
TPC	0.60	PAHs (Benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-c,d)pyrene, dibenz(a,h)anthracene, benzo(g,h,i)perylene).

Concentrations of chromium(VI), mercury and free cyanide 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[3]. 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.

[2] http://www.atrisksoil.co.uk/pages/general/subscribers.asp
[3] Ref: ATRISK soil, SSVs derived using CLEA v1.071 for 1% SOM, Residential with home grown produce land use, 23.06.17.

The results of the contaminants found to exceed these screening values are tabulated below:

Table 2: Summary of Areas Contaminated by PAHs

Location	Depth (m)	Contaminants found to be exceeding SSVs (Residential with plant uptake)
TPA	0.20	None.
TPB	0.60	None.
TPC	0.60	PAHs (Benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, dibenz(a,h)anthracene).

The results of this current and previous investigation have proven that the soils insitu within the soft landscaping areas are suitable with respect to the intended end use. Indeed, at these locations, topsoil has been proven on to the natural weathered fraction of the rock.

However, beneath the driveway area, made ground is evidently present. At the location of TPC, it would appear that a deposit of ash containing material has been historically placed. It is considered that the ash is attributable for the elevated PAHs. Whilst materials may have been removed site since 2022, this area remains to contain ash containing material. Notwithstanding this, as the material is present beneath the driveway area, it considered that there is not a pathway between source and end-user.

For context, the soils at TPC would be suitable for a public open space end use. As such, it is considered to be acceptable for these soils to be left insitu beneath the driveway area.

In view of the results of the chemical testing undertaken the conceptual site model has been updated and presented accordingly as Table 3.

The 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 3 below.

Table 3: Conceptual Site Model and Site-Specific Risk Assessment				
Conceptual Site Model			**Site Specific Risk Assessment**	
Pathways	**Receptor**	**Linkage Present?**	**Risk Rating**	**Notes**
Direct contact/dermal absorption/soil ingestion	Operative	No – works already completed.	N/A	No further action required.
	End User	No – soils suitable within exposed areas (soft landscaping). Contaminated soils to remain insitu beneath driveway area.	N/A	
	Neighbours	No – a residential property is present adjacent to the site and the new development has been constructed with the grounds of that property. The contamination identified at TPC is not considered to be significantly mobile and is bound within the ash with the made ground.	N/A	
Inhalation of Dust/Vapours	Operative	No – works already completed.	N/A	No further action required.
	End User	No – soils suitable within exposed areas (soft landscaping). Contaminated soils to remain insitu beneath driveway area.	N/A	
	Neighbours	No – a residential property is present adjacent to the site and the new development has been constructed with the grounds of that property. The contamination identified at TPC is not considered to be significantly mobile and is bound within the ash with the made ground.	N/A	
Ingestion of fruit/vegetables and/or waters	Operative	No – works already completed.	N/A	No further action required.
	End User	No – soils suitable within exposed areas (soft landscaping). Contaminated soils to remain insitu beneath driveway area.	N/A	
	Neighbours	No – a residential property is present adjacent to the site and the new development has been constructed with the grounds of that property. The contamination identified at TPC is not considered to be significantly mobile and is bound within the ash with the made ground.	N/A	

Migration of hazardous gases via permeable strata or shallow mining activity	End User	Yes – low levels of carbon dioxide revealed and site is being considered as Characteristic Situation Level 1.	Low	Low concentrations of harmful gases (methane and carbon dioxide) were detected at the site. Characteristic Situation Level 1 has been concluded for the site, no precautionary measures will be required.
	Neighbours		Low	
Spillage/loss/run off direct to receiving water	Controlled Waters	Yes – Box Ings Dike located along the eastern boundary of the site, however, contamination bound is ash is not considered to be significantly mobile.	Low	No further action required.
Migration via permeable unsaturated strata	Controlled Waters	Yes – a secondary A aquifer is present beneath the site, however, contamination bound is ash is not considered to be significantly mobile.	Low	
Run off via drainage/sewers etc	Controlled Waters	Yes –services present on site, however, contamination bound is ash is not considered to be significantly mobile.	Low	
Direct contact with contaminated soils	Plants	Yes – garden areas are present, however, all determinands fell below screening levels for those areas.	Low	No further action required.
Uptake via root system			Low	
Direct contact with contaminated soils	Building Materials	Yes – testing indicates that the aggressive chemical environment for concrete classification is AC-1s. Services understood to avoid the most eastern area and enter between TPA and TPB.	Low (plastic services)	
Direct contact with contaminated groundwater			Low (buried concrete)	
Exposure to Radon	End User	Yes – located in an area where between 1% and 3% of property are at or above the action limit.	Low	The publication BR211 states that no protection measures are necessary.

In view of the site-specific risk assessment it is considered that it will not be necessary to undertake any specific remediation at this site. It should be appreciated.

We trust that this information is of interest and should you have any other requirements do not hesitate to contact us.

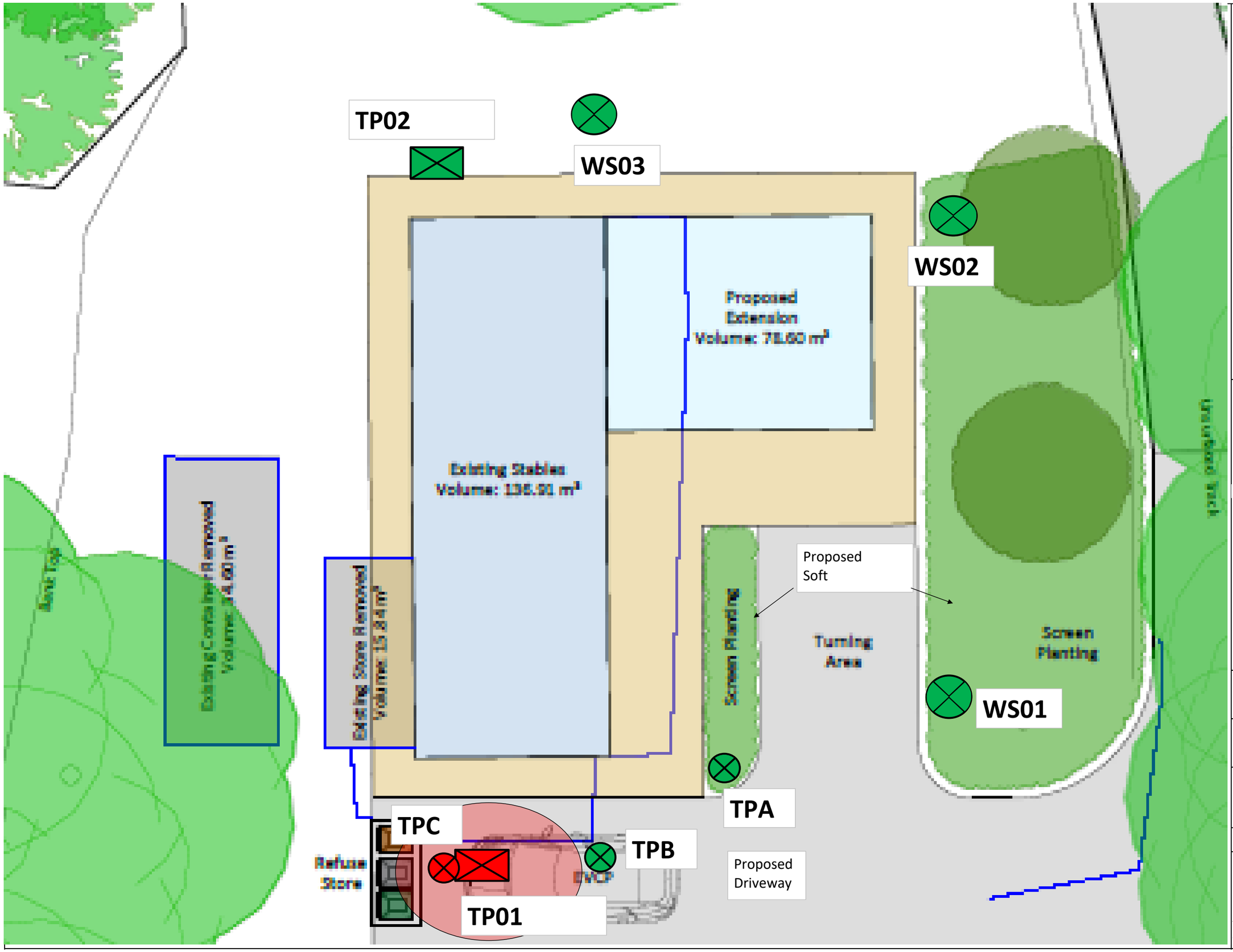
For Rogers Geotechnical Services Ltd,

Yours Faithfully

Engineering Director

Appended

- Site Plan
- Trial Pit Logs
- Contamination Results
- Contamination Summary Sheet



Notes:

Hot Spot

PASS

FAIL

RGS Environmental Geotechnical Specialists

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Client:

Peter Armitage

Job Number:

C3044/24/E/8416

Project Details:

Shelley Lodge, Kirkburton

Scale: Not to scale - reference only

Trial Pit Log

Trialpit No
TPA
Sheet 1 of 1

Project Name: Shelley Lodge	Project No. C3044/25/E/8416	Co-ords: - Level:	Date 20/08/2025
Location: 2 Box Ings Lane, Huddersfield, West Yorkshire, HD8 0SU		Dimensions (m): Depth 0.60	Scale 1:25
Client: Peter Armitage			Logged SH

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.20			TOPSOIL (Brown organic silty fine SAND).
				0.60			Soft greenish grey mottled grey and brown slightly sandy slightly gravelly silty CLAY. Sand is fine to medium. Gravel is sub-angular fine to coarse sandstone. WEATHERED PENNINE LOWER COAL MEASURES FORMATION
							End of pit at 0.60 m

Remarks:

Stability:

Trial Pit Log

Trialpit No **TPB** Sheet 1 of 1

Project Name: Shelley Lodge	Project No. C3044/25/E/8416	Co-ords: - Level:	Date 20/08/2025
Location: 2 Box Ings Lane, Huddersfield, West Yorkshire, HD8 0SU		Dimensions (m): Depth 0.60	Scale 1:25
Client: Peter Armitage			Logged SH

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.05			MADE GROUND (Grey sub-angular fine and medium GRAVEL of limestone).
				0.40			MADE GROUND (Brown clayey silty angular to subangular fine to coarse GRAVEL of brick sandstone and siltstone).
				0.60			Soft greenish grey mottled grey and brown slightly sandy slightly gravelly silty CLAY. Sand is fine to medium. Gravel is sub-angular fine to coarse sandstone. WEATHERED PENNINE LOWER COAL MEASURES FORMATION
							End of pit at 0.60 m

Remarks:

Stability:

Trial Pit Log

Trialpit No
TPC
Sheet 1 of 1

Project Name: Shelley Lodge	Project No. C3044/25/E/8416	Co-ords: - Level:	Date 20/05/2025
Location: 2 Box Ings Lane, Huddersfield, West Yorkshire, HD8 0SU		Dimensions (m): Depth 0.60	Scale 1:25
Client: Peter Armitage			Logged SH

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.05			MADE GROUND (Surface - excavated by client). MADE GROUND (Brown clayey silty angular to subangular fine to coarse GRAVEL of brick sandstone siltstone and ash).
				0.50			Soft greenish grey mottled grey and brown slightly sandy slightly gravelly silty CLAY. Sand is fine to medium. Gravel is sub-angular fine to coarse sandstone. WEATHERED PENNINE LOWER COAL MEASURES FORMATION
				0.60			End of pit at 0.60 m

Remarks:

Stability:

i2 Analytical Ltd.
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WD18 8YS

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Analytical Report Number : 25-045103

Project / Site name:	Shelley Lodge	**Samples received on:**	22/08/2025
Your job number:	C3044 25 E	**Samples instructed on/ Analysis started on:**	22/08/2025
Your order number:	PO 3510	**Analysis completed by:**	03/09/2025
Report Issue Number:	1	**Report issued on:**	03/09/2025
Samples Analysed:	3 soil 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

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

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: 25-045103
Project / Site name: Shelley Lodge
Your Order No: PO 3510

Lab Sample Number				657961	657962	657963
Sample Reference				TPA	TPB	TPC
Sample Number				None Supplied	None Supplied	None Supplied
Water Matrix				N/A	N/A	N/A
Depth (m)				0.20	0.60	0.60
Date Sampled				20/08/2025	20/08/2025	20/08/2025
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	< 0.1	< 0.1	29.3
Moisture Content	%	0.01	NONE	18	18	14
Total mass of sample received	kg	0.1	NONE	0.7	0.7	0.7
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	KSZ	KSZ	KSZ
Analysis completed	N/A	N/A	N/A	28/08/2025	28/08/2025	28/08/2025
General Inorganics						
pH (L099)	pH Units	N/A	MCERTS	7.2	7.2	8.2
Free Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Total Sulphate as SO_4	%	0.005	MCERTS	0.027	0.023	0.095
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	97	58	120
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	48.5	28.8	61.8
Organic Matter (automated)	%	0.1	MCERTS	1.3	1.6	3.5
Total Phenols						
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Speciated PAHs						
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.44
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.36
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.94
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.93
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	0.09	7.3
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	3
Fluoranthene	mg/kg	0.05	MCERTS	0.07	0.16	18
Pyrene	mg/kg	0.05	MCERTS	0.07	0.16	17
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.09	8.8
Chrysene	mg/kg	0.05	MCERTS	< 0.05	0.08	8.6
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	0.11	11
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	< 0.05	4.9
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.08	9.9
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.06	5.8
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	1.3
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	0.06	6.2
Total PAH						
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	< 0.80	0.88	105

Analytical Report Number: 25-045103
Project / Site name: Shelley Lodge
Your Order No: PO 3510

Lab Sample Number				657961	657962	657963
Sample Reference				TPA	TPB	TPC
Sample Number				None Supplied	None Supplied	None Supplied
Water Matrix				N/A	N/A	N/A
Depth (m)				0.20	0.60	0.60
Date Sampled				20/08/2025	20/08/2025	20/08/2025
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	6.3	7	18
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	0.3
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	U/S *U/S g
Chromium (VI) by IC	mg/kg	1.8	NONE	-	-	< 1.80
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	27	25	22
Copper (aqua regia extractable)	mg/kg	1	MCERTS	16	14	34
Lead (aqua regia extractable)	mg/kg	1	MCERTS	13	15	76
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	26	22	18
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	1.1
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	26	25	26
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	76	68	100
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	< 8.0	< 8.0	46
TPHCWG - Aliphatic >EC5 - EC35 $_{EH\_CU+HS\_1D\_AL}$	mg/kg	10	NONE	< 10	< 10	46
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	1.1
TPHCWG - Aromatic >EC12 - EC16 $_{EH\_CU\_1D\_AR}$	mg/kg	2	MCERTS	< 2.0	< 2.0	7.6
TPHCWG - Aromatic >EC16 - EC21 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	< 10	< 10	62
TPHCWG - Aromatic >EC21 - EC35 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	< 10	< 10	210
TPHCWG - Aromatic >EC5 - EC35 $_{EH\_CU+HS\_1D\_AR}$	mg/kg	10	NONE	< 10	< 10	280
VOCs						
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
Toluene	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
o-Xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0

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

Analytical Report Number : 25-045103
Project / Site name: Shelley Lodge

* 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 *
657961	TPA	None Supplied	0.4	Brown loam and clay with gravel and vegetation
657962	TPB	None Supplied	0.6	Brown loam and clay with gravel and vegetation
657963	TPC	None Supplied	0.6	Brown loam and clay with gravel and stones

Analytical Report Number : 25-045103
Project / Site name: Shelley Lodge

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
Total petroleum hydrocarbons with carbon banding by GC-FID in soil	Determination of total petroleum hydrocarbons in soil by GC-FID with carbon banding aliphatic and aromatic	In-house method	L076B	D	MCERTS
Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil (Summed Bands)	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS with carbon banding aliphatic and aromatic (Summed Bands).	Calculation	L076B/L088-PL	D/W	NONE
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
Total petroleum hydrocarbons with carbon banding by HS-GC/MS in soil	Determination of total petroleum hydrocarbons in soil by HS-GC/MS with carbon banding aliphatic and aromatic	In-house method	L088-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

Analytical Report Number : 25-045103
Project / Site name: Shelley Lodge

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Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Soil Descriptions	Textural classification	In-house method	L019B	W	NONE
Cr(VI) in soils by Ion chromatography	Determination of hexavalent chromium in alkaline soil extract by use of ion chromatography with spectrophotometric detection	In-house method	L130B	W	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.

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

*U/S g- Unsuitable for analysis due to high colour intensity.

Rogers Geotechnical Services: Soil Screening Values Comparison Sheet

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

Job Number	C3044/25/E/8416
Job Name	Shelley Lodge
Date	18.09.25
Client	Peter Armitage

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)

Sample Location	TPA	TPB	TPC
Depth Top	0.20	0.60	0.60
Depth Base			

Determinand	Units	Ref	LOD	Residential With Plant Uptake 1%											
				Atrisk 2015 (No Free Product	Atrisk 2017										
Cadmium	mg/kg	C	0.2		22.1	< 0.2	< 0.2	0.3							
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	16	14	34							
Mercury	mg/kg	A/D	0.3		8.81	< 0.3	< 0.3	< 0.3							
Nickel	mg/kg	A+	1.0		136	26	22	18							
Lead	mg/kg	C	1.0		200	13	15	76							
Zinc	mg/kg	A+	1.0		20000	76	68	100							
Vanadium	mg/kg	A+	1.0		136	26	25	26							
Arsenic	mg/kg	C	1.0		37	6.3	7	18							
Selenium	mg/kg	A	1.0		375	< 1.0	< 1.0	1.1							
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	0.829	< 0.05	< 0.05	0.44							
Acenaphthylene	mg/kg		0.05			< 0.05	< 0.05	0.36							
Acenaphthene	mg/kg	A+	0.05	608	157	< 0.05	< 0.05	0.94							
Fluorene	mg/kg	A+	0.05	0	735	< 0.05	< 0.05	0.93							
Phenanthrene	mg/kg		0.05			< 0.05	0.09	7.3							
Anthracene	mg/kg	A+	0.05	0	10200	< 0.05	< 0.05	3							
Fluoranthene	mg/kg	A+	0.05		983	0.07	0.16	18							
Pyrene	mg/kg	A+	0.05		668	0.07	0.16	17							
Benzo[a]anthracene	mg/kg	A	0.05	4.52	1.71	< 0.05	0.09	8.8							
Chrysene	mg/kg	A	0.05	585	0.44	< 0.05	0.08	8.6							
Benzo[b]fluoranthene	mg/kg	A	0.05	7.72	1.22	< 0.05	0.11	11							
Benzo[k]fluoranthene	mg/kg	A	0.05	84.4	0.686	< 0.05	< 0.05	4.9							
Benzo[a]pyrene	mg/kg	B/C	0.05	4.95	1.51	< 0.05	0.08	9.9							
Indeno(1,2,3-c,d)Pyrene	mg/kg	A*	0.05	7.31	0.0614	< 0.05	0.06	5.8							
Dibenz(a,h)Anthracene	mg/kg	A	0.05	0.838	0.00393	< 0.05	< 0.05	1.3							
Benzo[g,h,i]perylene	mg/kg	A	0.05	96.2	0.0187	< 0.05	0.06	6.2							
Total Of 16 PAH's	mg/kg		0.8												
Aliphatic TPH >C5-C6	mg/kg	A+	0.01	0	42.7	< 0.010	< 0.010	< 0.010							
Aliphatic TPH >C6-C8	mg/kg	A+	0.01	0	99.3	< 0.010	< 0.010	< 0.010							
Aliphatic TPH >C8-C10	mg/kg	A+	0.01	0	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	< 8.0	< 8.0	46							
Aliphatic TPH >C35-C44	mg/kg		10.0												
Total Aliphatic Hydrocarbons	mg/kg		10.0												

Rogers Geotechnical Services: Soil Screening Values Comparison Sheet

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

Job Number	C3044/25/E/8416			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	Shelley Lodge														
Date	18.09.25			Sample Location		TPA	TPB	TPC							
Client	Peter Armitage			Depth Top		0.20	0.60	0.60							
				Depth Base											
Determinand	**Units**	**Ref**	**LOD**	**Residential With Plant Uptake 1%**											
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	0	113	< 0.010	< 0.010	< 0.010							
Aromatic TPH >C8-C10	mg/kg	A+	0.02	0	20.5	< 0.020	< 0.020	< 0.020							
Aromatic TPH >C10-C12	mg/kg	A+	1.0	0	70	< 1.0	< 1.0	1.1							
Aromatic TPH >C12-C16	mg/kg	A+	2.0	165	155	< 2.0	< 2.0	7.6							
Aromatic TPH >C16-C21	mg/kg	A+	10.0		319	< 10	< 10	62							
Aromatic TPH >C21-C35	mg/kg	A+	10.0		1120	< 10	< 10	210							
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			**7.20**	**7.20**	**8.20**							
Sulphate (2:1 Water Soluble) as SO4	g/l		0.00125												
ACM Type			N/A												
Asbestos Identification	%					Not-detected	Not-detected	Not-detected							
ACM Detection Stage			N/A												
Moisture	%		0.01												
Soil Colour			N/A												
Other Material			N/A												
Soil Texture			N/A												
Sulphate (Total)	%		0.005												
Organic Matter	%		0.1			**1.3**	1.6	**3.5**							

KEY

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