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GEOTECHNICAL ENVIRONMENTAL

PHASE 2 ENVIRONMENTAL REPORT

job number C1061/20/E/1936	date 03/02/2021

site address
Land off Waingate
Linthwaite,
Huddersfield,
HD8 5NR

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Environmental Geotechnical Specialists

Report on a Phase 2 Geo-environmental Investigation

Location:	Land off Waingate Linthwaite, Huddersfield, HD8 5NR
For:	Williams Walling Limited
Consultants:	AKPlanning
Report No.	C1061/20/E/1936 Report date: February 2021

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

Charlotte Mason BSc FGS
Geo-environmental Engineer

Steve Rogers CEng, CGeol, MICE, MCIHT, FGS, ACIEH
Technical Director

Report Summary[1]

Item	Comments	Section
Development	Redevelopment of the site at 18 Waingate, for residential purposes.	1.
Geology	Superficial geology – None Solid geology – Marsden Formation	5.
Strata Conditions	Variable thickness of made ground. Overlying the residual fraction of the marsen formation recovered as a sandy gravel/ completely weathered sandstone	6.
Contamination	Lead, arsenic and PAH contamination revealed within the made ground. Underlying residual soils are generally uncontaminated.	8.

[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 at 18 Waingate is to be redeveloped for residential purposes.

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, take 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 trial pit 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.

3. Desk Study

A Phase 1 Desk Study has been undertaken Demeter Environmental Ltd and the results were presented as report number 20-08-05 in July 2020 This report has been used extensively during the current intrusive investigation.

4. Fieldworks

The fieldworks were undertaken on the 18th December 2020 and included the following:

- Machine Excavated trial pits for the collection of chemical samples. (Client supplied min-digger)

The investigatory locations are shown on the site plan which is presented in Appendix 1 to this report.

4.1 Trial Pits

A total 9 trial pits were excavated (TP09 hand dug) in order to reveal the nature of the near surface soils. The soils were logged on site in general accordance with BS5930: 2015, and full descriptions are given on the trialpit records which are presented in Appendix 2. At regular intervals throughout the excavation of the pits, samples were taken for chemical testing. The test specimens were

retained in the appropriate air tight containers within cool boxes for onward transition to the laboratory.

Once excavations were completed, the trial pits were carefully re-instated with the arisings. Whilst every care was taken during the infilling process, including compacting of the infill at regular intervals with the back acting arm of the excavator, it should be appreciated that some mounding of the surface may have resulted. Moreover, the infilled soils may be subjected to settlement over time, such that a depression in the surface may also occur. As such, foundations placed in this disturbed material may not perform as anticipated.

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 recorded
Solid Geology	Marsden Formation and other sandstone members	-	Coarse-grained, massively bedded sandstone, somewhat finer and flaggy in its lower part.

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
0.3 – 0.9	MADE GROUND (Dark brown and brown sandy slightly gravelly CLAY. with low cobble content. Gravel is subangular fine to coarse of sandstone brick mortar and rare clinker).	All	None
+0.5 - +1.0	Brown sandy sub-angular GRAVEL of sandstone with medium cobble content. OR SANDSTONE	TP0 – TP04 TP06 – TP08	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 Groundwater

[2] Sources: British Geological Survey (NERC) Map Sheet 77; Huddersffield; Solid and Drift Edition, and Geology of Britain Viewer [*online resource from www.bgs.ac.uk*]
[3] Sources: British Geological Survey (NERC) Lexicon of Named Rock Units [*online resource from www.bgs.ac.uk*]

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. 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 Screen.

This testing was undertaken by Chemtest Ltd and the results of all of the chemical testing are presented in Appendix 3 of this report.

8. Discussion of Ground Conditions - Environmental

8.1 Discussion of Test Results

It is understood that the site is to be redeveloped for residential purposes. Consequently, soils screening values for a residential with plant update end use have been employed in the below assessment.

8.1.1 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 1.4% and 13%. On this basis, it is considered that the screening values associated with 1% 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[4] and these include many local authorities.

A comparison of the results of the testing, together with the data given above, can be found within Appendix 3. These results indicate the following:

[4] http://www.atrisksoil.co.uk/pages/general/subscribers.asp

Table 3: Summary of Contaminated Areas		
Location	**Depth (m)**	**Contaminants found to be exceeding SSVs (Residential with plant uptake)**
TP01	0.3	Lead, Arsenic, Chrysene
TP01	0.5	Chrysene
TP02	0.2	
TP02	0.4	
TP03	0.5	Chrysene
TP04	0.3	
TP05	0.2	Lead, Naphthalene, Chrysene, Benzo[b]fluoranthene, Benzo[k]fluoranthene, Indeno(1,2,3-c,d)Pyrene, Dibenz(a,h)Anthracene, Benzo[g,h,i]perylene
TP05	0.6	Lead
TP06	0.4	Lead
TP07	0.3	
TP08	0.4	
TP09	0.3	

Concentrations of chromium^{VI}, free cyanide, phenols (total) and total petroleum hydrocarbons (aliphatic C5 to C21; aromatic C5 to C35) 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 soils 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[5]. 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 4: Summary of Areas Contaminated by PAHs & TPHs		
Location	**Depth (m)**	**Contaminants found to be exceeding SSVs (Residential with plant uptake)**
TP01	0.3	
TP01	0.5	
TP02	0.2	
TP02	0.4	
TP03	0.5	

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

TP04	0.3	
TP05	0.2	Naphthalene
TP05	0.6	
TP06	0.4	
TP07	0.3	
TP08	0.4	
TP09	0.3	

On the basis of the above information, the results of the investigation have concluded that the made ground at the site is generally contaminated with lead and arsenic, and, locally, some PAH's. However, near surface natural residual soils are uncontaminated.

8.2 Site Specific Risk Assessment

8.2.1 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[6] advice on the assessment of risks arising from the presence of contamination in soils and using the source-pathway-receptor approach.[7] 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.'[8]

8.2.2 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 5. Sources of contamination include the following:

On-site – Made Ground (Lead, arsenic and TPHs).

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

[6] 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'.
[7] 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.
[8] See 'Circular 2/2000 Contaminated Land: Implementation of Part II of The Environmental Protection Act 1990', appendix A.

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 5.

Table 5: Conceptual Site Model and Site Specific Risk Assessment [Contamination: Lead, arsenic and PAHs]

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 an apartment block 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. However, contamination does not pose a significant vapour risk.	Dust – High Vapours - Low	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. However, contamination does not pose a significant vapour risk.	Dust – High Vapours - Low	
	Neighbours	Yes – contamination found to be present at the site and residential and commercial properties located within 250m radius of the site and possible inhalation of dust during the works.	Dust – High Vapours - Low	
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 a residential property with garden 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 – no credible sources of ground gas identified within the Phase 1 Desk Study.	N/A	
	End User		N/A	
	Neighbours		N/A	

Spillage/loss/run off direct to receiving water	Controlled Waters	Yes – Contamination by lead and arsenic is not anticipated to be significantly mobile and is likely to result in a diminishing source.	Low	
Migration via permeable unsaturated strata	Controlled Waters	Yes – Contamination by lead and arsenic is not anticipated to be significantly mobile and is likely to result in a diminishing source.	Low	
Run off via drainage/sewers etc	Controlled Waters	Yes – Contamination by lead and arsenic is not anticipated to be significantly mobile and is likely to result in a diminishing source.	Low	
Direct contact with contaminated soils	Plants	Yes – significant 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 –minor PAH contamination revealed at the site may represent an elevated risk to building materials or plastic water pipes	Moderate (plastic services)	Please see section 8.3.3 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			

8.3 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.

8.3.1 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.
- To protect the end user from the ingestion of soil or dust, dermal contact with the soil.
- To protect neighbours from the inhalation and ingestion dust during the construction process.
- To protect plants from direct contact with contamination and prevent uptake via root system.
- To protect plastic services from being penetrated by, or degrading due to the presence of, contamination in the soil or groundwater.

8.3.2 Development Requirements

Whilst the precise nature of this development has not been finalised it is understood that it is to be developed for residential purposes. 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.

8.3.3 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 1984, 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 12458.
- 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.

Landscaped Areas

It is understood that there is proposed to include some garden areas. 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.

8.4 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[9] 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 6: Validation Sampling and Testing

Fill Type	Frequency	Minimum Determinands
Virgin Quarried Material	1 or 2 depending on the type of stone (to confirm the inert nature of the material)	Standard metals/metalloids (As, Cd, Cr, Cr^{VI}, Cu, Hg, Ni, Pb, Se, Zn)
Crushed Hardcore, Stone, Brick	Minimum 1 per 1000m³	Standard metals/metalloids as above plus PAH (16 USEPA) and Asbestos
Greenfield/ Manufactured Soils	The greater of a minimum of 3 or 1 per 250m³	Standard metals/metalloids as above plus PAH (16 USEPA) and Asbestos
Brownfield/ Screened Soils	The greater of a minimum of 6 or 1 per 100m³	Standard metals/metalloids as above plus PAH (16 USEPA), TPH (CWG banded) and Asbestos Any additional analysis dependant on the history of the donor site.

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 7: Fill Screening Values

Contaminant	Screening Value	Reference

[9] *YALPAG Technical Guidance for Developers, Landowners and Consultants – Verification Requirements for Cover Systems V3.3* Appendix 1a, October 2016.

	(Residential with Plant Uptake) (mg/kg)		
	1% SOM	**6% SOM**	
As	38	38	Atrisk^{SOIL} SSVs
Cd	22.1	22.1	Atrisk^{SOIL} SSVs
Cr(VI)	3.62	3.63	Atrisk^{SOIL} SSVs
Cu	4830	4890	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 5 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.

8.5 Verification Report

In order to demonstrate that the remedial works and provision of clean cover has been sufficiently carried out where applicable, it will be necessary to produce a verification report for submission to any statutory authorities.

It will be necessary for this report to include the following:

- The extents of any areas where made ground has been wholly removed.
- Characterisation of the suitability of the clean material including the derivation of the material, comments from a visual screen, the tests results of chemical screening, delivery tickets where appropriate and the conditions by which the clean material has been stored and handled on site.
- Photographic and logged evidence the clean material has been handled on site and placed in a sufficient thickness over areas where made ground remains. This may be either at the time of placement or after placement by means of hand excavated trialpits. Photographs should include visual site references or reference boards to prove the location and date taken. A measurement reference should be visible in the photographs to substantiate the thickness of material placed. Please note that it may also be necessary to undertake a topographical survey and the requirement for which should be checked with any statutory authorities.

The report detailed above should be produced by a suitably qualified engineer. The number of verification areas for the development should be confirmed with any statutory authorities for the site.

9. 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 validation report to demonstrate that the geo-environmental risks discussed in this report have been mitigated.

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

10. References

- British Geological Survey (NERC) (2021), BGS, Keyworth.
  - Geology of Britain Viewer: (*http://maps.bgs.ac.uk/geologyviewer_google/googleviewer.html)*
  - Lexicon of Named Rock Units:
  - (*http://www.bgs.ac.uk/lexicon/)*

- British Standards Institution (1990) BS1388: *British standard methods of test for soils for civil engineering purposes,* B.S.I., London.

- British Standards Institution (2015 +A1: 2020) BS 5930: *Code of practice for ground investigations,* B.S.I., London.

- British Standards Institution (208), BS 10185: *Investigation of potentially contaminated sites – Code of Practice,* British Standards Institute.

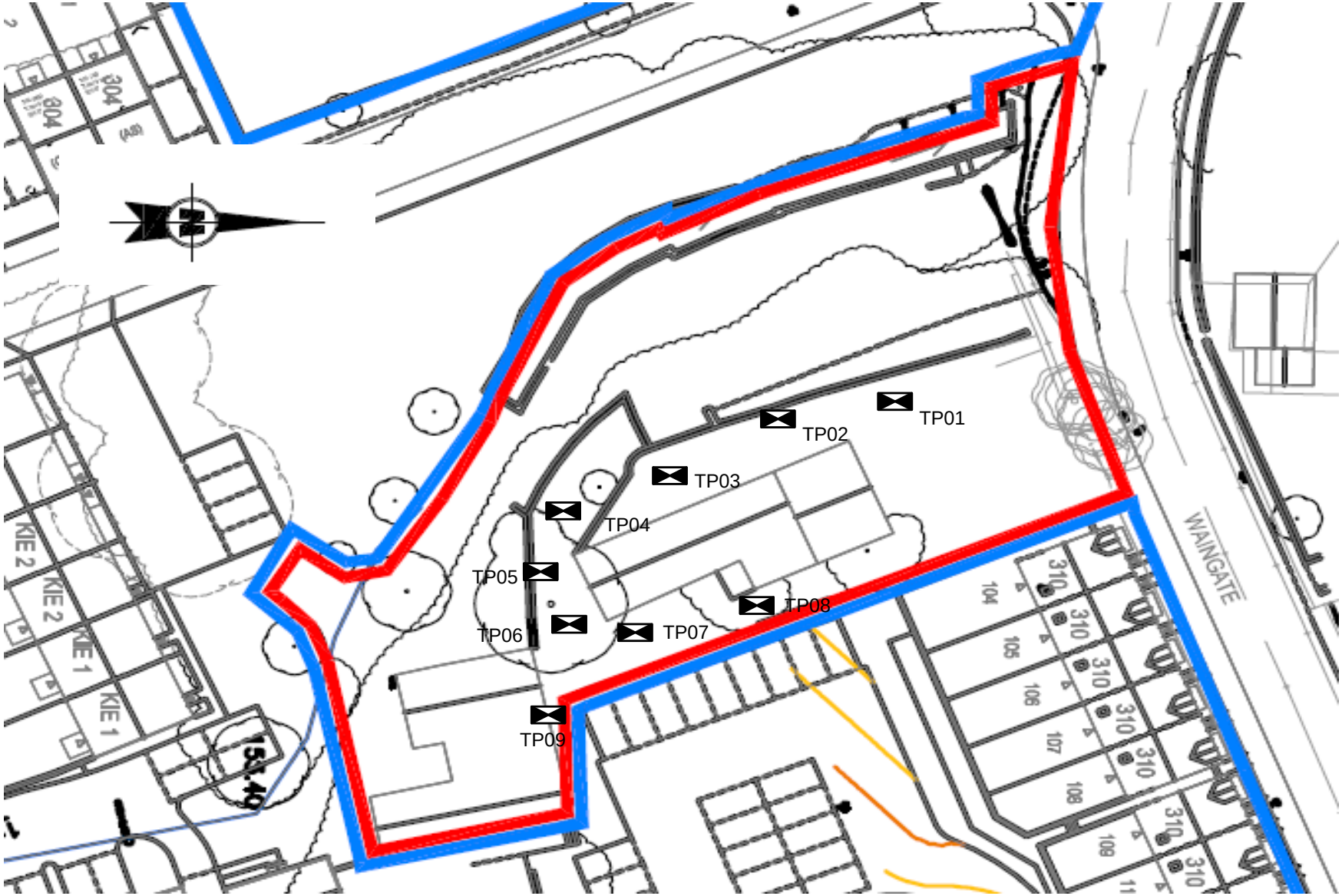
- Department for Environment, Food and Rural Affairs and the Environment Agency (2009) DEFRA Science Report – Final SC050021/SR2, *Human Health toxicological assessment of contaminants in soil*. Environment Agency, Bristol.

- 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.

- Department for Environment, Food and Rural Affairs (2014) SP1010: *Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination – Policy Companion Document*.

Appendix 1

Site Plan



Notes:

Investigation positions approximated from site operative's notes.

Environmental Geotechnical Specialists

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Client:

Williams Walling Limited

Job Number:

C1061/20/E/1936

Project Details:

Land off Waingate Linthwaite, Huddersfield, HD8 5NR

Scale: Not to scale - reference only

Appendix 2

Trial Pit Records

Trial Pit Log

Trialpit No **TP01**

Sheet 1 of 1

Project Name: Land off Waingate	Project No. C1061/20/E/1936	Co-ords: - Level:	Date 17/12/2020
Location: Linthwaite		Dimensions (m): Depth 1.00 0.6	Scale 1:50
Client: Richard Williams			Logged RAP

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.60			MADE GROUND (Dark brown and brown sandy slightly gravelly CLAY. with low cobble content. Gravel is sub-angular fine to coarse of sandstone brick mortar and rare clinker).
				1.00			Brown sandy sub-angular GRAVEL of sandstone with medium cobble content.
							End of pit at 1.00 m

Remarks:

Stability:

Trial Pit Log

Trialpit No **TP02**

Sheet 1 of 1

Project Name: Land off Waingate	Project No. C1061/20/E/1936	Co-ords: - Level:	Date 17/12/2020
Location: Linthwaite		Dimensions (m): Depth 1.00	Scale 1:50
Client: Richard Williams		0.6	Logged RAP

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.40			MADE GROUND (Dark brown and brown sandy slightly gravelly CLAY. with low cobble content. Gravel is sub-angular fine to coarse of sandstone brick mortar and rare clinker).
				1.00			Brown sandy sub-angular GRAVEL of sandstone with medium cobble content.
							End of pit at 1.00 m

Remarks:

Stability:

Trial Pit Log

Trialpit No **TP03**

Sheet 1 of 1

Project Name: Land off Waingate	Project No. C1061/20/E/1936	Co-ords: - Level:	Date 17/12/2020
Location: Linthwaite		Dimensions (m): Depth 0.90	Scale 1:50
Client: Richard Williams		0.6	Logged RAP

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.80			MADE GROUND (Dark brown and brown sandy slightly gravelly CLAY. with low cobble content. Gravel is sub-angular fine to coarse of sandstone brick mortar and rare clinker).
				0.90			Brown sandy sub-angular GRAVEL of sandstone with medium cobble content.
							End of pit at 0.90 m

Remarks:

Stability:

Trial Pit Log

Trialpit No **TP04**

Sheet 1 of 1

Project Name: Land off Waingate	Project No. C1061/20/E/1936	Co-ords: - Level:	Date 17/12/2020
Location: Linthwaite		Dimensions (m): Depth 0.80	Scale 1:50
Client: Richard Williams		0.6	Logged RAP

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.50			MADE GROUND (Dark brown and brown sandy slightly gravelly CLAY. with low cobble content. Gravel is sub-angular fine to coarse of sandstone brick mortar and rare clinker).
				0.80			Brown sandy sub-angular GRAVEL of sandstone with medium cobble content.
							End of pit at 0.80 m

Remarks:

Stability:

Trial Pit Log

Trialpit No **TP05**

Sheet 1 of 1

Project Name: Land off Waingate	Project No. C1061/20/E/1936	Co-ords: - Level:	Date 17/12/2020
Location: Linthwaite		Dimensions (m): Depth 0.90 0.6	Scale 1:50
Client: Richard Williams			Logged RAP

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.30			TOPSOIL (Dark grey very clayey silty gravelly fine and medium SAND. Occasional clinker and ash).
				0.90			MADE GROUND (Dark brown and brown sandy slightly gravelly CLAY. with low cobble content. Gravel is sub-angular fine to coarse of sandstone brick mortar and rare clinker).
							End of pit at 0.90 m

Remarks:

Stability:

Trial Pit Log

Trialpit No **TP06**

Sheet 1 of 1

Project Name: Land off Waingate	Project No. C1061/20/E/1936	Co-ords: - Level:	Date 17/12/2020
Location: Linthwaite		Dimensions (m): Depth 1.00	Scale 1:50
Client: Richard Williams			Logged RAP

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.50			MADE GROUND (Dark brown and brown sandy slightly gravelly CLAY. with low cobble content. Gravel is sub-angular fine to coarse of sandstone brick mortar and rare clinker).
				1.00			Brown sandy sub-angular GRAVEL of sandstone with medium cobble content.
							End of pit at 1.00 m

Remarks:

Stability:

Trial Pit Log

Trialpit No
TP07
Sheet 1 of 1

Project Name: Land off Waingate	Project No. C1061/20/E/1936	Co-ords: - Level:	Date 17/12/2020
Location: Linthwaite		Dimensions (m): Depth 0.50	Scale 1:50
Client: Richard Williams			Logged RAP

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.35 0.50			MADE GROUND (Dark brown and brown sandy slightly gravelly CLAY. with low cobble content. Gravel is sub-angular fine to coarse of sandstone brick mortar and rare clinker). SANDSTONE. End of pit at 0.50 m

Remarks:

Stability:

Trial Pit Log

Trialpit No
TP08
Sheet 1 of 1

Project Name: Land off Waingate	Project No. C1061/20/E/1936	Co-ords: - Level:	Date 17/12/2020
Location: Linthwaite		Dimensions (m): Depth 0.50	Scale 1:50
Client: Richard Williams		0.6	Logged RAP

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.45 0.50			MADE GROUND (Dark brown and brown sandy slightly gravelly CLAY. with low cobble content. Gravel is sub-angular fine to coarse of sandstone brick mortar and rare clinker). SANDSTONE. End of pit at 0.50 m

Remarks:

Stability:

Trial Pit Log

Trialpit No
TP09
Sheet 1 of 1

Project Name: Land off Waingate	Project No. C1061/20/E/1936	Co-ords: - Level:	Date 17/12/2020
Location: Linthwaite		Dimensions (m): Depth 0.30	Scale 1:50
Client: Richard Williams			Logged RAP

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.30			MADE GROUND (Dark brown and brown sandy slightly gravelly CLAY. with low cobble content. Gravel is sub-angular fine to coarse of sandstone brick mortar and rare clinker). End of pit at 0.30 m

Remarks: Hand dug trialpit.

Stability:

Appendix 3

Laboratory Testing

Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	20-35120-1
Initial Date of Issue:	31-Dec-2020
Client	Rogers Geotechnical Services Ltd
Client Address:	Unit 4, Barncliffe Business Park Near Bank Shelley Huddersfield West Yorkshire HD8 8LU
Contact(s):	Harry Letch Jude Norcliffe
Project	C1061/20/E/1936

Quotation No.:		**Date Received:**	21-Dec-2020
Order No.:	PO-1149	**Date Instructed:**	21-Dec-2020
No. of Samples:	12		
Turnaround (Wkdays):	7	**Results Due:**	31-Dec-2020
Date Approved:	31-Dec-2020		

Approved By:

Details: Glynn Harvey, Technical Manager

Results - Soil

Project: C1061/20/E/1936

Client: Rogers Geotechnical Services Ltd		**Chemtest Job No.:**			20-35120	20-35120	20-35120	20-35120	20-35120	20-35120	20-35120	20-35120
Quotation No.:		**Chemtest Sample ID.:**			1117586	1117587	1117588	1117589	1117590	1117591	1117592	1117593
Order No.: PO-1149		Client Sample Ref.:			1	2	1	2	1	1	1	2
		Sample Location:			TP01	TP01	TP02	TP02	TP03	TP04	TP05	TP05
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.3	0.5	0.2	0.4	0.5	0.3	0.2	0.6
		Date Sampled:			17-Dec-2020	17-Dec-2020	17-Dec-2020	17-Dec-2020	17-Dec-2020	17-Dec-2020	17-Dec-2020	17-Dec-2020
		Asbestos Lab:			COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
Cadmium	M	2450	mg/kg	0.10	0.37	0.23	0.13	< 0.10	0.26	0.53	0.45	0.34
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Copper	M	2450	mg/kg	0.50	58	38	25	23	46	33	85	38
Mercury	M	2450	mg/kg	0.10	0.17	0.10	0.12	< 0.10	0.21	1.1	0.59	0.34
Nickel	M	2450	mg/kg	0.50	20	25	29	27	20	16	27	19
Lead	M	2450	mg/kg	0.50	260	120	130	28	170	130	730	360
Zinc	M	2450	mg/kg	0.50	510	150	110	95	69	65	140	78
Vanadium	U	2450	mg/kg	5.0	25	23	27	30	28	25	34	24
Arsenic	M	2450	mg/kg	1.0	39	7.6	6.2	3.0	13	19	22	10
Selenium	M	2450	mg/kg	0.20	< 0.20	< 0.20	0.34	0.35	< 0.20	0.81	0.80	0.38
Cyanide (Free)	M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Naphthalene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	2.0	< 0.10
Acenaphthylene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.51	< 0.10
Acenaphthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.73	< 0.10
Fluorene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.98	< 0.10
Phenanthrene	M	2700	mg/kg	0.10	1.4	1.5	0.42	< 0.10	1.0	< 0.10	2.3	0.65
Anthracene	M	2700	mg/kg	0.10	0.25	0.27	0.10	< 0.10	0.19	< 0.10	0.45	0.14
Fluoranthene	M	2700	mg/kg	0.10	2.2	2.0	1.2	< 0.10	1.7	0.81	3.8	0.99
Pyrene	M	2700	mg/kg	0.10	2.3	2.0	1.1	< 0.10	1.7	0.90	3.6	1.0
Benzo[a]anthracene	M	2700	mg/kg	0.10	0.99	0.85	0.39	< 0.10	0.83	< 0.10	1.7	< 0.10
Chrysene	M	2700	mg/kg	0.10	1.3	1.1	0.44	< 0.10	1.2	< 0.10	2.7	< 0.10
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	< 0.10	1.1	< 0.10	< 0.10	1.2	< 0.10	2.1	< 0.10
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	< 0.10	0.48	< 0.10	< 0.10	0.54	< 0.10	1.3	< 0.10
Benzo[a]pyrene	M	2700	mg/kg	0.10	< 0.10	0.86	< 0.10	< 0.10	0.92	< 0.10	1.5	< 0.10
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.98	< 0.10
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.80	< 0.10
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	1.5	< 0.10
Total Of 16 PAH's	M	2700	mg/kg	2.0	8.4	10	3.7	< 2.0	9.3	< 2.0	27	2.8
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0			< 1.0		< 1.0		
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0			< 1.0		< 1.0		
Aliphatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0			< 1.0		< 1.0		
Aliphatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0			< 1.0		< 1.0		
Aliphatic TPH >C12-C16	M	2680	mg/kg	1.0	< 1.0			< 1.0		< 1.0		
Aliphatic TPH >C16-C21	M	2680	mg/kg	1.0	< 1.0			< 1.0		< 1.0		
Aliphatic TPH >C21-C35	M	2680	mg/kg	1.0	45			< 1.0		< 1.0		
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0			< 1.0		< 1.0		
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	45			< 5.0		< 5.0		

Results - Soil

Project: C1061/20/E/1936

Client: Rogers Geotechnical Services Ltd		**Chemtest Job No.:**			20-35120	20-35120	20-35120	20-35120	20-35120	20-35120	20-35120	20-35120
Quotation No.:		**Chemtest Sample ID.:**			1117586	1117587	1117588	1117589	1117590	1117591	1117592	1117593
Order No.: PO-1149		Client Sample Ref.:			1	2	1	2	1	1	1	2
		Sample Location:			TP01	TP01	TP02	TP02	TP03	TP04	TP05	TP05
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.3	0.5	0.2	0.4	0.5	0.3	0.2	0.6
		Date Sampled:			17-Dec-2020	17-Dec-2020	17-Dec-2020	17-Dec-2020	17-Dec-2020	17-Dec-2020	17-Dec-2020	17-Dec-2020
		Asbestos Lab:			COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0			< 1.0		< 1.0		
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0			< 1.0		< 1.0		
Aromatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0			< 1.0		< 1.0		
Aromatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0			< 1.0		< 1.0		
Aromatic TPH >C12-C16	M	2680	mg/kg	1.0	< 1.0			< 1.0		< 1.0		
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0			< 1.0		< 1.0		
Aromatic TPH >C21-C35	M	2680	mg/kg	1.0	< 1.0			< 1.0		< 1.0		
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0			< 1.0		< 1.0		
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0			< 5.0		< 5.0		
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	45			< 10		< 10		
ACM Type	U	2192		N/A	-	-	-	-	-	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
ACM Detection Stage	U	2192		N/A	-	-	-	-	-	-	-	-
Moisture	N	2030	%	0.020	6.2	5.5	19	16	7.7	20	16	15
Soil Colour	N	2040		N/A	Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown
Other Material	N	2040		N/A	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Stones
Soil Texture	N	2040		N/A	Sand	Sand	Clay	Clay	Sand	Clay	Sand	Sand
Chromium	M	2450	mg/kg	1.0	46	45	26	26	28	21	46	25
Organic Matter	M	2625	%	0.40	5.0	1.7	2.2	2.1	9.3	4.3	13	6.4

Results - Soil

Project: C1061/20/E/1936

Client: Rogers Geotechnical Services Ltd		**Chemtest Job No.:**			20-35120	20-35120	20-35120	20-35120
Quotation No.:		**Chemtest Sample ID.:**			1117594	1117595	1117596	1117597
Order No.: PO-1149		Client Sample Ref.:			1	1	1	1
		Sample Location:			TP06	TP07	TP08	TP09
		Sample Type:			SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.4	0.3	0.4	0.3
		Date Sampled:			17-Dec-2020	17-Dec-2020	17-Dec-2020	17-Dec-2020
		Asbestos Lab:			COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**				
Cadmium	M	2450	mg/kg	0.10	0.34	0.20	0.28	0.24
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Copper	M	2450	mg/kg	0.50	99	43	27	34
Mercury	M	2450	mg/kg	0.10	0.31	0.27	0.11	0.16
Nickel	M	2450	mg/kg	0.50	31	26	23	34
Lead	M	2450	mg/kg	0.50	590	38	22	29
Zinc	M	2450	mg/kg	0.50	110	51	51	49
Vanadium	U	2450	mg/kg	5.0	30	31	24	28
Arsenic	M	2450	mg/kg	1.0	24	11	11	9.6
Selenium	M	2450	mg/kg	0.20	0.88	1.1	< 0.20	1.0
Cyanide (Free)	M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Naphthalene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Pyrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Chrysene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	M	2700	mg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0		< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0		< 1.0
Aliphatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0	< 1.0		< 1.0
Aliphatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0	< 1.0		< 1.0
Aliphatic TPH >C12-C16	M	2680	mg/kg	1.0	< 1.0	< 1.0		< 1.0
Aliphatic TPH >C16-C21	M	2680	mg/kg	1.0	< 1.0	< 1.0		< 1.0
Aliphatic TPH >C21-C35	M	2680	mg/kg	1.0	21	< 1.0		< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0		< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	21	< 5.0		< 5.0

Results - Soil

Project: C1061/20/E/1936

Client: Rogers Geotechnical Services Ltd		**Chemtest Job No.:**			20-35120	20-35120	20-35120	20-35120
Quotation No.:		**Chemtest Sample ID.:**			1117594	1117595	1117596	1117597
Order No.: PO-1149		Client Sample Ref.:			1	1	1	1
		Sample Location:			TP06	TP07	TP08	TP09
		Sample Type:			SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.4	0.3	0.4	0.3
		Date Sampled:			17-Dec-2020	17-Dec-2020	17-Dec-2020	17-Dec-2020
		Asbestos Lab:			COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**				
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0		< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0		< 1.0
Aromatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0	< 1.0		< 1.0
Aromatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0	< 1.0		< 1.0
Aromatic TPH >C12-C16	M	2680	mg/kg	1.0	< 1.0	< 1.0		< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0		< 1.0
Aromatic TPH >C21-C35	M	2680	mg/kg	1.0	100	< 1.0		< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0		< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	100	< 5.0		< 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	120	< 10		< 10
ACM Type	U	2192		N/A	-	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
ACM Detection Stage	U	2192		N/A	-	-	-	-
Moisture	N	2030	%	0.020	14	13	9.5	12
Soil Colour	N	2040		N/A	Brown	Brown	Brown	Brown
Other Material	N	2040		N/A	Stones	Stones	Stones	Stones
Soil Texture	N	2040		N/A	Sand	Clay	Sand	Clay
Chromium	M	2450	mg/kg	1.0	39	37	27	33
Organic Matter	M	2625	%	0.40	5.2	6.0	1.4	1.5

Test Methods

SOP	Title	Parameters included	Method summary
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied

B - Sample age exceeds stability time (sampling to extraction)

C - Sample not received in appropriate containers

D - Broken Container

E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.com

Rogers Geotechnical Services: Soil Screening Values Comparison Sheet

The Ground Investigation Specialists

Rogers Geotechnical Services Ltd		Soil Screening Value (SSV) Comparison Sheet
Job Number	C1061/20/E/1936	A = WS Atkins PLC, Atrisk Soil Screening Values. A+ = Values updated June 2017. A* = Atrisk's SSV is lower than Chemtest'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
Job Name	Land off Waingate, Linthwaite , Huddersfield, HD7 5NR	**KEY** Exceeds SSV Exceeds 2017, Below 2015 Below limit of detection (LOD)
Date	31/12/2020	
Client	Williams Walling Limited	

Determinand	Units	Ref	LOD	Residential With Plant Uptake 1%		Sample Location	TP01	TP01	TP02	TP02	TP03	TP04
				Atrisk 2015 (No Free Product	Atrisk 2017	Depth Top	0.3	0.5	0.2	0.4	0.5	0.3
						Depth Base						
Cadmium	mg/kg	C	0.10		22.1		0.37	0.23	0.13	< 0.10	0.26	0.53
Chromium (Hexavalent)	mg/kg	B/C	0.5	20.5	3.62		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Copper	mg/kg	A+	0.50		4730		58	38.0	25	23	46	33
Mercury	mg/kg	A/D	0.10		8.81		0.17	0.1	0.12	< 0.10	0.21	1.1
Nickel	mg/kg	A+	0.50		136		20	25.0	29	27	20	16
Lead	mg/kg	C	0.50		200		260	120	130	28	170	130
Zinc	mg/kg	A+	0.50		20000		510	150	110	95	69	65
Vanadium	mg/kg	A+	5.0		136		25	23.0	27	30	28	25
Arsenic	mg/kg	C	1.0		37		39	8	6	3	13	19
Selenium	mg/kg	A	0.20		375		< 0.20	< 0.20	0.3	0.35	< 0.20	0.81
Cyanide (Free)	mg/kg	A	0.50		34		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Total Phenols	mg/kg	A	0.30		267							
Naphthalene	mg/kg	A+	0.10	0	0.829		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	mg/kg		0.10				< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	mg/kg	A+	0.10	608	157		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	mg/kg	A+	0.10	0	735		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	mg/kg		0.10				1.4	1.5	0.42	< 0.10	1	< 0.10
Anthracene	mg/kg	A+	0.10	0	10200		0.25	0.27	0.1	< 0.10	0.19	< 0.10
Fluoranthene	mg/kg	A+	0.10		983		2.20	2	1.2	< 0.10	1.7	0.81
Pyrene	mg/kg	A+	0.10		668		2.30	2	1.1	< 0.10	1.7	0.9
Benzo[a]anthracene	mg/kg	A	0.10	4.52	1.71		0.99	0.85	0.39	< 0.10	0.83	< 0.10
Chrysene	mg/kg	A	0.10	585	0.44		1.30	1.1	0.44	< 0.10	1.2	< 0.10
Benzo[b]fluoranthene	mg/kg	A	0.10	7.72	1.22		< 0.10	1.1	< 0.10	< 0.10	1.2	< 0.10
Benzo[k]fluoranthene	mg/kg	A	0.10	84.4	0.686		< 0.10	0.48	< 0.10	< 0.10	0.54	< 0.10
Benzo[a]pyrene	mg/kg	B/C	0.10	4.95	1.51		< 0.10	0.86	< 0.10	< 0.10	0.92	< 0.10
Indeno(1,2,3-c,d)Pyrene	mg/kg	A*	0.10	7.31	0.0614		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	mg/kg	A	0.10	0.838	0.00393		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	mg/kg	A	0.10	96.2	0.0187		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	mg/kg		2.0				8.4	10	3.7	< 2.0	9.3	< 2.0
Aliphatic TPH >C5-C6	mg/kg	A+	1.0	0	42.7		< 1.0			< 1.0		< 1.0
Aliphatic TPH >C6-C8	mg/kg	A+	1.0	0	99.3		< 1.0			< 1.0		< 1.0

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Job Name	Land off Waingate, Linthwaite , Huddersfield, HD7 5NR	**KEY** Exceeds SSV Exceeds 2017, Below 2015 Below limit of detection (LOD)
Date	31/12/2020	
Client	Williams Walling Limited	

Determinand	Units	Ref	LOD	Residential With Plant Uptake 1%		Sample Location	TP01	TP01	TP02	TP02	TP03	TP04
						Depth Top	0.3	0.5	0.2	0.4	0.5	0.3
						Depth Base						
Aliphatic TPH >C8-C10	mg/kg	A+	1.0	0	13.9		< 1.0			< 1.0		< 1.0
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+	1.0	385	20.9		< 1.0			< 1.0		< 1.0
Aliphatic TPH >C16-C21	mg/kg	A+	1.0		210000		< 1.0			< 1.0		< 1.0
Aliphatic TPH >C21-C35	mg/kg	A+	1.0		210000		45			< 1.0		< 1.0
Aliphatic TPH >C35-C44	mg/kg		1.0				< 1.0			< 1.0		< 1.0
Total Aliphatic Hydrocarbons	mg/kg		5.0				45			< 5.0		< 5.0
Aromatic TPH >C5-C7	mg/kg	A+	1.0		0.137		< 1.0			< 1.0		< 1.0
Aromatic TPH >C7-C8	mg/kg	A+	1.0	0	113		< 1.0			< 1.0		< 1.0
Aromatic TPH >C8-C10	mg/kg	A+	1.0	0	20.5		< 1.0			< 1.0		< 1.0
Aromatic TPH >C10-C12	mg/kg	A+	1.0	0	70		< 1.0			< 1.0		< 1.0
Aromatic TPH >C12-C16	mg/kg	A+	1.0	165	155		< 1.0			< 1.0		< 1.0
Aromatic TPH >C16-C21	mg/kg	A+	1.0		319		< 1.0			< 1.0		< 1.0
Aromatic TPH >C21-C35	mg/kg	A+	1.0		1120		< 1.0			< 1.0		< 1.0
Aromatic TPH >C35-C44	mg/kg		1.0				< 1.0			< 1.0		< 1.0
Total Aromatic Hydrocarbons	mg/kg		5.0				< 5.0			< 5.0		< 5.0
Total Petroleum Hydrocarbons	mg/kg		10.0				45			< 10		< 10
Asbestos Identification	%		0.001				No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Organic Matter	%		0.40				5.0	**1.7**	2.2	2.1	9.3	4.3

Rogers Geotechnical Services: Soil Screening Values Comparison Sheet

The Ground Investigation Specialists

Rogers Geotechnical Services Ltd							
Job Number	C1061/20/E/1936			KEY			
Job Name	Land off Waingate, Linthwaite , Huddersfield, HD7 5NR			Exceeds SSV Exceeds 2017, Below 2015 Below limit of detection (LOD)			
Date	31/12/2020			TP05	TP05	TP06	TP07
Client	Williams Walling Limited			0.2	0.6	0.4	0.3
Determinand	**Units**	**Ref**	**LOD**				
Cadmium	mg/kg	C	0.10	0.45	0.34	0.34	0.2
Chromium (Hexavalent)	mg/kg	B/C	0.5	< 0.50	< 0.50	< 0.50	< 0.50
Copper	mg/kg	A+	0.50	85	38	99	43
Mercury	mg/kg	A/D	0.10	0.59	0.34	0.31	0.27
Nickel	mg/kg	A+	0.50	27	19	31	26
Lead	mg/kg	C	0.50	730	360	590	38
Zinc	mg/kg	A+	0.50	140	78	110	51
Vanadium	mg/kg	A+	5.0	34	24	30	31
Arsenic	mg/kg	C	1.0	22	10	24	11
Selenium	mg/kg	A	0.20	0.8	0.38	0.88	1.1
Cyanide (Free)	mg/kg	A	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Total Phenols	mg/kg	A	0.30				
Naphthalene	mg/kg	A+	0.10	2	< 0.10	< 0.10	< 0.10
Acenaphthylene	mg/kg		0.10	0.51	< 0.10	< 0.10	< 0.10
Acenaphthene	mg/kg	A+	0.10	0.73	< 0.10	< 0.10	< 0.10
Fluorene	mg/kg	A+	0.10	0.98	< 0.10	< 0.10	< 0.10
Phenanthrene	mg/kg		0.10	2.3	0.65	< 0.10	< 0.10
Anthracene	mg/kg	A+	0.10	0.45	0.14	< 0.10	< 0.10
Fluoranthene	mg/kg	A+	0.10	3.8	0.99	< 0.10	< 0.10
Pyrene	mg/kg	A+	0.10	3.6	1	< 0.10	< 0.10
Benzo[a]anthracene	mg/kg	A	0.10	1.7	< 0.10	< 0.10	< 0.10
Chrysene	mg/kg	A	0.10	2.7	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	mg/kg	A	0.10	2.1	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	mg/kg	A	0.10	1.3	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	mg/kg	B/C	0.10	1.5	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	mg/kg	A*	0.10	0.98	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	mg/kg	A	0.10	0.8	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	mg/kg	A	0.10	1.5	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	mg/kg		2.0	27	2.8	< 2.0	< 2.0
Aliphatic TPH >C5-C6	mg/kg	A+	1.0			< 1.0	< 1.0
Aliphatic TPH >C6-C8	mg/kg	A+	1.0			< 1.0	< 1.0

Rogers Geotechnical Services: Soil Screening Values Comparison Sheet

Rogers Geotechnical Services Ltd							
Job Number	C1061/20/E/1936			KEY			
Job Name	Land off Waingate, Linthwaite , Huddersfield, HD7 5NR			Exceeds SSV Exceeds 2017, Below 2015 Below limit of detection (LOD)			
Date	31/12/2020			TP05	TP05	TP06	TP07
Client	Williams Walling Limited			0.2	0.6	0.4	0.3
Determinand	**Units**	**Ref**	**LOD**				
Aliphatic TPH >C8-C10	mg/kg	A+	1.0			< 1.0	< 1.0
Aliphatic TPH >C10-C12	mg/kg	A+	1.0			< 1.0	< 1.0
Aliphatic TPH >C12-C16	mg/kg	A+	1.0			< 1.0	< 1.0
Aliphatic TPH >C16-C21	mg/kg	A+	1.0			< 1.0	< 1.0
Aliphatic TPH >C21-C35	mg/kg	A+	1.0			21	< 1.0
Aliphatic TPH >C35-C44	mg/kg		1.0			< 1.0	< 1.0
Total Aliphatic Hydrocarbons	mg/kg		5.0			21	< 5.0
Aromatic TPH >C5-C7	mg/kg	A+	1.0			< 1.0	< 1.0
Aromatic TPH >C7-C8	mg/kg	A+	1.0			< 1.0	< 1.0
Aromatic TPH >C8-C10	mg/kg	A+	1.0			< 1.0	< 1.0
Aromatic TPH >C10-C12	mg/kg	A+	1.0			< 1.0	< 1.0
Aromatic TPH >C12-C16	mg/kg	A+	1.0			< 1.0	< 1.0
Aromatic TPH >C16-C21	mg/kg	A+	1.0			< 1.0	< 1.0
Aromatic TPH >C21-C35	mg/kg	A+	1.0			100	< 1.0
Aromatic TPH >C35-C44	mg/kg		1.0			< 1.0	< 1.0
Total Aromatic Hydrocarbons	mg/kg		5.0			100	< 5.0
Total Petroleum Hydrocarbons	mg/kg		10.0			120	< 10
Asbestos Identification	%		0.001	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Organic Matter	%		0.40	**13**	6.4	5.2	6

Appendix 4

Fill Screening Values

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.