



Intrusive Site Investigation Report

LOCATION	Land at 11 Slathwaite Drive, Manchester M11 4BA
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FOR	D Gornea
CLIENT REF.	
OUR REF.	G21100

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1. Introduction

In accordance with your instruction, Geoinvestigate Ltd. carried out an intrusive site investigation at Land at 11 Slathwaite Drive, Manchester M11 4BA.

It is proposed to erect a new, two-storey dwelling, with associated parking and landscaping on the site.

The preliminary Phase 1 Desk Study (G21100) suggested that the site would be underlain by several metres of made ground may be present, due to the site's past land use in terms of clay extraction and subsequent infilling works.

The purpose of this Phase 2 investigation was to establish the true nature of the ground conditions at the site with regard to the potential for contamination and hazardous gas to occur, and determining appropriate foundation types.

The site is reasonably flat forms a triangular parcel of land, surrounded by established dwellings.

2. Scope of Intrusive Investigation

2.1 Scope of Works

As agreed with the client, to give an indication as to the ground conditions at the site, the following investigation was considered appropriate to establish the foundation requirements for the proposed development:

- Sinking of three (3) boreholes (BH1, BH2 and BH3) to 3.00m depths respectively using a Dando Terrier Drill rig or hand portable drilling equipment with associated CPT and / or shear vane testing with supervision by an experienced and qualified geotechnical engineer.
- Excavation of two (2) hand excavated trial pits to a depth of 0.50m to recover further samples for contamination within proposed garden areas.
- Installation of three (3) gas wells across the site (BH1, BH2 and BH3), with up to six (6) gas monitoring visits to test for potential hazardous gases (CO₂ and CH₄) at a range of high and low atmospheric pressures.
- Recovery of samples from the boreholes at 0.50m intervals.
- Contamination analysis on six (6) samples recovered from depths of 0.20m to 1.00m to confirm that metals, Asbestos and speciated polycyclic aromatic hydrocarbons (PAHs) and Total Petroleum Hydrocarbons (TPHs) are absent or within acceptable limits. Leachate testing was carried out on two samples to determine contaminant mobility.
- Provision of an interpretative report including, site plan, borehole logs and geotechnical soil analysis results, together with advice on the contamination situation and, if required, remediation and validation.

The positions of each of the boreholes and trial pit, are shown on the plan provided in Appendix 1 which also shows the layout of the proposed development.

The excavations were sampled and logged at site by a geotechnical engineer and the ground conditions encountered are described on the borehole log also provided in Appendix 1.

No Geotechnical Assessment is made by this report, as this has been dealt with on a previous study report.

The results of the contamination testing are included in Chemtech Report 94205 in Appendix 2.

2.2 Sampling Rationale

BH1, BH2 and BH3, along with TPA and TPB, were positioned within or close to the footprint of the proposed building on site. BH1 to the south-west, BH2 to the north-west and BH3 to the East. TPA and TPB were excavated within proposed garden areas and were located at the centre of the site (TPA) and to the west (TPB).

3 Phase 2 Investigation Findings

3.1. Encountered Ground Conditions

3.1.1 BH1, BH2 and BH3.

The boreholes at the site encountered generally similar conditions, with initial made ground comprising very soft / loose very sandy clayey gravel / very sandy gravelly clay to depths of 2.20m in BH3, 2.70m in BH1 and the entire depth of the borehole (3.00m) in BH2.

Gravel constituents in the made ground include, sandstone, brick, concrete, ash, glass, tile and coal with some plastic noted also.

Below the fill BH1 and BH3 both encountered firm natural, slightly gravelly sandy clay to the base of each borehole at 3.00m and 4.00m. The clay is noted as becoming stiff from 2.40m to 3.80m. Both boreholes are terminated, BH1 at 4.00m and BH3 at 3.00m.

Vane shear strength testing within the natural clay returned values of between 52kN/m² to 110kN/m² between 2.50m to 4.00m.

In situ SPT testing was carried out (using a solid cone sampler) within the made ground and returned N values of N=7, N=3 and N=3, at 1.00m; N=6, N=3 and N=5, at 2.00m in BH1, BH2 and BH3 respectively.

Roots were noted to depths of 3.00m in BH2 only.

All three boreholes remained open and dry on completion.

3.1.2 TPA and TPB

TPA and TPB both encountered very soft to very loose, sandy gravelly clay/clayey sandy gravel. Gravel constituents include brick, sandstone, ash, concrete and occasional coal. Both trial pits were terminated at 0.50m.

The trial pit remained stable and dry upon completion.

3.2 Summary of Conditions Encountered

The presence of between 2.20m and >3m of made ground at the site corroborates with the Phase 1 Desk Study findings that the site lies within an area of infilling. The variable depth present also suggests that the site may have, as suspected, been an incised valley, subsequently infilled to form a level surface.

4. Contamination Testing

As mentioned in Section 1, the conclusions in the Phase 1 Desk Study considered that the site's location within an infilled valley and subsequent fill would comprise the most viable source of contamination at the site.

Potential contaminant could potentially occur throughout the full thickness of the made ground which was recovered from the boreholes and trial pits to a depth of up to 3.00m. Soils close to surface would most relevant regarding human risk assessment through analysis of deeper soils would also be appropriate to ensure no risk to local ground and surface waters exists through potential contaminant leaching and mobilisation.

The proposed development of the site, adjacent dwellings and site history, potential contamination risk existed at the site.

Therefore five (5) samples of made ground were recovered from a depth of 0.20m to 0.50m from the site and tested for a range of substances.

These included common contaminants such as Arsenic, Lead and Cadmium which are normally included in a general human health contamination suite together with analysis for Speciated polycyclic aromatic hydrocarbons (PAHs), Total Petroleum Hydrocarbons (TPHs) and Asbestos. Additionally, leachate testing was also carried out on two samples to establish the mobility of potential contaminants.

The results of the contamination testing are included in Appendix 3 of this report (Chemtech Environmental Ltd. Report 94788) and have been used in the contamination risk assessment, set out in the following sections.

5. Risk Assessment

5.1 Method

Geoinvestigate Ltd. uses a combination of assessment criterion provided by the environment agency, DEFRA and by the Chartered Institute of Environmental Health; Environment Agency Environmental Quality Standards (EQSs), Site Specific Assessment Criteria (SSAC) generated using CLEA software version 1.06 site specific risk assessment modelling, DEFRA Category 4 Screening Levels (C4SLs), and Land Quality Management / Chartered Institute of Environmental Health (LQM/CIEH) Safe for use Levels (S4ULs) in order to assess the presence of potentially harmful chemicals within soils and water.

As the site is to be redeveloped as a new residential dwelling, it is considered appropriate to treat it as falling within the residential end-use category. Uptake by grown produce is considered possible due to this end use and therefore is reflected in the contamination thresholds chosen.

In this instance, no site-specific assessment criteria (SSAC) have been created for the site as no unusual circumstances are considered to be present/likely at the site that would render the generic residential assessment criteria unsuitable.

The results of the contamination testing that has been carried out have been compared to the soil quality values from the above sources. Where they fall below these limit values, they have been deemed safe for a residential end use.

Where results are above the intervention values, an assessment of the available pathways and receptors has been carried out to determine whether further investigation or remediation is necessary. An appraisal of the chemical results and relevant limits is set out in the Contamination Risk Assessment that follows.

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5.2 Contamination Risk to Identified Receptors

5.2.1 Contamination Risk to Human Health

Made ground is present to depths of up to 3.00m at the site therefore there was a possible source of contamination within this. The site is considered to be at high risk of contamination at the site, due to the history of the site area and depth of encountered made ground.

Although some occasional glass fragments were present in the made ground, no hydrocarbon staining, odours, obvious chemical substances or signs of physical contamination such as metal shards were noted in any of the material uncovered in the boreholes. Neither was there any visible evidence of Asbestos contamination such as roofing board. In light of this it was not anticipated that chemical or physical contamination would pose a significant hazard for the new development and its users but given the former land use, analysis would be required to confirm this.

Samples submitted for analysis were generally chosen to give a representation of the majority of strata considered to pose likely risk to environmental and human receptors at site. Borehole locations were sunk throughout the site, to provide general non-targeted analyses of soil samples from other areas around the site. Trial Pits were excavated within proposed garden areas to target the areas at most potential exposure to the sites end-users.

As discussed earlier in the report, levels of determinands have been compared to the assessment criteria for residential end-use, as published by the Environment Agency, LQM/CIEH and DEFRA.

The results of the analyses of six (6) samples of soil recovered from the site from a depth of 0.20m and 0.50m returned concentrations of a range of substances falling, for the most part, below respective assessment criteria adopted from the sources named above with some exceptions discussed later. Further discussion is presented in the following sections.

Where they fall below these limits, they have been deemed safe for residential end use. Where results are above the target values, an assessment of the available pathways and receptors has been carried out to determine whether further investigation or remediation is necessary.

A mean Total Organic Carbon Content of 9.14% (TOC range 0.7%-14.4%) and mean Soil Organic Matter Content (SOM) of 15.74% (estimated from the TOC – range 1.2% to 24.8%) were returned from the soil analyses. Therefore, the LQM/CIEH GAC for PAHs and Hydrocarbons were chosen using the Soil Organic Matter (SOM) option of 6.0% as a conservative choice.

Table 1: Chemical Determinands in Soils

	Range of Returned concentrations (mg/kg)	S4UL (LQM/CIEH)* (mg/kg)	C4SL (DEFRA)* (mg/kg)
Asbestos	None encountered in any (4) samples	Any presence unacceptable	
Arsenic	10-55	37	40
Boron	<0.5-1.4	290	
Cadmium	0.30-1.70	11	149
Chromium VI	<1	6	21
Chromium III	13-64	910	
Copper	37-158	2,400	
Lead	273- 573		310
Mercury (elemental)	<0.5- 3.3	1.2	
Nickel	8.0-48	180	
Selenium	<0.3-1.7	250	
Zinc	68-421	3,700	
pH	7.2-7.7	See Report Section 7.3 "Concrete Design"	
Water Soluble SO ₄	641-1923		
Phenol	<0.5-0.9	1100	
Total PAH	1.65-620		
PAH Acenaphthene	<0.02-10.27	1100	
PAH Acenaphthylene	<0.02-0.42	920	
PAH Anthracene	0.04-28.01	11000	
PAH Benzo[a]anthracene	<0.12- 43.27	13	
PAH Benzo(a)pyrene	0.16- 38.6	3.0	5.3
PAH Benzo(b)fluoranthene	0.18- 44.51	3.7	
PAH Benzo(ghi)perylene	0.22-21.74	350	
PAH Benzo(k)fluoranthene	0.07-18.41	100	
PAH Chrysene	0.12- 44.64	27	
PAH Dibenzo(a,h)anthracene	0.03- 7.06	0.30	
PAH Fluoranthene	0.22-122.04	890	
PAH Fluorene	<0.02-8.12	860	
PAH Indeno(123-cd)pyrene	0.18-23.22	41	
PAH Naphthalene	<0.02-1.72	13	
PAH Phenanthrene	0.12-104.45	440	
PAH Pyrene	0.21-103.79	2000	
TPH Aromatic C5-C7	<0.01	300	
TPH Aromatic C7-C8	<0.01	660	
TPH Aromatic C8-C10	<0.01-0.03	190	
TPH Aromatic C10-C12	2-3	380	
TPH Aromatic C12-C16	4-12	660	
TPH Aromatic C16-C21	63-367	930	
TPH Aromatic C21-C35	47-220	1700	
TPH Aromatic C35-C44	7-23	1700	
TPH Aliphatic C5-C6	<0.1	160	
TPH Aliphatic C6-C8	<0.1	530	
TPH Aliphatic C8-C10	<0.1	150	
TPH Aliphatic C10-C12	<4-9	760 (283)**	
TPH Aliphatic C12-C16	26-86	4300 (142)**	
TPH Aliphatic C16-C35	509-1923	110000 (21)**	
TPH Aliphatic C35-C44	59-262	110000 (21)**	

*For Residential use with allowance for cultivation of fruit/veg and at 6.0% organic matter where relevant.

Figures in parentheses represent estimated soil saturation limits above which there *may* be some potential for free phase contamination to exist. Exceedances of assessment Criteria shown in **BOLD type

As can be seen from the results in Table 1 and the detailed results presented in Chemtech Environmental Ltd. report 64205 (Appendix 2) the returned results are than the adopted assessment criteria, for all determinands, without exception.

No asbestos fibres were detected in the four samples tested. BTEX compounds returned levels less than detectable limits in both samples tested.

As can be seen from the results in Table 1 and the detailed results presented in Chemtech Environmental Ltd. Report 94788 (Appendix 3) the returned results are less than the adopted assessment criteria with only some exemptions:

- Arsenic (As) was found at 55mg/kg in the sample recovered from BH2 at 0.20m.
- Lead (Pb) was found at 358mg/kg in the sample recovered from BH1 at 0.20m depth and 573mg/kg in the sample recovered from BH3 at 0.50m.
- Mercury was found at 3.3mg/kg in the sample recovered from BH2 at 0.20m.
- Five PAH species were also present at levels above the S4UL target values
 - PAH Benzo[a]anthracene was found at 43.27mg/kg, 14.46mg/kg and 14.69mg/kg in BH2, TPA and TPB, respectively.
 - PAH Benzo(a)pyrene was found at 8.95mg/kg, 38.06mg/kg, 14.55mg/kg and 15.90mg/kg in BH1, BH2, TPA and TPB respectively.
 - PAH Benzo(b)fluoranthene was found at 10.01mg/kg, 44.51mg/kg, 16.16mg/kg and 16.34mg/kg in BH1, BH2, TPA and TPB, respectively.
 - PAH Chrysene was found at 44.64mg/kg in BH2 at 0.20m.
 - PAH Dibenzo(a,h)anthracene was found at 1.26 mg/kg, 7.06mg/kg, 2.05mg/kg and 2.32mg/kg in BH1, BH2, TPA and TPB, respectively.

5.2.2 Contamination Risk to Controlled Waters

Given the possible sources of historical land uses adjacent to/on site leachate was analysed from two (2) samples obtained from BH2 at 0.20m and TPB at 0.20m. This screening returned generally negligible concentrations (though not without exception) and concentrations below detectable limits and/or safe levels for domestic water supply or the protection of aquatic life levels as published by the Environment Agency which were used as the assessment criteria (EQSs). The results of the testing and the assessment criteria are shown Table 2 on the following page which is followed by discussion regarding occasional exceedances of these assessment criteria.

Table 2: Chemical Determinands in Leachate

	Returned Concentrations (µg/l)	UK Standard for Surface Waters intended for Drinking Water Abstraction* (DW) and/or protection of Aquatic Life in surface waters* (Aq) (µg/l)
<i>Inorganic Chemicals</i>		
Arsenic	1.89-13.44	50-100 (DW, range: 50-100) / 50 (Aq)
Boron	27-33	1000 (DW & Aq)
Cadmium	<0.07-0.41	5 (DW & Aq)
Chromium	1.4-4.4	50 (DW) / 5-250 (Aq, range: 5-250)
Copper	8.8-15.9	50 (DW) / 5-112 (Aq, range: 5-112)
Lead	0.9-8.0	50 (DW) / 4-250 (Aq, range: 4-250)
Mercury (elemental Hg)	<0.008-0.024	1 (DW & Aq)
Nickel	1.4-3.5	20** (DW) / 50-200 (Aq, range: 50-200)
Selenium	0.26-0.93	10 (DW) (No Aq standard)
Zinc	7-41	3000 (DW, range: 3000-5000) / 30-2000 (Aq, range: 30-2000)
pH	7.6-8.0	Range 5.5 to 10 (UK drinking water standards)
<i>Organic Chemicals</i>		
Cyanide	<20 (both)	50 (DW) / 5 (Aq)
Phenols	<10 (both)	50** (DW) / 300 (Aq)
PAHs (total)	<1.6 – 2.7	
PAH Species at detectable concentrations:		
Acenaphthene	<0.1-1.1	No applicable UK standard
Anthracene	<0.1	0.4 (inland surface waters – max. allowable concentration)
Fluorene	<0.1-0.5	No applicable UK standard
Naphthalene	<0.1	10 (Aq) / 2.4 (inland surface waters)
Phenanthrene	<0.1	No applicable UK standard

*sourced from Environment Agency database at <http://evidence.environment-agency.gov.uk/ChemicalStandards/home.aspx>.

If more than one option is available (dependant on other water properties or environmental setting) applicability is discussed later.

**Standard for water supply as no standard available for surface water abstraction for drinking water.

Concentrations of Phenol are below detectable limits and would not be considered to pose a risk to controlled waters.

As can be seen from Table 3 and the detailed results presented in Chemtech Environmental Ltd report 94205 (Appendix 2), soils at the site have been shown not to be leaching any potential inorganic contaminants at elevated levels and as such would not be considered to pose a potential risk to the local ground or surface water features through leaching.

Some leachates returned elevated copper and lead concentrations which exceed the lowest threshold of the assessment criteria options (of several possible choices). These lowest options relate to freshwater with very low calcium carbonate content (<50mg/l_ which is unlikely in water of pH 7.6 to 8.0 as measures for these leachates (Low CaCO₃ content would be expected to more likely in more acidic waters than this). Though no data has been collected regarding the calcium carbonate content of local waters and underlying groundwater, groundwater in the limestone bedrock would have intrinsically high pH and CaCO₃ content, and the low concentration and consequently very minor nature of the exceedances suggest that these results not represent any noteworthy risk to underground or surface waters.

In summary, the leachate testing returned negligible concentrations of determinands which would generally pass the adopted water quality standards and would not be considered to be representative of any noteworthy risk to surface or ground waters.

5.3 Review of Results

Soils

In general, all samples tested at the site returned concentrations of all (tested) potential contaminants within acceptable limits with several exceptions.

Although some of the Metal exceedances may be regarded as anomalous, these, together with the very high exceedances for several species of PAH in most of the returned samples tested at the site would infer that the made ground present provides a viable source of contamination to the site's end users. This would not be untypical given the nature of the fill beneath the site.

Waters

Leachate analysis has shown all (tested) potential contaminants are not mobile/leachable at noteworthy levels. As such, soils at the site are not expected to pose any significant risk to ground and surface waters.

Therefore, it is concluded that remedial works will be required at the site before it can be deemed suitable for residential use.

Remedial Options

The most suitable remedial solution would be a "cover system" or "capping layer". This system involves the removal of near-surface soils to an agreed depth (normally 600mm below proposed finished ground levels), followed by replacement with a 600mm thickness of proven uncontaminated material.

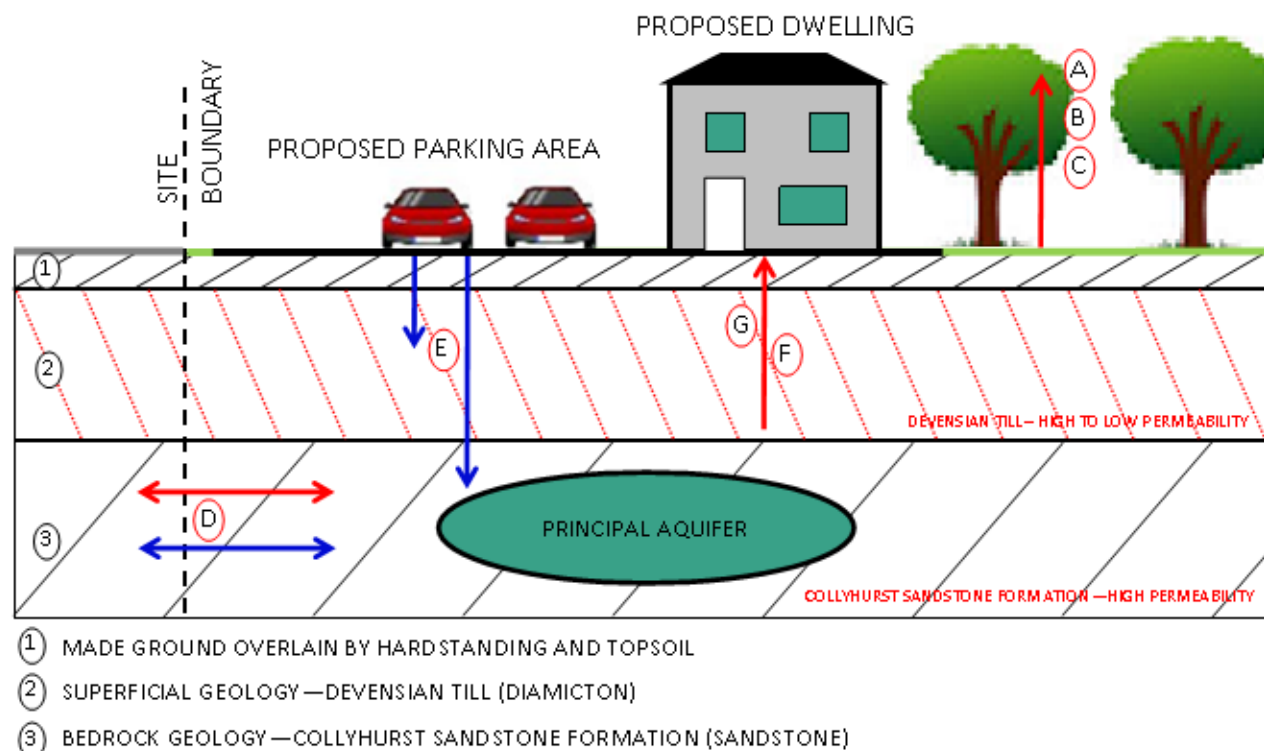
This method is advantageous where no risk to groundwater exists and removal/replacement of *all* potentially contaminated soils would clearly therefore be very wasteful. The remedial work will only be necessary in areas of proposed gardens and soft landscaping. Areas where buildings or hardstanding are proposed will not require any such work as no pathway will exist whereby the vulnerable receptors (i.e. future residents) can come into contact with the potentially contaminated soils.

The local planning authority (LPA) will most likely require a "remediation and validation strategy" document for approval prior to commencement of the remedial works, and a "validation report" on completion of the works confirming their success.

5.3.1 Summary and Conceptual Ground Hazard Model

Given the findings in section 5.3 above it is concluded that no remedial action is likely to be required at the site.

Figure 2 – Conceptual cross section of site including a Source, Pathway and Receptor Model



IDENTIFIED HAZARDS Including Potential CONTAMINATION SOURCES

- Made ground services and utilities associated with demolished former developments.
- Ground surface instability due to potential weak made ground (Infilled valley & Filled ground workings).
- Potential hazardous gases sourced from made ground near to or within site.

IDENTIFIED RECEPTORS and ASSOCIATED PATHWAY

- A—** End Users through Direct Contact / Inhalation / Ingestion. Buildings and hard standing will encompass most of the site, removing any pathway to end users through direct contact in these areas.
- B—** Plants and Trees through uptake, possible given the intended end use of the site.
- C—** End Users through cultivation and consumption of vegetables / fruit. Possible given the intended end use of the site.

Linkages considered possible due to elevated contaminants. Remediation will be necessary.

- D—** Neighbouring Sites through lateral migration (in soil and water, including surface water run off).
- E—** Ground water through leaching of sub-soil.
- F—** Buildings and services through direct contact. Buildings and hard standing will encompass some of the site, removing any pathway to end users through direct contact in these areas.

Linkages D-F considered disproves due to negligible levels of potential contaminants within Leachates.

- G—** End users and buildings through ground gas migration. Buildings and hard standing will encompass some of the site, removing any pathway to end users through direct contact in these areas.

Ongoing gas monitoring regime. See section 6.

6 Hazardous Gas

6.1 Gas Regime

Based on the presence of several metres of made ground beneath the site and in order to quantify the risk from ground gas to the proposed dwelling, a ground gas monitoring exercise was considered necessary.

Gas monitoring wells were therefore installed in boreholes BH1, BH2 and BH3. The results of two (2) initial gas monitoring visits at the site are presented in Table 3 below.

A further four additional measurements may be required to complete the gas risk assessment at the site.

Table 3 Summary of Gas Monitoring Data

Borehole	Number of Visits	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	Flow Rate (l/hr)	Atmospheric Pressure (mb)
BH1	2	<0.1-0.2	1.1-1.7	18.7-19.2	<0.1	1003 and 1005
BH2		<0.1-0.1	1.7-2.3	17.6-18.1	<0.1	
BH3		<0.1	1.0-1.1	19.1-19.2	<0.1	

The one gas monitoring visit carried out to date at atmospheric pressures of 1003mb and 1005mb returned:

- Near normal levels of O₂ of between 17.6% and 19.2%.
- Negligible levels of CH₄ of <0.1% to 0.1%.
- Slightly elevated levels of CO₂ recorded between 1.1% and 2.3%.
- Negligible flow rates below detectable limits (<0.1 l/hr).

6.2 Radon Gas

According to the Phase 1 Desk Study the site is within an area of <1% to 3% maximum radon potential and as such no radon protection is required for the proposed dwelling.

7. Conclusions

7.1 Contamination

Analysis of the ground conditions at the site and an assessment of the potential pathways have confirmed that the site will require remedial works before it can be deemed suitable for residential use. Elevated PAH concentrations have been identified in TPA, TPB, BH1 and BH2.

Leachate analysis of BH2 and TPB has shown that although the elevated PAHs levels are present in solid form, no significant risk is present to the ground and surface waters.

The most suitable remedial solution would be a “cover system” or “capping layer”. This system involves the removal of near-surface soils to an agreed depth (normally 600mm below proposed finished ground levels), followed by replacement with a 600mm thickness of proven uncontaminated material.

7.2 Hazardous Gas

Gas monitoring is ongoing at the site with two monitoring visits having been undertaken to date. Slightly elevated CO₂ has been encountered in BH1 and BH2 to varying degrees, with O₂ found to be depleted to corresponding extent. Normal gas levels have otherwise been returned (for CH₄, CO, H₂S).

On the basis of just the gas screening value, a classification of Characteristic situation 1 (CS1) of the Modified Wilson and Card classification might be inferred (CIRIA C665). However, no testing has been carried out at Low or following falling atmospheric pressure, therefore, it is possible that the gassing levels may increase.

This is dependent on the findings of the continued monitoring of course, and if this returns comparable results, the above CS1 categorisation will apply. A Gas Monitoring Addendum Report containing final recommendations will subsequently be issued on completion of the gas monitoring exercise. It is possible that the inferred level of gas risk and required protection might increase or decrease.

7.3 Concrete design

The results of chemical analyses of the topsoil returned Water Soluble Sulphate levels of between 25mg/l and 64mg/l (SO₄) and pH levels of between 8.4 and 8.7. On this basis concrete in contact with the ground may be designed to ACEC Class AC-1 of BRE Special Digest 1 – Concrete in aggressive ground.

END OF REPORT

The findings and contents of this (intrusive) Site Investigation Report pertain solely to the study area(s) outlined herein and are based solely on the findings of the excavations undertaken as part of the current exercise unless otherwise stated. The findings and/or recommendations of this report do not take into account any ground conditions that may be present but have hitherto not been encountered and as such further investigation and/or a reconsideration of the findings of this report should be undertaken if such conditions are subsequently encountered or an alternative development plan or land use is subsequently proposed.

This report considers various environmental and/or geological risks posed to the site and/or proposed development and offers advice accordingly as guidance only. The findings of this report will remain valid provided no change of ground or groundwater conditions, either natural or anthropogenic, take place and no warrantee is offered or implied.

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APPENDIX 1
SITE PLAN
and
BOREHOLE & TRIAL PIT LOGS

GEOINVESTIGATE Ltd.

Your Ref.

Our Ref.

G21100

BH No.1 Sheet No. 1 of 1

Location: 11 Scathwaite Drive, Manchester, M11 4BA

DATE: 09/03/21

Depth (m)	Description of Strata	Thick-ness	Legend	Gas Well	Sample	Test Type Result	SPT N Value (Depth)	Depth to Water	Depth (m)
0.25	MADE GROUND. Loose blackish brown sandy gravel/gravelly sand. Gravel is fine to coarse of brick, glass, ash, concrete and coal. Brick cobbles noted.	2700			O	Cv kN/m ²	1.00m - 1.45m 1/1/2/2/2/1 N = 7		0.25
0.50					O				0.50
0.75					O				0.75
1.00					O				1.00
1.25					O				1.25
1.50					O				1.50
1.75	Firm light orangish brown and occasionally mottled grey sandy gravelly CLAY. Gravel is fine to coarse of sandstone and occasional coal.	1300			O	52	2.00m - 2.45m 2/1/1/2/1/2 N = 6		1.75
2.00					O				2.00
2.25					O				2.25
2.50					O				2.50
2.75					O				2.75
3.00					O				3.00
3.25	Becoming stiff from 3.80m.				O	61			3.25
3.50					O				3.50
3.75					O				3.75
4.00					O	81			4.00
	Borehole terminated at 4.00m								

Remarks:

Casing to 1.00m

Dynamic windowless sampling by Terrier Rig to 4.00m

Borehole remained dry on completion

Gas well installed to 3.00m with gas bung and cover

Key:

Slotted Pipe

Plain Pipe

Bentonite

Gravel Filter

O Disturbed sample

Cv Shear vane

W Water sample

S Standard Penetration Test

C Cone Penetration Test

BH1

GEOINVESTIGATE Ltd.

Your Ref.

Our Ref.

G21100

BH No.2 Sheet No. 1 of 1

Location: 11 Scathwaite Drive, Manchester, M11 4BA

DATE: 09/03/21

Depth (m)	Description of Strata	Thick-ness	Legend	Gas Well	Sample	Test Type Result	SPT N Value (Depth)	Depth to Water	Depth (m)
	MADE GROUND. Dark brown and blackish brown very soft/loose sandy gravelly clay/clayey sandy gravel. Gravel is fine to coarse of brick, sandstone, ash, concrete and occasional coal. Plastic and glass also noted.					Cv kN/m ²			0.25
									0.50
									0.75
							1.00m - 1.45m 1/1/0/1/1/1 N = 3		1.00
									1.25
									1.50
									1.75
							2.00m - 2.45m 1/1/1/1/2/1 N = 5		2.00
									2.25
									2.50
									2.75
3.00	Roots noted to 3.00m.								3.00
	Borehole terminated at 3.00m								

Remarks:

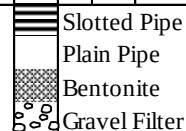
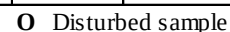
Casing to 1.00m

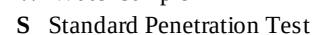
Dynamic windowless sampling by Terrier Rig to 3.00m

Borehole remained dry on completion

Gas well installed to 3.00m with gas bung and cover

Key:

BH2

GEOINVESTIGATE Ltd.

Your Ref.

Our Ref.

G21100

BH No.3 Sheet No. 1 of 1

Location: 11 Scathwaite Drive, Manchester, M11 4BA

DATE: 09/03/21

Depth (m)	Description of Strata	Thickness	Legend	Gas Well	Sample	Test Type Result	SPT N Value (Depth)	Depth to Water	Depth (m)
0.30	MADE GROUND. Dark brown and blackish brown very soft/loose sandy gravelly clay/clayey sandy gravel. Gravel is fine to coarse of brick, sandstone, ash, concrete and occasional coal.	300			O	Cv kN/m ²			0.25
					O				0.50
	MADE GROUND. Very loose light grey slightly sandy gravel. Gravel is fine to coarse of dolomite and occasional coal.				O		1.00m - 1.45m 1/1/0/1/1/1 N = 3		0.75
					O				1.00
		1800			O				1.25
					O				1.50
					O		2.00m - 2.45m 0/0/0/1/1/1 N = 3		1.75
2.10					O				2.00
2.20	MADE GROUND. Dark blackish brown very loose sandy gravel. Gravel is fine to coarse of brick, ash and coal. Glass noted.	100			O	82			2.25
					O				2.50
	Firm orangish brown mottled grey slightly gravelly sandy CLAY. Gravel is fine to coarse of sandstone and occasional coal. Becoming stiff from 2.40m.	800			O	92			2.75
3.00					O	110			3.00
	Borehole terminated at 3.00m								

Remarks:

Casing to 1.00m

Dynamic windowless sampling by Terrier Rig to 3.00m

Borehole remained dry on completion

Gas well installed to 3.00m with gas bung and cover

Key:

 Slotted Pipe
 Plain Pipe
 Bentonite
 Gravel Filter

O Disturbed sample
Cv Shear vane
W Water sample
S Standard Penetration Test

BH3

GEOINVESTIGATE Ltd.

Your Ref.

Our Ref. G21100

TP No.A Sheet No. 1 of 1

Location: 11 Scathwaite Drive, Manchester, M11 4BA

DATE: 9/3/21

Depth (m)	Description of Strata	Thick-ness	Legend	Sample	Test Type Result	Root Information	Depth to Water	Depth (m)
0.50	MADE GROUND. Very soft/loose dark brown and blackish brown sandy gravelly clay/clayey sandy gravel. Gravel is fine to coarse of brick, sandstone, ash, concrete and occasional coal.	500		O O				0.25 0.50
	Trial pit terminated at 0.50m							

Remarks: Hand excavated to 0.50m
Trial pit remained stable and dry on completion

Key: O Disturbed sample
Cv Shear vane
W Water sample

GEOINVESTIGATE Ltd.

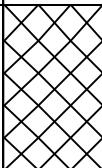
Your Ref.

Our Ref. G21100

TP No.2 Sheet No. 1 of 1

Location: 11 Scathwaite Drive, Manchester, M11 4BA

DATE: 09/03/21

Depth (m)	Description of Strata	Thick-ness	Legend	Sample	Test Type Result	Root Information	Depth to Water	Depth (m)
0.50	MADE GROUND. Very soft/loose dark brown and blackish brown sandy gravelly clay/clayey sandy gravel. Gravel is fine to coarse of brick, sandstone, ash, concrete and occasional coal.	500		O	Cv kN/m ²			0.25
				O				0.50
	Trial pit terminated at 0.50m							

Remarks: Hand excavated to 0.50m
Trial pit remained stable and dry on completion

Key: O Disturbed sample
Cv Shear vane
W Water sample

APPENDIX 2
Chemtech Water Soluble Sulphate
Test Results



ANALYTICAL TEST REPORT

Contract no: 94788

Contract name: Proposed Dwelling - 11 Slathwaite Drive, Manchester M11 4BA

Client reference: G21100

Clients name: Geo Investigate

Clients address: Units 3a & 4 Terry Dicken Industrial Estate
Ellerbeck Way, Stokesley
North Yorkshire
TS9 7AE

Samples received: 26 March 2021

Analysis started: 26 March 2021

Analysis completed: 31 March 2021

Report issued: 31 March 2021

Notes: Opinions and interpretations expressed herein are outside the UKAS accreditation scope.
Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.
All testing carried out at Unit 6 Parkhead, Stanley, DH9 7YB, except for subcontracted testing.
Methods, procedures and performance data are available on request.
Results reported herein relate only to the material supplied to the laboratory.
This report shall not be reproduced except in full, without prior written approval.
Samples will be disposed of 6 weeks from initial receipt unless otherwise instructed.

Key: U UKAS accredited test
M MCERTS & UKAS accredited test
\$ Test carried out by an approved subcontractor
I/S Insufficient sample to carry out test
N/S Sample not suitable for testing
NAD No Asbestos Detected

Approved by:



Karan Campbell
Director

Unit 6 Parkhead, Greencroft Industrial Park, Stanley, County Durham, DH9 7YB
Tel 01207 528578 Email customerservices@chemtech-env.co.uk
Vat Reg No. 772 5703 18 Registered in England number 4284013

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SAMPLE INFORMATION

MCERTS (Soils):

Soil descriptions are only intended to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions. MCERTS accreditation applies for sand, clay and loam/topsoil, or combinations of these whether these are derived from naturally occurring soils or from made ground, as long as these materials constitute the major part of the sample. Other materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

All results are reported on a dry basis. Samples dried at no more than 30°C in a drying cabinet.
Analytical results are inclusive of stones.

Lab ref	Sample id	Depth (m)	Sample description	Material removed	% Removed	% Moisture
94788-1	BH1	0.20	Loamy Sand with Gravel	-	-	21.2
94788-2	BH2	0.20	Loamy Sand with Gravel	-	-	20.7
94788-3	BH3	0.50	Loamy Sand with Gravel	-	-	18.3
94788-4	TPA	0.20	Loamy Sand with Gravel	-	-	27.9
94788-5	TPB	0.20	Loamy Sand with Gravel	-	-	23.8

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SOILS

Lab number Sample id Depth (m) Date sampled			94788-1 BH1 0.20 10/03/2021	94788-2 BH2 0.20 10/03/2021	94788-3 BH3 0.50 10/03/2021	94788-4 TPA 0.20 10/03/2021	94788-5 TPB 0.20 10/03/2021
Test	Method	Units					
Arsenic (total)	CE127 ^M	mg/kg As	24	55	10	26	24
Boron (water soluble)	CE063	mg/kg B	1.7	1.4	<0.5	3.2	2.4
Cadmium (total)	CE127 ^M	mg/kg Cd	1.7	1.0	0.3	0.8	1.6
Chromium (total)	CE127 ^M	mg/kg Cr	55	64	13	32	44
Chromium (III)	CE208	mg/kg CrIII	55	64	13	32	44
Chromium (VI)	CE146	mg/kg CrVI	<1	<1	<1	<1	<1
Copper (total)	CE127 ^M	mg/kg Cu	114	158	37	128	149
Lead (total)	CE127 ^M	mg/kg Pb	358	273	573	276	292
Mercury (total)	CE127 ^M	mg/kg Hg	<0.5	3.3	0.6	<0.5	<0.5
Nickel (total)	CE127 ^M	mg/kg Ni	27	37	8.0	22	48
Selenium (total)	CE127 ^M	mg/kg Se	0.7	1.7	<0.3	0.7	0.6
Zinc (total)	CE127 ^M	mg/kg Zn	421	274	68	302	415
pH	CE004 ^M	units	7.7	7.6	7.2	7.2	7.2
Sulphate (2:1 water soluble)	CE061	mg/l SO ₄	1739	641	1668	1923	1874
Sulphide	CE079	mg/kg S ²⁻	<10	<10	<10	<10	<10
Cyanide (free)	CE077	mg/kg CN	<1	<1	<1	<1	<1
Cyanide (total)	CE077	mg/kg CN	2.2	1.4	<1	1.3	27
Thiocyanate	CE145 ^M	mg/kg SCN	1.9	1.5	<1	2.2	2.4
Phenols (total)	CE078	mg/kg PhOH	<0.5	<0.5	<0.5	<0.5	0.9
Total Organic Carbon (TOC)	CE197	% w/w C	6.6	10.3	0.7	14.4	13.7
Estimate of OMC (calculated from TOC)	CE197	% w/w	11.3	17.8	1.2	24.8	23.6
PAH							
Acenaphthene	CE087 ^M	mg/kg	3.16	10.27	<0.02	3.01	3.32
Acenaphthylene	CE087 ^M	mg/kg	0.29	0.42	<0.02	0.15	0.22
Anthracene	CE087 ^U	mg/kg	3.51	28.01	0.04	6.91	7.57
Benzo(a)anthracene	CE087 ^U	mg/kg	8.34	43.27	0.12	14.46	14.69
Benzo(a)pyrene	CE087 ^U	mg/kg	8.95	38.06	0.16	14.55	15.90
Benzo(b)fluoranthene	CE087 ^M	mg/kg	10.01	44.51	0.18	16.16	16.34
Benzo(ghi)perylene	CE087 ^M	mg/kg	5.86	21.74	0.22	8.56	9.95
Benzo(k)fluoranthene	CE087 ^M	mg/kg	3.54	18.41	0.07	5.88	6.59
Chrysene	CE087 ^M	mg/kg	7.68	44.64	0.12	15.41	12.69
Dibenz(ah)anthracene	CE087 ^M	mg/kg	1.26	7.06	0.03	2.05	2.32
Fluoranthene	CE087 ^M	mg/kg	21.42	122.04	0.22	36.80	37.21
Fluorene	CE087 ^U	mg/kg	2.29	8.12	<0.02	2.04	2.41
Indeno(123cd)pyrene	CE087 ^M	mg/kg	5.97	23.22	0.18	9.82	9.82
Naphthalene	CE087 ^M	mg/kg	1.29	1.72	<0.02	1.17	1.63
Phenanthrene	CE087 ^M	mg/kg	16.37	104.45	0.12	27.42	27.15
Pyrene	CE087 ^M	mg/kg	18.28	103.79	0.21	31.68	32.36
PAH (total of USEPA 16)	CE087	mg/kg	118	620	1.65	196	200
TPH							
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	<0.01	<0.01	-	<0.01	<0.01

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SOILS

Lab number			94788-1	94788-2	94788-3	94788-4	94788-5
Sample id			BH1	BH2	BH3	TPA	TPB
Depth (m)			0.20	0.20	0.50	0.20	0.20
Date sampled			10/03/2021	10/03/2021	10/03/2021	10/03/2021	10/03/2021
Test	Method	Units					
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	<0.01	<0.01	-	<0.01	<0.01
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	<0.01	0.01	-	0.03	<0.01
EPH Aromatic (>EC10-EC12)	CE068	mg/kg	2	3	-	2	3
EPH Aromatic (>EC12-EC16)	CE068	mg/kg	4	12	-	4	5
EPH Aromatic (>EC16-EC21)	CE068	mg/kg	63	367	-	106	108
EPH Aromatic (>EC21-EC35)	CE068	mg/kg	47	220	-	79	79
EPH Aromatic (>EC35-EC44)	CE068	mg/kg	7	23	-	10	11
VPH Aliphatic (>C5-C6)	CE067	mg/kg	<0.1	<0.1	-	<0.1	<0.1
VPH Aliphatic (>C6-C8)	CE067	mg/kg	<0.1	<0.1	-	<0.1	<0.1
VPH Aliphatic (>C8-C10)	CE067	mg/kg	<0.1	<0.1	-	<0.1	<0.1
EPH Aliphatic (>C10-C12)	CE068	mg/kg	4	9	-	7	<4
EPH Aliphatic (>C12-C16)	CE068	mg/kg	26	86	-	36	35
EPH Aliphatic (>C16-C35)	CE068	mg/kg	755	1923	-	685	509
EPH Aliphatic (>C35-C44)	CE068	mg/kg	262	158	-	59	87
Subcontracted analysis							
Asbestos (qualitative)	\$	-	NAD	NAD	-	NAD	NAD

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PREPARED LEACHATES

Lab number Sample id Depth (m)			94788-2L BH2 0.20	94788-5L TPB 0.20
Test	Method	Units		
Arsenic (dissolved)	CE128 ^U	µg/l As	13.44	1.89
Boron (dissolved)	CE128 ^U	µg/l B	27	33
Cadmium (dissolved)	CE128 ^U	µg/l Cd	<0.07	0.41
Chromium (dissolved)	CE128 ^U	µg/l Cr	1.4	4.4
Copper (dissolved)	CE128 ^U	µg/l Cu	15.8	8.8
Lead (dissolved)	CE128 ^U	µg/l Pb	8.0	0.9
Mercury (dissolved)	CE128 ^U	µg/l Hg	0.024	<0.008
Nickel (dissolved)	CE128 ^U	µg/l Ni	1.4	3.5
Selenium (dissolved)	CE128 ^U	µg/l Se	0.93	0.26
Zinc (dissolved)	CE128 ^U	µg/l Zn	7	41
pH	CE213 ^U	units	8.0	7.6
Sulphate	CE049 ^U	mg/l SO ₄	16	567
Sulphur (dissolved)	CE128 ^U	mg/l S	5.4	199.2
Sulphide	CE079	µg/l S ²⁻	<100	<100
Cyanide (free)	CE147	µg/l CN	<20	<20
Cyanide (total)	CE147	µg/l CN	<20	<20
Thiocyanate	CE014	µg/l SCN	<200	<200
Phenols (total)	CE148	µg/l PhOH	<10	<10
PAH				
Acenaphthene	CE051	µg/l	1.1	<0.1
Acenaphthylene	CE051	µg/l	<0.1	<0.1
Anthracene	CE051	µg/l	<0.1	<0.1
Benzo(a)anthracene	CE051	µg/l	<0.1	<0.1
Benzo(a)pyrene	CE051	µg/l	<0.1	<0.1
Benzo(b)fluoranthene	CE051	µg/l	<0.1	<0.1
Benzo(ghi)perylene	CE051	µg/l	<0.1	<0.1
Benzo(k)fluoranthene	CE051	µg/l	<0.1	<0.1
Chrysene	CE051	µg/l	<0.1	<0.1
Dibenz(ah)anthracene	CE051	µg/l	<0.1	<0.1
Fluoranthene	CE051	µg/l	0.6	<0.1
Fluorene	CE051	µg/l	0.5	<0.1
Indeno(123cd)pyrene	CE051	µg/l	<0.1	<0.1
Naphthalene	CE051	µg/l	<0.1	<0.1
Phenanthrene	CE051	µg/l	<0.1	<0.1
Pyrene	CE051	µg/l	0.4	<0.1
PAH (total of USEPA 16)	CE051	µg/l	2.7	<1.6

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METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE127	Arsenic (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg As
CE063	Boron (water soluble)	Hot water extract, ICP-OES	Dry		0.5	mg/kg B
CE127	Cadmium (total)	Aqua regia digest, ICP-MS	Dry	M	0.2	mg/kg Cd
CE127	Chromium (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Cr
CE208	Chromium (III)	Calculation: Cr (total) - Cr (VI)	Dry		1	mg/kg CrIII
CE146	Chromium (VI)	Acid extraction, Colorimetry	Dry		1	mg/kg CrVI
CE127	Copper (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Cu
CE127	Lead (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Pb
CE127	Mercury (total)	Aqua regia digest, ICP-MS	Dry	M	0.5	mg/kg Hg
CE127	Nickel (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Ni
CE127	Selenium (total)	Aqua regia digest, ICP-MS	Dry	M	0.3	mg/kg Se
CE127	Zinc (total)	Aqua regia digest, ICP-MS	Dry	M	5	mg/kg Zn
CE004	pH	Based on BS 1377, pH Meter	As received	M	-	units
CE061	Sulphate (2:1 water soluble)	Aqueous extraction, ICP-OES	Dry		10	mg/l SO ₄
CE079	Sulphide	Extraction, Continuous Flow Colorimetry	As received		10	mg/kg S ²⁻
CE077	Cyanide (free)	Extraction, Continuous Flow Colorimetry	As received		1	mg/kg CN
CE077	Cyanide (total)	Extraction, Continuous Flow Colorimetry	As received		1	mg/kg CN
CE145	Thiocyanate	Weak acid extraction, Colorimetry	Dry	M	1	mg/kg SCN
CE078	Phenols (total)	Extraction, Continuous Flow Colorimetry	As received		0.5	mg/kg PhOH
CE197	Total Organic Carbon (TOC)	Carbon Analyser	Dry		0.1	% w/w C
CE197	Estimate of OMC (calculated from TOC)	Calculation from Total Organic Carbon	Dry		0.1	% w/w
CE087	Acenaphthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Acenaphthylene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Anthracene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Benzo(a)anthracene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Benzo(a)pyrene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Benzo(b)fluoranthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(ghi)perylene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(k)fluoranthene	Solvent extraction, GC-MS	As received	M	0.03	mg/kg
CE087	Chrysene	Solvent extraction, GC-MS	As received	M	0.03	mg/kg
CE087	Dibenz(ah)anthracene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Fluoranthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Fluorene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Indeno(123cd)pyrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Naphthalene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Phenanthrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Pyrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	PAH (total of USEPA 16)	Solvent extraction, GC-MS	As received		0.34	mg/kg
CE067	VPH Aromatic (>EC5-EC7)	Headspace GC-FID	As received		0.01	mg/kg
CE067	VPH Aromatic (>EC7-EC8)	Headspace GC-FID	As received		0.01	mg/kg
CE067	VPH Aromatic (>EC8-EC10)	Headspace GC-FID	As received		0.01	mg/kg
CE068	EPH Aromatic (>EC10-EC12)	Solvent extraction, GC-FID	As received		1	mg/kg
CE068	EPH Aromatic (>EC12-EC16)	Solvent extraction, GC-FID	As received		1	mg/kg
CE068	EPH Aromatic (>EC16-EC21)	Solvent extraction, GC-FID	As received		1	mg/kg

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METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE068	EPH Aromatic (>EC21-EC35)	Solvent extraction, GC-FID	As received		1	mg/kg
CE068	EPH Aromatic (>EC35-EC44)	Solvent extraction, GC-FID	As received		1	mg/kg
CE067	VPH Aliphatic (>C5-C6)	Headspace GC-FID	As received		0.1	mg/kg
CE067	VPH Aliphatic (>C6-C8)	Headspace GC-FID	As received		0.1	mg/kg
CE067	VPH Aliphatic (>C8-C10)	Headspace GC-FID	As received		0.1	mg/kg
CE068	EPH Aliphatic (>C10-C12)	Solvent extraction, GC-FID	As received		4	mg/kg
CE068	EPH Aliphatic (>C12-C16)	Solvent extraction, GC-FID	As received		4	mg/kg
CE068	EPH Aliphatic (>C16-C35)	Solvent extraction, GC-FID	As received		4	mg/kg
CE068	EPH Aliphatic (>C35-C44)	Solvent extraction, GC-FID	As received		10	mg/kg
\$	Asbestos (qualitative)	HSG 248, Microscopy	Dry	U	-	-

Chemtech Environmental Limited

METHOD DETAILS

METHOD	PREPARED LEACHATES	METHOD SUMMARY	STATUS	LOD	UNITS
CE002	Leachate preparation (EA)	L:S 10:1		-	-
CE128	Arsenic (dissolved)	ICP-MS	U	0.06	µg/l As
CE128	Boron (dissolved)	ICP-MS	U	8	µg/l B
CE128	Cadmium (dissolved)	ICP-MS	U	0.07	µg/l Cd
CE128	Chromium (dissolved)	ICP-MS	U	0.2	µg/l Cr
CE128	Copper (dissolved)	ICP-MS	U	0.4	µg/l Cu
CE128	Lead (dissolved)	ICP-MS	U	0.2	µg/l Pb
CE128	Mercury (dissolved)	ICP-MS	U	0.008	µg/l Hg
CE128	Nickel (dissolved)	ICP-MS	U	0.5	µg/l Ni
CE128	Selenium (dissolved)	ICP-MS	U	0.07	µg/l Se
CE128	Zinc (dissolved)	ICP-MS	U	1	µg/l Zn
CE213	pH	Based on BS 1377, pH Meter	U	-	units
CE049	Sulphate	Ion Chromatography	U	1.7	mg/l SO ₄
CE128	Sulphur (dissolved)	ICP-MS	U	0.2	mg/l S
CE079	Sulphide	Continuous Flow Colorimetry		100	µg/l S ²⁻
CE147	Cyanide (free)	Continuous Flow Colorimetry		20	µg/l CN
CE147	Cyanide (total)	Continuous Flow Colorimetry		20	µg/l CN
CE014	Thiocyanate	Colorimetry		200	µg/l SCN
CE148	Phenols (total)	Continuous Flow Colorimetry		10	µg/l PhOH
CE051	Acenaphthene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Acenaphthylene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Anthracene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Benzo(a)anthracene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Benzo(a)pyrene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Benzo(b)fluoranthene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Benzo(ghi)perylene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Benzo(k)fluoranthene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Chrysene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Dibenz(ah)anthracene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Fluoranthene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Fluorene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Indeno(123cd)pyrene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Naphthalene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Phenanthrene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Pyrene	Solvent extraction, GC-MS		0.1	µg/l
CE051	PAH (total of USEPA 16)	Solvent extraction, GC-MS		1.6	µg/l

Chemtech Environmental Limited

DEVIATING SAMPLE INFORMATION

Comments

Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.

For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.

Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

Key

N	No (not deviating sample)
Y	Yes (deviating sample)
NSD	Sampling date not provided
NST	Sampling time not provided (waters only)
EHT	Sample exceeded holding time(s)
IC	Sample not received in appropriate containers
HP	Headspace present in sample container
NCF	Sample not chemically fixed (where appropriate)
OR	Other (specify)

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
94788-1	BH1	0.20	N	
94788-2	BH2	0.20	N	
94788-3	BH3	0.50	N	
94788-4	TPA	0.20	N	
94788-5	TPB	0.20	N	