



INVESTIGATE



REMEDiate



REGENERATE



GROUND INVESTIGATION REPORT

**FOR
ARKADY INDUSTRIAL ESTATE,
BRISCOE LANE,
NEWTON HEATH,
GREATER MANCHESTER**

**PREPARED FOR
CASSEL & FLETCHER
CONSTRUCTION LIMITED**

**REPORT NO. 6921F
OCTOBER 2021**

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**GROUND INVESTIGATION FOR ARKADY INDUSTRIAL ESTATE,
BRISCOE LANE, NEWTON HEATH, GREATER MANCHESTER**

CLIENT: CASSEL & FLETCHER CONSTRUCTION LIMITED

1. INTRODUCTION

This report has been prepared in accordance with a Purchase Order, No. 91-014 and dated 20 January 2021, from the Client.

The brief was set out in our estimate, ref. E4660 and dated 19 January 2021, and updated in our estimate, ref. E4660A and dated 20 January 2021, with amendments as the investigation proceeded and includes:

- 9 No. mini boreholes
- Contamination analysis
- Installation of standpipes followed by groundwater and ground gas monitoring
- Provision of an interpretative report on the above.

Mini Soil Surveys have previously compiled and issued a Phase II Ground Investigation Report, ref. NTH 2707 and dated March 2020, for the site. We have previously also compiled and issued reports for the site, including a Phase I Desk Study Report, ref. 6921 and dated March 2020 and a Phase I Coal Mining Risk Assessment Report, ref. 6921A dated April 2020. The above reports should be read in conjunction with this Phase II Ground Investigation Report.

During the monitoring period standpipes installed in M1A, M5, M6 and M9 were lost/removed. In order to continuing monitoring after the fourth visit on 14 May 2021, four mini boreholes (M1B, M5A, M6A and MA) were taken out on 16 July 2021 and standpipes were installed. These works (6921E) were undertaken in accordance with our estimate, ref. E5004 and dated 24 May 2021, and receipt of a Purchase Order, No. 91-080 and dated 12 July 2021, from the Client.

1.1 Site Location and Description

The site is located to the north west of Briscoe Lane in the Newton Heath district of Greater Manchester, as indicated on Figure 1. The approximate National Grid Reference of the centre of the site is SD. 8689 9950 (E.386920m, N.399500m).

As shown on Figure 2, the 'L' shaped about 0.46 hectare site is bounded to the south east by Briscoe Lane with a cemetery beyond, to the south west by the premises of Anglo-European, to the north west by the premises of Mont Blanc Coldstore Company with a triangular railway junction beyond, to the east by derelict industrial premises and to the south east by the premises of Basic Welding Services (former Public House) with the junction of Briscoe Lane and Riverpark Road beyond.

1.2 Proposed Development and Purpose of the Ground Investigation

We understand that the previous buildings on the site were destroyed by fire and it is proposed to construct a "L" shaped industrial building, apparently surrounded by access roads and hardstandings, as shown on Figures 3 and 4.

The purpose of the investigation was to determine the ground conditions at the positions of the exploratory holes and to take samples for contamination analysis and assessment in order to determine necessary precautions and/or remedial measures required for the proposed development. Ground gas monitoring and assessment was also required to determine necessary precautions and/or remedial measures.

2. INVESTIGATION

2.1 Investigation Details

Ten mini boreholes (M1, M1A, M2, M3, M4, M5, M6, M7, M8 and M9) were put down to 0.20 and 4.00 metres depth at the positions determined and set out by Sub Surface North West Limited, as shown on Figure 5. Initially the hard surface cover was cored with a diamond drill and then the mini boreholes were progressed by hand digging. Eight mini boreholes were then advanced with a Dart Mini Sampling Rig fitted with windowless sample tubes of 84, 74, 64 and 54mm diameter. The samples were subsequently logged in accordance with BS EN ISO 14688-1: 2018 and BS EN ISO 14689-1: 2018 and the resulting Mini Borehole Records are appended. On completion the M1, M2, M3, M4, M7 and M8 were backfilled with gravel sized fragments of stone as no installations were required.

Ground levels at the exploratory hole positions have been interpolated from spot heights given on the topographical survey plan commissioned by ourselves, ref. 6921B dated April 2020. The reduced levels are related to Ordnance Datum.

2.2 Sub Surface Detail

Details of the strata encountered in the ground investigation are given on the appended Mini Borehole Records. The exploratory holes found Made Ground underlain by apparent glacial drift deposits. The depths of strata found were as follows:

TABLE 1 STRATA

Expl. Hole No.	Ground Level (mOD)	Depth of Hard Surface Cover (m)	Depth of Insulation Board or Foam (m)	Depth of Made Ground (m)	Depth to Drift Deposits (m)	Depth of Hole (m)
M1	63.70	0.00-0.13 (c)	0.13-0.27 *			0.27
M1A	63.70	0.00-0.10 (c) 0.25-0.43 (c)	0.10-0.25 **	0.43-0.90	0.90	4.00
M2	63.65	0.00-0.35 (c) 0.45-0.50 (c)		0.35-0.45 0.50-0.80	0.80	4.00
M3	63.80	0.00-0.15 (c)			0.15	4.00
M4	63.55	0.00-0.15 (c)		0.15-1.35	1.35	4.00
M5	63.70	0.00-0.38(c)		0.38-1.70	1.70	4.00
M6	63.60	0.00-0.05(b)		0.05-0.80	0.80	4.00
M7	63.50	0.00-0.17(c) 0.40-0.80 (c)	0.17-0.20	0.20-0.40 0.80-2.45	2.45	4.00
M8	63.50	0.00-0.20(c)				0.20
M9	63.50	0.00-0.17(c) 0.25-0.50 (c)	0.17-0.20	0.50-2.50 ***	2.50	4.00

M = Mini Borehole, (b) bituminous macadam, (c) = concrete.

* underlain by apparent electric cable.

** underlain by blue membrane.

*** underlain by 0.05m of peat.

A general summary of the strata found is as follows:

2.2.1 Made Ground

Reinforced concrete was initially encountered in all but M6 where bituminous macadam surfacing was present. Underlying the concrete were layers of insulation board or foam in M1, M1A, M7 and M9. In addition layers of granular and cohesive Made Ground was also found. M1 and M8 which were terminated at 0.27 and 0.20 metres depth due to an apparent electric cable and an additional layer of concrete respectively. The base of the Made Ground was found to vary from 0.15 metres depth (north western margin) to 2.50 metres depth (south eastern margin).

Granular Made Ground generally comprised slightly silty slightly sandy to sandy gravel sized fragments of stone, brick, slag, clinker and concrete with in parts cobble sized fragments of brick and concrete.

Cohesive Made Ground was generally found to be slightly gravelly slightly sandy silty clay, the gravel sized fragments comprising brick, stone, slag, concrete and occasional plastic. Organic content or odours were noted in M4, M5, M7 and M9.

2.2.2 Drift Deposits

In all but M9, the above Made Ground was underlain directly by cohesive, apparently glacial, drift deposits which were proven to 4.00 metres depth. These deposits were found to be generally firm or stiff, but locally soft, slightly gravelly silty clays, the gravel comprising siltstone, sandstone, coal and quartz.

In M9, the above Made Ground was underlain directly by 0.05 metres of soft black slightly sandy fibrous peat.

2.2.3 Groundwater

No groundwater was encountered in the exploratory holes although it should be noted that they were only left open for a short period of time and groundwater levels may be subject to seasonal and/ or climatic variations.

Seven ground gas and groundwater monitoring visits have been undertaken between 22 February 2021 and 19 September 2021. As indicated on the ground gas and groundwater monitoring sheet it was not possible to monitor all of the standpipes on all of the monitoring visits. Standpipes were installed in M1A/M1B, M5/M5A, M6/M6A and M9/ M9A and the depth to groundwater was found to be 0.80 to 1.20, 0.00 to 2.35, 0.50 to 0.65 and 1.40 to 1.50 metres depth respectively.

3. SAMPLING, TESTING AND MONITORING

3.1 Sampling

Continuous core and bulk disturbed samples were obtained for the strata encountered and were subjected to careful examination.

The samples will be retained for a period of one month after the issue of this report, for reference purposes, and then disposed of unless otherwise instructed.

3.2 Installations and Monitoring

On completion of M1A, M5, M6 and M9 hdpe standpipes were installed to depths of 4.00, 4.00, 4.00 and 3.50 metres respectively. The standpipes are slotted from 1.00 metres depth, have an internal diameter of 50mm and have removable quick release gas valves to enable both ground gas and groundwater monitoring and sampling to be undertaken. Details of the installations are given on the Mini Borehole Records.

Monitoring of the standpipes for ground gas and groundwater has been undertaken on seven occasions using portable equipment. A Gas Data GFM 435 was used for monitoring methane, carbon dioxide, oxygen, gas flows and atmospheric pressure. The results of the monitoring is given on the appended Ground Gas and Groundwater Monitoring Results sheet.

3.4 Laboratory Testing

Contamination analyses have been performed on thirteen soil samples to determine: pH and concentrations of sulphate, sulphide, cyanide, arsenic, boron (soluble), cadmium, chromium, hexavalent chromium, copper, lead, mercury, molybdenum, nickel, selenium, zinc, speciated total petroleum hydrocarbons (TPHs), the speciated polynuclear aromatic hydrocarbons (PAHs) suite, the benzene/ ethylbenzene/ toluene/ xylene (BTEX) suite and phenols. In addition all thirteen soil samples were subjected to an asbestos screen.

In addition four soil samples were also analysed for a suite of volatile organic compounds (VOCs) to identify chlorinated solvent contamination.

In view of the Electricity Sub-stations present one soil sample, from M7 at 1.00 to 2.00 metres depth, was subjected to speciated poly chlorinated bi-phenyls (PCBs) analysis.

Foams were used to control the fire at the former development and in view of this two soil samples have been subjected to a suite of speciated Perfluoro Alkyl analysis.

Contamination analyses have also been performed on three samples of groundwater taken on 22 February 2021 from the standpipes installed in M1A, M5 and M6 to determine: pH and concentrations of sulphate, sulphide, cyanide, arsenic, boron (soluble), cadmium, chromium, hexavalent chromium, copper, lead, mercury, molybdenum, nickel, selenium, zinc, speciated TPHs, the speciated PAHs suite, the BTEX suite and phenols.

In addition two of the above groundwater samples have been subjected to a suite of speciated Perfluoro Alkyl analysis.

The results of the above analyses are appended.

4. APPRAISAL AND RECOMMENDATIONS

4.1 Comments on the Profile

At the outset it should be appreciated that only a small proportion of the area to be developed has been investigated and consequently the recommendations made and opinions expressed in this report can only be applied to such conditions as were encountered in the exploratory holes. The exploratory holes indicate a nature and degree of similarity to the extent that we consider them likely to be representative of the natural ground conditions.

Due to the site having been previously developed, and the nature of Made Ground, localised variations in thickness and composition should be anticipated and hence interpolation or extrapolation from the exploratory holes to adjoining areas should only be undertaken with caution.

Details of the findings of the investigation are given on the appended Mini Borehole Records and a summary of the ground conditions is given in Section 2.2.

4.2 Contamination Considerations

We understand that the previous buildings on the site were destroyed by fire and it is proposed to construct a "L" shaped industrial building, apparently surrounded by access roads and hardstandings, as shown on Figures 3 and 4.

The ground investigation found the surface to be covered by reinforced concrete, and a localised area of bituminous surfacing, underlain in parts by interlayered insulation boards, foam, buried concrete and granular and cohesive Made Ground to between 0.15 and 2.50 metres depth. Generally firm and stiff cohesive drift deposits were then proven to 4.00 metres depth.

We have previously undertaken a Phase I Desk Study Report, ref. 6921 and dated March 2020, and this Phase II ground investigation has been undertaken to provide a contamination risk assessment in accordance with the Phase I Conceptual Ground Model.

It should be appreciated that the suite of determinants analysed for consists of a range of contaminants identified in the Conceptual Ground Model. However, the absence of any other specific contaminants cannot be guaranteed.

4.2.1 Assessment (Soil)

In order to provide an assessment of the presence of contamination thirteen soil samples have been analysed for a suite of determinants and the results are appended.

Levels of the determinants have been compared against the most recently published guideline values. Contaminated Land: Applications in Real Environments (CL:AIRE) published guideline values in December 2009 to supplement previous guideline values. The Department for Environment, Food and Rural Affairs (DEFRA) published in March 2014 Category 4 Screening Levels (C4SLs) for arsenic, cadmium, lead, hexavalent chromium, benzo(a)pyrene and benzene.

Land Quality Management Limited (LQM)/ Chartered Institute of Environmental Health (CIEH) then published Suitable for Use Levels (S4ULs) in November 2014, which largely superseded the previous guideline values. Updated S4ULs values for cadmium and phenols were published in July 2015 and for nickel in August 2015. The guideline values (S4ULs and occasionally C4SLs and CL:AIRE) are derived using the Environment Agency's CLEA Model and vary dependent upon the land use; allotment and residential use being the most sensitive and commercial/ industrial use being the least sensitive.

For the purposes of assessment, as the proposed development is an industrial building, contamination analyses have been compared with the guideline values for a standard land use of commercial and industrial.

The contamination analysis determined no elevated levels of the determinants analysed for when compared with the guideline values for a standard land use of commercial and industrial. Guideline values for the assessment can be supplied directly to the Regulator, if requested.

An asbestos screen was undertaken on all thirteen soil samples and no asbestos was detected.

The speciated poly chlorinated bi-phenyls (PCBs) analysis and speciated Perfluoro Alkyl analysis found no levels above the limit of detection levels.

In addition to the above, an assessment of risk to personnel who will come into contact with on-site materials throughout the site has been undertaken.

4.2.2 Assessment (Water)

Three samples of groundwater taken from the standpipes installed in M1A, M5 and M6 on 22 February 2021 have been analysed for a suite of determinants in accordance with the Conceptual Ground Model and the results are appended.

To assess the risk to surface water bodies the results have been compared with the Environmental Quality Standards (EQS) for annual allowable concentrations, published in the Department of Environment Food and Rural Affairs (DEFRA) Water Framework Directive Directions 2015, or the best equivalent (e.g. the Dangerous Substance Directive List II Substances).

To assess the risk to groundwater resources the results have been compared with the United Kingdom Drinking Water Standards (UK DWS), published in the Water Supply (Water Quality) Regulations 2016. Where no UK DWS is available the World Health Organisation (WHO) Drinking Water Guidelines have been adopted.

We have listed the samples where the levels of contamination have exceeded the EQS, UK DWS and/ or WHO, as follows:

TABLE 2 ASSESSMENT OF GROUNDWATER CONTAMINATION

Determinant	Expl. Hole No	Depth (m)	Recorded Level (µg/l)	EQS (µg/l)	UK DWS (µg/l)	WHO (µg/l)
sulphate	M1A	0.80	490,000	400,000	250,000	-
cadmium	M5	1.00	0.09	0.08	5.0	3.0
chromium	M1A	0.80	22	4.7	50	50
	M5	1.00	43			
	M6	0.50	20			
copper	M1A	0.80	2.9	1.0	2,000	2,000
	M5	1.00	67			
	M6	0.50	2.2			
molybdenum	M5	1.00	1,500	-	-	70
nickel	M1A	0.80	11	4.0	20	70
	M5	1.00	18			
	M6	0.50	8.6			
lead	M5	1.00	1.8	1.2	10	10
selenium	M1A	0.80	16	-	10	40
	M5	1.00	21			
	M6	0.50	24			
zinc	M1A	0.80	11	10.9	5,000	-

TABLE 3 ASSESSMENT OF GROUNDWATER CONTAMINATION

Determinant	Expl. Hole No	Depth (m)	Recorded Level (µg/l)	EQS (µg/l)	UK DWS * (µg/l)	(Tier)
PFOA	M1A	0.80	0.0146	-	0.01-0.1	2
Linear PFOS	M1A	0.80	0.0482	9.1	0.01-0.1	2
	M6	0.50	0.0365			
Branched PFOS	M1A	0.80	0.0414	9.1	0.01-0.1	2
	M6	0.50	0.0267			

PFOA = Perflouro-n-octanoic acid, PFOS = Perflouro-1-octanesulfonate

* the Drinking Water Inspectorate Drinking Water Regulations

The results of the groundwater analysis indicate:

- sulphate, cadmium, chromium, copper, nickel and zinc exceed the EQS value in one to three groundwater samples.
- molybdenum exceeds the WHO value in the groundwater sample from M5.
- selenium exceeds the UK DWS value in all three groundwater samples.
- PFOAs in M1A fall into Tier 2 of the Drinking Water Inspectorate Drinking Water Regulations (which requires consultation with local health professionals and monitoring levels in drinking water).
- PFOSs in M1A and M6 fall into Tier 2 of the Drinking Water Inspectorate Drinking Water Regulations (which requires consultation with local health professionals and monitoring levels in drinking water).

It should be noted that the EQS values for cadmium, chromium, copper, lead, nickel and zinc are based on the bioavailable component. The groundwater analyses report total concentrations of metal ions rather than bioavailable concentrations and consequently may indicate a false exceedance of the EQS.

In view of the levels of copper, lead, nickel and zinc being below the UKA DWS, in our opinion, these exceedances are of no concern and no further analysis is required.

The UK DWS is a post treatment standard and as such is very stringent.

4.2.3 Conclusions and Recommendations

Section 78a(2) of the Environmental Protection Act: 1990 as amended by the Contaminated Land (England) (Amendment) regulations 2012, and Section 86 of the Water Act 2003, defines CONTAMINATED LAND for the purposes of Part IIA as:

“any land which appears to the LOCAL AUTHORITY in whose area it is situated to be in such a condition, by reason of substances in, on or under the land, that:

- (a) SIGNIFICANT HARM is being caused or there is a SIGNIFICANT POSSIBILITY of such harm being caused; or
- (b) SIGNIFICANT POLLUTION OF CONTROLLED WATERS is being, or is likely to be, caused”

Before a LOCAL AUTHORITY can make the judgement that land appears to be CONTAMINATED LAND on the basis that SIGNIFICANT HARM is being caused, or that there is a SIGNIFICANT POSSIBILITY of such harm being caused, the LOCAL AUTHORITY must identify a SIGNIFICANT POLLUTANT LINKAGE. This means that each of the following has to be identified:

- (a) a CONTAMINANT;
- (b) a relevant RECEPTOR (defined as living organisms, ecological systems, controlled waters or property); and
- (c) a PATHWAY by means of which either:
 - (i) the CONTAMINANT is causing SIGNIFICANT HARM to that RECEPTOR, or
 - (ii) there is a SIGNIFICANT POSSIBILITY of such harm being caused by that CONTAMINANT to that RECEPTOR

It should be noted that the words in capitals have a legal definition within the legislation.

Without a clear identification of all three elements of the pollutant linkage, land cannot be identified as contaminated under the regime.

The National Planning Policy Framework states that, “after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the Environmental Protection Act 1990”. Therefore, the general principles detailed above apply to this assessment.

Our assessment, based on thirteen soil samples, indicates that there are no contaminants requiring remediation and/or precautions to be taken for the proposed development.

If waste materials are to be removed from the site, classification of the waste should be undertaken to determine the most appropriate tip to use and the associated costs. It should be noted that significant cost savings can sometimes be made on waste disposal by correct classification of the waste, a service that we can provide.

S4ULs, C4SLs and CL:AIRE assume long term contact with contamination and assess chronic health risk. The risk of short term acute exposure to site personnel is dealt with in the remit of the Health and Safety Executive under the Health and Safety at Work Act: 1974 and Regulations made under the Act, including the Control of Substances Hazardous to Health (COSHH) Regulations. The levels of contamination and risk to site personnel should be considered under the Construction Design and Management (CDM) Regulations at the planning stage and in the development of the designers and contractors Health and Safety Plans and Method Statements. The risk of contact with on-site soils should be minimised and the following precautions should be taken as a minimum requirement.

Site personnel involved in earthworks and excavations should wear gloves, overalls, and boots and smoking should be prohibited.

The hydrogeology section of the Phase I report indicates that the drift deposits, a secondary undifferentiated aquifer, are underlain by Coal Measures bedrock, a Secondary A aquifer. However, the ground investigation has found the drift deposits to be cohesive and probably greater than 4 metres in thickness. In our opinion the cohesive drift deposits represent an aquiclude which will protect the underlying Secondary A aquifer. The Phase I report also indicates that there are three surface water abstraction licences, five groundwater abstraction licences but no potable water abstraction licences within 2000 metres of the site boundary. In addition there are no Source Protection Zones, set up to protect a water source within 500 metres of the site of boundary, present. The hydrology section of the Phase I report indicates that there are no watercourses (rivers, streams or canals) or surface water features (ponds or lakes) within 250 metres of the site boundary.

Given the above, the contaminants found in the groundwater, are unlikely to affect “controlled waters” in the form of groundwater or surface water.

Should it be necessary for groundwater to be pumped from on-site excavations the groundwater analysis should be submitted to the appropriate waste water authority with a request for a discharge consent. Following receipt of a discharge consent groundwater is likely to be discharged to a sewer or to an off-site licensed discharge point.

4.3 Ground Gas Considerations

Ground gas monitoring has been undertaken on seven visits and the results of the monitoring visits are appended.

Ground gases: methane, carbon dioxide and oxygen and flow rate have been monitored and the ranges of ground gases and flow rate during the monitoring period are as follows:

TABLE 4 GROUND GAS CONCENTRATIONS AND FLOW RATE

Methane (% vol. In air)	Carbon Dioxide (% vol. in air)	Oxygen (% vol. in air)	Gas Flow Rate (litres/ hour)
0.0	0.0 to 2.6	20.8 to 16.0	< 0.1

It can be seen from the monitoring that no elevated levels of methane or gas flows have been detected. However, slightly elevated levels of carbon dioxide and depleted levels of associated oxygen have been detected.

The levels of gas have been assessed in accordance with British Standard 8485, “Code of practice for the design of protective measures for methane and carbon dioxide gasses for new buildings”, published in June 2015 and updated in January 2019 (BS.8485:2015+A1:2019).

The characteristic hazardous gas flow rate (Q_{hg}) is calculated by dividing the maximum gas (methane or carbon dioxide) concentration by 100 and multiplying by the maximum flow rate in litres per hour (minimum 0.1 l/hr for Sub Surface monitoring equipment). For this site $Q_{hg} = [2.6/ 100] \times 0.1 = 0.0026$ l/hr

BS.8485:2015+A1:2019, Table 2, indicates that the site falls into Characteristic Situation 1 (CS1) and BS.8485:2015+A1:2019, Table 4, indicates that for a CS1 and the type of development proposed a score of zero gives no protection and remedial measures required.

All excavations of greater than 1.20 metres depth, however, should be routinely checked for air quality prior to man entry and appropriate precautions taken.

Any manholes, inspection chambers or other void spaces formed beneath the sites ground surface are potential ground gas traps. Precautions, as per the excavations above, should be taken.

4.4 General

We recommend that consultation should be undertaken with, and the written approval obtained from, the Local Authority Environmental Health Officer and the Local Authority Building Control Officer prior to commencing development.

We trust that this report fulfils your present requirements but if you have any queries or we can be of further assistance please contact the undersigned or Ms Anna Marsden at our Preston office.

SUB SURFACE CONSULTANTS LIMITED
REPORT No. 6921F
OCTOBER 2021

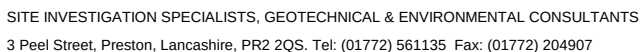


A. J. Parker B.Sc.(Hons.), C.Geol., F.G.S.
Principal Geotechnical Engineer
For and on behalf of
Sub Surface Consultants Limited



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Director
For and on behalf of
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INSITU TEST RESULTS



Site:	ARKADY INDUSTRIAL ESTATE, BRISCOE LN, NEWTON HEATH, GT MANCHESTER	Job Number: 6921F
Client:	CASSEL & FLETCHER CONSTRUCTION LIMITED	Sheet: 1 / 1
Engineer:		

Date	Hole No.	Methane (% Volume)	Carbon Dioxide (% Volume)	Oxygen (% Volume)	Gas Flow Rate (l/hr)	Atmospheric Pressure (millibars)	Depth to Groundwater (m)
22/02/21	M1A*	#	#	#	#	1005	0.80
	M5*	0.0	0.0	19.7	< 0.1		1.00
	M6*	0.0	0.0	19.9	< 0.1		0.50
	M9	##	##	##	##		##
26/03/21	M1A	0.0	0.6	17.8	< 0.1	994	0.95
	M5	0.0	0.0	19.7	< 0.1		1.25
	M6	0.0	0.3	19.9	< 0.1		0.65
	M9	##	##	##	##		##
06/04/21	M1A	0.0	0.6	17.5	< 0.1	1011	0.80
	M5	0.0	0.0	19.6	< 0.1		1.15
	M6	###	###	###	###		###
	M9	##	##	##	##		##
14/05/21	M1A	##	##	##	##	1001	##
	M5	0.0	0.1	19.1	< 0.1		1.20
	M6	###	###	###	###		###
	M9	##	##	##	##		##
Standpipes lost/ removed. Additional mini boreholes taken out and standpipes installed (6921E)							
16/08/21	M1B	\$	\$	\$	\$	1008	\$
	M5A	\$\$	\$\$	\$\$	\$\$		0.00
	M6A	0.0	0.1	20.6	< 0.1		0.55
	M9A	0.0	1.7	17.4	< 0.1		1.45
24/08/21	M1B	0.0	0.0	20.4	< 0.1	1024	1.00
	M5A	\$\$	\$\$	\$\$	\$\$		0.00
	M6A	0.0	0.1	20.8	< 0.1		0.50
	M9A	0.0	1.5	18.2	< 0.1		1.40
17/09/21	M1B	0.0	0.0	19.4	< 0.1	1004	1.20
	M5A	0.0	2.6	16.2	< 0.1		2.35
	M6A	0.0	0.0	20.8	< 0.1		0.65
	M9A	0.0	1.9	16.0	< 0.1		1.50

Remarks:	Elevated levels of methane and carbon dioxide and depleted levels of oxygen are shown in <i>bold/italics</i> . * Following monitoring groundwater sample taken for contamination analysis. # Not monitored as quick release valve open. ## Not monitored as inaccessible/ standpipe missing. ### Barrels tipped over and leaking contents in the vicinity of the cover. \$ Not monitored as covered by building material. \$\$ Not monitored as area flooded. Water baled out of the standpipe.
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CONTAMINATION ANALYSIS RESULTS



Final Report

Report No.: 21-04194-1

Initial Date of Issue: 24-Feb-2021

Client Sub Surface

Client Address: 3 Peel Street
Preston
Lancashire
PR2 2QS

Contact(s): Simon Gabbatt

Project (6921C) Arkady Ind. Est, Briscoe Lane, Newton Heath, Gt. Manchester

Quotation No.: **Date Received:** 12-Feb-2021

Order No.: **Date Instructed:** 12-Feb-2021

No. of Samples: 13

Turnaround (Wkdays): 5 **Results Due:** 18-Feb-2021

Date Approved: 24-Feb-2021 **Subcon Results Due:** 05-Mar-2021

Approved By:

Details: Glynn Harvey, Technical Manager

Results - Soil

(6921C) Arkady, Briscoe Ln, Newton Heath, Gt Man.

Client: Sub Surface	Chemtest Job No.: 21-04194 21-04194 21-04194 21-04194 21-04194 21-04194 21-04194 21-04194 21-04194 21-04194 21-04194 21-04194 21-04194 21-04194 21-04194 21-04194																
Quotation No.:	Chemtest Sample ID.: 1140464 1140465 1140466 1140467 1140468 1140469 1140470 1140471 1140472 1140473 1140474 1140475 1140476																
	Client Sample ID.: 405 406 327 401 331 332 323 324 335 409 410 413 414																
	Sample Location: M1A M1A M2 M3 M4 M4 M5 M5 M6 M7 M7 M9 M9																
	Sample Type: SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL																
	Top Depth (m): 0.50 1.00 0.50 0.10 0.20 1.00 0.50 1.00 0.10 0.20 1.00 0.70 1.00																
	Bottom Depth (m): 1.00 0.80 2.00 1.00 1.80 0.40 2.00 1.00 2.00																
	Date Sampled: 02/02/21 02/02/21 02/02/21 02/02/21 02/02/21 02/02/21 02/02/21 02/02/21 02/02/21 02/02/21 02/02/21 02/02/21 02/02/21 02/02/21 02/02/21 02/02/21																
	Asbestos Lab: DURHAM DURHAM DURHAM DURHAM DURHAM DURHAM DURHAM DURHAM DURHAM DURHAM DURHAM DURHAM DURHAM DURHAM																
Determinand	Accred.	SOP	Units	LOD													
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	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	15	14	15	16	24	7.3	30	53	11	2.1	31	20	23
pH	M	2010		4.0	8.4	8.0	9.0	8.7	10.9	11.5	9.7	7.4	10.0	10.0	8.7	8.5	11.0
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	1.7	0.86	1.4	0.69	15	5.2	1.4	1.7	2.7	0.56	1.6	1.3	0.88
Cyanide (Total)	M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	12	< 0.50	< 0.50	< 0.50	< 0.50
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	4.0	5.3	2.2	7.5	7.9	15	9.0	7.0	4.2	7.9	2.4	4.3	5400
Sulphate (Total)	M	2430	%	0.010	0.021	0.052	0.15	0.10	0.60	0.22	0.19	0.84	0.10	0.035	0.55	0.26	0.20
Arsenic	M	2450	mg/kg	1.0	4.7	6.7	12	11	26	7.8	17	12	6.5	2.8	17	27	30
Cadmium	M	2450	mg/kg	0.10	0.11	0.10	0.36	0.11	1.2	0.48	0.66	0.14	0.28	0.13	15	7.9	3.5
Chromium	M	2450	mg/kg	1.0	4.5	21	17	34	1500	480	15	20	190	59	16	49	41
Molybdenum	M	2450	mg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0	19	4.7	< 2.0	< 2.0	< 2.0	< 2.0	5.2	5.7	3.1
Copper	M	2450	mg/kg	0.50	3.7	19	27	26	170	35	28	17	25	15	110	310	120
Mercury	M	2450	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	2.6	1.1	0.19	< 0.10	0.18	< 0.10	0.13	0.34	0.18
Nickel	M	2450	mg/kg	0.50	5.5	28	14	43	70	18	14	19	18	21	36	130	51
Lead	M	2450	mg/kg	0.50	5.6	13	65	15	640	57	220	21	26	8.8	50	230	520
Selenium	M	2450	mg/kg	0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	0.33	< 0.20	< 0.20	2.8	0.91	0.37
Zinc	M	2450	mg/kg	0.50	15	45	62	63	540	160	87	43	110	51	230	410	720
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	0.79	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
TPH >C6-C10	N	2670	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH >C10-C21	N	2670	mg/kg	1.0	< 1.0	< 1.0	6.7	< 1.0	3.9	22	< 1.0	< 1.0	12	< 1.0	< 1.0	35	120
TPH >C21-C40	N	2670	mg/kg	1.0	< 1.0	< 1.0	45	< 1.0	2.2	28	< 1.0	< 1.0	910	< 1.0	< 1.0	81	360
Total TPH >C6-C40	M	2670	mg/kg	10	< 10	< 10	52	< 10	< 10	49	< 10	< 10	920	< 10	< 10	120	480

Results - Soil

(6921C) Arkady, Briscoe Ln, Newton Heath, Gt Man.

Client: Sub Surface		Chemtest Job No.:		21-04194	21-04194	21-04194	21-04194	21-04194	21-04194	21-04194	21-04194	21-04194	21-04194	21-04194	21-04194	21-04194	21-04194
Quotation No.:		Chemtest Sample ID.:		1140464	1140465	1140466	1140467	1140468	1140469	1140470	1140471	1140472	1140473	1140474	1140475	1140476	1140476
		Client Sample ID.:		405	406	327	401	331	332	323	324	335	409	410	413	414	414
		Sample Location:		M1A	M1A	M2	M3	M4	M4	M5	M5	M6	M7	M7	M9	M9	M9
		Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):		0.50	1.00	0.50	0.10	0.20	1.00	0.50	1.00	0.10	0.20	1.00	0.70	1.00	1.00
		Bottom Depth (m):		1.00		0.80			2.00	1.00	1.80		0.40	2.00	1.00	2.00	2.00
		Date Sampled:		02/02/21	02/02/21	02/02/21	02/02/21	02/02/21	02/02/21	02/02/21	02/02/21	02/02/21	02/02/21	02/02/21	02/02/21	02/02/21	02/02/21
		Asbestos Lab:		DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD													
Naphthalene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.58	0.87
Acenaphthylene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.42	0.32
Acenaphthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.41	0.99
Fluorene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.35	0.73
Phenanthrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.80	0.72	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	2.4	5.3
Anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.14	0.31	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.55	1.3
Fluoranthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	0.25	< 0.10	1.1	0.87	0.13	< 0.10	0.42	< 0.10	0.45	3.6	11
Pyrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	0.31	< 0.10	1.1	0.88	0.17	< 0.10	0.39	< 0.10	0.50	3.7	11
Benzo[a]anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.89	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	1.8	5.4
Chrysene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.75	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	1.6	4.8
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	2.2	6.4
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.76	2.8
Benzo[a]pyrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	1.4	6.4
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	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	1.1	4.7
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.29	1.1
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.95	5.1
Total Of 16 PAH's	M	2700	mg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0	4.8	2.8	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	22	68
Benzene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methyl Tert-Butyl Ether	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Phenols	M	2920	mg/kg	0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30
PCB 28	U	2815	mg/kg	0.010											< 0.010		
PCB 52	U	2815	mg/kg	0.010											< 0.010		
PCB 90+101	U	2815	mg/kg	0.010											< 0.010		
PCB 118	U	2815	mg/kg	0.010											< 0.010		
PCB 153	U	2815	mg/kg	0.010											< 0.010		
PCB 138	U	2815	mg/kg	0.010											< 0.010		
PCB 180	U	2815	mg/kg	0.010											< 0.010		
Total PCBs (7 Congeners)	U	2815	mg/kg	0.10											< 0.10		

Results - Soil

(6921C) Arkady, Briscoe Ln, Newton Heath, Gt Man.

Client: Sub Surface	Chemtest Job No.: 21-04194 21-04194 21-04194 21-04194 21-04194 21-04194 21-04194 21-04194 21-04194 21-04194 21-04194 21-04194 21-04194 21-04194													
Quotation No.:	Chemtest Sample ID.: 1140464 1140465 1140466 1140467 1140468 1140469 1140470 1140471 1140472 1140473 1140474 1140475 1140476													
	Client Sample ID.:	405	406	327	401	331	332	323	324	335	409	410	413	414
	Sample Location:	M1A	M1A	M2	M3	M4	M4	M5	M5	M6	M7	M7	M9	M9
	Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):	0.50	1.00	0.50	0.10	0.20	1.00	0.50	1.00	0.10	0.20	1.00	0.70	1.00
	Bottom Depth (m):	1.00		0.80			2.00	1.00	1.80		0.40	2.00	1.00	2.00
	Date Sampled:	02/02/21	02/02/21	02/02/21	02/02/21	02/02/21	02/02/21	02/02/21	02/02/21	02/02/21	02/02/21	02/02/21	02/02/21	02/02/21
	Asbestos Lab:	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD										
VOCs														
1,1,1,2-Tetrachloroethane	M	2760	µg/kg	2.0	< 2.0				< 2.0			< 2.0		< 2.0
1,1,1-Trichloroethane	M	2760	µg/kg	1.0	< 1.0				< 1.0			< 1.0		< 1.0
1,1,2-Trichloroethane	M	2760	µg/kg	10	< 10				< 10			< 10		< 10
1,1-Dichloroethane	M	2760	µg/kg	1.0	< 1.0				< 1.0			< 1.0		< 1.0
1,1-Dichloroethene	M	2760	mg/kg	1.0	< 1.0				< 1.0			< 1.0		< 1.0
1,1-Dichloropropene	U	2760	µg/kg	1.0	< 1.0				< 1.0			< 1.0		< 1.0
1,2,3-Trichlorobenzene	U	2760	µg/kg	2.0	< 2.0				< 2.0			< 2.0		< 2.0
1,2,3-Trichloropropane	N	2760	µg/kg	50	< 50				< 50			< 50		< 50
1,2,4-Trichlorobenzene	M	2760	µg/kg	1.0	< 1.0				< 1.0			< 1.0		< 1.0
1,2,4-Trimethylbenzene	M	2760	µg/kg	1.0	< 1.0				< 1.0			< 1.0		< 1.0
1,2-Dibromo-3-Chloropropane	U	2760	µg/kg	50	< 50				< 50			< 50		< 50
1,2-Dibromoethane	M	2760	µg/kg	5.0	< 5.0				< 5.0			< 5.0		< 5.0
1,2-Dichlorobenzene	M	2760	µg/kg	1.0	< 1.0				< 1.0			< 1.0		< 1.0
1,2-Dichloroethane	M	2760	µg/kg	2.0	< 2.0				< 2.0			< 2.0		< 2.0
1,2-Dichloropropane	M	2760	µg/kg	1.0	< 1.0				< 1.0			< 1.0		< 1.0
1,3,5-Trimethylbenzene	M	2760	µg/kg	1.0	< 1.0				< 1.0			< 1.0		< 1.0
1,3-Dichlorobenzene	M	2760	µg/kg	1.0	< 1.0				< 1.0			< 1.0		< 1.0
1,3-Dichloropropane	U	2760	µg/kg	2.0	< 2.0				< 2.0			< 2.0		< 2.0
1,4-Dichlorobenzene	M	2760	µg/kg	1.0	< 1.0				< 1.0			< 1.0		< 1.0
2-Chlorotoluene	M	2760	µg/kg	1.0	< 1.0				< 1.0			< 1.0		< 1.0
4-Chlorotoluene	U	2760	µg/kg	1.0	< 1.0				< 1.0			< 1.0		< 1.0
4-Isopropyltoluene	U	2760	µg/kg	1.0	< 1.0				< 1.0			< 1.0		< 1.0
Bromobenzene	M	2760	µg/kg	1.0	< 1.0				< 1.0			< 1.0		< 1.0
Bromochloromethane	U	2760	µg/kg	5.0	< 5.0				< 5.0			< 5.0		< 5.0
Bromodichloromethane	M	2760	µg/kg	5.0	< 5.0				< 5.0			< 5.0		< 5.0
Bromomethane	M	2760	µg/kg	20	< 20				< 20			< 20		< 20
Chlorobenzene	M	2760	µg/kg	1.0	< 1.0				< 1.0			< 1.0		< 1.0
Chloroethane	U	2760	µg/kg	2.0	< 2.0				< 2.0			< 2.0		< 2.0
Chloromethane	M	2760	µg/kg	1.0	< 1.0				< 1.0			< 1.0		< 1.0
cis-1,2-Dichloroethene	M	2760	µg/kg	1.0	< 1.0				< 1.0			< 1.0		< 1.0
cis-1,3-Dichloropropene	N	2760	µg/kg	10	< 10				< 10			< 10		< 10
Dibromochloromethane	U	2760	µg/kg	10	< 10				< 10			< 10		< 10
Dibromomethane	M	2760	µg/kg	1.0	< 1.0				< 1.0			< 1.0		< 1.0
Dichlorodifluoromethane	U	2760	µg/kg	1.0	< 1.0				< 1.0			< 1.0		< 1.0
Hexachlorobutadiene	U	2760	µg/kg	1.0	< 1.0				< 1.0			< 1.0		< 1.0

Results - Soil

(6921C) Arkady, Briscoe Ln, Newton Heath, Gt Man.

Client: Sub Surface	Chemtest Job No.: 21-04194 21-04194 21-04194 21-04194 21-04194 21-04194 21-04194 21-04194 21-04194 21-04194 21-04194 21-04194 21-04194 21-04194													
Quotation No.:	Chemtest Sample ID.: 1140464 1140465 1140466 1140467 1140468 1140469 1140470 1140471 1140472 1140473 1140474 1140475 1140476													
	Client Sample ID.:	405	406	327	401	331	332	323	324	335	409	410	413	414
	Sample Location:	M1A	M1A	M2	M3	M4	M4	M5	M5	M6	M7	M7	M9	M9
	Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):	0.50	1.00	0.50	0.10	0.20	1.00	0.50	1.00	0.10	0.20	1.00	0.70	1.00
	Bottom Depth (m):	1.00		0.80			2.00	1.00	1.80		0.40	2.00	1.00	2.00
	Date Sampled:	02/02/21	02/02/21	02/02/21	02/02/21	02/02/21	02/02/21	02/02/21	02/02/21	02/02/21	02/02/21	02/02/21	02/02/21	02/02/21
	Asbestos Lab:	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD										
Isopropylbenzene	M	2760	µg/kg	1.0	< 1.0					< 1.0			< 1.0	< 1.0
N-Butylbenzene	U	2760	µg/kg	1.0	< 1.0					< 1.0			< 1.0	< 1.0
N-Propylbenzene	U	2760	µg/kg	1.0	< 1.0					< 1.0			< 1.0	< 1.0
Sec-Butylbenzene	U	2760	µg/kg	1.0	< 1.0					< 1.0			< 1.0	< 1.0
Styrene	M	2760	µg/kg	1.0	< 1.0					< 1.0			< 1.0	< 1.0
Tert-Butylbenzene	U	2760	µg/kg	1.0	< 1.0					< 1.0			< 1.0	< 1.0
Tetrachloroethene	M	2760	µg/kg	1.0	< 1.0					< 1.0			< 1.0	< 1.0
Tetrachloromethane	M	2760	µg/kg	1.0	< 1.0					< 1.0			< 1.0	< 1.0
Trans 1,2-Dichloroethene	M	2760	mg/kg	1.0	< 1.0					< 1.0			< 1.0	< 1.0
Trans-1,3-Dichloropropene	N	2760	µg/kg	10	< 10					< 10			< 10	< 10
Tribromomethane	U	2760	µg/kg	1.0	< 1.0					< 1.0			< 1.0	< 1.0
Trichloroethene	N	2760	µg/kg	1.0	< 1.0					< 1.0			< 1.0	< 1.0
Trichlorofluoromethane	M	2760	µg/kg	1.0	< 1.0					< 1.0			< 1.0	< 1.0
Trichloromethane	M	2760	µg/kg	1.0	< 1.0					< 1.0			< 1.0	< 1.0
Vinyl Chloride	M	2760	µg/kg	1.0	< 1.0					< 1.0			< 1.0	< 1.0
PFBS	SN		µg/kg	1.00	Attached						Attached			
PFPS	SN		µg/kg	1.00	Attached						Attached			
PFHxS	SN		µg/kg	1.00	Attached						Attached			
PFHpS	SN		µg/kg	1.00	Attached						Attached			
PFOS	SN		µg/kg	1.00	Attached						Attached			
PFNS	SN		µg/kg	1.00	Attached						Attached			
PFDS	SN		µg/kg	1.00	Attached						Attached			
PFUdS	SN		µg/kg	1.00	Attached						Attached			
PFDoS	SN		µg/kg	1.00	Attached						Attached			
PFBA	SN		µg/kg	3.00	Attached						Attached			
PFPeA	SN		µg/kg	1.00	Attached						Attached			
PFHxA	SN		µg/kg	2.00	Attached						Attached			
PFHpA	SN		µg/kg	1.00	Attached						Attached			
PFOA	SN		µg/kg	1.00	Attached						Attached			
PFNA	SN		µg/kg	1.00	Attached						Attached			
PFDA	SN		µg/kg	1.00	Attached						Attached			
PFUdA	SN		µg/kg	1.00	Attached						Attached			
PFDoA	SN		µg/kg	1.00	Attached						Attached			

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
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	Alkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N-dimethyl-p-phenylenediamine.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
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.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
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; Dibenzo[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)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.

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"
SOP	Standard operating procedure
LOD	Limit of detection

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



Unit 7-8 Hawarden Business Park

Manor Road (off Manor Lane)

Hawarden

Deeside

CH5 3US

Tel: (01244) 528700

Fax: (01244) 528701

email: hawardencustomerservices@alsglobal.com

Website: www.alsenvironmental.co.uk

Chemtest
Willie Snaith Rd
Newmarket
Suffolk
CB8 7SQ

Attention: Chemtest Subcontracting

SOIL

CERTIFICATE OF ANALYSIS

Date of report Generation:	23 February 2021
Customer:	Chemtest
Sample Delivery Group (SDG):	210215-44
Your Reference:	21-04194
Location:	21-04194
Report No:	587810

We received 2 samples on Monday February 15, 2021 and 2 of these samples were scheduled for analysis which was completed on Tuesday February 23, 2021. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager



CERTIFICATE OF ANALYSIS

Validated

SDG: 210215-44 Client Reference: 21-04194 Report Number: 587810
Location: 21-04194 Order Number: 20367 Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
23729595	1140464	MI	0-50-1.00	02/02/2021
23729596	1140472	ML	0-10	02/02/2021

Only received samples which have had analysis scheduled will be shown on the following pages.



CERTIFICATE OF ANALYSIS

Validated

SDG: 210215-44
Location: 21-04194

Client Reference: 21-04194
Order Number: 20367

Report Number: 587810
Superseded Report:

Results Legend

X Test
N No Determination Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)

23729595
23729596

Customer Sample Reference

1140464
1140472

AGS Reference

MIA M6

Depth (m)

0.50
1.00
0.10

Container

250g Glass jar
250g Glass jar

Sample Type

S
S

PFAS Solids

All

NDPs: 0
Tests: 2

X
X

Sample description

All

NDPs: 0
Tests: 2

X
X



CERTIFICATE OF ANALYSIS

Validated

SDG: 210215-44
Location: 21-04194

Client Reference: 21-04194
Order Number: 20367

Report Number: 587810
Superseded Report:

Sample Descriptions

Grain Sizes

very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm
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Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Inclusions	Inclusions 2
23729595	1140464	M11A0-50-1.00	Light Brown	Sandy Clay	Stones	None
23729596	1140472	M6 0.10	Dark Brown	Clay	Stones	None

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.



CERTIFICATE OF ANALYSIS

Validated

SDG:	210215-44	Client Reference:	21-04194	Report Number:	587810
Location:	21-04194	Order Number:	20367	Superseded Report:	

Table of Results - Appendix

Method No	Reference	Description
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos
TM338		Containing Material

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).



CERTIFICATE OF ANALYSIS

Validated

SDG: 210215-44
Location: 21-04194

Client Reference: 21-04194
Order Number: 20367

Report Number: 587810
Superseded Report:

Test Completion Dates

Lab Sample No(s)	23729595	23729596
Customer Sample Ref.	1140464	1140472
AGS Ref.	M1A	M6
Depth	0.50-1.00	0-10
Type	Soil/Solid (S)	Soil/Solid (S)
PFAS Solids	23-Feb-2021	23-Feb-2021
Sample description	18-Feb-2021	18-Feb-2021