



Phase II Geoenvironmental Site Assessment
Land at Jersey Street, Ancoats, Manchester

PARCEL C

Reference:13-350-R3
Date: February 2020



PHASE II GEOENVIRONMENTAL SITE ASSESSMENT

Parcel C
Manchester Life Phase 3
Land to the north and south of Jersey Street,
Manchester,
M4 6JW

Prepared for:
Manchester Life



Report Ref: 13-729-R2
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EXECUTIVE SUMMARY

Site Address	Land to the north and south of Jersey Street, Manchester, M4 6JW	
Grid Reference	E 385200, N 398770	
Site Area	1.54 Hectares	
Current Site Use	Parcel C (Green area) is located to the south of Jersey Street adjacent to the Rochdale canal in the south. The area has more recently been the temporary location of stockpiles of material from the surrounding development and further construction materials. Parcel C is entirely soft covered and features mature trees to the west. 	
Proposed Development	E3P understands that the site referred to as Parcel C will be developed into residential high rise buildings with some commercial use to the ground floor. The detailed design has not yet been provided.	
Environmental Setting	Drift Geology	Glacial Till (Devensian) – Diamicton
	Bedrock Geology	Manchester Marls Formation – Mudstone
	Faults	None identified within parcel C.
	Hydrogeology	Secondary Undifferentiated aquifer strata overlying a Principal Aquifer to the east Parcel C and and Secondary B Aquifer for the remainder of the site (Bedrock Geology).
Hydrology	Historic mapping dated 1948 shows all three parcels being intersected by Bengal Arm canal (west of parcel C) before being later cut off from the main canal to the south and eventually infilled.	
	The Rochdale Canal is located immediately south of Parcel C and a canal basin is located 95 m south west of the site. The River Irk runs circa 880m to the north. There are no groundwater abstraction points located within 1 km of the site	



Environmental Setting	Flood Risk	The site is located within Flood Risk Zone 1 and is considered unaffected by river flooding.
	Ecology	A number of semi and mature trees are present in throughout Parcel C. The canal to the south is should also be considered as potentially supporting ecosystems.
	Subsidence Hazards	No hazard identified in data searches.
Site History	The former canal arm ran along the western boundary of Parcel C known as Prussia Street Arm and is infilled during the mid 20th century. The earliest mapping shows this parcel with industrial units noted from 1948 as a sheet metal works featuring a chimney to the north east of the parcel. This configuration as an engineering works remains until the late 90's when the site is demolished.	
Utility Locations	A formal GPR survey has been completed and combined with a review of online service plans and a detailed GPR survey have identified the following services within the site boundary: ■ Low voltage electivity cables intersect Parcel C ■ Medium power gas main ■ Further local/private connections throughout	
Landfill Sites and Ground Gases	There are no current or historic landfill sites within 250 m of the site. However, there are two areas of potentially infilled land (Infilled Canal arm) within the site boundary and further areas within 250 m of the site (Further Canal infilling, phases of redevelopment/upfilling/grading) There are likely varying depths of Made Ground generated from historical development, demolition works, infilling of canal and areas of potentially infilled land. The presence of historic Made Ground may result in the generation of hazardous ground gases (such as carbon dioxide & methane) which can accumulate within deep excavations or migrate through permeable strata, foundation structures and/or service ducting and pose a potential low-level risk to construction workers and future residential site users.	
Radon	Unaffected – no special precautions required.	
Coal Mining/Land Stability	Geological mapping for the area notes area notes that four seams are located to the north east of the site including Openshaw Coal Seam (875 m), Charlotte Coal (980 m), Bradford Threequarters Coal (1020 m) and Bradford Four Foot Coal (1030 m). All seams are dipping towards the site in a south westward direction. The closest seam to site is the Openshaw Coal Seam which would be circa 75 m beneath the east of the site and is therefore deemed to be of low risk. There are no mine entries within 100 m of the site boundary. Based on the above the site has been deemed to be in an area of low risk and further assessment is therefore not required.	
Hazardous Installations	No hazardous installations that could potentially prejudice the proposed construction of highly sensitive residential dwellings have been identified within influencing distance of the subject site.	



SITE INVESTIGATION

Ground Investigation Works	E3P has completed an intrusive ground investigation comprising mechanically excavated trial pits, window sample boreholes, cable percussive boreholes, ground water sampling, ground gas monitoring, geotechnical and environmental sampling and environmental monitoring installations
Ground Conditions	MADE GROUND Made Ground was encountered within all exploratory holes between ground level and 2.30 m bgl. Within this parcel all locations confirmed the full depth of Made Ground. Made Ground mainly comprised Black gravel with frequent cobbles with gravel of sandstone, ash, mudstone, concrete and brick that was encountered between ground level and a maximum proven depth of 2.30m bgl. Large obstructions including brick and concrete were encountered within exploratory hole locations. Former foundations in the form of brick walls were noted in TP117 between ground level and 2.30m bgl. DRIFT The natural drift deposits were identified in all locations and were found to be generally uniform across the area. Natural CLAY stratum directly underlay the Made Ground. Drift deposits comprised firm to very stiff brown slightly gravelly CLAY which were encountered at depths of between 0.80 m and 10.30 m bgl. An isolated area of brown clayey SILT was identified in TP117 between 2.30 m and 2.80 m bgl. Deeper cable percussive drilling recorded the CLAY to depths in excess of 10 m bgl before the bedrock strata was encountered. SOLID Bedrock has not been identified within the exploratory hole locations completed within the original site investigation, although deeper cable percussive boreholes completed subsequently identified as dense brown SANDSTONE in CP106 between 10.30 m to 12.50 m bgl. The closest BGS borehole encountered sandstone bedrock at 23.00m bgl which corroborates a dip to the west. GROUNDWATER No groundwater strikes were recorded during the ground investigation, however groundwater was noted between 1.73 m and 1.76 m bgl during the first groundwater monitoring visit.



CONTAMINATED LAND ASSESSMENT

Human Health	A Tier I human health risk assessment has been undertaken using the chemical analysis results of the soils and comparing to the relevant Tier I criteria. Laboratory analysis of the soils indicated the presence of elevated asbestos, heavy metals, non-volatile PAHs and asbestos in Made Ground deposits. The majority of the identified elevated concentrations have primary exposure pathways related to dermal contact and ingestion, soil ingestion and consumption of homegrown produce. These exceedances can be mitigated by the installed of a designed and chemically suitable cover system within all proposed soft standing landscaped areas. With regards to the asbestos, WS112 at 1.20m identified quantities of asbestos fibres below <0.001%. With reference to the E3P Asbestos Conceptual Site Model, Made Ground deposits will require placement below plots or a 300 mm cover system (150 mm topsoil, 150 mm subsoil). Where asbestos is found >0.001% but <0.1% this can be placed at greater than 1.00 m bgl to ensure that the risk to future end users is fully mitigated. No sources of suitable topsoil have been identified on site. Chemical analysis of the natural clay drift deposits have identified these soils to be acceptable for use as subsoil within the proposed garden areas.
Controlled Waters	A Tier 1 controlled waters risk assessment has been completed based on the leachate analysis of soils and groundwater samples obtained from boreholes during a post site investigation visit. This assessment identified the underlying aquifer as the most sensitive receptor. The results of the assessment recorded cyanide and lead elevated above the DWS criteria. However, as the impact has been identified within the Made Ground and the lack of a viable migration pathway due to the presence of significant thicknesses of low permeability clay protecting the underlying aquifer there is considered to be a low risk to controlled waters. Three samples from the adjacent canal have also been considered within the controlled waters assessment and have not been found to exceed criteria. In addition, it is expected that the Made Ground will be mostly removed as part of the enabling works to construct basement structures and therefore the source of contaminants will be removed from site.
Ground Gas	Ground gas monitoring thus far has indicated the site would be classed as Characteristic Situation 1 or Green, suggesting no gas protection measures will be required. However, the final ground gas regime will be confirmed following the completion of the ground gas monitoring programme.
Potable Water Infrastructure	This will need to be confirmed following the completion of a UKWIR risk assessment. Post-remediation and enabling works ground conditions may be different from those identified during this site investigation. An allowance for specialist pipelines should be retained at this point.



GEOTECHNICAL ASSESSMENT

Underground Obstructions	Within this parcel all obstructions encountered were penetrated in full. Significant concrete and brick obstructions have been encountered within the Made Ground indicative of relic foundations from former buildings and infilled canal. The infilled canal is present along the western boundary and considered to retain perched water. This will require pumping, stanking at the boundary and consideration of undermining adjacent structures during its removal. During a phase of cut-and-fill enabling works to create a developable platform, all below-ground obstructions will require grubbing out to the base of the Made Ground to enable the construction of proposed plots. Alternatively, a controlled removal of all relict features within the area of new subterranean structures could be considered.
Allowable Bearing Pressure	Within Parcels A the underlying natural drift deposits comprised firm to very stiff CLAY with an ABP in the order of 100 kN/m² achievable at 2.00 m bgl increasing in excess of 120 kN/m² from 3.00 m bgl. However, this is unlikely to be suitable founding strata based on the expected high rise building which is likely to require in excess of 1500kN/m² and as such the target founding strata will be the underlying bedrock strata below 10.00m.
Foundation Options	Given the nature of the proposed development and the high rise nature, it is envisaged that an engineering structural design will be required to support the structure. As such given our experience of similar sites and construction types a driven or CFA pile will be the most viable in order to support a cast in situ slab and the building structure.
Building Floor Slabs	Ground-bearing floor slabs will be possible but will require a structural engineering design.
Heave Precautions	As the underlying cohesive deposits are deemed to be predominately of Moderate Volume Change Potential, Heave Precautions are required to the internal face of the external load bearing walls (outside or within tree influence).
Soakaway Drainage	The Made Ground and underlying soils are cohesive in nature and impacted by low-level inorganic and hydrocarbon compounds which would preclude the use of infiltration drainage systems. As part of the site investigation falling head permeability testing has been completed utilising the monitoring well installations. This assessment confirms that the material does not have sufficient permeability characteristics to support a drainage system however, where this drainage system is required, soakaway testing in accordance with BRE365 should be completed to inform the subsequent specialist design.
Sulphate Assessment	Concrete classification will be DS1 AC1s.
CBR Design %	Made Ground can be re-engineered to ensure a CBR in the order of 15%. Natural granular soils, if encountered can be re-engineered to provide 3-5% within the sub-grade during favourable climatic conditions. Natural clay soils will provide a CBR in the order of 2-4% during drier climatic periods, however if water is allowed to shed onto the formation, the CBR will reduce to <2% which will require specialist engineering of the sub-grade.



Cut/Fill	Development levels unknown at this time. It is likely that a major cut exercise will be required in order to form the excavation for a basement/undercroft parking area. It is likely that a significant quantity of recycled aggregate will be generated during the demolition of slabs and sub-structures. There are a number of historical structures and infrastructure at the sites boundary, therefore the viability of deep excavation will be impeded by the risk of undermining and should be considered prior to works.
Civil Engineering Excavations	The E3P Intrusive Ground Investigation has not identified the presence of weathered/competent bedrock at a shallow depth.
Waste Characterisation	Further testing will be required for waste classification. Any material that is to be disposed off-site should undergo assessment using Technical Guidance WM3: Waste Classification – <i>Guidance on the classification and assessment of waste</i>.

RECOMMENDATIONS

Based on the findings of the geoenvironmental site assessment, the following additional works are recommended to be completed in due course:

- Completion of Ground gas monitoring;
- Investigation of west of Parcel C upon demolition of structures/access;
- Geotechnical earthworks strategy (infrastructure);
- Remediation and enabling works strategy.



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DRAWING LIST

13-729-001 - Site Location Plan
13-729-002 - Site Features Plan
13-729-003 - Historical Features Plan
13-729-004 - Exploratory Hole Location Plan
13-729-005 - Depth of Made Ground Plan
13-729-006 - Depth to Founding Strata Plan
13-729-007 - Depth to Bedrock Plan
13-729-008 - Conceptual Site Model
13-729-009 - Trial Trench Cross Section



1. INTRODUCTION

1.1. BACKGROUND

E3P Ltd has been commissioned by Scott Hughes on behalf of their client (Manchester Life) to undertake a Phase 2 Geoenvironmental Site Assessment at Manchester Life Phase 3 located amongst three parcels along Jersey Street.

This report is required to determine potential contaminated land liabilities, remediation requirements and geotechnical engineering works that will be required as part of the proposed development for a high rise residential development within Parcel C.

The scope of work includes the following elements:

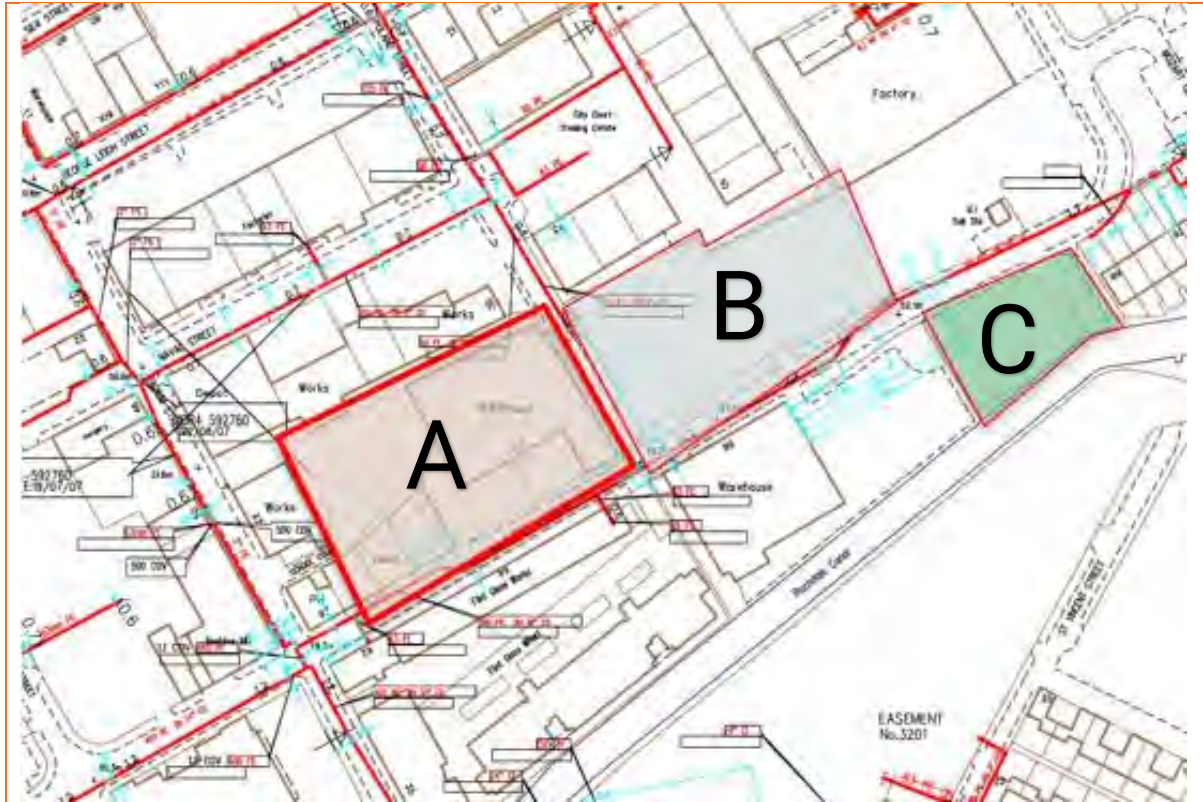
- Detailed review of historic information;
- Detailed review of desk study;
- Design and complete a suitable intrusive ground investigation that includes:
 - Window sample probeholes with, and construction of, environmental monitoring installations;
 - Deep cable percussive boreholes with groundwater monitoring installations;
 - Falling Head Permeability Testing;
 - Mechanically excavated trial trenches to investigate historic canal;
 - Mechanically excavated trial pits;
 - In-situ geotechnical testing;
 - Chemical and geotechnical laboratory analysis;
 - Groundwater monitoring and sampling;
 - Ground gas monitoring;
 - Contamination risk assessment and conceptual site model;
 - Geotechnical assessment and interpretation; and
- Complete a detailed Phase II Geoenvironmental Assessment

1.2. PROPOSED DEVELOPMENT

E3P understands that the site referred to as Parcel C will be developed into residential high rise buildings with some commercial use to the ground floor and the potential provision for under croft parking. Currently E3P has not yet been presented with a proposed development plan for the subject site, however, for the avoidance of doubt a location and parcel plan is included in figure 1.1.



FIGURE 1.1 JERSEY STREET LOCATION AND ZONING PLAN



For the avoidance of doubt this report is pertinent to the Parcel C area of the wider development only. Other parcels will be assessed under separate cover.

1.3. OBJECTIVES

The objectives of the geoenvironmental assessment are as follows:

- Undertake a preliminary stage of sampling and analysis to provide an overview of environmental issues identified.
- Assess the implications of any potential environmental risks, liabilities and development constraints associated with the site in relation to the future use of the site and in relation to off-site receptors.
- Assess the geotechnical information and provide preliminary recommendations in relation to foundations, pavement construction and floor slabs.
- Provide recommendations regarding future works required.

1.4. LIMITATIONS

The limitations of this report are presented in Appendix I.



1.5. CONFIDENTIALITY

E3P has prepared this report solely for the use of the client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from E3P; a charge may be levied against such approval.



2. GROUND INVESTIGATION

2.1. PHASE I DESK STUDY SUMMARY

Historic Features

The former canal arm ran along the western boundary of parcel C, known as the Prussia Street Arm. This was infilled in the mid 20th century. The western sector (currently un-accessible) was occupied by the Jersey Street Cotton Mills in the 19th century with various small structures in the east. In the early 20th century industrial works were constructed either side of the canal arm which remained until the latter 20th / early 21st century.

Current Features

The west of Parcel C comprises a warehouse occupied by Easy Equipment who are a catering supplier. The central sector is utilised as a car park. This area was not accessible during the site investigation.

The far east of the parcel is used to store building equipment including timber, boards and brick from the surrounding developments in progress.

Geology and Ground Conditions

The BGS recorded drift geology comprises CLAY, SAND and GRAVEL (Diamicton) and bedrock geology comprises MUDSTONE (Manchester Marls Formation).

Site Sensitivity

The site has been deemed to be located within a high sensitivity setting.

There is a nitrate vulnerable zone located 37 m north west of the site. There are also residential houses located 30 m south of Parcel C.

The aquifer classification in the bedrock is a Principal Aquifer (East parcel C)

The Rochdale Canal is located immediately south of Parcel C and a canal basin is located 95 m south west of the site.

Human Health

Based on the information available to review, it is considered that there will be a moderate risk to human health as a number of sources of contamination have been identified in relation to historic land uses on all three parcels of the site.

Hydrocarbon compounds may be present due to historic iron works, chimney, factories, garage and builders yard in addition to underlying Made Ground. Material deemed to have a potential vapour risk may require delineation and a hotspot removal.

The historic iron works is also thought to be a source of heavy metals, in particular iron. The presence of deep Made Ground may be a potential source of heavy metals, sulphates, asbestos and Polycyclic aromatic hydrocarbons (PAHs), however can be mitigated with the use of a minimum 300 mm cover system to all landscaped areas (as required by Manchester City Council).

Controlled Waters

Historical industrial land uses on the site, including works, garage, factories and builders yard, as well as Made Ground represent potential sources of mobile hydrocarbon contamination.



Glacial Till reduces the potential for migration of contaminants, if present, however, considering the underlying Secondary B Aquifer and Principal aquifer in addition to the Rochdale Canal located immediately south of parcel C, there is considered to be a moderate risk to controlled waters. Intrusive investigation with chemical analysis of soil and groundwater samples is recommended to assess the presence of mobile contaminants and facilitate further risk assessment.

Ground Gas

There are likely varying depths of Made Ground generated from historical development, demolition works and infilling of canal. The Envirocheck report has also recorded two areas of potentially infilled land within the site boundary and nine areas within 250 m of the site. The presence of historic Made Ground may result in the generation of hazardous ground gases (such as carbon dioxide & methane) which can accumulate within deep excavations or migrate through permeable strata, foundation structures and/or service ducting and pose a potential low-level risk to construction workers and future residential site users.

Carbon dioxide and methane have associated asphyxiation and explosive risks, respectively. Should a ground gas risk be identified to end users, the risks can be mitigated through the adoption of suitable control measures within the building construction using guidance presented within CIRIA 665 (Assessing Risk Posed by Hazardous Ground Gases to Buildings) and BS8485(2015) +A1(2019) Code of Practice for the Characterisation and Remediation from Ground Gas in Affected Developments.

Geotechnical Risk

The site is located within a coal mining reporting area, however, is considered to be low risk;

The underlying superficial geology will likely comprise a cohesive soil matrix and, as such, is not likely to offer the required degree of permeability to make soak-away drainage viable in this instance.

Footings will require deepening in accordance with NHBC guidance 2016 Chapter 4.2 if the development incorporates any existing and proposed trees within any cohesive drift deposits.

The site is generally topographically level due to historic levelling. To construct the proposed factory limited earthworks will be required to create a level developable platform.

Services have been identified within the site boundary. VSC would not be possible within close proximity to any sensitive infrastructure.

The Rochdale Canal is located immediately south of parcel C.

Intrusive investigation will be required to assess the ground conditions and undertake in-situ geotechnical testing to determine possible foundation solutions.

Any underground obstructions will require grubbing out in their entirety, prior to the construction of the proposed development.

2.2. GENERAL OVERVIEW

A ground investigation has been designed based on the findings of the desk study, with exploratory holes advanced to target specific potential contaminant sources summarised in Table 2.1. The investigation has also been used to collect geotechnical information to assist in the design and construction of the proposed development.

Exploratory fieldwork was completed between 18th November and 27th January 2020. The works are summarised in Table 2.1.



TABLE 2.1 SUMMARY OF FIELDWORK PARCEL C

POTENTIAL SOURCE/RATIONALE	LOCATION HOLE	TYPE	MAXIMUM DEPTH (m bgl)	MONITORING WELLS RESPONSE ZONE (m bgl)
Investigation of former sheet metal works	TP115	Mechanically Excavated Trial Pit	2.10	N/A
	WS112	Window Sample Probehole	5.45	2.50–4.00
Investigation of former factory building	TP116	Mechanically Excavated Trial Pit	1.60	N/A
	TP117		3.00	
	WS111	Window Sample Probehole	5.45	1.70–5.00
Investigation of deeper soil horizons	CP106	Cable Percussion Borehole	12.50	N/A

Mechanically excavated trial pits were advanced to investigate ground conditions and to retrieve environmental samples, spatially distributed to offer the maximum site coverage whilst also being advanced to target specific contaminant sources.

Window sample probeholes were advanced to undertake in-situ detailed geotechnical testing, obtain environmental samples and install groundwater and ground gas monitoring wells.

Mechanically excavated trial trenches were advanced within the proximity of the historically infilled canal to expose the infilled canal basin and assess its construction and relict structure.

Cable Percussion boreholes were advanced to facilitate the investigation of deeper soil horizons (in excess of 5.00m) with extensive in-situ geotechnical testing to determine the relative densities of granular soils and undrained strengths of clays.

In situ falling head permeability tests were undertaken to assess the potential porosity of the underlying drift deposits and inform the design of any infiltration drainage systems.

The sampling locations are illustrated in Drawing 13-729-004 (Appendix III). The ground conditions encountered are indicated on the logs, which are provided in Appendix V.

Return visits were made to monitor installations for groundwater level and gas concentrations. In addition, selected wells were purged and samples of groundwater recovered for chemical analysis.

2.3. IN-SITU STANDARD PENETRATION TESTING (SPT)

In-situ geotechnical testing was conducted using the standard penetration test (SPT) and, where the ground is granular, a 60° cone (SPT(C)) was used instead of the sampling tube. The results are shown in the probehole logs in Appendix VIII and presented in Table 3.8 and discussed in Section 5.



2.4. LABORATORY ANALYSIS

Selected soil samples were submitted for a range of chemical analysis comprising:

- Metals.
- pH, total sulphate, water-soluble sulphate (2:1 extract).
- Sulphide.
- Cyanide.
- Phenols.
- Total and speciated polycyclic aromatic hydrocarbons (PAHs).
- Semi Volatile Organic Compounds (SVOC).
- Volatile Organic Compounds (VOC).
- Asbestos identification and quantification.
- Speciated and banded total petroleum hydrocarbon (TPH).

I2 Analytical undertook the analytical work and the testing results are included in Appendix VI and discussed in Section 4.

Selected samples were submitted to PSL Laboratory where the following geotechnical tests were undertaken:

- Atterberg limits determinations;
- Moisture Content;
- Single-stage triaxial tests;
- One Dimensional Consolidation Test

Laboratory analysis sheets are included in Appendix VII and are summarised in Section 3 and discussed in Section 5.



3. GROUND AND GROUNDWATER CONDITIONS

3.1. SUMMARY OF GROUND CONDITIONS

The ground investigation generally confirms the published geology and identifies the strata set out in Table 3.1.

TABLE 3.1 SUMMARY OF STRATA PARCEL C

HOLE	DEPTH TO STRATUM (m bgl)			
	MADE GROUND GRAVEL	SILT	CLAY	BEDROCK
TP115	0.00–0.80		0.80–2.10	-
TP116	0.00–1.00		1.00–1.60	-
TP117	0.00–2.30	2.30–2.80	2.80–3.00	-
WS111	0.00–1.70		1.70–5.45	-
WS112	0.00–2.30		2.30–4.45	-
CP106	0.00–1.80		1.80–12.50	10.30-12.50

3.2. AREA SPECIFICS (TRIAL TRENCHES INVESTIGATING FORMER CANAL)

E3P were unable to investigate the historically infilled trial trench due to constraints including the presence of a gas main. The area was also being used by site workers and so access to the area was prohibited. Trial pits were advanced where possible and confirm general ground conditions. Evidence at the canal edge suggests the feature was bricked up and infilled between the bridge and the existing canal on either side of parcel C.

3.3. MADE GROUND

Made Ground was encountered within all exploratory holes between ground level and 2.30 m bgl. Within this parcel all locations confirmed the full depth of Made Ground.

Made Ground mainly comprised Black gravel with frequent cobbles with gravel of sandstone, ash, mudstone, concrete and brick that was encountered between ground level and a maximum proven depth of 2.30m bgl.

The infilled canal could not be accessed within this parcel however, throughout the wider site this is considered to contain perched water and soils with visual and olfactory contamination potential.

Large obstructions including brick and concrete were encountered within exploratory hole locations. Brick walls were noted in TP117 at depths up to 2.30m bgl indicative of the historic buildings.

A Depth of Made Ground Plan is presented as Drawing 13-729-005 in Appendix III.

3.4. DRIFT DEPOSITS

The natural drift deposits were identified in all locations and were found to be generally uniform across the area. Natural CLAY stratum directly underlay the Made Ground.



Drift deposits comprised firm to very stiff brown slightly gravelly CLAY which were encountered at depths of between 0.80 m and 10.30 m bgl.

An isolated area of brown clayey SILT was identified in TP117 between 2.30 m and 2.80 m bgl. Deeper cable percussive drilling recorded the CLAY to depths in excess of 10 m bgl before the bedrock strata was encountered.

3.5. SOLID GEOLOGY

Bedrock has not been identified within the exploratory hole locations completed within the original site investigation, although deeper cable percussive boreholes completed subsequently identified as dense brown SANDSTONE in CP106 between 10.30 m to 12.50 m bgl.

The closest BGS borehole encountered sandstone bedrock at 23.00m bgl which corroborates a dip to the west.

3.6. GROUNDWATER

No groundwater strikes were recorded during the ground investigation; however groundwater was noted between 1.73 m and 1.76 m bgl during the first groundwater monitoring visit.

3.7. VISUAL AND OLFACTORY EVIDENCE OF CONTAMINATION

Visual and olfactory evidence of potential contamination has been identified during the site investigation and these are summarised in Table 3.2.

TABLE 3.2 SUMMARY VISUAL AND OLFACTORY EVIDENCE OF CONTAMINATION

LOCATION	DEPTH (m)	STRATUM	NOTES
TP117	2.30–2.80	SILT	Organic odour

3.8. SOIL CONSISTENCY

Undrained shear strength values were measured using both field hand shear vane tests and laboratory undrained triaxial tests. Results of the tests are presented in Table 3.3. and Table 3.4, which indicate the clay soils to vary between firm and very stiff. Strength test data is generally consistent with the field descriptions of the aforementioned soils.

TABLE 3.3 SUMMARY OF HAND SHEAR VANE TESTS

LOCATION	DEPTH	SHEAR STRENGTH (kPA)	CALCULATED ALLOWABLE BEARING PRESSURE (kN/m ²)
TP115	1.00	83.00	195.05
TP115	2.00	97.00	227.95
TP116	1.20	111.00	260.85
TP116	1.50	97.00	227.95
TP117	2.90	52.00	122.20

Results of the standard penetration tests, including undrained shear strengths derived from SPTs are included in Table 3.5.



TABLE 3.4 SUMMARY OF UNDRAINED SHEAR STRENGTH TEST RESULTS

LOCATION	SAMPLE DEPTH (m)	LAB DESCRIPTION	UNDRAINED SHEAR STRENGTH (kN/m ²)	CONSISTENCY
WS112	3.50–4.00	Stiff brown slightly gravelly sandy CLAY.	134	Stiff

3.9. SIDE STABILITY AND EASE OF EXCAVATION

All trial pit excavations were noted to be stable.

The presence of brick and concrete cobbles within the Made Ground deposits meant that in certain places, excavation was slow through the Made Ground.

Existing site constraints in the form of historic structures should be considered as these have the potential to limit the application of piling techniques without the requirement to pre bore. Obstructions in the Made Ground will require removal through a Made Ground turnover to facilitate the use of driven foundation solutions.

It is likely that in order to form the excavation for a basement structure a significant works will be required including the dewatering of groundwater. Both the soils and water will require appropriate, regulatory compliant disposal. It is likely the Made Ground during this process will be unstable but will also comprise the majority of the excavated materials.

The natural strata was excavated with relative ease.



TABLE 3.5 STANDARD/CONE PENETRATION TEST RESULTS

BOREHOLES	DEPTH (m bgl)	MATERIAL FIELD DESCRIPTION	CPT/SPT "N" VALUE	CORRECTED "N" VALUE (N ₁) ₆₀	TERZAGHI & PECK RELATIVE DENSITY (SANDS)	EUROCODE SOIL STRENGTH	CONSISTENCY (BS 5930)	TERZAGHI & PECK APPROXIMATE UNDRAINED SHEAR STRENGTH (kN/m ²)
WS111	2	CLAY	7	6.39	N/A	Low strength	Firm	31.97
WS111	3	CLAY	17	14.78	N/A	Medium strength	Stiff	73.92
WS111	4	CLAY	22	18.59	N/A	High strength	Very Stiff	92.93
WS111	5	CLAY	21	17.42	N/A	High strength	Very Stiff	87.11
WS112	3	CLAY	17	14.78	N/A	Medium strength	Stiff	73.92
WS112	4	CLAY	50	42.24	N/A	Very high strength	Very Stiff	211.21
CP106	2	CLAY	4	3.65	N/A	Very low strength	Soft	18.27
CP106	3	CLAY	6	5.22	N/A	Low strength	Firm	26.09
CP106	4	CLAY	9	7.60	N/A	Low strength	Firm	38.02
CP106	5	CLAY	11	9.13	N/A	Medium strength	Stiff	45.63
CP106	7.5	CLAY	30	24.34	N/A	High strength	Very Stiff	121.69
CP106	12	SANDSTONE	40	29.77	Medium Dense	N/A	N/A	N/A
CP106	12.5	SANDSTONE	50	36.53	Dense	N/A	N/A	N/A



3.10. SOIL COMPRESSIBILITY

Consolidation tests have been undertaken on selected samples of CLAY using an odometer to obtain consolidation properties. Tests include an unload cycle to help assess potential heave. The results are included in Table 3.6 and show the CLAY to be of medium compressibility assuming a load in excess of 150 kN/m² is generated, which is consistent with the soils visual description as ultimately this will not be loaded by the full structure that would require in excess of 1500kN/m².

TABLE 3.6 SUMMARY CONSOLIDATION TEST DATA

LOCATION	DEPTH (m)	LOAD INCREMENT	VOLUME CHANGE COEFFICIENT, M_v	CONSOLIDATION COEFFICIENT, C_v
WS106	2.50–3.00	0–55	0.797	1.901
		55–110	0.385	0.726
		110–220	0.267	0.557
		220–440	0.157	0.551
		440–55	0.044	2.475

The results have determined that the clay soil is of moderate compressibility between 110 kN/m² and 440 kN/m² in WS106 assuming a bearing pressure in the region of 150kN/m² is generated. The assessment is consistent with the soils visual description.

3.11. SOIL PLASTICITY

The liquid and plastic limits of samples of natural in-situ clay are determined using the cone penetrometer method and the rolling thread test. These tests enable determination of an average plasticity index (PI) for each “type” of clay, although judgement is applied where variable results are reported.

PI can be related to shrinkability (low, medium or high) and then to minimum founding depth.

E3P typically only consider a soil to be shrinkable if the proportion finer than 63 µm is > 35%.

PI results are compared against guidance given in the NHBC standards, Chapter 4.2 (revised January 2014), which advocates the use of modified plasticity index (I'_p), defined as:

$$I'_p = I_p \times (\% < 425 \mu\text{m}/100)$$

In other words, if PI is 30%, but the soil contains 80% < 425 µm, then $I'_p = 30 \times 80/100 = 24\%$.

It should be noted that in accordance with the requirements of BS 1377, the % passing the 425 µm sieve is routinely reported by testing labs.

E3P apply engineering judgement where PI results are spread over a range of classifications. Consideration is given to the average values for each particular soil type (differentiate between residual soil and alluvium), the number of results in each class and the actual values.

The Atterberg limits determinations, summarised in Table 3.7, show the clay to be of predominantly low plasticity with discrete areas of moderate plasticity clay.



TABLE 3.7 SUMMARY OF PLASTICITY INDEX TEST RESULTS

LOCATION	DEPTH (m)	NATURAL MOISTURE CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	PASSING 425 µm SIEVE (%)	MODIFIED PLASTICITY INDEX	NHBC VOLUME CHANGE POTENTIAL
WS111	2.00	16	20	41	21	91	19.11	LOW
WS112	2.80	18	21	43	22	98	21.56	MEDIUM

The results of the Atterberg limits testing confirmed that the soils would be deemed to be low to medium Volume Change Potential in accordance with the classification system utilised by the LABC/NHBC industry guidance.

3.12. pH AND SULPHATE

Chemical analyses for pH and soluble sulphate content contained in Appendix VI (summarised in Table 3.8), shows that the soils at the site meet Class DS-1, Aggressive Chemical Environment for Concrete Classification (ACEC) AC-1s in accordance with BRE *Special Digest 1* (2005).

TABLE 3.8 SUMMARY OF pH AND SULPHATE DATA

LOCATION	DEPTH (m)	SO ₄ IN 2:1 WATER/SOIL (g/l)	pH VALUE	CLASSIFICATION
TP117	1.60	0.47	9.1	DS-1 AC-1s
TP117	2.90	0.16	6.9	DS-1 AC-1s

3.13. GROUND GAS

A ground gas assessment has been completed in accordance with guidance provided within CIRIA 665 – *Assessing risk posed by hazardous ground gases to buildings*.

3.14. INVESTIGATION RATIONALE

The ICSM has identified that the underlying Made Ground and infilled land may represent a potential source of ground gas generation.

Based on the identification of these sources, E3P has determined that the site represents a low ground gas source generation potential.

Within the context of the proposed residential end use and ground gas generation potential, the gas assessment requires that six visits are required over three months, with at least two sets of readings at low or falling atmospheric pressure as set out within CIRIA 665 Tables 5.5a and 5.5b.

The spacing requirements for monitoring wells are detailed within CIRIA 665 Table 4.2, which indicates that for low gas hazard sites (Made Ground with limited degradable material, organic clay of limited thickness) and a high sensitivity development, nominal well spacing should be between 25 m and 50 m.



TABLE 3.9 GROUND GAS MONITORING LOCATION RATIONALE

LOCATION	GROUND GAS SOURCE	DEPTH OF MONITORING WELL (m)
WS111	CLAY	1.70–5.00
WS112	CLAY	2.50–4.00

3.15. MONITORING METHODOLOGY

Concentrations of methane (CH₄), carbon dioxide (CO₂) and oxygen (O₂) were measured using an infra-red gas analyser (GFM435) calibrated to a reference standard (before and after each survey) and gas flow rates were measured using an integrated flow meter.

Gas measurements were recorded for a minimum of 60 seconds at each location, at which point the maximum concentration of CH₄ and CO₂, together with the lowest concentration of O₂ were recorded. The results of the ground gas monitoring are presented in Table 3.10.



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TABLE 3.10 SUMMARY OF GROUND GAS MONITORING RESULTS

WELL	DATE	CH ₄ INITIAL (%V/V)	CH ₄ STEADY (%V/V)	CH ₄ GSV (l/hr)	CO ₂ INITIAL (%V/V)	CO ₂ STEADY (%V/V)	CO ₂ GSV (l/hr)	O ₂ (%V/V)	ATMOS (mb)	ATMOS. DYNAMIC	FLOW (l/hr)	RESPONSE ZONE (m bgl)	DEPTH TO BASE (m bgl)	DEPTH TO WATER (m bgl)
WS111	9/12/19	0.10	0.10	0.0001	0.10	0.10	0.0001	20.40	1006	Rising	0.10	1.00-5.00	4.60	1.73
WS112	9/12/19	0.10	0.10	0.0001	0.50	0.50	0.0005	19.50	1006	Rising	0.10	2.50-4.00	3.70	1.76



4. TIER I QUALITATIVE CONTAMINATED LAND RISK ASSESSMENT

E3P has undertaken a Tier 1 qualitative risk assessment to determine if any potential contaminants within the underlying soils and groundwater pose an unacceptable level of risk to the identified receptors.

4.1. HUMAN HEALTH RISK ASSESSMENT

At Tier 1 stage, the long term (chronic) human health toxicity of the soil has been assessed by comparing the on-site concentrations of organic and inorganic compounds with reference values published in LQM/CIEH S4UL (S4UL3267).

The results of this comparison have been summarised within Table 4.1.



TABLE 4.1 SUMMARY OF INORGANIC AND HYDROCARBON TOXICITY ASSESSMENT FOR A RESIDENTIAL END USE

DETERMINANT	UNIT	GAC	N	MC	LOC. OF EX	PATH-WAY	ASSESSMENT
Arsenic	mg/kg	37	7	40	TP117 1.60 m	1	Further Action
Cadmium	mg/kg	17	7	18	TP116 0.80 m	1	Further Action
Chromium (VI)	mg/kg	6.1	7	<4.0	N/A	1	No Further Action
Lead	mg/kg	200	7	200	N/A	1	No Further Action
Mercury	mg/kg	1.2	7	0.7	N/A	3	No Further Action
Nickel	mg/kg	180	7	57	N/A	1	No Further Action
Selenium	mg/kg	250	7	<1.0	N/A	1	No Further Action
Copper	mg/kg	2400	7	160	N/A	1	No Further Action
Zinc	mg/kg	3700	7	1100	N/A	1	No Further Action
Cyanide – Total	mg/kg	791	6	<1.0	N/A	1	No Further Action
Phenols – Total	mg/kg	210	2	<1.0	N/A	1	No Further Action
Asbestos	Fibres	NFD	4	<0.001	WS112 1.20 m	4	Further Action
Naphthalene	mg/kg	2.3	7	0.53	N/A	3	No Further Action
Acenaphthylene	mg/kg	170	7	<0.05	N/A	2	No Further Action
Acenaphthene	mg/kg	210	7	0.29	N/A	1	No Further Action
Fluorene	mg/kg	170	7	0.38	N/A	1	No Further Action
Phenanthrene	mg/kg	95	7	2.1	N/A	2	No Further Action
Anthracene	mg/kg	2400	7	0.46	N/A	2	No Further Action
Fluoranthene	mg/kg	280	7	2.5	N/A	2	No Further Action
Pyrene	mg/kg	620	7	2.6	N/A	2	No Further Action
Benzo(a)Anthracene	mg/kg	7.2	7	1.5	N/A	2	No Further Action
Chrysene	mg/kg	15	7	1.1	N/A	2	No Further Action
Benzo(b)Fluoranthene	mg/kg	2.6	7	1.2	N/A	2	No Further Action
Benzo(k)Fluoranthene	mg/kg	77	7	0.79	N/A	2	No Further Action
Benzo(a)Pyrene**	mg/kg	2.2	7	1.3	N/A	2	No Further Action
Indeno(123-cd)Pyrene	mg/kg	27	7	0.69	N/A	2	No Further Action
Dibenzo(a,h)Anthracene	mg/kg	0.24	7	0.26	WS112 1.20 m	2	Further Action
Benzo(ghi)Perylene	mg/kg	320	7	0.81	N/A	2	No Further Action
TPH C5-C6 (aliphatic)*	mg/kg	42	7	<1.0	N/A	3	No Further Action
TPH C6-C8 (aliphatic)*	mg/kg	100	7	<0.1	N/A	3	No Further Action
TPH C8-C10 (aliphatic)*	mg/kg	27	7	<0.1	N/A	3	No Further Action
TPH C10-C12 (aromatic)*	mg/kg	74	7	7.1	N/A	3	No Further Action
TPH C12-C16 (aromatic)*	mg/kg	140	7	21	N/A	3	No Further Action
TPH C16-C21 (aromatic)*	mg/kg	260	7	78	N/A	1	No Further Action



DETERMINANT	UNIT	GAC	N	MC	LOC. OF EX	PATH-WAY	ASSESSMENT
TPH C21-C35 (aromatic)*	mg/kg	1100	7	350	N/A	1	No Further Action

Notes

Main exposure pathways: 1 = soil ingestion, 2 = dermal contact and ingestion, 3 = vapour inhalation (indoor), 4 = dust inhalation.

Abbreviations: GAC = general assessment criteria, n = number of samples, MC = maximum concentration; Loc of Ex = location of exceedance; NFD = no fibres detected.

Referring to Table 4.1, the results of this direct comparison indicates that the data exceeds the screening criteria for a residential end use for the following contaminants:

- Cadmium;
- Arsenic;
- Asbestos; and
- Dibenzo(a,h)Anthracene.

Laboratory analysis of the soils has indicated the presence of elevated metals, non-volatile PAHs and asbestos in Made Ground deposits.

Asbestos was identified in one out of four samples submitted for analysis by E3P. Asbestos in the form of Chrysotile was identified in WS112 at 1.20 m bgl. Quantification of the asbestos present was confirmed to be less than 0.001% v/v.

A soil sample from TP117 at 2.90 m bgl was submitted for specific VOC analysis with no elevated compounds identified.

In relation to these exceedances, the following can be determined:

- The main exposure pathways based on the Tier I exceedances are:
 - Soil ingestion;
 - Dust inhalation
 - Dermal contact and ingestion; and
- All exceedances have been identified in the Made Ground between 0.80 m and 1.60 m bgl.

HUMAN HEALTH RISK ASSESSMENT AND MITIGATION

The majority of the identified elevated concentrations have primary exposure pathways related to dermal contact and ingestion, soil ingestion and consumption of homegrown produce. These exceedances can be mitigated by the installed of a suitable cover system within all proposed soft standing landscaped areas.

The specific design and installation process for the appropriate cover systems will be clearly defined within the site remediation and enabling works strategy; however, industry best practice (as outlined within BRE 465) will require the following minimum depths of certified clean cover:



- Landscaped areas within private dwellings – 300 mm;
- Public open space – 300 mm.

Asbestos was identified in one sample out of three samples submitted for analysis. Quantification identified WS112 at 1.20m to have concentrations below <0.001%. With reference to the E3P Asbestos Conceptual Site Model shown below, Made Ground deposits will require placement below plots or a 300mm cover system (150mm topsoil, 150mm subsoil) in order to mitigate the risks to future residential end users (Figure 4.1).

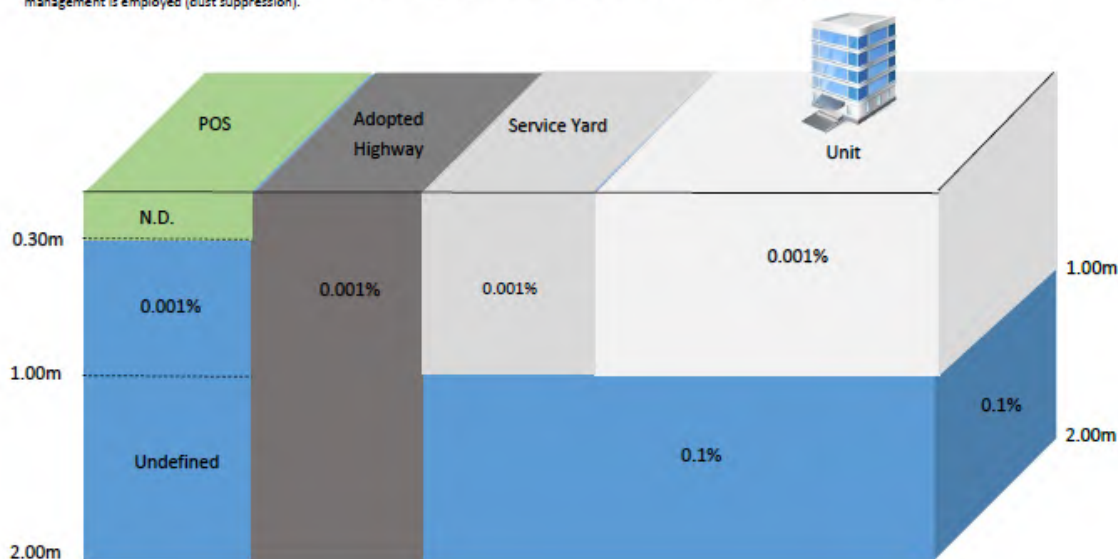
FIGURE 4.1 ASBESTOS RISK MITIGATION CONCEPTUAL SITE MODEL (RESIDENTIAL HIGH RISE DEVELOPMENT)

Figure A1Asbestos in Soils Conceptual Site Model Residential Apartment Development

Notes:

N.D. – None Detected

0.001% - Soils may contain 0.001% asbestos using composite testing to ensure there is no potential risk to human health. This value is present within areas where there may be short term low level exposure of soils containing trace asbestos fibres by construction workers where an appropriate level of asbestos management is employed (dust suppression).



No sources of suitable topsoil have been identified on site. Chemical analysis of the natural clay drift deposits have identified these soils to be acceptable for use as subsoil within the proposed garden areas.

Given identification across the wider site, It is likely that impacted perched water confined in the canal will require pumping and removal. The remaining soils will then require either removal from site, treatment on site or retention with the installation of vapour membranes or further assessment to fully determine any risk.



4.2. CONTROLLED WATERS RISK ASSESSMENT

The site sensitivity with respect to controlled waters is summarised within Table 4.2.

TABLE 4.2 CONTROLLED WATERS SENSITIVITY PROFILE

RISK PROFILE	DISCUSSION	SENSITIVITY RATING
Groundwater Source Protection Zone or Drinking Water Safeguard Zone	The site is not located within a Groundwater Source Protection Zone or Drinking Water Safeguard Zone	Low
Distance to the Closest Groundwater Abstraction Point	There are no groundwater abstraction points located within 1km of the site.	Low
Aquifer Classification in Superficial Drift Deposits	The underlying superficial deposits located within the Secondary undifferentiated aquifer are likely to comprise gravely sands interbedded with low-permeability clay soils to depths in excess of 5 m, which may reduce the potential for mobile phase contaminants to migrate towards the bedrock aquifer.	Low
Aquifer Classification in Bedrock	Secondary B Aquifer	Low
Viability for Anthropogenic Soil in Direct Contact with Aquifer (Drift or Bedrock)	Variable Made Ground with predominantly low-solubility contaminant impact is present throughout the Made Ground to maximum proven depth of 2.80 m bgl. However, this is known to be underlain by cohesive strata to a maximum proven depth of 10.30m in this area.	Low
Is the Site Located Within 50 m of a Surface Watercourse?	The Rochdale Canal is located immediately south of Parcel C. No further surface water course are present within 800 m of the site.	Moderate
SUMMARY The ICSM developed within the context of the site setting has identified a viable pollutant risks, which would be the downward migration of potentially mobile phase-soluble contaminants towards the underlying Secondary B aquifer and lateral migration towards the off-site Rochdale Canal.		

To further refine the ICSM, E3P has undertaken an initial qualitative assessment of the soil data analysis to assess the potential for a source of separate-phase or dissolved-phase contamination originating from either a defined on-site source or from impacted soils. This assessment is summarised in Table 4.3.



TABLE 4.3 QUALITATIVE RISK TO CONTROLLED WATERS FROM SOIL ANALYTICAL RESULTS

BTEX > 1 mg/kg	No elevated TPHC5-C6, VOCs or BTEX have been identified within the chemical analysis of soils at the site.
Total VOC > 1 mg/kg	
Total SVOC > 1 mg/kg	Concentrations of low solubility PAH compounds greater than 10mg/kg have been detected throughout the site with a maximum concentration of 15 mg/kg.
C5-C10 > 5 mg/kg	All concentrations are below the laboratory 5 mg/kg.
C10-C12 > 10 mg/kg	All concentrations are below the laboratory 10 mg/kg.
C12-C16 > 50 mg/kg	All concentrations are below the laboratory 50 mg/kg.
Phenols > 2 mg/kg	All concentrations are below the laboratory LOD
Naphthalene > 2 mg/kg	All concentrations are below 2 mg/kg.
Total PAH > 10 mg/kg	Concentrations of low solubility PAH compounds greater than 10mg/kg have been detected throughout the site with a maximum concentration of 15 mg/kg.
PCB > 1 mg/kg	No potential sources of PCB have been identified
Heavy metals > 500 mg/kg	Heavy metals concentrations are all below 500 mg/kg with the exceptions of one location (TP116 at 0.80 m bgl) where zinc has been identified at 1100 mg/kg.

In due consideration of the ICSM, E3P has undertaken a Tier I controlled waters risk assessment. The Tier I assessment has included a comparison of leachate analysis and groundwater samples to drinking water standards (DWS) as the site is underlain by a Secondary B aquifer with significant contaminant in the near surface and, where absent, environmental surface water quality (EQS) due to the close proximity to the Rochdale Canal.

These are presented in Table 4.4.



TABLE 4.4 COMPARISON OF GROUNDWATER ANALYSIS WITH TIER 1 SCREENING LEVELS

DETERMINAND	UNIT	EQS SCREENING VALUE ^{1, 2, 3}		DWS _{3,4,5}	N		MC	LOC. OF EX	ASSESSMENT
		AA	MAC		L	GW			
Arsenic	µg/l	50	–	10	1	3	7.5	-	No Further Action
Cadmium	µg/l	0.08	0.45	5	1	3	<0.08	-	No Further Action
Chromium (VI)	µg/l	3.4	–	–	1	3	<5.0	-	No Further Action
Chromium (III)	µg/l	4.7	–	50	1	3	2.8	-	No Further Action
Copper (hardness)	µg/l	1–28	–	2000	1	3	9.0	-	No Further Action
Total Cyanide	µg/l	1	–	50	1	3	5.2	-	No Further Action
Lead	µg/l	1.2	14	10	1	3	16	TP116 0.80 m	Further Action
Mercury	µg/l	–	0.07	1.0	1	3	<0.5	–	No Further Action
Nickel	µg/l	4	34	20	1	3	3.2	–	No Further Action
Selenium	µg/l	–	–	10	1	3	<4.0	–	No Further Action
Zinc (hardness)	µg/l	8–125	–	–	1	3	31	–	No Further Action
pH	6–9				1	3	7.6–8.0	–	No Further Action
PAH									
Naphthalene	µg/l	2	130	10*	1	3	<0.01	–	No Further Action
Anthracene	µg/l	0.1	0.1		1	3	<0.01	–	No Further Action
Benzo[b]fluoranthene	µg/l	1.7–4	0.017		1	3	<0.01	–	No Further Action
Benzo[k]fluoranthene	µg/l	1.7–4	0.017		1	3	<0.01	–	No Further Action
Benzo(a)pyrene	µg/l	1.7–4	0.27		1	3	<0.01	–	No Further Action
Fluoranthene	µg/l	0.0063	0.12		1	3	<0.01	–	No Further Action
Benzo(ghi)perylene	µg/l	1.7–4	8.2–3		1	3	<0.01	–	No Further Action
TPH-Aromatic									
TPH C5-C6 (benzene)	µg/l	10	50	1	1	3	<1.0	–	No Further Action
TPH C6-C8 (toluene)	µg/l	50	–	700	1	3	<1.0	–	No Further Action
TPH C8-C10 (ethyl Benzene)	µg/l	20	–	300	1	3	<1.0	–	No Further Action
TPH C10-C12 (xylene)	µg/l	30	–	500	1	3	<10	–	No Further Action
TPH C12-C16	µg/l	2	130	90 ⁵	1	3	<10	–	No Further Action
TPH C16-C35	µg/l	50#	50#	90 ⁵	1	3	<10	–	No Further Action



TPH Aliphatic ⁵									
TPH C5-C6	µg/l	–	–	15000	1	3	<1.0	–	No Further Action
TPH C6-C8	µg/l	–	–	15000	1	3	<1.0	–	No Further Action
TPH C8-C10	µg/l	–	–	300	1	3	<1.0	–	No Further Action
TPH C10-C12	µg/l	–	–	300	1	3	<10	–	No Further Action
TPH C12-C16	µg/l	–	–	300	1	3	<10	–	No Further Action
TPH C16 – C21	µg/l	–	–	300**	1	3	<10	–	No Further Action
TPH C21-C35	µg/l	–	–	300**	1	3	<1.0	–	No Further Action
VOC									
Tetrachloroethylene	µg/l	0.4	–	10	N/A	3	<1.0	–	No Further Action
Trichloroethylene	µg/l	10	–	10		3	<1.0	–	No Further Action
Trichlorobenzene	µg/l	0.4	–	–		3	<1.0	–	No Further Action
Trichloromethane	µg/l	2.5	–	–		3	<1.0	–	No Further Action
Dichloromethane	µg/l	20	–	200		3	<1.0	–	No Further Action
Carbon Tetrachloride	µg/l	12	–	3		3	<1.0	–	No Further Action
Vinyl Chloride	µg/l	–	–	0.3		3	<1.0	–	No Further Action

Notes

Solubility < 0.01 µg/l.

AA – Annual average.

MAC – Maximum admissible concentration.

* Sum of The specified compounds are benzo[b]fluoranthene (CAS 205-99-2), benzo[k]fluoranthene (CAS 207-08-9), benzo[g,h,i]perylene (CAS 191-24-2) and indeno[1,2,3-c,d]pyrene (CAS 193-39-5).

1. *The Water Environment (Water Framework Directive) (England and Wales) (Amendment) Regulations* (2015).
2. *Directive establishing a framework for Community action in the field of water policy* (Water Framework Directive).
3. *Council Directive on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community (Dangerous Substances Directive) – List II substances.*
4. *Council Directive on the quality of water intended for human consumption (Drinking Water Directive).*
5. *WHO Guidelines for Drinking Water Quality.* Third edition (2004).

CONTROLLED WATER RISK ASSESSMENT AND MITIGATION

This comparison indicates that the data exceeds the DWS values for the following inorganic compounds:

■ Lead

Lead exceeds the DWS in a leachate sample in TP116 at 0.80 m bgl.

All three Canal surface water samples collected at the site show no exceedance.

It should be noted that the Tier I assessment criteria provides a conservative view, which may overstate the risk. Inorganic determinants identified above are of a general low solubility and therefore mobility, suggesting that these will not migrate to controlled water receptors. In the case of Leachate results, the aggressive nature of the test does not replicate the natural environmental setting and may force compounds into solution that wouldn't otherwise at the site.



Given that the site is underlain by low-permeability, predominantly cohesive glacial till deposits, which will afford protection to the underlying secondary and principal aquifer limiting vertical migration, there is considered to be a low risk to controlled waters and the wider environment, in the absence of a groundwater potable abstraction, no complete pollutant linkage can be determined.

Furthermore, it is expected that the majority of the Made Ground at the site will be removed as part of the works to construct a basement within the future building. As such the source material responsible for this exceedance is likely to be removed from site in its entirety.

Based on the above, there is considered to be no unacceptable level of risk to the controlled water receptors.

4.3. GROUND GAS

The potential impact on the development from ground gases has been assessed with reference to standards and guidelines published in CIRIA Report 665 – *Assessing risks posed by hazardous ground gases to buildings* (2007). However, it is recommended that the full ground gas assessment and recommended protection measures are agreed with the local authority prior to their adoption on site. Furthermore, all protection measures adopted should be validated by a suitably qualified engineer.

CIRIA C665 and NHBC Report No 10627-R01 provide assessments for carbon dioxide and methane based upon gas screening values (GSVs) utilising flow rates and concentrations. The site-based GSVs for steady state methane and carbon dioxide are based upon the following equation:

$$GSV = \frac{\text{concentration (by vol)}}{100} \times \text{flowrate (l / hr)}$$

The GSVs within CIRIA C665 are based upon all buildings other than standard residential houses. The NHBC GSVs are based upon standard residential houses with precast concrete floors (block and beam). The CIRIA 665 report author (Steve Wilson) since provided further clarification regarding which guidance should be adopted for residential houses that have suspended cast in-situ concrete floor slab: for the avoidance of doubt, it was confirmed that the GSVs within the CIRIA 665 guidance should be adopted. The thresholds for GSVs based upon NHBC and CIRIA guidance are provided within Table 4.5.

TABLE 4.5 RESIDENTIAL THRESHOLDS FOR GAS SCREENING VALUES (GSV) IN ACCORDANCE WITH CIRIA C665 AND NHBS REPORT NO 10627-R01 – RESIDENTIAL END USE

CIRIA – NO SUBFLOOR VOID		NHBC – SUBFLOOR VOID		
CLASSIFICATION	GSV (METHANE AND CARBON DIOXIDE)	CLASSIFICATION	GSV (METHANE)	GSV (CARBON DIOXIDE)
CS1	< 0.07	Green	< 0.13	< 0.76
CS2	< 0.70	Amber 1	< 0.63	< 1.60
CS3	< 3.5	Amber 2	< 1.60	< 3.10
CS4	< 15	Red	> 1.60	> 3.10
CS5	< 70	N/A	N/A	N/A
CS6	> 70	N/A	N/A	N/A

4.3.1. SOURCES OF GROUND GAS

The Phase I report and subsequent ground investigation has identified the following potential sources of ground gas:



- Made Ground deposits; and
- Infilled ground

4.3.2. GROUNDWATER

Given the single monitoring visit completed to date identify a groundwater level throughout the site between 1.73 m and 1.76 m bgl.

4.3.3. GAS FLOW

During the monitoring a positive flow was noted in 111 and 112. The measure of positive flow is considered to be the result of groundwater fluctuations and flooding of the well causing compression – as opposed to gas generation – as the highest flows are recorded during periods of high groundwater levels.

4.3.4. GAS CONCENTRATIONS

Methane has not been recorded within monitoring wells above the trigger level of the equipment at any location.

Carbon dioxide concentrations were recorded within the monitoring wells WS112 at a concentration of ranging from 0.5% v/v. Levels above the CO₂ trigger level on the equipment were not reached in WS111.

4.3.5. GAS ASSESSMENT

In accordance with the methodology outlined with the CIRIA publication C665, E3P have utilised the results of the ground gas monitoring surveys to calculate a tentative gas screening value (GSV). The GSVs for the monitoring positions are summarised in Table 4.6.

TABLE 4.6 GAS RISK PROFILE AND LOCATION

LOCATION	MAX CO ₂ (% v/v)	GSV (l/hr)	MAX CH ₄ (% v/v)	GSV (l/hr)	CLASSIFICATION
WS111	0.10	0.0001	0.10	0.0001	Green (CS1)
WS112	0.50	0.0005	0.10	0.0001	Green (CS1)

The GSV has been compared to the criteria outlined with CIRIA C665 to determine the level of risk to the proposed development and to ensure the appropriate remedial options are incorporated into any future building design in this area.

Preliminary ground gas monitoring suggests that the site can be predominantly classified as CS1, and in these areas it is considered that gas protection measures will not be required.

However, give the site setting and on site historical uses, as well as, the identified ground conditions it is recommended that an allowance for mitigation measures to a CS2/Amber 1 level are retained pending completion of the full phase of ground gas monitoring. Where a gas risk to a CS2 level are identified properties within this area will likely require specialist protection measures as detailed below.

Furthermore, given the identification of SVOC and VOC compounds within the former canal through other parcels in the wider site, further investigation is required in parcel C to ascertain whether a potential vapour risk is present. Where volatile compounds are identified a vapour resistant membrane will be required within the future structure.



4.4. RESIDENTIAL BUILDING GAS RISK MITIGATION

British Standard BS8485 (2015)+A1(2019) provides two types of residential property that require assessment. The most likely building type is:

- **Type B Building** – Private or commercial property with central building management control of any alterations to the building or its uses but limited or no central building management control of the maintenance of the building, including the gas protection measures. Multiple occupancy. Small- to medium-sized rooms with passive ventilation of rooms and other internal spaces throughout ground floor and basement areas. May be conventional building or civil engineering construction. Examples include managed apartments, multiple occupancy offices, some retail premises and parts of some public buildings (such as schools, hospitals, leisure centres) and parts of hotels.

Based on the ground gas risk assessment and the proposed Type B Building, it is envisaged that a point score of 3.5 *could* be required for affected properties, as summarised in Table 4.7.

TABLE 4.7 BS 8485 (2015) POINTS REQUIRED FOR TYPE A AND TYPE B BUILDINGS

CHARACTERISTIC SITUATION	NHBC TRAFFIC LIGHT SYSTEM	MINIMUM GAS PROTECTION SCORE (POINTS)	
		HIGH SENSITIVITY	
		TYPE A BUILDING	TYPE B BUILDING
1	Green	0	0
2	Amber 1	3.5	3.5
3	Amber 2	4.5	4
4	Red	6.5	5.5
5	N/A	N/A	6.5
6	N/A	N/A	N/A

Residential buildings should not be built on CS4 or higher sites unless the type of construction or site circumstances allow additional levels of protection to be incorporated, for example, high-performance ventilation or pathway intervention measures, and an associated sustainable system of management of maintenance of the gas control system such as in institutional and/or fully serviced contractual situations.

The requisite 3.5 points must be achieved by installation of a suitable combination of measures detailed in Table 4.8.

TABLE 4.8 SUMMARY OF GROUND GAS MITIGATION MEASURES – BS8485 (2015)+A1(2019)

GAS PROTECTION SCORES FOR THE STRUCTURAL BARRIER	SCORE ^A
Floor and Substructure Design	
Precast Suspended Segmental Subfloor (Beam and Block)	0
Cast In-Situ Ground-Bearing Floor Slab (With Only Nominal Mesh Reinforcement)	0.5
Cast In-Situ Monolithic Reinforced Ground-Bearing Raft or Reinforced Cast In-Situ Suspended Floor Slab With Minimal Penetrations	1 or 1.5 ^B
Basement Floor and Walls Conforming to BS 8102:2009, Grade 2 Waterproofing ^C	2
Basement Floor and Walls Conforming to BS 8102:2009, Grade 3 Waterproofing ^C	2.5



- A) The scores are conditional on breaches of floor slabs, etc. being effectively sealed.
B) To achieve a score of 1.5 the raft or suspended slab should be well reinforced to control cracking and have minimal penetrations cast in (see **A.2.2.2**).
C) The score is conditional on the waterproofing not being based on the use of a geosynthetic clay liner waterproofing product (see **C.3**, Note 4).

PROTECTION ELEMENT SYSTEM		SCORE	COMMENTS
Gas protection scores for ventilation protection measures			
(a) Pressure Relief Pathway – Usually formed of low fines gravel or with a thin geocomposite blanket or strips terminating in a gravel trench external to the building.		0.5	Whenever possible a pressure relief pathway (as a minimum) should be installed in all gas protection measures systems. If the layer has a low permeability and/or is not terminated in a venting trench (or similar), then the score is 0.
(b) Passive Subfloor Dispersal Layer – Media used to provide the dispersal layer are: ■ Clear void; ■ Polystyrene void former blanket; ■ Geocomposite void former blanket; ■ No-fines gravel layer with gas drains; and ■ No-fines gravel layer.	Very good performance	2.5	The ventilation effectiveness of different media depends on a number of different factors including the transmissivity of the medium, the width of the building, the side ventilation spacing and type and the thickness of the layer. The selected score should be assigned taking into account the recommendations in Annex B of BS 8485 (2015). Passive ventilation should be designed to meet at least “good performance”.
	Good performance	1.5	
(c) Active Dispersal Layer – Usually comprising fans with active abstraction (suction) from a subfloor dilution layer with roof-level vents. The dilution layer may comprise a clear void or be formed of geocomposite or polystyrene void formers.		1.5 to 2.5	This system relies on continued serviceability of the pumps, therefore alarm and response systems should be in place. There should be robust management systems in place to ensure the continued maintenance of the system, including pumps and vents. Active ventilation should always be designed to meet at least “good performance”.



(d) Active Positive Pressurisation – Provided by the creation of a blanket of external fresh air beneath the building floor slab by pumps supplying air to points across the central footprint of the building into a permeable layer, usually formed of a thin geocomposite blanket.	1.5 to 2.5	This system relies on continued operation of the pumps, therefore alarm and response systems should be in place. The score assigned should be based on the efficient “coverage” of the building footprint and the redundancy of the system. Active ventilation should always be designed to meet at least “good performance”.
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PROTECTION ELEMENT SYSTEM	SCORE	COMMENTS
(e) Ventilated Car Park – Floor slab of occupied part of the building under consideration is underlain by a basement or undercroft car park.	4	Assumes that the car park is vented to deal with car exhaust fumes, designed to Buildings Regulations 2000, Approved Document F [9].

Gas Protection Score for the Gas-Resistant Membrane

Gas-resistant membrane meeting all of the following criteria:

- Sufficiently impervious to the gases with a methane gas transmission rate < 40.0 ml/day/m²/atm (average) for sheet and joints (tested in accordance with BS ISO 15105-1 manometric method);
- Sufficiently durable to remain serviceable for the anticipated life of the building and duration of gas emissions;
- Sufficiently strong to withstand in-service stresses (e.g. settlement if placed below a floor slab);
- Sufficiently strong to withstand the installation process and following trades until covered (e.g. penetration from steel fibres in fibre-reinforced concrete, penetration of reinforcement ties, tearing due to working above it, dropping tools);
- Capable, after installation, of providing a complete barrier to the entry of the relevant gas; and
- Verified in accordance with CIRIA C735.

2

The performance of membranes is heavily dependent on the quality and design of the installation, resistance to damage after installation and integrity of joints.

For example, a minimum 0.4 mm thickness (equivalent to 370 g/m² for polyethylene) reinforced membrane (virgin polymer) meets the performance criteria opposite.

If a membrane is installed that does not meet all the criteria opposite, then the score is 0.

This table should be read in conjunction with the notes presented in BS 8485 (2015)+A1 (2019)



4.5. POTABLE WATER SUPPLY

This section provides a summary of the site investigation data with reference to the selection of potable water supply pipework. The assessment is made with reference to the UK Water Industry Research (UKWIR) publication "Guidance on the selection of Water Supply Pipes to be used in Brownfield Sites"

TABLE 4.9 PIPELINE SELECTION PE THRESHOLD CONCENTRATIONS

Contaminant Group	PE-threshold (mg/kg)	Concentrations at <u>Current</u> pipeline depth (mg/kg)
Total VOC	0.5	<1.0
Total BTEX And MTBE	0.1	<1.0
Total SVOCs (Excluding PAH and those substances marked with an *)	2	<2.0
EC5-EC10 Aliphatic and Aromatic Hydrocarbons	2	<1.0
EC10-EC16- Aliphatic and Aromatic Hydrocarbons	10	11 mg/kg WS112 1.20 m
EC16-EC40 Aliphatic and Aromatic Hydrocarbons	500	<500
Phenols (From SVOC Analysis)*	2	<0.2
Cresols and Chlorinated Phenols (From SVOC Analysis)	2	<0.2
Ethers*	0.5	NA
Nitrobenzene*	0.5	NA
Ketones*	0.5	NA
Aldehydes*	0.5	NA
Amines	Fail	NA
Other Consideration		
Are there any exceedances of the PE threshold outside of the pipeline depth?	NA	
Is free product present in soil and groundwater?	NA	
Could hydrocarbon impact at greater depth than current pipeline depth be mobilised by rising groundwater levels?	NA	
Will soils impacted with above determinands likely be utilised elsewhere on site?	To be determined.	
Will soils be imported to site as part of any future earth works	Currently unknown, however it is unlikely soils will be required to be imported to site.	

Notes - Pipe line depth normally between 0.75m–1.35m

Based on the assessment of current site conditions it is likely that PE pipe will be suitable, however a hotspot removal will be required in the proximity WS112 at 1.20 m bgl due to elevated levels of EC10-EC16.



4.6. CONCEPTUAL SITE MODEL

Following the completion of the intrusive site investigation, chemical analysis and risk assessment, the conceptual model shown in Table 4.10 has been prepared for the site.

TABLE 4.10 CONCEPTUAL MODEL

POLLUTANT LINKAGE	CONTAMINANT (SOURCE)	PATHWAY	RECEPTOR	PROBABILITY	CURRENT RISK	RESIDUAL RISK AFTER MITIGATION
PL1	Dermal contact.	Future site users.	Heavy metals (in Made Ground)	Present	Moderate	LOW
PL2	Dermal contact and ingestion.	Off-site receptors.				

Discussion:

Elevated arsenic has been identified in TP117 at 1.60 m bgl and elevated cadmium has been identified in TP116 at 0.80 m bgl. Elevated Dibenzo(a,h)Anthracene has been identified in WS112 at 1.20 m bgl.

However, given that the proposed development is expected to include a basement/undercroft parking, the majority of Made Ground (and therefore source) will be removed as part of these works.

Recommendation:

Where impacted materials remain a cover system to any landscaped areas will prevent exposure to future site users.

Construction works completed with PPE and provision of welfare..



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PL4	ACM in Made Ground	Inhalation of dust.	Future site users. Buildings. Off-site land users.	Present	Moderate	LOW
Assessment: Asbestos was identified in WS112 at 1.20m below <0.001%. Given that the proposed development is expected to include a basement/undercroft parking, the majority of Made Ground (and therefore source) will be removed as part of these works Recommendation: During the remediation and enabling works, asbestos impacted materials should be carefully managed to ensure no release of fibres. The E3P conceptual model demonstrates the regulatory compliant placement of impacted materials based on the level of impact. All asbestos impacted materials will be placed at depth beneath areas of hardstanding/beneath plots/under cover systems to mitigate the risk in the future development. Made Ground in locations where asbestos has been identified above <0.001% but less than 0.15 can be places at greater than a meter depth. Asbestos above 0.1% v/v will require removal from site by a licensed waste handler, with subsequent validation sampling to determine if asbestos remains at this location.						
PL5	Methane, carbon dioxide (Made Ground and infilled features on and within 250 m of the site)	Inhalation of gas. Migration through permeable strata and preferential pathways. Explosion in confined spaces.	Future site users. Buildings. Off-site land users.	Low likelihood	Low	Low
Assessment: Low likelihood due to the currently identified level of ground gas being Green/CS1 not requiring mitigation. However, given the nature of the ground conditions at the site coupled with sensitive nature of the proposed development (residential) there remains a potential that CS2 mitigation measures will be required.						



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Given that the proposed development is expected to include a basement/undercroft parking, the majority of Made Ground (and therefore source) will be removed as part of these works.

Recommendation:

Completed phase of ground gas monitoring or precautionary CS2 measures required.

POLLUTANT LINKAGE	CONTAMINANT (SOURCE)	PATHWAY	RECEPTOR	PROBABILITY	CURRENT RISK	RESIDUAL RISK AFTER MITIGATION
PL6	Mobile contaminants such as metals, PAHs, hydrocarbons, volatile compounds (Made Ground, works, canal and yards)	Surface runoff. Migration through permeable strata and preferential pathways. Perched waters migration.	Groundwater (Secondary B). Surface water (Canal).	Likely	Low	Low

Assessment:

Likely probability as significant sources of mobile contamination identified. Leakages/spillages of mobile contamination are considered possible. Glacial till across the site may reduce downward migration into the underlying bedrock aquifer.

Whilst contaminants have been identified the lack of viable pathways reduces the risk rating. Furthermore, the managed nature of the canal confirms that this is not in hydraulic continuity with other surface water in the wider area and also with and aquifer beneath the site.

Given that the proposed development is expected to include a basement/undercroft parking, the majority of Made Ground (and therefore source) will be removed as part of these works.

Recommendation:

Hotspots and sources of contamination (infilled canal and Made Ground) will be managed as part of the site remediation and enabling works package, in some cases these sources will be removed from site, however, where the materials remain these will be placed in a low risk area of the site (ie not in piling locations/areas where preferential pathways exist/not where human interaction with soils can take place).



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PL7	Sulphate (potential ash within Made Ground)	Sulphate attack on concrete.	Building structure.	Unlikely	Low	Low
Assessment: pH and Sulphate levels have been assessed from soil samples across the site obtained during the site investigation. This confirmed the requirement for DS-1 AC-1s class of concrete. Recommendation: Following the remediation and enabling works in all likelihood the classification throughout will be DS-1 AC-1s.						
PL8	Organic contaminants such as hydrocarbons, solvents (Made Ground)	Ingestion of tainted water supply.	Future site users. Water pipes.	Likely	Moderate	Low
Assessment: Low level of contaminants pertinent to the UK WIR have been identified. Assessment against current chemical soils levels suggests that barrier pipeline could be required. Recommendation: Completion of UK WIR assessment utilising chemical analysis of soils post remediation as these are likely to differ. As such an allowance for Barrier Pipeline should be retained.						

Main exposure pathways:

PL1 = soil ingestion, PL2 = dermal contact and ingestion, PL3 = vapour inhalation (indoor), PL4 = dust inhalation; PL5 = Explosive/Asphyxiation; PL6 = Vertical/lateral migration; PL7 = Corrosion of concrete; PL8=Tainting of water supply;



5. GEOTECHNICAL ASSESSMENT

5.1. PROPOSED DEVELOPMENT

E3P understands that the site referred to as Parcel C will be developed into residential high rise buildings with some commercial use to the ground floor and the potential provision for undercroft parking.

5.2. SUMMARY OF GROUND CONDITIONS

Area specifics (Trial Trenches Investigating Former Canal)

E3P were unable to investigate the historically infilled trial trench due to constraints including the presence of a gas main. The area was also being used by site workers and so access to the area was prohibited. Trial pits were advanced where possible and confirm general ground conditions. Evidence at the canal edge suggests the feature was bricked up and infilled between the bridge and the existing canal on either side of parcel C

Made Ground

Made Ground was encountered within all exploratory holes between ground level and 2.30 m bgl. Within this parcel all locations confirmed the full depth of Made Ground.

Made Ground mainly comprised Black gravel with frequent cobbles with gravel of sandstone, ash, mudstone, concrete and brick that was encountered between ground level and a maximum proven depth of 2.30m bgl.

Large obstructions including brick and concrete were encountered within exploratory hole locations.

A Depth of Made Ground Plan is presented as Drawing 13-729-005 in Appendix III.

Drift

The natural drift deposits were identified in all locations and were found to be generally uniform across the area. Natural CLAY stratum directly underlay the Made Ground.

Drift deposits comprised firm to very stiff brown slightly gravelly CLAY which were encountered at depths of between 0.80 m and 10.30 m bgl.

An isolated area of brown clayey SILT was identified in TP117 between 2.30 m and 2.80 m bgl.

Deeper cable percussive drilling recorded the CLAY to depths in excess of 10 m bgl before the bedrock strata was encountered.

Solid

Bedrock has not been identified within the exploratory hole locations completed within the original site investigation, although deeper cable percussive boreholes completed subsequently identified as dense brown SANDSTONE in CP106 between 10.30 m to 12.50 m bgl.



The closest BGS borehole encountered sandstone bedrock at 23.00m bgl which corroborates a dip to the west..

Groundwater

No groundwater strikes were recorded during the ground investigation, however groundwater was noted between 1.73 m and 1.76 m bgl during the first groundwater monitoring visit.

5.3. SITE PREPARATION

The site should be cleared and any vegetation below areas of proposed development stripped in accordance with Series 200 of the *Manual of Contract Documents for Highway Works (MCHW)*. This should include the following:

- Roots present below the footprint of proposed structures and infrastructure should be grubbed out and the resulting void infilled with suitable compacted engineered fill.
- Demolition of all existing buildings and removal of all concrete hardstanding.
- Redundant services should be sealed off and grubbed out and replaced with suitable compacted engineered fill.
- Buried structures and old foundations have been encountered on site. These should be excavated from below the proposed development footprint with the resulting void backfilled.
- Perched water within the former canal may require removal and a stank installing to keep the historic canal dry during works.

5.4. FOUNDATION CONDITIONS AND ASSESSMENT OF POTENTIAL BEARING CAPACITIES

In due consideration of the identified ground conditions, in-situ and laboratory geotechnical testing, E3P has undertaken an assessment of the net safe allowable bearing pressure (ABP) within the underlying natural stratum to assist in the detailed design of foundations and infrastructure and determine the target founding stratum. The results of this assessment are summarised in Table 5.1.



TABLE 5.3 SUMMARY OF ABPS IN PARCEL C

GRANULAR SOILS			
Description	Depth (Range m bgl)	Relative Density	Allowable Bearing Pressure (kN/m ²)
CP106	12.00–12.45	Medium Dense	298
CP106	12.50–12.95	Dense	365
COHESIVE SOILS			
Description	Depth (range m bgl)	Undrained Shear Strength (Cu) (kN/m ²)	Allowable Bearing Pressure (kN/m ²)
Soft Low strength CLAY (CP106)	2.00–2.45	18	38
Firm low strength Gravelly CLAY (WS111 and CP106)	2.00–4.45	26–38	54–78
Stiff to very stiff gravelly CLAY	3.00–3.45	73	151
	4.00–4.45	92–211	191–434
	5.00–5.45	45–87	93–179
	7.50–7.95	122	250

The underlying natural clay drift deposits have been assessed as being firm low strength to very stiff high strength with ABPs ranging between 151 kN/m² and 250 kN/m².

An isolated area of soft low strength CLAY was noted in CP106 at 2.00 m bgl with an ABP 38 kN/m².

Medium dense SANDSTONE was identified in CP106 at 12.00 m bgl and dense SANDSTONE was identified in CP106 at 12.50 m bgl.

Based on the requirements of a building of this type it is likely that the underlying bedrock will be the only suitable stratum for foundations requiring in excess of 1500kN/m² (expected).



TABLE 5.4 ANTICIPATED FOUNDATIONS PARCEL C

LOCATION	ANTICIPATED FOUNDING STRATA DEPTH (m bgl)	GROUND WATER (m bgl)	TARGET STRATUM	TREES	FOUNDATION TYPE	TYPE OF CONCRETE
TP115	>2.50	–	Bedrock	N	It is expected given the proposed development that a driven pile or CFA pile will be the optimum foundation solution bearing within the underlying bedrock	DS-1 AC-1s
TP116	>2.50	–	Bedrock	N		DS-1 AC-1s
TP117	>2.50	–	Bedrock	N		DS-1 AC-1s
WS111	>2.50	–	Bedrock	N		DS-1 AC-1s
WS112	>2.50	–	Bedrock	N		DS-1 AC-1s
CP106	>2.50	–	Bedrock	N		DS-1 AC-1s

It is recommended that, at working drawing stage, a foundation schedule is prepared for the development taking account of the physical change of natural clay soils and the current/proposed locations of trees.

At this time it is not possible to accurately define the foundation types due to the absence of a detailed building design, tree survey and final development levels; however, based on our extensive experience of similar high rise sites in the surrounding area, we would anticipate that the final foundation solution would be a combination of the following:

- Driven pile seated into bedrock
- Or similarly a CFA Pile

Both solutions above would support the structure in a similar method and employ a ground bearing floor slab with structural engineering design.

An anticipated depth to founding strata is included as Drawing 13-729-006 in Appendix III.

5.5. GROUND FLOOR SLABS

A ground-bearing slab will be viable for the commercial structures; however, it will need to be constructed utilising a sub-base with the thickness designed by a structural engineer to ensure that settlement tolerances are taken into consideration.

Where a ground-bearing floor slab is to be constructed within the conjectured zone of tree influence, the clay will need to be removed to ensure that any desiccated soil cannot swell and induce heave to the structure. Alternatively, it may be possible to design the structure to resist the influence of clay heave using exaggerated sub-base and additional reinforcement within the slab to be designed by the structural engineer.



Where it is necessary to undertake cut-and-fill works utilising site-derived cohesive soils, careful consideration must be given to seasonal climatic conditions, which will have a significant impact of moisture conditions and the ability to compact clay soils in the wetter winter months. It may be necessary to undertake an element of stabilisation works through the addition of lime to ensure the soils can be engineered to the required performance standards.

It would be possible to utilise soil stabilisation techniques that incorporate the addition of lime and OPC to construct a stiffened soil horizon with a CBR > 15% to constitute a sub-base replacement layer that could then be capped with Type 1 MOT. The use of soil stabilisation could be extended within the conjectured zone of tree influence to modify the structure of clay soils and negate the potential for volumetric instability.

Depending on the design requirements of the proposed residential care home structure, and its location on-site, it would be possible to utilise either a suspended or cast in-situ floor slab to incorporate the principals outlined above.

5.6. HEAVE PRECAUTIONS

The site has been proven to be underlain by clay soils, which are susceptible to volumetric instability due to fluctuations in moisture content, particularly within influencing distance of trees as per the NHBC/LABC conjectured zones of influence.

As the clay is deemed to be low to moderate volume change potential, heave precautions are not required to the internal face of the external load-bearing walls (outside or within tree influence).

If a ground beam is to be constructed within the zone of tree influence, heave precautions are required to the underside of this and edge beams.

A ground floor slab will be possible but will require structural engineering design to incorporate tolerances as required.

If the ground floor slab is constructed with a cast in-situ suspended floor slab, then heave precautions that can tolerate 50 mm of clay swelling are required within any part of the floor slab to be located within the zone of influence of a tree.

A summary of heave precautions is presented in Table 5.5.



TABLE 5.5 SUMMARY OF HEAVE PRECAUTIONS

		MINIMUM VOID DIMENSION FOR FOUNDATIONS, GROUND BEAMS AND SUSPENDED IN-SITU CONCRETE GROUND FLOORS		MINIMUM VOID DIMENSIONS UNDER PRECAST CONCRETE AND SUSPENDED TIMBER FLOORS
Plasticity Index of Soil	Required Foundation Depth (m)	Thickness of Void Former Against Side of Foundation or Ground Beam (mm)	Thickness of Void Former on Underside of Edge Beam and Floor Slab (mm)	Void Dimension (mm)
High Plasticity (> 40)	> 2.5	Engineer Design		Engineer Design
	2.0–2.5	35	150	300
	1.5–2.0	25	75	
Moderate Plasticity (20–40)	> 2.5	Engineer Design		Engineer Design
	2.0–2.5	25	100	250
	1.5–2.0	25	50	
Low Plasticity (< 20)	2.0–2.5	N/A	50	200
	> 2.0	No Special Precautions		

5.7. HIGHWAYS CONSTRUCTION

A programme of remediation and enabling works will be required to remediate the proposed road subgrade in accordance with the requirements of the *highways design manual* (series 600) for a method compaction.

It is considered that the material can be re-engineered using method compaction to achieve a CBR in excess of 5% if works are completed in favourable climatic conditions.

5.8. DRAINAGE

The presence of substantial depths of Made Ground across some areas of the site may result in settlement. It is therefore recommended that drain runs are designed using steeper gradients and flexible joints to allow for some differential settlement.

Furthermore, the site is predominantly underlain by circa 1–2 m of likely low-permeability gravelly CLAY. Therefore, the use of soakaway drainage will be limited, and as the lateral continuity of the Made Ground cannot be assured, it is not recommended that soakaways are utilised for disposal of surface water runoff.

If soakaway drainage is to be considered, full BRE 365 testing must be completed to inform the detailed design.



5.9. CONCRETE DURABILITY

Chemical analyses for pH and soluble sulphate content, shows that the soils at the site meet Class DS-1, Aggressive Chemical Environment for Concrete Classification (ACEC) AC-1s in accordance with BRE Special Digest 1 (2005).

5.10. EXCAVATIONS

All trial pit excavations were noted to be stable.

The presence of brick and concrete cobbles within the Made Ground deposits meant that in certain places, excavation was slow through the Made Ground.

Existing site constraints in the form of historic structures should be considered as these have the potential to limit the application of piling techniques without the requirement to pre bore. Obstructions in the Made Ground will require removal through a Made Ground turnover to facilitate the use of driven foundation solutions.

The natural strata was excavated with relative ease

If local pumping of groundwater is required during the advancement of excavations for the proposed foundations then consideration should be given to the potential for dewatering gravels in the surrounding areas that may cause structural damage to building substructures in close proximity to the site.

Perched water is held within the former canal currently, it is expected that this will require a stank to keep back the water to allow pumping out and to allow removal works to be completed. Water within the former canal will require removal and deposition off site that, given the impacted nature, may require a specialist waste water contractor. To stop the ingress of water from the existing canal the boundary may require a stank during the works.

TABLE 5.6 CIVIL ENGINEERING EXCAVATION RISK MATRIX

RISK ITEM	PRESENT	COMMENT
Running Sands	No	No running sand has been identified.
Minor Water Ingress	Yes	Water ingress will require localised dewatering/sump pumping during the construction of site drainage infrastructure. Ingress of water into foundation excavation will potentially flood foundation excavations, limiting the viability of spread foundations to be constructed. During the excavation for basement structures, groundwater pumping is likely to be a requirement.
Shallow Bedrock	No	Shallow bedrock has not been identified within any exploratory holes and is expected at depths in excess of 10m bgl. However, obstructions in the near surface have been identified that will impede the advancement of excavations.



5.11. SLOPE STABILITY

There have been no significant slopes identified within the site boundary. However, the highway retaining to the north of parcel C will require consideration.

5.12. FURTHER WORKS

Based on the findings of the intrusive site investigation, the following additional works are recommended to be completed in due course:

- Further Investigation west of Parcel C upon demolition of structures;
- Further Investigation within the canal to the west of the site;
- Plot-specific foundation schedule (upon receipt of the final development levels);
- Geotechnical earthworks strategy (infrastructure);
- Remediation and enabling works strategy; and,
- Completion of UK WIR assessment of post remediation soils to determine appropriate pipeline selection.

5.13. CONSTRUCTION ACTIVITY AND INSPECTION

The following activities and inspections should be incorporated into the site works:

- Investigation west of Parcel C upon demolition of structures/access;
- Due to the variability of the soils at the site, it is recommended that sufficient allowance is made for the inspection of formations and sub formations to foundations and pavement construction.
- Excavations where access is required should be subject to a risk assessment from a competent person and, where appropriate, mitigation measures such as benching back the sides or use of support systems in accordance with CIRIA R97 should be utilised.
- It is considered that dewatering may be required, especially following periods of heavy rainfall. Removal of surface water and water within trenches should be possible with conventional sump pumping. Discharge of any water should be agreed with the relevant regulatory body and be undertaken under a trade effluent discharge, where required. Measures to remove silt and suspended solids may be required and consideration should be given to provision of space for settling tanks or an attenuation pond.
- Where access to confined spaces is required, appropriate mitigation measures should be addressed within the construction stage health and safety plan. Particular account should be taken of the gas results.
- The presence of potential contamination and mitigation measures should be addressed as part of the construction stage health and safety plan and should include measures to design out the risks, reduce their impact and, finally, to include the use of personnel protective equipment (PPE).





6. CONCLUSIONS AND RECOMMENDATIONS

CONTAMINATED LAND ASSESSMENT

Human Health	A Tier I human health risk assessment has been undertaken using the chemical analysis results of the soils and comparing to the relevant Tier I criteria. Laboratory analysis of the soils has indicated the presence of elevated metals, non-volatile PAHs and asbestos in Made Ground deposits. The majority of the identified elevated concentrations have primary exposure pathways related to dermal contact and ingestion and soil ingestion. These exceedances can be mitigated by the installed of a minimum 300 mm chemically suitable cover system within all proposed soft standing landscaped areas. Asbestos was identified in one sample out of three samples submitted for analysis. Quantification identified WS112 at 1.20m to have concentrations below <0.001%. With reference to the E3P Asbestos Conceptual Site Model shown below, Made Ground deposits will require placement below plots or a 300mm cover system (150mm topsoil, 150mm subsoil) in order to mitigate the risks to future residential end users. No sources of suitable topsoil have been identified on site. Chemical analysis of the natural clay drift deposits have identified these soils to be acceptable for use as subsoil within the proposed garden areas.
Controlled Waters	A Tier 1 controlled waters risk assessment has been completed based on the leachate analysis of soils and groundwater samples obtained from boreholes during a post site investigation visit. This assessment identified the underlying aquifer as the most sensitive receptor. The results of the assessment recorded cyanide and lead elevated above the DWS criteria. However, as the impact has been identified within the Made Ground and the lack of a viable migration pathway due to the presence of significant thicknesses of low permeability clay protecting the underlying aquifer there is considered to be a low risk to controlled waters. In addition, it is expected that the Made Ground will be mostly removed as part of the enabling works to construct basement structures and therefore the source of contaminants will be removed from site.
Ground Gas	Characteristic Situation 1 (pending completion of gas monitoring).
Potable Water	This will need to be confirmed following the completion of a UKWIR risk assessment. Post-remediation and enabling works ground conditions may be different from those identified during this site investigation. Based on the assessment of current site conditions WS112 at 1.20 m bgl identifies elevated levels of EC10-EC16 and as such barrier pipeline is likely to be required.



GEOTECHNICAL ASSESSMENT

Significant concrete and brick obstructions have been encountered within the Made Ground, indicative of relic foundations from the former building and potential infilled basements across the site. It will be necessary to consider structures adjacent to the site when advancing earthworks to ensure no structures are undermined as a result of excavating obstructions.

Furthermore, significant evidence of the former canal arm (Bengal Arm & Prussia Street Arm) have been identified through the wider site and so its presence can be assumed similarly through parcel C currently. Perched water within the canal is currently considered to be a risk and will require pumping and off site disposal. In order to facilitate this it is likely that the former canal will require a tank to seal off the ingress of water to the site.

Areas of the site have not been accessible during the works and will require supplementary post demolition investigation to satisfy the nature of the underlying soils and Made Ground.

During a phase of cut-and-fill enabling works to create a developable platform, all below-ground obstructions will require grubbing out to the base of the Made Ground to enable the construction of proposed plots. The Made Ground will then require processing and an element of re-engineering to ensure minimal settlement in the material.

The underlying natural clay drift deposits have been assessed as being very stiff, high-strength with a net ABP in the order of 100 kN/m² at circa 2.00 m bgl increasing in excess of 120 kN/m² at circa 3 m bgl.

It is anticipated that this shallow cohesive strata will be excavated in order to form the basement/undercroft areas of the structure along with the overlying Made Ground. As such it is likely that the underlying bedrock strata will be the target bearing material for piling (or similar) foundations.

Given the high rise nature of the proposed development it is likely that the foundation will require engineering input and so given our experience of similar sites in both location and build type, it is envisaged that a driven or CFA pile will be the most viable option in order to support the proposed structure.

END OF REPORT



APPENDIX I

LIMITATIONS

1. This report and its findings should be considered in relation to the terms of reference and objectives agreed between E3P and the client as indicated in Section 1.3.
2. For the work, reliance has been placed on publicly available data obtained from the sources identified. The information is not necessarily exhaustive and further information relevant to the site may be available from other sources. When using the information it has been assumed it is correct. No attempt has been made to verify the information.
3. This report has been produced in accordance with current UK policy and legislative requirements for land and groundwater contamination which are enforced by the local authority and the Environment Agency. Liabilities associated with land contamination are complex and requires advice from legal professionals.
4. During the site walkover, reasonable effort has been made to obtain an overview of the site conditions. However, during the site walkover, no attempt has been made to enter areas of the site that are unsafe or present a risk to health and safety, are locked, barricaded, overgrown, or the location of the area has not been made known or accessible.
5. Access considerations, the presence of services and the activities being carried out on the site limited the locations where sampling locations could be installed and the techniques that could be used.
6. Site sensitivity assessments have been made based on available information at the time of writing and are ultimately for the decision of the regulatory authorities.
7. Where mention has been made to the identification of Japanese Knotweed and other invasive plant species and asbestos or asbestos-containing materials, this is for indicative purposes only and do not constitute or replace full and proper surveys.
8. The executive summary, conclusions and recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon without considering the context of the report in full.
9. E3P cannot be held responsible for any use of the report or its contents for any purpose other than that for which it was prepared. The copyright in this report and other plans and documents prepared by E3P is owned by them and no such plans or documents may be reproduced, published or adapted without written consent. Complete copies of this may, however, be made and distributed by the client as is expected in dealing with matters related to its commission. Should the client pass copies of the report to other parties for information, the whole report should be copied, but no professional liability or warranties shall be extended to other parties by E3P in this connection without their explicit written agreement there to by E3P.
10. New information, revised practices or changes in legislation may necessitate the re-interpretation of the report, in whole or in part.



APPENDIX II

GLOSSARY

TERMS

ACM	Asbestos-containing material	MMP	Materials management plan
ADS	Acoustic design statement	ND	Not detected
AST	Above-ground storage tank	NDP	Nuclear density probe
BGS	British Geological Survey	NMP	Noise management plan
BSI	British Standards Institute	NPSE	Noise policy statement for England
BTEX	Benzene, toluene, ethylbenzene, xylenes	NR	Not recorded
CA	Coal Authority	PAH	Polycyclic aromatic hydrocarbon
CBR	California bearing ratio	PCB	Polychlorinated biphenyl
CIEH	Chartered Institute of Environmental Health	PI	Plasticity index
CIRIA	Construction Industry Research Association	PID	Photo ionisation detector
CLEA	Contaminated land exposure assessment	POS	Public open space
aCML	Council of Mortgage Lenders	PPE	Personnel protective equipment
CoC	Contaminants of concern	ProPG	Professional practice guidance
CSM	Conceptual site model	QA	Quality assurance
DNAPL	Dense non-aqueous phase liquid (chlorinated solvents, PCB)	SGV	Soil guideline value
DWS	Drinking water standard	SPH	Separate-phase hydrocarbon
EA	Environment Agency	SPT	Standard penetration test
EQS	Environmental quality standard	SVOC	Semi-volatile organic compound
FFL	Finished floor level	TPH	Total and speciated petroleum hydrocarbon
GAC	General assessment criteria	TPH CWG	Total Petroleum Hydrocarbon (Criteria Working Group)
GL	Ground level	UKWIR	United Kingdom Water Infrastructure Risk
GSV	Gas screening value	UST	Underground storage tank
HCV	Health criteria value	VCC	Vibro-concrete column
ICSM	Initial conceptual site model	VOC	Volatile organic compound
LEL	Lower explosive limit	VRSC	Vibro-replacement stone columns
LMRL	Lower method reporting limit	VSC	Vibro-stone columns
LNAPL	Light non-aqueous phase liquid (petrol, diesel, kerosene)	WHO	World Health Organisation
MCV	Moisture condition value	WRAP	Waste and Resources Action Programme



Parcel C - Jersey Street, Ancoats

Phase II Geoenvironmental Site Assessment

February 2020

MIBK	Methyl isobutyl ketone	WTE	Water table elevation
m	Metres	ppm	Parts per million
km	Kilometres	mg/m³	Milligram per metre cubed
% v/v	Percent volume in air	m bgl bgl	Metres below ground level
mb	Millibars (atmospheric pressure)	m bcl	Metre below cover level
l/hr	Litres per hour	mAOD	Metres above ordnance datum (sea level)
µg/l	Micrograms per litre (parts per billion)	kN/m²	Kilonewtons per metre squared
ppb	Parts per billion	µm	Micrometre
mg/kg	Milligrams per kilogram (parts per million)	SSRT	Site Specific Remediation Target
PSD	Particle Size Distribution	DD	Dry Density
CL:AIRE	Contaminated Land: Applications in Real Environments	Mc	Moisture Content
ρ	Bulk Density	GPR	Ground Penetrating Radar
NDP	Nuclear Density Probe	FFL	Finished Floor Level
LEL	Lower Explosive Limit	UKWIR	UK Water Industry Research
CIRIA	Construction Industry Research and Information Association	LOD	Limit of Detection



APPENDIX III

DRAWINGS



- Current Site Features**
- Skips
 - Existing Commercial Buildings
 - Trees/Bushes
 - Site Cabins
 - Gas Box
 - Building Materials
 - Retaining Wall
 - Car Park
 - Drums
 - Brick Wall
 - Fence
 - Camera/Pay and Display Machine
 - Parcel A
 - Parcel B
 - Parcel C

Notes:					
P1	-	02.12.2019	DRAFT	CB	RJW
Phase	Revision	Date	Issue	Drawn	Checked

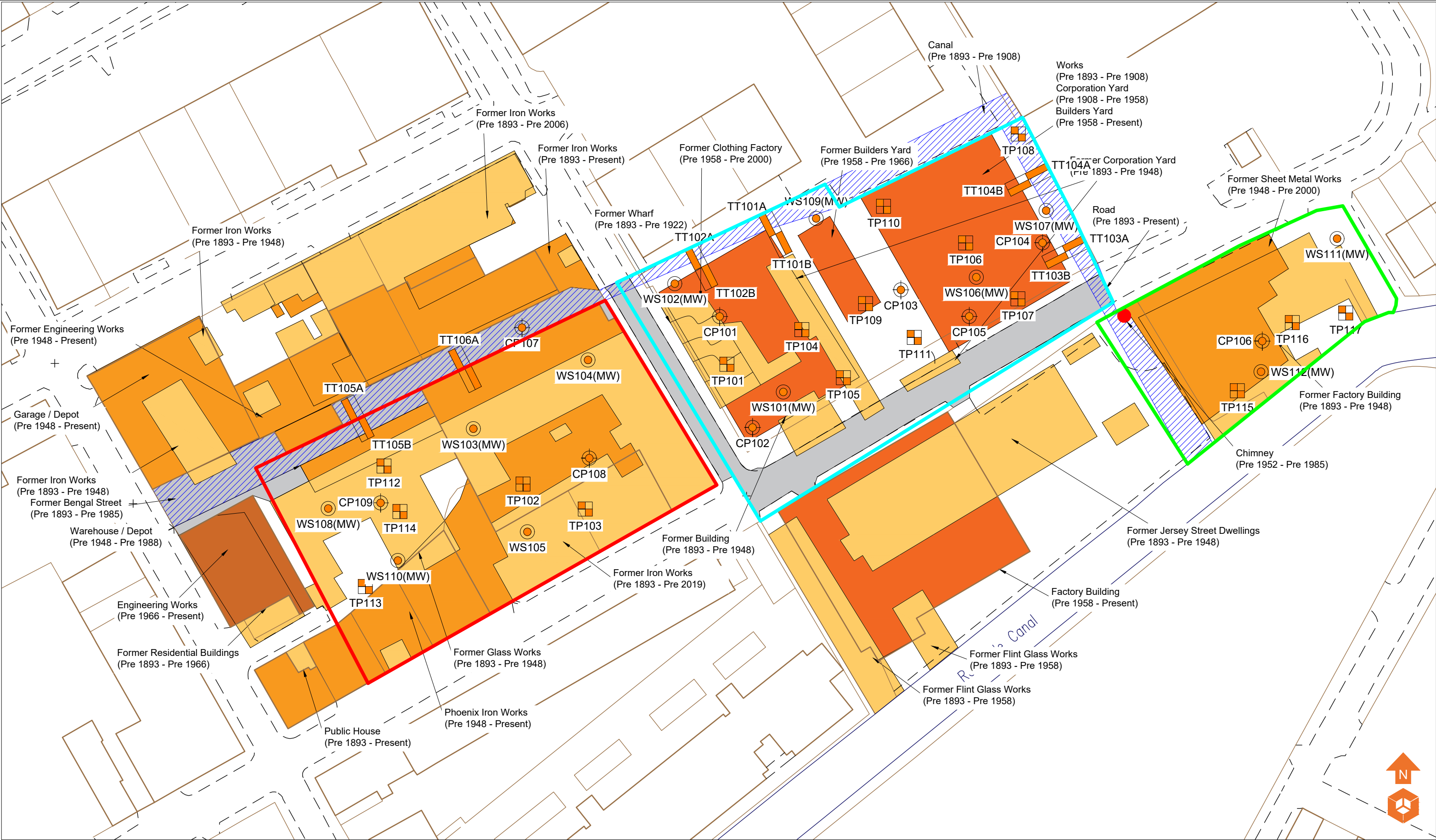
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Job Title:	Jersey Street

Job No:	13-729	Date:	02.12.2019
Drawing No:	002	Scale:	NTS
Drawing Title:		Site Features Plan	

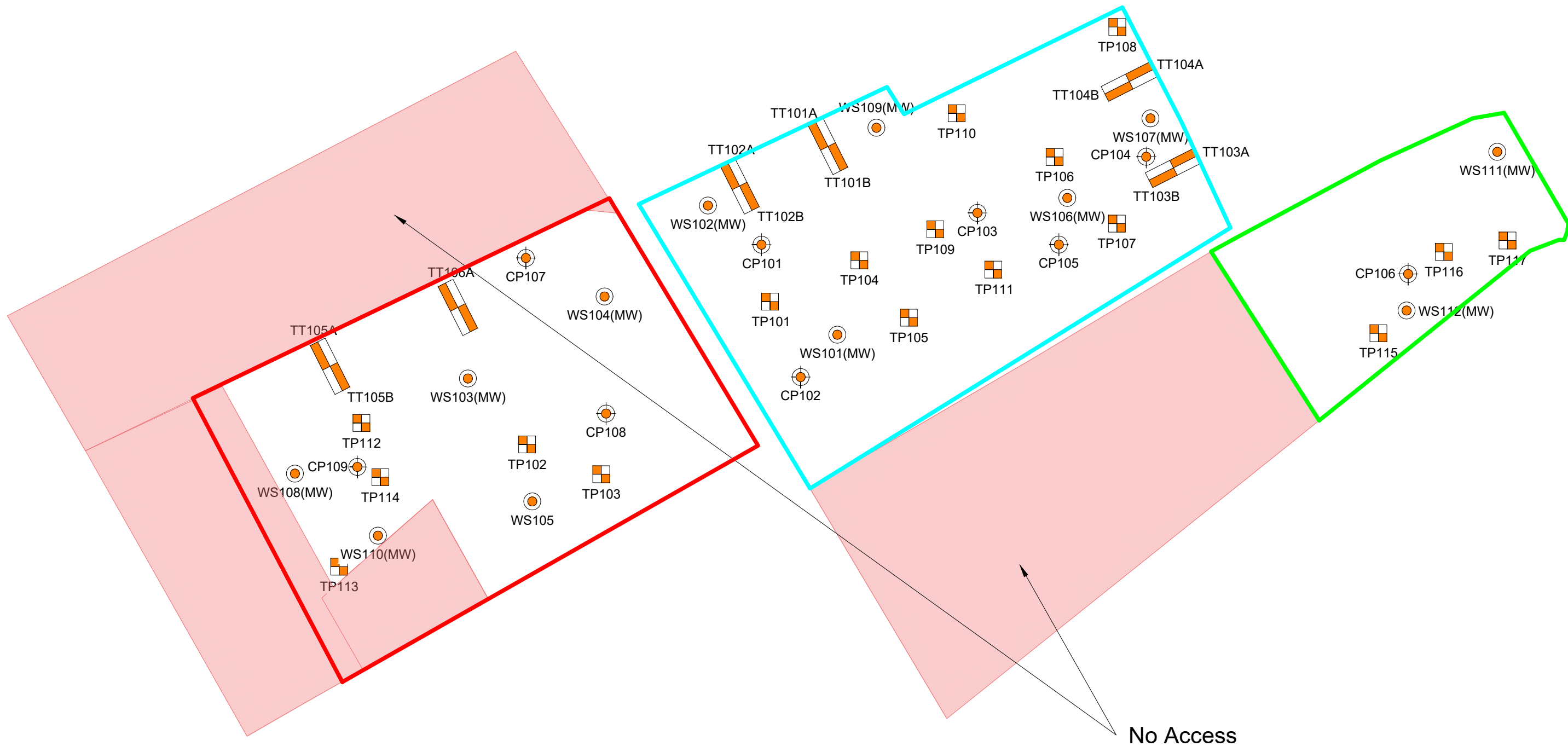


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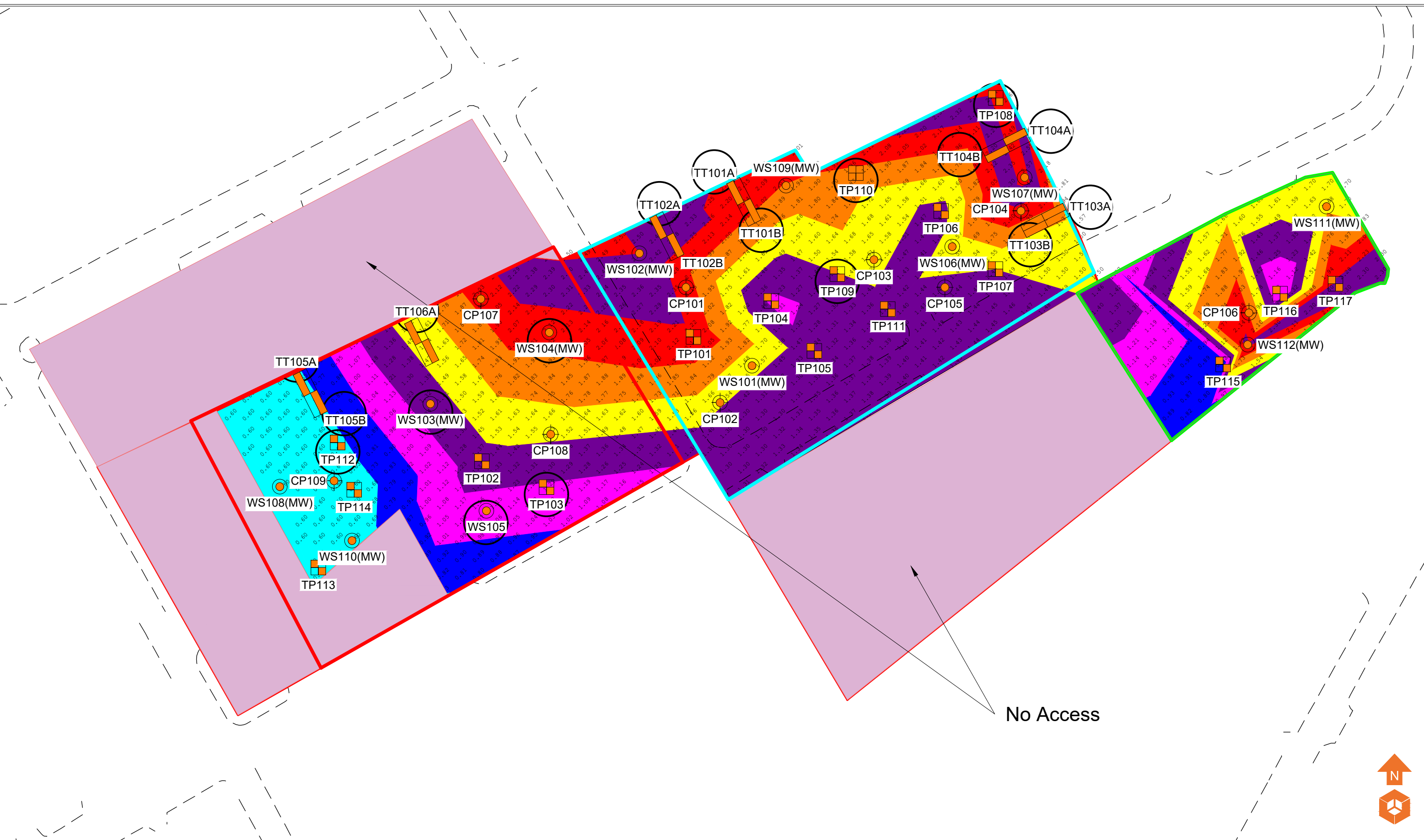
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Historical Features Former Canal Former Chimney Former Works Building Former Works Building Former Works Building Location Symbols Approximate Window Sample Probehole Location Approximate Trial Pit Location Approximate Slit Trench Location Parcel A Parcel B Parcel C	Notes:	Client: Manchester Life	Job No: 13-729	Date: 01.11.2019	 Environmental Engineering Partnerships Ltd City Heliport & Business Centre Eccles, Manchester, M30 7RU Tel: 0161 707 9612 E-mail: info@e3p.co.uk Website: www.e3p.co.uk	
		Job Title: Jersey Street	Drawing No: 003	Scale: NTS		
	P1 - 01.11.2019 DRAFT HM RJW	Drawing Title: Historical Features Plan	The client must not amend any drawing, design or other intellectual property produced by E3P Ltd without permission in writing from E3P Ltd in advance of any amendments being made. In the event that such written permission is not obtained in advance of the amendments being made, E3P Ltd shall not be liable for any damage and/or losses occurring as a result of the amended drawing, design or intellectual property.			
Phase	Revision	Date	Issue	Drawn	Checked	



Location Symbols ○ Approximate Window Sample Probehole Location □ Approximate Trial Pit Location □ Approximate Silt Trench Location □ No Access — Parcel A — Parcel B — Parcel C	Notes:	Client: Manchester Life	Job No: 13-729	Date: 22.11.2019	 Environmental Engineering Partnerships Ltd City Heliport & Business Centre Eccles, Manchester, M30 7RU Tel: 0161 707 9612 E-mail: info@e3p.co.uk Website: www.e3p.co.uk												
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P1	-	22.11.2019	DRAFT	CB	RJW												
Phase	Revision	Date	Issue	Drawn	Checked												



No Access



Location Symbols

- Approximate Window Sample Probehole Location
- ⊞ Approximate Trial Pit Location
- ⊞ Approximate Silt Trench Location
- No Access
- Full Depth of Made Ground not Proven - Depth has been Inferred
- Parcel A
- Parcel B
- Parcel C

Made Ground Depth (m)

- Depth of Made Ground 0.00 - 0.29m
- Depth of Made Ground 0.30 - 0.59m
- Depth of Made Ground 0.60 - 0.89m
- Depth of Made Ground 0.90 - 1.19m
- Depth of Made Ground 1.20 - 1.49m
- Depth of Made Ground 1.50 - 1.79m
- Depth of Made Ground 1.80 - 2.09m
- Depth of Made Ground 2.10 - 2.39m
- Depth of Made Ground >2.40m

Notes:

P1	-	04.12.2019	DRAFT	CB	RJW
Phase	Revision	Date	Issue	Drawn	Checked

Client:

Manchester Life

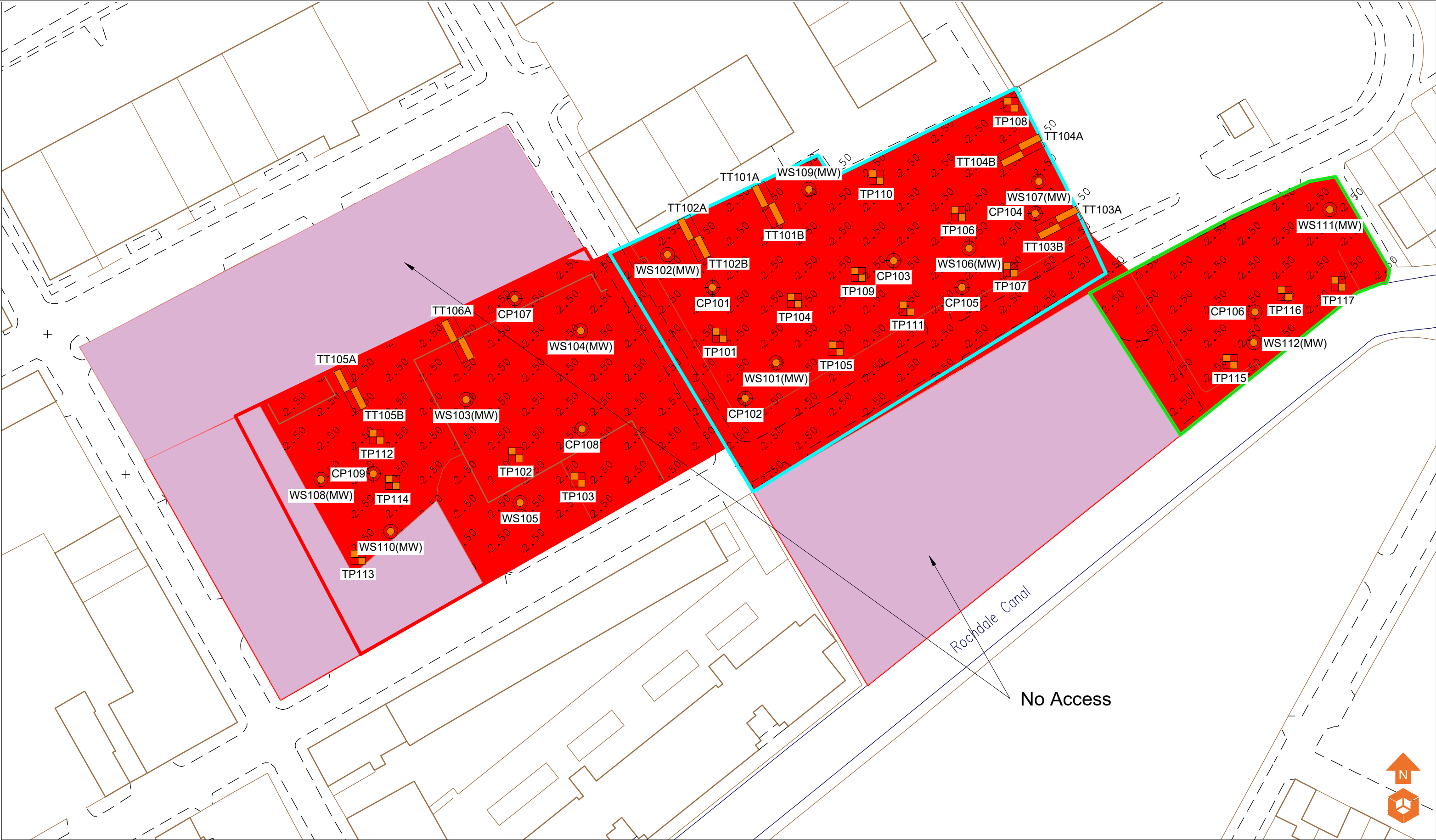
Job Title:

Jersey Street

Job No:	13-729	Date:	04.12.2019
Drawing No:	005	Scale:	NTS
Drawing Title:			
Depth of Made Ground Plan			

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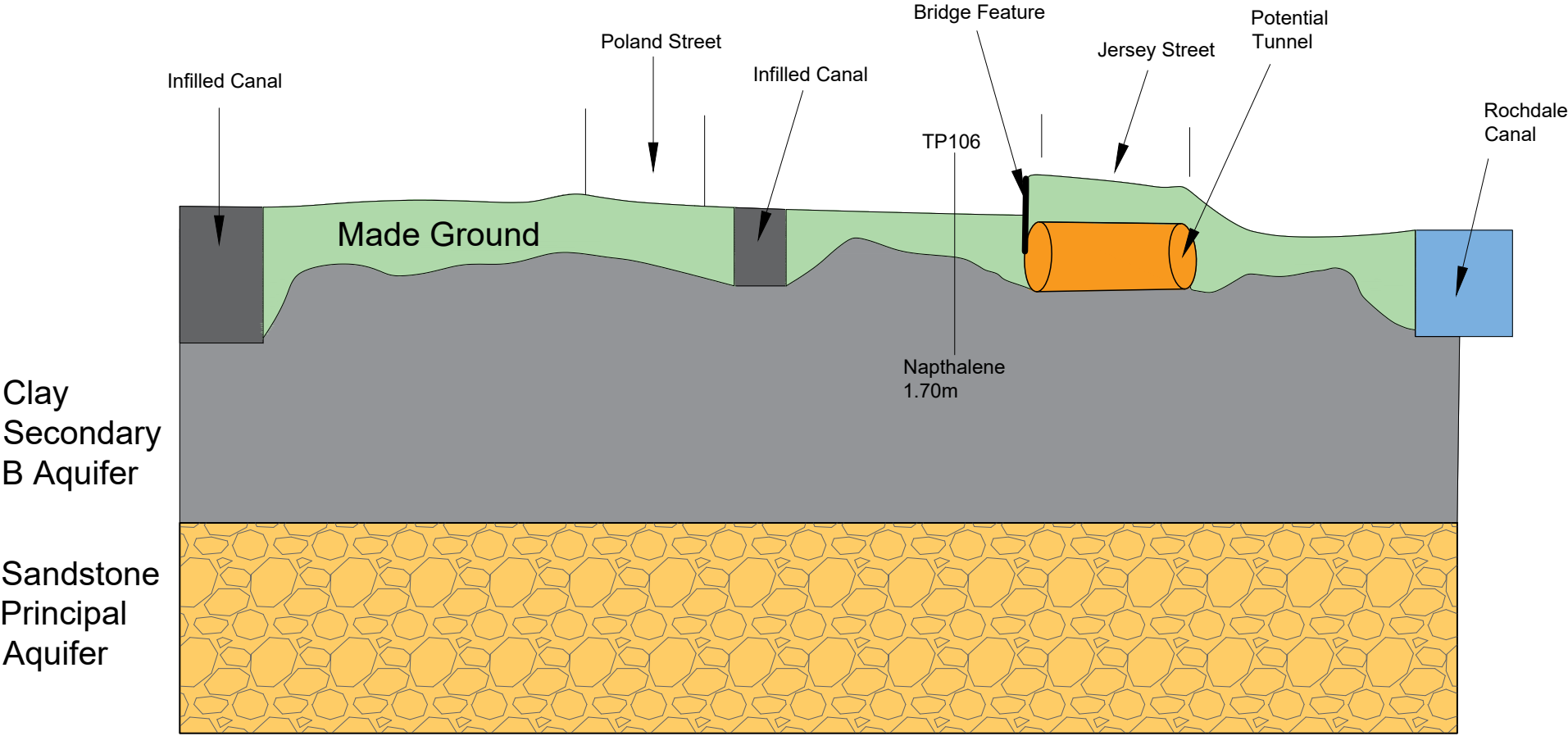
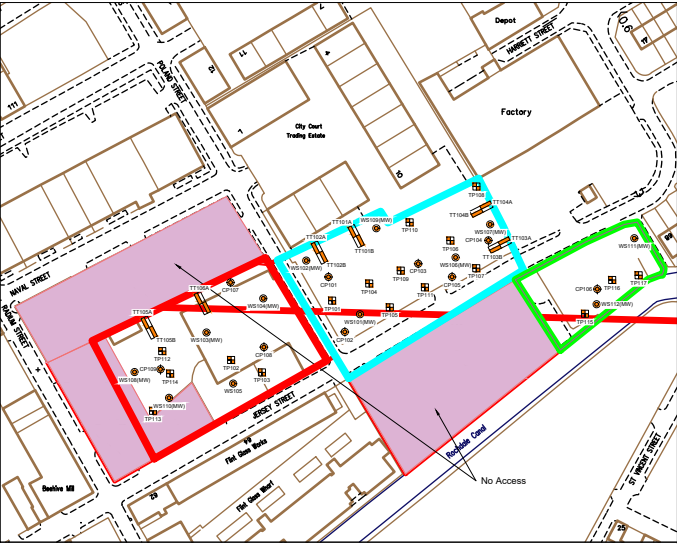


Location Symbols Approximate Window Sample Probehole Location Approximate Trial Pit Location Approximate Silt Trench Location No Access Parcel A Parcel B Parcel C Shallow Spread Footings Depth to Founding Strata 0.00 - 1.24m Depth to Founding Strata 1.25 - 1.49m Mass Trench Fill Footings Depth to Founding Strata 1.50 - 1.74m Depth to Founding Strata 1.75 - 1.99m Depth to Founding Strata 2.00 - 2.24m Engineered Footings Depth to Founding Strata 2.25 - 2.49m Depth to Founding Strata >2.50m	Notes:	Client: Manchester Life	Job No: 13-729	Date: 24.02.2020	e3p Environmental Engineering Partnerships Ltd City Heliport & Business Centre Eccles, Manchester, M30 7RU Tel: 0161 707 9612 E-mail: info@e3p.co.uk Website: www.e3p.co.uk																								
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P1	R2	24.02.2020	REVISION	HM	RJW																								
P1	R1	19.02.2019	REVISION	LM	RJW																								
P1	-	04.12.2019	DRAFT	CB	RJW																								
Phase	Revision	Date	Issue	Drawn	Checked																								



Location Symbols Approximate Window Sample Probehole Location Approximate Trial Pit Location Approximate Silt Trench Location No Access Full Extent of Made Ground Not Identified Parcel A Parcel B Parcel C Depth to Bedrock (m) Depth to Bedrock 0.00 - 1.99m Depth to Bedrock 2.00 - 3.99m Depth to Bedrock 4.00 - 5.99m Depth to Bedrock 6.00 - 7.99m Depth to Bedrock 8.00 - 9.99m Depth to Bedrock 10.00 - 11.99m Depth to Bedrock 12.00 - 13.99m Depth to Bedrock 14.00 - 15.99m Depth to Bedrock >16.00m		Notes:						Client: Manchester Life		Job No: 13-729	Date: 17.02.2020	e3p Environmental Engineering Partnerships Ltd City Heliport & Business Centre Eccles, Manchester, M30 7RU Tel: 0161 707 9612 E-mail: info@e3p.co.uk Website: www.e3p.co.uk			
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ID	SOURCE	EXPOSURE	POTENTIAL PATHWAY
HUMAN HEALTH			
1	Heavy Metals, heavy end Hydrocarbons & Non Volatile Polycyclic Aromatic Hydrocarbon (PAH)	Dermal Contact and Ingestion	Construction Workers &
		Consumption of Home-grown Produce	Residential End Users
2	Semi Volatile Polycyclic Aromatic, and petroleum and diesel range Hydrocarbon Compounds, Chlorinated Hydrocarbons	Volatilisation / Accumulation, Vapour Inhalation	Construction Workers &
			Residential End Users
3	Asbestos Containing Materials (ACM)	Fibre / Dust Inhalation	Construction Workers, Residential End Users &Third Party Property
4	Hazardous Ground Gases	Inhalation	Construction Workers
		Accumulation	Residential End Users
5	PCB's	Dermal Contact and Ingestion	Construction Workers &
		Consumption of Home-grown Produce	Residential End Users
CONTROLLED WATERS			
6	Water Soluble Mobile Contaminants	Vertical Migration	Secondary A Aquifer
7	Water Soluble Mobile Contaminants	Lateral Migration	Surface Water Courses
BUILDING & INFRASTRUCTURE			
8	pH & Sulphate	Corrosion of Concrete	Foundations / Concrete
9	VOC, TPH's Phenols, pH	Chemical Corrosion	Potable Water Supply



Made Ground Depth (m) Made Ground Rochdale Canal Infilled Canals Clay (Secondary B Aquifer) Potential Tunnel Sandstone Principal Aquifer Parcel A Parcel B Parcel C	Notes:						Client: Manchester Life		Job No: 13-729	Date: 13.02.2020	 Environmental Engineering Partnerships Ltd City Heliport & Business Centre Eccles, Manchester, M30 7RU Tel: 0161 707 9612 E-mail: info@e3p.co.uk Website: www.e3p.co.uk	
									Drawing No: 008	Scale: NTS		
							Job Title: Jersey Street		Drawing Title: Conceptual Site Model			The client must not amend any drawing, design or other intellectual property produced by E3P Ltd without permission in writing from E3P Ltd in advance of any amendments being made. In the event that such written permission is not obtained in advance of the amendments being made, E3P Ltd shall not be liable for any damage and/or losses occurring as a result of the amended drawing, design or intellectual property.
	P1	-	13.02.2020	DRAFT	LM	RW						
	Phase	Revision	Date	Issue	Drawn	Checked						

APPENDIX IV PHOTOGRAPHS

PLATE 1 PARCEL B BRIDGE STRUCTURE UNDER JERSEY STREET LEADING TO PARCEL C



PLATE 2 VIEW WEST OVER PARCEL C



APPENDIX V

E3P EXPLORATORY HOLE LOGS

Project Name: Phase 3	Project No. 13-729	Co-ords: - Level:	Date 20/11/2019
Location: Jersey Street, Ancoats		Dimensions (m): 2.00 1.00	Scale 1:30
Client: Manchester Life		Depth 2.10	Logged EM

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.50	ES		0.20			MADE GROUND: Concrete with rebar.	
							MADE GROUND: Black gravel with frequent cobbles. Gravel is fine to coarse, sub-angular to sub-rounded of sandstone, ash, mudstone, concrete and brick. Cobbles are sub-angular of concrete and brick. (old service at 0.6 m bgl)	
	1.00	HVP	83	0.80			Stiff high strength brown gravelly CLAY. Gravel is fine to coarse, sub-angular of mudstone. (very brittle)	1
	2.00	HVP	97	2.10			End of Pit at 2.10m	2
								3
								4

Trial Pit Photographs



Trial Pit 115



Trial Pit 115 Spoil

Remarks: 1. Complete. 2. Moved west due to services at 0.60m bgl.

Stability: Stable

Project Name: Phase 3	Project No. 13-729	Co-ords: - Level:	Date 20/11/2019
Location: Jersey Street, Ancoats		Dimensions (m): Depth 1.60	Scale 1:30 Logged EM
Client: Manchester Life			

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.20			MADE GROUND: Concrete with rebar.	
	0.80	ES					MADE GROUND: Black gravel with frequent cobbles. Gravel is fine to coarse, sub-angular to sub-rounded of sandstone, ash, mudstone, concrete and brick. Cobbles are sub-angular of concrete and brick.	
	1.20	ES		1.00			Stiff high strength brown gravelly CLAY. Gravel is fine to coarse, sub-angular of mudstone. (very brittle)	1
	1.20	HVP	111					
	1.50	HVP	97	1.60			End of Pit at 1.60m	2
								3
								4

Trial Pit Photographs



Trial Pit 116

Trial Pit 116 Spoil

Remarks: 1.Complete.

Stability: Stable



e3p

Trial Pit Log

TrialPit No
TP117
Sheet 1 of 1

Project Name: Phase 3

Project No.
13-729Co-ords: -
Level:Date
20/11/2019

Location: Jersey Street, Ancoats

Dimensions
(m):

2.00

Scale
1:24

Client: Manchester Life

Depth
3.00

1.00

Logged
EM

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.20			MADE GROUND: Concrete with rebar	
	1.60	ES					MADE GROUND: Brown sandy clayey gravel with frequent cobbles. Gravel is fine to coarse, sub-angular to sub-rounded of sandstone, mudstone, ash, concrete and brick. Cobbles are sub-angular of brick.	1
				2.30			Brown clayey sandy SILT (organic odour)	2
	2.90 2.90	ES HVP	52	2.80 3.00			Firm medium strength brown CLAY.	3
							End of Pit at 3.00m	4
								5

Remarks: 1. Complete. 2. Brick wall and drain encountered north of excavation.

Stability: Stable



Borehole Log

Borehole No.

WS111

Sheet 1 of 1

Project Name: Phase 3

Project No.
13-729

Co-ords:

Hole Type
WS

Location: Jersey Street, Ancoats

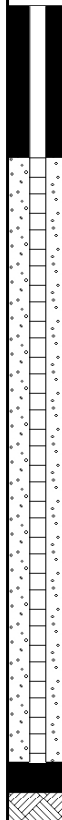
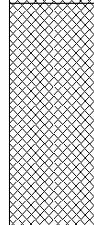
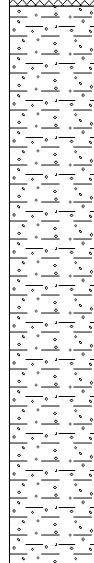
Level:

Scale
1:50

Client: Manchester Life

Dates: 20/11/2019

Logged By
EM

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.20			MADE GROUND: Concrete with rebar.	
		0.80	ES					MADE GROUND: Black gravel. Gravel is fine to coarse, sub-angular to sub-rounded of sandstone, mudstone, concrete and brick. Cobbles are sub-angular to sub-rounded of brick and concrete.	1
		1.00	SPT	N=10 (2,1/2,2,3,3)					
		1.90	ES		1.70			Firm low strength brown gravelly CLAY. Gravel is fine to coarse, sub-angular to sub-rounded of mudstone. (Becoming stiff medium strength at circa 3.00m bgl) (Becoming very stiff high strength at circa 4.00m bgl).	2
		2.00	SPT	N=7 (2,2/2,2,1,2)					
		3.00	SPT	N=17 (2,3/3,4,5,5)					3
		4.00	SPT	N=22 (3,4/5,6,5,6)					4
		5.00	SPT	N=21 (4,4/4,5,6,6)					5
					5.45			End of Borehole at 5.45m	6
									7
									8
									9
									10

Remarks

1.Complete. 2. Monitoring well installed.

Borehole Log

Borehole No.

WS112

Sheet 1 of 1

Project Name: Phase 3

Project No.
13-729

Co-ords:

Hole Type
WS

Location: Jersey Street, Ancoats

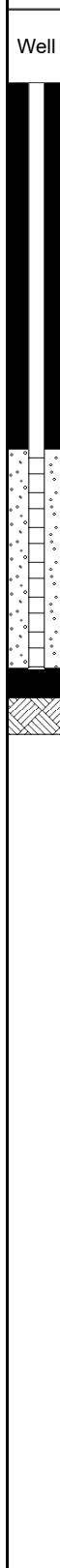
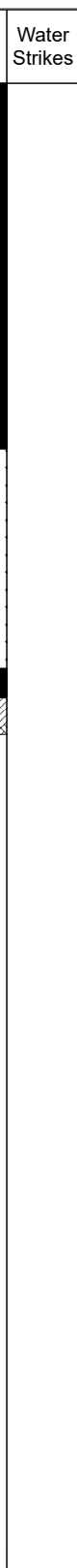
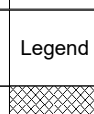
Level:

Scale
1:50

Client: Manchester Life

Dates: 20/11/2019

Logged By
EM

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.20			MADE GROUND: Concrete with rebar.	
					0.60			MADE GROUND: Brown red gravel. Gravel is fine to coarse, sub-angular to sub-rounded of sandstone, mudstone, concrete and brick. Cobbles are sub-angular to sub-rounded of brick and concrete.	
		1.00	SPT	N=5 (2,2/2,1,1,1)				MADE GROUND: Firm brown gravelly clay. Gravel is fine to coarse, sub-angular to sub-rounded of coal, brick and concrete.	1
		1.20	ES						
		2.00	SPT	N=9 (2,2/2,2,3,2)					2
					2.30				
		2.80	ES					Stiff medium strength brown gravelly CLAY. Gravel is fine to coarse, sub-angular to sub-rounded of mudstone. (Becoming very stiff very high strength at circa 4.00m bgl).	3
		3.00	SPT	N=17 (3,3/4,4,5,4)					
		4.00	SPT	N=50 (5,5/10,18,18,4)					4
					4.45			End of Borehole at 4.45m	

Remarks

1.Terminated at 4.0 m bgl due to refusal on cobble. 2.Monitoring well installed.

Borehole Log

Borehole No.

CP106

Sheet 1 of 2

Project Name: Phase 3

Project No.
13-729

Co-ords:

Hole Type
CP

Location: Jersey Street, Ancoats

Level:

Scale
1:50

Client: Manchester Life

Dates: 16/01/2020

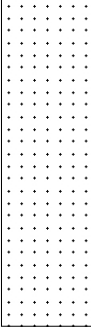
Logged By
R. Walker

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.70	B		0.70			MADE GROUND: Red brown gravel. Gravel is fine to coarse sub-angular of brick.	1
		1.00	SPT	N=4 (1,0/1,1,1,1)				MADE GROUND: Red brown gravel. Gravel is fine to coarse sub-rounded of brick, concrete and ash.	
		1.80	B		1.80			Soft very low strength brown CLAY. (Becoming firm low strength at circa 3.00m bgl).	2
		2.00	B						
		2.00	SPT	N=4 (1,0/1,1,1,1)					
		3.00	B						3
		3.00	SPT	N=6 (2,1/1,1,2,2)					
		4.00	B						
		4.00	U						
		4.00	SPT	Ublow=97 N=9 (2,2/2,2,2,3)					
		4.50	B		4.50			Stiff medium strength brown CLAY with occasional bands of medium sand (Becoming very stiff high strength from circa 7.50m bgl).	5
		5.00	SPT	N=11 (1,2/1,3,3,4)					
		7.00	B						7
		7.00	U	Ublow=221					
		7.50	SPT	N=30 (3,4/5,8,8,9)					
									8
		9.00	B		9.00			Brown CLAY.	9
									10

Remarks

1. Complete. 2. Chiseling from 10.30m to 12.50m bgl for two hours.

				Borehole Log				Borehole No. CP106 Sheet 2 of 2	
Project Name: Phase 3				Project No. 13-729		Co-ords:		Hole Type CP	
Location: Jersey Street, Ancoats						Level:		Scale 1:50	
Client: Manchester Life						Dates: 16/01/2020		Logged By R. Walker	

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					10.30			Brown CLAY.	
		11.00	B					Dense brown SANDSTONE.	11
		12.00	SPT	40 (8,13/40 for 340mm)				12	
		12.50	SPT	50 (8,10/50 for 355mm)	12.50			End of Borehole at 12.50m	13
									14
									15
									16
									17
									18
									19
									20

Remarks
 1. Complete. 2. Chiseling from 10.30m to 12.50m bgl for two hours.



APPENDIX VI

CHEMICAL TESTING

RESULTS

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Analytical Report Number : 19-73873

Project / Site name:	Manchester Life	Samples received on:	21/11/2019
Your job number:	13729	Samples instructed on:	26/11/2019
Your order number:		Analysis completed by:	04/12/2019
Report Issue Number:	1	Report issued on:	04/12/2019
Samples Analysed:	3 leachate samples - 32 soil samples		

Signed:

Zina Abdul Razzak
Senior Quality Specialist

For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

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

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement. Application of uncertainty of measurement would provide a range within which the true result lies. An estimate of measurement uncertainty can be provided on request.



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372505	1372506	1372507	1372508	1372509
Sample Reference				TT101 A	TP101	TP101	TP102	TP105
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.20	1.00	2.30	0.80	1.40
Date Sampled				20/11/2019	20/11/2019	20/11/2019	20/11/2019	20/11/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	23	13	15	15	13
Total mass of sample received	kg	0.001	NONE	0.50	0.43	0.40	0.40	0.40

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	Amosite	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Detected	-	-	Not-detected	-
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	0.005	-	-	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	0.005	-	-	-	-

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	-	-	-	-	-
Total Cyanide	mg/kg	1	MCERTS	10	< 1	< 1	< 1	< 1
Total Sulphate as SO ₄	mg/kg	50	MCERTS	-	-	-	-	-
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	-	-	-	-	-
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	-	-	-	-
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-	-	-	-
Sulphide	mg/kg	1	MCERTS	-	-	-	-	-
Total Sulphur	mg/kg	50	MCERTS	-	-	-	-	-
Total Organic Carbon (TOC)	%	0.1	MCERTS	4.6	-	-	-	-

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	-	-	-	-	-
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	-	-	0.27	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	-	-	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	-	-	0.10	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	-	-	0.12	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	-	-	0.54	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	-	-	0.09	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	-	-	0.35	< 0.05	< 0.05
Pyrene	mg/kg	0.05	MCERTS	-	-	0.16	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	-	0.35	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	-	-	0.38	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	-	0.11	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	-	0.15	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	-	0.05	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	-	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	-	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	-	< 0.05	< 0.05	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	-	-	2.67	< 0.80	< 0.80
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Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number	1372505	1372506	1372507	1372508	1372509
Sample Reference	TT101 A	TP101	TP101	TP102	TP105
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	1.20	1.00	2.30	0.80	1.40
Date Sampled	20/11/2019	20/11/2019	20/11/2019	20/11/2019	20/11/2019
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	20	13	7.6	25	7.3
Barium (aqua regia extractable)	mg/kg	1	MCERTS	470	150	160	130	150
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.3	0.56	1.2	1.1	1.0
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	1.0	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	85	29	18	540	17
Iron (aqua regia extractable)	mg/kg	40	MCERTS	-	-	-	56000	-
Fe ²⁺	mg/kg	2	NONE	-	-	-	62.0	-
Fe ³⁺	mg/kg	2	NONE	-	-	-	56400	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	280	140	13	160	12
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.5	0.7	< 0.3	0.4	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	27	11	35	30	31
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	55	20	31	46	29
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	390	46	56	150	49

Monoaromatics & Oxygenates

Benzene	µg/kg	1	MCERTS	-	-	-	-	-
Toluene	µg/kg	1	MCERTS	-	-	-	-	-
Ethylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
p & m-xylene	µg/kg	1	MCERTS	-	-	-	-	-
o-xylene	µg/kg	1	MCERTS	-	-	-	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	-	-	-

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	-	-

TPH (C5 - C6)	mg/kg	1	NONE	< 1.0	-	< 1.0	< 1.0	< 1.0
TPH (C6 - C8)	mg/kg	0.1	MCERTS	< 0.1	-	< 0.1	< 0.1	< 0.1
TPH (C8 - C10)	mg/kg	0.1	MCERTS	< 0.1	-	< 0.1	< 0.1	< 0.1
TPH (C10 - C12)	mg/kg	2	MCERTS	220	-	< 2.0	< 2.0	< 2.0
TPH (C12 - C16)	mg/kg	4	MCERTS	1300	-	4.8	< 4.0	< 4.0
TPH (C16 - C21)	mg/kg	1	MCERTS	3400	-	10	7.2	5.7
TPH (C21 - C35)	mg/kg	1	MCERTS	5000	-	11	39	8.5
TPH (C35 - C40)	mg/kg	10	MCERTS	130	-	< 10	< 10	< 10
TPH Total C5 - C40	mg/kg	10	MCERTS	10000	-	30	48	18



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number	1372505	1372506	1372507	1372508	1372509
Sample Reference	TT101 A	TP101	TP101	TP102	TP105
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	1.20	1.00	2.30	0.80	1.40
Date Sampled	20/11/2019	20/11/2019	20/11/2019	20/11/2019	20/11/2019
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		

VOCs

Chloromethane	µg/kg	1	ISO 17025	< 1.0	-	-	-	-
Chloroethane	µg/kg	1	NONE	< 1.0	-	-	-	-
Bromomethane	µg/kg	1	ISO 17025	< 1.0	-	-	-	-
Vinyl Chloride	µg/kg	1	NONE	< 1.0	-	-	-	-
Trichlorofluoromethane	µg/kg	1	NONE	< 1.0	-	-	-	-
1,1-Dichloroethene	µg/kg	1	NONE	< 1.0	-	-	-	-
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	1	ISO 17025	< 1.0	-	-	-	-
Cis-1,2-dichloroethene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	-	-	-	-
1,1-Dichloroethane	µg/kg	1	MCERTS	< 1.0	-	-	-	-
2,2-Dichloropropane	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Trichloromethane	µg/kg	1	MCERTS	< 1.0	-	-	-	-
1,1,1-Trichloroethane	µg/kg	1	MCERTS	< 1.0	-	-	-	-
1,2-Dichloroethane	µg/kg	1	MCERTS	< 1.0	-	-	-	-
1,1-Dichloropropene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Trans-1,2-dichloroethene	µg/kg	1	NONE	< 1.0	-	-	-	-
Benzene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Tetrachloromethane	µg/kg	1	MCERTS	< 1.0	-	-	-	-
1,2-Dichloropropane	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Trichloroethene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Dibromomethane	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Bromodichloromethane	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Cis-1,3-dichloropropene	µg/kg	1	ISO 17025	< 1.0	-	-	-	-
Trans-1,3-dichloropropene	µg/kg	1	ISO 17025	< 1.0	-	-	-	-
Toluene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
1,1,2-Trichloroethane	µg/kg	1	MCERTS	< 1.0	-	-	-	-
1,3-Dichloropropane	µg/kg	1	ISO 17025	< 1.0	-	-	-	-
Dibromochloromethane	µg/kg	1	ISO 17025	< 1.0	-	-	-	-
Tetrachloroethene	µg/kg	1	NONE	< 1.0	-	-	-	-
1,2-Dibromoethane	µg/kg	1	ISO 17025	< 1.0	-	-	-	-
Chlorobenzene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
1,1,1,2-Tetrachloroethane	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
p & m-Xylene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Styrene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Tribromomethane	µg/kg	1	NONE	< 1.0	-	-	-	-
o-Xylene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
1,1,2,2-Tetrachloroethane	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Isopropylbenzene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Bromobenzene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
n-Propylbenzene	µg/kg	1	ISO 17025	< 1.0	-	-	-	-
2-Chlorotoluene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
4-Chlorotoluene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
1,3,5-Trimethylbenzene	µg/kg	1	ISO 17025	< 1.0	-	-	-	-
tert-Butylbenzene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
1,2,4-Trimethylbenzene	µg/kg	1	ISO 17025	< 1.0	-	-	-	-
sec-Butylbenzene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
1,3-Dichlorobenzene	µg/kg	1	ISO 17025	< 1.0	-	-	-	-
p-Isopropyltoluene	µg/kg	1	ISO 17025	< 1.0	-	-	-	-
1,2-Dichlorobenzene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
1,4-Dichlorobenzene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Butylbenzene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
1,2-Dibromo-3-chloropropane	µg/kg	1	ISO 17025	< 1.0	-	-	-	-
1,2,4-Trichlorobenzene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Hexachlorobutadiene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
1,2,3-Trichlorobenzene	µg/kg	1	ISO 17025	< 1.0	-	-	-	-



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372505	1372506	1372507	1372508	1372509
Sample Reference				TT101 A	TP101	TP101	TP102	TP105
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.20	1.00	2.30	0.80	1.40
Date Sampled				20/11/2019	20/11/2019	20/11/2019	20/11/2019	20/11/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
SVOCs								
Aniline	mg/kg	0.1	NONE	< 0.1	-	-	-	-
Phenol	mg/kg	0.2	ISO 17025	< 0.2	-	-	-	-
2-Chlorophenol	mg/kg	0.1	MCERTS	< 0.1	-	-	-	-
Bis(2-chloroethyl)ether	mg/kg	0.2	MCERTS	< 0.2	-	-	-	-
1,3-Dichlorobenzene	mg/kg	0.2	MCERTS	< 0.2	-	-	-	-
1,2-Dichlorobenzene	mg/kg	0.1	MCERTS	< 0.1	-	-	-	-
1,4-Dichlorobenzene	mg/kg	0.2	MCERTS	< 0.2	-	-	-	-
Bis(2-chloroisopropyl)ether	mg/kg	0.1	MCERTS	< 0.1	-	-	-	-
2-Methylphenol	mg/kg	0.3	MCERTS	< 0.3	-	-	-	-
Hexachloroethane	mg/kg	0.05	MCERTS	< 0.05	-	-	-	-
Nitrobenzene	mg/kg	0.3	MCERTS	< 0.3	-	-	-	-
4-Methylphenol	mg/kg	0.2	NONE	< 0.2	-	-	-	-
Isophorone	mg/kg	0.2	MCERTS	< 0.2	-	-	-	-
2-Nitrophenol	mg/kg	0.3	MCERTS	< 0.3	-	-	-	-
2,4-Dimethylphenol	mg/kg	0.3	MCERTS	< 0.3	-	-	-	-
Bis(2-chloroethoxy)methane	mg/kg	0.3	MCERTS	< 0.3	-	-	-	-
1,2,4-Trichlorobenzene	mg/kg	0.3	MCERTS	< 0.3	-	-	-	-
Naphthalene	mg/kg	0.05	MCERTS	46	-	-	-	-
2,4-Dichlorophenol	mg/kg	0.3	MCERTS	< 0.3	-	-	-	-
4-Chloroaniline	mg/kg	0.1	NONE	< 0.1	-	-	-	-
Hexachlorobutadiene	mg/kg	0.1	MCERTS	< 0.1	-	-	-	-
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	< 0.1	-	-	-	-
2,4,6-Trichlorophenol	mg/kg	0.1	MCERTS	< 0.1	-	-	-	-
2,4,5-Trichlorophenol	mg/kg	0.2	MCERTS	< 0.2	-	-	-	-
2-Methylnaphthalene	mg/kg	0.1	NONE	31	-	-	-	-
2-Chloronaphthalene	mg/kg	0.1	MCERTS	< 0.1	-	-	-	-
Dimethylphthalate	mg/kg	0.1	MCERTS	< 0.1	-	-	-	-
2,6-Dinitrotoluene	mg/kg	0.1	MCERTS	< 0.1	-	-	-	-
Acenaphthylene	mg/kg	0.05	MCERTS	3.3	-	-	-	-
Acenaphthene	mg/kg	0.05	MCERTS	170	-	-	-	-
2,4-Dinitrotoluene	mg/kg	0.2	MCERTS	< 0.2	-	-	-	-
Dibenzofuran	mg/kg	0.2	MCERTS	47	-	-	-	-
4-Chlorophenyl phenyl ether	mg/kg	0.3	ISO 17025	< 0.3	-	-	-	-
Diethyl phthalate	mg/kg	0.2	MCERTS	< 0.2	-	-	-	-
4-Nitroaniline	mg/kg	0.2	MCERTS	< 0.2	-	-	-	-
Fluorene	mg/kg	0.05	MCERTS	110	-	-	-	-
Azobenzene	mg/kg	0.3	MCERTS	< 0.3	-	-	-	-
Bromophenyl phenyl ether	mg/kg	0.2	MCERTS	< 0.2	-	-	-	-
Hexachlorobenzene	mg/kg	0.3	MCERTS	< 0.3	-	-	-	-
Phenanthrene	mg/kg	0.05	MCERTS	550	-	-	-	-
Anthracene	mg/kg	0.05	MCERTS	170	-	-	-	-
Carbazole	mg/kg	0.3	MCERTS	37	-	-	-	-
Dibutyl phthalate	mg/kg	0.2	MCERTS	< 0.2	-	-	-	-
Anthraquinone	mg/kg	0.3	MCERTS	29	-	-	-	-
Fluoranthene	mg/kg	0.05	MCERTS	720	-	-	-	-
Pyrene	mg/kg	0.05	MCERTS	620	-	-	-	-
Butyl benzyl phthalate	mg/kg	0.3	ISO 17025	< 0.3	-	-	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	330	-	-	-	-
Chrysene	mg/kg	0.05	MCERTS	290	-	-	-	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	380	-	-	-	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	140	-	-	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	280	-	-	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	150	-	-	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	41	-	-	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	170	-	-	-	-



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372510	1372511	1372512	1372513	1372514
Sample Reference				TP106	TP106	TP107	TP108	TP109
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	1.70	0.50	2.10	1.00
Date Sampled				20/11/2019	20/11/2019	20/11/2019	20/11/2019	20/11/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	13	19	19	19	13
Total mass of sample received	kg	0.001	NONE	0.40	0.40	0.40	0.40	0.40

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	Amosite	-	-	Chrysotile	-
Asbestos in Soil	Type	N/A	ISO 17025	Detected	-	-	Detected	-
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	< 0.001	-	-	< 0.001	-
Asbestos Quantification Total	%	0.001	ISO 17025	< 0.001	-	-	< 0.001	-

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	-	-	-	8.1	-
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	3	-
Total Sulphate as SO ₄	mg/kg	50	MCERTS	-	-	-	1100	-
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	-	-	-	540	-
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	-	-	0.27	-
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-	-	272	-
Sulphide	mg/kg	1	MCERTS	-	-	-	54	-
Total Sulphur	mg/kg	50	MCERTS	-	-	-	1900	-
Total Organic Carbon (TOC)	%	0.1	MCERTS	-	-	-	-	1.9

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	-	-	-	< 1.0	-
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	-	7.7	250	-	-
Acenaphthylene	mg/kg	0.05	MCERTS	-	0.78	30	-	-
Acenaphthene	mg/kg	0.05	MCERTS	-	2.2	89	-	-
Fluorene	mg/kg	0.05	MCERTS	-	3.3	140	-	-
Phenanthrene	mg/kg	0.05	MCERTS	-	14	550	-	-
Anthracene	mg/kg	0.05	MCERTS	-	3.1	120	-	-
Fluoranthene	mg/kg	0.05	MCERTS	-	11	430	-	-
Pyrene	mg/kg	0.05	MCERTS	-	11	480	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	4.7	190	-	-
Chrysene	mg/kg	0.05	MCERTS	-	5.2	140	-	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	3.2	140	-	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	2.2	69	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	3.6	140	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	1.3	52	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	< 0.05	19	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	1.8	64	-	-

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	-	75.7	2910	-	-
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Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372510	1372511	1372512	1372513	1372514
Sample Reference				TP106	TP106	TP107	TP108	TP109
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	1.70	0.50	2.10	1.00
Date Sampled				20/11/2019	20/11/2019	20/11/2019	20/11/2019	20/11/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	21	9.2	34	19	-
Barium (aqua regia extractable)	mg/kg	1	MCERTS	150	110	180	-	-
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.6	1.3	2.2	-	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	0.9	-
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	26	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	110	25	210	130	-
Iron (aqua regia extractable)	mg/kg	40	MCERTS	-	-	-	-	-
Fe ²⁺	mg/kg	2	NONE	-	-	-	-	-
Fe ³⁺	mg/kg	2	NONE	-	-	-	-	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	210	40	780	270	-
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.6	< 0.3	1.4	0.4	-
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	32	34	34	35	-
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	39	34	47	-	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	96	58	120	390	-

Monoaromatics & Oxygenates

Benzene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Toluene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
p & m-xylene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
o-xylene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	-	-	-	-

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	-	-	-	-
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	-	-	-	-
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	0.099	-	-	-	-
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	20	-	-	-	-
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	180	-	-	-	-
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	590	-	-	-	-
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	4800	-	-	-	-
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	5600	-	-	-	-
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	-	-	-	-
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	-	-	-	-
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	-	-	-	-
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	56	-	-	-	-
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	420	-	-	-	-
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	1200	-	-	-	-
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	3200	-	-	-	-
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	4900	-	-	-	-

TPH (C5 - C6)	mg/kg	1	NONE	-	< 1.0	-	< 1.0	-
TPH (C6 - C8)	mg/kg	0.1	MCERTS	-	< 0.1	-	< 0.1	-
TPH (C8 - C10)	mg/kg	0.1	MCERTS	-	< 0.1	-	< 0.1	-
TPH (C10 - C12)	mg/kg	2	MCERTS	-	24	-	11	-
TPH (C12 - C16)	mg/kg	4	MCERTS	-	60	-	180	-
TPH (C16 - C21)	mg/kg	1	MCERTS	-	110	-	480	-
TPH (C21 - C35)	mg/kg	1	MCERTS	-	170	-	1100	-
TPH (C35 - C40)	mg/kg	10	MCERTS	-	< 10	-	65	-
TPH Total C5 - C40	mg/kg	10	MCERTS	-	400	-	1900	-



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372510	1372511	1372512	1372513	1372514
Sample Reference				TP106	TP106	TP107	TP108	TP109
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	1.70	0.50	2.10	1.00
Date Sampled				20/11/2019	20/11/2019	20/11/2019	20/11/2019	20/11/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)				Units	Limit of detection	Accreditation Status		

VOCs

Chloromethane	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	-
Chloroethane	µg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	-
Bromomethane	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	-
Vinyl Chloride	µg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	-
Trichlorofluoromethane	µg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	-
1,1-Dichloroethene	µg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	-
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	-
Cis-1,2-dichloroethene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
1,1-Dichloroethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
2,2-Dichloropropane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
Trichloromethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
1,1,1-Trichloroethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
1,2-Dichloroethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
1,1-Dichloropropene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
Trans-1,2-dichloroethene	µg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	-
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	5.4	< 1.0	-
Tetrachloromethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
1,2-Dichloropropane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
Trichloroethene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
Dibromomethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
Bromodichloromethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
Cis-1,3-dichloropropene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	-
Trans-1,3-dichloropropene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	-
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	16	< 1.0	-
1,1,2-Trichloroethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
1,3-Dichloropropane	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	-
Dibromochloromethane	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	-
Tetrachloroethene	µg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	-
1,2-Dibromoethane	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	-
Chlorobenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
1,1,1,2-Tetrachloroethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
p & m-Xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	31	< 1.0	-
Styrene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
Tribromomethane	µg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	-
o-Xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	28	< 1.0	-
1,1,2,2-Tetrachloroethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
Isopropylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
Bromobenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
n-Propylbenzene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	-
2-Chlorotoluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
4-Chlorotoluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
1,3,5-Trimethylbenzene	µg/kg	1	ISO 17025	< 1.0	< 1.0	29	< 1.0	-
tert-Butylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
1,2,4-Trimethylbenzene	µg/kg	1	ISO 17025	< 1.0	< 1.0	53	< 1.0	-
sec-Butylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
1,3-Dichlorobenzene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	-
p-Isopropyltoluene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	-
1,2-Dichlorobenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
1,4-Dichlorobenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
Butylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
1,2-Dibromo-3-chloropropane	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	-
1,2,4-Trichlorobenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
Hexachlorobutadiene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
1,2,3-Trichlorobenzene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	-



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372510	1372511	1372512	1372513	1372514
Sample Reference				TP106	TP106	TP107	TP108	TP109
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	1.70	0.50	2.10	1.00
Date Sampled				20/11/2019	20/11/2019	20/11/2019	20/11/2019	20/11/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
SVOCs								
Aniline	mg/kg	0.1	NONE	< 0.1	-	-	< 0.1	-
Phenol	mg/kg	0.2	ISO 17025	< 0.2	-	-	< 0.2	-
2-Chlorophenol	mg/kg	0.1	MCERTS	< 0.1	-	-	< 0.1	-
Bis(2-chloroethyl)ether	mg/kg	0.2	MCERTS	< 0.2	-	-	< 0.2	-
1,3-Dichlorobenzene	mg/kg	0.2	MCERTS	< 0.2	-	-	< 0.2	-
1,2-Dichlorobenzene	mg/kg	0.1	MCERTS	< 0.1	-	-	< 0.1	-
1,4-Dichlorobenzene	mg/kg	0.2	MCERTS	< 0.2	-	-	< 0.2	-
Bis(2-chloroisopropyl)ether	mg/kg	0.1	MCERTS	< 0.1	-	-	< 0.1	-
2-Methylphenol	mg/kg	0.3	MCERTS	< 0.3	-	-	< 0.3	-
Hexachloroethane	mg/kg	0.05	MCERTS	< 0.05	-	-	< 0.05	-
Nitrobenzene	mg/kg	0.3	MCERTS	< 0.3	-	-	< 0.3	-
4-Methylphenol	mg/kg	0.2	NONE	< 0.2	-	-	< 0.2	-
Isophorone	mg/kg	0.2	MCERTS	< 0.2	-	-	< 0.2	-
2-Nitrophenol	mg/kg	0.3	MCERTS	< 0.3	-	-	< 0.3	-
2,4-Dimethylphenol	mg/kg	0.3	MCERTS	< 0.3	-	-	< 0.3	-
Bis(2-chloroethoxy)methane	mg/kg	0.3	MCERTS	< 0.3	-	-	< 0.3	-
1,2,4-Trichlorobenzene	mg/kg	0.3	MCERTS	< 0.3	-	-	< 0.3	-
Naphthalene	mg/kg	0.05	MCERTS	40	-	-	4.8	-
2,4-Dichlorophenol	mg/kg	0.3	MCERTS	< 0.3	-	-	< 0.3	-
4-Chloroaniline	mg/kg	0.1	NONE	< 0.1	-	-	< 0.1	-
Hexachlorobutadiene	mg/kg	0.1	MCERTS	< 0.1	-	-	< 0.1	-
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	< 0.1	-	-	< 0.1	-
2,4,6-Trichlorophenol	mg/kg	0.1	MCERTS	< 0.1	-	-	< 0.1	-
2,4,5-Trichlorophenol	mg/kg	0.2	MCERTS	< 0.2	-	-	< 0.2	-
2-Methylnaphthalene	mg/kg	0.1	NONE	19	-	-	4.5	-
2-Chloronaphthalene	mg/kg	0.1	MCERTS	< 0.1	-	-	< 0.1	-
Dimethylphthalate	mg/kg	0.1	MCERTS	< 0.1	-	-	< 0.1	-
2,6-Dinitrotoluene	mg/kg	0.1	MCERTS	< 0.1	-	-	< 0.1	-
Acenaphthylene	mg/kg	0.05	MCERTS	11	-	-	1.4	-
Acenaphthene	mg/kg	0.05	MCERTS	40	-	-	6.0	-
2,4-Dinitrotoluene	mg/kg	0.2	MCERTS	< 0.2	-	-	< 0.2	-
Dibenzofuran	mg/kg	0.2	MCERTS	17	-	-	4.1	-
4-Chlorophenyl phenyl ether	mg/kg	0.3	ISO 17025	< 0.3	-	-	< 0.3	-
Diethyl phthalate	mg/kg	0.2	MCERTS	< 0.2	-	-	< 0.2	-
4-Nitroaniline	mg/kg	0.2	MCERTS	< 0.2	-	-	< 0.2	-
Fluorene	mg/kg	0.05	MCERTS	60	-	-	7.3	-
Azobenzene	mg/kg	0.3	MCERTS	< 0.3	-	-	< 0.3	-
Bromophenyl phenyl ether	mg/kg	0.2	MCERTS	< 0.2	-	-	< 0.2	-
Hexachlorobenzene	mg/kg	0.3	MCERTS	< 0.3	-	-	< 0.3	-
Phenanthrene	mg/kg	0.05	MCERTS	250	-	-	39	-
Anthracene	mg/kg	0.05	MCERTS	61	-	-	11	-
Carbazole	mg/kg	0.3	MCERTS	11	-	-	2.6	-
Dibutyl phthalate	mg/kg	0.2	MCERTS	< 0.2	-	-	< 0.2	-
Anthraquinone	mg/kg	0.3	MCERTS	< 0.3	-	-	< 0.3	-
Fluoranthene	mg/kg	0.05	MCERTS	240	-	-	40	-
Pyrene	mg/kg	0.05	MCERTS	270	-	-	43	-
Butyl benzyl phthalate	mg/kg	0.3	ISO 17025	< 0.3	-	-	< 0.3	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	110	-	-	27	-
Chrysene	mg/kg	0.05	MCERTS	95	-	-	27	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	100	-	-	23	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	33	-	-	18	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	89	-	-	28	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	33	-	-	12	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	13	-	-	3.5	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	42	-	-	13	-



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372515	1372516	1372517	1372518	1372519
Sample Reference				TP112	TP113	TP115	TP116	TP117
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	0.90	0.50	0.80	1.60
Date Sampled				21/11/2019	21/11/2019	21/11/2019	21/11/2019	21/11/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	17	16	20	18	19
Total mass of sample received	kg	0.001	NONE	0.40	0.30	1.4	0.40	0.40

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	Chrysotile	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Detected	-	Not-detected	-	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	0.008	-	-	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	0.008	-	-	-	-

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	-	-	-	-	9.1
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Total Sulphate as SO ₄	mg/kg	50	MCERTS	-	-	-	-	2500
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	-	-	-	-	940
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	-	-	-	0.47
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-	-	-	470
Sulphide	mg/kg	1	MCERTS	-	-	-	-	30
Total Sulphur	mg/kg	50	MCERTS	-	-	-	-	3000
Total Organic Carbon (TOC)	%	0.1	MCERTS	1.4	-	-	-	-

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	-	-	-	-	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	0.53
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	0.21	< 0.05	< 0.05	-	0.29
Fluorene	mg/kg	0.05	MCERTS	0.20	< 0.05	< 0.05	-	0.38
Phenanthrene	mg/kg	0.05	MCERTS	2.2	0.49	< 0.05	-	2.1
Anthracene	mg/kg	0.05	MCERTS	0.48	< 0.05	< 0.05	-	0.46
Fluoranthene	mg/kg	0.05	MCERTS	5.2	0.43	< 0.05	-	2.1
Pyrene	mg/kg	0.05	MCERTS	5.4	0.38	< 0.05	-	2.3
Benzo(a)anthracene	mg/kg	0.05	MCERTS	3.8	< 0.05	< 0.05	-	1.3
Chrysene	mg/kg	0.05	MCERTS	3.3	< 0.05	< 0.05	-	1.1
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	4.0	< 0.05	< 0.05	-	0.82
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	3.4	< 0.05	< 0.05	-	0.75
Benzo(a)pyrene	mg/kg	0.05	MCERTS	4.7	< 0.05	< 0.05	-	1.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	2.8	< 0.05	< 0.05	-	0.41
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.85	< 0.05	< 0.05	-	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	3.4	< 0.05	< 0.05	-	0.50

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	39.8	1.30	< 0.80	-	14.1
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Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372515	1372516	1372517	1372518	1372519
Sample Reference				TP112	TP113	TP115	TP116	TP117
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	0.90	0.50	0.80	1.60
Date Sampled				21/11/2019	21/11/2019	21/11/2019	21/11/2019	21/11/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	39	9.9	29	32	40
Barium (aqua regia extractable)	mg/kg	1	MCERTS	180	300	170	230	-
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.6	1.6	2.0	1.5	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	1.5	0.4	< 0.2	18	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	25
Copper (aqua regia extractable)	mg/kg	1	MCERTS	1000	27	74	110	160
Iron (aqua regia extractable)	mg/kg	40	MCERTS	-	-	-	-	-
Fe ²⁺	mg/kg	2	NONE	-	-	-	-	-
Fe ³⁺	mg/kg	2	NONE	-	-	-	-	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	410	23	91	200	160
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.6	< 0.3	0.4	0.7	0.5
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	53	49	42	53	57
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	67	38	49	53	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	380	87	92	1100	110

Monoaromatics & Oxygenates

Benzene	µg/kg	1	MCERTS	-	-	-	-	-
Toluene	µg/kg	1	MCERTS	-	-	-	-	-
Ethylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
p & m-xylene	µg/kg	1	MCERTS	-	-	-	-	-
o-xylene	µg/kg	1	MCERTS	-	-	-	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	-	-	-

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	-	-

TPH (C5 - C6)	mg/kg	1	NONE	< 1.0	< 1.0	< 1.0	-	< 1.0
TPH (C6 - C8)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	-	< 0.1
TPH (C8 - C10)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	-	< 0.1
TPH (C10 - C12)	mg/kg	2	MCERTS	5.4	8.3	< 2.0	-	3.6
TPH (C12 - C16)	mg/kg	4	MCERTS	15	61	< 4.0	-	21
TPH (C16 - C21)	mg/kg	1	MCERTS	99	100	< 1.0	-	78
TPH (C21 - C35)	mg/kg	1	MCERTS	400	380	< 1.0	-	350
TPH (C35 - C40)	mg/kg	10	MCERTS	56	53	< 10	-	38
TPH Total C5 - C40	mg/kg	10	MCERTS	580	610	< 10	-	500



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372515	1372516	1372517	1372518	1372519
Sample Reference				TP112	TP113	TP115	TP116	TP117
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	0.90	0.50	0.80	1.60
Date Sampled				21/11/2019	21/11/2019	21/11/2019	21/11/2019	21/11/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)								
	Units	Limit of detection	Accreditation Status					

VOCs

Chloromethane	µg/kg	1	ISO 17025	-	-	-	-	-
Chloroethane	µg/kg	1	NONE	-	-	-	-	-
Bromomethane	µg/kg	1	ISO 17025	-	-	-	-	-
Vinyl Chloride	µg/kg	1	NONE	-	-	-	-	-
Trichlorofluoromethane	µg/kg	1	NONE	-	-	-	-	-
1,1-Dichloroethene	µg/kg	1	NONE	-	-	-	-	-
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	1	ISO 17025	-	-	-	-	-
Cis-1,2-dichloroethene	µg/kg	1	MCERTS	-	-	-	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	-	-	-
1,1-Dichloroethane	µg/kg	1	MCERTS	-	-	-	-	-
2,2-Dichloropropane	µg/kg	1	MCERTS	-	-	-	-	-
Trichloromethane	µg/kg	1	MCERTS	-	-	-	-	-
1,1,1-Trichloroethane	µg/kg	1	MCERTS	-	-	-	-	-
1,2-Dichloroethane	µg/kg	1	MCERTS	-	-	-	-	-
1,1-Dichloropropene	µg/kg	1	MCERTS	-	-	-	-	-
Trans-1,2-dichloroethene	µg/kg	1	NONE	-	-	-	-	-
Benzene	µg/kg	1	MCERTS	-	-	-	-	-
Tetrachloromethane	µg/kg	1	MCERTS	-	-	-	-	-
1,2-Dichloropropane	µg/kg	1	MCERTS	-	-	-	-	-
Trichloroethene	µg/kg	1	MCERTS	-	-	-	-	-
Dibromomethane	µg/kg	1	MCERTS	-	-	-	-	-
Bromodichloromethane	µg/kg	1	MCERTS	-	-	-	-	-
Cis-1,3-dichloropropene	µg/kg	1	ISO 17025	-	-	-	-	-
Trans-1,3-dichloropropene	µg/kg	1	ISO 17025	-	-	-	-	-
Toluene	µg/kg	1	MCERTS	-	-	-	-	-
1,1,2-Trichloroethane	µg/kg	1	MCERTS	-	-	-	-	-
1,3-Dichloropropane	µg/kg	1	ISO 17025	-	-	-	-	-
Dibromochloromethane	µg/kg	1	ISO 17025	-	-	-	-	-
Tetrachloroethene	µg/kg	1	NONE	-	-	-	-	-
1,2-Dibromoethane	µg/kg	1	ISO 17025	-	-	-	-	-
Chlorobenzene	µg/kg	1	MCERTS	-	-	-	-	-
1,1,1,2-Tetrachloroethane	µg/kg	1	MCERTS	-	-	-	-	-
Ethylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
p & m-Xylene	µg/kg	1	MCERTS	-	-	-	-	-
Styrene	µg/kg	1	MCERTS	-	-	-	-	-
Tribromomethane	µg/kg	1	NONE	-	-	-	-	-
o-Xylene	µg/kg	1	MCERTS	-	-	-	-	-
1,1,2,2-Tetrachloroethane	µg/kg	1	MCERTS	-	-	-	-	-
Isopropylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
Bromobenzene	µg/kg	1	MCERTS	-	-	-	-	-
n-Propylbenzene	µg/kg	1	ISO 17025	-	-	-	-	-
2-Chlorotoluene	µg/kg	1	MCERTS	-	-	-	-	-
4-Chlorotoluene	µg/kg	1	MCERTS	-	-	-	-	-
1,3,5-Trimethylbenzene	µg/kg	1	ISO 17025	-	-	-	-	-
tert-Butylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
1,2,4-Trimethylbenzene	µg/kg	1	ISO 17025	-	-	-	-	-
sec-Butylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
1,3-Dichlorobenzene	µg/kg	1	ISO 17025	-	-	-	-	-
p-Isopropyltoluene	µg/kg	1	ISO 17025	-	-	-	-	-
1,2-Dichlorobenzene	µg/kg	1	MCERTS	-	-	-	-	-
1,4-Dichlorobenzene	µg/kg	1	MCERTS	-	-	-	-	-
Butylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
1,2-Dibromo-3-chloropropane	µg/kg	1	ISO 17025	-	-	-	-	-
1,2,4-Trichlorobenzene	µg/kg	1	MCERTS	-	-	-	-	-
Hexachlorobutadiene	µg/kg	1	MCERTS	-	-	-	-	-
1,2,3-Trichlorobenzene	µg/kg	1	ISO 17025	-	-	-	-	-



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372515	1372516	1372517	1372518	1372519
Sample Reference				TP112	TP113	TP115	TP116	TP117
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	0.90	0.50	0.80	1.60
Date Sampled				21/11/2019	21/11/2019	21/11/2019	21/11/2019	21/11/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
SVOCs								
Aniline	mg/kg	0.1	NONE	-	-	-	-	-
Phenol	mg/kg	0.2	ISO 17025	-	-	-	-	-
2-Chlorophenol	mg/kg	0.1	MCERTS	-	-	-	-	-
Bis(2-chloroethyl)ether	mg/kg	0.2	MCERTS	-	-	-	-	-
1,3-Dichlorobenzene	mg/kg	0.2	MCERTS	-	-	-	-	-
1,2-Dichlorobenzene	mg/kg	0.1	MCERTS	-	-	-	-	-
1,4-Dichlorobenzene	mg/kg	0.2	MCERTS	-	-	-	-	-
Bis(2-chloroisopropyl)ether	mg/kg	0.1	MCERTS	-	-	-	-	-
2-Methylphenol	mg/kg	0.3	MCERTS	-	-	-	-	-
Hexachloroethane	mg/kg	0.05	MCERTS	-	-	-	-	-
Nitrobenzene	mg/kg	0.3	MCERTS	-	-	-	-	-
4-Methylphenol	mg/kg	0.2	NONE	-	-	-	-	-
Isophorone	mg/kg	0.2	MCERTS	-	-	-	-	-
2-Nitrophenol	mg/kg	0.3	MCERTS	-	-	-	-	-
2,4-Dimethylphenol	mg/kg	0.3	MCERTS	-	-	-	-	-
Bis(2-chloroethoxy)methane	mg/kg	0.3	MCERTS	-	-	-	-	-
1,2,4-Trichlorobenzene	mg/kg	0.3	MCERTS	-	-	-	-	-
Naphthalene	mg/kg	0.05	MCERTS	-	-	-	-	-
2,4-Dichlorophenol	mg/kg	0.3	MCERTS	-	-	-	-	-
4-Chloroaniline	mg/kg	0.1	NONE	-	-	-	-	-
Hexachlorobutadiene	mg/kg	0.1	MCERTS	-	-	-	-	-
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	-	-	-	-	-
2,4,6-Trichlorophenol	mg/kg	0.1	MCERTS	-	-	-	-	-
2,4,5-Trichlorophenol	mg/kg	0.2	MCERTS	-	-	-	-	-
2-Methylnaphthalene	mg/kg	0.1	NONE	-	-	-	-	-
2-Chloronaphthalene	mg/kg	0.1	MCERTS	-	-	-	-	-
Dimethylphthalate	mg/kg	0.1	MCERTS	-	-	-	-	-
2,6-Dinitrotoluene	mg/kg	0.1	MCERTS	-	-	-	-	-
Acenaphthylene	mg/kg	0.05	MCERTS	-	-	-	-	-
Acenaphthene	mg/kg	0.05	MCERTS	-	-	-	-	-
2,4-Dinitrotoluene	mg/kg	0.2	MCERTS	-	-	-	-	-
Dibenzofuran	mg/kg	0.2	MCERTS	-	-	-	-	-
4-Chlorophenyl phenyl ether	mg/kg	0.3	ISO 17025	-	-	-	-	-
Diethyl phthalate	mg/kg	0.2	MCERTS	-	-	-	-	-
4-Nitroaniline	mg/kg	0.2	MCERTS	-	-	-	-	-
Fluorene	mg/kg	0.05	MCERTS	-	-	-	-	-
Azobenzene	mg/kg	0.3	MCERTS	-	-	-	-	-
Bromophenyl phenyl ether	mg/kg	0.2	MCERTS	-	-	-	-	-
Hexachlorobenzene	mg/kg	0.3	MCERTS	-	-	-	-	-
Phenanthrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Anthracene	mg/kg	0.05	MCERTS	-	-	-	-	-
Carbazole	mg/kg	0.3	MCERTS	-	-	-	-	-
Dibutyl phthalate	mg/kg	0.2	MCERTS	-	-	-	-	-
Anthraquinone	mg/kg	0.3	MCERTS	-	-	-	-	-
Fluoranthene	mg/kg	0.05	MCERTS	-	-	-	-	-
Pyrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Butyl benzyl phthalate	mg/kg	0.3	ISO 17025	-	-	-	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	-	-	-	-
Chrysene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	-	-	-	-



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372520	1372521	1372522	1372523	1372524
Sample Reference				TP117	TT105 A	TT102 B	TT103 A	TT102 A
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				2.90	2.00	1.70	1.50	1.10
Date Sampled				21/11/2019	21/11/2019	21/11/2019	21/11/2019	21/11/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	23	46	16	23	23
Total mass of sample received	kg	0.001	NONE	0.40	0.40	0.40	0.50	0.40

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	Amosite	Amosite
Asbestos in Soil	Type	N/A	ISO 17025	-	Not-detected	-	Detected	Detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	-	0.002	0.100
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	-	0.002	0.100

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	6.9	-	8.4	8.5	-
Total Cyanide	mg/kg	1	MCERTS	< 1	-	< 1	200	2
Total Sulphate as SO ₄	mg/kg	50	MCERTS	560	-	240	3600	-
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	320	-	77	1500	-
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.16	-	0.039	0.76	-
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	161	-	38.5	758	-
Sulphide	mg/kg	1	MCERTS	26	-	3.4	90	-
Total Sulphur	mg/kg	50	MCERTS	1500	-	300	4500	-
Total Organic Carbon (TOC)	%	0.1	MCERTS	-	-	-	-	3.7

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	-
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-	-
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-	-
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-	-
Fluorene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-	-
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-	-
Anthracene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-	-
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-	-
Pyrene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-	-
Chrysene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-	-

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	-	< 0.80	-	-
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Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372520	1372521	1372522	1372523	1372524
Sample Reference				TP117	TT105 A	TT102 B	TT103 A	TT102 A
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				2.90	2.00	1.70	1.50	1.10
Date Sampled				21/11/2019	21/11/2019	21/11/2019	21/11/2019	21/11/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	7.2	-	9.4	31	23
Barium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	470
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	-	-	-	-	3.4
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	-	< 0.2	12	0.8
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	-	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	25	-	30	56	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	9.1	-	20	750	210
Iron (aqua regia extractable)	mg/kg	40	MCERTS	-	52000	-	-	-
Fe ²⁺	mg/kg	2	NONE	-	49.8	-	-	-
Fe ³⁺	mg/kg	2	NONE	-	51800	-	-	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	17	-	13	860	250
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	-	< 0.3	0.6	2.4
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	17	-	37	40	58
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	68
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	38	-	55	4900	380

Monoaromatics & Oxygenates

Benzene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
Toluene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
Ethylbenzene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
p & m-xylene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
o-xylene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	-	< 0.001	-	< 0.001	-
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	-	< 0.001	-	< 0.001	-
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	< 0.001	-	< 0.001	-
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	-	4.8	-	4.5	-
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	-	44	-	41	-
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	-	390	-	250	-
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	-	7100	-	2500	-
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	7500	-	2800	-
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	-	< 0.001	-	< 0.001	-
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	-	< 0.001	-	< 0.001	-
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	< 0.001	-	< 0.001	-
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	-	2.1	-	3.9	-
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	-	53	-	65	-
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	390	-	390	-
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	2200	-	2600	-
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	2600	-	3000	-

TPH (C5 - C6)	mg/kg	1	NONE	< 1.0	< 1.0	< 1.0	-	< 1.0
TPH (C6 - C8)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	-	< 0.1
TPH (C8 - C10)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	-	< 0.1
TPH (C10 - C12)	mg/kg	2	MCERTS	< 2.0	6.9	4.6	-	15
TPH (C12 - C16)	mg/kg	4	MCERTS	< 4.0	97	38	-	420
TPH (C16 - C21)	mg/kg	1	MCERTS	< 1.0	780	71	-	1200
TPH (C21 - C35)	mg/kg	1	MCERTS	< 1.0	9200	61	-	2000
TPH (C35 - C40)	mg/kg	10	MCERTS	< 10	3500	11	-	250
TPH Total C5 - C40	mg/kg	10	MCERTS	< 10	14000	190	-	3900



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372520	1372521	1372522	1372523	1372524
Sample Reference				TP117	TT105 A	TT102 B	TT103 A	TT102 A
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				2.90	2.00	1.70	1.50	1.10
Date Sampled				21/11/2019	21/11/2019	21/11/2019	21/11/2019	21/11/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)				Units	Limit of detection	Accreditation Status		

VOCs

Chloromethane	µg/kg	1	ISO 17025	< 1.0	-	< 1.0	< 1.0	< 1.0
Chloroethane	µg/kg	1	NONE	< 1.0	-	< 1.0	< 1.0	< 1.0
Bromomethane	µg/kg	1	ISO 17025	< 1.0	-	< 1.0	< 1.0	< 1.0
Vinyl Chloride	µg/kg	1	NONE	< 1.0	-	< 1.0	< 1.0	< 1.0
Trichlorofluoromethane	µg/kg	1	NONE	< 1.0	-	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	µg/kg	1	NONE	< 1.0	-	< 1.0	< 1.0	< 1.0
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	1	ISO 17025	< 1.0	-	< 1.0	< 1.0	< 1.0
Cis-1,2-dichloroethene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
2,2-Dichloropropane	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
Trichloromethane	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
Trans-1,2-dichloroethene	µg/kg	1	NONE	< 1.0	-	< 1.0	< 1.0	< 1.0
Benzene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
Tetrachloromethane	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
Trichloroethene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
Dibromomethane	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
Bromodichloromethane	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
Cis-1,3-dichloropropene	µg/kg	1	ISO 17025	< 1.0	-	< 1.0	< 1.0	< 1.0
Trans-1,3-dichloropropene	µg/kg	1	ISO 17025	< 1.0	-	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
1,3-Dichloropropane	µg/kg	1	ISO 17025	< 1.0	-	< 1.0	< 1.0	< 1.0
Dibromochloromethane	µg/kg	1	ISO 17025	< 1.0	-	< 1.0	< 1.0	< 1.0
Tetrachloroethene	µg/kg	1	NONE	< 1.0	-	< 1.0	< 1.0	< 1.0
1,2-Dibromoethane	µg/kg	1	ISO 17025	< 1.0	-	< 1.0	< 1.0	< 1.0
Chlorobenzene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
p & m-Xylene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
Styrene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
Tribromomethane	µg/kg	1	NONE	< 1.0	-	< 1.0	< 1.0	< 1.0
o-Xylene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
Isopropylbenzene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
Bromobenzene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
n-Propylbenzene	µg/kg	1	ISO 17025	< 1.0	-	< 1.0	< 1.0	< 1.0
2-Chlorotoluene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
4-Chlorotoluene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	µg/kg	1	ISO 17025	< 1.0	-	< 1.0	< 1.0	< 1.0
tert-Butylbenzene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	µg/kg	1	ISO 17025	< 1.0	-	< 1.0	< 1.0	< 1.0
sec-Butylbenzene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	µg/kg	1	ISO 17025	< 1.0	-	< 1.0	< 1.0	< 1.0
p-Isopropyltoluene	µg/kg	1	ISO 17025	< 1.0	-	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
Butylbenzene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-chloropropane	µg/kg	1	ISO 17025	< 1.0	-	< 1.0	< 1.0	< 1.0
1,2,4-Trichlorobenzene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	µg/kg	1	ISO 17025	< 1.0	-	< 1.0	< 1.0	< 1.0



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372520	1372521	1372522	1372523	1372524
Sample Reference				TP117	TT105 A	TT102 B	TT103 A	TT102 A
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				2.90	2.00	1.70	1.50	1.10
Date Sampled				21/11/2019	21/11/2019	21/11/2019	21/11/2019	21/11/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
SVOCs								
Aniline	mg/kg	0.1	NONE	-	< 0.1	-	< 0.1	< 0.1
Phenol	mg/kg	0.2	ISO 17025	-	< 0.2	-	< 0.2	< 0.2
2-Chlorophenol	mg/kg	0.1	MCERTS	-	< 0.1	-	< 0.1	< 0.1
Bis(2-chloroethyl)ether	mg/kg	0.2	MCERTS	-	< 0.2	-	< 0.2	< 0.2
1,3-Dichlorobenzene	mg/kg	0.2	MCERTS	-	< 0.2	-	< 0.2	< 0.2
1,2-Dichlorobenzene	mg/kg	0.1	MCERTS	-	< 0.1	-	< 0.1	< 0.1
1,4-Dichlorobenzene	mg/kg	0.2	MCERTS	-	< 0.2	-	< 0.2	< 0.2
Bis(2-chloroisopropyl)ether	mg/kg	0.1	MCERTS	-	< 0.1	-	< 0.1	< 0.1
2-Methylphenol	mg/kg	0.3	MCERTS	-	< 0.3	-	< 0.3	< 0.3
Hexachloroethane	mg/kg	0.05	MCERTS	-	< 0.05	-	< 0.05	< 0.05
Nitrobenzene	mg/kg	0.3	MCERTS	-	< 0.3	-	< 0.3	< 0.3
4-Methylphenol	mg/kg	0.2	NONE	-	< 0.2	-	< 0.2	< 0.2
Isophorone	mg/kg	0.2	MCERTS	-	< 0.2	-	< 0.2	< 0.2
2-Nitrophenol	mg/kg	0.3	MCERTS	-	< 0.3	-	< 0.3	< 0.3
2,4-Dimethylphenol	mg/kg	0.3	MCERTS	-	< 0.3	-	< 0.3	< 0.3
Bis(2-chloroethoxy)methane	mg/kg	0.3	MCERTS	-	< 0.3	-	< 0.3	< 0.3
1,2,4-Trichlorobenzene	mg/kg	0.3	MCERTS	-	< 0.3	-	< 0.3	< 0.3
Naphthalene	mg/kg	0.05	MCERTS	-	< 0.05	-	2.1	0.54
2,4-Dichlorophenol	mg/kg	0.3	MCERTS	-	< 0.3	-	< 0.3	< 0.3
4-Chloroaniline	mg/kg	0.1	NONE	-	< 0.1	-	< 0.1	< 0.1
Hexachlorobutadiene	mg/kg	0.1	MCERTS	-	< 0.1	-	< 0.1	< 0.1
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	-	< 0.1	-	< 0.1	< 0.1
2,4,6-Trichlorophenol	mg/kg	0.1	MCERTS	-	< 0.1	-	< 0.1	< 0.1
2,4,5-Trichlorophenol	mg/kg	0.2	MCERTS	-	< 0.2	-	< 0.2	< 0.2
2-Methylnaphthalene	mg/kg	0.1	NONE	-	1.0	-	2.4	0.9
2-Chloronaphthalene	mg/kg	0.1	MCERTS	-	< 0.1	-	< 0.1	< 0.1
Dimethylphthalate	mg/kg	0.1	MCERTS	-	< 0.1	-	< 0.1	< 0.1
2,6-Dinitrotoluene	mg/kg	0.1	MCERTS	-	< 0.1	-	< 0.1	< 0.1
Acenaphthylene	mg/kg	0.05	MCERTS	-	2.3	-	1.1	0.39
Acenaphthene	mg/kg	0.05	MCERTS	-	12	-	8.2	1.1
2,4-Dinitrotoluene	mg/kg	0.2	MCERTS	-	< 0.2	-	< 0.2	< 0.2
Dibenzofuran	mg/kg	0.2	MCERTS	-	2.7	-	2.6	0.6
4-Chlorophenyl phenyl ether	mg/kg	0.3	ISO 17025	-	< 0.3	-	< 0.3	< 0.3
Diethyl phthalate	mg/kg	0.2	MCERTS	-	< 0.2	-	< 0.2	< 0.2
4-Nitroaniline	mg/kg	0.2	MCERTS	-	< 0.2	-	< 0.2	< 0.2
Fluorene	mg/kg	0.05	MCERTS	-	13	-	4.7	1.2
Azobenzene	mg/kg	0.3	MCERTS	-	< 0.3	-	< 0.3	< 0.3
Bromophenyl phenyl ether	mg/kg	0.2	MCERTS	-	< 0.2	-	< 0.2	< 0.2
Hexachlorobenzene	mg/kg	0.3	MCERTS	-	< 0.3	-	< 0.3	< 0.3
Phenanthrene	mg/kg	0.05	MCERTS	-	36	-	26	8.7
Anthracene	mg/kg	0.05	MCERTS	-	17	-	7.3	1.8
Carbazole	mg/kg	0.3	MCERTS	-	< 0.3	-	2.0	< 0.3
Dibutyl phthalate	mg/kg	0.2	MCERTS	-	< 0.2	-	< 0.2	< 0.2
Anthraquinone	mg/kg	0.3	MCERTS	-	< 0.3	-	< 0.3	< 0.3
Fluoranthene	mg/kg	0.05	MCERTS	-	130	-	27	11
Pyrene	mg/kg	0.05	MCERTS	-	130	-	29	12
Butyl benzyl phthalate	mg/kg	0.3	ISO 17025	-	< 0.3	-	< 0.3	< 0.3
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	39	-	21	6.2
Chrysene	mg/kg	0.05	MCERTS	-	39	-	14	5.8
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	30	-	15	5.9
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	14	-	10	3.5
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	27	-	17	6.2
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	11	-	8.1	3.3
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	3.6	-	2.7	1.0
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	14	-	9.3	3.7



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372525	1372526	1372527	1372528	1372529
Sample Reference				TT104 A	WS104	WS105	WS109	WS109
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				2.20	0.70	0.50	1.10	4.20
Date Sampled				21/11/2019	20/11/2019	20/11/2019	21/11/2019	21/11/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	20	18	13	34	24
Total mass of sample received	kg	0.001	NONE	0.40	0.40	0.39	0.40	0.43

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	Chrysotile	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Detected	Not-detected	-	Not-detected	-
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	< 0.001	-	-	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	< 0.001	-	-	-	-

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	-	-	-	-	-
Total Cyanide	mg/kg	1	MCERTS	59	< 1	< 1	< 1	< 1
Total Sulphate as SO ₄	mg/kg	50	MCERTS	-	-	-	-	-
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	-	-	-	-	-
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	-	-	-	-
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-	-	-	-
Sulphide	mg/kg	1	MCERTS	-	-	-	-	-
Total Sulphur	mg/kg	50	MCERTS	-	-	-	-	-
Total Organic Carbon (TOC)	%	0.1	MCERTS	-	-	-	-	-

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	-	-	-	-	-
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	0.40
Acenaphthylene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	0.25
Fluorene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	0.22
Phenanthrene	mg/kg	0.05	MCERTS	-	0.76	-	-	1.0
Anthracene	mg/kg	0.05	MCERTS	-	0.12	-	-	0.15
Fluoranthene	mg/kg	0.05	MCERTS	-	0.87	-	-	0.84
Pyrene	mg/kg	0.05	MCERTS	-	0.94	-	-	0.77
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	0.62	-	-	0.41
Chrysene	mg/kg	0.05	MCERTS	-	0.51	-	-	0.45
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	0.59	-	-	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	0.45	-	-	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	0.58	-	-	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	0.31	-	-	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	0.22	-	-	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	-	5.97	-	-	4.50
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Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372525	1372526	1372527	1372528	1372529
Sample Reference				TT104 A	WS104	WS105	WS109	WS109
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				2.20	0.70	0.50	1.10	4.20
Date Sampled				21/11/2019	20/11/2019	20/11/2019	21/11/2019	21/11/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	32	23	13	40	7.4
Barium (aqua regia extractable)	mg/kg	1	MCERTS	440	200	180	220	100
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.2	1.0	0.76	1.9	1.0
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	3.5	< 0.2	0.3	1.4	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	290	550	190	210	21
Iron (aqua regia extractable)	mg/kg	40	MCERTS	-	-	-	-	-
Fe ²⁺	mg/kg	2	NONE	-	-	-	-	-
Fe ³⁺	mg/kg	2	NONE	-	-	-	-	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	390	590	160	980	22
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.9	< 0.3	< 0.3	0.8	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	49	31	23	55	31
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	3.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	40	47	33	46	27
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	1700	150	190	540	51

Monoaromatics & Oxygenates

Benzene	µg/kg	1	MCERTS	-	-	-	-	-
Toluene	µg/kg	1	MCERTS	-	-	-	-	-
Ethylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
p & m-xylene	µg/kg	1	MCERTS	-	-	-	-	-
o-xylene	µg/kg	1	MCERTS	-	-	-	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	-	-	-

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	-	-

TPH (C5 - C6)	mg/kg	1	NONE	< 1.0	< 1.0	-	< 1.0	< 1.0
TPH (C6 - C8)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	-	< 0.1	< 0.1
TPH (C8 - C10)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	-	< 0.1	< 0.1
TPH (C10 - C12)	mg/kg	2	MCERTS	16	3.2	-	37	9.6
TPH (C12 - C16)	mg/kg	4	MCERTS	130	15	-	720	33
TPH (C16 - C21)	mg/kg	1	MCERTS	610	82	-	1200	54
TPH (C21 - C35)	mg/kg	1	MCERTS	2600	210	-	670	61
TPH (C35 - C40)	mg/kg	10	MCERTS	940	62	-	68	< 10
TPH Total C5 - C40	mg/kg	10	MCERTS	4300	380	-	2700	170



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372525	1372526	1372527	1372528	1372529
Sample Reference				TT104 A	WS104	WS105	WS109	WS109
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				2.20	0.70	0.50	1.10	4.20
Date Sampled				21/11/2019	20/11/2019	20/11/2019	21/11/2019	21/11/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)				Units	Limit of detection	Accreditation Status		

VOCs

Chloromethane	µg/kg	1	ISO 17025	< 1.0	-	-	< 1.0	-
Chloroethane	µg/kg	1	NONE	< 1.0	-	-	< 1.0	-
Bromomethane	µg/kg	1	ISO 17025	< 1.0	-	-	< 1.0	-
Vinyl Chloride	µg/kg	1	NONE	< 1.0	-	-	< 1.0	-
Trichlorofluoromethane	µg/kg	1	NONE	< 1.0	-	-	< 1.0	-
1,1-Dichloroethene	µg/kg	1	NONE	< 1.0	-	-	< 1.0	-
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	1	ISO 17025	< 1.0	-	-	< 1.0	-
Cis-1,2-dichloroethene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
1,1-Dichloroethane	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
2,2-Dichloropropane	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
Trichloromethane	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
1,1,1-Trichloroethane	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
1,2-Dichloroethane	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
1,1-Dichloropropene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
Trans-1,2-dichloroethene	µg/kg	1	NONE	< 1.0	-	-	< 1.0	-
Benzene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
Tetrachloromethane	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
1,2-Dichloropropane	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
Trichloroethene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
Dibromomethane	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
Bromodichloromethane	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
Cis-1,3-dichloropropene	µg/kg	1	ISO 17025	< 1.0	-	-	< 1.0	-
Trans-1,3-dichloropropene	µg/kg	1	ISO 17025	< 1.0	-	-	< 1.0	-
Toluene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
1,1,2-Trichloroethane	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
1,3-Dichloropropane	µg/kg	1	ISO 17025	< 1.0	-	-	< 1.0	-
Dibromochloromethane	µg/kg	1	ISO 17025	< 1.0	-	-	< 1.0	-
Tetrachloroethene	µg/kg	1	NONE	< 1.0	-	-	< 1.0	-
1,2-Dibromoethane	µg/kg	1	ISO 17025	< 1.0	-	-	< 1.0	-
Chlorobenzene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
1,1,1,2-Tetrachloroethane	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
p & m-Xylene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
Styrene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
Tribromomethane	µg/kg	1	NONE	< 1.0	-	-	< 1.0	-
o-Xylene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
1,1,2,2-Tetrachloroethane	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
Isopropylbenzene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
Bromobenzene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
n-Propylbenzene	µg/kg	1	ISO 17025	< 1.0	-	-	< 1.0	-
2-Chlorotoluene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
4-Chlorotoluene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
1,3,5-Trimethylbenzene	µg/kg	1	ISO 17025	< 1.0	-	-	< 1.0	-
tert-Butylbenzene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
1,2,4-Trimethylbenzene	µg/kg	1	ISO 17025	< 1.0	-	-	< 1.0	-
sec-Butylbenzene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
1,3-Dichlorobenzene	µg/kg	1	ISO 17025	< 1.0	-	-	< 1.0	-
p-Isopropyltoluene	µg/kg	1	ISO 17025	< 1.0	-	-	< 1.0	-
1,2-Dichlorobenzene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
1,4-Dichlorobenzene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
Butylbenzene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
1,2-Dibromo-3-chloropropane	µg/kg	1	ISO 17025	< 1.0	-	-	< 1.0	-
1,2,4-Trichlorobenzene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
Hexachlorobutadiene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
1,2,3-Trichlorobenzene	µg/kg	1	ISO 17025	< 1.0	-	-	< 1.0	-



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372525	1372526	1372527	1372528	1372529
Sample Reference				TT104 A	WS104	WS105	WS109	WS109
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				2.20	0.70	0.50	1.10	4.20
Date Sampled				21/11/2019	20/11/2019	20/11/2019	21/11/2019	21/11/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
SVOCs								
Aniline	mg/kg	0.1	NONE	< 0.1	-	-	< 0.1	-
Phenol	mg/kg	0.2	ISO 17025	< 0.2	-	-	< 0.2	-
2-Chlorophenol	mg/kg	0.1	MCERTS	< 0.1	-	-	< 0.1	-
Bis(2-chloroethyl)ether	mg/kg	0.2	MCERTS	< 0.2	-	-	< 0.2	-
1,3-Dichlorobenzene	mg/kg	0.2	MCERTS	< 0.2	-	-	< 0.2	-
1,2-Dichlorobenzene	mg/kg	0.1	MCERTS	< 0.1	-	-	< 0.1	-
1,4-Dichlorobenzene	mg/kg	0.2	MCERTS	< 0.2	-	-	< 0.2	-
Bis(2-chloroisopropyl)ether	mg/kg	0.1	MCERTS	< 0.1	-	-	< 0.1	-
2-Methylphenol	mg/kg	0.3	MCERTS	< 0.3	-	-	< 0.3	-
Hexachloroethane	mg/kg	0.05	MCERTS	< 0.05	-	-	< 0.05	-
Nitrobenzene	mg/kg	0.3	MCERTS	< 0.3	-	-	< 0.3	-
4-Methylphenol	mg/kg	0.2	NONE	< 0.2	-	-	< 0.2	-
Isophorone	mg/kg	0.2	MCERTS	< 0.2	-	-	< 0.2	-
2-Nitrophenol	mg/kg	0.3	MCERTS	< 0.3	-	-	< 0.3	-
2,4-Dimethylphenol	mg/kg	0.3	MCERTS	< 0.3	-	-	< 0.3	-
Bis(2-chloroethoxy)methane	mg/kg	0.3	MCERTS	< 0.3	-	-	< 0.3	-
1,2,4-Trichlorobenzene	mg/kg	0.3	MCERTS	< 0.3	-	-	< 0.3	-
Naphthalene	mg/kg	0.05	MCERTS	11	-	-	0.59	-
2,4-Dichlorophenol	mg/kg	0.3	MCERTS	< 0.3	-	-	< 0.3	-
4-Chloroaniline	mg/kg	0.1	NONE	< 0.1	-	-	< 0.1	-
Hexachlorobutadiene	mg/kg	0.1	MCERTS	< 0.1	-	-	< 0.1	-
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	< 0.1	-	-	< 0.1	-
2,4,6-Trichlorophenol	mg/kg	0.1	MCERTS	< 0.1	-	-	< 0.1	-
2,4,5-Trichlorophenol	mg/kg	0.2	MCERTS	< 0.2	-	-	< 0.2	-
2-Methylnaphthalene	mg/kg	0.1	NONE	7.1	-	-	< 0.1	-
2-Chloronaphthalene	mg/kg	0.1	MCERTS	< 0.1	-	-	< 0.1	-
Dimethylphthalate	mg/kg	0.1	MCERTS	< 0.1	-	-	< 0.1	-
2,6-Dinitrotoluene	mg/kg	0.1	MCERTS	< 0.1	-	-	< 0.1	-
Acenaphthylene	mg/kg	0.05	MCERTS	3.2	-	-	1.3	-
Acenaphthene	mg/kg	0.05	MCERTS	11	-	-	1.3	-
2,4-Dinitrotoluene	mg/kg	0.2	MCERTS	< 0.2	-	-	< 0.2	-
Dibenzofuran	mg/kg	0.2	MCERTS	6.0	-	-	< 0.2	-
4-Chlorophenyl phenyl ether	mg/kg	0.3	ISO 17025	< 0.3	-	-	< 0.3	-
Diethyl phthalate	mg/kg	0.2	MCERTS	< 0.2	-	-	< 0.2	-
4-Nitroaniline	mg/kg	0.2	MCERTS	< 0.2	-	-	< 0.2	-
Fluorene	mg/kg	0.05	MCERTS	15	-	-	2.6	-
Azobenzene	mg/kg	0.3	MCERTS	< 0.3	-	-	< 0.3	-
Bromophenyl phenyl ether	mg/kg	0.2	MCERTS	< 0.2	-	-	< 0.2	-
Hexachlorobenzene	mg/kg	0.3	MCERTS	< 0.3	-	-	< 0.3	-
Phenanthrene	mg/kg	0.05	MCERTS	74	-	-	12	-
Anthracene	mg/kg	0.05	MCERTS	18	-	-	3.0	-
Carbazole	mg/kg	0.3	MCERTS	3.1	-	-	< 0.3	-
Dibutyl phthalate	mg/kg	0.2	MCERTS	< 0.2	-	-	< 0.2	-
Anthraquinone	mg/kg	0.3	MCERTS	4.7	-	-	< 0.3	-
Fluoranthene	mg/kg	0.05	MCERTS	79	-	-	23	-
Pyrene	mg/kg	0.05	MCERTS	75	-	-	24	-
Butyl benzyl phthalate	mg/kg	0.3	ISO 17025	< 0.3	-	-	< 0.3	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	35	-	-	16	-
Chrysene	mg/kg	0.05	MCERTS	33	-	-	13	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	37	-	-	13	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	14	-	-	9.0	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	31	-	-	16	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	13	-	-	5.8	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	4.3	-	-	2.2	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	16	-	-	6.6	-



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372530	1372531	1372532	1372533	1372534
Sample Reference				WS106	WS110	WS111	WS111	WS112
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.90	0.90	0.80	1.90	1.20
Date Sampled				21/11/2019	21/11/2019	21/11/2019	21/11/2019	21/11/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	21	20	20	20	14
Total mass of sample received	kg	0.001	NONE	0.40	0.40	0.40	0.30	0.40

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-	Chrysotile
Asbestos in Soil	Type	N/A	ISO 17025	-	-	Not-detected	-	Detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	-	-	< 0.001
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	-	-	< 0.001

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	-	-	-	-	-
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	-	< 1	< 1
Total Sulphate as SO ₄	mg/kg	50	MCERTS	-	-	-	-	-
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	-	-	-	-	-
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	-	-	-	-
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-	-	-	-
Sulphide	mg/kg	1	MCERTS	-	-	-	-	-
Total Sulphur	mg/kg	50	MCERTS	-	-	-	-	-
Total Organic Carbon (TOC)	%	0.1	MCERTS	-	-	-	-	-

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	-	-	-	-	-
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.23	< 0.05	0.21
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	0.19
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	0.24
Phenanthrene	mg/kg	0.05	MCERTS	0.54	< 0.05	2.0	< 0.05	1.4
Anthracene	mg/kg	0.05	MCERTS	0.10	< 0.05	0.39	< 0.05	0.26
Fluoranthene	mg/kg	0.05	MCERTS	0.39	< 0.05	2.5	< 0.05	1.6
Pyrene	mg/kg	0.05	MCERTS	0.38	< 0.05	2.6	< 0.05	1.7
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	1.5	< 0.05	1.1
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	1.1	< 0.05	0.98
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	1.2	< 0.05	1.0
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.79	< 0.05	0.65
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	1.3	< 0.05	1.3
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.61	< 0.05	0.69
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.21	< 0.05	0.26
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.58	< 0.05	0.81

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	1.41	< 0.80	15.0	< 0.80	12.4
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Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372530	1372531	1372532	1372533	1372534
Sample Reference				WS106	WS110	WS111	WS111	WS112
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.90	0.90	0.80	1.90	1.20
Date Sampled				21/11/2019	21/11/2019	21/11/2019	21/11/2019	21/11/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	6.6	8.3	-	10	17
Barium (aqua regia extractable)	mg/kg	1	MCERTS	130	110	-	100	180
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.2	1.4	-	0.98	1.3
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	-	< 0.2	0.5
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	-	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	22	19	-	19	120
Iron (aqua regia extractable)	mg/kg	40	MCERTS	-	-	-	-	-
Fe ²⁺	mg/kg	2	NONE	-	-	-	-	-
Fe ³⁺	mg/kg	2	NONE	-	-	-	-	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	34	20	-	76	96
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	-	< 0.3	0.5
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	32	32	-	25	36
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	-	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	32	38	-	32	39
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	55	63	-	44	130

Monoaromatics & Oxygenates

Benzene	µg/kg	1	MCERTS	-	-	-	-	-
Toluene	µg/kg	1	MCERTS	-	-	-	-	-
Ethylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
p & m-xylene	µg/kg	1	MCERTS	-	-	-	-	-
o-xylene	µg/kg	1	MCERTS	-	-	-	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	-	-	-

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	-	-

TPH (C5 - C6)	mg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH (C6 - C8)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH (C8 - C10)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH (C10 - C12)	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	3.5
TPH (C12 - C16)	mg/kg	4	MCERTS	8.7	7.1	< 4.0	< 4.0	11
TPH (C16 - C21)	mg/kg	1	MCERTS	20	17	7.8	< 1.0	73
TPH (C21 - C35)	mg/kg	1	MCERTS	70	49	16	< 1.0	350
TPH (C35 - C40)	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	47
TPH Total C5 - C40	mg/kg	10	MCERTS	100	77	26	< 10	490



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372530	1372531	1372532	1372533	1372534
Sample Reference				WS106	WS110	WS111	WS111	WS112
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.90	0.90	0.80	1.90	1.20
Date Sampled				21/11/2019	21/11/2019	21/11/2019	21/11/2019	21/11/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)				Units	Limit of detection	Accreditation Status		

VOCs

Chloromethane	µg/kg	1	ISO 17025	-	-	-	-	-
Chloroethane	µg/kg	1	NONE	-	-	-	-	-
Bromomethane	µg/kg	1	ISO 17025	-	-	-	-	-
Vinyl Chloride	µg/kg	1	NONE	-	-	-	-	-
Trichlorofluoromethane	µg/kg	1	NONE	-	-	-	-	-
1,1-Dichloroethene	µg/kg	1	NONE	-	-	-	-	-
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	1	ISO 17025	-	-	-	-	-
Cis-1,2-dichloroethene	µg/kg	1	MCERTS	-	-	-	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	-	-	-
1,1-Dichloroethane	µg/kg	1	MCERTS	-	-	-	-	-
2,2-Dichloropropane	µg/kg	1	MCERTS	-	-	-	-	-
Trichloromethane	µg/kg	1	MCERTS	-	-	-	-	-
1,1,1-Trichloroethane	µg/kg	1	MCERTS	-	-	-	-	-
1,2-Dichloroethane	µg/kg	1	MCERTS	-	-	-	-	-
1,1-Dichloropropene	µg/kg	1	MCERTS	-	-	-	-	-
Trans-1,2-dichloroethene	µg/kg	1	NONE	-	-	-	-	-
Benzene	µg/kg	1	MCERTS	-	-	-	-	-
Tetrachloromethane	µg/kg	1	MCERTS	-	-	-	-	-
1,2-Dichloropropane	µg/kg	1	MCERTS	-	-	-	-	-
Trichloroethene	µg/kg	1	MCERTS	-	-	-	-	-
Dibromomethane	µg/kg	1	MCERTS	-	-	-	-	-
Bromodichloromethane	µg/kg	1	MCERTS	-	-	-	-	-
Cis-1,3-dichloropropene	µg/kg	1	ISO 17025	-	-	-	-	-
Trans-1,3-dichloropropene	µg/kg	1	ISO 17025	-	-	-	-	-
Toluene	µg/kg	1	MCERTS	-	-	-	-	-
1,1,2-Trichloroethane	µg/kg	1	MCERTS	-	-	-	-	-
1,3-Dichloropropane	µg/kg	1	ISO 17025	-	-	-	-	-
Dibromochloromethane	µg/kg	1	ISO 17025	-	-	-	-	-
Tetrachloroethene	µg/kg	1	NONE	-	-	-	-	-
1,2-Dibromoethane	µg/kg	1	ISO 17025	-	-	-	-	-
Chlorobenzene	µg/kg	1	MCERTS	-	-	-	-	-
1,1,1,2-Tetrachloroethane	µg/kg	1	MCERTS	-	-	-	-	-
Ethylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
p & m-Xylene	µg/kg	1	MCERTS	-	-	-	-	-
Styrene	µg/kg	1	MCERTS	-	-	-	-	-
Tribromomethane	µg/kg	1	NONE	-	-	-	-	-
o-Xylene	µg/kg	1	MCERTS	-	-	-	-	-
1,1,2,2-Tetrachloroethane	µg/kg	1	MCERTS	-	-	-	-	-
Isopropylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
Bromobenzene	µg/kg	1	MCERTS	-	-	-	-	-
n-Propylbenzene	µg/kg	1	ISO 17025	-	-	-	-	-
2-Chlorotoluene	µg/kg	1	MCERTS	-	-	-	-	-
4-Chlorotoluene	µg/kg	1	MCERTS	-	-	-	-	-
1,3,5-Trimethylbenzene	µg/kg	1	ISO 17025	-	-	-	-	-
tert-Butylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
1,2,4-Trimethylbenzene	µg/kg	1	ISO 17025	-	-	-	-	-
sec-Butylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
1,3-Dichlorobenzene	µg/kg	1	ISO 17025	-	-	-	-	-
p-Isopropyltoluene	µg/kg	1	ISO 17025	-	-	-	-	-
1,2-Dichlorobenzene	µg/kg	1	MCERTS	-	-	-	-	-
1,4-Dichlorobenzene	µg/kg	1	MCERTS	-	-	-	-	-
Butylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
1,2-Dibromo-3-chloropropane	µg/kg	1	ISO 17025	-	-	-	-	-
1,2,4-Trichlorobenzene	µg/kg	1	MCERTS	-	-	-	-	-
Hexachlorobutadiene	µg/kg	1	MCERTS	-	-	-	-	-
1,2,3-Trichlorobenzene	µg/kg	1	ISO 17025	-	-	-	-	-



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372530	1372531	1372532	1372533	1372534
Sample Reference				WS106	WS110	WS111	WS111	WS112
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.90	0.90	0.80	1.90	1.20
Date Sampled				21/11/2019	21/11/2019	21/11/2019	21/11/2019	21/11/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
SVOCs								
Aniline	mg/kg	0.1	NONE	-	-	-	-	-
Phenol	mg/kg	0.2	ISO 17025	-	-	-	-	-
2-Chlorophenol	mg/kg	0.1	MCERTS	-	-	-	-	-
Bis(2-chloroethyl)ether	mg/kg	0.2	MCERTS	-	-	-	-	-
1,3-Dichlorobenzene	mg/kg	0.2	MCERTS	-	-	-	-	-
1,2-Dichlorobenzene	mg/kg	0.1	MCERTS	-	-	-	-	-
1,4-Dichlorobenzene	mg/kg	0.2	MCERTS	-	-	-	-	-
Bis(2-chloroisopropyl)ether	mg/kg	0.1	MCERTS	-	-	-	-	-
2-Methylphenol	mg/kg	0.3	MCERTS	-	-	-	-	-
Hexachloroethane	mg/kg	0.05	MCERTS	-	-	-	-	-
Nitrobenzene	mg/kg	0.3	MCERTS	-	-	-	-	-
4-Methylphenol	mg/kg	0.2	NONE	-	-	-	-	-
Isophorone	mg/kg	0.2	MCERTS	-	-	-	-	-
2-Nitrophenol	mg/kg	0.3	MCERTS	-	-	-	-	-
2,4-Dimethylphenol	mg/kg	0.3	MCERTS	-	-	-	-	-
Bis(2-chloroethoxy)methane	mg/kg	0.3	MCERTS	-	-	-	-	-
1,2,4-Trichlorobenzene	mg/kg	0.3	MCERTS	-	-	-	-	-
Naphthalene	mg/kg	0.05	MCERTS	-	-	-	-	-
2,4-Dichlorophenol	mg/kg	0.3	MCERTS	-	-	-	-	-
4-Chloroaniline	mg/kg	0.1	NONE	-	-	-	-	-
Hexachlorobutadiene	mg/kg	0.1	MCERTS	-	-	-	-	-
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	-	-	-	-	-
2,4,6-Trichlorophenol	mg/kg	0.1	MCERTS	-	-	-	-	-
2,4,5-Trichlorophenol	mg/kg	0.2	MCERTS	-	-	-	-	-
2-Methylnaphthalene	mg/kg	0.1	NONE	-	-	-	-	-
2-Chloronaphthalene	mg/kg	0.1	MCERTS	-	-	-	-	-
Dimethylphthalate	mg/kg	0.1	MCERTS	-	-	-	-	-
2,6-Dinitrotoluene	mg/kg	0.1	MCERTS	-	-	-	-	-
Acenaphthylene	mg/kg	0.05	MCERTS	-	-	-	-	-
Acenaphthene	mg/kg	0.05	MCERTS	-	-	-	-	-
2,4-Dinitrotoluene	mg/kg	0.2	MCERTS	-	-	-	-	-
Dibenzofuran	mg/kg	0.2	MCERTS	-	-	-	-	-
4-Chlorophenyl phenyl ether	mg/kg	0.3	ISO 17025	-	-	-	-	-
Diethyl phthalate	mg/kg	0.2	MCERTS	-	-	-	-	-
4-Nitroaniline	mg/kg	0.2	MCERTS	-	-	-	-	-
Fluorene	mg/kg	0.05	MCERTS	-	-	-	-	-
Azobenzene	mg/kg	0.3	MCERTS	-	-	-	-	-
Bromophenyl phenyl ether	mg/kg	0.2	MCERTS	-	-	-	-	-
Hexachlorobenzene	mg/kg	0.3	MCERTS	-	-	-	-	-
Phenanthrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Anthracene	mg/kg	0.05	MCERTS	-	-	-	-	-
Carbazole	mg/kg	0.3	MCERTS	-	-	-	-	-
Dibutyl phthalate	mg/kg	0.2	MCERTS	-	-	-	-	-
Anthraquinone	mg/kg	0.3	MCERTS	-	-	-	-	-
Fluoranthene	mg/kg	0.05	MCERTS	-	-	-	-	-
Pyrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Butyl benzyl phthalate	mg/kg	0.3	ISO 17025	-	-	-	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	-	-	-	-
Chrysene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	-	-	-	-



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372535	1372539			
Sample Reference				WS112	WS107			
Sample Number				None Supplied	None Supplied			
Depth (m)				2.80	1.80			
Date Sampled				21/11/2019	20/11/2019			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)								
	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1			
Moisture Content	%	N/A	NONE	15	44			
Total mass of sample received	kg	0.001	NONE	0.30	0.36			

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-			
Asbestos in Soil	Type	N/A	ISO 17025	-	Not-detected			
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-			
Asbestos Quantification Total	%	0.001	ISO 17025	-	-			

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	-	-			
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1			
Total Sulphate as SO ₄	mg/kg	50	MCERTS	-	-			
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	-	-			
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	-			
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-			
Sulphide	mg/kg	1	MCERTS	-	-			
Total Sulphur	mg/kg	50	MCERTS	-	-			
Total Organic Carbon (TOC)	%	0.1	MCERTS	0.8	-			

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	-	-			
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	2.8			
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	2.3			
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	36			
Fluorene	mg/kg	0.05	MCERTS	< 0.05	28			
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	130			
Anthracene	mg/kg	0.05	MCERTS	< 0.05	32			
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	160			
Pyrene	mg/kg	0.05	MCERTS	< 0.05	170			
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	74			
Chrysene	mg/kg	0.05	MCERTS	< 0.05	55			
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	63			
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	18			
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	55			
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	20			
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	7.0			
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	24			

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	870			
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Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372535	1372539			
Sample Reference				WS112	WS107			
Sample Number				None Supplied	None Supplied			
Depth (m)				2.80	1.80			
Date Sampled				21/11/2019	20/11/2019			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	6.8	45			
Barium (aqua regia extractable)	mg/kg	1	MCERTS	130	160			
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.97	1.2			
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	4.5			
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0			
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	-			
Copper (aqua regia extractable)	mg/kg	1	MCERTS	22	210			
Iron (aqua regia extractable)	mg/kg	40	MCERTS	-	-			
Fe ²⁺	mg/kg	2	NONE	-	-			
Fe ³⁺	mg/kg	2	NONE	-	-			
Lead (aqua regia extractable)	mg/kg	1	MCERTS	11	290			
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	1.0			
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	47	48			
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0			
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	28	31			
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	55	1900			

Monoaromatics & Oxygenates

Benzene	µg/kg	1	MCERTS	-	-			
Toluene	µg/kg	1	MCERTS	-	-			
Ethylbenzene	µg/kg	1	MCERTS	-	-			
p & m-xylene	µg/kg	1	MCERTS	-	-			
o-xylene	µg/kg	1	MCERTS	-	-			
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-			

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	-	-			
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	-	-			
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-			
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	-	-			
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	-	-			
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	-	-			
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	-	-			
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-			
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	-	-			
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	-	-			
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-			
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	-	-			
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	-	-			
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	-			
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	-			
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-			

TPH (C5 - C6)	mg/kg	1	NONE	< 1.0	< 1.0			
TPH (C6 - C8)	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH (C8 - C10)	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH (C10 - C12)	mg/kg	2	MCERTS	7.1	30			
TPH (C12 - C16)	mg/kg	4	MCERTS	14	290			
TPH (C16 - C21)	mg/kg	1	MCERTS	22	1400			
TPH (C21 - C35)	mg/kg	1	MCERTS	160	6800			
TPH (C35 - C40)	mg/kg	10	MCERTS	29	1200			
TPH Total C5 - C40	mg/kg	10	MCERTS	240	9800			



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372535	1372539			
Sample Reference				WS112	WS107			
Sample Number				None Supplied	None Supplied			
Depth (m)				2.80	1.80			
Date Sampled				21/11/2019	20/11/2019			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)				Units	Limit of detection	Accreditation Status		

VOCs

Chloromethane	µg/kg	1	ISO 17025	-	-			
Chloroethane	µg/kg	1	NONE	-	-			
Bromomethane	µg/kg	1	ISO 17025	-	-			
Vinyl Chloride	µg/kg	1	NONE	-	-			
Trichlorofluoromethane	µg/kg	1	NONE	-	-			
1,1-Dichloroethene	µg/kg	1	NONE	-	-			
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	1	ISO 17025	-	-			
Cis-1,2-dichloroethene	µg/kg	1	MCERTS	-	-			
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-			
1,1-Dichloroethane	µg/kg	1	MCERTS	-	-			
2,2-Dichloropropane	µg/kg	1	MCERTS	-	-			
Trichloromethane	µg/kg	1	MCERTS	-	-			
1,1,1-Trichloroethane	µg/kg	1	MCERTS	-	-			
1,2-Dichloroethane	µg/kg	1	MCERTS	-	-			
1,1-Dichloropropene	µg/kg	1	MCERTS	-	-			
Trans-1,2-dichloroethene	µg/kg	1	NONE	-	-			
Benzene	µg/kg	1	MCERTS	-	-			
Tetrachloromethane	µg/kg	1	MCERTS	-	-			
1,2-Dichloropropane	µg/kg	1	MCERTS	-	-			
Trichloroethene	µg/kg	1	MCERTS	-	-			
Dibromomethane	µg/kg	1	MCERTS	-	-			
Bromodichloromethane	µg/kg	1	MCERTS	-	-			
Cis-1,3-dichloropropene	µg/kg	1	ISO 17025	-	-			
Trans-1,3-dichloropropene	µg/kg	1	ISO 17025	-	-			
Toluene	µg/kg	1	MCERTS	-	-			
1,1,2-Trichloroethane	µg/kg	1	MCERTS	-	-			
1,3-Dichloropropane	µg/kg	1	ISO 17025	-	-			
Dibromochloromethane	µg/kg	1	ISO 17025	-	-			
Tetrachloroethene	µg/kg	1	NONE	-	-			
1,2-Dibromoethane	µg/kg	1	ISO 17025	-	-			
Chlorobenzene	µg/kg	1	MCERTS	-	-			
1,1,1,2-Tetrachloroethane	µg/kg	1	MCERTS	-	-			
Ethylbenzene	µg/kg	1	MCERTS	-	-			
p & m-Xylene	µg/kg	1	MCERTS	-	-			
Styrene	µg/kg	1	MCERTS	-	-			
Tribromomethane	µg/kg	1	NONE	-	-			
o-Xylene	µg/kg	1	MCERTS	-	-			
1,1,2,2-Tetrachloroethane	µg/kg	1	MCERTS	-	-			
Isopropylbenzene	µg/kg	1	MCERTS	-	-			
Bromobenzene	µg/kg	1	MCERTS	-	-			
n-Propylbenzene	µg/kg	1	ISO 17025	-	-			
2-Chlorotoluene	µg/kg	1	MCERTS	-	-			
4-Chlorotoluene	µg/kg	1	MCERTS	-	-			
1,3,5-Trimethylbenzene	µg/kg	1	ISO 17025	-	-			
tert-Butylbenzene	µg/kg	1	MCERTS	-	-			
1,2,4-Trimethylbenzene	µg/kg	1	ISO 17025	-	-			
sec-Butylbenzene	µg/kg	1	MCERTS	-	-			
1,3-Dichlorobenzene	µg/kg	1	ISO 17025	-	-			
p-Isopropyltoluene	µg/kg	1	ISO 17025	-	-			
1,2-Dichlorobenzene	µg/kg	1	MCERTS	-	-			
1,4-Dichlorobenzene	µg/kg	1	MCERTS	-	-			
Butylbenzene	µg/kg	1	MCERTS	-	-			
1,2-Dibromo-3-chloropropane	µg/kg	1	ISO 17025	-	-			
1,2,4-Trichlorobenzene	µg/kg	1	MCERTS	-	-			
Hexachlorobutadiene	µg/kg	1	MCERTS	-	-			
1,2,3-Trichlorobenzene	µg/kg	1	ISO 17025	-	-			



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372535	1372539			
Sample Reference				WS112	WS107			
Sample Number				None Supplied	None Supplied			
Depth (m)				2.80	1.80			
Date Sampled				21/11/2019	20/11/2019			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
SVOCs								
Aniline	mg/kg	0.1	NONE	-	-			
Phenol	mg/kg	0.2	ISO 17025	-	-			
2-Chlorophenol	mg/kg	0.1	MCERTS	-	-			
Bis(2-chloroethyl)ether	mg/kg	0.2	MCERTS	-	-			
1,3-Dichlorobenzene	mg/kg	0.2	MCERTS	-	-			
1,2-Dichlorobenzene	mg/kg	0.1	MCERTS	-	-			
1,4-Dichlorobenzene	mg/kg	0.2	MCERTS	-	-			
Bis(2-chloroisopropyl)ether	mg/kg	0.1	MCERTS	-	-			
2-Methylphenol	mg/kg	0.3	MCERTS	-	-			
Hexachloroethane	mg/kg	0.05	MCERTS	-	-			
Nitrobenzene	mg/kg	0.3	MCERTS	-	-			
4-Methylphenol	mg/kg	0.2	NONE	-	-			
Isophorone	mg/kg	0.2	MCERTS	-	-			
2-Nitrophenol	mg/kg	0.3	MCERTS	-	-			
2,4-Dimethylphenol	mg/kg	0.3	MCERTS	-	-			
Bis(2-chloroethoxy)methane	mg/kg	0.3	MCERTS	-	-			
1,2,4-Trichlorobenzene	mg/kg	0.3	MCERTS	-	-			
Naphthalene	mg/kg	0.05	MCERTS	-	-			
2,4-Dichlorophenol	mg/kg	0.3	MCERTS	-	-			
4-Chloroaniline	mg/kg	0.1	NONE	-	-			
Hexachlorobutadiene	mg/kg	0.1	MCERTS	-	-			
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	-	-			
2,4,6-Trichlorophenol	mg/kg	0.1	MCERTS	-	-			
2,4,5-Trichlorophenol	mg/kg	0.2	MCERTS	-	-			
2-Methylnaphthalene	mg/kg	0.1	NONE	-	-			
2-Chloronaphthalene	mg/kg	0.1	MCERTS	-	-			
Dimethylphthalate	mg/kg	0.1	MCERTS	-	-			
2,6-Dinitrotoluene	mg/kg	0.1	MCERTS	-	-			
Acenaphthylene	mg/kg	0.05	MCERTS	-	-			
Acenaphthene	mg/kg	0.05	MCERTS	-	-			
2,4-Dinitrotoluene	mg/kg	0.2	MCERTS	-	-			
Dibenzofuran	mg/kg	0.2	MCERTS	-	-			
4-Chlorophenyl phenyl ether	mg/kg	0.3	ISO 17025	-	-			
Diethyl phthalate	mg/kg	0.2	MCERTS	-	-			
4-Nitroaniline	mg/kg	0.2	MCERTS	-	-			
Fluorene	mg/kg	0.05	MCERTS	-	-			
Azobenzene	mg/kg	0.3	MCERTS	-	-			
Bromophenyl phenyl ether	mg/kg	0.2	MCERTS	-	-			
Hexachlorobenzene	mg/kg	0.3	MCERTS	-	-			
Phenanthrene	mg/kg	0.05	MCERTS	-	-			
Anthracene	mg/kg	0.05	MCERTS	-	-			
Carbazole	mg/kg	0.3	MCERTS	-	-			
Dibutyl phthalate	mg/kg	0.2	MCERTS	-	-			
Anthraquinone	mg/kg	0.3	MCERTS	-	-			
Fluoranthene	mg/kg	0.05	MCERTS	-	-			
Pyrene	mg/kg	0.05	MCERTS	-	-			
Butyl benzyl phthalate	mg/kg	0.3	ISO 17025	-	-			
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	-			
Chrysene	mg/kg	0.05	MCERTS	-	-			
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	-			
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	-			
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	-			
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	-			
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	-			
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	-			



Analytical Report Number: **19-73873**
Project / Site name: **Manchester Life**
Your Order No:

Certificate of Analysis - Asbestos Quantification

Methods:

Qualitative Analysis

The samples were analysed qualitatively for asbestos by polarising light and dispersion staining as described by the Health and Safety Executive in HSG 248.

Quantitative Analysis

The analysis was carried out using our documented in-house method A006 based on HSE Contract Research Report No: 83/1996: Development and Validation of an analytical method to determine the amount of asbestos in soils and loose aggregates (Davies et al, 1996) and HSG 248. Our method includes initial examination of the entire representative sample, then fractionation and detailed analysis of each fraction, with quantification by hand picking and weighing.

The limit of detection (reporting limit) of this method is 0.001 %.

The method has been validated using samples of at least 100 g, results for samples smaller than this should be interpreted with caution.

Both Qualitative and Quantitative Analyses are UKAS accredited.

Sample Number	Sample ID	Sample Depth (m)	Sample Weight (g)	Asbestos Containing Material Types Detected (ACM)	PLM Results	Asbestos by hand picking/weighing (%)	Total % Asbestos in Sample
1372505	TT101 A	1.20	107	Loose Fibrous Debris	Amosite	0.005	0.005
1372510	TP106	0.50	103	Loose Fibres	Amosite	< 0.001	< 0.001
1372513	TP108	2.10	134	Loose Fibres	Chrysotile	< 0.001	< 0.001
1372515	TP112	0.50	132	Loose Fibrous Debris	Chrysotile	0.008	0.008
1372523	TT103 A	1.50	128	Loose Fibrous Debris	Amosite	0.002	0.002
1372524	TT102 A	1.10	113	Loose Fibres & Loose Fibrous Debris	Amosite	0.100	0.100
1372525	TT104 A	2.20	109	Loose Fibres	Chrysotile	< 0.001	< 0.001
1372534	WS112	1.20	131	Loose Fibres	Chrysotile	< 0.001	< 0.001

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372536	1372537	1372538		
Sample Reference				TP101	TP116	WS103		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				1.00	0.80	0.80		
Date Sampled				20/11/2019	21/11/2019	20/11/2019		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Leachate Analysis)				Units	Limit of detection	Accreditation Status		

General Inorganics

pH	pH Units	N/A	ISO 17025	8.4	8.0	8.1		
Total Cyanide (Low Level 1 µg/l)	µg/l	1	ISO 17025	1.4	4.4	< 1.0		

Total Phenols

Total Phenols (monohydric)	µg/l	1	ISO 17025	3.3	3.1	4.2		
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Speciated PAHs

Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01		
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01		
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01		

Total PAH

Total EPA-16 PAHs	µg/l	0.2	NONE	< 0.2	< 0.2	< 0.2		
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Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	1.1	ISO 17025	8.3	7.5	5.1		
Cadmium (dissolved)	µg/l	0.08	ISO 17025	< 0.08	< 0.08	< 0.08		
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0	< 5.0		
Chromium (dissolved)	µg/l	0.4	ISO 17025	5.4	2.8	1.9		
Copper (dissolved)	µg/l	0.7	ISO 17025	5.7	9.0	5.6		
Lead (dissolved)	µg/l	1	ISO 17025	40	16	9.6		
Mercury (dissolved)	µg/l	0.5	ISO 17025	< 0.5	< 0.5	< 0.5		
Nickel (dissolved)	µg/l	0.3	ISO 17025	1.6	2.2	0.4		
Selenium (dissolved)	µg/l	4	ISO 17025	< 4.0	< 4.0	< 4.0		
Zinc (dissolved)	µg/l	0.4	ISO 17025	9.7	10	12		



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372536	1372537	1372538		
Sample Reference				TP101	TP116	WS103		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				1.00	0.80	0.80		
Date Sampled				20/11/2019	21/11/2019	20/11/2019		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Leachate Analysis)				Units	Limit of detection	Accreditation Status		

Monoaromatics & Oxygenates

Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
MTBE (Methyl Tertiary Butyl Ether)	µg/l	10	NONE	< 10	< 10	< 10		

Petroleum Hydrocarbons

TPH1 (C10 - C40)	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aliphatic >C5 - C6	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
TPH-CWG - Aliphatic >C6 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
TPH-CWG - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	< 10	< 10	< 10		



Analytical Report Number : 19-73873

Project / Site name: Manchester Life

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1372505	TT101 A	None Supplied	1.20	Brown clay and sand.
1372506	TP101	None Supplied	1.00	Brown loam and clay with gravel and vegetation.
1372507	TP101	None Supplied	2.30	Brown clay and sand.
1372508	TP102	None Supplied	0.80	Brown loam and sand with gravel.
1372509	TP105	None Supplied	1.40	Brown clay with gravel.
1372510	TP106	None Supplied	0.50	Brown loam and clay with gravel.
1372511	TP106	None Supplied	1.70	Brown loam and clay with gravel.
1372512	TP107	None Supplied	0.50	Black loam and sand with gravel.
1372513	TP108	None Supplied	2.10	Brown loam and clay with gravel and brick.
1372514	TP109	None Supplied	1.00	Black loam and sand with gravel and brick.
1372515	TP112	None Supplied	0.50	Brown loam and clay with gravel.
1372516	TP113	None Supplied	0.90	Brown loam and clay with gravel.
1372517	TP115	None Supplied	0.50	Brown loam and clay with gravel.
1372518	TP116	None Supplied	0.80	Brown loam and clay with gravel.
1372519	TP117	None Supplied	1.60	Brown loam and clay with gravel.
1372520	TP117	None Supplied	2.90	Brown loam and clay with gravel.
1372521	TT105 A	None Supplied	2.00	Black loam and clay with gravel.
1372522	TT102 B	None Supplied	1.70	Black loam and clay with gravel.
1372523	TT103 A	None Supplied	1.50	Black loam and clay with gravel.
1372524	TT102 A	None Supplied	1.10	Brown loam and clay with gravel and brick.
1372525	TT104 A	None Supplied	2.20	Brown loam and clay with gravel and brick.
1372526	WS104	None Supplied	0.70	Brown loam and clay with gravel and brick.
1372527	WS105	None Supplied	0.50	Brown clay and sand with gravel.
1372528	WS109	None Supplied	1.10	Brown loam and clay with gravel.
1372529	WS109	None Supplied	4.20	Brown loam and clay with gravel.
1372530	WS106	None Supplied	1.90	Brown loam and clay with gravel.
1372531	WS110	None Supplied	0.90	Brown loam and clay with gravel.
1372532	WS111	None Supplied	0.80	Brown loam and clay with gravel.
1372533	WS111	None Supplied	1.90	Brown clay and sand.
1372534	WS112	None Supplied	1.20	Brown clay and sand with gravel.
1372535	WS112	None Supplied	2.80	Brown clay and sand with gravel.
1372539	WS107	None Supplied	1.80	Grey clay and sand with vegetation.

Analytical Report Number : 19-73873

Project / Site name: Manchester Life

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Asbestos Quantification - Gravimetric	Asbestos quantification by gravimetric method - in house method based on references.	HSE Report No: 83/1996, HSG 248, HSG 264 & SCA Blue Book (draft).	A006-PL	D	ISO 17025
BS EN 12457-1 (2:1) Leachate Prep	2:1 (as recieved, moisture adjusted) end over end extraction with water for 24 hours. Eluate filtered prior to analysis.	In-house method based on BSEN12457-1.	L043-PL	W	NONE
BTEX and MTBE in leachates (Monoaromatics)	Determination of BTEX and MTBE in leachates by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Cations in soil by ICP-OES	Determination of cations in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
D.O. for Gravimetric Quant if Screen/ID positive	Dependent option for Gravimetric Quant if Screen/ID positive scheduled.	In house asbestos methods A001 & A006.	A006-PL	D	NONE
Hexavalent chromium in leachate	Determination of hexavalent chromium in leachate by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	ISO 17025
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Iron (II) and Iron (III) in soils	Determination of Iron II and Iron III in soil by coloration with phenanthroline and calculation	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L079	W	NONE
Metals by ICP-OES in leachate	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In-house method based on BS1377 Part 2, 1990, Classification tests	L019-UK/PL	W	NONE
Monohydric phenols in leachate - LOW LEVEL 1 ug/l	Determination of phenols in leachate by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
pH at 20oC in leachate	Determination of pH in leachate by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	ISO 17025
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS

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The results included within the report are representative of the samples submitted for analysis.

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Analytical Report Number : 19-73873

Project / Site name: Manchester Life

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds in soil by extraction in dichloromethane and hexane followed by GC-MS.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Speciated EPA-16 PAHs in leachate	Determination of PAH compounds in leachate by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L102B-PL	W	NONE
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP-OES.	L038-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total cyanide in leachate - 1µg/l	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	ISO 17025
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests ^{***}	L009-PL	D	MCERTS
Total sulphate (as SO ₄ in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L038-PL	D	MCERTS
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, and MEWAM 2006 Methods for the Determination of Metals in Soil	L038-PL	D	MCERTS
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	MCERTS
TPH1 (Leachates)	Determination of dichloromethane extractable hydrocarbons in leachate by GC-MS.	In-house method	L070-PL	W	NONE
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/cleanup.	L088/76-PL	W	MCERTS
Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30°C.



Sample ID	Other_ID	Sample Type	Job	Sample Number	Sample Deviation Code	test_name	test_ref	Test Deviation code
TP102		S	19-73873	1372508	c	Iron (II) and Iron (III) in soils	L079	c
TT105 A		S	19-73873	1372521	c	Iron (II) and Iron (III) in soils	L079	c



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Analytical Report Number : 20-82292

Replaces Analytical Report Number : 20-82292, issue no. 1

Client references/information amended.

Project / Site name:	Manchester Life	Samples received on:	21/01/2020
Your job number:	13729	Samples instructed on:	21/01/2020
Your order number:		Analysis completed by:	21/02/2020
Report Issue Number:	2	Report issued on:	21/02/2020
Samples Analysed:	3 water samples		

Signed:

James Dent

Technical Reviewer (CS Team)
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :	soils	- 4 weeks from reporting
	leachates	- 2 weeks from reporting
	waters	- 2 weeks from reporting
	asbestos	- 6 months from reporting

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

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement. Application of uncertainty of measurement would provide a range within which the true result lies. An estimate of measurement uncertainty can be provided on request.

Iss No 20-82292-2 Manchester Life 13729.XLS

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The results included within the report are representative of the samples submitted for analysis.

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Analytical Report Number: 20-82292

Project / Site name: Manchester Life

Lab Sample Number				1418184	1418185	1418186		
Sample Reference				SW101	SW102	SW103		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				None Supplied	None Supplied	None Supplied		
Date Sampled				21/01/2020	21/01/2020	21/01/2020		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

General Inorganics

pH	pH Units	N/A	ISO 17025	7.6	7.6	7.7		
Total Cyanide (Low Level 1 µg/l)	µg/l	1	ISO 17025	5.2	5.2	5.1		

Total Phenols

Total Phenols (monohydric)	µg/l	1	ISO 17025	< 1.0	2.3	2.5		
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Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	0.15	ISO 17025	1.20	1.33	1.44		
Cadmium (dissolved)	µg/l	0.02	ISO 17025	0.03	0.05	< 0.02		
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0	< 5.0		
Chromium (dissolved)	µg/l	0.2	ISO 17025	0.5	0.7	0.6		
Copper (dissolved)	µg/l	0.5	ISO 17025	8.7	9.5	6.5		
Lead (dissolved)	µg/l	0.2	ISO 17025	3.5	3.7	2.0		
Mercury (dissolved)	µg/l	0.05	ISO 17025	< 0.05	< 0.05	< 0.05		
Nickel (dissolved)	µg/l	0.5	ISO 17025	3.2	3.2	3.1		
Selenium (dissolved)	µg/l	0.6	ISO 17025	< 0.6	< 0.6	< 0.6		
Zinc (dissolved)	µg/l	0.5	ISO 17025	31	31	27		

Monoaromatics & Oxygenates

Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		



Analytical Report Number: 20-82292

Project / Site name: Manchester Life

Lab Sample Number				1418184	1418185	1418186		
Sample Reference				SW101	SW102	SW103		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				None Supplied	None Supplied	None Supplied		
Date Sampled				21/01/2020	21/01/2020	21/01/2020		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

Petroleum Hydrocarbons

TPH1 (C10 - C40)	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aliphatic >C5 - C6	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
TPH-CWG - Aliphatic >C6 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
TPH-CWG - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	< 10	< 10	< 10		



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Lab Sample Number				1418184	1418185	1418186		
Sample Reference				SW101	SW102	SW103		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				None Supplied	None Supplied	None Supplied		
Date Sampled				21/01/2020	21/01/2020	21/01/2020		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

VOCS

Chloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Chloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Bromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Vinyl Chloride	µg/l	1	NONE	< 1.0	< 1.0	< 1.0		
Trichlorofluoromethane	µg/l	1	NONE	< 1.0	< 1.0	< 1.0		
1,1-Dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,1,2-Trichloro-1,2,2-trifluoroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Cis-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,1-Dichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
2,2-Dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Trichloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,1,1-Trichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,2-Dichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,1-Dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Trans-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Tetrachloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,2-Dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Trichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Dibromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Bromodichloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Cis-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Trans-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,1,2-Trichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,3-Dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Dibromochloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Tetrachloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,2-Dibromoethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Chlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,1,1,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
p & m-Xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Styrene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Tribromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
o-Xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,1,2,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Isopropylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Bromobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
n-Propylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
2-Chlorotoluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
4-Chlorotoluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,3,5-Trimethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
tert-Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,2,4-Trimethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
sec-Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,3-Dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
p-Isopropyltoluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,2-Dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,4-Dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,2-Dibromo-3-chloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,2,4-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Hexachlorobutadiene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,2,3-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		



Analytical Report Number: 20-82292

Project / Site name: Manchester Life

Lab Sample Number				1418184	1418185	1418186		
Sample Reference				SW101	SW102	SW103		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				None Supplied	None Supplied	None Supplied		
Date Sampled				21/01/2020	21/01/2020	21/01/2020		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

SVOCs

Aniline	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05		
Phenol	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05		
2-Chlorophenol	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05		
Bis(2-chloroethyl)ether	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05		
1,3-Dichlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05		
1,2-Dichlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05		
1,4-Dichlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05		
Bis(2-chloroisopropyl)ether	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05		
2-Methylphenol	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05		
Hexachloroethane	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05		
Nitrobenzene	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05		
4-Methylphenol	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05		
Isophorone	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05		
2-Nitrophenol	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05		
2,4-Dimethylphenol	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05		
Bis(2-chloroethoxy)methane	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05		
1,2,4-Trichlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05		
Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
2,4-Dichlorophenol	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05		
4-Chloroaniline	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05		
Hexachlorobutadiene	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05		
4-Chloro-3-methylphenol	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05		
2,4,6-Trichlorophenol	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05		
2,4,5-Trichlorophenol	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05		
2-Methylnaphthalene	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05		
2-Chloronaphthalene	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05		
Dimethylphthalate	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05		
2,6-Dinitrotoluene	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05		
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
2,4-Dinitrotoluene	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05		
Dibenzofuran	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05		
4-Chlorophenyl phenyl ether	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05		
Diethyl phthalate	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05		
4-Nitroaniline	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05		
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Azobenzene	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05		
Bromophenyl phenyl ether	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05		
Hexachlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05		
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Carbazole	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05		
Dibutyl phthalate	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05		
Anthraquinone	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05		
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Butyl benzyl phthalate	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05		
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		

U/S = Unsuitable Sample I/S = Insufficient Sample



Analytical Report Number : 20-82292

Project / Site name: Manchester Life

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
BTEX and MTBE in water (Monoaromatics)	Determination of BTEX and MTBE in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method by continuous flow analyser. Accredited Matrices SW, GW, PW.	L080-PL	W	ISO 17025
Low level total cyanide in water	Determination of total cyanide by distillation followed by colorimetry. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Monohydric phenols in water - LOW LEVEL 1 ug/l	Determination of phenols in water by continuous flow analyser. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
pH at 20oC in water (automated)	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In house method.	L099-PL	W	ISO 17025
Semi-volatile organic compounds in water	Determination of semi-volatile organic compounds in leachate by extraction in dichloromethane followed by GC-MS.	In-house method based on USEPA 8270	L102B-PL	W	NONE
TPH1 (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS.	In-house method	L070-PL	W	NONE
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-PL	W	NONE
Volatile organic compounds in water	Determination of volatile organic compounds in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073B-PL	W	ISO 17025

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

APPENDIX VII

ORIGIN OF TIER I GENERIC ASSESSMENT CRITERIA

Land at Jersey Street, Ancoats

Phase II Geoenvironmental Site Assessment

January 2020

CONSTITUENT	ORIGIN OF RISK ASSESSMENT VALUE
Arsenic	2014 LQM/CIEH S4ULs
Cadmium	2014 LQM/CIEH S4ULs
Chromium	2014 LQM/CIEH S4ULs
Lead	2014 LQM/CIEH S4ULs
Mercury	2014 LQM/CIEH S4ULs – methylmercury
Nickel	2014 LQM/CIEH S4ULs
Selenium	2014 LQM/CIEH S4ULs
Copper	2014 LQM/CIEH S4ULs
Zinc	2014 LQM/CIEH S4ULs
Cyanide – Total	2014 LQM/CIEH S4ULs
Phenols – Total	2014 LQM/CIEH S4ULs
Naphthalene	General assessment criteria (GAC) developed by CIEH/LQM Suitable 4 Use Levels with supporting data from SR3, SR7 and existing Tox report where applicable. 1% SOM.
Acenaphthylene	
Acenaphthene	
Fluorene	
Phenanthrene	
Anthracene	
Fluoranthene	
Pyrene	
Benzo(a)Anthracene	
Chrysene	
Benzo(b/k)Fluoranthene ⁽ⁱⁱⁱ⁾	
Benzo(a)Pyrene	
Indeno(123-cd)Pyrene	
Dibenzo(a,h)Anthracene	
Benzo(ghi)Perylene	
TPH C₅-C₆ (aliphatic)	
TPH C₆-C₈ (aliphatic)	
TPH C₈-C₁₀ (aliphatic)	
TPH C₁₀-C₁₂ (aliphatic)	
TPH C₁₂-C₁₆ (aromatic)	
TPH C₁₆-C₂₁ (aromatic)	
TPH C₂₁-C₃₅ (aromatic)	



APPENDIX VIII GEOTECHNICAL LABORATORY TESTING RESULTS



LABORATORY REPORT



4043

Contract Number: PSL20/0752

Report Date: 19 February 2020

Client's Reference: 13-729

Client Name: E3P
Heliport Business Park
Liverpool Road
Eccles
Manchester
M30 7RU

For the attention of: Ella Moss

Contract Title: Manchester Life

Date Received: 6/2/2020

Date Commenced: 6/2/2020

Date Completed: 19/2/2020

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

R Gunson
(Director)

A Watkins
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R Berriman
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SUMMARY OF LABORATORY SOIL DESCRIPTIONS

[illegible]

4043

PSL
Professional Soils Laboratory

Manchester Life

Contract No:

PSL20/0752

Client Ref:

13-729

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

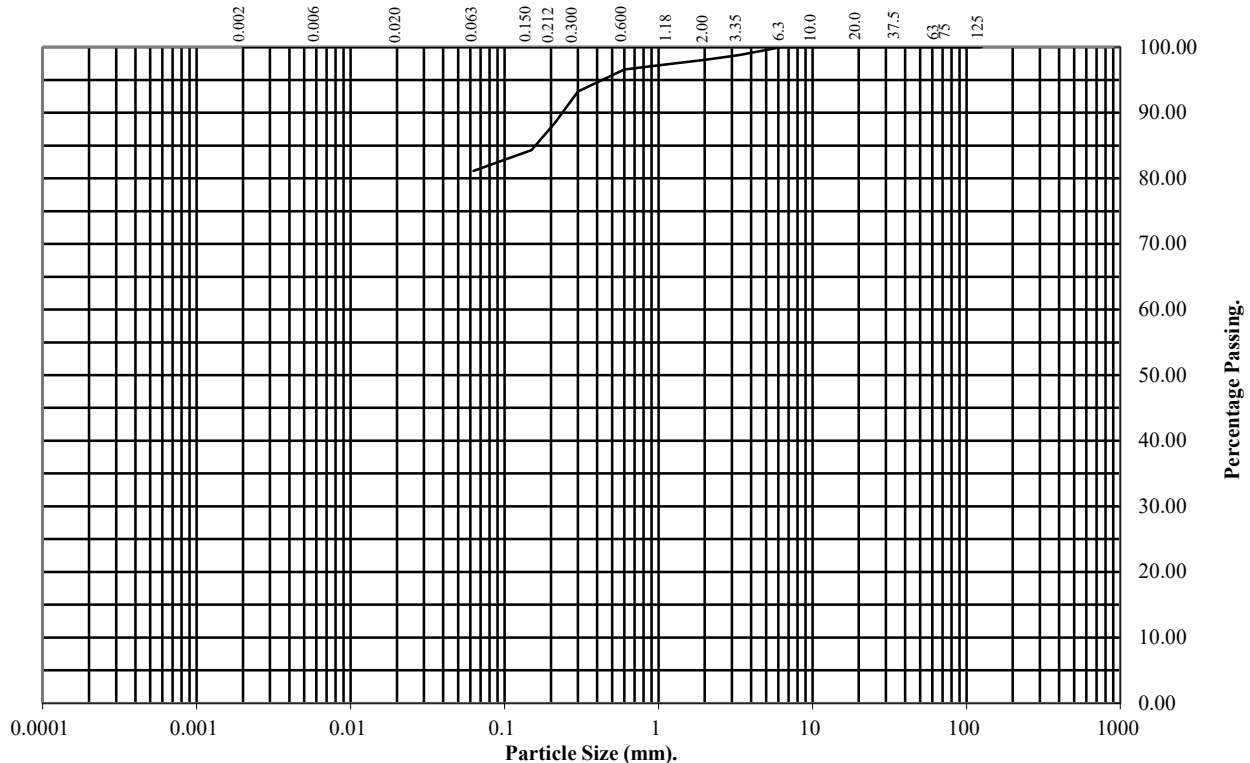
Hole Number: SA105

Top Depth (m): 6.00

Sample Number:

Base Depth(m): 6.60

Sample Type: U



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	99
2	98
1.18	97
0.6	97
0.3	93
0.212	88
0.15	84
0.063	81

Soil Fraction	Total Percentage
Cobbles	0
Gravel	2
Sand	17
Silt/Clay	81

Remarks:

See Summary of Soil Descriptions



Manchester Life

Contract No:
PSL20/0752
Client Ref:
13-729

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

Hole Number: SA106

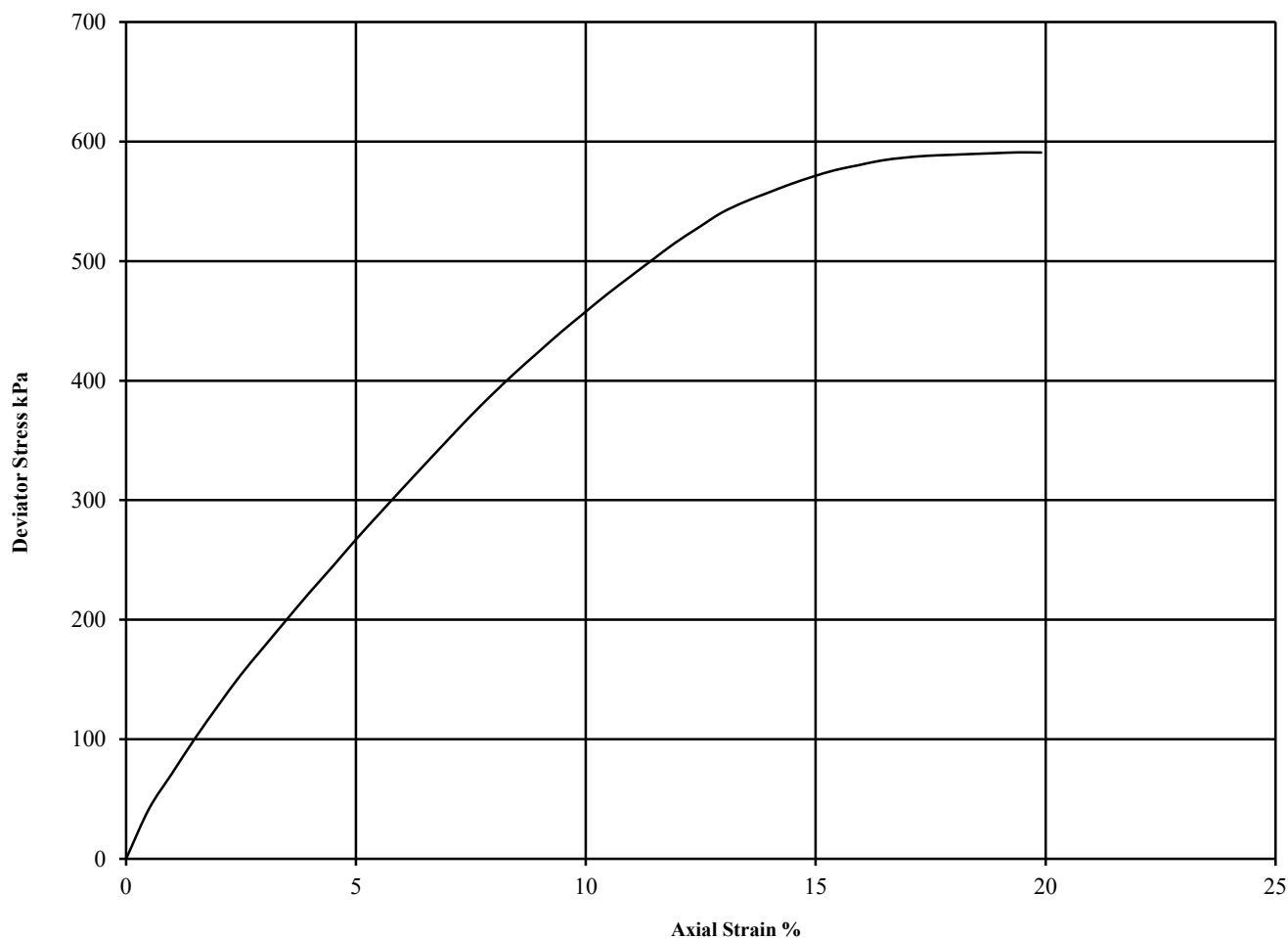
Top Depth (m): 9.00

Sample Number:

Base Depth (m): 9.60

Sample Type

U



Diameter (mm):		103		Height (mm):		207		Test:		UU Single Stage		Remarks:	
Specimen	Moisture Content (%)	Bulk Density (Mg/m ³)	Dry Density (Mg/m ³)	Cell Pressure (kPa)	Corr. Max. Deviator Stress (kPa)	Shear Strength Cu (kPa)	Failure Strain (%)	Mode of Failure				Undisturbed Sample Sample taken from top of tube Rate of strain = 2 %/min Latex Membrane used 0.2 mm thick, Correction applied 0.33	
				θ_3	$(\theta_1 - \theta_3)_f$	$\frac{1}{2}(\theta_1 - \theta_3)_f$							
1	9.7	2.28	2.08	186	591	295	19.4	Intermediate				See summary of soil descriptions	



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PSL

Professional Soils Laboratory

Manchester Life

Contract No:

PSL20/0752

Client Ref:

13-729

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

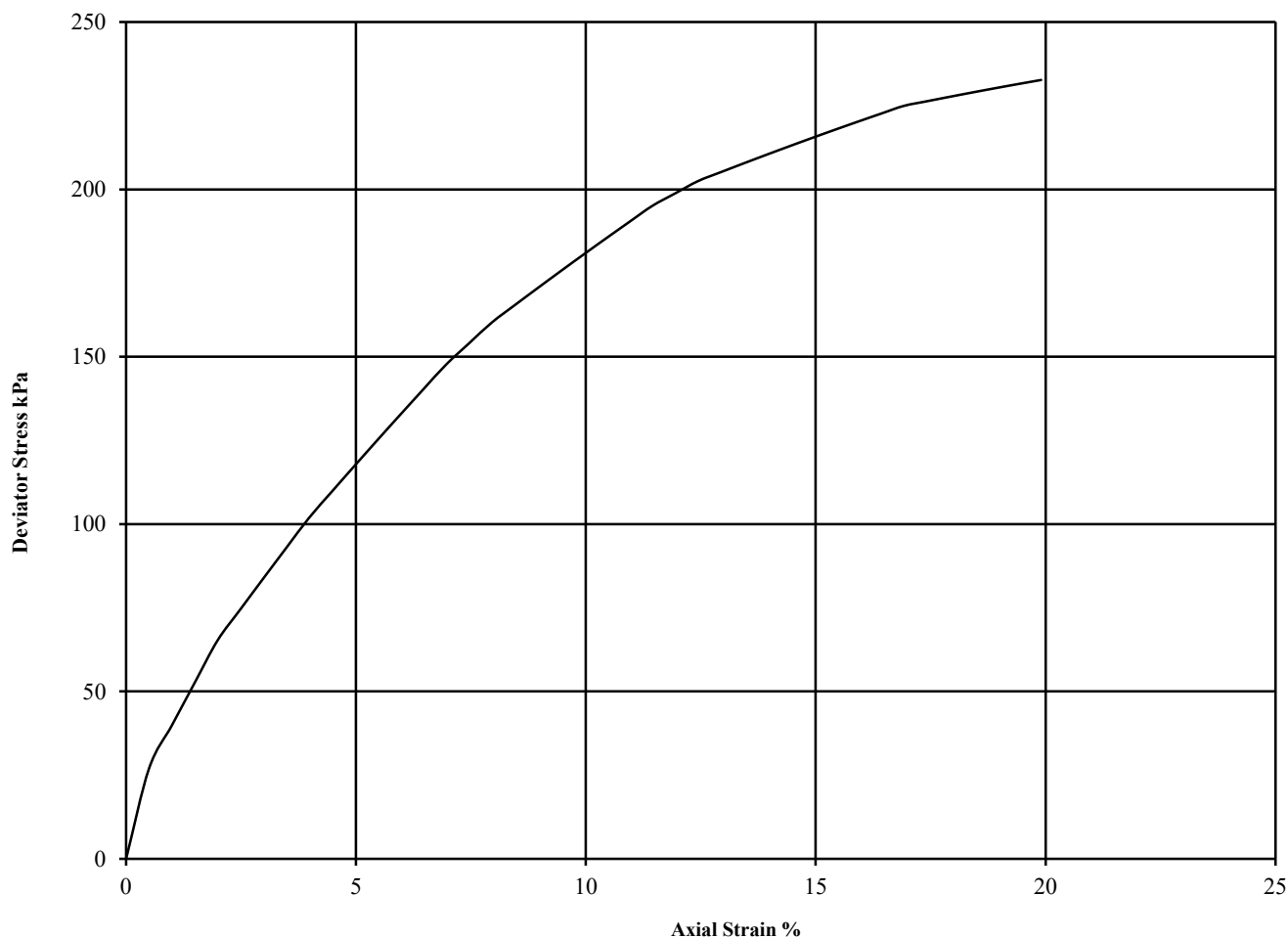
Hole Number: SA104

Top Depth (m): 6.00

Sample Number:

Base Depth (m): 6.60

Sample Type U



Diameter (mm):		103	Height (mm):		207	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa)	Corr. Max. Deviator Stress (kPa)	Shear Strength Cu (kPa)	Failure Strain (%)	Mode of Failure	Undisturbed Sample
									Sample taken from top of tube
									Rate of strain = 2 %/min
									Latex Membrane used 0.2 mm thick,
				θ_3	$(\theta_1-\theta_3)_f$	$^{1/2}(\theta_1-\theta_3)_f$			Correction applied 0.33
1	18	2.12	1.80	126	233	116	19.9	Intermediate	See summary of soil descriptions



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Professional Soils Laboratory

Manchester Life

Contract No:

PSL20/0752

Client Ref:

13-729

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

Hole Number:

SA102

Top Depth (m):

6.00

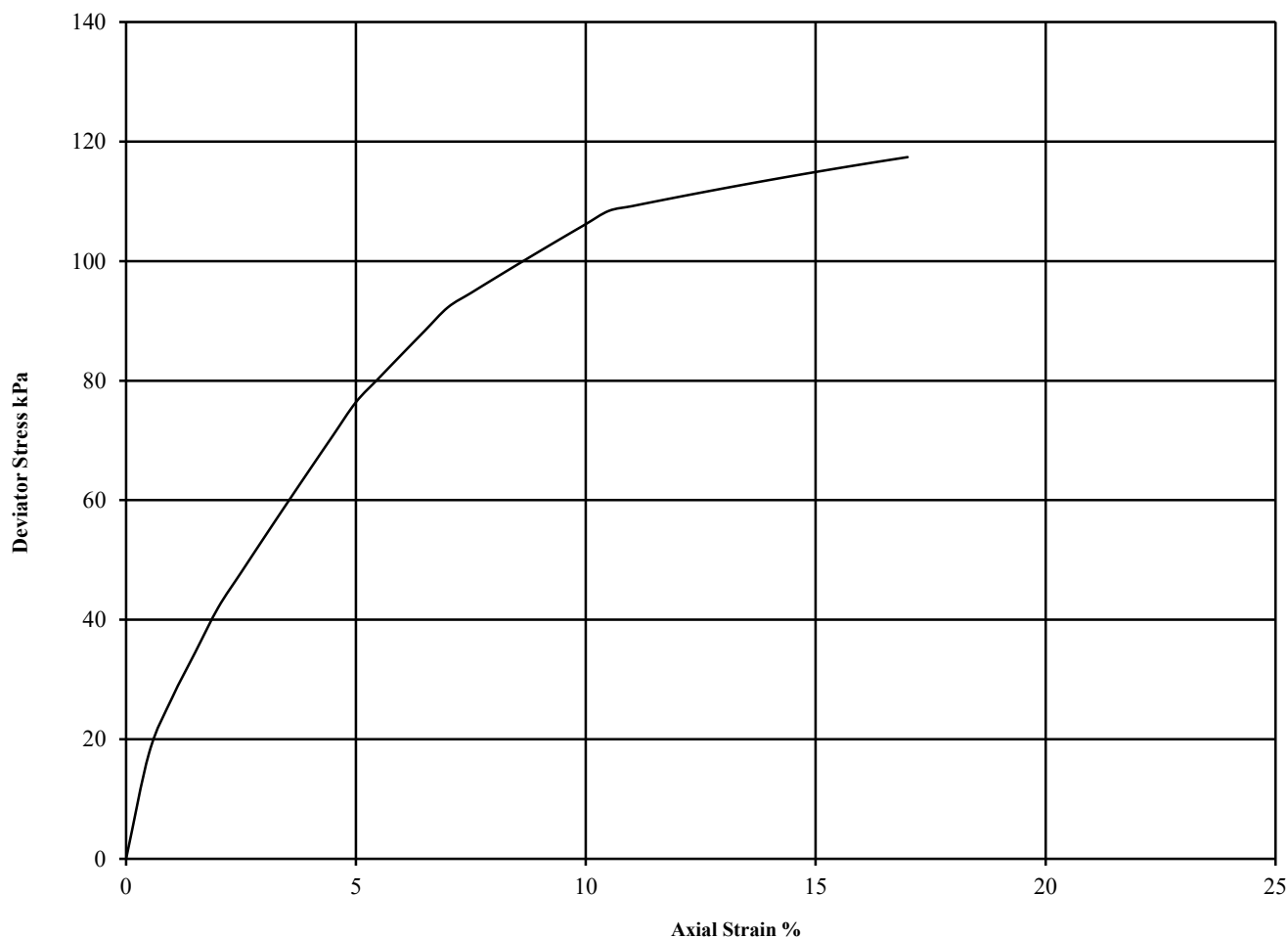
Sample Number:

Base Depth (m):

6.70

Sample Type

U



Diameter (mm):		38	Height (mm):		76	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa)	Corr. Max. Deviator Stress (kPa)	Shear Strength Cu (kPa)	Failure Strain (%)	Mode of Failure	Undisturbed Sample Sample taken from top of tube Rate of strain = 2 %/min Latex Membrane used 0.2 mm thick, Correction applied 0.74 38mm due to insufficient material
1	28	1.92	1.51	126	117	59	17.0	Plastic	



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PSL

Professional Soils Laboratory

Manchester Life

Contract No:

PSL20/0752

Client Ref:

13-729

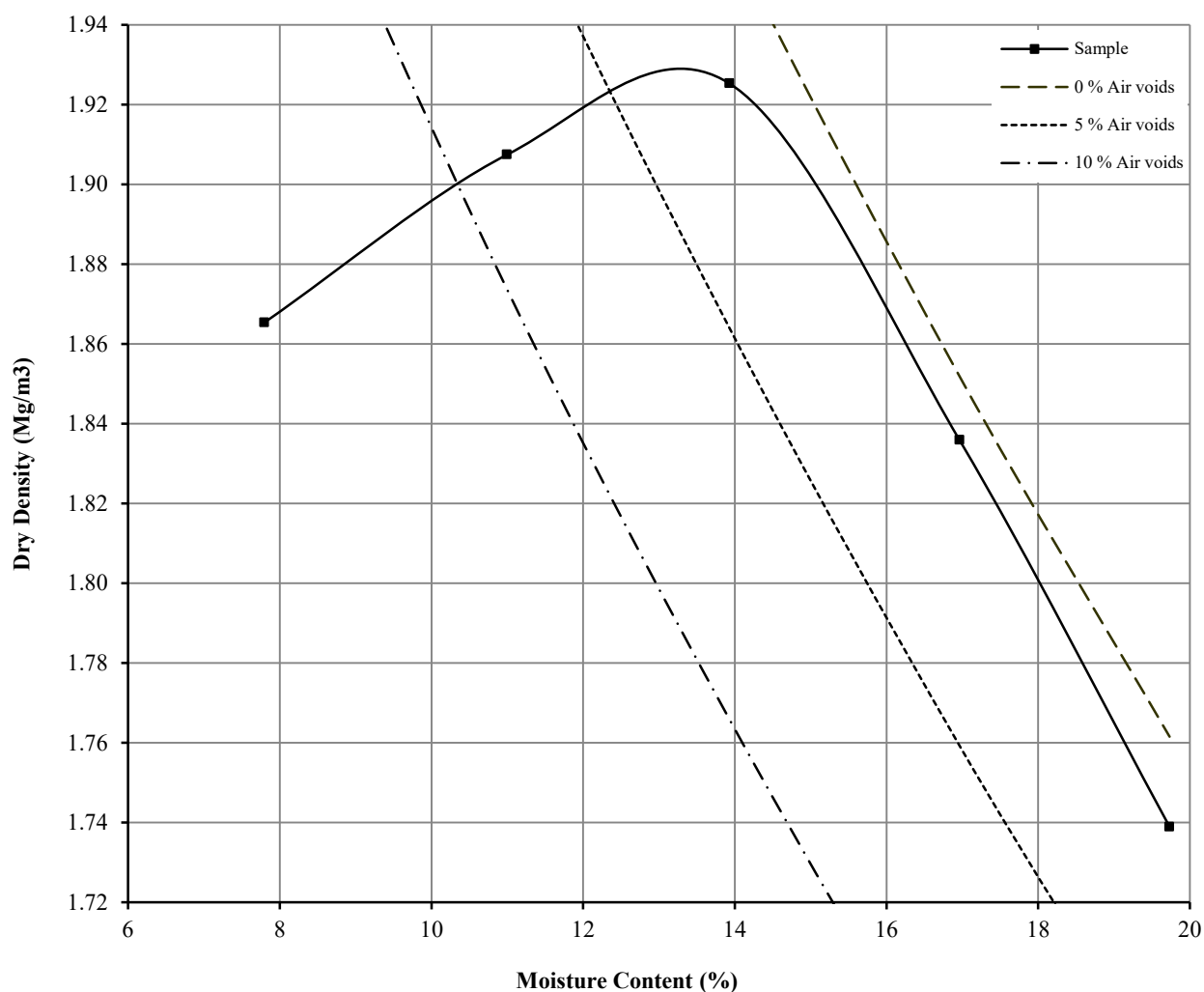
DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS 1377 : Part 4 : Clause 3.5 : 1990

Hole Number: SA105 Top Depth (m) : 6.00

Sample Number: Base Depth (m) : 6.60

Sample Type: U



Initial Moisture Content:	17	Method of Compaction:	4.5kg	Separate Samples
Particle Density (Mg/m3):	2.7	Assumed	Material Retained on 37.5 mm Test Sieve (%):	0
Maximum Dry Density (Mg/m3):	1.93		Material Retained on 20.0 mm Test Sieve (%):	0
Optimum Moisture Content (%):	14			
Remarks				
See summary of soil descriptions.				



Manchester Life

Contract
PSL20/0752
Client Ref
13-729



LABORATORY REPORT



4043

Contract Number: PSL19/7572

Report Date: 13 January 2020
Client's Reference: 13-729
Client Name: E3P
Heliport Business Park
Liverpool Road
Eccles
Manchester
M30 7RU

For the attention of: Ella Moss

Contract Title: Manchester Life
Date Received: 11/12/2019
Date Commenced: 11/12/2019
Date Completed: 13/1/2020

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

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(Director)

L Knight
(Senior Technician)

A Watkins
(Director)

S Eyre
(Senior Technician)

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SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
WS112		D	2.80		Brown slightly gravelly sandy CLAY.
WS111		D	2.00	2.45	Brown slightly gravelly sandy CLAY.
WS108		D	1.00	1.45	Brown slightly gravelly slightly sandy CLAY.
WS101		D	2.00	2.45	Brown slightly gravelly sandy CLAY.
WS110		D	2.00	2.45	Brown slightly gravelly sandy CLAY.
WS106		D	2.00	2.45	Brown slightly gravelly sandy CLAY.
WS107		D	1.00	1.45	Brown slightly gravelly sandy CLAY.
WS106		Liner	2.50	3.00	Firm brown slightly gravelly sandy CLAY.
WS109		Liner	4.50	5.00	Firm brown slightly gravelly sandy CLAY.
WS112		Liner	3.50	4.00	Stiff brown slightly gravelly sandy CLAY.
WS110		Liner	3.50	4.00	Stiff brown slightly gravelly slightly sandy CLAY.
TP111		BB	1.20		Dark brown very sandy clayey silty gravel with cobbles.



4043

PSL

Professional Soils Laboratory

Manchester Life

Contract No:

PSL19/7572

Client Ref:

13-729

SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

[illegible]

SYMBOLS : NP : Non Plastic

*** : Liquid Limit and Plastic Limit Wet Sieved.**



4043

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Professional Soils Laboratory

Manchester Life

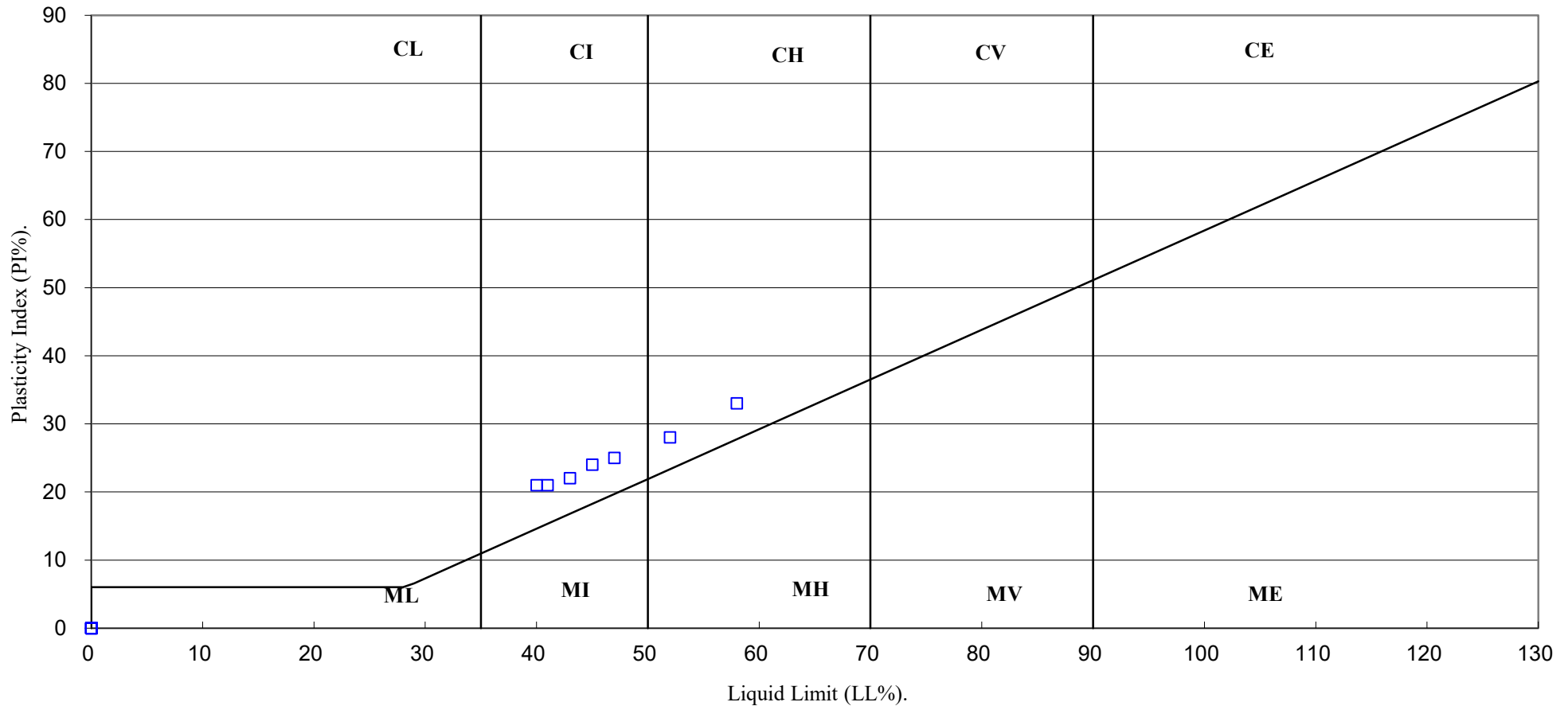
Contract No:

PSL19/7572

Client Ref:

13-729

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



4043

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Professional Soils Laboratory

Manchester Life

Contract No:

PSL19/7572

Client Ref:

13-729

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

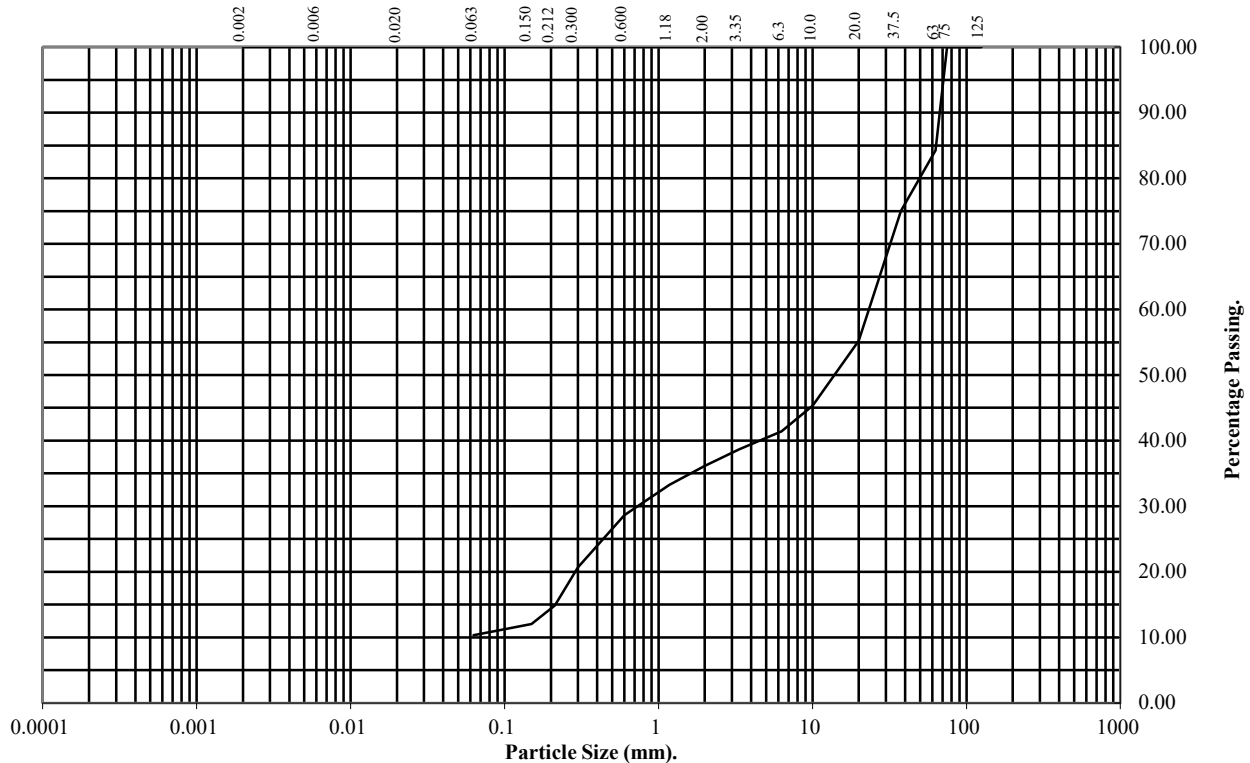
Hole Number: TP111

Top Depth (m): 1.20

Sample Number:

Base Depth(m):

Sample Type: BB



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	84
37.5	75
20	55
10	45
6.3	41
3.35	39
2	36
1.18	33
0.6	29
0.3	21
0.212	15
0.15	12
0.063	10

Soil Fraction	Total Percentage
Cobbles	16
Gravel	48
Sand	26
Silt/Clay	10

Remarks:

See Summary of Soil Descriptions



Manchester Life

Contract No:
PSL19/7572
Client Ref:
13-729

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

Hole Number: WS106

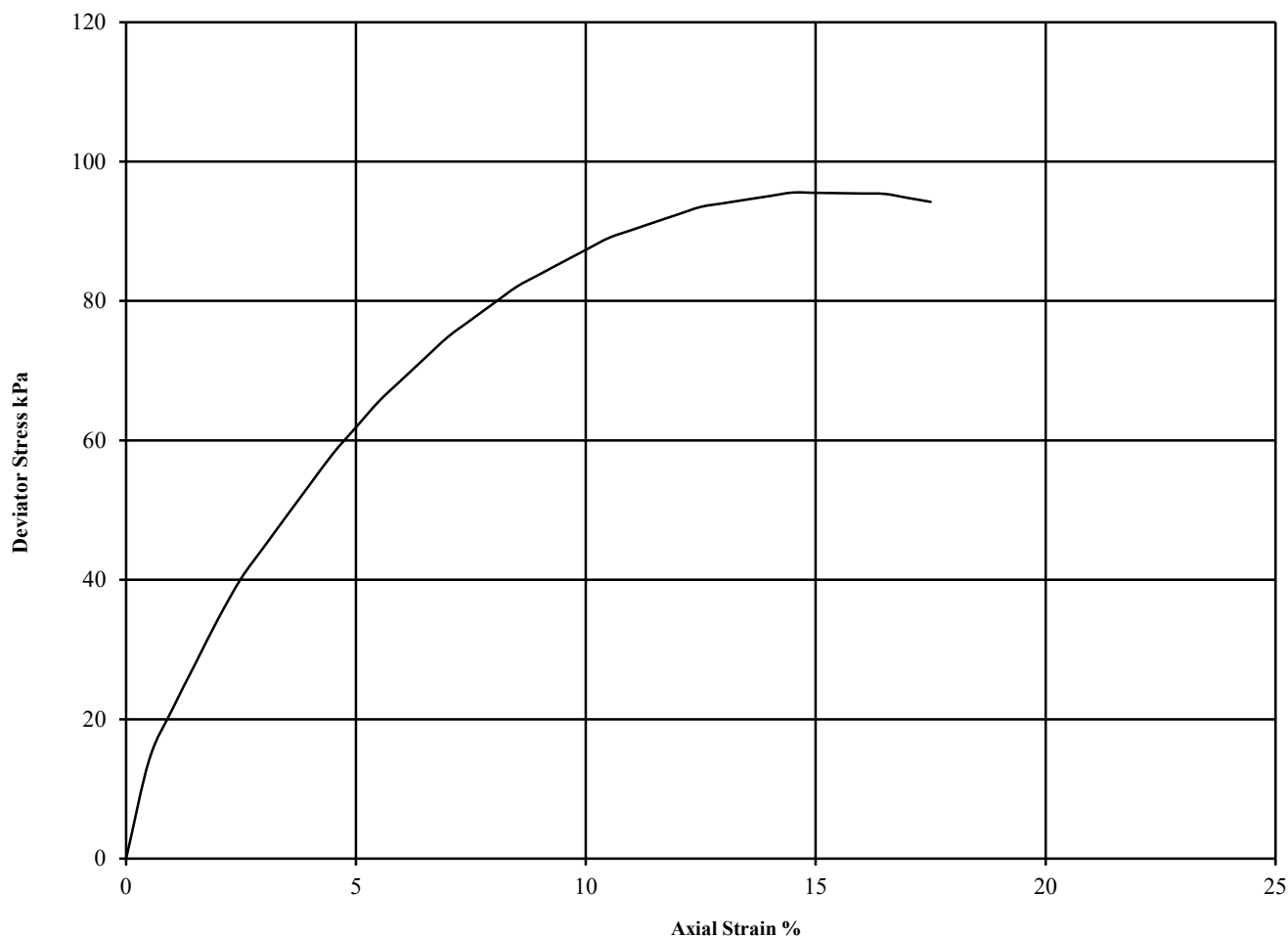
Top Depth (m): 2.50

Sample Number:

Base Depth (m): 3.00

Sample Type

Liner



Diameter (mm):		74	Height (mm):		148	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m ³)	Dry Density (Mg/m ³)	Cell Pressure (kPa)	Corr. Max. Deviator Stress (kPa)	Shear Strength Cu (kPa)	Failure Strain (%)	Mode of Failure	Undisturbed Sample Sample taken from top of tube Rate of strain = 2 %/min Latex Membrane used 0.2 mm thick, Correction applied 0.46 See summary of soil descriptions
1	24	1.99	1.61	55	96	48	14.5	Plastic	



4043

PSL

Professional Soils Laboratory

Manchester Life

Contract No:

PSL19/7572

Client Ref:

13-729

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

Hole Number: WS109

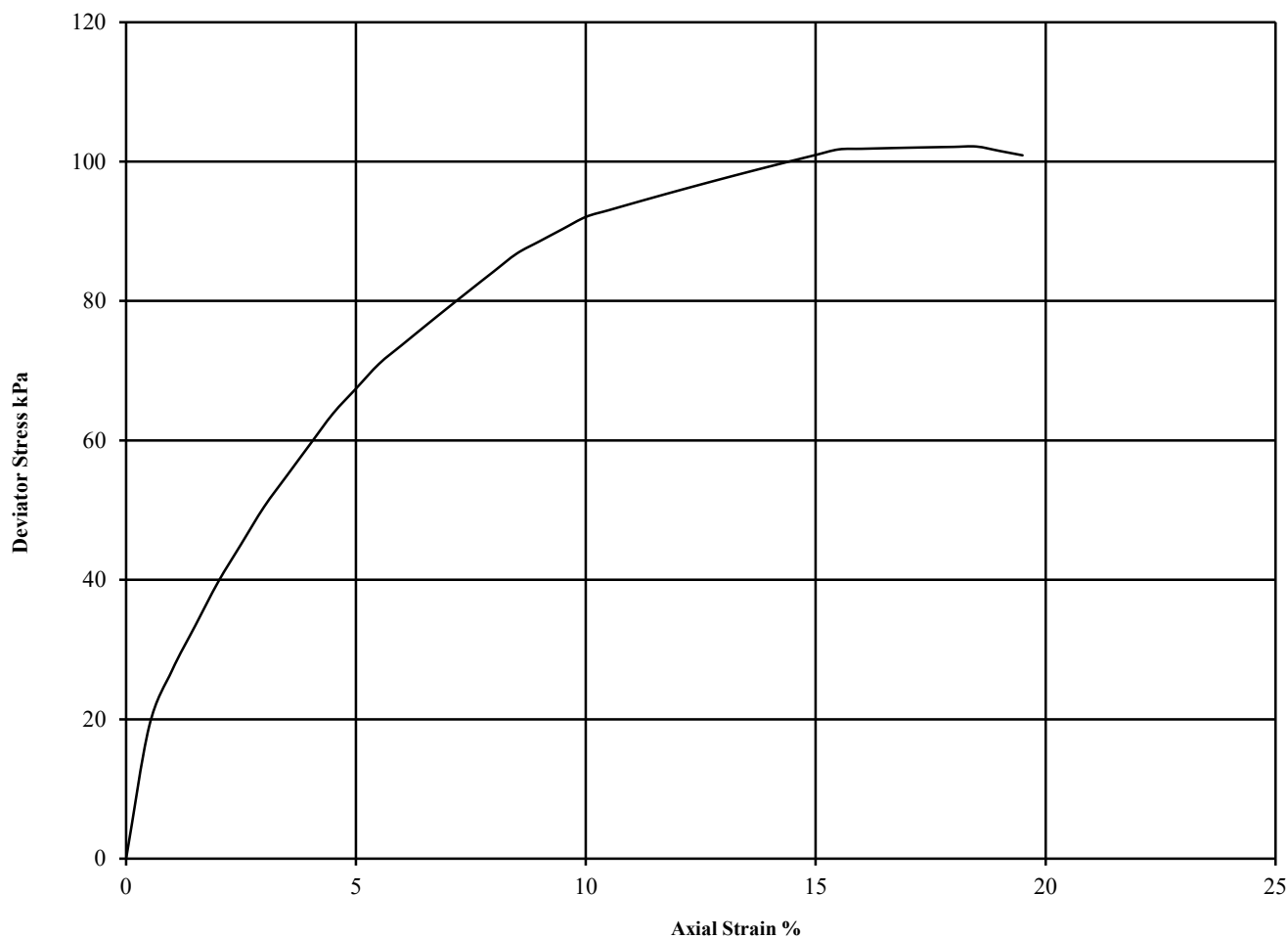
Top Depth (m): 4.50

Sample Number:

Base Depth (m): 5.00

Sample Type

Liner



Diameter (mm):		52	Height (mm):		104	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m ³)	Dry Density (Mg/m ³)	Cell Pressure (kPa)	Corr. Max. Deviator Stress (kPa)	Shear Strength Cu (kPa)	Failure Strain (%)	Mode of Failure	Undisturbed Sample Sample taken from top of tube Rate of strain = 2 %/min Latex Membrane used 0.2 mm thick, Correction applied 0.59 See summary of soil descriptions
				θ_3	$(\theta_1 - \theta_3)_f$	$\frac{1}{2}(\theta_1 - \theta_3)_f$			
1	21	2.13	1.75	95	102	51	18.5	Plastic	



4043

PSL

Professional Soils Laboratory

Manchester Life

Contract No:

PSL19/7572

Client Ref:

13-729

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

Hole Number: WS110

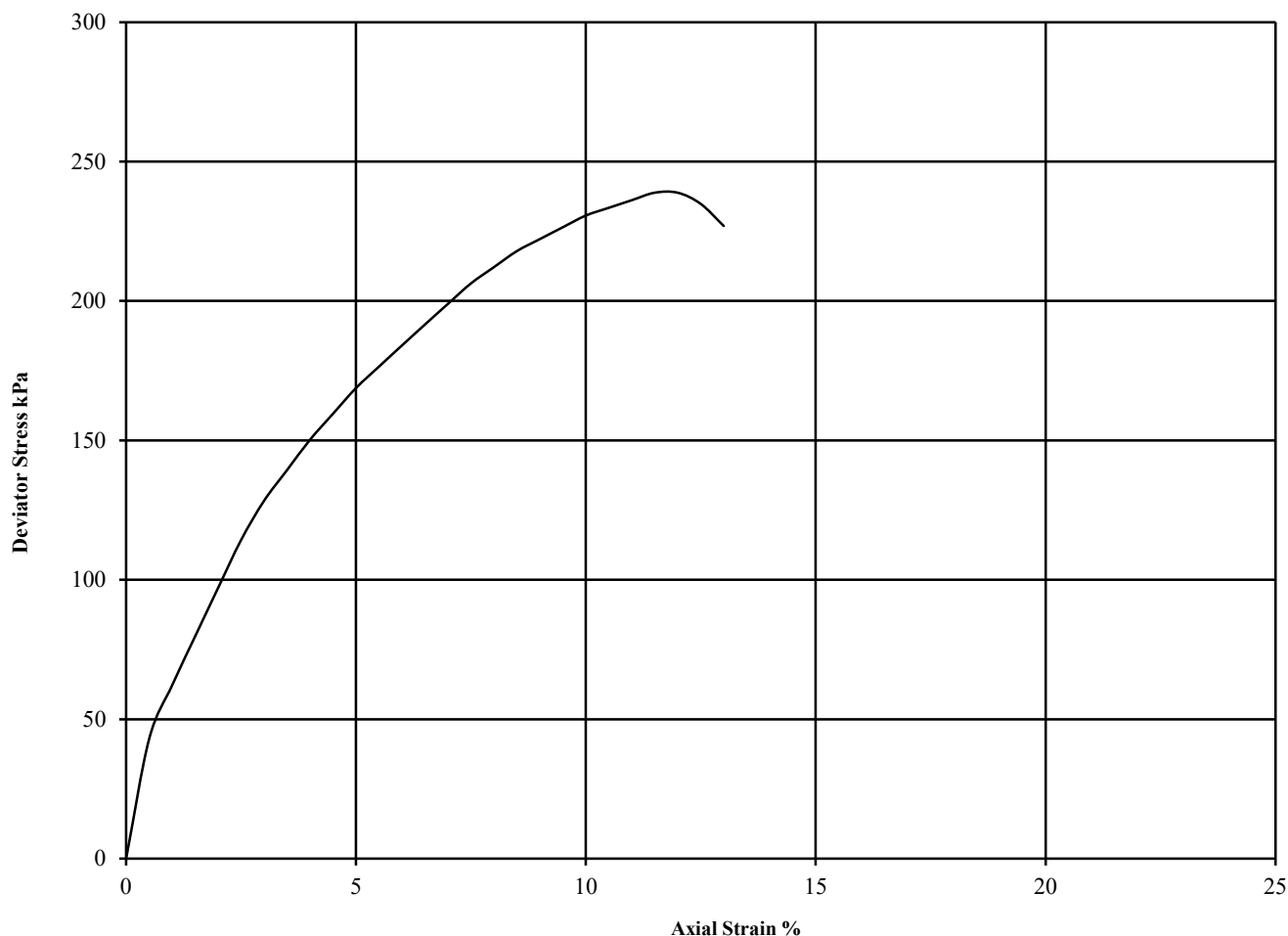
Top Depth (m): 3.50

Sample Number:

Base Depth (m): 4.00

Sample Type

Liner



Diameter (mm):		52		Height (mm):		104		Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa)	Corr. Max. Deviator Stress (kPa)	Shear Strength Cu (kPa)	Failure Strain (%)	Mode of Failure	Undisturbed Sample Sample taken from top of tube Rate of strain = 2 %/min Latex Membrane used 0.2 mm thick, Correction applied 0.64 See summary of soil descriptions		
1	25	2.04	1.64	θ_3 75	$(\theta_1 - \theta_3)_f$ 239	$\frac{1}{2}(\theta_1 - \theta_3)_f$ 119	11.5	Brittle			



4043

PSL

Professional Soils Laboratory

Manchester Life

Contract No:

PSL19/7572

Client Ref:

13-729

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

Hole Number: WS112

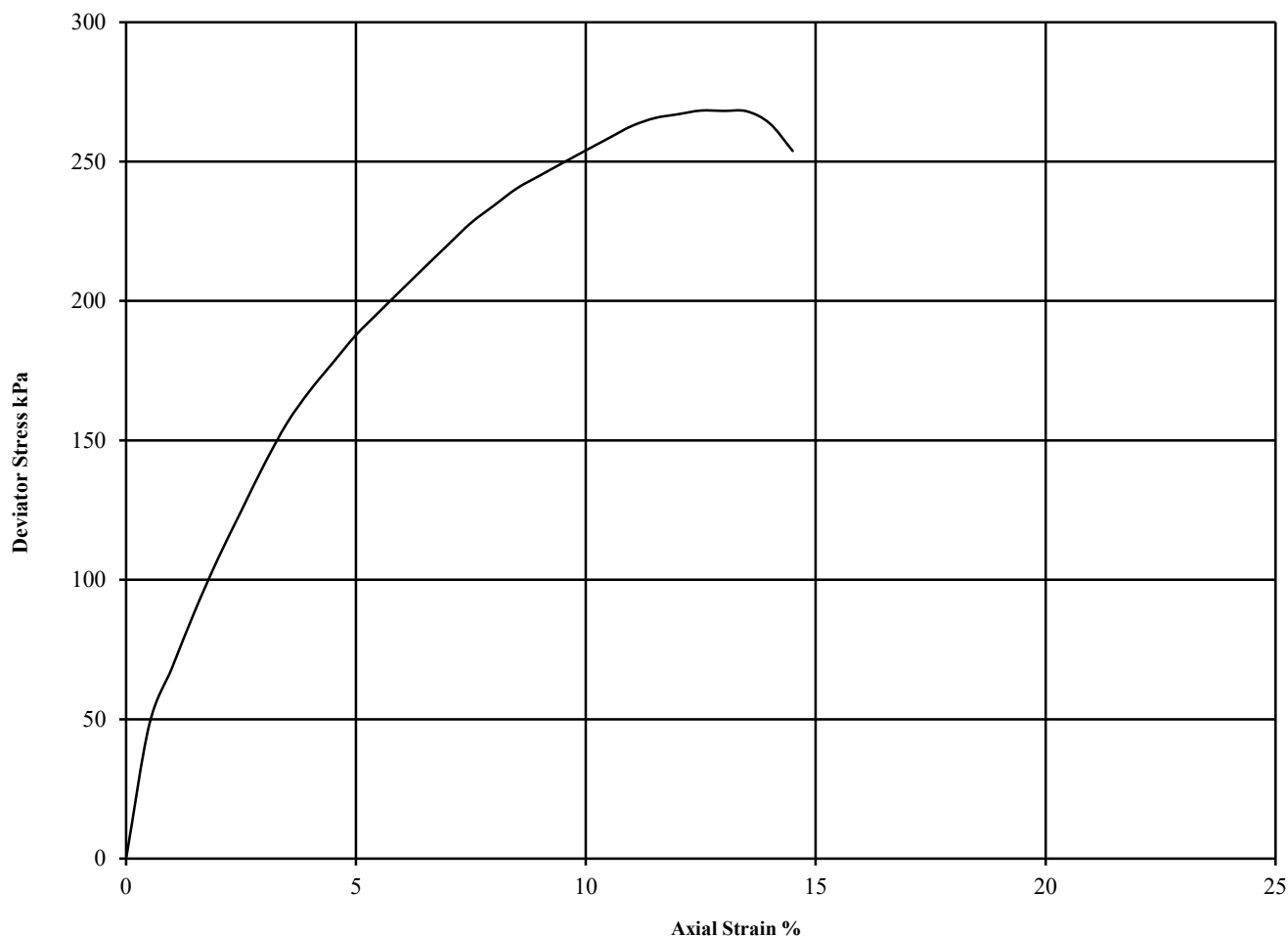
Top Depth (m): 3.50

Sample Number:

Base Depth (m): 4.00

Sample Type

Liner



Diameter (mm):		52	Height (mm):		104	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m ³)	Dry Density (Mg/m ³)	Cell Pressure (kPa)	Corr. Max. Deviator Stress (kPa)	Shear Strength Cu (kPa)	Failure Strain (%)	Mode of Failure	Undisturbed Sample Sample taken from top of tube Rate of strain = 2 %/min Latex Membrane used 0.2 mm thick, Correction applied 0.64 See summary of soil descriptions
1	17	2.15	1.84	75	268	134	12.5	Brittle	



4043

PSL

Professional Soils Laboratory

Manchester Life

Contract No:

PSL19/7572

Client Ref:

13-729

ONE DIMENSIONAL CONSOLIDATION TEST

BS 1377: Part 5: 1990: Clause 3

Hole Number: WS106

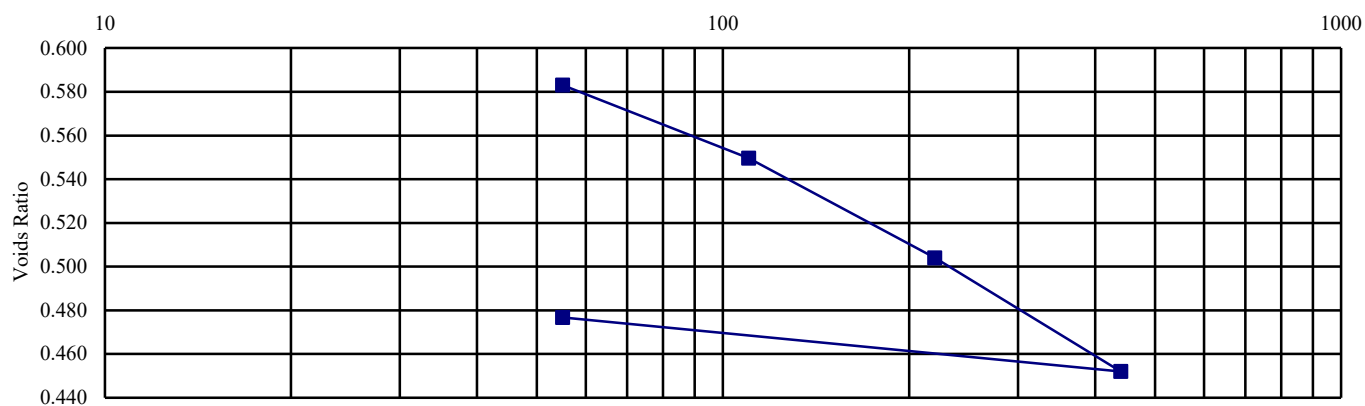
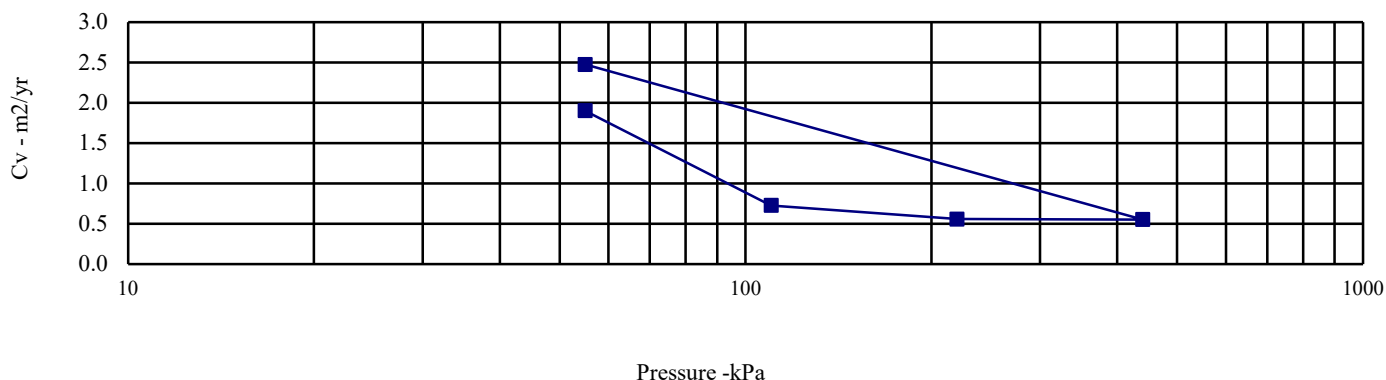
Top Depth (m): 2.50

Sample Number:

Base Depth (m) : 3.00

Sample Type: Liner

Initial Conditions		Pressure Range		Mv	Cv	Specimen location	
Moisture Content (%):	24	kPa		m2/MN	m2/yr	within tube:	Top
Bulk Density (Mg/m3):	1.99	0	55	0.797	1.901	Method used to	
Dry Density (Mg/m3):	1.60	55	110	0.385	0.726	determine CV:	T90
Voids Ratio:	0.656	110	220	0.267	0.557	Nominal temperature	
Degree of saturation:	98.4	220	440	0.157	0.551	during test ' C:	20
Height (mm):	19.818	440	55	0.044	2.475	Remarks:	
Diameter (mm)	50.02					See summary of soil descriptions	
Particle Density (Mg/m3):	2.65						
Assumed							



Manchester Life

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ONE DIMENSIONAL CONSOLIDATION TEST

BS 1377: Part 5: 1990: Clause 3

Hole Number: WS112

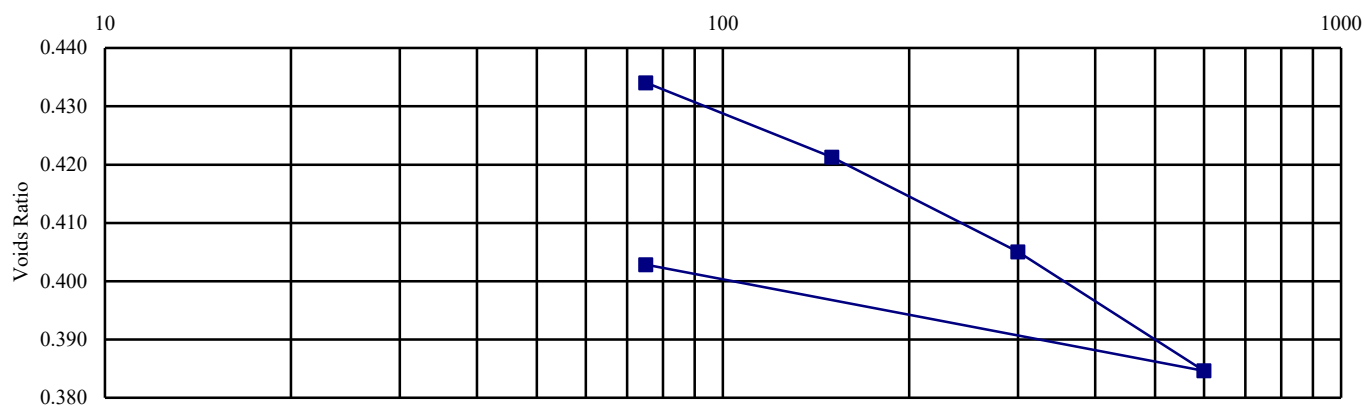
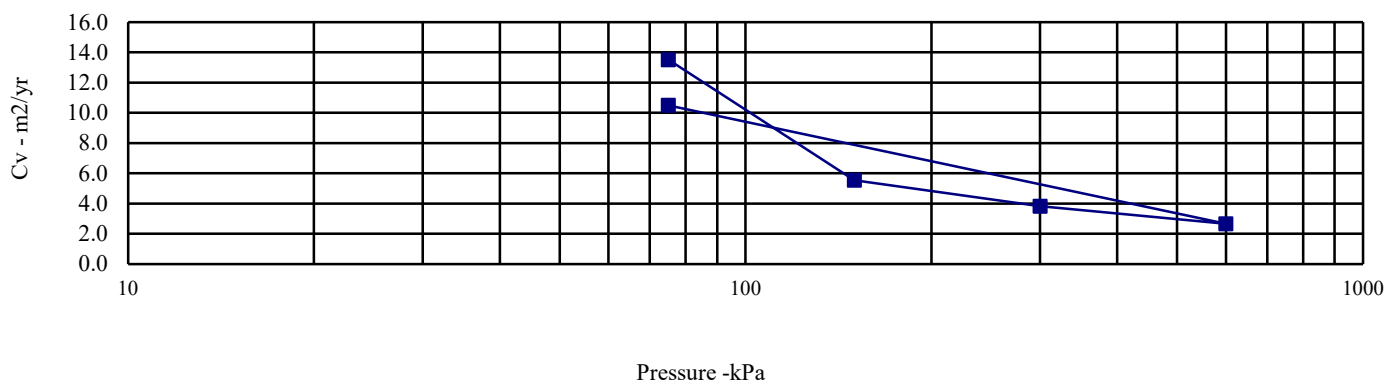
Top Depth (m): 3.50

Sample Number:

Base Depth (m) : 4.00

Sample Type: Liner

Initial Conditions		Pressure Range		Mv	Cv	Specimen location	
Moisture Content (%):	17	kPa		m2/MN	m2/yr	within tube:	Top
Bulk Density (Mg/m3):	2.14	0	75	0.177	13.511	Method used to	
Dry Density (Mg/m3):	1.82	75	150	0.119	5.543	determine CV:	T90
Voids Ratio:	0.453	150	300	0.076	3.821	Nominal temperature	
Degree of saturation:	100.5	300	600	0.048	2.655	during test ' C:	20
Height (mm):	19.79	600	75	0.025	10.493	Remarks:	See summary of soil descriptions
Diameter (mm)	50.018						
Particle Density (Mg/m3):	2.65						
Assumed							



Manchester Life

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