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

PARCEL A

Reference:13-350-R3
Date: February 2020

PHASE II GEOENVIRONMENTAL SITE ASSESSMENT

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

Prepared for:

Report Ref: 13-729-R2
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EXECUTIVE SUMMARY

Site Address	Land to the north and south of Jersey Street, Ancoats, Manchester, M4 6JW	
Grid Reference	E 385200, N 398770	
Site Area	1.54 Hectares	
Current Site Use	Parcel A (Pink area) comprises several structures with multiple uses and is surrounded by Jersey Street to the south and Poland Street to the east. A textile waste merchant is present to the north of the site, referred to as Unit 1. The majority of the is currently occupied by Eric Wright containing site cabins and materials store for the construction project to the south west. A dance bar and fashion clothing offices are present to the south west of the site off Daisy Street and a depot is present along the southern boundary. 	
Proposed Development	E3P understands that the site referred to as Parcel A 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 A.
	Hydrogeology	Secondary Undifferentiated aquifer strata overlying a Principal Aquifer to the west of Parcel A and Secondary B Aquifer for the remainder of the site (Bedrock Geology). There are no groundwater abstraction points located within 1 km of the site
	Hydrology	Historic mapping dated 1948 shows all three parcels being intersected by Bengal Arm Canal before being later cut off from the main canal to the south and eventually infilled. It is possible a connection remains. The Rochdale Canal is located to the south and a canal basin is located 95 m south west of the site. The River Irk is located circa 880 m to the north.

Environmental Setting	**Flood Risk**	The site is located within Flood Risk Zone 1 and is considered unaffected by river flooding.
	Ecology	No vegetation or any areas that could support a habitat are considered present in this parcel. The canal to the south is should also be considered as potentially supporting ecosystems.
	Subsidence Hazards	No hazard identified in data searches.
Site History	Historical mapping shows that Parcel A was formerly occupied by the Phoenix Iron and Glass Works with a canal (Bengal Arm) running east west along the northern boundary of the works with a wharf present on the northern bank (considered part of Phoenix Works). The canal appears to have been infilled in the late 1950s. The site remained as various industrial works and warehouses until the part demolition in 2000.	
Utility Locations	A formal utility survey has been completed and combined with a review of online service plans has identified the following services within the site boundary: • 2W fibre optic cable intersects the centre of Parcel A • Low voltage electivity cables intersect Parcel A and C • BT intersecting Parcel A • Drainage in Parcel A and B • Medium power gas main in all sectors • 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 basin and canal arm) within the site boundary and further areas within 250 m of the site including further canal infilling, phases of redevelopment/upfilling and grading. There are likely varying depths of Made Ground generated from historical development. The presence of Made Ground may result in the generation of hazardous ground gases (such as carbon dioxide and 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 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.

GROUND INVESTIGATION

Ground Investigation Works	E3P has completed an intrusive ground investigation comprising mechanically excavated trial pits, window sample boreholes, cable percussive boreholes, groundwater sampling, ground gas monitoring, geotechnical and environmental sampling.
Ground Conditions	**MADE GROUND** Made Ground was encountered within all exploratory holes between ground level and 2.50 m bgl. The full depth to Made Ground was not determined in several exploratory hole locations due to the presence of obstructions, ingress of groundwater flooding the excavation and suspected basement floor slabs. The majority of exploratory holes were surfaced by concrete between ground level and 0.30 m bgl. Made Ground mainly comprises gravelly black ash with frequent cobbles with gravel of mudstone, concrete, brick and asphalt and cobbles of brick which was encountered between ground level and 2.50 m bgl. Gravelly ash which presented a strong hydrocarbon odour and sheen were encountered within TT105A, TT105B, TT106A and TP110. In particular visual and olfactory contamination was present in the north of Parcel A within the historically infilled canal. Furthermore, it is considered that the impact relates to the perched water held within the former canal channel. Large obstructions including brick and concrete were encountered within the majority of exploratory hole locations. Brick walls were noted in TP102, and TP103.
	DRIFT The natural drift deposits were identified where the Made Ground could be penetrated and were found to be generally uniform across the area. Natural CLAY stratum directly underlay the Made Ground. Drift deposits comprise firm to very stiff brown slightly gravelly CLAY which was encountered between 0.60 m and 5.45 m bgl. Deeper cable percussive drilling recorded the CLAY to depths in excess of 10 m bgl before the bedrock strata was encountered.

Ground Conditions	**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 the bedrock (sandstone) stratum from depths between 13.20 m and 18.80 m bgl. The closest BGS borehole encountered sandstone bedrock at 23.0 m bgl which corroborates a dip to the west.
	GROUNDWATER Groundwater strikes were encountered as seepages considered to be water perched within the former infilled canal. These were generally encountered between 0.70m and 2.20m bgl.

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 across the site has indicated the presence of elevated metals, non-volatile PAHs, and non-volatile TPH compounds within the Made Ground. Naphthalene, mercury and volatile TPH were also identified throughout the site. Asbestos was also identified in eight samples out of 16 submitted for analysis by E3P. The majority of the identified elevated concentrations have primary exposure pathways related to dermal contact and ingestion of soil. These exceedances can be mitigated by the installation of a 300 mm chemically suitable cover system within all proposed landscaping areas. With regards to the elevated SVOCs, VOCs, naphthalene, mercury and TPHs, these present a potential volatilisation to indoor air risk and have been identified throughout the site but predominantly within the infilled canal materials. Where these soils are not removed from site in their entirety, it is recommended that a vapour risk assessment be completed at the site to determine the potential for release and accumulation in internal areas and the required extent of any remediation. Alternatively, a vapour membrane should be installed to all structures. With regards to the asbestos, quantification identified WS112 at 1.20m to have concentrations below <0.001%. However, TP112 at 0.50 m bgl was noted to have asbestos above at 0.008%. 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 arsenic, lead, pH, naphthalene, TPH C12-C35 elevated above the DWS criteria. Methylnaphthalene was identified in WS110 (0.32ug/l). Perched groundwater within the former infilled canal is considered a primary source of contaminants. The canal will need a stank at the boundary to stop ingress before pumping out the perched water and disposal from site in consideration of the potential contaminant risk. 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.
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. If a VOC risk is identified during further works a vapour membrane will be required within the building structure.
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. Based on existing conditions it is likely that specialist pipelines are required throughout.

GEOTECHNICAL ASSESSMENT

Underground Obstructions	Significant concrete and brick obstructions have been encountered within the Made Ground, indicative of relic foundations from the former buildings and infilled canal running through all parcels of the site. The presence of obstructions, brick walls and suspected concrete slabs also resulted in the premature termination in a number of locations. During any removal of the former infilled canal structure the boundary will require a stank and controlled removal and disposal of both the perched water and soils. 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/m^2 achievable at 2.00 m bgl increasing in excess of 120 kN/m^2 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/m^2 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 should be considered to the internal face of the external load bearing walls (outside or within tree influence) however, there are no trees currently identified in this parcel.
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 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 – *Guidance on the classification and assessment of waste.*

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;
- Vapour Assessment of potential volatile compounds identified within the soils;

- Investigation of north of Parcel A 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 the Parcel A area.

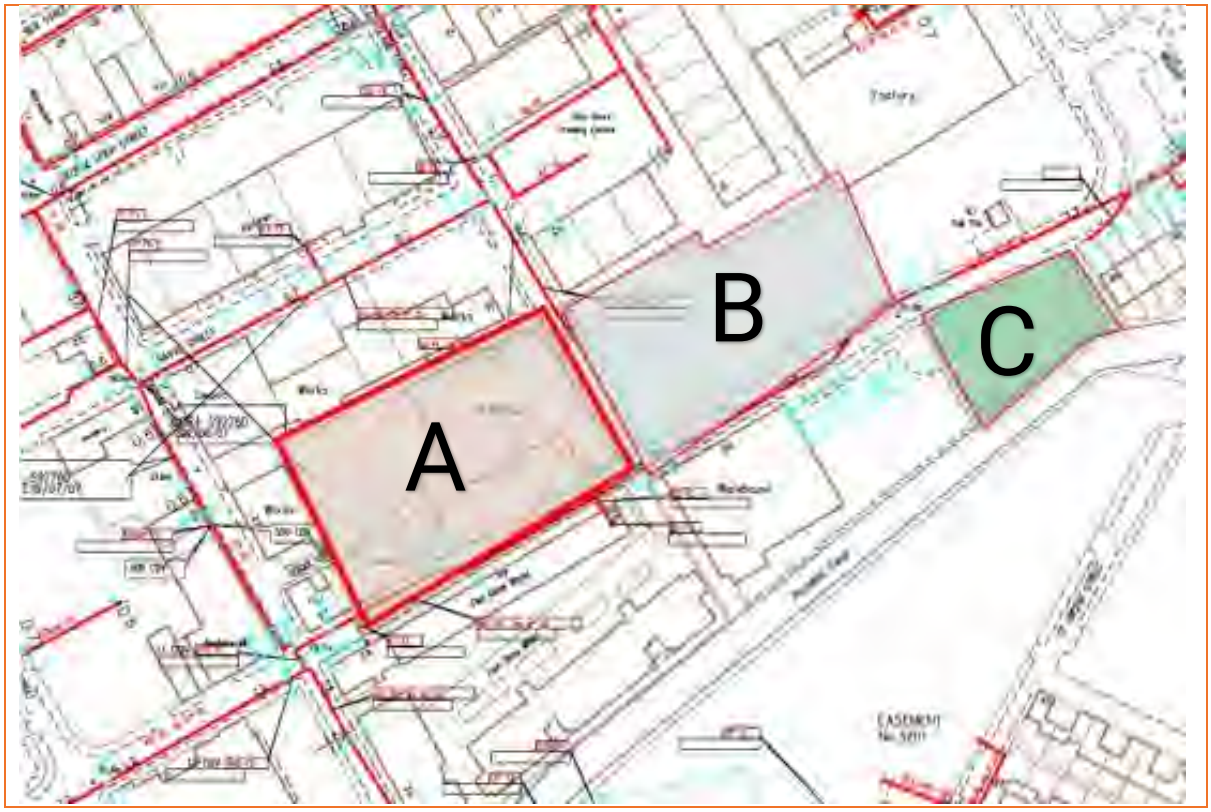
The scope of work includes the following elements:

- 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 three adjacent sites referred to as Parcel A, B and C will be developed into residential high rise buildings with some commercial use to the ground floor and the potential provision for undercroft parking. Currently E3P has not yet been presented with a proposed development plan for the subject sites, 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 A 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 site comprises three parcels of land referred to as Parcel A, B and C.

Historical mapping suggests that the parcel A was occupied by the Phoenix Works (south) with a canal running east west though the centre of the site. The Phoenix Works later became an iron works with an engineering works to the north of the canal (formally a canal wharf). The canal appears to have been infilled in the late 1950s. The site appears to have remained as various industrial works.

Current Features

Parcel A comprises several structures with multiple uses. A textile waste merchant is present in the north west occupied by Frank Hitchen and is referred to as Unit 1. The north east of the site is occupied by two adjacent secured car parks and works buildings are present directly behind the car parks. This area was inaccessible at the time of the site investigation.

The south of the site is currently a construction site yard occupied by Eric Wright containing site cabins, offices and building materials such as bricks.

A dance bar, fashion clothing offices occupied by Daisy Street and a depot are located to the far south west. More recently the buildings along the southern boundary have been used as storage and scrap metal facilities.

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 and west of parcel A).

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).

The more recent scrap metal and salvage usage of the buildings to the south could be a source of stored liquids, degreasers, paints, lubricants etc and therefore a source of Polycyclic aromatic hydrocarbons (PAHs), volatile and semi volatile hydrocarbons. The potential for volatilisation should be assessed within these areas as vapour membranes may be a requirement to mitigate the risk to future end users.

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 and 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.

There is a retaining wall to the south east of parcel B which retains the road at an elevated level to the south referred to as Jersey Street and adjacent car park to the east. There is also a brick retaining wall to the south of parcel A retaining the land to the south east corner of Jersey Street and land to the east on Poland Street. This will need to be assessed by a structural engineer prior to development. 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 20th November 2019. The works are summarised in Table 2.1.

TABLE 2.1 SUMMARY OF FIELDWORK PARCEL A

POTENTIAL SOURCE/RATIONALE	LOCATION HOLE	TYPE	MAXIMUM DEPTH (m bgl)	MONITORING WELLS RESPONSE ZONE (m bgl)
Investigation of former works	TP102	Mechanically Excavated Trial Pit	3.20	N/A
	TP103		2.40	
	TP112		0.90	
	TP113		1.60	
	TP114		1.50	
	WS103	Window Sample Probehole	1.20	0.50–1.20
	WS104		1.00	0.50–0.70
	WS105		1.00	N/A
	WS108		5.45	1.00–4.00
	WS110		5.45	1.00–5.00
Investigation of In-filled Canal	TT105 A	Mechanically Excavated Trial Trench	2.20	N/A
	TT105 B		2.20	
	TT106 A		2.20	
Investigation of deeper soil horizons	CP107	Cable Percussive Borehole	14.00	
	CP108		19.50	
	CP109		19.50	

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 undertaken 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.

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.

During the initial site walkover, it was identified that existing buildings were inaccessible with plant required and so these areas could not be investigated. Return visits to carry out targeted investigation in these areas will be required when achievable. Furthermore, much of Parcel A was active at the time of investigation and so materials storage and access to other areas was also substantially limited.

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 V and presented in Table 3.8 and discussed in Section 5.

2.4. PERMEABILITY TESTS

A falling head permeability test was undertaken within environmental monitoring well WS110 in order to assess the likely permeability of the underlying strata to determine the potential suitability for soakaway drainage within the proposed development. The results are presented in Table 3.10 and the test certificates are included within Appendix VIII.

2.5. 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 IX 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 A

HOLE	DEPTH TO STRATUM (m bgl)			
	MADE GROUND GRAVEL	MADE GROUND SILT	CLAY	BEDROCK (SANDSTONE)
TP102	0.00–1.40	-	1.40–2.30	-
TP103	0.00–2.40	-	-	-
TP112	0.00–0.90	-	-	-
TP113	0.00-0.60	-	0.60-1.60	-
TP114	0.00–0.60	-	0.60–1.50	-
TT105A	0.00–1.80	1.80–2.20	-	-
TT105B	0.00–1.80	1.80–2.20	-	-
TT106A	0.00–1.80	1.80–2.00	-	-
WS103	0.00–1.20	-	-	-
WS104	0.00–1.00	-	-	-
WS105	0.00–1.00	-	-	-
WS108	0.00–0.60	-	0.60–5.45	-
WS110	0.00–0.60	-	0.60–5.45	-
CP107	0.00-1.00	-	1.00-13.20	13.20-14.00
CP108	0.00-2.40	-	2.40-18.70	18.70-19.50
CP109	0.00-1.00	-	1.00-18.80	18.80-19.00

3.2. TRIAL TRENCHES INVESTIGATING FORMER CANAL

Specific Findings

Parcel A

TT105A, TT105B and TT106A were underlain by Made Ground comprising black gravel of ash which had visible and olfactory evidence of hydrocarbons at depths between 0.30 m and 1.80 m bgl thought to have originated from the infilling of the historic canal and on-site processes.

The Made Ground was underlain by a soft silt between 1.80 m and 2.20 m bgl. It is considered that this material is indicative of the natural strata however, identification was made difficult due to the ingress of impacted perched groundwater, held in the former canal, coating the deposits in a hydrocarbon sheen.

3.3. MADE GROUND

Made Ground was encountered within all exploratory holes between ground level and 2.80 m bgl. The full depth to Made Ground was not determined in several exploratory hole locations due to the presence of obstructions, ingress of groundwater flooding the excavation and suspected basement floor slabs.

The majority of exploratory holes were surfaced by concrete between ground level and 0.30 m bgl.

Made Ground mainly comprised gravelly black ash with frequent cobbles with gravel of mudstone, concrete, brick and asphalt and cobbles of brick which was encountered between ground level and 2.80 m bgl.

Gravelly ash which presented a strong hydrocarbon odour and sheen were encountered within TT105A, TT105B and TT106A. In particular visual and olfactory contamination was present in the north of Parcel A associated with the historically infilled canal. Furthermore, it is considered that the impact relates to the perched water held within the former canal channel.

Large obstructions including brick and concrete were encountered within the majority of exploratory hole locations. Brick walls were noted in TP102 and TP103.

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 where the Made Ground could be penetrated and were found to be generally uniform across the area. Natural clay strata directly underlay the Made Ground.

Drift deposits comprised firm to very stiff brown slightly gravelly CLAY which was encountered between 0.60 m and 5.45 m bgl.

Deeper cable percussive drilling found this natural clay strata to depths in excess of 10m 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 the bedrock (sandstone) strata from depths between 13.20m and 18.80m bgl.

The closest BGS borehole encountered sandstone bedrock at 23.0 m bgl which corroborates a dip to the west.

3.6. GROUNDWATER

Groundwater strikes were encountered as seepages and what was considered to be water held within the former infilled reservoir. These were generally encountered between 0.70 m and 2.20 m bgl. The depth of the seepages are shown on the exploratory hole records in Appendix V and are summarised in Table 3.2.

TABLE 3.2 SUMMARY GROUNDWATER STRIKES

LOCATION	DEPTH TO STRIKE (m)	NOTES
TT105 A	1.20	Rapid Ingress
TT105B	1.20	Rapid Ingress
TP106	0.70	Slow Ingress
WS108	1.00	Slow Ingress
WS108	1.40	Slow Ingress
WS108	2.00	Slow Ingress
WS108	3.00	Slow Ingress

Monitoring was undertaken using an electronic dip meter and interface probe to record the depth to groundwater and the thickness of any free-phase hydrocarbon product, if present. These results are summarised in Table 3.12.

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 3.3.

TABLE 3.3 SUMMARY VISUAL AND OLFACTORY EVIDENCE OF CONTAMINATION

LOCATION	DEPTH (m)	STRATUM	NOTES
TT105A	0.30–1.80	MADE GROUND	Hydrocarbon odour and sheen
TT105B	0.30–1.80	MADE GROUND	Hydrocarbon odour and sheen
TT106A	0.60–1.80	MADE GROUND	Hydrocarbon 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 3.4 and Table 3.5, 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 3.4 SUMMARY OF HAND SHEAR VANE TESTS

LOCATION	DEPTH	SHEAR STRENGTH (kPA)	CALCULATED ALLOWABLE BEARING PRESSURE (kN/m^2)
TP102	1.50	100.00	235.00
TP102	1.80	97.00	227.95
TP113	1.00	130.00	305.50
TP114	1.00	125.00	293.75
TP114	1.20	126.00	296.10

Results of the standard penetration tests, including undrained shear strengths derived from SPTs are included in Table 3.6.

TABLE 3.5 SUMMARY OF UNDRAINED SHEAR STRENGTH TEST RESULTS

LOCATION	SAMPLE DEPTH (m)	LAB DESCRIPTION	UNDRAINED SHEAR STRENGTH (kN/m^2)	CONSISTENCY
WS110	3.50–4.00	Stiff brown slightly gravelly slightly sandy CLAY.	119	Stiff

3.9. SIDE STABILITY AND EASE OF EXCAVATION

The majority of exploratory hole locations were noted to have been unstable due to the presence of loose ash and Made Ground.

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

A number of locations throughout all three parcels could not be fully penetrated due to the presence of underlying concrete floor slabs, flooding of excavations and unstable ground conditions. 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.

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 3.6 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/m²)
WS108	1	CLAY	4	4.03	N/A	Low strength	Firm	20.16
WS108	2	CLAY	11	10.05	N/A	Medium strength	Stiff	50.24
WS108	3	CLAY	18	15.65	N/A	High strength	Very Stiff	78.27
WS108	4	CLAY	22	18.59	N/A	High strength	Very Stiff	92.93
WS108	5	CLAY	24	19.91	N/A	High strength	Very Stiff	99.55
WS110	1	CLAY	8	8.07	N/A	Medium strength	Stiff	40.33
WS110	2	CLAY	22	20.10	N/A	High strength	Very Stiff	100.49
WS110	3	CLAY	23	20.00	N/A	High strength	Very Stiff	100.01
WS110	4	CLAY	23	19.43	N/A	High strength	Very Stiff	97.16
WS110	5	CLAY	23	19.08	N/A	High strength	Very Stiff	95.41
CP107	1	CLAY	1	1.01	N/A	Extremely low strength	Very Soft	5.04
CP107	2	CLAY	1	0.91	N/A	Extremely low strength	Very Soft	4.57
CP107	3	CLAY	19	16.52	N/A	High strength	Very Stiff	82.62
CP107	4	CLAY	16	13.52	N/A	Medium strength	Stiff	67.59
CP107	5	CLAY	20	16.59	N/A	High strength	Very Stiff	82.96
CP107	7.5	CLAY	26	21.09	N/A	High strength	Very Stiff	105.47
CP107	10.5	CLAY	22	17.36	N/A	High strength	Very Stiff	86.78

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)
CP107	12	CLAY	39	29.03	N/A	High strength	Very Stiff	145.13
CP107	13.5	SANDSTONE	50	35.24	Dense	N/A	N/A	N/A
CP107	14	SANDSTONE	52	36.02	Dense	N/A	N/A	N/A
CP108	3	CLAY	14	12.18	N/A	Medium strength	Stiff	60.88
CP108	4	CLAY	24	20.28	N/A	High strength	Very Stiff	101.38
CP108	5	CLAY	16	13.27	N/A	Medium strength	Stiff	66.37
CP108	7.5	CLAY	15	12.17	N/A	Medium strength	Stiff	60.85
CP108	10.5	CLAY	25	19.72	N/A	High strength	Very Stiff	98.61
CP108	12	CLAY	27	20.10	N/A	High strength	Very Stiff	100.48
CP108	15	CLAY	26	17.41	N/A	High strength	Very Stiff	87.05
CP108	18	CLAY	50	30.43	N/A	Very high strength	Very Stiff	152.17
CP108	19	SANDSTONE	50	29.53	Medium Dense	N/A	N/A	N/A
CP108	19.5	SANDSTONE	52	30.26	Dense	N/A	N/A	N/A
CP109	1	CLAY	8	8.07	N/A	Medium strength	Stiff	40.33
CP109	2	CLAY	18	16.44	N/A	High strength	Very Stiff	82.22
CP109	3	CLAY	17	14.78	N/A	Medium strength	Stiff	73.92
CP109	4	CLAY	13	10.98	N/A	Medium strength	Stiff	54.92
CP109	5	CLAY	20	16.59	N/A	High strength	Very Stiff	82.96
CP109	7.5	CLAY	17	13.79	N/A	Medium strength	Stiff	68.96

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)
CP109	10.5	CLAY	26	20.51	N/A	High strength	Very Stiff	102.56
CP109	13.5	CLAY	50	35.24	N/A	Very high strength	Very Stiff	176.22
CP109	15	CLAY	34	22.77	N/A	High strength	Very Stiff	113.84

3.10. SOIL COMPRESSIBILITY

A sufficient sample of the natural underlying cohesive strata could not be obtained within Parcel A. However, samples within the wider site show the CLAY to be of medium compressibility assuming a high rise load in excess of 150 kN/m2 is generated, which is consistent with the soils visual description.

3.11. SOIL INFILTRATION

In-situ variable (falling) head permeability tests were undertaken within the monitoring well installation located in WS110. The installation was noted to have a head of water prior to the test being undertaken however were not flooded, therefore the tests were undertaken in the unsaturated zone. Tests in WS110 were undertaken within monitoring wells with response zones located in the natural cohesive drift stratum.

The results are presented in Table 3.7 and the test certificates are included within Appendix VIII.

TABLE 3.7 SOIL INFILTRATION RESULTS

LOCATION	DEPTH (m)	MATERIAL	TEST No.	SOIL INFILTRATION RATE (m/s)
WS110	1.00-5.00	Stiff medium strength Brown Clay	1	5.25E-07

Soil infiltration was taken over the wetted area from between 75% and 25% of the effective depth. All tests showed cohesive drift deposits to have poor soakage potential as a result of the cohesive nature of the materials and high water table found across the site.

Therefore, considering the significant volumes of low permeability clay on the site, it is considered that soakaway drainage is not suitable for the proposed development. However, the application of soakaway drainage will ultimately be dependent on the specific requirements of the development. All soakaways should be designed in accordance with BRE Special Digest 365 – *Soakaway Design*.

3.12. 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:

$$I'p = Ip \times (\% < 425\ \mu m/100)$$

In other words, if PI is 30%, but the soil contains 80% < 425 µm, then I'p = 30 × 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 3.8, show the clay to be of predominantly low plasticity with discrete areas of moderate plasticity clay.

TABLE 3.8 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
WS108	1.00	23	25	58	33	95	31.35	MEDIUM
WS110	2.00	16	19	40	21	92	19.32	LOW

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.

3.13. pH AND SULPHATE

Chemical analyses for pH and soluble sulphate content contained in Appendix VI (summarised in Table 3.9), shows that the soils in the wider site generally meet Class DS-1, Aggressive Chemical Environment for Concrete Classification (ACEC) AC-1s in accordance with BRE *Special Digest 1* (2005). However, elevated sulphate concentrations in TT103A at 1.50 m bgl have been identified which classify the Made Ground deposits as been classes as DS-2 AC-1s. However, upon completion of site enabling works it will, in all likelihood, be DS1 AC1s.

TABLE 3.9 SUMMARY OF pH AND SULPHATE DATA

LOCATION	DEPTH (m)	SO_4 IN 2:1 WATER/SOIL (g/l)	pH VALUE	CLASSIFICATION
TP108	2.10	0.27	8.1	DS-1 AC-1s
TP117	1.60	0.47	9.1	DS-1 AC-1s
TP117	2.90	0.16	6.9	DS-1 AC-1s
TT102B	1.70	0.039	8.4	DS-1 AC-1s
TT103A	1.50	0.76	8.5	DS-2 AC-1s

3.14. 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*.

3.15. 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 3.10 GROUND GAS MONITORING LOCATION RATIONALE

LOCATION	GROUND GAS SOURCE	DEPTH OF MONITORING WELL (m)
WS103	Made Ground	0.50–1.20
WS104	Made Ground	0.50–0.70
WS108	CLAY	1.00–4.00
WS110	CLAY	1.00–5.00

3.16. MONITORING METHODOLOGY

Concentrations of methane (CH_4), carbon dioxide (CO_2) and oxygen (O_2) 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 CH_4 and CO_2, together with the lowest concentration of O_2 were recorded. The results of the ground gas monitoring are presented in Table 3.11.

TABLE 3.11 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)
WS103	9/12/19	0.10	0.10	0.0001	0.20	0.20	0.0002	18.80	1006	Rising	0.10	0.50-1.20	1.00	1.00
	5/2/20	0.10	0.10	0.0061	0.40	0.40	0.0244	16.80	1033	Falling	6.10		2.76	1.00
WS104	9/12/19	0.10	0.10	0.0001	0.10	0.10	0.0001	19.50	1006	Rising	0.10	0.50-0.70	0.70	Dry
	5/2/20	0.10	0.10	0.00026	0.10	0.10	0.0003	19.70	1033	Falling	0.26		0.70	Dry
WS108	9/12/19	0.10	0.10	0.00238	0.10	0.10	0.0024	20.30	1006	Rising	2.38	1.00-4.00	3.40	0.87
	5/2/20	0.10	0.10	-0.00127	1.10	1.10	-0.0140	15.30	1033	Falling	-1.27		Bung jammed	
WS110	9/12/19	0.10	0.10	-0.00079	0.10	0.10	-0.0008	19.90	1006	Rising	-0.79	1.00-5.00	Bung jammed	
	5/2/20	0.10	0.10	0.0001	0.10	0.10	0.0001	15.10	1033	Falling	0.10		Bung jammed	

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	39	TP112 0.50 m	1	**Further Action**
Cadmium	mg/kg	17	7	1.5	N/A	1	No Further Action
Chromium (VI)	mg/kg	6.1	7	<.4.0	N/A	1	No Further Action
Lead	mg/kg	200	7	410 590	TP112 0.50 m WS104 0.70 m	1	**Further Action**
Mercury	mg/kg	1.2	7	0.6	N/A	3	No Further Action
Nickel	mg/kg	180	7	51	N/A	1	No Further Action
Selenium	mg/kg	250	7	3.0	N/A	1	No Further Action
Copper	mg/kg	2400	7	1000	N/A	1	No Further Action
Zinc	mg/kg	3700	7	380	N/A	1	No Further Action
Cyanide – Total	mg/kg	791	7	<1	N/A	1	No Further Action
Phenols – Total	mg/kg	210	7	<1.0	N/A	1	No Further Action
Asbestos	Fibres	NFD	4	0.008	TP112 0.50 m	4	**Further Action**
Naphthalene	mg/kg	2.3	7	<0.05	N/A	3	No Further Action
Acenaphthylene	mg/kg	170	7	2.3	N/A	2	No Further Action
Acenaphthene	mg/kg	210	7	12	N/A	1	No Further Action
Fluorene	mg/kg	170	7	13	N/A	1	No Further Action
Phenanthrene	mg/kg	95	7	36	N/A	2	No Further Action
Anthracene	mg/kg	2400	7	17	N/A	2	No Further Action
Fluoranthene	mg/kg	280	7	130	N/A	2	No Further Action
Pyrene	mg/kg	620	7	130	N/A	2	No Further Action
Benzo(a)Anthracene	mg/kg	7.2	7	39	TT105A 2.00m	2	**Further Action**
Chrysene	mg/kg	15	7	39	TT105A 2.00m	2	**Further Action**
Benzo(b)Fluoranthene	mg/kg	2.6	7	4.0 30	TP112 0.50 m TT105A 2.00 m	2	**Further Action**
Benzo(k)Fluoranthene	mg/kg	77	7	14	N/A	2	No Further Action
Benzo(a)Pyrene**	mg/kg	2.2	7	4.7 27	TP112 0.50 m TT105A 2.00 m	2	**Further Action**
Indeno(123-cd)Pyrene	mg/kg	27	7	11	N/A	2	No Further Action
Dibenzo(a,h)Anthracene	mg/kg	0.24	7	0.85	TP112 0.50 m	2	**Further Action**
Benzo(ghi)Perylene	mg/kg	320	7	14	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 (aliphatic)*	mg/kg	74	7	4.8	N/A	3	No Further Action

DETERMINANT	UNIT	GAC	N	MC	LOC. OF EX	PATH-WAY	ASSESSMENT
TPH C12-C16 (aliphatic)*	mg/kg	140	7	44	N/A	3	No Further Action
TPH C16-C21 (aliphatic)*	mg/kg	260	7	390	TT105 A 2.00 m	1	Further Action
TPH C21-C35 (aliphatic)*	mg/kg	1100	7	7100	TT105 A 2.00 m	1	Further Action
TPH C5-C7 (aromatic)*	mg/kg	70	7	<0.001	N/A	3	No Further Action
TPH C7-C8 (aromatic)*	mg/kg	130	7	<0.001	N/A	3	No Further Action
TPH C8-C10 (aromatic)*	mg/kg	34	7	<0.001	N/A	3	No Further Action
TPH C10-C12 (aromatic)*	mg/kg	74	7	2.1	N/A	3	No Further Action
TPH C12-C16 (aromatic)*	mg/kg	140	7	53	N/A	3	No Further Action
TPH C16-C21 (aromatic)*	mg/kg	260	7	390	TT105 A 2.00 m	1	Further Action
TPH C21-C35 (aromatic)*	mg/kg	1100	7	2200	TT105 A 2.00 m	1	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:

- Lead;
- Arsenic;
- Asbestos (chrysotile fibres 0.008%);
- Benzo(a)Anthracene;
- Chrysene;
- Benzo(b)Fluoranthene;
- Benzo(a)Pyrene;
- Dibenzo(a,h)Anthracene;
- TPH C16-C21 (aromatic);
- TPH C21-C35 (aromatic)
- TPH C16-C21 (Aliphatic);
- TPH C21-C35 (Aliphatic)

Laboratory analysis of the soils across the site has indicated the presence of asbestos, elevated metals, non-volatile PAHs, and non-volatile TPH compounds within the Made Ground.

Elevated naphthalene has not been identified within soil samples obtained within Parcel A.

Potentially volatile fractions of total petroleum hydrocarbons have not been identified within Parcel A.

Asbestos was identified in one sample of four submitted for analysis from Parcel a. Asbestos in the form of Chrysotile was identified in TP112 at 0.50m bgl and further quantified to confirm 0.008% v/v which can be carefully managed within the site.

The results of this direct comparison also indicate that the following SVOCs have been identified above the LOD:

- 2-Methylnaphthalene (TT105A at 2.00 m) to 1.0mg/kg
- Dibenzofuran (TT105A at 2.00 m) to 2.7mg/kg.

Such sources of semi volatile organic (aromatic) compounds (SVOCs) are used as fuel additives and present in coal tar respectively. As such these may be associated with the historic site uses as a former works, factory and garage. No S4UL values exist currently for these compounds.

The majority of the exceedances were noted in trial trenches located in the proximity of the former canal.

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;
  - Consumption of homegrown vegetables;
- All exceedances have been identified in the Made Ground generally less than 2.00m in depth.

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 minimum 300 mm chemically suitable cover system within all proposed soft standing landscaped areas.

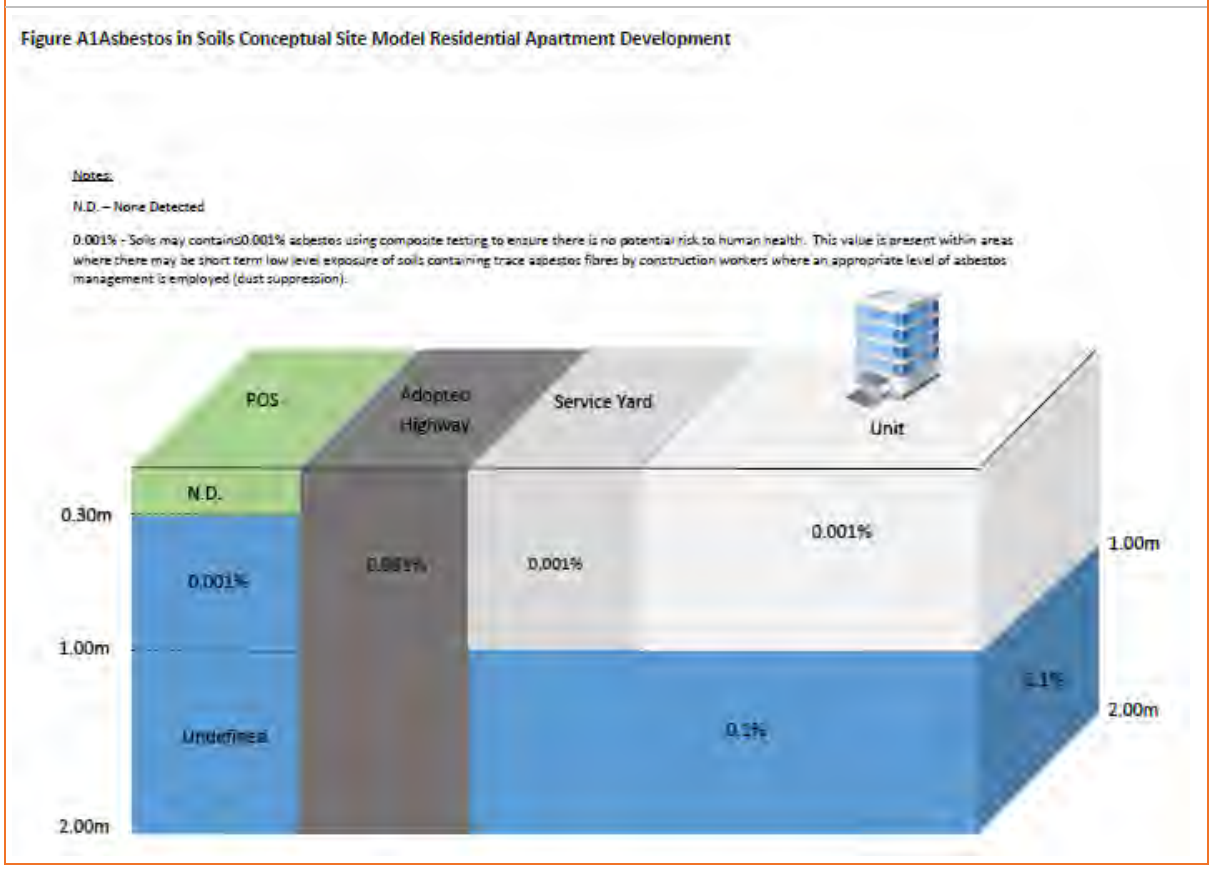
The specific design and installation process for the appropriate cover systems will be clearly defined within the site remediation and enabling works strategy; however, industry best practice (as outlined within BRE 465) will require the following minimum depths of certified clean cover:

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

Asbestos was identified in one sample out of four submitted for analysis by E3P. Quantification identified asbestos above >0.001% in TP112 at 0.50 m bgl (0.008%). With reference to the E3P Asbestos Conceptual Site Model shown below, Made Ground deposits will require placement below plots or a 300 mm cover system (150 mm topsoil, 150 mm subsoil) in order to mitigate the risks to future residential end users (Figure 4.1).

Made Ground in locations where asbestos has been identified above <0.001% but less than 0.1% 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.

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



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 landscaping areas.

With regards to the detected SVOCs in TT105A and TP112, these post a potential volatile risk with future accumulation in confined spaces and inhalation by future end users. Given the locations identifying the compounds it is likely that this is due to the materials within the former canal. It is likely therefore that the 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 the risk.

Due to the access limitations at the site during the works it will be necessary for supplementary post demolition sampling at the site.

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 1 km of the site.	**Low**
Aquifer Classification in Superficial Drift Deposits	The underlying superficial deposits located within the Secondary undifferentiated aquifer are likely to comprise gravelly 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	Principal Aquifer (western area of parcel A) Secondary B Aquifer (remainder of the site)	**High**
Viability for Anthropogenic Soil in Direct Contact with Aquifer (Drift or Bedrock)	Variable Made Ground with high-level (predominantly low-solubility) hydrocarbon impact is present throughout the Made Ground to maximum proven depth of 2.80 m bgl.	**Moderate**
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.	**Low**
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 Principal 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	TPHC5-C6 has not been identified within the chemical analysis of soils at the site.
Total VOC > 1 mg/kg	
Total SVOC > 1 mg/kg	Exceedances in PAHs throughout the site with a maximum concentration of Chrysene at 39 mg/kg.
C5-C10 > 5 mg/kg	All concentrations are below the laboratory LOD
C10-C12 > 10 mg/kg	All concentrations are below the laboratory LOD
C12-C16 > 50 mg/kg	All concentrations are below the laboratory LOD
Phenols > 2 mg/kg	All concentrations are below the laboratory LOD
Naphthalene > 2 mg/kg	The most soluble SVOC (naphthalene) has not been identified at concentrations greater than 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 of chrysene at 39mg/kg.
PCB > 1 mg/kg	No potential sources of PCB have been identified
Heavy metals > 500 mg/kg	Heavy metals have been identified throughout the site at concentrations above 500 mg/kg, with a maximum concentration of copper identified in TP112 at 0.50 m bgl (1000 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 and Principal 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	2	28.6	WS108	Further Action
Cadmium	µg/l	0.08	0.45	5	1	2	<0.08	–	No Further Action
Chromium (VI)	µg/l	3.4	–	–	1	2	<5.0	–	No Further Action
Chromium (III)	µg/l	4.7	–	50	1	2	20	-	No Further Action
Copper (hardness)	µg/l	1–28	–	2000	1	2	18	–	No Further Action
Total Cyanide	µg/l	1	–	50	1	2	3.7	-	No Further Action
Lead	µg/l	1.2	14	10	1	2	18	WS110	Further Action
Mercury	µg/l	–	0.07	1.0	1	2	<0.05	–	No Further Action
Nickel	µg/l	4	34	20	1	2	4.6	–	No Further Action
Selenium	µg/l	–	–	10	1	2	6.6	-	No Further Action
Zinc (hardness)	µg/l	8–125	–	–	1	2	12	–	No Further Action
pH	6–9				1	2	7.6–12.0	WS110	Further Action
PAH									
Naphthalene	µg/l	2	130	10*	1	2	1.1	-	No Further Action
Anthracene	µg/l	0.1	0.1		1	2	0.1	-	No Further Action
Benzo[b]fluoranthene	µg/l	1.7–4	0.017		1	2	0.01	-	No Further Action
Benzo[k]fluoranthene	µg/l	1.7–4	0.017		1	2	<0.01	-	No Further Action
Benzo(a)pyrene	µg/l	1.7–4	0.27		1	2	<0.01	-	No Further Action
Fluoranthene	µg/l	0.0063	0.12		1	2	<0.01	-	No Further Action
Benzo(ghi)perylene	µg/l	1.7–4	8.2–3		1	2	<0.01	-	No Further Action
TPH-Aromatic									
TPH C5-C6 (benzene)	µg/l	10	50	1	1	2	<1.0	–	No Further Action
TPH C6-C8 (toluene)	µg/l	50	–	700	1	2	<1.0	–	No Further Action
TPH C8-C10 (ethyl Benzene)	µg/l	20	–	300	1	2	<1.0	–	No Further Action
TPH C10-C12 (xylene)	µg/l	30	–	500	1	2	<10	-	No Further Action
TPH C12-C16	µg/l	2	130	90[5]	1	2	<10	-	No Further Action
TPH C16-C35	µg/l	50#	50#	90[5]	1	2	<10	-	No Further Action

DETERMINAND	UNIT	EQS SCREENING VALUE[1, 2, 3]		DWS [3,4,5]	N		MC	LOC. OF EX	ASSESSMENT
		AA	MAC		L	GW			
TPH Aliphatic[5]									
TPH C5-C6	µg/l	–	–	15000	1	2	<1.0	–	No Further Action
TPH C6-C8	µg/l	–	–	15000	1	2	<1.0	–	No Further Action
TPH C8-C10	µg/l	–	–	300	1	2	<1.0	–	No Further Action
TPH C10-C12	µg/l	–	–	300	1	2	<10	–	No Further Action
TPH C12-C16	µg/l	–	–	300	1	2	<10	-	No Further Action
TPH C16 – C21	µg/l	–	–	300**	1	2	<10	-	No Further Action
TPH C21-C35	µg/l	–	–	300**	1	2	<10	-	No Further Action
VOC									
Tetrachloroethylene	µg/l	0.4	–	10	N/A	2	<1.0	–	No Further Action
Trichloroethylene	µg/l	10	–	10		2	<1.0	–	No Further Action
Trichlorobenzene	µg/l	0.4	–	–		2	<1.0	–	No Further Action
Trichloromethane	µg/l	2.5	–	–		2	<1.0	–	No Further Action
Dichloromethane	µg/l	20	–	200		2	<1.0	–	No Further Action
Carbon Tetrachloride	µg/l	12	–	3		2	<1.0	–	No Further Action
Vinyl Chloride	µg/l	–	–	0.3		2	<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 DGW values for the following inorganic compounds:

- pH
- Arsenic
- Lead

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 would not otherwise do so 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 B and Principal aquifer, there is considered to be a low risk to controlled waters and the wider environ as, in the absence of a groundwater potable abstraction, no complete pollutant linkage can be determined.

Based on the expected development at the site, It is envisaged that during excavation of materials to for a basement, groundwater pumping will be required based on the existing high water table. This water will require appropriate discharge with permits where applicable. However, in this process much of the impacted groundwater will be pumped out and the source soils removed.

Given the perched water currently held within the former canal, this will require pumping out with appropriate off site disposal with the potential contaminant issues considered.

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:

$$GSV = \frac{concentration\ (by\ vol)}{100} \times flowrate\ (1\ /\ hr)$$

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

The two monitoring visits completed to date identify a groundwater level throughout the site between 0.80m and 1.00m bgl. This supports the findings during the site investigation. In the majority of cases the wells are set within a predominantly cohesive strata and groundwater levels could be a result of percolating or surface water collecting in the well.

4.3.3. GAS FLOW

During the monitoring a positive flow was noted in all four wells (WS103, 104, 108 and 110) during at least one visit. 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.

Negative flows are indicative of back pressure from wind being greater than the active flow from the wells. Negative flows were recorded in WS108 and WS110 on one of the two visits completed to date.

4.3.4. GAS CONCENTRATIONS

Methane has not been recorded within monitoring wells above the trigger level (0.1% v/v) of the equipment at any location.

Carbon dioxide concentrations were recorded within the monitoring well WS103 at concentrations ranging from 0.2% v/v to 0.4% v/v. Within the remaining wells, levels above the CO2 trigger level on the equipment were not reached. The maximum carbon dioxide levels were also associated with low oxygen concentrations and appear to be associated with Made Ground, identified in WS103.

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
WS103	0.40	0.0244	0.10	0.0061	Green (CS1)
WS104	0.10	0.0003	0.10	0.00026	Green (CS1)
WS108	1.10	-0.0140	0.10	0.00238	Green (CS1)
WS110	0.10	-0.0008	0.10	-0.00079	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 identified presence of SVOC and VOC within chemical analysis of the soils at the site (Made Ground) there is a resulting potential for vapour risks. It may therefore be a requirement for vapour membranes to be installed within the building structure following further assessment.

4.4. RESIDENTIAL BUILDING GAS RISK MITIGATION

British Standard BS8485 (2015)+A1(2019) provides two types of residential property that require assessment. These building types are:

- **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

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;	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
	Good performance	1.5	

• Polystyrene void former blanket; • Geocomposite void former blanket; • No-fines gravel layer with gas drains; and • No-fines gravel layer.			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".
(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".

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/m^2/atm (average) for sheet and joints (tested in accordance with BS ISO 15105-1 manometric method);	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/m^2 for

- 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.		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 Current 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	<1.0
EC16-EC40 Aliphatic and Aromatic Hydrocarbons	500	<1.0
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?	There were exceedances throughout the site outside of the pipeline depth, above the PE threshold.	
Is free product present in soil and groundwater?	A hydrocarbon sheen has been noted within TT105A, TT105B.	
Could hydrocarbon impact at greater depth than current pipeline depth be mobilised by rising groundwater levels?	Volatile hydrocarbon impact and PAH have not been identified through the site. However, groundwater has been identified through the site within the intended pipeline depth.	
Will soils impacted with above determinants likely be utilised elsewhere on site?	Widespread contamination has been identified throughout the site, which may result in cross contamination.	
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 barrier pipe will be required at the proposed development.

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: Heavy metals (Lead, Arsenic) identified throughout Made Ground between depths of 0.50m to 2.20m 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.						

PL3	Volatile Contaminants such as hydrocarbons, solvents, antifreeze (Made Ground, Engineering works, canal infill)	Inhalation of vapours. Migration through permeable strata and preferential pathways.	Future site users. Off-site receptors.	Not Identified	Low	**Low**
Assessment: Potentially aromatic volatile compounds have been identified within two locations advanced at the site. These have a risk of accumulation within confined spaces and resulting vapour inhalation risks to the future end users. Initially, the impacted perched groundwater will require pumping and off site removal. The resulting soils should then be either excavated and removed from site in full, or treated on site to remove the risk, or further assessment is required to determine the resulting risk to future end users through a DQRA and vapour monitoring leading to the potential requirement of vapour membranes to the building structure. **Recommendation:** Removal of impacted soils from the site in full, treatment of soils on site to remove the risk, or further assessment to determine the risk.						
PL4	ACM in Made Ground	Inhalation of dust.	Future site users. Buildings. Off-site land users.	Present	Moderate	**LOW**
Assessment: Asbestos was identified in one sample out of 4 submitted for analysis by E3P. Quantification identified TP112 at 0.50 m bgl (0.008%). 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.

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.

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 (Principal aquifer). 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).						
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 wider site obtained during the site investigation. This highlighted one location outside of Parcel A that would require DS-2 Ac-1s concrete classification, all other locations 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 PE pipeline could be suitable.

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 is not currently in receipt of any development plan but understands that the three sites referred to as parcel A, B and C will be considered for residential high rise buildings with commercial uses at the ground floor level and possible undercroft parking provision.

5.2. SUMMARY OF GROUND CONDITIONS

Made Ground

Made Ground was encountered within all exploratory holes between ground level and 2.80 m bgl. The full depth to Made Ground was not determined in several exploratory hole locations due to the presence of obstructions, ingress of groundwater flooding the excavation and suspected basement floor slabs.

The majority of exploratory holes were surfaced by concrete between ground level and 0.30 m bgl.

Made Ground mainly comprised gravelly black ash with frequent cobbles with gravel of mudstone, concrete, brick and asphalt and cobbles of brick which was encountered between ground level and 2.80 m bgl.

Gravelly ash which presented a strong hydrocarbon odour and sheen were encountered within TT105A, TT105B and TT106A. In particular visual and olfactory contamination was present in the north of Parcel A associated with the historically infilled canal. Furthermore, it is considered that the impact relates to the perched water held within the former canal channel.

Large obstructions including brick and concrete were encountered within the majority of exploratory hole locations. Brick walls were noted in TP102 and TP103.

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

Drift

The natural drift deposits were identified where the Made Ground could be penetrated and were found to be generally uniform across the area. Natural clay strata directly underlay the Made Ground.

Drift deposits comprised firm to very stiff brown slightly gravelly CLAY which was encountered between 0.60 m and 5.45 m bgl.

Deeper cable percussive drilling found this natural clay strata to depths in excess of 10m 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 the bedrock (sandstone) strata from depths between 13.20m and 18.80m bgl.

The closest BGS borehole encountered sandstone bedrock at 23.0 m bgl which corroborates a dip to the west.

Groundwater

Groundwater strikes were encountered as seepages and what was considered to be water held within the former infilled reservoir. These were generally encountered between 0.70m and 2.20m bgl.

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.
- Processing of the Made Ground in full, including removal of oversize (>120mm) obstructions with reengineering to mitigate any potential settlement in the strata,
- Installation of a suitable geotechnically designed piling mat.
- 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 5.1 SUMMARY OF ABPS IN PARCEL A

COHESIVE SOILS			
Description	**Depth (range m bgl)**	**Undrained Shear Strength (Cu) (kN/m²)**	**Allowable Bearing Pressure (kN/m²)**
Firm low strength Gravelly CLAY (WS108)	1.00–1.45	20	41
Stiff to very stiff gravelly CLAY	1.00–1.45	40	82
	2.00-2.45	50-100	103-206
	3.00-3.45	78-100	160-205
	4.00-4.45	92-97	191-199
	5.00-5.45	95-99	196-204

Within parcel A, the underlying natural drift deposits comprised firm to very stiff CLAY with an ABP of circa 100kN/m^2 from 2.00m bgl generally increasing in excess of 125kN/m2 from 3.00m bgl.

However, depending on the height of the proposed structure the underlying bedrock at greater than 10m bgl is likely to be the suitable target stratum providing a suitable bearing capacity in excess of 1500kN/m^2. At present the design of the proposed building has not been provided and so the ultimate design parameters are beyond the scope of this report.

TABLE 5.2 ANTICIPATED FOUNDATIONS PARCEL A

LOCATION	ANTICIPATED FOUNDING STRATA DEPTH (m bgl)	GROUND WATER (m bgl)	TARGET STRATUM	TREES	FOUNDATION TYPE	TYPE OF CONCRETE
TP102	>2.50	–	Bedrock	N	It is expected given the proposed development that a driven pile or CFA pile will be the optimum foundation solution.	DS-1 AC-1s
TP103	>2.50	–	Bedrock	N		DS-1 AC-1s
TP112	>2.50	–	Bedrock	N		DS-1 AC-1s
TP113	>2.50	–	Bedrock	N		DS-1 AC-1s
TP114	>2.50	–	Bedrock	N		DS-1 AC-1s
TT105A	>2.50	1.20	Bedrock	N		DS-1 AC-1s
TT105B	>2.50	1.20	Bedrock	N		DS-1 AC-1s
WS103	>2.50	–	Bedrock	N		DS-1 AC-1s
WS104	>2.50	–	Bedrock	N		DS-1 AC-1s
WS105	>2.50	–	Bedrock	N		DS-1 AC-1s
WS108	>2.50	1.40	Bedrock	N		DS-1 AC-1s
WS110	>2.50	–	Bedrock	N		DS-1 AC-1s
CP107	>2.50	-	Bedrock	N		DS-1 AC-1s
CP108	>2.50	-	Bedrock	N		DS-1 AC-1s
CP109	>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 to support the structure of the proposed development;
- Or similarly a CFA Pile

A conceptual 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.

If the ground floor slab is to be constructed with a beam and block floor, a minimum subfloor void of 200 mm to 250 mm is required within any structures located in the zone of conjectured tree influence.

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 5.3.

TABLE 5.3 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 across the wider site generally meet Class DS-1, Aggressive Chemical Environment for Concrete Classification (ACEC) AC-1s in accordance with BRE Special Digest 1 (2005).

However, elevated sulphate concentrations in TT103A at 1.50 m bgl (Parcel B) have been identified which classify the Made Ground deposits as been classes as DS-2 AC-1s. However, upon completion of site enabling works it will, in all likelihood, be DS1 AC1s.

5.10. EXCAVATIONS

The majority of exploratory hole locations were noted to have been unstable due to the presence of loose ash.

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

A number of locations throughout all three parcels could not be fully penetrated due to the presence of underlying concrete floor slabs, flooding of excavations and unstable ground conditions. 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.

However, due to the depth and variability of the Made Ground and likelihood of trench collapse, it is considered that all excavations are supported or battered back in accordance with guidance contained in CIRIA R97.

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.

TABLE 5.4 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. A significant excavation will be required in order to form the basement/undercroft car park within the structure. This will require groundwater pumping with subsequent discharge.
Shallow Bedrock	No	Shallow bedrock has been identified within cable percussive 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 and will need prior treatment during enabling works.

5.11. SLOPE STABILITY

A small retaining wall is thought to retain the highway to the east of parcel A. This should be suitably assessed by a structural specialist and considered in the ultimate design.

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 of north and west of Parcel A upon demolition of structures (currently not accessible);
- Vapour risk assessment;
- Investigation of retaining wall in east of Parcel A by structural engineer;
- 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:

- 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 across the site has indicated the presence of elevated metals, non-volatile PAHs, and non-volatile TPH compounds within the Made Ground. Naphthalene, mercury and volatile TPH were also identified throughout the site. Asbestos was also identified in eight samples out of 16 submitted for analysis by E3P. The majority of the identified elevated concentrations have primary exposure pathways related to dermal contact and ingestion of soil. These exceedances can be mitigated by the installation of a 300 mm chemically suitable cover system within all proposed landscaping areas. With regards to the elevated SVOCs, VOCs, naphthalene, mercury and TPHs, these present a potential volatilisation to indoor air risk and have been identified throughout the site but predominantly within the infilled canal materials. Where these soils are not removed from site in their entirety, it is recommended that a vapour risk assessment be completed at the site to determine the potential for release and accumulation in internal areas and the required extent of any remediation. Alternatively, a vapour membrane should be installed to all structures. With regards to the asbestos, quantification identified WS112 at 1.20m to have concentrations below <0.001%. However, TP112 at 0.50 m bgl was noted to have asbestos above at 0.008%. 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	Low risk to controlled waters.
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. Assessment utilising the existing soils suggests that PE pipeline will be suitable however suitable assessment should be completed using post remediation soils analysis taken from the specific location of pipeline placement. An allowance for specialist pipelines should be retained.

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 presence of impacted Made Ground, subsurface concrete and brick structures in the associated locations. 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 stank 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/m^2 at circa 2.00 m bgl increasing in excess of 120 kN/m^2 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.

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10. New information, revised practices or changes in legislation may necessitate the re-interpretation of the report, in whole or in part.

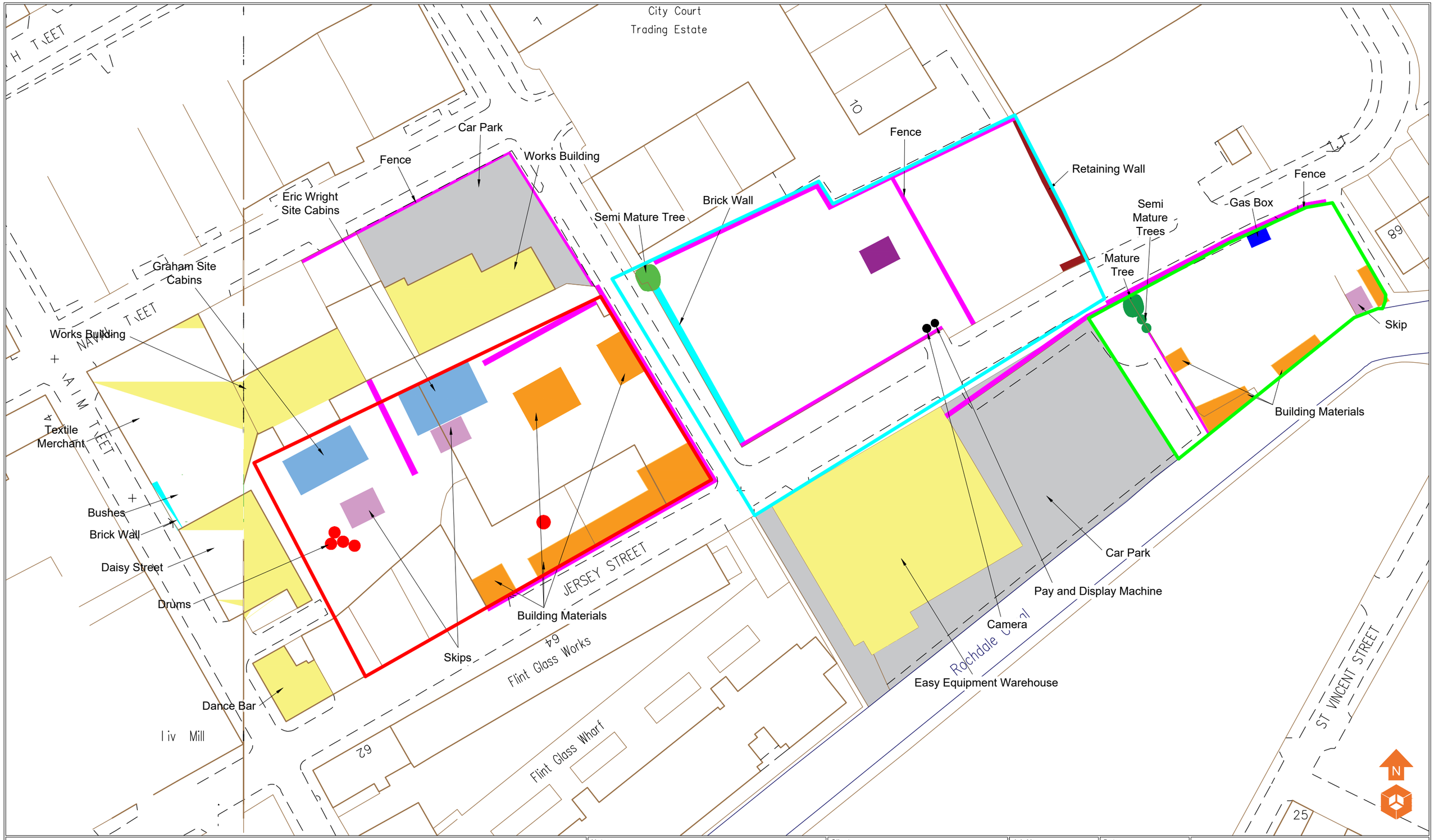
APPENDIX II
GLOSSARY

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
CML	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

MIBK	Methyl isobutyl ketone	**WTE**	Water table elevation
m	Metres	**ppm**	Parts per million
km	Kilometres	**mg/m^3**	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/m^2**	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:

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

Client: Manchester Life

Job No: 13-729

Date: 02.12.2019

Drawing No: 002

Scale: NTS

Job Title: Jersey Street

Drawing Title: Site Features Plan

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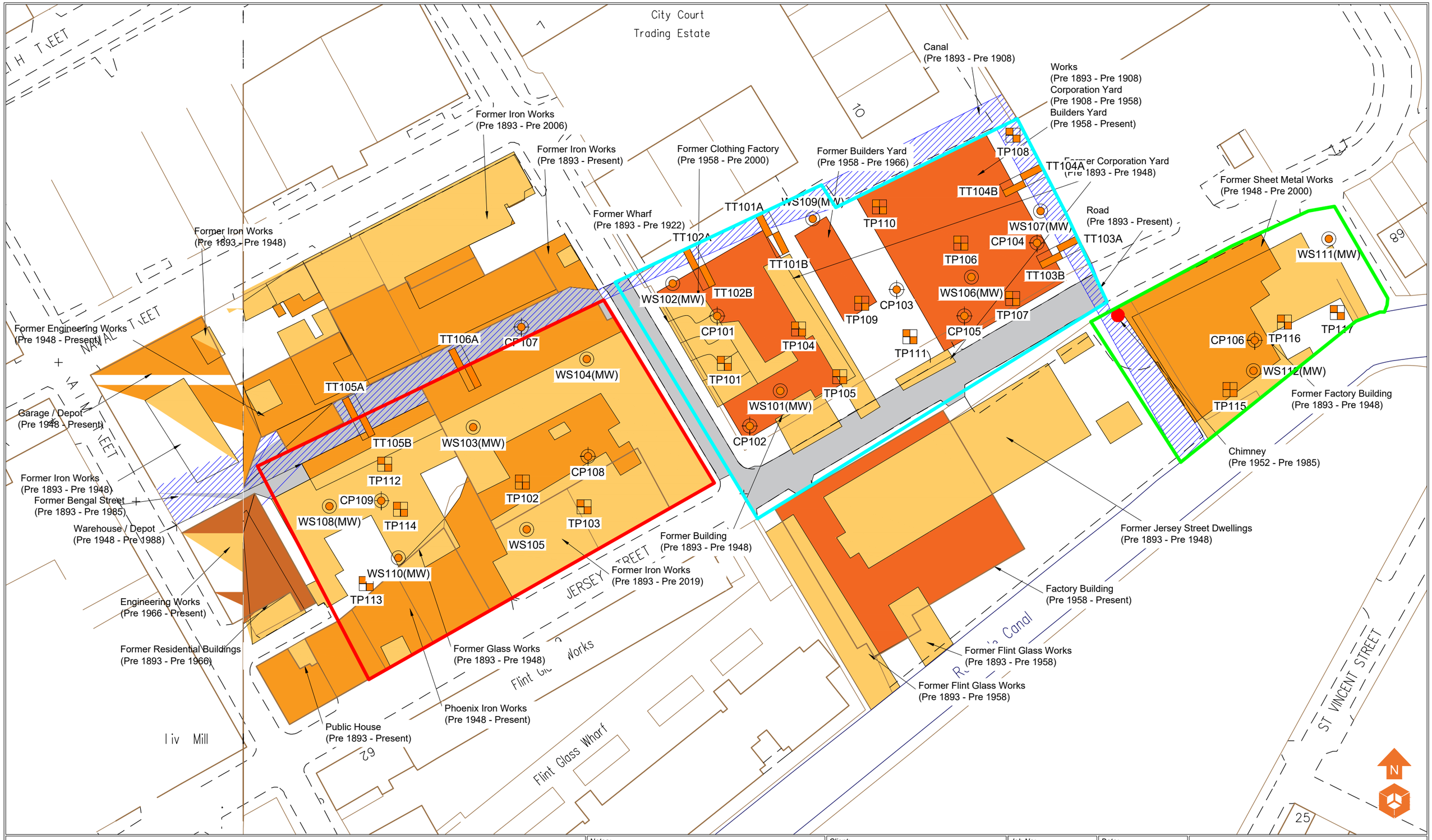

Historical Features

- 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:

Phase	Revision	Date	Issue	Drawn	Checked
P1	-	01.11.2019	DRAFT	HM	RJW

Client: Manchester Life

Job No: 13-729

Date: 01.11.2019

Drawing No: 003

Scale: NTS

Job Title: Jersey Street

Drawing Title: Historical Features Plan

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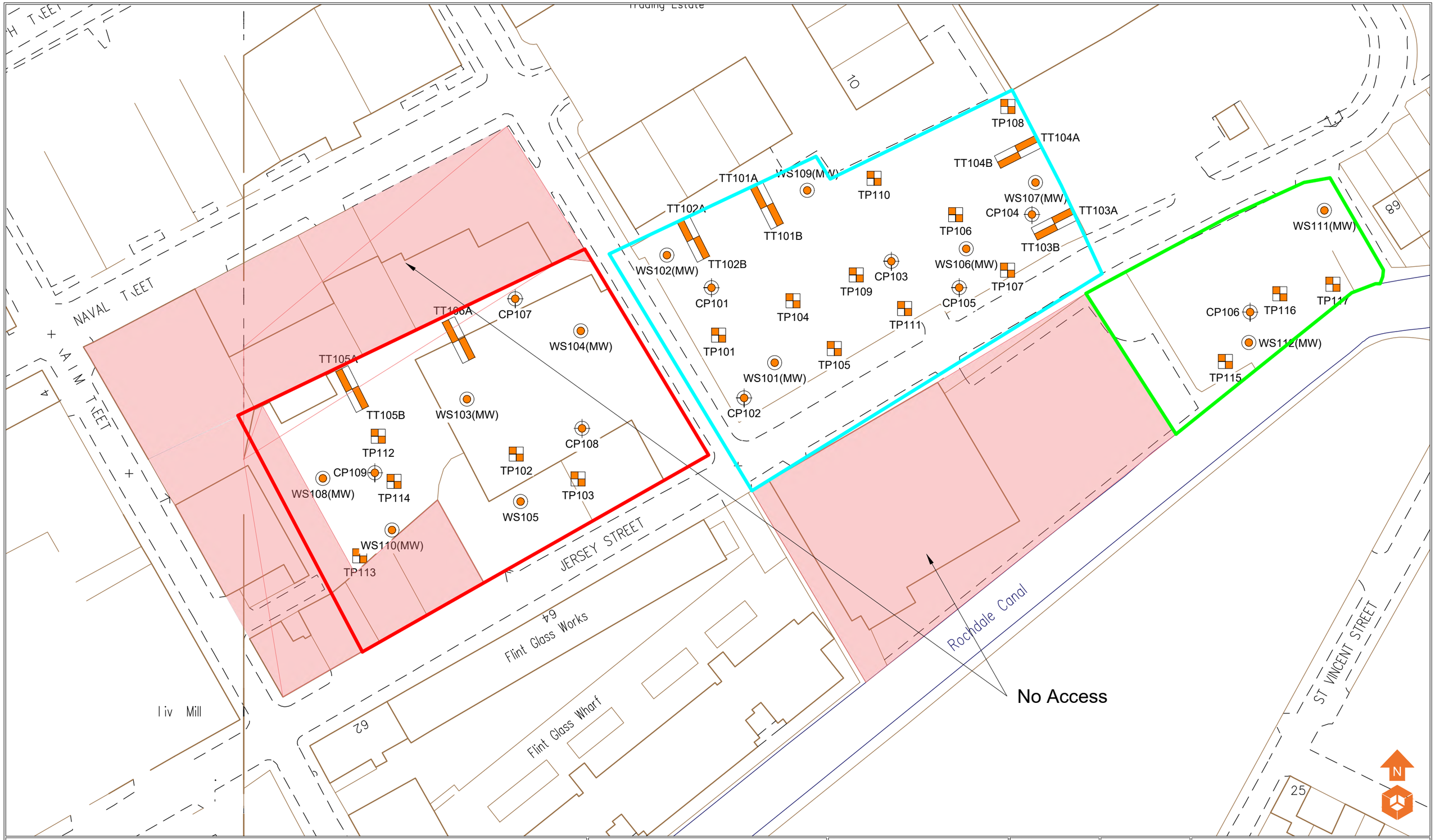

Location Symbols

- Approximate Window Sample Probehole Location
- Approximate Trial Pit Location
- Approximate Slit Trench Location
- No Access
- Parcel A
- Parcel B
- Parcel C

Notes:

Phase	Revision	Date	Issue	Drawn	Checked
P1	-	22.11.2019	DRAFT	CB	RJW

Client: Manchester Life

Job No: 13-729

Date: 22.11.2019

Drawing No: 004

Scale: NTS

Job Title: Jersey Street

Drawing Title: Exploratory Hole Location Plan

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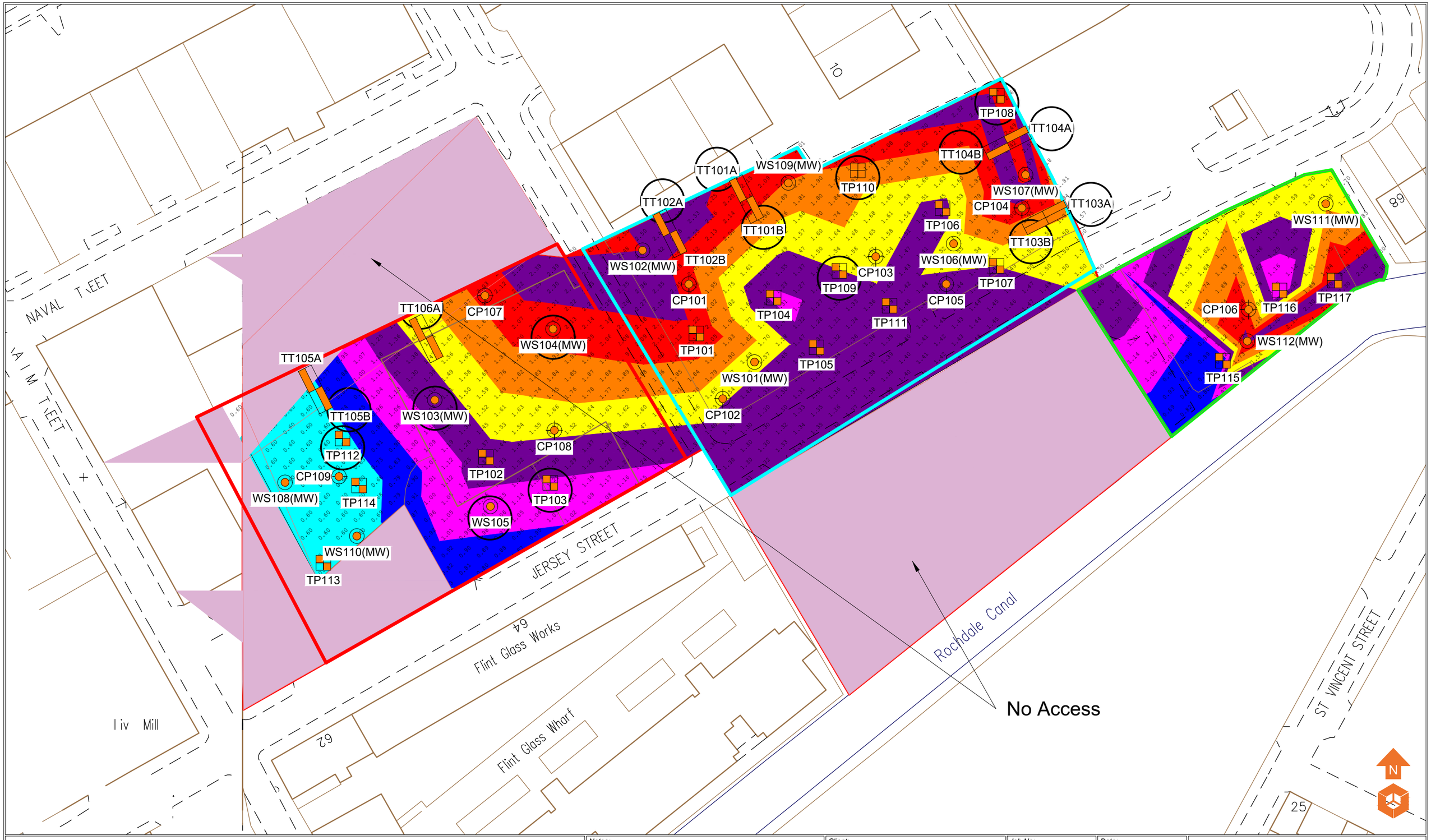

Location Symbols

- Approximate Window Sample Probehole Location
- Approximate Trial Pit Location
- Approximate Slit 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:

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

Client: Manchester Life

Job No: 13-729

Date: 04.12.2019

Drawing No: 005

Scale: NTS

Job Title: Jersey Street

Drawing Title: Depth of Made Ground Plan

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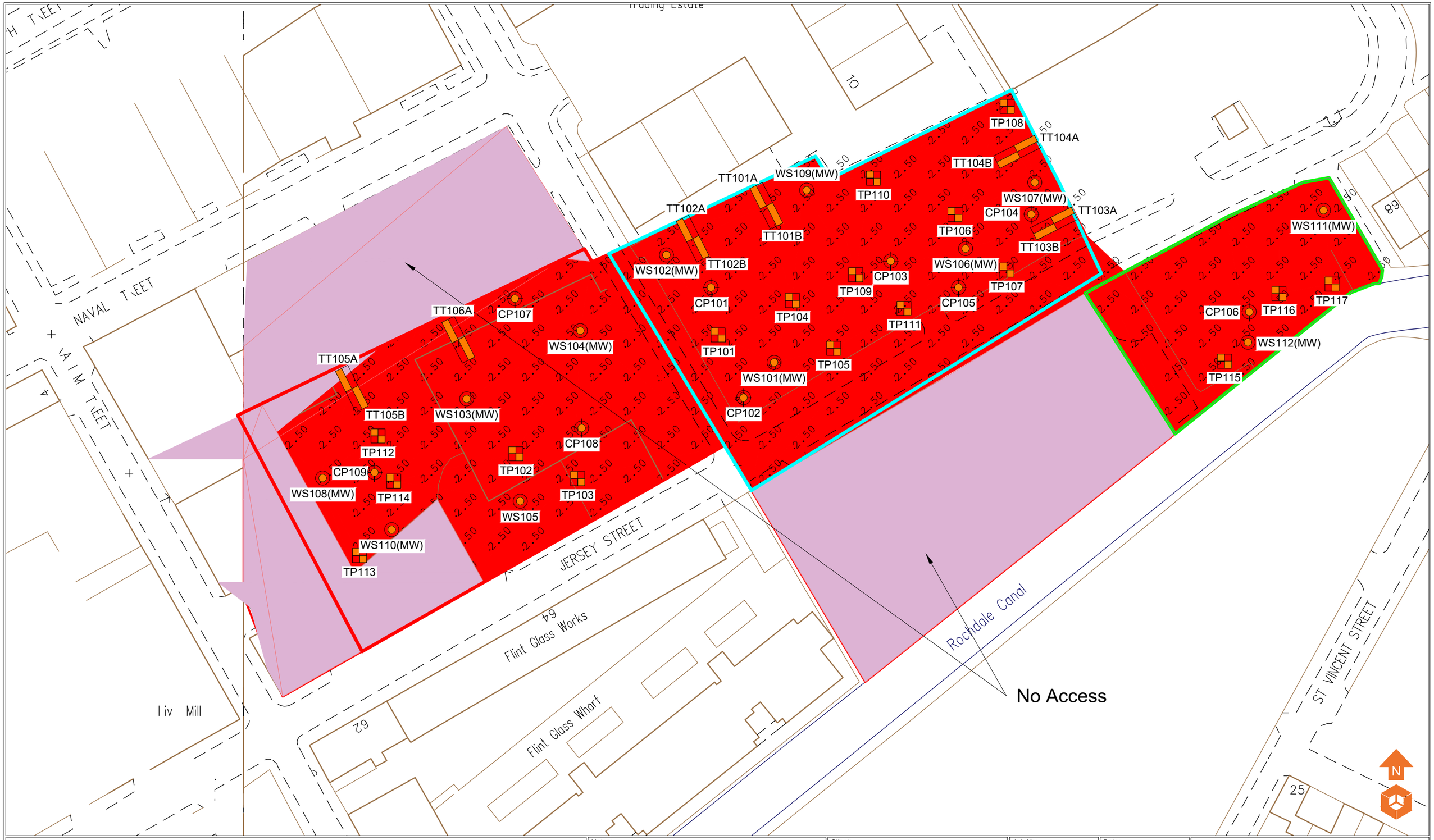

Location Symbols

- Approximate Window Sample Probehole Location
- Approximate Trial Pit Location
- Approximate Slit 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:

Phase	Revision	Date	Issue	Drawn	Checked
P1	R2	24.02.2020	REVISION	HM	RJW
P1	R1	19.02.2019	REVISION	LM	RJW
P1	-	04.12.2019	DRAFT	CB	RJW

Client: Manchester Life

Job No: 13-729

Date: 24.02.2020

Drawing No: 006

Scale: NTS

Job Title: Jersey Street

Drawing Title: Depth to Founding Strata Plan

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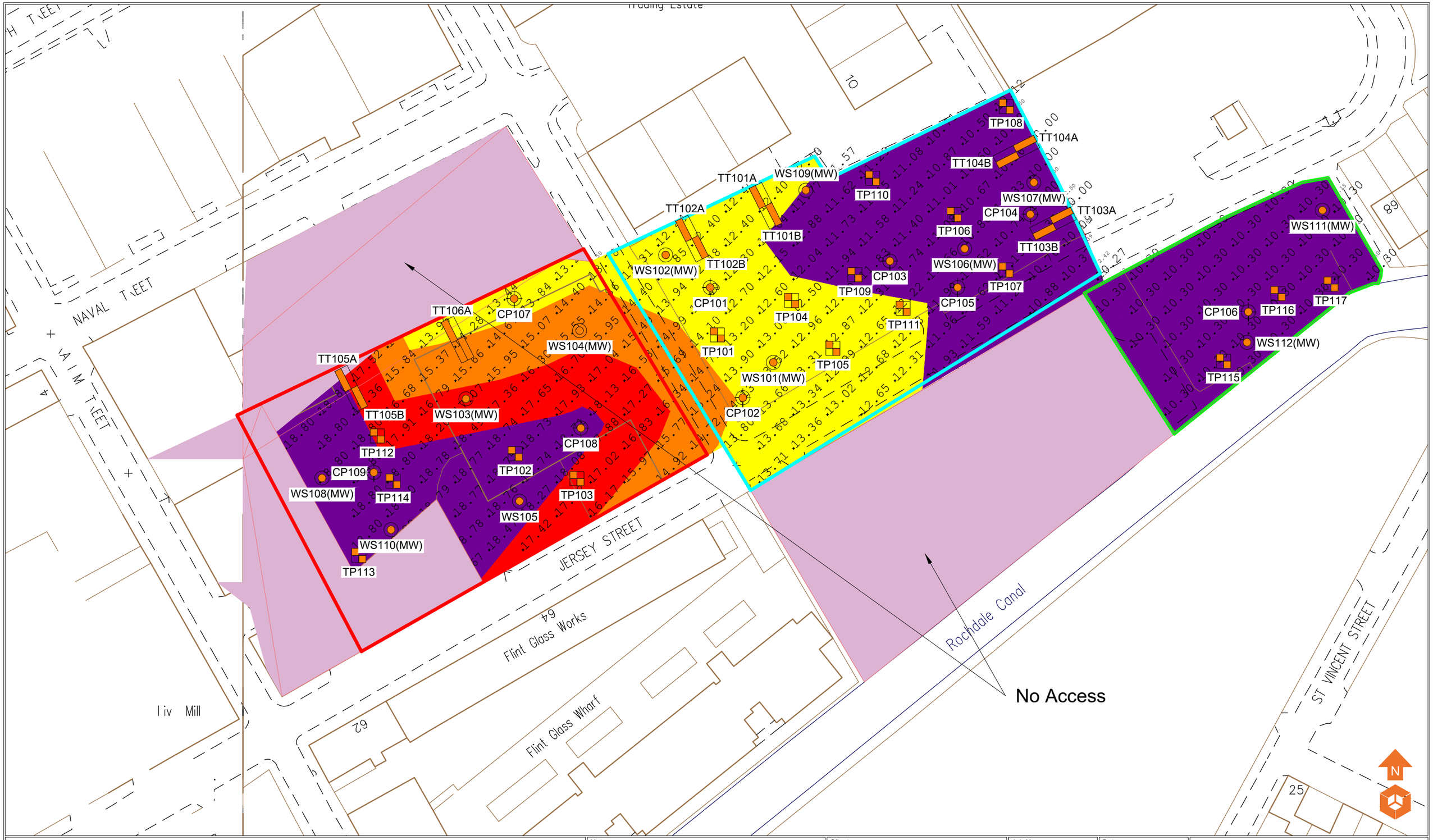

Location Symbols

- Approximate Window Sample Probehole Location
- Approximate Trial Pit Location
- Approximate Slit 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:

Phase	Revision	Date	Issue	Drawn	Checked
P1	-	17.02.2020	DRAFT	LM	RJW

Client: Manchester Life

Job No: 13-729

Date: 17.02.2020

Drawing No: 007

Scale: NTS

Job Title: Jersey Street

Drawing Title: Depth to Bedrock Plan

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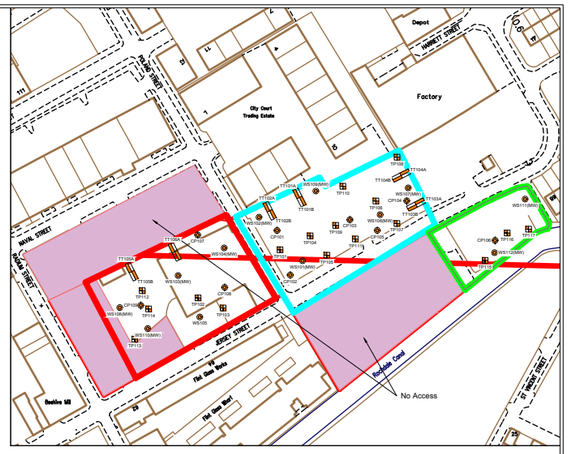
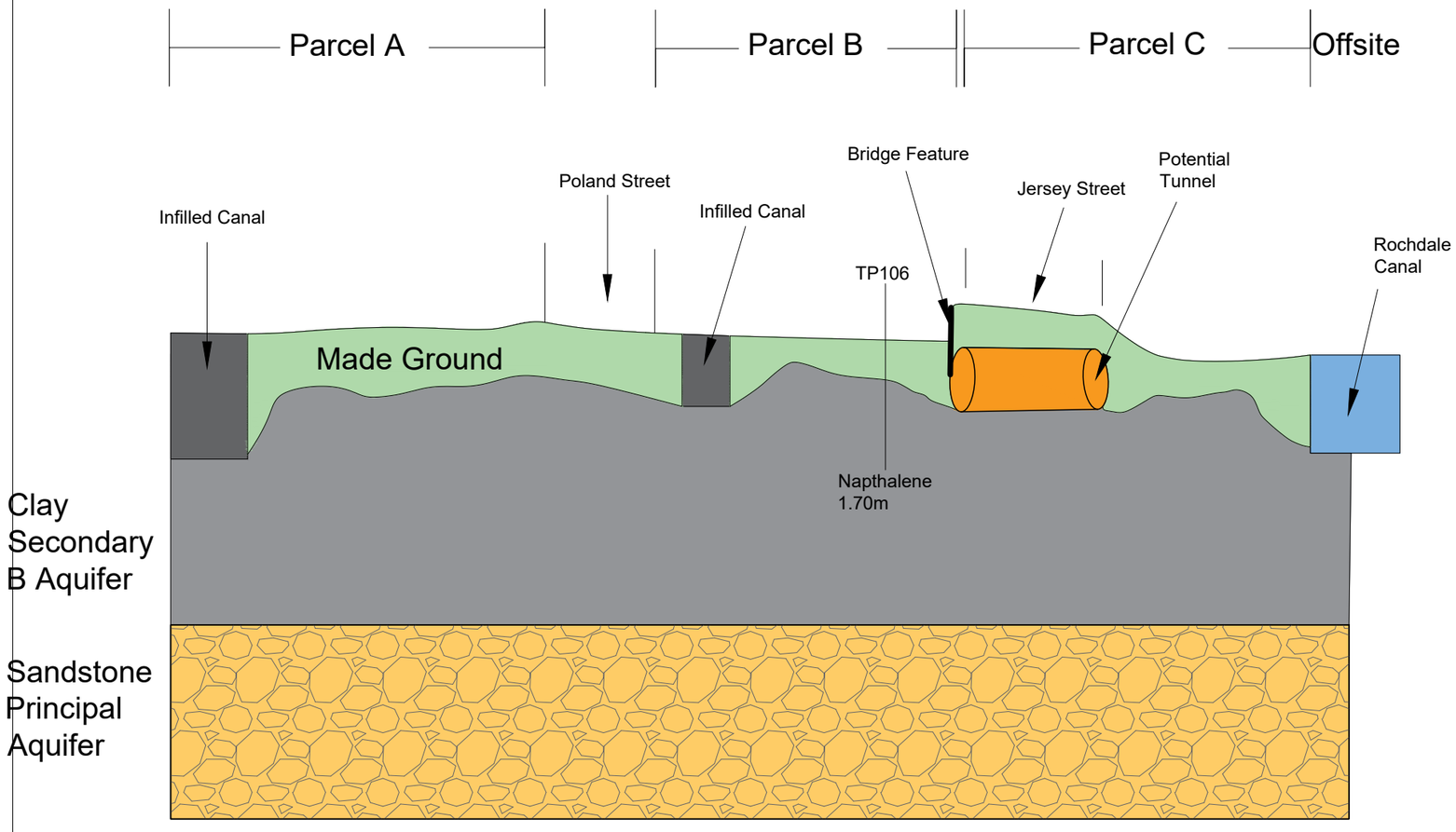
ID	SOURCE		EXPOSURE	POTENTIAL PATHWAY
			HUMAN HEALTH	
1	Heavy Metals, heavy end Hydrocarbons & Non Volatile Polycyclic Aromatic Hydrocarbon (PAH)		Dermal Contact and Ingestion	Construction Workers &
			Consumption of Home-grown Produce	Residential End Users
2	Semi Volatile Polycyclic Aromatic, and petroleum 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:

Phase	Revision	Date	Issue	Drawn	Checked
P1	-	13.02.2020	DRAFT	LM	RW

Client: Manchester Life

Job No: 13-729

Date: 13.02.2020

Drawing No: 008

Scale: NTS

Job Title: Jersey Street

Drawing Title: Conceptual Site Model

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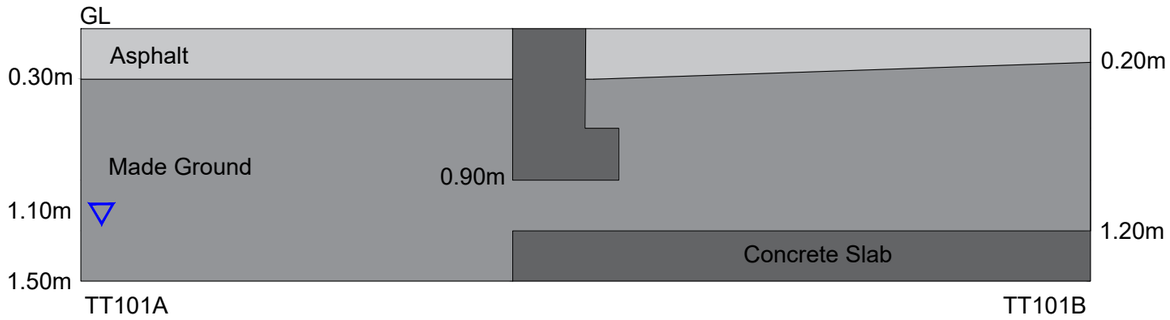

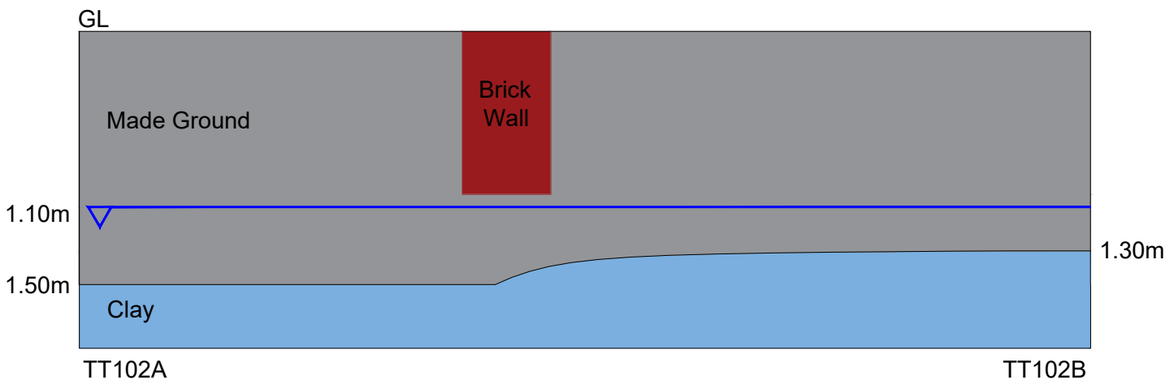

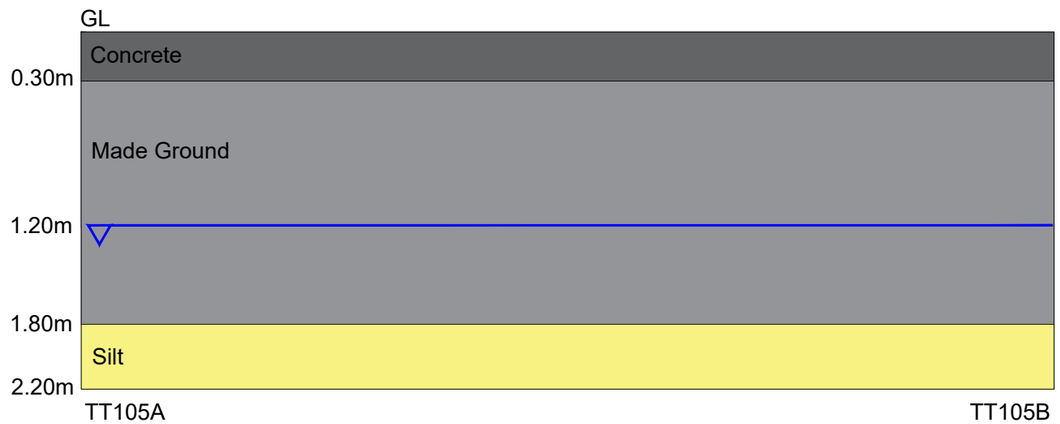

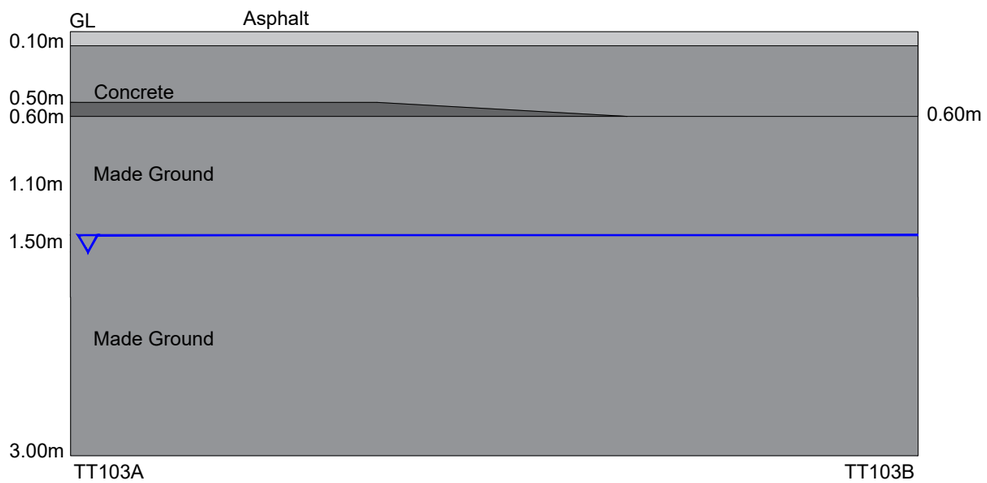

Legend

- Concrete
- Made Ground
- Asphalt
- Clay
- Silt
- Brick Wall
- Water Strike

Notes:

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

Client: Manchester Life

Job No: 13-729

Date: 04.12.2019

Drawing No: 009

Scale: NTS

Job Title: Jersey Street

Drawing Title: Trial Trench Cross Section Plan

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APPENDIX IV
PHOTOGRAPHS

PLATE 1 VIEW EAST OVER PARCEL A

PLATE 2 PARCEL A VIEW NORTH WEST

APPENDIX V
E3P EXPLORATORY HOLE LOGS

Trial Pit Log

e3p	Trial Pit Log		TrialPit No TP102 Sheet 1 of 1
Project Name: Phase 3	Project No. 13-729	Co-ords: - Level:	Date 18/11/2019
Location: Jersey Street, Ancoats		Dimensions (m): 2.00 × 1.00 Depth 2.30	Scale 1:24
Client: Manchester Life			Logged EM

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.10			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, mudstone, ash, concrete and brick. Cobbles are sub-angular of brick.
	1.50	HVP	100	1.40			Stiff medium strength brown gravelly CLAY. Gravel is fine to coarse, sub-angular to sub-rounded of mudstone.
	1.80	HVP	97				
				2.30			End of Pit at 2.30m

1 2 3 4 5

Remarks: 1.Complete. 2.Brick wall encountered east of excavation at 0.5 m bgl. 2.Service encountered west of excavation at 1.0 m bgl.

Stability: Stable

e3p

Trial Pit Log

e3p	Trial Pit Log		TrialPit No TP103 Sheet 1 of 1
Project Name: Phase 3	Project No. 13-729	Co-ords: - Level:	Date 18/11/2019
Location: Jersey Street, Ancoats		Dimensions (m): 2.00 × 1.00 Depth 2.40	Scale 1:30
Client: Manchester Life			Logged EM

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
							MADE GROUND: Concrete with rebar.
				0.30			MADE GROUND: Black gravelly medium to coarse sand with occasional cobbles. Gravel is fine to coarse, sub-angular to sub-rounded of sandstone, mudstone, ash, concrete and brick. Cobbles are sub-angular of brick and concrete.
	1.50	ES					
				2.40			End of Pit at 2.40m

1 2 3 4

Trial Pit Photographs

Trial Pit 103

Trial Pit 103 Spoil

Remarks: 1.Terminated due to brick wall and suspected slab prohibiting excavation. 2.Service present at 1.1 m bgl in south.

Stability: Unstable

e3p

Trial Pit Log

e3p	Trial Pit Log		TrialPit No TP112 Sheet 1 of 1
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 Depth 0.90	Scale 1:30
Client: Manchester Life			Logged EM

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.20			MADE GROUND: Concrete with rebar.
	0.50	ES		0.90			MADE GROUND: Black gravel with occasional cobbles. Gravel is fine to coarse, sub-angular of sandstone, ash, mudstone, concrete and brick. Cobbles are sub-angular to sub-rounded of concrete.
							End of Pit at 0.90m

1 2 3 4

Trial Pit Photographs

Trial Pit 112

Trial Pit 112 Spoil

Remarks: Terminated due to concrete block circa 0.70m in centre of pit prohibiting excavation.

Stability: Stable

e3p

Trial Pit Log

e3p	Trial Pit Log		TrialPit No TP113 Sheet 1 of 1
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 Depth 1.60	Scale 1:30
Client: Manchester Life			Logged EM

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.20			MADE GROUND: Concrete with rebar.
				0.60			MADE GROUND: Black gravel with occasional cobbles. Gravel is fine to coarse, sub-angular of sandstone, ash, mudstone, concrete and brick. Cobbles are sub-angular to sub-rounded of concrete.
	0.90	ES					Stiff high strength brown gravelly CLAY. Gravel is fine to coarse, sub-angular of mudstone. (very brittle)
	1.00	HVP	130				
	1.40	HVP	130				
				1.60			End of Pit at 1.60m

1
2
3
4

Trial Pit Photographs

Trial Pit 113

Trial Pit 113 Spoil

Remarks: 1.Complete. 2.Old service encountered in east of excavationm at 0.5 m bgl.

Stability: Stable

e3p

Trial Pit Log

TrialPit No
TP114
Sheet 1 of 1

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 1.50	Logged EM

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.20			MADE GROUND: Concrete with rebar.
				0.60			MADE GROUND: Black gravel with occasional cobbles. Gravel is fine to coarse, sub-angular of sandstone, mudstone, ash, concrete and brick. Cobbles are sub-angular to sub-rounded of concrete.
	1.00	HVP	125				Stiff high strength brown gravelly CLAY. Gravel is fine to coarse, sub-angular of mudstone. (very brittle)
	1.20	HVP	126				
				1.50			End of Pit at 1.50m

1 2 3 4

Trial Pit Photographs

Trial Pit 114

Trial Pit 114 Spoil

Remarks: 1.Complete. 2.Old service encountered in east of excavation.

Stability: Stable

Borehole Log

Borehole No.
WS103
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: 18/11/2019	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.
		1.00	SPT	N=27 (1,2/2,2,3,20)	1.20			MADE GROUND: Brown sandy gravel with occasional cobbles. Gravel is fine to coarse of concrete, brick, sandstone and asphalt.
								End of Borehole at 1.20m

1 2 3 4 5 6 7 8 9 10

Remarks
1.Terminated at 1.2 m bgl due to suspected concrete slab. 2.Monitoring well installed.

Borehole Log

Borehole No.
WS104
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: 18/11/2019	Logged By EM

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.30			MADE GROUND: Concrete with rebar.
		0.70	ES					MADE GROUND: Black clayey gravel. Gravel is fine to coarse, sub-angular to sub-rounded of asphalt, ash, brick and concrete.
		1.00	SPT	N=9 (2,2/2,2,2,3)	1.00			End of Borehole at 1.00m

Remarks
1.Terminated at 1.0 m bgl due to suspected concrete slab. 2.Monitoring well installed.

Borehole Log

Borehole No.
WS105
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: 18/11/2019	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.
		0.50	ES					MADE GROUND: Black clayey gravel. Gravel is fine to coarse, sub-angular to sub-rounded of asphalt, ash, brick and concrete.
		1.00	SPT	50 (8,14/50 for 75mm)	1.00			End of Borehole at 1.00m

1 2 3 4 5 6 7 8 9 10

Remarks
1.Terminated at 1.0 m bgl due to suspected concrete slab.

Borehole Log

Borehole No. **WS108** 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: 19/11/2019	Logged By EM

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
					0.20			MADE GROUND: Concrete with rebar.
		0.50	ES		0.60			MADE GROUND: Black red gravel. Gravel is fine to coarse, sub-angular to sub-rounded of sandstone, mudstone, ash, concrete and brick.
		0.80	ES					Firm low strength brown CLAY. (Becoming stiff medium strength at circa 2.00m bgl) (Very stiff high strength at 3.00m bgl).
	1.00	1.00	SPT	N=4 (1,1/1,1,1,1)				
	1.40							
	2.00	2.00	SPT	N=11 (3,3/3,2,3,3)				
	3.00	3.00	SPT	N=18 (3,3/4,4,5,5)				
		4.00	SPT	N=22 (3,3/4,6,6,6)				
		5.00	SPT	N=24 (3,4/5,6,6,7)				
					5.45			End of Borehole at 5.45m

Depth scale: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

Remarks

1.Complete. 2.Continued collapse. 3. Monitoring well installed. 4.Slow groundwater strike at 1.4 m bgl.

Borehole Log

Borehole No. **WS110** 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)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
					0.20			MADE GROUND: Concrete with rebar.
					0.60			MADE GROUND: Black red gravel. Gravel is fine to coarse, sub-angular to sub-rounded of sandstone, ash, mudstone, concrete and brick.
		0.80	ES					Stiff medium strength brown CLAY. (Becoming very stiff high strength at circa 2.00m bgl).
		0.90	ES					
		1.00	SPT	N=8 (1,2/2,2,2,2)				
		2.00	SPT	N=22 (4,5/5,5,6,6)				
		3.00	SPT	N=23 (4,5/5,6,6,6)				
		4.00	SPT	N=23 (3,4/5,6,6,6)				
		5.00	SPT	N=23 (3,5/5,6,6,6)				
					5.45			End of Borehole at 5.45m

Remarks

1.Complete. 2. Monitoring well installed.

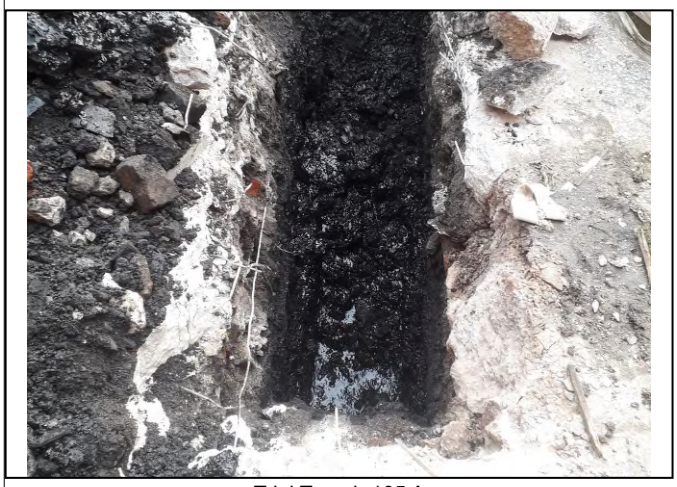
Trial Pit Log

e3p	Trial Pit Log		TrialPit No TT105 A Sheet 1 of 1
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 2.20	Logged EM

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
							MADE GROUND: Concrete with rebar.
				0.30			MADE GROUND: Black 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. Boulders are sub-angular of concrete. (strong hydrocarbon odour and sheen)
1.20							
	2.00	ES		1.80			Soft black clayey silt.
				2.20			End of Pit at 2.20m

1 2 3 4

Trial Pit Photographs



Trial Trench 105 A

Trial Trench 105 A Spoil

Remarks: 1.Terminated due to rapid groundwater strike at 1.20m.

Stability: Unstable throughout Made Ground.

e3p

Trial Pit Log

e3p	Trial Pit Log		TrialPit No TT105 B Sheet 1 of 1
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 1:24
Client: Manchester Life		Depth 2.20	Logged EM

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
							MADE GROUND: Concrete with rebar.
				0.30			MADE GROUND: Black 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. Boulders are sub-angular of concrete. (strong hydrocarbon odour and sheen)
1.20				1.80			Soft black clayey silt.
				2.20			End of Pit at 2.20m

Remarks: 1.Terminated due to rapid groundwater strike at 1.20 m.

Stability: Unstable throughout

e3p

Trial Pit Log

TrialPit No
TT106 A
Sheet 1 of 1

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 2.00	Logged EM

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
							MADE GROUND: Concrete with rebar.
				0.60			MADE GROUND: Black 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. Boulders are sub-angular of concrete. (strong hydrocabron odour and sheen)
				1.80			Soft black clayey SILT.
				2.00			End of Pit at 2.00m

1
2
3
4

Trial Pit Photographs

Trial Trench 106 A

Trial Trench 106 A Spoil

Remarks: 1.Terminated due to rapid groundwater strike at 1.2 m bgl.

Stability: Unstable throughout

Borehole Log

Borehole No. **CP107** 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: 20/01/2020	Logged By R. Walker

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description	
		0.00	B					MADE GROUND: White gravel. Gravel is fine to coarse sub-angular of concrete.	
		0.30	B		0.30			MADE GROUND: Black gravel. Gravel is fine to coarse sub-angular of ash.	
	1.00	1.00	B		1.00			Very soft extremely low strength black CLAY.	1
		1.00	SPT	N=1 (1,0/0,1,0,0)					
		1.20	B						
		2.00	B						2
		2.00	SPT	N=1 (1,0/1,0,0,0)					
		3.00	SPT	N=19 (3,4/4,5,5,5)	3.00			Brown CLAY with occasional bands of medium sand. (Becoming very stiff high strength from circa 5.00m bgl).	3
		4.00	B						4
		4.00	SPT	N=16 (4,3/4,4,4,4)					
		5.00	SPT	N=20 (3,3/4,4,6,6)					5
									6
		7.00	B						7
		7.00	U	Ublow=115					
		7.50	SPT	N=26 (2,3/5,6,7,8)					
									8
		9.00	B						9
									10

Remarks

1. Complete. 2. Water strike encountered at 1.00m bgl. 3. Chiseling from 13.20m to 14.00m bgl for 60 minutes.

Borehole Log

Borehole No. **CP107** 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: 20/01/2020	Logged By R. Walker

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description	
		10.50	SPT	N=22 (2,2/4,5,5,8)				Brown CLAY with occasional bands of medium sand. (Becoming very stiff high strength from circa 5.00m bgl).	11
		12.00	U	Ublow=150					12
		12.00	SPT	N=39 (8,8/8,10,10,11)					
		12.70	B		12.70			Brown CLAY.	13
		13.20	B		13.20			Dense red SANDSTONE.	
		13.50	SPT	50 (5,8/50 for 260mm)					
		14.00	SPT	52 (8,15/32,20,,)	14.00			End of Borehole at 14.00m	14
									15
									16
									17
									18
									19
									20

Remarks

1. Complete. 2. Water strike encountered at 1.00m bgl. 3. Chiseling from 13.20m to 14.00m bgl for 60 minutes.

Borehole Log

Borehole No. **CP108**

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: 22/01/2020	Logged By R. Walker

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description	
		0.00	B					MADE GROUND: Brown gravel. Gravel is fine to coarse sub-angular of brick, concrete and ash.	
		1.00	B						1
		1.00	SPT	N=7 (4,4/3,3,1,0)					
		2.00	SPT	N=11 (1,2/2,2,3,4)					2
					2.40			Stiff medium strength to very stiff high strength brown CLAY with occasional bands of medium sand.	
		3.00	B						3
		3.00	SPT	N=14 (1,2/3,3,4,4)					
		4.00	SPT	N=24 (4,7/6,6,6,6)					4
		5.00	SPT	N=16 (3,3/3,4,4,5)					5
									6
		7.00	B						7
		7.50	SPT	N=15 (2,2/3,3,4,5)					
									8
		9.00	B						9
									10

Remarks

1. Complete. 2. Water strike encountered at 18.70m bgl. 3. Chiseling from 18.70m to 19.50m bgl for 60 minutes.

Borehole Log

Borehole No. **CP108** 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: 22/01/2020	Logged By R. Walker

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description	
								Stiff medium strength to very stiff high strength brown CLAY with occasional bands of medium sand.	
		10.50	SPT	N=25 (3,3/5,6,7,7)					11
		12.00 12.00 12.00	D U SPT	 Ublow=163 N=27 (3,4/5,6,8,8)					12
									13
									14
		15.00 15.00	B SPT	 N=26 (4,4/5,6,7,8)					15
									16
		17.00 17.00	B U	 Ublow=103	17.00			Very stiff very high strength brown CLAY.	17
		18.00	SPT	50 (5,5/50 for 400mm)					18
	18.70				18.70			Dense brown SANDSTONE.	
		19.00 19.00	B SPT	 50 (9,12/50 for 230mm)					19
		19.50	SPT	52 (22,20/52 for 150mm)	19.50			End of Borehole at 19.50m	
									20

Remarks

1. Complete. 2. Water strike encountered at 18.70m bgl. 3. Chiseling from 18.70m to 19.50m bgl for 60 minutes.

Borehole Log

Borehole No.
CP109
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: 27/01/2020	Logged By R. Walker

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description	
		0.00	B					MADE GROUND: Black gravel. Gravel is fine to coarse sub-angular of ash, brick and concrete.	
		1.00 1.00	B SPT	N=8 (2,2/2,2,2,2)	1.00			Stiff medium strength to very stiff high strength brown CLAY with occasional bands of medium sand.	1
		2.00	SPT	N=18 (2,2/4,4,5,5)					2
		3.00 3.00	B SPT	N=17 (2,3/3,4,4,6)					3
		4.00	SPT	N=13 (2,2/2,3,4,4)					4
		5.00	SPT	N=20 (3,2/4,6,5,5)					5
		6.00	B						6
									7
		7.50	SPT	N=17 (2,3/4,4,4,5)					8
		9.00	B						9
									10

Remarks
1. Complete.

Borehole Log

Borehole No. **CP109** 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: 27/01/2020	Logged By R. Walker

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description	
								Stiff medium strength to very stiff high strength brown CLAY with occasional bands of medium sand.	
		10.50	SPT	N=26 (2,3/5,6,7,8)					
		11.00	B						11
		12.00	U	Ublow=160					12
									13
		13.50	SPT	50 (5,8/50 for 250mm)					
					13.80			Very stiff high strength to very stiff very high strength brown CLAY.	
		14.00	B						14
		15.00	SPT	N=34 (5,6/7,9,8,10)					15
		16.00	B		16.00			Very stiff high strength brown CLAY with occasional thin bands of medium sand.	16
		17.00	U	Ublow=190					17
		18.00 18.00	B SPT	N=43 (5,20/15,9,9,10)					18
					18.80			Dense brown SANDSTONE.	
		19.00	SPT	50 (11,25/50 for 250mm)					19
		19.50 19.50	U SPT	Ublow=200 50 (18,24/50 for 280mm)	19.50			End of Borehole at 19.50m	
									20

Remarks
1. Complete.

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

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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.

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

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 SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	-	-	-	-
Water Soluble SO4 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	-	-	-	-	-

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

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

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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**					
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	-	-	-	-

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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**					
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	-	-	-	-

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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**					
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 SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	-	-	0.27	-
Water Soluble SO4 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	-

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	-

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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**					
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	-

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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**					
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	-

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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**					
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 SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	-	-	-	0.47
Water Soluble SO4 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

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

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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**					
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	-	-	-	-	-

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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**					
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	-	-	-	-	-

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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**					
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 SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.16	-	0.039	0.76	-
Water Soluble SO4 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	-

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

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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**					
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

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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**					
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

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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**					
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 SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	-	-	-	-
Water Soluble SO4 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	-	-	-	-	-

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

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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**					
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	-

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

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	-

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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**					
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 SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	-	-	-	-
Water Soluble SO4 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	-	-	-	-	-

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

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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**					
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	-	-	-	-	-

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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**					
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	-	-	-	-	-

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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**					
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 SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	-			
Water Soluble SO4 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	-	-			
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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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			

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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**					
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	-	-			

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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**					
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	-	-			

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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.

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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		
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		
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		

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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		

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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.

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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
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 diphenylcarbazide 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 diphenylcarbazide 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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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 SO4 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/clean up.	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 30oC.

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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

Key: a - No sampling date b - Incorrect container
c - Holding time d - Headspace e - Temperature

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Analytical Report Number : 19-74625

Project / Site name:	Manchester Life	**Samples received on:**	28/11/2019
Your job number:	13-729	**Samples instructed on:**	28/11/2019
Your order number:		**Analysis completed by:**	05/12/2019
Report Issue Number:	1	**Report issued on:**	05/12/2019
Samples Analysed:	2 water samples		

Signed:

Katarzyna Lewicka
Head of Reporting Section

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

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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.

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Analytical Report Number: 19-74625

Project / Site name: Manchester Life

Lab Sample Number				1376318	1376319			
Sample Reference				WS109	WS110			
Sample Number				None Supplied	None Supplied			
Depth (m)				None Supplied	None Supplied			
Date Sampled				27/11/2019	27/11/2019			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
General Inorganics								
pH	pH Units	N/A	ISO 17025	7.5	12.0			
Total Cyanide (Low Level 1 µg/l)	µg/l	1	ISO 17025	< 1.0	3.7			
Total Phenols								
Total Phenols (monohydric)	µg/l	1	ISO 17025	87	27			
Heavy Metals / Metalloids								
Arsenic (dissolved)	µg/l	0.15	ISO 17025	4.64	2.86			
Cadmium (dissolved)	µg/l	0.02	ISO 17025	< 0.02	< 0.02			
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	U/S			
Chromium (dissolved)	µg/l	0.2	ISO 17025	0.4	20			
Copper (dissolved)	µg/l	0.5	ISO 17025	1.7	18			
Lead (dissolved)	µg/l	0.2	ISO 17025	0.6	18			
Mercury (dissolved)	µg/l	0.05	ISO 17025	< 0.05	< 0.05			
Nickel (dissolved)	µg/l	0.5	ISO 17025	2.1	4.6			
Selenium (dissolved)	µg/l	0.6	ISO 17025	3.3	6.6			
Zinc (dissolved)	µg/l	0.5	ISO 17025	2.1	0.9			
Monoaromatics & Oxygenates								
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0			
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0			
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0			
Petroleum Hydrocarbons								
TPH1 (C10 - C40)	µg/l	10	NONE	11000	< 10			
TPH-CWG - Aliphatic >C5 - C6	µg/l	1	ISO 17025	< 1.0	< 1.0			
TPH-CWG - Aliphatic >C6 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0			
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0			
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	2300	< 10			
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	3200	< 10			
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	3500	< 10			
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	9000	< 10			
TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0	< 1.0			
TPH-CWG - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0			
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0			
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	110	< 10			
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	600	< 10			
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	600	< 10			
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	300	< 10			
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	1600	< 10			

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Analytical Report Number: 19-74625

Project / Site name: Manchester Life

Lab Sample Number				1376318	1376319			
Sample Reference				WS109	WS110			
Sample Number				None Supplied	None Supplied			
Depth (m)				None Supplied	None Supplied			
Date Sampled				27/11/2019	27/11/2019			
Time Taken				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			
Chloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Bromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Vinyl Chloride	µg/l	1	NONE	< 1.0	< 1.0			
Trichlorofluoromethane	µg/l	1	NONE	< 1.0	< 1.0			
1,1-Dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,1,2-Trichloro-1,2,2-trifluoroethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Cis-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0			
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,1-Dichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
2,2-Dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Trichloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,1,1-Trichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,2-Dichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,1-Dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Trans-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Tetrachloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,2-Dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Trichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Dibromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Bromodichloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Cis-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Trans-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,1,2-Trichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,3-Dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Dibromochloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Tetrachloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,2-Dibromoethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Chlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,1,1,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
p & m-Xylene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Styrene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Tribromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
o-Xylene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,1,2,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Isopropylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Bromobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
n-Propylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
2-Chlorotoluene	µg/l	1	ISO 17025	< 1.0	< 1.0			
4-Chlorotoluene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,3,5-Trimethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
tert-Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,2,4-Trimethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
sec-Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,3-Dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
p-Isopropyltoluene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,2-Dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,4-Dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,2-Dibromo-3-chloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,2,4-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Hexachlorobutadiene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,2,3-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			

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

Analytical Report Number: 19-74625

Project / Site name: Manchester Life

Lab Sample Number				1376318	1376319			
Sample Reference				WS109	WS110			
Sample Number				None Supplied	None Supplied			
Depth (m)				None Supplied	None Supplied			
Date Sampled				27/11/2019	27/11/2019			
Time Taken				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			
Phenol	µg/l	0.05	NONE	3.1	< 0.05			
2-Chlorophenol	µg/l	0.05	NONE	< 0.05	< 0.05			
Bis(2-chloroethyl)ether	µg/l	0.05	NONE	< 0.05	< 0.05			
1,3-Dichlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05			
1,2-Dichlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05			
1,4-Dichlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05			
Bis(2-chloroisopropyl)ether	µg/l	0.05	NONE	< 0.05	< 0.05			
2-Methylphenol	µg/l	0.05	NONE	5.1	< 0.05			
Hexachloroethane	µg/l	0.05	NONE	< 0.05	< 0.05			
Nitrobenzene	µg/l	0.05	NONE	< 0.05	< 0.05			
4-Methylphenol	µg/l	0.05	NONE	9.6	< 0.05			
Isophorone	µg/l	0.05	NONE	< 0.05	< 0.05			
2-Nitrophenol	µg/l	0.05	NONE	< 0.05	< 0.05			
2,4-Dimethylphenol	µg/l	0.05	NONE	7.9	< 0.05			
Bis(2-chloroethoxy)methane	µg/l	0.05	NONE	< 0.05	< 0.05			
1,2,4-Trichlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05			
Naphthalene	µg/l	0.01	ISO 17025	15	1.1			
2,4-Dichlorophenol	µg/l	0.05	NONE	< 0.05	< 0.05			
4-Chloroaniline	µg/l	0.05	NONE	< 0.05	< 0.05			
Hexachlorobutadiene	µg/l	0.05	NONE	< 0.05	< 0.05			
4-Chloro-3-methylphenol	µg/l	0.05	NONE	< 0.05	< 0.05			
2,4,6-Trichlorophenol	µg/l	0.05	NONE	< 0.05	< 0.05			
2,4,5-Trichlorophenol	µg/l	0.05	NONE	< 0.05	< 0.05			
2-Methylnaphthalene	µg/l	0.05	NONE	2.5	0.32			
2-Chloronaphthalene	µg/l	0.05	NONE	< 0.05	< 0.05			
Dimethylphthalate	µg/l	0.05	NONE	< 0.05	< 0.05			
2,6-Dinitrotoluene	µg/l	0.05	NONE	< 0.05	< 0.05			
Acenaphthylene	µg/l	0.01	ISO 17025	0.64	< 0.01			
Acenaphthene	µg/l	0.01	ISO 17025	2.1	0.21			
2,4-Dinitrotoluene	µg/l	0.05	NONE	< 0.05	< 0.05			
Dibenzofuran	µg/l	0.05	NONE	< 0.05	< 0.05			
4-Chlorophenyl phenyl ether	µg/l	0.05	NONE	< 0.05	< 0.05			
Diethyl phthalate	µg/l	0.05	NONE	< 0.05	< 0.05			
4-Nitroaniline	µg/l	0.05	NONE	< 0.05	< 0.05			
Fluorene	µg/l	0.01	ISO 17025	3.0	0.22			
Azobenzene	µg/l	0.05	NONE	< 0.05	< 0.05			
Bromophenyl phenyl ether	µg/l	0.05	NONE	< 0.05	< 0.05			
Hexachlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05			
Phenanthrene	µg/l	0.01	ISO 17025	4.9	0.67			
Anthracene	µg/l	0.01	ISO 17025	0.78	0.13			
Carbazole	µg/l	0.05	NONE	< 0.05	< 0.05			
Dibutyl phthalate	µg/l	0.05	NONE	< 0.05	< 0.05			
Anthraquinone	µg/l	0.05	NONE	< 0.05	< 0.05			
Fluoranthene	µg/l	0.01	ISO 17025	2.4	0.36			
Pyrene	µg/l	0.01	ISO 17025	2.7	0.34			
Butyl benzyl phthalate	µg/l	0.05	NONE	< 0.05	< 0.05			
Benzo(a)anthracene	µg/l	0.01	ISO 17025	0.74	< 0.01			
Chrysene	µg/l	0.01	ISO 17025	0.74	< 0.01			
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	0.57	< 0.01			
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	0.37	< 0.01			
Benzo(a)pyrene	µg/l	0.01	ISO 17025	0.40	< 0.01			
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			

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

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Analytical Report Number : 19-74625

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 based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	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.

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Analytical Report Number : 19-75415

Project / Site name:	Jersey St	**Samples received on:**	03/12/2019
Your job number:	13729	**Samples instructed on:**	03/12/2019
Your order number:	13729	**Analysis completed by:**	10/12/2019
Report Issue Number:	1	**Report issued on:**	10/12/2019
Samples Analysed:	2 water samples		

Signed:

Rachel Bradley

Deputy Quality Manager
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

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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.

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

Analytical Report Number: 19-75415

Project / Site name: Jersey St

Your Order No: 13729

Lab Sample Number				1380646	1380647			
Sample Reference				WS108	WS106			
Sample Number				None Supplied	None Supplied			
Depth (m)				None Supplied	None Supplied			
Date Sampled				02/12/2019	02/12/2019			
Time Taken				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			
Total Cyanide (Low Level 1 µg/l)	µg/l	1	ISO 17025	< 1.0	< 1.0			
Total Phenols								
Total Phenols (monohydric)	µg/l	1	ISO 17025	3.5	63			
Heavy Metals / Metalloids								
Arsenic (dissolved)	µg/l	0.15	ISO 17025	28.6	2.66			
Cadmium (dissolved)	µg/l	0.02	ISO 17025	< 0.02	< 0.02			
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0			
Chromium (dissolved)	µg/l	0.2	ISO 17025	< 0.2	0.3			
Copper (dissolved)	µg/l	0.5	ISO 17025	0.8	7.5			
Lead (dissolved)	µg/l	0.2	ISO 17025	0.9	9.6			
Mercury (dissolved)	µg/l	0.05	ISO 17025	< 0.05	< 0.05			
Nickel (dissolved)	µg/l	0.5	ISO 17025	2.2	0.5			
Selenium (dissolved)	µg/l	0.6	ISO 17025	1.0	< 0.6			
Zinc (dissolved)	µg/l	0.5	ISO 17025	4.0	5.9			
Monoaromatics & Oxygenates								
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0			
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0			
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0			
Petroleum Hydrocarbons								
TPH1 (C10 - C40)	µg/l	10	NONE	< 10	3100			
TPH-CWG - Aliphatic >C5 - C6	µg/l	1	ISO 17025	< 1.0	< 1.0			
TPH-CWG - Aliphatic >C6 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0			
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0			
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	< 10	140			
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	< 10	250			
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	< 10	470			
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10	1800			
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10	2700			
TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0	< 1.0			
TPH-CWG - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0			
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0			
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	< 10	91			
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	< 10	170			
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	< 10	110			
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	< 10	370			

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Analytical Report Number: 19-75415

Project / Site name: Jersey St

Your Order No: 13729

Lab Sample Number				1380646	1380647			
Sample Reference				WS108	WS106			
Sample Number				None Supplied	None Supplied			
Depth (m)				None Supplied	None Supplied			
Date Sampled				02/12/2019	02/12/2019			
Time Taken				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			
Chloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Bromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Vinyl Chloride	µg/l	1	NONE	< 1.0	< 1.0			
Trichlorofluoromethane	µg/l	1	NONE	< 1.0	< 1.0			
1,1-Dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,1,2-Trichloro-1,2,2-trifluoroethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Cis-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0			
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,1-Dichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
2,2-Dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Trichloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,1,1-Trichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,2-Dichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,1-Dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Trans-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Tetrachloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,2-Dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Trichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Dibromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Bromodichloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Cis-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Trans-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,1,2-Trichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,3-Dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Dibromochloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Tetrachloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,2-Dibromoethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Chlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,1,1,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
p & m-Xylene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Styrene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Tribromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
o-Xylene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,1,2,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Isopropylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Bromobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
n-Propylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
2-Chlorotoluene	µg/l	1	ISO 17025	< 1.0	< 1.0			
4-Chlorotoluene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,3,5-Trimethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
tert-Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,2,4-Trimethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
sec-Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,3-Dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
p-Isopropyltoluene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,2-Dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,4-Dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,2-Dibromo-3-chloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,2,4-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Hexachlorobutadiene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,2,3-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			

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Analytical Report Number: 19-75415

Project / Site name: Jersey St

Your Order No: 13729

Lab Sample Number				1380646	1380647			
Sample Reference				WS108	WS106			
Sample Number				None Supplied	None Supplied			
Depth (m)				None Supplied	None Supplied			
Date Sampled				02/12/2019	02/12/2019			
Time Taken				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			
Phenol	µg/l	0.05	NONE	< 0.05	< 0.05			
2-Chlorophenol	µg/l	0.05	NONE	< 0.05	< 0.05			
Bis(2-chloroethyl)ether	µg/l	0.05	NONE	< 0.05	< 0.05			
1,3-Dichlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05			
1,2-Dichlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05			
1,4-Dichlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05			
Bis(2-chloroisopropyl)ether	µg/l	0.05	NONE	< 0.05	< 0.05			
2-Methylphenol	µg/l	0.05	NONE	< 0.05	14			
Hexachloroethane	µg/l	0.05	NONE	< 0.05	< 0.05			
Nitrobenzene	µg/l	0.05	NONE	< 0.05	< 0.05			
4-Methylphenol	µg/l	0.05	NONE	< 0.05	6.1			
Isophorone	µg/l	0.05	NONE	< 0.05	< 0.05			
2-Nitrophenol	µg/l	0.05	NONE	< 0.05	< 0.05			
2,4-Dimethylphenol	µg/l	0.05	NONE	< 0.05	10			
Bis(2-chloroethoxy)methane	µg/l	0.05	NONE	< 0.05	< 0.05			
1,2,4-Trichlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05			
Naphthalene	µg/l	0.01	ISO 17025	< 0.01	8.2			
2,4-Dichlorophenol	µg/l	0.05	NONE	< 0.05	< 0.05			
4-Chloroaniline	µg/l	0.05	NONE	< 0.05	< 0.05			
Hexachlorobutadiene	µg/l	0.05	NONE	< 0.05	< 0.05			
4-Chloro-3-methylphenol	µg/l	0.05	NONE	< 0.05	< 0.05			
2,4,6-Trichlorophenol	µg/l	0.05	NONE	< 0.05	< 0.05			
2,4,5-Trichlorophenol	µg/l	0.05	NONE	< 0.05	< 0.05			
2-Methylnaphthalene	µg/l	0.05	NONE	< 0.05	0.81			
2-Chloronaphthalene	µg/l	0.05	NONE	< 0.05	< 0.05			
Dimethylphthalate	µg/l	0.05	NONE	< 0.05	< 0.05			
2,6-Dinitrotoluene	µg/l	0.05	NONE	< 0.05	< 0.05			
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	0.29			
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	0.97			
2,4-Dinitrotoluene	µg/l	0.05	NONE	< 0.05	< 0.05			
Dibenzofuran	µg/l	0.05	NONE	< 0.05	< 0.05			
4-Chlorophenyl phenyl ether	µg/l	0.05	NONE	< 0.05	< 0.05			
Diethyl phthalate	µg/l	0.05	NONE	< 0.05	< 0.05			
4-Nitroaniline	µg/l	0.05	NONE	< 0.05	< 0.05			
Fluorene	µg/l	0.01	ISO 17025	< 0.01	1.1			
Azobenzene	µg/l	0.05	NONE	< 0.05	< 0.05			
Bromophenyl phenyl ether	µg/l	0.05	NONE	< 0.05	< 0.05			
Hexachlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05			
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	1.5			
Anthracene	µg/l	0.01	ISO 17025	< 0.01	0.36			
Carbazole	µg/l	0.05	NONE	< 0.05	1.3			
Dibutyl phthalate	µg/l	0.05	NONE	< 0.05	< 0.05			
Anthraquinone	µg/l	0.05	NONE	< 0.05	< 0.05			
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	1.0			
Pyrene	µg/l	0.01	ISO 17025	< 0.01	1.1			
Butyl benzyl phthalate	µg/l	0.05	NONE	< 0.05	< 0.05			
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	0.34			
Chrysene	µg/l	0.01	ISO 17025	< 0.01	0.28			
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			

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

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

Analytical Report Number : 19-75415

Project / Site name: Jersey St

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 based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	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.

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

APPENDIX VII
ORIGIN OF TIER I GENERIC ASSESSMENT CRITERIA

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 C_5-C_6 (aliphatic)	
TPH C_6-C_8 (aliphatic)	
TPH C_8-C_{10} (aliphatic)	
TPH C_{10}-C_{12} (aliphatic)	
TPH C_{12}-C_{16} (aromatic)	
TPH C_{16}-C_{21} (aromatic)	
TPH C_{21}-C_{35} (aromatic)	

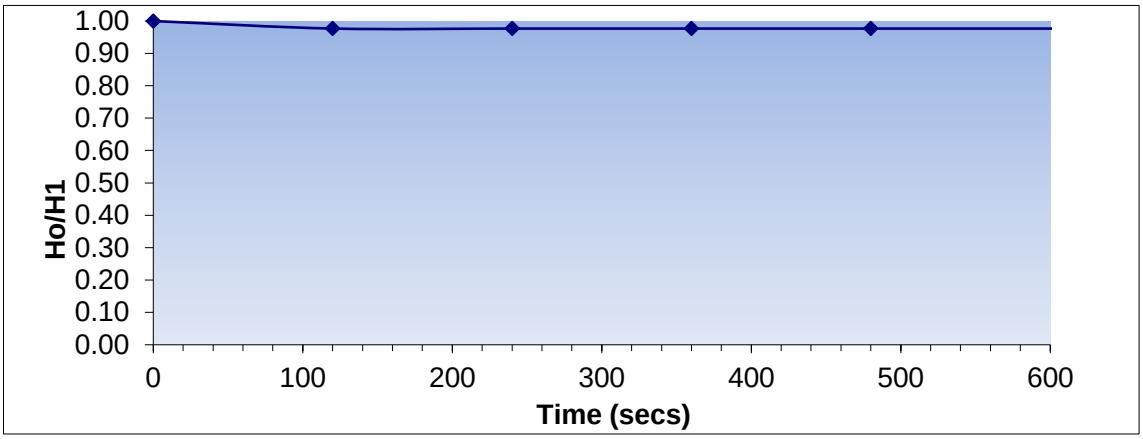
APPENDIX VIII FALLING HEAD PERMEABILITY TEST CERTIFICATES

Falling Head Test

Borehole: WS110 **Test No:** 1

Contract No:	13-729	Casing Diameter: (m)	0.05
Contract Title:	Manchester Life	Height of Casing:	0
Date of Test:	17/12/2019	Depth of Borehole: (m)	4.30

Recorded Time			Total Time			H/Ho
Hours	Minutes	Seconds	(secs)	Depth (m)		
0	0	0	0	0	0	1.0000
0	1	0	60	0.1	120	0.9767
0	2	0	120	0.1	240	0.9767
0	3	0	180	0.1	360	0.9767
0	4	0	240	0.1	480	0.9767
0	5	0	300	0.1	1080	0.9767
0	10	0	600	0.1	2280	0.9767
0	20	0	1200	0.1	3480	0.9767
0	30	0	1800	0.1	7080	0.9767
0	60	0	3600	0.1	5280	0.9767



General Approach

$$k = \frac{A}{F(t_2 - t_1)} \log_e \frac{H_1}{H_2}$$

k = permeability of soil

F = Intake Factor (figures 6 &7, BS5930:1999)

H_1 = variable head measured at time t_1 after commencement of test

H_2 = variable head measured at time t_2 after commencement of test

A = Cross sectional area of borehole casing or standpipe as appropiate.

H_1 =	0.9767	t_1 =	60
H_2 =	0.9767	t_2 =	1800
		F=	5.84

A = 0.00196349 m^2

Coefficient of Permeability, k = **5.25E-07** m/s

APPENDIX IX GEOTECHNICAL LABORATORY TESTING RESULTS

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:

R Gunson (Director)	A Watkins (Director)	R Berriman (Quality Manager)
L Knight (Senior Technician)	S Eyre (Senior Technician)	S Royle (Laboratory Manager)

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Doncaster DN4 0AR
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e-mail: rgunson@prosoils.co.uk
awatkins@prosoils.co.uk

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.

SUMMARY OF SOIL CLASSIFICATION TESTS

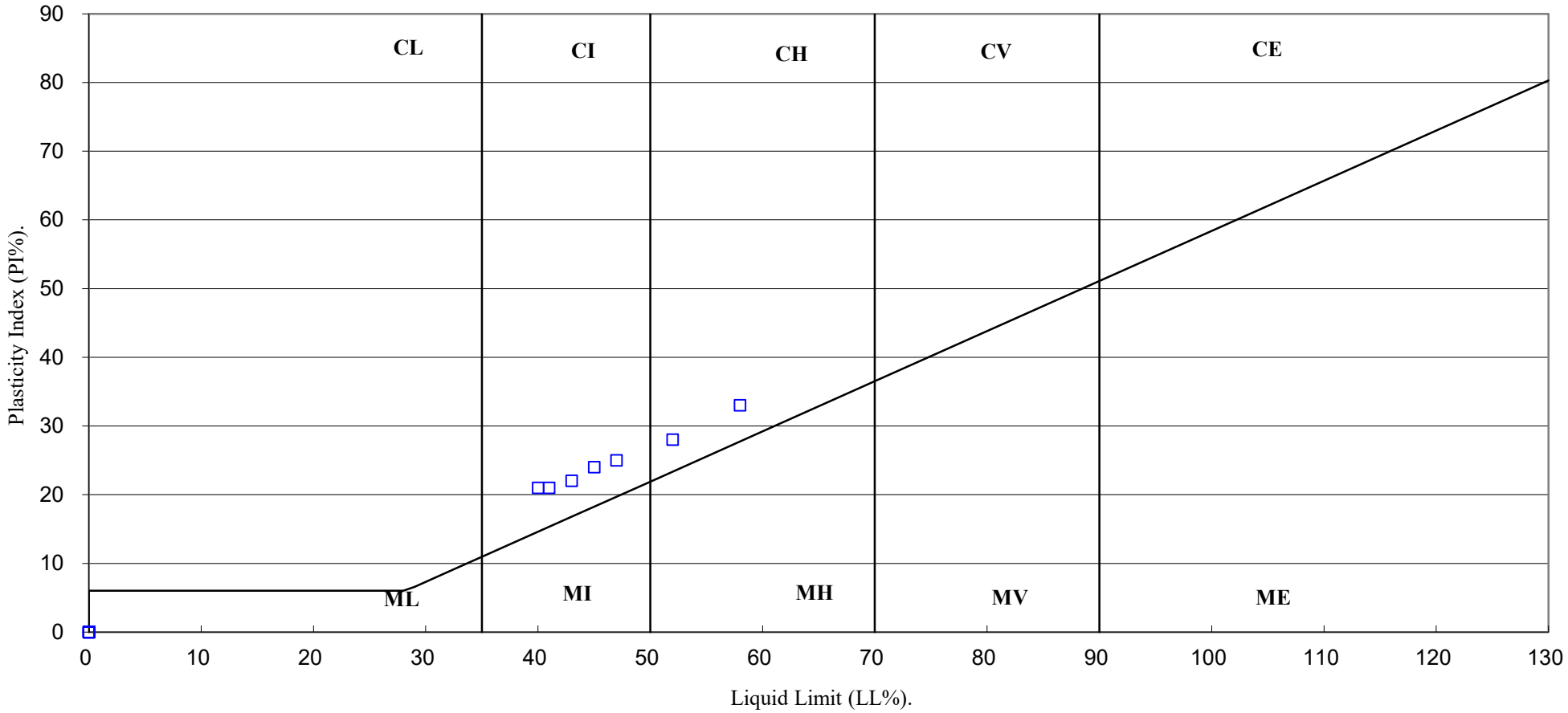
(BS1377 : PART 2 : 1990)

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Moisture Content % Clause 3.2	Linear Shrinkage % Clause 6.5	Particle Density Mg/m^3 Clause 8.2	Liquid Limit % Clause 4.3/4	Plastic Limit % Clause 5.3	Plasticity Index % Clause 5.4	Passing .425mm %	Remarks
WS112		D	2.80		18			43	21	22	98	Intermediate plasticity CI.
WS111		D	2.00	2.45	16			41	20	21	91	Intermediate plasticity CI.
WS108		D	1.00	1.45	23			58	25	33	95	High plasticity CH.
WS101		D	2.00	2.45	19			45	21	24	97	Intermediate plasticity CI.
WS110		D	2.00	2.45	16			40	19	21	92	Intermediate plasticity CI.
WS106		D	2.00	2.45	29			47	22	25	97	Intermediate plasticity CI.
WS107		D	1.00	1.45	22			52	24	28	95	High plasticity CH.

SYMBOLS : NP : Non Plastic * : Liquid Limit and Plastic Limit Wet Sieved.

UKAS TESTING 4043	PSL Professional Soils Laboratory	Manchester Life	Contract No: PSL19/7572
			Client Ref: 13-729

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



UKAS TESTING 4043	PSL Professional Soils Laboratory	Manchester Life	Contract No:
			PSL19/7572
			Client Ref:
			13-729

PARTICLE SIZE DISTRIBUTION TEST

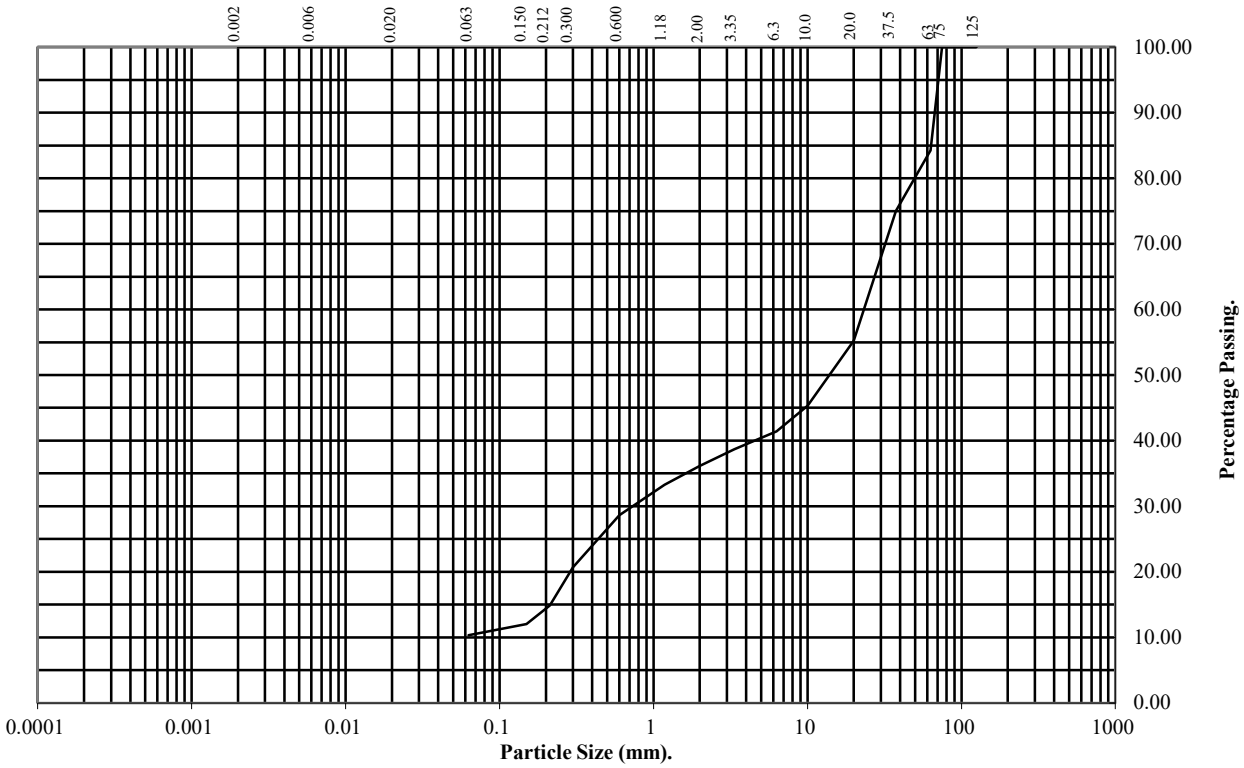
BS1377 : Part 2 : 1990

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

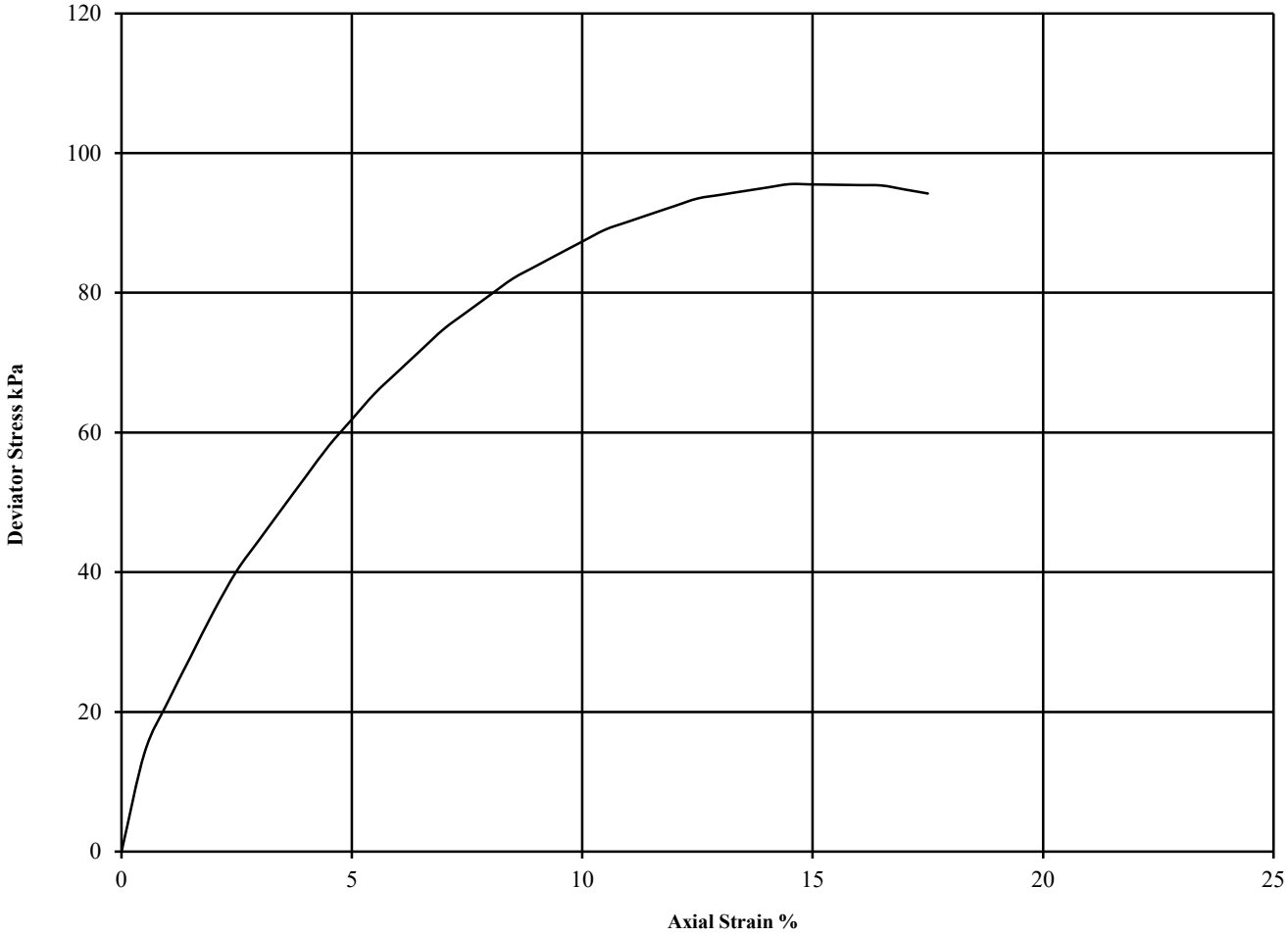
UKAS TESTING 4043	PSL Professional Soils Laboratory	Manchester Life	**Contract No:** PSL19/7572 **Client Ref:** 13-729

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

Hole Number:	**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/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $^1/_2(\theta_1-\theta_3)_f$	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
1	24	1.99	1.61	55	96	48	14.5	Plastic	See summary of soil descriptions

UKAS TESTING 4043	PSL Professional Soils Laboratory	**Manchester Life**	**Contract No:** PSL19/7572
			Client Ref: 13-729

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

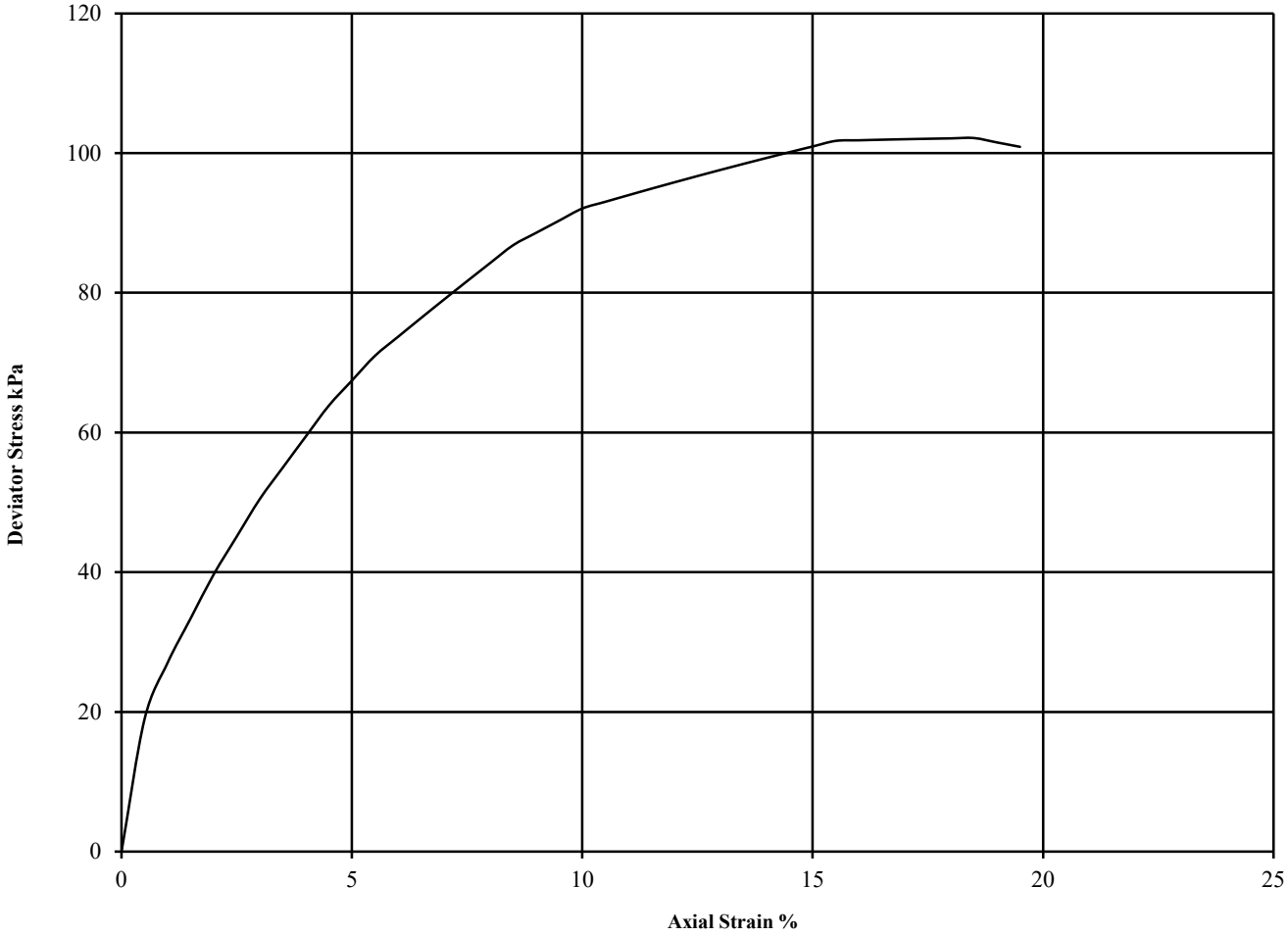
WITHOUT MEASUREMENT OF PORE PRESSURE

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/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $^1/_2(\theta_1-\theta_3)_f$	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
1	21	2.13	1.75	95	102	51	18.5	Plastic	See summary of soil descriptions

UKAS TESTING 4043	PSL Professional Soils Laboratory	Manchester Life	Contract No: PSL19/7572 Client Ref: 13-729

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

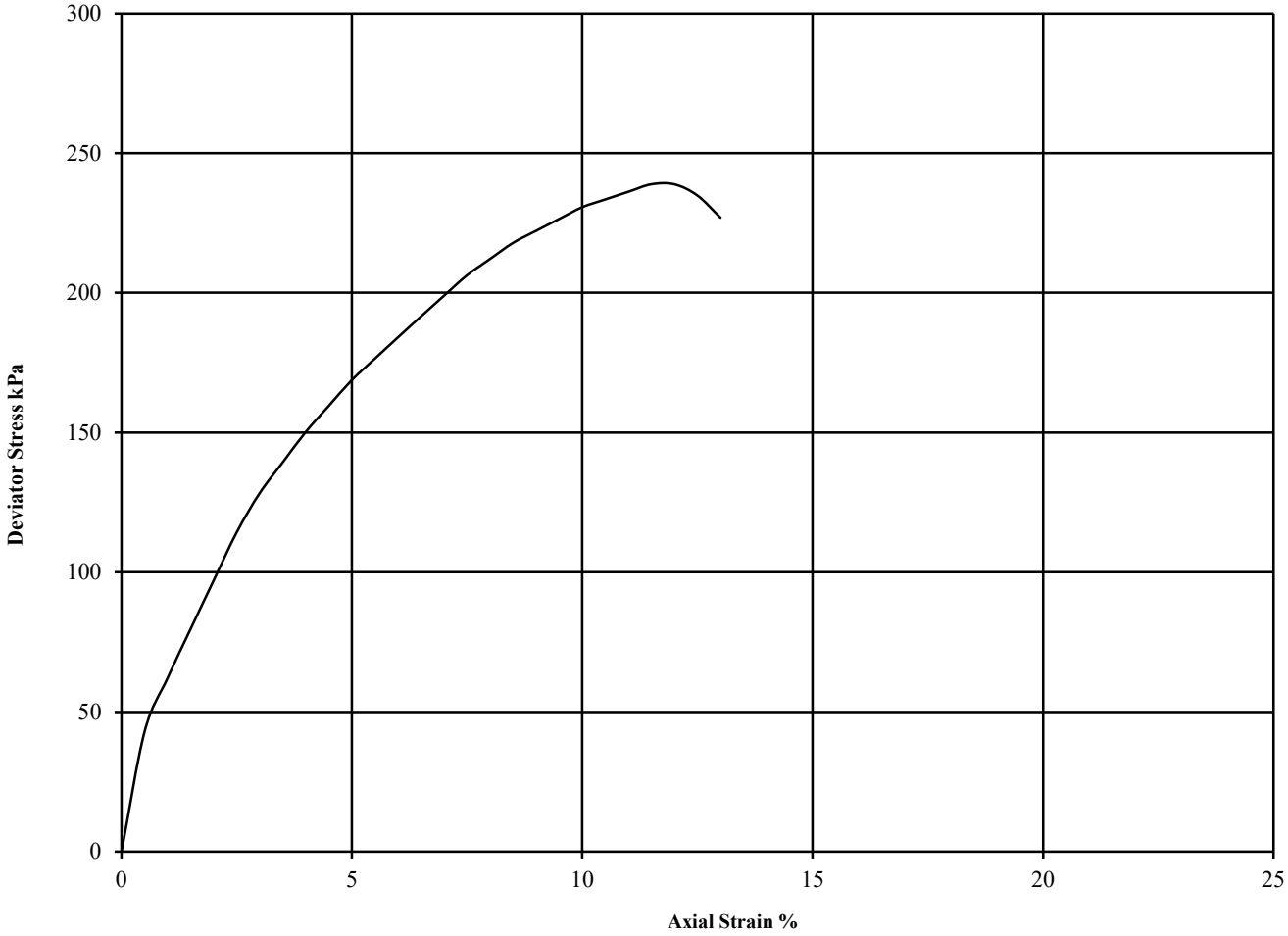
WITHOUT MEASUREMENT OF PORE PRESSURE

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) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $^1/_2(\theta_1-\theta_3)_f$	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
1	25	2.04	1.64	75	239	119	11.5	Brittle	See summary of soil descriptions

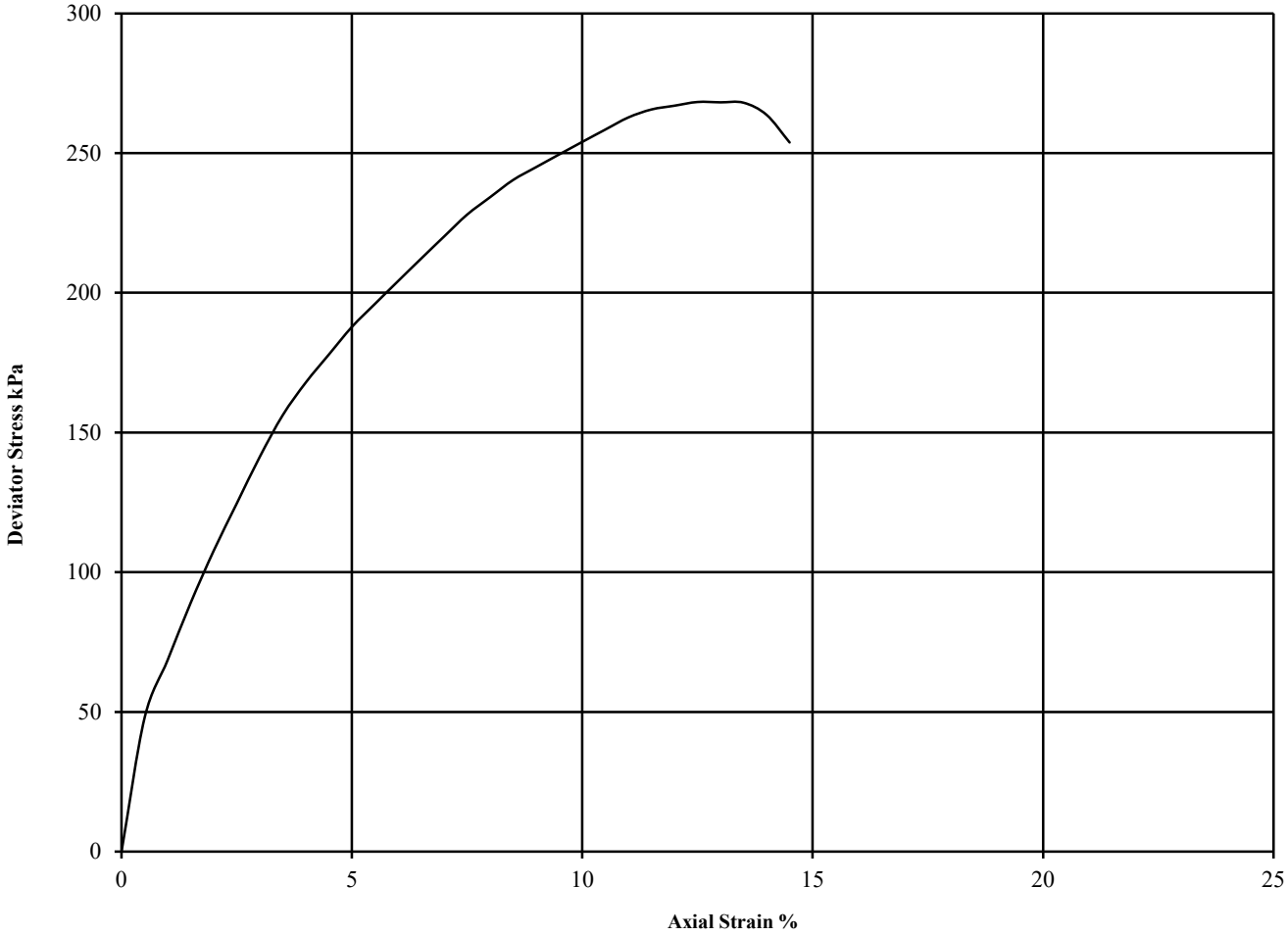
UKAS TESTING 4043	PSL Professional Soils Laboratory	Manchester Life	Contract No: PSL19/7572 Client Ref: 13-729

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/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $^1/_2(\theta_1-\theta_3)_f$	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
1	17	2.15	1.84	75	268	134	12.5	Brittle	See summary of soil descriptions

UKAS TESTING 4043	PSL Professional Soils Laboratory	**Manchester Life**	**Contract No:** PSL19/7572
			Client Ref: 13-729

ONE DIMENSIONAL CONSOLIDATION TEST

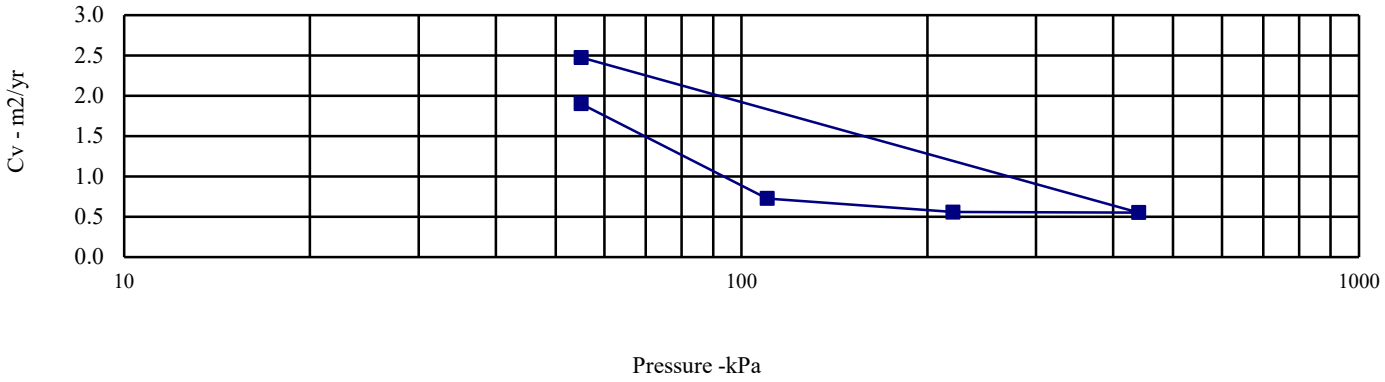
BS 1377: Part 5: 1990: Clause 3

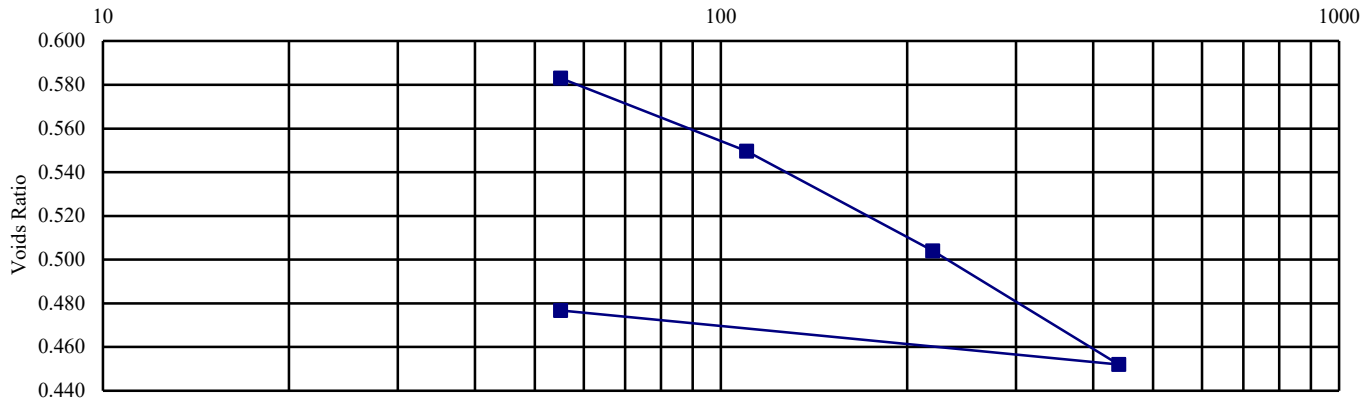
Hole Number: **WS106** **Top Depth (m):** **2.50**

Sample Number: **Base Depth (m) :** **3.00**

Sample Type: **Liner**

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





UKAS TESTING 4043	PSL Professional Soils Laboratory	Manchester Life	Contract No: PSL19/7572
			Client Ref: 13-729

ONE DIMENSIONAL CONSOLIDATION TEST

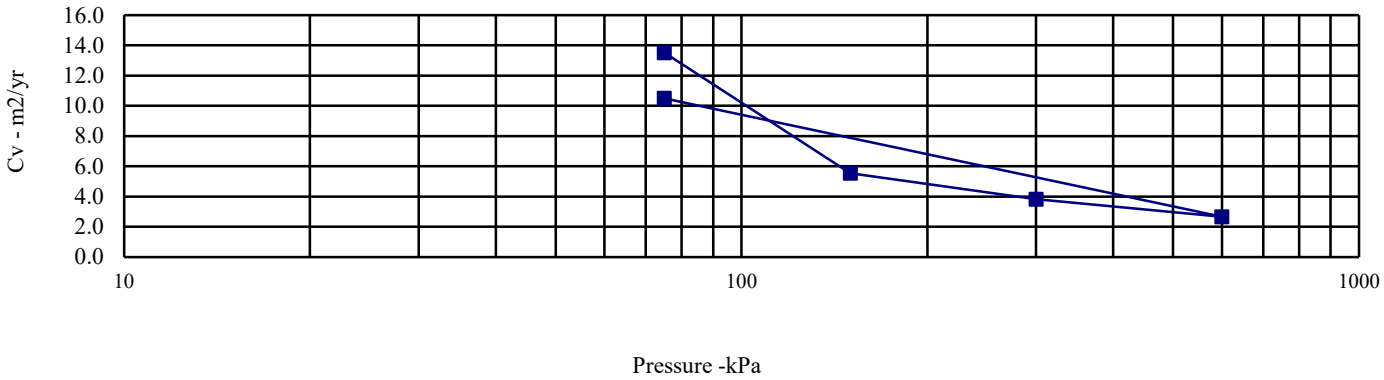
BS 1377: Part 5: 1990: Clause 3

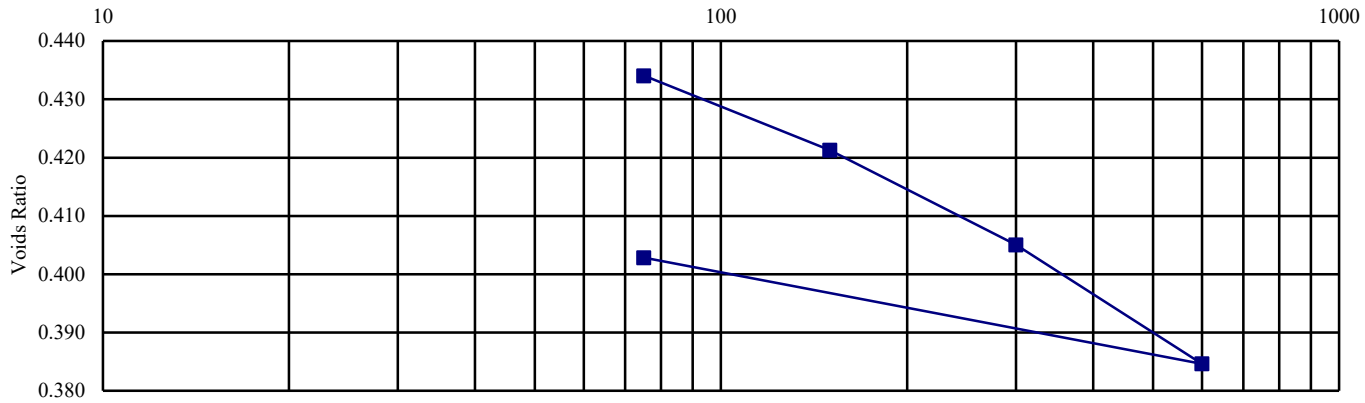
Hole Number: WS112 **Top Depth (m):** 3.50

Sample Number: **Base Depth (m) :** 4.00

Sample Type: Liner

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





UKAS TESTING 4043	PSL Professional Soils Laboratory	Manchester Life	Contract No: PSL19/7572
			Client Ref: 13-729

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 (Director)	R Berriman (Quality Manager)
L Knight (Senior Technician)	S Eyre (Senior Technician)	R Cowles (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
SA106		U	9.00	9.60	Very stiff brown slightly gravelly very sandy very silty CLAY.
SA105		U	6.00	6.60	Brown slightly gravelly sandy very silty CLAY.
SA104		U	6.00	6.60	Stiff brown slightly gravelly sandy very silty CLAY.
SA102		U	6.00	6.70	Firm brown slightly sandy silty CLAY.

PARTICLE SIZE DISTRIBUTION TEST

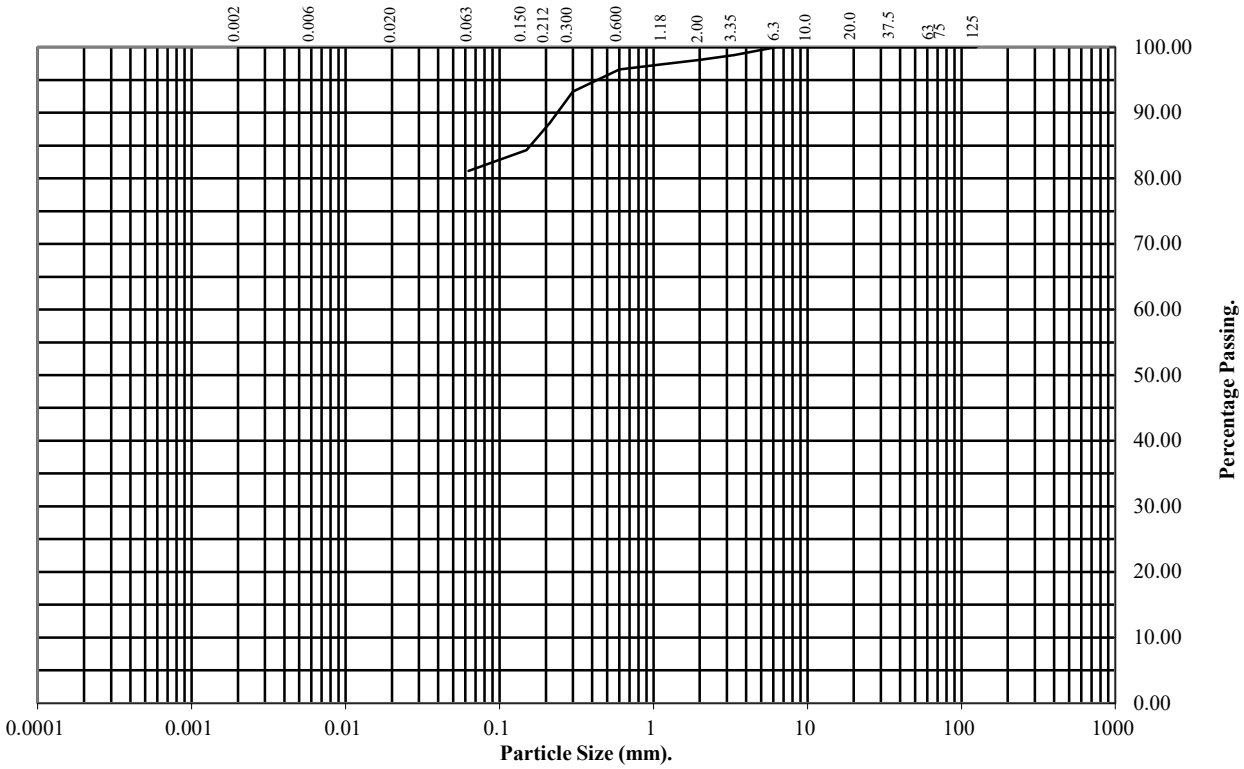
BS1377 : Part 2 : 1990

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

UKAS TESTING 4043	PSL Professional Soils Laboratory	**Manchester Life**	**Contract No:** PSL20/0752 **Client Ref:** 13-729

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

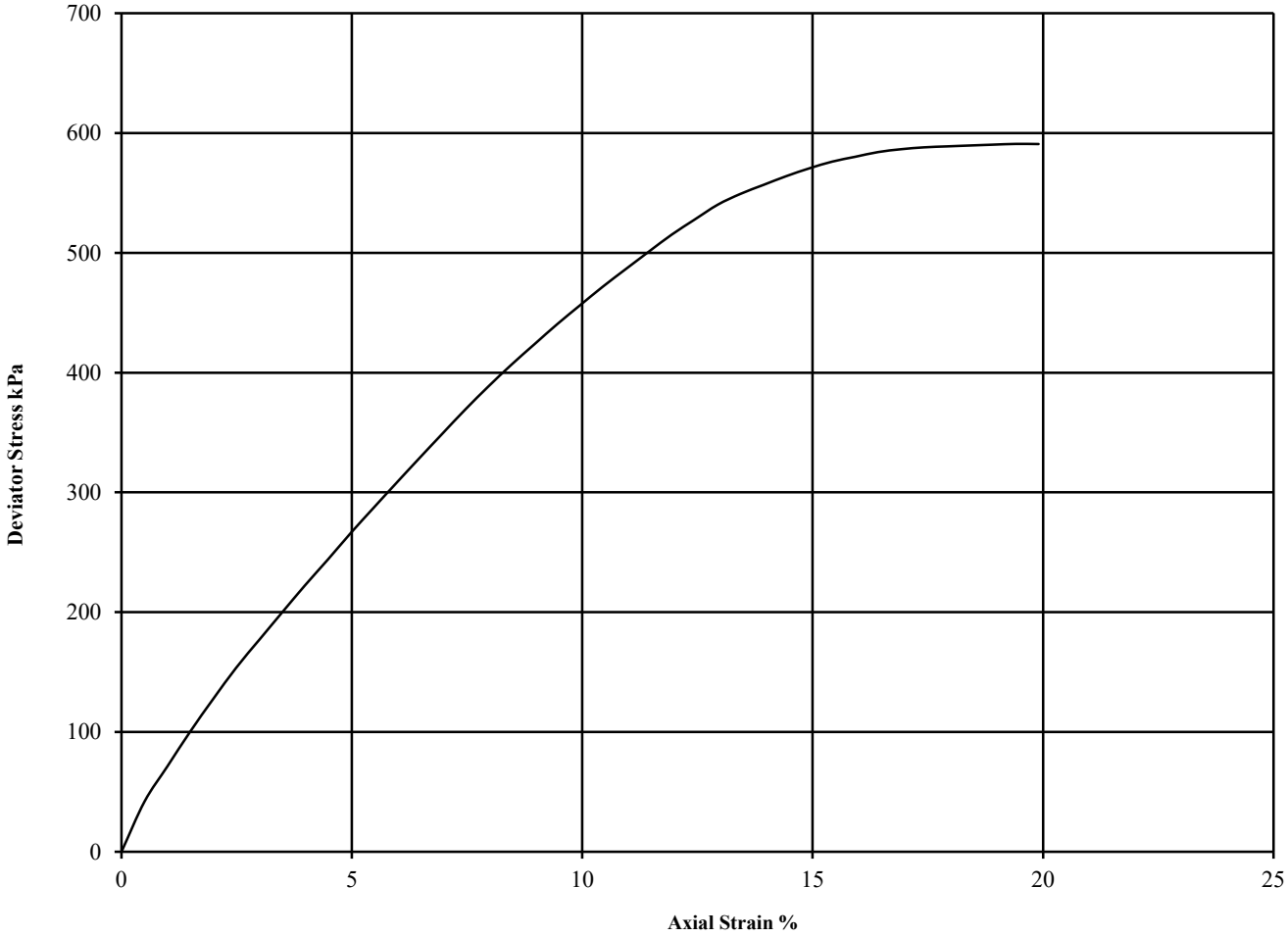
WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

Hole Number: 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/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $^1/_2(\theta_1-\theta_3)_f$	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
1	9.7	2.28	2.08	186	591	295	19.4	Intermediate	See summary of soil descriptions

UKAS TESTING 4043	PSL Professional Soils Laboratory	Manchester Life	Contract No: PSL20/0752 Client Ref: 13-729

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

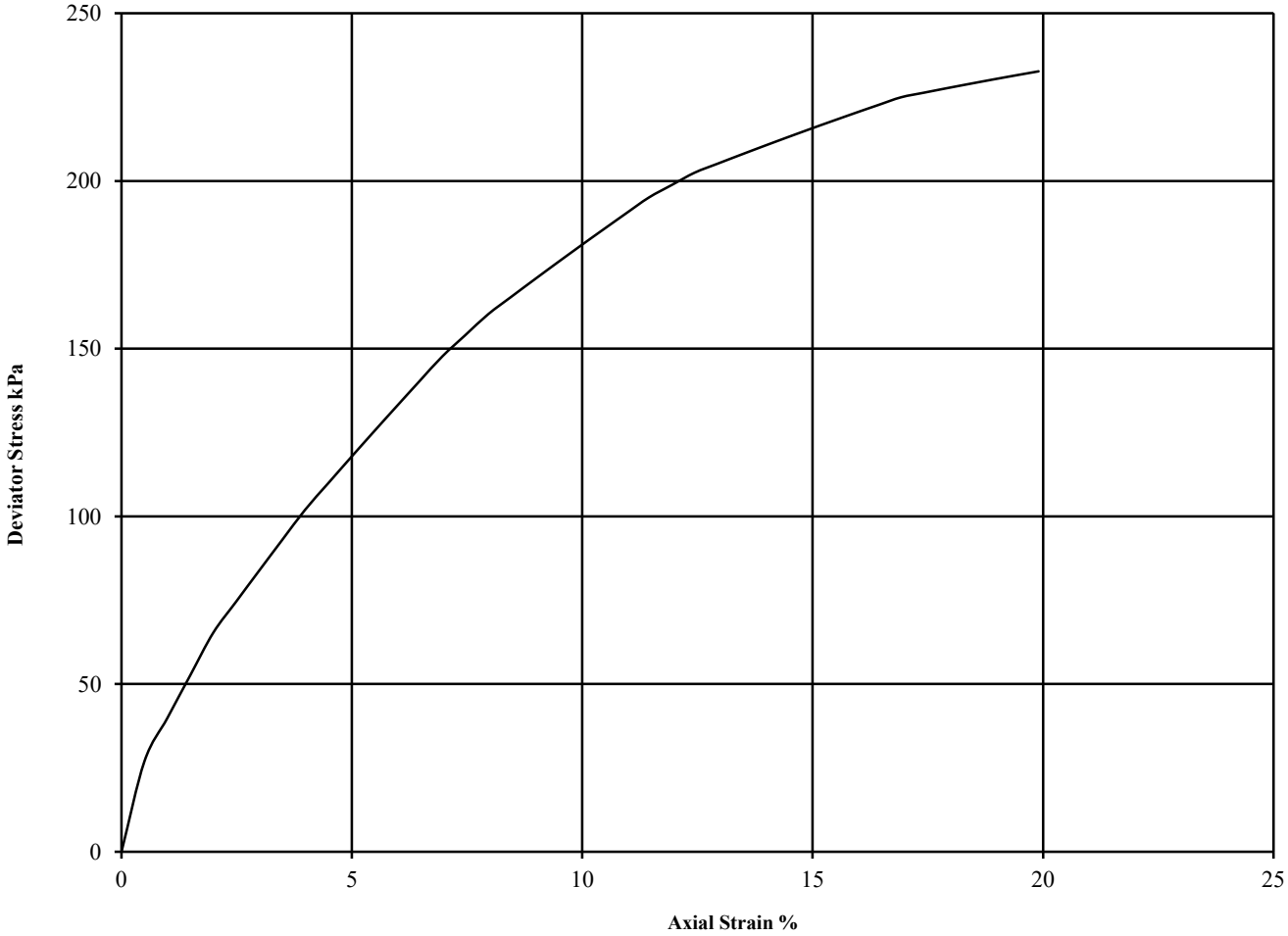
WITHOUT MEASUREMENT OF PORE PRESSURE

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) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $^1/_2(\theta_1-\theta_3)_f$	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
1	18	2.12	1.80	126	233	116	19.9	Intermediate	See summary of soil descriptions

UKAS TESTING 4043	PSL Professional Soils Laboratory	Manchester Life	**Contract No:** PSL20/0752 **Client Ref:** 13-729

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

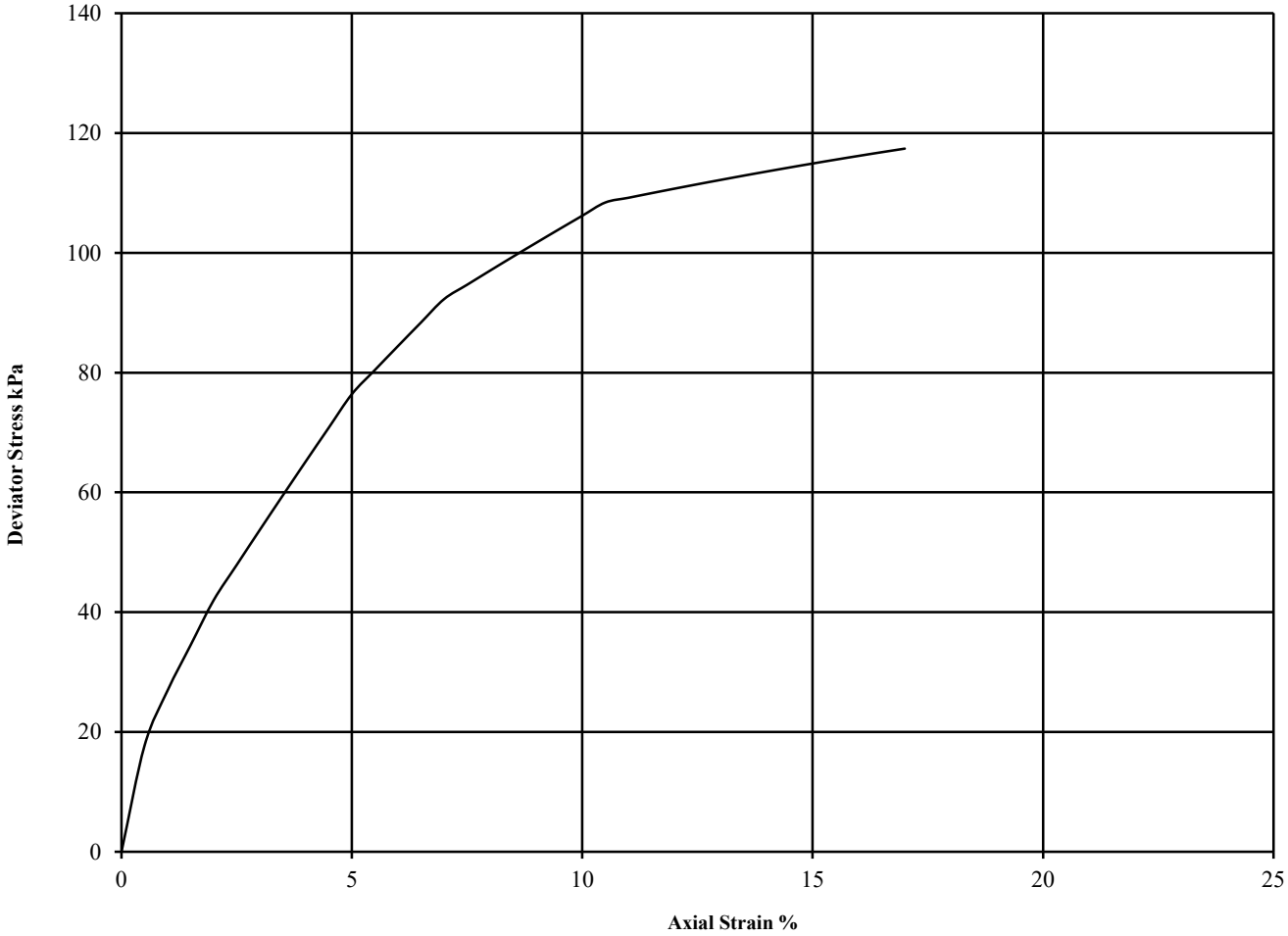
WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

Hole Number: SA102 **Top Depth (m):** 6.00

Sample Number: **Base Depth (m):** 6.70

Sample Type U



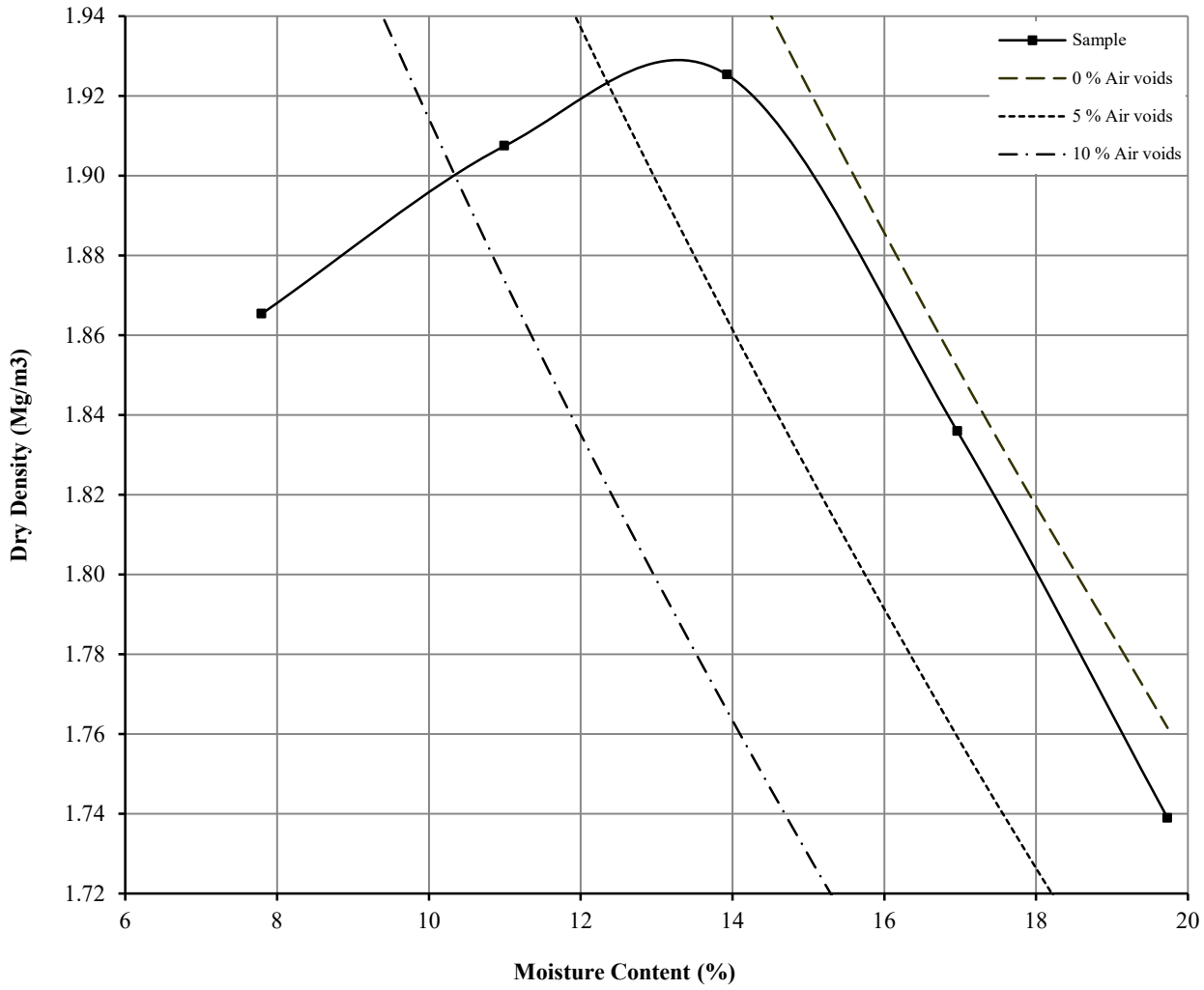
Diameter (mm):		38	Height (mm):		76	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $^1/_2(\theta_1-\theta_3)_f$	Failure Strain (%)	Mode of Failure	Undisturbed Sample Sample taken from top of tube Rate of strain = 2 %/min Latex Membrane used 0.2 mm thick, Correction applied 0.74
1	28	1.92	1.51	126	117	59	17.0	Plastic	38mm due to insufficient material

UKAS TESTING 4043	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.					

UKAS TESTING 4043	PSL Professional Soils Laboratory	**Manchester Life**	**Contract**
			PSL20/0752
			Client Ref
			13-729