



Phase II Geoenvironmental Site Assessment
Thompson Street, Manchester

Reference:12-729-R2-1
Date: November 2020



PHASE II GEOENVIRONMENTAL SITE ASSESSMENT

Thompson Street
Manchester
M4 5FP

Prepared for:

Mulbury City



Report Ref: 12-729-R2-1
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EXECUTIVE SUMMARY

Site Address	Thompson Street, Manchester, M4 5FP	
Grid Reference	E384800, 398870	
Site Area	0.14 Hectares	
Current Site Use	Hardstanding is present across the site and a single storey brick building is present in the southern sector, which is currently utilised as commercial premises (locksmiths). A car park is present in the central and northern sectors of the site. The car park is accessed via an existing site entrance off Thompson Street to the east.	
Proposed Development	E3P understands that Mulbury City proposes to develop the subject site for high rise residential end use including demolition of existing buildings and redevelopment of the site for a 12-storey residential building (Use Class C3) comprising 161 residential units, with ground floor commercial use (Use Class A1, A2, A3, B1, and / or D1 (excluding Places of Worship)), disabled car parking, with highways, landscaping and other associated works.	
Environmental Setting	Drift Geology	Glacial Till - BGS indicate the presence of Clay.
	Bedrock Geology	Chester Formation - Sandstone.
	Faults	None recorded within 250 m of the site.
	Hydrogeology	Superficial – Secondary Undifferentiated Aquifer; and Bedrock – Principal Aquifer.
	Hydrology	There are no surface watercourses within influencing distance of the site (<250 m radius).
	Flood Risk	The site is classified as being unaffected by flooding from rivers (Flood Zone 1).
Site History	The southern portion of the site has predominantly been occupied by industrial buildings throughout its mapped history, including a garage and smithy. A school in the central sector and terraced housing present across the north of the site were removed by the 1970s.	
Utility Locations	The available utility plans indicate the presence of service infrastructure for BT, Cadent Gas Ltd, United Utilities and Electricity NW are present immediately adjacent to the site.	
Landfill Sites and Ground Gases	No present or historic landfill sites are recorded within 250 m of the site.	
Radon	Unaffected – No special precautions required.	
Coal Mining / Land Stability	The site is not located within an area deemed to be at risk from ground instability arising from historic coal mining activities.	
Brine Workings	The site is not located within an area deemed to be at risk from ground instability arising from historic brine pumping activities and/or salt extraction.	
Hazardous Installations	No hazardous installations that could potentially prejudice the proposed construction of highly sensitive residential development have been identified within influencing distance of the subject site.	



SITE INVESTIGATION

Ground Investigation Works	E3P has completed an intrusive ground investigation comprising mechanically excavated trial pits, window sample probeholes and a cable percussion borehole with rotary follow on. Selected window sample and cable percussion borehole locations were fitted with environmental monitoring installations to enable gas and groundwater monitoring.
Ground Conditions	Made Ground – 0.0 m bgl to > 2.45 m bgl Made Ground deposits were encountered within all exploratory hole locations to depths of between 0.30 m and in excess of 2.45 m bgl although, in general, Made Ground was encountered to a depth of less than 1.00 m bgl. Made Ground deposits generally comprise light brown gravelly fine to medium sand with concrete and sandstone over dark brown gravelly fine to medium sand with brick, sandstone and rare plastic. The greatest depths of Made Ground were encountered in the south east sector, in the vicinity of the existing building. The full thickness could not be proven in TP102, TP103, WS104 and WS106. DRIFT – 0.3 m bgl to >21.39 m bgl Drift deposits were encountered within the majority of exploratory locations with the exception of four locations where the full depth of Made Ground could not be proven. The drift deposits were encountered between 0.30 m and 21.39 m bgl and comprise stiff medium strength to very stiff very high strength orange brown to light grey sandy CLAY. No granular drift deposits have been identified. Soft very low strength brown slightly gravelly silty CLAY was identified in WS105 from 0.30 to 1.50 m bgl. SOLID A red brown SANDTONE was recorded at 26.50 m bgl to a proven termination depth of 35.50 m bgl. GROUNDWATER Groundwater level monitoring (to date) has recorded groundwater at depth of between 0.80 m bgl and 2.80 m bgl.



CONTAMINATED LAND ASSESSMENT

Human Health	A Tier I human health risk assessment has been undertaken using the soil chemical analysis results and comparing to the relevant Tier I criteria. This assessment has identified the presence of elevated heavy metals, non-volatile polycyclic aromatic hydrocarbons (PAH) and asbestos. The chronic risk to human health associated with the elevated concentrations on inorganic heavy metals and non-volatile PAH can be mitigated through the capping of the material by the structure or hardstand, alternatively the installation of a suitable cover system in any landscaping and public open space to remove the potential for direct exposure to impacted soils. The concentration of total mercury at WS106 is below the target values for methyl and inorganic mercury, however further analysis is required to confirm the concentrations of elemental mercury. During remediation and enabling works, further samples should be submitted for speciated mercury analysis to assess whether elemental mercury is present which may pose a risk to future site users through vapour inhalation. If elemental mercury is identified, it may be necessary to delineate and excavate the soils as a localised hotspot for off-site disposal. Alternatively, if it is proven that there is no elemental mercury and no vapour risk exists, the soils can be retained on site if placed in an area of low sensitivity (such as beneath hardstand) or a clean cover system in areas of soft landscaping. Asbestos in the form of chrysotile has also been identified in the Made Ground in TP104. Asbestos quantification confirms that only trace fibres are present, and no visual signs of ACM were encountered during the ground investigation. Impacted soils should be managed according to the asbestos risk mitigation conceptual site model.
Controlled Waters	The site is not considered to pose an unacceptable level of risk to controlled waters.
Ground Gas	Ground gas monitoring thus far has indicated the site would be classed as Characteristic Situation 1, suggesting no gas protection measures will be required. However, the final ground gas regime will be confirmed following the completion of the ground gas monitoring programme.
Potable Water Infrastructure	This will need to be confirmed following the completion of a UKWIR risk assessment. Post-remediation and enabling works ground conditions may be different from those identified during this site investigation. Current indications suggest that barrier pipe will be required.



GEOTECHNICAL ASSESSMENT

Underground Obstructions	Significant concrete and brick obstructions have been encountered within the Made Ground, indicative of relict foundations from the former buildings. These features pose a constraint and will require grubbing out in their entirety.
Allowable Bearing Pressure	The underlying natural clay drift deposits have been assessed as being stiff high strength to very stiff very high strength with a net allowable bearing pressure (ABP) of 125–300 kN/m² between depths of 5.00–21.00 m bgl. The upper horizons of weathered bedrock at a depth >26.00 m bgl offer an ABP in excess of 350 kN/m² (based on SPT data) which is likely to increase with depth. The results of the Unconfined Compressive Strength (UCS) and Point Load tests from the rock cores are currently awaited and will be issued as an addendum to this report.
Foundation Options	The Made Ground and underlying natural deposits are not considered a suitable target founding stratum. In respect of the proposed development; E3P consider it feasible to construct the proposed residential apartment blocks utilising piled foundations. The final foundation solution will be dependent on the structural loadings, elevation and should be designed by a suitably qualified structural engineer with detailed designs from a specialist piling contractor.
Building Floor Slabs	A ground bearing slab will be viable, but it will need to be constructed on a granular sub base with the thickness designed by a structural engineer to ensure that settlement tolerances are taken into consideration.
Heave Precautions	As the clay is deemed to be Medium Volume Change Potential, if a ground floor slab is constructed with a cast in-situ suspended floor slab, an engineered design will be required for the heave precautions.
Soakaway Drainage	The presence of shallow groundwater and deep Made Ground deposits would likely preclude the use of soakaway drainage systems in this instance.
Sulphate Assessment	Concrete classification will be DS1 AC1s.
CBR Design %	It is considered that the shallow Made Ground soils can be re-engineered in accordance with Class 1 (a-c) material under favourable climatic conditions to achieve a CBR of 5%. Natural clay soils will provide a CBR in the order of 3–5% 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 subgrade. Where any compressible ground is present beneath proposed roads, adopted drainage infrastructure and hard stand consideration must be given to the potential for consolidation which will induce unacceptable degrees of total and differential settlement at the surface.
Cut/Fill	It is assumed that site levels will remain close to present for the proposed residential apartments, however, a programme of cut works will be required to removal buried obstructions to facilitate piling operations.
Civil Engineering Excavations	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
Waste Characterisation	Any material that is to be disposed off-site should undergo assessment using Technical Guidance WM3: <i>Waste Classification – Guidance on the classification and assessment of waste.</i>



RECOMMENDATIONS

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

-  Further assessment and delineation of mercury impact / hotspot;
-  Remediation & Enabling Works Strategy;
-  Further geotechnical testing to determine the settlement characteristics for ground bearing floor slab (upon completion of the reduced level dig) and pavement design;
-  Foundations to be designed by suitably qualified Structural Engineer; and
-  Geotechnical Earthworks Compaction Specification (Infrastructure).



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DRAWING LIST

12-729-R1-001	Site Location Plan
12-729-R1-002	Proposed Development Plan
12-729-R1-003	Historical Features Plan
12-729-R1-004	Site Features Plan
12-729-R1-005	Exploratory Hole Location Plan
12-729-R1-006	Depth of Made Ground Plan
12-729-R1-010	Conceptual Site Model
12-729-R1-018	Contamination Exceedances Plan



1. INTRODUCTION

1.1. BACKGROUND

E3P has been commissioned by Scott Hughes Design Ltd, on behalf of their client (Mulbury City) to undertake a detailed Phase II Geoenvironmental Site Assessment for a parcel of land located off Thompson Street, Manchester; herein referred to as the site.

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 proposed low-rise residential development.

The scope of work includes the following elements:

- ✿ Design of suitable intrusive ground investigation;
- ✿ Window sample probeholes with, and construction of, environmental monitoring installations;
- ✿ Deep cable percussive borehole with groundwater monitoring installation;
- ✿ Mechanically excavated trial pits and trial trenches;
- ✿ 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
- ✿ Factual and interpretive reporting.

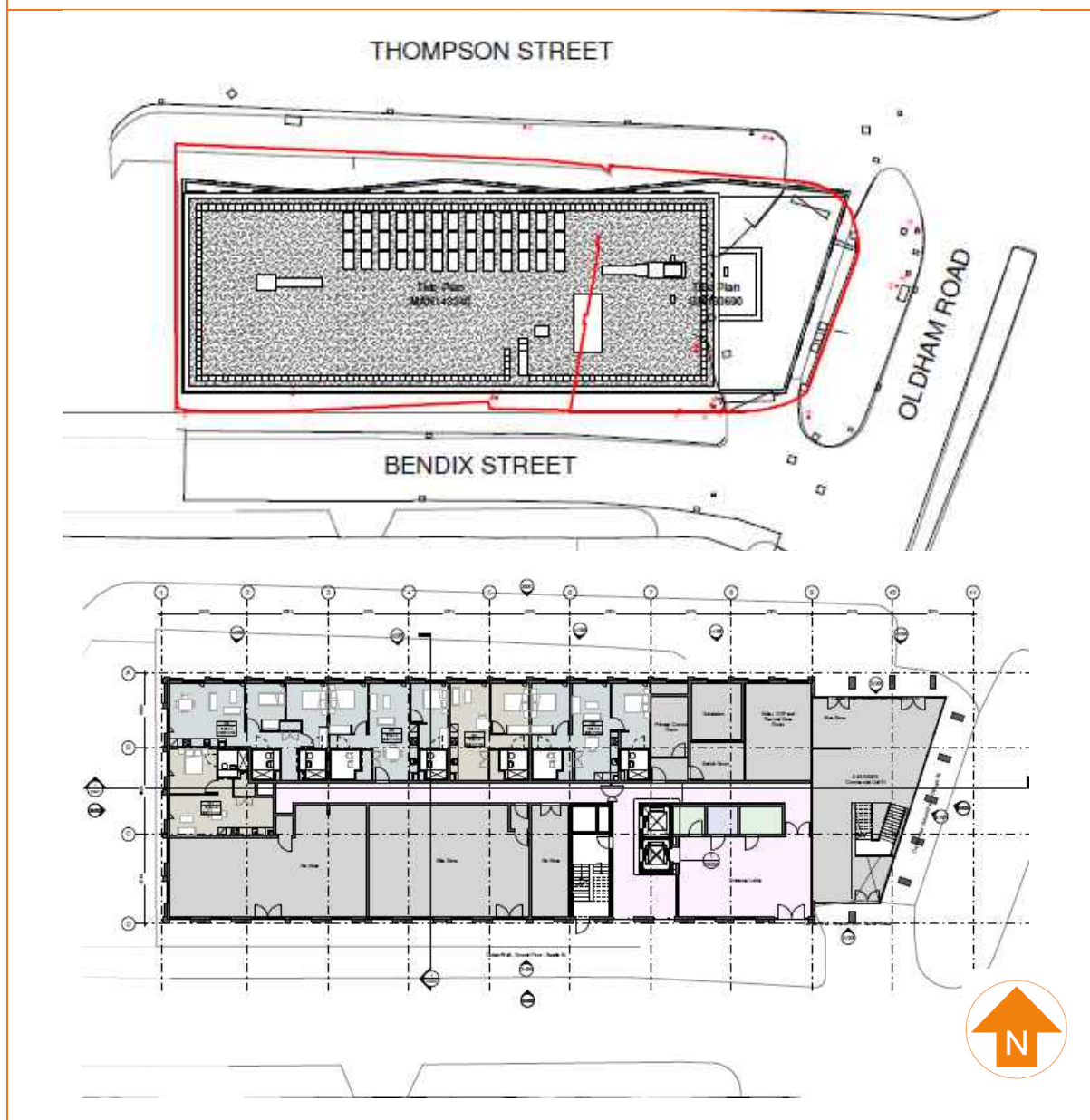
1.2. PROPOSED DEVELOPMENT

E3P understands that Mulbury City proposes to develop the subject site for high rise residential end use including demolition of existing buildings and redevelopment of the site for a 12-storey residential building (Use Class C3) comprising 161 residential units, with ground floor commercial use (Use Class A1, A2, A3, B1, and / or D1 (excluding Places of Worship)), disabled car parking, with highways, landscaping and other associated works.

A snapshot of the Proposed Development Layout is presented in Figure 1.1 below and Appendix III.



FIGURE 1.1 SNAPSHOT OF PROPOSED DEVELOPMENT



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

E3P has previously completed a Phase I Geo-Environmental Assessment (Ref: 12-729-R1-1) dated November 2019. The pertinent point from the desk study report are summarised below:

- ✿ *BGS borehole logs indicate the presence of Clay.*
- ✿ *The Envirocheck Report indicates that the site is not located within a Groundwater Source Protection Zone. The closest groundwater abstraction is a potable supply, located 993m west.*
- ✿ *The existing buildings may support protected species such as bats. A habitat assessment may be required.*
- ✿ *No invasive plant species were identified during the site walkover; however, their presence cannot be ruled out.*
- ✿ *No Above Ground Storage Tanks (AST) or Underground Storage Tanks (UST) were observed at the site during the preliminary site walkover.*
- ✿ *ACM may be present within the fabric of the existing building; however, no evidence of ACM was noted during the site walkover.*
- ✿ *There is no equipment identified which may contain PCBs within the site boundary.*
- ✿ *No landfills are identified within 250m of the site.*
- ✿ *The closest Licensed Waste Management Facility is associated with end of life vehicles and is located 25m southwest.*
- ✿ *Historical commercial land uses, and Made Ground represent potential localised sources of heavy metal, polycyclic aromatic hydrocarbon (PAH), petroleum hydrocarbon, asbestos, and ground gas.*
- ✿ *Historical commercial land uses on site, including a garage and smithy, as well as Made Ground, represent potential sources of mobile hydrocarbon contamination.*
- ✿ *Made Ground associated with historical development represent potential sources of hazardous ground gases.*
- ✿ *There is a Contemporary Trade Directory Entry identified on the site, associated with the supply and installation of safes and vaults, however, the entry is shown as inactive.*



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 Section 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 the 5th September and 4th November 2020. The works are summarised in Table 2.1.

TABLE 2.1 SUMMARY OF FIELDWORK

POTENTIAL SOURCE/RATIONALE	LOCATION HOLE	TYPE	MAXIMUM DEPTH (m bgl)	MONITORING WELLS RESPONSE ZONE (m bgl)
General Ground Conditions Including the Presence/ Nature of Obstructions	WS101	Window Sample Probehole	3.45	1.00-3.00
	WS102		3.45	1.00-3.00
	WS103		2.42	0.50-1.00
	WS104		2.45	0.50-1.50
	WS105		3.45	0.50-1.50
	WS106		2.45	0.50-1.00
	TP101	Mechanically Excavated Trial Pit	2.00	N/A
	TP102		0.90	
	TP103		0.80	
	TP104		2.10	
	TP105		2.00	
	CP101	Cable Percussive Borehole	21.39	N/A

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

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

The cable percussive borehole was advanced to investigate the deeper soil horizons and to provide detailed geotechnical testing.

The sampling locations are illustrated in Drawing 12-729-005 (Appendix III). The ground conditions encountered are indicated on the logs, which are provided in Appendix V.

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



2.3. IN-SITU STANDARD PENETRATION TESTING (SPT)

In-situ geotechnical testing was conducted using the standard penetration test (SPT) and, where the ground is granular, a 60° cone (SPT(C)) was used instead of the sampling tube.

The results are shown in the probehole logs in Appendix V and presented in Table 3.4 and discussed in Section 5.

2.4. LABORATORY ANALYSIS

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

-  Metals.
-  pH, total sulphate, water-soluble sulphate (2:1 extract).
-  Sulphide.
-  Cyanide.
-  Phenols.
-  Total and speciated polycyclic aromatic hydrocarbons (PAHs).
-  Semi Volatile Organic Compounds (SVOC).
-  Volatile Organic Compounds (VOC).
-  Total Organic Carbon (TOC);
-  Asbestos identification and quantification.
-  Speciated 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;
-  Multi-stage triaxial tests;
-  Unconfined Compressive Strength (UCS); and
-  Point Load.

Laboratory analysis sheets are included in Appendix VIII and are summarised 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

HOLE	DEPTH TO STRATUM (m bgl)					
	MADE GROUND	MADE GROUND (CONCRETE)	SOFT CLAY	STIFF TO VERY STIFF CLAY	GRAVEL	BEDROCK
TP101	0.00–0.70	–	–	0.70–2.00	–	–
TP102	0.00–0.05 0.10–>0.90	0.05–0.10	–	–	–	–
TP103	0.00–>0.80	–	–	–	–	–
TP104	0.00–0.85	–	–	0.85–2.10	–	–
TP105	0.00–0.70	–	–	0.70–2.00	–	–
WS101	0.00–0.30	–	–	0.30–3.45	–	–
WS102	0.00–0.70	–	–	0.70–3.45	–	–
WS103	0.00–1.00	–	–	1.00–2.42	–	–
WS104	0.00–>2.45	–	–	–	–	–
WS105	0.10–0.30	0.00–0.10	0.30–1.50	1.50–3.45	–	–
WS106	0.10–>2.45	0.00–0.10	–	–	–	–
CP101	0.10–1.00	0.00–0.10	–	1.00–21.39	–	–

3.2. MADE GROUND

Made Ground deposits were encountered within all exploratory hole locations to depths of between 0.30 m and in excess of 2.45 m bgl, although, typically Made Ground was encountered to a depth of less than 1.00 m bgl across the site.

Made Ground deposits generally comprise light brown gravelly fine to medium sand with concrete and sandstone over dark brown gravelly fine to medium sand with brick, sandstone and rare plastic.

The greatest depths of Made Ground were encountered in the south east sector, in the vicinity of the existing building. The full thickness could not be proven in TP102, TP103, WS104 and WS106.

A Depth of Made Ground Plan is presented as Drawing 12-729-005 in Appendix III.



3.3. DRIFT DEPOSITS

Drift deposits were encountered within the majority of exploratory locations with the exception of four locations where the full depth of Made Ground could not be proven.

The drift deposits were encountered to depths in excess of 21.39 m bgl and comprise stiff medium strength to very stiff very high strength orange, brown to light grey sandy CLAY.

A soft very low strength brown slightly gravelly silty CLAY was identified in WS105 from 0.30 to 1.50 m bgl.

No granular drift deposits have been identified.

3.4. SOLID GEOLOGY

A red brown SANDTONE has been recorded on an adjacent property (Goulden Street) at 26.50 m bgl.

3.5. GROUNDWATER

No groundwater strikes were encountered during the ground investigation.

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 3.8.

3.6. VISUAL AND OLFACTORY EVIDENCE OF CONTAMINATION

Visual and olfactory evidence of potential contamination has not been identified during the site investigation.

3.7. 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 3.2 and Table 3.3 overleaf, which indicate the clay soils to vary between stiff and very stiff.

Strength test data is generally consistent with the field descriptions of the aforementioned soils.



TABLE 3.2 SUMMARY OF HAND SHEAR VANE TESTS

LOCATION	DEPTH	SHEAR STRENGTH (kPA)	CALCULATED ALLOWABLE BEARING PRESSURE (kN/m ²)
TP101	1.0	98	230.3
TP101	1.3	95	223.25
TP101	1.6	83	195.05
TP101	1.9	117	274.95
TP104	1.0	111	260.85
TP104	1.3	101	237.35
TP104	1.6	83	195.05
TP104	1.9	99	232.65
TP105	1.0	92	216.2
TP105	1.3	92	216.2
TP105	1.6	109	256.15
TP105	1.9	117	274.95

Results of the standard penetration tests, including undrained shear strengths derived from SPTs are included in Table 3.4.

TABLE 3.3 SUMMARY OF UNDRAINED SHEAR STRENGTH TEST RESULTS

LOCATION	SAMPLE DEPTH (m)	LAB DESCRIPTION	UNDRAINED SHEAR STRENGTH (kN/m ²)	CONSISTENCY
WS102	1.5-2.0	Very stiff brown slightly gravelly CLAY.	74	Very Stiff
			91	
			121	

3.8. SIDE STABILITY AND EASE OF EXCAVATION

The sides of the exploratory trial pit excavations appeared to be generally stable during excavation.

The presence of brick and concrete cobbles within the Made Ground deposits meant that in certain places, excavation was slow through the Made Ground and in some places, Made Ground could not be fully penetrated. Concrete obstructions were noted in TP102 and TP103.

The natural strata was excavated with relative ease.



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TABLE 3.4 STANDARD/CONE PENETRATION TEST RESULTS

BOREHOLES	DEPTH (m bgl)	MATERIAL FIELD DESCRIPTION	CPT/SPT "N" VALUE	CORRECTED "N" VALUE (N ₁) ₆₀	TERZAGHI & PECK RELATIVE DENSITY (SANDS)	EUROCODE SOIL STRENGTH	CONSISTENCY (BS 5930)	TERZAGHI & PECK APPROXIMATE UNDRAINED SHEAR STRENGTH (kN/m ²)	ALLOWABLE BEARING PRESSURE (kN/m ²)*
WS101	1	Sandy CLAY	18	18.15	N/A	High Strength	Very Stiff	90.73	186.55
	2	Sandy CLAY	26	23.75	N/A	High Strength	Very Stiff	118.76	244.17
	3	Sandy CLAY	38	33.05	N/A	Very High Strength	Very Stiff	165.23	339.72
WS102	1	Sandy CLAY	15	15.12	N/A	High Strength	Very Stiff	75.61	155.46
	2	Sandy CLAY	33	30.15	N/A	Very High Strength	Very Stiff	150.73	309.91
	3	Sandy CLAY	36	31.31	N/A	Very High Strength	Very Stiff	156.54	321.84
WS103	1	Sandy CLAY	15	15.12	N/A	High Strength	Very Stiff	75.61	155.46
	2	Sandy CLAY	51	46.59	N/A	Very High Strength	Very Stiff	232.95	478.95
WS104	1	MG Gravelly Sand	10	10.08	Medium Dense	N/A	N/A	N/A	100.81
	2	MG Gravelly Sand	14	12.79	Medium Dense	N/A	N/A	N/A	127.90
WS105	1	Silty CLAY	2	2.02	N/A	Very Low Strength	Soft	10.08	20.73
	2	Sandy CLAY	28	25.58	N/A	High Strength	Very Stiff	127.90	262.95
	3	Sandy CLAY	34	29.57	N/A	High Strength	Very Stiff	147.84	303.96
WS106	1	MG Gravelly Sand	7	7.06	Loose	N/A	N/A	N/A	70.57
	2	MG Gravelly Sand	17	15.53	Medium Dense	N/A	N/A	N/A	155.30



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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)	ALLOWABLE BEARING PRESSURE (kN/m ²)*
CP101	1	Sandy CLAY	12	12.10	N/A	Medium Strength	Stiff	60.49	124.37
	2	Sandy CLAY	17	15.53	N/A	High Strength	Very Stiff	77.65	159.65
	3	Sandy CLAY	16	13.91	N/A	Medium Strength	Stiff	69.57	143.04
	4	Sandy CLAY	17	14.36	N/A	Medium Strength	Stiff	71.81	147.65
	5	Sandy CLAY	19	15.76	N/A	High Strength	Very Stiff	78.81	162.04
	6.5	Sandy CLAY	16	13.06	N/A	Medium Strength	Stiff	65.31	134.28
	8	Sandy CLAY	15	12.14	N/A	Medium Strength	Stiff	60.71	124.82
	9.5	Sandy CLAY	39	31.43	N/A	Very High Strength	Very Stiff	157.16	323.12
	11	Sandy CLAY	27	20.88	N/A	High Strength	Very Stiff	104.40	214.65
	12.5	Sandy CLAY	33	24.11	N/A	High Strength	Very Stiff	120.55	247.85
	14	Sandy CLAY	35	24.25	N/A	High Strength	Very Stiff	121.23	249.24
	15.5	Sandy CLAY	39	25.69	N/A	High Strength	Very Stiff	128.44	264.08
	17	Sandy CLAY	43	26.99	N/A	High Strength	Very Stiff	134.97	277.51
	18.5	Sandy CLAY	45	26.98	N/A	High Strength	Very Stiff	134.89	277.33
	20	Sandy CLAY	50	28.67	N/A	High Strength	Very Stiff	143.36	294.75
	21	Sandy CLAY	50	27.86	N/A	High Strength	Very Stiff	139.28	286.36

NOTES

* The Allowable Bearing Pressure (ABP) should be considered indicative.



3.9. 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:

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

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

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

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

The Atterberg limits determinations, summarised in Table 3.5, show the clay to be of moderate plasticity.

TABLE 3.5 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
WS102	2.0	19	22	48	26	97	25	Medium
WS101	1.0	17	19	41	22	100	22	Medium
WS103	2.0	18	21	44	23	92	21	Medium

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

3.10. pH AND SULPHATE

Chemical analyses for pH and soluble sulphate content contained in Appendix V (summarised in Table 3.6), shows that the soils at the site generally meet Class DS-1, Aggressive Chemical Environment for Concrete Classification (ACEC) AC-1s in accordance with BRE *Special Digest 1* (2005).

Elevated sulphate concentrations meeting Class DS-2, AC-1s were noted within the Made Ground in TP101 at 0.5 m bgl, however, this material will likely be removed as part of the reduced level excavation.



TABLE 3.6 SUMMARY OF pH AND SULPHATE DATA

LOCATION	DEPTH (m)	SO ₄ IN 2:1 WATER/SOIL (g/l)	pH VALUE	CLASSIFICATION
WS101	0.1	0.06	8.6	DS-1, AC-1s
WS102	0.5	0.13	9.1	DS-1, AC-1s
WS103	0.5	0.083	8.7	DS-1, AC-1s
WS103	1.5	0.077	8.3	DS-1, AC-1s
WS104	0.7	0.064	8.6	DS-1, AC-1s
WS105	0.2	0.066	11.8	DS-1, AC-1s
WS105	0.8	0.065	8.7	DS-1, AC-1s
WS106	1.2	0.022	12	DS-1, AC-1s
TP101	0.5	0.73	7.2	DS-2, AC-1s
TP102	0.7	0.27	7.7	DS-1, AC-1s
TP104	0.7	0.078	7.8	DS-1, AC-1s
TP105	1.0	0.1	8.4	DS-1, AC-1s

3.11. 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*.

3.12. INVESTIGATION RATIONALE

The ICSM has identified that the underlying Made Ground 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 3.7 GROUND GAS MONITORING LOCATION RATIONALE

LOCATION	GROUND GAS SOURCE	DEPTH OF MONITORING WELL (m)
WS101	Natural Drift Deposits	1.00–3.00
WS102	Natural Drift Deposits	1.00–3.00
WS103	Made Ground	0.50–1.00
WS104	Made Ground	0.50–1.50
WS105	Natural Drift Deposits	0.50–1.50
WS106	Made Ground	0.50–1.00



3.13. MONITORING METHODOLOGY

Concentrations of methane (CH₄), carbon dioxide (CO₂) and oxygen (O₂) were measured using a calibrated infra-red gas analyser (GFM435) with gas flow rates were measured using an integrated flow meter.

Gas measurements were recorded for a minimum of 60 seconds at each location, at which point the maximum concentration of CH₄ and CO₂, together with the lowest concentration of O₂ were recorded.

The results of the ground gas monitoring are presented in Table 3.8.



TABLE 3.8 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)
WS101	6/10/20	0.1	0.1	-0.00108	4.2	4.2	-0.04536	13.9	1004	Rising	-1.08	1.00-3.00	2.91	2.80
	22/10/20	0.1	0.1	-0.00075	3.7	3.7	-0.02775	14.2	1001	Rising	-0.75		2.90	2.82
WS102	6/10/20	0.1	0.1	0.00085	1.7	1.7	0.01445	17.2	1004	Rising	0.85	1.00-3.00	2.66	Dry
	22/10/20	0.1	0.1	0.00026	1.5	1.5	0.0039	17.9	1001	Rising	0.26		2.66	Dry
WS103	6/10/20	0.1	0.1	0.00183	0.9	0.9	0.01647	16.8	1004	Rising	1.83	0.50-1.00	1.13	0.80
	22/10/20	0.1	0.1	0.00076	1.1	1.1	0.00836	16.3	1001	Rising	0.76		1.12	0.82
WS104	6/10/20	Well Destroyed										0.50-1.50	-	-
	22/10/20												-	-
WS105	6/10/20	0.1	0.1	-0.00172	0.1	0.1	-0.00172	20.1	1004	Rising	-1.72	0.50-1.50	2.00	1.64
	22/10/20	0.1	0.1	-0.00236	0.3	0.3	-0.00708	19.9	1001	Rising	-2.36		2.00	1.70
WS106	6/10/20	0.1	0.1	0.00164	0.4	0.4	0.00656	19.9	1004	Rising	1.64	0.50-1.00	1.06	Dry
	22/10/20	0.1	0.1	0.00084	0.5	0.5	0.0042	19.7	1001	Rising	0.84		1.05	Dry



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. DEVIATING SAMPLES

Deviating samples were to be avoided during the ground investigation by using best practice sampling procedures including use of appropriate sampling containers and adhering to the laboratory holding times for each contaminant analysis undertaken. The following is noted regarding sample deviations:

Deviation is identified in the groundwater samples from CP101 and WS104, which relate to the use of an incorrect container for BTEX and MTBE and VOCs. The identified deviations are not considered to have impacted the overall risk assessment.

4.2. 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 WITHOUT PLANT UPTAKE

DETERMINANT	UNIT	GAC	N	MC	LOC. OF EX	PATH-WAY	ASSESSMENT
Arsenic	mg/kg	40	15	31	N/A	1	No Further Action
Cadmium	mg/kg	85	15	1.9	N/A	1	No Further Action
Chromium (VI)	mg/kg	6	15	< 4.0	N/A	1	No Further Action
Lead	mg/kg	200	15	780 760 640 460 320 250 220	TP102 0.7 m WS102 0.5 m WS103 0.5 m WS104 0.7 m WS101 0.1 m TP101 0.5 m TP104 0.7 m	1	Further Action
Mercury	mg/kg	1.2	15	1.3	WS106 1.2 m	3	No Further Action
Nickel	mg/kg	180	15	44	N/A	1	No Further Action
Selenium	mg/kg	430	15	2.4	N/A	1	No Further Action
Copper	mg/kg	7100	15	180	N/A	1	No Further Action
Zinc	mg/kg	40000	15	290	N/A	1	No Further Action
Cyanide – Total	mg/kg	791	15	< 1.0	N/A	1	No Further Action
Phenols – Total	mg/kg	210	12	< 1.0	N/A	1	No Further Action
Asbestos	Fibres	NFD	8	<0.001 %	TP104 0.7 m	3	Further Action
Naphthalene	mg/kg	2.3	15	0.36	N/A	4	No Further Action
Acenaphthylene	mg/kg	2900	15	1.0	N/A	2	No Further Action
Acenaphthene	mg/kg	3000	15	4.4	N/A	1	No Further Action
Fluorene	mg/kg	2800	15	4.1	N/A	1	No Further Action
Phenanthrene	mg/kg	1300	15	53	N/A	2	No Further Action
Anthracene	mg/kg	31000	15	16	N/A	2	No Further Action
Fluoranthene	mg/kg	1500	15	110	N/A	2	No Further Action
Pyrene	mg/kg	3700	15	100	N/A	2	No Further Action
Benzo(a)Anthracene	mg/kg	11	15	53	WS104 0.7 m	2	Further Action
Chrysene	mg/kg	30	15	38	WS104 0.7 m	2	Further Action
Benzo(b)Fluoranthene	mg/kg	3.9	15	52	WS104 0.7 m	2	Further Action
Benzo(k)Fluoranthene	mg/kg	110	15	29	N/A	2	No Further Action
Benzo(a)Pyrene**	mg/kg	3.2	15	49 3.7	WS104 0.7 m TP102 0.7 m	2	Further Action
Indeno(123-cd)Pyrene	mg/kg	45	15	24	N/A	2	No Further Action
Dibenzo(a,h)Anthracene	mg/kg	0.31	15	7.3 0.63 0.56 0.37	WS104 0.7 m TP102 0.7 m WS101 0.1 m WS103 0.5 m	2	Further Action
Benzo(ghi)Perylene	mg/kg	360	15	26	N/A	2	No Further Action



DETERMINANT	UNIT	GAC	N	MC	LOC. OF EX	PATH-WAY	ASSESSMENT
TPH C5-C7 (aromatic)	mg/kg	370	15	<0.001		4	
TPH C7-C8 (aromatic)	mg/kg	860	15	<0.001		4	
TPH C8-C10 (aromatic)	mg/kg	47	15	<0.001		4	
TPH C10-C12 (aromatic)	mg/kg	250	15	<1.0		4	
TPH C12-C16 (aromatic)	mg/kg	1800	15	15		4	
TPH C16-C21 (aromatic)	mg/kg	1900	15	230		1	
TPH C21-C35 (aromatic)	mg/kg	1900	15	620		1	
TPH C5-C6 (aliphatic)*	mg/kg	42	15	<0.001		4	
TPH C6-C8 (aliphatic)*	mg/kg	100	15	<0.001		4	
TPH C8-C10 (aliphatic)*	mg/kg	27	15	<0.001		4	
TPH C10-C12 (aliphatic)	mg/kg	130	15	<1.0		4	
TPH C12-C16 (aliphatic)	mg/kg	1100	15	8.1		1	
TPH C16-C35 (aliphatic)	mg/kg	65000	15	143		1	

Notes

PL1 = soil ingestion, PL2 = dermal contact and ingestion, PL3 = dust inhalation; PL4 = Vapour 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;
- ☼ Total mercury;
- ☼ Benzo(a)Anthracene;
- ☼ Chrysene;
- ☼ Benzo(b)Fluoranthene;
- ☼ Benzo(a)Pyrene;
- ☼ Dibenzo(a,h)Anthracene;
- ☼ Chrysotile.

Asbestos in the form of loose chrysotile fibres (<0.001 %) has been identified in the natural clay drift deposits in TP104 at 0.70 m bgl.

No concentrations of VOCs have been identified above the limit of detection in the soils submitted for chemical analysis.

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

- ☼ The main exposure pathways based on the Tier I exceedances are:
 - Soil ingestion;
 - Vapour inhalation (indoor);
 - Dermal contact and ingestion; and
 - Fibre/dust inhalation.



All exceedances relate to shallow Made Ground deposits at depths of 0.10-1.20m bgl.

HUMAN HEALTH RISK ASSESSMENT AND MITIGATION

All of the identified elevated concentrations have primary exposure pathways related to dermal contact and ingestion of soils, vapour inhalation, and inhalation of particulate.

The risk to chronic human health associated with the elevated concentrations on inorganic heavy metals and non-volatile PAH and TPH compounds can be mitigated through the capping of the material by the structure or hardstand, alternatively the installation of a suitable cover system in any landscaping and public open space to remove the potential for direct exposure to impacted soils.

The concentration of total mercury at WS106 is below the target values for methyl and inorganic mercury, however further analysis is required to confirm the concentration of elemental mercury. During remediation and enabling works, further samples should be submitted for speciated mercury analysis to assess whether elemental mercury is present which may pose a risk to future site users through vapour inhalation. If elemental mercury is identified, it may be necessary to delineate and excavate the soils as a localised hotspot for off-site disposal. Alternatively, if it is proven that there is no elemental mercury and no vapour risk exists, the soils can be retained on site if placed in an area of low sensitivity (such as beneath hardstand) or a clean cover system in areas of soft landscaping.

Asbestos in the form of chrysotile has been identified in the Made Ground in TP104 at 0.70 m bgl. Asbestos quantification confirms that only trace fibres are present, and no visual signs of ACM were encountered during the ground investigation. Impacted soils should be managed according to the asbestos risk mitigation conceptual site model shown in Figure 4.1 below.

FIGURE 4.1 ASBESTOS RISK MITIGATION CONCEPTUAL SITE MODEL



Notes

ND None Detect

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

0.1% Soils at a depth of $>1.00\text{m}$ bgl may contain $<0.1\%$ asbestos using composite testing where they will not be likely to be disturbed in the future and will therefore be in an area of low sensitivity. Risk assessment completed in accordance with Asbestos JIWG risk assessment tools.

Undefined- this will be dependent upon soils encountered during earthworks, which may be placed at these depths to ensure no potential risk to human health.

Chemical analysis of the natural clay drift deposits has identified these soils to be acceptable for use as subsoil within the proposed landscaped areas; however, further chemical validation samples will be required to confirm this.

There are no suitable sources of topsoil available on the site.

If sub-soil is to be removed from site, a U1 Exemption or a CL:AIRE MMP for the direct transfer of naturally occurring soils will be required.

If any material is removed for off-site disposal a WM-3 waste classification will be required.

4.3. 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.	Low
Distance to the Closest Groundwater Abstraction Point	The closest groundwater abstraction is a potable supply, located 993m west.	Low
Aquifer Classification in Superficial Drift Deposits	Underlying Glacial Till is classified as a Secondary Aquifer - undifferentiated.	Low
Aquifer Classification in Bedrock	Underlying bedrock is classified as a Principal Aquifer.	High
Viability for Anthropogenic Soil in Direct Contact with Aquifer (Drift or Bedrock)	Variable Made Ground underlain by low permeability clay soils to depths in excess of 21.0 m bgl.	Low
Is the Site Located Within 50 m of a Surface Watercourse?	The risk to surface water is negligible given the absence of a viable receptor within influencing distance of the site	Low
SUMMARY The ICSM developed within the context of the site setting has only identified a single viable pollutant risk, which would be the downward migration of potentially mobile phase-soluble contaminants towards the underlying principal aquifer. However, the overall sensitivity of this receptor is reduced given the presence of a significant thickness of low permeability drift deposits and absence of any groundwater abstraction in the principal aquifer within 950 m of the site.		



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	The soil data analysis has not identified any detectable concentrations of TPH C5 to C6 that might otherwise be indicative of VOC impact.
Total VOC > 1 mg/kg	
Total SVOC > 1 mg/kg	Concentrations either below or only slightly elevated above the laboratory LOD.
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 15 mg/kg.
Phenols > 2 mg/kg	All concentrations are below the laboratory LOD.
Naphthalene > 2 mg/kg	Naphthalene has been not identified at concentrations greater than 2 mg/kg.
Total PAH > 10 mg/kg	Concentrations of low-solubility PAH compounds greater than 10 mg/kg have been detected in the soil analysis at WS104.
PCB > 1 mg/kg	No potential sources of PCB have been identified
Heavy metals > 500 mg/kg	Concentrations of lead exceed 500 mg/kg in three samples of Made Ground.

In due consideration of the ICSM, which has identified a potential pollutant linkage associated with the migration towards the underlying secondary A aquifer, E3P has undertaken a Tier I controlled waters risk assessment.

The Tier I assessment has included a comparison of leachate analysis from samples of the Made Ground and groundwater samples to drinking water standards in the first instance and in absence of environmental quality standards (EQS).

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		L	GW			
Arsenic	µg/l	50	10	2	2	8.22	N/A	No Further Action
Cadmium	µg/l	0.08-0.25	5	2	2	1.4	N/A	No Further Action
Chromium (VI)	µg/l	3.4	–	2	2	<5.0	N/A	No Further Action
Chromium (III)	µg/l	4.7	50	2	2	7.3	N/A	No Further Action
Copper	µg/l	1	2000	2	2	23	N/A	No Further Action
Total Cyanide	µg/l	1	50	2	2	1.4	N/A	No Further Action
Lead	µg/l	1.2	10	2	2	10	N/A	No Further Action
Mercury	µg/l	–	1.0	2	2	<0.5	N/A	No Further Action
Nickel	µg/l	4	20	2	2	12	N/A	No Further Action
Selenium	µg/l	–	10	2	2	<4.0	N/A	No Further Action
Zinc	µg/l	10.9	–	2	2	140 12	TP103-L TP105-L	Further Assessment
pH		6–9		2	2	7.8 – 8.1	N/A	No Further Action
PAH								
Naphthalene	µg/l	2	10*	2	2	<0.01	N/A	No Further Action
Anthracene	µg/l	0.1		2	2	<0.01	N/A	No Further Action
Benzo[b]fluoranthene	µg/l	0.00017*		2	2	<0.01	N/A	No Further Action
Benzo[k]fluoranthene	µg/l	0.00017*		2	2	<0.01	N/A	No Further Action
Benzo(a)pyrene	µg/l	0.00017*		2	2	<0.01	N/A	No Further Action
Indeno(123-cd)pyrene	µg/l	0.00017*		2	2	<0.01	N/A	No Further Action
Fluoranthene	µg/l	0.0063		2	2	<0.01	N/A	No Further Action
Benzo(ghi)perylene	µg/l	1.7–4		2	2	<0.01	N/A	No Further Action
TPH-Aromatic								
TPH C5-C6 (benzene)	µg/l	10	1	2	2	<1.0	N/A	No Further Action
TPH C6-C8 (toluene)	µg/l	74	700	2	2	<1.0	N/A	No Further Action
TPH C8-C10 (ethyl benzene)	µg/l	20	300	2	2	<1.0	N/A	No Further Action
TPH C10-C12 (xylene)	µg/l	30	500	2	2	<10	N/A	No Further Action
TPH C12-C16	µg/l	2	90 ⁵	2	2	<10	N/A	No Further Action
TPH C16-C35	µg/l	50#	90 ⁵	2	2	<10	N/A	No Further Action



DETERMINAND	UNIT	EQS SCREENING VALUE ^{1, 2, 3}	DWS ^{3,4,5}	N		MC	LOC. OF EX	ASSESSMENT
		AA		L	GW			
TPH Aliphatic ⁵								
TPH C5-C6	µg/l	–	15000	2	2	<1.0	N/A	No Further Action
TPH C6-C8	µg/l	–	15000	2	2	<1.0	N/A	No Further Action
TPH C8-C10	µg/l	–	300	2	2	<1.0	N/A	No Further Action
TPH C10-C12	µg/l	–	300	2	2	<10	N/A	No Further Action
TPH C12-C16	µg/l	–	300	2	2	<10	N/A	No Further Action
TPH C16 – C21	µg/l	–	300**	2	2	<10	N/A	No Further Action
TPH C21-C35	µg/l	–	300**	2	2	<10	N/A	No Further Action
VOC								
Tetrachloroethylene	µg/l	0.4	10	0	2	<1.0	N/A	No Further Action
Trichloroethylene	µg/l	10	10	0	2	<1.0	N/A	No Further Action
Trichlorobenzene	µg/l	0.4	–	0	2	<1.0	N/A	No Further Action
Trichloromethane	µg/l	2.5	–	0	2	<1.0	N/A	No Further Action
Dichloromethane	µg/l	20	200	0	2	<1.0	N/A	No Further Action
Carbon Tetrachloride	µg/l	12	3	0	2	<1.0	N/A	No Further Action
Vinyl Chloride	µg/l	–	0.3	0	2	<1.0	N/A	No Further Action

Notes

Solubility <0.01µg/l

AA – Annual Average

* Polyaromatic hydrocarbons (PAH) - Benzo(a)pyrene (BaP), Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(g,h,i)-perylene and Indeno(1,2,3-cd)-pyrene. Benzo(a)pyrene can be considered as a marker for the other PAHs, hence only benzo(a)pyrene needs to be monitored for comparison with the biota EQS or the corresponding AA-EQS in water

** There are no WHO Guideline Values for aliphatic fractions C16-C21 and C21-C35, therefore the guideline value for aliphatic fractions inclusive of C8-C16 (300µg/l) has been applied.

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 EQS value for zinc. No DWS is available for zinc, therefore, to be conservative, the value has been compared to the EQS standard.

The zinc exceedances are related to the leachate samples from TP103 and TP105. Leachate analysis is generally considered to be more aggressive and can overstate the risk.

Given that there are no potable abstractions within 900 m and the site is underlain by low-permeability, cohesive glacial till deposits to depths in excess of 21.0 m bgl, which will afford protection to the underlying principal aquifer, there is considered to be a low risk to controlled waters and the wider environment as no complete pollutant linkage can be determined.



4.4. GROUND GAS

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

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

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

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

4.4.1. SOURCES OF GROUND GAS

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

- ☼ Made Ground deposits to a proven depth of 2.45 m bgl

4.4.2. GROUNDWATER

Groundwater levels were recorded between depths of 0.78 m bgl (WS103) and 4.20 m bgl (CP101). WS102 and WS106 were recorded as dry during the initial monitoring visits.



4.4.3. GAS FLOW

During the monitoring a positive flow was noted in WS102, WS103 and WS106 at rates of between 0.26-1.83 l/hr. The measure of positive flow is considered to be the result of atmospheric conditions and low-level gas generation.

Negative flows were recorded in WS101 and WS105. Negative flows may be indicative of back pressure from wind being greater than the active flow from the wells.

4.4.4. GAS CONCENTRATIONS

No methane concentrations were recorded above the limit of detection.

Carbon dioxide concentrations were recorded within all the monitoring wells at concentrations ranging from 0.3% v/v to 4.2% v/v (WS101). The maximum carbon dioxide levels were also associated with low oxygen concentrations.

4.4.5. GAS ASSESSMENT

In accordance with the methodology outlined with the CIRIA publication C665, E3P has 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 CH ₄ (% v/v)	GSV (l/hr)	MAX CO ₂ (% v/v)	GSV (l/hr)	CLASSIFICATION
WS101	0.1	-0.00108	4.2	-0.04536	CS1
WS102	0.1	0.00085	1.7	0.01445	CS1
WS103	0.1	0.00183	1.1	0.01647	CS1
WS104	N/A				
WS105	0.1	-0.00236	0.3	-0.00708	CS1
WS106	0.1	0.00164	0.5	0.00656	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 it is considered that gas protection measures will not be required., however, this is an interim assessment and will be confirmed on completion of the full gas monitoring programme.



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 4.7 PIPELINE SELECTION PE THRESHOLD CONCENTRATIONS

Contaminant Group	PE-threshold (mg/kg)	Concentrations at <u>Current</u> pipeline depth (mg/kg)
Total VOC	0.5	<1.0
Total BTEX And MTBE	0.1	<0.1
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	<2.0
EC16-EC40 Aliphatic and Aromatic Hydrocarbons	500	<8.0
Phenols (From SVOC Analysis)*	2	<2.0
Cresols and Chlorinated Phenols (From SVOC Analysis)	2	<2.0
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?	Yes – WS104 at 0.70m for TPH C12-C40	
Is free product present in soil and groundwater?	None	
Could hydrocarbon impact at greater depth than current pipeline depth be mobilised by rising groundwater levels?	No – heavy end hydrocarbon impact and low solubility PAH has been identified within Made Ground.	
Will soils impacted with above determinands likely be utilised elsewhere on site?	Currently unknown.	
Will soils be imported to site as part of any future earth works	Currently unknown. The importation of materials may affect the WIR Risk Assessment which should be updated after completion.	

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

Based on the assessment of current site conditions, PE pipe may be suitable for the proposed development. This will need to be confirmed with a UKWIR risk assessment, post remediation.



4.6. CONCEPTUAL SITE MODEL

Following the completion of the intrusive site investigation, chemical analysis and risk assessment, the conceptual model shown in Table 4.8 has been prepared for the site.

TABLE 4.8 CONCEPTUAL MODEL

POLLUTANT LINKAGE	CONTAMINANT (SOURCE)	PATHWAY	RECEPTOR	PROBABILITY	CURRENT RISK	RESIDUAL RISK AFTER MITIGATION
PL1	Heavy Metals	Dermal contact.	Future site users.	Likely	High	LOW
PL2	Non-volatile PAH	Dermal contact and ingestion.	Off-site receptors.			
Discussion: Heavy metals and non-volatile PAH identified throughout Made Ground between depths of 0.1 m and 1.20 m bgl. Recommendation: The Made Ground will likely be capped beneath the proposed structure or hardstand, however, a cover system to any landscaped areas will be required to prevent exposure to future site users. Construction works completed with PPE and provision of welfare.						
PL3	ACM in Made Ground	Inhalation of dust.	Future site users. Buildings. Off-site land users.	Likely	High	LOW
Assessment: Trace fibres of asbestos (<0.001 %) have been identified in the Made Ground in TP104, however asbestos fibres must be assumed to be present throughout the Made Ground. Recommendation: Placement of impact soils beneath hardstand or cover system in landscaped areas in accordance the asbestos CSM will prevent exposure to future site users. Construction works completed with PPE and provision of welfare.						



POLLUTANT LINKAGE	CONTAMINANT (SOURCE)	PATHWAY	RECEPTOR	PROBABILITY	CURRENT RISK	RESIDUAL RISK AFTER MITIGATION
PL4	Mercury (Made Ground)	Inhalation of vapours.	Future site users. Off-site receptors.	Likely	Moderate	To be Determined
Assessment: Marginally elevated total mercury has been identified in the Made Ground at WS106. Recommendation: Mercury speciation analysis is required to determine if a vapour risk has been identified. If elemental mercury is identified, it may be necessary to delineate and excavate the soils as a hotspot for removal off-site. Alternatively, if it is proven that there is no elemental mercury, placement of material in an area of non-sensitivity will be sufficient.						
PL4	Methane, carbon dioxide (Made Ground)	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: Monitoring completed to date suggests CS1 / Green. Recommendation: Completion of ground gas monitoring and precautionary CS2 measures due to deep Made Ground.						



POLLUTANT LINKAGE	CONTAMINANT (SOURCE)	PATHWAY	RECEPTOR	PROBABILITY	CURRENT RISK	RESIDUAL RISK AFTER MITIGATION
PL5	Mobile contaminants (Made Ground)	Surface runoff. Migration through permeable strata and preferential pathways. Perched waters migration.	Groundwater (Principal aquifer).	Low Likelihood	Low	LOW
Assessment: This comparison indicates that the data exceeds the EQS value for zinc. The zinc exceedances are related to the leachate samples from TP103 and TP105. Leachate analysis is generally considered to be more aggressive and can overstate the risk. Given that there are no potable abstractions within 900 m and the site is underlain by low-permeability, cohesive glacial till deposits to depths in excess of 21.0 m bgl, which will afford protection to the underlying principal aquifer, there is considered to be a low risk to controlled waters and the wider environ as no complete pollutant linkage can be determined. Recommendation: No further assessment is required.						
PL6	Sulphate (potential ash within Made Ground)	Sulphate attack on concrete.	Building structure.	Likely	Moderate	LOW
Assessment: The soils at the site generally meet Class DS-1, Aggressive Chemical Environment for Concrete Classification (ACEC) AC-1s in accordance with BRE Special Digest 1 (2005). Elevated sulphate concentrations meeting Class DS-2, AC-1s were noted within the Made Ground in TP101 at 0.5 m bgl, however, this material will likely be excavated as part of the wider reduced level dig for the sub-structure works. Recommendation: Concrete should be designed in accordance with the chemical testing results.						



POLLUTANT LINKAGE	CONTAMINANT (SOURCE)	PATHWAY	RECEPTOR	PROBABILITY	CURRENT RISK	RESIDUAL RISK AFTER MITIGATION
PL7	Organic contaminants such as hydrocarbons, solvents (Made Ground, scrap yards, mills and works)	Ingestion of tainted water supply.	Future site users. Water pipes.	Likely	Low	LOW
Assessment: No significant contamination has been identified at pipeline depth site (0.75–1.35 m). Recommendation: Based on the assessment of current site conditions, PE pipe may be suitable for the proposed development. This will need to be confirmed with a UKWIR risk assessment post remediation.						
PL8	Phytotoxic contaminants (Made Ground)	Direct Contact (plant uptake).	Flora.	Likely	Low	LOW
Assessment: Contamination has been encountered within shallow Made Ground across the site which may be taken up by flora in soft landscaping. Recommendation: Installation of a clean cover system within any areas of soft landscaping to prevent plant uptake of contaminants.						

Main exposure pathways:

PL1 = soil ingestion, PL2 = dermal contact and ingestion, PL3 = dust inhalation; PL4 = Vapour/Gas Inhalation; PL5 = Vertical / Lateral Migration; PL6 = Corrosion of concrete; PL7=Tainting of water supply; PL8 = Uptake by plants;



5. GEOTECHNICAL ASSESSMENT

5.1. PROPOSED DEVELOPMENT

E3P understands that Mulbury City proposes the demolition of existing buildings and redevelopment of the site for a 12-storey residential building (Use Class C3) comprising 161 residential units, with ground floor commercial use (Use Class A1, A2, A3, B1, and / or D1 (excluding Places of Worship)), disabled car parking, with highways, landscaping and other associated works.

5.2. SUMMARY OF GROUND CONDITIONS

Made Ground

Made Ground deposits were encountered within all exploratory hole locations to depths of between 0.30 m and in excess of 2.45 m bgl, although, typically Made Ground was encountered to a depth of less than 1.00 m bgl across the site.

Made Ground deposits generally comprise light brown gravelly fine to medium sand with concrete and sandstone over dark brown gravelly fine to medium sand with brick, sandstone and rare plastic.

The greatest depths of Made Ground were encountered in the south east sector, in the vicinity of the existing building. The full thickness could not be proven in TP102, TP103, WS104 and WS106.

Drift

The drift deposits were encountered to a proven depth of 21.39 m bgl and comprise stiff medium strength to very stiff very high strength orange, brown to light grey sandy CLAY.

A soft very low strength brown slightly gravelly silty CLAY was identified in WS105 from 0.30 to 1.50 m bgl. No granular drift deposits have been identified.

Solid Geology

A red brown SANDTONE has been recorded on an adjacent property (Goulden Street) at 26.50 m bgl.

Groundwater

Groundwater level monitoring has recorded groundwater at depth of between 0.80 m bgl and 280 m 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.



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 ABP

COHESIVE SOILS			
DESCRIPTION	DEPTH (m bgl)	UNDRAINED SHEAR STRENGTH (Cu) (kN/m ²)	ALLOWABLE BEARING PRESSURE (kN/m ²)
Stiff to Very Stiff, Sandy CLAY	1.00–5.00	60–233	124–479
Stiff to Very Stiff, Sandy CLAY	5.00–21.00	61–143	125–295
Soft CLAY (1 Location)	1.00	10	21

Based on the assessment of the relative undrained shear strength, relative in-situ densities and corresponding safe net allowable bearing pressure, the suitable target founding stratum has been identified as the underlying stiff to very stiff glacial clays or sandstone bedrock.

The underlying natural clay drift deposits have been assessed as being stiff medium strength to very stiff very high strength with a net allowable bearing pressure (ABP) in the order of 125–300 kN/m² between depths of 5.00–21.00 m bgl.

The upper horizons of weathered bedrock in the locality at a depth >26.00 bgl offers an ABP in excess of 350 kN/m² (based on SPT data) which will likely increase with depth.

The results of the Unconfined Compressive Strength (UCS) and Point Load tests from the rock cores are currently awaited and will be issued as an addendum to this report.

As the proposed building will be eight storeys, the structural loads will necessitate the use of piled foundations. All obstructions would need to be removed as part of the enabling works prior to any piling.

While a detailed assessment of pile depths and bearing capacity is beyond the scope of this report, it is likely that piles would achieve a 'set' within the very stiff clay strata or the underlying sandstone bedrock. Consideration of the effects of negative skin friction due to variability on the Made Ground and natural drift strata will be required.

A specialist piling contractor should be contacted to obtain detailed designs and costs for a specialist piling technique and to allow them to reduce the factor of safety based on their extensive pile testing data.

Obstructions would need to be removed as part of the enabling works prior to piling.



Table 5.2 below outlines the anticipated depth to suitable founding strata from existing levels at each E3P location.

TABLE 5.2 ANTICIPATED FOUNDATIONS

LOCATION	ANTICIPATED FOUNDING STRATA DEPTH (m bgl)	GROUND WATER (m bgl)	TARGET STRATUM	TREES	FOUNDATION TYPE	TYPE OF CONCRETE
WS101	>5.00	~2.80	Stiff CLAY	N	Piled	DS-1 AC-1s
WS102	>5.00	N/A	Stiff CLAY	N	Piled	DS-1 AC-1s
WS103	>5.00	~0.80	Stiff CLAY	N	Piled	DS-1 AC-1s
WS104	>5.00	N/A	Stiff CLAY	N	Piled	DS-1 AC-1s
WS105	>5.00	~1.65	Stiff CLAY	N	Piled	DS-1 AC-1s
WS106	>5.00	~1.05	Stiff CLAY	N	Piled	DS-1 AC-1s
CP101	>5.00	N/A	Stiff CLAY	N	Piled	DS-1 AC-1s

5.5. GROUND FLOOR SLABS

Given the nature of the proposed high-rise residential development it is recommended that a ground bearing floor slab be utilised.

In order to accommodate for differential settlement and slab failure it is recommended further Plate Load Testing is undertaken on the sub-grade following the breaking out of hardstand and reduced level dig to understand settlement characteristics and inform a geotechnical design specification in order to engineer to the required level to support a proposed ground bearing slab.

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 Medium Volume Change Potential, if a ground floor slab is constructed with a cast in-situ suspended floor slab, an engineered design will be required for the heave precautions.

A summary of heave precautions is presented in Table 5.3.



TABLE 5.3 SUMMARY OF HEAVE PRECAUTIONS

TABLE 5.5 SUMMARY OF HEAVE PRECAUTIONS				
		MINIMUM VOID DIMENSION FOR FOUNDATIONS, GROUND BEAMS AND SUSPENDED IN-SITU CONCRETE GROUND FLOORS		MINIMUM VOID DIMENSIONS UNDER PRECAST CONCRETE AND SUSPENDED TIMBER FLOORS
Plasticity Index of Soil	Required Foundation Depth (m)	Thickness of Void Former Against Side of Foundation or Ground Beam (mm)	Thickness of Void Former on Underside of Edge Beam and Floor Slab (mm)	Void Dimension (mm)
High Plasticity (> 40)	> 2.5	Engineer Design		Engineer Design
	2.0–2.5	35	150	300
	1.5–2.0	25	75	
Moderate Plasticity (20–40)	> 2.5	Engineer Design		Engineer Design
	2.0–2.5	25	100	250
	1.5–2.0	25	50	
Low Plasticity (< 20)	2.0–2.5	N/A	50	200
	> 2.0	No Special Precautions		

5.7. HIGHWAYS CONSTRUCTION

A programme of remediation and enabling works will be required to remediate the proposed road subgrade in accordance with the requirements of the Manual of Contract Documents for Highway Works Volume 1 Specification For Highway Works (Series 600-Earthworks) for a method compaction.

It is considered that the material can be re-engineered using method compaction to achieve a CBR in excess of 3-5% if works are completed in favourable climatic conditions.

Following excavation, the sub formation should be proof rolled and any soft material inspected and removed during favourable climatic conditions to prevent exposure to precipitation.



5.8. DRAINAGE

The presence of a deep Made Ground across the site may result in settlement and would therefore preclude the use of soakaway drainage.

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 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.

5.9. CONCRETE DURABILITY

Based upon the results of the chemical analyses it is considered that subsurface concrete can be designed in accordance with Design Sulphate Class DS-1, Aggressive Chemical Environment for Concrete Classification (ACEC) AC-1s in accordance with the recommendations provided in BRE *Special Digest 1* (2005).

Elevated sulphate concentrations meeting Class DS-2, AC-1s were noted within the Made Ground in TP101 at 0.5 m bgl, however, this material will likely be removed as part of the reduced level dig for the sub-structure works.

5.10. EXCAVATIONS

Trial pits were generally stable in both granular Made Ground and natural strata. In areas where Made Ground exceeded 2 m, excavations were generally less stable. The boreholes were advanced with relative ease through the natural soils and generally excavations should be feasible as part of future works with normal plant.

Relict foundations and underground obstructions have been encountered which will require grubbing out in their entirety during the reduced level dig for the sub structure works.

Groundwater has been encountered at depths of between 0.78 m-4.20 m bgl based on the monitoring completed to date.

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. Consideration should be given for the potential for dewatering gravels in the surrounding areas to the subject site that may cause structural damage to buildings sub-structures in close proximity to the site.

TABLE 5.5 CIVIL ENGINEERING EXCAVATION RISK MATRIX

RISK ITEM	PRESENT	COMMENT
Running Sands	No	No running sand has been identified.
Minor Water Ingress	Yes	Minor water ingress will require localised dewatering/sump pumping during the construction of site drainage infrastructure.
Shallow Bedrock	No	Drift deposits were identified to depths in excess of 25.0 m bgl.



5.11. FURTHER WORKS

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

-  Further assessment and delineation of mercury hotspot;
-  Remediation & Enabling Works Strategy;
-  Further geotechnical testing to determine the settlement characteristics for ground bearing floor slab (upon completion of the reduced level dig) and pavement design;
-  Foundations to be designed by suitably qualified Structural Engineer; and
-  Geotechnical Earthworks Compaction Specification (Infrastructure).

5.12. 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).



5.13. GEOTECHNICAL RISK REGISTER

POTENTIAL CONSTRAINT	ABNORMAL	LOCATION ON SITE	ESTIMATED AREA OF SITE AT RISK (%)	ASSESSMENT AND MITIGATION
Remediation of Contaminated Soils		Site	TBC	The mercury at WS106 requires speciation analysis to determine the type of mercury that may be present and whether this poses a risk to human health through vapour inhalation. Should a risk be identified, the impacted soil may require hotspot removal.
Obstructions		All	100	Subsurface obstructions from relict foundations have been encountered which will require removal.
Trench Collapse		All	100	Made Ground present beneath the site is likely to be loosely compacted and possibly prone to collapse.
Mature Trees		N/A	N/A	No semi-mature or mature trees within influencing distance of the site, as such, not arboricultural survey is required.
Volume Change Potential Clay		Site	100	The cohesive soils have been assessed to be medium volume change potential and therefore precautions may be required at the site.
Peat		N/A	N/A	No identified.
Running Sands		N/A	N/A	Data searches indicate Low Risk.
Ground Dissolution		N/A	N/A	Data searches indicate No Hazard.
Concrete Design		Site	10	The soils typically meet the classification for DS-1, AC-1s. Elevated sulphate concentrations meeting Class DS-2, AC-1s were recorded in TP101 at 0.5 m bgl.
Low-Permeability Ground		Site	100	Soakaways unlikely to be effective in areas where low permeability cohesive deposits are present
Services / Sensitive Structures		-	-	Utilities are present throughout the surrounding highways. Piling may not be possible within immediate proximity of any sensitive infrastructure.



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POTENTIAL CONSTRAINT	ABNORMAL	LOCATION ON SITE	ESTIMATED AREA OF SITE AT RISK (%)	ASSESSMENT AND MITIGATION
Abnormal Foundation Solutions		Site	100	A piled foundation will be required due to the presence of deep Made Ground and obstructions.
Areas Not investigated		Site	30	Relict foundations and obstruction (such as tanks) are anticipated beneath the existing structure (former petrol filling station).



6. CONCLUSIONS AND RECOMMENDATIONS

6.1. 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. This assessment has identified the presence of elevated heavy metals, non-volatile PAH and asbestos. The risk to chronic human health associated with the elevated concentrations on inorganic heavy metals and non-volatile PAH can be mitigated through the capping of the material by the structure or hardstand, alternatively the installation of a suitable cover system in any landscaping and public open space to remove the potential for direct exposure to impacted soils. The concentration of total mercury at WS106 is below the target values for methyl and inorganic mercury, however further analysis is required to confirm the concentrations of elemental mercury. During remediation and enabling works, further samples should be submitted for speciated mercury analysis to assess whether elemental mercury is present which may pose a risk to future site users through vapour inhalation. If elemental mercury is identified, it may be necessary to delineate and excavate the soils as a localised hotspot for off-site disposal. Alternatively, if it is proven that there is no elemental mercury and no vapour risk exists, the soils can be retained on site if placed in an area of low sensitivity (such as beneath hardstand) or a clean cover system in areas of soft landscaping. Asbestos in the form of chrysotile has also been identified in the Made Ground in TP104. Asbestos quantification confirms that only trace fibres are present, and no visual signs of ACM were encountered during the ground investigation. Impacted soils should be managed according to the asbestos risk mitigation conceptual site model.
Controlled Waters	The site is not considered to pose an unacceptable level of risk to controlled waters.
Ground Gas	Ground gas monitoring thus far has indicated the site would be classed as Characteristic Situation 1, suggesting no gas protection measures will be required. However, the final ground gas regime will be confirmed following the completion of the ground gas monitoring programme.
Potable Water	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. Current indications suggest that barrier pipe will be required.



6.2. GEOTECHNICAL ASSESSMENT

Based on the assessment of the relative undrained shear strength, relative in-situ densities and corresponding safe net allowable bearing pressure, the suitable target founding stratum has been identified as the underlying stiff to very stiff glacial clays or sandstone bedrock.

It is therefore recommended that piled foundations are installed capable of transferring structural loads to competent stratum for the residential blocks.

It is assumed that site levels will remain close to present for the proposed residential development, however, a programme of cut and fill works may be required to remove the buried obstructions;

The final foundation solution will be dependent on the structural loadings and elevation and should be designed by a suitably qualified structural engineer;

It is considered the Made Ground and underlying soils may provide a sub-grade formation to support proposed roads and infrastructure with a likely CBR of >5%.

The site is not located in an area of historic mine workings or ground instability and the risk of future subsidence is considered to be very low; and

The presence of shallow groundwater and deep Made Ground deposits would likely preclude the use of soakaway drainage systems in this instance.

END OF REPORT



APPENDIX I

LIMITATIONS

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



APPENDIX II

GLOSSARY

TERMS

ACM	Asbestos-containing material	MMP	Materials management plan
ADS	Acoustic design statement	ND	Not detected
AST	Above-ground storage tank	NDP	Nuclear density probe
BGS	British Geological Survey	NMP	Noise management plan
BSI	British Standards Institute	NPSE	Noise policy statement for England
BTEX	Benzene, toluene, ethylbenzene, xylenes	NR	Not recorded
CA	Coal Authority	PAH	Polycyclic aromatic hydrocarbon
CBR	California bearing ratio	PCB	Polychlorinated biphenyl
CIEH	Chartered Institute of Environmental Health	PI	Plasticity index
CIRIA	Construction Industry Research Association	PID	Photo ionisation detector
CLEA	Contaminated land exposure assessment	POS	Public open space
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



Thompson Street, Manchester

Phase II Geoenvironmental Site Assessment

November 2020

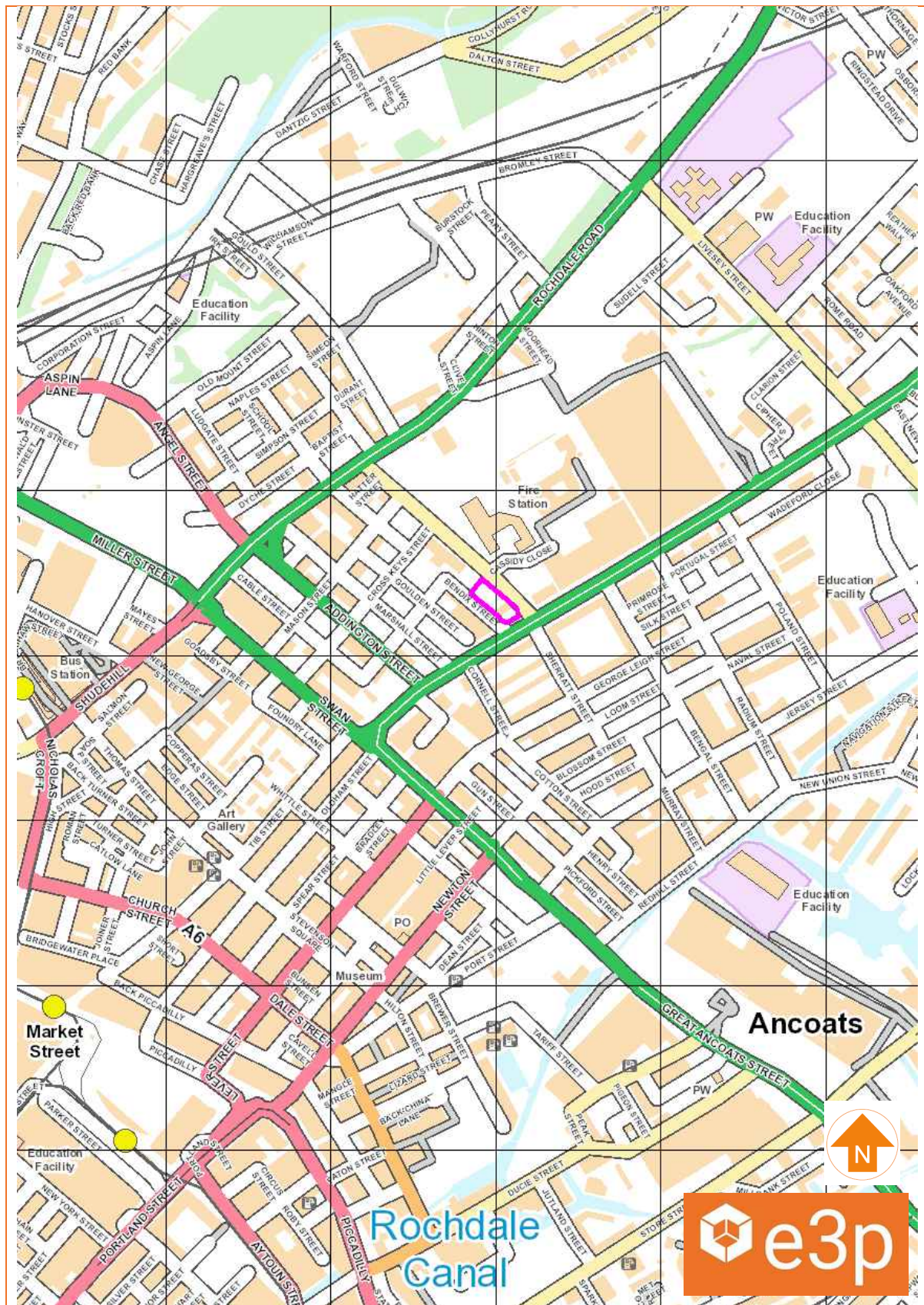
m	Metres	ppm	Parts per million
km	Kilometres	mg/m³	Milligram per metre cubed
% v/v	Percent volume in air	m bgl bgl	Metres below ground level
mb	Millibars (atmospheric pressure)	m bcl	Metre below cover level
l/hr	Litres per hour	mAOD	Metres above ordnance datum (sea level)
µg/l	Micrograms per litre (parts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

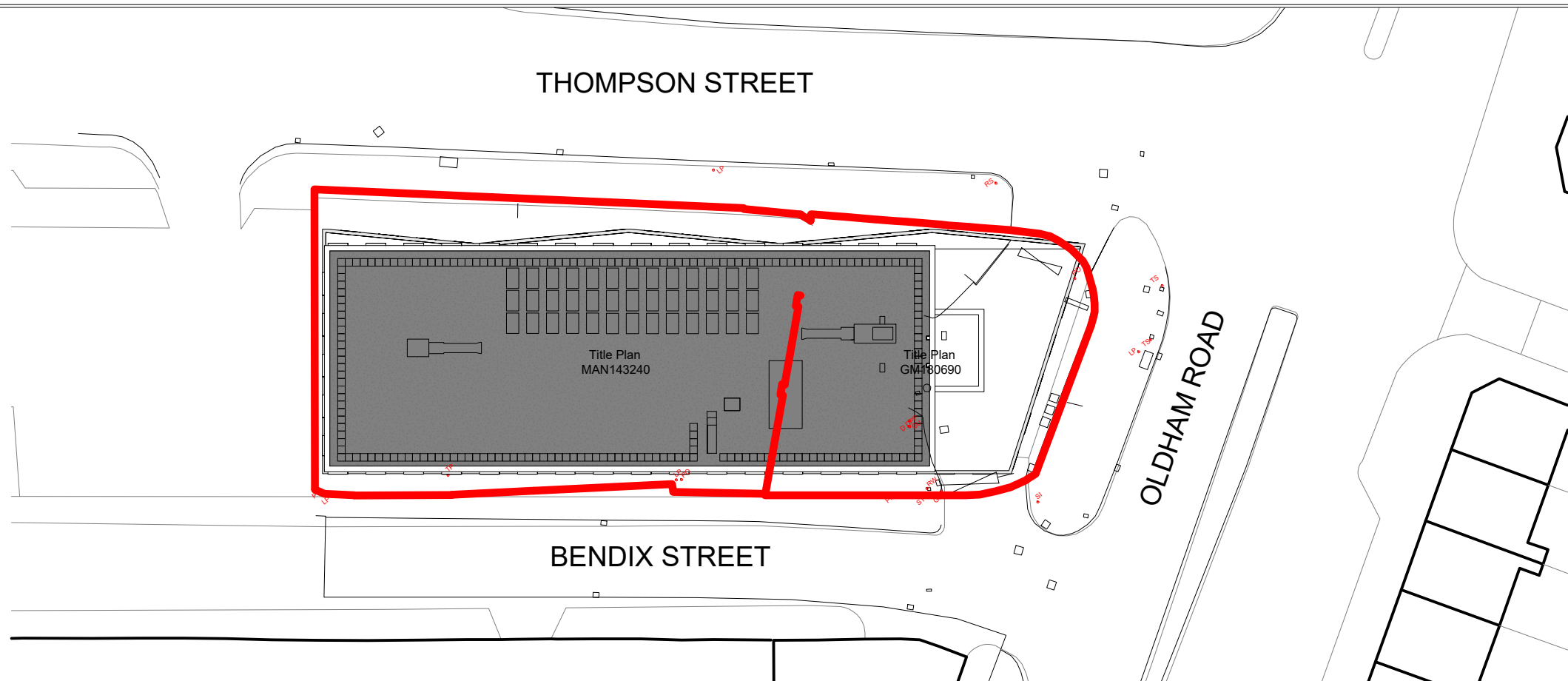


APPENDIX III

DRAWINGS

DRAWING 12-729-001 – SITE LOCATION PLAN





Notes:				
P1	REVA	13.11.2020	LM	NS
Phase	Issue	Date	Drawn	Checked

Client:		Mulbury	
Job Title:		Thompson Street	

Job No:	12-729
Drawing No:	002

Date:	13.11.2020
Scale:	NTS



Environmental Engineering
Partnership Ltd
Taylor Road, Trafford Park
Urmston, Manchester, M41 7JQ
Tel: 0161 707 9612
E-mail: info@e3p.co.uk
Website: www.e3p.co.uk

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Drawing Title:	Proposed Development Plan
----------------	---------------------------



Historical Features

-  Current Building (Pre 1948 - Present)
-  Former School Building (Pre 1948 - Pre 1990)
-  Former Buildings (Pe 1938 - Pre 1990)
-  Car Park (Pre 1968 - Present)

Notes:

P1	REVB	16.11.2020	LM	NS
P1	REVA	18.07.2018	HM	MD
Phase	Issue	Date	Drawn	Checked

Client:

Mulbury

Job Title:

Thompson
Street

Job No:

12-729

Drawing No:

003

Date:

16.11.2020

Scale:

NTS



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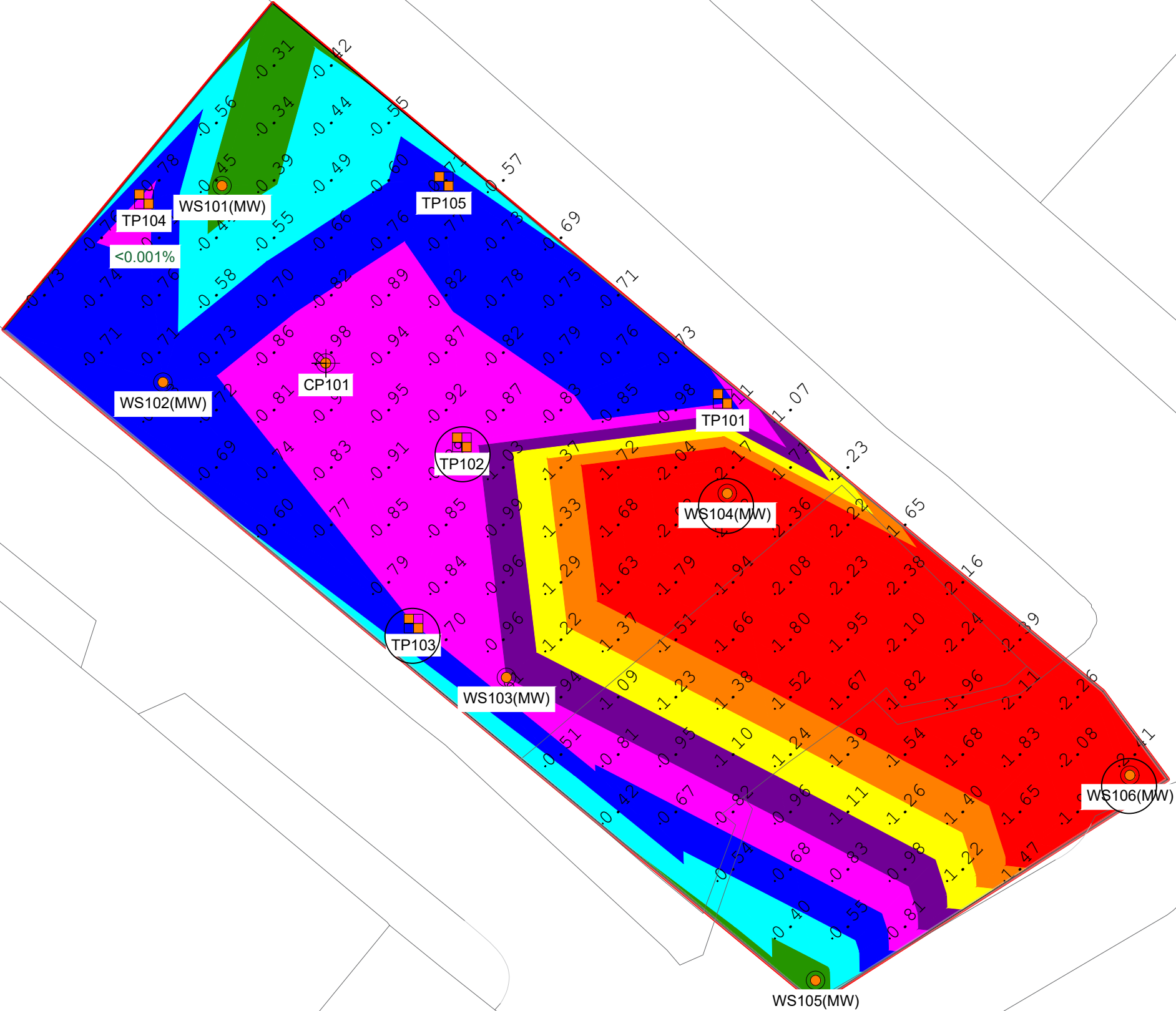
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Location Symbols WS101 Approximate Window Sample Probehole Location with Install TP101 Approximate Trial Pit Location
--

CP101

Approximate Cable Percussive Borehole Location



- Location Symbols**
- Approximate Window Sample Probehole Location with Install
 - Approximate Trial Pit Location
 - Approximate Cable Percussive Borehole Location

- Made Ground Depth (m)**
- Depth of Made Ground 0.00 - 0.19m
 - Depth of Made Ground 0.20 - 0.39m
 - Depth of Made Ground 0.40 - 0.59m
 - Depth of Made Ground 0.60 - 0.79m
 - Depth of Made Ground 1.00 - 1.19m
 - Depth of Made Ground 1.20 - 1.39m
 - Depth of Made Ground 1.40 - 1.59m
 - Depth of Made Ground 1.60 - 1.79m
 - Depth of Made Ground >1.80m

Notes:				
P1	REVB	16.11.2020	LM	NS
P1	REVA	14.09.2020	HM	AS
Phase	Issue	Date	Drawn	Checked

Client:
Mulbury
Job Title:
Thompson Street

Job No:
12-729
Drawing No:
006

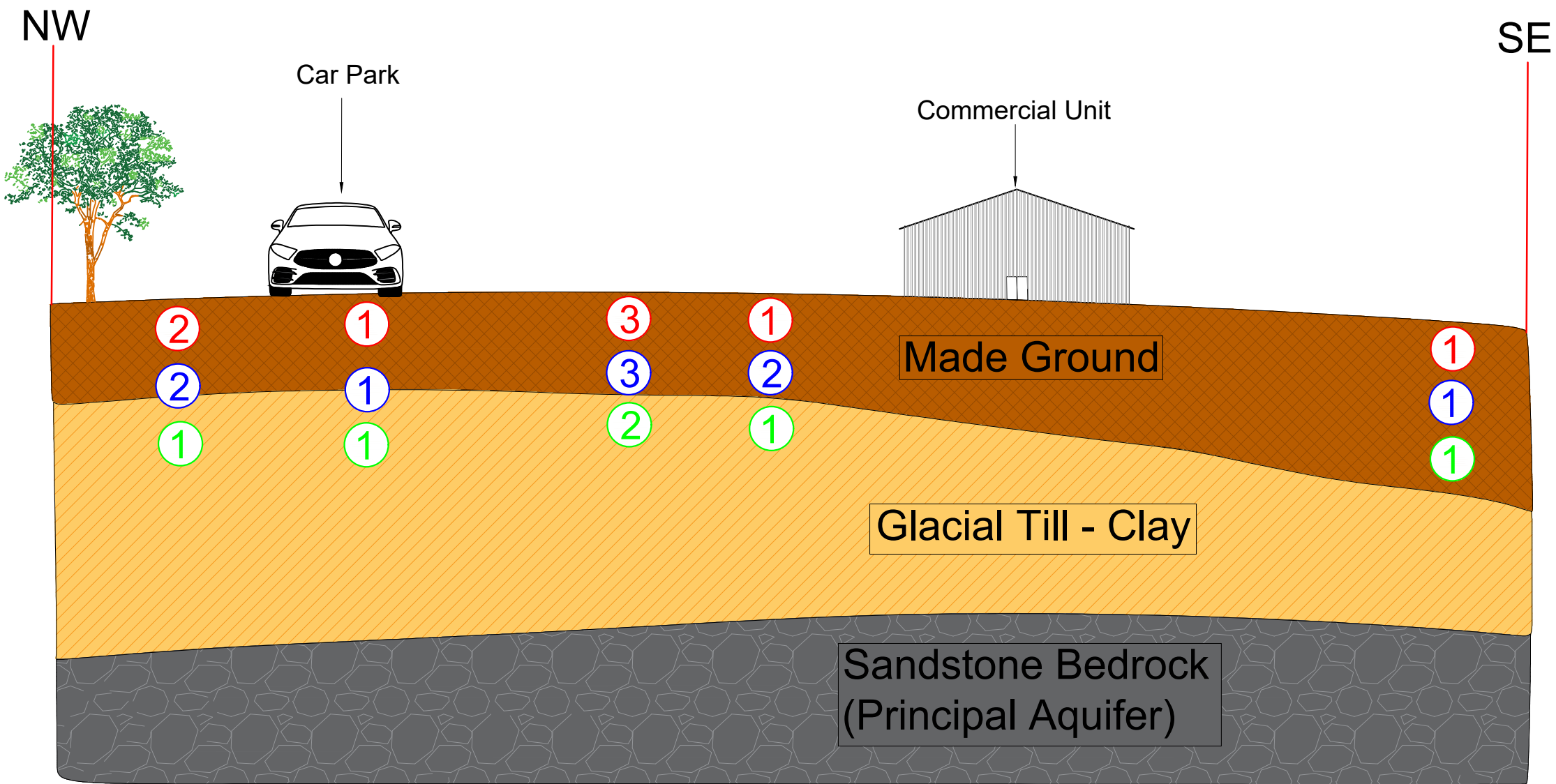
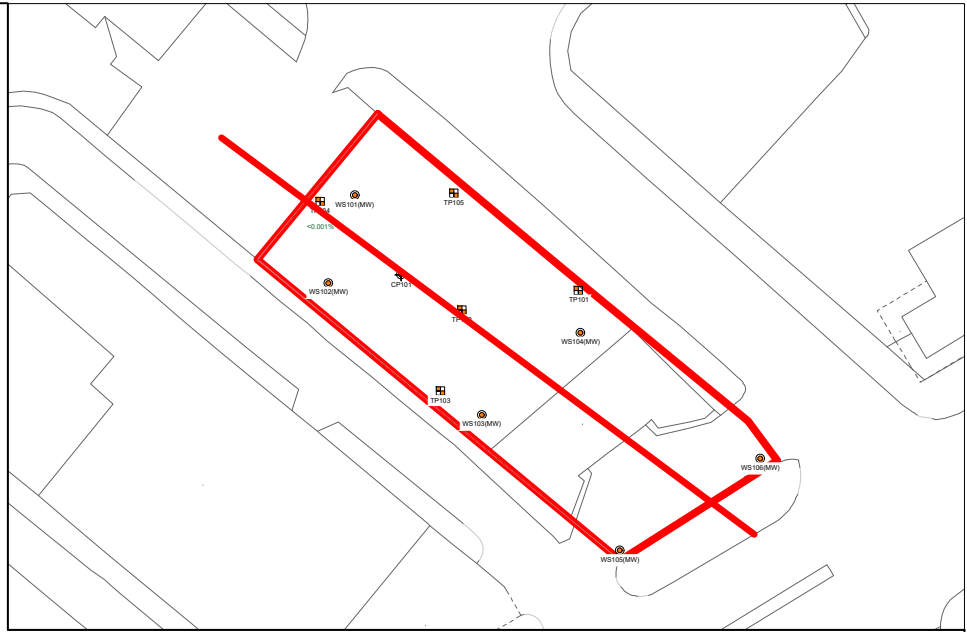
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16.11.2020
Scale:
NTS



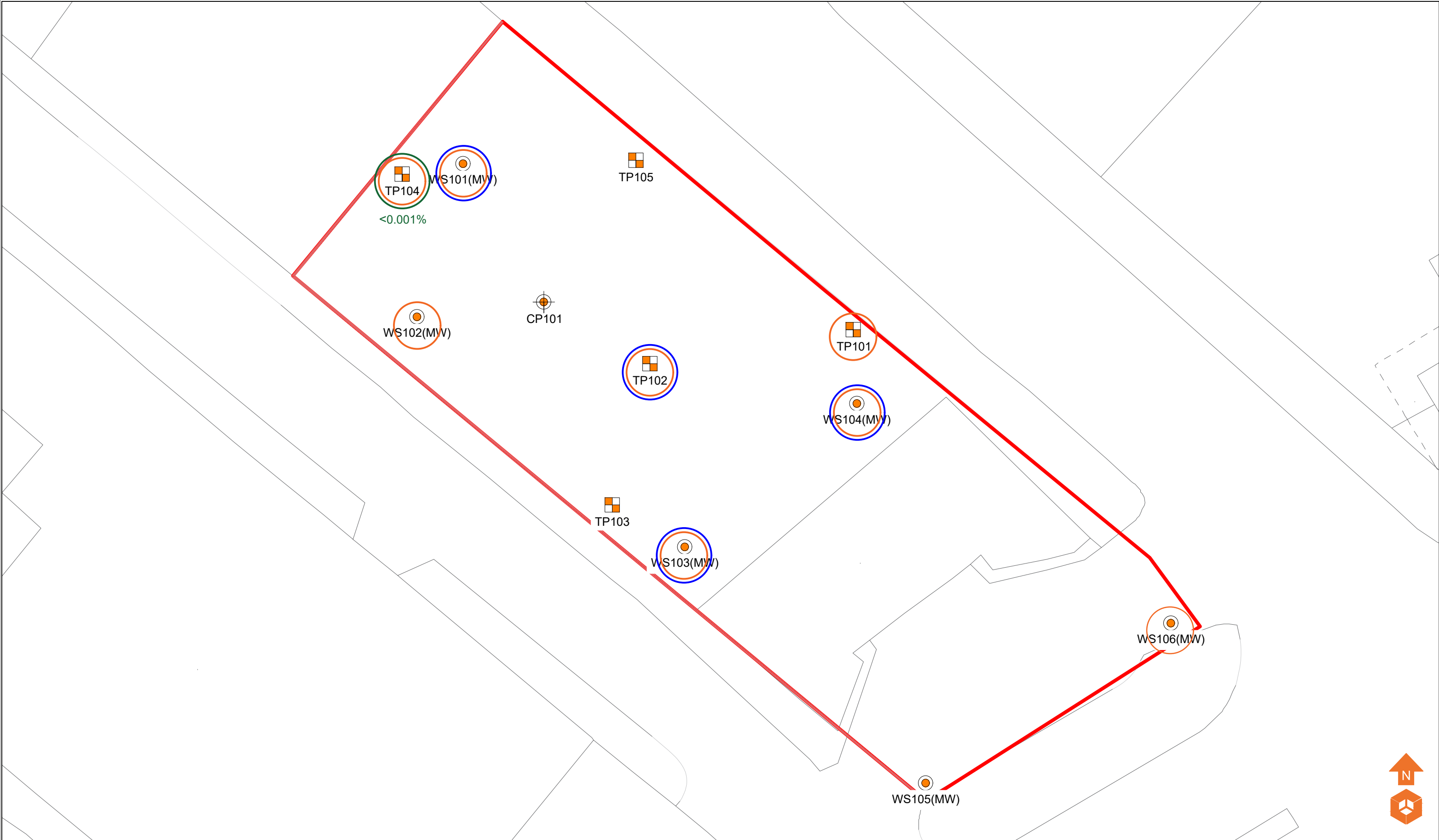
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Website: www.e3p.co.uk

Drawing Title:
Depth of Made Ground Plan

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Geology Key Made Ground Clay Sandstone Bedrock	Sources 1 Heavy Metals, Non Volatile PAH 2 Asbestos 3 PH & Sulphate	Pathways 1 Dermal Contact / Ingestion 2 Fibre / Dust Inhalation 3 Corrosion of Concrete	Receptors 1 Future Residential site users / Commercial Employees 2 Foundations / Concrete	Notes:					Client:		Job No:	Date:	e3p Environmental Engineering Partnership Ltd Taylor Road, Trafford Park Urmston, Manchester, M41 7JQ Tel: 0161 707 9612 E-mail: info@e3p.co.uk Website: www.e3p.co.uk
									Mulbury		Drawing No:	Scale:	
											010	NTS	
					Job Title:		Drawing Title:		The client must not amend any drawing, design or other intellectual property produced by E3P Ltd without permission in writing from E3P Ltd in advance of any amendments being made. In the event that such written permission is not obtained in advance of the amendments being made, E3P Ltd shall not be liable for any damage and/or losses occurring as a result of the amended drawing, design or intellectual property.				
					Thompson Street		Conceptual Site Model						
P1	REVA	13.11.2020	LM	NS									
Phase	Issue	Date	Drawn	Checked									



Location Symbols  Approximate Window Sample Probehole Location with Install  Approximate Trial Pit Location  Approximate Cable Percussive Borehole Location		Contamination Exceedances  Heavy Metals  Non Volatile PAH  Asbestos		Notes:					Client: Mulbury		Job No: 12-729	Date: 13.11.2020	 Environmental Engineering Partnership Ltd Taylor Road, Trafford Park Urmston, Manchester, M41 7JQ Tel: 0161 707 9612 E-mail: info@e3p.co.uk Website: www.e3p.co.uk	
									Drawing No: 018		Scale: NTS			
				Job Title: Thompson Street					Drawing Title: Contamination Exceedances Plan		The client must not amend any drawing, design or other intellectual property produced by E3P Ltd without permission in writing from E3P Ltd in advance of any amendments being made. In the event that such written permission is not obtained in advance of the amendments being made, E3P Ltd shall not be liable for any damage and/or losses occurring as a result of the amended drawing, design or intellectual property.			
P1		REVA		13.11.2020		LM		NS						
Phase		Issue		Date		Drawn		Checked						

APPENDIX IV

PHOTOGRAPHS

PLATE 1 AREA ADJACENT TO OLDHAM ROAD



PLATE 2 VIEW OF EXISTING BUILDING



PLATE 3 TP101 EXCAVATION



PLATE 4 TP102 EXCAVATION



PLATE 5 TP103 EXCAVATION



PLATE 6 TP104 EXCAVATION



APPENDIX V

E3P EXPLORATORY HOLE LOGS

Project Name: Thompson Street	Project No. 12729	Co-ords: 384721.55 - 398792.18 Level: 49.90	Date 05/09/2020
Location: Manchester	Dimensions (m): 2.00 0.60		Scale 1:30
Client: Mulbury City	Depth 2.00		Logged A. Allcock

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.07			0.07	49.83		MADE GROUND: Light brown gravelly fine to medium sand. Gravel is fine to medium angular to sub-angular of concrete and sandstone.	
	0.50	ES					MADE GROUND: Dark brown gravelly fine to medium sand with cobbles. Gravel is fine to coarse angular to sub-angular of brick, sandstone and rare plastic. Cobbles are angular of brick.	
	0.70			0.70	49.20		Stiff high strength orange brown to light grey sandy CLAY.	
	1.00	HVP	98					1
	1.30	HVP	95					
	1.50	ES						
	1.60	HVP	83					
	1.90	HVP	117					
	2.00			2.00	47.90		End of Pit at 2.00m	2
								3
								4

Trial Pit Photographs



Trial Pit 101



Trial Pit 101 Spoil

Remarks: Complete.

Stability: Stable.

Project Name: Thompson Street	Project No. 12729	Co-ords: 384710.14 - 398782.18 Level: 49.84	Date 05/09/2020
Location: Manchester		Dimensions (m): 2.00 Depth 0.90	Scale 1:30
Client: Mulbury City			Logged A. Allcock

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.05 0.10			0.05 0.10	49.79 49.74		MADE GROUND: Light brown gravelly fine to medium sand. Gravel is fine to medium angular to sub-angular of concrete and sandstone. MADE GROUND: Concrete.
	0.70 0.70	B ES		0.90	48.94		MADE GROUND: Dark brown gravelly fine to medium sand with cobbles. Gravel is fine to coarse angular to sub-angular of brick, sandstone, timber, metal and rare plastic. Cobbles are angular of brick.
							End of Pit at 0.90m

Trial Pit Photographs



Trial Pit 102



Trial Pit 102 Spoil

Remarks: Terminated on concrete obstruction.

Stability: Stable.



Project Name: Thompson Street	Project No. 12729	Co-ords: - Level:	Date 05/09/2020
Location: Manchester		Dimensions (m): 2.00	Scale 1:30
Client: Mulbury City		Depth 2.10	Logged A. Allcock

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.03			MADE GROUND: Light brown gravelly fine to medium sand. Gravel is fine to medium angular to sub-angular of concrete and sandstone.	
	0.70	ES					MADE GROUND: Dark brown gravelly fine to medium sand with cobbles. Gravel is fine to coarse angular to sub-angular of brick, timber, sandstone and rare plastic. Cobbles are angular of brick.	
	1.00	HVP	111	0.85			Stiff orange brown light grey sandy CLAY.	1
	1.20	ES						
	1.30	HVP	101					
	1.60	HVP	83					
	1.90	HVP	99					2
				2.10			End of Pit at 2.10m	3
								4

Trial Pit Photographs



Trial Pit 104



Trial Pit 104 Spoil

Remarks: Complete.

Stability: Stable.

Project Name: Thompson Street	Project No. 12729	Co-ords: - Level:	Date 05/09/2020
Location: Manchester		Dimensions (m): 2.00 0.60	Scale 1:30
Client: Mulbury City		Depth 2.00	Logged A. Allcock

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.05			0.05			MADE GROUND: Light brown gravelly fine to medium sand. Gravel is fine to medium angular to sub-angular of concrete and sandstone.	
	0.50	ES		0.70			MADE GROUND: Dark brown gravelly fine to medium sand with cobbles. Gravel is fine to coarse angular to sub-angular of brick, sandstone and rare plastic. Cobbles are angular of brick.	
	1.00	ES					Stiff high strength orange brown to light grey sandy CLAY.	1
	1.00	HVP	92					
	1.30	HVP	92					
	1.60	HVP	109					
	1.90	HVP	117	2.00			End of Pit at 2.00m	2
								3
								4

Trial Pit Photographs



Trial Pit 105



Trial Pit 105 Spoil

Remarks: Complete.

Stability: Stable.

Borehole Log

Borehole No.

WS101

Sheet 1 of 1

Project Name: Thompson Street

Project No.
12729

Co-ords: 384691E - 398821N

Hole Type
WS

Location: Manchester

Level: 50.24 m AOD

Scale
1:50

Client: Mulbury City

Dates: 05/09/2020

Logged By
A. Allcock

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10	ES		0.05 0.20 0.30	50.24 50.19 50.04		MADE GROUND: Light brown gravelly fine to medium sand. Gravel is fine to medium angular to sub-angular of concrete and sandstone.	
		1.00	SPT	N=18 (2,3/3,5,4,6)				MADE GROUND: Dark grey very gravelly fine to medium sand. Gravel is fine to medium angular to sub-angular of sandstone and mudstone.	1
		2.00	SPT	N=26 (5,5/5,6,7,8)				MADE GROUND: Dark brown gravelly fine to medium sand with cobbles. Gravel is fine to coarse angular to sub-angular of brick, sandstone and rare plastic. Cobbles are angular of brick.	2
		2.70	ES					Very stiff high strength orange brown to light grey sandy CLAY. Very stiff very high strength at 3.0m bgl.	
		3.00	SPT	N=38 (4,4/8,10,9,11)					3
					3.45	49.94		End of Borehole at 3.45m	4
									5
									6
									7
									8
									9
									10

Remarks

1. Monitoring well installed. 2. Terminated in stiff clay, struggles to get casing further down.

Borehole Log

Borehole No.

WS102

Sheet 1 of 1

Project Name: Thompson Street

Project No.
12729

Co-ords: 384695E - 398807N

Hole Type
WS

Location: Manchester

Level: 50.02 m AOD

Scale
1:50

Client: Mulbury City

Dates: 05/09/2020

Logged By
A. Allcock

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.05			0.05	50.02		MADE GROUND: Light brown gravelly fine to medium sand. Gravel is fine to medium angular to sub-angular of concrete and sandstone.	
		0.50	ES		0.70	49.97		MADE GROUND: Dark brown gravelly fine to medium sand with cobbles. Gravel is fine to coarse angular to sub-angular of brick, sandstone and rare plastic. Cobbles are angular of brick.	1
		1.00	SPT	N=15 (2,3/3,3,4,5)				Very stiff high strength orange brown to light grey sandy CLAY. Very stiff very high strength at 2.0m bgl.	
		1.50	U						
		2.00	SPT	N=33 (4,6/7,7,9,10)					2
		3.00	SPT	N=36 (4,6/8,8,10,10)					3
		3.45			3.45	49.32		End of Borehole at 3.45m	4
									5
									6
									7
									8
									9
									10

Remarks

1. Monitoring well installed. 2. Terminated in stiff clay, struggles to get casing further down.

Borehole Log

Borehole No.

WS103

Sheet 1 of 1

Project Name: Thompson Street

Project No.
12729

Co-ords: 384712E - 398802N

Hole Type
WS

Location: Manchester

Level: 50.04 m AOD

Scale
1:50

Client: Mulbury City

Dates: 05/09/2020

Logged By
A. Allcock

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.05			0.05	50.04		MADE GROUND: Light brown gravelly fine to medium sand. Gravel is fine to medium angular to sub-angular of concrete and sandstone.	
		0.50	ES					MADE GROUND: Dark brown gravelly fine to medium sand with cobbles. Gravel is fine to coarse angular to sub-angular of brick, sandstone and rare plastic. Cobbles are angular of brick.	1
		1.00	SPT	N=15 (2,2/3,3,4,5)	1.00	49.99		Very stiff high strength orange brown to light grey sandy CLAY. Very stiff very high strength at 2.0m bgl.	2
		1.50	ES						
		2.00	SPT	51 (3,4/51 for 40mm)					
		2.42			2.42	49.04		End of Borehole at 2.42m	3
									4
									5
									6
									7
									8
									9
									10

Remarks

1. Monitoring well installed. 2. Refusal on very stiff clay at 2.42m bgl.



Borehole Log

Borehole No.

WS104

Sheet 1 of 1

Project Name: Thompson Street

Project No.
12729

Co-ords: 384707E - 398797N

Hole Type
WS

Location: Manchester

Level: 50.04 m AOD

Scale
1:50

Client: Mulbury City

Dates: 05/09/2020

Logged By
A. Allcock

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.05	50.04		MADE GROUND: Light brown gravelly fine to medium sand. Gravel is fine to medium angular to sub-angular of concrete and sandstone.	
		1.00	SPT	N=10 (3,3/2,2,2,4)				MADE GROUND: Medium dense dark brown gravelly fine to medium sand with cobbles. Gravel is fine to coarse angular to sub-angular of brick, sandstone and rare plastic. Cobbles are angular of brick.	1
		2.00	SPT	N=14 (2,3/3,4,3,4)					2
					2.45	49.99		End of Borehole at 2.45m	3
									4
									5
									6
									7
									8
									9
									10

Remarks

1. Monitoring well installed. 2. Terminated due to collapse



Project Name: Thompson Street

Project No.
12729

Co-ords:

Hole Type
WS

Location: Manchester

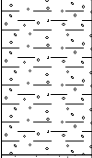
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Scale
1:50

Client: Mulbury City

Dates: 05/09/2020

Logged By
A. Allcock

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	ES		0.10			MADE GROUND: Light grey concrete.	1
					0.30			MADE GROUND: Light grey gravelly fine to medium sand. Gravel is fine to coarse angular to sub-angular of mudstone and concrete.	
		1.00	SPT	N=2 (1,0/0,1,0,1)				Soft very low strength brown slightly gravelly slightly silty CLAY. Gravel is fine to medium angular to sub-angular of concrete.	
		1.30	ES						2
		1.50	U		1.50			Very stiff high strength orange brown to light grey sandy CLAY.	
		2.00	SPT	N=28 (5,5/5,7,7,9)					
		3.00	SPT	N=34 (6,7/8,8,8,10)					
					3.45			End of Borehole at 3.45m	
									4
									5
									6
									7
									8
									9
									10

Remarks

1. Monitoring well installed. 2. Terminated in very stiff clay, struggled to get casing down further.

Borehole Log

Borehole No.

WS106

Sheet 1 of 1

Project Name: Thompson Street

Project No.
12729

Co-ords: 384700E - 398783N

Hole Type
WS

Location: Manchester

Level: 49.90 m AOD

Scale
1:50

Client: Mulbury City

Dates: 05/09/2020

Logged By
A. Allcock

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.10	49.90		MADE GROUND: Light grey concrete.	
		1.00	SPT	N=7 (1,1/1,1,2,3)				MADE GROUND: Loose dark brown gravelly fine to medium sand with cobbles. Gravel is fine to coarse angular to sub-angular of brick, sandstone and rare plastic. Cobbles are angular of brick.	1
		1.40	ES						
		2.00	SPT	N=17 (1,1/2,4,5,6)					2
					2.45	49.80		End of Borehole at 2.45m	3
									4
									5
									6
									7
									8
									9
									10

Remarks

1. Monitoring well installed. 2. Terminated due to collapse.



Borehole Log

Borehole No.

CP101

Sheet 1 of 3

Project Name: Thompson Street

Project No.
12729

Co-ords: 384706E - 398804N

Hole Type
CP

Location: Manchester

Level: 50.06 m AOD

Scale
1:50

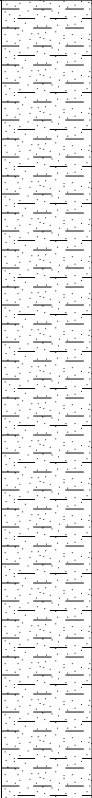
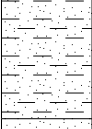
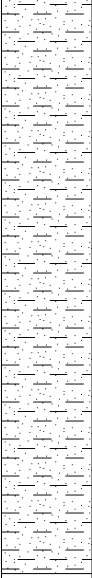
Client: Mulbury City

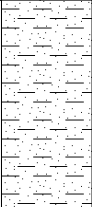
Dates: 05/09/2020

Logged By
A. Allcock

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.10	50.06		MADE GROUND: Concrete.	
								MADE GROUND: Brown gravelly clay. Gravel is fine to coarse angular to sub-angular of brick and ash.	
		1.00	SPT	N=12 (1,2/2,3,3,4)	1.00	49.96		Stiff medium strength brown sandy CLAY with sand bands. Very stiff high strength at 2.0m and 5.0m bgl.	1
		2.00	SPT	N=17 (2,2/3,4,5,5)					2
		3.00	SPT	N=16 (1,2/3,4,4,5)					3
		4.00	SPT	N=17 (2,3/3,4,5,5)					4
		5.00	SPT	N=19 (2,3/4,4,5,6)					5
		6.50	SPT	N=16 (2,3/3,4,4,5)					6
		8.00	SPT	N=15 (1,2/3,3,4,5)					7
		9.50	SPT	N=39 (25 for 55mm/15,7,8,9)	9.50	49.06		Very stiff high strength brown sandy CLAY with sand bands.	8
									9
									10

Remarks
Complete.

				Borehole Log				Borehole No. CP101 Sheet 2 of 3	
Project Name: Thompson Street				Project No. 12729		Co-ords: 384706E - 398804N		Hole Type CP	
Location: Manchester				Level: 50.06 m AOD		Scale 1:50		Logged By A. Allcock	
Client: Mulbury City				Dates: 05/09/2020					
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		11.00	SPT	N=27 (3,4/5,7,7,8)				Very stiff high strength brown sandy CLAY with sand bands.	11
		12.50	SPT	N=33 (3,5/7,8,8,10)				12	
		14.00	SPT	N=35 (10,12/8,8,9,10)				13	
		15.50	SPT	N=39 (4,7/9,9,10,11)	15.30	40.56		14	
		17.00	SPT	N=43 (5,8/10,10,11,12)	16.10	34.76		15	
		18.50	SPT	N=45 (6,9/10,11,11,13)				16	
		20.00	SPT	50 (6,12/50 for 10mm)				Very stiff high strength red brown sandy CLAY.	17
								Very stiff high strength brown sandy CLAY.	18
									19
									20
Remarks Complete.									

					Borehole Log			Borehole No. CP101 Sheet 3 of 3	
Project Name: Thompson Street					Project No. 12729		Co-ords: 384706E - 398804N		Hole Type CP
Location: Manchester					Level: 50.06 m AOD		Scale 1:50		
Client: Mulbury City					Dates: 05/09/2020		Logged By A. Allcock		
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		21.00	SPT	50 (6,12/50 for 15mm)	21.39	33.96		Very stiff high strength brown sandy CLAY.	21
								End of Borehole at 21.39m	22
									23
									24
									25
									26
									27
									28
									29
									30
Remarks Complete.									

APPENDIX VI

CHEMICAL TESTING

RESULTS



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Analytical Report Number : 20-28805

Project / Site name:	Thompson Street	Samples received on:	07/09/2020
Your job number:	12-729	Samples instructed on/ Analysis started on:	07/09/2020
Your order number:	12729-AA-G	Analysis completed by:	15/09/2020
Report Issue Number:	1	Report issued on:	15/09/2020
Samples Analysed:	2 leachate samples - 15 soil samples		

Signed: *A. Czerwińska*

Agnieszka Czerwińska
Technical Reviewer (Reporting Team)
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

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



Analytical Report Number: 20-28805
Project / Site name: Thompson Street

Your Order No: 12729-AA-G

Lab Sample Number	1614317	1614318
Sample Reference	TP103	TP105
Sample Number	None Supplied	None Supplied
Depth (m)	0.50	0.50
Date Sampled	05/09/2020	05/09/2020
Time Taken	None Supplied	None Supplied
Analytical Parameter (Leachate Analysis)	Units	Limit of detection
		Accreditation Status

General Inorganics

pH	pH Units	N/A	ISO 17025	7.8	8.1
Total Cyanide (Low Level 1 µg/l)	µg/l	1	ISO 17025	1.4	< 1.0

Total Phenols

Total Phenols (monohydric)	µg/l	1	ISO 17025	2.1	3
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Speciated PAHs

Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	1.6	< 0.01
Fluorene	µg/l	0.01	ISO 17025	0.43	< 0.01
Phenanthrene	µg/l	0.01	ISO 17025	0.51	< 0.01
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
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	NONE	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01	< 0.01

Total PAH

Total EPA-16 PAHs	µg/l	0.2	NONE	2.6	< 0.2
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Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	1.1	ISO 17025	1.7	< 1.1
Cadmium (dissolved)	µg/l	0.08	ISO 17025	1.4	< 0.08
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0
Chromium (dissolved)	µg/l	0.4	ISO 17025	1.1	0.5
Copper (dissolved)	µg/l	0.7	ISO 17025	20	23
Lead (dissolved)	µg/l	1	ISO 17025	10	< 1.0
Mercury (dissolved)	µg/l	0.5	ISO 17025	< 0.5	< 0.5
Nickel (dissolved)	µg/l	0.3	ISO 17025	2.3	0.6
Selenium (dissolved)	µg/l	4	ISO 17025	< 4.0	< 4.0
Zinc (dissolved)	µg/l	0.4	ISO 17025	140	12

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	10	NONE	< 10	< 10

Petroleum Hydrocarbons

TPH1 (C10 - C40)	µg/l	10	NONE	< 10	< 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



Analytical Report Number: 20-28805
Project / Site name: Thompson Street

Your Order No: 12729-AA-G

Lab Sample Number				1614317	1614318
Sample Reference				TP103	TP105
Sample Number				None Supplied	None Supplied
Depth (m)				0.50	0.50
Date Sampled				05/09/2020	05/09/2020
Time Taken				None Supplied	None Supplied
Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accred- itation Status		
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10	< 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	< 10	< 10
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	< 10	< 10

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



Analytical Report Number: 20-28805
 Project / Site name: Thompson Street
 Your Order No: 12729-AA-G

Lab Sample Number		1614302	1614303	1614304	1614305
Sample Reference		WS101	WS101	WS102	WS103
Sample Number		None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)		0.10	2.70	0.50	0.50
Date Sampled		05/09/2020	05/09/2020	05/09/2020	05/09/2020
Time Taken		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
Moisture Content	%	N/A	NONE	14	13	12	13
Total mass of sample received	kg	0.001	NONE	0.3	0.3	0.3	0.3

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	-	Not-detected	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	8.6	-	9.1	8.7
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1
Total Sulphate as SO ₄	mg/kg	50	MCERTS	1300	-	890	2100
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	120	-	260	160
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.06	-	0.13	0.083
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	60.3	-	128	82.5
Sulphide	mg/kg	1	MCERTS	23	-	10	150
Total Sulphur	mg/kg	50	MCERTS	740	-	480	1300
Total Organic Carbon (TOC)	%	0.1	MCERTS	3.1	0.9	-	2.2

Total Phenols

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

Naphthalene	mg/kg	0.05	MCERTS	0.32	< 0.05	-	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	0.28	< 0.05	-	< 0.05
Fluorene	mg/kg	0.05	MCERTS	0.26	< 0.05	-	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	3	< 0.05	-	1.8
Anthracene	mg/kg	0.05	MCERTS	0.75	< 0.05	-	0.45
Fluoranthene	mg/kg	0.05	MCERTS	6	< 0.05	-	4.5
Pyrene	mg/kg	0.05	MCERTS	5.6	< 0.05	-	4.3
Benzo(a)anthracene	mg/kg	0.05	MCERTS	3.1	< 0.05	-	2.3
Chrysene	mg/kg	0.05	MCERTS	2.3	< 0.05	-	2.1
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	2.8	< 0.05	-	2.4
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	1.7	< 0.05	-	1.5
Benzo(a)pyrene	mg/kg	0.05	MCERTS	2.5	< 0.05	-	2.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	1.5	< 0.05	-	1.2
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.56	< 0.05	-	0.37
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	1.8	< 0.05	-	1.5

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	32.5	< 0.80	-	24.5
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	31	9.6	7.8	20
Barium (aqua regia extractable)	mg/kg	1	MCERTS	-	200	-	-
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	-	1.4	-	-
Boron (water soluble)	mg/kg	0.2	MCERTS	-	0.3	-	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.8	< 0.2	0.4	1.9
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	25	-	19	30
Copper (aqua regia extractable)	mg/kg	1	MCERTS	150	28	57	180
Lead (aqua regia extractable)	mg/kg	1	MCERTS	320	13	760	640



Analytical Report Number: 20-28805
 Project / Site name: Thompson Street
 Your Order No: 12729-AA-G

Lab Sample Number				1614302	1614303	1614304	1614305
Sample Reference				WS101	WS101	WS102	WS103
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	2.70	0.50	0.50
Date Sampled				05/09/2020	05/09/2020	05/09/2020	05/09/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status				
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.6	< 0.3	0.6	0.4
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	40	40	17	28
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	1.5	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	-	35	-	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	160	70	82	280

Monoaromatics & Oxygenates

Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	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
o-xylene	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

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	8.1	< 2.0	4.3	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	12	< 8.0	14	8.2
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	40	< 8.0	44	85
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	61	< 10	62	94

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	7.4	< 2.0	5.9	6.6
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	32	< 10	22	29
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	72	< 10	56	90
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	110	< 10	83	130

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	-



Analytical Report Number: 20-28805
Project / Site name: Thompson Street
Your Order No: 12729-AA-G

Lab Sample Number					1614302	1614303	1614304	1614305
Sample Reference					WS101	WS101	WS102	WS103
Sample Number					None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)					0.10	2.70	0.50	0.50
Date Sampled					05/09/2020	05/09/2020	05/09/2020	05/09/2020
Time Taken					None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accred- itation Status					
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	-

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	-	-	< 0.05	-
2,4-Dichlorophenol	mg/kg	0.3	MCERTS	-	-	< 0.3	-
4-Chloroaniline	mg/kg	0.1	NONE	-	-	< 0.1	-



Analytical Report Number: 20-28805
Project / Site name: Thompson Street
Your Order No: 12729-AA-G

Lab Sample Number				1614302	1614303	1614304	1614305
Sample Reference				WS101	WS101	WS102	WS103
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	2.70	0.50	0.50
Date Sampled				05/09/2020	05/09/2020	05/09/2020	05/09/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status				
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	-	-	< 0.1	-
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	-	-	< 0.05	-
Acenaphthene	mg/kg	0.05	MCERTS	-	-	< 0.05	-
2,4-Dinitrotoluene	mg/kg	0.2	MCERTS	-	-	< 0.2	-
Dibenzofuran	mg/kg	0.2	MCERTS	-	-	< 0.2	-
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	-	-	< 0.05	-
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	-	-	0.68	-
Anthracene	mg/kg	0.05	MCERTS	-	-	0.18	-
Carbazole	mg/kg	0.3	MCERTS	-	-	< 0.3	-
Dibutyl phthalate	mg/kg	0.2	MCERTS	-	-	< 0.2	-
Anthraquinone	mg/kg	0.3	MCERTS	-	-	< 0.3	-
Fluoranthene	mg/kg	0.05	MCERTS	-	-	1.2	-
Pyrene	mg/kg	0.05	MCERTS	-	-	1.2	-
Butyl benzyl phthalate	mg/kg	0.3	ISO 17025	-	-	< 0.3	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	-	0.73	-
Chrysene	mg/kg	0.05	MCERTS	-	-	0.68	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	-	0.76	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	-	0.5	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	-	0.71	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	-	0.44	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	-	< 0.05	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	-	0.54	-

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



Analytical Report Number: 20-28805
Project / Site name: Thompson Street
Your Order No: 12729-AA-G

Lab Sample Number	1614306	1614307	1614308	1614309
Sample Reference	WS103	WS104	WS105	WS105
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	1.50	0.70	0.20	0.80
Date Sampled	05/09/2020	05/09/2020	05/09/2020	05/09/2020
Time Taken	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
Moisture Content	%	N/A	NONE	11	10	7.8	13
Total mass of sample received	kg	0.001	NONE	0.3	0.3	0.3	0.3

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	-	Not-detected	Not-detected	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	8.3	8.6	11.8	8.7
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1
Total Sulphate as SO4	mg/kg	50	MCERTS	460	970	3600	410
Water Soluble Sulphate as SO4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	150	130	130	130
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.077	0.064	0.066	0.065
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	76.8	63.8	66.2	64.5
Sulphide	mg/kg	1	MCERTS	< 1.0	24	3.5	< 1.0
Total Sulphur	mg/kg	50	MCERTS	170	640	1400	150
Total Organic Carbon (TOC)	%	0.1	MCERTS	0.8	-	-	-

Total Phenols

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

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-
Fluorene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	-	0.45	-
Anthracene	mg/kg	0.05	MCERTS	< 0.05	-	0.15	-
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	-	0.84	-
Pyrene	mg/kg	0.05	MCERTS	< 0.05	-	0.78	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	-	0.44	-
Chrysene	mg/kg	0.05	MCERTS	< 0.05	-	0.37	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	-	0.37	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	-	0.26	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	-	0.34	-
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	-	4	-
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	8.6	17	5	5.5
Barium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	-	-	-	-
Boron (water soluble)	mg/kg	0.2	MCERTS	-	-	-	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	1.1	0.2	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	35	30	17	35
Copper (aqua regia extractable)	mg/kg	1	MCERTS	25	130	18	27
Lead (aqua regia extractable)	mg/kg	1	MCERTS	24	460	28	15



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 Project / Site name: Thompson Street
 Your Order No: 12729-AA-G

Lab Sample Number				1614306	1614307	1614308	1614309
Sample Reference				WS103	WS104	WS105	WS105
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.50	0.70	0.20	0.80
Date Sampled				05/09/2020	05/09/2020	05/09/2020	05/09/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status				
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	0.6	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	38	33	11	38
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	2.1	2.4	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	65	200	62	66

Monoaromatics & Oxygenates

Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	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
o-xylene	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

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	3.4	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	23	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	120	< 8.0	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	140	< 10	< 10

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	15	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	230	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	620	< 10	< 10
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	870	< 10	< 10

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



Analytical Report Number: 20-28805
Project / Site name: Thompson Street
Your Order No: 12729-AA-G

Lab Sample Number					1614306	1614307	1614308	1614309
Sample Reference					WS103	WS104	WS105	WS105
Sample Number					None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)					1.50	0.70	0.20	0.80
Date Sampled					05/09/2020	05/09/2020	05/09/2020	05/09/2020
Time Taken					None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Cis-1,3-dichloropropene	µg/kg	1	ISO 17025	-	< 1.0	-	< 1.0	< 1.0
Trans-1,3-dichloropropene	µg/kg	1	ISO 17025	-	< 1.0	-	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	< 1.0
1,1,2-Trichloroethane	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	< 1.0
1,3-Dichloropropane	µg/kg	1	ISO 17025	-	< 1.0	-	< 1.0	< 1.0
Dibromochloromethane	µg/kg	1	ISO 17025	-	< 1.0	-	< 1.0	< 1.0
Tetrachloroethene	µg/kg	1	NONE	-	< 1.0	-	< 1.0	< 1.0
1,2-Dibromoethane	µg/kg	1	ISO 17025	-	< 1.0	-	< 1.0	< 1.0
Chlorobenzene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	< 1.0
p & m-Xylene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	< 1.0
Styrene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	< 1.0
Tribromomethane	µg/kg	1	NONE	-	< 1.0	-	< 1.0	< 1.0
o-Xylene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	< 1.0
Isopropylbenzene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	< 1.0
Bromobenzene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	< 1.0
n-Propylbenzene	µg/kg	1	ISO 17025	-	< 1.0	-	< 1.0	< 1.0
2-Chlorotoluene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	< 1.0
4-Chlorotoluene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	< 1.0
1,3,5-Trimethylbenzene	µg/kg	1	ISO 17025	-	< 1.0	-	< 1.0	< 1.0
tert-Butylbenzene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	< 1.0
1,2,4-Trimethylbenzene	µg/kg	1	ISO 17025	-	< 1.0	-	< 1.0	< 1.0
sec-Butylbenzene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	< 1.0
1,3-Dichlorobenzene	µg/kg	1	ISO 17025	-	< 1.0	-	< 1.0	< 1.0
p-Isopropyltoluene	µg/kg	1	ISO 17025	-	< 1.0	-	< 1.0	< 1.0
1,2-Dichlorobenzene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	< 1.0
1,4-Dichlorobenzene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	< 1.0
Butylbenzene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	< 1.0
1,2-Dibromo-3-chloropropane	µg/kg	1	ISO 17025	-	< 1.0	-	< 1.0	< 1.0
1,2,4-Trichlorobenzene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	< 1.0
Hexachlorobutadiene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	< 1.0
1,2,3-Trichlorobenzene	µg/kg	1	ISO 17025	-	< 1.0	-	< 1.0	< 1.0

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	-	0.36	-	< 0.05
2,4-Dichlorophenol	mg/kg	0.3	MCERTS	-	< 0.3	-	< 0.3
4-Chloroaniline	mg/kg	0.1	NONE	-	< 0.1	-	< 0.1



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Project / Site name: Thompson Street
Your Order No: 12729-AA-G

Lab Sample Number				1614306	1614307	1614308	1614309
Sample Reference				WS103	WS104	WS105	WS105
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.50	0.70	0.20	0.80
Date Sampled				05/09/2020	05/09/2020	05/09/2020	05/09/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status				
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	-	0.6	-	< 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	-	1	-	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	-	4.4	-	< 0.05
2,4-Dinitrotoluene	mg/kg	0.2	MCERTS	-	< 0.2	-	< 0.2
Dibenzofuran	mg/kg	0.2	MCERTS	-	1.8	-	< 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	-	4.1	-	< 0.05
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	-	53	-	< 0.05
Anthracene	mg/kg	0.05	MCERTS	-	16	-	< 0.05
Carbazole	mg/kg	0.3	MCERTS	-	4.4	-	< 0.3
Dibutyl phthalate	mg/kg	0.2	MCERTS	-	< 0.2	-	< 0.2
Anthraquinone	mg/kg	0.3	MCERTS	-	5.7	-	< 0.3
Fluoranthene	mg/kg	0.05	MCERTS	-	110	-	< 0.05
Pyrene	mg/kg	0.05	MCERTS	-	100	-	< 0.05
Butyl benzyl phthalate	mg/kg	0.3	ISO 17025	-	< 0.3	-	< 0.3
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	53	-	< 0.05
Chrysene	mg/kg	0.05	MCERTS	-	38	-	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	52	-	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	29	-	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	49	-	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	24	-	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	7.3	-	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	26	-	< 0.05

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



Analytical Report Number: 20-28805
 Project / Site name: Thompson Street
 Your Order No: 12729-AA-G

Lab Sample Number	1614310	1614311	1614312	1614313
Sample Reference	WS106	TP101	TP101	TP102
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	1.20	0.50	1.50	0.70
Date Sampled	05/09/2020	05/09/2020	05/09/2020	05/09/2020
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status	Accreditation Status

Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	7.9	14	14	9.6
Total mass of sample received	kg	0.001	NONE	0.3	0.3	0.3	0.3

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	-	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	12	7.2	-	7.7
Total Cyanide	mg/kg	1	MCERTS	< 1	1	< 1	< 1
Total Sulphate as SO4	mg/kg	50	MCERTS	3600	2100	-	2400
Water Soluble Sulphate as SO4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	44	1500	-	550
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.022	0.73	-	0.27
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	22.2	727	-	274
Sulphide	mg/kg	1	MCERTS	19	5.4	-	32
Total Sulphur	mg/kg	50	MCERTS	1400	980	-	1200
Total Organic Carbon (TOC)	%	0.1	MCERTS	-	2.5	0.7	-

Total Phenols

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

Naphthalene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	0.29
Acenaphthylene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	0.22
Fluorene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	-	2	< 0.05	2.1
Anthracene	mg/kg	0.05	MCERTS	-	0.53	< 0.05	0.52
Fluoranthene	mg/kg	0.05	MCERTS	-	3.2	< 0.05	4.9
Pyrene	mg/kg	0.05	MCERTS	-	3.4	< 0.05	5.4
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	1.6	< 0.05	3.2
Chrysene	mg/kg	0.05	MCERTS	-	1.4	< 0.05	2.8
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	1.5	< 0.05	2.6
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	0.83	< 0.05	2.1
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	1.4	< 0.05	3.7
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	0.78	< 0.05	2
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	0.23	< 0.05	0.63
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	0.91	< 0.05	2.6

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	-	17.7	< 0.80	32.9
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	12	18	9.3	23
Barium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	200	-
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	-	-	1.8	-
Boron (water soluble)	mg/kg	0.2	MCERTS	-	-	0.5	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.4	< 0.2	< 0.2	1.3
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	77	21	-	40
Copper (aqua regia extractable)	mg/kg	1	MCERTS	35	71	27	140
Lead (aqua regia extractable)	mg/kg	1	MCERTS	170	250	14	780



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 Project / Site name: Thompson Street
 Your Order No: 12729-AA-G

Lab Sample Number				1614310	1614311	1614312	1614313
Sample Reference				WS106	TP101	TP101	TP102
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.20	0.50	1.50	0.70
Date Sampled				05/09/2020	05/09/2020	05/09/2020	05/09/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status				
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	1.3	0.6	< 0.3	1
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	14	22	41	37
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	38	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	73	69	68	290

Monoaromatics & Oxygenates

Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	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
o-xylene	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

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	4.2	< 2.0	4.8
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	25	< 10	31
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	51	< 10	89
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	81	< 10	120

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	-	-	-



Analytical Report Number: 20-28805
Project / Site name: Thompson Street
Your Order No: 12729-AA-G

Lab Sample Number					1614310	1614311	1614312	1614313
Sample Reference					WS106	TP101	TP101	TP102
Sample Number					None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)					1.20	0.50	1.50	0.70
Date Sampled					05/09/2020	05/09/2020	05/09/2020	05/09/2020
Time Taken					None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accred- itation Status					
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	-	-	-	-

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	< 0.05	-	-	-
2,4-Dichlorophenol	mg/kg	0.3	MCERTS	< 0.3	-	-	-
4-Chloroaniline	mg/kg	0.1	NONE	< 0.1	-	-	-



Analytical Report Number: 20-28805
Project / Site name: Thompson Street
Your Order No: 12729-AA-G

Lab Sample Number					1614310	1614311	1614312	1614313
Sample Reference					WS106	TP101	TP101	TP102
Sample Number					None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)					1.20	0.50	1.50	0.70
Date Sampled					05/09/2020	05/09/2020	05/09/2020	05/09/2020
Time Taken					None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
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	< 0.1	-	-	-	-
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	< 0.05	-	-	-	-
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	-	-	-	-
2,4-Dinitrotoluene	mg/kg	0.2	MCERTS	< 0.2	-	-	-	-
Dibenzofuran	mg/kg	0.2	MCERTS	< 0.2	-	-	-	-
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	< 0.05	-	-	-	-
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	0.91	-	-	-	-
Anthracene	mg/kg	0.05	MCERTS	0.17	-	-	-	-
Carbazole	mg/kg	0.3	MCERTS	< 0.3	-	-	-	-
Dibutyl phthalate	mg/kg	0.2	MCERTS	< 0.2	-	-	-	-
Anthraquinone	mg/kg	0.3	MCERTS	< 0.3	-	-	-	-
Fluoranthene	mg/kg	0.05	MCERTS	1.2	-	-	-	-
Pyrene	mg/kg	0.05	MCERTS	1.3	-	-	-	-
Butyl benzyl phthalate	mg/kg	0.3	ISO 17025	< 0.3	-	-	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.64	-	-	-	-
Chrysene	mg/kg	0.05	MCERTS	0.57	-	-	-	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	0.55	-	-	-	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.37	-	-	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.46	-	-	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.26	-	-	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	-	-	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.34	-	-	-	-

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



Analytical Report Number: 20-28805
 Project / Site name: Thompson Street
 Your Order No: 12729-AA-G

Lab Sample Number	1614314	1614315	1614316
Sample Reference	TP104	TP104	TP105
Sample Number	None Supplied	None Supplied	None Supplied
Depth (m)	0.70	1.30	1.00
Date Sampled	05/09/2020	05/09/2020	05/09/2020
Time Taken	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
Moisture Content	%	N/A	NONE	8.5	13	11
Total mass of sample received	kg	0.001	NONE	0.3	0.3	0.3

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	Chrysotile	-	-
Asbestos in Soil	Type	N/A	ISO 17025	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	7.8	-	8.4
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1
Total Sulphate as SO4	mg/kg	50	MCERTS	1000	-	520
Water Soluble Sulphate as SO4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	160	-	210
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.078	-	0.1
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	78.4	-	103
Sulphide	mg/kg	1	MCERTS	13	-	1.4
Total Sulphur	mg/kg	50	MCERTS	610	-	180
Total Organic Carbon (TOC)	%	0.1	MCERTS	2.2	0.7	-

Total Phenols

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

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	0.51	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	1.1	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.8	0.76	0.35
Anthracene	mg/kg	0.05	MCERTS	0.13	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.89	< 0.05	0.49
Pyrene	mg/kg	0.05	MCERTS	0.89	< 0.05	0.5
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.49	< 0.05	0.26
Chrysene	mg/kg	0.05	MCERTS	0.48	< 0.05	0.53
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	0.48	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.48	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.51	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.36	< 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	0.44	< 0.05	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	5.95	2.39	2.13
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	21	9.8	8.7
Barium (aqua regia extractable)	mg/kg	1	MCERTS	-	180	-
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	-	1.6	-
Boron (water soluble)	mg/kg	0.2	MCERTS	-	0.6	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.4	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	25	-	36
Copper (aqua regia extractable)	mg/kg	1	MCERTS	93	29	27
Lead (aqua regia extractable)	mg/kg	1	MCERTS	220	20	21



Analytical Report Number: 20-28805
 Project / Site name: Thompson Street
 Your Order No: 12729-AA-G

Lab Sample Number				1614314	1614315	1614316
Sample Reference				TP104	TP104	TP105
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				0.70	1.30	1.00
Date Sampled				05/09/2020	05/09/2020	05/09/2020
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accred- itation Status			
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.4	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	41	44	38
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	1.7	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	-	38	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	130	72	72

Monoaromatics & Oxygenates

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

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	< 10	< 10
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10

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	-	-	-
1,1,1,2-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	-	-	-



Analytical Report Number: 20-28805
Project / Site name: Thompson Street
Your Order No: 12729-AA-G

Lab Sample Number					1614314	1614315	1614316
Sample Reference					TP104	TP104	TP105
Sample Number					None Supplied	None Supplied	None Supplied
Depth (m)					0.70	1.30	1.00
Date Sampled					05/09/2020	05/09/2020	05/09/2020
Time Taken					None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accred- itation Status				
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	-	-	-	-

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	-	-	-

Analytical Report Number: 20-28805
 Project / Site name: Thompson Street
 Your Order No: 12729-AA-G

Lab Sample Number				1614314	1614315	1614316
Sample Reference				TP104	TP104	TP105
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				0.70	1.30	1.00
Date Sampled				05/09/2020	05/09/2020	05/09/2020
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accred- itation Status			
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	-	-	-

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



Analytical Report Number: 20-28805
Project / Site name: Thompson Street
Your Order No: 12729-AA-G

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-PL 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
1614314	TP104	0.70	138	Loose Fibres	Chrysotile	< 0.001	< 0.001

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



Analytical Report Number : 20-28805
Project / Site name: Thompson Street

* 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 *
1614302	WS101	None Supplied	0.1	Brown gravelly sand.
1614303	WS101	None Supplied	2.7	Brown clay with gravel and vegetation.
1614304	WS102	None Supplied	0.5	Brown clay and sand with gravel and vegetation.
1614305	WS103	None Supplied	0.5	Brown clay and sand with gravel and vegetation.
1614306	WS103	None Supplied	1.5	Brown clay with gravel.
1614307	WS104	None Supplied	0.7	Brown clay and sand with gravel.
1614308	WS105	None Supplied	0.2	Brown sand with gravel.
1614309	WS105	None Supplied	0.8	Brown clay with gravel.
1614310	WS106	None Supplied	1.2	Brown sand with gravel.
1614311	TP101	None Supplied	0.5	Brown sand with gravel.
1614312	TP101	None Supplied	1.5	Brown clay with gravel.
1614313	TP102	None Supplied	0.7	Brown sand with gravel.
1614314	TP104	None Supplied	0.7	Brown sand with gravel.
1614315	TP104	None Supplied	1.3	Brown clay with gravel.
1614316	TP105	None Supplied	1	Brown clay with gravel.



Analytical Report Number : 20-28805
Project / Site name: Thompson Street

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
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
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.	L038-PL	D	MCERTS
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
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
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
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Hexavalent chromium in leachate	Determination of hexavalent chromium in leachate by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	ISO 17025
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	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
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
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
pH at 20oC in leachate	Determination of pH in leachate by electrometric measurement.	In house method.	L005-PL	W	ISO 17025
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 sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS



Analytical Report Number : 20-28805
Project / Site name: Thompson Street

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
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
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.	L038-PL	D	MCERTS
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
TPH1 (Leachates)	Determination of dichloromethane extractable hydrocarbons in leachate by GC-MS.	In-house method	L070-PL	W	NONE
TPHCWG (Leachates)	Determination of dichloromethane extractable hydrocarbons in leachate by GC-MS.	In-house method	L070-PL	W	NONE
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.	L009-PL	D	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
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
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
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
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
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
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
Sulphate, water soluble, in soil	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	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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Analytical Report Number : 20-30678

Project / Site name:	Goulden St - Thompson St	Samples received on:	17/09/2020
Your job number:	12728-12730	Samples instructed on/ Analysis started on:	17/09/2020
Your order number:		Analysis completed by:	23/09/2020
Report Issue Number:	1	Report issued on:	23/09/2020
Samples Analysed:	4 water samples		

Signed: *A. Czerwińska*

Agnieszka Czerwińska
Technical Reviewer (Reporting Team)
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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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.



Analytical Report Number: 20-30678
Project / Site name: Goulden St - Thompson St

Lab Sample Number				1623183	1623184	1623185	1623186
Sample Reference				Goulden CP101	Goulden WS104	Thompson WS101	Thompson WS103
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				17/09/2020	17/09/2020	17/09/2020	17/09/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status				

General Inorganics

pH	pH Units	N/A	ISO 17025	7.9	7.9	7.2	7.4
Total Cyanide (Low Level 1 µg/l)	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0
Dissolved Organic Carbon (DOC)	mg/l	0.1	NONE	4.01	4.12	19.1	2.93

Total Phenols

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

Calcium (dissolved)	mg/l	0.012	ISO 17025	57	81	130	93
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0	< 5.0	< 5.0

Arsenic (dissolved)	µg/l	0.15	ISO 17025	0.37	< 0.15	8.22	< 0.15
Cadmium (dissolved)	µg/l	0.02	ISO 17025	0.03	0.02	0.13	0.05
Chromium (dissolved)	µg/l	0.2	ISO 17025	5.6	2.3	7.3	4.6
Copper (dissolved)	µg/l	0.5	ISO 17025	2.1	1.8	7.8	1.5
Lead (dissolved)	µg/l	0.2	ISO 17025	1.1	< 0.2	4.3	1.6
Manganese (dissolved)	µg/l	0.05	ISO 17025	0.56	200	2400	44
Mercury (dissolved)	µg/l	0.05	ISO 17025	< 0.05	< 0.05	< 0.05	< 0.05
Nickel (dissolved)	µg/l	0.5	ISO 17025	1.6	2.2	12	3.3
Selenium (dissolved)	µg/l	0.6	ISO 17025	3.6	12	1.2	2.7
Zinc (dissolved)	µg/l	0.5	ISO 17025	4.1	2.3	8.6	4.8

Monoaromatics & Oxygenates

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

Petroleum Hydrocarbons

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

TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10	< 10



Analytical Report Number: 20-30678
Project / Site name: Goulden St - Thompson St

Lab Sample Number				1623183	1623184	1623185	1623186
Sample Reference				Goulden CP101	Goulden WS104	Thompson WS101	Thompson WS103
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				17/09/2020	17/09/2020	17/09/2020	17/09/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status				
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	< 10	< 10	< 10	< 10

VOCs

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



Analytical Report Number: 20-30678
Project / Site name: Goulden St - Thompson St

Lab Sample Number				1623183	1623184	1623185	1623186
Sample Reference				Goulden CP101	Goulden WS104	Thompson WS101	Thompson WS103
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				17/09/2020	17/09/2020	17/09/2020	17/09/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status				
p-Isopropyltoluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0
Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-chloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0

SVOCs

Aniline	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Phenol	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
2-Chlorophenol	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Bis(2-chloroethyl)ether	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
1,3-Dichlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
1,2-Dichlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
1,4-Dichlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Bis(2-chloroisopropyl)ether	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
2-Methylphenol	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Hexachloroethane	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Nitrobenzene	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
4-Methylphenol	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Isophorone	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
2-Nitrophenol	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
2,4-Dimethylphenol	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Bis(2-chloroethoxy)methane	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
1,2,4-Trichlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01
2,4-Dichlorophenol	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
4-Chloroaniline	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Hexachlorobutadiene	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
4-Chloro-3-methylphenol	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
2,4,6-Trichlorophenol	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
2,4,5-Trichlorophenol	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
2-Methylnaphthalene	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
2-Chloronaphthalene	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Dimethylphthalate	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
2,6-Dinitrotoluene	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01
2,4-Dinitrotoluene	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Dibenzofuran	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
4-Chlorophenyl phenyl ether	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Diethyl phthalate	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
4-Nitroaniline	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01
Azobenzene	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Bromophenyl phenyl ether	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Hexachlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01



Analytical Report Number: 20-30678
Project / Site name: Goulden St - Thompson St

Lab Sample Number				1623183	1623184	1623185	1623186
Sample Reference				Goulden CP101	Goulden WS104	Thompson WS101	Thompson WS103
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				17/09/2020	17/09/2020	17/09/2020	17/09/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status				
Carbazole	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Dibutyl phthalate	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Anthraquinone	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01
Butyl benzyl phthalate	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01

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



Analytical Report Number : 20-30678

Project / Site name: Goulden St - Thompson St

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in water by ICP-OES (dissolved)	Determination of metals in water by acidification followed by ICP-OES. Accredited Matrices SW, GW, PW, PrW.(Al, Cu,Fe,Zn).	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-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
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
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
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
Dissolved Organic Carbon in water	Determination of dissolved inorganic carbon in water by TOC/DOC NDIR Analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	NONE
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
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
pH at 20oC in water (automated)	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In house method.	L099-PL	W	ISO 17025

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.

Sample Deviation Report



Analytical Report Number : 20-30678

Project / Site name: Goulden St - Thompson St

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
Goulden CP101	None Supplied	W	1623183	b	BTEX and MTBE in water (Monoaromatics)	L073B-PL	b
Goulden CP101	None Supplied	W	1623183	b	Volatile organic compounds in water	L073B-PL	b
Goulden WS104	None Supplied	W	1623184	b	BTEX and MTBE in water (Monoaromatics)	L073B-PL	b
Goulden WS104	None Supplied	W	1623184	b	Volatile organic compounds in water	L073B-PL	b
Thompson WS101	None Supplied	W	1623185	b	BTEX and MTBE in water (Monoaromatics)	L073B-PL	b
Thompson WS101	None Supplied	W	1623185	b	Volatile organic compounds in water	L073B-PL	b
Thompson WS103	None Supplied	W	1623186	b	BTEX and MTBE in water (Monoaromatics)	L073B-PL	b
Thompson WS103	None Supplied	W	1623186	b	Volatile organic compounds in water	L073B-PL	b

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 GEOTECHNICAL TESTING RESULTS



LABORATORY REPORT



4043

Contract Number: PSL20/4776

Report Date: 17 September 2020
Client's Reference: 12729
Client Name: E3P
Heliport Business Park
Liverpool Road
Eccles
Manchester
M30 7RU

For the attention of: Andrew Allcock

Contract Title: Thompson Street
Date Received: 10/9/2020
Date Commenced: 10/9/2020
Date Completed: 17/9/2020

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)

S Royle
(Laboratory Manager)

A Watkins
(Director)

S Eyre
(Senior Technician)

R Berriman
(Quality Manager)

L Knight
(Senior Technician)

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Page 1 of

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

[illegible]

4043

PSL
Professional Soils Laboratory

Thompson Street

Contract No:

PSL20/4776

Client Ref:

12729-AA-H

SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

[illegible]

SYMBOLS : NP : Non Plastic

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



4043

PSL
Professional Soils Laboratory

Thomson Street

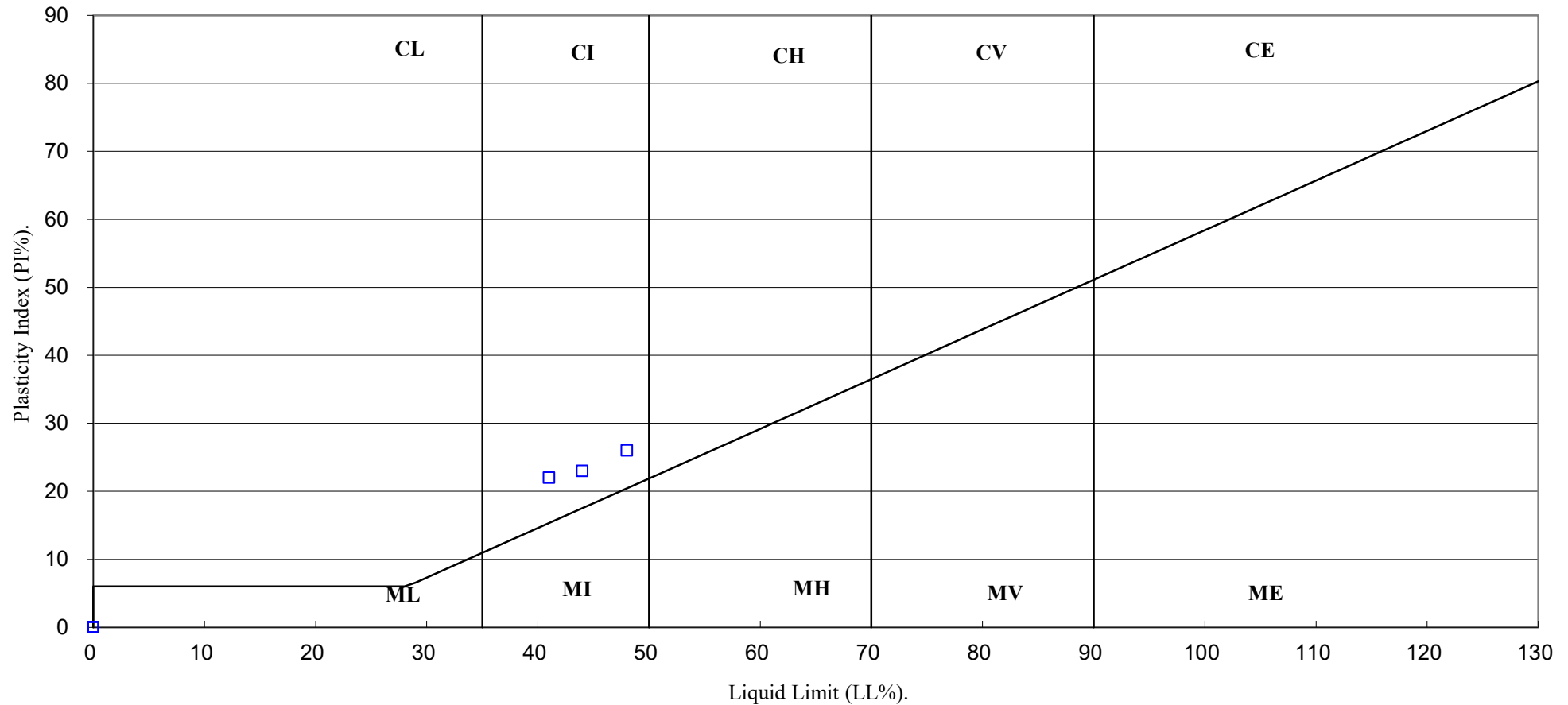
Contract No:

PSL20/4776

Client Ref:

12729-AA-H

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



4043

PSL

Professional Soils Laboratory

Thompson Street

Contract No:

PSL20/4776

Client Ref:

12729-AA-H

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

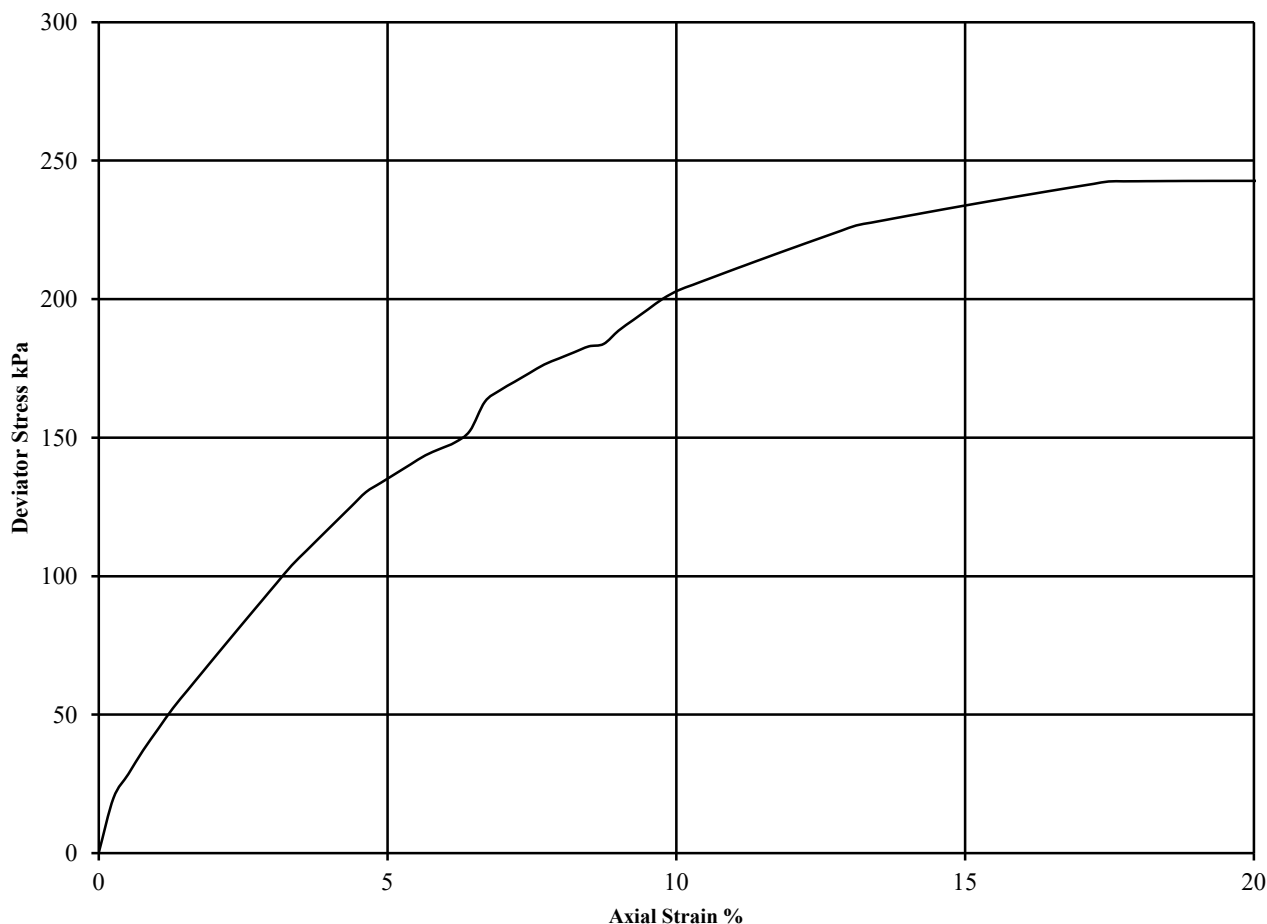
WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 9

Hole Number: WS102 Top Depth (m): 1.50

Sample Number: Base Depth (m): 2.00

Sample Type U100



Diameter (mm):		72		Height (mm):		140	Test:	UU Multistage		Remarks
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa)	Corr. Max. Deviator Stress (kPa)	($\theta_1 - \theta_3$) _f	Shear Strength Cu (kPa)	Failure Strain (%)	Mode of Failure	Undisturbed Sample Sample taken from top of tube Rate of strain = 2 %/min Latex Membrane used 0.2 mm thick Membrane Correction applied (kPa) 0.51 0.50 0.47 See summary of soil descriptions
1	17	2.21	1.88	35	148		74	6.2		
				70	183		91	8.5		
				140	243		121	19.8	Plastic	



PSL
Professional Soils Laboratory

Thompson Street

Contract No:
PSL20/4776
Client Ref:
12729-AA-H