Phase II Geoenvironmental Site Assessment

Site: Pitsford Road, Miles Platting
Reference: 17-302-R2-1
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1. INTRODUCTION

1.1. BACKGROUND

Bellway Homes commissioned E3P to undertake a Phase II Geoenvironmental Site Assessment at Pitsford Road, Miles Platting, Manchester.

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 of a low-rise residential development.

1.2. PROPOSED DEVELOPMENT

Bellway Homes intends to construct a low-rise residential development with associated gardens, estate roads and infrastructure. Drawing 17-302-002 (Appendix IV) identifies the proposed development layout.

A snapshot of the proposed development layout is indicated in Figure 1.

Figure 1 Snapshot of Proposed Development



1.3. OBJECTIVES AND SCOPE

The objectives of the geoenvironmental investigation are as follows:

- Review historical plans, geology, hydrogeology, site sensitivity, floodplain issues, mining records and any local authority information available to complete a desk study in line with Environment Agency (EA) document Land Contamination: Risk Management (LCRM) (updated June 2023).
- Undertake a phase of sampling and analysis to provide an overview of the environmental issues identified.

- Assess the implications of any potential environmental risks, liabilities and development constraints associated with the site concerning the site's future use and off-site receptors.
- Assess the geotechnical information and provide recommendations concerning foundations, pavement construction and floor slabs.
- Assess the coal mining-related information and provide recommendations regarding any future treatment; and,
- Provide recommendations regarding future works required.

1.4. SCOPE OF WORKS

The scope of works has been summarised in Table 1.

Table 1 Scope of Works

GROUND INVESTIGATION
Design of suitable ground investigation
Mechanically excavated trial pits
Soil sampling
TESTING AND MONITORING
In-situ geotechnical testing
Chemical and geotechnical laboratory analysis
ASSESSMENT AND REPORTING
Factual and interpretative reporting
Contamination risk assessment and conceptual site model
Geotechnical assessment and interpretation

1.5. PREVIOUS REPORTS

E3P previously carried out site investigation works which are presented in the below report (Ref: 16-148-R2, dated Feb 23). The key findings of the previous site investigation reports are summarised below, and where necessary, data has been used to support the E3P geoenvironmental site assessment.

Table 2 Previous Reports

AUTHOR	TITLE / REFERENCE	DATE
E3P	Phase II Geoenvironmental Site Assessment – Land at Pitsford Road, Miles Platting	February 2023

Site Background

The subject site is rectangular in shape and located to the northeast of Manchester City Centre. It is currently unoccupied but bound to the south by a national rail access road, railway lines and an industrial park beyond in the east.

Japanese knotweed has been identified in sporadic areas particularly the northeast of the site.

The site has been artificially raised and levelled to facilitate the construction of historical railway sidings at the subject site, creating an embankment and steep slope on the north, west and eastern sides.

This embankment raises the site by up to 5m from the surrounding highway (circa 63.65m AOD – 68.70m AOD). On the railway side (southeast) a topographical data point isn't currently available but lidar of the area suggests this is level with the existing railway features to the south.

A review of the pertinent Ordnance Survey mapping suggests that the site comprised agricultural land circa 1848 until circa 1891 when the site was raised and levelled to allow the installation of railway sidings of the main line with associated small buildings in the south of the site. Further development to the sidings continued in circa 1908. The railway sidings were fully removed from the site by circa 1985.

The site comprises Glacial Till drift deposits (secondary A aquifer), underlain by Pennine Middle and Upper Coal Measures bedrock formation (secondary undifferentiated aquifer). A geological fault is recorded across the southwest corner of the site.

No surface water features are present within 250 m of the site.

Phase 2 Site Investigation

E3P attended site and exploratory fieldwork was completed between 2nd November 2022 and 14th November 2022. The intrusive ground investigation comprised twenty-two mechanically excavated trial pits, five soakaway tests, six hand-dug trial pits, twelve window sample boreholes and three cable percussive boreholes.

MADE GROUND

MADE GROUND was encountered within all locations between ground level to a maximum proven depth of 6.40 m bgl. The MADE GROUND was not fully penetrated within any of the trial pit locations and the full depth of MADE GROUND was only proven in WS107, WS110, WS112 and CP101-103. In general, deposits comprised of black sandy fine to coarse gravels comprising ash, clinker, slag, brick, pottery and glass. This was underlain by firm to very stiff brown to black gravelly reworked clay deposits. The gravels comprise of mudstone, sandstone, brick, ash, clinker and slag.

No natural topsoil was encountered. A reworked topsoil is present across the site with a maximum thickness of 0.10 m bgl with gravel of mudstone, sandstone, brick, clinker, ash and concrete.

One pocket of brown fibrous peat was encountered within WS106 between 2.00 – 2.10 m bgl.

Sweet odours were noted in the MADE GROUND in TP111 (2.90 – 3.80 m bgl), TP114 (0.20 – 0.70 m bgl), TP118 (2.20 – 2.85 m bgl) and TP120 (3.20 – 3.70 m bgl). An organic odour was noted within WS111 between 4.40 – 5.45 m bgl. The majority of the MADE GROUND was noted to comprise ash, clinker and slag.

Drift Deposits

Drift deposits were only encountered within six exploratory hole locations from depths of between 4.70 m bgl to 6.40 m bgl and was proven to a maximum depth of 20.44 m bgl. Drift deposits comprised brown mottled grey stiff high strength to stiff very high strength CLAY.

Bedrock

The solid geology was not identified. A BGS borehole situated 139 m to the northeast of the site has identified SHALE bedrock circa 29 m bgl.

Groundwater

Groundwater was encountered between 0.40 – 4.00 m bgl as perched water within MADE GROUND. No groundwater strikes were noted within the natural drift deposits.

Human Health Risk Assessment

A Tier 1 human health risk assessment was undertaken using GACs for a residential end use which identified exceedances of arsenic, lead, mercury, naphthalene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(a)pyrene and dibenzo(a,h)anthracene. SVOCs were also identified above the LOD within three locations.

The majority of identified elevated concentrations have a primary exposure pathway of dermal contact and ingestion, soil ingestion and consumption of homegrown produce. This can be mitigated by installing a chemically suitable cover system.

Further analysis of mercury including speciation confirmed the level of elemental mercury is below the GAC and therefore can be assessed as organic mercury and mitigated with the provision of a suitable clean cover system.

Further sampling across the site should be completed for naphthalene and SVOCs to confirm the extent of the risk across the site. A vapour risk assessment may be required to determine the requirement for vapour proof membranes.

Asbestos was not identified within the soil samples analysed.

There is no surface water feature within 250 m of the site therefore the receptor has been identified as the underlying secondary A bedrock aquifer. No exceedances were noted within three leachate samples. Samples of groundwater were not able to be obtained. The site is currently soft standing which allows for infiltration therefore given the proposed residential endues, the infiltration will be somewhat reduced given the presence of buildings and hardstanding. Based on the above, it was concluded there is a low risk to controlled waters.

Initial gas monitoring suggested the site could be classified as CS1 however due to substantial MADE GROUND deposits CS2 is considered likely. Further vapour risk assessment is required to determine the requirement for vapour proof membranes.

Based on the assessment of current site conditions it is likely that barrier pipe will be required as part of the proposed development construction.

Geotechnical Risk Assessment

The MADE GROUND had frequent cobbles of brick and concrete, however, no evidence has been identified to date that would prevent the use of normal plant or indicative of former structures. No evidence of railway features (rails, structures) have been identified to date beyond the occasional timber sleeper section within the MADE GROUND.

The removal of Japanese knotweed should be considered as this action may involve deep excavations that will impede on the foundation solution and engineering requirements in areas of the site.

The underlying natural clay drift deposits have been assessed as being stiff to very stiff with a net allowable bearing pressure (ABP) in the order of 93.8 kN/m2 at circa 5.00 m bgl. Between 5.00m and 15.00m ABP ranges between 110-170kN/m2 increasing to 294.7 kN/m2 at circa 20 m bgl.

The cohesive MADE GROUND was generally identified as firm to very stiff with a Cu of ~40kN/m2 at 1.00m bgl generally remaining constant until circa 5.00m bgl where shear strength is consistently above 50kN/m2.

Where levels are retained consideration of the settlement of material placed to an unknown specification should be considered. It may be necessary to reengineer the upper 3.00m of MADE GROUND to 95% of the laboratory optimum to ensure limited long-term settlement.

Following completion of the cut/fill enabling works, it is considered for a residential development that the most appropriate foundation options at this stage would be Vibro Stone Columns (VSC) that will ensure a uniform ABP in the order of 100 kN/m2 for the construction of a doubly reinforced strip footing at ~600mm below remediated ground level.

Where VSC is proposed for plots located within the influence of trees, the stratum should be prepared to mitigate the potential risk associated within volumetric instability in cohesive soils.

Given the distance from the Network Rail assets, it may not be possible to install Vibro stone columns and a piled solution may be necessary. Piles will also be necessary where there is a slope stability issue identified. Piling will be subject to the findings of the coal assessment. The coal authority will not permit piles where there is a risk of collapse or instability in shallow seams.

Where a plot is close to a slope a fully stiffened raft designed by a structural engineer could be adopted; however, consideration of the bulb of pressure being exerted needs to be taken to ensure that the stress from the applied loadings does not induce a loading onto the top of the slope that could induce differential settlement or slope failure. The slope has been modelled which suggests a high risk for failure given the steepness. As such it is recommended that loads are transferred to below the base of the slope including those of the retaining walls. The possibility of retaining walls being structurally loaded will rely on the structural engineers design with the correct parameters of the re-worked material taken into account to ensure a robust foundation.

1.6. LIMITATIONS

The limitations of this report are presented in Appendix I.

1.7. RISK CLASSIFICATION

The description of risk classification and the likely action required as set out in CIRIA C552 are included in Appendix III.

1.8. 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 report's contents, written approval must be sought from E3P; a charge may be levied against such consent.

2. E3P GROUND INVESTIGATION

2.1. GENERAL OVERVIEW

The ground investigation has been designed based on the findings of the desk study and previous E3P site investigation works, with exploratory holes advanced to target specific potential contaminant sources and expand on previous phases of investigation and assessment to ensure a robust detailed assessment and developed conceptual site model. 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 29th February 2024 to 1st March 2024. The works are summarised in Table 3.

2.2. LIMITATIONS OF THE INVESTIGATION

The entire site is covered in dense woodland formed of semi-mature and mature trees and scrub vegetation limiting access across the site.

Established knotweed was encountered within the northeast and along the boundary with Pitsford Road. These areas were avoided during the site investigation and no intrusive works were carried out within 10 m of those areas.

The southern boundary of the site is bound by Network Rail assets and the Huddersfield Main Line. Site investigation works were carried out under a Basic Asset Protection Agreement (BAPA) with Network Rail and a 10 m buffer zone was put in place along the southern boundary of the site where no excavations could be undertaken.

2.3. SCOPE OF GROUND INVESTIGATION

A summary of the supplementary ground investigation completed are included in Table 3.

Table 3 Summary of Supplementary Fieldwork

POTENTIAL SOURCE/RATIONALE	LOCATION HOLE	TYPE	MAXIMUM DEPTH (M BGL)
General Ground Conditions Including the Presence/Nature of Obstructions - Former Railway Sidings	TP201	Mechanically Excavated Trial Pit	2.80
	TP202		2.60
	TP203		2.00
	TP204		2.70
	TP205		2.60
	TP206		2.60
	TP207		2.60
	TP208		2.60
	TP209		2.50
	TP210		2.55
	TP211		2.70
	TP212		2.65
	TP213		2.40
	TP214		2.20

POTENTIAL SOURCE/RATIONALE	LOCATION HOLE	TYPE	MAXIMUM DEPTH (M BGL)
	TP215		2.50
	TP216		2.75
	TP217		2.60
	TP218		2.40
	TP219		2.70
	TP220		2.65

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.

The sampling locations are illustrated in Drawing 17-302-005 (Appendix IV). The ground conditions encountered are indicated on the logs, which are provided in Appendix VI.

The locations were recorded using hand-held GPS and what3words to an accuracy of 3 metres.

2.4. LABORATORY ANALYSIS

Selected soil samples were submitted for a range of chemical analysis, summarised in Table 4.

Table 4 Summary of Laboratory Analysis

CHEMICAL ANALYSIS
Metals
pH, total sulphate, water-soluble sulphate (2:1 extract)
Sulphide
Cyanide
Phenols
Total and speciated polycyclic aromatic hydrocarbons (PAHs)
Semi-Volatile Organic Compounds (SVOCs)
Volatile Organic Compounds (VOCs)
Asbestos identification
Speciated and banded total petroleum hydrocarbons (TPHs)
Total Organic Carbon (TOC)
Calorific Value
2 Stage Waste Acceptance Criteria (WAC)

GEOTECHNICAL ANALYSIS

- Atterberg limits determinations
- Moisture content
- Particle Size Distribution

2.5. STORAGE, PRESERVATION AND TRANSPORT OF SAMPLES

Measures taken to ensure the quality and integrity of the collected samples, from collection to receipt of the samples by the laboratory, are summarised in Table 5.

Table 5 Sample Integrity Information

SUBJECT	CHEMICAL SAMPLING	
Storage	**SOIL**	**GROUNDWATER**
	Glass jars supplied by the laboratory were used for the collection of soil samples to be analysed for VOCs. Plastic tubs were used to collect soil samples for metals analysis, PFAS testing and asbestos screening.	Glass vials supplied by the laboratory were used for the collection of samples to be analysed for VOCs. Samples to be analysed for lower volatility compounds were stored in laboratory-prepared glass jars. Samples to be tested for PFAS compounds were stored in laboratory-supplied HDPE bottles.
Preservation	Soil and groundwater sample containers were filled to minimise headspace prior to sealing and stored at a low temperature within cool boxes with cooling aids to minimise the loss of volatile contaminants and reduce microbial activity during the collection of samples. Cooling aids that may contain PFAS compounds (such as blue ice) were not utilised to prevent cross-contamination with samples.	
Sample Integrity	**SOIL**	**GROUNDWATER**
	Dedicated disposable nitrile gloves were worn and changed between sample collections to prevent cross-contamination. Hand tools were decontaminated with PFAS free detergent and rinsed with PFAS free water between sampling events. PFAS free stationary was used to label all samples.	Groundwater samples were collected using dedicated plastic tubing, which was changed between monitoring well locations to prevent cross-contamination. Interface probes were decontaminated with PFAS free detergent and rinsed with PFAS free water between monitoring wells. PFAS free stationary was used to label all samples.
Transport	Samples were stored and shipped in dedicated sample boxes provided by the laboratory. Sample details were recorded on the laboratory chain of custody form enclosed with the samples prior to dispatch. Scheduling information for the samples was confirmed with the laboratory via email.	

Chemical analysis has been undertaken by an accredited laboratory with the testing results summarised and discussed in Section 4 and the testing certificates included in Appendix VII.

Geotechnical samples were collected as required per location immediately after excavation, labelled and sealed to minimise moisture loss. The geotechnical samples were collected and couriered by a dedicated courier to an accredited geotechnical testing laboratory. The testing results are summarised and discussed in Section 5 and the testing certificates included in Appendix VII.

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 6.

Table 6 Summary of Strata

HOLE	DEPTH TO STRATUM (M BGL)
	MADE GROUND
TP201	0.00 – 2.80*
TP202	0.00 – 2.60*
TP203	0.00 – 2.00*
TP204	0.00 – 2.70*
TP205	0.00 – 2.60*
TP206	0.00 – 2.60*
TP207	0.00 – 2.60*
TP208	0.00 – 2.60*
TP209	0.00 – 2.50*
TP210	0.00 – 2.55*
TP211	0.00 – 2.70*
TP212	0.00 – 2.65*
TP213	0.00 – 2.40*
TP214	0.00 – 2.20*
TP215	0.00 – 2.50*
TP216	0.00 - 2.75*
TP217	0.00 – 2.60*
TP218	0.00 – 2.40*
TP219	0.00 – 2.70*
TP220	0.0 – 2.65*

*Denotes base of MADE GROUND not encountered

3.2. MADE GROUND

MADE GROUND deposits were encountered within all exploratory hole locations from ground level to a maximum proven depth of 2.80 m bgl. The base of MADE GROUND was not proven within any exploratory hole location.

MADE GROUND deposits generally comprise black gravelly sand with gravels of sandstone and mudstone. Fragments of brick, clinker, slag, ash, ceramic, plastic, timber and glass were all encountered throughout this layer. Granular MADE GROUND was underlain by a brown mottled grey slightly sandy slightly gravelly reworked clay. The gravels comprise mudstone, sandstone and coal with fragments of ash, clinker, brick, slag, plastic, glass and timber.

Rootlets were encountered within TP202, TP205, TP209, TP213, TP214, TP215, TP218 and TP220 from ground level to 0.20 bgl. A reworked topsoil was encountered in TP210 from ground level to 0.30 m bgl.

The MADE GROUND conditions are consistent with those reported within the previous E3P 2022 site investigation.

A hydrocarbon odour was encountered within TP209 between 0.20 – 0.70 m bgl.

A Depth of MADE GROUND Plan is presented as Drawing 17-302-006 in Appendix IV.

3.3. DRIFT DEPOSITS

Drift deposits were not encountered within this investigation.

In the previous 2022 E3P site investigation natural drift deposits were encountered within six locations from depths of between 4.70 m bgl to 6.40 m bgl and was proven to a maximum depth of 20.44 m bgl. Drift deposits comprised brown mottled grey stiff high strength to stiff very high strength CLAY.

3.4. SOLID GEOLOGY

The solid bedrock geology was not encountered and has not been encountered in the previous 2022 E3P site investigation.

A BGS borehole situated 139 m to the northeast of the site has identified SHALE bedrock circa 29.00 m bgl.

3.5. GROUNDWATER

No groundwater strikes were encountered during this investigation.

In the previous E3P 2022 site investigation perched groundwater was encountered between 0.40 – 4.00 m bgl within the MADE GROUND. It is understood that true groundwater has not been encountered during either site investigation.

3.6. VISUAL AND OLFACTORY EVIDENCE OF CONTAMINATION

Visual and olfactory evidence of potential contamination has been identified during the site investigation and these are summarised in Table 7.

Table 7 Summary of Visual and Olfactory Evidence of Contamination

LOCATION	DEPTH (M)	STRATUM	NOTES
TP209	0.20 – 0.70	MADE GROUND	Hydrocarbon odour
Across the site	0.00 – 2.80	MADE GROUND	Clinker and slag

3.7. OBSTRUCTIONS

The MADE GROUND had frequent cobbles of brick and concrete; however, no evidence has been identified to date that would prevent the use of normal plant.

The previous investigation identified a surface mound of demolition materials and shallow obstructions in the west of the site indicative of former structures.

4. TIER 2 QUALITATIVE CONTAMINATED LAND RISK ASSESSMENT

E3P has undertaken a Tier 2 qualitative land risk assessment with respect to human health, controlled waters and ground gas to determine if any potential contaminants within the underlying soils and groundwater pose an unacceptable level of risk to the identified receptors.

4.1. SAMPLE ANALYSIS POPULATION

Table 8 summarises the chemical analysis testing scheduled.

Table 8 Summary of Testing Schedule

TYPE OF SAMPLE	NO. OF SAMPLES	DETERMINANDS
MADE GROUND: Gravelly sand and reworked clay	13	Speciated PAH
	17	pH, heavy metals, TOC
	13	Banded TPH
	17	Asbestos ID
	5	TPH CWG and BTEX/MTBE
	5	VOC/SVOC
	8	Calorific Value
	2	2-Stage WAC

4.2. HUMAN HEALTH RISK ASSESSMENT

At Tier 2 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).

Where Tier 2 screening values are not provided by LQM, other screening values have been used and these are referenced in Table 9.

The Tier 2 screening values for residential with plant uptake have been utilised for this assessment due to the proposed development being a residential end use. To remain conservative at an early stage, the screening values based on a 1% SOM have been utilised for this assessment.

The results of the comparison have been summarised in Table 9.

Table 9 Summary of Inorganic and Hydrocarbon Toxicity Assessment for a Residential End Use (with plant uptake)

DETERMINANT	UNIT	GAC	N	MC	LOC. OF EX	PL	ASSESSMENT
Arsenic	mg/kg	37	15	95 81 81 76 72 68 67 63 62 56 49 48 48 46	TP210 0.15 TP208 0.40 TP212 0.60 TP211 1.00 TP206 0.80 TP214 0.40 TP215 0.10 TP209 0.40 TP203 0.60 TP204 0.10 TP217 0.50 TP220 0.60 TP202 1.50 TP219 0.50	1	Further Action
Cadmium	mg/kg	11	15	4.6	-	1	No Further Action
Chromium (VI)	mg/kg	6.0	15	4.7	-	1	No Further Action
Lead	mg/kg	200**	15	5300 1900 1200 1100 750 750 720 670 520 490 490 460 370 280	TP214 0.40 TP203 0.60 TP206 0.80 TP217 0.50 TP208 0.40 TP211 1.00 TP220 0.60 TP202 1.50 TP209 0.40 TP210 0.15 TP212 0.60 TP215 0.10 TP204 0.10 TP219 0.50	1	Further Action
Mercury	mg/kg	1.2	15	8.1 8.0 4.7 3.7 2.1 2.0 1.6 1.6	TP220 0.60 TP203 0.60 TP214 0.40 TP202 1.50 TP212 0.60 TP211 1.00 TP208 0.40 TP210 0.15	4	Further Action
Nickel	mg/kg	130	15	83	-	1	No Further Action
Selenium	mg/kg	250	15	2.1	-	1	No Further Action
Copper	mg/kg	2400	15	5300	TP214 0.40	1	Further Action
Zinc	mg/kg	3700	15	3900	TP206 0.80	1	Further Action
Cyanide – Total	mg/kg	791	15	8.2	-	1	No Further Action
Phenols – Total	mg/kg	120	15	1.7	-	1	No Further Action
Asbestos	Fibres	NFD	15	0.003 0.077 0.005	TP203 0.60 TP204 0.10 TP208 0.40	3	Further Action
Naphthalene	mg/kg	2.3	15	2.4 2.7 3.8 6.7	TP203 0.60 TP206 0.80 TP208 0.40 TP210 0.15	4	Further Action
Acenaphthylene	mg/kg	170	15	0.18	-	2	No Further Action
Acenaphthene	mg/kg	210	15	2.4	-	1	No Further Action
Fluorene	mg/kg	170	15	1.6	-	1	No Further Action
Phenanthrene	mg/kg	95	15	18	-	2	No Further Action
Anthracene	mg/kg	2400	15	6	-	2	No Further Action
Fluoranthene	mg/kg	280	15	28	-	2	No Further Action
Pyrene	mg/kg	620	15	32	-	2	No Further Action

DETERMINANT	UNIT	GAC	N	MC	LOC. OF EX	PL	ASSESSMENT
Benzo(a)Anthracene	mg/kg	7.2	15	23 13 9.2 9.1	TP211 1.00 TP210 0.15 TP212 0.60 TP208 0.40	2	Further Action
Chrysene	mg/kg	15	15	24	TP211 1.00	2	Further Action
Benzo(b)Fluoranthene	mg/kg	2.6	15	35 13 12 10 7.7 7.6 7.5 7.4 6.5 5.5 3	TP211 1.00 TP210 0.15 TP212 0.60 TP208 0.40 TP215 0.10 TP206 0.80 TP203 0.60 TP204 0.10 TP209 0.40 TP220 0.60 TP202 1.50	2	Further Action
Benzo(k)Fluoranthene	mg/kg	77	15	14	-	2	No Further Action
Benzo(a)Pyrene	mg/kg	2.2	15	38 13 12 7.9 6.5 6.2 6.1 6 5.8 4.6 2.7	TP211 1.00 TP210 0.15 TP212 0.60 TP208 0.40 TP203 0.60 TP206 0.80 TP209 0.40 TP215 0.10 TP204 0.10 TP220 0.60 TP202 1.50	2	Further Action
Indeno(123-cd)Pyrene	mg/kg	27	15	19	-	2	No Further Action
Dibenzo(a,h)Anthracene	mg/kg	0.24		1.8 1.4 1.2 0.94 0.93 0.87 0.82 0.82 0.69 0.53 0.27 0.26	TP210 0.15 TP212 0.60 TP208 0.40 TP203 0.60 TP206 0.40 TP215 0.10 TP204 0.10 TP209 0.40 TP220 0.60 TP202 1.50 TP219 0.50 TP214 0.40	2	Further Action
Benzo(ghi)Perylene	mg/kg	320	15	22	-	2	No Further Action
TOTAL PETROLEUM HYDROCARBONS*							
TPH C5-C6 (aliphatic)*	mg/kg	42	13	<0.1	-	4	No Further Action
TPH C6-C8 (aliphatic)*	mg/kg	100	13	<1.0	-	4	No Further Action
TPH C8-C10 (aliphatic)*	mg/kg	27	13	<1.0	-	4	No Further Action
TPH C10-C12 (aromatic)*	mg/kg	74	13	3.8	-	4	No Further Action
TPH C12-C16 (aromatic)*	mg/kg	140	13	21	-	4	No Further Action
TPH C16-C21 (aromatic)*	mg/kg	260	13	140	-	1	No Further Action
TPH C21-C35 (aromatic)*	mg/kg	1100	13	550	-	1	No Further Action
TPH CWG (Aliphatic)							
TPH C5-C6 (aliphatic)	mg/kg	42	5	< 0.02	-	4	No Further Action
TPH C6-C8 (aliphatic)	mg/kg	100	5	< 0.02	-	4	No Further Action
TPH C8-C10 (aliphatic)	mg/kg	27	5	< 0.05	-	4	No Further Action
TPH C10-C12 (aliphatic)	mg/kg	130	5	1.9	-	4	No Further Action
TPH C12-C16 (aliphatic)	mg/kg	1100	5	19	-	4	No Further Action
TPH C16-C35 (aliphatic)	mg/kg	65000	5	100	-	1	No Further Action
TPH CWG (Aromatic)							
TPH C5-C7 (aromatic)	mg/kg	70	5	0.023	-	1	No Further Action

DETERMINANT	UNIT	GAC	N	MC	LOC. OF EX	PL	ASSESSMENT
TPH C7-C8 (aromatic)	mg/kg	130	5	0.011	-	4	No Further Action
TPH C8-C10 (aromatic)	mg/kg	34	5	<0.05	-	4	No Further Action
TPH C10-C12 (aromatic)	mg/kg	74	5	2.9	-	4	No Further Action
TPH C12-C16 (aromatic)	mg/kg	140	5	8.3	-	4	No Further Action
TPH C16-C21 (aromatic)	mg/kg	260	5	51	-	1	No Further Action
TPH C21-C35 (aromatic)	mg/kg	1100	5	140	-	1	No Further Action

Notes
PL1 = soil ingestion, PL2 = dermal contact and ingestion, PL3 = dust inhalation; PL4 = Vapour/Gas Inhalation

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

The pathway noted in the table is the primary pathway, however it may not be the only pathway of that contaminant.
* The Tier 2 GAC for the hydrocarbon fraction is derived from the CIEH assessment for petroleum hydrocarbons Criteria Working Group (CWG) for both aliphatic and aromatic compounds. E3P has utilised the Tier 2 values for aliphatic compounds for the volatile and semi volatile fractions (C5-C12) and the Tier 2 values for aromatic compound for the non-volatile fractions (C12-C35). The comparison of a total (aliphatic/aromatic) compounds to an individual fraction is considered to be a conservative approach and satisfactory for the protection of human health.
** Tier 2 GAC for lead taken from C4SL CL:AIRE

Referring to Table 9, the result of this direct comparison indicates that the data exceeds the screening criteria for a residential end use for the following contaminants:

Inorganics

- Arsenic (PL1);
- Lead (PL1);
- Mercury (PL4);
- Copper (PL1);
- Zinc(PL1); and
- Asbestos (PL3).

Organics

- Naphthalene (PL4);
- Benzo(a)anthracene (PL2);
- Chrysene (PL2);
- Benzo(b)Fluoranthene (PL2);
- Benzo(a)pyrene (PL2); and
- Dibenzo(a,h)Anthracene (PL2).

It should be noted that for the assessment, the screening values utilised are dependent on Soil Organic Matter (SOM) content and as an initial assessment an SOM of 1% has been used. Where appropriate, further detailed assessment will be undertaken to include higher SOM values where soil characteristics are appropriate.

Four SVOC compounds have been recorded at concentrations above the laboratory limit of detection (LOD). These are summarised in Table 10.

Table 10 Summary Of SVOC Compounds Above Laboratory LOD

DETERMINANT	UNIT	CONCENTRATION	LOCATION	GAC	ASSESSMENT
2-Methylnaphthalene	mg/kg	1.7 2.1 1.6 0.7	TP204 0.10 TP206 0.80 TP209 0.40 TP212 0.60	No GAC Available	Further Action
Dibenzofuran	mg/kg	0.9 1.0 0.7 0.5	TP204 0.10 TP206 0.80 TP209 0.40 TP212 0.60	No GAC Available	Further Action
Carbazole	mg/kg	0.5 0.4 0.4 0.9	TP204 0.10 TP206 0.80 TP209 0.40 TP212 0.60	No GAC Available	Further Action
Anthraquinone	mg/kg	0.8 0.7 0.5	TP204 0.10 TP206 0.80 TP209 0.40	No GAC Available	Further Action

In addition, in the 2022 site investigation levels of VOCs and SVOCs were identified above the laboratory LOD. These are summarised in Table 11.

Table 11 Summary Of VOC/SVOC Compounds Above Laboratory LOD

DETERMINANT	UNIT	GAC	MC	LOC. OF EX	ASSESSMENT
Aniline	mg/kg	No GAC Available	0.20 0.30	TP118 - 2.45m WS103 - 4.00m	Further Action
1,3 Dichlorobenzene	mg/kg	0.40	0.90	TP118 - 2.45m	Further Action
4-Methylphenol	mg/kg	80	0.20	WS103 - 4.00m	No further Action
2-Methylnaphthalene	mg/kg	No GAC Available	1.00 0.20 0.40	TP111 - 0.30m TP118 - 2.45m WS103 - 4.00m	Further Action
Dimethyl phthalate	mg/kg	No GAC Available	0.30 0.40	TP118 - 2.45m WS103 - 4.00m	Further Action
Dibenzofuran	mg/kg	No GAC Available	0.80	TP111 - 0.30m	Further Action
Carbazole	mg/kg	No GAC Available	0.70	TP111 - 0.30m	Further Action

4.2.1. EXPOSURE PATHWAYS

The main exposure pathways based on the Tier 2 exceedances are:

- Soil ingestion (PL1);
- Vapour inhalation (indoor) (PL4);
- Dermal contact and ingestion (PL2);
- Consumption of homegrown vegetables (PL1); and
- Fibre/dust inhalation (PL3).

4.2.2. HUMAN HEALTH RISK ASSESSMENT AND MITIGATION

Asbestos

Asbestos in the form of loose chrysotile fibres has been identified in the MADE GROUND in TP203 (0.60m), TP204 (0.10m) and TP208 (0.40m) all in the east of the site. Asbestos quantification has been undertaken which indicates levels between 0.003% and 0.077%.

Visual signs of ACM were encountered during the ground investigation; fly-tipped asbestos sheeting near the entrance in the northeast. No other signs of ACM have been noted. Impacted soils should be managed according to the asbestos risk mitigation conceptual site model shown in Figure 2.

Figure 2 Asbestos Risk Mitigation Conceptual Site Model



Notes
ND None Detect
0.001% Soils may contain ≤ 0.001% asbestos using composite testing to ensure there is no potential risk to human health. This value is present within areas where there may be 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 >1.00m 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.

Inorganic Heavy Metals and PAH

Heavy metals and non-volatile PAH were found site-wide in both site investigations. All of the identified elevated concentrations have primary exposure pathways related to dermal contact and ingestion of soils (PL2), and consumption of homegrown vegetables (PL1). The risk to chronic human health associated with the elevated concentrations of inorganic heavy metals and non-volatile PAH compounds can be mitigated through the installation of a suitable cover system in all proposed private gardens, landscaping and public open space to remove any potential for direct exposure to impacted soils.

The specific design and installation process for the appropriate cover systems will be clearly defined within the site remediation and enabling works strategy.

Elevated concentrations of total mercury have been identified within eight locations across the site. Mercury was also encountered within TP112 at 0.90 m bgl during the 2022 site investigation. It was detected at 2.6mg/kg, exceeding the LQM GAC of 1.2mg/kg. Further analysis confirmed that the level of elemental mercury is below the Tier 1 threshold value of 1.2 mg/kg, and therefore the mercury criteria can be increased to 40mg/kg.

Where further exceedances have been identified, it is plausible that the levels of elemental mercury within the samples are below the 1.2mg/kg GAC and therefore do not pose a risk.

Organic Contamination

Naphthalene

The Tier 2 assessment above is a comparison against GACs utilising a Soil Organic Matter (SOM) of 1% as a conservative method. It should be noted that soil samples with elevated naphthalene all have an SOM in excess 2.5% therefore an assessment has been carried out against the GAC for the relevant SOM based on chemical testing. Table 12 below indicates the GAC (LQM S4ULs) for Naphthalene with varying levels of SOM.

Table 12 GAC for Naphthalene with varying Soil Organic Matter

SOIL ORGANIC MATTER	NAPHTHALENE GAC (LQM S4ULS)
1% SOM	2.3 mg/kg
2.5% SOM	5.6 mg/kg
6% SOM	13 mg/kg

This increases the GAC value for naphthalene to 5.6mg/kg (2.5% SOM) and 13mg/kg (6% SOM) and therefore the concentrations encountered are below the relevant GAC and therefore are not deemed to pose a risk to the development.

Table 13 below summarises the SOM value for each sample where naphthalene has been identified above the 1% SOM GAC and has therefore been assessed using the increased GAC.

Table 13 Assessment of Naphthalene exceedances with Soil Organic Matter

LOCATION	SOM (%)	GAC (mg/kg)	MAXIMUM CONCENTRATION (mg/kg)	ASSESSMENT
WS101	8.94	13	3.7	No further assessment
HP101	8.31*	5.6	2.9	No further assessment
TP111	4.64	5.6	2.5	No further assessment
TP203	9.11	13	2.4	No further assessment
TP206	12.55	13	2.7	No further assessment
TP208	11.01	13	3.8	No further assessment
TP210	15.82	13	6.7	No further assessment

* SOM not available on testing results therefore this has been estimated from average results within the same material type.

Semi-Volatile Organic Compounds (SVOCs)
Concentrations above the laboratory limit of detection (LOD) where GACs are not available have been recorded for 2-metylnapthalene, dibenzofuran, carbazole, and anthraquinone. These determinants pose a potential volatilisation to indoor air risk.

The uses of the above determinants are typically associated with industrial and manufacturing processes as shown in Table 11. Based on the historical development across the site it is likely the source if these SVOC contaminants is associated with the former railway and associated sidings located on-site.

Table 14 Summary Of SVOC Industry Uses

DETERMINANT	INDUSTRY USES
2-Methylnaphthalene	Produced from coal tar and used to make dyes and resins; present in asphalt and smoke from burning cigarettes and wood.[1]
Dibenzofuran	Used as a component of heat-transfer oils and suitable as a carrier for dyeing and printing textiles.[2]
Carbazole	Used in UV-sensitive photographic plates and as a reagent and dye intermediate. Used to make insecticides, lubricants, explosives and rubber antioxidants.[3]
Anthraquinone	Used as a chemical intermediate for dyes and pigments, a catalyst in vegetable oil processing and an additive in tyre manufacturing.[4]

Sources
1. PubChem Database - *https://pubchem.ncbi.nlm.nih.gov/compound/2-Methylnaphthalene*
2. PubChem Database *https://pubchem.ncbi.nlm.nih.gov/compound/dibenzofuran*
3. PubChem Database - *https://pubchem.ncbi.nlm.nih.gov/compound/carbazole*
4. PubChem Database - *https://pubchem.ncbi.nlm.nih.gov/compound/anthraquinone*

Information on the identified compounds is provided herein to help inform the assessment.

2-Metylnapthalene
2-methylnaphthalene is a white crystalline solid compound. This determinant is classified as a non-threshold substance, therefore even the smallest amount of exposure is considered to pose a theoretical risk to the critical receptor within the context of the developed CSM.

This compound is detected at a maximum concentration of 2.10 mg/kg in TP206 at 0.80 m bgl.
The vapour pressure of 2-methylnaphthalene is (0.055 mm Hg @ 25oC) is slightly lower than that of naphthalene (0.085 mm Hg @ 25oC), it is therefore determined that the compound is less volatile than naphthalene. This data is obtained from Pub Chem.

The Tier 2 CIEH / LQM S4UL for naphthalene is 2.3 mg/kg for a residential with plant update scenario, however, this assessment assumes dermal contact, inhalation of particulate and other direct exposure pathways. The developed CSM for the subject site incorporates clean cover systems to ensure no direct exposure pathways.

When considering that 2-Methylnaphthalene has a notably reduced vapour pressure to that of naphthalene, the absence of the compound in the vast majority of samples tested and in due consideration of the maximum concentration of the determinant being only 0.8 ppm, the potential for this compound to enter the vapour phase from soil with temperatures ~10oC is low.

There is no justifiable or peer reviewed toxicological data for an inhalation pathway for 2-methylnaphthalene, therefore is it not possible to develop a robust site-specific risk assessment model given the absence of suitable input parameters.

The US national library for medicine confirms:

If released to soil, 2-methylnaphthalene is expected to have slight to no mobility based upon log Koc values of 3.00-5.96. Volatilisation from moist soil surfaces is expected based upon a Henry's Law constant of 5.18X10-4 atm-cu m/mole. However, adsorption to soil is expected to attenuate volatilisation. 2-Methylnaphthalene is not expected to volatilise from dry soil surfaces based upon its vapour pressure.

This compound has a very low to no actual volatility, there is no inhalation of dust (indoor or outdoor air) or inhalation of vapour (indoor or outdoor) exposure. The total inhalation background is 1.52%.

As discussed, herein it is highly unlikely that this compound can enter the vapour phase in the soil temperatures, furthermore the presence of a passively ventilated sub-floor void with a reasonable volume change potential (24hr) will ensure that in the extremely unlikely event that this compound could volatilise and migrate, the standard mitigation measure would ensure there is absolutely no potential for ingress into the habitable space.

Therefore, within the context of the developed site CSM and the lines of evidence approach, it can be determined that the residual compound in this instance is highly unlikely to pose any risk in terms of vapour migration and ingress to the dwelling.

Dibenzofuran
This is a white solid compound generally derived from coal tar. The US EPA have determined a threshold value of 7.8 mg/kg. Based on this threshold value it is considered that samples TP204 0.10m, TP206 0.80m, TP209 0.40m, and TP212 0.60m are not exceeding.

In addition to the above, the relatively low volatility of this compound within soils with a temperature of ~10oC all but inhibits any volatilisation potential.

The US national library for medicine confirms:

Volatilisation from moist soil surfaces is expected to be an important fate process based upon an estimated Henry's Law constant of 2.1X10-4 atm-cu m/mole. However, adsorption to soil is expected to attenuate volatilisation.

Dibenzofuran is not expected to volatilise from dry soil surfaces (SRC) based upon its vapour pressure.

Therefore, within the context of the developed site CSM and the lines of evidence approach, it can be determined that the residual compound in this instance is highly unlikely to pose any risk in terms of vapour migration and ingress to the dwelling for the samples outlined above.

Carbazole
This compound is detected at a maximum concentration of 0.90 mg/kg in TP212 at 0.60m.

Carbazole is a non-threshold substance and is a white, crystalline solid. It has a characteristic odour. It is a product of incomplete combustion of organic matter and occurs in petroleum, coal, peat, crude oil and coal tar.

There is no toxicological data available to inform the preparation of a robust site-specific risk-based assessment criteria that would model the potential for ingress of vapour to indoor air.

The US national library for medicine confirms:

Carbazole released to air will also be in or on particles that eventually fall to the ground. It is expected to be broken down by sunlight, depending on environmental conditions. It will not move into air from moist soil and water surfaces.

If released to soil, carbazole can have high to no mobility based upon a Koc range of 114-4980, with most values suggesting low mobility to immobility. Volatilisation from moist soil surfaces is not expected to be an important fate process based upon a Henry's Law constant of 1.16X10-7 atm-cu m/mole. Carbazole is not expected to volatilise from dry soil surfaces based upon its vapour pressure.

It is accepted that carbazole is a non-threshold substance, however it will be encapsulated in soils with a temperature in the region of 10oC, furthermore given that it is highly unlikely to move into the ambient air via a vapour phase migratory pathway from a soil or water there cannot be a complete pollutant linkage in this instance.

Carbazole can also be banded with dibenzofuran due to the absence of a GAC. Based on the threshold of 7.8mg/kg, the concentrations within TP204 0.10m, TP206 0.80m, TP209 0.40m, and TP212 0.60m are not considered to be exceeding and will not present a risk to future end users.

Anthraquinone
Anthraquinone is a PAH derived from anthracene or phthalic anhydride and is used in the manufacture of dyes in the textile and pulp industries. It is also utilised as a bird repellent. The compound appears as yellow crystals or powder and is possibly carcinogenic to humans.

The US EPA determines a threshold of 13 mg/kg. Within all of locations this determinant has been identified, the concentrations are below the US EPA threshold and as such is not considered to pose a risk to future end users and no further works are required.

Aniline

Aniline is a clear to slightly yellow liquid with a characteristic odour. It does not readily evaporate at room temperature, is slightly soluble in water and mixes readily with most organic solvents. Aniline is used to make a wide variety of products such as polyurethane foam, agricultural chemicals, synthetic dyes, antioxidants, stabilizers for the rubber industry, herbicides, varnishes and explosives.

Aniline's production and use as a chemical intermediate in the synthesis of rubber accelerators and antioxidants, dyes and intermediates, photographic chemicals, isocyanates for urethane foams, pharmaceuticals, explosives, petroleum refining, diphenylamine, phenolics, herbicides, and fungicides and its use as a solvent and in the manufacture of dyes, medicinal, resins, varnishes, perfumes, and shoe blacks may result in its release to the environment through various waste streams.

If released to air, a vapor pressure of 0.667 mm Hg at 25 °C indicates aniline will exist solely as a vapor in the atmosphere. Vapor-phase aniline will be degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be 4 hours.

If released to soil, aniline is expected to have very high to moderate mobility based upon measured Koc values of 43.8 to 497.7. The pKa of aniline is 4.60, indicating that this compound may exist partially in cation form in the environment and cations generally adsorb more strongly to soils containing organic carbon and clay than their neutral counterparts. Anilines are expected to bind strongly to humus or organic matter in soils due to the high reactivity of the aromatic amino group, suggesting that mobility may be much lower in some soils. Volatilization of the neutral species from moist soil surfaces is expected to be an important fate process based upon a Henry's Law constant of 2.02X10-6 atm-cu m/mole. Aniline has a vapor pressure close to 1 mm Hg and exists as a liquid under environmental conditions; therefore, aniline may volatilize from dry soil. Utilizing the Japanese MITI test, 85% of the Theoretical BOD(NH3) was reached in 2 weeks indicating that biodegradation is an important environmental fate process in soil and water.

If released into water, aniline is not expected to adsorb to suspended solids and sediment based upon its Koc range. Volatilization of the neutral species from water surfaces is expected to be an important fate process based upon this compound's Henry's Law constant. Estimated volatilization half-lives for a model river and model lake are 17.6 and 131 days, respectively. Measured BCF values of less than 1 suggest bioconcentration in aquatic organisms is low. Aniline has a reported aqueous hydrolysis half-life of greater than 50 years suggesting that hydrolysis is not an important environmental fate process.

Occupational exposure to aniline may occur through inhalation and dermal contact with this compound at workplaces where aniline is produced or used. Monitoring data indicate that the general population may be exposed to aniline via inhalation of ambient air, ingestion of food and drinking water contaminated with this chemical, dermal contact with consumer products containing aniline and via inhalation of tobacco smoke. (SRC)

The US EPA has classified aniline as a Group B2, probable human carcinogen.

No screening values are currently available for Aniline. It is noted that the concentration identified within two locations (TP118 and WS103) is only marginally above the laboratory LOD (0.1 mg/kg).

Therefore, within the context of the developed site CSM and the lines of evidence approach, it can be determined that the residual compound in this instance is highly unlikely to pose any risk in terms of vapour migration and ingress to the proposed building.

4.2.3. HUMAN HEALTH SUMMARY

- Heavy metals and non-volatile PAHs have been identified above the GAC therefore mitigation will be required to remove the pathway to the future end user in the form of a clean cover system across the site.
- Low levels of VOCs and SVOCs which have been identified above the laboratory limit of detection, however based on a review of relevant toxicology data, the levels present on site are not deemed to pose a risk to the development.
- Total Mercury has been identified within several samples however mercury speciation undertaken during the previous site investigation works confirmed that the levels of elemental mercury were below the GAC of 1.2 mg/kg therefore the overall risk is deemed low.
- Naphthalene has been identified above the GAC (SOM 1%) however all samples where exceedances have been identified have a SOM in excess of 2.5% therefore the GAC can be increased. There are no exceedances when compared against GACs with higher SOM values therefore the risk is deemed low.
- Asbestos has been identified in several locations with concentrations ranging from 0.003% to 0.077%. Visual ACM and asbestos sheeting has been identified on site. This will require removal by a specialist contractor. Asbestos impacted soils should be dealt with in line with the Asbestos Conceptual Site Model.

A plan showing the locations of contamination exceedances has been included within Appendix IV.

4.3. COMBUSTIBILITY

E3P have also completed an assessment of the calorific content of the soils. Calorific value is not an indication of chronic human health risk but may be useful in assessment of the potential combustion risk posed by Made Ground containing elevated concentrations of potentially combustible organic matter.

There is no formal guidance with respect to the assessment of the risk of spontaneous combustion of colliery wastes. ICRCL Guidance Note 61/84 'Notes on the fire hazards of contaminated land' suggests that materials with Calorific Values above 10 MJ/kg may be combustible, while those with calorific values less than 2 MJ/kg are unlikely to be combustible. A Calorific Value of 10 MJ/kg approximately equates to a Loss on Ignition value of 25 to 30 %.

Many other factors are involved in the assessment of the risk of combustibility of colliery spoil, including; temperature, coal rank, lower coal ranks, moisture, void ratio and particle size.

The results from the Calorific testing can be found below within Table 15 (below) which find the soils to be at a low risk of combustion.

Table 15 Calorific Content

LOCATION	DEPTH (M)	CALORIFIC VALUE (MJ/KG)
TP201	0.50	<0.120
TP203	0.40	0.426
TP207	0.90	<0.120
TP209	0.30	0.652
TP212	0.40	<0.120
TP216	0.60	<0.120
TP218	0.50	<0.120
TP219	0.90	<0.120

During the remediation of the site, it is likely that some form of engineered compaction will be required to prepare a development platform for residential development at the site. The construction of the engineered fill will reduce the oxygen availability in the absence of oxygen, the processes that leads to combustion cease to exist, thus reducing the potential for combustion. Based on the above, there is not deemed to be a risk of combustion associated with the materials tested on site.

4.4. CONTROLLED WATERS RISK ASSESSMENT

E3P has undertaken a controlled waters risk assessment for the site based on the consideration of the conceptual site model and the sensitive receptors, which are summarised in Table 16.

Table 16 Controlled Waters Conceptual Model and Sensitivity Profile

DISCUSSION		SENSITIVITY RATING
Contaminant Source		
MADE GROUND Heavy metal and PAH contamination is present throughout the MADE GROUND infill material across the site from the historical usage of the site as a railway siding. Additionally, within the MADE GROUND SVOC impacted has been noted within TP204, TP206, TP209, TP212 and within WS103, TP111 and TP118 between 0.10 m bgl and 4.00 m bgl.		**High**
Pathway		
Vertical Migration The site is underlain by significant depths of MADE GROUND. The MADE GROUND across the site is generally formed of granular fill overlying cohesive fill materials. Due to the relatively high permeability of the granular MADE GROUND vertical migration of contaminants is seen likely to occur. The presence of this low permeability MADE GROUND deposits and cohesive drift will offer some protection to the underlying aquifer and inhibit lateral migration.		**Medium**
Lateral Migration Lateral migration of contaminants is considered possible due to the presence of granular MADE GROUND deposits across the site.		**Medium**
Receptor		
Aquifer Classification in Superficial Drift Deposits	Secondary undifferentiated aquifer.	**Medium**
Aquifer Classification in Bedrock	Secondary A aquifer.	**Medium**
Groundwater Source Protection Zone or Drinking Water Safeguard Zone	The site is not affected.	**Low**
Distance to the Closest Groundwater Abstraction Point	None identified within a 1 km radius	**Low**
Is the Site Located Within 50 m of a Surface Watercourse?	No surface water features within 50 m of the site boundary	**Low**
The ICSM developed within the context of the site setting has viable pollutant pathway, which would be the downward migration of potentially mobile phase-soluble contaminants towards the underlying secondary A aquifer.		

4.4.1. DISCUSSION

During the E3P 2022 investigation leachate analysis was carried out and identified no exceedances when compared to DWS threshold criteria. During two return visits to the site water levels within monitoring installations were not sufficient enough to collect water samples.

There are no surface water features within 250 m of the site therefore the receptor has been identified as the underlying secondary A bedrock aquifer. No exceedances were noted within three leachate samples during the previous 2022 site investigation and samples of groundwater were not able to be obtained.

The previous E3P site investigation confirmed the presence of clay drift deposits from circa 6.00m bgl to 20.00 m bgl. These deposits will likely provide some protection against the downward migration of mobile-phase contaminants to the underlying secondary A bedrock aquifer.
The site is currently soft standing which allows for infiltration therefore given the proposed residential endues, the infiltration will be somewhat reduced given the presence of buildings and hardstanding.

Based on the above, it was concluded there is a low risk to controlled waters.

4.5. GROUND GAS RISK ASSESSMENT

4.5.1. RATIONALE

Hazardous ground gas qualitative risk assessment is based on a conceptual site model (CSM) similar to that used for soil and groundwater contamination sources (i.e., source pathway receptor pollutant linkages).

The risk can be assessed based on knowledge of the ground conditions and CSM and a measure of hazardous gas concentrations and gas flow at the site within monitoring standpipes.

Ground gas monitoring was not included within the scope of the 2024 investigation however results from the E3P investigation carried out in 2022 have been included to form the following assessment.

4.5.2. SOURCES AND PATHWAYS OF GROUND GAS

Table 17 summarises the potential sources and pathways of ground gas within the context of the recorded site setting and proposed development.

Table 17 Identified Potential Sources of Ground Gas

SOURCE
MADE GROUND
Deep MADE GROUND was encountered within all exploratory hole locations to a maximum proven depth of 6.40 m bgl within CP101 (E3P 2022 Investigation). The full depth of MADE GROUND was not encountered during the 2024 site investigation. MADE GROUND deposits generally comprise black gravelly sand with gravels of sandstone and mudstone. Fragments of brick, clinker, slag, ash, ceramic, plastic, timber and glass were all encountered throughout this layer. Overlying a brown mottled grey slightly sandy slightly gravelly clay. The gravels comprise mudstone, sandstone and coal with fragments of ash, clinker, brick, slag, plastic, glass and timber were encountered within this layer. A reworked topsoil was encountered site-wide from ground level to 0.30 m bgl. This material is believed to be formed from the natural degradation of plant matter over the recent 50 years and it is not thought to have been anthropogenically placed on-site.

A pocket of brown fibrous peat was encountered within WS106 between 2.00 m and 2.10 m bgl. The peat was not encountered in TP111 to the west or TP113 to the east of this position or any other positions completed across the site. This suggests that the peat is an isolated pocket of organic rich material deposited in a localised load during the upfill works.

A hydrocarbon odour was encountered within TP209 between 0.20 – 0.70 m bgl. Sweet odours have been noted within fill deposits onsite in TP111 (2.90—3.80 m bgl), TP114 (0.20—0.70 m bgl), TP118 (2.20—2.85 m bgl) and TP120 (3.20—3.70 m bgl). Further organic odours were noted within WS111 4.40—5.45 m bgl.

Drift Strata

Drift deposits were not encountered within the 2024 E3P investigation.

In the previous 2022 E3P site investigation natural drift deposits were encountered within six locations. The natural drift deposits were consistent across the site being formed of brown mottled grey stiff high strength to very high strength CLAY.

Solid Strata

Solid geology has not been encountered during the previous rounds of site investigation. A BGS borehole situated 139 m to the northeast of the site has identified SHALE bedrock circa 29.00 m bgl.

The site is located within an area underlain by coal measures and a coal outcrop recorded across the northeast of the site. There are mine entries and past or probable shallow coal mine workings within proximity to the site. Where coal measures are present beneath the site, particularly where workings are present, there is a risk of mine gas migration to the surface presenting a risk to the proposed end-user and residential properties.

Landfill Sites

There are no active or historical landfills within 250 m of the site.

Other Gases/Vapours

The BGS reports that full radon protective measures are not necessary in the construction of new dwellings or extensions.

The CIRIA C665 guidance on gas risk assessment includes recommendations for periods and frequencies for monitoring visits. These recommendations take into account the nature of the proposed development and the likely generation potential of the source.

The proposed development comprises private residential properties, which would be classified as a Type A development (high sensitivity) in accordance with BS8485:2015+A1:2019. However, it is considered that the likely generation potential of the identified gas sources (taking into account the likelihood of future increases in gas generation) would be best classified as low.

Therefore, within the context of the proposed residential end-use and ground gas generation potential, the gas assessment requires six visits over three months, with at least two sets of readings at low or falling atmospheric pressure.

4.5.3. GROUND GAS RISK ASSESSMENT METHODOLOGY

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)
- BS8485:2015+A1:2019 – Code of Practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings

BS8485 provides guidance on the level of gas protection requirements based upon the characteristic situation (CS) and the proposed development based on building type.

Therefore, in accordance with BS8485, based on the measured flow rates and hazardous gas concentrations, individual hazardous gas flow rates (Q_{hg}) shall be derived for each monitoring point, from which the site characteristic hazardous gas flow rate (Q_{hgs}), and then the Characteristic Situation (CS) can be determined.

The following equation should be utilised:

$$Q_{hg} = q\left(\frac{C_{hg}}{100}\right)$$

Where:
q is the measured flow rate (in litres per hour) of combined gases from the monitoring standpipe
C_{hg} is the measured hazardous gas concentration (in percentage volume/volume).

The subsequent derived gas screening value (GSV) should be the maximum Q_{hg} (flow rate x concentration as a percentage volume) for all the monitoring events.

A 'worst case check' may be carried out using the maximum recorded flow in any hole with the maximum concentration in any hole to present the plausible worst-case conditions. Adoption of the worst case Q_{hg} requires thorough justification and reference to the CSM.

The final derived GSV can then be used to characterise the site as summarised in Table 18.

Table 18 Site Characterisation by GSV (BS8485:2015)

CS	HAZARD POTENTIAL	GSV (l/hr) FOR METHANE AND CARBON DIOXIDE	ADDITIONAL FACTORS
CS1	Very Low	< 0.07	Typically <1% methane concentration and <5% carbon dioxide concentration (otherwise consider an increase to CS2)
CS2	Low	< 0.70	Typical measured flow rate <70 l/h (otherwise consider an increase to CS3)
CS3	Moderate	< 3.5	N/A
CS4	Moderate to High	< 15	N/A
CS5	High	< 70	N/A
CS6	Very High	> 70	N/A

Notes
1) *The CS is equivalent to the characteristic GSV in CIRIA C665.*
2) *The worst-case ground gas regime identified on the site, either methane or carbon dioxide, at the worst-case temporal conditions that the site may be expected to encounter should be considered.*
3) *Gas Screening Value is the Borehole Gas Volume Flow Rate, in litres per hour, multiplied by the concentration in the air stream of the particular gas being considered.*
4) *The Gas Screening Value thresholds should not generally be exceeded without the completion of a detailed ground gas risk assessment taking into account site-specific conditions.*

It should be noted that in the first instance, this assessment has been carried out in accordance with BS8485:2015+A1(2019) and the thresholds given.

4.5.4. MONITORING METHODOLOGY

Concentrations of methane (CH_4), carbon dioxide (CO_2) and oxygen (O_2) (hydrogen sulphide) were measured using a calibrated infrared gas analyser (GFM435) with gas flow rates measured using an integrated flow meter.

Gas measurements were recorded for a minimum of 300 seconds (5 minutes) at each location, increasing to 600 seconds if elevated concentrations identified, at which point the maximum concentration of CH_4 and CO_2, together with the lowest concentration of O_2 were recorded.

The results of the ground gas monitoring are presented in Table 19.

In addition to the raw data, the results for each individual standpipe have been assessed with reference to guidance provided in BS8485:2015. Based on the initial peak measured flow rates and hazardous gas concentrations, individual hazardous gas flow rates (Q_{hg}) have been derived for each monitoring point, from which an individual Characteristic Situation (CS) can ultimately be determined.

4.5.5. SUMMARY OF MONITORING RESULTS

Table 19 presents of the ground gas and groundwater monitoring results.

Table 19 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	21/11/2021	0.1	0.1	0.0001	0.1	0.1	0.0001	19.8	984	Rising	0.1	1.50 – 3.00	2.45	Dry
	14/12/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	19.9	998	Steady	0.1		2.45	Dry
	22/12/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	19.9	996	Falling	0.1		2.45	Dry
	09/01/2023	0.1	0.1	0.0001	0.9	0.9	0.0009	19.3	984	Steady	0.1		2.45	Dry
	07/02/2023	0.1	0.1	0.0001	1.4	1.4	0.0014	19.2	1031	Falling	0.1		2.45	Dry
	14/02/2023	0.1	0.1	0.0001	0.1	0.1	0.0001	19.8	1022	Falling	0.1		2.45	Dry
WS102	21/11/2021	0.1	0.1	0.0001	0.1	0.1	0.0001	19.8	985	Rising	0.1	1.00 – 5.00	4.60	4.30
	14/12/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	19.9	997	Steady	0.1		4.60	4.10
	22/12/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	19.9	997	Falling	0.1		4.60	4.35
	09/01/2023	0.1	0.1	0.0001	0.9	0.9	0.0009	19.4	997	Steady	0.1		4.56	1.14
	07/02/2023	0.1	0.1	0.0001	1.3	1.3	0.0013	19.3	997	Falling	0.1		4.56	1.39
	14/02/2023	0.1	0.1	0.0001	0.1	0.1	0.0001	19.8	997	Falling	0.1		4.55	1.37
WS103	21/11/2021	0.1	0.1	0.0001	0.1	0.1	0.0001	19.8	985	Rising	0.1	3.00 – 4.50	4.95	4.60
	14/12/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	19.8	998	Steady	0.1		4.85	4.22
	22/12/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	20.0	995	Falling	0.1		4.85	4.50
	09/01/2023	0.1	0.1	0.0001	0.8	0.8	0.0008	19.4	983	Steady	0.1		4.89	3.72
	07/02/2023	0.1	0.1	0.0001	2.1	2.1	0.0021	15.6	1030	Falling	0.1		4.89	3.05
	14/02/2023	0.1	0.1	0.0001	0.1	0.1	0.0001	19.8	1020	Falling	0.1		4.87	3.09
WS105	21/11/2021	0.1	0.1	0.0001	0.1	0.1	0.0001	19.9	985	Rising	0.1	1.00 – 5.00	4.40	Dry
	14/12/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	19.7	996	Steady	0.1		4.33	Dry
	22/12/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	19.9	995	Falling	0.1		4.30	Dry
	09/01/2023	0.1	0.1	0.0001	1.9	0.8	0.0019	19.8	982	Steady	0.1		4.37	1.09
	07/02/2023	0.1	0.1	0.0001	0.7	0.7	0.0007	19.8	1029	Falling	0.1		4.36	1.39
	14/02/2023	0.1	0.1	0.0001	0.1	0.1	0.0001	19.9	1020	Falling	0.1		4.35	1.42

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)
WS106	21/11/2021	0.1	0.1	0.0001	0.1	0.1	0.0001	19.8	985	Rising	0.1	2.00 – 4.00	3.45	Dry
	14/12/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	19.7	997	Steady	0.1		3.47	Dry
	22/12/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	19.9	995	Falling	0.1		3.45	Dry
	09/01/2023	0.1	0.1	0.0001	2.2	2.2	0.0022	18.5	983	Steady	0.1		3.45	Dry
	07/02/2023	0.1	0.1	0.0001	**5.4**	**5.4**	0.0054	11.6	1029	Falling	0.1		3.45	Dry
	14/02/2023	0.1	0.1	0.0001	0.1	0.1	0.0001	19.9	1020	Falling	0.1		3.45	Dry
WS107	21/11/2021	0.1	0.1	0.0001	0.1	0.1	0.0001	19.8	985	Rising	0.1	0.50 - 1.50	1.40	Dry
	14/12/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	19.7	998	Steady	0.1		1.37	Dry
	22/12/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	19.9	995	Falling	0.1		1.35	Dry
	09/01/2023	0.1	0.1	0.0001	2.3	2.2	0.0023	18.3	983	Steady	0.1		1.38	1.32
	07/02/2023	0.1	0.1	0.0001	1.3	1.3	0.0013	19.2	1028	Falling	0.1		1.38	1.35
	14/02/2023	0.1	0.1	0.0001	0.1	0.1	0.0001	19.8	1019	Falling	0.1		1.38	1.36
WS108	21/11/2021	0.1	0.1	0.0001	0.1	0.1	0.0001	19.8	985	Rising	0.1	1.00 – 5.00	4.25	4.00
	14/12/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	19.6	997	Steady	0.1		4.25	4.05
	22/12/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	19.9	995	Falling	0.1		4.25	4.15
	09/01/2023	0.1	0.1	0.0001	2.4	2.4	0.0024	18.2	982	Steady	0.1		4.23	3.37
	07/02/2023	0.1	0.1	0.0001	2.1	2.1	0.0021	18.5	1028	Falling	0.1		4.23	3.12
	14/02/2023	0.1	0.1	0.0001	0.1	0.1	0.0001	19.9	1018	Falling	0.1		4.22	3.22
WS109	21/11/2021	0.1	0.1	0.0001	0.1	0.1	0.0001	19.8	986	Rising	0.1	2.00 – 4.00	3.45	3.30
	14/12/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	19.6	998	Steady	0.1		3.45	3.20
	22/12/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	19.9	994	Falling	0.1		3.45	3.35
	09/01/2023	0.1	0.1	0.0001	2.4	2.4	0.0024	17.9	982	Steady	0.1		3.45	2.12
	07/02/2023	0.1	0.1	0.0001	0.8	0.5	0.0008	19.9	1028	Falling	0.1		3.45	1.84
	14/02/2023	0.1	0.1	0.0001	0.1	0.1	0.0001	19.9	1018	Falling	0.1		3.45	1.54

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)
WS110	21/11/2021	0.1	0.1	0.0001	0.1	0.1	0.0001	19.8	986	Rising	0.1	2.00 – 3.50	1.45	Dry
	14/12/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	19.6	998	Steady	0.1		1.45	Dry
	22/12/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	19.9	994	Falling	0.1		1.45	Dry
	09/01/2023	0.1	0.1	0.0001	2.3	0.8	0.0023	19.3	984	Steady	0.1		1.44	1.16
	07/02/2023	0.1	0.1	0.0001	1.3	1.3	0.0013	19.1	1028	Falling	0.1		1.44	1.28
	14/02/2023	0.1	0.1	0.0001	0.1	0.1	0.0001	19.9	1018	Falling	0.1		1.45	1.30
WS111	21/11/2021	0.1	0.1	0.0001	0.2	0.1	0.0002	19.8	986	Rising	0.1	2.00 – 5.00	4.15	3.90
	14/12/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	19.7	998	Steady	0.1		4.10	3.84
	22/12/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	19.9	994	Falling	0.1		4.10	4.00
	09/01/2023	0.1	0.1	0.0001	0.4	0.4	0.0004	20.0	984	Steady	0.1		4.15	3.69
	07/02/2023	0.1	0.1	0.0001	4.5	4.5	0.0045	13.5	1028	Falling	0.1		4.15	3.48
	14/02/2023	0.1	0.1	0.0001	0.1	0.1	0.0001	19.9	1018	Falling	0.1		4.15	3.57

Notes

CIRIA Characteristic Situation	*Q_{hg}*		
CS1	*<0.07*	*Typical Max CO2 <5 % Typical Max CH4 <1 %*	*Values in BOLD exceed CS1 Thresholds*
CS2	*<0.7*	*Flow rate not to exceed 70 l/hr otherwise consider increase to CS3*	*Values in BLUE denote water above level of response zone (flooded)*
CS3	*<3.5*		
CS4	*<15*	*Quantitative Risk Assessment required to evaluate scope of protective measures*	

4.5.6. GROUNDWATER

Water levels were monitored between 1.09 - 4.50 m bgl and generally water levels were seen to rise throughout the monitoring period. However, due to the predominantly low permeability cohesive drift stratum, it is likely that water levels are representative of surface water collecting within the standpipes and not a true representation of groundwater.

WS105, WS107 and WS110 were noted to be dry for the first three monitoring visits then the water levels increased during the last three monitoring visits.

WS109 was noted to be flooded during the last two monitoring visits.

WS101 and WS106 were noted to be dry throughout the monitoring period.

4.5.7. BAROMETRIC PRESSURE

Visits 1 to 4 were undertaken during low pressure events with the pressure recorded between 982 mbar and 998 mbar.

Visit 5 was undertaken during high pressure with pressures recorded between 1028 and 1031 mbar.

Visit 6 was undertaken during relatively high, falling pressure with pressure dropping from 1022 mbar to 1018 mbar.

It is therefore considered that the visits have been undertaken over representative conditions.

4.5.8. GAS FLOW

Throughout the monitoring period, flow rates were recorded to be 0.1 l/hr (limit of detection of the analyser).

4.5.9. GAS CONCENTRATIONS

The maximum methane value recorded within the monitoring wells was 0.1% v/v (limit of detection of the analyser).

Carbon dioxide concentrations were recorded at concentrations ranging from 0.1% v/v to 5.4% v/v (WS106).

4.5.10. RADON RISK

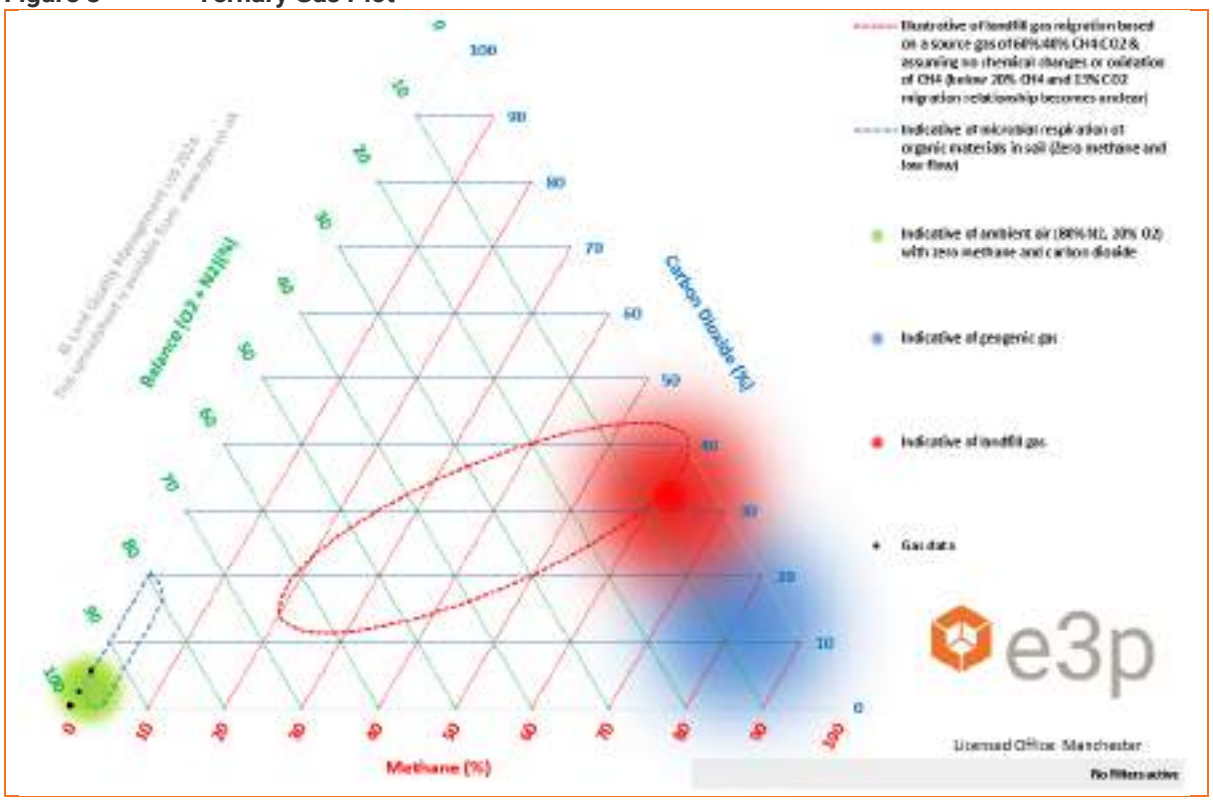
The site is within an area where <1% of properties are above the action levels therefore no mitigation measures are required in relation to Radon.

4.5.11. TERNARY PLOT FOR GROUND GAS

A ternary gas plot is a triangular plot of three variables which equal 100%. They allow the composition of gas to be identified and can help to identify the potential source of gas. As carbon dioxide is present in natural soils (such as Glacial Till), this can lead to uncertainty about whether it is necessary to increase the gas regime. On this basis, a ternary plot has been used as an assessment tool for the gas monitoring data within WS106 where an elevated level of carbon dioxide has been recorded, to identify if there is a true risk.

Figure **3** shows the ternary gas plot for the gas monitoring data.

Figure 3 Ternary Gas Plot



The ternary gas plot indicates the monitoring data within WS106 is indicative of ambient air and is not indicative of landfill or geogenic gases.

4.5.12. CONCLUSION

The determined Characteristic Situation for each standpipe for each visit is presented in **Table 20**. This indicates that based on the peak flow rates the majority of the monitoring visits classify as Characteristic Situation (CS)1 – Very Low Gas Risk.

Table 20 Gas Risk Profile and Location

WELL	DEPTH TO WATER (m bgl)	MAX FLOW (l/hr)	MAX CH_4 (%V/V)	MAX CH_4 Q_{hg} (l/hr)	MAX CO_2 (%V/V)	MAX CO_2 Q_{hg} (l/hr)	CHARACTERISTIC SITUATION
WS101	Dry	0.1	0.1	0.0001	0.1	0.0001	CS1
	Dry	0.1	0.1	0.0001	0.1	0.0001	CS1
	Dry	0.1	0.1	0.0001	0.1	0.0001	CS1
	Dry	0.1	0.1	0.0001	0.9	0.0009	CS1
	Dry	0.1	0.1	0.0001	1.4	0.0014	CS1
	Dry	0.1	0.1	0.0001	0.1	0.0001	CS1
WS102	4.30	0.1	0.1	0.0001	0.1	0.0001	CS1
	4.10	0.1	0.1	0.0001	0.1	0.0001	CS1
	4.35	0.1	0.1	0.0001	0.1	0.0001	CS1
	1.14	0.1	0.1	0.0001	0.9	0.0009	CS1
	1.39	0.1	0.1	0.0001	1.3	0.0013	CS1
	1.37	0.1	0.1	0.0001	0.1	0.0001	CS1
WS103	4.60	0.1	0.1	0.0001	0.1	0.0001	CS1
	4.22	0.1	0.1	0.0001	0.1	0.0001	CS1
	4.50	0.1	0.1	0.0001	0.1	0.0001	CS1
	3.72	0.1	0.1	0.0001	0.8	0.0008	CS1
	3.05	0.1	0.1	0.0001	2.1	0.0021	CS1
	3.09	0.1	0.1	0.0001	0.1	0.0001	CS1
WS105	Dry	0.1	0.1	0.0001	0.1	0.0001	CS1
	Dry	0.1	0.1	0.0001	0.1	0.0001	CS1
	Dry	0.1	0.1	0.0001	0.1	0.0001	CS1
	1.09	0.1	0.1	0.0001	0.8	0.0019	CS1
	1.39	0.1	0.1	0.0001	0.7	0.0007	CS1
	1.42	0.1	0.1	0.0001	0.1	0.0001	CS1
WS106	Dry	0.1	0.1	0.0001	0.1	0.0001	CS1
	Dry	0.1	0.1	0.0001	0.1	0.0001	CS1
	Dry	0.1	0.1	0.0001	0.1	0.0001	CS1
	Dry	0.1	0.1	0.0001	2.2	0.0022	CS1
	Dry	0.1	0.1	0.0001	**5.4**	0.0054	CS1
	Dry	0.1	0.1	0.0001	0.1	0.0001	CS1
WS107	Dry	0.1	0.1	0.0001	0.1	0.0001	CS1
	Dry	0.1	0.1	0.0001	0.1	0.0001	CS1
	Dry	0.1	0.1	0.0001	0.1	0.0001	CS1
	1.32	0.1	0.1	0.0001	2.2	0.0023	CS1
	1.35	0.1	0.1	0.0001	1.3	0.0013	CS1
	1.36	0.1	0.1	0.0001	0.1	0.0001	CS1

WELL	DEPTH TO WATER (m bgl)	MAX FLOW (l/hr)	MAX CH_4 (%V/V)	MAX CH_4 Q_{hg} (l/hr)	MAX CO_2 (%V/V)	MAX CO_2 Q_{hg} (l/hr)	CHARACTERISTIC SITUATION
WS108	4.00	0.1	0.1	0.0001	0.1	0.0001	CS1
	4.05	0.1	0.1	0.0001	0.1	0.0001	CS1
	4.15	0.1	0.1	0.0001	0.1	0.0001	CS1
	3.37	0.1	0.1	0.0001	2.4	0.0024	CS1
	3.12	0.1	0.1	0.0001	2.1	0.0021	CS1
	3.22	0.1	0.1	0.0001	0.1	0.0001	CS1
WS109	3.30	0.1	0.1	0.0001	0.1	0.0001	CS1
	3.20	0.1	0.1	0.0001	0.1	0.0001	CS1
	3.35	0.1	0.1	0.0001	0.1	0.0001	CS1
	2.12	0.1	0.1	0.0001	2.4	0.0024	CS1
	1.84	0.1	0.1	0.0001	0.5	0.0008	CS1
	1.54	0.1	0.1	0.0001	0.1	0.0001	CS1
WS110	Dry	0.1	0.1	0.0001	0.1	0.0001	CS1
	Dry	0.1	0.1	0.0001	0.1	0.0001	CS1
	Dry	0.1	0.1	0.0001	0.1	0.0001	CS1
	1.16	0.1	0.1	0.0001	0.8	0.0023	CS1
	1.28	0.1	0.1	0.0001	1.3	0.0013	CS1
	1.30	0.1	0.1	0.0001	0.1	0.0001	CS1
WS111	3.90	0.1	0.1	0.0001	0.1	0.0002	CS1
	3.84	0.1	0.1	0.0001	0.1	0.0001	CS1
	4.00	0.1	0.1	0.0001	0.1	0.0001	CS1
	3.69	0.1	0.1	0.0001	0.4	0.0004	CS1
	3.48	0.1	0.1	0.0001	4.5	0.0045	CS1
	3.57	0.1	0.1	0.0001	0.1	0.0001	CS1

No credible persistent source of hazardous ground gasses has been identified when considering the developed CSM. There is no putrescible material within the Made ground capable of generating a significant gas source attributed to biological processes, and there is no viable pathway for any thermogenic / geogenic gasses.

The site can be classified as CS1, given the absence of a viable source which is confirmed by the on-site monitoring.

It should be noted that the site is underlain by coal measures and further intrusive coal mining investigation works are to be undertaken to determine if the site is underlain by mine workings. If mine workings are identified beneath the site, ground gas protection measures will be required in line with Characteristic Situation 2 (CS2) as a minimum. Additional ground gas monitoring may also be required.

It is recommended that the full ground gas assessment and recommended protection measures (if applicable) 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.

4.6. 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 21 Pipeline Selection PE Threshold Concentrations

CONTAMINANT GROUP	PE-THRESHOLD (MG/KG)	CONCENTRATIONS AT CURRENT PIPELINE DEPTH (MG/KG)
Total VOC	0.5	<1.0
Total BTEX And MTBE	0.1	<1.0
Total SVOCs (Excluding PAH and those substances marked with an *)	2	2.1
EC5-EC10 Aliphatic and Aromatic Hydrocarbons	2	<1.0
EC10-EC16- Aliphatic and Aromatic Hydrocarbons	10	6.4
EC16-EC40 Aliphatic and Aromatic Hydrocarbons	500	260
Phenols (From SVOC Analysis)*	2	< 0.1
Cresols and Chlorinated Phenols (From SVOC Analysis)	2	<0.1
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	
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?	No	
Will soils be imported to site as part of any future earth works	Currently unknown, however it is unlikely soils will be required to be imported to site.	

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

Based on the assessment of current site conditions it is likely that barrier pipe will be required at the proposed development.

4.7. DEVELOPED CONCEPTUAL SITE MODEL

Following the completion of the intrusive site investigation, chemical analysis and risk assessment, the conceptual model shown in Table 22 has been prepared for the site.

Table 22 Developed Conceptual Model

CONTAMINANT RISK			LIKELIHOOD	SEVERITY	MITIGATION DISCUSSION	RESIDUAL RISK
SOURCES	**MIGRATION PATHWAYS**	**RECEPTORS**				
HUMAN HEALTH - SOIL						
MADE GROUND Historic Railway Sidings Heavy Metals (arsenic, lead, mercury, copper and zinc) – site wide **MADE GROUND** PAHs (benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(a)pyrene and dibenzo(a,h)anthracene)	Accidental ingestion and/or dermal contact with contaminated soil and/or leachate. **PL1/PL2** Inhalation of contaminated dust. **PL3**	Human Health – construction workers	Likely	High	Elevated concentrations of heavy metals and PAHs have been recorded in the MADE GROUND deposits across the site. Site personnel have a greater chance of coming into contact with contaminated soils. Particularly during excavation and soil recovery works. **Recommendation:** Construction works to be completed with appropriate PPE and welfare facilities.	Low
		Human Health – end users	Likely	High	Development of hardstanding and installation of a clean cover system shall break migration pathways to end users. **Recommendation:** Cover system to garden and landscaped areas will prevent exposure to future site users.	Low
MADE GROUND Historical Railway Sidings, infilled ground and deep MADE GROUND >5.00 m bgl. (Naphthalene, Mercury, SVOCs)	Inhalation of vapours. **PL4** Migration through permeable strata and preferential pathways.	Human Health – end users Human Health – Off-site receptors	Low likelihood	Medium	Low levels of VOCs and SVOCs which have been identified above the laboratory limit of detection, however based on a review of relevant toxicology data, the levels present on site are not deemed to pose a risk to the development. Total Mercury has been identified within several samples however mercury speciation undertaken during the previous site investigation works confirmed that the levels of elemental mercury were below the GAC of 1.2 mg/kg therefore the overall risk is deemed low. Naphthalene has been identified above the GAC (SOM 1%) however all samples where exceedances have been identified have a SOM in excess of 2.5% therefore the GAC can be increased. There are no	Low

CONTAMINANT RISK			LIKELIHOOD	SEVERITY	MITIGATION DISCUSSION	RESIDUAL RISK
SOURCES	**MIGRATION PATHWAYS**	**RECEPTORS**				
					exceedances when compared against GACs with higher SOM values therefore the risk is deemed low. **Recommendation:** Sampling of Made Ground turnover during remediation works to confirm no elevated levels of volatile organic contaminants.	
MADE GROUND Asbestos (Asbestos containing materials (ACM) and loose fibres)	Inhalation (of fibres). Construction works disturbing bound material and releasing fibres. **PL3**	Human Health - Site personnel, end land users, and users of adjacent sites	Likely	High	Asbestos has been identified within TP203, TP206, TP208 and TP210. Asbestos quantification has been undertaken which indicates levels between 0.003% and 0.077%. Visual signs of ACM were encountered during the ground investigation; fly-tipped asbestos sheeting near the entrance in the northeast. Risk of inhalation of fibres during Ground Investigation and construction works. Disturbance of ACMs and dust derivatives from construction would increase risk to adjacent sites. **Recommendation:** The soils will require placement in accordance with the asbestos CSM. Cover system to landscaped areas will prevent exposure to future site users. Construction works completed with PPE and provision of welfare	Low
MADE GROUND Sulphate from potential ash within the MADE GROUND.	Sulphate attack on concrete. **PL6**	Building concrete	Likely	Low	Due to the presence of MADE GROUND on the Site, the potential for sulphate in ash deposits is high which may impact the proposed building concrete. **Recommendation:** Classification will be DS-1, AC-1s. Construction works to be completed with appropriate PPE and welfare facilities.	Low
MADE GROUND Organic contaminants such as hydrocarbons, solvents	Ingestion of tainted water supply. **PL7**	Human Health – End Users Water pipeline	Likely	Medium	Likely probability as significant contamination identified at pipeline depth (0.75–1.35 m) and across the site. **Recommendation:** Barrier pipe is likely to be required following a pipeline risk assessment.	Low

CONTAMINANT RISK			LIKELIHOOD	SEVERITY	MITIGATION DISCUSSION	RESIDUAL RISK
SOURCES	**MIGRATION PATHWAYS**	**RECEPTORS**				
MADE GROUND Phytotoxic contaminants	Direct contact (plant uptake). **PL8**	Flora	Likely	Medium	Likely probability as contamination considered possible, which may be taken up by flora in soft landscaping/gardens. **Recommendation:** Cover system to all proposed landscaped areas.	Low
CONTROLLED WATERS						
MADE GROUND Mobile Contaminants	Leaching of contaminants from MADE GROUND through infiltration and percolation of rainwater. **PL5**	Controlled waters, underlying Secondary A aquifer	Low likelihood	Low	No exceedances were noted against DWS criteria within leachate analysis of MADE GROUND. No groundwater samples have been taken to date.	Low
		Infrastructure and services	Unlikely	Low	The development of the proposed road (hardstanding and drainage) will reduce the leaching of contaminated soils. Infrastructure and services shall be designed to resist chemical attack and ingress.	Low
GROUND GAS						
Ground gases (methane and carbon dioxide in the MADE GROUND)	Inhalation of ground gas. **PL4** Accumulation of ground gas in confined spaces (asphyxiation or explosion)	Human Health – site personnel	Unlikely	Low	Ground gas monitoring shows the site classified as CS1.	Low
		Human Health – end users	Unlikely	Low		Low
		Infrastructure and services	Unlikely	Low		Low
Radon	Inhalation of ground gas. **PL4** Accumulation of ground gas in confined spaces (carcinogenic)	Human Health – site personnel	Unlikely	Low	The site is an area where between less than 1% of homes are above the radon action level. Radon measures are not required in all new dwellings.	Low
		Human Health – end users	Unlikely	Low		Low

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.

Level of Risk

Very Low		Moderate	
Low		Moderate/High	
Low/Moderate		High	

5. COAL MINING

The site is located within a Coal Mining Reporting Area however is not located within a Development High Risk Area. A conjectured coal seam is recorded to outcrop across the north of the site however it is currently unknown whether this seam has been historically worked.

Given the potential presence of a seam at the site confirmatory boreholes will be required to demonstrate that the coal is or is not; present, of workable thickness or intact. A series of deep rotary boreholes will be advanced in the north of the site. However, this has not been undertaken at the time of writing this report therefore the findings of the coal mining investigation will be reported under a separate cover.

6. GEOTECHNICAL ASSESSMENT

6.1. SOIL CONSISTENCY

Undrained shear strength values were measured using both field hand shear vane tests. Results of the tests are presented in Table 23 which indicate the MADE GROUND (reworked) clay soils to vary between firm to very stiff. Strength test data is generally consistent with the field descriptions of the aforementioned soils. As the underlying natural deposits were not encountered during the site investigation, all hand shear vanes were undertaken within MADE GROUND recorded as reworked clay.

Table 23 Summary of Hand Shear Vane Tests

LOCATION	MATERIAL	DEPTH	SHEAR STRENGTH (KPA)	CALCULATED ALLOWABLE BEARING CAPACITY (KN/M^2)
TP201	MADE GROUND Clay	1.40	71	168
TP201		1.90	106	249
TP201		2.50	109	256
TP204	MADE GROUND Clay	1.30	90	211
TP204		1.70	104	244
TP204		2.30	109	256
TP204		2.60	103	242
TP205	MADE GROUND Clay	1.60	62	145
TP205		2.00	73	172
TP205		2.40	43	101
TP206	MADE GROUND Clay	1.80	65	154
TP206		2.40	102	240
TP207	MADE GROUND Clay	1.30	109	256
TP207		1.80	138	324
TP207		2.40	133	312
TP208	MADE GROUND Clay	1.30	77	180
TP208		1.60	100	235
TP209	MADE GROUND Clay	1.10	77	180
TP209		1.50	147	344
TP209		2.10	123	289
TP210	MADE GROUND Clay	1.40	114	268
TP210		1.90	123	289
TP210		2.30	131	307
TP212	MADE GROUND Clay	1.20	84	197
TP212		1.60	87	205
TP212		2.10	103	243

LOCATION	MATERIAL	DEPTH	SHEAR STRENGTH (KPA)	CALCULATED ALLOWABLE BEARING CAPACITY (KN/M^2)
TP212	MADE GROUND Clay	2.50	114	268
TP215	MADE GROUND Clay	1.50	84	197
TP216	MADE GROUND Clay	1.80	72	170
TP216		2.10	88	207
TP216		2.60	82	193
TP217	MADE GROUND Clay	1.50	92	215
TP217		1.80	110	258
TP217		2.30	36	85
TP218	MADE GROUND Clay	1.20	100	236
TP218		1.80	132	309
TP218		2.20	123	289
TP219	MADE GROUND Clay	1.20	79	186
TP219		1.60	86	203
TP219		2.10	84	197

Notes: ABC Calculated using Stroud and Butler et al 1974.
** granular content within soil tests may underestimate true shear strength.*

6.2. SIDE STABILITY AND EASE OF EXCAVATION

The sides of the exploratory trial pit excavations appeared to be generally stable during excavation. MADE GROUND deposits across the site were noted as being unstable from below 1.00m upon excavation associated with loose granular elements.

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 within the trial pit locations due to the depths of the deposits.

A surface stockpile of demolition materials is noted in the west of the site and shallow buried obstructions are also noted in this area evident of relic foundations.

6.3. PARTICLE SIZE DISTRIBUTION

Particle Size Distribution Tests have been undertaken on selected samples of granular material via wet sieve to obtain information on the soil fractions. The results are included in Table 24. The full results can be found in Appendix VII.

Table 24 Summary of Particle Size Distribution Test Results

LOCATION	DEPTH (M)	SOIL FRACTION (%)			
		COBBLES	GRAVEL	SAND	SILT/CLAY
TP201	2.00	0	12	15	73
TP201	1.50	0	56	27	17

LOCATION	DEPTH (M)	SOIL FRACTION (%)			
		COBBLES	GRAVEL	SAND	SILT/CLAY
TP202	1.50	0	49	29	22
TP203	0.40	0	73	16	11
TP204	0.80	0	55	25	21
TP206	1.00	0	51	19	31
TP208	2.20	0	59	25	16
TP210	0.80	0	66	18	16
TP211	2.00	0	58	25	17
TP212	0.40	0	61	24	15
TP213	2.00	7	61	19	12
TP214	1.50	0	53	26	21
TP216	2.20	0	5	10	84
TP216	2.00	0	56	23	21
TP217	1.50	0	3	9	88
TP217	1.00	0	60	24	16
TP218	0.50	0	56	25	19
TP219	2.00	0	5	11	84
TP220	1.60	0	20	13	67
TP220	0.70	0	54	19	27

6.4. SOIL DENSITY/MOISTURE CONTENT RELATIONSHIP

Dry density / moisture content relationship analysis has been conducted on soils using via utilising proctor compaction tests utilising a 4.5kg rammer. The results of the tests have been summarised in Table 25. The full test results can be found in Appendix VII.

Table 25 Summary of Dry Density and Moisture Content

LOCATION	LABORATORY DESCRIPTION	TOP DEPTH (M)	METHOD OF COMPACTION	INITIAL MOISTURE CONTENT (%)	OPTIMUM MOISTURE CONTENT (%)	MATERIAL RETAINED ON 37.5 MM SIEVE (%)	MAX DRY DENSITY (MG/M³)	MATERIAL RETAINED ON 20.0 MM TEST SIEVE (%)
TP120	MADE GROUND Clay	1.60	4.5 kg	9.7	13	5	1.82	11
TP217	MADE GROUND Clay	1.50	4.5 kg	8.2	12	0	1.90	0
TP201	MADE GROUND Clay	2.00	4.5 kg	10.2	14	0	1.80	4
TP219	MADE GROUND Clay	2.00	4.5 kg	9.5	13	0	1.81	0
TP218	MADE GROUND Granular	0.50	4.5 kg	17.5	21	4	1.27	17

LOCATION	LABORATORY DESCRIPTION	TOP DEPTH (M)	METHOD OF COMPACTION	INITIAL MOISTURE CONTENT (%)	OPTIMUM MOISTURE CONTENT (%)	MATERIAL RETAINED ON 37.5 MM SIEVE (%)	MAX DRY DENSITY (MG/M³)	MATERIAL RETAINED ON 20.0 MM TEST SIEVE (%)
TP214	MADE GROUND Granular	1.50	4.5 kg	17.2	21	2	1.36	19
TP210	MADE GROUND Granular	0.80	4.5 kg	18.6	22	5	1.30	16
TP206	MADE GROUND Granular	1.00	4.5 kg	13.5	18	2	1.26	13

Dry density/moisture content relationship analyses have indicated that the material is not wet of optimum.

6.5. SOIL INFILTRATION

Soil infiltration tests were not included within the scope of this investigation however five BRE365 soakaway tests were undertaken during the 2022 site investigation.

One location SA105 did not demonstrate soakaway potential and over the 24hr monitoring period and did not fall below the effective storage depths. Whereas the other four locations demonstrated significant permeability, in some cases allowing up to 1.04x10-5 infiltration rate.

All locations were completed in the MADE GROUND soils (due to the depth of this stratum) and generally exhibited the properties of a granular material (as per the engineer's description). It is likely however that the head of water percolated through the infilled granular materials to Pitsford Road level. Soakaway tests have been completed in the upper 2.50m of material, where the site is cut these may no longer be representative of the materials in which the drainage will sit, and further testing may be required.

However, the application of soakaway drainage will ultimately be dependent on the specific requirements of the development. All soakaways should be designed in accordance with BRE Special Digest 365 – Soakaway Design.

The presence of contamination throughout the MADE GROUND will ultimately preclude the usage of soakaway drainage onsite.

6.6. SOIL PLASTICITY

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

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

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

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

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

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

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

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

The Atterberg limits determinations, summarised in Table 27, show the clay to be of medium plasticity.

Table 26 Summary of Plasticity Index Test Results

LOCATION	DEPTH (M)	NATURAL MOISTURE CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	PASSING 425 MM SIEVE (%)	MODIFIED PLASTICITY INDEX	NHBC VOLUME CHANGE POTENTIAL
TP217	2.00	25.6	15	42	27	98	26.46	Medium
TP209	1.00	30.2	16	44	28	96	26.88	Medium
TP220	1.30	23.3	14	43	29	95	27.55	Medium
TP204	1.30	17.4	15	41	26	97	25.22	Medium
TP205	1.50	27.0	17	44	27	97	26.19	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.

6.7. PH AND SULPHATE

Chemical analyses for pH and soluble sulphate content contained in Appendix VII (summarised in Table 27), 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).

Table 27 Summary of pH and Sulphate Data

LOCATION	DEPTH (M)	SO_4 IN 2:1 WATER/SOIL (G/L)	PH VALUE	CLASSIFICATION
TP202	1.50	0.4120	7.4	DS-1, AC-1s
TP215	2.00	0.1080	8.2	DS-1, AC-1s
TP203	0.60	0.1790	7.2	DS-1, AC-1s
TP204	0.10	0.0351	8.4	DS-1, AC-1s
TP204	1.10	0.0218	8.1	DS-1, AC-1s
TP206	0.80	0.0547	7.5	DS-1, AC-1s
TP208	0.40	0.0463	7.2	DS-1, AC-1s
TP209	0.40	0.0226	7.1	DS-1, AC-1s
TP210	0.15	0.0329	7.4	DS-1, AC-1s

LOCATION	DEPTH (M)	SO_4 IN 2:1 WATER/SOIL (G/L)	PH VALUE	CLASSIFICATION
TP211	1.00	0.2100	8.0	DS-1, AC-1s
TP212	0.60	0.0420	6.6	DS-1, AC-1s
TP214	0.40	0.0488	6.4	DS-1, AC-1s
TP215	0.10	0.0425	6.9	DS-1, AC-1s
TP217	0.50	0.0572	6.6	DS-1, AC-1s
TP219	0.50	0.0525	7.9	DS-1, AC-1s
TP220	0.60	0.0739	7.0	DS-1, AC-1s
TP220	1.20	0.0330	8.3	DS-1, AC-1s

6.7.1. HIGHWAYS AND CONCRETE

MCHW Series 600 provides a criteria of 1500mg/l for water-soluble sulphate within 500mm of any concrete structure. A second criteria of 300 mg/l is given with respect to soils within 500mm of steel structures.

6.8. GROUNDWATER

No groundwater or perched water was encountered during this investigation.

In the E3P 2022 investigation groundwater was encountered as perched water strikes throughout the MADE GROUND between 0.40 m bgl and 4.00 m bgl. The water strikes are defined as perched water within MADE GROUND deposits. No groundwater strikes were noted within the natural deposits. The identified groundwater is not considered to be representative of a viable (drift) aquifer.

Table 28 Summary of Groundwater Strikes

LOCATION	DEPTH (M BGL)	DESCRIPTION OF STRIKE	STRATA	EVIDENCE OF CONTAMINATION
2022 Site Investigation Water strike Information				
TP103/SA103	1.20	Seepage	MADE GROUND	Ash/Clinker/Slag
TP105	1.60	Seepage	MADE GROUND	Ash/Clinker/Slag
TP106	0.40	Seepage	MADE GROUND	Ash/Clinker/Slag
TP109	2.50	Seepage	MADE GROUND	Ash/Clinker/Slag
TP110	0.50	Seepage	MADE GROUND	Ash/Clinker/Slag
TP111	1.70	Seepage	MADE GROUND	Ash/Clinker/Slag
TP113	0.60	Seepage	MADE GROUND	Ash/Clinker/Slag
TP116/SA105	0.40	Seepage	MADE GROUND	Ash/Clinker/Slag
WS101	3.50	–	MADE GROUND	Ash/Clinker/Slag
WS103	3.50	–	MADE GROUND	Ash/Clinker/Slag
WS105	4.00	–	MADE GROUND	Ash/Clinker/Slag

6.8.1. INFLUENCING FUNCTIONAL WATERBODIES

Long-term monitoring of groundwater has not been conducted as a part of this investigation and interpreted levels are approximate and may be dependent on seasonal variation. It should be noted that seasonal variation is likely to result in potentially significant changes in groundwater levels beneath the site.

The water table can have significant effects on the foundation of a building, including:

- **Soil settlement**: Changes in the water table can cause soil to expand or contract, which can result in foundation settlement or movement. This can lead to cracks in the foundation, walls, or floors of a building.
- **Soil erosion**: High water tables can cause soil erosion, which can lead to the loss of soil support beneath the foundation. This can result in foundation settling or movement, which can be dangerous for the stability of the structure.
- **Hydrostatic pressure**: When the water table rises, the water exerts hydrostatic pressure on the foundation. This can cause foundation walls to crack or bow, which can compromise the structural integrity of the building.
- **Moisture infiltration**: High water tables can result in moisture infiltration into the foundation and surrounding soil. This can lead to mould growth, decay, and deterioration of building materials.
- **Drainage problems**: Poor drainage around a building can cause water to pool around the foundation, increasing the likelihood of soil erosion and hydrostatic pressure. This can lead to foundation settling or movement and can also cause flooding in the basement or crawl space.

It is important to consider the effects of the water table on the foundation when designing and constructing a building. Proper drainage and foundation waterproofing can help to mitigate the effects of the water table on the foundation and improve the longevity and stability of the structure.

6.9. SITE PREPARATION

Our assessment has been based on the fact that the site will 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:

- Areas of Japanese Knotweed should be managed by a specialist and removed from site.
- 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 existing structures 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.
- MADE GROUND should be processed removing all of the oversize elements and unsuitable material.

6.10. 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 safe allowable bearing capacity (ABC) 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 29.

Table 29 Summary of ABC

COHESIVE SOILS			
Description	**Depth (range m bgl)**	**Undrained Shear Strength (Cu) (kN/m^2)**	**Allowable Bearing Capacity (kN/m^2)**
Stiff to very Stiff sandy CLAY	5.00 – 20.00	45 - 143	93 – 294.7

The allowable bearing pressure data included above is from the E3P investigation in 2022.

6.11. FOUNDATIONS OPTIONS APPRAISAL

MADE GROUND in its current state, is not suitable for founding.

Due to the variable nature and probable settlement issues from unconsolidated fill, the application of foundations in the MADE GROUND in its current state is not appropriate. Prior to the detailed design of suitable foundation solutions, a programme of remediation and enabling works will be required to reengineer the MADE GROUND across the site to provide a suitable development platform.

Within the natural clay drift deposits have been assessed as being stiff to very stiff with a net allowable bearing pressure (ABP) in the order of 93.8 kN/m2 at circa 5.00 m bgl. Between 5.00m and 15.00m ABP ranges between 110-170kN/m2 increasing to 294.7 kN/m2 at circa 20 m bgl.

Foundation depths should take account of the presence of existing and proposed trees, with foundations deepened locally to mitigate the potential for volumetric instability attributed to fluctuations in moisture content, in accordance with the requirements of NHBC standards.

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

At this time, it is not possible to accurately define the foundation types due to the absence of a detailed tree survey and final development levels; however, based on our extensive experience of similar sites, we would anticipate that the final foundation solution would be a piled foundation. Detailed assessment should be undertaken to determine the specific requirements for piling.

Further work is required to determine the presence of shallow coal workings beneath the site. It is desirable to maintain bearing pressures below 160kN/m2 at the grouted horizons therefore piles should be founded below the grouted horizons to ensure they do not stress mine workings (typically, this cannot be achieved with driven piles) and further detailed assessment is required. There is also a potential for pile installation to disturb workings or shafts, refer to CIRIA SP32 and C758 for details.

Foundations which encounter coal, should be brought to a depth below the coal. The sides of foundations should be protected when they are in contact with coal.

6.12. GROUND FLOOR SLABS

Current building control regulations require that where infilled ground is present to depths in excess of 600 mm, or where the substratum is variable in terms of the structure and settlement potential, or where clay soils are present within the influence of existing or proposed trees, a suspended floor slab is required.

In this instance, it is considered that for the majority of substructures, the underlying stratum would have in excess of 600 mm of infill and, as such, a suspended floor slab will be required.

Where a cast in-situ suspended slab is utilised with no subfloor void, appropriate compressible material (heave precautions) will be required in the construction of the substructure.

In clay soils if the foundation depth is greater than 1.50m, allowance should be made in the design for heave. This must incorporate either a clear void of a specified minimum depth under the suspended floor, or a proprietary compressible material/void former below the underside of the floor construction.

Ground bearing slabs should not be used in ground conditions where heave can occur or where the foundation depth is greater than 1.50m. Under these circumstances a suspended floor construction should be used.

6.13. SETTLEMENT

The site has been appraised through desk-based information and site investigation data in order to inform geotechnical risk where possible. Table 33 below has been formulated to determine if settlement risks are required to be further appraised. Where any item is determined to be appraised a settlement appraisal for the site should be prepared upon receipt of development levels and layout.

Table 30 Summary of Geotechnical Information for Settlement

RISK	COMMENT	ASSESSMENT
Site is located in an area deemed to be at Risk from Ground Dissolution from desk-based information	The site is in a low-risk area of ground dissolution based on BGS data searches.	No Further Assessment
Site is in an area where geology is reported as having a compressible risk from desk-based information	A pocket of brown fibrous peat was encountered within WS106 between 2.00 m and 2.10 m bgl. This has not been encountered elsewhere on site and is likely to be isolated materials within the import materials used to upfill the site.	No Further Assessment
Do historical maps indicate relic excavation features such as opencast or ponds that have been infilled.	None identified.	No Further Assessment
Has the site been proven to be underlain by anthropogenic materials to an unknown specification?	Yes, filled ground to a maximum proven depth of 6.40 m bgl.	Further Assessment
Have High walls been identified on site that could result in differential settlement?	None identified.	No Further Assessment

RISK	COMMENT	ASSESSMENT
Has any evidence been observed on site indicating settlement (non-structural assessment)	None identified.	No Further Assessment
Is voided ground present beneath the site?	None identified.	No Further Assessment
Is the site in an area where a mobile groundwater regime is present in influencing distance of foundations and infrastructure?	None identified.	No Further Assessment
Will the site be subject to changes in site levels that may induce heave or settlement?	Yes – site levels are likely to change.	Further Assessment

The site has been appraised as having a potential future settlement risk. In order to determine the level of risk and appropriate mitigation options a detailed settlement appraisal is required for the site. This does not form a part of the structural engineers settlement calculations associated with the sub structure however loadings will need to be considered for surcharge both static and variable pressures.

Immediate Settlement

This is the near instantaneous response of the ground due to the application of the load.

The magnitude of ground movement associated with this is a function of the characteristics of the ground as well as the magnitude of the load.

As this form of settlement occurs during the construction process, the contribution from immediate settlement will not be given any further consideration by E3P.

Primary, Consolidation Settlement

This is the response of the ground due to the closing up of voids, typically water filled.

The magnitude of ground movement associated with this is a function of the characteristics of the ground as well as the magnitude of the load.

The rate at which primary settlement occurs is related directly to the permeability of the ground.
Primary settlement typically provides the largest individual contribution to the magnitude of overall ground movement.

The profile of settlement against time can be described by a polynomial regression and is typically plotted on a log-time vs settlement graph and forms a curve, which flattens as consolidation nears completion.

Secondary, Creep Settlement

This is the long-term slow response of the ground to changes in stress.

The magnitude of movement due to creep is not governed by the magnitude of stress applied but is a function of the characteristics of the ground.

The rate at which creep settlement occurs can be described by a logarithmic regression and forms a straight line when plotted on a log time vs settlement graph.

A change in stress, including a variation on water levels, can instigate a new phase of creep movement.

Given the potential for future settlement detailed geotechnical modelling will be required across the site to determine the level of risk associated with the redevelopment of the site.

6.14. 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 conjectures zones of influence.

The clay has been determined as being of medium volume change potential. Table 31 shows where heave precautions are required for a trench fill, pier and beam and pile and beam foundation types which are in the zone of influence of trees which are to remain or be removed.

Table 31 Position of Heave Precautions

SITUATION	TRENCH FILL	PIER AND BEAM	PILE AND BEAM
External trench fill and pier foundations. Unless NHBC is satisfied that the soil is not desiccated compressible material should be provided to the:	Inside faces of external wall foundations deeper than 1.5m, based on the appropriate tree height.	All faces of pier foundations deeper than 1.5m, based on the appropriate tree height.	N/A
External ground beams. Unless NHBC is satisfied that the soil is not desiccated, compressible material or void formers should be provided to the:	N/A	Inside faces	Inside faces
Internal trench fill foundations and ground beams. Compressible material required:	No	No	No
External and internal ground beams. Compressible material, void former or void should be provided to the underside of:	N/A	All	All
Heave precautions required for proposed trees where the soil is not desiccated:	No	No	No

Note: Information taken from NHBC Standards 2024, Chapter 4.2, Table 8 – Position of heave precautions

A summary of heave precautions is presented in Table 32.

Table 32 Summary of Heave Precautions

VOLUME CHANGE POTENTIAL	VOID DIMENSION AGAINST SIDE OF FOUNDATION AND GROUND BEAM	VOID DIMENSION UNDER GROUND BEAMS, AND SUSPENDED IN-SITU CONCRETE GROUND FLOOR	VOID DIMENSION UNDER SUSPENDED PRECAST CONCRETE AND TIMBER FLOORS(1)
High	35mm	150mm	300mm
Medium	25mm	100mm	250mm
Low	0mm	50mm	200mm

In addition to the requirements of the 'Drainage' section, drainage near trees should incorporate additional provisions. Where there is a volume change potential within the ground, the provisions include:

- Increased falls to cater for any ground movement.
- Deeper and wider backfill of granular material.
- A drainage system that is capable of movement should heave and shrinkage occur.
- Drainage pipes should not be encased in concrete.
- Additional clearance is required where drains pass through the structure of a building to allow for additional movement.

6.15. 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.

6.16. DRAINAGE

Where loose or soft materials have been identified at drainage invert levels, there will need to be consideration for the use of reinforced pipe bedding.

Shrinkage and heave of clay soils can affect pipelines. To protect against the effects of heave, drainage should be designed:

- To take account of potential ground movement as shown in
- Table 33, including where pipes and services pass through substructure walls or foundations.
- With gradients which may need to be steeper.
- To use alternative means of catering for the movement when sufficient falls cannot be provided, for example, by deepening the excavation and laying pipework on a granular bedding of suitable thickness to reduce the extent of potential movement.

Table 33 Potential Ground Movement for Drainage

VOLUME CHANGE POTENTIAL	HIGH	MEDIUM	LOW
Potential ground movement	150mm	100mm	50mm

6.17. EXCAVATIONS

Trial pits were generally stable in cohesive MADE GROUND but unstable within granular MADE GROUND.

Concrete obstructions were identified in the near surface. It is anticipated that any obstructions will be grubbed out during the reduced-level dig for the substructure works.

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

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

Table 34 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. Ingress of water into foundation excavation will potentially flood foundation excavations, limiting the viability of spread foundations to be constructed.
Shallow Bedrock	No	Shallow bedrock has not been identified on site.

6.18. SLOPE STABILITY

As and when detailed topographic information is available and in due consideration of the proposed development design, structural and infrastructure loading, a detailed slope stability model will be required. This model will seek to determine the potential for newly imposed loadings to generate a risk of instability or failure within the off-site embankment and the need for any mitigation measures such as piled foundations to transfer loadings below the base of the slope.

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

6.20. DEVELOPED GEOTECHNICAL RISK REGISTER

POTENTIAL ABNORMAL CONSTRAINT	LOCATION ON SITE	ESTIMATED AREA OF SITE AT RISK (%)	ASSESSMENT AND MITIGATION
Remediation of contaminated soils	All	50	Elevated concentrations of heavy metals, non-volatile PAHs, naphthalene and asbestos have been identified within MADE GROUND soils at the site. Speciated mercury analysis if required to assess potential for elemental mercury which may pose a vapour risk.
Obstructions	All	50	The site has been subject to historical development and, while the majority of above-ground structures have been removed, subsurface obstruction from relict foundations remain, particularly in the southwest. Areas which have not been investigated due to the presence of stockpiles (asbestos) and Japanese Knotweed may present further areas of underground obstructions which will require assessment and removal.
Artificially levelled and filled platforms	All	100	The site has been artificially backfilled and raised for the construction of the historical railway sidings which are no longer present. The upfill material s recorded to depths in excess of 6.00 m bgl and comprises reworked clays overlaid by granular MADE GROUND.
Retaining walls	N/A	N/A	No retaining walls have been noted onsite. The E3P Phase I (16-148-R1-1, dated October 2022) states a retaining wall along the southwestern boundary of the site, however following vegetation clearance access to this area has been gained, with the wall being reassessed and doesn't appear to currently be retaining soils.
Trench collapse	All	100	MADE GROUND present beneath the site is likely to be loosely compacted and possibly prone to collapse. Where trial pits were advanced to depths in excess of 2.00 m bgl within granular stratum, these generally appeared to be unstable with some side wall collapse.
Drainage Invert levels	All	100	Due to the presence of deep MADE GROUND across the site, the potential for settlement within this material will need to be assessed, particularly at drainage invert levels to determine whether any requirements for ground engineering to support drainage infrastructure.
Mature trees	All	100	Very dense semi-mature and mature trees and scrub vegetation is present across the entire site in an even distribution.

POTENTIAL ABNORMAL CONSTRAINT	LOCATION ON SITE	ESTIMATED AREA OF SITE AT RISK (%)	ASSESSMENT AND MITIGATION
Volume change potential clay	All	100	The site is underlain by medium volume change potential soils. It should be noted that the volume change potential of the natural cohesive deposit has not been assessed however these are recorded at depths in excess of 6.00 m bgl therefore unless site levels are reduced significantly, the volume change potential of the natural soils will not pose a risk to the foundations.
Running sands	N/A	N/A	Data searches indicate low risk.
Ground dissolution	N/A	N/A	Data searches indicate no hazard.
Concrete design	All	100	Sulphate analysis across the site suggests that generally the concrete classification for the will be DS1 AC1s.
Services/sensitive structures	Southern Boundary	20	The site is bound to the south by The Huddersfield Main Line with a strict 10 m buffer zone employed by Network Rail. Piling may not be possible within close proximity to these areas of sensitive infrastructure. Consultation is required with Network Rail and prior agreement relating to all construction activities within proximity to the rail line.
Abnormal foundation solutions	All	100	Due to the non-uniform nature and probable settlement issues associated with founding in the MADE GROUND, it is anticipated that VSC, piles and/or doubly reinforced rafts will be required across the site. Given the risk of slope failure at the site, proposed retaining features and plots at the edge of a slope are likely to require a piled footing beneath the base of the slope to apply the load to stable materials beneath.
Areas not investigated	On-site	15	During an ecological site walkover carried out prior to the site investigation commencing large pockets of Japanese Knotweed were identified along the embankment forming the boundary with Pitsford Road and in the north-eastern sector of the site. These areas were avoided during the site investigation and no intrusive work was carried out within 10 m of these areas. A 10 m buffer zone was put in place by Network Rail along the southern boundary of the site due to the site bounding The Huddersfield Main Line. Within this area, only hand-dug trial pits were permitted (E3P 2022 investigation). No exploratory holes were advanced within this area during the 2024 investigation.
Slope	On-site	50	Significant slopes are present to the north, east and western boundaries, the stability of these should be carefully considered for construction and loadings associated with the proposed plots, drainage and roads.

POTENTIAL ABNORMAL CONSTRAINT	LOCATION ON SITE	ESTIMATED AREA OF SITE AT RISK (%)	ASSESSMENT AND MITIGATION
Consolidation & Settlement	All	100	The presence of variable historical MADE GROUND represents an unacceptable risk associated with the consolidation of materials that could induce unacceptable settlement to structures and infrastructure. A detailed settlement analysis will be required as part of a Geotechnical Design Report.
Enabling Earthworks	All	100	All proposed earthworks will need to be designed by a suitably qualified geotechnical engineer in accordance with NHBC Chapter 4.6. The earthworks design will incorporate a Geotechnical Specification for Earthworks that will define protocols to ensure no unacceptable future risk.

6.21. FURTHER WORKS

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

- Coal Mining Investigation and detailed coal mining risk assessment.
- Arboricultural survey.
- Settlement Analysis for earthworks design.
- Slope stability assessment.
- Geotechnical Design Report (GDR)
- Geotechnical Earthworks Strategy (infrastructure).
- Remediation and enabling works strategy.

END OF REPORT

APPENDIX I
LIMITATIONS



GENERAL

1. This report and any associated works (together comprising the "Services") were compiled and carried out by E3P for the client (as present in Section 1) under the E3P “Terms of Business” or with those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed and outlined in the body of the report.

2. Unless explicitly agreed otherwise, in writing, this report has been prepared under E3P Standard Terms and Business as included within our proposal to the Client.

3. Project-specific appointment documents may be agreed upon at our discretion and a charge may be levied for both the time to review and finalise appointment documents and also for associated changes to the appointment terms. E3P reserves the right to amend the fee should any changes to the appointment terms create an increased risk to E3P.

4. The report needs to be considered in light of the proposal and associated limitations of scope. The report needs to be read in full and isolated sections cannot be used without full reference to other elements of the report and any previous works referenced within the report.

PHASE 1 GEOENVIRONMENTAL AND PRELIMINARY RISK ASSESSMENTS

5. Coverage: This section covers reports with the following titles or combination of titles: Phase 1; Desktop Study; Geoenvironmental Assessment; Development Appraisal; Preliminary Environmental Risk Assessment; Constraints Report; Due Diligence Report; Geotechnical Development Review; Environmental Statement; Environmental Chapter; Baseline Environmental Assessment; Project Scope Summary Report (PSSR), Program Environmental Impact Report (PEIR), Geotechnical Development Risk Register; Agricultural Land Assessment; Mineral Safeguarding Assessment; Desk Top Coal Mining Risk Assessment; Hydrogeological Appraisal; Construction Environmental Management Plan; and Site Water Management Plan.

6. The works undertaken to prepare this report comprised a study of available and easily documented information from a variety of sources (including the Client), together with (where appropriate) a brief walkover inspection of the Site and correspondence with relevant authorities and other interested parties. Due to the short timescales associated with these projects responses may not have been received from all parties. E3P cannot be held responsible for any disclosures that are provided post-production of our report and will not automatically update our report.

7. The opinions given in this report have been dictated by the finite data on which they are based and are relevant only for the purpose for which the report was commissioned. The information reviewed should not be considered exhaustive and has been accepted in good faith as providing true and representative data pertaining to site conditions. Should additional information become available which may affect the opinions expressed in this report, E3P reserves the right to review such information and, if warranted, to modify the opinions accordingly.

8. It should be noted that any risks identified in this report are perceived risks based on the information reviewed. Actual risks can only be assessed following intrusive investigations of the site.

9. 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 does not constitute or replace full and proper surveys completed by suitably qualified and experienced specialists in these fields.

10. E3P does not warrant work/data undertaken/provided by others.

INTRUSIVE INVESTIGATION REPORTS

11. Coverage: The following report titles (or combination) may cover this category of work: Geoenvironmental Site Investigation; Geotechnical Assessment; GIR (Ground Investigation Reports); Preliminary Environmental And Geotechnical Risk Assessment; Preliminary Summary; Coal Mining Risk Assessment, Ground Gas Addendum; and, Geotechnical Risk Register.

12. The investigation has been undertaken to provide information concerning either:

    I. The type and degree of contamination present at the site in order to allow a generic quantitative risk assessment to be undertaken; or

    II. Information on the soil properties present at the site to allow for geotechnical development constraints to be considered.

13. The scope of the investigation was selected on the basis of the specific development and land use scenario proposed by the Client and may be inappropriate to another form of development or scheme. If the development layout was not known at the time of the investigation the report findings may need revisiting once the development layout is confirmed.

14. Unless otherwise specified in the scope of works, any site drawing(s) provided in this report is (are) not meant to be an accurate base plan but is (are) used to present the general relative locations of features on, and surrounding, the site. Features (intrusive and sample locations etc) annotated on site plans are not drawn to scale but are centred over the approximate location. Such features should not be used for setting out and should be considered indicative only.

15. For contamination purposes, the objectives of the investigation are limited to establishing the risks associated with potential contamination sources with the potential to cause harm to human health, building materials, the environment (including adjacent land), or controlled waters.

16. For geotechnical investigations, the purpose is to broadly consider potential development constraints associated with the physical property of the soils underlying the site within the context of the proposed future or continued use of the site, as stated within the report.

17. The amount of exploratory work, soil property testing and chemical testing undertaken has necessarily been restricted by various factors which may include accessibility, the presence of services; existing buildings; current site usage or short timescales. The exploratory holes completed assess only a small percentage of the area in relation to the overall size of the Site, and as such can only provide a general indication of conditions.

18. The number of sampling points and the methods of sampling and testing do not preclude the possible existence of contamination where concentrations may be significantly higher than those actually encountered or ground conditions that vary from those identified. In addition, there may be exceptional ground conditions elsewhere on the site which have not been disclosed by this investigation and which have therefore not been taken into account in this report.

19. The inspection, testing and monitoring records relate specifically to the investigation points and the timeframe that the works were undertaken. They will also be limited by the techniques employed. As part of this assessment, E3P has used reasonable skill and care to extrapolate conditions between these points based on assumptions to develop our interpretation and conclusions.

20. The assumption made in forming our conclusions is that the ground and groundwater conditions (both chemically and physically) are the same as have been encountered during the works undertaken at the specific points of investigation and at the time of the investigation.

21. Conditions can change between investigation points both spatially and over time and these interpretations should therefore be considered indicative. The assessment of extreme weather events and their impact on ground conditions is not within the scope of E3P's work.

22. The risk assessment and opinions provided are based on currently available guidance relating to acceptable contamination concentrations; no liability can be accepted for the retrospective effects of any future changes or amendments to these values. Specific assumptions associated with the risk assessment process have been outlined within the body or associated appendix of the report.

23. Additional investigations may be required in order to satisfy relevant planning conditions or to resolve any engineering and environmental issues.

24. Where soil contamination concentrations recorded as part of this investigation are used for commentary on the potential waste classification of soils for disposal purposes, these should be classed as indicative only. Due consideration should be given to the variability of contaminant concentrations taken from targeted samples versus bulk excavated soils and the potential variability of contaminant concentrations between sampling locations. Where major waste disposal operations are considered, targeted waste classification investigations should be designed and the waste classification and any subsequent disposal option agreed upon with licenced subcontractors and/or the relevant regulators.

25. The results of the asbestos testing are factually reported and interpretation is given as to how this relates to the previous use of the site, the types of ground encountered and site conceptualisation. This does not however constitute a formal asbestos assessment. These results should be treated cautiously and should not be relied upon to provide detailed and representative information on the delineation, type and extent of bulk ACMs and/or trace loose asbestos fibres within the soil matrix at the site.

26. If costs have been included in relation to additional site works, and/or site remediation works these must be considered as indicative only and must be confirmed by a qualified quantity surveyor.

EUROCODE 7: GEOTECHNICAL DESIGN

27. On 1st April 2010, BS EN 1997-1:2004 (Eurocode 7: Geotechnical Design – Part 1) became the mandatory baseline standard for geotechnical ground investigations.

28. In terms of geotechnical design for foundations, slopes, retaining walls and earthworks, EC7 sets guidance on design procedures including specific guidance on the numbers and spacings of boreholes for geotechnical design, there are limits to methods of ground investigation and the quality of data obtained and there are also prescriptive methods of assessing soil strengths and methods of design. Unless otherwise explicitly stated, the work has not been undertaken in accordance with EC7. A standard geotechnical interpretative report will not meet the requirements of the Geotechnical Design Report (GDR) under Eurocode 7. The GDR can only be prepared following confirmation of all structural loads and serviceability requirements. The report is likely to represent a Ground Investigation Report (GIR) under the Eurocode 7 guidance.

DETAILED QUANTITATIVE RISK ASSESSMENTS AND REMEDIATION AND ENABLING WORK STRATEGY REPORTS

29. These reports build upon previous report versions and associated notes. The scope of the investigation, further testing and monitoring and associated risk assessments were selected based on the specific development and land use scenario proposed by the Client and may not be appropriate to another form of development or scheme layout. The risk assessment and opinions provided are based on currently available approaches in the generation of Site Specific Assessment Criteria relating to contamination concentrations and are not considered to represent a risk in a specific land use scenario to a specific receptor. No liability can be accepted for the retrospective effects of any future changes or amendments to these values, associated models or associated guidance.

30. The outputs of the Detailed Quantitative Risk Assessments are based upon the manipulation of standard risk assessment models. These are our interpretation of the risk assessment criteria.

31. Before adoption on-site, assessment criteria will need to be discussed and agreed upon with the Regulatory Authorities prior to adoption on site. The regulatory discussion and engagement process may result in an alternative interpretation being determined and agreed. The process and timescales associated with the Regulatoy Authority engagement are not within the control of E3P. All costs and programmes presented as a result of this process should be validated by a quantity surveyor and should be presumed to be indicative.

32. E3P does not accept liability for any subcontract work that has not been completed in strict accordance with an approved E3P Remediation and Enabling Works Strategy.

GEOTECHNICAL DESIGN REPORT (GDR)

33. The GDR can only be prepared following confirmation of all structural loads and serviceability requirements. All the relevant information needs to be provided to allow for a GDR to be produced.

MONITORING (INCLUDING REMEDIATION MONITORING REPORTS AND BUILD PHASE MITIGATION)

34. These reports are factual and comprise monitoring, normally groundwater and ground gas and data provided by contractors as part of earthworks or remedial works.

35. The data is presented and will be compared with assessment criteria.

APPENDIX II
GLOSSARY



TERMS

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

MCV	Moisture condition value	**WRAP**	Waste and Resources Action Programme
MIBK	Methyl isobutyl ketone	**WTE**	Water table elevation
m	Metres	**ppm**	Parts per million
km	Kilometres	**mg/m^3**	Milligram per metre cubed
% v/v	Percent volume in air	**m bgl bgl**	Metres below ground level
mb	Millibars (atmospheric pressure)	**m bcl**	Metre below cover level
l/hr	Litres per hour	**mAOD**	Metres above ordnance datum (sea level)
µg/l	Micrograms per litre (parts per billion)	**kN/m^2**	Kilonewtons per metre squared
ppb	Parts per billion	**µm**	Micrometre
mg/kg	Milligrams per kilogram (parts per million)	**SSRT**	Site Specific Remediation Target
PSD	Particle Size Distribution	**DD**	Dry Density
CL:AIRE	Contaminated Land: Applications in Real Environments	**Mc**	Moisture Content
ρ	Bulk Density	**GPR**	Ground Penetrating Radar
NDP	Nuclear Density Probe	**FFL**	Finished Floor Level
LEL	Lower Explosive Limit	**UKWIR**	UK Water Industry Research
CIRIA	Construction Industry Research and Information Association	**LOD**	Limit of Detection

APPENDIX III
RISK CLASSIFICATION



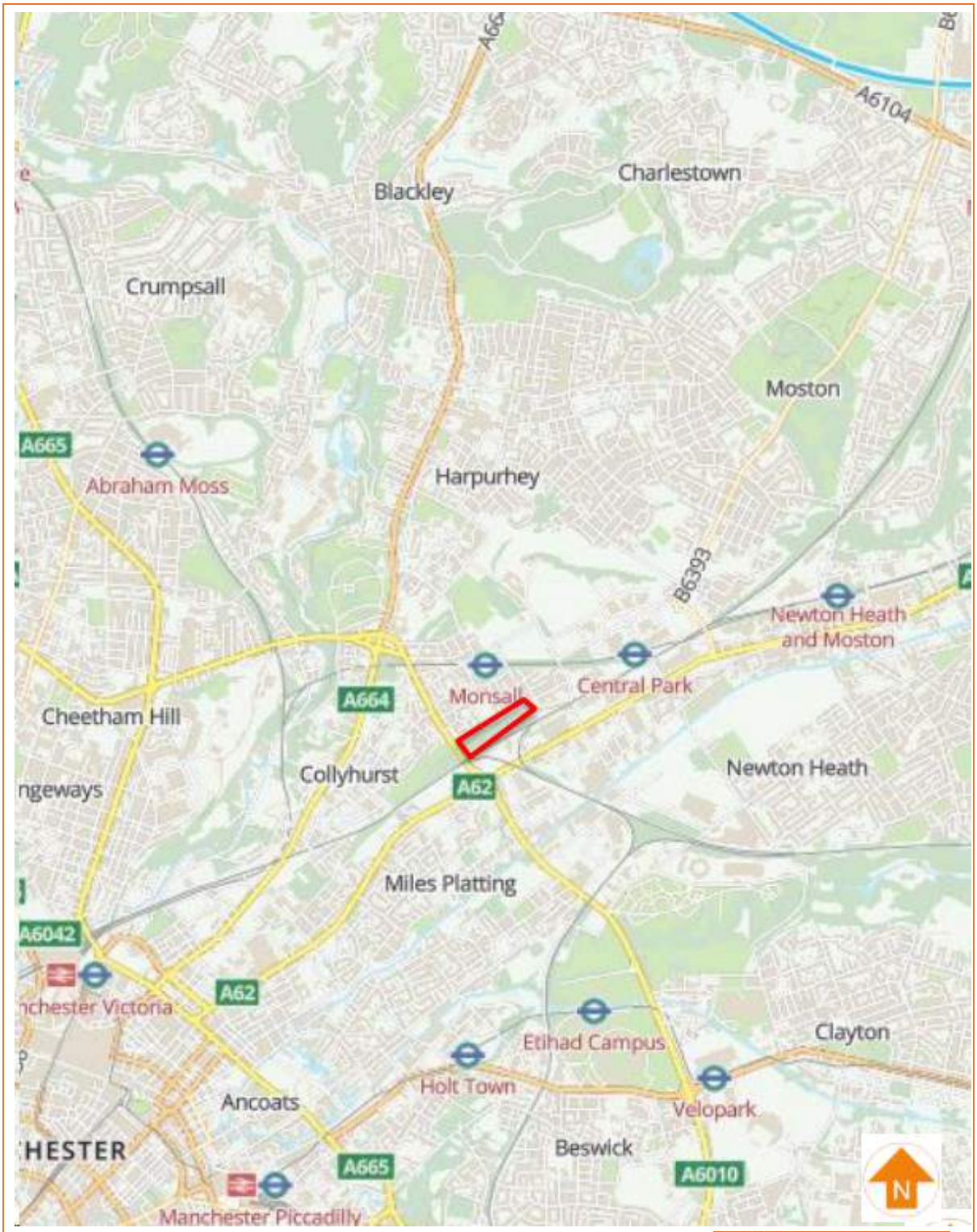
Risk Classification

RISK	DEFINITION
Low	There are unlikely to be significant contaminated land liabilities/geotechnical constraints associated with the property.
Low Moderate	There are unlikely to be significant contaminated land liabilities/geotechnical constraints associated with the property with regard to the proposed use. However, minor issues may require further consideration in the event of future redevelopment of the Site.
Moderate	Some potential contaminated land liabilities/geotechnical constraints are likely to affect the property as a result of historical and/or current activities. The risks identified are unlikely to pose an immediate significant issue but the purchaser/developer may wish to make further enquiries of the vendor or undertake further environmental improvements. Redevelopment of the Site will likely require further site investigation.
Moderate High	Some potentially significant contaminated land liabilities/geotechnical constraints have been identified at the property that requires further assessment, including intrusive ground investigations.
High	Significant potential contaminated land liabilities/geotechnical constraints have been identified at the property. Further assessment including intrusive ground investigation will be required to determine the level of risk and associated liability.

APPENDIX IV
DRAWINGS



DRAWING 17-302-001 – Site Location Plan





Notes:

Client: Bellway Homes

Job No: 17-302

Date: 11.04.2024

Drawing No: 002

Scale: NTS @ A3

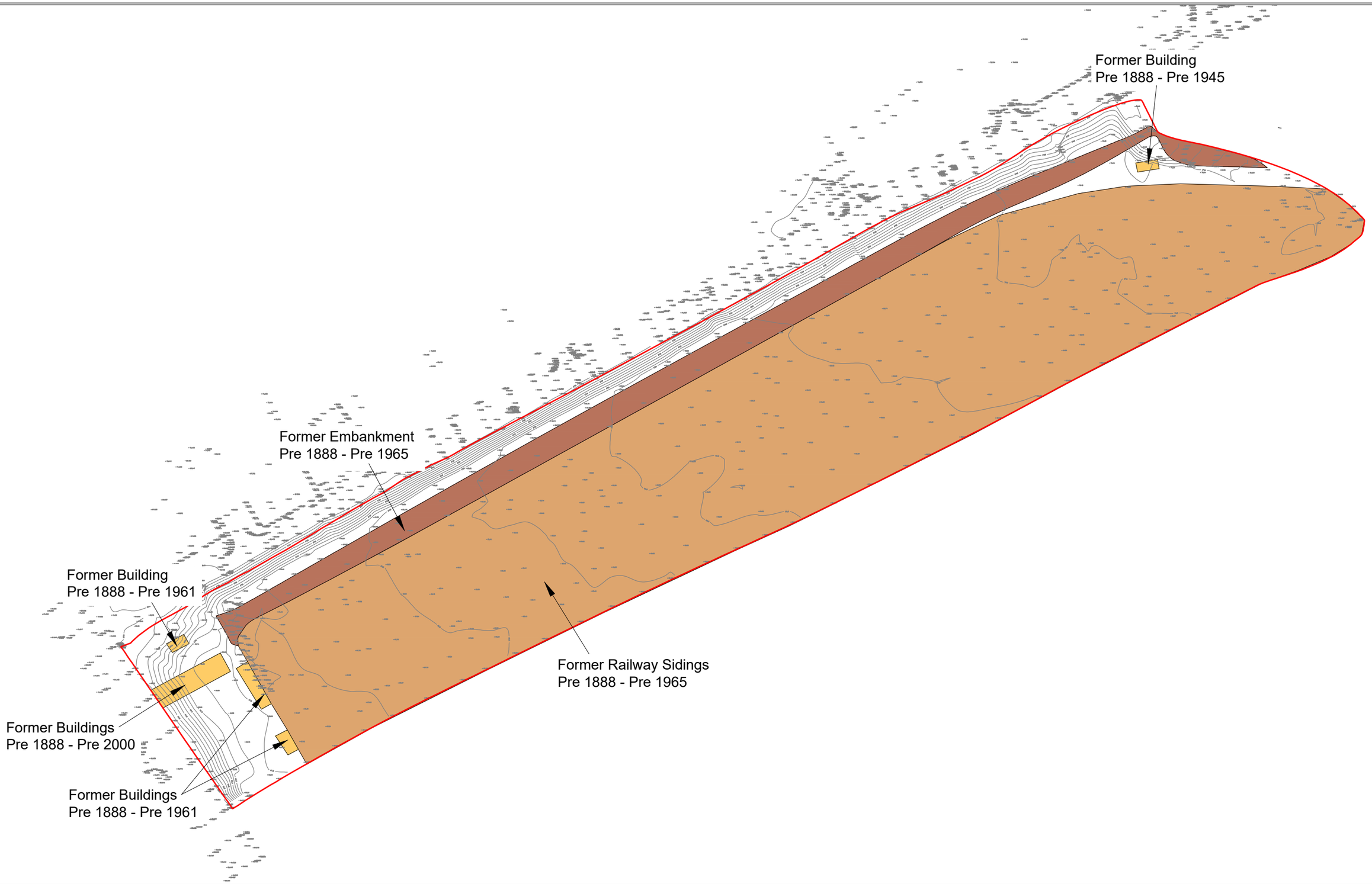
e3p
Environmental Engineering Partnership Ltd
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Urmston, Manchester, M41 7JQ
Tel: 0161 707 9612
E-mail: info@e3p.co.uk
Website: www.e3p.co.uk

Phase	Issue	Date	Drawn	Checked	PM
P1	REVA	11.04.2024	OW	HM	ND

Job Title: Pitsford Road, Manchester

Drawing Title: Proposed Development Plan

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Historical Features

- Former Buildings
- Former Railway Sidings
- Former Embankment

Notes:

P1	REVA	11.04.2024	OW	HM	ND
Phase	Issue	Date	Drawn	Checked	PM

Client: Bellway Homes

Job No: 17-302

Date: 11.04.2024

Drawing No: 003

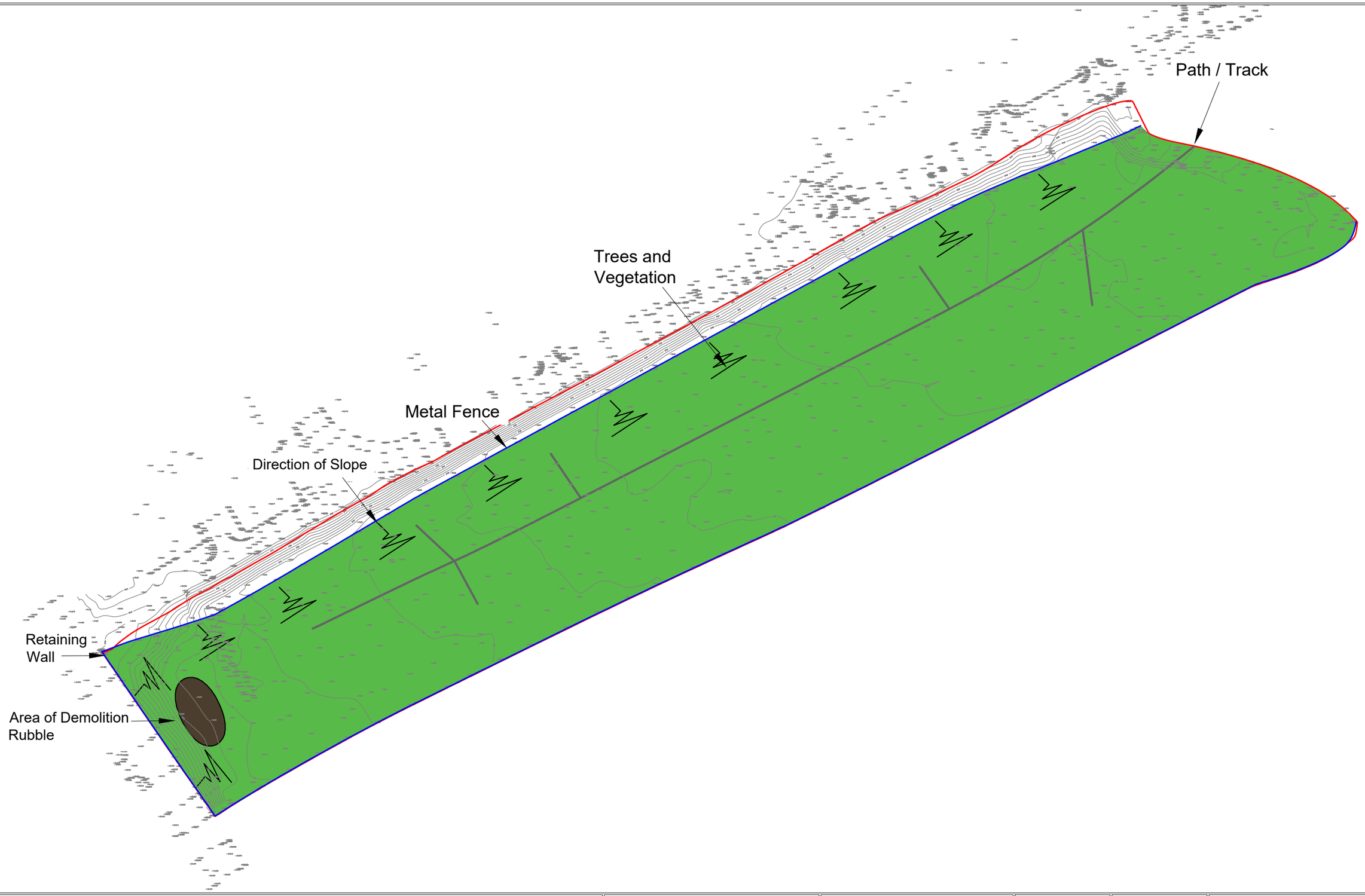
Scale: NTS @ A3

Job Title: Pitsford Road, Manchester

Drawing Title: Historical Features Plan

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Site Features

- Trees and Vegetation
- Path and Track
- Metal Fence
- Retaining Wall
- Knotweed
- Demolition Rubble
- Slope Direction

Notes:

P1	REVA	11.04.2024	OW	HM	ND
Phase	Issue	Date	Drawn	Checked	PM

Client: Bellway Homes

Job No: 17-302

Date: 11.04.2024

Drawing No: 004

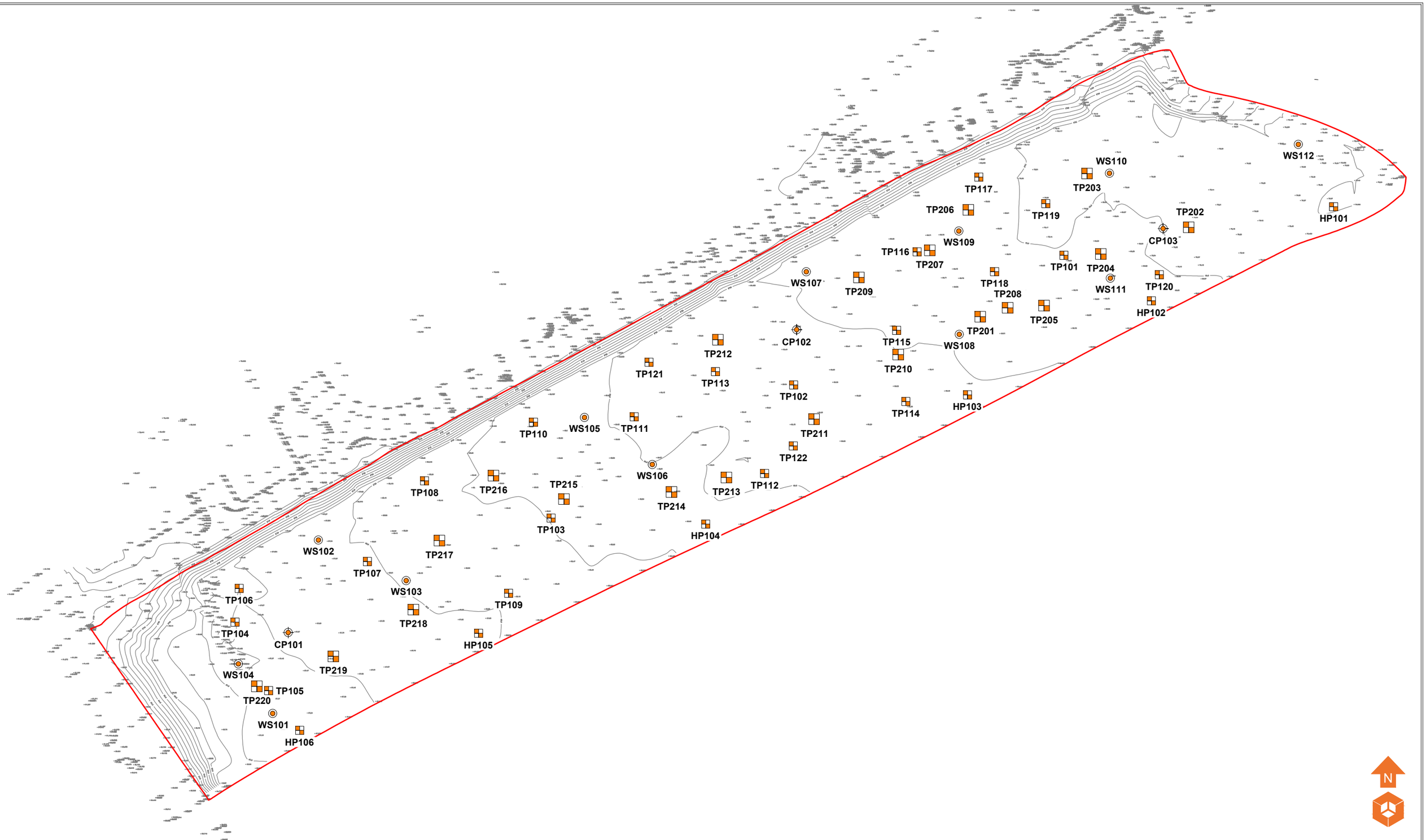
Scale: NTS @ A3

Job Title: Pitsford Road, Manchester

Drawing Title: Site Features Plan

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Location Symbols

- Approximate Trial Pit Location (E3P Locations - February 2024)
- Proposed Window Sample Probehole Location (E3P Locations - Novemver 2022)
- Proposed Trial Pit Location (E3P Locations - Novemver 2022)
- Proposed Hand Pit Location (E3P Locations - Novemver 2022)
- Proposed Cable Percussive Borehole Location (E3P Locations - Novemver 2022)

Notes:

P1	REVA	08.04.2024	OW	HM	ND
Phase	Issue	Date	Drawn	Checked	PM

Client: Bellway Homes

Job No: 17-302

Date: 08.04.2024

Drawing No: 005

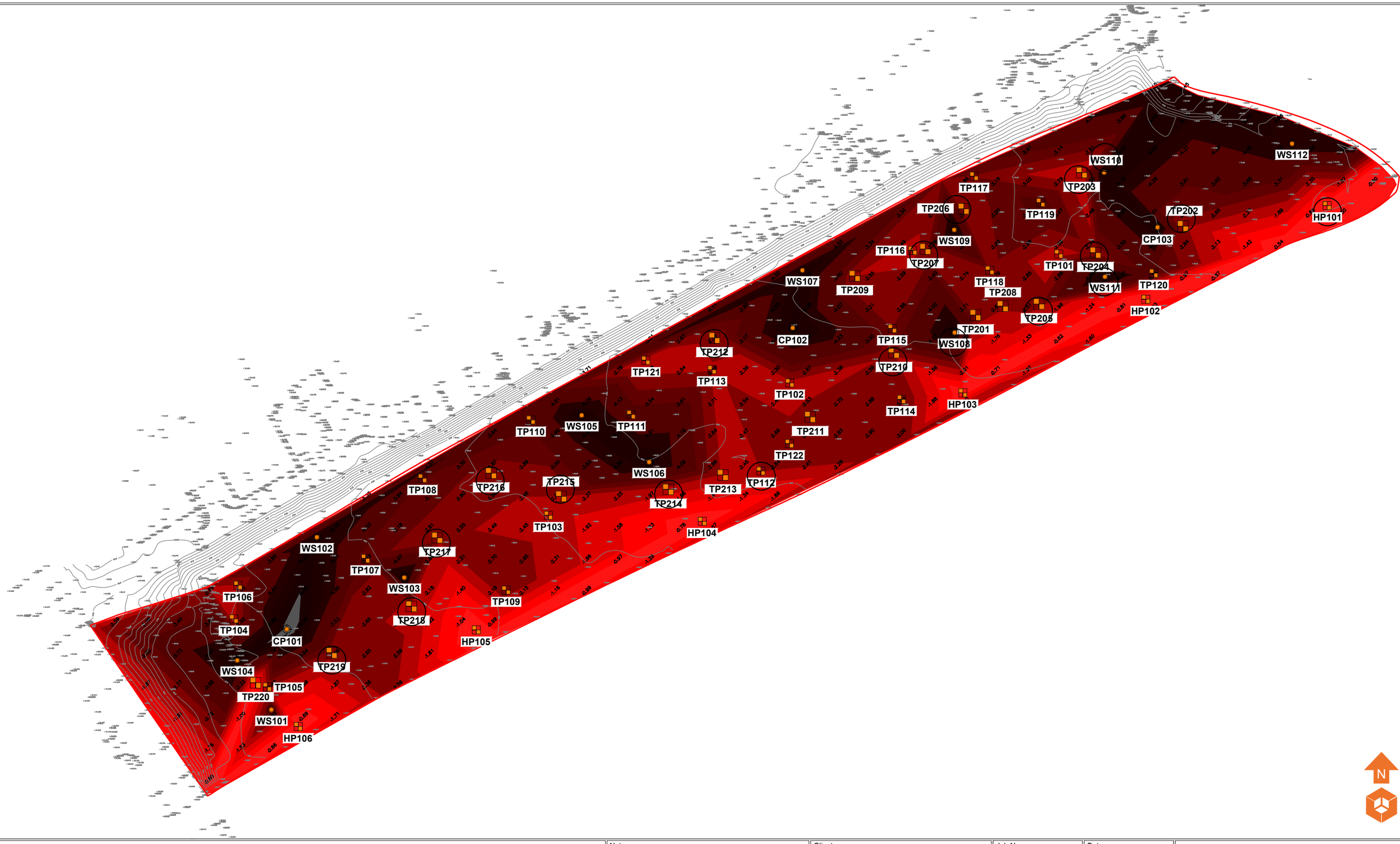
Scale: NTS @ A3

Job Title: Pitsford Road, Manchester

Drawing Title: Exploratory Hole Location Plan

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Location Symbols

- TP101 — Approximate Trial Pit Location (E3P Locations - February 2024)
- WS101 — Approximate Window Sample Probehole Location (E3P Locations - Novemver 2022)
- TP101 — Approximate Trial Pit Location (E3P Locations - Novemver 2022)
- HP101 — Approximate Hand Pit Location (E3P Locations - Novemver 2022)
- CP101 — Approximate Cable Percussive Borehole Location (E3P Locations - Novemver 2022)
- Depth to Made Ground Not Proven

Made Ground Depth (m)

- Depth of Made Ground 0.00 - 0.40m
- Depth of Made Ground 0.50 - 0.99m
- Depth of Made Ground 1.00 - 1.49m
- Depth of Made Ground 1.50 - 1.99m
- Depth of Made Ground 2.00 - 2.49m
- Depth of Made Ground 2.50 - 2.99m
- Depth of Made Ground 3.00 - 3.99m
- Depth of Made Ground > 4.00m

Notes:

Phase	Issue	Date	Drawn	Checked	PM
P1	REVA	09.04.2024	OW	HM	ND

Client: Bellway Homes

Job No: 17-302

Date: 09.04.2024

Drawing No: 006

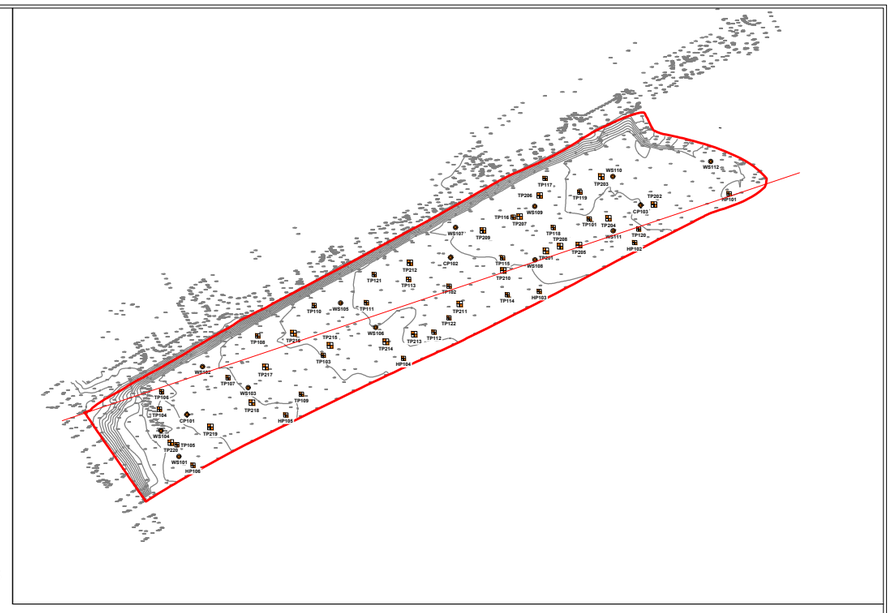
Scale: NTS @ A3

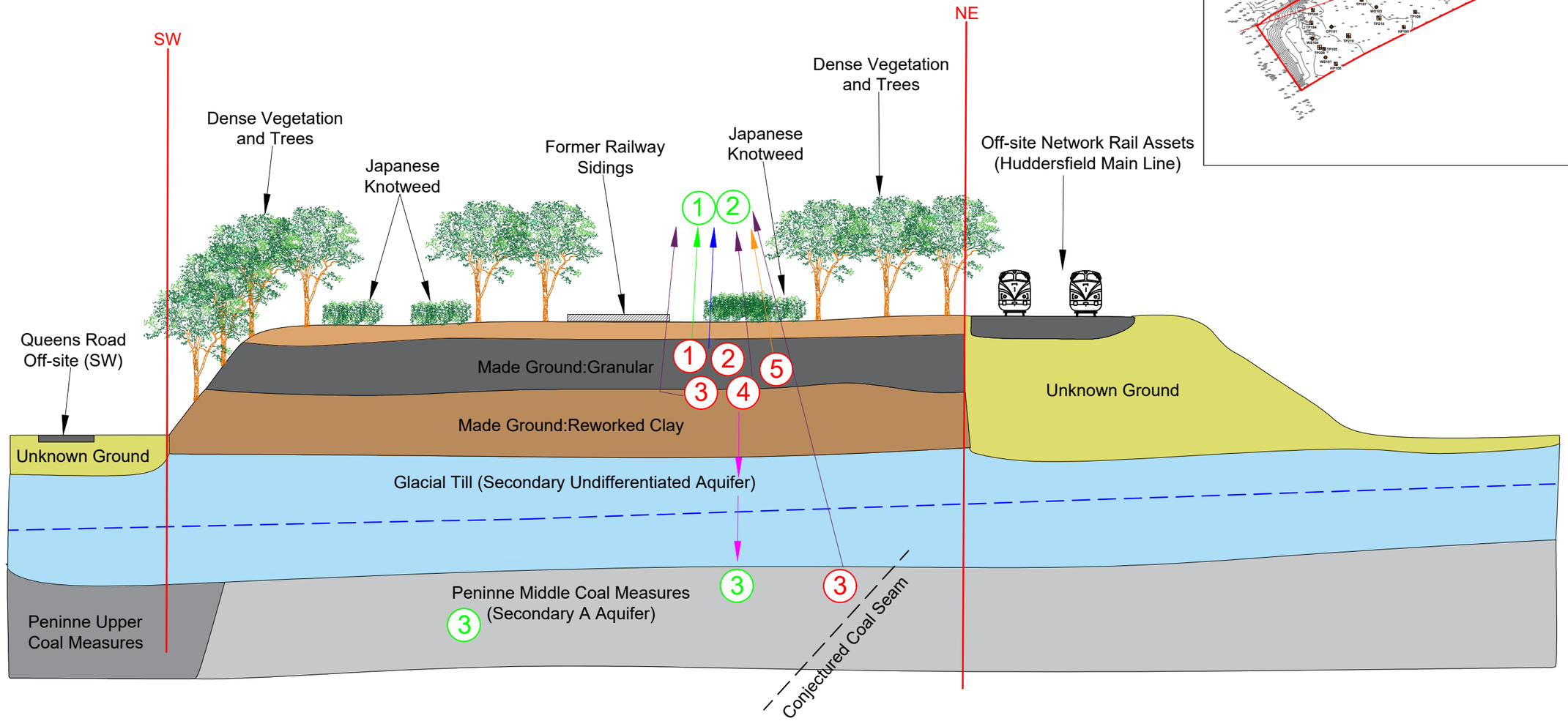
Job Title: Pitsford Road, Manchester

Drawing Title: Depth of Made Ground Plan

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Sources

1. Asbestos (Made Ground)
2. Metals/PAHs
3. Ground Gas (Made Ground and Coal Workings)
4. Volatile Contaminants (Made Ground)
5. Organic Contaminants

Pathways

- Dermal Contact / Ingestion
- Dust Inhalation
- Vapour/Gas Inhalation
- Downward Migration
- Plant Uptake
- Tainting Water Supply

Receptors

1. Future End Users
2. Construction Workers
3. Secondary A Aquifer (Bedrock)
4. Flora/Vegetation
5. Potable Water Supply

Notes:

Phase	Issue	Date	Drawn	Checked	PM
P1	REVB	02.05.2024	OW	ND	ND
P1	REVA	11.04.2024	OW	HM	ND

Client: Bellway Homes

Job No: 17-302

Date: 02.05.2024

Drawing No: 010

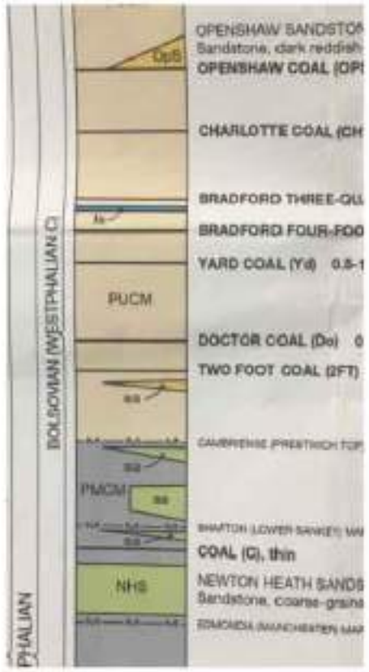
Scale: NTS

Job Title: Pitsford Road, Manchester

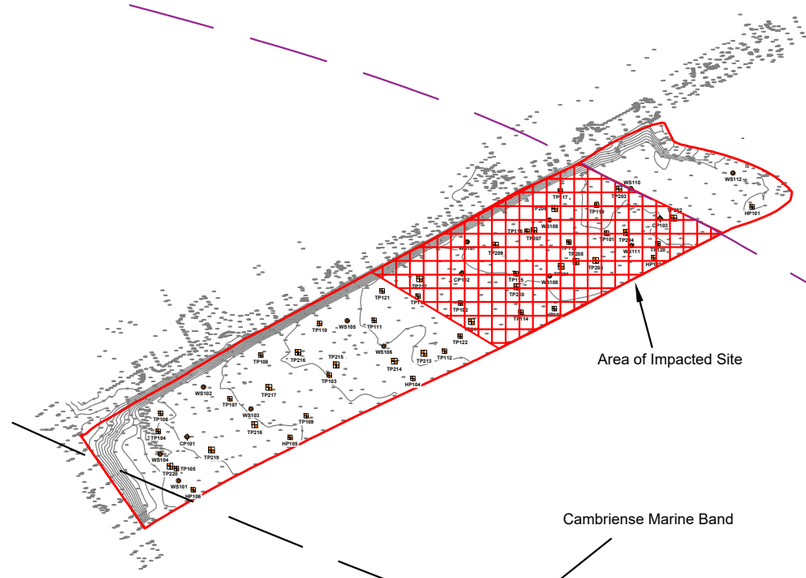
Drawing Title: Conceptual Site Model

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Generalised Vertical Section
Taken from BGS Sheet SJ89NE



Cambriense Marine Band

Two Foot Mine

Bradford Four Foot

20°

25°

N

Coal Mining

- Dip and Direction
- Area of Impact
- Coal Seam
- Marine Band

Notes:

Phase	Issue	Date	Drawn	Checked	PM
P1	REVA	03.05.2024	OW	ND	ND

Client: Bellway Homes

Job No: 17-302

Date: 03.05.2024

Drawing No: 011

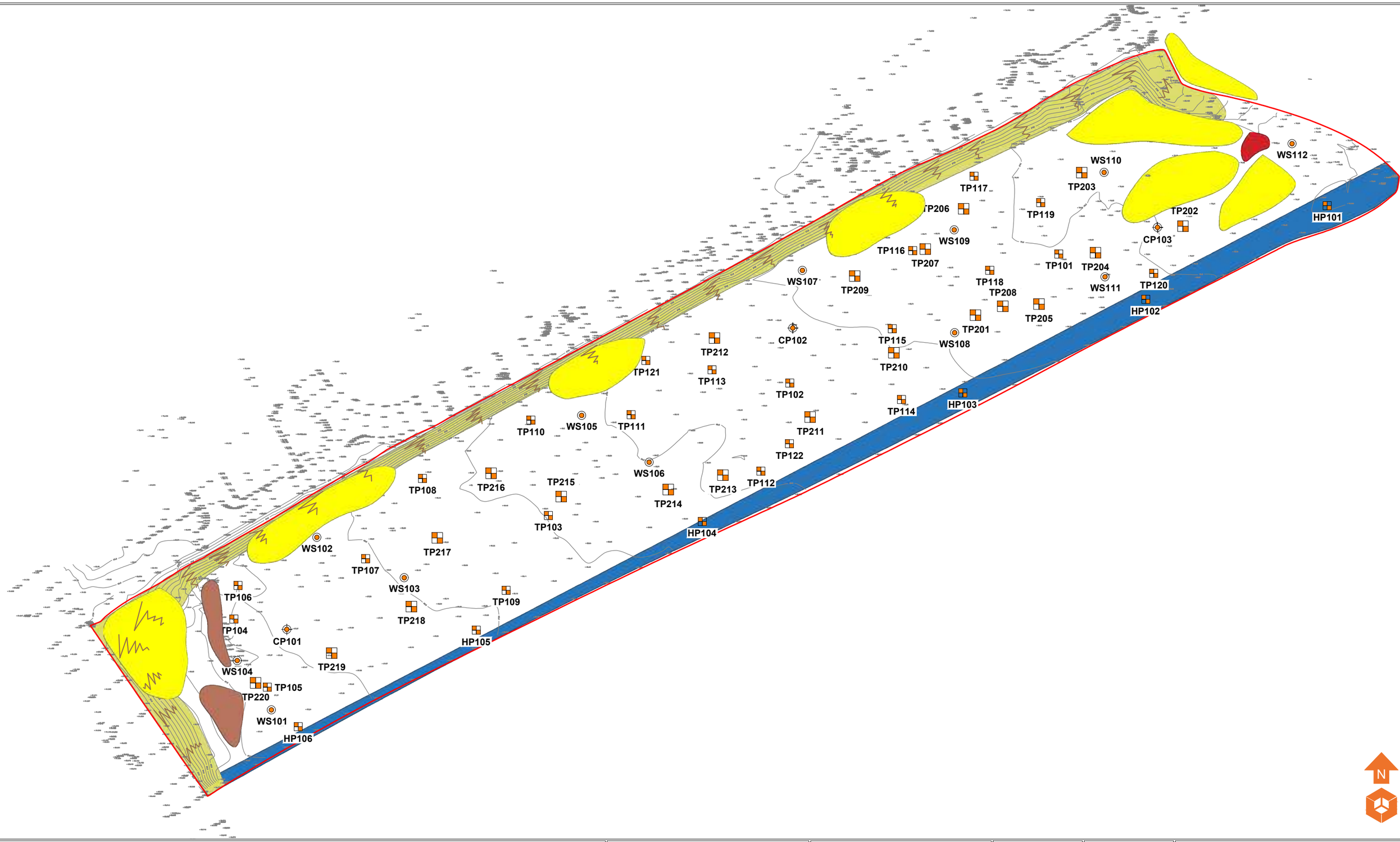
Scale: NTS @ A3

Job Title: Pitsford Road, Manchester

Drawing Title: Coal Mining Issues Plan

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Location Symbols

- Approximate Trial Pit Location (E3P Locations - February 2024)
- Approximate Window Sample Probehole Location (E3P Locations - Novemver 2022)
- Approximate Trial Pit Location (E3P Locations - Novemver 2022)
- Approximate Hand Pit Location (E3P Locations - Novemver 2022)
- Approximate Cable Percussive Borehole Location (E3P Locations - Novemver 2022)

Development Constraints

- Bounding with Network Rail Assets
- Slope/Embankment
- Japanese Knotweed
- Rubble/Relic Buildings
- Asbestos Sheeting

Notes:

Client: Bellway Homes

Job No: 17-302

Date: 02.05.2024

Drawing No: 015

Scale: NTS @ A3

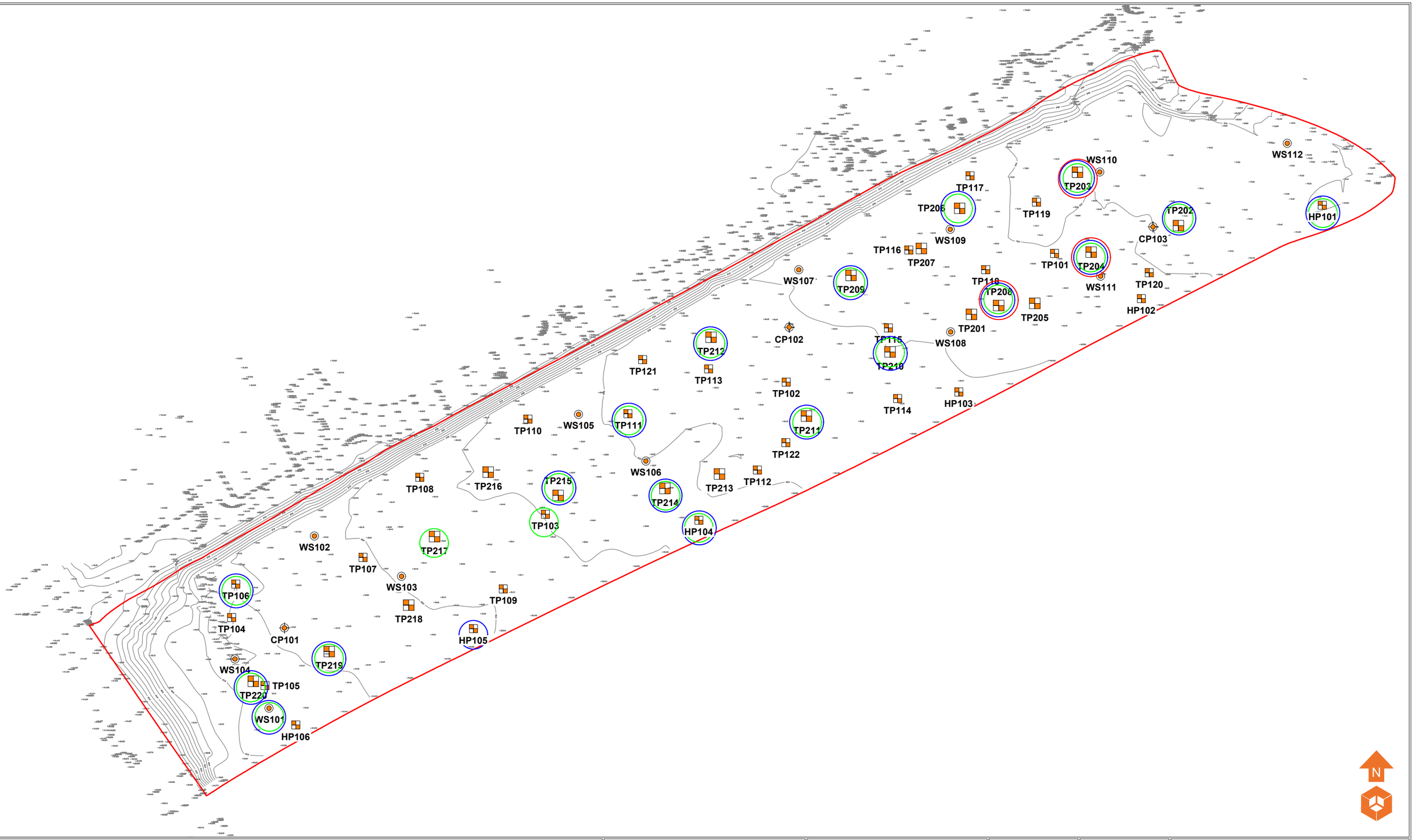
Phase	Issue	Date	Drawn	Checked	PM
P1	REVB	02.05.2024	OW	ND	ND
P1	REVA	11.04.2024	OW	HM	ND

Job Title: Pitsford Road, Manchester

Drawing Title: Development Constraints Plan

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Location Symbols

- TP101 — Approximate Trial Pit Location (E3P Locations - February 2024)
- WS101 — Approximate Window Sample Probehole Location (E3P Locations - Novemver 2022)
- TP101 — Approximate Trial Pit Location (E3P Locations - Novemver 2022)
- HP101 — Approximate Hand Pit Location (E3P Locations - Novemver 2022)
- CP101 — Approximate Cable Percussive Borehole Location (E3P Locations - Novemver 2022)

Contamination Exceedances

- Heavy Metals
- Asbestos (0.003% - 0.077%)
- Non Volatile PAH

Notes:

P1	REVB	07.05.2024	OW	ND	ND
P1	REVA	09.04.2024	OW	HM	ND
Phase	Issue	Date	Drawn	Checked	PM

Client: Bellway Homes

Job No: 17-302

Date: 07.05.2024

Drawing No: 018

Scale: NTS @ A3

Job Title: Pitsford Road, Manchester

Drawing Title: Contamination Exceedances Plan

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APPENDIX V
PHOTOGRAPHS

PLATE 1 SITE ENTRANCE



PLATE 2 KNOTWEED ALONG NORTHERN BOUNDARY



PLATE 3 VEGETATION CLEARANCE TO CREATE ACCESS AROUND SITE



PLATE 4 SOUTHERN BOUNDARY



APPENDIX VI
EXPLORATORY HOLE LOGS



Trial Pit Log

TrialPit No: TP201
Sheet 1 of 1

Project Name: Pitsford Road	Project No. 17302	Co-ords: - Level:	Date 29/02/2024
Location: Manchester		Dimensions (m): 2.20 × 0.80, Depth 2.80	Scale 1:30
Client: Bellway Homes Manchester			Logged G.Calvert

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.20			MADE GROUND: Brown mottled grey slightly gravelly slightly sandy clay. Gravel is fine to medium subangular to subrounded of sandstone, mudstone and coal with rare fragments of brick. (Reworked clay).
				1.00			MADE GROUND: Black gravelly fine to medium sand. Gravel is fine to medium subangular to subrounded of sandstone, mudstone and coal with frequent fragments of brick, concrete, ash, glass, timber, paper, plastic and slag.
	1.40	HVP	71				MADE GROUND: Stiff brown mottled grey slightly gravelly sandy clay. Gravel is fine, subangular to subrounded of sandstone and coal with rare fragments of brick and concrete. (Reworked clay).
	1.90	HVP	106				
	2.50	HVP	109				
				2.80			End of Pit at 2.80m

1
2
3
4

Trial Pit Photographs



Trial Pit 201



Trial Pit 201 Spoil

Remarks: 1. Complete. 2. What3Words Location: ///tend.moss.roses

Stability: Stable

Trial Pit Log

TrialPit No TP202
Sheet 1 of 1

Project Name: Pitsford Road	Project No. 17302	Co-ords: - Level:	Date 29/02/2024
Location: Manchester		Dimensions (m): 2.20 × 0.80 Depth 2.60	Scale 1:30
Client: Bellway Homes Manchester			Logged G.Calvert

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.20			MADE GROUND: Black slightly clayey slightly gravelly fine to medium sand with rootlets. Gravel is fine, subangular to subrounded of sandstone and mudstone with fragments of brick and clinker.
				0.90			MADE GROUND: Black gravelly fine to medium sand. Gravel is fine, subangular to subrounded of sandstone, mudstone and rare coal with fragments of ash, slag, clinker, concrete, brick and plastic.
				1.30			MADE GROUND: Brown mottled grey slightly gravelly sandy clay. Gravel is fine to medium, subangular to subrounded of sandstone, mudstone and coal with rare fragments of brick and concrete. (Reworked clay).
				2.60			MADE GROUND: Black gravelly fine to medium sand. Gravel is fine, subangular to subrounded of sandstone, mudstone and rare coal with fragments of ash, slag, clinker, concrete, brick and plastic.
							End of Pit at 2.60m

1
2
3
4

Trial Pit Photographs



Trial Pit 202



Trial Pit 202 Spoil

Remarks: 1. Complete. 2. What3Words Location: ///lion.bonus.email

Stability: Stable

Trial Pit Log

TrialPit No: TP203
Sheet 1 of 1

Project Name: Pitsford Road	Project No. 17302	Co-ords: - Level:	Date 29/02/2024
Location: Manchester		Dimensions (m): 2.20 × 0.80, Depth 2.00	Scale 1:30
Client: Bellway Homes Manchester			Logged G.Calvert

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.20			MADE GROUND: Black gravelly fine to medium sand. Gravel is fine, subangular to subrounded of sandstone, mudstone and coal with fragments of ash, clinker, ceramic, plastic and timber.
							MADE GROUND: Black gravelly fine to medium sand. Gravel is fine, subangular to subrounded of sandstone, mudstone and coal with frequent fragments of clinker, ash, brick and ceramic.
				1.50			MADE GROUND: Brown mottled grey slightly gravelly sandy clay. Gravel is fine, subangular to subrounded of sandstone and mudstone with rare fragments of brick. (Reworked clay).
				2.00			End of Pit at 2.00m

1
2
3
4

Trial Pit Photographs



Trial Pit 203



Trial Pit 203 Spoil

Remarks: 1. Complete. 2. What3Words Location: ///battle.pigs.almost

Stability: Stable

Trial Pit Log

TrialPit No: TP204
Sheet 1 of 1

Project Name: Pitsford Road	Project No. 17302	Co-ords: - Level:	Date 29/02/2024
Location: Manchester		Dimensions (m): 2.20 × 0.80, Depth 2.70	Scale 1:30
Client: Bellway Homes Manchester			Logged G.Calvert

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.20			MADE GROUND: Black gravelly fine to medium sand. Gravel is fine, subangular to subrounded of sandstone, mudstone and coal with fragments of ash, clinker, ceramic, plastic and timber.
				0.95			MADE GROUND: Black gravelly fine to medium sand. Gravel is fine to medium, subangular to subrounded of sandstone, mudstone, and coal with fragments of ash, clinker, brick, slag, plastic, and rare glass.
	1.30	HVP	90				MADE GROUND: Brown mottled grey slightly gravelly sandy clay. Gravel is fine to medium, subangular to subrounded of sandstone, mudstone, and coal with rare fragments of brick and concrete.
	1.70	HVP	104				
	2.30	HVP	109				
	2.60	HVP	103				
				2.70			End of Pit at 2.70m

1
2
3
4

Trial Pit Photographs



Trial Pit 204



Trial Pit 204 Spoil

Remarks: 1. Complete. 2. What3Words Location: ///limp.class.pets

Stability: Stable

Trial Pit Log

TrialPit No: TP205
Sheet 1 of 1

Project Name: Pitsford Road	Project No. 17302	Co-ords: - Level:	Date 29/02/2024
Location: Manchester		Dimensions (m): 2.20 × 0.80, Depth 2.60	Scale 1:30
Client: Bellway Homes Manchester			Logged G.Calvert

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.20			MADE GROUND: Dark brown gravelly slightly clayey fine to medium sand with rootlets. Gravel is fine, subangular to subrounded of sandstone with fragments of clinker, brick, timber and ash.
				1.30			MADE GROUND: Dark brownish black gravelly fine to medium sand. Gravel is fine to medium, subangular to subrounded of sandstone, mudstone and coal with fragments of brick, timber, concrete, rubber, glass, ash, clinker and metal.
	1.60	HVP	62				MADE GROUND: Brown mottled grey slightly gravelly sandy clay. Gravel is fine to medium, subangular to subrounded of sandstone, mudstone, and coal with rare fragments of brick and concrete.
	2.00	HVP	73				MADE GROUND: Firm dark brown mottled grey slightly gravelly sandy clay. Gravel is fine, subangular to subrounded of sandstone, mudstone and coal with fragments of brick and ash. (Reworked clay).
	2.40	HVP	43				
				2.60			End of Pit at 2.60m
				2.70			

1
2
3
4

Trial Pit Photographs



Trial Pit 205



Trial Pit 205 Spoil

Remarks: 1. Complete. 2. What3Words Location: ///locals.woke.epic

Stability: Stable

Trial Pit Log

TrialPit No: TP206
Sheet 1 of 1

Project Name: Pitsford Road	Project No. 17302	Co-ords: - Level:	Date 29/02/2024
Location: Manchester		Dimensions (m): 2.20 × 0.80, Depth 2.60	Scale 1:30
Client: Bellway Homes Manchester			Logged G.Calvert

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.20			MADE GROUND: Black gravelly fine to medium sand. Gravel is fine, subangular to subrounded of sandstone, mudstone and coal with fragments of ash, clinker, ceramic, plastic and timber.
				1.50			MADE GROUND: Black gravelly fine to medium sand. Gravel is fine to medium, subangular to subrounded of sandstone, mudstone, and coal with fragments of ash, clinker, brick, slag, plastic and rare glass and ceramic. (Reworked clay).
	1.80	HVP	65				MADE GROUND: Brown mottled grey slightly gravelly sandy clay. Gravel is fine, subangular to subrounded of sandstone, mudstone, and rare coal with fragments of brick and clinker.
	2.40	HVP	102				
				2.60			End of Pit at 2.60m

1
2
3
4

Trial Pit Photographs



Trial Pit 206



TrialPit 206 Spoil

Remarks: 1. Complete. 2. What3Words Location: ///pill.forced.loving

Stability: Stable

Trial Pit Log

TrialPit No: TP207
Sheet 1 of 1

Project Name: Pitsford Road	Project No. 17302	Co-ords: - Level:	Date 29/02/2024
Location: Manchester		Dimensions (m): 2.20 × 0.80, Depth 2.60	Scale 1:30
Client: Bellway Homes Manchester			Logged G.Calvert

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.20			MADE GROUND: Black gravelly fine to medium sand. Gravel is fine, subangular to subrounded of sandstone, mudstone and coal with fragments of ash, clinker, ceramic, plastic and timber.
				1.00			MADE GROUND: Black gravelly fine to medium sand. Gravel is fine, subangular to subrounded of sandstone, mudstone and coal with fragments of brick, ash, clinker, slag, ceramic and glass.
	1.30	HVP	109				MADE GROUND: Brown mottled grey slightly gravelly sandy clay. Gravel is fine, subangular to subrounded of sandstone, mudstone and coal with fragments of brick and clinker. (Reworked clay).
	1.80	HVP	138				
	2.40	HVP	133				
				2.60			End of Pit at 2.60m

1
2
3
4

Trial Pit Photographs



Trial Pit 207



Trial Pit 207 Spoil

Remarks: 1. Complete. 2. What3Words Location: ///driven.think.mile

Stability: Stable

Trial Pit Log

TrialPit No: TP208
Sheet 1 of 1

Project Name: Pitsford Road	Project No. 17302	Co-ords: - Level:	Date 29/02/2024
Location: Manchester		Dimensions (m): 2.20 × 0.80, Depth 2.60	Scale 1:30
Client: Bellway Homes Manchester			Logged G.Calvert

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.20			MADE GROUND: Black gravelly fine to medium sand. Gravel is fine, subangular to subrounded of sandstone, mudstone and coal with fragments of ash, clinker, ceramic, plastic and timber.
				1.00			MADE GROUND: Black gravelly fine to medium sand. Gravel is fine to medium, subangular to subrounded of sandstone, mudstone and coal with fragments of ash, clinker, brick, slag, plastic, and rare glass.
	1.30	HVP	77				MADE GROUND: Brown slightly gravelly sandy clay. Gravel is fine, subangular to subrounded of sandstone and rare coal with fragments of brick and concrete. (Reworked clay).
	1.60	HVP	100	1.90			MADE GROUND: Dark brown gravelly fine to medium sand. Gravel is fine to medium, subangular to subrounded of sandstone, mudstone and coal with fragments of ash, clinker, brick, slag, plastic, and glass.
				2.60			End of Pit at 2.60m

1
2
3
4

Trial Pit Photographs



Trial Pit 208



Trial Pit 208 Spoil

Remarks: 1. Complete. 2. What3Words Location: ///pepper.boil.loose

Stability: Stable

Trial Pit Log

TrialPit No: TP209
Sheet 1 of 1

Project Name: Pitsford Road	Project No. 17302	Co-ords: - Level:	Date 29/02/2024
Location: Manchester		Dimensions (m): 2.20 × 0.80, Depth 2.50	Scale 1:30
Client: Bellway Homes Manchester			Logged G.Calvert

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.20			MADE GROUND: Black slightly clayey slightly gravelly fine to medium sand with frequent rootlets. Gravel is fine, subangular to subrounded of sandstone and mudstone with fragments of brick and clinker.
				0.70			MADE GROUND: Black gravelly fine to medium sand. Gravel is fine, subangular to subrounded of sandstone and mudstone with fragments of brick, clinker, ash and rare slag. (Slight hydrocarbon odour).
	1.10	HVP	77				MADE GROUND: Brown mottled grey slightly gravelly sandy clay. Gravel is fine to medium, subangular to subrounded of sandstone, mudstone and coal with rare fragments of brick, clinker, and plastic. (Reworked clay).
	1.50	HVP	147				
	2.10	HVP	123				
				2.50			End of Pit at 2.50m

1
2
3
4

Trial Pit Photographs



Trial Pit 209



Trial Pit 209 Spoil

Remarks: 1. Complete. 2. Hydrocarbon odour between 0.70 - 2.50 m bgl. 3. What3Words Location: /// stale.limp.shots

Stability: Stable

Trial Pit Log

TrialPit No: TP210
Sheet 1 of 1

Project Name: Pitsford Road	Project No. 17302	Co-ords: - Level:	Date 29/02/2024
Location: Manchester		Dimensions (m): 2.20 × 0.80, Depth 2.55	Scale 1:30
Client: Bellway Homes Manchester			Logged G.Calvert

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.30			MADE GROUND: Black slightly clayey slightly gravelly fine to medium sand with rootlets. Gravel is fine, subangular to subrounded of sandstone with fragments of clinker. (Reworked Topsoil).
				1.00			MADE GROUND: Black gravelly fine to medium sand. Gravel is fine, subangular to subrounded of sandstone, mudstone coal with fragments of ash, clinker and brick.
	1.40	HVP	114				MADE GROUND: Brown mottled grey slightly gravelly slightly sandy clay. Gravel is fine, subangular of sandstone and coal with rare fragments of clinker. (Reworked clay).
	1.90	HVP	123				
	2.30	HVP	131				
				2.55			End of Pit at 2.55m

1
2
3
4

Trial Pit Photographs



Trial Pit 210



Trial Pit 210 Spoil

Remarks: 1. Complete. 2. What3Words Location: ///hood.speaks.shin

Stability: Stable

Trial Pit Log

TrialPit No: TP211
Sheet 1 of 1

Project Name: Pitsford Road	Project No. 17302	Co-ords: - Level:	Date 01/03/2024
Location: Manchester		Dimensions (m): 2.20 × 0.80, Depth 2.70	Scale 1:30
Client: Bellway Homes Manchester			Logged G.Calvert

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				2.70			MADE GROUND: Black gravelly fine to medium sand. Gravel is fine, subangular to subrounded of sandstone, mudstone and coal with fragments of ash, clinker, ceramic, plastic, timber, shells and slag. Lenses of clayey fine to medium sand.
							End of Pit at 2.70m

1
2
3
4

Trial Pit Photographs



Trial Pit 211



Trial Pit 211 Spoil

Remarks: 1. Complete. 2. What3Words Location: ///ample.blend.jolly

Stability: Stable

Trial Pit Log

TrialPit No: TP212
Sheet 1 of 1

Project Name: Pitsford Road	Project No. 17302	Co-ords: - Level:	Date 01/03/2024
Location: Manchester		Dimensions (m): 2.20 × 0.80, Depth 2.65	Scale 1:30
Client: Bellway Homes Manchester			Logged G.Calvert

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.90			MADE GROUND: Black slightly clayey gravelly fine to medium sand. Gravel is fine to medium, subangular to subrounded of sandstone, mudstone and coal with fragments of ash, clinker and brick.
	1.20	HVP	84				MADE GROUND: Brown mottled grey slightly gravelly slightly sandy clay. Gravel is fine, subangular to subrounded of sandstone, mudstone, coal with rare fragments of brick. (Reworked clay).
	1.60	HVP	87				MADE GROUND: Brown mottled grey slightly gravelly slightly sandy clay. Gravel is fine, subangular to subrounded of sandstone, mudstone and coal with rare fragments of brick. (Reworked clay).
	2.10	HVP	103				
	2.50	HVP	114	2.50			
				2.65			End of Pit at 2.65m

1
2
3
4

Trial Pit Photographs



Trial Pit 212



Trial Pit 212 Spoil

Remarks: 1. Complete. 2. What3Words Location: ///vase.task.common

Stability: Stable

Trial Pit Log

TrialPit No: TP213
Sheet 1 of 1

Project Name: Pitsford Road	Project No. 17302	Co-ords: - Level:	Date 01/03/2024
Location: Manchester		Dimensions (m): 2.20 × 0.80, Depth 2.40	Scale 1:30
Client: Bellway Homes Manchester			Logged G.Calvert

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.20			MADE GROUND: Dark grey slightly clayey slightly gravelly fine to medium sand with occasional rootlets. Gravel is fine subangular to subrounded fragments of ash and clinker.
							MADE GROUND: Black slightly gravelly fine to medium sand. Gravel is fine, subangular to subrounded of sandstone, mudstone and coal with fragments of brick, clinker, ash, timber, plastic and ceramic. Rare clay nodule of brown mottled grey clay.
				2.40			End of Pit at 2.40m

1
2
3
4

Trial Pit Photographs



Trial Pit 213



Trial Pit 213 Spoil

Remarks: 1. Complete. 2. What3Words Location: ///smart.those.bikes

Stability: Stable

Trial Pit Log

TrialPit No: TP214
Sheet 1 of 1

Project Name: Pitsford Road	Project No. 17302	Co-ords: - Level:	Date 01/03/2024
Location: Manchester		Dimensions (m): 2.20 × 0.80 Depth 2.20	Scale 1:30
Client: Bellway Homes Manchester			Logged G.Calvert

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
							MADE GROUND: Black slightly clayey gravelly fine to medium sand with occasional roots and rootlets. Gravel is fine, subangular to subrounded of sandstone and coal with frequent fragments of clinker, ash, brick, plastic, ceramic, glass, and concrete.
				2.20			End of Pit at 2.20m

1
2
3
4

Trial Pit Photographs



Trial Pit 214



Trial Pit 214 Spoil

Remarks: 1. Terminated due to instability. 2. What3Words Location: ///older.search.rounds

Stability: Unstable

Trial Pit Log

TrialPit No: TP215
Sheet 1 of 1

Project Name: Pitsford Road	Project No. 17302	Co-ords: - Level:	Date 01/03/2024
Location: Manchester		Dimensions (m): 2.20 × 0.80, Depth 2.50	Scale 1:30
Client: Bellway Homes Manchester			Logged G.Calvert

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.15			MADE GROUND: Black slightly gravelly slightly clayey fine to medium sand with occasional rootlets. Gravel is fine, subangular to subrounded of sandstone and mudstone and fragments of ash and clinker.
				0.90			MADE GROUND: Black gravelly fine to medium sand. Gravel is fine, subangular to subrounded of sandstone, mudstone and coal with fragments of ash, clinker, ceramic, plastic and timber.
	1.50	HVP	84	1.70			MADE GROUND: Brown mottled grey slightly gravelly slightly sandy clay. Gravel is fine, subangular to subrounded of sandstone, mudstone and coal with rare fragments of brick. (Reworked clay).
				2.50			MADE GROUND: Black gravelly fine to medium sand. Gravel is fine, subangular to subrounded of sandstone, mudstone and coal with fragments of ash, clinker, ceramic, plastic, timber, and glass. Lenses of light grey fine to medium sand.
							End of Pit at 2.50m

1
2
3
4

Trial Pit Photographs



Trial Pit 215



Trial Pit 215 Spoil

Remarks: 1. Complete. 2. What3Words Location: ///races.outer.pizza

Stability: Stable

Trial Pit Log

TrialPit No: TP216
Sheet 1 of 1

Project Name: Pitsford Road	Project No. 17302	Co-ords: - Level:	Date 01/03/2024
Location: Manchester		Dimensions (m): 2.20 × 0.80, Depth 2.75	Scale 1:30
Client: Bellway Homes Manchester			Logged G.Calvert

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.20			MADE GROUND: Black slightly clayey slightly gravelly fine to medium sand with occasional rootlets. Gravel is fine, subangular to subrounded of sandstone and mudstone with fragments of clinker and ash.
							MADE GROUND: Black gravelly fine to medium sand. Gravel is fine, subangular to subrounded of sandstone, mudstone and coal with frequent fragments of brick, clinker, ash, slag and ceramic.
				1.60			
	1.80	HVP	72				MADE GROUND: Brown mottled grey slightly gravelly sandy clay. Gravel is fine, subangular to subrounded of sandstone, mudstone and coal with rare fragments of brick. (Reworked clay).
	2.10	HVP	88				
	2.60	HVP	82				
				2.75			End of Pit at 2.75m

1
2
3
4

Trial Pit Photographs



Trial Pit 216



Trial Pit 216 Spoil

Remarks: 1. Complete. 2. What3Words Location: ///rested.gross.ruled

Stability: Stable

Trial Pit Log

TrialPit No: TP217
Sheet 1 of 1

Project Name: Pitsford Road	Project No. 17302	Co-ords: - Level:	Date 01/03/2024
Location: Manchester		Dimensions (m): 2.20 × 0.80, Depth 2.60	Scale 1:30
Client: Bellway Homes Manchester			Logged G.Calvert

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.15			MADE GROUND: Black slightly clayey slightly gravelly fine to medium sand with occasional rootlets. Gravel is fine, subangular to subrounded of sandstone with fragments of concrete and brick.
				1.20			MADE GROUND: Dark grey gravelly fine to medium sand. Gravel is fine, subangular to subrounded of sandstone and mudstone with frequent fragments of ash, clinker, ceramic, timber and rare slag.
	1.50	HVP	92				MADE GROUND: Brown slightly gravelly sandy clay. Gravel is fine, subangular to subrounded of sandstone, mudstone and coal with rare fragments of brick. (Reworked clay).
	1.80	HVP	110				
	2.30	HVP	36				
				2.60			End of Pit at 2.60m

1
2
3
4

Trial Pit Photographs



Trial Pit 217



Trial Pit 217 Spoil

Remarks: 1. Complete. 2. What3Words Location: ///amber.plants.oddly

Stability: Stable

Trial Pit Log

TrialPit No: TP218
Sheet 1 of 1

Project Name: Pitsford Road	Project No. 17302	Co-ords: - Level:	Date 01/03/2024
Location: Manchester		Dimensions (m): 2.20 × 0.80, Depth 2.40	Scale 1:30
Client: Bellway Homes Manchester			Logged G.Calvert

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.15			MADE GROUND: Black slightly gravelly fine to medium sand. Gravel is fine, subangular to subrounded of sandstone with occasional rootlets and frequent fragments of ash.
				0.90			MADE GROUND: Black gravelly fine to medium sand. Gravel is fine to medium, subangular to subrounded of sandstone and mudstone with frequent fragments of ash, clinker, timber, brick and rare slag.
	1.20	HVP	100				MADE GROUND: Brown mottled grey slightly gravelly sandy clay. Gravel is fine, subangular to subrounded of sandstone, mudstone and coal with rare fragments of brick. (Reworked clay).
	1.80	HVP	132				
	2.20	HVP	123				
				2.40			End of Pit at 2.40m

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2
3
4

Trial Pit Photographs



Trial Pit 218



Trial Pit 218 Spoil

Remarks: 1. Complete. 2. What3Words Location: ///brand.blame.garden

Stability: Stable

Trial Pit Log

TrialPit No: TP219
Sheet 1 of 1

Project Name: Pitsford Road	Project No. 17302	Co-ords: - Level:	Date 01/03/2024
Location: Manchester		Dimensions (m): 2.20 × 0.80, Depth 2.70	Scale 1:30
Client: Bellway Homes Manchester			Logged G.Calvert

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.20			MADE GROUND: Black slightly gravelly fine to medium sand with occasional rootlets. Gravel is fine, subangular to subrounded of sandstone and mudstone with fragments of brick, ceramic and ash.
				1.00			MADE GROUND: Black slightly gravelly fine to medium sand. Gravel is fine, subangular to subrounded of sandstone, mudstone and coal with frequent fragments of ash, clinker and rare slag, timber, ceramic and plastic.
	1.20	HVP	79				MADE GROUND: Brown mottled grey slightly gravelly slightly sandy clay. Gravel is fine, subangular to subrounded of sandstone and mudstone with rare fragments of brick. (Reworked clay).
	1.60	HVP	86				
	2.10	HVP	84				
				2.70			End of Pit at 2.70m

1 2 3 4

Trial Pit Photographs



Trial Pit 219



Trial Pit 219 Spoil

Remarks: 1. Complete. 2. What3Words Location: ///edit.fault.tolls

Stability: Stable

Trial Pit Log

TrialPit No: TP220
Sheet 1 of 1

Project Name: Pitsford Road	Project No. 17302	Co-ords: - Level:	Date 01/03/2024
Location: Manchester		Dimensions (m): 2.20 × 0.80, Depth 2.65	Scale 1:30
Client: Bellway Homes Manchester			Logged G.Calvert

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.20			MADE GROUND: Black slightly clayey slightly gravelly fine to medium sand with frequent rootlets. Gravel is fine, subangular to subrounded of sandstone and mudstone with fragments of ceramic, tile, brick and ash.
				0.90			MADE GROUND: Dark grey slightly gravelly fine to medium sand. Gravel is fine, subangular to subrounded of sandstone with fragments of brick, ash, and clinker.
	1.10	HVP	93				MADE GROUND: Stiff brown slightly gravelly slightly sandy CLAY. Gravel is fine to medium, subangular to subrounded of sandstone and mudstone. (Reworked clay).
	1.70	HVP	106				
	2.30	HVP	103				
				2.65			End of Pit at 2.65m

1
2
3
4

Trial Pit Photographs



Trial Pit 220



Trial Pit 220 Spoil

Remarks: 1. Complete. 2. What3Words Location: ///stuff.clash.jacket

Stability: Stable

APPENDIX VII
CHEMICAL TESTING RESULTS



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Analytical Report Number : 24-006499

Replaces Analytical Report Number: 24-006499, issue no. 1
Additional analysis undertaken.
Asbestos Quantification added as per clients request

Project / Site name:	Pitsford Road	**Samples received on:**	01/03/2024
Your job number:		**Samples instructed on/ Analysis started on:**	01/03/2024
Your order number:	007576	**Analysis completed by:**	13/03/2024
Report Issue Number:	2	**Report issued on:**	13/03/2024
Samples Analysed:	15 soil samples		

Signed:

Joanna Wawrzeczko
Senior Reporting Specialist
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number: 24-006499
Project / Site name: Pitsford Road
Your Order No: 007576

Lab Sample Number				132893	132894	132895	132896	132897
Sample Reference				TP203	TP204	TP204	TP206	TP208
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.60	0.10	1.10	0.80	0.40
Date Sampled				29/02/2024	29/02/2024	29/02/2024	29/02/2024	29/02/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	21	44	17	23	19
Total mass of sample received	kg	0.1	NONE	0.4	0.2	0.3	0.3	0.2
Asbestos								
Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Detected	Detected	Not-detected	Not-detected	Detected
Asbestos Analyst ID	N/A	N/A	N/A	MLO	MLO	MLO	MLO	MLO
Actinolite detected	Type	N/A	ISO 17025	Not-detected	Not-detected	-	-	Not-detected
Amosite detected	Type	N/A	ISO 17025	Not-detected	Not-detected	-	-	Not-detected
Anthophyllite detected	Type	N/A	ISO 17025	Not-detected	Not-detected	-	-	Not-detected
Chrysotile detected	Type	N/A	ISO 17025	Detected	Detected	-	-	Detected
Crocidolite detected	Type	N/A	ISO 17025	Not-detected	Not-detected	-	-	Not-detected
Tremolite detected	Type	N/A	ISO 17025	Not-detected	Not-detected	-	-	Not-detected
Asbestos % by hand picking/weighing	%	0.001	ISO 17025	0.003	0.077	-	-	0.005
Asbestos Containing Material Types Detected (ACM)	Type	N/A	ISO 17025	Loose Fibrous Debris	Loose Fibrous Debris	-	-	Loose Fibrous Debris
General Inorganics								
pH (L099)	pH Units	N/A	MCERTS	7.2	7.4	8.1	7.5	7.2
Total Cyanide	mg/kg	1	MCERTS	5.3	6.9	< 1.0	1.1	8.2
Total Sulphate as SO4	mg/kg	50	MCERTS	4800	2100	300	1400	2700
Water Soluble SO4 1hr extraction	mg/kg	2.5	MCERTS	360	70	44	110	93
Water Soluble SO4 (2:1 Leach. Equiv.) 1hr extraction	mg/l	1.25	MCERTS	179	35.1	21.8	54.7	46.3
Sulphide	mg/kg	1	MCERTS	16	4.7	< 1.0	7.4	3.6
Total Sulphur	mg/kg	50	MCERTS	2400	1800	230	2600	1600
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	5.3	-	1.1	7.3	6.4
Total Organic Carbon (TOC) – Manual	%	0.1	MCERTS	-	13	-	-	-
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	1.7	< 1.0	< 1.0	< 1.0

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

Analytical Report Number: 24-006499
Project / Site name: Pitsford Road
Your Order No: 007576

Lab Sample Number				132893	132894	132895	132896	132897
Sample Reference				TP203	TP204	TP204	TP206	TP208
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.60	0.10	1.10	0.80	0.40
Date Sampled				29/02/2024	29/02/2024	29/02/2024	29/02/2024	29/02/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	2.4	2.1	< 0.05	2.7	3.8
Acenaphthylene	mg/kg	0.05	MCERTS	0.11	0.15	< 0.05	0.17	0.22
Acenaphthene	mg/kg	0.05	MCERTS	1.3	0.75	< 0.05	1.5	1.1
Fluorene	mg/kg	0.05	MCERTS	0.99	0.46	< 0.05	1	0.85
Phenanthrene	mg/kg	0.05	MCERTS	10	6.7	0.18	11	13
Anthracene	mg/kg	0.05	MCERTS	2.3	1.6	< 0.05	2.4	3
Fluoranthene	mg/kg	0.05	MCERTS	12	11	0.17	13	17
Pyrene	mg/kg	0.05	MCERTS	11	11	0.18	13	16
Benzo(a)anthracene	mg/kg	0.05	MCERTS	6.3	5.9	0.1	6.9	9.1
Chrysene	mg/kg	0.05	MCERTS	6.9	5.9	0.15	6.8	11
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	7.5	7.4	0.16	7.6	10
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	2.9	2.5	0.05	2.2	4.2
Benzo(a)pyrene	mg/kg	0.05	MCERTS	6.5	5.8	0.12	6.2	7.9
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	3	3.3	0.06	3.2	3.8
Dibenzo(a,h)anthracene	mg/kg	0.05	MCERTS	0.94	0.82	< 0.05	0.93	1.2
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	3.4	3.5	0.08	3.5	3.9
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	77.7	68.8	1.26	-	106
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	62	56	11	72	81
Barium (aqua regia extractable)	mg/kg	1	MCERTS	650	370	140	350	370
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	2.5	0.96	1.1	2.3	1.5
Boron (water soluble)	mg/kg	0.2	MCERTS	1.3	3.3	0.5	1	0.8
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	3.6	2.6	< 0.2	4.6	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8	2.3	1.9
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	55	63	26	30	96
Copper (aqua regia extractable)	mg/kg	1	MCERTS	760	300	59	250	470
Lead (aqua regia extractable)	mg/kg	1	MCERTS	1900	370	38	1200	750
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	8	0.9	< 0.3	1.2	1.6
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	65	71	31	51	76
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	2	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	87	53	30	71	150
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	990	760	81	3900	410

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

Analytical Report Number: 24-006499
Project / Site name: Pitsford Road
Your Order No: 007576

Lab Sample Number				132893	132894	132895	132896	132897
Sample Reference				TP203	TP204	TP204	TP206	TP208
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.60	0.10	1.10	0.80	0.40
Date Sampled				29/02/2024	29/02/2024	29/02/2024	29/02/2024	29/02/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Petroleum Hydrocarbons								
TPHCWG - Aliphatic >C5 - C6 HS_1D_AL	mg/kg	0.02	NONE	-	< 0.020	-	< 0.020	-
TPHCWG - Aliphatic >C6 - C8 HS_1D_AL	mg/kg	0.02	NONE	-	< 0.020	-	< 0.020	-
TPHCWG - Aliphatic >C8 - C10 HS_1D_AL	mg/kg	0.05	NONE	-	< 0.050	-	< 0.050	-
TPHCWG - Aliphatic >C10 - C12 EH_CU_1D_AL_#1_#2	mg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
TPHCWG - Aliphatic >C12 - C16 EH_CU_1D_AL_#1_#2	mg/kg	2	MCERTS	-	< 2.0	-	2.9	-
TPHCWG - Aliphatic >C16 - C21 EH_CU_1D_AL_#1_#2	mg/kg	8	MCERTS	-	9.6	-	< 8.0	-
TPHCWG - Aliphatic >C21 - C35 EH_CU_1D_AL_#1_#2	mg/kg	8	MCERTS	-	83	-	19	-
TPHCWG - Aliphatic >C5 - C35 EH_CU+HS_1D_AL_#1_#2	mg/kg	10	NONE	-	92	-	22	-
TPHCWG - Aromatic >EC5 - EC7 HS_1D_AR	mg/kg	0.01	NONE	-	< 0.010	-	0.023	-
TPHCWG - Aromatic >EC7 - EC8 HS_1D_AR	mg/kg	0.01	NONE	-	< 0.010	-	0.011	-
TPHCWG - Aromatic >EC8 - EC10 HS_1D_AR	mg/kg	0.05	NONE	-	< 0.050	-	< 0.050	-
TPHCWG - Aromatic >EC10 - EC12 EH_CU_1D_AR_#1_#2	mg/kg	1	MCERTS	-	1.2	-	1.3	-
TPHCWG - Aromatic >EC12 - EC16 EH_CU_1D_AR_#1_#2	mg/kg	2	MCERTS	-	4.5	-	6.4	-
TPHCWG - Aromatic >EC16 - EC21 EH_CU_1D_AR_#1_#2	mg/kg	10	MCERTS	-	18	-	25	-
TPHCWG - Aromatic >EC21 - EC35 EH_CU_1D_AR_#1_#2	mg/kg	10	MCERTS	-	57	-	35	-
TPHCWG - Aromatic >EC5 - EC35 EH_CU+HS_1D_AR_#1_#2	mg/kg	10	NONE	-	81	-	67	-
TPH (>C5 - C10) HS_1D_TOTAL	mg/kg	1	NONE	< 1.0	< 1.0	< 1.0	-	< 1.0
TPH (>C5 - C6) HS_1D_TOTAL	mg/kg	0.1	NONE	< 0.1	< 0.1	< 0.1	-	< 0.1
TPH (>C6 - C8) HS_1D_TOTAL	mg/kg	1	NONE	< 1.0	< 1.0	< 1.0	-	< 1.0
TPH (>C8 - C10) HS_1D_TOTAL	mg/kg	1	NONE	< 1.0	< 1.0	< 1.0	-	< 1.0
TPH (>C10 - C12) EH_CU_1D_TOTAL_#1_#2	mg/kg	2	MCERTS	3.8	< 2.0	< 2.0	-	2
TPH (>C12 - C16) EH_CU_1D_TOTAL_#1_#2	mg/kg	4	MCERTS	16	6	< 4.0	-	13
TPH (>C16 - C21) EH_CU_1D_TOTAL_#1_#2	mg/kg	10	MCERTS	57	28	< 10	-	100
TPH (>C21 - C35) EH_CU_1D_TOTAL_#1_#2	mg/kg	10	MCERTS	140	140	< 10	-	540
TPH (>C35 - C40) EH_CU_1D_TOTAL_#1_#2	mg/kg	10	MCERTS	27	33	< 10	-	110
TPH Total >C5 - C40 EH_CU+HS_1D_TOTAL_#1_#2	mg/kg	10	NONE	250	210	< 10	-	760
TPH (C10 - C40) EH_CU_1D_TOTAL_#1_#2	mg/kg	10	MCERTS	250	210	< 10	-	760
VOCs								
Chloromethane	µg/kg	5	ISO 17025	-	< 5.0	-	< 5.0	-
Chloroethane	µg/kg	5	NONE	-	< 5.0	-	< 5.0	-
Bromomethane	µg/kg	5	ISO 17025	-	< 5.0	-	< 5.0	-
Vinyl Chloride	µg/kg	5	NONE	-	< 5.0	-	< 5.0	-
Trichlorofluoromethane	µg/kg	5	NONE	-	< 5.0	-	< 5.0	-
1,1-Dichloroethene	µg/kg	5	NONE	-	< 5.0	-	< 5.0	-
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	5	NONE	-	< 5.0	-	< 5.0	-
Trans 1,2-dichloroethylene	µg/kg	5	NONE	-	< 5.0	-	< 5.0	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	-	< 5.0	-	< 5.0	-
1,1-Dichloroethane	µg/kg	5	ISO 17025	-	< 5.0	-	< 5.0	-
2,2-Dichloropropane	µg/kg	5	NONE	-	< 5.0	-	< 5.0	-
Chloroform	µg/kg	5	ISO 17025	-	< 5.0	-	< 5.0	-
1,1,1-Trichloroethane	µg/kg	5	ISO 17025	-	< 5.0	-	< 5.0	-
1,2-Dichloroethane	µg/kg	5	ISO 17025	-	< 5.0	-	< 5.0	-
1,1-Dichloropropene	µg/kg	5	ISO 17025	-	< 5.0	-	< 5.0	-
Cis-1,2-dichloroethene	µg/kg	5	ISO 17025	-	< 5.0	-	< 5.0	-
Benzene	µg/kg	5	MCERTS	-	< 5.0	-	25	-
Carbontetrachloride	µg/kg	5	NONE	-	< 5.0	-	< 5.0	-
1,2-Dichloropropane	µg/kg	5	ISO 17025	-	< 5.0	-	< 5.0	-
Trichloroethene	µg/kg	5	ISO 17025	-	< 5.0	-	< 5.0	-
Dibromomethane	µg/kg	5	ISO 17025	-	< 5.0	-	< 5.0	-

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Analytical Report Number: 24-006499
Project / Site name: Pitsford Road
Your Order No: 007576

Lab Sample Number				132893	132894	132895	132896	132897
Sample Reference				TP203	TP204	TP204	TP206	TP208
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.60	0.10	1.10	0.80	0.40
Date Sampled				29/02/2024	29/02/2024	29/02/2024	29/02/2024	29/02/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Bromodichloromethane	µg/kg	5	ISO 17025	-	< 5.0	-	< 5.0	-
Cis-1,3-dichloropropene	µg/kg	5	ISO 17025	-	< 5.0	-	< 5.0	-
Trans-1,3-dichloropropene	µg/kg	5	ISO 17025	-	< 5.0	-	< 5.0	-
Toluene	µg/kg	5	MCERTS	-	< 5.0	-	15	-
1,1,2-Trichloroethane	µg/kg	5	ISO 17025	-	< 5.0	-	< 5.0	-
1,3-Dichloropropane	µg/kg	5	ISO 17025	-	< 5.0	-	< 5.0	-
Dibromochloromethane	µg/kg	5	ISO 17025	-	< 5.0	-	< 5.0	-
Tetrachloroethene	µg/kg	5	NONE	-	< 5.0	-	< 5.0	-
1,2-Dibromoethane	µg/kg	5	ISO 17025	-	< 5.0	-	< 5.0	-
Chlorobenzene	µg/kg	5	ISO 17025	-	< 5.0	-	< 5.0	-
1,1,1,2-Tetrachloroethane	µg/kg	5	ISO 17025	-	< 5.0	-	< 5.0	-
Ethylbenzene	µg/kg	5	MCERTS	-	< 5.0	-	< 5.0	-
p & m-Xylene	µg/kg	5	MCERTS	-	< 5.0	-	< 5.0	-
Styrene	µg/kg	5	ISO 17025	-	< 5.0	-	< 5.0	-
Bromoform	µg/kg	5	NONE	-	< 5.0	-	< 5.0	-
o-Xylene	µg/kg	5	MCERTS	-	< 5.0	-	< 5.0	-
Isopropylbenzene	µg/kg	5	ISO 17025	-	< 5.0	-	< 5.0	-
1,1,2,2-Tetrachloroethane	µg/kg	5	NONE	-	< 5.0	-	< 5.0	-
Bromobenzene	µg/kg	5	NONE	-	< 5.0	-	< 5.0	-
n-Propylbenzene	µg/kg	5	ISO 17025	-	< 5.0	-	< 5.0	-
2-Chlorotoluene	µg/kg	5	ISO 17025	-	< 5.0	-	< 5.0	-
4-Chlorotoluene	µg/kg	5	ISO 17025	-	< 5.0	-	< 5.0	-
1,3,5-Trimethylbenzene	µg/kg	5	ISO 17025	-	< 5.0	-	< 5.0	-
tert-Butylbenzene	µg/kg	5	ISO 17025	-	< 5.0	-	< 5.0	-
1,2,4-Trimethylbenzene	µg/kg	5	ISO 17025	-	< 5.0	-	< 5.0	-
sec-Butylbenzene	µg/kg	5	ISO 17025	-	< 5.0	-	< 5.0	-
1,3-Dichlorobenzene	µg/kg	5	ISO 17025	-	< 5.0	-	< 5.0	-
p-Isopropyltoluene	µg/kg	5	ISO 17025	-	< 5.0	-	< 5.0	-
1,4-Dichlorobenzene	µg/kg	5	ISO 17025	-	< 5.0	-	< 5.0	-
1,2-Dichlorobenzene	µg/kg	5	ISO 17025	-	< 5.0	-	< 5.0	-
Butylbenzene	µg/kg	5	NONE	-	< 5.0	-	< 5.0	-
1,2-Dibromo-3-chloropropane	µg/kg	5	ISO 17025	-	< 5.0	-	< 5.0	-
1,2,4-Trichlorobenzene	µg/kg	5	ISO 17025	-	< 5.0	-	< 5.0	-
Hexachlorobutadiene	µg/kg	5	NONE	-	< 5.0	-	< 5.0	-
1,2,3-Trichlorobenzene	µg/kg	5	ISO 17025	-	< 5.0	-	< 5.0	-

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	ISO 17025	-	< 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	NONE	-	< 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	-
2,4-Dichlorophenol	mg/kg	0.3	MCERTS	-	< 0.3	-	< 0.3	-

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Analytical Report Number: 24-006499
Project / Site name: Pitsford Road
Your Order No: 007576

Lab Sample Number				132893	132894	132895	132896	132897
Sample Reference				TP203	TP204	TP204	TP206	TP208
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.60	0.10	1.10	0.80	0.40
Date Sampled				29/02/2024	29/02/2024	29/02/2024	29/02/2024	29/02/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
4-Chloroaniline	mg/kg	0.1	NONE	-	< 0.1	-	< 0.1	-
Hexachlorobutadiene	mg/kg	0.1	MCERTS	-	< 0.1	-	< 0.1	-
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	-	< 0.1	-	< 0.1	-
2,4,6-Trichlorophenol	mg/kg	0.1	NONE	-	< 0.1	-	< 0.1	-
2,4,5-Trichlorophenol	mg/kg	0.2	NONE	-	< 0.2	-	< 0.2	-
2-Methylnaphthalene	mg/kg	0.1	NONE	-	1.7	-	2.1	-
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	NONE	-	< 0.1	-	< 0.1	-
2,4-Dinitrotoluene	mg/kg	0.2	NONE	-	< 0.2	-	< 0.2	-
Dibenzofuran	mg/kg	0.2	MCERTS	-	0.9	-	1	-
4-Chlorophenyl phenyl ether	mg/kg	0.3	MCERTS	-	< 0.3	-	< 0.3	-
Diethyl phthalate	mg/kg	0.2	MCERTS	-	< 0.2	-	< 0.2	-
4-Nitroaniline	mg/kg	0.2	NONE	-	< 0.2	-	< 0.2	-
Azobenzene	mg/kg	0.3	NONE	-	< 0.3	-	< 0.3	-
Bromophenyl phenyl ether	mg/kg	0.2	MCERTS	-	< 0.2	-	< 0.2	-
Hexachlorobenzene	mg/kg	0.3	MCERTS	-	< 0.20	-	< 0.20	-
Carbazole	mg/kg	0.3	MCERTS	-	0.5	-	0.4	-
Dibutyl phthalate	mg/kg	0.2	NONE	-	< 0.2	-	< 0.2	-
Anthraquinone	mg/kg	0.3	NONE	-	0.8	-	0.7	-
Butyl benzyl phthalate	mg/kg	0.3	NONE	-	< 0.3	-	< 0.3	-

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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Analytical Report Number: 24-006499
Project / Site name: Pitsford Road
Your Order No: 007576

Lab Sample Number				132898	132899	132900	132901	132902
Sample Reference				TP209	TP210	TP211	TP212	TP214
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.40	0.15	1.00	0.60	0.40
Date Sampled				29/02/2024	29/02/2024	29/02/2024	29/02/2024	29/02/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	19	19	22	19	22
Total mass of sample received	kg	0.1	NONE	1.1	0.3	0.4	0.3	0.4
Asbestos								
Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	EC	EC	EC	EC	EC
Actinolite detected	Type	N/A	ISO 17025	-	-	-	-	-
Amosite detected	Type	N/A	ISO 17025	-	-	-	-	-
Anthophyllite detected	Type	N/A	ISO 17025	-	-	-	-	-
Chrysotile detected	Type	N/A	ISO 17025	-	-	-	-	-
Crocidolite detected	Type	N/A	ISO 17025	-	-	-	-	-
Tremolite detected	Type	N/A	ISO 17025	-	-	-	-	-
Asbestos % by hand picking/weighing	%	0.001	ISO 17025	-	-	-	-	-
Asbestos Containing Material Types Detected (ACM)	Type	N/A	ISO 17025	-	-	-	-	-
General Inorganics								
pH (L099)	pH Units	N/A	MCERTS	7.1	7.4	8	6.6	6.1
Total Cyanide	mg/kg	1	MCERTS	5.8	4.7	2.1	2.9	< 1.0
Total Sulphate as SO4	mg/kg	50	MCERTS	1700	2800	2800	1600	3400
Water Soluble SO4 1hr extraction	mg/kg	2.5	MCERTS	45	66	420	84	98
Water Soluble SO4 (2:1 Leach. Equiv.) 1hr extraction	mg/l	1.25	MCERTS	22.6	32.9	210	42	48.8
Sulphide	mg/kg	1	MCERTS	3	2	4	< 1.0	17
Total Sulphur	mg/kg	50	MCERTS	1400	2300	3200	1800	2300
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	6.3	-	5.6	5.2	4.7
Total Organic Carbon (TOC) – Manual	%	0.1	MCERTS	-	9.2	-	-	-
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

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Analytical Report Number: 24-006499
Project / Site name: Pitsford Road
Your Order No: 007576

Lab Sample Number				132898	132899	132900	132901	132902
Sample Reference				TP209	TP210	TP211	TP212	TP214
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.40	0.15	1.00	0.60	0.40
Date Sampled				29/02/2024	29/02/2024	29/02/2024	29/02/2024	29/02/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	1.8	6.7	0.95	1	0.45
Acenaphthylene	mg/kg	0.05	MCERTS	0.18	0.63	0.15	0.11	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	0.53	0.79	2.4	0.87	0.13
Fluorene	mg/kg	0.05	MCERTS	0.44	0.52	1.6	0.87	0.12
Phenanthrene	mg/kg	0.05	MCERTS	6.3	9.2	18	6.4	1.4
Anthracene	mg/kg	0.05	MCERTS	1.6	2.4	6	2.7	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	13	18	28	9.8	1.4
Pyrene	mg/kg	0.05	MCERTS	12	25	32	10	1.5
Benzo(a)anthracene	mg/kg	0.05	MCERTS	6.4	13	23	9.2	1.2
Chrysene	mg/kg	0.05	MCERTS	7	14	24	8.7	1.4
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	6.5	13	35	12	1.7
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	3.5	4.9	14	4.3	0.6
Benzo(a)pyrene	mg/kg	0.05	MCERTS	6.1	13	38	12	1.3
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	3.4	5.2	19	6.2	0.75
Dibenzo(a,h)anthracene	mg/kg	0.05	MCERTS	0.82	1.8	< 0.05	1.4	0.26
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	3.5	5.7	22	6.2	0.9
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	-	134	263	-	13
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	63	95	76	81	68
Barium (aqua regia extractable)	mg/kg	1	MCERTS	620	350	360	250	350
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	2.3	1.2	1.7	3.1	2.2
Boron (water soluble)	mg/kg	0.2	MCERTS	0.5	0.9	0.3	0.6	0.4
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	26	77	22	26	31
Copper (aqua regia extractable)	mg/kg	1	MCERTS	610	310	500	370	5300
Lead (aqua regia extractable)	mg/kg	1	MCERTS	520	490	750	490	5300
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.9	1.6	2	2.1	4.7
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	62	60	59	83	56
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	2.1	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	63	50	57	75	55
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	800	470	370	870	620

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Analytical Report Number: 24-006499
Project / Site name: Pitsford Road
Your Order No: 007576

Lab Sample Number				132898	132899	132900	132901	132902
Sample Reference				TP209	TP210	TP211	TP212	TP214
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.40	0.15	1.00	0.60	0.40
Date Sampled				29/02/2024	29/02/2024	29/02/2024	29/02/2024	29/02/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Petroleum Hydrocarbons								
TPHCWG - Aliphatic >C5 - C6 HS_1D_AL	mg/kg	0.02	NONE	< 0.020	-	-	< 0.020	-
TPHCWG - Aliphatic >C6 - C8 HS_1D_AL	mg/kg	0.02	NONE	< 0.020	-	-	< 0.020	-
TPHCWG - Aliphatic >C8 - C10 HS_1D_AL	mg/kg	0.05	NONE	< 0.050	-	-	< 0.050	-
TPHCWG - Aliphatic >C10 - C12 EH_CU_1D_AL_#1_#2	mg/kg	1	MCERTS	< 1.0	-	-	1.5	-
TPHCWG - Aliphatic >C12 - C16 EH_CU_1D_AL_#1_#2	mg/kg	2	MCERTS	4.1	-	-	6.9	-
TPHCWG - Aliphatic >C16 - C21 EH_CU_1D_AL_#1_#2	mg/kg	8	MCERTS	16	-	-	< 8.0	-
TPHCWG - Aliphatic >C21 - C35 EH_CU_1D_AL_#1_#2	mg/kg	8	MCERTS	100	-	-	20	-
TPHCWG - Aliphatic >C5 - C35 EH_CU+HS_1D_AL_#1_#2	mg/kg	10	NONE	120	-	-	29	-
TPHCWG - Aromatic >EC5 - EC7 HS_1D_AR	mg/kg	0.01	NONE	< 0.010	-	-	< 0.010	-
TPHCWG - Aromatic >EC7 - EC8 HS_1D_AR	mg/kg	0.01	NONE	< 0.010	-	-	< 0.010	-
TPHCWG - Aromatic >EC8 - EC10 HS_1D_AR	mg/kg	0.05	NONE	< 0.050	-	-	< 0.050	-
TPHCWG - Aromatic >EC10 - EC12 EH_CU_1D_AR_#1_#2	mg/kg	1	MCERTS	1.5	-	-	2.9	-
TPHCWG - Aromatic >EC12 - EC16 EH_CU_1D_AR_#1_#2	mg/kg	2	MCERTS	7.5	-	-	8.3	-
TPHCWG - Aromatic >EC16 - EC21 EH_CU_1D_AR_#1_#2	mg/kg	10	MCERTS	51	-	-	51	-
TPHCWG - Aromatic >EC21 - EC35 EH_CU_1D_AR_#1_#2	mg/kg	10	MCERTS	120	-	-	140	-
TPHCWG - Aromatic >EC5 - EC35 EH_CU+HS_1D_AR_#1_#2	mg/kg	10	NONE	180	-	-	200	-
TPH (>C5 - C10) HS_1D_TOTAL	mg/kg	1	NONE	-	< 1.0	< 1.0	-	< 1.0
TPH (>C5 - C6) HS_1D_TOTAL	mg/kg	0.1	NONE	-	< 0.1	< 0.1	-	< 0.1
TPH (>C6 - C8) HS_1D_TOTAL	mg/kg	1	NONE	-	< 1.0	< 1.0	-	< 1.0
TPH (>C8 - C10) HS_1D_TOTAL	mg/kg	1	NONE	-	< 1.0	< 1.0	-	< 1.0
TPH (>C10 - C12) EH_CU_1D_TOTAL_#1_#2	mg/kg	2	MCERTS	-	6.2	2.2	-	< 2.0
TPH (>C12 - C16) EH_CU_1D_TOTAL_#1_#2	mg/kg	4	MCERTS	-	21	15	-	< 4.0
TPH (>C16 - C21) EH_CU_1D_TOTAL_#1_#2	mg/kg	10	MCERTS	-	140	83	-	< 10
TPH (>C21 - C35) EH_CU_1D_TOTAL_#1_#2	mg/kg	10	MCERTS	-	550	260	-	16
TPH (>C35 - C40) EH_CU_1D_TOTAL_#1_#2	mg/kg	10	MCERTS	-	130	49	-	< 10
TPH Total >C5 - C40 EH_CU+HS_1D_TOTAL_#1_#2	mg/kg	10	NONE	-	860	410	-	23
TPH (C10 - C40) EH_CU_1D_TOTAL_#1_#2	mg/kg	10	MCERTS	-	860	410	-	23
VOCs								
Chloromethane	µg/kg	5	ISO 17025	< 5.0	-	-	< 5.0	-
Chloroethane	µg/kg	5	NONE	< 5.0	-	-	< 5.0	-
Bromomethane	µg/kg	5	ISO 17025	< 5.0	-	-	< 5.0	-
Vinyl Chloride	µg/kg	5	NONE	< 5.0	-	-	< 5.0	-
Trichlorofluoromethane	µg/kg	5	NONE	< 5.0	-	-	< 5.0	-
1,1-Dichloroethene	µg/kg	5	NONE	< 5.0	-	-	< 5.0	-
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	5	NONE	< 5.0	-	-	< 5.0	-
Trans 1,2-dichloroethylene	µg/kg	5	NONE	< 5.0	-	-	< 5.0	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	< 5.0	-	-	< 5.0	-
1,1-Dichloroethane	µg/kg	5	ISO 17025	< 5.0	-	-	< 5.0	-
2,2-Dichloropropane	µg/kg	5	NONE	< 5.0	-	-	< 5.0	-
Chloroform	µg/kg	5	ISO 17025	< 5.0	-	-	< 5.0	-
1,1,1-Trichloroethane	µg/kg	5	ISO 17025	< 5.0	-	-	< 5.0	-
1,2-Dichloroethane	µg/kg	5	ISO 17025	< 5.0	-	-	< 5.0	-
1,1-Dichloropropene	µg/kg	5	ISO 17025	< 5.0	-	-	< 5.0	-
Cis-1,2-dichloroethene	µg/kg	5	ISO 17025	< 5.0	-	-	< 5.0	-
Benzene	µg/kg	5	MCERTS	< 5.0	-	-	< 5.0	-
Carbontetrachloride	µg/kg	5	NONE	< 5.0	-	-	< 5.0	-
1,2-Dichloropropane	µg/kg	5	ISO 17025	< 5.0	-	-	< 5.0	-
Trichloroethene	µg/kg	5	ISO 17025	< 5.0	-	-	< 5.0	-
Dibromomethane	µg/kg	5	ISO 17025	< 5.0	-	-	< 5.0	-

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Analytical Report Number: 24-006499
Project / Site name: Pitsford Road
Your Order No: 007576

Lab Sample Number				132898	132899	132900	132901	132902
Sample Reference				TP209	TP210	TP211	TP212	TP214
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.40	0.15	1.00	0.60	0.40
Date Sampled				29/02/2024	29/02/2024	29/02/2024	29/02/2024	29/02/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Bromodichloromethane	µg/kg	5	ISO 17025	< 5.0	-	-	< 5.0	-
Cis-1,3-dichloropropene	µg/kg	5	ISO 17025	< 5.0	-	-	< 5.0	-
Trans-1,3-dichloropropene	µg/kg	5	ISO 17025	< 5.0	-	-	< 5.0	-
Toluene	µg/kg	5	MCERTS	< 5.0	-	-	< 5.0	-
1,1,2-Trichloroethane	µg/kg	5	ISO 17025	< 5.0	-	-	< 5.0	-
1,3-Dichloropropane	µg/kg	5	ISO 17025	< 5.0	-	-	< 5.0	-
Dibromochloromethane	µg/kg	5	ISO 17025	< 5.0	-	-	< 5.0	-
Tetrachloroethene	µg/kg	5	NONE	< 5.0	-	-	< 5.0	-
1,2-Dibromoethane	µg/kg	5	ISO 17025	< 5.0	-	-	< 5.0	-
Chlorobenzene	µg/kg	5	ISO 17025	< 5.0	-	-	< 5.0	-
1,1,1,2-Tetrachloroethane	µg/kg	5	ISO 17025	< 5.0	-	-	< 5.0	-
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	-	-	< 5.0	-
p & m-Xylene	µg/kg	5	MCERTS	< 5.0	-	-	< 5.0	-
Styrene	µg/kg	5	ISO 17025	< 5.0	-	-	< 5.0	-
Bromoform	µg/kg	5	NONE	< 5.0	-	-	< 5.0	-
o-Xylene	µg/kg	5	MCERTS	< 5.0	-	-	< 5.0	-
Isopropylbenzene	µg/kg	5	ISO 17025	< 5.0	-	-	< 5.0	-
1,1,2,2-Tetrachloroethane	µg/kg	5	NONE	< 5.0	-	-	< 5.0	-
Bromobenzene	µg/kg	5	NONE	< 5.0	-	-	< 5.0	-
n-Propylbenzene	µg/kg	5	ISO 17025	< 5.0	-	-	< 5.0	-
2-Chlorotoluene	µg/kg	5	ISO 17025	< 5.0	-	-	< 5.0	-
4-Chlorotoluene	µg/kg	5	ISO 17025	< 5.0	-	-	< 5.0	-
1,3,5-Trimethylbenzene	µg/kg	5	ISO 17025	< 5.0	-	-	< 5.0	-
tert-Butylbenzene	µg/kg	5	ISO 17025	< 5.0	-	-	< 5.0	-
1,2,4-Trimethylbenzene	µg/kg	5	ISO 17025	< 5.0	-	-	< 5.0	-
sec-Butylbenzene	µg/kg	5	ISO 17025	< 5.0	-	-	< 5.0	-
1,3-Dichlorobenzene	µg/kg	5	ISO 17025	< 5.0	-	-	< 5.0	-
p-Isopropyltoluene	µg/kg	5	ISO 17025	< 5.0	-	-	< 5.0	-
1,4-Dichlorobenzene	µg/kg	5	ISO 17025	< 5.0	-	-	< 5.0	-
1,2-Dichlorobenzene	µg/kg	5	ISO 17025	< 5.0	-	-	< 5.0	-
Butylbenzene	µg/kg	5	NONE	< 5.0	-	-	< 5.0	-
1,2-Dibromo-3-chloropropane	µg/kg	5	ISO 17025	< 5.0	-	-	< 5.0	-
1,2,4-Trichlorobenzene	µg/kg	5	ISO 17025	< 5.0	-	-	< 5.0	-
Hexachlorobutadiene	µg/kg	5	NONE	< 5.0	-	-	< 5.0	-
1,2,3-Trichlorobenzene	µg/kg	5	ISO 17025	< 5.0	-	-	< 5.0	-

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	ISO 17025	< 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	NONE	< 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	-
2,4-Dichlorophenol	mg/kg	0.3	MCERTS	< 0.3	-	-	< 0.3	-

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Analytical Report Number: 24-006499
Project / Site name: Pitsford Road
Your Order No: 007576

Lab Sample Number				132898	132899	132900	132901	132902
Sample Reference				TP209	TP210	TP211	TP212	TP214
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.40	0.15	1.00	0.60	0.40
Date Sampled				29/02/2024	29/02/2024	29/02/2024	29/02/2024	29/02/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
4-Chloroaniline	mg/kg	0.1	NONE	< 0.1	-	-	< 0.1	-
Hexachlorobutadiene	mg/kg	0.1	MCERTS	< 0.1	-	-	< 0.1	-
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	< 0.1	-	-	< 0.1	-
2,4,6-Trichlorophenol	mg/kg	0.1	NONE	< 0.1	-	-	< 0.1	-
2,4,5-Trichlorophenol	mg/kg	0.2	NONE	< 0.2	-	-	< 0.2	-
2-Methylnaphthalene	mg/kg	0.1	NONE	1.6	-	-	0.7	-
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	NONE	< 0.1	-	-	< 0.1	-
2,4-Dinitrotoluene	mg/kg	0.2	NONE	< 0.2	-	-	< 0.2	-
Dibenzofuran	mg/kg	0.2	MCERTS	0.7	-	-	0.5	-
4-Chlorophenyl phenyl ether	mg/kg	0.3	MCERTS	< 0.3	-	-	< 0.3	-
Diethyl phthalate	mg/kg	0.2	MCERTS	< 0.2	-	-	< 0.2	-
4-Nitroaniline	mg/kg	0.2	NONE	< 0.2	-	-	< 0.2	-
Azobenzene	mg/kg	0.3	NONE	< 0.3	-	-	< 0.3	-
Bromophenyl phenyl ether	mg/kg	0.2	MCERTS	< 0.2	-	-	< 0.2	-
Hexachlorobenzene	mg/kg	0.3	MCERTS	< 0.20	-	-	< 0.20	-
Carbazole	mg/kg	0.3	MCERTS	0.4	-	-	0.9	-
Dibutyl phthalate	mg/kg	0.2	NONE	< 0.2	-	-	< 0.2	-
Anthraquinone	mg/kg	0.3	NONE	0.5	-	-	< 0.3	-
Butyl benzyl phthalate	mg/kg	0.3	NONE	< 0.3	-	-	< 0.3	-

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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Analytical Report Number: 24-006499
Project / Site name: Pitsford Road
Your Order No: 007576

Lab Sample Number				132903	132904	132905	132906	132907
Sample Reference				TP215	TP217	TP219	TP220	TP220
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.50	0.50	0.60	1.20
Date Sampled				29/02/2024	29/02/2024	29/02/2024	29/02/2024	29/02/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	36	20	21	21	16
Total mass of sample received	kg	0.1	NONE	0.3	0.3	1.3	0.4	0.3
Asbestos								
Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	MJN	MJN	SCA	SCA	SCA
Actinolite detected	Type	N/A	ISO 17025	-	-	-	-	-
Amosite detected	Type	N/A	ISO 17025	-	-	-	-	-
Anthophyllite detected	Type	N/A	ISO 17025	-	-	-	-	-
Chrysotile detected	Type	N/A	ISO 17025	-	-	-	-	-
Crocidolite detected	Type	N/A	ISO 17025	-	-	-	-	-
Tremolite detected	Type	N/A	ISO 17025	-	-	-	-	-
Asbestos % by hand picking/weighing	%	0.001	ISO 17025	-	-	-	-	-
Asbestos Containing Material Types Detected (ACM)	Type	N/A	ISO 17025	-	-	-	-	-
General Inorganics								
pH (L099)	pH Units	N/A	MCERTS	6.9	6.6	7.9	7	8.3
Total Cyanide	mg/kg	1	MCERTS	4.9	2.5	< 1.0	< 1.0	< 1.0
Total Sulphate as SO4	mg/kg	50	MCERTS	2400	1700	1600	1600	360
Water Soluble SO4 1hr extraction	mg/kg	2.5	MCERTS	85	110	100	150	66
Water Soluble SO4 (2:1 Leach. Equiv.) 1hr extraction	mg/l	1.25	MCERTS	42.5	57.2	52.5	73.9	33
Sulphide	mg/kg	1	MCERTS	7.6	12	< 1.0	7.8	< 1.0
Total Sulphur	mg/kg	50	MCERTS	1500	1600	1300	2000	180
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	-	5.1	4.6	5.5	0.8
Total Organic Carbon (TOC) – Manual	%	0.1	MCERTS	10	-	-	-	-
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	1.2	< 1.0	< 1.0	< 1.0	< 1.0

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Analytical Report Number: 24-006499
Project / Site name: Pitsford Road
Your Order No: 007576

Lab Sample Number				132903	132904	132905	132906	132907
Sample Reference				TP215	TP217	TP219	TP220	TP220
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.50	0.50	0.60	1.20
Date Sampled				29/02/2024	29/02/2024	29/02/2024	29/02/2024	29/02/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	1.8	1.7	0.81	2.3	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	0.27	0.15	< 0.05	0.13	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	0.65	0.15	0.11	0.58	< 0.05
Fluorene	mg/kg	0.05	MCERTS	0.47	< 0.05	0.1	0.5	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	7.3	1.4	1.5	5.5	0.29
Anthracene	mg/kg	0.05	MCERTS	1.8	0.61	< 0.05	1.2	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	13	10	1.7	6.6	0.26
Pyrene	mg/kg	0.05	MCERTS	11	11	1.7	6.3	0.28
Benzo(a)anthracene	mg/kg	0.05	MCERTS	6.2	2.8	1.3	4.2	0.13
Chrysene	mg/kg	0.05	MCERTS	7.2	3.4	1.5	4.7	0.2
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	7.7	2.1	1.8	5.5	0.15
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	3.5	0.82	0.72	2	0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	6	1.1	1.4	4.6	0.12
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	3.1	0.56	0.84	2.6	< 0.05
Dibenzo(a,h)anthracene	mg/kg	0.05	MCERTS	0.87	0.17	0.27	0.69	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	3.2	0.67	0.97	2.7	0.07
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	73.8	36.9	14.7	-	1.57
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	67	49	46	48	8.7
Barium (aqua regia extractable)	mg/kg	1	MCERTS	470	170	180	290	190
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.2	2.8	2.3	1.8	1.1
Boron (water soluble)	mg/kg	0.2	MCERTS	3.1	0.7	0.2	0.6	0.6
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	4.7	< 1.8	2.9	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	45	22	21	22	29
Copper (aqua regia extractable)	mg/kg	1	MCERTS	260	320	250	520	32
Lead (aqua regia extractable)	mg/kg	1	MCERTS	460	1100	280	720	28
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.5	0.7	0.3	8.1	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	51	61	61	41	32
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	1.9	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	61	72	67	57	31
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	360	240	220	440	63

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Analytical Report Number: 24-006499
Project / Site name: Pitsford Road
Your Order No: 007576

Lab Sample Number				132903	132904	132905	132906	132907
Sample Reference				TP215	TP217	TP219	TP220	TP220
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.50	0.50	0.60	1.20
Date Sampled				29/02/2024	29/02/2024	29/02/2024	29/02/2024	29/02/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Petroleum Hydrocarbons								
TPHCWG - Aliphatic >C5 - C6 HS_1D_AL	mg/kg	0.02	NONE	-	-	-	< 0.020	-
TPHCWG - Aliphatic >C6 - C8 HS_1D_AL	mg/kg	0.02	NONE	-	-	-	< 0.020	-
TPHCWG - Aliphatic >C8 - C10 HS_1D_AL	mg/kg	0.05	NONE	-	-	-	< 0.050	-
TPHCWG - Aliphatic >C10 - C12 EH_CU_1D_AL_#1_#2	mg/kg	1	MCERTS	-	-	-	1.9	-
TPHCWG - Aliphatic >C12 - C16 EH_CU_1D_AL_#1_#2	mg/kg	2	MCERTS	-	-	-	19	-
TPHCWG - Aliphatic >C16 - C21 EH_CU_1D_AL_#1_#2	mg/kg	8	MCERTS	-	-	-	27	-
TPHCWG - Aliphatic >C21 - C35 EH_CU_1D_AL_#1_#2	mg/kg	8	MCERTS	-	-	-	63	-
TPHCWG - Aliphatic >C5 - C35 EH_CU+HS_1D_AL_#1_#2	mg/kg	10	NONE	-	-	-	110	-
TPHCWG - Aromatic >EC5 - EC7 HS_1D_AR	mg/kg	0.01	NONE	-	-	-	< 0.010	-
TPHCWG - Aromatic >EC7 - EC8 HS_1D_AR	mg/kg	0.01	NONE	-	-	-	< 0.010	-
TPHCWG - Aromatic >EC8 - EC10 HS_1D_AR	mg/kg	0.05	NONE	-	-	-	< 0.050	-
TPHCWG - Aromatic >EC10 - EC12 EH_CU_1D_AR_#1_#2	mg/kg	1	MCERTS	-	-	-	1.5	-
TPHCWG - Aromatic >EC12 - EC16 EH_CU_1D_AR_#1_#2	mg/kg	2	MCERTS	-	-	-	6	-
TPHCWG - Aromatic >EC16 - EC21 EH_CU_1D_AR_#1_#2	mg/kg	10	MCERTS	-	-	-	12	-
TPHCWG - Aromatic >EC21 - EC35 EH_CU_1D_AR_#1_#2	mg/kg	10	MCERTS	-	-	-	13	-
TPHCWG - Aromatic >EC5 - EC35 EH_CU+HS_1D_AR_#1_#2	mg/kg	10	NONE	-	-	-	33	-
TPH (>C5 - C10) HS_1D_TOTAL	mg/kg	1	NONE	< 1.0	< 1.0	< 1.0	-	< 1.0
TPH (>C5 - C6) HS_1D_TOTAL	mg/kg	0.1	NONE	< 0.1	< 0.1	< 0.1	-	< 0.1
TPH (>C6 - C8) HS_1D_TOTAL	mg/kg	1	NONE	< 1.0	< 1.0	< 1.0	-	< 1.0
TPH (>C8 - C10) HS_1D_TOTAL	mg/kg	1	NONE	< 1.0	< 1.0	< 1.0	-	< 1.0
TPH (>C10 - C12) EH_CU_1D_TOTAL_#1_#2	mg/kg	2	MCERTS	2.9	< 2.0	< 2.0	-	< 2.0
TPH (>C12 - C16) EH_CU_1D_TOTAL_#1_#2	mg/kg	4	MCERTS	13	8.8	7.5	-	< 4.0
TPH (>C16 - C21) EH_CU_1D_TOTAL_#1_#2	mg/kg	10	MCERTS	59	26	11	-	< 10
TPH (>C21 - C35) EH_CU_1D_TOTAL_#1_#2	mg/kg	10	MCERTS	310	45	28	-	< 10
TPH (>C35 - C40) EH_CU_1D_TOTAL_#1_#2	mg/kg	10	MCERTS	74	< 10	< 10	-	< 10
TPH Total >C5 - C40 EH_CU+HS_1D_TOTAL_#1_#2	mg/kg	10	NONE	460	86	51	-	13
TPH (C10 - C40) EH_CU_1D_TOTAL_#1_#2	mg/kg	10	MCERTS	460	86	51	-	13
VOCs								
Chloromethane	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
Chloroethane	µg/kg	5	NONE	-	-	-	< 5.0	-
Bromomethane	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
Vinyl Chloride	µg/kg	5	NONE	-	-	-	< 5.0	-
Trichlorofluoromethane	µg/kg	5	NONE	-	-	-	< 5.0	-
1,1-Dichloroethene	µg/kg	5	NONE	-	-	-	< 5.0	-
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	5	NONE	-	-	-	< 5.0	-
Trans 1,2-dichloroethylene	µg/kg	5	NONE	-	-	-	< 5.0	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	-	-	-	< 5.0	-
1,1-Dichloroethane	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
2,2-Dichloropropane	µg/kg	5	NONE	-	-	-	< 5.0	-
Chloroform	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
1,1,1-Trichloroethane	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
1,2-Dichloroethane	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
1,1-Dichloropropene	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
Cis-1,2-dichloroethene	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
Benzene	µg/kg	5	MCERTS	-	-	-	< 5.0	-
Carbontetrachloride	µg/kg	5	NONE	-	-	-	< 5.0	-
1,2-Dichloropropane	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
Trichloroethene	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
Dibromomethane	µg/kg	5	ISO 17025	-	-	-	< 5.0	-

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Analytical Report Number: 24-006499
Project / Site name: Pitsford Road
Your Order No: 007576

Lab Sample Number				132903	132904	132905	132906	132907
Sample Reference				TP215	TP217	TP219	TP220	TP220
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.50	0.50	0.60	1.20
Date Sampled				29/02/2024	29/02/2024	29/02/2024	29/02/2024	29/02/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Bromodichloromethane	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
Cis-1,3-dichloropropene	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
Trans-1,3-dichloropropene	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
Toluene	µg/kg	5	MCERTS	-	-	-	< 5.0	-
1,1,2-Trichloroethane	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
1,3-Dichloropropane	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
Dibromochloromethane	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
Tetrachloroethene	µg/kg	5	NONE	-	-	-	< 5.0	-
1,2-Dibromoethane	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
Chlorobenzene	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
1,1,1,2-Tetrachloroethane	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
Ethylbenzene	µg/kg	5	MCERTS	-	-	-	< 5.0	-
p & m-Xylene	µg/kg	5	MCERTS	-	-	-	< 5.0	-
Styrene	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
Bromoform	µg/kg	5	NONE	-	-	-	< 5.0	-
o-Xylene	µg/kg	5	MCERTS	-	-	-	< 5.0	-
Isopropylbenzene	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
1,1,2,2-Tetrachloroethane	µg/kg	5	NONE	-	-	-	< 5.0	-
Bromobenzene	µg/kg	5	NONE	-	-	-	< 5.0	-
n-Propylbenzene	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
2-Chlorotoluene	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
4-Chlorotoluene	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
1,3,5-Trimethylbenzene	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
tert-Butylbenzene	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
1,2,4-Trimethylbenzene	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
sec-Butylbenzene	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
1,3-Dichlorobenzene	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
p-Isopropyltoluene	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
1,4-Dichlorobenzene	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
1,2-Dichlorobenzene	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
Butylbenzene	µg/kg	5	NONE	-	-	-	< 5.0###	-
1,2-Dibromo-3-chloropropane	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
1,2,4-Trichlorobenzene	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
Hexachlorobutadiene	µg/kg	5	NONE	-	-	-	< 5.0	-
1,2,3-Trichlorobenzene	µg/kg	5	ISO 17025	-	-	-	< 5.0	-

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	ISO 17025	-	-	-	< 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	NONE	-	-	-	< 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	-
2,4-Dichlorophenol	mg/kg	0.3	MCERTS	-	-	-	< 0.3	-

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Analytical Report Number: 24-006499
Project / Site name: Pitsford Road
Your Order No: 007576

Lab Sample Number				132903	132904	132905	132906	132907
Sample Reference				TP215	TP217	TP219	TP220	TP220
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.50	0.50	0.60	1.20
Date Sampled				29/02/2024	29/02/2024	29/02/2024	29/02/2024	29/02/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
4-Chloroaniline	mg/kg	0.1	NONE	-	-	-	< 0.1	-
Hexachlorobutadiene	mg/kg	0.1	MCERTS	-	-	-	< 0.1	-
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	-	-	-	< 0.1	-
2,4,6-Trichlorophenol	mg/kg	0.1	NONE	-	-	-	< 0.1	-
2,4,5-Trichlorophenol	mg/kg	0.2	NONE	-	-	-	< 0.2	-
2-Methylnaphthalene	mg/kg	0.1	NONE	-	-	-	2.2	-
2-Chloronaphthalene	mg/kg	0.1	MCERTS	-	-	-	< 0.1	-
Dimethylphthalate	mg/kg	0.1	MCERTS	-	-	-	< 0.1	-
2,6-Dinitrotoluene	mg/kg	0.1	NONE	-	-	-	< 0.1	-
2,4-Dinitrotoluene	mg/kg	0.2	NONE	-	-	-	< 0.2	-
Dibenzofuran	mg/kg	0.2	MCERTS	-	-	-	0.8	-
4-Chlorophenyl phenyl ether	mg/kg	0.3	MCERTS	-	-	-	< 0.3	-
Diethyl phthalate	mg/kg	0.2	MCERTS	-	-	-	< 0.2	-
4-Nitroaniline	mg/kg	0.2	NONE	-	-	-	< 0.2	-
Azobenzene	mg/kg	0.3	NONE	-	-	-	< 0.3	-
Bromophenyl phenyl ether	mg/kg	0.2	MCERTS	-	-	-	< 0.2	-
Hexachlorobenzene	mg/kg	0.3	MCERTS	-	-	-	< 0.20	-
Carbazole	mg/kg	0.3	MCERTS	-	-	-	0.3	-
Dibutyl phthalate	mg/kg	0.2	NONE	-	-	-	< 0.2	-
Anthraquinone	mg/kg	0.3	NONE	-	-	-	< 0.3	-
Butyl benzyl phthalate	mg/kg	0.3	NONE	-	-	-	< 0.3	-

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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Analytical Report Number: 24-006499
Project / Site name: Pitsford Road
Your Order No: 007576

Certificate of Analysis - Asbestos Quantification

Methods:

Qualitative Analysis

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

Quantitative Analysis

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

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

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

Both Qualitative and Quantitative Analyses are UKAS accredited.

Sample Number	Sample ID	Sample Depth (m)	Sample Weight (g)	Asbestos Containing Material Types Detected (ACM)	PLM Results	Asbestos by hand picking/weighing (%)	Total % Asbestos in Sample
132893	TP203	0.60	124	Loose Fibrous Debris	**Chrysotile**	0.003	**0.003**
132894	TP204	0.10	26.7	Loose Fibrous Debris	**Chrysotile**	0.077	**0.077**
132897	TP208	0.40	43.1	Loose Fibrous Debris	**Chrysotile**	0.005	**0.005**

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

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Analytical Report Number : 24-006499
Project / Site name: Pitsford Road

* 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 *
132893	TP203	None Supplied	0.6	Brown loam and gravel
132894	TP204	None Supplied	0.1	Brown loam with vegetation and gravel
132895	TP204	None Supplied	1.1	Brown sandy clay with gravel
132896	TP206	None Supplied	0.8	Brown loam and gravel
132897	TP208	None Supplied	0.4	Brown loam and gravel with vegetation
132898	TP209	None Supplied	0.4	Brown loam and gravel with clinker and vegetation
132899	TP210	None Supplied	0.15	Brown loam and gravel with clinker and coal
132900	TP211	None Supplied	1	Brown loam and gravel with clinker
132901	TP212	None Supplied	0.6	Brown loam and gravel with vegetation
132902	TP214	None Supplied	0.4	Brown loam and gravel with vegetation
132903	TP215	None Supplied	0.1	Brown loam with gravel and vegetation
132904	TP217	None Supplied	0.5	Brown loam and gravel
132905	TP219	None Supplied	0.5	Brown gravely loam with clinker
132906	TP220	None Supplied	0.6	Brown gravely loam with clinker
132907	TP220	None Supplied	1.2	Brown sandy clay

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Analytical Report Number : 24-006499
Project / Site name: Pitsford Road

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in Soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques	In-house method based on HSG 248, 2021	A001B	D	ISO 17025
Asbestos Quantification - Gravimetric	Asbestos quantification by gravimetric method - in house method based on references	HSE Report No: 83/1996, HSG 248 (2021), HSG 264 (2012) & SCA Blue Book (draft)	A006B	D	ISO 17025
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode	In-house method	L010	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
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.	L019B	D	NONE
Total organic carbon in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L023B	D	MCERTS
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	L038B	D	MCERTS
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	L038B	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	L038B	D	MCERTS
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES	In-house method	L038B	D	MCERTS
Sulphate, water soluble, in soil (1hr extraction)	Sulphate, water soluble, in soil (1hr extraction)	In-house method	L038B	D	MCERTS
Speciated EPA-16 PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
BTEX and/or Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS	In-house method based on USEPA 8260	L073B	W	MCERTS
Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS with carbon banding aliphatic and aromatic	In-house method	L076B/L088	D/W	MCERTS
Total petroleum hydrocarbons by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS	In-house method	L076B/L088	D/W	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazide followed by colorimetry	In-house method	L080	W	MCERTS

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Analytical Report Number : 24-006499
Project / Site name: Pitsford Road

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
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	L080	W	MCERTS
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	L080	W	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement	In-house method	L099	D	MCERTS

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL' or 'B' 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.
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

- Quality control parameter failure associated with this result; other checks applied prior to reporting the data have been accepted. The result should be considered as being deviating and may be compromised.

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Analytical Report Number : 24-007224

Project / Site name:	Pitsford Road	**Samples received on:**	05/03/2024
Your job number:	17-302	**Samples instructed on/ Analysis started on:**	06/03/2024
Your order number:	007576-007575	**Analysis completed by:**	13/03/2024
Report Issue Number:	1	**Report issued on:**	13/03/2024
Samples Analysed:	2 soil samples		

Signed: A. Czerwińska

Agnieszka Czerwińska
Reporting Specialist
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

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

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Analytical Report Number: 24-007224
Project / Site name: Pitsford Road
Your Order No: 007576-007575

Lab Sample Number				136291	137220
Sample Reference				TP202	TP215
Sample Number				None Supplied	None Supplied
Depth (m)				1.50	2.00
Date Sampled				29/02/2024	29/02/2024
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Stone Content	%	0.1	NONE	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	19	19
Total mass of sample received	kg	0.1	NONE	0.3	0.2
Asbestos					
Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	WEM	WEM
General Inorganics					
pH (L099)	pH Units	N/A	MCERTS	7.4	8.2
Total Cyanide	mg/kg	1	MCERTS	1.9	< 1.0
Total Sulphate as SO4	mg/kg	50	MCERTS	1700	370
Water Soluble SO4 1hr extraction	mg/kg	2.5	MCERTS	820	220
Water Soluble SO4 (2:1 Leach. Equiv.) 1hr extraction	mg/l	1.25	MCERTS	412	108
Sulphide	mg/kg	1	MCERTS	39	4.8
Total Sulphur	mg/kg	50	MCERTS	1900	230
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	4.6	0.8
Total Phenols					
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0
Speciated PAHs					
Naphthalene	mg/kg	0.05	MCERTS	1.3	0.17
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	0.19	< 0.05
Fluorene	mg/kg	0.05	MCERTS	0.14	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	2.1	0.12
Anthracene	mg/kg	0.05	MCERTS	0.4	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	2.8	0.1
Pyrene	mg/kg	0.05	MCERTS	2.8	0.12
Benzo(a)anthracene	mg/kg	0.05	MCERTS	2	0.07
Chrysene	mg/kg	0.05	MCERTS	2.2	0.08
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	3	0.09
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	1	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	2.7	0.08
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	1.5	< 0.05
Dibenzo(a,h)anthracene	mg/kg	0.05	MCERTS	0.53	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	2.2	< 0.05
Total PAH					
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	25	0.83

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
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Analytical Report Number: 24-007224
Project / Site name: Pitsford Road
Your Order No: 007576-007575

Lab Sample Number				136291	137220
Sample Reference				TP202	TP215
Sample Number				None Supplied	None Supplied
Depth (m)				1.50	2.00
Date Sampled				29/02/2024	29/02/2024
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Heavy Metals / Metalloids					
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	48	9.2
Barium (aqua regia extractable)	mg/kg	1	MCERTS	290	160
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.8	1.1
Boron (water soluble)	mg/kg	0.2	MCERTS	1	0.3
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	28	28
Copper (aqua regia extractable)	mg/kg	1	MCERTS	440	41
Lead (aqua regia extractable)	mg/kg	1	MCERTS	670	56
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	3.7	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	51	32
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	54	29
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	390	69
Petroleum Hydrocarbons					
TPH (>C5 - C10) HS_1D_TOTAL	mg/kg	1	NONE	< 1.0	< 1.0
TPH (>C5 - C6) HS_1D_TOTAL	mg/kg	0.1	NONE	< 0.1	< 0.1
TPH (>C6 - C8) HS_1D_TOTAL	mg/kg	1	NONE	< 1.0	< 1.0
TPH (>C8 - C10) HS_1D_TOTAL	mg/kg	1	NONE	< 1.0###	< 1.0
TPH (>C10 - C12) EH_CU_1D_TOTAL_#1_#2	mg/kg	2	MCERTS	< 2.0	< 2.0
TPH (>C12 - C16) EH_CU_1D_TOTAL_#1_#2	mg/kg	4	MCERTS	10	< 4.0
TPH (>C16 - C21) EH_CU_1D_TOTAL_#1_#2	mg/kg	10	MCERTS	28	< 10
TPH (>C21 - C35) EH_CU_1D_TOTAL_#1_#2	mg/kg	10	MCERTS	260	26
TPH (>C35 - C40) EH_CU_1D_TOTAL_#1_#2	mg/kg	10	MCERTS	77	14
TPH Total >C5 - C40 EH_CU+HS_1D_TOTAL_#1_#2	mg/kg	10	NONE	370###	49
TPH (C10 - C40) EH_CU_1D_TOTAL_#1_#2	mg/kg	10	MCERTS	370	49

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number : 24-007224
Project / Site name: Pitsford Road

* 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 *
136291	TP202	None Supplied	1.5	Brown gravely sand
137220	TP215	None Supplied	2	Brown clay

Analytical Report Number : 24-007224
Project / Site name: Pitsford Road

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in Soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques	In-house method based on HSG 248, 2021	A001B	D	ISO 17025
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode	In-house method	L010	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
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.	L019B	D	NONE
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	L038B	D	MCERTS
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	L038B	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	L038B	D	MCERTS
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES	In-house method	L038B	D	MCERTS
Sulphate, water soluble, in soil (1hr extraction)	Sulphate, water soluble, in soil (1hr extraction)	In-house method	L038B	D	MCERTS
Speciated EPA-16 PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
Total petroleum hydrocarbons by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS	In-house method	L076B/L088	D/W	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazide followed by colorimetry	In-house method	L080	W	MCERTS
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	L080	W	MCERTS
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	L080	W	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement	In-house method	L099	D	MCERTS

Analytical Report Number : 24-007224
Project / Site name: Pitsford Road

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL' or 'B' 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.
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

- Quality control parameter failure associated with this result; other checks applied prior to reporting the data have been accepted. The result should be considered as being deviating and may be compromised.

e3p☐
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Urmston
Manchester

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i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
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Herts,
WD18 8YS

t: 01923 225404
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e: reception@i2analytical.com

Analytical Report Number : 24-006704

Project / Site name:	Pitsfrd Road	**Samples received on:**	01/03/2024
Your job number:	17-302	**Samples instructed on/ Analysis started on:**	01/03/2024
Your order number:	007576-007575	**Analysis completed by:**	07/03/2024
Report Issue Number:	1	**Report issued on:**	08/03/2024
Samples Analysed:	8 soil samples		

Signed:

Joanna Wawrzeczko
Senior Reporting Specialist
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

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

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number: 24-006704
Project / Site name: Pitsfrd Road
Your Order No: 007576-007575

Lab Sample Number				134051	134052	134053	134054	134055
Sample Reference				TP201	TP203	TP207	TP209	TP212
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	0.40	0.90	0.30	0.40
Date Sampled				29/02/2024	29/02/2024	29/02/2024	29/02/2024	28/02/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	20	23	17	19	18
Total mass of sample received	kg	0.1	NONE	2	2	2	2	2
General Inorganics								
Calorific Value	MJ/Kg	0.12	ISO 17025	< 0.120	0.426	< 0.120	0.652	< 0.120

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number: 24-006704
Project / Site name: Pitsfrd Road
Your Order No: 007576-007575

Lab Sample Number				134056	134057	134058
Sample Reference				TP216	TP218	TP219
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				0.60	0.50	0.90
Date Sampled				28/02/2024	28/02/2024	28/02/2024
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	%	0.01	NONE	16	15	17
Total mass of sample received	kg	0.1	NONE	2	2	2
General Inorganics						
Calorific Value	MJ/Kg	0.12	ISO 17025	< 0.120	< 0.120	< 0.120

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number : 24-006704
Project / Site name: Pitsfrd Road

* 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 *
134051	TP201	None Supplied	0.5	Brown loam and gravel
134052	TP203	None Supplied	0.4	Brown loam and gravel
134053	TP207	None Supplied	0.9	Brown loam and gravel
134054	TP209	None Supplied	0.3	Brown loam and gravel
134055	TP212	None Supplied	0.4	Brown loam and gravel
134056	TP216	None Supplied	0.6	Brown loam and gravel
134057	TP218	None Supplied	0.5	Brown loam and gravel with vegetation
134058	TP219	None Supplied	0.9	Brown loam and sand with gravel and vegetation

Analytical Report Number : 24-006704
Project / Site name: Pitsfrd Road

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Calorific Value of soil	Determination of the calorific value of soil by combustion in a controlled environment	Calorific Value of Soil by Bomb Calorimeter	L013B	D	ISO 17025
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
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.	L019B	D	NONE

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL' or 'B' 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.
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

APPENDIX VIII
GEOTECHNICAL TESTING RESULTS



MURRAY RIX
CONSULTANCY, SITE INVESTIGATION
CONSTRUCTION MATERIALS TESTING

TEST REPORT

Client e3p

Address Taylor Road
Trafford Park
Urmston
Manchester
M41 7JQ

Contract Pitsford Road,
Manchester

Job Number MRN 24005/39
Date of Issue 16 March 2024
Page 1 of 21

Approved Signatories

S J Hutchings, O P Davies

Notes

1 All remaining samples and remnants from this contract will be disposed 28 days from the date of this report unless you notify us to the contrary.

2 Result certificates, in this report, not bearing a UKAS mark, are not included in our UKAS accreditation schedule.

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

4 Certified that the samples have been examined and tested in accordance with the terms of the contract/order and unless otherwise stated conform to the standards/specifications quoted.

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

6 This certificate should not be reproduced, except in full, without the express permission of the laboratory.

M U R R A Y R I X

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

UKAS TESTING 1580

TEST CERTIFICATE

PARTICLE SIZE DISTRIBUTION

BS EN ISO 17892-4:2016

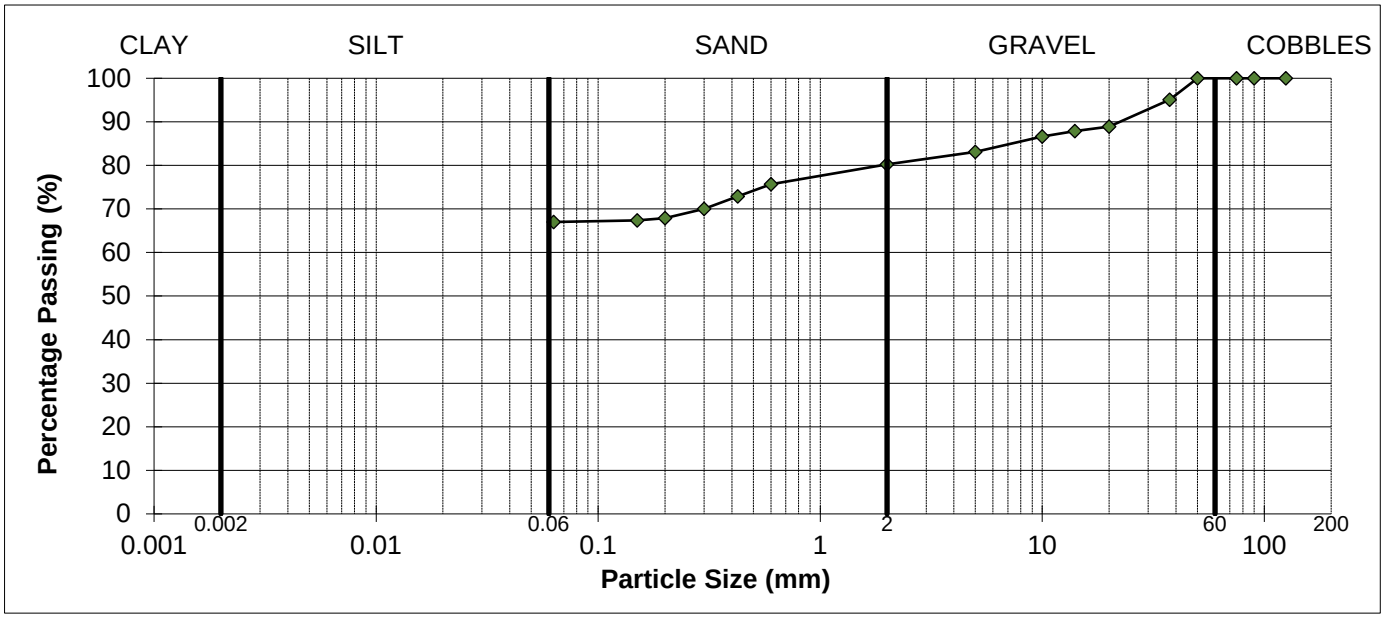
Determination of Water Content in accordance with BS EN ISO 17892-1:2014+A1:2022 (Oven Dry)

CLIENT	e3p
SITE	Pitsford Road, Manchester
JOB NUMBER	MRN 24005/39

SAMPLE LABEL	TP120 1.60	DATE SAMPLED	Not Advised
LAB SAMPLE No	433501	DATE RECEIVED	04-Mar-24
DATE TESTED	05-Mar-24	SAMPLED BY	Client

MATERIAL	Made Ground
ADVISED SOURCE	Site Invesitgation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100	100	5	83	
90	100		2	80	80-100
75	100		0.6	76	
50	100		0.425	73	
37.5	95		0.3	70	
20	89		0.2	68	
14	88		0.15	67	
10	87		0.063	67	15-100



SOIL FRACTIONS			
COBBLES	0%	SAND	13%
GRAVEL	20%	SILT / CLAY	67%

As received water content	23.5%

REMARKS

Sample complies with the advised grading specification for a 2A/2B material (SHW 2016)

SIGNED

NAME O.P. Davies BA (Hons) (Laboratory Manager) DATE 16-Mar-24

M U R R A Y R I X

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

UKAS TESTING 1580

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PARTICLE SIZE DISTRIBUTION

BS EN ISO 17892-4:2016

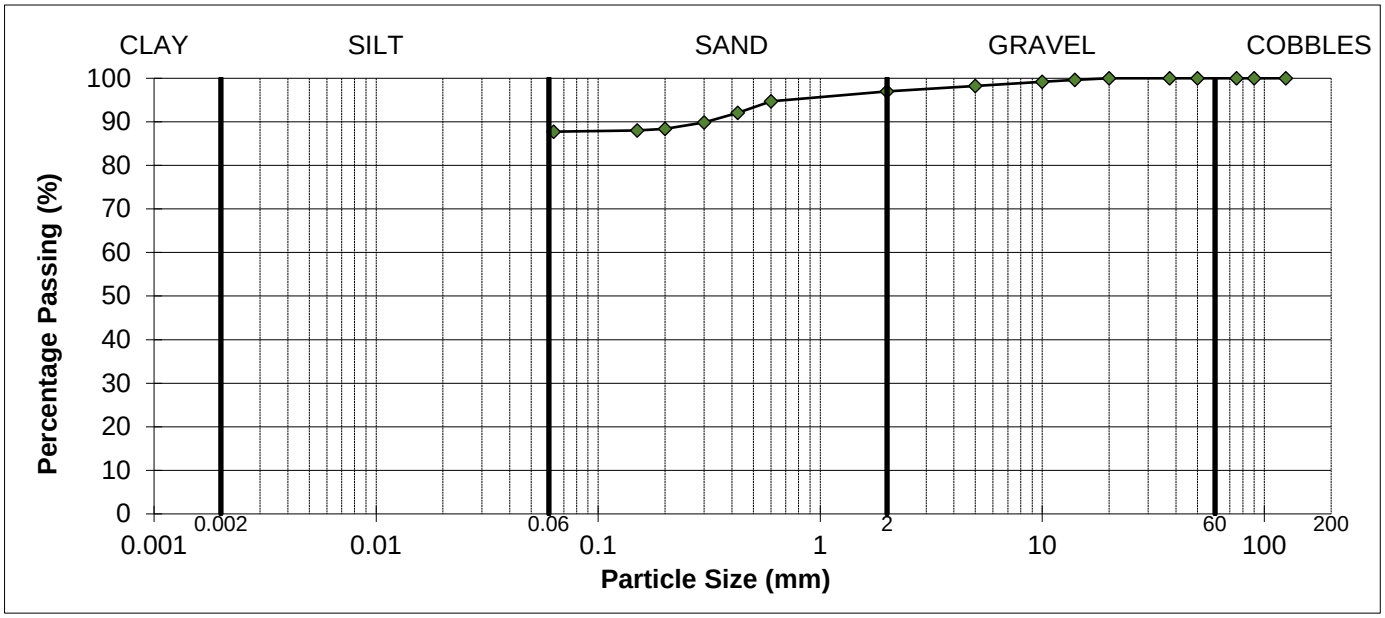
Determination of Water Content in accordance with BS EN ISO 17892-1:2014+A1:2022 (Oven Dry)

CLIENT	e3p
SITE	Pitsford Road, Manchester
JOB NUMBER	MRN 24005/39

SAMPLE LABEL	TP217 1.50	DATE SAMPLED	Not Advised
LAB SAMPLE No	433502	DATE RECEIVED	04-Mar-24
DATE TESTED	05-Mar-24	SAMPLED BY	Client

MATERIAL	Made Ground
ADVISED SOURCE	Site Invesitgation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100	100	5	98	
90	100		2	97	80-100
75	100		0.6	95	
50	100		0.425	92	
37.5	100		0.3	90	
20	100		0.2	88	
14	100		0.15	88	
10	99		0.063	88	15-100



SOIL FRACTIONS			
COBBLES	0%	SAND	9%
GRAVEL	3%	SILT / CLAY	88%

As received water content	20.5%

REMARKS

Sample complies with the advised grading specification for a 2A/2B material (SHW 2016)

SIGNED

NAME O.P. Davies BA (Hons) (Laboratory Manager) DATE 16-Mar-24

M U R R A Y R I X

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

UKAS TESTING 1580

TEST CERTIFICATE

PARTICLE SIZE DISTRIBUTION

BS EN ISO 17892-4:2016

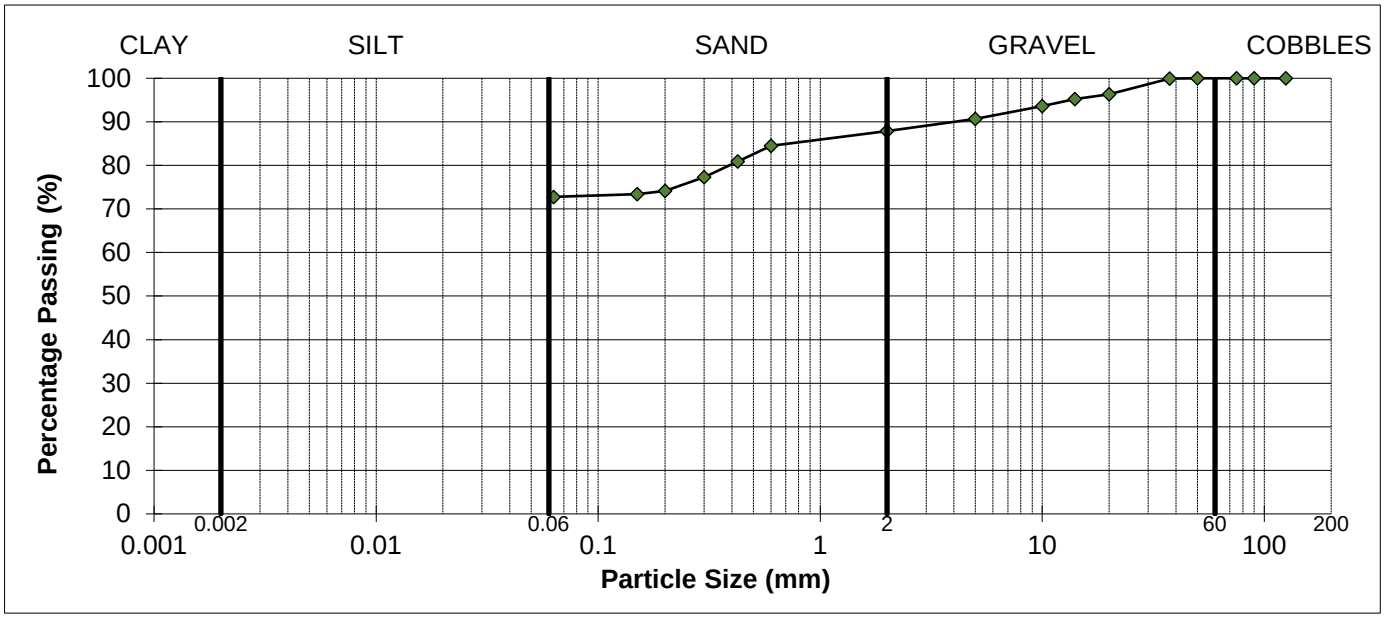
Determination of Water Content in accordance with BS EN ISO 17892-1:2014+A1:2022 (Oven Dry)

CLIENT	e3p
SITE	Pitsford Road, Manchester
JOB NUMBER	MRN 24005/39

SAMPLE LABEL	TP201 2.00	DATE SAMPLED	Not Advised
LAB SAMPLE No	433503	DATE RECEIVED	04-Mar-24
DATE TESTED	05-Mar-24	SAMPLED BY	Client

MATERIAL	Made Ground
ADVISED SOURCE	Site Invesitgation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100	100	5	91	
90	100		2	88	80-100
75	100		0.6	84	
50	100		0.425	81	
37.5	100		0.3	77	
20	96		0.2	74	
14	95		0.15	73	
10	94		0.063	73	15-100



SOIL FRACTIONS			
COBBLES	0%	SAND	15%
GRAVEL	12%	SILT / CLAY	73%

As received water content	23.9%

REMARKS

Sample complies with the advised grading specification for a 2A/2B material (SHW 2016)

SIGNED

NAME O.P. Davies BA (Hons) (Laboratory Manager) DATE 16-Mar-24

M U R R A Y R I X

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DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

UKAS TESTING 1580

TEST CERTIFICATE

PARTICLE SIZE DISTRIBUTION

BS EN ISO 17892-4:2016

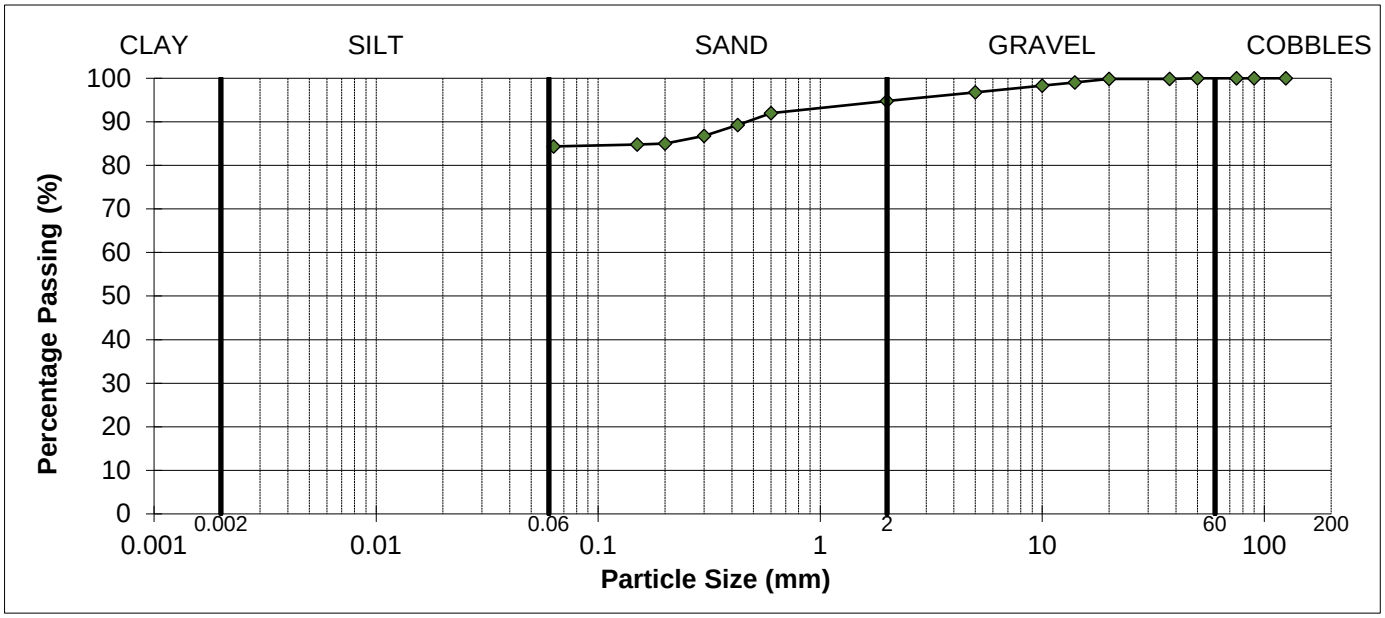
Determination of Water Content in accordance with BS EN ISO 17892-1:2014+A1:2022 (Oven Dry)

CLIENT	e3p
SITE	Pitsford Road, Manchester
JOB NUMBER	MRN 24005/39

SAMPLE LABEL	TP216 2.20	DATE SAMPLED	Not Advised
LAB SAMPLE No	433504	DATE RECEIVED	04-Mar-24
DATE TESTED	05-Mar-24	SAMPLED BY	Client

MATERIAL	Made Ground
ADVISED SOURCE	Site Invesitgation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100	100	5	97	
90	100		2	95	80-100
75	100		0.6	92	
50	100		0.425	89	
37.5	100		0.3	87	
20	100		0.2	85	
14	99		0.15	85	
10	98		0.063	84	15-100



SOIL FRACTIONS			
COBBLES	0%	SAND	10%
GRAVEL	5%	SILT / CLAY	84%

As received water content	20.1%

REMARKS

Sample complies with the advised grading specification for a 2A/2B material (SHW 2016)

SIGNED

NAME O.P. Davies BA (Hons) (Laboratory Manager) DATE 16-Mar-24

M U R R A Y R I X

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

UKAS TESTING 1580

TEST CERTIFICATE

PARTICLE SIZE DISTRIBUTION

BS EN ISO 17892-4:2016

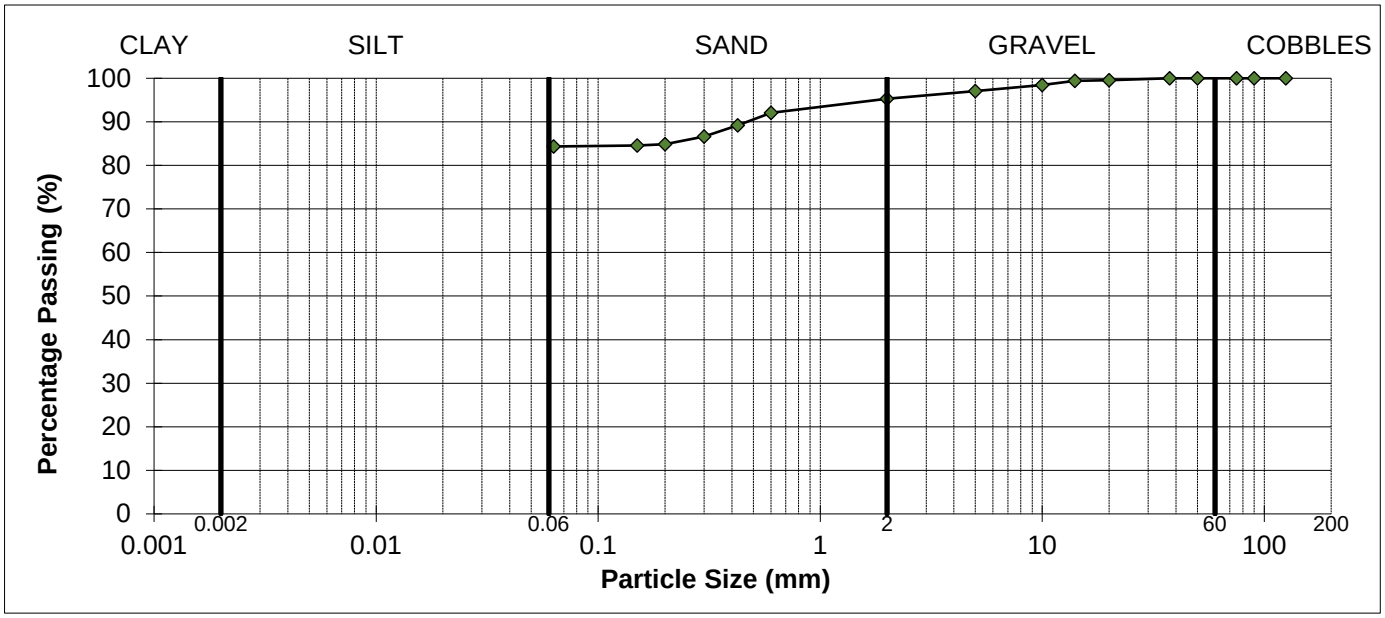
Determination of Water Content in accordance with BS EN ISO 17892-1:2014+A1:2022 (Oven Dry)

CLIENT	e3p
SITE	Pitsford Road, Manchester
JOB NUMBER	MRN 24005/39

SAMPLE LABEL	TP219 2.00	DATE SAMPLED	Not Advised
LAB SAMPLE No	433505	DATE RECEIVED	04-Mar-24
DATE TESTED	05-Mar-24	SAMPLED BY	Client

MATERIAL	Made Ground
ADVISED SOURCE	Site Invesitgation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100	100	5	97	
90	100		2	95	80-100
75	100		0.6	92	
50	100		0.425	89	
37.5	100		0.3	87	
20	100		0.2	85	
14	99		0.15	85	
10	98		0.063	84	15-100



SOIL FRACTIONS			
COBBLES	0%	SAND	11%
GRAVEL	5%	SILT / CLAY	84%

As received water content	19.5%

REMARKS

Sample complies with the advised grading specification for a 2A/2B material (SHW 2016)

SIGNED

NAME O.P. Davies BA (Hons) (Laboratory Manager) DATE 16-Mar-24

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TEST CERTIFICATE

PARTICLE SIZE DISTRIBUTION

BS EN ISO 17892-4:2016

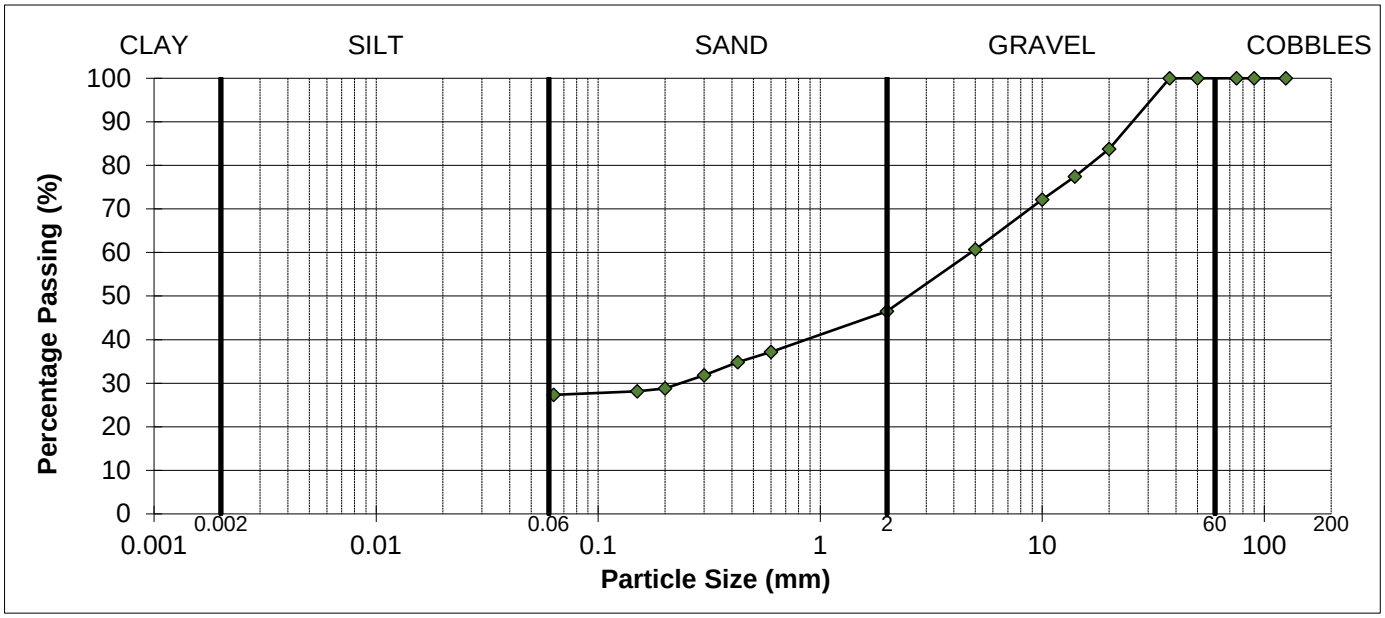
Determination of Water Content in accordance with BS EN ISO 17892-1:2014+A1:2022 (Oven Dry)

CLIENT	e3p
SITE	Pitsford Road, Manchester
JOB NUMBER	MRN 24005/39

SAMPLE LABEL	TP220 0.70	DATE SAMPLED	Not Advised
LAB SAMPLE No	433511	DATE RECEIVED	04-Mar-24
DATE TESTED	05-Mar-24	SAMPLED BY	Client

MATERIAL	Made Ground
ADVISED SOURCE	Site Invesitgation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100	100	5	61	
90	100		2	46	15-80
75	100		0.6	37	
50	100		0.425	35	
37.5	100		0.3	32	
20	84		0.2	29	
14	77		0.15	28	
10	72		0.063	27	15-80



SOIL FRACTIONS			
COBBLES	0%	SAND	19%
GRAVEL	54%	SILT / CLAY	27%

As received water content	25.8%

REMARKS

Sample complies with the advised grading specification for a 2C material (SHW 2016)

SIGNED

NAME O.P. Davies BA (Hons) (Laboratory Manager) DATE 16-Mar-24

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ANDREW HOUSE, HADFIELD STREET,
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TEL 0161 475 0870

UKAS TESTING 1580

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PARTICLE SIZE DISTRIBUTION

BS EN ISO 17892-4:2016

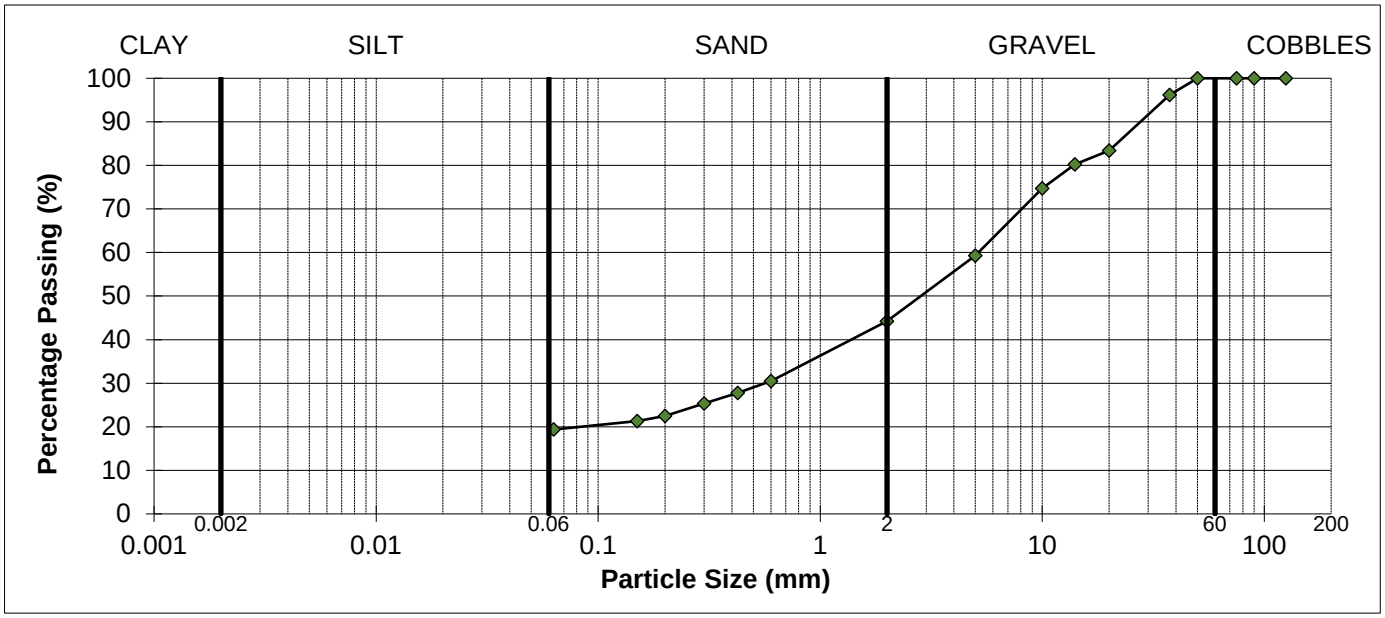
Determination of Water Content in accordance with BS EN ISO 17892-1:2014+A1:2022 (Oven Dry)

CLIENT	e3p
SITE	Pitsford Road, Manchester
JOB NUMBER	MRN 24005/39

SAMPLE LABEL	TP218 0.50	DATE SAMPLED	Not Advised
LAB SAMPLE No	433512	DATE RECEIVED	04-Mar-24
DATE TESTED	05-Mar-24	SAMPLED BY	Client

MATERIAL	Made Ground
ADVISED SOURCE	Site Invesitgation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100	100	5	59	
90	100		2	44	15-80
75	100		0.6	30	
50	100		0.425	28	
37.5	96		0.3	25	
20	83		0.2	23	
14	80		0.15	21	
10	75		0.063	19	15-80



SOIL FRACTIONS			
COBBLES	0%	SAND	25%
GRAVEL	56%	SILT / CLAY	19%

As received water content	31.8%

REMARKS

Sample complies with the advised grading specification for a 2C material (SHW 2016)

SIGNED

NAME O.P. Davies BA (Hons) (Laboratory Manager) DATE 16-Mar-24

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PARTICLE SIZE DISTRIBUTION

BS EN ISO 17892-4:2016

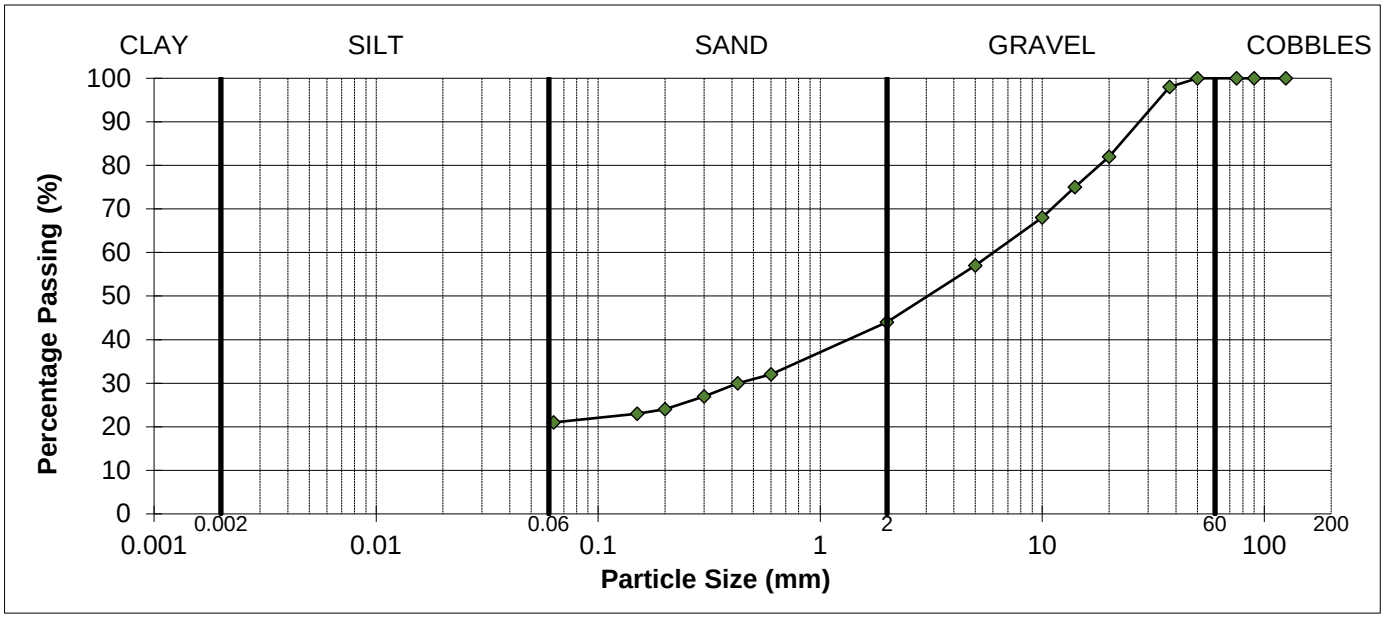
Determination of Water Content in accordance with BS EN ISO 17892-1:2014+A1:2022 (Oven Dry)

CLIENT	e3p
SITE	Pitsford Road, Manchester
JOB NUMBER	MRN 24005/39

SAMPLE LABEL	TP216 2.00	DATE SAMPLED	Not Advised
LAB SAMPLE No	433513	DATE RECEIVED	04-Mar-24
DATE TESTED	05-Mar-24	SAMPLED BY	Client

MATERIAL	Made Ground
ADVISED SOURCE	Site Invesitgation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100	100	5	57	
90	100		2	44	15-80
75	100		0.6	32	
50	100		0.425	30	
37.5	98		0.3	27	
20	82		0.2	24	
14	75		0.15	23	
10	68		0.063	21	15-80



SOIL FRACTIONS			
COBBLES	0%	SAND	23%
GRAVEL	56%	SILT / CLAY	21%

As received water content	30.3%

REMARKS
Sample complies with the advised grading specification for a 2C material (SHW 2016)

SIGNED

NAME O.P. Davies BA (Hons) (Laboratory Manager) DATE 16-Mar-24

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PARTICLE SIZE DISTRIBUTION

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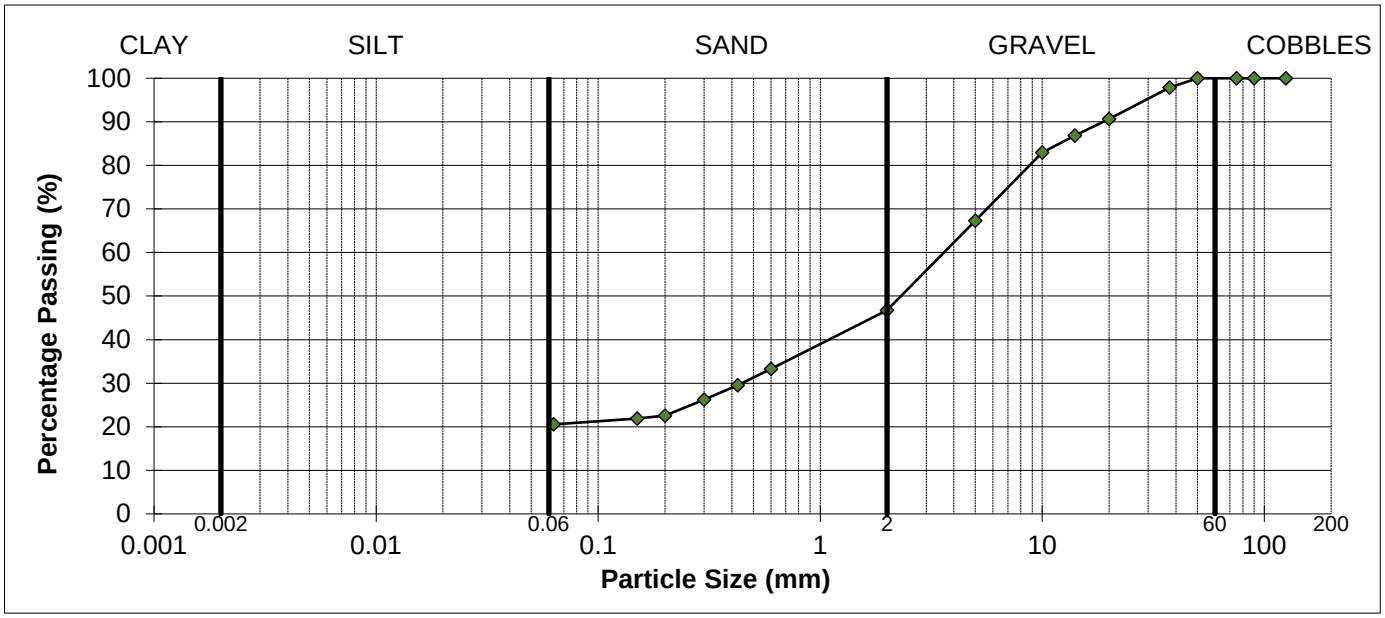
Determination of Water Content in accordance with BS EN ISO 17892-1:2014+A1:2022 (Oven Dry)

CLIENT	e3p
SITE	Pitsford Road, Manchester
JOB NUMBER	MRN 24005/39

SAMPLE LABEL	TP214 1.50	DATE SAMPLED	Not Advised
LAB SAMPLE No	433514	DATE RECEIVED	04-Mar-24
DATE TESTED	05-Mar-24	SAMPLED BY	Client

MATERIAL	Made Ground
ADVISED SOURCE	Site Invesitgation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100	100	5	67	
90	100		2	47	15-80
75	100		0.6	33	
50	100		0.425	30	
37.5	98		0.3	26	
20	91		0.2	23	
14	87		0.15	22	
10	83		0.063	21	15-80



SOIL FRACTIONS			
COBBLES	0%	SAND	26%
GRAVEL	53%	SILT / CLAY	21%

As received water content	23.9%

REMARKS

Sample complies with the advised grading specification for a 2C material (SHW 2016)

SIGNED

NAME O.P. Davies BA (Hons) (Laboratory Manager) DATE 16-Mar-24

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PARTICLE SIZE DISTRIBUTION

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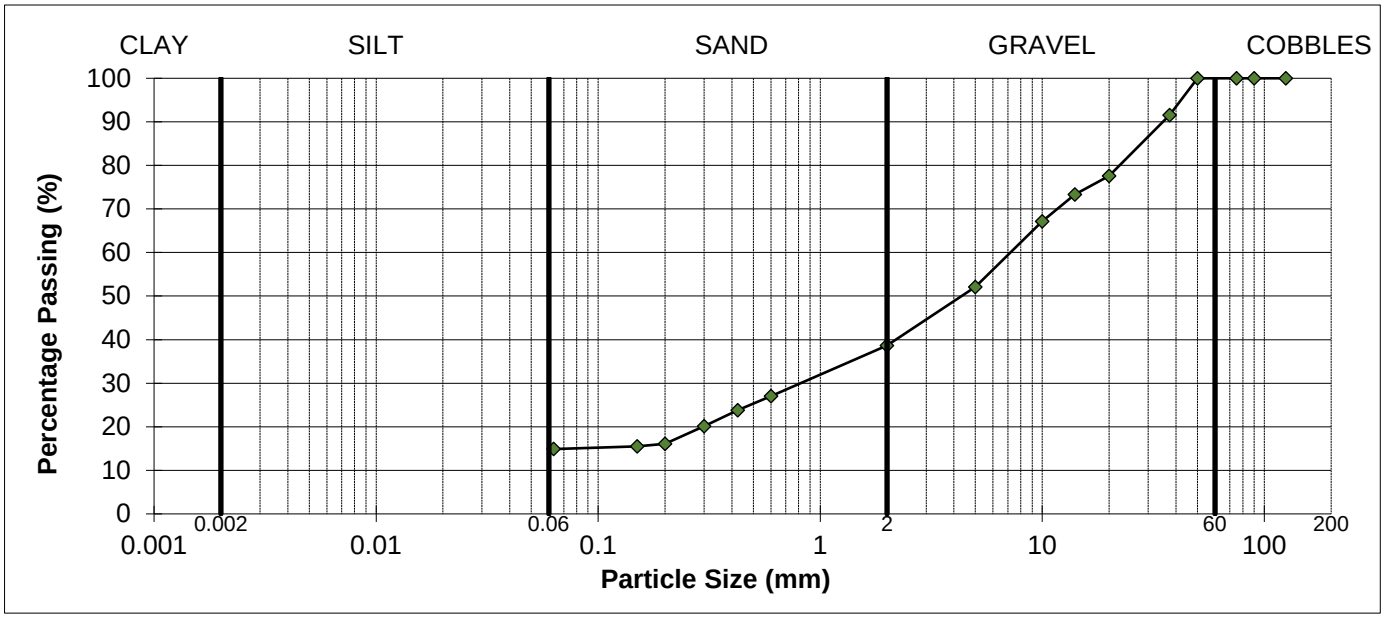
Determination of Water Content in accordance with BS EN ISO 17892-1:2014+A1:2022 (Oven Dry)

CLIENT	e3p
SITE	Pitsford Road, Manchester
JOB NUMBER	MRN 24005/39

SAMPLE LABEL	TP212 0.40	DATE SAMPLED	Not Advised
LAB SAMPLE No	433515	DATE RECEIVED	04-Mar-24
DATE TESTED	05-Mar-24	SAMPLED BY	Client

MATERIAL	Made Ground
ADVISED SOURCE	Site Invesitgation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100	100	5	52	
90	100		2	39	15-80
75	100		0.6	27	
50	100		0.425	24	
37.5	92		0.3	20	
20	78		0.2	16	
14	73		0.15	15	
10	67		0.063	15	15-80



SOIL FRACTIONS			
COBBLES	0%	SAND	24%
GRAVEL	61%	SILT / CLAY	15%

As received water content	23.3%

REMARKS
Sample complies with the advised grading specification for a 2C material (SHW 2016)

SIGNED

NAME O.P. Davies BA (Hons) (Laboratory Manager) DATE 16-Mar-24

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PARTICLE SIZE DISTRIBUTION

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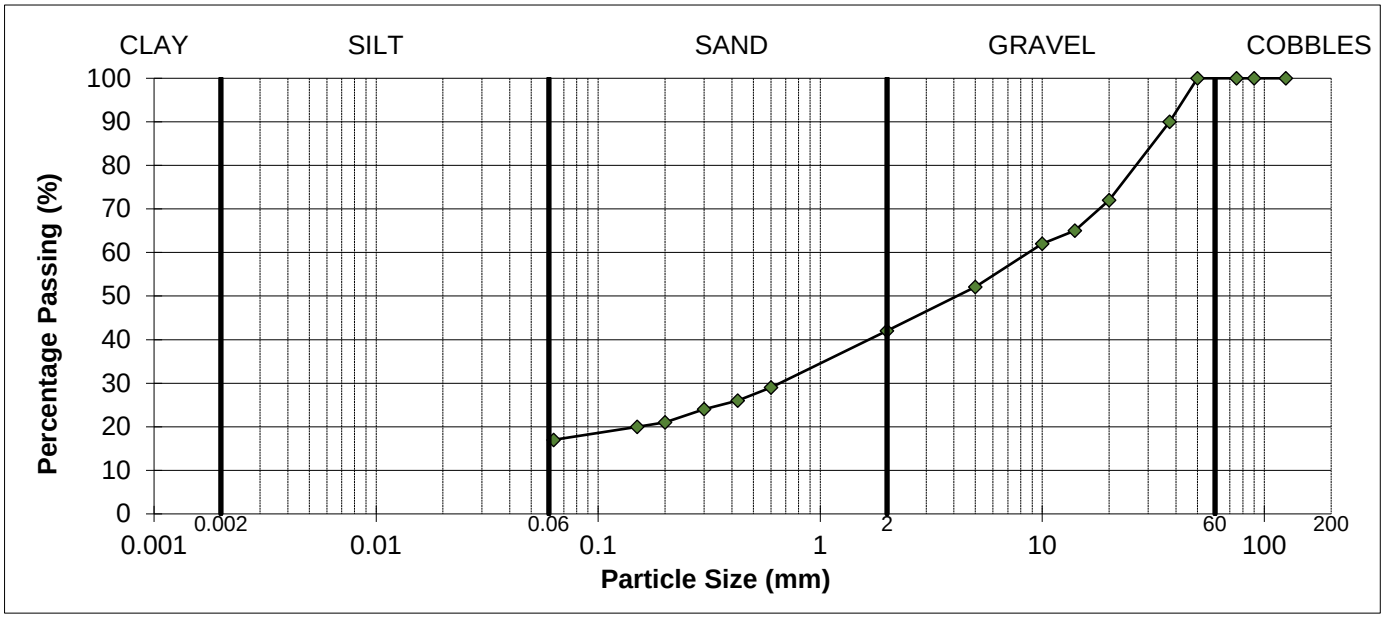
Determination of Water Content in accordance with BS EN ISO 17892-1:2014+A1:2022 (Oven Dry)

CLIENT	e3p
SITE	Pitsford Road, Manchester
JOB NUMBER	MRN 24005/39

SAMPLE LABEL	TP211 2.00	DATE SAMPLED	Not Advised
LAB SAMPLE No	433516	DATE RECEIVED	04-Mar-24
DATE TESTED	05-Mar-24	SAMPLED BY	Client

MATERIAL	Made Ground
ADVISED SOURCE	Site Invesitgation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100	100	5	52	
90	100		2	42	15-80
75	100		0.6	29	
50	100		0.425	26	
37.5	90		0.3	24	
20	72		0.2	21	
14	65		0.15	20	
10	62		0.063	17	15-80



SOIL FRACTIONS			
COBBLES	0%	SAND	25%
GRAVEL	58%	SILT / CLAY	17%

As received water content	27.5%

REMARKS

Sample complies with the advised grading specification for a 2C material (SHW 2016)

SIGNED

NAME O.P. Davies BA (Hons) (Laboratory Manager) DATE 16-Mar-24

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DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

UKAS TESTING 1580

TEST CERTIFICATE

PARTICLE SIZE DISTRIBUTION

BS EN ISO 17892-4:2016

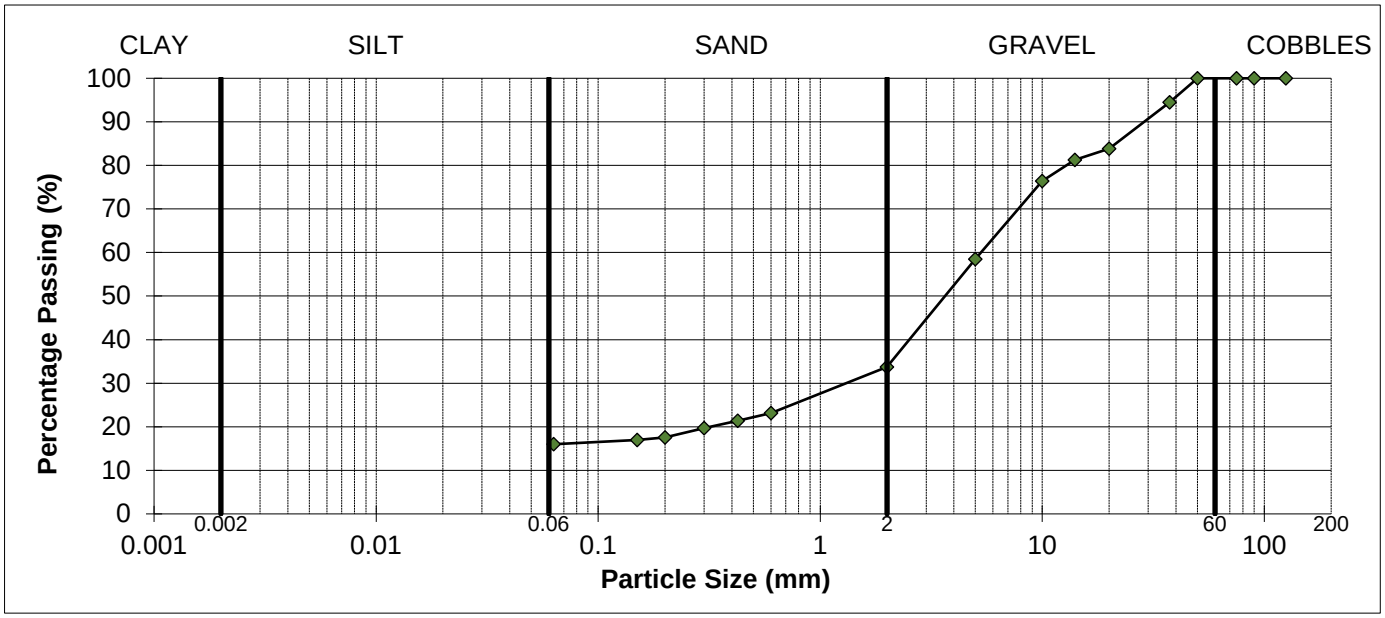
Determination of Water Content in accordance with BS EN ISO 17892-1:2014+A1:2022 (Oven Dry)

CLIENT	e3p
SITE	Pitsford Road, Manchester
JOB NUMBER	MRN 24005/39

SAMPLE LABEL	TP210 0.80	DATE SAMPLED	Not Advised
LAB SAMPLE No	433517	DATE RECEIVED	04-Mar-24
DATE TESTED	05-Mar-24	SAMPLED BY	Client

MATERIAL	Made Ground
ADVISED SOURCE	Site Invesitgation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100	100	5	58	
90	100		2	34	15-80
75	100		0.6	23	
50	100		0.425	21	
37.5	95		0.3	20	
20	84		0.2	18	
14	81		0.15	17	
10	76		0.063	16	15-80



SOIL FRACTIONS			
COBBLES	0%	SAND	18%
GRAVEL	66%	SILT / CLAY	16%

As received water content	26.0%

REMARKS
Sample complies with the advised grading specification for a 2C material (SHW 2016)

SIGNED

NAME O.P. Davies BA (Hons) (Laboratory Manager) DATE 16-Mar-24

M U R R A Y R I X
ANDREW HOUSE, HADFIELD STREET,
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TEL 0161 475 0870

UKAS TESTING 1580

TEST CERTIFICATE

PARTICLE SIZE DISTRIBUTION

BS EN ISO 17892-4:2016

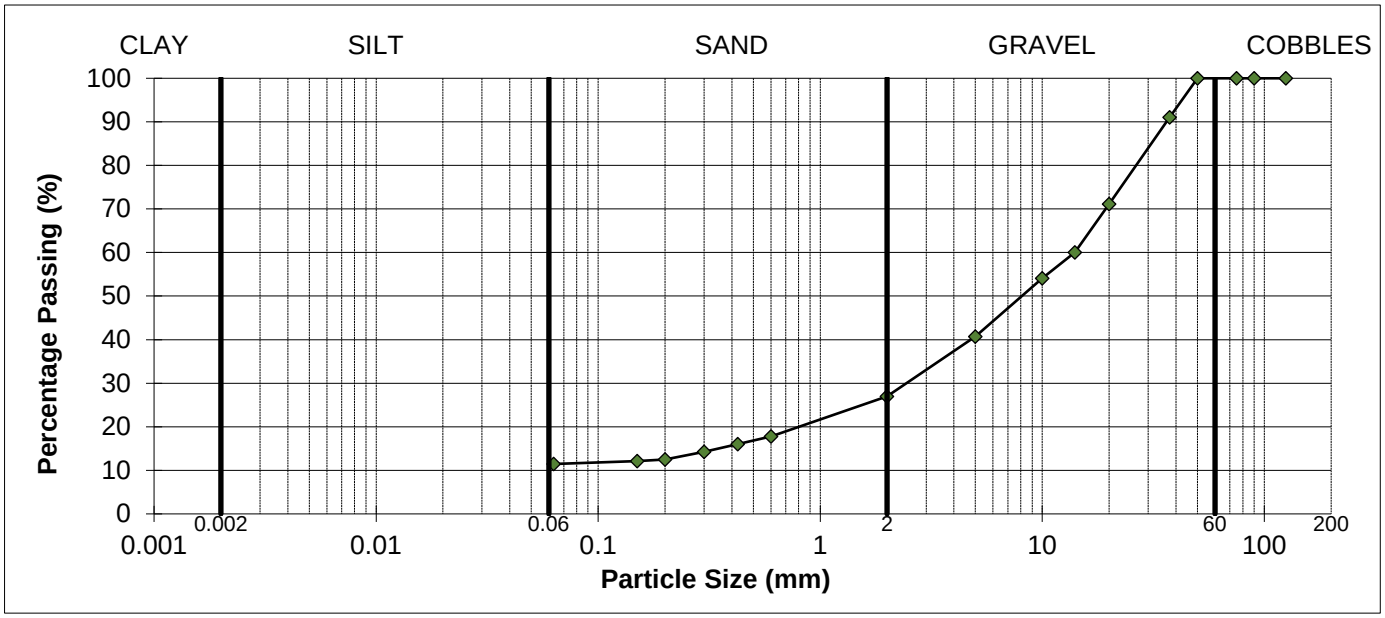
Determination of Water Content in accordance with BS EN ISO 17892-1:2014+A1:2022 (Oven Dry)

CLIENT	e3p
SITE	Pitsford Road, Manchester
JOB NUMBER	MRN 24005/39

SAMPLE LABEL	TP203 0.40	DATE SAMPLED	Not Advised
LAB SAMPLE No	433518	DATE RECEIVED	04-Mar-24
DATE TESTED	05-Mar-24	SAMPLED BY	Client

MATERIAL	Made Ground
ADVISED SOURCE	Site Invesitgation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100	95-100	5	41	
90	100		2	27	
75	100		0.6	18	
50	100		0.425	16	
37.5	91		0.3	14	
20	71		0.2	12	
14	60		0.15	12	
10	54		0.063	11	<15



SOIL FRACTIONS			
COBBLES	0%	SAND	16%
GRAVEL	73%	SILT / CLAY	11%

As received water content	31.1%

REMARKS

Sample complies with the advised grading specification for a 1A material (SHW 2016), Uniformity coefficient = >10

SIGNED

NAME O.P. Davies BA (Hons) (Laboratory Manager) DATE 16-Mar-24

M U R R A Y R I X

ANDREW HOUSE, HADFIELD STREET,
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TEL 0161 475 0870

UKAS TESTING 1580

TEST CERTIFICATE

PARTICLE SIZE DISTRIBUTION

BS EN ISO 17892-4:2016

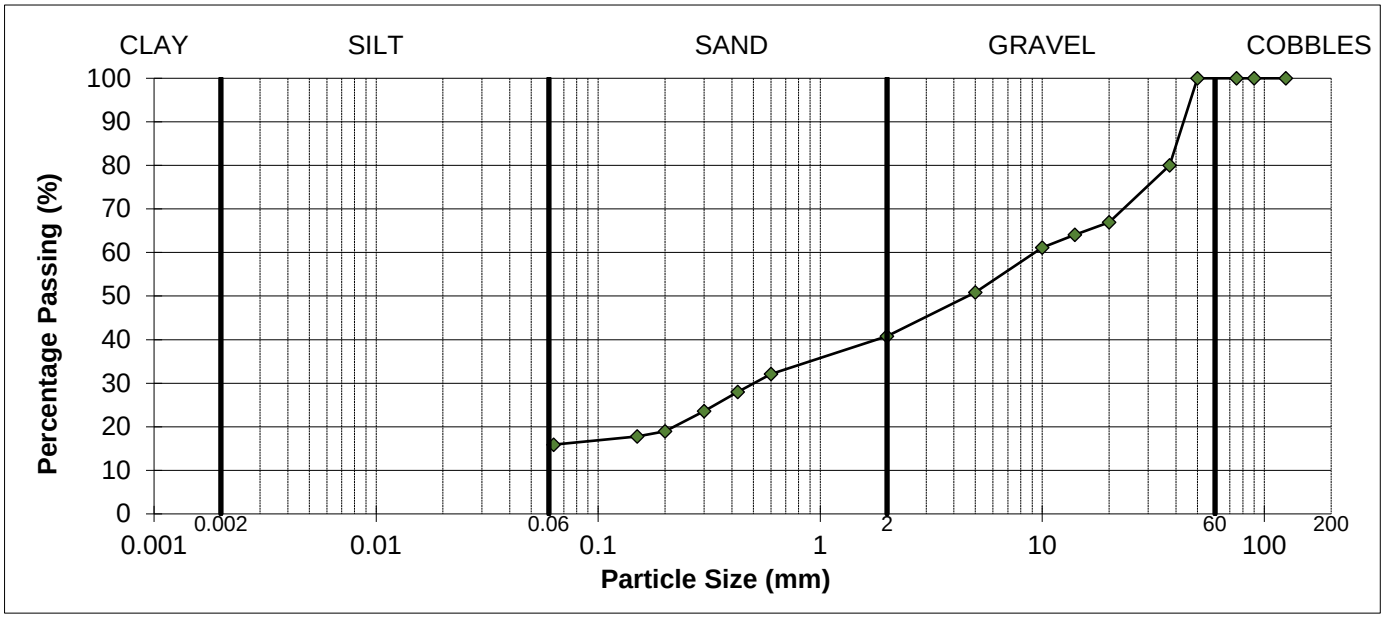
Determination of Water Content in accordance with BS EN ISO 17892-1:2014+A1:2022 (Oven Dry)

CLIENT	e3p
SITE	Pitsford Road, Manchester
JOB NUMBER	MRN 24005/39

SAMPLE LABEL	TP208 2.20	DATE SAMPLED	Not Advised
LAB SAMPLE No	433519	DATE RECEIVED	04-Mar-24
DATE TESTED	05-Mar-24	SAMPLED BY	Client

MATERIAL	Made Ground
ADVISED SOURCE	Site Invesitgation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100	100	5	51	
90	100		2	41	15-80
75	100		0.6	32	
50	100		0.425	28	
37.5	80		0.3	24	
20	67		0.2	19	
14	64		0.15	18	
10	61		0.063	16	15-80



SOIL FRACTIONS			
COBBLES	0%	SAND	25%
GRAVEL	59%	SILT / CLAY	16%

As received water content	19.5%

REMARKS
Sample complies with the advised grading specification for a 2C material (SHW 2016)

SIGNED

NAME O.P. Davies BA (Hons) (Laboratory Manager) DATE 16-Mar-24

M U R R A Y R I X

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PARTICLE SIZE DISTRIBUTION

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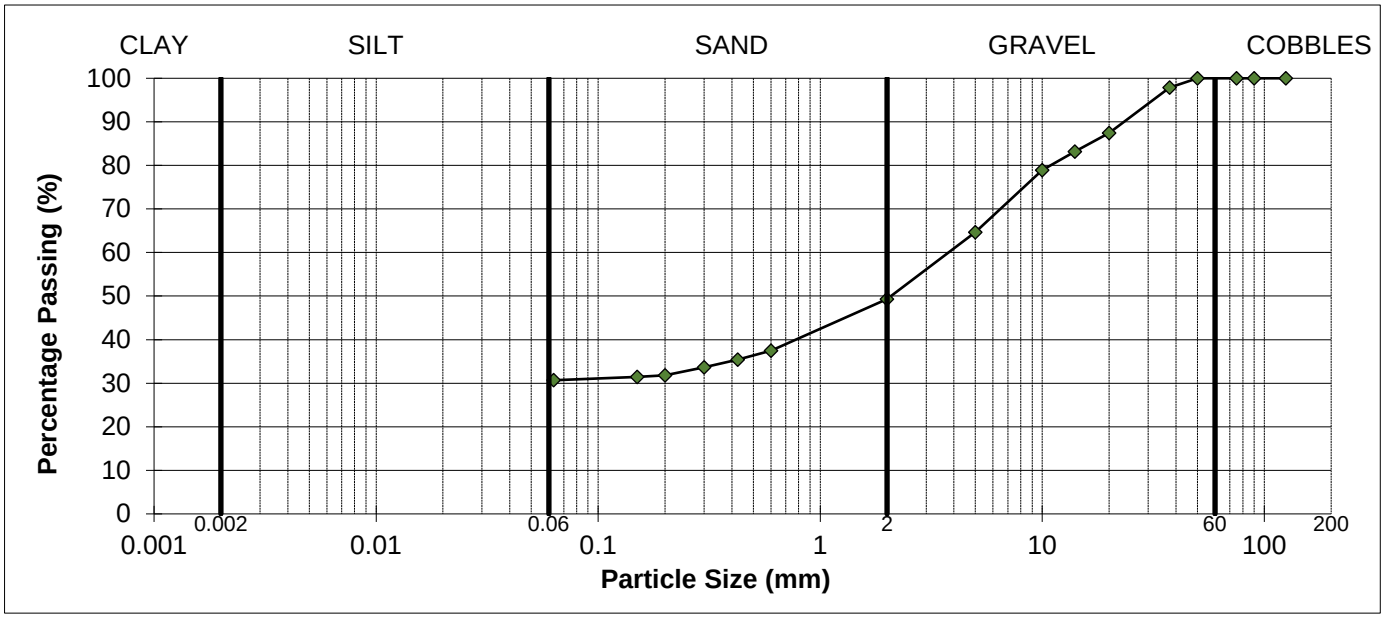
Determination of Water Content in accordance with BS EN ISO 17892-1:2014+A1:2022 (Oven Dry)

CLIENT	e3p
SITE	Pitsford Road, Manchester
JOB NUMBER	MRN 24005/39

SAMPLE LABEL	TP206 1.00	DATE SAMPLED	Not Advised
LAB SAMPLE No	433520	DATE RECEIVED	04-Mar-24
DATE TESTED	05-Mar-24	SAMPLED BY	Client

MATERIAL	Made Ground
ADVISED SOURCE	Site Invesitgation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100	100	5	65	
90	100		2	49	15-80
75	100		0.6	37	
50	100		0.425	35	
37.5	98		0.3	34	
20	87		0.2	32	
14	83		0.15	31	
10	79		0.063	31	15-80



SOIL FRACTIONS			
COBBLES	0%	SAND	19%
GRAVEL	51%	SILT / CLAY	31%

As received water content	27.9%

REMARKS

Sample complies with the advised grading specification for a 2C material (SHW 2016)

SIGNED

NAME O.P. Davies BA (Hons) (Laboratory Manager) DATE 16-Mar-24

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PARTICLE SIZE DISTRIBUTION

BS EN ISO 17892-4:2016

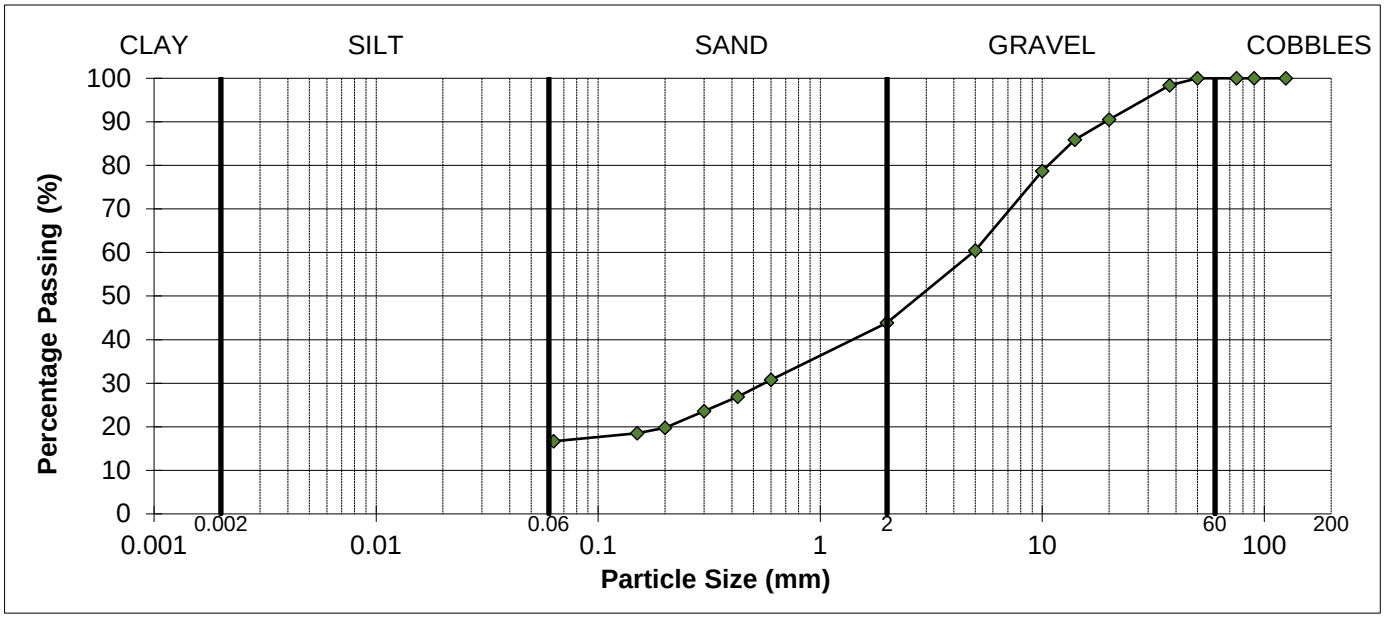
Determination of Water Content in accordance with BS EN ISO 17892-1:2014+A1:2022 (Oven Dry)

CLIENT	e3p
SITE	Pitsford Road, Manchester
JOB NUMBER	MRN 24005/39

SAMPLE LABEL	TP201 0.50	DATE SAMPLED	Not Advised
LAB SAMPLE No	433521	DATE RECEIVED	04-Mar-24
DATE TESTED	05-Mar-24	SAMPLED BY	Client

MATERIAL	Made Ground
ADVISED SOURCE	Site Invesitgation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100	100	5	60	
90	100		2	44	15-80
75	100		0.6	31	
50	100		0.425	27	
37.5	98		0.3	24	
20	91		0.2	20	
14	86		0.15	19	
10	79		0.063	17	15-80



SOIL FRACTIONS			
COBBLES	0%	SAND	27%
GRAVEL	56%	SILT / CLAY	17%

As received water content	26.1%

REMARKS

Sample complies with the advised grading specification for a 2C material (SHW 2016)

SIGNED

NAME O.P. Davies BA (Hons) (Laboratory Manager) DATE 16-Mar-24

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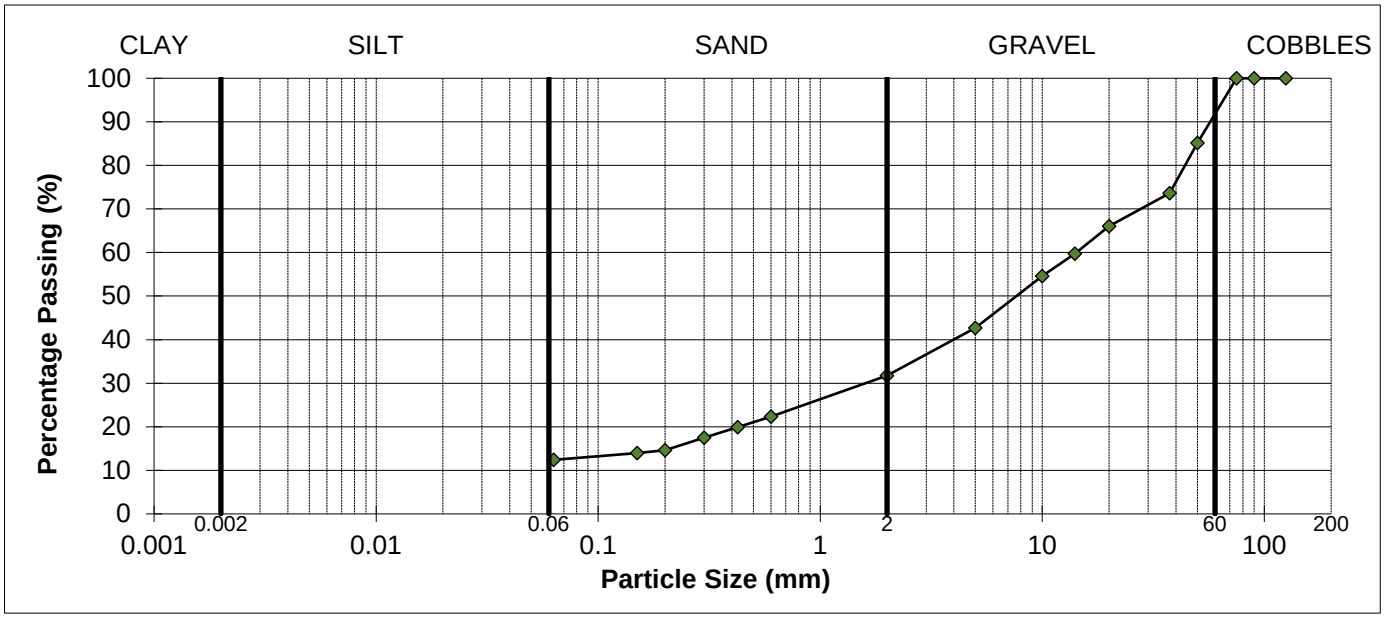
Determination of Water Content in accordance with BS EN ISO 17892-1:2014+A1:2022 (Oven Dry)

CLIENT	e3p
SITE	Pitsford Road, Manchester
JOB NUMBER	MRN 24005/39

SAMPLE LABEL	TP213 2.00	DATE SAMPLED	Not Advised
LAB SAMPLE No	433522	DATE RECEIVED	04-Mar-24
DATE TESTED	05-Mar-24	SAMPLED BY	Client

MATERIAL	Made Ground
ADVISED SOURCE	Site Invesitgation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100	95-100	5	43	
90	100		2	32	
75	100		0.6	22	
50	85		0.425	20	
37.5	74		0.3	18	
20	66		0.2	15	
14	60		0.15	14	
10	55		0.063	12	<15



SOIL FRACTIONS			
COBBLES	7%	SAND	19%
GRAVEL	61%	SILT / CLAY	12%

As received water content	20.1%

REMARKS

Sample complies with the advised grading specification for a 1A material (SHW 2016), Uniformity coefficient = >10

SIGNED

NAME O.P. Davies BA (Hons) (Laboratory Manager) DATE 16-Mar-24

M U R R A Y R I X
ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

UKAS TESTING 1580

TEST CERTIFICATE

PARTICLE SIZE DISTRIBUTION

BS EN ISO 17892-4:2016

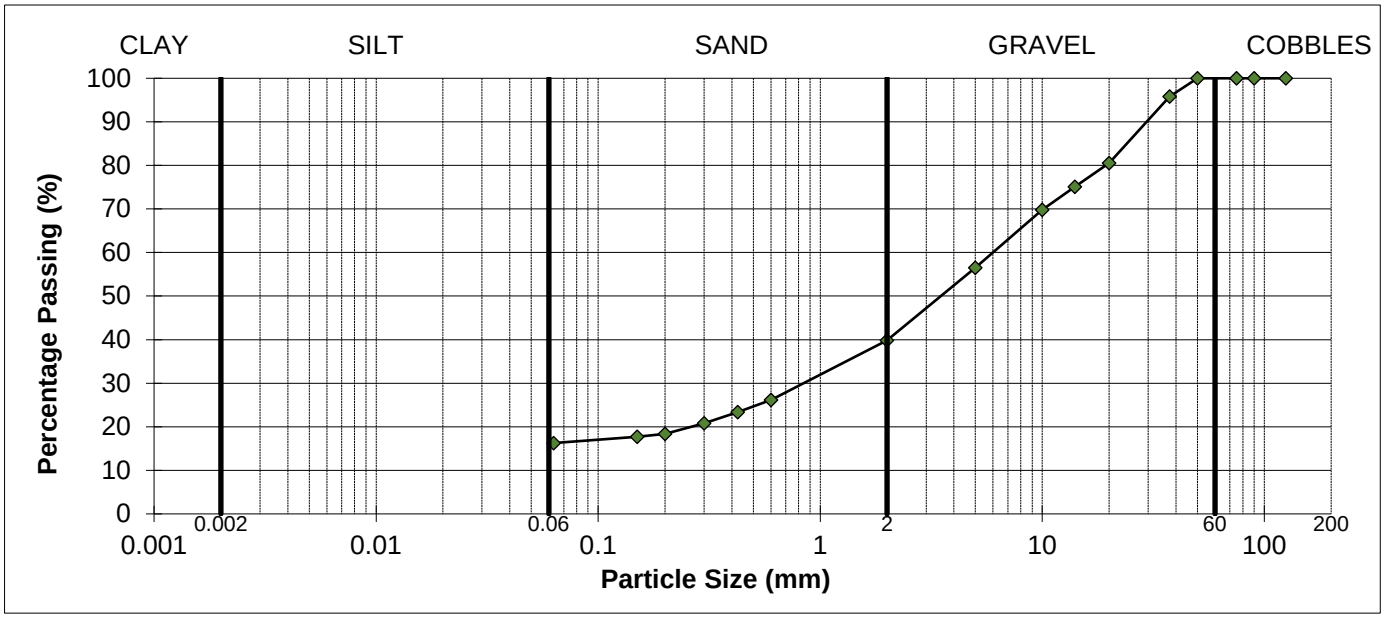
Determination of Water Content in accordance with BS EN ISO 17892-1:2014+A1:2022 (Oven Dry)

CLIENT	e3p
SITE	Pitsford Road, Manchester
JOB NUMBER	MRN 24005/39

SAMPLE LABEL	TP217 1.00	DATE SAMPLED	Not Advised
LAB SAMPLE No	433523	DATE RECEIVED	04-Mar-24
DATE TESTED	05-Mar-24	SAMPLED BY	Client

MATERIAL	Made Ground
ADVISED SOURCE	Site Invesitgation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100	100	5	57	
90	100		2	40	15-80
75	100		0.6	26	
50	100		0.425	23	
37.5	96		0.3	21	
20	81		0.2	18	
14	75		0.15	18	
10	70		0.063	16	15-80



SOIL FRACTIONS			
COBBLES	0%	SAND	24%
GRAVEL	60%	SILT / CLAY	16%

As received water content	22.8%

REMARKS
Sample complies with the advised grading specification for a 2C material (SHW 2016)

SIGNED

NAME O.P. Davies BA (Hons) (Laboratory Manager) DATE 16-Mar-24

M U R R A Y R I X

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

UKAS TESTING 1580

TEST CERTIFICATE

PARTICLE SIZE DISTRIBUTION

BS EN ISO 17892-4:2016

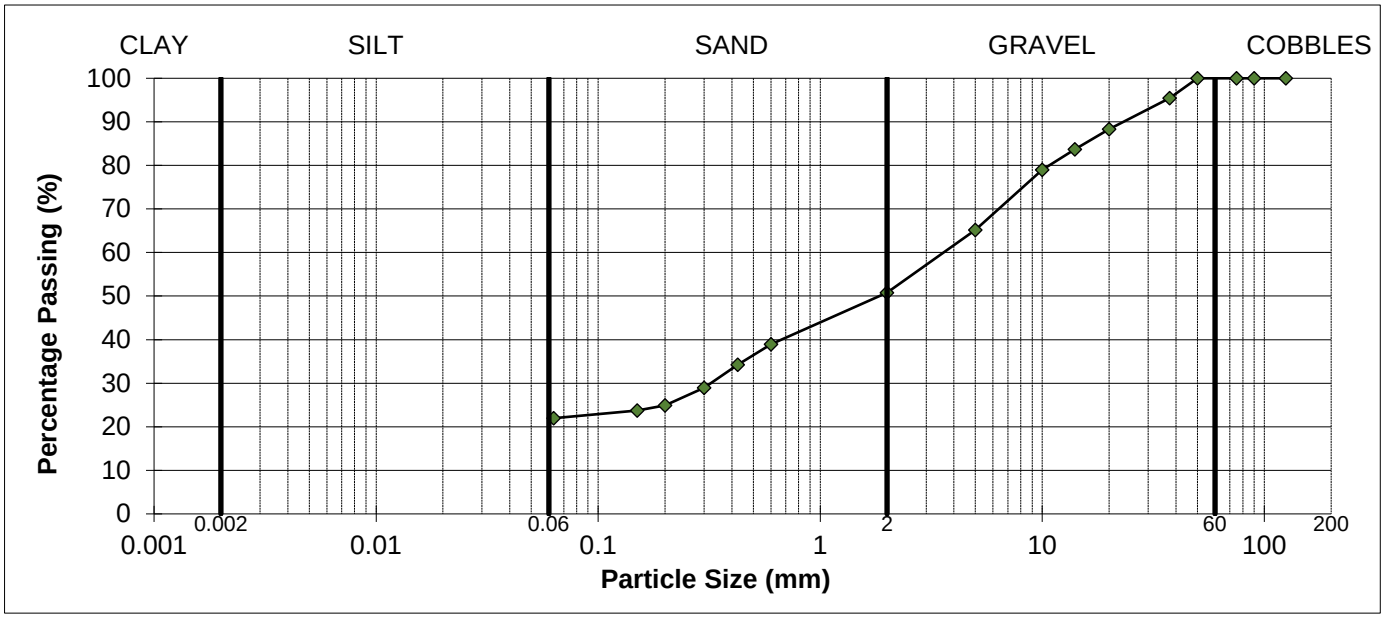
Determination of Water Content in accordance with BS EN ISO 17892-1:2014+A1:2022 (Oven Dry)

CLIENT	e3p
SITE	Pitsford Road, Manchester
JOB NUMBER	MRN 24005/39

SAMPLE LABEL	TP202 1.50	DATE SAMPLED	Not Advised
LAB SAMPLE No	433524	DATE RECEIVED	04-Mar-24
DATE TESTED	05-Mar-24	SAMPLED BY	Client

MATERIAL	Made Ground
ADVISED SOURCE	Site Invesitgation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100	100	5	65	
90	100		2	51	15-80
75	100		0.6	39	
50	100		0.425	34	
37.5	95		0.3	29	
20	88		0.2	25	
14	84		0.15	24	
10	79		0.063	22	15-80



SOIL FRACTIONS			
COBBLES	0%	SAND	29%
GRAVEL	49%	SILT / CLAY	22%

As received water content	27.5%

REMARKS

Sample complies with the advised grading specification for a 2C material (SHW 2016)

SIGNED

NAME O.P. Davies BA (Hons) (Laboratory Manager) DATE 16-Mar-24

M U R R A Y R I X

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

UKAS TESTING 1580

TEST CERTIFICATE

PARTICLE SIZE DISTRIBUTION

BS EN ISO 17892-4:2016

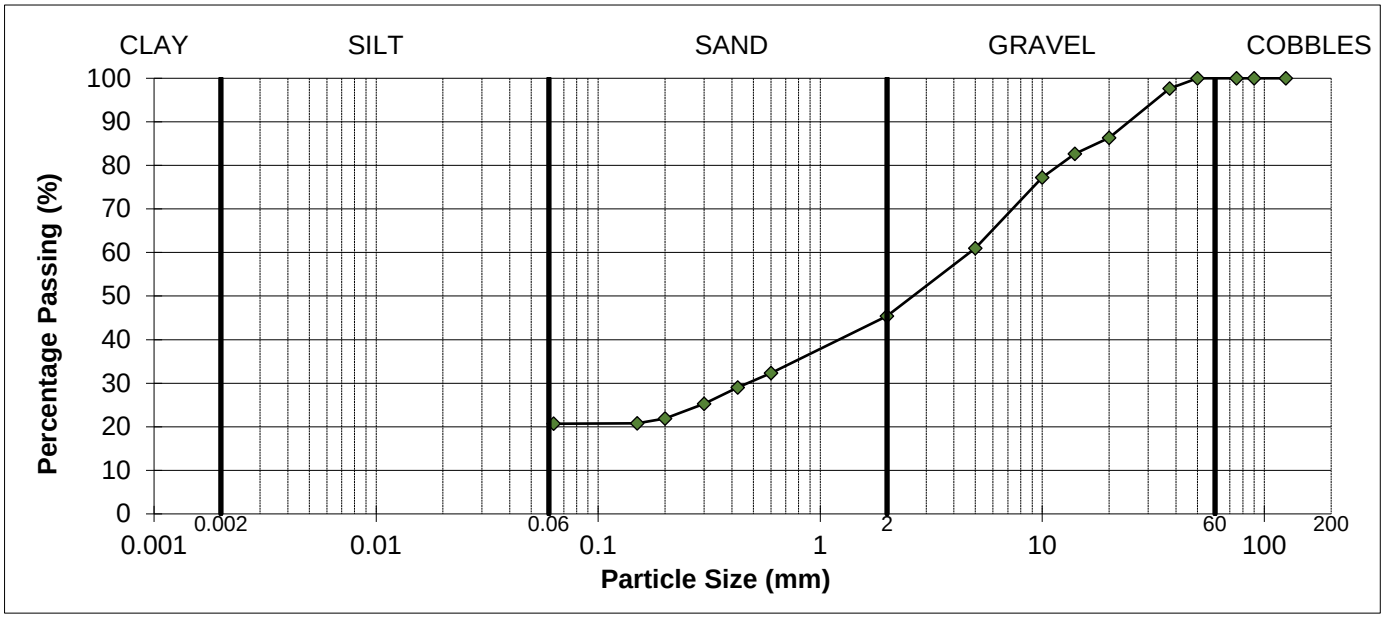
Determination of Water Content in accordance with BS EN ISO 17892-1:2014+A1:2022 (Oven Dry)

CLIENT	e3p
SITE	Pitsford Road, Manchester
JOB NUMBER	MRN 24005/39

SAMPLE LABEL	TP204 0.80	DATE SAMPLED	Not Advised
LAB SAMPLE No	433525	DATE RECEIVED	04-Mar-24
DATE TESTED	05-Mar-24	SAMPLED BY	Client

MATERIAL	Made Ground
ADVISED SOURCE	Site Invesitgation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100	100	5	61	
90	100		2	45	15-80
75	100		0.6	32	
50	100		0.425	29	
37.5	98		0.3	25	
20	86		0.2	22	
14	83		0.15	21	
10	77		0.063	21	15-80



SOIL FRACTIONS			
COBBLES	0%	SAND	25%
GRAVEL	55%	SILT / CLAY	21%

As received water content	23.4%

REMARKS

Sample complies with the advised grading specification for a 2C material (SHW 2016)

SIGNED

NAME O.P. Davies BA (Hons) (Laboratory Manager) DATE 16-Mar-24

MURRAY RIX
CONSULTANCY, SITE INVESTIGATION
CONSTRUCTION MATERIALS TESTING

TEST REPORT

Client e3p

Address Taylor Road
Trafford Park
Urmston
Manchester
M41 7JQ

Contract Pitsford Road,
Manchester

Job Number MRN 24005/39
Date of Issue 31 March 2024
Page 1 of 24

Approved Signatories

S J Hutchings, O P Davies

Notes

1 All remaining samples and remnants from this contract will be disposed 28 days from the date of this report unless you notify us to the contrary.

2 Result certificates, in this report, not bearing a UKAS mark, are not included in our UKAS accreditation schedule.

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

4 Certified that the samples have been examined and tested in accordance with the terms of the contract/order and unless otherwise stated conform to the standards/specifications quoted.

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

6 This certificate should not be reproduced, except in full, without the express permission of the laboratory.

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

DRY DENSITY/WATER CONTENT RELATIONSHIP 4.5kg RAMMER
BS 1377-2:2022 Cl.11
PARTICLE DENSITY METHOD BS 1377-2:2022 Cl.9.2

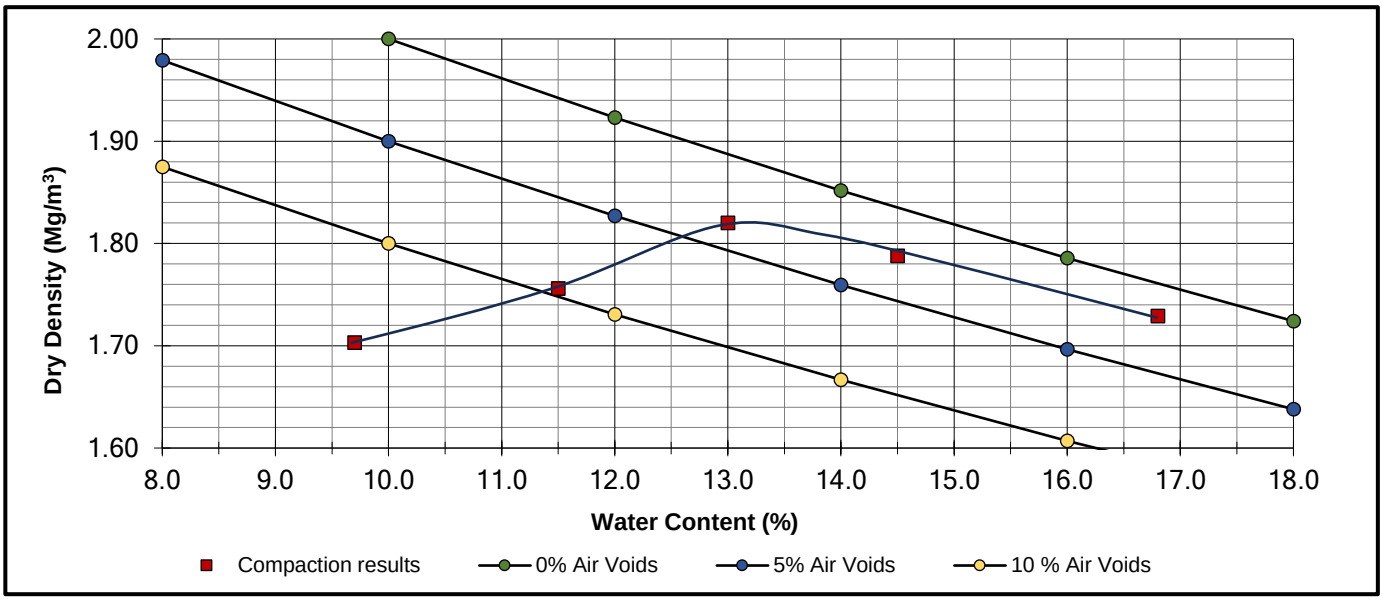
CLIENT	e3p
SITE	Pitsford Road, Manchester
JOB NUMBER	MRN 24005/39

SAMPLE LABEL	TP120 1.60	DATE SAMPLED	Not Advised
SAMPLE NUMBER	433501	DATE RECEIVED	04-Mar-24
DATE TESTED	11-Mar-24	SAMPLED BY	Client

MATERIAL	Made Ground
ADVISED SOURCE	Site Investigation Sample
PRE TREATMENT	Air Dried / Single Sample

RETAINED 37.5mm	5 %	GRADING ZONE	Zone 4
RETAINED 20mm	11 %	PARTICLE DENSITY	2.50 Mg/m3 (Assumed)

POINT NUMBER	WATER CONTENT (%)	DRY DENSITY (Mg/m^3)
1	9.7	1.703
2	11.5	1.756
3	13.0	1.820
4	14.5	1.788
5	16.8	1.729



OPTIMUM WATER CONTENT	**13**	(%)
MAXIMUM DRY DENSITY	**1.82**	(Mg/m^3)

REMARKS

NAME O.P. Davies BA (Hons) (Laboratory Manager) SIGNED DATE 31-Mar-24

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

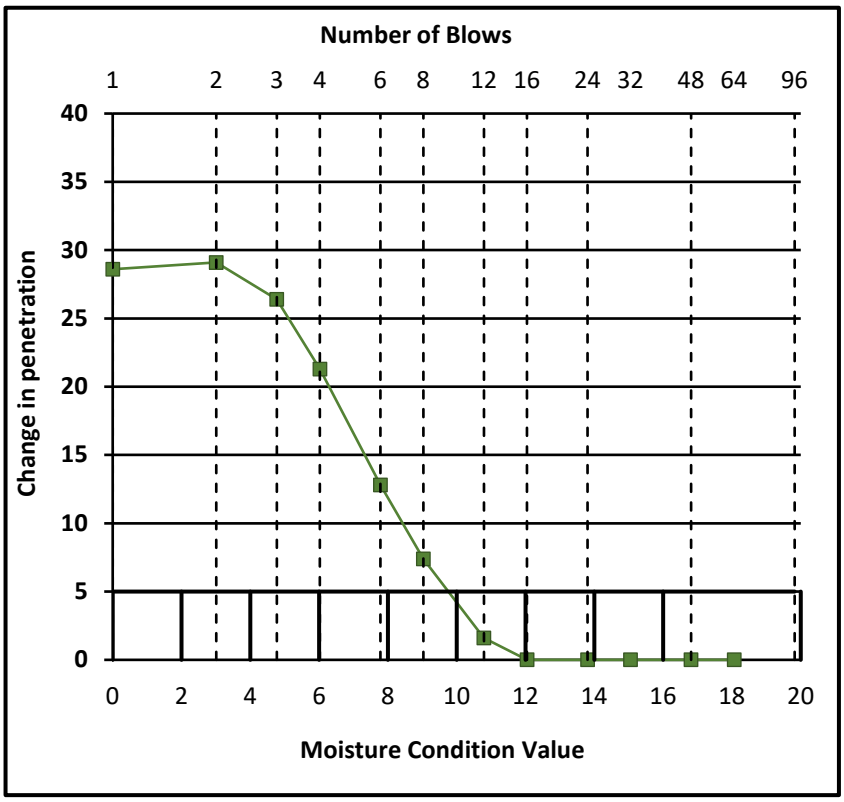
MOISTURE CONDITION VALUE
BS 1377-2:2022 Cl. 13
DETERMINATION OF WATER CONTENT - BS EN ISO 17892-1:2014+A1:2022

CLIENT	e3p
SITE	Pitsford Road, Manchester
JOB NUMBER	MRN 24005/39

SAMPLE LABEL	TP120 1.60	DATE SAMPLED	Not Advised
LAB SAMPLE No	433501	DATE RECEIVED	04-Mar-24
DATE TESTED	16-Mar-24	SAMPLED BY	Client

MATERIAL	Made Ground
ADVISED SOURCE	Site Investigation Sample
INTERPRETATION OF TEST CURVE	Straight line through 5mm change in penetration
PROPORTION LARGER THAN 20mm	11%

Total number of blows (n)	Penetration (mm)	Change in penetration n to 4 n (mm)
1	113.7	28.6
2	99.8	29.1
3	91.2	26.4
4	85.1	21.3
6	76.3	12.8
8	70.7	7.4
12	64.8	1.6
16	63.8	
24	63.5	
32	63.3	
48	63.2	
64		
96		
128		
192		
256		



MOISTURE CONDITION VALUE	**9.7**
WATER CONTENT	**23.8** %

REMARKS

NAME O.P. Davies BA (Hons) (Laboratory Manager) SIGNED DATE 31-Mar-24

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

DRY DENSITY/WATER CONTENT RELATIONSHIP 4.5kg RAMMER
BS 1377-2:2022 Cl.11
PARTICLE DENSITY METHOD BS 1377-2:2022 Cl.9.2

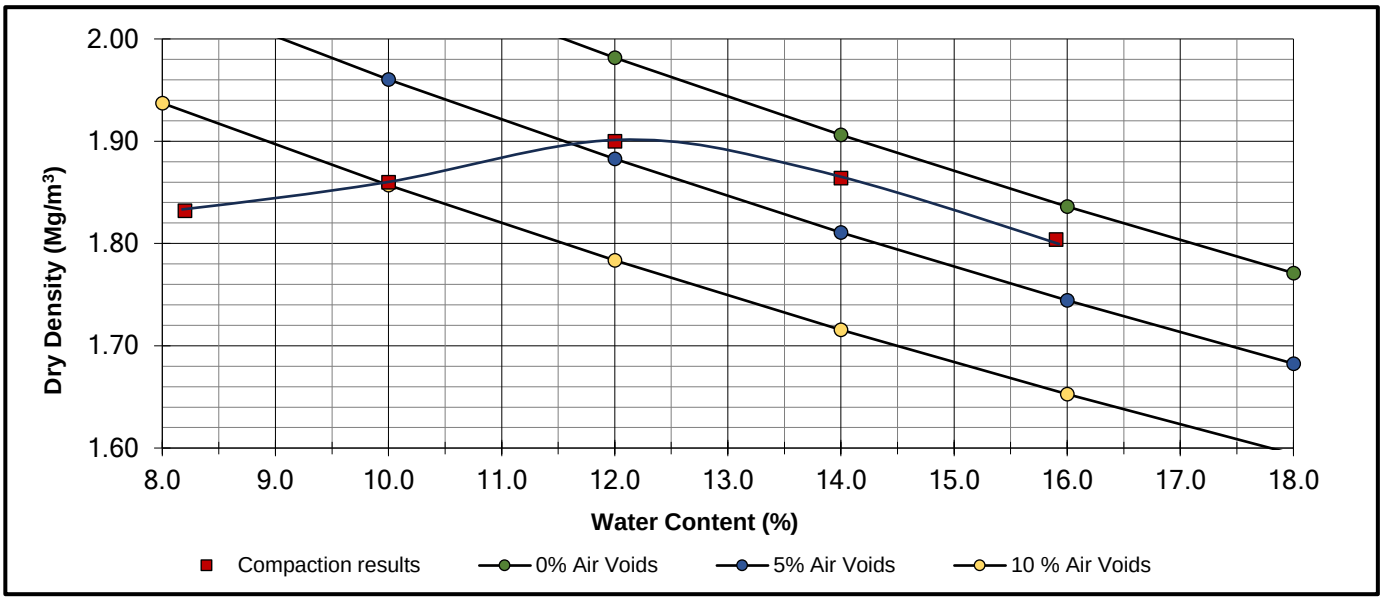
CLIENT	e3p
SITE	Pitsford Road, Manchester
JOB NUMBER	MRN 24005/39

SAMPLE LABEL	TP217 1.50	DATE SAMPLED	Not Advised
SAMPLE NUMBER	433502	DATE RECEIVED	04-Mar-24
DATE TESTED	11-Mar-24	SAMPLED BY	Client

MATERIAL	Made Ground
ADVISED SOURCE	Site Investigation Sample
PRE TREATMENT	Air Dried / Single Sample

RETAINED 37.5mm	0 %	GRADING ZONE	Zone 1
RETAINED 20mm	0 %	PARTICLE DENSITY	2.60 Mg/m3 (Assumed)

POINT NUMBER	WATER CONTENT (%)	DRY DENSITY (Mg/m^3)
1	8.2	1.832
2	10.0	1.860
3	12.0	1.900
4	14.0	1.864
5	15.9	1.804



OPTIMUM WATER CONTENT	**12**	(%)
MAXIMUM DRY DENSITY	**1.90**	(Mg/m^3)

REMARKS

NAME O.P. Davies BA (Hons) (Laboratory Manager) SIGNED DATE 31-Mar-24

MURRAY RIX

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DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

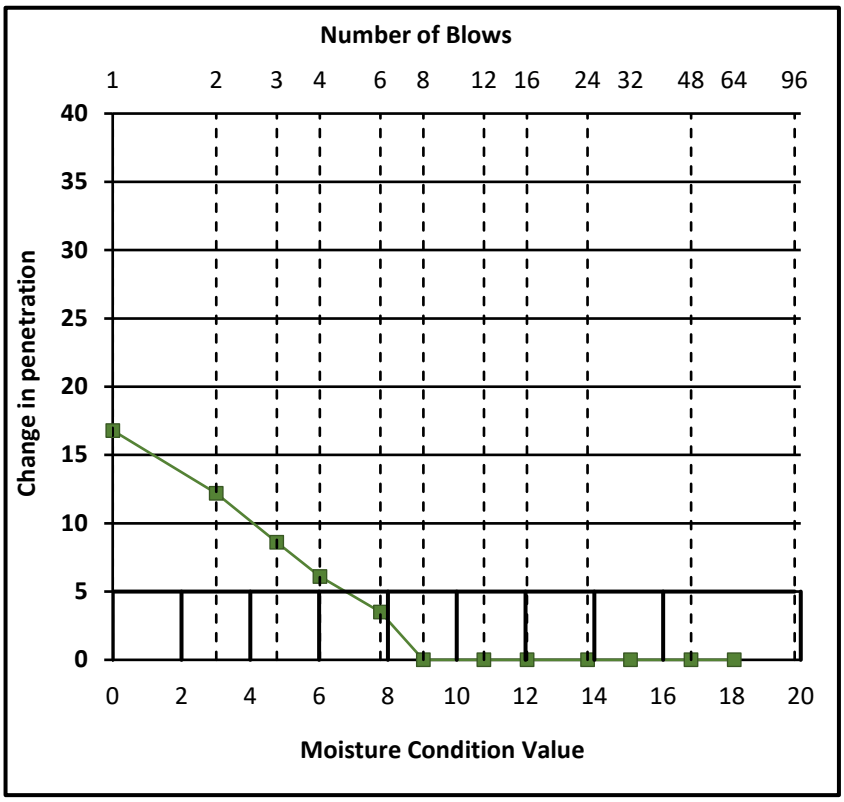
MOISTURE CONDITION VALUE
BS 1377-2:2022 Cl. 13
DETERMINATION OF WATER CONTENT - BS EN ISO 17892-1:2014+A1:2022

CLIENT	e3p
SITE	Pitsford Road, Manchester
JOB NUMBER	MRN 24005/39

SAMPLE LABEL	TP217 1.50	DATE SAMPLED	Not Advised
LAB SAMPLE No	433502	DATE RECEIVED	04-Mar-24
DATE TESTED	16-Mar-24	SAMPLED BY	Client

MATERIAL	Made Ground
ADVISED SOURCE	Site Investigation Sample
INTERPRETATION OF TEST CURVE	Straight line through 5mm change in penetration
PROPORTION LARGER THAN 20mm	0%

Total number of blows (n)	Penetration (mm)	Change in penetration n to 4 n (mm)
1	86.5	16.8
2	77.6	12.2
3	72.7	8.6
4	69.7	6.1
6	66.6	3.5
8	65.4	
12	64.1	
16	63.6	
24	63.1	
32		
48		
64		
96		
128		
192		
256		



MOISTURE CONDITION VALUE	**6.7**
WATER CONTENT	**20.2** %

REMARKS

NAME O.P. Davies BA (Hons) (Laboratory Manager) SIGNED DATE 31-Mar-24

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

DRY DENSITY/WATER CONTENT RELATIONSHIP 4.5kg RAMMER
BS 1377-2:2022 Cl.11
PARTICLE DENSITY METHOD BS 1377-2:2022 Cl.9.2

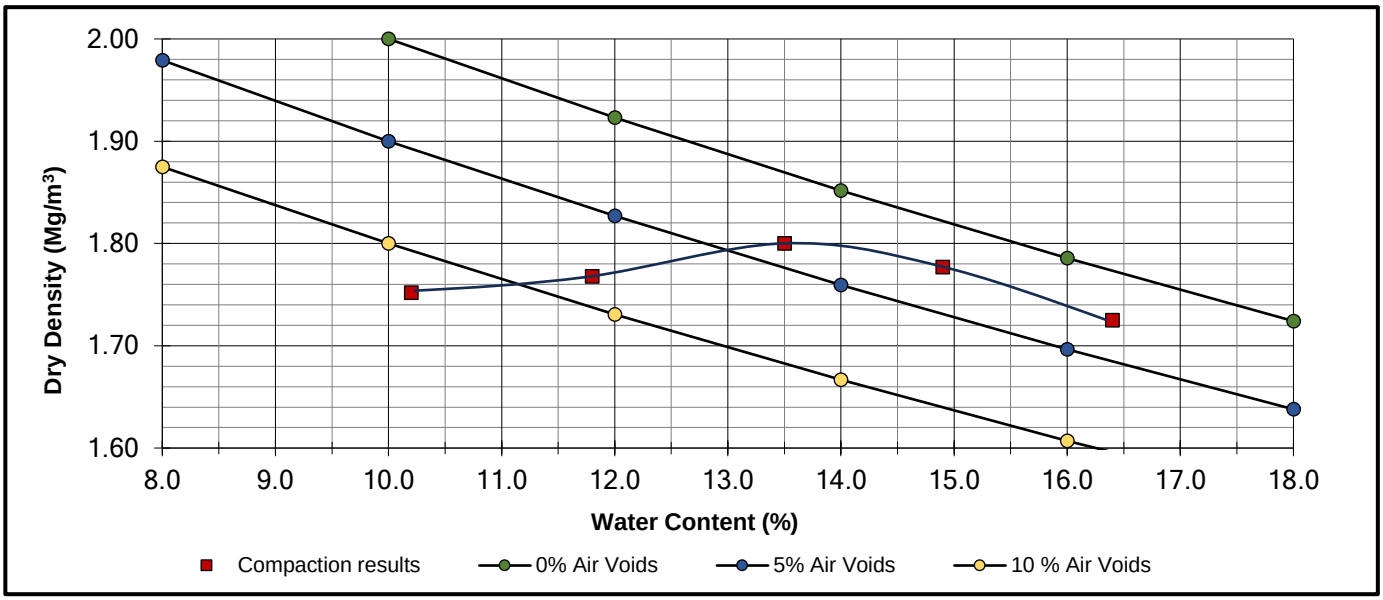
CLIENT	e3p
SITE	Pitsford Road, Manchester
JOB NUMBER	MRN 24005/39

SAMPLE LABEL	TP201 2.00	DATE SAMPLED	Not Advised
SAMPLE NUMBER	433503	DATE RECEIVED	04-Mar-24
DATE TESTED	11-Mar-24	SAMPLED BY	Client

MATERIAL	Made Ground
ADVISED SOURCE	Site Investigation Sample
PRE TREATMENT	Air Dried / Single Sample

RETAINED 37.5mm	0 %	GRADING ZONE	Zone 2
RETAINED 20mm	4 %	PARTICLE DENSITY	2.50 Mg/m3 (Assumed)

POINT NUMBER	WATER CONTENT (%)	DRY DENSITY (Mg/m^3)
1	10.2	1.752
2	11.8	1.768
3	13.5	1.800
4	14.9	1.777
5	16.4	1.725



OPTIMUM WATER CONTENT	**14**	(%)
MAXIMUM DRY DENSITY	**1.80**	(Mg/m^3)

REMARKS

NAME O.P. Davies BA (Hons) (Laboratory Manager) SIGNED DATE 31-Mar-24

MURRAY RIX

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TEL 0161 475 0870

TEST CERTIFICATE

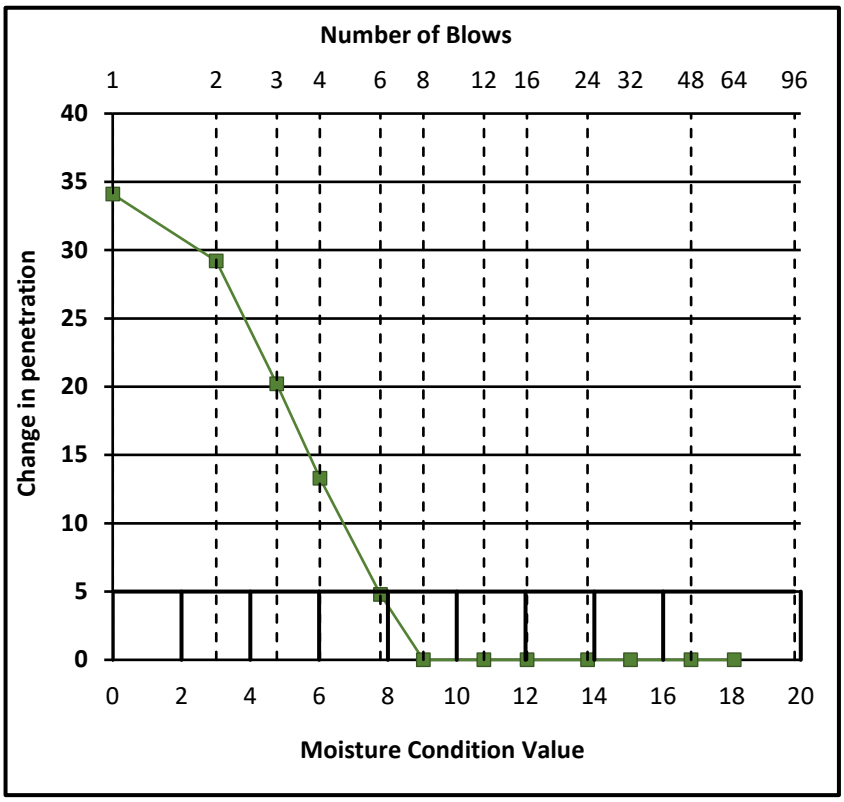
MOISTURE CONDITION VALUE
BS 1377-2:2022 Cl. 13
DETERMINATION OF WATER CONTENT - BS EN ISO 17892-1:2014+A1:2022

CLIENT	e3p
SITE	Pitsford Road, Manchester
JOB NUMBER	MRN 24005/39

SAMPLE LABEL	TP201 2.00	DATE SAMPLED	Not Advised
LAB SAMPLE No	433503	DATE RECEIVED	04-Mar-24
DATE TESTED	16-Mar-24	SAMPLED BY	Client

MATERIAL	Made Ground
ADVISED SOURCE	Site Investigation Sample
INTERPRETATION OF TEST CURVE	Straight line through 5mm change in penetration
PROPORTION LARGER THAN 20mm	4%

Total number of blows (n)	Penetration (mm)	Change in penetration n to 4 n (mm)
1	115.6	34.1
2	98.5	29.2
3	88.6	20.2
4	81.5	13.3
6	72.7	4.8
8	69.3	
12	68.4	
16	68.2	
24	67.9	
32		
48		
64		
96		
128		
192		
256		



MOISTURE CONDITION VALUE	**7.9**
WATER CONTENT	**24.9** %

REMARKS

NAME O.P. Davies BA (Hons) (Laboratory Manager) SIGNED DATE 31-Mar-24

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

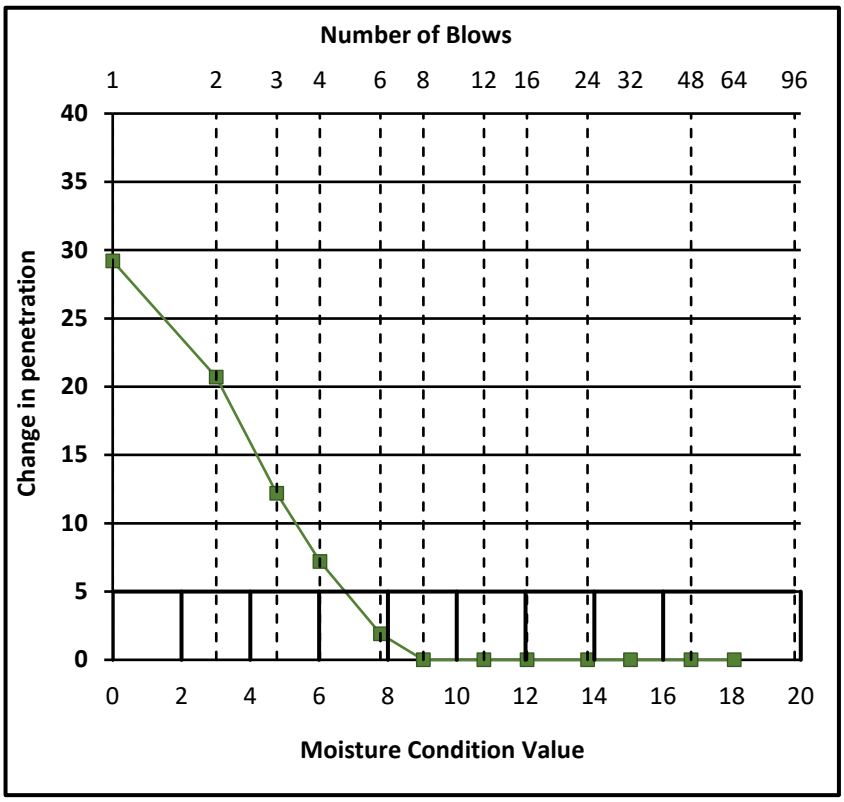
MOISTURE CONDITION VALUE
BS 1377-2:2022 Cl. 13
DETERMINATION OF WATER CONTENT - BS EN ISO 17892-1:2014+A1:2022

CLIENT	e3p
SITE	Pitsford Road, Manchester
JOB NUMBER	MRN 24005/39

SAMPLE LABEL	TP216 2.20	DATE SAMPLED	Not Advised
LAB SAMPLE No	433504	DATE RECEIVED	04-Mar-24
DATE TESTED	16-Mar-24	SAMPLED BY	Client

MATERIAL	Made Ground
ADVISED SOURCE	Site Investigation Sample
INTERPRETATION OF TEST CURVE	Straight line through 5mm change in penetration
PROPORTION LARGER THAN 20mm	0%

Total number of blows (n)	Penetration (mm)	Change in penetration n to 4 n (mm)
1	100.4	29.2
2	85.2	20.7
3	76.3	12.2
4	71.2	7.2
6	65.7	1.9
8	64.5	
12	64.1	
16	64.0	
24	63.8	
32		
48		
64		
96		
128		
192		
256		



MOISTURE CONDITION VALUE	**6.8**
WATER CONTENT	**20.2** %

REMARKS

NAME O.P. Davies BA (Hons) (Laboratory Manager) SIGNED DATE 31-Mar-24

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

DRY DENSITY/WATER CONTENT RELATIONSHIP 4.5kg RAMMER
BS 1377-2:2022 Cl.11
PARTICLE DENSITY METHOD BS 1377-2:2022 Cl.9.2

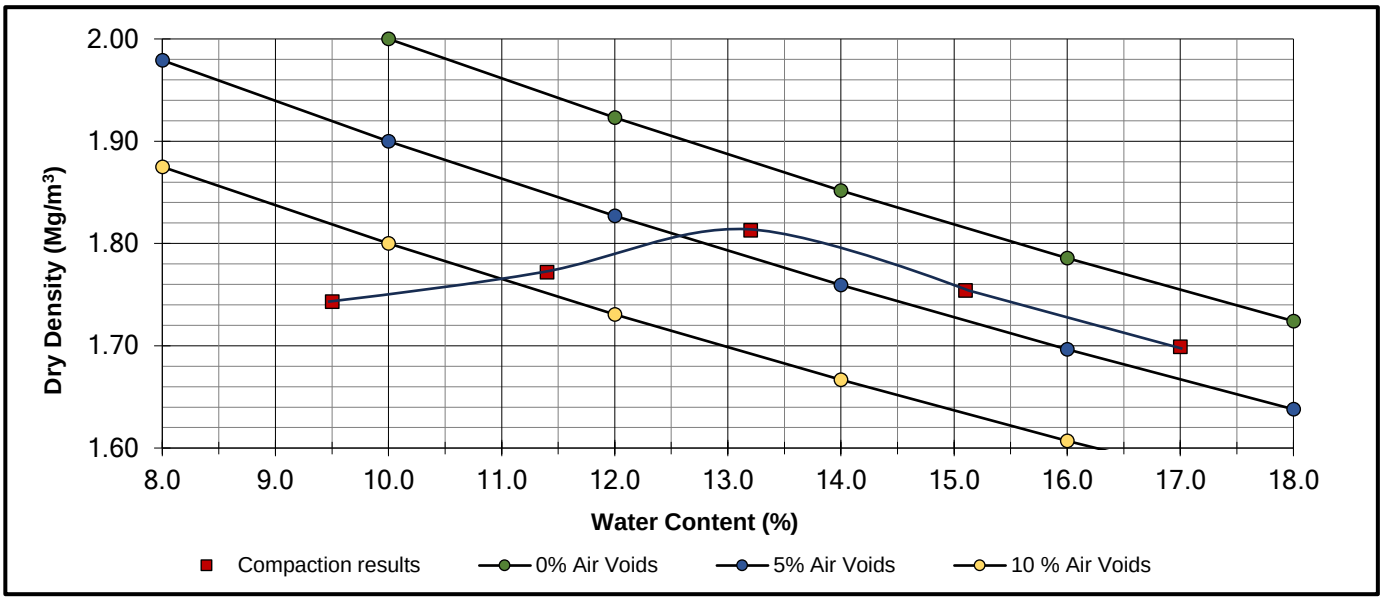
CLIENT	e3p
SITE	Pitsford Road, Manchester
JOB NUMBER	MRN 24005/39

SAMPLE LABEL	TP219 2.00	DATE SAMPLED	Not Advised
SAMPLE NUMBER	433505	DATE RECEIVED	04-Mar-24
DATE TESTED	11-Mar-24	SAMPLED BY	Client

MATERIAL	Made Ground
ADVISED SOURCE	Site Investigation Sample
PRE TREATMENT	Air Dried / Single Sample

RETAINED 37.5mm	0 %	GRADING ZONE	Zone 1
RETAINED 20mm	0 %	PARTICLE DENSITY	2.50 Mg/m3 (Assumed)

POINT NUMBER	WATER CONTENT (%)	DRY DENSITY (Mg/m^3)
1	9.5	1.743
2	11.4	1.772
3	13.2	1.813
4	15.1	1.754
5	17.0	1.699



OPTIMUM WATER CONTENT	**13**	(%)
MAXIMUM DRY DENSITY	**1.81**	(Mg/m^3)

REMARKS

NAME O.P. Davies BA (Hons) (Laboratory Manager) SIGNED DATE 31-Mar-24

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

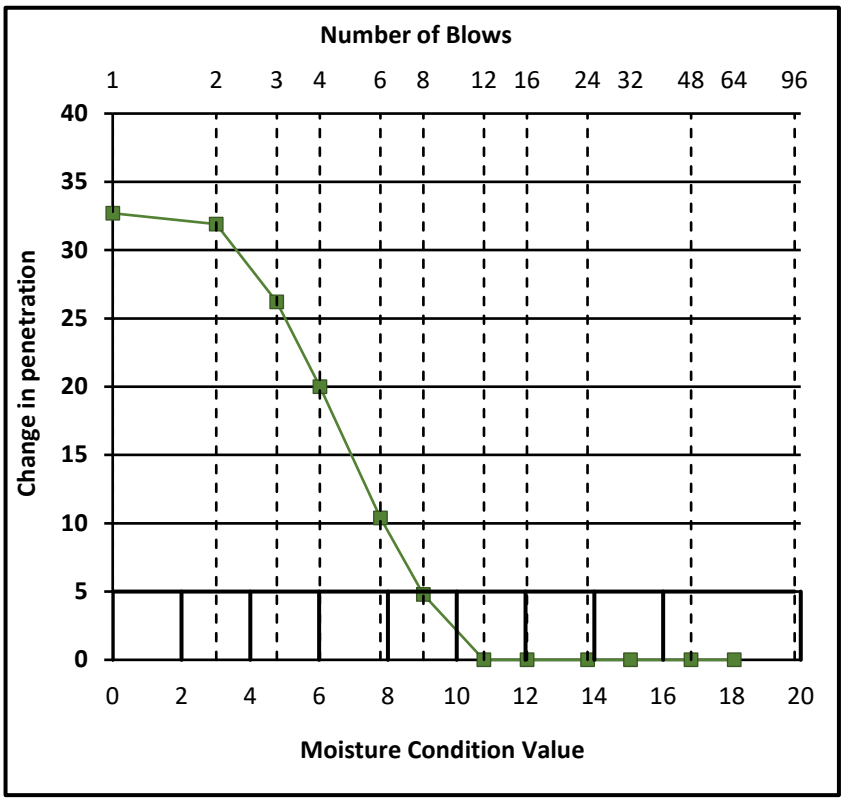
MOISTURE CONDITION VALUE
BS 1377-2:2022 Cl. 13
DETERMINATION OF WATER CONTENT - BS EN ISO 17892-1:2014+A1:2022

CLIENT	e3p
SITE	Pitsford Road, Manchester
JOB NUMBER	MRN 24005/39

SAMPLE LABEL	TP219 2.00	DATE SAMPLED	Not Advised
LAB SAMPLE No	433505	DATE RECEIVED	04-Mar-24
DATE TESTED	16-Mar-24	SAMPLED BY	Client

MATERIAL	Made Ground
ADVISED SOURCE	Site Investigation Sample
INTERPRETATION OF TEST CURVE	Straight line through 5mm change in penetration
PROPORTION LARGER THAN 20mm	0%

Total number of blows (n)	Penetration (mm)	Change in penetration n to 4 n (mm)
1	118.7	32.7
2	102.4	31.9
3	92.6	26.2
4	86.0	20.0
6	76.2	10.4
8	70.5	4.8
12	66.4	
16	66.0	
24	65.8	
32	65.7	
48		
64		
96		
128		
192		
256		



MOISTURE CONDITION VALUE	**9.0**
WATER CONTENT	**19.8** %

REMARKS

NAME O.P. Davies BA (Hons) (Laboratory Manager) SIGNED DATE 31-Mar-24

MURRAY RIX

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DUKINFIELD, CHESHIRE SK16 4QX
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TEST CERTIFICATE

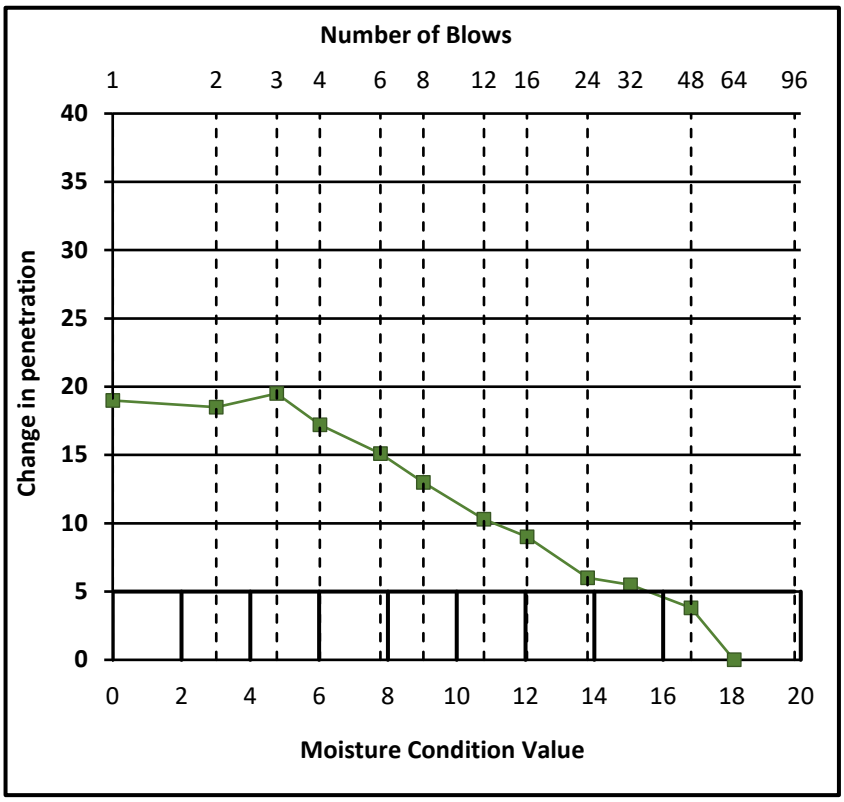
MOISTURE CONDITION VALUE
BS 1377-2:2022 Cl. 13
DETERMINATION OF WATER CONTENT - BS EN ISO 17892-1:2014+A1:2022

CLIENT	e3p
SITE	Pitsford Road, Manchester
JOB NUMBER	MRN 24005/39

SAMPLE LABEL	TP220 0.70	DATE SAMPLED	Not Advised
LAB SAMPLE No	433511	DATE RECEIVED	04-Mar-24
DATE TESTED	16-Mar-24	SAMPLED BY	Client

MATERIAL	Made Ground
ADVISED SOURCE	Site Investigation Sample
INTERPRETATION OF TEST CURVE	Straight line through 5mm change in penetration
PROPORTION LARGER THAN 20mm	16%

Total number of blows (n)	Penetration (mm)	Change in penetration n to 4 n (mm)
1	132.7	19.0
2	122.6	18.5
3	118.6	19.5
4	113.7	17.2
6	107.6	15.1
8	104.1	13.0
12	99.1	10.3
16	96.5	9.0
24	92.5	6.0
32	91.1	5.5
48	88.8	3.8
64	87.5	
96	86.5	
128	85.6	
192	85.0	
256		



MOISTURE CONDITION VALUE	**15.5**
WATER CONTENT	**28.4** %

REMARKS

NAME O.P. Davies BA (Hons) (Laboratory Manager) SIGNED DATE 31-Mar-24

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

DRY DENSITY/WATER CONTENT RELATIONSHIP 4.5kg RAMMER
BS 1377-2:2022 Cl.11
PARTICLE DENSITY METHOD BS 1377-2:2022 Cl.9.2

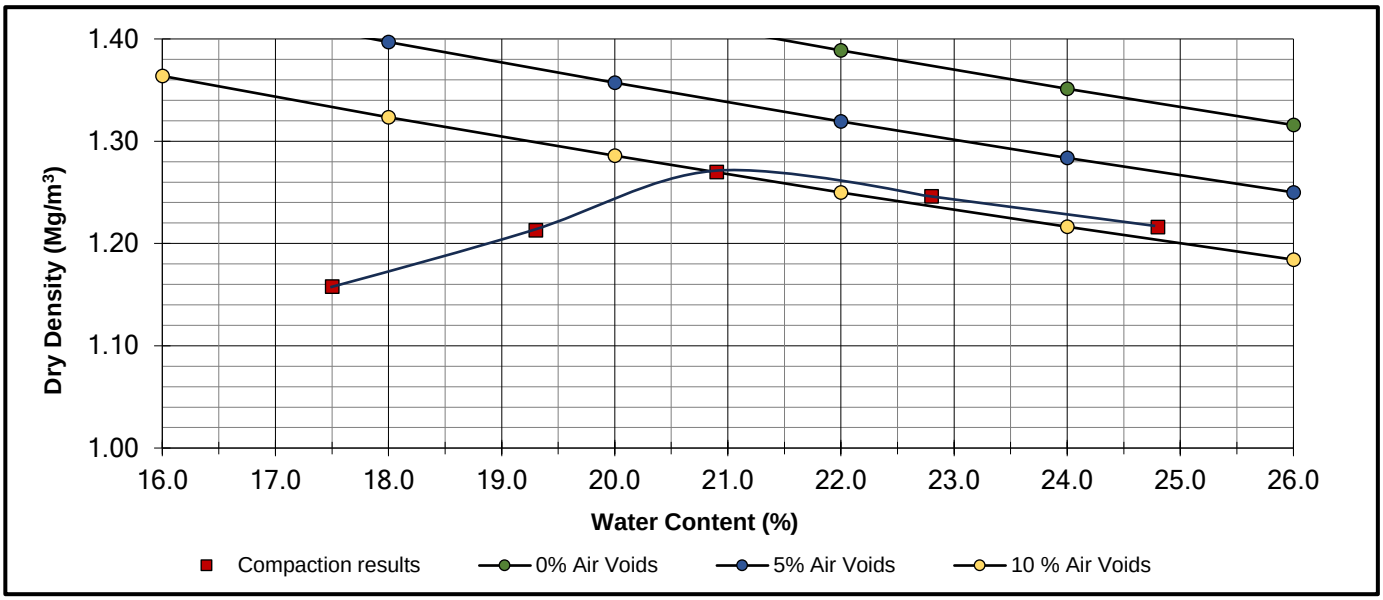
CLIENT	e3p
SITE	Pitsford Road, Manchester
JOB NUMBER	MRN 24005/39

SAMPLE LABEL	TP218 0.50	DATE SAMPLED	Not Advised
SAMPLE NUMBER	433512	DATE RECEIVED	04-Mar-24
DATE TESTED	11-Mar-24	SAMPLED BY	Client

MATERIAL	Made Ground
ADVISED SOURCE	Site Investigation Sample
PRE TREATMENT	Air Dried / Single Sample

RETAINED 37.5mm	4 %	GRADING ZONE	Zone 4
RETAINED 20mm	17 %	PARTICLE DENSITY	2.00 Mg/m3 (Assumed)

POINT NUMBER	WATER CONTENT (%)	DRY DENSITY (Mg/m^3)
1	17.5	1.158
2	19.3	1.213
3	20.9	1.270
4	22.8	1.246
5	24.8	1.216



OPTIMUM WATER CONTENT	**21**	(%)
MAXIMUM DRY DENSITY	**1.27**	(Mg/m^3)

REMARKS

NAME O.P. Davies BA (Hons) (Laboratory Manager) SIGNED DATE 31-Mar-24

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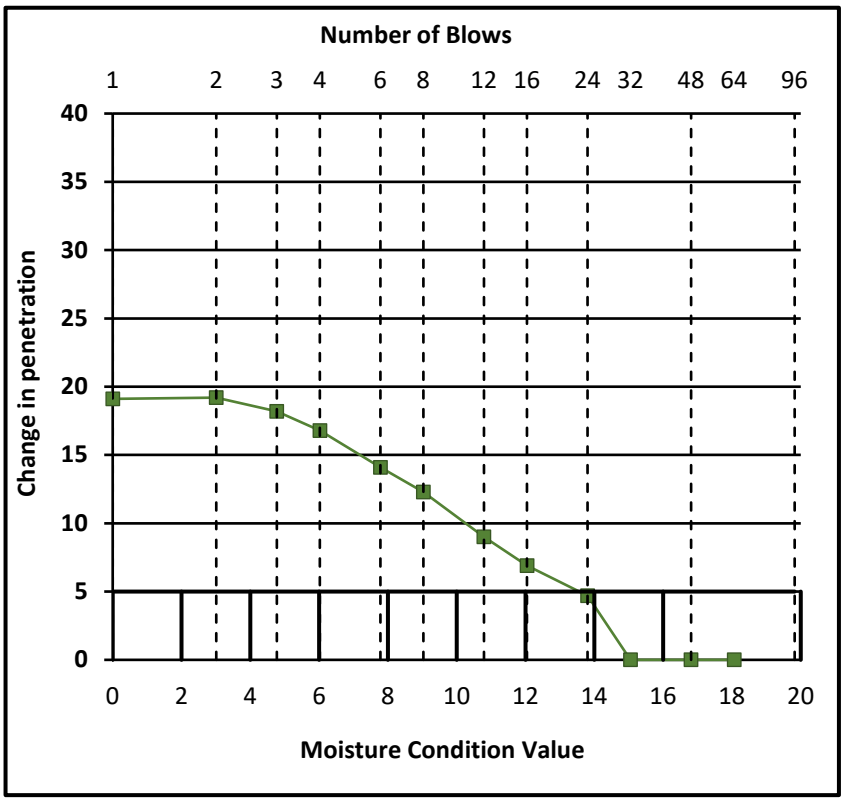
MOISTURE CONDITION VALUE
BS 1377-2:2022 Cl. 13
DETERMINATION OF WATER CONTENT - BS EN ISO 17892-1:2014+A1:2022

CLIENT	e3p
SITE	Pitsford Road, Manchester
JOB NUMBER	MRN 24005/39

SAMPLE LABEL	TP216 2.00	DATE SAMPLED	Not Advised
LAB SAMPLE No	433513	DATE RECEIVED	04-Mar-24
DATE TESTED	16-Mar-24	SAMPLED BY	Client

MATERIAL	Made Ground
ADVISED SOURCE	Site Investigation Sample
INTERPRETATION OF TEST CURVE	Straight line through 5mm change in penetration
PROPORTION LARGER THAN 20mm	18%

Total number of blows (n)	Penetration (mm)	Change in penetration n to 4 n (mm)
1	129.7	19.1
2	121.4	19.2
3	114.9	18.2
4	110.6	16.8
6	105.0	14.1
8	102.2	12.3
12	96.7	9.0
16	93.8	6.9
24	90.9	4.7
32	89.9	
48	87.7	
64	86.9	
96	86.2	
128		
192		
256		



MOISTURE CONDITION VALUE	**13.4**
WATER CONTENT	**32.2** %

REMARKS

NAME O.P. Davies BA (Hons) (Laboratory Manager) SIGNED DATE 31-Mar-24

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DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

DRY DENSITY/WATER CONTENT RELATIONSHIP 4.5kg RAMMER
BS 1377-2:2022 Cl.11
PARTICLE DENSITY METHOD BS 1377-2:2022 Cl.9.2

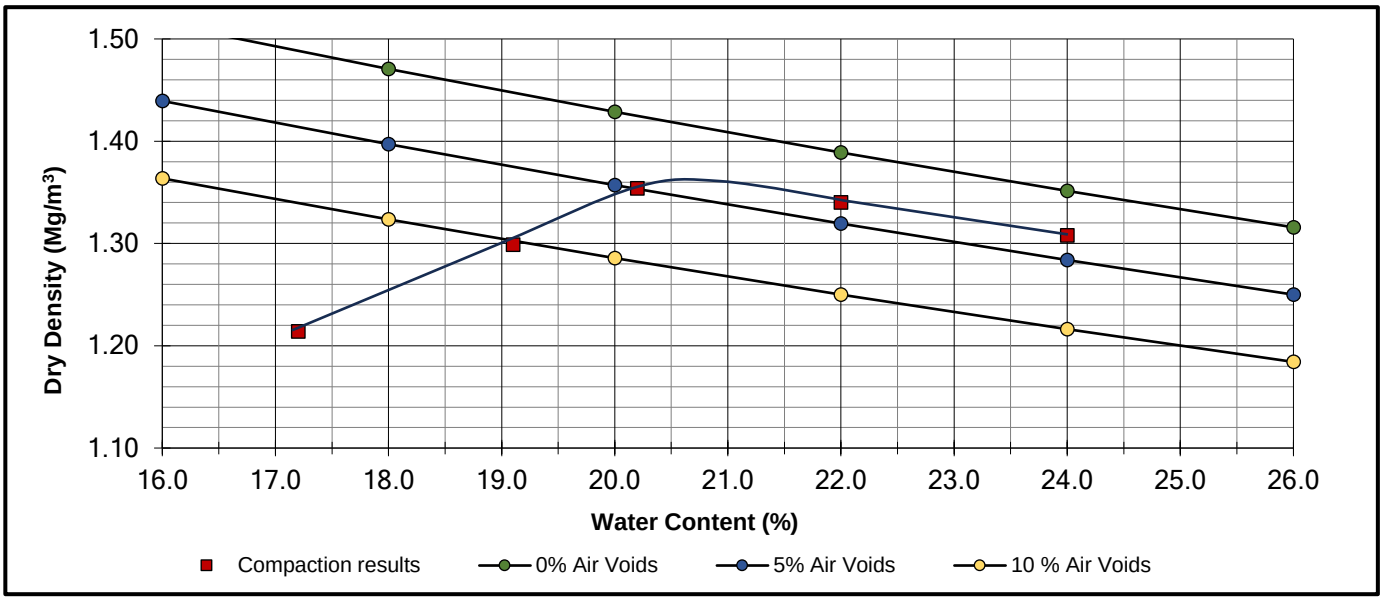
CLIENT	e3p
SITE	Pitsford Road, Manchester
JOB NUMBER	MRN 24005/39

SAMPLE LABEL	TP214 1.50	DATE SAMPLED	Not Advised
SAMPLE NUMBER	433514	DATE RECEIVED	04-Mar-24
DATE TESTED	11-Mar-24	SAMPLED BY	Client

MATERIAL	Made Ground
ADVISED SOURCE	Site Investigation Sample
PRE TREATMENT	Air Dried / Single Sample

RETAINED 37.5mm	2 %	GRADING ZONE	Zone 4
RETAINED 20mm	19 %	PARTICLE DENSITY	2.00 Mg/m3 (Assumed)

POINT NUMBER	WATER CONTENT (%)	DRY DENSITY (Mg/m^3)
1	17.2	1.214
2	19.1	1.299
3	20.2	1.354
4	22.0	1.340
5	24.0	1.308



OPTIMUM WATER CONTENT	**21**	(%)
MAXIMUM DRY DENSITY	**1.36**	(Mg/m^3)

REMARKS

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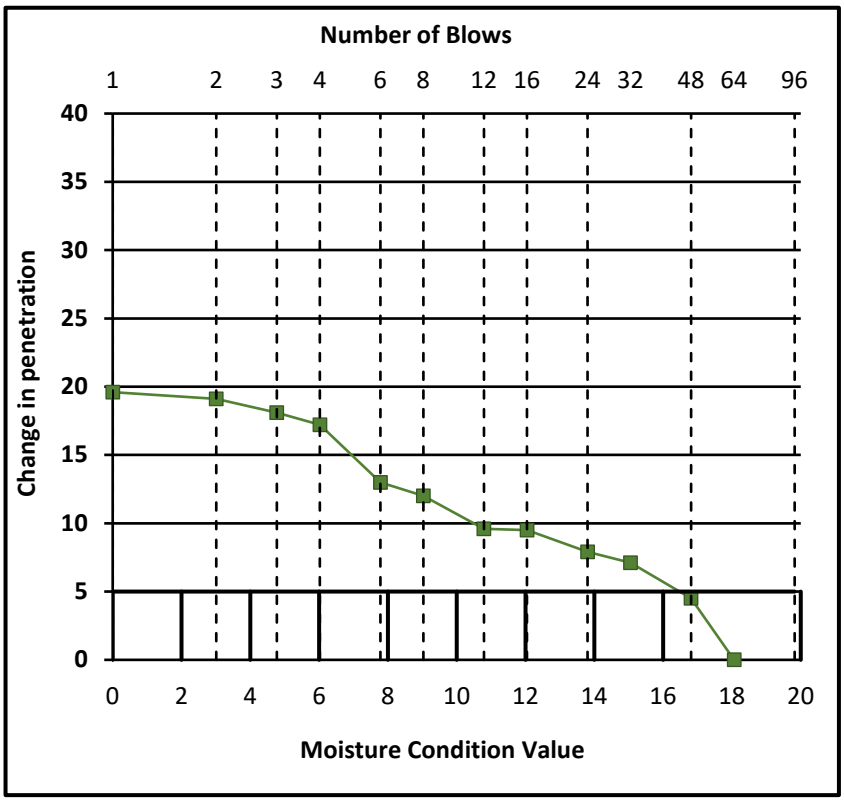
MOISTURE CONDITION VALUE
BS 1377-2:2022 Cl. 13
DETERMINATION OF WATER CONTENT - BS EN ISO 17892-1:2014+A1:2022

CLIENT	e3p
SITE	Pitsford Road, Manchester
JOB NUMBER	MRN 24005/39

SAMPLE LABEL	TP212 0.40	DATE SAMPLED	Not Advised
LAB SAMPLE No	433515	DATE RECEIVED	04-Mar-24
DATE TESTED	16-Mar-24	SAMPLED BY	Client

MATERIAL	Made Ground
ADVISED SOURCE	Site Investigation Sample
INTERPRETATION OF TEST CURVE	Straight line through 5mm change in penetration
PROPORTION LARGER THAN 20mm	22%

Total number of blows (n)	Penetration (mm)	Change in penetration n to 4 n (mm)
1	134.0	19.6
2	123.2	19.1
3	117.0	18.1
4	114.4	17.2
6	106.6	13.0
8	104.1	12.0
12	98.9	9.6
16	97.2	9.5
24	93.6	7.9
32	92.1	7.1
48	89.3	4.5
64	87.7	
96	85.7	
128	85.0	
192	84.8	
256		



MOISTURE CONDITION VALUE	**16.3**
WATER CONTENT	**26.2** %

REMARKS

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TEST CERTIFICATE

DRY DENSITY/WATER CONTENT RELATIONSHIP 4.5kg RAMMER
BS 1377-2:2022 Cl.11
PARTICLE DENSITY METHOD BS 1377-2:2022 Cl.9.2

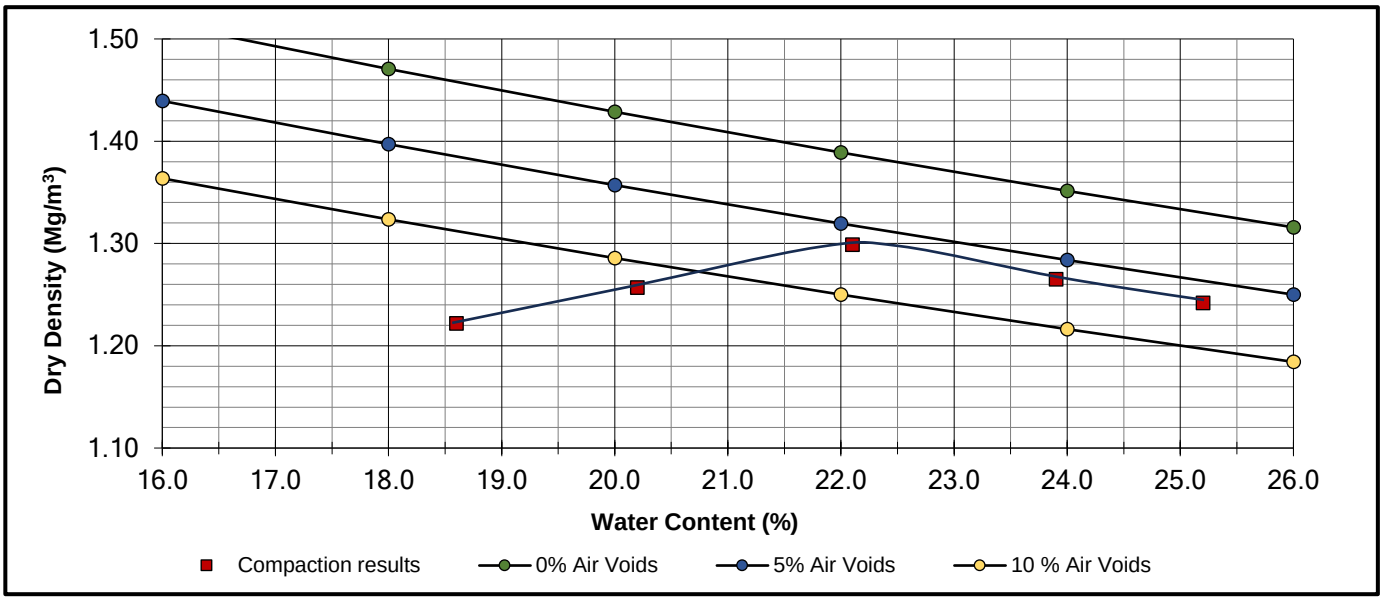
CLIENT	e3p
SITE	Pitsford Road, Manchester
JOB NUMBER	MRN 24005/39

SAMPLE LABEL	TP210 0.80	DATE SAMPLED	Not Advised
SAMPLE NUMBER	433517	DATE RECEIVED	04-Mar-24
DATE TESTED	11-Mar-24	SAMPLED BY	Client

MATERIAL	Made Ground
ADVISED SOURCE	Site Investigation Sample
PRE TREATMENT	Air Dried / Single Sample

RETAINED 37.5mm	5 %	GRADING ZONE	Zone 4
RETAINED 20mm	16 %	PARTICLE DENSITY	2.00 Mg/m3 (Assumed)

POINT NUMBER	WATER CONTENT (%)	DRY DENSITY (Mg/m^3)
1	18.6	1.222
2	20.2	1.257
3	22.1	1.299
4	23.9	1.265
5	25.2	1.242



OPTIMUM WATER CONTENT	**22**	(%)
MAXIMUM DRY DENSITY	**1.30**	(Mg/m^3)

REMARKS

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TEST CERTIFICATE

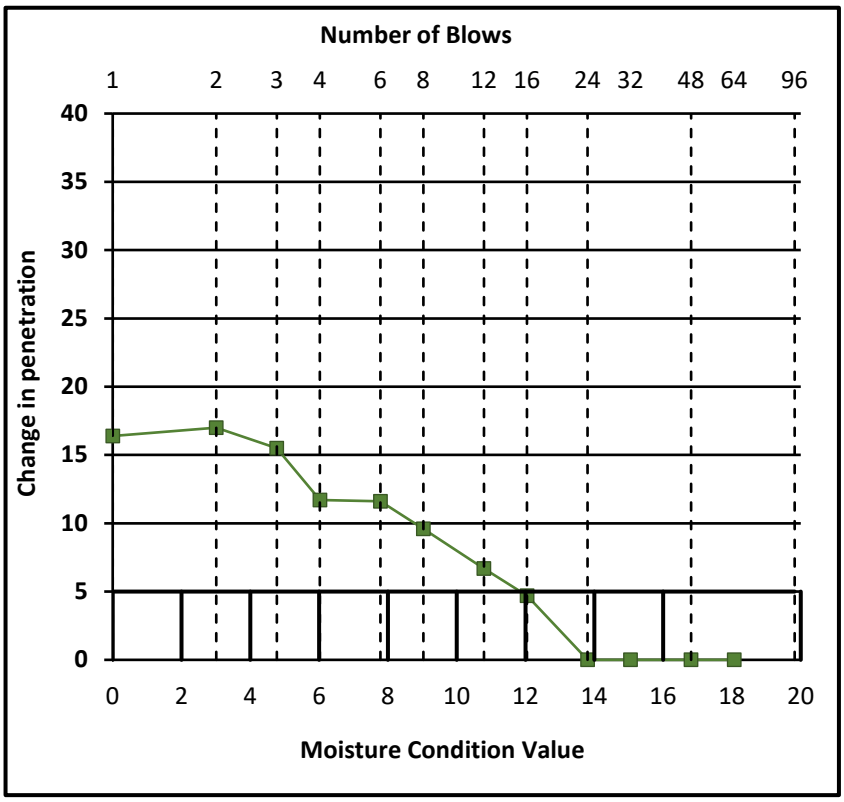
MOISTURE CONDITION VALUE
BS 1377-2:2022 Cl. 13
DETERMINATION OF WATER CONTENT - BS EN ISO 17892-1:2014+A1:2022

CLIENT	e3p
SITE	Pitsford Road, Manchester
JOB NUMBER	MRN 24005/39

SAMPLE LABEL	TP203 0.40	DATE SAMPLED	Not Advised
LAB SAMPLE No	433518	DATE RECEIVED	04-Mar-24
DATE TESTED	16-Mar-24	SAMPLED BY	Client

MATERIAL	Made Ground
ADVISED SOURCE	Site Investigation Sample
INTERPRETATION OF TEST CURVE	Straight line through 5mm change in penetration
PROPORTION LARGER THAN 20mm	29%

Total number of blows (n)	Penetration (mm)	Change in penetration n to 4 n (mm)
1	126.9	16.4
2	122.8	17.0
3	117.1	15.5
4	110.5	11.7
6	109.0	11.6
8	105.8	9.6
12	101.6	6.7
16	98.8	4.7
24	97.4	
32	96.2	
48	94.9	
64	94.1	
96		
128		
192		
256		



MOISTURE CONDITION VALUE	**11.8**
WATER CONTENT	**34.9** %

REMARKS

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TEST CERTIFICATE

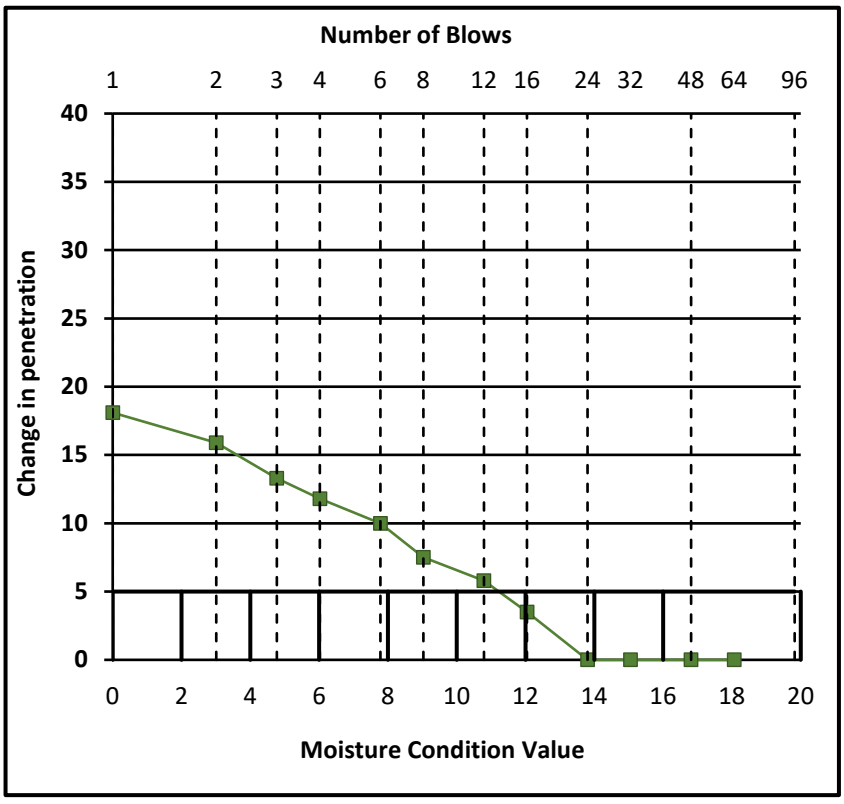
MOISTURE CONDITION VALUE
BS 1377-2:2022 Cl. 13
DETERMINATION OF WATER CONTENT - BS EN ISO 17892-1:2014+A1:2022

CLIENT	e3p
SITE	Pitsford Road, Manchester
JOB NUMBER	MRN 24005/39

SAMPLE LABEL	TP208 2.20	DATE SAMPLED	Not Advised
LAB SAMPLE No	433519	DATE RECEIVED	04-Mar-24
DATE TESTED	16-Mar-24	SAMPLED BY	Client

MATERIAL	Made Ground
ADVISED SOURCE	Site Investigation Sample
INTERPRETATION OF TEST CURVE	Straight line through 5mm change in penetration
PROPORTION LARGER THAN 20mm	33%

Total number of blows (n)	Penetration (mm)	Change in penetration n to 4 n (mm)
1	133.1	18.1
2	124.8	15.9
3	119.7	13.3
4	115.0	11.8
6	112.2	10.0
8	108.9	7.5
12	106.4	5.8
16	103.2	3.5
24	102.2	
32	101.4	
48	100.6	
64	99.7	
96		
128		
192		
256		



MOISTURE CONDITION VALUE	**11.3**
WATER CONTENT	**25.0** %

REMARKS

NAME O.P. Davies BA (Hons) (Laboratory Manager) SIGNED DATE 31-Mar-24

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DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

DRY DENSITY/WATER CONTENT RELATIONSHIP 4.5kg RAMMER
BS 1377-2:2022 Cl.11
PARTICLE DENSITY METHOD BS 1377-2:2022 Cl.9.2

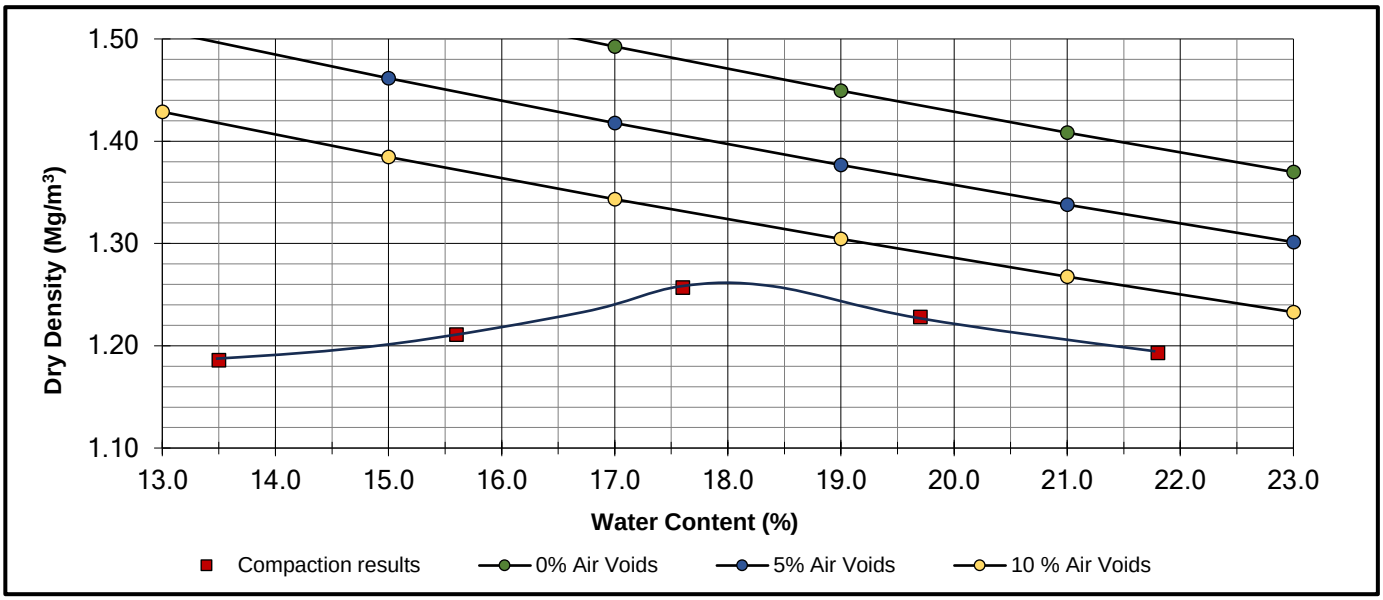
CLIENT	e3p
SITE	Pitsford Road, Manchester
JOB NUMBER	MRN 24005/39

SAMPLE LABEL	TP206 1.00	DATE SAMPLED	Not Advised
SAMPLE NUMBER	433520	DATE RECEIVED	04-Mar-24
DATE TESTED	11-Mar-24	SAMPLED BY	Client

MATERIAL	Made Ground
ADVISED SOURCE	Site Investigation Sample
PRE TREATMENT	Air Dried / Single Sample

RETAINED 37.5mm	2 %	GRADING ZONE	Zone 4
RETAINED 20mm	13 %	PARTICLE DENSITY	2.00 Mg/m3 (Assumed)

POINT NUMBER	WATER CONTENT (%)	DRY DENSITY (Mg/m^3)
1	13.5	1.186
2	15.6	1.211
3	17.6	1.257
4	19.7	1.228
5	21.8	1.193



OPTIMUM WATER CONTENT	**18**	(%)
MAXIMUM DRY DENSITY	**1.26**	(Mg/m^3)

REMARKS

NAME O.P. Davies BA (Hons) (Laboratory Manager) SIGNED DATE 31-Mar-24

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TEL 0161 475 0870

TEST CERTIFICATE

LIQUID LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.3 (30° FALL CONE) 1 POINT METHOD
PLASTIC LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.5
WATER CONTENT METHOD BS EN ISO 17892-1:2014+A1:2022

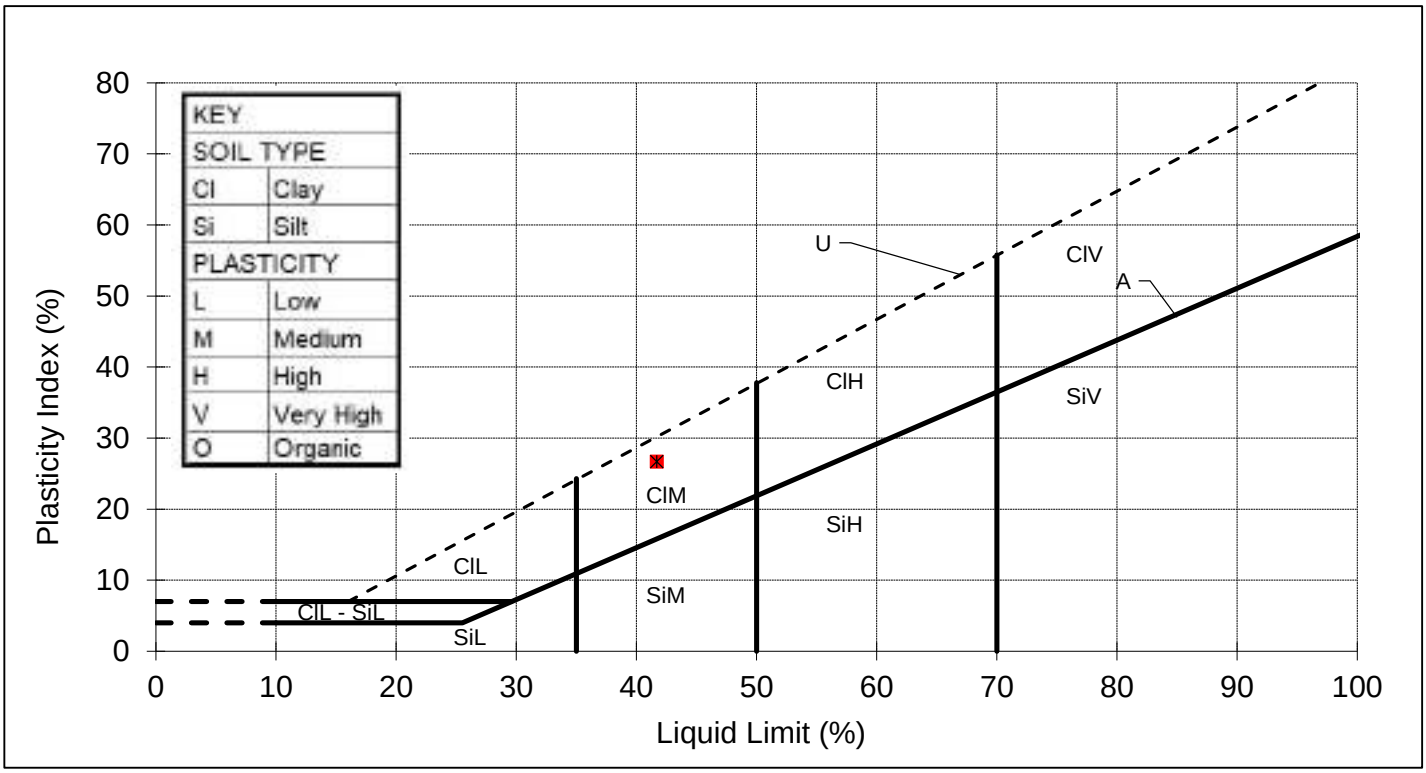
CLIENT	e3p
SITE	Pitsford Road, Manchester
JOB NUMBER	MRN 24005/39

SAMPLE LABEL	TP217 2.00	DATE SAMPLED	Not Advised
SAMPLE No.	433506	DATE RECEIVED	04-Mar-24
DATE TESTED	11-Mar-24	SAMPLED BY	Client

MATERIAL	Made Ground		
ADVISED SOURCE	Site Investigation Sample	WATER CONTENT	Increasing
SAMPLE HISTORY	Natural State	% RET. 425um BY	Wet Sieved

Test Readings mm (average)		Moisture Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	17.7	40.3	1.040	
Determination 2 (avg)	17.6	39.9		

Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
25.6	42	15	27	98



REMARKS

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NAME O.P. Davies BA (Hons)
(Laboratory Manager)

DATE 31-Mar-24

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LIQUID LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.3 (30° FALL CONE) 1 POINT METHOD
PLASTIC LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.5
WATER CONTENT METHOD BS EN ISO 17892-1:2014+A1:2022

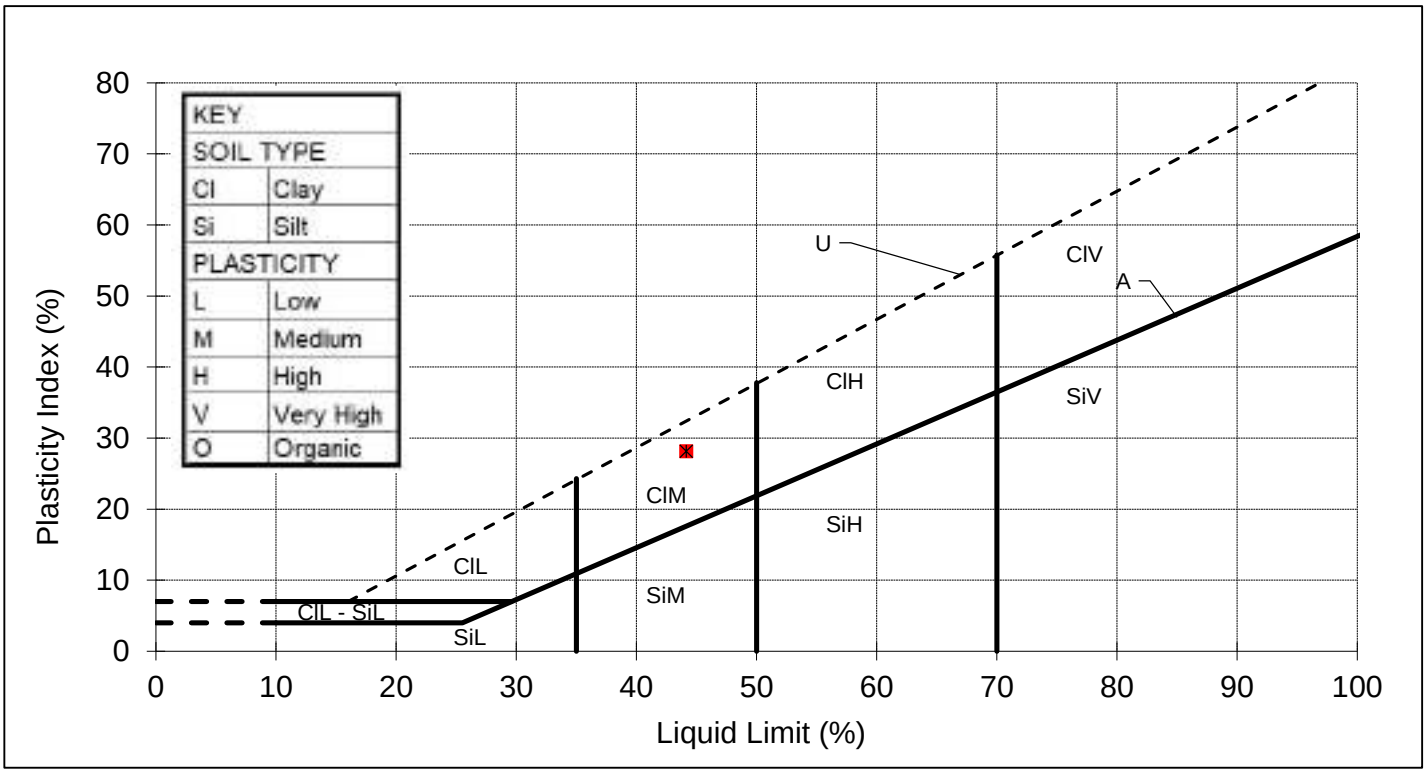
CLIENT	e3p
SITE	Pitsford Road, Manchester
JOB NUMBER	MRN 24005/39

SAMPLE LABEL	TP209 1.00	DATE SAMPLED	Not Advised
SAMPLE No.	433507	DATE RECEIVED	04-Mar-24
DATE TESTED	11-Mar-24	SAMPLED BY	Client

MATERIAL	Made Ground		
ADVISED SOURCE	Site Investigation Sample	WATER CONTENT	Increasing
SAMPLE HISTORY	Natural State	% RET. 425um BY	Wet Sieved

Test Readings mm (average)		Moisture Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	19.7	44.0	1.007	
Determination 2 (avg)	19.6	43.7		

Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
30.2	44	16	28	96



REMARKS

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PLASTIC LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.5
WATER CONTENT METHOD BS EN ISO 17892-1:2014+A1:2022

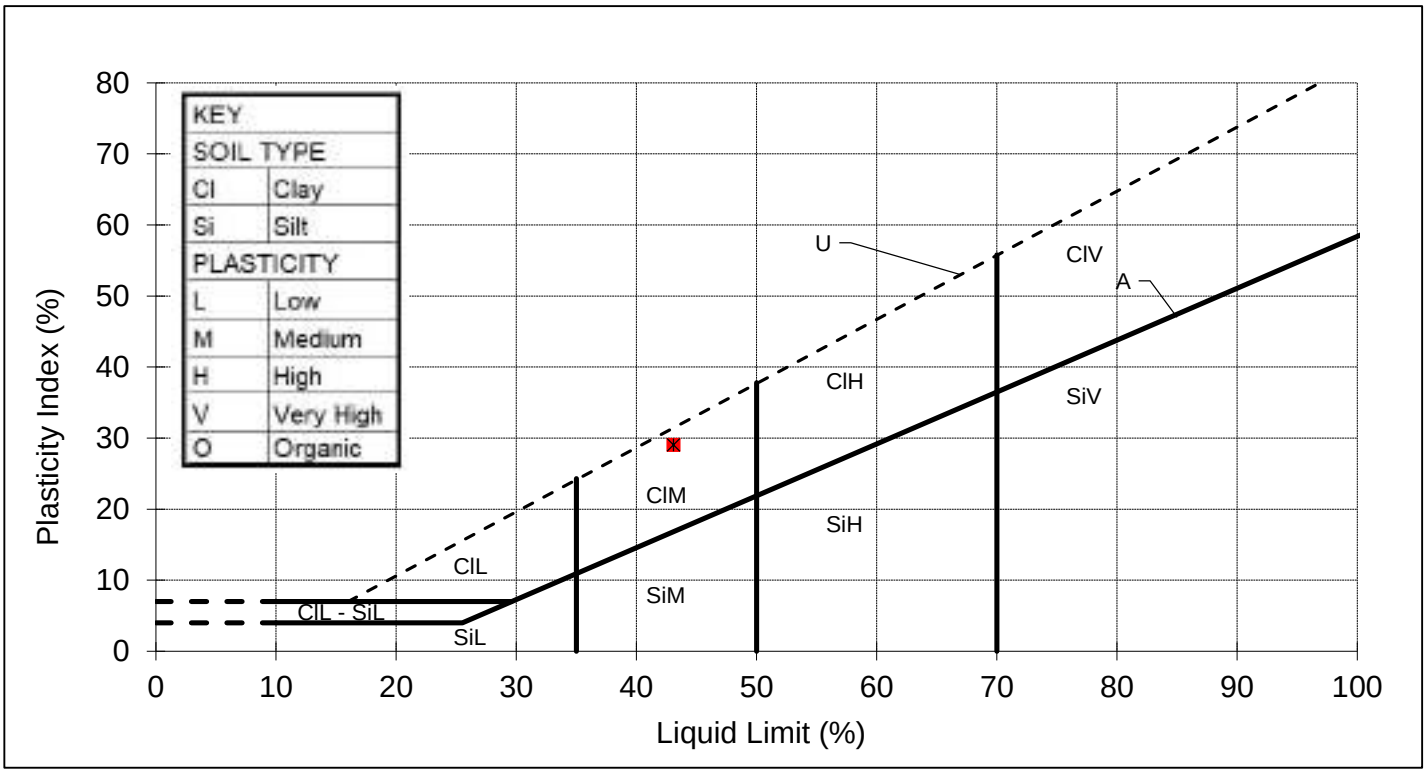
CLIENT	e3p
SITE	Pitsford Road, Manchester
JOB NUMBER	MRN 24005/39

SAMPLE LABEL	TP220 1.30	DATE SAMPLED	Not Advised
SAMPLE No.	433508	DATE RECEIVED	04-Mar-24
DATE TESTED	11-Mar-24	SAMPLED BY	Client

MATERIAL	Made Ground		
ADVISED SOURCE	Site Investigation Sample	WATER CONTENT	Increasing
SAMPLE HISTORY	Natural State	% RET. 425um BY	Wet Sieved

Test Readings mm (average)		Moisture Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	18.6	42.1	1.027	
Determination 2 (avg)	18.4	41.8		

Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
23.3	43	14	29	95



REMARKS

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PLASTIC LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.5
WATER CONTENT METHOD BS EN ISO 17892-1:2014+A1:2022

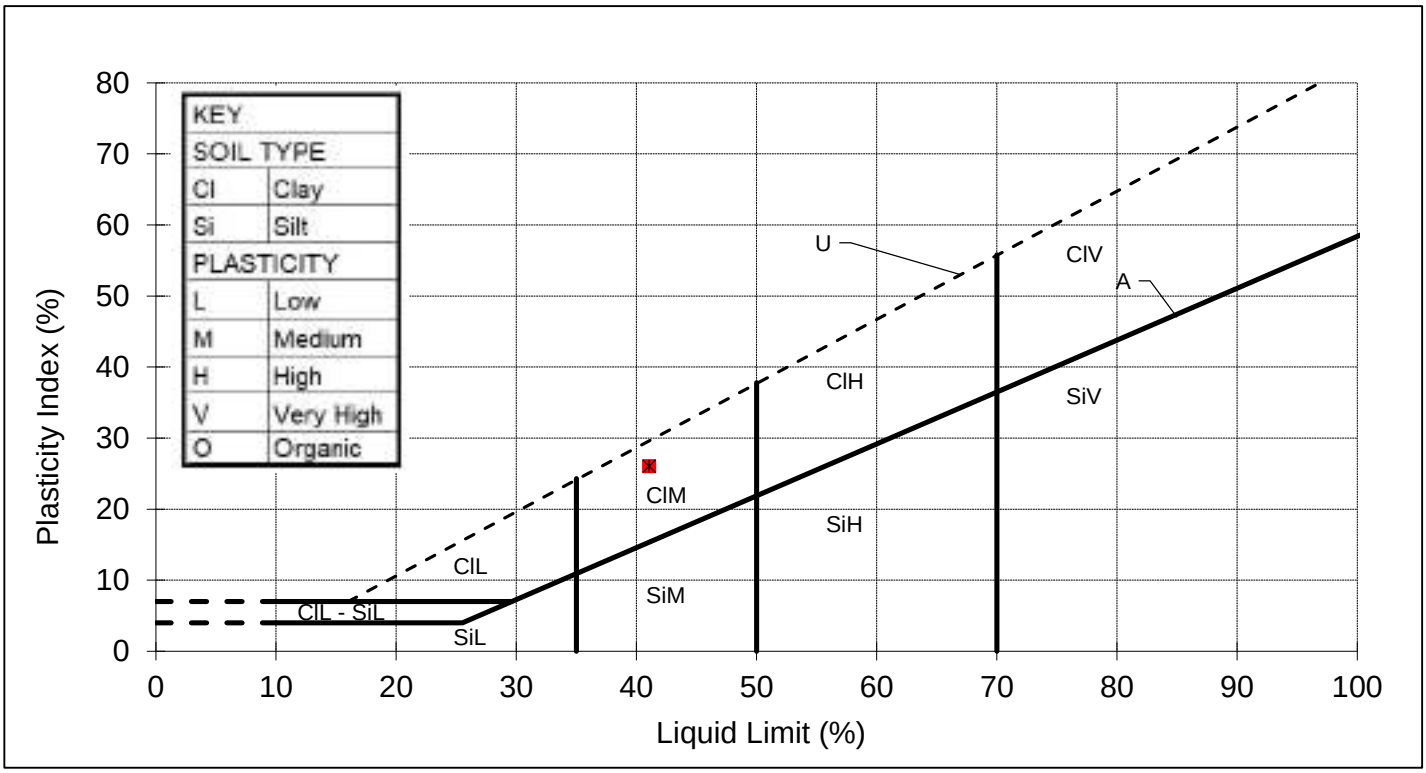
CLIENT	e3p
SITE	Pitsford Road, Manchester
JOB NUMBER	MRN 24005/39

SAMPLE LABEL	TP204 1.30	DATE SAMPLED	Not Advised
SAMPLE No.	433509	DATE RECEIVED	04-Mar-24
DATE TESTED	11-Mar-24	SAMPLED BY	Client

MATERIAL	Made Ground		
ADVISED SOURCE	Site Investigation Sample	WATER CONTENT	Increasing
SAMPLE HISTORY	Natural State	% RET. 425um BY	Wet Sieved

Test Readings mm (average)		Moisture Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	19.5	40.8	1.010	
Determination 2 (avg)	19.5	40.5		

Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
17.4	41	15	26	97



REMARKS

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PLASTIC LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.5
WATER CONTENT METHOD BS EN ISO 17892-1:2014+A1:2022

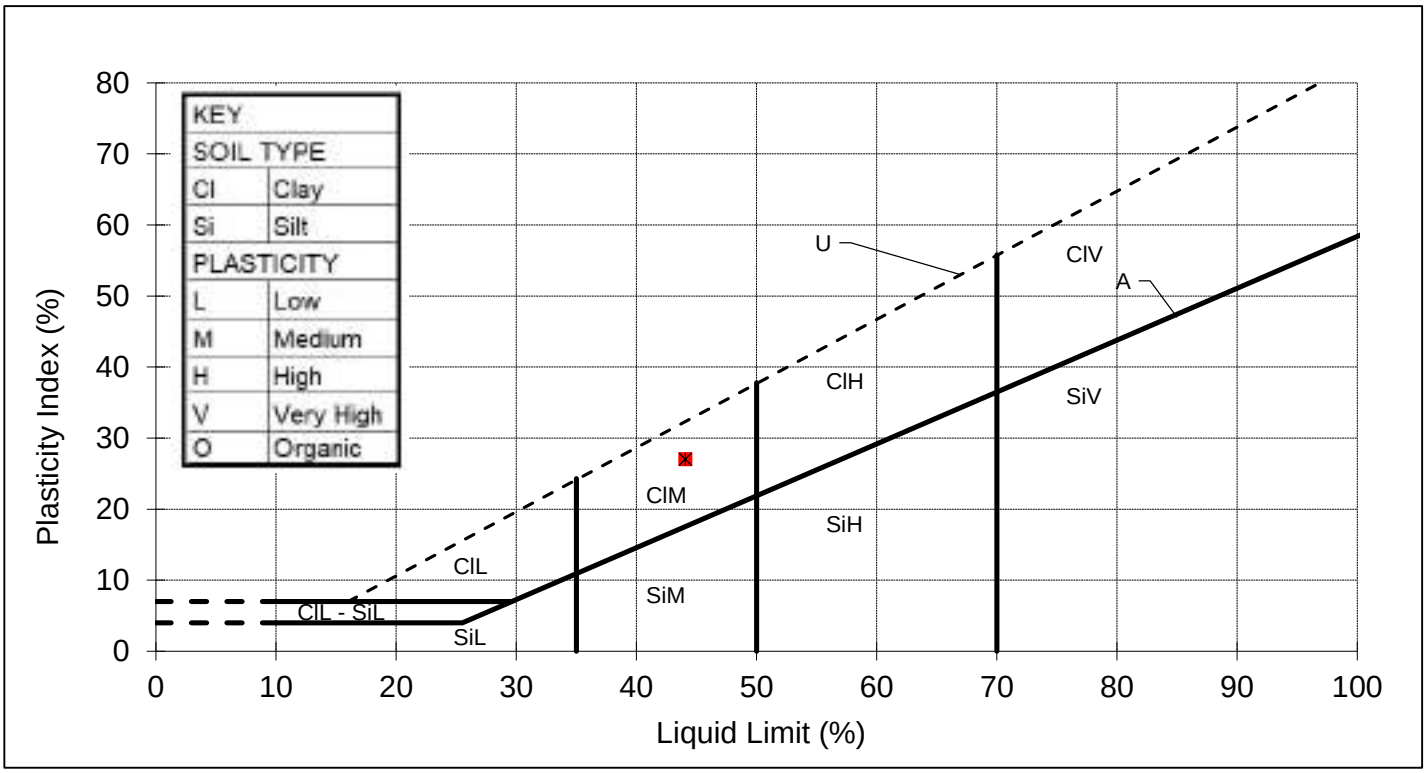
CLIENT	e3p
SITE	Pitsford Road, Manchester
JOB NUMBER	MRN 24005/39

SAMPLE LABEL	TP205 1.50	DATE SAMPLED	Not Advised
SAMPLE No.	433510	DATE RECEIVED	04-Mar-24
DATE TESTED	11-Mar-24	SAMPLED BY	Client

MATERIAL	Made Ground		
ADVISED SOURCE	Site Investigation Sample	WATER CONTENT	Increasing
SAMPLE HISTORY	Natural State	% RET. 425um BY	Wet Sieved

Test Readings mm (average)		Moisture Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	20.3	44.3	0.994	
Determination 2 (avg)	20.5	44.4		

Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
27.0	44	17	27	97



REMARKS

SIGNED

NAME O.P. Davies BA (Hons) (Laboratory Manager) DATE 31-Mar-24

APPENDIX IX
ORIGIN OF CHEMICAL 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)	