



e3p

Phase I & II Geoenvironmental Site Assessment
Loom Street, Ancoats

Reference: 15-018-R1-1
Date: February 2022



PHASE I & II GEOENVIRONMENTAL SITE ASSESSMENT

Loom Street
Ancoats
Manchester
M4 6AN

Prepared for:

forshaw.

Report Ref: 15-018-R1

Date Issued: February 2022

Loom Street Ancoats

Phase I & II Geoenvironmental Site Assessment
February 2022

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EXECUTIVE SUMMARY

Site Address	Loom Street, Ancoats, Manchester, M4 6AN	
Grid Reference	E 384853, N 398674	
Site Area	0.01 Ha	
Proposed Development	Forshaw Group intends to construct a four-storey residential townhouse.	
Current Site Use	The subject site is a rectangular shaped parcel of land located at Loom Street, Manchester City Centre. The historical building has been demolished and the site currently lies empty. The historical on-site building has been demolished and the hardstanding beneath has been removed leaving a layer of demolition-related rubble covering the site. Pedestrian and vehicular access to the site can be gained via Loom Street. The site is bordered on the eastern, southern, and western sides by the exterior walls of neighbouring buildings. These buildings are currently active residential or commercial units.	
Site History	A review of the pertinent Ordnance Survey mapping dating from circa 1851 to the present day shows three phases of construction. From pre-1851 to pre-1891 the site was intersected by multiple residential units and contained a courtyard space through the centre. Between pre-1891 and pre-1908 the buildings were demolished and the site lay vacant until pre-1931 when the most recent building was constructed. This building was demolished post-April 2021 and currently lies vacant.	
Environmental Setting	Drift Geology	Till (Devensian) – CLAY, SAND and GRAVEL.
	Bedrock Geology	Chester Formation – SANDSTONE.
	Faults	123 m NE - normal fault
	Hydrogeology	Secondary Undifferentiated (drift) overlying principal aquifer (solid). No groundwater abstractions have been identified within a 1 km radius.
	Hydrology	The Rochdale Canal is located 250 m southeast of the site.
	Flood Risk	Unaffected by flooding from rivers.
Natural Landform and Geomorphology	A review of relevant records indicates that the site has not been subject to significant anthropogenic changes with the current site topography broadly representing natural landform. However, it is probable that an element of the upper materials have been reworked during phases of redevelopment.	
Previous Reports	No previous site investigation reports have been provided to E3P for review.	
Utility Locations	Combined sewers and clean water mains run along the northern boundary of the site down Loom Street. A clean water comms pipe enters the site from Loom Street, a stop tap is located on this pipe just outside the site boundary.	



Landfill Sites and Ground Gases	There are no active or historical landfill sites within 500 m of the site. A licensed waste site 181 m northwest of the site surrendered its license on 06/06/2010. No other active or historical waste sites are within 250 m of the site.
Radon	Unaffected – no special precautions required.
Coal Mining/Land Stability	E3P has completed a detailed coal mining risk assessment as part of this Geoenvironmental Site Assessment. Whilst the site is within a reporting area there are no coal mining features within influencing distance. The site is considered low risk. As such no further assessment is required.
Hazardous Installations	No hazardous installations that could potentially prejudice the proposed construction of highly sensitive residential dwellings have been identified within influencing distance of the subject site.
Initial Conceptual Site Model	On-site Contaminant Sources: ☛ Made Ground - Heavy, metals, inorganic compounds, Polycyclic aromatic hydrocarbons (PAHs), hydrocarbon compounds, asbestos, hazardous ground gas (methane and carbon dioxide). Off-site Contaminant Sources: ☛ Made Ground fill deposits – Heavy metals and inorganic compounds, PAHs, hydrocarbon compounds, asbestos, hazardous ground gas (methane and carbon dioxide). ☛ 50 m E - Brass Foundry ○ Heavy Metals: Copper, Zinc ○ Mineral Acids ○ Oils/Fuels ○ Inorganic Compounds ○ Organic Solvents ○ Organic Acids ○ Alkalis ☛ 70 m E - Iron Foundry – ○ Heavy Metals: Iron, Lead, Zinc ○ Inorganic Compounds: Fluoride, Cyanide, ○ Sulphates ○ Poly-Chlorinated Biphenols (PCBs) Pathways ☛ Dermal contact; ☛ Ingestion; ☛ Inhalation; ☛ Accumulation; ☛ Vertical/lateral migration; ☛ Corrosion of concrete.



	Receptors  Construction workers;  Residential end-users;  Third-party property;  Primary bedrock aquifer;  Secondary undifferentiated superficial aquifer;  Concrete foundations.
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GROUND INVESTIGATION

Ground Investigation Works	E3P has completed an intrusive ground investigation comprising:  5 x window sample boreholes,  Construction of environmental monitoring installations.  Chemical and geotechnical Sampling  Human Health Risk Assessment (Tier 1)  Controlled Waters Assessment  RB17 Ground Gas Assessment
Ground Conditions	Made Ground – 0.00 m bgl to 1.00 m bgl Made Ground deposits were encountered within all exploratory hole locations to depths of between 0.30 m to 1.00 m bgl. Made Ground deposits comprise a reworked topsoil of dark brown, clayey, sandy, gravel with brick, metal, ceramic and clinker in the majority of locations. In the northern sector, Made Ground deposits are slightly deeper. DRIFT – 1.00 m bgl to 5.45 m bgl Drift deposits were encountered within all exploratory locations. The drift deposits are homogenous across the site, generally comprising a stiff to very stiff, medium to high strength, brown or grey mottled brown CLAY with gravel of sandstone and mudstone. The CLAY contains localised lenses of orange, fine to medium SAND SOLID – Not Encountered The solid bedrock geology was not encountered in any exploratory hole on site. BGS boreholes in the area suggest bedrock can be expected in excess of 20.00 m bgl. GROUNDWATER – Groundwater was not encountered.



CONTAMINATED LAND ASSESSMENT

Human Health	At Tier 1 stage, the long term (chronic) human health toxicity of the soil has been assessed by comparing the on-site concentrations of organic and inorganic compounds for a residential (no plant uptake) with reference values published in LQM/CIEH S4UL (S4UL3267). Elevated concentrations of Arsenic, Lead and mercury have been identified and these have primary exposure pathways related to ingestion of soils and vapour inhalation. The risk to chronic human health associated with the elevated concentrations of inorganic heavy metals can be mitigated through the application of hardstanding throughout the site footprint to remove any potential for direct exposure to impacted soils (other than vapours). At this time it has not been possible to undertake speciation of the identified mercury exceedance. Mercury may present a potential volatilisation to indoor air risk. The elevated concentration has only been identified within one discrete area of the site within the shallow Made Ground and is therefore considered to be a localised hotspot. Where mercury speciation returns results confirming no elemental mercury, then the GAC limits (1.2 mg/kg) will no longer apply as this is based on vapour inhalation. The detected level of 2.5 mg/kg will then be related to inorganic mercury and the associated GAC will be 40 mg/kg. Where this is the case further assessment and mitigation measures will not be required. Chemical analysis of the natural clay drift deposits has identified these soils to be acceptable for use within the context of a residential development. No garden areas are proposed for the plot and so no topsoil is likely required, and existing subsoil/Made Ground will be capped by the building slab and so no risk will remain.
Controlled Waters	A controlled waters risk assessment has been completed that has confirmed the presence of arsenic in one location (WS101 -0.10m bgl). Given the absence of viable receptors and potential contaminant pathways present at the site, the distance to any surface water features and the absence of any groundwater abstractions the risk to controlled waters is considered low. In addition, the former hardstanding cover at the site will be re-installed given the design of the new structure covering the entire site and as such the percolation of surface water will be restricted and there is, therefore, a lower likelihood that contaminants will be mobilised. Contaminant migration will also be restricted by a lower level of low permeability cohesive stratum that will offer some degree of protection to the underlying principal aquifer.
Ground Gas	Given the site setting the likely ground gas source at the site has been considered to be the Made Ground present from phases of historic redevelopment. The site is not within an area of peat or high organic content (alluvium), nor is the site close to any significant infilling or landfilling that would otherwise be a potential source. An RB17 assessment has been completed as part of this report that confirms the site can be classified as Characteristic Situation 1. Mitigation measures will not be required in the construction of the new plot in this location.
Potable Water Infrastructure	An assessment has been completed using the chemical analysis of soils at the subject site. These have suggested that polyethylene pipeline will be suitable for the site.



GEOTECHNICAL ASSESSMENT

Underground Obstructions	Significant concrete and brick obstructions have been removed during the demolition of the former ground bearing slab. It could be considered that the footings and foundations from neighbouring structures are obstructions but are necessary to remain. No obstructions have been noted within the site investigation locations completed to date.
Allowable Bearing Pressure	The underlying natural clay drift deposits have been assessed as being stiff, high strength with a net allowable bearing pressure (ABP) in the order of 100 kN/m² at circa 1.00 m bgl increasing to 150–200 kN/m² at circa 2.00 m bgl.
Foundation Options	Based on the assessment of the relative undrained shear strength, relative in-situ densities and corresponding safe net allowable bearing pressure, the suitable target founding stratum has been identified as the underlying stiff to very stiff glacial clays. It is unlikely anything more than minor levelling will be required to reduce the site to allow for the construction of the new slab and tie in with the adjacent road level to the north. Therefore, it is likely that the advised foundation solution will be possible and likely to be the most cost-effective option for the site that would be to use a mini piled foundation supporting a steel internal structure.
Building Floor Slabs	Ground-bearing floor slabs are unlikely to be viable given the anticipated depths or reworked Made Ground > 600 mm and shallow cohesive soils. Where building floor slabs are required these should be constructed in accordance with a detailed design from a structural engineer that incorporates a granular layer that will tolerate volumetric change in the Made Ground beneath the site.
Heave Precautions	Given that the underlying clay is of medium volume change potential, heave precautions will be required to the internal face of a foundation less than 1.50 m in depth. Heave precautions will be required to the underside of floor slabs (where there is no 250 mm void) and pile ground beams are required within the modelled influencing distance of trees.
Soakaway Drainage	The Made Ground and underlying granular soils are cohesive in nature which would preclude the use of infiltration drainage systems.
Sulphate Assessment	Soils at the site generally meet Class DS-1, Aggressive Chemical Environment for Concrete Classification (ACEC) AC-1s in accordance with BRE <i>Special Digest 1</i> (2005). Elevated sulphate concentrations meeting Class DS-2, AC-1s were noted within the Made Ground deposits in WS101 (0.10 m), WS102 (0.30 m), WS104 (0.30 m), WS105 (0.40 m).
CBR Design %	Natural clay soils will provide a CBR in the order of 3–5% during drier climatic periods. However, if water is allowed to shed onto the formation, the CBR will reduce to < 2%, which will require specialist engineering of the subgrade.
Cut/Fill	Development levels are unknown at this time; however, very minor cut-and-fill works are expected to prepare the development platform.
Civil Engineering Excavations	The E3P Intrusive Ground Investigation has not identified the presence of weathered/competent bedrock that would otherwise impede the excavation of materials to form sewerage and drainage infrastructure and foundations.



**Waste
Characterisation**

Any material that is to be disposed off-site should undergo assessment using Technical Guidance WM3: *Waste Classification – Guidance on the classification and assessment of waste*.

RECOMMENDATIONS

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

-  Speciation of identified mercury impacted Made Ground to determine potential volatilisation
-  Remediation and enabling works strategy.



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DRAWING LIST

15-018-R1-001 - Site Location Plan
15-018-R1-002 - Proposed Development Plan
15-018-R1-003 - Historical Features Plan
15-018-R1-005 - Exploratory Hole Location Plan
15-018-R1-006 - Depth of Made Ground Plan
15-018-R1-008 - Depth to Founding Strata Plan
15-018-R1-010 - Conceptual Site Model



1. INTRODUCTION

1.1. BACKGROUND

E3P has been commissioned by Forshaw Group to undertake a detailed Phase I and II Geoenvironmental Site Assessment for a parcel of land located at Loom Street, Ancoats, 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 four-storey residential property.

1.2. PROPOSED DEVELOPMENT

Forshaw Group intends to construct a four-storey residential townhouse. Drawing 15-018-002 (Appendix XI) identifies the proposed development layout.

A snapshot of the proposed development layout is indicated in Figure 1.1.

FIGURE 1.1 SNAPSHOT OF PROPOSED DEVELOPMENT



1.3. OBJECTIVES

The objectives of the geoenvironmental assessment are as follows:

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

1.4. SCOPE OF WORKS

The scope of work includes the following elements:

-  Design of suitable intrusive ground investigation;
-  Window sample probeholes with, and construction of, environmental monitoring installations;
-  Deep cable percussive boreholes with groundwater monitoring installations;
-  Mechanically excavated trial pits;
-  In-situ geotechnical testing;
-  Chemical and geotechnical laboratory analysis;
-  Groundwater monitoring and sampling;
-  Ground gas monitoring;
-  Contamination risk assessment and conceptual site model;
-  Geotechnical assessment and interpretation; and
-  Factual and interpretive reporting.

1.5. LIMITATIONS

The limitations of this report are presented in Appendix I.

1.6. CONFIDENTIALITY

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



2. SITE SETTING

2.1. SITE DETAILS

Site Address	Loom Street, Ancoats, Manchester, M4 6AN
National Grid Reference	E 384853, N 398674
Site Area	0.01 Ha.

All acronyms used within this report are defined in the Glossary presented in Appendix II.

A site location map is presented in Appendix III as Drawing 15-018-001.

2.2. CURRENT SITE USE

E3P has undertaken a site walkover of the entire site and a description of the key findings is summarised in Table 2.1.

TABLE 2.1 SITE DESCRIPTION

Occupancy/Use	The subject site is a rectangular shaped parcel of land located at Loom Street, Manchester. The historical building has been demolished and the site currently lies empty.	
Surface Cover (%)	Buildings	0%
	Hardstand	0%
	Soft Cover	100%
Structures	The historical on-site building has been demolished and the hardstanding beneath has been removed leaving a layer of soft demolition-related rubble/Made Ground covering the site.	
Access	Pedestrian and vehicular access to the site can be gained via Loom Street to the north.	
Slope	The site lies in a highly developed area and occupies a very small footprint as such is relatively flat. During the site walkover, it was noticed that there was a fall in level from Loom Street due to the hardstanding being removed formerly at the external level.	
Retaining Structures	The site is bordered on the eastern, southern and western sides by the exterior walls of other buildings.	
Vegetation/Ecology	No vegetation or ecology was noted during the initial site walkover.	
Hazardous Material Storage	No above-ground storage tanks (ASTs) or underground storage tanks (USTs) were observed at the site during the preliminary site walkover. Due to the historically developed nature of the site and the wider areas populated with a number of mills, there is potential that hazardous material storage will have occurred on the site.	



Asbestos-Containing Material (ACM)	No evidence of ACM was noted across the majority of the site during the site walkover. It is unknown if a pre-demolition asbestos was completed before the existing buildings were demolished so there is potential for ACM to be present in the Made Ground. The site has undergone multiple phases of development and it is considered likely that ACM will be present in the Made Ground from demolition of buildings in the early 1900s.
Polychlorinated Biphenyls (PCBs)	There is no equipment identified that may contain PCBs within the site boundary. The closest electricity sub-station is 93 m southeast and as such is not considered within influencing distance.
Waste Storage	Potentially hazardous waste streams are unlikely to be generated at the site and none were observed during the preliminary site inspection.
Drainage	Combined sewers and clean water mains run along the northern boundary of the site down Loom Street. A clean water pipe enters the site from Loom Street, a stop tap is located on this pipe just outside the site boundary.

2.3. SURROUNDING AREA

The surrounding area land uses are summarised in Table 2.2.

TABLE 2.2 SURROUNDING LAND USES

DIRECTION	LAND USE
North	Residential units and non-profit organisation
East	Residential units and commercial units including Redline Promotions
South	Residential units and commercial units including pubs and restaurants
West	Residential units

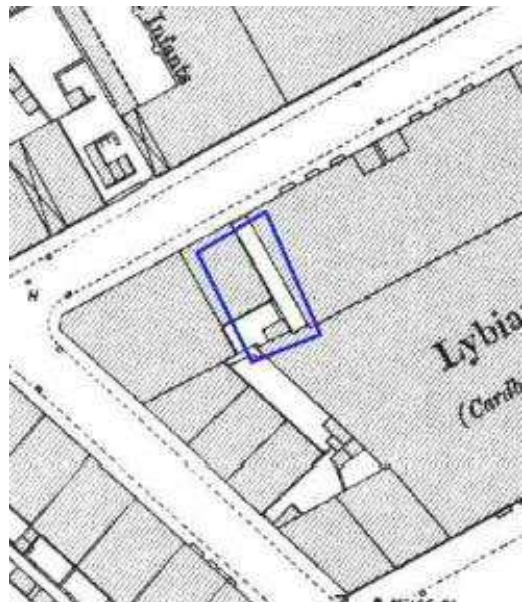


3. SITE HISTORY

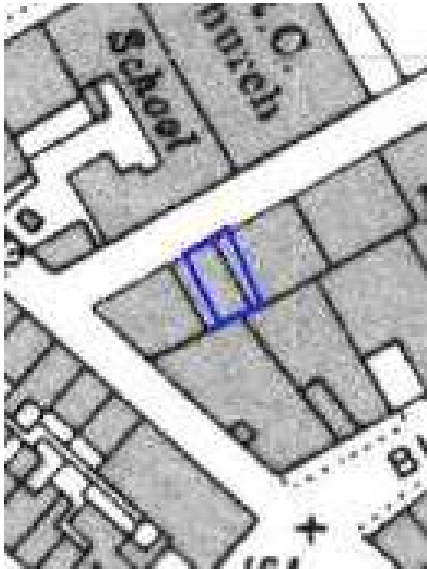
3.1. ON-SITE HISTORICAL DEVELOPMENT

A review of historical mapping and historical aerial imagery pertinent to the site is summarised in Table 3.1. In addition, historical site features are presented on Drawing No 15-018-003 in Appendix III.

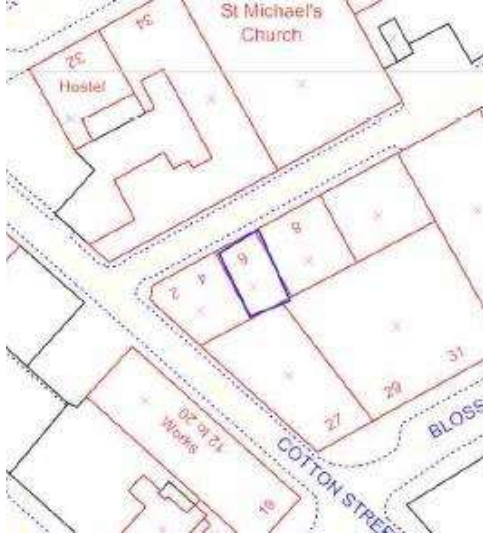
TABLE 3.1 HISTORICAL DEVELOPMENT

MAP EDITION	HISTORICAL LAND USE	HISTORICAL MAP EXCERPT
1851 1:1,056	The site is intersected by multiple structures, as well as a courtyard that runs across the centre of the site.	
1891 1:500	The building in the southern section of the site has been demolished and a cardboard box manufacturing site have been constructed in their place.	



MAP EDITION	HISTORICAL LAND USE	HISTORICAL MAP EXCERPT
1908 1:2,500	The previous building has been demolished. The site was vacant at this point.	
1931 1:2,500	A building has been constructed and fills the site boundary.	



MAP EDITION	HISTORICAL LAND USE	HISTORICAL MAP EXCERPT
1969 1:2,500	There have been no significant changes to the site.	
2003 1:1,250	There have been no significant changes to the site.	
April 2019 Aerial Image	There have been no significant changes to the site.	



3.2. OFF-SITE HISTORICAL DEVELOPMENT

A review of potentially contaminative uses identified on historical Ordnance Survey maps within a 250 m radius of the site is summarised in Table 3.2.

TABLE 3.2 SURROUNDING HISTORICAL DEVELOPMENT

SURROUNDING FEATURE	DISTANCE	DATES	DIRECTION
Timber Yard	45 m	Pre 1851 - Pre 1891	East
Brass Foundry Then: Works	50 m	Pre 1851 - Pre 1891	East
Coal Yard	65 m	Pre 1851 - Pre 1891	East
Iron Foundry Then: Works	70 m	Pre 1851 - Pre 1891	East
Smith's Arms	85 m	Pre 1891 - Pre 1908	East
Timber Yard	90 m	Pre 1851 - Pre 1891	East
Timber Yard	95 m	Pre 1851 - Pre 1891	East
Paragon Mill (Cotton) Then: Works	130 m	Pre 1922 - Present	Southeast
Long Mill (Cotton) Then: Works	140 m	Pre 1893 - Present	South
Old Mill (Cotton) Then: Royal Mill (Cotton) Then: Works	165 m	Pre 1893 - Present	Southeast
Murray Street Mill Then: Works	195 m	Pre 1893 - Present	East
Sedgewick Mill (Cotton) Then: Works	200 m	Pre 1893 - Present	Southeast
Brass and Iron Works Then: Works	220 m	Pre 1953 - Pre 1990	South
Cotton Mill Then: Works	220 m	Pre 1893 - Present	East
Timber Yard	240 m	Pre 1953 - Pre 1990	South
Cotton Mill Then: Works	245 m	Pre 1893 - Present	East

3.3. PLANNING HISTORY

E3P has undertaken a review of online planning records held by Manchester City Council and the following information has been obtained for the site:

-  065758/CC/NORTH1/02 - CONSERVATION AREA CONSENT Demolition works in connection with proposed redevelopment



-  065757/FO/NORTH1/02 - Redevelopment and extension of existing Ice Plant building to residential use over commercial use at ground and basement level with residents car park at basement level
-  125037/FO/2019 - Erection five-storey building to form two duplex apartments including roof terrace and associated car parking
-  132294/JO/2021 - Variation of planning condition 2 associated with planning permission 125037/FO/2019 to allow increase in parapet height
-  128476/NMC/2020 - Non-material amendment to planning permission referenced 125037/FO/2019 to change the description to remove reference to "two duplex apartments".
-  128760/JO/2020 - Variation of condition 2 (Specified Plans) attached to planning permission reference 125037/FO/2019 to allow changes to the internal layout to form 1 single dwelling rather than 2 duplex apartments.
-  CDN/21/0656 - Discharge of conditions 8a (acoustic insulation) and 16 (external lighting) attached to planning permission referenced 128760/JO/2020
-  CDN/21/0624 - Discharge of planning condition 7a (Archaeology) associated with planning permission 128760/JO/2020
-  108469/FO/2015/N1 - Erection of a four-storey single dwelling following the demolition of the existing single-storey garage.

3.4. PREVIOUS REPORTS

No previous site investigation reports have been provided to E3P for review.



4. ENVIRONMENTAL SETTING

4.1. GEOLOGY AND HYDROGEOLOGY

The British Geological Survey (BGS) map (Sheet 85) for the site, (1:50,000, Solid and Drift editions) and online records indicate the site is underlain by the geological sequence presented in Table 4.1.

TABLE 4.1 SUMMARY OF UNDERLYING GEOLOGY

GEOLOGICAL UNIT	CLASSIFICATION	DESCRIPTION	AQUIFER CLASSIFICATION
Drift	Glacial Till	CLAY, SAND and GRAVEL	Secondary undifferentiated
Solid	Chester Formation	SANDSTONE	Principal

TABLE 4.2 SUMMARY OF BGS BOREHOLE RECORDS

LOCATION	DEPTH	MADE GROUND	DRIFT	SOLID
46 m E SJ89NW205	122.99 m	Not encountered	CLAY, SAND and GRAVEL 0.00 - 27.74 m	SANDSTONE 27.74 m
70 m NE SJ89NW1348	25.59 m	0.83 m	CLAY, SAND and GRAVEL > 25.59 m	Not encountered

TABLE 4.3 FAULTING

LOCATION	DESCRIPTION
123 m NE	Normal Fault

The Groundsure report indicates that the site is not located within a groundwater source protection zone. Furthermore, there are no groundwater, surface water or potable abstractions within 1 km of the site.

Following a review of the historical and present-day mapping, no springs or wells are located within 500 m of the site. However, the Rochdale Canal is located around 125 m south of the site.

Based on the local topography and the location of surface watercourses, it is considered likely that shallow groundwater, if present, will flow in a south-westerly direction, following the topographical gradient with the River Irwell to the north and Medlock to the south.

4.2. NATURAL LANDFORM AND GEOMORPHOLOGY

Based on the initial geological assessment, a review of available topographic data and pertinent mapping, E3P has undertaken a preliminary geomorphological assessment of the landform and its possible mechanism for formation.

A review of relevant records indicates that the site has been subject to significant anthropogenic changes within the upper metre on a very local scale however overall currently represents the natural landform.

4.3. GEOTECHNICAL DATA

Geotechnical data presented within a commercially available environmental database is summarised in Table 4.4.



TABLE 4.4 SUMMARY OF GEOTECHNICAL DATA

HAZARD	DESIGNATION
Shrink-Swell Clay	Very low risk
Landslides	Very low risk
Ground Dissolution	Negligible risk
Compressible Ground	Negligible risk
Collapseable Deposits	Very low risk
Running Sand	Very low risk

4.4. COAL MINING

The Groundsure report states the site is in an area that may be affected by coal mining.

The CA operates a risk-based approach to the assessment of potential instability issues associated with future development of land located within the predefined CA consultation areas. This risk-based approach subdivides the potential risk into “low” and “high” risk categories.

The risk categories can be defined as:

Low-Risk Sites – Deemed to be land where coal mining has taken place, however it was at such depth not to pose a risk to new development and it therefore contains no known recorded risks and as such no further assessment is required.

For low-risk sites, the CA categorically states:

If your proposed development is within the Development Low Risk Area there is no need for you to submit any coal mining information with your planning application and The Coal Authority will not be consulted by the LPA. The LPA will include our Standing Advice as an informative note within the decision notice.

High-Risk Sites – Deemed to be landholdings located within an area known to contain legacy risks that include:

- ✚ Mine entries (shaft or adit);
- ✚ Shallow coal workings (recorded and probable);
- ✚ Workable coal seam outcrops;
- ✚ Mine gas sites and areas;
- ✚ Recorded coal-mining-related hazards;
- ✚ Geological features (fissures and break lines); and
- ✚ Former surface mining sites (sometimes using historic opencast extraction methods).



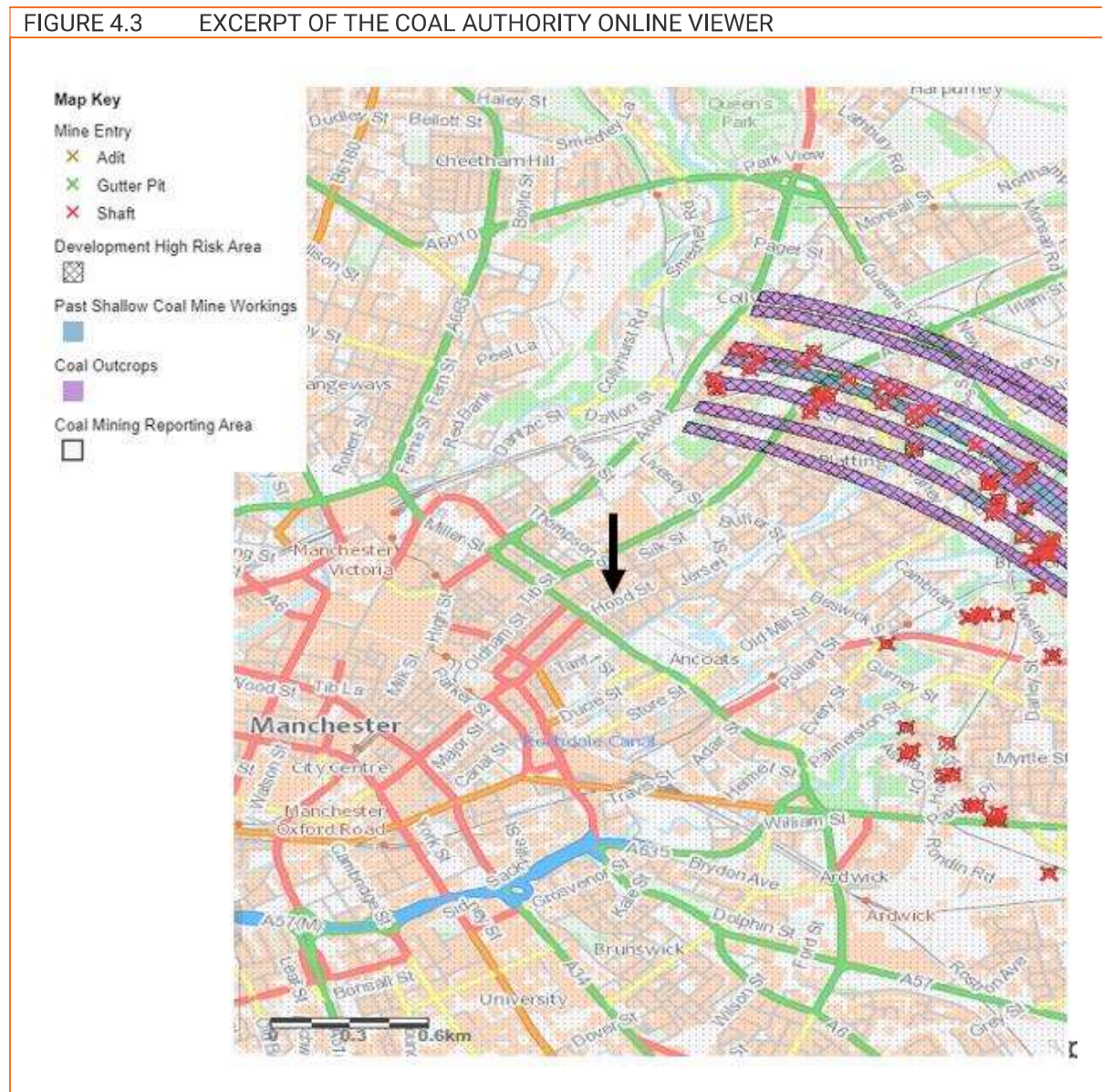
4.5. COAL MINING INFORMATION

Prior to the enactment of the Coal Mines Regulation Act (1872), which came into force on the 1st January 1883, there was no statutory requirement to record the extent of abandoned mine workings and as such the CA has no knowledge of extensive workings throughout the UK Coal Fields where shallow workings are present at a depth that could result in a subsidence event in the future (through successive cavitation) associated with failure of support mechanism.

To determine if a site may have unrecorded or recorded coal mine workings requires the consideration of a wide range of information and E3P has completed a review of relevant information in relation to potential coal mining activities.

In the first instance, E3P has reviewed the Coal Authority Online Viewer and an excerpt of this is presented as Figure 4.3. This map shows that the site does not lie within a development high risk area.

FIGURE 4.3 EXCERPT OF THE COAL AUTHORITY ONLINE VIEWER



4.6. COAL MINING RISK ASSESSMENT

This risk assessment comprises a desk-based review of all available information on coal mining issues that are relevant to the application site deemed to be located within a high-risk area. This includes:

- ✚ Interpretation of information to identify and assess the risks to the proposed development from coal mining legacy, including the cumulative impact of issues;
- ✚ Setting out appropriate mitigation measures to address the coal mining legacy issues affecting the site, including any necessary remedial works and/or demonstrate how coal mining issues have influenced the proposed development; and
- ✚ Demonstrating to the local planning authority that the application site is, or can be made, safe and stable to meet the requirements of national planning policy with regard to development on unstable land.

The coal mining risk assessment is summarised in Table 4.5.

TABLE 4.5 SUMMARY OF COAL MINING RISK ASSESSMENT

COAL MINING RISK ASSESSMENT	YES/NO	RISK ASSESSMENT
Recorded Underground Coal Mining at Shallow Depth (< 30 m)	No	Very low
Recorded Underground Coal Mining at Shallow Depth (> 30 m)	No	Very low
Evidence of Unrecorded Surface Extraction of Coal Outcrop	No	Very low
Unrecorded Underground Coal Mining at Shallow Depth (< 30 m)	No	Very low
Mine Entries (Shaft/Adits)	No	Very low
Coal Mining Geology – Fractures/Fissures	No	Very low
Recorded Gas Emissions	No	Very low
Recorded Mining Surface Hazard	No	Very low
Surface Mining (Opencast)	No	Very low

As the nearest recorded mining, unrecorded mining and mine entries are all of 800 m north of the site, the CA Coal Report would have contained no pertinent information for the site.

This distance from the site means all of the above coal mining risk assessment criteria have a very low, if not negligible risk to the development of the site. It is therefore concluded that no special coal mining measures will be required for the site.

4.1. RADON RISK POTENTIAL

The Groundsure report indicates the site is situated in an area where less than 1% of homes are above the “Action Level” and that the BGS reports that full radon protective measures are not necessary in the construction of new dwellings or extensions.

4.2. PRELIMINARY GEOTECHNICAL ASSESSMENT

Based on the desk-study information, the following geotechnical assessment has been made:



- ✳ Given the developed nature of the site, it is likely there will be Made Ground fill deposits and obstructions.
- ✳ The site is relatively flat. In order to construct low-rise residential development, minimal earthworks will be required to create a level developable platform.
- ✳ No trees are present to affect cohesive soils beneath the site. It is unlikely trees will be applied in the proposed development but should be considered against the foundation solution where present.
- ✳ Adjacent infrastructure forms the eastern, western and southern boundary with an adopted highway forming the northern boundary. All will need to be considered structurally and during any groundworks to ensure no damage caused.

4.3. HYDROLOGY

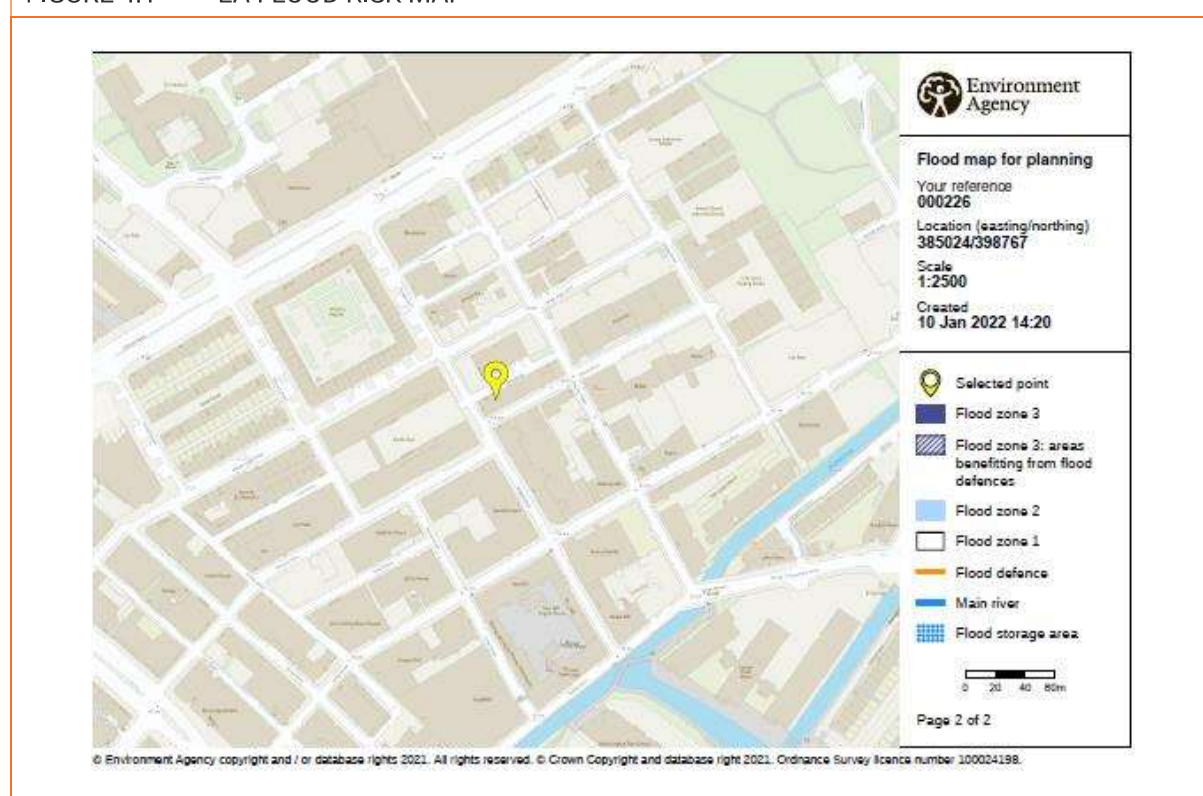
Surface water features within 250 m of the subject site are summarised in Table 4.6.

TABLE 4.6 SURFACE WATER FEATURES

SURFACE WATER FEATURE	QUALITY	DISTANCE (m)	DIRECTION
Rochdale Canal	Unknown	245 m	Southeast

The site is predominantly located within a currently defined “Flood Risk Zone 1”; defined as land assessed as having less than 1 in 1,000 annual probability of river or sea flooding (< 0.1%), and as such is considered to be unaffected by river flooding. In addition, the Envirocheck report states there is a limited potential for groundwater flooding to occur at the site. The Environment Agency (EA) Flood Risk Map for the site is presented as Figure 4.1.

FIGURE 4.1 EA FLOOD RISK MAP



Source - <https://flood-map-for-planning.service.gov.uk/>



4.4. INDUSTRIAL LAND USES

The site is located within a predominantly residential and commercial area, there are 29 active entries within the trade directory for industrial land uses. Uses generally include:

- ✳ 43m west – Clothing and accessories, textiles, silk and machinery
- ✳ 56m northeast - Bar
- ✳ 62m southwest – vehicle repair, testing and servicing
- ✳ 93m southeast – electricity sub-station
- ✳ 102m east – radar and telecoms equipment
- ✳ 102m east – catering products
- ✳ 133m north – haulage and distribution
- ✳ 156-242m – Electrical sub-stations
- ✳ 217m east – Chimneys
- ✳ 232m west – Industrial Engineers

4.5. SENSITIVE LAND USES

The closest residential properties are located adjacent to the northern, western and eastern boundaries of the site. No other environmentally sensitive land uses have been identified within close proximity to the site.

4.6. SITE SENSITIVITY ASSESSMENT

The site is assessed to be located within a “Low” sensitivity setting as discussed within Table 4.7.

TABLE 4.7 SITE SENSITIVITY ASSESSMENT

SENSITIVITY PROFILE	DISCUSSION	RATING
Groundwater Source Protection Zone or Drinking Water Safeguard Zone	The site does not lie within a Groundwater Source Protection Zone.	Low
Distance to the Closest Groundwater Abstraction Point	There are no active or historical groundwater, surface water or potable water abstractions within 1000 m of the site.	Low
Aquifer Classification in Superficial Drift Deposits	Secondary Undifferentiated Aquifer. Comprising mainly impermeable clay deposits.	Low
Aquifer Classification in Bedrock	Principal Aquifer. Overlain by around 25 m of clay-dominant glacial till.	Moderate



SENSITIVITY PROFILE	DISCUSSION	RATING
Is the Site Underlain by Low-Permeability Drift to Depths in Excess of 10 m?	The underlying superficial deposits are likely to comprise low-permeability clays interbedded with sands and gravels to depths in excess of 25 m which may reduce the potential for mobile phase contaminants to migrate towards the bedrock aquifer or adjacent watercourses.	Low
Is the Site Located Within 50 m of a Surface Watercourse?	The risk of surface water is negligible given the absence of a viable receptor within influencing distance of the site	Low
Sensitive Land Uses	The closest residential properties are located adjacent to the northern, western and eastern boundaries of the site.	Low
OVERALL SITE ENVIRONMENTAL SENSITIVITY		Low

