



EARTH ENVIRONMENTAL
& GEOTECHNICAL

Phase 1 GeoEnvironmental Desk Study

34-42 Durham Street

Rochdale

On behalf of

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PHASE I GEOENVIRONMENTAL DESK STUDY

34-42 DURHAM STREET

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1.0 INTRODUCTION

Appointment

- 1.1 Earth Environmental & Geotechnical Ltd. has been commissioned by TDM Architectural (the Client) to undertake a Phase I GeoEnvironmental Desk Study at Durham Street, Rochdale.
- 1.2 It is understood that the client wishes to construct four new residential dwellings on site with associated landscaping.
- 1.3 Vehicle access will be gained from the site via Exeter Street to the south or Durham Street to the north.

Objective

- 1.4 The purpose of the Desk Study is to collate available geological and environmental data for the site (and its environment) and provide a preliminary geotechnical and geo-environmental appraisal, with a site-specific conceptual model. This enables a preliminary assessment of geo-environmental risks to be undertaken and, if necessary, provides information for the design of a Phase 2 Ground Investigation.

Scope

- 1.5 The Phase I Environmental Desk Study comprises of a site reconnaissance visit and a review of the following information sources, some of which was provided by the client.
- British Geological Survey online maps.
 - Google Earth imagery.
 - Environment Agency online mapping data.
 - Historical Ordnance Survey maps.
 - The site and surrounding areas environmental, geological, and mining data presented in the site specific GroundSure Reports (Appendix 1).
 - Coal Authority Interactive Viewer.
 - Rochdale Metropolitan Borough Council Planning Portal.

2.0 SITE LOCATION AND DESCRIPTION

- 2.1 The site is located on Exeter Street, Rochdale, approximately 0.16km south of Rochdale train station.
- 2.2 The approximate National Grid Reference for the centre of the site is SD 389928 with the closest postcode being OL11 1JW.
- 2.3 The site is a rectangular shaped parcel of land with current access via Exeter Street to the south of the site. The maximum dimensions of the site are 19m east to west and 19m north to south.
- 2.4 The site occupies an area of approximately 0.04 hectares.
- 2.5 The site is located within an urban residential area. Durham Street runs parallel to the northern boundary of the site. Exeter Street runs parallel to the southern boundary of the site. There are residential and commercial properties to the east and west of the site.
- 2.6 The proposed development is to construct four residential properties on site with associated landscaping.
- 2.7 A location plan is shown below as Figure 1, along with a proposed development layout plan as Figure 2.

Figure 1 Site Location Plan



Figure 2 Proposed Development Layout Plan



Site Utility Services

- 2.8 Site service plans have not been obtained for the site. The status of all services should be checked prior to any development (including site investigation) commencing.

3.0 ENVIRONMENTAL SETTING

- 3.1 The geology of the site is covered by British Geological Survey (BGS) online data and the site specific GroundSure Enviro+Geo Insight report (Appendix 1).
- 3.2 Environmental conditions are covered by Environment Agency (EA) and British Geological Survey (BGS) online data, and the site specific GroundSure Enviro+Geo Insight report (Appendix 1).

Geology

- 3.3 The site is not underlain by artificial and made ground.
- 3.4 The site is underlain by superficial deposits of Devensian Glaciofluvial Sheet Deposits comprising of sand and gravel.
- 3.5 The solid geology beneath the site is shown to be of the Pennine Lower Coal Measures Formation comprising of coal seams, siltstone, sandstone, and mudstone.
- 3.6 There are 4 records of bedrock faults and other linear features within 500m of the site boundary. The closest linear feature record refers to a coal seam located 188m southwest of the site.
- 3.7 There are no records of landslips within 500m of the site.
- 3.8 There are 3 borehole records identified within 250m of the site. All borehole records within the vicinity are confidential.
- 3.9 The site is in an area where the hazard rating is negligible with regards to shrink swell clays, dissolution of soluble rocks, and compressible deposits. The hazard rating is very low with regards to running sands, collapsible deposits, and landslides.

Ground Workings

- 3.10 There are 6 records of historical surface ground working features identified within 250m of the site boundary. The closest record refers to a Saw Pit located 167m east of the site and dated to 1851.
- 3.11 According to the BGS, there is 1 record of a British Pit within 500m of the site. This refers to the Deepish Hall Gravel Pit located 271m south of the site.

Mining and Other Underground Workings

- 3.12 The site is located within an identified coal mining area. Reference to the Coal Authority Interactive viewer shows the site is not located within a Development High Risk Area.
- 3.13 There are no records of a non-coal mining area located within 1km of the site.
- 3.14 There are no areas of brine extraction, gypsum extraction, tin mining, or clay mining on the site.
- 3.15 There are no records of natural cavities within 500m of the site.

- 3.16 There are no records for mining cavities identified within 1km of the site.
- 3.17 There are no records for historical underground working features identified within 1km of the site.
- 3.18 There are no records of historic mineral planning areas within 500m of the site.

Radon Potential

- 3.19 The site is not located in a Radon Affected Area; less than 1% of the site is above the Action Level. Therefore, radon protection measures will not be required.

Hydrogeology and Hydrology

- 3.20 The superficial deposits of Devensian Glaciofluvial Sheet Deposits are classified by the EA as a Secondary A Aquifer with an Intergranular flow type and very high to high permeability. The BGS states the following:

Secondary A: *'Permeable layers capable of supporting water suppliers at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.'*

- 3.21 The Pennine Lower Coal Measures Formation is classified by the EA as a Secondary A Aquifer with a fracture flow type and moderate to low permeability. The BGS states the following:

Secondary A: *'Permeable layers capable of supporting water suppliers at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.'*

- 3.22 The groundwater vulnerability and soil leaching potential of the site have been classified as medium vulnerability. The BGS states:

High: *'Areas able to easily transmit pollution to groundwater. They are likely to be characterised by high leaching soils and the absence of low permeability superficial deposits'*

- 3.23 The soil leaching potential of the site has been classified as High vulnerability. The BGS states:

High: *'Areas able to easily transmit pollution to groundwater. They are likely to be characterised by high leaching soils and the absence of low permeability superficial deposits.'*

- 3.24 There are 8 groundwater abstraction licence records within 2km of the site. The closest record refers to a historical licence for process water relating to Secondary Category (Medium Loss) located 1.5km northwest of the site.
- 3.25 There are 12 surface water abstraction licence records within 2km of the site. The closest record refers to a historical license for Boiler located 402m southeast of the site.
- 3.26 There are no potable water abstraction licence records within 2km of the site.

- 3.27 The site is not located within a Total Catchment Source Protection Zone.
- 3.28 The site is not located within 500m of a Source Protection Zone within a confined aquifer.
- 3.29 There are no records of water network entries within 250m of the site.
- 3.30 There are no records of surface water features identified within 250m of the site.
- 3.31 There is 1 record of a Water Framework Directive (WFD) surface water body catchment located on-site. The record refers to the Roch (Source to Spodden) water body catchment.
- 3.32 There is 1 record of a WFD surface water body located 819m from site. The record refers to Roch (Source to Spodden). The water body received a fail chemical rating and a moderate ecological rating in 2019.
- 3.33 There is 1 record of a Water Framework Directive (WFD) groundwater body located on-site. The record refers to Weaver and Dane Quaternary Sand and Gravel Aquifers, which received a poor chemical rating in 2019.

Landfill & Waste Management Activity

- 3.34 There are no records for current Environment Agency/Natural Resource Wales landfill sites within 500m of the site.
- 3.35 There is 1 record of historic Environment Agency/Natural Resource Wales landfill sites within 500m of the site, this is located 398m northeast of the site. The landfill is recorded as receiving inert, industrial and commercial waste and was recorded between 1987-1989.
- 3.36 There are no records of BGS/DoE non-operational landfill sites within 500m of the site.
- 3.37 There are no records of a historical landfill from the Local Authority and Historical Mapping records within 500m of the site.
- 3.38 There are 26 records of a waste treatment, transfer, or disposal site within 500m of the site. The closest record refers to a treating waste exemption, not on a farm, for the repair or refurbishment of WEEE, located 113m southwest of the site.
- 3.39 There are 4 records of historical waste sites within 500m of the site, this is located 462m southeast of the site. The site is recorded to be a scrap yard which was dated 1993.
- 3.40 There are 4 records of current Environment Agency/Natural Resources Wales licensed waste sites within 500m of the site, this is located 205m northeast of the site. Site is recorded to be a Metal Recycling Site dated 2006.

Industrial Land Use Information

- 3.41 There are 225 records of potentially contaminative historical land uses identified within 500m of the site. The closest record refers to an unspecified works located 30m north of the site and dated to 1987-1992.

- 3.42 Other records within 100m of the site refer to railway sidings, railway station and railway buildings. These records are dated between 1891-1992.
- 3.43 There are 29 records of current potentially contaminative land uses identified within 250m of the site. The closest record refers to an unspecified works or factory located 32m southwest of the site.
- 3.44 There are 22 records of historical tanks identified within 500m of the site. The closest record refers to an unspecified tank located 185m north-east of the site and dated 1957.
- 3.45 There are 45 records of historical energy features identified within 500m of the site. The closest record refers to an Electricity Sub Station located 88m west of the site and dated between 1971 and 1996.
- 3.46 There are no records for current petrol or fuel sites within 500m of the site.
- 3.47 There are no records of historical petrol or fuel sites within 500m of the site.
- 3.48 There are 75 records of historical garages and motor vehicle repair sites identified within 500m of the site. The closest record refers to a garage located 142m southwest of the site, dated 1984.
- 3.49 There are no historical military land use records within 500m of the site.
- 3.50 There are no National Grid high voltage underground electricity transmission cables within 500m of the site.
- 3.51 There are no National Grid high-pressure gas transmission pipelines within 500m of the site.
- 3.52 There are 28 historical railway and tunnel features identified within 250m of the site. The closest record refers to railway sidings located on-site, dated 1892. Examination of mapping however reveals an absence of any railway sidings.
- 3.53 There are 19 current active railway line records identified within 250m of the site. The closest record refers to the Caldervale rail line located 94m northwest of the site.
- 3.54 There are no underground railway lines or tunnels identified within 250m of the site.
- 3.55 The site is not within 500m of the route of the High Speed 2 rail project.
- 3.56 The site is not within 500m of the route of the Crossrail 1 and Crossrail 2 rail projects.

Environmental Permits, Incidents and Registers

- 3.57 The Groundsure Report includes records of environmental permits, incidents, and registers within 500m of the site, which are summarised in Table 1 below.

Table 1: Environmental Permits, Incidents and Registers within 500m of the Site

Permit/Incident/Register	Number
Historical Licensed Industrial Activities (IPC)	0
Part A (1) and IPPC Authorised Activities	0
Pollutant Release to Surface Waters (Red List)	0
List 1 Dangerous Substances Inventory Sites	0
List 2 Dangerous Substances Inventory Sites	0
Part A (2) and Part B Activities and Enforcements	3
Category 3 or 4 Radioactive Substance Authorisations	0
Licensed Discharge Consents to controlled waters	0
Planning Hazardous Substance Consents and Enforcements	1
Dangerous or Hazardous (COMAH and NIHHS) Sites	1
Sites Determined as Contaminated Land under Part 2A EPA 1990	0
Regulated Explosive Sites	0
Pollutant Release to Public Sewer	0
Substantiated Pollution Incidents (Category 1 and 2)	7
Pollution Inventory Substances, Wastes and Radioactive Wastes	0

- 3.58 There is 1 record of a dangerous or hazardous (COMAH and NIHHS) site located 466m east of the site. This is a current lower tier COMAH operator site.
- 3.59 There are 3 records of licensed pollutant release, the closest recorded being located 45m northeast of the site. This refers to a current part B permit for respraying of road vehicles.
- 3.60 There are no further records environmental permits, incidents, and registers within 500m of the site.
- 3.61 There are 7 records of pollution incidents, located within 500m of the site. The closest recorded incident is 389m northwest of site. This refers to an incident relating to commercial waste dated 2001. The incident is recorded as having minor impact to land and air quality.
- 3.62 There is 1 record of hazardous substance storage/usage located within 500 m of the site. The closest recorded incident is located 499m east of the site.

Environmentally Sensitive Sites

- 3.63 There are 5 records of Sites of Special Scientific Interest (SSSI) within 2km of the site. The closest record refers to the Rochdale Canal located 350m east of the site.

- 3.64 There are 5 records of Special Areas of Conservation (SAC) within 2km of the site. The closest record refers to a floating water plantain within the Rochdale Canal, located 350m east of the site.
- 3.65 There is 1 record of Nitrate vulnerable zones within 2km of the site. The closest record refers to surface water within the River Irk, located 1.9km south of the site.
- 3.66 There are no records of a Green Belt area within 2km of the site.
- 3.67 There are no further records of environmental sensitive sites within 2km of the site.

Ecology

- 3.68 An ecological assessment of the site falls outside the brief of this report. Where considered necessary, advice should be sought from an ecological specialist in this respect.
- 3.69 The site is classified as Urban land.

Archaeology

- 3.70 An archaeological assessment falls outside the brief of this report. Where considered necessary, advice should be sought from an archaeological specialist in this respect.
- 3.71 There are no records of listed buildings within 250m of the site.
- 3.72 There is 1 record of Conversation Areas within 250m of the site. This refers to Maclure Road located 202m north of the site, designated in 2006.
- 3.73 There are no records of Areas of Outstanding Natural Beauty within 250m of the site.
- 3.74 There are no records of World Heritage Sites or Scheduled Ancient Monuments with 250m of the site.
- 3.75 There are no records of National Parks or Registered Parks and Gardens within 250m of the site.

Potential Flood Risks

- 3.76 Detailed assessment of flood risks is outside the scope of this report. However, the site does lie within EA Flood Zones 2 and 3.
- 3.77 There are no records of risk of flooding from rivers and sea (RoFRaS) within 50m of the site.
- 3.78 There are no records of historical flood events within 250m of the site.
- 3.79 There are no records of flood defences located within 250m of the site.
- 3.80 There are no record of areas benefitting from flood defences within 250m of the site.
- 3.81 There are no records of areas used for flood storage within 250m of the site.

3.82 The highest risk of surface water flooding occurring on-site is 1 is negligible.

3.83 The highest risk of groundwater flooding occurring on-site is moderate.

Previous Site Investigations

3.84 Earth Environmental & Geotechnical Ltd. are not aware of any previous site investigations carried out for the site.

4.0 SITE HISTORY

- 4.1 The historical development of the site has been determined by reference historical plans and Google Earth imagery. The reviewed historical plans comprise only readily available records and may be limited; however, the information available to date indicates that additional searches are unlikely to add to our understanding of the site. The earliest available historical mapping covering the site dates to 1848-1851.
- 4.2 The site history is summarised in Table 2, below, followed by selected extracts from maps and aerial photographs.

Table 2: Summary of Site History

Date	On-Site History	Surrounding Land Use History
1848-1851 1:1,056 1851 1:10,560	Undeveloped land.	The site is surrounded by further undeveloped land. A sand pit is located approx 100m southwest from site. Train line located 80m northwest from site. Residential area located 75m west of site.
1891 1:2,500 1890-1891 1:10,560	No significant changes	The site is immediately surrounded by further undeveloped land. Rochdale railway station developed 80m north of the site. Significant residential developed within approx 15-25m from site. Industrial development located 68m east of the site. Sand pit filled and replaced with industrial works.
1908 1:10,560 1910 1:2500	No significant changes	The site is further developed with residential buildings - directly adjacent west of the site and within 5m of the site.

Date	On-Site History	Surrounding Land Use History
1928,1938 1:10,560 1930 1:2,500	No significant changes	Further residential development within 500m of the site.
1954- 1956,1967-1968 1:10,560	Site developed with garages.	Further residential development within 500m of the site.
1975-1976 1:10,000	No significant changes	Primary school built 83m southeast of the site.
1982- 1985,1995,2003 1:1,250 2010,2023 1:10,000	Garages demolished between 2005-2013	No significant changes to surrounding site.

Figure 3 OS Map Extract 1848-1851

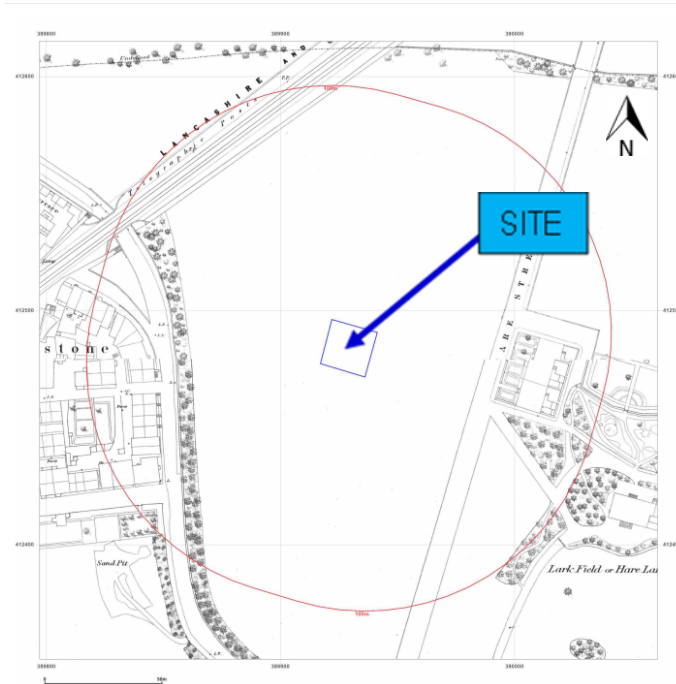


Figure 4 OS Map Extract 1910

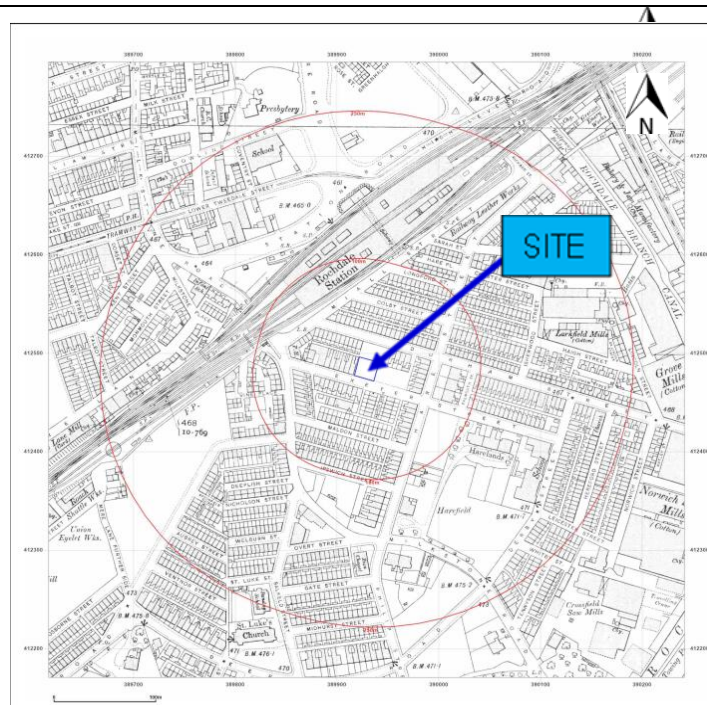


Figure 5 OS Map Extract 1930

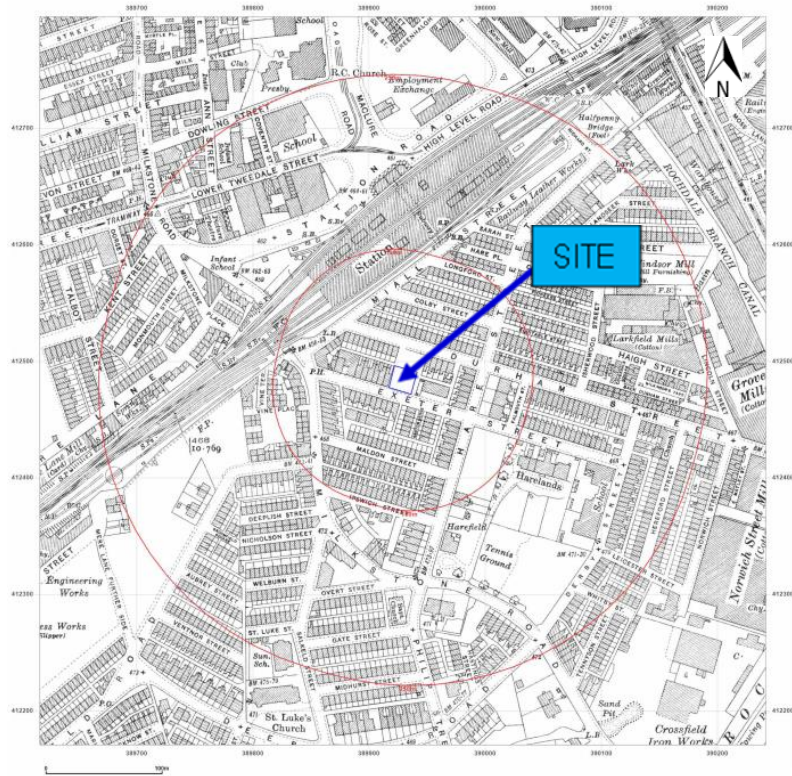
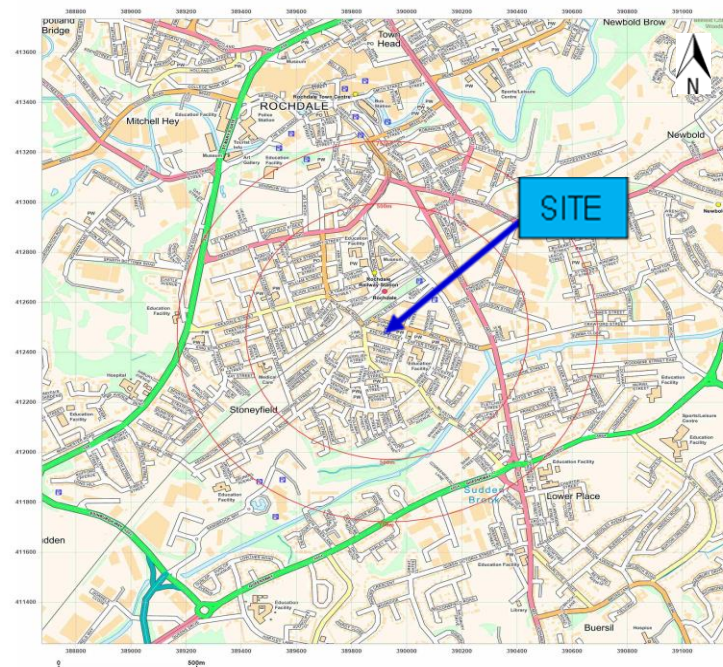


Figure 6 OS Map Extract 2023



5.0 WALKOVER SURVEY

- 5.1 A walkover survey was completed on the 25th of October 2023. The photographs and notes from this survey are appended to this report as Appendix 2 and Appendix 3, respectively.
- 5.2 The site is currently accessed by Durham Street via Oldham Road. The site can also be accessed by Exeter Street via Milkstone Road. There is a factory adjacent to site on Durham Street.
- 5.3 The rest of the surrounding area comprises of residential properties and some retail shops on Durham Street, east of the site within 10 metres.
- 5.4 The site consists of hardstanding ground comprising of rubbles, foliage and household waste.
- 5.5 The site is surrounded by residential properties with some commercial properties also on Durham Street. There is a factory opposite the site adjacent to Durham Street.
- 5.6 There is a manhole cover adjacent to the site.
- 5.7 A site features plan is presented as Figure 7 overleaf.

Figure 7 Site Features plan



6.0 PRELIMINARY CONTAMINATION RISK ASSESSMENT

Introduction

- 6.1 The following paragraphs outline a Preliminary Risk Assessment (PRA) for the site based on the above desk study information as defined by Land Contamination Risk Management Environment Agency, July 2023
- 6.2 Table 5 provides a Preliminary Conceptual Model (PCM) which considers the source-pathway-receptor linkages present alongside the likelihood, severity and risk level as defined within Table 3 and Table 4 below. The assessment of probability, a modified risk table, and certain consequence definitions are based on CIRIA C552 and Land Contamination Risk Management Environment Agency, July 2023.
- 6.3 Table 5 considers whether a pollution linkage is potentially present and provides a preliminary qualitative assessment of risk based on the information currently available. Where a possible linkage is identified, it does not necessarily mean that a significant risk exists but indicates that further information is required through appropriate site investigation to substantiate the conceptual model.
- 6.4 The PCM/PRA is based on a residential end use.

Table 3: Consequence, Probability and Risk

Probability	Consequence,	Risk
High Likelihood- There is a pollution linkage and an event either appears very likely in the short term and almost inevitable over the long term, or there is evidence at the receptor of harm or pollution	Very High – acute risk to the human health likely to result in significant harm. Risk of severe or irreversible effect on ground/surface water quality. Catastrophic damage to buildings / property.	Very High – there is a high potential that the source-pathway-receptor scenarios may give rise to harm to human health, or the environment and remedial action is likely to be required.
Likely – there is a pollution linkage, and all the elements are present, which means that it is probable an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term.	High – Severe or irreversible effect on human health. Temporary severe or irreversible effect on ground/surface water quality. Reduction of water quality rendering groundwater or surface water unfit to drink and/or substantial adverse impact on groundwater dependant environmental receptors.	High – it is likely that the source-pathway-receptor scenarios may give rise to an impact on human health or the environment, which may require remediation and/or control measures to mitigate risks
Low likelihood– there is a pollutant linkage and circumstances are possible for an event could occur. However, it is by no means certain that even over a longer period such event would take place, and is less likely in the shorter term	Moderate – Long term or short-term moderate effect on human health. Moderate effect on ground/surface water quality, reversible with time. Reduced reliability of a supply at a groundwater or surface water abstraction source	Moderate – it is possible that the source-pathway-receptor scenarios may give rise to an impact on human health or the environment, however it is either relatively unlikely that such would be severe, or if any harm were to occur it is more likely that harm would be mild.
Unlikely – there is a pollution linkage, but circumstances are such that it is doubtful that an event would occur even in the very long term.	Low – Non-permanent health effects to human health (easily prevented by means such as personal protective clothing etc.) Slight effect on ground/surface water quality, reversible with time. Marginal reduced reliability of a supply at a groundwater or surface water abstraction source.	Low – it is possible that harm could arise at the source, however it is likely that this would at worst be mild.
		Very Low – it is unlikely that the source-pathway-receptor scenarios will give rise to an impact on human health or the environment.

Table 4: Estimation of Level of Risk by Comparison of Consequence and Probability

		Consequence			
		High	Moderate	Low	Very low
Probability	High Likelihood	Very high	High risk	Moderate risk	Moderate to low risk
	Likely	High risk	Moderate risk	Moderate to low risk	Low risk
	Low Likelihood	Moderate risk	Moderate to low risk	Low risk	Very low risk
	Unlikely	Moderate to low risk	Low risk	Very low risk	Very low risk

Potential Sources

- 6.5 The site has been located on undeveloped land since the mid 1800's to the mid 1900's when rows of small private garages were constructed on site. The site remained unchanged until between 2005-2013 where the garages were demolished.
- 6.6 Aerial images show the site to contain rubble associated with the demolition. The surrounding area was occupied by vacant land up until the early 20th century when significant residential development occurred.
- 6.7 A railway line has been located approx. 80m north of the site since historical records began. Rochdale Train Station was first recorded in the 1890's approx. 80m north of the site.
- 6.8 There is the potential for the presence of contamination associated with the demolition of the former garages.

Potential Receptors

- 6.9 The following receptors have been considered for the construction and operational stages of the proposed redevelopment.
- Current site users;
 - Adjacent land users;
 - Future land users;
 - Construction workers during site development works;
 - Surface water and Groundwater within the underlying aquifer.

Potential Pathways

- 6.10 The following pathways have been considered for the construction and operational stages of the proposed redevelopment.
- Dermal contact, ingestion, inhalation pathways of potentially contaminated soils;
 - Downward vertical migration of leachate to surface waters and shallow groundwater;
 - Vertical or lateral migration of ground gas.

Table 5: Preliminary Conceptual Model

Source	Pathway	Receptor	Probability	Consequence	Risk	Comment
Potential soil contamination E.g., Heavy Metals, PAH, TPH, BTEX and ground gases.	Dermal contact, ingestion, and inhalation of soils dust	Current Site Users	Unlikely	Moderate	Low	There are no current site users. Therefore, the risk is LOW .
		Adjacent land users	Unlikely	Moderate	Low	There are residential properties within the immediate vicinity of the site. Usual dust control measures should be implemented as part of good site working practices during any construction to reduce dust generation. Therefore, the risk is considered LOW .
		Future land users	Low likelihood	Moderate	Moderate to low	The proposed development is to construct 4 residential properties with associated private gardens. There is potential for contamination on site associated with small scale historical development, therefore the risk to future site users via direct exposure is considered MODERATE to LOW .
		Construction Workers	Low likelihood	Moderate	Moderate to low	Construction workers may be exposed to potentially contaminated soils during construction works, however, exposure duration will be short-term only. The risk to construction workers is considered MODERATE to LOW . Appropriate health and safety measures (in line with CDM and other relevant health and safety guidance) will reduce the risk to LOW .
	Downward vertical migration of leachate to shallow groundwater	Groundwater within the Underlying Aquifer	Low likelihood	Moderate	Moderate to low	The underlying superficial soils are of Devensian Glaciofluvial Sheet Deposits comprising of sand and gravel. The solid geology beneath the site is shown to be Pennine Lower Coal Measures Formation comprising of siltstone, sandstone, and mudstone. There are no potable water abstraction licence records within 2km of the site. The groundwater vulnerability and leaching potential is high. Potential sources of contamination have been identified on-site. Therefore, the risk to groundwater is considered MODERATE to LOW .
	Lateral migration in surface waters	Surface water	Unlikely	Moderate	Low	There are no surface water features located within 250m of the site. There is no active surface abstraction water license within 2km. Therefore, the perceived risk to surface waters is LOW .
	Vertical or lateral migration of ground gas	Current Site Users	Unlikely	Moderate	Low	There are no current site users. Therefore, the risk is LOW .
		Adjacent land users	Unlikely	Moderate	Low	The site is not located in a Radon Affected Area with less than 1% of properties above the Action Level. It is unlikely for deep made ground to be present on the site. Therefore, the risk to adjacent site users from ground gas is considered LOW .
		Future land users	Unlikely	Moderate	Low	The proposed development is to construct 4 residential properties with associated private gardens. The site is not located in a Radon Affected Area with less than 1% of

Source	Pathway	Receptor	Probability	Consequence	Risk	Comment
						properties above the Action Level. Radon protection measures will not be required for the proposed development. It is unlikely for deep made ground to be present on the site. The risk to future site users from ground gas is considered LOW .
		Construction Workers	Unlikely	Moderate	Low	Construction workers may be exposed to ground gas/depleted oxygen conditions in confined spaces and excavations; however, the duration will be short-term. The risk to construction workers from ground gas is considered LOW .
Asbestos Containing Material (ACM)		Current Site Users	Unlikely	Moderate	Low	There are no current land users. Asbestos is likely to be present on site associated with previous garages. Asbestos is only harmful when disturbed. The risk to current site users is considered to be LOW .
		Adjacent land users	Unlikely	Moderate	Low	There are residential properties within the immediate surround area. Asbestos is likely to be present on the site associated with the demolished garages. Disturbance of soil during the construction phase may allow fibres to become airborne. Dust control measures (dampening down) should be implemented as part of good site working practices. Therefore, the risk is considered LOW .
		Future land users	Likely	Moderate	Moderate	The proposed development is to construct 4 residential properties with gardens. Asbestos containing materials are likely to be present on site associated with the previously demolished garages. Therefore, the risk is considered MODERATE . A contamination assessment of the existing on-site soils and structures would be required to determine the level of risk and necessary mitigation measures.
		Construction Workers	Low likelihood	Moderate	Moderate to low	Construction workers may be exposed to potential asbestos in Made Ground soils. The risk is considered MODERATE to LOW . A contamination assessment of the existing on-site soils would be required to determine the level of risk and necessary mitigation measures.

7.0 GEOTECHNICAL HAZARDS ASSOCIATED WITH THE DEVELOPMENT

7.1 In addition to the environmental hazards there are also geotechnical hazards associated with the stability of the ground including load bearing capacity, slope stability and effects of ground mining activities. Local Authorities follow NPPF (2012) which requires that a site be suitable for its new use considering of ground conditions and land instability, including from natural hazards to former activities such as mining. A summary of the geotechnical considerations is provided below in Table 6.

Table 6: Summary of Geotechnical Hazards

Geohazards:	
Highly Compressible Ground	Negligible risk
Collapsible Soils	Very low risk
Swelling Clay	Negligible risk
Running Sands	Very low risk
Ground Dissolution	Negligible risk
Landslip	Very low risk
Mining & Quarrying	The site is located within an identified coal mining area however reference to the Coal Authority Interactive viewer shows the site is not located within a Development High Risk Area. There are no records of underground workings or mining within 250m of the site. The risk is therefore considered very low.
Geotechnical Design Considerations	
Site Clearance	Site is covered by demolition rubble, household waste and fly tipped material.
Trees	There are young unestablished trees and vegetation situated within the site.
Existing Buildings/Obstructions	Concrete from previous garages on site could be a potential obstruction.
Foundations	The depth and type of proposed new foundations would depend on the ground conditions present on-site. Made Ground artificial deposits associated with the current and historic developments may underlie the site.

Geotechnical Design Considerations	
Floor Slabs	Again, an intrusive geotechnical investigation is recommended prior to any new structure construction works to discover the most suitable floor slab design for the on-site ground conditions.
Groundwater	Exact groundwater conditions are not known at this stage. For more detailed knowledge of the groundwater regime, an intrusive geotechnical investigation would be needed. The risk of groundwater flooding on-site is Low.
Earthworks	Earthworks are not considering necessary at the site.
Slopes	The site is level.
Retaining Walls	No retaining walls on site.
Chemically aggressive ground conditions	Chemically aggressive ground conditions are not expected at this site. However, an intrusive geotechnical investigation would be necessary to confirm this.

8.0 CONCLUSIONS & RECOMMENDATIONS

Conclusions

- 8.1 Historically, the land was undeveloped up until the mid-1900's whereby two small rows of private garages were constructed. The site remained unchanged until between 2005-2013 when the garages were demolished. The surrounding area has undergone significant residential development within 500m over historical records to present day.
- 8.2 The site is recorded to be underlain by superficial deposits of Devensian Glaciofluvial Sheet Deposits comprising of sand and gravel. The solid geology beneath the south of the site is recorded to be the Pennine Lower Coal Measures Formation comprising of coal seams, siltstone, sandstone, and mudstone.
- 8.3 The site is not located in a Radon Affected Area as less than 1% of the site is above the Action Level. Therefore, radon protection measures will not be required.
- 8.4 The overall risk from soil contamination to end users is concluded to be **LOW** based on the current proposed development. However, a **MODERATE to LOW** classification has been attributed due to the potential for contamination associated with demolished garages.
- 8.5 The risk to controlled waters is concluded to be **LOW** as there are no nearby surface water bodies and no significant sources of mobile contamination identified on site.
- 8.6 The risk from ground gas to end users and construction workers is **LOW**.

Recommendations

- 8.7 An intrusive investigation should be undertaken to ensure the most up to date geotechnical parameters for the design foundations, floor slabs and pavement construction for the proposed new structures and surrounding area are gained.
- 8.8 As part of the ground investigation soil samples should be taken from across the site for chemical analysis.
- 8.9 Access to the site would need to be created and the site would need to be cleared of debris, vegetation and general litter prior to any intrusive investigation.

APPENDIX 1

GROUNDSURE REPORTS

APPENDIX 2

SITE PHOTOGRAPHS

Earth Environmental & Geotechnical Ltd Tel: 0161 975 6088 Email: info@earthenvironmental.co.uk Web: www.earthenvironmental.co.uk	SITE PHOTOGRAPHS 
Job No.: A5655/23	Site: Durham Street, Rochdale
Plate 1 Viewing west on Durham Street showing site boundary wall.	Plate 2 Viewing south, entry between adjacent residential properties and east of site leading to Exeter Street.
	
Date: 25th October 2023	Date: 25th October 2023
Plate 3 Viewing north from Exeter Street showing site boundary wall.	Plate 4 Viewing south entry between adjacent residential properties and west of site leading to Exeter Street.
	
Date: 25th October 2023	Date: 25th October 2023

Earth Environmental & Geotechnical Ltd Tel: 0161 975 6088 Email: info@earthenvironmental.co.uk Web: www.earthenvironmental.co.uk	SITE PHOTOGRAPHS 
Job No.: A5655/23	Site: Durham Street, Rochdale
Plate 5 Viewing northeast showing different vegetation present and some litter.	Plate 6 Viewing south showing litter and fly tipping present within site.
	
Date: 25th October 2023	Date: 25th October 2023
Plate 7 Viewing south showing vegetation and rubble.	Plate 8 Viewing east showing vegetation and rubble
	
Date: 25th October 2023	Date: 25th October 2023

APPENDIX 3

SITE WALKOVER NOTES

WALK OVER SURVEY REPORT

Site: Durham Street, Rochdale

Date: 25th October 2023

Job No: A5655/23

Undertaken By: Michael Coleman

Purpose of Site Walkover:

- 1) Provide further information for the Desk Study Report.
- 2) Identify potential contamination sources, pathways, and receptors.
- 3) Identify geotechnical features and potential geohazards.
- 4) Determine locations for exploratory boreholes.

Desk Study features checked during site visit	Feature and Information required	Present	Description / Comments
Site Setting	Description required for: Town/Country/Suburb Setting Industrial/Residential/Retail Usage Current Site use (if undertaking security and access to the site)		Site is located between Exeter Street and Durham Street. Factory located on Durham Street opposite the site adjacent to Durham Street. Site is undeveloped.
Evidence of Past Activities	Are there: Any relevant street names in area? Features or relics which indicate past history?	Yes/No Yes/No	Exeter Street and Durham Street. Access to Durham Street via Oldham Road. Debris and obstructions present on the site.
Geographic Setting	Description required for: Low lying flood plain/dry valley/rolling hills etc.		Flat residential surface
Ground Conditions	Is there any evidence of: Mining, Mine entries Subsidence Landslip/slope erosion Former investigation works	Yes/No Yes/No Yes/No Yes/No	

Desk Study features checked during site visit	Feature and Information required	Present	Description / Comments
Topography	Description required for: Are there apparent differences between site and surrounding area? (If yes describe the presence of retaining walls, and slopes). Is there evidence of Made Ground / Fill on site?	Yes/No Yes/No	All site is Made Ground.
Site Boundaries and Neighbours	Description required for: Type of boundary demarcation (if any) on each side of site, usage of adjacent land and name of industrial/commercial occupiers. Note any adjacent features such as water course and other potentially environmentally sensitive uses (residential, school, infirmary, SSSI etc)		Site is located next to commercial retail buildings to the north on Durham Street. The immediate vicinity of the site is residential which are both adjacent, either side separated by a narrow entry which connects Exeter Street to Durham Street.
Vegetation	Are there any vegetation/trees on or close to site (if yes describe locations, type, maturity, etc) Is there any evidence of poor health / distress?	Yes/No Yes/No	The site itself has some immature foliage present.
Ground Surface	Are there areas of hardstanding and estimate the split between hard and soft cover? (If yes describe locations, types, and conditions). Is there any evidence of any spillages or staining?	Yes/No Yes/No	The site is entirely comprised of hard cover. None visible on the site walkover.

Desk Study features checked during site visit	Feature and Information required	Present	Description / Comments
Site Drainage	Are there any drain covers / soakaways (if yes describe locations) Are there any outfalls/water courses on site (note the condition of water courses in open water courses. discolouration, odour, eutrophication, oily sheen, gas bubbling water, clear or cloudy) Where a watercourse runs alongside or crosses a site are there any differences in visible water quality upstream and downstream of the site?	Yes/No Yes/No Yes/No	A manhole is present adjacent to site in the passage west of site that runs between Exeter Street and Durham Street.
Electrical Equipment	Are there any electricity sub stations on or adjacent to the site? Are there any electrical transformers, capacitors, pylons etc on site?	Yes/No	There are none on site however there is a telecommunications pole located on the northwest corner of the site on Durham Street.
Buildings	Is there any evidence of asbestos construction materials e.g., roofing, insulation materials. Do any buildings have basements? Do any buildings have a boiler room (if yes, describe fuel type and storage arrangements)?	Yes/No Yes/No Yes/No	There was no access to site however there was some corrugated iron and concrete foundations left over from the previous structures which were demolished.

Desk Study features checked during site visit	Feature and Information required	Present	Description / Comments
Landfilling	Is there any evidence of gas protection measures (gas membrane, gravel-filled trenches, venting pipes, etc)?	Yes/No	
Process Air Emissions	Point Source: Are there any stacks / vents / cooling towers / abatement equipment? Fugitive Source: is there any stockpiled material / windblown dust / vapour process?	Yes/No Yes/No	
Storage of fuels & Chemicals	Are there any drums / containers (if yes, describe quantity, full /empty, stored on hard standing / soft landscaping, bunding)? Are there any above ground fuel tanks (if yes, describe locations, volumes, how many, bunding, used / disused, condition?) Is there any evidence of underground fuel tanks (fuel pumps, covers, vent pipes, how many and how large, fill point, used / disused, and condition)?	Yes/No Yes/No Yes/No	
Accidents	In the event of a large spillage would runoff affect any vulnerable watercourse/culverts? Are emergency procedures / equipment in place?	Yes/No Yes/No	

Desk Study features checked during site visit	Feature and Information required	Present	Description / Comments
Waste	Are there any waste skips present on site? Are waste storage facilities adequate? Is there any litter/fly tipped material?	Yes/No Yes/No Yes/No	Household waste has been fly tipped.
Atmospheric	Are there any fumes, odours originating from site or affecting site from neighbouring sites?	Yes/No	
Access / Further Investigations	If a Phase 2 Investigation is likely to be required, describe any access problems including headroom where relevant, services, overhead cables, restricted access areas, confined spaces, trafficked areas, etc that are likely to affect investigation scope/techniques. Identify possible site office and storage locations. Identify possible water supply		There is currently no access to the site as it is surrounded by a tall concrete wall. There is a newer wall which has been built to cover the entrance therefore this would need to be knocked down. Site office could be on site; however, obstructions would need clearing. None nearby.
Site Environs	Are there any local features that could have a harmful influence e.g., landfill, industrial processes, railway land? Are there any sensitive water features/courses near to the site?	Yes/No Yes/No	Railway line located 80m north of the site.
Local Knowledge / Anecdotal Evidence			
Site Dimensions	Describe shape of Site in plan and measure dimensions.		Square shape, 19m x 19m

APPENDIX 4

REPORT LIMITATIONS

LIMITATIONS

This contract was completed by Earth Environmental & Geotechnical Ltd on the basis of a defined programme and scope of works and terms and conditions agreed with the client. This report was compiled with all reasonable skill, and care, bearing in mind the project objectives, the agreed scope of works, the prevailing site conditions, the budget, and staff resources allocated to the project.

Other than that, expressly contained in the above paragraph, Earth Environmental & Geotechnical Ltd provides no other representation or warranty whether express or implied, is made in relation to the services. Unless otherwise agreed this report has been prepared exclusively for the use and reliance of the client in accordance with generally accepted consulting practices and for the intended purposes as stated in the agreement under which this work was completed. This report may not be relied upon, or transferred to, by any other party without the written agreement of a Director of Earth Environmental & Geotechnical Ltd.

If a third party relies on this report, it does so wholly at its own and sole risk and Earth Environmental & Geotechnical Ltd disclaims any liability to such parties.

It is Earth Environmental & Geotechnical Ltd understanding that this report is to be used for the purpose described in the introduction to the report. That purpose was an important factor in determining the scope and level of the services. Should the purpose for which the report is used, or the proposed use of the site change, this report will no longer be valid and any further use of, or reliance upon the report in those circumstances by the client without Earth Environmental & Geotechnical Ltd review and advice shall be at the client's sole and own risk.

The report was written in 2023 and should be read in light of any subsequent changes in legislation, statutory requirements, and industry best practices. Ground conditions can also change over time and further investigations, or assessment should be made if there is any significant delay in acting on the findings of this report. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should not be relied upon in the future without the written advice of Earth Environmental & Geotechnical Ltd. In the absence of such written advice of Earth Environmental & Geotechnical Ltd, reliance on the report in the future shall be at the client's own and sole risk. Should Earth Environmental & Geotechnical Ltd be requested to review the report in the future, Earth Environmental & Geotechnical Ltd shall be entitled to additional payment at the then existing rate or such other terms as may be agreed between Earth Environmental & Geotechnical Ltd and the client.

The observations and conclusions described in this report are based solely upon the services that were provided pursuant to the agreement between the client and Earth Environmental & Geotechnical Ltd. Earth Environmental & Geotechnical Ltd has not performed any observations, investigations, studies or testing not specifically set out or mentioned within this report.

Earth Environmental & Geotechnical Ltd is not liable for the existence of any condition, the discovery of which would require performance of services not otherwise contained in the services. For the avoidance of doubt, unless otherwise expressly referred to in the introduction to this report, Earth Environmental & Geotechnical Ltd did not seek to evaluate the presence on or off the site of electromagnetic fields, lead paint, radon gas or other radioactive materials.

The services are based upon Earth Environmental & Geotechnical Ltd observations of existing physical conditions at the site gained from a walkover survey of the site together with Earth Environmental & Geotechnical Ltd interpretation of information including documentation, obtained from third parties and from the client on the history and usage of the site. The findings and recommendations contained in this report are based in part upon information provided by third parties, and whilst Earth Environmental & Geotechnical Ltd have no reason to doubt the accuracy and that it has been provided in full from those it was requested from, the items relied on have not been verified.

No responsibility can be accepted for errors within third party items presented in this report. Further Earth Environmental & Geotechnical Ltd was not authorised and did not attempt to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the services. Earth Environmental & Geotechnical Ltd is not liable for any inaccurate information, misrepresentation of data or conclusions, the discovery of which inaccuracies required the doing of any act including the gathering of any information which was not reasonably available to Earth Environmental & Geotechnical Ltd and including the doing of any independent investigation of the information provided to Earth Environmental & Geotechnical Ltd save as otherwise provided in the terms of the contract between the client and Earth Environmental & Geotechnical Ltd.

Where field investigations have been carried out these have been restricted to a level of detail required to achieve the stated objectives of the work. Ground conditions can also be variable and as investigation excavations only allow examination of the ground at discrete locations. The potential exists for ground conditions to be encountered which are different to those considered in this report. The extent of the limited area depends on the soil and groundwater conditions, together with the position of any current structures and underground facilities and natural and other activities on-site. In addition, chemical analysis was carried out for a limited number of parameters [as stipulated in the contract between the client and Earth Environmental & Geotechnical Ltd] based on an understanding of the available operational and historical information, and it should not be inferred that other chemical species are not present.

The groundwater conditions entered on the exploratory hole records are those observed at the time of investigation. The normal speed of investigation usually does not permit the recording of an equilibrium water level for any one water strike. Moreover, groundwater levels are subject to seasonal variation or changes in local drainage conditions and higher groundwater levels may occur at other times of the year than were recorded during this investigation.

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.