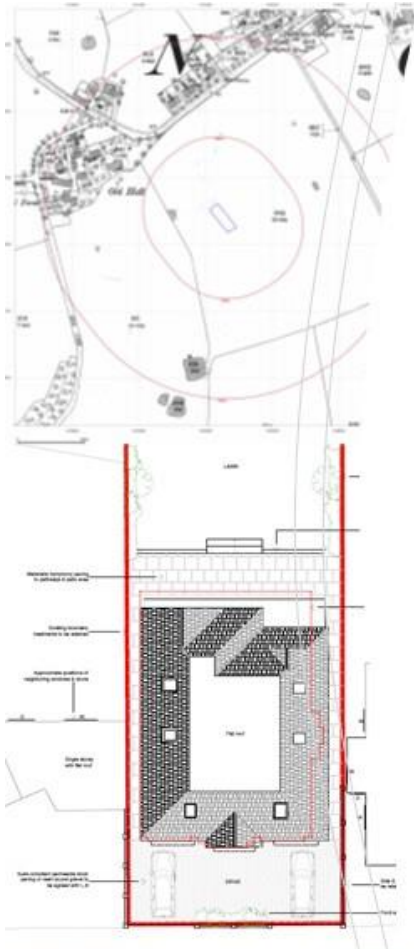




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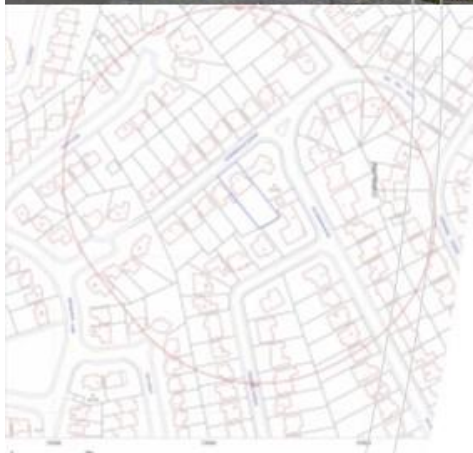
Phase 1 GeoEnvironmental Desk Study

3 Sunningdale Avenue

Whitefield

On behalf of

Mr. Usman Ali



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PHASE I GEOENVIRONMENTAL DESK STUDY

3 SUNNINGDALE AVENUE

WHITEFIELD

ON BEHALF OF

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Report No. A6184/24/BDS

AUGUST 2024

Report Title:	3 Sunningdale Avenue, Whitefield Phase I GeoEnvironmental Desk Study
Report Reference:	A6184/24/BDS
Client:	Mr. Usman Ali
Issue Date:	8th August 2024
Drafted By:	L Waller
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1.0 INTRODUCTION

Appointment

- 1.1 Earth Environmental & Geotechnical Ltd has been commissioned by Archirama Ltd on behalf of Mr. Usman Ali (the Client) to undertake a Phase I GeoEnvironmental Desk Study for 3 Sunningdale Avenue, Whitefield, Manchester.
- 1.2 It is understood that the Client intends to demolish an existing dwelling & erection of replacement dwelling with associated external works.
- 1.3 A planning application (70105) has been approved by Bury Metropolitan Council with conditions.
- 1.4 An existing and proposed development plan for the site can be viewed overleaf in Figure 1.

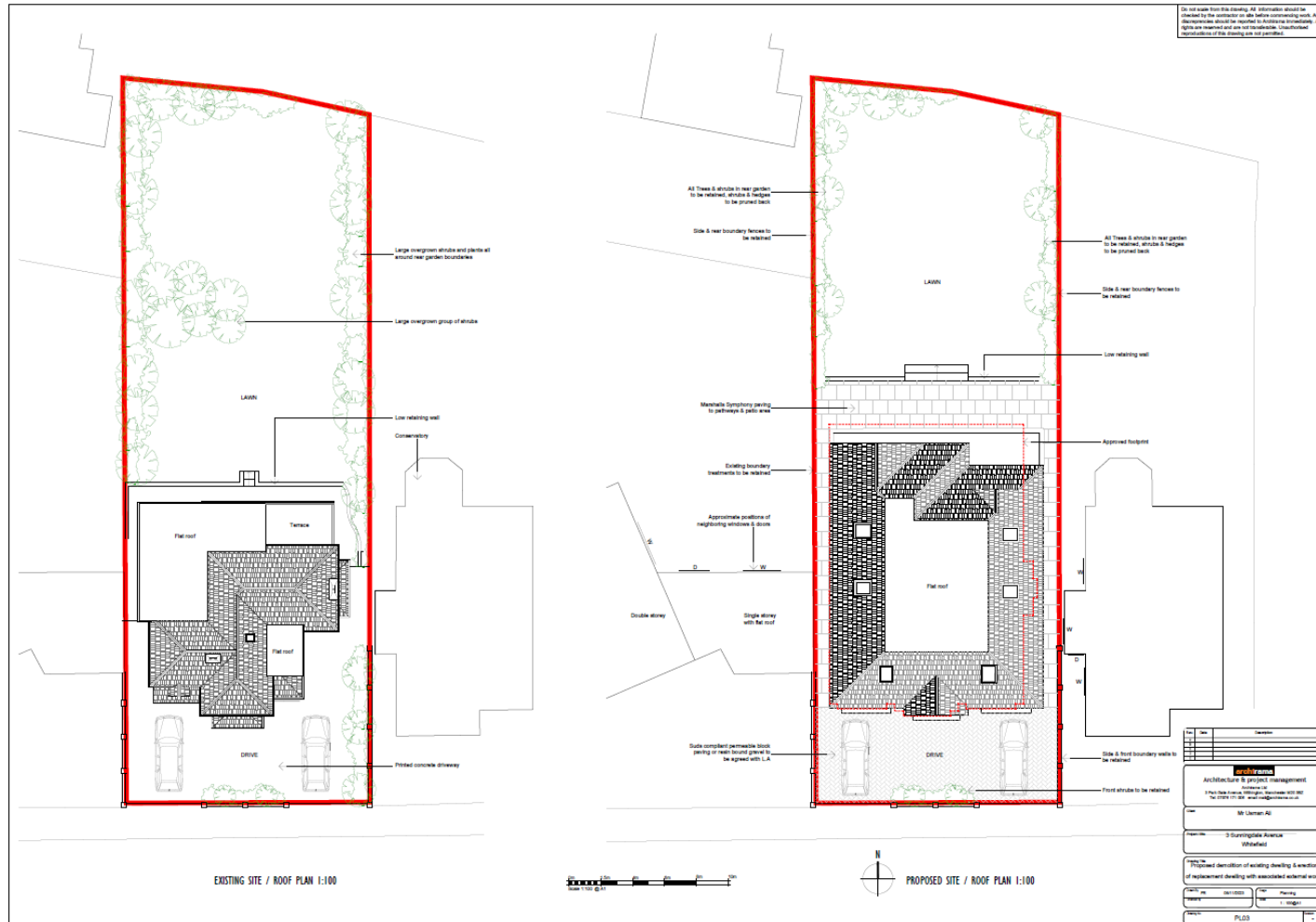
Objective

- 1.5 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

- 1.6 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.
 - Manchester City Council Planning Portal.

Figure 1: Development Layout Plan



2.0 SITE LOCATION AND DESCRIPTION

- 2.1 The site is located at land on 3 Sunningdale Avenue, Whitefield, Manchester, M45 7GW. The site is situated approximately 1.4km to the southwest of the tram stop.
- 2.2 The approximate National Grid Reference for the centre of the site is SD 79425 05239 (X: 379425, Y: 405239).
- 2.3 The site (0.07hetares) is a rectangular shaped parcel of land, which comprises an existing domestic dwelling.
- 2.4 The site is currently occupied with a two-storey domestic dwelling with an attached garage made of brick and. The front of the property is covered with hardstanding driveway. The rear of the property is covered with soft landscaping, shrubs, and majority tress in the eastern neighbour properties.
- 2.5 The site is bound by domestic properties to the east, west and south. The northern boundary of the property is Sunningdale Avenue. Additionally, an electricity substation is located on the eastern boundary. The site is bound to the north by a wall of a residential property, the east by garden wall of an adjacent property, the south by a wall that is presumed to be against the wall of an adjacent property and the east is open onto the site access point of Gardiner Street.
- 2.6 The general surrounding area comprises of residential dwellings.
- 2.7 A location plan is shown below as Figure 2, together with a recent site photograph as Figure 3 (overleaf).

Figure 2: Site Location Plan



Figure 3: Site Photograph



Site Utility Services

- 2.8 Site service plans have been obtained for the site by the Client. 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 BGS states that the site is not underlain by artificial deposits.
- 3.4 The site is recorded to be underlain by superficial deposits of glaciofluvial deposits which generally comprises of sands and gravels.
- 3.5 The bedrock geology beneath the site is shown to be the Triassic Chester Pebble Bed Formation, comprising reddish brown conglomerates interbedded with sandstones and rare mudstones.
- 3.6 There are 8no. records of linear features within 500m of the site boundary. The closest refers to an inferred normal fault 106m to the northeast of the site.
- 3.7 There are 2no. records of landslips within 500m of the site. The closest is recorded to 306m to the southwest of the site.
- 3.8 There are no borehole records identified within 250m of the site.
- 3.9 The following hazards ratings applicate to the site and land with 50m are presented in the Enviro + Geo Insight Report

- | | |
|--|------------|
| • Shrink / swell clays: | Negligible |
| • Running sands: | Very Low |
| • Compressible deposits: | Negligible |
| • Collapsible deposits: | Very Low |
| • Landslides: | Very Low |
| • Ground dissolution of soluble rocks: | Negligible |

Hydrogeology and Hydrology

- 3.10 The Glaciofluvial Deposits are classified by the Environment Agency (EA) as a Secondary A, Aquifer with an Intergranular flow type and a high to very high permeability. The BGS states the following:

Secondary A 'Permeable layers capable of supporting water supplies 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.'

- 3.11 The Chester Pebble Bed Formation is classified by the Environment Agency (EA) as a Principal Aquifer with a mixed flow type and moderate to high permeability. The BGS states the following:

Principal *'Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers'*

- 3.12 The groundwater vulnerability of the site has been classified as high for the superficial and bedrock aquifers. The soil leaching potential of the site classified as intermediate. 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.'

- 3.13 There are 22no. groundwater abstraction license records within 2km of the site. The closest record refers to an active licence for spray irrigation from a borehole at Stand Golf Club located 685m to the northeast of the site.
- 3.14 There are 3no. surface water abstraction license records within 2km of the site. All the records refer to a historical licence located 1.8km to the south of the site.
- 3.15 There are 3no. records of potable water abstraction license records within 2km of the site. All the records refer to a historical licence located 1.5km to the northeast of the site.
- 3.16 The site is not located within 500m of a source Protection Zone.
- 3.17 The site is not located within 500m of a Source Protection Zone within a confined aquifer.
- 3.18 There are no water network entries within 250m of the site.
- 3.19 There is 1 surface water feature identified within 250m of the site.
- 3.20 There is 1 record of a Water Framework Directive (WFD) surface water bodies located onsite. The record refers to the River Irwell (Croal to Irk), which is within the Irwell Management catchment and Croal Irwell operational catchment. The EA assigned a fail chemical and moderate ecological rating in 2019.
- 3.21 There is 1 record of a Water Framework Directive (WFD) groundwater body located on-site. The record refers to the Manchester and East Cheshire Permo-Triassic Sandstone Aquifers which had a poor chemical rating in 2019.

Ground Workings

- 3.22 There are 11no. records of historical surface ground working features identified within 250m of the site boundary. All records refer to a pond or ponds located 181m to 250m to the south of the site.

Mining and Other Underground Workings

- 3.23 The site is located within an identified coal mining area however the site is not within a Coal Authority Development High Risk Area.

- 3.24 There are no underground workings within 2km of the site.
- 3.25 There are no records of non-coal mining areas located within 2km of the site.
- 3.26 There are no records of historical mineral planning areas within 500m of the site.
- 3.27 There are no records of brine areas, gypsum extraction, tin mining, or clay mining on the site.
- 3.28 There are no records of natural cavities within 500m of the site.
- 3.29 There are no records of mining cavities within 1kmm of the site.

Radon Potential

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

Landfill & Waste Management Activity

- 3.31 There are no records for current Environment Agency landfill records within 500m of the site.
- 3.32 There is no record of historic Environment Agency landfill sites within 500m of the site.
- 3.33 There are no records of BGS/DoE non-operational landfill sites within 500m of the site.
- 3.34 There are no records of a historical landfill from the Local Authority and Historical Mapping records within 500m of the site.
- 3.35 There are no records of a waste treatment, transfer, or disposal site within 500m of the site.
- 3.36 There are no records of historical waste sites within 500m of the site.

Industrial Land Use Information

- 3.37 There are 11no. records of potentially contaminative historical land uses identified within 500m of the site. The closest record refers to a refuse heap located 286m to the north of the site. Other records within the area for Unspecified Heap, Unspecified Ground Workings, Unspecified Tank, Sand Pit, Nursery, Cotton Mill and Sand Pit.
- 3.38 There are no records of historical tanks within 500m of the site.
- 3.39 There are 36no. records of historical energy features identified within 500m of the site. There are 4no. onsite records for an electrical substation, however the substation is located adjacent to the site on the northeastern boundary. The adjacent substation dates from at least 1955 to the present, this predates the 1981 ban on Polychlorinated Biphenyls.
- 3.40 There are 3no. records of recent industrial land uses identified within 250m of the site. The closest records refer to an electricity substation located 7mm to the east of the site.
- 3.41 There are no records of historical petrol or fuel sites within 500m of the site.

- 3.42 There are no records of historical garage identified within 500m of the site.
- 3.43 There are no records for current petrol or fuel sites within 500m of the site.
- 3.44 There are no records of historical military land use record within 500m of the site.
- 3.45 There are no National Grid high voltage underground electricity transmission cables within 500m of the site.
- 3.46 There are no National Grid high-pressure gas transmission pipelines within 500m of the site.
- 3.47 There are no historical railway and tunnel features identified within 250m of the site.
- 3.48 There are no historical railway lines identified within 250m of the site.
- 3.49 There are no current active railway line records identified within 250m of the site.
- 3.50 There are no underground railway lines or tunnels identified within 250m of the site.
- 3.51 The site is not within 500m of the route of the High Speed 2 rail project.
- 3.52 The site is not within 500m of the route of the Crossrail 1 rail project.

Environmental Permits, Incidents and Registers

- 3.53 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
Sites Determined as Contaminated Land under Part 2a EPA 1990	0
Dangerous or Hazardous (COMAH and NIHS) Sites	0
Regulated Explosive Sites	0
Historical Licensed Industrial Activities (IPC)	0
Part A (1) and IPPC Authorised Activities	0
Part A (2) and Part B Activities and Enforcements	0
Pollutant Release to Surface Waters (Red List)	0
List 1 Dangerous Substances Inventory Sites	0
List 2 Dangerous Substances Inventory Sites	0
Category 3 or 4 Radioactive Substance Authorisations	0
Licensed Discharge Consents	0
Planning Hazardous Substance Consents and Enforcements	0
Pollutant Release to Public Sewer	0
Substantiated Pollution Incidents	0

Permit/Incident/Register	Number
Pollution Inventory Substances, Wastes and Radioactive Wastes	0

Environmentally Sensitive Sites

- 3.54 There are 6no. records of Local Nature Reserves (LNR) located within 2km of the site. The closest record refers to Chapelfield located 934 northwest of the site.
- 3.55 There are 8no. records of designated ancient woodland located within 2km of the site. The closest refers to Ancient a Semi-Natural Woodland of Carters Hill Wood located 281m to the southwest of the site.
- 3.56 There are 4no. records of Green Belt located within 2km of the site. The closest record is 213m to the northwest of the site.
- 3.57 There is 1 record of a Nitrate Vulnerable Zone (NVZ) located within 2km of the site. The record refers to the Irwell/Man.Ship Canal (Kearsley to Irlam Locks) located 240m to the west of the site.

Ecology

- 3.58 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.
- 3.59 However, the site is classified as urban land.

Archaeology

- 3.60 An archaeological assessment falls outside the brief of this report. Where considered necessary, advice should be sought from an archaeological specialist in this respect.
- 3.61 There are no records of World Heritage sites, areas of outstanding natural beauty, national parks, listed buildings, conservation areas, schedules ancient monument and registered Parks and Gardens within 250m of the site.

Potential Flood Risks

- 3.62 Detailed assessment of flood risks is outside the scope of this report. However, the site does not lie within 50m of an Environment Agency Zone 2 or Zone 3 floodplain.
- 3.63 There are no records of risk of flooding from rivers and sea (RoFRaS) within 50m of the site.
- 3.64 There are no records of a historical flood event within 250m of the site.
- 3.65 There are no records of flood defences, no areas benefitting from flood defences, or no areas used for flood storage within 250m of the site.
- 3.66 The highest risk of surface water flooding occurring on-site for a 1 in 1000-year return event is 0.1-0.3m.

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

Previous Site Investigations

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

Unexploded Ordnance

3.69 The online Zetica UXO map shows the site within a low-risk zone.

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 back to 1848.
- 4.2 The site history is summarised in Table 2 and Table 3, below, followed by selected extracts from maps and aerial photographs in Figure 4 to 7.

Table 2: Summary of Site History from Historical Maps

Date	Scale	On-Site History	Surrounding Land Use History
1848-1850	1:10,560	The site is unoccupied.	The site is surrounded by undeveloped land.
1891	1:10,560	No significant change compared to previous map.	A pond is located approximately 80m to the west of the site.
1893	1:2,500	No significant change compared to previous map.	No significant change compared to previous map.
1907-1908	1:10,560	No significant change compared to previous map.	No significant change compared to previous map.
1909	1:2,500	No significant change compared to previous map.	No significant change compared to previous map.
1923-1927	1:10,560	No significant change compared to previous map.	No significant change compared to previous map.
1929	1:12,500	No significant change compared to previous map.	No significant change compared to previous map.
1932-1937	1:2,500	No significant change compared to previous map.	Presumed residential properties have been construed approximately 10, to the north of the site.
1955-1956	1:1,250	A property has been constructed on the site.	Residential properties have been constructed to the immediate northeast and northwest of the site. An electrical substation had been constructed to the immediate northeast of the site.
1955-1956	1:10,560	No significant change compared to previous map.	No significant change compared to previous map.
1964-1967	1:1,250	No significant change compared to previous map.	Residential properties have been construed to the immediate south of the site.
1965-1968	1:10,560	No significant change compared to previous map.	The residential properties are not present on the map.

Date	Scale	On-Site History	Surrounding Land Use History
1970	1:2,500	No significant change compared to previous map.	No significant change compared to previous map.
1973	1:10,000	No significant change compared to previous map.	No significant change compared to previous map.
1988	1:10,000	No significant change compared to previous map.	No significant change compared to previous map.
1989-1990	1:1,250	No significant change compared to previous map.	No significant change compared to previous map.
1987-1992	1:1,250	No significant change compared to previous map.	No significant change compared to previous map.
1991	1:10,000	No significant change compared to previous map.	No significant change compared to previous map.
1992	1:1,250	No significant change compared to previous map.	No significant change compared to previous map.
2001	1:10,000	No significant change compared to previous map.	No significant change compared to previous map.
1992	1:1,250	No significant change compared to previous map.	No significant change compared to previous map.
2010	1:10,000	No significant change compared to previous map.	No significant change compared to previous map.
2024	1:10,000	No significant change compared to previous map.	No significant change compared to previous map.

Table 3: Summary of Site History from Aerial Photographs

Date	On-Site History	Surrounding Land Use History
2000	The image is unclear but shows the site is occupied by a residential property.	The site is surrounded by residential properties with an electrical substation to the immediate east of the site.
2011	No significant change compared to the previous photograph.	No significant change compared to the previous photograph.
2015	No significant change compared to the previous photograph.	No significant change compared to the previous photograph.
2019	No significant change compared to the previous photograph.	No significant change compared to the previous photograph.

Figure 4 OS Map Extract 1893

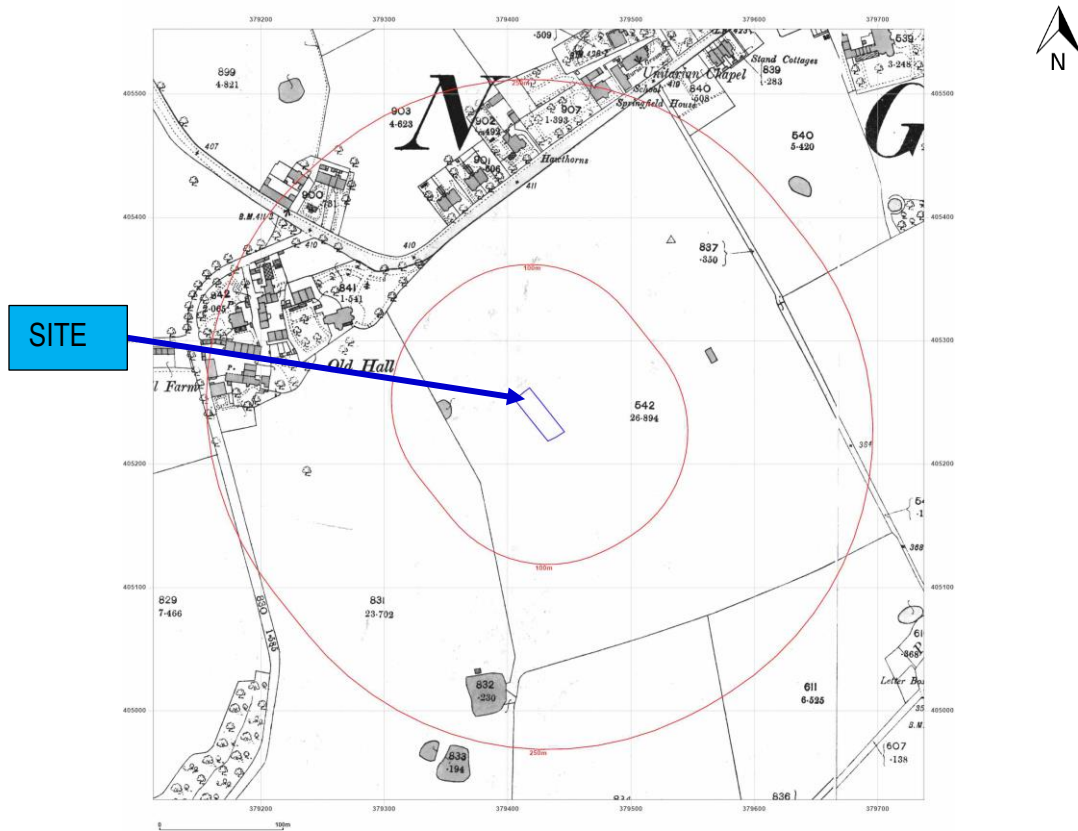


Figure 5 OS Map Extract 1952-1956

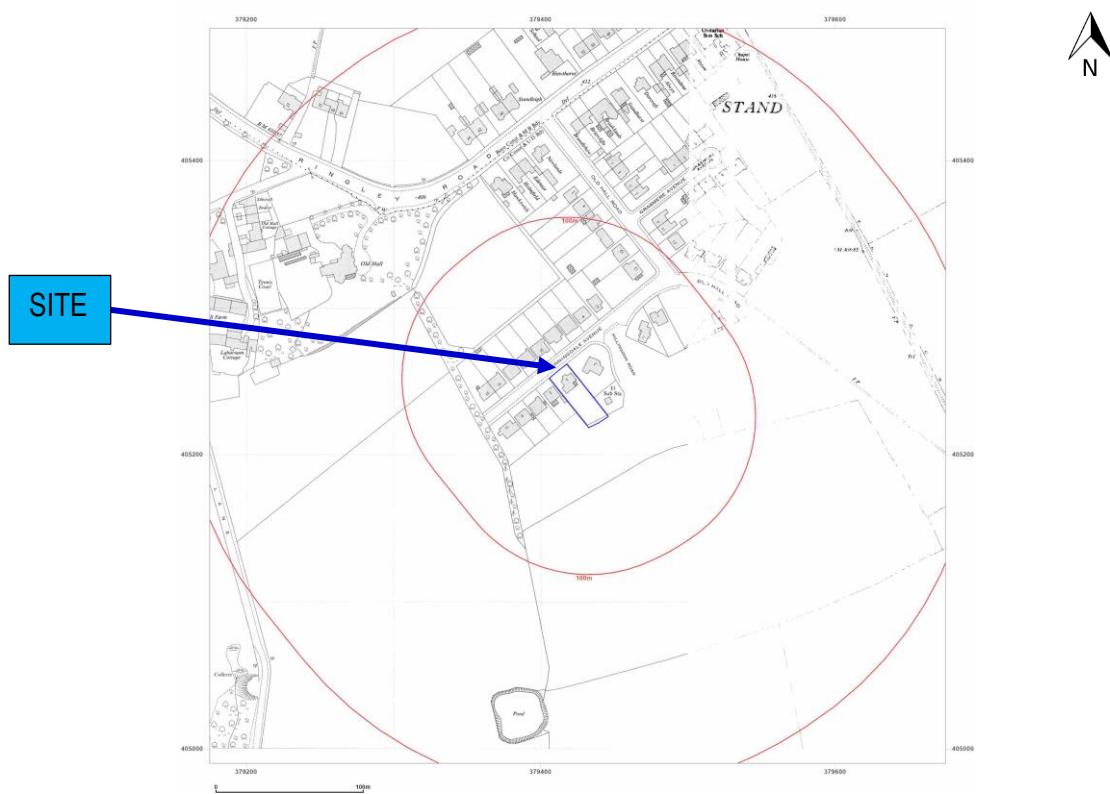


Figure 6 OS Map Extract 2003

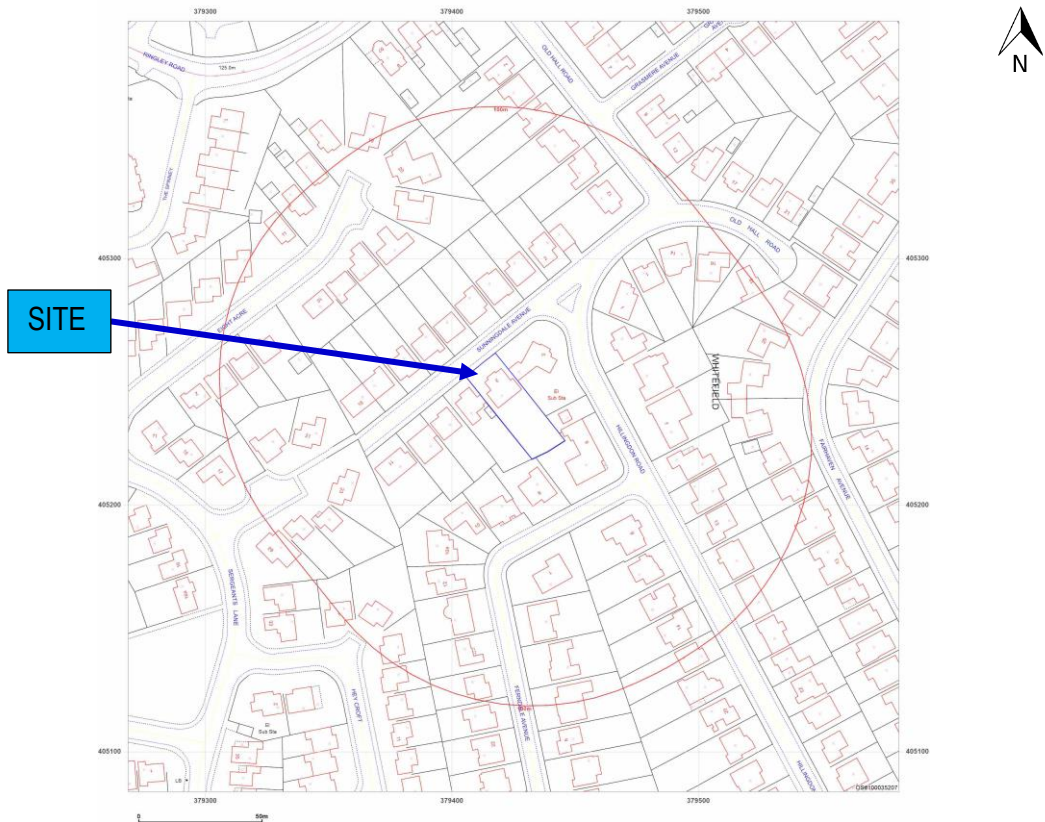


Figure 7 Aerial Photograph 2021



5.0 RELIMINARY CONTAMINATION RISK ASSESSMENT

Introduction

- 5.1 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.
- 5.2 Table 6 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 4 and Table 5 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.
- 5.3 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.
- 5.4 The PCM/PRA is based on a residential end use.

Table 4: 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 5: 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

- 5.5 The site was unoccupied land from the first map dated 1848 until the 1955-1956 map at which point a residential property was constructed onsite. After which no significant changes have occurred to date.

- 5.6 The surrounding areas was undeveloped land at the time of the 1848 map until 1932 when residential properties were constructed 10m to the north of the site. In the 1955 map residential properties were built to the immediate northeast and northwest of the site.
- 5.7 An electricity substation was constructed to the immediate northeast of the site. By the 1964 map residential properties have been constructed to the immediate south of the site after which no significant change occurred till the present.
- 5.8 To summarise, there is potential for the presence of contamination associated with the following:
- PCBs and mineral oils from adjacent electricity substation.

Potential Receptors

- 5.9 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

- 5.10 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 6: Preliminary Conceptual Model

Source	Pathway	Receptor	Probability	Consequence	Risk	Comment
Made Ground across site (Heavy Metals, PAH & TPH, PCBs).	Dermal contact, ingestion, and inhalation of soils dust	Current Site Users	Low Likelihood	Moderate	Low	The site is currently occupied by a single domestic property. There is potential for direct contact within PCB contaminated soils and receptors but very limited potential source of other contamination. The risk is therefore considered to be LOW .
		Adjacent land users	Unlikely	Low	Very Low	Residential properties partially surround the site. The risk is considered VERY LOW and usual dust control measures should be implemented as part of good site working practices during construction to reduce dust generation.
		Future land users	Low Likelihood	Moderate	Moderate	The proposed development includes a residential property with private gardens. The risk to future site users via direct exposure is considered to be MODERATE .
		Construction Workers	Low Likelihood	Moderate	Low	Construction workers could potentially be exposed to limited contaminated Made Ground materials and PCBs during construction works, however exposure duration will be short-term only. Assuming appropriate health and safety measures are adopted (in line with CDM and other relevant health and safety guidance) a LOW risk to construction workers is anticipated.
	Downward vertical migration of leachate to shallow groundwater	Groundwater within the Underlying Aquifer	Unlikely	Low	Low	Shallow groundwater may be present beneath the site; however, sources of contamination are limited and there are no nearby abstraction licenses. The risk to groundwater is therefore considered to be LOW .
	Vertical or lateral migration of ground gas	Current Site Users	Unlikely	Low	Very Low	There is very limited potential for Made Ground soils beneath the site. However, given the age of the materials present it is likely that any gasses or volatile vapours originally present would now have dissipated. The risk to current site users from ground gas is therefore considered VERY LOW .
		Adjacent land users	Unlikely	Low	Very Low	Considering the age of the potential Made Ground materials present the risk to adjacent site users from ground gas is therefore considered VERY LOW .
		Future land users	Unlikely	Low	Very Low	There is very limited potential for Made Ground from former development at the site. However, given the age of the materials present it is likely that any gasses or volatile vapours originally present would now have dissipated. The

Source	Pathway	Receptor	Probability	Consequence	Risk	Comment
						risk to future site users from ground gas is therefore considered VERY LOW .
		Construction Workers	Unlikely	Low	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 is very limited potential for made ground below the site. The risk to current site users is considered to be LOW .
		Adjacent land users	Unlikely	Moderate	Low	There is very limited potential for made ground below the site. Disturbance of soil during the construction phase may allow fibres to become airborne. The risk is therefore considered LOW . Dust control measures (dampening down) should be implemented as part of good site working practices in order to reduce the risk to LOW .
		Future land users	Unlikely	Moderate	Low	The proposed residential development includes private gardens. Disturbance of potential ACM by future resident may allow fibres to become airborne. However, there is very limited potential for ACM within the soils. The risk is therefore considered to be LOW .
		Construction Workers	Unlikely	Moderate	Low	Construction workers may be exposed to potential asbestos in soils. The risk is considered LOW . A contamination assessment of the existing on-site soils would be required to determine the level of risk and necessary mitigation measures.

6.0 GEOTECHNICAL HAZARDS ASSOCIATED WITH THE DEVELOPMENT

6.1 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 taking into account 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 7 and Table 8.

Table 7: Summary of Geotechnical Hazards

Geohazards:	
Highly Compressible Ground	Negligible
Collapse Soils	Very low risk.
Swelling Clay	Negligible
Running Sand	Very low risk.
Ground Dissolution	Negligible
Landslip	Very low risk.
Mining & Quarrying	The site is located within an identified coal mining area but not within Coal Authority Development High Risk area. The risk from mining and quarrying is generally considered to be very low.

Table 8: Summary of Geotechnical Design Considerations

Geotechnical Design Considerations	
Site Clearance	The site is currently occupied by a residential building therefore, site clearance is unlikely to be required.
Trees	There are trees directly located on site or immediate adjacent to the site. If any cohesive soils are encountered, the depth of foundations may need to be adjusted for the effects of nearby trees in accordance with NHBC guidance.
Existing Buildings/Obstructions	The site is occupied by any existing buildings that is due to be demolished as part of the development and therefore relict foundation and services will be present at the site.
Foundations	The suitability of the proposed foundations would depend on the ground conditions present on site. The site is recorded to be underlain by Glaciofluvial superficial deposits. The bedrock geology is the Chester Pebble Bed Formation. Therefore, shallow foundation may be suitable for the proposed residential development bearing into the superficial or bedrock. An intrusive ground investigation will be carried out prior to any construction works taking place to discover the most suitable foundation options for the site and to make sure the ground conditions are the same across the entire site.
Floor Slabs	An intrusive geotechnical investigation is recommended prior to any construction works to identify the most suitable slab design for the on-site ground conditions.

Geotechnical Design Considerations	
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. However, it is recorded that the site is underlain by a Secondary A superficial aquifer and Principal bedrock aquifer. The highest risk of groundwater flooding on site is considered moderate.
Earthworks	Extensive earthworks are unlikely to be required for the proposed development. However, it is likely the existing foundations and hardstanding will need to be removed.
Slopes	The site is generally flat and low-lying.
Retaining Walls	There are currently no retaining walls present on site.
Aggressive Ground	There is a low potential for chemically aggressive ground conditions on site. However, an intrusive geotechnical investigation would be necessary to confirm this.

7.0 CONCLUSIONS & RECOMMENDATIONS

Conclusions

- 7.1 It is understood that the Client intends to demolish an existing dwelling & erection of a replacement dwelling with associated external works. A planning application (70105) has been approved by Bury Metropolitan Council with conditions.
- 7.2 The site was unoccupied land from the first map dated 1848 until the 1955-1956 map at which point a residential property was constructed onsite. After which no significant changes have occurred to date.
- 7.3 The surrounding areas was undeveloped land at the time of the 1848 map until 1932 when residential properties were constructed 10m to the north of the site. In the 1955 map residential properties were built to the immediate northeast and northwest of the site. An electricity substation was constructed to the immediate northeast of the site. By the 1964 map residential properties have been constructed to the immediate south of the site after which no significant change occurred till the present.
- 7.4 The site is recorded to be underlain by no known artificial deposits underlying the site. The superficial deposits underlying the site are Glaciofluvial (Secondary A aquifer), generally comprising sands and gravels. The bedrock geology beneath the site is shown to be the Chester Pebble Bed formation, comprising of reddish-brown conglomerates interbedded with sandstones and rare mudstones (Principal Aquifer).
- 7.5 The site is located within the specified search distance of an identified coal mining area but not within a Coal Authority Development High Risk Area.
- 7.6 The property is not located in a Radon Affected Area, as less than 1% of the properties are above the Action Level.
- 7.7 There is potential for the presence of contamination on site associated with a pre-1981 electricity substation adjacent to the site. There is very limited potential for any other source of contamination in the soils.
- 7.8 Given the electricity substation adjacent to the site the overall risk from soil contamination to end users and construction workers is **MODERATE**.
- 7.9 The overall risk to controlled waters is concluded to be **LOW** based on the absence of any nearby surface water features and groundwater abstraction licences.
- 7.10 The risk from ground gas to end users and construction workers is **VERY LOW** based on the absence of significant sources.
- 7.11 An Environment Agency Flood Zone 2 and 3 are not located on site. However, the highest risk of groundwater flooding is **MODERATE**.

Recommendations

- 7.12 An intrusive investigation should be undertaken to establish geotechnical parameters for the design of foundations, floor slabs and pavement construction for the proposed new structure.
- 7.13 As part of the geotechnical investigation, it is recommended that samples of soil are recovered for contamination testing of potential PCBs and mineral oils.

APPENDIX 1

GROUNDSURE REPORTS

APPENDIX 2

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 2024 and should be read considering 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.