



**EARTH ENVIRONMENTAL
& GEOTECHNICAL**
A Technics Group Company



Phase 1 GeoEnvironmental Desk Study

Land At Marl Road

Knowsley

November 2025

On behalf of

Cuboid Self-Storage Ltd

Earth Environmental & Geotechnical Ltd
Houldsworth Mill Business Centre
Houldsworth Street
Stockport
SK5 6DA

Tel : 01619756088

Email
headoffice@earthenvironmental.co.uk

www.earthenvironmental.co.uk



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PHASE I GEOENVIRONMENTAL DESK STUDY

LAND AT MARL ROAD

KNOWSLEY

FOR

CUBOID SELF-STORAGE LTD

Earth Environmental & Geotechnical Ltd
Houldsworth Mill Business & Arts Centre
Houldsworth Street
Stockport
SK5 6DA

www.earthenvironmental.co.uk

Tel: 0161 975 6088

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Drafted By:	R. Sarnoe	
Reviewed By:	A Czarnecki	<i>Adam Czarnecki</i>
Authorised By:	A Czarnecki	<i>Adam Czarnecki</i>

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CONTENTS

1.0	INTRODUCTION.....	1
	Appointment	1
	Objective	1
	Scope	1
2.0	SITE LOCATION AND DESCRIPTION.....	4
	Site Utility Services.....	4
3.0	ENVIRONMENTAL SETTING.....	6
	Geology.....	6
	Hydrogeology and Hydrology	6
	Ground Workings, Mining and Other Underground Workings	7
	Mining and Other Underground Workings	8
	Radon Potential.....	8
	Landfill & Waste Management Activity	8
	Industrial Land Use Information.....	8
	Environmental Permits, Incidents, and Registers	9
	Environmentally Sensitive Sites	11
	Ecology	11
	Archaeology	11
	Potential Flood Risks.....	12
	Unexploded Ordnance	12
4.0	SITE HISTORY	13
5.0	SITE WALKOVER SURVEY	18
6.0	PRELIMINARY CONTAMINATION RISK ASSESSMENT	20
	Introduction	20
	Potential Sources	21
	Potential Receptors	21
	Potential Pathways.....	21
7.0	GEOTECHNICAL HAZARDS ASSOCIATED WITH THE DEVELOPMENT	24
8.0	CONCLUSIONS AND RECOMMENDATIONS	26
	Conclusions.....	26



FIGURES

Figure 1	Proposed Development Plan
Figure 2	Site Location Plan
Figure 3	Site Photograph
Figure 4	OS Map Extract 1867
Figure 5	OS Map Extract 1962
Figure 6	OS Map Extract 2025
Figure 7	Aerial Photograph 2000
Figure 8	Site Features Plan
Figure 9	Site Walkover Photograph Locations

TABLES

Table 1	Environmental Permits, Incidents, and Registers within 500m of the Site
Table 2	Summary of Site History
Table 3	Summary of Site History from Aerial Photographs
Table 4	Consequence, Probability, and Risk
Table 5	Estimation of the Level of Risk by Comparison of Consequence and Probability
Table 6	Preliminary Conceptual Model
Table 7	Summary of Geotechnical Hazards
Table 8	Summary of Geotechnical Considerations

APPENDICES

Appendix 1	Groundsure Reports
Appendix 2	Site Photographs
Appendix 3	Site Walkover Notes
Appendix 4	Report Limitations

1.0 INTRODUCTION

Appointment

- 1.1 Cuboid Self Storage Ltd (the client) has commissioned Earth Environmental & Geotechnical Ltd to undertake a Pre-Purchase Phase I Environmental Desk Study for a proposed development at undeveloped land adjacent to Marl Road, Knowsley.
- 1.2 It is understood that the client intends to develop the site into a containerised self-storage facility (120 containers) with an associated car park.
- 1.3 A proposed development plan is presented in Figure 1, overleaf.

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 a site reconnaissance visit and a review of the following information sources, some of which were 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 are presented in the site-specific GroundSure Reports (Appendix 1).
 - Coal Authority Interactive Viewer.
 - Zetica UXO Online Interactive Viewer
 - Knowsley Metropolitan Borough Council planning portal.

Figure 1: Proposed Development Plan



2.0 SITE LOCATION AND DESCRIPTION

- 2.1 The site (0.37 hectares) is vacant land adjacent to Marl Road, Knowsley, Liverpool, approximately 1.9km east of Headbolt Lane rail station.
- 2.2 The approximate National Grid Reference for the centre of the site is SJ 43259 99479 (X: 343259, Y: 399470) and postcode L33 7AP
- 2.3 The surface topography of the site is slightly undulating in the northern part but generally level. Additionally, the site has soil mounds from site clearing, and it slopes to the northwest.
- 2.4 The site was covered by overgrown vegetation and trees, which have been recently cleared. The site's surroundings are split between hardstanding and soft cover.
- 2.5 Mature bushes and trees are located on site on the western end of the site, adjacent to Marl Road. However, the trees are not within the proposed site development boundary.
- 2.6 Access to the site is gained via an entrance off Marl Road along the western boundary of the site. A steel gate is present across the entrance.
- 2.7 The site is bounded by a steel gate along the western entrance. A steel fence surrounds the site boundaries.
- 2.8 Trees border the site and Marl Road to the west, and across the road is the Amazon depot. A garage is at the northern boundary of the site, and unknown industrial buildings are on the east and south boundaries.

Site Utility Services

- 2.9 Site service plans have not been obtained for the site on behalf of the client. The status of all services should be checked before any development (including site investigation) commences.

Figure 2: Site Location Plan



Figure 3: Site Photograph



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 the 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 records indicate that artificial deposits (Made Ground-Undivided) underlie the site.
- 3.4 The BGS records indicate that the site is underlain by the Shirdley Hill Sand Formation, comprising '*moderately to well-sorted, fine-grained sand with peat layers in the lower part.*'
- 3.5 The bedrock geology beneath the site is shown to be of the Chester Formation-Sandstone, generally comprising *conglomerates and reddish brown, cross-bedded, pebbly sandstones with subordinate beds of red-brown mudstone. The conglomerates have a reddish-brown sandy matrix and consist mainly of pebbles of brown or purple quartzite, with quartz conglomerate and vein quartz.*
- 3.6 There are no records of linear features within 500m of the site boundary.
- 3.7 There are no records of landslips within 500m of the site.
- 3.8 There are 49no. borehole records identified within 250m of the site. There are all confidential boreholes. The closest record refers to a borehole located 29m west of the site.
- 3.9 The following hazard ratings apply to the site and land within 50m and are presented in the Enviro + Geo Insight Report
- | | |
|--|------------|
| • Shrink / swell clays: | Negligible |
| • Running sands: | Very Low |
| • Compressible deposits: | Very Low |
| • Collapsible deposits: | Very Low |
| • Landslides: | Very Low |
| • Ground dissolution of soluble rocks: | Negligible |

Hydrogeology and Hydrology

- 3.10 The site is underlain by superficial Shirdley Hill Sand Formation Deposits, which are classified by the Environment Agency (EA) as a Secondary 'A' Aquifer, with an intergranular flow type and a high permeability.

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 Formation-Sandstone 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 aquifers and low for the bedrock aquifer. The site's soil leaching potential is classified as high. The BGS states:

'HIGH' Areas can easily transmit pollution to groundwater. They are likely to be characterised by high leaching soils and the absence of low-permeability superficial deposits.'

'LOW' Areas that provide the best protection from pollution. They are likely to be characterised by low leaching soils and/or the presence of superficial deposits characterised by a low permeability.'

- 3.13 The site is not located within an area vulnerable to soluble rock.
- 3.14 There are 46no. groundwater abstraction license records within 2km of the site. The closest active record refers to a commercial/industrial/public service licence located 738m south of the site.
- 3.15 There are 5no. surface water abstraction license records within 2km of the site. The closest record refers to an active spray irrigation licence located 818m east of the site.
- 3.16 There is 5no. potable water abstraction license records within 2km of the site. The closest record refers to an active licence for commercial/industrial/public services located 738m south of the site.
- 3.17 The site is located within a Source Protection Zone Type 3 Total Catchment.
- 3.18 The site is not located within 500m of a Source Protection Zone within a confined aquifer.
- 3.19 There are no records of water network entries within 250m of the site.
- 3.20 There is 1no. record of surface water features identified within 250m of the site.
- 3.21 There is 1no. record of a Water Framework Directive (WFD) surface water bodies located onsite. The record refers to Simonswood Brook, which is within the Alt and Crossens management catchment and the Alt operational catchment. The EA assigned a 'fail' chemical and a moderate ecological rating in 2019.
- 3.22 There is 1no. record of a Water Framework Directive (WFD) groundwater body located on-site. The record refers to the Lower Mersey Basin and North Merseyside Permo-Triassic Sandstone Aquifers, which had a poor chemical rating in 2019.

Ground Workings, Mining and Other Underground Workings

- 3.23 There are 4no. records of historical surface ground working features, identified within 250m of the site boundary. The records refer to ponds and cuttings. The closest record is ponds mapped in 1890, located 19m east of the site.
- 3.24 According to the BGS, there are no records of a British Pit within 500m of the site.

Mining and Other Underground Workings

- 3.25 The site is not within an area affected by underground coal mining.
- 3.26 There are no records of historical mineral planning areas within 500m of the site.
- 3.27 There are no records for historical underground working features identified within 1km of the site.
- 3.28 There is no record of a non-coal mining area located within 1km of the site.
- 3.29 There are no records of brine areas, gypsum extraction, tin mining, or clay mining on the site.
- 3.30 There are no records of natural cavities within 500m of the site.
- 3.31 There are no records for mining cavities identified within 1km of the site.

Radon Potential

- 3.32 The site is in a Radon Affected Area, where less than 1% of properties are above the Action Level. Therefore, no radon protection measures are required in any new structures.

Landfill & Waste Management Activity

- 3.33 There is 1no. record for the current Environment Agency landfill records within 500m of the site. The record refers to a closed landfill type A05 located 29m northwest of the site.
- 3.34 There are no records of BGS/DoE non-operational landfill sites within 500m of the site.
- 3.35 There are no records of a historical landfill from the Local Authority and Historical Mapping records within 500m of the site.
- 3.36 There are no records of historic Environment Agency landfill sites within 500m of the site.
- 3.37 There are 3no. records of historical waste sites within 500m of the site. The closest record refers to a waste treatment/transfer operation facility located 336m southeast of the site.
- 3.38 There are 15no. records of the current Environment Agency licensed waste sites within 500m of the site. The closest record refers to a landfill taking non-biodegradable wastes located 45m east of the site.
- 3.39 There are 68no. records of a waste treatment, transfer, or disposal site, within 500m of the site. The closest record refers to a site located 72m east of the site for the storage of waste in a secure place. The remaining record below 100m refers to a site located 92m south of the site for the burning of waste in the open.

Industrial Land Use Information

- 3.40 There are 25no. records of potentially contaminative historical land uses identified within 500m of the site. There are 6no. onsite records for an industrial estate and railway sidings dated from 1956 to 1988.
- 3.41 There are 71no. records of historical tanks identified within 500m of the site. There are 2no. records onsite dated in 1971.

- 3.42 There are 44no. records of historical energy features, identified within 500m of the site. The closest record refers to an electrical substation dated in 1994 located 9m to the east.
- 3.43 There are no records of historical petrol stations within 500m of the site.
- 3.44 There are no records for current petrol or fuel sites within 500m of the site.
- 3.45 There are no records of historical garage and motor vehicle repair sites identified within 500m of the site.
- 3.46 There are 24no. records of recent industrial land uses within 250m of the site. The closest record refers to an electricity substation located 10m east of the site. The remaining records below 100m refer to engineering services and industrial products.
- 3.47 The site was formerly a military site, ROF Kirkby, which was operational between 1940 and 1946. It produced approximately 10% of WW2 ammunition.
- 3.48 There is 1no. record of current tanks within 250m of the site. The record refers to a roofed storage tank identified in 2014, located 100m southeast of the site.
- 3.49 There are no National Grid high voltage underground electricity transmission cables within 500m of the site.
- 3.50 There are no National Grid high-pressure gas transmission pipelines within 500m of the site.
- 3.51 There are 26no. records of historical railway and tunnel features identified within 250m of the site. There are 3no. records onsite mapped in 1962, 1966 and 1978.
- 3.52 There is 1no. record of historical railway lines identified within 250m of the site. The record refers to a razed line located 57m north of the site.
- 3.53 There are 6no. records of the current active railway line identified within 250m of the site. The closest record refers to a rail located 88m north 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.

Environmental Permits, Incidents, and Registers

- 3.56 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 NIHHS) Sites	5
Regulated Explosive Sites	0
Historical Licensed Industrial Activities (IPC)	38
Part A (1) and IPPC Authorised Activities	20
Pollutant Release to Surface Waters (Red List)	0
List 1 Dangerous Substances Inventory Sites	2
List 2 Dangerous Substances Inventory Sites	4
Part A (2) and Part B Activities and Enforcements	5
Category 3 or 4 Radioactive Substance Authorisations	0
Licensed Discharge Consents	3
Planning Hazardous Substance Consents and Enforcements	8
Pollutant Release to Public Sewer	0
Substantiated Pollution Incidents	11
Pollution Inventory Substances, Wastes and Radioactive Wastes	2

- 3.57 There are 5no. records of Control of Major Accident Hazards (COMAH) within 500m of the site. The closest record refers to a historical NIHHS site located 62m east of the site.
- 3.58 There are 8no. records of Hazardous substance storage/usage within 500m of the site. The closest record refers to category 2 storage located 209m north of the site.
- 3.59 There are 38no. records of Historical licensed industrial activities (IPC) within 500m of the site. The closest record refers to an inorganic chemical process site located 321m southeast of the site.
- 3.60 There are 20no. records of Licensed industrial activities (Part A (1)) within 500m of the site. The closest record refers to a carbon disulphide or ammonia process site located 321m south of the site.
- 3.61 There are 5no. records of Licensed pollutant release (Part A (2)/B) within 500m of the site. The closest record refers to a combustion and incineration process site located 71m south of the site.
- 3.62 There is 3no. records of a Licensed Discharge to Controlled Waters located within 500m of the site. The closest record refers to a site with a revoked status located 410m northeast of the site.
- 3.63 There are 2no. records of List 1 Dangerous Substances within 500m of the site. The records refer to sites with an active status located 435m east of the site.

- 3.64 There are 4no. records of List 2 Dangerous Substances within 500m of the site. The closest record refers to a laboratory with toluene as an authorised substance located 311m east of the site.
- 3.65 There are 11no. records of Pollution Incidents within 500m of the site. The closest record refers to an incident dated in 2003, which had no impact on the water or air and a minor impact on the land located 98m south of the site.

Environmentally Sensitive Sites

- 3.66 There are no records for a Site of Specific Scientific Interest (SSSI) located within 2km.
- 3.67 There are no records of Conserved wetland sites (Ramsar Sites) within 2km of the site.
- 3.68 There are no records of Special Areas of Conservation (SAC) within 2km of the site.
- 3.69 There is 1no. record of Local Natural Reserves within 2km of the site. The record is for Acornfield Plantation, located 1431m to the south.
- 3.70 There are no records of a Designated Ancient Woodland within 2km of the site.
- 3.71 There are no records of a Biosphere Reserves within 2km of the site.
- 3.72 There are no records of a Forest Parks within 2km of the site.
- 3.73 There are no records of a Marine Conservation Zones within 2km of the site.
- 3.74 There are 2no. records of Green belt areas within 2km of the site. The records refer to the Merseyside and Greater Manchester Green Belt located 334m north and 923m southeast of the site.
- 3.75 The site is within a Nitrate Vulnerable Zone.
- 3.76 The site is located within an SSI impact Risk Zones.

Ecology

- 3.77 An ecological assessment of the site falls outside the brief of this report. Where necessary, advice should be sought from an environmental specialist.
- 3.78 The land on the site is classified as Urban, non-agricultural land.
- 3.79 There are no further records for agricultural or habitat designation on the site.

Archaeology

- 3.80 An archaeological assessment falls outside the scope of this report. Where considered necessary, advice should be sought from an archaeological specialist in this respect.
- 3.81 There are no world heritage sites, areas of outstanding natural beauty, listed buildings, conservation areas, scheduled ancient monuments, national parks, or registered parks and gardens within 250m of the site.

Potential Flood Risks

- 3.82 Detailed assessment of flood risks is outside the scope of this report. However, the site does not lie within an Environment Agency Zone 2 and Zone 3 floodplain.
- 3.83 There are 2no. records of risk of flooding from rivers and sea (RoFRaS) within 50m of the site. The onsite flood risk category is non-applicable.
- 3.84 There are no records of a historical flood event within 250m of the site.
- 3.85 There are no records of flood defences within 250m of the site.
- 3.86 There are no records for areas benefitting from flood defences within 250m of the site.
- 3.87 There are no flood storage areas within 250m of the site.
- 3.88 There are 2no. records of the Flood Zones within 50m of the site. The records refer to an area within Zone 2, located 27m northwest, and to Zone 3, located 3m north of the site.
- 3.89 The highest risk of surface water flooding occurring on the site is negligible.
- 3.90 The highest risk of groundwater flooding occurring on-site is low.

Unexploded Ordnance

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

4.0 SITE HISTORY

- 4.1 Reference historical plans and Google Earth imagery have determined the historical development of the site. Information in the historical mapping study has been predominantly limited to the site or within 100m of the site to focus on the most directly relevant information. Beyond this radius, only information deemed appropriate will be referenced. Each map or photograph represents a snapshot of the site and its environment at the date of the survey. Any changes that occur at other times may not have been recorded on the maps and could represent an unidentified hazard to the site.
- 4.2 Only selected maps with a clear view of the site and surrounding area have been used; the information reported might not represent all pertinent information that could be obtained. The interpretation of the maps and/or other data commented on in this report is subjective.
- 4.3 The earliest available historical mapping covering the site dates back to 1867. The site history is summarised in Tables 2 and 3 below, followed by selected extracts from maps and aerial photographs in Figures 4-6.

Table 2: Summary of Site History

Date	Scale	On-Site History	Surrounding Land Use History
1867	1:2,500	The site is a plain field. A road goes through the site from the south.	The site is surrounded by a plain field with little vegetation, and there are buildings approximately 25m north of the site.
1890-1892	1:10,560	There is no significant change compared to the previous map.	There are ponds approximately 10m east and 50m west of the site.
1893	1:2,500	There is no significant change compared to the previous map.	The area to the northwest of the site with the buildings has been identified as a farm.
1907	1:10,560	There is no significant change compared to the previous map.	There is no significant change compared to the previous map.
1908	1:2,500	There is no significant change compared to the previous map.	There is no significant change compared to the previous map.
1925-1928	1:10,560	There is no significant change compared to the previous map.	There is no significant change compared to the previous map.
1955-1956	1:10,560	The site is a military base with buildings used for explosion testing.	Industrial buildings are at the eastern, southern, and northern boundaries of the site. The buildings to the east have an embankment built around them. A railway line is seen to have been constructed approximately 50m north of the site.
1962	1:1,250	A little embankment is at the northwest end of the site.	There is no significant change compared to the previous map.
1966	1:10,560	There is no significant change compared to the previous map.	There is no significant change compared to the previous map.
1971-1976	1:1,250	There are tanks at the eastern end of the site.	A sports field is at the western boundary of the site with a small building.

Date	Scale	On-Site History	Surrounding Land Use History
1984-1986	1:1,250	There is no significant change compared to the previous map.	An electricity substation is at the southeastern boundary of the site.
1987-1988	1:10,000	The building on the site has been demolished. There is a small structure or building on the northeastern corner of the site.	There is a building at the northern boundary of the site. The railway has been dismantled.
1992-1994	1:1,250	Three structures or buildings are located at the northern end of the site.	The area that the site is within has been identified as an industrial park.
2001	1:10,000	A structure is seen on the map in the northeastern end of the site.	There is no significant change compared to the previous map.
2003	1:1,250	A structure is seen on the map in the northwestern end of the site.	There is no significant change compared to the previous map.
2010	1:10,000	There are no buildings or structures on the site.	A large industrial building has been constructed at the western boundary of the site, approximately 5m.
2025	1:10,000	There is vegetation at the western end of the site.	There is no significant change compared to the previous map.

Table 3: Summary of Site History from Aerial Photographs

Date	On-Site History	Surrounding Land Use History
2000	The site is covered in vegetation.	An industrial estate surrounds the site. There is a road and trees at the western boundary of the site.
2001	There is no significant change compared to the previous photograph	There is no significant change compared to the previous photograph
2015	In the centre of the site, the vegetation is shown to have been cleared. There are trees within the site's boundaries.	There is no significant change compared to the previous photograph.
2021	Soil appears to have been imported from an adjacent building project.	Nearby construction project.
2022	The vegetation appears to be regrowing to where it was cleared, as shown on the previous map.	There is no significant change compared to the previous photograph.
2023	There is no significant change compared to the previous photograph.	There is no significant change compared to the previous picture.

- 4.4 The site was a plain field with a road going through the site from the south in the earliest map of 1867.
- 4.5 The site was in military use between 1940 and 1946 for the manufacture of ammunition.
- 4.6 Between 1955 and 1956, a large building was constructed on the site, which was demolished between 1987 and 1988.

- 4.7 There were industrial buildings at the boundaries of the site. Embankments were constructed around the buildings to the east. During this time, a railway was also seen approximately 50m north of the site but was dismantled between 1987 and 1988.
- 4.8 Additionally, an embankment was constructed along the west of the site in 1962.
- 4.9 Soil appears to have been imported to the site in 2021.
- 4.10 Presently, the site is an unoccupied land with vegetation and trees within the boundary of the site. The site is within an Industrial Park and has an electricity substation approximately 10m east of the site.

Figure 4 OS Map Extract 1867

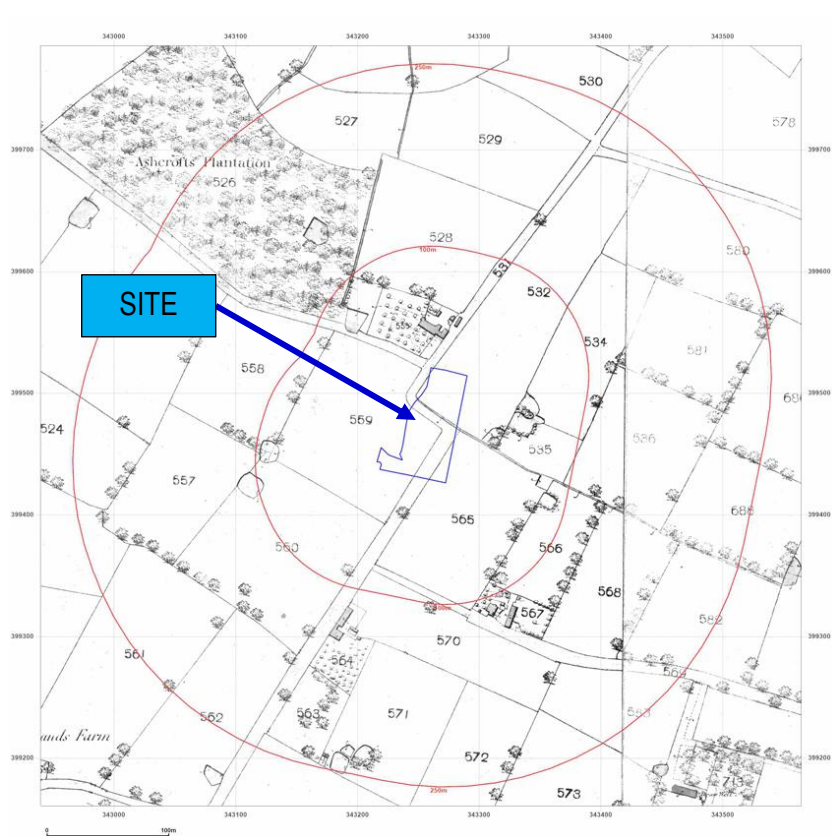


Figure 5 OS Map Extract 1962

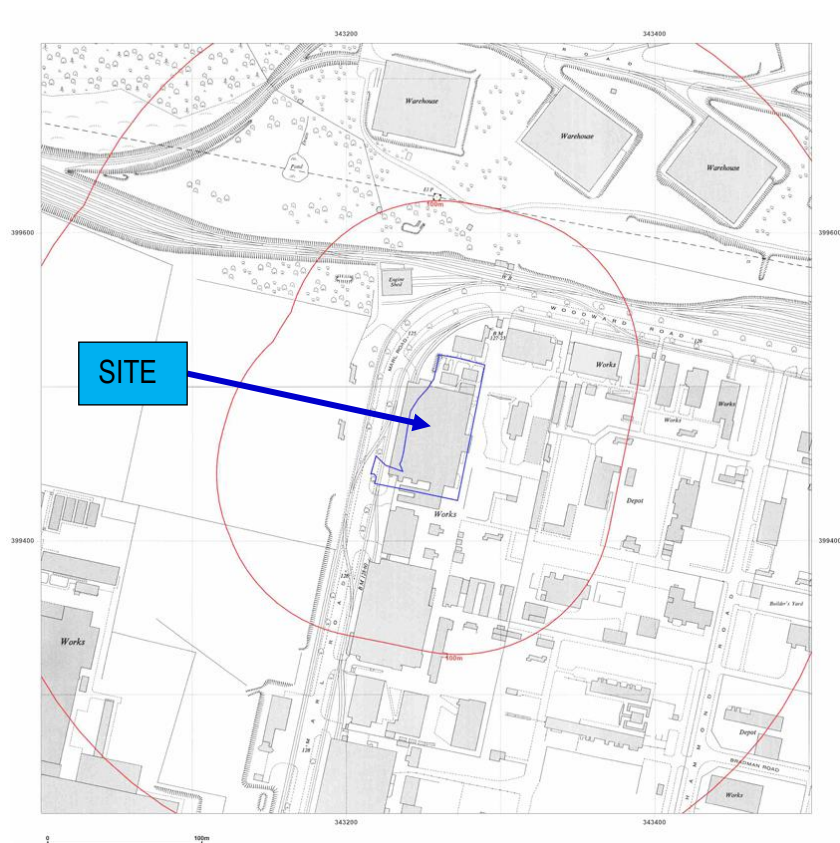
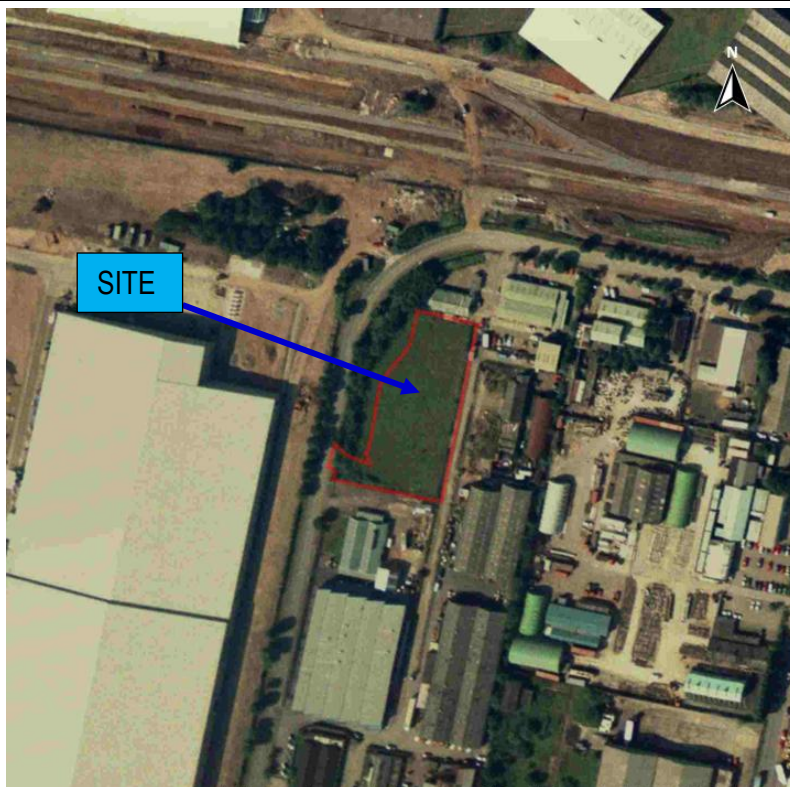


Figure 6 OS Map Extract 2025



Figure 7 Aerial Photograph 2000



5.0 SITE WALKOVER SURVEY

- 5.1 A walkover survey was completed on 31st October 2025.
- 5.2 The photographs and notes from this survey are appended to this report as Appendix 2 and Appendix 3, respectively. The site is understood to comprise the area of the proposed development, which is located within an industrial park. A plan of key features is shown in Figure 9.
- 5.3 The surface topography of the site is slightly undulating in the northern part but generally level. Additionally, the site has soil mounds from site clearing, and it slopes to the northwest.
- 5.4 A repaired underground electric cable using a low-voltage cable joint was seen at the southern end of the site.
- 5.5 The site was covered by overgrown vegetation and trees, which have been recently cleared. The site's surrounding area is split between hardstanding and soft cover.
- 5.6 Mature bushes and trees are located on site on the western end of the site, adjacent to Marl Road. However, the trees are not within the proposed site development boundary.
- 5.7 Access to the site is gained via an entrance off Marl Road along the western boundary of the site. A steel gate is present across the entrance.
- 5.8 The site is bounded by a steel gate along the western entrance. A steel fence surrounds the site boundaries.
- 5.9 Trees border the site and Marl Road to the west, and across the road is the Amazon depot.
- 5.10 A garage is at the northern boundary of the site, and unknown industrial buildings are on the east and south borders of the site.

Figure 8 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 the Land Contamination Risk Management Environment Agency, July 2023.
- 6.2 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, the modified risk table, and the specific consequence definitions are based on CIRIA C552 and the Land Contamination Risk Management Environment Agency (July 2023).
- 6.3 Table 8 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 indicate a significant risk; instead, it suggests that further information is required through appropriate site investigation to substantiate the conceptual model.
- 6.4 The PCM/PRA is based on an industrial 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 human health, likely to result in significant harm. Risk of severe or irreversible effects on ground/surface water quality. Catastrophic damage to buildings/property.	Very High – there is a high potential that the source-pathway-receptor scenarios may result in 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 that 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 a substantial adverse impact on groundwater-dependent environmental receptors.	High – it is likely that the source-pathway-receptor scenarios may affect human health or the environment, requiring remediation and/or control measures to mitigate risks.
Low likelihood– there is a pollutant linkage, and circumstances are possible for an event to occur. However, it is by no means certain that, even over a longer period, such an event would occur, and it is even less likely in the short term.	Moderate – Long term or short-term moderate effect on human health. Moderate impact 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 have an impact on human health or the environment; however, it is either relatively unlikely that such consequences would be severe, or, if any harm were to occur, it is more likely to 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 impact 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, this would likely, at worst, be mild.
		Very Low – It is unlikely that the source-pathway-receptor scenarios will have an impact on human health or the environment.

Table 5: Estimation of the 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 potential sources of contamination on the site are made ground and asbestos due to the site's history of demolished buildings and site usage.
- 6.6 The site was used between 1940 and 1946 for the manufacture of military explosives.
- 6.7 The site has a potential for ground gas due to a closed landfill located 29m northwest of the site.

Potential Receptors

- 6.8 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 features (Simonswood Brook)

Potential Pathways

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

Table 6: Preliminary Conceptual Model

Source	Pathway	Receptor	Probability	Consequence	Risk	Comment
Made Ground (Heavy Metals, PAH, TPH, BTEX)	Dermal contact, ingestion, and inhalation of soil dust	Current Site Users	Unlikely	Low	Very Low	The site has potential for deep-made ground due to a few buildings being demolished; however, it is currently unoccupied. Therefore, the risk is considered VERY LOW .
		Adjacent land users	Low Likelihood	Low	Low	The potential for lateral migration of significant contamination is likely due to deep groundwater. During the site walkover, the site was seen to be entirely covered in made ground. The risk to off-site land users is considered LOW . 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	Low	Low	Given the industrial end use, the majority of hardstanding across the site enables limited contact with contamination and industrial end users. The risk to future site users via direct exposure is considered to be LOW .
		Construction Workers	Low Likelihood	Low	Low	Construction workers are likely to be exposed to potentially contaminated materials during construction; however, the exposure will be short-term. 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	Moderate	Low	A potential source of mobile contaminants has been identified on-site. The granular soil does not limit downward migration, and the groundwater vulnerability is high. However, there are no nearby groundwater abstraction licenses. The risk to groundwater is therefore considered LOW .
	Lateral migration in surface waters	Nearby Surface water features	Low Likelihood	Moderate	Moderate to Low	There are surface water features and potential for limited contaminants on the site. Lateral surface migration may occur below the site, and granular superficial deposits are present. Lateral migration is possible. Therefore, the risk to surface waters is considered MODERATE to LOW .
	Vertical or lateral migration of ground gas	Current Site Users	Unlikely	Moderate	Low	The site is currently unoccupied, and there are no enclosed structures on the site. The risk to current site users from ground gas is therefore considered to be LOW .
		Adjacent land users	Low Likelihood	Moderate	Moderate to Low	There is a nearby landfill that was recently closed; however, there is a potential for the material to have migrated to the site, causing ground gas. This might affect adjacent land users during construction. Therefore, the risk to adjoining site users



Source	Pathway	Receptor	Probability	Consequence	Risk	Comment
						from ground gas is considered MODERATE to LOW .
		Future land users	Unlikely	Moderate	Moderate	There is a significant source of ground gas within 250m of the site. Therefore, there is a risk of the ground gas to future site users. Thus, the risk is considered MODERATE .
		Construction Workers	Low Likelihood	Moderate	Moderate to Low	Given the site's history, deep-made ground is likely to be anticipated. Construction workers may be exposed to ground gas / depleted oxygen conditions in excavations; however, the exposure will be short-term. The risk to construction workers from ground gas is considered MODERATE to LOW .
Asbestos Containing Material (ACM)		Current Site Users	Unlikely	Moderate	Moderate	Given the site history, there is potential for asbestos in the site soils. Asbestos is only harmful when disturbed. The risk to current site users is considered to be MODERATE .
		Adjacent land users	Low Likelihood	Moderate	Moderate to Low	No ACM was observed during the site walkover. However, given the site history, there is limited potential for asbestos in the soil. Disturbance of soil during the construction phase may allow fibres to become airborne. The risk is considered to be MODERATE to LOW .
		Future land users	Unlikely	Moderate	Low	There is potential of ACM within the oil; however, due to the proposed majority of hardstanding across the site, the risk is considered LOW .
		Construction Workers	Low Likelihood	Moderate	Low	Given the site history, there is limited potential for asbestos in the soil. Therefore, it is likely that Construction workers will be exposed to potential asbestos in soils during the construction phase. The risk is considered MODERATE to LOW .

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 the NPPF (2012), which requires that a site be suitable for its new use, taking into account ground conditions and land instability, including from natural hazards and from former activities such as mining. A summary of the geotechnical considerations is provided in Table 9 below.
- 7.2 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 the NPPF (2021), which requires that a site be suitable for its new use, taking into account ground conditions and land instability, including from natural hazards and from former activities such as mining. A summary of the geotechnical hazards and geotechnical considerations is provided below in Tables 9 and 10, respectively.

Table 7: Summary of Geotechnical Hazards

Geohazards:	
Highly Compressible Ground	Very Low
Collapsible Soils	Very Low
Swelling Clay	Negligible
Running Sand	Low
Ground Dissolution	Negligible
Landslip	Very low
Mining & Quarrying	No mining or quarrying is recorded as taking place on site. The site does not lie within a Coal Authority Development High Risk Area.

Table 8: Summary of Geotechnical Considerations

Geotechnical Design Considerations	
Site Clearance	No site clearance will be required, as the site was cleared during the walkover.
Trees	There are trees to the western boundary of the site.
Existing Buildings/Obstructions	There are no buildings, including historical buildings, within the development area.
Foundations	The depth and type of proposed foundations would depend on the site's ground conditions. There are artificial deposit records underlying the proposed development area. The Shirdley Hill Sand Formation underlies the proposed development. Shallow foundations may be possible.
Floor Slabs	A ground-bearing floor slab is anticipated to be suitable on the prepared formation level. However, verification of the ground would be required.
Groundwater	Groundwater conditions are not known at this stage. For more detailed knowledge of the groundwater regime, an intrusive geotechnical investigation would be needed. However, the site is underlain by [Secondary A aquifer]. The highest risk of groundwater flooding on the site is recorded as low.
Soakaways	Soakaways are considered feasible on the site based on the superficial sand deposits underlying it.
Earthworks	Earthworks are unlikely to be required for the proposed development.
Slopes	The site slopes to the northwest. However, the slope is not significant.
Retaining Walls	It is unlikely that retaining walls will be required.
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 at the proposed development location.

8.0 CONCLUSIONS AND RECOMMENDATIONS

Conclusions

- 8.1 The site was a plain field with a road going through the site from the south in the earliest map of 1867. Between 1955 and 1956, a large building was constructed on the site, which was demolished between 1987 and 1988. There were industrial buildings along the site boundaries. Embankments were built around the buildings to the east. During this time, a railway was also seen approximately 50m north of the site but was dismantled between 1987 and 1988. Additionally, an embankment was constructed along the west of the site in 1962. Presently, the site is unoccupied land with vegetation and trees within its boundaries. The site is within an Industrial Park and has an electricity substation approximately 10m east of the site.
- 8.2 The site was a military base (ROF Kirkby) used for the manufacture of explosives between 1940 and 1946.
- 8.3 The site is recorded to be underlain by the Shirdley Hill Sand Formation (Secondary 'A' Aquifer).
- 8.4 The bedrock geology beneath the site is shown to be of the Chester Formation-Sandstone (Principal Aquifer).
- 8.5 The overall risk from soil contamination to industrial end users is concluded to be **MODERATE**, and construction workers are concluded to be **MODERATE to LOW**.
- 8.6 The risk to controlled waters is concluded to be **LOW**.
- 8.7 There is a recently closed landfill, which is a significant source of ground gas located 29m from the site; therefore, the risk from ground gas to end users is considered to be **MODERATE to LOW**.
- 8.8 The site does not lie within a radon-affected area and therefore radon protection measures are not required for any new structures.
- 8.9 The site does not lie within a flood plain, although Zones 2 and 3 are close to the site boundary.
- 8.10 The site lies within an area of **LOW RISK** of UXOs.
- 8.11 Soakaways may be feasible on the site.

Recommendations

- 8.12 A further intrusive investigation should be undertaken to establish geotechnical parameters for the design of foundations for the storage containers.
- 8.13 As part of the geotechnical investigation, it is recommended that samples of soil and groundwater be recovered for contamination testing to allow for a more detailed assessment of the risk and allow for an evaluation of potential surplus off-site soil disposal.
- 8.14 Monitoring wells also need to be installed to confirm the risk of contamination from potential ground gas.

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  EARTH ENVIRONMENTAL & GEOTECHNICAL A Technics Group Company
Job No.: A7189	Site: Land off Marl Road, Knowsley
Plate 1 View facing west showing site entrance	Plate 2 View facing northeast into the site
	
Date: 31 st October 2025	Date: 31 st October 2025
Plate 3 View facing east showing the site from the southern corner	Plate 4 View facing west showing trees at the western boundary of the site
	
Date: 31 st October 2025	Date: 31 st October 2025

Earth Environmental & Geotechnical Ltd Tel: 0161 975 6088 Email: info@earthenvironmental.co.uk Web: www.earthenvironmental.co.uk	SITE PHOTOGRAPHS  EARTH ENVIRONMENTAL & GEOTECHNICAL A Technics Group Company
Job No.: A7189	Site: Land off Marl Road, Knowsley
Plate 5 View facing southwest showing stockpile on the site	Plate 6 View facing the western boundary showing fly tipping evidence on the site
	
Date: 31st October 2025	Date: 31st October 2025
Plate 7 View facing northwest showing evidence of made ground	Plate 8 View facing east, present made ground
	
Date: 31st October 2025	Date: 31st October 2025

Earth Environmental & Geotechnical Ltd

Tel: 0161 975 6088
Email: info@earthenvironmental.co.uk
Web: www.earthenvironmental.co.uk

SITE PHOTOGRAPHS



Job No.: A7189

Site: Land off Marl Road, Knowsley

Plate 9 View showing repaired electrical cable in the southern area of the site



Plate 10 View showing the undulating ground condition of the site and slopes in the northwest end of the site



Date: 31st October 2025

Date: 31st October 2025

Plate 11 View showing the eastern boundary of the site



Plate 12 View showing the northern boundary of the site and slope



Date: 31st October 2025

Date: 31st October 2025

Figure 9: Site Walkover Photograph Locations



APPENDIX 3

SITE WALKOVER NOTES

WALK OVER SURVEY REPORT

Site: Land off Marl Road, Knowsley

Date: 31/10/2025

Job No: A7189

Undertaken By: Rose Sarnoe

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)		The site is located in an industrial area. The site is an unoccupied land with vegetation.
Evidence of Past Activities	Are there: Any relevant street names in the area? Features or relics which indicate past history?	Yes Yes	Marl Road is located to the west of the site. No significant evidence onsite of previous activity other than the presence of made ground and dumps, which indicate the site's previous uses as a fly tipping location.
Geographic Setting	Description required for: Low lying flood plain/dry valley/rolling hills, etc.		
Ground Conditions	Is there any evidence of: Mining, Mine entries Subsidence Landslip/slope erosion Former investigation works	No Yes No	No evidence of negative ground conditions nor a previous ground investigation within the site. The site slopes slightly to the north.

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?	No Yes	Made ground was present on the site, and deep-made ground is anticipated on the site.
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.)	N/A	The site is bounded by steel fencing on each side of the site. To the west of the site is a road, and across the road is the Amazon depot. A garage is at the northern boundary of the site, and unknown industrial buildings are on the east and south borders of the site.
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	Mature trees and bushes are located at the west boundary of the site.
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?	No No	

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?	No No No	
Electrical Equipment	Are there any electricity substations on or adjacent to the site? Are there any electrical transformers, capacitors, pylons etc on site?	Yes	A repaired underground electrical cable was seen at the southern end of the site.
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)?	No No No	N/A

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)?	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?	No Yes	Stockpiled material, which comprises cut-down trees and vegetation with some soil, is at the western and southern ends of the site.
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)?	No No No	N/A
Accidents	In the event of a large spillage would runoff affect any vulnerable watercourse/culverts? Are emergency procedures / equipment in place?	No No	

Desk Study features checked during site visit	Feature and Information required	Present	Description / Comments
Waste	Are there any waste skips present on site?	No	N/A Rubbish in black bin bags was seen in the west corner of the site next to the site entrance.
	Are waste storage facilities adequate?	No	
	Is there any litter/fly tipped material?	Yes	
Atmospheric	Are there any fumes, odours originating from site or affecting site from neighbouring sites?	No	N/A
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		No issues with access, a large steel gate is present to allow for vehicles to access. No headroom issues. Site office is suitable anywhere within the site. No water supply present.
Site Environs	Are there any local features that could have a harmful influence, e.g. landfill, industrial processes, or railway land?	Yes	A recently closed landfill is located approximately 30m from the site.
	Are there any sensitive water features/courses near the site?	Yes	A surface water feature is approximately 200m from the site.
Local Knowledge / Anecdotal Evidence			N/A

APPENDIX 5

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 2025 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 assessments 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 from 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 explicitly 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 on Earth Environmental & Geotechnical Ltd's observations of existing physical conditions at the site, gained from a walkover survey, together with Earth Environmental & Geotechnical Ltd's 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 of that information, which 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 investigation excavations only allow examination of the ground at discrete locations. The potential exists for ground conditions to be encountered that differ from those considered in this report. The extent of the limited area depends on soil and groundwater conditions, 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; it should not be inferred that other chemical species are absent.

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.