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SUB SURFACE
Site Investigation Specialists,
Geotechnical & Environmental Consultants

DESK STUDY WITH WALKOVER SURVEY

FOR
WASTE TRANSFER DEPOT,
OLD COAL YARD,
WEST DRAYTON,
GREATER LONDON

PREPARED FOR
HEATON PLANNING LIMITED

REPORT NO. SE1789
MARCH 2024

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CONTENTS

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EXECUTIVE SUMMARY

This executive summary is a brief summary only and should be read in conjunction with the full report.

Section	Subject	Summary
Site Details	Site Address	Old Coal Yard, West Drayton, Greater London, UB7 7RS.
	Grid Reference	505519, 180251.
	Current Land Use	Flat concrete-surfaced plot of land with several mounds of construction waste, soil and rubble, and storage of concrete plinths.
	Proposed Development	Erect a 30m x 30m open-fronted building in the north of the site, with a vehicle parking and skip storage area in the southwest, and offices inside a shipping container in the southeast
Site History	On Site	The earliest map (1866-1868) shows the site in undeveloped fields. The site is raised by 1934. The site is part of a coal depot from 1969 to 2001, with two buildings in the southeast from 1969 to 1987. From 1999 to the present day, the site has had a number of uses, with skip storage, refuse heaps, spoil mounds and vehicle storage all noted during this time.
	Beyond Site Boundary	The earliest map (1866-1868) shows a small river 10m southwest (no longer shown by 1934, possibly culverted), Fray's River 110m northeast, The Great Western Railway (GWR) on an embankment 105m south (new lines added by 1934 and removed again by 2010), and the nearest building 70m north. Staines Branch of the GWR on an embankment 5m north from 1894. Residential development 190m northeast from 1913 and 140m south from 1934. Railway line adjacent to northeast from 1960 to 1969. Old gravel pit (now a large body of water) 105m northwest from 1960, part infilled by 1969. Land adjacent to the east, south and west part of a Coal Depot, with new buildings adjacent to the east, a traveling crane 30m south, and a conveyor 70m southeast, from 1969 to 2001. New buildings 10m southeast from 2010 and 5m south of 2024.
Geological Appraisal	Made Ground	Made Ground, described as 'Artificial Deposits', is indicated to be present.
	Superficial Geology	Alluvium, generally comprising clay, silt, sand and gravel.
	Bedrock Geology	Clay, silt and sand, belonging to London Clay Formation of the Ypresian Age
	Subsidence Hazards	Very low to negligible.
	Mining	None recorded.
	Radon	No radon protection measures are required.
Environmental Appraisal	Industrial Land Uses	Railway sidings and coal depot on site, unspecified works 39m north, travelling crane 42m south, vehicle repair, testing and servicing centre 49m north, unspecified works 60m northeast, electricity substation 63m southeast, tank 73m southeast, boat house 77m northeast, gravel pit 102m northwest.
	Landfill Sites	Industrial waste landfill 27m north and 219m northwest, and refuse tip 212m north.
	Hydrogeology	Superficial deposits are indicated to be a Secondary A aquifer.
		Bedrock is indicated to be an Unproductive aquifer.
	Hydrology	Inland rivers within 250m, with the nearest being 56m to the northeast.
	Flood Risk	Flood Zone 2 25m north and Flood Zone 3 26m north. However, the site itself is in a Flood Zone 1 and a Flood Risk Assessment is unlikely to be required.
	Other Relevant Details	None.
Recommendations	The Client has informed us that the proposed development is to be secured to the existing concrete using anchor bolts, therefore there is no breaking out of the exiting hardstanding taking place, and there are also no enclosed buildings/spaces in the current plans. Should any groundwork be required as part of the development, an intrusive ground investigation is required to assess the ground conditions for contamination. The ground investigation should obtain soil samples for contamination analysis and asbestos detection and, where possible, groundwater and surface water samples for contamination analysis. In addition ground gases might be present and hence, should there be any enclosed buildings/spaces constructed as part of the development, gas standpipes should be installed and monitored over an extended period of time to allow for an assessment to be made.	

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Other Considerations (for Warranty Providers, Building Control, Structural Engineers, Developers, etc.)	Listed below are various items that are likely to be required at some point during the development and it would be cost effective to have them carried out simultaneously. This is not an exhaustive list. • Boreholes and laboratory testing to assess the ground conditions for foundation design. • BRE Digest 365 Soakaway Tests. • Waste Classification and WAC testing for removal of waste to landfill. • CBR Testing for road design and construction. • Water Pipeline Risk Assessment.

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DESK STUDY WITH WALKOVER SURVEY FOR WASTE TRANSFER DEPOT, OLD COAL YARD, WEST DRAYTON, GREATER LONDON, UB7 7RS

CLIENT: HEATON PLANNING LIMITED

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1. INTRODUCTION

This report has been prepared in accordance with an email, dated 19th February 2024, from the Client.

The brief was set out in our estimate, ref. ESE3344A dated 19th February 2023, and comprises a walkover survey and a desk study report including a historical, geological, mining and environmental appraisal together with a conceptual ground model.

1.1 Site Location and Description

The site is located at the Old Coal Yard, West Drayton, Greater London, UB7 7RS, as indicated in Figure 1. The approximate National Grid Reference of the centre of the site is 505519, 180251.

As shown in Figure 2, the site comprises an approximately rectangular plot of land of 0.20ha. It is bound by a wooded area and railway line to the north, a crane hire company to the east, an access road and a scaffolding company to the south, and a skip storage area to the west.

1.2 Proposed Development and Purpose of the Desk Study

We understand that it is proposed to erect a 30m x 30m open-fronted building in the north of the site, with a skip storage area in the southwest, and offices on top of a shipping container and adjacent vehicle parking area in the southeast, as shown in Figure 3.

The purpose of the desk study is to obtain information regarding the sites historical, geological, and environmental setting in order to produce a conceptual ground model, to assess the ground conditions, to undertake a preliminary assessment of contamination sources, pathways and receptors relating to potential hazards that exist or will potentially exist on the site and to assess the need for ground investigation.

1.3 Walkover Survey

The walkover survey was undertaken on 4th March 2024. Photographs taken during the site walkover are appended, with their locations and any surface features observed indicated in Figure 2.

At the time of the walkover, the site comprised a flat concrete-surfaced plot of land. The site was bound by concrete plinths to the east, south and west, with a further line of concrete plinths in the centre. Several small mounds of construction waste and other spoil were noted throughout the site (photos 5 – 8), and a larger mound of soil and rubble was noted in the northwest (photo 4). The site could be accessed via an access road off Tavistock Road to the east.

No visual or olfactory contamination was noted during the walkover survey.

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2. DESK STUDY

2.1 Historical Appraisal

The history of the site has been interpreted from the study of old Ordnance Survey plans supplied by GroundSure, as follows:

TABLE 1 SMALL SCALE SURVEY

Date	Scale
1868	1:10,560
1881	1:10,560
1894 – 1897	1:10,560
1895 – 1897	1:10,560
1898 – 1900	1:10,560
1913	1:10,560
1932	1:10,560
1935	1:10,560
1938	1:10,560
1960 – 1964 *	1:10,560
1960 – 1965	1:10,560
1970	1:10,560
1973 – 1975	1:10,000
1987 – 1990	1:10,000
2001	1:10,000
2010	1:10,000
2024	1:10,000

TABLE 2 LARGE SCALE SURVEY

Date	Scale
1866	1:2,500
1875 *	1:2,500
1896	1:2,500
1899	1:2,500
1932 *	1:2,500
1934	1:2,500
1964	1:1,250 **
1969	1:2,500
1968 – 1972	1:1,250 **
1975 – 1976 *	1:1,250 **
1982 – 1987	1:1,250 **
1992	1:1,250 **
2003	1:1,250

* Site not covered by survey.
** Published scale, appended extract reproduced at 1:2,000 scale.

Extracts of the above surveys are appended.

TABLE 3 HISTORICAL APPRAISAL

Date	On site	Beyond site boundary
1866-1868	At the time of the earliest survey, the site was depicted in undeveloped fields.	A small river is shown 10m to the southwest of the site and a larger river named Fray's River is depicted 110m to the northeast with a railway line beyond. The Great Western Railway (GWR) is shown on an embankment 105m to the south of the site. The nearest building to site is 70m to the north.
1881	No significant changes are noted during this time.	No significant changes are noted during this time.
1894-1900	No significant changes are noted during this time.	The Staines Branch of the GWR is now shown on an embankment 5m to the north of the site.
1913	No significant changes are noted during this time.	A new residential development is depicted 190m to the northeast of the site.
1934-1938	The site and the and all adjacent land between site and the railway lines has been raised.	The small river 10m to the southwest of the site is no longer depicted, possibly culverted. New railway lines have been added, starting 75m to the south of the site. A football ground is now shown 100m to the northwest of the site and a new residential development is depicted 140m to the south.

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1960-1965	No significant changes are noted during this time.	A further railway line is now shown adjacent to the northeast of the site, with further ground workings depicted 5m to the northeast. The football ground is no longer shown. Four unspecified works are now shown within 250m of the site, with the nearest being 40m to the north. A large body of water is now depicted 105m to the northwest of the site, in an old gravel pit.
1969-1972	The site is now depicted as part of a Coal Depot, with two buildings shown in the southeast.	The land adjacent to the east, south and west of the site is all now part of a Coal Depot, with new buildings shown adjacent to the east, a traveling crane 30m to the south, and a conveyor 70m to the southeast. The railway line adjacent to the northeast of the site is no longer shown. Part of the large body of water 105m to the northwest of the site appears to have been infilled.
1973-1985	No significant changes are noted during this time.	No significant changes are noted during this time.
1982-1987	No significant changes are noted during this time.	Two large unspecified works buildings 140m to the northeast of the site have been demolished and replaced with residential properties.
1987-1992	The two buildings on site have been demolished.	The two buildings adjacent to the east of the site have been demolished.
2001-2003	No significant changes are noted during this time.	No significant changes are noted during this time.
2010	The Coal Depot is no longer labelled.	Most buildings associated with the Coal Depot have been demolished and the travelling crane and conveyor belt removed. A new building is shown 10m to the southeast of the site. Several of the railway lines 75m to the south of the site have been removed.
2024	No significant changes are noted during this time.	A new building is shown 5m to the south of the site.

Satellite imagery shows that, from 1999 to the present day, the site has had a number of uses, with skip storage, refuse heaps, spoil mounds and vehicle storage all noted during this time.

2.2 Geological Appraisal

This following appraisal is based upon the appended Groundsure Enviro & Geo Insight Report (Sections 14 to 17).

2.2.1 Artificial Ground (Made Ground)

Made Ground, described as ‘Artificial Deposits’, is indicated to be present within the site, the depth of which is unknown.

2.2.2 Superficial Geology (Drift Deposits)

The drift deposits beneath the site are anticipated to be Alluvium, generally comprising clay, silt, sand and gravel, the depth of which is unknown. The drift deposits are indicated as having a very low to high permeability.

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2.2.3 Bedrock Geology

The bedrock beneath the site is anticipated to be clay, silt and sand belonging to the London Clay Formation of the Ypresian Age. The bedrock is indicated as having a very low to moderate permeability.

2.2.4 Potential Hazards in Natural Ground

The hazard rating for shrinking/ swelling clays, running sands, compressible deposits, and landslides is very low, and the hazard rating for collapsible deposits and ground dissolution of soluble rocks is negligible.

2.3 Mining, Radon, Soil Chemistry and Railway Infrastructure Appraisal

This following appraisal is based upon the appended Groundsure Enviro & Geo Insight Report (Sections 18 to 21).

2.3.1 Mining and Ground Workings

The British Geological Surveys "BritPits" database contains details of currently active and closed surface and underground mineral workings. There are three records of BritPits within 500m of the site boundary, the nearest being related to crushed rock 101m to the southwest, listed as active.

Ordnance Survey mapping identifies surface excavations which may, or may not, have been subsequently backfilled with unknown material. The Ordnance Survey indicates that there are two historical surface excavations within 250m of the site boundary, which are ponds and groundworkings related to a gravel pit 100m to the northwest and unspecified ground workings (possibly the railway embankment) 119m to the south.

The boundaries of permitted, withdrawn and refused mineral planning permissions for England and Wales, from the 1930s to the mid-1980s, are maintained by the British Geological Survey. There are three historical mineral planning areas within 500m of the site boundary, the nearest being related to sand and gravel 31m to the north.

The British Geological Survey maintain records of mining of minerals other than coal and indicates that there is no potential for non-coal mining beneath the site or within 1km of the site boundary.

The Coal Authority, and others, indicate that there is there is no potential for coal mining beneath the site or within 1km of the site boundary.

According to the report the site is not in an area affected by significant natural cavities, historical underground workings, mining cavities, brine extraction, gypsum extraction, tin mining, or clay mining.

2.3.2 Radon

The British Geological Survey and Public Health England have estimated the percentage of dwellings exceeding the "Radon Action Level" of 200 Becquerels/m^3 for the UK based on geological assessments and long-term measurements of radon in more than 560,000 households.

The site is unlikely to be affected by radon gas as less than 1% of surrounding properties are above the Radon Action Level. No radon protection measures are required.

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2.3.3 Soil Chemistry

The British Geological Survey have estimated likely background concentrations of potentially harmful arsenic, cadmium, chromium, lead, and nickel in the topsoil. Data for on-site topsoil is given. In addition data for the land within 50m of the site boundary is given.

2.3.4 Railway Infrastructure

There are historical railway and tunnel features within 250m of the site boundary, with the site being situated on a large area of railway sidings.

There are active railways within 250m of the site boundary, with the nearest being 15m to the north and 93m to the south.

There are no underground railways or railway tunnels within 250m of the site boundary.

The site is within 105m of 'surface alignment' related to the Crossrail 1 rail project.

The site is not within 250m of the Crossrail 2 or High Speed 2 (HS2) rail projects.

2.4 Environmental Appraisal

This following appraisal is based upon the appended Groundsure Enviro & Geo Insight Report (Sections 1 to 13).

2.4.1 Historical Industrial Land Use

Historical potentially contaminative industrial land uses are recorded by the Ordnance Survey. There are several potentially contaminative industrial land uses identified within 250m of the site boundary, which include railway sidings and a coal depot on site, unspecified works 60m to the northeast, a boat house 77m to the northeast, and a gravel pit 102m to the northwest.

There are three historical tanks within 250m of the site boundary, which are all unspecified tanks with the nearest being 78m to the southeast.

There are six historical energy features within 250m of the site boundary, which are all electricity substations with the nearest being 61m to the north.

There are no historical petrol stations, garages, or military land within 250m of the site boundary.

2.4.2 Landfill

Local Authority records and detailed Ordnance Surveys indicate one landfill site within 250m of the site boundary, which is a refuse tip 212m to the north.

The Environment Agency and Natural Resources Wales have two records of known historical (closed) landfill sites, where there is no PPC permit or current waste management licence, within 250m of the site boundary, related to industrial waste 27m to the north, and related to industrial, commercial and household waste 219m to the northwest.

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2.4.3 Waste

Local Authority records and detailed Ordnance Surveys indicate two historical waste sites within 250m of the site boundary, which are a waste recycling building 21m to the southwest and a waste transfer station 126m to the north.

According to the Environment Agency and Natural Resources Wales there are three active or recently closed waste sites within 250m of the site boundary, with the nearest being a household waste recycling centre 33m to the east.

The Environment Agency and Natural Resources Wales have several records of activities involving the storage, treatment, use or disposal of wastes that are exempt from needing a permit (within specific limits and conditions) within 250m of the site boundary, with the nearest being 27m to the west.

2.4.4 Current Land Use

Current potentially contaminative industrial land uses are recorded by the Ordnance Survey. There are several potentially contaminative industrial land uses identified within 250m of the site boundary. These include unspecified works 39m to the north, a travelling crane 42m to the south, a vehicle repair, testing and servicing centre 49m to the north, an electricity substation 63m to the southeast, and a tank 73m to the southeast.

According to Experian, there are no current or recent petrol stations within 250m of the site boundary.

2.4.5 Contaminated Land

There are no sites determined as contaminated under Part 2a of the Environmental Protection Act (1990) within 250m of the site boundary.

2.4.6 Control of Major Accident Hazards (COMAH)

Records of Control of Major Accident Hazards (COMAH), including Notification of Installations Handling Hazardous Substances (NIHHS) and other historical data, indicate that there are no dangerous or hazardous sites within 250m of the site boundary.

2.4.7 Regulated Explosives Sites

Up to April 2015 there were no sites within 250m of the site boundary registered and licensed by the Health and Safety Executive under the 2005 Manufacture and Storage of Explosives Regulations.

2.4.8 Hazardous Substance Storage and Usage

There are no Local Authority records of consents granted for sites to hold certain quantities of hazardous substances at or above defined limits in accordance with the 2015 Planning (Hazardous Substances) Regulations within 250m of the site boundary.

2.4.9 Historical Licenced Industrial Activities (IPC)

There are no historical Integrated Pollution Control (IPC) records of substances released to the air, land, and water according to the Environment Agency and Natural Resources Wales within 250m of the site boundary.

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2.4.10 Licenced Industrial Activities (Part A(1))

The Environment Agency and Natural Resources Wales indicate that there are no records of Part A(1) installations regulated under the 2016 Environmental Permitting (England and Wales) Regulations for release to the environment within 250m of the site boundary.

2.4.11 Licensed Pollutant Release (Part A(2) and Part B)

Local Authority records indicate that there are three Part B installations regulated under the 2016 Environmental Permitting (England and Wales) Regulations for the release of substances to the environment within 250m of the site boundary. These are historical permits 90m and 105m to the northeast and 110m to the southeast.

There are no Part A(2) installations within 250m of the site boundary.

2.4.12 Radioactive Substance Authorisations

The Environment Agency and Natural Resources Wales indicate that there are no records of storage, use, accumulation, and disposal of radioactive substances regulated under the 1993 Radioactive Substances Act within 250m of the site boundary.

2.4.13 Licensed Discharges to Controlled Waters

According to Environment Agency and Natural Resources Wales records there have been eight discharges of treated or untreated effluent to controlled waters under the 1991 Water Resources Act within 250m of the site boundary, with the nearest being related to surface water and sewage discharges 163m to the east.

2.4.14 Pollutant Release to Surface Waters (Red List)

The Environment Agency and Natural Resources Wales records indicate that there have been no discharges of specified substances under the 1991 Environmental Protection (Prescribed Processes and Substances) Regulations within 250m of the site boundary.

2.4.15 Pollutant Release to Public Sewers

According to Environment Agency and Natural Resources Wales records there have been no discharges of special category effluents to public sewers within 250m of the site boundary.

2.4.16 List 1 and List 2 Dangerous Substances

The Environment Agency and Natural Resources Wales records indicate that there have been no discharges of substances on List 1 or List 2 of the European Directive E2006/11/EC respectively, regulated under the 2015 Environmental Damage (Prevention and Remediation) Regulations, within 250m of the site boundary.

2.4.17 Pollution Incidents

According to the Environment Agency and Natural Resources Wales there are no records of substantiated pollution incidents within 250m of the site boundary.

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2.4.18 Pollution Inventory Substances

The Environment Agency and the Scottish Environment Protection Agency indicate that there have been no reports on annual emissions of certain regulated substances to air, controlled waters, and land within 250m of the site boundary.

2.4.19 Pollution Inventory Waste Transfers

According to the Environment Agency and the Scottish Environment Protection Agency there have been no reports on annual transfers and recovery/ disposal of controlled wastes within 250m of the site boundary.

2.4.20 Pollution Inventory Radioactive Waste

The Environment Agency and the Scottish Environment Protection Agency indicate that there have been no reports on annual releases of radioactive substances within 250m of the site boundary.

2.4.21 Hydrogeology

The following designation of aquifers is in accordance with the Environment Agency's April 2010 Groundwater Protection Policy.

Superficial/ drift deposits are anticipated to be present and comprise Alluvium. These are indicated to be a Secondary A aquifer comprising permeable layers capable of supporting water supplies at a local scale and in some cases forming an important source of base flow to rivers.

The bedrock is anticipated to be London Clay (sand, silt and clay), which is indicated to be an Unproductive aquifer comprising layers with low permeability that have negligible significance for water supply or river base flow.

The vulnerability of groundwater to a pollutant found within the site and its immediate surrounding area has been assessed as "High" – an area able to easily transmit pollution to groundwater.

British Geological Survey and Environment Agency data indicates that the site is not within a 1km grid where solution features are present that will enable rapid movement of a pollutant to groundwater.

Environment Agency data indicates that the site is in an area where additional local information indicates that groundwater is vulnerable to pollution. This is related to a highly vulnerable Principal superficial aquifer in nearby river terrace gravels.

According to data provided by the Environment Agency and Natural Resources Wales, there are no groundwater abstraction licences within 1km of the site boundary, one surface water abstraction licence within 1km of the site boundary, which is 863m to the southwest, and no potable water abstraction licences within 2km of the site boundary.

There are no Source Protection Zones, set up to protect a water source within 500m of the site of boundary, present according to the Environment Agency and Natural Resources Wales.

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2.4.22 Hydrology

The Ordnance Survey indicate that there are watercourses (rivers, streams, lakes or canals) within 250m of the site boundary, which are all inland rivers with the nearest being 56m to the northeast.

There are fourteen surface water features (rivers, streams or lakes) within 250m of the site boundary according to the Ordnance Survey.

The Water Framework Directive (WFD) indicates that the site is within the catchment of the River Colne, this watercourse being 117m to the east and the groundwater body is known as the Lower Thames Gravels.

2.4.23 Flooding

Flooding data is maintained by the Environment Agency and Natural Resources Wales. The Risk of Flooding from Rivers and Sea (RoFRaS) database indicates that within 50m of the site boundary the highest risk of flooding is “Medium”.

In the period since records began in 1946, there are no records of historical floods within 250m of the site boundary.

There are two areas benefitting from flood defences within 250m of the site boundary, which are 212m to the south and 233m to the southeast.

There are no flood defences or flood storage areas present within 250m of the site boundary.

The site is within 50m of a Flood Zone 2 and a Flood Zone 3, these being 25m and 26m to the north respectively. However, the site itself is in a Flood Zone 1 and a Flood Risk Assessment is unlikely to be required.

According to Ambiental Risk Analytics surface water “FloodMap” there is a 1 in 250 year (0.1m – 0.3m) risk of surface water flooding on the site and a 1 in 30 year (0.1m – 0.3m) risk within 50m of the site boundary.

According to Ambiental Risk Analytics, there is a moderate risk of groundwater flooding on the site and within 50m of the site boundary.

2.4.24 Environmental Designations

Natural England, Natural Resources Wales and Scottish Natural Heritage indicate that there are environmental sensitive sites within 2km of the site boundary.

The site is within an SSSI Impact Risk Zone and there are sixteen records of Green Belt Land, with the nearest being 28m to the north.

2.4.25 Visual and Cultural Designations

Historic England, Cadw and Historic Environment Scotland indicate that within 250m of the site boundary there are no World Heritage Sites, Areas of Outstanding Natural Beauty, National Parks, Listed Buildings, Conservation Areas, Scheduled Ancient Monuments or Registered Parks and Gardens.

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2.4.26 Agricultural Designations

Natural England indicate that the Agricultural Land (quality) Classification for the site is 'Non Agricultural'.

Natural England and Natural Resources Wales indicate that there is no open access land within 250m of the site boundary.

The Forestry Commission indicate that there are no tree felling licences within 250m of the site boundary.

Natural England indicate that there are no environmental stewardship schemes or countryside stewardship schemes within 250m of the site boundary.

2.4.27 Habitat Designations

Natural England indicate that there are ten priority habitats within 250m of the site boundary, which are all deciduous woodlands with the nearest being 98m to the northwest.

There is one open mosaic habitat within 250m of the site boundary, which is 214m to the northwest.

There are no habitat networks or limestone pavement orders within 250m of the site boundary.

2.5 Conceptual Ground Model

A conceptual ground model of a site and its environs uses available information to form a preliminary assessment of contamination sources, pathways and receptors, and the significance of hazards that exist or will potentially exist on the site. Its purpose is to identify the relationships between sources of contamination, pathways, and receptors to allow exposure scenarios to be determined and thereby aid in the design of any intrusive investigation. It also forms the basis of the risk assessment.

2.5.1 Sources

Potential sources of contamination identified in the desk study are:

- General contaminants including asbestos in Made Ground present on site and past and present contaminative processes undertaken on and adjacent to the site including earthworks, construction and demolition and past site usage as a coal yard and other recent industrial usages.
- Hydrocarbon contamination from on-site spillage and leakage of oils and fuels associated with past vehicles stored on site.
- Migrating ground gases from the Made Ground on site, the landfill sites 27m and 212m to the north and 219m to the northwest, and the infilled gravel pit 100m to the northwest.

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2.5.2 Pathways

Potential pathways from source and receptor for the proposed development are:

- Direct skin contact with and ingestion of contaminated soil by site workers during construction and by end users of the site in any landscaped areas.
- Inhalation of dust, vapours and/ or gases by site workers during construction and by the end users of the site in enclosed spaces.
- Migration of contaminants to the underlying aquifer and to adjacent properties.
- Ground gases via permeable soils and rocks.
- Accumulation of ground gases in enclosed spaces.

2.5.3 Receptors

Potential receptors for the proposed development are:

- Site operatives during demolition, earthworks and/ or construction.
- The end users of the site.
- Controlled waters including surface water, groundwater, and the underlying aquifer.
- Maintenance operatives entering on-site confined spaces after development.
- Adjacent properties.

Conclusions

An appraisal of the sources, pathways and receptors has been considered and we have produced a conceptual ground model based upon the available information, as follows:

TABLE 4 CONCEPTUAL GROUND MODEL

Potential Source	Nature of Hazard	Contaminants Associated with the Source	Pathway	Receptor	Preliminary Risk Rating
Made Ground (indicated to be present on site, from past developments and past site usage as a coal yard and other recent industrial usages)	Contaminants in Made Ground	Gen. Contaminants Arsenic Cadmium Chromium Lead Mercury Molybdenum Nickel Selenium Boron Copper Zinc Cyanide Sulphide Sulphate pH Phenols Polynuclear Aromatic Hydrocarbons (PAH) Total Petroleum Hydrocarbons (TPH) Volatile Organic Compounds (VOC)	Ingestion of soil Ingestion of dust Dermal contact Inhalation of dust/vapours	Site Operatives End Users	Low to Moderate
			Vertical and lateral movement of contaminants to surface water and groundwater	Controlled Waters Adjacent Properties	Low to Moderate
			Direct contact	Structures and Services	Low to Moderate
Asbestos on/ in ground	Asbestos fibres	Asbestos fibres	Inhalation of fibres	Site Operatives End Users	Low to Moderate

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Machinery Vehicles (past vehicles stored on site)	Fuel oil spillage and or leakage from oil tanks and or vehicles	Total Petroleum Hydrocarbons (TPH)	Ingestion of soil Ingestion of dust Dermal contact Inhalation of dust vapours	Site Operatives End Users	Low to Moderate
			Uptake via contaminated groundwater	Vegetation	Low to Moderate
			Vertical and lateral movement of contaminants to surface water and groundwater	Controlled Waters Adjacent Properties	Low to Moderate
			Direct contact	Structures and Services	Low to Moderate
Landfill (Made Ground on site, landfill sites 27m and 212m north and 219m northwest, infilled gravel pit 100m northwest)	Ground Gas (Asphyxiation, fire and explosion)	Methane Carbon Dioxide	Inhalation of gas Ignition of gas	Site Operatives End Users	Low to Moderate

The Client has informed us that the proposed development is to be secured to the existing concrete using anchor bolts, therefore there is no breaking out of the existing hardstanding taking place, and there are also no enclosed buildings spaces in the current plans.

The conceptual ground model indicates that, should any groundwork be re uired as part of the development, an intrusive ground investigation is re uired to assess the ground conditions for contamination. The ground investigation should obtain soil samples for contamination analysis and asbestos detection and, where possible, groundwater and surface water samples for contamination analysis.

In addition the conceptual ground model indicates that ground gases might be present and hence, should there be any enclosed buildings spaces constructed as part of the development, gas standpipes should be installed and monitored over an extended period of time to allow for an assessment to be made.

2. General

No consideration has been given to flora and fauna as this was outside our brief.

This Phase I walkover survey and desk study should be followed by a Phase II ground investigation. It should be noted that dependent upon the findings of the ground investigation, a Phase III remediation statement and Phase IV validation with report may be re uired.

We recommend that consultation should be undertaken with and written approval obtained from the Local Authority Contaminated Land Officer and Building Control Officer prior to commencing any development.

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We trust that this report fulfils your present requirements but if you have any queries or we can be of further assistance please contact the undersigned or Mr Jonathan Mahoney at our High Wycombe office.

SUB SURFACE CONSULTANTS LIMITED
REPORT No. SE1789
MARCH 2024

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