Desktop Study Report

YEX4337- Former Garage Block, UB10 9DJ

September 22

	Name	Position	Signature	Date
Prepared	Cathleen Cox	Geo-Environmental Engineer		22 September 2022
Responsible	Rebecca Hearn	Senior Geo-Environmental Engineer		22 September 2022
Authorised	Matthew Blakey	Managing Director		22 September 2022

Issue	Date	Description	Contributors	Responsible	Authorised
01	22 September 2022	Final Report	CC	RH	MB

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Appendices

Executive Summary

The below table shows a snapshot of the recommendations concerning contamination. It is advised that the report is read in its entirety to gain a better understanding of our findings.

	No Investigation	Investigation Required
Soil	✓	
Ground Gas	✓	
Groundwater	✓	

No Investigation Recommended

There is no evidence presented within this report of potential contamination that would require a Phase 2: Site Investigation. Watching brief by a suitably qualified individual should be undertaken during groundworks, in the event of any unforeseen contamination works shall cease and contact be made with YE and the regulator.

Introduction

*Your*Environment was instructed by ARKS Design Studio to produce a Phase 1: Desktop Study and Preliminary Risk Assessment Report for the Former Garage Site, Hazeldene Gardens, Hillingdon, UB10 9DJ.

Grid reference	508251, 183807
Size of study site	0.08ha
Topography	Approximately flat lying at around 32mAOD
Description of the study site and surrounding area	The site comprises twenty-four (24no) unused garages in assumed association with nearby residential properties. The area is predominantly residential, with some commercial units within a walkable distance.

It is understood plans for the redevelopment of the site comprise:

- Demolition of existing disused garages
- Erection of two (2no) semi-detached residential dwellings each containing four (4no) bedrooms
- Construction of associated external works
- Structural support to be implemented for existing garage walls

The purpose of this report Is to support the discharge of a planning condition (condition 16) attached to the planning application submitted to Chichester Council (ref: 56804/APP/2019/3696), as well as a planning condition (condition 16) attached to the planning application (ref: 56804/APP/2021/1354). Both were submitted to the London Borough of Hillingdon Council, and the latter was a supplementary application to amend the boundary to include the existing garage walls.

The proposed plans can be viewed in Appendices A.

The objectives of this report are to:

- Establish the environmental setting, including sensitivity in relation to human health, surface water, groundwater and ecological receptors
- Review historical and recent uses to assess the potential for contamination to be present from past and current land-use
- Assess by qualitative means the potential nature and extent of contamination from those uses and the environmental risk and liabilities which may affect the site redevelopment
- Identify the prevalent source-pathway-receptor linkages present on site by means of a Tier 1 Contamination Risk Assessment which incorporates the formulation of a Conceptual Site Model (CSM)

During the production of this report the following information sources have been utilised:

- Data obtained from Groundsure
- Historical Ordnance Survey (OS) mapping
- Site walkover
- Zetica bomb risk maps
- Recent and most significant available planning history on the London Borough of Hillingdon Council Planning Portal

The full information from these sources can be reviewed within Appendices B & C.

Previous Reports

A review of the available documents on the London Borough of Hillingdon Council Planning Portal suggests that there is a limited history of planning associated with the study site, and no evidence of contaminated land conditions attached to other sites under the postcode 'UB10 9DJ'.

All other planning records associated with sites within the 'UB10 9DJ' postcode refer to applications that had been refused, were for minor amendments to properties or were deemed irrelevant in the context of this report due to the nature and age of the applications.

Environmental and Geological Setting

Information on the environmental and geological setting of the site is presented in Appendix B.

Site Geology

Site geology has been assessed using information from British Geological Survey (BGS) mapping and is summarised below:

Artificial/Made Ground	There are no records of artificial or Made Ground underlying the site.
Superficial Ground and Drift Deposits	There are no superficial deposits underlying the study site.
Bedrock Geology	Underlying the study site are bedrock deposits comprised of the London Clay Formation (clay, silt and sand).
Landslips	There are no records within 250m
Linear Features	There are no records within 250m

The following hazard ratings on site are:

Shrink swell clays	Low
Running sands	Very low
Compressible deposits	Negligible
Collapsible deposits	Very low
Landslides	Very low
Ground dissolution	Negligible

Site Hydrogeology and Hydrology

These records are derived from Environment Agency and BGS data. Details of the source and coverage of specific records are provided in the Appendices.

Principal Aquifer	Layers with high intergranular and/or secondary permeability capable of supporting water supplies at strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as Major Aquifers
Secondary (A) Aquifer	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
Secondary (B) Aquifer	Predominantly lower permeability layers which may store/yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water bearing parts of former Non-Aquifers
Secondary Undifferentiated Aquifer	Layers that cannot be attributed to a category A or B rock type. These layers could have previously been described as a minor or a non-aquifer due to their variable characteristics
Unproductive strata	Rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow

Aquifer and geological permeability are summarised below:

Aquifer within Superficial Deposits	There are no superficial deposits underlying the study site.
Permeability of Superficial Deposits	There are no superficial deposits underlying the study site.
Aquifer within Bedrock Geology	As a result of the bedrock geology on site, the London Clay Formation is designated as an Unproductive aquifer.
Water Framework Directive Groundwater Bodies	There are no records within 250m of the study site.
Permeability of Bedrock Deposits	The minimum permeability is recorded as being very low with the maximum permeability recorded as being moderate.
Groundwater Vulnerability	The groundwater vulnerability in the vicinity of the site is classified as low due to the unproductive aquifer underlying the site.
Groundwater Abstraction Licences	There are no groundwater abstractions within 1000m of the study site.
Surface Water Abstraction Licences	There are no records of surface water abstractions within 1000m of the study site.
Potable Water Abstraction Licences	There are no potable abstraction licences within 1000m of the study site.
Source Protection Zones	There are no records within 250m of the study site.
OS Water Network	There are no records within 250m of the study site.
Surface Water Features	There are no records within 250m of the study site. However, a surface water feature is shown on mapping 350m to the south of the site. Historical mapping (1920)shows this feature issuing in this location and flowing to the south. Evidence on the surface water flooding mapping indicates risk in a linear pattern to the west of the site, however no surface water feature is shown in this area on historically mapping prior to the residential development in the area. (It is noted that detailed mapping is incomplete).
Water Framework Directive Surface Water Bodies and Catchments	The site is within the GB106039023051 river waterbody catchment (Yeading Brook).
Flood Risk	There are no records of river or coastal flooding within 250m of the study site.

	A 1 in 1000-year risk was identified onsite, at depths of 0.1-03m. This risk is concentrated at the centre-northernmost area of the site, where the access driveway is situated. Further to this, a 1 in 30-year risk of surface water flooding was identified within 50m of the study site. This record refers to depths of 0.1-0.3m and is concentrated northwest of the study site. There is a low risk to groundwater flooding both onsite and within 50m. This risk assessment is based on a 1 in 100 year return period.

Environmentally Sensitive Areas

These records are derived from Environment Agency, Natural England, Historic England, English Heritage, Forestry Commission and UK Government data. Details of the source and coverage of specific records are provided in Appendices.

Environmental and Habitat Designations	The site is within an SSSI impact risk zone which is vulnerable to developments including aviation infrastructure, air pollution from livestock and slurry, and general combustion processes. In addition, the London Green Belt was identified 171m south. There are two (2no) records of deciduous woodland Priority Habitat Inventories, located 154m and 171m south.
Visual and Cultural Designations	There are no records within 250m of the study site.

Past Land Use and Potential Contaminant Sources

Information on past land use and potential contaminant sources is presented in Appendix B.

Land Use Records

These records are derived from historical mapping and each record corresponds to a particular map revision date.

There are no historical industrial land uses within 250m of the study site.

Current land uses are summarised below:

Land Use	Distance and Direction	Sources Summary
Electronic Equipment	138m north	N
Electrical substation (3)	144m southwest 150m southeast 234m north*	N
Distribution and haulage	247m southwest	Y

Land Use	Distance and Direction
Historical Tanks	There are no records of historical tanks within 250m of the study site. Further afield, an unspecified tank was identified 292m south.
Historical Energy Features	A single record of an electrical substation was identified 230m north. Considered to be the same as * in the above table.
Historical Petrol Stations	There are no records of historical petrol stations within 250m of the study site.
Historical Garages	There are no records of historical garages within 250m of the study site.
Historical Military Land	There are no records of historical military land within 250m of the study site.
Current or Recent Petrol Stations	There are no records within 250m of the study site.
Electricity Cables	There are no records of high voltage underground electricity cables within 250m of the study site.

Gas Pipelines	There are no records of high-pressure underground gas pipelines within 250m of the study site.
Railway Infrastructure	There are no records within 250m of the study site.

Environmental Permits, Incidents and Registers

These records are derived from local authority, Health and Safety Executive and Environment Agency data. Details of the source and coverage of specific records are provided in the Appendices.

These data are summarised below:

Sites Determined as Contaminated Land	There are no records of sites determined as contaminated land under Part 2A of the Environmental Protection Act 1990 within 250m
Control of Major Accident Hazards (COMAH)	There are no records within 250m of the study site.
Regulated Explosive Sites	There are no records within 250m. Note that details of some sites may be redacted for security reasons
Planning Hazardous Substances Consents	There are no records within 250m of the study site.
Historic IPC Licensed Activities	There are no records within 250m of the study site.
Part A (1) Licensed Activities	There are no records within 250m of the study site.
Part A (2)/B Licensed Activities and Pollutant Release	There are no records within 250m of the study site.
Radioactive Substance Authorisations	There are no records within 250m of the study site.
Licensed Discharges to Controlled Waters	There are no records within 250m of the study site.
Pollutant release to Surface Waters (Red List)	There are no records within 250m of the study site.
Pollutant Release to Public Sewer	There are no records within 250m of the study site.
List 1 and List 2 Dangerous Substances	There are no records within 250m of the study site.
Substantiated Pollution Incidents	There are no records within 250m of the study site.

Pollution Inventory Substances	There are no records within 250m of the study site.
Pollution Inventory Waste transfers	There are no records within 250m of the study site.
Pollution Inventory Radioactive Waste	There are no records within 250m of the study site.

Waste and Landfill

These records are derived from Environment Agency, BGS, OS and local authority data. Details of the source and coverage of specific records are provided in the Appendices.

Active or Recent Landfill	There are no records within 500m of the study site.
Historic Landfill	There are no records within 500m of the study site.
Non-Landfill Waste Records	There are five (5no) records of waste exemptions within 250m of the study site. Four (4no) of these refer to a site 176m north for the sorting and de-naturing of controlled drugs for disposal. The other is for a site 186m north for storage of waste in a secure place.

Mining, Ground Workings and Natural Cavities

These records are derived by from BGS, OS, Coal Authority, Peter Brett Associates, Johnson Poole and Bloomer, Cheshire Brine Subsidence Compensation Board, British Gypsum, Mining Searches UK, Kaolin and Ball Clay Association and local authority data. Details of the source and coverage of specific records are provided in the Appendices. The data are summarised below:

Natural Cavities	There are no records within 250m of the study site.
Mining Cavities	There are no records within 250m of the study site.
BritPits Data (Surface and Underground Mineral Workings)	There are no records within 250m of the study site.
Historic Mineral Planning Areas	There are no records within 250m of the study site.
Surface Ground Workings	There are no records within 250m of the study site.
Underground Workings	There are no records within 250m of the study site.
Coal Mining	There are no records held by the Coal Authority or by Johnson Poole and Bloomer within 250m.
Non-Coal Mining	There are no non-coal mining records within 250m of the site. There are no records within 250m for brine extraction or gypsum, tin or clay mining.

Radon and Background Soil Chemistry

These records are derived by from BGS and Public Health England data. Details of the source and coverage of specific records are provided in the Appendices.

Radon

The study site is not located within a Radon Affected Area, as less than 1% of properties are above the Radon Action Level. No radon protective measures are necessary for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment.

Background Urban Soil Chemistry (estimated by BGS)

Arsenic	15mg/kg
Bio-accessible arsenic	2.6mg/kg
Lead	86mg/kg
Bio-accessible lead	59mg/kg
Cadmium	0.7mg/kg
Chromium	88mg/kg
Nickel	29mg/kg
Copper	29mg/kg
Tin	7mg/kg

Unexploded Ordnance (UXO)

The site is in an area considered to have a low bombing density. The Zetica bomb risk map is reproduced in Appendix E.

Historic Mapping

The object of this search is to report on the evidence of site history and redevelopment of the site and its environs from available County Series, OS Maps and aerial photography.

Year	On site	Off site
1864 to 1868	Incomplete map- the site is undeveloped and part of a large field area with a small area of woodland encroaching the northwest corner	Incomplete map- the surrounding area is largely undeveloped and comprised of large field areas
1881 to 1897	No discernible changes	No relevant changes
1900 to 1914	Incomplete map- no discernible changes	Incomplete map- no relevant changes
1920	No discernible changes	No relevant changes
1932	Incomplete map- no discernible changes	Incomplete map- no relevant changes
1935	No discernible changes	A number of unspecified buildings in assumed residential use have been erected in the surrounding area
1938 to 1941	No discernible changes	No relevant changes
1960 to 1970	A number of unspecified buildings are onsite and likely represent the existing present-day garages	Further residential properties have been built
1974 to 1975	Incomplete map- no discernible changes	Incomplete map- no relevant changes
1987 to 2022	No discernible changes	No relevant changes

The Historical OS Maps are available in Appendix C.

Walkover Survey

Date	28th July 2022
Weather	Dry and Sunny
Current Use	The site currently comprises twenty-four (24no) derelict garages, likely associated with residential developments. Waste materials and debris were found in a number of the garage units. (It is possible that an effort to clear the garages is being undertaken as a skip was present on the site at the time of the walkover, Suitable disposal routes for harmful substances should be identified as part of the clearance and demolition works)
Access	The site is accessible via a driveway to the southwest of Hazeldene Gardens.
Topography	The general ground slope is flat and level.
Structures	There were twenty-four (24no) garages which are predominantly brick and breezeblock. The roof on some garages have been removed. The remaining rooves appear to comprise corrugated sheet metal however, inspection of all rooves was not undertaken and given the age of the building it is possible that sheet asbestos roofing may be present. The majority of the retractable doors are in a poor condition, likely due to age. Waste materials stored in a number of the units include discarded home furnishings; organic material, gas canisters and small quantities of fuel and oil, and assorted hardware goods. A skip was identified at the centre of the site containing waste materials of a similar nature to those in the garages. Electrical substations were identified adjacent to the northeast boundary, to the south of the access road to the site. The location is shown on the proposed layout plan presented in Appendix A. leaf litter was present on the floor surrounding the substation infrastructure and no access into the area was made during the walkover, the ownership and date of installation of the substation are unknown, A small outdoor storage building, identified adjacent north of the access driveway in a neighbouring garden, appeared to have a roof comprised of potentially asbestos containing materials. This was approximately 0.5m north of the study site.
Ground Covering	The site is laid to concrete, which appear to be jointed. The concrete appears aged and cracked in places with some localised staining/ discolouration of the surface.
Vegetated Areas	While there are no garden or soft-landscaping areas, some weeds and overgrowth were identified in cracks in the concrete.

Drainage	Grated drainage covered were identified in the access driveway as well as in front of the garages. In addition, an additional surface drainage cover in the driveway area of the site.
Services	With the exception of those identified above no other services were observed during the site walkover.

Direction	**Boundary**
North	2m wooden fencing At the north of the site, the western boundary of the access driveway is partially bounded by palisade fencing and an access gate to the electrical substation
East	No defined boundary/adjacent properties
South	No defined boundary/large trees
West	No defined boundary/adjacent properties

Direction	**Surrounding Land Use**
North	Residential properties / Electrical Substation (northeast of main site area and to south of access road)
East	Residential properties
South	Residential properties
West	Residential properties

Potential on site sources

- Hydrocarbons and oils from localised small volume storage within residential garages.

Potential off-site sources

- Poly-chlorinated biphenyls (PCBs) from electrical substations

Sources, Pathways and Receptors

Potential Sources

Source	Identified by	Location	Description
Hydrocarbons sources/historic developments/Made Ground	Walkover/Envirosearch report	Onsite 247m northwest	A broad spectrum of contaminants may be present including BTEX/MTBE, VOCs and SVOCs, PAHs, TPH and heavy metals. Historic structures may also PACMs. Made Ground may also contain ground gas.
Electrical substations	Walkover	<1m northeast	The main contaminant associated with this source are poly-chlorinated biphenyls (PCBs).

The following contaminants are potentially associated with on-site sources:

- Heavy Metals
- Potential Asbestos Containing Material (PACM's)
- Polycyclic Aromatic Hydrocarbons (PAH)
- Total Petroleum Hydrocarbons (TPH)
- Volatile Organic Compounds (VOC)
- Semi Volatile Organic Compounds (sVOC's)
- Methyl tert-butyl ether (MTBE)
- Benzene, toluene, ethylbenzene and xylene (BTEX)

The following contaminants are potentially associated with off-site sources:

- Heavy Metals
- Potential Asbestos Containing Material (PACM's)
- Polycyclic Aromatic Hydrocarbons (PAH)
- Total Petroleum Hydrocarbons (TPH)
- Volatile Organic Compounds (VOC)
- Semi Volatile Organic Compounds (sVOC's)
- Methyl tert-butyl ether (MTBE)
- Benzene, toluene, ethylbenzene and xylene (BTEX)
- Poly-chlorinated biphenyls (PCBs)

Pathways

Pathway	Medium	Properties
Direct Contact	Dust, solid and liquid phase	There may be direct contact with potentially impacted soil and Made Ground across the site. There is a possibility of dust fumes being produced during earthworks in the construction phase. Dermal contact and ingestion of potentially contaminated soils during construction or operational phase of the site.
Leaching through Made Ground	Unsaturated flow	Potential for leaching and migration of potential contaminants along preferential flow paths in the ground.
Foundations and Underground Infrastructure and Obstructions	Preferential flow	Contaminants will flow the path of least resistance which can be gaps around foundations, services, and floor construction
Migration of Ground Gas	Gaseous flow	Infilled land material is likely to be variable in composition. Migration through granular material within superficial deposits is possible.

Receptors

Category	Receptor	Properties
Humans	End users (such as residents and visitors)	Potential contact with contaminated soils in proposed soft landscaping areas. Potential contact with ground gas within enclosed buildings
	Construction workers	Reworking of contaminant impacted materials in underlying soil during construction works can expose workers to contamination.
Property	Materials and site structures	Foundations and site services may be damaged by potentially aggressive compounds present in soils.
Controlled Waters	Underlying superficial / bedrock Aquifer and surface water	The site is recorded as having an Unproductive aquifer in the bedrock deposits underlying the site. The nearest surface water feature shown on mapping is approximately 350m to the south of the site.

Plant (species and uptake) and Wildlife	Various	Attributes will be influenced by factors such as relative quality, scale, rarity and substitutability.

Preliminary Conceptual Site Model (CSM)

The assessment is undertaken based on the current proposals for the site.

Proposed Land use Assessment Criteria

Residential with consumption of homegrown produce

Any change in the development proposals for the site involving a change in end use class will result in a requirement for this assessment to be revised.

On Site						
Source	*Pathways*	*Receptor*	*Severity*	*Probability*	*Risk*	*Justification*
Made Ground possibly containing metals, TPH, PAH, VOC's and sVOC's	Ingestion, dermal contact, inhalation of dusts and vapours	Future end users and site visitors	Medium	Low Likelihood	Moderate /Low	While there is a limited commercial history for the study site, the presence of multiple residential garages with the potential for storage of small quantities of fuel and oils may represent a source. Concrete hardstanding is present across the site which is likely to serve to limit the potential for any spillages to enter into shallow soils. It is noted that there is cracking in the surface but given the likely localised and small quantities of fuels and oils is it considered unlikely that widespread contamination will be present.
		Construction Workers	Medium	Likely	Moderate	Construction workers are likely to come into direct contact with soils during groundworks. Safe working practices should be implemented, and appropriate personal protective equipment (PPE) should be used to mitigate any potential risk from contact with soils and shallow/perched groundwater reducing the risk to Low
	Leaching through soils and migration via groundwater or soil pores	Controlled Waters	Mild	Unlikely	Very Low	A low risk has been assessed due to the absence of any nearby abstraction licences and the unproductive aquifer in bedrock deposits.

On Site						
Source	*Pathways*	*Receptor*	*Severity*	*Probability*	*Risk*	*Justification*
	Permeation of water pipes	Construction materials, future end users and site visitors	Medium	Low Likelihood	Moderate/ Low	Hydrocarbons, especially aromatics are known to permeate plastic pipes. Provision of water supply pipes and proprietary barrier pipes may be required by the water supply company
	Uptake	Plants	Mild	Low Likelihood	Low	Uptake may be possible in areas of proposed soft landscaping.

On Site						
Source	*Pathways*	*Receptor*	*Severity*	*Probability*	*Risk*	*Justification*
Asbestos at/near ground surface in Made Ground	Inhalation of fibres in airborne dust	Future end users and site visitors	Medium	Low likelihood	Moderate /Low	Due to the presence of historical developments and Made Ground onsite as well as potentially asbestos containing materials within the existing building fabric and that of building nearby (0.5m adjacent north of the study site), contact may be possible in areas of soft landscaping. Appropriate Pre-demolition survey and removal (if required) of asbestos will reduce the likelihood of exposure. Made Ground beneath the existing concrete slab is likely to be limited given the development history of the site. Should import of soils for soft landscaping areas be required appropriate testing at source and verification following placement is recommended
		Construction Workers	Medium	Likely	Moderate	Due to the presence of historical developments and Made Ground onsite as well as potentially asbestos containing materials 0.5m adjacent north of the study site from which fibres may have been liberated to the site sub soils via drainage. Construction workers (in ground) may come into contact with ACMs or fibres if present within soils. Safe working practices should be implemented to minimise dust and potential liberation of fibres, and appropriate personal protective equipment (PPE) should be used to mitigate any potential risk from residual asbestos in soils.
Ground Gases: From Made Ground: H, CH_4,	Gas migration and build up within	Future end users and building structures	Severe	Unlikely	Moderate/ Low	There is a potential for limited made ground on site which may be a source of potential ground gas, however given that prior to the current development no, previous

CO, CO_2 and H_2S	buildings (explosion/ asphyxiation risk)					development was undertaken at the site there is unlikely to be a significant thickness of Made Ground that represents a gas generating source.

Off Site						
Source	*Pathways*	*Receptor*	*Severity*	*Probability*	*Risk*	*Justification*
Land uses in the vicinity including electrical substations and distribution and haulage	Leaching through soils and migration via groundwater or soil pore moisture	Controlled Waters	Mild	Unlikely	Very Low	Given the Aquifer beneath the site is unproductive and that there is no surface water course onsite, combined with the limited history of contamination sources and the nature of the contaminants as low mobility (PCBs associated with substation) identified within the vicinity of the site a very low risk has been identified.
	Ingestion, dermal contact, inhalation of dusts/vapours	Future end users and site visitors	Medium	Low likelihood	Moderate to Low	The age of the substation is not known however, the presence of PCBs cannot be discounted. If PCBs are present the are low mobility and are unlikely to migrate a significant distance. The proposed layout shows hardstanding external areas in the vicinity of the substation and direct contact with soils in these areas will occur during future use.

Off Site						
Source	*Pathways*	*Receptor*	*Severity*	*Probability*	*Risk*	*Justification*
Ground Gases: From Made Ground: H, CH_4, CO, CO_2 and H_2S	Gas migration and build up within buildings (explosion/ asphyxiation risk)	Future end users and building structures	N/A	N/A	No linkage	No linkage was identified due to the absence of ground gas sources in the surrounding area.

Recommendations

The potential contaminant linkages as outlined with the Preliminary CSM in line with LCRM 2021 have been identified at moderate risk as the highest risk with respect to human health, this is associated with the potential for construction workers to come into contact with asbestos fibres which can be reduced to Moderate/Low through the implementation of good practise. The risk with respect to controlled waters is considered to be very low, based on the proposed development. Based on the information assessed in this report and the proposed development plans provided in Appendix A, no specific Site Investigation (SI) is required for the assessment of the contaminant linkages.

The following recommendation are provided below:

- Confirmation of the final masterplan finished levels and regulatory status is required.
- Whilst outside the scope of this works, an asbestos survey will be required prior to the demolition of onsite structures, and appropriate removal of asbestos if required, to be completed by a competent person. This is assumed to be undertaken in the risk assessment outlined above.
- Clearance of waste materials from the site, with appropriate disposal of hazardous and harmful substances including but not limited to fuels and oils.
- During the ground works, a watching brief should be adopted in line with the strategy below alongside good environmental management practices / safe work protocols to protect construction workers during the construction works. If a significant thickness of Made Ground and/or organic material is encountered during future works, works should be stopped and contact YE. Further details are provided below.
- Any ground works may reveal on-site sources of contamination that were not established in this report. Therefore, the CSM will be updated with contamination data obtained from future ground works.
- During future groundworks, safe working practices should be implemented, and appropriate personal protective equipment (PPE) should be used to mitigate any potential risk from residual asbestos in soils.
- There is a low bombing density for the site. However, the due to the proximity to London, and as UXO risk is outside the scope of this report, it is recommended that further consideration should be sought.

Following the implementation of these recommendations it is considered unlikely that relevant contaminant linkage would exist post development.

Groundworks Watching Brief Strategy

If during construction works any material is noted to show visual and/or olfactory signs of contamination, YE must be contacted for advice.

A watching brief should be maintained by the client (or appointed responsible person) at all times during the any groundworks stage. Records of key stages of works such as lifting of slabs or alteration of drainage should be made including a photographic record and any observations of the ground conditions. Should any unforeseen contamination, such as oils, ashes, fibrous material or soils/groundwater with an unusual colour or odour, deepened Made Ground with gas generating

materials be encountered during groundworks then the following procedure should be implemented:

- Work to cease in that area to prevent exposure to ground workers and potential contaminants being spread around and a photograph taken as evidence of suspected contamination encountered. The Local Authority Environmental Health Department/Contaminated Land Officer (CLO) should be notified that works have ceased and further suspected contamination was identified during the works. In this event, an appropriately qualified geo-environmental consultant shall be appointed by the client to over-see works and implement the actions of the discovery strategy.
- Where relevant, an environmental consultant should be approached to undertake the following:
    - Attending the site to note visual/olfactory signs of contamination;
    - Take further photographs of the identified suspected contamination;
    - Where relevant, collection of soil samples and discussion with the CLO.
    - Chemical testing completion to inform a environmental risk assessment and update to the CSM as needed.
    - A report outlining the findings should be compiled and issued to the client to present to the CLO.

If the nature and extent of the contamination is unmanageable under the procedure set out above, then a suitable management, mitigation or remediation procedure will be agreed with the CLO. However, this is considered unlikely given the proposed development.

Should no contamination be encountered, a letter will be provided by the client or appointed person to YE stating this, which will be submitted to the CLO.

Consultees

Following confirmation of regulatory status, this report may be submitted to the relevant Local Authority (LA). Confirmation of the presence of gas protection measures with the existing building should be undertaken prior to the submission of this report.

Works may be delayed, or additional works may be required, should the LA not be able to provide comment, or the works are commenced prior to obtaining comment.

Notes and Limitations

The following table details the applicable distances relevant to sections to focus on the information directly relevant to the site. Information from outside these radii will be referenced when relevant.

Section	*Reference Distance*
Geology	50m (underlying geology) or 250m (structural features, borehole records)
Hydrogeology	250m (aquifers, surface water) or 1,000m (abstractions)
Environmentally Sensitive Areas	500m (environmental designations) or 250m (habitat, visual and cultural designations)
Land Use Records	250m. Several records may refer to the same feature where it is present over time. Differences in distances quoted from the study site may be due to geolocation errors
Environmental Permits, Incidents and Registers	250m
Waste and Landfill	500m (landfills) or 250m (non-landfill waste operations)
Mining, Ground Working and Natural Cavities	250m
Radon and Background Soil Chemistry	50m
Historic Mapping	100m. Each map represents a snapshot of the site and its environs at the date of the survey. Changes that had occurred at other times may not have been recorded on the maps and could represent an unidentified hazard to the site. The information reported might not represent all pertinent information that could be obtained. The interpretation of the maps and other data commented on in this report is subjective

Framework for Assessment

Risks are assessed within the risk management framework established in Part IIA of the Environmental Protection Act (EPA) 1990 introduced by Section 57 of the Environment Act 1995 which provides a statutory definition of contaminated land. To fall within this definition it is necessary that, as a result of the condition of the land, substances may be present on or under the land such that:

"Significant harm is being caused or there is a significant possibility of such harm being caused; or Pollution of controlled water is being or is likely to be caused."

Risk from contamination is assessed in accordance with the Land Contamination Risk Management Framework (LCRM) prepared by the Environment Agency on 8 October 2020. This considers possible linkages between contaminant sources and potential receptors which could be harmed or polluted.

The key aspect of the framework is the development of a Conceptual Site Model (CSM) which considers the potential contaminant linkages between potential contaminant sources, the receptors, and the pathways by which the receptors could be exposed to the contaminants.

For a risk of environmental harm to occur due to of ground contamination, ***all*** the following elements must be present:

Source	A substance that can cause pollution or harm
Pathway	A route by which the contaminant can reach the receptor
Receptor	Something which could be adversely affected by the contaminant

If all are present then the risk is a function of the magnitude and mobility of the source, the sensitivity of the receptor and the nature of the migration pathway.

The qualitative risk assessment (QRA) and conceptual site model (CSM) has been undertaken in accordance with Annex 4 of the R&D publication 66, Guidance for the Safe Development of Housing on Land Affected by Contamination (NHBC/EA/CIEH, 2008) which updates and supersedes CIRIA C552: Contaminated Land Risk Assessment, A Guide to Good Practice (Rudland et al., 2001).

Where it is considered that there is no credible linkage, this is indicated in the table. In accordance with the R&D66 guidance, if there is no pollution linkage then there is no requirement to apply tests for probability and consequence.

Flood Risk

This report does not replace a hydrogeological survey or Flood Risk Assessment and specialist studies may need to be undertaken to ascertain the risks posed from flooding.

Limitations and Uncertainties

This report has been prepared by Your Environment with all reasonable skill, care and diligence. The work undertaken to provide the basis of this report comprised a study of available documented information from a variety of sources, together with a site walkover of the site.

The opinions given in this report have been dictated by the finite data on which are they based and are relevant only to the purpose for which the report was commissioned.

Information reviewed should not be considered exhaustive and should be accepted in good faith as providing true and representative data with respect to site conditions. Should additional information become available which may influence the opinion expressed in this report, Your Environment reserves the right to review such information and, if warranted, to alter the opinions accordingly.

It should be noted that any risks identified in this report are perceived risks based on the information reviewed; actual risks can only be assessed following a physical investigation of the site. This report is an environmental phase 1 report and does not consider the geotechnical implications.