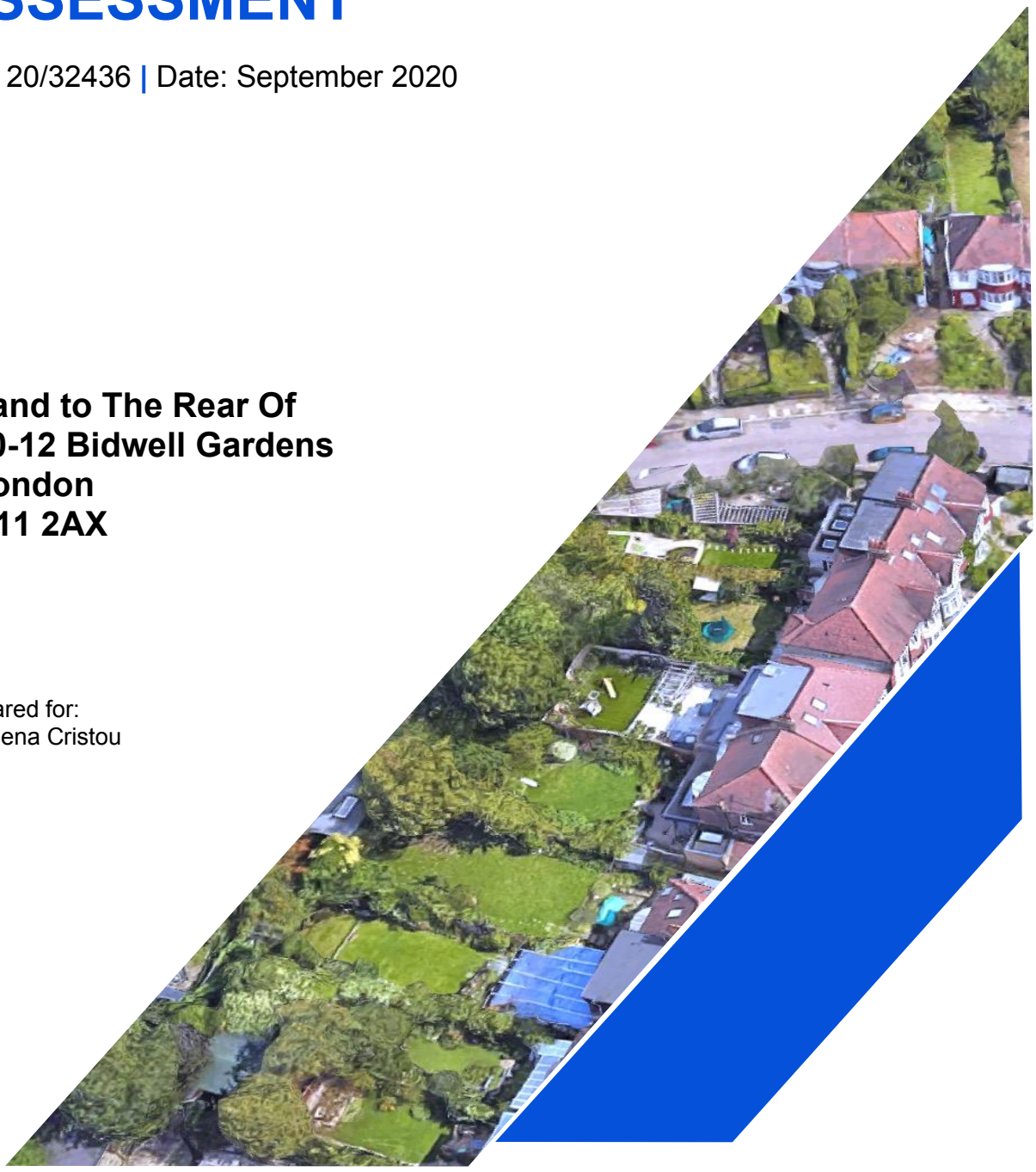
Report on a

PHASE 1 PRELIMINARY RISK ASSESSMENT

Ref: 20/32436 | Date: September 2020

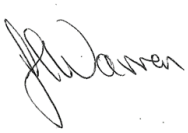


Land to The Rear Of
10-12 Bidwell Gardens
London
N11 2AX

Prepared for:
Ms Elena Cristou

DOCUMENT CONTROL

Project	Land to The Rear Of 10-12 Bidwell Gardens, London, N11 2AX
Document Type	Report on a Phase 1 Risk Assessment
Document Reference	SAS 20/32436
Document Status	Final
Revision	0
Changes	
Date	September 2020
Document version	V1.5 3-20

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1.0 EXECUTIVE SUMMARY

Site Location	Land to The Rear Of 10-12 Bidwell Gardens, London, N11 2AX
Proposed Development	The proposals are for a new single storey property with a single storey basement to approximately 3.00m depth below ground level.
Historic and Current Activities	Currently vacant undeveloped residential land. Site has remained undeveloped since prior 1879. Infilled ponds, infilled drains, a railway and industrial premises including clay pits, brick works, pottery works, tile works and piano works have been present within 250m.
Environmental Setting	Bedrock Geology: London Clay (Unproductive). No Groundwater Source Protection Zones within 250m. Pond located 195m N. No landfill sites within 250m.
Potential Contamination Sources	On Site: No sources Off Site: Infilled Clay Pit, Railway, Brick Works, Infilled Pond and Infilled Drain, Builders' Merchants, Tile Works, Piano Works
Potential Risks	• Human Health: Future Users + Workforce Inhalation of contaminated dust and vapours Direct Contact with contaminated soil • Human Health: Future Users + Workforce + Neighbours Inhalation of asbestos fibres • Buildings/Service Materials • Pond, 195m N • Site Flora/Ecosystems
Recommendations	• Provide further characterisation of the site in relation to potential pollution from local industry. • Provide further characterisation of the site in relation to potential ground gas.

SITE CONCEPTUAL MODEL

Potential Contaminants / Source	Pathway	Receptor	Site specific settings	Action Required
On Site: No Sources Off Site: Infilled Clay Pit, Railway, Brick Works, Infilled Pond and Infilled Drain, Builders' Merchants, Tile Works, Piano Works	Dust and soil Inhalation, ingestion and dermal contact.	Human Health Residential use	Residential use with gardens.	Further investigation required – Soils
	Inhalation, ingestion and dermal contact	Human Health Workers	Follow health and safety during development (HSE, 1991).	Further investigation required – Soils
	Inhalation of vapours	Human Health	Volatile contamination is not expected to be encountered within soils or groundwater.	No further investigation required.
	Chemical attack on water supply pipe	Human Health	Potential for small amount of Made Ground	Further investigation required – Soils
	Negligible groundwater flow	Deep groundwater	A drain is located 195m north. Unproductive Strata underlying the site.	No further investigation required.
	Negligible groundwater flow	Deep groundwater	Unproductive Strata underlying the site.	No further investigation required.
Heavy metals, asbestos, PAH, Petroleum hydrocarbons and fuels	Uptake (root and stomata), ingestion, inhalation and dermal absorption by animal)	Environmentally Sensitive Land use	There are no significant sensitive land uses within 250m of the site.	No further investigation required.
Ground Gas	Through high permeability strata, fissures and shafts, and by Inhalation by humans	Human Health Inhalation of Gases Gas accumulation in buildings	There are sources of ground gas found within 250m of the site.	Further investigation required – Ground gas monitoring

2.0 INTRODUCTION

2.1 Project Objectives

At the request of Ms Elena Cristou, a preliminary risk assessment was carried out to develop an outline conceptual model and to establish whether or not there are any potentially unacceptable risks arising from potential contamination at the above site in reference to the proposed development with potential impact on sensitive receptors, such as human health, controlled waters, ecological features, building structures and services.

The information was required for a qualitative risk assessment of the potential for contamination at the site and to evaluate whether any remediation may be required for the protection of the end-user and other sensitive receptors from the presence of potential contamination.

The investigation is required by the London Borough of Haringey under planning regulations.

The project objectives include the following aims:

- To assess the presence, extent and nature of potential risk of pollution to end-users of the site, controlled waters and other potentially sensitive receptors.
- To undertake a qualitative environmental risk assessment of the site and surroundings.
- To identify further works, if any, needed to further assess, manage or mitigate any potential risks.
- To provide information relevant for planning approval.

This report comprises a Phase 1 - Preliminary Risk Assessment to assess the potential for the presence of potential contamination on site and to identify potential receptors.

Planning permission granted by councils for development of Brownfield often have conditions attached which require the following site investigation to be undertaken and submitted to the local authority for approval:

1. Phase 1 - Preliminary Risk Assessment
2. Phase 2 - Intrusive Investigation
3. Phase 3 - Remediation Strategy
4. Phase 4 - Validation Report

This Phase 1 - Preliminary Risk Assessment is to be submitted to planning for approval.

2.2 Scope of Works

A preliminary risk assessment comprising a Phase 1 Land Quality Assessment (a desk study and site survey) has been undertaken and is summarised as follows:

1. A review of current activities and conditions at the site based on information from the Client, regulatory data and the results of a site walkover survey.
2. A review of the history of the site and surrounding area from historical maps and available anecdotal information.
3. An assessment of geological, hydrological and hydrogeological information pertaining to the site.
4. The development of a site conceptual model identifying potential sources, pathways, receptors and linkages, a preliminary qualitative risk assessment and identification of unacceptable risks.
5. Recommendations for further works, if necessary.

The site works were performed in accordance with the methods given in BS 5930+A2:2010 and BS EN ISO 22476-2&3:2005. The work was carried out in accordance with the methodologies detailed in CLR11: Model Procedures for the Management of Land Contamination.

The recommendations and comments given in this report are based on the information contained from the sources cited and may include information provided by the Client and other parties including anecdotal information. It must be noted that there may be special conditions prevailing at the site which have not been disclosed by the investigation and which have not been taken into account in the report. No liability can be accepted should such conditions alter the recommendations made in this report.

2.3 Details of Research Undertaken

A number of database searches have been undertaken, soliciting information of the current and historical uses of the site and surrounding area in order to complete a qualitative risk assessment associated with the development of the site. These include:

- Environmental Data Search 1:10000
- Environmental Data Search 1:2500
- Site Sensitivity Maps and Data Sheets
- Historical Maps
- Local Council consultation
- Consultation with the Client / Architect / Site representatives
- Google Search

2.4 Report Limitations

This report is prepared for Ms Elena Cristou (herein called the 'Client'), for purposes agreed and in accordance with the terms and conditions set out in the Agreement between Site Analytical Services Limited and the client.

This report refers, within the limitations stated, to the condition of the site at the time of the inspections. No warranty is given as to the possibility of future changes in the condition of the site.

The comments given in this report, and the opinions expressed herein, are based upon the readily available information collated for the report and an assessment based upon the current UK guidance, primarily the Contaminated Land Research (CLR) Reports and most importantly CLR Report 11.

This report has been prepared for the sole use of the Client for the purposes described and no extended duty of care to any third party is implied or offered. Third parties using any information contained within this report do so at their own risk.

The accuracy of any map extracts cannot be guaranteed. It is possible that different conditions existed on-site, between and subsequent to the various map surveys appended.

Whilst the report may express an opinion on possible configurations of strata between or beyond exploratory holes discussed or on the possible presence of features based on visual, verbal or published evidence, this is for guidance only and no liability can be accepted for its accuracy.

The conceptual model is based on the information available at the time of conducting this assessment and is an interpretative assessment of the conditions at the site. It should be noted that the redevelopment and/or further investigation of the site may reveal additional information and therefore alter the conceptual model and the conclusion of this report.

There may be other sources of information not included in those listed that hold data relevant to the Phase I Desk Study undertaken at the site that could materially affect the conclusions made in this report.

This report does not include specific investigation for the presence of Japanese Knotweed at the subject site however, if obvious evidence of this is observed during the site walkover, details will be provided in this report. Specialist contractors should be commissioned to make detailed assessments and recommendations if these materials are suspected.

This report is prepared and written for the use stated herein; it should not be used for any other purposes without reference to Site Analytical Services Limited. The report has been prepared in relation to the proposed end-use and should another end-use been intended a further re-assessment may be required.

2.5 Confidentiality, Copyright and Reproduction

This document has been prepared by Site Analytical Services Limited in connection with a contract to supply goods and/or services and is submitted only on the basis of strict confidentiality. The contents must not be disclosed to third parties other than in accordance with the terms of the contract.

Site Analytical Services Limited accepts no responsibility whatsoever to third parties to whom this report, or any part thereof, is made known. Any such party relies upon the report at their own risk.

3.0 SITE DETAILS

3.1 Site Location

The site is located on land to the rear of the residential properties on the northern side of Bidwell Gardens. The site is situated in Haringey, in the north of Central London, at approximate postcode N11 2AX. It is immediately bound by Wroxham Gardens to the north-east and residential properties to all other directions.

The site is roughly pentagonal in shape covers an approximate area of 0.04 Hectares with the general area being under the authority of the London Borough of Haringey.

The site is at National Grid Reference: TQ 529 192

The site location map is presented below in Figure 1:

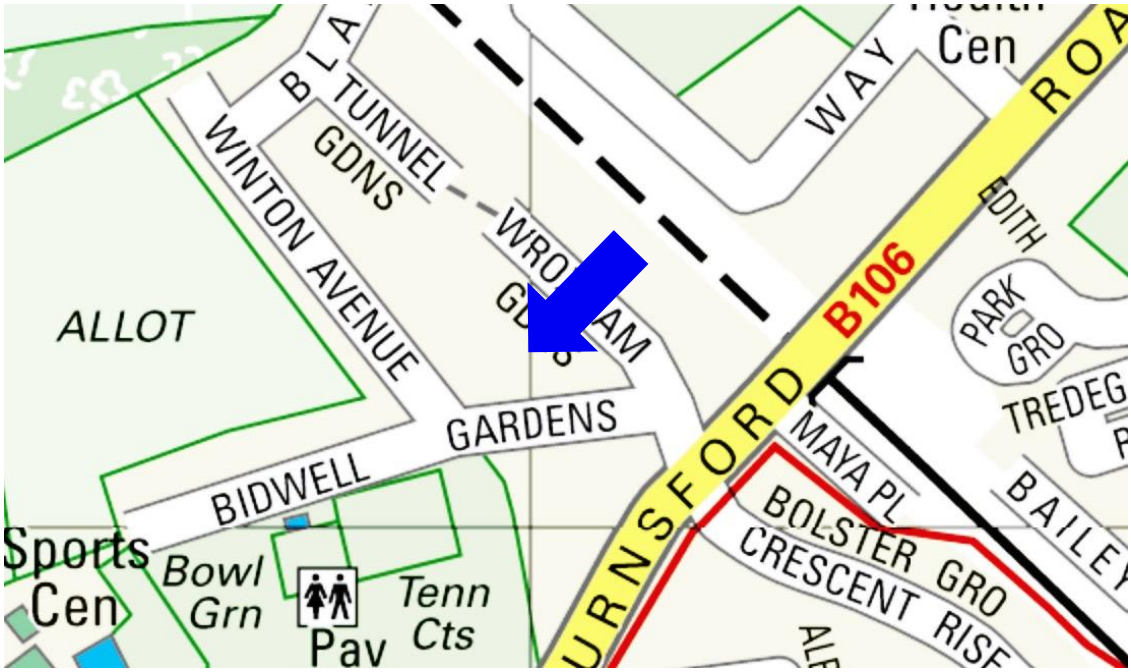


Figure 1 - Site Location Map

3.2 Current Use of the Site and Surrounding Land Uses

The site mostly comprises undeveloped land which is currently not in use. A derelict greenhouse is located in the north of the site.

The nearby surrounding areas to the site are residential in all directions.

An existing site plan is presented below in Figure 2:

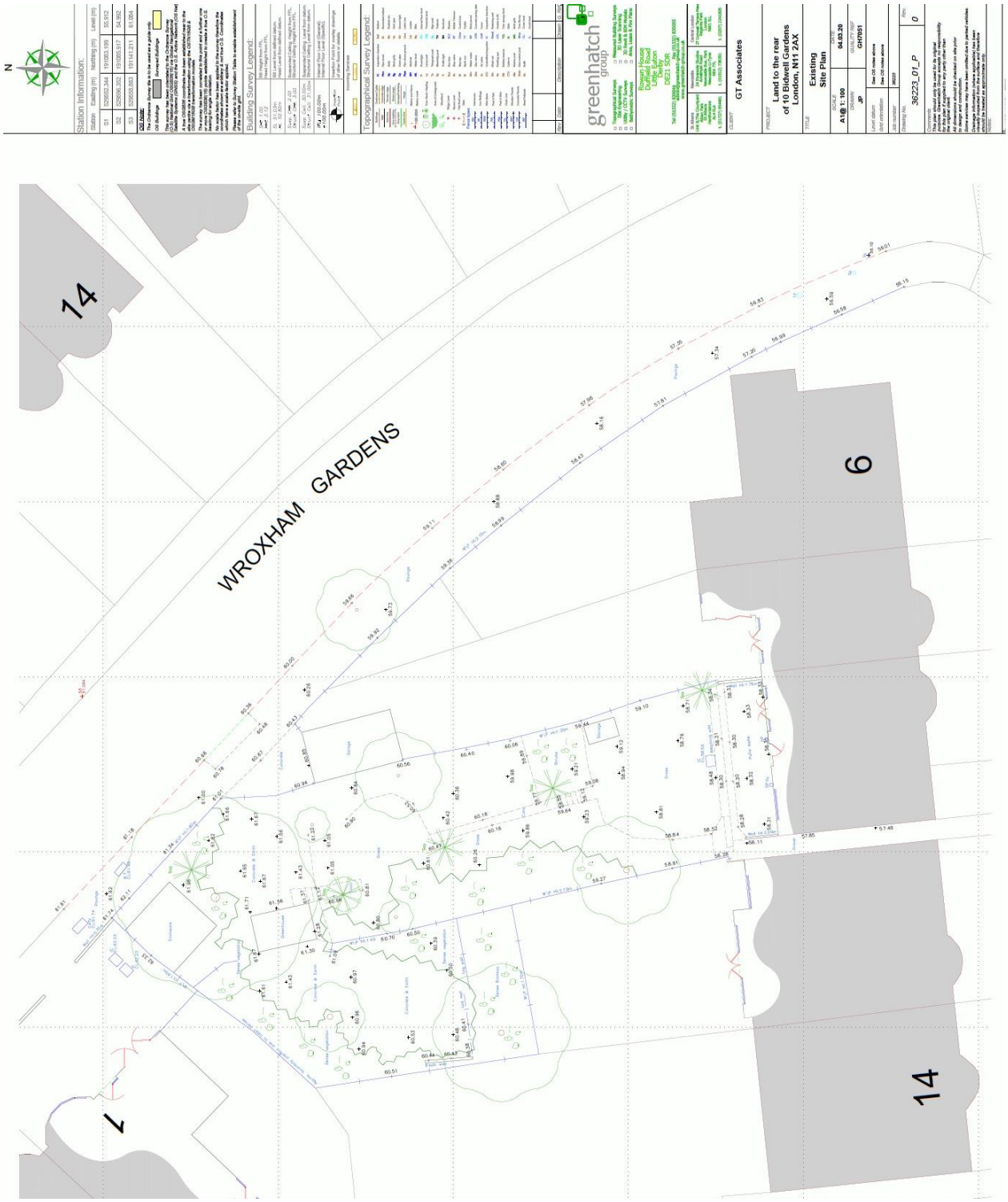


Figure 2 - Existing Site Plan

3.3 Site Walkover

The site was attended on 15th September 2020 for the sake of undertaking a site walkover survey.

Current Use of the Site	The site mostly comprises vacant (residential) undeveloped land.
Structures or Past Structures	The site comprises a derelict greenhouse in the north, located to the rear of 10 Bidwell Gardens.
Site Covering	The majority of the site covering is soft-landscaped in the form of overgrown grass lawns. There are concrete slabs located around the perimeter of the derelict greenhouse.
On-Site Vegetation	Vegetation exists across the site. Mature trees, overgrown grass, weeds and shrubs are located predominantly around the borders of the site. Bamboo may be present in the north-east of the site. A neglected area of home-grown produce (including tomato plants) is located in front of the derelict greenhouse.
Site Topography	The site slopes gently from the north to the south.
Potential Contamination Sources	There are no potential sources of contamination evident on-site.
Visual or Olfactory Signs of Contamination	There are no visual or olfactory signs of contamination noted on-site.
Drainage/Services or Past Services	There are no drainage features which are visibly evident. Any drainage in the future is likely to be located around the footprint of the concrete footing. There is not considered to be a significant potential from on-site drainage / services to cause contamination on-site. There are not any obvious preferential pathways resulting from the presence of services that may connect possible contamination on-site with receptors on and / off site.
Water Courses	There were no obvious water courses on site or adjacent to the site.

From the walkover, the site appears to be a neglected (residential) plot of unused land. There are no potential sources of contamination evident on-site.

3.4 Details of Intended Future Uses of the Site

At the time of reporting (September 2020), it is proposed to construct a two-storey development to provide a two-bedroom detached house.

A proposed site plan is presented below in Figure 3:

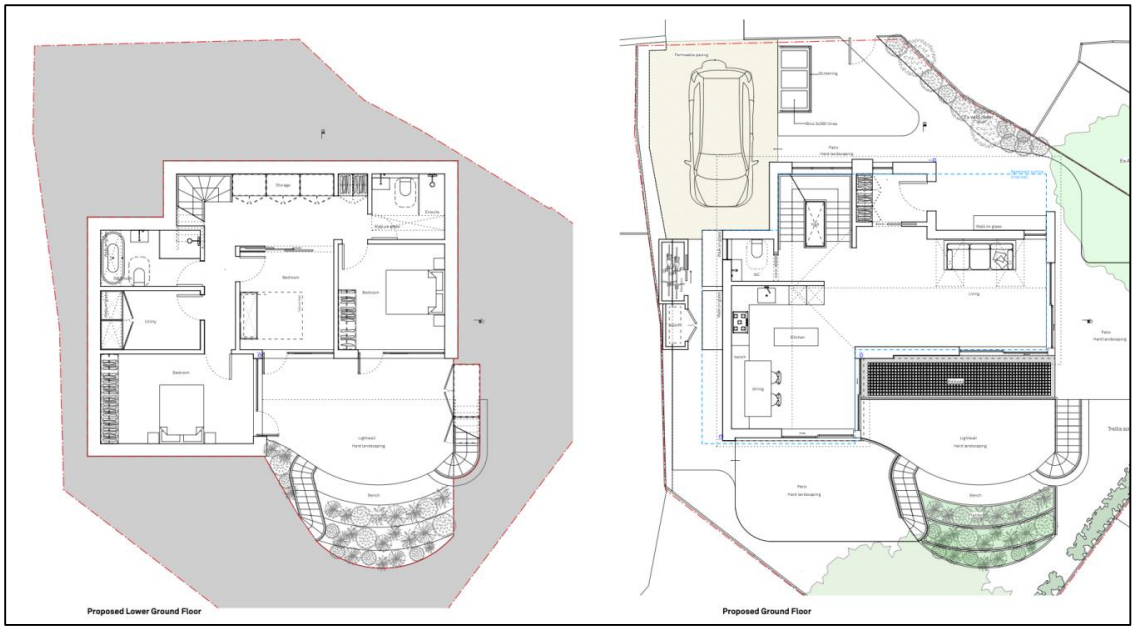


Figure 3 - Proposed Site Plan

3.5 References of Planning Applications

There are no recent relevant planning applications for the site registered on the London Borough of Haringey planning portal.

4.0 ENVIRONMENTAL SETTING

4.1 Anticipated Geology

The Geological Survey of Great Britain (England and Wales) covering the area indicates the site to be underlain the London Clay Formation at depth.

4.1.1 London Clay Formation

The London Clay mainly comprises bioturbated or poorly laminated, blue-grey or grey-brown, slightly calcareous, silty to very silty clay, clayey silt and sometimes silt, with some layers of sandy clay. It commonly contains thin courses of carbonate concretions ('cementstone nodules') and disseminated pyrite. It also includes a few thin beds of shells and fine sand partings or pockets of sand, which commonly increase towards the base and towards the top of the formation. At the base, and at some other levels, thin beds of black rounded flint gravel occur in places. Glauconite is present in some of the sands and in some clay beds, and white mica occurs at some levels.

4.1.2 Artificial Made Ground

According to the BGS map, Made Ground deposits are not present on-site, however it is anticipated that localised areas of Made Ground may be present on the site.

4.1.3 Historical Boreholes

The British Geological Survey maintains an archive of historical exploratory borehole logs throughout the UK. SAS Limited has searched the database and have found a borehole located 540m to the south-west of the site at 'Muswell Hill Golf Club' and shows 16.0m of grey and brown clay over 18.0m of brown clay over 13.0m of grey, blue clay mudstone over 7.0m of hard grey silty clay over 11.5m of red green clay over chalk and flints to 120.0m.

The records of the British Geological Survey indicate the following:

Ground Stability Hazard	Risk Assessment
Collapsible Ground	Very Low
Compressible Ground	No Hazard
Ground Dissolution	No Hazard
Landslide	Very Low
Running Sand	Very Low
Shrinking or Swelling Clay	Moderate
Coal Mining	Not Affected

4.1.4 Natural Ground Gases

Natural strata can present a source of ground gases, such as methane and carbon dioxide. The natural geological strata identified above are not considered to pose a ground gas risk.

The Site is not in a Radon Affected Area (as defined by the Health Protection Agency), as less than 1% of properties are above the action level set by the Health Protection Agency. According to BR211 (by the Building Research Establishment), Radon Protection Measures are not required for new properties in these areas.

4.2 Hydrogeology

4.2.1 Groundwater

The Environment Agency Groundwater Protection Policy uses aquifer designations that are consistent with the Water Framework Directive. These designations reflect the importance of aquifers in terms of groundwater as a resource (drinking water supply) and also their role in supporting surface water flows and wetland ecosystems.

The Bedrock geology underlying the site has been classified as Unproductive Strata; rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.

An Unproductive Strata designation was noted on-site and therefore controlled water is not considered to be vulnerable to potential contaminants that may be present on-site.

Considering the thickness of London Clay, it is considered that the potential for pollutants, if present, to interact with the underlying Chalk aquifer would be minimal.

Any works or development, which may have an impact on surface water, aquifer or groundwater quality, must be approved by the Environment Agency prior to implementation.

4.2.2 Water Abstractions

There are 3 Groundwater Source Protection Zones located within 1km of the site:

A Zone II (Outer) Groundwater Source Protection Zone is located 493m to the east of the site. Two Zone I (Inner) Groundwater Source Protection Zones are located 558m to the south-east and 724m to the east of the site.

There are 2 water abstraction licences within 1 kilometre of the site. The closest is a non-potable water abstraction licence located 521m to the south-west of the site at with the abstraction for 'Golf Courses: Spray Irrigation' direct from groundwater. The permitted start date for this licence is 31st August 2016. Due to the distances of the abstractions from the site, they are not considered to be risks of potential contamination on- site.

4.2.3 Hydrology and Drainage

The closest surface water feature is a pond located 195m to the north of the site. Due to the distance of the surface water feature from the site, it is considered to be a vulnerable receptor to potential contaminants that may be present on-site.

The site is currently not located within 1km of an area at risk from extreme flooding from rivers or sea without defences (Zone 2) or an area at risk from rivers or sea without defences (Zone 3).

Modelling of surface water flooding has been undertaken by the Environment Agency and was published on its website in January 2014; an extract from their model is presented within the Envirocheck Site Sensitivity maps. Whilst this map identifies three levels of risk (high, medium and low) it is understood that it is based at least in part on depths of flooding. The modelling shows no risk of flooding across site.

4.3 Sensitive Land Use

There are 2 sensitive land issues within 1 kilometre of the site:

- The site is located 99m to the north-east of a Nitrate Vulnerable Zone.
- The site is located 651m to the south of a Local Nature Reserve.

4.4 Summary of Potential Environmental Receptors

Receptor Type	Receptor(s)	Sensitivity	Comments
Groundwater/ Water Abstraction	Unproductive Aquifer	Low	Due to the presence of an Unproductive Aquifer beneath the site, the risk is low.
Surface Water	Pond 195m N	High	Due to the distance from the site, the risk is deemed high.
Flooding	The Site	Low	Due to there being no zones of extreme flooding or flooding from rivers or sea without defence within 1km of the site, the risk can be deemed as low.
Sensitive Land	Nitrate Vulnerable Zone, 99m NE Local Nature Reserve, 651m S	Low	There are 2 sensitive land uses within 1km of the site. Due to the nature of the Nitrate Vulnerable Zone and the distance of the Local Nature Reserve from the site, the risk from contamination on-site can be deemed low.

5.0 INFORMATION ON SITE HISTORY AND LOCAL INDUSTRY

5.1 Present Use and Activities

There are no entries in the contemporary trade directories on-site, there are 2 within 250m of the site, 6 within 500m and 138 within one kilometre of the site.

5.1.1 Industrial Data

Trade	On-Site	Within 250m
Current Industrial Data Entries	0	2

5.1.2 Entries Within 250m

Trade	Distance (m)
Builders' Merchants	172m S

Note: Only trades likely to impact the underlying soil and/or groundwater and /or activities which are described in R&D Publication CLR8 – Potential Contaminants for the Assessment of Land have been selected. Dates not supplied, multiple entries of similar trades are not listed, and references considered to be office premises only are not listed.

5.1.3 Fuel Station Entries

There are 3 fuel stations recorded within 1 kilometre of the site. The closest is located 627m to the east of the site at '2, Bounds Green Road, Wood Green, London, Inner London, N11 2QH' and its status is currently described as 'Open'. Due to the distances of the fuel stations from the site, they are not considered to be a risk on-site.

There are no Control of Major Accident Hazards (COMAH) sites, Explosive sites or Planning Hazardous Substance Enforcements within 1 kilometre of the site.

There is one Notification of Installations Handling Hazardous Substances (NIHHS) located within 1km of the site. It is located 877m to the north-west of the site at 'Southgate Holder Station, Station Road, London, N11 1QF' and its status is described as 'Not Active'.

There is one Planning Hazardous Substance Consent located within 1km of the site. It is located 890m to the north-west of the site at 'Southgate Holder Station, Station Road, London, N11 1QF' and its decision is described as 'New application granted conditionally granted', application dated 16th November 1992.

Due to the distances of the Notification of Installations Handling Hazardous Substances (NIHHS) and Planning Hazardous Substance Consent from the site, they are not considered to be a risk on-site.

There are 11 local authority pollution prevention and controls found within 1 kilometre of the site. The closest is located 600m to the north-east of the site with the description for 'PG6/46 Dry cleaning', its status is described as 'Permitted', and the date is not supplied. Due to the distances of the local authority pollution prevention and controls from the site, they are not considered to be a risk on-site.

5.2 Landfill Sites and Waste

There is one BGS recorded landfill site located within 1 kilometre of the site. It is located 739m to the north-west of the site at 'Cromwell Road, London, N10'. Due to the distance of the BGS recorded landfill site from the site, it is not considered to be a risk on-site.

There are two recorded historical landfill sites located within 1 kilometre of the site. The closest is located 663m to the north-west of the site at 'Pinkham Way, Bounds Green, Friern Barnet', with the specified waste type described as 'Deposited Waste included Inert Waste' and last input dated 31st December 1980. Due to the distances of the recorded historical landfill sites from the site, they are not considered to be a risk on-site.

There are 2 local authority recorded landfill sites located within 1 kilometre of the site. The closest is located 628m to the north-west of the site at 'Former East Barnet Sewage Works, Pinkham Way', with the last reported status described as 'Closed' and date of closure 31st December 1980. Due to the distances of the local authority recorded landfill sites from the site, they are not considered to be a risk on-site.

There are no registered radioactive substances within 1 kilometre of the site.

There are 2 licenced waste management facilities (locations) within 1 kilometre of the site. The closest is located 770m to the north-west of the site at 'Rear of Block D, Bounds Green Industrial Estate, Bounds Green Road, London, N11 2UD', with the site category described as 'Metal Recycling Sites (Vehicle Dismantlers)', licence status described as 'Expired' and issued date 17th February 1993. Due to the distances of the licenced waste management facilities (locations) from the site, they are not considered to be a risk on-site.

There are no licenced waste management facilities (landfill boundaries) located within 1 kilometre of the site.

There are no integrated pollution control registered waste sites within 1 kilometre of the site.

There are no registered waste transfer sites located within 1 kilometre of the site.

5.3 Land Raising or Land Filling

There is an infilled clay pit located 100m to the south-west, an infilled pond located 165m to the south-west and an infilled drain located from 228m to the south of the site. They are all dated from 1935 and due to their age of infill they are considered to be potential sources of ground gas and will be of risk to the site.

There are no obvious burial sites within 250m of the site.

5.4 Pollution Incidents and Discharge Consents

There has been one pollution incident to controlled waters within 1 kilometre of the site. This is located 836m to the north-west of the site at 'Southgate', with the pollutant described as 'Oils – Unknown', incident severity described as 'Category 3 - Minor Incident' and the incident is dated 14th November 1991. Due to the age of the pollution incident to controlled waters and its distance from the site, it is not considered to be a risk on-site.

There have been 4 discharge consents to controlled waters within 1 kilometre of the site. The closest is located 902m to the north of the site and relates to 'Discharge of Other Matter-Surface Water' into 'Freshwater Stream/River'. The status of this consent is described as 'Authorisation revoked', dated 9th April 1986. Due to the distances of the discharge consents to controlled waters from the site, they are not considered to be a risk on-site.

There are no integrated pollution controls within 1 kilometre of the site.

5.5 Historical Maps

The site history was compiled from information available from a Landmark Envirocheck Report consisting of a series of past Ordnance Survey maps (scale 1:1,250 and 1:2,500 which are presented in Appendix B). Information was also sourced from Envirocheck Analysis (online database) containing a series of more recent Ordnance Survey maps and satellite images (scale 1:10,000).

Date	Description of Site Use	Surrounding Site Use
1879-1881	The site comprises undeveloped land.	The surrounding areas to the site are mostly undeveloped in all directions. A **drain** is evident from 88m to the south-west to 228m to the south of the site. A **railway and railway embankment** is evident from 115m to the south-east of the site. A **brick works** is evident 165m to the north-east of the site. A **pond** is evident 165m to the south-west of the site. Five **ponds** of varying shapes and sizes associated with the brick works are evident from 209m to the north-east of the site. A **drain** associated with the brick works is evident 219m to the north-east of the site.

1896	The site remains essentially unchanged.	**Railway tunnels** are evident from 58m to the north-east of the site. The **drain** which was previously evident 88m to the south-west of the site has been partially **infilled**. An old **clay pit** is evident 100m to the south-west of the site. Three manmade **ponds** seem to exist on the clay pit site; 86m, 95m and 150m to the south-west of the site. The brick works which was previously evident 165m to the north-east of the site has been expanded and comprises a **glazed brick and tile pottery works**. The five ponds of varying shapes and sizes associated with the brick works which were previously evident from 209m to the north-east of the site have been **infilled**. Two new **ponds** are evident 195m and 209m to the north-east of the site.
1912-1914	The site remains essentially unchanged.	The three manmade **ponds** which were previously present on the clay pit site; 86m, 95m and 150m to the south-west of the site have all been **infilled**. The **pond** which was previously evident 195m to the north-east of the site has been **partially infilled**. A new (larger) **pond** is evident 193m to the north-east of the site.
1935	The site remains essentially unchanged. The site is undeveloped land which is equally divided between two properties with the boundary line intersecting from north to south.	The old **clay pit** which was previously evident 100m to the south-west of the site looks to have been (partially) **infilled**. The **pond** which was previously evident 165m to the south-west of the site has been **infilled**. The **drain** which was previously evident from 228m to the south of the site has been **infilled.** A **piano works** is evident 242m to the south-east of the site.
1946 *Aerial Photograph*	The site remains essentially unchanged.	The surrounding area remains essentially unchanged.
1951	The site remains essentially unchanged.	The surrounding area remains essentially unchanged.
1951-1952	The site remains essentially unchanged.	A **tile works** is evident 238m to the south-east of the site.

1963-1973	The site remains essentially unchanged.	The surrounding area remains essentially unchanged.
1975	The site remains essentially unchanged.	The surrounding area remains essentially unchanged.
1987	The site remains essentially unchanged.	The surrounding area remains essentially unchanged.
1991	The site remains essentially unchanged.	The surrounding area remains essentially unchanged.
1992-1995	The site remains essentially unchanged.	The surrounding area remains essentially unchanged.
1999 *Aerial Photograph*	The site remains essentially unchanged.	The surrounding area remains essentially unchanged.
2003 *Envirocheck Analysis*	The site remains essentially unchanged.	The surrounding area remains essentially unchanged.
2009 *Envirocheck Analysis*	The site remains essentially unchanged.	The surrounding area remains essentially unchanged.
2013 *Envirocheck Analysis*	The site remains essentially unchanged.	The surrounding area remains essentially unchanged.
2020 *Envirocheck Analysis*	The site remains essentially unchanged.	The surrounding area remains essentially unchanged.

5.5.1 Historical Summary of Site

Date	Site Development
1879 - 2020	The site comprises undeveloped land.

From historical map evidence it would appear that the site has remained undeveloped since prior 1879. Infilled ponds, infilled drains, a railway and industrial premises including clay pits, brick works, pottery works, tile works and piano works have been present within 250m.

5.6 WW2 Unexploded Ordnance Potential

The 'Bomb Sight' archive has identified multiple areas within 250m of the site that have previously been targeted by WW2 bombings. A high-explosive bomb located 135m to the south-east of the site has been recorded close to: Maya Place, Bounds Green, London Borough of Haringey, N13, London, dated from 1940-1941.

6.0 SITE DRAINAGE AND MAN-MADE POTENTIAL POLLUTANT PATHWAYS

The site comprises undeveloped land, however drainage may still be present under and surrounding the nearby site buildings, which may potentially lead to lateral or vertical migration of potential pollutants on-site.

7.0 CONSULTATION WITH THE LOCAL AUTHORITY, THE ENVIRONMENT AGENCY, ETC.

Consultation with the Local Authority was undertaken via the council's online planning portal and archives.

Consultation with the Environment Agency has not been undertaken; however, the Environment Agency have been cited within the information of the Envirocheck report with reference to groundwater, surface water, authorised processes and licenced waste management issues.

There was no additional consultation with other bodies/sources undertaken.

The Canal & River Trust were not consulted regarding navigable rivers and canals and English Nature were not consulted regarding ecological systems; however, their databases have been cited within the information of the Envirocheck report.

8.0 REVIEW AND SUMMARY OF PREVIOUS REPORTS

There have not been any previous reports available to us at the time of writing.

9.0 OUTLINE CONCEPTUAL MODEL

In accordance with current UK guidance on land contamination risk assessment (CLR 11, Science Report – SC050021/SR3 and BS10175), the following conceptual site model has been generated for the subject site.

The purpose of the conceptual model is to identify:

- All potential source(s) of contamination at and / or within the immediate vicinity of the site.
- Any potentially sensitive receptor(s) which may be at risk from the above source(s).
- Any potential migration and / or exposure pathways which link the source(s) to the receptor(s).

Only if all three of the above elements are present i.e. a source-pathway-receptor, is a potential risk present. Such a relationship is termed a 'pollutant linkage'. The SCM describes in detail any potentially significant pollutant linkages present and justifies the exclusion of any potential pollutant linkages considered to be non-significant.

9.1 Contamination Sources

A review of the current and historical land uses indicated the potential contaminative land uses that may impact the site are similar to the following industries highlighted in DoE industry profiles for potential contaminants of concern.

9.1.1 On-Site Sources

Date	Feature	Distance and Direction from Site	Potential Contaminants	Potential Impact on the Site?
1879 - Present	No Sources	N/A	N/A	No

9.1.2 Off-Site Sources

Date	Feature	Distance and Direction from Site	Potential Contaminants	Potential Impact on the Site?
1912	Infilled Drain and Infilled Ponds	From 86m SW to 195m NE	**Potential Made Ground/ground gas**	No – due to age of infill >100 years
1896	Infilled Drain and Infilled Ponds	From 88m NE to 209m NE	**Potential Made Ground/ground gas**	No – due to age of infill >100 years
1935	Infilled Clay Pit	100m SW	**Potential Made Ground/ground gas**	Yes
1879	Railway	115m SE	**Railway Land:** Cadmium, Chromium, Copper, Lead, Nickel, Vanadium, Sulphate, Asbestos, PAH's, Chlorinated Aliphatic Hydrocarbons, PCB's.	Yes
1879	Brick Works	165m NE	**Ceramics, cement and asphalt manufacturing works:** Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Zinc, Arsenic, Sulphide, Asbestos, pH, Acetone, Oil/Fuel Hydrocarbons, PAH's, PCB's.	Yes
1935	Infilled Pond and Infilled Drain	165 SW & 228m S	**Potential Made Ground/ground gas**	Yes
Present	Builders' Merchants	172m S	**Road vehicle servicing and repair: transport and haulage centres:** Chromium, Copper, Lead, Vanadium, Zinc, Sulphur, Asbestos, pH, Acetone, Aromatic Hydrocarbons, PAH's, Chlorinated Aliphatic Hydrocarbons, Organo-lead compound's.	Yes
1951	Tile Works	238m SE	**Ceramics, cement and asphalt manufacturing works:** Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Zinc, Arsenic, Sulphide, Asbestos, pH, Acetone, Oil/Fuel Hydrocarbons, PAH's, PCB's.	Yes

1935	Piano Works	242m SE	**Engineering works: mechanical engineering and ordnance works:** Beryllium, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Vanadium, Zinc, Arsenic, Boron, Free Cyanide, Nitrate, Sulphate, Sulphide, Asbestos, pH, Phenol, Acetone, Aromatic Hydrocarbons, PAH's, Chlorinated Aliphatic Hydrocarbons, PCB's.	Yes

9.2 Contaminants of Concern

It is considered that a number of the contamination sources are similar to those highlighted in "DoE industry profiles for potential contaminants of concern" and those likely to be of concern can be summarised as follows:

- Metals and metalloids: Cadmium, Chromium, Copper, Lead, Selenium, Nickel, Vanadium, Zinc, Arsenic, Mercury, Boron
- Inorganic Compounds: Nitrate, Sulphate, Sulphide, Complex and Free Cyanide
- Organic compounds: Acetone, Oil/Fuel Hydrocarbons, Aromatic Hydrocarbons, PAH's, Chlorinated Aliphatic Hydrocarbons, PCB's, Organo-lead compounds.
- Other: Asbestos, pH, Ground gas

9.3 Receptors

The receptors / resources considered to be affected by identified contamination during the assessment included the following:

- Construction workers
- Future users
- Building materials and services
- Site flora / ecosystems
- Pond, 195m N
- Off-site receptors / neighbouring residents and property

9.4 Pollutant Linkages

The following tables illustrate the hypothesised Source - Pathway - Receptor linkages for exposure to possible contaminants associated with industrial activity in the area, the current site conditions and the proposed development.

The Conceptual Site Model summarises all the potential sources/pathways/receptors at this site.

Contaminated Land Risk Assessment Table

		Consequence			
		Severe	***Medium***	***Mild***	***Minor***
Probability	***High Likelihood***	*Very High Risk*	*High Risk*	*Moderate Risk*	*Moderate/Low Risk*
	Likely	*High Risk*	*Moderate Risk*	*Moderate/Low Risk*	*Low Risk*
	Low Likelihood	*Moderate Risk*	*Moderate/Low Risk*	*Low Risk*	*Very Low Risk*
	Unlikely	*Moderate/Low Risk*	*Low Risk*	*Very Low Risk*	*Very Low Risk*

9.4.1 Risk Classification Definitions

Very High - There is a high probability that severe harm could arise to a designated receptor from an identified hazard, OR, there is evidence that severe harm to a designated receptor is currently happening. This risk, if realised, is likely to result in a substantial liability. Urgent investigation (if not undertaken already) and remediation are likely to be required.

High - Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Urgent investigation (if not undertaken already) is required and remedial works may be necessary in the short term and are likely over the longer term.

Moderate - It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that such harm would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild. Investigation (if not already undertaken) is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer term.

Moderate/Low or Low - It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild.

Very Low - There is a low possibility that harm could arise to a receptor. In the event of such harm being realised it is not likely to be severe.

Area of Potential Concern (and contaminants of concern)	Potential Receptor	Potential Pathway to Receptor	Hazard (Potential Consequence)	Likelihood of Pollutant Linkage	Risk Assessment	Justification / Comments
On Site: No Sources Off Site: Infilled Clay Pit, Railway, Brick Works, Infilled Pond and Infilled Drain, Builders' Merchants, Tile Works, Piano Works	Construction workers	Direct soil and dust ingestion Dermal contact Inhalation of dust Inhalation of vapours Inhalation of ground gases Fire and explosion	Acute and chronic toxicity, carcinogenic impact	*Low Likelihood*	*Moderate Risk*	Significant reconstruction is planned. As such, significant groundwork would be involved in the construction process. Additional investigation required.
	Future users – open landscaped areas. Off-site receptors/residents	Consumption of home-grown produce Dermal contact Inhalation of dust Inhalation of vapours	Acute and chronic toxicity, carcinogenic impact	*Low Likelihood*	*Low Risk*	The proposed development will have areas of soft landscaping. Additional investigation is required.
	Future users – within building footprint	Inhalation of dust Inhalation of vapours Inhalation of ground gases Fire and explosion	Acute and chronic toxicity, carcinogenic impact	*Low Likelihood*	*Low Risk*	There are potentially ground gas sources within 250m. Additional investigation is required.
	Surface water	Surface water run-off Migration via groundwater flows	Water pollution	*Low Likelihood*	*Low Risk*	There is a pond located 195m to the north of the site. Additional investigation required.
	Superficial Aquifer (Unproductive London Clay)	Surface water run-off Migration downwards via granular soils Migration downwards via permeable soils and bedrock Migration via groundwater flows	Water pollution	*Low Likelihood*	*Low Risk*	The London clay underlying the site is unproductive. No Risk
	Bedrock Aquifer (Unproductive London Clay)	Migration downwards via granular soils Migration downwards via permeable soils and bedrock Migration via groundwater flows	Water pollution	*Unlikely*	*Very Low Risk*	The London clay underlying the site is unproductive. No Risk
Heavy metals, asbestos, PAH, Petroleum hydrocarbons and fuels, ground gas	Built materials and services Off-site buildings	Direct contact of concrete with concrete aggressive soils Direct contact with service supply pipes in contaminated soils	Degradation	*Low Likelihood*	*High Risk*	It is probable that future underground services and structures will come into contact with potentially impacted soils. Additional investigation required.
	Environmentally Sensitive Land use	Plant uptake and Phytotoxicity Plant uptake and ecotoxological effects	Phytotoxicity	*Unlikely*	*Very Low Risk*	There are no significant sensitive land uses within 250m of the site. No Risk.

10.0 SITE CONCEPTUAL MODEL

Following the hypothesised Source - Pathway - Receptor linkages for exposure to possible contaminants as identified in the site conceptual model, the following possible unacceptable risks have been identified.

Potential Contaminants / Source	Pathway	Receptor	Site specific settings	Action Required
On Site: No Sources Off Site: Infilled Clay Pit, Railway, Brick Works, Infilled Pond and Infilled Drain, Builders' Merchants, Tile Works, Piano Works	Dust and soil Inhalation, ingestion and dermal contact.	Human Health Residential use	Residential use with gardens.	Further investigation required – Soils
	Inhalation, ingestion and dermal contact	Human Health Workers	Follow health and safety during development (HSE, 1991).	Further investigation required – Soils
	Inhalation of vapours	Human Health	Volatile contamination is not expected to be encountered within soils or groundwater.	No further investigation required.
	Chemical attack on water supply pipe	Human Health	Potential for small amount of Made Ground	Further investigation required – Soils
	Negligible groundwater flow	Deep groundwater	A drain is located 195m north. Unproductive Strata underlying the site.	No further investigation required.
	Negligible groundwater flow	Deep groundwater	Unproductive Strata underlying the site.	No further investigation required.
Heavy metals, asbestos, PAH, Petroleum hydrocarbons and fuels	Uptake (root and stomata), ingestion, inhalation and dermal absorption by animal)	Environmentally Sensitive Land use	There are no significant sensitive land uses within 250m of the site.	No further investigation required.
Ground Gas	Through high permeability strata, fissures and shafts, and by Inhalation by humans	Human Health Inhalation of Gases Gas accumulation in buildings	There are sources of ground gas found within 250m of the site.	Further investigation required – Ground gas monitoring

11.0 SUGGESTED NEXT STEPS

The information from the preliminary risk assessment and site conceptual model has identified a number of potential unacceptable risks relating to sensitive receptors on-site.

Dependent on the scope of the proposed works on-site, it may be necessary to fully assess the potentially unacceptable risks, for which additional information would be required. We would suggest that the most viable method of assessment would be via a Quantitative Risk Assessment (Site Investigation) and the investigation would have the following objectives:

- Provide information for further characterisation of the site in relation to potential pollution from local industry.
- Provide information for further characterisation of the site in relation to potential ground gases on-site

An intrusive investigation may reveal on-site sources of contamination that were not established by the Phase I Desk Study and Site Walkover, and thus require modification of the conceptual model.

11.1 Proposed Further Site Works

The proposal is a combined environmental and geotechnical Intrusive Site Investigation in order to obtain further information about the site conditions.

Phase II Intrusive Investigation

The Preliminary CSM allows for the identification of the test parameters relevant to the investigation, though this may require modification or addition from the findings of the intrusive investigation. Phase II intrusive site investigation will be carried out in order to investigate and assess pollutant linkages identified in the preliminary Conceptual Site Model presented in Section 10. The works to be undertaken on the site would comprise (a) soil sampling that is appropriate to the potential sources and (b) testing for the potential contaminants given in the CSM or other sources identified during the intrusive investigation.

Geotechnical Site Investigation

The purpose of the geotechnical investigation will be to obtain data regarding engineering properties of the soils to enable the design of foundations, concrete, pavements and drainage. The works to be undertaken on the site would comprise (a) soil sampling, trial pits, boreholes, gas and groundwater monitoring (b) drilling boreholes at selected locations within the site and to establish foundation design parameters.

The scope of any such investigation should be agreed with the Local Authority, Environment Agency and any other Interested Parties prior to commencement.

12.0 REFERENCES

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