JOMAS ENGINEERING ENVIRONMENTAL

WE LISTEN, WE PLAN, WE DELIVER

Geotechnical Engineering and Environmental Services across the UK.

DESK STUDY / PRELIMINARY RISK ASSESSMENT REPORT

FORMER SITE OF HPH4, HYDE PARK,
1 MILLINGTON ROAD,
HAYES,
LONDON,
UB3 4AZ

JOMAS ASSOCIATES LTD
6-9 The Square, Stockley Park, Uxbridge, UB11 1FW
www.jomasassociates.com 0843-289-2187 info@jomasassociates.com

Report Title: **Desk Study/Preliminary Risk Assessment Report for Former Site of HPH4, Hyde Park, 1 Millington Road, Hayes, London, UB3 4AZ**

Report Status: **Final**

Job No: **P3284J2275/SL**

Date: **10/05/2021**

Quality Control: Revisions

Version	Date	Issued By

Prepared by: JOMAS ASSOCIATES LTD **For: MILLINGTON ROAD (HPH4) LLP**

Prepared by
Clare Prosser BSc (Hons), MSc
Geo-environmental Engineer

.....

Reviewed and approved by
Suneel Law BSc (Hons), MSc, FGS
Principal Geo-environmental Engineer

.....

Should you have any queries relating to this report, please contact

JOMAS ASSOCIATES LTD

www.jomasassociates.com

0843 289 2187

info@jomasassociates.com

CONTENTS

Page

EXECUTIVE SUMMARY

Millington Road (HPH4) LLP ('The client') commissioned Jomas Associates Ltd to undertake a desk study and preliminary risk assessment at Former site of HPH4, Hyde Park, Former site of HPH4, Hyde Park, 1 Millington Road, Hayes, London, UB3 4AZ.

It should be noted that the table below is an executive summary of the findings of this report and is for briefing purposes only. Reference should be made to the main report for detailed information and analysis.

Desk Study	
Current Site Use	The site is occupied by a car park in the east of the site and unoccupied soft landscaping in the west.
Proposed Site Use	The proposed development is to comprise the construction of a new residential building to consist of approximately 8-9 storeys containing approximately 130 residential units.
Site History	The historical record of the site indicates that the site remained undeveloped until after World War 2, when the site appears to have been used for storage associated with the adjacent aviation works. From the 1970's until recent demolition ca 2013, the site appears to been developed with a warehouse. The site vicinity underwent significant development in the early part of the 20th century with a gramophone factory 240m north of the site, and an aviation works 90m east during the 1930s. The aviation works appears to have been redeveloped with industrial warehouses from the 1970s onwards, with more recent commercial developments occurring in the last ten years.
Site Setting	The British Geological Survey indicates that the site is directly underlain by superficial deposits of the Lynch Hill Gravel Member. These superficial deposits are underlain by solid deposits of the London Clay Formation. Artificial deposits are reported across the entire site, reported as worked ground (undivided). The superficial deposits underlying the site are identified as a Principal Aquifer with the underlying solid deposits identified as Unproductive. A review of the Enviro+Geoinsight Report indicates that there are no source protection zones within 500m of the site. There are no potable water abstractions reported within 2km of the site. There are no surface water features within 1km of the site. There are no Environment Agency Zone 2 or 3 floodplains reported within 250m of the site.

Potential Sources	• Warehouse on site from c. early 1970's to c. late 2010's – (S1)
	• Use of site for storage associated with nearby aircraft works - (S2)
	• Current and previous industrial use –off site (S3)
	  ○ Gramophone factory 240m NE (from ca 1910)
	  ○ Gas works 300m north (from ca 1910)

Desk Study	
	○ Aviation works 90m east (from ca 1930s) ○ USTs for fuel storage at adjacent site to the north, and wider within the adjacent former aviation works • Potential for Made Ground associated with previous development operations – on site (S4) • Former brick fields 20m north and 130m north east (S5) • Worked ground on site and in wider site vicinity (S6)
Potential Receptors	• Construction and maintenance workers, • neighbouring and future site users, • buried foundations and services, • controlled waters (Principal Aquifer).
Preliminary Risk Assessment	It is recommended that an intrusive investigation is undertaken to clarify potential risks to the identified receptors, as discussed in Table 5.3. A preliminary investigation may comprise a series of window sampler holes and cable percussive boreholes.
Potential Geological Hazards	The Groundsure data identifies only very low to negligible risks – for full details see Section 4 The nearest historical surface ground working feature is a brick field reported 24m north west of the site followed by a pond 90m north west of the site. A geotechnical investigation is recommended to inform foundation design.
Recommended Further Work	An intrusive investigation is recommended to further assess the potential pollutant linages identified in the conceptual site model and to provide geotechnical information for use in design. A UXO risk assessment is recommended.

1 INTRODUCTION

1.1 Terms of Reference

1.1.1 Millington Road (HPH4) LLP ("The Client") has commissioned Jomas Associates Ltd, to assess the risk of contamination posed by the ground conditions at a site referred to as: Former site of HPH4, Hyde Park, 1 Millington Road, Hayes, London, UB3 4AZ.

1.1.2 The risk assessment has been conducted in relation to a proposed redevelopment of the site.

1.1.3 To this end a desk based assessment has been undertaken in accordance with Jomas Associates Limited's email proposal dated 20th April 2021.

1.2 Proposed Development

1.2.1 The proposed development is to comprise the construction of a new residential building to consist of approximately 8-9 storeys containing approximately 130 residential units. Ground floor areas are understood to comprise parking and communal internal areas.

1.2.2 A plan of the proposed development is provided in Appendix 1, Figure 3.

1.2.3 For the purposes of the contamination risk assessment, the proposed development is classified as 'Residential without plant uptake'.

1.2.4 For the purpose of geotechnical assessment, it is considered that the project could be classified as a Geotechnical Category (GC) 2 site in accordance with BS EN 1997 Part 1. GC 2 projects are defined as involving:

- Conventional structures.
- Quantitative investigation and analysis.
- Normal risk.
- No difficult soil and site conditions.
- No difficult loading conditions.
- Routine design and construction methods.

1.2.5 This will be reviewed at each stage of the project.

1.3 Objectives

1.3.1 The objectives of Jomas Associates Limited's investigation were as follows:

- To present a description of the present site status, based upon the published geology, hydrogeology and hydrology of the site and surrounding area;

- To review readily available historical information (i.e., Ordnance Survey maps and database search information) for the site and surrounding areas, with respect to potentially contaminative land uses;
- To provide an assessment of the environmental sensitivity at the site and the surrounding area, in relation to any suspected or known contamination which may significantly affect the site and the proposed development;
- To assess the potential presence of significant pollutant linkages, in accordance with the procedures set out within Part IIA of the Environmental Protection Act 1990, associated statutory guidance and current best practice including the EA report R&D CLR 11;
- To identify and assess geotechnical issues that may affect the site.

1.4 Scope of Works

1.4.1 The following tasks were undertaken to achieve the objectives listed above:

- A walkover survey of the site;
- A desk study, which included the review of third party historical Ordnance Survey maps and an environmental database report (attached in Appendix 2 and Appendix 3);
- The compilation of this report, which collects and discusses the above data, and presents an assessment of the site conditions, conclusions and recommendations.

1.5 Supplied Documentation

1.5.1 A number of reports previously prepared by third parties were supplied to Jomas Associates at the commencement of this investigation. Table 1.1 details the documents supplied:

Table 1.1: Supplied Reports

Title	Author	Reference	Date
Hyde Park Hayes Building 4 – Phase 1 Environmental Assessment	Ramboll	R1620010949_01_HPH4 _ Ph1	9th November 2020
Hyde Park Hayes 4 Groundwater Survey	Ramboll	L1700000706JR22_01	9th November 2020
HPH4 Groundwater Contamination Commentary	Ramboll	-	-

1.6 Limitations

1.6.1 Jomas Associates Ltd has prepared this report for the sole use of Millington Road (HPH4) LLP in accordance with the generally accepted consulting practices and for the intended purposes as stated in the agreement under which this work was completed. This report may not be relied upon by any other party without the explicit written

agreement of Jomas Associates Limited. No other third-party warranty, expressed or implied, is made as to the professional advice included in this report. This report must be used in its entirety.

1.6.2 The records search was limited to information available from public sources; this information is changing continually and frequently incomplete. Unless Jomas Associates Limited has actual knowledge to the contrary, information obtained from public sources or provided to Jomas Associates Limited by site personnel and other information sources, have been assumed to be correct. Jomas Associates Limited does not assume any liability for the misinterpretation of information or for items not visible, accessible or present on the subject property at the time of this study.

1.6.3 Whilst effort has been made to ensure the accuracy of the data supplied, and analysis derived from it, there may be conditions at the site that have not been disclosed by the investigation, and could not therefore be taken into account. As with any site, there may be differences in soil conditions between exploratory hole positions. Furthermore, it should be noted that groundwater conditions may vary due to seasonal and other effects and may at times be significantly different from those measured by the investigation. No liability can be accepted for any such variations in these conditions.

1.6.4 Any reports provided to Jomas Associates Limited have been reviewed in good faith. Jomas Associates Limited cannot be held liable for any errors or omissions in these reports, or for any incorrect interpretation contained within them.

1.6.5 This investigation and report has been carried out in accordance with the relevant standards and guidance in place at the time of the works. Future changes to these may require a re-assessment of the recommendations made within this report.

1.6.6 *Our investigations exclude surveys to identify the presence of injurious and invasive weeds.*

1.6.7 ***This report is not an engineering design and the figures and calculations contained in the report should be used by the Structural Engineer, taking note that variations may apply, depending on variations in design loading, in techniques used, and in site conditions. Our recommendations should therefore not supersede the Engineer's design.***

2 SITE SETTING

2.1 Site Information

2.1.1 The site location plan is appended to this report in Figure 1, Appendix 1.

Table 2.1: Site Information

Name of Site	Former site of HPH4, Hyde Park
Address of Site	1 Millington Road Hayes UB3 4AZ
Approx. National Grid Ref.	509088 179269
Site Area (Approx)	0.37ha
Site Occupation	Car park and unoccupied land
Local Authority	London Borough of Hillingdon

2.2 Walkover Survey

2.2.1 A site walkover survey was undertaken by Jomas Associates on 28th April 2021. At the time of the visit, the site gates were locked and therefore access could not be gained. The following observations were made from the site boundary.

Table 2.2: Site Description

Area	Item	Details
On-site:	**Current Uses:**	The site is occupied by a car park in the east of the site and unoccupied soft landscaping in the west.
	Evidence of historic uses:	The west of the site appears to have previously been occupied by a building and has since been demolished.
	Evidence of previous site investigations:	1No historic monitoring well was observed in close proximity to the site. From available records it was considered that the well comprised BH27, as detailed in historic reports listed in Table 1.1. The well was inspected; a water level of 2.88m bgl was gauged using an interface probe and the depth of the hole was reported as 5.64m bgl. No free phase product was detected.
	Surfaces:	The car park in the east of the site is covered by asphalt and the west of the site is covered by soft landscaping.

Area	Item	Details
	Vegetation:	The west of the site is covered by grass. 5No coniferous trees are noted on site, 4No of which are positioned along the northern boundary and 1No located at the western boundary. Some weeds and small bushes are also noted on site. None of the vegetation seen appeared to be exhibiting any evidence of distress.
	Topography/Slope Stability:	A downward slope to the south was noted along the northern boundary of the site. A downward slope to the east was noted along the western boundary of the site. The remainder of the site is relatively flat.
	Drainage:	No drainage issues were observed.
	Services:	Manholes are located in the east of the car park. The surrounding buildings appear to be connected to normal active services.
	Controlled waters:	No controlled waters were noted on site.
	Tanks:	No tanks were noted on site.
Neighbouring land:	**North:**	Office buildings occupied by 'Regus', 'WHS' and 'JGC'.
	East:	Millington Road, office buildings occupied by 'rackspace'.
	South:	Office space and warehouse occupied by 'BTC group'.
	South west:	Dawley Road, residential.

2.2.2 Key features noted during the walkover are shown on a site walkover plan in Figure 2, together with site photos, in Figure 4.

2.3 Historical Mapping Information

2.3.1 The historical development of the site and its surrounding areas was evaluated following the review of a number of Ordnance Survey historic maps, procured from GroundSure, and provided in Appendix 3 of this report.

2.3.2 A summary produced from the review of the historical map is given in Table 2.3 below. Distances are taken from the site boundary.

Table 2.3: Historical Development

Dates and Scale of Map	Relevant Historical Information	
	On Site	**Off Site**
1865-1868 1:2,500 1:10,560	The site is undeveloped and lies within fields.	The site is surrounded by fields in all directions. A pond is located 90m NW within what appears to be 'rough pasture'. **A railway line** is identified 160m N generally running E-W. Woolpack Farm located 200m N. Road located 30m SW. Brick Fields located 400m N and 300m NE.
1881 1:10,560	No significant change	A row of terraced style buildings have been constructed 175m NE.
1895-1898 1:2,500 1:10,560	No significant change	Brick fields to NE no longer present, possibly **infilled.** Brick field located 130m NW.
1913-1920 1:2,500	No significant change	Residential development from 50m S. **Gramophone factories** constructed 240m NE with numerous **tanks** around 300m NE. Pond 90m NW no longer present, **possibly infilled.** **Marble slate granite works, Engineering works and Mack partition works** all identified 500m NE. **Gas works** identified 300m NE. Brick field 130m NW no longer present, possibly **infilled.**
1932 1:2,500 1:10,560	Incomplete mapping	Incomplete mapping
1935-1960 1:2,500 1:10,560	No significant change	Residential developments in the surrounding area. An **Aviation works** has been constructed from 90m E.
1965-1970 1:1,250 1:10,560	The site remains undeveloped, it appears that the boundary to the nearby site encroaches into the study site boundary from the east. The north western boundary of the site appears to slope down to the land beyond.	Large **industrial style buildings** have been constructed from 20m E and 20m S. The site is now bounded to a road along the western boundary. **Mound** present 100m NE. Aviation works is now identified as **Aeronautical Engineering works.** **Tanks** identified 50m E.

Dates and Scale of Map	Relevant Historical Information	
	On Site	Off Site
1974-2001 1:2,500 1:10,000	A building has been constructed on covering a large proportion of the site, identified as a **warehouse.**	Area to the N redeveloped, L-shaped building now present 20m N. Developments have occurred to the roadways to the NW, a roundabout is now present. Redevelopments are visible at the Aeronautical Engineering Works buildings and it is no longer identified as works. Additional buildings have been constructed in the sports field 100m SE, also identified as **warehouses.** Building 20m S identified as works and buildings from 30m E are identified as **warehouses.** **Substation** present 30m S.
2010 1:10,000	No significant change	Warehouses 100m SE no longer present.
2021 1:10,000	The building on site is no longer present, likely demolished as the site appears to be in its current configuration.	Westlands estate to the E, previously Aeronautical works, has been redeveloped into fewer buildings. No other significant changes

Potentially polluting/contaminating uses/activities shown in **bold**

2.3.3 Aerial photographs supplied as part of the GroundSure Enviro+GeoInsight report range from 1999 to 2019. These generally show a warehouse style building covering a large proportion of the site and a car parking area along the south east of the site. It appears that the building on site was demolished by 2013. The area to the south west of the site appears to comprise of residential style buildings with associated gardens. The buildings to the east and south east of the site appear to be of industrial style. The building to the south east is also shown to have been demolished by 2013 and redeveloped by 2017.

2.4 Past Land Use

2.4.1 Groundsure provide some information on past land use on and in the vicinity of the site. Table 2.4 below summarises the information provided, which is presented in further detail in the Enviro+Geoinsight in Appendix 2. Where the identified features have appeared on more than one map they have been counted multiple times and therefore the reported numbers may be higher than the actual count.

Table 2.4: Past Land Use

Type of Use	On site	Off-site (within 500m of site, unless stated otherwise)	Potential to Impact Site*
Historical Industrial Land Uses	5No reported; unspecified works and unspecified commercial/industrial.	131No reported; nearest entry is a brick field 24m NW. Other entries include a works 76m E and an aviation works 80m E.	✓

Type of Use	On site	Off-site (within 500m of site, unless stated otherwise)	Potential to Impact Site*
Historical Tanks	None reported	34No reported; nearest entry is an unspecified tank 32m NE from 1996-1998. Other tanks are located 82m E and 144m E.	✓
Historical Energy Features	None reported	14No substations reported; nearest entry is 23m SW of the site.	X
Historical Petrol Stations	None reported	None reported	X
Historical Garages	None reported	None reported	X
Historical Military Land	None reported	1No reported; an aero engine factory, circa WW1 located 316m NE.	X

2.5 Landfill, Waste and Potentially Infilled Surface Ground Workings

2.5.1 The Groundsure Enviro+Geoinsight Report provides information on active and historical landfills and waste sites. It also provides information on historical land uses identified from Ordnance Survey mapping that involved ground excavation at the surface; these features may or may not have been subsequently infilled. The following section summarises the information collected from the available sources.

Table 2.5: Landfill, Waste and Potentially Infilled Ground Surface Workings

Type of Consent/Authorisation	On site	Off-site (within 500m of site, unless stated otherwise)	Potential to Impact Site*
Active or Recent Landfill	None reported	None reported	X
Historical Landfill	None reported	None reported	X
Historical Waste Sites	None reported	None reported	X
Licensed Waste Sites	None reported	1No reported; Beechwood Nurseries, Farnham Lane, Farnham Royal, Slough, Buckinghamshire reported 473m NW for inert landfill. Given the address provided this report of the landfill site in the vicinity of the study site is considered to be a data/mapping error.	X
Waste Exemptions	None reported	14No reported; nearest entry is 57m E for storage of non-agricultural waste in a secure place.	X
Potentially Infilled Surface Ground Workings	None reported	Ponds – 90m NW (1913) Mound 100m NE (1965) Brick Field– 24m north (1894), 130m NW (1914)	✓

2.6 Current Industrial Land Use

2.6.1 The Groundsure Enviro+Geoinsight Report also provides information on various records relating to current industrial land use on and in the vicinity of the site. The following section summarises the information collected from the available sources.

Table 2.6: Current Industrial Land Use

Type of Consent/Authorisation	On site	Off-site (within 500m of site, unless stated otherwise)	Potential to Impact Site*
Recent Industrial Land Uses	None reported	20No reported; nearest entry is an electricity substation located 16m NE. Other entries include an electricity substation 23m SW and the transport, storage and delivery of airline and airline services 25m NE.	✓
Current or Recent Petrol Stations	None reported	1No reported; ASDA petrol station is located 320m SE.	X
High Voltage Electricity Cables	None reported	None reported	X
High Pressure Gas Pipelines	None reported	None reported	X
Sites Determined as Contaminated Land	None reported	None reported	X
Control of Major Accident Hazards (COMAH) and Notification of Installations Handling Hazardous Substances (NIHHS) Sites	None reported	1No reported for a COMAH Upper Tier Operator at Lufthansa Technik Landing Gear Services UK Limited, 363m NW.	X
Regulated Explosive Sites	None reported	None reported	X
Hazardous Substance Storage/Usage	None reported	1No reported for the continued storage of hazardous substances, 366m NW.	X
Historical Licensed Industrial Activities	None reported	2No reported; nearest entry is for inorganic chemical processes 395m NW.	X
Licensed Industrial Activities	None reported	19No reported; nearest entry is for 'other waste disposal; non-hazardous waste >50T/D by physio-chemical treatment', 365m NE.	X
Licensed Pollutant Release	None reported	3No reported; nearest entry is for the unloading of petrol into storage at ASDA, 321m E.	X
Radioactive Substance Authorisations	None reported	3No reported 7m NE for the disposal of radioactive waste; 1991-2015 reported as superseded by variation, 1994-2015 and 2005-2015 reported as revoked/cancelled.	X
Licensed Discharge to Controlled Waters	None reported	None reported	X
Pollutant Release to Surface Waters (Red List)	None reported	None reported	X
Pollutant Release to Public Sewer	None reported	None reported	X
List 1 and List 2 Dangerous Substances	None reported	None reported	X
Pollution Incidents	None reported	4No reported; nearest entry is 393m NE for contaminated water from firefighting run-off, with no impact reported for water and minor impact reported for land and air.	X

Type of Consent/Authorisation	On site	Off-site (within 500m of site, unless stated otherwise)	Potential to Impact Site*
Pollution Inventory Substances	None reported	3No reported; nearest entry is 474m NW for surface treating metals and plastics with an air release for Cadium.	X
Pollution Inventory Waste Transfers	None reported	2No reported; nearest entry is 365m NE for deposit into or onto land (eg landfill etc) for sludges and filter cakes and mixed municipal waste.	✓
Pollution Inventory Radioactive Waste	None reported	None reported	X

2.7 Tunnels and Railways

2.7.1 The Groundsure Enviro+Geoinsight Report provides information on railway tunnels and railways on and within the vicinity of the site, as summarised in the table below.

Table 2.7: Tunnels and Railways

Feature	On site	Off-site (within 250m of site, unless stated otherwise)	Potential to Impact Site*
Underground Railways (London)	None reported	None reported	X
Underground Railways (Non-London)	None reported	None reported	X
Railway Tunnels	None reported	None reported	X
Historical Railway and Tunnel Features	None reported	19No reported; nearest entry is railway sidings 131m N.	X
Royal Mail Tunnels	None reported	None reported	X
Railways	None reported	16No reported; nearest entry is the Heathrow express 156m N.	X
Crossrail and HS2	None reported	None reported	X

* *From a land contamination/site development perspective*

2.8 Previous Site Investigations – Phase 1 Environmental Assessment (Ramboll UK Ltd, 9th November 2020)

2.8.1 A Phase 1 Environmental Assessment has been prepared for the site by Ramboll UK Ltd on behalf of Threadneedle UKPEC Hayes Jersey LP, dated 9th November 2020.

2.8.2 The report includes observations from a site inspection in 2014 and ad-hoc observations during Ramboll's groundwater monitoring surveys at a wider site area between 2016 and 2020. At that time the site was being used as a contractor's compound associated with development of a nearby site.

2.8.3 A programme of environmental monitoring of groundwater across the Hyde Park Hayes site has been undertaken by Ramboll in support of the discharge of planning conditions associated with the redevelopment of an adjacent site known as HPH5.

Two (2) monitoring wells included within the monitoring programme lie within the boundary of the current study site, referred to by Ramboll as HPH4.

2.8.4 A review of historical mapping reached similar conclusions to those identified by Jomas Associates in Table 2.3. However, aerial photography not seen by Jomas indicated that in the post WW2 years, the eastern part of the site appears unsurfaced and in use for storage, potentially associated with off-site Aviation works. The western part of site had the appearance of possible allotment gardens.

2.8.5 Ramboll noted that are records of four (4) former landfills within 1km of the subject site. The nearest of these (located 770m south-west at its nearest point) is the Frogsditch Farm landfill site, operated by Hall Aggregates Limited. The landfill was authorised to receive inert construction and demolition waste between 1982 and 1989.

2.8.6 Ramboll identified the following on site potentially contaminative activities:

- Use of the site for Warehousing from c. early 1970's to c. late 2010's. Potential contaminants would depend on the nature of materials stored in the Warehouse; fuels and other hydrocarbons may be present if refuelling activities were undertaken on-site.

- Storage associated with off-site Westland Aircraft Ltd (Fairy Aviation Division) Aeronautical Engineering Works from the 1940s, potentially up to site redevelopment in the early 1970s.

2.8.7 The following potentially contaminative activities were identified as having taken place in the surrounding area:

- Westland Aircraft Ltd (Fairy Aviation Division) Aeronautical Engineering Works from the 1940s, potentially up to site redevelopment in the early 1970s. The Westlands site is indicated to have included fuel storage in underground storage tanks, and the specific location of these tanks is unconfirmed. Potential contaminants would depend on the nature of materials stored and utilised, but could include hydrocarbon fuels and oils, solvents, and metals.

- Gramophone Factories from at least the 1910s to the 1990s approximately 170m north of the site. Potential contaminants from the Gramophone Factory could include solvents, hydrocarbons, metals and asbestos.

- Further industrial and commercial land use in the area, including a large unidentified Factory 290m north-west (1960s to 1990s); and a Transport Depot 190m north-west (from 1960s).

2.8.8 Ground conditions from previous investigations at the HPH4 site were reported to comprise:

- Made Ground comprising reworked natural strata with some observations of concrete and brick fragments to depths of between 0.7m (REH01) and 1.8m (BH11) below ground level (bgl);

- Natural strata underlying the made ground comprised dense sandy gravel of flint (Lynch Hill Gravels) with discrete bands of gravelly Sand and silty Clay (REH01 only) to depths of between 4.5m bgl (BH11) and 4.7m bgl (REH01);

- The London Clay was encountered at the base of the Lynch Hill Gravels in both boreholes on the HPH4 plot.

2.8.9 Environmental assessments of the wider Hyde Park Hayes site and remediation verification reporting for HPH5 (a site located to the east-southeast of HPH4) was undertaken by the consultant Jacobs on behalf of (its client) the former owner of the site (Melfords) in conjunction with the planning process for the construction of HPH5. Long term monitoring of groundwater conditions was requested by the EA in conjunction with the discharge of planning condition No.14 relating to groundwater contamination. Ramboll was commissioned to undertake longer term groundwater monitoring in 2016 to discharge this condition.

2.8.10 The Groundwater Assessment programme comprised eight (8) groundwater monitoring and sampling surveys over the period March 2016 to March 2017, reported and submitted to the Local Planning Authority (LPA) (ref: RUK16-20878_GWA_2, dated 10th October 2017). The outstanding Planning Condition 14 associated with HPH5 was discharged by the LPA following submission of the Ramboll report.

2.8.11 A subsequent programme of three (3) groundwater monitoring and sampling surveys were subsequently undertaken in 2018 (April, September and December). A further confirmatory survey was undertaken in October 2020.

2.8.12 The findings of the groundwater monitoring were summarised by Ramboll as follows:

- Groundwater depths on the HPH4 plot ranged from 1.46m bgl (BH11, October 2020) to 2.68m bgl (BH11, April 2018).

- Overall, groundwater flow direction was towards the east/north-east across the wider HPH area, which was broadly consistent with the findings of Jacobs' previous assessments and indicating a recharge mound in the vicinity of HPH4 (unsurfaced ground on/off-site to the west). Therefore, groundwater flow was considered to flow away from HPH4 towards the wider HPH site.

- The groundwater system within the Lynch Hill Gravels aquifer was considered to have been demonstrated by long term field monitoring surveys to be moderately dynamic, with seasonal fluctuations in groundwater levels and physio-chemical parameters observed;

2.8.13 Groundwater physico-chemical testing on-site indicated that the groundwater at the wider HPHP site (and specifically HPH4) is oxygenated (>1.5mg/l dissolved O2) and oxidising (>100mV redox potential), which provides a supporting line of evidence for the presence of a local recharge zone. The observed groundwater conditions were not considered to be conducive to microbially-mediated de-chlorination of chlorinated hydrocarbons (natural attenuation);

2.8.14 Contaminants of concern have not been detected in samples from BH11 in any of the groundwater monitoring surveys conducted by Ramboll between March 2016 and December2018;

2.8.15 Since the installation of REH01 in July 2016, some contaminants, including chlorinated hydrocarbons (specifically Trichloroethene and cis-1,2-Dichloroethene), have been detected at concentrations exceeding the remedial targets derived by DQRA by SKM. However, since December 2016 only one (1) of seven (7) samples recovered from REH01 (the September 2018 sample) were exceeded the remedial target. The latest detected concentration at RE0H1 from the October 2020 sample survey was again below the remedial target and was found to be consistent with the reported declining trend in TCE concentrations at this location since December 2016.

2.8.16 Concentrations of these contaminants have been assessed as having exhibited an overall decreasing trend between August 2016 and December 2018 (despite a moderate increase in detected concentrations in September 2018).

2.8.17 In the absence of observed groundwater conditions conducive to natural attenuation processes, the observed declining concentration in contaminant concentrations was considered likely to be representative of a declining source influenced by dilution and dispersion processes in the groundwater formation.

2.8.18 Ramboll considered that the HPH4 site area and wider Hyde Park Hayes site benefit from a significant level of environmental assessment which serves to reduce the uncertainty associated with the assessment of the potential for contaminated land to affect future users of HPH4.

2.8.19 According to Ramboll, the site of HPH5 was considered by Jacobs to represent the primary source area for observed chlorinated solvent impacts to groundwater.

2.8.20 Ramboll considered that a robust understanding of the environmental conditions has been established at HPH4. Ramboll considered that a localised contamination impact to groundwater has been identified in one (1) of the two (2) monitoring wells on the HPH4 plot (REH01); however, Ramboll also considered that statistical analysis of the available dataset indicated an overall declining trend in detected concentrations since the installation of the monitoring well in 2016.

2.8.21 Ramboll considered that a Planning Consent for redevelopment of HPH4 would likely include standard contaminated land related Conditions; a requirement for onerous remedial intervention is considered to be unlikely. Ramboll concluded that the Environment Agency has de-prioritised the site and consistently declined to provide

comment on the discharging of Planning Conditions relating to groundwater contamination at HPH5.

2.8.22 Using the activities undertaken as part of the HPH5 development as a template, remedial interventions that might be required at HPH4 were considered likely to be limited to:

- Segregation and removal of impacted soils (if any);
- Dewatering of excavations (likely only required if development includes construction of a basement); and
- Inclusion of a vapour impermeable membrane as a precautionary measure to prevent the ingress of any residual volatile compounds present in soil / groundwater into the indoor airspace.

2.9 Previous Site Investigations – Hyde Park Hayes 4 Groundwater Survey (Ramboll UK Ltd, 9th November 2020)

2.9.1 A further groundwater sampling visit was conducted by Ramboll in October 2020, and included the groundwater monitoring wells BH11 and REH011 present on the HPH4 site.

2.9.2 Trichloroethene was the only chlorinated solvents compound detected above the laboratory method detection limits. A concentration of 26 µg/L was detected in REH011 only, which did not exceed the remedial target of 179 ug/L.

2.9.3 Ramboll's conclusions were unchanged from those presented in their Phase 1 Environmental Assessment.

2.10 Local Authority Information

2.10.1 Jomas have made a request to London Borough of Hillingdon for information relating to contamination on the site and surrounding areas..

2.10.2 A response is pending.

2.11 Planning Information

2.11.1 A review of the local authority's planning portal was undertaken on 05th May 2021.

2.11.2 A Phase 1 contaminated land desk study was found that relates to a current planning application for the site to the north of the study site (report ref. R1620010949_01_PhI, by Ramboll UK Limited, dated 22nd October 2020). This relates to planning application number 73998/APP/2020/3589.

2.11.3 Former vent pipes were identified at the study site associated with the former fuel filling operations in addition to foam filled underground storage tanks, an offset fill point and a monitoring well.

2.11.4 It was reported that intrusive investigations conducted at the site had confirmed the absence of impacts to soil and groundwater at the site.

2.12 Unexploded Ordnance

2.12.1 Publicly available information indicates a low potential risk.

2.12.2 This does not comprise a full UXO risk assessment. A UXO threat assessment is recommended.

3 GEOLOGICAL & ENVIRONMENTAL SETTING

3.1.1 The following section summarises the principal environmental resources (geological, hydrogeological and hydrological) of the site and its surroundings.

3.1.2 The data discussed herein is generally based on the information given within the Enviro+Geoinsight Report and published information provided by the Environment Agency and British Geological Survey.

3.2 Solid and Drift Geology

3.2.1 The British Geological Survey indicates that the site is directly underlain by superficial deposits of the Lynch Hill Gravel Member.

3.2.2 The BGS describes the Lynch Hill Gravel Member as consisting of

> *"Sand and gravel, locally with lenses of silt, clay or peat."*

3.2.3 Superficial deposits of the Langley Silt Member are reported 15m south east of the site, these deposits are anticipated to have originally overlay the Lynch Hill Gravel Member. Due to worked ground at the site, it appears this strata may have been removed.

3.2.4 The BGS describes the Langley Silt Member as consisting of

> *"Varies from silt to clay, commonly yellow-brown and massively bedded."*

3.2.5 Superficial deposits of the Lynch Hill Gravel Member overlie solid deposits of the London Clay Formation. These are indicated by the BGS to consist of

> *"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 occurs in places. Glauconite is present in some of the sands and in some clay beds, and white mica occurs at some levels."*

3.2.6 Artificial deposits are reported across the entire site extending off site, these are reported as worked ground (undivided).

3.2.7 No bedrock faults or other linear features are reported within 500m of the site.

3.3 British Geological Survey (BGS) Borehole Data

3.3.1 As part of the assessment, publicly available BGS borehole records were obtained and reviewed from the surrounding area. The local records obtained are presented in Appendix 5.

3.3.2 The nearest such record was located approximately 42m north east of the site, in July 1987.

3.3.3 This showed the underlying ground conditions to comprise 'topsoil' over 'made ground' to a depth of around 4.50m bgl. The made ground was overlying sand and gravel to around 5.20m, overlying a clayey silt to 5.70m bgl. This was underlain by a grey silty clay with selenite crystals to the base of the borehole, at approximately 30.00m bgl.

3.3.4 The encountered strata is considered to represent the Lynch Hill Gravel Member overlying the London Clay Formation.

3.3.5 During the drilling of the borehole groundwater was first struck at 4.30m bgl and reported 4.80m bgl the following day. Water level observation tubing was installed to 6.00m bgl and groundwater was sealed off by casing at a depth of 2.30m bgl.

3.3.6 All depths and measurements should be viewed as approximate, due to the age of the borehole.

3.4 Hydrogeology & Hydrology

3.4.1 General information about the hydrogeology of the site was obtained from the EnviroInsight and / or the DEFRA "MAGIC" website.

Groundwater Vulnerability

3.4.2 The EA operates a classification system to categorise the importance of groundwater resources (aquifers) and their sensitivity to contamination. Aquifers were formerly classified as major, minor and non-aquifers, based on the amenity value of the resource. A major aquifer is a significant resource capable of producing large quantities of water suitable for potable supply. Minor aquifers produce water in varying quantities or qualities, and if utilised are of local importance. Non aquifers are low permeability strata, which contain no significant exploitable groundwater and have very limited capacity to transmit contaminants.

3.4.3 Since 1 April 2010, the EA's Groundwater Protection Policy uses aquifer designations that are consistent with the Water Framework Directive. This comprises;

- **Secondary A** - permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers;
- **Secondary B** - predominantly lower permeability layers which may store and 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 the former non-aquifers.
- **Secondary Undifferentiated** - has been assigned in cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type.

- **Principal Aquifer** – this is a formation with a high primary permeability, supplying large quantities of water for public supply abstraction.

- **Unproductive Strata -** These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.

Source Protection Zones (SPZ)

3.4.4 In terms of aquifer protection, the EA generally adopts a three-fold classification of SPZs for public water supply abstraction wells.

- Zone I - or 'Inner Protection Zone' is located immediately adjacent to the groundwater source and is based on a 50-day travel time. It is designed to protect against the effects of human activity and biological/chemical contaminants that may have an immediate effect on the source.
- Zone II - or 'Outer Protection Zone' is defined by a 400-day travel time to the source. The travel time is designed to provide delay and attenuation of slowly degrading pollutants.
- Zone III - or 'Total Catchment' is the total area needed to support removal of water from the borehole, and to support any discharge from the borehole.

Hydrology

3.4.5 The hydrology of the site and the area covers water abstractions, rivers, streams, other water bodies and flooding.

3.4.6 The Environment Agency defines a floodplain as the area that would naturally be affected by flooding if a river rises above its banks, or high tides and stormy seas cause flooding in coastal areas.

3.4.7 There are two different kinds of area shown on the Flood Map for Planning. They can be described as follows:

Areas that could be affected by flooding, either from rivers or the sea, if there were no flood defences. This area could be flooded:

- from the sea by a flood that has a 0.5 per cent (1 in 200) or greater chance of happening each year;
- or from a river by a flood that has a 1 per cent (1 in 100) or greater chance of happening each year.

(For planning and development purposes, this is the same as Flood Zone 3, in England only.)

- The additional extent of an extreme flood from rivers or the sea. These outlying areas are likely to be affected by a major flood, with up to a 0.1 per cent (1 in 1000) chance of occurring each year.

(For planning and development purposes, this is the same as Flood Zone 2, in England only.)

3.4.8 These two areas show the extent of the natural floodplain if there were no flood defences or certain other manmade structures and channel improvements.

3.4.9 Outside of these areas flooding from rivers and the sea is very unlikely. There is less than a 0.1 per cent (1 in 1000) chance of flooding occurring each year. The majority of England and Wales falls within this area. (For planning and development purposes, this is the same as Flood Zone 1, in England only.)

3.4.10 Some areas benefit from flood defences and these are detailed on Environment Agency mapping.

3.4.11 Flood defences do not completely remove the chance of flooding, however, and can be overtopped or fail in extreme weather conditions.

Table 3.1: Summary of Hydrogeology & Hydrology

Feature		On Site	Off Site	Potential Receptor?
Aquifer	**Superficial:**	Principal	-	✓
	Solid:	Unproductive	-	**X**
Abstractions	**Ground water**	None	24No reported within 2km; nearest abstraction is located 1104m E for evaporative cooling and is termed historical.	**X**
	Surface water	None	3No reported within 2km; nearest abstraction is located 606m N for non-evaporative cooling.	**X**
	Potable	None	None reported within 2km.	**X**
Source Protection Zone		None	None within 500m	**X**
Surface Water Features		None	None within 1km	**X**
Flood Risk	**EA Flood Zone 2**	No	-	-
	EA Flood Zone 3	No	-	-
	RoFRaS	Low	-	-
	Historical flood events	None	None within 250m	-
	Flood Defences	There are no areas benefiting from Flood Defences within 250m of the study site.		-
	Surface water flooding	The highest risk on site for surface water flooding is 1 in 100 year, 0.1m-0.3m.		-

Feature		On Site	Off Site	Potential Receptor?
	Groundwater flooding	The highest risk on site for groundwater flooding is moderate.		-

3.5 Sensitive Land Uses

3.5.1 The site is not located within a Nitrate Vulnerable Zone.

3.5.2 The London Green Belt is located 626m north east of the site.

3.5.3 The Botwell, Thorn EMI conservation area is located 185m north of the site.

3.5.4 The site is located within an open mosaic habitat, with a low identification confidence.

3.5.5 Mosaic habitats are brownfield sites that are identified under the UK Biodiversity Action Plan as a priority habitat due to the habitat variation within a single site, supporting an array of invertebrates.

3.5.6 No other sensitive land use was identified within 1km of the site.

3.6 Radon

3.6.1 As reported, the site is not within a Radon affected area, as less than 1% of properties are above the action level.

3.6.2 Consequently, no radon protective measures are necessary in the construction of new dwellings or extensions as described in publication BR211 (BRE, 2015).

4 POSSIBLE GEOLOGICAL HAZARDS

4.1 Database Information Review

4.1.1 The following are brief findings extracted from the GroundSure Enviro+Geoinsight Report, that relate to factors that may have a potential impact upon the engineering of the proposed development.

Table 4.1: Geological Hazards

Potential Hazard	Site check Hazard Rating	Details	Further Action Required?
Shrink swell clays	Negligible	Ground conditions predominantly non-plastic.	No
Running sands	Very low	Running sand conditions are unlikely. No identified constraints on land use due to running conditions unless water table rises rapidly.	No
Compressible deposits	Negligible	Compressible strata are not thought to occur.	No
Collapsible Deposits	Very low	Deposits with potential to collapse when loaded and saturated are unlikely to be present.	No
Landslides	Very low	Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.	No
Ground dissolution soluble rocks	Negligible	Soluble rocks are either not thought to be present within the ground, or not prone to dissolution. Dissolution features are unlikely to be present.	No
Coal mining	None	The study site is not located within the specified search distance of an identified coal mining area.	No
Non-coal mining	None	The study site is not located within the specified search distance of an identified non-coal mining area.	No

4.1.2 In addition, the GeoInsight report notes the following:

- There are no natural cavities reported within 500m of the site.
- 3 No BritPits (British Pits) are reported within 500m of the site, the nearest reported is a brickfield located 302m west of the site.
- 18 No. historical surface ground working features are reported within 250m of the site. The nearest reported is a brick field 24m north west of the site followed by a pond 80m north west of the site.
- 1 No historical underground working feature is reported within 1km of the site, a tunnel reported 913m east.

4.1.3 Any existing hardstanding and foundations will need to be removed and grubbed out ahead of the development. This may require the use of hydraulic breaking.

4.1.4 The clearance of the site, including removal of foundations and services is likely to increase the depth of Made Ground on the site.

4.1.5 Foundations should not be formed within Made Ground or organic rich material (e.g. Topsoil) due to the unacceptable risk of total and differential settlement.

4.1.6 Foundations must be designed so as not to load nor undermine adjacent boundary walls and buildings.

4.1.7 The presence of Made Ground derived from demolition material may be a source of elevated sulphate, associated with plaster from the previous structures. If such levels are noted then sulphate resistant concrete may be required.

4.1.8 The BGS notes disseminated pyrite within the London Clay Formation and as such may be a source of elevated sulphate results. If such levels are noted then sulphate resistant concrete may be required.

4.1.9 The resultant thickness of Made Ground and the potential for clays beneath the proposed footprint may mean that a suspended floor slab would be required.

A geotechnical investigation is recommended to inform foundation design.

5 QUALITATIVE RISK ASSESSMENT

5.1 Legislative Framework

5.1.1 A qualitative risk assessment has been prepared for the site, based on the information collated. This highlights the potential sources, pathways and receptors. Intrusive investigations will be required to confirm the actual site conditions and risks.

5.1.2 Under Part IIA of the Environmental Protection Act 1990, the statutory definition of contaminated land is:

"*land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land, that:*

(a) significant harm is being caused or there is a significant possibility of such harm being caused; or
(b) significant pollution of controlled waters is being caused, or there is significant possibility of such pollution being caused."

5.1.3 The Statutory Guidance provided in the DEFRA Circular 04/2012 lists the following categories of significant harm to **human health**:

- death; life threatening diseases (e.g. cancers); other diseases likely to have serious impacts on health; serious injury; birth defects; and impairment of reproductive functions.

5.1.4 Other health effects may also be considered by the local authority to constitute significant harm with a wide range of conditions that may or may not constitute significant harm (alone or in combination) including: physical injury; gastrointestinal disturbances; respiratory tract effects; cardio-vascular effects; central nervous system effects; skin ailments; effects on organs such as the liver or kidneys; or a wide range of other health impacts.

5.1.5 In deciding whether or not land is contaminated land on grounds of significant possibility of significant harm to human health there are four categories to be considered. Categories 1 and 2 would encompass land which is capable of being determined as contaminated land on grounds of significant possibility of significant harm to human health. Categories 3 and 4 would encompass land which is not capable of being determined on such grounds.

5.1.6 For non-human receptors the following types of harm should be considered to be significant harm:

Ecological System Effects

- Harm which results in an irreversible adverse change, or in some other substantial adverse change, in the functioning of the ecological system within any substantial part of that location; or
- Harm which significantly affects any species of special interest within that location and which endangers the long-term maintenance of the population of that species at that location.

- In the case of European sites, harm should also be considered to be significant harm if it endangers the favourable conservation status of natural habitats at such locations or species typically found there. In deciding what constitutes such harm, the local authority should have regard to the advice of Natural England and to the requirements of the Conservation of Habitats and Species Regulations 2010.

Property Effects

- Crops: A substantial diminution in yield or other substantial loss in their value resulting from death, disease or other physical damage. For domestic pets, death, serious disease or serious physical damage. For other property in this category, a substantial loss in its value resulting from death, disease or other serious physical damage.
- Buildings: Structural failure, substantial damage or substantial interference with any right of occupation. The local authority should regard substantial damage or substantial interference as occurring when any part of the building ceases to be capable of being used for the purpose for which it is or was intended. In the case of a scheduled Ancient Monument, substantial damage should also be regarded as occurring when the damage significantly impairs the historic, architectural, traditional, artistic or archaeological interest by reason of which the monument was scheduled.

5.1.7 Contaminated land will only be identified when a 'pollutant linkage' has been established.

5.1.8 A 'pollutant linkage' is defined in Part IIA as:

"A linkage between a contaminant Source and a Receptor by means of a Pathway".

5.1.9 Therefore, this report presents an assessment of the potential pollutant linkages that may be associated with the site, in order to determine whether additional investigations are required to assess their significance.

5.1.10 In accordance with the National Planning Policy Framework, where development is proposed, the developer is responsible for ensuring that the development is safe and suitable for use for the purpose for which it is intended, or can be made so by remedial action. In particular, the developer should carry out an adequate investigation to inform a risk assessment to determine:

- whether the land in question is already affected by contamination through source – pathway – receptor pollutant linkages and how those linkages are represented in a conceptual model;
- whether the development proposed will create new linkages, e.g. new pathways by which existing contaminants might reach existing or proposed receptors and whether it will introduce new vulnerable receptors; and
- what action is needed to break those linkages and avoid new ones, deal with any unacceptable risks and enable development and future occupancy of the site and neighbouring land.

5.1.11 A potential developer will need to satisfy the Local Authority that unacceptable risk from contamination will be successfully addressed through remediation without undue environmental impact during and following the development.

5.2 Conceptual Site Model

5.2.1 On the basis of the information summarised above, a conceptual site model (CSM) has been developed for the site. The CSM is used to guide the investigation activities at the site and identifies potential contamination sources, receptors (both on and off-site) and exposure pathways that may be present. The identification of such potential "pollutant linkages" is a key aspect of the evaluation of potentially contaminated land.

5.2.2 The site investigation is then undertaken in order to prove or disprove the presence of these potential source-pathway-receptor linkages. Under current legislation an environmental risk is only deemed to exist if there are proven linkages between all three elements (source, pathway and receptor).

5.2.3 This part of the report lists the potential sources, pathways and receptors at the site, and assesses based on current and future land use, whether pollution linkages are possible.

5.2.4 Potential pollutant linkages identified at the site are detailed below:

Table 5.1: Potential Sources, Pathways and Receptors

Source(s)	Pathway(s)	Receptor(s)

• Warehouse on site from c. early 1970's to c. late 2010's – (S1)
• Use of site for storage associated with nearby aircraft works - (S2)
• Current and previous industrial use –off site (S3)
  ○ Gramophone factory 240m NE (from ca 1910)
  ○ Gas works 300m north (from ca 1910)
  ○ Aviation works 90m east (from ca 1930s)
  ○ USTs for fuel storage at adjacent site to the north, and wider within the adjacent former aviation works
• Potential for Made Ground associated with previous development operations – on site (S4)
• Former brick fields 20m north and 130m north east (S5)
• Worked ground on site and in wider site vicinity (S6)
	• Ingestion and dermal contact with contaminated soil (P1)
	• Inhalation or contact with potentially contaminated dust and vapours (P2)
	• Leaching through permeable soils, migration within the vadose zone (i.e., unsaturated soil above the water table) and/or lateral migration within surface water, as a result of cracked hardstanding or via service pipe/corridors and surface water runoff. (P3)
	• Horizontal and vertical migration of contaminants within groundwater (P4)
	• Accumulation and Migration of Soil Gases (P5)
	• Permeation of water pipes and attack on concrete foundations by aggressive soil conditions (P6)
		• Construction workers (R1)
		• Maintenance workers (R2)
		• Neighbouring site users (R3)
		• Future site users (R4)
		• Building foundations and on site buried services (water mains, electricity and sewer) (R5)
		• Controlled waters - Principal aquifer (R6)

5.3 Qualitative Risk Estimation

5.3.1 Based on information previously presented in this report, a qualitative risk estimation was undertaken.

5.3.2 For each potential pollutant linkage identified in the conceptual model, the potential risk can be evaluated, based on the following principle:

Overall contamination risk = Probability of event occurring x Consequence of event occurring

5.3.3 In accordance with CIRIA C552, the consequence of a risk occurring has been classified into the following categories:

- Severe
- Medium
- Mild
- Minor

5.3.4 The probability of a risk occurring has been classified into the following categories:

- High Likelihood
- Likely
- Low Likelihood
- Unlikely

5.3.5 This relationship can be represented graphically as a matrix (Table 5.2).

Table 5.2: Overall Contamination Risk Matrix

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

5.3.6 The risk assessment process is based on guidance provided in CIRIA C552 (2001) *Contaminated Land Risk Assessment – A Guide to Good Practice*. Further information including definitions of descriptive terms used in the risk assessment process is included in Appendix 4.

5.3.7 The degree of risk is based on a combination of the potential sources and the sensitivity of the environment. The risk classifications can be cross checked with reference to Table A4.4 in Appendix 4.

5.3.8 Hazard assessment was also carried out, the outcome of which could be:

- Urgent Action (UA) required to break existing source-pathway-receptor link.
- Ground Investigation (GI) required to gather more information
- Watching Brief there is no evidence of potential contamination but the possibility of it exists and so the site should be monitored for local and olfactory evidence of contamination.
- No action required (NA)

5.3.9 The preliminary risk assessment for the site is presented in Table 5.3 below.

Table 5.3 – Conceptual Site Model / Preliminary Risk Assessment

Source	Pathway	Receptor	Assessment to date	Further investigation required?	Linkage Number
• Warehouse on site from c. early 1970's to c. late 2010's – (S1) • Use of site for storage associated with nearby aircraft works - (S2) • Potential for Made Ground associated with previous development operations – on site (S4)	• Ingestion • Inhalation or contact with potentially contaminated dust and vapours	• Future site users • Construction workers • Maintenance workers • Neighbouring site users	The reports of previous investigations at the site made available to Jomas Associates have focussed on groundwater quality. No soil analysis data has been provided. Acute and sub chronic risks to construction/maintenance workers are outside the scope of this assessment but would be expected to be managed by appropriate health and safety procedures	Yes	1
			An extended period of groundwater monitoring has been undertaken by Ramboll on a wider site area, with 2no monitoring wells within the study site. Concentrations of a chlorinated solvent trichloroethene have been detected within one well (REH011), which could has the potential to pose a risk to human health via vapour inhalation pathways The source of the detected trichloroethene contamination was considered to have originated from an off-site source at a site known as HPH5.	Yes. It is noted that the previous investigations at the site were undertaken as part of investigation of a wider site area, and it is recommended that further sampling is undertaken on the study site to reduce uncertainty in relation to the proposed development.	
	• Inhalation of vapours	• Future site users • Construction workers • Maintenance workers • Neighbouring site users	Ramboll suggested that inclusion of a vapour impermeable membrane as a precautionary measure could be required to prevent ingress of residual volatile organic contamination (VOCs) into the indoor airspace. Although the site historically is likely to have been used for storage of materials associated with the nearby aircraft site, the potential for a residual on site source of VOC contamination is considered to be low to medium risk. Acute and sub chronic risks to construction/maintenance workers are outside the scope of this assessment but would be expected to be managed by appropriate health and safety procedures.		2
	• Permeation of water pipes and attack on concrete foundations by aggressive soil conditions	• Building structures/services	The reports of previous investigations at the site made available to Jomas Associates have focussed on groundwater quality. No soil analysis data has been provided.	Yes	3
	• Leaching through permeable soils, migration within the vadose zone (i.e., unsaturated soil above the water table) and/or lateral migration within surface water, as a result of cracked hardstanding or via service pipe/corridors and surface water runoff. • Horizontal and vertical migration of contaminants within groundwater	• Controlled waters - Principal aquifer (R6)	Given the groundwater monitoring undertaken at the site to date, the relatively low concentrations of contaminants detected, and the lack of groundwater abstractions or surface waters in the vicinity of the site, further risk assessment in relation to controlled waters is not considered necessary.	No	4

Table 5.3 – Conceptual Site Model / Preliminary Risk Assessment

Source	Pathway	Receptor	Assessment to date	Further investigation required?	Linkage Number
• Current and previous industrial use – off site (S3) ○ Grammophone factory 240m NE (from ca 1910) ○ Gas works 300m north (from ca 1910) ○ Aviation works 90m east (from ca 1930s) ○ USTs for fuel storage at adjacent site to the north, and wider within the adjacent former aviation works	• Horizontal and vertical migration of contaminants within groundwater • Inhalation of vapours	• Future site users • Construction workers • Maintenance workers	An extended period of groundwater monitoring has been undertaken by Ramboll on a wider site area, with 2no monitoring wells within the study site. Concentrations of a chlorinated solvent trichloroethene have been detected within one well (REH011), which could have the potential to pose a risk to human health via vapour inhalation pathways The source of the detected trichloroethene contamination was considered to have originated from an off-site source at a site known as HPH5. Ramboll suggested that inclusion of a vapour impermeable membrane as a precautionary measure could be required to prevent ingress of residual volatile organic contamination (VOCs) into the indoor airspace. Acute and sub chronic risks to construction/maintenance workers are outside the scope of this assessment but would be expected to be managed by appropriate health and safety procedures.	Yes. It is noted that the previous investigations at the site were undertaken as part of investigation of a wider site area, and it is recommended that further sampling is undertaken on the study site to reduce uncertainty in relation to the proposed development.	5
• Former brick fields 20m north and 130m north east (S5) • Worked ground on site and in wider site vicinity (S6)	• Accumulation and Migration of Soil Gases (P5)	• Future site users • Construction workers • Maintenance workers	Although no current or historic landfill sites are recorded within the proximity of the site, this desk study has identified historic brickfield in the site vicinity. Previous reports by Ramboll referenced 4no former landfill sites within 1km of the site, with the nearest located 770m south west of the site. In addition, the site and the wider site vicinity is recorded by the BGS as comprising worked ground, and the site vicinity has been the location of significant historical industrial activities. No recorded ground gas risk assessment has been referenced within the previous reports provided. Although the risk associated with ground gas risk is considered to be low to moderate, it is recommended that further investigation and assessment be undertaken in this regard to confirm that risks are acceptable in relation to the proposed development.	Yes	6

5.3.10 It should be noted that the identification of potential pollutant linkages does not necessarily signify that the site is unsuitable for its current or proposed land use. It does however act as a way of focussing data collection at the site in accordance with regulatory guidance.

5.4 Outcome of Risk Assessment

5.4.1 The historical record of the site indicates that the site remained undeveloped until after World War 2, when the site appears to have been used for storage associated with the adjacent aviation works. From the 1970's until recent demolition ca 2013, the site appears to been developed with a warehouse.

5.4.2 The site vicinity underwent significant development in the early part of the 20th century with a gramophone factory 240m north of the site, and an aviation works 90m east during the 1930s. The aviation works appears to have been redeveloped with industrial warehouses from the 1970s onwards, with more recent commercial developments occurring in the last ten years.

5.4.3 It is recommended that an intrusive investigation is undertaken to clarify potential risks to the identified receptors, as identified in Table 5.3.

5.4.4 A preliminary investigation may comprise a series of window sampler holes and cable percussive boreholes.

5.5 List of Key Contaminants

5.5.1 The possible contamination implications for both on-site and off-site sources have been assessed based on the information presented in the report. This has been achieved using guidance publications by the Environment Agency, together with other sources.

5.5.2 In the case of the site uses identified as part of the desk study research, reference has been made to DoE industry profiles for aircraft manufacturing works

5.5.3 Based on recommendations within the guidance publications, an initial soil and water chemical testing suite would need to consider a range of contaminants as follows:

- *Metals*: cadmium, chromium, copper, lead, mercury, nickel, zinc;
- *Semi-metals and non-metals*: arsenic, boron, sulphur;
- *Inorganic chemicals*: cyanide, nitrate, sulphate and sulphide;
- *Organic chemicals*: aromatic hydrocarbons, aliphatic hydrocarbons, petroleum hydrocarbons, phenol, polyaromatic hydrocarbons; VOCs
- *Others*: pH, Asbestos, Polychlorinated biphenyls (PCBs)

6 REFERENCES

BRE Report BR211; Radon: Guidance on protective measures for new buildings, 2015

Code of Practice for Ground Investigations BS5930: 2015

CL:AIRE; Petroleum Hydrocarbons in Groundwater, 2017

Environment Agency (2004) *Model procedures for the management of land contamination*. CLR11. Bristol: Environment Agency

Groundsure Enviro+Geoinsight Report Ref HMD-377-7790277 26/4/2021

Investigation of Potentially Contaminated Sites – Code of Practice BS10175: 2011

Ministry of Housing, Communities & Local Government: *National Planning Policy Framework*. February 2019

Department of Environment Industry Profiles (1996) – Engineering works – arcraft manufacturing works ISBN 1 85112 299 0

APPENDICES

APPENDIX 1 – FIGURES

APPENDIX 2 – GROUNDSURE REPORT

APPENDIX 3 – OS HISTORICAL MAPS

APPENDIX 4 – QUALITATIVE RISK ASSESSMENT METHODOLOGY

APPENDIX 5 – BGS BOREHOLE RECORDS

JOMAS ENGINEERING ENVIRONMENTAL

WE LISTEN, WE PLAN, WE DELIVER

Geotechnical Engineering and Environmental Services across the UK.

Construction Enquirer Awards – BEST CONSULTANT TO WORK FOR – WINNER

Constructionline Gold Member

SSIP Safety Schemes in Procurement – Acclaim Accreditation

CSCS

CEnv Chartered Environmentalist

National Quality Mark Scheme for Land Contamination Management

The Chartered Institution of Wastes Management

silc – Specialist in Land Condition

The Geological Society

IEMA – Transforming the world to sustainability

LCA London Construction Awards – Finalist – Engineering Consultant of the Year

JOMAS ASSOCIATES LTD

6-9 The Square

Stockley Park

Uxbridge

UB11 1FW

CONTACT US

Website: www.jomasassociates.com

Tel: 0843-289-2187

Fax: 0872-115-4505

Email: info@jomasassociates.com