PHASE 1 PRELIMINARY RISK ASSESSMENT

75 Norcutt Road, Twickenham, London TW2 6SR

HLEI68708
Phase 1 Preliminary Environmental Risk Assessment
Rev 1
June 2019

rpsgroup.com

Document status

Version	Purpose of document	Authored by	Reviewed by	Approved by	Review date
0	First Issue	TK	JL	JL	13/06/2019
1	Amendments	TK	JL	JL	28/06/2019

Approval for issue

Jim Lightbown		13 June 2019

Prepared by:

RPS

Tomos Kidd
Principal Consultant

20 Farringdon Street
London, EC4A 4AB

T +44 20 7280 3240
E rpslon@rps.com

Prepared for:

Leek Real Estate (No.1) Ltd

Benjamin Leek
Director

4th Floor Tuition House, 27-37 St George's Road
London SW19 4EU

T +44 (0)7986 991 280
E ben@leekrealestate.com

Contents

Tables

Figures

Appendices

EXECUTIVE SUMMARY

RPS Consulting Services Ltd (RPS) was commissioned by *Leek Real Estate (No.1) Ltd* to undertake a Phase 1 Preliminary Environmental Risk Assessment of 75 Norcutt Road, Twickenham, London TW2 6SR. The report has been commissioned prior to the proposed residential redevelopment of the site.

Current Site and Surrounding Land Use

The site currently comprises a vacant single storey building formerly in use for commercial purposes. No current on site potentially contaminative land uses have been identified.

The site is located in an area of mixed commercial and residential land use. The immediate surroundings of the site include a railway line (adjacent to the north), a disused bakery with electricity substation (adjacent to the west), an electricity distribution site (adjacent to the east) and an engineering works (approximately 115m south of the site).

History of Site and Surrounding Land use

A review of historical maps indicates numerous phases of redevelopment on the site, included a laundry (c.1915 to c.1973) and a printing works (c.1973 to c.1988), prior to construction of the current commercial unit. Two tanks were labelled in the northeast of the site, associated with the former Laundry, between c.1961 and c.1973.

Off-site historical potential sources of contaminants of concern include off site areas of the former laundry, off site areas of the former printing works, an electricity works, a sewage works, another laundry and other unspecified works. Historical mapping indicates a gravel pit approximately 5m south of the site in c.1896 was subsequently infilled by c.1915.

Environmental Setting

The closest residential properties are located adjacent to the south of the site.

The site is indicated to be underlain by a Principal Aquifer relating to the Kempton Park Gravel Member over an Unproductive Stratum relating to the London Clay Formation. The London Clay Formation is underlain by Secondary A Aquifers (relating to the Lambeth Group and the Thanet Formation) and a Principal Aquifer (relating to the White Chalk Subgroup) at depth. The site is not indicated to be located in a groundwater Source Protection Zone (SPZ) and there are no there are no active licensed groundwater abstractions indicated within 1.50km of the site.

The nearest surface water feature is River Crane, which is located approximately 35m to the northwest of the site at its closest point.

Previous Investigations

A site investigation was undertaken by Risk Management in February 2014 (ref: RML 5294). The investigation identified lead and speciated polycyclic aromatic hydrocarbons (PAH) at concentrations above their respective generic assessment criteria (GAC) in samples of Made Ground collected from the site. A previous investigation (in 2005) was indicated to have detected a ‘‘minimal’ PCBs in a sample of Made Ground from the site. Following a review of this report, RPS has identified a number of significant data gaps.

Outline Conceptual Site Model

Current and historical potentially contaminative land uses have been identified on site and in the surrounding area.

It is understood that the proposed surface cover at the site will likely comprise mainly building cover and hard landscaping with some areas of soft landscaping. In areas of the site covered by buildings or hard landscaping the risks to future on site human health receptors via the pathways of dermal contact and ingestion will be mitigated. However, in areas of soft landscaping, the pathways of dermal contact and

ingestion could still be active. In addition, there would be potential for the airborne migration of soil/dust from these areas.

There is the potential for ground gas and volatile contaminants of concern in soil and/or groundwater (if present) beneath the site to impact future site users via the inhalation pathway in indoor areas.

Groundwater within the Made Ground and/or Kempton Park Gravel Member may constitute a potential pathway for the off-site migration of contaminants of concern. These may impact neighbouring site users via the direct contact, ingestion and vapour inhalation pathways.

Potential contaminants of concern associated with current and historical land uses in the vicinity of the site also have the potential to migrate onto site via groundwater within the underlying permeable strata.

The low permeability London Clay Formation, present beneath the Kempton Park Gravel Member, is likely to restrict the downward migration of groundwater and potential contaminants (if present) to the underlying Secondary A Aquifers (relating to the Lambeth Group and the Thanet Formation) and the Principal Aquifer (relating to the White Chalk Subgroup) at depth.

Recommendations

The outline Conceptual Site Model produced upon completion of the Phase 1 assessment has identified a number of potential pollutant linkages that may become active upon the redevelopment of the site.

Although a site investigation was undertaken at the site by Risk Management in 2014, a number of significant data gaps have been identified by RPS. It is therefore recommended that a Supplementary Phase 2 Environmental Site Investigation is carried out at the site prior to construction. Where necessary, the assessment will outline any recommendations necessary in order to remediate / mitigate any identified environmental risks.

1 INTRODUCTION

1.1 Preamble

1.1.1 RPS Consulting Services Ltd (RPS) was commissioned by *Leek Real Estate (No.1) Ltd* to undertake a Phase 1 Preliminary Environmental Risk Assessment of 75 Norcutt Road, Twickenham, London TW2 6SR. The report has been commissioned prior to the proposed residential redevelopment of the site.

1.1.2 The site is located in the administrative area of the London Borough of Richmond upon Thames (LBRuT). It is irregular in shape and occupies an area of approximately 0.07ha. The site currently comprises a vacant single storey building formerly in use as an office and light industrial purposes. A site location plan is presented as Figure 1.

1.2 Objectives

1.2.1 The principal objectives of this assessment were as follows:

- To assess potential sources of contamination at the site, associated with historical and current land uses both on site and in the surrounding area;
- To review the environmental setting to assess the sensitivity of the surrounding area to contamination/pollution;
- Produce an outline Conceptual Site Model (CSM) detailing how any contamination may impact the identified receptors via pollutant linkages; and
- To provide recommendations for further investigation of potential pollutant linkages, where considered necessary.

1.3 Legislation and Guidance

1.3.1 This report has been produced in general accordance with:

- Contaminated Land (England) Regulations 2006 (as amended);
- DEFRA Environmental Protection Act 1990: Part 2A - *Contaminated Land Statutory Guidance* (2012);
- DEFRA and Environment Agency (2004) Contaminated Land Report 11 (CLR 11*): Model Procedures for the Management of Land Contamination*;
- National Planning Policy Framework (2019);
- CIRIA Document C665: *Assessing Risks Posed by Hazardous Ground Gases to Buildings*;
- British Standard requirements for the '*Investigation of potentially contaminated sites - Code of practice*' (ref. BS10175:2011+A1:2013);
- British Standard requirements for the '*Code of practice for ground investigations*' (ref. BS5930:2015); and
- British Standard requirements for the '*Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings*' (ref BS8485:2015+A1:2019).

1.3.2 Where appropriate, consideration has also been given to the following:

- The potential for environmental liabilities to occur under other associated regimes, for example the Water Resources Act (1991) and the Environmental Damage Regulations (2009); and

- Key constraints on site redevelopment (if proposed);

1.3.3 Although not part of the scope of this report, the following may be commented on for information only where readily observed, reported or identified:

- Asbestos-containing materials; and
- Japanese Knotweed (invasive plant species). It should be noted that its identification can be limited by the seasons, dense vegetation, physical, infrastructural, health & safety and other constraints.

1.3.4 Details of the limitations of this type of assessment are described in Appendix A.

2 SITE RECONNAISSANCE AND DESK STUDY

2.1 Site Reconnaissance

2.1.1 This section of the report is based upon observations made during a site visit carried out on 21st May 2019. A site boundary plan is provided as Figure 2. Selected photos are shown in Appendix B.

General view of the site. For further photos see Appendix B.

The Site

Table 1 – Summary of on-site activities

Section	Description
Background:	The site is located approximately 1.3km west of Twickenham Railway Station at National Grid Reference TQ153733. It is roughly rectangular in shape and occupies an area of approximately 0.07ha.
Site Layout:	At the time of the walkover the site comprised a vacant single storey commercial building with ancillary office accommodation, staff welfare facilities and an adjacent external yard area in the east. The site comprised approximately 35% building cover, 50% hardstanding and 15% soft landscaping. The site was noted to exhibit generally flat topography. A previously completed topographical survey of the site by RPS (Ref. JKK10321-01, dated 12th December 2018) recorded a general elevation across the site of approximately 10.20m above ordnance datum (m AOD). Access to the site was via Norcutt Road to the south of the site.
Activity / Operations:	The building predominantly comprised a commercial area with ancillary office accommodation and welfare facilities in the east. The commercial area was located over ground and mezzanine levels, with two storey equivalent racking in the east, and predominantly comprised the storage of plastic piping (See Photo 1, Appendix B). Small chemical storage (<5 litre capacity) was noted inside the commercial area and a water butt (<500 litre capacity) was noted on the mezzanine level (See Photo 2 and 3, Appendix B).

Section	Description
	The east of the unit comprised ground floor office accommodation and welfare facilities including a kitchen area and toilet facilities. The yard area in the east of the site comprised three large waste bins, a small waste bin, storage of pallets/wood, three small (<25 litre capacity) chemical containers and a small brick shed (See Photo 4, Appendix B). The shed contained an electricity switchboard and general maintenance equipment including paint pots, shovels, weed killer and gardening equipment (See Photo 5, Appendix B).
Building Structure(s):	The building was of brick construction, with steel cladding covering the top third of the building façade and roof. The south wall is infill blockwork. The commercial area was accessible via a metal roller door on the eastern façade of the building.
Surface Cover:	The yard in the east of the site was generally laid to poor quality asphalt with signs of wear, cracks and scattered weeds (See Photo 6, Appendix B). A band of fair quality brick paving was noted in the southeast and centre of the north of the site. Soft Landscaping was confined to the northern and southwestern edges of the site and predominantly comprised grasses, weeds and shrubs.
Drainage:	No drainage survey or drainage plans were available for review during the site visit and no external surface water drains were identified on-site during the site walkover. Water use at the site was limited to sanitary purposes and it is considered likely that foul water on-site is limited to sewage and domestic waste water. No operational trade effluent discharges that would require the freeholder to obtain consent to discharge were identified during the site visit. An Asset Location Search for the site supplied to RPS by the client. This identified two Thames Water foul sewers and a surface water sewer are located beneath the site. The main foul sewer running east to west through the site is indicated to be 914mm in diameter and located approximately 10.00m bgl. A shallower 225mm foul sewer and 225mm surface water sewer are indicated to be present in the south east corner of the site at approximately 3.00m bgl, connecting to the larger foul sewer.
Bulk Storage / Tanks:	RPS did not identify any bulk chemical storage or tanks on-site and no evidence (such as relic pipework) to indicate underground storage tanks were identified on-site during the time of the site walkover. A large <500 litre capacity plastic water tank, of good condition, was noted on the mezzanine level of the building (See Photo 3, Appendix B). Three <25 litre plastic containers comprising unspecified chemicals were noted in the east of the yard area, located on poor quality asphalt hardstanding (See Photo 2, Appendix B). Small 2.5 litre bottles of primer, a 5-litre bottle of motor oil and six <2.5 litre pots of paint were located on the racking within the commercial area (See Photos 2, Appendix B).
Waste:	RPS did not consult a site representative regarding waste streams and waste management at the site, however, two large black waste bins and two green bins were noted in the east of the yard area which appeared to be for general and recycling use only (See Photo 7, Appendix B).
Electricity Substations /Transformers:	No electricity substations or transformers were identified on-site at the time of the site walkover.
Visual Evidence of Contamination:	RPS did not observe any significant visual or olfactory evidence of contamination on site during the site walkover.
Statutory Nuisance:	RPS is not aware of any complaints relating to statutory nuisance at the site.
Other Issues:	No Japanese Knotweed or Giant Hogweed (invasive plant species) were readily identified on the site at the time of the survey. (It should be noted that the identification can be limited by the seasons and in areas of dense vegetation growth). A pipe, appeared to be for venting purposes, was present in the external yard area in the east of the site (See Photo 8, Appendix B), however this appeared to be associated with the adjacent building to the east.

The Surrounding Area

2.1.2 The site is located in an area of mixed commercial and residential land uses. At the time of the site inspection, neighbouring land consisted of the following:

Table 2 – Neighbouring Land Uses

Direction	Description
North:	Railway line beyond which in turn was Twickenham Rifle Club, the River Crane and Recreation Ground.
East:	Twickenham Grid Substation (electricity distribution site)
South:	Block of flats and Norcutt Road, with residential properties beyond.
West:	Industrial buildings (large disused bakery factory) including electricity substation adjacent to the site to the northwest.

2.2 Proposed Development

2.2.1 It is proposed to construct a 4 to 5 storey block of residential flats with ancillary areas of landscaping, hardstanding and car parking.

2.2.2 A proposed development plan is included as Figure 3.

2.3 Site History

Historical Map Review

2.3.1 The following review is based on past editions of readily available Ordnance Survey (OS) maps. These include scales of 1:1,250, 1:2,500 and 1:10,000 dated 1869 to 2019. Extracts from selected historical maps are given as Figure 4 to Figure 8.

Table 3 – Historical Site Uses

On-site Land Use and Features	Dates
The majority of the site comprised undeveloped woodland. An unnamed track / path was present in the eastern section of the site.	1869 to c.1896
The site was indicated to have been cleared of trees.	1896 to c.1915
The site comprised a *Laundry* with a large building occupying the central, and south-western section of the site and two smaller ancillary buildings in the north and northwest of the site. From c.1934 an additional building extension was present in the southeast of the site. From c.1961 two tanks and a well were labelled in the northeast of the site.	1915 to c.1973
The site had been redeveloped as part of a large Printing Works with a building covering the majority of the site extending beyond to the south. Three ancillary buildings / structures were present in the north, northwest and northeast of the site.	1973 to c.1988
The site had been redeveloped to resemble its current layout with likely commercial units constructed in the east of the site. One unit (labelled “3”) corresponds to the footprint of the existing building on site. An adjoining unit (was also initially shown, extending beyond the southern boundary of the site. This unit had been demolished by 2013.	1988 to Present

Table 4 – Historical Neighbouring Site Uses

Surrounding Land Uses (250m radius)	Orientation	Distance	Dates	
			From	To
Railway line	North	Adjacent	1869	Present

Surrounding Land Uses (250m radius)	Orientation	Distance	Dates	
			From	To
Gravel pit *Then* potentially infilled	South	5m	1896 1915	c. 1915 c.1934
Then Laundry *Then* Printworks		Adjacent (extending from site)	1934 1973	c. 1973 c.1988
Bakery (with electricity substation)	West	Adjacent	1961	Present (disused)
Electricity Works *Then* Depot *Then* Electricity Distribution Site	East	15m	1915 1961 1973	c. 1961 c. 1973 Present
Sewage works *Then* Depot	Northeast	50m	1896 1962	c. 1962 Present
Laundry *Then* unlabelled (likely associated with bakery)	South	110m	1934 1973	c. 1973 Present
Works (of unspecified use)	South	115m	1961	Present
Works (of unspecified use)	West	120m	1961	c. 1999
Coal yard	East	190m	1961	c. 1981
Coal yard	Southeast	215m	1961	c. 1973
Builders yard *Then* depot	Southeast	230m	1961 1977	c. 1977 c. 1999

Site Planning History

2.3.2 Relevant planning records for the site, obtained from LBRuT Council's planning website are summarised as follows:

- 19/1580/DEMPN – Demolition of building – Approved 13th June 2019.
- 17/1033/FUL - Demolition of building and replacement with a part four, part five-storey building comprising nine student flats, car parking spaces and landscaping - Application Permitted on Appeal on 23/05/2018.
- 14/0157/FUL - Demolition of building and replacement with a three-storey building (with accommodation in roof) to provide nine flats, car parking and landscaping areas - Granted permission 23th June 2015.

2.3.3 The 14/0157/FUL and 17/1033/FUL permissions referenced standard pre-development conditions relating to the assessment of potentially contaminated land. A combined Phase 1 and Phase 2 site investigation report for the site dated February 2014 (by Risk Management, Ref. RML 5294) was submitted in support of both of these applications. A summary of this report is presented in Sections 2.4 and 2.5.

2.3.4 No conditions pertaining to the assessment of potentially contaminated land at the site have been identified as associated with the 19/1580/DEMPN application.

2.4 Previous Reports

2.4.1 A review of the existing environmental reports, available on LBRuT Council's planning website is provided below. RPS cannot vouch for the accuracy or validity of the information provided within third party reports. and the following opinion is based solely upon the reports. Legal reliance should be sought from the original authors of these reports where their content is considered material to the characterisation of the site.

Risk Management (February 2014) Phase I and Phase II Site Investigation at Norcutt Road, Twickenham, Ref. RML 5294, on behalf of N & A (Guildford) Limited

2.4.2 A review of historical mapping identified numerous phases of redevelopment on the site, including a laundry and a printing works. Historical land uses in the immediate site surroundings included gravel pits, an electricity works, a printing works and other unspecified works. Limited site investigation works were undertaken including drilling four window sample boreholes to a maximum depth of 4m below ground level (bgl). One borehole was installed with a groundwater / ground gas monitoring well and three rounds of monitoring were subsequently undertaken. The site investigation by Risk Management encountered Made Ground up to 0.7m in thickness, over silty sandy clay (in approximately 1m thickness). This in turn was underlain by sand and gravel to the base of the borehole excavations, up to 4m bgl. Groundwater was not encountered during the intrusive investigations or subsequent monitoring.

2.4.3 Four samples of Made Ground soils (from depths ranging between 0.15m and 0.5m bgl) were analysed for a range of contaminants of concern including asbestos, heavy metals, speciated total petroleum hydrocarbons (TPH), volatile organic compounds (VOCs), semi volatile organic compounds (SVOCs), speciated polycyclic aromatic hydrocarbons (PAH) and polychlorinated biphenyls (PCBs). Asbestos, PCBs, VOCs and SVOCs were not detected. The analysis results were compared to CLEA Soil Guideline Values (SGVs) or ATRISK Contaminated Land Screening Values (SSVs) for residential without plant uptake. Exceedances of the benzo(a)pyrene (a PAH) and lead were noted in samples obtained in 2014. *RPS notes that these assessment criteria were in line with industry standard at the time of the report*. *The current guideline values would be Suitable 4 Use Levels (S4UL) published in 2015 or in the absence of a S4UL for lead the Category 4 Screening Level (C4SL) published in 2014 would be used. Comparison with the current guideline values indicates marginal exceedances of S4ULs and C4ULs for benzo(a)pyrene and lead.*

2.4.4 The report indicates that in 2005 four soil samples were also obtained from the site and analysed for asbestos, VOC, VOCs and PCBs. *RPS notes that the associated analysis results were not presented in the report reviewed.* The report states that 'minimal' PCBs were detected in one sample and all other results were below laboratory detection limits.

2.4.5 The ground gas monitoring did not detect methane and the carbon dioxide concentrations were low.

2.4.6 RPS has noted the following data gaps in relation to the existing Phase 2 investigation:

- The paucity of the sampling (both spatially and vertically) in relation to the size of the site, potential sources of contamination (including the tanks identified on historical mapping) and the number of residential units proposed;
- Groundwater monitoring was not carried out as part of the site investigation. The potential risk to controlled waters and human health receptors from any contaminants of concern in groundwater beneath the site cannot therefore be adequately assessed;
- The laboratory analysis results for soil samples were compared to generic assessment criteria which have since been superseded;
- Laboratory analytical certificates have not been provided soil testing results. RPS is therefore unable to verify Risk Management's conclusions;
- Only one borehole was installed therefore the ground gas conditions of the site have not have been adequately captured during the monitoring;
- RPS note that deeper wells would likely be required to enable monitoring and sampling of groundwater.

2.4.7 The report mentioned above is discussed further in the following section.

2.5 Environmental Setting

Geology

2.5.1 Based on British Geological Survey (BGS) mapping (1:50,000-scale) and the Environment Agency (EA) Groundwater Vulnerability mapping (1:100,000-scale), the stratigraphic sequence and aquifer classifications beneath the site are indicated to be as follows:

Table 5 – Descriptions of Geological Strata

Strata	Description & approximate thickness	Aquifer Classification
Kempton Park Gravel Member	Sand and gravel. Likely to be several metres in thickness beneath the site.	Principal Aquifer
London Clay Formation	Clay and silt. Likely to be of significant thickness beneath the site.	Unproductive Stratum
Lambeth Group	Clay, silt, sand and gravel. Likely to be in excess of 10m beneath the site.	Secondary A Aquifer
Thanet Formation	Sand. Likely to be approximately 5m beneath the site.	Secondary A Aquifer
White Chalk Subgroup	Chalk with flints. Likely to be of significant thickness beneath the site.	Principal Aquifer

2.5.2 As discussed in Section 2.4, the site investigation by Risk Management encountered Made Ground up to 0.7m in thickness, over silty sandy clay (in approximately 1m thickness). This in turn was underlain by sand and gravel to the base of the borehole excavations, up to 4m bgl. The Made Ground is likely the result of past construction and demolition activities.

2.5.3 BGS borehole logs (ref. TQ17SE29, TQ17SE30 and TQ17SE31), located approximately 415m to 440m northwest of the site, generally indicate:

- Made Ground to up to 1m bgl;
- Sandy gravel (Kempton Park Gravel Member) to between 5.75m and 6.25m bgl;
- Silty clay (London Clay Formation) to the base of the borehole, up to 10m bgl; and
- Groundwater encountered at approximately 4m bgl.

2.5.4 BGS borehole log (ref. TQ17SE193), located approximately 690m to the east of the site, indicated the following:

- Made Ground to up to approximately 2.1m bgl;
- Kempton Park Gravel Member to approximately 4.5m bgl;
- London Clay Formation to approximately 53m bgl;
- Lambeth Group to approximately 77m bgl;
- Thanet Formation to approximately 80m bgl; and
- White Chalk Subgroup to the base of the borehole at approximately 121m bgl.

Hydrogeology

2.5.5 The site is indicated to be located above a Principal Aquifer relating to the superficial deposits of the Kempton Park Gravel Member. These formations provide a high level of water storage and may support water supply and / or river base flow on a strategic scale.

2.5.6 The Kempton Park Gravel Member superficial deposits are indicated to be located above Unproductive Stratum relating to bedrock of the London Clay Formation site. These formations have a low permeability and have negligible significance for water supply or base flow.

2.5.7 Secondary A Aquifers (related to the Lambeth Group and Thanet Formation) and a Principal Aquifer (related to the White Chalk Subgroup) are indicated to underlie the London Clay Formation. Secondary A Aquifers have 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.

2.5.8 Groundwater was not encountered during the 2014 site investigation by Risk Management.

2.5.9 According to EA data, the site is not located in a groundwater Source Protection Zone (SPZ).

2.5.10 Information provided by the EA indicates that there is one record of an active licensed groundwater abstraction within 2km of the site. This relates to an abstraction located approximately 1880m northeast of the site for lake and pond throughflow purposes.

2.5.11 Under the Water Framework Directive, the EA's local River Basin Management Plan classifies groundwater chemical quality beneath the site (within the Lower Thames Gravels) as good quality.

Surface Water

2.5.12 There are three watercourses within 1km of the site which are classified within a River Basin Management Plan published by the EA under the European Water Framework Directive (2000). A list of all nearby watercourses and water bodies is as follows:

Table 6 – Nearby Watercourses and Water Bodies

Watercourse / Body	Quality Classification	Approx. Distance and Direction from Site
River Crane	Chemical: Good Ecological: Poor	35m Northwest
Duke of Northumberland's River	Not separately classified - is a tributary of the River Crane	300m West
River Thames	Chemical: Moderate Ecological: Fail	900m Southwest

2.5.13 Information provided by the EA indicates that there are records of four active licensed surface water abstractions within 2km of the site. The details of these are as follows:

Table 7 – Licensed Surface Water Abstractions

Licence Holder	Use	Approx. Distance and Direction from Site
Thames Water Utilities Ltd	General Use	1465 North
Thames Water Utilities Ltd	General Use	1465 North
Thames Water Utilities Ltd	General Use	1465 North
Trustees Of Ham Polo Club	Spray irrigation	1965 East

Fluvial / Tidal Flood Risk

2.5.14 According to the EA flood map, the site is located within Flood Zone 1, with the annual probability of flooding classified as less than 1 in 1000 (0.1%).

Ecologically Sensitive Sites

2.5.15 Natural England data indicates that there are no ecologically sensitive sites, that constitute environmental receptors as defined within Table 1 of the DEFRA Environmental Protection Act 1990: Part 2A - Contaminated Land Statutory Guidance (2012), located within a 1km radius of the site.

Radon

2.5.16 According to the Indicative Atlas of Radon in England and Wales published by the Health Protection Agency (part of Public Health England) and the British Geological Survey, the site is not located in an area at risk from radon gas.

Coal Authority

2.5.17 The Interactive Map Viewer on the Coal Authority website indicates that the site is not located in a coal mining reporting area.

Non-Coal Mining

2.5.18 The Envirocheck Report indicates that the site is not located in an area affected by non coal mining activities.

2.6 Authorised Processes and Pollution Incidents

Landfills and Waste Sites

2.6.1 Information provided by a number of sources (EA, Local Authority and BGS) shows that there are no recorded licensed or known historical landfill sites and one waste treatment / transfer site recorded within 250m of the site. There is a licenced waste transfer station located approximately 140m to the northwest of the site, recorded as handling household, commercial and industrial waste.

Environmental Permits

2.6.2 EA and Local Authority data indicates that there are three active processes regulated by an Environmental Permit (under the Environmental Permitting Regulations 2010) within 500m of the subject site. These are outlined in the table below:

Table 8 – Environmental Permits

Licence Holder	Approx. Distance and Direction from Site	Permitted Activity
Proper Energy Limited	80m East	Organic Chemicals; Oxygen Containing Compounds Eg Alcohols - Part B permit
Beaucare Dry Cleaners	390m Southeast	Dry cleaning - Part B permit
Twickenham Green Dry Cleaners	450m Southwest	Dry cleaning - Part B permit

COMAH Sites

2.6.3 There are no records of any operations under the Control of Major Accident Hazards (COMAH) Regulations 1999, located within 500m of the site.

Pollution Incidents

2.6.4 Environment Agency data indicates that there is one records of a ‘major’ or ‘significant’ pollution incident within 500m of the site. A Category 2 significant’ pollution incident was recorded approximately 340m to the west of the site, comprising of a release of sewage to the River Crane in 1990.

2.7 Unexploded Ordnance

2.7.1 CIRIA Report C681 (stone et al 2009) outlines recommendations for dealing with the potential risk associated with the legacy of Unexploded Ordnance Risk, largely relating the WWII bombing and military sites.

2.7.2 Reference to the Zetica Regional Unexploded Bomb Risk mapping indicates that the site is in an area of low potential risk from Unexploded Bombs. Furthermore, reference to BombSight mapping indicates there are no records WWII bombing within 250m of the site. As the site is not within an area of known military history, in general accordance with CIRIA Report C681, no further consideration of Unexploded Ordnance is considered necessary.

2.8 Regulatory Consultations

2.8.1 The Environmental Health Department at LBRuT was consulted regarding any know contamination issues at the site. The council stated that they have no specific concerns for the site relating to contaminated land. The council also stated that the site had not been prioritised for further investigation under Part 2A of the Environmental Protection Act 1990. They are not aware of any pollution or contamination incidents or issues that have occurred, or are occurring, at or near the site.

3 OUTLINE CONCEPTUAL SITE MODEL

3.1 Background

3.1.1 An outline conceptual site model (CSM) consists of an appraisal of the *source-pathway-receptor* 'contaminant linkages' which is central to the approach used to determine the existence of 'contaminated land' according to the definition set out under Part 2A of the Environmental Protection Act 1990. For a risk to exist (under Part 2A), all three of the following components must be present to facilitate a potential 'pollutant linkage'.

- **Source** referring to the source of contamination (Hazard).
- **Pathway** for the contaminant to move/migrate to receptor(s).
- **Receptor** (Target) that could be affected by the contaminant(s).

3.1.2 Receptors include human beings, other living organisms, crops, controlled waters and buildings / structures. The National Planning Policy Framework, used to address contaminated land through the planning process, follows the same principles as those set out under Part 2A. Further details on the Part 2A regime are presented within Appendix C.

3.2 Potential Pollutant Linkages

3.2.1 Each stage of the potential pollutant linkages have been assessed individually on the basis of information obtained during the site reconnaissance, review of the previous phase 1 report and desk study exercise and are discussed in the following section.

Potential Contaminant Sources

On Site – Current

3.2.2 No current on site potentially contaminative land uses have been identified.

3.2.3 Made Ground present beneath the site could represent a potential sources of contaminants of concern and / or ground gas. Previous limited investigations at the site have indicated marginally elevated concentrations of PAH and lead as well as a ''minimal' detection of PCBs in sampled Made Ground from the site.

On Site – Historical

3.2.4 Historical maps indicate numerous phases of redevelopment on the site, including a laundry (c.1915 to c.1973) and a printing works (c.1973 to c.1988), prior to construction of the current commercial unit. Two tanks were labelled in the northeast of the site, associated with the former Laundry, between c.1961 and c.1973.

Off-site – Current

3.2.5 Current off-site potential sources of contaminants of concern include a disused bakery (adjacent to the west, including an electricity substation), an electricity distribution site (adjacent to the east), a railway line (adjacent to the north) and an engineering works (approximately 115m south).

Off-Site – Historical

3.2.6 Historical potentially contaminative land uses in the immediate site surroundings (within 150m of the site) included off site areas of the former laundry and off site areas of the former printing works, a gravel pit, an electricity works, a sewage works, another laundry and other unspecified works. Some of the former industrial uses within 150m of the site have since ceased and have been redeveloped for commercial and residential uses.

Potential Pathways

3.2.7 In areas of the site covered by buildings or hardstanding the risks to future on site human health receptors via the pathways of dermal contact and ingestion will be mitigated. However, in areas of soft landscaping, the pathways of dermal contact and ingestion could still be active. In addition, there would be potential for the airborne migration of soil/dust from these areas.

3.2.8 There is the potential for ground gas and volatile contaminants of concern in soil and/or groundwater (if present) beneath the site to impact future site users via the inhalation pathway in indoor areas.

3.2.9 There is the potential for contaminants of concern (if present) beneath the site to migrate on or off-site via granular horizons of the Made Ground and the Kempton Park Gravel Formation. These may impact off-site human heath receptors via the dermal contact, ingestion and vapour inhalation pathways.

3.2 If shallow groundwater is present within granular horizons of the Made Ground and the Kempton Park Gravel Formation, there is the potential for contaminants of concern (if present) beneath the site to migrate on or off-site. Depending on the depth of groundwater beneath the site, the pathways of dermal contact, ingestion and vapour inhalation to off-site human health receptors from potential contaminants of concern originating from the site (if present) could be active.

3.3 The London Clay Formation (underlying the Kempton Park Gravel Formation) will restrict the downward migration of groundwater and potential contaminants (if present) to the underlying Secondary A Aquifers (relating to the Lambeth Group and the Thanet Formation) and the Principal Aquifer (relating to the White Chalk Subgroup) at depth.

Potential Receptors

3.2.1 Potential human health receptors include future site users and off-site human health receptors (including residential properties located to the south of the site).

3.2.2 Providing construction workers adopt appropriate levels of hygiene and personal protective equipment, they are not considered to be at significant risk from potential contaminants of concern and have not been considered further as part of this assessment.

3.2.3 The site is located above a Principal Aquifer relating to the Kempton Park Gravel Member. However, the site is not located within a groundwater SPZ and there are no sensitive groundwater abstractions in the vicinity of the site. The closest groundwater abstraction is located approximately 1.8km to the northeast of the site, for lake and pond throughflow purposes. There are no potable groundwater abstractions recorded within 2km of the site.

3.2.4 The nearest surface water feature is the River Crane, which is located approximately 35m to the northwest of the site. This watercourse is classified under the EA's local River Basin Management Plan as having 'good' chemical quality and 'poor' ecological quality.

3.3 Outline Conceptual Site Model

3.3.1 An outline CSM has been developed on the basis of the above. The CSM is used to identify potential sources, pathways and receptors (i.e. potential pollutant linkages) on site and is summarised in the table below:

Table 9 – Outline Conceptual Site Model

Potential Source	Contaminants of Concern	*Via*	Potential Pathways	Linkage Potentially Active?	Receptors
On site – current: Made Ground **On site – historical:** Laundry (with tanks) and printing works.	Metals, hydrocarbons, solvents, PCBs and asbestos	Soil	Direct contact/ingestion	✓	Future site users
			Inhalation of volatiles	✓	
			Airborne migration of soil or dust	✓	Off-site users
			Leaching of mobile contaminants	✓	Principal Aquifer (Kempton Park Gravel Formation)
		Groundwater	Direct contact/ingestion	✓ ✓	Future site users Off-site users
			Inhalation of volatiles	✓ ✓	Future site users Off-site users
			Vertical and lateral migration in permeable strata	✓ ✓	Principal Aquifer River Crane
Off-site – current: Bakery (disused, with electricity substation), electricity distribution site, railway line and engineering works **Off site – historical:** Laundries, printing works, gravel pit, electricity works, sewage works and unspecified works	Metals, hydrocarbons, solvents and PCBs	Groundwater	Direct contact/ingestion	✓	Future site users
			Inhalation of volatiles	✓	Future site users
On and off-site – Made Ground (including that associated with off-site infilled gravel pit) / natural strata or bio-degradation of contamination	Carbon dioxide and methane	Ground Gas	Inhalation of ground gas	✓ ✓	Future site users Off-site users
			Explosive risks	✓ ✓	Future site users Off-site users

4 CONCLUSIONS AND RECOMMENDATIONS

4.1.1 The outline CSM produced upon completion of the desk study assessment has identified a number of potential pollutant linkages that may be active upon the redevelopment of the site.

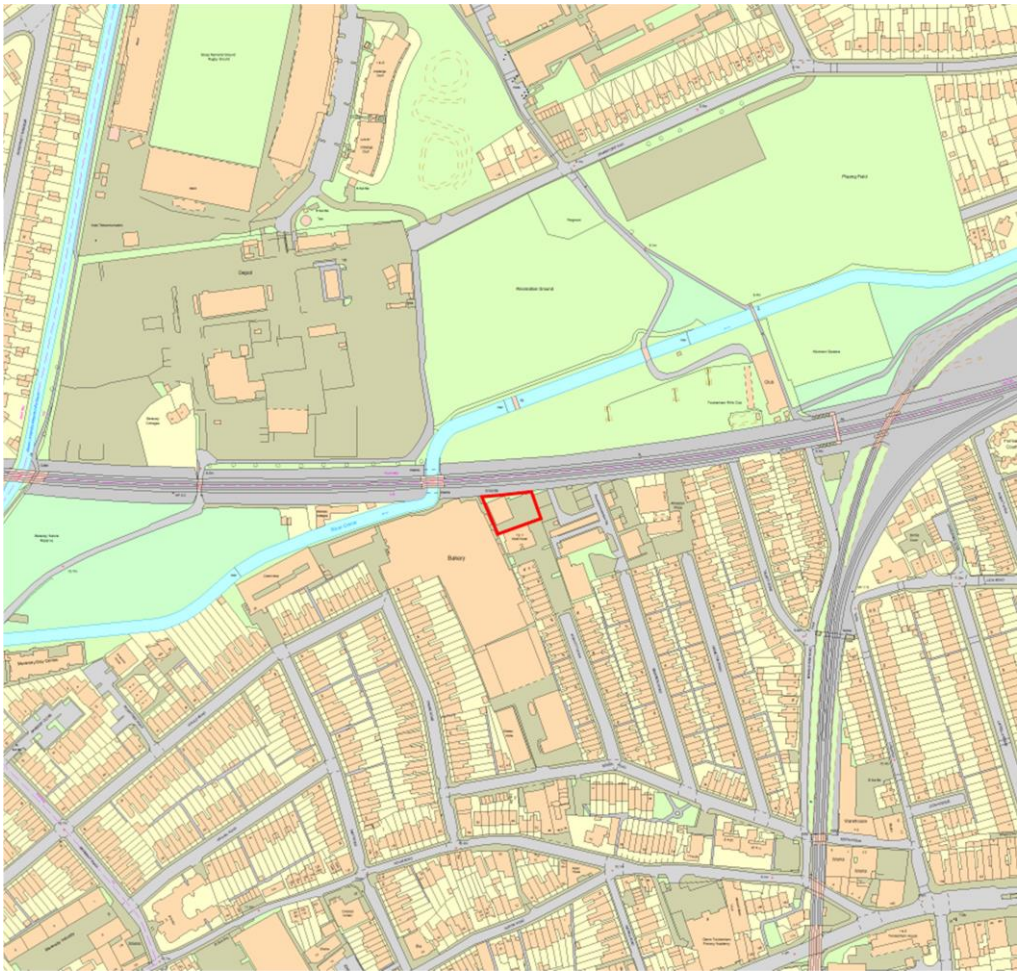
4.1.2 Although a site investigation was undertaken by Risk Management in February 2014, a number of significant data gaps have been identified by RPS.

4.1.3 It is therefore recommended that a Supplementary Phase 2 Environmental Site Investigation is carried out at the site. The scope of this investigation is to assess identified data gaps and to comprise the following:

- Drilling of a number of boreholes across the site targeting identified potential sources and pollutant linkages;
- Installation of groundwater and gas monitoring wells in selected boreholes;
- Collection of soil and groundwater samples from beneath the site with chemical analysis of these samples for contaminants of concern;
- Ground gas monitoring from wells installed at the site;
- Assessment of ground conditions and generic quantitative risk assessment of soil and groundwater chemical analysis results to determine the potential for the identified potential pollutant linkages to remain active upon redevelopment of the site; and
- Provision of recommendations (where necessary) for remediation/mitigation measures to ensure that any identified potential pollutant linkages are not active upon redevelopment of the site.

4.1.4 It would be prudent to combine any site investigation undertaken for environmental purposes with geotechnical testing, in order to facilitate preliminary foundation and pavement design.

FIGURES



Contains OS data (license 100022432) © Crown copyright and database right 2019, replicated from Envirocheck Report (Ref: 205732165_1_1)

Figure 1: Site Location Plan
Map Date: 2019
Scale: Not to scale

20 Farringdon Street
London, EC4A 4BL

☎ 020-7280-3240
www.rpsgroup.com

Figure 2: Site Boundary Plan
Map Date: Current
Scale: Not to scale

20 Farringdon Street
London, EC4A 4BL

☎ 020-7280-3240
www.rpsgroup.com

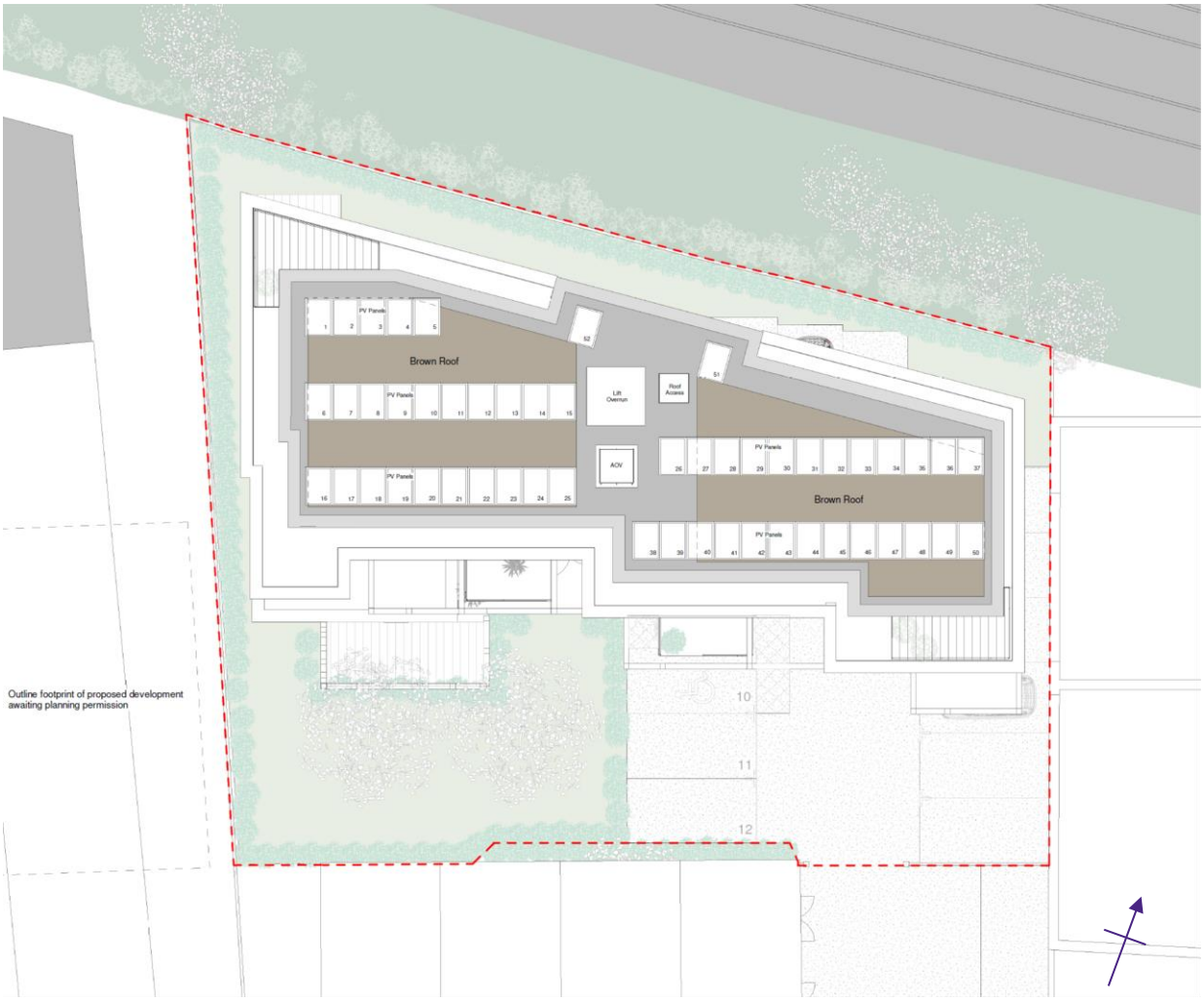
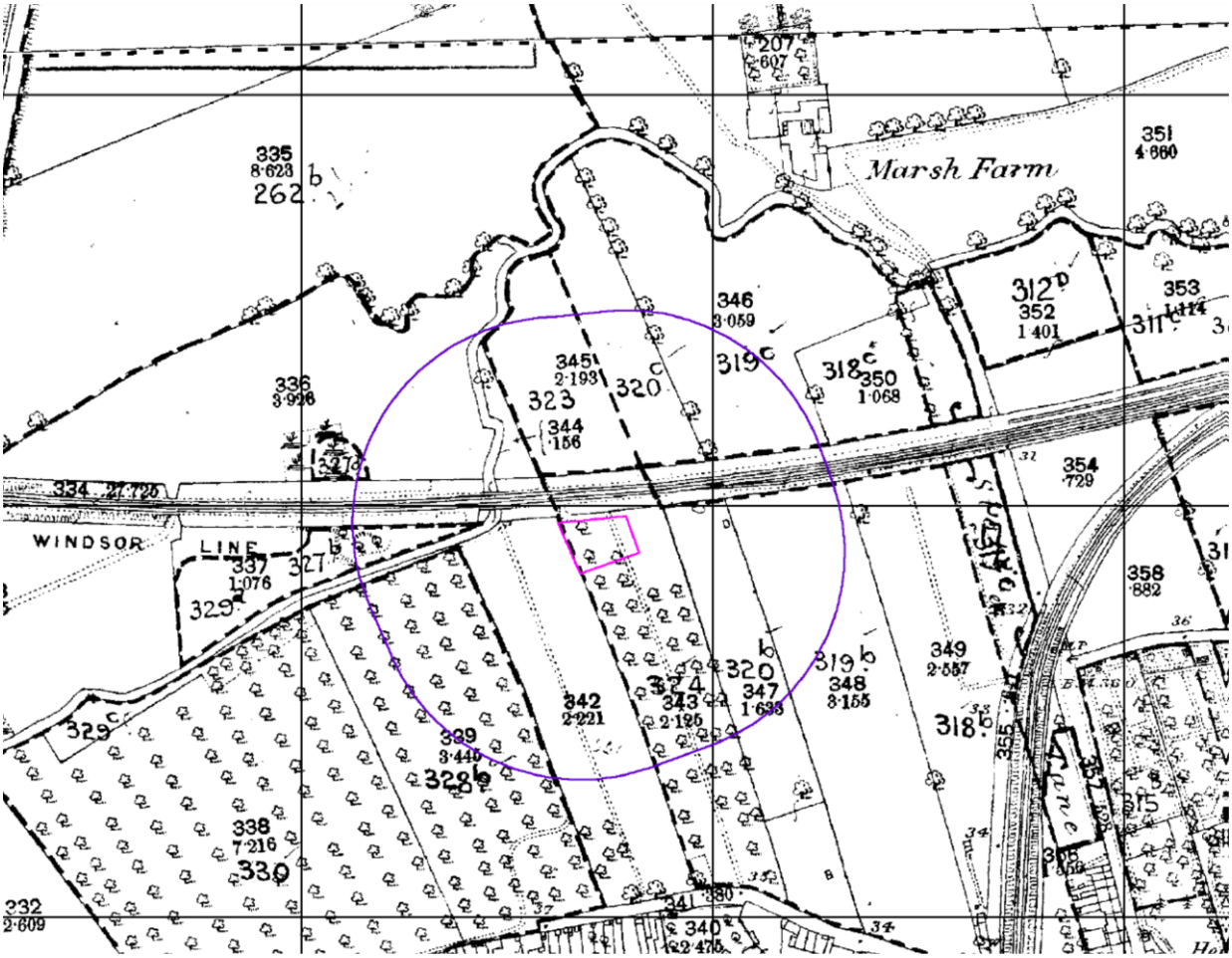


Figure 3: Proposed Development Plan (Ground Floor)
Map Date: Current
Scale: Not to scale

20 Farringdon Street
London, EC4A 4BL

☎ 020-7280-3240
www.rpsgroup.com



Contains OS data (license 100022432) © Crown copyright and database right 2019, replicated from Envirocheck Report (Ref: 205732165_1_1)

Figure 4: Historical Map Extract

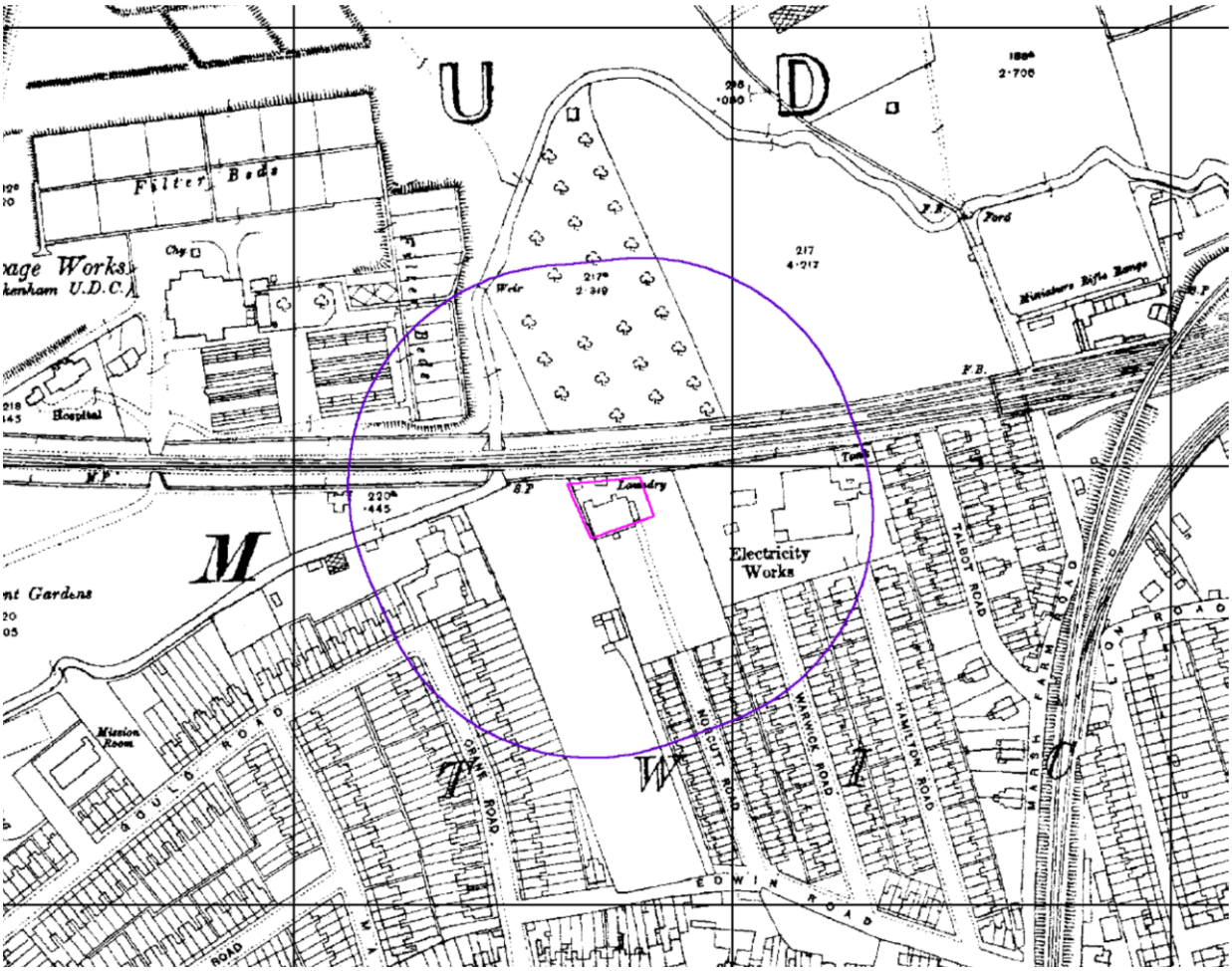
Map Date: 1874

Scale: Not to scale

20 Farringdon Street
London, EC4A 4BL

☎ 020-7280-3240

www.rpsgroup.com



Contains OS data (license 100022432) © Crown copyright and database right 2019, replicated from Envirocheck Report (Ref: 205732165_1_1)

Figure 5: Historical Map Extract

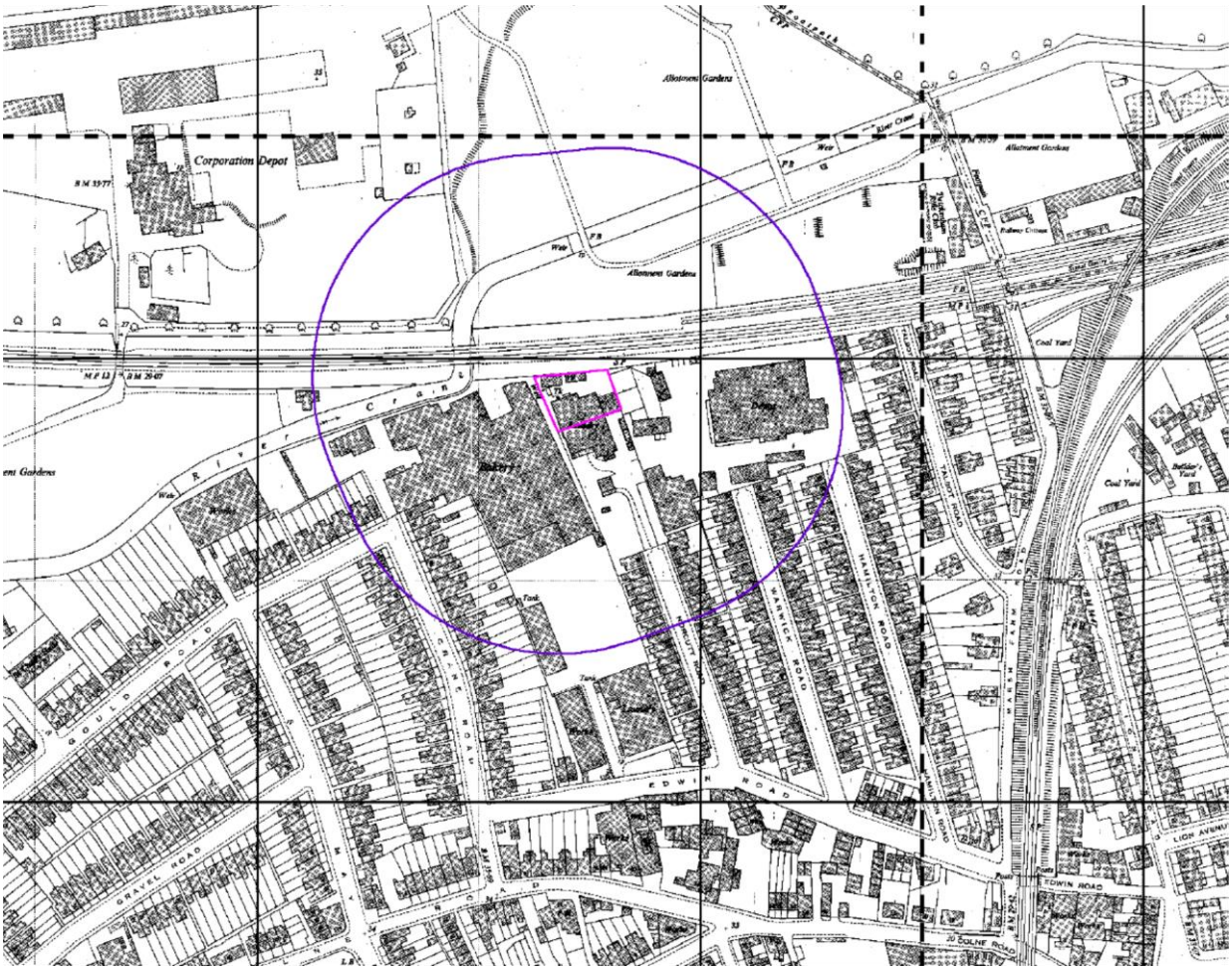
Map Date: 1915

Scale: Not to scale

20 Farringdon Street
London, EC4A 4BL

☎ 020-7280-3240

www.rpsgroup.com



Contains OS data (license 100022432) © Crown copyright and database right 2019, replicated from Envirocheck Report (Ref: 205732165_1_1)

Figure 6: Historical Map Extract

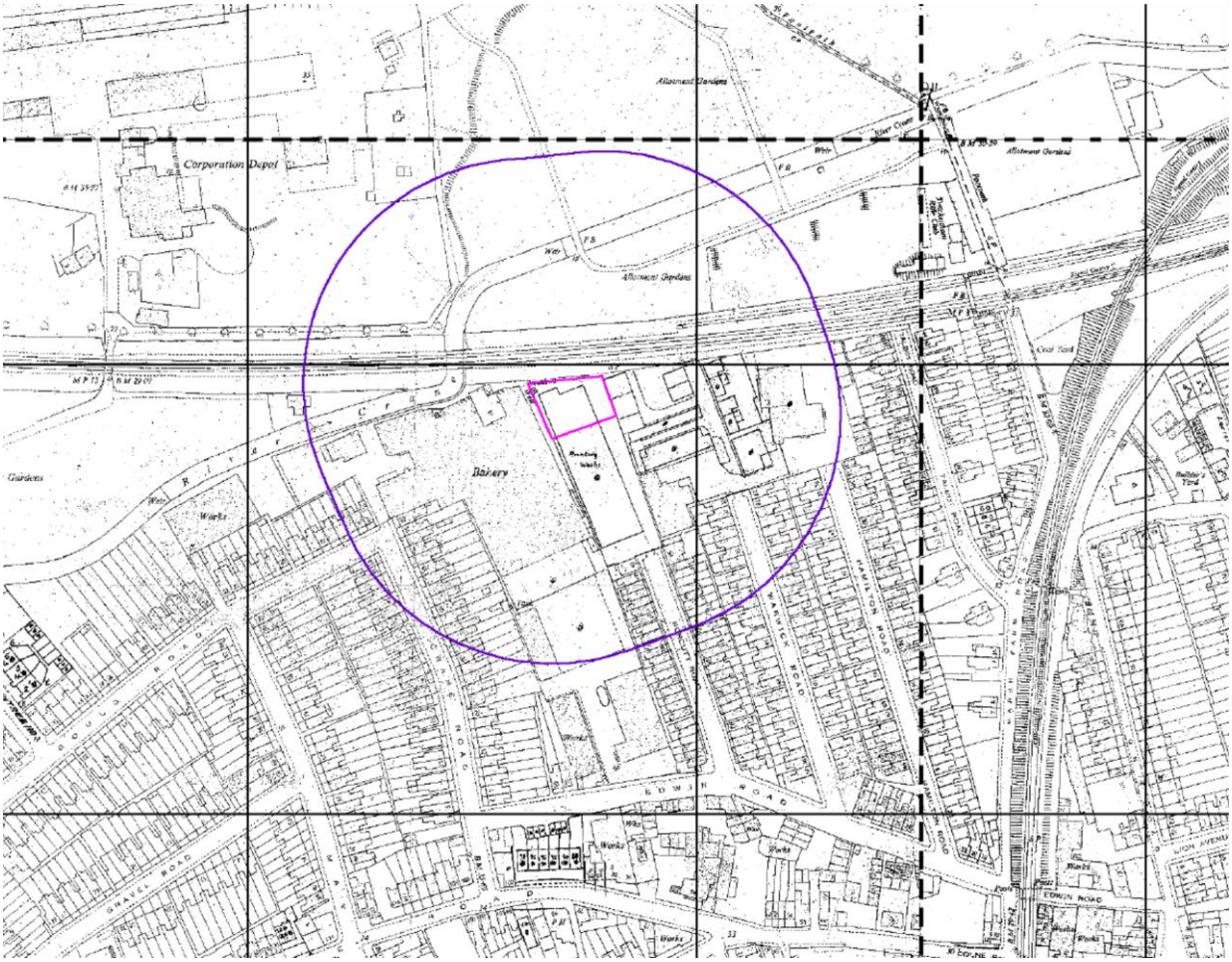
Map Date: 1961

Scale: Not to scale

20 Farringdon Street
London, EC4A 4BL

☎ 020-7280-3240

www.rpsgroup.com



Contains OS data (license 100022432) © Crown copyright and database right 2019, replicated from Envirocheck Report (Ref: 205732165_1_1)

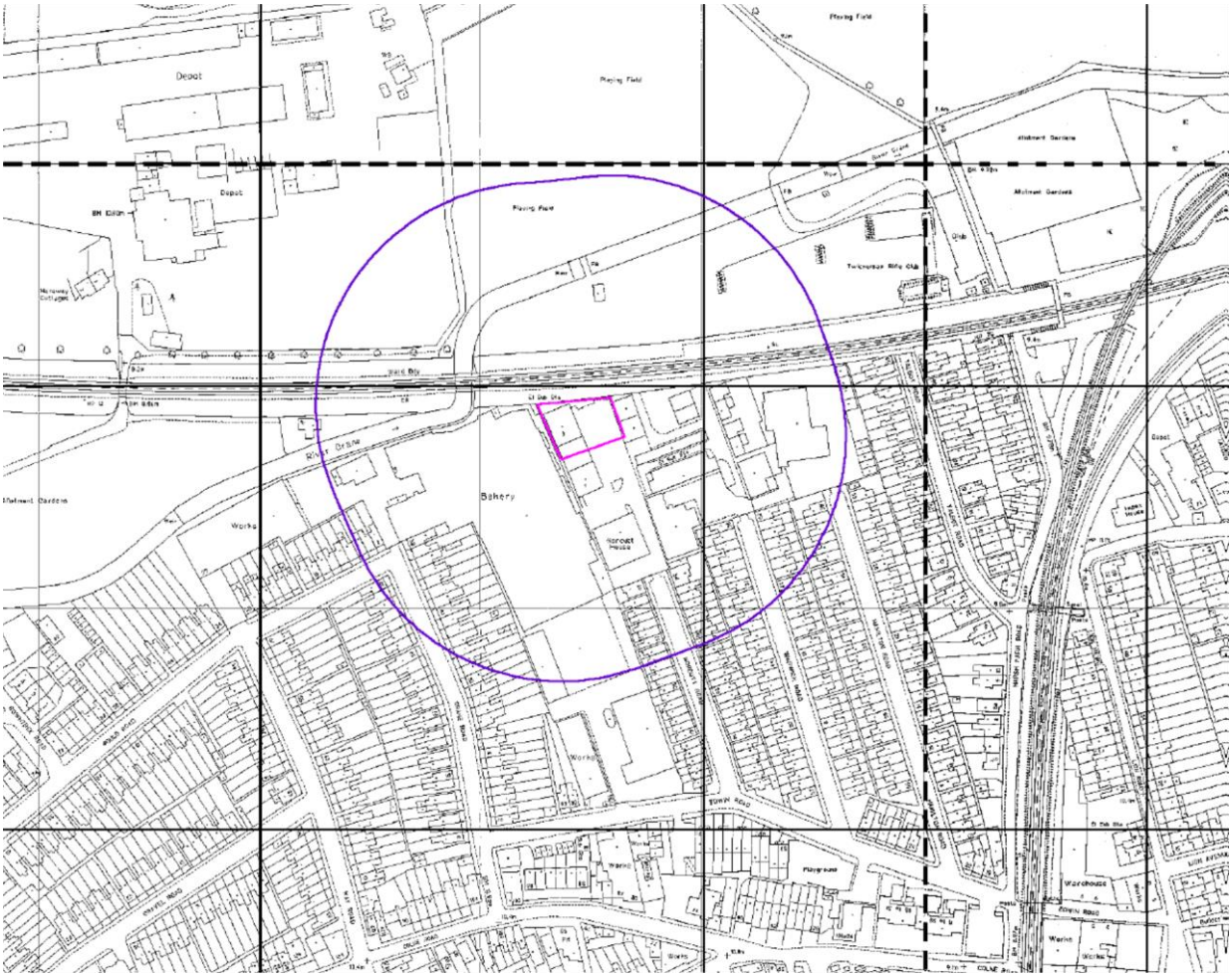
Figure 7: Historical Map Extract

Map Date: 1973

Scale: Not to scale

20 Farringdon Street
London, EC4A 4BL

☎ 020-7280-3240
www.rpsgroup.com



Contains OS data (license 100022432) © Crown copyright and database right 2019, replicated from Envirocheck Report (Ref: 205732165_1_1)

Figure 8: Historical Map Extract

Map Date: 1991

Scale: Not to scale

20 Farringdon Street
London, EC4A 4BL

☎ 020-7280-3240

www.rpsgroup.com

APPENDICES

Appendix A

General Notes

RPS CONSULTING SERVICES LTD

PHASE 1 - ENVIRONMENTAL RISK ASSESSMENT / DESK STUDY ENVIRONMENTAL REVIEW

General Notes

1. A "desk study" means that no site visits have been carried out as any part thereof, unless otherwise specified.
2. This report provides available factual data for the site obtained only from the sources described in the text and related to the site on the basis of the location information provided by the Client.
3. The desk study information is not necessarily exhaustive and further information relevant to the site may be available from other sources.
4. The accuracy of maps cannot be guaranteed and it should be recognised that different conditions on site may have existed between and subsequent to the various map surveys.
5. No sampling or analysis has been undertaken in relation to this desk study.
6. Any borehole data from British Geological Survey sources is included on the basis that: "The British Geological Survey accept no responsibility for omissions or misinterpretation of the data from their Data Bank as this may be old or obtained from non-BGS sources and may not represent current interpretation".
7. Where any data supplied by the Client or from other sources, including that from previous site investigations, have been used it has been assumed that the information is correct. No responsibility can be accepted by RPS for inaccuracies in the data supplied by any other party.
8. This report is prepared and written in the context of an agreed scope of work and should not be used in a different context. Furthermore, new information, improved practices and changes in legislation may necessitate a re-interpretation of the report in whole or in part after its original submission.
9. The copyright in the written materials shall remain the property of the RPS Company but with a royalty-free perpetual licence to the Client deemed to be granted on payment in full to the RPS Company by the Client of the outstanding amounts.
10. The report is provided for sole use by the Client and is confidential to them, their professional advisors, no responsibility whatsoever for the contents of the report will be accepted to any person other than the Client. [Unless otherwise agreed]
11. These terms apply in addition to the RPS "Standard Terms & Conditions" (or in addition to another written contract which may be in place instead thereof) unless specifically agreed in writing. (In the event of a conflict between these terms and the said Standard Terms & Conditions the said Standard Terms & Conditions shall prevail.) In the absence of such a written contract the Standard Terms & Conditions will apply.

Appendix B

Photographs

Photo 1: The commercial area to the west of the unit, comprising the storage of plastic piping.

Photo 2: Small <5 litre containers of primer and engine oil stored on racking within the commercial area.

Photo 3: A <500 litre capacity water butt stored on the mezzanine level within the commercial area.

Photo 4: Small <25 litre capacity chemical containers stored within the yard area in the east of the site.

Photo 5: Storage located within the brick shed in the east of the yard area.

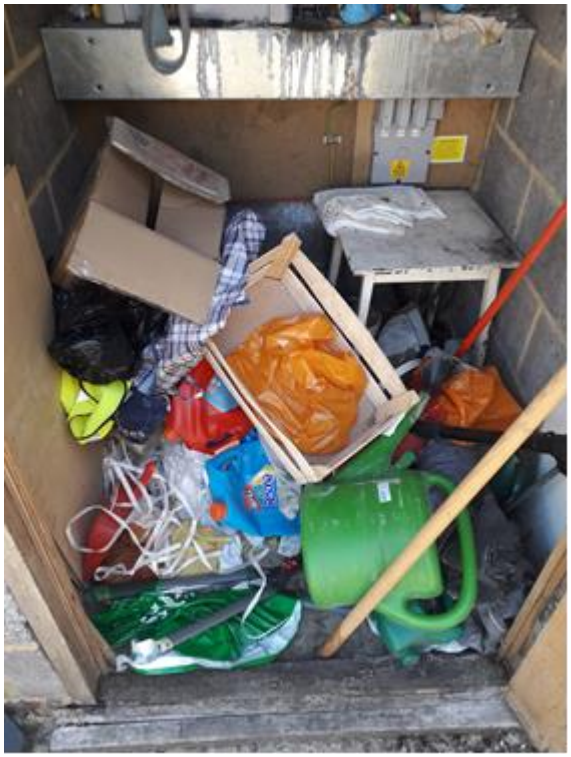


Photo 6: Fair quality asphalt hardstanding in the centre of the yard in the east of the site

Photo 7: General waste storage area.

Photo 8: Venting pipe in the external yard area, adjacent to the building located to the east of the site.

Appendix C

Part 2A (The Contaminated Land Regime)

Contaminated Land Definition

Under Section 57 of the Environmental Act 1995, Part 2A was inserted into the Environmental Protection Act 1990 to include provisions for the management of contaminated land.

Subsequent regulations were first implemented in England in April 2000, Scotland in July 2000 and Wales in July 2001[1], providing a definition of 'contaminated land' and setting out the nature of liabilities that can be incurred by owners of contaminated land and groundwater.

According to the Act, contaminated land is defined as 'any land which appears to the local authority in whose area the land 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[2] is being caused or there is a significant possibility of such pollution being caused[3]'

The guidance on determining whether a particular possibility is significant is based on the principles of risk assessment and in particular on considerations of the magnitude or consequences of the different types of significant harm caused. The term 'possibility of significant harm being caused' should be taken, as referring to a measure of the probability, or frequency, of the occurrence of circumstances that could lead to significant harm being caused.

The following situations are defined where harm is to be regarded as significant:

i. Chronic or acute toxic effect, serious injury or death to humans

ii. Irreversible or other adverse harm to the ecological system

iii. Substantial damage to, or failure of, buildings

iv. Disease, other physical damage or death of livestock or crops

v. The pollution of controlled waters[4].

[1] In England by The Contaminated Land (England) Regulations 2000, updated by The Contaminated Land (England) (Amendment) Regulations 2012; in Scotland by The Contaminated Land (Scotland) Regulations 2000, updated by the Contaminated Land (Scotland) Regulations 2005; and in Wales by The Contaminated Land (Wales) Regulations 2001, updated by the Contaminated Land (Wales) Regulations 2006.

[2] In Scotland the term "controlled water" has been updated to "water environment" under the Contaminated Land (Scotland) Regulations 2005 in line with the Water Environment and Water Services (Scotland) Act 2003.

[3] The definition was amended in 2012 by implementation of the Water Act 2003.

[4] Groundwater in this context does not include waters within underground strata but above the saturated zone.

With regard to radioactivity, contaminated land is defined as 'any land which appears to be in such a condition, by reason of substances in, on or under the land that harm is being caused, or there is a *significant possibility of such harm being caused*[5]'.

The Risk Assessment Methodology

Risk assessment is the process of collating known information on a hazard or set of hazards in order to estimate actual or potential risks to receptors. The receptor may be humans, a water resource, a sensitive local ecosystem or future construction materials. Receptors can be connected with the hazard via one or several exposure pathways (e.g. the pathway of direct contact). Risks are generally managed by isolating or removing the hazard, isolating the receptor, or by intercepting the exposure pathway. Without the three essential components of a source (hazard), pathway and receptor, there can be no risk. Thus, the mere presence of a hazard at a site does not mean that there will necessarily be attendant risks.

The Risk Assessment

By considering where a viable pathway exists which connects a source with a receptor, this assessment will identify where pollutant linkages may exist. A pollutant linkage is the term used by the DEFRA in their standard procedure on risk assessment. If there is no pollutant linkage, then there is no risk. Therefore, only where a viable pollutant linkage is established does this assessment go on to consider the level of risk. Risk should be based on a consideration of both:

The likelihood of an event (probability) - takes into account both the presence of the hazard and receptor and the integrity of the pathway.

The severity of the potential consequence - takes into account both the potential severity of the hazard and the sensitivity of the receptor.

For further information please see the Contaminated Land section on the DEFRA website (www.defra.gov.uk).

[5] The Radioactive Contaminated Land (Modification of Enactments) (England) Regulations 2006 and Contaminated Land (Wales) Regulations 2006.