9-23 THIRD CROSS ROAD TWICKENHAM

REPORT ON DESK STUDY AND FIRST STAGE RISK ASSESSMENT

Submitted to:
Wynnstay Properties plc
London

Submitted by:
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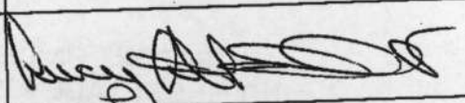
Signed	
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SUMMARY & CONCEPTUAL MODEL

SITE DETAILS

• Name and Address	• 9-23 Third Cross Road, Twickenham
• National Grid Reference	• TQ 150 727
• Proposed Development	• Residential with gardens and offices with car parking

SITE SUMMARY
The site, which may be located by National Grid Reference TQ 150 727, is situated on Third Cross Road, Twickenham. The site has been occupied by various commercial and light industrial units from at least 1934. It is considered that contamination may have arisen from historical industrial uses of the site. Details of the works carried out are unknown and therefore contaminants may comprise metals, organic and inorganic substances. The site overlies a major aquifer and is to be redeveloped to a residential end-use, therefore, a site investigation to determine the chemical quality of the soil is been recommended, preferably after site clearance.

SITE DESCRIPTION
The site covers an area of approximately 0.17ha and is currently occupied by four commercial units and associated vehicle parking covered with hardstanding. The site cambered slightly to the south west, towards storm drains.

SURROUNDING AREA
The site is located in south Twickenham, approximately 600m to the north west of Strawberry Hill train station. The immediate surrounding area is generally level and is predominantly in residential use with industrial/commercial buildings to the west of the site.

GEOLOGY
The site is underlain by Drift deposits comprising the Third River Terrace Gravels. The solid geology is the London Clay Formation.

HYDROGEOLOGY
The Third River Terrace Gravels are classified as a major aquifer and the London Clay Formation a non aquifer.

SOURCE CHARACTERISATION
The source/contamination characterisation is solely from this desk study. Sources of potential on-site contamination have been identified as metals, organic and inorganic substances as a result of past and present uses of the site.

POTENTIAL RECEPTORS
The site overlies a major aquifer and is currently in commercial use. It is proposed to redevelop the site to a residential end-use. Potential receptors are therefore identified as future site users, groundwater, plants, buildings and services.

POTENTIAL PATHWAYS
Potential pathways are identified as soil ingestion, dermal contact, inhalation of vapours and dust, plant uptake, migration through the soil and ingress through plastic service pipes.

SIGNIFICANT POLLUTANT LINKAGES (SPL) CONSIDERED	SPL
Groundwater	☑
Surface Water	☒
Current and/or Future Users of the Site	☑
Buildings and Services	☑
Adjacent Residential Properties	☒
Construction Workers	☑

LIMITATIONS AND UNCERTAINTIES
The processes carried out at the works on the site before 1977 and the ground cover at the site during this time are unknown. Therefore the potential contaminants and the extent of the ground contamination are not known and can only be hypothesised.

SITE RANKING
The above information has been used to rank the site into one of four categories as follows:

'A1' Type:	very low risk requiring no specific investigation for contamination.
'A' Type:	low risk but contamination may be present and requires investigation.
'B' Type:	moderate risk in terms of contamination and requires investigation
'C' Type:	high risk in terms of contamination and requires detailed investigation

The categorisation is based on a combination of the contaminative status and vulnerability of the site in relation to the receptors described above.

For this site, a ranking of 'B' Type has been assigned.

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1. INTRODUCTION

1.1 General

1.1.1 This report presents the results of a desk study of the site known as 9-23 Third Cross Road in Twickenham, performed for Wynnstay Properties plc (Wynnstay) during June 2008. This report was written in June 2008 in accordance with current good practice[1] and should be read in the light of any subsequent changes in legislation, statutory requirements or industry practices.

1.1.2 The services provided are outlined below:

- Site inspection and walkover survey to identify indicators (as defined in later sections) of the existence of hazardous substances or conditions on and in the vicinity of the site.
- While being located in public roads and areas, and other freely accessible areas, adjoining properties, and properties in the vicinity were viewed in an attempt to see if any possessed facilities or structures operated by organisations that are likely to use, store, generate or dispose of hazardous substances.
- Review of publicly available sources to obtain information about the potential for hazardous substances to exist at the site or at properties located in the vicinity of the site.

1.2 Scope of Work

1.2.1 The site is situated in a mixed commercial and residential area of Twickenham. It is proposed to redevelop the site to a mixed commercial and residential end-use comprising houses with private gardens and six office units with associated car parking. On the instructions of Wynnstay, a desk-based assessment was made to provide a preliminary evaluation of the ground conditions at the site.

1.2.2 The comments given in this report and the opinions expressed are based on the information made available. There may be, however, conditions pertaining to the site which could not be taken into account. The term 'TOPSOIL' may be used in this report to describe the surface, usually organic layer including turf, subsoil, weathered material with roots *etc.*, and should not be taken to imply agricultural soil suitable for re-use. In addition, information may have been obtained from a variety of sources as detailed in this report which AMEC believes is reliable. AMEC cannot and does not guarantee the authenticity or reliability of the information it has relied upon.

1.2.3 The following comments have taken into account information from the desk study described below and also information made available to AMEC up to the date of publication of this report. Therefore, this report may not be appropriate to alternative proposals which may subsequently be put forward after its issue.

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1 Nathanail J, Bardos P and Nathanail P. *Contaminated Land Management: Ready Reference*. Land Quality Press, EPP Publications, version 2, April 2007.

2. ENVIRONMENTAL SETTING

2.1 Location and Topography

2.1.1 The site, which may be located by National Grid Reference TQ 150 727, is situated approximately halfway along Third Cross Road, approximately 600m to the northwest of Strawberry Hill train station, Twickenham. A location map is included within Appendix A (Drawing No. 7888001193/R3116/01).

2.1.2 The site covers an area of approximately 0.17ha and is currently occupied by four commercial units and associated vehicle parking. The site cambered slightly to the south west, towards storm drains. The immediate surrounding area is generally level and is in residential and industrial/commercial use.

2.2 Geology, Hydrogeology and Hydrology

Geology

2.2.1 The geological appraisal has been compiled using the following reference:

- British Geological Survey 1:50,000 Series. South London Sheet 270 – Solid and Drift Edition

2.2.2 The records indicate that the site is underlain by Drift deposits comprising the Third River Terrace Gravels. This consists of stratified gravels and sands which can be up to 8m in thickness. The solid geology is the London Clay Formation which is described as a dark grey silty clay with claystones (nodular limestones).

2.2.3 The Building Research Establishment has published revised guidelines concerning protective measures for radon[2]. According to this guidance, the site does not lie within an area where full or basic measures with regards to radon should be installed (BRE, 1999[3]).

Hydrogeology

2.2.4 The hydrogeological appraisal has been compiled using the following references:

- Environment Agency: Policy and Practice for the Protection of Groundwater. Groundwater Vulnerability Map 1:100,000. Sheet 39 West London.
- Environment Agency: Policy and Practice for the Protection of Groundwater. Regional Appendix Thames Region.
- Environment Agency "What's in Your Backyard" Web Site (www.environment-agency.gov.uk)

2.2.5 The Environment Agency has classified the Third Terrace Gravels as a major aquifer and the London Clay Formation as a non-aquifer.

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2 BR211 *Radon Guidance on Protective Measures for New Buildings.* BRE 1999

3 Building Research Establishment. Radon - Guidance on Protective Measures for New Buildings. DETR, 1999.

2.2.6 The site is not located within a currently defined groundwater Source Protection Zone (EA). There are no records of public water abstraction licences within a 1km radius of the site (Envirocheck).

Hydrology

2.2.7 The nearest surface watercourse is the River Crane located approximately 500m to the northwest of the site. (OS Landranger 1:50,000 - Sheet 176, North West London).

Flood Risk

2.2.8 The site is not located upon a fluvial floodplain as indicated on the Environment Agency flood maps and is therefore not located within a Flood Warning Zone (EA).

Discharge Consents to Controlled Waters

2.2.9 There is one record of a consent to discharge to controlled waters within a 500m radius of the site. The consent (Ref: Temp.0593) is temporary and is held by Thames Water Utilities Limited for the discharge of sewage materials to the River Crane, located approximately 460m to the northwest of the site (Envirocheck).

3. CONTAMINATIVE USES OF THE SITE AND ITS ENVIRONS

3.1 General

3.1.1 Historical maps were obtained from Landmark to review the history of the site and its vicinity and a selection of these are included within Appendix A. A review of information with regards to the location of potential contaminative uses within a radius of at least 250m from the site has been carried out using the Envirocheck® Report (included within Appendix B) and the Environment Agency's web-site. Consultations were also undertaken with the London Borough of Richmond Upon Thames and the responses are included within Appendix C.

3.2 Site History

3.2.1 The age and general activity/land use can often be determined from the layout of structures depicted on historical ordnance survey plans. However, specific elements of site operations cannot normally be determined from such maps.

1875 (1:2,500)

3.2.2 Residential properties and gardens occupy the southern and western sectors of the site. The north eastern sector of the site is occupied by an orchard. The site boundaries are defined by Third Cross Road to the west and residential properties to the north and open space to the south. The eastern boundary is partly defined by residential properties and the remainder is undefined. Residential development interspersed with orchards characterises the surrounding area although a large area of open space is located to the west of the site at an approximate distance of 5m. 'Gothic House' and its grounds are located approximately 50m to the northwest of the site and include a large pond.

1891 (1:2,500)

3.2.3 The site and surrounding area remain relatively unchanged.

1898 (1:2,500)

3.2.4 The orchard in the north western sector of the site has been replaced by open space. A 'Disused Malthouse' comprising two buildings and a small circular structure, probably a chimney, is located approximately 5m to the west of the site.

1915 (1:2,500)

3.2.5 The site remains relatively unchanged. 'Gothic House' and grounds have been demolished and the large pond may have been infilled. This has been replaced by terraced housing along Elmsleigh Road and Gothic Road. Residential development is located adjacent to the south, which has been developed upon former open space.

1934 (1:2,500)

3.2.6 The residential properties on-site have been demolished and the site has been redeveloped to an industrial comprising a large rectangular shaped building in the central sector, surrounded by open space. Further residential development has taken place along Elmsleigh Road and Gothic Road. The former Malthouse buildings to the west of the site have been demolished and the area immediately to the west has been developed to a large building named 'Fruit Preserving Works'. Extensive residential development has occurred to the south of the site at an approximate distance of 200m.

1959-1961 (1:1,250)

3.2.7 The building on-site is named as 'Works' and has been extended to the north and south. The Fruit Preserving Works is now named 'Works' and the building has been extended to the east and west. Further residential development has taken place to the south east of the site at an approximate distance of 110m.

1972-1987 (1:1,250)

3.2.8 The site remains unchanged. The Works to the west of the site have been named Nicol House (Printing works), Electron House (Engineering Works) and an Engineering Works.

1991 (1:1,250)

3.2.9 The building on-site has been demolished and has been redeveloped to the present day layout which consists of four commercial units (9-23 Third Cross Road) with open space in the western sector. The surrounding area remains relatively unchanged.

Planning History

3.2.10 Information with regards to the planning history was obtained from the London Borough of Richmond website (www2.richmond.gov.uk/PlanData2). A planning application (Ref: 77/0182) was submitted and refused in 1977 which related to the

extension to an existing cold store at the site. An application (Ref: 08/0501/FUL) was granted in 1981 for the demolition of the existing warehouse and redevelopment to four light industrial units with first floor office accommodation, car parking, loading bays and refuse bin compartments.

3.3 Site Walkover Survey

3.3.1 A site walkover survey was carried out on 4 June 2008 by a representative from AMEC. Access to the site was gained from Third Cross Road adjacent to the west of the site.

3.3.2 The site was in commercial use and consisted of four adjoining units of brick and corrugated aluminium construction. The units were occupied by 'Signs Express', 'Oasis Vending Services' and 'CPC Battery Services Limited'. A '2P Hazchem Multi-Storage' sign was observed on the CPC unit. The remaining unit appeared to be unoccupied. Loading bays were located along the western side of the units, adjacent to a concrete-covered car park. The hardstanding appeared to be in good condition and cambered slightly to the south west, towards several storm drains. A small area of shrubs delineated the central part of the western site boundary and a narrow strip of land adjacent to the northernmost unit was overgrown.

3.3.3 The site boundaries were defined by 2m high brick walls or wooden panel fencing. There were no indications that subsidence had occurred and there were no visual or olfactory indications of contamination.

3.3.4 The immediate surrounding area was predominantly in residential use with houses adjacent to the north, south and east. The former Works buildings to the west was in various stages of demolition and the foundations of the nearest Works building were being excavated and stockpiled. Information obtained from a workman indicated that the site was to be redeveloped to a residential end-use.

Anecdotal Information

3.3.5 Information regarding the contents of the CPC Battery Services Unit was obtained from a member of staff. Batteries are contained within appropriate plastic containers. Sulphuric Acid is kept on site which is concentrated to 30%.

3.4 Potentially Contaminative Uses of the Site and its Environs

3.4.1 There are no records of operational or former landfill sites within a 250m radius of the site (EA, Envirocheck). There are no records of currently operational IPC registered waste sites, licensed waste management facilities, waste transfer sites or waste treatment sites within a 250m radius of the site (EA, Envirocheck).

3.4.2 There are no records of Control of Major Accident Hazard Sites (COMAH), Notification of Installations Handling Hazardous Substances Sites (NIHHS) or explosives sites within a 250m radius of the site. There are no records of Local Authority IPPC or Local Authority PPC permits within a 250m radius of the site. There are no records of radioactive substances within a 250m radius of the site (Envirocheck).

3.4.3 There is no record of any fuel stations within a 250m radius of the site.

3.4.4 Unit D at the site is listed within the Trade Directory. CPC Limited is listed as suppliers and manufacturers of disability equipment. There are an additional eleven currently active entries within a 250m radius of the site. The nearest entry is listed as Air Sea Packing Group Limited – Airfreight Services. However, this building appeared to have been undergoing demolition at the time of the walkover survey. The remaining Trade Directory entries include bath resurfacers, dry cleaners, office furnishers and painting/decorating suppliers.

4. RISK ASSESSMENT

4.1 General

4.1.1 It is understood that redevelopment of the site will comprise a mixed residential and commercial redevelopment which is to comprise five houses with private gardens and six office units with associated car parking facilities. When assessing the potential hazards relating to land contamination, the following issues must be addressed:

- Does the site present a threat to the public or occupiers in its current state;
- Will the contaminants present a hazard with respect to fire, explosion or contact with contaminants during demolition clearance;
- Will the contaminants present a hazard with respect to the deterioration of building materials and services;
- Will there be a threat to end-users of the site, *e.g.* direct contact with contaminated soil or uptake of contaminants by plants; and
- Is there a potential for future liabilities due to off-site migration of contaminants.

4.2 Conceptual Model

Potential Sources

4.2.1 The site was occupied by residential properties and orchard until sometime between 1891 and 1896 when the orchards were cleared. The houses were demolished between 1915 and 1934 and the site redeveloped to industrial use comprising a large rectangular shaped building of unknown nature. This was shown as a 'Works' by 1959. The building was demolished sometime between 1987 and 1991 and the site was redeveloped to its present layout. Therefore, as a result of historical industrial uses at the site, it is considered that ground contamination has potentially occurred. The nature of the Works prior to 1977 (*i.e.* before planning records were available) is not known. The nature of ground cover is also unknown prior to redevelopment. Potential contaminants that may be present in the ground include metals, inorganic and organic substances and asbestos.

4.2.2 Potential sources of off-site contamination identified as a result of the desk study or walkover survey are the industrial works (maltings and fruit preserving works) which were located at a distance of approximately 5m to the west of the site from at least 1886.

Potential Receptors

4.2.3 It is likely that the site is underlain by a major aquifer and therefore groundwater is potentially vulnerable to contamination through vertical migration of contaminants through the ground.

4.2.4 The nearest surface watercourse is located at a distance of approximately 500m to the north west of the site and therefore it is not considered that surface watercourses are vulnerable to the potential presence of on-site contamination.

4.2.5 The site in its current state comprises commercial units and a car park. Much of the site is covered with concrete hardstanding; however, there are some areas of overgrown vegetation and landscaping. It is therefore considered that there is a potential risk to current site occupiers including humans, plants and services.

4.2.6 The site is to be redeveloped to a commercial and residential end-use with private gardens and therefore potential future receptors are considered to be future site occupiers, buildings, services and plants. Potential pathways are through soil ingestion, dermal contact and inhalation of dust and vapours.

4.2.7 Contact with contaminants during demolition and clearance is typically a short-term hazard, mainly concerning site workers. Potential risks are repeated contact with contaminated ground containing substances that are skin irritants and may cause dermatitis. Therefore, with respect to site operatives, it would be prudent to exercise good hygiene practices, *e.g.* the use of gloves, the avoidance of any eating and smoking on-site, and the provision of washing facilities. In addition, any specific advice given by the Health & Safety Executive should be followed[4]. Assuming good site practices are followed, such incidents should be considered a low risk, although a site investigation would be required to fully assess this risk.

4.2.8 Concrete foundations are at risk of attack from sulphate and other deleterious matter in the subsoil. The effect of sulphate on concrete can be very severe due to the reaction of sulphate with aluminium salts in the concrete. The product of this reaction has a larger volume than the original salt and so causes internal disruption.

4.2.9 Plastic water mains can be affected by contaminated soil through aggressive substances such as phenols, chlorides and sulphates producing acid conditions. Consideration should be given to an appropriate specification for drainage and other service pipes with particular attention paid to the suitability of the proposed pipe material[5].

4.3 Site Ranking

4.3.1 The categorisation is based on a combination of the contaminative status and vulnerability of the site in relation to the receptors described above. For this site, a ranking of 'B' Type has been assigned. A Type 'B' ranking implies a moderate risk in terms of contamination and requires investigation.

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4 Health & Safety Executive: *Protection of Workers and the General Public during Development of Contaminated Land*. HMSO, 1991.

5 Water Regulations Advisory Scheme: Information and Guidance Note No. 9-04-03. October 2002.

5. RECOMMENDATIONS FOR FURTHER WORK

5.1 Site Investigation Sampling Strategy

5.1.1 The conceptual model and risk assessment has indicated a number of potential Significant Pollutant Linkages. The potential source for these linkages concerns previous and current uses of the site and the works located in close proximity to the western boundary. The primary receptors identified are future site users and groundwater.

5.1.2 In order to fully establish the sources and pathways for these significant pollutant linkages, it would be necessary to undertake an intrusive investigation. The site investigation should provide information to enable revision of the conceptual model and risk assessment. In particular, the investigation should aim to:

- determine types and concentration of contamination;
- determine the lateral and vertical extent of contamination; and
- provide sufficient data points to plan remedial measures if necessary.

5.1.3 The location of the sampling holes should be determined on the basis of the available information and the conceptual model. Potential targeting points should include areas of private gardens and proposed buildings, as well as gaining a representative coverage of the entire site. It is recommended that the site investigation be carried out after the site cleared of buildings and hardstanding. Otherwise, the location of the sampling points may be affected by the presence of current buildings, foundations, services and other impedances.

5.1.4 Chemical analyses should ideally be carried out for a range of determinands that can be used to provide an indication of the nature and degree of contamination present. These determinands should include metals, inorganic and organic substances.

5.1.5 An asbestos survey carried by an appropriately accredited asbestos consultancy may also be required.

5.1.6 As a precautionary measure, it is recommended that the contractor provide evidence to demonstrate that any topsoil placed in areas of private gardens is uncontaminated. If, during development works, contaminated soils are identified, a risk assessment should be implemented and remedial works carried out if required.