Prepared on behalf of
The Royal Brompton & Harefield NHS Foundation Trust

Royal Brompton Hospital
Preliminary Geoenvironmental Risk Assessment
ROYAL BROMPTON HOSPITAL, CHELSEA, GREATER LONDON
PRELIMINARY GEOENVIRONMENTAL RISK ASSESSMENT
# QUALITY MANAGEMENT

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<td>C. Nichols</td>
</tr>
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<td>Signature</td>
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<td>P. Sheppard</td>
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<td>Sheppard, Peter 2016.06.22 16:11:00 +01'00'</td>
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<tr>
<td>Authorised by</td>
<td>A. O’Dea</td>
</tr>
<tr>
<td>Signature</td>
<td>John <a href="mailto:Davies@wspgroup.com">Davies@wspgroup.com</a> p.p on behalf of Andy O’Dea 2016.06.23 08:42:25 +01’00’</td>
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EXECUTIVE SUMMARY

**Authorisation and purpose of assessment**

WSP | Parsons Brinckerhoff was instructed by Royal Brompton & Harefield NHS Foundation Trust (the Client) to undertake a Preliminary Risk Assessment (PRA) at the Royal Brompton Hospital (RBH), Chelsea, Greater London (the Site). The works were commissioned in response to WSP | Parsons Brinckerhoff’s proposal reference Draft EIA Scoping Report Chelsea 140307_For Legal - 40499.01, which included the preparation of PRAs for a portfolio of six properties.

WSP | Parsons Brinckerhoff understands that the proposed development will comprise the demolition of two buildings to facilitate an extension to the hospital and construction of an imaging centre. A PRA is required in order to assess potential environmental liabilities and constraints associated with the proposed redevelopment of the Site for continued use as a hospital.

**Key findings**

The 0.9 ha Site currently comprises four buildings (the Sydney Wing, Imatron Unit, 30 Britten Street and the Britten Wing), all of which are utilised for hospital related purposes. A car park is also present in the south-east of the Site, with an internal road running towards the north.

No specific sources of contamination have been identified following a review of the Site history. However, the potential for Made Ground to be present beneath the Site cannot be completely discounted given redevelopment history. Historical borehole logs suggest that Made Ground may be present to 2.30 – 2.60 m bgl, although the thickness and composition is likely to be variable across the Site.

A number of specific sources of contamination were identified from the current use of the Site and surrounding area as a hospital. These include an electrical sub-station and two underground oil tanks adjacent to the eastern boundary in the north. WSP | Parsons Brinckerhoff notes that the hospital holds licenses for the keeping and use of radioactive materials and for the disposal of radioactive waste. However, these are tightly regulated and, as such, are not thought to pose a significant potential source of contamination. Additionally the disposal of clinical waste (yellow bag waste) is tightly regulated due to the risk of infection; therefore, this is not thought to pose a significant risk to human health.

**Environmental Risk Assessment**

Although a number of plausible contaminant linkages have been identified under the proposed land use scenario with respect to human health and the underlying shallow aquifer; the overall risk to human health and controlled waters is considered to be variably in the range of **Low** to **Moderate**.

**Recommendations**

- In order to assess the potential for plausible contaminant linkages to be present, WSP | Parsons Brinckerhoff recommends a preliminary soil, groundwater and gas investigation should be undertaken. These should target areas of the Site (and the site boundaries near to offsite sources) which have been identified as potential sources and should include some grid based locations in order to assess the potential presence and composition of Made Ground.

- It is likely that some reduced level excavations will be required as part of the proposed redevelopment. Any materials disposed of off-site must be done so in Accordance with the Waste Regulations.

- Consideration should be given to the potential for the presence of unexploded ordnance (UXO) during any below ground works and it is recommended that a UXO report is commissioned for the Site.

- In order to address the linkages associated with potential ingress of contaminants into potable water supply, reference should be made to UK Water Industry Research (ref:10/WM/03/21 Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites) guidance. Contact should also be made with the local water supplier when choosing appropriate pipework for the development.
INTRODUCTION AND OBJECTIVES

1.1 AUTHORIZATION AND PURPOSE OF ASSESSMENT

WSP | Parsons Brinckerhoff was instructed by Royal Brompton & Harefield NHS Foundation Trust (the Client) to undertake a Preliminary Risk Assessment (PRA) at the Royal Brompton Hospital (RBH), Chelsea, Greater London (the Site). The works were commissioned in response to WSP | Parsons Brinckerhoff’s proposal reference Draft EIA Scoping Report Chelsea 140307_For Legal - 40499.01 which included the preparation of PRAs for a portfolio of six properties.

WSP | Parsons Brinckerhoff understands that the Client wishes to redevelop the Site and a PRA is required in order to assess potential environmental liabilities and constraints associated with the proposed redevelopment of the Site for continued use as a hospital.

1.2 PROPOSED DEVELOPMENT

WSP | Parsons Brinckerhoff understand that the proposed development will include:

“The demolition of 30 Britten Street and the Imatron building to facilitate the extension to the existing Sydney Street hospital to provide a ground plus five storey consolidated healthcare building with 2 storeys of basement and a ground plus two basement level imaging centre, together with the formation of a new pedestrian entrance along Sydney Street, reconfigured vehicular access, associated landscaping and car parking, plant and all necessary enabling works”.

1.3 OBJECTIVES

The key objectives of this assessment are to:

Æ Develop a preliminary conceptual site model for the Site to identify potential ground contamination limitations associated with the potential redevelopment of the Site for a commercial end use; and

Æ Evaluate the likely exposure and its potential significance on identified receptors and provide risk management advice to support the proposed planning application.

1.4 SCOPE OF WORKS

In order to meet the objectives stated in Section 1.3 the following scope of works was undertaken:

Æ A site walkover survey of accessible areas, to document the current land use and site setting;

Æ A review of publicly available historical maps to identify former land uses and potential contaminative activities on and surrounding the Site;

Æ A review of relevant regulatory databases and contact with relevant regulatory authorities including: Local Council planning website and the local Contaminated Land Officer (CLO);

Æ A review of relevant publicly available information relating to hydrological features, hydrogeology, neighbouring land use, ecologically sensitive uses and geology in order to establish the environmental setting of the Site;
Development of a preliminary conceptual site model via the source-pathway-receptor contaminant linkage approach; and

Outline the environmental risks and/or opportunities, with respect to ground, groundwater and ground gas conditions, which may potentially arise as liabilities or constraints associated with the proposed redevelopment of the Site.

This report has been prepared in general accordance with:

- Part 2A of the Environmental Protection Act 1990;
- The National Planning Policy Framework 2012;

1.5 LIMITATIONS

This report is addressed to and may be relied upon by Royal Brompton & Harefield NHS Foundation Trust and may not be relied upon or transferred to any other parties without the express written agreement of WSP | Parsons Brinckerhoff.

This report should be read and used in full. No responsibility will be accepted where this report is used, either in its entirety or in part, by any other party. WSP | Parsons Brinckerhoff cannot be held liable for third party information. Full details of the limitations are provided as Appendix A.

1.6 UNDERSTANDING RISK

It is important to recognise that any risks identified during a preliminary assessment such as that presented below are perceived risks based on the record information reviewed. A more detailed assessment of the actual risks can only be assessed following intrusive investigations of the Site. The preliminary assessments presented herein are qualitative based on professional judgements following review of the available data and within the context of the existing/proposed use. Those risk categories presented (Very Low, Low, Low to Moderate, Moderate, High, Very High) follow guidance presented in CIRIA Publication C552, Contaminated Land Risk Assessment – A Guide to Good Practice. CIRIA states that risk levels should be based on an understanding of both the probability (likelihood) of a risk occurring and the magnitude of the potential consequence (severity) of a risk. CIRIA defines four levels of probability and four levels of severity with relation to contaminated land, as presented in Appendix B, Tables A1 to A3.

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1 Reference should be made to CIRIA C552 for the detailed definitions of probability and severity in relation to contaminated land, as well as the derivation of risk categories.
2 SUMMARY OF THE SITE AND SURROUNDING AREA

The Site location and Site layout plan are provided in Appendix C.

A walkover survey of accessible areas of the Site was carried out by a representative of WSP | Parsons Brinckerhoff on 13 February 2014 and a photographic record is also provided in Appendix C.

Table 2-1 provides details of the Site obtained from a review of Ordnance Survey (OS) mapping, online aerial photography, key regulatory information obtained from the Envirocheck report and key observations made during the walkover.

Table 2-1: Site Information

<table>
<thead>
<tr>
<th>DETAILS</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name and Address of Site</td>
<td>Royal Brompton Hospital, Chelsea, Greater London, SW3 6NP.</td>
</tr>
<tr>
<td>Grid Reference</td>
<td>527118, 178248.</td>
</tr>
<tr>
<td>Site Ownership/ Occupation</td>
<td>The Site is currently owned by Royal Brompton &amp; Harefield Trust, and occupied as a National Health Service (NHS) hospital.</td>
</tr>
<tr>
<td>Site Description and Current Use</td>
<td>The Site comprises a car park, internal road and four buildings across an area of approximately 0.9 ha.</td>
</tr>
<tr>
<td></td>
<td>➔ The Sydney Wing is located in the east of the Site and continues beyond the northern Site boundary. It is four storeys high and includes a</td>
</tr>
<tr>
<td></td>
<td>basement level and two court yard areas within the central sections of the building. The building is used for a range of hospital uses,</td>
</tr>
<tr>
<td></td>
<td>including wards, operations and x-rays. A compressor is located on the 4th floor which is used to produce medical gases.</td>
</tr>
<tr>
<td></td>
<td>➔ The Imatron Unit is a single storey building on the western boundary of the Site. The unit houses a CMR scanner and examination rooms.</td>
</tr>
<tr>
<td></td>
<td>➔ 30 Britten Street is a two storey building located on the southern boundary of the Site. The building was constructed in the 1980s and is</td>
</tr>
<tr>
<td></td>
<td>predominantly used for office admin, as well as containing a CMR scanner.</td>
</tr>
<tr>
<td></td>
<td>➔ The Britten Wing is a four storey building located immediately to the west of 30 Britten Street and to the south of the Imatron Unit.</td>
</tr>
<tr>
<td></td>
<td>The wing predominantly contains administrative offices, as well as some x-ray facilities and examination rooms.</td>
</tr>
<tr>
<td>Site Surrounding Area and</td>
<td>Adjacent to the eastern boundary in the north of the Site is an electrical sub-</td>
</tr>
<tr>
<td></td>
<td>Envirocheck reference 53104937_1_1 – 18 February 2014</td>
</tr>
<tr>
<td>DETAILS</td>
<td>DESCRIPTION</td>
</tr>
<tr>
<td>----------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Topography</td>
<td>Station and two 17 m³ underground fuel oil storage tanks (USTs), installed in 1991. The tank construction details are unknown.</td>
</tr>
<tr>
<td></td>
<td>The <strong>Chelsea Wing</strong> is located to the west/north-west of the Site (outside of the Site boundary). The building is three storeys high, constructed of red brick and is predominantly used for administration purposes including offices and examination rooms. The Chelsea wing is connected to the Sydney wing via an elevated corridor.</td>
</tr>
<tr>
<td></td>
<td>The Site is situated in the Royal Borough of Kensington and Chelsea, surrounded by a mix of commercial and residential properties. Immediate neighbouring land uses are as follows:</td>
</tr>
<tr>
<td></td>
<td>North – Cale Street, with residential houses/flats and The Royal Marsden hospital beyond;</td>
</tr>
<tr>
<td></td>
<td>East – Sydney Street, St Luke’s Church and gardens with residential and shops beyond;</td>
</tr>
<tr>
<td></td>
<td>South – Britten Street, Garden Centre yard with residential and shops beyond; and</td>
</tr>
<tr>
<td></td>
<td>West – Chelsea Wing, with Dovehouse Street, offices and shops beyond.</td>
</tr>
<tr>
<td></td>
<td>In general, the Site is relatively level.</td>
</tr>
<tr>
<td></td>
<td>The Site is located approximately 650 m north of the River Thames in the London Basin.</td>
</tr>
<tr>
<td>Ground Cover</td>
<td>The car park area is surfaced with a mix of tarmac and concrete. All surfaces were observed to be in fair/good condition with no staining noted. A small area of soft standing, vegetation and trees is located on the southern boundary of the site.</td>
</tr>
</tbody>
</table>
3 POTENTIALLY CONTAMINATIVE LAND USES

3.1 SITE HISTORY

Historical maps were obtained as part of the Envirocheck report (ref: 53104937_1_1) and were reviewed to identify any potential former sources of contamination.

According to the earliest historical map dated 1850, the Site appeared to be undeveloped apart from roads. By 1874, the Site appears to have been developed and comprised mainly residential properties, with a central strip of open land or gardens running north to south down the middle of the Site. Between around 1895 and 1919, buildings in the south-east of the Site were labelled as 'Mission Hall'.

Between 1916 and 1947, maps and aerial photographs depict that the west of the Site and much of the immediate surrounding area had been redeveloped and was labelled as ‘Chelsea Infirmary’. A tennis court on the west of the Site was visible on an aerial photograph from 1947. A thin strip of buildings with a residential appearance remained along the eastern edge of the Site.

Between 1950 and 1973, a cluster of buildings to the west of the Site were labelled ‘Chelsea Hospital for Women’, and a cluster of buildings to east of the Site were labelled ‘St Luke’s Hospital’, along with a tennis court. A building to the south-west of the Site was labelled as a ‘Nursing Home’.

After 1978, the tennis courts were no longer visible on any of the maps with the area appearing to have been developed into new hospital buildings.

The Site layout remained unchanged until sometime between 1987 and 1990, when the building(s) in the south and east were no longer present.

After 1991, the surrounding Site area was redeveloped to its current layout with the main building to the north/north-east of the Site referred to as The Royal Brompton and National Heart Hospital.

Table 3-1 provides a summary of relevant observations for potential off-site sources. Relevant historical maps are reproduced in Appendix C.

Table 3-1: Summary of Off-Site Pertinent Historical Information

<table>
<thead>
<tr>
<th>HISTORICAL OFF-SITE LAND USE</th>
<th>DISTANCE / DIRECTION FROM SITE</th>
<th>DATES OF MAPS IN WHICH FEATURE IS PRESENT (OLDEST TO NEWEST)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graveyard*</td>
<td>~ 15 m east</td>
<td>1843 - 1893</td>
</tr>
<tr>
<td>Graveyard**</td>
<td>~ 175 m north west</td>
<td>1815 - 1884</td>
</tr>
<tr>
<td>Railway station/ line</td>
<td>~ 450 m north</td>
<td>1893 - Present</td>
</tr>
<tr>
<td>Garage (later labelled Industrial Works of unspecified use then becomes Vehicle Maintenance Depot)</td>
<td>~ 225 m north east</td>
<td>1916 - 1973</td>
</tr>
<tr>
<td>Former Garage</td>
<td>~ 410 m north</td>
<td>1962 - 1993</td>
</tr>
<tr>
<td>Garage</td>
<td>~ 360 m north east</td>
<td>1916 - 1994</td>
</tr>
</tbody>
</table>
3.2 SITE USE

Table 3-2 provides information relevant to identifying current potential contaminative land uses, activities and incidents relating to the Site. The information was obtained from a review of OS mapping, online aerial photography, key regulatory information obtained from the Envirocheck report, the EA website and key observations made during the walkover.

<table>
<thead>
<tr>
<th>ACTIVITY / INCIDENT</th>
<th>DESCRIPTION</th>
<th>INFORMATION SOURCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operations and Processes</td>
<td>At the time of the walkover, the Site buildings were utilised for activities associated with the hospital including examining rooms, office admin, x-ray and CMR scanning. There was ground level car parking in the south east of the Site. The Site is not listed on the Contaminated Sites Register and there are no listed pollution incidents or prosecutions relating to the Site. There are no LAPPC licenses relating to the Site. There is one active trade directory relating to the Site for ‘hospitals’.</td>
<td>Site visit Royal Borough of Kensington Council (RBKC) EA</td>
</tr>
<tr>
<td>Waste Storage</td>
<td>In general, good housekeeping was observed at the Site. The service roadway between the</td>
<td>Site visit RBKC, Westminster and</td>
</tr>
</tbody>
</table>

* Information provided by Contaminated Land Officer at The Royal Borough of Kensington and Chelsea.
** Information provided by WSP | Parsons Brinckerhoff EIA Scoping Report – February 2014.
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ACTIVITY / INCIDENT | DESCRIPTION | INFORMATION SOURCE
-------------------|-------------|-----------------
Chelsea and Sydney buildings (running north to south) was also used for the storage of waste (along the sides of the road). General waste, as well as clinical waste (yellow bag) is stored in allocated bins. The clinical waste is removed from site for disposal, although the frequency was unknown.

The hospital holds an authorisation for the keeping and use of radioactive materials and for the disposal of radioactive waste (dated 5 October 2009). It was reported by the hospital that this licence is likely to be related to the isotopes ingested by patients for certain medical tests, which are then disposed of separately to normal sewage waste.

RBKC, Westminster and Wandsworth Councils and BGS do not hold records of land filling at the Site.

Drainage / Services | The Site does not hold any active discharge consents. | Discharge Consents

Observations or Indications of Impact | No evidence of contaminant impact or ground staining was noted during the site walkover. | Site walkover and pollution incidents

3.3 LAND USES IN THE SURROUNDING AREA
A summary of activities determined by WSP | Parsons Brinckerhoff to be of note within the surrounds of the Site are provided in Table 3-3.

Table 3-3: Summary of Potential Land Uses, Activities and Incidents in the Immediate Surrounding Area

<table>
<thead>
<tr>
<th>LAND USE</th>
<th>DISTANCE (M) / DIRECTION</th>
<th>SOURCE(S) OF INFORMATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical sub-station and two 17 m³ below ground fuel oil tanks.</td>
<td>Adjacent to eastern boundary in the north of the Site</td>
<td>Site Visit</td>
</tr>
<tr>
<td>Chelsea Wing</td>
<td>Adjacent to west/north-west boundary</td>
<td>Site Visit</td>
</tr>
<tr>
<td>Sydney Wing</td>
<td>Adjacent to northern boundary</td>
<td>Site Visit</td>
</tr>
<tr>
<td>Garden centre</td>
<td>~ 5 m south</td>
<td>Site Visit</td>
</tr>
<tr>
<td>Two historical graveyards</td>
<td>~ 15 m east, and ~ 175 m north</td>
<td>RBKC information and WSP</td>
</tr>
<tr>
<td>LAND USE</td>
<td>DISTANCE (M) / DIRECTION</td>
<td>SOURCE(S) OF INFORMATION</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>--------------------------</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td>Five sub-stations that are used by the residential dwellings surrounding the Site.</td>
<td>~ 100 m north, ~140 m east, ~ 145 south west, ~ 175 m north and ~ 380 m south.</td>
<td>Historical maps</td>
</tr>
<tr>
<td>A licensed waste management facility for clinical waste transfer and treatment.</td>
<td>~ 100 m south</td>
<td>Envirocheck / EA</td>
</tr>
<tr>
<td>Substation on the Royal Brompton Fulham Road wing Site.</td>
<td>~ 110 m north west</td>
<td>Site Visit</td>
</tr>
<tr>
<td>Two fuel oil tanks on the Royal Brompton Fulham Road wing Site. Unknown size and age.</td>
<td>~ 120 m north west</td>
<td>Site Visit</td>
</tr>
<tr>
<td>A number of active contemporary trade directories are listed these include: waste disposal services, hospitals, road haulage, food product manufacturing.</td>
<td>&lt;200 m</td>
<td>Trade Directories</td>
</tr>
<tr>
<td>A large number of inactive contemporary trade directories are listed and include, but are not limited to: dry cleaner, printers, clock and watch manufacturers and hospitals.</td>
<td>&lt;200 m</td>
<td>Trade Directories</td>
</tr>
<tr>
<td>Former garage (1916 and 1973). It has since been redeveloped with residential properties.</td>
<td>~ 225 m north east</td>
<td>Historical maps</td>
</tr>
<tr>
<td>Former garage (1916 and 1973). The garage has been developed for commercial warehousing space.</td>
<td>~ 225 m east</td>
<td>Historical maps</td>
</tr>
</tbody>
</table>

### 3.4 PREVIOUS REPORTS

No previous reports were provided for review.
## ENVIRONMENTAL SETTING

### 4.1 GEOLOGY AND HYDROGEOLOGY

The British Geological Survey (BGS) Map Sheet 270 ‘South London’ (Solid and Drift) (1:50,000 Series) and BGS borehole records for locations in the vicinity of the Site have been reviewed. The anticipated underlying geology is presented in Table 4-1. The table also provides the EA’s aquifer designations for each of the geological units.

<table>
<thead>
<tr>
<th>GEOLOGICAL UNIT/STRATUM</th>
<th>DESCRIPTION</th>
<th>ESTIMATED DEPTH TO BASE OF STRATUM (M BGL)</th>
<th>AQUIFER DESIGNATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Langley Silt Member (a small area in the north of the Site)</td>
<td>Clay and silt</td>
<td>Unknown</td>
<td>Unproductive</td>
</tr>
<tr>
<td>Kempton Park Gravel</td>
<td>River Terrace Deposits: gravel, sandy and clayey in part</td>
<td>~ 8 m</td>
<td>Secondary A</td>
</tr>
<tr>
<td>London Clay Formation</td>
<td>Clay and mudstone</td>
<td>~ 30 m</td>
<td>Unproductive/ confining</td>
</tr>
<tr>
<td>Lambeth Group Formation</td>
<td>Shallow marine sand, fluvial and estuarine mud and sand</td>
<td>~ 40 m</td>
<td>Secondary A</td>
</tr>
<tr>
<td>Upper Chalk</td>
<td>Chalk with banded flint nodules</td>
<td>~ 80 m</td>
<td>Principal Aquifer</td>
</tr>
</tbody>
</table>

Since the Site has been subject to redevelopment, it is anticipated that Made Ground is likely to be present on-site.

WSP undertook a geotechnical assessment at the Royal Brompton Hospital in November 2010, in which two boreholes were drilled within the Site boundary: BH1 (9.05 m) in the far north of the Site and BH2 (8.75 m) in the south-east of the Site.

- In borehole BH1, Made Ground was reported to 2.30 m bgl and comprised block paviours (0.00 – 0.08 m), over yellow brown medium sand (0.08 – 0.25 m), over brown gravelly slightly clayey sand with subangular fine to coarse gravel of brick and concrete and subrounded medium to coarse gravel of flint (0.25 – 1.20 m), over brown slightly clayey gravelly sand with some angular to subangular fine to coarse gravel of red brick and concrete fragments (1.20 – 2.30 m).

- In borehole BH2, Made Ground was reportedly present to 2.60 m bgl and comprised brick paving (0.00 – 0.08 m), over light brown medium to coarse sand (0.08 – 0.20 m), over brown to light brown slightly clayey gravelly sand (0.20 – 2.60 m).

The Site is not located within a Groundwater Source Protection Zone (SPZ) for public water supply, or within a Groundwater Safeguard Zone. The EA designates no classification of the Site with regards to Groundwater Drinking Water Protected Areas.

The eastern part of the Site is located within an area classified by the EA as being of high leaching potential with respect to potential groundwater pollution, although the western part of the Site is classified as being of negligible leaching potential.
Licensed groundwater abstractions within a 250 m radius of the Site (as of February 2014) are summarised in Table 4-2.

**Table 4-2: Licensed Groundwater Abstractions within 250 m**

<table>
<thead>
<tr>
<th>AQUIFER</th>
<th>DISTANCE (M) / DIRECTION</th>
<th>PURPOSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unspecified</td>
<td>~ 195 m south east</td>
<td>Cannons Health &amp; Fitness Ltd: Commercial/Industrial/Public Services</td>
</tr>
<tr>
<td>Unspecified</td>
<td>~ 195 m south east</td>
<td>Royal Borough Of Kensington And Chelsea: Commercial/Industrial/Public Services (286 m³ daily)</td>
</tr>
<tr>
<td>Unspecified</td>
<td>~ 210 m south east</td>
<td>Greenwich Leisure Limited: Commercial/Industrial/Public Services (286 m³ daily)</td>
</tr>
</tbody>
</table>

### 4.2 HYDROLOGY

The Site is located within the Thames River Basin (Lower Thames Corridor) catchment in the London Basin. This is an urban area where groundcover predominately consists of impermeable tarmac and concrete, thereby reducing rainfall infiltration.

The nearest surface water feature (the River Thames) is located approximately 650 m south of the Site. The River Thames is the receptor for four consented discharges within the study area. Information obtained from the EA in June 2014 stated that the estuarine ecological quality of the river was ‘Moderate’ and the chemical quality of the river was ‘Fail’. They predicted that these would be unchanged in 2015. The EA did however state that the river was ‘probably at risk’ of not achieving the 2015 qualities. No information could be obtained regarding the water quality of the river in June 2016.

The Site is not located within a flood warning or flood alert area as defined by the EA. At the time of reporting, there were no surface water abstractions within a 1 km radius of the Site.

### 4.3 DESIGNATED ECOLOGICAL SITES AND OTHER SENSITIVE LAND USES

There are no ecological or other sensitive sites identified within 500 m of the Site.

### 4.4 PRELIMINARY HYDROGEOLOGICAL MODEL

The majority of the Site is underlain by the superficial River Terrace Deposits, designated as a Secondary A aquifer due to high permeability and storage capacity characteristics. However, a small area in the north of the Site is underlain by the Langley Silt Member, over River Terrace Deposits. The Langley Silt is designated as an unproductive aquifer due to its high clay and silt content. The impermeable nature of this stratum may impede vertical migration of water towards the underlying River Terrace Deposits.

Groundwater flow in the shallow River Terrace Deposit aquifer is inter-granular and generally oblique towards watercourses which are usually in hydraulic continuity with the gravels. In this case, the River Thames is the nearest surface water body, so groundwater is assumed to flow generally from a north to south direction beneath the Site. Across the catchment, local groundwater flow directions within the aquifer are believed to depend on river flows and on any large abstractions from the gravel, which is likely to draw in river water.
Both superficial strata are underlain by the London Clay Formation, which is considered to impede vertical groundwater migration towards the Principal Chalk aquifer. Groundwater flow in the confined Upper Chalk aquifer is dominated by fracture and fissure flow and generally toward the middle of the London Basin.
5 PRELIMINARY CONCEPTUAL MODEL

5.1 INTRODUCTION

This section of the report presents the characteristics of the Site and provides a systematic indication of the risks to enable uncertainties and further assessment needs or other actions to be identified. It draws on the information presented in earlier sections of the report to identify plausible contaminant-pathway-receptor contaminant linkages in the context of continued use as a hospital.

5.2 POTENTIAL SOURCES

Table 5-1 provides a summary of the potential sources of contamination and the likely nature of such sources both on-site and in the immediate surrounds.

Table 5-1: Potential Sources of Contamination

<table>
<thead>
<tr>
<th>POTENTIAL SOURCES</th>
<th>POTENTIAL CONTAMINANTS OF CONCERN</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ON-SITE</strong></td>
<td></td>
</tr>
<tr>
<td>Made Ground</td>
<td>A wide range of potential contaminants, depending on the source of material, but may include asbestos, metals, petroleum hydrocarbons and polycyclic aromatic hydrocarbons (PAHs).</td>
</tr>
<tr>
<td>Car Park</td>
<td>Lead, petroleum hydrocarbons, benzene toluene ethyl benzene and xylenes (BTEX) and PAHs.</td>
</tr>
<tr>
<td><strong>OFF-SITE</strong></td>
<td></td>
</tr>
<tr>
<td>Underground Fuel Oil Tanks</td>
<td>Petroleum hydrocarbons, benzene toluene ethyl benzene and xylenes (BTEX) and PAHs.</td>
</tr>
<tr>
<td>Sub-stations</td>
<td>Polychlorinated biphenyls (PCBs). Petroleum hydrocarbons and PAHs.</td>
</tr>
<tr>
<td>Dry cleaners</td>
<td>Solvents</td>
</tr>
<tr>
<td>Garages</td>
<td>Petroleum hydrocarbons, PAHs, BTEX, lead and methyl tert-butyl ether (MTBE).</td>
</tr>
<tr>
<td>Clinical waste facility</td>
<td>A wide range of potential contaminants, depending on the source of material, but may include asbestos, metals, and PAHs and radioactive materials.</td>
</tr>
<tr>
<td>Others including garden centre</td>
<td>A wide range of potential contaminants, metals, PAHs, pesticides.</td>
</tr>
</tbody>
</table>

Both medical waste and potential radioactive materials/ waste located on-site have both been discounted as potential sources. This is due to the strict controls that will be in enforced by the hospital to mitigate any exposure related risks regarding these potential sources.
Sources such as the historical graveyards and garden centre have also been discounted as they are located either across or down hydraulic gradient of the Site or of sufficient distance away from the Site that contaminant migration is unlikely.

5.3 POTENTIAL RECEPTORS

In the context of the proposed on-going and potential future land uses, the following potential receptors of soil and/or groundwater impact were identified:

- Future site users (hospital employees, patients and visitors);
- Maintenance workers (during routine maintenance and potential future refurbishment);
- Neighbouring site users (residential and commercial);
- The building infrastructure and related underground services; and
- Underlying Secondary A superficial aquifer in the Kempton Park Gravels.

The River Thames has been discounted as a receptor owing to distance from the Site. The underlying deeper aquifer within the Chalk has also been discounted as a receptor as it is anticipated to be protected by a thick layer (~30 m) of effectively impermeable London Clay. The underlying Lambeth Group (approximately ~40 m thick) will provide further protection from vertical migration to the Chalk since it is relatively impermeable, due to thick layers of clay.

5.4 PLAUSIBLE CONTAMINANT LINKAGES

Table 5-2 provides an evaluation of the potential contaminant linkages that are considered to be plausible.
### Table 5-2: Plausible Contaminant Linkages

<table>
<thead>
<tr>
<th>POTENTIAL CONTAMINANT</th>
<th>RECEPTOR</th>
<th>PATHWAYS</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Made Ground</td>
<td>Human Health</td>
<td>➔ Dermal contact</td>
<td>The Site has been subject to various phases of redevelopment. Therefore Made Ground is likely to be present beneath the Site. Historical borehole logs indicate the thickness of Made Ground to be approximately 2.30 - 2.60m. However, the thickness and composition of the Made Ground is likely to be variable across the Site. The entire Site is anticipated to be underlain by the River Terrace Deposits. Since this stratum is considered to be permeable, any contaminants present within the Made Ground have the potential to leach via surface water infiltration and migrate into potable water pipework. Organic material present within the Made Ground has the potential to produce ground gas, which can migrate into buildings and pose an explosive and/or asphyxiation risk. No specific sources of ground gas or volatile contaminants have been identified on-site and the risk is considered <strong>Low</strong>. However, there is a potential risk of a build-up of volatile gases (if present) in the proposed basements. Mitigation measures may be required, such as a ventilation system. Since the proposed new buildings will include basements, the Made Ground in these areas is likely to be excavated, therefore removing the associated risk to human health from contaminants in Made Ground.</td>
</tr>
<tr>
<td>Car park</td>
<td>➔ Future site users</td>
<td>➔ Ingestion of impacted soil particles on-site, and windblown to adjacent properties</td>
<td></td>
</tr>
<tr>
<td></td>
<td>➔ Construction workers and future maintenance workers</td>
<td>➔ Inhalation of asbestos fibres, dust and windblown to adjacent properties</td>
<td></td>
</tr>
<tr>
<td></td>
<td>➔ Third Party neighbours</td>
<td>➔ Migration of ground gas and volatile vapours into buildings</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>➔ Infiltration into potable water pipework</td>
<td></td>
</tr>
<tr>
<td>POTENTIAL CONTAMINANT</td>
<td>RECEPTOR</td>
<td>PATHWAYS</td>
<td>COMMENTS</td>
</tr>
<tr>
<td>-----------------------</td>
<td>----------</td>
<td>----------</td>
<td>----------</td>
</tr>
<tr>
<td>Controlled Waters</td>
<td>Secondary A Aquifer (River Terrace Deposits)</td>
<td>Vertical and lateral leaching from impacted soil, Vertical and lateral migration via groundwater</td>
<td>The entire Site is anticipated to be underlain by the River Terrace Deposits. Since this stratum is considered to be permeable, potential contaminants present within the Made Ground have the potential to leach via surface water infiltration and migrate vertically to the shallow aquifer. However, the presence of the Langley Silt overlying the River Terrace Deposits in the far north of the Site may help mitigate the transfer of contaminants, due to its impermeable nature. Where basements are proposed, the removal of Made Ground will remove a potential source of contamination to Controlled Waters. Risks to groundwater from potential on-site sources of contamination are considered to be Low to Moderate.</td>
</tr>
<tr>
<td></td>
<td>USTs</td>
<td></td>
<td>Due to the proximity of the sub-station and USTs to the Site and the inferred groundwater flow direction (to the south),</td>
</tr>
<tr>
<td>Human Health</td>
<td>Future site users</td>
<td>Migration of ground gas/vapours, Lateral migration of contaminants via groundwater</td>
<td></td>
</tr>
</tbody>
</table>

The presence of buildings and hardstanding across the majority of the Site will break the contaminant linkage between potentially impacted soils and future site users. Therefore, the risk to human health is considered to be Low. The risk to future ground/maintenance workers is considered to be Low to Moderate due to their direct contact with potentially contaminated soils. Clean service corridors should be considered to minimise the risk to construction workers.
<table>
<thead>
<tr>
<th>POTENTIAL CONTAMINANT</th>
<th>RECEPTOR</th>
<th>PATHWAYS</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub-station</td>
<td>Construction workers and future maintenance workers</td>
<td>impacted groundwater</td>
<td>there is a potential risk that contamination could migrate laterally in permeable geology. The BGS map suggests the presence of Langley Silt in this area which may help mitigate the migration of contaminants to the underlying aquifer. However, the thickness is unknown and it is likely that the base of the tanks are buried &gt;1m bgl. Therefore there is a risk that it would have breached the cohesive layer. The risk to Controlled Waters is therefore considered to be <strong>Moderate</strong>.</td>
</tr>
<tr>
<td>Dry cleaners</td>
<td>Secondary A Aquifer (Kempton Park Gravels)</td>
<td></td>
<td>In addition, although sources of volatile contaminants (including a dry cleaners and printers) have been identified off-site, the potential for significant contamination to have migrated within shallow ground onto the Site is considered to be <strong>Low</strong>. The risk to human health from off-site sources of contamination is also considered to be <strong>Low</strong>, since the majority of the Site will be occupied by buildings and hardstanding.</td>
</tr>
<tr>
<td>Garages</td>
<td></td>
<td></td>
<td>Confirmation of the underlying geology and the groundwater flow direction are required through ground investigation.</td>
</tr>
</tbody>
</table>

Controlled Waters
6 CONCLUSIONS AND RECOMMENDATIONS

Based on the findings of the Site walkover and the desk based assessment WSP | Parsons Brinckerhoff makes the following conclusions and recommendations in the context of the proposed redevelopment of the Site.

The Site was developed in the mid-1800s for residential purposes and redeveloped during the early to mid-1900s as part a hospital, which also included buildings in the immediate area. There is potential for Made Ground to be present beneath the Site given the redevelopment history. Historical borehole logs suggest that Made Ground may be present to a depth of 2.30 – 2.60 m bgl, although the thickness and composition is likely to be variable across the Site.

A number of off-site sources of contamination were identified relating to the current use of the surrounding area as a hospital; these include an electrical sub-station and two USTs. There is potential for lateral migration of contaminants on to the Site from these sources, particularly the USTs.

WSP | Parsons Brinckerhoff note that the hospital holds current licenses for the use and storage of radioactive materials and for the disposal of radioactive waste. However, these are tightly regulated and, as such, are considered to be unlikely to pose significant potential source of contamination. Additionally the disposal of clinical waste (yellow bag waste) is also tightly regulated due to the risk of infection; therefore this is not thought to pose a significant risk to human health.

A number of plausible contaminant linkages have been identified under the proposed land use scenario with respect to human health and the underlying shallow aquifer; the overall risk to Human Health and Controlled Waters is considered to be in the range of Low to Moderate.

6.1 RECOMMENDATIONS

Based on the assessment above, WSP | Parsons Brinckerhoff provide the following recommendations:

Æ In order to assess the potential for plausible contaminant linkages to be present, WSP | Parsons Brinckerhoff recommends a preliminary soil, groundwater and gas investigation should be undertaken. These should target areas of the Site (and the site boundaries near to offsite sources) which have been identified as potential sources and should include some grid based locations in order to assess the potential presence and composition of Made Ground.

Æ It is likely that some reduced level excavations will be required as part of the proposed redevelopment. Any materials disposed of off-site must be done so in Accordance with the Waste Regulations.

Æ Consideration should be given to the potential for the presence of unexploded ordnance (UXO) during any below ground works and it is recommended that a UXO report is commissioned for the Site.

Æ In order to address the linkages associated with potential ingress of contaminants into potable water supply, reference should be made to UK Water Industry Research (ref:10/WM/03/21 Guidance for the Selection of Water Supply Piles to be used in Brownfield Sites) guidance and contact made with the local water supplier when choosing appropriate pipework for the development.
REPORT LIMITATIONS - GROUND RISK AND REMEDIAITION

effects of any future changes or amendments to these values. Specific assumptions associated with the WSP UK Limited risk assessment process have been outlined within the body or associated appendix of the report.

17. Additional investigations may be required in order to satisfy relevant planning conditions or to resolve any engineering and environmental issues.

18. Where soil contamination concentrations recorded as part of this investigation are used for commentary on potential waste classification of soils for disposal purposes, these should be classed as indicative only. Due consideration should be given to the variability of contaminant concentrations taken from targeted samples versus bulk excavated soils and the potential variability of contaminant concentrations between sampling locations. Where major waste disposal operations are considered, targeted waste classification investigations should be designed.

19. The results of the asbestos testing are factually reported and interpretation given as to how this relates to the previous use of the site, the types of ground encountered and site conceptualisation. This does not however constitute a formal asbestos assessment. These results should be treated cautiously and should not be relied upon to provide detailed and representative information on the delineation, type and extent of bulk ACMs and / or trace loose asbestos fibres within the soil matrix at the site.

20. If costs have been included in relation to additional site works, and / or site remediation works these must be considered as indicative only and must be confirmed by a qualified quantity surveyor.

EUROCODE 7: GEOTECHNICAL DESIGN


22. In terms of geotechnical design for foundations, slopes, retaining walls and earthworks, EC7 sets guidance on design procedures including specific guidance on the numbers and spacings of boreholes for geotechnical design, there are limits to methods of ground investigation and the quality of data obtained and there are also prescriptive methods of assessing soil strengths and methods of design. Unless otherwise explicitly stated, the work has not been undertaken in accordance with EC7. A standard geotechnical interpretative report will not meet the requirements of the Geotechnical Design Report (GDR) under Eurocode 7. The GDR can only be prepared following confirmation of all structural loads and serviceability requirements. The report is likely to represent a Ground Investigation Report (GIR) under the Eurocode 7 guidance.

DETAILED QUANTITATIVE RISK ASSESSMENTS AND REMEDIAL STRATEGY REPORTS

23. These reports build upon previous report versions and associated notes. The scope of the investigation, further testing and monitoring and associated risk assessments were selected on the basis of the specific development and land use scenario proposed by the Client and may not be appropriate to another form of development or scheme layout. The risk assessment and opinions provided are based on currently available approaches in the generation of Site Specific Assessment Criteria relating to contamination concentrations and are not considered to represent a risk in a specific land use scenario to a specific receptor. No liability can be
Appendix B

CIRIA RISK DEFINITIONS
CIRIA RISK DEFINITIONS

Table A1 – Classifications of Probability

<table>
<thead>
<tr>
<th>CLASSIFICATION</th>
<th>DEFINITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>High likelihood</td>
<td>There is a pollution linkage / identified geotechnical hazard and an event that either appears very likely in the short term and almost inevitable over the long term, or there is evidence at the receptor of harm or pollution.</td>
</tr>
<tr>
<td>Likely</td>
<td>There is a pollution linkage and all the elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term.</td>
</tr>
<tr>
<td>Low likelihood</td>
<td>There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such event would take place, and is less likely in the shorter term.</td>
</tr>
<tr>
<td>Unlikely</td>
<td>There is a pollution linkage but circumstances are such that it is improbable that an event would occur even in the very long term.</td>
</tr>
</tbody>
</table>

Table A2 – Classifications of Consequence

<table>
<thead>
<tr>
<th>CLASSIFICATION</th>
<th>DEFINITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severe</td>
<td>Short-term (acute) risk to human health likely to result in &quot;significant harm&quot; as defined by the Environment Protection Act 1990, Part IIA. Short-term risk of pollution of sensitive water resource. Catastrophic damage to buildings/property. A short-term risk to a particular ecosystem, or organism forming part of such ecosystem.</td>
</tr>
<tr>
<td>Medium</td>
<td>Chronic damage to Human Health (&quot;significant harm&quot; as defined in DETR, 2000). Pollution of sensitive water resources. A significant change in a particular ecosystem, or organism forming part of such ecosystem.</td>
</tr>
<tr>
<td>Mild</td>
<td>Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services (significant harm as defined in the Draft Circular on Contaminated Land, DETR, 2000). Damage to sensitive buildings/structures/services or the environment.</td>
</tr>
<tr>
<td>Minor</td>
<td>Harm, although not necessarily significant harm, which may result in a financial loss, or expenditure to resolve, Non-permanent health effects to human health (easily prevented by means such as personal protective clothing etc.). Easily repairable effects of damage to buildings, structures and services.</td>
</tr>
</tbody>
</table>

The risk categories presented in this report, taking into account both probability and severity, are based on the matrix presented in Table A3 below, following CIRIA C552.

Table A3 – Adopted Risk Categories / Comparison of Consequence against Probability

<table>
<thead>
<tr>
<th>PROBABILITY</th>
<th>Severe</th>
<th>Medium</th>
<th>Mild</th>
<th>Minor</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Likelihood</td>
<td>Very High Risk</td>
<td>High Risk</td>
<td>Moderate Risk</td>
<td>Low to Moderate Risk</td>
</tr>
<tr>
<td>Likely</td>
<td>High Risk</td>
<td>Moderate Risk</td>
<td>Low to Moderate Risk</td>
<td>Low Risk</td>
</tr>
<tr>
<td>Low Likelihood</td>
<td>Moderate Risk</td>
<td>Low to Moderate Risk</td>
<td>Low Risk</td>
<td>Very Low Risk</td>
</tr>
<tr>
<td>Unlikely</td>
<td>Low to Moderate Risk</td>
<td>Low Risk</td>
<td>Very Low Risk</td>
<td>Very Low Risk</td>
</tr>
</tbody>
</table>
Appendix C

FIGURES, PHOTOGRAPHS AND RELEVANT HISTORICAL PLANS
TITLE: Royal Brompton Hospital

FIGURE No: Figure 1 - Site Location Plan
TITLE: Royal Brompton Hospital

FIGURE No: Figure 2 - Site Layout Plan

Key
- Site Boundary
- Point of Interest

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, Swisstopo, and the GIS User Community
IMPORTANT – Please Read

This drawing is for illustrative purposes only and is for use only in conjunction with associated reports relating to the project details below. WSP accepts no liability for the mis-interpretation or use of this illustration by any other parties.

Photo 1: View of southern main entrance to Hospital.

Photo 2: View of car park, facing south-east.

Photo 3: View of eastern boundary Sydney Wing.

Photo 4: View of the internal road between the Sydney Wing and Chelsea Wing, facing south. Two oxygen tanks are visible.

Photo 5: Waste storage area running along the internal road separating the Sydney and Chelsea wings.

Photo 6: Substation located north/north-east of the Site.

Key:

Royal Brompton Hospital

Appendix C

Photographic Record

1. 2. 3.

5.

6.

1. 2. 3.

5.

6.

1. 2. 3.

5.

6.

1. 2. 3.

5.

6.
The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840s. In 1864 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

**Historical Map - Segment A8**

**Map Name(s) and Date(s)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>A8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Order Details**

Order Number: 53104937_1.1
Customer Ref: 40499.01/0006
National Grid Reference: 527090, 178280
Slice: 1.52
Search Buffer (m): 250

**Site Details**

The Jam Tree, 541 Kings Road, Fulham, LONDON, SW6 2EB
London

Published 1916

Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840s. In 1864 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered a fairly large part of the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Order Details
Order Number: 53104937_1_1
Customer Ref: 40499.01/0006
National Grid Reference: 527090, 178280
Slice: A
Site Area (Ha): 1.52
Search Buffer (m): 250

Site Details
The Jam Tree, 541 Kings Road, Fulham, LONDON, SW6 2EB
The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Order Details
Order Number: 53104937_1_1
Customer Ref: 40499.01/0006
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Slice: A
Site Area (Ha): 1.52
Search Buffer (m): 250

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The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Order Details
Order Number: 53104937 1.1
Customer Ref: 40499.01/0006
National Grid Reference: 527090, 178280
Slice: A
Site Area (Ha): 1.52
Search Buffer (m): 250

Site Details
The Jam Tree, 541 Kings Road, Fulham, LONDON, SW6 2EB
Ordnance Survey Plan
Published 1955 - 1964
Source map scale - 1:1,250

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Order Details
Order Number: 53104937 1.1
Customer Ref: 40499.01/0006
National Grid Reference: S27090, 178280
Slice: A
Site Area (Ha): 1.52
Search Buffer (m): 250

Site Details
The Jam Tree, 541 Kings Road, Fulham, LONDON, SW6 2EB
Large-Scale National Grid Data
Published 1991
Source map scale - 1:1,250

‘Large-Scale National Grid Data’ superseded SIM cards (Ordnance Survey’s ‘Survey of Information on Microfilm’) in 1992, and continued to be produced until 1999. These maps were the forerunners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

Order Details
Order Number: 53104937_1_1
Customer Ref: 40499.01/0006
National Grid Reference: 527090, 178280
Slice: A
Site Area (Ha): 1.52
Search Buffer (m): 250

Site Details
The Jam Tree, 541 Kings Road, Fulham, LONDON, SW6 2EB

Historical Map - Segment A8

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The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840s. In 1864 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

Historical Map - Segment A13

Order Details

Order Number: 53104937 1.1
Customer Ref: 40449.01/0006
National Grid Reference: 527090, 178280
Slice: A
Site Area (Ha): 1.52
Search Buffer (m): 250

Site Details

The Jam Tree, 541 Kings Road, Fulham, LONDON, SW6 2EB
London

Published 1896

Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

Order Details

Order Number: 53104937 1 1
Customer Ref: 40499.01/0006
National Grid Reference: 527090, 178280
Slice: A
Site Area (Ha): 1.52
Search Buffer (m): 250

Site Details

The Jam Tree, 541 Kings Road, Fulham, LONDON, SW6 2EB
Order Details

Order Number: 53104937_1_1
Customer Ref: 40499.01/0006
National Grid Reference: 527090, 178280
Slice: A
Site Area (Ha): 1.52
Search Buffer (m): 250

Site Details

The Jam Tree, 541 Kings Road, Fulham, LONDON, SW6 2EB

Ordnance Survey Plan
Published 1951 - 1952
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the area of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Historical Map - Segment A13

Map Name(s) and Date(s)

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk
Order Details
Order Number: 53104837_1_1
Customer Ref: 40499.01/0006
National Grid Reference: 527090, 178280
Slice: A
Site Area (Ha): 250
Search Buffer (m): 250

Site Details
The Jam Tree, 541 Kings Road, Fulham, LONDON, SW6 2EB

Ordnance Survey Plan
Published 1954 - 1962
Source map scale - 1:1,250

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840s. In 1864 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1936, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Historical Map - Segment A13
Large-Scale National Grid Data
Published 1992 - 1994
Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the forerunners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.
The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840’s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1840’s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.
10k Raster Mapping
Published 2013
Source map scale - 1:10,000

The historical maps shown were produced from the Ordnance Survey’s 1:10,000 colour raster mapping. These maps are derived from Landplan which replaced the old 1:10,000 maps originally published in 1970. The data is highly detailed showing buildings, fences and field boundaries as well as all roads, tracks and paths. Road names are also included together with the relevant road number and classification. Boundary information depiction includes county, unitary authority, district, civil parish and constituency.

Map Name(s) and Date(s)

Historical Map - Slice A

Order Details
Order Number: 53104937_1_1
Customer Ref: 40499.01/0006
National Grid Reference: 527090, 178280
Slice: A
Site Area (Ha): 1.52
Search Buffer (m): 1000

Site Details
The Jam Tree, 541 Kings Road, Fulham, LONDON, SW6 2EB