



## **Phase I Geo-Environmental Desk Study**

### **Wootton Street**

Lambeth  
London  
SE1 8LX

### **Prepared for:**

#### **Homes for Lambeth (HFL) c/o**

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**WOOTTON STREET, LAMBETH**

**NON-TECHNICAL CLIENT SUMMARY**




This report presents the findings of a Phase I Geo-Environmental Desk Study which was carried out to identify potential contamination from previous or current uses of the site and surrounding area and to provide an initial assessment of geological and geotechnical aspects of the site and how the proposed development or surrounding environment might be affected.

- The site is anticipated to have been recently used as a day nursery, set within a building which has been present since the 1960's. Proposed development plans for the site are currently understood to comprise the demolition of the existing building and the construction of a multi storey building including a new community centre across the ground floor, with residential apartments above. The scheme also includes landscaping, car parking and associated infrastructure works.
- Geological mapping reports that the site is underlain by superficial Alluvium overlying London Clay, which is of limited importance as a groundwater resource and no significant watercourses have been identified nearby. Therefore, the site is considered to be of relatively low environmental sensitivity. Initial Unexploded Ordnance (UXO) review indicates the site to be within a High Risk area where a detailed assessment would be required and a UXO engineer is likely to be required to oversee any intrusive groundworks/ investigation.
- Historical mapping shows the site was occupied by terraced housing from before the 1870's. This was largely unchanged until the 1940's when anticipated building damage at the site and in the local area saw the property become derelict until it was developed into its current layout. A few sources of potential contamination have been identified in the local area, including various factories, works, and an obsolete PFS within approximately 300m.
- Although widespread contamination is not anticipated, given the nature of the former land use, it is considered likely that made ground materials (fill) will be present that may impact future site users and plants used in areas of soft landscaping. Furthermore, given the proximity and nature of nearby commercial land uses, associated impacts to soil and groundwater beneath the site also can't be ruled out at this stage.
- A ground investigation is recommended to assess the quality and nature of the underlying soils, to assess what further work or assessment will be required to ensure the site is safe and suitable for the proposed end use.

By their very nature, the above bullet points represent a simplified summary of our work and should not be relied upon to form the basis for key decisions for the proposed development. A full picture is provided in the following report, or alternatively give us a call and we'll talk you through it.



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The report has been written, reviewed and authorised by the persons listed above. It has also undergone EPS' in house quality management inspection. Should you require any further assistance regarding the information provided within the report, please do not hesitate to contact us.

The National Planning Policy Framework requires a competent person to prepare site investigation information, which is defined as a person with a recognised relevant qualification, sufficient experience in dealing with the type(s) of pollution or land instability, and membership of a relevant professional organisation. EPS considers that it fulfils these criteria and would welcome any request for staff CVs or case studies to demonstrate it.

As stated within DEFRA's Contaminated Land Statutory Guidance, with any complex risk assessment it is possible that different suitably qualified people may reach slightly different conclusions when interpreting the same information. EPS recognises this and considers the conclusions presented within this report to be robust and appropriate but input from the Local Authority and their judgement in line with this guidance would still be welcomed.

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## TABLE OF CONTENTS

<b>1</b>	<b>INTRODUCTION.....</b>	<b>1</b>
1.1	Background .....	1
1.2	Objectives.....	1
1.3	Project Limitations and Constraints.....	2
<b>2</b>	<b>GEO-ENVIRONMENTAL SETTING .....</b>	<b>3</b>
2.1	Site Location and Description .....	3
2.2	Environmental Setting .....	4
2.3	Site History .....	6
2.4	Unexploded Ordnance (UXO) Risk .....	7
<b>3</b>	<b>CONCEPTUAL MODEL &amp; PRELIMINARY RISK ASSESSMENT .....</b>	<b>9</b>
3.1	Source Characterisation .....	9
3.2	Potential Receptors .....	9
3.3	Potential Pathways .....	10
3.4	Summary of Contaminant Linkages .....	11
<b>4</b>	<b>GEOTECHNICAL GROUND MODEL.....</b>	<b>14</b>
<b>5</b>	<b>CONCLUSIONS &amp; RECOMMENDATIONS .....</b>	<b>16</b>

### Figures

Figure 1	Site Location Plan
Figure 2	Current Site Layout
Figure 3	Aerial Photograph

### Appendices

Appendix A	Selected Site Photographs
Appendix B	Indicative Proposed Development Plan
Appendix C	Surrounding Land Use
Appendix D	Geological Context
Appendix E	Groundwater Vulnerability and Flood Maps
Appendix F	A Selection of Historic Maps
Appendix G	Unexploded Ordnance (UXO) Risk Map

## 1 INTRODUCTION

In April 2020, Environmental Protection Strategies Ltd (EPS) was commissioned by Ardent Consulting Engineers on behalf of Homes for Lambeth (HFL) to complete a Phase I Geo-Environmental Desk Study for land at Wootton Street, Lambeth, London, SE1 8LX ('the site'); see Figure 1.

The work was commissioned in order to fulfil initial planning requirements relating to contamination, for the redevelopment of the site. The proposed development is anticipated to comprise the demolition of the existing single storey building and the construction of a part 5, part 8-10 storey building to provide a new community centre at the ground floor level and residential units above. The scheme also includes landscaping, car parking and associated infrastructure works.

Selected Site Photographs are included as Appendix A, an indicative proposed development plan is included as Appendix B.

This report presents the findings, conclusions, and recommendations of the Phase I Desk Study undertaken for the site as instructed.

### 1.1 Background

A Desk Study comprises the first stage of any geo-environmental assessment, the purpose of which is to determine what potentially contaminative activities may have occurred at the property or the surrounding area which may pose an environmental or geological risk to site users, the surrounding environment or proposed development, either at present or in the future.

The method used in this investigation to assess the environmental risk posed is based on the concept of 'contaminant linkage', which considers the following three factors:

<b>Source</b>	The location from which an environmentally hazardous / contaminative substance is, (or was,) derived.
<b>Pathway</b>	A route or mechanism via which a source could come into contact with a receptor to cause significant harm.
<b>Receptor</b>	An environmentally sensitive object or condition e.g. person, property, controlled water, or ecological system, which may be present now or in future.

If all three factors are identified, there is the potential for a 'contaminant linkage' to be active, which could result in significant harm being caused to the environment or human health.

### 1.2 Objectives

The purpose of this desk study is to evaluate the potential contaminant linkages which may be active at the site in its current condition, or could become active in future, and to determine if any action is required to investigate them further or to break them.

This is achieved by carrying out the following activities:

- a) Examining the site history - late 1800s to present day, through collection of historical maps of the area, site records, records held by relevant local authorities, the Environment Agency and review of other information databases.
- b) Characterising the site's environmental and geological sensitivity through examination of existing geological, hydrogeological, topographical, and historical maps and aerial photographs of the area.
- c) Identifying Potential Areas of Concern (PAOCs) through a combination of historical map and data review.
- d) Consideration of any future plans for the site and the effects any proposed changes may have on contaminant linkages over time.
- e) Development of a Conceptual Site Model and Preliminary Risk Assessment to evaluate the potential risks posed by the site and make recommendations for any further work that may be required to ensure suitability for use and safe development. In accordance with the Environment Agency's *Land Contamination: Risk Management* (2019) and the *National Planning Policy Framework*.

### **1.3 Project Limitations and Constraints**

The purpose of this report is to present the findings of a Phase I Geo-Environmental Desk Study conducted at the location(s) specified. When examining the data collected from the investigations made during the assessment, EPS makes the following statements:

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

## 2 GEO-ENVIRONMENTAL SETTING

The following section provides a summary of the information collected in relation to the site location and history.

### 2.1 Site Location and Description

Detail	Description
<b>Location</b>	The site is situated at the junction of Wootton Street and Greet Street, around 250m east of Waterloo Station, in Lambeth, south London.
<b>National Grid Reference</b>	531430, 180010
<b>Topographic Elevation</b>	The property lies at approximately 3m Above Ordnance Datum (AOD) and appears to be relatively flat.
<b>Description of Site</b>	<p>The site is bordered by Wootton Street, Greet Street and a private residential road and currently contains a single storey brick building, with an enclosed playground area and car park to the south. At the time of the walkover survey, access to the building and playground was limited.</p> <p>The current structure occupies the northern section of the site (fronting onto Wootton Street), and is understood to have been previously used as a day nursery and also links with the residential flats to the west. The building was surrounded by fringe soft landscaping to the north and east, which contained shrubs and occasional semi-mature/ mature trees. A low brick wall separated the landscaping from the adjacent pavements, with breaks in the north western corner and southern boundary to allow pedestrian access to the building and vehicular access to the car park respectively. A number of manhole covers were also noted in these areas, anticipated to be related to surface/ foul water. The playground was located to the rear (south) of the nursery in the centre of the site and was surrounded by a slightly higher brick wall with a chain link fence, extending from the top of the wall to make up the full height. The playground consisted of various play equipment and appeared to be surfaced with a combination artificial grass and rubber matting.</p> <p>The southern area consisted of a small car park, surfaced with asphalt and surrounded by brick walls. Adjacent to the northern wall was a small, planted border with plants and shrubs. Either side of the entrance to the car park was a strip of hedgerow/ shrubs and a few mature trees to the west. One manhole was noted in the centre of the car park area and a couple of lamp posts were also identified.</p>
<b>Surrounding Land Use</b>	Multi storey residential buildings are present to the east, west and south, with an above-ground section of a railway line present to the north (20m), which also includes London Waterloo East Station.

A plan showing the site location is provided as Figure 1, the current site layout is detailed on Figure 2 and an aerial photograph is included as Figure 3. Furthermore, relevant extracts of a Landmark Envirocheck report are included as Appendix C.





## 2.2 Environmental Setting

Detail	Description																
<b>Geology</b>	Geological mapping indicates the site to be underlain by superficial Alluvium (clay, silt, sand and peat) overlying bedrock of the London Clay Formation. Information on the site's geological context is included as Appendix D.																
<b>British Geological Survey (BGS)</b>	A borehole was reviewed for a location around 20m to the north east of the proposed development area, to give local insight on the potential ground conditions. The log reports made ground to 3.8m, underlain by sand and sandy gravel to 9.6m, labelled as terrace gravels (but anticipated to be representative of the superficial Alluvium) present on the BGS mapping. Closely fissured clay of the London Clay Formation, with fine layers of silt and sand was present beneath, progressing to 19.5m, where the borehole was terminated. The log lists slight water seepages at 4.0m, 16.0m and 19.0m and when left overnight the water level was observed to rise from 19.0m to 3.1m bgl. A copy of this log is included within Appendix D.																
<b>Geological Hazards</b>	<table border="1"> <thead> <tr> <th>Hazard</th> <th>On Site Risk</th> </tr> </thead> <tbody> <tr> <td>Mining Activities</td> <td>No Hazard</td> </tr> <tr> <td>Collapsible Ground</td> <td>No Hazard</td> </tr> <tr> <td>Compressible Ground</td> <td>High</td> </tr> <tr> <td>Ground Dissolution</td> <td>No Hazard</td> </tr> <tr> <td>Running Sand</td> <td>Low</td> </tr> <tr> <td>Landslide</td> <td>Very Low</td> </tr> <tr> <td>Shrinking/ Swelling Clay</td> <td>Low</td> </tr> </tbody> </table>	Hazard	On Site Risk	Mining Activities	No Hazard	Collapsible Ground	No Hazard	Compressible Ground	High	Ground Dissolution	No Hazard	Running Sand	Low	Landslide	Very Low	Shrinking/ Swelling Clay	Low
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	Shrinking/ Swelling Clay	Low															
No BGS recorded mineral sites are present within 1km.																	
Three natural cavities are recorded within the same radius, with the closest located approximately 325m west, relating to a scour hollow.																	
<b>Radon</b>	The Envirocheck report indicates the site to lie in a location where the percentage of homes above the radon action level is less than 1%. It further reports that the site will not require radon protection measures in the construction of new buildings.																
<b>Hydrogeology</b>	<p>Groundwater vulnerability maps for the area show that the underlying superficial Alluvium is classified by the Environment Agency (EA) as a Secondary Aquifer (Undifferentiated), with the bedrock London Clay Formation classified as an Unproductive Aquifer. Furthermore, the area does not lie within a Source Protection Zone (SPZ) for local groundwater abstraction.</p> <p>The Envirocheck report lists six licences for groundwater abstractions within 500m. Four of these relate to a cluster of points at Stamford House, located roughly 395m north east for use in commercial, industrial and public services such as drinking, cooking, washing and sanitary purposes.</p> <p>Groundwater vulnerability maps are included as Appendix E.</p>																





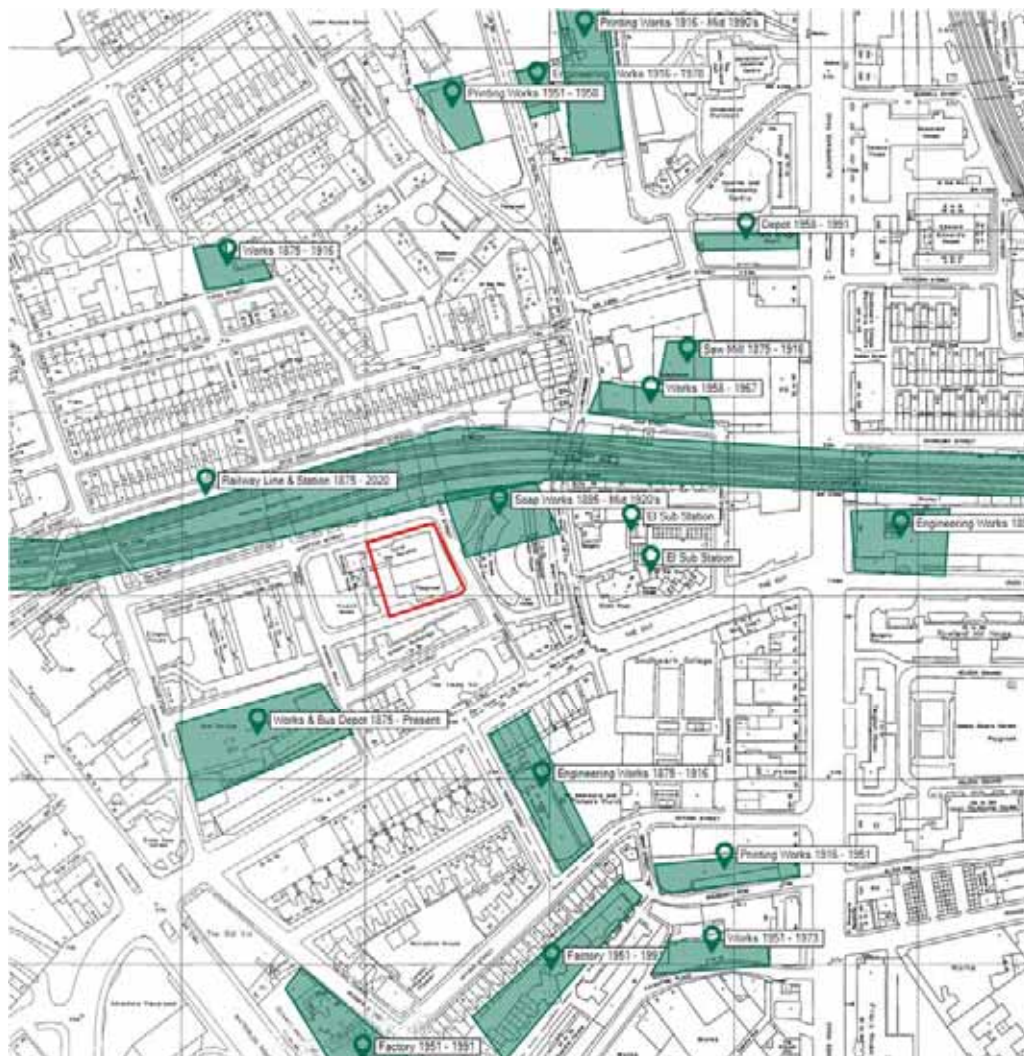
Detail	Description		
<b>Hydrology</b>	<p>The Envirocheck lists the nearest surface water feature to be the River Thames located around 435m north east.</p> <p>The Envirocheck reports lists one discharge consent within 500m (albeit this has been revoked), located around 490m north for the discharge of “other matter” surface water into the River Thames. No surface water abstractions are recorded within a 500m radius.</p>		
<b>Flood Risk</b>	<p>Review of the EA Flood Zone Map for the area indicates that the site lies within Flood Zone 3, which is defined as the area with a high potential risk of flooding from fluvial or tidal sources.</p> <p>It should be noted that the EA maps do not take into account flooding from poor drainage or groundwater and that the area is highlighted as benefiting from flood defences. A copy of the flood map for the site and surrounding area is also included in Appendix E.</p>		
<b>Landfill &amp; Waste</b>	<p>The Envirocheck report does not record any historic/ active landfills within 1km.</p> <p>One licensed waste management facility is reported within 500m, located roughly 495m west for a mobile plant license operated by Ecovert F M Ltd since March 2008.</p> <p>One licensed waste treatment or disposal site is reported within 500m, roughly 90m north west and was/ has been operated by Partridge Metals as a scrapyards with a maximum input of less than 10,000 tonnes per year, from May 1993 (for an unknown period).</p> <p>No entries for infilled land (non-water) have been recorded.</p>		
<b>Industrial Land Use</b>	<p>The Envirocheck report lists 161 industrial land uses within 500m, with 33 of these present within 250m. The most pertinent are summarised below.</p>		
	<p style="text-align: center;"><b>Land Use</b></p>	<p style="text-align: center;"><b>Approximate Distance (Direction)</b></p>	<p style="text-align: center;"><b>Status</b></p>
	<p>Chelsea Telecom Ltd (Telecommunications Equipment)</p>	<p style="text-align: center;">8m (W)</p>	<p style="text-align: center;">Inactive</p>
	<p>Quality Electronics (Electronic Component Manufacturers)</p>	<p style="text-align: center;">52m (E)</p>	<p style="text-align: center;">Inactive</p>
	<p>Zeelo Ltd ( Bus &amp; Coach Operators)</p>	<p style="text-align: center;">79m (W)</p>	<p style="text-align: center;">Inactive</p>
	<p>Mercury Garage (Car Engine Tuning)</p>	<p style="text-align: center;">80m (W)</p>	<p style="text-align: center;">Inactive</p>
	<p>The Printing Shop Ltd (Printers)</p>	<p style="text-align: center;">88m (SE)</p>	<p style="text-align: center;">Inactive</p>
	<p>Clean Cut (Dry Cleaners)</p>	<p style="text-align: center;">91m (SE)</p>	<p style="text-align: center;">Inactive</p>
	<p>Sonic Rail Services Ltd (Railway Equipment Manufacturers)</p>	<p style="text-align: center;">161m (SW)</p>	<p style="text-align: center;">Inactive</p>
<p>It should be noted that 3 fuel stations are listed within the same radius, the closest proximity of which ‘Blackfriars Filling Station’, located around 280m south east, but is not obsolete.</p>			



Detail	Description
<b>Pollution Incidents</b>	No pollution incidents to controlled waters are reported within 500m.  There are a number of local authority pollution prevention and control measures in place within 1km. These relate to commercial land uses, and the closest to the study area is located roughly 50m to the west and is for the permitted respraying of road vehicles.
<b>Previous Investigation or Remediation</b>	EPS are not aware of any previous ground investigations or remedial works undertaken at the site.
<b>Sensitive Land Use</b>	No sensitive land uses are listed within 1km.

### 2.3 Site History

A summary of historical map data from 1875 to 2020 is summarised below, with notable features highlighted on the historical overlay. Key points are highlighted and copies of relevant historic maps and any others examined during the investigation are included in this report as Appendix F.



- Earliest records from the 1870's showed the site and the immediate surrounding area to be occupied by terraced housing. At least two rows of terraces ran through the property from east to west, fronting onto Wootton Street and Ethelm Street.
- The site was cleared and remained empty for a period during the 1950's, with large sections of the surrounding area also being regenerated, after what is anticipated to be damage to infrastructure which occurred during World War II (WWII). Coral Day Nursery and the adjacent Windmill House (west) was built in the 1960's, in a layout that appears to be similar to modern day.
- Historic mapping shows a number of industrial land uses within 250m including factories, engineering works, printing works, depots and a saw mill. A soap works, and a railway line/station have been identified within 50m, the latter of which is still present. Furthermore, mapping from the 1970's shows the development of two electricity sub stations located approximately 100m east.

## 2.4 Unexploded Ordnance (UXO) Risk

A UXO map was consulted from Zetica UXO Ltd, with a copy of the map included in this report as Appendix G. This map does not form a preliminary UXO risk assessment but can be used with other information to form the basis of one.



The map indicates the potential for UXO from WWII bombings at the site falls into the lower end of the **HIGH RISK** category meaning that a more detailed UXO assessment is likely to be required as well as a UXO engineer to oversee any intrusive groundworks/ investigation.

### 3 CONCEPTUAL MODEL & PRELIMINARY RISK ASSESSMENT

The following section provides a review of the contaminant linkages that may be active at the site through the process of a Preliminary Risk Assessment, whereby EPS have examined the potential sources that may be present as a result of historic and/ or current site activities and where potential interaction between these sources and the identified human/ environmental receptors may occur.

#### 3.1 Source Characterisation

The following potential contaminant sources have been identified at the site and in the surrounding area:

Potential Source	Source Description	Principal Contaminants of Concern
Current & Historic Site Use	Infill material of unknown origin (made ground) used to level areas beneath the former/ current buildings/ hardstanding.	PAH, Metals, ACM
Current and Historical Surrounding Land Use	Railway located approximately 20m north.	PAH, Metals, ACM
	Historic commercial/ industrial land uses within 250m including various commercial premises, factories and works sites, and an obsolete Petrol Filling Station around 280m south east.	PAH, Metals, ACM, TPH (incl. BTEX), VOC
	Two electricity sub-stations located around 100m from site.	PCB's

**Notes:** PAH Polycyclic Aromatic Hydrocarbons ACM Asbestos Containing Materials  
TPH Total Petroleum Hydrocarbons BTEX Benzene, Toluene, Ethylbenzene & Xylenes  
PCBs Polychlorinated Biphenyls

#### 3.2 Potential Receptors

A framework for the assessment of risks arising from the presence of contamination in soils has been produced by the Environment Agency and the Department for the Environment, Food and Rural Affairs (DEFRA) and is presented with the report: 'Using Science to Create A Better Place: Updated Technical Background to the CLEA Model – Science Report SC050021/SR3'. This guidance document defines a series of standard land-uses which have been further developed into six generic land uses in the Category 4 Screening Levels project for Land Affected by Contamination (DEFRA/Contaminated Land: Applications in Real Environments (CL:AIRE) Project Report SP1010, 2014) which form a basis for the development of the Conceptual Site Model.

The proposed development is anticipated to comprise the demolition of the existing single storey building and the construction of a part 5, part 8-10 storey building to provide a new community centre at the ground floor level and residential units above. The scheme also includes landscaping, car parking and associated infrastructure works. This proposed land use has been considered as:

- Public Open Space (Residential)

The proposed land use is considered to be most relevant to a POS<sub>RESI</sub> for the following reasons:



- The soft landscaped areas within the development will comprise predominantly grassed or planted areas in close proximity to the residential building.
- The type of activities which are envisaged in these areas are children playing and informal sports activities, such as a 'kickabout'.
- The critical receptor age class is not as sensitive as typical residential land uses and more realistically reflects the age of children who will use these areas most frequently.
- Home-grown vegetable intake is not assumed to take place but the amenity areas are considered close enough to properties to allow the tracking back of soils into people's homes, where POS (Parks) would not.

It should be noted that the above classification is subject to adjustment should finalised development plans reveal more sensitive areas of landscaping than currently anticipated, although given the nature of the proposed ground floor space, this is considered particularly unlikely.

In view of the environmental setting, current and potential future land use of the site and surrounding sites, the potential receptors for any contaminant impact are discussed below:

<b>Receptor</b>	<b>Site Specific Description</b>
<b>Human</b>	Future site users, site workers involved in the site redevelopment, and those working and living in the surrounding area have the potential to be at risk from exposure to potential contaminants of concern (CoCs).
<b>Groundwater</b>	The underlying geology comprises superficial Alluvium, which is classified by the EA as Secondary Aquifer with the underlying London Clay Formation classified as an Unproductive Aquifer. Whilst the site does not lie within a SPZ for nearby groundwater abstraction, the underlying superficial geology does have some resource potential and therefore, groundwater should be considered as a potential receptor to site derived contaminants at this stage.
<b>Surface Water</b>	The nearest surface water feature is the River Thames, located around 435m north east, with no significant watercourses illustrated in the local area. Given this distance and the anticipated nature of any site derived contaminants identified, surface waters have not been identified as a sensitive receptor to site derived contaminants.
<b>Flora and Fauna</b>	The proposed development is expected to include soft landscaped areas. Some of the identified contaminants of concern are known to be phytotoxic and as such, the potential for this impact should be considered.
<b>Buildings &amp; Infrastructure</b>	Given the nature of the contaminations of concern identified, subsurface structures such as new building foundations or potable water supply pipework are not considered to be at risk.
<b>Adjacent Land</b>	Given the limited mobility of the site-derived contaminants of concern, adjacent properties including private residential dwellings are not considered to be at risk from potential contaminants.

### 3.3 Potential Pathways

Where contaminants may be present in soil, there are a number of potential pathways that enable human receptors to come into contact with or be exposed to them. The most direct pathways, considered under current UK legislation, can be summarised as follows:

- Direct ingestion of contaminated soil
- Ingestion of household dust
- Ingestion of contaminated vegetables
- Ingestion of soil attached to vegetables
- Dermal contact with contaminated soil
- Dermal contact with household dust
- Inhalation of fugitive soil dust
- Inhalation of fugitive household dust
- Inhalation of vapours outdoors
- Inhalation of vapours indoors

Clearly, not all of these potential pathways apply for every standard land-use. For example, ingestion of contaminated vegetables will not apply to land uses other than residential with plant uptake and allotments.

However, in addition to direct exposure pathways, a number of physical transport mechanisms / pathways may also exist at a site that allow remote or less accessible contaminants in soil or groundwater to reach human or environmental receptors both at a site and beyond the site boundary. These include the following:

- Downward and lateral movement of contaminants in soil either by gravity or through being 'leached' by percolating rainwater.
- Lateral migration of contaminants dissolved in groundwater.
- Direct seepage or leaching of contaminants from soil into subsurface drains or supply pipework.
- Volatilisation of contaminants from groundwater or unsaturated soils into buildings or outdoor air.

Through examination of the standard land use and environmental setting at each site, the presence of pathways and transport mechanisms described above must be considered when assessing whether a contaminant linkage may plausibly be active, and therefore be included in the conceptual site model.

### 3.4 Summary of Contaminant Linkages

Considering the site use and environmental setting, and the proposed land use; the plausible contaminant linkages that require further investigation are summarised in the following table:

Source	Pathway	Receptor
Contaminated soil (made ground beneath previous buildings and hardstanding)	Direct contact and inadvertent ingestion by eating or smoking with dirty hands & inhalation of fugitive dusts.	Construction workers during redevelopment & site users
	Direct uptake via root systems	Plants
Contaminated soil / groundwater	On-site migration of contaminants and subsequent volatilisation of organic compounds to indoor air.	Site users

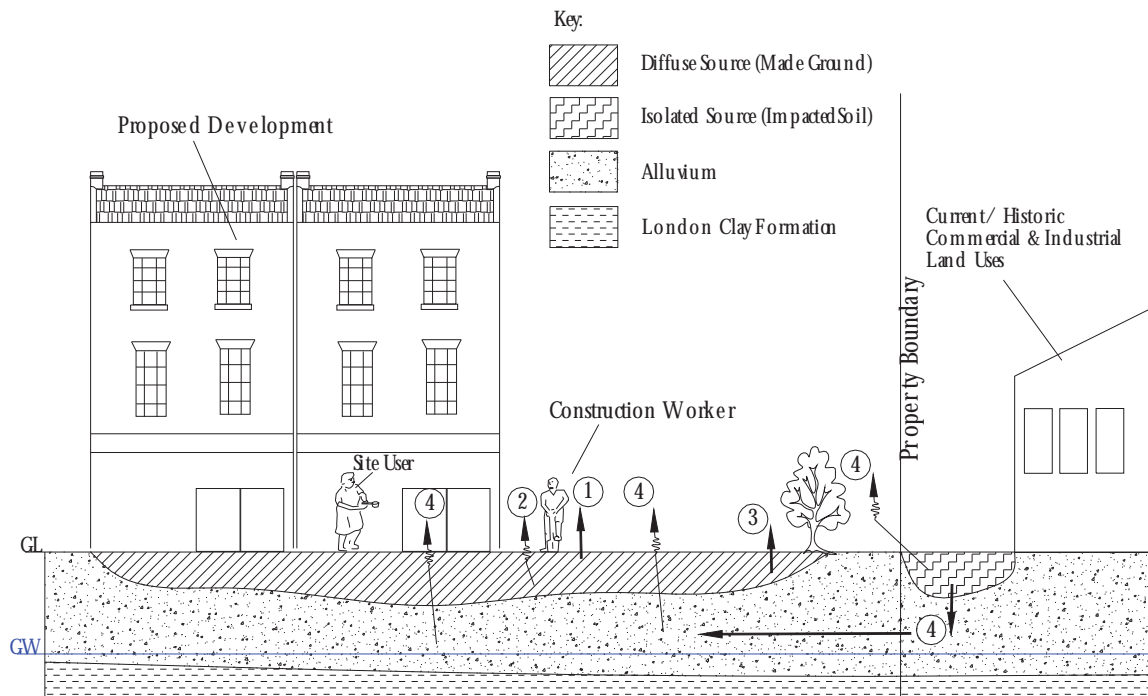


The following comments are made with respect to contaminant linkages which have been considered through development of the conceptual model, but have not been concluded as 'plausible' – i.e. through which a significant possibility of significant harm could occur to an identified receptor:

- PAHs and metals have been identified as contaminants of concern associated with the historic onsite infill, however these contaminants are considered to be relatively immobile in the environment by virtue of their very low solubility and volatility. On this basis, plausible pathways by which these potential contaminants could pose a significant risk to the underlying groundwater or local surface waters are not considered to be active.
- Based on the site walkover and previous use of the property inferred from this historical records, it is considered unlikely that significant volumes of volatile compounds (i.e. petrol) have ever been stored at the site. Furthermore, it is not considered likely that significant contamination has occurred which could pose a risk to off-site receptors such as adjacent buildings or site users. Risks associated with on-site migration of contaminants in soil and/ or groundwater and subsequent generation of organic vapours to the proposed buildings have been maintained, due to the nature and proximity of the surrounding industrial land uses.
- Contaminants of concern may be associated with the nearby railway line, located to the north of the site. However, given the distance of this feature (roughly 20m from the nearest boundary), and as no goods/ storage yards or sidings have been present close to the site, a plausible contaminant linkage has not been identified associated with this source.
- Whilst the majority of relatively modern electrical transformers do not contain insulation oils containing PCBs, the electricity sub-stations identified in the surrounding area do represent a potential source that could contain PCBs. However, given the distance of these from the site and the limited mobility of PCBs in the environment, these sources are not considered to pose a significant risk to the proposed development.

The following diagram provides an illustration of the plausible contaminant linkages that may be active at the site and which may need further investigation or control to ensure safe development:

### Wootton Street, Lambeth – Illustrative Conceptual Site Model



#### Potential Pathways:

- |  |   |
|--|---|
| <ol style="list-style-type: none"> <li>1 Direct Contact with /Inadvertent Ingestion by Eating or Smoking with Dirty Hands</li> <li>2 Inhalation of Fugitive Soil Dust</li> </ol> | <ol style="list-style-type: none"> <li>3 Direct Uptake via Root Systems</li> <li>4 Volatilisation of Organic Compounds to Indoor &amp; Outdoor Air</li> </ol> |
|--|---|

#### 4 GEOTECHNICAL GROUND MODEL

Geological records indicate the ground conditions are likely to comprise superficial Alluvium overlying London Clay Formation bedrock, although made ground is anticipated to be present at the surface, particularly beneath former structures. A conceptual geotechnical ground model is provided in the table below which assesses design elements, anticipated strata and ground conditions:

Element	Anticipated Strata	Parameter(s)	Anticipated Conditions
Foundations	Made Ground	Allowable Bearing Pressure	Not appropriate as a bearing strata
		Settlement	High sensitivity
		Volume Change	Depends upon the soil composition
	Alluvium	Allowable Bearing Pressure	50kN/m <sup>2</sup> to 100kN/m <sup>2</sup>
		Settlement	High sensitivity
		Volume Change	Low to medium volume change potential
	London Clay Formation	Allowable Bearing Pressure	75kN/m <sup>2</sup> to 125kN/m <sup>2</sup>
		Settlement	Moderate sensitivity/ long term consolidation under loading
		Volume Change	High volume change potential
Drainage	Made Ground	Permeability	Not suitable for infiltration drainage
	Alluvium		May be suitable depending on the depth to groundwater
	London Clay Formation		Unlikely to be suitable for infiltration drainage
Concrete Grade	Made Ground	Grade	Low risk of high sulphate levels
	Alluvium		
	London Clay Formation		High risk of high sulphate levels



<b>Potential Hazard</b>	<b>Comment</b>
Trees & Vegetation	A limited number of trees have been noted around the site and as shallow soils may be cohesive, this could lead to deepening of foundations (and even piles) to mitigate against future ground movements.
Below Ground Structures	The site has been previously developed therefore foundations are likely to be present. The presence of underground utilities including electric and water should also be considered.
Excavation Stability	Made ground materials are expected that are likely to be unstable in unsupported excavations. Consideration should also be given to the proximity of neighbouring structures, to ensure these aren't undermined during future groundworks.

## 5 CONCLUSIONS & RECOMMENDATIONS

This Phase I Desk Study has identified that there are a limited number of plausible contaminant linkages that have the potential to become active as a result of the previously developed nature of the site, as well as the presence of several commercial premises including various factories and works sites and a former PFS within approximately 300m.

In the context of potentially unacceptable or acceptable risks as outlined within the Environment Agency's *Land Contamination: Risk Management* guidance (LC:RM, 2019), the contamination linkages which pose potentially unacceptable risks and warrant further assessment to determine the most appropriate action are as follows:

- Human health risks associated with interaction between future site users/ residents and potentially contaminated shallow soils, especially within soft landscaped areas.
- Potential exposure of site workers to contaminated soils during the proposed redevelopment.
- Volatilisation of organic compounds to indoor/ outdoor air from nearby commercial land uses.

It is therefore recommended that, initially, the identified plausible contaminant linkages should be further investigated by means of exploratory intrusive investigation, which should also include the installation of some standpipes, so that a future vapour monitoring programme can be conducted on a precautionary basis. A proposed scope and costing for this work can be provided upon request and, where appropriate discussed and agreed with the local authority prior to commencement.

Any impacts to soil quality by source contaminants which are identified by the exploratory investigation may require further targeted intrusive assessment (pre commencement of the redevelopment works), in order to delineate the contaminants found and quantitatively evaluate the risks posed. The objective of the intrusive assessment would be to evaluate what remedial work or control measures will be required prior, or as part of the redevelopment process, to ensure the site is safe and suitable for its proposed end use.

If not already completed, it may be appropriate to carry out ground investigation work to confirm the nature of the underlying ground conditions and inform appropriate geotechnical (foundation) design. It may also be necessary to analyse samples of natural soils for compounds that may be aggressive to concrete, such as sulphates.

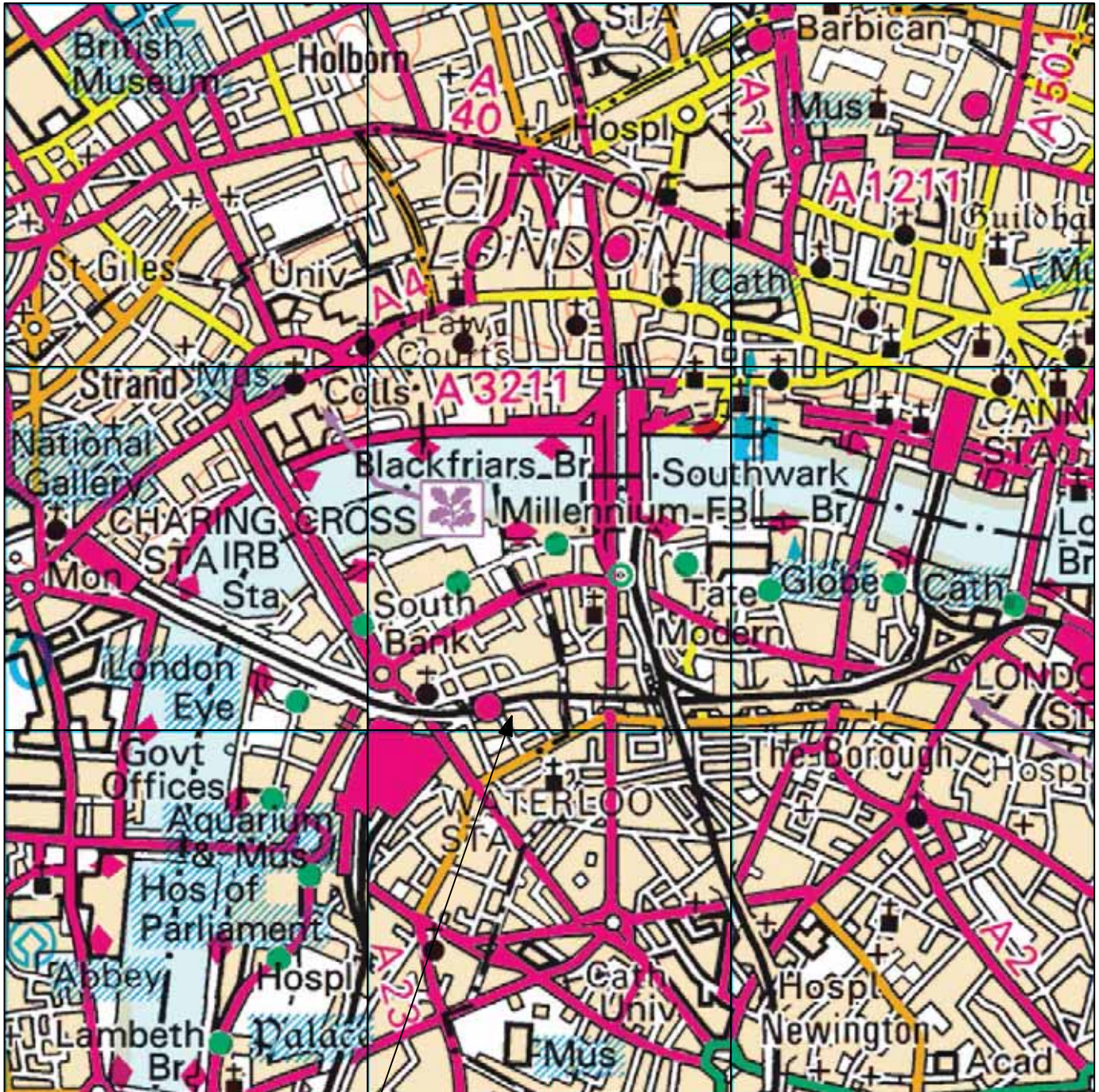
Initial Unexploded Ordnance (UXO) review indicates the site to be within a High Risk area where a detailed assessment may be necessary and a UXO engineer is likely to be required to oversee any intrusive groundworks/ investigation.

A copy of this report should be provided to the Environmental Health department of Lambeth Borough Council so that the information may be used to support planning proposals for the site.



## FIGURES





Approximate Site Location

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Licence Number: 100054115



**Title:** Site Location Plan

**Project:** Wootton Street, Lambeth,  
London, SE1 8LX

**Fig No:** 1

**Scale:** NTS

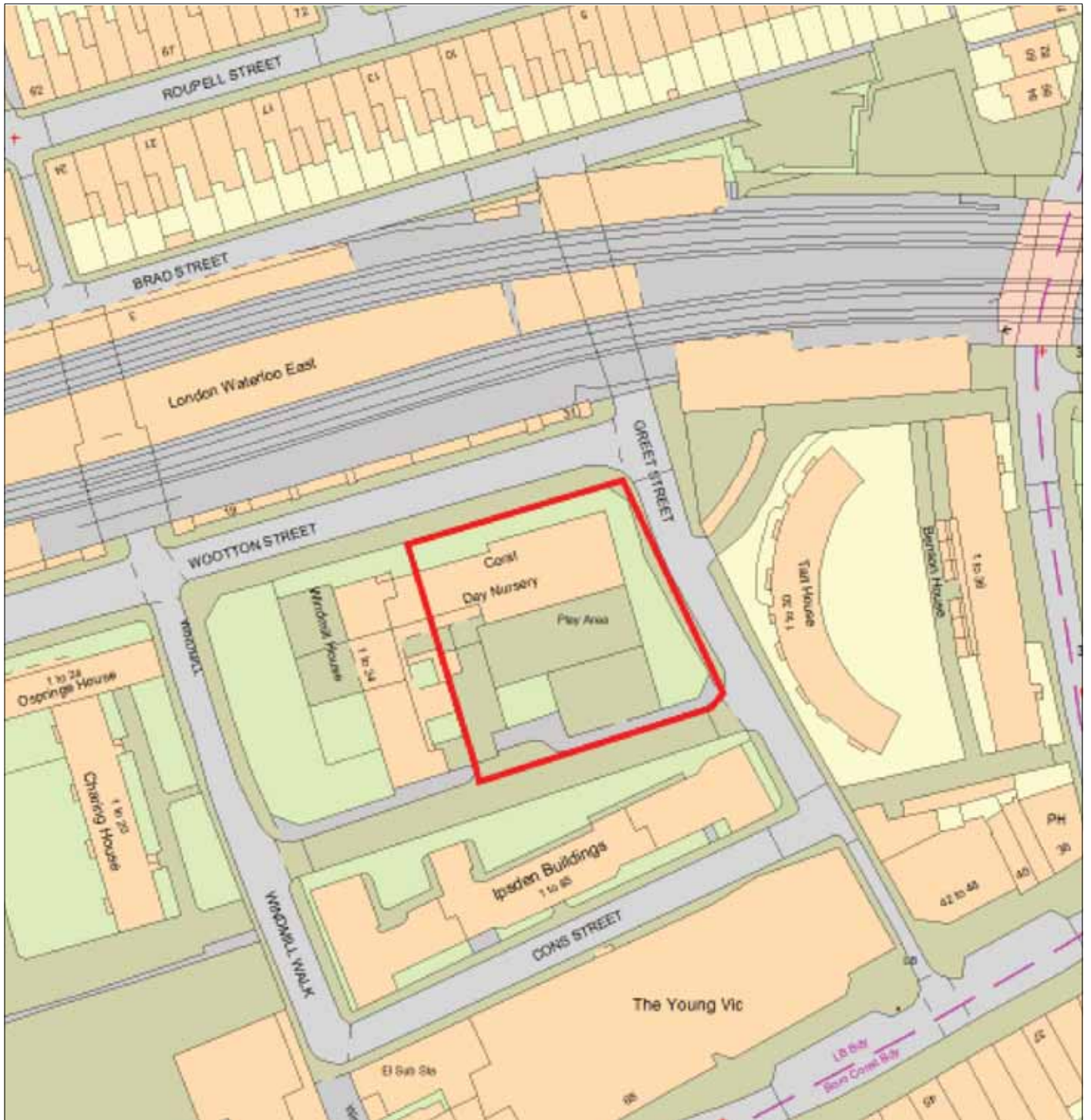
**Drawn By:** BV | **Approved By:** WE

**Job No:** UK20.4975

**Dwg No:** Wootton/1220/01

**Date:** December 2020





Approximate Site Boundary 

Crown Copyright. All rights reserved.  
Licence Number: 100054115



**Title:** Current Site Layout

**Project:** Wootton Street, Lambeth,  
London, SE1 8LX

**Fig No:** 2

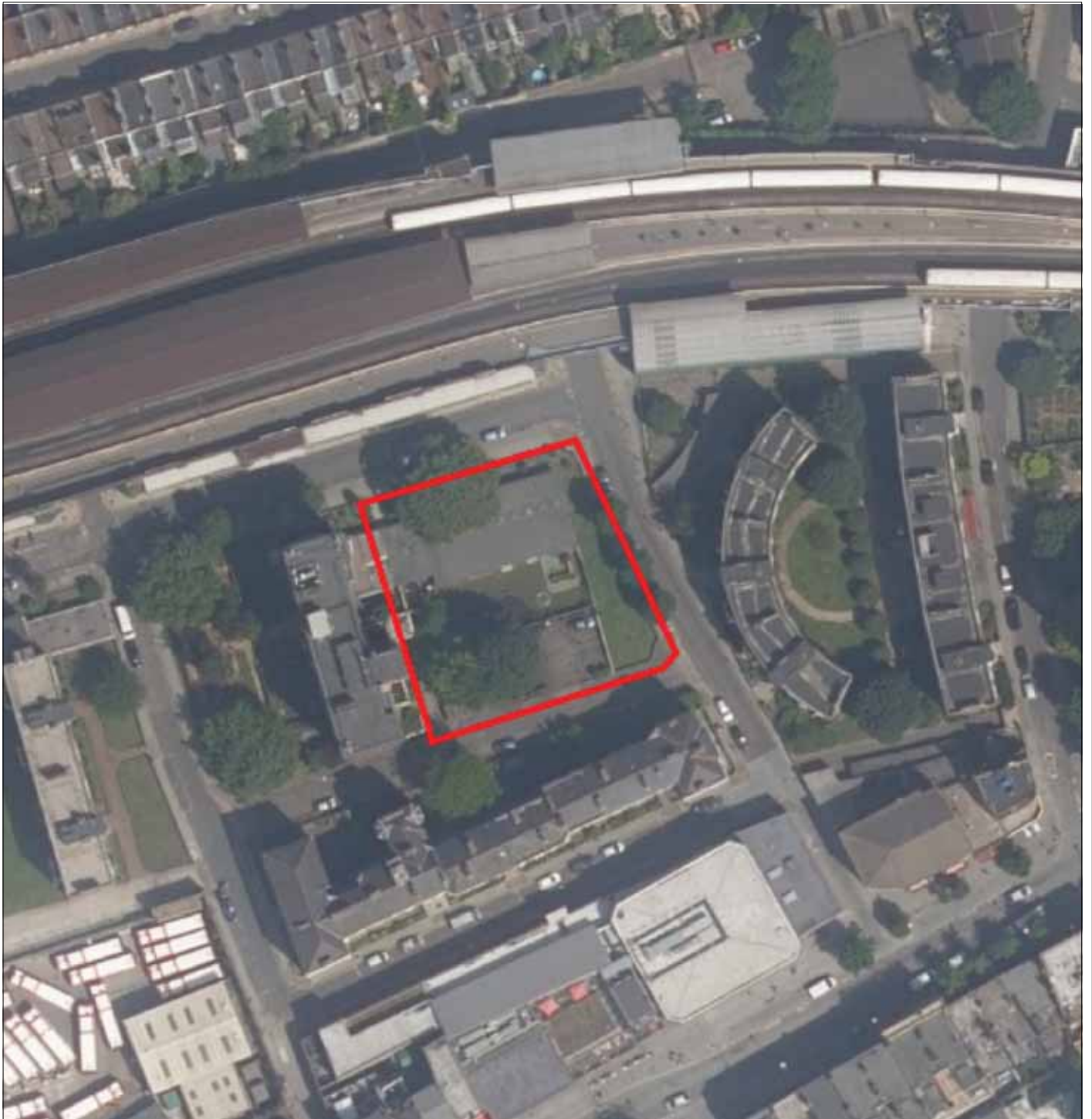
Scale: NTS

Drawn By: BV | Approved By: WE

Job No: UK20.4975

Dwg No: Wootton/1220/02

Date: December 2020



Approximate Site Boundary 

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**Title:** Aerial Photograph

**Project:** Wootton Street, Lambeth,  
London, SE1 8LX

**Fig No:** 3

Scale: NTS

Drawn By: BV | Approved By: WE

Job No: UK20.4975

Dwg No: Wootton/1220/03

Date: December 2020



## **APPENDICES**



## **APPENDIX A**

### **Selected Site Photographs**



Photo 1: Image of the site from the junction of Greet Street and Wootton Street.



Photo 2: View of the pedestrian entrance to the day nursery, located along the northern boundary.



Photo 3: Photograph showing the nature of the soft landscaping along the northern face of the existing building.



Photo 4: Image looking north, along the eastern boundary.



Photo 5: Image of the car park located in the southern area of the property.



Photo 6: View looking towards the enclosed playground area, at the rear of the day nursery.





## **APPENDIX B**

### **Indicative Proposed Development Plan**







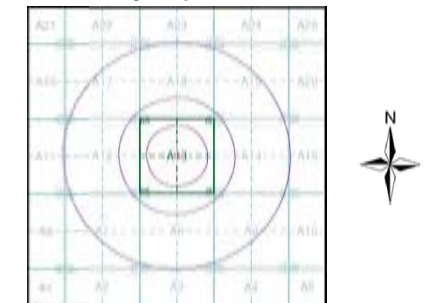
## **APPENDIX C**

### **Surrounding Land Use**



- General**
- Specified Site
  - Specified Buffer(s)
  - Drawing Reference Point
  - Map ID
- Agency and Hydrological**
- Contaminated Land Register Entry or Notice (General)
  - Contaminated Land Register Entry or Notice (Specific)
  - Discharge Consent
  - Enforcement or Prohibition Notice
  - Integrated Pollution Control
  - Integrated Pollution Prevention Control
  - Local Authority Integrated Pollution Prevention and Control
  - Local Authority Pollution Prevention and Control
  - Local Authority Pollution Prevention and Control Enforcement
  - Pollution Incident to Controlled Waters
  - Prosecution Relating to Authorized Processes
  - Prosecution Relating to Controlled Waters
  - Registered Radioactive Substance
  - River Network or Water Feature
  - River Quality Sampling Point
  - Substantiated Pollution Incident Register
  - Water Abstraction
  - Water Industry Act Returns
- Waste**
- BOS Recorded Landfill Site (General)
  - BOS Recorded Landfill Site (Specific)
  - EA Historic Landfill (Interred Refill)
  - EA Historic Landfill (Original)
  - Integrated Pollution Control Registered Waste Site
  - Licensed Waste Management Facility (General)
  - Licensed Waste Management Facility (Specific)
  - Local Authority Recorded Landfill Site (General)
  - Local Authority Recorded Landfill Site (Specific)
  - Potentially Infilled Land (Non-water)
  - Potentially Infilled Land (Non-water)
  - Potentially Infilled Land (Water)
  - Potentially Infilled Land (Water)
  - Registered Landfill Site
  - Registered Landfill Site (General)
  - Registered Landfill Site (Specific)
  - Registered Landfill Site (Phase Subject to 2002)
  - Registered Landfill Site (Phase Subject to 2002)
  - Registered Waste Transfer Site (General)
  - Registered Waste Transfer Site (Specific)
  - Registered Waste Treatment or Disposal Site (General)
  - Registered Waste Treatment or Disposal Site (Specific)
- Hazardous Substances**
- COMAH Site
  - Excavation Site
  - Heritage Site
  - Planning Hazardous Substance Consent
  - Planning Hazardous Substance Enforcement
- Geological**
- BOS Recorded Mineral Site

### Site Sensitivity Map - Slice A



### Order Details

Order Number: 241598160\_1\_1  
 Customer Ref: UK20.4975  
 National Grid Reference: 531430, 180010  
 Slice: A  
 Site Area (Ha): 0.17  
 Search Buffer (m): 1000

### Site Details

Wootton Street, Windmill House, Wotton Street, London, SE1 8LX



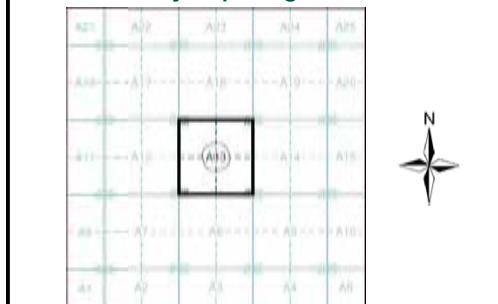
Tel: 0844 844 9952  
 Fax: 0844 844 9951  
 Web: www.envirocheck.co.uk





- General**
- Specified Site
  - Specified Buffer(s)
  - General or Type of Location
  - Pykn
  - Bearing Reference Point
  - Overhead Transmission Line
  - Map ID
- Agency and Hydrological**
- Contaminated Land Register Entry or Notice (Location)
  - Discharge Consent
  - Enforcement or Prohibition Notice
  - Integrated Pollution Control
  - Local Authority Integrated Pollution Prevention and Control
  - Local Authority Pollution Prevention and Control Enforcement
  - Pollution Incident to Controlled Waters
  - Prevention Relating to Authorized Processes
  - Prevention Relating to Controlled Waters
  - Registered Radioactive Substance
  - River Network or Water Feature
  - River Quality Sampling Point
  - Substantiated Pollution Incident Register
  - Water Abstraction
  - Water Industry Act Referral
- Waste**
- DOS Recorded Landfill Site (Location)
  - EA Historic Landfill (Refused Fuel)
  - EA Historic Landfill (Prevent)
  - Integrated Pollution Control Registered Waste Site
  - Local Authority Record Landfill Site (Location)
  - Potentially Infill Land (Non-water)
  - Potentially Infill Land (Water)
  - Registered Landfill Site
  - Registered Landfill Site (Location)
  - Registered Landfill Site (Post Refused to Sites)
  - Registered Landfill Site (Pre Refused to Sites)
  - Registered Waste Transfer Site (General)
  - Registered Waste Treatment or Disposal Site (Location)
  - Registered Waste Treatment or Disposal Site
- Hazardous Substances**
- COMAH Site
  - Explosive Site
  - PHG Site
  - Planning Hazardous Substance Consent
  - Planning Hazardous Substance Enforcement
- Geological**
- DOS Recorded Mineral Site

### Site Sensitivity Map - Segment A13



### Order Details

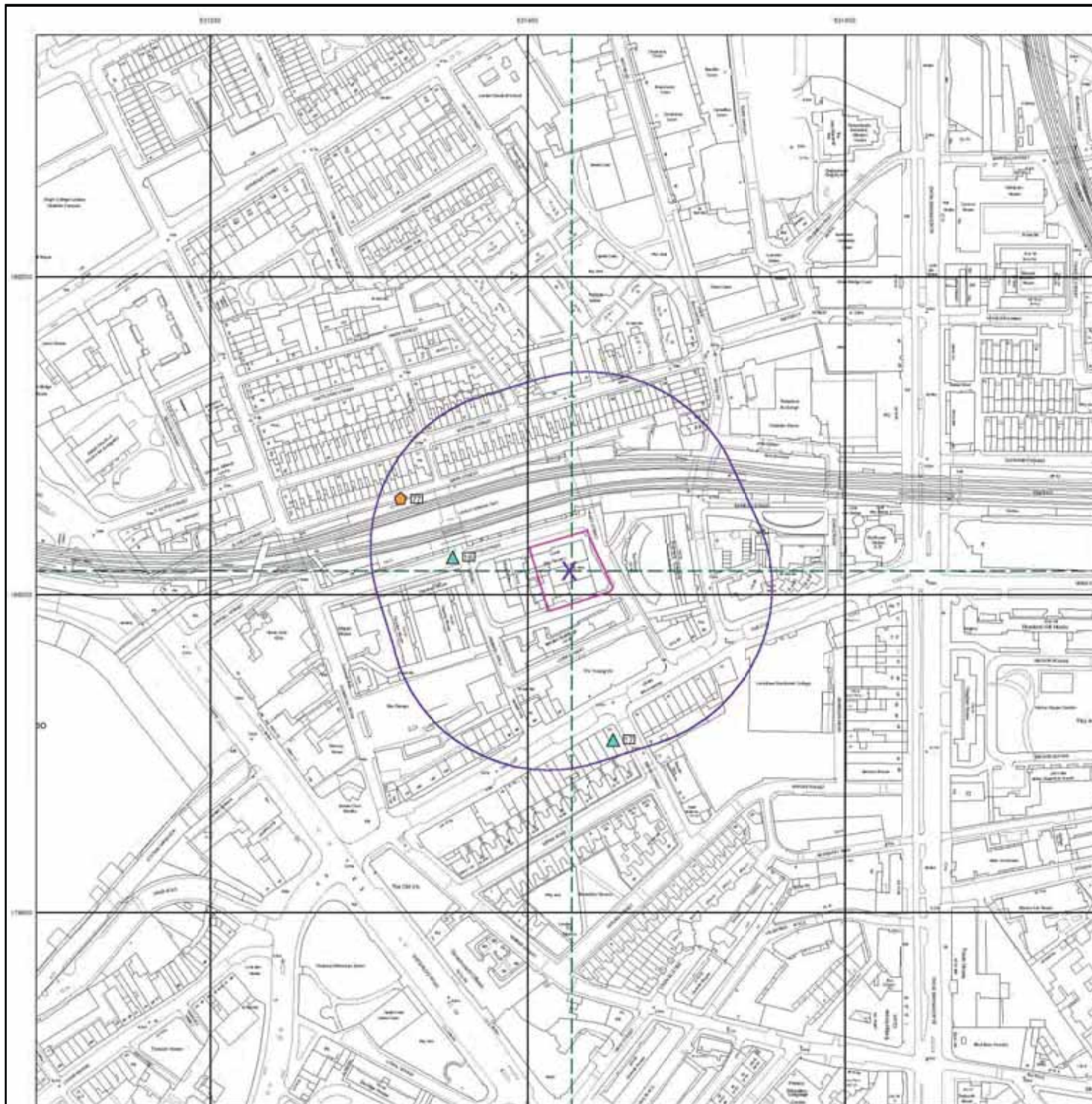
Order Number: 241598160\_1\_1  
 Customer Ref: UK20.4975  
 National Grid Reference: 531430, 180010  
 Slice: A  
 Site Area (Ha): 0.17  
 Plot Buffer (m): 100

### Site Details

Wootton Street, Windmill House, Wotton Street, London, SE1 8LX



Tel: 0844 844 9952  
 Fax: 0844 844 9951  
 Web: www.envirocheck.co.uk



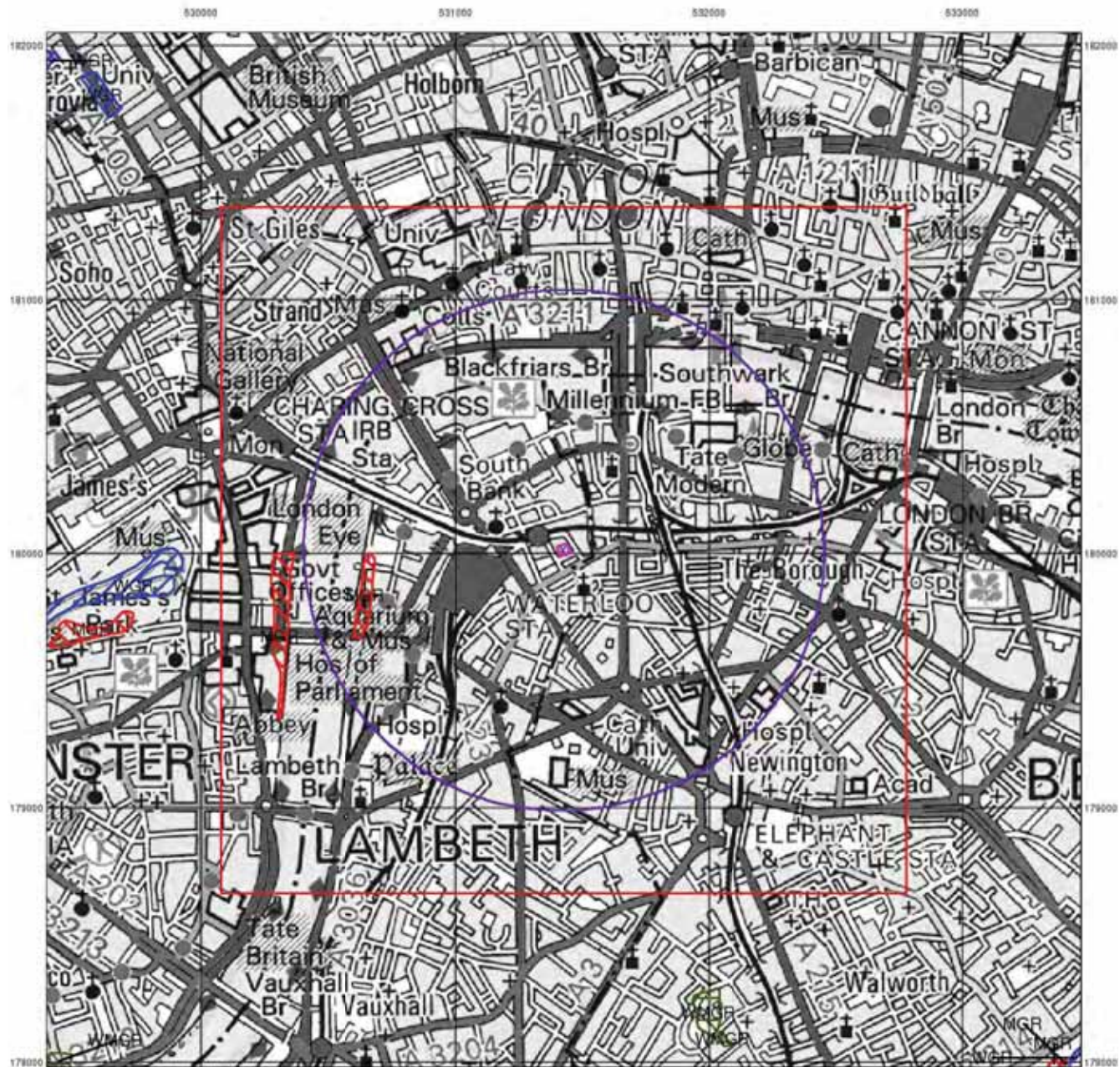


# **APPENDIX D**

## **Geological Context**





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### Artificial Ground and Landslip

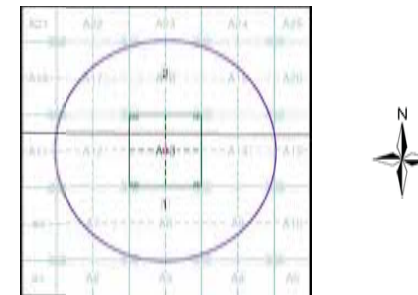
Artificial ground is a term used by BGS for those areas where the ground surface has been significantly modified by human activity. Information about previously developed ground is especially important, as it is often associated with potentially contaminated material, unpredictable engineering conditions and unstable ground.

Artificial ground includes:

- Made ground - man-made deposits such as embankments and spoil heaps on the natural ground surface.
- Worked ground - areas where the ground has been cut away such as quarries and road cuttings.
- Infilled ground - areas where the ground has been cut away then wholly or partially backfilled.
- Landscaped ground - areas where the surface has been reshaped.
- Disturbed ground - areas of ill-defined shallow or near surface mineral workings where it is impracticable to map made and worked ground separately.

Mass movement (landslip) deposits on BGS geological maps are primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground. The dataset also includes foundered strata, where the ground has collapsed due to subsidence.

### Artificial Ground and Landslip Map - Slice A



#### Order Details:

Order Number: 241598160\_1\_1  
 Customer Reference: UK20.4975  
 National Grid Reference: 531430, 180010  
 Slice: A  
 Site Area (Ha): 0.17  
 Search Buffer (m): 1000

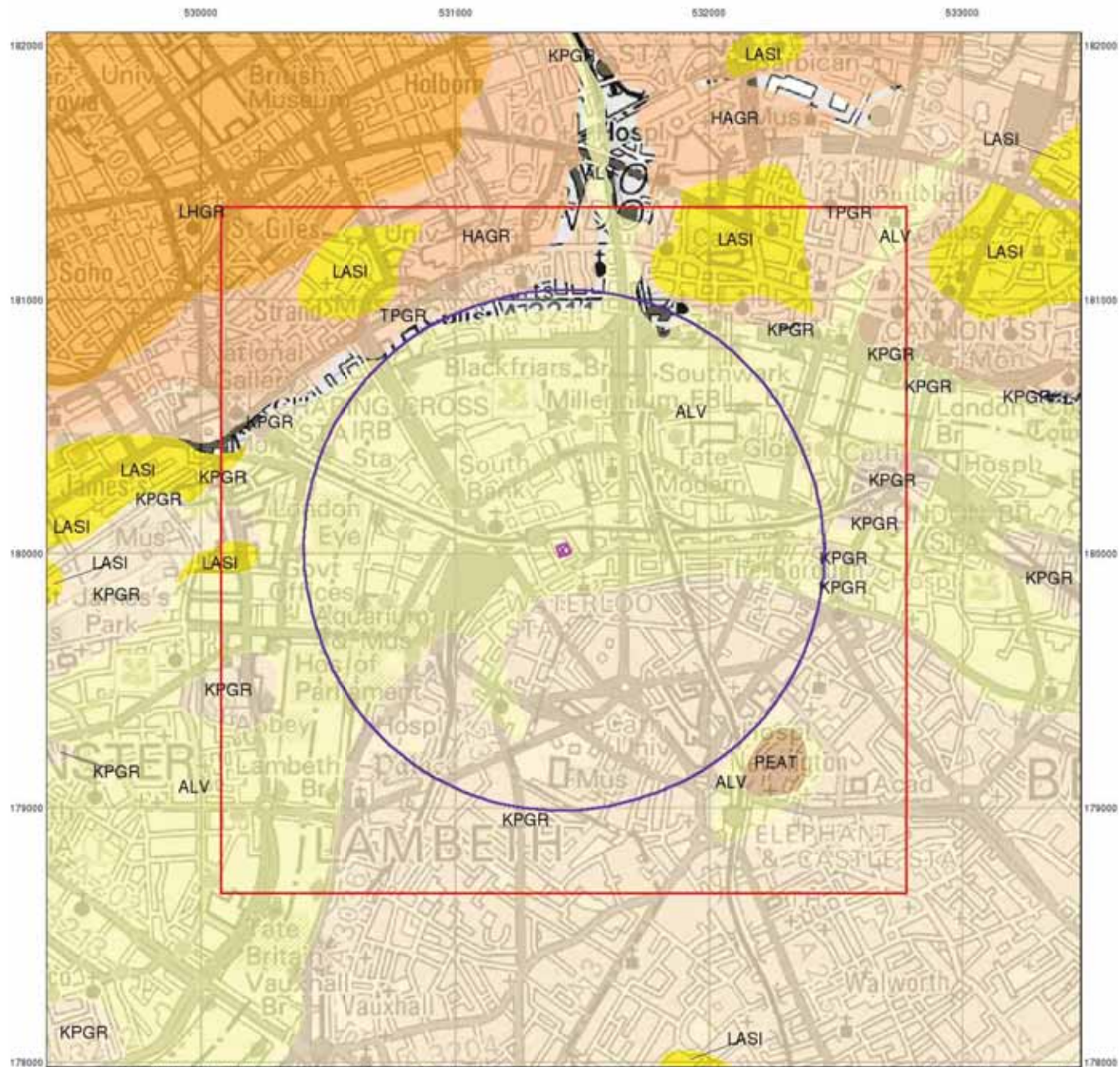
#### Site Details:

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Tel: 0844 844 9952  
 Fax: 0844 844 9951  
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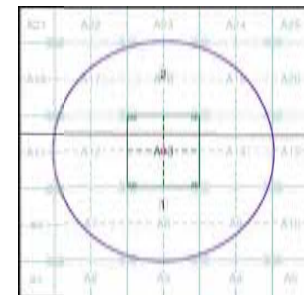
### Superficial Geology

Superficial Deposits are the youngest geological deposits formed during the most recent period of geological time, the Quaternary, which extends back about 1.8 million years from the present.

They rest on older deposits or rocks referred to as Bedrock. This dataset contains Superficial deposits that are of natural origin and 'in place'. Other superficial strata may be held in the Mass Movement dataset where they have been moved, or in the Artificial Ground dataset where they are of man-made origin.

Most of these Superficial deposits are unconsolidated sediments such as gravel, sand, silt and clay, and onshore they form relatively thin, often discontinuous patches or larger spreads.

### Superficial Geology Map - Slice A



#### Order Details:

Order Number: 241598160\_1\_1  
 Customer Reference: UK20.4975  
 National Grid Reference: 531430, 180010  
 Slice: A  
 Site Area (Ha): 0.17  
 Search Buffer (m): 1000

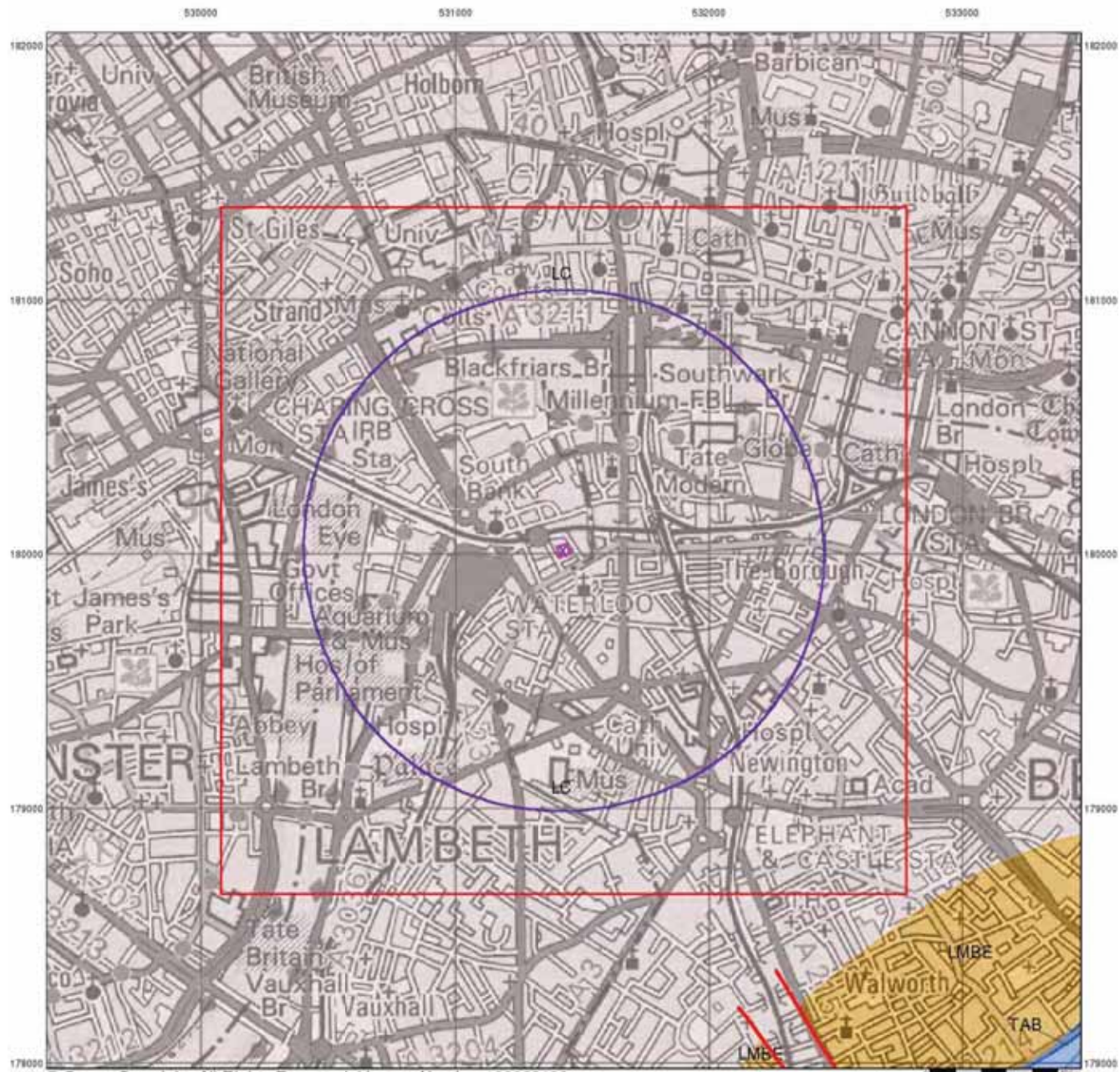
#### Site Details:

Wootton Street, Windmill House, Wotton Street, London, SE1 8LX



Tel: 0844 844 9952  
 Fax: 0844 844 9951  
 Web: www.envirocheck.co.uk





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### Bedrock and Faults

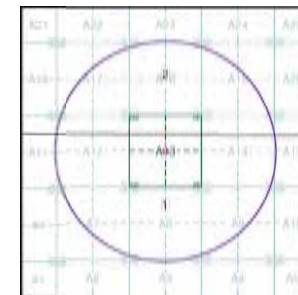
Bedrock geology is a term used for the main mass of rocks forming the Earth and are present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

The bedrock has formed over vast lengths of geological time ranging from ancient and highly altered rocks of the Proterozoic, some 2500 million years ago, or older, up to the relatively young Pliocene, 1.8 million years ago.

The bedrock geology includes many lithologies, often classified into three types based on origin: igneous, metamorphic and sedimentary.

The BGS Faults and Rock Segments dataset includes geological faults (e.g. normal, thrust), and thin beds mapped as lines (e.g. coal seam, gypsum bed). Some of these are linked to other particular 1:50,000 Geology datasets, for example, coal seams are part of the bedrock sequence, most faults and mineral veins primarily affect the bedrock but cut across the strata and post date its deposition.

### Bedrock and Faults Map - Slice A



### Order Details:

Order Number: 241598160\_1\_1  
 Customer Reference: UK20.4975  
 National Grid Reference: 531430, 180010  
 Slice: A  
 Site Area (Ha): 0.17  
 Search Buffer (m): 1000

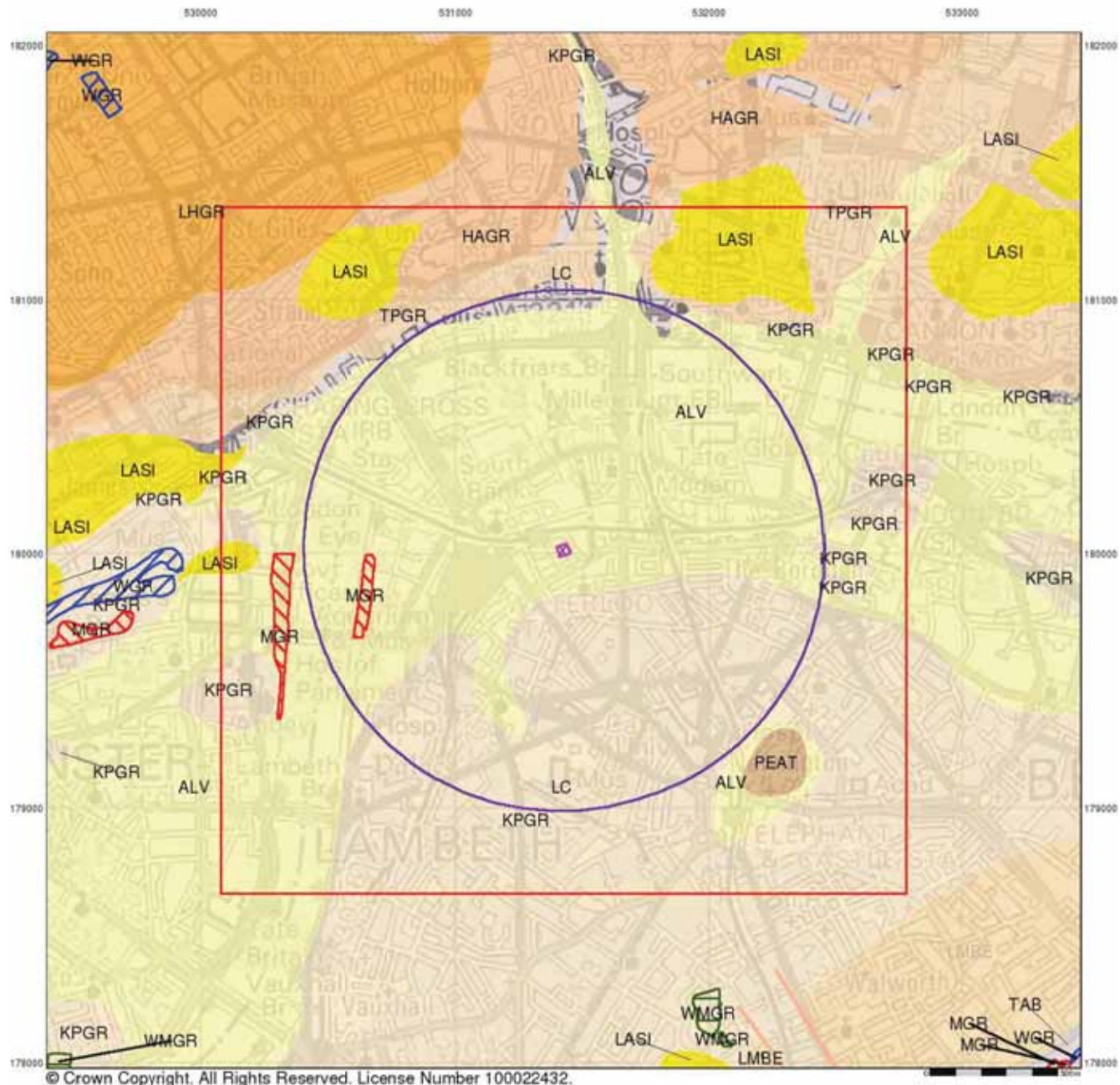
### Site Details:

Wootton Street, Windmill House, Wotton Street, London, SE1 8LX



Tel: 0844 844 9952  
 Fax: 0844 844 9951  
 Web: www.envirocheck.co.uk





### Combined Surface Geology

The Combined Surface Geology map combines all the previous maps into one combined geological overview of your site.

Please consult the legends to the previous maps to interpret the Combined "Surface Geology" map.

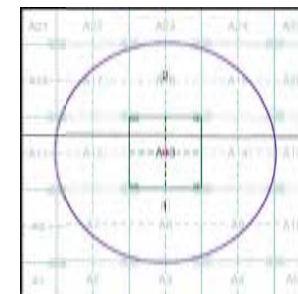
### Additional Information

More information on 1:50,000 Geological mapping and explanations of rock classifications can be found on the BGS website. Using the LEX Codes in this report, further descriptions of rock types can be obtained by interrogating the 'BGS Lexicon of Named Rock Units'. This database can be accessed by following the 'Information and Data' link on the BGS website.

### Contact

British Geological Survey  
 Kingsley Dunham Centre  
 Keyworth  
 Nottingham  
 NG12 5GG  
 Telephone: 0115 936 3143  
 Fax: 0115 936 3276  
 email: [enquiries@bgs.ac.uk](mailto:enquiries@bgs.ac.uk)  
 website: [www.bgs.ac.uk](http://www.bgs.ac.uk)

### Combined Geology Map - Slice A



### Order Details:

Order Number: 241598160\_1\_1  
 Customer Reference: UK20.4975  
 National Grid Reference: 531430, 180010  
 Slice: A  
 Site Area (Ha): 0.17  
 Search Buffer (m): 1000

### Site Details:

Wootton Street, Windmill House, Wotton Street, London, SE1 8LX



Tel: 0844 844 9952  
 Fax: 0844 844 9951  
 Web: [www.envirocheck.co.uk](http://www.envirocheck.co.uk)



# Soil Mechanics

## BOREHOLE No. 207

Sheet 1 of 3

Equipment & Methods  
Hand dug inspection pit to 1.00m then cable percussive boring in 200mm diameter to 19.50m. Casing installed to 10.00m.

Location No. 7658

Location

JUBILEE LINE EXTENSION TQ 38 SW 2168

Carried out for  
London Underground Limited (JLE008)

Ground Level  
2.71 m O.D.

Coordinates  
531359.10m E  
180035.18m N

Date  
30.08.90  
to 31.08.90

Description	Reduced Level	Legend	Depth (Thick)	Samples/Tests			Field Records
				Depth	Sample Type No.	Test	
PAVING SLABS	2.71		(0.05)				
Light yellow-brown medium and coarse sand. (MADE GROUND)	2.64 2.55		(0.05) (0.11)				
Dark grey brown clayey fine to coarse sand with some fine to coarse gravel and cobble sized brick and concrete fragments. (MADE GROUND)			(1.84)	1.50	D 1		
Soft dark grey brown mottled brown clay with many partially decomposed wood fragments and fine fibres and with a little coarse sand to coarse gravel sized brick fragments. (MADE GROUND)	0.71		(1.80)	2.00 - 2.90	B 2	C N-2	1./1.-.1
Light brown fine to coarse sand with some subangular to subrounded fine to medium flint gravel and occasional pockets of grey-brown clay (<60mm). (TERRACE GRAVELS / MADE GROUND ?)	-1.09		(1.40)	4.50	D 3		
Medium dense gray and grey-brown very sandy (fine to coarse) subangular to rounded fine to coarse flint GRAVEL. (TERRACE GRAVELS)	-2.49		(3.00)	5.90 - 6.40	B 4	C N-19	2,3/5,4,5,5
Medium dense grey brown generally medium and coarse SAND and subangular to subrounded fine to coarse flint GRAVEL. (TERRACE GRAVELS)	-5.49		(1.40)	7.50	D 5		
Medium dense grey brown generally medium and coarse SAND and subangular to subrounded fine to coarse flint GRAVEL. (TERRACE GRAVELS)	-6.89		(9.90)	8.80 - 9.30	B 6	C N-21	3,4/5,5,6,5
(LONDON CLAY) (As sheet 2)	-6.89		(9.90)				

Remarks

Logged by

MSF

Scale

1:50

Notes:

Materials are described in accordance with Appendices. For explanation of symbols and abbreviations see Fig. 1. (c) Soil Mechanics 09.12.90/18.57 (Ver 4.1.28)

Fig.

26



# Soil Mechanics

## BOREHOLE No.207

Sheet 2 of 3

Equipment & Methods As sheet 1	Location No. 7658 Location JUBILEE LINE EXTENSION TQ38SW 2168
Carried out for London Underground Limited (JLE008)	Ground Level Coordinates Date As sheet 1

Description	Reduced Level	Legend	Depth (Thick)	Samples/Tests			Field Records
				Depth	Sample Type No.	Test	
rare pockets (<7mm) of light brown fine sand				10.50	D 7		
<p>Stiff becoming very stiff below about 13.50m thinly laminated extremely to very closely fissured grey-brown CLAY with occasional partings (&lt;2mm) of light brown silt and silty fine sand. Fissures randomly orientated planar smooth and mottled dark grey. (LONDON CLAY) Below 15.50m generally very closely fissured with rare lenses (&lt;5mm) of light brown silt and fine sand</p> <p>fissures slightly polished</p>				11.00 - 12.25	U 8		40 blows 260mm recovery
				12.11	D 9		
				12.11 - 12.56	D 10	S N-27	3,4/5,7,8
				12.50	D 10a		
			(9.90 pen)	15.00 - 15.45	U 11		50 blows 260mm recovery
				15.33	D 12		
				15.33 - 15.78	D 13	S N-27	2,3/4,7,8,7
				17.50	D 14		
				18.00 - 18.45	U 15		50 blows 320mm recovery
				18.37	D 16		
			18.37 - 18.82	D 17	S N-33	3,5/7,9,10	
			19.00 - 19.45	U 18		70 blows 220mm recovery	
			19.27	D 20			
BOREHOLE ENDS AT 19.50 m.	-16.79		19.50				

**Remarks**  
 1. Borehole terminated and grouted (1:1 bentonite/cement mix) following complaint by British Rail. Cable percussive rig moved 8.15m in a SSE direction to borehole 207A and drilling recommenced.

**Notes:**  
 Materials are described in accordance with Appendices. For explanation of symbols and abbreviations see Fig. 1. (c) Soil Mechanics 06.12.90/10.56 (Ver 4.1.28)

Logged by  
 AMSF  
 Scale  
 1:50  
 Fig. 26



# Soil Mechanics

## BOREHOLE No. 207

Sheet 3 of 3

Equipment & Methods

As sheet 1

Location No. 7658

Location

JUBILEE LINE EXTENSION TQ 385W 2168

Carried out for

London Underground Limited (JLE008)

Ground Level

Coordinates

Date

As sheet 1

Description

Reduced Level

Legend

Depth (Thick)

Samples/Tests

Depth

Sample Type

No.

Test

Field Records

### Water Level Observations During Boring

Date	Time	Depth of Hole (m)	Depth of Casing (m)	Depth to Water (m)	Remarks
30.08	-	4.00	4.00	4.00	Slight seepage
30.08	-	4.00	4.00	-	Water added from 4.00m to 8.00m.
30.08	-	16.00	10.00	16.00	Slight seepage
30.08	-	19.00	10.00	19.00	Slight seepage at end of shift
31.08	-	19.00	10.00	3.10	Start of shift
31.08	-	19.50	10.00	19.00	End of borehole

Remarks

Logged by

AMF

Scale

1:50

Notes:

Materials are described in accordance with Appendices. For explanation of symbols and abbreviations see Fig. 1. (c) Soil Mechanics  
All depths and reduced levels in metres. Thicknesses given in brackets in depth column.

06.12.90/10.56 (Ver 4.1.20)

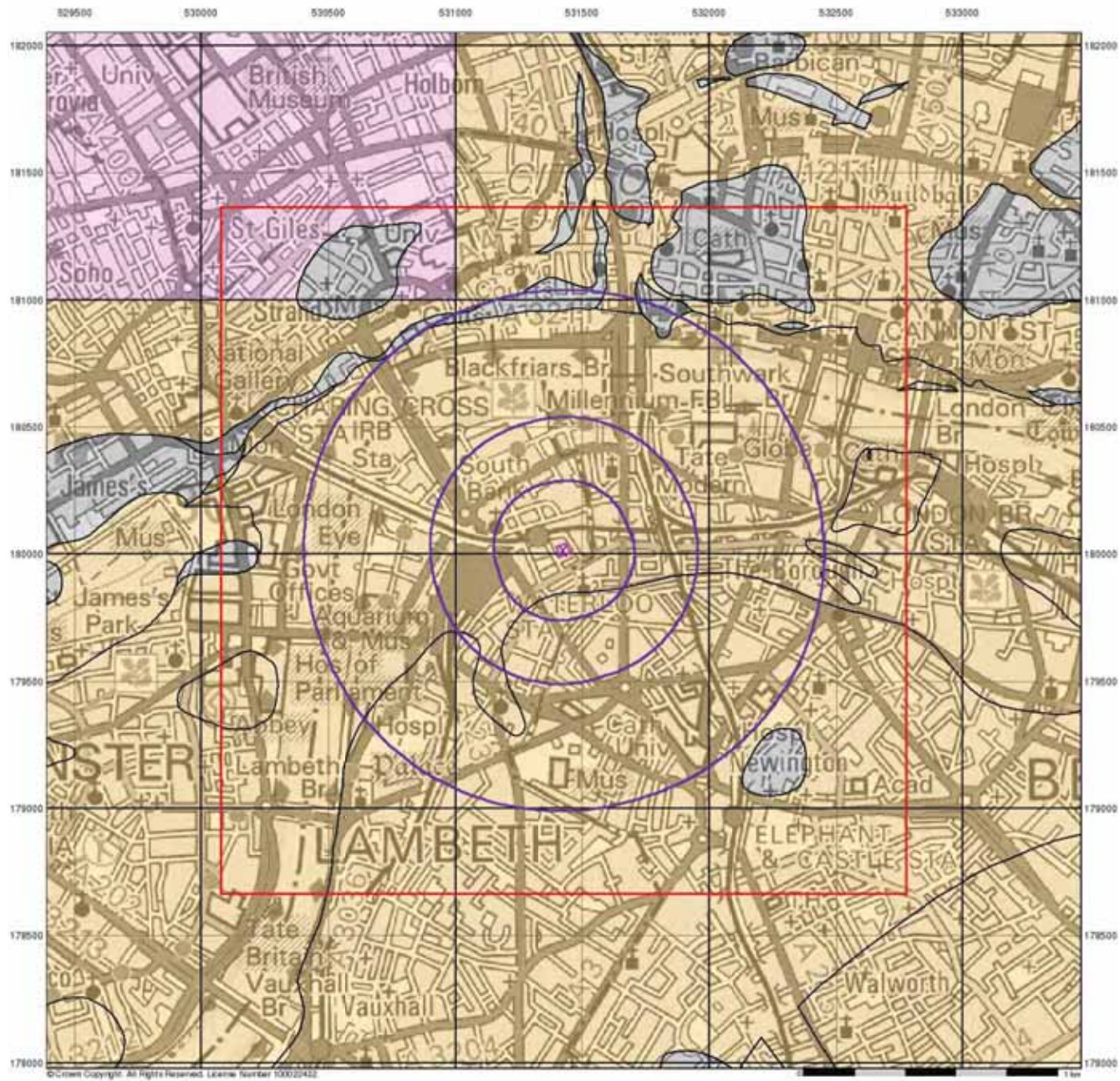
Fig. 26



## **APPENDIX E**

### **Groundwater Vulnerability and Flood Maps**





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## Groundwater Vulnerability

### General

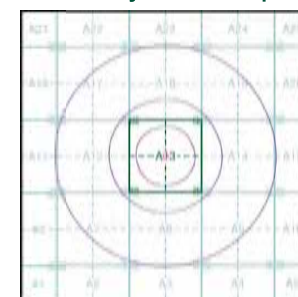
- Specified Side
- Specified Buffer(s)
- Bearing Reference Point
- Slice
- Map ID

### Agency and Hydrological

- | Bedrock Aquifers                        | Superficial Aquifers                    |
|---|---|
| High Vulnerability, Principal Aquifer   | High Vulnerability, Principal Aquifer   |
| High Vulnerability, Secondary Aquifer   | High Vulnerability, Secondary Aquifer   |
| Medium Vulnerability, Principal Aquifer | Medium Vulnerability, Principal Aquifer |
| Medium Vulnerability, Secondary Aquifer | Medium Vulnerability, Secondary Aquifer |
| Low Vulnerability, Principal Aquifer    | Low Vulnerability, Principal Aquifer    |
| Low Vulnerability, Secondary Aquifer    | Low Vulnerability, Secondary Aquifer    |

- Unproductive Aquifer
- Soluble Rock

### Site Sensitivity Context Map - Slice A



### Order Details

Order Number: 241598160\_1\_1  
 Customer Ref: UK20.4975  
 National Grid Reference: 531430, 180010  
 Slice: A  
 Site Area (Ha): 0.17  
 Search Buffer (m): 1000

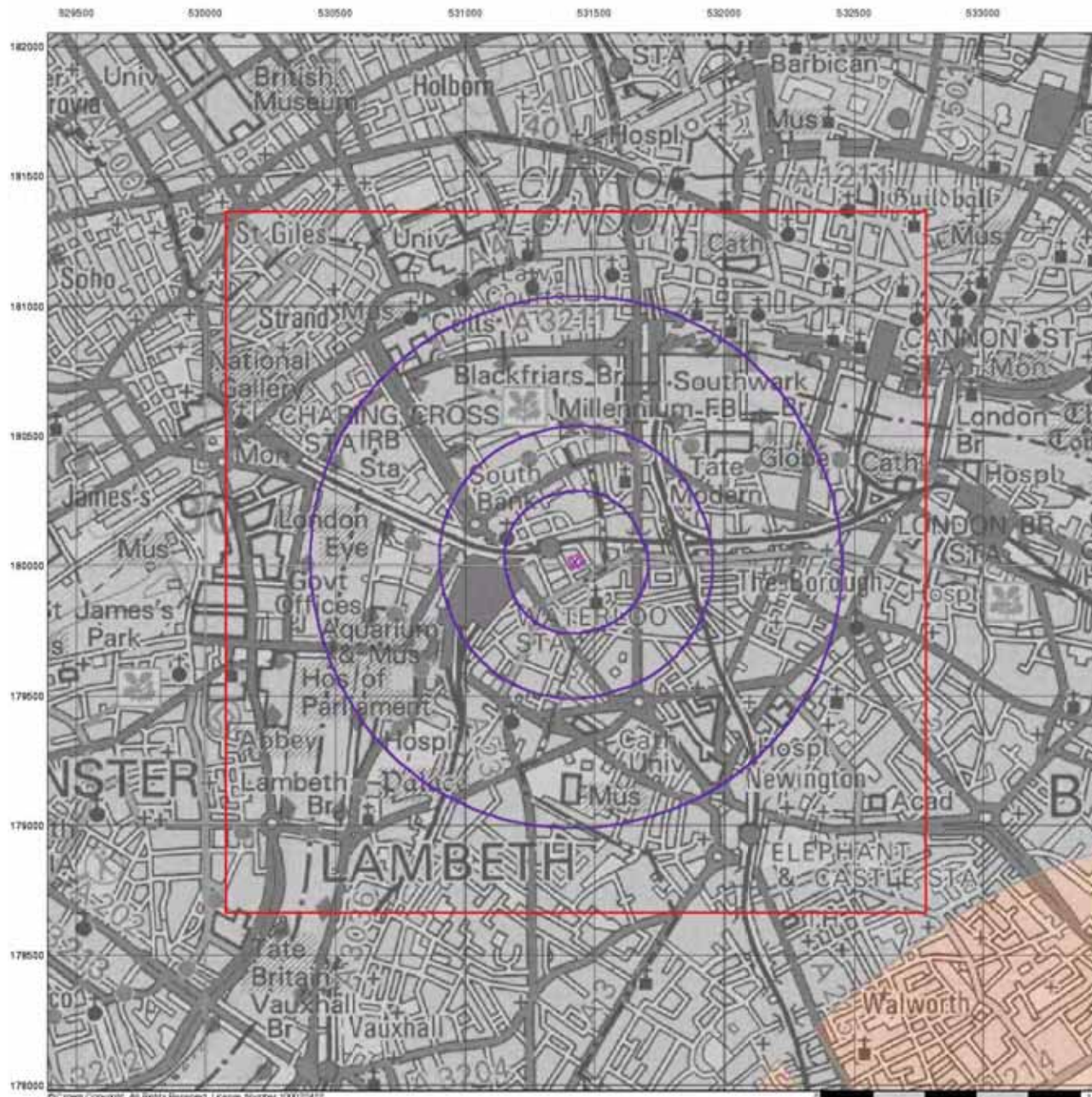
### Site Details

Wootton Street, Windmill House, Wotton Street, London, SE1 8LX



Tel: 0844 844 9952  
 Fax: 0844 844 9951  
 Web: www.envirocheck.co.uk










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## Bedrock Aquifer Designation

### General

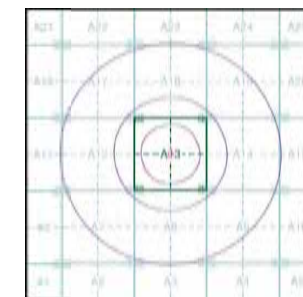
-  Specified Site
-  Specified Buffer(s)
-  Bearing Reference Point
-  Slice
-  Map ID

### Agency and Hydrological

#### Geological Classes

-  Principal Aquifer
-  Secondary A Aquifer
-  Secondary B Aquifer
-  Secondary Undifferentiated
-  Unproductive Strata
-  Unknown
-  Unknown (Lakes and Landslip)

### Site Sensitivity Context Map - Slice A



### Order Details

Order Number: 241598160\_1\_1  
 Customer Ref: UK20.4975  
 National Grid Reference: 531430, 180010  
 Slice: A  
 Site Area (Ha): 0.17  
 Search Buffer (m): 1000

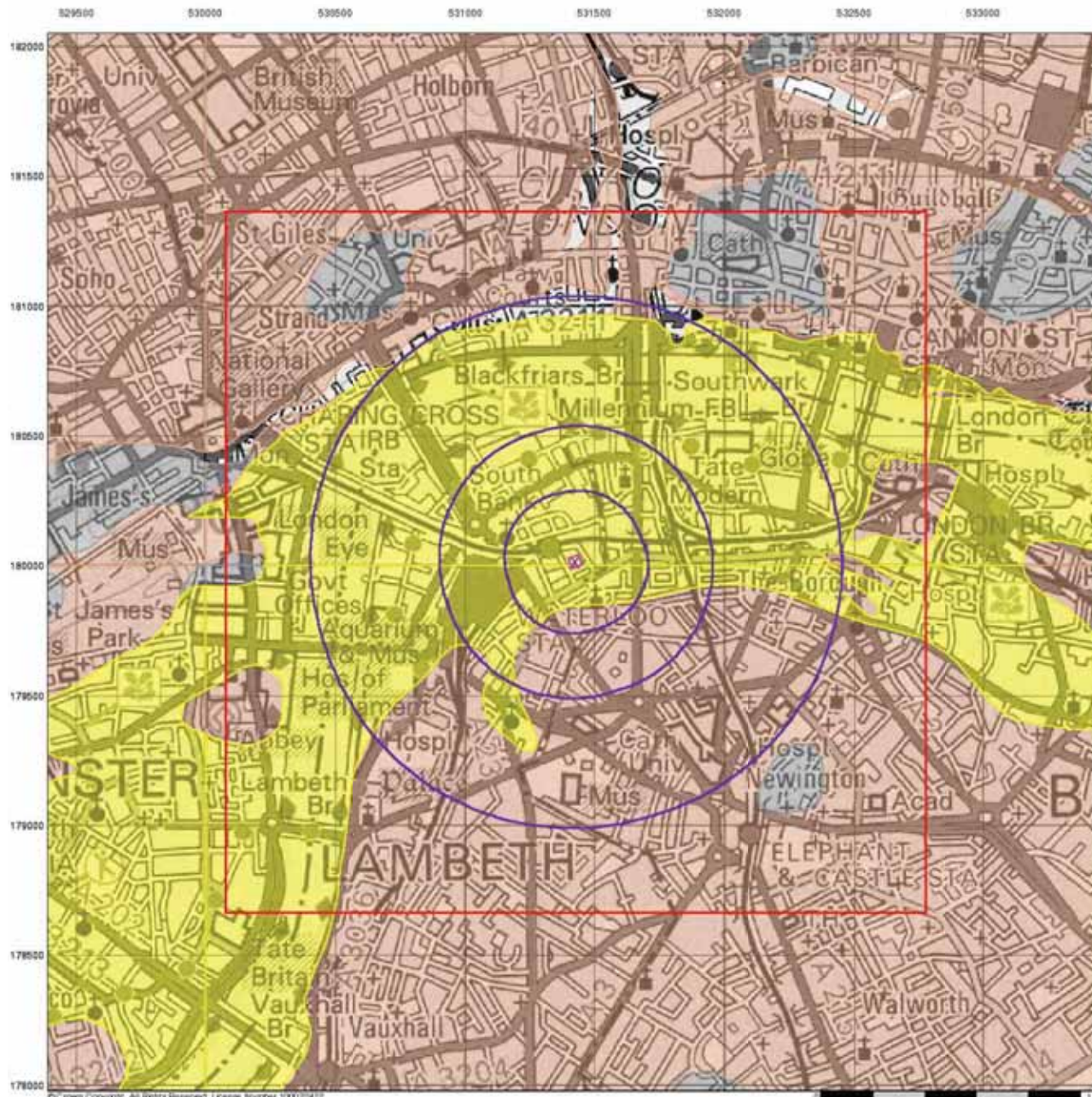
### Site Details

Wootton Street, Windmill House, Wotton Street, London, SE1 8LX



Tel: 0844 844 9952  
 Fax: 0844 844 9951  
 Web: www.envirocheck.co.uk





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## Superficial Aquifer Designation

### General

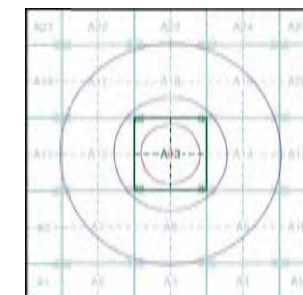
- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Slice
- Map ID

### Agency and Hydrological

#### Geological Classes

- Principal Aquifer
- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown
- Unknown (Lakes and Landslip)

### Site Sensitivity Context Map - Slice A



### Order Details

Order Number: 241598160\_1\_1  
 Customer Ref: UK20.4975  
 National Grid Reference: 531430, 180010  
 Slice: A  
 Site Area (Ha): 0.17  
 Search Buffer (m): 1000

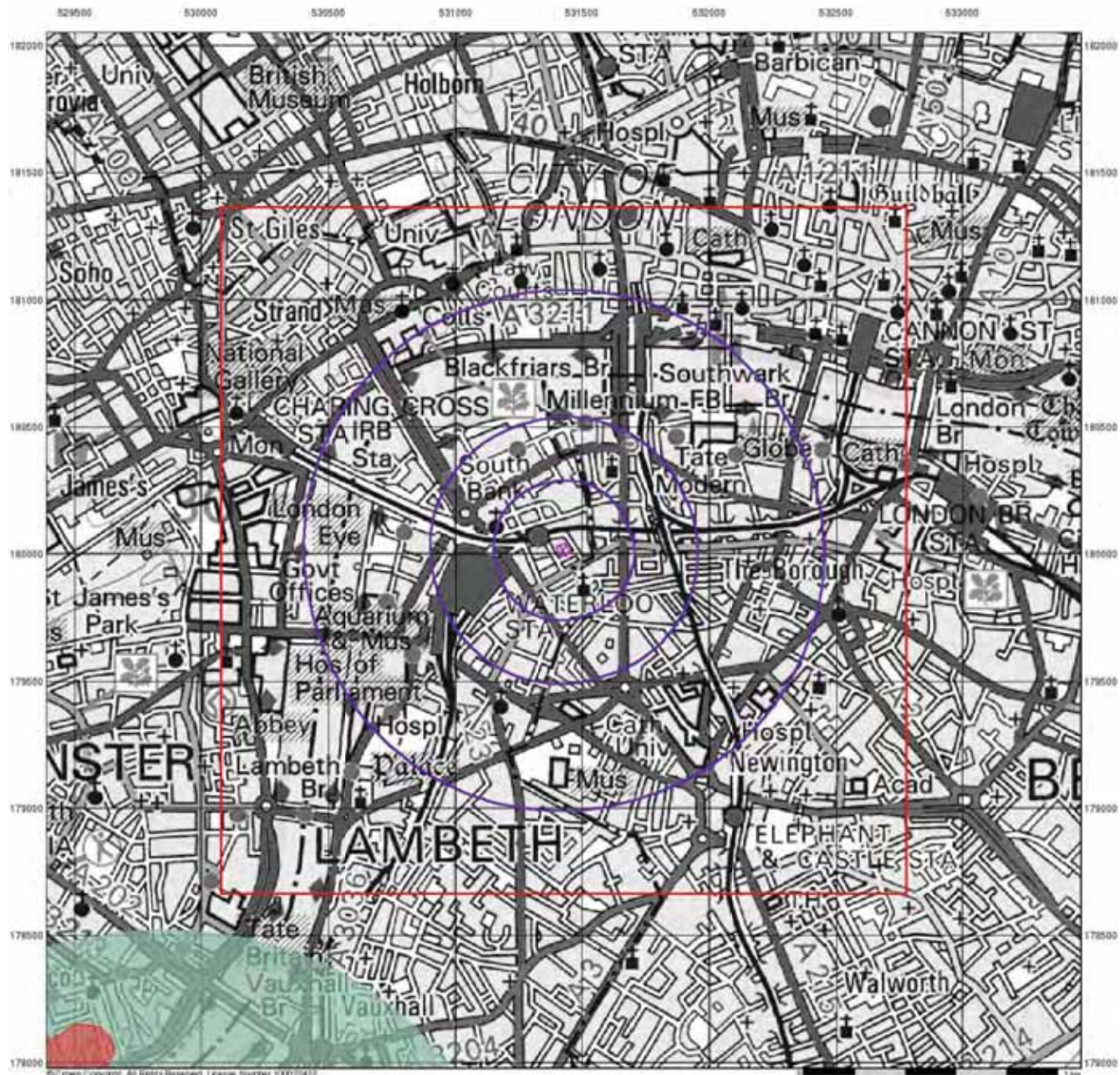
### Site Details

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## Source Protection Zones

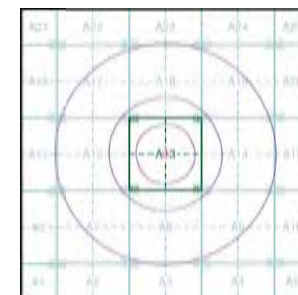
### General

- Specified SDR
- Specified Buffer(s)
- Bearing Reference Point
- Slice
- Map ID

### Agency and Hydrological

- Inner zone (Zone 1)
- Inner zone - subsurface activity only (Zone 1c)
- Outer zone (Zone 2)
- Outer zone - subsurface activity only (Zone 2c)
- Total catchment (Zone 3)
- Total catchment - subsurface activity only (Zone 3c)
- Special interest (Zone 4)

### Site Sensitivity Context Map - Slice A



### Order Details

Order Number: 241598160\_1\_1  
 Customer Ref: UK20.4975  
 National Grid Reference: 531430, 180010  
 Slice: A  
 Site Area (Ha): 0.17  
 Search Buffer (m): 1000

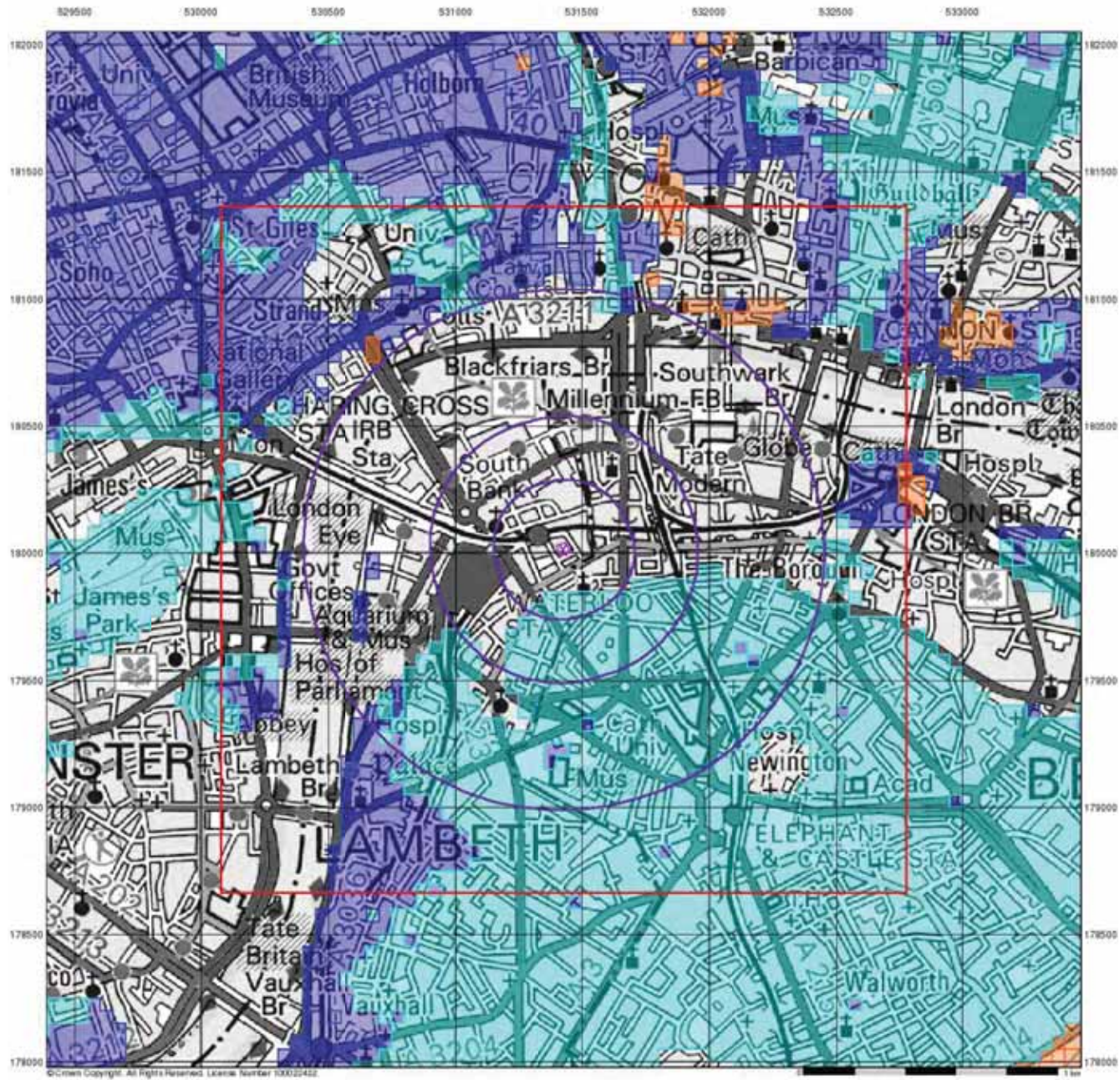
### Site Details

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**BGS Flood GFS Data**

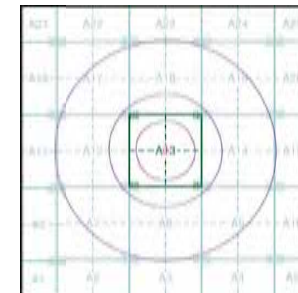
**General**

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Slice

**Agency and Hydrological (Flood)**

- Limited Potential for Groundwater Flooding to Occur
- Potential for Groundwater Flooding of Property Situated Below Ground Level
- Potential for Groundwater Flooding to Occur at Surface

**Site Sensitivity Context Map - Slice A**



**Order Details**

Order Number: 241598160\_1\_1  
 Customer Ref: UK20.4975  
 National Grid Reference: 531430, 180010  
 Slice: A  
 Site Area (Ha): 0.17  
 Search Buffer (m): 1000

**Site Details**

Wootton Street, Windmill House, Wotton Street, London, SE1 8LX



Tel: 0844 844 9952  
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 Web: www.envirocheck.co.uk





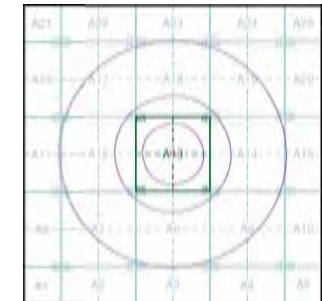
### General

- Specified Site
- Specified Buffer(s)
- X Bearing Reference Point

### Agency and Hydrological (Flood)

- Extreme Flooding from Rivers or Seas without Defences (Zone 2)
- Flooding from Rivers or Seas without Defences (Zone 3)
- Area Benefiting from Flood Defence
- Flood Water Storage Areas
- Flood Defence

### Flood Map - Slice A



### Order Details

Order Number: 241598160\_1\_1  
Customer Ref: UK20.4975  
National Grid Reference: 531430, 180010  
Slice: A  
Site Area (Ha): 0.17  
Search Buffer (m): 1000

### Site Details

Wootton Street, Windmill House, Wotton Street, London, SE1 8LX

**Landmark**  
INFORMATION GROUP

Tel: 0844 844 9952  
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Web: www.envirocheck.co.uk



## **APPENDIX F**

### **A Selection of Historic Maps**





London

Published 1879

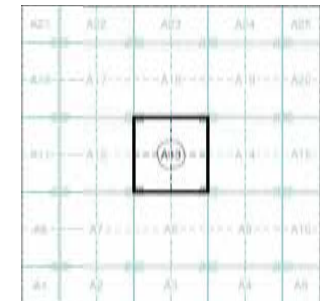
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. 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)



### Historical Map - Segment A13



### Order Details

Order Number: 241598160\_1\_1  
 Customer Ref: UK20.4975  
 National Grid Reference: 531430, 180010  
 Slice: A  
 Site Area (Ha): 0.17  
 Search Buffer (m): 100

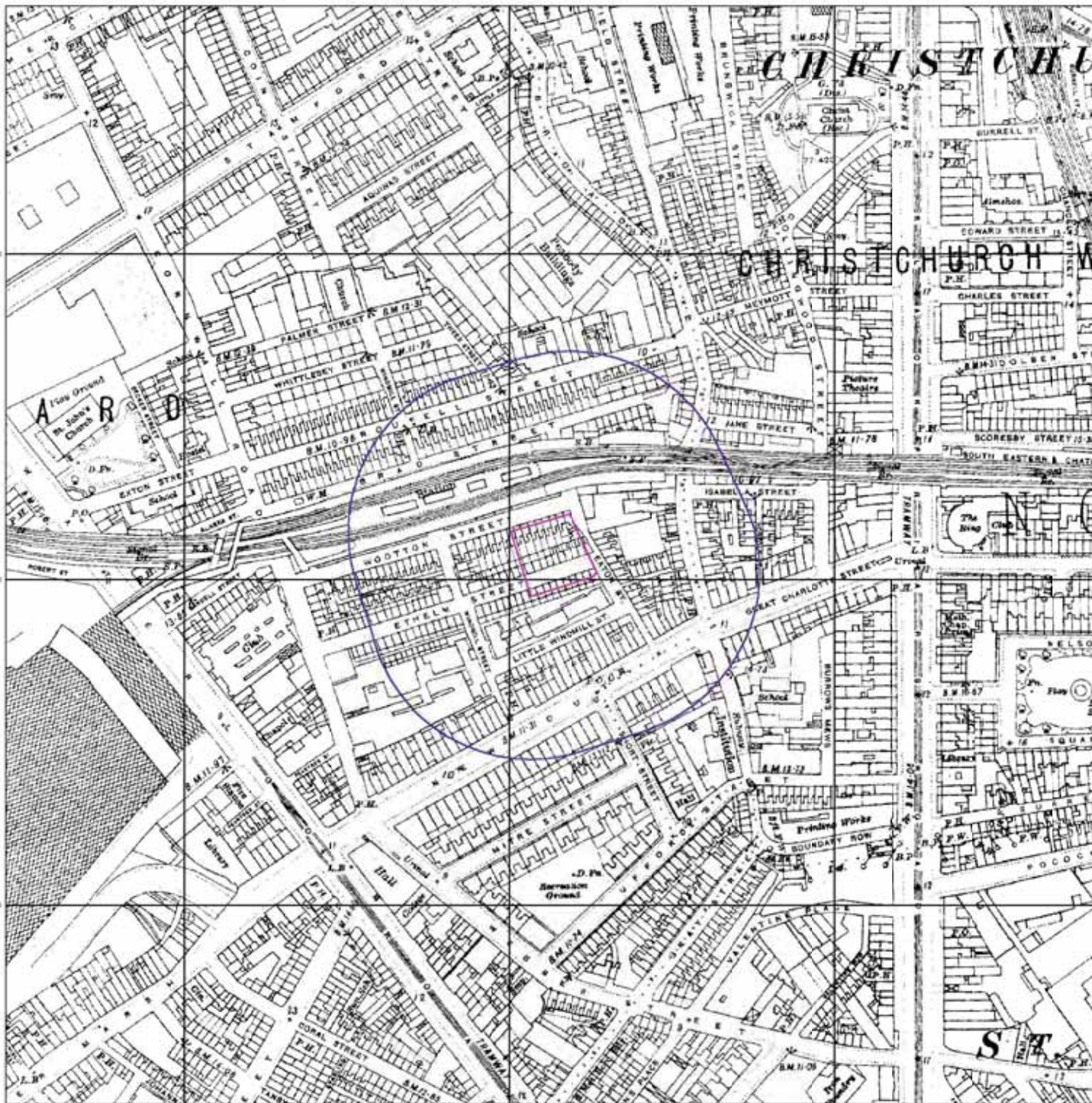
### Site Details

Wootton Street, Windmill House, Wotton Street, London, SE1 8LX



Tel: 0844 844 9952  
 Fax: 0844 844 9951  
 Web: www.envirocheck.co.uk





London

Published 1916

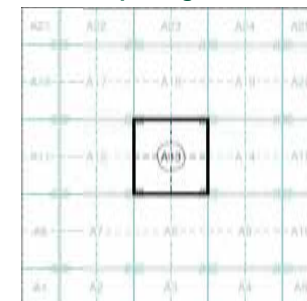
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. 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)



### Historical Map - Segment A13



### Order Details

Order Number: 241598160\_1\_1  
 Customer Ref: UK20.4975  
 National Grid Reference: 531430, 180010  
 Slice: A  
 Site Area (Ha): 0.17  
 Search Buffer (m): 100

### Site Details

Wootton Street, Windmill House, Wootton Street, London, SE1 8LX



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## Ordnance Survey Plan

Published 1951 - 1952

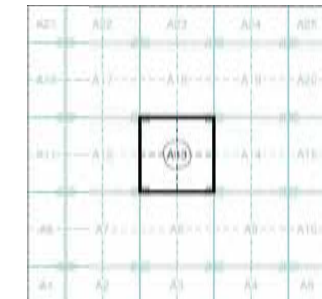
Source map scale - 1:1,250

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. 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)

TQ21805W	TQ21806E
1951	1951
1:1,250	1:1,250
TQ21794W	TQ21795E
1952	1:1,250

### Historical Map - Segment A13



### Order Details

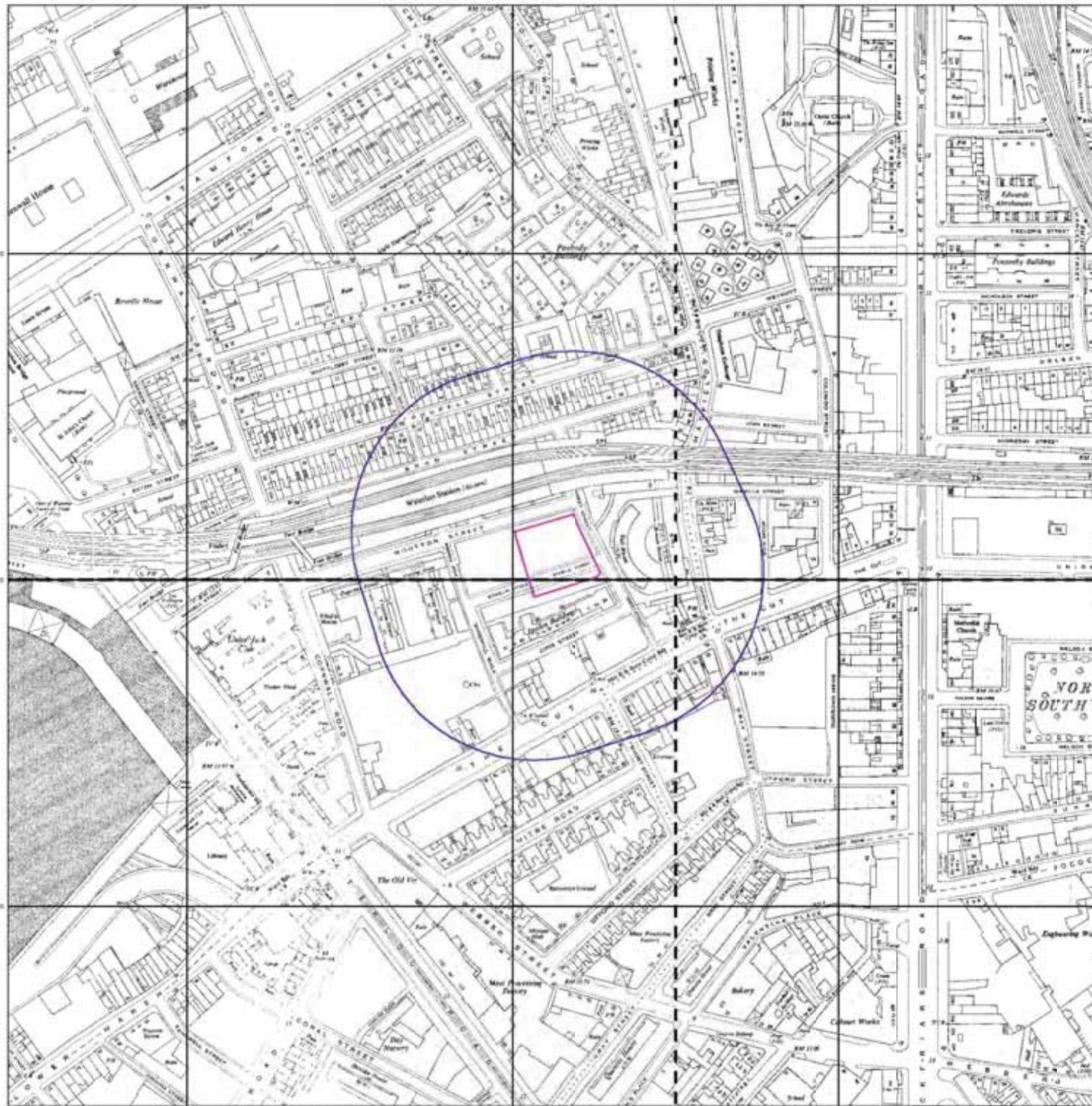
Order Number: 241598160\_1\_1  
Customer Ref: UK20.4975  
National Grid Reference: 531430, 180010  
Slice: A  
Site Area (Ha): 0.17  
Search Buffer (m): 100

### Site Details

Wootton Street, Windmill House, Wotton Street, London, SE1 8LX

**Landmark**  
INFORMATION GROUP

Tel: 0844 844 9952  
Fax: 0844 844 9951  
Web: www.envirocheck.co.uk







## Ordnance Survey Plan

Published 1958 - 1967

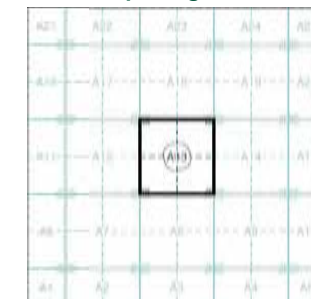
Source map scale - 1:1,250

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. 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)

TQ21805W	TQ21805E
1963	1962
1:1,250	1:1,250
TQ21794W	TQ21794E
1967	1958
1:1,250	1:1,250

### Historical Map - Segment A13



### Order Details

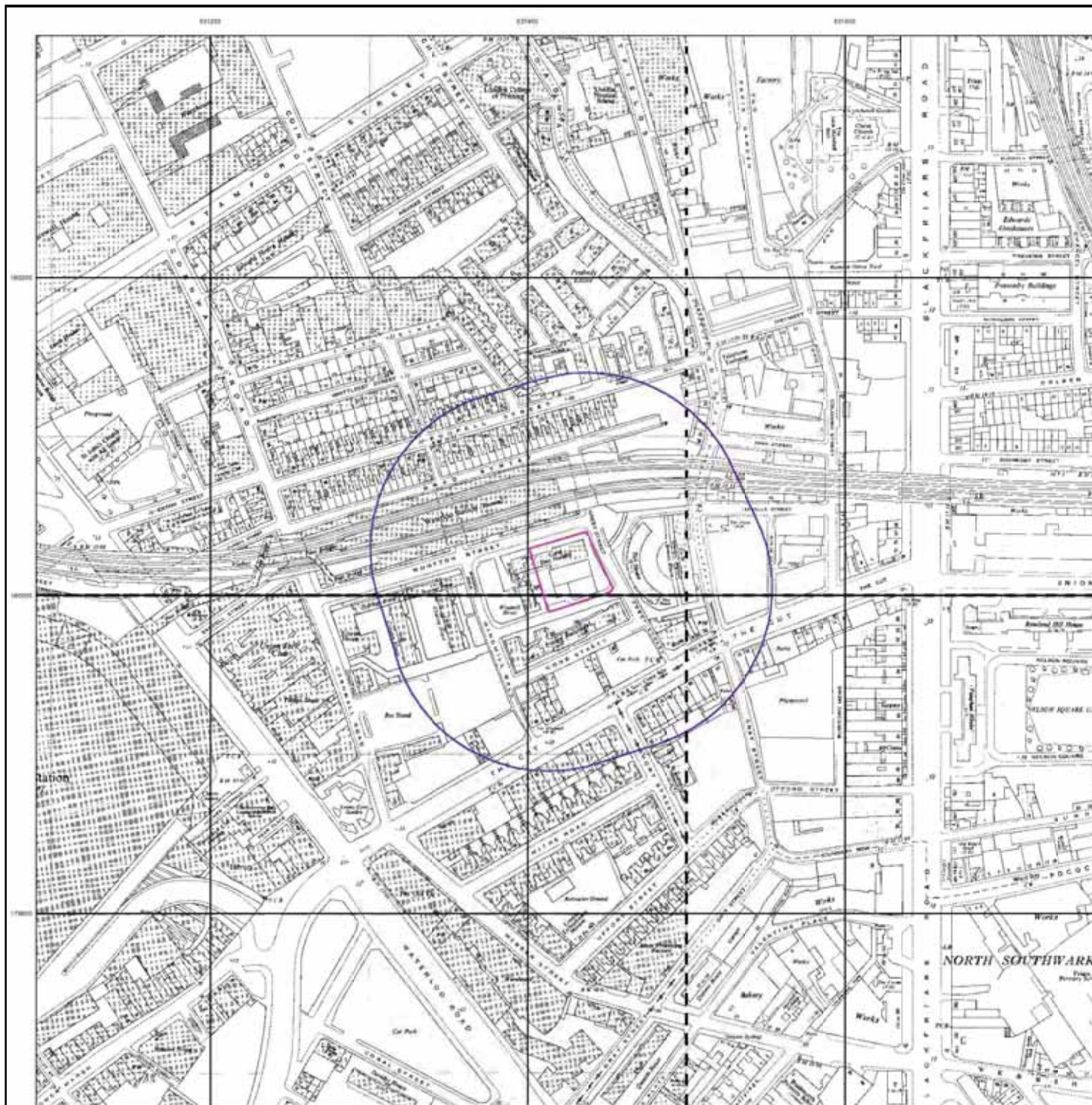
Order Number: 241598160\_1\_1  
 Customer Ref: UK20.4975  
 National Grid Reference: 531430, 180010  
 Slice: A  
 Site Area (Ha): 0.17  
 Search Buffer (m): 100

### Site Details

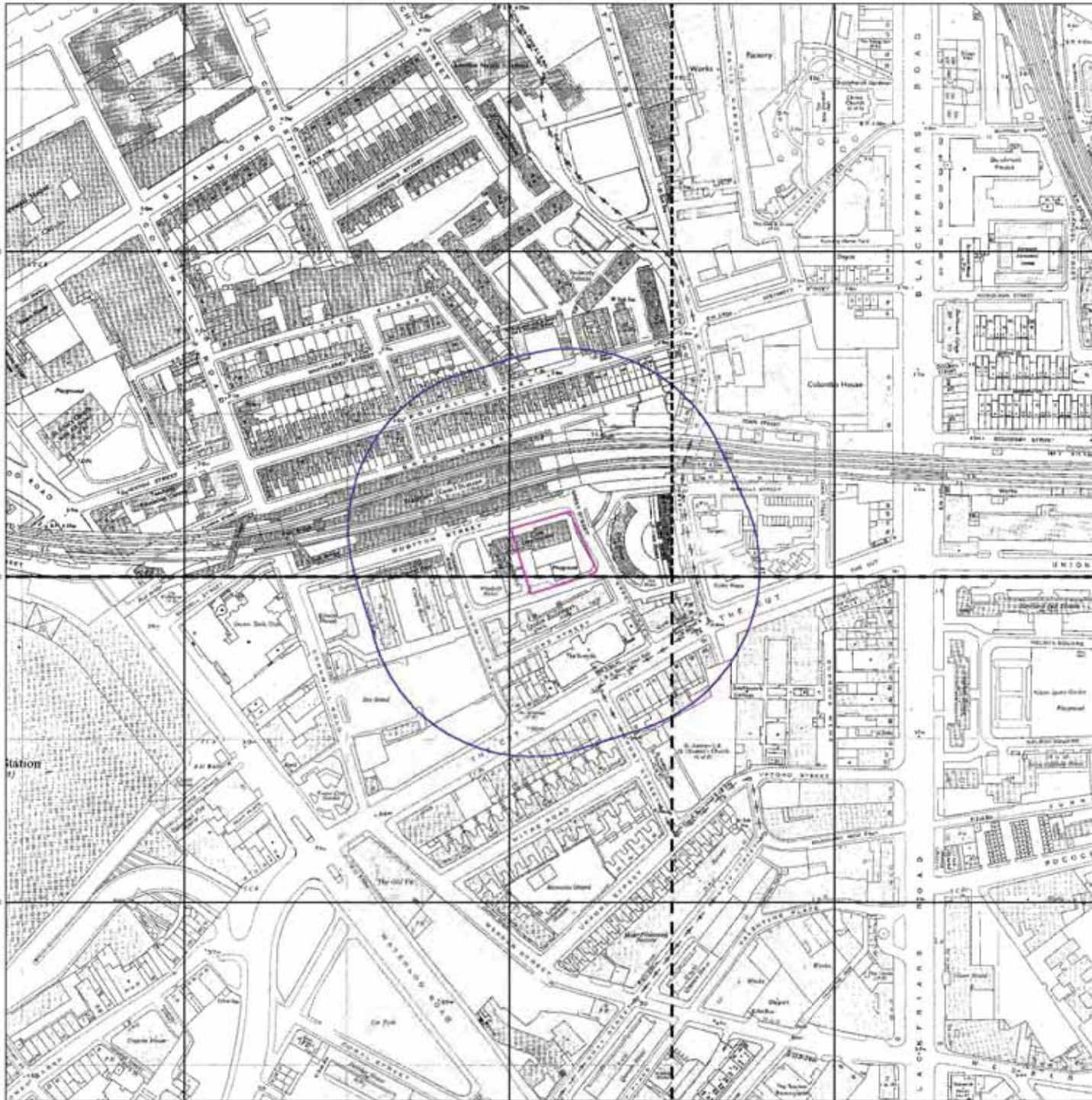
Wootton Street, Windmill House, Wotton Street, London, SE1 8LX



Tel: 0844 844 9952  
 Fax: 0844 844 9951  
 Web: www.envirocheck.co.uk







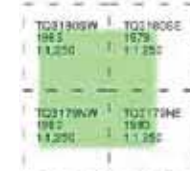
### Additional SIMs

Published 1978 - 1983

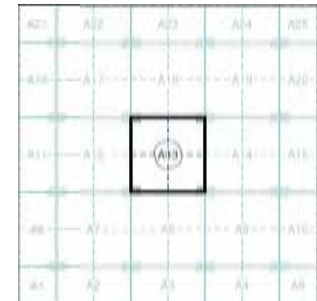
Source map scale - 1:1,250

The SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

### Map Name(s) and Date(s)



### Historical Map - Segment A13



### Order Details

Order Number: 241598160\_1\_1  
 Customer Ref: UK20.4975  
 National Grid Reference: 531430, 180010  
 Slice: A  
 Site Area (Ha): 0.17  
 Search Buffer (m): 100

### Site Details

Wootton Street, Windmill House, Wootton Street, London, SE1 8LX



Tel: 0844 844 9952  
 Fax: 0844 844 9951  
 Web: www.envirocheck.co.uk





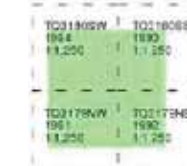
## Large-Scale National Grid Data

Published 1991 - 1994

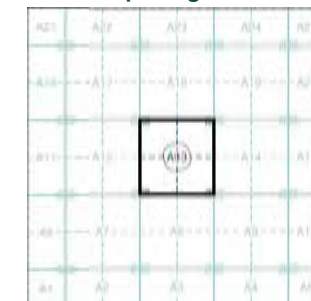
Source map scale - 1:1,250

'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 fore-runners 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)



### Historical Map - Segment A13



### Order Details

Order Number: 241598160\_1\_1  
Customer Ref: UK20.4975  
National Grid Reference: 531430, 180010  
Slice: A  
Site Area (Ha): 0.17  
Search Buffer (m): 100

### Site Details

Wootton Street, Windmill House, Wotton Street, London, SE1 8LX

**Landmark**  
INFORMATION GROUP

Tel: 0844 844 9952  
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Web: www.envirocheck.co.uk



## **APPENDIX G**

### **Unexploded Ordnance (UXO) Risk Map**



# UNEXPLODED BOMB RISK MAP



## SITE LOCATION

Location: SE1 8LX,  
Map Centre: 531399,180001



## LEGEND

### London Bomb Risk



- |           |                 |                   |       |
|-----------|-----------------|-------------------|-------|
| military  | industry        | UXO find          | Other |
| transport | dock            | Luftwaffe targets |       |
| utilities | abandoned bombs | Bombing decoy     |       |

### How to use your Unexploded Bomb (UXB) risk map?

The map indicates the potential for Unexploded Bombs (UXB) to be present as a result of World War Two (WWII) bombing.

You can incorporate the map into your preliminary risk assessment\* for potential Unexploded Ordnance (UXO) for a site. Using this map, you can make an informed decision as to whether more in-depth detailed risk assessment\* is necessary.

### Relative UXB risk across London

The relative risk for the London area is established by plotting the recorded bombing densities.

These are represented as counts of high explosive bombs in km<sup>2</sup> area. The areas coloured green represent a record of less than 10 bombs per km<sup>2</sup>.

Compared to other areas of the UK, this still represents a significant density. However, this is much lower than parts of Central London, where the red colouration indicates in excess of 150 bombs falling per km<sup>2</sup>, representing a very significant bombing density.

### What do I do if my site is in a moderate or high density area?

Generally, we recommend that a detailed UXO desk study and risk assessment is undertaken for sites with a moderate or high bombing density.

Similarly, if your site is near to a designated Luftwaffe target or bombing decoy then additional detailed research is recommended.

More often than not, this further detailed research will conclude that the potential for a significant UXO hazard to be present on your site is actually low.

**Never plan site work or undertake a risk assessment using these maps alone. More detail is required, particularly where there may be a source of UXO from other military operations which are not reflected on these maps.**

### If my site is in a low risk area, do I need to do anything?

If both the map and other research confirms that there is a low potential for UXO to be present on your site then, subject to your own comfort and risk tolerance, works can proceed with no special precautions.

A low risk really means that there is no greater probability of encountering UXO than anywhere else in the UK.

If you are unsure whether other sources of UXO may be present, you can ask for one of our **pre-desk study assessments (PDSA)**

### If I have any questions, who do I contact?

tel: +44 (0) 1993 886682  
email: [uxo@zetica.com](mailto:uxo@zetica.com)  
web: [www.zeticauxo.com](http://www.zeticauxo.com)

The information in this UXB risk map is derived from a number of sources and should be used in conjunction with the accompanying notes on our website: (<https://zeticauxo.com/downloads-and-resources/risk-maps/>)

Zetica cannot guarantee the accuracy or completeness of the information or data used and cannot accept any liability for any use of the maps. These maps can be used as part of a technical report or similar publication, subject to acknowledgment. The copyright remains with Zetica Ltd.

It is important to note that this map is not a UXO risk assessment and should not be reported as such when reproduced.

\*Preliminary and detailed UXO risk assessments are advocated as good practice by industry guidance such as CIRIA C681 'Unexploded Ordnance (UXO), a guide for the construction industry'.



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