Lendlease

1 Triton Square

St Anne's
Contamination Desk Study and Programme of Investigation

Issue | 16 February 2018

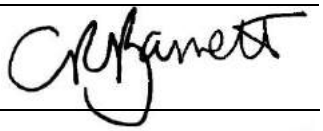
Job number 246868

13 Fitzroy Street
London
W1T 4BQ
United Kingdom

ARUP

Document Verification

ARUP

Job title		1 Triton Square			**Job number** 246868
Document title		St Anne's Contamination Desk Study and Programme of Investigation			**File reference**
Document ref					
Revision	**Date**	**Filename**	St Anne's Desk Study and Programme of GI draft.docx		
Draft 1	15 Feb 2018	**Description**	First draft		
			Prepared by	Checked by	Approved by
		Name	Rachael Clark	Tim Morgan	
		Signature			
Issue 1	16 Feb 2018	**Filename**	St Anne's Desk Study and Programme of GI draft.docx		
		Description	First issue		
			Prepared by	Checked by	Approved by
		Name	Rachael Clark	Tim Morgan	Chris Barrett
		Signature			
		Filename			
		Description			
			Prepared by	Checked by	Approved by
		Name			
		Signature			
		Filename			
		Description			
			Prepared by	Checked by	Approved by
		Name			
		Signature			
				Issue Document Verification with Document	✓

Contents

References

Tables

Figures

Appendices

Executive summary

Ove Arup and Partners Ltd (Arup) has been commissioned by British Land Ltd to provide consultancy services for St. Anne's, Laxton Place, London, NW1 3PT which is part of the development at 1 Triton Square.

St Anne's Church is one of three areas being developed by British Land Ltd. The development scheme includes a commercial element (1 Triton Square), an area of public realm (Longford Place) and a residential element (St Anne's). Planning permission has been granted (reference 2016/6069/P) subject to a Section 106 legal agreement. This report provides an assessment for the St Anne's area.

The site is underlain by a low sensitivity shallow secondary undifferentiated aquifer. The deeper principal aquifer within the Chalk is overlain by a significant thickness of London Clay and there are no source protection zones, surface water receptors, abstractions, environmentally sensitive areas or historic or current landfills in the vicinity of the site. The environmental sensitivity of the site is therefore considered to be **low**.

The development is comprised of a part six storey, part nine storey residential building with hard landscaping and a private garden in the north east corner of the site. The site will be occupied by residents which will include children and will have gardens where produce will be grown for consumption. The development sensitivity is therefore considered to be **high** (for those living on the ground floor).

A number of potential sources have been identified on the site including an electrical power station which was subsequently an electricity substation and a works as well as the potential for asbestos to be present associated with former modular buildings. Offsite potential sources include a substation, petrol filling station with tanks and a 'planing and saw' mill. The potential for contamination on the site is generally considered to be **low** but increases to **moderate** in the area of the former power station.

A summary of risk classifications for the development and plausible contaminant linkages (PCL) is provided in the table below.

Description	Classification
Contaminant sources and site sensitivity	
Environmental sensitivity	Low
Development sensitivity	High
Potential for contamination on site	Low to moderate
Potential for contamination from offsite sources	Moderate
Preliminary risk assessment	
Risk of harm to human health during construction	Low to very low
Risk of harm to human health after construction	Moderate
Risk of pollution to groundwater	Moderate

Description	Classification
Risk of pollution to surface water	Negligible
Risk of damage to building materials and services	Low
Risk of harm to designated ecological receptors	Negligible
Risk of harm to planting in landscaped areas	Low

A ground investigation is proposed to further assess the contaminative status of the site and to enable detailed assessment of the PCL identified.

The site is very small at approximately 0.1ha. The scope of the ground investigation will comprise the following:

- two cable percussion boreholes within the north west and south east (within the building) portion of the site;
- five trial pits located along the northern boundary of the site and to the south east corner;
- four shallow hand dug pits to provide information on shallow soils in the garden area in the north east corner of the site;
- chemical analysis of environmental soil samples for a range of contaminants to include metals, detailed quantified asbestos analysis (two stage by initial stereo-binocular/PLM and quantitative phase contrast microscopy assessment), speciated total petroleum hydrocarbons (TPHCWG method), MTBE, speciated PAH, BTEX, VOCs and SVOCs (including cresols), phenols, cyanide, PCBs, plus various other inorganic compounds;
- in situ groundwater monitoring, including the assessment of non-aqueous phase liquids (NAPL) and groundwater testing (similar to the above), of controlled waters in the secondary aquifer (RTD); and,
- waste classification and waste acceptance criteria testing.

This investigation will result in a sampling density of approximately 10m centres which is detailed.

1 Introduction

1.1 General

Ove Arup and Partners Ltd (Arup) has been commissioned by British Land Ltd (British Land) to provide consultancy services for the development at St. Anne's, Laxton Place, London, NW1 3PT which is part of the wider development at Triton Square. The site location is shown on Figure 1.

The Triton Square redevelopment is also being undertaken by British Land and the development area has been divided into three to reflect the phased nature of the works, as shown on Figure 2. The scheme includes a commercial element (1 Triton Square), an area of public realm (Longford Place) and a residential element (St Anne's). Planning permission has been granted by London Borough of Camden (LBC) (reference 2016/6069/P) subject to a Section 106 legal agreement.

The permission includes a condition which relates to contamination (condition 12). The condition wording has been amended to reflect the phasing. The amendments to the condition allow details to be submitted and discharged separately for the three different areas of the site (1 Triton Square, Longford Place and St Anne's). The wording of the amended condition 12 relevant to St Anne's is as follows:

- At least 28 days before development commences on the residential element of the development:

  (a) *a written programme of ground investigation for the presence of soil and groundwater contamination and landfill gas on land within the residential element shall be submitted to and approved by the local planning authority in writing; and*

  (b) following the approval detailed in paragraph (a), an investigation shall be carried out on land within the residential element in accordance with the approved programme and the results and a written scheme of remediation measures relevant to that land [if necessary] shall be submitted to and approved by the local planning authority in writing

- *Any remediation measures [if necessary] shall be implemented strictly in accordance with the approved scheme(s) and where relevant a written report detailing the remediation for either the commercial element or the residential element shall be submitted to and approved by the local planning authority in writing prior to occupation of that element.*

- *Reporting and management of significant additional contamination. additional significant contamination discovered during development shall be fully assessed and any necessary modifications made to the remediation schemes shall be submitted to the Local Planning Authority for written approval. Before any part of either the commercial element or the residential element hereby permitted is occupied, where relevant the developer shall provide written confirmation that all works were completed in accordance with the revised remediation scheme(s) for that element.*

A ground investigation was completed largely within the footprint of 1 Triton Square as two phases during 2017. Arup previously prepared a Contamination Desk Study and Risk Assessment Report for the 1 Triton Square building footprint. The report presented and assessed the results of the 2017 Phase 1 and 2 ground investigation and was discussed at a meeting with London Borough of Camden (LBC) on 4 December 2017 where no comments were raised. The report was subsequently submitted in relation to parts (c) and (d) of Condition 12.

Arup also prepared a Contamination Desk Study and Scheme of Ground Investigation for the Longford Place area of the site which was agreed with LBC. The report presented a desk based assessment of the site and proposed a scheme of investigation which successfully enabled discharge of Condition 12(e).

1.2 Scope and objectives

This report specifically relates to St Anne's, which is located north west of the Triton Square Building over Longford Street, as shown on Figure 2. The objective of this report is to enable the discharge of part (a) of planning condition 12 (2016/6069/P) as it relates to St Anne's, following amendments to the wording of the condition.

To meet the requirements of the condition this report:

- provides a review of past and current uses of the site and the surrounding area, discussing the environmental setting, nature of any identified hazards and potential contaminative sources;
- outlines the local geology, hydrogeology and hydrology conditions;
- uses available data to inform an initial preliminary risk assessment including an initial conceptual model; and,
- proposes a programme of intrusive ground investigation.

1.3 Report structure

This report has the following structure:

- Section 2 describes the site layout, the approved development and the environmental setting;
- Section 3 summarises the site history;
- Section 4 introduces the conceptual model;
- Section 5 provides the risk assessment; and,
- Section 6 presents the conclusions and recommendations of the desk study.

1.4 Information sources

The following information sources have been used in the preparation of this report:

- Groundsure (2016) EnviroInsight and MapInsight reports [1];
- Arup (2017) 1 Triton Square, Contamination Desk Study and Risk Assessment Report Commercial Element, Issue 1, November 2017 [2] (submitted to LBC);
- Envirocheck Report, Landmark, Order No 76872908_1_1, Dec 2015 [3] (included in Appendix B);
- Arup (2018) 1 Triton Square, Contamination Desk Study and Programme of Investigation Longford Place report, Issue 1, January 2018 [4] (submitted to and approved by LBC);
- Concept (2017) Phase 1 Factual Report [5] (included in Appendix C); and
- Concept (2017) Phase 2 Factual Report [6] (included in Appendix D).
- previous offsite ground investigation conducted in 1994 by Laing Technology Group Limited [7] (Appendix E)

1.5 Limitations

This report has been prepared for the use of British Land Ltd in relation to the approved redevelopment of St Anne's. It takes into account our client's particular instructions and requirements and addresses their priorities at the time. It is not intended for, and should not be relied upon by any third party and no responsibility is undertaken to any third party in relation to it, except as provided for in Arup's agreement with British Land Ltd.

Arup has based this report on the sources of information detailed within the report text and believes them to be reliable, but cannot and does not guarantee the authenticity or reliability of third party information. Notwithstanding the efforts made by the professional team in undertaking this assessment, it is possible that ground and contamination conditions other than those potentially indicated by this report may exist at the site.

This report does not present a survey or assessment of the location, condition or liabilities associated with hazardous materials in building fabric such as (but not limited to) asbestos containing material (ACM), radiological or bacterial substances or lead.

This report has been prepared based on current legislation, statutory requirements, planning policy and industry good practice prevalent at the time of writing. Any subsequent changes or new guidance may require the findings, conclusions and recommendations made in this report to be reassessed in light of the circumstances. Should the approved layout or use of the site change, the assessments and conclusions presented in this report may need to be revised.

2 The site

2.1 Site location

The site is located to the north of Longford Street with an approximate National Grid Reference TQ 289824. Figure 1 shows the site location. The site lies to the north west of 1 Triton Square and is approximately 150m north of Euston Road and 650m from Euston Square Station.

2.2 Approved redevelopment scheme

The proposed development at the site will involve:

- the demolition of the existing church;
- construction of a part six storey, part nine storey residential building;
- a private garden at the north east corner of the site (shown in Figure 4); and,
- a generous pavement area at the main entrance.

The wider development approved under application ref 2016/6069/P also includes 1 Triton Square and Longford Place (shown on Figure 2). Table 1 shows the proposed development at St Anne's.

Table 1 Architectural drawing of the proposed development at St Anne's

2.3 Topography

The ground level around the site is generally level at +28mOD. The site is currently largely occupied by St Anne's Church with some limited hard landscaping. The surrounding area is at a similar level with no major topographical changes.

2.4 Environmental setting

2.4.1 General

This section provides a summary of the current environmental setting based on the recent Groundsure report [1] and extracts from the Envirocheck report that was obtained for the Triton Square redevelopment [4]. As well as this, information has been obtained from the Environment Agency website [8].

The Groundsure report is included in Appendix A. It contains environmental sensitivity maps and permitting records (EnviroInsight) and historical Ordnance Survey maps (MapInsight).

The Groundsure report doesn't include Goad fire and insurance plans which provide detailed information on historical uses. The plans included in the Envirocheck for 1 Triton Square extend to the St Anne's site and therefore they have been used as an additional source of information. Goad plans for the site are included as extracts from the Envirocheck report in Appendix B.

2.4.2 Geology, hydrogeology and hydrology

The Groundsure report states that:

- the superficial geology is Lynch Hill Gravel; and,
- the bedrock geology is London Clay.

The 2017 ground investigation at 1 Triton Square [2] included a borehole (BH101) outside the building (on the Longford Place site). A summary of the geology based on the stratigraphy observed in the borehole and from a previous ground investigation in the area is presented in Table 2 below.

Table 2 Site stratigraphy based on 2017 and 1994 investigations

Layer	Description	Thickness (m)	Top (mOD)
Made Ground	Variable including 0.5m of concrete at the surface with layers beneath described as light grey and orange sandy gravel, orangish brown and grey slightly clayey gravelly sand and firm dark grey and brown/orangish brown gravelly sandy silty clay. The gravel was comprised of concrete, brick fragments and rare clinker fragments.	2.15	+27.99
River Terrace Deposits (RTD)	Medium dense orangish brown slightly clayey silty sandy fine to coarse flint gravel.	5.7	+25.84
London Clay	Stiff extremely closely fissured grey clay with rare pockets of grey silty fine sand and occasional fine to medium sand sized selenite crystals.	20.15	+20.14
Harwich Formation*	Very stiff greenish grey sandy silty clay	0.5	-0.51
Lambeth Group*	Very stiff, greenish grey to blue clay (Reading Formation) becoming mottled reddish brown and bluish grey.	Not proven	-1.01

Layer	Description	Thickness (m)	Top (mOD)
Thanet Sands*	Not encountered but described during previous investigations as very dense, light greyish brown sand with a thin basal layer of very dense gravel.	Typically 4.4 to 5.1	-13.5 to -18.5
Chalk*	Not encountered but described during previous investigations as gravel sized fragments of very weak to very strong chalk.	Not proven	-19.9 to -23.6
*Not encountered – description taken from previous investigation in 1994 [7]			

With regard to hydrogeology, the RTD is classified by the Environment Agency as a secondary undifferentiated aquifer. Secondary aquifers are permeable layers which are able to support water supplies at a local as opposed to a strategic scale.

The bedrock (London Clay) is defined as unproductive strata. The Chalk, Thanet Formation and the lower, more permeable strata of the Lambeth Group are in hydraulic continuity and are therefore normally considered together as the Chalk Basal Sands aquifer. The Chalk is classified by the Environment Agency as a principal aquifer.

The site is not located within 500m of a groundwater source protection zone (SPZ). There are two groundwater abstractions approximately 518m to the south of the site, both located at the same site and related to a heat pump at 10 Weymouth Street.

There are no surface water features within 250m of the site and the nearest surface water feature is Regent's Park Boating Lake which forms part of the historical River Tyburn and is located over 1km to the west.

2.4.3 Registered potentially contaminative land uses

The Groundsure report states that there are 21 potentially contaminative past land uses within 250m of the site. Those that may be relevant to the site are:

- a hospital, 158m south;
- a railway station, 201m south west;
- an electricity railway station, 212m east;
- a London transport station, 245m south west; and
- a hospital, 247m south east.

Other potentially contaminative sources within 500m of the site as identified by the Groundsure report include:

- 16 historical tanks, the nearest being 133m south;
- 50 historical energy features, two of these are electricity substations that were present onsite;
- 30 historical garages and motor vehicle repair sites, the nearest being a garage located 29m east; and,
- Four areas of potentially infilled land, the nearest of which was 298m west.

2.4.4 Environmental permitting and registers

Within 500m of the site the Groundsure report confirms that there are:

- seven Part 2A and B activities and enforcements, the nearest being a dry cleaners located 322m north;
- eight registered radioactive substances (RAS) licences for the keeping and disposal of radioactive materials, the nearest being at the University College Hospital 412m north east;
- two licensed discharge consents relating to the discharge of cooling water located 499m south; and
- one National Incidents Recording System (NIRS) List 2 record located 236m south west regarding petrol that had no impact (category 4) to the land, water or air.

The Groundsure report confirms that there have been no Integrated Pollution Control (IPC) authorisations or Integrated Pollution Prevention Control (IPPC) permits or harmful discharges within 1km of the site.

2.4.5 Landfill, hazardous and waste sites

There are no registered landfills on or within 1km of the site recorded in the Groundsure report or on the Environment Agency website [8]. The Groundsure report indicates that there are no landfill sites, Notification of Installations Handling Hazardous Substances (NIHHS) or Control of Major Accident Hazards (COMAH) sites, waste treatment, transfer or disposal sites within 500m of the site.

2.4.6 Sensitive land use

The Groundsure report confirms that there are no designated environmentally sensitive sites within 1km of the study site which could represent potential ecological receptors on or within 1km of the site. These include designations such as Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Areas of Outstanding Natural Beauty (AONB), Special Areas of Conservation (SAC), Special Protection Areas (SPA), RAMSAR sites and Local Nature Reserves (LNR).

2.4.7 Radon

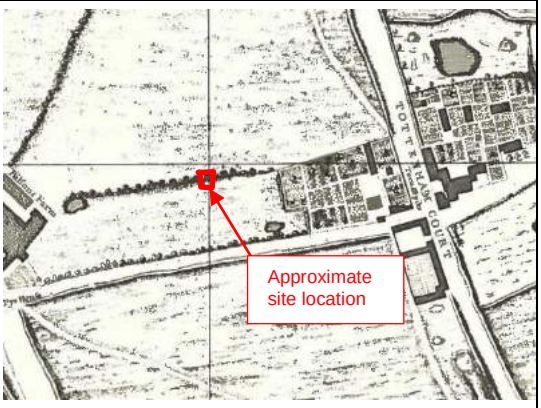
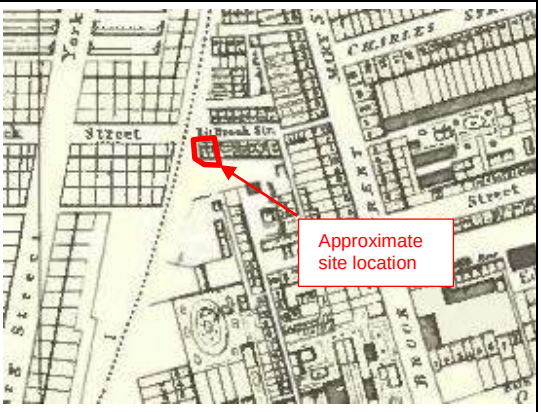
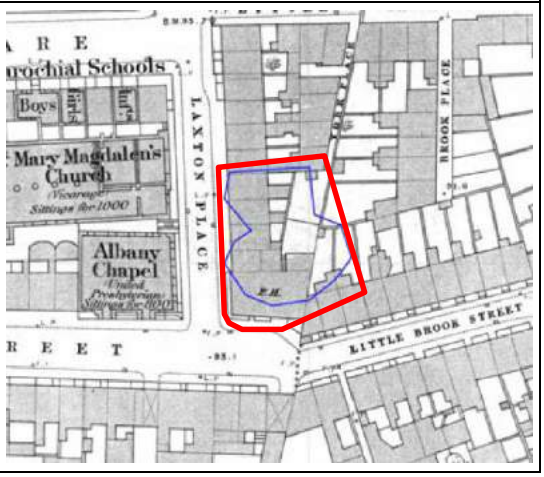
The Groundsure report states that the site is not in a radon affected area, as less than 1% of properties are above the action level. The report states that no radon protective measures are required for the construction of new properties or extensions in such areas.

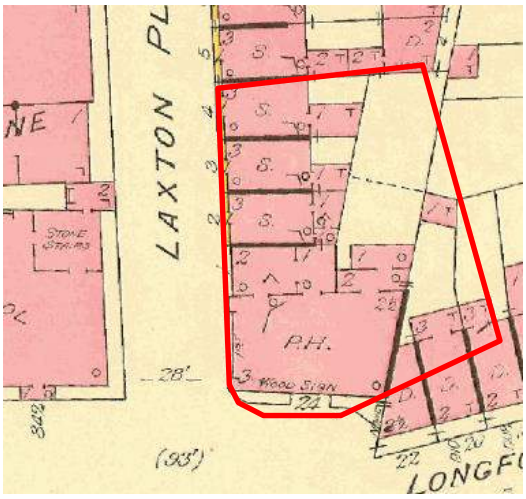
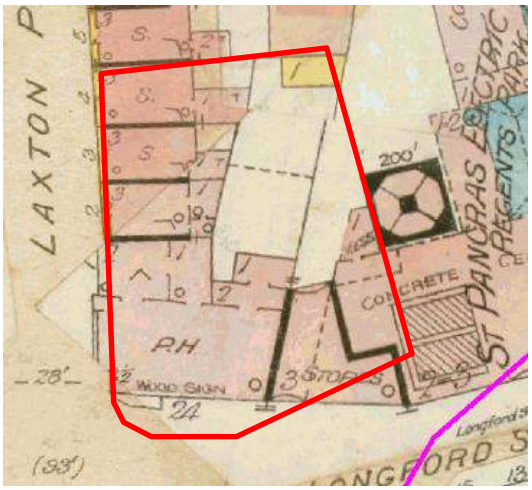
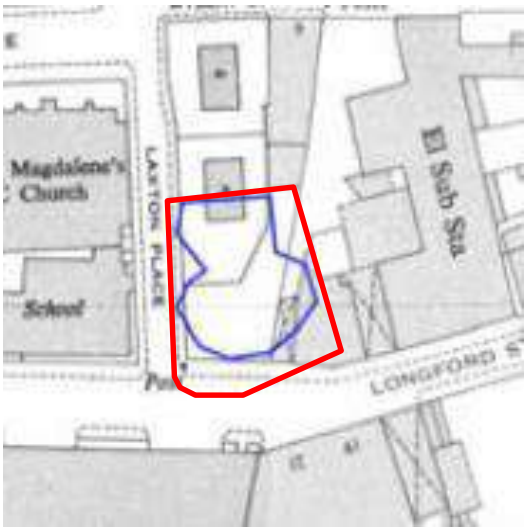
3 Site history

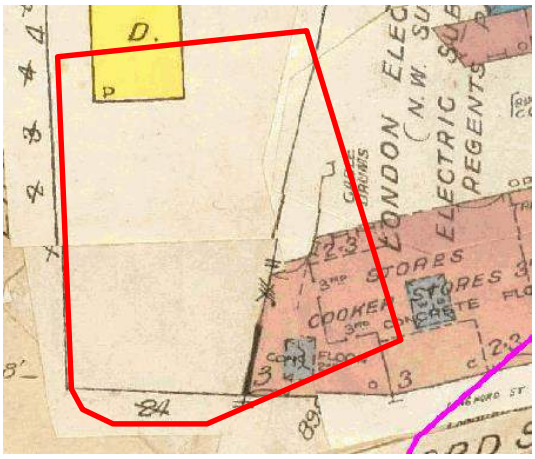
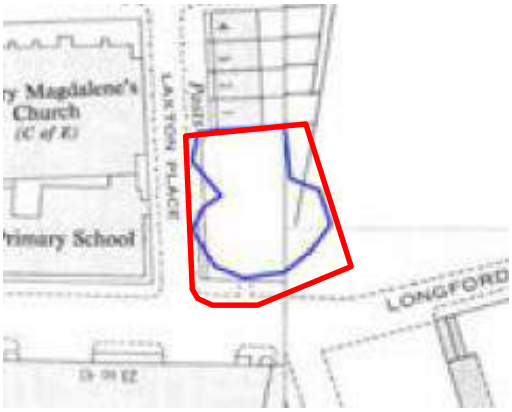
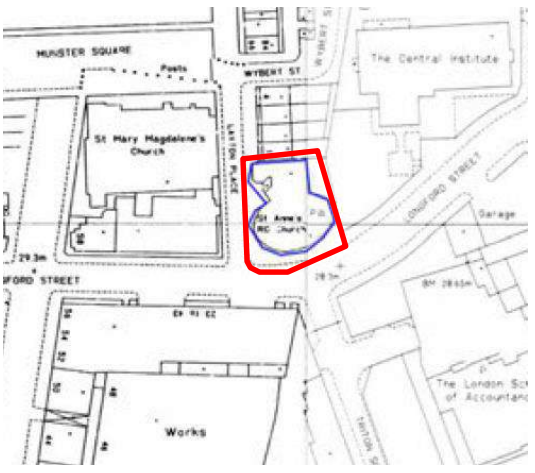
A review of historical mapping including Roque [9] and Horwood's [10] maps, Ordnance Survey (OS) maps as provided by Groundsure [1] and Goad Fire Insurance plans provided by Envirocheck [3] has been undertaken. Selected map extracts are included in Table 3 to provide a summary of the development history of the site.

The extracts from the mapping in Table 3 include the outline of St Anne's Church shown in blue and the site boundary shown in red.

Table 3 Summary of site history

Year	Description	Map Extract
1746	**Onsite** Rocque's map shows the site to be undeveloped with a possible ditch or brook running across the site. From east to west **Offsite** Possible pits, ponds and drainage ditches exist in the vicinity. Buildings are present to the east towards Tottenham Court.	
1813	**Onsite** Horwood's map shows the site has been developed before this date. The site is occupied by terraced buildings, likely residential use. **Offsite** Little Brook Street is adjacent to the north and further terraced buildings and Brook Street lie to the east of the site.	
1873	**Onsite** The site is occupied by residential buildings with gardens. The main building onsite is a public house. **Offsite** The surrounding area is predominantly residential with several schools and a chapel to the west.	

Year	Description	Map Extract
1889	**Onsite** The buildings in the north of the site are identified as shops and dwellings are identified in the south east. **Offsite** No significant changes in the immediate surrounding area.	
1916	**On site** dwellings in the south east of the site are no longer identified on the map. **Offsite** there is no significant change in the surrounding area.	
1927	**Onsite** The public house and shops are still present. New buildings have been built in the south east including a store room which is part of the St Pancras Electric Power Station. **Offsite** The St Pancras Electric Power Station extends offsite to the east. It has a factory chimney, steam boilers, a coal store, an underground tank (north east), engines and dynamos. A planing and saw mill is also present to the east.	
1952	**Onsite** The public house and shops are no longer shown. A building is shown in the north of the site extending offsite to the north. **Offsite** The areas to the south and east have undergone significant redevelopment and are now in primarily commercial and industrial use. The power station is now identified as a substation. An engineering works (sheet metal & galvanizing) is located to the south as is an optical instrument works. A furniture works is to the north east.	

Year	Description	Map Extract
1957	**Onsite** The building in the north of the site is identified as wooden with asbestos cladding on the Goad plan. **Offsite** The substation is identified as a London Electricity Board substation. This includes associated switch rooms, stores, transformers and rotary converters.	
1965	**Onsite** No buildings are shown onsite. **Offsite** Large areas to the east have been cleared. Four buildings, possibly residential, are present to the north. The substation to the east is no longer shown. To the south the works is no longer identified and Triton Square is identified as a road with an adjacent electricity board depot.	
1970	**Onsite** no significant changes are shown. **Offsite** a road has been developed to the south of the site.	
1982	**Onsite** St Anne's Church is now present and in its current configuration. **Offsite** no significant changes are shown.	
1985	**Onsite** no significant changes are shown. **Offsite** a garage is identified to the east and the London School of Accountancy is present to the south.	
1993 to present day	**Onsite** There are no significant changes and the site remains in the same configuration today. **Offsite** No significant changes are shown. The area to the south was subsequently demolished and developed as 1 Triton Square.	

4 Conceptual model

4.1 Contaminated land framework

The assessment process set out in CLR11 [11] has been used within this report. A preliminary contamination risk assessment using the framework based on the following information has been completed to identify sources, receptors and pathways:

- historical and current potential contaminative activities operating on and in the vicinity of the site;
- sensitivity of the site in the context of the wider environmental setting and ground conditions; and,
- sensitivity of the future development and potential receptors.

4.2 Potential sources of contamination

The principal potential source of contamination at the site is the former electric power station works and subsequent electrical substation located on the eastern boundary of the site and extending offsite. The power station works included a factory chimney, steam boilers, a coal store, an underground tank, engines and dynamos. There is potential for asbestos to be present onsite due to the demolition of previous buildings, shown on plans from 1952 to 1957 to be wooden and described as having asbestos cladding. A former petrol filling station was located to the southeast at Longford Place.

A ground investigation at the 1 Triton Square building, specified by Arup and undertaken by Concept, was completed in 2017 [2]. The investigation included a borehole outside the building footprint, located in the south of the Longford Place area. No visual or olfactory observations of potential contamination were recorded and no elevated concentrations of contaminants were recorded in soil samples taken from this location. Concentrations of petroleum hydrocarbons within the groundwater sample taken from this location were below the detection limit. Some low concentrations of dissolved phase hydrocarbons were recorded in groundwater samples obtained from locations within the footprint of 1 Triton Square (CH02 and CH03).

Potential on site sources identified at the site and likely contaminants of concern are outlined in Table 4.

Table 4 Potential sources of contamination

Potential sources of contamination	Description
Made Ground	Made Ground is man-made and can be a combination of natural soils (sand, gravel and clay) mixed with anthropogenic materials from older demolition fills and discarded items. It can contain a range of contaminants such as metals, sulphates, petroleum hydrocarbons and asbestos depending on the activities on site or the source of the Made Ground. It can also be a potential source of ground gas if it contains significant quantities of organic material.
Former power station and subsequent electrical substation	Goad plans show a store building present on site which was part of the St Pancras Electric Power Station. Engines, dynamos, coal stores and a possible underground tank were located off site to the north within the power station. The power station is noted in Grace's Guide [12] to have been built with six dynamos and triple expansion engines in 1891. The station was developed and further turbo-generators installed with the last entry in 1927. The contamination associated with the power station will be dependent on the fuel type and combustion residues. Based on the 1927 map it seems the power station was likely to be generating electricity from coal. This has been researched and historical accounts [13] confirm the power station was fuelled by coal. Potential contaminants associated with this use are likely to include heavy metals, sulphate and sulphide, PCBs, pulverised fuel ash, coal residues and combustion residues. Asbestos was also likely used extensively in such buildings.
Former asbestos clad wooden buildings	Historical plans show a wooden building present in the north of the site and extending offsite to the north. The building is listed as having asbestos cladding and following demolition of the buildings, fragments of asbestos containing materials and asbestos fibres may be present in the Made Ground due to previous phases of demolition.
Offsite sources	The Groundsure report has identified several relatively small scale potentially contaminative sites in the vicinity of the site. These include a former petrol filling station (which has the potential for associated organic contaminants from spills and leaking tanks), a former planing and saw mill and a galvanising works (common contaminants include heavy metals used in the galvanising process and other substances such as cyanide, alkalis and acids used for stripping and cleaning) .

4.3 Potential receptors

Potential receptors associated with the development include:

- Future residents and maintenance workers;
- construction workers;
- neighbours;
- shallow groundwater (secondary A aquifer); and,
- building materials and services (if relevant).

Ecological receptors have not been identified in the area surrounding the site and are not considered further.

4.4 Initial plausible contaminant linkages

The plausible contaminant linkages (PCLs) associated with the potential sources of contamination are presented in Table 5.

Table 5 Plausible contaminant linkages

Receptors	Pathways	PCL
Human health		
Site workers (during construction)	Ingestion of soils, dust and/or groundwater. Dermal contact with soils, dust and/or groundwater. Inhalation of dust fibres and/or gas and vapours	Yes Workers are likely to come into contact with soil and perched water (if present) when carrying out ground works. Workers may be exposed to gases/vapours if working in confined spaces.
Neighbours (during construction)		Yes Principally due to dust or fibre emissions
Future site users (after construction)	Ingestion of soils, dust and/or groundwater. Dermal contact with soils and/or groundwater. Inhalation of dust, fibres and/or gas and vapours. Consumption of home-grown produce	Yes Future development will comprise residential apartments with a garden area and hard landscaping. Potential exposure to soils and consumption of home-grown produce. Dust and fibres may be released due to new soft landscaping. Gas and vapour pathways may be active if contamination/ground gas is present.
Controlled waters		
Shallow groundwater (secondary aquifer)	Vertical migration of contamination from Made Ground to the RTD	Yes If contamination is present in shallow soils it could migrate to the RTD.
	Migration pathways created by piling	Yes If contamination is present in shallow soils pathways could be created during piling.
Building materials and services		
New building, hard landscaping and services	Direct contact with ground and/or groundwater	Yes New services and foundations may be in contact with contaminated soils.
Ecological		
Designated ecological receptors Planting within garden area	Uptake from contaminated soils or groundwater	There are no designated ecological receptors. Yes, for plant uptake (but limited) Made Ground is expected to be present across the site. All new planting will be within clean imported soils.

5 Risk assessment

5.1 Introduction

The potential risks to the identified receptors have been considered in the context of the conceptual site model in accordance with the current UK approach to contaminated land assessment. The method for risk evaluation has been based on a qualitative assessment taking into consideration the magnitude of the potential severity of the risk as well as the probability of the risk occurring. The risk characterisations provided below have been assessed using a scale from very high to very low based on the CIRIA guidance C552 [14]. A brief summary of each preliminary risk classification is provided in Table 6 below**Error! Reference source not found.**.

Table 6 Risk classification

Risk classification	Description of risk
Very high	There is a high probability that severe harm could arise to a designated receptor from an identified hazard, or there is evidence that severe harm to a designated receptor is currently happening. The risk, if realised, is likely to result in substantial liability. Remediation is likely to be required.
High	Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Remedial works may be necessary
Moderate	It is possible that harm could arise to a receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild. Some remedial works may be required.
Low	It is possible that harm could arise to a receptor from an identified hazard but it is likely that this harm, if realised, would typically be mild.
Very low	There is a low possibility that harm could arise to a receptor. In the event of such harm being realised the consequence would at worst be mild.
Negligible	There is no plausible contaminant linkage due to the absence of a pathway or receptor (without any intervention).

5.2 Environmental sensitivity

The secondary undifferentiated shallow aquifer within the RTD is expected to be of relatively low sensitivity since it will be truncated by existing basements particularly to the south. The deeper principal aquifer within the Chalk is expected to be overlain by a significant thickness of London Clay which will provide significant protection. There are no source protection zones, surface water receptors, abstractions, environmentally sensitive areas or historic or current landfills in the vicinity of the site. The environmental sensitivity of the site is consequently considered to be **low**.

5.3 Development sensitivity

The development comprises a new residential apartment building including a private garden in the north east corner. Residents will include adults and children and therefore sensitive receptors will be present at the site. Fewer pathways will be active for residents on upper floors since they will not have access to the private garden and gas and vapour pathways will be less relevant. The development sensitivity is considered to be **high** for ground floor residents.

5.4 Potential for contamination

The site has a long development history which was largely for residential use until the early 20th century. A number of potential sources have been identified on the site including Made Ground, the potential for asbestos associated with cladding on a former building and a former electric power station which may have resulted in contamination of the soil or water. The proposed development does not include a basement and therefore there is the potential for Made Ground to remain onsite. The potential for significant contamination onsite is generally considered to be **low** but is **moderate** in the east given the previous industrial site use.

Offsite potential sources have been identified. These are largely historical uses and include the power station (substation) adjacent to the east, a planning and saw mill, an engineering works (sheet metal and galvanizing), and a garage/filling station. There is a **moderate** potential for contamination to migrate onto site from the identified offsite sources.

5.5 Risk to human health

Human receptors at the site include construction workers and neighbours during construction and residents and maintenance workers after construction.

During construction

There is a potential PCL between potentially contaminated Made Ground soils and dusts and construction workers and neighbours during anticipated shallow earthworks. The risk of harm to human health associated with the construction of the development (without additional mitigation and/or remediation) is generally **low**, based on the potential for contamination identified in this report. This may further increase to **moderate** in the east due to the previous industrial use.

The associated ingestion, inhalation and dermal contact risks can be mitigated by appropriate construction practices and design measures, including active dust control and the use of suitable personal protective equipment (PPE), which will be informed based on the results of the existing and proposed ground investigation.

With mitigation, the potential risks to construction workers would be **low to very low** (with appropriate control measures and risk management during construction). The potential risk (and mitigation) will be determined based on ground investigation, including chemical testing. This will be further assessed based on the outcome of the proposed investigation.

After construction

After development the main receptors at the site will be residents and maintenance workers. Residents will include adults and children that live within the apartment building. The potential for contamination at the site has been identified as generally low (moderate in the east).

The presence of a soft surfaced private garden means direct contact pathways will be active. Without mitigation there is the potential for consumption of home-grown produce pathways to be active. Vapour and gas pathways would be active if ground gas or volatile contamination is present in soils or groundwater. The future buildings onsite will mean there is an indoor exposure pathway. The presence of ground gas or volatile contamination should be confirmed through ground investigation. Potential risks to future residents are considered to be **moderate** to **high** without mitigation.

If the garden is constructed within a suitable depth of clean imported soils, direct contact and consumption of produce pathways will be limited. A number of offsite potential sources have been identified. The majority of these potential sources are historical and there is limited potential for impact to the site.

The risk of harm to human health after development is therefore assessed to be **moderate**. If necessary, additional cover layers, barriers or remediation may be required. This will be further assessed based on the outcome of the proposed investigation.

5.6 Risks to controlled waters

No nearby surface water receptors have been identified by the conceptual model. The Chalk principal aquifer is expected to be protected by a significant thickness of London Clay.

The development is expected to involve limited excavation and little disturbance of the ground. Works will include the demolition of the existing church and associated hard landscaping as well as piling. There is the potential for piling to create migration pathways to the shallow aquifer if contamination is present in shallow soils. However, the expected piling method is continuous flight auger (CFA) which will minimise the potential for pathways to be created.

The secondary shallow aquifer within the RTD is low sensitivity based on the lack of SPZs and abstractions. The risk of pollution of shallow groundwater is considered to be **moderate.** Further investigation of the site, groundwater analysis and assessment of the RTD will be undertaken. This will be further assessed based on the outcome of the proposed investigation.

There are no surface water receptors in the vicinity of the site. The risk to surface waters is therefore considered to be **negligible.**

5.7 Risks to building materials

Building materials normally identified as being at risk on contaminated sites are concrete, plastic and metals. The results of the ground investigation will be used to assess the risks to materials and services. The information obtained will enable the correct specification of materials (if appropriate).

Based on the above the risks to building materials and services are assessed to be **low**.

5.8 Risks to ecological receptors

The site is not located in an area of ecological importance and the risks of harm to designated ecological receptors from contaminated ground are therefore considered to be **negligible**.

The principal (non-designated) ecological receptors have been identified as new landscaping (grass, trees and shrubs etc.) within the garden in the north east corner of the site.

Site-won soils will not be reused and the garden area will be constructed within a suitable depth of clean imported soils. However, there is the possibility that potential contaminants may be present in deeper Made Ground or soils and groundwater in the upper aquifer. The risk of harm to planting is considered to be **low** considering they will generally be in clean imported soils. This will be further assessed based on the outcome of the proposed investigation.

6 Conclusions and recommendations

6.1 Summary and conclusion

This report presents a desk based review and preliminary risk assessment for the St Anne's site to identify potential contamination risks for the development.

The site has predominantly been in residential use until the mid-20th century. Gardens have been present on site and it is assumed most of the buildings were residential dwellings. A small part of the site was occupied the St Pancras Electric Power Station. By the 1950s the power station had become an electrical substation which was no longer shown in 1959 and subsequently became an electrical substation. In the late 1940s and early 1950s the buildings onsite are no longer shown suggesting the area may have been affected by bombing during World War 2. The site was subsequently developed to its current use as St Anne's Church in the 1970s or early 1980s.

A summary of risk classifications for the development PCL associated with the identified potential sources of contamination is given in Table 7.

Table 7 Summary of risk classifications for the development

Description	Classification
Contaminant sources and site sensitivity	
Environmental sensitivity	Low
Development sensitivity	High
Potential for contamination on site	Low to moderate
Potential for contamination from offsite sources	Moderate
Preliminary risk assessment	
Risk of harm to human health during construction	Low to very low
Risk of harm to human health after construction	Moderate
Risk of pollution to groundwater	Moderate
Risk of pollution to surface water	Negligible
Risk of damage to building materials and services	Low
Risk of harm to designated ecological receptors	Negligible
Risk of harm to planting in landscaped areas	Low

6.2 Scope of ground investigation

A ground investigation is proposed to further assess the contaminative status of the site and to enable detailed assessment of the PCL identified.

The site is currently occupied by St Anne's Church and hard landscaped areas. The ground investigation will be limited to some extent by the presence of the existing church building and associated foundations. Given these constraints it is likely to be necessary to use a modular limited access rig and all pits are likely to be hand dug. The objectives of the investigation will be to:

- confirm levels and thicknesses of the stratigraphy present at site;
- investigate the potential presence of contamination at the site;
- confirm ground gas concentrations and vapour;
- confirm groundwater levels within the RTD and obtain groundwater samples for laboratory analysis; and,
- undertake geotechnical soil sampling and testing.

The ground investigation will comprise the following:

- two cable percussion boreholes within the north west (outside the building) and south east (within the building) portion of the site;
- five trial pits located along the northern boundary of the site and to the south east corner;
- four shallow hand dug pits to provide information on shallow soils in the garden area in the north east corner of the site;
- chemical analysis of environmental soil samples for a range of contaminants to include metals, detailed quantified asbestos analysis (two stage by initial stereo-binocular/PLM and quantitative phase contrast microscopy assessment), speciated total petroleum hydrocarbons (TPHCWG method), MTBE, speciated PAH, BTEX, VOCs and SVOCs (including cresols), phenols, cyanide, PCBs, plus various other inorganic compounds;
- ground gas and vapour monitoring;
- in situ groundwater monitoring, including the assessment of non-aqueous phase liquids (NAPL) and groundwater testing (similar to the above), of controlled waters in the secondary aquifer (RTD); and
- waste classification and waste acceptance criteria testing.

The 11 proposed locations will give an overall sampling density of approximately 10m centres. Within the garden area, the sampling density is higher with approximately 3.5m centres.

The boreholes will extend to the upper surface of the London Clay and groundwater monitoring standpipes will be installed at both locations with response zones within the RTD. These locations will provide information on the groundwater conditions at the site and should identify if there has been any impact from the historical presence of the substation and works.

Both boreholes will have dual installation and will have ground gas monitoring wells screened within the Made Ground. A plan showing the proposed ground investigation locations as produced by CGL is provided as Figure 3.

6.3 Chemical analysis

6.3.1 Soil

The frequency of soil sampling will vary dependent on the ground conditions that will be encountered. It is anticipated that between two and three samples per

location, with at least one sample from each stratum encountered, will be submitted for laboratory analysis presented in Table 8. The samples will be selected based on visual or olfactory observations of potential contamination, results of PID screening and to ensure representative characterisation of the Made Ground, taking into consideration variability within the strata.

Samples from the underlying natural soils (where encountered), to the top of the London Clay, will also be submitted for analysis (but at a lower frequency), excluding Suite E2 (asbestos), unless there is suspicion that the soil may be reworked.

Table 8 Proposed chemical analysis of soils

Determinands
Soil analysis
Suite E1: General
Antimony, arsenic, beryllium, boron (water soluble), cadmium, chromium (total), copper, lead, mercury, nickel, selenium, vanadium, zinc, cyanide (total), sulphate (water soluble), pH, phenol, total organic carbon
Suite E2: Asbestos
Asbestos presence in accordance with HSG248 to 0.001% Asbestos identification and quantification in accordance with HSG248 to 0.001%
Suite E3: TPH CWG
Speciated total petroleum hydrocarbons (TPH) by GC-FID with aliphatic and aromatic class separation with criteria working group (CWG) banding, MTBE
Suite E4: PAH and BTEX
Polyaromatic hydrocarbons (PAH) (USEPA16) by GCMS Benzene, toluene, ethyl benzene, m,p-xylene and o-xylene
Suite E5: Soil samples VOC and SVOC
Volatile organic compounds (GC-MS US EPA Method 8260) Semi volatile organic compounds (GC-MS US EPA Method 8270) including 2-methylphenol, 3-methylphenol and 4-methylphenol
Suite E6: PCB
Polychlorinated biphenyls (PCB) (speciated WHO12)
Suite E7 – Soil samples hydrocarbon fuel identification
Total Petroleum Hydrocarbons, Diesel Range Organics, Petrol Range Organics, Mineral oils
Suite E10 – Soil samples speciated phenols
Speciated phenol
Suite I: Leachability in line with BS EN 12457 Part 2
Arsenic, barium, cadmium, chromium (total), copper, mercury, molybdenum, nickel, lead, antimony, selenium, zinc, phenol index, chloride, fluoride, sulphate, total dissolved solids, dissolved organic carbon

6.3.2 Groundwater

Two rounds of groundwater monitoring and sampling are proposed at weekly intervals, starting at least one week after installation of the standpipes.

Groundwater samples recovered from each round of monitoring will be analysed for the suite of determinands listed in Table 9, determined from the site history and potential contamination identified in this assessment.

Table 9 Proposed chemical analysis of groundwater

Groundwater analysis
Suite F1: General
pH, hardness, antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, zinc, vanadium, ammoniacal nitrogen, chloride, cyanide (total), total phenols, calcium, DOC, manganese
Suite F2: Speciated TPH
Speciated total petroleum hydrocarbons (TPH) by GC-FID with aliphatic and aromatic class separation with criteria working group (CWG) banding, MTBE
Suite F3: PAH and BTEX
Polycyclic aromatic hydrocarbons (PAH) (USEPA16) by GCMS Benzene, toluene, ethyl benzene, m,p-xylene, o-xylene
Suite F4: Water samples VOC and SVOC
Volatile Organic compounds (GC-MS US EPA Method 8260) Semi-Volatile Organic compounds (GC-MS US EPA Method 8270)

6.3.3 Ground gas

Six rounds of gas monitoring will be undertaken over a two-month period. One gas sample will be taken during each round of monitoring from the location with the highest gas concentration to validate the monitoring results. One ground gas sample, recovered from each round of monitoring, will be analysed for the determinands listed in Table 10 for Suite G1. If the results of analysis indicate VOC in soil or groundwater or elevated PID results are recorded in standpipes during gas monitoring, a separate soil vapour analysis suite (Suite G3) may be required.

Table 10 Ground gas analysis determinands

Gas analysis
Suite G1 - general
Carbon dioxide, hydrogen, methane, nitrogen oxygen, hydrogen sulphide
Suite G3 – soil vapour analysis
VOC analysis, TPH

6.4 Scope of assessment

The ground investigation will be carried out in accordance with the programme of works described above and the results will be used to inform a risk assessment. If the risk assessment identifies the need for remediation or further works, a written scheme of remediation measures or remediation strategy will be submitted for approval to LBC to meet the requirements of condition 12(b).

References

[1] Groundsure (2016) St Anne's Church, Laxton Place EnviroInsight and MapInsight reports, Ref. CGL01-3083559, June 2016;

[2] Arup (2017) 1 Triton Square, Contamination Desk Study and Risk Assessment Report, Commercial Element (excluding Longford Place), Issue 1, 30 November 2017.

[3] Landmark (2015) Envirocheck Report, Order No 76872908_1_1, Dec 2015;

[4] Arup (2018) 1 Triton Square, Contamination Desk Study and Programme of Investigation Longford Place report, Issue 1, January 2018 (submitted to and approved by LBC).

[5] Concept (2017) 1 Triton Square, Ground Investigation, Phase 1, Issue 3, June 2017.

[6] Concept (2017) 1 Triton Square, Ground Investigation, Phase 2, Issue 3, October 2017

[7] Laing Technology Group Limited (1995), Report on Site Investigation, Regents Place/Triton Square, London. April 1995, Project No. 94484, Volume 1.

[8] Environment Agency (2018), What's in my backyard website, accessed February 2018: http://maps.environment-agency.gov.uk/wiyby/wiybyController?ep=maptopics&lang=_e

[9] Rocque, J. (1981) *The A to Z of Georgian London*. London, London Topographical Society.

[10] Horwood, R. (1985) *The A to Z of Regency London*. London, London Topographical Society.

[11] Defra and Environment Agency (2004) CLR 11: Model Procedures for the management of land contamination.

[12] Grace's Guide to British Industrial History, accessed January 2018 https://www.gracesguide.co.uk/St._Pancras_Power_Station

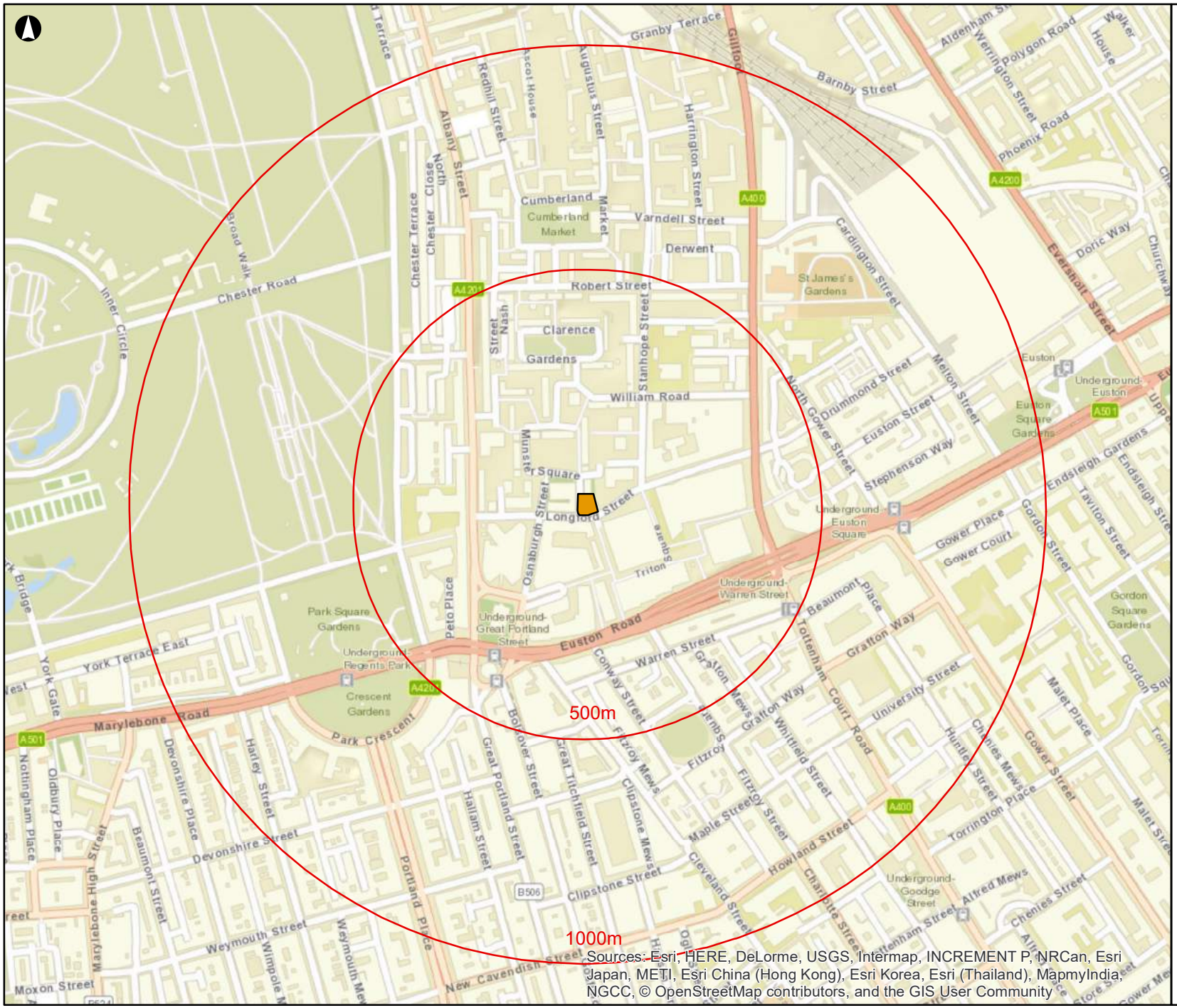
[13] A London Inheritance website: Regent's Park Power Station and the First Electric Lighting in Tottenham Court Road, accessed January 2018 http://alondoninheritance.com/tag/stanhope-street/

[14] CIRIA (2001), C552 Contaminated land assessment – A guide to good practice.

\\GLOBAL.ARUP.COM\LONDON\G_E\JOBS\240000\246868 -147 TRITON PROJECT MINT\60_OUTPUT\1_REPORTS\09 ST ANNES\REPORT\ST ANNE'S DESK STUDY AND PROGRAMME OF GI ISSUE1.DOCX

Figures

A4



Legend

St Anne's

Issue	Date	By	Chkd	Appd
F1	05-02-18	RC	TM	CB

Metres
0 145 290 580

ARUP

13 Fitzroy Street
London W1T 4BQ
Tel +44 20 7636 1531 Fax +44 20 7580 3924
www.arup.com

Client
British Land Ltd

Job Title
St Anne's Church

Site location plan

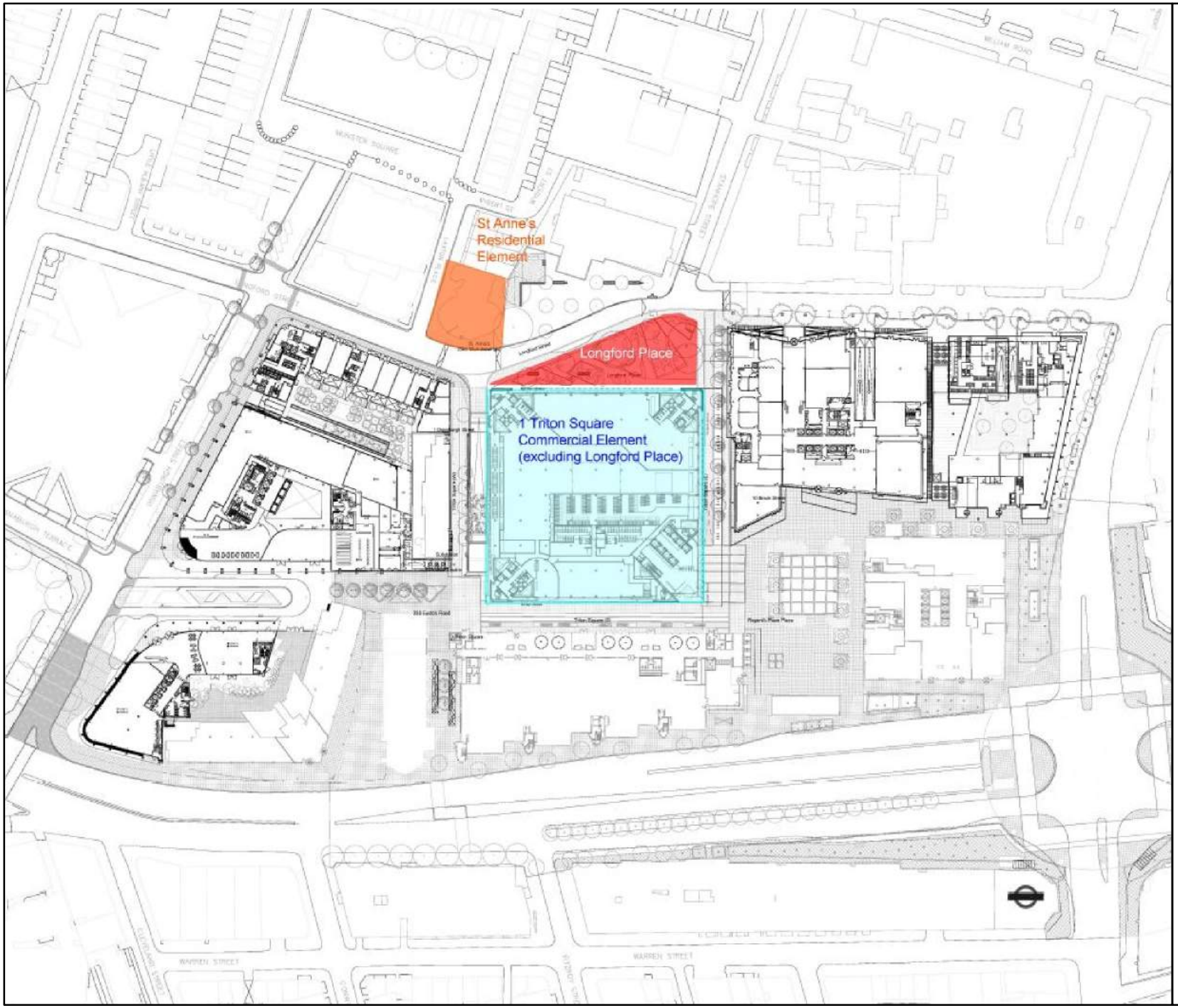
Scale at A4
1:12,000

Job No	Drawing Status
246868	**Final**

Figure	Issue
01	**F1**

MXD Location

A4



Issue	Date	By	Chkd	Appd
F1	05-02-18	RC	TM	CB

Metres
0 95 190 380

ARUP

13 Fitzroy Street
London W1T 4BQ
Tel +44 20 7636 1531 Fax +44 20 7580 3924
www.arup.com

Client
British Land Ltd

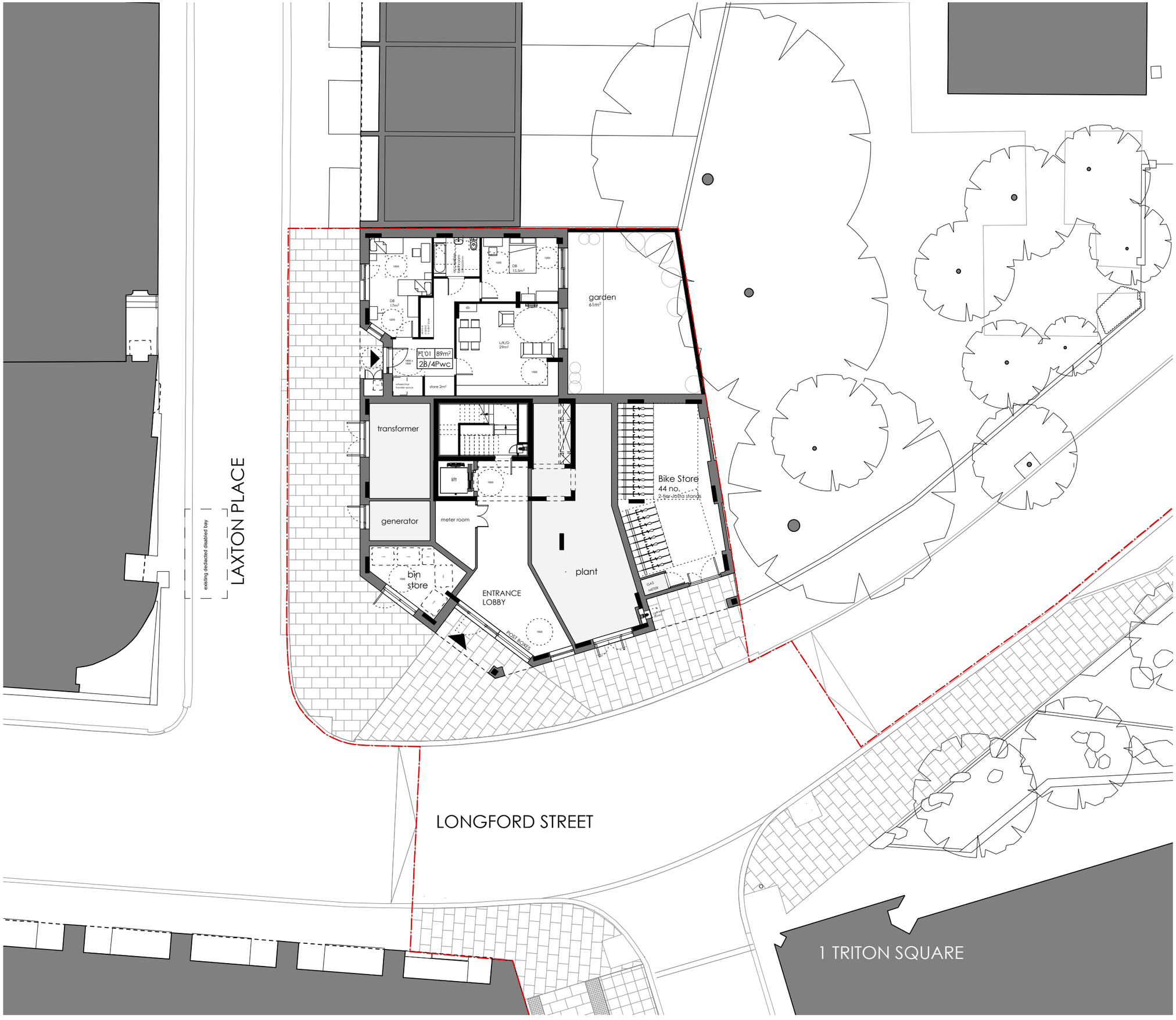
Job Title
St Anne's Church

Site layout plan

Job No	Drawing Status
246868	**Final**

Figure	Issue
02	**F1**

MXD Location



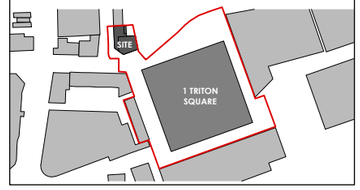
Notes:

1. do not scale from this drawing
2. survey indicative only
3. proposals are subject to utilities surveys
4. drawing to be read in conjunction with relevant consultant's information
5. drawing to be read in conjunction with relevant specifications

Site boundary

Revisions:

Key Plan (NTS)



MatthewLloyd**Architects** LLP

1b The Hangar
Perseverance Works
38 Kingsland Road
London E2 8DD

T 020 7613 1934

email: mail@matthewlloyd.co.uk
www.matthewlloyd.co.uk

Client:
British Land Property Management Limited

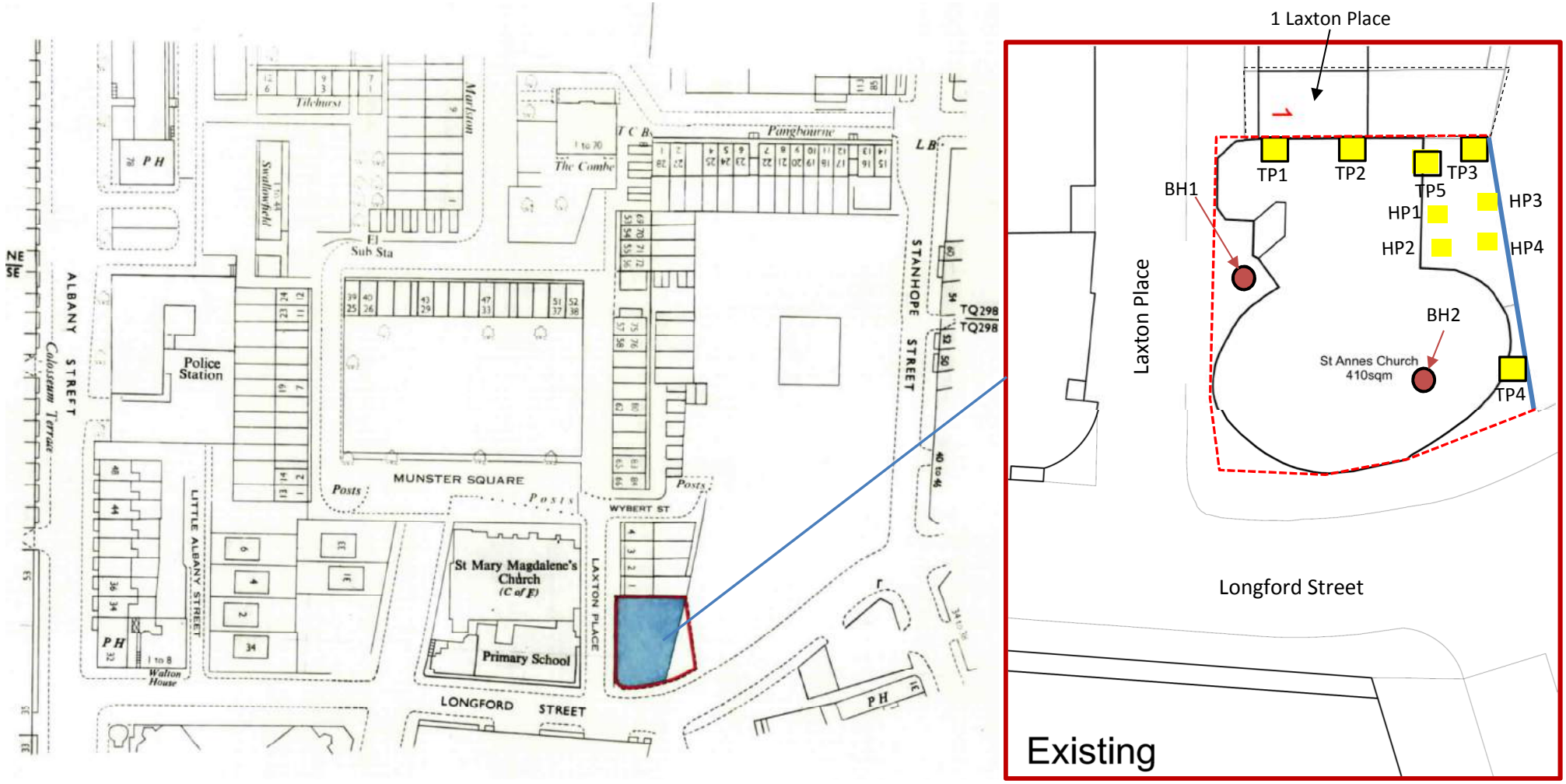
PLANNING

Date:	Scale:	Drawn by:
SEP 16	1:200@A3 / 1:100@A1	BM

Project:
1 Triton Square and St Anne's

Drawing title:
ST. ANNE'S
PROPOSED GROUND FLOOR PLAN

Reference:	Dwg. No:	Rev.
SA	Figure 3	-



Client	Project	Job No
CRE8 Structures LLP	**St Anne's Church, Laxton Place, London**	**CGL/09097**
CGL	Title **Borehole location plan**	**Figure 4**

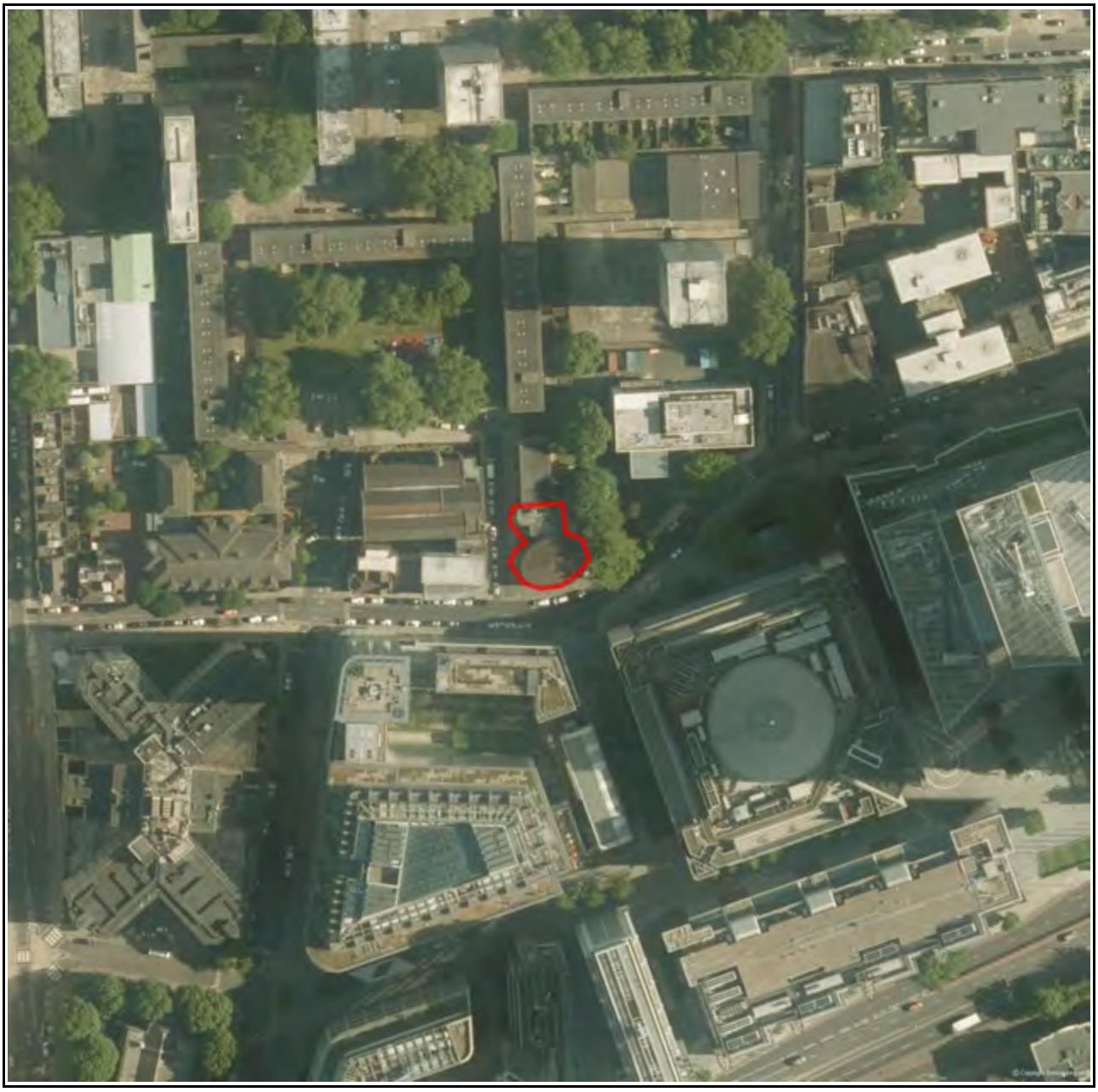
Appendix A

Groundsure report

Groundsure Enviro Insight

Address:	**ST. ANNES CHURCH, LAXTON PLACE, LONDON, NW1 3PT**
Date:	**22 Jun 2016**
Reference:	**CGL01-3083559**
Client:	**Card Geotechnics Ltd**

NW N NE



W E

SW S SE

Aerial Photograph Capture date:	04-May-2014
Grid Reference:	528988,182410
Site Size:	0.04ha

Report Reference: CGL01-3083559
Client Reference: PO3358

Contents Page

Overview of Findings

For further details on each dataset, please refer to each individual section in the main report as listed. Where the database has been searched a numerical result will be recorded. Where the database has not been searched '-' will be recorded.

Section 1: Historical Industrial Sites	On-site	0-50	51-250	251-500
1.1 Potentially Contaminative Uses identified from 1:10,000 scale mapping	0	0	21	53
1.2 Additional Information – Historical Tank Database	0	0	7	9
1.3 Additional Information – Historical Energy Features Database	2	4	15	29
1.4 Additional Information – Historical Petrol and Fuel Site Database	0	0	0	0
1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database	0	3	8	19
1.6 Potentially Infilled Land	0	0	0	4

Section 2: Environmental Permits, Incidents and Registers	On-site	0-50m	51-250	251-500
2.1 Industrial Sites Holding Environmental Permits and/or Authorisations				
2.1.1 Records of historic IPC Authorisations	0	0	0	0
2.1.2 Records of Part A(1) and IPPC Authorised Activities	0	0	0	0
2.1.3 Records of Red List Discharge Consents	0	0	0	0
2.1.4 Records of List 1 Dangerous Substances Inventory sites	0	0	0	0
2.1.5 Records of List 2 Dangerous Substances Inventory sites	0	0	0	0
2.1.6 Records of Part A(2) and Part B Activities and Enforcements	0	0	0	7
2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations	0	0	0	8
2.1.8 Records of Licensed Discharge Consents	0	0	0	2
2.1.9 Records of Water Industry Referrals	0	0	0	0
2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site	0	0	0	0
2.2 Records of COMAH and NIHHS sites	0	0	0	0
2.3 Environment Agency Recorded Pollution Incidents				
2.3.1 National Incidents Recording System, List 2	0	0	1	0
2.3.2 National Incidents Recording System, List 1	0	0	0	0
2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990	0	0	0	0

Section 3: Landfill and Other Waste Sites	On-site	0-50m	51-250	251-500	501-1000	1000-1500
3.1 Landfill Sites						
3.1.1 Environment Agency Registered Landfill Sites	0	0	0	0	0	Not searched
3.1.2 Environment Agency Historic Landfill Sites	0	0	0	0	0	0
3.1.3 BGS/DoE Landfill Site Survey	0	0	0	0	0	0
3.1.4 Records of Landfills in Local Authority and Historical Mapping Records	0	0	0	0	0	0
3.2 Landfill and Other Waste Sites Findings						
3.2.1 Operational and Non-Operational Waste Treatment, Transfer and Disposal Sites	0	0	0	0	Not searched	Not searched
3.2.2 Environment Agency Licensed Waste Sites	0	0	0	0	0	4

Section 4: Current Land Use	On-site	0-50m	51-250	251-500
4.1 Current Industrial Sites Data	0	1	21	Not searched
4.2 Records of Petrol and Fuel Sites	0	0	0	1
4.3 National Grid Underground Electricity Cables	0	0	0	0
4.4 National Grid Gas Transmission Pipelines	0	0	0	0

Section 5: Geology	
5.1 Are there any records of Artificial Ground and Made Ground present beneath the study site?	No
5.2 Are there any records of Superficial Ground and Drift Geology present beneath the study site?	Yes
5.3 For records of Bedrock and Solid Geology beneath the study site see the detailed findings section.	

Section 6: Hydrogeology and Hydrology	0-500m
6.1 Are there any records of Strata Classification in the Superficial Geology within 500m of the study site?	Yes
6.2 Are there any records of Strata Classification in the Bedrock Geology within 500m of the study site?	Yes

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
6.3 Groundwater Abstraction Licences (within 2000m of the study site)	0	0	0	0	10	43
6.4 Surface Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	6
6.5 Potable Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	2	13
6.6 Source Protection Zones (within 500m of the study site)	0	0	0	0	Not searched	Not searched
6.7 Source Protection Zones within Confined Aquifer	0	0	0	0	Not searched	Not searched
6.8 Groundwater Vulnerability and Soil Leaching Potential (within 500m of the study site)	1	0	0	0	Not searched	Not searched

	On-site	0-50m	51-250	251-500	501-1000	1000-1500

Section 6: Hydrogeology and Hydrology	0-500m					
6.9 Is there any Environment Agency information on river quality within 1500m of the study site?	No	No	No	No	No	No
6.10 Detailed River Network entries within 500m of the site	0	0	0	0	Not searched	Not searched
6.11 Surface water features within 250m of the study site	No	No	No	Not searched	Not searched	Not searched

Section 7: Flooding	
7.1 Are there any Enviroment Agency Zone 2 floodplains within 250m of the study site?	No
7.2 Are there any Environment Agency Zone 3 floodplains within 250m of the study site	No
7.3 What is the Risk of flooding from Rivers and the Sea (RoFRaS) rating for the study site?	Very Low
7.4 Are there any Flood Defences within 250m of the study site?	No
7.5 Are there any areas benefiting from Flood Defences within 250m of the study site?	No
7.6 Are there any areas used for Flood Storage within 250m of the study site?	No
7.7 What is the maximum BGS Groundwater Flooding susceptibility within 50m of the study site?	Potential at Surface
7.8 What is the BGS confidence rating for the Groundwater Flooding susceptibility areas?	Moderate

Section 8: Designated Environmentally Sensitive Sites	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.1 Records of Sites of Special Scientific Interest (SSSI)	0	0	0	0	0	0
8.2 Records of National Nature Reserves (NNR)	0	0	0	0	0	0
8.3 Records of Special Areas of Conservation (SAC)	0	0	0	0	0	0
8.4 Records of Special Protection Areas (SPA)	0	0	0	0	0	0
8.5 Records of Ramsar sites	0	0	0	0	0	0
8.6 Records of Ancient Woodlands	0	0	0	0	0	0
8.7 Records of Local Nature Reserves (LNR)	0	0	0	0	0	2
8.8 Records of World Heritage Sites	0	0	0	0	0	0
8.9 Records of Environmentally Sensitive Areas	0	0	0	0	0	0
8.10 Records of Areas of Outstanding Natural Beauty (AONB)	0	0	0	0	0	0

Section 8: Designated Environmentally Sensitive Sites	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.11 Records of National Parks	0	0	0	0	0	0
8.12 Records of Nitrate Sensitive Areas	0	0	0	0	0	0
8.13 Records of Nitrate Vulnerable Zones	0	0	0	0	0	0
8.14 Records of Green Belt land	0	0	0	0	0	0

Section 9: Natural Hazards

9.1 What is the maximum risk of natural ground subsidence?	Very Low
9.1.1 What is the maximum Shrink-Swell hazard rating identified on the study site?	Negligible
9.1.2 What is the maximum Landslides hazard rating identified on the study site?	Very Low
9.1.3 What is the maximum Soluble Rocks hazard rating identified on the study site?	Negligible
9.1.4 What is the maximum Compressible Ground hazard rating identified on the study site?	Negligible
9.1.5 What is the maximum Collapsible Rocks hazard rating identified on the study site?	Very Low
9.1.6 What is the maximum Running Sand hazard rating identified on the study site?	Very Low
9.2 Radon	
9.2.1 Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?	The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.
9.2.2 Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment?	No radon protective measures are necessary.

Section 10: Mining

10.1 Are there any coal mining areas within 75m of the study site?	No
10.2 Are there any Non-Coal Mining areas within 50m of the study site boundary?	No
10.3 Are there any brine affected areas within 75m of the study site?	No

Using this report

The following report is designed by Environmental Consultants for Environmental Professionals bringing together the most up-to-date market leading environmental data. This report is provided under and subject to the Terms & Conditions agreed between Groundsure and the Client. The document contains the following sections:

1. Historical Industrial Sites

Provides information on past land uses that may pose a risk to the study site in terms of potential contamination from activities or processes. Potentially Infilled Land features are also included. This search is conducted using radii of up to 500m.

2. Environmental Permits, Incidents and Registers

Provides information on Regulated Industrial Activities and Pollution Incidents as recorded by Regulatory Authorities, and sites determined as Contaminated Land. This search is conducted using radii up to 500m.

3. Landfills and Other Waste Sites

Provides information on landfills and other waste sites that may pose a risk to the study site. This search is conducted using radii up to 1500m.

4. Current Land Uses

Provides information on current land uses that may pose a risk to the study site in terms of potential contamination from activities or processes. These searches are conducted using radii of up to 500m. This includes information on potentially contaminative industrial sites, petrol stations and fuel sites as well as high pressure gas pipelines and underground electricity transmission lines.

5. Geology

Provides information on artificial and superficial deposits and bedrock beneath the study site.

6. Hydrogeology and Hydrology

Provides information on productive strata within the bedrock and superficial geological layers, abstraction licenses, Source Protection Zones (SPZs) and river quality. These searches are conducted using radii of up to 2000m.

7. Flooding

Provides information on river and coastal flooding, flood defences, flood storage areas and groundwater flood areas. This search is conducted using radii of up to 250m.

8. Designated Environmentally Sensitive Sites

Provides information on the Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar sites, Local Nature Reserves (LNR), Areas of Outstanding Natural Beauty (AONB), National Parks (NP), Environmentally Sensitive Areas, Nitrate Sensitive Areas, Nitrate Vulnerable Zones and World Heritage Sites and Scheduled Ancient Woodland. These searches are conducted using radii of up to 2000m.

9. Natural Hazards

Provides information on a range of natural hazards that may pose a risk to the study site. These factors include natural ground subsidence and radon..

10. Mining

Provides information on areas of coal and non-coal mining and brine affected areas.

11. Contacts

This section of the report provides contact points for statutory bodies and data providers that may be able to provide further information on issues raised within this report. Alternatively, Groundsure provide a free Technical Helpline (08444 159000) for further information and guidance.

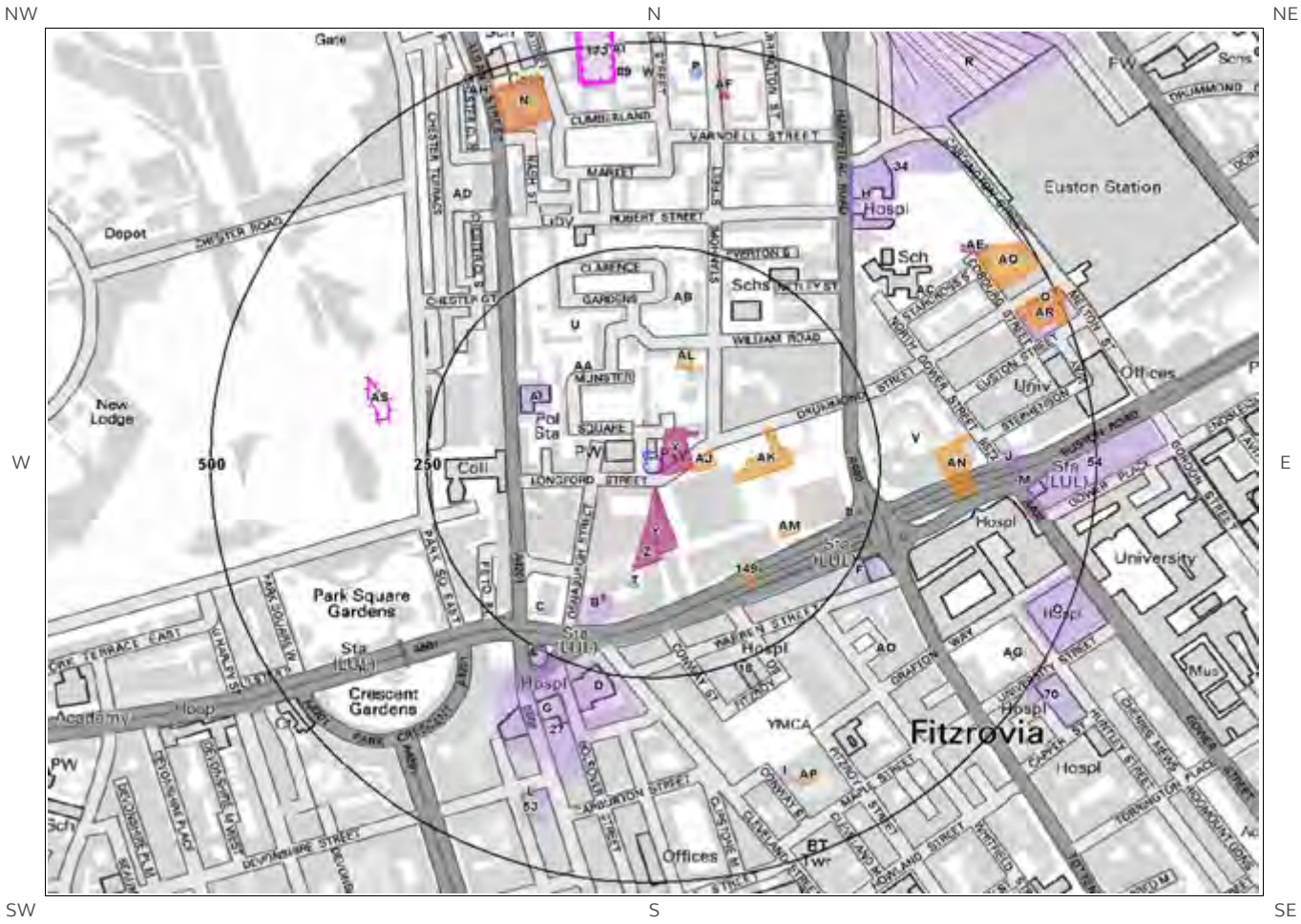
Note: Maps

Only certain features are placed on the maps within the report. All features represented on maps found within this search are given an identification number. This number identifies the feature on the mapping and correlates it to the additional information provided below. This identification number precedes all other information and takes the following format -Id: 1, Id: 2, etc. Where numerous features on the same map are in such close proximity that the numbers would obscure each other a letter identifier is used instead to represent the features. (e.g. Three features which overlap may be given the identifier “A” on the map and would be identified separately as features 1A, 3A, 10A on the data tables provided).

Where a feature is reported in the data tables to a distance greater than the map area, it is noted in the data table as “Not Shown”.

All distances given in this report are in Metres (m). Directions are given as compass headings such as N: North, E: East, NE: North East from the nearest point of the study site boundary.

1. Historical Land Use



Historical 1:10,000 and 1:10,560 scale mapping

Industrial Land Use

Potentially Infilled Land

Site Outline

Search Buffers (m)

250

500

Historical 1:2,500, 1:1,250 and 1:500 scale mapping

Energy Features

Petrol Stations

Tanks

Garages

1. Historical Industrial Sites

1.1 Potentially Contaminative Uses identified from 1:10,000 scale Mapping

The systematic analysis of data extracted from standard 1:10,560 and 1:10,000 scale historical maps provides the following information:

Records of sites with a potentially contaminative past land use within 500m of the search boundary: 74

ID	Distance [m]	Direction	Use	Date
1A	116	W	Police Station	1968
2A	116	W	Police Station	1989
3A	116	W	Police Station	1973
4B	158	S	Hospital	1894
5B	164	S	Hospital	1911
6C	201	SW	Unspecified Station	1920
7C	201	SW	Railway Station	1938
8	212	E	Electricity Railway Station	1920
9D	236	S	Hospital	1968
10D	236	S	Hospital	1973
11D	236	S	Hospital	1989
12E	242	SW	Unspecified Station	1948
13E	243	SW	Unspecified Station	1894
14E	245	SW	London Transport Station	1968
15E	245	SW	London Transport Station	1989
16E	245	SW	London Transport Station	1973
17E	245	SW	London Transport Station	1957
18	247	SE	Hospital	1989
19F	247	SE	Unspecified Station	1920
20F	247	SE	Unspecified Station	1938
21F	250	SE	Electricity Railway Station	1948
22E	252	SW	Unspecified Station	1882
23F	253	SE	London Transport Station	1968
24F	253	SE	London Transport Station	1973
25G	254	S	Hospital	1894
26F	261	SE	London Transport Station	1989
27	274	SW	Hospital	1911
28G	306	S	Hospital	1895
29H	350	NE	Hospital	1938
30H	350	NE	Hospital	1920
31H	357	NE	Hospital	1973
32H	357	NE	Hospital	1989
33H	357	NE	Hospital	1968
34	378	NE	Hospital	1894

35H	380	NE	Hospital	1911
36I	384	S	Hospital	1989
37I	384	S	Hospital	1973
38J	388	E	Unspecified Station	1948
39J	393	E	London Transport Station	1968
40J	393	E	London Transport Station	1973
41J	394	E	Unspecified Station	1894
42K	399	SW	London Transport Station	1989
43K	399	SW	London Transport Station	1968
44K	399	SW	London Transport Station	1973
45K	401	SW	London Transport Station	1957
46K	401	SW	Electricity Railway Station	1948
47L	403	S	Hospital	1895
48K	405	SW	Electricity Railway Station	1938
49K	405	SW	Unspecified Station	1920
50L	407	S	Hospital	1895
51M	409	E	Unspecified Station	1938
52M	409	E	Electricity Railway Station	1920
53	411	S	Hospital	1898
54	413	E	Unspecified Station	1882
55N	420	N	Garage	1948
56M	421	E	London Transport Station	1989
57N	422	N	Garage	1938
58N	422	N	Garage	1920
59O	439	SE	Hospital	1920
60O	439	SE	Hospital	1938
61O	444	E	Hospital	1948
62O	444	E	Hospital	1957
63AR	446	NE	Electricity Railway Station	1948
64	456	N	Basin	1911
65P	461	N	Unspecified Tank	1973
66P	461	N	Unspecified Tank	1989
67P	461	N	Unspecified Tank	1968
68Q	465	NE	Unspecified Station	1920
69Q	465	NE	Unspecified Station	1938
70	493	SE	Hospital	1973
71R	498	NE	Railway Sidings	1989
72R	498	NE	Railway Sidings	1973
73S	499	NE	Railway Sidings	1938
74S	499	NE	Railway Sidings	1920

1.2 Additional Information – Historical Tank Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical tanks within 500m of the search boundary: 16

ID	Distance (m)	Direction	Use	Date
75T	133	S	Unspecified Tank	1970
76T	133	S	Unspecified Tank	1982
77T	133	S	Unspecified Tank	1991
78T	133	S	Unspecified Tank	1968
79U	168	NW	Unspecified Tank	1968
80U	169	NW	Unspecified Tank	1990
81U	169	NW	Unspecified Tank	1991
82V	290	E	Unspecified Tank	1982
83V	290	E	Unspecified Tank	1991
84V	290	E	Unspecified Tank	1999
85W	455	N	Tanks	1896
86W	456	N	Tanks	1916
87P	457	N	Unspecified Tank	1969
88P	457	N	Unspecified Tank	1985
89	458	N	Tanks	1896
90P	458	N	Unspecified Tank	1970

1.3 Additional Information – Historical Energy Features Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical energy features within 500m of the search boundary: 50

ID	Distance (m)	Direction	Use	Date
91X	0	On Site	Electricity Substation	1951
92X	0	On Site	Electricity Substation	1952
93Y	15	S	Electricity Board Depot	1970
94Y	16	S	Electricity Board Depot	1968
95Y	22	S	Electricity Board Depot	1969
96Y	23	S	Electricity Board Depot	1982
97Z	84	S	Electricity Board Depot	1982
98Z	84	S	Electricity Board Depot	1991
99AA	120	NW	Electricity Substation	1968
100AA	121	NW	Electricity Substation	1970

101AA	121	NW	Electricity Substation	1991
102AA	121	NW	Electricity Substation	1990
103B	157	S	Electricity Substation	1970
104B	158	S	Electricity Substation	1982
105B	158	S	Electricity Substation	1991
106B	158	S	Electricity Substation	1993
107B	158	S	Electricity Substation	1968
108AB	183	N	Electricity Substation	1969
109AB	183	N	Electricity Substation	1985
110AB	184	N	Electricity Substation	1970
111AB	185	N	Electricity Substation	1991
112AC	363	NE	Electricity Substation	1985
113AC	363	NE	Electricity Substation	1969
114AC	363	NE	Electricity Substation	1991
115AC	363	NE	Electricity Substation	1970
116AD	372	NW	Electricity Substation	1968
117AD	373	NW	Electricity Substation	1970
118AD	373	NW	Electricity Substation	1991
119AD	373	NW	Electricity Substation	1990
120AE	428	NE	Electricity Substation	1952
121AE	428	NE	Electricity Substation	1952
122AF	436	N	Electricity Substation	1985
123AF	436	N	Electricity Substation	1969
124AF	438	N	Electricity Substation	1991
125AF	439	N	Electricity Substation	1970
126AG	461	SE	Electricity Substation	1982
127AG	461	SE	Electricity Substation	1970
128AG	462	SE	Electricity Substation	1969
129AG	463	SE	Electricity Substation	1951
130AG	464	SE	Electricity Substation	1952
131Q	475	NE	Electricity Substation	1952
132Q	475	NE	Electricity Substation	1952
133AH	476	NW	Electricity Substation	1968
134AH	477	NW	Electricity Substation	1970
135AH	477	NW	Electricity Substation	1991
136AH	477	NW	Electricity Substation	1990
137AI	486	N	Electricity Substation	1991
138AI	486	N	Electricity Substation	1990
139AI	486	N	Electricity Substation	1968
140AI	487	N	Electricity Substation	1970

1.4 Additional Information – Historical Petrol and Fuel Site Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical petrol stations and fuel sites within 500m of the search boundary: 0

Database searched and no data found.

1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical garage and motor vehicle repair sites within 500m of the search boundary: 30

ID	Distance (m)	Direction	Use	Date
141AJ	29	E	Garage	1991
142AJ	29	E	Garage	1982
143AJ	30	E	Garage	1985
144AK	81	E	Garage	1951
145AK	81	E	Garage	1952
146AK	93	E	Garage	1962
147AL	104	N	Garage	1952
148AL	104	N	Garage	1952
149	146	SE	Garage	1916
150AM	152	SE	Garage	1951
151AM	152	SE	Garage	1952
152AN	312	E	Garage	1951
153AN	312	E	Garage	1952
154AO	337	SE	Garage	1951
155AO	337	SE	Garage	1952
156AP	404	SE	Garages	1952
157AP	404	SE	Garage	1951
158N	419	N	Garage	1952
159N	420	N	Garage	1959
160N	420	N	Garage	1952
161N	422	N	Garage	1916
162AQ	438	NE	Garages	1952
163AQ	439	NE	Garages	1952
164AR	445	NE	Garage	1991
165AR	454	NE	Garage	1959
166AR	455	NE	Garage	1969
167AR	456	NE	Garage	1985
168AR	458	NE	Garage	1952
169AR	458	NE	Garage	1970
170AR	459	NE	Garage	1952

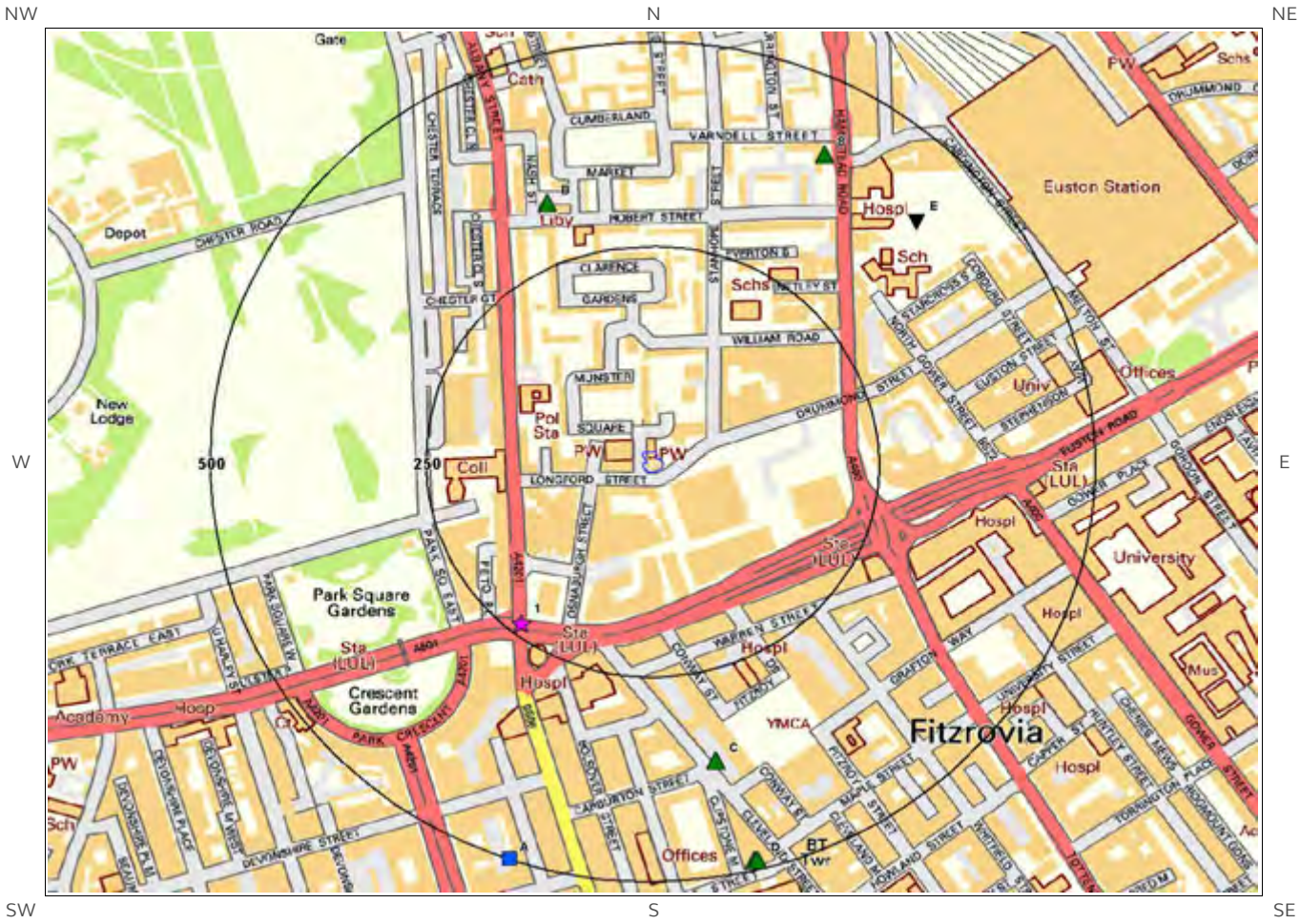
1.6 Potentially Infilled Land

Records of Potentially Infilled Features from 1:10,000 scale mapping within 500m of the study site: 4

The following Historical Potentially Infilled Features derived from the Historical Mapping information is provided by Groundsure:

ID	Distance(m)	Direction	Use	Date
171AS	298	W	Pond	1920
172AS	298	W	Pond	1938
173	453	N	Canal	1894
174	455	N	Canal	1948

2. Environmental Permits, Incidents and Registers Map



2. Environmental Permits, Incidents and Registers

2.1 Industrial Sites Holding Licences and/or Authorisations

Searches of information provided by the Environment Agency and Local Authorities reveal the following information:

2.1.1 Records of historic IPC Authorisations within 500m of the study site:

0

Database searched and no data found.

2.1.2 Records of Part A(1) and IPPC Authorised Activities within 500m of the study site:

0

Database searched and no data found.

2.1.3 Records of Red List Discharge Consents (potentially harmful discharges to controlled waters) within 500m of the study site:

0

Database searched and no data found.

2.1.4 Records of List 1 Dangerous Substances Inventory Sites within 500m of the study site:

0

Database searched and no data found.

2.1.5 Records of List 2 Dangerous Substance Inventory Sites within 500m of the study site:

0

Database searched and no data found.

2.1.6 Records of Part A(2) and Part B Activities and Enforcements within 500m of the study site:

7

The following Part A(2) and Part B Activities are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details	
4B	322	N	528873 182719	Address: The Fresh Collection Ltd, 104 Robert St, NW1 3QP Process: Dry Cleaning Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of Enforcement: No Enforcement Notified Comment: No Enforcement Notified
5B	322	N	528873 182719	Address: The Fresh Collection Ltd, 104 Robert St, NW1 3QP Process: Dry Cleaning Status: Current Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of Enforcement: No Enforcement Notified Comment: No Enforcement Notified
6C	361	S	529068 182038	Address: Fitzroy Cleaners, 90 Cleveland Street, W1T 6NL Process: Dry Cleaning Status: Current Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of Enforcement: No Enforcement Notified Comment: No Enforcement Notified
7C	361	S	529068 182038	Address: Fitzroy Cleaners, 90 Cleveland Street, W1T 6NL Process: Dry Cleaning Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of Enforcement: No Enforcement Notified Comment: No Enforcement Notified
8	410	NE	529194 182779	Address: BP Euston, 142 Hampstead Road, London, NW1 2PT Process: Unloading of Petrol into Storage at Service Stations Status: Revoked Permit Type: Part B	Enforcement: No Enforcement Notified Date of Enforcement: No Enforcement Notified Comment: No Enforcement Notified
9D	490	S	529117 181917	Address: Jet Filling Station, 30 Clipstone Street, London, W1W 5DQ Process: Unloading of Petrol into Storage at Service Stations Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of Enforcement: No Enforcement Notified Comment: No Enforcement Notified
10D	490	S	529113 181916	Address: BP Filling Station, Clipstone Street, London, W1P 7DH Process: Unloading of Petrol into Storage at Service Stations Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of Enforcement: No Enforcement Notified Comment: No Enforcement Notified

2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations:

8

The following RAS Licence (3 or 4) records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Address	Operator	Type	Permission Number	Dates	Status
19E	412	NE	529300 182700	Covidien Uk Commercial Ltd, Mallinckroot Radiopharmacy Services,university College Hospital,235 Euston Road, London, NW1 2BU	Covidien Uk Commercial Ltd	Keeping And Use Of Radioactive Materials (was Rsa60 Section 1).	CC5428	Date of Approval:8/12/2008 Effective from:8/12/2008 Last date of update:2015-01-01	Effective
20E	412	NE	529300 182700	University College London Hospitals Nhs Foundation Trust, University College Hospital, 235 Euston Road, London, NW1 2BU	University College London Hospitals Nhs Foundation Trust	Disposal Of Radioactive Waste (was Rsa60 Section 6).	BY8624	Date of Approval:24/1/2006 Effective from:21/2/2006 Last date of update:2015-01-01	Effective
21E	412	NE	529300 182700	University College London Hospitals Nhs Foundation Trust, University College Hospital, 235 Euston Road, London, NW1 2BU	University College London Hospitals Nhs Foundation Trust	Disposal Of Radioactive Waste (was Rsa60 Section 6).	BY8624	Date of Approval:14/7/2005 Effective from:14/7/2005 Last date of update:2015-01-01	Superseded By Variation
22E	412	NE	529300 182700	Covidien Uk Commercial Ltd, Mallinckroot Radiopharmacy Services, University College Hospital, 235 Euston Road, London, NW1 2BU	Covidien Uk Commercial Ltd	Disposal Of Radioactive Waste (was Rsa60 Section 6).	CC3883	Date of Approval:9/6/2008 Effective from:9/6/2008 Last date of update:2015-01-01	Effective
23E	412	NE	529300 182700	Tyco Healthcare (uk) Limited, Mallinckroot Radiopharmacy Services, University College Hospital, 235 Euston Road, London, NW1 2BU	Tyco Healthcare (uk) Limited	Disposal Of Radioactive Waste (was Rsa60 Section 6).	BZ4268	Date of Approval:4/10/2005 Effective from:4/10/2005 Last date of update:2015-01-01	Revoked/cancelled
24E	412	NE	529300 182700	University College London Hospitals Nhs Foundation Trust, University College Hospital,235 Euston Road, London, NW1 2BU	University College London Hospitals Nhs Foundation Trust	Keeping And Use Of Radioactive Materials (was Rsa60 Section 1).	BY8632	Date of Approval:14/7/2005 Effective from:14/7/2005 Last date of update:2015-01-01	Effective
25E	412	NE	529300 182700	Covidien Uk Commercial Ltd, Mallinckroot Radiopharmacy Services,university College Hospital,235 Euston Road, London, NW1 2BU	Covidien Uk Commercial Ltd	Keeping And Use Of Radioactive Materials (was Rsa60 Section 1).	CC5428	Date of Approval:9/6/2008 Effective from:9/6/2008 Last date of update:2015-01-01	Superseded By Variation

ID	Distance (m)	Direction	NGR	Address	Operator	Type	Permission Number	Dates	Status
26E	412	NE	529300 182700	Tyco Healthcare (uk) Limited, Mallinckroot Radiopharmacy Services,university College Hospital,235 Euston Road, London, NW1 2BU	Tyco Healthcare (uk) Limited	Keeping And Use Of Radioactive Materials (was Rsa60 Section 1).	BZ4276	Date of Approval:4/10/2005 Effective from:4/10/2005 Last date of update:2015-01-01	Revoked/cancelled

2.1.8 Records of Licensed Discharge Consents within 500m of the study site:

2

The following Licensed Discharge Consents records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details	
2A	499	S	528830 181920	Address: RIDGEFORD PROPERTIES LIMITED, 10 WEYMOUTH STREET, LONDON, ., ., W1W 5BX Effluent Type: TRADE DISCHARGES - COOLING WATER Permit Number: NPSWQD007488 Permit Version: 1	Receiving Water: Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 20/08/2009 Effective Date: 20-Aug-2009 Revocation Date: 06/02/2013
3A	499	S	528830 181920	Address: RIDGEFORD PROPERTIES LIMITED, 10 WEYMOUTH STREET, LONDON, ., ., W1W 5BX Effluent Type: TRADE DISCHARGES - COOLING WATER Permit Number: NPSWQD007488 Permit Version: 2	Receiving Water: Status: VARIED UNDER EPR 2010 Issue date: 07/02/2013 Effective Date: 07-Feb-2013 Revocation Date: -

2.1.9 Records of Water Industry Referrals (potentially harmful discharges to the public sewer) within 500m of the study site:

0

Database searched and no data found.

2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site:

0

Database searched and no data found.

2.2 Dangerous or Hazardous Sites

Records of COMAH & NIHHS sites within 500m of the study site: 0

Database searched and no data found.

2.3 Environment Agency Recorded Pollution Incidents

2.3.1 Records of National Incidents Recording System, List 2 within 500m of the study site:

1

The following NIRS List 2 records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details	
1	236	SW	528843 182208	Incident Date: 26-Apr-2003 Incident Identification: 154154 Pollutant: Oils and Fuel Pollutant Description: Petrol	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)

2.3.2 Records of National Incidents Recording System, List 1 within 500m of the study site:

0

Database searched and no data found.

2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990

How many records of sites determined as contaminated land under Section 78R of the Environmental Protection Act 1990 are there within 500m of the study site? 0

Database searched and no data found.