

TFL_PSF_9131 SITE INVESTIGATIONS: SMALL SITES INITIATIVE LAND AT BEECHWOOD AVENUE, BARNET, N3 3BB

Site Ref. 439

Preliminary Geotechnical and Geo-Environmental Report

NOVEMBER 2017

Incorporating

EC HARRIS
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Hyder

Land at Beechwood Avenue, Barnet, N3 3BB

PRELIMINARY GEOTECHNICAL AND GEO-ENVIRONMENTAL REPORT

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This report dated 06 November 2017 has been prepared for Transport for London (TfL) Transport for London (TfL) (the "Client") in accordance with the terms and conditions of appointment dated 02 May 2017 (the "Appointment") between the Client and **Arcadis Consulting (UK) Limited** ("Arcadis") for the purposes specified in the Appointment. For avoidance of doubt, no other person(s) may use or rely upon this report or its contents, and Arcadis accepts no responsibility for any such use or reliance thereon by any other third party.

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1 Introduction

1.1 Terms of Reference

Arcadis Consulting (UK) Limited (Arcadis) has been commissioned by Transport for London (TfL) 'the Client' to undertake a Geotechnical and Environmental desk study report and limited site investigation for the land at Beechwood Avenue, Barnet, London ('the Site').

TfL is aiming to divest a number of small Sites to enable positive regeneration. The objective of this review is to identify any potential abnormal development costs due to geotechnical and geo-environmental conditions on Site.

The objectives of this review are to:

- Review geo-environmental information regarding the Site and its surrounding area;
- Undertake a limited Site investigation to obtain preliminary information relating to ground conditions with limited testing to inform the assessment of contamination issues and foundation constraints;
- Provide outline information on potential geo-environmental and geotechnical constraints which may impact on the land value or redevelopment potential for the Site; and
- Identify potential development constraints due to geotechnical and geo-environmental conditions on Site.

The Site location is shown in Figure 1 below.

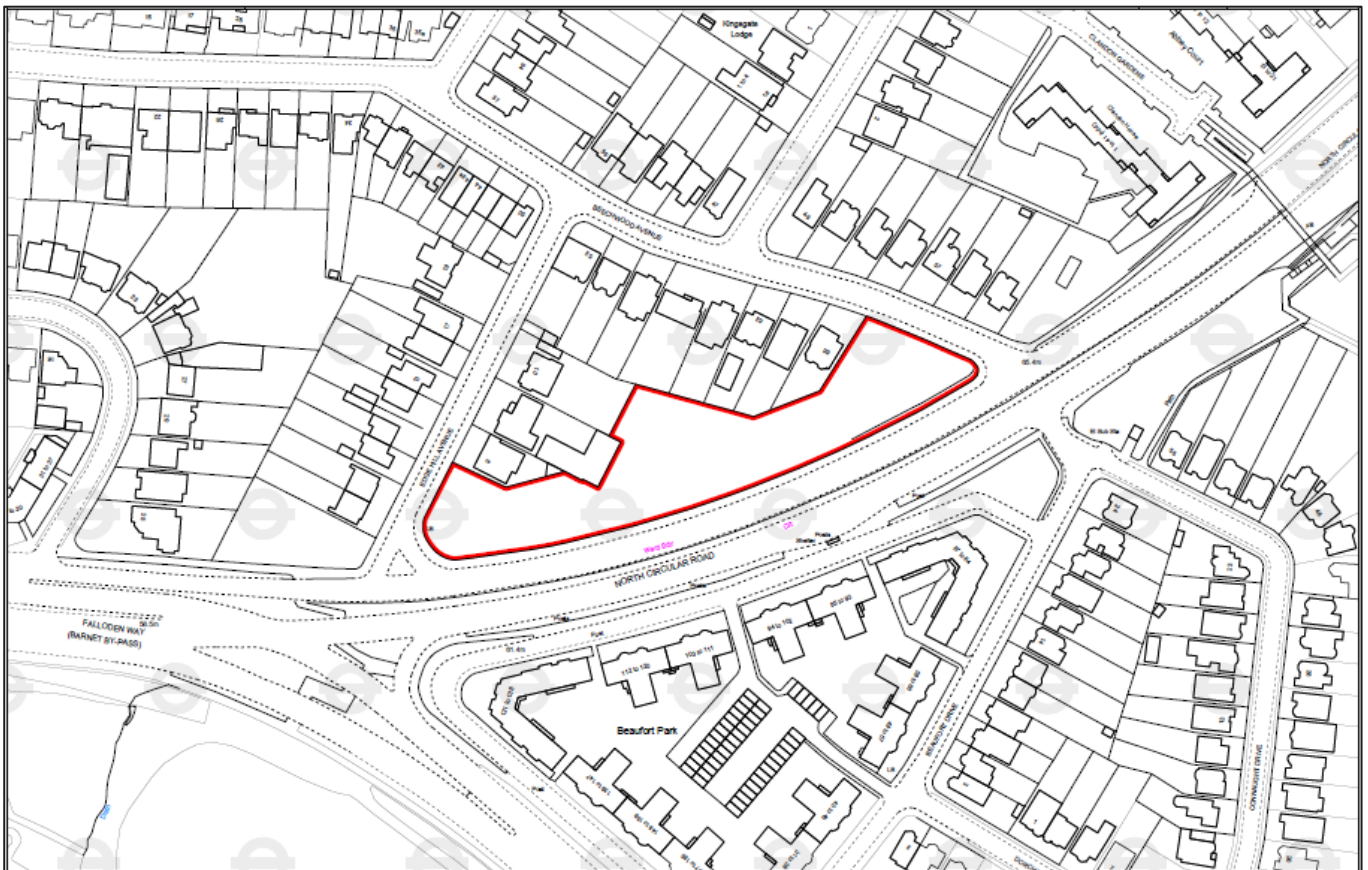


Figure 1: Site Location Plan provided by TfL

1.2 Sources of Information

As part of this report various sources of information have been used and are detailed below:

- The on-line British Geological Survey (BGS) 1:50 000 scale geological map comprising the Site (Ref. 1);
- Historical borehole records available through BGS website;
- Historical Ordnance Survey maps (included in Appendix A);
- Groundsure Environmental Data Reports (Appendix B);
- The Environment Agency (EA) What's in Your Backyard website (Ref. 2);
- The Bomb Sight Project <http://bombsight.org/>; and
- Zetica Regional Unexploded Ordnance (UXO) Map (Ref. 3) (Appendix C).

1.3 Limitations and Expectations

This report has been prepared for the Client in accordance with the terms and conditions of appointment. Arcadis cannot accept any responsibility for any use of or reliance on the contents of this report by any third party. The copyright of this document, including the electronic format shall remain the property of Arcadis.

This report has been compiled from a number of sources, which Arcadis believes to be trustworthy. However, Arcadis is unable to guarantee the accuracy of information provided by others. The report is based on information available at the time. Consequently, there is a potential for further information to become available, which may change this report's conclusion and for which Arcadis cannot be responsible.

Ground conditions can only be inferred between test locations and as such localised conditions on Site may vary. Furthermore, observations made at the time of investigations and during the monitoring visit may be subject to variation due to atmospheric, seasonal or other effects.

This report is based on a preliminary ground investigation and the purpose of which is to provide an initial indication of ground conditions and potential ground abnormalities and enable an assessment of contamination issues and foundation constraints. Further development-specific ground investigation and risk assessment will be required.

2 Site Setting and History

2.1 Site Location

Table 2.1 Details relating to Site Location

Site Location / Address	Land at Beechwood Avenue, Barnet, N3 3BB
National Grid Reference	525193,189457 Site
Approximate Site Area	The Site covers an area of approximately 0.58 hectares.
Description of Site	The Site is a vacant open space and covers an area of approximately 0.58 hectares. The Site overgrown with many trees and shrubs, notably within the east with a significant amount of fly-tipping particularly in the east of the site. There is wooden fencing and hedges on the southeast boundary (with some gaps noted along the eastern and south eastern boundaries) and a small wooden locked gate on western boundary. The access to the site is through the locked gate which was also blocked by overgrown vegetation.
Topography	Site is generally flat and level however, there is a slope along the south and west boundaries up to 4m high in the southwest corner. The surrounding area generally slopes down to the west.
Surrounding Area	<p>The Site is located in a suburban area dominantly by residential housing with local amenities such as schools, churches and shops near to the Site.</p> <p>The North Circular Road runs along the southern boundary of the Site with low-rise flats beyond.</p> <p>Beechwood Avenue and Edge Hills Avenue borders the Site to the east and the west.</p>

2.2 Site History

A review of the available historical Ordnance Survey maps (Appendix A) has been undertaken to assess the historical development of the Site and surrounding areas.

It is not the intention of this report to provide a full history, but to identify those past uses on and within the vicinity of the Site that could have resulted in contamination of the soils and/or waters. Significant changes to the land use of the Site and surrounding areas are summarised in Table 2.2 below.

Table 2.2 History of Site and Surrounding Area

Date	Historical Development (Site and Surrounding Area)
1863, 1864, 1896	The Site is undeveloped land with a stream, a brook (Mutton Brook) and pond approximately 90m west, 160m south and 200m northwest of the Site, respectively. Later a stream is noted 50m east of the Site.
1914, 1920	<p>No significant changes are noted on Site</p> <p>Residential areas had developed expanding to within approximately 150m northwest and 200m south of the Site.</p>

Date	Historical Development (Site and Surrounding Area)
1935 – 1936, 1939	Eight houses had developed within the Site with further houses north of the Site fronting onto Beechwood Avenue and Edge Hill Avenue. To the south, the North Circular Road (A406) had developed with some low-rise flats beginning to develop along Beaufort Drive approximately 80m south of the Site. The maps show the general expansion of residential properties within the surrounding, within Finchley.
1952, 1970, 1991	<p>No significant changes are noted within the Site. The 1970/1980 maps show some of the smaller outbuildings in the centre of the Site had been removed.</p> <p>Further low-rise flats had developed in Beaufort Part, south of the North Circular Road. A school and allotment gardens are present approximately 400m east of the Site.</p>
2002	The 2002 map shows the Site and surrounding area in its current day layout. Sometime between 1991 and 2002, the houses on-site were demolished. The surrounding area remained largely unchanged since 1991.

Historical land use recorded on-site and off-site was largely residential given the setting of the Site.

2.3 Unexploded Ordnance

With reference to the Zetica Regional Unexploded Bomb Risk of North London (Appendix C), the Site is designated as lying within an area denoted as “low” bomb risk area. The Bombsite website (Ref. 4) indicates that no bombs are recorded as having been dropped within the Site. However, the closest high explosive bombs are recorded having been dropped close to Tilling Bourne Gardens approximately 150m west and 200m northwest close to Beechwood Avenue (Ref. 4).

Therefore, based on the information provided by Zetica, the National Archives and historical OS mapping, the Site is unlikely to have been affected by Second World War bombing although the presence of UXO cannot be ruled out.

3 Physical and Environmental Setting

3.1 Published Geology, Hydrogeology and Hydrology

With reference to the sources of information detailed in Section 0, the following information has been obtained.

Table 3.1 Information regarding geology, hydrogeology and hydrology

Geology (Aquifer Status)	<p>Superficial Deposits: Superficial Deposits are not mapped within the Site however, the Lowestoft Formation- Diamicton (Secondary Aquifer – Undifferentiated) and Dollis Hill Gravel Member (Secondary A Aquifer) are mapped close to the northeastern boundary of the Site and therefore may be present within the Site.</p> <p>Solid Geology: London Clay Formation (Unproductive Strata).</p>
BGS Boreholes (within 100m of the Site)	There is one BGS borehole recorded (TQ28NE266) is mapped in the east of the Site, dated 1993 and reveals a 0.3m thick band of Topsoil, underlain by Made Ground to 0.7m bgl described as brown silty sandy clay with occasional traces of clinker and brick fragments. Stiff brown clay was encountered between 0.70m – 1.00m (possibly the highly weathered London Clay) becoming stiff extremely closely fissured brown / grey silty clay with occasional light grey veins silty clay with occasional roots, shells and selenite with strong light grey claystone noted near the base of the holes at 40m.
Within a Source Protection Zone	N/A
Licensed Groundwater Abstraction Points	None are recorded within 2km of the Site.
Surface Water Feature	Mutton Brook a tributary of the River Brent is located approximately 160m south of the Site. A further drain is noted approximately 125m southwest of the Site.
Likely Groundwater Flow Direction	Based on the proximity of the Site to the stream Mutton Brook, it is inferred that groundwater flow will be in a southerly direction towards the brook.

A preliminary ground investigation has been undertaken comprising 5 window sampling boreholes and the ground conditions encountered during these works are discussed in Section 5.2.

3.2 Environmental Public Registers

Public register information from available environmental datasets (Appendix B) for the Site and the surrounding area has been summarised in Table 3.2 below.

It is not the purpose of this section to provide a comprehensive account of the environmental data but only to detail those factors that are or could impact the Site.

Table 3.2. Environmental Data

Data type	Description	Distance (m) and Direction
Radon	The Site is not in a radon affected area, as less than 1% of properties are above the Action level.	N/A
Landfill sites	None identified within 1km of the Site	N/A

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Data type	Description	Distance (m) and Direction
Fuel Storage and Retail	Texaco at Co-op Golders Green (open) Total at Holly Park (closed) Temple Fortune Filling Station (Obsolete)	293m southwest 366m northwest 435m southwest
Local Authority Pollution Prevention and Controls	Four identified within 500m of the Site: Golders Green Service Station – Unloading of Petrol into Storage at Service Stations (Current permit) Total UK Limited, Holly Park Service Station – Petrol Vapour Recovery Process (Historical permit) Temple Fortune Filling Station – Petrol Vapour Recovery Process (Revoked) Aburami Ltd (Formerly Jacksons Dry Cleaners) – Dry Cleaning (Current permit)	289m southwest 362m northwest 439m southwest 492m southwest
Contemporary Trade Directory Entries	Six business are recorded within 250m: 2 electrical substations, 4 suppliers / industrial products	46m southeast and 243m west 89m northwest - 228m northeast

The Site and immediate surrounding area have been subject to demolition and redevelopment however, these have been largely limited to housing within the Site and off-site and the construction of the North Circular Road and housing. Made Ground is likely to be present within and immediately adjacent to the Site associated with these activities. This is discussed further in Section 4. The other features are not considered to be a contaminated land risk due to their distance and many are down hydraulic gradient from the Site.

4 Preliminary Conceptual Site Model

Geo-environmental assessments are required in accordance with current regulatory guidance to consider the significance of potential contamination in terms of plausible source-pathway-receptor contaminant linkages. As part of this process, it is necessary to develop a conceptual model of these potential contaminant linkages by identifying the potential contamination sources, sensitive receptors and any potential exposure pathways. A risk assessment is then undertaken to determine the likelihood and significance of these potential contaminant linkages.

4.1 Potential Contaminant Sources

Based on the information obtained from the existing data and information obtained from historical and environmental research and the Site walkover, there are a number of potential contaminative sources identified on and off site. These are detailed in Table 4.1 below.

It should be noted that it is considered unlikely that all these substances would be present at significant concentrations across the Site.

Table 4.1: Potential Sources of Contamination on Site

Source	Potential Contaminants
On Site	
Made Ground associated with demolition of residential properties.	Metals, polyaromatic hydrocarbons (PAH), total petroleum hydrocarbons (TPH), asbestos, ground gas and vapours.
London Clay	Sulphates (potential aggressive ground conditions for concrete)
Off Site	
Made Ground associated with developments adjacent to the Site	Metals, PAH, TPH, asbestos, ground gas and vapours

4.2 Potential Receptors

The proposed land use is currently unknown. Based on the Site's current setting and location, it has been assumed that residential properties with gardens or without gardens (such as low-rise flats) with limited areas of soft landscaping. However, as a precautionary approach, the residential end-use scenario with gardens, which is more conservative, has been used for this initial assessment.

4.2.1 Human Health

- Site Users (residents, visitors, maintenance workers and contractors).

Contamination risks to construction workers are not appraised by chronic (long term) exposure human health risk assessments. There are no appropriate published criteria applicable to assessment of potential risks to construction workers. The potential risks should be addressed by a Site-specific construction workers risk assessment and implementation of appropriate health and safety measures, to adequately mitigate any potential risks. All works should be conducted in accordance with the CDM Regulations (2015) or any other relevant guidance. Construction workers are not considered further in this assessment.

4.2.2 Controlled Waters

- Groundwater beneath the Site – Lowestoft Formation which is classified as Secondary (Undifferentiated) Aquifer and the Dollis Hill Gravel Member which is classified as Secondary A Aquifer, are mapped close to the Site and therefore may be present.

- Surface water features – Mutton Brook stream a tributary of the River Brent located approximately 160m south of the Site.
- The Site is not within 500m of a groundwater Source Protection Zone.

4.2.3 Buildings

- Underground /structures/services (water pipes, concrete, foundations).
- Proposed buildings.

4.3 Potential Pathways

Potential pathways are the routes that link the receptor to the contamination source. The potential pathways for this Site are summarised in Table 4.2.

Table 4.2: Potential Contaminant Pathways

Receptor	Description
Human Health (residents, visitors, maintenance workers and contractors)	<p>Accidental ingestion of contaminants within soil, water and dust</p> <p>Ingestion of contamination in home-grown produce</p> <p>Inhalation of dust, vapours and ground gases</p> <p>Dermal contact with contaminants within soil, water and dust</p>
Controlled Waters (Secondary (undifferentiated Aquifer and Secondary A Aquifers)	<p>Leaching of potential contaminants in soil or Made Ground into groundwater.</p> <p>Vertical migration of soluble contaminants through the unsaturated zone into groundwater (head deposits) beneath the Site.</p> <p>Surface run-off and lateral migration.</p>
Buildings	<p>Direct contact of building services or foundations with contaminants in the soil and Made Ground, including sulphate attack.</p> <p>Gas accumulation in confined and poorly ventilated spaces.</p> <p>Aerial deposition of windblown dusts / fibres from offsite sources.</p> <p>Sulphate attack on buried concrete</p>

4.4 Summary

Made Ground is likely to be present which could be a source of contamination including asbestos. Human exposure could occur in future gardens or soft landscaped areas, especially if soils are disturbed by activities such as digging / gardening. Ground gas / vapours could be generated by the Made Ground which could accumulate in confined spaces and pose risk to future site users.

Historical and current off-site potential sources have been limited given the largely residential setting although business are recorded within 250m of the Site, the impacts are not considered to be significant.

The Site is underlain by a Secondary (undifferentiated) Aquifer and groundwater may be perched within this material. The London Clay is a source of naturally occurring sulphates, which could impact buried concrete.

Near surface investigation comprising dynamic sampling completed by Arcadis to assess the chemical properties of the existing near surface soils and to characterise the underlying subsurface soils is discussed in the following sections.

5 Preliminary Ground Investigation

5.1 Scope and Rationale of Investigation

A preliminary ground investigation was undertaken on the 10th August 2017 to assess the shallow ground conditions at five locations across the Site. An exploratory hole location plan is included within Appendix D.

5.1.1 Rationale

The development of the preliminary CSM highlighted possible pollutant linkages with respect to the proposed future development. The ground investigation was designed to provide a better understanding of these potential pollutant linkages to facilitate a preliminary contamination and foundation assessment and to provide further recommendations, as necessary. The objectives of the investigation were therefore to:

- Characterise the Made Ground, Superficial Deposits (if present) and London Clay;
- Establish a preliminary understanding of the geo-environmental regime (soil only);
- Establish the preliminary groundwater conditions beneath the Site;
- Establish the preliminary soil borne gas regime;
- Preliminary waste classification based on the *Hazwaste Online* tool; and
- Identify the geotechnical properties of the natural soils.

It should be noted that as part of the preliminary nature of the investigation, testing comprised a general suite of contaminants which were used within the preliminary assessment. No Volatile Organic Compounds (VOCs) were tested as no olfactory evidence of contamination was noted during the works and, in addition, no asbestos quantification testing, leachates or groundwater testing was included.

5.1.2 Scope

The ground investigation comprised:

- 5No. windowless sampling boreholes placed to provide general coverage within the Site;
- Chemical testing – 12No. soil samples were tested for the following suite; arsenic, cadmium, chromium (total), chromium (vi), copper, lead, mercury, nickel, selenium, zinc, PAH (16 speciated), pH, sulphate (water soluble) and asbestos;
- 2No. soil samples were analysed for moisture content, 6No. for Atterberg limits and 4No. samples were tested for particle size distribution (wet sieve); and
- Gas and groundwater monitoring standpipes were installed into four of the boreholes upon completion with response zones targeting the Made Ground and one return monitoring visit for ground gas concentrations and groundwater level monitoring.

An exploratory hole location plan, exploratory hole logs, and chemical and geotechnical laboratory test results are presented within Appendix D.

5.2 Ground Conditions Encountered

The windowless sampled boreholes were spread approximately equally over the Site to provide even coverage; but were restricted due to the dense vegetation. It was necessary to clear vegetation along access paths under the supervision of a suitably qualified ecologist, prior to commencement. The sample location plan and logs are presented within Appendix D:

Made Ground

- Made Ground was encountered at all five locations from the surface to a maximum of 1.7m bgl, where proven. It ranged between a sandy gravel with demolition rubble, roots and wires, to a gravelly sand and as a sandy gravelly clay with anthropogenic inclusions of flint, brick and concrete. Occasional cobbles were noted.

- In WS101 a layer or possible relic Topsoil described as firm brown clay with occasional roots was encountered at the base of the Made Ground (1.7-2.5m). In WS104 a firm grey brown silty gravelly clay (possible reworked natural soils) was encountered from 1.5m to the base of the hole at 3.2m.
- In WS102, WS104 and WS105, the boreholes terminated at depths ranging between 1.2m (WS102) and 3.2m (WS104) within the Made Ground.

London Clay

- London Clay was encountered underlying the Made Ground in WS101 and WS103 at depths of 2.5m (WS101) and 3.0m (WS103) but was not proven beyond 3.2m (WS101) and 3.5m (WS103). In WS101 it is described as a firm brown and grey clay and in WS103 as a firm brown and grey thinly laminated clay with relict rootlets.
- No groundwater was encountered during excavation of the exploratory holes.
- No visual or olfactory evidence of contamination was encountered during the investigation.

5.3 Geotechnical Laboratory and Field Testing

5.3.1 Made Ground

The general geotechnical properties for the Made Ground are summarised below:

Table 5.3 Made Ground – Geotechnical Testing Summary

Parameter	Number of Tests	Values	Average	Assessment
Natural Moisture Content (%)	7	19-33		
Liquid Limit (%)	5	51-62	59	Clay of high plasticity Modified plasticity index of medium volume potential*
Plastic Limit (%)	5	24-30	27	
Plasticity Index (%)	5	25-36	32	
% passing 425µm sieve	5	60-97	88	
SPT N Values	10	10-24	15	Firm to stiff (firm) Locally dense (SPT>50) but considered to be associated with gravels/cobbles

*Based on average values

Five particle size distribution tests were undertaken on samples of the Made Ground (granular, cohesive, possible relict Topsoil and possible reworked natural material) which confirmed the Made Ground samples tested were predominantly cohesive generally described as slightly gravelly/sandy silt/clay (WS101 at 2-2.3m, WS104 at 0.5-0.7m & 1.7-2m, & WS105 at 0.6-0.8m) except in one sample which is described as very silty/clayey and sandy gravel (BH01 5-5.5m).

5.3.2 London Clay

The general geotechnical properties for the weathered London Clay are summarised below:

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Table 5.4 London Clay – Geotechnical Testing Summary

Parameter	Number of Tests	Values	Average	Assessment
Natural Moisture Content (%)	2	29-30	30	-
Liquid Limit (%)	2	61-67	64	Clay of high plasticity Modified plasticity index of medium volume potential*
Plastic Limit (%)	2	29-32	31	
Plasticity Index (%)	2	32-35	34	
% passing 425µm sieve	2	85-96	91	
SPT N Values	2	11-17	12	Firm to stiff (firm)

*Based on average values

One particle size distribution test was undertaken on two samples of the weathered London Clay and reveals the sample tested comprises slightly gravelly/sandy silt/clay (WS101 & WS103 both at 3-3.2m); this confirms the engineer's description.

6 Preliminary Qualitative Risk Assessment

6.1 Human Health Screening

The proposed use is not currently known and therefore, as a preliminary assessment, the chemical test results have been screened against the LQM / CIEH S4ULs (Ref. 6) for a residential with plant uptake scenario. This is considered to be suitably conservative and representative of, for example, residential housing with private gardens. Exceedances are summarised in Table 6.1.

Asbestos fragments or fibres were not visually identified during the investigation however, asbestos cement board debris (chrysotile) was detected by the laboratory in samples WS101 (0.80m bgl) and WS104 (1.30m bgl).

Table 6.1. Exceedances of the human health screening criteria in soils

Determinant	Location	Screening Criteria (mg/kg) Residential with plant uptake	Concentration (mg/kg)
Asbestos	WS101 0.80m bgl WS104 1.30m bgl	N/A	Chrysotile- Loose Fibrous Debris
Benzo(b)fluoranthene	WS101 0.80m bgl WS105 1.00m bgl	2.6	3.6 2.9
Benzo(a)pyrene	WS101 0.30m bgl WS101 0.80m bgl WS102 0.40m bgl WS105 1.00m bgl	2.2	2.6 3.2 2.8 2.6
Dibenz(a,h)anthracene	WS101 0.30m bgl WS101 0.80m bgl WS102 0.40m bgl WS105 1.00m bgl	0.24	0.26 0.37 0.25 0.29
Lead	WS103 2.00m bgl	220	310

Marginal exceedances were recorded for lead and PAHs within samples of the Made Ground and asbestos were also identified in two samples of the Made Ground.

Whilst the development proposals are unknown, it is likely that to facilitate the development the Made Ground or part of it will be removed. The source removal, the non-volatile nature of the contaminants will sever the potential pathway and, therefore, may mitigate the risk to future human health receptors where buildings or hardstanding is proposed. In areas of gardens or soft landscaping, a clean cover system may be required, although this is based on the limited testing available and further testing should be undertaken to confirm the most appropriate mitigation measures.

6.2 Soil Waste Assessment

The chemical results from the twelve Made Ground soil samples were screened using HazWaste Online software to determine whether excavated materials requiring off-site disposal would potentially be classified as hazardous or non-hazardous waste.

The concentration threshold for HP8: Corrosive was exceeded in WS105 1.4m bgl due to the high pH level (11.5) recorded for this sample. The source of the elevated pH is likely to be the concrete gravel and cobbles identified in WS105 from 1.2m to 1.5m bgl. Sample WS105 1.4m is therefore classified as **Hazardous**. Waste acceptance Criteria (WAC) testing should be undertaken of the material to be disposed of prior to removal off-site to inform the potential disposal options.

The List of Wastes Code used in the assessment for non-hazardous material is 17.06.04; soils and stones other than those mentioned in 17.05.03, whilst the code applicable for hazardous material is 17.05.03.

Asbestos was identified in WS101 0.8m and WS104 1.3m bgl. Asbestos quantification analysis has not been undertaken at this stage. For the waste to be classified as Hazardous with regard to asbestos, greater than 0.1% loose asbestos fibres would need to be identified. Therefore, until quantification has been undertaken, the samples have been classified as **potentially hazardous**. WAC testing and asbestos quantification analysis of the actual material to be disposed of should be undertaken prior to removal off-site to inform the potential disposal options.

The other 9 samples are classified as **non-hazardous** based on the determinants analysed. It is likely that arisings represented by these samples may be suitable for disposal as inert waste, subject to the results of Waste Acceptance Criteria (WAC) testing.

It should be noted that to secure disposal at a landfill site, a waste management facility may require testing of the actual material that is to be disposed of off-site prior to acceptance, and that there is no obligation on a landfill operator to accept the waste.

The developer has a statutory responsibility under the Duty of Care Regulations to abide by the Environmental Protection Act 1990 to ensure that contaminated soils and waste are disposed of off-site to a suitably licenced waste management facility in a safe and approved manner. To comply with the Duty of Care all wastes taken off-site must be handled by a registered waste carrier and be accompanied by a consignment note that describes the waste.

Any imported soil proposed for fill or landscaping should be suitable for its intended use (i.e. not present an environmental risk) and its condition validated as necessary.

The results of the HazWaste assessment are attached in Appendix D.

6.3 Ground Gas Assessment

One monitoring visit was carried out on the 1st September 2017 for monitoring standpipes installed in WS101, WS103, WS104 and WS105 (with response zones targeting the Made Ground and Made Ground/London Clay). The results are summarised below.

Table 6.2. Ground Gas and Groundwater Monitoring Results

Parameter	Unit	WS101	WS103	WS104	WS105
Gas flow rate	l/h	<0.1	<0.1	<0.1	<0.1
Methane (CH ₄)	% v/v	<0.1	<0.1	<0.1	<0.1
Carbon Dioxide (CO ₂)	% v/v	2.5	2.8	4.6	1.5
Oxygen (O ₂)	% v/v	18.6	18.1	16.7	19.0
Carbon Monoxide (CO)	ppm	<1	<1	<1	<1
Hydrogen Sulphide (H ₂ S)	ppm	<1	<1	<1	<1
Depth to groundwater	m bgl	DRY	DRY	DRY	DRY

Note: Ground gas concentrations monitored for a minimum of 90 seconds or until stabilised. Maximum readings are given for all parameters except oxygen for which the minimum value is shown.

The gas monitoring revealed concentrations of carbon dioxide to a maximum of 4.6 % v/v. Concentrations of methane, hydrogen sulphide and carbon monoxide were below detection limits, as were gas flow rates.

An initial assessment was carried out in accordance with CIRIA C665 (Ref. 7). This indicated that the highest gas concentration (carbon dioxide) of 4.6 % and maximum flow (taken as the detection limit of <0.1 l/hr; 0.1l/hr being used) result in a gas screening value (GSV) of 0.0046 l/hr for carbon dioxide, potentially placing the Site within 'Characteristic Gas Situation 1' (very low risk) based upon modified Wilson and Card methodology (Ref. 7) or Green in accordance with NHBC guidance (Ref. 8).

For preliminary assessment purposes and based on the development of private housing type buildings and CS1 classification, no specific gas protection measures would be required however, this will need to be confirmed as part of design specific investigation and monitoring.

6.4 Refined Conceptual Site Model

Exceedances of the screening values have been recorded in the soils tested including lead and PAHs, and asbestos-containing materials were identified in samples of the Made Ground. The following refined CSM has been prepared based on the available information.

Table 6.3 Refined Conceptual Site Model

Source	Pathway	Receptor
On-Site Made Ground, lead, PAH and asbestos	Accidental ingestion of contaminants within soil, water and dust	Human Health (residents, visitors, maintenance workers and contractors)
	Ingestion of contamination in home-grown produce	Human Health (residents)
	Inhalation of dust	Human Health (residents, visitors, maintenance workers and contractors)
	Dermal contact with contaminants within soil, water and dust	
	Leaching of PAH and metals from Made Ground	Secondary (undifferentiated) aquifer (Head Deposits)
	Direct contact of building services or foundations with contaminants in the soil and Made Ground.	Buildings
Sulphates in London Clay	Direct contact with sulphates leading to concrete degradation.	Buildings
Made Ground	Gas accumulation in confined and poorly ventilated spaces.	Buildings Human Health (residents, visitors, maintenance workers and contractors) Note – based on current data this may not be an issue but further gas monitoring will be required to confirm this.

7 Waste Management and Potential Development Constraints

7.1 Waste Management

Consideration should be given to disposal of waste soils / Made Ground generated by the development. Chemical testing of soils / Made Ground is likely to be required to inform a waste classification assessment and determine the potential disposal options. It should be noted that the waste contractor may require testing of the actual material to be disposed prior to acceptance, and that there is no obligation on a landfill operator to accept the waste.

Soils suspected of being contaminated should be segregated from soils which appear to be 'clean' and should not be used elsewhere on the Site as fill or landscaping unless they can be proven to be fit for purpose.

Imported topsoil for landscaped areas should be clean, fit for purpose and validated as necessary.

The preliminary waste assessment carried out indicates that some of the Made Ground may be classed as hazardous based on the presence of asbestos and elevated lead concentrations. The remainder of the Made Ground is classified as non-hazardous, and would likely be suitable for disposal as inert waste, subject to the results of Waste Acceptance Criteria (WAC) testing.

7.2 Potential Development Constraints

The Site is located on land between Edge Hill Avenue to the west and Beechwood Avenue to the east and North Circular Road to the south is the within a residential area with local amenities. The historical review reveals former uses of the Site has been limited to a single phase of residential development surrounded by largely residential properties. Off-site sources have been recorded (e.g. petrol filling stations, electricity substations) but these are not considered to be significant due to the distance from site. A preliminary ground investigation has been carried out and gross contamination was not encountered, although marginally elevated concentrations of some contaminants and asbestos were recorded associated with the Made Ground.

Subsurface obstructions (possible demolition rubble, potentially foundations and service) may be present within the Site associated with the former development.

From experience, the potential for remediation to be required should be limited given the Site has not previously been used for industrial or commercial use and the findings of the initial ground investigation information.

The following potential environmental and geotechnical conditions have been identified that will warrant further consideration and/or implementation:

- Removal of fly-tipped waste.
- Removal, protection, diversion or chasing and plugging of services at the boundary;
- Gross contamination is not anticipated however, provisions should be allowed for the potential for unforeseen contamination (this can be a planning requirement);
- Asbestos has been identified within two samples tested and further testing and assessment including quantification testing will be required;
- No gas protection measures are expected to be required, but this has been based on one return visit, therefore further monitoring and discussions with Building Control are recommended. If CS1 conditions are confirmed, no gas protection measures would be required;
- Sulphate resistant concrete is likely to be required and should be confirmed during a development-specific ground investigation;
- Contaminant resistant water supply pipes may be required due to contaminants in the ground;
- Provision of clean cover system in landscaped areas are likely to be required; and
- Design specific ground investigation and consultancy advice to support planning obligations will be required.

8 Geotechnical Considerations

Ground conditions encountered within the five exploratory holes reveal Made Ground to a maximum depth of to 3.0m although three of the holes terminated within the Made Ground at depths between 1.2m and 3.2m. The Made Ground is underlain by London Clay comprising firm to stiff brown and grey clay locally with occasional rootlets or thinly laminated. No groundwater strikes were encountered during the investigation. The proposals for the Site including structure layouts and loadings are unknown therefore the following has been provided for indicative purposes only.

Potential founding solutions will be dependent on the thickness of Made Ground and the geotechnical properties of the natural deposits. The Made Ground is generally considered unsuitable for foundations due to its variable composition and its potential for high total and differential settlement. Below ground structures and services associated with previous structures may be present and will require removal prior to redevelopment. Ground disturbance caused by the removal of historical structures may increase the thickness of Made Ground already present beneath the Site locally. At this stage, conventional shallow foundations may not be appropriate for the Site but this would depend on the thickness of the Made Ground and the underlying ground conditions. Deeper trench fill may be possible although the maximum practical extent of this type of foundation is in the region of 2-2.5m. In areas of deeper Made Ground, or where deeper soft / loose bands are recorded either piling or ground treatment e.g. vibro-stone columns should provide a suitable foundation solution. The advice of a specialist contractor should be sought to verify the suitability of the ground for treatment / piling.

Consideration will need to be given to the presence of existing trees that are removed, retained or the planting of future trees when considering the depths of the foundations (Ref. 8). In addition, the risks associated with the London Clay include high plasticity clay which are subject to shrinkage and swelling, sulphate attack and the potential for relict shear slip surfaces should be considered during the investigation / design.

Consultation with external stakeholders (e.g. highways) may be required during design and services which may require protection or diversion.

9 Conclusions and Recommendations

The Site is a vacant parcel of land currently overgrown with vegetation and trees with areas covered in fly tipped waste. The Site is located north of North Circular Road within a largely residential area. The site was undeveloped until the 1930s when approximately 8 houses developed on the Site. These were demolished sometime between the 1990s and 2002. The surrounding area had remained largely residential with some local amenities.

A preliminary Site investigation has been undertaken comprising five window sampling boreholes to investigate ground conditions and to provide an indication of the levels of contaminants in the Site.

9.1 Design Considerations

Potential risks to human health, controlled waters and the built environment have been identified from on-Site Made Ground. Gross contamination was not encountered during the preliminary ground investigation, however, concentrations of contaminants (lead, PAH and asbestos) were recorded within the Made Ground but these were only marginally elevated and the risks are likely to be mitigated during development or with coverage by buildings/hardstanding or a clean cover system where gardens or soft landscaping are proposed.

Further development-specific ground investigation will be required to confirm the requirements for (but not limited to):

- Confirm concrete design for sulphate resistance for foundations and services;
- Determine the extent and depth of buried obstructions within the Site;
- Further gas monitoring and assessment of the potential risk of ground gases to receptors, and to determine whether gas protection measures would be required for future development; and
- Consideration of shrinkage and swelling, trees, potential for relict shear slip surfaces and buried services may need to be considered during the design.

9.2 Construction Considerations

During construction, a watching brief should be undertaken to identify the presence of any unforeseen contamination. If contamination is encountered, all works should cease until the advice of a suitably qualified professional can be sought.

Construction / demolition workers should use appropriate PPE and follow the site-specific contractors risk assessment which should include risks to human health from potential contamination. Due to the historic phases of development and demolition (and identification of asbestos containing materials in the preliminary ground investigation) consideration should be given to the presence of asbestos within the Made Ground.

Good site management practices should be adopted during the construction phase such as covering stockpiles to minimise surface runoff/dust creation.

Material re-used on site would need to be assessed in terms of its chemical and geotechnical suitability for reuse as engineering or landscaping fill. If off-site disposal is required, a waste assessment for the Made Ground and shallow soil materials would need to be undertaken to determine whether they are classified as hazardous or non-hazardous waste. Based on a preliminary assessment, Made Ground associated with the structures in the west of the Site may be hazardous due to elevated lead concentrations, and other Made Ground material may be hazardous depending on the quantity of asbestos present.

10 References

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7. CIRIA C665. (2007) Assessing Risks Posed by Hazardous Ground Gases to Buildings
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APPENDIX A

Historical Maps

Site Details:

LAND AT BEECHWOOD
AVENUE, BARNET, N3 3BB

Client Ref: PO0067007-1
Report Ref: GS-3884791
Grid Ref: 525188, 189465

Map Name: County Series

Map date: 1863

Scale: 1:2,500

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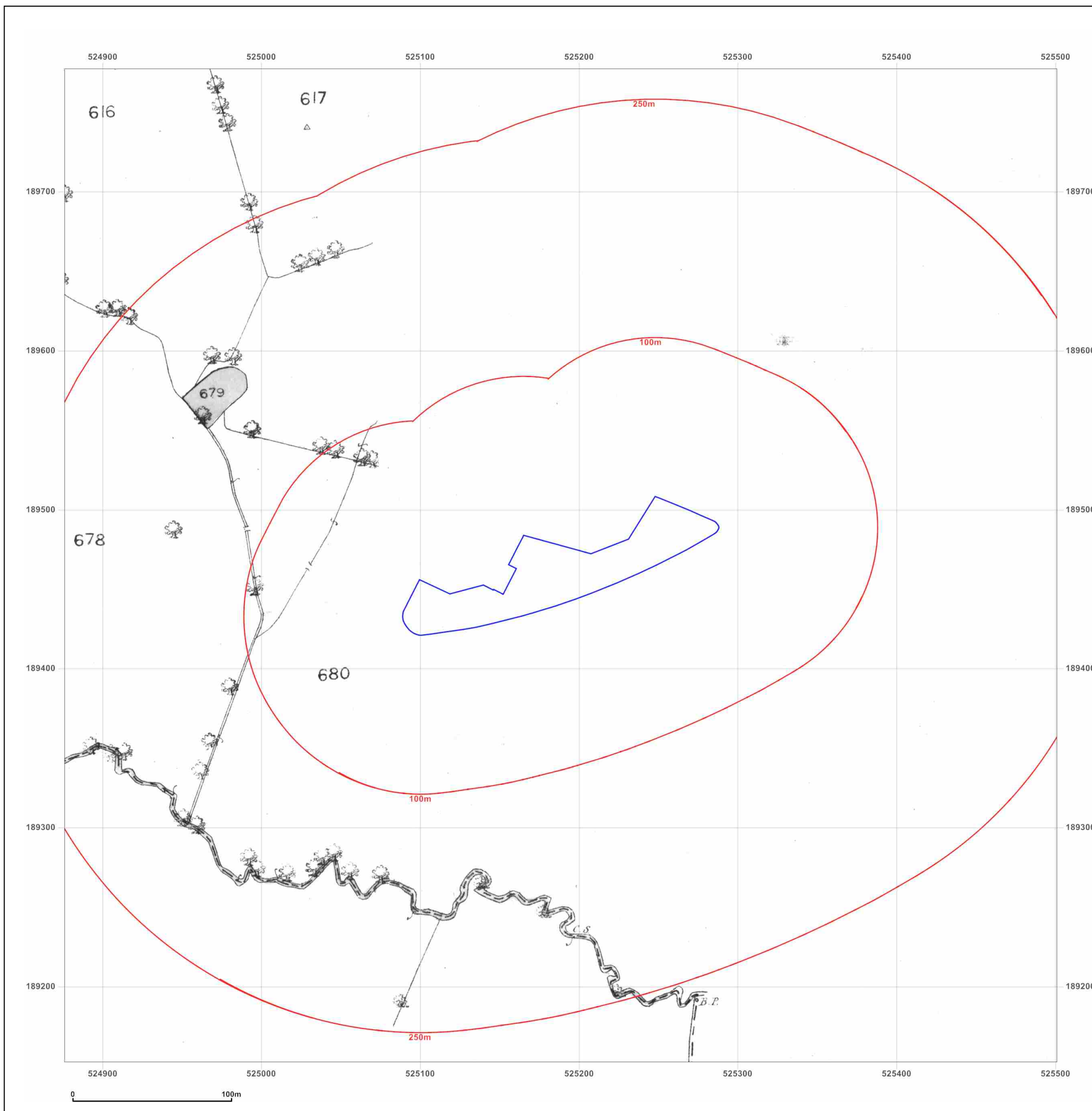


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Map Name: County Series

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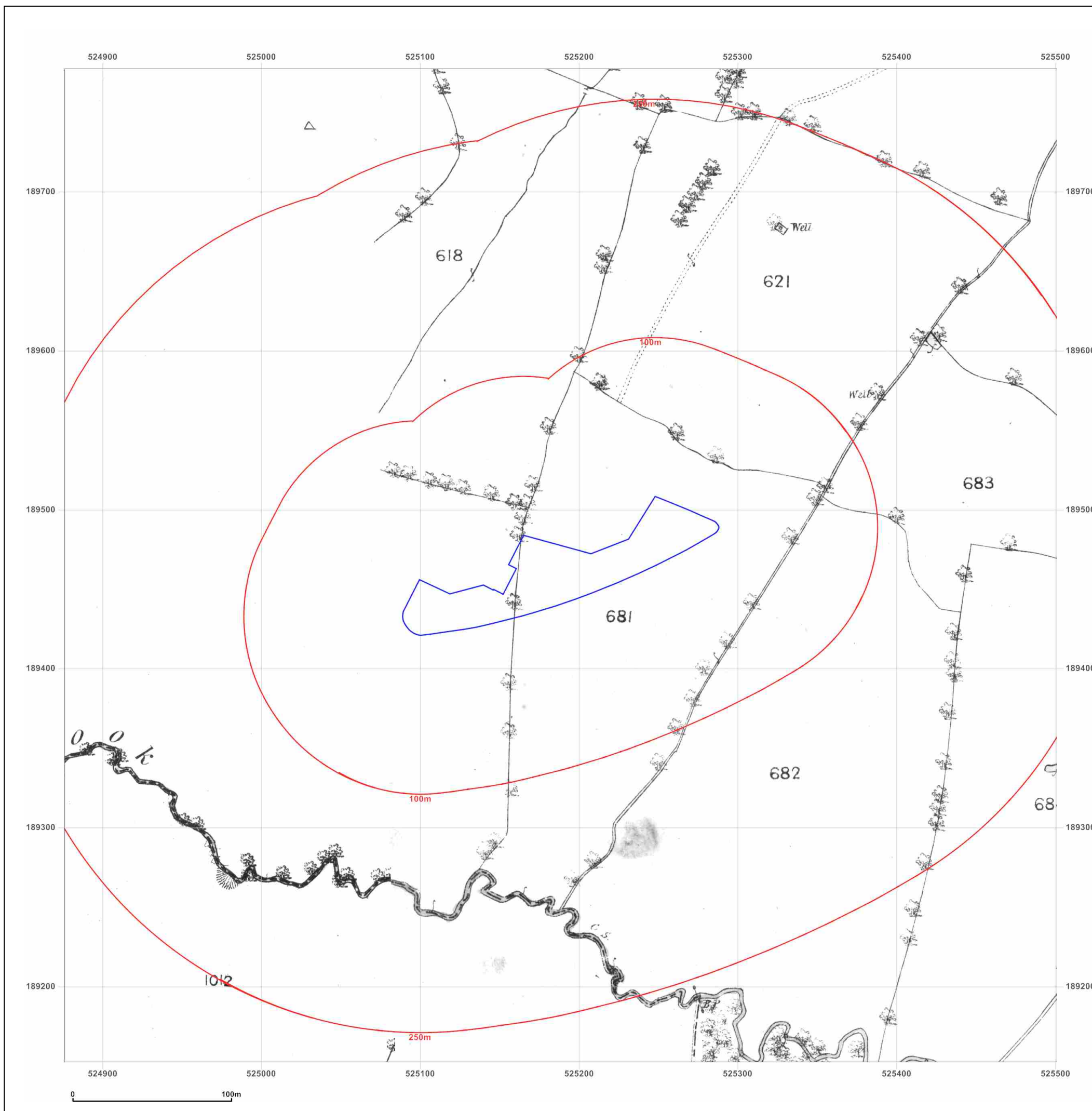


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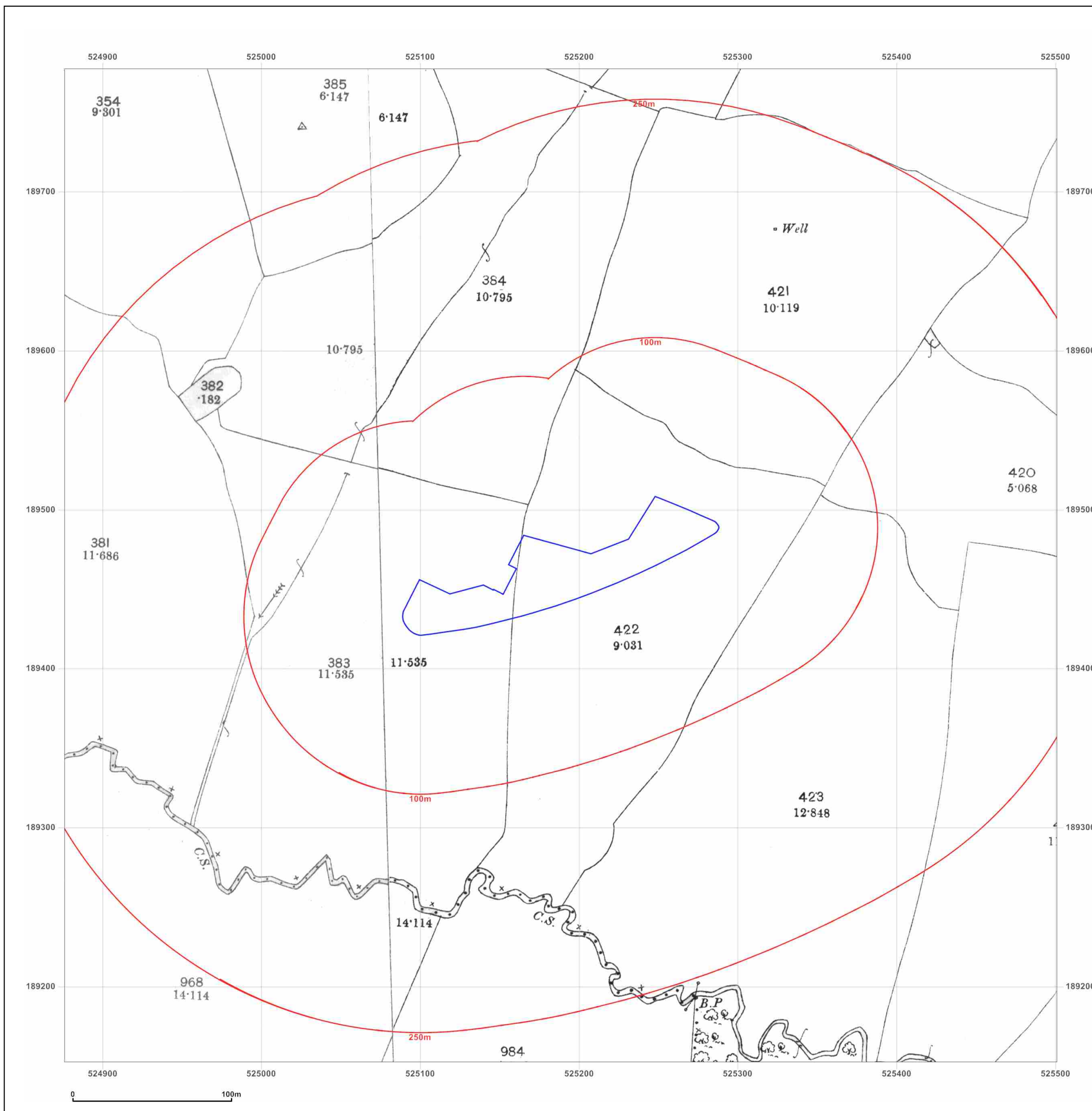


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Client Ref: PO0067007-1
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Map Name: County Series

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Map Name: County Series

Map date: 1935-1936

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Report Ref: GS-3884791
Grid Ref: 525188, 189465

Map Name: National Grid

Map date: 1952

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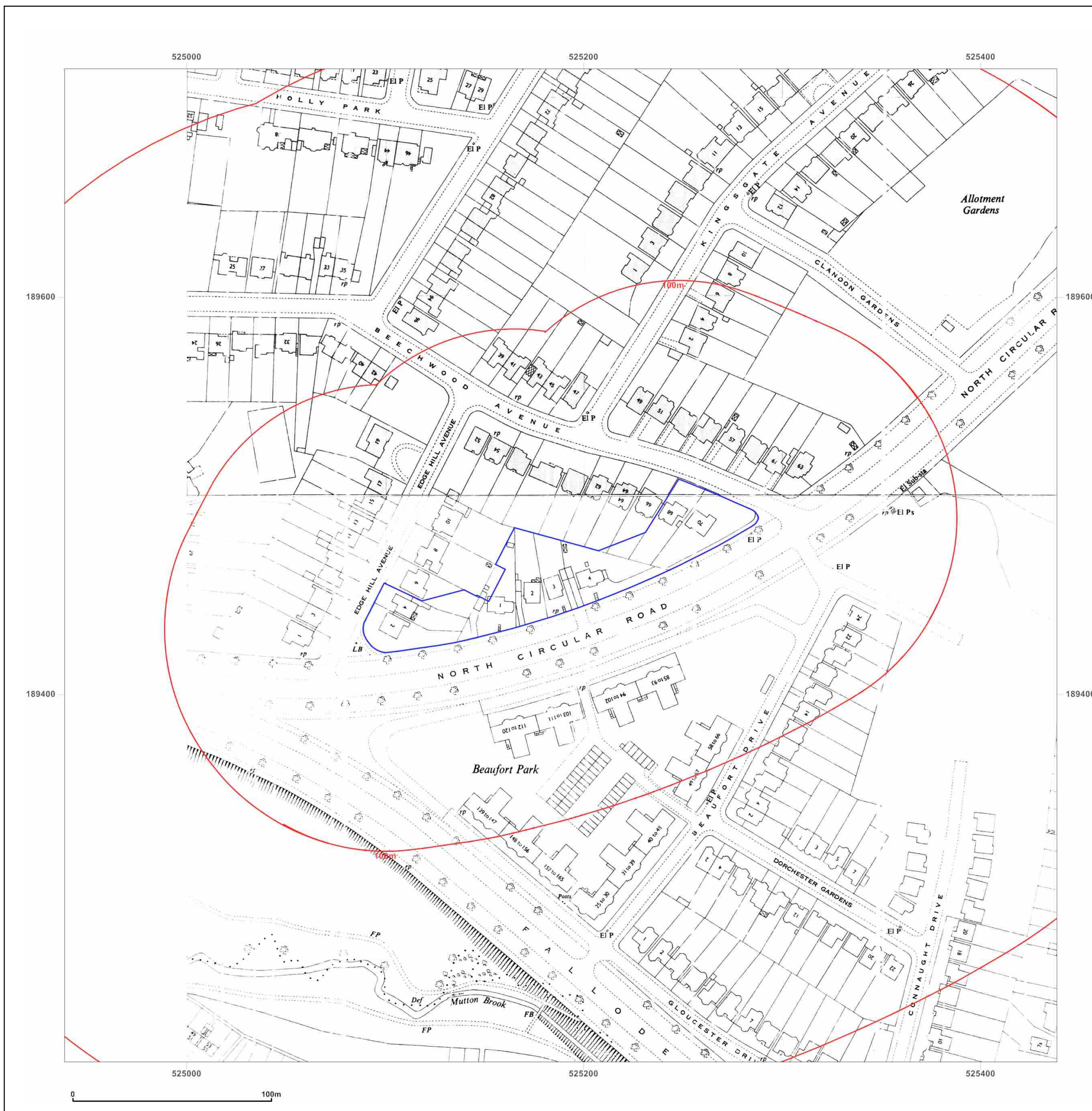


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Grid Ref: 525188, 189465

Map Name: National Grid

Map date: 1951-1953

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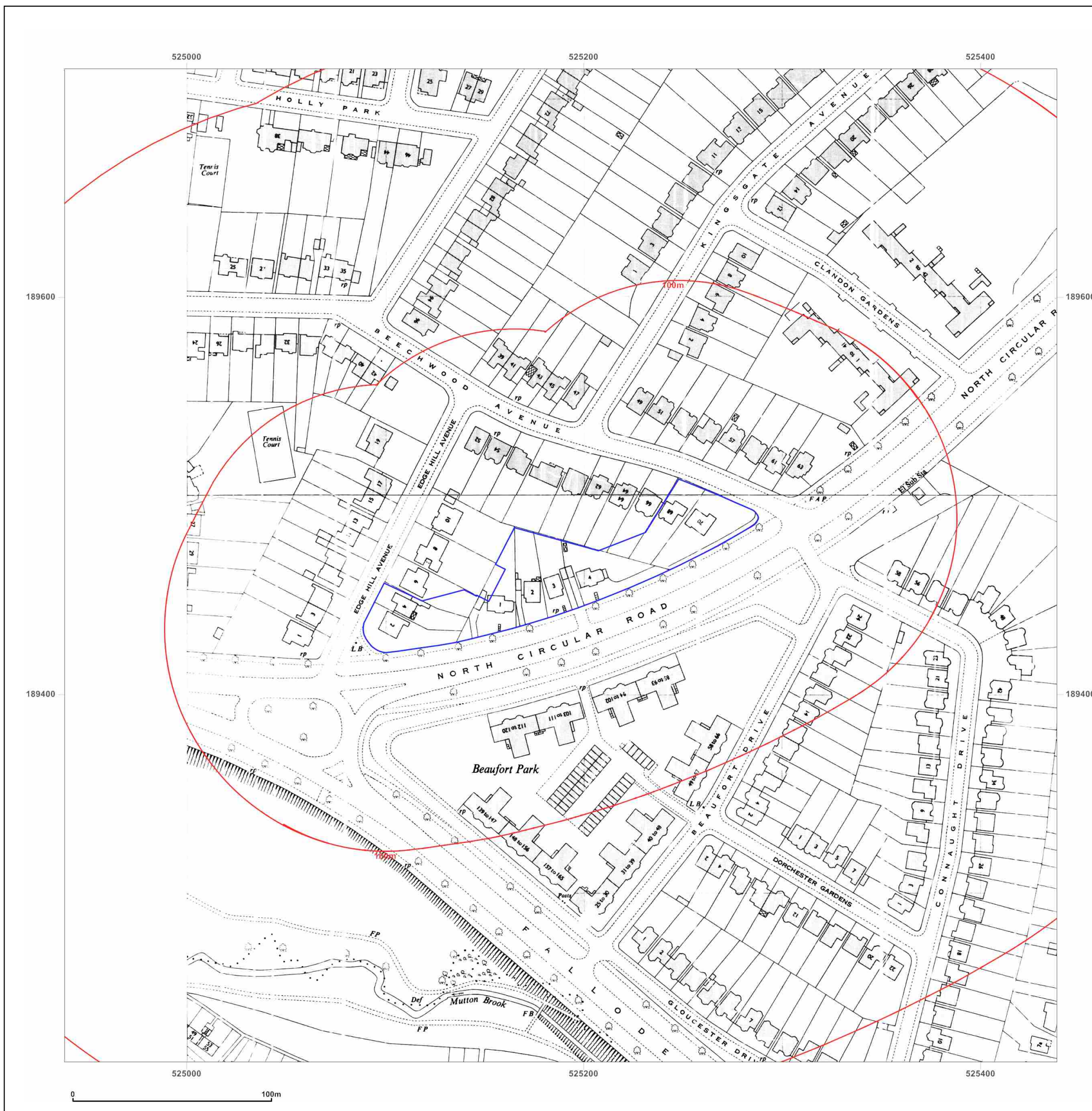


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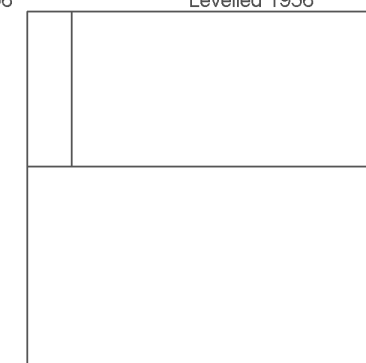
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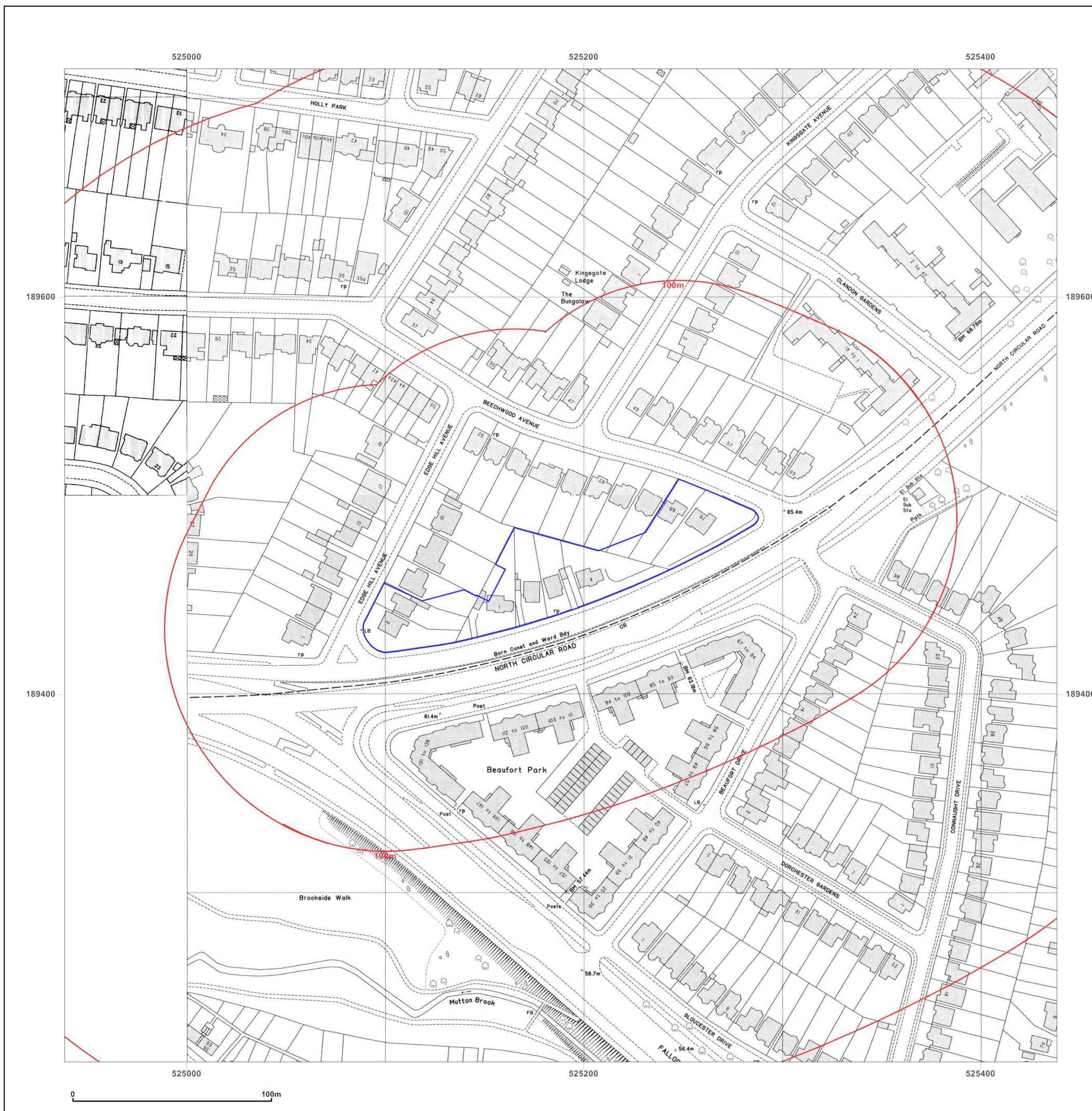


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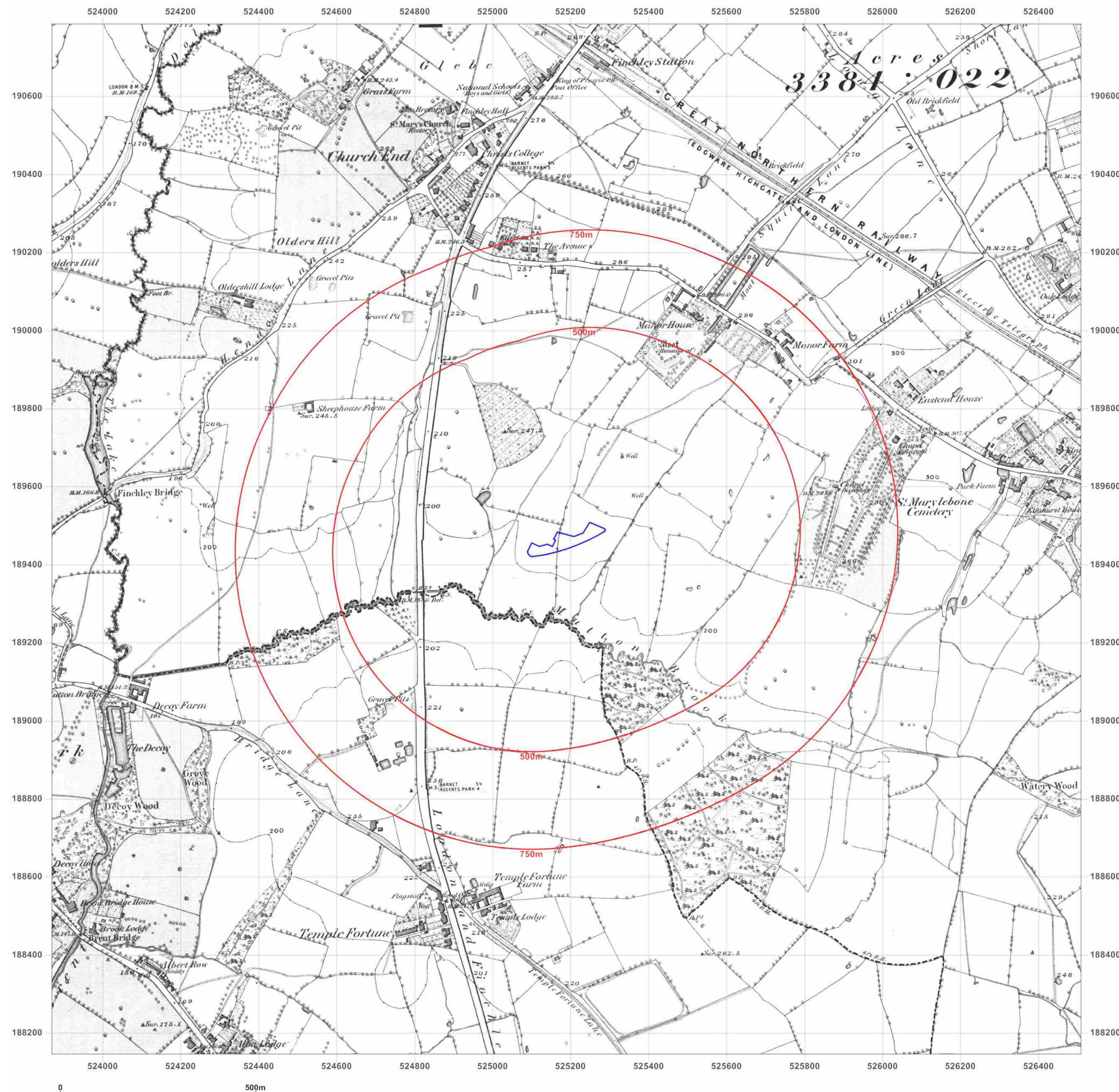


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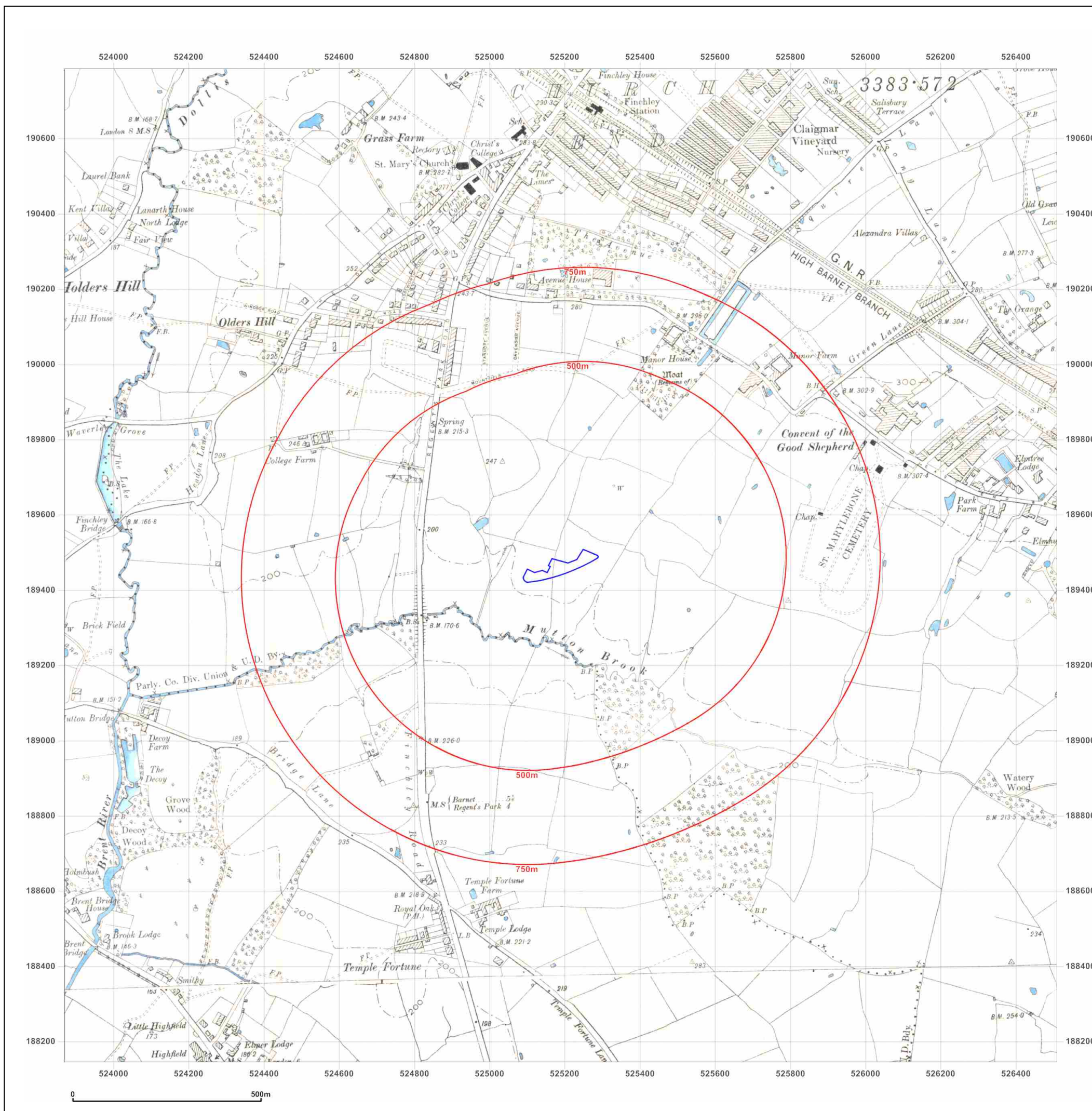


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Report Ref: GS-3884791
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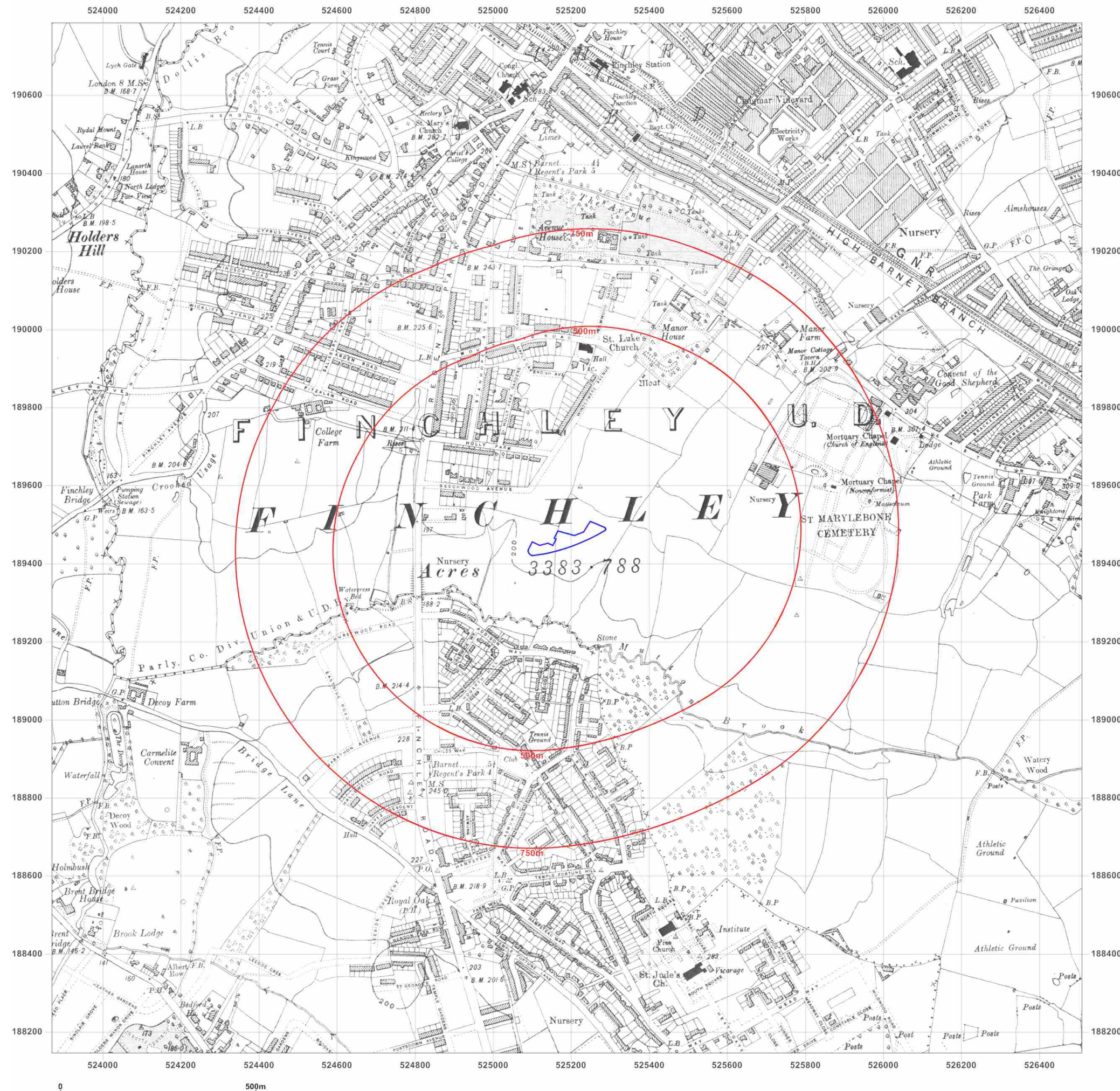


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Grid Ref: 525188, 189465

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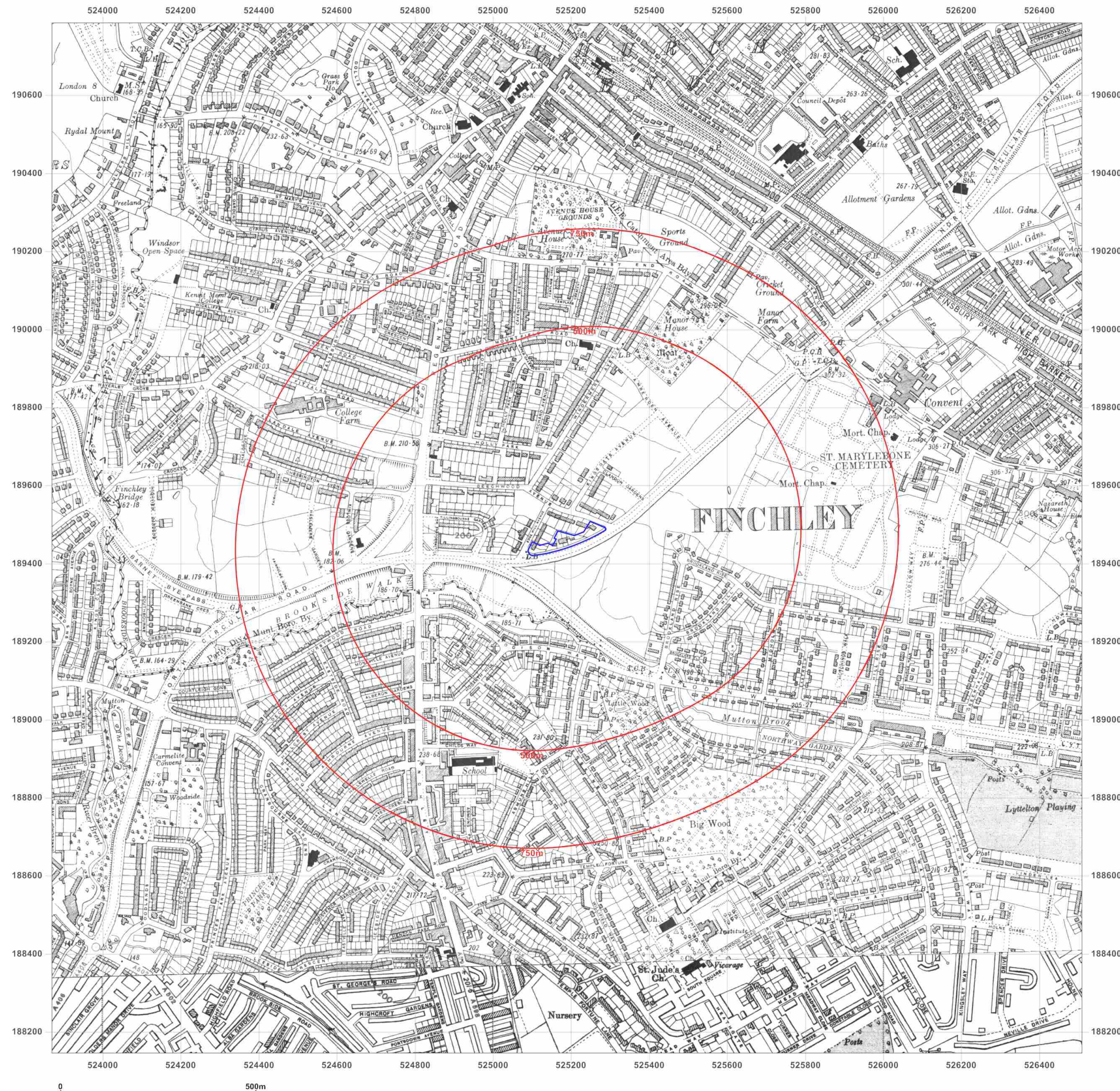


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Map Name: County Series

Map date: 1938

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1865
Revised 1938
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Client Ref: PO0067007-1
Report Ref: GS-3884791
Grid Ref: 525188, 189465

Map Name: County Series

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Client Ref: PO0067007-1
Report Ref: GS-3884791
Grid Ref: 525188, 189465

Map Name: Provisional

Map date: 1951

Scale: 1:10,560

Printed at: 1:10,560



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Revised 1950
Edition 1951
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Surveyed N/A
Revised 1951
Edition 1951
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Surveyed 1940
Revised 1949
Edition N/A
Copyright 1951
Levelled 1935

Surveyed N/A
Revised 1949
Edition 1951
Copyright N/A
Levelled N/A

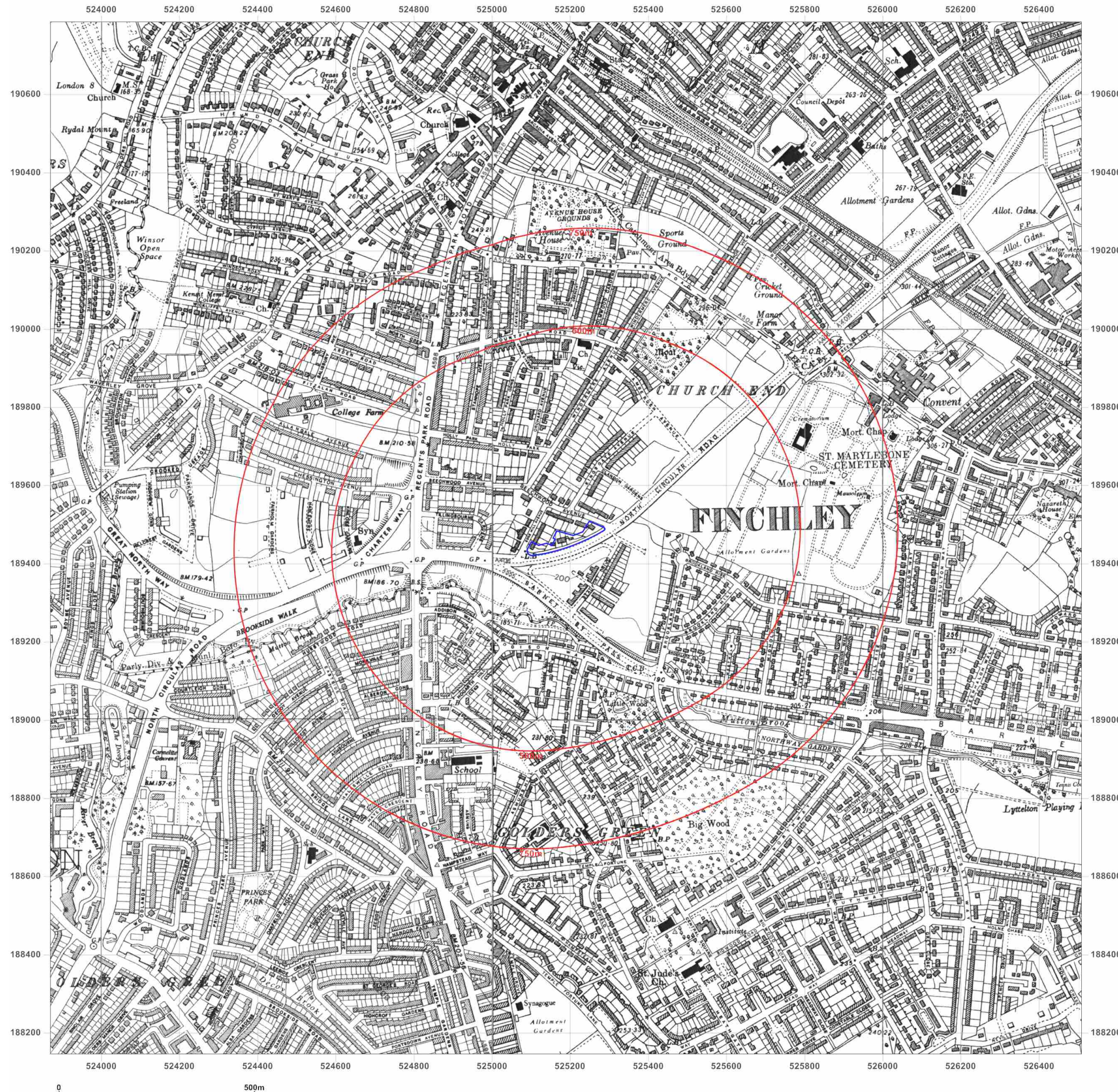


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Client Ref: PO0067007-1
Report Ref: GS-3884791
Grid Ref: 525188, 189465

Map Name: Provisional

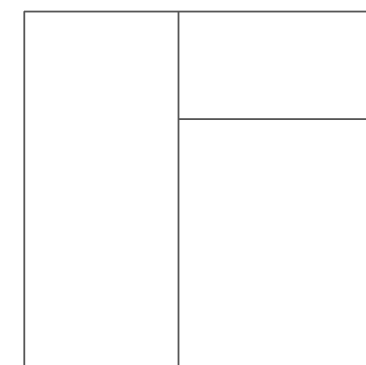
Map date: 1958-1962

Scale: 1:10,560

Printed at: 1:10,560



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Surveyed 1958
Revised 1958
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Levelled N/A

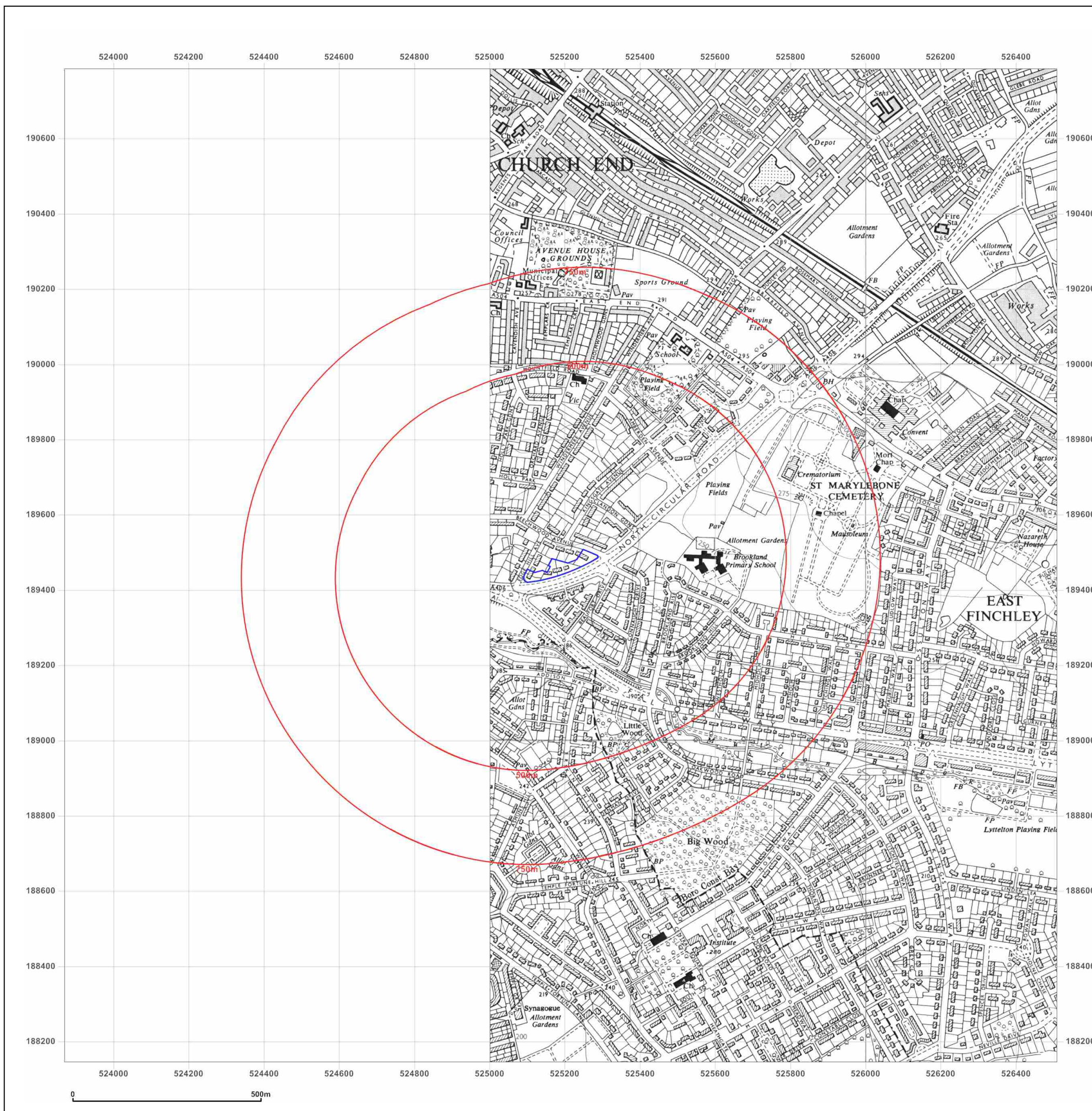


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Grid Ref: 525188, 189465

Map Name: Provisional

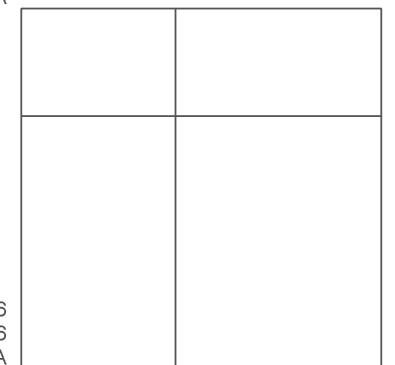
Map date: 1965-1968

Scale: 1:10,560

Printed at: 1:10,560



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Edition N/A
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Surveyed 1965
Revised 1965
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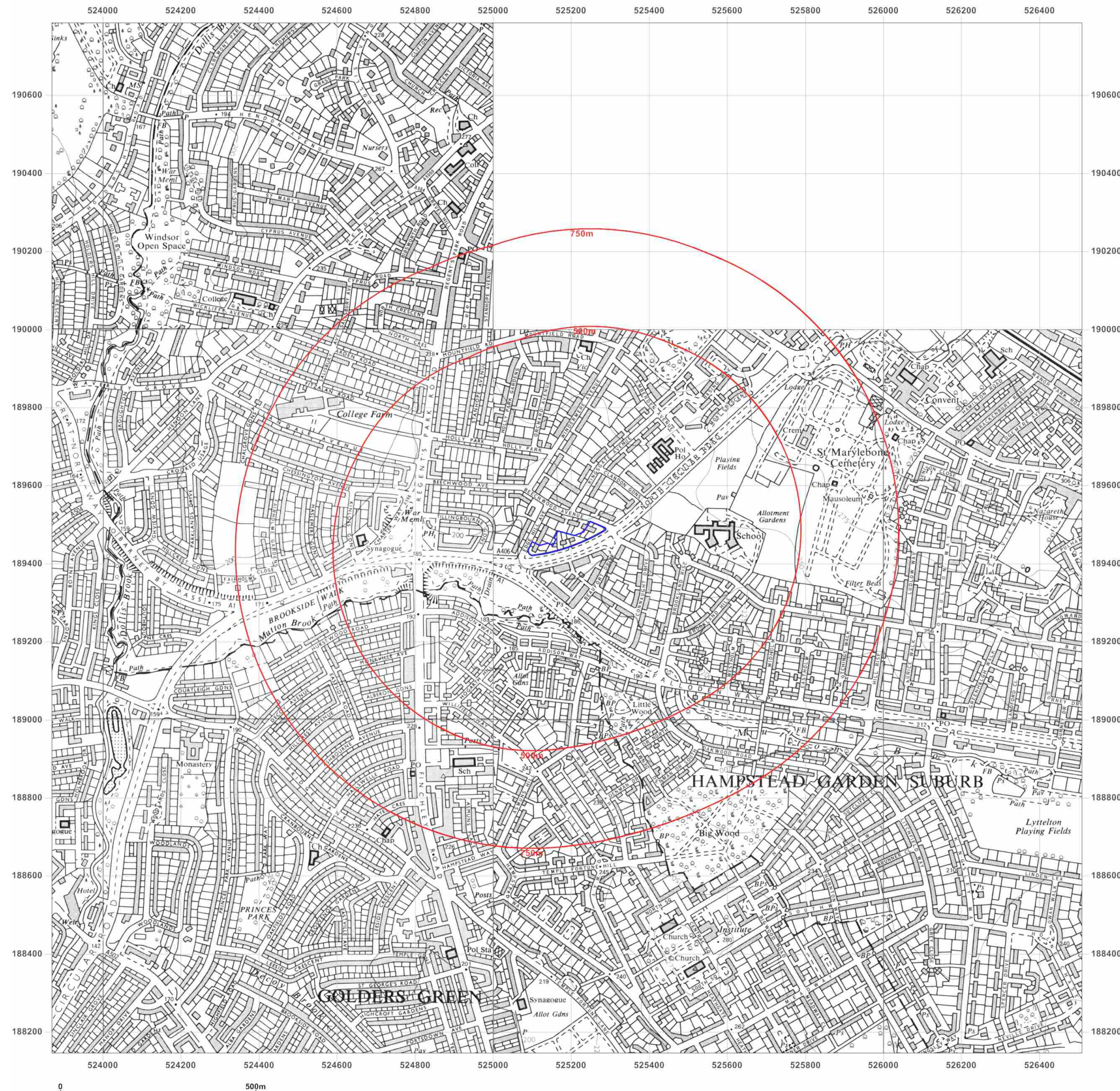


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Report Ref: GS-3884791

Grid Ref: 525188, 189465

Map Name: National Grid

Map date: 1973-1976

Scale: 1:10,000

Printed at: 1:10,000

Surveyed 1973

Revised 1975

Edition N/A

Copyright 1976

Levelled N/A

Surveyed 1972

Revised 1973

Edition N/A

Copyright 1973

Levelled 1972

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Client Ref: PO0067007-1
Report Ref: GS-3884791
Grid Ref: 525188, 189465

Map Name: National Grid

Map date: 1987

Scale: 1:10,000

Printed at: 1:10,000



Surveyed 1982
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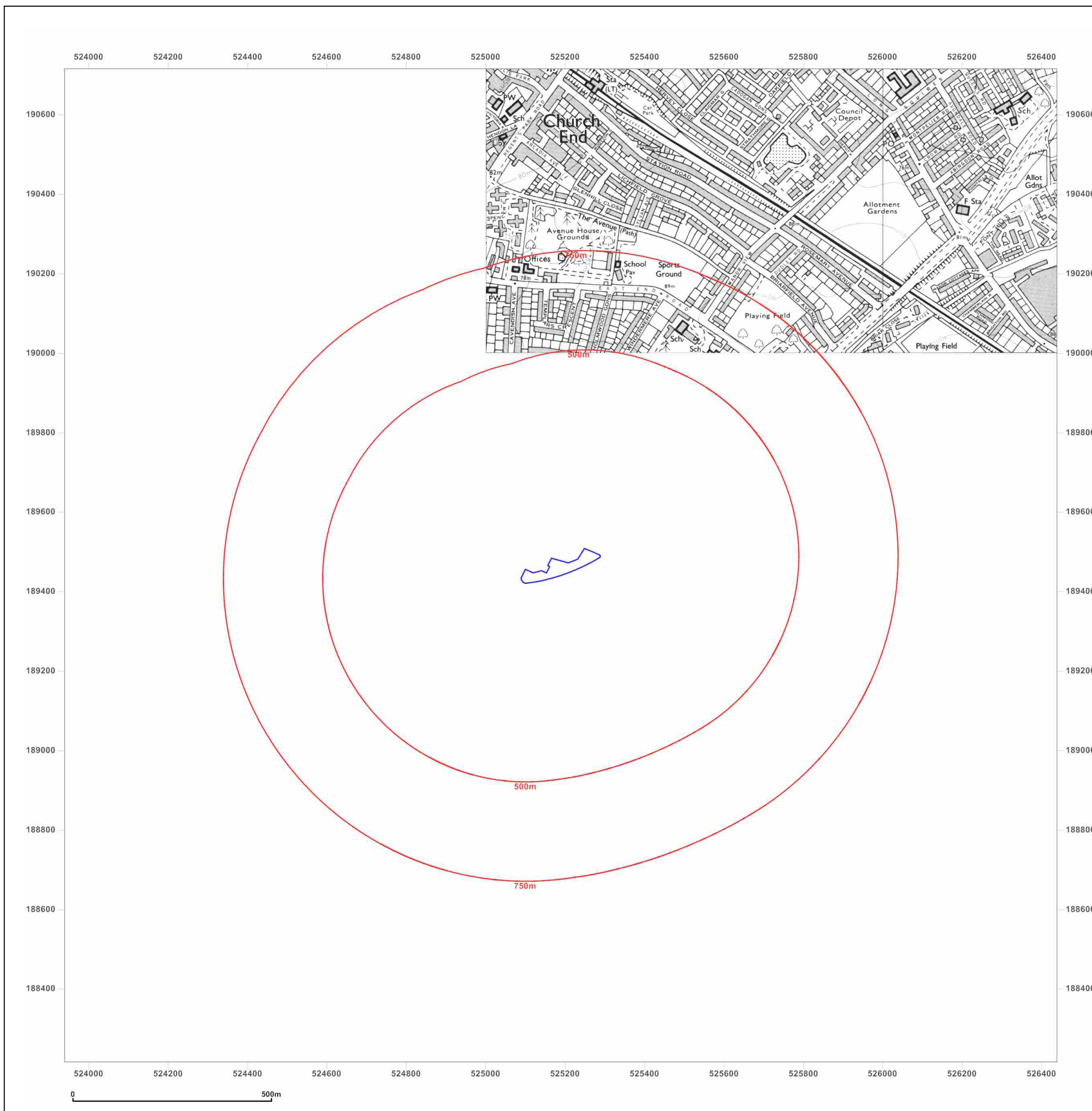


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Site Details:

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Client Ref: PO0067007-1
Report Ref: GS-3884791
Grid Ref: 525188, 189465

Map Name: National Grid

Map date: 1993

Scale: 1:10,000

Printed at: 1:10,000



Surveyed 1975
Revised 1993
Edition N/A
Copyright N/A
Levelled N/A

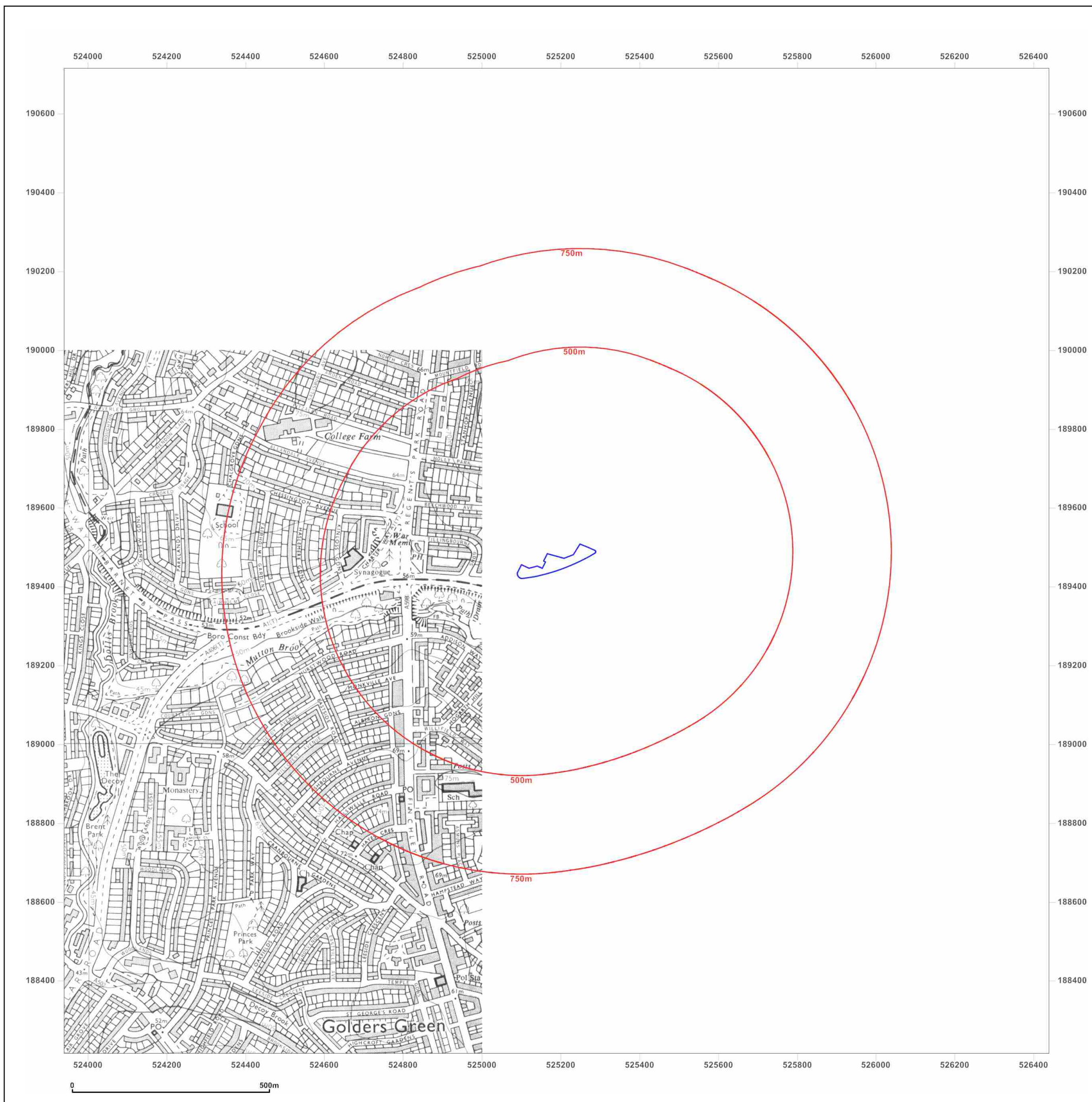


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Site Details:

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Client Ref: PO0067007-1
Report Ref: GS-3884791
Grid Ref: 525188, 189465

Map Name: 1:10,000 Raster

Map date: 2002

Scale: 1:10,000

Printed at: 1:10,000



2002



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Client Ref: PO0067007-1
Report Ref: GS-3884791
Grid Ref: 525188, 189465

Map Name: National Grid

Map date: 2010

Scale: 1:10,000

Printed at: 1:10,000



2010

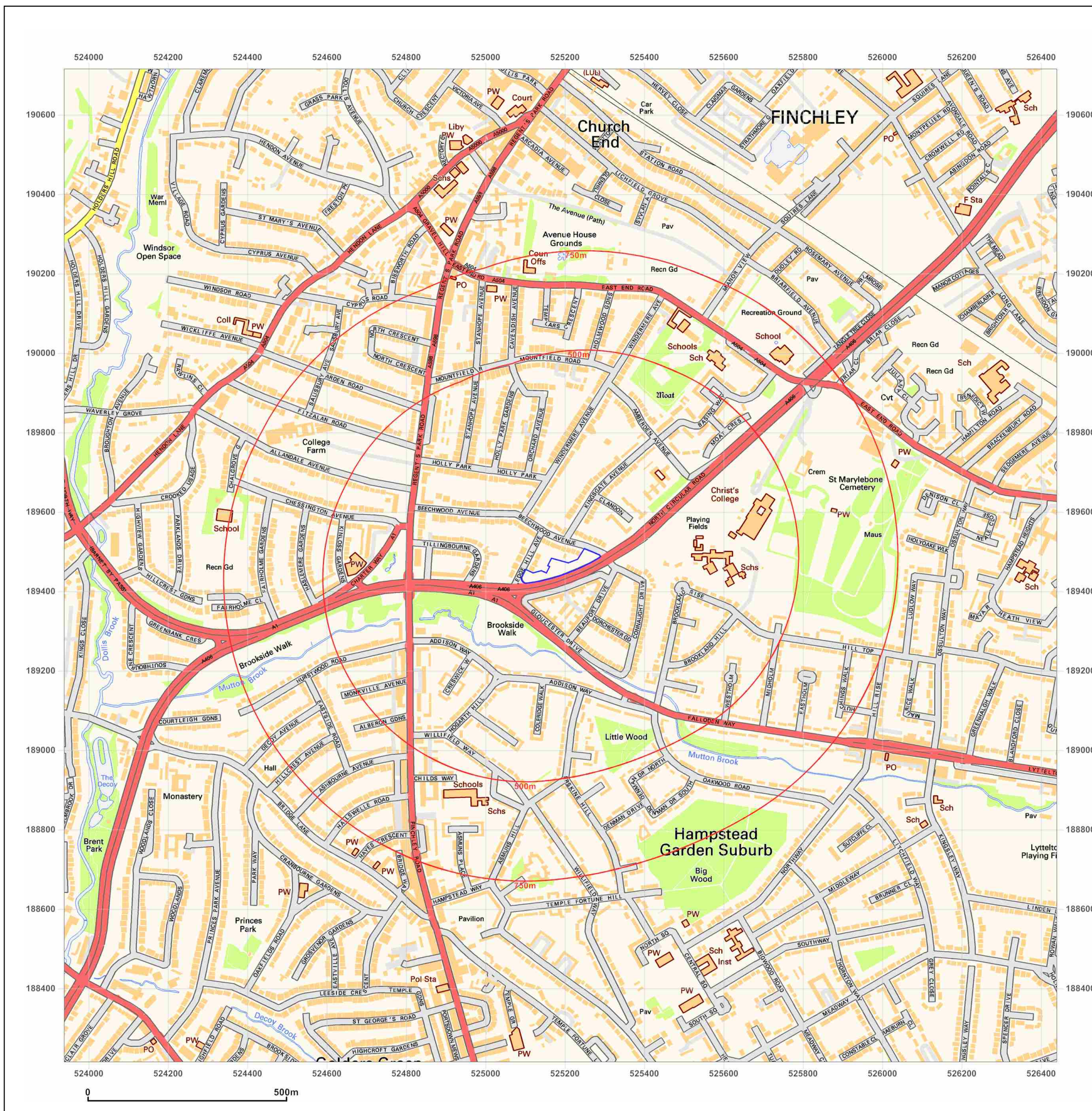


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Site Details:

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Client Ref: PO0067007-1
Report Ref: GS-3884791
Grid Ref: 525188, 189465

Map Name: National Grid

Map date: 2014

Scale: 1:10,000

Printed at: 1:10,000



2014

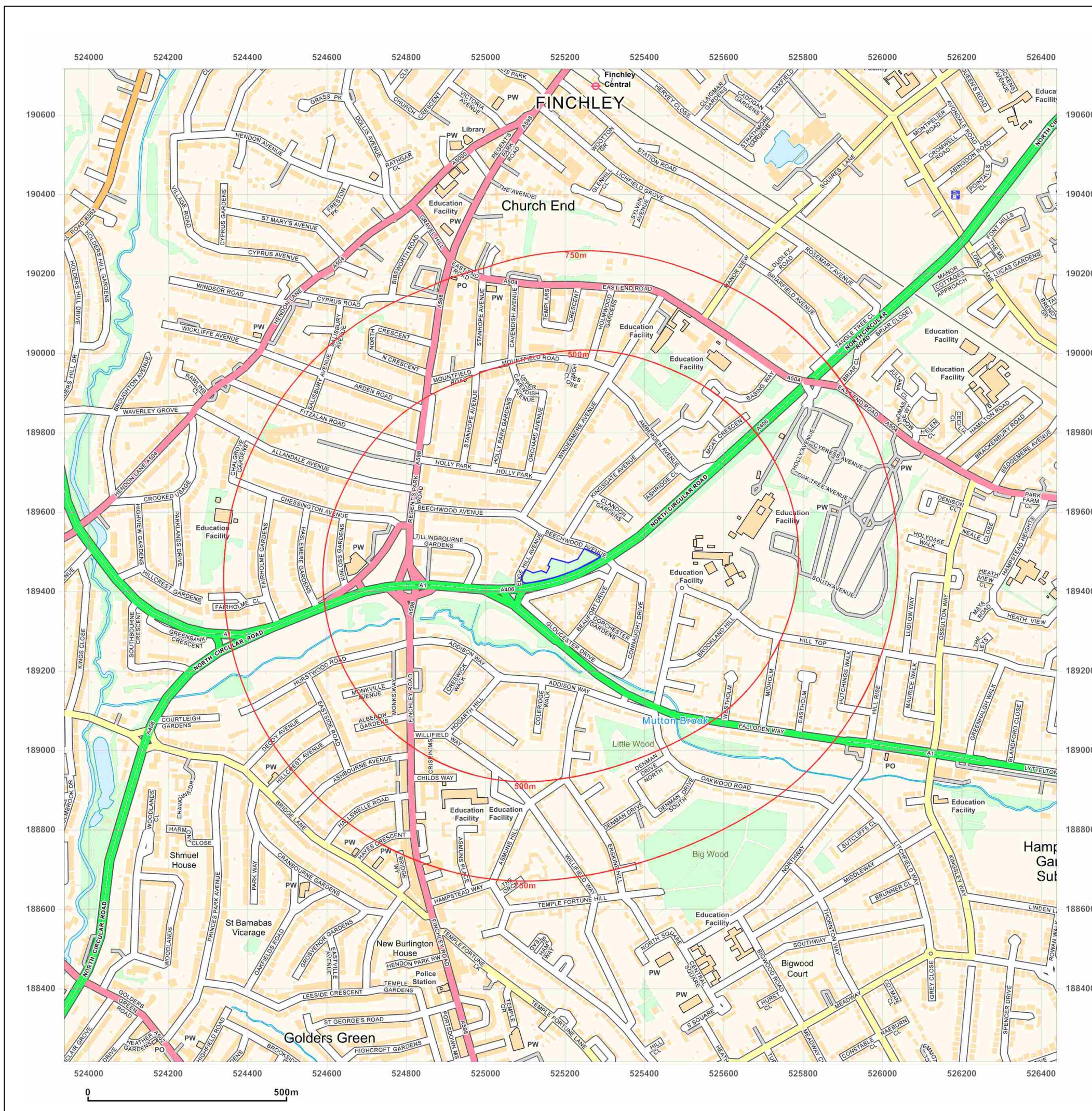


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APPENDIX B
Environmental Data Sheets

Groundsure Enviro Insight

Address: LAND AT BEECHWOOD AVENUE, BARNET, N3 3BB

Date: 16 May 2017

Reference: GS-3884789

Client: Arcadis

NW

N

NE

W

E



SW

S

SE

Aerial Photograph Capture date: 28-Apr-2013

Grid Reference: 525193,189457

Site Size: 0.58ha

Report Reference: GS-3884789

Client Reference: PO0067007-1

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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	1	23
1.2 Additional Information – Historical Tank Database	0	0	0	1
1.3 Additional Information – Historical Energy Features Database	0	0	8	37
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	0	0	15
1.6 Potentially Infilled Land	0	0	2	23

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	4
2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations	0	0	0	0
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/Natural Resources Wales Recorded Pollution Incidents				
2.3.1 National Incidents Recording System, List 2	0	0	1	2
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/Natural Resources Wales Registered Landfill Sites	0	0	0	0	0	Not searched
3.1.2 Environment Agency/Natural Resources Wales 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/Natural Resources Wales Licensed Waste Sites	0	0	0	0	0	0

Section 4: Current Land Use	On-site	0-50m	51-250	251-500
4.1 Current Industrial Sites Data	0	1	5	Not searched
4.2 Records of Petrol and Fuel Sites	0	0	0	3
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	0	0
6.4 Surface Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	0
6.5 Potable Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	0
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	2	Not searched	Not searched

Section 6: Hydrogeology and Hydrology	0-500m					
	On-site	0-50m	51-250	251-500	501-1000	1000-1500
6.9 Is there any Environment Agency/Natural Resources Wales information on river quality within 1500m of the study site?	No	No	No	No	No	Yes
6.10 Detailed River Network entries within 500m of the site	0	0	3	0	Not searched	Not searched
6.11 Surface water features within 250m of the study site	No	No	Yes	Not searched	Not searched	Not searched

Section 7: Flooding						
7.1 Are there any Environment Agency Zone 2 floodplains within 250m of the study site?	Yes					
7.2 Are there any Environment Agency/Natural Resources Wales Zone 3 floodplains within 250m of the study site	Yes					
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 below 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	1	0
8.7 Records of Local Nature Reserves (LNR)	0	0	0	1	1	0
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

Section 8: Designated Environmentally Sensitive Sites	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.10 Records of Areas of Outstanding Natural Beauty (AONB)	0	0	0	0	0	0
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	2

Section 9: Natural Hazards

9.1 What is the maximum risk of natural ground subsidence?	Moderate
9.1.1 What is the maximum Shrink-Swell hazard rating identified on the study site?	Moderate
9.1.2 What is the maximum Landslides hazard rating identified on the study site?	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.

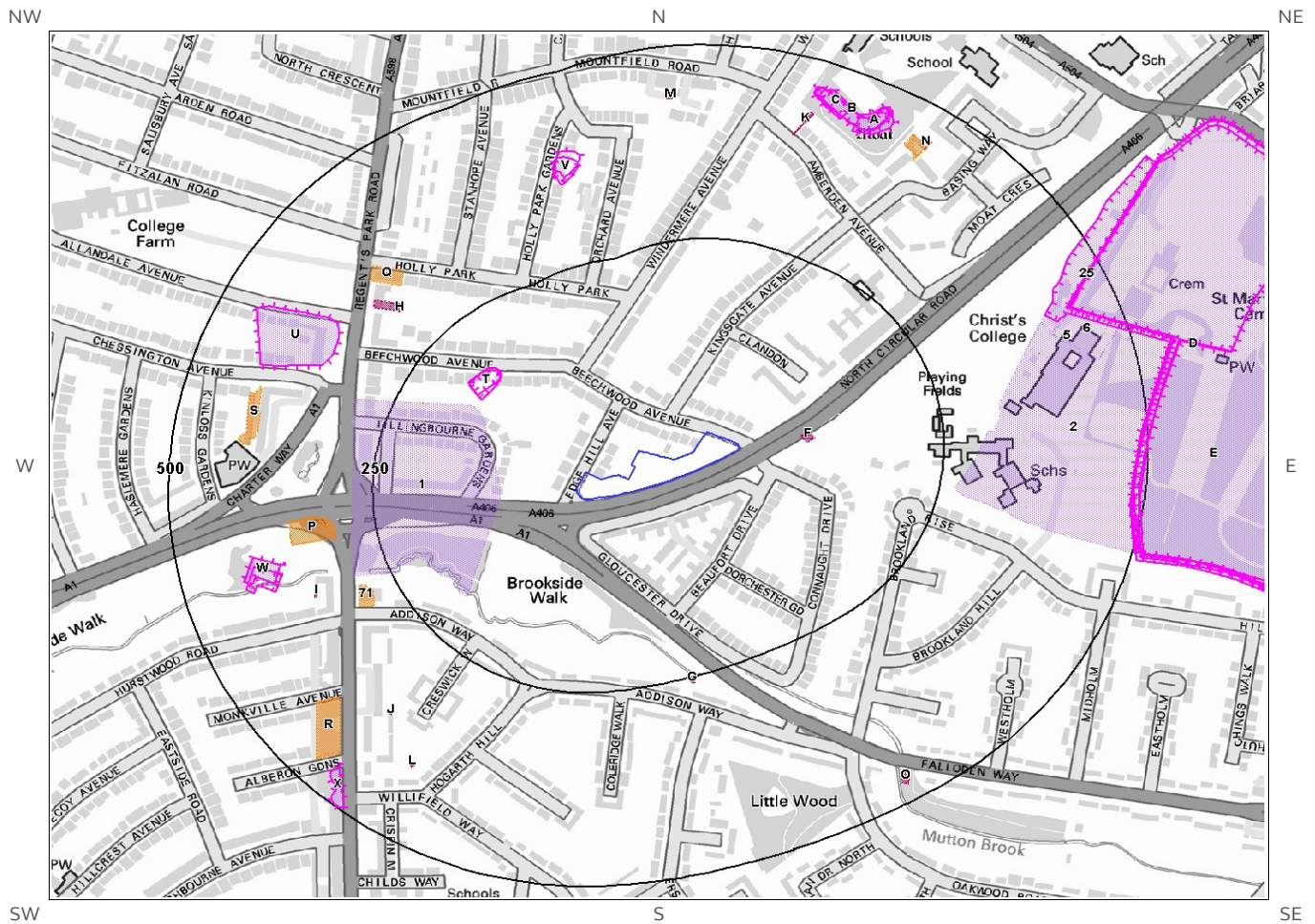
Note: Maps

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).

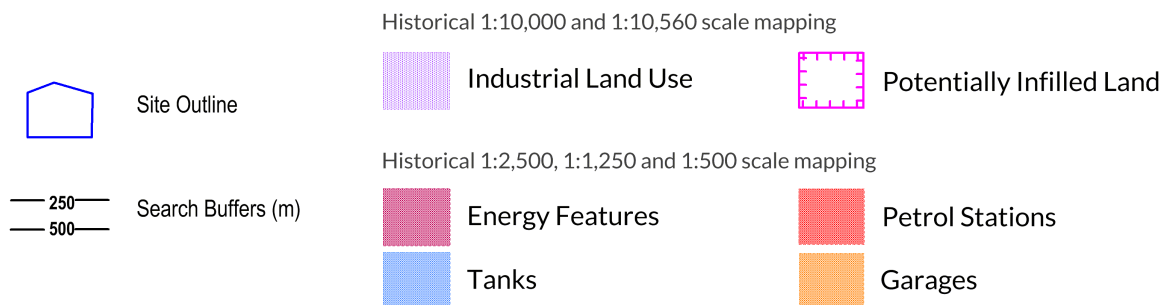
Where a feature is reported in the data tables to a distance greater than the map area, it is noted in the data table as "Not Shown".

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



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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: 24

ID	Distance [m]	Direction	Use	Date
1	93	W	Nursery	1920
2	268	E	Nursery	1938
3U	344	NW	Unspecified Pit	1949
4W	375	W	Watercress Bed	1938
5	376	E	Nursery	1920
6	409	E	Nursery	1938
7D	411	NE	Cemetery	1920
8A	427	N	Unspecified Pit	1974
9A	427	N	Unspecified Pit	1996
10B	433	NE	Unspecified Pit	1938
11B	433	NE	Unspecified Pit	1938
12C	436	N	Unspecified Pit	1974
13C	436	N	Unspecified Pit	1996
14D	439	NE	Cemetery	1965
15D	439	NE	Cemetery	1949
16D	439	NE	Cemetery	1996
17D	439	NE	Cemetery	1974
18D	439	NE	Cemetery	1958
19D	440	NE	Cemetery	1938
20D	444	NE	Cemetery	1936
21D	444	NE	Cemetery	1938
22X	457	SW	Gravel Pits	1873
23E	491	E	Cemetery	1873
24E	494	E	Cemetery	1895

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:

1

ID	Distance (m)	Direction	Use	Date
25	461	NE	Tanks	1914

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:

45

ID	Distance (m)	Direction	Use	Date
26F	76	E	Electricity Substation	1953
27F	76	E	Electricity Substation	1991
28F	76	E	Electricity Substation	1951
29F	76	E	Electricity Substation	1953
30F	76	E	Electricity Substation	1968
31F	76	E	Electricity Substation	1979
32F	78	E	Electricity Substation	1978
33F	79	E	Electricity Substation	1991
34G	251	S	Electricity Substation	1991
35G	252	S	Electricity Substation	1978
36G	252	S	Electricity Substation	1970
37H	307	NW	Electricity Substation	1991
38H	308	NW	Electricity Substation	1991
39H	308	NW	Electricity Substation	1986
40H	308	NW	Electricity Substation	1953
41H	309	NW	Electricity Substation	1953
42H	310	NW	Electricity Substation	1991
43H	310	NW	Electricity Substation	1991
44H	310	NW	Electricity Substation	1991
45I	343	W	Electricity Substation	1970
46I	343	W	Electricity Substation	1953
47J	361	SW	Electricity Substation	1991
48J	361	SW	Electricity Substation	1970
49J	361	SW	Electricity Substation	1953
50J	361	SW	Electricity Substation	1953
51K	397	N	Electricity Substation	1951
52K	397	N	Electricity Substation	1968
53K	397	N	Electricity Substation	1979
54K	397	N	Electricity Substation	1953
55K	398	N	Electricity Substation	1991

56L	399	SW	Electricity Substation	1953
57L	399	SW	Electricity Substation	1953
58L	399	SW	Electricity Substation	1970
59L	399	SW	Electricity Substation	1991
60K	425	N	Electricity Substation	1991
61M	432	N	Electricity Substation	1968
62M	432	N	Electricity Substation	1979
63M	432	N	Electricity Substation	1973
64N	444	NE	Electricity Substation	1981
65N	444	NE	Electricity Substation	1991
66N	444	NE	Electricity Substation	1991
67N	444	NE	Electricity Substation	1991
68O	462	SE	Electricity Substation	1978
69O	463	SE	Electricity Substation	1970
70O	463	SE	Electricity Substation	

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: 15

ID	Distance (m)	Direction	Use	Date
71	280	SW	Garage	1970
72P	299	W	Garage	1991
73P	300	W	Garage	1970
74P	300	W	Garage	1953
75P	301	W	Garage	1953
76Q	330	NW	Garage	1964
77Q	330	NW	Garage	1964
78R	392	SW	Garage	1953
79R	395	SW	Garage	1970
80R	395	SW	Garage	1953
81S	398	W	Garages	1953

82S	404	W	Garages	1953
83N	425	NE	Garage	1953
84N	425	NE	Garage	1953
85N	431	NE	Garage	1953

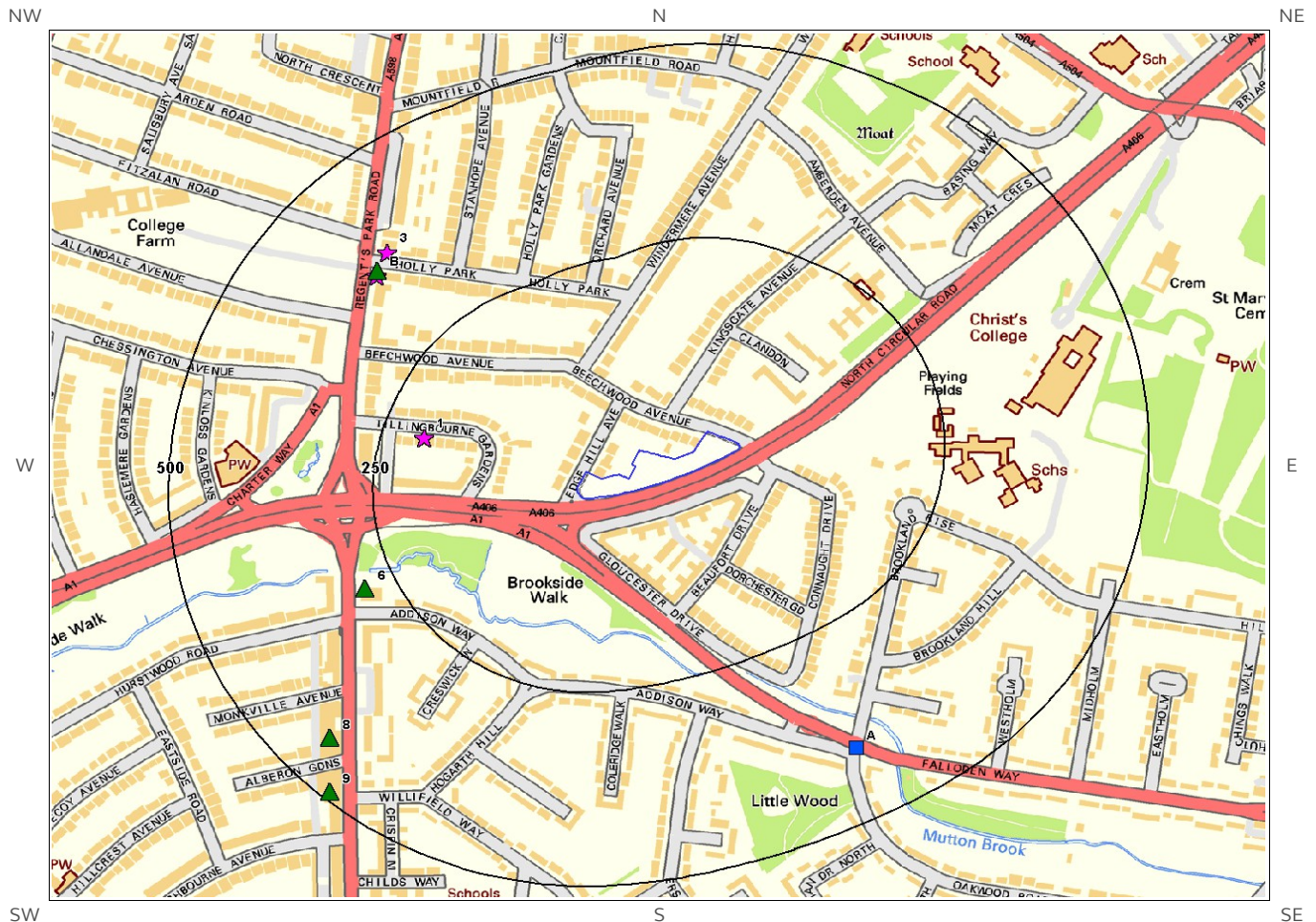
1.6 Potentially Infilled Land

Records of Potentially Infilled Features from 1:10,000 scale mapping within 500m of the study site: 25














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

ID	Distance(m)	Direction	Use	Date
86T	156	NW	Pond	1873
87T	159	NW	Pond	1895
88U	344	NW	Unspecified Pit	1949
89V	356	N	Pond	1920
90V	365	N	Pond	1938
91W	375	W	Watercress Bed	1938
92W	377	W	Pond	1920
93D	411	NE	Cemetery	1920
94A	427	N	Unspecified Pit	1974
95A	427	N	Unspecified Pit	1996
96B	433	NE	Unspecified Pit	1938
97B	433	NE	Unspecified Pit	1938
98C	436	N	Unspecified Pit	1974
99C	436	N	Unspecified Pit	1996
100D	439	NE	Cemetery	1949
101D	439	NE	Cemetery	1974
102D	439	NE	Cemetery	1958
103D	439	NE	Cemetery	1965
104D	439	NE	Cemetery	1996
105D	440	NE	Cemetery	1938
106D	444	NE	Cemetery	1938
107D	444	NE	Cemetery	1936
108X	457	SW	Gravel Pits	1873
109E	491	E	Cemetery	1873
110E	494	E	Cemetery	1895

2. Environmental Permits, Incidents and Registers Map



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- | | | |
|---|---|--|
|  Site Outline |  Recorded Pollution Incident |  RAS 3 & 4 Authorisations |
|  Dangerous Substances (List 1) |  Dangerous Substances (List 2) |  Part A(1) Authorised Processes and Historic IPC Authorisations |
|  Water Industry Referrals |  Licenced Discharge Consents |  Part A(2) and Part B Authorised Processes |
|  Red List Discharge Consents |  COMAH / NIHHS Sites |  Sites Determined as Contaminated Land |
| |  Hazardous Substance Consents and Enforcements | |

2. Environmental Permits, Incidents and Registers

2.1 Industrial Sites Holding Licences and/or Authorisations

Searches of information provided by the Environment Agency/Natural Resources Wales 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:

4

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
6	289	SW	524829 189304	<p>Address: The Co-Operative Food, Golders Green Service Station, 872 Finchley Road, Golders Green, NW11 6AH</p> <p>Process: Unloading of Petrol into Storage at Service Stations</p> <p>Status: Current Permit</p> <p>Permit Type: Part B</p> <p>Enforcement: No Enforcement Notified</p> <p>Date of Enforcement: No Enforcement Notified</p> <p>Comment: No Enforcement Notified</p>
7B	362	NW	524844 189713	<p>Address: Total UK Limited, Holly Park Service Station, 114 Regents Park Road, N3 3JG</p> <p>Process: Petrol Vapour Recovery Process</p> <p>Status: Historical Permit</p> <p>Permit Type: Part B</p> <p>Enforcement: No Enforcement Notified</p> <p>Date of Enforcement: No Enforcement Notified</p> <p>Comment: No Enforcement Notified</p>
8	439	SW	524786 189111	<p>Address: Temple Fortune Filling Station, Finchley Road, NW11 0AJ</p> <p>Process: Petrol Vapour Recovery Process</p> <p>Status: Revoked</p> <p>Permit Type: Part B</p> <p>Enforcement: No Enforcement Notified</p> <p>Date of Enforcement: No Enforcement Notified</p> <p>Comment: No Enforcement Notified</p>
9	492	SW	524785 189041	<p>Address: Aburami Ltd (Formerly Jacksons Dry Cleaners), 9 Ashbourne Parade, Finchley Road, London, NW11 0AD</p> <p>Process: Dry Cleaning</p> <p>Status: Current Permit</p> <p>Permit Type: Part B</p> <p>Enforcement: No Enforcement Notified</p> <p>Date of Enforcement: No Enforcement Notified</p> <p>Comment: No Enforcement Notified</p>

2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations:

0

Database searched and no data found.

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
4A	408	SE	525430 189100	<p>Address: Boorkland Rise, Boorkland Rise, -, -, -</p> <p>Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY</p> <p>Permit Number: TEMP.2450</p> <p>Permit Version: 1</p> <p>Receiving Water: MUTTON BROOK</p> <p>Status: TEMPORARY CONSENTS (WATER ACT 1989, SECTION 113)</p> <p>Issue date: 02/11/1989</p> <p>Effective Date: 02-Nov-1989</p> <p>Revocation Date: 02/09/2010</p>
5A	408	SE	525430 189100	<p>Address: Boorkland Rise, Boorkland Rise, -, -, -</p> <p>Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY</p> <p>Permit Number: TEMP.2450</p> <p>Permit Version: 2</p> <p>Receiving Water: Mutton Brook</p> <p>Status: SURRENDERED UNDER EPR 2010</p> <p>Issue date: 03/09/2010</p> <p>Effective Date: 03-Sep-2010</p> <p>Revocation Date: 13/10/2015</p>

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/Natural Resources Wales Recorded Pollution Incidents

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

3

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	200	W	524900 189500	Incident Date: 14-Feb-2003 Incident Identification: 136925 Pollutant: Inert Materials and Wastes Pollutant Description: Construction and Demolition Materials and Wastes Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
2B	360	NW	524842 189708	Incident Date: 23-Nov-2001 Incident Identification: 44699 Pollutant: Oils and Fuel Pollutant Description: Diesel Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
3	374	NW	524855 189739	Incident Date: 30-Mar-2004 Incident Identification: 226366 Pollutant: Inert Materials and Wastes Pollutant Description: Construction and Demolition Materials and Wastes Water Impact: Category 4 (No Impact) Land Impact: Category 2 (Significant) 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.

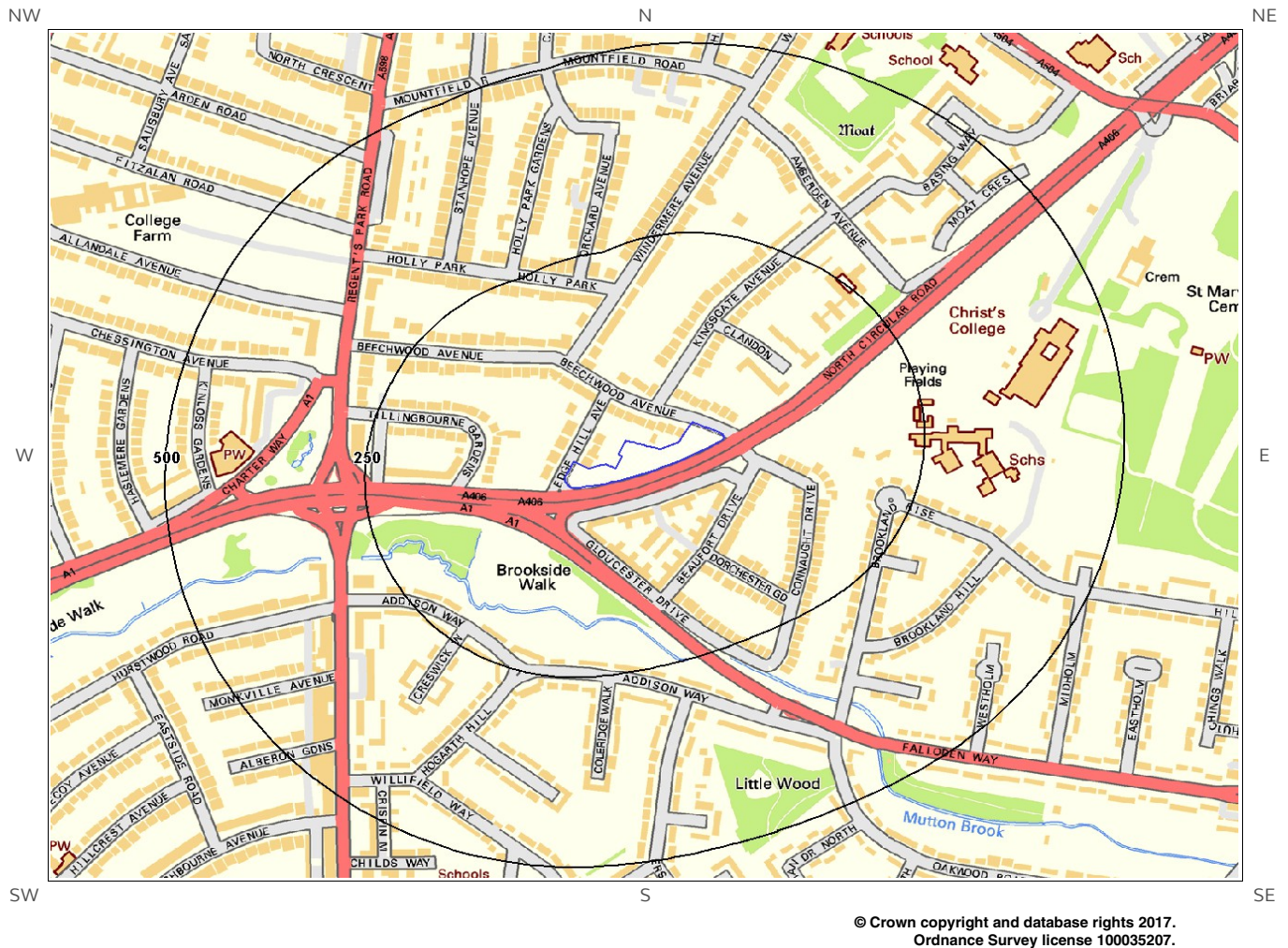
2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990










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.

3. Landfill and Other Waste Sites Map



- | | | | | | |
|---|---------------------------|---|---|---|----------------------------------|
|  | Site Outline |  | EA/NRW Active Landfill |  | Historic and Planned Waste Sites |
|  | EA/NRW Historic Landfill |  | EA/NRW Licensed Waste Site | | |
|  | BGS / DoE Survey Landfill |  | Local Authority/Historical Mapping Landfill Records | | |
-  250 Search Buffers (m)
 500

3. Landfill and Other Waste Sites

3.1 Landfill Sites

3.1.1 Records from Environment Agency/Natural Resources Wales landfill data within 1000m of the study site:

0

Database searched and no data found.

3.1.2 Records of Environment Agency/Natural Resources Wales historic landfill sites within 1500m of the study site:

0

Database searched and no data found.

3.1.3 Records of BGS/DoE non-operational landfill sites within 1500m of the study site:

0

Database searched and no data found.

3.1.4 Records of Landfills from Local Authority and Historical Mapping Records within 1500m of the study site:

0

Database searched and no data found.

3.2 Other Waste Sites

3.2.1 Records of waste treatment, transfer or disposal sites within 500m of the study site:

0

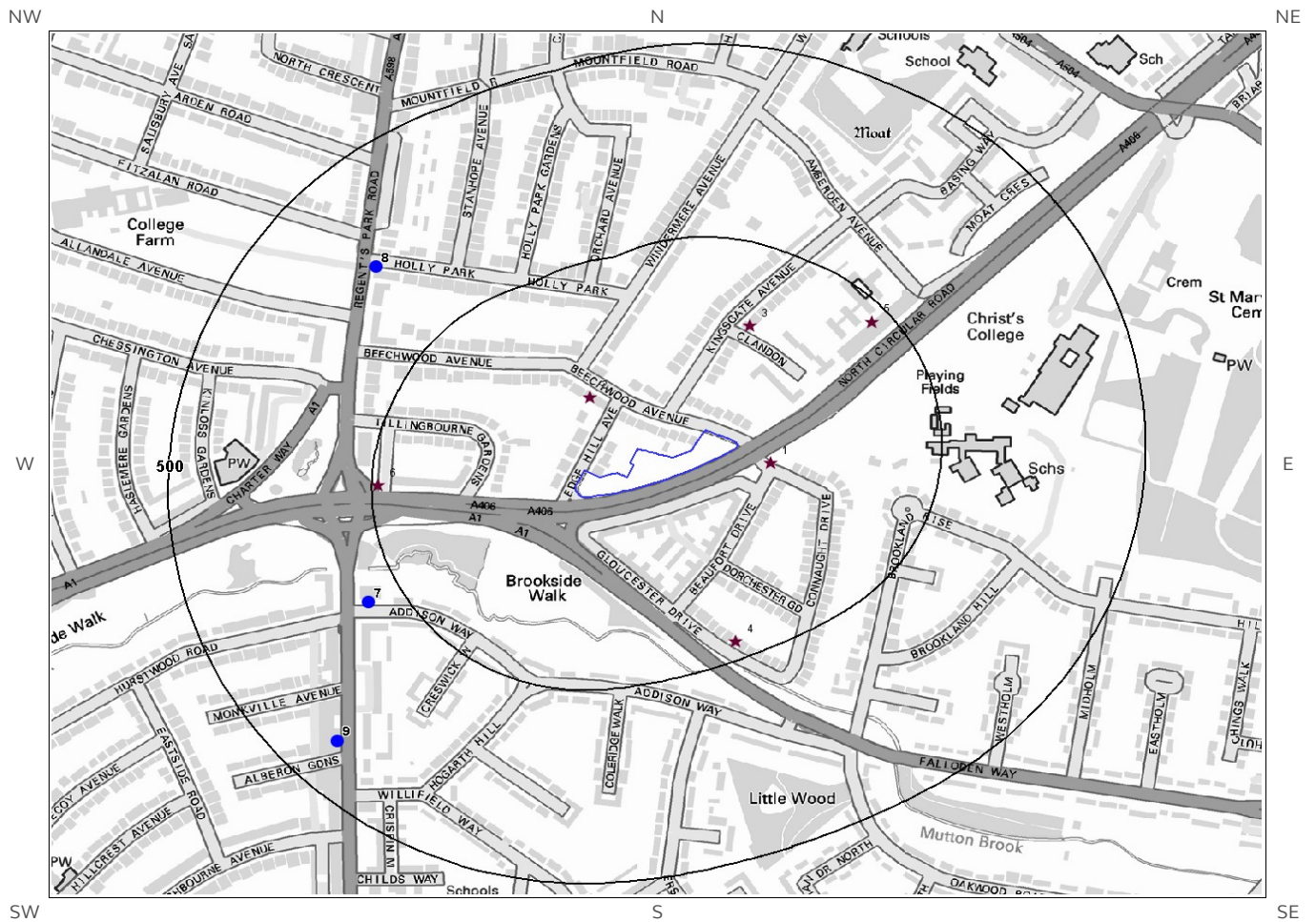
Database searched and no data found.

3.2.2 Records of Environment Agency/Natural Resources Wales licensed waste sites within 1500m of the study site:

0

Database searched and no data found.

4. Current Land Use Map



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Site Outline

★ Current Industrial Sites

— Electricity Transmission Cables

— 250 — Search Buffers (m)
— 500 —

● Petrol & Fuel Sites

— Gas Transmission Pipelines

4. Current Land Uses

4.1 Current Industrial Data

Records of potentially contaminative industrial sites within 250m of the study site:

6

The following records are represented as points on the Current Land Uses map.

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
1	46	SE	Electricity Sub Station	525328 189466	Electricity Sub Station, NW11	Electrical Features	Infrastructure and Facilities
2	89	NW	D C Communications	525106 189551	D C Communications, 44, Beechwood Avenue, London, N3 3AX	Measurement and Inspection Equipment	Industrial Products
3	146	N	Ibrahimoff & Sons	525302 189644	Ibrahimoff & Sons, 12, Kingsgate Avenue, London, N3 3BH	Agricultural Machinery and Goods	Industrial Products
4	226	S	Enlight Entertainment Europe	525284 189235	Enlight Entertainment Europe, 7, Gloucester Drive, London, NW11 6BH	Hobby, Sports and Pastime Products	Consumer Products
5	228	NE	Direct First Aid	525452 189649	Direct First Aid, Flat 7 Marina Court 2, Ashridge Close, London, N3 3AQ	Medical Equipment, Supplies and Pharmaceuticals	Industrial Products
6	243	W	Electricity Sub Station	524846 189437	Electricity Sub Station, NW11	Electrical Features	Infrastructure and Facilities

4.2 Petrol and Fuel Sites

Records of petrol or fuel sites within 500m of the study site:

3

The following petrol or fuel site records provided by Catalist are represented as points on the Current Land Use map:

ID	Distance (m)	Direction	NGR	Company	Address	LPG	Status
7	293	SW	524834 189285	Texaco	Co-Op Golders Green, 872, Finchley Road, Finchley Road, Golders Green, London, Outer London, NW11 6AH	No	Open
8	366	NW	524844 189719	Total	Total Holly Park, 114, Regents Park Road, Regents Park Road, Finchley, London, Outer London, N3 3JG	No	Closed

ID	Distance (m)	Direction	NGR	Company	Address	LPG	Status
9	435	SW	524796 189106	Jet	Temple Fortune Filling Station, Finchley Road, Finchley Road, Golders Green, London, Outer London, NW11 0AD	Not Applicable	Obsolete

4.3 National Grid High Voltage Underground Electricity Transmission Cables

This dataset identifies the high voltage electricity transmission lines running between generating power plants and electricity substations. The dataset does not include the electricity distribution network (smaller, lower voltage cables distributing power from substations to the local user network). This information has been extracted from databases held by National Grid and is provided for information only with no guarantee as to its completeness or accuracy. National Grid do not offer any warranty as to the accuracy of the available data and are excluded from any liability for any such inaccuracies or errors.

Records of National Grid high voltage underground electricity transmission cables within 500m of the study site:

0

Database searched and no data found.

4.4 National Grid High Pressure Gas Transmission Pipelines

This dataset identifies high-pressure, large diameter pipelines which carry gas between gas terminals, power stations, compressors and storage facilities. The dataset does not include the Local Transmission System (LTS) which supplies gas directly into homes and businesses. This information has been extracted from databases held by National Grid and is provided for information only with no guarantee as to its completeness or accuracy. National Grid do not offer any warranty as to the accuracy of the available data and are excluded from any liability for any such inaccuracies or errors.

Records of National Grid high pressure gas transmission pipelines within 500m of the study site:

0

Database searched and no data found.

5. Geology

5.1 Artificial Ground and Made Ground

Database searched and no data found.

The database has been searched on site, including a 50m buffer.

5.2 Superficial Ground and Drift Geology

The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
LOFT-DMTN	LOWESTOFT FORMATION	DIAMICTON
DHGR-XSV	DOLLIS HILL GRAVEL MEMBER	SAND AND GRAVEL

5.3 Bedrock and Solid Geology

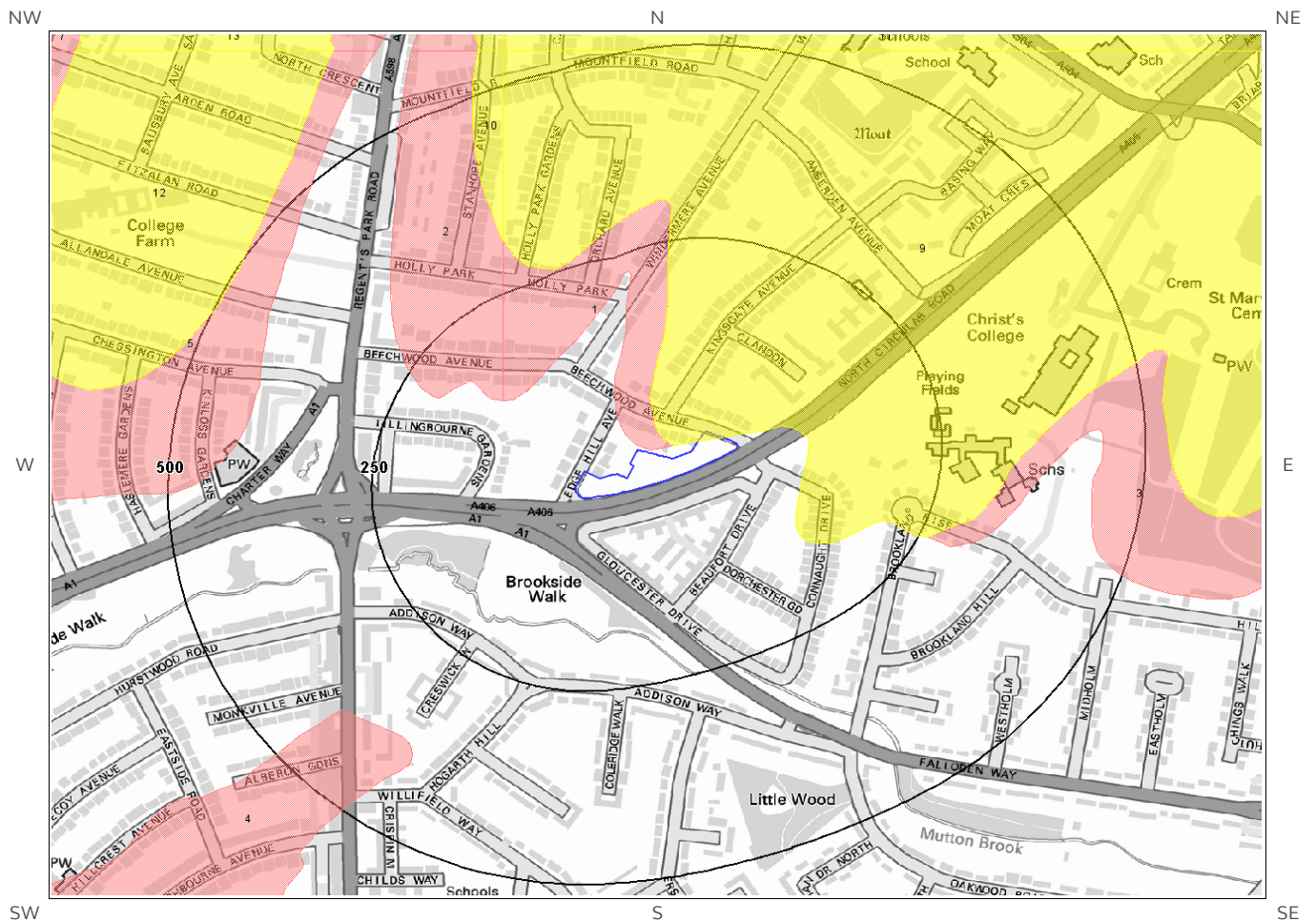
The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
LC-XCZS	LONDON CLAY FORMATION	CLAY, SILT AND SAND

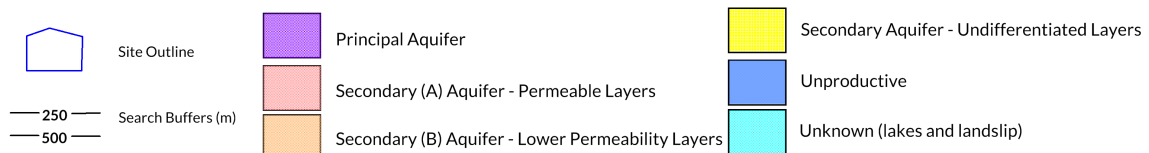
(Derived from the BGS 1:50,000 Digital Geological Map of Great Britain)

6 Hydrogeology and Hydrology

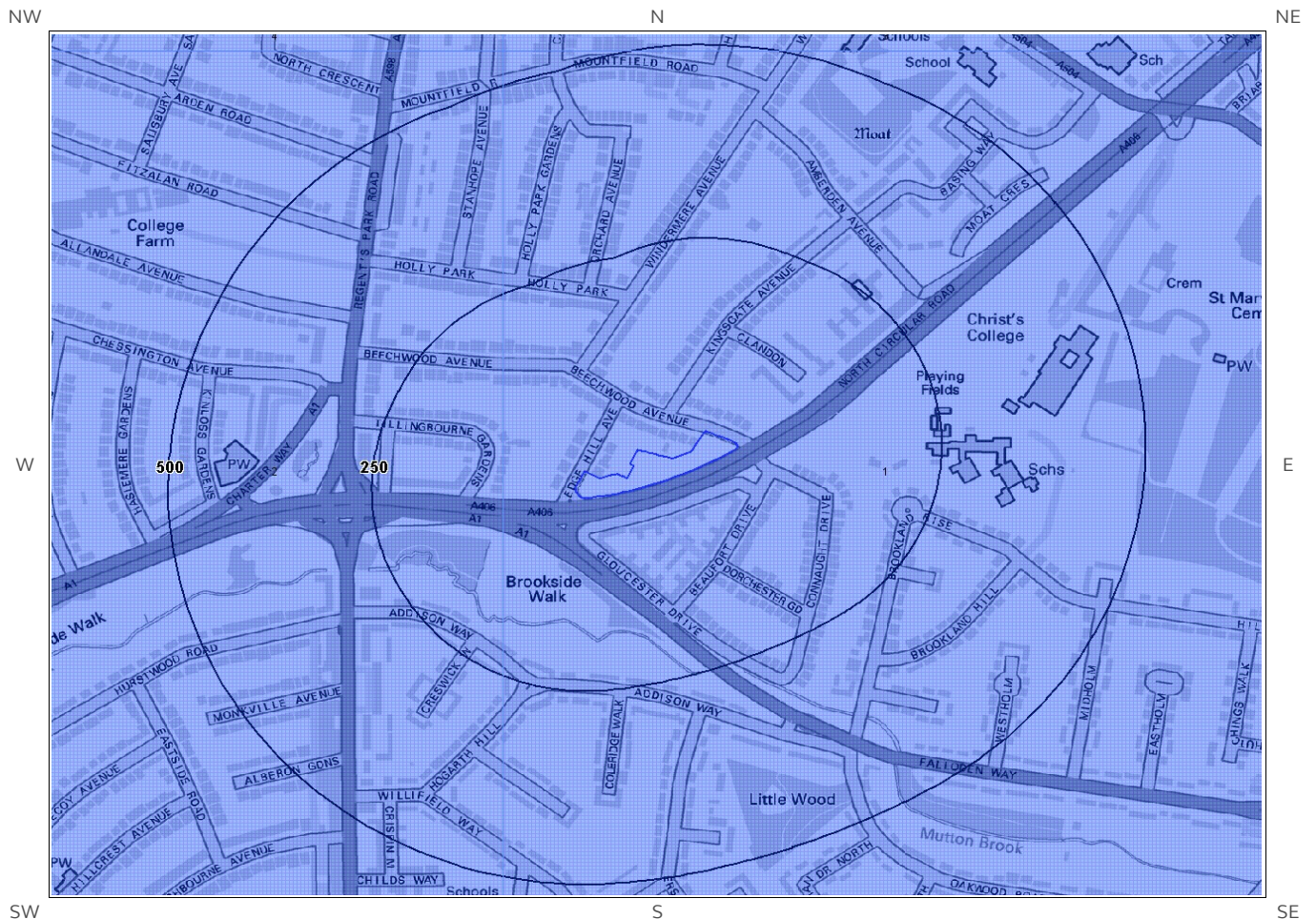
6a. Aquifer Within Superficial Geology



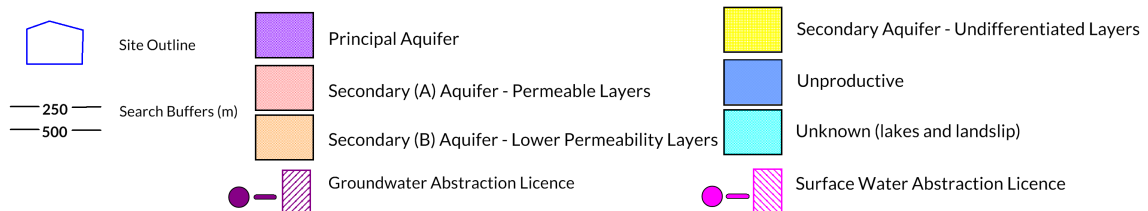
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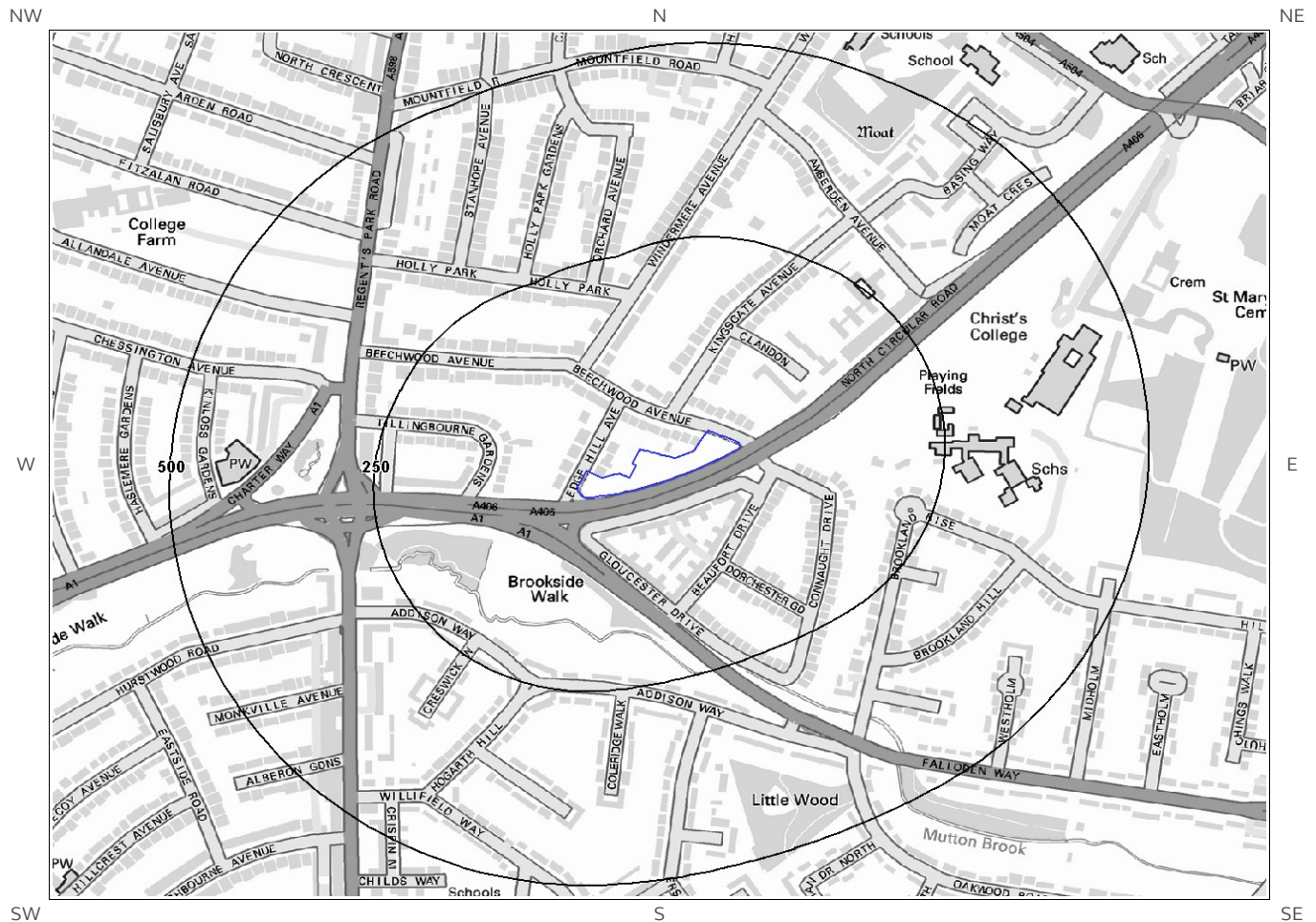
6b. Aquifer Within Bedrock Geology and Abstraction Licenses



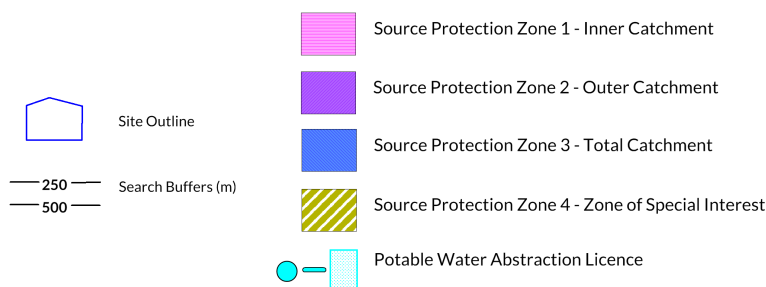
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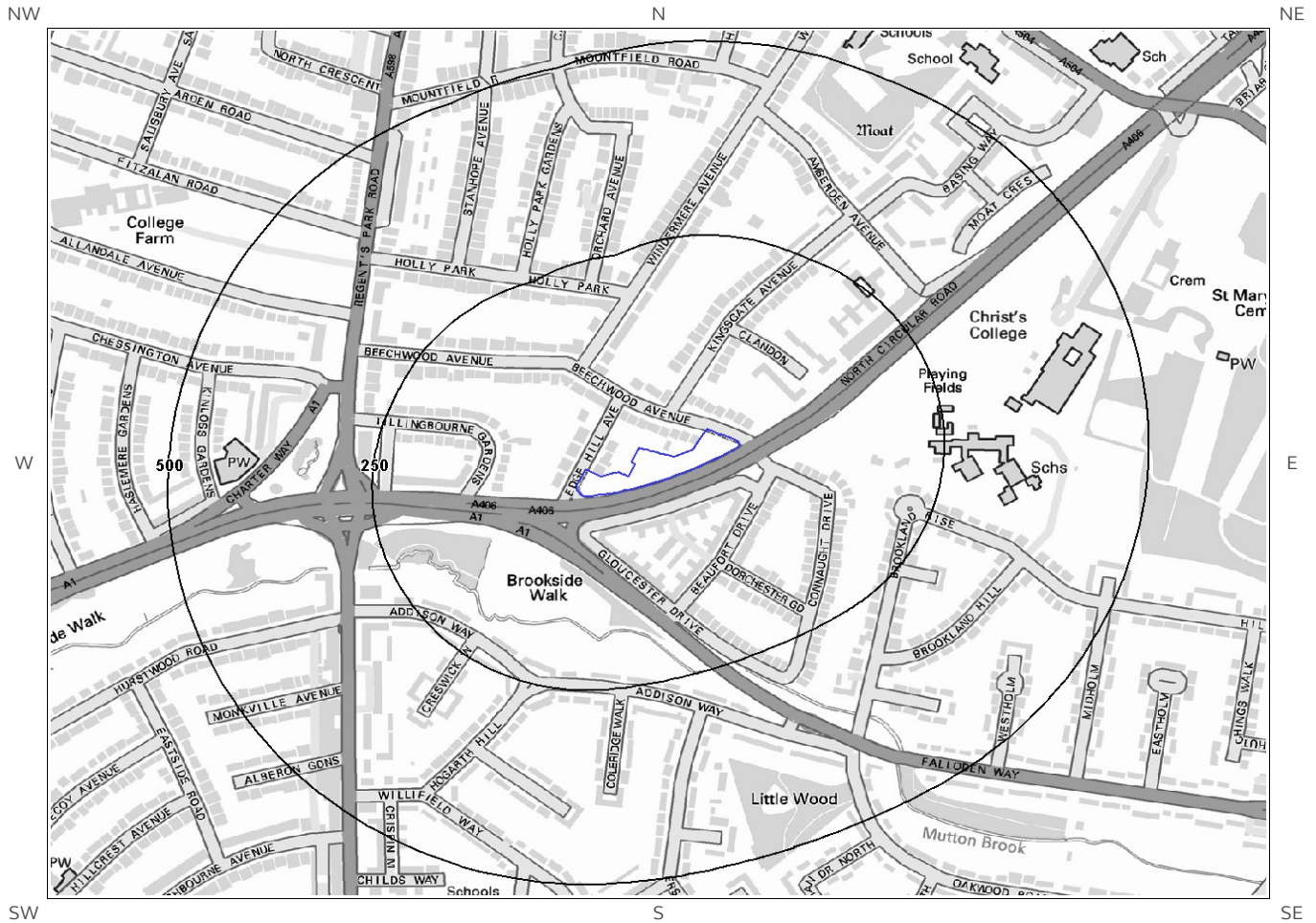
6c. Hydrogeology – Source Protection Zones and Potable Water Abstraction Licenses



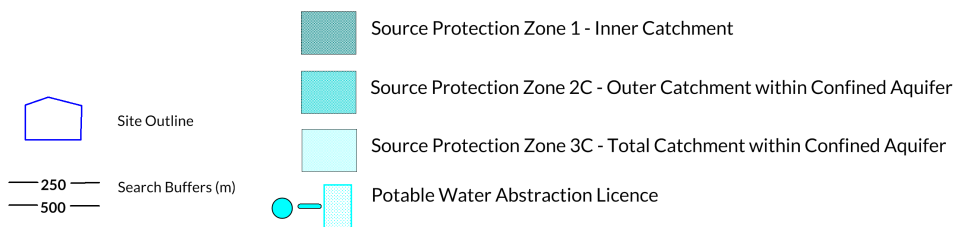
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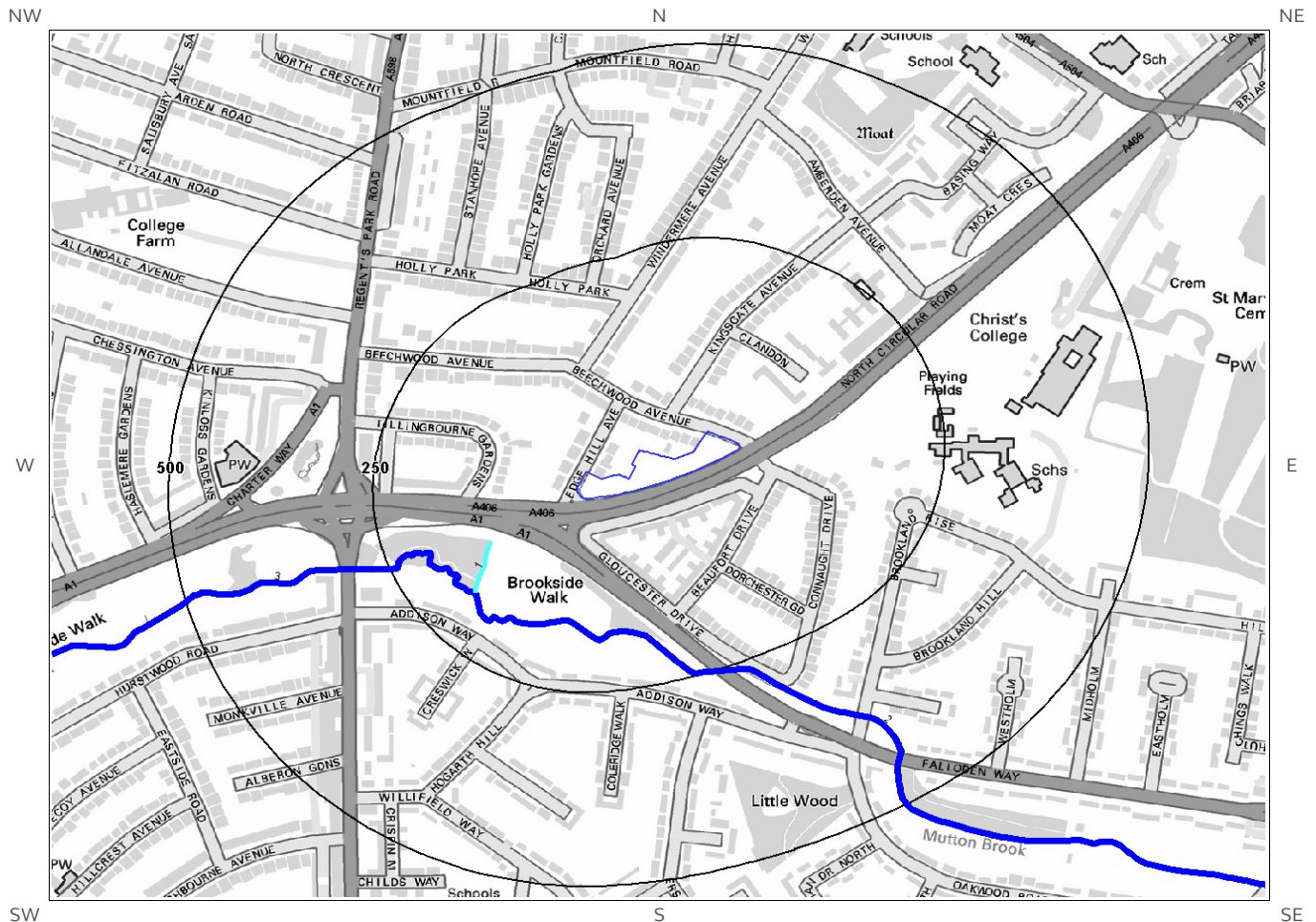
6d. Hydrogeology – Source Protection Zones within confined aquifer



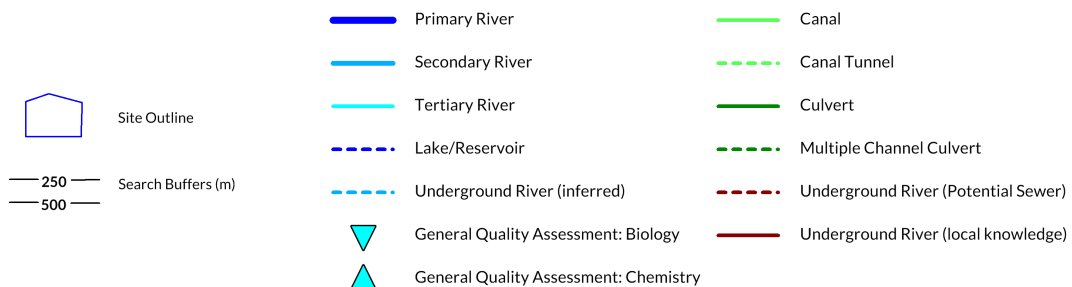
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6e. Hydrology – Detailed River Network and River Quality



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6. Hydrogeology and Hydrology

6.1 Aquifer within Superficial Deposits

Are there records of strata classification within the superficial geology at or in proximity to the property?
Yes

From 1 April 2010, the Environment Agency/Natural Resources Wales's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the Groundsure Enviro Insight User Guide.

The following aquifer records are shown on the Aquifer within Superficial Geology Map (6a):

ID	Distance (m)	Direction	Designation	Description
9	0	On Site	Secondary (undifferentiated)	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
1	4	N	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
2	135	NW	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
3	261	SE	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
10	314	N	Secondary (undifferentiated)	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
4	379	SW	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
5	410	W	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
11	492	N	Secondary (undifferentiated)	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
12	498	NW	Secondary (undifferentiated)	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type

6.2 Aquifer within Bedrock Deposits

Are there records of strata classification within the bedrock geology at or in proximity to the property? Yes

From 1 April 2010, the Environment Agency/Natural Resources Wales's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the Groundsure Enviro Insight User Guide.

The following aquifer records are shown on the Aquifer within Bedrock Geology Map (6b):

ID	Distance (m)	Direction	Designation	Description
1	0	On Site	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow
2	89	W	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow
3	492	N	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow

6.3 Groundwater Abstraction Licences

Are there any Groundwater Abstraction Licences within 2000m of the study site? No

Database searched and no data found.

6.4 Surface Water Abstraction Licences

Are there any Surface Water Abstraction Licences within 2000m of the study site? No

Database searched and no data found.

6.5 Potable Water Abstraction Licences

Are there any Potable Water Abstraction Licences within 2000m of the study site? No

Database searched and no data found.

6.6 Source Protection Zones

Are there any Source Protection Zones within 500m of the study site? No

Database searched and no data found.

6.7 Source Protection Zones within Confined Aquifer

Are there any Source Protection Zones within the Confined Aquifer within 500m of the study site? No

Historically, Source Protection Zone maps have been focused on regulation of activities which occur at or near the ground surface, such as prevention of point source pollution and bacterial contamination of water supplies. Sources in confined aquifers were often considered to be protected from these surface pressures due to the presence of a low permeability confining layer (e.g. glacial till, clay). The increased interest in subsurface activities such as onshore oil and gas exploration, ground source heating and cooling requires protection zones for confined sources to be marked on SPZ maps where this has not already been done.

Database searched and no data found.

6.8 Groundwater Vulnerability and Soil Leaching Potential

Is there any Environment Agency/Natural Resources Wales information on groundwater vulnerability and soil leaching potential within 500m of the study site? Yes

Distance (m)	Direction	Classification	Soil Vulnerability Category	Description
0	On Site	Minor Aquifer/High Leaching Potential	HU	Soil information for urban areas and restored mineral workings. These soils are therefore assumed to be highly permeable in the absence of site-specific information.
281	S	Minor Aquifer/High Leaching Potential	HU	Soil information for urban areas and restored mineral workings. These soils are therefore assumed to be highly permeable in the absence of site-specific information.
285	SE	Minor Aquifer/High Leaching Potential	HU	Soil information for urban areas and restored mineral workings. These soils are therefore assumed to be highly permeable in the absence of site-specific information.

6.9 River Quality

Is there any Environment Agency/Natural Resources Wales information on river quality within 1500m of the study site? Yes

6.9.1 Biological Quality:

Biological Quality data describes water quality in terms of 83 groups of macroinvertebrates, some of which are pollution sensitive. The results are graded from A ('Very Good') to F ('Bad').

The following Biological Quality records are shown on the Hydrology Map (6e):

ID	Distance (m)	Direction	NGR	River Quality Grade	Biological Quality Grade				
					2005	2006	2007	2008	2009
Not shown	1104	W	524030 189120	River Name: Brent Reach: Conf Dollis/mutton Bk - Neasden Lane Swo End/Start of Stretch: Start of Stretch NGR	D	D	D	D	D

6.9.2 Chemical Quality:

Database searched and no data found.

6.10 Detailed River Network

Are there any Detailed River Network entries within 500m of the study site? Yes

The following Detailed River Network records are represented on the Hydrology Map (6e):

ID	Distance (m)	Direction	Details
1	124	SW	River Name: Drain Welsh River Name: - Alternative Name: - River Type: Tertiary River Main River Status: Currently Undefined
2	159	S	River Name: Mutton Brook Welsh River Name: - Alternative Name: - River Type: Primary River Main River Status: Currently Undefined
3	180	SW	River Name: Mutton Brook Welsh River Name: - Alternative Name: - River Type: Primary River Main River Status: Currently Undefined

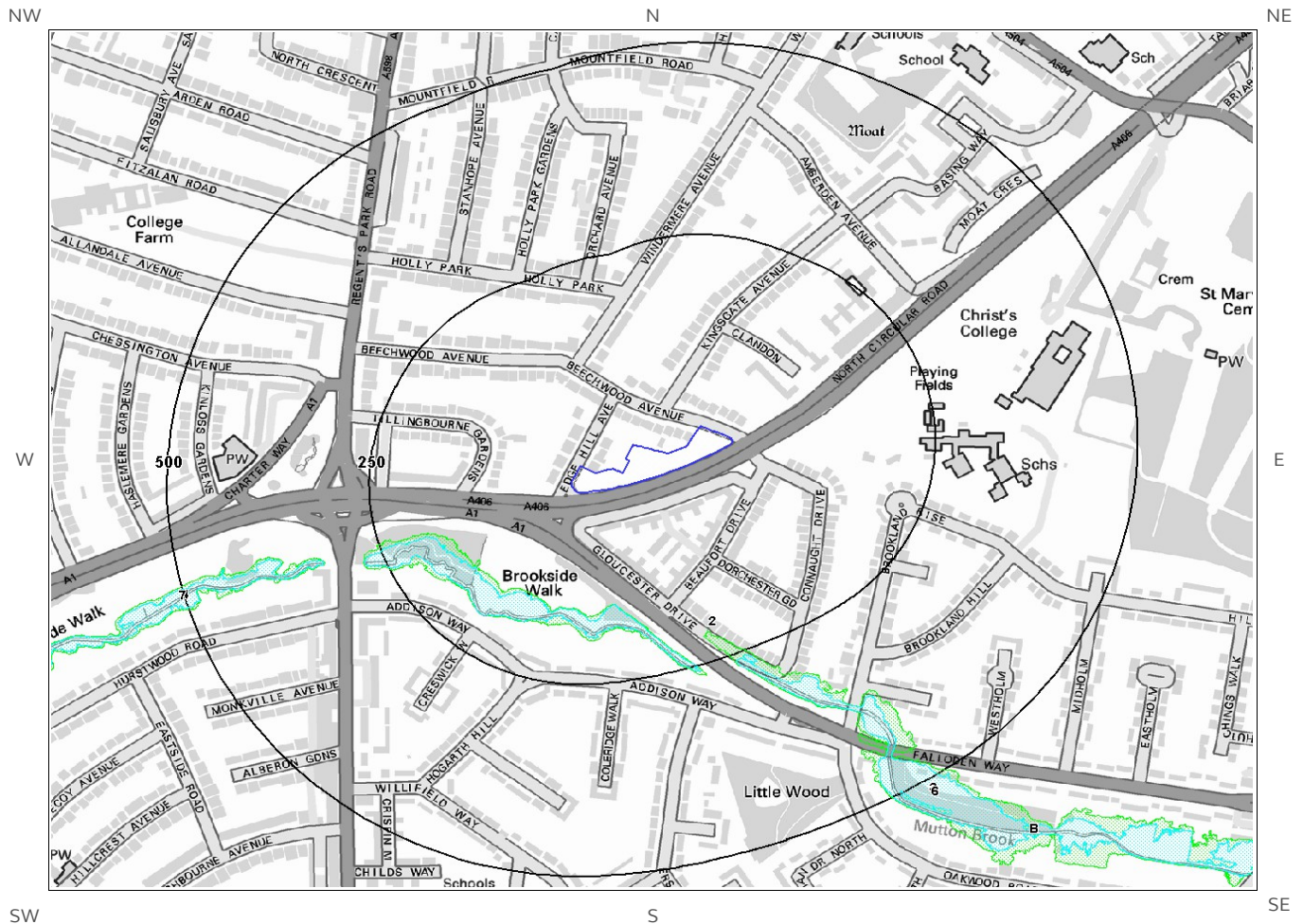
6.11 Surface Water Features

Are there any surface water features within 250m of the study site? Yes

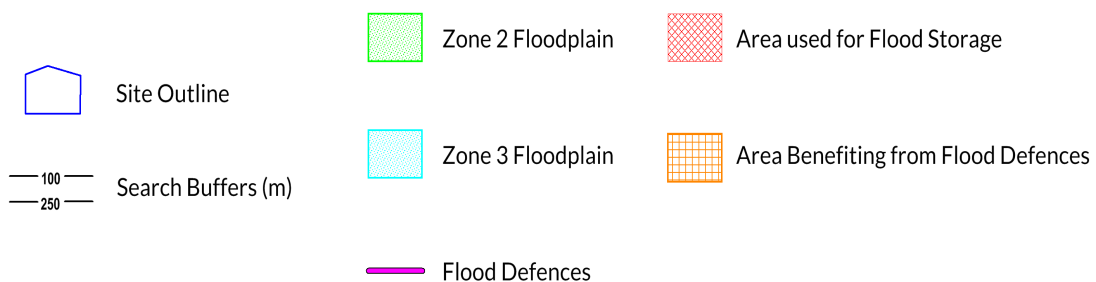
The following surface water records are not represented on mapping:

Distance (m)	Direction
124	SW
157	S
167	SW

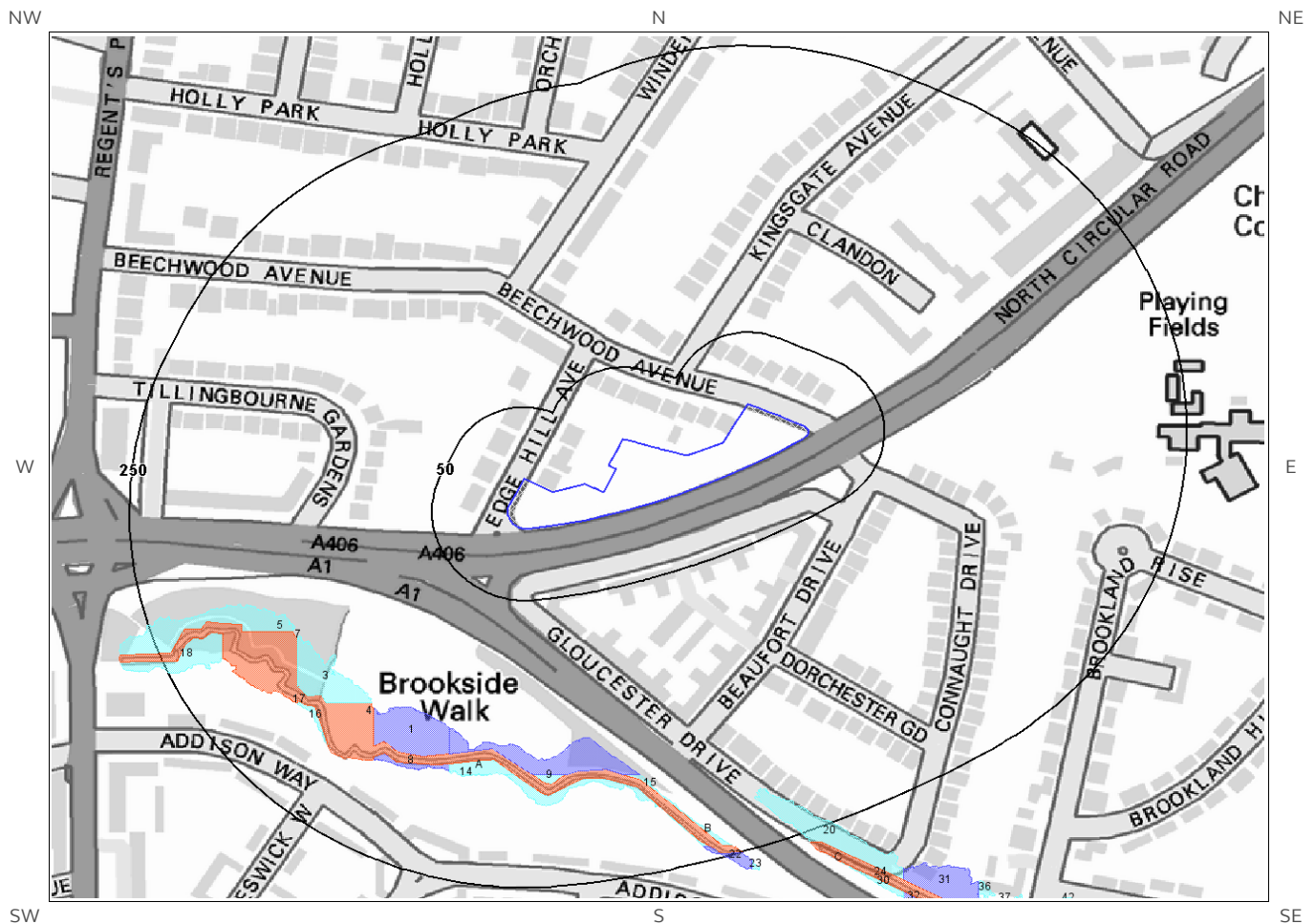
7a. Environment Agency/Natural Resources Wales Flood Map for Planning (from rivers and the sea)



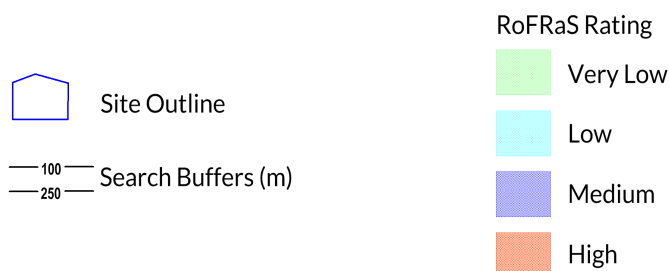
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7b. Environment Agency/Natural Resources Wales Risk of Flooding from Rivers and the Sea (RoFRaS) Map



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7 Flooding

7.1 River and Coastal Zone 2 Flooding

Is the site within 250m of an Environment Agency/Natural Resources Wales Zone 2 floodplain? **Yes**

Environment Agency/Natural Resources Wales Zone 2 floodplains estimate the annual probability of flooding as between 1 in 1000 (0.1%) and 1 in 100 (1%) from rivers and between 1 in 1000 (0.1%) and 1 in 200 (0.5%) from the sea. Any relevant data is represented on Map 7a – Flood Map for Planning:

ID	Distance (m)	Direction	Update	Type
1A	143	SW	01-Feb-2017	Zone 2 - (Fluvial /Tidal Models)
2	209	S	01-Feb-2017	Zone 2 - (Fluvial /Tidal Models)
3	211	S	01-Feb-2017	Zone 2 - (Fluvial /Tidal Models)

7.2 River and Coastal Zone 3 Flooding

Is the site within 250m of an Environment Agency/Natural Resources Wales Zone 3 floodplain? **Yes**

Zone 3 shows the extent of a river flood with a 1 in 100 (1%) or greater chance of occurring in any year or a sea flood with a 1 in 200 (0.5%) or greater chance of occurring in any year. Any relevant data is represented on Map 7a – Flood Map for Planning.

ID	Distance (m)	Direction	Update	Type
1A	146	SW	01-Feb-2017	Zone 3 - (Fluvial Models)

7.3 Risk of Flooding from Rivers and the Sea (RoFRaS) Flood Rating

What is the highest risk of flooding onsite? **Very Low**

The Environment Agency/Natural Resources Wales RoFRaS database provides an indication of river and coastal flood risk at a national level on a 50m grid with the flood rating at the centre of the grid calculated and given above. The data considers the probability that the flood defences will overtop or breach by considering their location, type, condition and standard of protection.

RoFRaS data for the study site indicates the property is in an area with a Very Low (less than 1 in 1000) chance of flooding in any given year.

7.4 Flood Defences

Are there any Flood Defences within 250m of the study site? No
Database searched and no data found.

7.5 Areas benefiting from Flood Defences

Are there any areas benefiting from Flood Defences within 250m of the study site? No

7.6 Areas benefiting from Flood Storage

Are there any areas used for Flood Storage within 250m of the study site? No

7.7 Groundwater Flooding Susceptibility Areas

7.7.1 Are there any British Geological Survey groundwater flooding susceptibility areas within 50m of the boundary of the study site? Yes

Does this relate to Clearwater Flooding or Superficial Deposits Flooding? Superficial Deposits Flooding

Notes: Groundwater flooding may either be associated with shallow unconsolidated sedimentary aquifers which overlie unproductive aquifers (Superficial Deposits Flooding), or with unconfined aquifers (Clearwater Flooding).

7.7.2 What is the highest susceptibility to groundwater flooding in the search area based on the underlying geological conditions?

Potential below Surface

Where potential for groundwater flooding of property situated below ground level is indicated, this means that given the geological conditions there may be a groundwater flooding hazard to basements and other below surface infrastructure. Unless other relevant information, e.g. records of previous flooding, suggests groundwater flooding has occurred before in this area you need take no further action in relation to groundwater flooding hazard. If there are records of previous incidences of groundwater flooding, then is recommended that other information e.g. rainfall history, property type, and land drainage information in addition to previous records of flooding be investigated in order to establish relative, but not absolute, risk of groundwater flooding.

7.8 Groundwater Flooding Confidence Areas

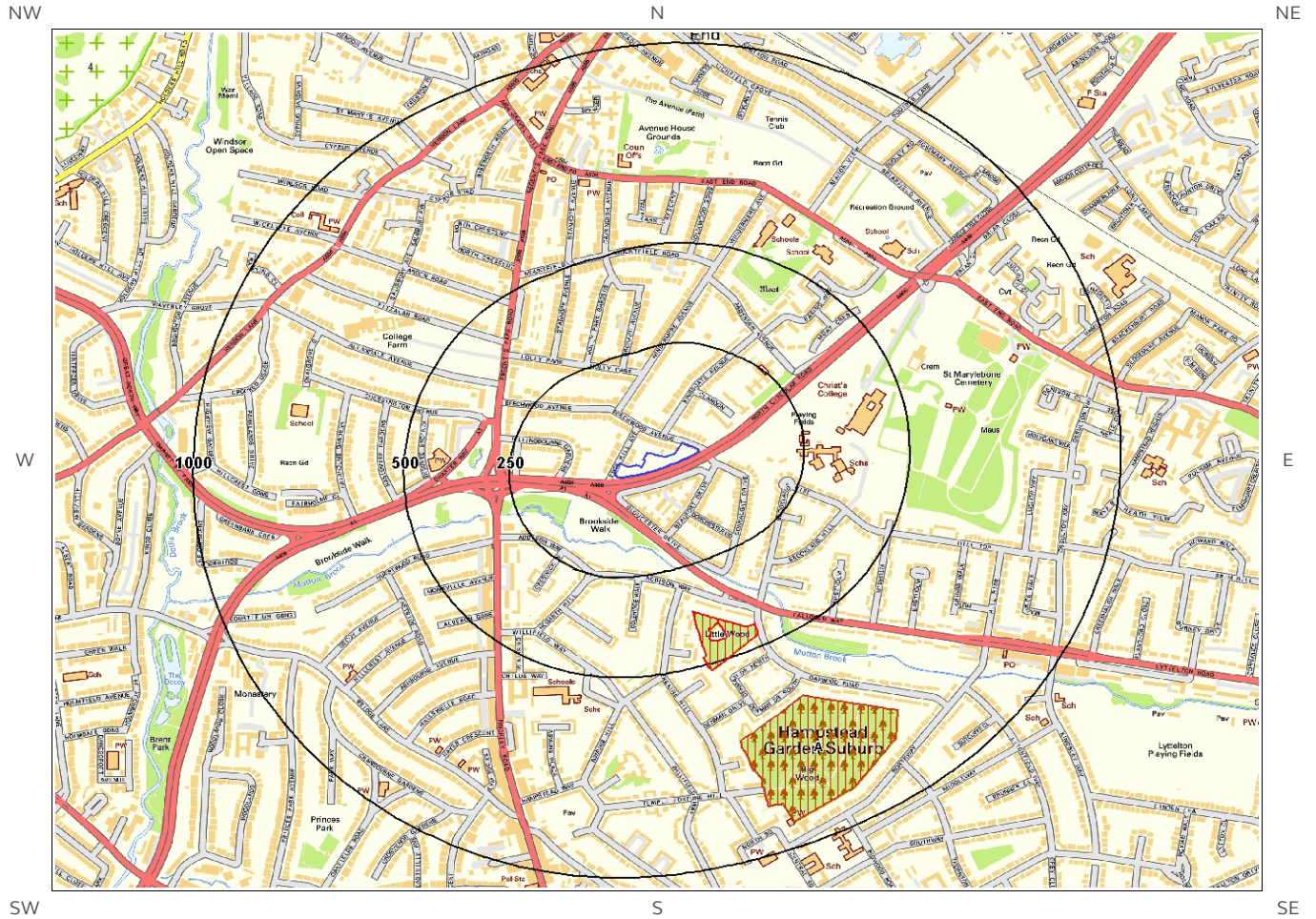
What is the British Geological Survey confidence rating in this result?

Moderate

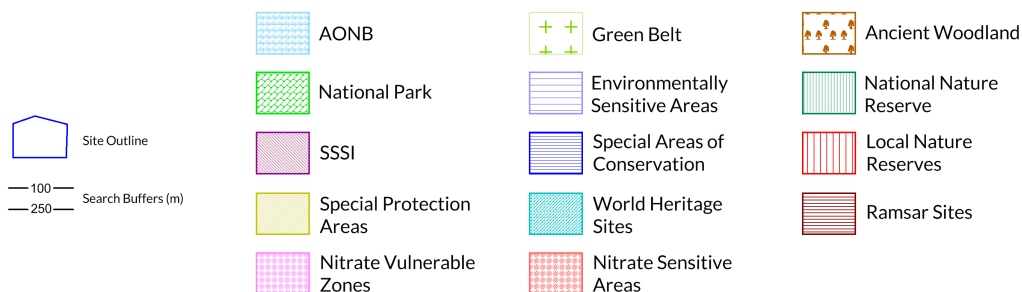
Notes: Groundwater flooding is defined as the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels is exceeded.

The confidence rating is on a threefold scale - Low, Moderate and High. This provides a relative indication of the BGS confidence in the accuracy of the susceptibility result for groundwater flooding. This is based on the amount and precision of the information used in the assessment. In areas with a relatively lower level of confidence the susceptibility result should be treated with more caution. In other areas with higher levels of confidence the susceptibility result can be used with more confidence.

8. Designated Environmentally Sensitive Sites Map



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8. Designated Environmentally Sensitive Sites

Presence of Designated Environmentally Sensitive Sites within 2000m of the study site? Yes

8.1 Records of Sites of Special Scientific Interest (SSSI) within 2000m of the study site:

0

Database searched and no data found.

8.2 Records of National Nature Reserves (NNR) within 2000m of the study site:

0

Database searched and no data found.

8.3 Records of Special Areas of Conservation (SAC) within 2000m of the study site:

0

Database searched and no data found.

8.4 Records of Special Protection Areas (SPA) within 2000m of the study site:

0

Database searched and no data found.

8.5 Records of Ramsar sites within 2000m of the study site:

0

Database searched and no data found.

8.6 Records of Ancient Woodland within 2000m of the study site:

1

The following records of Designated Ancient Woodland provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	Ancient Woodland Name	Data Source
3A	654	SE	UNKNOWN	Ancient and Semi-Natural Woodland

8.7 Records of Local Nature Reserves (LNR) within 2000m of the study site:

2

The following Local Nature Reserve (LNR) records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	LNR Name	Data Source
1	364	S	Big Wood & Little Wood	Natural England
2A	654	SE	Big Wood & Little Wood	Natural England

8.8 Records of World Heritage Sites within 2000m of the study site:

0

Database searched and no data found.

8.9 Records of Environmentally Sensitive Areas within 2000m of the study site:

0

Database searched and no data found.

8.10 Records of Areas of Outstanding Natural Beauty (AONB) within 2000m of the study site:

0

Database searched and no data found.

8.11 Records of National Parks (NP) within 2000m of the study site:

0

Database searched and no data found.

8.12 Records of Nitrate Sensitive Areas within 2000m of the study site:

0

Database searched and no data found.

8.13 Records of Nitrate Vulnerable Zones within 2000m of the study site:

0

Database searched and no data found.

8.14 Records of Green Belt land within 2000m of the study site:

2

Green Belt data contains Ordnance Survey data © Crown copyright and database right [2015].

ID	Distance	Direction	Green Belt Name	Local Authority Name
4	1501	NW	London Area Greenbelt	Barnet London Borough
Not shown	1691	N	London Area Greenbelt	Barnet London Borough

9. Natural Hazards Findings

9.1 Detailed BGS GeoSure Data

BGS GeoSure Data has been searched to 50m. The data is included in tabular format. If you require further information on geology and ground stability, please obtain a **Groundsure Geo Insight**, available from our [website](#). The following information has been found:

9.1.1 Shrink Swell

What is the maximum Shrink-Swell* hazard rating identified on the study site? Moderate

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Ground conditions predominantly high plasticity. Do not plant or remove trees or shrubs near to buildings without expert advice about their effect and management. For new build, consideration should be given to advice published by the National House Building Council (NHBC) and the Building Research Establishment (BRE). There is a probable increase in construction cost to reduce potential shrink-swell problems. For existing property, there is a probable increase in insurance risk during droughts or where vegetation with high moisture demands is present.

9.1.2 Landslides

What is the maximum Landslide* hazard rating identified on the study site? Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Possibility of slope instability problems after major changes in ground conditions. Consideration should be given to stability if changes to drainage or excavations take place. Possible increase in construction cost to reduce potential slope stability problems. Existing property no significant increase in insurance risk due to natural slope instability problems.

9.1.3 Soluble Rocks

What is the maximum Soluble Rocks* hazard rating identified on the study site? Negligible

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.

* This indicates an automatically generated 50m buffer and site.

9.1.4 Compressible Ground

What is the maximum Compressible Ground* hazard rating identified on the study site? Negligible

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
No indicators for compressible deposits identified. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.

9.1.5 Collapsible Rocks

What is the maximum Collapsible Rocks* hazard rating identified on the study site? Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

9.1.6 Running Sand

What is the maximum Running Sand** hazard rating identified on the study site? Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Very low potential for running sand problems if water table rises or if sandy strata are exposed to water. No special actions required, to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.

9.2 Radon

9.2.1 Radon Affected Areas

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.

* This indicates an automatically generated 50m buffer and site.

9.2.2 Radon Protection

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.

10. Mining

10.1 Coal Mining

Are there any coal mining areas within 75m of the study site? No

Database searched and no data found.

10.2 Non-Coal Mining

Are there any Non-Coal Mining areas within 50m of the study site boundary? No

Database searched and no data found.

10.3 Brine Affected Areas

Are there any brine affected areas within 75m of the study site? No

Guidance: No Guidance Required.

Contact Details

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info@groundsure.com

British Geological Survey Enquiries

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BGS Geological Hazards Reports and general geological enquiries:
enquiries@bgs.ac.uk

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Web: www.environment-agency.gov.uk

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Hampshire RG27 8NW
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<https://www.groundsure.com/terms-and-conditions-sept-2016>

Groundsure Geo Insight

Address: LAND AT BEECHWOOD AVENUE, BARNET, N3 3BB
Date: 16 May 2017
Reference: GS-3884790
Client: Arcadis



Aerial Photograph Capture date: 28-Apr-2013
Grid Reference: 525193,189457
Site Size: 0.58ha

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Overview of Findings

The Groundsure Geo Insight provides high quality geo-environmental information that allows geo-environmental professionals and their clients to make informed decisions and be forewarned of potential ground instability problems that may affect the ground investigation, foundation design and possibly remediation options that could lead to possible additional costs.

The report is based on the BGS 1:50,000 and 1:10,000 Digital Geological Map of Great Britain, BGS Geosure data; BRITPITS database; Non-coal mining data and Borehole Records, Coal Authority data including brine extraction areas, PBA non-coal mining and natural cavities database, Johnson Poole and Bloomer mining data and Groundsure's unique database including historical surface ground and underground workings.

For further details on each dataset, please refer to each individual section in the 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: Geology 1:10,000 Scale

1.1 Artificial Ground	1.1 Is there any Artificial Ground/ Made Ground present beneath the study site at 1:10,000 scale?	No
1.2 Superficial Geology and Landslips	1.2.1 Is there any Superficial Ground/Drift Geology present beneath the study site at 1:10,000 scale?*	Yes
	1.2.2 Are there any records of landslide within 500m of the study site boundary at 1:10,000 scale?	No
1.3 Bedrock, Solid Geology and Faults	1.3.1 For records of Bedrock and Solid Geology beneath the study site* see the detailed findings section.	
	1.3.2 Are there any records of faults within 500m of the study site boundary at 1:10,000 scale?	No

Section 2: Geology 1:50,000 Scale

2.1 Artificial Ground	2.1.1 Is there any Artificial Ground/ Made Ground present beneath the study site?	No
	2.1.2 Are there any records relating to permeability of artificial ground within the study site*boundary?	No
2.2 Superficial Geology and Landslips	2.2.1 Is there any Superficial Ground/Drift Geology present beneath the study site?*	Yes
	2.2.2 Are there any records of permeability of superficial ground within 500m of the study site?	Yes
	2.2.3 Are there any records of landslide within 500m of the study site boundary?	No
	2.2.4 Are there any records relating to permeability of landslips within the study site* boundary?	No

Section 2: Geology 1:50,000 Scale

2.3 Bedrock, Solid Geology and Faults

2.3.1 For records of Bedrock and Solid Geology beneath the study site* see the detailed findings section.

2.3.2 Are there any records relating to permeability of bedrock ground within the study site boundary?

Yes

2.3.3 Are there any records of faults within 500m of the study site boundary?

No

Section 3: Radon

3. Radon

3.1 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.

3.2 Radon Protection

No radon protective measures are necessary.

Section 4: Ground Workings

	On-site	0-50m	51-250	251-500	501-1000
4.1 Historical Surface Ground Working Features from Small Scale Mapping	0	0	2	Not Searched	Not Searched
4.2 Historical Underground Workings from Small Scale Mapping	0	0	0	0	0
4.3 Current Ground Workings	0	0	0	0	0

Section 5: Mining, Extraction & Natural Cavities

	On-site	0-50m	51-250	251-500	501-1000
5.1 Historical Mining	0	0	0	0	0
5.2 Coal Mining	0	0	0	0	0
5.3 Johnson Poole and Bloomer Mining Area	0	0	0	0	0
5.4 Non-Coal Mining*	0	0	0	0	0
5.5 Non-Coal Mining Cavities	0	0	0	0	0
5.5 Natural Cavities	0	0	0	0	0

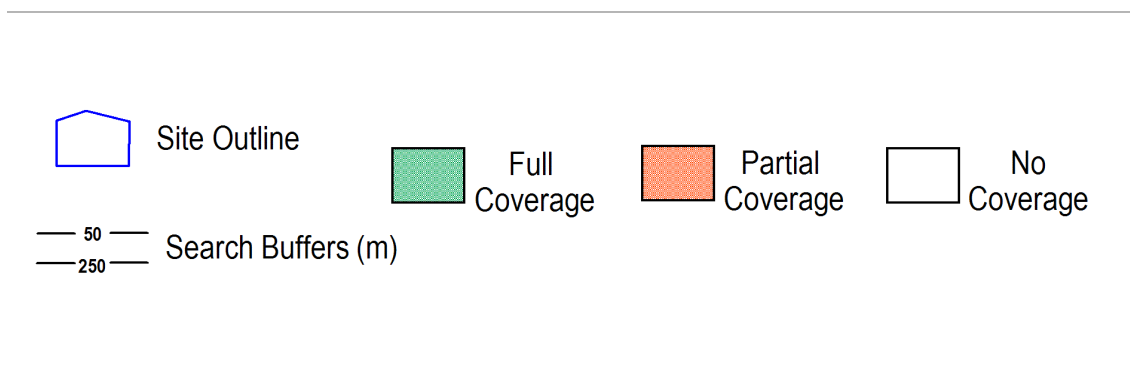
Section 5: Mining, Extraction & Natural Cavities	On-site	0-50m	51-250	251-500	501-1000
5.6 Brine Extraction	0	0	0	0	0
5.7 Gypsum Extraction	0	0	0	0	0
5.8 Tin Mining	0	0	0	0	0
5.9 Clay Mining	0	0	0	0	0
Section 6: Natural Ground Subsidence	On-site				
6.1 Shrink-Swell Clay	Moderate				
6.2 Landslides	Low				
6.3 Ground Dissolution of Soluble Rocks	Negligible				
6.4 Compressible Deposits	Negligible				
6.5 Collapsible Deposits	Very Low				
6.5 Running Sand	Very Low				
Section 7: Borehole Records	On-site	0-50m	51-250		
7 BGS Recorded Boreholes	1	5	18		
Section 8: Estimated Background Soil Chemistry	On-site	0-50m	51-250		
8 Records of Background Soil Chemistry	4	3	0		
Section 9: Railways and Tunnels	On-site	0-50m	51-250	250-500	
9.1 Tunnels	0	0	0	Not Searched	
9.2 Historical Railway and Tunnel Features	0	0	0	Not Searched	
9.3 Historical Railways	0	0	0	Not Searched	
9.4 Active Railways	0	0	0	Not Searched	
9.5 Railway Projects	0	0	0	0	

1:10,000 Scale Availability



1_10,000 Availability Legend

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Availability of 1:10,000 Scale Geology Mapping

The following information represents the availability of the key components of the 1:10,000 scale geological data.

ID	Distance	Artificial Coverage	Superficial Coverage	Bedrock Coverage	Mass Movement Coverage
1	0.0	Some deposits are mapped	Full	Full	No coverage
2	89.0	Some deposits are mapped	Full	Full	No coverage
3	492.0	Some deposits are mapped	Full	Full	No coverage
4	542.0	Some deposits are mapped	Full	Full	No coverage

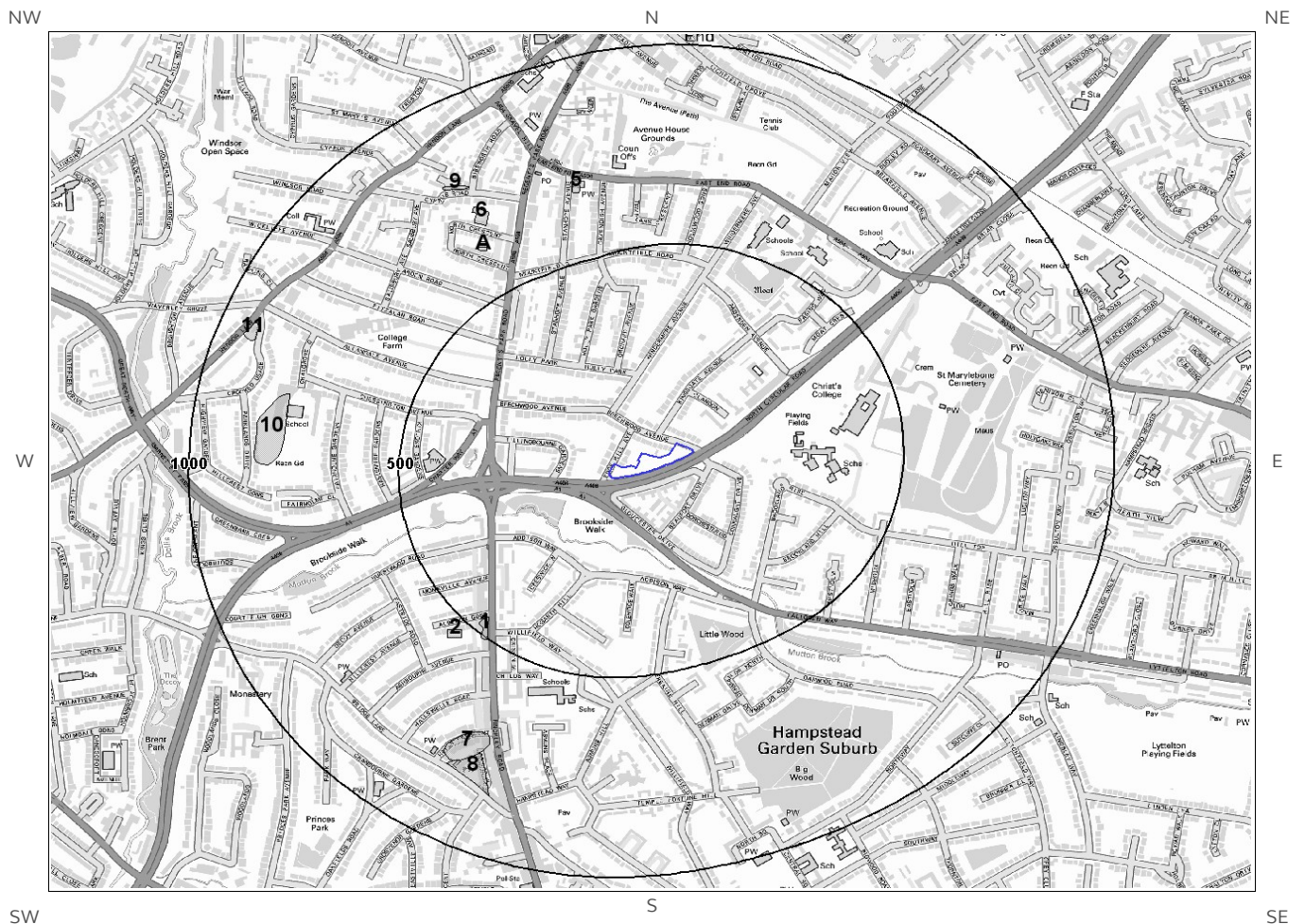
Guidance: The 1:10,000 scale geological interpretation is the most detailed generally available from BGS and is the scale at which most geological surveying is carried out in the field. The database is presented as four types of geology (artificial, mass movement, superficial and bedrock), although not all themes are mapped or available on every map sheet. Therefore a coverage layer showing the availability of the four themes is presented above.

The definitions of coverage are as follows:

Geology	Full Coverage	Partial Coverage	No Coverage
Bedrock	The whole tile has been mapped	Some but not all the tile has been mapped	No coverage
Superficial	The whole tile has been mapped	Some but not all of the tile has been mapped	No coverage
Artificial	Some deposits are mapped on this tile	-	No deposits are mapped
Mass Movement	Some deposits are mapped on this tile	-	No coverage

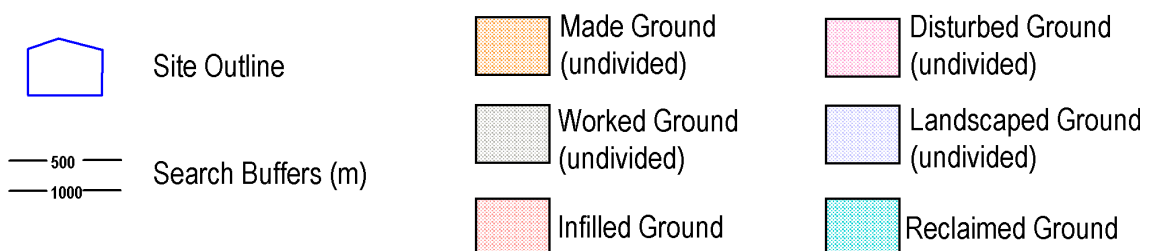
1 Geology (1:10,000 scale).

1.1 Artificial Ground Map (1:10,000 scale)



Artificial Ground Legend

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1. Geology 1:10,000 scale

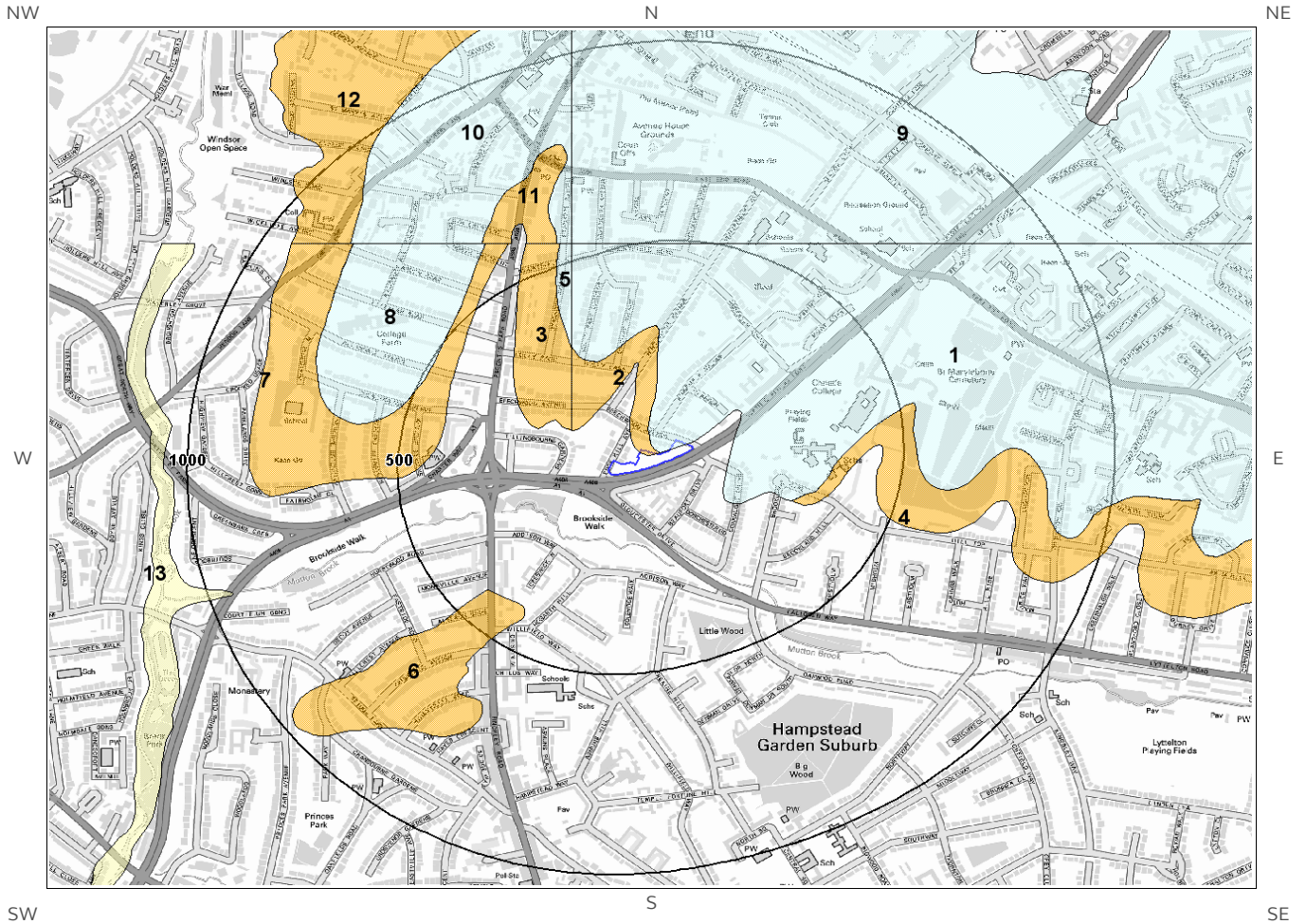
1.1 Artificial Ground

The following geological information represented on the mapping is derived from 1:10,000 scale BGS Geological mapping.

Are there any records of Artificial/ Made Ground within 500m of the study site boundary at 1:10,000 scale? Yes

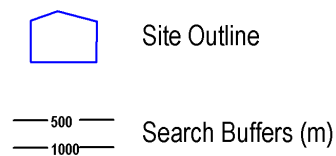
ID	Distance	Direction	LEX Code	Description	Rock Description
1	457.0	SW	WGR- UNKNOWN	Worked Ground (Undivided)	Unknown/unclassified Entry

1.2 Superficial Deposits and Landslips Map (1:10,000 scale)



Artificial Ground Legend

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1.2 Superficial Deposits and Landslips

The following geological information represented on the mapping is derived from 1:10,000 scale BGS Geological mapping

1.2.1 Superficial Deposits/ Drift Geology

Are there any records of Superficial Deposits/ Drift Geology within 500m of the study site boundary at 1:10,000 scale? Yes

ID	Distance (m)	Direction	LEX Code	Description	Rock Description
1	0.0	On Site	TILL-DMTN	Till - Diamicton	Diamicton
2	0.0	On Site	DHGR-XSV	Dollis Hill Gravel Member - Sand And Gravel	Sand And Gravel
3	127.0	NW	DHGR-XSV	Dollis Hill Gravel Member - Sand And Gravel	Sand And Gravel
4	268.0	SE	DHGR-XSV	Dollis Hill Gravel Member - Sand And Gravel	Sand And Gravel
5	302.0	N	TILL-DMTN	Till - Diamicton	Diamicton
6	390.0	SW	DHGR-XSV	Dollis Hill Gravel Member - Sand And Gravel	Sand And Gravel
7	405.0	W	DHGR-XSV	Dollis Hill Gravel Member - Sand And Gravel	Sand And Gravel
8	490.0	NW	TILL-DMTN	Till - Diamicton	Diamicton
9	492.0	N	TILL-DMTN	Till - Diamicton	Diamicton

1.2.2 Landslip

Are there any records of Landslip within 500m of the study site boundary at 1:10,000 scale?

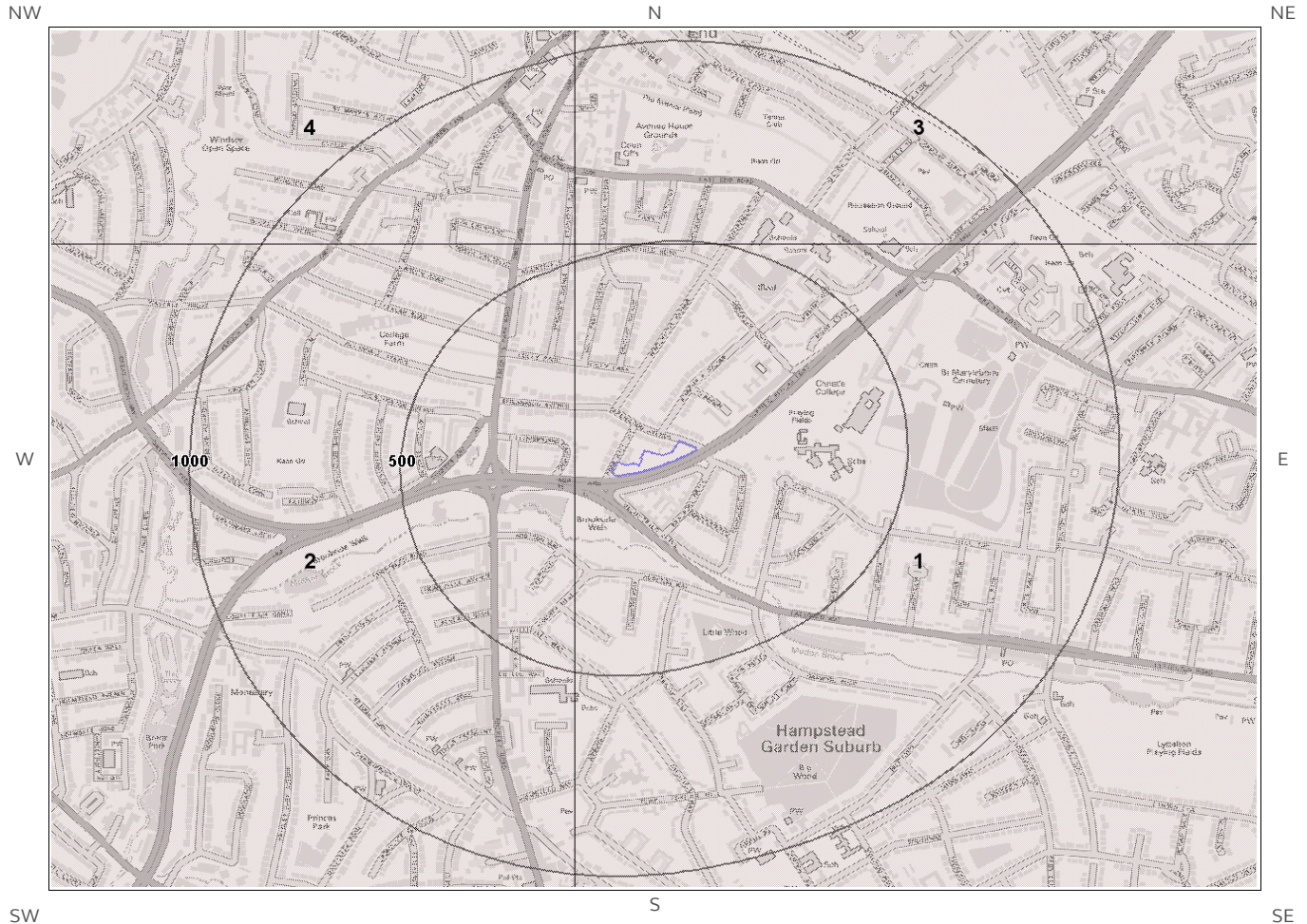
No

Database searched and no data found.

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of Great Britain at 1:10,000 scale

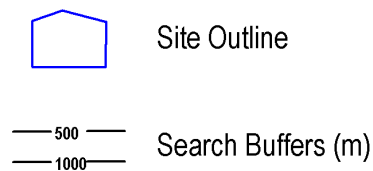
This Geology shows the main components as discrete layers, these are: Artificial / Made Ground, Superficial / Drift Geology and Landslips. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

1.3 Bedrock and Faults Map (1:10,000 scale)



Bedrock and Faults Legend

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1.3 Bedrock and Faults

The following geological information represented on the mapping is derived from 1:10,000 scale BGS Geological mapping.

1.3.1 Bedrock/ Solid Geology

Records of Bedrock/Solid Geology within 500m of the study site boundary at 1:10,000 scale.

ID	Distance (m)	Direction	LEX Code	Description	Rock Age
1	0.0	On Site	LC-CLAY	London Clay Formation - Clay	Eocene Epoch
2	89.0	W	LC-CLAY	London Clay Formation - Clay	Eocene Epoch
3	492.0	N	LC-CLAY	London Clay Formation - Clay	Eocene Epoch

1.3.2 Faults

Are there any records of Faults within 500m of the study site boundary at 1:10,000 scale? No

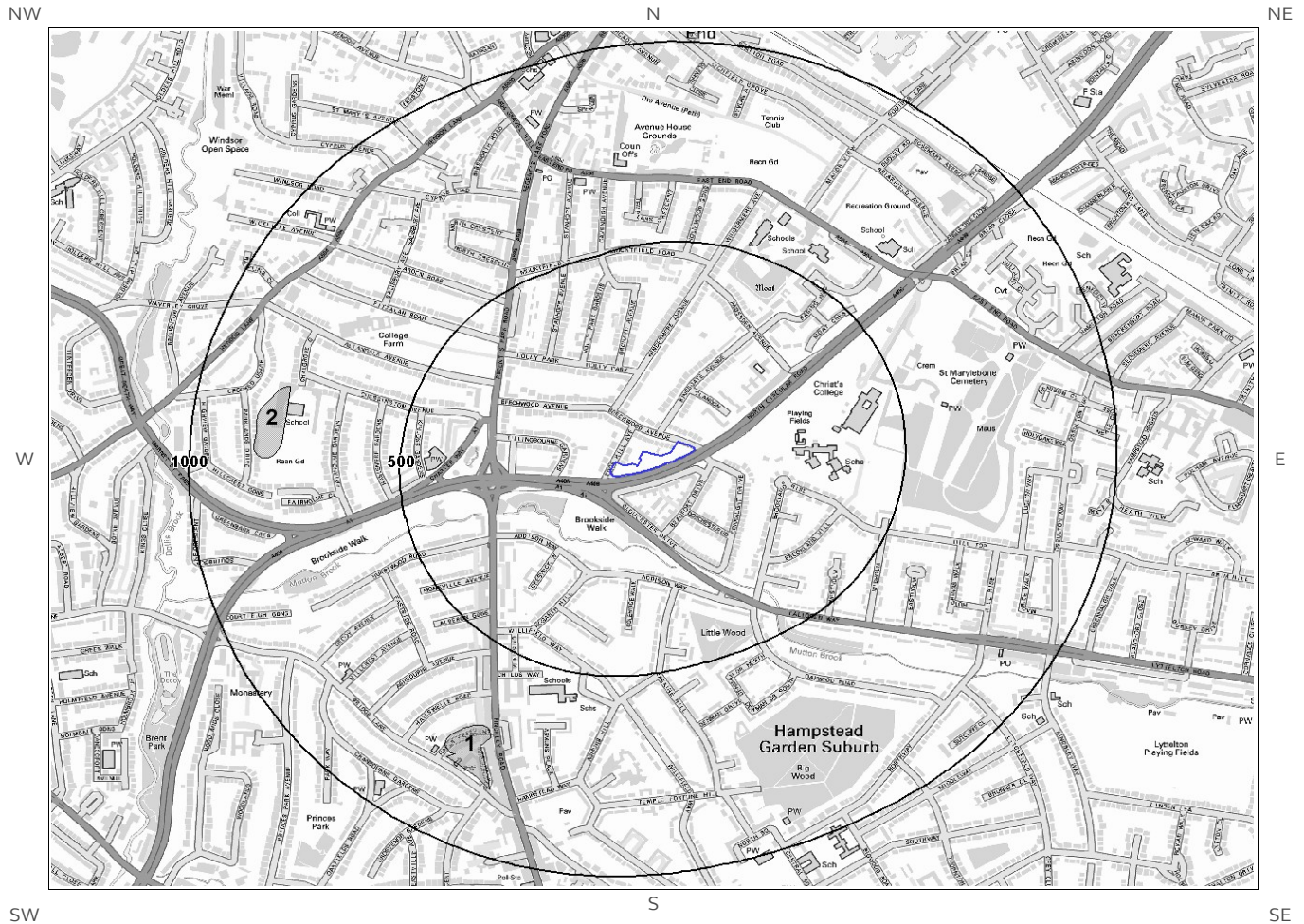
Database searched and no data found at this scale.

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of great Britain at 1:10,000 scale.

This Geology shows the main components as discrete layers, these are: Bedrock/ Solid Geology and linear features such as Faults. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

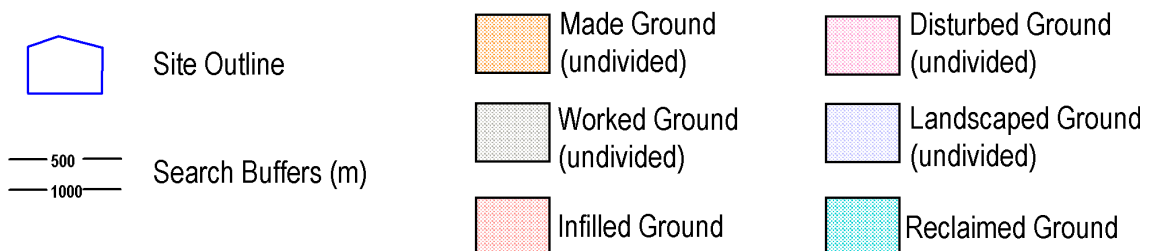
2 Geology 1:50,000 Scale

2.1 Artificial Ground Map



Ground Workings Legend

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2. Geology 1:50,000 scale

2.1 Artificial Ground

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No: 256

2.1.1 Artificial/ Made Ground

Are there any records of Artificial/ Made Ground within 500m of the study site boundary? No

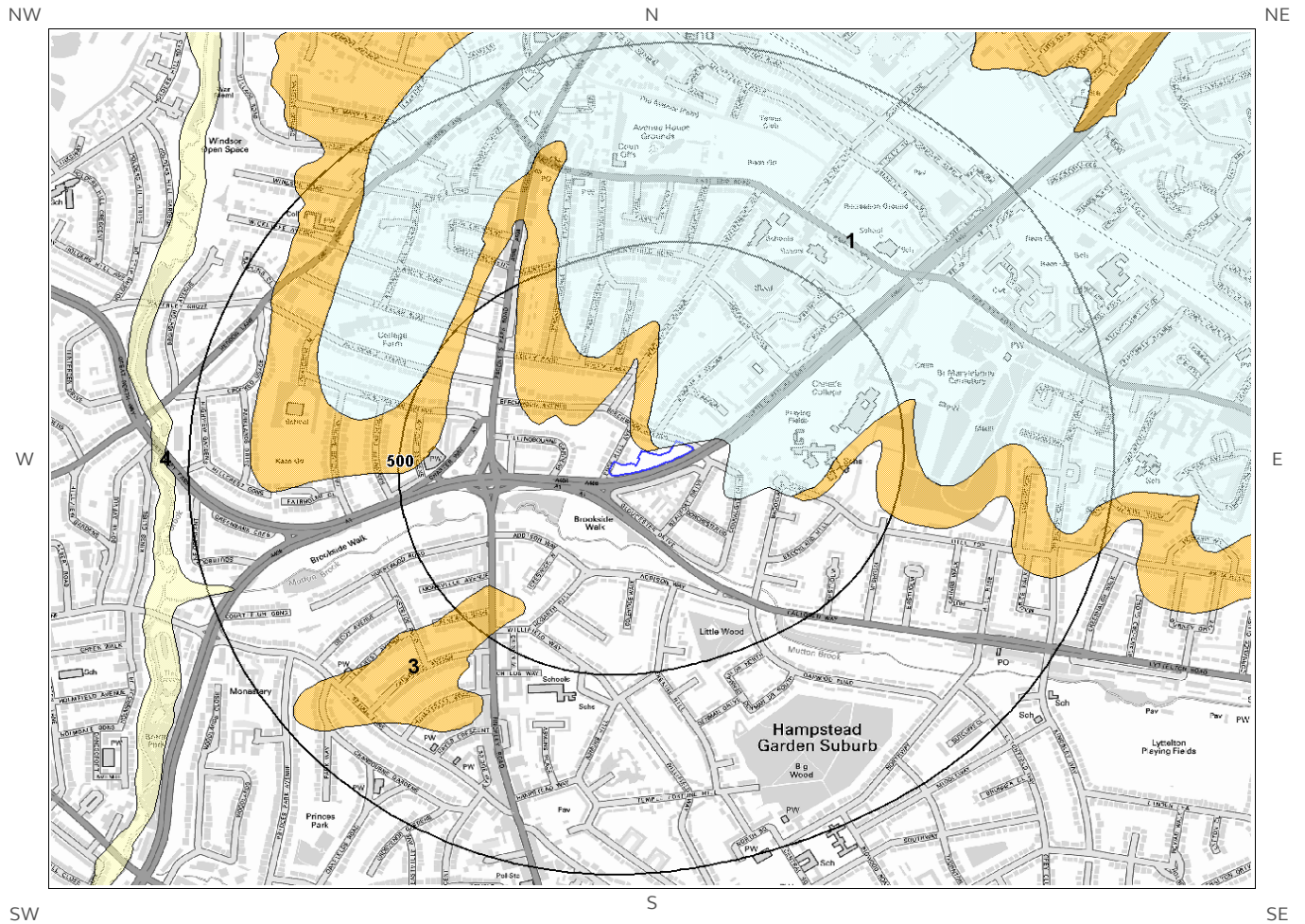
Database searched and no data found.

2.1.2 Permeability of Artificial Ground

Are there any records relating to permeability of artificial ground within the study site boundary? No

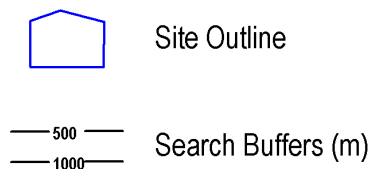
Database searched and no data found.

2.2 Superficial Deposits and Landslips Map (1:50,000 scale)



Ground Workings Legend

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2.2 Superficial Deposits and Landslips

2.2.1 Superficial Deposits/ Drift Geology

Are there any records of Superficial Deposits/ Drift Geology within 500m of the study site boundary? Yes

ID	Distance	Direction	LEX Code	Description	Rock Description
1	0.0	On Site	LOFT-DMTN	LOWESTOFT FORMATION	DIAMICTON
2	4.0	N	DHGR-XSV	DOLLIS HILL GRAVEL MEMBER	SAND AND GRAVEL
3	379.0	SW	DHGR-XSV	DOLLIS HILL GRAVEL MEMBER	SAND AND GRAVEL

2.2.2 Permeability of Superficial Ground

Are there any records relating to permeability of superficial ground within the study site boundary? Yes

Distance (m)	Direction	Flow Type	Maximum Permeability	Minimum Permeability
0.0	On Site	Mixed	Moderate	Low
4.0	N	Intergranular	Very High	High

2.2.3 Landslip

Are there any records of Landslip within 500m of the study site boundary? No

Database searched and no data found.

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of Great Britain at 1:50,000 scale.

This Geology shows the main components as discrete layers, there are: Artificial/ Made Ground, Superficial/ Drift Geology and Landslips. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

2.2.4 Landslip Permeability

Are there any records relating to permeability of landslips within the study site boundary? No

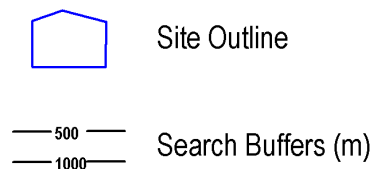
Database searched and no data found.

2.3 Bedrock and Faults Map (1:50,000 scale)



Ground Workings Legend

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2.3 Bedrock, Solid Geology & Faults

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No: 256

2.3.1 Bedrock/Solid Geology

Records of Bedrock/Solid Geology within 500m of the study site boundary:

ID	Distance	Direction	LEX Code	Rock Description	Rock Age
1	0.0	On Site	LC-XCZS	LONDON CLAY FORMATION - CLAY, SILT AND SAND	YPRESIAN

2.3.2 Permeability of Bedrock Ground

Are there any records relating to permeability of bedrock ground within the study site boundary? Yes

Distance	Direction	Flow Type	Maximum Permeability	Minimum Permeability
0.0	On Site	Mixed	Moderate	Very Low

2.3.3 Faults

Are there any records of Faults within 500m of the study site boundary? No

Database searched and no data found.

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of Great Britain at 1:50,000 scale.

This Geology shows the main components as discrete layers, these are: Bedrock/Solid Geology and linear features such as Faults. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nation wide coverage.

3 Radon Data

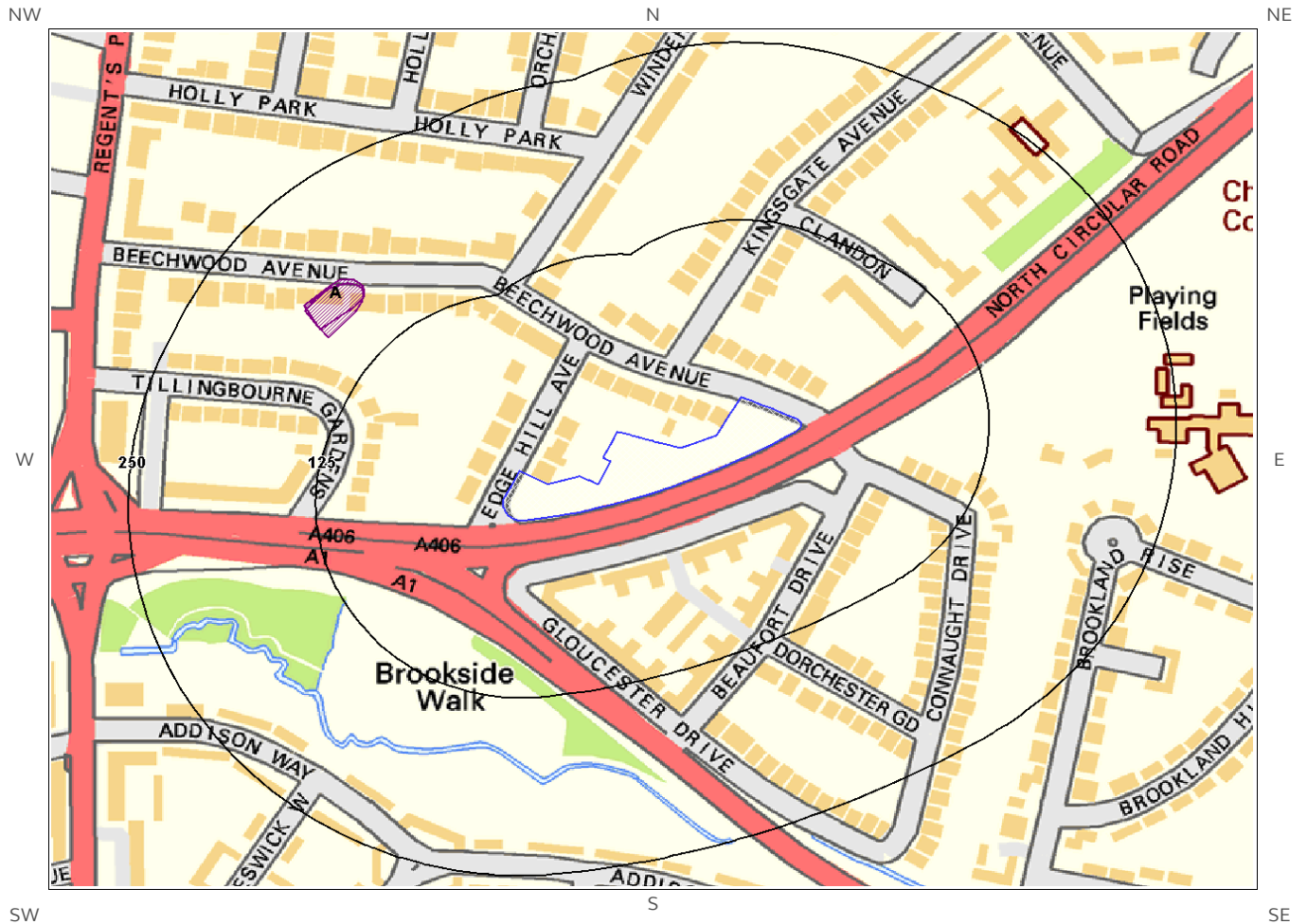
3.1 Radon Affected Areas

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.

3.2 Radon Protection



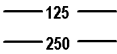

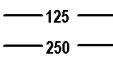
Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment? No radon protective measures are necessary.

4 Ground Workings Map



Ground Workings Legend

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-  Site Outline
-  Historic Surface Ground Workings
-  Historic Underground Workings
-  Current Ground Workings
-  Search Buffers (m)

4 Ground Workings

4.1 Historical Surface Ground Working Features derived from Historical Mapping

This dataset is based on Groundsure's unique Historical Land Use Database derived from 1:10,560 and 1:10,000 scale historical mapping

Are there any Historical Surface Ground Working Features within 250m of the study site boundary? Yes

ID	Distance (m)	Direction	NGR	Use	Date
1A	156.0	NW	524976 189569	Pond	1865
2A	159.0	NW	524976 189574	Pond	1895

4.2 Historical Underground Working Features derived from Historical Mapping

This data is derived from the Groundsure unique Historical Land Use Database. It contains data derived from 1:10,000 and 1:10,560 historical Ordnance Survey Mapping and includes some natural topographical features (Shake Holes for example) as well as manmade features that may have implications for ground stability. Underground and mining features have been identified from surface features such as shafts. The distance that these extend underground is not shown.

Are there any Historical Underground Working Features within 1000m of the study site boundary? No

Database searched and no data found.

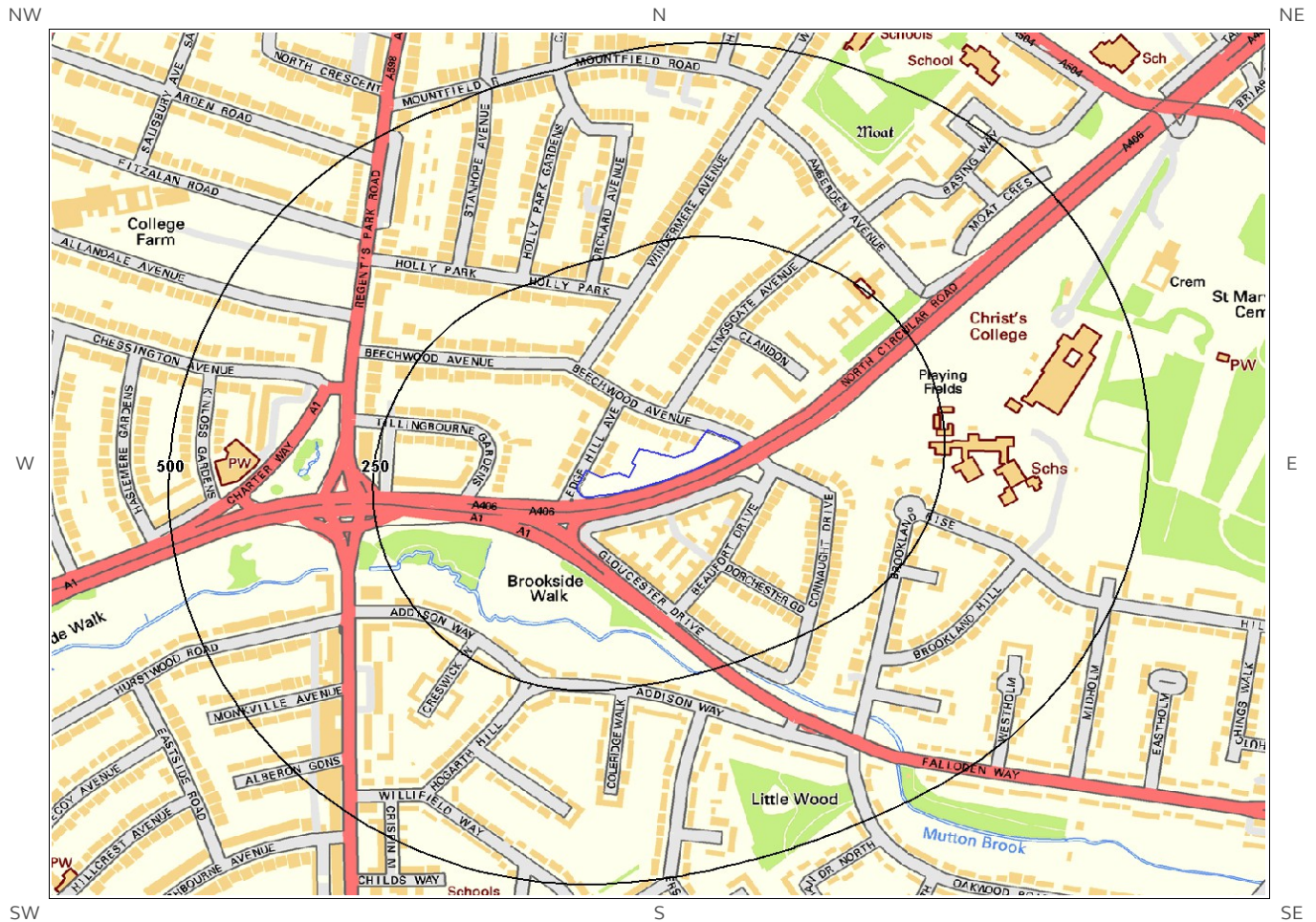
4.3 Current Ground Workings

This dataset is derived from the BGS BRITPITS database covering active; inactive mines; quarries; oil wells; gas wells and mineral wharves; and rail deposits throughout the British Isles.

Are there any BGS Current Ground Workings within 1000m of the study site boundary? No

Database searched and no data found.

5 Mining, Extraction & Natural Cavities Map



Mining, Extraction and Natural Cavities Legend

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5 Mining, Extraction & Natural Cavities

5.1 Historical Mining

This dataset is derived from Groundsure unique Historical Land-use Database that are indicative of mining or extraction activities.

Are there any Historical Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

5.2 Coal Mining

This dataset provides information as to whether the study site lies within a known coal mining affected area as defined by the coal authority.

Are there any Coal Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

5.3 Johnson Poole and Bloomer

This dataset provides information as to whether the study site lies within an area where JPB hold information relating to mining.

Are there any JPB Mining areas within 1000m of the study site boundary? No

The following information provided by JPB is not represented on mapping: Database searched and no data found.

5.4 Non-Coal Mining

This dataset provides information as to whether the study site lies within an area which may have been subject to non-coal historic mining.

Are there any Non-Coal Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

5.5 Non-Coal Mining Cavities

This dataset provides information from the Peter Brett Associates (PBA) mining cavities database (compiled for the national study entitled “Review of mining instability in Great Britain, 1990” PBA has also continued adding to this database) on mineral extraction by mining.

Are there any Non-Coal Mining cavities within 1000m of the study site boundary? No

Database searched and no data found.

5.6 Natural Cavities

This dataset provides information based on Peter Brett Associates natural cavities database.

Are there any Natural Cavities within 1000m of the study site boundary? No

Database searched and no data found.

5.7 Brine Extraction

This data provides information from the Coal Authority issued on behalf of the Cheshire Brine Subsidence Compensation Board.

Are there any Brine Extraction areas within 1000m of the study site boundary? No

Database searched and no data found.

5.8 Gypsum Extraction

This dataset provides information on Gypsum extraction from British Gypsum records.

Are there any Gypsum Extraction areas within 1000m of the study site boundary? No

Database searched and no data found.

5.9 Tin Mining

This dataset provides information on tin mining areas and is derived from tin mining records. This search is based upon postcode information to a sector level..

Are there any Tin Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

5.10 Clay Mining

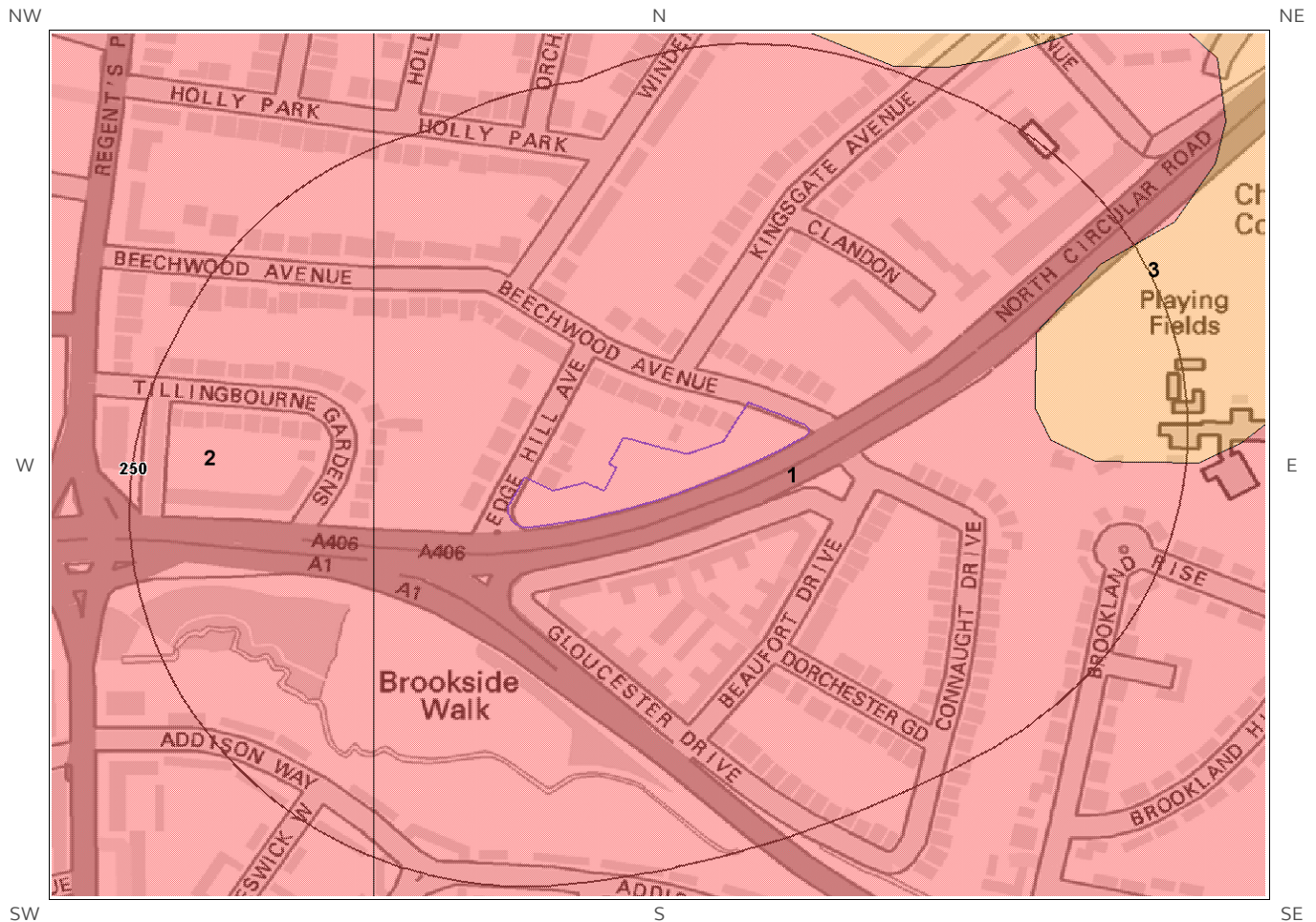
This dataset provides information on Kaolin and Ball Clay mining from relevant mining records.

Are there any Clay Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

6 Natural Ground Subsidence

6.1 Shrink-Swell Clay Map

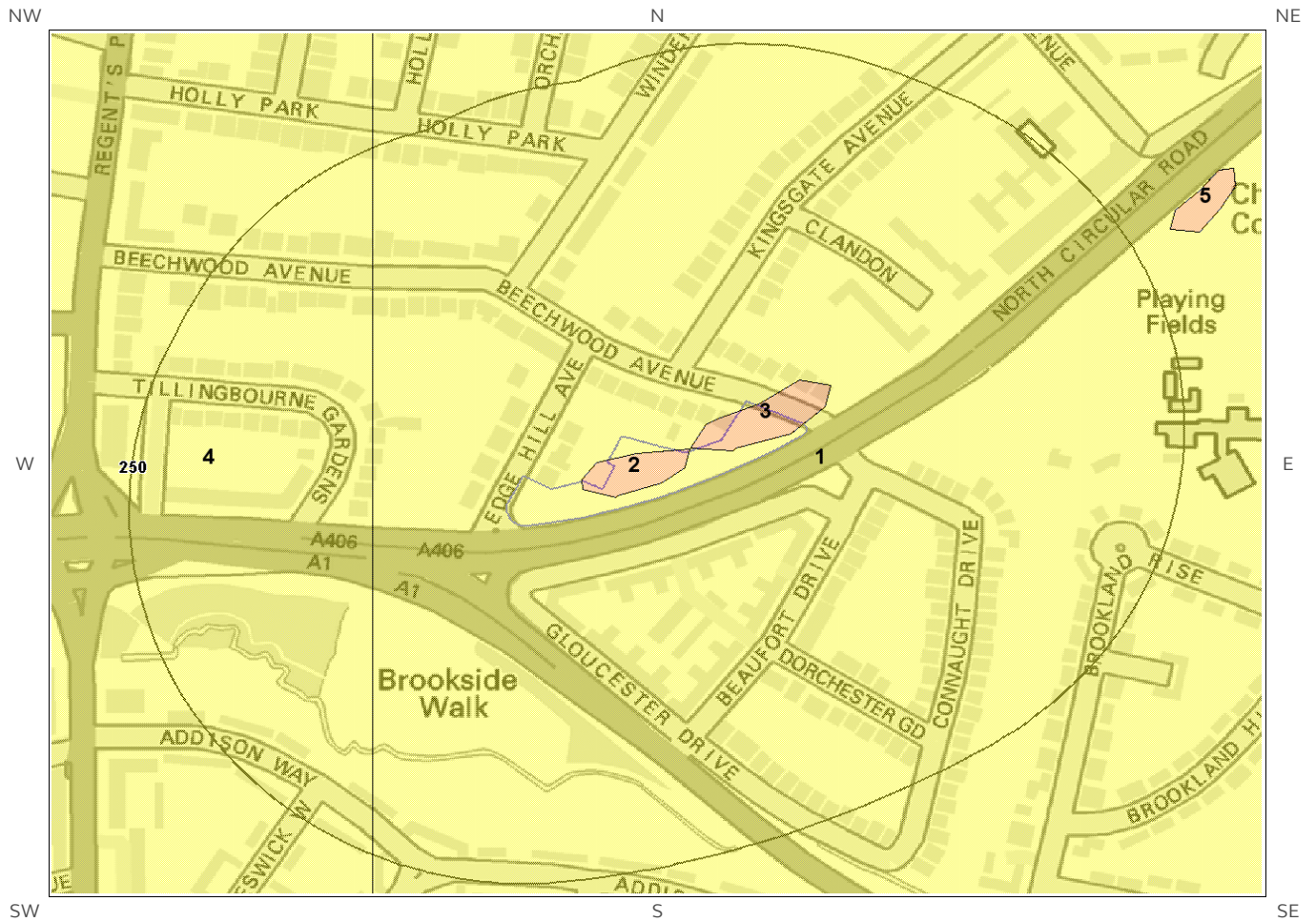


Shrink Swell Clay Legend

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6.2 Landslides Map

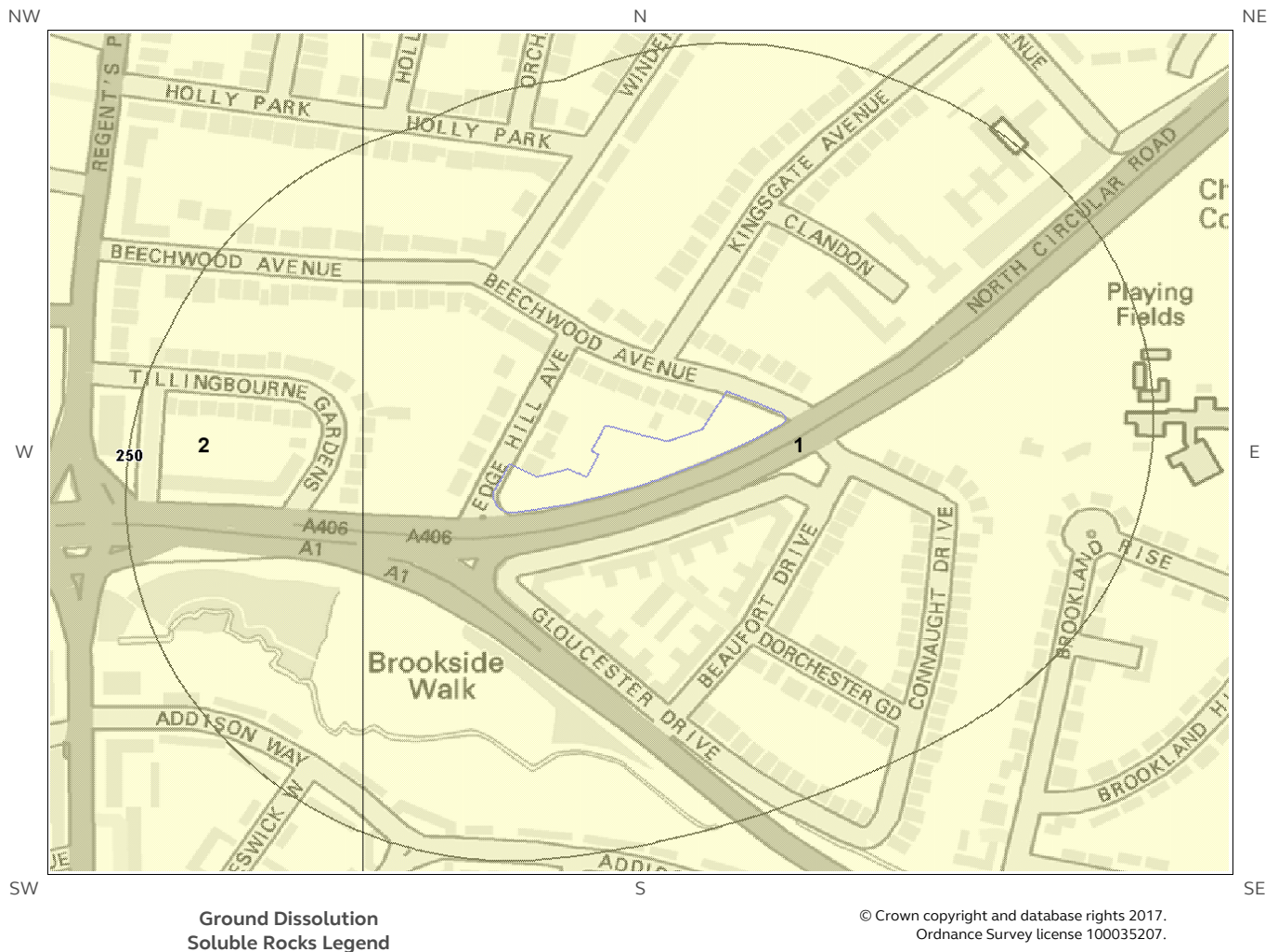


Landslides Legend

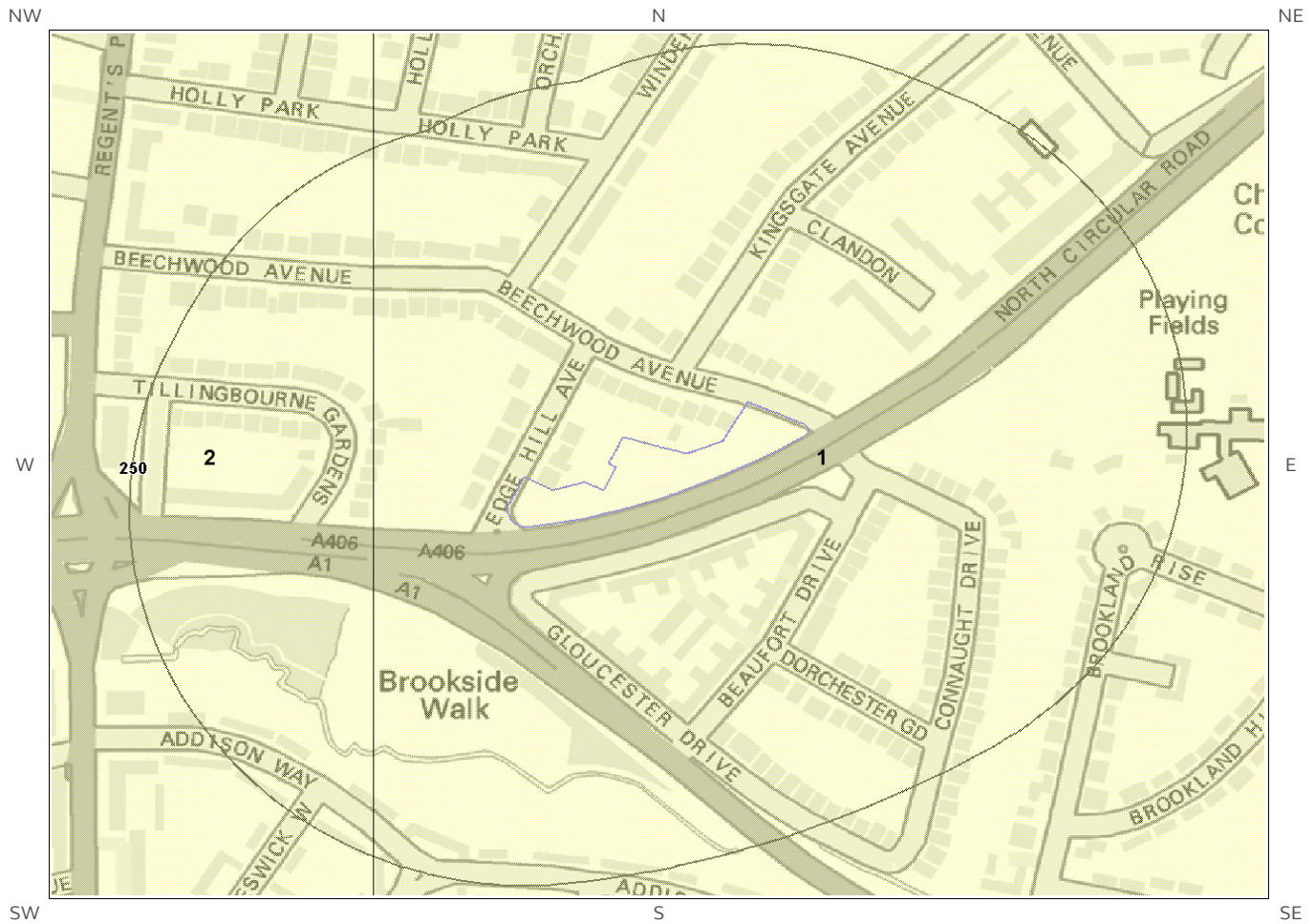
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6.3 Ground Dissolution of Soluble Rocks Map



6.4 Compressible Deposits Map

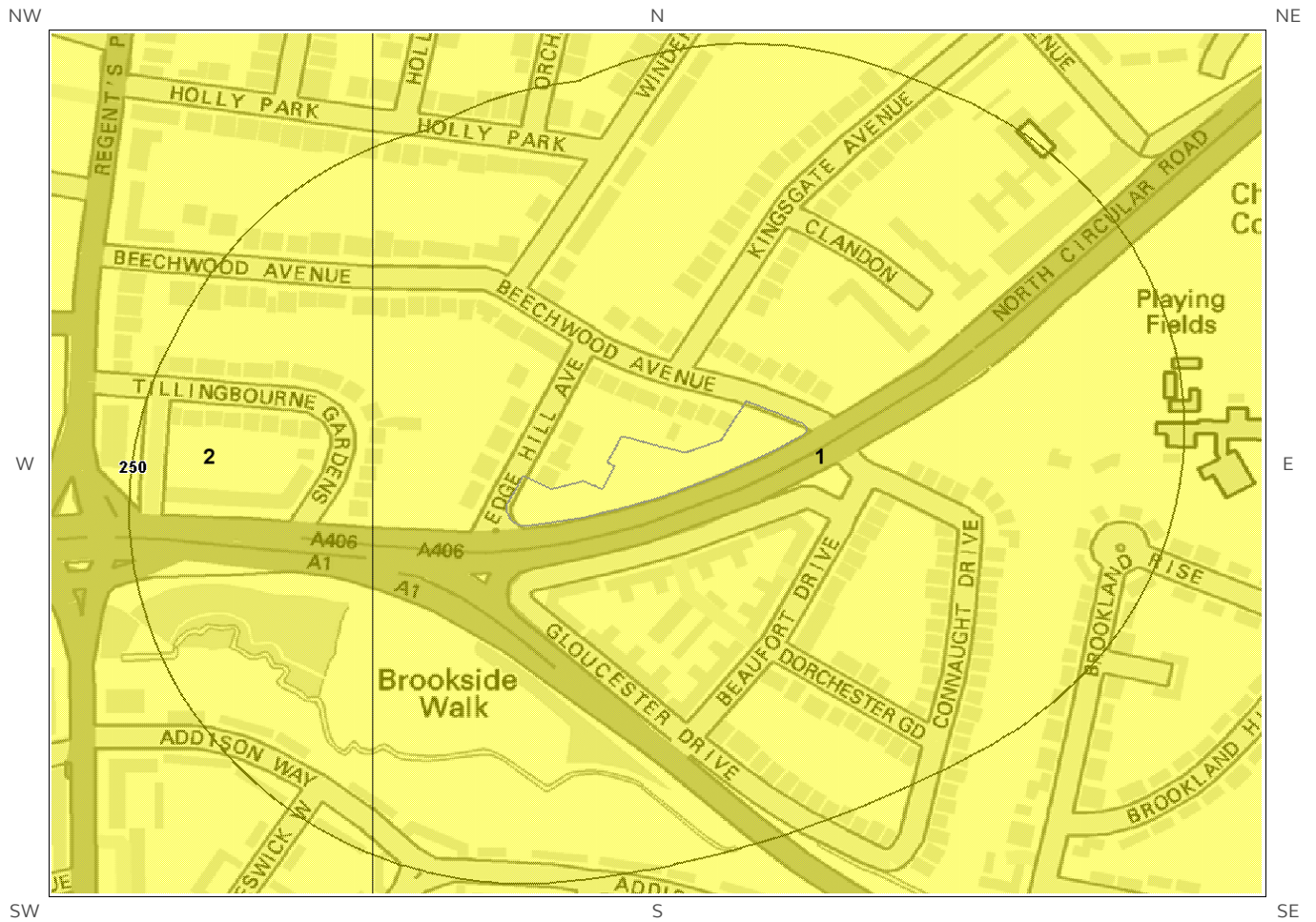


Compressible Deposits Legend

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6.5 Collapsible Deposits Map

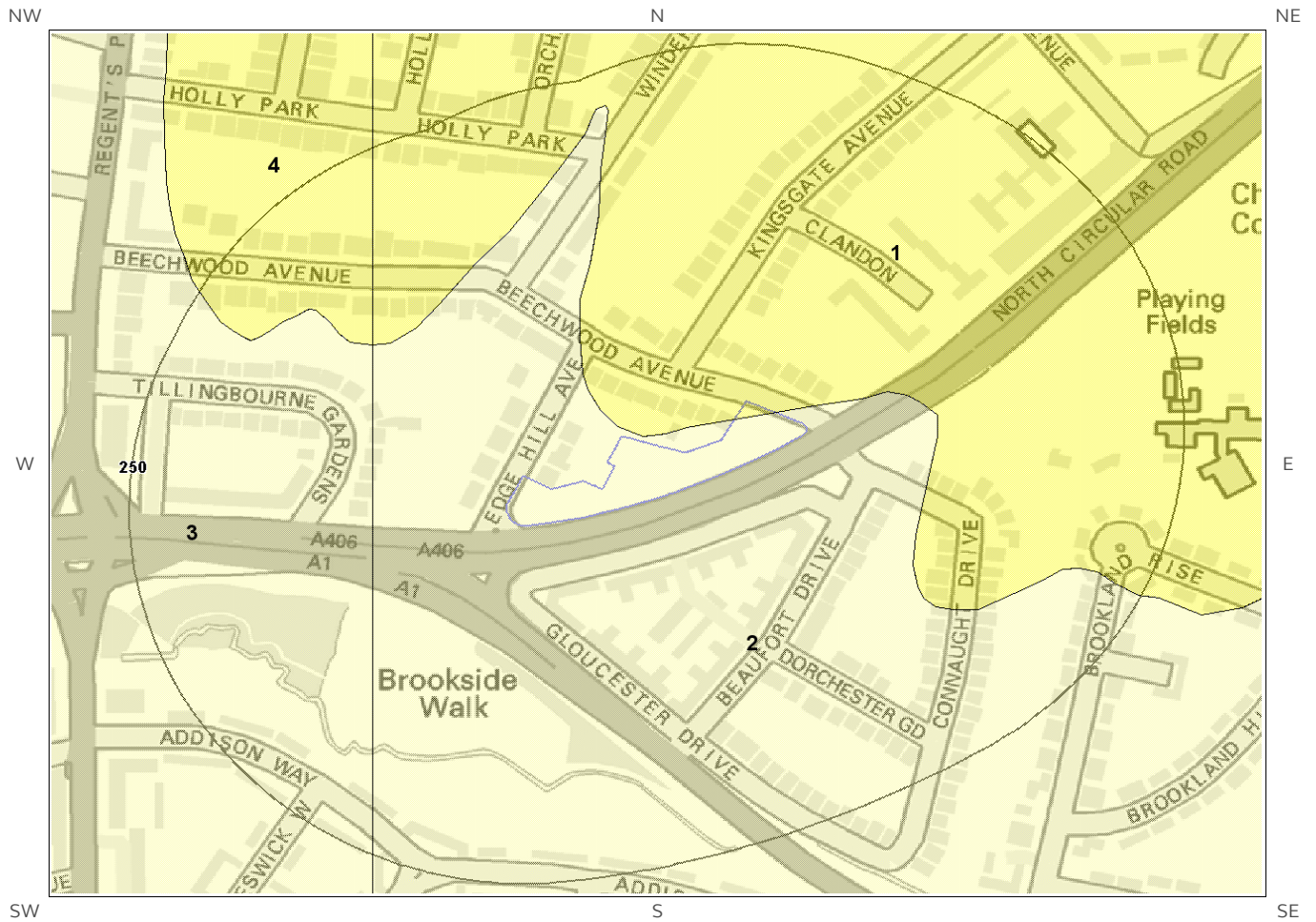


Collapsible Deposits Legend

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6.6 Running Sand Map



Running Sand Legend

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6 Natural Ground Subsidence

The National Ground Subsidence rating is obtained through the 6 natural ground stability hazard datasets, which are supplied by the British Geological Survey (BGS).

The following GeoSure data represented on the mapping is derived from the BGS Digital Geological map of Great Britain at 1:50,000 scale.

What is the maximum hazard rating of natural subsidence within the study site* boundary? Moderate

6.1 Shrink-Swell Clays

The following Shrink Swell information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Moderate	Ground conditions predominantly high plasticity. Do not plant or remove trees or shrubs near to buildings without expert advice about their effect and management. For new build, consideration should be given to advice published by the National House Building Council (NHBC) and the Building Research Establishment (BRE). There is a probable increase in construction cost to reduce potential shrink-swell problems. For existing property, there is a probable increase in insurance risk during droughts or where vegetation with high moisture demands is present.

6.2 Landslides

The following Landslides information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.
2	0.0	On Site	Low	Possibility of slope instability problems after major changes in ground conditions. Consideration should be given to stability if changes to drainage or excavations take place. Possible increase in construction cost to reduce potential slope stability problems. Existing property - no significant increase in insurance risk due to natural slope instability problems.

* This includes an automatically generated 50m buffer zone around the site

ID	Distance (m)	Direction	Hazard Rating	Details
3	0.0	On Site	Low	Possibility of slope instability problems after major changes in ground conditions. Consideration should be given to stability if changes to drainage or excavations take place. Possible increase in construction cost to reduce potential slope stability problems. Existing property - no significant increase in insurance risk due to natural slope instability problems.

6.3 Ground Dissolution of Soluble Rocks

The following Ground Dissolution information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.

6.4 Compressible Deposits

The following Compressible Deposits information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	No indicators for compressible deposits identified. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.

6.5 Collapsible Deposits

The following Collapsible Rocks information provided by the British Geological Survey:

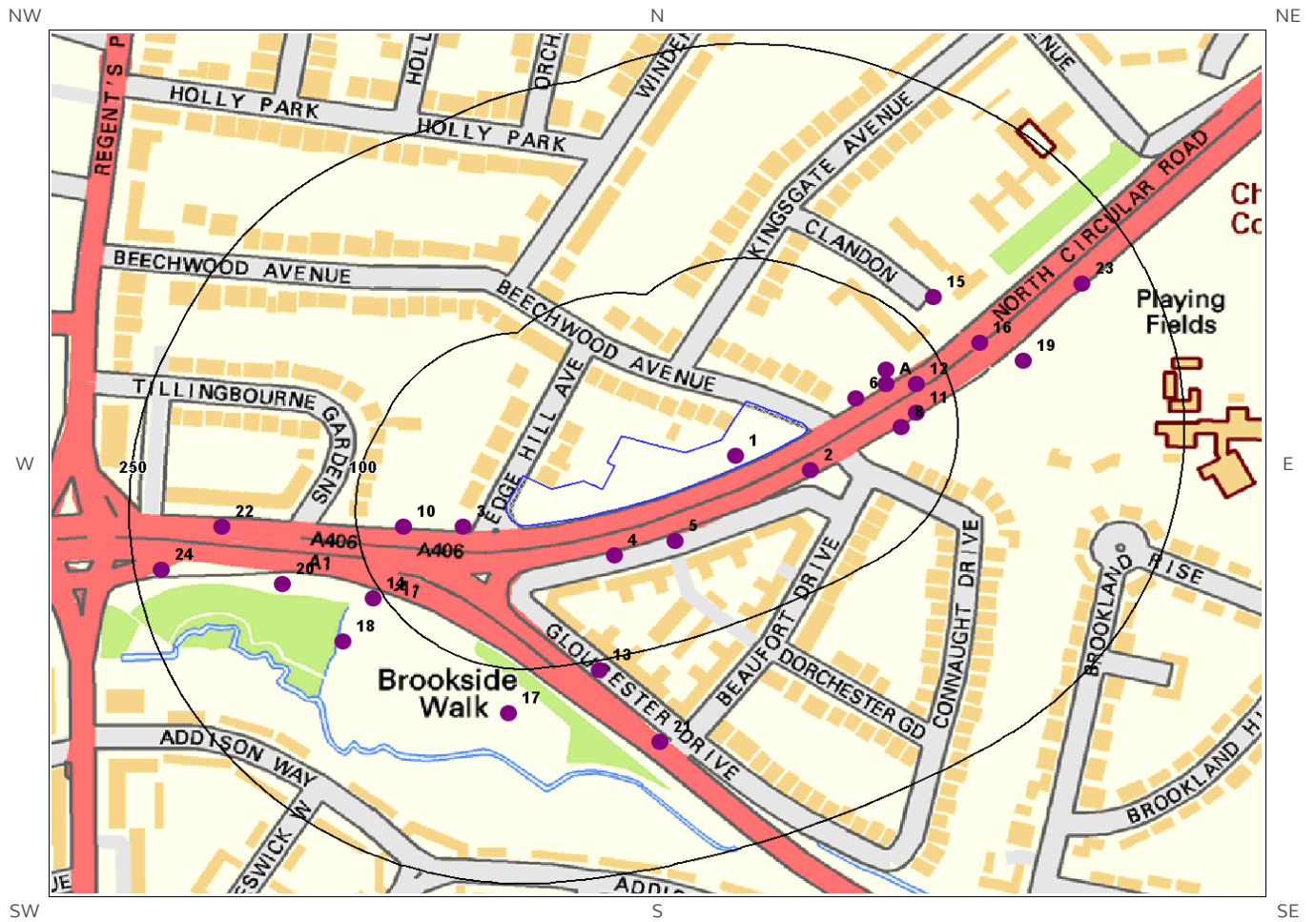
ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

6.6 Running Sands

The following Running Sands information provided by the British Geological Survey:

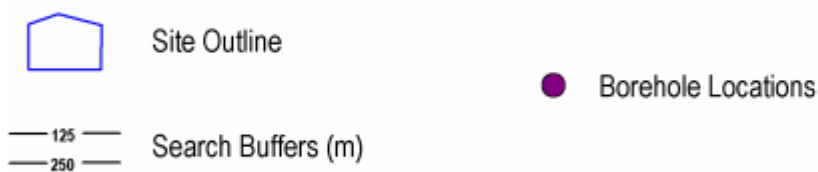
ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Very low potential for running sand problems if water table rises or if sandy strata are exposed to water. No special actions required, to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.
2	0.0	On Site	Negligible	No indicators for running sand identified. No special actions required to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.

7 Borehole Records Map



Borehole Records Legend

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7 Borehole Records

The systematic analysis of data extracted from the BGS Borehole Records database provides the following information.

Records of boreholes within 250m of the study site boundary:

24

ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length	Borehole Name
1	0.0	On Site	525240 189470	TQ28NE266	40.0	A406 A1 A598 JUNCTION IMPROVEMENTS 6
2	24.0	SE	525290 189460	TQ28NE265	30.0	A406 A1 A598 JUNCTION IMPROVEMENTS 5
3	31.0	W	525060 189420	TQ28NE269	25.0	A406 A1 A598 JUNCTION IMPROVEMENTS 10
4	31.0	S	525160 189400	TQ28NE268	25.0	A406 A1 A598 JUNCTION IMPROVEMENTS 9
5	33.0	S	525200 189410	TQ28NE267	30.0	A406 A1 A598 JUNCTION IMPROVEMENTS 8
6	38.0	NE	525320 189510	TQ28NE264	40.0	A406 A1 A598 JUNCTION IMPROVEMENTS 4
7A	60.0	NE	525340 189520	TQ28NE263	10.0	A406 A1 A598 JUNCTION IMPROVEMENTS 2
8	62.0	E	525350 189490	TQ28NE262	10.0	A406 A1 A598 JUNCTION IMPROVEMENTS 1
9A	66.0	NE	525340 189530	TQ28NE106	7.0	NORTH CIRCULAR ROAD A406 BH2
10	70.0	W	525020 189420	TQ28NE270	20.0	A406 A1 A598 JUNCTION IMPROVEMENTS 12
11	73.0	E	525360 189500	TQ28NE105	7.0	NORTH CIRCULAR ROAD A406 BH1
12	78.0	NE	525360 189520	TQ28NE275	0.5	A406 A1 A598 JUNCTION IMPROVEMENTS RC42
13	107.0	S	525150 189320	TQ28NE272	10.0	A406 A1 A598 JUNCTION IMPROVEMENTS 33
14	107.0	SW	525000 189370	TQ28NE271	30.0	A406 A1 A598 JUNCTION IMPROVEMENTS 13
15	123.0	NE	525371 189581	TQ28NE203	19.95	A406 NTH CIRC FINCHLEY A3
16	129.0	NE	525402 189549	TQ28NE202	7.45	A406 NTH CIRC FINCHLEY A2
17	131.0	S	525090 189290	TQ28NE274	3.2	A406 A1 A598 JUNCTION IMPROVEMENTS TP41
18	141.0	SW	524980 189340	TQ28NW239	2.85	A406 A1 A598 JUNCTION IMPROVEMENTS TP40
19	151.0	E	525431 189536	TQ28NE201	10.55	A406 NTH CIRC FINCHLEY A1
20	157.0	W	524940 189380	TQ28NW220	20.0	A406 A1 A598 JUNCTION IMPROVEMENTS 15
21	165.0	S	525190 189270	TQ28NE276	0.6	A406 A1 A598 JUNCTION IMPROVEMENTS RC43
22	189.0	W	524900 189420	TQ28NW240	0.55	A406 A1 A598 JUNCTION IMPROVEMENTS RC44

ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length	Borehole Name
23	208.0	NE	525470 189590	TQ28NE107	7.0	NORTH CIRCULAR ROAD A406 BH3
24	233.0	W	524860 189390	TQ28NW221	20.0	A406 A1 A598 JUNCTION IMPROVEMENTS 16

The borehole records are available using the hyperlinks below: Please note that if the donor of the borehole record has requested the information be held as commercial-in-confidence, the additional data will be held separately by the BGS and a formal request must be made for its release.

#1: scans.bgs.ac.uk/sobi_scans/boreholes/590854
 #2: scans.bgs.ac.uk/sobi_scans/boreholes/590853
 #3: scans.bgs.ac.uk/sobi_scans/boreholes/590857
 #4: scans.bgs.ac.uk/sobi_scans/boreholes/590856
 #5: scans.bgs.ac.uk/sobi_scans/boreholes/590855
 #6: scans.bgs.ac.uk/sobi_scans/boreholes/590852
 #7A: scans.bgs.ac.uk/sobi_scans/boreholes/590851
 #8: scans.bgs.ac.uk/sobi_scans/boreholes/590850
 #9A: scans.bgs.ac.uk/sobi_scans/boreholes/590694
 #10: scans.bgs.ac.uk/sobi_scans/boreholes/590858
 #11: scans.bgs.ac.uk/sobi_scans/boreholes/590693
 #12: scans.bgs.ac.uk/sobi_scans/boreholes/590863
 #13: scans.bgs.ac.uk/sobi_scans/boreholes/590860
 #14: scans.bgs.ac.uk/sobi_scans/boreholes/590859
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 #22: scans.bgs.ac.uk/sobi_scans/boreholes/590554
 #23: scans.bgs.ac.uk/sobi_scans/boreholes/590695
 #24: scans.bgs.ac.uk/sobi_scans/boreholes/590535

8 Estimated Background Soil Chemistry

Records of background estimated soil chemistry within 250m of the study site boundary:

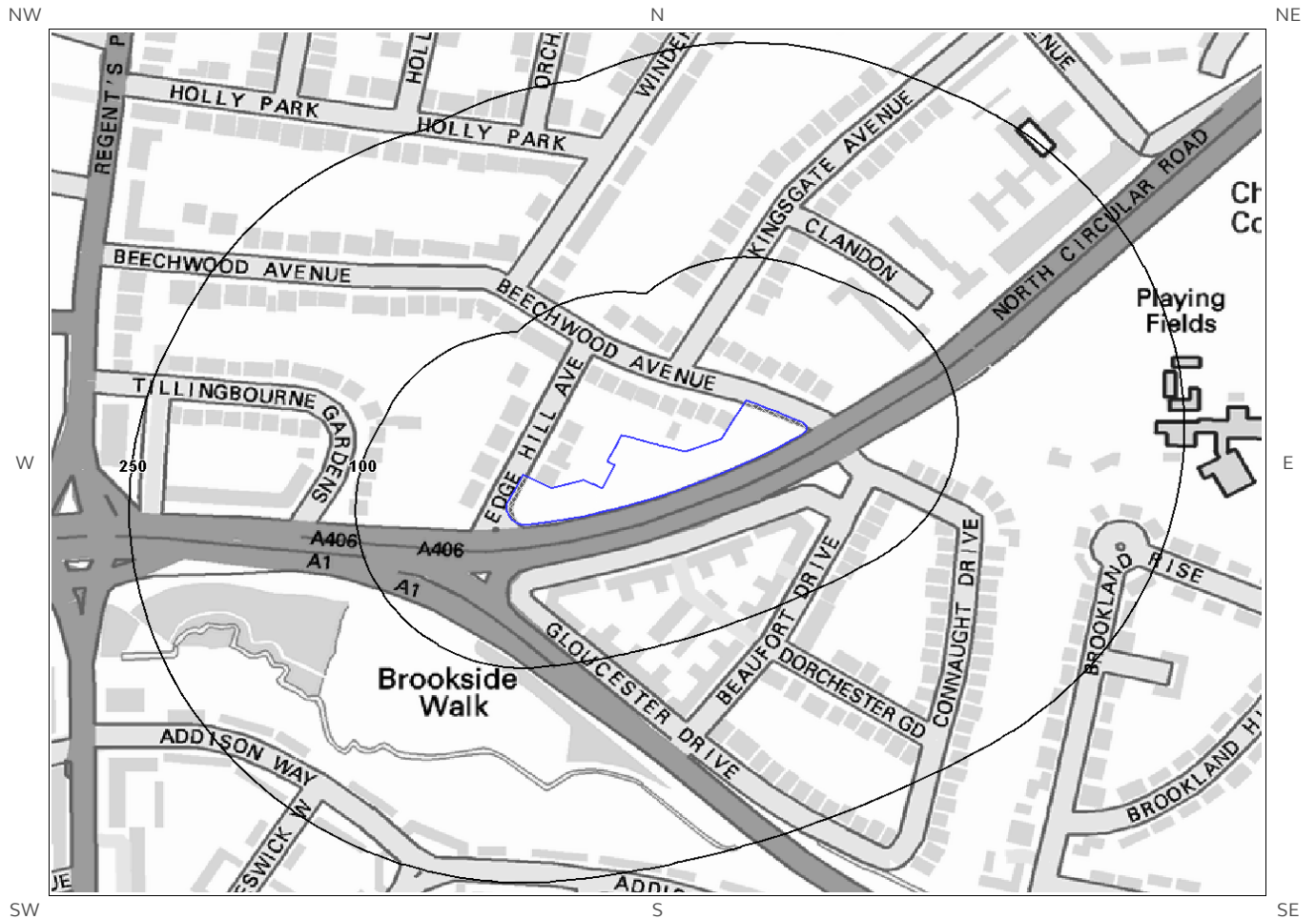
7

For further information on how this data is calculated and limitations upon its use, please see the Groundsure Geo Insight User Guide, available on request.

Distance (m)	Direction	Sample Type	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Nickel (Ni)	Lead (Pb)
0.0	On Site	London	No data	No data	No data	No data	No data
0.0	On Site	London	No data	<1.8 mg/kg	No data	No data	100 - 200 mg/kg
0.0	On Site	London	No data	No data	No data	No data	No data
0.0	On Site	London	No data	<1.8 mg/kg	No data	No data	100 - 200 mg/kg
4.0	N	London	No data	No data	No data	No data	No data
16.0	N	London	No data	<1.8 mg/kg	No data	No data	100 - 200 mg/kg
20.0	NW	London	No data	<1.8 mg/kg	No data	No data	100 - 200 mg/kg

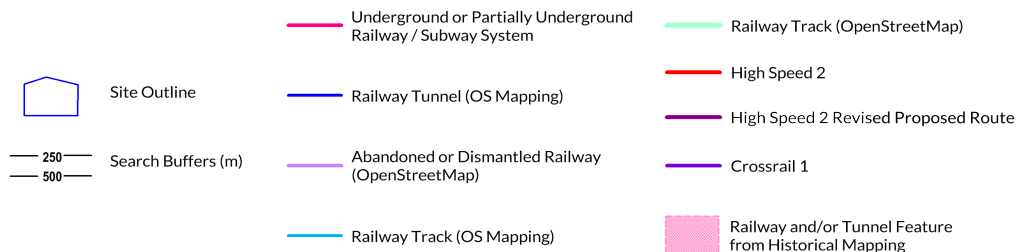
*As this data is based upon underlying 1:50,000 scale geological information, a 50m buffer has been added to the search radius.

9 Railways and Tunnels Map



Railways and Tunnels Legend

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Ordnance Survey license 100035207.
© OpenStreetMapContributors



9 Railways and Tunnels

9.1 Tunnels

This data is derived from OpenStreetMap and provides information on the possible locations of underground railway systems in the UK - the London Underground, the Tyne & Wear Metro and the Glasgow Subway.

Have any underground railway lines been identified within the study site boundary? No

Have any underground railway lines been identified within 250m of the study site boundary? No

Database searched and no data found.

Any records that have been identified are represented on the Railways and Tunnels Map.

This data is derived from Ordnance Survey mapping and provides information on the possible locations of railway tunnels forming part of the UK overground railway network.

Have any other railway tunnels been identified within the site boundary? No

Have any other railway tunnels been identified within 250m of the site boundary? No

Database searched and no data found.

Any records that have been identified are represented on the Railways and Tunnels Map.

9.2 Historical Railway and Tunnel Features

This data is derived from Groundsure's unique Historical Land-use Database and contains features relating to tunnels, railway tracks or associated works that have been identified from historical Ordnance Survey mapping.

Have any historical railway or tunnel features been identified within the study site boundary? No

Have any historical railway or tunnel features been identified within 250m of the study site boundary? No

Database searched and no data found.

Any records that have been identified are represented on the Railways and Tunnels Map.

9.3 Historical Railways

This data is derived from OpenStreetMap and provides information on the possible alignments of abandoned or dismantled railway lines in proximity to the study site.

Have any historical railway lines been identified within the study site boundary? No

Have any historical railway lines been identified within 250m of the study site boundary? No

Database searched and no data found.

Multiple sections of the same track may be listed in the detail above
Any records that have been identified are represented on the Railways and Tunnels Map.

9.4 Active Railways

These datasets are derived from Ordnance Survey mapping and OpenStreetMap and provide information on the possible locations of active railway lines in proximity to the study site.

Have any active railway lines been identified within the study site boundary? No

Have any active railway lines been identified within 250m of the study site boundary? No

Database searched and no data found.

Multiple sections of the same track may be listed in the detail above
Any records that have been identified are represented on the Railways and Tunnels Map.

9.5 Railway Projects

These datasets provide information on the location of large scale railway projects High Speed 2 and Crossrail 1 .

Is the study site within 5km of the route of the High Speed 2 rail project? No

Is the study site within 500m of the route of the Crossrail 1 rail project? No

Further information on proximity to these routes, the project construction status and associated works can be obtained through the purchase of a Groundsure HS2 and Crossrail 1 Report.

The route data has been digitised from publicly available maps by Groundsure. The route as provided relates to the Crossrail 1 project only, and does not include any details of the Crossrail 2 project, as final details of the route for Crossrail 2 are still under consultation.

Please note that this assessment takes account of both the original Phase 2b proposed route and the amended route proposed in 2016. As the Phase 2b route is still under consultation, Groundsure are providing information on both options until the final route is formally confirmed. Practitioners should take account of this uncertainty when advising clients.

Contact Details

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Telephone: 08444 159 000
info@groundsure.com



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Fax: 0115 936 3276.
Email: enquiries@bgs.ac.uk
Web: www.bgs.ac.uk

BGS Geological Hazards Reports and general geological enquiries



British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

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Leicestershire
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The Coal Authority

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Mansfield
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Tel: 0345 7626 848
DX 716176 Mansfield 5
www.coal.gov.uk



The Coal Authority

Public Health England

Public information access office
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133-155 Waterloo Road, London, SE1 8UG
<https://www.gov.uk/government/organisations/public-health-england>
Email: enquiries@phe.gov.uk
Main switchboard: 020 7654 8000



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This report has been prepared in accordance with the Groundsure Ltd standard Terms and Conditions of business for work of this nature.

Standard Terms and Conditions

Groundsure's Terms and Conditions can be viewed online at this link:
<https://www.groundsure.com/terms-and-conditions-sept-2016/>

APPENDIX C

Zetica UXO Maps

REGIONAL UNEXPLODED BOMB RISK

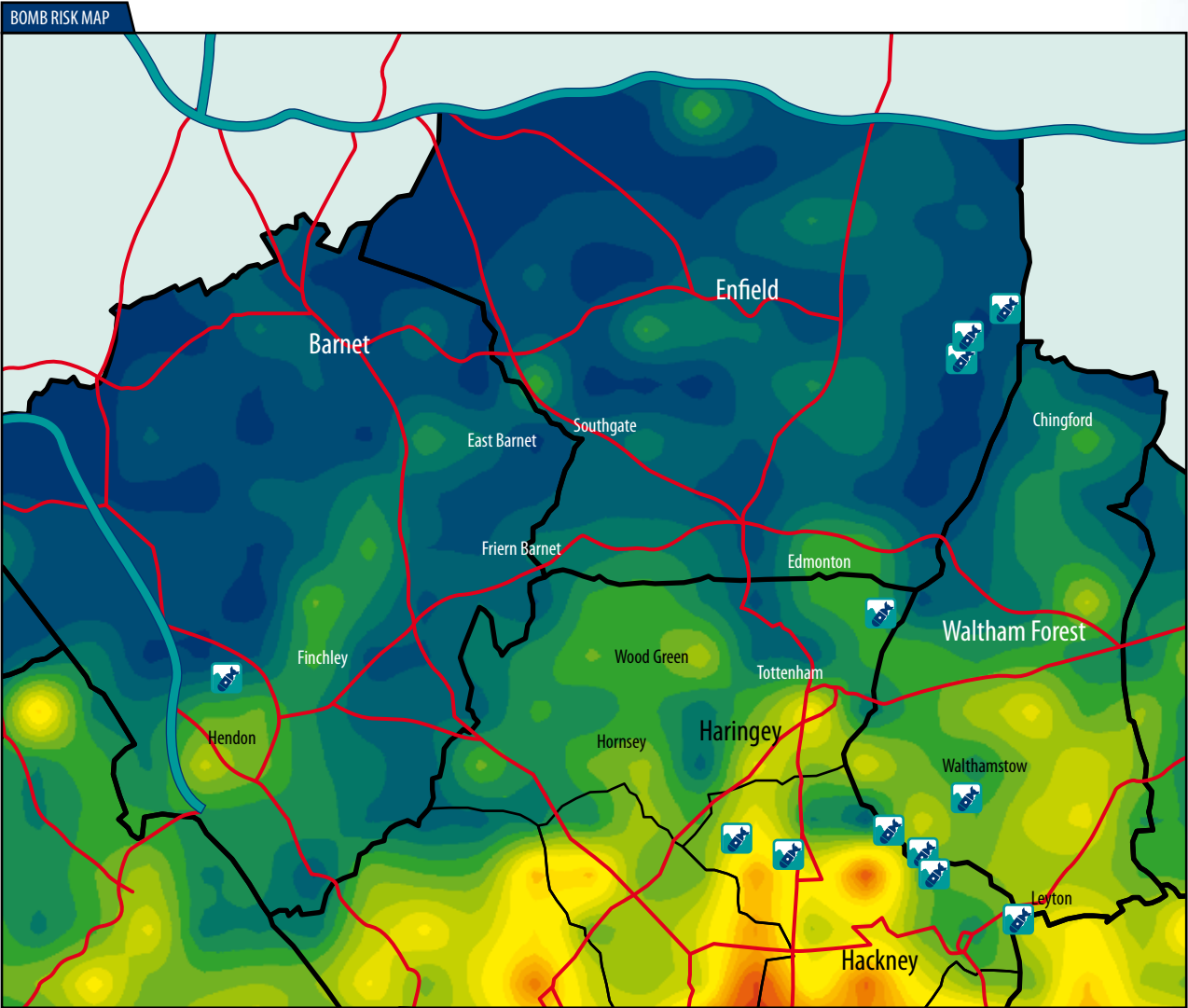
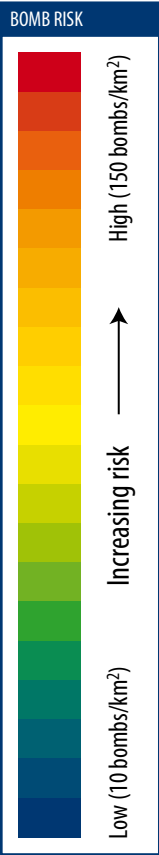
LONDON – North

NUMBER OF BOMBS PER BOROUGH			
Borough	High Explosive	Parachute mines	Incendiary*
Barnet	124	2	8
Chingford	188	4	11
East Barnet	96	2	11
Edmonton	227	8	37
Enfield	375	5	48
Finchley	220	4	11
Frien Barnet	101	1	4
Hendon	467	9	41
Hornsey	292	9	33
Leyton	419	12	46
Southgate	199	7	23
Tottenham	283	4	18
Walthamstow	462	20	36
Wood Green	176	0	19

London and its approaches are renowned for the heavy bombing inflicted on them during WWII. This is reflected in the number of UXB found since the war and so it is accepted that a significant risk from UXB exists across the London area. On average, less than 10% of high explosive and 50% of incendiary bombs failed to explode. This map shows the relative increase in this risk based on bombing densities.

*Larger incendiary devices only. This figure does not include the numerous smaller incendiary devices (eg. 1kg devices).

The information in this UXB risk map is derived from a number of sources and should be read in conjunction with the 'Users' Guide' attached. The often inaccessible nature and changing ground conditions in estuaries and riverbeds (eg. movement of silt that may contain ordnance) means that historical bombing records of these areas may be poor or inaccurate, and further assessment of the bomb risk may be required as part of a site specific study. Zetica cannot guarantee the accuracy or completeness of the information or data.



UXB hazard map
This map can be used as part of a preliminary risk assessment in line with CIRIA guidance (C681).

A FOUR-STEP PROCESS



Risk assessment and method statement from a qualified explosive ordnance clearance (EOC) operative.



Surface geophysical survey to allow shallow groundwork.



MAGCONE detects UXBs and obstructions on piling layout to the no-risk depth.

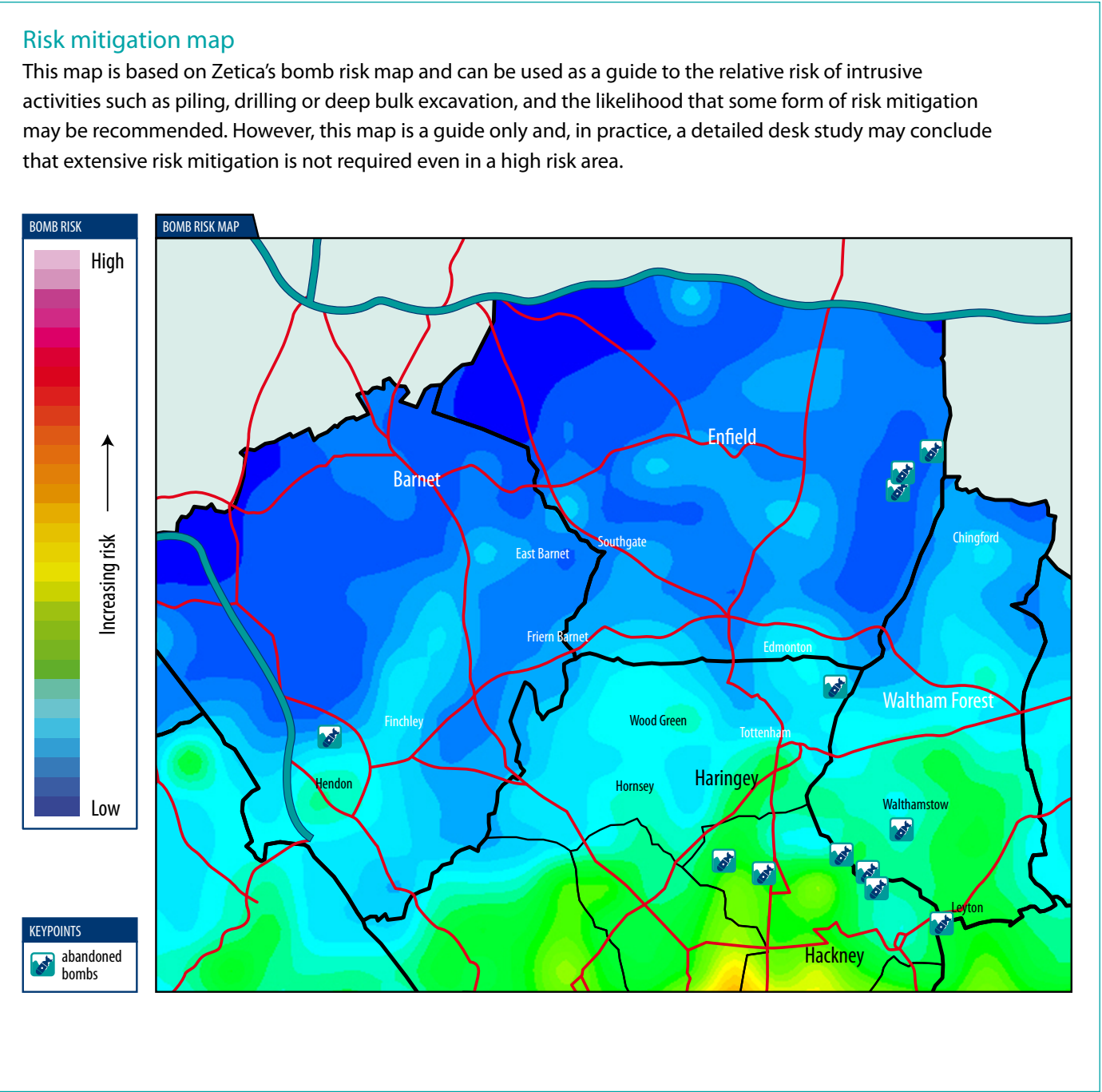


Detected UXBs can be dealt with by our EOC engineers and a Clearance Certificate issued for the site.



RISK MITIGATION AND INVESTIGATION

LONDON – North



Investigation options

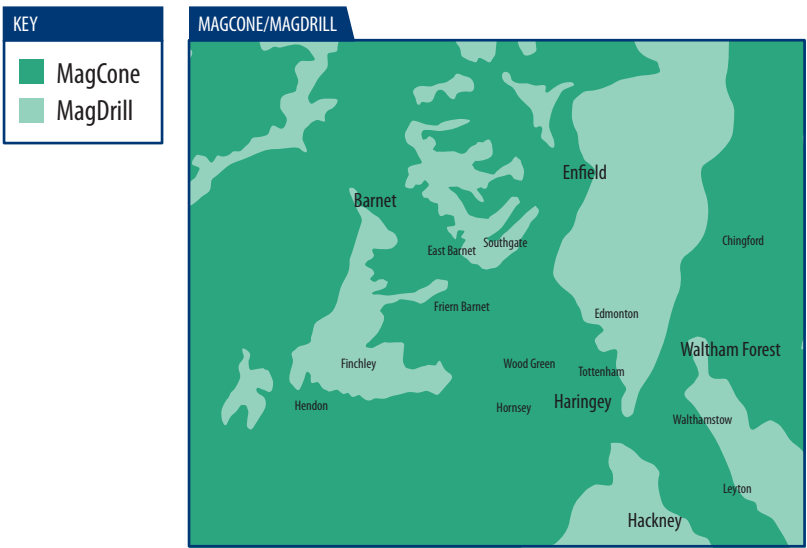
The unexploded bomb (UXB) risk for intrusive site works, such as drilling or piling that usually extend to depths greater than can be mapped from surface, can be effectively managed by clearing borehole or pile locations using MagCone or MagDrill techniques.

For the London area, the geology is extremely complex with a complicated succession that includes several units that are unsuitable for MagCone techniques. To give a first order approximation as to which technique might be appropriate for a site, a simplified map has been produced. This map has been compiled from the BGS Solid and Drift map sheets 256, 257, 270 and 271. The complex geology has been reduced to three areas coloured grey, green and pink. Areas that involve units that are probably only suitable for MagDrill, which include gravels, are shown in



pink. Areas that involve units probably suitable for MagCone, such as London Clay or alluvium, are coloured green. Where chalk crops out at surface or there is negligible soil cover over chalk,

it is shown in grey. This map is for indicative purposes only and specific site geology needs to be taken in to account, especially close to the boundaries shown on the map.



MagCone/MagDrill map

This map compilation provides a guide to appropriate intrusive UXB detection methods. The map is based on British Geological Survey maps at 1:50,000 scale. Soft, compressible alluvial materials can typically be investigated using MagCone (CPT-based) methods whereas sands and dense gravels from River Terrace deposits are typically investigated using MagDrill (drilling-based) methods.

The use of an inappropriate method could result in insufficient depth of detection or a less cost effective technique being used.

BOMB MAP USERS' GUIDE

Sources of information and explanation of bomb risk

Why?

Unexploded bombs (UXB) still present a risk to construction projects long after the end of the Second World War (WWII). UXBs often entered the ground unnoticed at high velocity and penetrated to a depth of several metres. Here they remain – vulnerable to disturbances from construction work. Beyond the depth of shallow excavation work, the greatest risk is to piling, drilling and probing crews. A piling rig could repeatedly hit a UXBs with considerable force before the crew realises an obstruction has been impacted. It could then be up to 72 hours before the detonator activates.

Who?

The responsibility for avoiding UXB risk usually lies with construction companies or house builders particularly those who are redeveloping urban sites. In addition, project engineering or environmental consultants are expected to advise their clients of a site's history. Other interested parties include those organisations whose employees are physically at most risk from intrusive works, normally piling companies, drillers or probing operators.

How?

UXB risk should be assessed for every site, but especially those in known heavily bombed areas or those situated near war-time strategic installations that were priority targets for enemy aircraft, for example, airfields. Zetica's regional bomb risk map is therefore a first point of reference from which the relative, potential abundance of UXBs can be judged. Consultants then advise their clients that an ordnance-risk desk study is required, which they may obtain from external sources. Construction companies or house builders who assess their own risk could choose to come direct to Zetica.

When?

Do not wait for the piling or drilling company to be on site before thinking about UXB risk – it will inevitably cause delays and higher costs. Request the regional bomb risk map from Zetica as soon as a site is being considered, and then use it to help you or your clients to decide if an ordnance-risk desk study is required.

Where?

Maps can be obtained for any county in England, Scotland, Wales or Northern Ireland – or for any London borough. They can help determine the areas that were most heavily bombed – but no part of the country should be considered 100% safe from UXB risk. Even remote rural areas can have a high risk if, for example, they were locations for decoy airfields or beacons that were lit to fool enemy pilots into thinking they had located a burning city that had been successfully hit by others in the raid.

How to use this regional map of London

This map is designed to give you an indication of the potential risk from UXBs in your area. If you are conducting work that involves excavation, piling or other disturbance of the ground, then you should use the map to identify the category of risk for your site.

The risk boundaries are a guide, compiled from data based on the political areas for which records are held; being just outside a high-risk area does not mean there is no UXB risk. You should use the map to assist in your decision of whether to investigate the UXB risk further.

Information on the regional risk remaining from UXBs in the UK

Zetica has built the largest UXB database of its kind in the UK. It includes a unique digital library of bomb census data, and maps showing key strategic points and bombing densities from the First and Second World Wars. The main sources of information include records from central government (Public Records Office), the Ministry of Defence, and the German Luftwaffe.

Using information from this database, Zetica has published maps of UXB risk on a regional, county and borough scale. The maps indicate relative degrees of UXB risk based on available records for bombing densities and known targeted areas for regions within the UK. The risk is broken down into individual boroughs, towns or cities. The data are based on the historical boroughs and are then overlaid onto the modern map. It is important to note that more-detailed research may be required for individual sites, particularly where proximity to a potential WWII target means the local risk may be higher.

Relative UXB risk across London

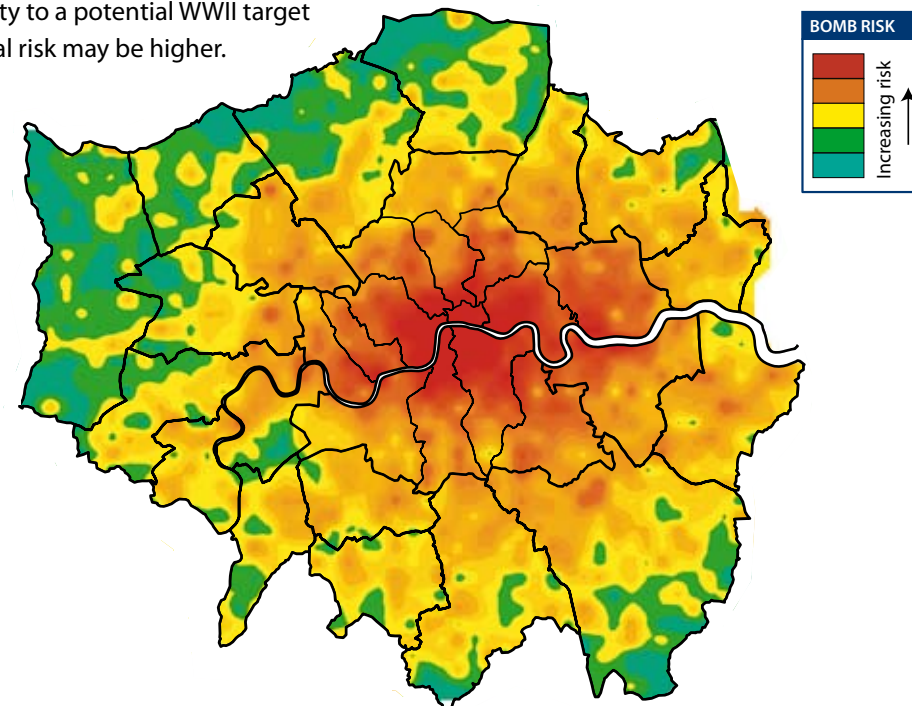
The relative risk for the London area is established by plotting the recorded bombing densities. These are represented as counts of high explosive bombs in km² area.

The areas coloured green represent a record of less than 10 bombs per km². Compared to other areas of the UK, this still represents a significant risk.

However, this is much lower than parts of Central London, where the red colouration indicates in excess of 150 bombs falling per km², representing a very significant UXB risk.

Other WWII targets

Other regions with the risk of UXBs are key strategic points as defined by the government during WWII as representing potential enemy targets. Where these exist outside areas mapped as high, moderate or low risk, a site-specific assessment of the UXB risk may be required.



What to do if...

...you have a site that has a potential UXB risk

In the absence of current legislation requiring you to address the risk from UXBs, your responsibilities under health and safety legislation and regulations such as construction design and management require that you address all identified risks. The first stage is to request further advice from a professional adviser such as Zetica, or to gain more site-specific information by commissioning an ordnance-risk desk study. Then a strategy to deal with the risk can be established that is tailored to your proposed work.

...you find a suspect item or require advice

If during site works you find a suspect (ordnance-related) item, it is very important that you do not touch or move it (even if it has already been moved by an excavator). If it is clearly ordnance related, then dial 999 and ask for the police. Ensure that the area around the item is kept as clear as possible without placing yourself at risk. If you are unsure and do not wish to cause undue alarm, or you just require some advice, then you can call Zetica. We have experienced qualified UXB specialists on hand who can offer support and advice during any site works.

More-detailed procedures should be established in advance if you are in an area where the risk of finding a UXB is shown to be significant (moderate to high).

Site-specific desktop studies

Zetica is able to provide high-quality, site-specific UXB risk information for any residential, industrial or commercial property in the UK. These desktop studies provide details of the bombing density within an area and for the site itself, in order to indicate the risks of UXBs still being present. A risk assessment is provided to facilitate informed decision making on whether any further risk mitigation measures are required.

APPENDIX D

Site Investigation Data

0002-UA009696 Borehole Location Plan

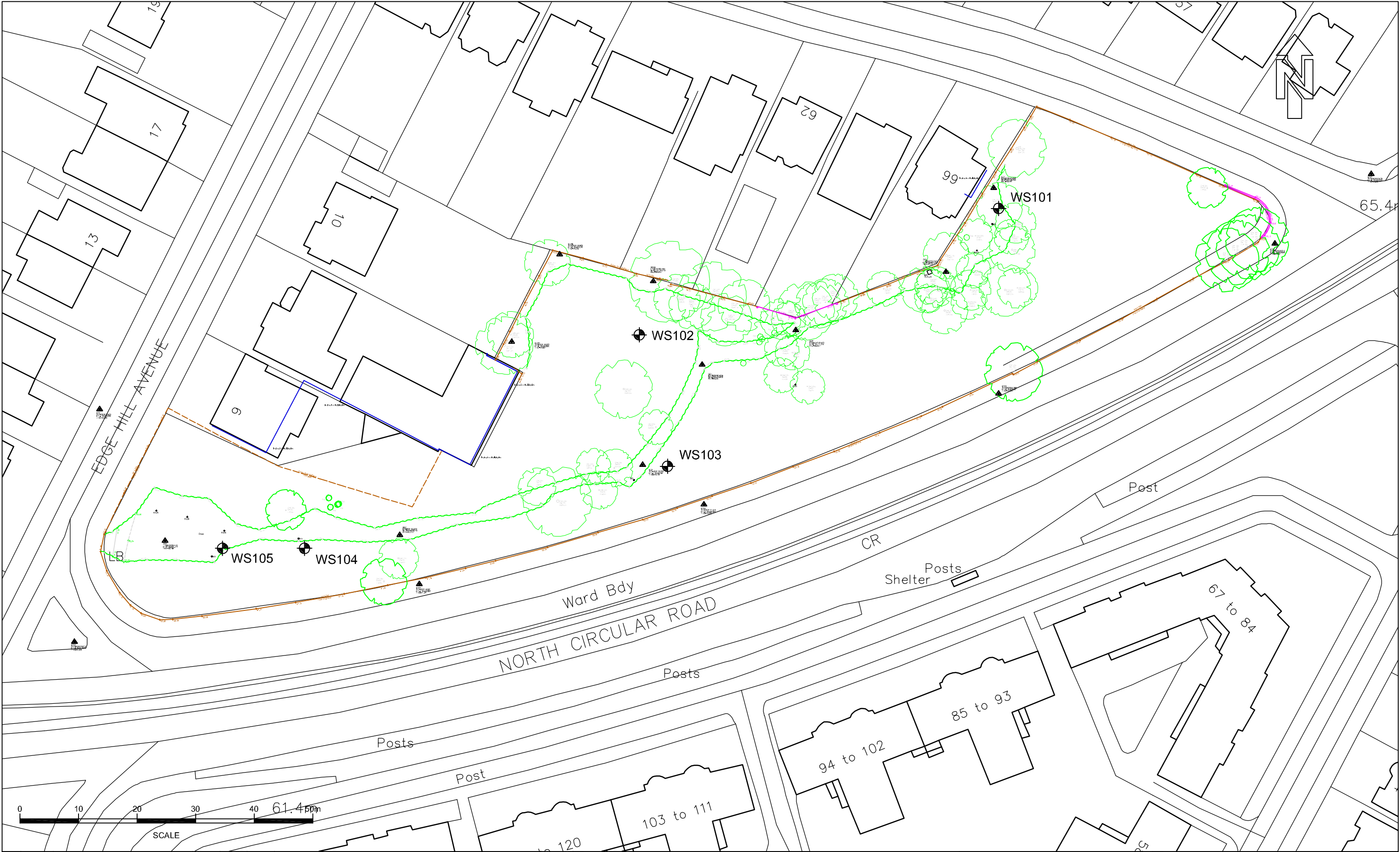
Borehole logs

Chemical testing laboratory certificates

Geotechnical testing laboratory certificates

Chemical soil screening summary

HazWaste Online report and summary



01	06NOV17	FIRST ISSUE	JR	AP	TW
Rev	Date	Description	Drawn	Check	Approv

NOTES:
Based on topographic drawing by 40Seven Ltd. Drawing 439 - BEECHWOOD AVENUE Rev.A, dated August 2017

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Client

TRANSPORT FOR LONDON

Address

Phone Fax

Suitability Description:			
AB			
AS BUILT			
Designed	J. RAVEN	Date 06NOV17	Signed
Drawn	J. RAVEN	Date 06NOV17	Signed
Checked	A. PUGH	Date 06NOV17	Signed
Approved	T. WINDSOR	Date 06NOV17	Signed
Scale:	1:600 @ A3	Datum:	AOD
Original Size:	A3	Grid:	OS
Suitability Code:	AB	Project Number:	UA009686

PROJECT:

TfL PSF 9131 SITE INVESTIGATIONS

TITLE:

LAND AT BEECHWOOD AVENUE
BARNET, N3 3BB
BOREHOLE LOCATION PLAN

ARCADIS

Design & Consultancy
for natural and built assets

Registered office:
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N1 9AB

Coordinating office:
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10 Medware Road
Guildford GU2 7AR
Tel: 44 (0)1483 803 000

www.arcadis.com

Drawing Number: 0003-UA009686

Revision: 01


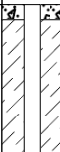





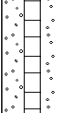






Project
TFL - Beechwood Avenue
Client
Transport for London

Project No.
UA009686-03
Easting (OS mE)
525241.00

Ground Level (mAOD)
68.00
Northing (OS mN)
189491.00

Start Date
10/08/2017
End Date
10/08/2017

Scale
1:50
Sheet 1 of 1

SAMPLES		TESTS			Water Strikes	STRATA		Depth (Thickness)	Level	Install/ Backfill
Depth	Type/ No.	Depth	Type/ No.	Results		Description	Legend			
0.30	ES1	0.30	PID	<1ppm		Orangish brown slightly clayey silty very sandy fine to coarse, well rounded to angular GRAVEL of flint, brick and concrete with frequent fragments of glass. Sand is fine to coarse. Frequent whole bricks and occasional roots and rootlets with rare pieces of household electrical wiring (MADE GROUND).		(1.10)		
0.80 0.80 - 1.00	ES2 B1	0.80	PID	<1ppm		Grey slightly gravelly fine to coarse SAND. Gravel is fine to coarse, angular concrete. (MADE GROUND).		1.10 1.20	66.90 66.80	
1.30 - 1.50	B2	1.20	SPT(C)	N=14 (5,3/3,4,3,4)		Very stiff reddish brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse, sub-angular to very angular brick and concrete. (MADE GROUND).		(0.50)		
2.00 - 2.30	B3					Firm brown CLAY with occasional rootlets. (MADE GROUND - POSSIBLE RELICT TOPSOIL)		1.70	66.30	
2.20 - 2.65	SPTLS 1	2.20	SPT(S)	N=12 (1,2/2,3,3,4)				(0.80)		
						Stiff brown and grey CLAY.		2.50	65.50	
3.00 - 3.20	B4	3.20	SPT(S)	N=17 (2,3/3,4,4,6)			(0.70)			
							3.20	64.80		

Sheet 1 of 1

Checked By
TA


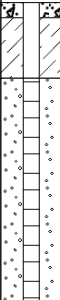




Project
TFL - Beechwood Avenue
Client
Transport for London

Project No.
UA009686-03
Easting (OS mE)
525185.00

Ground Level (mAOD)
66.10
Northing (OS mN)
189447.00

Start Date
10/08/2017
End Date
10/08/2017

Scale
1:50
Sheet 1 of 1

SAMPLES		TESTS			Water Strikes	STRATA		Depth (Thickness)	Level	Install/ Backfill
Depth	Type/ No.	Depth	Type/ No.	Results		Description	Legend			
0.50	ES1	0.50	PID	<1ppm		Firm brown mottled grey slightly sandy very gravelly CLAY. Gravel is fine to coarse, well rounded to very angular of flint, brick and concrete. Frequent roots and rootlets. (MADE GROUND).		(2.00)		
1.00	ES2	1.00	PID	<1ppm						
		1.20	SPT(C)	N=13 (2,2/2,3,3,5)						
2.00	ES3	2.00	PID	<1ppm						
2.20 - 2.65	SPTLS 1	2.20	SPT(C)	N=24 (7,8/7,6,5,6)						
2.40	ES1	2.40	PID	<1ppm		Dark brown mottled grey and red clayey sandy slightly gravelly SILT. Sand is fine to coarse, gravel is fine to medium, angular brick and concrete. (MADE GROUND).		2.00 (0.20)	64.10	
2.40	ES4					Grey and orange mottled red very gravelly coarse SAND. Gravel is fine to coarse, sub-rounded to very angular flint, brick and concrete. (MADE GROUND).		(0.80)		
3.00 - 3.20	B1					Stiff brown and grey thinly laminated CLAY with relict rootlets.		3.00	63.10	
3.20 - 3.65	SPTLS 2	3.20	SPT(S)	N=11 (2,2/3,3,2,3)		(0.50)				
								3.50	62.60	

Project
TFL - Beechwood Avenue
Client
Transport for London

Project No.
UA009686-03
Easting (OS mE)
525123.00

Ground Level (mAOD)
64.40
Northing (OS mN)
189433.00

Start Date
10/08/2017
End Date
10/08/2017

Scale
1:50
Sheet 1 of 1

SAMPLES		TESTS			Water Strikes	STRATA		Depth (Thickness)	Level	Install/ Backfill
Depth	Type/ No.	Depth	Type/ No.	Results		Description	Legend			
0.50 0.50 - 0.70	ES1 B1	0.50	PID	<1ppm		Firm dark brown slightly sandy gravelly CLAY. Gravel is fine to coarse, well rounded to very angular of flint, brick and concrete. (MADE GROUND).		(1.60)		
1.20 - 1.65 1.30	SPTLS 1 ES2	1.20 1.30	SPT(S) PID	N=18 (5,9/5,4,5,4) <1ppm		becoming stiff		1.60	62.80	
1.70 - 2.00	B2					Stiff greyish brown slightly gravelly CLAY. (MADE GROUND - POSSIBLE RE-WORKED NATURAL)		(1.60)		
2.20 - 2.65 2.40 2.50 - 3.00	SPTLS 2 ES3 B3	2.20 2.40	SPT(S) PID	N=13 (1,2/2,3,4,4) <1ppm				(1.60)		
3.20 - 3.65	SPTLS 3	3.20	SPT(S)	N=12 (2,2/2,3,3,4)				3.20	61.20	
<div> <div>DRILLING TECHNIQUE</div> <div> <div>From</div> <div>To</div> <div>Technique</div> </div> <div> <div>Date/Time</div> <div>Strike At</div> <div>Time Elapsed</div> <div>Rise To</div> <div>Casing</div> <div>Sealed</div> <div>Hole Dia.</div> <div>Depth</div> <div>Casing Dia.</div> <div>Depth</div> <div>Top</div> <div>Base</div> <div>Backfill</div> </div> </div>										
0.00 1.20	1.20 3.20	Inspection Pit Dynamic Sample								
<div> <div>Remarks</div> <div>No groundwater encountered. Coordinates and elevations are approximate.</div> <div>Termination Depth: 3.20m</div> </div>										

Project
TFL - Beechwood Avenue
Client
Transport for London

Project No.
UA009686-03
Easting (OS mE)
525109.00

Ground Level (mAOD)
64.00
Northing (OS mN)
189433.00

Start Date
10/08/2017
End Date
10/08/2017

Scale
1:50
Sheet 1 of 1

SAMPLES		TESTS			Water Strikes	STRATA		Depth (Thickness)	Level	Install/ Backfill												
Depth	Type/ No.	Depth	Type/ No.	Results		Description	Legend															
0.50 0.60 - 0.80	ES1 B1	0.50	PID	<1ppm		Very stiff dark brown mottled red and grey sandy gravelly CLAY with high cobble and boulder content. Gravel is fine to coarse, well rounded to very angular of flint brick and concrete. Cobbles and boulders are angular to very angular concrete and brick. Occasional roots and rootlets and wood fragments throughout. (MADE GROUND).		(1.20)														
1.00	ES2	1.00	PID	<1ppm		Loose to dense brown and grey very sandy fine to coarse, angular to very angular GRAVEL of flint, concrete and brick with a high cobble content. Sand is fine to coarse. Cobbles are angular concrete and brick.		1.20	62.80													
		1.20	SPT(C)	N=10 (4,4/3,3,2,2)																		
1.40	ES3	1.40	PID	<1ppm				(0.30)														
		1.50	SPT(C)	N=50 (13,12/50,0,0,0)				1.50	62.50													
<div>DRILLING TECHNIQUE</div> <table border="1"> <thead> <tr> <th>From</th> <th>To</th> <th>Technique</th> </tr> </thead> <tbody> <tr> <td>0.00</td> <td>1.20</td> <td>Inspection Pit</td> </tr> <tr> <td>1.20</td> <td>1.50</td> <td>Dynamic Sample</td> </tr> </tbody> </table>											From	To	Technique	0.00	1.20	Inspection Pit	1.20	1.50	Dynamic Sample			
From	To	Technique																				
0.00	1.20	Inspection Pit																				
1.20	1.50	Dynamic Sample																				
<div>WATER OBSERVATIONS</div> <table border="1"> <thead> <tr> <th>Date/Time</th> <th>Strike At</th> <th>Time Elapsed</th> <th>Rise To</th> <th>Casing</th> <th>Sealed</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>											Date/Time	Strike At	Time Elapsed	Rise To	Casing	Sealed						
Date/Time	Strike At	Time Elapsed	Rise To	Casing	Sealed																	
<div>HOLE/CASING DIAMETER</div> <table border="1"> <thead> <tr> <th>Hole Dia.</th> <th>Depth</th> <th>Casing Dia.</th> <th>Depth</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>											Hole Dia.	Depth	Casing Dia.	Depth								
Hole Dia.	Depth	Casing Dia.	Depth																			
<div>BACKFILL</div> <table border="1"> <thead> <tr> <th>Top</th> <th>Base</th> <th>Backfill</th> </tr> </thead> <tbody> <tr> <td>0.00</td> <td>0.10</td> <td>Concrete</td> </tr> <tr> <td>0.10</td> <td>0.50</td> <td>Bentonite</td> </tr> <tr> <td>0.50</td> <td>1.50</td> <td>Gravel</td> </tr> </tbody> </table>											Top	Base	Backfill	0.00	0.10	Concrete	0.10	0.50	Bentonite	0.50	1.50	Gravel
Top	Base	Backfill																				
0.00	0.10	Concrete																				
0.10	0.50	Bentonite																				
0.50	1.50	Gravel																				
<div>Remarks</div> <p>No groundwater encountered. Coordinates and elevations are approximate.. Hole terminated at 1.5 m on refused (possible cobble).</p>																						
<div>Termination Depth:</div> <p>1.50m</p>																						



Tony Windsor

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Analytical Report Number : 17-57132

Project / Site name: Beechwood

Samples received on: 14/08/2017

Your job number: UA009686

Samples instructed on: 14/08/2017

Your order number:

Analysis completed by: 21/08/2017

Report Issue Number: 1

Report issued on: 22/08/2017

Samples Analysed: 12 soil samples

Signed: 

Dr Irma Doyle
Senior Account Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Analytical Report Number: 17-57132

Project / Site name: Beechwood

Lab Sample Number	797855	797856	797857	797858	797859
Sample Reference	WS101	WS101	WS102	WS103	WS103
Sample Number	1	2	1	1	3
Depth (m)	0.30-0.30	0.80-0.80	0.40-0.40	0.50-0.50	2.00-2.00
Date Sampled	10/08/2017	10/08/2017	10/08/2017	10/08/2017	10/08/2017
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		
Stone Content	%	0.1	NONE	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	6.9	7.7
Total mass of sample received	kg	0.001	NONE	1.7	1.8

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	Chrysotile - Loose Fibrous Debris	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Detected	Not-detected	Not-detected	Not-detected

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.0	7.8	7.9	7.9	7.8
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	600	420	870	540	3400
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.30	0.21	0.44	0.27	1.7
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	301	212	437	268	1710

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.11	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	0.17	0.20	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	0.13	0.15	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	0.16	0.11	0.16	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	1.3	1.5	1.5	0.13	0.21
Anthracene	mg/kg	0.05	MCERTS	0.46	0.39	0.37	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	3.4	4.0	1.9	0.40	0.52
Pyrene	mg/kg	0.05	MCERTS	3.1	3.8	1.7	0.27	0.45
Benzo(a)anthracene	mg/kg	0.05	MCERTS	2.5	3.4	1.7	0.30	0.40
Chrysene	mg/kg	0.05	MCERTS	1.4	2.0	0.91	0.21	0.27
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	2.6	3.6	2.5	0.40	0.58
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	1.3	1.6	1.2	0.13	0.18
Benzo(a)pyrene	mg/kg	0.05	MCERTS	2.6	3.2	2.8	0.31	0.41
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	1.3	2.0	1.4	0.16	0.18
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.26	0.37	0.25	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	1.3	2.0	1.3	0.16	0.19

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	22.0	28.3	18.0	2.47	3.39
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	15	16	12	14	17
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	23	28	39	33	22
Copper (aqua regia extractable)	mg/kg	1	MCERTS	54	48	37	33	38
Lead (aqua regia extractable)	mg/kg	1	MCERTS	75	220	85	65	310
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	0.6	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	17	20	34	29	23
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	1.3
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	64	110	95	78	100

Analytical Report Number: 17-57132

Project / Site name: Beechwood

Lab Sample Number	797860	797861	797862	797863	797864
Sample Reference	WS103	WS104	WS104	WS104	WS105
Sample Number	1	1	2	3	1
Depth (m)	2.40-2.40	0.50-0.50	1.30-1.30	2.40-2.40	0.50-0.50
Date Sampled	10/08/2017	10/08/2017	10/08/2017	10/08/2017	10/08/2017
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		
Stone Content	%	0.1	NONE	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	6.2	15
Total mass of sample received	kg	0.001	NONE	1.8	1.3

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	Chrysotile - Loose Fibres	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Detected	Not-detected	Not-detected

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.5	7.6	7.5	7.8	8.2
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	2300	3300	1300	1400	850
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	1.2	1.7	0.64	0.68	0.43
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	1150	1660	639	678	426

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.37	< 0.05	0.21
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	0.18	0.59	< 0.05	0.57
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.12	< 0.05	0.16
Fluoranthene	mg/kg	0.05	MCERTS	0.14	0.29	1.6	0.19	1.3
Pyrene	mg/kg	0.05	MCERTS	0.14	0.25	1.5	0.18	1.2
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.15	0.24	1.1	0.18	0.93
Chrysene	mg/kg	0.05	MCERTS	0.10	0.14	0.65	0.09	0.54
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	0.19	0.28	1.2	0.18	0.91
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.07	0.09	0.52	0.08	0.48
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.14	0.23	1.1	0.14	0.80
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.10	0.60	< 0.05	0.45
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	0.13	0.60	< 0.05	0.45

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	0.93	1.93	9.94	1.04	8.02
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	7.7	12	17	11	17
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	17	33	39	38	39
Copper (aqua regia extractable)	mg/kg	1	MCERTS	19	28	53	25	41
Lead (aqua regia extractable)	mg/kg	1	MCERTS	9.7	21	170	19	49
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	17	34	25	33	29
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	1.1	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	42	67	190	62	78

Analytical Report Number: 17-57132

Project / Site name: Beechwood

Lab Sample Number				797865	797866			
Sample Reference				WS105	WS105			
Sample Number				2	3			
Depth (m)				1.00-1.00	1.40-1.40			
Date Sampled				10/08/2017	10/08/2017			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1			
Moisture Content	%	N/A	NONE	13	1.3			
Total mass of sample received	kg	0.001	NONE	1.4	1.3			

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-			
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected			

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.8	11.5			
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	2900	240			
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	1.5	0.12			
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	1450	119			

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	0.13	0.19			
Acenaphthylene	mg/kg	0.05	MCERTS	0.17	< 0.05			
Acenaphthene	mg/kg	0.05	MCERTS	0.15	0.23			
Fluorene	mg/kg	0.05	MCERTS	0.13	0.21			
Phenanthrene	mg/kg	0.05	MCERTS	1.6	1.6			
Anthracene	mg/kg	0.05	MCERTS	0.37	0.34			
Fluoranthene	mg/kg	0.05	MCERTS	3.4	2.2			
Pyrene	mg/kg	0.05	MCERTS	3.1	1.8			
Benzo(a)anthracene	mg/kg	0.05	MCERTS	2.7	1.5			
Chrysene	mg/kg	0.05	MCERTS	1.5	0.98			
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	2.9	1.6			
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	1.1	0.65			
Benzo(a)pyrene	mg/kg	0.05	MCERTS	2.6	1.5			
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	1.4	0.72			
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.29	0.13			
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	1.3	0.68			

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	22.9	14.4			
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	14	8.5			
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	0.3			
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0			
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	37	42			
Copper (aqua regia extractable)	mg/kg	1	MCERTS	51	46			
Lead (aqua regia extractable)	mg/kg	1	MCERTS	110	90			
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3			
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	31	32			
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0			
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	120	110			

Analytical Report Number : 17-57132

Project / Site name: Beechwood

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
797855	WS101	1	0.30-0.30	Brown loam and clay with gravel and vegetation.
797856	WS101	2	0.80-0.80	Brown loam and sand with gravel and vegetation.
797857	WS102	1	0.40-0.40	Brown clay and sand with gravel and vegetation.
797858	WS103	1	0.50-0.50	Brown clay and sand with gravel and vegetation.
797859	WS103	3	2.00-2.00	Brown loam and sand with gravel and brick.
797860	WS103	1	2.40-2.40	Light brown clay and sand.
797861	WS104	1	0.50-0.50	Brown clay and sand.
797862	WS104	2	1.30-1.30	Brown clay and sand with gravel and coal.
797863	WS104	3	2.40-2.40	Brown clay.
797864	WS105	1	0.50-0.50	Brown clay and sand with gravel and brick.
797865	WS105	2	1.00-1.00	Brown clay and sand with gravel.
797866	WS105	3	1.40-1.40	Non Soil**

**Non Mcerts Matrix

Analytical Report Number : 17-57132

Project / Site name: Beechwood

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP-OES.	L038-PL	D	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.



Contract Number: 36422

Client's Reference: **UA009686-03**

Report Date: **11-09-2017**

Client **Arcadis**
Fortran Rd
St Mellons
Cardiff
CF3 0EY

Contract Title: **TFL - Beechwood Avenue**
For the attention of: **Jon Raven**

Date Received: **24-08-2017**
Date Commenced: **24-08-2017**
Date Completed: **11-09-2017**

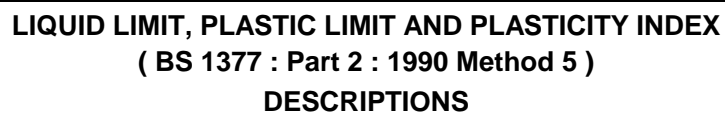
Test Description	Qty
Moisture Content 1377 : 1990 Part 2 : 3.2 - * UKAS	9
4 Point Liquid & Plastic Limit (LL/PL) 1377 : 1990 Part 2 : 4.3 & 5.3 - * UKAS	7
PSD Wet Sieve method 1377 : 1990 Part 2 : 9.2 - * UKAS	7
PSD: Sedimentation by pipette carried out with Wet Sieve (Wet Sieve must also be selected) 1377 : 1990 Part 2 : 9.4 - * UKAS	1
Disposal of Samples on Project	1

Notes: Observations and Interpretations are outside the UKAS Accreditation
* - denotes test included in laboratory scope of accreditation
- denotes test carried out by approved contractor
@ - denotes non accredited tests

This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.



Approved Signatories:

Alex Wynn (Associate Director) - Ben Sharp (Contracts Manager) - Emma Sharp (Office Manager)
Paul Evans (Quality/Technical Manager) - Richard John (Advanced Testing Manager) - Sean Penn (Administrative/Quality Assistant)
Vaughan Edwards (Managing Director) - Wayne Honey (Administrative/Quality Assistant)



36422

TFL - Beechwood Avenue

Operators	Checked	10/09/2017	Sean Penn	
RO/MH	Approved	11/09/2017	Ben Sharp	





PARTICLE SIZE DISTRIBUTION
BS 1377 Part 2:1990
Wet Sieve, Clause 9.2

Contract Number

36422

Borehole/Pit No.

WS101

Site Name

TFL - Beechwood Avenue

Sample No.

1

Soil Description

Brown silty fine to coarse sandy fine to coarse GRAVEL

Depth Top

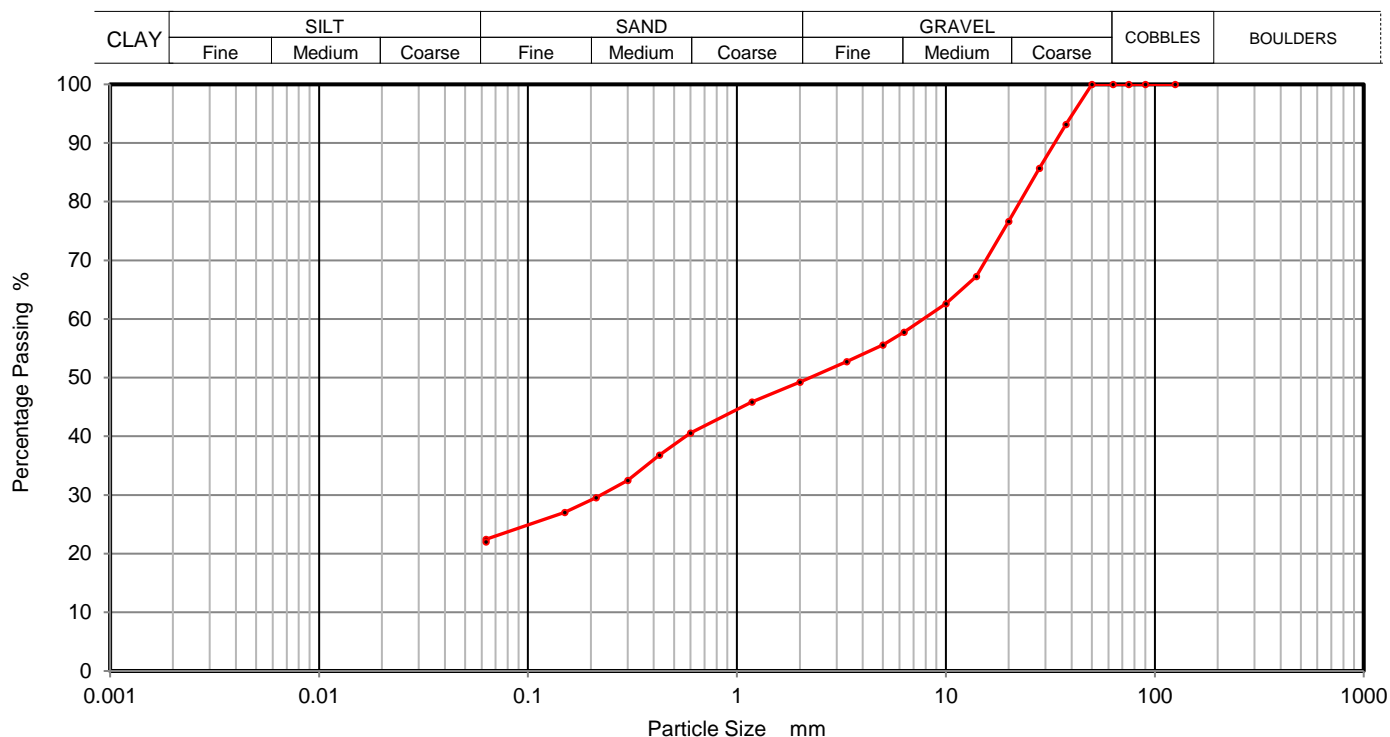
0.80

Depth Base

1.00

Sample Type

B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	
90	100	0.0060	
75	100	0.0019	
63	100		
50	100		
37.5	93		
28	86		
20	77		
14	67		
10	63		
6.3	58		
5	56		
3.35	53		
2	49		
1.18	46		
0.6	41		
0.425	37		
0.3	33		
0.212	30		
0.15	27		
0.063	22		

Sample Proportions	% dry mass
Cobbles	0
Gravel	51
Sand	27
Silt and Clay	22

Grading Analysis	
Uniformity Coefficient	

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operators	Checked	10/09/2017	Sean Penn	
RO/MH	Approved	11/09/2017	Ben Sharp	





PARTICLE SIZE DISTRIBUTION
BS 1377 Part 2:1990
Wet Sieve, Clause 9.2

Contract Number

36422

Borehole/Pit No.

WS101

Site Name

TFL - Beechwood Avenue

Sample No.

3

Soil Description

Brown slightly fine gravelly slightly fine to coarse sandy silty CLAY

Depth Top

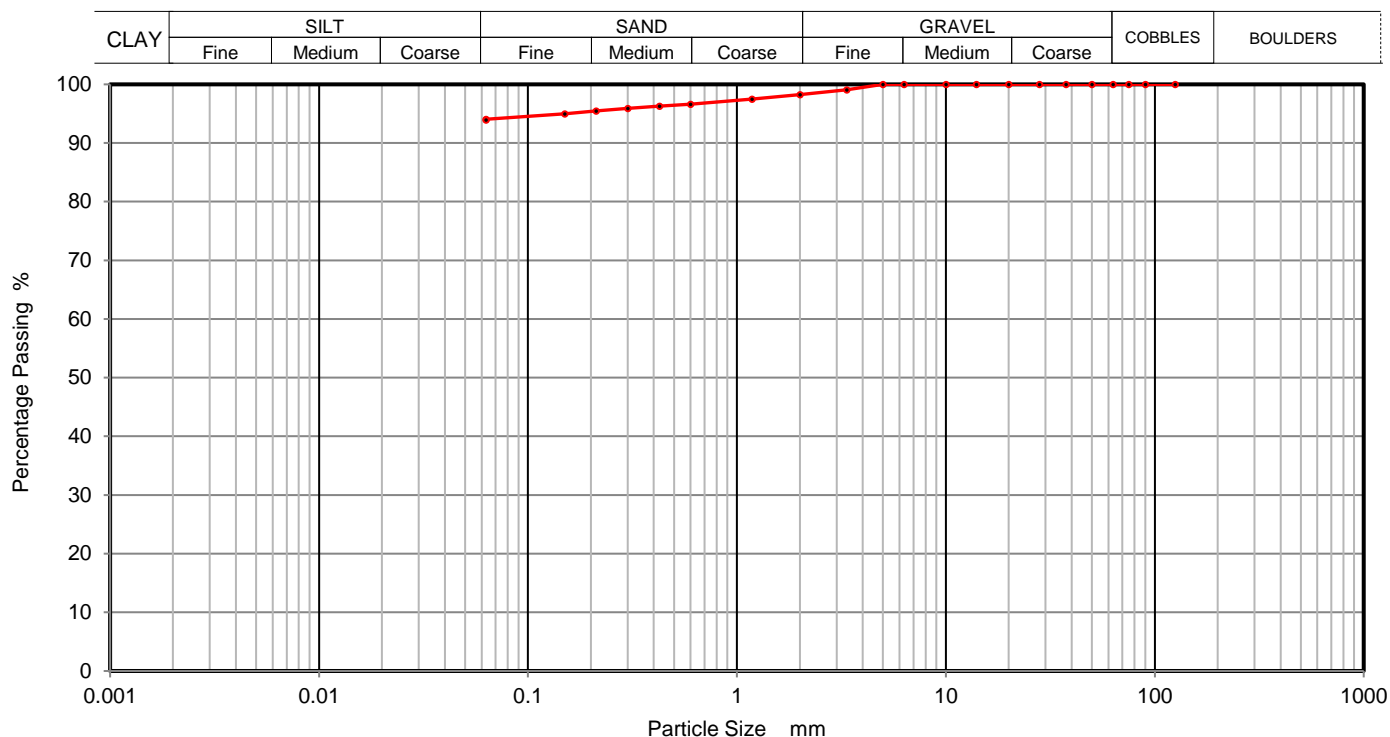
2.00

Depth Base

2.30

Sample Type

B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	
90	100	0.0060	
75	100	0.0019	
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	99		
2	98		
1.18	97		
0.6	97		
0.425	96		
0.3	96		
0.212	95		
0.15	95		
0.063	94		

Sample Proportions	% dry mass
Cobbles	0
Gravel	2
Sand	4
Silt and Clay	94

Grading Analysis	
Uniformity Coefficient	

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operators	Checked	10/09/2017	Sean Penn	
RO/MH	Approved	11/09/2017	Ben Sharp	





PARTICLE SIZE DISTRIBUTION
BS 1377 Part 2:1990
Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Contract Number

36422

Borehole/Pit No.

WS101

Site Name

TFL - Beechwood Avenue

Sample No.

4

Soil Description

Brown slightly fine gravelly slightly fine to coarse sandy silty CLAY

Depth Top

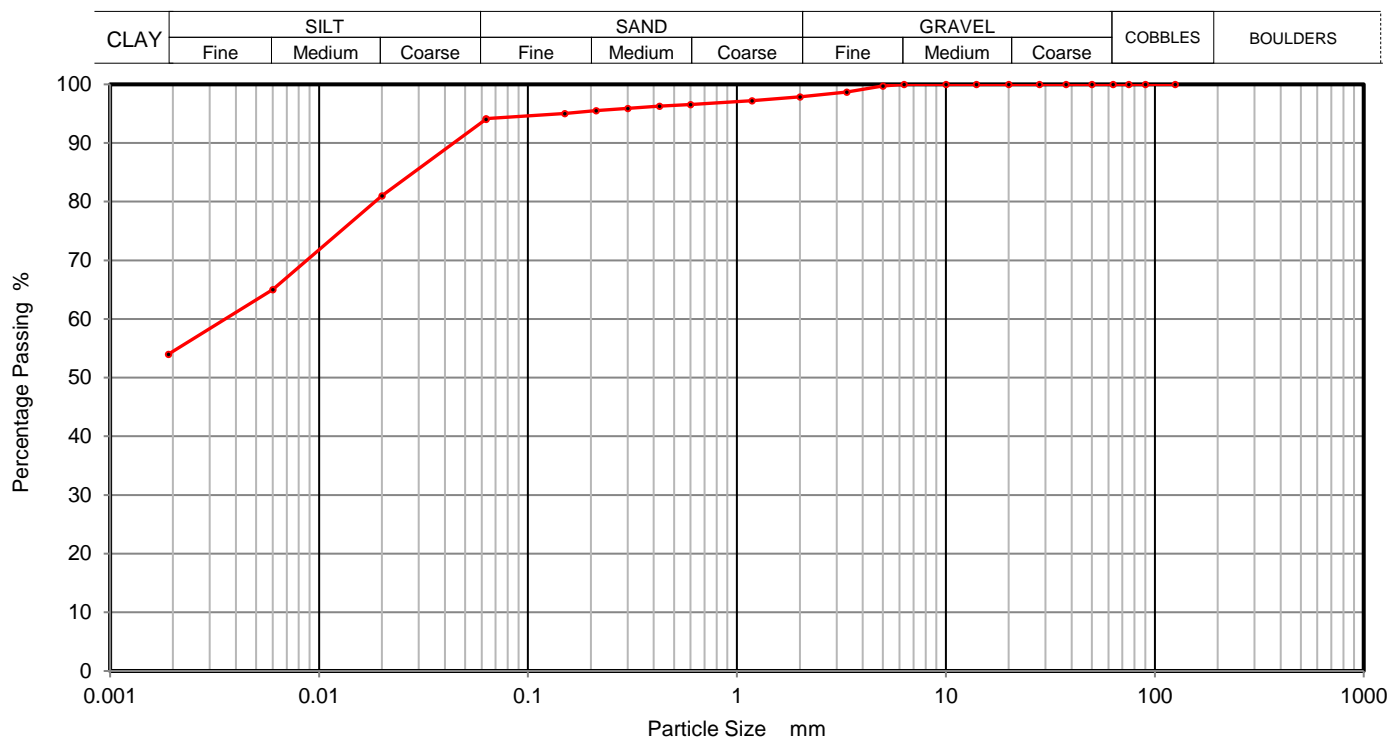
3.00

Depth Base

3.20

Sample Type

B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	81
90	100	0.0060	65
75	100	0.0019	54
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	99		
2	98		
1.18	97		
0.6	97		
0.425	96		
0.3	96		
0.212	96		
0.15	95		
0.063	94		

Sample Proportions	% dry mass
Cobbles	0
Gravel	2
Sand	4
Silt	40
Clay	54

Grading Analysis	
Uniformity Coefficient	

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operators	Checked	10/09/2017	Sean Penn	
RO/MH	Approved	11/09/2017	Ben Sharp	





PARTICLE SIZE DISTRIBUTION
BS 1377 Part 2:1990
Wet Sieve, Clause 9.2

Contract Number

36422

Borehole/Pit No.

WS103

Site Name

TFL - Beechwood Avenue

Sample No.

1

Soil Description

Brown slightly fine to coarse sandy fine to coarse gravelly silty CLAY

Depth Top

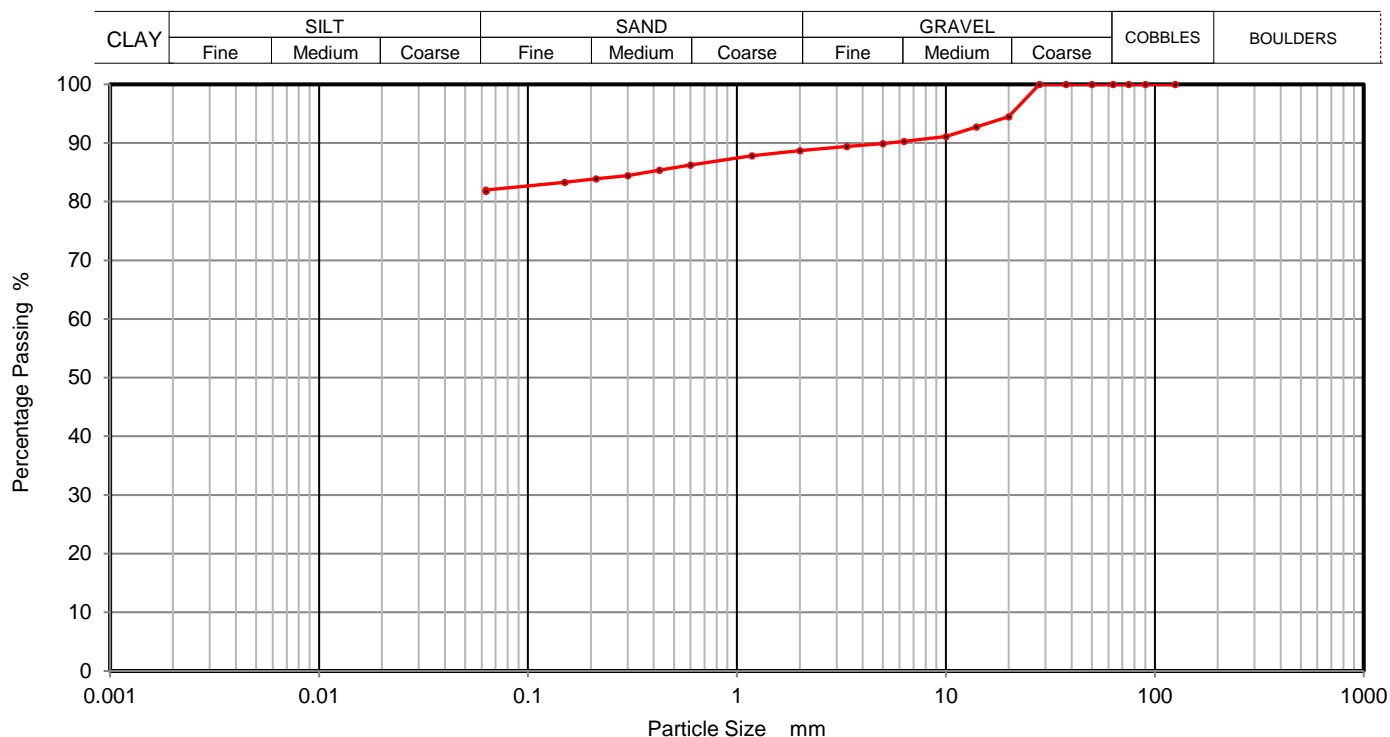
3.00

Depth Base

3.20

Sample Type

B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	
90	100	0.0060	
75	100	0.0019	
63	100		
50	100		
37.5	100		
28	100		
20	94		
14	93		
10	91		
6.3	90		
5	90		
3.35	89		
2	89		
1.18	88		
0.6	86		
0.425	85		
0.3	84		
0.212	84		
0.15	83		
0.063	82		

Sample Proportions	% dry mass
Cobbles	0
Gravel	11
Sand	7
Silt and Clay	82

Grading Analysis	
Uniformity Coefficient	

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operators	Checked	10/09/2017	Sean Penn	
RO/MH	Approved	11/09/2017	Ben Sharp	





PARTICLE SIZE DISTRIBUTION
BS 1377 Part 2:1990
Wet Sieve, Clause 9.2

Contract Number

36422

Borehole/Pit No.

WS104

Site Name

TFL - Beechwood Avenue

Sample No.

1

Soil Description

Brown slightly fine gravelly slightly fine to coarse sandy silty CLAY

Depth Top

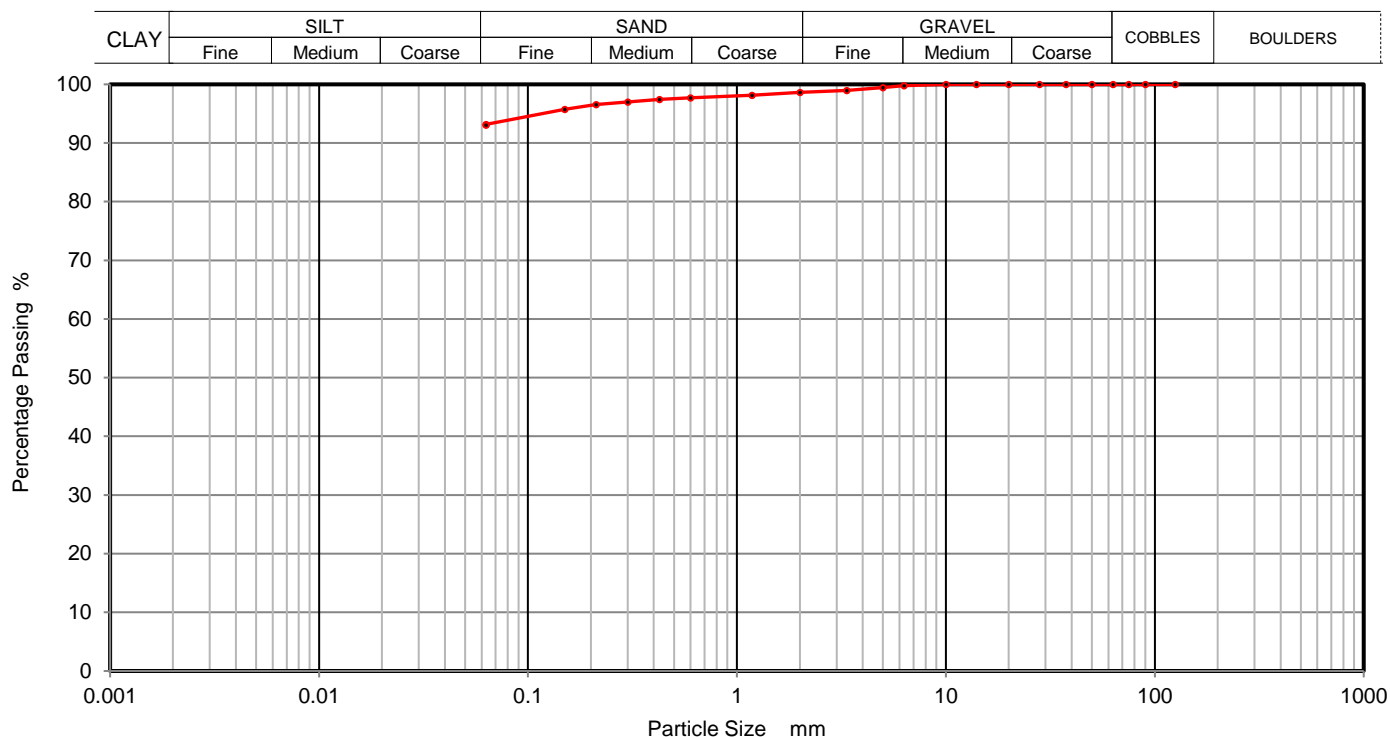
0.50

Depth Base

0.70

Sample Type

B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	
90	100	0.0060	
75	100	0.0019	
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	99		
3.35	99		
2	99		
1.18	98		
0.6	98		
0.425	97		
0.3	97		
0.212	97		
0.15	96		
0.063	93		

Sample Proportions	% dry mass
Cobbles	0
Gravel	1
Sand	6
Silt and Clay	93

Grading Analysis	
Uniformity Coefficient	

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operators	Checked	10/09/2017	Sean Penn	
RO/MH	Approved	11/09/2017	Ben Sharp	





PARTICLE SIZE DISTRIBUTION
BS 1377 Part 2:1990
Wet Sieve, Clause 9.2

Contract Number

36422

Borehole/Pit No.

WS104

Site Name

TFL - Beechwood Avenue

Sample No.

2

Soil Description

Brown slightly fine to medium gravelly slightly fine to coarse sandy
silty CLAY

Depth Top

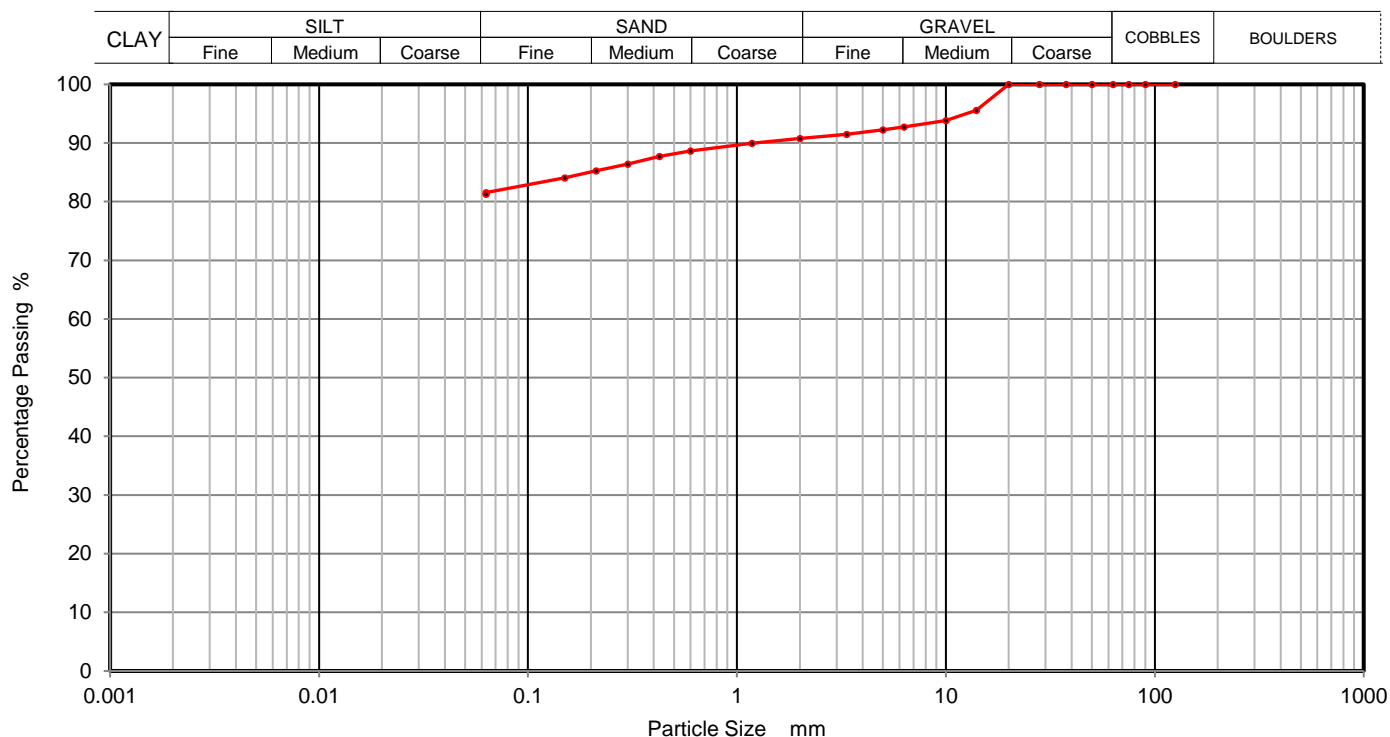
1.70

Depth Base

2.00

Sample Type

B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	
90	100	0.0060	
75	100	0.0019	
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	96		
10	94		
6.3	93		
5	92		
3.35	91		
2	91		
1.18	90		
0.6	89		
0.425	88		
0.3	86		
0.212	85		
0.15	84		
0.063	82		

Sample Proportions	% dry mass
Cobbles	0
Gravel	9
Sand	9
Silt and Clay	82

Grading Analysis	
Uniformity Coefficient	

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operators	Checked	10/09/2017	Sean Penn	
RO/MH	Approved	11/09/2017	Ben Sharp	





PARTICLE SIZE DISTRIBUTION
BS 1377 Part 2:1990
Wet Sieve, Clause 9.2

Contract Number

36422

Borehole/Pit No.

WS105

Site Name

TFL - Beechwood Avenue

Sample No.

1

Soil Description

Brown slightly fine to medium gravelly fine to coarse sandy silty CLAY

Depth Top

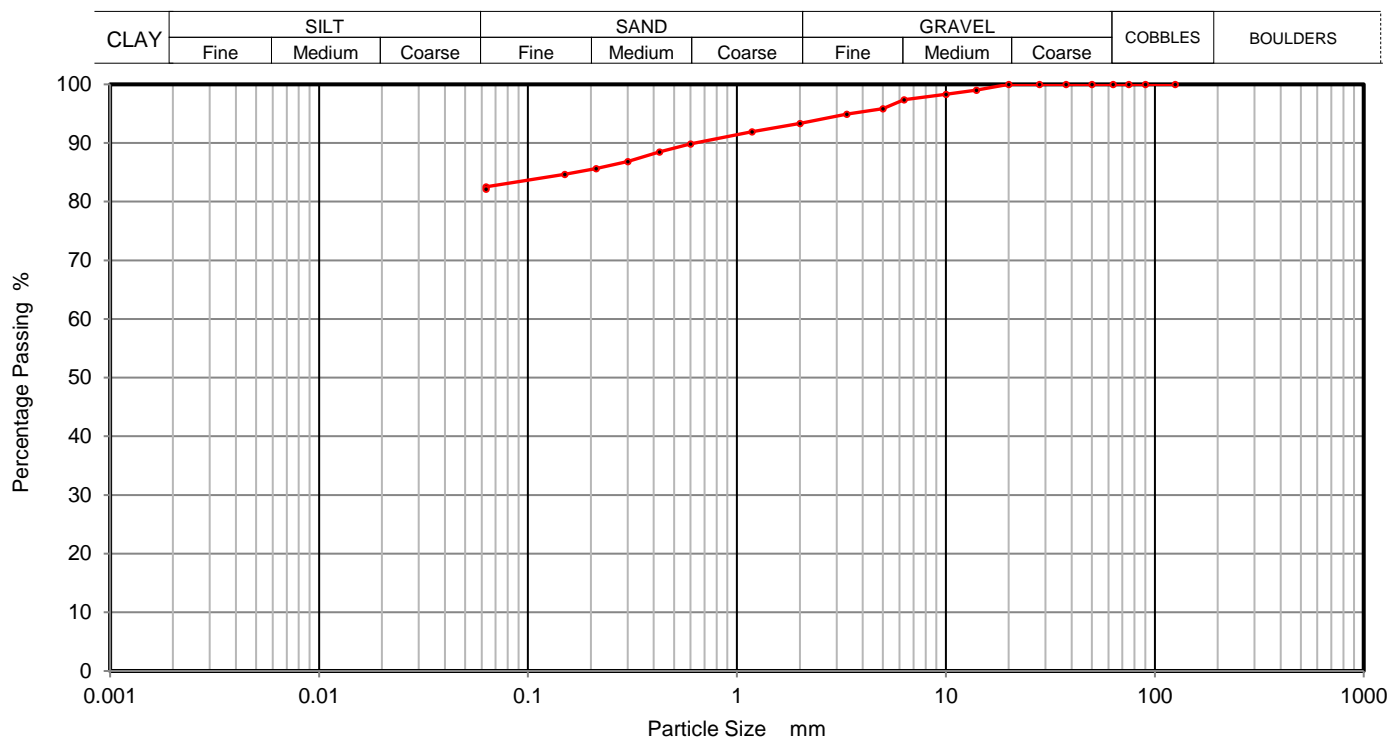
0.60

Depth Base

0.80

Sample Type

B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	
90	100	0.0060	
75	100	0.0019	
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	99		
10	98		
6.3	97		
5	96		
3.35	95		
2	93		
1.18	92		
0.6	90		
0.425	88		
0.3	87		
0.212	86		
0.15	85		
0.063	83		

Sample Proportions	% dry mass
Cobbles	0
Gravel	7
Sand	10
Silt and Clay	83

Grading Analysis	
Uniformity Coefficient	

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operators	Checked	10/09/2017	Sean Penn	
RO/MH	Approved	11/09/2017	Ben Sharp	



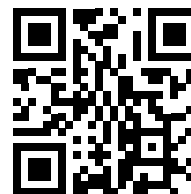
Determinand (laboratory concentrations)	Unit	WS101 ES1	WS101 ES2	WS102 ES1	WS103 ES1	WS103 ES3	WS103 ES1[1]	WS104 ES1	WS104 ES2	WS104 ES3	WS105 ES1	WS105 ES2	WS105 ES3
Classification Result		Non Hazardous	Non Hazardous	Non Hazardous	Non Hazardous	Non Hazardous	Non Hazardous	Non Hazardous	Non Hazardous	Non Hazardous	Non Hazardous	Non Hazardous	Hazardous
Hazardous Properties			HP7: Carcinogenic						HP7: Carcinogenic				HP8: Corrosive
Comment/ Justification			Asbestos has been identified but no quantification analysis has been undertaken at this stage - see notes below						Asbestos has been identified but no quantification analysis has been undertaken at this stage - see notes below				
Final Classification			Potentially Hazardous						Potentially Hazardous				Hazardous
Depth	m	0.30-0.30	0.80-0.80	0.40-0.40	0.50-0.50	2.00-2.00	2.40-2.40	0.50-0.50	1.30-1.30	2.40-2.40	0.50-0.50	1.00-1.00	1.40-1.40
moisture (Dry Weight Moisture Correction)	%	6.9	7.7	13	13	6.5	6.2	15	13	14	16	13	1.3
asbestos	mg/kg		Detected - Chrysotile - Loose Fibrous Debris						Detected - Chrysotile - Loose Fibres				
pH	pH	7	7.8	7.9	7.9	7.8	7.5	7.6	7.5	7.8	8.2	8.8	11.5
naphthalene	mg/kg	<0.05	<0.05	0.11	<0.05	<0.05	<0.05	<0.05	0.37	<0.05	0.21	0.13	0.19
acenaphthylene	mg/kg	0.17	0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.17	<0.05
acenaphthene	mg/kg	<0.05	0.13	0.15	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.15	0.23
fluorene	mg/kg	0.16	0.11	0.16	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.13	0.21
phenanthrene	mg/kg	1.3	1.5	1.5	0.13	0.21	<0.05	0.18	0.59	<0.05	0.57	1.6	1.6
anthracene	mg/kg	0.46	0.39	0.37	<0.05	<0.05	<0.05	<0.05	0.12	<0.05	0.16	0.37	0.34
fluoranthene	mg/kg	3.4	4	1.9	0.4	0.52	0.14	0.29	1.6	0.19	1.3	3.4	2.2
pyrene	mg/kg	3.1	3.8	1.7	0.27	0.45	0.14	0.25	1.5	0.18	1.2	3.1	1.8
benzo[a]anthracene	mg/kg	2.5	3.4	1.7	0.3	0.4	0.15	0.24	1.1	0.18	0.93	2.7	1.5
chrysene	mg/kg	1.4	2	0.91	0.21	0.27	0.1	0.14	0.65	0.09	0.54	1.5	0.98
benzo[b]fluoranthene	mg/kg	2.6	3.6	2.5	0.4	0.58	0.19	0.28	1.2	0.18	0.91	2.9	1.6
benzo[k]fluoranthene	mg/kg	1.3	1.6	1.2	0.13	0.18	0.07	0.09	0.52	0.08	0.48	1.1	0.65
benzo[a]pyrene; benzo[def]chrysene	mg/kg	2.6	3.2	2.8	0.31	0.41	0.14	0.23	1.1	0.14	0.8	2.6	1.5
indeno[123-cd]pyrene	mg/kg	1.3	2	1.4	0.16	0.18	<0.05	0.1	0.6	<0.05	0.45	1.4	0.72
dibenz[a,h]anthracene	mg/kg	0.26	0.37	0.25	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.29	0.13
benzo[ghi]perylene	mg/kg	1.3	2	1.3	0.16	0.19	<0.05	0.13	0.6	<0.05	0.45	1.3	0.68
arsenic (arsenic trioxide)	mg/kg	15	16	12	14	17	7.7	12	17	11	17	14	8.5
boron (boron tribromide/trichloride/trifluoride (combined))	mg/kg												
cadmium (cadmium sulfide)	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.3
chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex	mg/kg	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	
chromium in chromium(III) compounds (chromium(III) oxide)	mg/kg	23	28	39	33	22	17	33	39	38	39	37	42
copper (dicopper oxide; copper (I) oxide)	mg/kg	54	48	37	33	38	19	28	53	25	41	51	46
lead (lead compounds with the exception of those specified elsewhere in this Annex (worst case))	mg/kg	75	220	85	65	310	9.7	21	170	19	49	110	90
mercury (mercury dichloride)	mg/kg	<0.3	0.6	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
nickel (nickel dihydroxide)	mg/kg	17	20	34	29	23	17	34	25	33	29	31	32
selenium (selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex)	mg/kg	<1	<1	<1	<1	1.3	<1	1.1	<1	<1	<1	<1	<1
zinc (zinc oxide)	mg/kg	64	110	95	78	100	42	67	190	62	78	120	110

Notes:

Asbestos fibres have been identified in the sample but not yet quantified. When WAC testing is undertaken by a waste carrier prior to removal of arisings, the waste will be classed as hazardous is greater than 0.1% loose asbestos fibres are found. If large individual pieces of asbestos tile are found they must be assessed separately. Therefore without quantification the waste has been assessed as potentially hazardous.

Note: even if less than 0.1% asbestos fibres are found the landfill operator may decline to accept the waste.

Waste Classification Report



9659S-23NWM-7ZGZE

Job name

TFL - Beechwood Avenue

Description/Comments

Project

UA009686-03

Site

Land at Beechwood Avenue, Barnet, N3 3BB

Waste Stream Template

TFL Sites

Classified by

Name:
Jonathan Raven
Date:
31/08/2017 15:41:55 UTC
Telephone:
01638 674 767

Company:
Arcadis UK
2 Craven Court
Willie Snaith Road
Newmarket
CB8 7FA

Report

Created by: Jonathan Raven
Created date: 31/08/2017 15:41 UTC

Job summary

#	Sample Name	Depth [m]	Classification Result	Hazard properties	Page
1	WS101 ES1	0.30-0.30	Non Hazardous		3
2	WS101 ES2	0.80-0.80	Non Hazardous		5
3	WS102 ES1	0.40-0.40	Non Hazardous		7
4	WS103 ES1	0.50-0.50	Non Hazardous		9
5	WS103 ES3	2.00-2.00	Non Hazardous		11
6	WS103 ES1[1]	2.40-2.40	Non Hazardous		13
7	WS104 ES1	0.50-0.50	Non Hazardous		15
8	WS104 ES2	1.30-1.30	Non Hazardous		17
9	WS104 ES3	2.40-2.40	Non Hazardous		19
10	WS105 ES1	0.50-0.50	Non Hazardous		21
11	WS105 ES2	1.00-1.00	Non Hazardous		23
12	WS105 ES3	1.40-1.40	Hazardous	HP 8	25

Appendices

Appendix A: Classifier defined and non CLP determinands
Appendix B: Rationale for selection of metal species

Page

27

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Appendices	Page
Appendix C: Version	29

Classification of sample: WS101 ES1

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:	
WS101 ES1	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.30-0.30 m		
Moisture content:		
6.9%		
(dry weight correction)		











Hazard properties

None identified


Determinands

Moisture content: 6.9% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	• pH				7 pH		7 pH	7pH		
2	naphthalene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
3	• acenaphthylene				0.17 mg/kg		0.159 mg/kg	0.0000159 %	✓	
		205-917-1	208-96-8							
4	• acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9							
5	• fluorene				0.16 mg/kg		0.15 mg/kg	0.000015 %	✓	
		201-695-5	86-73-7							
6	• phenanthrene				1.3 mg/kg		1.216 mg/kg	0.000122 %	✓	
		201-581-5	85-01-8							
7	• anthracene				0.46 mg/kg		0.43 mg/kg	0.000043 %	✓	
		204-371-1	120-12-7							
8	• fluoranthene				3.4 mg/kg		3.181 mg/kg	0.000318 %	✓	
		205-912-4	206-44-0							
9	• pyrene				3.1 mg/kg		2.9 mg/kg	0.00029 %	✓	
		204-927-3	129-00-0							
10	benzo[a]anthracene				2.5 mg/kg		2.339 mg/kg	0.000234 %	✓	
	601-033-00-9	200-280-6	56-55-3							
11	chrysene				1.4 mg/kg		1.31 mg/kg	0.000131 %	✓	
	601-048-00-0	205-923-4	218-01-9							
12	benzo[b]fluoranthene				2.6 mg/kg		2.432 mg/kg	0.000243 %	✓	
	601-034-00-4	205-911-9	205-99-2							
13	benzo[k]fluoranthene				1.3 mg/kg		1.216 mg/kg	0.000122 %	✓	
	601-036-00-5	205-916-6	207-08-9							
14	benzo[a]pyrene; benzo[def]chrysene				2.6 mg/kg		2.432 mg/kg	0.000243 %	✓	
	601-032-00-3	200-028-5	50-32-8							
15	• indeno[123-cd]pyrene				1.3 mg/kg		1.216 mg/kg	0.000122 %	✓	
		205-893-2	193-39-5							
16	dibenz[a,h]anthracene				0.26 mg/kg		0.243 mg/kg	0.0000243 %	✓	
	601-041-00-2	200-181-8	53-70-3							

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number								
17		benzo[ghi]perylene				1.3 mg/kg		1.216 mg/kg	0.000122 %	✓		
		205-883-8		191-24-2								
18		arsenic { arsenic trioxide }				15 mg/kg	1.32	18.527 mg/kg	0.00185 %	✓		
		033-003-00-0	215-481-4	1327-53-3								
19		cadmium { cadmium sulfide }			1	<0.2 mg/kg	1.285	<0.257 mg/kg	<0.00002 %		<LOD	
		048-010-00-4	215-147-8	1306-23-6								
20		chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex				<4 mg/kg		<4 mg/kg	<0.0004 %		<LOD	
		024-017-00-8										
21		chromium in chromium(III) compounds { chromium(III) oxide }				23 mg/kg	1.462	31.446 mg/kg	0.00314 %	✓		
			215-160-9	1308-38-9								
22		copper { dicopper oxide; copper (I) oxide }				54 mg/kg	1.126	56.874 mg/kg	0.00569 %	✓		
		029-002-00-X	215-270-7	1317-39-1								
23		lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }			1	75 mg/kg		70.159 mg/kg	0.00702 %	✓		
		082-001-00-6										
24		mercury { mercury dichloride }				<0.3 mg/kg	1.353	<0.406 mg/kg	<0.0000406 %		<LOD	
		080-010-00-X	231-299-8	7487-94-7								
25		nickel { nickel dihydroxide }				17 mg/kg	1.579	25.118 mg/kg	0.00251 %	✓		
		028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]								
26		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD	
		034-002-00-8										
27		zinc { zinc oxide }				64 mg/kg	1.245	74.52 mg/kg	0.00745 %	✓		
		030-013-00-7	215-222-5	1314-13-2								
Total:									0.0304 %			

Key

- User supplied data
- Determinand values ignored for classification, see column 'Conc. Not Used' for reason
- Determinand defined or amended by HazWasteOnline (see Appendix A)
-  Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
- <LOD** Below limit of detection
- CLP: Note 1 Only the metal concentration has been used for classification

Classification of sample: WS101 ES2

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:	
WS101 ES2	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.80-0.80 m		
Moisture content:		
7.7%		
(dry weight correction)		











Hazard properties

None identified


Determinands

Moisture content: 7.7% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	• pH				7.8 pH		7.8 pH	7.8 pH		
2	naphthalene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
3	• acenaphthylene				0.2 mg/kg		0.186 mg/kg	0.0000186 %	✓	
		205-917-1	208-96-8							
4	• acenaphthene				0.13 mg/kg		0.121 mg/kg	0.0000121 %	✓	
		201-469-6	83-32-9							
5	• fluorene				0.11 mg/kg		0.102 mg/kg	0.0000102 %	✓	
		201-695-5	86-73-7							
6	• phenanthrene				1.5 mg/kg		1.393 mg/kg	0.000139 %	✓	
		201-581-5	85-01-8							
7	• anthracene				0.39 mg/kg		0.362 mg/kg	0.0000362 %	✓	
		204-371-1	120-12-7							
8	• fluoranthene				4 mg/kg		3.714 mg/kg	0.000371 %	✓	
		205-912-4	206-44-0							
9	• pyrene				3.8 mg/kg		3.528 mg/kg	0.000353 %	✓	
		204-927-3	129-00-0							
10	benzo[a]anthracene				3.4 mg/kg		3.157 mg/kg	0.000316 %	✓	
	601-033-00-9	200-280-6	56-55-3							
11	chrysene				2 mg/kg		1.857 mg/kg	0.000186 %	✓	
	601-048-00-0	205-923-4	218-01-9							
12	benzo[b]fluoranthene				3.6 mg/kg		3.343 mg/kg	0.000334 %	✓	
	601-034-00-4	205-911-9	205-99-2							
13	benzo[k]fluoranthene				1.6 mg/kg		1.486 mg/kg	0.000149 %	✓	
	601-036-00-5	205-916-6	207-08-9							
14	benzo[a]pyrene; benzo[def]chrysene				3.2 mg/kg		2.971 mg/kg	0.000297 %	✓	
	601-032-00-3	200-028-5	50-32-8							
15	• indeno[123-cd]pyrene				2 mg/kg		1.857 mg/kg	0.000186 %	✓	
		205-893-2	193-39-5							
16	dibenz[a,h]anthracene				0.37 mg/kg		0.344 mg/kg	0.0000344 %	✓	
	601-041-00-2	200-181-8	53-70-3							

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used	
		CLP index number	EC Number	CAS Number									
17		benzo[ghi]perylene				2	mg/kg		1.857	mg/kg	0.000186 %	✓	
			205-883-8	191-24-2									
18		arsenic { arsenic trioxide }				16	mg/kg	1.32	19.615	mg/kg	0.00196 %	✓	
		033-003-00-0	215-481-4	1327-53-3									
19		cadmium { cadmium sulfide }			1	<0.2	mg/kg	1.285	<0.257	mg/kg	<0.00002 %		<LOD
		048-010-00-4	215-147-8	1306-23-6									
20		chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex				<4	mg/kg		<4	mg/kg	<0.0004 %		<LOD
		024-017-00-8											
21		chromium in chromium(III) compounds { chromium(III) oxide }				28	mg/kg	1.462	37.998	mg/kg	0.0038 %	✓	
			215-160-9	1308-38-9									
22		copper { dicopper oxide; copper (I) oxide }				48	mg/kg	1.126	50.179	mg/kg	0.00502 %	✓	
		029-002-00-X	215-270-7	1317-39-1									
23		lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }			1	220	mg/kg		204.271	mg/kg	0.0204 %	✓	
		082-001-00-6											
24		mercury { mercury dichloride }				0.6	mg/kg	1.353	0.754	mg/kg	0.0000754 %	✓	
		080-010-00-X	231-299-8	7487-94-7									
25		nickel { nickel dihydroxide }				20	mg/kg	1.579	29.331	mg/kg	0.00293 %	✓	
		028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]									
26		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
		034-002-00-8											
27		zinc { zinc oxide }				110	mg/kg	1.245	127.13	mg/kg	0.0127 %	✓	
		030-013-00-7	215-222-5	1314-13-2									
Total:											0.0502 %		

Key

- User supplied data
- Determinand values ignored for classification, see column 'Conc. Not Used' for reason
- Determinand defined or amended by HazWasteOnline (see Appendix A)
-  Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
- <LOD** Below limit of detection
- CLP: Note 1 Only the metal concentration has been used for classification

Classification of sample: WS102 ES1

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:	
WS102 ES1	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.40-0.40 m		
Moisture content:		
13%		
(dry weight correction)		











Hazard properties

None identified


Determinands

Moisture content: 13% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	● pH				7.9 pH		7.9 pH	7.9 pH		
2	naphthalene				0.11 mg/kg		0.0973 mg/kg	0.00000973 %	✓	
	601-052-00-2	202-049-5	91-20-3							
3	● acenaphthylene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		205-917-1	208-96-8							
4	● acenaphthene				0.15 mg/kg		0.133 mg/kg	0.0000133 %	✓	
		201-469-6	83-32-9							
5	● fluorene				0.16 mg/kg		0.142 mg/kg	0.0000142 %	✓	
		201-695-5	86-73-7							
6	● phenanthrene				1.5 mg/kg		1.327 mg/kg	0.000133 %	✓	
		201-581-5	85-01-8							
7	● anthracene				0.37 mg/kg		0.327 mg/kg	0.0000327 %	✓	
		204-371-1	120-12-7							
8	● fluoranthene				1.9 mg/kg		1.681 mg/kg	0.000168 %	✓	
		205-912-4	206-44-0							
9	● pyrene				1.7 mg/kg		1.504 mg/kg	0.00015 %	✓	
		204-927-3	129-00-0							
10	benzo[a]anthracene				1.7 mg/kg		1.504 mg/kg	0.00015 %	✓	
	601-033-00-9	200-280-6	56-55-3							
11	chrysene				0.91 mg/kg		0.805 mg/kg	0.0000805 %	✓	
	601-048-00-0	205-923-4	218-01-9							
12	benzo[b]fluoranthene				2.5 mg/kg		2.212 mg/kg	0.000221 %	✓	
	601-034-00-4	205-911-9	205-99-2							
13	benzo[k]fluoranthene				1.2 mg/kg		1.062 mg/kg	0.000106 %	✓	
	601-036-00-5	205-916-6	207-08-9							
14	benzo[a]pyrene; benzo[def]chrysene				2.8 mg/kg		2.478 mg/kg	0.000248 %	✓	
	601-032-00-3	200-028-5	50-32-8							
15	● indeno[123-cd]pyrene				1.4 mg/kg		1.239 mg/kg	0.000124 %	✓	
		205-893-2	193-39-5							
16	dibenz[a,h]anthracene				0.25 mg/kg		0.221 mg/kg	0.0000221 %	✓	
	601-041-00-2	200-181-8	53-70-3							

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number								
17		benzo[ghi]perylene				1.3 mg/kg		1.15 mg/kg	0.000115 %	✓		
			205-883-8	191-24-2								
18		arsenic { arsenic trioxide }				12 mg/kg	1.32	14.021 mg/kg	0.0014 %	✓		
		033-003-00-0	215-481-4	1327-53-3								
19		cadmium { cadmium sulfide }			1	<0.2 mg/kg	1.285	<0.257 mg/kg	<0.00002 %		<LOD	
		048-010-00-4	215-147-8	1306-23-6								
20		chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex				<4 mg/kg		<4 mg/kg	<0.0004 %		<LOD	
		024-017-00-8										
21		chromium in chromium(III) compounds { chromium(III) oxide }				39 mg/kg	1.462	50.443 mg/kg	0.00504 %	✓		
			215-160-9	1308-38-9								
22		copper { dicopper oxide; copper (I) oxide }				37 mg/kg	1.126	36.865 mg/kg	0.00369 %	✓		
		029-002-00-X	215-270-7	1317-39-1								
23		lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }			1	85 mg/kg		75.221 mg/kg	0.00752 %	✓		
		082-001-00-6										
24		mercury { mercury dichloride }				<0.3 mg/kg	1.353	<0.406 mg/kg	<0.0000406 %		<LOD	
		080-010-00-X	231-299-8	7487-94-7								
25		nickel { nickel dihydroxide }				34 mg/kg	1.579	47.525 mg/kg	0.00475 %	✓		
		028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]								
26		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD	
		034-002-00-8										
27		zinc { zinc oxide }				95 mg/kg	1.245	104.644 mg/kg	0.0105 %	✓		
		030-013-00-7	215-222-5	1314-13-2								
Total:									0.0352 %			

Key

- User supplied data
- Determinand values ignored for classification, see column 'Conc. Not Used' for reason
- Determinand defined or amended by HazWasteOnline (see Appendix A)
-  Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
- <LOD** Below limit of detection
- CLP: Note 1 Only the metal concentration has been used for classification

Classification of sample: WS103 ES1

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:	
WS103 ES1	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.50-0.50 m		
Moisture content:		
13%		
(dry weight correction)		











Hazard properties

None identified


Determinands

Moisture content: 13% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	• pH				7.9 pH		7.9 pH	7.9 pH		
2	naphthalene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
3	• acenaphthylene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		205-917-1	208-96-8							
4	• acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9							
5	• fluorene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-695-5	86-73-7							
6	• phenanthrene				0.13 mg/kg		0.115 mg/kg	0.0000115 %	✓	
		201-581-5	85-01-8							
7	• anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		204-371-1	120-12-7							
8	• fluoranthene				0.4 mg/kg		0.354 mg/kg	0.0000354 %	✓	
		205-912-4	206-44-0							
9	• pyrene				0.27 mg/kg		0.239 mg/kg	0.0000239 %	✓	
		204-927-3	129-00-0							
10	benzo[a]anthracene				0.3 mg/kg		0.265 mg/kg	0.0000265 %	✓	
	601-033-00-9	200-280-6	56-55-3							
11	chrysene				0.21 mg/kg		0.186 mg/kg	0.0000186 %	✓	
	601-048-00-0	205-923-4	218-01-9							
12	benzo[b]fluoranthene				0.4 mg/kg		0.354 mg/kg	0.0000354 %	✓	
	601-034-00-4	205-911-9	205-99-2							
13	benzo[k]fluoranthene				0.13 mg/kg		0.115 mg/kg	0.0000115 %	✓	
	601-036-00-5	205-916-6	207-08-9							
14	benzo[a]pyrene; benzo[def]chrysene				0.31 mg/kg		0.274 mg/kg	0.0000274 %	✓	
	601-032-00-3	200-028-5	50-32-8							
15	• indeno[123-cd]pyrene				0.16 mg/kg		0.142 mg/kg	0.0000142 %	✓	
		205-893-2	193-39-5							
16	dibenz[a,h]anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-041-00-2	200-181-8	53-70-3							

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number								
17		benzo[ghi]perylene				0.16 mg/kg		0.142 mg/kg	0.0000142 %	✓		
			205-883-8	191-24-2								
18		arsenic { arsenic trioxide }				14 mg/kg	1.32	16.358 mg/kg	0.00164 %	✓		
		033-003-00-0	215-481-4	1327-53-3								
19		cadmium { cadmium sulfide }			1	<0.2 mg/kg	1.285	<0.257 mg/kg	<0.00002 %		<LOD	
		048-010-00-4	215-147-8	1306-23-6								
20		chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex				<4 mg/kg		<4 mg/kg	<0.0004 %		<LOD	
		024-017-00-8										
21		chromium in chromium(III) compounds { chromium(III) oxide }				33 mg/kg	1.462	42.683 mg/kg	0.00427 %	✓		
			215-160-9	1308-38-9								
22		copper { dicopper oxide; copper (I) oxide }				33 mg/kg	1.126	32.88 mg/kg	0.00329 %	✓		
		029-002-00-X	215-270-7	1317-39-1								
23		lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }			1	65 mg/kg		57.522 mg/kg	0.00575 %	✓		
		082-001-00-6										
24		mercury { mercury dichloride }				<0.3 mg/kg	1.353	<0.406 mg/kg	<0.0000406 %		<LOD	
		080-010-00-X	231-299-8	7487-94-7								
25		nickel { nickel dihydroxide }				29 mg/kg	1.579	40.536 mg/kg	0.00405 %	✓		
		028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]								
26		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD	
		034-002-00-8										
27		zinc { zinc oxide }				78 mg/kg	1.245	85.918 mg/kg	0.00859 %	✓		
		030-013-00-7	215-222-5	1314-13-2								
Total:									0.0286 %			

Key

- User supplied data
- Determinand values ignored for classification, see column 'Conc. Not Used' for reason
- Determinand defined or amended by HazWasteOnline (see Appendix A)
-  Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
- <LOD** Below limit of detection
- CLP: Note 1 Only the metal concentration has been used for classification

Classification of sample: WS103 ES3

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:	
WS103 ES3	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
2.00-2.00 m		
Moisture content:		
6.5%		
(dry weight correction)		











Hazard properties

None identified


Determinands

Moisture content: 6.5% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	• pH				7.8 pH		7.8 pH	7.8 pH		
2	naphthalene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
3	• acenaphthylene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		205-917-1	208-96-8							
4	• acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9							
5	• fluorene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-695-5	86-73-7							
6	• phenanthrene				0.21 mg/kg		0.197 mg/kg	0.0000197 %	✓	
		201-581-5	85-01-8							
7	• anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		204-371-1	120-12-7							
8	• fluoranthene				0.52 mg/kg		0.488 mg/kg	0.0000488 %	✓	
		205-912-4	206-44-0							
9	• pyrene				0.45 mg/kg		0.423 mg/kg	0.0000423 %	✓	
		204-927-3	129-00-0							
10	benzo[a]anthracene				0.4 mg/kg		0.376 mg/kg	0.0000376 %	✓	
	601-033-00-9	200-280-6	56-55-3							
11	chrysene				0.27 mg/kg		0.254 mg/kg	0.0000254 %	✓	
	601-048-00-0	205-923-4	218-01-9							
12	benzo[b]fluoranthene				0.58 mg/kg		0.545 mg/kg	0.0000545 %	✓	
	601-034-00-4	205-911-9	205-99-2							
13	benzo[k]fluoranthene				0.18 mg/kg		0.169 mg/kg	0.0000169 %	✓	
	601-036-00-5	205-916-6	207-08-9							
14	benzo[a]pyrene; benzo[def]chrysene				0.41 mg/kg		0.385 mg/kg	0.0000385 %	✓	
	601-032-00-3	200-028-5	50-32-8							
15	• indeno[123-cd]pyrene				0.18 mg/kg		0.169 mg/kg	0.0000169 %	✓	
		205-893-2	193-39-5							
16	dibenz[a,h]anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-041-00-2	200-181-8	53-70-3							

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number								
17	 benzo[ghi]perylene				0.19	mg/kg		0.178	mg/kg	0.0000178 %	✓	
		205-883-8	191-24-2									
18	 arsenic { arsenic trioxide }				17	mg/kg	1.32	21.076	mg/kg	0.00211 %	✓	
		033-003-00-0	215-481-4	1327-53-3								
19	 cadmium { cadmium sulfide }			1	<0.2	mg/kg	1.285	<0.257	mg/kg	<0.00002 %		<LOD
		048-010-00-4	215-147-8									
20	chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex				<4	mg/kg		<4	mg/kg	<0.0004 %		<LOD
		024-017-00-8										
21	 chromium in chromium(III) compounds { chromium(III) oxide }				22	mg/kg	1.462	30.192	mg/kg	0.00302 %	✓	
			215-160-9									
22	 copper { dicopper oxide; copper (I) oxide }				38	mg/kg	1.126	40.173	mg/kg	0.00402 %	✓	
		029-002-00-X	215-270-7									
23	 lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }			1	310	mg/kg		291.08	mg/kg	0.0291 %	✓	
		082-001-00-6										
24	 mercury { mercury dichloride }				<0.3	mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<LOD
		080-010-00-X	231-299-8									
25	 nickel { nickel dihydroxide }				23	mg/kg	1.579	34.111	mg/kg	0.00341 %	✓	
		028-008-00-X	235-008-5 [1] 234-348-1 [2]									
26	 selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				1.3	mg/kg	2.554	3.117	mg/kg	0.000312 %	✓	
		034-002-00-8										
27	 zinc { zinc oxide }				100	mg/kg	1.245	116.875	mg/kg	0.0117 %	✓	
		030-013-00-7	215-222-5									
Total:										0.0545 %		

Key

- User supplied data
- Determinand values ignored for classification, see column 'Conc. Not Used' for reason
- Determinand defined or amended by HazWasteOnline (see Appendix A)
-  Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
- <LOD** Below limit of detection
- CLP: Note 1 Only the metal concentration has been used for classification

Classification of sample: WS103 ES1[1]

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:	
WS103 ES1[1]	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
2.40-2.40 m		
Moisture content:		
6.2%		
(dry weight correction)		











Hazard properties

None identified


Determinands

Moisture content: 6.2% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	• pH				7.5 pH		7.5 pH	7.5 pH		
2	naphthalene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
3	• acenaphthylene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		205-917-1	208-96-8							
4	• acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9							
5	• fluorene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-695-5	86-73-7							
6	• phenanthrene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-581-5	85-01-8							
7	• anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		204-371-1	120-12-7							
8	• fluoranthene				0.14 mg/kg		0.132 mg/kg	0.0000132 %	✓	
		205-912-4	206-44-0							
9	• pyrene				0.14 mg/kg		0.132 mg/kg	0.0000132 %	✓	
		204-927-3	129-00-0							
10	benzo[a]anthracene				0.15 mg/kg		0.141 mg/kg	0.0000141 %	✓	
	601-033-00-9	200-280-6	56-55-3							
11	chrysene				0.1 mg/kg		0.0942 mg/kg	0.00000942 %	✓	
	601-048-00-0	205-923-4	218-01-9							
12	benzo[b]fluoranthene				0.19 mg/kg		0.179 mg/kg	0.0000179 %	✓	
	601-034-00-4	205-911-9	205-99-2							
13	benzo[k]fluoranthene				0.07 mg/kg		0.0659 mg/kg	0.00000659 %	✓	
	601-036-00-5	205-916-6	207-08-9							
14	benzo[a]pyrene; benzo[def]chrysene				0.14 mg/kg		0.132 mg/kg	0.0000132 %	✓	
	601-032-00-3	200-028-5	50-32-8							
15	• indeno[123-cd]pyrene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		205-893-2	193-39-5							
16	dibenz[a,h]anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-041-00-2	200-181-8	53-70-3							

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used	
		CLP index number	EC Number	CAS Number									
17		benzo[ghi]perylene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
			205-883-8	191-24-2									
18		arsenic { arsenic trioxide }				7.7	mg/kg	1.32	9.573	mg/kg	0.000957 %	✓	
		033-003-00-0	215-481-4	1327-53-3									
19		cadmium { cadmium sulfide }			1	<0.2	mg/kg	1.285	<0.257	mg/kg	<0.00002 %		<LOD
		048-010-00-4	215-147-8	1306-23-6									
20		chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex				<4	mg/kg		<4	mg/kg	<0.0004 %		<LOD
		024-017-00-8											
21		chromium in chromium(III) compounds { chromium(III) oxide }				17	mg/kg	1.462	23.396	mg/kg	0.00234 %	✓	
			215-160-9	1308-38-9									
22		copper { dicopper oxide; copper (I) oxide }				19	mg/kg	1.126	20.143	mg/kg	0.00201 %	✓	
		029-002-00-X	215-270-7	1317-39-1									
23		lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }			1	9.7	mg/kg		9.134	mg/kg	0.000913 %	✓	
		082-001-00-6											
24		mercury { mercury dichloride }				<0.3	mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<LOD
		080-010-00-X	231-299-8	7487-94-7									
25		nickel { nickel dihydroxide }				17	mg/kg	1.579	25.284	mg/kg	0.00253 %	✓	
		028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]									
26		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
		034-002-00-8											
27		zinc { zinc oxide }				42	mg/kg	1.245	49.226	mg/kg	0.00492 %	✓	
		030-013-00-7	215-222-5	1314-13-2									
Total:											0.0145 %		

Key

- User supplied data
- Determinand values ignored for classification, see column 'Conc. Not Used' for reason
- Determinand defined or amended by HazWasteOnline (see Appendix A)
-  Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
- <LOD** Below limit of detection
- CLP: Note 1 Only the metal concentration has been used for classification

Classification of sample: WS104 ES1

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:	
WS104 ES1	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.50-0.50 m		
Moisture content:		
15%		
(dry weight correction)		











Hazard properties

None identified


Determinands

Moisture content: 15% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	● pH				7.6 pH		7.6 pH	7.6 pH		
2	naphthalene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
3	● acenaphthylene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		205-917-1	208-96-8							
4	● acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9							
5	● fluorene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-695-5	86-73-7							
6	● phenanthrene				0.18 mg/kg		0.157 mg/kg	0.0000157 %	✓	
		201-581-5	85-01-8							
7	● anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		204-371-1	120-12-7							
8	● fluoranthene				0.29 mg/kg		0.252 mg/kg	0.0000252 %	✓	
		205-912-4	206-44-0							
9	● pyrene				0.25 mg/kg		0.217 mg/kg	0.0000217 %	✓	
		204-927-3	129-00-0							
10	benzo[a]anthracene				0.24 mg/kg		0.209 mg/kg	0.0000209 %	✓	
	601-033-00-9	200-280-6	56-55-3							
11	chrysene				0.14 mg/kg		0.122 mg/kg	0.0000122 %	✓	
	601-048-00-0	205-923-4	218-01-9							
12	benzo[b]fluoranthene				0.28 mg/kg		0.243 mg/kg	0.0000243 %	✓	
	601-034-00-4	205-911-9	205-99-2							
13	benzo[k]fluoranthene				0.09 mg/kg		0.0783 mg/kg	0.00000783 %	✓	
	601-036-00-5	205-916-6	207-08-9							
14	benzo[a]pyrene; benzo[def]chrysene				0.23 mg/kg		0.2 mg/kg	0.00002 %	✓	
	601-032-00-3	200-028-5	50-32-8							
15	● indeno[123-cd]pyrene				0.1 mg/kg		0.087 mg/kg	0.0000087 %	✓	
		205-893-2	193-39-5							
16	dibenz[a,h]anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-041-00-2	200-181-8	53-70-3							

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used	
		CLP index number	EC Number	CAS Number								
17	 benzo[ghi]perylene				0.13	mg/kg		0.113	mg/kg	0.0000113 %	✓	
		205-883-8	191-24-2									
18	 arsenic { arsenic trioxide }				12	mg/kg	1.32	13.777	mg/kg	0.00138 %	✓	
		033-003-00-0	215-481-4	1327-53-3								
19	 cadmium { cadmium sulfide }			1	<0.2	mg/kg	1.285	<0.257	mg/kg	<0.00002 %		<LOD
		048-010-00-4	215-147-8									
20	chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex				<4	mg/kg		<4	mg/kg	<0.0004 %		<LOD
		024-017-00-8										
21	 chromium in chromium(III) compounds { chromium(III) oxide }				33	mg/kg	1.462	41.94	mg/kg	0.00419 %	✓	
			215-160-9									
22	 copper { dicopper oxide; copper (I) oxide }				28	mg/kg	1.126	27.413	mg/kg	0.00274 %	✓	
		029-002-00-X	215-270-7									
23	 lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }			1	21	mg/kg		18.261	mg/kg	0.00183 %	✓	
		082-001-00-6										
24	 mercury { mercury dichloride }				<0.3	mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<LOD
		080-010-00-X	231-299-8									
25	 nickel { nickel dihydroxide }				34	mg/kg	1.579	46.698	mg/kg	0.00467 %	✓	
		028-008-00-X	235-008-5 [1] 234-348-1 [2]									
26	 selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				1.1	mg/kg	2.554	2.443	mg/kg	0.000244 %	✓	
		034-002-00-8										
27	 zinc { zinc oxide }				67	mg/kg	1.245	72.518	mg/kg	0.00725 %	✓	
		030-013-00-7	215-222-5									
Total:									0.023 %			

Key

- User supplied data
- Determinand values ignored for classification, see column 'Conc. Not Used' for reason
- Determinand defined or amended by HazWasteOnline (see Appendix A)
-  Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
- <LOD** Below limit of detection
- CLP: Note 1 Only the metal concentration has been used for classification

Classification of sample: WS104 ES2

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:	
WS104 ES2	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
1.30-1.30 m		
Moisture content:		
13%		
(dry weight correction)		











Hazard properties

None identified

Determinands

Moisture content: 13% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	• pH		PH		7.5 pH		7.5 pH	7.5 pH		
2	naphthalene				0.37 mg/kg		0.327 mg/kg	0.0000327 %	✓	
	601-052-00-2	202-049-5	91-20-3							
3	• acenaphthylene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		205-917-1	208-96-8							
4	• acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9							
5	• fluorene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-695-5	86-73-7							
6	• phenanthrene				0.59 mg/kg		0.522 mg/kg	0.0000522 %	✓	
		201-581-5	85-01-8							
7	• anthracene				0.12 mg/kg		0.106 mg/kg	0.0000106 %	✓	
		204-371-1	120-12-7							
8	• fluoranthene				1.6 mg/kg		1.416 mg/kg	0.000142 %	✓	
		205-912-4	206-44-0							
9	• pyrene				1.5 mg/kg		1.327 mg/kg	0.000133 %	✓	
		204-927-3	129-00-0							
10	benzo[a]anthracene				1.1 mg/kg		0.973 mg/kg	0.0000973 %	✓	
	601-033-00-9	200-280-6	56-55-3							
11	chrysene				0.65 mg/kg		0.575 mg/kg	0.0000575 %	✓	
	601-048-00-0	205-923-4	218-01-9							
12	benzo[b]fluoranthene				1.2 mg/kg		1.062 mg/kg	0.000106 %	✓	
	601-034-00-4	205-911-9	205-99-2							
13	benzo[k]fluoranthene				0.52 mg/kg		0.46 mg/kg	0.000046 %	✓	
	601-036-00-5	205-916-6	207-08-9							
14	benzo[a]pyrene; benzo[def]chrysene				1.1 mg/kg		0.973 mg/kg	0.0000973 %	✓	
	601-032-00-3	200-028-5	50-32-8							
15	• indeno[123-cd]pyrene				0.6 mg/kg		0.531 mg/kg	0.0000531 %	✓	
		205-893-2	193-39-5							
16	dibenz[a,h]anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-041-00-2	200-181-8	53-70-3							

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number								
17	 benzo[ghi]perylene				0.6	mg/kg		0.531	mg/kg	0.0000531 %	✓	
		205-883-8	191-24-2									
18	 arsenic { arsenic trioxide }				17	mg/kg	1.32	19.863	mg/kg	0.00199 %	✓	
		033-003-00-0	215-481-4	1327-53-3								
19	 cadmium { cadmium sulfide }			1	<0.2	mg/kg	1.285	<0.257	mg/kg	<0.00002 %		<LOD
		048-010-00-4	215-147-8									
20	chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex				<4	mg/kg		<4	mg/kg	<0.0004 %		<LOD
		024-017-00-8										
21	 chromium in chromium(III) compounds { chromium(III) oxide }				39	mg/kg	1.462	50.443	mg/kg	0.00504 %	✓	
			215-160-9									
22	 copper { dicopper oxide; copper (I) oxide }				53	mg/kg	1.126	52.807	mg/kg	0.00528 %	✓	
		029-002-00-X	215-270-7									
23	 lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }			1	170	mg/kg		150.442	mg/kg	0.015 %	✓	
		082-001-00-6										
24	 mercury { mercury dichloride }				<0.3	mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<LOD
		080-010-00-X	231-299-8									
25	 nickel { nickel dihydroxide }				25	mg/kg	1.579	34.945	mg/kg	0.00349 %	✓	
		028-008-00-X	235-008-5 [1] 234-348-1 [2]									
26	 selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
		034-002-00-8										
27	 zinc { zinc oxide }				190	mg/kg	1.245	209.288	mg/kg	0.0209 %	✓	
		030-013-00-7	215-222-5									
Total:										0.0534 %		

Key

- User supplied data
- Determinand values ignored for classification, see column 'Conc. Not Used' for reason
- Determinand defined or amended by HazWasteOnline (see Appendix A)
- Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
- <LOD** Below limit of detection
- CLP: Note 1 Only the metal concentration has been used for classification

Classification of sample: WS104 ES3

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:	
WS104 ES3	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
2.40-2.40 m		
Moisture content:		
14%		
(dry weight correction)		











Hazard properties

None identified


Determinands

Moisture content: 14% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	• pH				7.8 pH		7.8 pH	7.8 pH		
2	naphthalene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
3	• acenaphthylene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		205-917-1	208-96-8							
4	• acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9							
5	• fluorene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-695-5	86-73-7							
6	• phenanthrene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-581-5	85-01-8							
7	• anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		204-371-1	120-12-7							
8	• fluoranthene				0.19 mg/kg		0.167 mg/kg	0.0000167 %	✓	
		205-912-4	206-44-0							
9	• pyrene				0.18 mg/kg		0.158 mg/kg	0.0000158 %	✓	
		204-927-3	129-00-0							
10	benzo[a]anthracene				0.18 mg/kg		0.158 mg/kg	0.0000158 %	✓	
	601-033-00-9	200-280-6	56-55-3							
11	chrysene				0.09 mg/kg		0.0789 mg/kg	0.00000789 %	✓	
	601-048-00-0	205-923-4	218-01-9							
12	benzo[b]fluoranthene				0.18 mg/kg		0.158 mg/kg	0.0000158 %	✓	
	601-034-00-4	205-911-9	205-99-2							
13	benzo[k]fluoranthene				0.08 mg/kg		0.0702 mg/kg	0.00000702 %	✓	
	601-036-00-5	205-916-6	207-08-9							
14	benzo[a]pyrene; benzo[def]chrysene				0.14 mg/kg		0.123 mg/kg	0.0000123 %	✓	
	601-032-00-3	200-028-5	50-32-8							
15	• indeno[123-cd]pyrene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		205-893-2	193-39-5							
16	dibenz[a,h]anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-041-00-2	200-181-8	53-70-3							

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used	
		CLP index number	EC Number	CAS Number									
17		benzo[ghi]perylene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
			205-883-8	191-24-2									
18		arsenic { arsenic trioxide }				11	mg/kg	1.32	12.74	mg/kg	0.00127 %	✓	
		033-003-00-0	215-481-4	1327-53-3									
19		cadmium { cadmium sulfide }			1	<0.2	mg/kg	1.285	<0.257	mg/kg	<0.00002 %		<LOD
		048-010-00-4	215-147-8	1306-23-6									
20		chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex				<4	mg/kg		<4	mg/kg	<0.0004 %		<LOD
		024-017-00-8											
21		chromium in chromium(III) compounds { chromium(III) oxide }				38	mg/kg	1.462	48.719	mg/kg	0.00487 %	✓	
			215-160-9	1308-38-9									
22		copper { dicopper oxide; copper (I) oxide }				25	mg/kg	1.126	24.691	mg/kg	0.00247 %	✓	
		029-002-00-X	215-270-7	1317-39-1									
23		lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }			1	19	mg/kg		16.667	mg/kg	0.00167 %	✓	
		082-001-00-6											
24		mercury { mercury dichloride }				<0.3	mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<LOD
		080-010-00-X	231-299-8	7487-94-7									
25		nickel { nickel dihydroxide }				33	mg/kg	1.579	45.722	mg/kg	0.00457 %	✓	
		028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]									
26		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
		034-002-00-8											
27		zinc { zinc oxide }				62	mg/kg	1.245	67.695	mg/kg	0.00677 %	✓	
		030-013-00-7	215-222-5	1314-13-2									
Total:										0.0225 %			

Key

- User supplied data
- Determinand values ignored for classification, see column 'Conc. Not Used' for reason
- Determinand defined or amended by HazWasteOnline (see Appendix A)
-  Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
- <LOD** Below limit of detection
- CLP: Note 1 Only the metal concentration has been used for classification

Classification of sample: WS105 ES1

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:	
WS105 ES1	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.50-0.50 m		
Moisture content:		
16%		
(dry weight correction)		











Hazard properties

None identified


Determinands

Moisture content: 16% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	• pH				8.2 pH		8.2 pH	8.2 pH		
2	naphthalene				0.21 mg/kg		0.181 mg/kg	0.0000181 %	✓	
	601-052-00-2	202-049-5	91-20-3							
3	• acenaphthylene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		205-917-1	208-96-8							
4	• acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9							
5	• fluorene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-695-5	86-73-7							
6	• phenanthrene				0.57 mg/kg		0.491 mg/kg	0.0000491 %	✓	
		201-581-5	85-01-8							
7	• anthracene				0.16 mg/kg		0.138 mg/kg	0.0000138 %	✓	
		204-371-1	120-12-7							
8	• fluoranthene				1.3 mg/kg		1.121 mg/kg	0.000112 %	✓	
		205-912-4	206-44-0							
9	• pyrene				1.2 mg/kg		1.034 mg/kg	0.000103 %	✓	
		204-927-3	129-00-0							
10	benzo[a]anthracene				0.93 mg/kg		0.802 mg/kg	0.0000802 %	✓	
	601-033-00-9	200-280-6	56-55-3							
11	chrysene				0.54 mg/kg		0.466 mg/kg	0.0000466 %	✓	
	601-048-00-0	205-923-4	218-01-9							
12	benzo[b]fluoranthene				0.91 mg/kg		0.784 mg/kg	0.0000784 %	✓	
	601-034-00-4	205-911-9	205-99-2							
13	benzo[k]fluoranthene				0.48 mg/kg		0.414 mg/kg	0.0000414 %	✓	
	601-036-00-5	205-916-6	207-08-9							
14	benzo[a]pyrene; benzo[def]chrysene				0.8 mg/kg		0.69 mg/kg	0.000069 %	✓	
	601-032-00-3	200-028-5	50-32-8							
15	• indeno[123-cd]pyrene				0.45 mg/kg		0.388 mg/kg	0.0000388 %	✓	
		205-893-2	193-39-5							
16	dibenz[a,h]anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-041-00-2	200-181-8	53-70-3							

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number								
17		benzo[ghi]perylene				0.45 mg/kg		0.388 mg/kg	0.0000388 %	✓		
			205-883-8	191-24-2								
18		arsenic { arsenic trioxide }				17 mg/kg	1.32	19.35 mg/kg	0.00193 %	✓		
		033-003-00-0	215-481-4	1327-53-3								
19		cadmium { cadmium sulfide }			1	<0.2 mg/kg	1.285	<0.257 mg/kg	<0.00002 %		<LOD	
		048-010-00-4	215-147-8	1306-23-6								
20		chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex				<4 mg/kg		<4 mg/kg	<0.0004 %		<LOD	
		024-017-00-8										
21		chromium in chromium(III) compounds { chromium(III) oxide }				39 mg/kg	1.462	49.139 mg/kg	0.00491 %	✓		
			215-160-9	1308-38-9								
22		copper { dicopper oxide; copper (I) oxide }				41 mg/kg	1.126	39.794 mg/kg	0.00398 %	✓		
		029-002-00-X	215-270-7	1317-39-1								
23		lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }			1	49 mg/kg		42.241 mg/kg	0.00422 %	✓		
		082-001-00-6										
24		mercury { mercury dichloride }				<0.3 mg/kg	1.353	<0.406 mg/kg	<0.0000406 %		<LOD	
		080-010-00-X	231-299-8	7487-94-7								
25		nickel { nickel dihydroxide }				29 mg/kg	1.579	39.487 mg/kg	0.00395 %	✓		
		028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]								
26		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD	
		034-002-00-8										
27		zinc { zinc oxide }				78 mg/kg	1.245	83.696 mg/kg	0.00837 %	✓		
		030-013-00-7	215-222-5	1314-13-2								
Total:									0.0288 %			

Key

- User supplied data
- Determinand values ignored for classification, see column 'Conc. Not Used' for reason
- Determinand defined or amended by HazWasteOnline (see Appendix A)
-  Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
- <LOD** Below limit of detection
- CLP: Note 1 Only the metal concentration has been used for classification

Classification of sample: WS105 ES2

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:	
WS105 ES2	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
1.00-1.00 m		
Moisture content:		
13%		
(dry weight correction)		











Hazard properties

None identified


Determinands

Moisture content: 13% Dry Weight Moisture Correction applied (MC)


#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	● pH				8.8 pH		8.8 pH	8.8 pH		
2	naphthalene				0.13 mg/kg		0.115 mg/kg	0.0000115 %	✓	
	601-052-00-2	202-049-5	91-20-3							
3	● acenaphthylene				0.17 mg/kg		0.15 mg/kg	0.000015 %	✓	
		205-917-1	208-96-8							
4	● acenaphthene				0.15 mg/kg		0.133 mg/kg	0.0000133 %	✓	
		201-469-6	83-32-9							
5	● fluorene				0.13 mg/kg		0.115 mg/kg	0.0000115 %	✓	
		201-695-5	86-73-7							
6	● phenanthrene				1.6 mg/kg		1.416 mg/kg	0.000142 %	✓	
		201-581-5	85-01-8							
7	● anthracene				0.37 mg/kg		0.327 mg/kg	0.0000327 %	✓	
		204-371-1	120-12-7							
8	● fluoranthene				3.4 mg/kg		3.009 mg/kg	0.000301 %	✓	
		205-912-4	206-44-0							
9	● pyrene				3.1 mg/kg		2.743 mg/kg	0.000274 %	✓	
		204-927-3	129-00-0							
10	benzo[a]anthracene				2.7 mg/kg		2.389 mg/kg	0.000239 %	✓	
	601-033-00-9	200-280-6	56-55-3							
11	chrysene				1.5 mg/kg		1.327 mg/kg	0.000133 %	✓	
	601-048-00-0	205-923-4	218-01-9							
12	benzo[b]fluoranthene				2.9 mg/kg		2.566 mg/kg	0.000257 %	✓	
	601-034-00-4	205-911-9	205-99-2							
13	benzo[k]fluoranthene				1.1 mg/kg		0.973 mg/kg	0.0000973 %	✓	
	601-036-00-5	205-916-6	207-08-9							
14	benzo[a]pyrene; benzo[def]chrysene				2.6 mg/kg		2.301 mg/kg	0.00023 %	✓	
	601-032-00-3	200-028-5	50-32-8							
15	● indeno[123-cd]pyrene				1.4 mg/kg		1.239 mg/kg	0.000124 %	✓	
		205-893-2	193-39-5							
16	dibenz[a,h]anthracene				0.29 mg/kg		0.257 mg/kg	0.0000257 %	✓	
	601-041-00-2	200-181-8	53-70-3							

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number								
17	 benzo[ghi]perylene				1.3	mg/kg		1.15	mg/kg	0.000115 %	✓	
		205-883-8	191-24-2									
18	 arsenic { arsenic trioxide }				14	mg/kg	1.32	16.358	mg/kg	0.00164 %	✓	
		033-003-00-0	215-481-4	1327-53-3								
19	 cadmium { cadmium sulfide }			1	<0.2	mg/kg	1.285	<0.257	mg/kg	<0.00002 %		<LOD
		048-010-00-4	215-147-8									
20	chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex				<4	mg/kg		<4	mg/kg	<0.0004 %		<LOD
		024-017-00-8										
21	 chromium in chromium(III) compounds { chromium(III) oxide }				37	mg/kg	1.462	47.856	mg/kg	0.00479 %	✓	
			215-160-9									
22	 copper { dicopper oxide; copper (I) oxide }				51	mg/kg	1.126	50.814	mg/kg	0.00508 %	✓	
		029-002-00-X	215-270-7									
23	 lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }			1	110	mg/kg		97.345	mg/kg	0.00973 %	✓	
		082-001-00-6										
24	 mercury { mercury dichloride }				<0.3	mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<LOD
		080-010-00-X	231-299-8									
25	 nickel { nickel dihydroxide }				31	mg/kg	1.579	43.331	mg/kg	0.00433 %	✓	
		028-008-00-X	235-008-5 [1] 234-348-1 [2]									
26	 selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
		034-002-00-8										
27	 zinc { zinc oxide }				120	mg/kg	1.245	132.182	mg/kg	0.0132 %	✓	
		030-013-00-7	215-222-5									
Total:										0.0415 %		

Key

- User supplied data
- Determinand values ignored for classification, see column 'Conc. Not Used' for reason
- Determinand defined or amended by HazWasteOnline (see Appendix A)
-  Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
- <LOD** Below limit of detection
- CLP: Note 1 Only the metal concentration has been used for classification

Classification of sample: WS105 ES3

 **Hazardous Waste**
Classified as **17 05 03 ***
in the List of Waste

Sample details

Sample Name:	LoW Code:
WS105 ES3	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
1.40-1.40 m	Entry:
Moisture content:	17 05 03 * (Soil and stones containing hazardous substances)
1.3%	
(dry weight correction)	

Hazard properties

HP 8: Corrosive "waste which on application can cause skin corrosion"

Risk phrases hit:

pH; pH "Assumed to be irritant/corrosive because of pH value"

Because of determinand:

pH: (conc.: 11.5 pH)

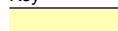




Determinands

Moisture content: 1.3% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	pH				11.5 pH		11.5 pH	11.5 pH		
2	naphthalene				0.19 mg/kg		0.188 mg/kg	0.0000188 %	✓	
	601-052-00-2	202-049-5	91-20-3							
3	acenaphthylene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		205-917-1	208-96-8							
4	acenaphthene				0.23 mg/kg		0.227 mg/kg	0.0000227 %	✓	
		201-469-6	83-32-9							
5	fluorene				0.21 mg/kg		0.207 mg/kg	0.0000207 %	✓	
		201-695-5	86-73-7							
6	phenanthrene				1.6 mg/kg		1.579 mg/kg	0.000158 %	✓	
		201-581-5	85-01-8							
7	anthracene				0.34 mg/kg		0.336 mg/kg	0.0000336 %	✓	
		204-371-1	120-12-7							
8	fluoranthene				2.2 mg/kg		2.172 mg/kg	0.000217 %	✓	
		205-912-4	206-44-0							
9	pyrene				1.8 mg/kg		1.777 mg/kg	0.000178 %	✓	
		204-927-3	129-00-0							
10	benzo[a]anthracene				1.5 mg/kg		1.481 mg/kg	0.000148 %	✓	
	601-033-00-9	200-280-6	56-55-3							
11	chrysene				0.98 mg/kg		0.967 mg/kg	0.0000967 %	✓	
	601-048-00-0	205-923-4	218-01-9							
12	benzo[b]fluoranthene				1.6 mg/kg		1.579 mg/kg	0.000158 %	✓	
	601-034-00-4	205-911-9	205-99-2							
13	benzo[k]fluoranthene				0.65 mg/kg		0.642 mg/kg	0.0000642 %	✓	
	601-036-00-5	205-916-6	207-08-9							

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
14	benzo[a]pyrene; benzo[def]chrysene				1.5	mg/kg		1.481	mg/kg	0.000148 %	✓	
	601-032-00-3	200-028-5	50-32-8									
15	indeno[123-cd]pyrene				0.72	mg/kg		0.711	mg/kg	0.0000711 %	✓	
		205-893-2	193-39-5									
16	dibenz[a,h]anthracene				0.13	mg/kg		0.128	mg/kg	0.0000128 %	✓	
	601-041-00-2	200-181-8	53-70-3									
17	benzo[ghi]perylene				0.68	mg/kg		0.671	mg/kg	0.0000671 %	✓	
		205-883-8	191-24-2									
18	arsenic { arsenic trioxide }				8.5	mg/kg	1.32	11.079	mg/kg	0.00111 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
19	cadmium { cadmium sulfide }			1	0.3	mg/kg	1.285	0.381	mg/kg	0.0000296 %	✓	
	048-010-00-4	215-147-8	1306-23-6									
20	chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex				<4	mg/kg		<4	mg/kg	<0.0004 %		<LOD
	024-017-00-8											
21	chromium in chromium(III) compounds { chromium(III) oxide }				42	mg/kg	1.462	60.598	mg/kg	0.00606 %	✓	
		215-160-9	1308-38-9									
22	copper { dicopper oxide; copper (I) oxide }				46	mg/kg	1.126	51.126	mg/kg	0.00511 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
23	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }			1	90	mg/kg		88.845	mg/kg	0.00888 %	✓	
	082-001-00-6											
24	mercury { mercury dichloride }				<0.3	mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<LOD
	080-010-00-X	231-299-8	7487-94-7									
25	nickel { nickel dihydroxide }				32	mg/kg	1.579	49.895	mg/kg	0.00499 %	✓	
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]									
26	selenium { selenium compounds with the exception of cadmium selenide and those specified elsewhere in this Annex }				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
	034-002-00-8											
27	zinc { zinc oxide }				110	mg/kg	1.245	135.161	mg/kg	0.0135 %	✓	
	030-013-00-7	215-222-5	1314-13-2									
Total:										0.0418 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Hazardous result
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Appendix A: Classifier defined and non CLP determinands

- **pH** (CAS Number: PH)

Description/Comments: Appendix C4
Data source: WM3 1st Edition 2015
Data source date: 25/05/2015
Risk Phrases: None.
Hazard Statements: None.

- **acenaphthylene** (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 17/07/2015
Risk Phrases: R22 , R26 , R27 , R36 , R37 , R38
Hazard Statements: Acute Tox. 4 H302 , Acute Tox. 1 H330 , Acute Tox. 1 H310 , Eye Irrit. 2 H319 , STOT SE 3 H335 , Skin Irrit. 2 H315

- **acenaphthene** (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 17/07/2015
Risk Phrases: R36 , R37 , R38 , N R50/53 , N R51/53
Hazard Statements: Eye Irrit. 2 H319 , STOT SE 3 H335 , Skin Irrit. 2 H315 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410 , Aquatic Chronic 2 H411

- **fluorene** (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 06/08/2015
Risk Phrases: N R50/53
Hazard Statements: Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

- **phenanthrene** (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 06/08/2015
Risk Phrases: R22 , R36 , R37 , R38 , R40 , R43 , N R50/53
Hazard Statements: Acute Tox. 4 H302 , Eye Irrit. 2 H319 , STOT SE 3 H335 , Carc. 2 H351 , Skin Sens. 1 H317 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410 , Skin Irrit. 2 H315

- **anthracene** (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 17/07/2015
Risk Phrases: R36 , R37 , R38 , R43 , N R50/53
Hazard Statements: Eye Irrit. 2 H319 , STOT SE 3 H335 , Skin Irrit. 2 H315 , Skin Sens. 1 H317 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

- **fluoranthene** (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 21/08/2015
Risk Phrases: Xn R22 , N R50/53
Hazard Statements: Acute Tox. 4 H302 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

- **pyrene** (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 21/08/2015
Risk Phrases: Xi R36/37/38 , N R50/53
Hazard Statements: Skin Irrit. 2 H315 , Eye Irrit. 2 H319 , STOT SE 3 H335 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

■ **indeno[123-cd]pyrene** (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database
 Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
 Data source date: 06/08/2015
 Risk Phrases: R40
 Hazard Statements: Carc. 2 H351

■ **benzo[ghi]perylene** (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015
 Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
 Data source date: 23/07/2015
 Risk Phrases: N R50/53
 Hazard Statements: Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

■ **chromium(III) oxide** (EC Number: 215-160-9, CAS Number: 1308-38-9)

Conversion factor: 1.462
 Description/Comments: Data from C&L Inventory Database
 Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
 Data source date: 17/07/2015
 Risk Phrases: R20 , R22 , R36 , R37 , R38 , R42 , R43 , R50/53 , R60 , R61
 Hazard Statements: Acute Tox. 4 H332 , Acute Tox. 4 H302 , Eye Irrit. 2 H319 , STOT SE 3 H335 , Skin Irrit. 2 H315 , Resp. Sens. 1 H334 , Skin Sens. 1 H317 , Repr. 1B H360FD , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

■ **dicopper oxide; copper (I) oxide** (EC Number: 215-270-7, CAS Number: 1317-39-1)

CLP index number: 029-002-00-X
 Data source: Regulation (EU) 2016/1179 of 19 July 2016 (ATP9)
 Additional Risk Phrases: N R50/53 , N R50/53 >= 0.25 %
 Additional Hazard Statement(s): None.
 Reason for additional Hazards Statement(s)/Risk Phrase(s):
 10/10/2016 - N R50/53 risk phrase sourced from: WM3 v1 still uses ecotoxic risk phrases
 10/10/2016 - N R50/53 >= 0.25 % risk phrase sourced from: WM3 v1 still uses ecotoxic risk phrases

■ **lead compounds with the exception of those specified elsewhere in this Annex (worst case)**

CLP index number: 082-001-00-6
 Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
 Additional Risk Phrases: None.
 Additional Hazard Statement(s): Carc. 1A H350
 Reason for additional Hazards Statement(s)/Risk Phrase(s):
 03/06/2015 - Carc. 1A H350 hazard statement sourced from: IARC Group 2A (Sup 7, 87) 2006; Lead REACH Consortium
www.reach-lead.eu/substanceinformation.html (worst case lead compounds). Review date 29/09/2015

Appendix B: Rationale for selection of metal species

arsenic {arsenic trioxide}

Worst case species based on hazard statements

cadmium {cadmium sulfide}

Worst case species based on hazard statements

chromium in chromium(III) compounds {chromium(III) oxide}

Worst case species based on hazard statements

copper {dicopper oxide; copper (I) oxide}

Most likely common species

lead {lead compounds with the exception of those specified elsewhere in this Annex (worst case)}

Assumes no lead chromate present as Cr VI is all < LOD

mercury {mercury dichloride}

Worst case species based on hazard statements

nickel {nickel dihydroxide}

Worst case species based on hazard statements

selenium {selenium compounds with the exception of cadmium sulposelenide and those specified elsewhere in this Annex}

Worst case species based on hazard statements

zinc {zinc oxide}

Assumes no zinc chromate present as Chromium VI is LOD

Appendix C: Version

HazWasteOnline Classification Engine: **WM3 1st Edition, May 2015**

HazWasteOnline Classification Engine Version: 2017.237.3385.6834 (25 Aug 2017)

HazWasteOnline Database: 2017.237.3385.6834 (26 Aug 2017)

This classification utilises the following guidance and legislation:

WM3 - Waste Classification - May 2015

CLP Regulation - Regulation 1272/2008/EC of 16 December 2008

1st ATP - Regulation 790/2009/EC of 10 August 2009

2nd ATP - Regulation 286/2011/EC of 10 March 2011

3rd ATP - Regulation 618/2012/EU of 10 July 2012

4th ATP - Regulation 487/2013/EU of 8 May 2013

Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013

5th ATP - Regulation 944/2013/EU of 2 October 2013

6th ATP - Regulation 605/2014/EU of 5 June 2014

WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014

Revised List of Wastes 2014 - Decision 2014/955/EU of 18 December 2014

7th ATP - Regulation 2015/1221/EU of 24 July 2015

8th ATP - Regulation (EU) 2016/918 of 19 May 2016

9th ATP - Regulation (EU) 2016/1179 of 19 July 2016

10th ATP - Regulation (EU) 2017/776 of 4 May 2017

POPs Regulation 2004 - Regulation 850/2004/EC of 29 April 2004

1st ATP to POPs Regulation - Regulation 756/2010/EU of 24 August 2010

2nd ATP to POPs Regulation - Regulation 757/2010/EU of 24 August 2010

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