Report

Basement
Screening and Scoping Report

5 Back Lane, Hampstead, London, NW3 1HL

David Loewi

Ref: 18649/R1.1

October 2017

Gabriel GeoConsulting Limited
Highfield House, Rolvenden Road, Benenden, Kent TN17 4EH
Company No. 6455714, registered in England and Wales. Registered office as above.
Tel: 01580 241044
e: info@gabrielgeo.co.uk
www.gabrielgeo.co.uk

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Site: **5 Back Lane, Hampstead, London NW3 1HL**

Client: **David Loewi**

Report Status: **FINAL** (Revision 1)		
Role	**By**	**Signature**
Compiled by:	Heather Baker MSci FGS	
Slope/ground stability aspects approved by:	Mike Summersgill MSc CEng MICE C.WEM FCIWEM	
Checked by, and Subterranean (Groundwater) flow aspects approved by:	Keith Gabriel MSc DIC CGeol FGS UK Registered Ground Engineering Adviser	
Surface flow and flooding aspects approved by:	Mike Summersgill MSc CEng MICE C.WEM FCIWEM	

Foreword

This report has been prepared in accordance with the scope and terms agreed with the Client, and the resources available, using all reasonable professional skill and care. The report is for the exclusive use of the Client and shall not be relied upon by any third party without explicit written agreement from Gabriel GeoConsulting Ltd.

This report is specific to the proposed site use or development, as appropriate, and as described in the report; Gabriel GeoConsulting Ltd accept no liability for any use of the report or its contents for any purpose other than the development or proposed site use described herein.

This assessment has involved consideration, using normal professional skill and care, of the findings of ground investigation data obtained from the Client and other sources. Ground investigations involve sampling a very small proportion of the ground of interest as a result of which it is inevitable that variations in ground conditions, including groundwater, will remain unrecorded around and between the exploratory hole locations; groundwater levels/pressures will also vary seasonally and with other man-induced influences; no liability can be accepted for any adverse consequences of such variations.

This report must be read in its entirety in order to obtain a full understanding of our recommendations and conclusions.

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Appendices

1. Introduction

1.1 This Basement Screening and Scoping Report has been prepared in support of a registered application (ref: 2017/2617/P) submitted to the London Borough of Camden (LBC) for the construction of a part single-, part two-storey rear extension with lowered ground floor and alterations to the rear garden of a residential dwelling. This report is for planning and scheme development purposes, and is not a design document.

1.2 The assessment is in accordance with the requirements of the London Borough of Camden (LBC) Development Policy DP27 in relation to basement construction, and follows the requirements set out in LBC's guidance document CPG4 'Basements and Lightwells' (July 2015).

1.3 Preparation of this assessment has been supervised and checked by Keith Gabriel, a Chartered Geologist with an MSc degree in Engineering Geology (who has specialised in slope stability and hydrogeology), and Mike Summersgill, a Chartered Civil Engineer and Chartered Water and Environmental Manager with an MSc degree in Soil Mechanics (geotechnical and hydrology specialist). Both authors have previously undertaken assessments of basements in several London Boroughs.

1.4 A preliminary site inspection (walk-over survey) of the house was undertaken on Thursday 5th October 2017. Photos from that visit are presented in Appendix A. Desk study data have been collected from various sources including borehole records (Appendix B) and geological data, environmental data and historic maps from GroundSure, which are presented in Appendices C, D and E. Relevant information from the desk study and site inspections is presented in Sections 2–6, followed by the screening and scoping assessments in accordance with CPG4 Stages 1 and 2, in Sections 7 and 8 respectively.

1.5 The following site-specific documents in relation to the proposed extension and planning application have been considered:

FORMstudio:

Existing

- Drg No. 882-021 Ground & First Floor Plans
- Drg No. 882-023 Section AA & BB
- Drg No. 882-024 Section CC, DD & EE

Proposed

- Drg No. 882-114 Rev.A Ground and First Floor Plans (OPTION 2)
- Drg No. 882-115 Section AA & BB (OPTION 2)
- Drg No. 882-116 Rev.A Section CC, DD, EE & FF (OPTION 2)

Quaife Woodlands:

- Arboricultural Survey and Planning Integration Report (ref: AR/3630/jq)

This report should be read in conjunction with all the documents and drawings listed above.

1.6 Instructions to prepare this Screening and Scoping Report were confirmed by email on 28th September 2017.

2. THE PROPERTY, TOPOGRAPHIC SETTING & PLANNING SEARCHES

2.1 No.5 Back Lane is a three-storey terraced house (see Photo 1 in Appendix A) within the Hampstead Conservation Area, in the London Borough of Camden. Back Lane can be accessed by vehicles at its south-east end where it adjoins Flask Walk, or at its north-west end where it meets Heath Street, and via the pedestrianised Streatley Place to the north-east. No.5 is situated on the north-east side of Back Lane, adjoining No.3 to the north-west. To the south-east, No.5 adjoins the upper floors of No.7 which span over the driveway to No.5a (as shown in Figure 1 and Photo 2 in Appendix A). No.5a Back Lane is located to the north-east of No.5, and adjoins No's 5, 6 & 7 Lakis Close.

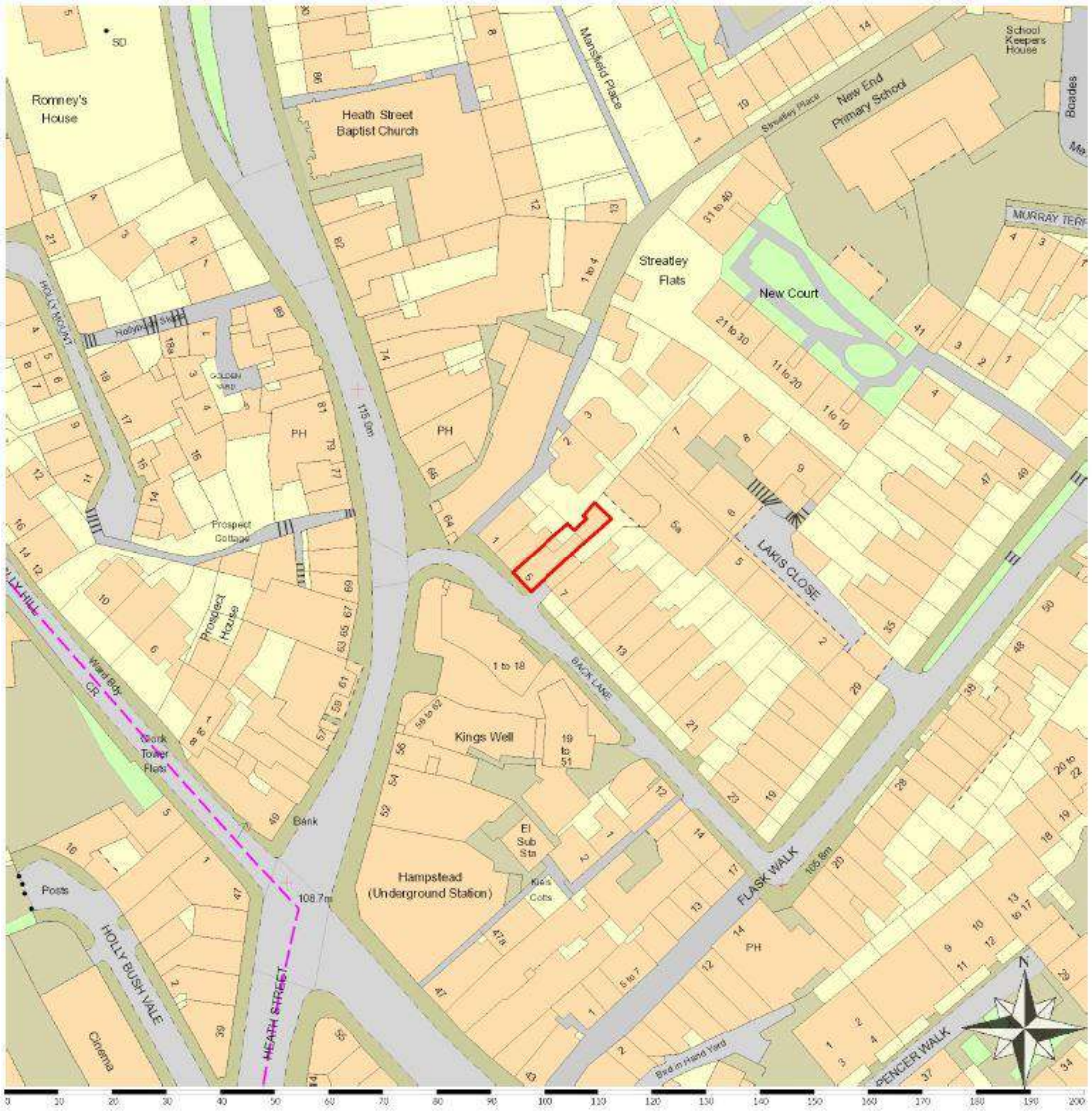

Figure 1: Extract from 1:1,250 OS map (not to scale) with the site outlined in red

2.2 No.5 Back Lane is situated on an east/south-east facing slope, on the south-west side of a weakly developed valley which leads down to the former alignment of the river Fleet, as illustrated in Figure 2. The contours on the 1:25,000 scale Ordnance Survey (OS) map indicate an overall slope angle within the immediate vicinity of the site of approximately 3.7° to the south-east (measured between the 110m and 105m contours). Where Back Lane meets Streatley Place the topography is approximately level, with the 110m contour line following the edge of the footway; however there is a significant drop in height approximately 45m north of this intersection, marked by a set of 8 steps down to Streatley Flats. Back Lane itself is level at its north-western end, outside No's 1 & 3, although there is a very slight downslope where it intersects Heath Street, and from No.5 it slopes south-eastwards over the remainder of its length (Photo 3). Considerable variation in the slope angle can be found both above and below the site of No.5, with measured slope angles ranging between 2.4° (between 105m and 100m contours downslope) to approximately 5.1° (between the 110m and 120m upslope). This is in agreement with Figure 16 of the Camden GHHS (Camden Geological, Hydrogeological and Hydrological Study by Arup, November 2010), which shows that there are no slopes >7° in the vicinity of the site – see extract presented in Figure 3.

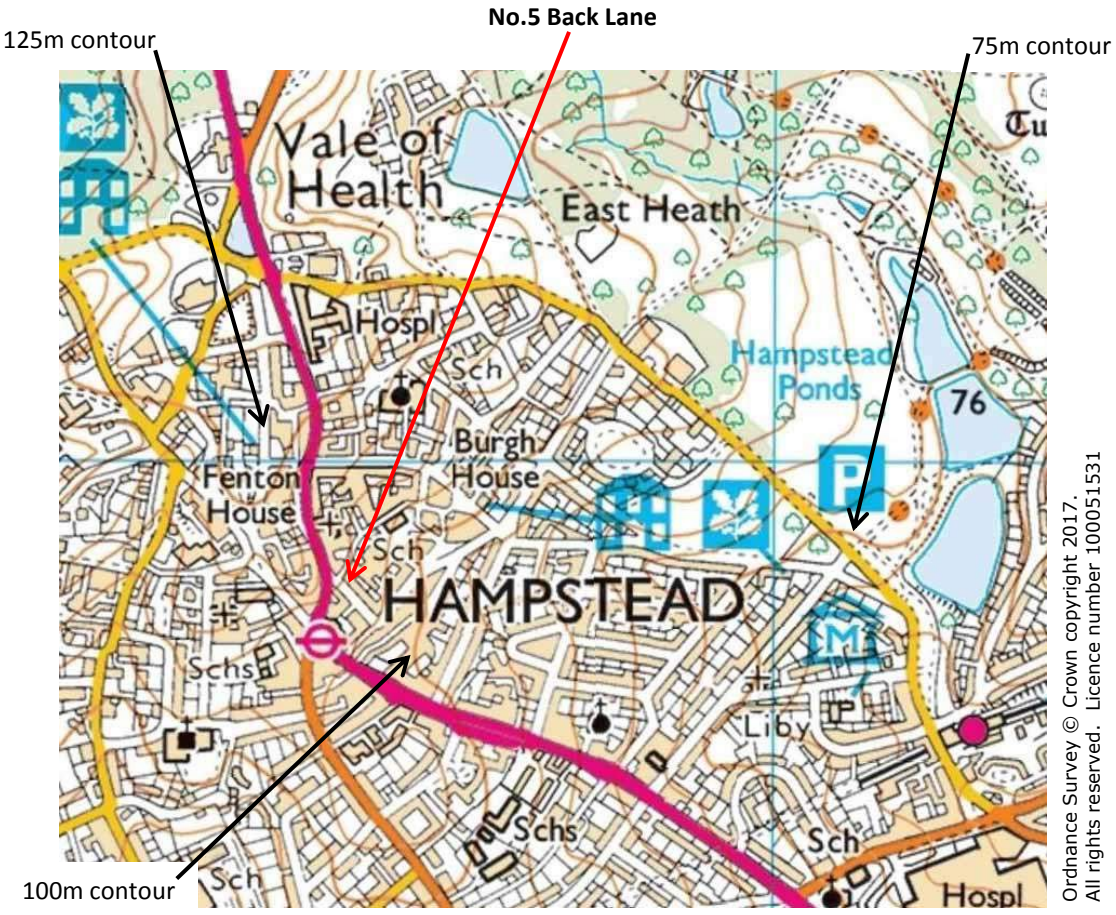

Figure 2: Enlarged extract from 1:25,000 Ordnance Survey map showing site location.

2.3 Reference to the earliest available historic Ordnance Survey (OS) map from 1870 (see Appendix E) shows that the road network in the surrounding area had already been constructed. The site of No.5 Back Lane had been partially developed prior to that date, as well as a few other small buildings along the north-east side of Back Lane and several properties on the south-west side (No's 2, 4 & 6). At that time a single building occupied the south-west end of the plot of No.5, and that of No's 1,3,7 & 9, and part of two outbuildings occupied the north-east end of the plot (although most of the plot boundaries do not match up to the current boundary positions). On the 1871 map, rows of planted trees in what resembles a landscaped garden occupy the middle section of No.5's plot.

2.4 The existing terrace which comprises No's 1, 3 & 5 Back Lane was constructed between the publication of 1871 and 1896 maps. An outbuilding filled the area which is now occupied by the rear garden and an entrance to what appears to be a mews was established adjacent to No.5. During this period, the building above the covered access between No's 62 & 64 Heath Street was removed, giving improved access from Back Lane to Heath Street. The layout of the buildings at No.5 has remained largely the same from that date to the present, although a single-storey rear extension was added to the north-west side at some stage between 1991 and 2017 and the rear outbuilding has been removed (although it is still shown on the current OS maps).

2.5 Also notable from the historic OS maps is that in 1953, at the site of the current No.5a Back Lane, the former suspected mews yard and units had been replaced by an 'Automobile Radiator Works' and (adjoining that to the north-east) a larger building labelled 'Rowland Smith Garage' was recorded. By the publication of the 1965 OS map the name of the garage was no longer recorded, and by 1974 the 'Radiator Works' was no longer labelled as such and the garage site had been re-developed as Lakis Close. The Hampstead Tube Station, approximately 65m south west, is first recorded on the 1915 OS map.

2.6 The earliest available map of London that pre-dates the OS maps and includes Hampstead is John Rocque's 1:10,800 scale "10 miles round London in 1746". This shows Hampstead Village, and records buildings on the south-west side of Back Lane and buildings on both sides of south-western end of Streatley Place (where the street intersects with Back Lane and Heath Street). There are no buildings recorded at the site of No.5, or along the north-east side of Back Lane; instead a small, possibly agricultural, plot is recorded. This indicates that the first development of the site of No.5 was between 1746 and 1870.

2.7 The London County Council Bomb Damage Map (LTS, 2005) for this area indicates that No.5 Back Lane and the adjoining properties did not suffer any bomb damage during World War II. The closest recorded hit was on Streatley Place, 115m north of the site, which recorded part of the Workhouse on the north side of the street as 'Damaged beyond repair', and various neighbouring properties, including the school (currently the site of the New End Primary School) were recorded as sustaining 'Blast Damage, minor in nature'. The bomb map for the London Borough of Hampstead indicates that this

was apparently an isolated bomb, so the possibility exists that 'dud' bombs from the same aircraft may remain as unexploded ordnance (UXO) in the vicinity.

2.8 No.5 Back Lane fronts directly onto the public footway with no external garden or amenity area to the front of the property. The front entrance sits above a single step up from the Back Lane footway (Photo 2). To the rear of the house is a fully walled garden, divided by the rear extension into two sections. The section adjoining No.3 to the north-west side, accessible via a sliding door in the dining area, is part covered by wooden decking above what is believed to be paving slabs, and partly a soft landscaped area containing a lined round pond and Japanese Maple tree (height unconfirmed). The section on the south-east side, adjacent to the passage leading to No.5a, consists of a 'crazy' paved pathway leading down to a level patio at the northern end of the garden (Photo 4). There is a step down from the sloping path to the patio. There are planting areas running parallel to the garden path and alongside the northern wall. There is a wooden cupboard adjacent to this wall and three trees: a substantial Pear tree (height unconfirmed but estimated at 9.5m), and two further small trees not marked on the FORMstudio drawings, leaning over the south-eastern wall above the passage; heights also unknown but estimated at 3-4m.

2.9 Major cracking was observed around the corner wall between the gardens of No.5 and No.2 Streatley Place (Photos 5 & 6). The wall is leaning towards No.5, and large tree roots or branches of vegetation appear to be pushing the north-west trending wall away from the north-east trending wall. There did not appear to be any associated structural damage to No.5's adjacent extension. An entirely separate large creeper was noted within the 3/5 garden boundary wall.

2.10 The flank wall to No.5 is slightly concave around the point where it meets the upper part of No.7's front parapet wall. This seems to be a historical feature, and no other structural damage was noted in the vicinity.

Planning Searches:

2.10 A search of planning applications on LBC's planning website found only two applications for the construction of basements beneath houses, new houses with basements or extensions to houses in the vicinity of No.5, including:

- **No.7 Lakis Close:** Application (PWX0103303) involving the "*Erection of 2 storey front extension and single storey side extension, plus excavation to create new basement rooms for dwelling house.*" was granted planning permission on 23rd July 2001. No documents relating to a ground investigation were found on the website.
- **No.7 Lakis Close:** Application (2013/7013/P) for the *"Erection of a double height rear conservatory extension to 7 Lakis Close, and demolition of outbuildings on land adjoining 3 Streatley Place"* was granted on 2nd February 2014. There is a 'Tree Survey' and associated 'Root Protection Plan' dating from

2012, apparently for 5A Back Lane, though it is clear from the plan that it relates to the site beyond No.3 Streatley Place.

- **No.64 Heath Street** (on north side of Streatley Place, opposite No.1 Back Lane): Application (8905053) for the "*The erection of a part three part single storey building to be used as a restaurant on the basement and ground floors and as two self contained flats on the first and second floors"* was 'Grant Full or Outline Perm. With Condit.' on 6th July 1989. The documents associated with this application show an existing basement (drawings indicated this has been back-filled) and a proposed basement for use as a kitchen and as ancillary accommodation. A finished floor level for the proposed basement is given at 110.47m AOD, 2.65m below the ground level of 113.12m AOD.

3. PROPOSED SCHEME

3.1 Drawings by FORMstudio (see paragraph 1.5) show that the proposed extension and rear garden alterations for which planning permission is being sought under application 2017/2617/P comprises a part single-storey, part two-storey rear extension, part-width at first floor level, and alterations to the ground floor layout including a lowered ground floor. Decking will also be installed in the rear garden, adjacent to the rear extension. The ground floor extension (on the north-west side of the property) will extend to, and require slight raising of, the garden boundary wall shared with No.3, whereas a new rear wall will be built immediately alongside the severely damaged boundary wall with No.2 Streatley Place. The first floor extension (on the south-east side of the property) will extend to the same line as the rear wall to the adjoining part of No.7 Back Lane, leaving approximately half of the existing decked roof terrace over the ground floor extension unaltered. The intended use of the first floor extension is as a study, as shown on FORMstudio's Proposed Drawings (Ground & First Floor Plans OPTION 2, Drg No.882-114 rev.A).

3.2 The drawings show the proposed lowering of the kitchen floor by only 0.55m. On the north-west side of the house, scaling off FORMstudio's Section EE (Drg No. 882-013 rev.B) indicated that the finished floor level (FFL) in the new extension will be approximately 0.75m below the raised garden bed level. This north-western side of the kitchen will have a part glazed, part opaque panelled, pitched roof sloping north-west and north-east onto the 3/5 boundary wall.

3.3 The alterations to the rear garden involve:

- lowering a short section of the garden adjacent to the existing rear extension by approximately 0.4m, in order to provide clearance for outward opening bi-fold doors. This will create a recessed area, one step above the new internal FFL, so a linear drainage channel will be installed running alongside the rear wall of the property.
- installation of permeable 'flat, level decking' above the upper part of the north-east sloping rear garden.

The existing levels of the north-eastern section of the rear garden will remain the same. In the area of the proposed rear extension, both the Japanese Maple Tree of unknown height, labelled T1, and the round pond will be removed.

3.4 Minimum excavation depths where required for underpins or new foundations are expected to be 1.3-1.5m, if founded on granular strata (see Section 4), or 1.55-1.75m if founded on clays, with deeper footings where required to extend below existing tree roots or the predicted extent of roots from trees to be retained (following recommendations given in NHBC Standards 2017, Chapter 4.2).

4. GEOLOGICAL SETTING

4.1 Mapping by the British Geological Survey (BGS) indicates that the site is located just west of the boundary between the Claygate Member (to the east) and the Bagshot Formation (to the west), which underlies the site. Figure 3 shows an extract from Figure 16 of the Camden GHHS (Camden Geological, Hydrogeological and Hydrological Study by Arup, November 2010) which illustrates the geology of the Hampstead area.

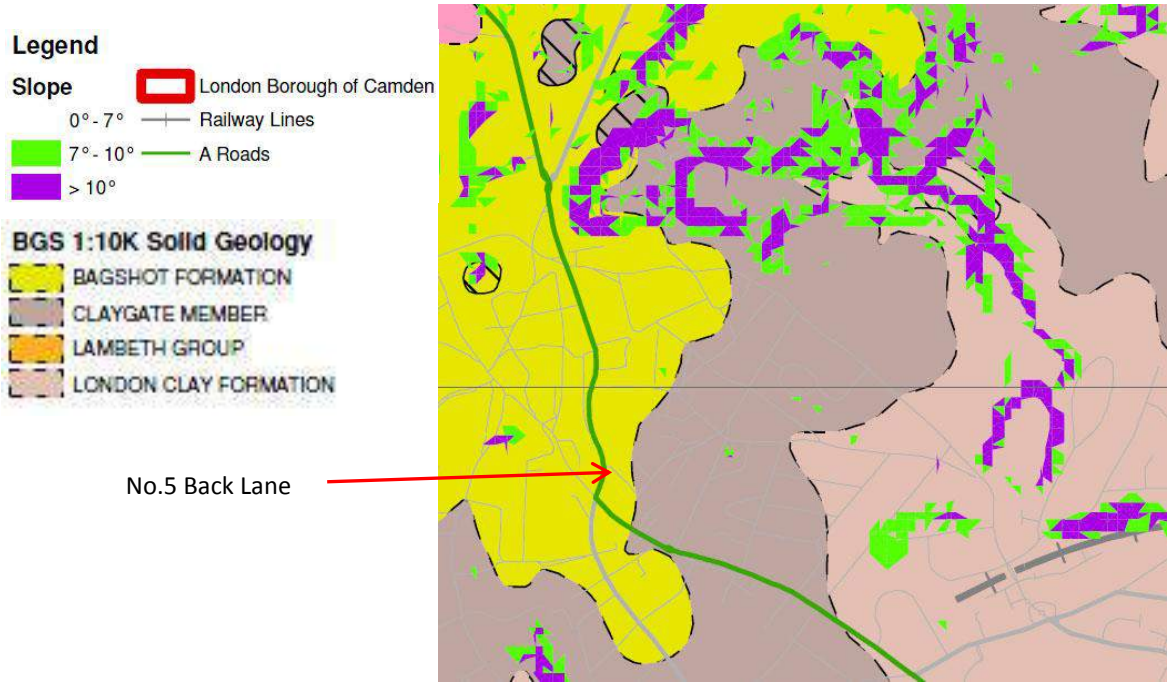

Figure 3: Extract from Figure 16 of the Camden GHHS (Arup, 2010) showing geology and slope angles >7° and >10°.

4.2 In urban parts of London, these natural strata are typically overlain by Made Ground. A thin superficial layer of natural, locally-derived re-worked soils called 'Head' deposits may also be present (because these are not mapped by the British Geological Survey where they are expected to be less than 1.0m thick). In the areas which have been excavated, some or all of these deposits may have been removed.

4.3 The Bagshot Formation is described by the BGS as "*pale yellow-brown to pale grey or white, locally orange or crimson, fine- to coarse-grained sand that is frequently micaceous and locally clayey, with sparse glauconite and sparse seams of gravel. The sands are commonly cross-bedded but some are laminated*" (BGS Lexicon). The base of the Bagshot Formation is marked by an erosional surface shared with the underlying Claygate Member, with a basal fine gravelly sand developed in places. According to the Camden GHHS (Arup, 2010), around the Hampstead Heath area, the Bagshot Formation has a basal bed of coarse grit with sub-rounded flint pebbles.

4.4 The London Clay beneath the Bagshot Formation and Claygate Member is well documented as being a firm to very stiff over-consolidated clay which is typically of high or very high plasticity and high volume change potential. As a result it undergoes

considerable volume changes in response to variations in its natural moisture content (the clay shrinks on drying and swells on subsequent rehydration). These changes can occur seasonally, in response to normal climatic variations, to depths of up to 1.50m and to much greater depths in the presence of the trees whose roots abstract moisture from the clay. The clay will also swell when unloaded by excavations such as those required for the construction of basements.

4.5 The Claygate Member, which outcrops just to the east of the site, forms the uppermost unit of the London Clay Formation and is described in the relevant BGS memoir (Ellison et al, 2004) as "*alternating beds of clayey silt, very silty clay, sandy silt and glauconitic silty fine sand. Beds are generally 1 to 5m thick, although the boundaries are generally diffuse as a result of bioturbation*". The Claygate Member was 16.0m thick in the Hampstead Heath borehole (located to the north of the site of present interest, near the top of the Heath) where the Claygate Member occurred between the levels of 93.71m and 109.71m AOD). The more silty and sandy clays of the Claygate Member generally have somewhat lower plasticities than those of the underlying London Clay Formation, though some are very similar to the underlying clays.

4.6 The results of the BGS classifications of six natural ground subsidence/stability hazards are presented in the GroundSure GeoInsight report (see Appendix C, Section 4); all indicated 'Negligible' or 'Very low' hazard ratings with the exception of 'Running Sand' for which a 'Low' hazard rating was given, which reflects the mapped outcrop of the Bagshot Formation at the surface. Although the hazard rating for 'Shrink – Swell Clay' was indicated as 'Very Low' on site, it was given a 'Moderate' hazard rating 17m to the east of the site, reflecting the outcrop of the Claygate Member at the surface.

4.7 A search of the BGS borehole database was undertaken for information on previous ground investigations and any wells in the vicinity of the site. Four relevant boreholes were identified, the locations of which are shown on the plan in Appendix B. BH TQ28NE/94 (originally OF7) is located approximately 10m west of No.5, at the junction between Back Lane and Streatley Place. BH TQ28NE/95 (originally OF8) was further downslope, by the junction between Heath Street and Holly Bush Lane, south-west of the site, and BH TQ28NE/93 (originally known as OF6) was on Heath Street by the Heath Street Baptist church, north-west of the site. BH TQ28NE/98 (originally known as OF11) was on Well Road by the former Old White Bear pub, north-east of the site. These boreholes are summarised in Table 1, with a tentative correlation between them. Reference should be made to the logs in Appendix B for full strata descriptions.

Table 1: Summary of BGS and other Boreholes - Depths/levels to base of strata								
Strata (abbreviated descriptions) Approx GL (ft AOD)	**BH TQ28NE/94 OF7**		**BH TQ28NE/93 OF6**		**BH TQ28NE/95 OF8**		**BH TQ28NE/98 OF11**	
	Depth (m)	**Level 112.58**	Depth (m)	**Level 117.76**	Depth (m)	**Level 108.77**	Depth (m)	**Level 107.93**
Made Ground	0.30	**112.28**	1.83	**115.93**	0.61	**108.16**	0.30	**107.63**
CLAY with sand and gravel (Head?)	-	**-**	3.35	**114.41**	-	**-**	-	**-**
Brown sandy to slightly sandy CLAY	-	**-**	3.65	**114.11**	1.83	**106.94**	-	**-**
CLAY with fine sand and/or clayey sand	-	**-**	4.56	**113.20**	-	**-**	-	**-**
Fine SAND & clayey SAND	3.05	**109.53**	6.71	**111.05**	3.35	**105.42**	-	**-**
Silty sandy CLAY and fine SAND	-	**-**	8.53	**109.23**	-	**-**	-	**-**
Wet running fine silty SAND	-	**-**	12.19	**105.57**	-	**-**	-	**-**
Soft/firm brown silty sandy CLAY		**-**	12.50	**105.26**	-	**-**	-	**-**
Firm to stiff CLAY & fine sand 'mixture' (Claygate Mbr)	8.69	**103.89**	-	**-**	5.49	**103.28**	3.66	**104.27**
Silty clayey SAND	>12.19		13.72	**104.04**	-	**-**	-	**-**
Silty, fine SAND			-	**-**	-	**-**	5.18	**102.75**
Firm, grey/red, silty CLAY and fine sand			-	**-**	-	**-**	6.71	**101.22**
Dark grey, silty, sandy CLAY			>15.70		-	**-**	7.62	**100.31**
Silty SAND & CLAY					-	**-**	10.67	**97.26**
Firm/stiff, dark grey silty CLAY (London Clay Fm?)					>12.65		>12.19	
Groundwater Strike	5.49	**107.09**	9.75	**99.02**	-	**-**	5.18	**102.75**

4.8 The BGS mapping of the site does not agree with the BGS borehole logs presented in Table 1. A cross section of the boreholes in the Hampstead area is shown in Figure 4. This indicates that the Bagshot Formation pinches out upslope and north/north-west of No.5, as it is not found in BGS boreholes TQ28NE/92-95, which are closest to the site. This suggests that the site is directly underlain by the Claygate Member, with the boundary with the Bagshot Formation located north-west of the site. BH TQ28NE/94 (BH7 and OF7) which was close to the front of No.5 recorded *"Light brown, fine clayey SAND (= pale grey CLAY + brown SAND)"* between 0.30m and 3.05m bgl; the interpretation on the cross-section indicates that this is a sand layer within the Claygate Member. The extensive interbedding between the clays and sands recorded in the boreholes may explain the discrepancy between the two British Geological Survey sources.

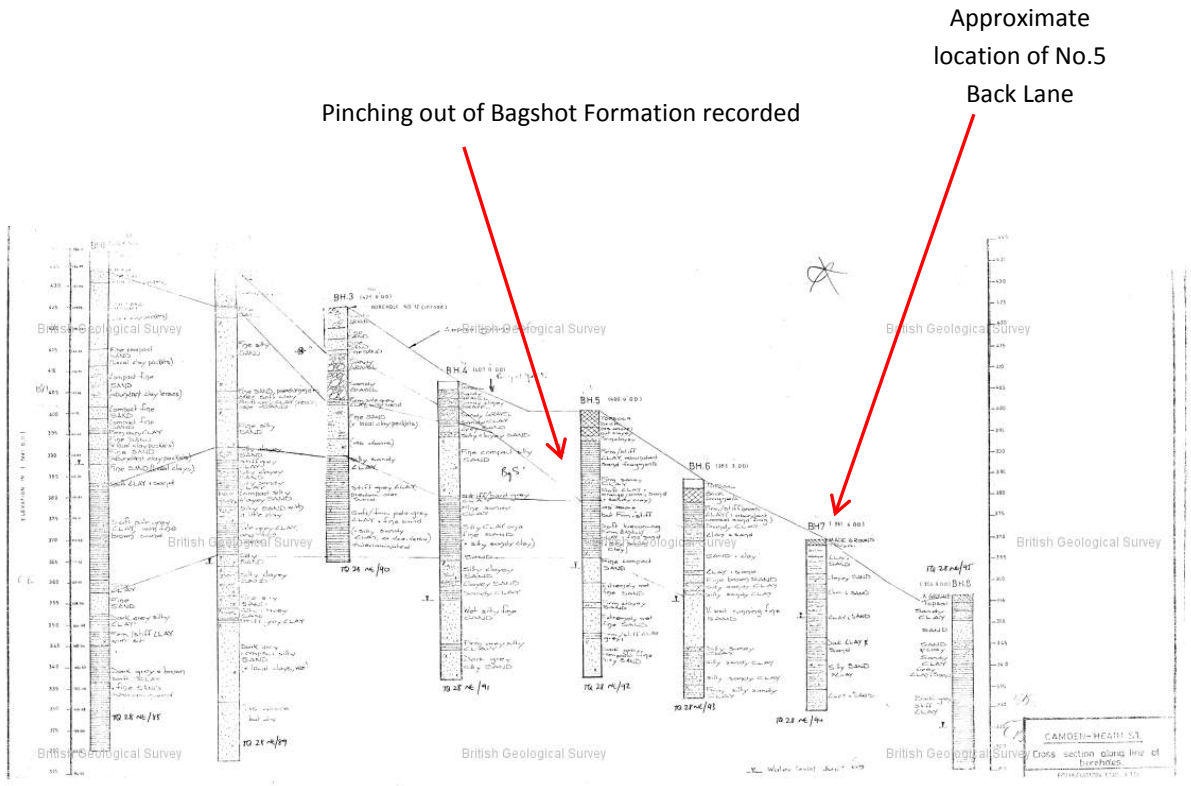

Figure 4: BGS Cross Section for the Hampstead Boreholes TQ28NE/88-95 (1969). The site of No.5 is approximately at the surface location of BH7 (TQ28NE/94).

5. HYDROLOGICAL SETTING (SURFACE WATER)

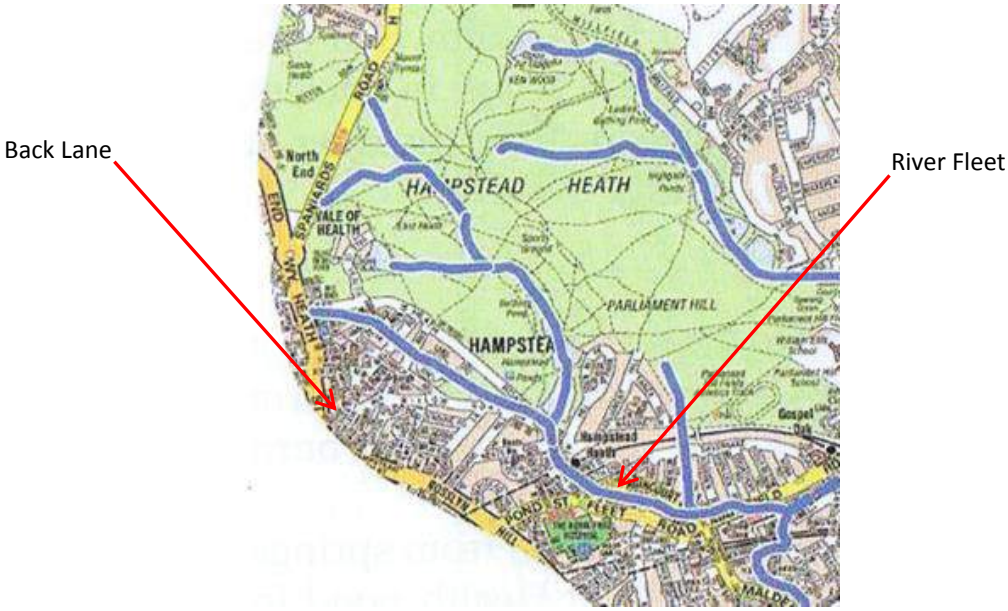

Figure 5: Extract from Map 9 of Barton & Myers' Lost Rivers of London (2016) – 'The course of the River Fleet from Hampstead and Highgate to the Thames at Blackfriars'.

5.1 As shown in Figure 5, none of the 'lost' rivers of London, most of which now run in dedicated culverts or the sewer system, are recorded as flowing close to the property. The nearest former watercourse to the property is a tributary of the River Fleet, which is recorded as passing between 350-400m north-east of the site. The property is in a weakly developed valley which leads down to this former tributary to the Fleet, as mentioned in Section 2.2 and shown in the topographic map of the area (Figure 2). There are also two tributaries of the river Westbourne recorded, which are located to the west and south-west of the site, but these are in a different catchment to the property.

5.2 Figure 14 of the Camden GHHS (Arup, 2010) shows that the site is not within the catchment of any of the Hampstead Heath Pond Chains, of which the Hampstead Chain is the nearest.

5.3 Surface water on the public footway and Back Lane carriageway will run-off downhill to the south-east because:

- the footway in front of No.5 falls gently towards the carriageway and to the crossover at the entrance to No.5A's passageway (adjacent to No.5),
- No.5A's crossover has a slightly steeper fall towards the carriageway from the passageway;
- the Back Lane carriageway, although almost level immediately outside No.5 falls to the south-east.

5.4 The rear garden area to No.5 is bounded by high brickwork boundary walls, therefore the surface water catchment for this area is restricted to direct rainfall, and any drains which discharge into it. There should not be any run-off from or to the neighbouring patio areas because the garden is fully walled. Currently, the north-east section of the garden is part wooden decking overlying paving slabs, and part soft landscaped area which may allow some infiltration. The area of this planting area is 4.8m^2, part of which forms a pond with an impermeable liner. The proposals involve covering this area with the ground floor extension, removing any infiltration from this part of the garden. The south-east section of the garden has planting beds running alongside all three boundary walls, except in the cupboard alcove (the bed on the north-west side of the garden is much narrower than shown on the existing ground floor plan). The permeable flat level decking to be installed in this part of the garden, will allow infiltration into the ground below to be maintained, and potentially enhanced if the crazy paving is removed from beneath the decking.

5.5 Figure 6 shows that Back Lane did not flood during either the 1975 or the 2002 flood events. The closest roads to the property which flooded during these events are Heath Street to the west of the site and Willow Road to the east, which flooded in 1975 and 2002 respectively.

Figure 6: Extract from Figure 15 of the Camden GHHS (Arup, 2010) showing roads which flooded in 1975 (light blue), in 2002 (dark blue), and 'Areas with potential to be at risk of surface water flooding' (wide light blue bands).

5.6 Maps on the website of the Environment Agency (EA) show that the site lies within Flood Zone 1, which is defined as areas where flooding from rivers and the sea is very unlikely, with less than a 0.1 per cent (1 in 1000) chance of such flooding occurring each year. The EA's website also shows that this area does not fall within an area at risk of flooding from reservoirs.

5.7 The following hydrological data for the site has been obtained from the GroundSure EnviroInsight report (see Appendix D), including:

- There are no rivers (or more specifically "Detailed River Network Entries") within 500m of the site (App.D, Section 6.10)
- There are no surface water features within 250m of the site (see App.D, Section 6.11)

- There are no surface water abstraction licences within 2000m of the site (App.D, Section 6.4)
- There are no flood defences, no areas benefitting from flood defences and no flood storage areas within 250m of the site (App.D, Sections 7.4, 7.5 & 7.6).

5.8 The Environment Agency (EA) published a new map of 'Flood Risk from Surface Water' in January 2014, and a more detailed version has since become available on the Government's 'Long Term Flood Risk Information' website, an extract from which is presented in Figure 7 below. This map identifies four levels of risk (high, medium, low and very low) and it appears to be based primarily on topographic levels, flood depths and flow paths. The EA's definitions of these risk categories are:

'Very low' risk: Each year, these areas have a chance of flooding of less than 1 in 1000 (0.1%).

'Low' risk: Each year, these areas have a chance of flooding of between 1 in 1000 (0.1%) and 1 in 100 (1%)

'Medium' risk: Each year, these areas have a chance of flooding of between 1 in 100 (1%) and 1 in 30 (3.3%).

'High' risk: Each year, these areas have a chance of flooding of greater than 1 in 30 (3.3%).

5.9 This modelling shows a 'Very Low' risk of flooding (the lowest category for the national background level of risk) for No.5 and the surrounding area, however it should be noted that the area immediately to the south of the property is obscured by the Hampstead tube station label in Figure 7.

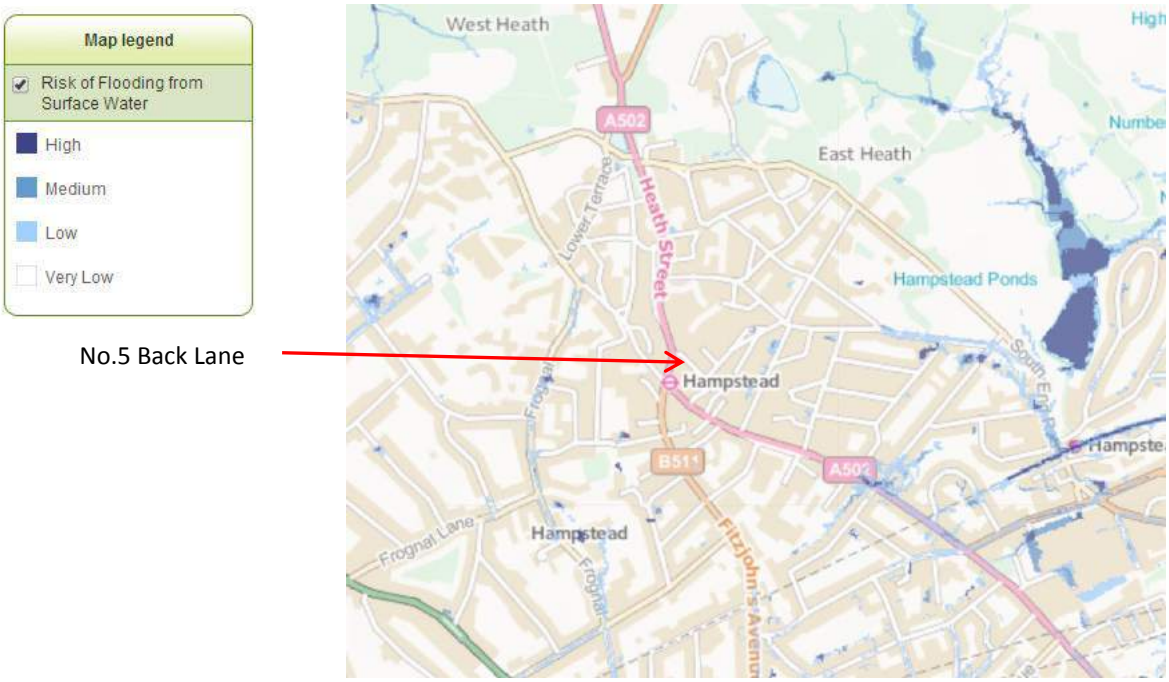

Figure 7: Extract from the Environment Agency's 'Risk of Flooding from Surface Water'. Ordnance Survey © Crown copyright 2015. All rights reserved. Licence No.100051531.

5.10 Surface water flood modeling has also been undertaken by URS as part of a Strategic Flood Risk Assessment for the London Borough of Camden, which was published in July 2014; an extract from their model is presented in Figure 8. As per the Environment Agency's modelling, this map identifies the same four levels of risk (high, medium, low and very low). Similar to the Environment Agency's modelling (Figure 7), this modelling shows the site of No.5 Back Lane as within an area at a 'Very Low' risk of flooding from surface water. To the east of the site, this modeling also shows areas at a 'Low' to 'High' risk of flooding from surface water within the weakly developed valley identified in Figure 2 where the tributary to the Fleet shown in Figure 5 formerly flowed.

5.11 Figure 8 also shows that Back Lane falls within the Group3_010 Critical Drainage Area.

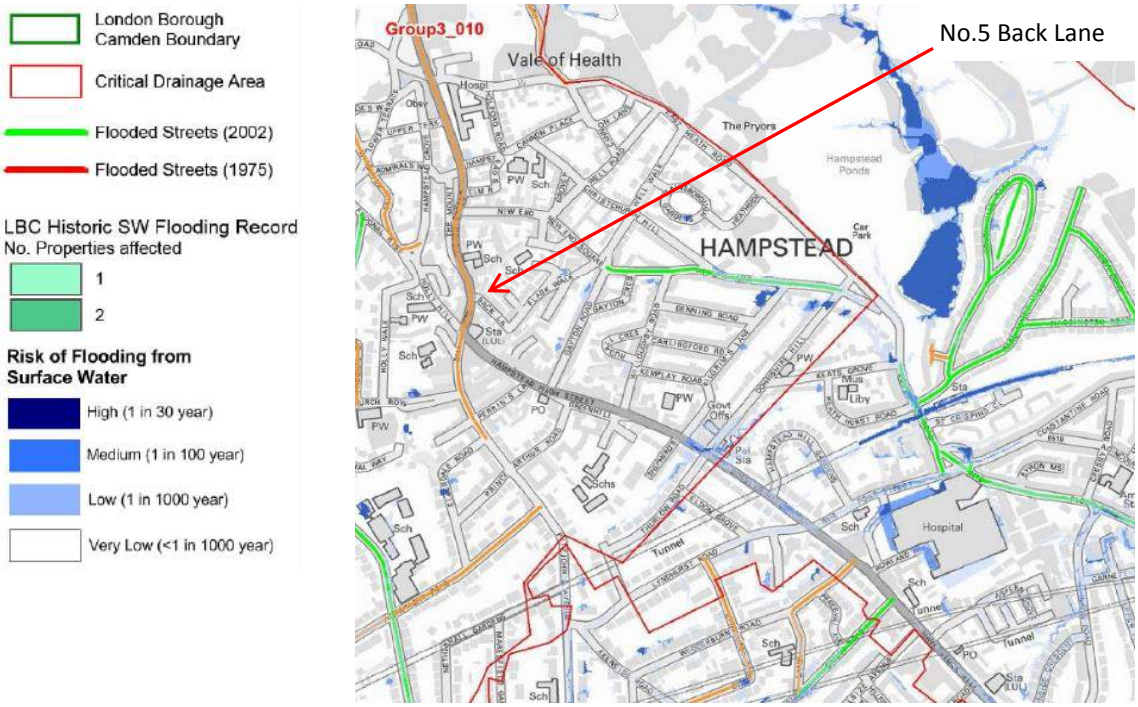

Figure 8: Extract from Figure 3v of the Camden Strategic Flood Risk Assessment (SFRA) (URS, July 2014) showing risk of flooding from surface water.

5.12 Recorded sewer flooding incidents were summarised and mapped by postcode in Figures 5a and 5b of the SFRA (2014). Within the 'NW3 1' sub-postcode (in which 5 Back Lane lies), one property was recorded as having been affected by external sewer flooding, and four properties were recorded as having been affected by internal sewer flooding. No further details are given on the properties affected.

5.13 A 'Sewer Flooding History Enquiry' report has been obtained from Thames Water Utilities Ltd (TWU). In response to the question 'Is the requested address or area at risk of flooding due to overloaded public sewers?' (TWU's wording) the response given

was: "*The flooding records held by Thames Water indicate that there have been no incidents of flooding in the requested area as a result of surcharging public sewers*". A copy of the report is available on request.

6. HYDROGEOLOGICAL SETTING (GROUNDWATER)

6.1 The Bagshot Formation and the underlying Claygate Member are both classified by the Environment Agency as a superficial 'Secondary A Aquifer', whereas the underlying London Clay is an 'Unproductive Stratum' as indicated by Figure 9.

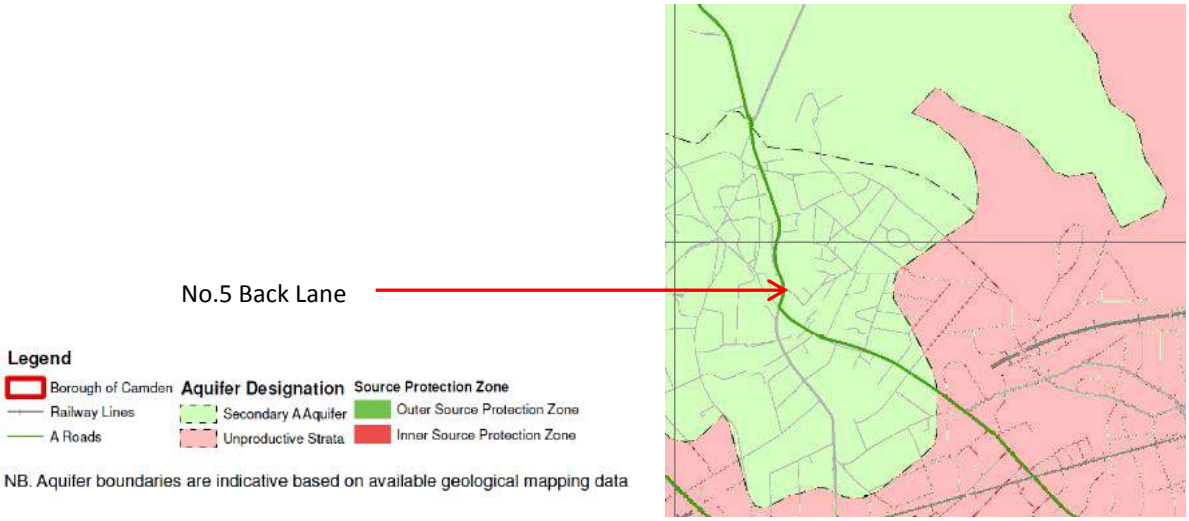

Figure 9: Extract from Figure 8 of the Camden GHHS (Arup, 2010) showing aquifer designations.

6.2 The Chalk Principal Aquifer which occurs at depth beneath the London Clay is not considered relevant to the proposed basement so is not considered further.

6.3 Under the old groundwater vulnerability classification scheme, which now applies only to superficial soils, the site is classed as 'Minor Aquifer – High' groundwater vulnerability, as shown in Figure 10.

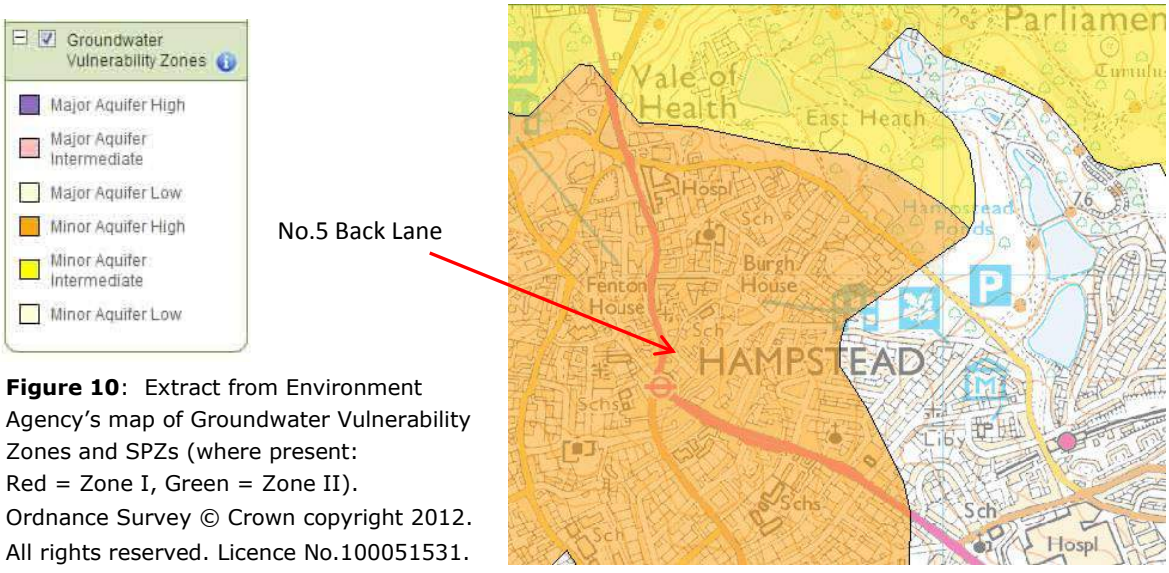

Figure 10: Extract from Environment Agency's map of Groundwater Vulnerability Zones and SPZs (where present: Red = Zone I, Green = Zone II). Ordnance Survey © Crown copyright 2012. All rights reserved. Licence No.100051531.

6.4 The beds of silty sand and sandy silt within the Claygate Member would generally be expected to be water-bearing and, where these are laterally continuous, they can give rise to moderate water entries into excavations. The clay and silty clay beds would also be expected to be saturated, with water pressures controlled by the water levels/pressures in adjacent silt/sand beds, by tree root activity or by the influence of man-made changes such as utility trenches (which can act either land drains or as sources of water and high groundwater pressures). Wells and boreholes drilled through low permeability layers can also homogenise groundwater pressures between permeable layers if they are not adequately sealed, which is highly likely to apply in Hampstead where old maps show several wells. Natural groundwater flow rates, if any, in the sand horizons within the Claygate Member are typically low. Variations in groundwater levels and pressures will occur seasonally and with other man-induced influences.

6.5 Local perched groundwater may occur near surface in Made Ground, and possibly also in any Head deposits which overlie low permeability strata, in at least the winter and early spring seasons.

6.6 A spring line is often found at the interface between the predominantly sandy Bagshot Formation and the top of the Claygate Member; however in this area the multiple sand layers in the upper part of the Claygate Member, and the likely homogenisation of the groundwater regime by wells and boreholes, means that springs forming along this boundary are less likely. Additionally, any trenches dug for services in this built-up area will intercept and provide a drainage route for such water before it reaches the ground surface. To the east and north of the site, the presence of interbedded sands, silts and clays of the Claygate Member give rise to various springs in the headwater valleys of the River Fleet. Of note is the Chalybeate spring on Well Walk, approximately 360m to the north-east of the site (see historic OS maps in Appendix F). Chalybeate springs are particularly iron-rich, as well as having high levels of some other minerals, and were claimed to have a variety of health-giving properties. From the 1915 map onwards it is referred to as a well, rather than a spring. The 1870 map records a number of other groundwater access features: a pump 200m north, a well 260m north-west, multiple pumps 270-275m south-east and multiple wells 240-260m east. By the publication of the 1915 map the majority of these pumps and wells were no longer recorded (the exceptions being the Chalybeate Spring and a drinking fountain recorded at the pump 270m south-east of the site), which probably reflects these having been collected and channelled into drains/culverts.

6.7 The log for the BGS boreholes (see Table 1) recorded:

BH OF6: 'Water first met at 29.0' (108.9mAOD) and then again at 47.0' (103.4mAOD) in the sand dominant horizon of soft CLAY and clayey SAND, and in the silty sandy CLAY at the base of the Borehole respectively.

BH OF7: 'Water first met at 18.0' (5.49m below ground level, 107.1mAOD), in the firm CLAY + wet very fine SAND, below the near-surface sands.

BH OF8: 'Water first met at 32.0' (99.0mAOD), in the London Clay Formation.

BH OF11: Water was 'first met' at 17'.0" (102.75mAOD) which is the base level of the 'extremely wet' silty fine SAND in that borehole.

These records were taken during drilling, so all are likely to be below the true equilibrium levels at that time. Piezometers were installed in most of these boreholes, but no readings from them were included in the records on the BGS website.

6.9 Other hydrogeological data obtained from the GroundSure EnviroInsight report (Appendix E) include:

- There is one active groundwater abstraction licence within 2000m of the site, at 1604m to the south of the site at the Swiss Cottage Open Space Borehole (TQ28SE/1769) (App.E, Section 6.3). This distance from the site means these are irrelevant to the proposed scheme.
- There are no abstraction licences for potable water within 2000m of the site (App.E, Section 6.5).
- There are no Source Protection Zones (SPZ) within 500m of the site (App.E, Section 6.6 and Figure 10 above).
- For an area within 50m of No.5 the BGS has classified the susceptibility to groundwater flooding as '**Limited Potential**', at 'low' confidence level (App.E, Sections 7.7 and 7.8). Such 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*".

6.12 The planning search identified a proposal for a retrofit, partial footprint basement below No.64 Heath Street, dated January 1989. The proposals record this basement as being full height, with a finished floor level 2.65m below the ground level of 113.12m AOD. These plans also recorded an existing basement that may have been backfilled. The existence of the proposed basement was confirmed during the site inspection on the 5th October 2017, and is currently used as a kitchen and staff area for the restaurant 'Gaucho'. It is possible that the location of No.5 lies in a hydrogeological 'shadow' of No.64.

7. STAGE 1 - SCREENING

7.1 The screening has been undertaken in accordance with the three screening flowcharts presented in LBC's CPG4 guidance document. Information to assist with answering these screening questions has been obtained from various sources including the the Camden geological, hydrogeological and hydrological study (Camden GHHS, Arup, 2010), historic maps and data obtained from GroundSure (see Appendices C, D & E) and other sources as referenced.

7.2 Subterranean (groundwater) flow screening flowchart:

Question		**Response, with justification of 'No' answers**	**Clauses where considered further**
1a	Is the site located directly above an aquifer?	Yes	Carried forward to Scoping: 8.2, Section 10.2
1b	Will the proposed basement extend beneath the water table surface?	No – BGS BH OF7 recorded groundwater strike at 5.49m below ground level. Maximum excavation depth likely to be about 1.5m for the underpinning/new foundations (though a local area of perched groundwater may be encountered).	Section 6.
2	Is the site within 100m of a watercourse?	No – The nearest surface water feature is Hampstead Pond No.1 on the river Fleet, around 800m to the east of the site.	5.1 & 5.8
3	Is the site within the catchment of the pond chains on Hampstead Heath?	No – As shown on Figure 14 of the Camden GHHS.	
4	Will the proposed basement development result in a change in the proportion of hard surfaced/ paved areas?	Yes – The ground floor extension will be in place of an existing soft landscaped area	Carried forward to Scoping: 8.2, Section 10.2
5	As part of the site drainage, will more surface water (eg: rainfall and run-off) than at present be discharged to the ground (eg: via soakaways and/or SUDS)?	No – All roof water will be discharged to mains drainage, giving a slight decrease in infiltration due to reduction of soft landscaped area in rear garden.	8.2, Section 10.2
6	Is the lowest point of the proposed excavation (allowing for any drainage and foundation space under the basement floor) close to, or lower than, the mean water level in any local pond (not just the pond chains on Hampstead Heath) or spring line?	No – There are no surface water features within 500m of the site. The main (Chalybeate) spring in the vicinity is 360m to the NE of the site at a similar level. It has been described as a 'well' on OS maps since 1915, which suggests a long-term decline in groundwater levels.	5.8, 6.7

7.3 Slope/ground stability screening flowchart:

Question		Response, with justification of 'No' answers	Clauses where considered further
1	Does the existing site include slopes, natural or man-made, greater than 7°? (approximately 1 in 8)	No – Gradients within the site are gentle (level changes are supported by retaining walls). See Camden GHHS Figure 16 (Fig 3 above).	2.2
2	Will the proposed re-profiling of landscaping at site change slopes at the property boundary to more than 7°?	No – There will be no significant re-profiling in the rear garden (with decking placed over part of the sloping section).	
3	Does the development neighbour land, including railway cuttings and the like, with a slope greater than 7°?	No – There are no slopes >7° in the vicinity of the site. See Figure 3.	2.2
4	Is the site in a wider hillside setting in which the general slope is greater than 7°?	No – As Q3 above	2.2
5	Is the London Clay the shallowest strata at the site?	No – Site is underlain by Claygate Member.	4.1
6	Will any tree/s be felled as part of the proposed development and/or are any works proposed within any tree root protection zones where trees are to be retained?	Yes and no. T1 (Japanese Maple Tree, height unknown) will be felled for the ground floor extension. T2 (Pear Tree, height unknown) will be retained; the Arboricultural Report (Nov 2016) states that the proposed works will not interfere with tree root protection zones.	Carried forward to Scoping: 8.3, Section 10.4
7	Is there a history of seasonal shrink/swell subsidence in the local area, and/or evidence of such effects at the site?	No – no evidence seen in No.5 or adjoining properties.	
8	Is the site within 100m of a watercourse or potential spring line?	No – The Chalybeate spring is approx 360m to the NE.	6.7
9	Is the site within an area of previously worked ground?	No – BGS map extract (Figure 3) and map/list on pages 10 & 11 of the GeoInsight report (in Appendix D) do not show any areas of previously worked ground within the vicinity of the site.	
10	Is the site within an aquifer? If so, will the proposed basement extend beneath the water table such that dewatering may be required during construction?	Yes and (probably) No	Carried forward to Scoping: 8.3, Section 10.4
11	Is the site within 50m of the Hampstead Heath ponds?	No – Site is approx 800m from nearest Hampstead Pond Chain (No.1).	5.8
12	Is the site within 5m of a highway or a pedestrian right of way?	No - All planned works are to the rear of the property away from the footway	8.3, Section 10.4

13	Will the proposed basement substantially increase the differential depth of foundations relative to neighbouring properties?	Unknown – maximum depth of underpins/footings will be approx. 1.5m (beneath/alongside garden walls), so probably not more than 1.0m below adjacent foundations.	Section 3 Carried forward to Scoping: 8.3
14	Is the site over or within the exclusion zone of any tunnels, eg railway lines.	No – Re railway tunnels (Northern line tunnels pass 62m to SW but are deep, approx. 66m bgl). Unknown re other tunnels.	Carried forward to Scoping: 8.3, 10.1.3

7.4 Surface flow and flooding screening flowchart:

Question		**Response, with justification of 'No' answers**	**Clauses where considered further**
1	Is the site within the catchment of the pond chains on Hampstead Heath?	No – As shown on Figure 14 of the Camden GHHS.	
2	As part of the proposed site drainage, will surface water flows (eg volume of rainfall and peak run-off) be materially changed from the existing route?	Yes – Linear drainage channel alongside rear extension proposed for surface water drainage. Other changes not material.	Carried forward to Scoping: 8.4 & Section 10.7
3	Will the proposed basement development result in a change in the proportion of hard surfaced / paved external areas?	Yes – The ground floor extension will be over existing soft landscaped area, so the proportion of hard surfaced external areas will increase	3.1 Carried forward to Scoping: 8.4 & Section 10.7
4	Will the proposed basement result in changes to the profile of the inflows (instantaneous and long-term) of surface water being received by the adjacent properties or downstream watercourses?	No – There is no run-off to adjacent properties or surface watercourses.	5.3, 5.4, 5.5
5	Will the proposed basement result in changes to the quality of surface water being received by adjacent properties or downstream watercourses?	No – as above.	5.3, 5.4, 5.5
6	Is the site in an area known to be at risk from surface water flooding, such as South Hampstead, West Hampstead, Gospel Oak and King's Cross, or is it at risk from flooding, for example because the proposed basement is below the static water level of a nearby surface water feature?	No – Back Lane did not flood during either the 1975 or 2002 flood events, and surface water flood modelling by the Environment Agency indicated a 'Very Low' flood risk (the lowest) for this property and the surrounding area.	5.9, Figure 6 & Figure 7.

7.5 Non-technical Summary – Stage 1:

The screening exercise in accordance with CPG4 has identified eight issues which need to be taken forward to Scoping (Stage 2); two are related to groundwater, four are related to ground stability and two are related to flooding potential.

8. STAGE 2 – SCOPING

8.1 The scoping stage is required to identify the potential impacts from the aspects of the proposed basement which have been shown by the screening process to need further investigation. As no ground investigation has been undertaken as part of this scheme, the geology has been taken from the BGS boreholes and cross-section (Section 4).

8.2 Subterranean (groundwater) flow scoping:

Issue (= Screening Question)		Potential impact and actions
1a	Is the site located directly above an aquifer?	**Potential impact**: Infiltration could be reduced. **Action:** Ground investigation required, then review implications of the proposed excavations.
4	Will the proposed basement development result in a change in the proportion of hard surfaced/ paved areas?	**Potential impact:** Increased hard surfacing would decrease infiltration of surface water into the ground. Area concerned is very small. **Action:** Consider potential for limited infiltration SuDS as site-specific mitigation, including removal of paving below decking.

8.3 Slope/ground stability scoping:

Issue (= Screening Question)		Potential impact and actions
6	Will any tree/s be felled as part of the proposed development and/or are any works proposed within any tree root protection zones where trees are to be retained?	**Potential impact:** Heave from removal of trees; slope(s) become less stable; damage to trees. **Actions:** **1.** Arboricultural assessment – already undertaken by Quaife Woodland Consultants in November 2016. **2.** Review of potential impact on stability of buildings and garden walls once ground investigation has confirmed whether any clays are present. Depth of footings to be in accordance with NHBC Chapter 4.2.
10	Is the site within an aquifer? If so, will the proposed basement extend beneath the water table such that dewatering may be required during construction?	**Potential impact:** Inadequate provision of dewatering can lead to collapse of excavations. Inappropriate dewatering can cause removal of fines and/or unacceptable increases ineffective stress, both of which can cause ground structures to settle. Reduced bearing capacity in granular strata. **Action:** Ground investigation required to confirm groundwater level relative to depth of excavations for new footings & underpins.
13	Will the proposed basement substantially increase the differential depth of foundations relative to neighbouring properties?	**Potential impact:** Loss of support to the ground beneath the foundations to neighbouring buildings if basement excavations are inadequately supported. Possible long term differential movement. **Action:** Ensure adequate temporary and permanent support by use of best practice underpinning methods. Ground investigation required to assess depths of existing footings, Made Ground and groundwater.

14	Is the site over or within the exclusion zone of any tunnels, eg railway lines.	**Potential impact:** Stress changes on any tunnel lining. **Action:** None, because no tunnels are expected within the 1.5m anticipated depth of excavation, unless the proposed ground investigation shows that much deeper excavations will be required.

8.4 Surface flow and flooding scoping:

Issue (= Screening Question)		**Potential impact and actions**
2	As part of the proposed site drainage, will surface water flows (eg volume of rainfall and peak run-off) be materially changed from the existing route?	**Potential impact:** Changes to drainage route can alter the discharge hydrograph and potentially result in increased flooding elsewhere. Use of channel drain in recess for folding doors gives potential for minor flooding within the house. **Action:** Specify use of watertight folding doors at rear of Family/Dining area, and SuDs as proposed under issue 3 below.
3	Will the proposed basement development result in a change in the proportion of hard surfaced / paved external areas?	**Potential impact:** May increase flow rates to sewer, and thus increase the risk of flooding (locally or elsewhere). **Action:** Assess net change in hard surfaced/ paved areas and, if limited infiltration SuDS (as recommended in 8.2(4) above) not feasible, then use intervention storage SuDS and/or green roof as site-specific mitigation.

8.5 Non-technical Summary – Stage 2:

The scoping exercise has reviewed the potential impacts for each of the items carried forward from Stage 1 screening, and has identified the following actions to be undertaken:

- Ground investigation required prior to construction commencing to assess groundwater level, depth of existing footings and depth of Made Ground (if any) and nature of founding strata.
- Assess the potential for limited infiltration SuDS (Sustainable Drainage Systems) to compensate for loss of soft landscaping by offsetting (mitigating) any potential increase in discharge to mains sewer. If infiltration SuDS not suitable, use temporary intervention storage SuDS (most likely a green roof and/or holding tank).
- Ensure adequate temporary and permanent support by use of best practice working methods when constructing underpins and new footings.

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APPENDIX A

Photographs

Project:

5 Back Lane, Hampstead, London NW3 1HL

18649

Photo 1 (left): Front elevation, looking north-east. No.5 is a three-storey terraced house, adjoining No.3 to the north-west and the upper floors of No.7 to the south-east. The property has a rear garden/amenity area but no external areas to the front.

Photo 2 (right): The external wall between No.5 and No.7 Back Lane. The passage way adjacent to the ground floor of No.5 leads to No.5a Back Lane.

Title:	**Photographs - Sheet 1**					Sheet	**A1**
Date:	5th October 2017	Checked:	HB	Approved:	KRG	Scale :	NTS

Project:

5 Back Lane, Hampstead, London NW3 1HL

18649

Photo 3: Carriageway of Back Lane, looking south-east. The footway slopes away from No.5, and the carriageway slopes to the south-east. Also visible is the slight drop between the Back Lane footway and the access passageway to No.5a.

Photo 4: Rear garden adjoining the rear projection of No.5, looking from the first floor roof terrace. The garden is enclosed with high brickwork boundary walls, the No.5a access passageway is at a lower level on the south-east side. The 'crazy' paved pathway sloping away from the property leads to the level paved patio at the north-eastern end of the garden.

Title:	**Photographs - Sheet 2**			Sheet	**A2**
Date:	5th October 2017	Checked: HB	Approved: KRG	Scale :	NTS

Project:

5 Back Lane, Hampstead, London NW3 1HL

18649

GabrielGeo Consulting

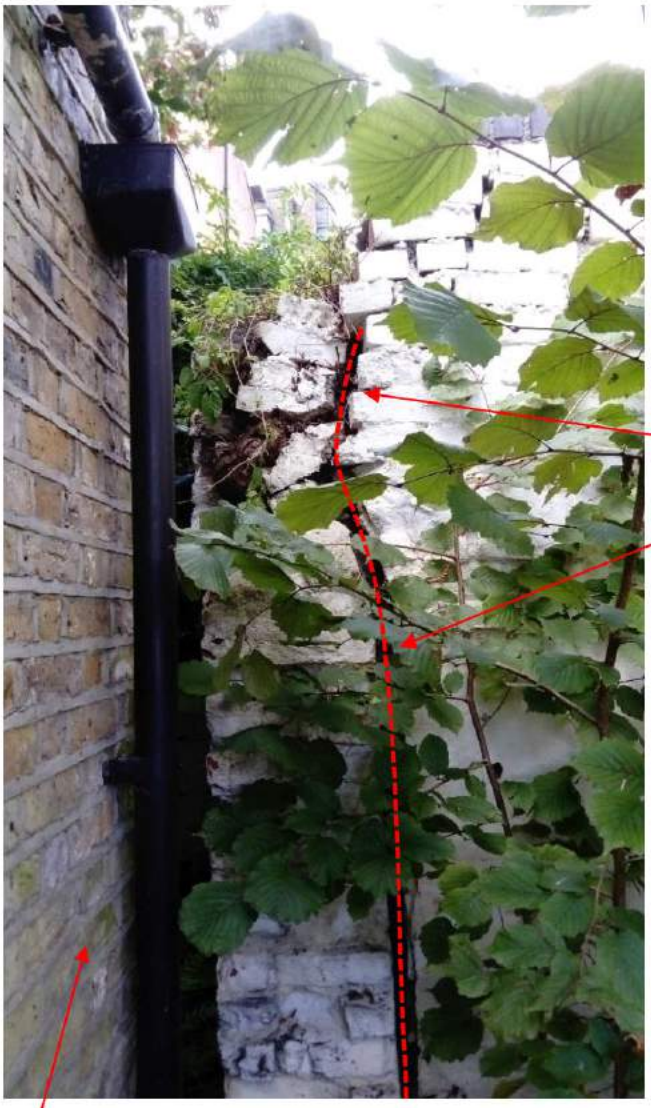


Photo 5: Corner of the boundary wall between No.5 Back Lane and No.2 Streatley Place, looking north-west. The north-west/south-east trending section of the wall is leaning into the rear garden of No.5, this is the opening of the joint where there is a lack of bonding between the walls.

Cracking/lack of bonding along the boundary wall with No.2 Streatley Place

Rear wall of rear extension of No.5

Tree root/branch or other vegetation within crack

Cracking along boundary wall with No.2 Streatley Place

Photo 6: Corner of the boundary wall between No.5 Back Lane and No.2 Streatley Place, looking north-east. A tree root/branch or other vegetation type on the No.2 side appears to be causing or exploiting the cracks in the wall.

Title:	**Photographs - Sheet 3**					Sheet	**A3**
Date:	5th October 2017	Checked:	HB	Approved:	KRG	Scale :	NTS

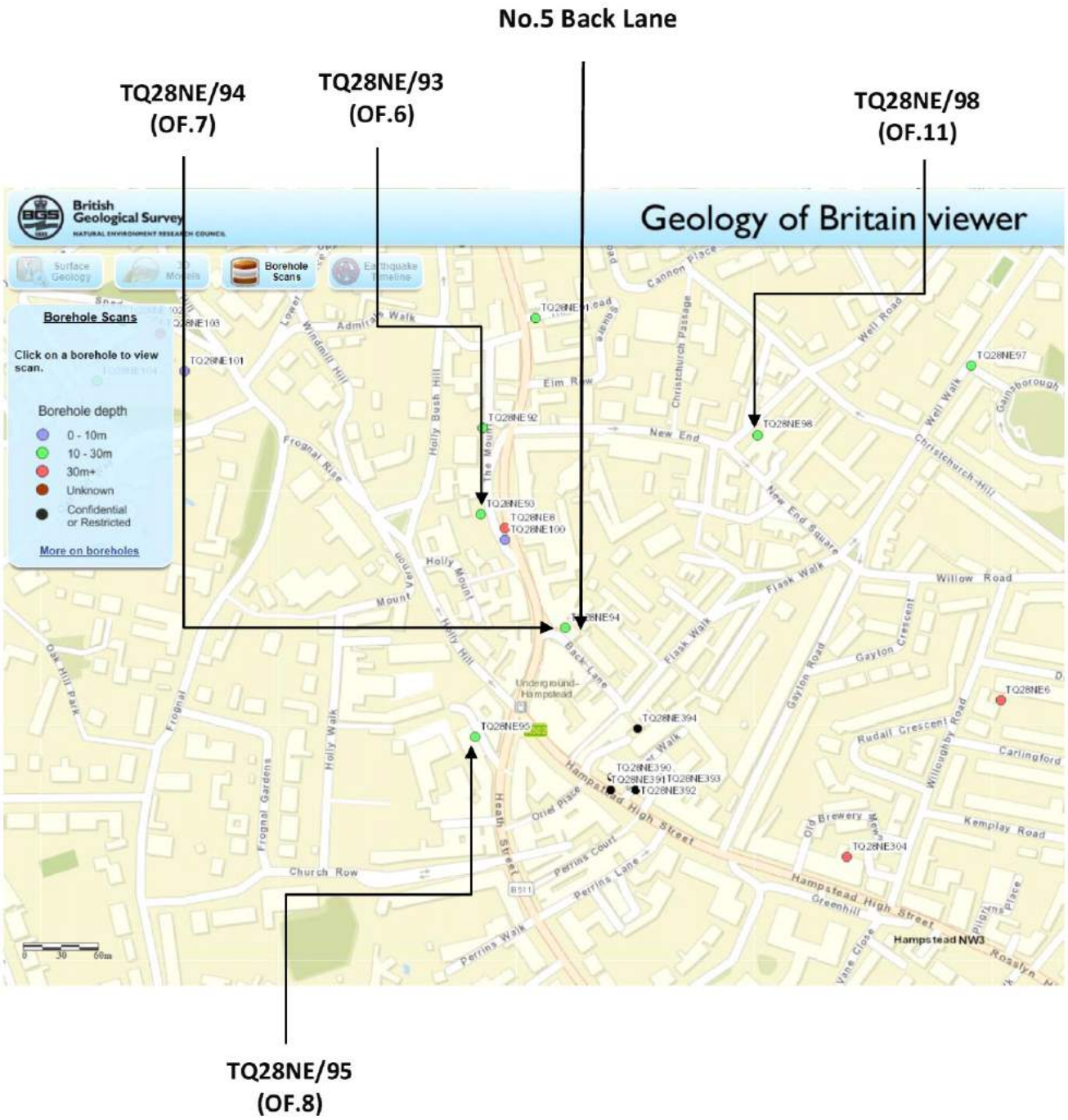
APPENDIX B

Desk Study Data – Boreholes in the surrounding area

Project:

5 Back Lane, Hampstead, London, NW3 1HL

18649



Title:	**Location Plan - Boreholes in the Surrounding Area**				Sheet	**B1**
Date:	October 2017	Checked:	HB	Approved:	KRG	Scale :	NTS

TQ|28NE|94

2641. 8584. OF 7

RECORD OF BOREHOLE No: OF7

BACK LANE,
HAMPSTEAD HEATH

Borehole Dia : 8"
Casing : 6" to 40·0
Ground Level : 369·350

Water Level	Depth	Type	No.	Legend	Depth	Thickness	DESCRIPTION OF STRATA
					1·0	1·0	MADE GROUND + Top Soil
	2·6	D	1				Light brown fine compact micaceous clayey SAND
	5·0	U	2			7·0	(= pale grey CLAY + brown SAND)
	7·6	D	3		8·0		
						2·0	Compact golden brown + grey clayey SAND
	10·6	U	4		10·0		
	12·6	D	5			4·0	Firm cream/grey CLAY, predominates over golden brown fine sand.
					14·0		
	15·0	U	6				Cream/light grey soft + firm CLAY, + wet very fine brown sand
	17·6	D	7			5·0	
	20·0 (N=16)	D	8				(= wet mottled micaceous silty sandy clay)
	22·6	D	9		23·0		
bey	25·0 (N=19)	D	10				(as above)
bey						5·6	darker in colour
	27·6	D	11		28·6		
	30·0	U	12				Silty SAND predom. over clay bands + lenses.
	32·6	D	13			6·6	(= dark grey micaceous silty clayey sand)
	35·0	U	14		35·0		
							(as above)
	37·6	D	15			5·0	CLAY content now firm/stiff is very much increased.
4·0	40·0	U	16		40·0		

Borehole Complete.

Water first met at 18·0

Piezometer installed at 50·0

Foundation Engineering Ltd.

TQ/28NE/93
2634 9393 OF.6

RECORD OF BOREHOLE No. OF6

Location : THE MOUNT/HEATH ST., HAMPSTEAD HEATH
Contract No. : 431
Type of Boring : Shell + Auger
Date (started) : 16·5·63
Borehole Dia : 8"
Casing :
Ground Level : 566·34'

Sheet 1 of 2

Depth of Casing	Water Level	SAMPLES Depth	Type	No.	STRATA Legend	Depth	Thickness	DESCRIPTION OF STRATA
	DRY							MADE GROUND
		2·6	D	1			6·0	(dark brown poorly sorted sand with some clay brick frag. roots & pebbles)
		5·0	U	2		6·0		Firm / stiff brown micaceous CLAY
		7·6	D	3			5·0	with abundant coarse & med. angular sand fragments.
		10·0	U	4		11·0		
		12·6	D	5		12·0	1·0	Compact brown sandy CLAY
		15·0	D	6		15·0	3·0	Pale fawn / pale grey CLAY, predominates over a fine SAND or clayey sand.
		17·6	D	7			7·0	Orange / brown fine SAND / light grey / cream silty CLAY + grey clayey SAND (SAND predominates)
		20·0	U	8		22·0		
		22·6	D	9		23·0	1·0	Stiff cream CLAY predom. over fine SAND
		25·6	D	10		25·0	2·0	Fine brown SAND
		26·6 (N=8)				27·0	2·0	Soft / firm brown silty sandy CLAY
		27·6	D	11		28·0	1·0	Soft / firm silty sandy CLAY
		30·6 (N=25)	D	12				
32·0	4·0	32·6	D	13				extremely wet running fine brown silty SAND
32·0	4·0						12·0	
		35·6	D	14				
		37·6	D	15				
		40·6 (N=19)	D	16		40·0		

REMARKS: Water first met at 29·0' and then again at 47·6'

Foundation Engineering Ltd.

TQ|28NE|93
2634.8593. OF 6

RECORD OF BOREHOLE No. DP6

THE MOUNT/HEATH ST.,
HAMPSTEAD HEATH

No. : 481

Boring : Shell & Auger

Started : 16 5/65

Borehole Dia : 8"

Casing :

Ground Level : 386.34'

Sheet 2 of 2

Water Level	SAMPLES Depth	Type	No.	STRATA Legend	Depth	Thickness	DESCRIPTION OF STRATA
					40·0		
					41·0	1·0	Soft/firm brown silty sandy CLAY
	42·6	D	17			4·0	Dark brown silty clayey SAND
	45·6	U	18		45·0		
	47·6	D	19			4·0	Firm dark grey silty sandy CLAY
	50·6	U	20		49·0		
50·6					51·6	2·6	Firm grey silty sandy CLAY
					Borehole Complete		

Foundation Engineering Ltd.

TQ/28NE/95
2638.8578 OF 8

RECORD OF BOREHOLE No: OF 8

HOLLY BUSH VALE,
HAMPSTEAD HEATH

Borehole Dia : 6"
Casing :
Ground Level : 356.863'

No. : 431
Boring : Shell + Auger
(started) : 20.5.65

Sheet 1 of 2

Water Level	SAMPLES Depth	Type	No.	STRATA Legend	Depth	Thickness	DESCRIPTION OF STRATA
					2'0	2'0	MADE GROUND (Brick Rubble)
	2'6	D	1				Mottled grey, orange brown + light brown firm slightly sandy CLAY
	5'0	U	2		6'0	4'0	
	7'6	D	3				Loose dry golden brown fine micaceous SAND
	10'0	U	4		11'0	5'0	(very local soft grey clay pockets)
	12'6	D	5		13'0	2'0	Light brown silty soft/firm CLAY + fine orange brown sand.
	15'0	U	6		16'0	3'0	Firm brown sandy CLAY
	17'6	D	7		18'0	2'0	Grey silty firm CLAY + fine brown sand.
	20'0	U	8				
	22'6	D	9				
	25'6	U	10				Dark grey stiff silty micaceous CLAY, (locally greenish tinge)
	27'6	D	11		28'6		
	30'0	U	12				
	32'6	D	13				
	35'0	U	14				
	37'6	D	15				
4'0	40'0	U	16		40'0		

Water first met at 32'0
Piezometer installed at 40'0

Foundation Engineering Ltd.

TQ/25NE/95

2135. 8978. OF.8

RECORD OF BOREHOLE No: OF3

[illegible] : HOLLY BUSH VALE, HAMPSTEAD HEATH

[illegible] No. : 431

[illegible] of Boring : Shell + Auger

Date (started) : 20. 5. 69

Borehole Dia : 6"

Casing :

Ground Level : 356. 863'

Sheet 2 of 2

[illegible]	Water Level	SAMPLES			STRATA			DESCRIPTION OF STRATA
		Depth	Type	No.	Legend	Depth	Thickness	
						41·6 Borehole Complete		as on sheet. 1.

Foundation Engineering Ltd.

TQ/28NE/98

2658. 8600. OF.11

RECORD OF BOREHOLE No: OF-11

WELL ROAD
HAMPSTEAD HEATH

Borehole Dia : 6"
Casing : 6" to 35·0
Ground Level : 354·09'

No. : 431
Boring : Shell + Auger
(Started) : 22.5.'69

Water Level	SAMPLES Depth	Type	No.	STRATA Legend	Depth	Thickness	DESCRIPTION OF STRATA
					1'0	1·0	MADE GROUND Asphalt + brick rubble
	2:6	D	1			5·0	Dark orange/brown + grey loose micaceous silty sandy CLAY (mixture firm clay + loose sand)
	5:0	U	2		6·0		
	7:6	D	3			6·0	Cream/light grey firm micaceous silty CLAY, predominates over orange/brown fine sand
	10:6	U	4				
	12:6 (U=13)	D	5		12·0		extremely wet deep orange/brown fine micaceous silty SAND
	15:6	D	6			5·0	
	17:6	D	7		17·0		Mottled grey + brick red firm micaceous silty CLAY and light brown fine sand
	20:0	U	8			5·0	
	22:6	D	9		22·0	3·0	Dark grey micaceous silty sandy CLAY
	25:0	U	10		25·0		Dark grey + brown mixture of silty SAND + CLAY
	27:6	D	11				
	30:0	U	12			10·0	
	32:6"	D	13				
	35:0"	U	14		35·0		Dark grey firm/stiff micaceous silty CLAY
	37:6	D	15			5·0	
DRY	40:0	U	16		40·0		

Borehole Complete

Water first met at 17·0
Piezometer installed at 30·0

Foundation Engineering Ltd.

APPENDIX C

Desk Study Data – Geological Data (Groundsure GeoInsight)

Groundsure
LOCATION INTELLIGENCE

Gabriel Geo Consulting

HENWOOD PAVILION, HENWOOD,
ASHFORD, TN24 8DH

Groundsure Reference:	GS-4309171
Your Reference:	18649
Report Date	29 Sep 2017
Report Delivery Method:	Email - pdf

Geo Insight

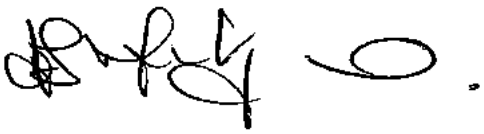
Address: 5, BACK LANE, LONDON, NW3 1HL

Dear Sir/ Madam,

Thank you for placing your order with Groundsure. Please find enclosed the **Groundsure Geo Insight** as requested.

If you need any further assistance, please do not hesitate to contact our helpline on 08444 159000 quoting the above Groundsure reference number.

Yours faithfully,



Managing Director
Groundsure Limited

Enc.
Groundsure Geo Insight

Geo Insight

Address:	**5, BACK LANE, LONDON, NW3 1HL**
Date:	**29 Sep 2017**
Reference:	**GS-4309171**
Client:	**Gabriel Geo Consulting**

NW N NE

W E

SW S SE

Aerial Photograph Capture date:	07-Jun-2015
Grid Reference:	526415,185837
Site Size:	0.01ha

Groundsure
LOCATION INTELLIGENCE

Contents Page

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?*	No
	1.2.2 Are there any records of landslip 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?*	No
	2.2.2 Are there any records of permeability of superficial ground within 500m of the study site?	No
	2.2.3 Are there any records of landslip 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	3.1Is 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.
	3.2Radon 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	3	Not Searched	Not Searched
4.2 Historical Underground Workings from Small Scale Mapping	0	0	0	0	29
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	7
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	Very Low
6.3 Ground Dissolution of Soluble Rocks	Negligible
6.4 Compressible Deposits	Negligible
6.5 Collapsible Deposits	Very Low
6.5 Running Sand	Low

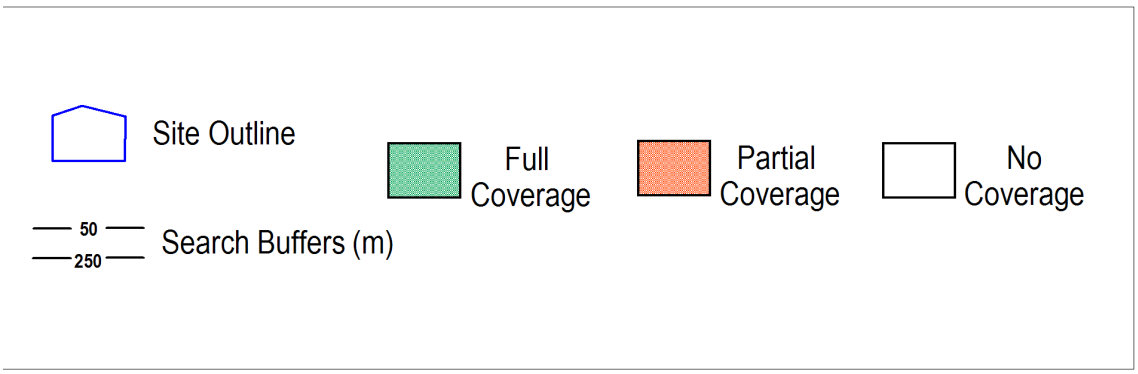
Section 7: Borehole Records	On-site	0-50m	51-250
7 BGS Recorded Boreholes	0	1	12

Section 8: Estimated Background Soil Chemistry	On-site	0-50m	51-250
8 Records of Background Soil Chemistry	1	1	0

Section 9: Railways and Tunnels	On-site	0-50m	51-250	250-500
9.1 Tunnels	0	0	1	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



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	829.0	Some deposits are mapped	Full	Full	No coverage
N3	1409.0	Some deposits are mapped	Full	Full	No coverage
N4	1636.0	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

Site Outline

500
1000
Search Buffers (m)

Made Ground (undivided)

Disturbed Ground (undivided)

Worked Ground (undivided)

Landscaped Ground (undivided)

Infilled Ground

Reclaimed Ground

1. Geology 1:10,000 scale

1.1 Artificial Ground

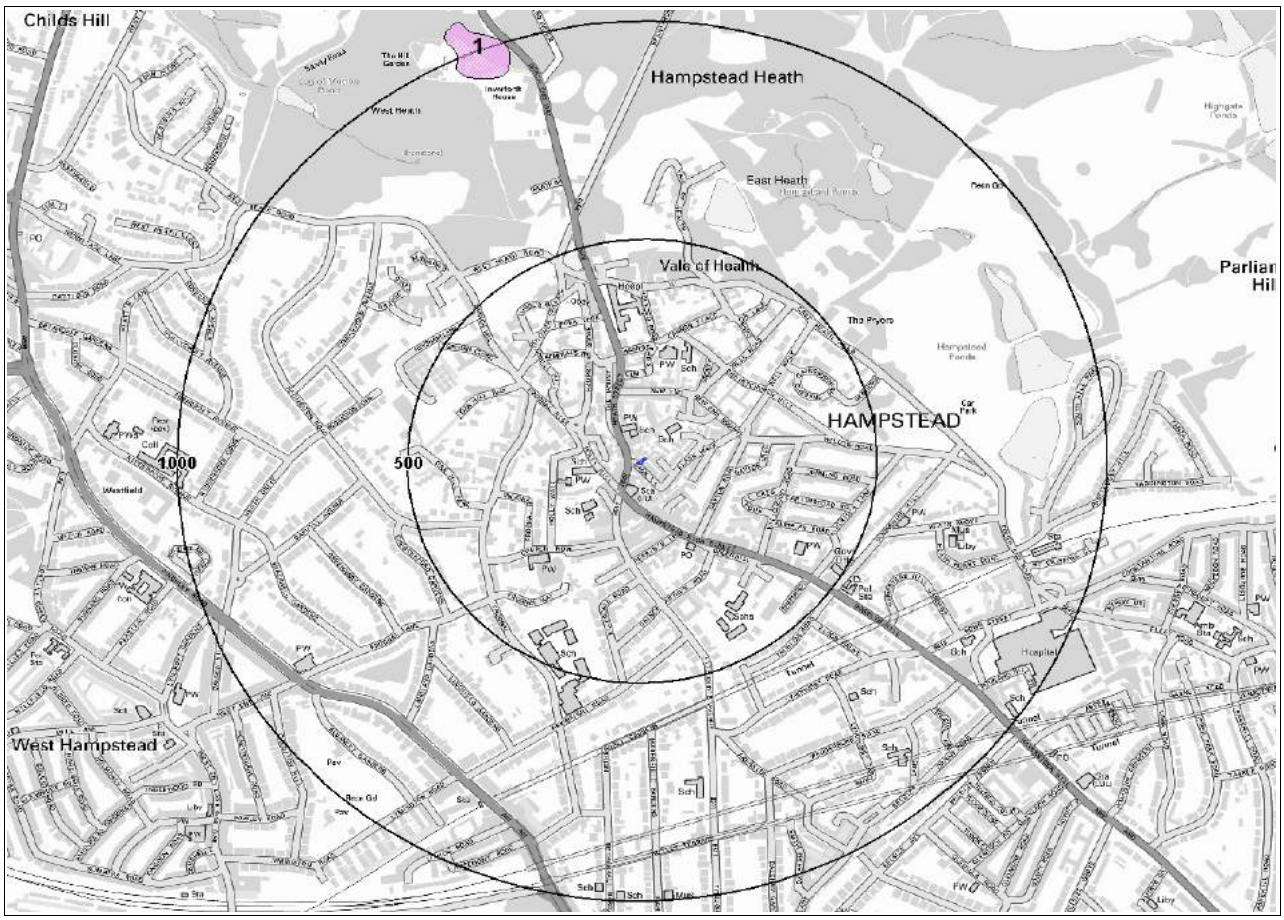
The following geological information represented on the mapping is derived from 1:10,000 scale BGS Geological mapping.

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	444.0	NW	WGR-UKNOWN	Worked Ground (Undivided)	Unknown/unclassified Entry

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

NW N NE



W E

SW S SE

Artificial Ground Legend

Site Outline

500
1000
Search Buffers (m)

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? No

Database searched and no data found.

1.2.2 Landslip

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

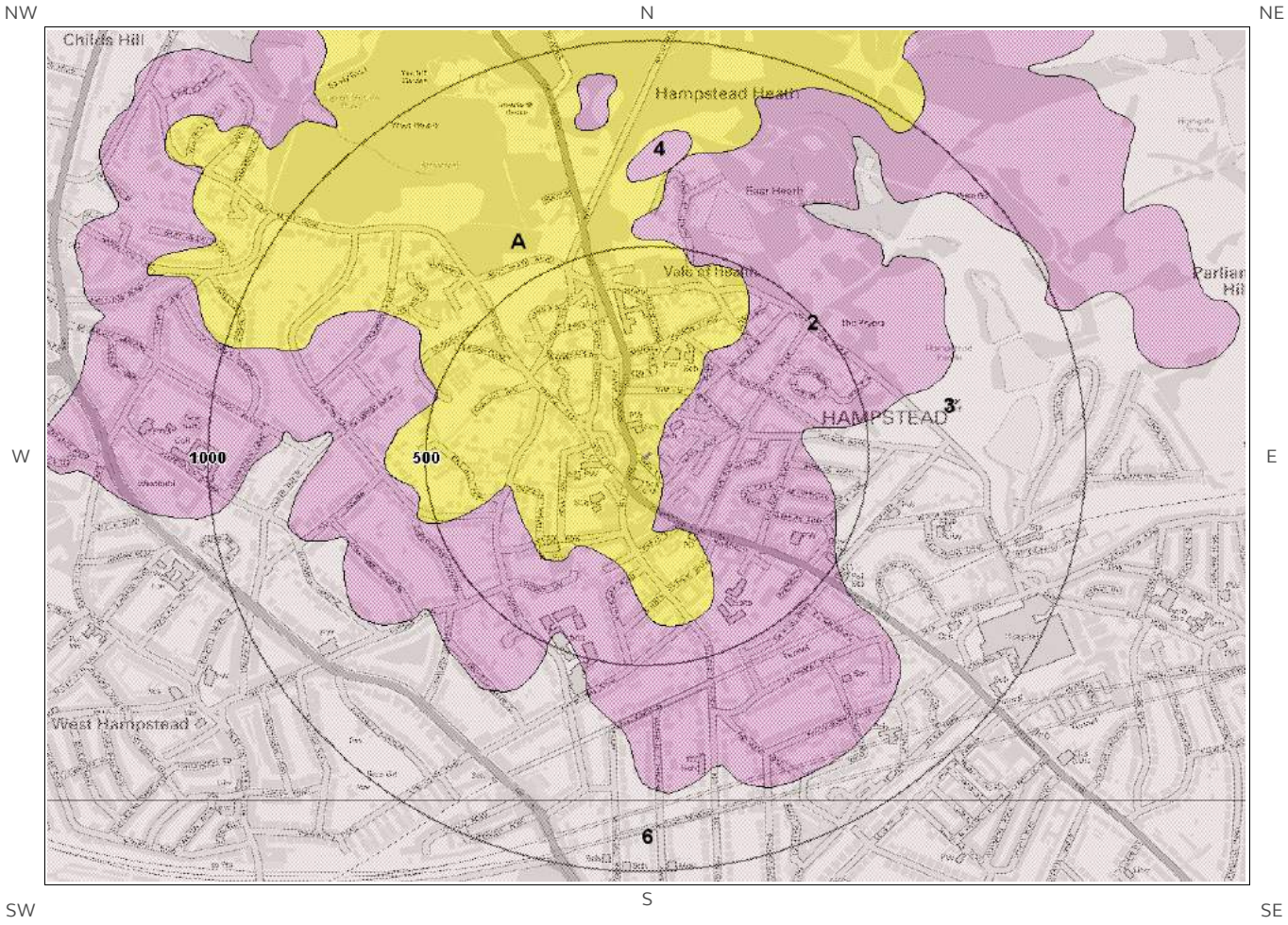
No

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

Site Outline

500
1000
Search Buffers (m)

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
1A	0.0	On Site	BGS-SANDU	Bagshot Formation - Sand	Eocene Epoch
2	17.0	E	CLGB-SDST	Claygate Member - Sandstone	Eocene Epoch
3	347.0	E	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

Site Outline

500
1000
Search Buffers (m)

Made Ground (undivided)

Worked Ground (undivided)

Infilled Ground

Disturbed Ground (undivided)

Landscaped Ground (undivided)

Reclaimed Ground

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? Yes

ID	Distance (m)	Direction	LEX Code	Description	Rock Description
1	455.0	NW	WGR-VOID	WORKED GROUND (UNDIVIDED)	VOID

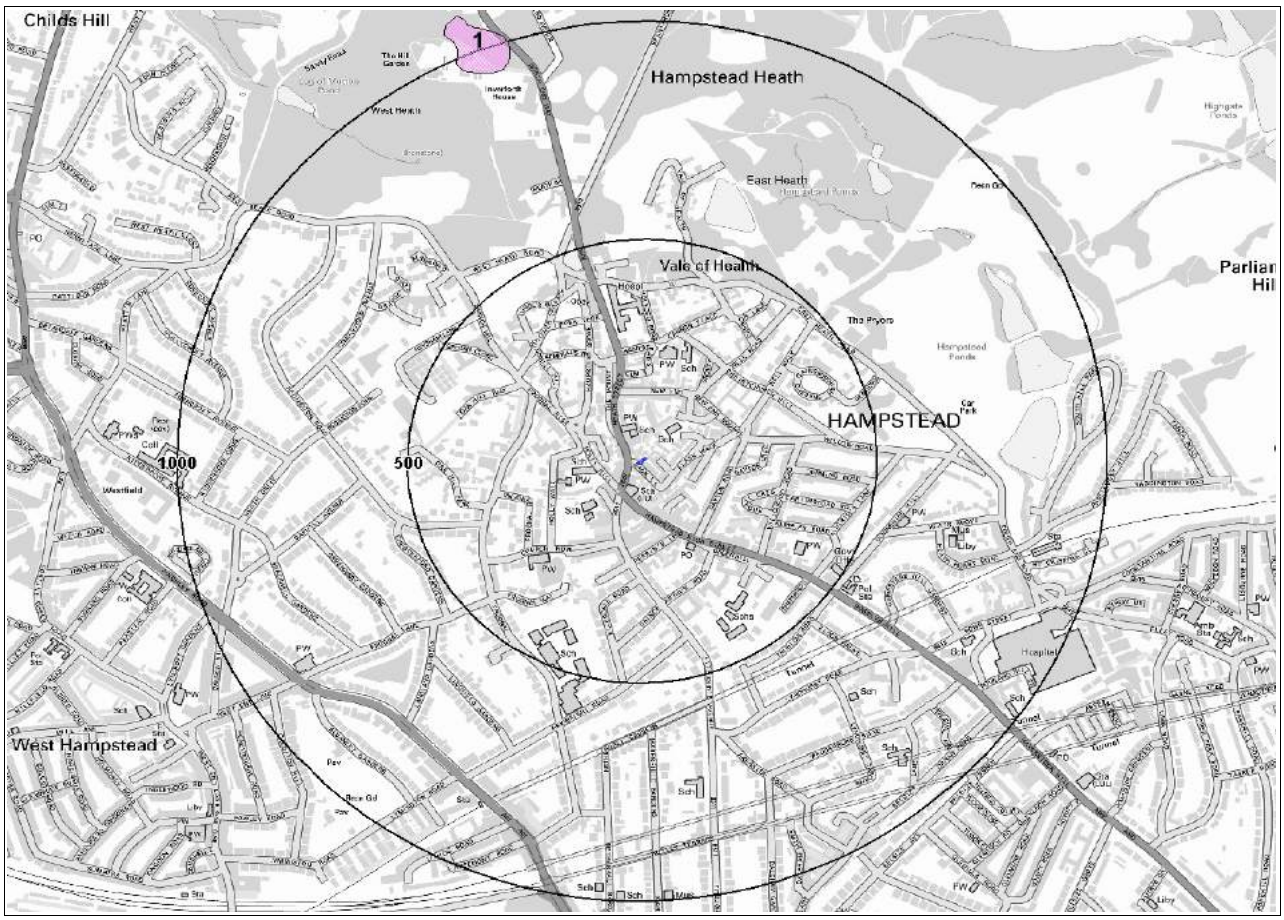
2.1.2 Permeability of Artificial Ground

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)

NW N NE



W E

SW S SE

Ground Workings Legend

Site Outline

500
1000
Search Buffers (m)

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? No

Database searched and no data found.

2.2.2 Permeability of Superficial Ground

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

Database searched and no data found.

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.

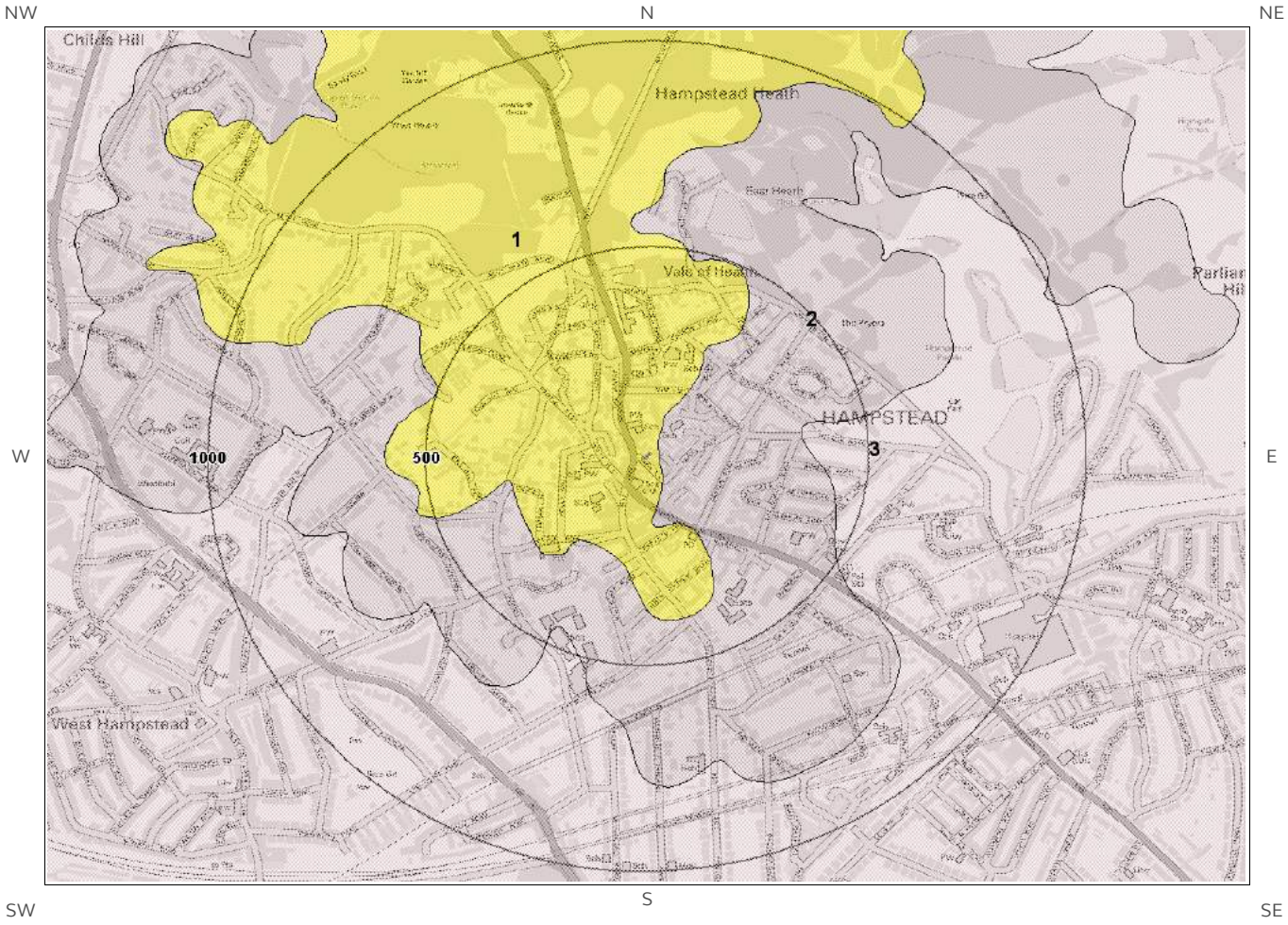
This Geology shows the main components as discrete layers, there are: Artificial/ Made Ground, Superficial/ Drift Geology and Landslips. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

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

Site Outline

500
1000
Search Buffers (m)

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	BGS-S	BAGSHOT FORMATION - SAND	YPRESIAN
2	17.0	E	CLGB-XCZS	CLAYGATE MEMBER - CLAY, SILT AND SAND	YPRESIAN
3	348.0	E	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	Intergranular	High	High
17.0	E	Mixed	High	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

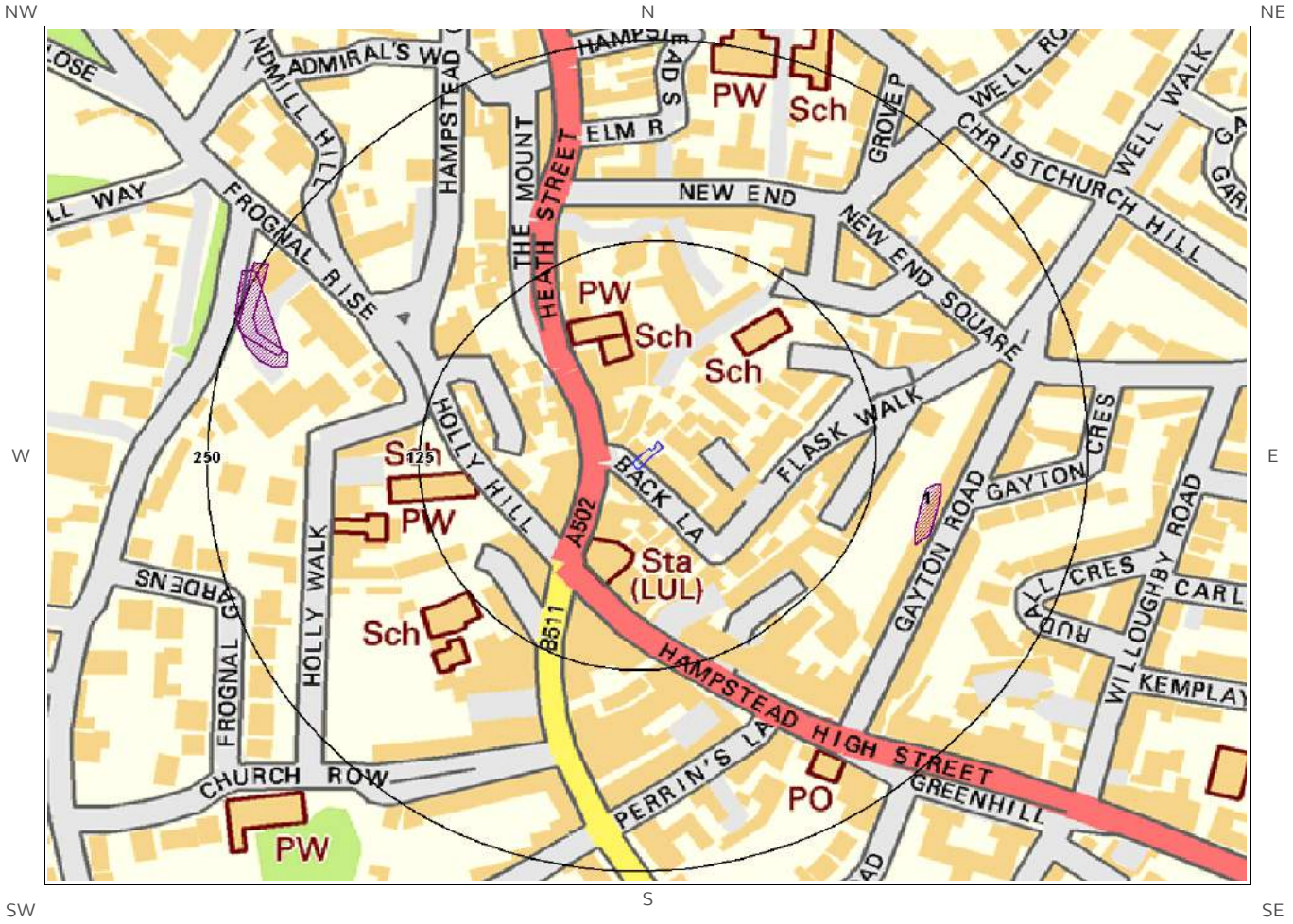
Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level? The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.

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

Site Outline

125
250
Search Buffers (m)

Historic Surface Ground Workings

Historic Underground Workings

Current Ground Workings

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
1	156.0	E	526583 185800	Pond	1865
2A	212.0	W	526183 185924	Unspecified Ground Workings	1920
3A	217.0	W	526190 185926	Unspecified Ground Workings	1940

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? Yes

The following Historical Underground Working Features are provided by Groundsure:

ID	Distance (m)	Direction	NGR	Use	Date
Not shown	543.0	SE	526845 185427	Tunnel	1958
Not shown	543.0	SE	526647 185330	Tunnel	1965
Not shown	543.0	SE	526647 185330	Tunnel	1974
Not shown	543.0	SE	526647 185330	Tunnel	1995
Not shown	556.0	S	526591 185300	Ventilating Shaft	1865
Not shown	650.0	S	526240 185137	Tunnel	1958
Not shown	806.0	S	527029 185170	Tunnel	1958
Not shown	806.0	S	527029 185170	Tunnel	1965
Not shown	806.0	S	527029 185170	Tunnel	1974

ID	Distance (m)	Direction	NGR	Use	Date
Not shown	806.0	S	527029 185170	Tunnel	1995
Not shown	810.0	S	526706 185071	Air Shaft	1920
Not shown	829.0	S	526326 184952	Tunnels	1957
Not shown	829.0	S	526326 184952	Tunnels	1968
Not shown	829.0	S	526326 184952	Tunnels	1973
Not shown	829.0	S	526326 184952	Tunnels	1989
Not shown	831.0	S	526461 184996	Air Shaft	1940
Not shown	831.0	S	526464 184994	Air Shaft	1989
Not shown	831.0	S	526464 184994	Air Shaft	1973
Not shown	832.0	S	526461 184995	Air Shaft	1920
Not shown	862.0	S	526419 184933	Tunnels	1957
Not shown	862.0	S	526419 184933	Tunnels	1973
Not shown	862.0	S	526419 184933	Tunnels	1968
Not shown	862.0	S	526419 184933	Tunnels	1989
Not shown	862.0	S	527203 185151	Tunnel	1958
Not shown	862.0	S	527203 185151	Tunnel	1974
Not shown	862.0	S	527203 185151	Tunnel	1995
Not shown	862.0	S	527203 185151	Tunnel	1965
Not shown	863.0	S	526842 185044	Tunnel	1866
Not shown	874.0	SE	526752 185021	Unspecified Shaft	1866

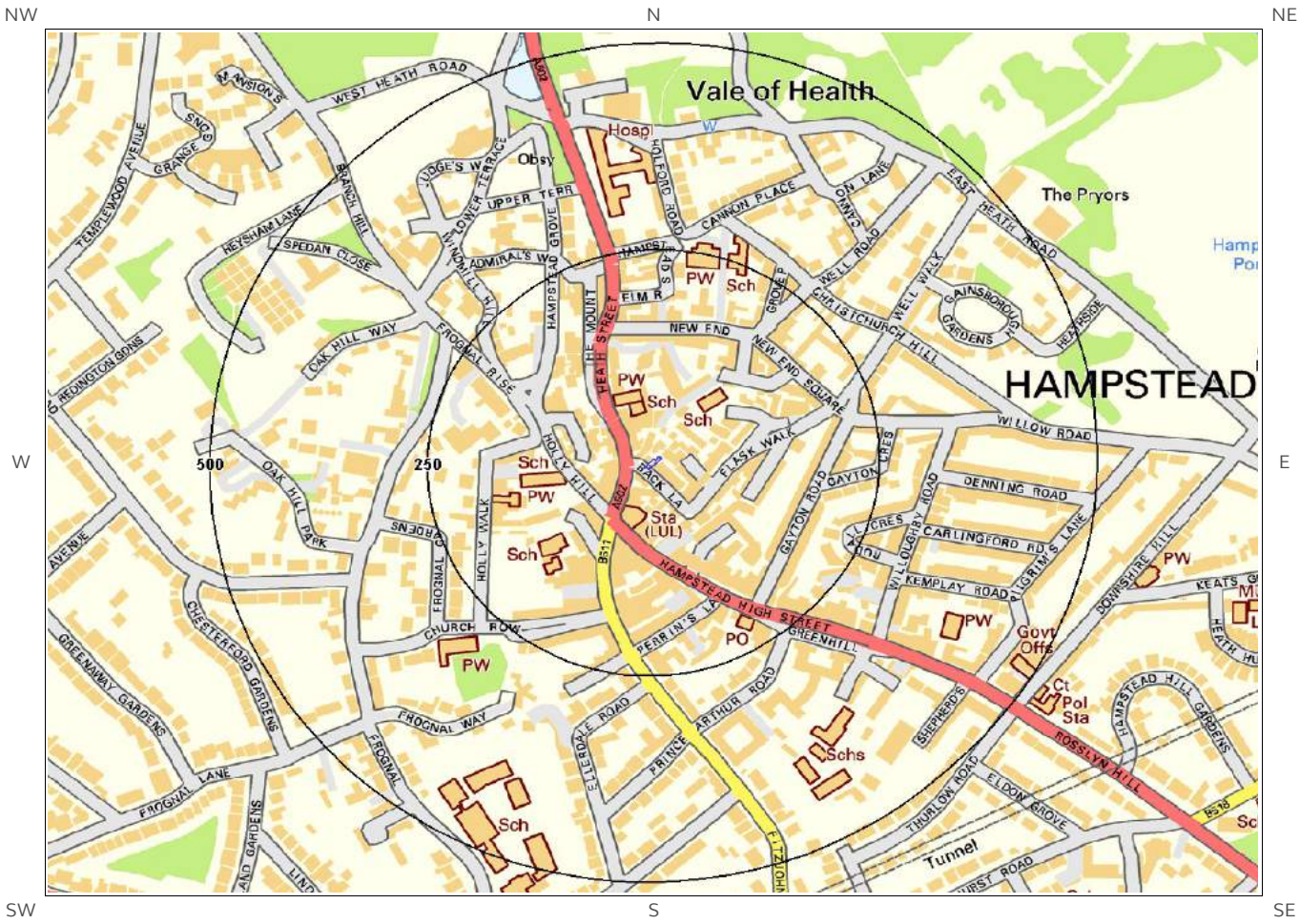
4.3 Current Ground Workings

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

Site Outline

250
500
Search Buffers (m)

Historical Mining

Non-Coal Mining Cavities

Natural Cavities

Non-Coal Mining

Highly likely

Likely

Unlikely

Highly unlikely

Rare

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? Yes

The following Historical Mining information is provided by Groundsure:

ID	Distance (m)	Direction	NGR	Details	Date
Not shown	556.0	S	526591 185300	Ventilating Shaft	1865
Not shown	810.0	S	526706 185071	Air Shaft	1920
Not shown	831.0	S	526461 184996	Air Shaft	1940
Not shown	831.0	S	526464 184994	Air Shaft	1973
Not shown	831.0	S	526464 184994	Air Shaft	1989
Not shown	832.0	S	526461 184995	Air Shaft	1920
Not shown	874.0	SE	526752 185021	Unspecified Shaft	1866

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.

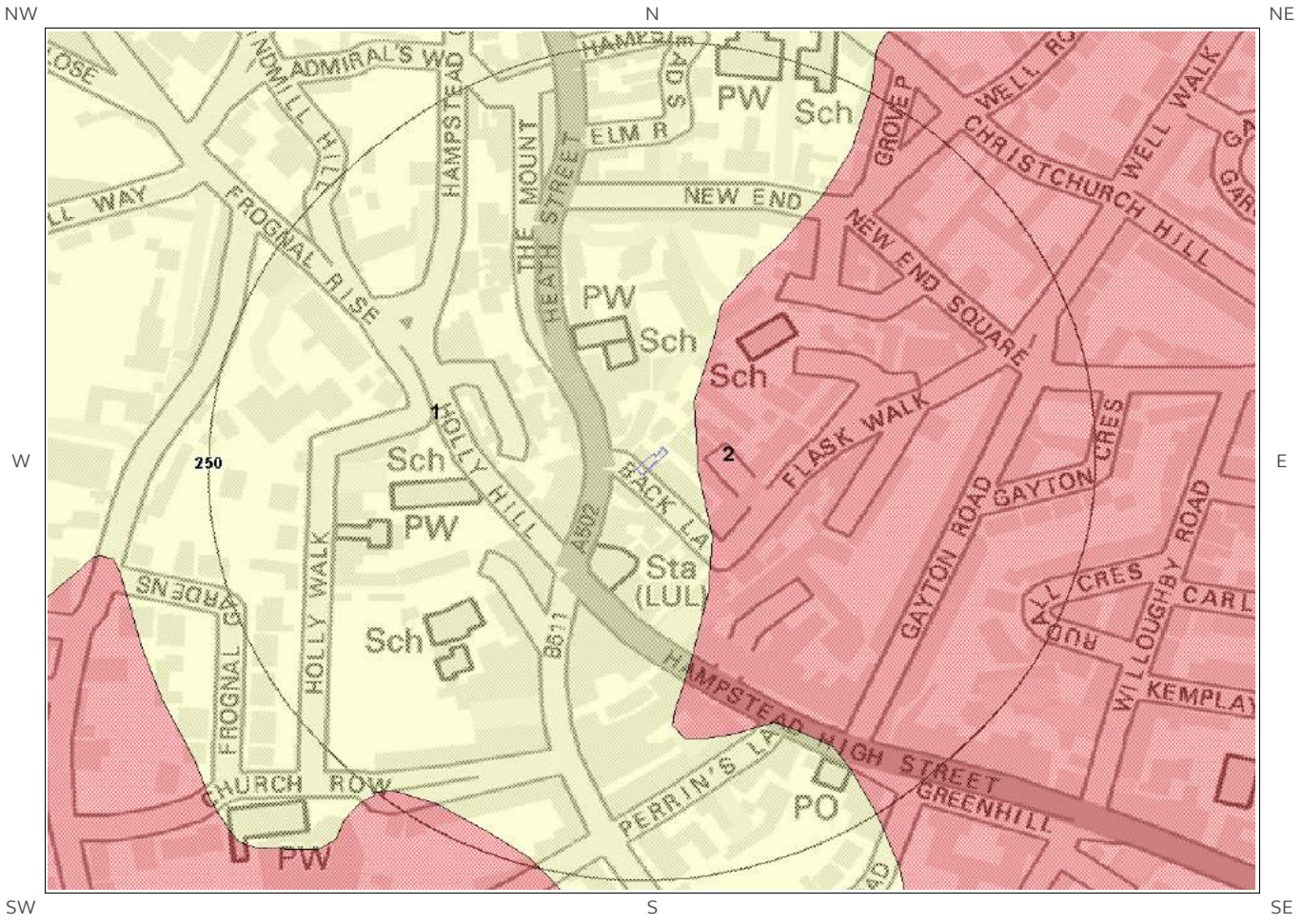
Are there any Clay Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

---

6 Natural Ground Subsidence

6.1 Shrink-Swell Clay Map



Shrink Swell Clay Legend

Site Outline

125
250
Search Buffers (m)

No Data / Null

Negligible

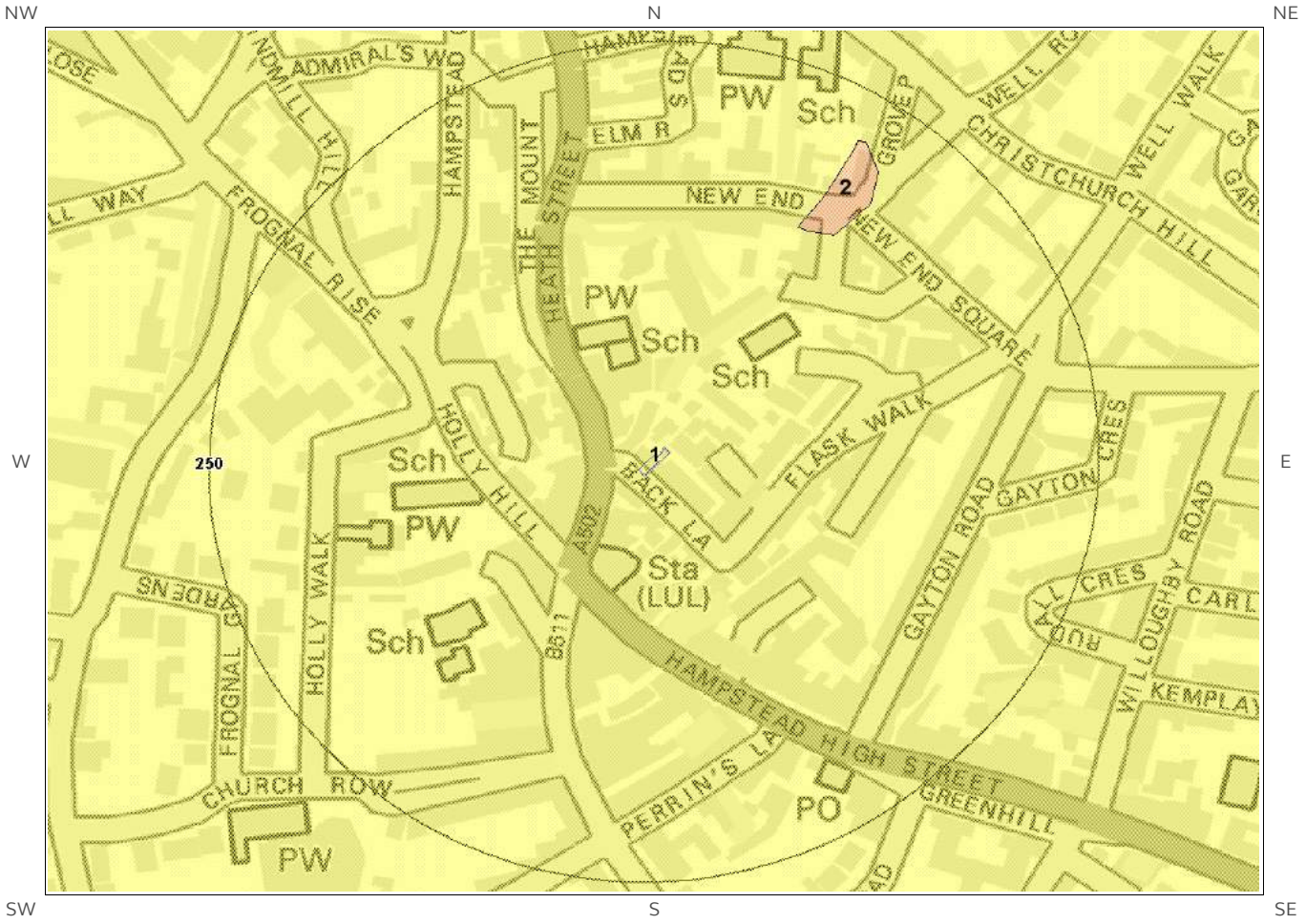
Very Low

Low

Moderate

High

6.2 Landslides Map



Landslides Legend

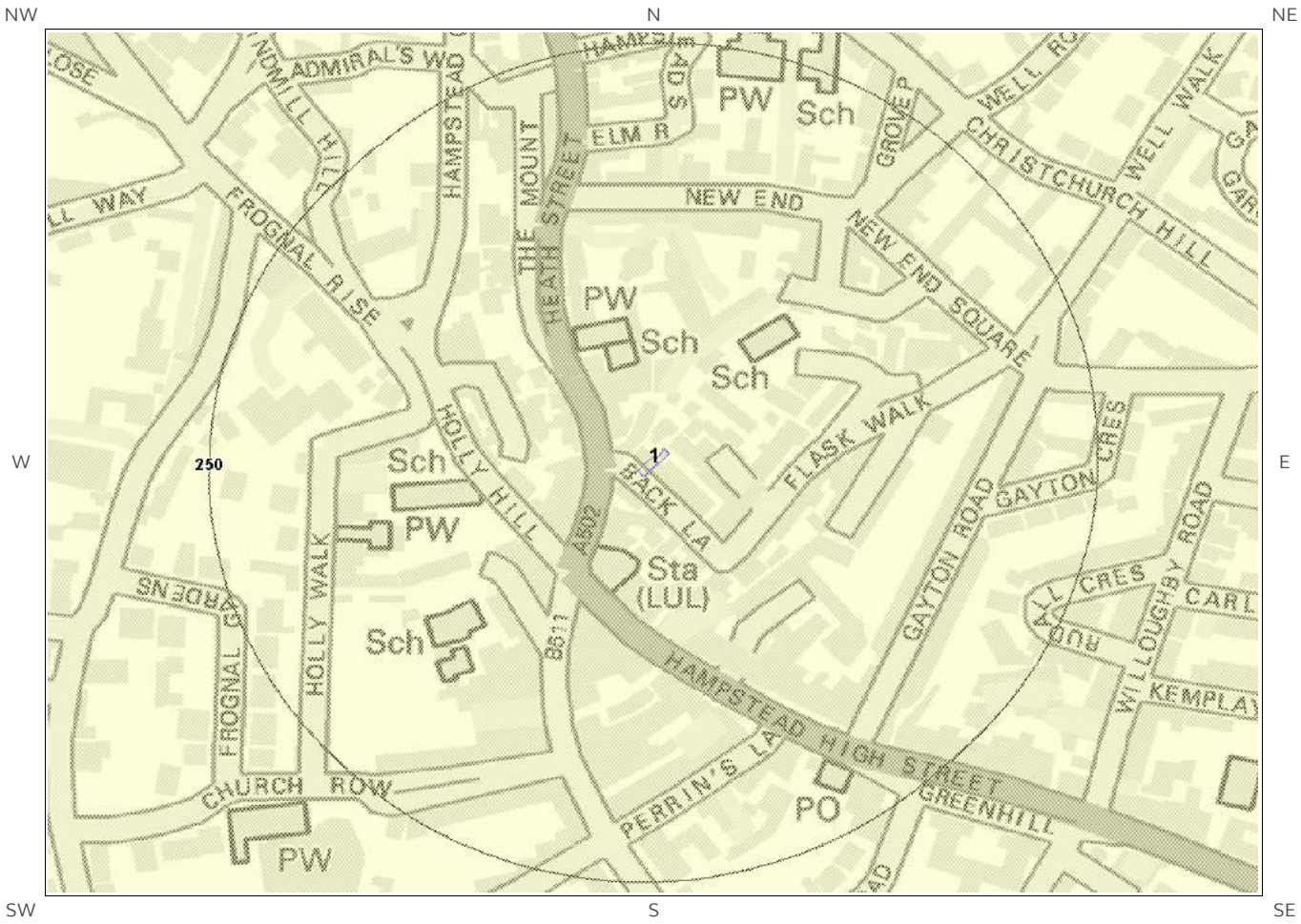
Site Outline

125
250
Search Buffers (m)

No Data / Null
Negligible
Very Low

Low
Moderate
High

6.3 Ground Dissolution of Soluble Rocks Map



Ground Dissolution Soluble Rocks Legend

Site Outline

125
250
Search Buffers (m)

No Data / Null

Negligible

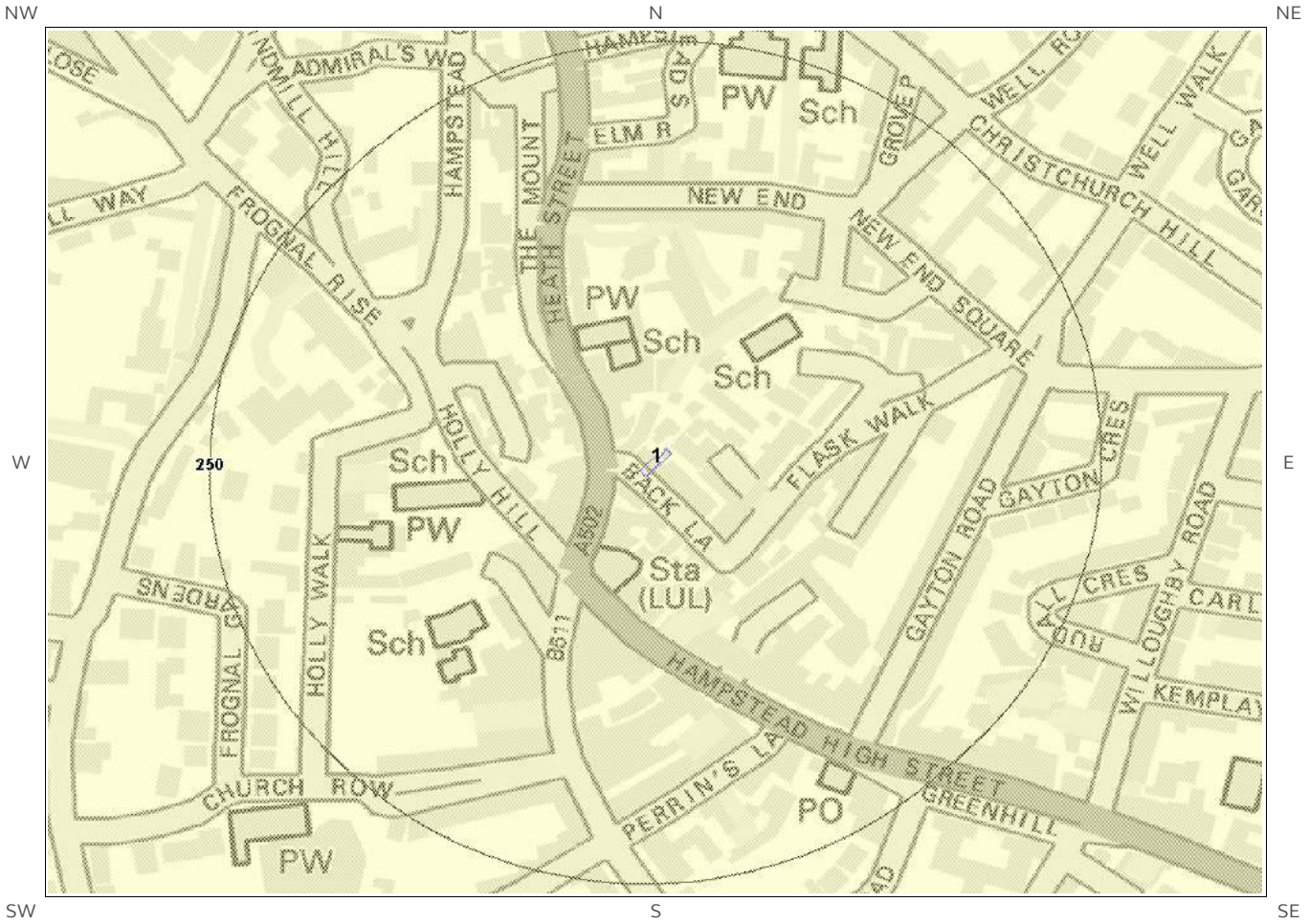
Very Low

Low

Moderate

High

6.4 Compressible Deposits Map



Compressible Deposits Legend

Site Outline

125
250
Search Buffers (m)

No Data / Null

Negligible

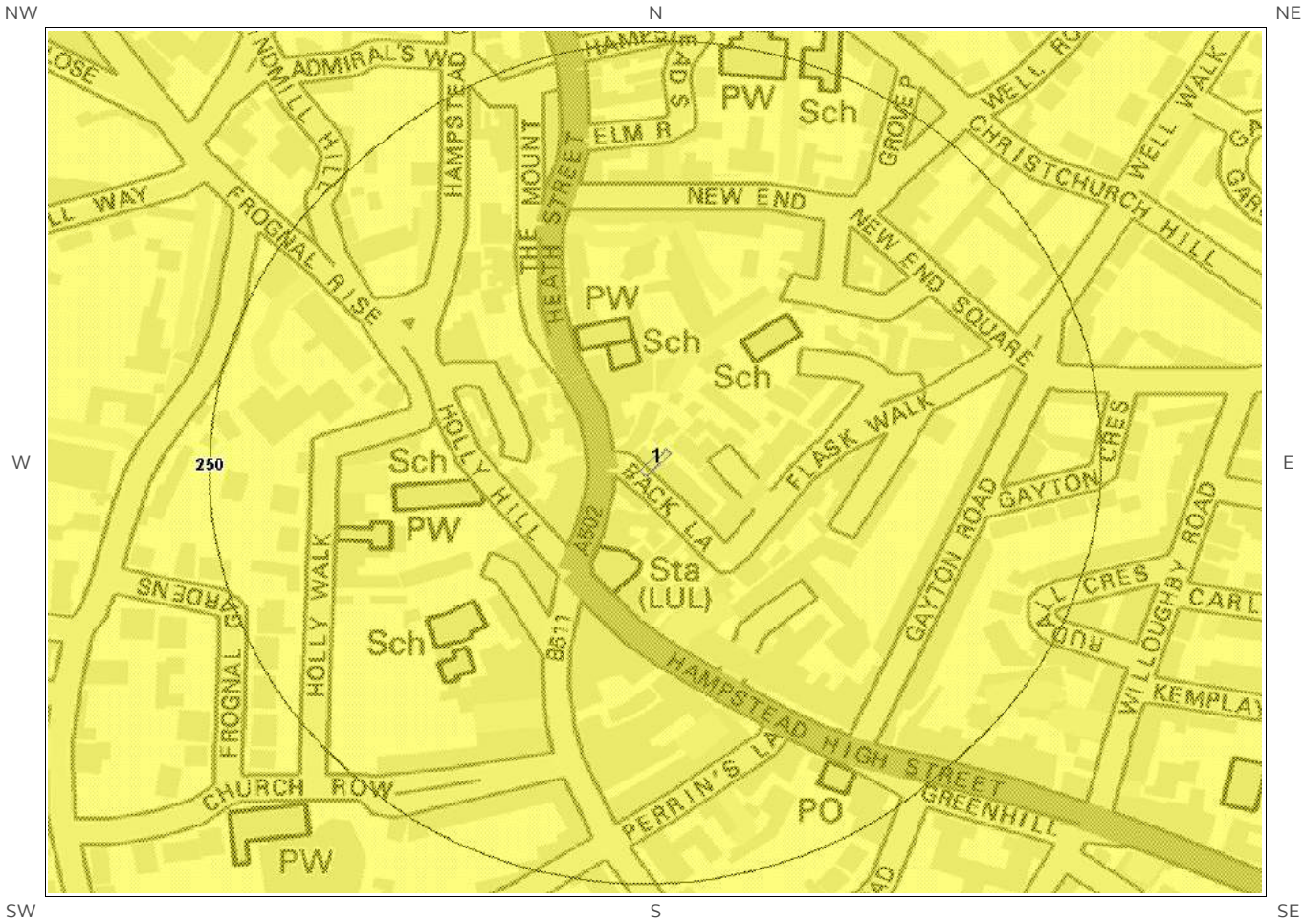
Very Low

Low

Moderate

High

6.5 Collapsible Deposits Map



Collapsible Deposits Legend

Site Outline

125
250
Search Buffers (m)

No Data / Null
Negligible
Very Low

Low
Moderate
High

6.6 Running Sand Map

Running Sand Legend

Site Outline

125
250
Search Buffers (m)

No Data / Null
Negligible
Very Low

Low
Moderate
High

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	Negligible	Ground conditions predominantly non-plastic. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely likely due to potential problems with shrink-swell clays.
2	17.0	E	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.

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

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:

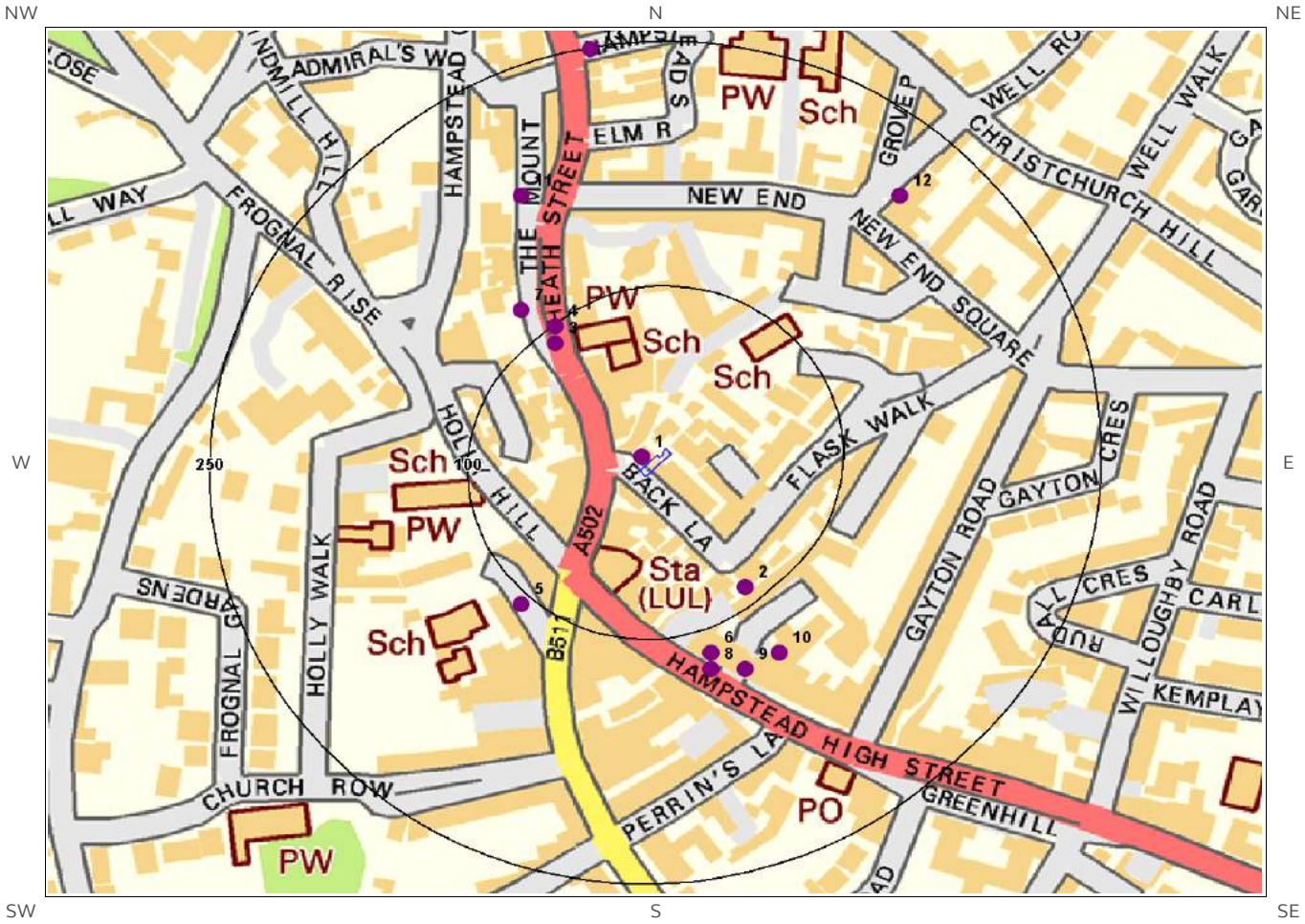
ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible 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	Low	Possibility of running sand problems after major changes in ground conditions. Normal maintenance to avoid leakage of water-bearing services or water bodies (ponds, swimming pools) should reduce likelihood of problems due to running sand. For new build - consider possibility of running sand into trenches or excavations if water table is high or sandy strata are exposed to water. Avoid concentrated water inputs to site. Unlikely to be an increase in construction costs due to potential for running sand. For existing property - no significant increase in insurance risk due to running sand problems is likely.
2	17.0	E	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.

7 Borehole Records Map



Borehole Records Legend

Site Outline

Borehole Locations

125
250
Search Buffers (m)

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: 13

ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length	Borehole Name
1	5.0	NW	526410 185840	TQ28NE94	12.19	HAMPSTEAD HEATH 7
2	90.0	SE	526470 185760	TQ28NE394	-1.0	BLUE STAR GARAGE HAMPSTEAD 8
3	91.0	NW	526360 185910	TQ28NE100	6.09	HAMPSTEAD HEATH 13
4	98.0	NW	526360 185920	TQ28NE8	51.2	JUNCTION FROGNALL RISE & HOLLY BUSH HILL
5	107.0	SW	526340 185750	TQ28NE95	12.67	HAMPSTEAD HEATH 8
6	115.0	S	526450 185720	TQ28NE390	-1.0	BLUE STAR GARAGE HAMPSTEAD 4
7	119.0	NW	526340 185930	TQ28NE93	15.72	HAMPSTEAD HEATH 6
8	124.0	S	526450 185710	TQ28NE391	-1.0	BLUE STAR GARAGE HAMPSTEAD 5
9	132.0	SE	526470 185710	TQ28NE392	-1.0	BLUE STAR GARAGE HAMPSTEAD 6
10	133.0	SE	526490 185720	TQ28NE393	-1.0	BLUE STAR GARAGE HAMPSTEAD 7
11	176.0	NW	526340 186000	TQ28NE92	18.89	HAMPSTEAD HEATH 5
12	206.0	NE	526560 186000	TQ28NE98	12.19	HAMPSTEAD HEATH 11
13	249.0	N	526380 186090	TQ28NE91	21.33	HAMPSTEAD HEATH 4

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/590682
#3: scans.bgs.ac.uk/sobi_scans/boreholes/590688
#4: scans.bgs.ac.uk/sobi_scans/boreholes/590588
#5: scans.bgs.ac.uk/sobi_scans/boreholes/590683
#7: scans.bgs.ac.uk/sobi_scans/boreholes/590681
#11: scans.bgs.ac.uk/sobi_scans/boreholes/590680
#12: scans.bgs.ac.uk/sobi_scans/boreholes/590686
#13: scans.bgs.ac.uk/sobi_scans/boreholes/590679

8 Estimated Background Soil Chemistry

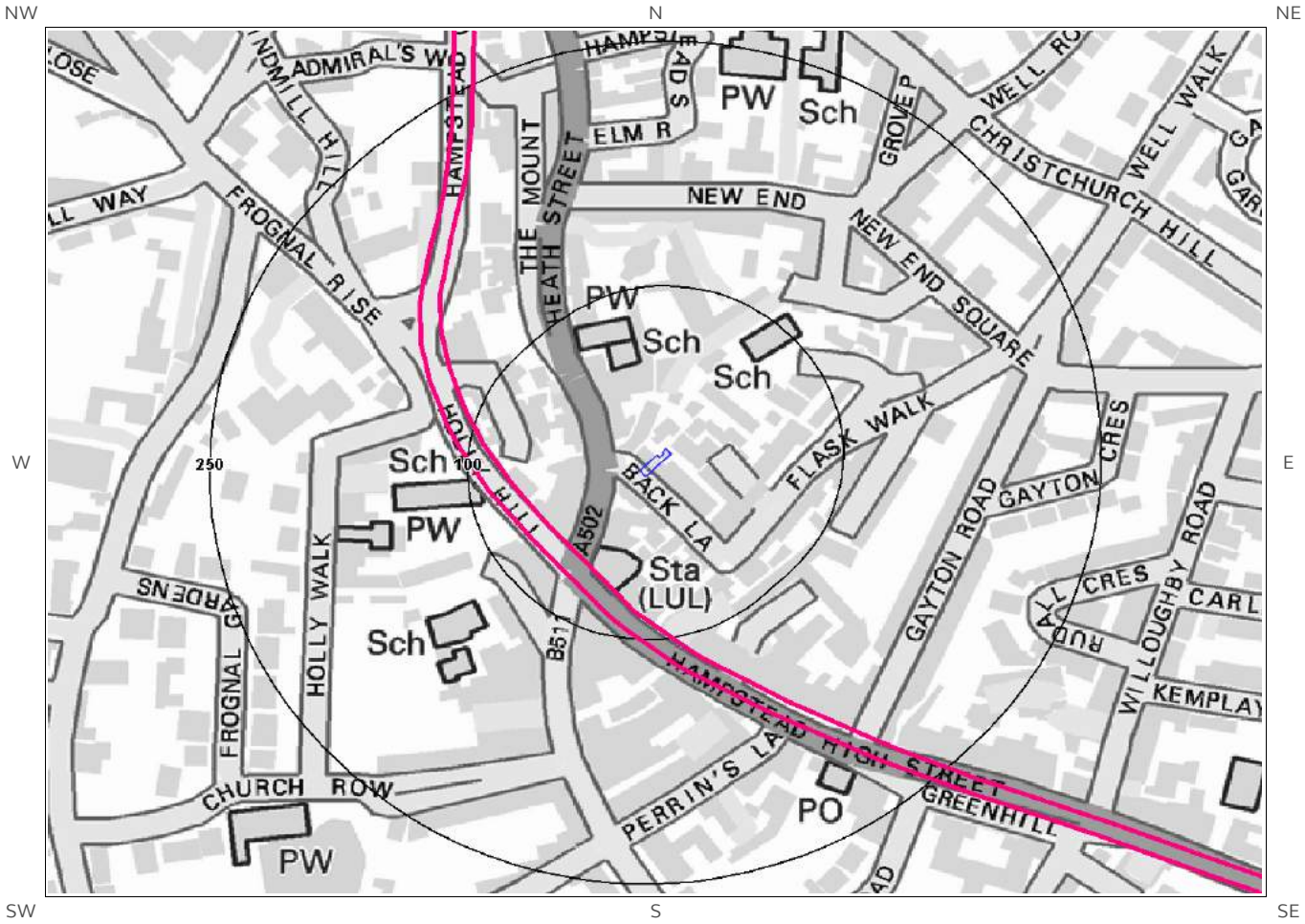
Records of background estimated soil chemistry within 250m of the study site boundary: 2

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
17.0	E	London	No data	No data	No data	No data	No data

*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

- Site Outline
- Search Buffers (m): 250, 500
- Underground or Partially Underground Railway / Subway System
- Railway Tunnel (OS Mapping)
- Abandoned or Dismantled Railway (OpenStreetMap)
- Railway Track (OS Mapping)
- Railway Track (OpenStreetMap)
- High Speed 2
- High Speed 2 Revised Proposed Route
- Crossrail 1
- Railway and/or Tunnel Feature from Historical Mapping

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? Yes

Distance (m)	Direction	Detail
62	SW	London Underground - Northern Line

The approximate depth value for the nearest London Underground line given in this dataset has been extrapolated from published depths of tube lines at station platforms, and assume a constant gradient between stations. Using this method, topographical variation has resulted in some parts of the line having associated depth values either shallower or deeper than the real-world situation. Depth values are for indication only and should not be relied upon for any calculation or technical purpose and are in no way a substitute for a professional survey.

Line
London Underground Line: Northern Line Depth: 66mbgl Track Type: Tunnel

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? Yes

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

Groundsure Helpline

Telephone: 08444 159 000
info@groundsure.com

British Geological Survey Enquiries

Kingsley Dunham Centre
Keyworth, Nottingham NG12 5GG
Tel: 0115 936 3143.
Fax: 0115 936 3276.
Email:**enquiries@bgs.ac.uk**
Web:**www.bgs.ac.uk**
BGS Geological Hazards Reports and general geological enquiries

British Gypsum

British Gypsum Ltd
East Leake
Loughborough
Leicestershire
LE12 6HX

The Coal Authority

200 Lichfield Lane
Mansfield
Notts NG18 4RG
Tel: 0345 7626 848
DX 716176 Mansfield 5
www.coal.gov.uk

Public Health England

Public information access office
Public Health England, Wellington House
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

Johnson Poole & Bloomer Limited

Harris and Pearson Building, Brettel Lane
Brierley Hill, West Midlands
DY5 3LH
Tel: +44 (0) 1384 262 000
Email:**enquiries.gs@jpb.co.uk**
Website: **www.jpb.co.uk**

Ordnance Survey

Adanac Drive, Southampton
SO16 0AS

Tel: 08456 050505
Website: http://www.ordnancesurvey.co.uk/

Getmapping PLC

Virginia Villas, High Street, Hartley Witney,
Hampshire RG27 8NW
Tel: 01252 845444
Website:**http://www1.getmapping.com/**

Peter Brett Associates
Caversham Bridge House
Waterman Place
Reading
Berkshire RG1 8DN
Tel: +44 (0)118 950 0761 E-mail:**reading@pba.co.uk**
Website:**http://www.peterbrett.com/home**

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 D

Desk Study Data – Environmental Data (Groundsure EnviroInsight)

Gabriel Geo Consulting

HENWOOD PAVILION, HENWOOD,
ASHFORD, TN24 8DH

Groundsure Reference:	GS-4309170
Your Reference:	18649
Report Date	29 Sep 2017
Report Delivery Method:	Email - pdf

Enviro Insight

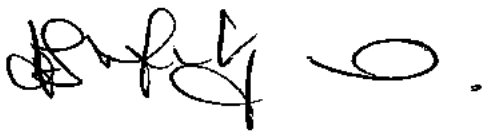
Address: 5, BACK LANE, LONDON, NW3 1HL

Dear Sir/ Madam,

Thank you for placing your order with Groundsure. Please find enclosed the **Groundsure Enviro Insight** as requested.

If you need any further assistance, please do not hesitate to contact our helpline on 08444 159000 quoting the above Groundsure reference number.

Yours faithfully,



Managing Director
Groundsure Limited

Enc.
Groundsure Enviroinsight

Enviro Insight

Address:	**5, BACK LANE, LONDON, NW3 1HL**
Date:	**29 Sep 2017**
Reference:	**GS-4309170**
Client:	**Gabriel Geo Consulting**

NW N NE

W E

SW S SE

Aerial Photograph Capture date:	07-Jun-2015
Grid Reference:	526415,185837
Site Size:	0.01ha

Report Reference: GS-4309170
Client Reference: 18649

Contents Page

Overview of Findings

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

Section 1: Historical Industrial Sites	On-site	0-50	51-250	251-500
1.1 Potentially Contaminative Uses identified from 1:10,000 scale mapping	0	4	14	16
1.2 Additional Information – Historical Tank Database	0	0	0	3
1.3 Additional Information – Historical Energy Features Database	0	1	18	29
1.4 Additional Information – Historical Petrol and Fuel Site Database	0	0	0	0
1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database	1	8	26	7
1.6 Potentially Infilled Land	0	0	3	30

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	2	1
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	1
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	0
2.3.2 National Incidents Recording System, List 1	0	0	0	0
2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990	0	0	0	0

Section 3: Landfill and Other Waste Sites

	On-site	0-50m	51-250	251-500	501-1000	1000-1500
3.1 Landfill Sites						
3.1.1 Environment Agency/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	1
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	2	14	Not searched
4.2 Records of Petrol and Fuel Sites	0	0	0	0
4.3 National Grid Underground Electricity Cables	0	0	4	8
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?	None
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?	No
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	4
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	1	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	No
6.10 Detailed River Network entries within 500m of the site	0	0	0	0	Not searched	Not searched
6.11 Surface water features within 250m of the study site	No	No	No	Not searched	Not searched	Not searched

Section 7: Flooding

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

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	3
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	2
8.7 Records of Local Nature Reserves (LNR)	0	0	0	0	0	3
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	0

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

Section 10: Mining

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

Using this report

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

1. Historical Industrial Sites

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

2. Environmental Permits, Incidents and Registers

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

3. Landfills and Other Waste Sites

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

4. Current Land Uses

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

5. Geology

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

6. Hydrogeology and Hydrology

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

7. Flooding

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

8. Designated Environmentally Sensitive Sites

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

9. Natural Hazards

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

10. Mining

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

11. Contacts

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

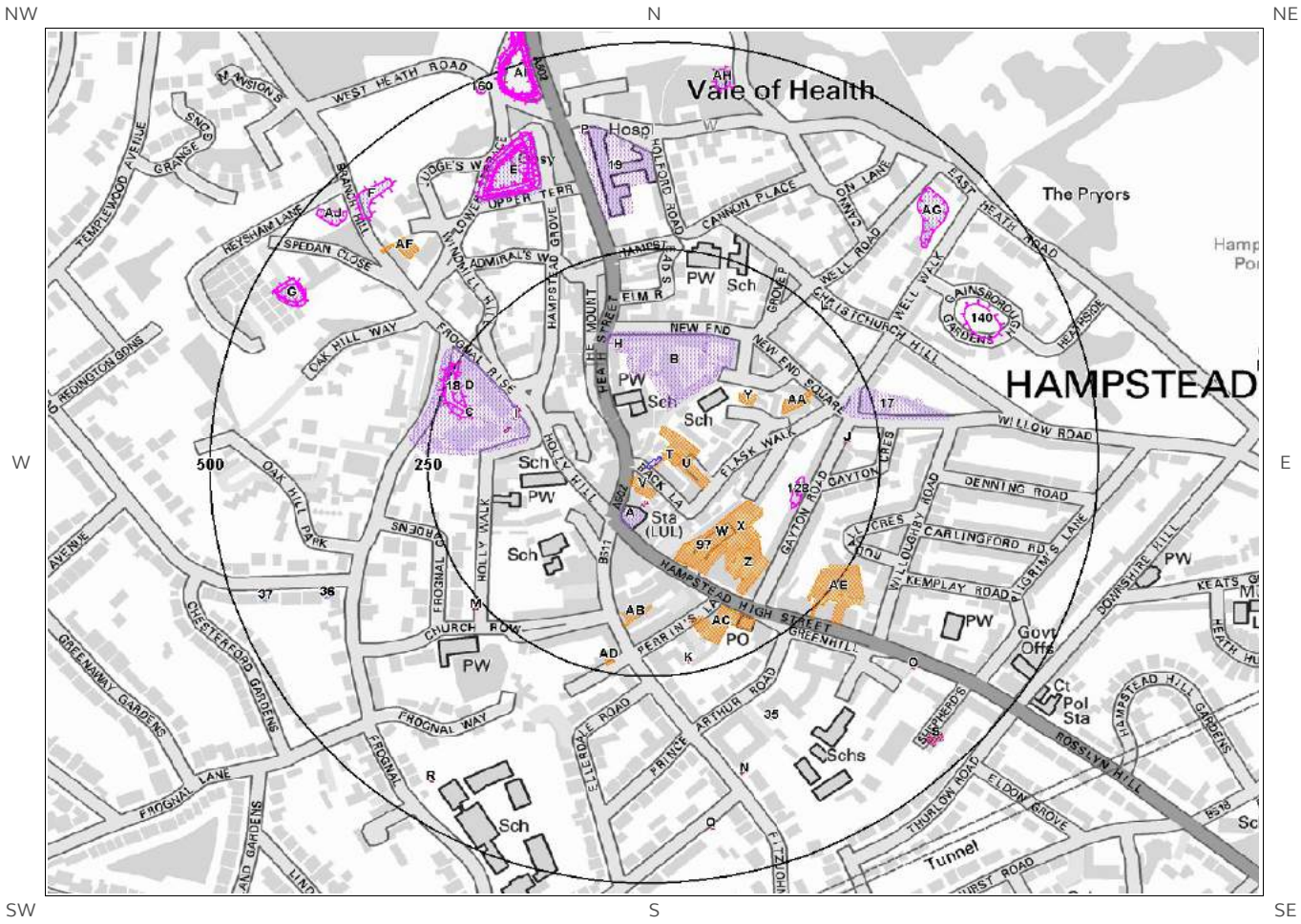
Note: Maps

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

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

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

1. Historical Land Use



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

Industrial Land Use

Potentially Infilled Land

Site Outline

250
500
Search Buffers (m)

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

Energy Features

Petrol Stations

Tanks

Garages

Report Reference: GS-4309170
Client Reference: 18649

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: 34

ID	Distance [m]	Direction	Use	Date
1A	48	S	London Transport Station	1996
2A	48	S	London Transport Station	1974
3A	48	S	London Transport Station	1965
4A	48	S	Unspecified Station	1958
5B	55	N	Unspecified Workhouse	1894
6B	65	N	Unspecified Workhouse	1911
7B	66	N	Hospital	1949
8B	71	N	Hospital	1974
9B	71	N	Hospital	1958
10B	71	N	Hospital	1965
11C	138	W	Hospital	1920
12C	141	W	Hospital	1938
13C	144	W	Hospital	1938
14D	162	NW	Hospital	1911
15D	169	NW	Hospital	1894
16D	212	W	Unspecified Ground Workings	1920
17	213	E	Militia Barracks	1873
18	217	W	Unspecified Ground Workings	1949
19	292	N	Hospital	1996
20E	346	NW	Water Works	1873
21E	353	NW	Unspecified Heap	1965
22E	353	NW	Unspecified Heap	1958
23E	353	NW	Unspecified Heap	1996
24E	353	NW	Unspecified Heap	1974
25AG	392	NE	Gravel Pit	1873
26F	436	NW	Unspecified Ground Workings	1996
27F	436	NW	Unspecified Ground Workings	1965
28F	436	NW	Unspecified Ground Workings	1974
29F	436	NW	Unspecified Ground Workings	1958
30G	437	NW	Unspecified Ground Workings	1920

31G	439	NW	Unspecified Ground Workings	1938
32G	441	NW	Unspecified Ground Workings	1949
33AH	448	N	Gravel Pit	1873
34AJ	456	NW	Unspecified Pit	1938

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: 3

ID	Distance (m)	Direction	Use	Date
35	330	SE	Unspecified Tank	1896
36	393	SW	Unspecified Tank	1896
37	461	W	Unspecified Tank	1896

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: 48

ID	Distance (m)	Direction	Use	Date
38A	38	S	Electricity Substation	1998
39H	137	N	Electricity Substation	1991
40H	137	N	Electricity Substation	1998
41H	137	N	Electricity Substation	1974
42I	157	W	Electricity Substation	1953
43I	157	W	Electricity Substation	1953
44I	158	NW	Electricity Substation	1953
45I	159	NW	Electricity Substation	1998
46I	162	W	Electricity Substation	1953
47I	162	W	Electricity Substation	1991
48I	163	W	Electricity Substation	1953
49I	163	W	Electricity Substation	1974
50I	163	W	Electricity Substation	1953
51J	208	E	Electricity Substation	1991
52J	209	E	Electricity Substation	1973
53J	212	E	Electricity Substation	1998

54K	233	S	Electricity Substation	1991
55K	234	S	Electricity Substation	1974
56K	234	S	Electricity Substation	1953
57L	255	NE	Electricity Substation	1953
58L	255	NE	Electricity Substation	1954
59L	255	NE	Electricity Substation	1987
60L	255	NE	Electricity Substation	1991
61L	255	NE	Electricity Substation	1986
62L	255	NE	Electricity Substation	1991
63M	256	SW	Electricity Substation	1998
64M	256	SW	Electricity Substation	1974
65M	257	SW	Electricity Substation	1991
66N	378	S	Electricity Substation	1991
67N	378	S	Electricity Substation	1986
68N	378	S	Electricity Substation	1977
69N	378	S	Electricity Substation	1991
70O	379	SE	Electricity Substation	1973
71O	380	SE	Electricity Substation	1991
72P	398	N	Electricity Substation	1991
73P	398	N	Electricity Substation	1978
74P	398	N	Electricity Substation	1991
75Q	432	S	Electricity Substation	1995
76Q	432	S	Electricity Substation	1992
77Q	432	S	Electricity Substation	1992
78Q	432	S	Electricity Substation	1995
79R	449	SW	Electricity Substation	1991
80R	449	SW	Electricity Substation	1970
81R	449	SW	Electricity Substation	1978
82R	450	SW	Electricity Substation	1953
83R	450	SW	Electricity Substation	1953
84S	451	SE	Electricity Substation	
85S	454	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: 42

ID	Distance (m)	Direction	Use	Date
86T	0	SE	Automobile Radiator Works	1953
87T	3	NE	Automobile Radiator Works	1953
88U	3	NE	Automobile Radiator Works	1953
89T	14	NE	Garage	1953
90T	14	NE	Garage	1953
91U	14	NE	Garage	1953
92V	14	SW	Garage	1953
93V	14	SW	Garage	1953
94V	14	SW	Garage	1953
95W	97	SE	Garage	1965
96W	98	SE	Garage	1974
97	98	SE	Garage	1966
98W	98	SE	Garage	1953
99X	102	SE	Garage	1966
100X	102	SE	Garage	1953
101X	102	SE	Garage	1973
102Y	113	NE	Garage	1953
103Y	113	NE	Garage	1965
104Y	113	NE	Garage	1966
105Y	113	NE	Garage	1953
106Y	113	NE	Garage	1973
107Z	145	SE	Garage	1953
108Z	145	SE	Garage	1953
109AA	147	E	Garage	1953
110AA	147	E	Garage	1953
111AB	164	S	Garage	1953
112AB	164	S	Garage	1953
113AC	184	SE	Garage	1965
114AC	185	SE	Garage	1953
115AC	187	SE	Garage	1953
116AD	223	S	Garage	1953
117AD	223	S	Garage	1953
118AD	223	S	Garage	1953
119AE	226	SE	Garage	1953
120AE	227	SE	Garage	1953
121AF	369	NW	Garage	1953
122AF	369	NW	Garage	1973

123AF	369	NW	Garage	1953
124AF	369	NW	Garage	1953
125AF	369	NW	Garage	1953
126AF	369	NW	Garage	1991
127AF	369	NW	Garage	1991

1.6 Potentially Infilled Land

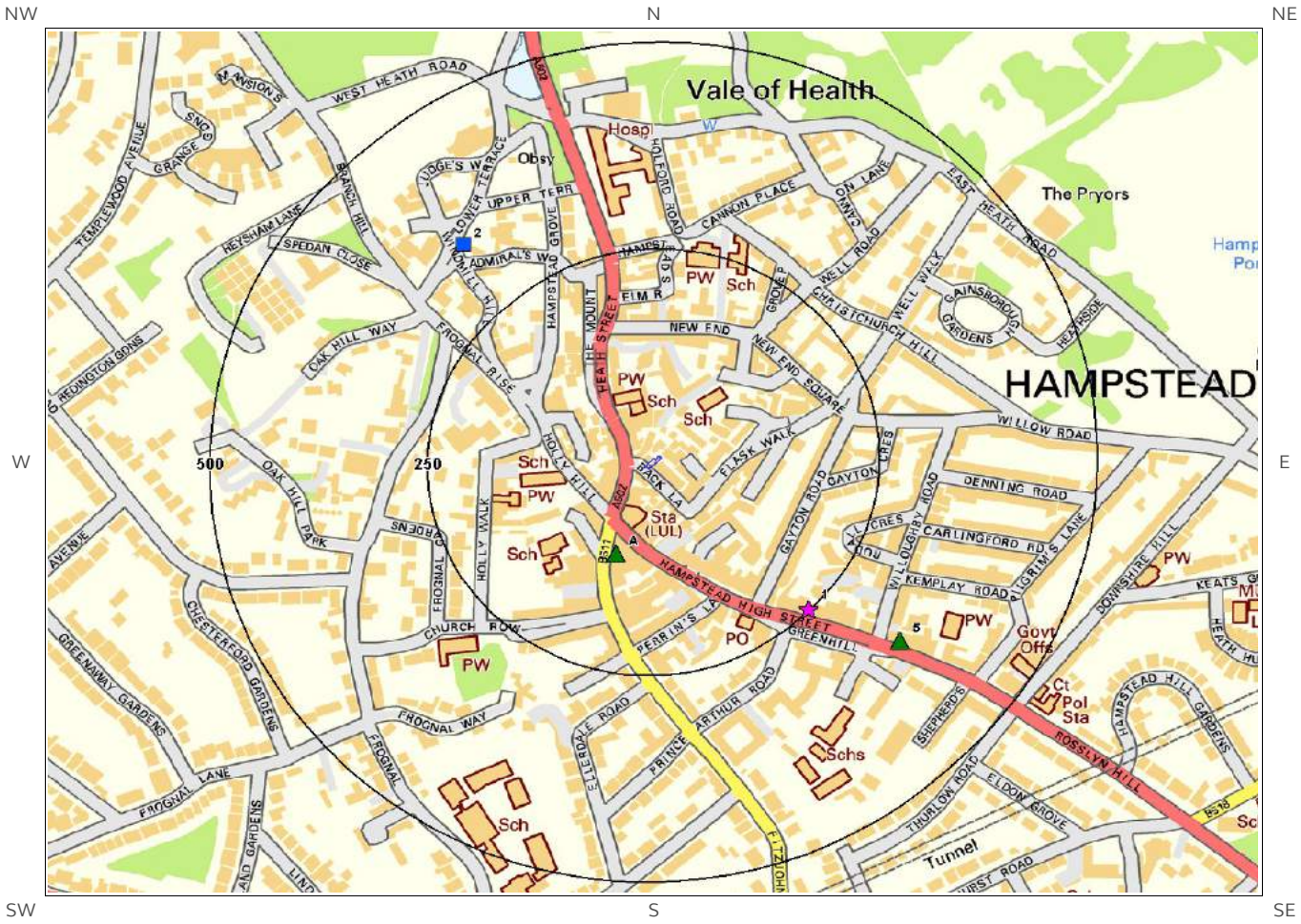
Records of Potentially Infilled Features from 1:10,000 scale mapping within 500m of the study site: 33

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

ID	Distance(m)	Direction	Use	Date
128	156	E	Pond	1873
129D	212	W	Unspecified Ground Workings	1920
130D	217	W	Unspecified Ground Workings	1949
131E	353	NW	Unspecified Heap	1958
132E	353	NW	Unspecified Heap	1965
133E	353	NW	Unspecified Heap	1974
134E	353	NW	Unspecified Heap	1996
135E	355	NW	Reservoir	1938
136E	359	NW	Covered Reservoir	1873
137E	360	NW	Reservoir	1920
138E	364	NW	Reservoir	1938
139E	365	NW	Reservoir	1949
140	386	NE	Pond	1873
141AG	392	NE	Gravel Pit	1873
142F	436	NW	Unspecified Ground Workings	1996
143F	436	NW	Unspecified Ground Workings	1974
144F	436	NW	Unspecified Ground Workings	1965
145F	436	NW	Unspecified Ground Workings	1958
146G	437	NW	Unspecified Ground Workings	1920
147G	439	NW	Unspecified Ground Workings	1938
148G	441	NW	Unspecified Ground Workings	1949
149AH	448	N	Gravel Pit	1873
150AI	451	N	Pond	1894
151AI	451	N	Pond	1873
152AJ	456	NW	Unspecified Pit	1938
153AI	457	N	Pond	1920
154AI	458	N	Pond	1958

155AI	458	N	Pond	1996
156AI	458	N	Pond	1974
157AI	458	N	Pond	1965
158AI	461	N	Pond	1938
159AI	462	N	Pond	1938
160	482	NW	Pond	1949

2. Environmental Permits, Incidents and Registers Map



- Site Outline
- Search Buffers (m) — 250, 500
- Recorded Pollution Incident
- Dangerous Substances (List 1)
- Dangerous Substances (List 2)
- Water Industry Referrals
- Licenced Discharge Consents
- Red List Discharge Consents
- RAS 3 & 4 Authorisations
- Part A(1) Authorised Processes and Historic IPC Authorisations
- Part A(2) and Part B Authorised Processes
- 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:

3

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	
3A	111	S	526374 185725	Address: Perkins Dry Cleaners, 40 Heath Street, NW3 6TE Process: Dry Cleaning Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of Enforcement: No Enforcement Notified Comment: No Enforcement Notified
4A	111	S	526374 185725	Address: Perkins Dry Cleaners, 40 Heath Street, NW3 6TE Process: Dry Cleaning Status: Current Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of Enforcement: No Enforcement Notified Comment: No Enforcement Notified
5	352	SE	526700 185619	Address: Heath Dry Cleaners, 66 Rosslyn Hill, NW3 1ND Process: Dry Cleaning Status: Current Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of Enforcement: No Enforcement Notified Comment: No Enforcement Notified

2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations:

0

Database searched and no data found.

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

1

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

ID	Distance (m)	Direction	NGR	Details	
2	339	NW	526200 186100	Address: Hampstead, Hampstead, -, -, - Effluent Type: TRADE DISCHARGES - UNSPECIFIED Permit Number: TEMP.0140 Permit Version: 1	Receiving Water: RIVER THAMES Status: REVOKED - UNSPECIFIED Issue date: 15/09/1989 Effective Date: 15-Sep-1989 Revocation Date: 05/10/2000

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:

1

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

ID	Distance (m)	Direction	NGR	Details	
1	248	SE	526595 185659	Incident Date: 13-Feb-2002 Incident Identification: 58214 Pollutant: Contaminated Water Pollutant Description: Firefighting Run-Off	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)

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

0

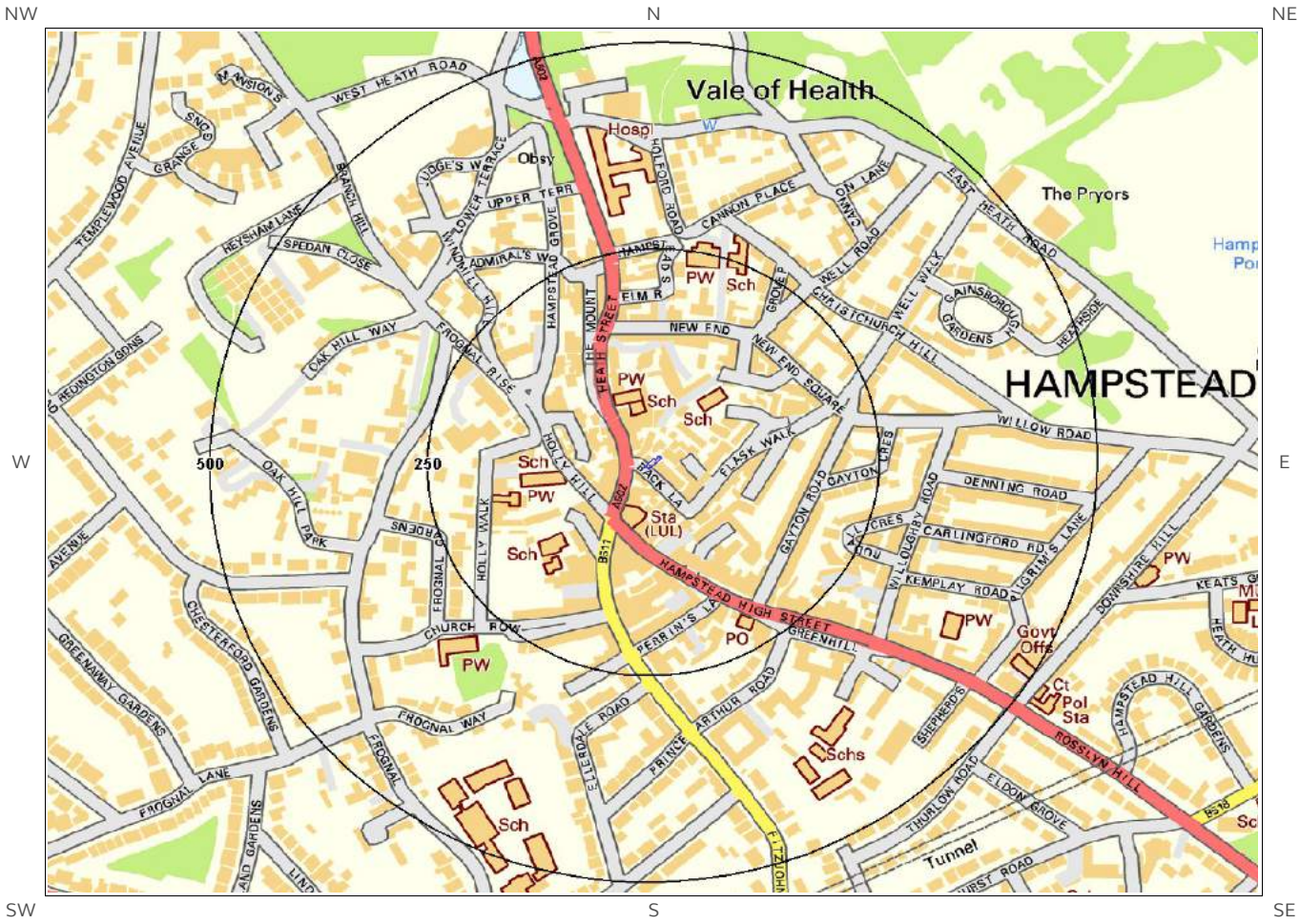
Database searched and no data found.

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

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

Database searched and no data found.

3. Landfill and Other Waste Sites Map



Site Outline

250
500
Search Buffers (m)

EA/NRW Active Landfill

EA/NRW Historic Landfill

BGS / DoE Survey Landfill

Historic and Planned Waste Sites

EA/NRW Licensed Waste Site

Local Authority/Historical Mapping Landfill Records

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:

1

The following landfill records are represented as either points or polygons on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details	
Not shown	1071	S	526000 184800	Site Address: Canfield Place, London NW6 Waste Licence: - Site Reference: DON009 Waste Type: - Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: Licence Surrendered: Licence Holder Address: - Operator: - Licence Holder: - First Recorded: - Last Recorded: -

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.

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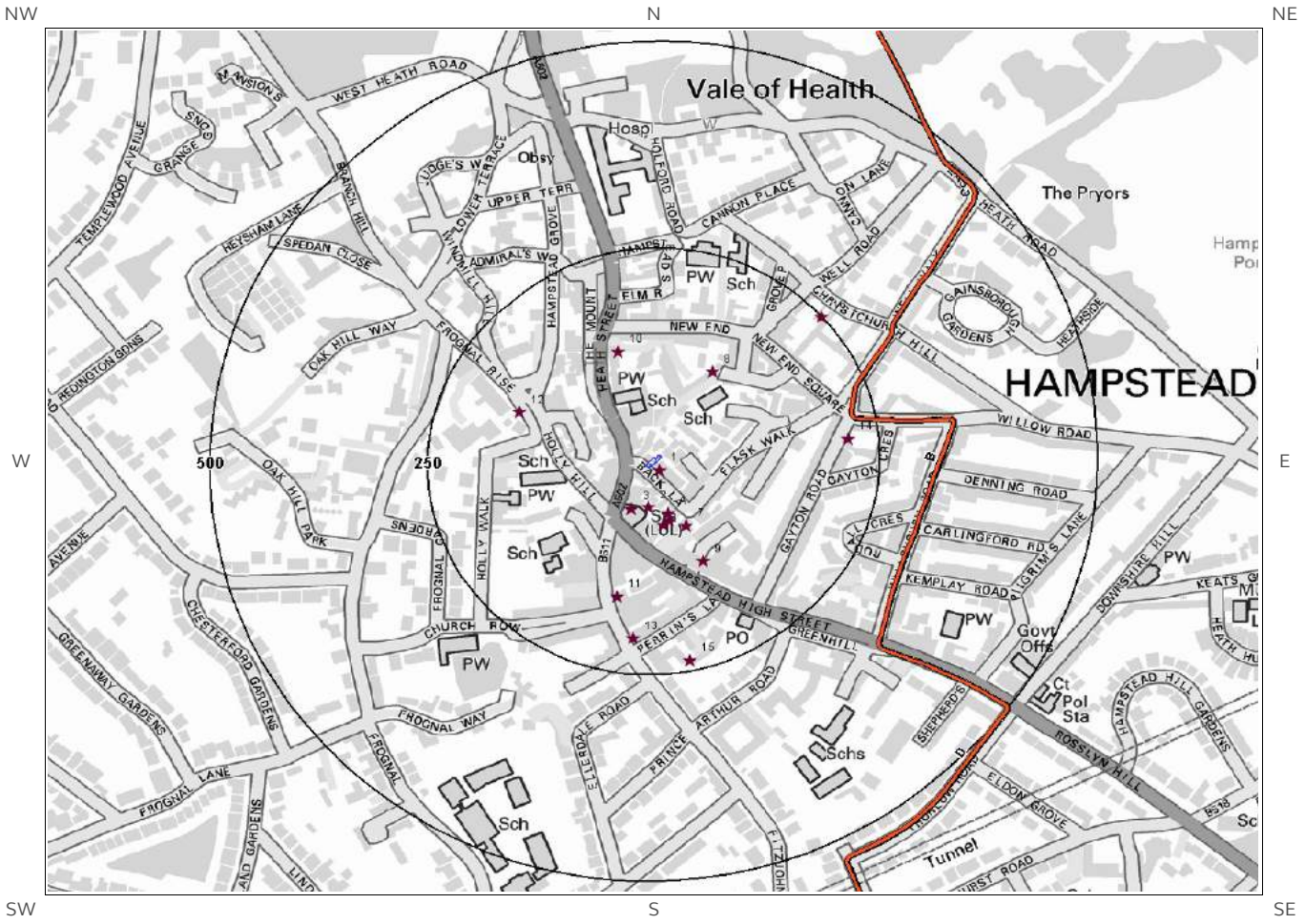
4. Current Land Use Map



Site Outline

Search Buffers (m)
250
500

Current Industrial Sites

Petrol & Fuel Sites

Electricity Transmission Cables

Gas Transmission Pipelines

4. Current Land Uses

4.1 Current Industrial Data

Records of potentially contaminative industrial sites within 250m of the study site: 16

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

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
1	10	SE	Soul Revolver	526425 185826	9, Back Lane, London, NW3 1HL	Leather Products	Consumer Products
2	47	S	Electricity Sub Station	526412 185782	NW3	Electrical Features	Infrastructure and Facilities
3	52	S	Hampstead	526392 185780	Hampstead Station, Hampstead High Street, London, NW3 1QG	Underground Network Stations	Public Transport, Stations and Infrastructure
4A	59	S	Card Aid	526434 185774	Back Lane, London, NW3 1HL	Medals, Trophies, Ceremonial and Religious Goods	Consumer Products
5A	67	S	Bubbles & Light Ltd	526435 185765	9a, Flask Walk, London, NW3 1HJ	Candles	Consumer Products
6A	70	S	Scaffolders of Cricklewood	526429 185760	7, Flask Walk, London, NW3 1HJ	Construction and Tool Hire	Hire Services
7	81	SE	Scaffolding Solutions of Hampstead	526454 185759	14, Flask Walk, London, NW3 1HE	Construction and Tool Hire	Hire Services
8	118	NE	Chimney	526485 185946	NW3	Chimneys	Industrial Features
9	128	SE	Lily's Kitchen	526474 185716	32, Hampstead High Street, London, NW3 1QD	Animal Feeds, Pet Foods, Hay and Straw	Foodstuffs
10	133	N	Electricity Sub Station	526377 185970	NW3	Electrical Features	Infrastructure and Facilities
11	159	S	Boots Hearing Care	526376 185674	26, Heath Street, London, NW3 6TE	Disability and Mobility Equipment	Consumer Products
12	159	NW	Electricity Sub Station	526264 185897	NW3	Electrical Features	Infrastructure and Facilities
13	206	S	Vita	526394 185623	6, Heath Street, London, NW3 6TE	Vehicles	Industrial Products
14	215	E	Electricity Sub Station	526641 185865	NW3	Electrical Features	Infrastructure and Facilities
15	236	S	Electricity Sub Station	526459 185597	NW3	Electrical Features	Infrastructure and Facilities
16	249	NE	Electricity Sub Station	526610 186012	NW3	Electrical Features	Infrastructure and Facilities

4.2 Petrol and Fuel Sites

Records of petrol or fuel sites within 500m of the study site: 0

Database searched and no data found.

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: 12

The following Underground Electricity Transmission Cable records are represented as linear features on the Current Land Use map:

ID	Distance (m)	Direction	Details	
17B	223	E	Cable Set: - Cable Route: - Cable Make: -	Cable Type: PILOT Operating Voltage (kV): - Year of installation: - Cable in tunnel: -
18B	223	E	Cable Set: - Cable Route: MILL HILL - ST JOHNS WOOD 2 Cable Make: -	Cable Type: DECOMMISSIONED Operating Voltage (kV): 275 Year of installation: 1963 Cable in tunnel: -
19B	224	E	Cable Set: - Cable Route: MILL HILL - ST JOHNS WOOD 1 Cable Make: -	Cable Type: DECOMMISSIONED Operating Voltage (kV): 275 Year of installation: 1963 Cable in tunnel: -
20B	224	E	Cable Set: - Cable Route: - Cable Make: -	Cable Type: PILOT Operating Voltage (kV): - Year of installation: - Cable in tunnel: -
21C	271	NE	Cable Set: - Cable Route: - Cable Make: -	Cable Type: PILOT Operating Voltage (kV): - Year of installation: - Cable in tunnel: -
22C	273	NE	Cable Set: - Cable Route: MILL HILL - ST JOHNS WOOD 2 Cable Make: -	Cable Type: DECOMMISSIONED Operating Voltage (kV): 275 Year of installation: 1963 Cable in tunnel: -
23C	273	NE	Cable Set: - Cable Route: MILL HILL - ST JOHNS WOOD 1 Cable Make: -	Cable Type: DECOMMISSIONED Operating Voltage (kV): 275 Year of installation: 1963 Cable in tunnel: -
24C	276	NE	Cable Set: - Cable Route: - Cable Make: -	Cable Type: PILOT Operating Voltage (kV): - Year of installation: - Cable in tunnel: -

ID	Distance (m)	Direction	Details	
25D	371	SE	Cable Set: - Cable Route: - Cable Make: -	Cable Type: PILOT Operating Voltage (kV): - Year of installation: - Cable in tunnel: -
26D	374	SE	Cable Set: - Cable Route: MILL HILL - ST JOHNS WOOD 1 Cable Make: -	Cable Type: DECOMMISSIONED Operating Voltage (kV): 275 Year of installation: 1963 Cable in tunnel: -
27D	374	SE	Cable Set: - Cable Route: MILL HILL - ST JOHNS WOOD 2 Cable Make: -	Cable Type: DECOMMISSIONED Operating Voltage (kV): 275 Year of installation: 1963 Cable in tunnel: -
28D	377	SE	Cable Set: - Cable Route: - Cable Make: -	Cable Type: PILOT Operating Voltage (kV): - Year of installation: - Cable in tunnel: -

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

Database searched and no data found.

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

5.3 Bedrock and Solid Geology

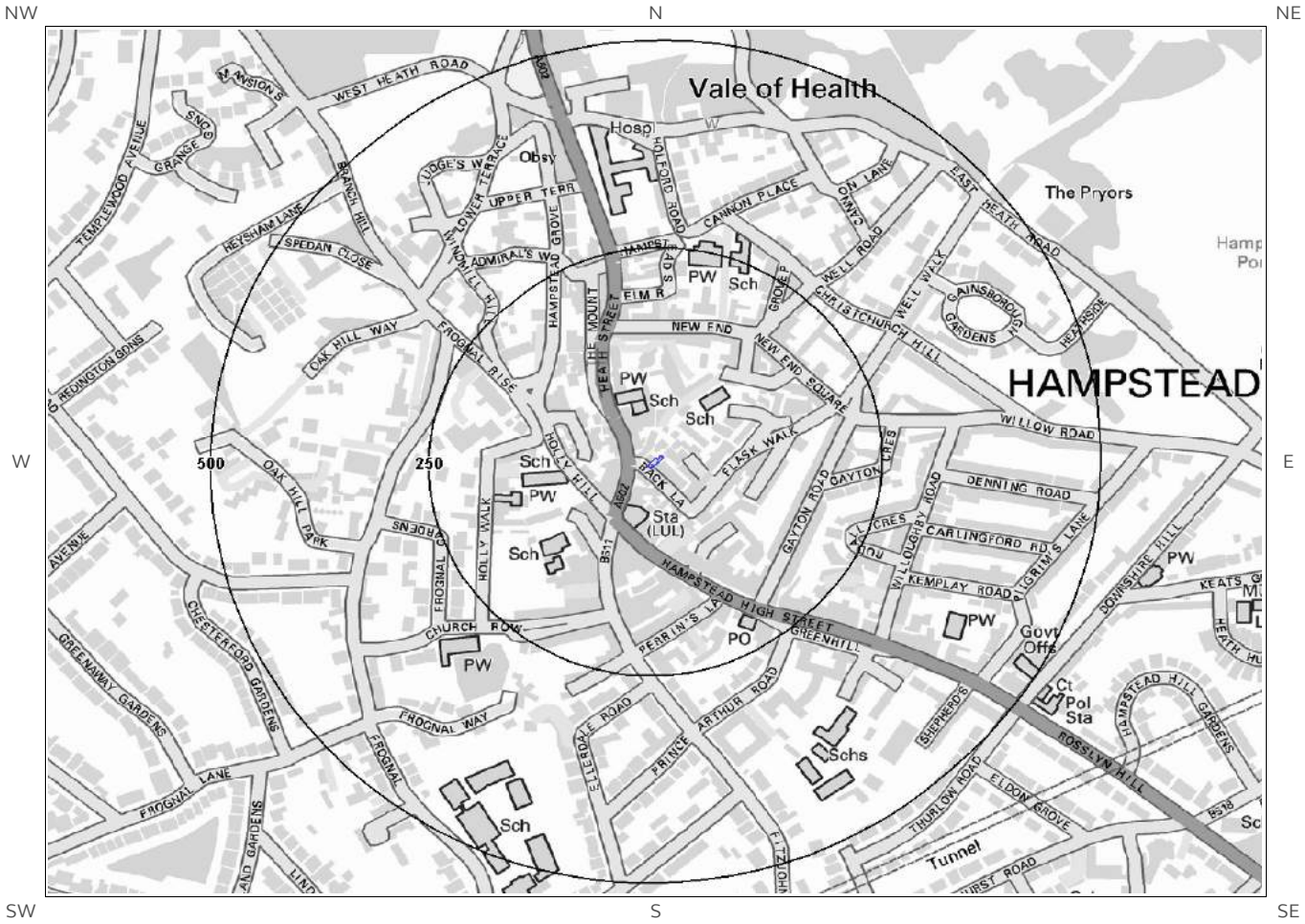
The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
BGS-S	BAGSHOT FORMATION	SAND
CLGB-XCZS	CLAYGATE MEMBER	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



Site Outline

250
500
Search Buffers (m)

Principal Aquifer

Secondary (A) Aquifer - Permeable Layers

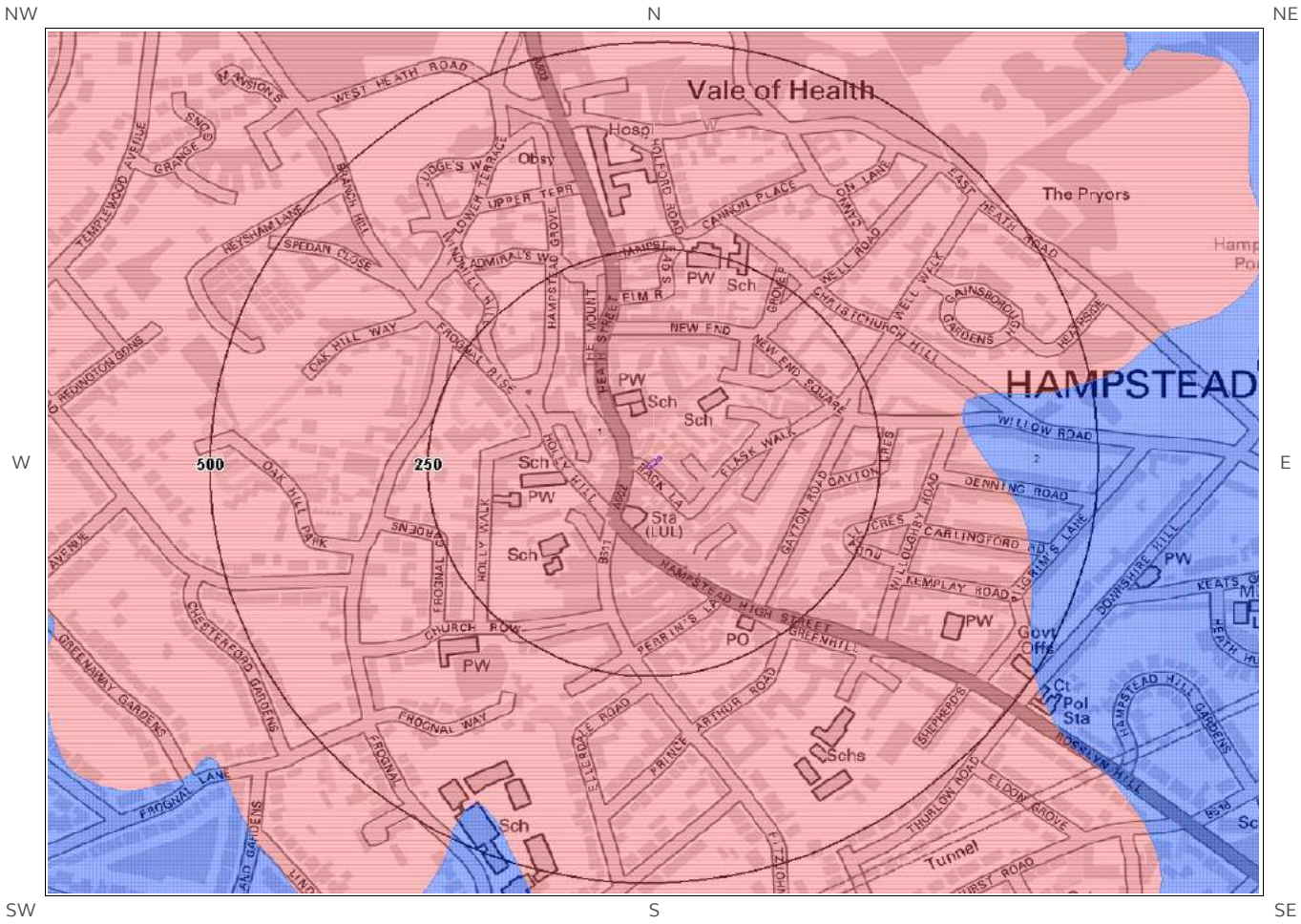
Secondary (B) Aquifer - Lower Permeability Layers

Secondary Aquifer - Undifferentiated Layers

Unproductive

Unknown (lakes and landslip)

6b. Aquifer Within Bedrock Geology and Abstraction Licenses



Site Outline

250
500
Search Buffers (m)

Principal Aquifer

Secondary (A) Aquifer - Permeable Layers

Secondary (B) Aquifer - Lower Permeability Layers

Groundwater Abstraction Licence

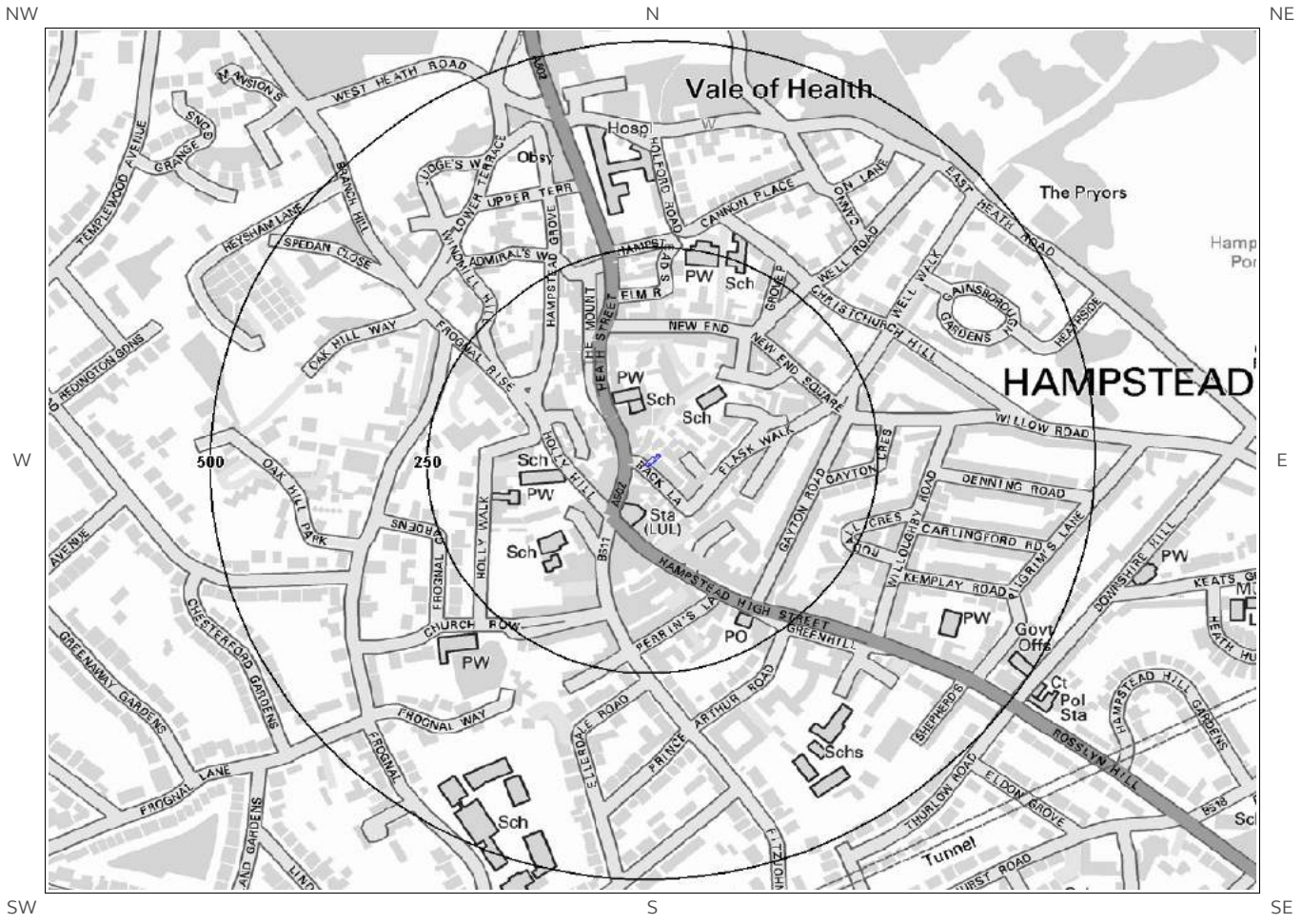
Secondary Aquifer - Undifferentiated Layers

Unproductive

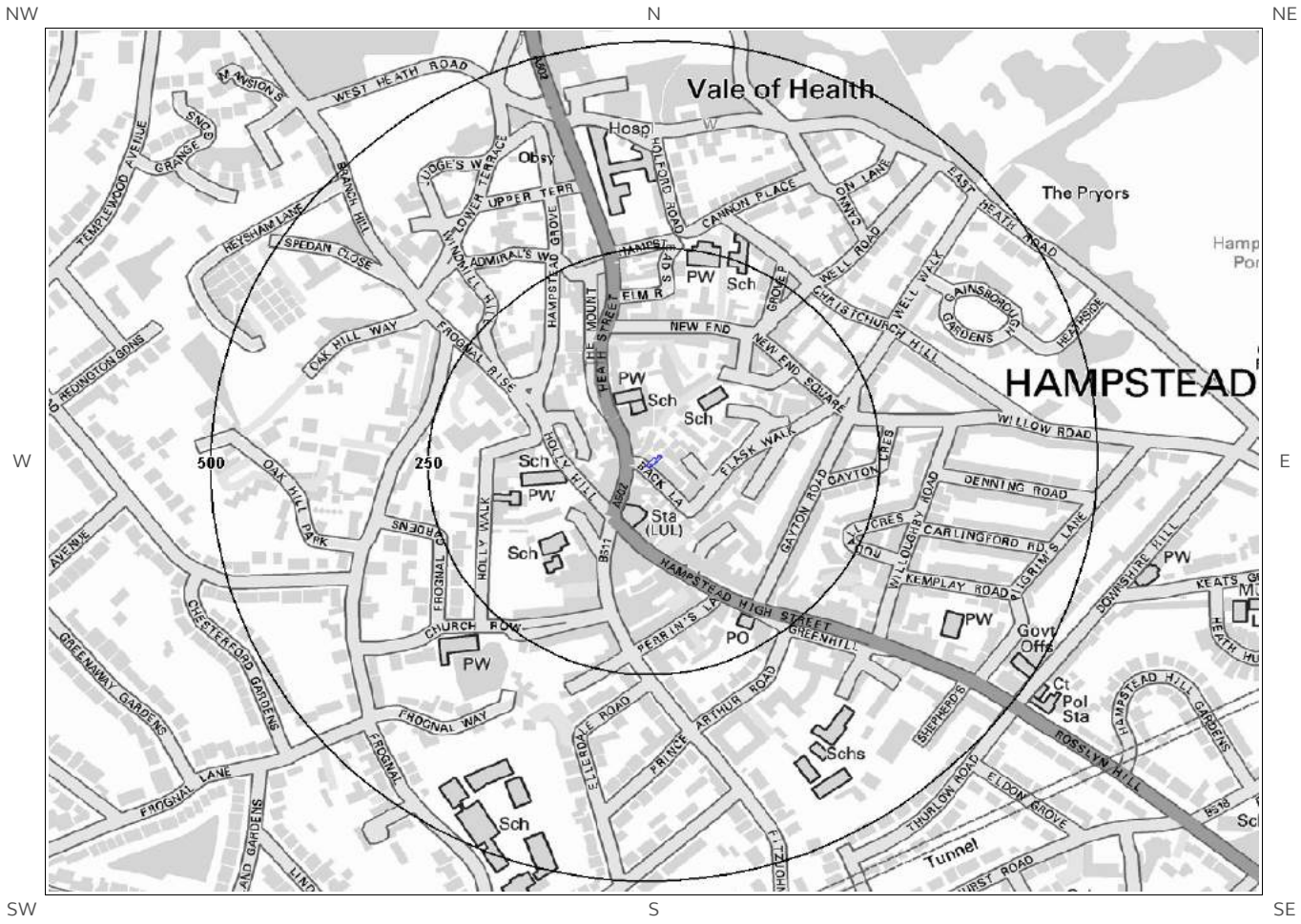
Unknown (lakes and landslip)

Surface Water Abstraction Licence

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



6d. Hydrogeology – Source Protection Zones within confined aquifer



Site Outline

250 500 Search Buffers (m)

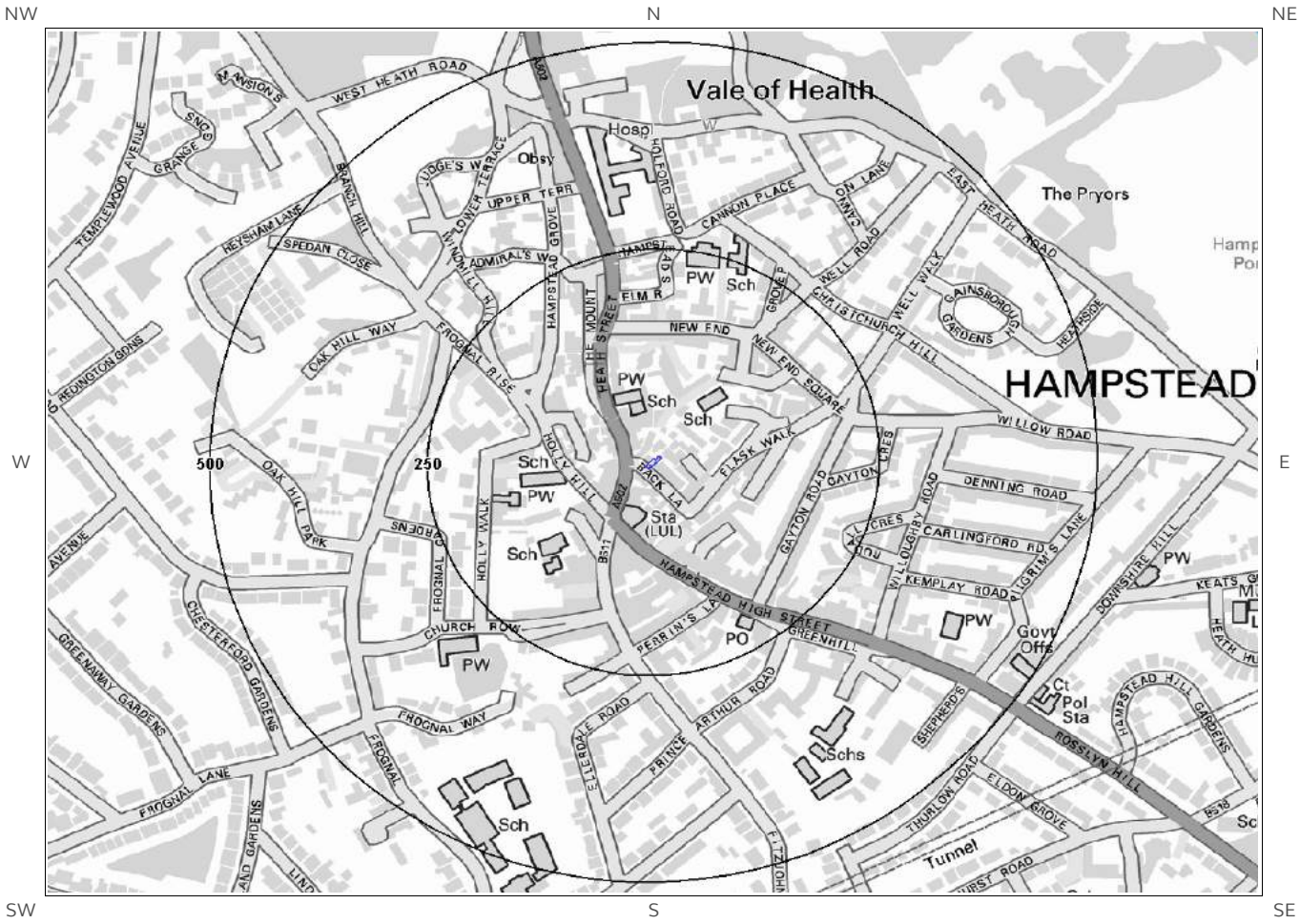
Source Protection Zone 1 - Inner Catchment

Source Protection Zone 2C - Outer Catchment within Confined Aquifer

Source Protection Zone 3C - Total Catchment within Confined Aquifer

Potable Water Abstraction Licence

6e. Hydrology – Detailed River Network and River Quality



Site Outline

250
500
Search Buffers (m)

Primary River
Secondary River
Tertiary River
Lake/Reservoir
Underground River (inferred)
General Quality Assessment: Biology
General Quality Assessment: Chemistry

Canal
Canal Tunnel
Culvert
Multiple Channel Culvert
Underground River (Potential Sewer)
Underground River (local knowledge)

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? No

Database searched and no data found.

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.

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	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	348	E	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? Yes

The following Abstraction Licences records are represented as points, lines and regions on the Aquifer within Bedrock Geology Map (6b):

ID	Distance (m)	Direction	NGR	Details	
Not shown	1596	S	526800 184280	Status: Historical Licence No: 28/39/39/0219 Details: Spray Irrigation - Direct Direct Source: Thames Groundwater Point: Swiss Cottage Open Space- Borehole Data Type: Point Name: LONDON BOROUGH OF CAMDEN	Annual Volume (m^3): 10512 Max Daily Volume (m^3): 28.8 Original Application No: WRA/N/1407 Original Start Date: 12/8/2005 Expiry Date: 31/3/2013 Issue No: 1 Version Start Date: 1/4/2008 Version End Date:

ID	Distance (m)	Direction	NGR	Details	
Not shown	1604	S	526750 184261	Status: Active Licence No: TH/039/0039/087 Details: Spray Irrigation - Direct Direct Source: Thames Groundwater Point: Swiss Cottage Open Space- Borehole Data Type: Point Name: LONDON BOROUGH OF CAMDEN	Annual Volume (m^3): 10512 Max Daily Volume (m^3): 28.8 Original Application No: NPS/WR/014567 Original Start Date: 5/12/2013 Expiry Date: 31/3/2025 Issue No: 1 Version Start Date: 5/12/2013 Version End Date:
Not shown	1604	S	526750 184261	Status: Active Licence No: TH/039/0039/087 Details: General Washing/Process Washing Direct Source: Thames Groundwater Point: Swiss Cottage Open Space- Borehole Data Type: Point Name: LONDON BOROUGH OF CAMDEN	Annual Volume (m^3): 10512 Max Daily Volume (m^3): 28.8 Original Application No: NPS/WR/014567 Original Start Date: 5/12/2013 Expiry Date: 31/3/2025 Issue No: 1 Version Start Date: 5/12/2013 Version End Date:
Not shown	1604	S	526750 184261	Status: Active Licence No: TH/039/0039/087 Details: Lake & Pond Throughflow Direct Source: Thames Groundwater Point: Swiss Cottage Open Space- Borehole Data Type: Point Name: LONDON BOROUGH OF CAMDEN	Annual Volume (m^3): 10512 Max Daily Volume (m^3): 28.8 Original Application No: NPS/WR/014567 Original Start Date: 5/12/2013 Expiry Date: 31/3/2025 Issue No: 1 Version Start Date: 5/12/2013 Version End Date:

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.
478	N	Minor Aquifer/Intermediate Leaching Potential	I1	Soils which can possibly transmit a wide range of pollutants.

6.9 River Quality

Is there any Environment Agency/Natural Resources Wales information on river quality within 1500m of the study site? No

6.9.1 Biological Quality:

Database searched and no data found.

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?	No

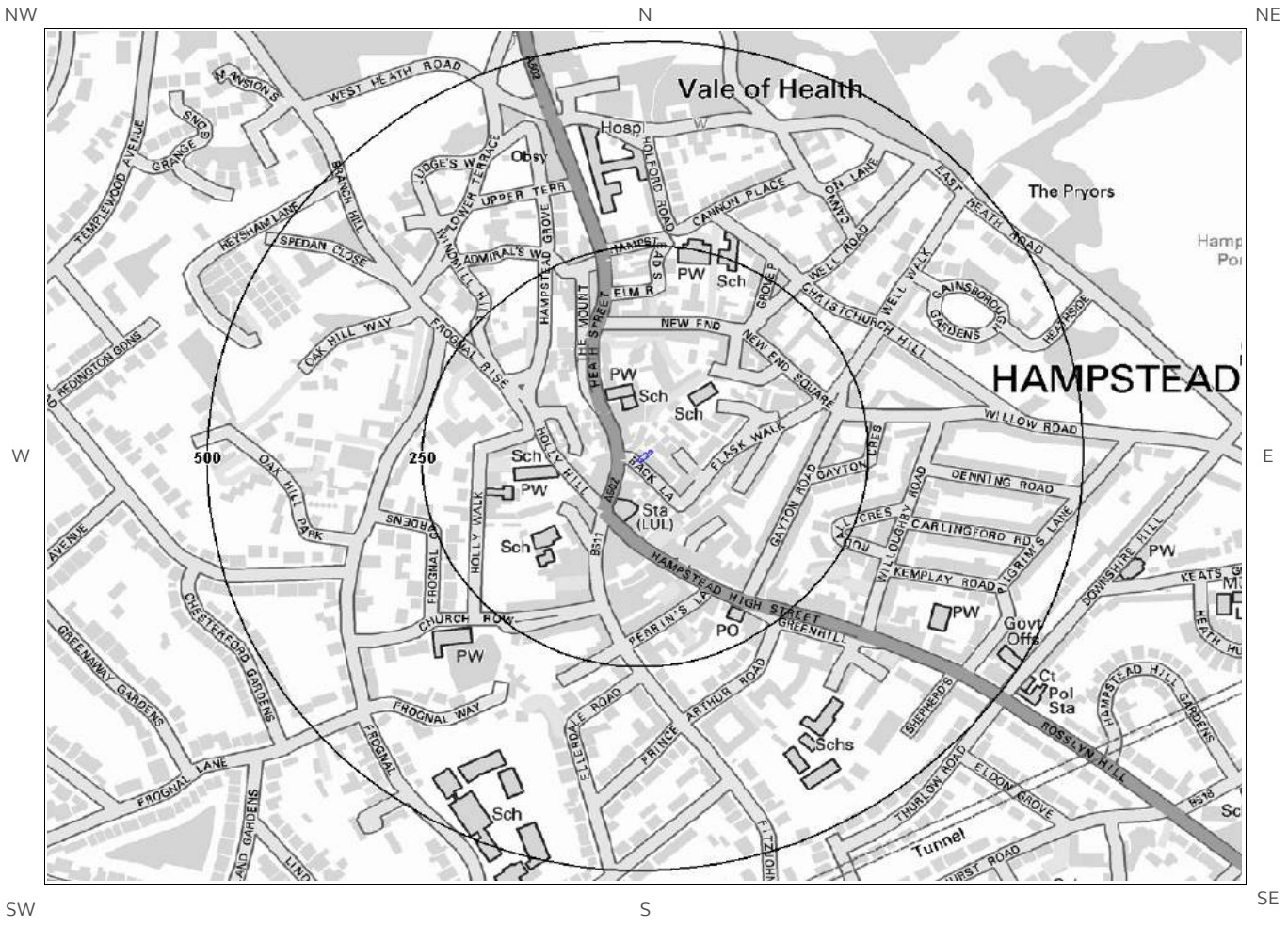
Database searched and no data found.

6.11 Surface Water Features

Are there any surface water features within 250m of the study site?	No

Database searched and no data found.

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



Site Outline

100
250
Search Buffers (m)

Zone 2 Floodplain

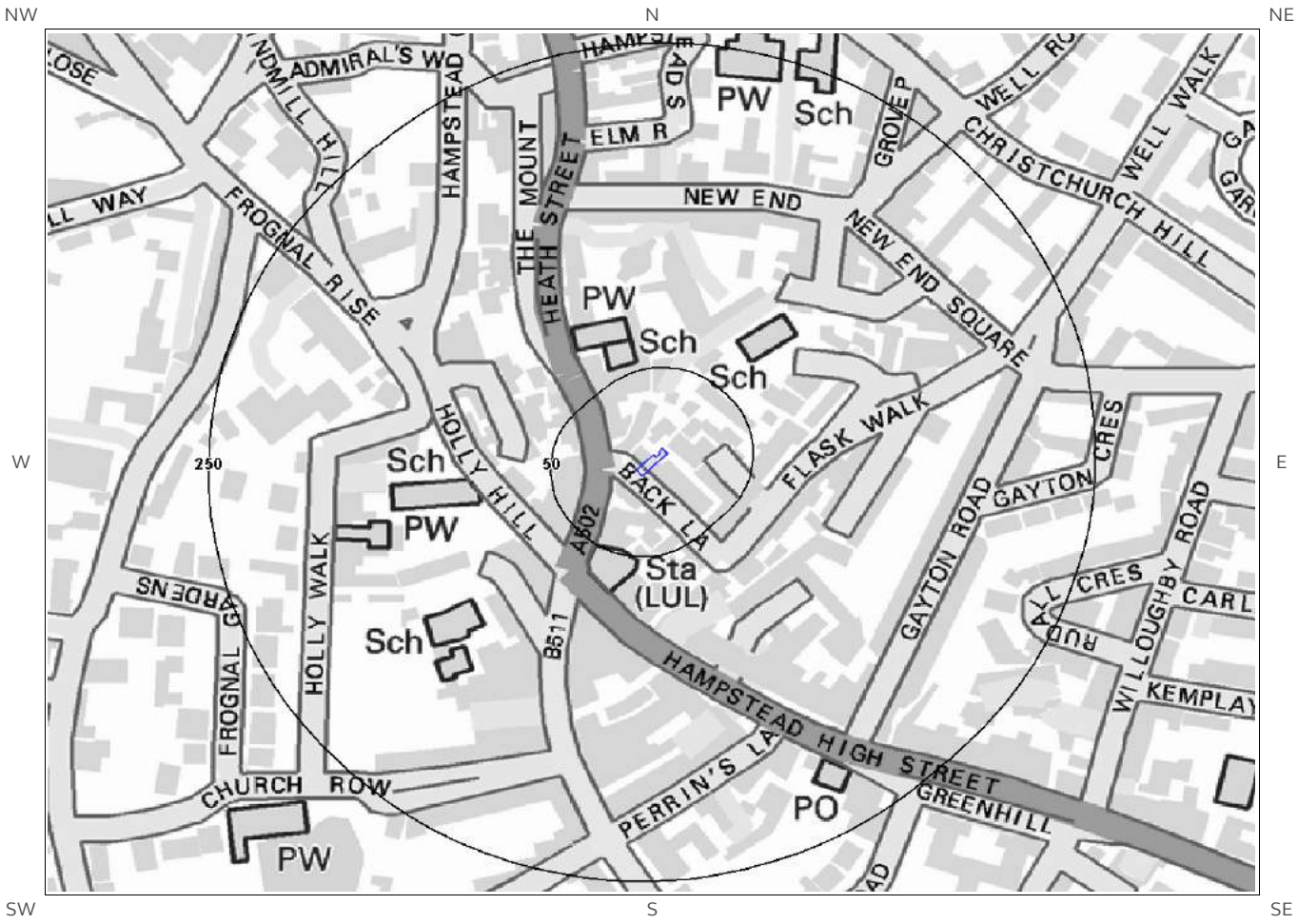
Zone 3 Floodplain

Flood Defences

Area used for Flood Storage

Area Benefiting from Flood Defences

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



Site Outline

100
250
Search Buffers (m)

RoFRaS Rating

Very Low

Low

Medium

High

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? No

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:

Database searched and no data found.

7.2 River and Coastal Zone 3 Flooding

Is the site within 250m of an Environment Agency/Natural Resources Wales Zone 3 floodplain? No

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.

Database searched and no data found.

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