Enviro Insight

Address:	**18A, FROGNAL GARDENS, LONDON, NW3 6XA**
Date:	**24 Jul 2019**
Reference:	**SCL-6195306**
Client:	**Soil Consultants Ltd**

NW N NE

W E

SW S SE

Aerial Photograph Capture date: 12-Aug-2016
Grid Reference: 526165,185776
Site Size: 0.0409ha

Report Reference: SCL-6195306
Client Reference: 10402-BM

Contents Page

Overview of Findings

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

Section 1: Historical Industrial Sites	On-site	0-50	51-250	251-500
1.1 Potentially Contaminative Uses identified from 1:10,000 scale mapping	0	0	11	23
1.2 Additional Information – Historical Tank Database	0	0	2	4
1.3 Additional Information – Historical Energy Features Database	0	0	13	36
1.4 Additional Information – Historical Petrol and Fuel Site Database	0	0	0	0
1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database	0	0	8	31
1.6 Historical military sites	0	0	0	0
1.7 Potentially Infilled Land	0	0	2	31

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	0
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	0	1
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	1	0
3.1.3 BGS/DoE Landfill Site Survey	0	0	0	0	0	0
3.1.4 Records of Landfills in Local Authority and Historical Mapping Records	0	0	0	0	0	0
3.2 Landfill and Other Waste Sites Findings						
3.2.1 Operational and Non-Operational Waste Treatment, Transfer and Disposal Sites	0	0	0	0	Not searched	Not searched
3.2.2 Environment Agency/Natural Resources Wales Licensed Waste Sites	0	0	0	0	0	0

Section 4: Current Land Use	On-site	0-50m	51-250	251-500
4.1 Current Industrial Sites Data	0	0	6	Not searched
4.2 Records of Petrol and Fuel Sites	0	0	0	0
4.3 National Grid Underground Electricity Cables	0	0	0	4
4.4 National Grid Gas Transmission Pipelines	0	0	0	0

Section 5: Geology	
5.1 Records of Artificial Ground and Made Ground present beneath the study site	None identified
5.2 Records of Superficial Ground and Drift Geology present beneath the study site	None identified
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 Records of Strata Classification in the Superficial Geology within 500m of the study site	None identified
6.2 Records of Strata Classification in the Bedrock Geology within 500m of the study site	Identified

	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	0	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 Environment Agency/Natural Resources Wales information on river quality within 1500m of the study site	No	No	No	No	No	No
6.10 Ordnance Survey MasterMap Water 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 Enviroment Agency Zone 2 floodplains within 250m of the study site	None identified
7.2 Environment Agency/Natural Resources Wales Zone 3 floodplains within 250m of the study site	None identified
7.3 Risk of flooding from Rivers and the Sea (RoFRaS) rating for the study site	Very Low
7.4 Flood Defences within 250m of the study site	None identified
7.5 Areas benefiting from Flood Defences within 250m of the study site	None identified
7.6 Areas used for Flood Storage within 250m of the study site	None identified
7.7 Maximum BGS Groundwater Flooding susceptibility within 50m of the study site	Limited potential
7.8 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	2
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 Maximum risk of natural ground subsidence	Moderate
9.1.1 Maximum Shrink-Swell hazard rating identified on the study site	Moderate
9.1.2 Maximum Landslides hazard rating identified on the study site	Very Low
9.1.3 Maximum Soluble Rocks hazard rating identified on the study site	Negligible
9.1.4 Maximum Compressible Ground hazard rating identified on the study site	Negligible
9.1.5 Maximum Collapsible Rocks hazard rating identified on the study site	Very Low
9.1.6 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 site 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 Coal mining areas within 75m of the study site	None identified
10.2 Non-Coal Mining areas within 50m of the study site boundary	None identified
10.3 Brine affected areas within 75m of the study site	None identified

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 licences, 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.

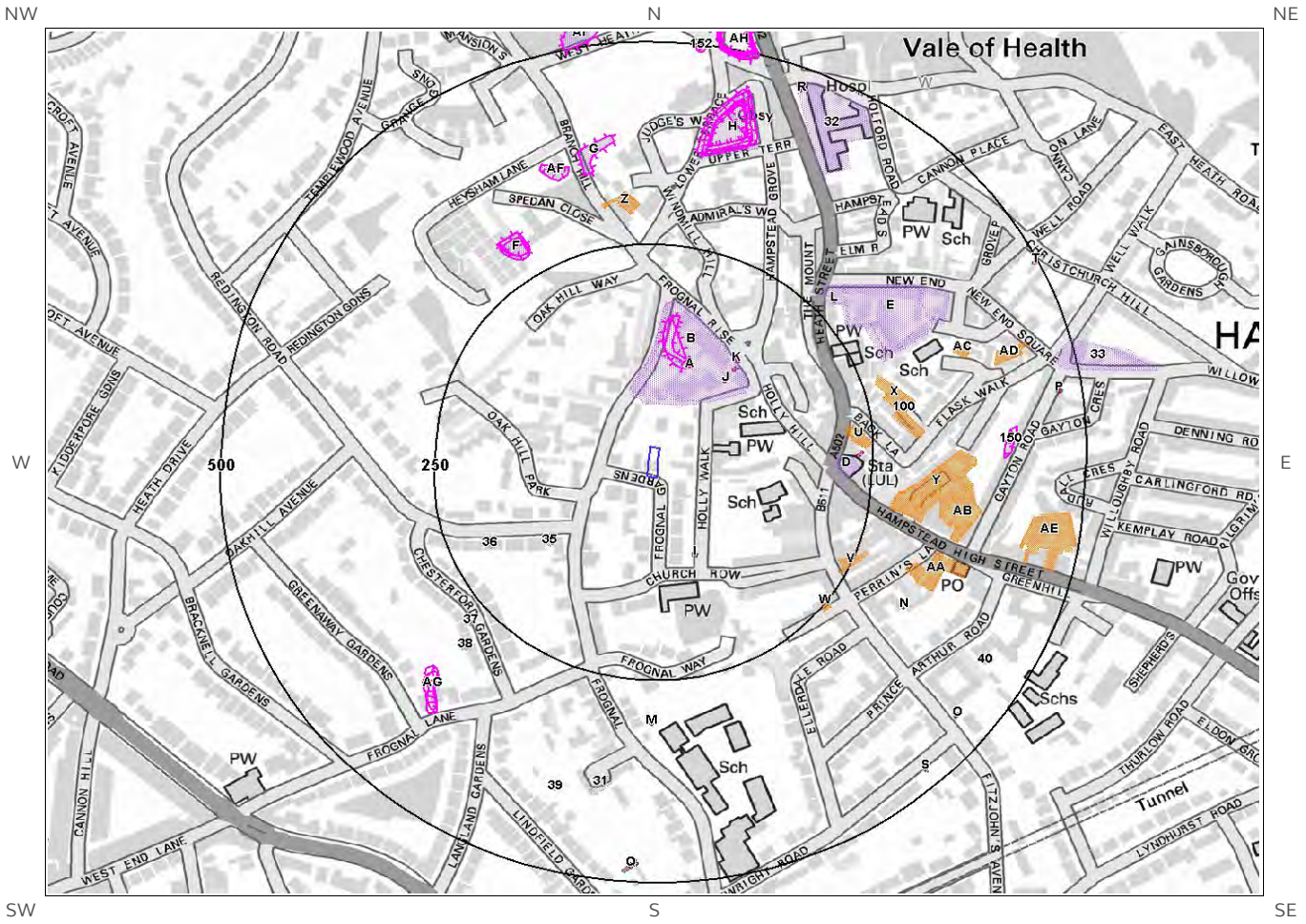
Note: Maps

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



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	51	N	Hospital	1920
2A	59	N	Hospital	1938
3A	59	N	Hospital	1938
4C	103	N	Unspecified Ground Workings	1920
5B	106	N	Hospital	1894
6B	108	N	Hospital	1911
7C	110	N	Unspecified Ground Workings	1949
8D	206	E	London Transport Station	1965
9D	206	E	London Transport Station	1974
10D	206	E	London Transport Station	1996
11D	206	E	Unspecified Station	1958
12E	265	NE	Hospital	1949
13E	267	NE	Unspecified Workhouse	1911
14E	268	NE	Hospital	1965
15E	268	NE	Hospital	1974
16E	268	NE	Hospital	1958
17E	268	NE	Unspecified Workhouse	1894
18F	275	NW	Unspecified Ground Workings	1920
19F	279	NW	Unspecified Ground Workings	1949
20F	279	NW	Unspecified Ground Workings	1938
21G	344	N	Unspecified Ground Workings	1965
22G	344	N	Unspecified Ground Workings	1974
23G	344	N	Unspecified Ground Workings	1996
24G	344	N	Unspecified Ground Workings	1958
25AF	345	N	Unspecified Pit	1938
26H	358	N	Water Works	1873
27H	365	N	Unspecified Heap	1996
28H	365	N	Unspecified Heap	1965

29H	365	N	Unspecified Heap	1974
30H	365	N	Unspecified Heap	1958
31	372	S	Unspecified Tanks	1911
32	386	NE	Hospital	1996
33	472	E	Militia Barracks	1873
34AI	499	N	Unspecified Pit	1873

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: 6

ID	Distance (m)	Direction	Use	Date
35	137	SW	Unspecified Tank	1896
36	200	SW	Unspecified Tank	1896
37	272	SW	Unspecified Tank	1896
38	297	SW	Unspecified Tank	1896
39	400	S	Unspecified Tank	1870
40	445	SE	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: 49

ID	Distance (m)	Direction	Use	Date
41I	101	SE	Electricity Substation	1998
42I	101	SE	Electricity Substation	1991
43I	102	SE	Electricity Substation	1974
44J	110	NE	Electricity Substation	1991
45J	110	NE	Electricity Substation	1953
46J	111	NE	Electricity Substation	1974
47J	111	NE	Electricity Substation	1953
48J	111	NE	Electricity Substation	1953
49J	128	NE	Electricity Substation	1953
50J	128	NE	Electricity Substation	1953
51K	139	NE	Electricity Substation	1998
52K	140	NE	Electricity Substation	1953

53D	230	E	Electricity Substation	1998
54L	272	NE	Electricity Substation	1974
55L	272	NE	Electricity Substation	1998
56L	272	NE	Electricity Substation	1991
57M	301	S	Electricity Substation	1995
58M	301	S	Electricity Substation	1992
59M	302	S	Electricity Substation	1991
60M	302	S	Electricity Substation	1970
61M	302	S	Electricity Substation	1978
62N	327	SE	Electricity Substation	1998
63N	327	SE	Electricity Substation	1991
64N	328	SE	Electricity Substation	1974
65O	455	SE	Electricity Substation	1991
66O	455	SE	Electricity Substation	1986
67O	455	SE	Electricity Substation	1991
68O	455	SE	Electricity Substation	1977
69P	468	E	Electricity Substation	1991
70P	469	E	Electricity Substation	1978
71Q	470	S	Electricity Substation	1970
72Q	470	S	Electricity Substation	1973
73R	471	N	Electricity Substation	1991
74R	471	N	Electricity Substation	1991
75R	471	N	Electricity Substation	1973
76P	471	E	Electricity Substation	1978
77S	472	SE	Electricity Substation	1995
78S	472	SE	Electricity Substation	1992
79S	472	SE	Electricity Substation	1991
80S	472	SE	Electricity Substation	1995
81Q	478	S	Electricity Substation	1992
82Q	478	S	Electricity Substation	1991
83Q	479	S	Electricity Substation	1953
84T	493	NE	Electricity Substation	1954
85T	493	NE	Electricity Substation	1953
86T	493	NE	Electricity Substation	1986
87T	493	NE	Electricity Substation	1991
88T	493	NE	Electricity Substation	1987
89T	493	NE	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: 39

ID	Distance (m)	Direction	Use	Date
90U	219	E	Garage	1953
91U	219	E	Garage	1953
92U	219	E	Garage	1953
93V	234	SE	Garage	1953
94V	234	SE	Garage	1953
95W	240	SE	Garage	1953
96W	240	SE	Garage	1953
97W	241	SE	Garage	1953
98X	264	E	Garage	1953
99X	264	E	Garage	1953
100	269	E	Garage	1953
101Y	274	E	Garage	1965
102Y	275	E	Garage	1974
103Y	275	E	Garage	1966
104Y	275	E	Garage	1953
105Z	288	N	Garage	1953
106Z	288	N	Garage	1953
107Z	288	N	Garage	1973
108Z	288	N	Garage	1991
109Z	288	N	Garage	1991
110Z	288	N	Garage	1953
111Z	288	N	Garage	1953
112AA	311	E	Garage	1965
113AA	319	E	Garage	1953
114Y	328	E	Garage	1966
115Y	328	E	Garage	1973
116Y	328	E	Garage	1953
117AB	334	E	Garage	1953
118AA	343	E	Garage	1953
119AB	344	E	Garage	1953
120AC	364	E	Garage	1953
121AC	364	E	Garage	1973
122AC	364	E	Garage	1966
123AC	364	E	Garage	1953

124AC	364	E	Garage	1965
125AD	405	E	Garage	1953
126AD	406	E	Garage	1953
127AE	432	E	Garage	1953
128AE	432	E	Garage	1953

1.6 Historical military sites

Certain military installations were not noted on historic mapping for security reasons. Whilst not all military land is necessarily of concern, Groundsure has researched and digitised a number of Ordnance Factories and other military industrial features (e.g. Ordnance Depots, Munitions Testing Grounds) which may be of contaminative concern. This research was drawn from a number of different sources, and should not be regarded as a definitive or exhaustive database of potentially contaminative military installations. The boundaries of sites within this database have been estimated from the best evidence available to Groundsure at the time of compilation.

Records of historical military sites within 500m of the search boundary: 0

Database searched and no data found.

1.7 Potentially Infilled Land

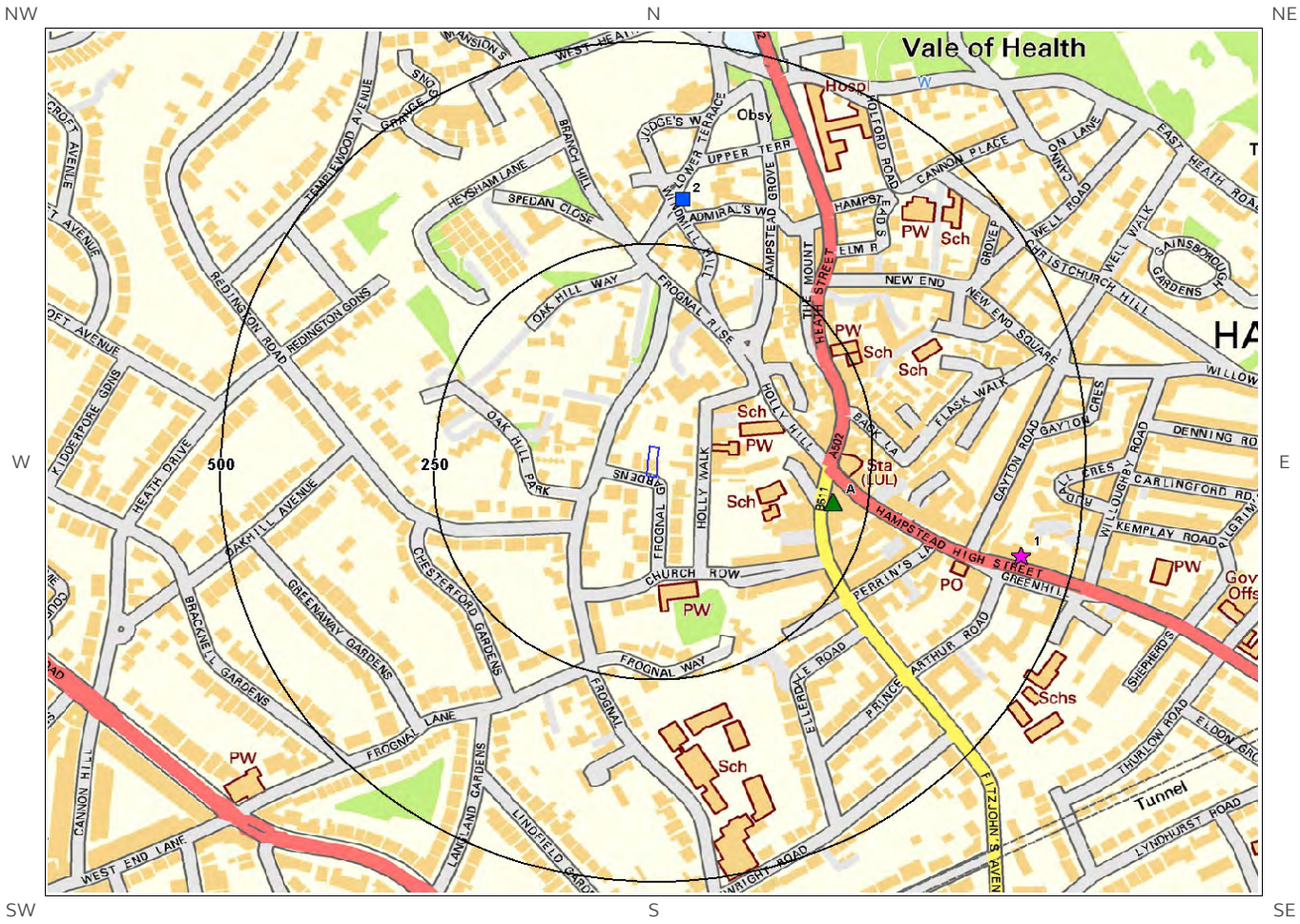
Records of Potentially Infilled Features from 1:10,000 scale mapping within 500m of the study site: 33

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

ID	Distance(m)	Direction	Use	Date
129B	103	N	Unspecified Ground Workings	1920
130B	110	N	Unspecified Ground Workings	1949
131F	275	NW	Unspecified Ground Workings	1920
132F	279	NW	Unspecified Ground Workings	1949
133F	279	NW	Unspecified Ground Workings	1938
134AG	343	SW	Ponds	1894
135G	344	N	Unspecified Ground Workings	1958
136G	344	N	Unspecified Ground Workings	1974
137G	344	N	Unspecified Ground Workings	1996
138G	344	N	Unspecified Ground Workings	1965
139AF	345	N	Unspecified Pit	1938
140AG	346	SW	Ponds	1873
141H	365	N	Unspecified Heap	1958
142H	365	N	Unspecified Heap	1965
143H	365	N	Unspecified Heap	1974
144H	365	N	Unspecified Heap	1996

145H	367	N	Reservoir	1938
146H	372	N	Reservoir	1920
147H	376	N	Reservoir	1949
148H	378	N	Reservoir	1938
149H	395	N	Covered Reservoir	1873
150	403	E	Pond	1873
151AH	490	N	Pond	1894
152	491	N	Pond	1949
153AH	491	N	Pond	1873
154AH	493	N	Pond	1920
155AH	494	N	Pond	1996
156AH	494	N	Pond	1974
157AH	494	N	Pond	1965
158AH	494	N	Pond	1958
159AH	495	N	Pond	1938
160AH	496	N	Pond	1938
161AI	499	N	Unspecified Pit	1873

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:

2

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	209	E	526376 185724	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	209	E	526376 185724	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

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	307	N	526200 186100	Address: 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	437	E	526595.0 185659.0	Incident Date: 13-Feb-2002 Incident Identification: 58214.0 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

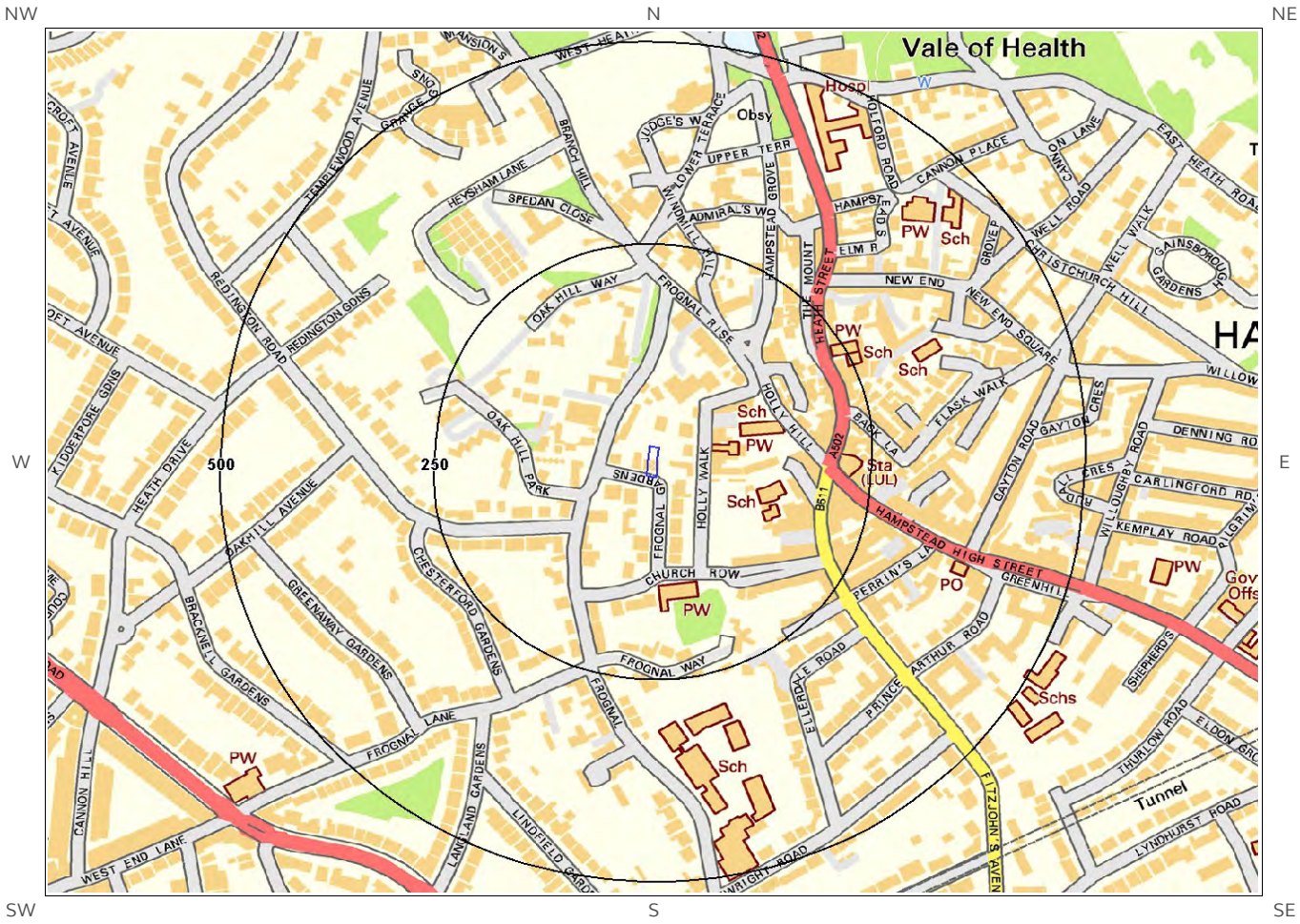
Database searched and no data found.

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

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	948	S		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.

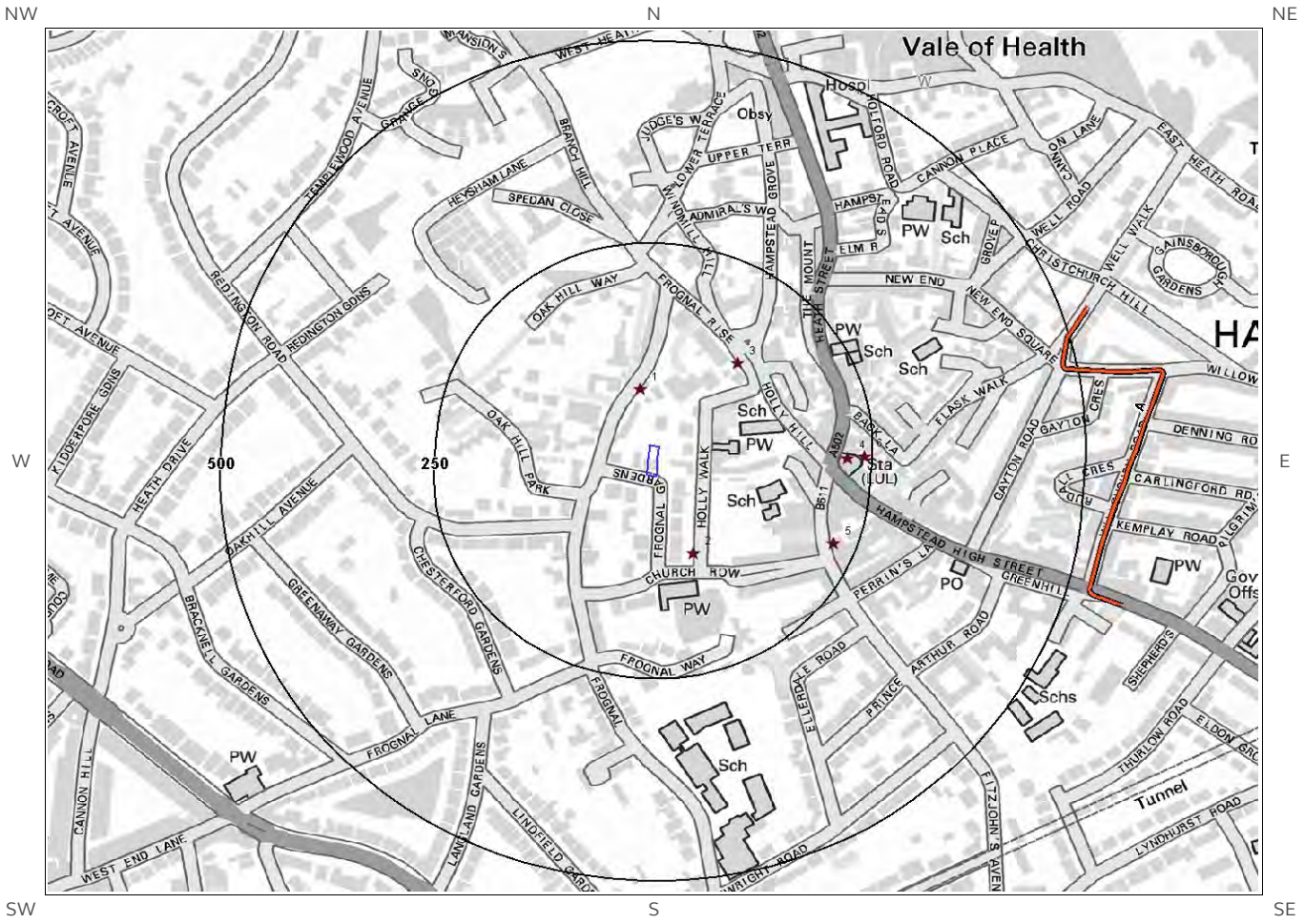
3.2.2 Records of Environment Agency/Natural Resources Wales licensed waste sites within 1500m of the study site:

0

Database searched and no data found.

---

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: 6

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

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
1	71	N	Mysparks Ltd	526150 185865	122, Frognal, London, Greater London, NW3 6XU	Electrical and Electronic Engineers	Engineering Services
2	103	SE	Electricity Sub Station	526212 185662	Greater London, NW3	Electrical Features	Infrastructure and Facilities
3	139	NE	Electricity Sub Station	526264 185897	Greater London, NW3	Electrical Features	Infrastructure and Facilities
4	221	E	Hampstead	526392 185780	Hampstead Station, Hampstead High Street, London, Greater London, NW3 1QG	Underground Network Stations	Public Transport, Stations and Infrastructure
5	223	E	Boots Hearing Care	526376 185674	26, Heath Street, London, Greater London, NW3 6TE	Disability and Mobility Equipment	Consumer Products
6	240	E	Electricity Sub Station	526412 185782	Greater London, 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: 4

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

ID	Distance (m)	Direction	Details	
7A	483	E	Cable Set: - Cable Route: - Cable Make: -	Cable Type: PILOT Operating Voltage (kV): - Year of installation: - Cable in tunnel: -
8A	483	E	Cable Set: CABLE SECT 13 Cable Route: DISCONNECTED MILL HILL - ST JOHNS WOOD 2 Cable Make: -	Cable Type: A/C Operating Voltage (kV): 132 Year of installation: 1963 Cable in tunnel: N
9A	484	E	Cable Set: CABLE SECT 13 Cable Route: DISCONNECTED MILL HILL - ST JOHNS WOOD 1 Cable Make: -	Cable Type: A/C Operating Voltage (kV): 132 Year of installation: 1963 Cable in tunnel: N
10A	484	E	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

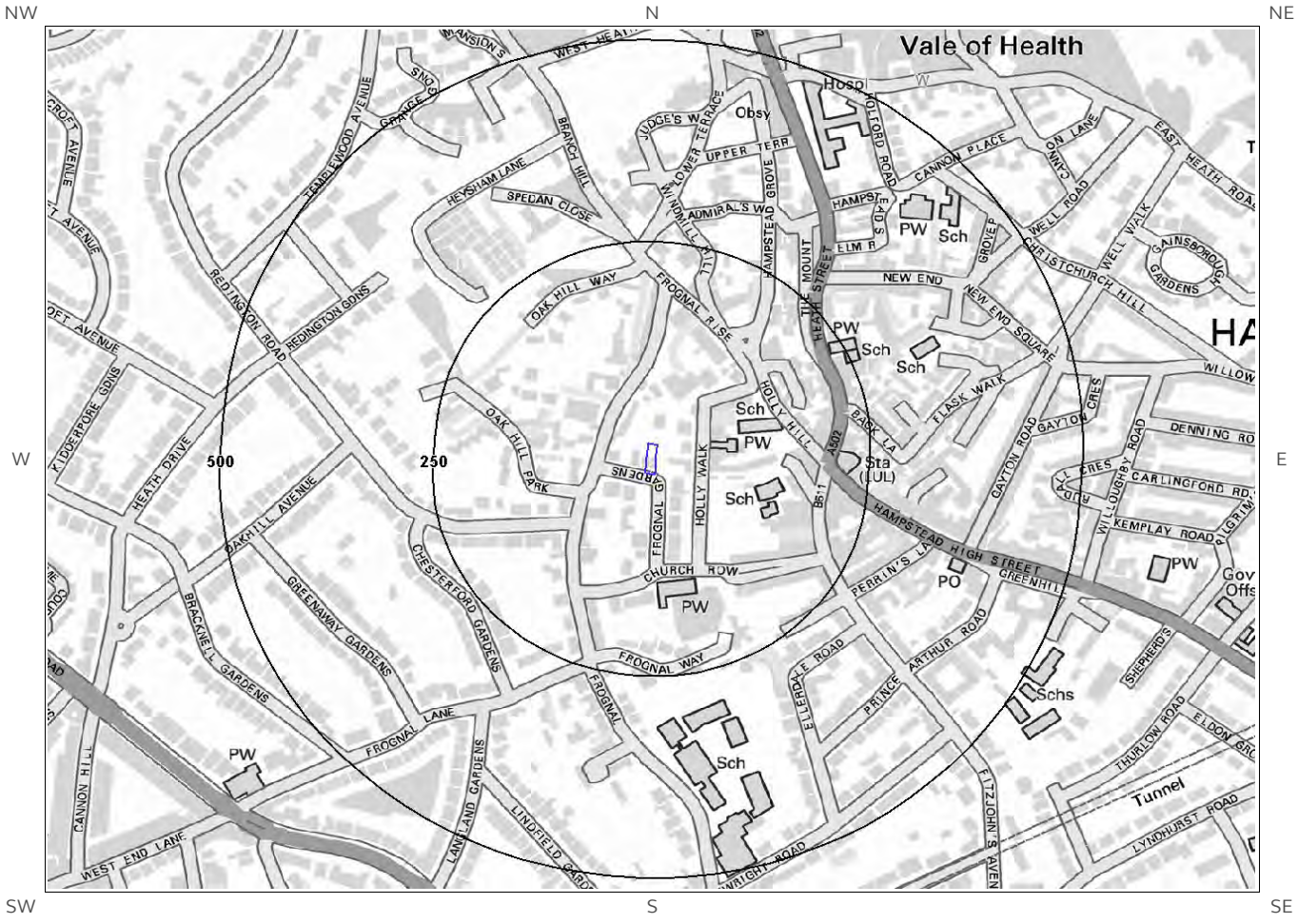
The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
BGS-S	BAGSHOT FORMATION	SAND
CLGB-XCZS	CLAYGATE MEMBER	CLAY, SILT AND SAND

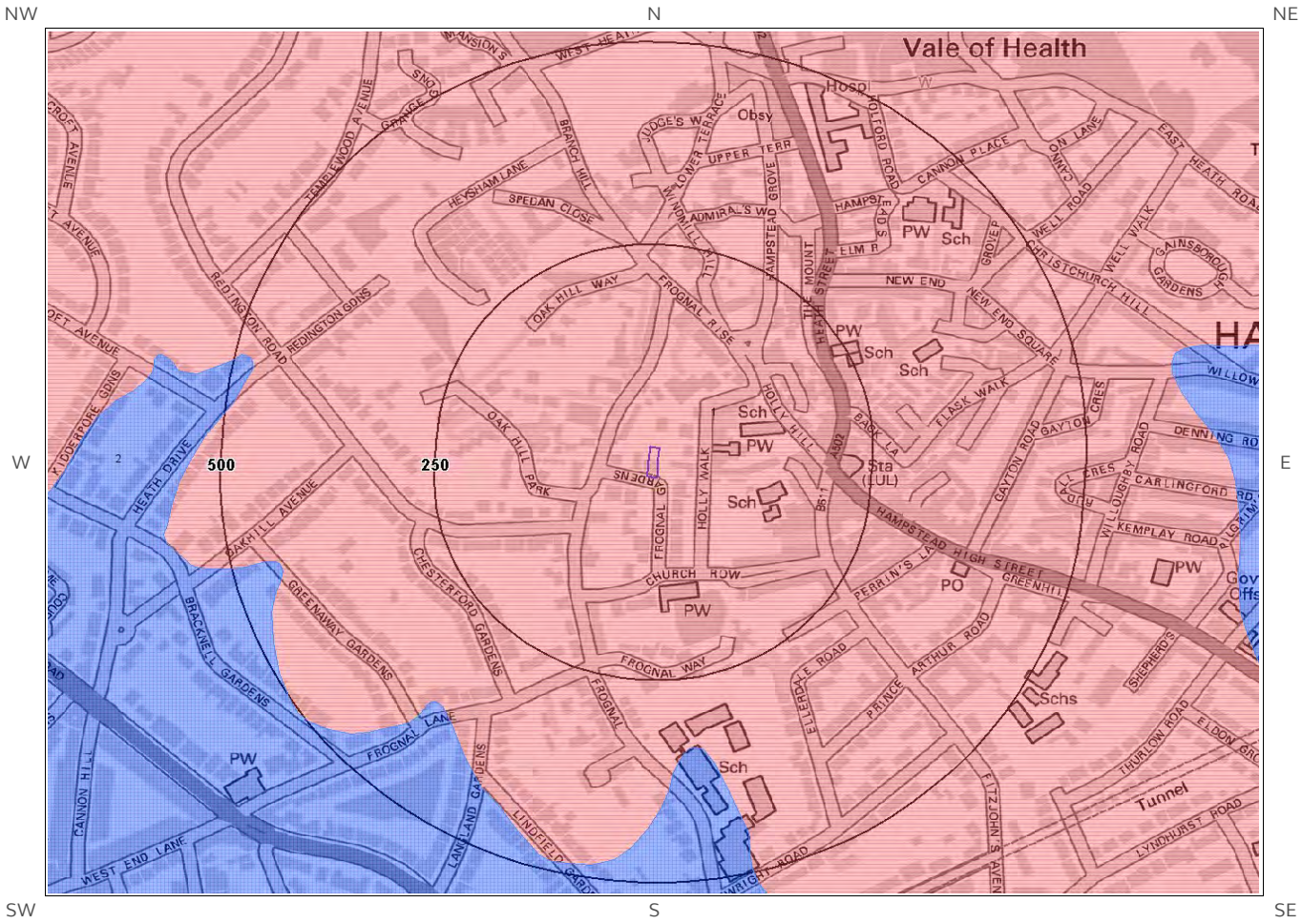
(Derived from the BGS 1:50,000 Digital Geological Map of Great Britain)

6 Hydrogeology and Hydrology

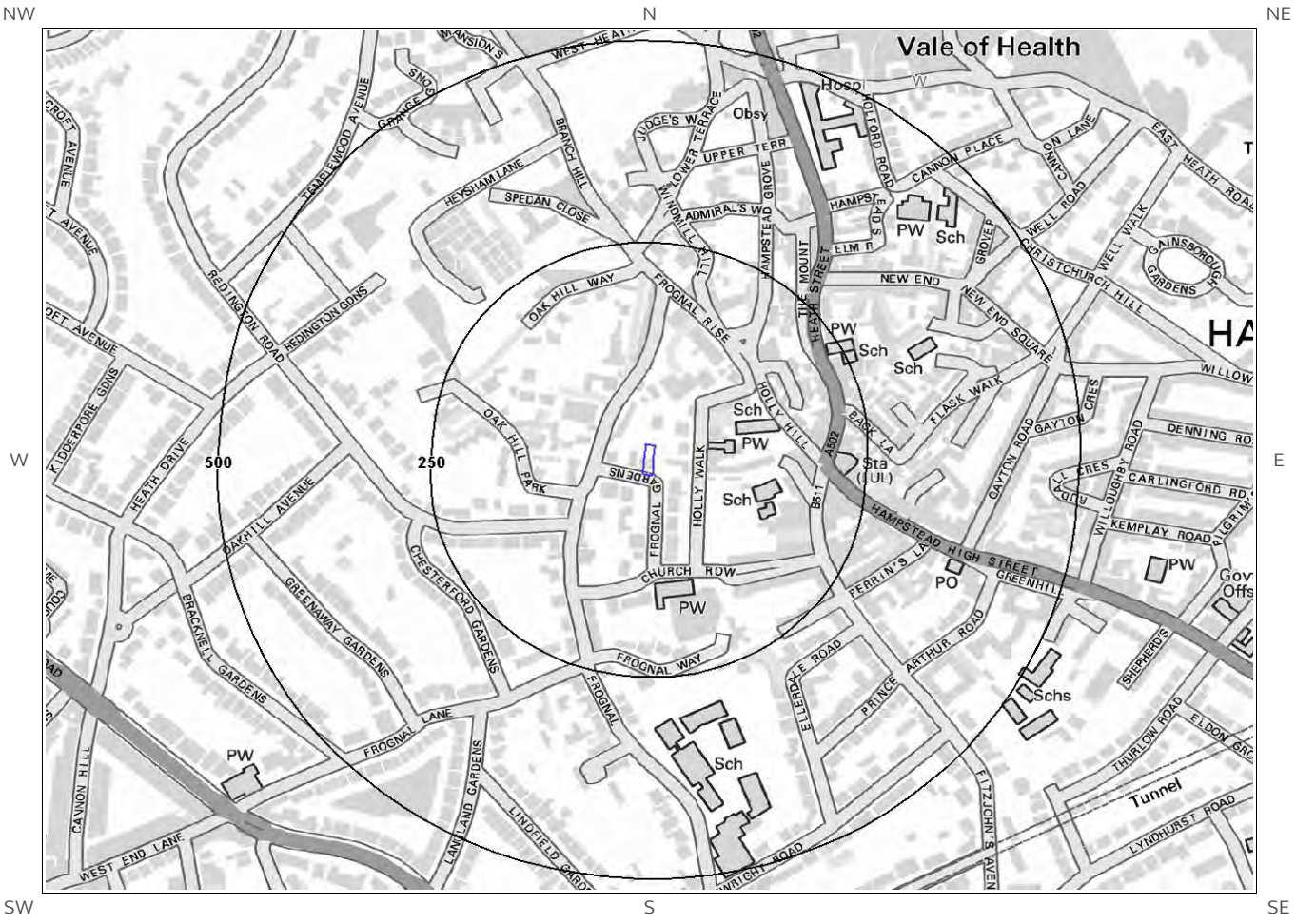
6a. Aquifer Within Superficial Geology



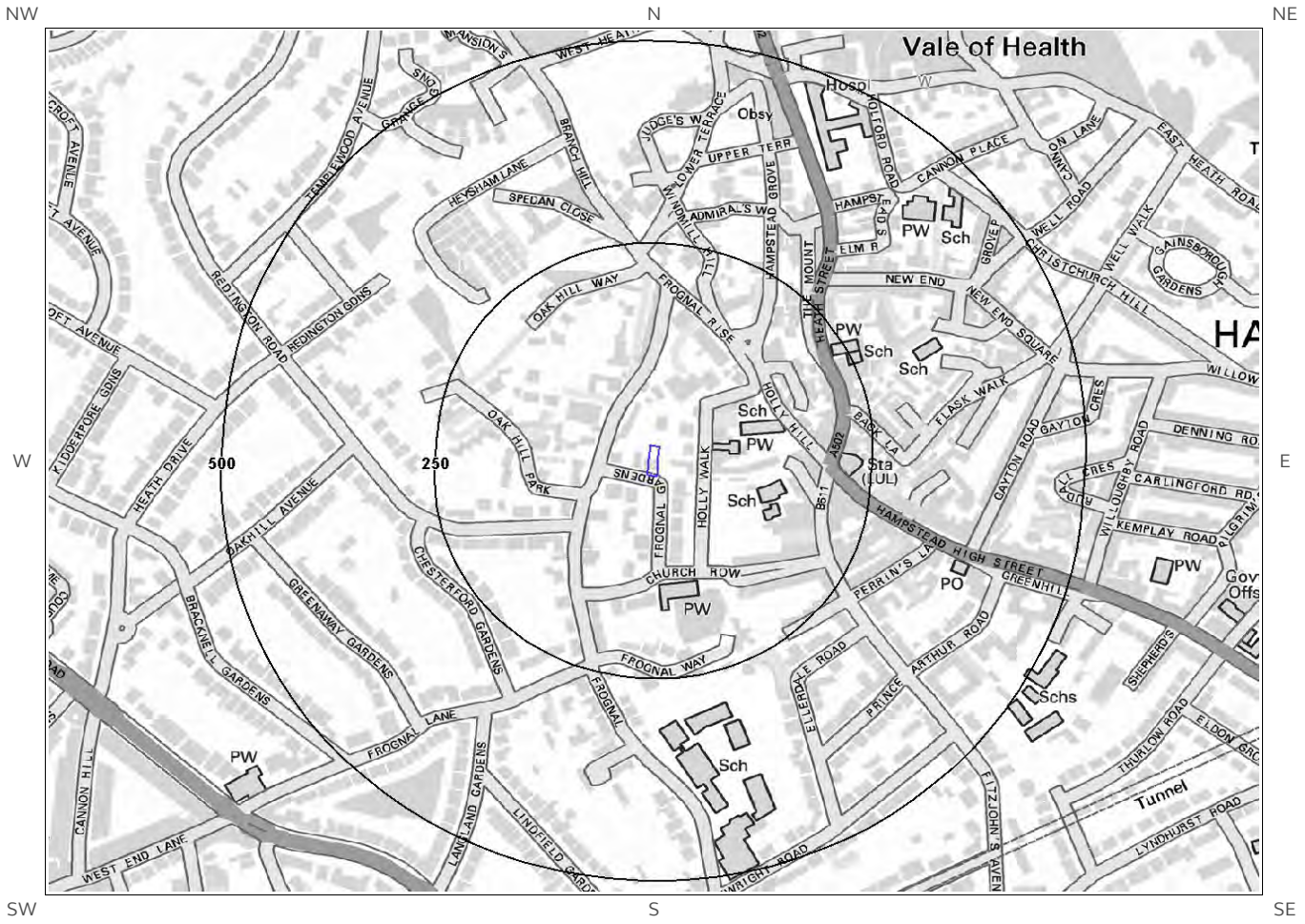
6b. Aquifer Within Bedrock Geology and Abstraction Licences



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

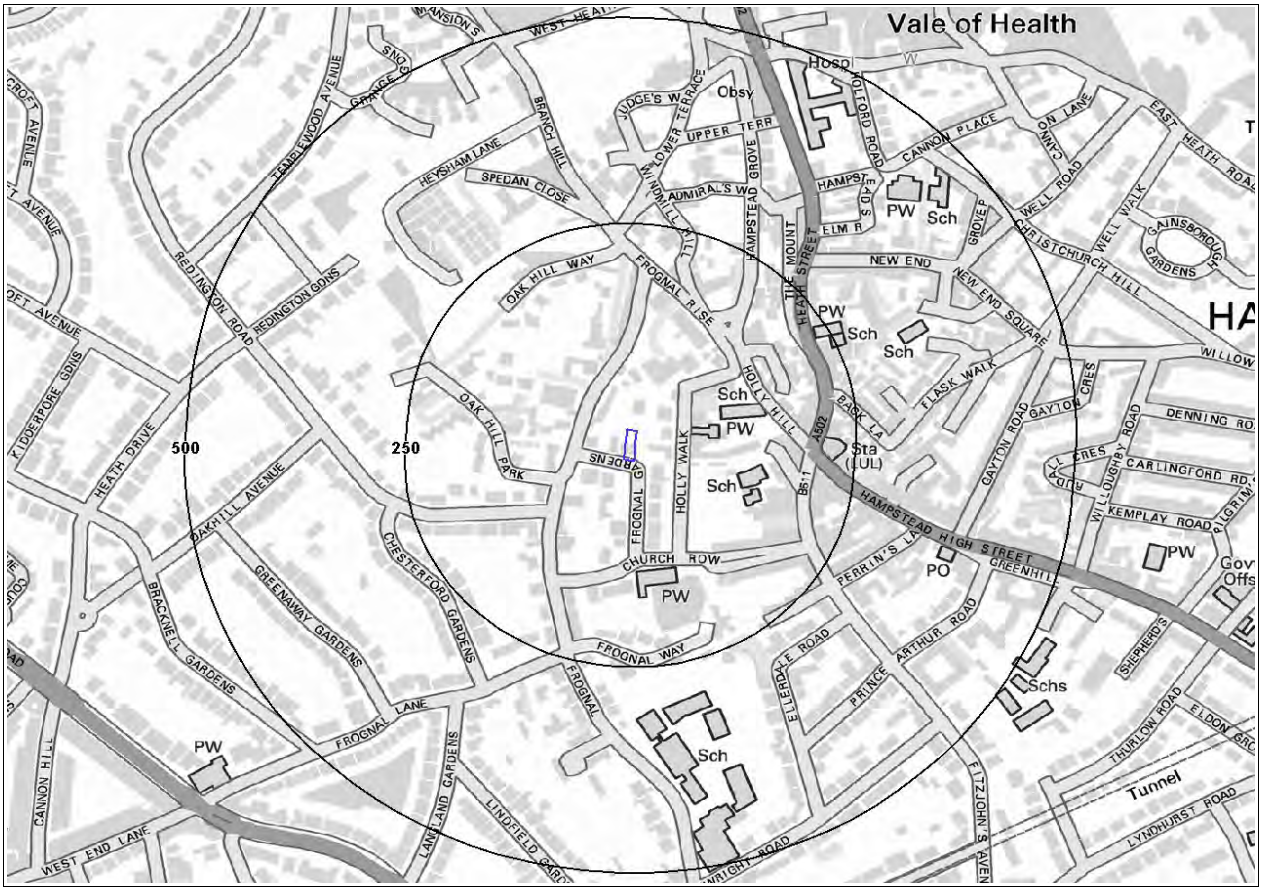


6d. Hydrogeology – Source Protection Zones within confined aquifer



6e. Hydrology – Watercourse Network and River Quality

NW N NE



SW S SE W E

Site Outline

250 Search Buffers (m)
500

Watercourse type

- Tidal River
- Inland River
- Canal
- Lock or Flight of Locks
- Lake, Reservoir, or Marsh
- Foreshore
- Drain or Transfer

Watercourse level

- On ground surface
- Underground or Elevated
- Level unknown

- General Quality Assessment: Biology
- General Quality Assessment: Chemistry

6.Hydrogeology and Hydrology

6.1 Aquifer within Superficial Deposits

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

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	335	S	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

Groundwater Abstraction Licences within 2000m of the study site Identified

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	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: - Original Start Date: 05/12/2013 Expiry Date: 31/03/2025 Issue No: 1 Version Start Date: 05/12/2013 Version End Date:

ID	Distance (m)	Direction	NGR	Details	
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: - Original Start Date: 05/12/2013 Expiry Date: 31/03/2025 Issue No: 1 Version Start Date: 05/12/2013 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: - Original Start Date: 05/12/2013 Expiry Date: 31/03/2025 Issue No: 1 Version Start Date: 05/12/2013 Version End Date:
Not shown	1605	SE	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: - Original Start Date: 12/08/2005 Expiry Date: 31/03/2013 Issue No: 1 Version Start Date: 01/04/2008 Version End Date:

6.4 Surface Water Abstraction Licences

Surface Water Abstraction Licences within 2000m of the study site — None identified

Database searched and no data found.

6.5 Potable Water Abstraction Licences

Potable Water Abstraction Licences within 2000m of the study site — None identified

Database searched and no data found.

6.6 Source Protection Zones

Source Protection Zones within 500m of the study site — None identified

Database searched and no data found.

6.7 Source Protection Zones within Confined Aquifer

Source Protection Zones within the Confined Aquifer within 500m of the study site None identified

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

Environment Agency/Natural Resources Wales information on groundwater vulnerability and soil leaching potential within 500m of the study site Identified

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.

6.9 River Quality

Environment Agency/Natural Resources Wales information on river quality within 1500m of the study site None identified

6.9.1 Biological Quality:

Database searched and no data found.

6.9.2 Chemical Quality:

Database searched and no data found.

6.10 Ordnance Survey MasterMap Water Network

Ordnance Survey MasterMap Water Network entries within 500m of the study site

Database searched and no data found.

6.11 Surface Water Features

Surface water features within 250m of the study site None identified

Database searched and no data found.

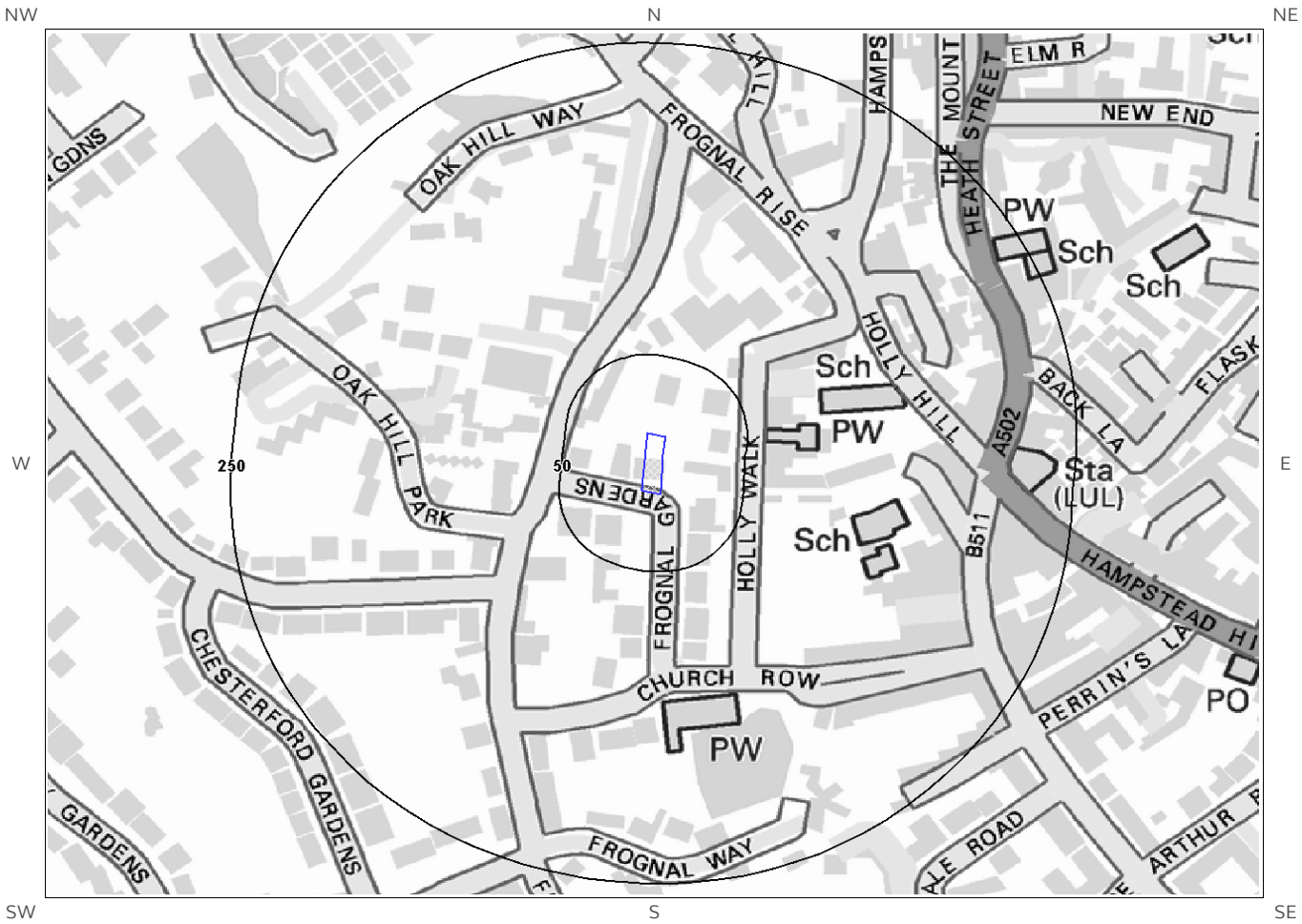
7a. Environment Agency/Natural Resources Wales Flood Map for Planning (from rivers and the sea)

NW N NE

W E

SW S SE

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

Environment Agency/Natural Resources Wales Zone 2 floodplain within 250m — None identified

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

Environment Agency/Natural Resources Wales Zone 3 floodplain within 250m — None identified

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

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

Flood Defences within 250m of the study site — None identified

Database searched and no data found.

7.5 Areas benefiting from Flood Defences

Areas benefiting from Flood Defences within 250m of the study site — None identified

7.6 Areas benefiting from Flood Storage

Areas used for Flood Storage within 250m of the study site	None identified

7.7 Groundwater Flooding Susceptibility Areas

7.7.1 British Geological Survey groundwater flooding susceptibility areas within 50m of the boundary of the study site	Identified
Clearwater Flooding or Superficial Deposits Flooding	Clearwater Flooding

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

7.7.2 Highest susceptibility to groundwater flooding in the search area based on the underlying geological conditions

Limited potential

Where limited potential for groundwater flooding to occur is indicated, this means that although given the geological conditions there may be a groundwater flooding hazard, unless other relevant information, e.g. records of previous flooding, suggests groundwater flooding has occurred before in this area, you need take no further action in relation to groundwater flooding hazard.

7.8 Groundwater Flooding Confidence Areas

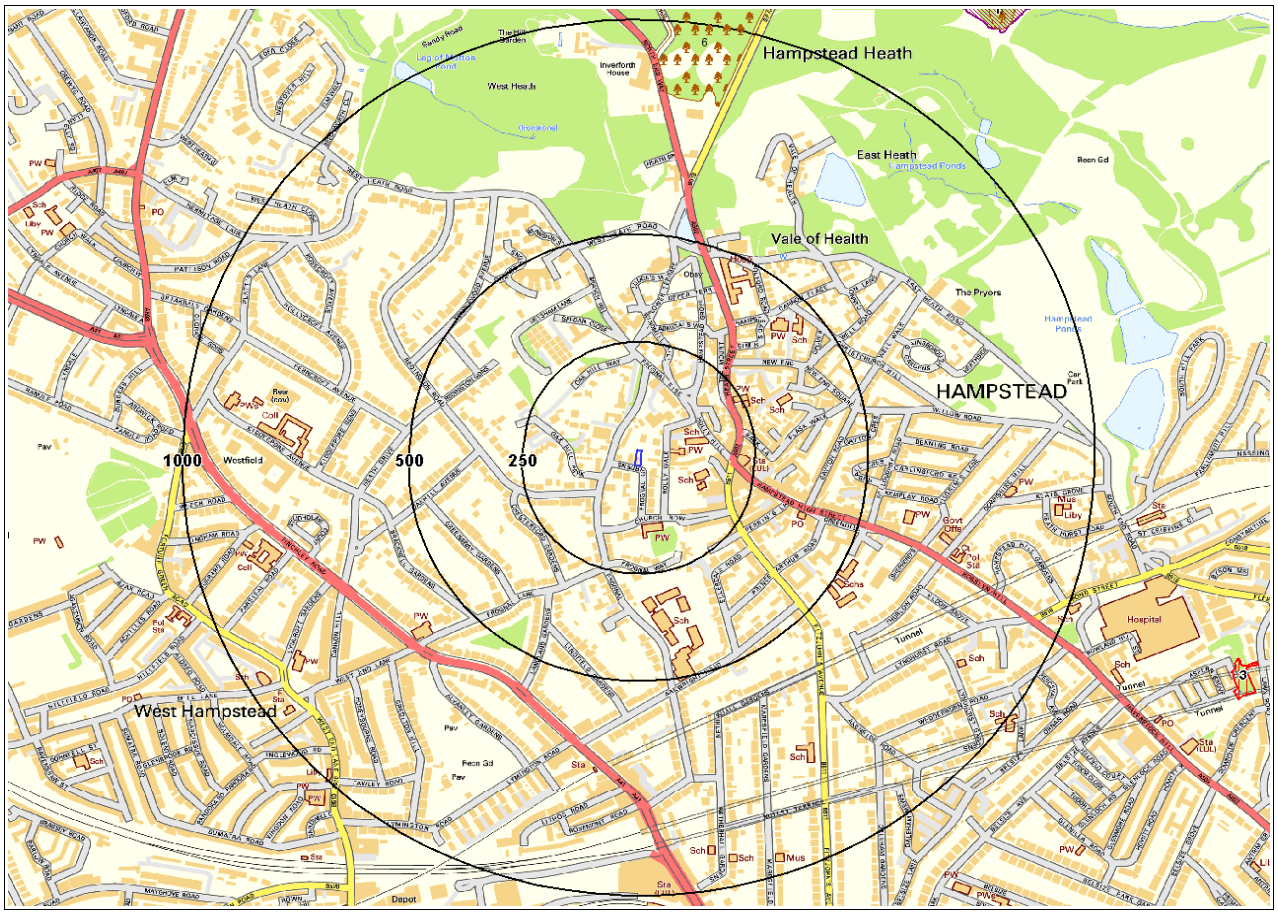
British Geological Survey confidence rating in this result	Low

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

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

8. Designated Environmentally Sensitive Sites Map

NW N NE



Site Outline

100 250 Search Buffers (m)

AONB

National Park

SSSI

Special Protection Areas

Nitrate Vulnerable Zones

Green Belt

Environmentally Sensitive Areas

Special Areas of Conservation

World Heritage Sites

Nitrate Sensitive Areas

Ancient Woodland

National Nature Reserve

Local Nature Reserves

Ramsar Sites

8. Designated Environmentally Sensitive Sites

Designated Environmentally Sensitive Sites within 2000m of the study site | Identified

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

2

The following Site of Special Scientific Interest (SSSI) records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	SSSI Name	Data Source
1	1248	NE	Hampstead Heath Woods	Natural England
Not shown	1794	N	Hampstead Heath Woods	Natural England

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

3

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

ID	Distance (m)	Direction	Ancient Woodland Name	Data Source
6	818	N	BISHOPS WOOD	Ancient and Semi-Natural Woodland
7	1255	NE	KEN WOOD	Ancient and Semi-Natural Woodland
Not shown	1636	N	UNKNOWN	Ancient and Semi-Natural Woodland

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

3

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

ID	Distance (m)	Direction	LNR Name	Data Source
3	1390	E	Belsize Wood	Natural England
Not shown	1712	W	Westbere Copse	Natural England
Not shown	1730	W	Westbere Copse	Natural England

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

9. Natural Hazards Findings

9.1 Detailed BGS GeoSure Data

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

9.1.1 Shrink Swell

Maximum Shrink-Swell* hazard rating identified on the study site — Moderate

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

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

9.1.2 Landslides

Maximum Landslide* hazard rating identified on the study site — Very Low

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

Hazard
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.

9.1.3 Soluble Rocks

Maximum Soluble Rocks* hazard rating identified on the study site — Negligible

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

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

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

9.1.4 Compressible Ground

Maximum Compressible Ground* hazard rating identified on the study site — Negligible

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

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

9.1.5 Collapsible Rocks

Maximum Collapsible Rocks* hazard rating identified on the study site — Very Low

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

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

9.1.6 Running Sand

Maximum Running Sand** hazard rating identified on the study site — Low

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

Hazard
Possibility of 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.

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

9.2 Radon

9.2.1 Radon Affected Areas

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

The radon data in this report is supplied by the BGS/Public Health England and is the definitive map of Radon Affected Areas in Great Britain and Northern Ireland. The dataset was created using long-term radon measurements in over 479,000 homes across Great Britain and 23,000 homes across Northern Ireland, combined with geological data. The dataset is considered accurate to 50m to allow for the margin of error in geological lines, and the findings of this report supercede any answer given in the less accurate Indicative Atlas of Radon in Great Britain, which simplifies the data to give the highest risk within any given 1km grid square. As such, the radon atlas is considered indicative, whereas the data given in this report is considered definitive.

9.2.2 Radon Protection

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

10. Mining

10.1 Coal Mining

Coal mining areas within 75m of the study site	None identified

Database searched and no data found.

10.2 Non-Coal Mining

Non-Coal Mining areas within 50m of the study site boundary	None identified

Database searched and no data found.

10.3 Brine Affected Areas

Brine affected areas within 75m of the study site	None identified

Guidance: No Guidance Required.

Contact Details

Soil Consultants Ltd
Telephone: 01494 712494
stuart.w@soilconsultants.co.uk

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

Environment Agency
National Customer Contact Centre, PO Box 544
Rotherham, S60 1BY
Tel: 03708 506 506
Web: **www.environment-agency.gov.uk**
Email: enquiries@environment-agency.gov.uk

Public Health England
Public information access office
Public Health England, Wellington House
133-155 Waterloo Road, London, SE1 8UG
www.gov.uk/phe
Email:**enquiries@phe.gov.uk**
Main switchboard**: 020 7654 8000**

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

Ordnance Survey
Adanac Drive, Southampton
SO16 0AS
Tel: 08456 050505

Local Authority
Authority: London Borough of Camden
Phone: 020 7974 4444
Web: http://www.camden.gov.uk/
Address: Camden Town Hall, Judd Street, London, WC1H 9JE

Gemapping PLC
Virginia Villas, High Street, Hartley Witney,
Hampshire RG27 8NW
Tel: 01252 845444

Standard Terms and Conditions

Groundsure's Terms and Conditions can be viewed online at this link:

https://www.groundsure.com/terms-and-conditions-feb11-2019

Soil Consultants Ltd

Chiltern House, Earl Howe Road,
Buckinghamshire, HP15 6QT

Report Reference: SCL-6195307

Your Reference: 10402-BM

Report Date 24 Jul 2019

Report Delivery Method: Email - pdf

Geo Insight

Address: 18A, FROGNAL GARDENS, LONDON, NW3 6XA

Dear Sir/ Madam,

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

If you need further assistance, please do not hesitate to contact our helpline on 01494 712494 quoting the above Soil Consultants Ltd reference number.

Yours faithfully,

Soil Consultants Ltd

Enc.
Groundsure Geo Insight

Geo Insight

Address:	**18A, FROGNAL GARDENS, LONDON, NW3 6XA**
Date:	**24 Jul 2019**
Reference:	**SCL-6195307**
Client:	**Soil Consultants Ltd**

NW N NE

W E

SW S SE

Aerial Photograph Capture date:	12-Aug-2016
Grid Reference:	526165,185776
Site Size:	0.0409ha

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 linear features	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 linear features 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 linear features	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 linear features 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	2	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 Cornwall and Devon Metalliferous Mining	0	0	0	0	0
5.9 Clay Mining	0	0	0	0	0

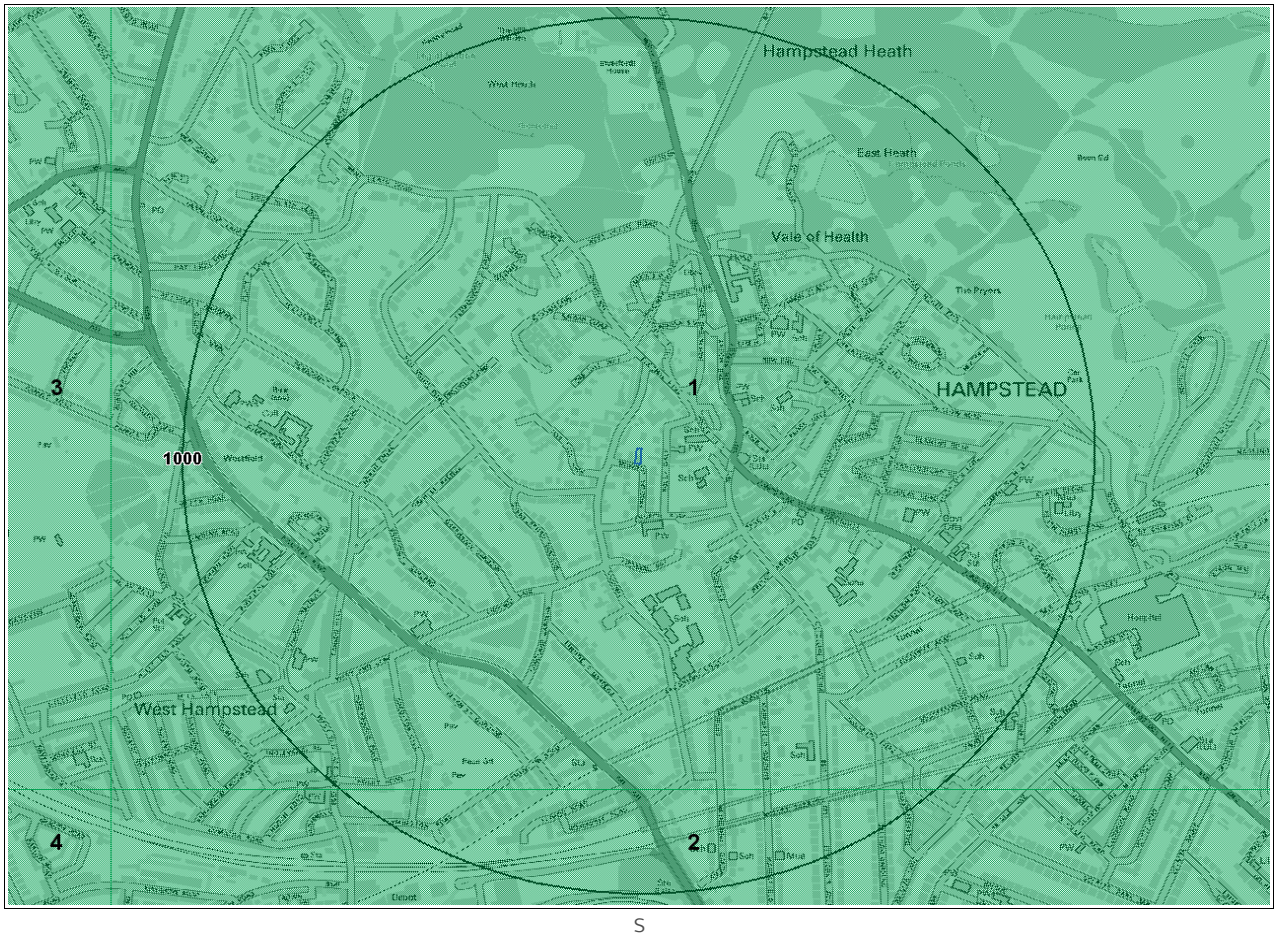
Section 6: Natural Ground Subsidence	On-site
6.1 Shrink-Swell Clay	Moderate
6.2 Landslides	Very Low
6.3 Ground Dissolution of Soluble Rocks	Negligible
6.4 Compressible Deposits	Negligible
6.5 Collapsible Deposits	Very Low
6.5 Running Sand	Low

Section 7: Borehole Records	On-site	0-50m	51-250
7 BGS Recorded Boreholes	0	0	6

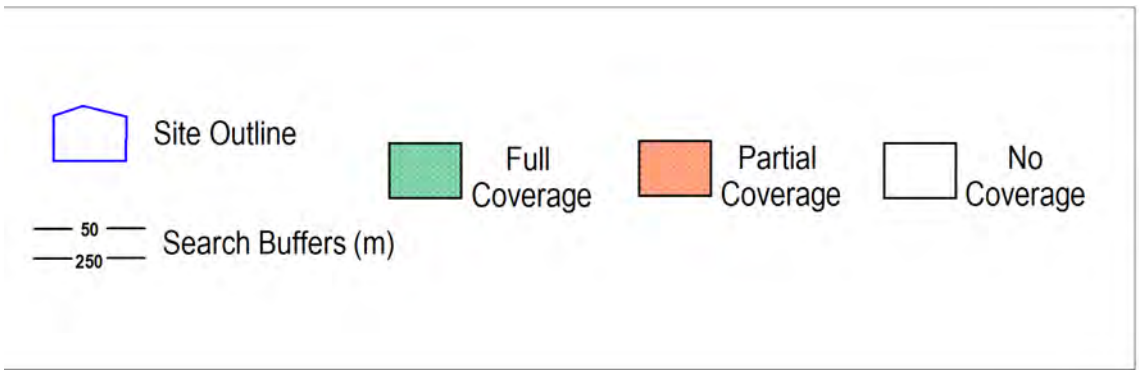
Section 8: Estimated Background Soil Chemistry	On-site	0-50m	51-250
8 Records of Background Soil Chemistry	1	1	0

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	756.0	Some deposits are mapped	Full	Full	No coverage
3	1158.0	Some deposits are mapped	Full	Full	No coverage
4	1384.0	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

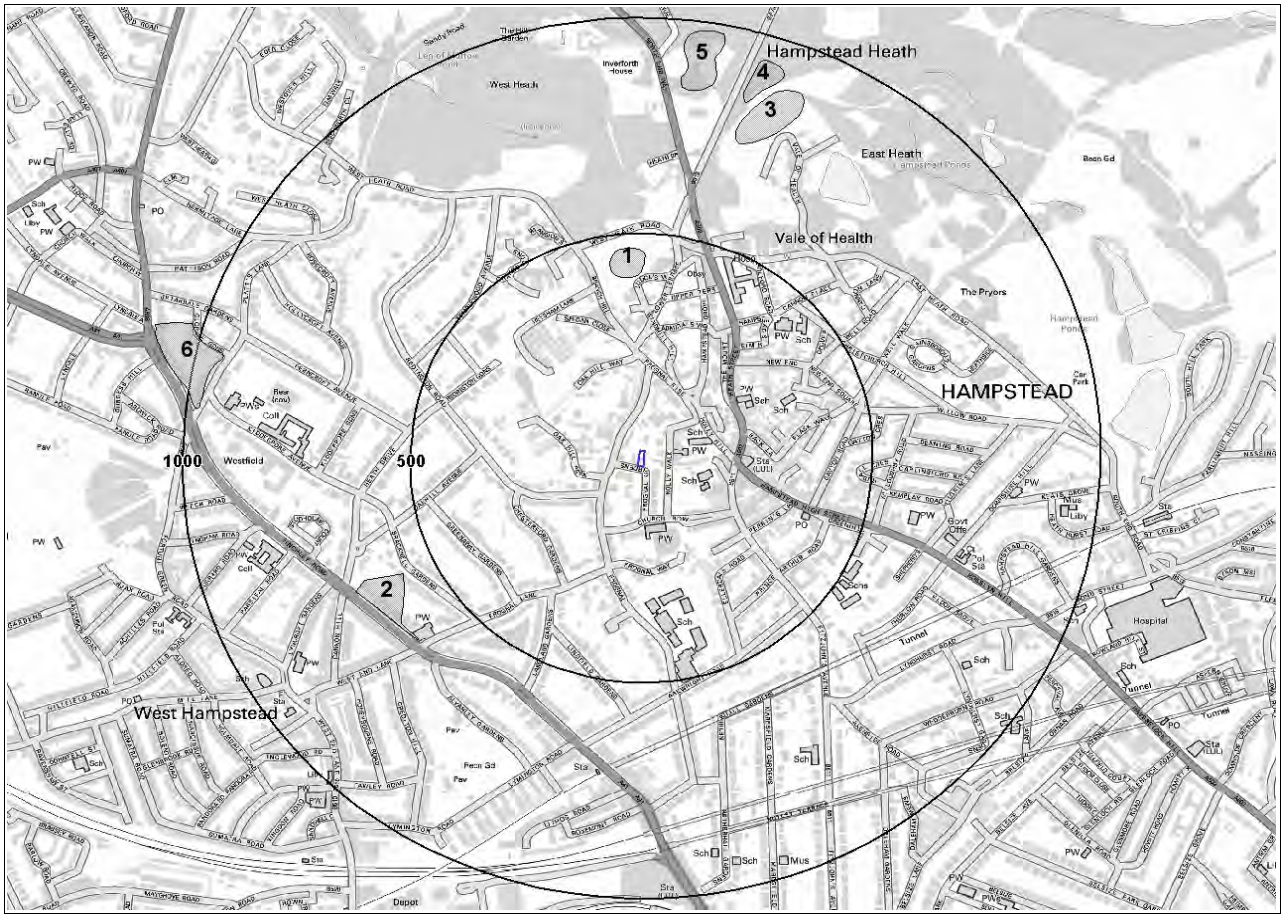
1 Geology (1:10,000 scale).

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

NW N NE

W E

SW S SE



Artificial Ground Legend

Site Outline

500
1000
Search Buffers (m)

Made Ground (undivided)

Worked Ground (undivided)

Infilled Ground

Disturbed Ground (undivided)

Landscaped Ground (undivided)

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

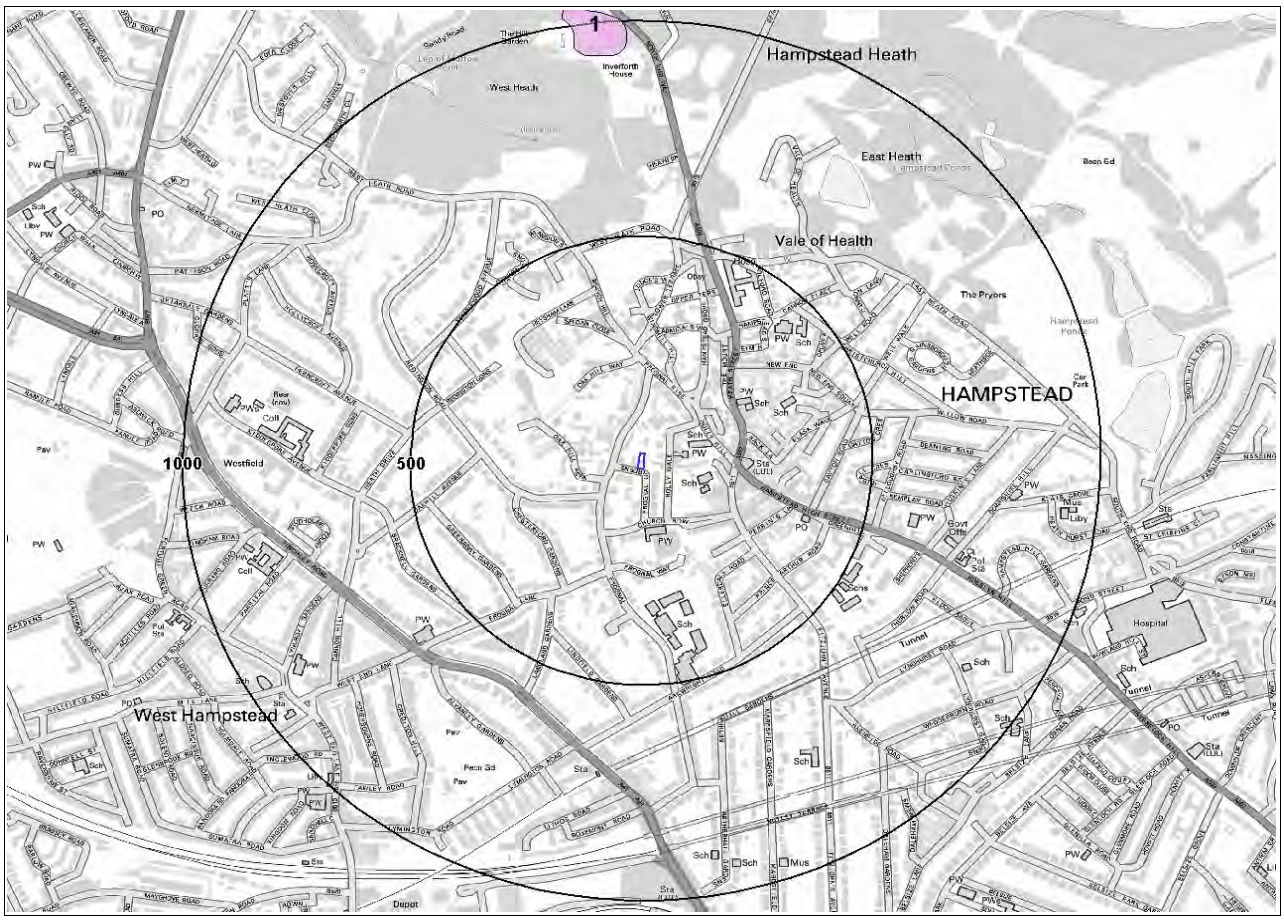
ID	Distance	Direction	LEX Code	Description	Rock Description
1	401.0	N	WGR-UKNOWN	Worked Ground (Undivided)	Unknown/unclassified Entry

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?

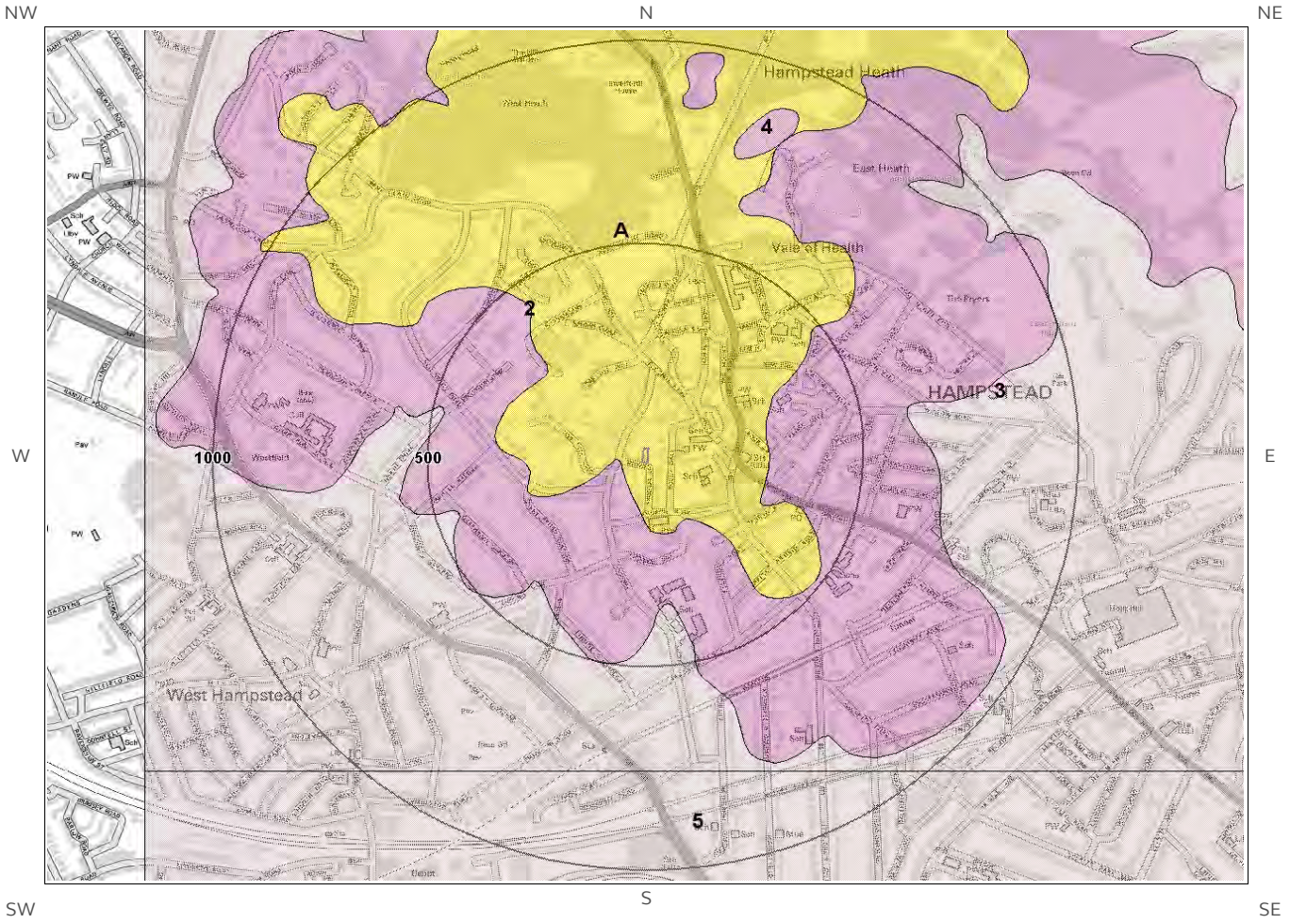
No

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 linear features map (1:10,000 scale)



Bedrock and linear features Legend

Site Outline

500
1000
Search Buffers (m)

1.3 Bedrock and linear features

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	49.0	W	CLGB-SDST	Claygate Member - Sandstone	Eocene Epoch
3	349.0	S	LC-CLAY	London Clay Formation - Clay	Eocene Epoch

1.3.2 Linear features

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

Database searched and no data found at this scale.

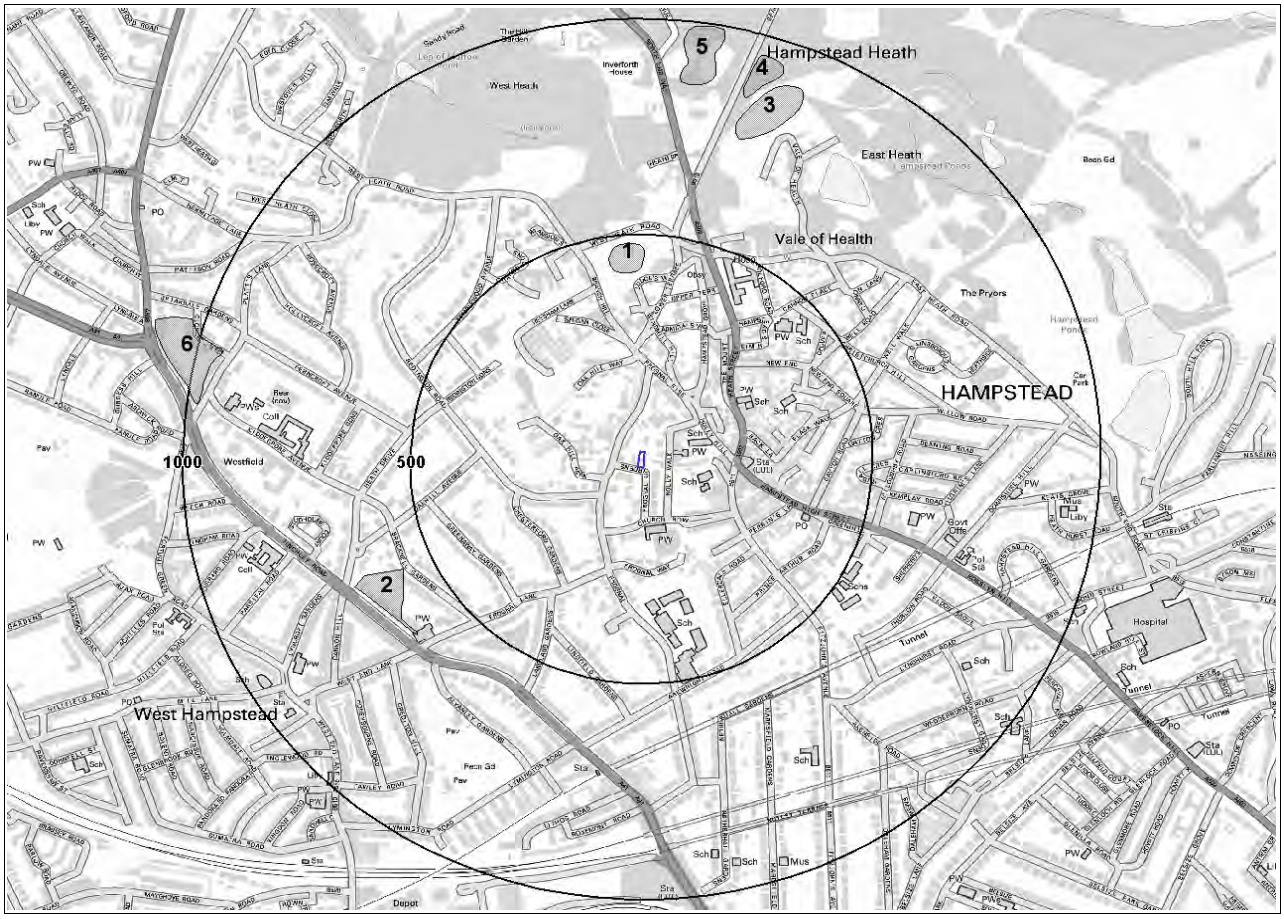
The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of great Britain at 1:10,000 scale.

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

NW N NE



W E

SW S SE

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	414.0	N	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

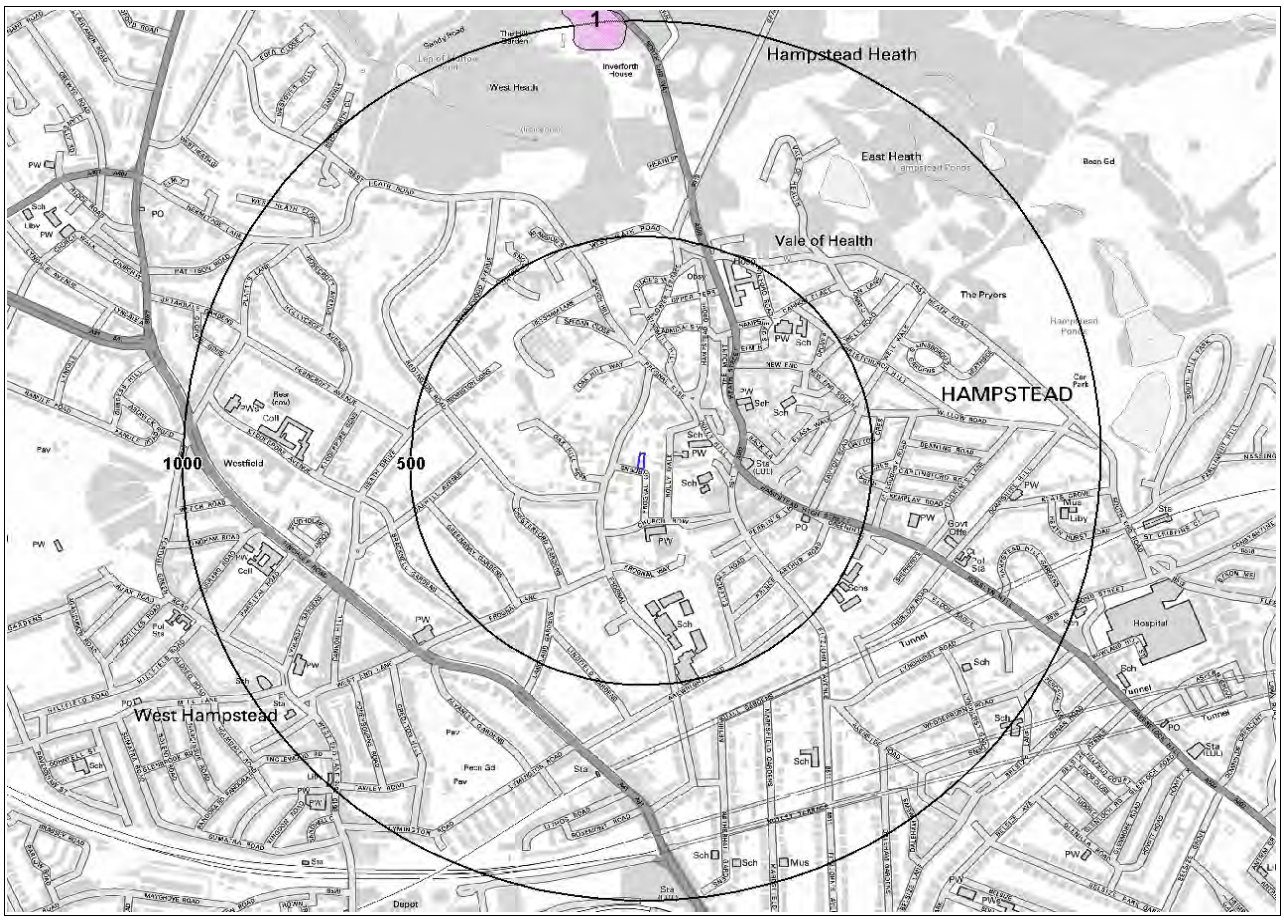
Database searched and no data found.

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

NW N NE

W E

SW S SE



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.

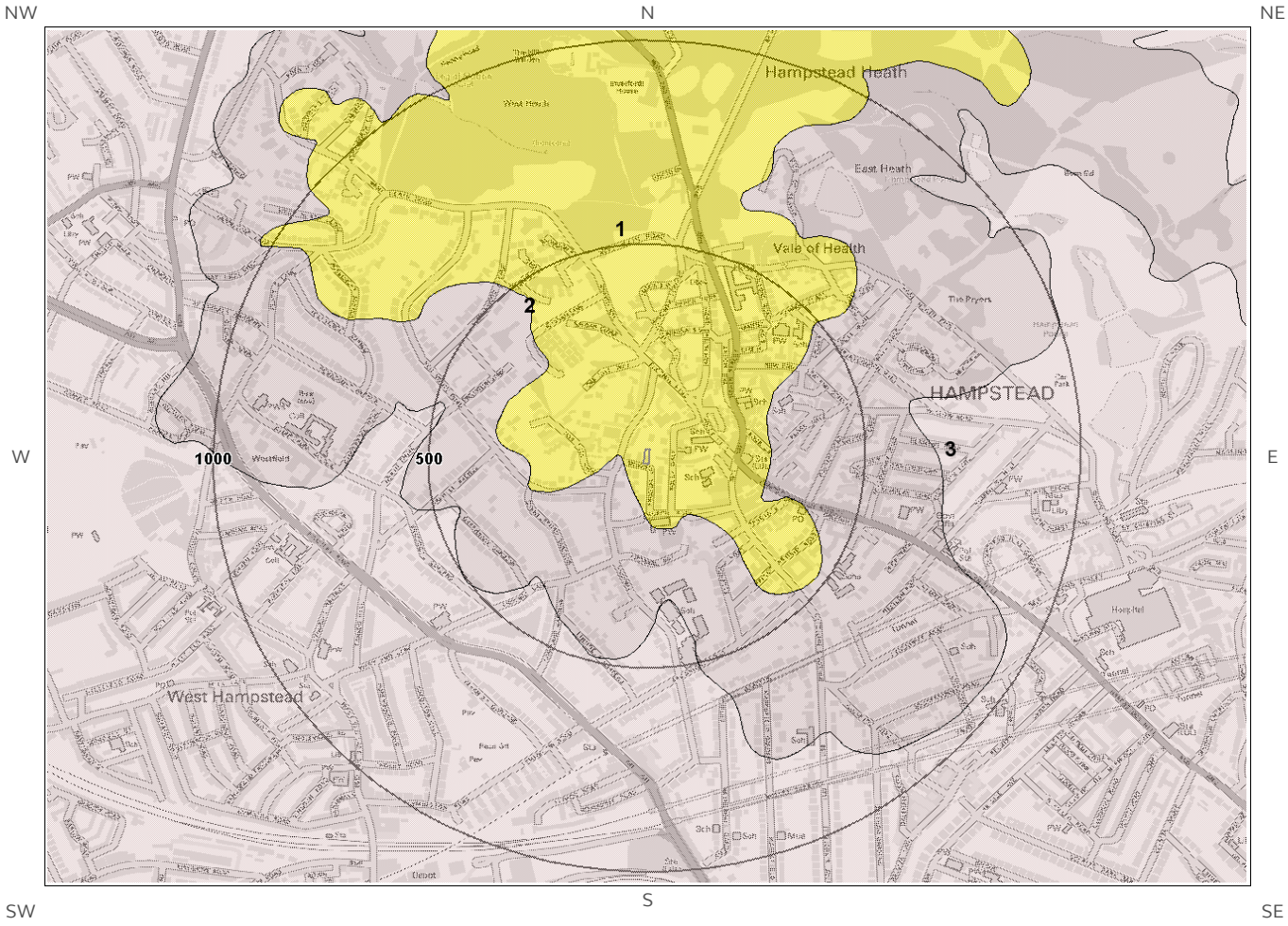
This Geology shows the main components as discrete layers, there are: Artificial/ Made Ground, Superficial/ Drift Geology and Landslips. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

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 linear features map (1:50,000 scale)



Site Outline

500
1000
Search Buffers (m)

2.3 Bedrock, Solid Geology & linear features

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	46.0	W	CLGB-XCZS	CLAYGATE MEMBER - CLAY, SILT AND SAND	YPRESIAN
3	335.0	S	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
46.0	W	Mixed	High	Very Low

2.3.3 Linear features

Are there any records of linear features 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.

The radon data in this report is supplied by the BGS/Public Health England and is the definitive map of Radon Affected Areas in Great Britain and Northern Ireland. The dataset was created using long-term radon measurements in over 479,000 homes across Great Britain and 23,000 homes across Northern Ireland, combined with geological data. The dataset is considered accurate to 50m to allow for the margin of error in geological lines, and the findings of this report supercede any answer given in the less accurate Indicative Atlas of Radon in Great Britain, which simplifies the data to give the highest risk within any given 1km grid square. As such, the radon atlas is considered indicative, whereas the data given in this report is considered definitive.

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.

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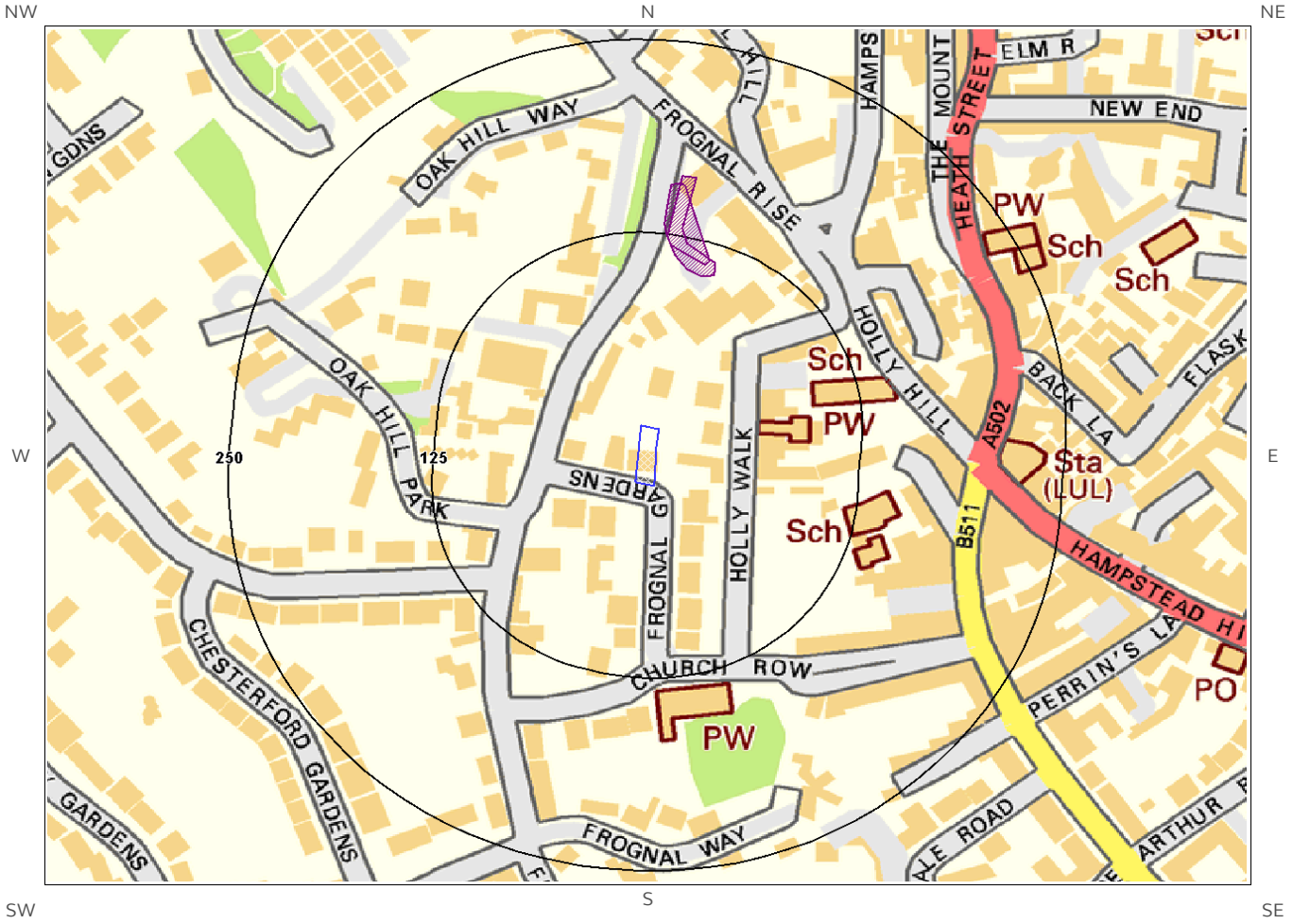
4 Ground Workings map



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
1A	103.0	N	526183 185924	Unspecified Ground Workings	1920
2A	110.0	N	526190 185926	Unspecified Ground Workings	1949

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	583.0	SE	526647 185330	Tunnel	1965
Not shown	583.0	SE	526647 185330	Tunnel	1974
Not shown	583.0	SE	526647 185330	Tunnel	1995
Not shown	593.0	S	526240 185137	Tunnel	1958
Not shown	605.0	SE	526845 185427	Tunnel	1958
Not shown	619.0	SE	526591 185300	Ventilating Shaft	1865
Not shown	809.0	S	526326 184952	Tunnels	1973
Not shown	809.0	S	526326 184952	Tunnels	1989
Not shown	809.0	S	526326 184952	Tunnels	1957
Not shown	809.0	S	526326 184952	Tunnels	1968

ID	Distance (m)	Direction	NGR	Use	Date
Not shown	810.0	S	526461 184996	Air Shaft	1940
Not shown	812.0	S	526461 184995	Air Shaft	1920
Not shown	812.0	S	526464 184994	Air Shaft	1989
Not shown	812.0	S	526464 184994	Air Shaft	1973
Not shown	813.0	S	527029 185170	Tunnel	1958
Not shown	813.0	S	527029 185170	Tunnel	1965
Not shown	813.0	S	527029 185170	Tunnel	1974
Not shown	813.0	S	527029 185170	Tunnel	1995
Not shown	856.0	S	526419 184933	Tunnels	1957
Not shown	856.0	S	526419 184933	Tunnels	1973
Not shown	856.0	S	526419 184933	Tunnels	1968
Not shown	856.0	S	526419 184933	Tunnels	1989
Not shown	857.0	S	526842 185044	Tunnel	1866
Not shown	868.0	SE	526706 185071	Air Shaft	1920
Not shown	897.0	SE	527203 185151	Tunnel	1958
Not shown	897.0	SE	527203 185151	Tunnel	1974
Not shown	897.0	SE	527203 185151	Tunnel	1995
Not shown	897.0	SE	527203 185151	Tunnel	1965
Not shown	936.0	SE	526752 185021	Unspecified Shaft	1866

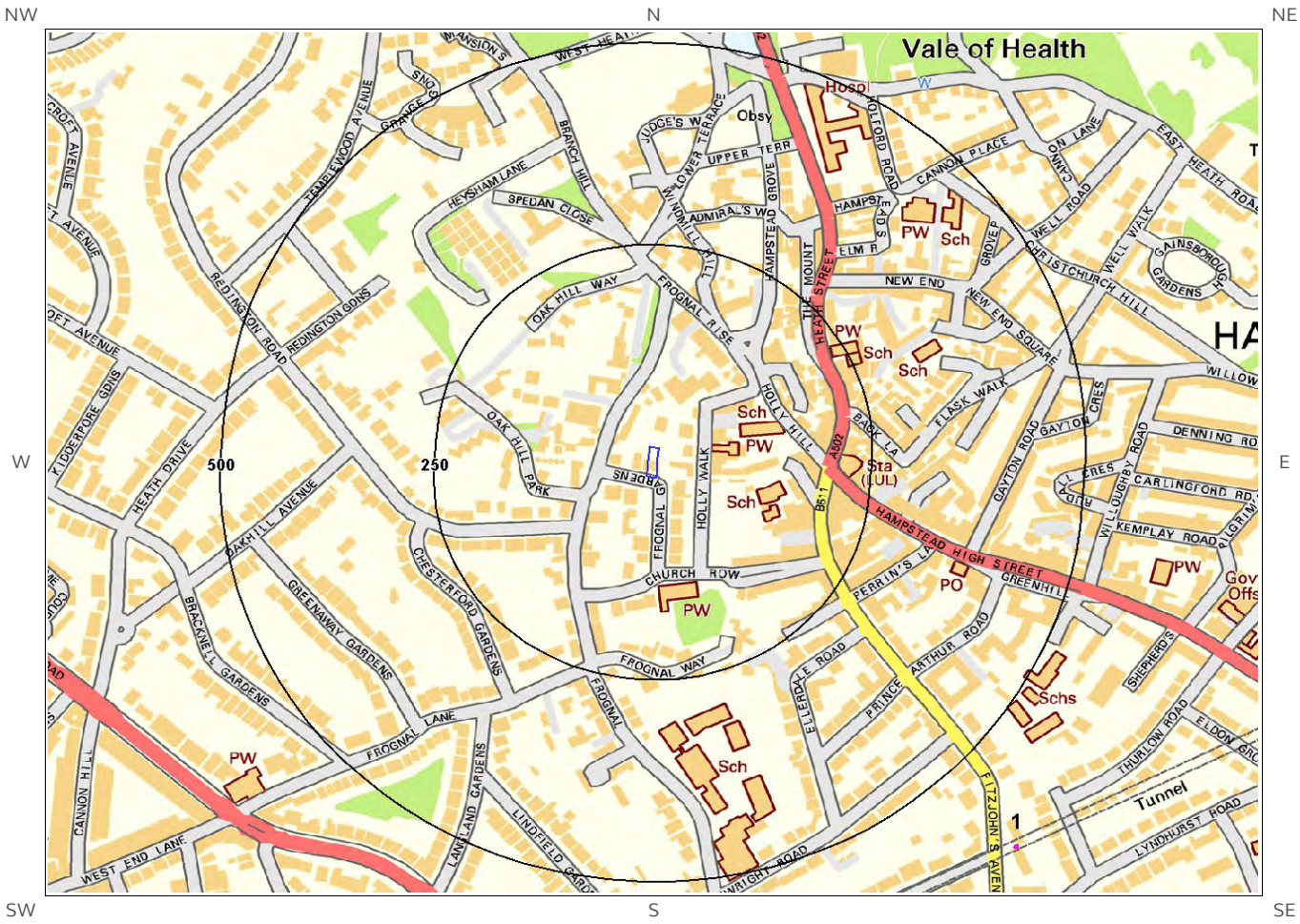
4.3 Current Ground Workings

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

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
1	619.0	SE	526591 185300	Ventilating Shaft	1865
Not shown	810.0	S	526461 184996	Air Shaft	1940
Not shown	812.0	S	526461 184995	Air Shaft	1920
Not shown	812.0	S	526464 184994	Air Shaft	1973
Not shown	812.0	S	526464 184994	Air Shaft	1989
Not shown	868.0	SE	526706 185071	Air Shaft	1920
Not shown	936.0	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 the Peter Brett Associates natural cavities database. The dataset is made up of points and polygons. Where polygons are used these represent an area in which it is expected the cavities could be found. It does not indicate that cavities are present everywhere within the polygon, and caution should be used in the interpretation of this data.

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 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 Cornwall and Devon Metalliferous Mining

This dataset provides information on metalliferous mining areas in Cornwall/Devon and is derived from records held by Mining Searches UK.

Are there any Cornwall and Devon Metalliferous 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.

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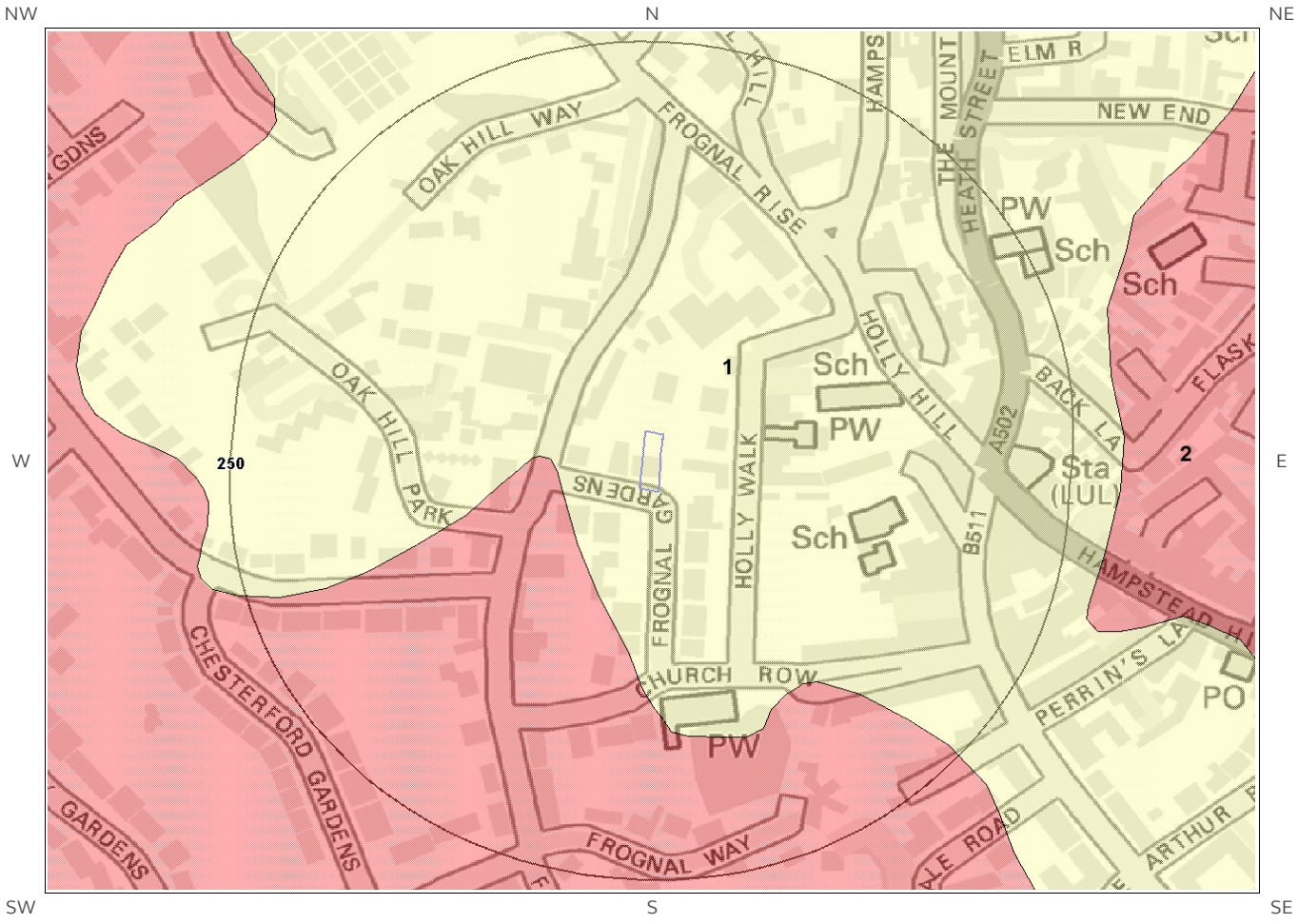
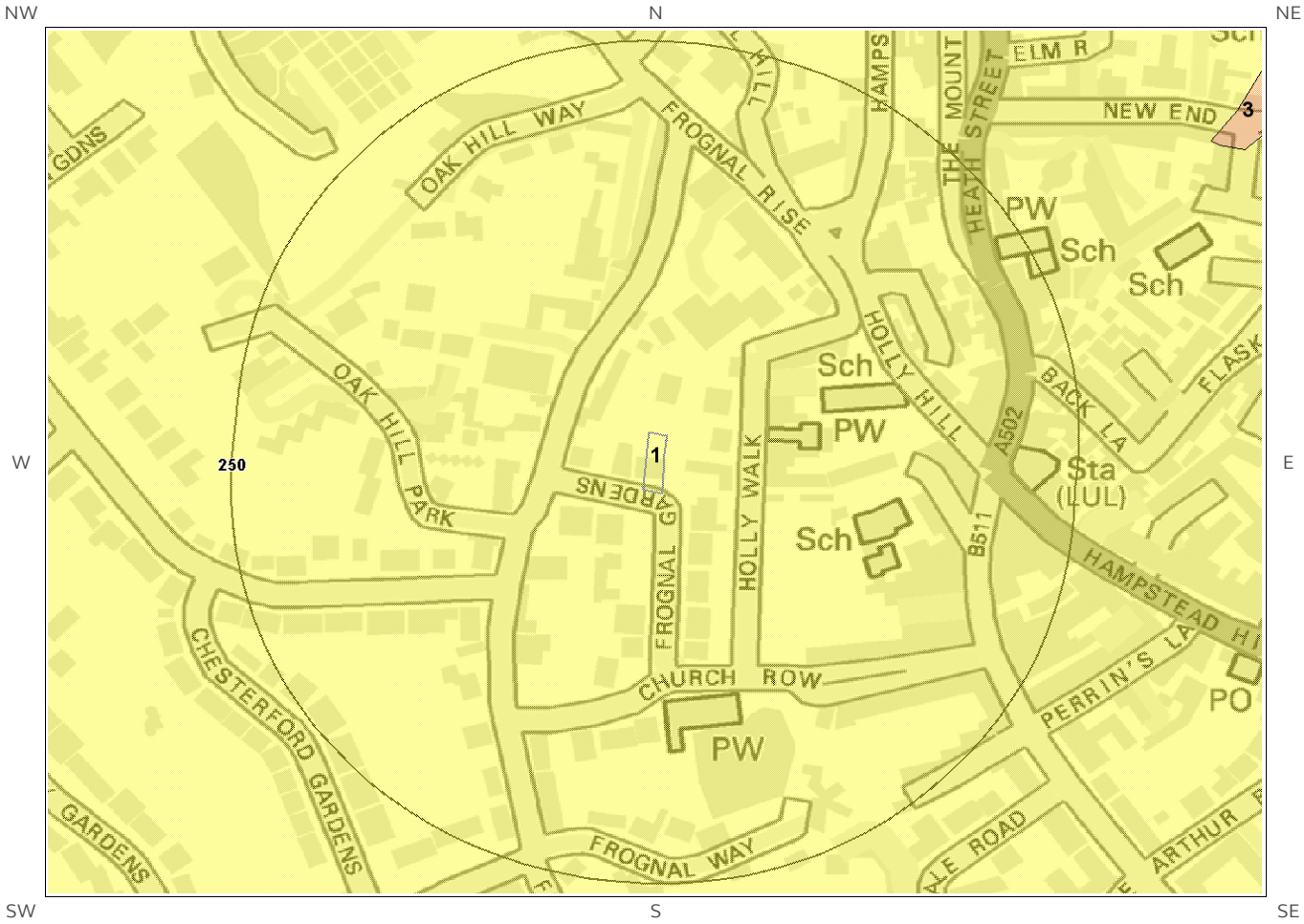
6 Natural Ground Subsidence

6.1 Shrink-Swell Clay map



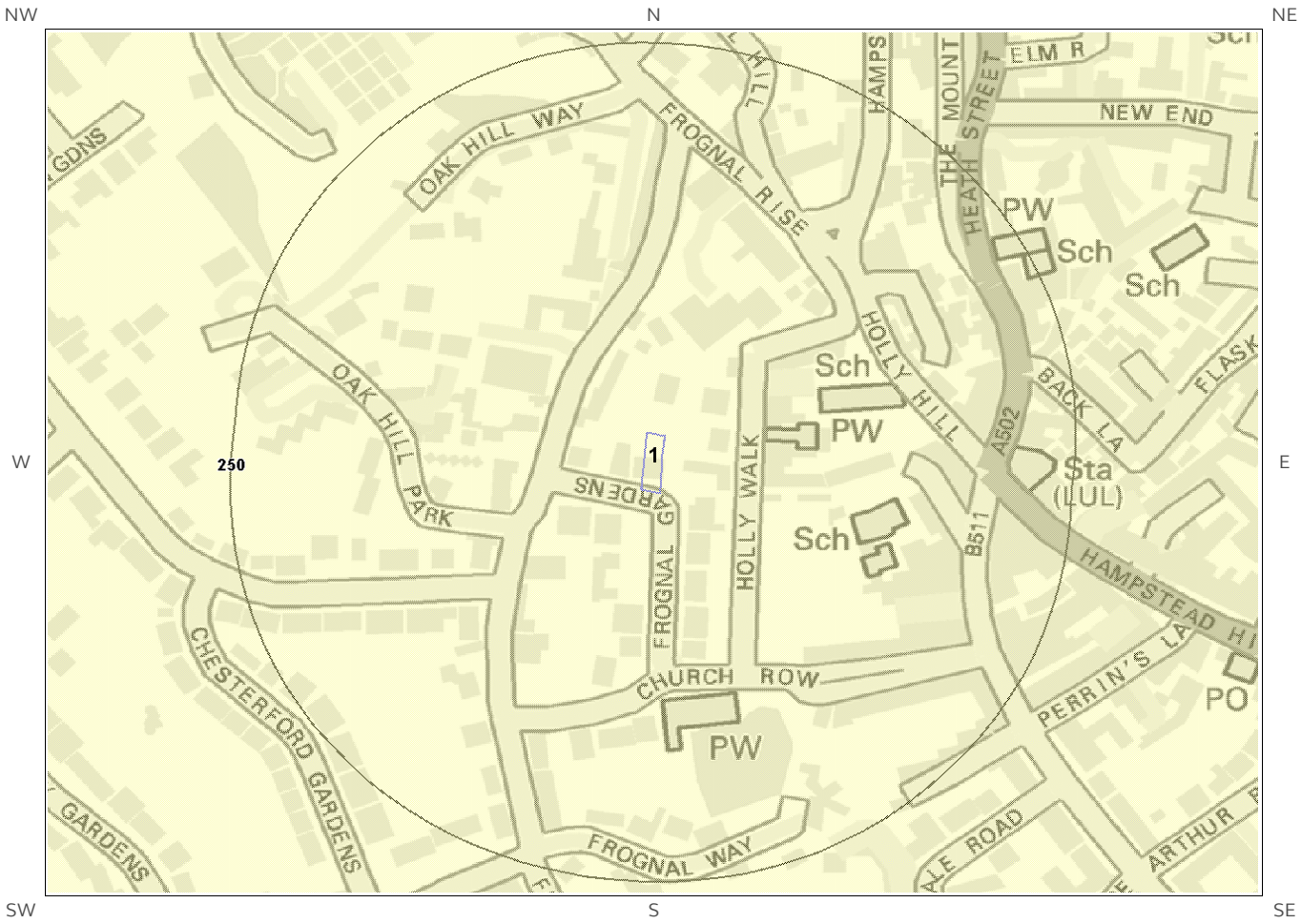
Shrink Swell Clay Legend

6.2 Landslides map



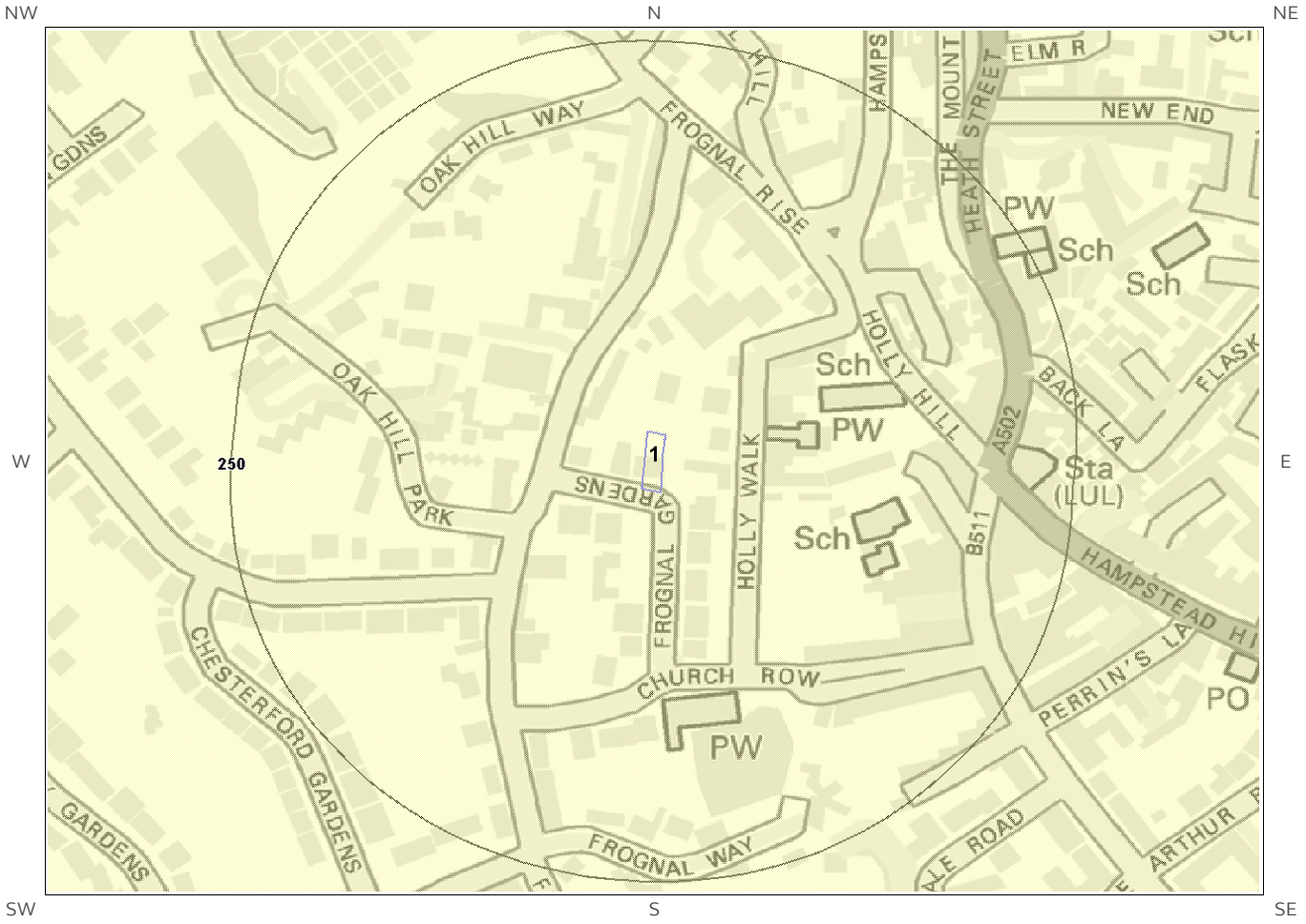
Landslides Legend

6.3 Ground Dissolution of Soluble Rocks map



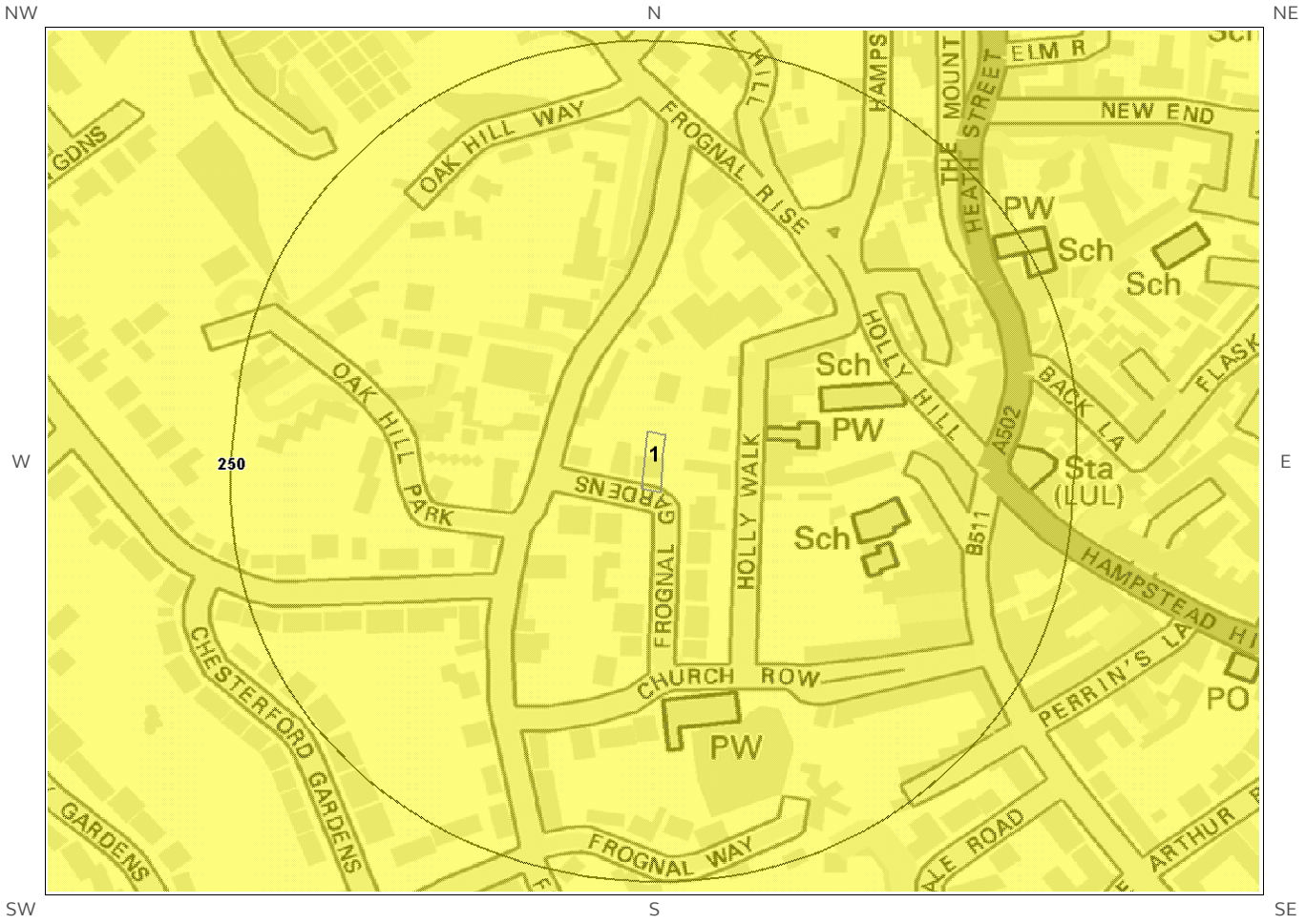
Ground Dissolution Soluble Rocks Legend

6.4 Compressible Deposits map



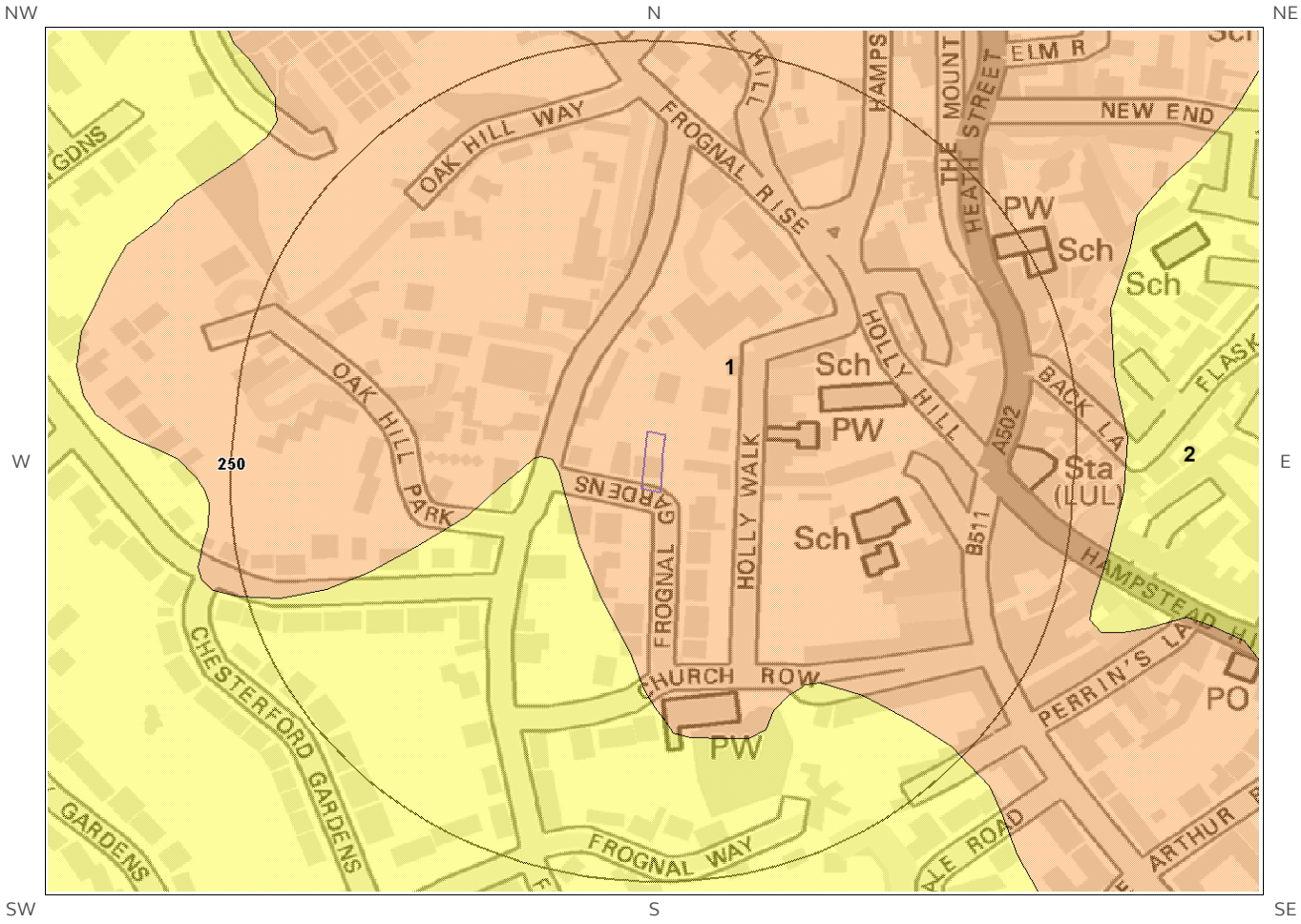
Compressible Deposits Legend

6.5 Collapsible Deposits map



Collapsible Deposits Legend

6.6 Running Sand map



Running Sand Legend

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	46.0	W	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:

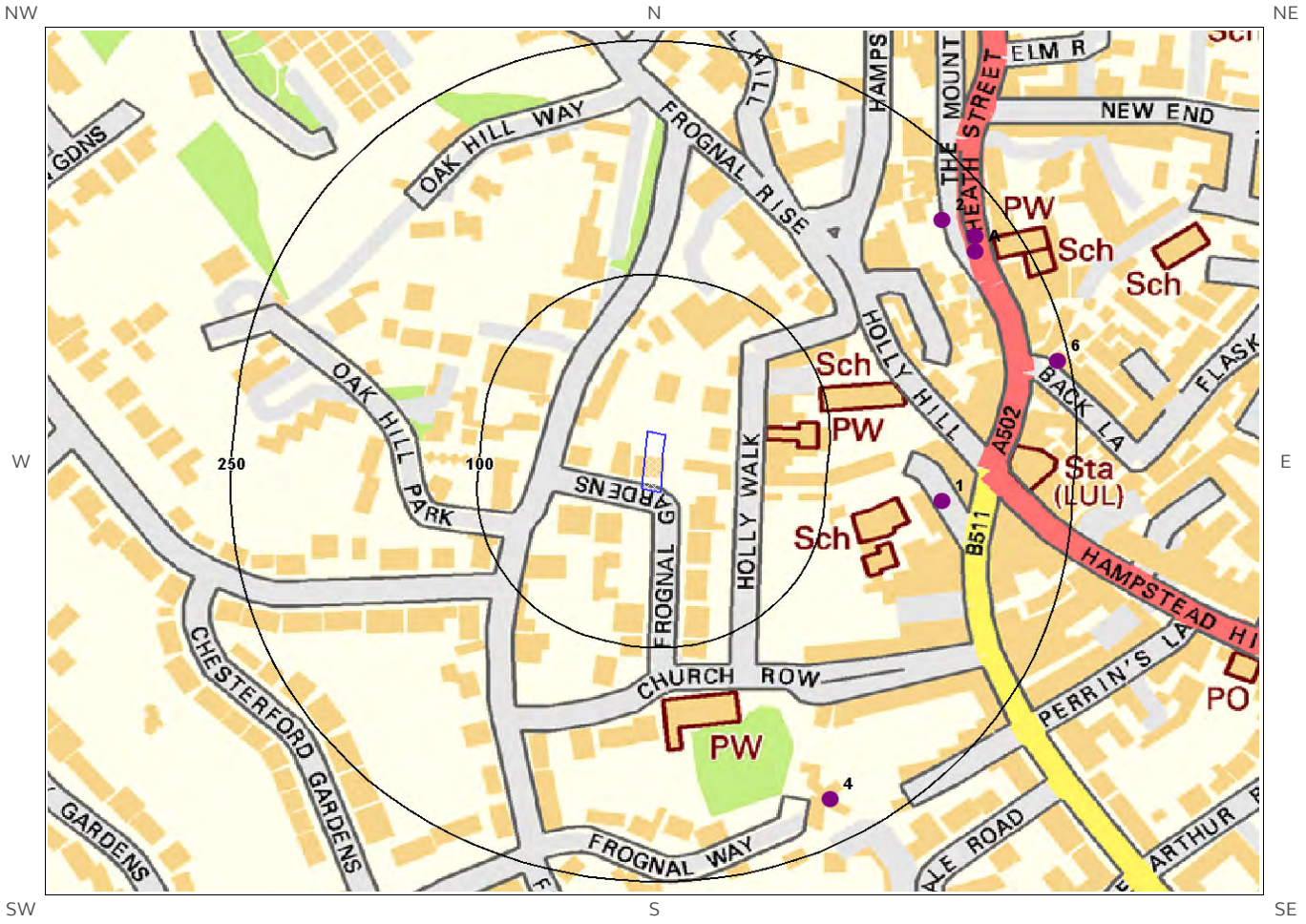
ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible 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	46.0	W	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: 6

ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length	Borehole Name
1	171.0	E	526340 185750	TQ28NE95	13	HAMPSTEAD HEATH 8
2	217.0	NE	526340 185930	TQ28NE93	16	HAMPSTEAD HEATH 6
3A	221.0	NE	526360 185910	TQ28NE100	6	HAMPSTEAD HEATH 13
4	222.0	SE	526272 185559	TQ28NE449	135	22 FROGNAL WAY HAMPSTEAD
5A	227.0	NE	526360 185920	TQ28NE8	51	JUNCTION FROGNALL RISE & HOLLY BUSH HILL
6	242.0	E	526410 185840	TQ28NE94	12	HAMPSTEAD HEATH 7

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/590683
#2: scans.bgs.ac.uk/sobi_scans/boreholes/590681
#3A: scans.bgs.ac.uk/sobi_scans/boreholes/590688
#4: scans.bgs.ac.uk/sobi_scans/boreholes/20574804
#5A: scans.bgs.ac.uk/sobi_scans/boreholes/590588
#6: scans.bgs.ac.uk/sobi_scans/boreholes/590682

8 Estimated Background Soil Chemistry

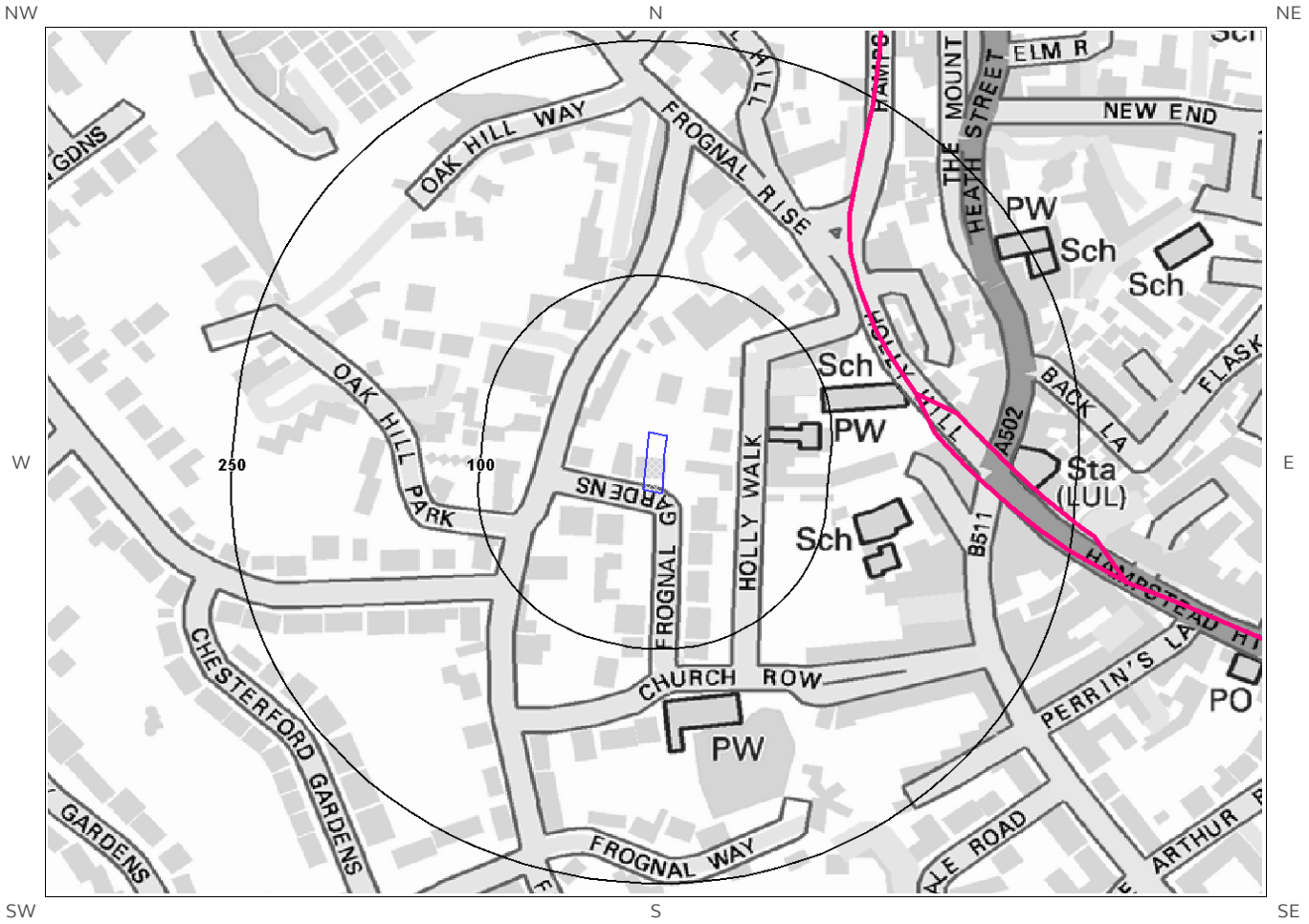
Records of background estimated soil chemistry within 250m of the study site boundary: 2

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
46.0	W	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
144	NE	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: 71mbgl 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

Soil Consultants Ltd

Telephone: 01494 712494
stuart.w@soilconsultants.co.uk

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

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Leicestershire
LE12 6HX

The Coal Authority

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

Public Health England

Public information access office
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https://www.gov.uk/government/organisations/public-health-england
Email: **enquiries@phe.gov.uk**
Main switchboard: 020 7654 8000

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Website: http://www.ordnancesurvey.co.uk/

Getmapping PLC

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Hampshire RG27 8NW
Tel: 01252 845444
Website:**http://www1.getmapping.com/**

Peter Brett Associates

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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-feb11-2019

APPENDIX C

- Email correspondence with Camden Council Contaminated Lane

Stuart Childs

From: Priddle, Nick <Nick.Priddle@camden.gov.uk>
Sent: 19 August 2019 15:27
To: Stuart Childs
Subject: RE: Contaminated Land enquiry - 18a Frognal Gardens
Attachments: PDF Report - 18A Frognal Gardens, NW3 6XA.pdf; Search Results - 18A Frognal Gardens, NW3 6XA.xlsx

Hi Stuart

RE Contaminated Land Inquiry –18A Frognal Gardens, NW3 6XA

As part of your inquiry, the following searches were undertaken to identify the potential for land contamination due to past and present land use activities within a 100m search radius of the site:

- Businesses registered with Kelly's Trade Directory operating within and intersecting a 25m radius of the site.
- Historical land use activities - none.
- Pollution Incidents - none
- Elevated levels of heavy metals in soils - none.
- Landfill sites within 250m radius -none
- Part B Industrial Process - none

The results (see spreadsheet attached) identified the following land uses of plausible concern within 25m of the site between 1894 -1971 :

- Wells, university medical research laboratory and grave yard.

According to our contaminated land risk characterisation, land on which the above processes/activities were carried out is considered to represent a low to high risk of contamination. It is considered likely that such land could exhibit significantly elevated contaminate levels with the potential to cause harm, although the Council has no present evidence that confirms that there are contamination issues affecting the site other than potentially contaminative land-use activities in proximity.

Camden Council has a Contaminated Land database to identify and prioritise sites within the Borough (with a former potentially contaminative land use) for inspection. Sites recorded on the database are not contaminated land (as defined by Part IIA of the Environmental Protection Act 1990); rather they are considered as having the potential to be contaminated due to their previous use. The subject site is **not** on the Councils priority for inspection, nor is it proposed to investigate the site further under Part IIA of the Contaminated Land Regime. Furthermore, the subject site has **not** been determined as contaminated land under Part IIA of the Environmental Protection Act 1990.

If the subject site was to be redeveloped in the future, involving ground disturbance, excavation works or soft landscaping (soils in Camden typically contain elevated levels of certain heavy metals) then a planning condition would be imposed requiring a detailed site investigation (desk top study, walkover survey and intrusive investigation) and if necessary remediation works . The investigation

process follows a risk based approach under Part 2A of EPA 1990, objectively to ensure that potentially contaminated land is suitable for its proposed use. Consequently, the planning process is the main way in which contaminated land and potentially contaminated land is investigated and remediated in Camden.

A review the Council's planning database confirms two planning applications (planning ref 8791165 & 9291199) have been submitted for the subject site, both relating to tree pruning

Disclaimer:

The above response is provided from such information that is readily available to the Council and in its possession. It is believed to be correct but the Council expressly gives no warranty in this respect nor will the Council accept any liability whatsoever for any error, omission or loss occasioned thereby to any person (whether or not the person requested the information) and in particular the Council gives no warranty that it has researched all its relevant archives in order to respond to the request for information.

If you require clarification on the above please feel free to contact me.

Best regards

Nick Priddle BSc (Hons) MSc AIEMA MIOA
Technical Officer Contaminated Land & Noise

Telephone: 0207 974 4054

From: Stuart Childs <Stuart.C@soilconsultants.co.uk>
Sent: 19 August 2019 14:17
To: Priddle, Nick <Nick.Priddle@camden.gov.uk>
Subject: RE: Contaminated Land enquiry - 18a Frognal Gardens

Nick,

We have ordered a Groundsure desk study for the site however, I was wondering whether you held any additional information such as historical trade directories, historical planning applications, OS maps showing previous land use or any environmental / contaminated land data in your databases for this particular site and surrounding area.

Cheers,

Stuart

From: Priddle, Nick <Nick.Priddle@camden.gov.uk>
Sent: 19 August 2019 14:14

To: Stuart Childs <Stuart.C@soilconsultants.co.uk>
Subject: RE: Contaminated Land enquiry - 18a Frognal Gardens

Hi Stuart

What are the specifics of your enquiry i.e. what do you want to know about the site

Regards

Nick Priddle BSc (Hons) MSc AIEMA MIOA
Technical Officer Contaminated Land & Noise

Telephone: 0207 974 4054

From: Stuart Childs <Stuart.C@soilconsultants.co.uk>
Sent: 19 August 2019 11:38
To: Priddle, Nick <Nick.Priddle@camden.gov.uk>
Subject: RE: Contaminated Land enquiry - 18a Frognal Gardens

Hi Nick,

I have attached a site location plan and site topo survery plan. The site only includes the building of 18a not 18b.

Not too sure what else you may require?

Kind regards,

Stuart

From: Priddle, Nick <Nick.Priddle@camden.gov.uk>
Sent: 19 August 2019 07:58
To: Stuart Childs <Stuart.C@soilconsultants.co.uk>
Subject: Contaminated Land enquiry - 18a Frognal Gardens

Hi Stuart

Further to the Council receiving payment on 13/8/19 for the enquiry referenced above, please can confirm the specifics and provide me a site location plan

Best regards

Nick Priddle BSc (Hons) MSc AIEMA MIOA
Technical Officer Contaminated Land & Noise
Supporting Communities
London Borough of Camden

Telephone: 0207 974 4054
Web: camden.gov.uk

5 Pancras Square
London N1C 4AG

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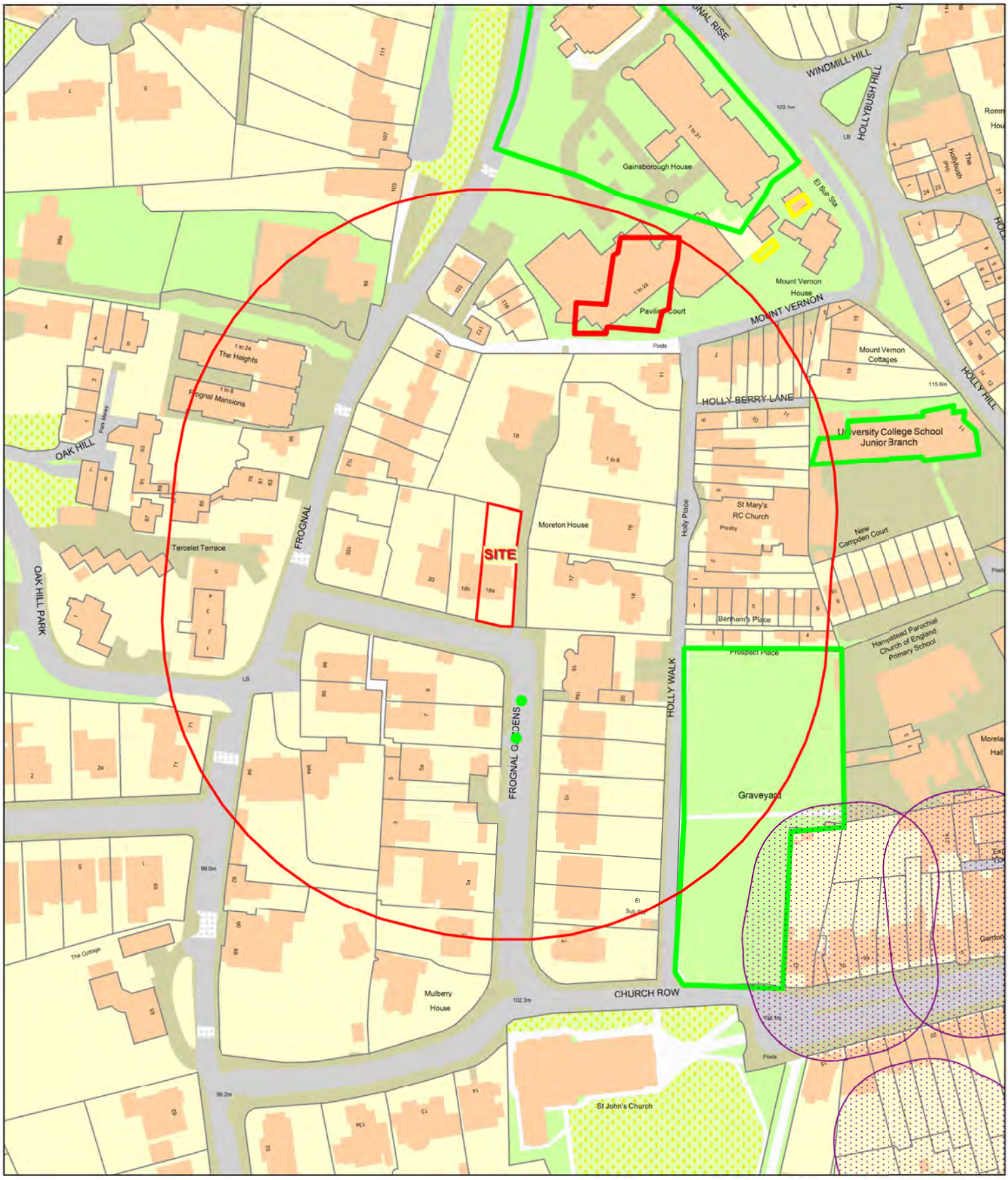
18A Frognal Gardens, London, Nw3 6XA



LUHistGeom - Source Risk

- 15 to 27 (119)
- 11 to 14 (641)
- 5 to 10 (785)
- 0 to 4 (374)

HistLandfillSite250mBuffer

Pollution Incident

Part B Sites

Heavy Metals B/G Surv

Kellys Data Buffer25m

HistoricLandfillSite

Camden

UID	UID_Landma	Desc	Linkage	MetaData	Epoch	LandUse	LU_model	PredictedSeverity_SV	PredictedF	SourceRisk	checked	X	Y	LPG_Resi	LPG_grde	area_m2	LandfillRef
1910	200281109	1930-1971: Well	http://www.	http://svr-ap	1965-1971	Well	Pit, pond, well low risk	2	2	4		526170.5	185720.5	0	0	3.014359	
1917	2002774	1894-1971: Well	http://www.	http://svr-ap	1894-1896	Well	Pit, pond, well low risk	2	2	4		526172.1	185732.6	0	0	3.014336	
131	200272660	1952-1954: University	http://www.	http://svr-ap	1952-1954	University	Educational institution and research	2	2	4		526291.1	185817	0	4	634.7031	
820	200279526	1952-1955: Medical Research Labor	http://www.	http://svr-ap	1952-1955	Medical Research Laboratory	Research Establishments	5	4	20		526205.7	185864.5	21	0	652.8435	
1096	200279519	1952-1971: Grave Yard	http://www.	http://svr-ap	1952-1955	Grave Yard	Cemetery (Modern)	2	2	4		526247.9	185695.1	7	12	4605.735	

APPENDIX D

- Stephen Buss Environmental Consulting Ltd (SBEC) Hydrological Basement Impact Assessment Report (Ref: 2019-003-059-003)
- Evans River and Coastal Flood Risk Assessment (Ref: 2351-RE-08-19-01_RevA)

Stephen Buss
Environmental Consulting Ltd

18A Frognal Gardens: Hydrology and Sub-surface Flow Screening Basement Impact Assessment

Version control log

Document number	Date	Issued by	Issued to	Comments
2019-003-059-003	16/10/19	Steve Buss	Client	Final
2019-003-059-002	17/09/19	Steve Buss	Soil Consultants	Final draft
2019-003-059-001	09/09/19	Steve Buss	Soil Consultants	First draft

Client: Roger Pilgrim and Nadine Majaro

Dated: October 2019

www.hydro-geology.co.uk

32 Port Hill Road, Shrewsbury SY3 8SA

Registered in England and Wales number 08595273

DISCLAIMER

This report has been prepared by Stephen Buss Environmental Consulting Ltd (SBEC) in its professional capacity as hydrogeologist, in a manner consistent with the level of care and skill ordinarily exercised by members of the geological and engineering professions practising at this time, within the agreed scope and terms of contract, and taking account of the manpower and resources devoted to it by agreement with its client.

The advice and opinions in this report should be read and relied on only in the context of the report as a whole. As with any environmental appraisal or investigation, the conclusions and observations are based on limited data. The risk of undiscovered environmental impairment of the property cannot be ruled out. SBEC cannot therefore warrant the actual conditions at the site and advice given is limited to those conditions for which information is held by SBEC at the time. The findings are based on the information made available to SBEC at the date of the report (and will have been assumed to be correct) and on current UK standards, codes, technology and practices as at that time.

This report is provided to the client addressed above. Should the client wish to release this report to any other third party for that party's reliance, SBEC accepts no responsibility to any third party to whom this report or any part thereof is made known. SBEC accepts no responsibility for any loss or damage incurred as a result, and the third party does not acquire any rights whatsoever, contractual or otherwise, against SBEC except as expressly agreed with SBEC in writing.

The findings do not purport to include any manner of legal advice or opinion. New information or changes in conditions and regulatory requirements may occur in future, which will change the conclusions presented here.

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Figures

Figures

1. Introduction

1.1 Background

This report presents the screening and scoping stage of a basement impact assessment, focussed on hydrology and sub-surface flow, to be submitted in support of a planning application for the basement development at 18A Frognal Gardens, London NW3 6XA (Figure 1.1, national grid reference TQ 2616 8577). The local planning authority is Camden Borough Council.

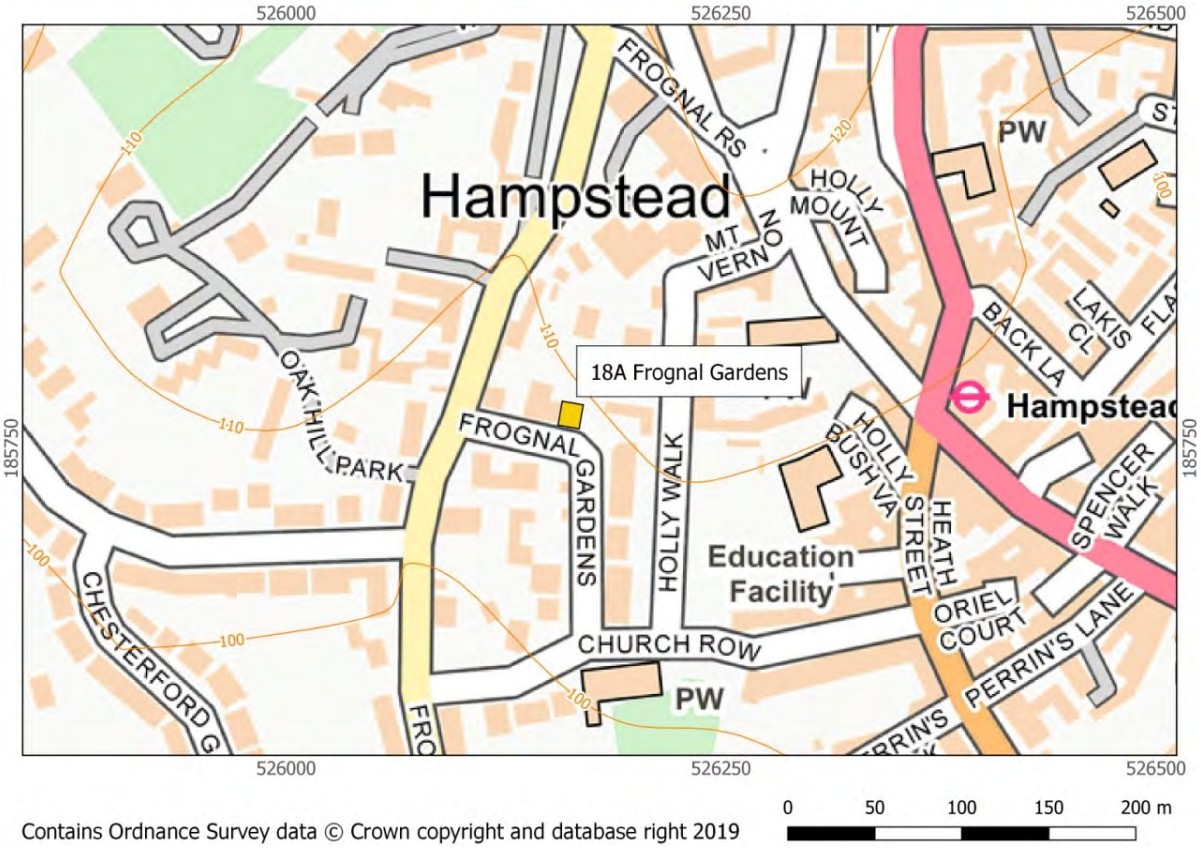

Figure 1.1 Location of 18A Frognal Gardens

1.2 The Site

The site at 18A Frognal Gardens currently comprises a residential semi-detached dwelling. The ground level on site rises by about 3 m from the front to the back of the property and as a result, at the front of the property the building consists of three-storeys with a garage, utility/boiler room and bedroom on the lower floor, whereas at the back of the premises, the building consists of two storeys with the ground floor level with the rear garden.

The surrounding area is predominantly residential. A private road runs alongside the east of the site to number 18 Frognal Gardens. The garden at 18A backs onto the garden surrounding number 18. Number 18B Frognal Gardens, to the west, is attached to the current property and of a similar age and construction. Other houses on the street consist of large detached and semi-detached properties built in the late 18th Century.

Moreton House, to the east, is a Grade II listed building situated on Holly Walk and consists of flats. The gardens of properties number 16, 17 and 18 on Holly Walk back onto the private alleyway leading to number 18.

Hampstead Heath is around 675 m to the north-east, and Hampstead tube station is 220 m to the east.

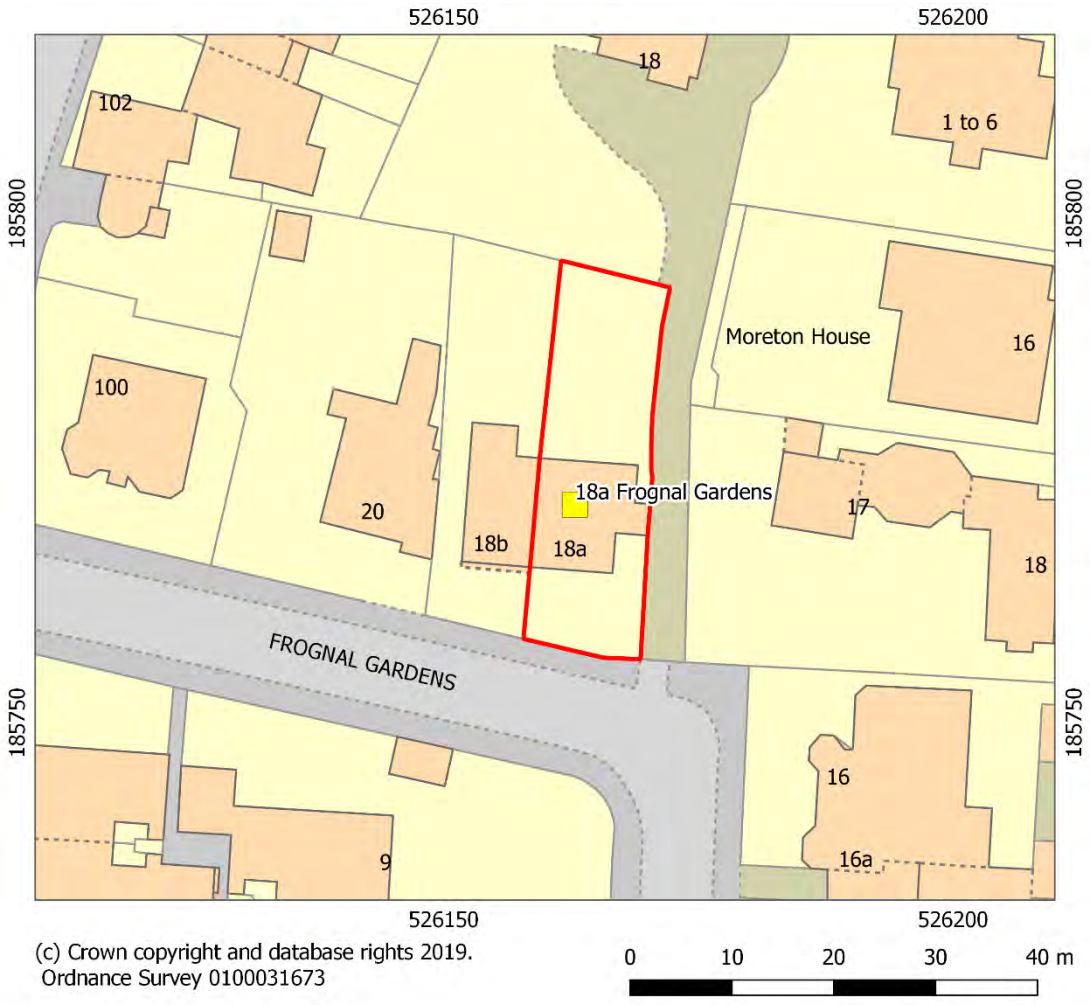

Figure 1.2 Local area (18A Frognal Gardens, outlined in red)

1.3 Proposed basement works

It is intended that the site will be redeveloped by demolishing the current property at the site and constructing a new dwelling. The new dwelling will include a lower ground floor level that extends along the entire footprint of the property and will involve deepening and extending the current lower ground floor level to the rear of the dwelling. A plunge pool will be built at the back of the house.

Proposed works, as drawn by Alison Brooks Architects, and plans of the current dwelling, as drawn by A D Horner Ltd, are shown in Figure 1.3 and 1.4.

Based on the site topographic survey by A D Horner Ltd (drawing number 5594-14JAN19-01), ground level at the street on the south-eastern corner of the site is 108.2 m above Ordnance Datum (AOD), and 109.0 m AOD on the south-western corner. Ground level at the front of number 18A is 108.7 m AOD, and at the rear is 111.4 m AOD. The rear garden rises to 112.9 m AOD at its north-eastern corner.

(Ground levels around the attached building, number 18B Frognal Gardens, are generally 1.0 m lower than around 18A, with the front of 18B at c. 107.8 m AOD and the rear at c. 110.3 m AOD.)

Proposed plans by Alison Brooks Architects (drawing number ABA-2473-20-023) show that the proposed level of the lower ground floor is at 108.4 m AOD, which is approximately 0.3 m below the current ground level at the front of the property and approximately 3.0 m below the ground level at the back of the proposed development. The plunge pool is expected to extend to a further depth of 2.0 m below ground level to circa 106.4 m AOD.

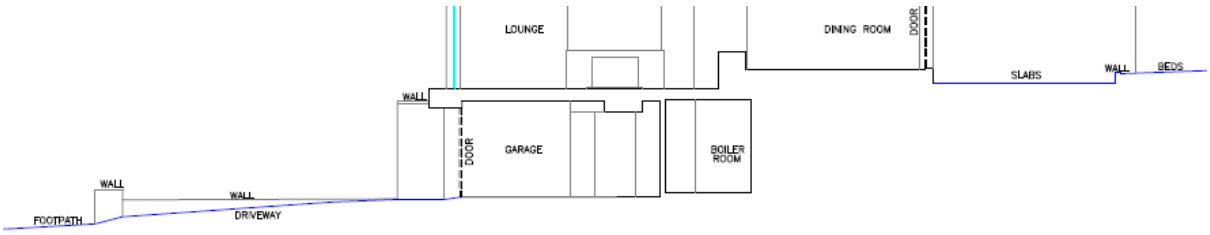

Figure 1.3 Cross-section of current dwelling at 18A Frognal Gardens

Figure 1.4 Cross-section of proposed works at 18A Frognal Gardens

1.4 Scope of Report

Stephen Buss Environmental Consulting Ltd was instructed in August 2019 to complete this report. This report presents the subsurface flow (groundwater) and surface water components of the basement impact assessment for the development, complies with Camden Planning Guidance: Basements (2018)[1] screening, scoping and site investigation stages, and makes reference to the basement impact assessment guidance of ARUP (2010)[2].

1.5 Authorship of Report

This report has been completed by Dr Stephen Buss MA MSc CGeol. Dr Buss is a UK-based independent hydrogeologist with more than 19 years' consulting experience in solving groundwater issues for regulators, water companies and other private sector organisations. **Dr**

THE GEOLOGICAL SOCIETY
CGeol
CHARTERED GEOLOGIST
Fellow No. 10004085

[1] The London Borough of Camden, 2018. Camden Planning Guidance: Basements.
[2] ARUP, 2010. Camden geological, hydrogeological and hydrological study. Guidance for subterranean development.

Buss is a Chartered Geologist with the Geological Society of London. Dr Buss's CV and publications list is available at www.hydro-geology.co.uk.

Rupert Evans MSc CEnv C.WEM MCIWEM AIEMA is a UK-based independent hydrologist with more than 12 years' consultancy experience in flood risk assessment, surface water drainage schemes and hydrology/hydraulic modelling. **Mr Evans is a Chartered Water and Environmental Manager (C.WEM) and a Member of the Chartered Institution of Water and Environmental Management.**

2. Conceptual Site Model

2.1 Site History

On the 1830 1:2500 County Series map the site is shown to be on a small road linking The Mansion to Holly Walk. Two wells are shown about 30 m to the south-east of the current location of 18A Frognal Gardens.

These wells are shown on maps until the 1896 1:2500 map, where the first properties on Frognal Gardens are shown to have been built over them. A small building was built on the site of 18 Frognal Gardens at this time.

Houses to the east on Holly Walk are first shown on historical maps from 1870. Number 18 Frognal Gardens (Frognal End) is a substantial house built in 1892 for the novelist Sir Walter Besant. Numbers 18A and 18B were built in the front garden of number 18 in the mid-1960s.

2.2 Drainage and Topography

Elevation of the plot, 18A Frognal Gardens, is between about 108.2 and 112.9 m AOD according to the site topographic survey. Ground surface around the site slopes down to the south west; the gradient calculated from Environment Agency LIDAR data is about 0.1.

The site is in the vicinity of three 'lost rivers' which are now culverted beneath the city and incorporated into the sewer network[3] (Barton and Myers, 2016). Most significantly, the site was in the upper catchment of one of the two main tributaries of the former River Westbourne. The East Westbourne East Branch tributary, as mapped by Arup (2016)[4], is believed to have risen around 80 m north-east of the site, and to have continued southwards along the line of the current road, Frognal, until it reached the River Westbourne. At its closest point, it flowed circa 60 m west of the site.

A tributary of the former River Fleet rose 430 m to the north-east-east, and the headwaters of the River Tyburn were 700 m to the south-east.

The nearest current surface water feature is Whitestone Pond, at the southern end of Golders Hill Park about 540 m north of the site. The elevation of Whitestone Pond is 133 m AOD and is up-gradient of the site.

The closest pond within the pond chains on Hampstead Heath is the Vale of Heath Pond, at around 780 m to the north east, and at about 105 m AOD, lower than the elevation of the site.

2.3 Local basements

Details of any recent basement developments in adjacent properties have been searched for via the Camden Planning Portal. Several properties have been identified as having basements: Moreton House and 16 Holly Walk, and there is an application in progress for 16 Frognal Gardens.

- At Flat 2 Moreton House, planning permission (2011/6231/P) was granted to create access to the basement flat from the lightwell at the side of the property. The

[3] Barton, N. and Myers, S., 2016. The Lost Rivers of London 3rd Edition. BCA, London.
[4] Arup, 2016. Redington Frognal Neighbourhood Forum, Red Frog Sub-surface Water Features Mapping, Summary Report.

development involved lowering a small amount of the floor of the lightwell by just under 1 m. It did not involve structural alteration to the existing basement.

- At number 16 Holly Walk, planning permission (2005/1055/P) was granted for the demolition of the existing building and erection of a two storey detached house with a single-storey basement. Final floor level (FFL) for the basement was 114.15 m AOD, with a pool on the northern side of the building (against its boundary with Moreton House) at approximately 112.55 m AOD.
- The application for 16 Frognal Gardens (2018/2440/P) is for erection of a single storey detached house with a single-storey basement in the rear of the property, i.e. on Holly Walk. The basement is to be constructed at a depth of 2 to 4 m bgl, which is about 108.3 to 110.3 m AOD (assuming ground level from Environment Agency LIDAR data).

  As part of the ground investigation at 16 Frognal Gardens two boreholes were constructed. Both encountered clayey sand/sandy silt of the Bagshot Beds, with no base identified. In the deepest borehole there was a groundwater strike at 6.0 m depth (c. 106.3 m AOD) but the standpipe that was installed to 5.0 m depth (c. 107.3 m AOD) remained dry during subsequent monitoring.

All known basements are at least 30 m from the proposed developent at 18A Frognal Gardens.

2.4 Geology and Hydrogeology

Mapped bedrock at the site comprises the Bagshot Formation, and beneath these are the Claygate Beds (Figure 2.1). The mapped boundary of the two deposits is approximately 50 m south-west of the site. No superficial deposits are mapped at the site's location.

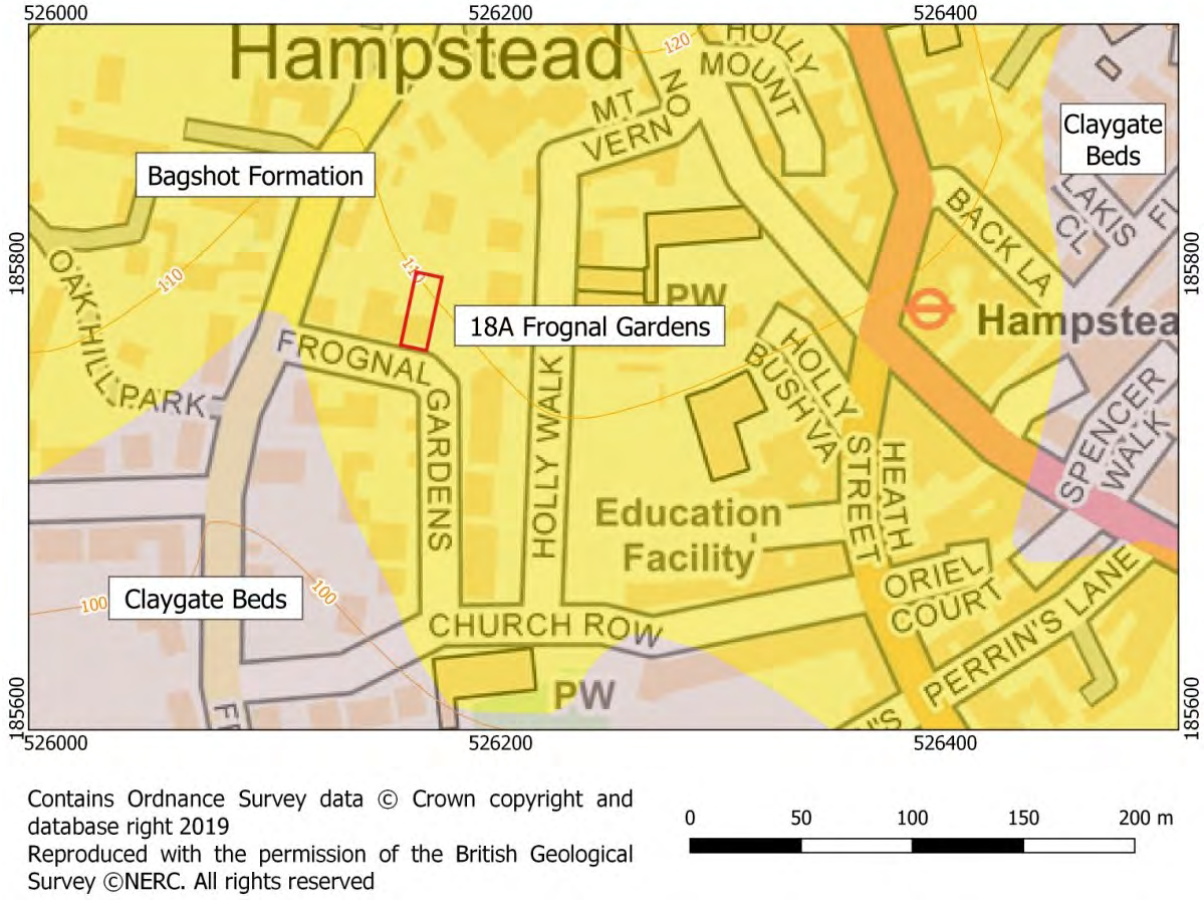

Figure 2.1 Bedrock Geology

The Bagshot Formation can be up to 45 m thick and consists of sandy layers with clayey horizons. The sand layers will often form localised aquifers. Beneath the Bagshot Formation lies the Claygate Beds, a silty clay unit at the top of the London Clay Formation.

Below the Claygate Beds the London Clay is about 105 m thick (at the former Hampstead Brewery borehole[5] (about 620 m to the east of the site) and isolates the main aquifer of the London Basin from the surface.

One borehole[6] was drilled, in 1969, on Back Lane, about 270 m north-east of the site. Ground level at the borehole was 112 m AOD so the stratigraphic sequence in the borehole is similar to that which will be penetrated by the basement. Water was first encountered within the clayey layer at 5.5 m depth (106.5 m AOD), but the rest water level is not recorded in the log on the BGS website.

[5] http://scans.bgs.ac.uk/sobi_scans/boreholes/590586
[6] http://scans.bgs.ac.uk/sobi_scans/boreholes/590682

2.5 Site Investigation Results

Two window sample boreholes and one auger borehole were constructed by Soil Consultants in August 2019. A map of the borehole locations is shown in Figure 2.2, and schematic logs of the boreholes are presented in Figure 2.3.

The upper layer consisting of clayey very silty sand with bands of sandy very silty clay is considered to be the Bagshot Formation, with silty clay of the Claygate Beds or London Clay below.

Standpipes were installed in BH1 and WS1. Water observations are shown in Table 2.1. WS2 was dry, probably because it did not penetrate to the depth of the water strike at adjacent BH1.

Table 2.1 Water observations (m | *m AOD*)

	Ground level (m AOD)	Borehole depth	Water strike	RWL 8/8/19 & 12/8/19	RWL 22/8/19	RWL 4/9/19
WS1	*108.70*	4.0 | *104.7*	3.00 | *105.70*	2.78 | *105.92*	2.37 | *106.33*	2.70 | *106.00*
WS2	*111.45*	5.0 | *106.45*	Dry	No standpipe	No standpipe	No standpipe
BH1	*111.45*	15.0 | *96.45*	5.45 | *106.00*	4.65 | *106.80*	4.67 | *106.78*	4.69 | *106.76*

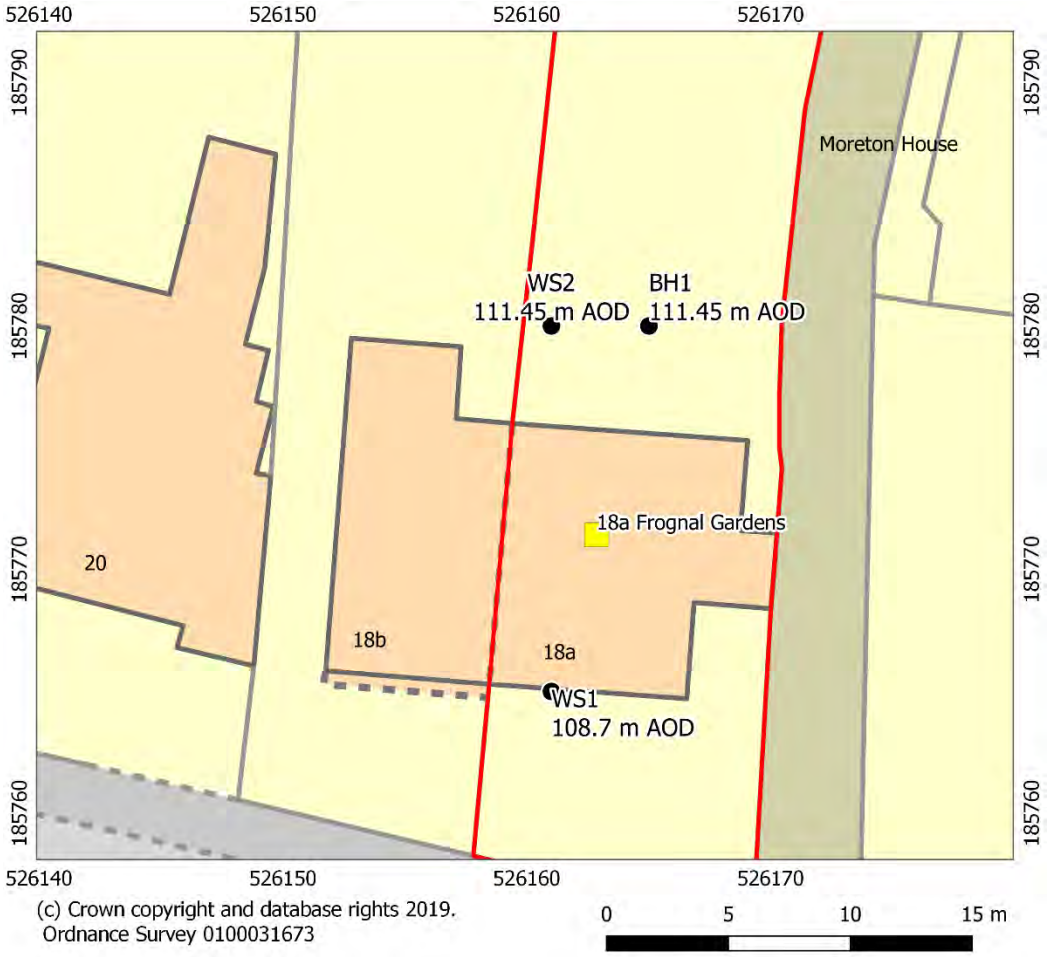

Figure 2.2 2019 borehole locations

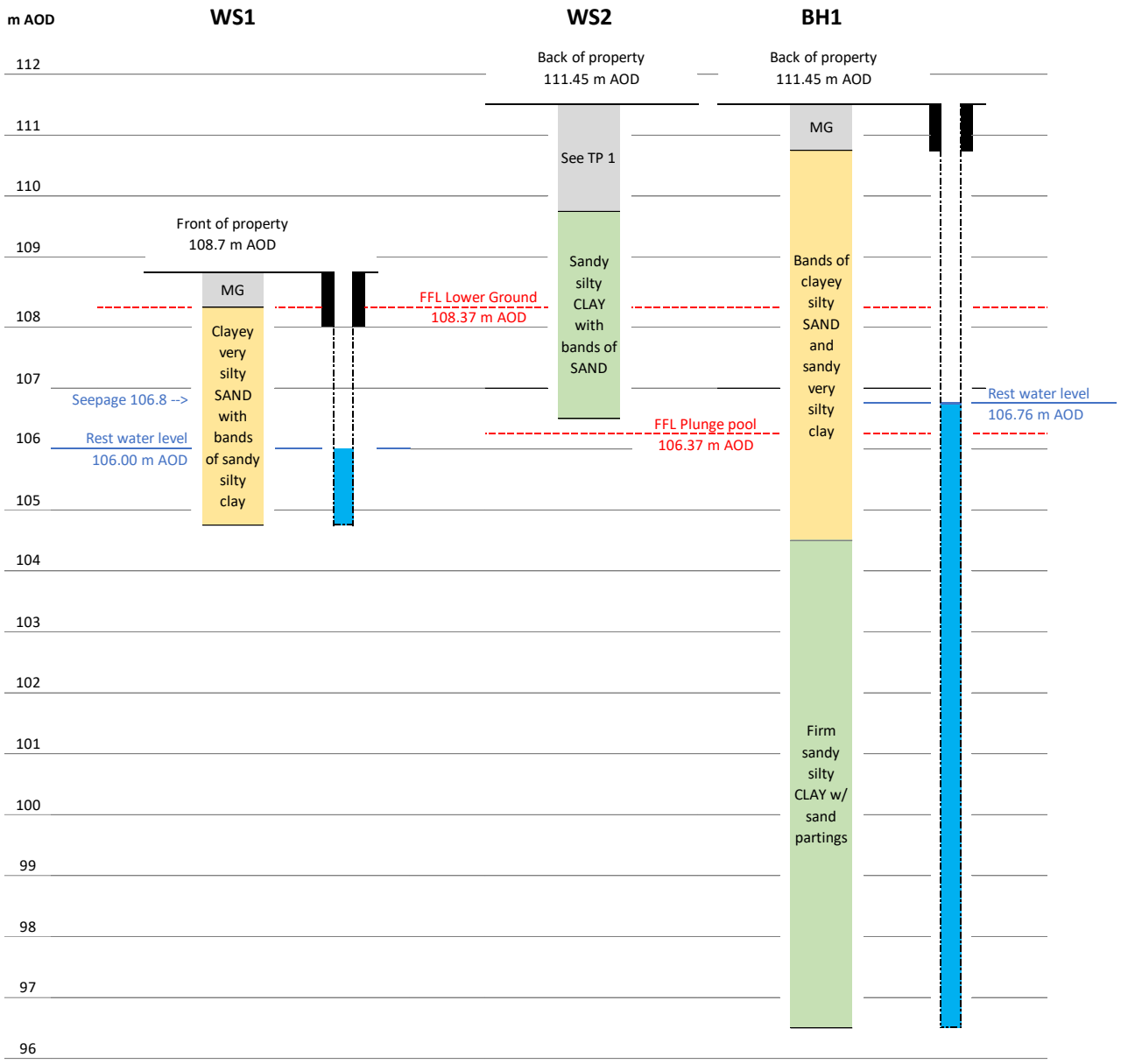

Figure 2.3 Schematic borehole logs

3. Screening Assessment: Groundwater

Subterranean (groundwater) screening follows the procedure outlined in the Camden Planning Guidance: Basements .

1a) Is the site located directly above an aquifer?

YES. The site boreholes indicate that the basement will be constructed within a permeable formation. This is discussed further in Section 5.

1b) Will the proposed basement extend beneath the water table surface?

YES. Rest water levels in borehole BH1 is above the likely base of the plunge pool, but not the main part of the basement. This is discussed further in Section 5.

2) Is the site within 100m of a watercourse, well (used/disused) or potential spring line?

YES. Historical mapping shows the presence of two wells within 100 m to the south-east of the site. It is also believed that the course of a tributary of the lost river Westbourne is within 100 m to the west of the site. This is discussed further in Section 5.

3) Is the site within the catchment of the pond chains on Hampstead Heath?

NO. The nearest pond within the pond chains on Hampstead Heath is the Vale of Heath Pond is at about 105 m AOD, lower than the elevation of the site. There is also a ridge feature between them, and so the site is not within the chain's catchment.

4) Will the proposed basement development result in a change in the proportion of hard surfaced / paved external areas?

YES. There will be a minor increase in impermeable area at the rear of the site, but the FRA proposes that paving at the front be permeable, so that there is overall no significant change in infiltration across the site, so the surface water flow regime will be unchanged.

5) As part of the site drainage, will more surface water (e.g. rainfall and runoff) than at present be discharged to the ground (e.g. via soakaways and/or SUDS)?

NO. Discharge to the ground is not proposed.

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 or spring line?

NO. The nearest surface water body is Whitestone Pond about 540 m north of the site.

4. Screening Assessment: Surface water

Surface flow and flooding screening follows the procedure outlined in Figure 3 (surface flow and flooding screening flowchart) of the Camden Planning Guidance 4 (CPG4) entitled Basements and Lightwells dated 2013.

1) *Is the site within the catchment of the pond chains on Hampstead Heath?*

   NO. Figure 14 of the Camden geological, hydrogeological and hydrological study – Guidance for subterranean development dated 2010, confirms that the site is not located within this catchment area.

2) *As part of the proposed site drainage, will surface water flows (e.g. volume of rainfall and peak run-off) be materially changed from the existing route?*

   NO. There will not be an increase in impermeable area across the site, so the surface water flow regime will be unchanged.

   The basement will largely be beneath the footprint of the building hence the 1 m distance between the roof of the basement and ground surface as recommended by section 3.2 of the CPG Basements 2018 does not apply.

   Due to the requirement of a lightwell across parts of the basement which extends outside of the footprint at the rear, it is not practical to include the 1m distance.

3) *Will the proposed basement development result in a change in the proportion of hard surfaced / paved external areas?*

   YES. Much of the area to the rear of the building that will be replaced by roof and/or underlain by basement currently comprises an existing hard surface beneath a shallow layer of accumulated leaf litter and topsoil). There will be some encroachment of the building onto current green space. However the FRA proposes that paving at the front be permeable, so that there should be overall no significant change in infiltration across the site, so the surface water flow regime will be unchanged.

   The lower ground floor will entirely be beneath the footprint of the future building/hardstanding, therefore the 1m distance between the roof of the lower ground floor and ground surface as recommended by the Arup report and para 2.16 of the CPG4 does not apply.

4) *Will the proposed basement result in changes to the profile of the inflows (instantaneous and long term) of surface water being received by adjacent properties or downstream watercourses?*

   YES. There will be a minor increase in impermeable area at the rear of the site, but the FRA proposes that paving at the front be permeable, so that there is overall no significant change in infiltration across the site, so the surface water flow regime will be unchanged.

5) *Will the proposed basement result in changes to the quality of surface water being received by adjacent properties or downstream watercourses?*

   NO. The proposed basement is very unlikely to result in any changes to the quality of surface water being received by adjacent properties or downstream watercourses as the surface water drainage regime will be unchanged and the land uses will remain the same.

6) *Is the site in an area identified to have surface water flood risk according to either the Local Flood Risk Management Strategy or the Strategic Flood Risk Assessment or is it at risk from flooding, for example because the proposed basement is below the static water level of nearby surface water feature?*

NO. The findings of this BIA together with the Camden Flood Risk Management Strategy dated 2013 and Figures 3iii, 4e, 5a and 5b of the SFRA dated 2014, in addition to the Environment Agency online flood maps show that the site has a very low flooding risk from surface water, sewers, reservoirs (and other artificial sources), and fluvial/tidal watercourses.

It is possible that the basement will be constructed within pockets of groundwater in the Bagshot Beds, and the recommendations outlined in the BIA with regards to water-proofing and tanking of the basement will reduce the risk to acceptable levels.

In accordance with paragraph 6.16 of the CPG a positive pumped device and non-return valve will be installed in the basement in order to further protect the site from sewer flooding.

5. Impact Assessment: Groundwater

5.1 Baseline Conditions

Sub-surface at the site consists of clayey very silty sand with bands of sandy very silty clay, considered to be the Bagshot Formation, with a silty clayey stratum below that is considered to comprise either the Claygate Beds or London Clay (Section 0).

The Bagshot Formation and Claygate Beds are designated as secondary aquifers by the Environment Agency[7]. This describes the sands in the formation as having low permeability, but high storage capacity. As a result, although water abstraction from the formation is reliable, yields are not high.

The sandy horizons of the Bagshot Formation beneath the site are water-bearing. Groundwater level in the Bagshot Formation has been c. 106.8 m AOD at the rear of 18A Frognal Gardens, over the summer of 2019. Groundwater level falls to 106.0 m AOD towards the front of the property, so the hydraulic gradient is approximately southwards, with the slope of the ground.

Groundwater levels were measured at the end of a dry summer, so winter levels are likely to be somewhat higher: ARUP (2010) suggests that the seasonal range of groundwater level fluctuation in the Bagshot Formation is likely c. 0.50 m.

(The presence of local historical wells and the source of a tributary of the River Westbourne is consistent with the groundwater level observations made, i.e. that there are water-bearing horizons in the permeable Bagshot Formation here.)

5.2 Impact Assessment

Typically, when a basement constructed with impermeable walls is placed into a permeable aquifer with flowing groundwater, groundwater level rises upstream of the basement and drops downstream of the basement. The hydraulic gradient of the water table beneath 18A Frognal Gardens falls towards the south, with the ground surface.

The FFL of the plunge pool is to be 106.37 m AOD, so this part of the basement will be excavated below the groundwater level. The summer groundwater level at the rear of the property, where the plunge pool is to be constructed is 106.8 m AOD but winter levels might be up to 107.3 m AOD.

Where the basement intersects with the groundwater level, the water table level will rise closest to the northern edge of the proposed basement. Typically, if the system were to be modelled, the rise in groundwater level might be expected[8] to be no more than 0.05 m at a distance of a few metres from the basement.

The rise in groundwater will occur beneath the garden of the property. Number 18B Frognal Gardens has a lower ground floor the same as number 18A at present. This is, like the floor level at 18A, several metres above the water table. Other deeper basements are beneath 16 Holly Walk

[7] BGS and Environment Agency (2000). The physical properties of minor aquifers in England and Wales http://nora.nerc.ac.uk/id/eprint/12663/

[8] For example, in the ARUP (2010) guidance for subterranean development for Camden Borough Council (paragraph 172), it is stated that: 'The change in water levels is in proportion to the increase in the length of the flow path. In the case of a site measuring 10 m in the direction of groundwater flow, the natural difference in groundwater level might be one or two centimetres.'

(about 30 m to the north-east) and Moreton House (about 40 m to the north-east). At these distances, and not directly up-the hydraulic gradient of the new basement, any rise in groundwater level will be negligible.

While there are some single-storey basements nearby, that may be constructed below the water table, they are separated sufficiently that there is no risk of a cumulative impact.

There may be a slight drop in groundwater level to the south of the new basement. The historical wells were, roughly, to the south but are no longer present and are not considered to be receptors for any change in groundwater level.

The source of the historical River Westbourne tributary is uphill of the site, and considerably above the observed rest water levels (at a horizontal distance of 80 m from 18A Frognal Gardens, the level of the historical spring is likely to have been about 111 m AOD). Any flow that persists will be diverted into Thames Water sewers, and do not feed any watercourse.

6. Conclusions

Potential environmental impacts of the basement development at 18A Frognal Gardens have been considered. The following summary conclusions are made:

- There will be a minor increase in man-made impermeable area, but it is proposed that this is compensated for by the use of permeable paving. Therefore the amount, timing and quality of surface water runoff will not be affected by the development. No additional water will go to ground as a result of the basement development.
- Available geological and hydrogeological information indicates there is an aquifer layer, the Bagshot Formation, beneath the site that water-bearing.
- Basement excavation is likely to intercept the water table, and construction of the plunge pool (though not the main basement structure) will intercept the water table permanently. A slight rise in groundwater level up-gradient of the new basement is therefore to be expected.
- Potential receptors for changing groundwater levels have been identified but a) the impact on groundwater level at a distance more than 5 m is likely to be un-measurable, and b) all potential receptors are either above the water table or several tens of metres from the new basement. Therefore there is negligible risk of impacting any of the identified receptors.

These conclusions are considered to be robust and no further investigations are recommended.

PROPOSED REPLACEMENT DWELLING AND BASEMENT LEVEL AT NUMBER 18A FROGNAL GARDENS, CAMDEN, LONDON

FLOOD RISK ASSESSMENT

AUGUST 2019

REPORT REF: 2351/RE/08-19/01

Evans Rivers and Coastal Ltd
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CONTRACT

Evans Rivers and Coastal Ltd has been commissioned by Stephen Buss Environmental Consulting Ltd to carry out a Flood Risk Assessment for a proposed redevelopment at number 18A Frognal Gardens, Camden, London.

QUALITY ASSURANCE, ENVIRONMENT AND HEALTH AND SAFETY

Evans Rivers and Coastal Ltd operates a Quality Assurance, Environmental, and Health and Safety Policy.

This project comprises various stages including data collection; depth analysis; and reporting. Quality will be maintained throughout the project by producing specific methodologies for each work stage. Quality will also be maintained by providing specifications to third parties such as surveyors; initiating internal quality procedures including the validation of third party deliverables; creation of an audit trail to record any changes made; and document control using a database and correspondence log file system.

To adhere to the Environmental Policy, data will be obtained and issued in electronic format and alternatively by post. Paper use will also be minimised by communicating via email or telephone where possible. Documents and drawings will be transferred in electronic format where possible and all waste paper will be recycled. Meetings away from the office of Evans Rivers and Coastal Ltd will be minimised to prevent unnecessary travel, however for those meetings deemed essential, public transport will be used in preference to car journeys.

The project will follow the commitment and objectives outlined in the Health and Safety Policy operated by Evans Rivers and Coastal Ltd. All employees will be equipped with suitable personal protective equipment prior to any site visits and a risk assessment will be completed and checked before any site visit. Other factors which have been taken into consideration are the wider safety of the public whilst operating on site, and the importance of safety when working close to a water source and highway. Any designs resulting from this project and directly created by Evans Rivers and Coastal Ltd will also take into account safety measures within a “designers risk assessment”.

Report carried out by:

Rupert Evans, BSc (Hons), MSc, CEnv, C.WEM, MCIWEM, PIEMA

DISCLAIMER

This report has been written and produced for Stephen Buss Environmental Consulting Ltd. No responsibility is accepted to other parties for all or any part of this report. Any other parties relying upon this report without the written authorisation of Evans Rivers and Coastal Ltd do so at their own risk.

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CONTENTS

1. INTRODUCTION

1.1 Project Scope

1.1.1 Evans Rivers and Coastal Ltd has been commissioned by Stephen Buss Environmental Consulting Ltd to carry out a Flood Risk Assessment for a proposed redevelopment at number 18A Frognal Gardens, Camden, London.

1.1.2 It is understood that this Flood Risk Assessment will be submitted to the Planning Authority as part of a planning application. Specifically, this assessment intends to:

a) Review any literature and guidance specific to this area;

b) Assess the risks to people and property and propose mitigation measures accordingly;

c) Review existing evacuation and warning procedures for the area;

d) Carry out an appraisal of flood risk from all sources as required by NPPF;

e) Report findings and recommendations.

1.1.3 This assessment is carried out in accordance with the requirements of the National Planning Policy Framework (NPPF) dated 2019. Other documents which have been consulted include:

- DEFRA/EA document entitled *Framework and guidance for assessing and managing flood risk for new development Phase 2 (FD2320/TR2)*, 2005;
- DEFRA/Jacobs 2006. *Groundwater flooding records collation, monitoring and risk assessment (ref HA5)*.
- National Planning Practice Guidance – Flood Risk and Coastal Change.
- Woods-Ballard., et al. 2015. *The SUDS Manual, Report C753*. London: CIRIA.
- National SUDS Working Group. 2004. *Interim Code of Practice for Sustainable Drainage Systems*.
- London Borough of Camden Preliminary Flood Risk Assessment (PFRA) Version 0.2 dated 2011.
- London Borough of Camden Strategic Flood Risk Assessment (SFRA) dated 2014.
- London Borough of Camden Surface Water Management Plan (SWMP) Version 1 dated 2011.
- London Borough of Camden flood risk management strategy (FRMS) dated 2013.
- *Camden Planning Guidance – Water and Flooding* dated 2018.
- *Camden Planning Guidance – Basements* dated 2018.

2. DATA COLLECTION

2.1 To assist with this report, the data collected included:

- 1:250,000 *Soil Map of South East England* (Sheet 6) published by Cranfield University and Soil Survey of England and Wales 1983.
- Ordnance Survey 1:10,000 street view map obtained via Promap (Evans Rivers and Coastal Ltd OS licence number 100049458).
- 1:625,000 *Hydrogeological Map of England and Wales*, published in 1977 by the Institute of Geological Sciences (now the British Geological Survey).
- Filtered LIDAR data at 1m resolution.
- British Geological Survey, *Online Geology of Britain Viewer*.
- British Geological Survey, *Groundwater Susceptibility Map*.
- Borehole logs undertaken by Soil Consultants.
- Topographical survey of the site as shown on Drawing Number 5594-14JAN19-01.

3. SITE CHARACTERISTICS

3.1 Existing Site Characteristics and Location

3.1.1 The site is located at number 18A Frognal Gardens, Camden, London. The approximate Ordnance Survey (OS) grid reference for the site is 520773 183953 and the location of the site is shown on Figure 1.

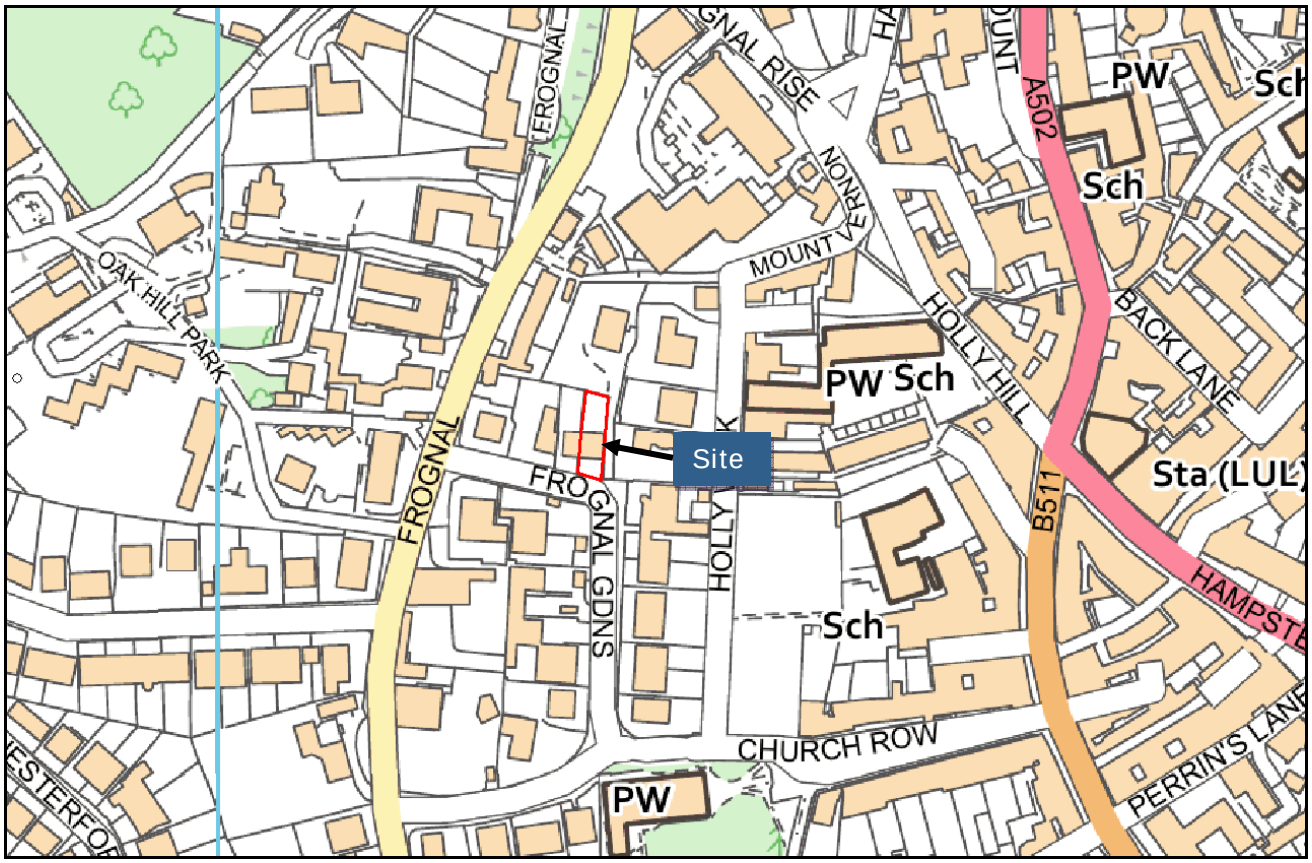

Figure 1: Site location plan (Source: Ordnance Survey)

3.1.2 The site comprises a three-storey dwelling with garage, bedroom, utility and boiler room across lower ground floor areas and living/sleeping areas across upper floors. As the site rises in a northerly direction the ground floor is cut into the ground slope which provides level access onto the rear garden from the upper ground floor.

3.1.3 The rear garden is partially paved and a driveway exists at the front of the property which leads onto Frognal Gardens. The existing site layout can be seen on Drawing Numbers 5594-14JAN19-01, 5594-14JAN19-02 and 5594-14JAN19-08.

3.1.4 A topographical survey of the site is shown on Drawing Number 5594-14JAN19-01. Filtered LIDAR data at 1m resolution has also been obtained to determine and illustrate the topography of the site and surrounding area (Figure 2).

3.1.5 By reviewing the site layout and LIDAR data it can be seen that ground levels rise in a northerly direction.

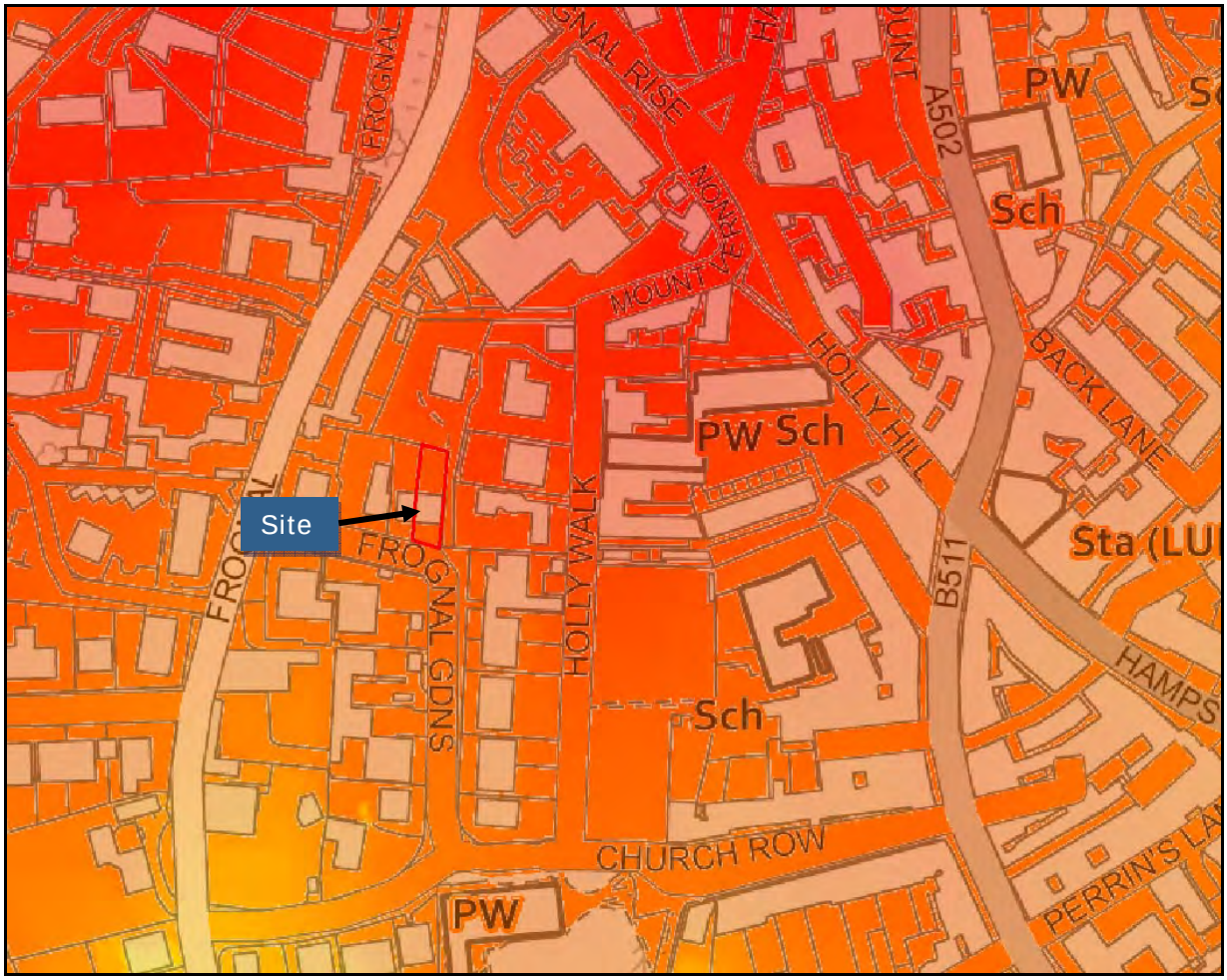

Figure 2: LIDAR survey data where higher ground is denoted as red, orange and yellow colours and lower areas denoted by blue and green colours

3.2 Site Proposals

3.2.1 It is the Client's intention to redevelop the site by demolishing the existing building and erecting a new dwelling together with a lower ground floor which will extend further below ground level into the rear garden and front driveway.

3.2.2 The site proposals can be seen on Drawing Number ABA-2473-20-023 and ABA-2473-20-099.

4. SOURCES OF FLOODING

4.1 Fluvial

4.1.1 The Environment Agency Flood Map shows that the site is located within the NPPF Flood Zone 1, 'Low Probability' which comprises land as having less than a 1 in 1000 year annual probability of fluvial or tidal flooding (i.e. an event more severe than the extreme 1 in 1000 year event). NPPF states that all uses of land are appropriate in this zone.

4.1.2 The SFRA also states that there has been no historical flooding within the Borough from fluvial or tidal sources.

4.1.3 The SFRA and SWMP states that all main rivers historically located within the Borough are now culverted and incorporated into the sewer network. The SWMP discusses the River Fleet which is one of London's "lost rivers" and which historically originates from springs on Hampstead Heath and drains to the Thames through the Borough. The Fleet is entirely incorporated within the sewer network.

4.1.4 The SFRA continues to discuss the Borough's historic rivers and in addition to the Fleet, the Tyburn, Kilburn and Brent were also located in the area of Hampstead Heath. All of these "lost rivers" are also now incorporated into the local sewer system maintained by Thames Water. It is for these reasons that the Borough is located entirely within Flood Zone 1.

4.2 Critical Drainage Areas (CDA)

4.2.1 Despite the site being located within Flood Zone 1, it is understood from Figure 6/Rev 2 of the SFRA and Figure 3.1 of the SWMP, that the site is located within the Group3-010 Critical Drainage Area (CDA).

4.2.2 The SWMP defines the CDA as:

"A discrete geographic area (usually a hydrological catchment) where multiple and interlinked sources of flood risk (surface water, groundwater, sewer, main river and/or tidal) cause flooding in one or more Local Flood Risk Zones during severe weather thereby affecting people, property or local infrastructure."

4.2.3 The site is also located adjacent to, and possibly partially within, the Frognal Lane Local Flood Risk Zone (LFRZ).

4.2.4 The SWMP defines the LFRZ as:

"…discrete areas of flooding that do not exceed the national criteria for a 'Flood Risk Area' but still affect houses, businesses or infrastructure. A LFRZ is defined as the actual spatial extent of predicted flooding in a single location."

4.3 Groundwater Flooding

4.3.1 In addition to the information provided in the SFRA and SWMP, in order to assess the potential for groundwater flooding, the Jacobs/DEFRA report entitled *Strategy for Flood and Coastal Erosion Risk Management: Groundwater Flooding Scoping Study*, published in May 2004, was consulted, together with the guidance offered within the document entitled *Groundwater flooding records collation, monitoring and risk assessment (ref HA5)*, commissioned by DEFRA and carried out by Jacobs in 2006.

4.3.2 The various soil and geological data outlined in Chapter 2, together with Figure 4b/Rev 1 of the SFRA indicates that the soils beneath the site comprise made ground overlying clay, silt and sand.

4.3.3 Figure 4e/Rev 1 of the SFRA shows that the site has not been affected in the past from groundwater flooding incidents (although there has been an incident 136m south east of the site), and that the site is not located within an area of increased susceptibility to elevated groundwater.

4.3.4 Paragraphs 2.10.4 and 2.10.6 of the SFRA states that the Claygate Member has a low permeability but is likely to permit moderate infiltration. The borehole logs indicate that perched water is present at a depth of between 2.78m bgl and 5.45m bgl with some seepage at 1.90m bgl.

4.3.5 The lower ground floor will need to be designed to achieve a Grade 3 level of waterproofing protection as outlined in BS8102:2009. A new reinforced concrete lining wall and ground-bearing concrete slab should be constructed using water resistant concrete to form the primary barrier. Appropriate groundwater control such as sump pumping may be required especially during the construction phase.

4.4 Surface Water Flooding and Sewer Flooding

4.4.1 Surface water and sewer flooding across urban areas is often a result of high intensity storm events which exceed the capacity of the sewer thus causing it to surcharge and flood. Poorly maintained sewer networks and blockages can also exacerbate the potential for sewer flooding.

Surface Water Flooding

4.4.2 It has been established that the site lies within the Group3-010 Critical Drainage Area. The SFRA notes that the surface water mapping indicates that the surface water flood extent broadly follows the natural topography of the borough and man-made features such as roads and rail lines. During extreme modelling scenarios, the SFRA states that there is increased ponding in areas of properties.

4.4.3 The SFRA discusses the two large surface water flooding events in the Borough, which occurred in 1975 and 2002 and caused widespread damage. It is understood that during these events the sewers reached maximum capacity. Figure 3iii/Rev 1 of the SFRA shows that Frognal Gardens was affected during the 1975 event but not the site.

4.4.4 Figure 3iii/Rev 1 of the SFRA and the Agency's Surface Water Flooding Map (Figure 3) indicates that there is a very low surface water flood risk across the site and Frognal Gardens (i.e. chance less than 1 in 1000 years).

4.4.5 It is generally accepted that the low risk flood event (i.e. between 1 in 1000 years and 1 in 100 years) on the Agency's map is used as a substitute for the climate change 1 in 100 year event to provide a worst-case scenario.

4.4.6 People should make a judgment on leaving or accessing the site before, during or after the event in relation to any external flood hazard. The data across the wider area indicates that the preferred evacuation route away from the site is in a southerly direction along Frognal Gardens (Figure 4).

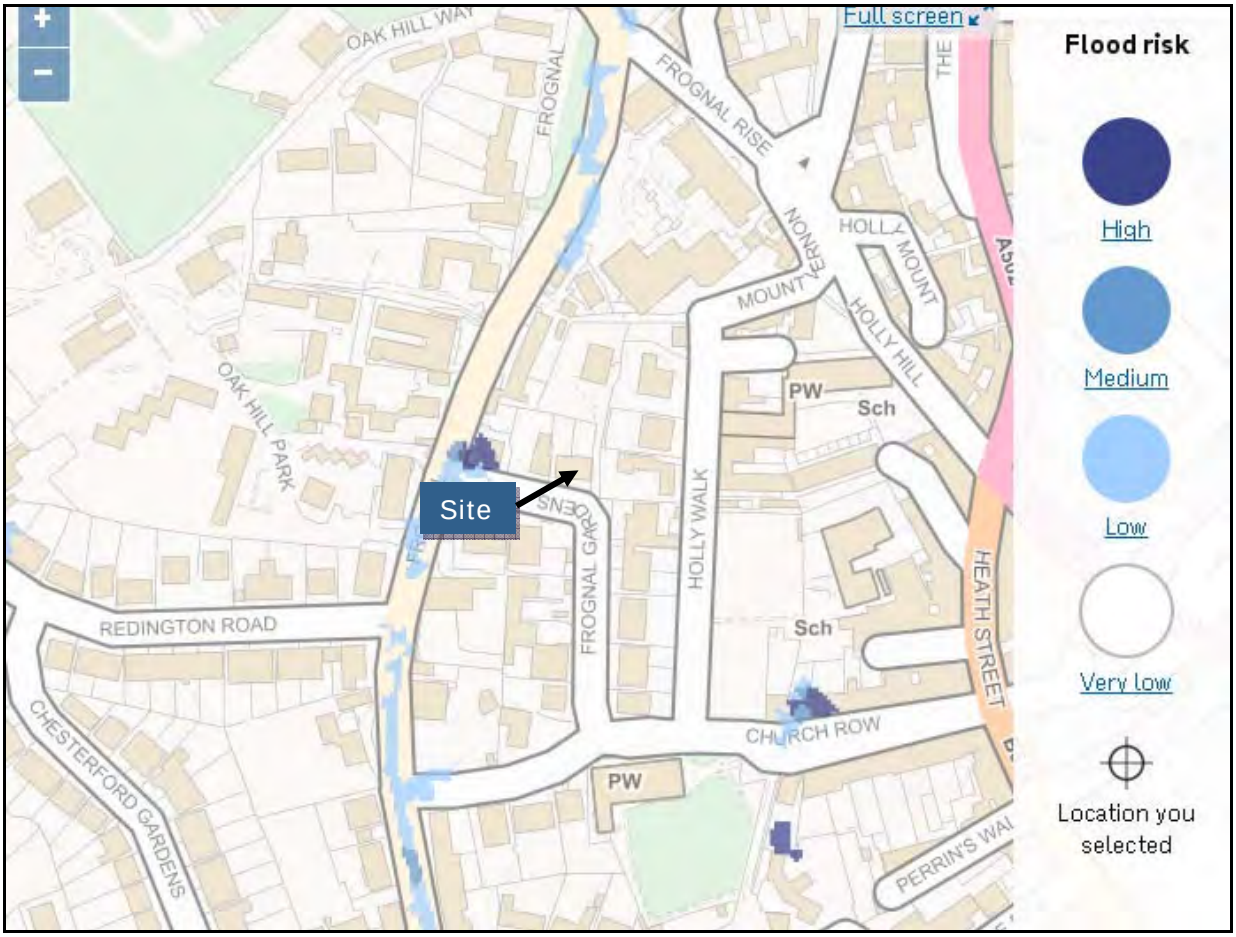

Figure 3: Environment Agency Surface Water Flooding Map (Source: Environment Agency, 2019)

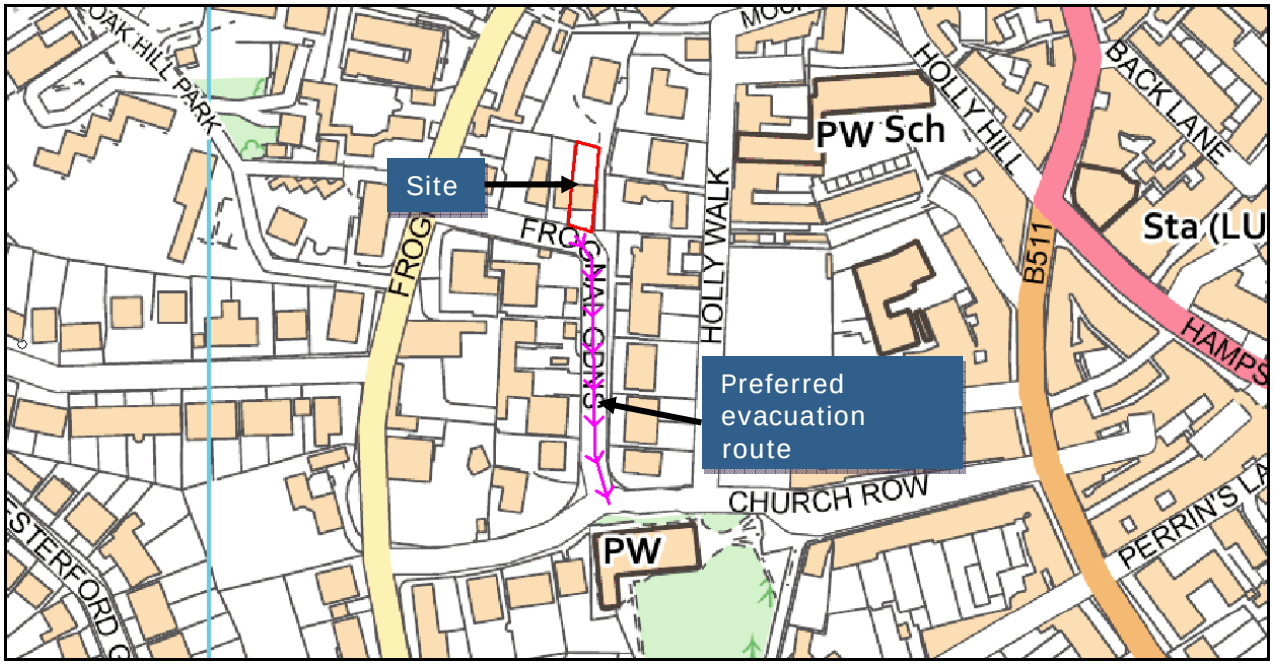

Figure 4: Preferred evacuation route

Sewer Flooding

4.4.7 Figure 5a/Rev 1 of the SFRA indicates that the site is located across an area which has had no internal recorded sewer flooding incidents. Figure 5b/Rev 1 of the SFRA that the site is located across an area which has had no external sewer flooding incidents.

4.4.8 It is considered that there is an overall low risk of sewer flooding at the site.

4.4.9 It is considered that the site should be fitted with a positive pumped device so that it will be protected further from sewer flooding.

4.4.10 In addition to the pumped device there should be a non-return valve (e.g. http://www.forgevalves.co.uk/) installed so that if the sewers become completely full during a heavy storm, foul water does not backflow into the property.

4.4.11 This approach is recommended in section 6.16 of the *Camden Planning Guidance – Basements* dated 2018.

4.5 Reservoirs, Canals And Other Artificial Sources

4.5.1 The failure of man-made infrastructure such as flood defences and other structures can result in unexpected flooding. Flooding from artificial sources such as reservoirs, canals and lakes can occur suddenly and without warning, leading to high depths and velocities of flood water which pose a safety risk to people and property.

4.5.2 The Environment Agency's "Risk of flooding from reservoirs" map suggests that the site is not at risk from reservoirs.

5. SURFACE WATER DRAINAGE AND SUDS

5.1 Policy 5.13 in Chapter 5 of the London Plan dated March 2015, requires sustainable drainage systems (SUDS) to be installed where appropriate and in line with the drainage hierarchy in order for runoff to be managed as close to its source as possible. The London Plan states that SUDS should be utilised unless there are practical reasons for not doing so.

5.2 Overall, there will not be a net increase in impermeable area as a result of the proposals and the proposed lower ground floor will extend beneath the currently paved rear garden area and across the front driveway.

5.3 Opportunities for incorporating SUDS across the site have been identified and consist of the replacement of existing impermeable surfaces at the front of the site with permeable paving (i.e. across the driveway), together with additional planting across part of the lower ground roof area at the front of the property.

5.4 This will result in a net reduction in impermeable area across the site. Therefore, there will not be an increase in runoff rate or runoff volume as a result of the proposed development.

6. CONCLUSIONS

- The site is located within Flood Zone 1.
- This assessment has investigated the possibility of groundwater flooding and flooding from other sources at the site. It is considered that there will be a moderate risk of groundwater flooding which will be mitigated by tanking of the lower ground floor.
- There is a very low surface water flood risk across the site and along Frognal Gardens.
- There is a low sewer flooding risk, however, it is considered that the site should be fitted with a positive pumped device so that it will be protected further from sewer flooding. In addition to the pumped device there should be a non-return valve (e.g. http://www.forgevalves.co.uk/) installed so that if the sewers become completely full during a heavy storm, foul water does not backflow into the property.
- There will not be an increase in surface water runoff from the site and there will be no net increase in impermeable area. Existing impermeable hardsurfaces at the front of the property will be retrofitted using SUDS permeable paving which will lead to a net reduction in impermeable area and runoff.

7. BIBLIOGRAPHY

i. *Camden Planning Guidance – Basements* dated 2018.

ii. *Camden Planning Guidance – Water and Flooding* dated 2018.

iii. Communities and Local Government 2018. *National Planning Policy Framework.*

iv. DEFRA/EA 2005. *Framework and guidance for assessing and managing flood risk for new development, Phase 2, Flood and Coastal Defence R&D Programme, R&D Technical Report FD2320/TR2*. Water Research Council.

v. DEFRA/Jacobs 2004. *Strategy for Flood and Coastal Erosion Risk Management: Groundwater Flooding Scoping Study (LDS), Final Report, Volumes 1 and 2*.

vi. Geological Society of London 2006. *Groundwater and Climate Change.* Geoscientist magazine, Volume 16, No 3.

vii. Institute of Geological Sciences 1977. *Hydrogeological Map of England and Wales,* 1:625,000. NERC.

viii. London Borough of Camden Preliminary Flood Risk Assessment (PFRA) Version 0.2 dated 2011.

ix. London Borough of Camden Strategic Flood Risk Assessment (SFRA) dated 2014.

x. London Borough of Camden Surface Water Management Plan (SWMP) Version 1 dated 2011.

xi. London Borough of Camden flood risk management strategy (FRMS) dated 2013.

xii. Water UK 2012. *Sewers for Adoption 7th Edition, A design and construction guide for developers*. Water Research Council.

DRAWINGS

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Title	No.18a Frognal Gardens, Hampstead, London NW3 6XA - Topographic Survey
Client	Roger Pilgrim
Date	January 2019
Drawing No.	5594-14JAN19-01
Plot scale	1 : 200 on A1 Sheet
Digital scale	1 CAD unit : 1 metre
Revision	
Surveyed	BPF
Checked	JKW

0 metres 10

N
Ordnance Survey Grid North

Notes

- Datum : Ordnance Survey Level datum via OS Active GPS Network
- Survey Grid :Ordnance Survey National Grid Co-ordinates derived via OS Active GPS Network.
- Survey contents correct as of date of survey and survey undertaken to agreed specification
- All critical dimensions to be checked prior to site works
- All kerb levels shown are channel levels
- Drainage and Service covers :
  Covers buried or obscured at the time of the survey are not shown. Manholes have not been entered for safety reasons and all pipe diameters are estimated from the surface. Drainage pipe diameters are in millimetres, eg. D100 means a 100mm diameter pipe. The flow type stated is based on visual evidence seen from the surface at the time of the survey. All internal manhole details should be confirmed by the contractor on site prior to site works.
- Trees :
  For concentric spread trees the spread plotted is an average value drawn to scale to the nearest metre. The minimum individual diameter surveyed is 0.10m at 1m up the trunk from the ground. Trunk diameters are not plotted to size. General species are only stated where noted. A qualified arboriculturalist should be consulted for species type and condition. Heights (when requested) are approximate to the nearest metre.

Legend of Abbreviations

AV	Air Valve
BEDS	Flower Beds
BK/W	Brick Wall
BLK/W	Block Wall
BOL	Bollard
BS	Brick Setts
BT	British Telecom
BW	Barbed Wire Fence
CB	Close Board Fence
CCTV	Closed Circuit Television Camera
CELL	Cellar Cover
CGI	Corrugated Iron Fence
CL	Cover Level
C/L	Chain Link Fence
CONC	Concrete Surface
CONC/P	Concrete Panel Fence
CP	Chestnut Paling Fence
CRB	Crash Barrier
D	Diameter (trees in metres / drainage pipes in millimetres)
DK	Drop Kerb
E	Electricity Cover
EP	Electricity Pole
ER	Earth Rod
FFL	Finished Floor Level
FH	Fire Hydrant
FLAG	Flag Pole
FLP	Floodlight Post
FP	Footpath
G	Gully
GV	Gas Valve
HW	Head Wall
IC	Inspection Cover
IL	Invert Level
IR	Iron Railing
LL	Larch-lap Fence
LP	Lamp Post
MB	Multibole Tree
MH	Manhole
MP	Marker Post
MP-E	Marker Post - Electric
MP-G	Marker Post - Gas
MP-T	Marker Post - Telephone
MP-W	Marker Post - Water
NAME	Road Nameplate
PAL	Palisade Fence
POK	Top of Kerb Level
PR	Post and Rail Fence
PW	Post and Wire Fence
RE	Rodding Eye
RET	Retaining
RS	Road Sign
RWP	Rainwater Pipe
SCK	Stop Cock
SOF	Soffit Level
ST/W	Stone Wall
SV	Sluice Valve
SVP	Soil Vent Pipe
TEL	Call Box (telephone)
TH	Threshold Level
TL	Traffic Light
TP	Telegraph Pole
TV	Cable Television
UTL	Unable to Lift (Cover)
V	Valve (Unknown Type)
VP	Vent Pipe
W-HT	Top of Wall Level
WL	Water Level
WM	Water Meter
W/M	Wire Mesh Fence
WO	Washout Valve
WV	Water Valve

Tree Abbreviations

ALD	Alder
BCH	Beech
CED	Cedar
CHE	Cherry
CYP	Cypress
ELD	Elder
EUC	Eucalyptus
FAC	False Acacia
FRT	Fruit
HAW	Hawthorn
HAZ	Hazel
HOL	Holly
HORN	Hornbeam
HCH	Horse Chestnut
LAR	Larch
LAU	Laurel
MAP	Maple
PLN	London Plane
POP	Poplar
RHO	Rhododendron
ROW	Rowan
SAL	Sallow
SB	Silver Birch
SCH	Sweet Chestnut
WBM	Whitebeam
WIL	Willow

Survey Stations

Station	Easting	Northing	Level
S001	526154.202	185747.253	107.578
S002	526140.202	185750.382	106.544
S003	526115.583	185755.936	104.836
S004	526103.027	185759.993	103.980
S005	526172.518	185754.684	109.017
S006	526166.597	185725.902	106.917
S007	526166.935	185744.294	108.227
S008	526166.440	185778.972	111.446
S009	526163.816	185791.852	112.035
S01A	526162.488	185761.697	108.596
S01B	526169.204	185765.625	110.312
S02A	526152.373	185781.248	110.290
S02B	526159.092	185789.928	110.660
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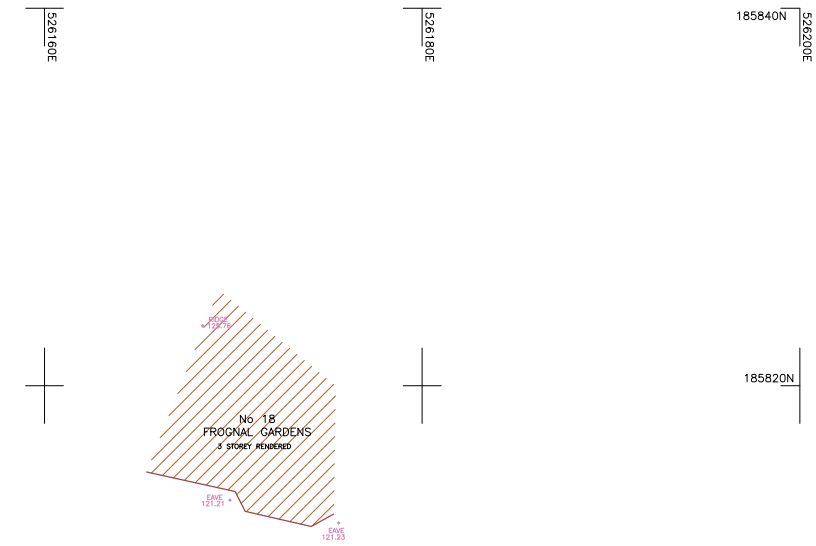

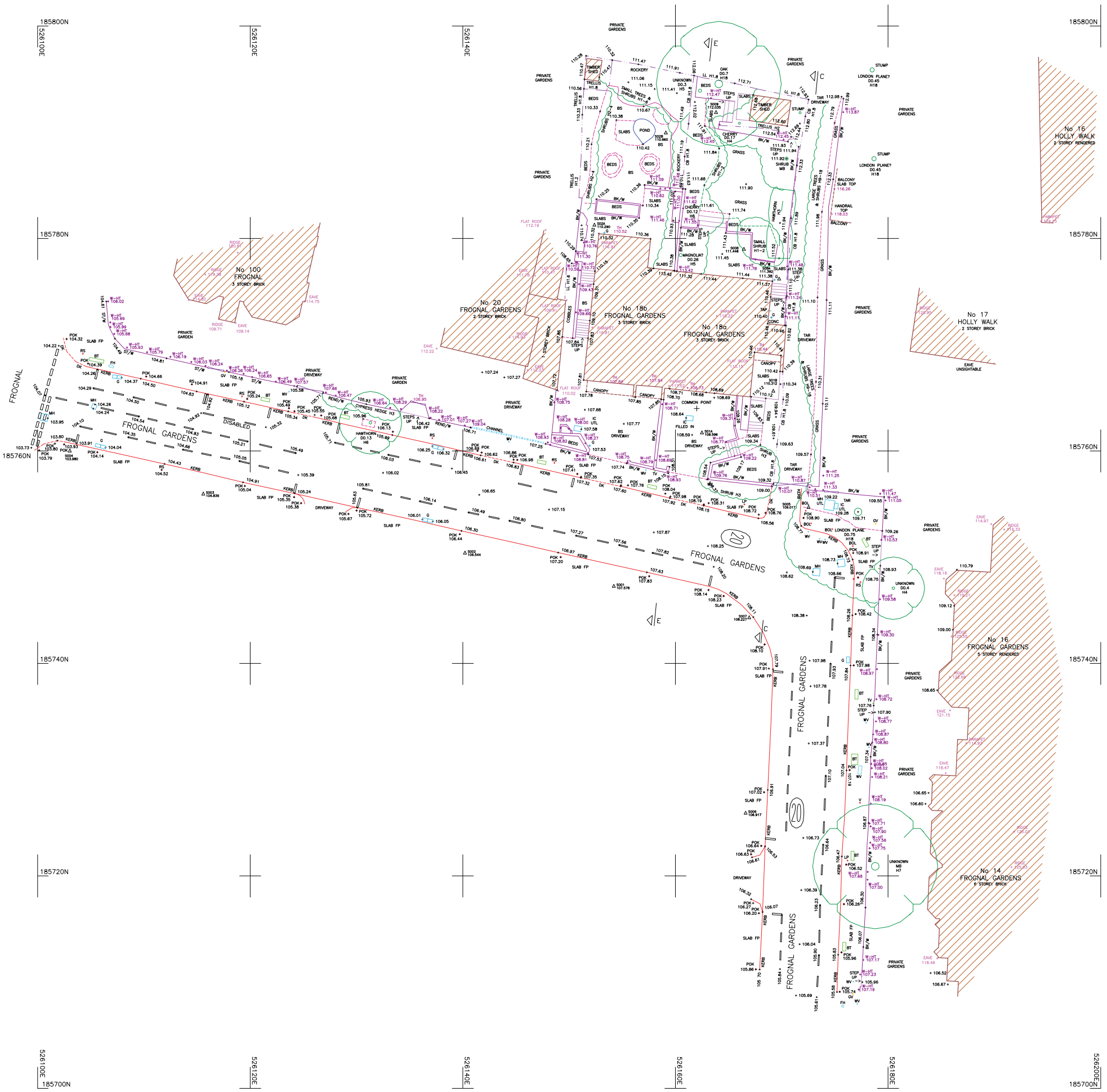

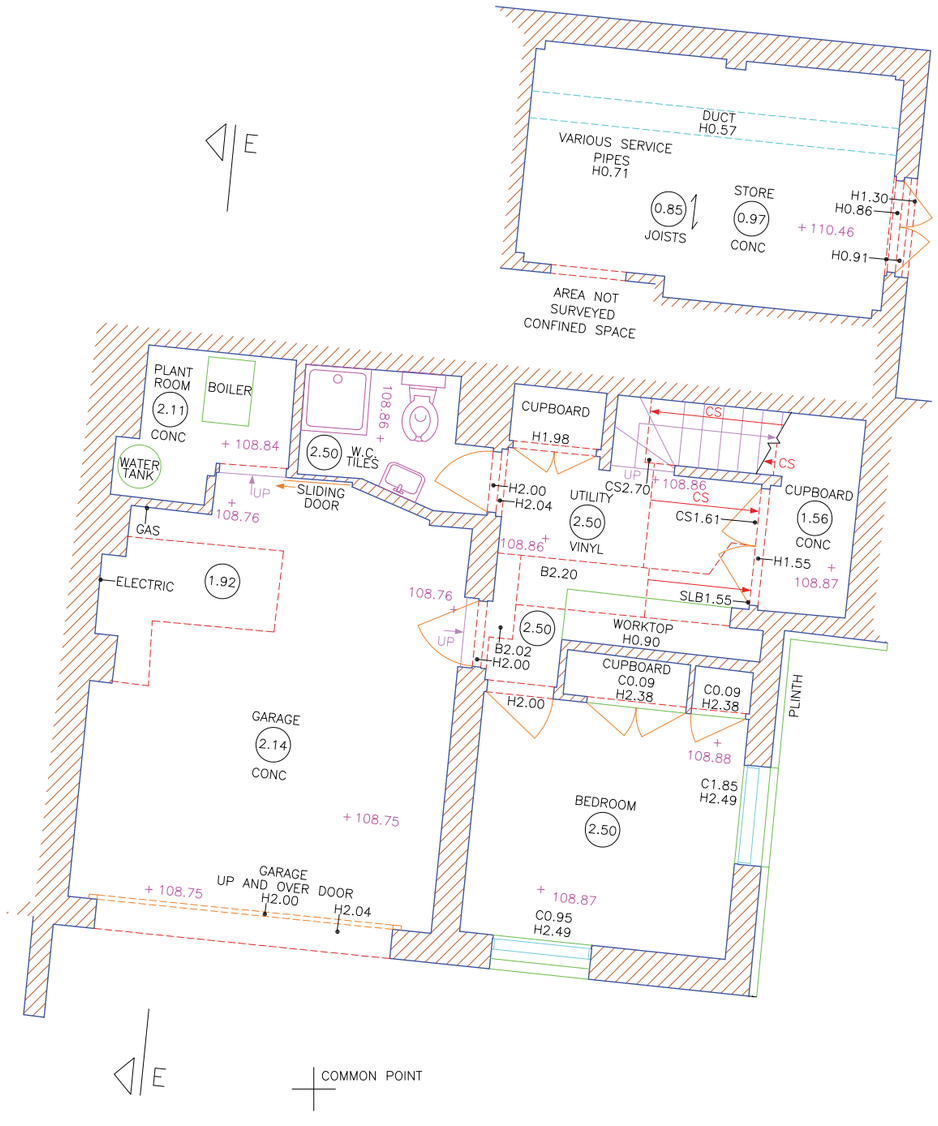

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- Datum : Ordnance Survey Level datum via OS Active GPS Network
- Survey Grid : Ordnance Survey National Grid Co-ordinates derived via OS Active GPS Network.
- Survey contents correct as of date of survey and survey undertaken to agreed specification
- All critical dimensions to be checked prior to site works
- All floor coverings are carpet unless stated otherwise

Legend of Abbreviations

B	Beam underside height
C	Internal cill height from the floor
CL	Cover level
CS	Ceiling slope height from the floor
F/C	False ceiling
FFL	Finished floor level
G	Gully
H	Internal head height from the floor
IC	Inspection cover
IL	Invert level
MH	Manhole
P	Purlin underside height
R	Ridge underside height
RWP	Rainwater pipe
SLB	Sloping beam
SP	Internal arch spring height from the floor
SVP	Soil vent pipe
U/S	Underside height
+10.00	Floor level
(2.50)	Floor to ceiling height
	Boxing
	Hatching indicates extent of structure
	Overhead feature, eg. beam, ceiling slope, opening
	Direction of floorboards or joists
	Up for stairs
	Down for ceiling slopes

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Title	No.18a Frognal Gardens, Hampstead, London NW3 6XA - Lower Ground Floor Plan
Client	Roger Pilgrim
Date	January 2019
Drawing No.	5594-14JAN19-02
Plot scale	1 : 50 on A2 Sheet
Digital scale	1 CAD unit : 1 metre
Revision	
Surveyed	BPF
Checked	JKW

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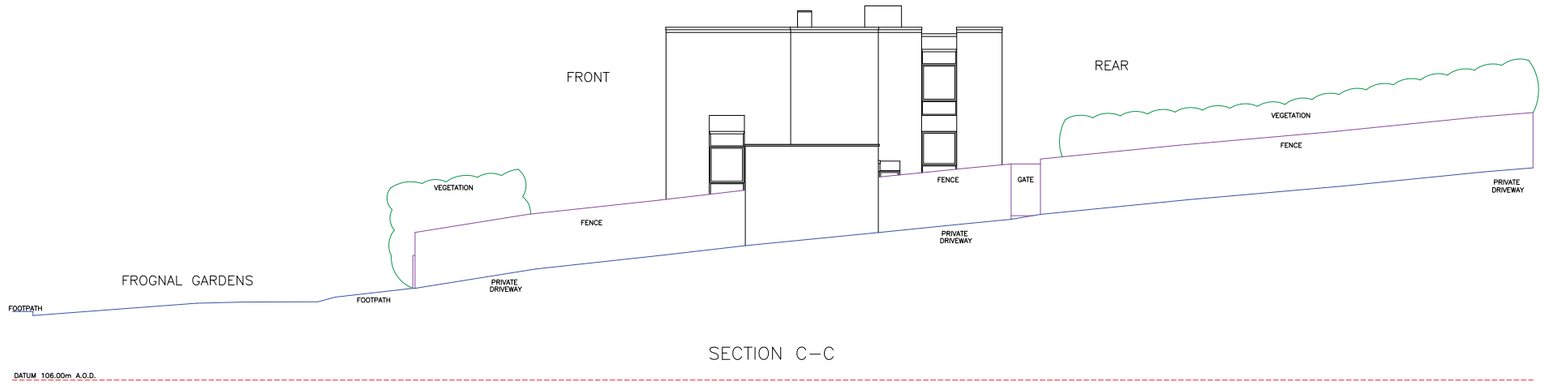
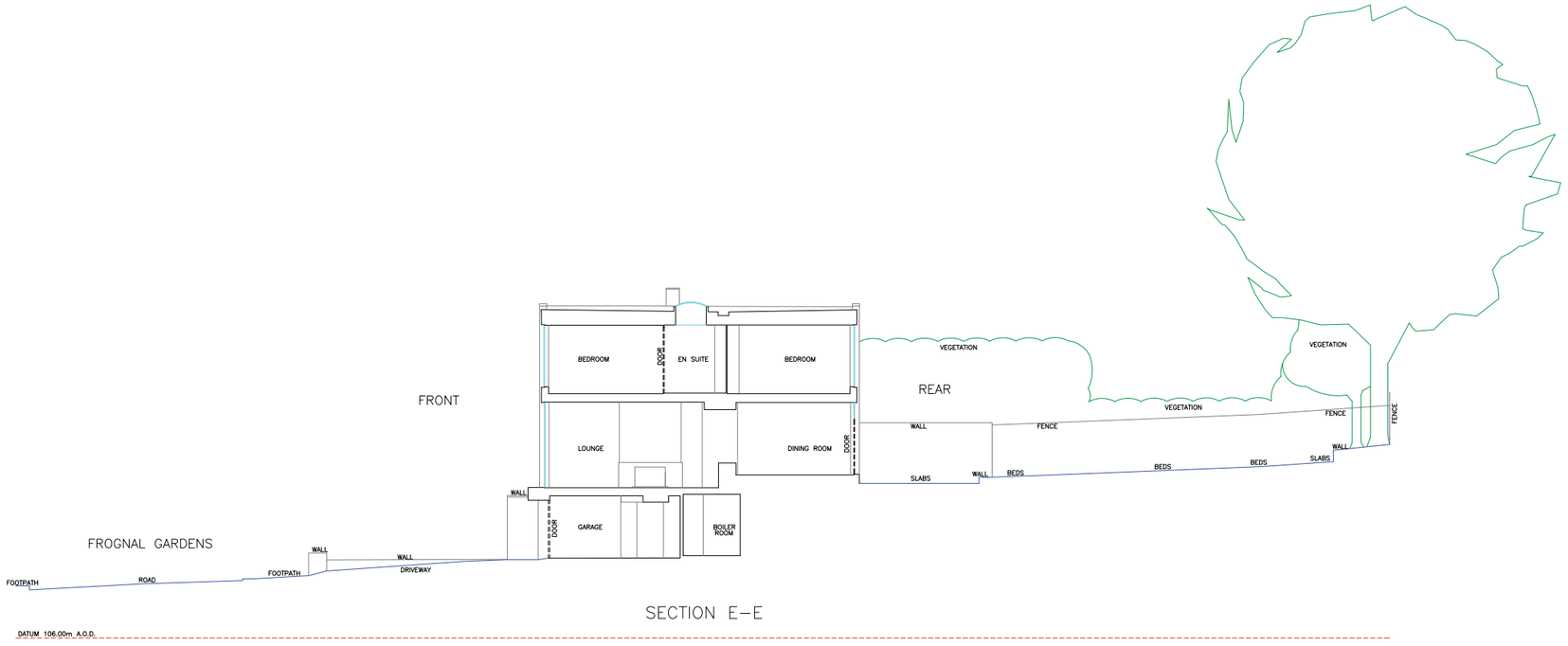
Ordnance Survey Grid North



SECTION C–C



SECTION E–E

Notes

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Title	No.18a Frognal Gardens, Hampstead, London NW3 6XA - Sections
Client	Roger Pilgrim
Date	January 2019
Drawing No.	5594-14JAN19-08
Plot scale	1 : 100 on A1 Sheet
Digital scale	1 CAD unit : 1 metre
Revision	
Surveyed	BPF
Checked	JKW

0 metres 5

Notes

Boundary Line

Rev	Date	Description

Note

Do not scale from this drawing. To be read in conjuction with all relevant Architects', Services and Structural Engineer' information. Architect to be immediately notified of discrepancies.

Key Plan

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18a Frognal Gardens

Client:
Roger Pilgrim & Nadine Majaro

Project Number: **2473**

Status: **For Approval**

Drawing Title:
Floor plan - Ground Floor

Date: **12/10/2020 16:18:09**

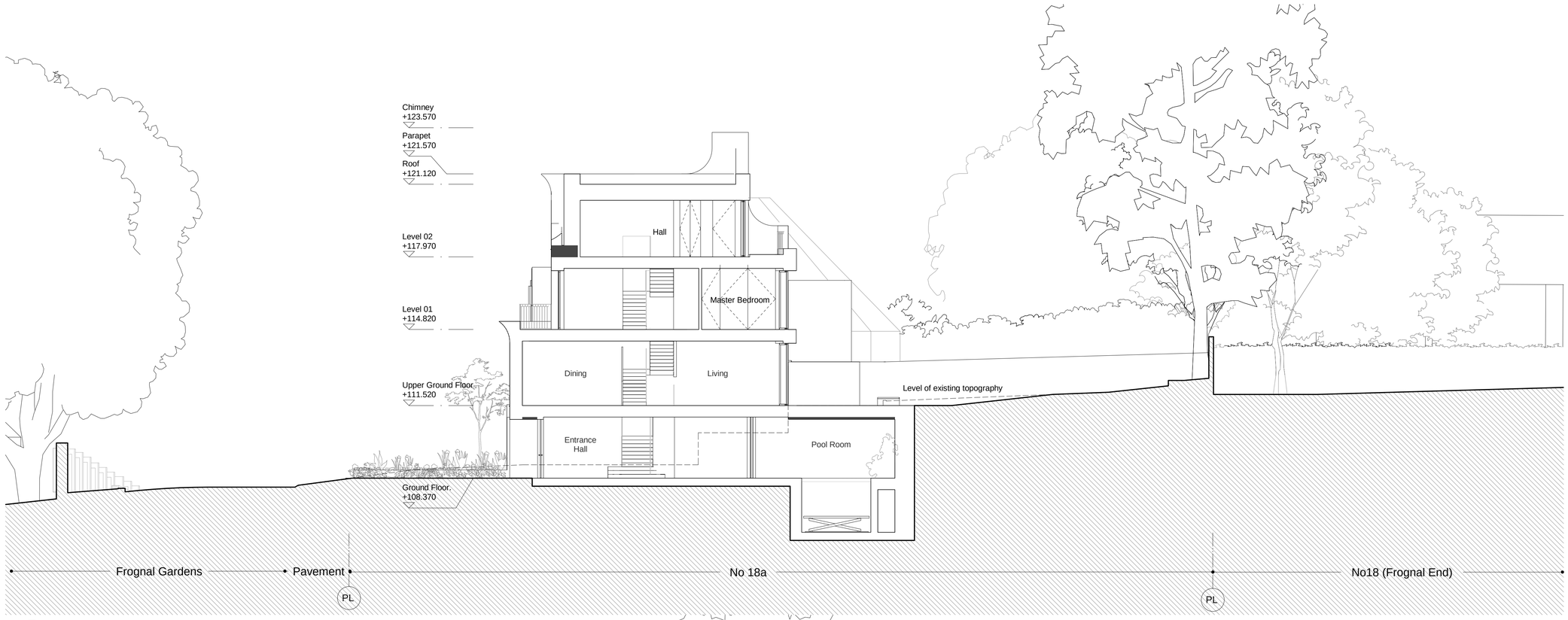
Drawn: **AK**

Scale: **1 : 100** @A1
1 : 200 @A3

Checked: **NB**

Drawing No: **ABA-2473-20-002**

Rev:



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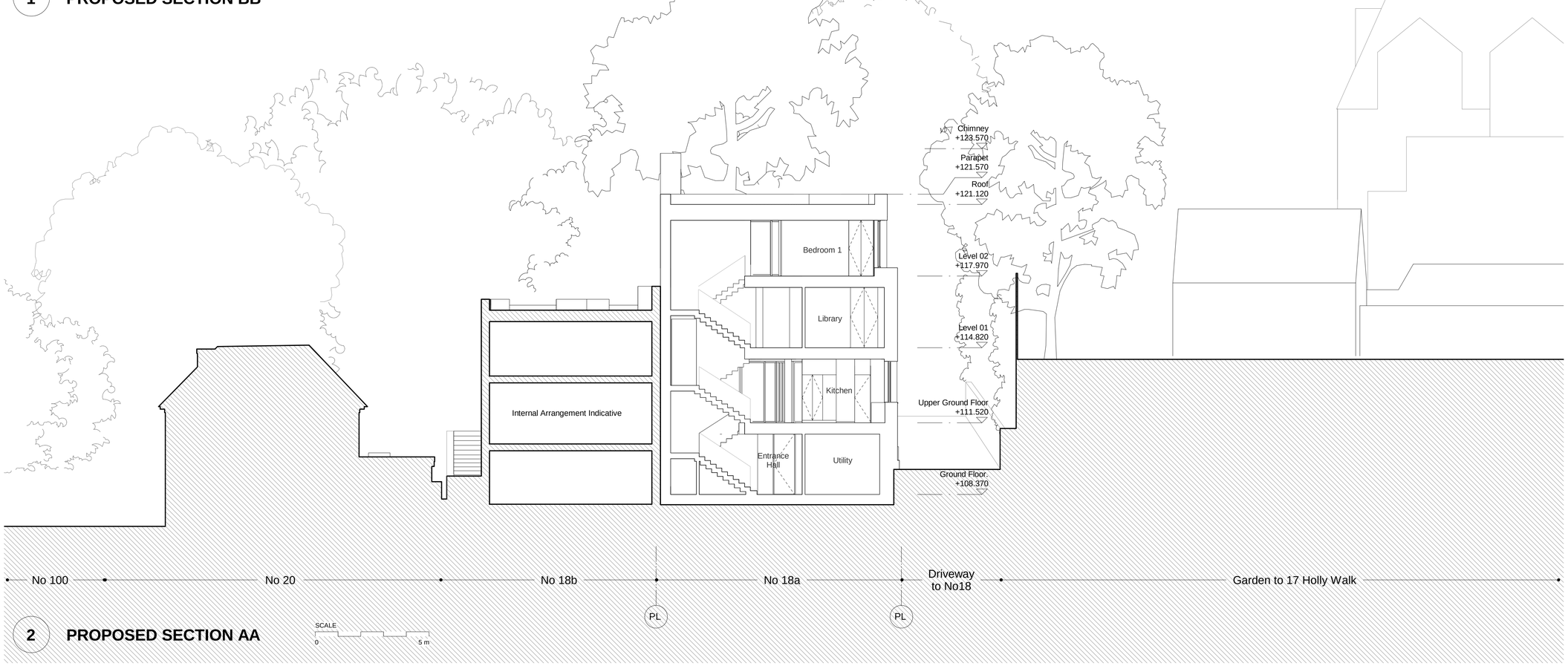

2 PROPOSED SECTION AA

SCALE
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Notes

Rev	Date	Description

Note

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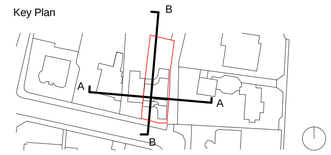
Key Plan



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Project:
18a Frognal Gardens

Client:
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Project Number:
2473

Status:
For Approval

Drawing Title:
Sections AA & BB

Date: **09/10/2020 19:08:16**
Drawn: **AK**
Scale: **1 : 100** @A1
1 : 200 @A3
Checked: **NB**
Drawing No: **ABA-2473-20-020**
Rev:


EVANS
Rivers and Coastal

APPENDIX E

- J000215 - 18a Frognal Gardens - Asbestos Management Survey Report