

APPENDIX 10.3: ENVIROINSIGHT REPORT



Groundsure

LOCATION INTELLIGENCE

Ruddlesden Geotechnical

65, Langaton Lane,
Exeter, EX1 3SP

Groundsure Reference: HMD-411-2612459

Your Reference: 14477

Report Date 26 Nov 2015

Report Delivery Method: Email - pdf

Groundsure Geosight Plus

Address: NORTH LONDON BUSINESS PARK & OAKLEY ROAD SOUTH, BARNET, N11 1HR

Dear Sir/ Madam,

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

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

Yours faithfully,

Managing Director
Groundsure Limited

Enc.
Groundsure Geosight Plus

Groundsure Geoinsight Plus

Address: NORTH LONDON BUSINESS PARK & OAKLEY ROAD SOUTH,
BARNET, N11 1HR

Date: 26 Nov 2015

Reference: HMD-411-2612459

Client: Ruddlesden Geotechnical

NW N NE



SW S SE

Aerial Photograph Capture date: 28-Apr-2013
Grid Reference: 528088,193479
Site Size: 16.50ha

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Overview of Findings

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

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

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

Section 1: Geology 1:10,000 Scale		
1.1 Artificial Ground	1.1 Is there any Artificial Ground/ Made Ground present beneath the study site at 1:10,000 scale?	No
1.2 Superficial Geology and Landslips	1.2.1 Is there any Superficial Ground/Drift Geology present beneath the study site at 1:10,000 scale?*	Yes
	1.2.2 Are there any records of landslip within 500m of the study site boundary at 1:10,000 scale?	No
1.3 Bedrock, Solid Geology and Faults	1.3.1 For records of Bedrock and Solid Geology beneath the study site* see the detailed findings section.	
	1.3.2 Are there any records of faults within 500m of the study site boundary at 1:10,000 scale?	No
Section 2: Geology 1:50,000 Scale		
2.1 Artificial Ground	2.1.1 Is there any Artificial Ground/ Made Ground present beneath the study site?	No
	2.1.2 Are there any records relating to permeability of artificial ground within the study site*boundary?	No
2.2 Superficial Geology and Landslips	2.2.1 Is there any Superficial Ground/Drift Geology present beneath the study site?*	Yes
	2.2.2 Are there any records of permeability of superficial ground within 500m of the study site?	Yes
	2.2.3 Are there any records of landslip within 500m of the study site boundary?	No
	2.2.4 Are there any records relating to permeability of landslips within the study site* boundary?	No

Section 2: Geology 1:50,000 Scale

2.3 Bedrock, Solid Geology and Faults

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

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

Yes

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

No

Section 3: Radon

3. Radon

3.1 Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?

The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.

3.2 Radon Protection

No radon protective measures are necessary.

Section 4: Ground Workings

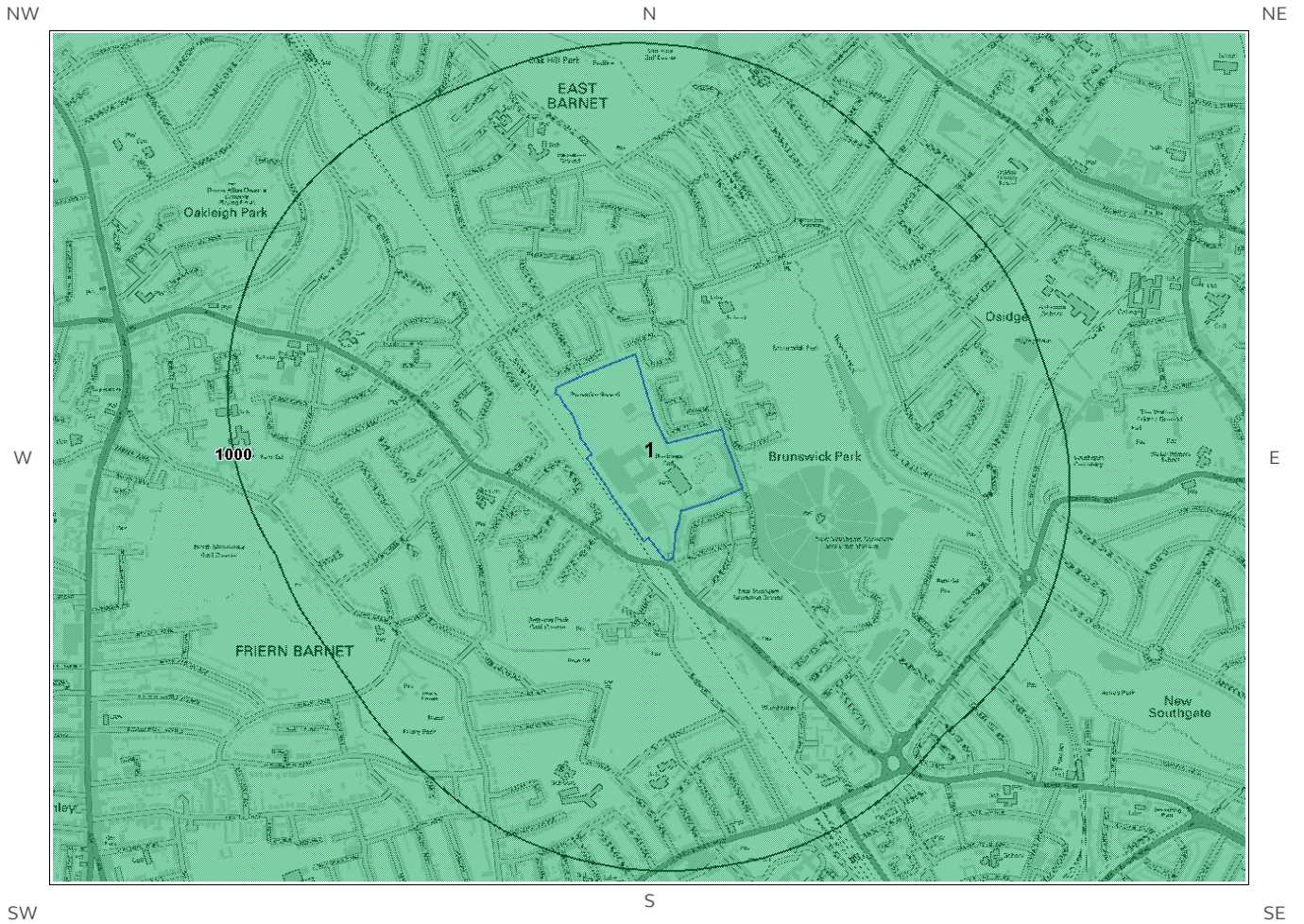
	On-site	0-50m	51-250	251-500	501-1000
4.1 Historical Surface Ground Working Features from Small Scale Mapping	31	18	8	Not Searched	Not Searched
4.2 Historical Underground Workings from Small Scale Mapping	0	10	1	0	4
4.3 Current Ground Workings	0	0	0	0	1

Section 5: Mining, Extraction & Natural Cavities

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

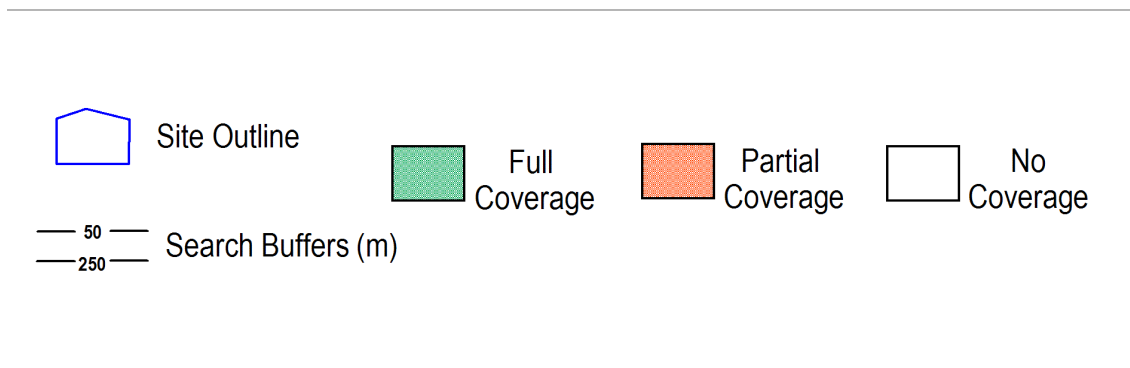
Section 5: Mining, Extraction & Natural Cavities	On-site	0-50m	51-250	251-500	501-1000
5.6 Brine Extraction	0	0	0	0	0
5.7 Gypsum Extraction	0	0	0	0	0
5.8 Tin Mining	0	0	0	0	0
5.9 Clay Mining	0	0	0	0	0
Section 6: Natural Ground Subsidence	On-site				
6.1 Shrink-Swell Clay	Moderate				
6.2 Landslides	Moderate				
6.3 Ground Dissolution of Soluble Rocks	Negligible				
6.4 Compressible Deposits	Negligible				
6.5 Collapsible Deposits	Very Low				
6.5 Running Sand	Very Low				
Section 7: Borehole Records	On-site	0-50m	51-250		
7 BGS Recorded Boreholes	0	0	0		
Section 8: Estimated Background Soil Chemistry	On-site	0-50m	51-250		
8 Records of Background Soil Chemistry	5	0	0		
Section 9: Railways and Tunnels	On-site	0-50m	51-250	250-500	
9.1 Tunnels	0	2	1	Not Searched	
9.2 Historical Railway and Tunnel Features	24	21	22	Not Searched	
9.3 Historical Railways	0	0	0	Not Searched	
9.4 Active Railways	0	16	0	Not Searched	
9.5 Railway Projects	0	0	0	0	

1:10,000 Scale Availability



1_10,000 Availability Legend

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Availability of 1:10,000 Scale Geology Mapping

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

ID	Distance	Artificial Coverage	Superficial Coverage	Bedrock Coverage	Mass Movement Coverage
1	0.0	Some deposits are mapped	Full	Full	No coverage
N2	1163.0	Some deposits are mapped	Full	Full	No coverage
N3	1676.0	Some deposits are mapped	Full	Full	No coverage

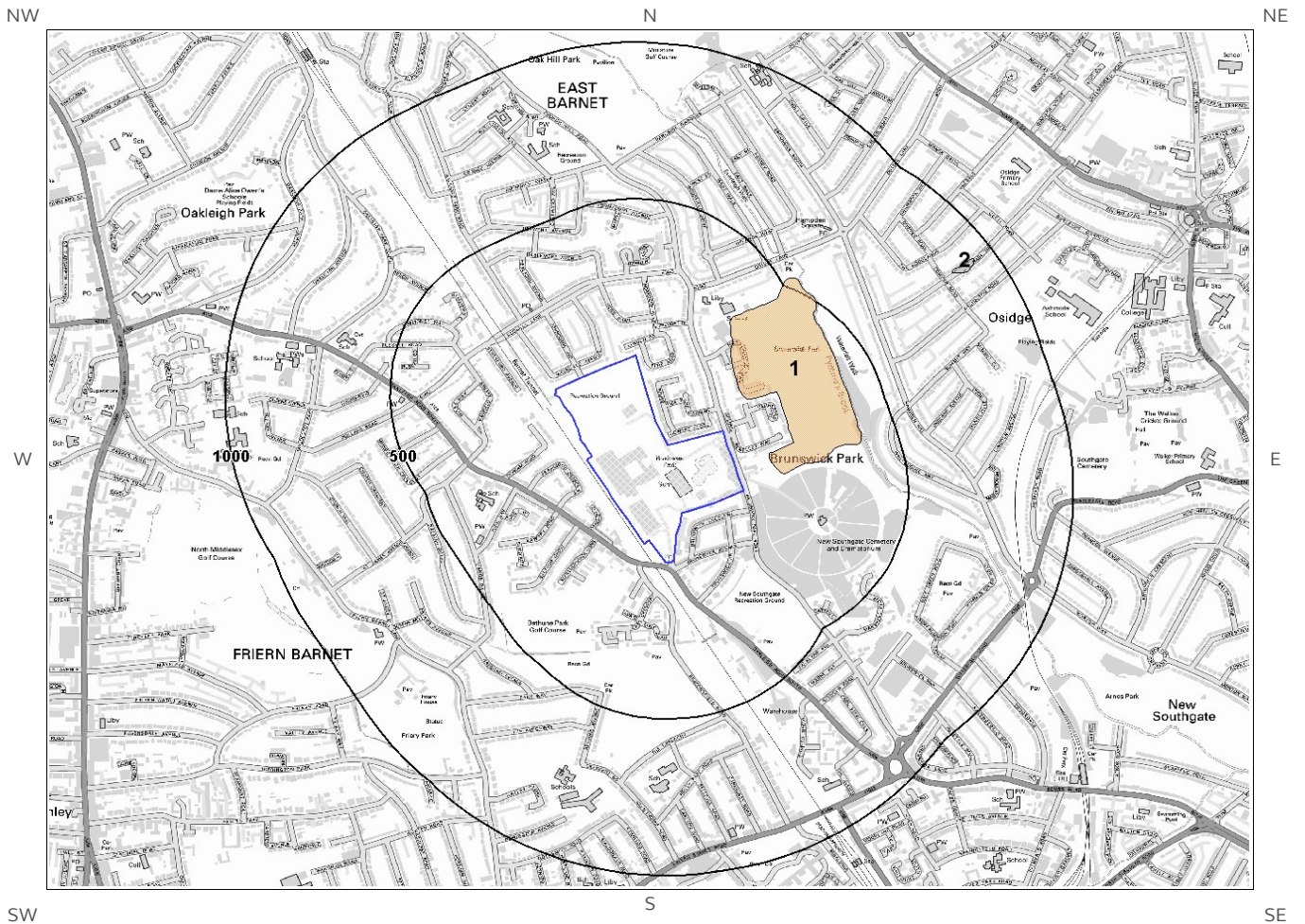
Guidance: The 1:10,000 scale geological interpretation is the most detailed generally available from BGS and is the scale at which most geological surveying is carried out in the field. The database is presented as four types of geology (artificial, mass movement, superficial and bedrock), although not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

The definitions of coverage are as follows:

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




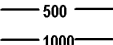




1 Geology (1:10,000 scale).

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



Artificial Ground Legend

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	Site Outline		Made Ground (undivided)		Disturbed Ground (undivided)
	Search Buffers (m)		Worked Ground (undivided)		Landscaped Ground (undivided)
			Infilled Ground		Reclaimed Ground

1. Geology 1:10,000 scale

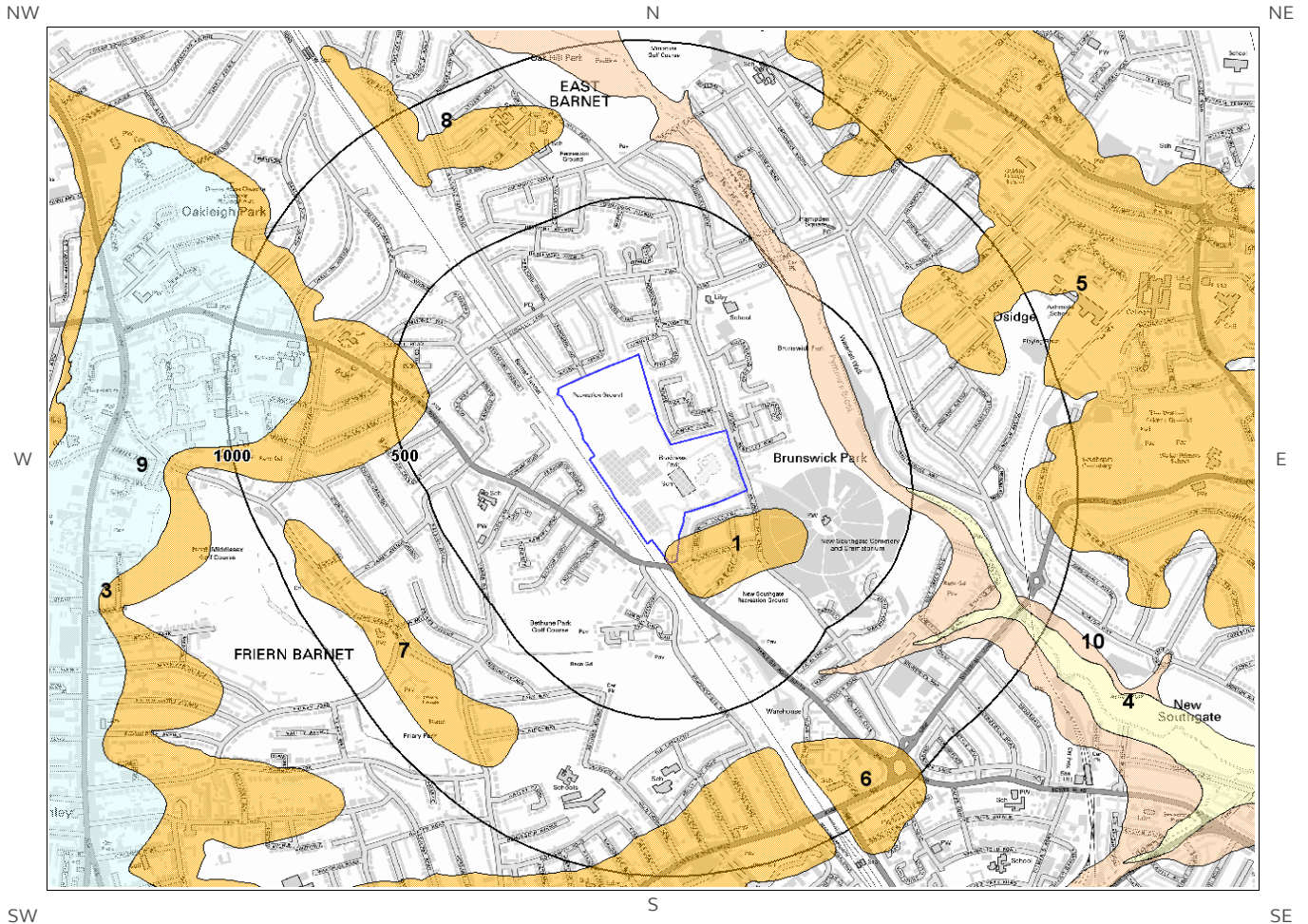
1.1 Artificial Ground

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

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


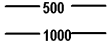
ID	Distance	Direction	LEX Code	Description	Rock Description
1	106.0	E	MGR- UNKNOWN	Made Ground (Undivided)	Unknown/unclassified Entry

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



Artificial Ground Legend

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-  Site Outline
-  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? Yes

ID	Distance (m)	Direction	LEX Code	Description	Rock Description
1	0.0	On Site	DHGR-XSV	Dollis Hill Gravel Member - Sand And Gravel	Sand And Gravel
2	298.0	E	RTDU-XSV	River Terrace Deposits (undifferentiated) - Sand And Gravel	Sand And Gravel
3	389.0	W	DHGR-XSV	Dollis Hill Gravel Member - Sand And Gravel	Sand And Gravel
4	481.0	E	ALV-C	Alluvium - Clay (unlithified Deposits Coding Scheme)	Clay

1.2.2 Landslip

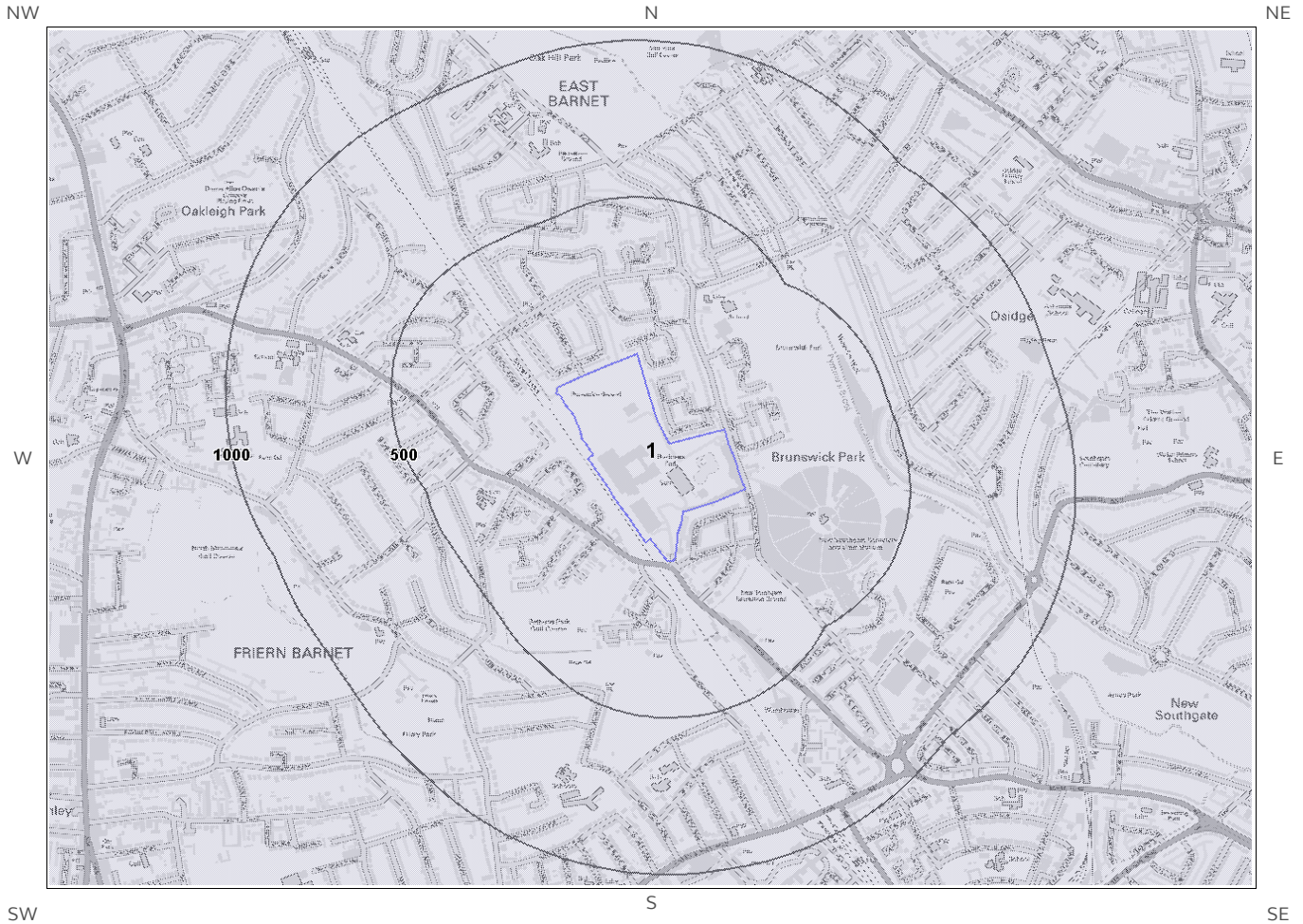
Are there any records of Landslip within 500m of the study site boundary at 1:10,000 scale? No

Database searched and no data found.

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

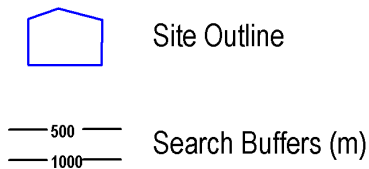
This Geology shows the main components as discrete layers, these are: Artificial / Made Ground, Superficial / Drift Geology and Landslips. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

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



Bedrock and Faults Legend

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1.3 Bedrock and Faults

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

1.3.1 Bedrock/ Solid Geology

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

ID	Distance (m)	Direction	LEX Code	Description	Rock Age
1	0.0	On Site	LC-CLAY	London Clay Formation - Clay	Eocene Epoch

1.3.2 Faults

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

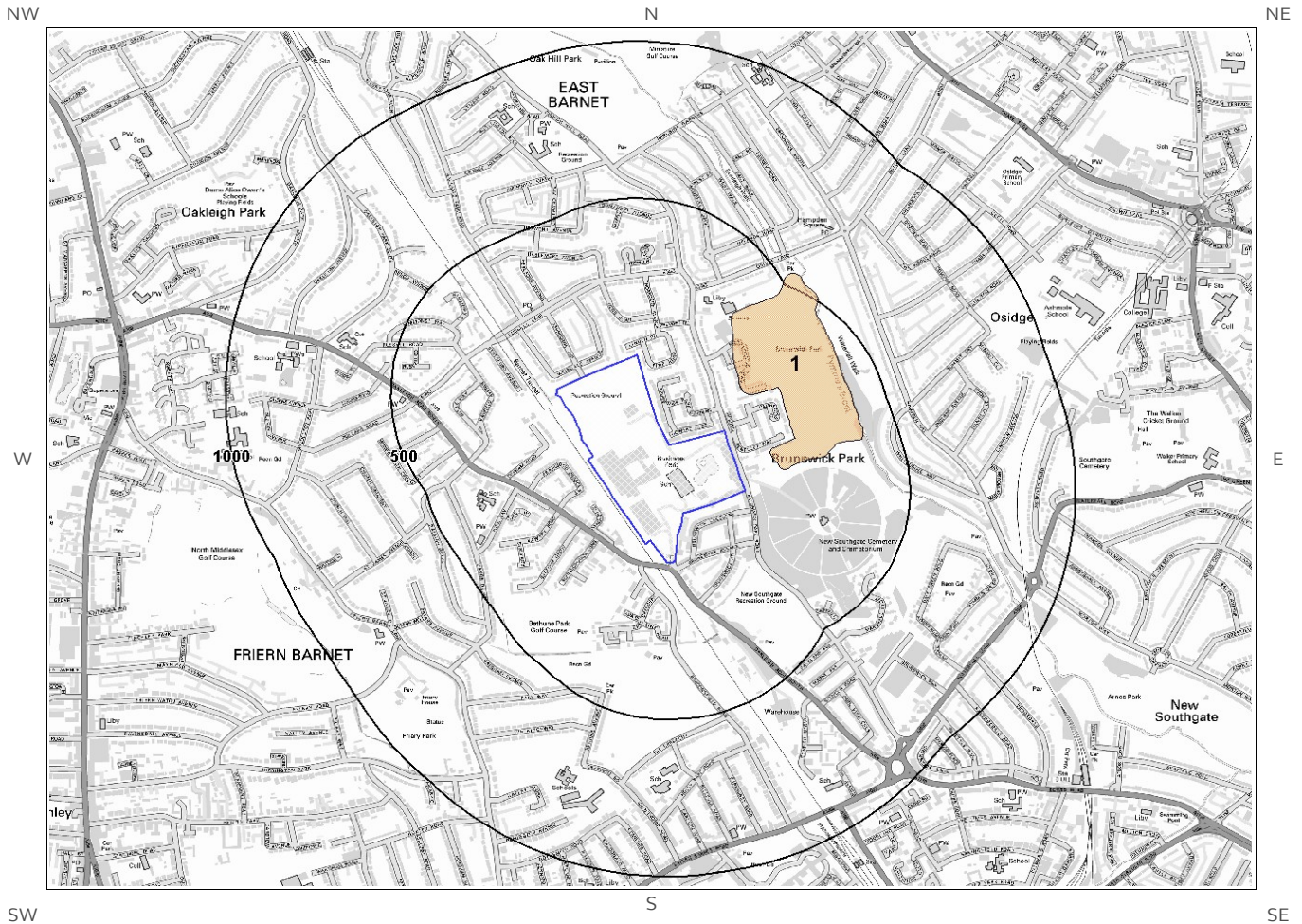
Database searched and no data found at this scale.

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

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

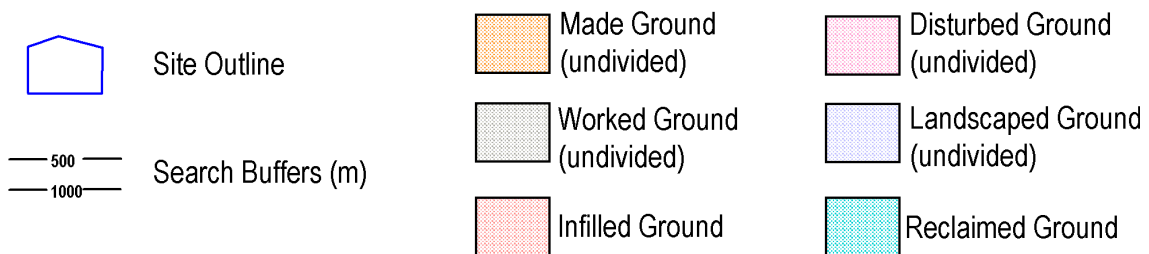
2 Geology 1:50,000 Scale

2.1 Artificial Ground Map



Ground Workings Legend

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2. Geology 1:50,000 scale

2.1 Artificial Ground

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

2.1.1 Artificial/ Made Ground

Are there any records of Artificial/ Made Ground within 500m of the study site boundary? Yes

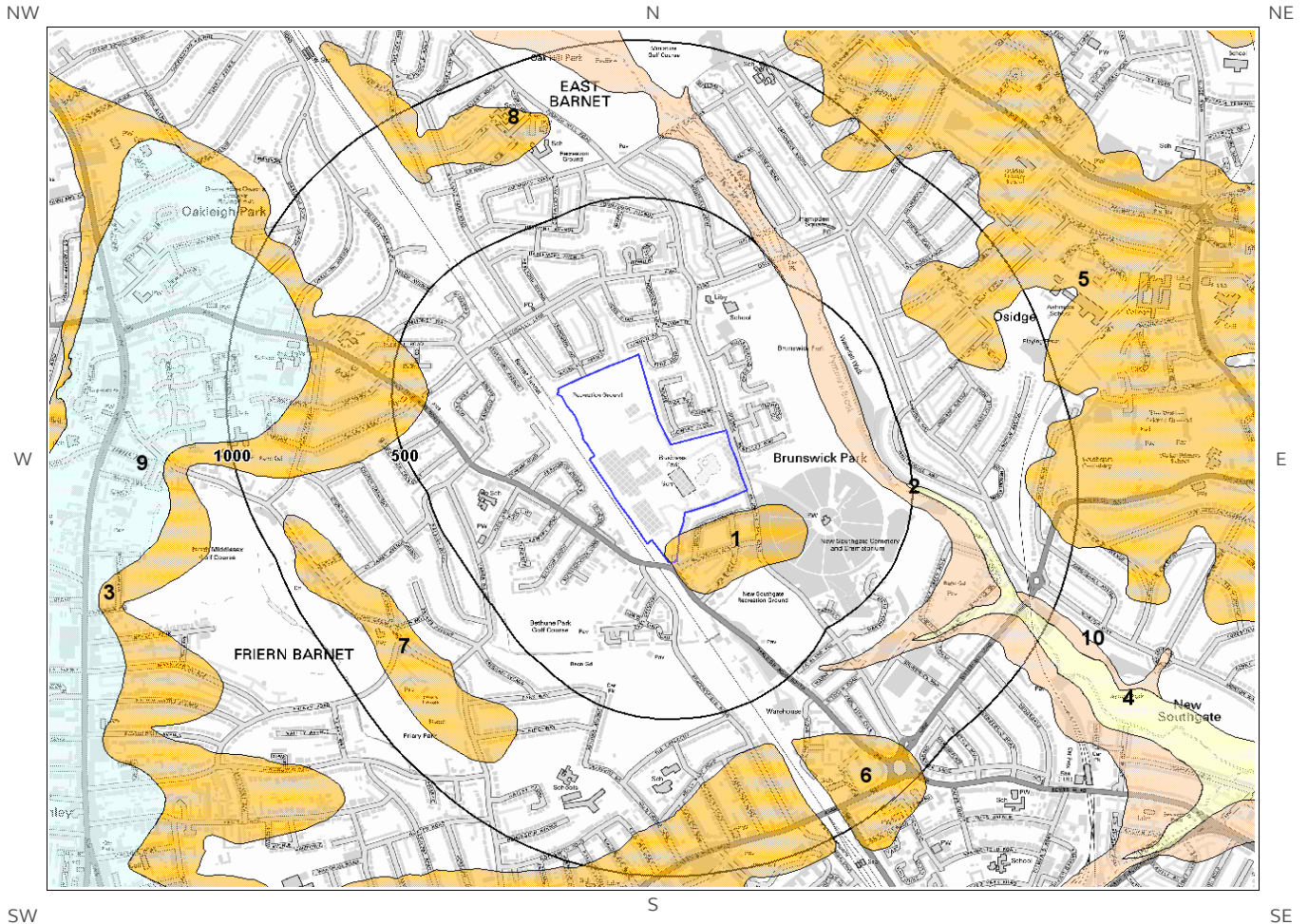
ID	Distance (m)	Direction	LEX Code	Description	Rock Description
1	109.0	E	MGR-MGRD	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT

2.1.2 Permeability of Artificial Ground

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

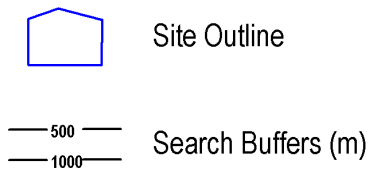
Database searched and no data found.

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



Ground Workings Legend

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2.2 Superficial Deposits and Landslips

2.2.1 Superficial Deposits/ Drift Geology

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

ID	Distance	Direction	LEX Code	Description	Rock Description
1	0.0	On Site	DHGR	DOLLIS HILL GRAVEL MEMBER	SAND AND GRAVEL [UNLITHIFIED DEPOSITS CODING SCHEME]
2	302.0	E	RTDU	RIVER TERRACE DEPOSITS (UNDIFFERENTIATED)	SAND AND GRAVEL [UNLITHIFIED DEPOSITS CODING SCHEME]
3	389.0	W	DHGR	DOLLIS HILL GRAVEL MEMBER	SAND AND GRAVEL [UNLITHIFIED DEPOSITS CODING SCHEME]
4	481.0	E	ALV	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL [UNLITHIFIED DEPOSITS CODING SCHEME]

2.2.2 Permeability of Superficial Ground

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

Distance (m)	Direction	Flow Type	Maximum Permeability	Minimum Permeability
0.0	On Site	Intergranular	Very High	High

2.2.3 Landslip

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

Database searched and no data found.

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

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

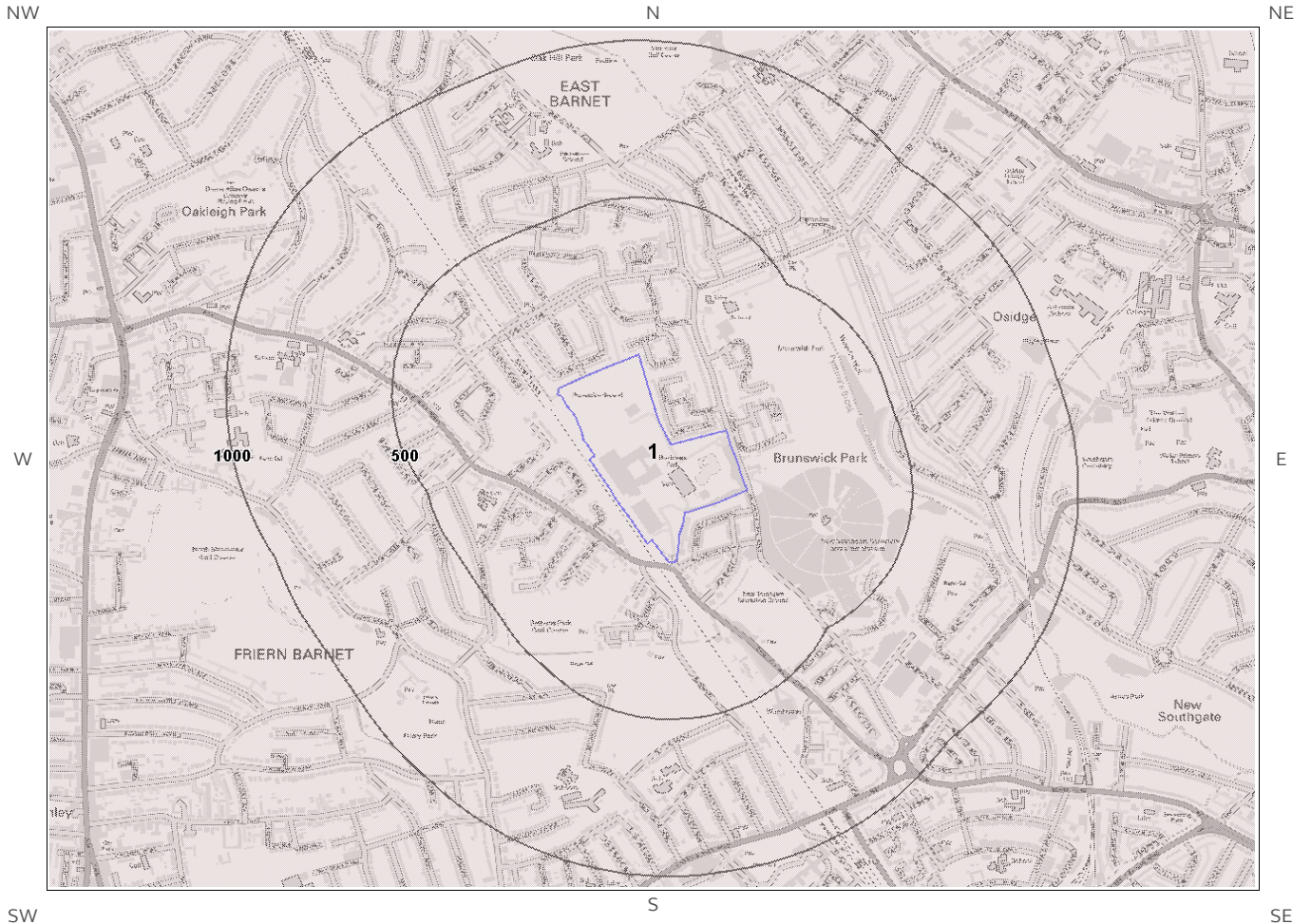
2.2.4 Landslip Permeability

Are there any records relating to permeability of landslips within the study site boundary?

No




Database searched and no data found.

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



Ground Workings Legend

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-  Site Outline
 -  500
 -  1000
- Search Buffers (m)

2.3 Bedrock, Solid Geology & Faults

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

2.3.1 Bedrock/Solid Geology

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

ID	Distance	Direction	LEX Code	Rock Description	Rock Age
1	0.0	On Site	LC-CLSISA	London Clay Formation - Clay, Silt And Sand	No Details

2.3.2 Permeability of Bedrock Ground

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

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

2.3.3 Faults

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

Database searched and no data found.

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

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

3 Radon Data

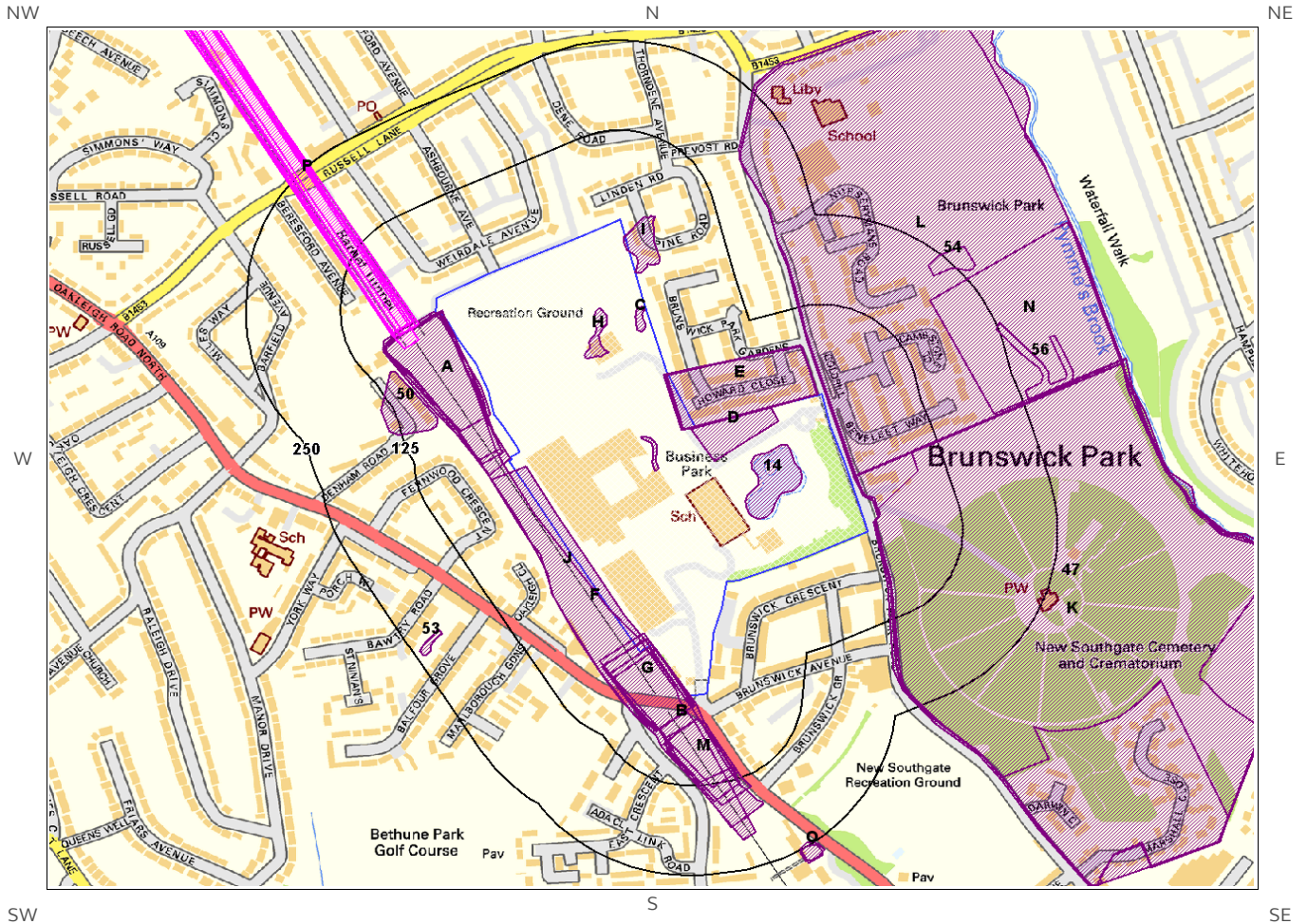
3.1 Radon Affected Areas

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

3.2 Radon Protection





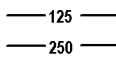
Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment? No radon protective measures are necessary.

4 Ground Workings Map



Ground Workings Legend

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

4 Ground Workings

4.1 Historical Surface Ground Working Features derived from Historical Mapping

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

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

ID	Distance (m)	Direction	NGR	Use	Date
1A	0.0	On Site	527766 193604	Cuttings	1920
2A	0.0	On Site	527766 193604	Cuttings	1912
3A	0.0	On Site	527766 193604	Cuttings	1938
4A	0.0	On Site	527769 193595	Cuttings	1895
5B	0.0	On Site	528079 193131	Cuttings	1980
6B	0.0	On Site	528079 193131	Cuttings	1987
7B	0.0	On Site	528079 193131	Cuttings	1973
8I	0.0	On Site	528026 193803	Refuse Heaps	1866
9C	0.0	On Site	528024 193699	Refuse Heap	1866
10C	0.0	On Site	528024 193699	Refuse Heap	1864
11	0.0	On Site	528043 193511	Unspecified Ground Workings	1938
12D	0.0	On Site	528148 193539	Cemetery	1973
13D	0.0	On Site	528148 193539	Disused Cemetery	1962
14	0.0	On Site	528200 193472	Pond	1987
15E	0.0	On Site	528156 193603	Cemetery	1895
16E	0.0	On Site	528158 193603	Cemetery	1938
17E	0.0	On Site	528158 193603	Cemetery	1912
18E	0.0	On Site	528158 193603	Cemetery	1920
19F	0.0	On Site	527961 193310	Cuttings	1920
20F	0.0	On Site	527961 193310	Cuttings	1912
21G	0.0	On Site	528032 193193	Cuttings	1895

ID	Distance (m)	Direction	NGR	Use	Date
22G	0.0	On Site	528035 193190	Cuttings	1938
23J	0.0	On Site	527930 193340	Cuttings	1866
24H	0.0	On Site	527967 193679	Refuse Heaps	1866
25H	0.0	On Site	527967 193679	Refuse Heaps	1864
26I	0.0	On Site	528026 193803	Refuse Heaps	1864
27D	0.0	On Site	528148 193539	Cemetery	1980
28E	0.0	On Site	528156 193603	Cemetery	1940
29B	0.0	On Site	528080 193122	Cuttings	1940
30A	0.0	On Site	527764 193605	Cuttings	1940
31J	0.0	On Site	527930 193340	Cuttings	1864
32B	1.0	SE	528066 193144	Cuttings	1962
33A	2.0	SW	527756 193624	Cuttings	1987
34A	2.0	SW	527756 193624	Cuttings	1962
35A	2.0	SW	527756 193624	Cuttings	1973
36A	2.0	SW	527756 193624	Cuttings	1980
37L	5.0	E	528406 193818	Sewage Disposal Works	1940
38K	5.0	E	528601 193273	Cemetery	1895
39K	5.0	E	528613 193272	Cemetery	1980
40K	5.0	E	528613 193272	Cemetery	1962
41K	5.0	E	528613 193272	Cemetery	1973
42K	5.0	E	528613 193272	Cemetery	1940
43L	7.0	E	528408 193810	Sewage Disposal Works	1938
44K	8.0	E	528616 193274	Cemetery	1938
45K	8.0	E	528616 193274	Cemetery	1920
46K	8.0	E	528616 193274	Cemetery	1912
47	12.0	E	528631 193324	Cemetery	1987
48M	32.0	S	528104 193084	Cuttings	1895
49M	33.0	S	528100 193097	Cuttings	1938
50	74.0	W	527719 193581	Unspecified Heap	1962

ID	Distance (m)	Direction	NGR	Use	Date
51N	188.0	NE	528531 193700	Sewage Farm	1912
52N	188.0	NE	528531 193700	Sewage Farm	1920
53	203.0	SW	527748 193248	Ponds	1895
54	222.0	NE	528434 193780	Unspecified Heap	1962
55O	246.0	SE	528250 192956	Cuttings	1962
56	247.0	E	528517 193666	Unspecified Ground Workings	1962
57O	250.0	SE	528251 192956	Cuttings	1940

4.2 Historical Underground Working Features derived from Historical Mapping

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

Are there any Historical Underground Working Features within 1000m of the study site boundary? Yes

The following Historical Underground Working Features are provided by Groundsure:

ID	Distance (m)	Direction	NGR	Use	Date
58P	27.0	SW	527581 193899	Tunnel	1980
59P	27.0	SW	527581 193899	Tunnel	1973
60P	27.0	SW	527581 193899	Tunnel	1987
61P	31.0	W	527573 193906	Tunnel	1962
62P	31.0	W	527573 193906	Tunnel	1940
63P	32.0	SW	527575 193901	Tunnels	1920
64P	32.0	SW	527575 193901	Tunnels	1912
65P	36.0	SW	527568 193910	Tunnels	1895
66P	39.0	SW	527574 193899	Tunnel	1864
67P	39.0	SW	527574 193899	Tunnel	1866
68P	51.0	SW	527571 193897	Tunnel	1938
Not shown	986.0	E	529516 194067	Tunnels	1962
Not shown	986.0	E	529516 194067	Tunnels	1980

ID	Distance (m)	Direction	NGR	Use	Date
Not shown	986.0	E	529516 194067	Tunnels	1973
Not shown	986.0	E	529516 194067	Tunnels	1987

4.3 Current Ground Workings

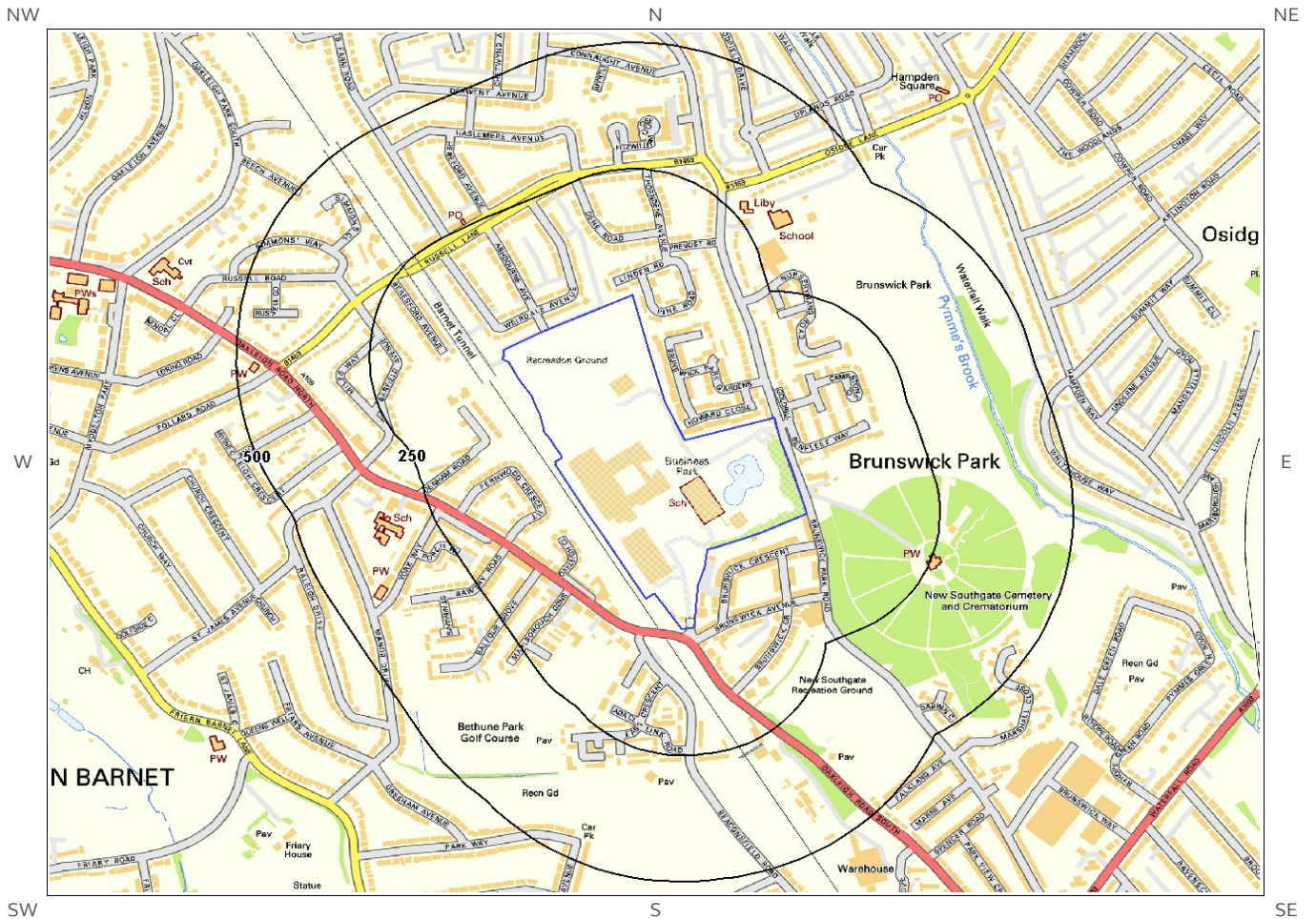
This dataset is derived from the BGS BRITPITS database covering active; inactive mines; quarries; oil wells; gas wells and mineral wharves; and rail deposits throughout the British Isles.

Are there any BGS Current Ground Workings within 1000m of the study site boundary? Yes

The following Current Ground Workings information is provided by British Geological Survey:

ID	Distance (m)	Direction	NGR	Commodity Produced	Pit Name	Type of working	Status
Not shown	990.0	NW	527286 194600	Sand & Gravel	Oakleigh Park Gravel Pit	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased

5 Mining, Extraction & Natural Cavities Map



Mining, Extraction and Natural Cavities Legend

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5 Mining, Extraction & Natural Cavities

5.1 Historical Mining

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

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

Database searched and no data found.

5.2 Coal Mining

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

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

Database searched and no data found.

5.3 Johnson Poole and Bloomer

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

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

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

5.4 Non-Coal Mining

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

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

Database searched and no data found.

5.5 Non-Coal Mining Cavities

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

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

Database searched and no data found.

5.6 Natural Cavities

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

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

Database searched and no data found.

5.7 Brine Extraction

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

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

Database searched and no data found.

5.8 Gypsum Extraction

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

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

Database searched and no data found.

5.9 Tin Mining

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

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

Database searched and no data found.

5.10 Clay Mining

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

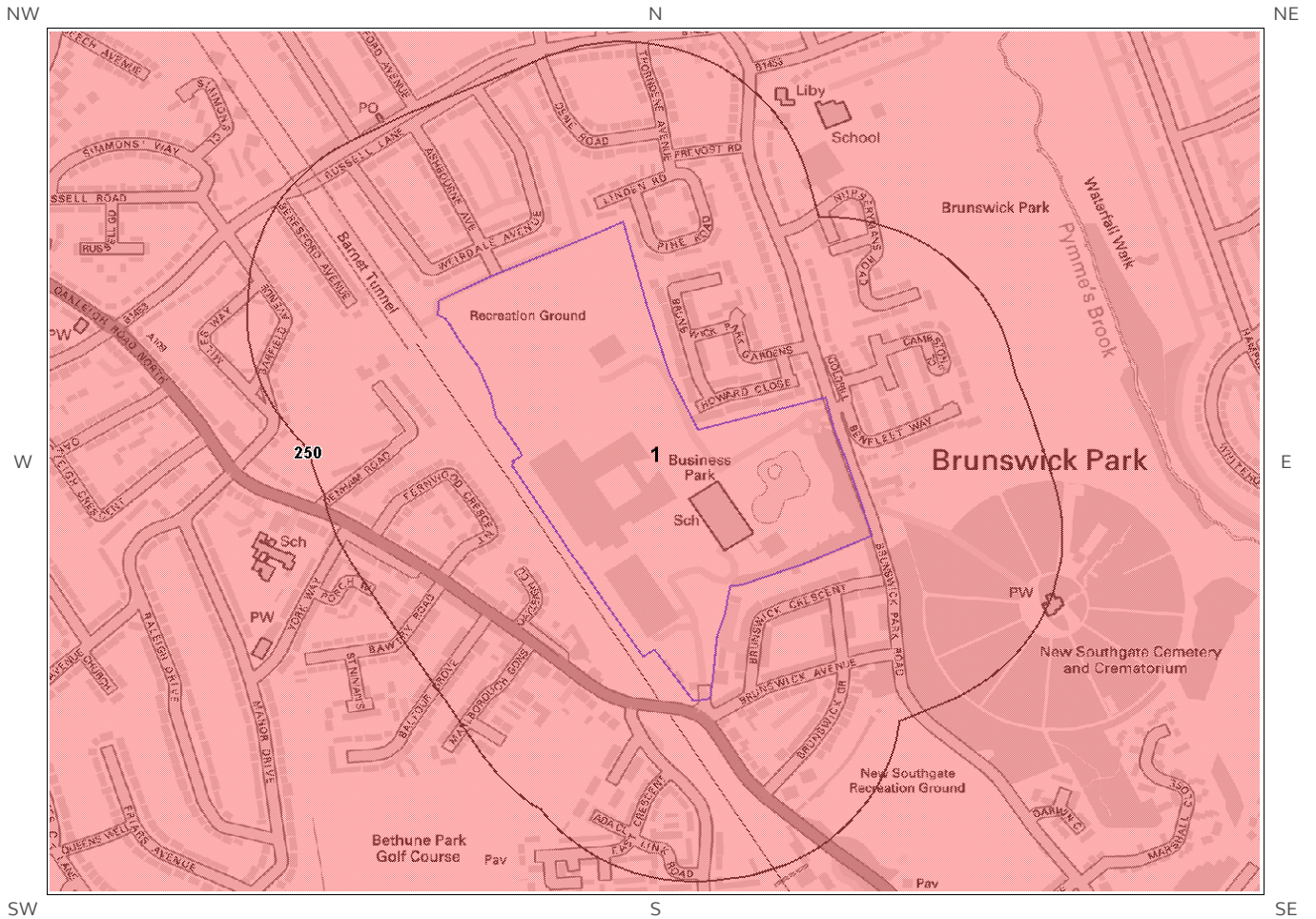
Are there any Clay Mining areas within 1000m of the study site boundary?

No

Database searched and no data found.

6 Natural Ground Subsidence

6.1 Shrink-Swell Clay Map

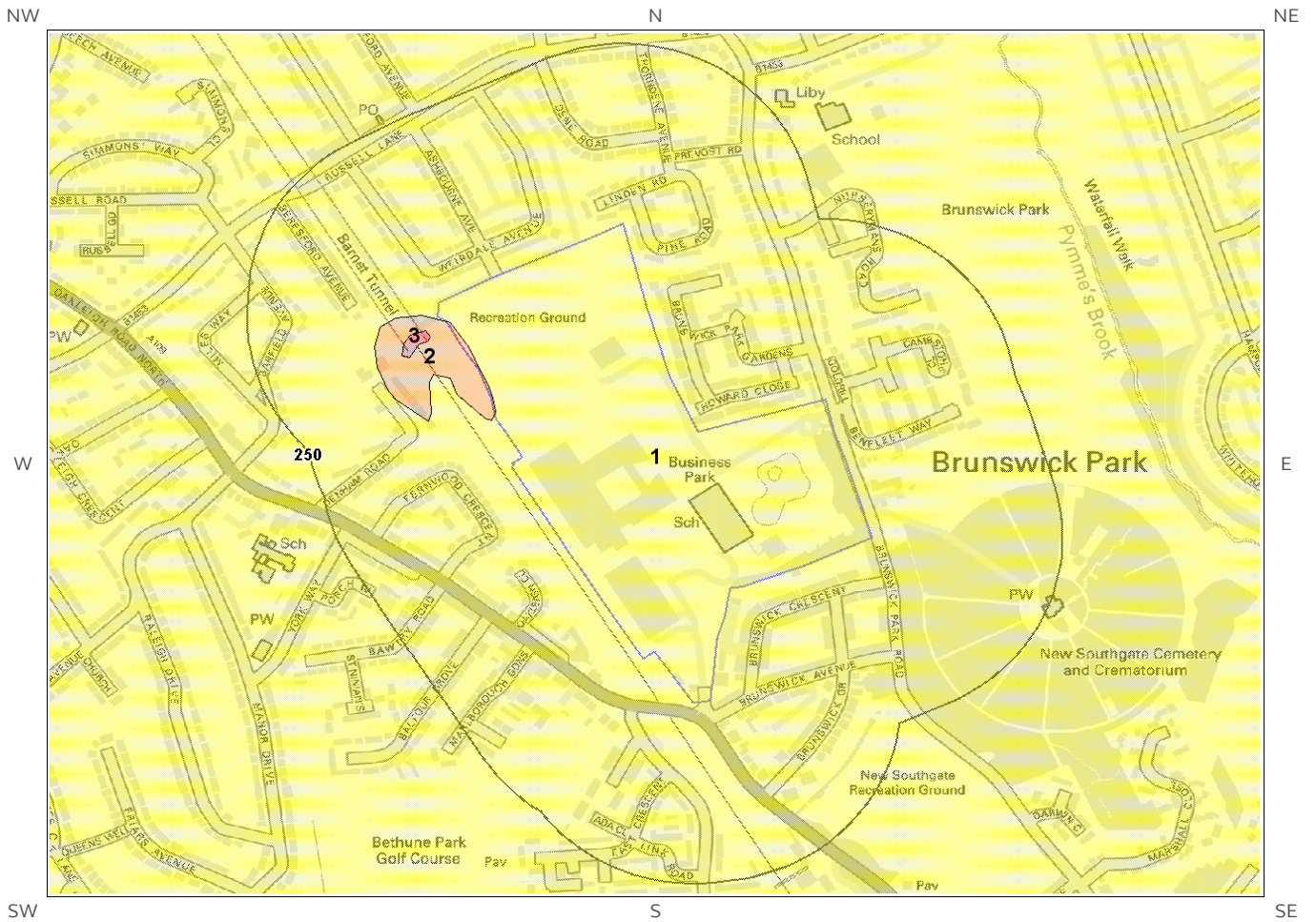


Shrink Swell Clay Legend

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6.2 Landslides Map

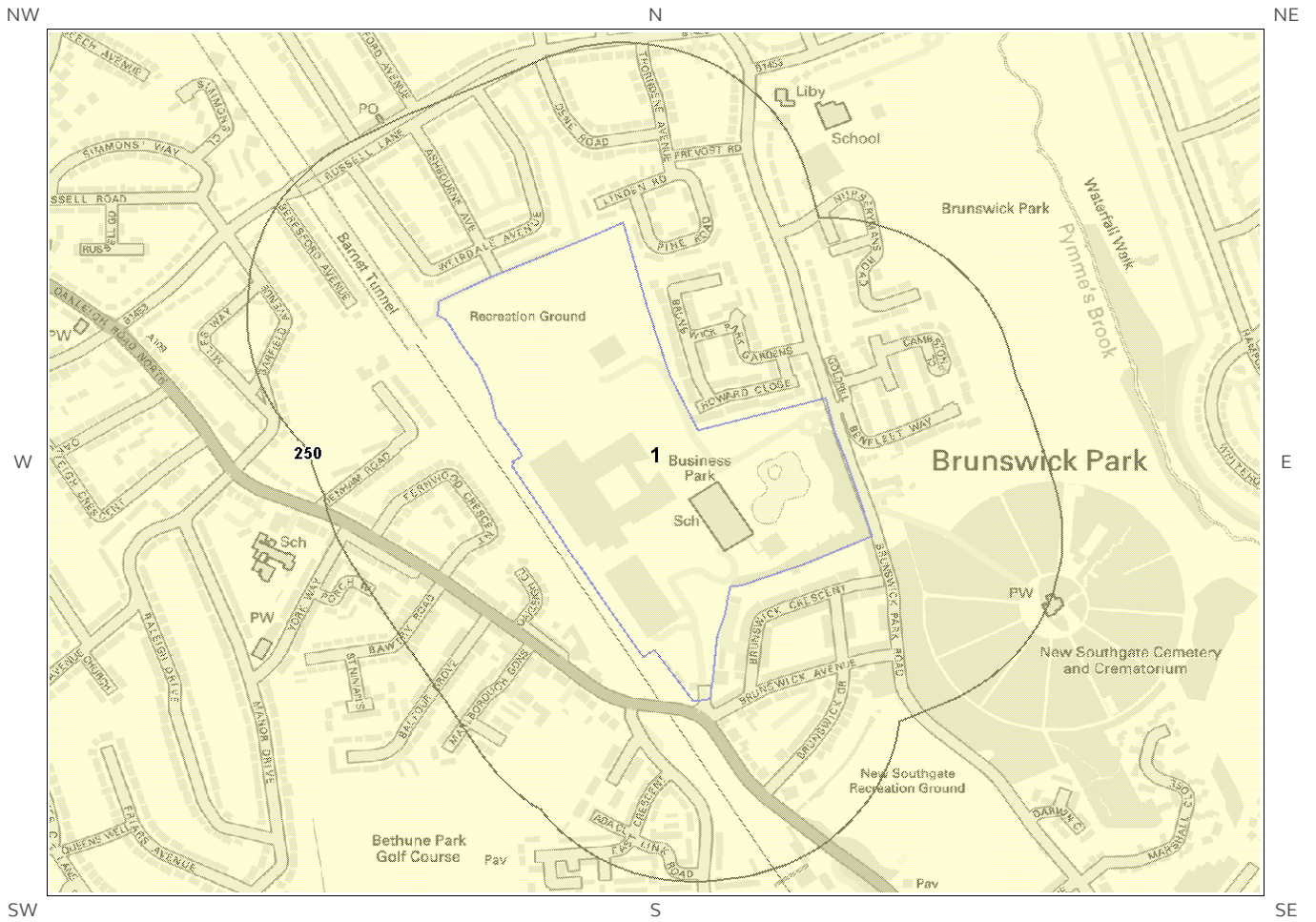


Landslides Legend

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6.3 Ground Dissolution of Soluble Rocks Map

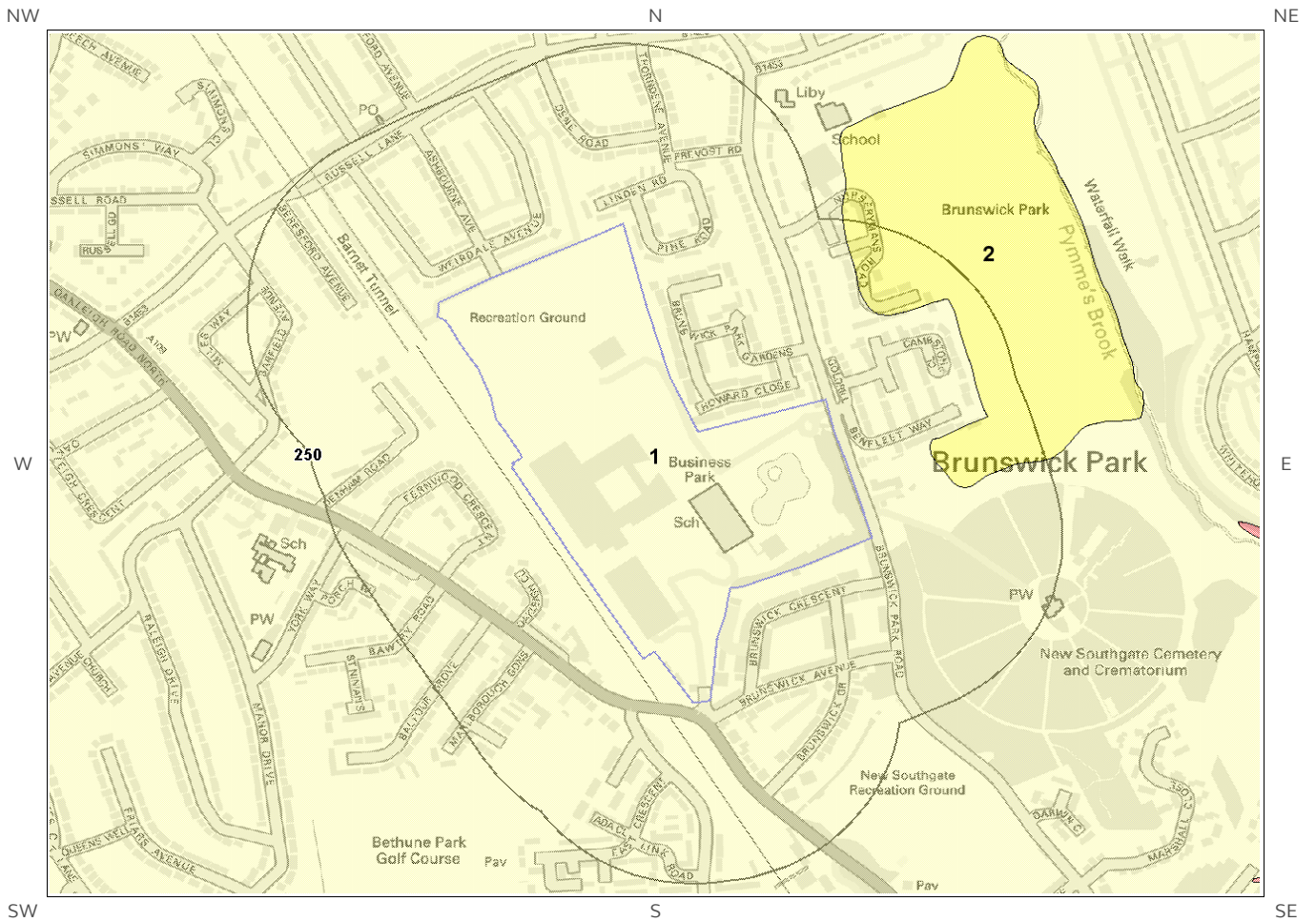


Ground Dissolution Soluble Rocks Legend

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6.4 Compressible Deposits Map

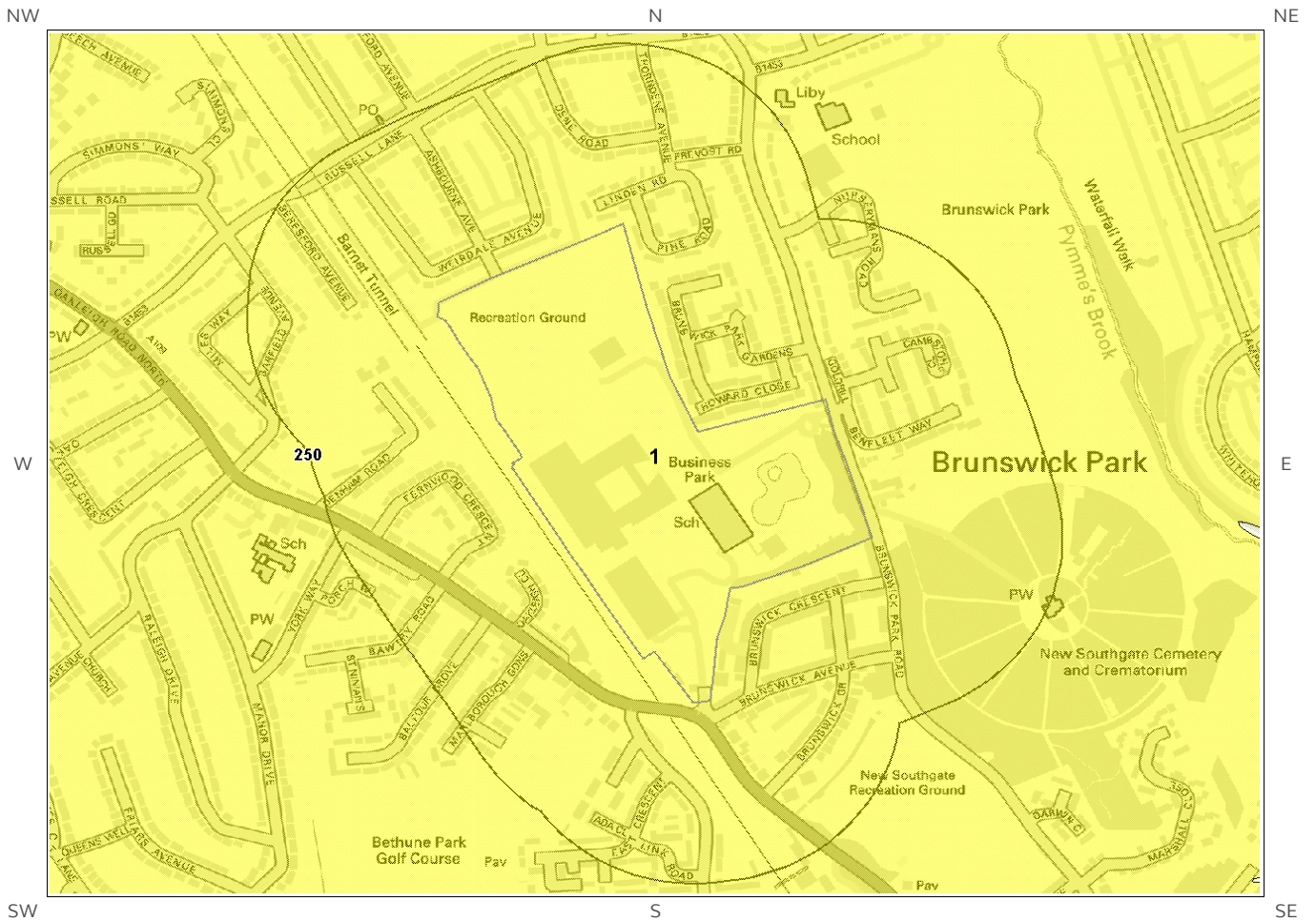


Compressible Deposits Legend

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6.5 Collapsible Deposits Map

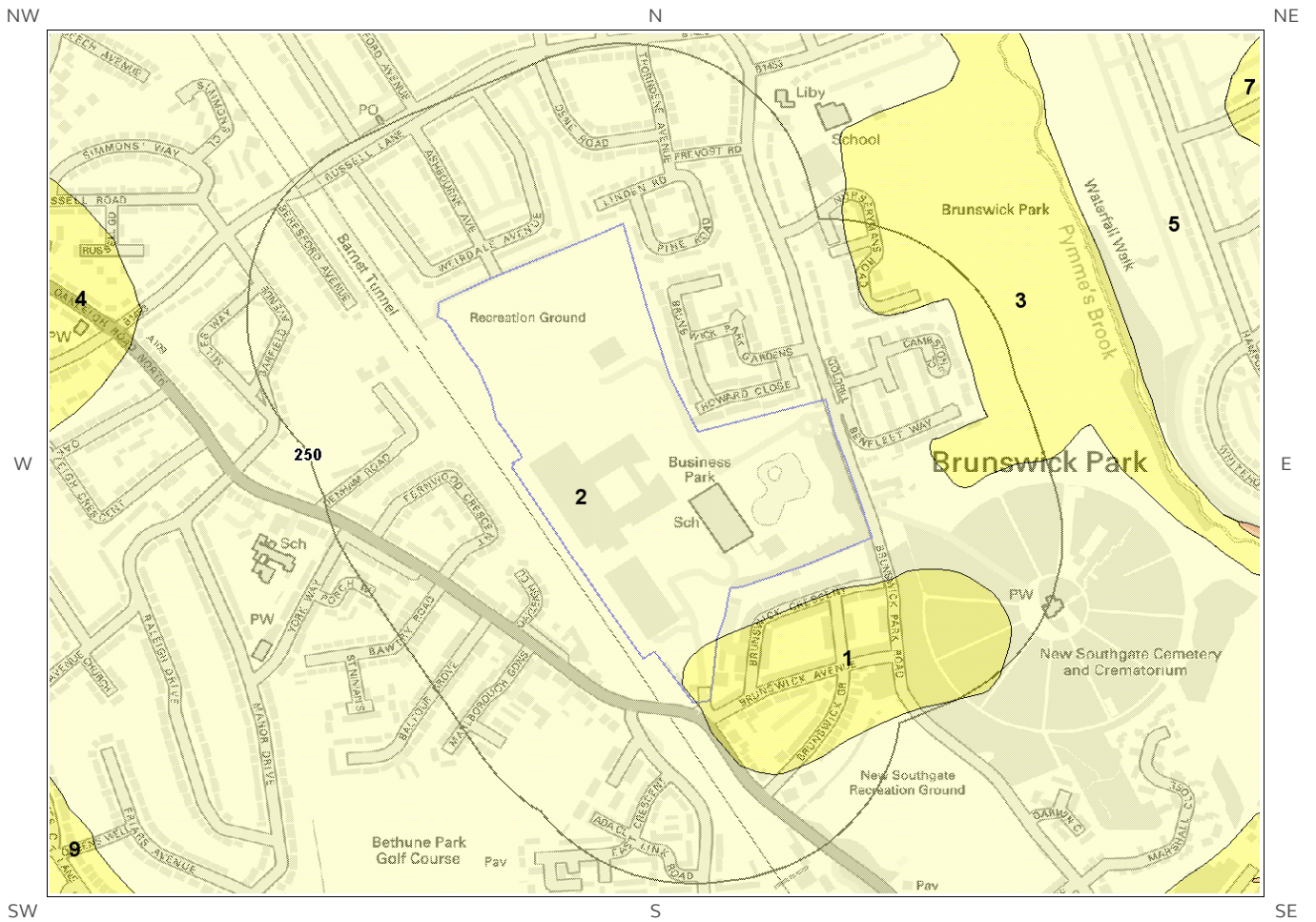


Collapsible Deposits Legend

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6.6 Running Sand Map



Running Sand Legend

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6 Natural Ground Subsidence

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

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

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

6.1 Shrink-Swell Clays

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

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

6.2 Landslides

The following Landslides information provided by the British Geological Survey:

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

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

ID	Distance (m)	Direction	Hazard Rating	Details
3	24.0	SW	Moderate	<p>Significant potential for slope instability with relatively small changes in ground conditions.</p> <p>Avoid large amounts of water entering the ground through pipe leakage or soak-aways. Do not undercut or place large amounts of material on slopes without technical advice. For new build - consider the potential and consequences of ground movement during excavations, or consequence of changes to loading or drainage.</p> <p>For existing property - probable increase in insurance risk is likely due to potential natural slope instability after changes to ground conditions such as a very long, excessively wet winter.</p>

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	<p>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.</p>

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	<p>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.</p>

6.5 Collapsible Deposits

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

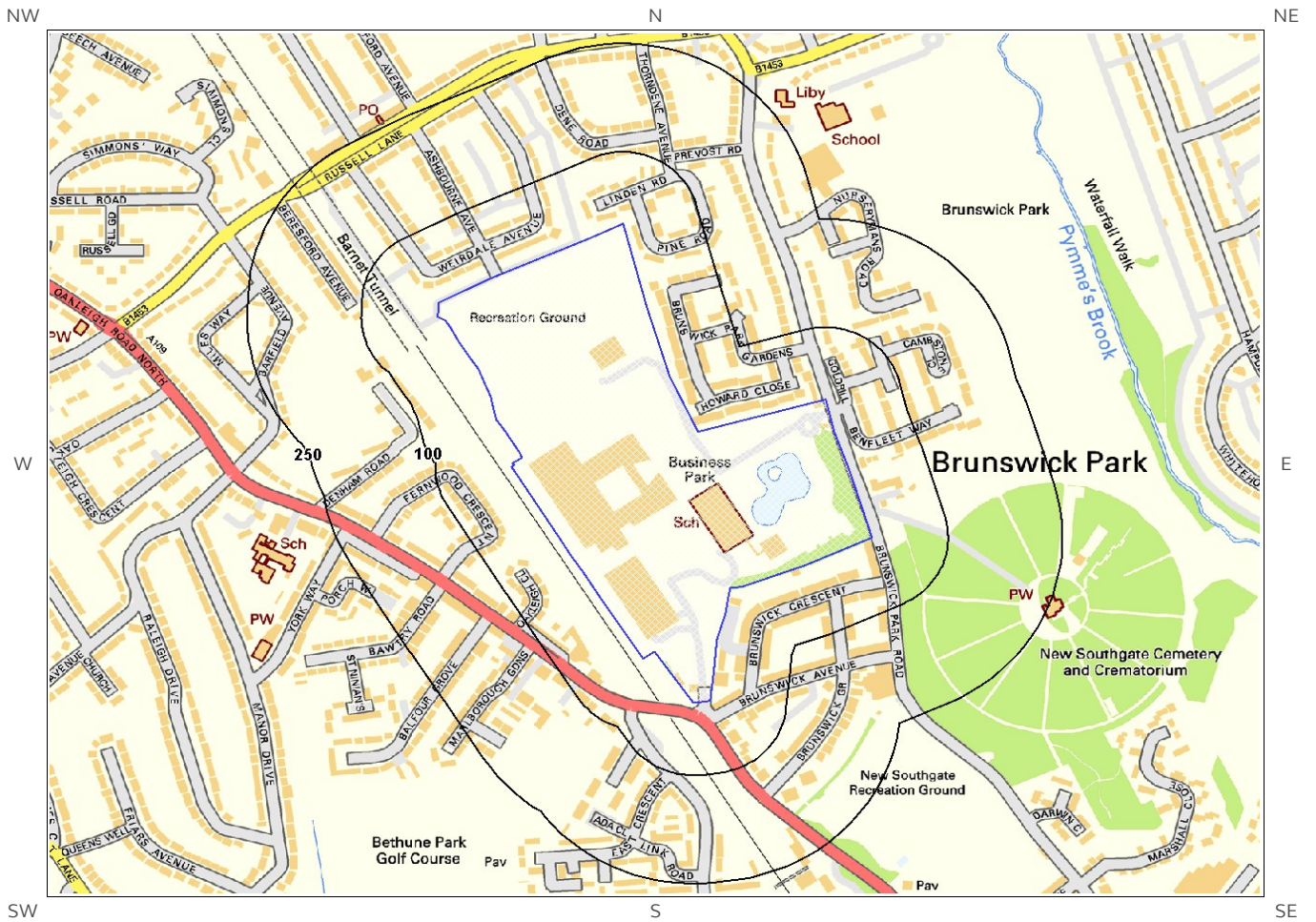
ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	<p>Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible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

6.6 Running Sands

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

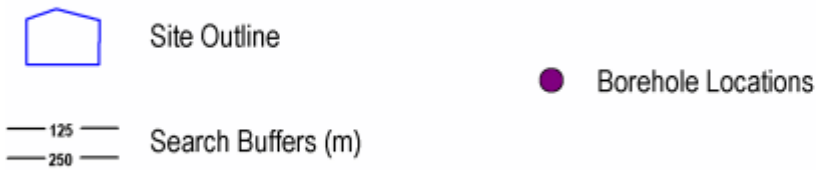
ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Very low potential for running sand problems if water table rises or if sandy strata are exposed to water. No special actions required, to avoid problems due to running sand. No special ground investigation required, and increased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

7 Borehole Records Map



Borehole Records Legend

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7 Borehole Records

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

Records of boreholes within 250m of the study site boundary: 0

Database searched and no data found.

8 Estimated Background Soil Chemistry

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

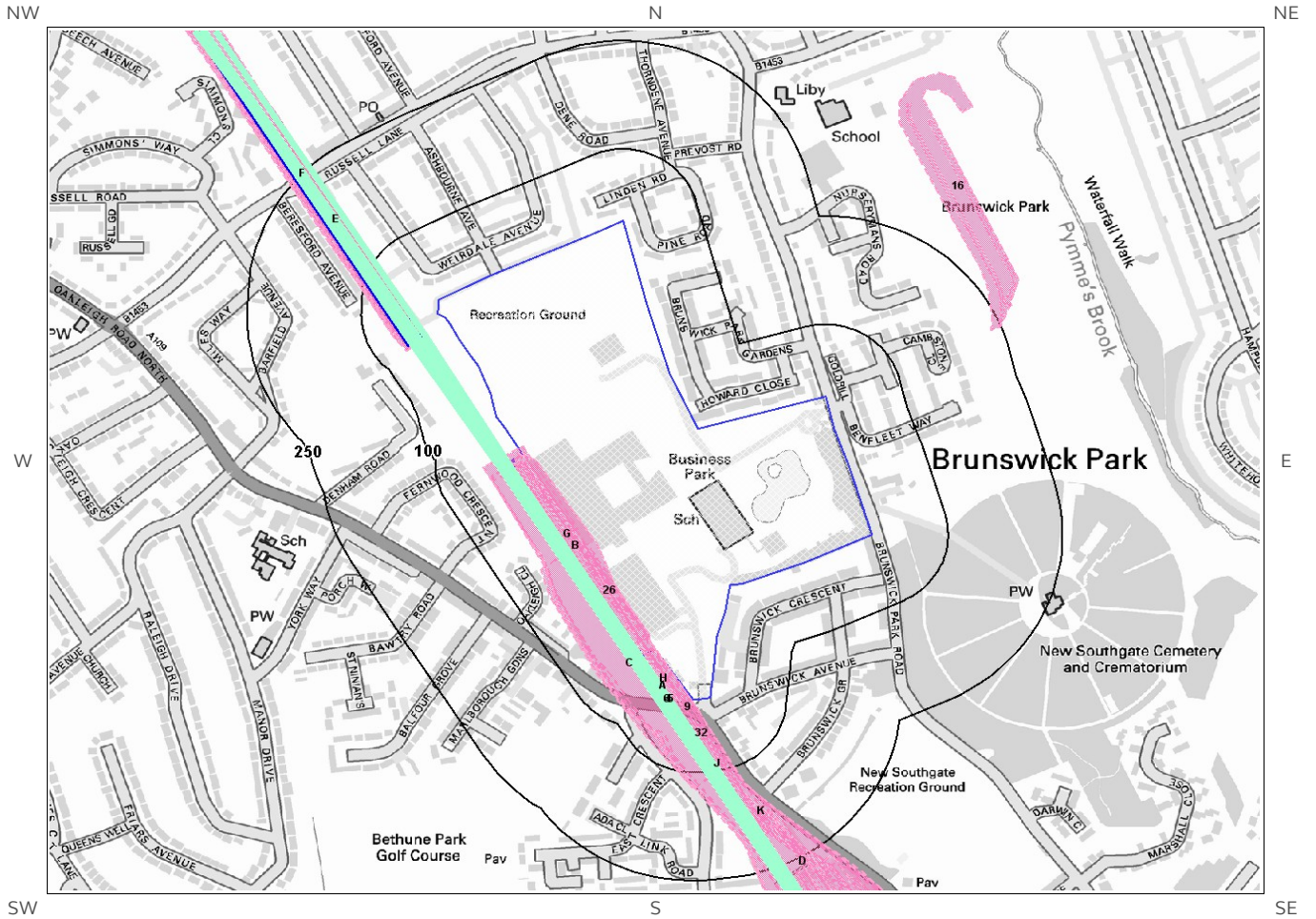
5

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

Distance (m)	Direction	Sample Type	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Nickel (Ni)	Lead (Pb)
0.0	On Site	London	No data	No data	No data	No data	No data
0.0	On Site	London	No data	No data	No data	No data	No data
0.0	On Site	London	No data	No data	No data	No data	No data
0.0	On Site	London	No data	No data	No data	No data	No data
0.0	On Site	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

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	Underground or Partially Underground Railway / Subway System		Railway Track (OpenStreetMap)
	Site Outline		Railway Tunnel (OS Mapping)
	Search Buffers (m)		Abandoned or Dismantled Railway (OpenStreetMap)
			High Speed 2
			Crossrail 1
			Railway Track (OS Mapping)
			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? No

Database searched and no data found.

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

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

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

Have any other railway tunnels been identified within 250m of the site boundary? Yes

Distance (m)	Direction	Detail
32	SW	Railway Tunnel
44	SW	Railway Tunnel
56	SW	Railway Tunnel

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? Yes

Have any historical railway or tunnel features been identified within 250m of the study site boundary? Yes

ID	Distance (m)	Direction	NGR	Details	Date
1A	0	On Site	528459 192601	Railway Sidings	1938
2A	0	On Site	528459 192601	Railway Sidings	1912
3A	0	On Site	528459 192601	Railway Sidings	1920

ID	Distance (m)	Direction	NGR	Details	Date
4	0	On Site	528167 193031	Railway Sidings	1962
5	0	On Site	528420 192612	Railway Sidings	1895
6	0	On Site	528465 192620	Railway Sidings	1951
7B	0	On Site	527934 193382	Railway Sidings	1973
8B	0	On Site	527934 193382	Railway Sidings	1980
9	0	On Site	528214 192945	Railway Sidings	1938
10	0	On Site	528138 193061	Railway Sidings	1897
11	0	On Site	528265 192915	Railway Sidings	1898
12C	0	On Site	528011 193219	Railway Sidings	1864
13C	0	On Site	528011 193219	Railway Sidings	1866
24B	0	On Site	527940 193387	Railway Sidings	1967
25G	0	On Site	527925 193399	Railway Sidings	1936
26	0	On Site	527978 193326	Railway Sidings	1868
27G	0	On Site	527930 193387	Railway Sidings	1896
28B	0	On Site	527940 193387	Railway Sidings	1950
29G	0	On Site	527929 193388	Railway Sidings	1898
30H	0	On Site	528050 193201	Railway Sidings	1949
31H	0	On Site	528050 193201	Railway Sidings	1966
32	0	On Site	528086 193143	Railway Sidings	1958
33I	0	On Site	528233 192938	Railway Sidings	1896
34I	0	On Site	528232 192933	Railway Sidings	1898
35I	2	SW	528271 192933	Railway Sidings	1914
54F	27	SW	527581 193899	Tunnel	1980
55F	27	SW	527581 193899	Tunnel	1973
56F	27	SW	527581 193899	Tunnel	1987
17E	29	SW	527618 193832	Tunnel	1950
18E	29	SW	527618 193832	Tunnel	1967
19E	29	SW	527619 193831	Tunnel	1963
20E	29	SW	527619 193831	Tunnel	1950

ID	Distance (m)	Direction	NGR	Details	Date
57F	31	W	527573 193906	Tunnel	1962
58F	31	W	527573 193906	Tunnel	1951
59F	32	SW	527575 193901	Tunnels	1912
60F	32	SW	527575 193901	Tunnels	1920
21F	34	W	527574 193905	Tunnels	1896
61F	34	W	527575 193905	Tunnel	1938
62F	34	SW	527575 193903	Tunnels	1897
22F	36	SW	527576 193897	Tunnels	1898
23F	36	SW	527576 193897	Tunnels	1936
63F	36	SW	527568 193910	Tunnels	1895
64F	36	W	527568 193911	Tunnels	1898
65F	39	SW	527574 193899	Tunnel	1866
66F	39	SW	527574 193899	Tunnel	1864
67F	51	SW	527571 193897	Tunnel	1938
36D	84	S	528278 192858	Railway Sidings	1913
37J	88	S	528120 193082	Railway Sidings	1986
38J	90	S	528119 193081	Railway Sidings	1991
39K	143	S	528179 193021	Railway Sidings	1966
40K	143	S	528179 193021	Railway Sidings	1949
41D	143	S	528340 192784	Railway Sidings	1936
42K	144	S	528174 193021	Railway Sidings	1951
43K	144	S	528178 193020	Railway Sidings	1950
14D	178	SE	528314 192788	Railway Sidings	1980
15D	178	SE	528314 192788	Railway Sidings	1973
44K	178	S	528186 193007	Railway Sidings	1986
45K	178	SE	528184 193007	Railway Sidings	1991
46L	197	SE	528320 192825	Railway Sidings	1949
47L	198	SE	528324 192813	Railway Sidings	1950
48L	199	SE	528332 192801	Railway Sidings	1966

ID	Distance (m)	Direction	NGR	Details	Date
49L	199	SE	528332 192801	Railway Sidings	1949
16	236	NE	528438 193864	Railway Sidings	1962
50M	246	NE	528441 193846	Railway Sidings	1958
51M	247	NE	528447 193835	Railway Sidings	1951
52M	247	NE	528441 193845	Railway Sidings	1963
53M	247	NE	528441 193845	Railway Sidings	1949

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? Yes

Distance (m)	Direction	Name	Type
2	SW	Not given	Rail
2	SW	Not given	Rail
7	SW	Not given	Rail
7	SW	Not given	Rail
10	SW	Not given	Rail
10	SW	Not given	Rail
12	SW	Not given	Multi Track
12	SW	Not given	Multi Track
15	SW	Not given	Rail
15	SW	Not given	Rail
29	SW	Not given	Rail
29	SW	Not given	Rail
39	SW	Not given	Rail
39	SW	Not given	Rail

Distance (m)	Direction	Name	Type
42	SW	Not given	Rail
42	SW	Not given	Rail
51	SW	East Coast Main Line	Rail
51	SW	East Coast Main Line	Rail

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

9.5 Railway Projects

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

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

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

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

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

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“Beneficiary” means the person or entity for whose benefit the Client has obtained the Services.

“Client” means the party or parties entering into a Contract with Groundsure.

“Commercial” means any building or property which is not Residential.

“Confidential Information” means the contents of this Contract and all information received from the Client as a result of, or in connection with, this Contract other than

- (i) information which the Client can prove was rightfully in its possession prior to disclosure by Groundsure and
- (ii) any information which is in the public domain (other than by virtue of a breach of this Contract).

“Support Services” means Support Services provided by Groundsure including, without limitation, interpreting third party and in-house environmental data, providing environmental support advice, undertaking environmental audits and assessments, Site investigation, Site monitoring and related items.

“Contract” means the contract between Groundsure and the Client for the provision of the Services, and which shall incorporate these terms and conditions, the Order, and the relevant User Guide.

“Third Party Data Provider” means any third party providing Third Party Content to Groundsure.

“Data Reports” means reports comprising factual data with no accompanying interpretation.

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“Groundsure” means Groundsure Limited, a company registered in England and Wales under number 03421028.

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“Ordnance Survey” means the Secretary of State for Business, Innovation and Skills, acting through Ordnance Survey, Adanac Drive, Southampton, SO16 0AS, UK.

“Order Website” means the online platform through which Orders may be placed by the Client and accepted by Groundsure.

“Report” means a Risk Screening Report or Data Report for Commercial or Residential property.

“Residential” means any building or property used as or intended to be used as a single dwelling.

“Risk Screening Report” means a risk screening report comprising factual data with an accompanying interpretation by Groundsure.

“Services” means any Report, Mapping and/or Support Services which Groundsure has agreed to provide by accepting an Order pursuant to clause 2.6.

“Site” means the area of land in respect of which the Client has requested Groundsure to provide the Services.

“Third Party Content” means data, database information or other information which is provided to Groundsure by a Third Party Data Provider.

“User Guide” means the user guide, as amended from time to time, available upon request from Groundsure and on the website (www.Groundsure.com) and forming part of this Contract.

2 Scope of Services, terms and conditions, requests for insurance and quotations

2.1 Groundsure agrees to provide the Services in accordance with the Contract.

2.2 Groundsure shall exercise reasonable skill and care in the provision of the Services.

2.3 Subject to clause 7.3 the Client acknowledges that it has not relied on any statement or representation made by or on behalf of Groundsure which is not set out and expressly agreed in writing in the Contract and all such statements and representations are hereby excluded to the fullest extent permitted by law.

2.4 The Client acknowledges that terms and conditions appearing on a Client’s order form, printed stationery or other communication, or any terms or conditions implied by custom, practice or course of dealing shall be of no effect, and that this Contract shall prevail over all others in relation to the Order.

2.5 If the Client or Beneficiary requests insurance in conjunction with or as a result of the Services, Groundsure shall use reasonable endeavours to recommend such insurance, but makes no warranty that such insurance shall be available from insurers or that it will be offered on reasonable terms. Any insurance purchased by the Client or Beneficiary shall be subject solely to the terms of the policy issued by insurers and Groundsure will have no liability therefor. In addition you acknowledge and agree that Groundsure does not act as an agent or broker for any insurance providers. The Client should take (and ensure that the Beneficiary takes) independent advice to ensure that the insurance policy requested or offered is suitable for its requirements.

2.6 Groundsure's quotations or proposals are valid for a period of 30 days only unless an alternative period of time is explicitly stipulated by Groundsure. Groundsure reserves the right to withdraw any quotation or proposal at any time before an Order is accepted by Groundsure. Groundsure's acceptance of an Order shall be binding only when made in writing and signed by Groundsure's authorised representative or when accepted through the Order Website.

3 The Client’s obligations

3.1 The Client shall comply with the terms of this Contract and

- (i) procure that the Beneficiary or any third party relying on the Services complies with and acts as if it is bound by the Contract and

- (ii) be liable to Groundsure for the acts and omissions of the Beneficiary or any third party relying on the Services as if such acts and omissions were those of the Client.

3.2 The Client shall be solely responsible for ensuring that the Services are appropriate and suitable for its and/or the Beneficiary’s needs.

3.3 The Client shall supply to Groundsure as soon as practicable and without charge all requisite information (and the Client warrants that such information is accurate, complete and appropriate), including without limitation any environmental information relating to the Site and shall give such assistance as Groundsure shall reasonably require in the provision of the Services including, without limitation, access to the Site, facilities and equipment.

3.4 Where the Client’s approval or decision is required to enable Groundsure to carry out work in order to provide the Services, such approval or decision shall be given or procured in reasonable time and so as not to delay or disrupt the performance of the Services.

3.5 Save as expressly permitted by this Contract the Client shall not, and shall procure that the Beneficiary shall not, re-sell, alter, add to, or amend the Groundsure Materials, or use the Groundsure Materials in a manner for which they were not intended. The Client may make the Groundsure Materials available to a third party who is considering acquiring some or all of, or providing funding in relation to, the Site, but such third party cannot rely on the same unless expressly permitted under clause 4.

3.6 The Client is responsible for maintaining the confidentiality of its user name and password if using the Order Website and the Client acknowledges that Groundsure accepts no liability of any kind for any loss or damage suffered by the Client as a consequence of using the Order Website.

4 Reliance

4.1 The Client acknowledges that the Services provided by Groundsure consist of the presentation and analysis of Third Party Content and other content and that information obtained from a Third Party Data Provider cannot be guaranteed or warranted by Groundsure to be reliable.

4.2 In respect of Data Reports, Mapping and Risk Screening Reports, the following classes of person and no other are entitled to rely on their contents;

- (i) the Beneficiary,

(ii) the Beneficiary's professional advisers, (iii) any person providing funding to the Beneficiary in relation to the Site (whether directly or as part of a lending syndicate),

(iv) the first purchaser or first tenant of the Site, and

(v) the professional advisers and lenders of the first purchaser or tenant of the Site.

4.3 In respect of Support Services, only the Client, Beneficiary and parties expressly named in a Report and no other parties are entitled to rely on its contents.

4.4 Save as set out in clauses 4.2 and 4.3 and unless otherwise expressly agreed in writing, no other person or entity of any kind is entitled to rely on any Services or Report issued or provided by Groundsure. Any party considering such Reports and Services does so at their own risk.

5 Fees and Disbursements

5.1 Groundsure shall charge and the Client shall pay fees at the rate and frequency specified in the written proposal, Order Website or Order acknowledgement form, plus (in the case of Support Services) all proper disbursements incurred by Groundsure. The Client shall in addition pay all value added tax or other tax payable on such fees and disbursements in relation to the provision of the Services (together "Fees").

5.2 The Client shall pay all outstanding Fees to Groundsure in full without deduction, counterclaim or set off within 30 days of the date of Groundsure's invoice or such other period as may be agreed in writing between Groundsure and the Client ("Payment Date"). Interest on late payments will accrue on a daily basis from the Payment Date until the date of payment (whether before or after judgment) at the rate of 8% per annum.

5.3 The Client shall be deemed to have agreed the amount of any invoice unless an objection is made in writing within 28 days of the date of the invoice. As soon as reasonably practicable after being notified of an objection, without prejudice to clause 5.2 a member of Groundsure's management team will contact the Client and the parties shall then use all reasonable endeavours to resolve the dispute within 15 days.

6 Intellectual Property and Confidentiality

6.1 Subject to

(i) full payment of all relevant Fees and

(ii) compliance with this Contract, the Client is granted (and is permitted to sub-licence to the Beneficiary) a royalty-free, worldwide, non-assignable and (save to the extent set out in this Contract) non-transferable licence to make use of the Groundsure Materials.

6.2 All Intellectual Property in the Groundsure Materials are and shall remain owned by Groundsure or Groundsure's licensors (including without limitation the Third Party Data Providers) the Client acknowledges, and shall procure acknowledgement by the Beneficiary of, such ownership. Nothing in this Contract purports to transfer or assign any rights to the Client or the Beneficiary in respect of such Intellectual Property.

6.3 Third Party Data Providers may enforce any breach of clauses 6.1 and 6.2 against the Client or Beneficiary.

6.4 The Client shall, and shall procure that any recipients of the Groundsure Materials shall:

(i) not remove, suppress or modify any trade mark, copyright or other proprietary marking belonging to Groundsure or any third party from the Services;

(ii) use the information obtained as part of the Services in respect of the subject Site only, and shall not store or reuse any information obtained as part of the Services provided in respect of adjacent or nearby sites;

(iii) not create any product or report which is derived directly or indirectly from the Services (save that those acting in a professional capacity to the Beneficiary may provide advice based upon the Services);

(iv) not combine the Services with or incorporate such Services into any other information data or service;

(v) not reformat or otherwise change (whether by modification, addition or enhancement), the Services (save that those acting for the Beneficiary in a professional capacity shall not be in breach of this clause 6.4(v) where such reformatting is in the normal course of providing advice based upon the Services);

(vi) where a Report and/or Mapping contains material belonging to Ordnance Survey, acknowledge and agree that such content is protected by Crown Copyright and shall not use such content for any purpose outside of receiving the Services; and

(vii) not copy in whole or in part by any means any map prints or run-on copies containing content belonging to Ordnance Survey (other than that contained within Ordnance Survey's OS Street Map) without first being in possession of a valid Paper Map Copying Licence from Ordnance Survey,

6.5 Notwithstanding clause 6.4, the Client may make reasonable use of the Groundsure Materials in order to advise the Beneficiary in a professional capacity. However, Groundsure shall have no liability in respect of any advice, opinion or report given or provided to Beneficiaries by the Client.

6.6 The Client shall procure that any person to whom the Services are made available shall notify Groundsure of any request or requirement to disclose, publish or disseminate any information contained in the Services in accordance with the Freedom of Information Act 2000, the Environmental Information Regulations 2004 or any associated legislation or regulations in force from time to time.

7. Liability: Particular Attention Should Be Paid To This Clause

7.1 This Clause 7 sets out the entire liability of Groundsure, including any liability for the acts or omissions of its employees, agents, consultants, subcontractors and Third Party Content, in respect of:

(i) any breach of contract, including any deliberate breach of the Contract by Groundsure or its employees, agents or subcontractors;

(ii) any use made of the Reports, Services, Materials or any part of them; and

(iii) any representation, statement or tortious act or omission (including negligence) arising under or in connection with the Contract.

7.2 All warranties, conditions and other terms implied by statute or common law are, to the fullest extent permitted by law, excluded from the Contract.

7.3 Nothing in the Contract limits or excludes the liability of the Supplier for death or personal injury resulting from negligence, or for any damage or liability incurred by the Client or Beneficiary as a result of fraud or fraudulent misrepresentation.

7.4 Groundsure shall not be liable for

(i) loss of profits;

(ii) loss of business;

(iii) depletion of goodwill and/or similar losses;

(iv) loss of anticipated savings;

(v) loss of goods;

(vi) loss of contract;

(vii) loss of use;

(viii) loss or corruption of data or information;

(ix) business interruption;

(x) any kind of special, indirect, consequential or pure economic loss, costs, damages, charges or expenses;

(xi) loss or damage that arise as a result of the use of all or part of the Groundsure Materials in breach of the Contract;

(xii) loss or damage arising as a result of any error, omission or inaccuracy in any part of the Groundsure Materials where such error, omission or inaccuracy is caused by any Third Party Content or any reasonable interpretation of Third Party Content;

(xiii) loss or damage to a computer, software, modem, telephone or other property; and

(xiv) loss or damage caused by a delay or loss of use of Groundsure's internet ordering service.

7.5 Groundsure's total liability in relation to or under the Contract shall be limited to £10 million for any claim or claims.

7.6 Groundsure shall procure that the Beneficiary shall be bound by limitations and exclusions of liability in favour of Groundsure which accord with those detailed in clauses 7.4 and 7.5 (subject to clause 7.3) in respect of all claims which the Beneficiary may bring against Groundsure in relation to the Services or other matters arising pursuant to the Contract.

8 Groundsure's right to suspend or terminate

8.1 If Groundsure reasonably believes that the Client or Beneficiary has not provided the information or assistance required to enable the proper provision of the Services, Groundsure shall be entitled to suspend all further performance of the Services until such time as any such deficiency has been made good.

8.2 Groundsure shall be entitled to terminate the Contract immediately on written notice in the event that:

(i) the Client fails to pay any sum due to Groundsure within 30 days of the Payment Date; or

(ii) the Client (being an individual) has a bankruptcy order made against him or (being a company) shall enter into liquidation whether compulsory or voluntary or have an administration order made against it or if a receiver shall be appointed over the whole or any part of its property assets or undertaking or if the Client is struck off the Register of Companies or dissolved; or

(iii) the Client being a company is unable to pay its debts within the meaning of Section 123 of the Insolvency Act 1986 or being an individual appears unable to pay his debts within the meaning of Section 268 of the Insolvency Act 1986 or if the Client shall enter into a composition or arrangement with the Client's creditors or shall suffer distress or execution to be levied on his goods; or

(iv) the Client or the Beneficiary breaches any term of the Contract (including, but not limited to, the obligations in clause 4) which is incapable of remedy or if remediable, is not remedied within five days of notice of the breach.

9. Client's Right to Terminate and Suspend

9.1 Subject to clause 10.1, the Client may at any time upon written notice terminate or suspend the provision of all or any of the Services.

9.2 In any event, where the Client is a consumer (and not a business) he/she hereby expressly acknowledges and agrees that:

(i) the supply of Services under this Contract (and therefore the performance of this Contract) commences immediately upon Groundsure's acceptance of the Order; and

(ii) the Reports and/or Mapping provided under this Contract are

(a) supplied to the Client's specification(s) and in any event

(b) by their nature cannot be returned.

10 Consequences of Withdrawal, Termination or Suspension

10.1 Upon termination of the Contract:

(i) Groundsure shall take steps to bring to an end the Services in an orderly manner, vacate any Site with all reasonable speed and shall deliver to the Client and/or Beneficiary any property of the Client and/or Beneficiary in Groundsure's possession or control; and

(ii) the Client shall pay to Groundsure all and any Fees payable in respect of the performance of the Services up to the date of termination or suspension. In respect of any Support Services provided, the Client shall also pay Groundsure any additional costs incurred in relation to the termination or suspension of the Contract.

11 Anti-Bribery

11.1 The Client warrants that it shall:

(i) comply with all applicable laws, statutes and regulations relating to anti-bribery and anti-corruption including but not limited to the Bribery Act 2010;

(ii) comply with such of Groundsure's anti-bribery and anti-corruption policies as are notified to the Client from time to time; and

(iii) promptly report to Groundsure any request or demand for any undue financial or other advantage of any kind received by or on behalf of the Client in connection with the performance of this Contract.

11.2 Breach of this Clause 11 shall be deemed a material breach of this Contract.

12 General

12.1 The Mapping contained in the Services is protected by Crown copyright and must not be used for any purpose other than as part of the Services or as specifically provided in the Contract.

12.2 The Client shall be permitted to make one copy only of each Report or Mapping Order. Thereafter the Client shall be entitled to make unlimited copies of the Report or Mapping Order only in accordance with an Ordnance Survey paper map copy license available through Groundsure.

12.3 Groundsure reserves the right to amend or vary this Contract. No amendment or variation to this Contract shall be valid unless signed by an authorised representative of Groundsure.

12.4 No failure on the part of Groundsure to exercise, and no delay in exercising, any right, power or provision under this Contract shall operate as a waiver thereof.

12.5 Save as expressly provided in this Contract, no person other than the persons set out therein shall have any right under the Contract (Rights of Third Parties) Act 1999 to enforce any terms of the Contract.

12.6 The Secretary of State for Business, Innovation and Skills ("BIS") or BIS' successor body, as the case may be, acting through Ordnance Survey may enforce a breach of clause 6.4(vi) and clause 6.4(vii) of these terms and conditions against the Client in accordance with the provisions of the Contracts (Rights of Third Parties) Act 1999.

12.7 Groundsure shall not be liable to the Client if the provision of the Services is delayed or prevented by one or more of the following circumstances:

(i) the Client or Beneficiary's failure to provide facilities, access or information;

(ii) fire, storm, flood, tempest or epidemic;

(iii) Acts of God or the public enemy;

(iv) riot, civil commotion or war;

(v) strikes, labour disputes or industrial action;

(vi) acts or regulations of any governmental or other

agency;

(vii) suspension or delay of services at public registries

by Third Party Data Providers;

(viii) changes in law; or

(ix) any other reason beyond Groundsure's reasonable control.

In the event that Groundsure is prevented from performing the Services (or any part thereof) in accordance with this clause 12.6 for a period of not less than 30 days then Groundsure shall be entitled to terminate this Contract immediately on written notice to the Client.

12.8 Any notice provided shall be in writing and shall be deemed to be properly given if delivered by hand or sent by first class post, facsimile or by email to the address, facsimile number or email address of the relevant party as may have been notified by each party to the other for such purpose or in the absence of such notification the last known address.

12.9 Such notice shall be deemed to have been received on the day of delivery if delivered by hand, facsimile or email (save to the extent such day is not a working day where it shall be deemed to have been delivered on the next working day) and on the second working day after the day of posting if sent by first class post.

12.10 The Contract constitutes the entire agreement between the parties and shall supersede all previous arrangements between the parties relating to the subject matter hereof.

12.11 Each of the provisions of the Contract is severable and distinct from the others and if one or more provisions is or should become invalid, illegal or unenforceable, the validity and enforceability of the remaining provisions shall not in any way be tainted or impaired.

12.12 This Contract shall be governed by and construed in accordance with English law and any proceedings arising out of or connected with this Contract shall be subject to the exclusive jurisdiction of the English courts.

12.13 Groundsure is an executive member of the Council of Property Search Organisation (CoPSO) and has signed up to the Search Code administered by the Property Codes Compliance Board (PCCB). All Risk Screening Reports shall be supplied in accordance with the provisions of the Search Code.

12.14 If the Client or Beneficiary has a complaint about the Services, written notice should be given to the Compliance Officer at Groundsure who will respond in a timely manner. In the event you are not satisfied with Groundsure's complaints handling process or you are unable to resolve the complaint, at your discretion you may refer the complaint to The Property Ombudsman Scheme at the following URL/email: website www.tpos.co.uk or email: admin@tpos.co.uk

12.15 The Client agrees that it shall, and shall procure that each Beneficiary shall, treat in confidence all Confidential Information and shall not, and shall procure that each Beneficiary shall not (i) disclose any Confidential Information to any third party other than in accordance with the terms of this Contract; and (ii) use Confidential Information for a purpose other than the exercise of its rights and obligations under this Contract. Subject to clause 6.6, nothing shall prevent the Client or any Beneficiary from disclosing Confidential Information to the extent required by law

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**APPENDIX 11.1: PHASE 1 GEOENVIRONMENTAL ASSESSMENT
REPORT, WSP**



Phase I Geo - Environmental Assessment
North London Business Park and Land at
Oakleigh Road South, New Southgate, UK

Comer Homes

December 2007

QM

Issue/revision	Issue 1	Revision 1	Revision 2	Revision 3
Remarks	Draft			
Date	December 2007			
Prepared by	A Reeder			
Signature				
Checked by	M Wheeler			
Signature				
Authorised by	M Wheeler			
Signature				
Project number	12220279			
File reference				

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Part 1: North London Business Park





Executive Summary

WSP Environmental Ltd (hereafter referred to as WSPE) was instructed by Comer Homes to undertake a Phase I Geo - Environmental Assessment of the land at North London Business Park (referred to by Comer Homes as Brunswick Park). The report highlights environmental considerations, predominantly with respect to ground conditions, and is required as part of the planning application associated with the site. Please refer to Appendix E for WSP's Methodology and Limitations.

Key Findings

The subject site comprises North London Business Park, and includes commercial buildings ranging from single to three storey buildings (ground plus two), surface and multi storey car parking areas, overgrown sports grounds, soft landscaped areas and a lake. There are significant changes in levels across the site, and a number of bunds are present from previous phases of redevelopment.

The site is located in New Southgate, within Barnet, adjacent to the east of the overland train station, in a predominantly residential area with the occasional commercial property.

Historical maps indicate that the site was partially associated with the cemetery in 1863. By 1879 railway sidings and gravel pits were noted on the site. New Southgate Works and a sports ground were present by 1936 and during the 1990s and 2000s building layouts changed. Surrounding land uses include a railway, residential properties, a cemetery, industrial properties and a sewage works.

The Local Authority has provided information relating to nearby historic landfills. In addition it indicated that an intrusive phase II investigation is likely to be required and contamination issues will be dealt with during the planning process associated with redevelopment.

It is understood that the site was subject to bombing in the Second World War, and as such there is a potential for unexploded ordnance to be present on site.

Liability

Based on the information contained within this report and with due regard to redevelopment (including residential with gardens), it is the opinion of WSPE that the site represents a **medium** risk with respect to environmental considerations.

Based on the information contained within this report, it is the opinion of WSPE that the site represents a **medium** risk with respect to geotechnical considerations.

Recommendations

No further work is considered necessary for the ongoing current use of the site. However, the following recommendations should be considered prior to redevelopment:

- An intrusive phase II investigation should be undertaken to provide information relating to contamination issues, provide preliminary geotechnical advice and a ground gas assessment.
- An unexploded ordnance desk study.

1 Site Information

1.1 SITE DETAILS

Site Address	North London Business Park, Brunswick Park Road, Barnet, N11 1HB, UK
National Grid Reference	528050, 193450
Size	Approximately 16 hectares
Site Location	The site is located in New Southgate, within Barnet, adjacent to the east of the overland train station, in a predominantly commercial and residential area. A site location plan is included as Appendix A.
Current Site Use	The subject site is utilised for a mixed development of commercial properties.

1.2 SITE RECONNAISSANCE

A walk over survey of the site was carried out on 28th November 2007, including an inspection of the exterior and interior of the site and buildings.

An annotated site plan, and associated site photographs are presented in Appendix B and C, respectively.


The following key observations were made during the site reconnaissance:

Site Description

The subject site comprises North London Business Park, and includes commercial buildings ranging from single to three storey buildings (ground plus two), surface and multi storey car parking areas, overgrown sports grounds, soft landscaped areas and a lake. There are significant changes in topographical levels across the site, and a number of bunds are present from previous phases of redevelopment.

Specific on-site activities

- The commercial units are generally located in the west of the site and are occupied by London Borough of Barnet (offices and meeting rooms), Barnet College (classrooms and lecture theatres), Middlesex University (offices, classrooms and lecture theatres), Philip ADVENT (offices) and a sports and social club. An additional building was being constructed at the time of the walkover, located to the west of the lake. The site representative indicated that this new building would be occupied by Barnet College.
 - A number of former air raid shelters are present across the site. The site representative indicated that a number of the air raid shelters have since been infilled with surplus material following previous phases of redevelopment, most noteworthy being the shelters in the north west of the site, to the rear of the commercial buildings. The site representative inferred that the roofs had been removed, but that the floors, walls and foundations were likely to remain. Ground level access to two small air raid shelters, located in the south east of the site, to the north east of the multi storey car park, was noted during the site walkover (see photo C1).
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- Three bunds were noted on site, primarily located within the north and centre of the site (see photo C2). The site representative stated that the bunds were constructed during previous phases of redevelopment as surplus material was not permitted to be disposed off site. It is unknown at this stage, exactly what is contained in these stockpiles.

External Areas

- A multi storey car park is present on site, located to the south east of the commercial buildings, with surface car parking noted around the majority of the site. In addition, a stepped surface car park is located to the north west of the commercial buildings; above where the site representative stated the former below ground air raid shelters were located.
- A former sports ground, including a sports pitch, a rifle range and a tennis court were noted in the north of the site, elevated above the commercial development. It was noted that at the time of the walkover the sports ground had not been used in a long time, and had become overgrown (see photo C3). In addition to this, the tennis courts were being utilised as a storage facility for construction materials (see photo C4).
- A lake and associated soft landscaped areas were present in the east of the site (see photo C5).

Bulk Hazardous Materials Storage

- The site representative stated that there are currently no below ground storage tanks and no evidence of such tanks was noted during the site reconnaissance.
- The site representative stated that a former below ground fuel tank was located beneath one of the current commercial buildings, located in the centre of the site. The site representative inferred that the tank had been removed during the redevelopment and construction of the current commercial building.
- An above ground storage tank, fuelling the back up generator was noted adjacent to one of the commercial buildings. The tank was raised above a concrete base. No ground staining was noted in the surrounding area (see photos C6 and C7).

Other Hazardous Materials

- The site representative stated that there are no hazardous materials stored on-site. No such materials were observed on site during the site walkover.

Polychlorinated Biphenyls (PCBs)

- An electricity sub station is located within the site's boundary, in the south of the site, adjacent to the main site entrance. It was not possible to access the compound in which the sub station is located and therefore the condition could not be determined.
 - In addition to the main sub station, located at the main site entrance, a number of smaller transformers were noted across the site associated with individual commercial buildings, and a mast and associated transformer was noted adjacent to the former rifle range in the north of the site (see photo C8).
-



Ozone Depleting Substances (ODS)

- The site representative stated that all air conditioning units had been recently refurbished, and no longer utilise the refrigerant R22, which is an ozone depleting substance.
- Further to this, former units were noted within the immediate external areas to some of the commercial buildings, however the site representative stated that these units were no longer in use.

Wastes Management

-Non Hazardous

- Waste produced on site comprises cardboard, packaging, office waste, catering waste and general wastes, which are compacted before being stored in a number of skips and removed regularly by reportedly licensed waste contractors.

-Hazardous

- The site representative stated that no hazardous waste was generated on site. No such materials were observed on site during the site walkover.

Drainage Issues

-Surface Water

- The site representative stated that all surface water drained into the lake on site.

-Foul Water

- Foul water on site is limited to sewage and domestic waste water. The site representative did not report any issues associated with on site foul water, and no issues were observed during the site walkover.

-Trade Effluent

- No trade effluent discharges were identified during the site visit.

Asbestos Containing Materials (ACMs)

The site representative stated that asbestos containing materials were historically found to be present within one of the buildings on site, the site representative stated that this has since been cleared, and that no asbestos containing materials are currently present on site, however WSPE has not received confirmation of this. It is understood that Asbestos Registers are held for the commercial buildings present on site, however these have not been reviewed by WSPE.

1.3 SURROUNDING LAND USE

The site is located in New Southgate, within Barnet, in a predominantly residential area, with occasional commercial properties, predominantly to the south of the site. Residential properties are located adjacent to the northeast, east and south east of the site, and the overland railway runs adjacent to the western boundary of the site.



2 Historical Land Use

2.1 SITE HISTORY

A study of historical Ordnance Survey maps has been undertaken to identify any potentially contaminative former land uses. Reference to historical maps provides invaluable information regarding the land use history of the site, but historical evidence will be incomplete for the period pre-dating the first edition and between successive maps. A selection of historical map extracts is included as Appendix D.

Historical maps indicate that the site comprised land associated with the adjacent cemetery from the earliest OS map dated 1863. The western boundary is marked by the cutting for the adjacent railway, with associated sidings noted on the 1879 map in the south west of the site. Also in 1879 gravel pits were noted in the north of the site, however were cleared by 1896. The Cemetery Station was noted in the east of the site on the 1866 map associated with the adjacent cemetery; however this was cleared by 1897. By 1936 the north and east of the site are occupied by a sports ground, including tennis courts, a pavilion, a miniature rifle range and a tank, whereas the south of the site is occupied by New Southgate Works (Telephones and Cables), with a number of large warehouse structures across the site. Two pond features were noted in the east of the site in 1981, with a weir separating them. The 1991 map shows the northern sports field to comprise the former pavilion and a new rifle range in the extreme north of the site, all other features have been cleared. Within the 1990s and 2000s the building layout within the works changes, and the map dated 2007 indicates the current layout.

Anecdotal Information

The site representative stated that a number of former air raid shelters were present across the site; two shelters are still present, with access at ground level located in the centre of the site, adjacent to the multi storey car park. Further to this, the site representative stated that additional shelters have since been infilled, and as such associated walls and foundations are likely to remain underground. The historic, infilled air raid shelters were located to the north of the remaining shelters and to the north of the commercial buildings.

2.2 SURROUNDING AREA

A study of historical Ordnance Survey maps has been undertaken to identify any potentially contaminative former land uses. A selection of relevant historical map extracts is included as Appendix D. The following represents a summary of the available map information:

Surrounding Features	Dates	Distance (m)	Direction
Great Northern Cemetery (including Mortuary Chapel)	Pre 1881 – pre 1989	Adjacent	South east
<i>Then</i> New Southgate Cemetery and Crematorium	Pre 1989 - present		
Railway line – Great Northern (including tunnel to north west)	Pre 1881 – present	Adjacent	West
East Barnet Sewage Farm	Pre 1897 – pre 1938	300	East
<i>Then</i> Sewage Disposal Works	Pre 1938 – pre 1962		



Surrounding Features	Dates	Distance (m)	Direction
<i>Then Works</i>	Pre 1962 – pre 1973		
<i>Then Scrub land</i>	Pre 1973 – pre 1989		
<i>Then Cleared</i>	Pre 1989 – pre 1999		
<i>Then Brunswick Park</i>	Pre 1999 – present		
Photographic Works	Pre 1897 – pre 1962	200	South
<i>Then Works</i>	Pre 1962 – present		
Unnamed building	Pre 1962 – pre 1963	100	East
<i>Then Works</i> (with electricity sub station)	Pre 1963 – pre 1994		
<i>Then</i> cleared, with a depot	Pre 1994 – pre 2007		
<i>Then Residential properties</i>	Pre 2007 – present		

3 Regulatory Information & Consultations

3.1 REGULATORY DATABASE

The following environmental data has been obtained from a summary of information databases.

	0-250m	250-500m	Details
Registered landfills	0	0	Not applicable (N/A)
Closed landfill facilities	2	0	Great Northern Cemetery (now New Southgate) was located approximately 100m to the east of the site and held a waste license for a year (1979). In addition to the cemetery, East Barnet Sewage Works, was formerly located approximately 125m to the north east of the site, held a license for fifteen years (1950-1965) including inert, commercial and household waste.
Registered transfer stations/treatment facilities	1	1	GBN Services Ltd is located approximately 200m to the south east of the site, and accepts inert commercial and household waste. Further to this, a second transfer station (Winters Haulage) is located approximately 380m to the south east of the site, and accepts household, commercial and industrial waste.
Closed transfer stations/treatment facilities	0	0	N/A
Authorised industrial processes (IPC/IPPC).	1	4	Oakleigh Dry Cleaners are located approximately 120m to the south west of the site. The remaining authorised processes relate to the cemetery, additional dry cleaners and a petrol filling station.
Fuel Stations Entries	1	1	The closest fuel station is approximately 70m to the south of the site and is recorded as obsolete. Further to this, Barnet service station is approximately 300m to the north west of the site and recorded as open.
Licensed radioactive substances	0	0	N/A
Enforcements, prohibitions or prosecutions	0	0	N/A
Discharge Consents	0	0	N/A
Pollution Incidents	0	1	The nearest pollution incident occurred 340m to the southeast of the site. The incident comprised the release of oil to a drainage ditch and was classified as minor. This has not been attributed to the subject site.
Natural Cavities	0	0	N/A
Consents issued under the Planning (Hazardous Substances) Act 1990	0	0	N/A



3.2 CONSULTEES

Local Authority Building Control

The Building Control Officer at London Borough of Barnet was contacted with regard to ground conditions beneath the subject site. A response has not yet been received by WSPE.

Local Authority Contaminated Land Office

The Contaminated Land Officer at London Borough of Barnet was contacted for environmentally pertinent information relating to the site. The Officer confirmed that the site has had numerous potentially contaminative uses, however stated that for continued current use the site was not considered as high priority for classification as contaminated land under Part IIa of the Environmental Protection Act (1990). The Officer indicated that prior to redevelopment of the site, particularly if the proposed redevelopment comprised an end use change, to residential, an intrusive investigation would be required, and that contamination issues would be dealt with through the planning process.

In addition to this the Officer was consulted on the former landfills identified in the surrounding area. The Officer stated that in relation to Great Northern Cemetery, London Borough of Barnet are not aware of any waste that has been deposited there historically. The Officer indicated that the license the cemetery held (1 year, 1979) may relate to the deposition of soil, permitting an additional layer of viable land. The Officer confirmed that this site is not considered to represent a significant risk to the subject site.

The second landfill license was related to East Barnet Sewage Works. The Officer stated that prior to the closure of the works materials may have been used to backfill holes and excavations across the site. Further to this, the Officer stated that a number of reports (including site investigations and gas assessments) are available for the sewage works as a portion of the works has been redeveloped for residential end use. The Officer stated that gas reports have identified low amounts of gas, and that in 1995 the Environment Agency (EA) classified the site as 'green' in relation to ground gas, and that low to no risk is anticipated. The Officer indicated that in addition to the sewage works materials present, there is a potential that household waste may have been deposited briefly at the site.

Petroleum Officer

No issues have been identified which warrant further consultation with the Petroleum Officer.

Environment Agency

The Environment Agency has been contacted in relation to landfills in the surrounding area. A response has not yet been received by WSPE. The Environment Agency confirmed the presence of the two landfills within the vicinity of the site, however have stated that as both sites were closed before the Environment Agency became the regulatory body for waste sites no further information is held.

Environment Agency Flooding Data

The site is not located within an Environment Agency indicative floodplain.



Health Protection Agency

The site is located within an area where no radon protection measures are considered necessary.

British Geological Survey

The site is located within an area where there is low to very low risk of landslip subsidence hazards and moderate risk of swelling clay subsidence hazards.

Coal Authority Report

The site is not located within an area affected by Coal Mining. From the information currently available to the Coal Authority, a mining report is not required for this site.





4 Other Relevant Information

4.1 PLANNING BRIEF

The London Borough of Barnet, Planning Brief for North London Business Park and land adjacent to Coppices Grove has been provided by the client and includes details of the site development. A summary of the relevant information has been provided below.

- The site's history has comprised New Southgate Works (telephone and cable), followed by Northern Telecom (Nortel) occupying part of the site in 1989. An optical centre of excellence was present in 2000 and by 2003 Nortel relocated off site;
- During the Second World War it is reported that the site was bombed, due to its strategic industrial use;
- A number of underground air raid shelters are present across the site;
- An underground public sewer crosses the site; and
- Fly tipping is reported to have occurred in the north of the site within and to the east of the former sports ground.



5 Environmental Setting

5.1 GEOLOGY AND HYDROGEOLOGY

The published 1:50,000 scale geological map of the area (Sheet No 256 “North London”) indicates the site to be underlain by London Clay, with a potential for Head Deposits to be present overlying the London Clay.

On the basis of the published geological maps of the full succession of natural strata in the vicinity of the site is likely to comprise:

Conjectural Geological Model

Geological Unit	Description	Anticipated Thickness (m)
<i>Superficial Soils / Drift</i>		
Head deposits	Variable deposit	Anticipated to be of limited thickness
<i>Solid Geology</i>		
London Clay	Clay, silty in part	Anticipated to be in the order of 30m
Lambeth Beds	Mottled clay with sand and pebble beds	Unknown
Thanet Sands	Fine grained sand	Unknown
White Chalk Group	Chalk	Unknown

The Dollis Hill River Terrace Deposits were noted off site to the south west of the site, as a gravel, sandy and clayey in part.

The existing topography and history of development of the site suggests that, in addition to these natural strata, Made Ground is likely to be present on the site. Further to this, there is an area of Made Ground noted on the BGS map, located to the east of the site, anticipated to be associated with the former East Barnet Sewage Works.

The published Environment Agency Groundwater Vulnerability Map of the area (Sheet 39 “West London”) indicates the site to be predominantly underlain by a Non Aquifer (London Clay). Therefore, groundwater resources are perceived not to be at risk from activities carried out on site.

The following current licensed groundwater abstractions have been identified within a 1km radius of the site, although the abstraction below is likely to be from the deeper chalk aquifer and therefore protected by a thickness of relatively impermeable London Clay:

Source	Use	Distance (m)	Direction
Groundwater	Potable water supply	700	South east

In terms of aquifer protection, the Environment Agency generally adopt a three-fold classification of Source Protection Zones for public supply abstraction wells

- Zone I - or ‘inner source protection’ is located immediately adjacent to the groundwater source. It is based on a 50-day travel time and is designed to protect



against the effects of human activity and biological/chemical contaminants that may have an Immediate effect on the source

- Zone II - or 'outer source protection' is larger than Zone I and is defined by a 400-day travel time to the source. The travel time is designed to provide delay and attenuation of slowly degrading pollutants
- Zone III - or 'source catchment' covers the complete catchment areas of a groundwater resource

Information available on the Environment Agency's web-site indicates that the site does not lie within a Source Protection Zone.

5.2 HYDROLOGY

Surface water features in the vicinity of the subject site are as follows:

Surface Water Feature	Quality*	Distance (m)	Direction
Unnamed lake	-	On site	-
Pymme's Brook	C	400	East

*Chemical water quality as classified under the EA's General Quality Assessment (GQA) Scheme.

No surface water abstractions have been identified within a 1km radius of the subject site.

5.3 5.3 SURROUNDING FEATURES

Sensitive surrounding land uses in the immediate vicinity of the subject site are as follows:

Sensitive Land Use	Approx. Distance	Direction
Residential properties with gardens	Adjacent	North, East, South

5.4 ENVIRONMENTAL SENSITIVITY

Overall, the site setting is considered to be of **low / moderate** sensitivity, due to the following reasons:

- The presence of on-site surface water features (lake in the east of the site);
- The residential land uses within the surrounding area;
- The presence of groundwater abstractions within a 1km radius of the site (potable supply, approximately 700m) – although this is considered to be protected by impermeable London Clay;
- The underlying Non Aquifer; and
- The absence of an unprotected minor aquifer underlying the site.



6 Geotechnical Considerations

6.1 PROPOSED DESIGN

WSPE understands that the site will be redeveloped for a mixed use purposes, including additional commercial buildings in the centre and south of the site and residential properties in the north and east of the site; however planning approval has, as yet, not been received. It is understood that current plans include underground parking across large portions of the site. Based on the desk study information obtained and a walkover survey of the site, several areas of geotechnical risk have been identified as outlined below:

The following ground-related hazards have been identified during the investigation:

Hazard	Justification
Lateral changes in ground conditions	Given the changes in levels across the site, and the possible presence for former air raid shelters, it is considered that the depth to natural ground will vary significantly across the site.
Shrinkable clay soils	London Clay is considered to be a material with a medium to high volume change potential.
Desiccation	Given the shrinkage potential of the London Clay and any existing / proposed trees on site, desiccation should be considered.
Soft clay – low bearing capacity	The Head deposits overlying the London Clay have the potential of being soft.
High groundwater / poor drainage	Unknown at this stage.
Potential for below ground obstructions.(foundations / air raid shelters)	Historic development of the site and former air raid shelters indicate the potential for below ground obstructions.
Made Ground / infilled ponds	The historical gravel pits in the north of the site are likely to have been infilled. In addition to this, significant earthworks have occurred on site, resulting in potentially significant thicknesses of Made Ground across the site.
Adverse ground chemistry (weathering of sulphides to sulphates / acidic pH)	Unknown at this stage.

6.2 FOUNDATIONS

From past experience, the London Clay is likely to have a safe bearing capacity in the region of 125kN/m² to 150kN/m². This generally proves suitable for pad foundations for structures up to three storeys in height. This solution will be subject to confirmatory tests undertaken during an intrusive site investigation. However, the thickness of Made Ground and the thickness and composition of the Head deposits may also preclude the use of shallow foundations.

Footings should be taken deeper where structures are located within influencing distance of any existing or future trees. In these circumstances reference should be made to NHBC Chapter 4.2.



For four storey structures, foundations could be excessively wide and piled foundations may be a more appropriate solution.

It is considered that suspended floor slabs are likely to be required across the site, based on the potential for a significant thickness of Made Ground being present.

The anticipated sub-grade soil CBR value for road pavement design is 2%.

6.3 OBSTRUCTIONS/RELIC STRUCTURES

There is the possibility of relict substructures, possibly including areas of underground air raid shelters and former foundations, being present on the site. In addition to any effect on foundation construction, such features may lead to increased costs for the groundworks operations and delays in programming.

It is recorded within the planning brief that the site was bombed during World War II. It is therefore possible that unexploded ordnance be present across the site.



7 Risk Assessment

7.1 OUTLINE ENVIRONMENTAL CONCEPTUAL MODEL

The methods used within this risk assessment follow a risk-based approach, with the potential environmental risk assessed qualitatively using the 'source-pathway-target pollutant linkage' concept introduced in the Environmental Protection Act 1990. For a site to be designated as Contaminated Land a plausible linkage between the identified Sources, Pathways and Targets must be demonstrated, this is further discussed within Appendix E.

Potential Contaminant Sources

On-Site Contaminant Sources	<ul style="list-style-type: none"> ■ Possibility of infilled former gravel pits in the north of the site, may give rise to deep areas of Made Ground or ground gas generation. ■ The site has had a long history of development, including railway sidings, the telephones / cables works, electricity sub stations and tanks, which could have resulted in contamination across the site. ■ A number of bunds are present as a result of previous phases of redevelopment. ■ The site is thought to have been bombed during World War II which could have resulted in unexploded ordnance being present across the site. ■ Previous phases of redevelopment at the site have resulted in bunds / infilled air raid shelters which could have resulted in deep areas of Made Ground.
Off-Site Contaminant Sources	<ul style="list-style-type: none"> ■ Neighbouring sites and land have had a commercial/industrial history, including the sewage works and photo works. ■ Two landfill sites are located within 250m of the site. Two waste transfer stations are located within 500m of the site.

Potential Contaminant Pathways

<ul style="list-style-type: none"> ■ Potentially granular soils in the underlying superficial geology (Head Deposits) have the potential to permit the transport of pollutants. However the underlying solid geology is London Clay and is predominantly cohesive and is likely to restrict the widespread transport of pollutants.
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Potential Receptors

Controlled Waters	<ul style="list-style-type: none"> ■ The lake on site.
Human Health Risks	<ul style="list-style-type: none"> ■ The proposed redevelopment plans include residential properties with gardens in the north and east of the site, there is unlikely to be a barrier between any subsurface contamination and the end users. ■ Third Party neighbours are primarily residential in nature and as such a barrier between any subsurface contamination is unlikely to be present.

Pollutant Linkages

<ul style="list-style-type: none"> ■ Migration of contamination through potentially granular soils within the Head deposits
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migrating towards surface water receptors.

- Direct contact with contaminated soils (ingestion, inhalation and dermal contact).
- Ground gas migration from historic filling activities on site.

7.2 ENVIRONMENTAL RISK ASSESSMENT MATRIX

Having evaluated the information gathered during this study and described in the previous sections, WSP Environmental Ltd has produced the following assessment of risk primarily focused on contaminated land issues:

	ISSUE	RISK CATEGORY	REASON
Contamination Potential:	Potential for significant on-site contamination	Medium	Potential sources of contamination have been identified across the site, including Made Ground, unexploded ordnance, and the sites predominantly industrial development history.
	Potential for contaminants migrating off the site	Low/Medium	The migration of any potential contaminants present is likely to be restricted due to the nature of the underlying geology. This is dependent on the thickness and composition of the Head deposits on site.
	Potential for contaminants migrating onto the site	Low/Medium	The migration of any potential contaminants present is likely to be restricted due to the nature of the underlying geology. This is dependent on the thickness and composition of the Head deposits on site.
Other Liability Issues:	Potential for 'other' environmental issues to give rise to liabilities	Medium	There is a potential for unexploded ordnance to be present on site, as a result of World War II bombing.
Environmental Consequences	Risk of Pollution of Controlled Waters	Low/Medium	It is considered that in light of the underlying cohesive geology, controlled waters are not considered a significant risk at the site. However there is a lake on site that may have been directly impacted.
	Risk of Damage to Property	Low	No significant issues identified.
	Risk of Harm to Human Health	Medium	The residential redevelopment in the north and east of the site present the highest risk of harm to human health, and certified clean topsoil will need to be imported for the garden areas if materials on site are not suitable.
Business Consequences:	Likelihood of designation as Contaminated Land under EPA 1990	Low/Medium	Consultations with the relevant Contaminated Land Officer have identified that the site is not considered a priority for further investigation under the Contaminated Land Regime for continued use, however prior to redevelopment (including residential end use) issues relating to contaminated land will be dealt with through the planning process.
	Risk of Site Value and/or Saleability being affected.	Medium	Source – pathway – receptor linkages have been identified on site, and as such it is recommended that an intrusive phase II investigation is undertaken.
	Likelihood of a Future Purchaser requesting further investigations.	Low/Medium	No further contamination assessment works are considered necessary for a continued use. However, in the event of redevelopment further works will be required as part of the planning process.
	Risk of Liability for Owner	Medium	Source – pathway – receptors have been identified on site, and as such it is recommended that an intrusive phase II investigation is undertaken. It should be noted that the Waste Licence may be required if the removal of the stockpiles is required.
OVERALL RISK FOR REDEVELOPMENT		MEDIUM	

7.3 GEOTECHNICAL RISK ASSESSMENT MATRIX

Based on anticipated ground conditions, potential geotechnical risks that may influence current or future land use are summarised below:

	ISSUE	RISK CATEGORY	REASON
Geotechnical Issue:	Potential for variable depth of Made Ground.	Medium/High	There is potential for infilled former gravel pits in the north of the site, and earthworks from previous phases of redevelopment is anticipated to have generated a significant thickness of Made Ground across the site.
	Potential for below ground obstructions.	Medium/High	Former air raid shelters and former foundations are anticipated to be present across the site.
	Potential for shallow mine workings and coal shafts and adits.	Low	The site is not in an area affected by coal mining.
	Potential for 'other' issues to give rise to liabilities.	Medium	There is a potential for unexploded ordnance to be present on site, as a result of World War II bombing.
Construction Consequences	Risk of Damage to Property	Low/Medium	Identified hazards include high shrinkage potential clay, desiccation and filled areas. The risk rating assumes appropriate investigation and remedial action / foundation solutions have been adopted during the development
	Risk of Harm to Human Health	Low	Structural damage is likely to be detected prior to damage to health.
	Implications for redevelopment	Medium	Above issues are likely to require consideration should the site be redeveloped.
Business Consequences:	Risk of Site Value and/or Saleability being affected.	Low/Medium	The above will require consideration and are likely to result in additional insurance / maintenance costs.
	Risk of Liability for Owner	Low	There is unlikely to be a liability risk to the owner assuming appropriate remedial actions / foundation solutions have been adopted during development.
OVERALL RISK		MEDIUM	

8 Summary, Conclusions & Recommendations

Site Address	North London Business Park, Oakleigh Road South, Barnet, N11 1HB, UK
Current Land Use	<p>The subject site comprises North London Business Park, and includes commercial buildings ranging from single to three storey buildings (ground plus two), surface and multi storey car parking areas, overgrown sports grounds, soft landscaped areas and a lake. There are significant changes in levels across the site, and a number of bunds are present from previous phases of redevelopment.</p> <p>The site is located in New Southgate, within Barnet, adjacent to the east of the overland train station, in a predominantly residential area with the occasional commercial property.</p>
Historical Land Use	Historical maps indicate that the site was partially associated with the cemetery in 1863. By 1879 railway sidings and gravel pits were noted on the site. New Southgate Works and a sports ground were present by 1936 and during the 1990s and 2000s building layouts changed. Surrounding land uses include a railway, residential properties, a cemetery, industrial properties and a sewage works.
Regulatory Enquiries	The Local Authority has provided information relating to nearby historic landfills. In addition it indicated that an intrusive phase II investigation is likely to be required and contamination issues will be dealt with during the planning process associated with redevelopment.
Other Information	It is understood that the site was subject to bombing in the Second World War, and as such there is a potential for unexploded ordnance to be present on site.
Environmental Setting	The site setting is considered to be of low / moderate sensitivity, due to the residential properties in the area, and the on site surface water feature.
Geotechnical Hazards	The primary geotechnical hazards are considered to be lateral changes in ground conditions, shrinkable clay soils, soft clay soils, desiccation, potential for below ground obstructions and Made Ground.
Conclusions	<p>Based on the information contained within this report and with due regard to redevelopment (including residential with gardens), it is the opinion of WSPE that the site represents a medium risk with respect to environmental considerations.</p> <p>Based on the information contained within this report, it is the opinion of WSPE that the site represents a medium risk with respect to geotechnical considerations.</p>
Recommendations	<p>No further work is considered necessary for the ongoing current use of the site. However, the following recommendations should be considered prior to redevelopment:</p> <ul style="list-style-type: none"> ■ An intrusive phase II investigation should be undertaken to provide information relating to contamination issues, provide preliminary geotechnical advice and a ground gas assessment. ■ An unexploded ordnance desk study.

Please Note: This summary forms part of WSP Environmental Ltd Phase I Environmental Assessment (ref.: 12220279) and as such this should be read in conjunction with the full report.



Appendix A Site Location Plan





Appendix B Annotated Site Plan





Appendix C Photographic Record





PLATE C1:

PLATE C2:

PLATE C3:

PLATE C4:

PLATE C5:

PLATE C6:

PLATE C7:

PLATE C8:



Appendix D Selection of Historical Map Extracts





Appendix E Methodology & Limitations





Methodology

This Environmental Assessment has been designed to provide information relating to:

- the current and former land uses on and surrounding the site;
- the environmental sensitivity of the site location as determined by factors including geology, hydrogeology, surface watercourses and neighbouring land uses; and,
- relevant records held by the environmental regulators.

Any relevant information provided by the client has been reviewed, with appropriate action taken to ensure this information is taken into account and/or verified where necessary. All information is then assessed to define the potential for the site to give rise to environmental liabilities for the freehold/leasehold owner (as appropriate). Recommendations are made for additional work where this is necessary to fully define the site's environmental liabilities, and cost estimates of the financial implications of the findings can be provided under separate cover, where appropriate.

Risk Classification

This assessment has been undertaken with due regard to Contaminated Land Guidance documents issued by the Department for Environment, Food and Rural Affairs (and its Predecessors), the British Standards Institute (the BSI), the Royal Institution of Chartered Surveyors (RICS) and the American Society for Testing and Materials (ASTM) Standard E 1527-00. The methods used follow a risk-based approach, with the potential environmental risk assessed qualitatively using the 'source-pathway-target pollutant linkage' concept introduced in the Environmental Protection Act 1990.

Specific comment is made regarding the site's status under the Contaminated Land Regime implemented on the 1st April 2000 as Part IIA of the Environmental Protection Act 1990, and the actual or potential designation of the site as 'Contaminated Land' as defined in Section 78A(2). Unless specifically stated as relating to this definition, references to 'contamination' and 'contaminants' relate in general terms to the Presence of potentially hazardous substances in, on or under the site.

In addition, consideration has been given to a wide range of related topics including (where appropriate): environmental processes; current and foreseeable environmental legislation; the practices and duties of environmental regulators; the health and safety of occupiers and neighbours as affected by contamination; effects on the structure of buildings; and financial implications. References to risk classifications are made according to the following definitions:

Low Risk

It is unlikely that the issue will arise as a liability/cost for the freehold/leasehold owner (as appropriate) of the site.

Medium Risk

It is possible that the issue could arise as a liability/cost for the freehold/leasehold owner (as appropriate) of the site. Further work is usually required to clarify the risk.

High Risk

It is likely that the issue will arise as a liability/cost for the site freehold/leasehold (as appropriate) owner of the site.

Environmental Risk Assessment

The presence of contaminated materials on a site is generally only of concern if an actual or potentially unacceptable risk exists. Within the context of current UK Legislation (i.e. Section 57 of the Environment Act 1995), the interpretation of a "significant risk" is termed to be one where:

- Significant harm is being caused or there is a significant possibility of such harm being caused, (where harm is defined as harm to health of living organisms or other interference with the ecological systems of which they form a part and, in the case of man, includes harm to his property); and / or, pollution of Controlled Waters is being caused.
-



The potential for harm to occur requires three conditions to be satisfied:

- Presence of substances (potential contaminants/pollutants) that may cause harm (Source of Pollution).
- The presence of a receptor which may be harmed, e.g. the water environment or humans, buildings, fauna and flora (The Receptor).
- The existence of a linkage between the source and the receptor (The Migration Pathway).

Therefore, the presence of measurable concentrations of contaminants within the ground and subsurface environment does not automatically imply that a contamination problem exists, since contamination must be defined in terms of pollutant linkages and unacceptable risk of harm.

The nature and importance of both pathways and receptors, which are relevant to a particular site, will vary according to the intended use of the site, its characteristics and its surroundings.

In order to assess the contamination risk at the subject site the above rationale has been applied and is discussed within section 6 in the context of Contamination Sources and Potential Pollutant Linkages.

Limitations

WSP Environmental Limited has prepared this report solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from WSP Environmental Limited; a charge may be levied against such approval.

WSP Environmental Limited accepts no responsibility or liability for:

- a) the consequences of this document being used for any purpose or project other than for which it was commissioned, and
- b) this document to any third party with whom an agreement has not been executed.

The work undertaken to provide the basis of this report comprised a study of available documented information from a variety of sources (including the Client) and discussions with relevant authorities and other interested parties. The opinions given in this report have been dictated by the finite data on which they are based and are relevant only to the purpose for which the report was commissioned. The information reviewed should not be considered exhaustive and has been accepted in good faith as providing true and representative data pertaining to site conditions. Should additional information become available which may affect the opinions expressed in this report, WSP Environmental Limited reserves the right to review such information and, if warranted, to modify the opinions accordingly.

Where no site inspection is undertaken (for example a Desk Study Assessment or due to restricted site access), WSPE cannot comment on the potential for environmental concerns associated with the current use or structure including the Presence of asbestos.

It should be noted that any risks identified in this report are perceived risks based on the information reviewed; actual risks can only be assessed following a physical investigation of the site.





Appendix F Report References





Environment Agency Aquifer Classifications

The Environment Agency (EA) Groundwater Vulnerability Map and Regional Appendices, which make up part of the published Policy and Practice for the Protection of Groundwater, divide the underlying strata in England and Wales into major, minor and non aquifers dependent upon their potential for potable water supply. The following table is derived from the main policy document. The division of the rock formations into major, minor and non aquifer reflects the Regional importance and vulnerability of the formation.

Major Aquifer

Highly permeable formations usually with the known or probable Presence of significant fracturing. Highly productive strata of Regional importance. Often used for large potable abstractions. E.g. Upper Chalk, Permo-Triassic Sandstones

Minor Aquifer

Fractured or potentially fractured but without high intergranular permeability. Generally only support locally important abstractions E.g. Coal Measures

Variable porosity and permeability but without significant fracturing. Generally only support locally important abstractions. E.g. River Terrace Gravels

Non Aquifer

Formations with negligible permeability. Only support very minor abstractions if any. E.g. Mercia Mudstones, igneous rocks

Regulatory Information Sources

Reference has been made to the Landmark Information Group data provision service. This includes information and data collated from several organisations, including the Environment Agency (EA), Department for Environment, Food & Rural Affairs (DEFRA), Health & Safety Executive (HSE), the Health Protection Agency (HPA), and the Coal Authority





Part 2: Land at Oakleigh Road South





Executive Summary

WSPE was instructed by Comer Homes to undertake a Phase I Geotechnical and Environmental Assessment of the portion of land at Oakleigh Road South. The report highlights environmental considerations, predominantly with respect to ground conditions, and is required as part of the planning application associated with the site. Please refer to Appendix K for WSPE's Methodology and Limitations.

Key Findings

The subject site comprises a warehouse and a two storey office building. To the rear of the warehouse (south) an above ground fuel tank, with associated filling point was noted, and a large above ground water tank. The land in the extreme south of the site was overgrown with vegetation; in addition the land in the east of the site was also overgrown and sloping steeply down to the road.

The site is located in New Southgate, within Barnet, adjacent to the north east of the overland train station, in a predominantly residential area, with the occasional commercial / industrial property.

Historical maps indicate that the site was vacant until 1881, railway sidings were present by 1897, and the current warehouse layout was present by 1966. Surrounding historical land uses include a railway, residential properties, a cemetery, and industrial properties.

No significant issues have been identified for continued use, however an intrusive phase II investigation is likely to be required and contamination issues will be dealt with during the planning process associated with redevelopment.

Unexploded ordnance may be present on site as a result of World War II bombing in the surrounding area.

Liability

Based on the information contained within this report and with due regard to redevelopment to residential with gardens, it is the opinion of WSPE that the site represents a **medium** risk with respect to environmental considerations.

Based on the information contained within this report, it is the opinion of WSPE that the site represents a **low / medium** risk with respect to geotechnical considerations.

Recommendations

No further work is considered necessary for the current ongoing use of the site. However, the following recommendations should be considered prior to redevelopment:

- An intrusive phase II investigation should be undertaken to provide information relating to contamination issues, provide preliminary geotechnical advice and a ground gas assessment.
- An unexploded ordnance desk study.

9 Site Information

9.1 SITE DETAILS

Site Address	Land at Oakleigh Road South
National Grid Reference	528430, 192720
Size	Approximately 2 hectares
Site Location	The site is located in New Southgate, within Barnet, adjacent to the north east of the overland railway line, in a predominantly commercial and residential area. A site location plan is included as Appendix G.
Current Site Use	The subject site is currently vacant, occupied by a derelict building formerly used as a packaging factory.

9.2 SITE RECONNAISSANCE

A walk over survey of the site was carried out on 28th November 2007, including an inspection of the exterior of the site. An annotated site plan and associated site photographs have been presented in Appendix H and I respectively.

The following key observations were made during the site reconnaissance:

Site Description

The subject site comprises a warehouse and a two storey office building. To the rear of the warehouse (south) an above ground fuel tank, with associated filling point was noted, and a large above ground water tank. The land in the extreme south of the site was overgrown with vegetation; in addition the land in the east of the site was also overgrown and sloping steeply down to the road.

Specific on-site activities

- The northern most building comprised two storeys of office space.
- The main building in the centre of the site was a single storey warehouse.
- A large above ground water tank was noted to the south west of the main warehouse building (see photo I1).
- An above ground fuel tank, and associated pipework was enclosed within a brick bund to the south of the main warehouse building (see photo I2 and I3).
- Temporary containers were noted across the site, utilised by contractors associated with London Borough of Barnet.

External Areas

- The land immediately to the west of the entrance to the site was being used by Winters (adjacent property) for vehicle / skip storage.
 - The land in the east of the site was overgrown. This portion of the site was sloping significantly downwards to the road.
-



- The land in the extreme south of the site was also overgrown and at a higher elevation than the rest of the site.

Bulk Hazardous Materials Storage

- The site representative indicated that there are no below ground storage tanks and no evidence of such tanks was noted during the site reconnaissance.
- An above ground fuel oil storage tank was observed to the south of the main warehouse building (see photos I2 and I3). The tank was noted to be placed within a brick bund. Due to overgrown vegetation, full inspection of the bund was not achieved, however no significant ground staining was noted within or surrounding the bund. It was not possible to determine if the tank contained fuel at the time of the walkover.

Other Hazardous Materials

- The site was vacant at the time of the walkover. No such materials were observed on site.

Polychlorinated Biphenyls (PCBs)

- There was no evidence observed at the time of the walkover that would indicate that PCBs are likely to be present on site.
- PCBs are generally associated with electricity sub stations and transformers.

Ozone Depleting Substances (ODS)

- ODSs are generally associated with air conditioning units (refrigerant R22).
- The buildings on site were in a partial state of disrepair, it is considered that prior to redevelopment the current structures will be demolished and should any old air conditioning units be present it is likely that they will be disposed of in an appropriate manner.

Wastes Management

-Non Hazardous

- As the site is vacant no wastes are currently being produced.

-Hazardous

- Five plastic containers were noted in the south of the site, not located in any form of secondary containment (see photo I4). The former contents of the containers are unknown.

Drainage Issues

-Surface Water

- The site representative stated that surface water was formerly directed to the off site pumping station, located to the east of the site.



- The site representative stated that there had been issues in the past relating to a blockage associated with the drainage underneath the railway. The representative stated that this has since been resolved.

-Foul Water

- Foul water on site is limited to sewage and domestic waste water. The site representative did not report any issues associated with on site foul water, and no issues were observed during the site walkover.

-Trade Effluent

- No trade effluent discharges were identified during the site visit.

Asbestos Containing Materials (ACMs)

- Given the age of the property on-site (1966) the presence of asbestos containing materials can not be discounted.

9.3 SURROUNDING LAND USE

The site is located in New Southgate, within Barnet, in a predominantly residential area, with the occasional commercial / industrial building, primarily to the north of the site. Residential properties are located adjacent to the northeast, east and south east of the site, and the overland railway runs adjacent to the west of the site.



10 Historical Land Use

10.1 SITE HISTORY

A study of historical Ordnance Survey maps has been undertaken to identify any potentially contaminative former land uses. Reference to historical maps provides invaluable information regarding the land use history of the site, but historical evidence will be incomplete for the period pre-dating the first edition and between successive maps. A selection of historical map extracts is included as Appendix J.

Historical maps indicate that the site comprised open land on the earliest OS map dated 1881. A slight depression was noted in the south of the site, and a well was noted in the east. By 1897 the site levels had changed and a significant slope was noted along the eastern boundary, sloping down to the site boundary, and railway sidings were present in the western part of the site. The next significant change was noted on the 1966 map, in the form of a warehouse present in the central part of the site. Two small buildings were noted to the north and south of the site, with the northern building being called Gordon House by 1985. An additional slope, to the south of the warehouse was noted, sloping down to the south of the site.

Anecdotal information

The site representative indicated that the warehouse has been vacant for at least five years.

Further to this it is understood that the site is elevated compared to Oakleigh Road South as a result of fill from the adjacent railway cutting being placed and compacted on site.

10.2 SURROUNDING AREA

A study of historical Ordnance Survey maps has been undertaken to identify any potentially contaminative former land uses. A selection of relevant historical map extracts is included as Appendix J. The following represents a summary of the available map information:

Surrounding Features	Dates	Distance (m)	Direction
Great Northern Railway	Pre 1881 – present	15	West
Residential properties <i>Then</i> extending south <i>Then</i> redeveloped	Pre 1881 Pre 1897 Pre 1966 – present	Adjacent	East
Great Northern Cemetery <i>Then</i> New Southgate Cemetery and Crematorium	Pre 1881 – pre 1999 Pre 1999 – present	300	North east
Cemetery Monumental Works <i>Then</i> lodge	Pre 1881 – pre 1897 Pre 1897 – present	180	East
Photographic works <i>Then</i> Works	Pre 1897 – pre 1938 Pre 1938 – present	350	North
Tank (associated with railway)	Pre 1914 – pre 1936	60	North



Surrounding Features	Dates	Distance (m)	Direction
<i>Then</i> railway sidings	Pre 1936 – pre 1985		
<i>Then</i> builders yard	Pre 1985 – present		
Pumping station	Pre 1916 – pre 1962	300	East
<i>Then</i> factory	Pre 1962 – present		
Boot polish factory	Pre 1916 – pre 1962	300	East
<i>Then</i> factory	Pre 1962 – present		
Works	Pre 1950 – pre 1981	200	south
<i>Then</i> depot	Pre 1981 – present		

11 Regulatory Information & Consultations

11.1 REGULATORY DATABASE

The following environmental data has been obtained from a summary of information databases.

	0-250m	250-500m	Details
Registered landfills	0	0	Not applicable (N/A)
Registered transfer stations/treatment facilities	1	1	Winters Haulage Ltd is a transfer station located approximately 50m to the north west of the site and is licensed to accept household, commercial and industrial waste. A second transfer station is located 275m to the north of the site, operated by GBN Services Ltd.
Authorised industrial processes (IPC/IPPC).	0	2	These both relate to authorisations associated with petrol filling stations. Both are located to the south east of the site, however one has since been revoked. The current operational station is approximately 260m from the site boundary.
Fuel Stations Entries	1	0	There is one petrol filling station located approximately 175m to the south east of the site.
Licensed radioactive substances	0	0	N/A
Enforcements, prohibitions or prosecutions	0	0	N/A
Discharge Consents	1	0	A temporary license was issued in November 1989 for a Thames Water Utilities pumping station located approximately 10m to the east of the site.
Pollution Incidents	1	0	The nearest pollution incident occurred approximately 170m to the north west of the site. The incident comprised the release of oil in April 1996 and was classified as minor.
Natural Cavities	0	0	N/A
Consents issued under the Planning (Hazardous Substances) Act 1990	0	0	N/A

11.2 CONSULTEES

Local Authority Building Control

The Building Control Officer at London Borough of Barnet was contacted with regard to ground conditions beneath the subject site. A response has not yet been received by WSP E

Local Authority Contaminated Land Office

The Contaminated Land Officer at London Borough of Barnet was contacted for environmentally pertinent information relating to the site. The Officer confirmed that the



site has had a potentially contaminative use, however stated that for continued current use the site was not considered as high priority for classification as contaminated land under Part IIa of the Environmental Protection Act (1990). The Officer indicated that prior to redevelopment of the site, particularly if the proposed redevelopment comprised an end use change, to residential, an intrusive investigation would be required, and that contamination issues would be dealt with through the planning process.

Petroleum Officer

No issues have been identified which warrant further consultation with the Petroleum Officer.

Environment Agency

The Environment Agency has been contacted in relation to landfills in the surrounding area (more than 500m away). A response has not yet been received by WSP E.

Environment Agency Flooding Data

The site is not located within an Environment Agency indicative floodplain.

Health Protection Agency

The site is located within an area where no radon protection measures are considered necessary.

British Geological Survey

The site is located within an area where there is a low to very low risk of landslip subsidence hazards; and a moderate risk of swelling clay subsidence hazards.

Coal Authority Report

The site is not located within an area affected by Coal Mining. From the information currently available to the Coal Authority, a mining report is not required for this site.



12 Other Relevant Information

12.1 PLANNING BRIEF

The London Borough of Barnet, Planning Brief for North London Business Park and land adjacent to Coppices Grove has been provided by the client and includes details of the site development. A summary of the relevant information has been provided below.

- The site was subject to a landslip on part of the vegetated bank in the 1960s. The problem was reportedly overcome by sheet steel piling and limited bank re-grading.



13 Environmental Setting

13.1 GEOLOGY AND HYDROGEOLOGY

The published 1:50,000 scale geological map of the area (Sheet No 256 “North London”) indicates the site to be underlain by London Clay, with a potential for Head Deposits to be present overlying the London Clay.

On the basis of the published geological maps of the the full succession of natural strata in the vicinity of the site is likely to comprise:

Conjectural Geological Model

Geological Unit	Description	Anticipated Thickness (m)
<i>Superficial Soils / Drift</i>		
Head deposits	Variable deposit	Anticipated to be limited in thickness
<i>Solid Geology</i>		
London Clay	Clay, silty in part	Anticipated to be in the order of 30m
Lambeth Beds	Mottled clay with sand and pebble beds	Unknown
Thanet Sands	Fine grained sand	Unknown
White Chalk Group	Chalk	Unknown

The Dollis Hill River Terrace Deposits were noted off site to the south of the site, as a gravel, sandy and clayey in part.

The existing topography and history of development of the site suggests that, in addition to these natural strata, Made Ground is likely to be present on the site.

The published Environment Agency Groundwater Vulnerability Map of the area (Sheet 39 “West London”) indicates the site to be predominantly underlain by a Non Aquifer (London Clay). The Dollis Hill, River Terrace Deposits are classified as a Minor Aquifer, however are likely to be limited in nature. Therefore, groundwater resources are perceived not to be at risk from activities carried out on site.

The following current licensed groundwater abstraction has been identified within a 1km radius of the site, although the abstraction below is likely to be from the deeper chalk aquifer and therefore protected by a thickness of relatively impermeable London Clay:

Source	Use	Distance (m)	Direction
Groundwater	Potable water supply	200	East

In terms of aquifer protection, the Environment Agency generally adopt a three-fold classification of Source Protection Zones for public supply abstraction wells

- Zone I - or ‘inner source protection’ is located immediately adjacent to the groundwater source. It is based on a 50-day travel time and is designed to protect against the effects of human activity and biological/chemical contaminants that may have an Immediate effect on the source



- Zone II - or 'outer source protection' is larger than Zone I and is defined by a 400-day travel time to the source. The travel time is designed to provide delay and attenuation of slowly degrading pollutants
- Zone III - or 'source catchment' covers the complete catchment areas of a groundwater resource

Information available on the Environment Agency's web-site indicates that the site does not lie within a Source Protection Zone.

13.2 HYDROLOGY

Surface water features in the vicinity of the subject site are as follows:

Surface Water Feature	Quality*	Distance (m)	Direction
Unnamed lake	-	600	north
Pymmes Brook	C	670	east

*Chemical water quality as classified under the EA's General Quality Assessment (GQA) Scheme.

No surface water abstractions have been identified within a 1km radius of the subject site.

13.3 SURROUNDING FEATURES

Sensitive surrounding land uses in the immediate vicinity of the subject site are as follows:

Sensitive Land Use	Approx. Distance	Direction
Residential properties with gardens	Adjacent	South and east

13.4 ENVIRONMENTAL SENSITIVITY

Overall, the site setting is considered to be of **low to moderate** sensitivity, due to the following reasons:

- The presence of groundwater abstractions (potable supply, approximately 200m) within a 1km radius of the site – although this is considered to be protected by impermeable London Clay;
- The residential land uses within the surrounding area;
- The underlying Non Aquifer;
- The absence of an unprotected aquifer underlying the site.
- The absence of on-site surface water features; and
- The absence of nearby surface water features (nearest surface water feature, approximately 600m).



14 Geotechnical Considerations

14.1 PROPOSED DESIGN

WSP Environmental Limited understands that sites will be redeveloped to a residential end use, however planning approval has as yet not been received. It is understood that current plans include underground parking across large portions of the site. Based on the desk study information obtained and a walkover survey of the site, several areas of geotechnical risk have been identified as outlined below:

The following ground-related hazards have been identified during the investigation:

Hazard	Justification
Lateral changes in ground conditions	Given the historic earthworks that have occurred on site there is likely to be variable thicknesses of Made Ground across the site.
Shrinkable clay soils	London Clay is considered to be a material with a medium to high volume change potential.
Desiccation	Given the shrinkage potential of the London Clay and any existing / proposed trees on site, desiccation should be considered.
Soft clay – low bearing capacity	The Head deposits overlying the London Clay have the potential of being soft.
High groundwater	Unknown at this stage.
Potential for below ground obstructions.(foundations)	Historic development of the site indicate the potential for below ground obstructions.
Made Ground / infilled ponds	Given the historic earthworks that have occurred on site there is likely to be variable thicknesses of Made Ground across the site.
Adverse ground chemistry (weathering of sulphides to sulphates / acidic pH)	Unknown at this stage.
Slope stabilisation	A steep slope, with history of landslips is present in the east of the site.

14.2 FOUNDATIONS

From past experience, the London Clay is likely to have a safe bearing capacity in the region of 125kN/m² to 150kN/m². This generally proves suitable for pad foundations for structures up to three storeys in height. This solution will be subject to confirmatory tests undertaken during an intrusive site investigation. However, the thickness of Made Ground and the thickness and composition of the Head deposits may also preclude the use of shallow foundations.

Footings should be taken deeper where structures are located within influencing distance of any existing or future trees. In these circumstances reference should be made to NHBC Chapter 4.2.

For four storey structures, foundations could be excessively wide and piled foundations may be a more appropriate solution.



It is considered that suspended floor slabs are likely to be required across the site, based on the potential for a significant thickness of Made Ground being present.

The anticipated sub-grade soil CBR value for road pavement design is 2%.

14.3 OBSTRUCTIONS/RELIC STRUCTURES

There is the possibility of relict substructures, including former foundations, being present on the site. In addition to any effect on foundation construction, such features may lead to increased costs for the groundworks operations and delays in programming.

A site located within 500m of the subject site is known to have experienced bombing during the Second World War. It is therefore possible that unexploded ordnance may be present across the site.



15 Risk Assessment

15.1 OUTLINE ENVIRONMENTAL CONCEPTUAL MODEL

The methods used within this risk assessment follow a risk-based approach, with the potential environmental risk assessed qualitatively using the 'source-pathway-target pollutant linkage' concept introduced in the Environmental Protection Act 1990. For a site to be designated as Contaminated Land a plausible linkage between the identified Sources, Pathways and Targets must be demonstrated, this is further discussed within Appendix K.

Potential Contaminant Sources

On-Site Contaminant Sources	<ul style="list-style-type: none"> ■ The site has had a history of development, including railway sidings, which could have resulted in contamination across the site. ■ Previous phases of redevelopment at the site could have resulted in deep areas of Made Ground. ■ An above ground fuel tank with associated pipework and filling point was located in the south of the site. This could have resulted in localised hydrocarbon spills. ■ The surrounding area is thought to have been bombed during World War II which could have resulted in unexploded ordnance being present across the site.
Off-Site Contaminant Sources	<ul style="list-style-type: none"> ■ Neighbouring sites and land have had a commercial/industrial history, including a haulage company. ■ Two waste transfer stations are located within 500m of the site, one is the adjacent property to the north west.

Potential Contaminant Pathways

<ul style="list-style-type: none"> ■ Potentially granular soils in the underlying superficial geology (Head Deposits) have the potential to permit the transport of pollutants. However the underlying solid geology is London Clay and is predominantly cohesive and is likely to restrict the widespread transport of pollutants.
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Potential Receptors

Controlled Waters	<ul style="list-style-type: none"> ■ Potable water supply well (approximately 200m east), although this is considered to be protected by the London Clay. ■ Unnamed lake (approximately 600m, north).
Human Health Risks	<ul style="list-style-type: none"> ■ The proposed redevelopment plans include residential properties with gardens, there is unlikely to be a barrier between any subsurface contamination and the end users. ■ Third Party neighbours are residential in nature and as such a barrier between any subsurface contamination is unlikely to be present.

Pollutant Linkages

<ul style="list-style-type: none"> ■ Migration of contamination through potentially granular soils within the Head deposits migrating towards surface water receptors. ■ Direct contact with contaminated soils (ingestion, inhalation and dermal contact).

15.2 ENVIRONMENTAL RISK ASSESSMENT MATRIX

Having evaluated the information gathered during this study and described in the previous sections, WSP Environmental Ltd has produced the following assessment of risk primarily focused on contaminated land issues:

	ISSUE	RISK CATEGORY	REASON
Contamination Potential:	Potential for significant on-site contamination	Medium	Potential sources of contamination have been identified, including Made Ground, an AST and the sites predominantly industrial development history.
	Potential for contaminants migrating off the site	Low/Medium	The migration of any potential contaminants present is likely to be restricted due to the nature of the underlying geology. This is dependent on the thickness and composition of the Head deposits on site.
	Potential for contaminants migrating onto the site	Low/Medium	The migration of any potential contaminants present is likely to be restricted due to the nature of the underlying geology. This is dependent on the thickness and composition of the Head deposits on site.
Other Liability Issues:	Potential for 'other' environmental issues to give rise to liabilities	Low/Medium	There is a potential for unexploded ordnance to be present on site, as a result of World War II bombing.
Environmental Consequences	Risk of Pollution of Controlled Waters	Low	It is considered that in light of the underlying cohesive geology, controlled waters are not considered a significant risk at the site.
	Risk of Damage to Property	Low	No significant issues identified.
	Risk of Harm to Human Health	Medium	The residential redevelopment in the north and east of the site present the highest risk of harm to human health, and certified clean topsoil will need to be imported for the garden areas if materials on site are not suitable.
Business Consequences:	Likelihood of designation as Contaminated Land under EPA 1990	Low/Medium	Consultations with the relevant Contaminated Land Officer have identified that the site is not considered a priority for further investigation under the Contaminated Land Regime for continued use, however prior to redevelopment (residential end use) issues relating to contaminated land will be dealt with through the planning process.
	Risk of Site Value and/or Saleability being affected.	Medium	Source – pathway – receptor linkages have been identified on site, and as such it is recommended that an intrusive phase II investigation is undertaken.
	Likelihood of a Future Purchaser requesting further investigations.	Low/Medium	No further contamination assessment works are considered necessary for a continued use. However, in the event of redevelopment further works will be required as part of the planning process.
	Risk of Liability for Owner	Medium	Source – pathway – receptor linkages have been identified on site, and as such it is recommended that an intrusive phase II investigation is undertaken.
OVERALL RISK FOR REDEVELOPMENT		MEDIUM	

15.3 GEOTECHNICAL RISK ASSESSMENT MATRIX

Based on anticipated ground conditions, potential geotechnical risks that may influence current or future land use are summarised below:

	ISSUE	RISK CATEGORY	REASON
Geotechnical Issue:	Potential for variable depth of Made Ground.	Medium	There is potential for significant thicknesses of Made Ground across the site, as a result of the earthworks that have occurred associated with the arisings from the railway cutting.
	Potential for below ground obstructions.	Low/Medium	Former foundations are anticipated to be present across the site.
	Potential for shallow mine workings and coal shafts and adits.	Low	The site is not in an area affected by coal mining.
	Properties for 'other' issues to give rise to liabilities.	Low/Medium	There is a potential for unexploded ordnance to be present on site, as a result of World War II bombing.
Construction Consequences	Risk of Damage to Property	Low/Medium	Identified hazards include high shrinkage potential clay, desiccation, slope instability and filled areas. The risk rating assumes appropriate investigation and remedial action / foundation solutions have been adopted during the development
	Risk of Harm to Human Health	Low	Structural damage is likely to be detected prior to damage to health.
	Implications for redevelopment	Medium	Above issues are likely to require consideration should the site be redeveloped.
Business Consequences:	Risk of Site Value and/or Saleability being affected.	Low/Medium	The above will require consideration and are likely to result in additional insurance / maintenance costs.
	Risk of Liability for Owner	Low	There is unlikely to be a liability risk to the owner assuming appropriate remedial actions / foundation solutions have been adopted during development.
OVERALL RISK		LOW / MEDIUM	

16 Summary, Conclusions & Recommendations

Site Address	Land at Oakleigh Road South, Barnet
Current Land Use	<p>The subject site comprises a warehouse and a two storey office building. To the rear of the warehouse (south) an above ground fuel tank, with associated filling point was noted, and a large above ground water tank. The land in the extreme south of the site was overgrown with vegetation; in addition the land in the east of the site was also overgrown and sloping steeply down to the road.</p> <p>The site is located in New Southgate, within Barnet, adjacent to the north east of the overland train station, in a predominantly residential area, with the occasional commercial / industrial property.</p>
Historical Land Use	Historical maps indicate that the site was vacant until 1881, railway sidings were present by 1897, and the current warehouse layout was present by 1966. Surrounding historical land uses include a railway, residential properties, a cemetery, and industrial properties.
Regulatory Enquiries	No significant issues have been identified for continued use, however an intrusive phase II investigation is likely to be required and contamination issues will be dealt with during the planning process associated with redevelopment.
Other Information	Unexploded ordnance may be present on site as a result of World War II bombing in the surrounding area.
Environmental Setting	The site setting is considered to be of low to moderate sensitivity, due to the residential properties in the area and the presence of a potable water supply borehole approximately 200m from the site.
Geotechnical Hazards	The primary geotechnical hazards are considered to be lateral changes in ground conditions, shrinkable clay soils, soft clay soils, desiccation, potential for below ground obstructions and Made Ground.
Conclusions	<p>Based on the information contained within this report and with due regard to redevelopment to residential with gardens, it is the opinion of WSPE that the site represents a medium risk with respect to environmental considerations.</p> <p>Based on the information contained within this report, it is the opinion of WSPE that the site represents a low / medium risk with respect to geotechnical considerations.</p>
Recommendations	<p>No further work is considered necessary for the ongoing current use of the site. However, the following recommendations should be considered prior to redevelopment:</p> <ul style="list-style-type: none"> ■ An intrusive phase II investigation should be undertaken to provide information relating to contamination issues, provide preliminary geotechnical advice and a ground gas assessment. ■ An unexploded ordnance desk study.

Please Note: This summary forms part of WSP Environmental Ltd Phase I Environmental Assessment (ref.: 12220279) and as such this should be read in conjunction with the full report.



Appendix G Site Location Plan





Appendix H Annotated Site Plan





Appendix I Photographic Record





Appendix J Selection of Historical Map
Extracts





Appendix K Methodology & Limitations





Methodology

This Environmental Assessment has been designed to provide information relating to:

- the current and former land uses on and surrounding the site;
- the environmental sensitivity of the site location as determined by factors including geology, hydrogeology, surface watercourses and neighbouring land uses; and,
- relevant records held by the environmental regulators.

Any relevant information provided by the client has been reviewed, with appropriate action taken to ensure this information is taken into account and/or verified where necessary. All information is then assessed to define the potential for the site to give rise to environmental liabilities for the freehold/leasehold owner (as appropriate). Recommendations are made for additional work where this is necessary to fully define the site's environmental liabilities, and cost estimates of the financial implications of the findings can be provided under separate cover, where appropriate.

Risk Classification

This assessment has been undertaken with due regard to Contaminated Land Guidance documents issued by the Department for Environment, Food and Rural Affairs (and its Predecessors), the British Standards Institute (the BSI), the Royal Institution of Chartered Surveyors (RICS) and the American Society for Testing and Materials (ASTM) Standard E 1527-00. The methods used follow a risk-based approach, with the potential environmental risk assessed qualitatively using the 'source-pathway-target pollutant linkage' concept introduced in the Environmental Protection Act 1990.

Specific comment is made regarding the site's status under the Contaminated Land Regime implemented on the 1st April 2000 as Part IIA of the Environmental Protection Act 1990, and the actual or potential designation of the site as 'Contaminated Land' as defined in Section 78A(2). Unless specifically stated as relating to this definition, references to 'contamination' and 'contaminants' relate in general terms to the Presence of potentially hazardous substances in, on or under the site.

In addition, consideration has been given to a wide range of related topics including (where appropriate): environmental processes; current and foreseeable environmental legislation; the practices and duties of environmental regulators; the health and safety of occupiers and neighbours as affected by contamination; effects on the structure of buildings; and financial implications. References to risk classifications are made according to the following definitions:

Low Risk

It is unlikely that the issue will arise as a liability/cost for the freehold/leasehold owner (as appropriate) of the site.

Medium Risk

It is possible that the issue could arise as a liability/cost for the freehold/leasehold owner (as appropriate) of the site. Further work is usually required to clarify the risk.

High Risk

It is likely that the issue will arise as a liability/cost for the site freehold/leasehold (as appropriate) owner of the site.

Environmental Risk Assessment

The presence of contaminated materials on a site is generally only of concern if an actual or potentially unacceptable risk exists. Within the context of current UK Legislation (i.e. Section 57 of the Environment Act 1995), the interpretation of a "significant risk" is termed to be one where:

- Significant harm is being caused or there is a significant possibility of such harm being caused, (where harm is defined as harm to health of living organisms or other interference with the ecological systems of which they form a part and, in the case of man, includes harm to his property); and / or, pollution of Controlled Waters is being caused.
-



The potential for harm to occur requires three conditions to be satisfied:

- Presence of substances (potential contaminants/pollutants) that may cause harm (Source of Pollution).
- The presence of a receptor which may be harmed, e.g. the water environment or humans, buildings, fauna and flora (The Receptor).
- The existence of a linkage between the source and the receptor (The Migration Pathway).

Therefore, the presence of measurable concentrations of contaminants within the ground and subsurface environment does not automatically imply that a contamination problem exists, since contamination must be defined in terms of pollutant linkages and unacceptable risk of harm.

The nature and importance of both pathways and receptors, which are relevant to a particular site, will vary according to the intended use of the site, its characteristics and its surroundings.

In order to assess the contamination risk at the subject site the above rationale has been applied and is discussed within section 6 in the context of Contamination Sources and Potential Pollutant Linkages.

Limitations

WSP Environmental Limited has prepared this report solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from WSP Environmental Limited; a charge may be levied against such approval.

WSP Environmental Limited accepts no responsibility or liability for:

- a) the consequences of this document being used for any purpose or project other than for which it was commissioned, and
- b) this document to any third party with whom an agreement has not been executed.

The work undertaken to provide the basis of this report comprised a study of available documented information from a variety of sources (including the Client) and discussions with relevant authorities and other interested parties. The opinions given in this report have been dictated by the finite data on which they are based and are relevant only to the purpose for which the report was commissioned. The information reviewed should not be considered exhaustive and has been accepted in good faith as providing true and representative data pertaining to site conditions. Should additional information become available which may affect the opinions expressed in this report, WSP Environmental Limited reserves the right to review such information and, if warranted, to modify the opinions accordingly.

Where no site inspection is undertaken (for example a Desk Study Assessment or due to restricted site access), WSPE cannot comment on the potential for environmental concerns associated with the current use or structure including the Presence of asbestos.

It should be noted that any risks identified in this report are perceived risks based on the information reviewed; actual risks can only be assessed following a physical investigation of the site.



Appendix L Report References





Environment Agency Aquifer Classifications

The Environment Agency (EA) Groundwater Vulnerability Map and Regional Appendices, which make up part of the published Policy and Practice for the Protection of Groundwater, divide the underlying strata in England and Wales into major, minor and non aquifers dependent upon their potential for potable water supply. The following table is derived from the main policy document. The division of the rock formations into major, minor and non aquifer reflects the Regional importance and vulnerability of the formation.

Major Aquifer

Highly permeable formations usually with the known or probable Presence of significant fracturing. Highly productive strata of Regional importance. Often used for large potable abstractions. E.g. Upper Chalk, Permo-Triassic Sandstones

Minor Aquifer

Fractured or potentially fractured but without high intergranular permeability. Generally only support locally important abstractions E.g. Coal Measures

Variable porosity and permeability but without significant fracturing. Generally only support locally important abstractions. E.g. River Terrace Gravels

Non Aquifer

Formations with negligible permeability. Only support very minor abstractions if any. E.g. Mercia Mudstones, igneous rocks

Regulatory Information Sources

Reference has been made to the Landmark Information Group data provision service. This includes information and data collated from several organisations, including the Environment Agency (EA), Department for Environment, Food & Rural Affairs (DEFRA), Health & Safety Executive (HSE), the Health Protection Agency (HPA), and the Coal Authority

