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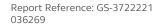
### **Overview of Findings**

The Groundsure Geo Insight provides high quality geo-environmental information that allows geoenvironmental 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: Geolo	gy 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: Geolo	gy 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	2.2.1 Is there any Superficial Ground/Drift Geology present beneath the study site?*	Yes
Landslips	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 relating to permeability of bedrock ground within the study site boundary?

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

No

Yes

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		O					

Section 4: Ground Workings

3.	Rac	Ion

3.1Is the property in a Radon Affected Area as defined by the Health The property is not in a Radon Affected Protection Agency (HPA) and if so what percentage of homes are above the Action Level?

Area, as less than 1% of properties are above the Action Level.

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

No radon protective measures are 3.2Radon Protection necessary.

4.1 Historical Surface Ground Working Features from Small Scale Mapping	0	1	19	Not Searched	Not Searched
4.2 Historical Underground Workings from Small Scale Mapping	0	0	0	0	0
4.3 Current Ground Workings	0	0	0	0	4
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

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				LOCATION IN	ITELLIGENCE
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-sit	te			
6.1 Shrink-Swell Clay	Modera	ite			
6.2 Landslides	Very Lo	)W			
6.3 Ground Dissolution of Soluble Rocks	Low				
6.4 Compressible Deposits	Modera	ite			
6.5 Collapsible Deposits	Very Lo	)W			
6.5 Running Sand	Low				
Section 7: Borehole Records	On-si	te	0-50m	5	1-250
7 BGS Recorded Boreholes	0		2		17
Section 8: Estimated Background Soil Chemistry	On-si	te	0-50m	5	1-250
8 Records of Background Soil Chemistry	12		5		0
Section 9: Railways and Tunnels	On-site	0-50m	51-250	250-500	
9.1 Tunnels	0	0	0	Not Searched	
9.2 Historical Railway and Tunnel Features	0 0 15 Not Searched				
9.3 Historical Railways	0	0	0	Not Searched	
9.4 Active Railways	0	0	12	Not Searched	
9.5 Railway Projects	0	0	0	0	



## 1:10,000 Scale Availability



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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	1386.0	Some deposits are mapped	Full	Full	No coverage
N3	1733.0	No deposits are mapped	No coverage	No coverage	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.

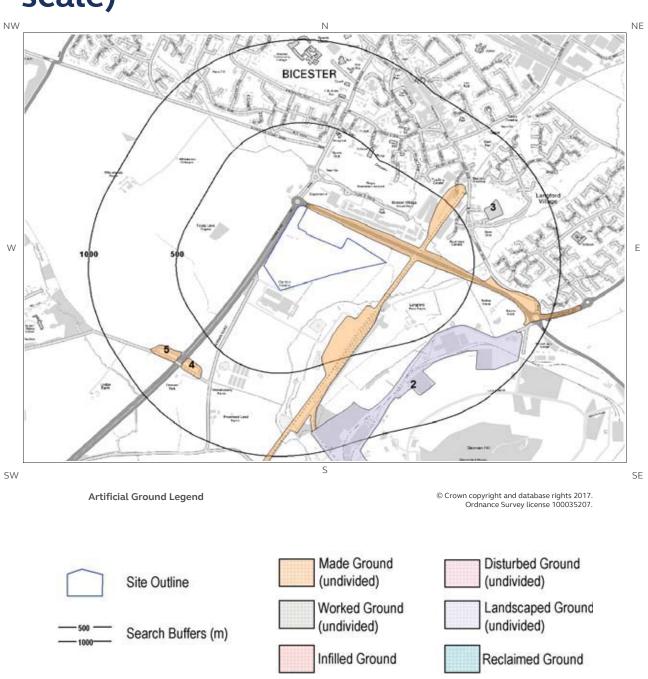
The definitions of coverage are as follows:

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)



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## 1. Geology 1:10,000 scale

#### 1.1 Artificial Ground

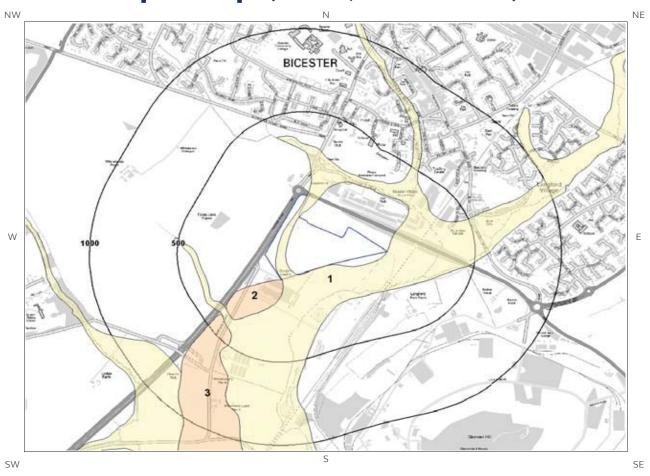
The following geological information represented on the mapping is derived from 1:10,000 scale BGS Geological mapping.

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

ID	Distance	Direction	LEX Code	Description	Rock Description
1	1.0	NE	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit



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



Artificial Ground Legend

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Site Outline

— 500 — — 1000—

Search Buffers (m)

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## 1.2 Superficial Deposits and Landslips

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

#### 1.2.1 Superficial Deposits/ Drift Geology

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

ID	Distance (m)	Direction	LEX Code	Description	Rock Description
1	0.0	On Site	ALV-CSV	Alluvium - Sandy Gravelly Clay	Clay, Sandy, Gravelly
2	4.0	S	RTD1-XSV	River Terrace Deposits, 1 - Sand And Gravel	Sand And Gravel
3	400.0	SW	RTD1-XSV	River Terrace Deposits, 1 - Sand And Gravel	Sand And Gravel

#### 1.2.2 Landslip

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

No

13

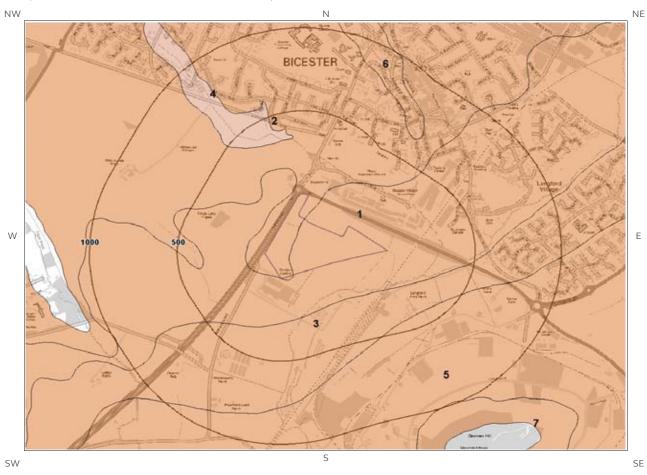
Database searched and no data found.

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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Site Outline



Search Buffers (m)

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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	KLC-MDST	Kellaways Clay Member - Mudstone	Callovian Age
2	0.0	On Site	CB-LMST	Cornbrash Formation - Limestone	Callovian Age - Bathonian Age
3	228.0	S	KLS-SDSL	Kellaways Sand Member - Sandstone And Siltstone, Interbedded	Callovian Age
4	336.0	N	FMB-LSMD	Forest Marble Formation - Interbedded Limestone And Mudstone	Bathonian Age
5	417.0	SE	PET-MDST	Peterborough Member - Mudstone	Callovian Age

#### 1.3.2 Faults

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

No

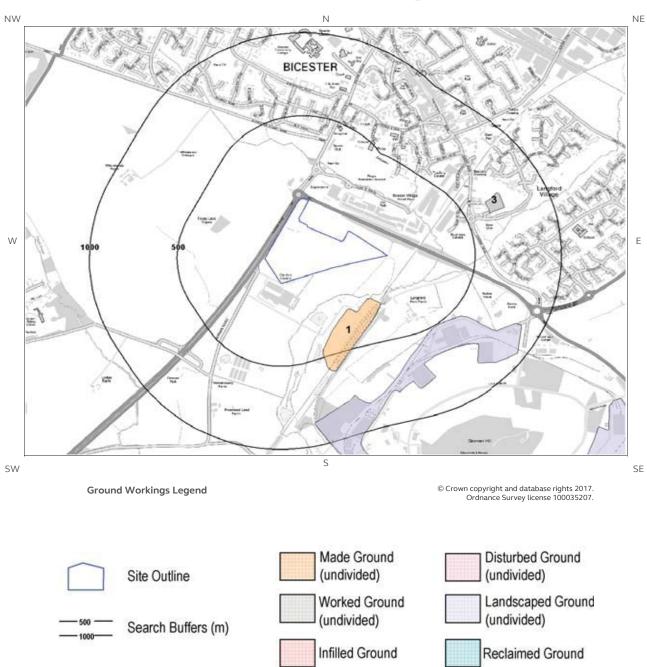
Database searched and no data found at this scale.

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 Scale2.1 Artificial Ground Map



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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: 219

#### 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	229.0	S	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?

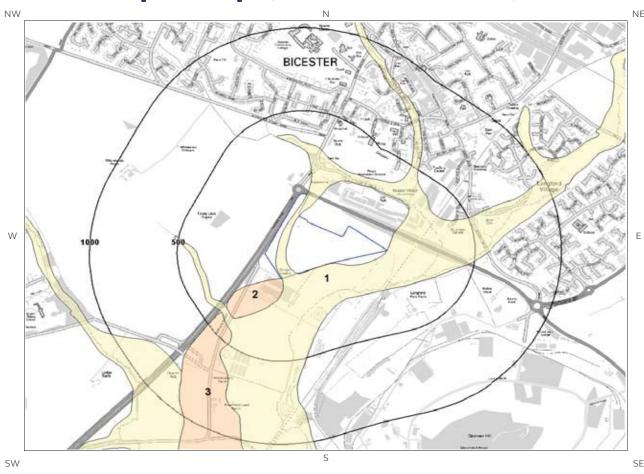
No

17

Database searched and no data found.



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



**Ground Workings Legend** 

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Site Outline



Search Buffers (m)

Report Reference: GS-3722221 Client Reference: 036269 Report Reference: GS-3722221 Client Reference: 036269



## 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	ALV	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL [UNLITHIFIED DEPOSITS CODING SCHEME]
2	1.0	S	RTD1	RIVER TERRACE DEPOSITS, 1	SAND AND GRAVEL [UNLITHIFIED DEPOSITS CODING SCHEME]
3	399.0	SW	RTD1	RIVER TERRACE DEPOSITS, 1	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	High	Very Low
1.0	S	Intergranular	Very High	High

#### 2.2.3 Landslip

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

No

19

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.

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No

#### 2.2.4 Landslip Permeability

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

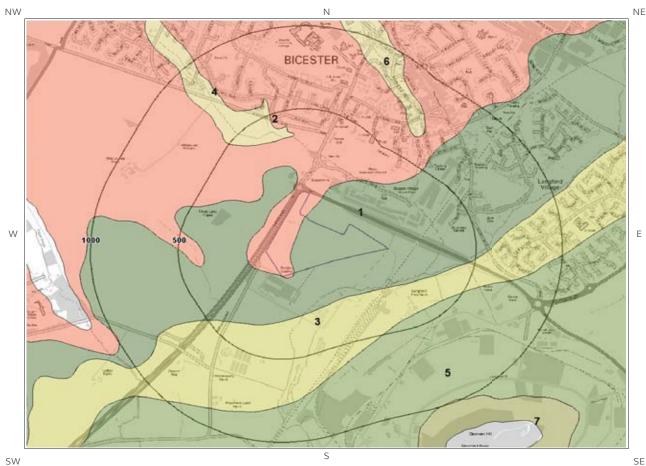
Database searched and no data found.

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



Ground Workings Legend

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Site Outline



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: 219

#### 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	KLC-MDST	Kellaways Clay Member - Mudstone	Callovian
2	0.0	On Site	CB-LMST	Cornbrash Formation - Limestone	Callovian / Bathonian
3	228.0	S	KLS-SDSL	Kellaways Sand Member - Sandstone And Siltstone, Interbedded	Callovian
4	338.0	N	FMB-LSMD	Forest Marble Formation - Limestone And Mudstone, Interbedded	Bathonian
5	417.0	SE	PET-MDST	Peterborough Member - Mudstone	Callovian

#### 2.3.2 Permeability of Bedrock Ground

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

Yes

Distanc e	Direction	Flow Type	Maximum Permeability	Minimum Permeability
0.0	On Site	Fracture	Very High	High
0.0	On Site	Fracture	Low	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.

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### 3 Radon Data

#### 3.1 Radon Affected Areas

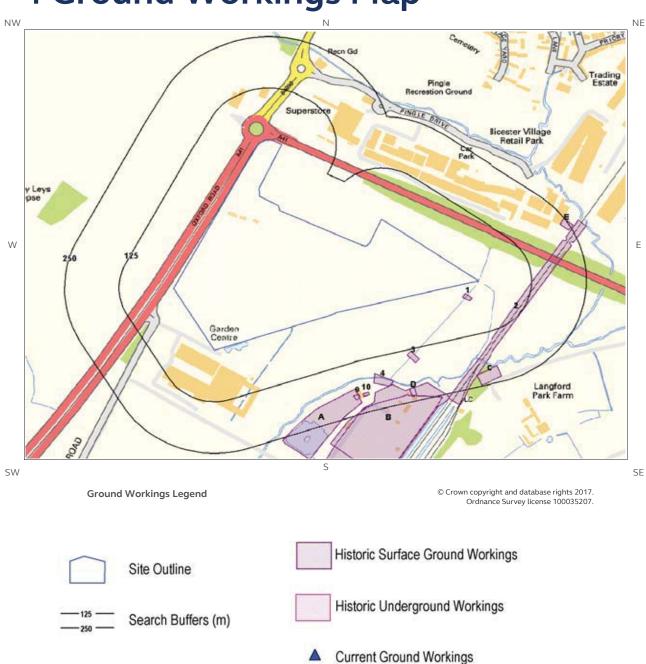
Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level? The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.

#### 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



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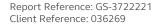
### **4 Ground Workings**

#### 4.1 Historical Surface Ground Working Features derived from Historical Mapping

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

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

ID	Distance (m)	Direction	NGR	Use	Date
1	22.0	S	458241 221515	Unspecified Heap	1950
2	106.0	SE	458371 221492	Cuttings	1880
3	130.0	S	458117 221369	Unspecified Heap	1950
4	163.0	S	458049 221314	Pond	1880
5A	188.0	S	457909 221207	Ponds	1995
6A	188.0	S	457909 221207	Ponds	1985
7В	199.0	S	458051 221163	Sewage Works	1995
8B	199.0	S	458051 221163	Sewage Works	1985
9	202.0	S	457988 221272	Unspecified Heap	1950
10	204.0	S	458009 221279	Sewage Tank	1880
11C	210.0	S	458293 221325	Pond	1985
12C	210.0	S	458293 221325	Pond	1995
13C	210.0	S	458293 221325	Pond	1970
14D	215.0	S	458117 221286	Sewage Tank	1898
15D	215.0	S	458117 221286	Sewage Tank	1919
16D	215.0	S	458117 221286	Sewage Tank	1879
17B	231.0	S	458056 221176	Sewage Farm	1970
18E	234.0	NE	458472 221691	Unspecified Heap	1879
19E	234.0	NE	458472 221691	Unspecified Heap	1919
20E	234.0	NE	458472 221691	Unspecified Heap	1898





#### 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?

Database searched and no data found.

#### **4.3 Current Ground Workings**

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

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

Yes

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

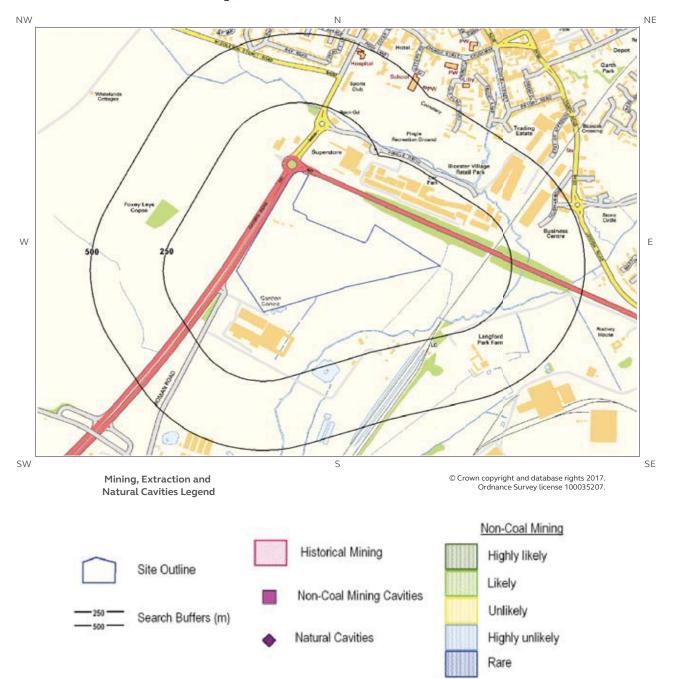
ID	Distanc e (m)	Direction	NGR	Commodity Produced	Pit Name	Type of working	Status
Not shown	742.0	NE	458929 221890	Clay & Shale	The Priory	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	808.0	SW	457118 220789	Clay & Shale	Promised-land Farm	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	919.0	SW	457051 220699	Clay & Shale	Promised-land Farm	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	998.0	S	457965 220435	Limestone	Langford Lane	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased

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Client Reference: 0



## 5 Mining, Extraction & Natural Cavities Map





## 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?

INO

Database searched and no data found.

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#### **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?

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

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.

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# 6 Natural Ground Subsidence6.1 Shrink-Swell Clay Map





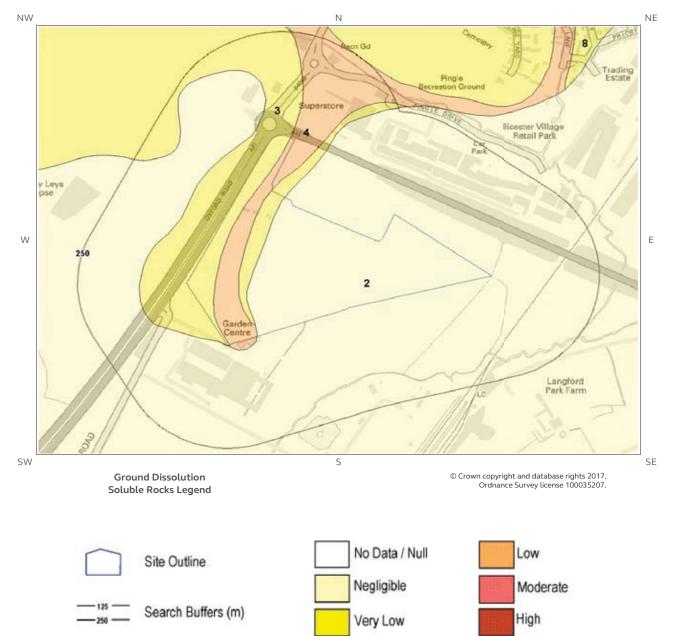
## 6.2 Landslides Map



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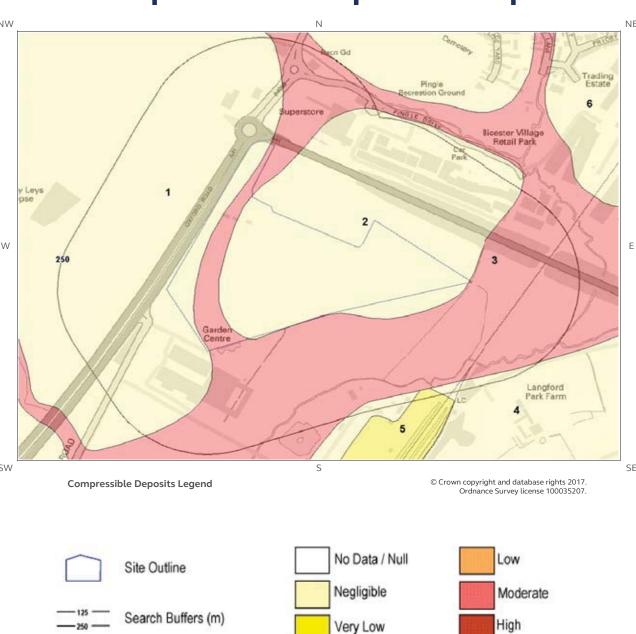


## 6.3 Ground Dissolution of Soluble Rocks Map





## 6.4 Compressible Deposits Map



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High

35

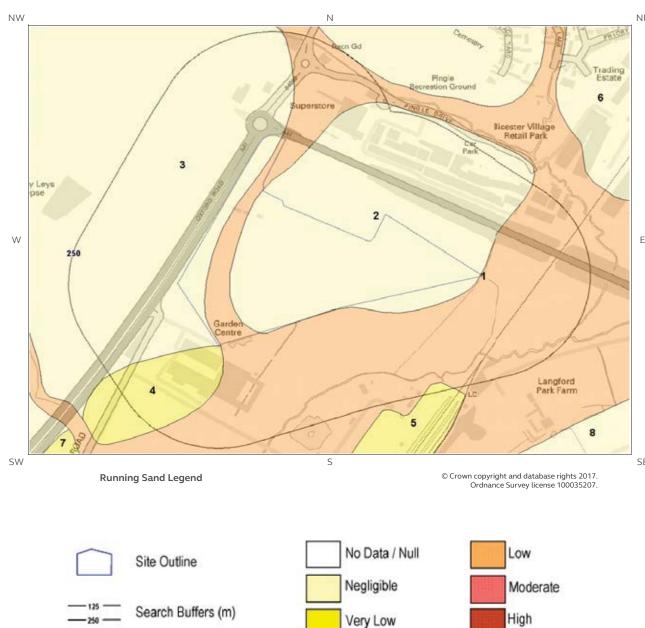
## Groundsure

## 6.5 Collapsible Deposits Map



Very Low

## 6.6 Running Sand Map



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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	Negligible	Ground conditions predominantly non-plastic. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely likely due to potential problems with shrink-swell clays.
2	0.0	On Site	Very Low	Ground conditions predominantly low plasticity. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with shrink-swell clays.
3	0.0	On Site	Negligible	Ground conditions predominantly non-plastic. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely likely due to potential problems with shrink-swell clays.
4	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.

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#### **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.

#### **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	Very Low	Significant soluble rocks are present. Problems unlikely except with considerable surface or subsurface water flow. No special actions required to avoid problems due to soluble rocks. No special ground investigation required or increased construction costs are likely. An increase in financial risk due to potential problems with soluble rocks is unlikely.
2	0.0	On Site	Negligible	Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.
3	0.0	On Site	Very Low	Significant soluble rocks are present. Problems unlikely except with considerable surface or subsurface water flow. No special actions required to avoid problems due to soluble rocks. No special ground investigation required or increased construction costs are likely. An increase in financial risk due to potential problems with soluble rocks is unlikely.
4	0.0	On Site	Low	Significant soluble rocks are present. Low possibility of subsidence occurring naturally, but may be possible in adverse conditions such as high surface or subsurface water flow. Consider implications for stability when changes to drainage or new construction are planned. For new build - site investigation should consider potential for dissolution problems on the site and its surroundings. Care should be taken with local drainage into the bedrock. Some possibility groundwater pollution. For existing property - possible increase in insurance risk due to soluble rocks.

#### **6.4 Compressible Deposits**

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

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

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 $<sup>^{\</sup>star}$   $\;$  This includes an automatically generated 50m buffer zone around the site



ID	Distance (m)	Direction	Hazard Rating	Details
2	0.0	On Site	Negligible	No indicators for compressible deposits identified. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.
3	0.0	On Site	Moderate	Significant potential for compressibility problems. Avoid large differential loadings of ground. Do not drain or de-water ground near the property without technical advice. For new build - consider possibility of compressible ground in ground investigation, construction and building design. Consider effects of groundwater changes. Extra construction costs are likely. For existing property - possible increase in insurance risk from compressibility, especially if water conditions or loading of the ground change significantly.

#### **6.5 Collapsible Deposits**

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

ID	Distance (m)	<sup>e</sup> Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.
2	0.0	On Site	Negligible	No indicators for collapsible deposits identified. No actions required to avoid problems due to collapsible deposits. No special ground investigation required, or increased construction costs or increased financial risk due to potential problems with collapsible deposits.
3	0.0	On Site	Very Low	Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

#### **6.6 Running Sands**

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

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Low	Possibility of running sand problems after major changes in ground conditions.  Normal maintenance to avoid leakage of water-bearing services or water bodies (ponds, swimming pools) should reduce likelihood of problems due to running sand. For new build - consider possibility of running sand into trenches or excavations if water table is high or sandy strata are exposed to water. Avoid concentrated water inputs to site. Unlikely to be an increase in construction costs due to potential for running sand. For existing property - no significant increase in insurance risk due to running sand problems is likely.
2	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.
3	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.
4	1.0	S	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.

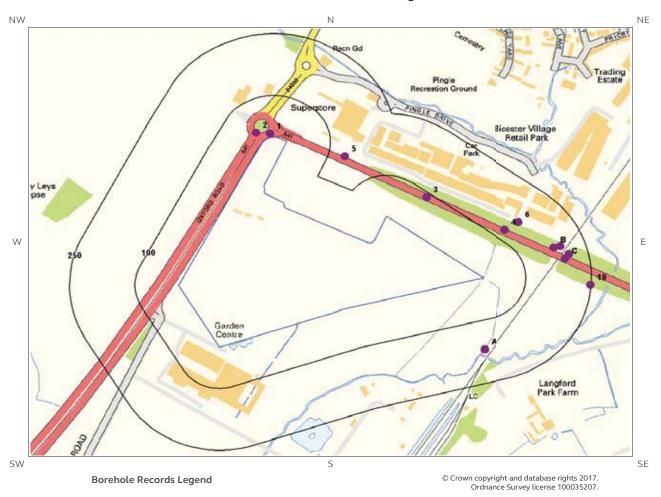
Report Reference: GS-3722221 Client Reference: 036269



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## 7 Borehole Records Map







### 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:

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ID	Distance (m)	rection	NGR	BGS Reference	Drilled Length	Borehole Name
1	8.0	NW	457777 221902	SP52SE88	0.0	BICESTER SOUTHERN BYPASS TP 2
2	25.0	NW	457745 221904	SP52SE87	1.0	BICESTER SOUTHERN BYPASS TP 1
3	88.0	NE	458136 221748	SP52SE90	5.0	BICESTER SOUTHERN BYPASS 4
4	125.0	NE	458318 221670	SP52SE91	6.2	BICESTER SOUTHERN BYPASS 5
5	138.0	Е	457949 221847	SP52SE89	1.0	BICESTER SOUTHERN BYPASS TP 3
6	158.0	NE	458350 221688	SP52SE92	6.0	BICESTER SOUTHERN BYPASS 6
7A	170.0	S	458270 221380	SP52SE82	8.0	SEWAGE TREATMENT WORKS BH421/8
8A	170.0	S	458270 221380	SP52SE80	9.0	SEWAGE TREATMENT WORKS BH421/6
9A	170.0	S	458270 221380	SP52SE75	6.0	SEWAGE TREATMENT WORKS BH421/1
10A	170.0	S	458270 221380	SP52SE79	10.2	SEWAGE TREATMENT WORKS BH421/5
11A	170.0	S	458270 221380	SP52SE77	7.2	SEWAGE TREATMENT WORKS BH421/3
12A	170.0	S	458270 221380	SP52SE76	6.0	SEWAGE TREATMENT WORKS BH421/2
13A	170.0	S	458270 221380	SP52SE81	10.0	SEWAGE TREATMENT WORKS BH421/7
14A	170.0	S	458270 221380	SP52SE78	11.0	SEWAGE TREATMENT WORKS BH421/4
15B	178.0	NE	458430 221626	SP52SE93	7.4	BICESTER SOUTHERN BYPASS 7
16B	194.0	NE	458445 221630	SP52SE94	15.45	BICESTER SOUTHERN BYPASS 8
17C	195.0	Е	458456 221600	SP52SE95	25.0	BICESTER SOUTHERN BYPASS 9
18C	206.0	Е	458465 221610	SP52SE96	7.95	BICESTER SOUTHERN BYPASS 10
19	248.0	E	458514 221536	SP52SE98	8.35	BICESTER SOUTHERN BYPASS 12

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

#1: scans.bgs.ac.uk/sobi scans/boreholes/336788 #2: scans.bgs.ac.uk/sobi scans/boreholes/336787 #3: scans.bgs.ac.uk/sobi scans/boreholes/336790 #4: scans.bgs.ac.uk/sobi\_scans/boreholes/336791 #5: scans.bgs.ac.uk/sobi scans/boreholes/336789 #6: scans.bgs.ac.uk/sobi\_scans/boreholes/336792 #7A: scans.bgs.ac.uk/sobi\_scans/boreholes/336782 #8A: scans.bgs.ac.uk/sobi\_scans/boreholes/336780 #9A: scans.bgs.ac.uk/sobi\_scans/boreholes/336775 #10A: scans.bgs.ac.uk/sobi\_scans/boreholes/336779 #11A: scans.bgs.ac.uk/sobi\_scans/boreholes/336777 #12A: scans.bgs.ac.uk/sobi\_scans/boreholes/336776 #13A: scans.bgs.ac.uk/sobi\_scans/boreholes/336781 #14A: scans.bgs.ac.uk/sobi\_scans/boreholes/336778 #15B: scans.bgs.ac.uk/sobi\_scans/boreholes/336793 #16B: scans.bgs.ac.uk/sobi\_scans/boreholes/336794 #17C: scans.bgs.ac.uk/sobi\_scans/boreholes/336795 #18C: scans.bgs.ac.uk/sobi\_scans/boreholes/336796 #19: scans.bgs.ac.uk/sobi\_scans/boreholes/336798



## 8 Estimated Background Soil Chemistry

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

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

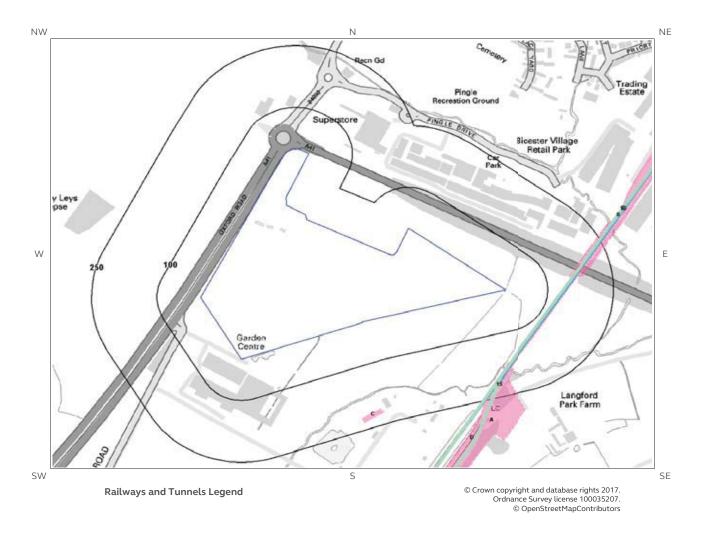
Distance (m)	Direction	Sample Type	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Nickel (Ni)	Lead (Pb)
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	90 - 120 mg/kg	30 - 45 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	90 - 120 mg/kg	30 - 45 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
1.0	S	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
1.0	S	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
1.0	SW	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
17.0	S	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	90 - 120 mg/kg	30 - 45 mg/kg	<100 mg/kg
42.0	NW	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg

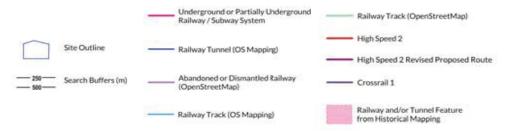
\*As this data is based upon underlying 1:50,000 scale geological information, a 50m buffer has been added to the search radius.

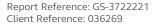
Report Reference: GS-3722221 Client Reference: 036269 Report Reference: GS-3722221 Client Reference: 036269



### 9 Railways and Tunnels Map









No

## 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?

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?

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

Database searched and no data found.

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

#### 9.2 Historical Railway and Tunnel Features

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

Have any historical railway or tunnel features been identified within the study site boundary?

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

ID	Distance (m)	Direction	NGR	Details	Date
5B	115	SE	458371 221497	Railway Sidings	1995
6B	115	SE	458371 221497	Railway Sidings	1996
7B	115	SE	458371 221497	Railway Sidings	1996
8	150	Е	n/a	Railway	1922
1A	172	S	457851 220688	Railway Sidings	1985
2A	172	S	457851 220688	Railway Sidings	1966

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ID	Distance (m)	Direction	NGR	Details	Date
3A	172	S	457851 220688	Railway Sidings	1970
4A	172	S	457851 220688	Railway Sidings	1995
9	178	Е	n/a	Railway	1881
10	181	Е	n/a	Railway	1875
11C	211	S	457963 221249	Railway Sidings	1995
12C	211	S	457963 221249	Railway Sidings	1995
13D	213	S	458177 221166	Railway Sidings	1992
14D	213	S	458177 221166	Railway Sidings	1986
15	216	S	458253 221322	Railway Sidings	1966

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?

Have any historical railway lines been identified within 250m of the study site boundary?

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

No

No

Have any active railway lines been identified within 250m of the study site boundary?

Yes

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Distance (m)	Direction	Name	Туре
111	SE	Not given	Rail
111	SE	Not given	Rail
116	SE	Not given	Multi Track
116	SE	Not given	Multi Track
190	E	Not given	Multi Track
190	E	Not given	Multi Track
197	S	Not given	Multi Track
197	S	Not given	Multi Track
197	S	Not given	Multi Track
197	S	Not given	Multi Track

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Distance (m)	Direction	Name	Туре
200 S		Bicester Military Railway	Rail
200	S	Bicester Military Railway	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

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

Is the study site within 5km of the route of the High Speed 2 rail project?

No

Is the study site within 500m of the route of the Crossrail 1 rail project?

No

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

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

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

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### **Contact Details**

Groundsure Helpline

Telephone: 08444 159 000 info@groundsure.com



#### British Geological Survey Enquiries

Kingsley Dunham Centre Keyworth, Nottingham NG12 5GG Tel: 0115 936 3143. Fax: 0115 936 3276.

British Geological Survey

Email:**enquiries@bgs.ac.uk** Web:**www.bgs.ac.uk** 

BGS Geological Hazards Reports and general geological enquiries

#### British Gypsum

British Gypsum Ltd East Leake Loughborough Leicestershire LE12 6HX



#### The Coal Authority

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



#### Public Health England

**P**ublic information access office Public Health England, Wellington House 133-155 Waterloo Road, London, SE1 8UG

#### https://www.gov.uk/government/organisations/public-healthengland

Email: enquiries@phe.gov.uk Main switchboard: 020 7654 8000

## Public Health England

#### Johnson Poole & Bloomer Limited

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



#### Ordnance Survey

Website: www.jpb.co.uk

Adanac Drive, Southampton SO16 0AS

Tel: 08456 050505

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



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



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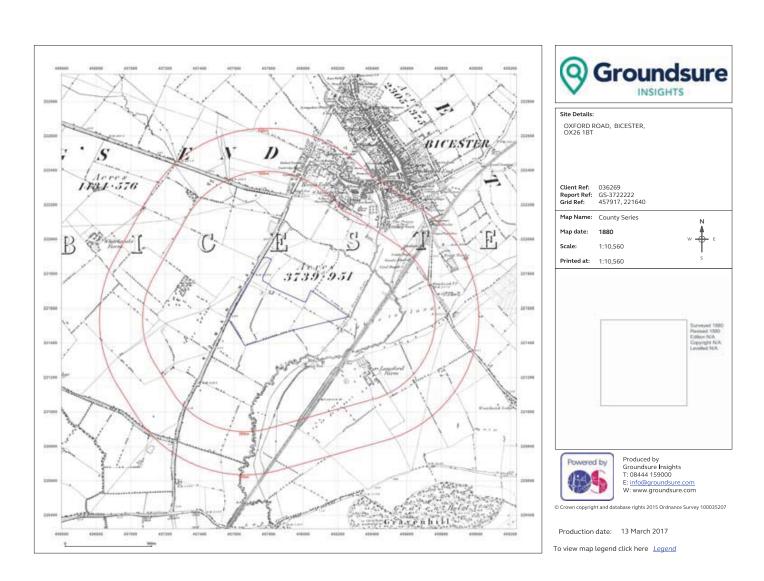
Acknowledgements: Ordnance Survey © Crown Copyright and/or Database Right. All Rights Reserved. Licence Number [03421028]. This report has been prepared in accordance with the Groundsure Ltd standard Terms and Conditions of business for work of this nature.

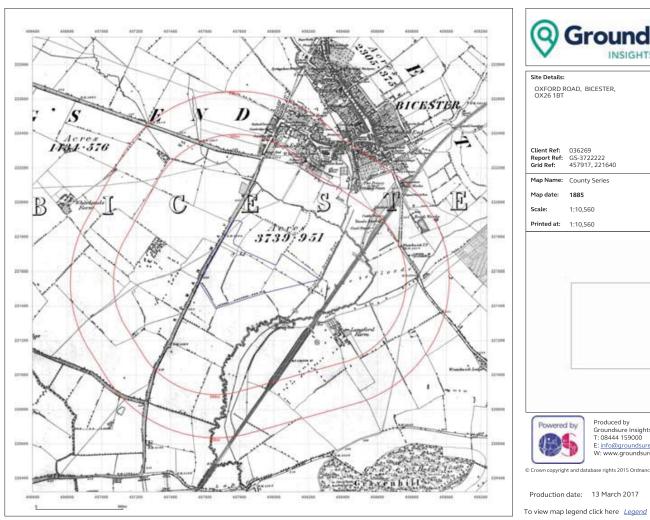
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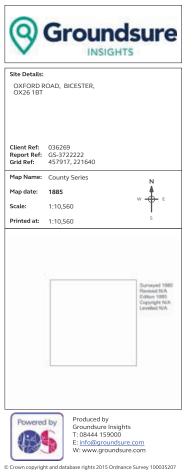
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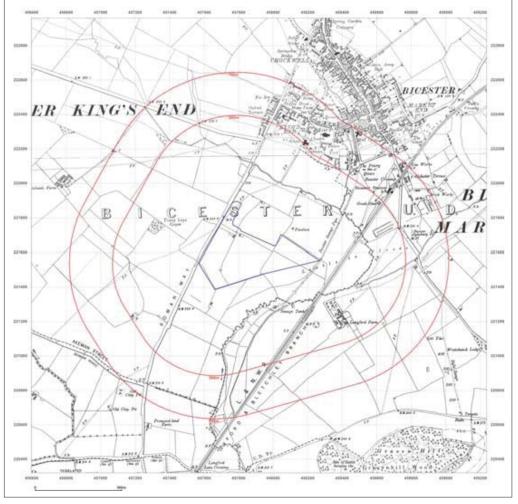
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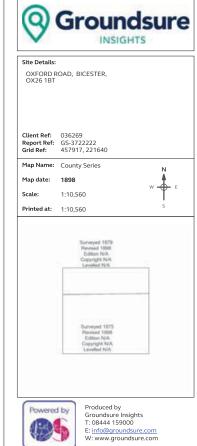
Groundsure's Terms and Conditions can be viewed online at this link: https://www.groundsure.com/terms-and-conditions-sept-2016/



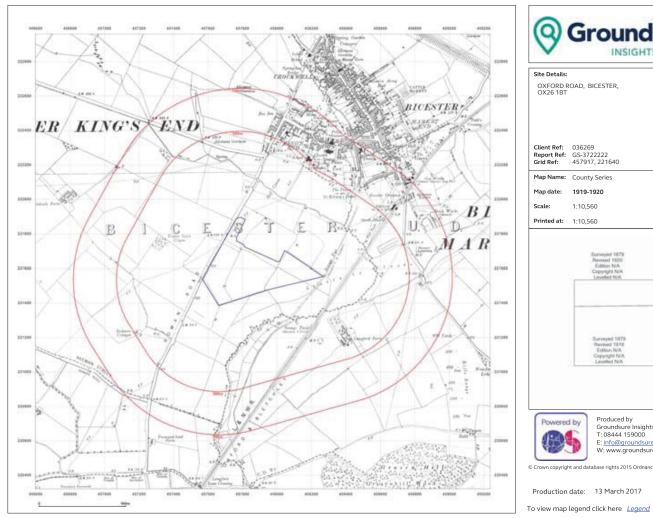


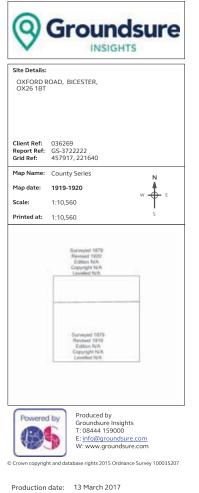


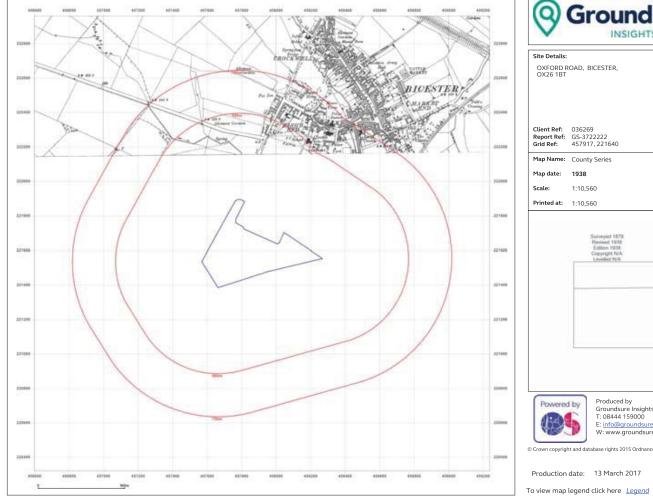


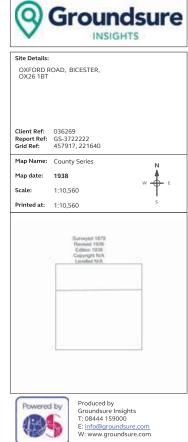


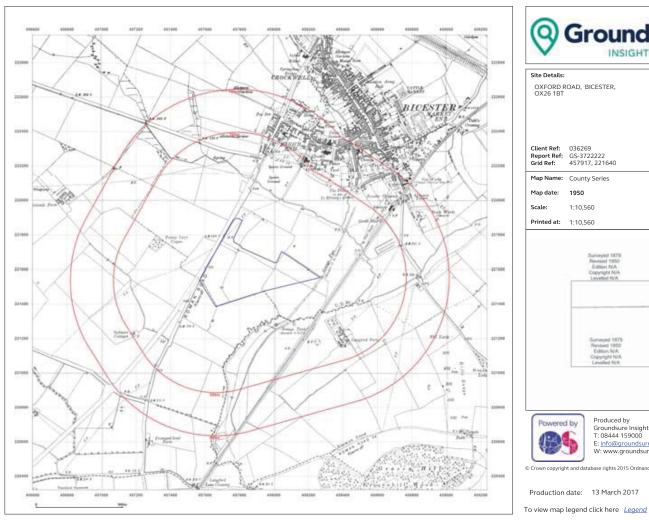
To view map legend click here <u>Legend</u>

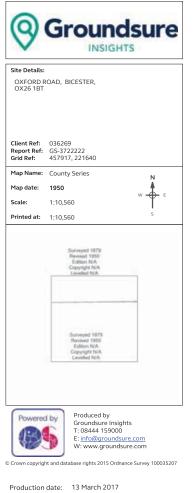


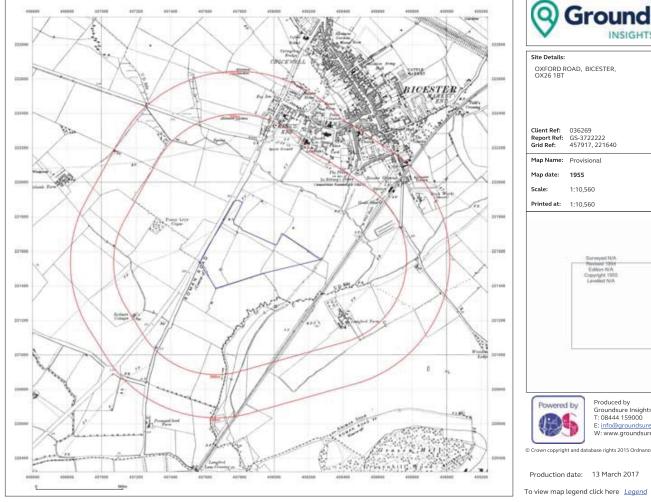


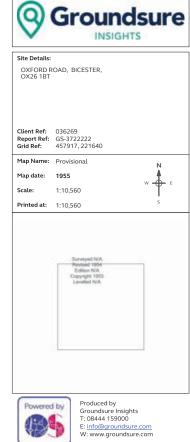


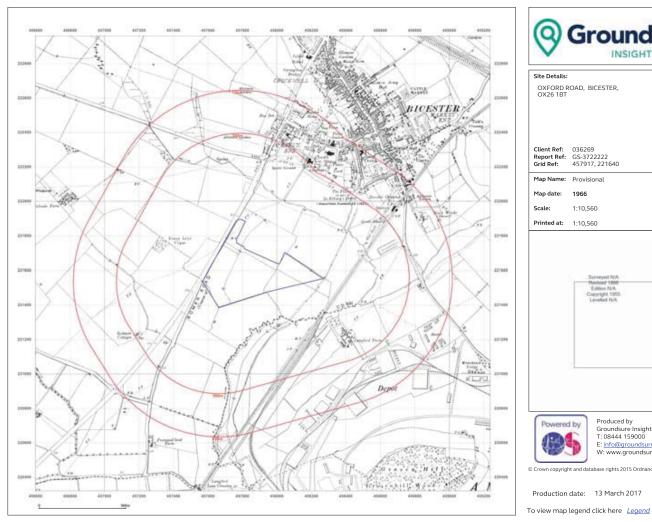


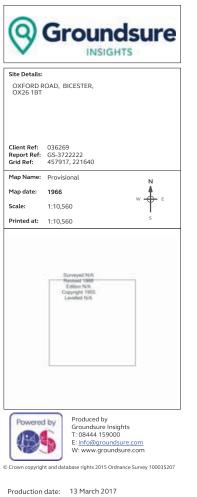


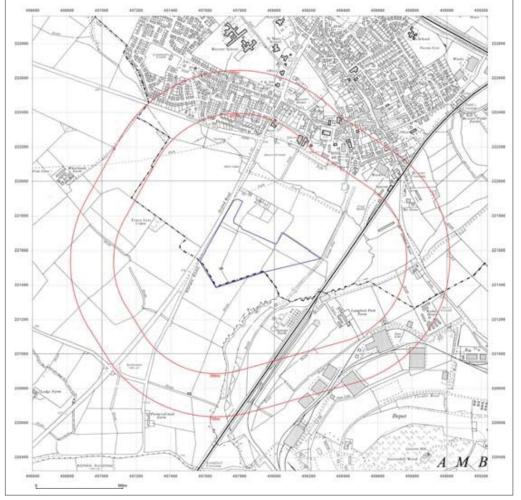


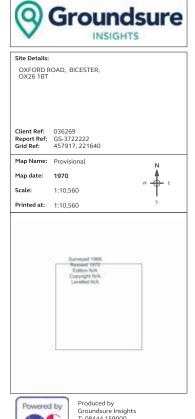




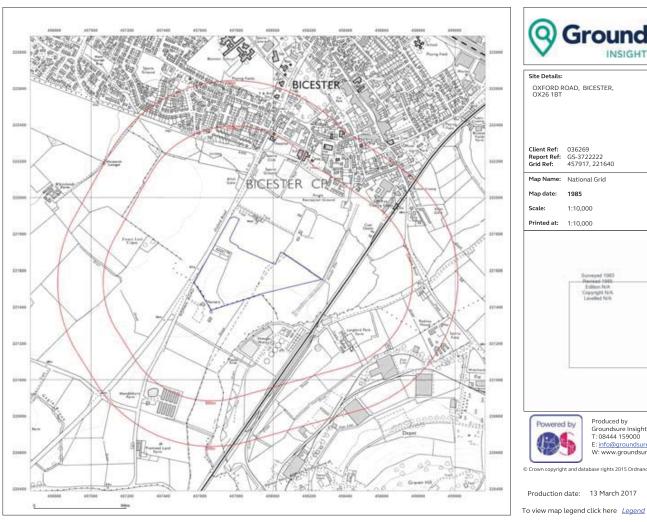


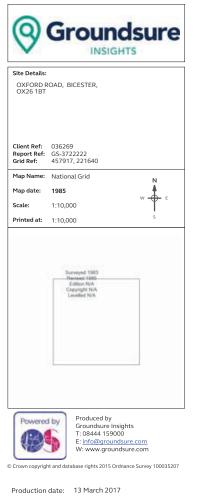


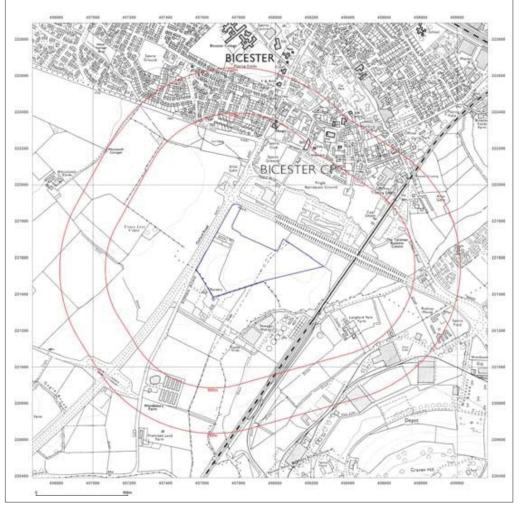


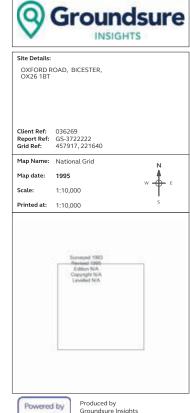




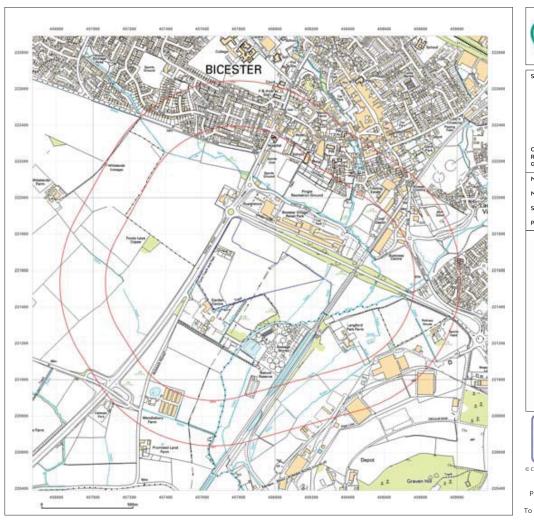


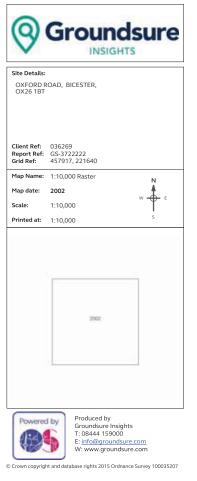






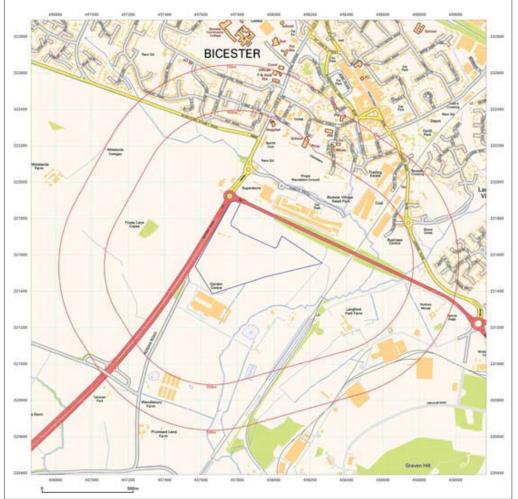


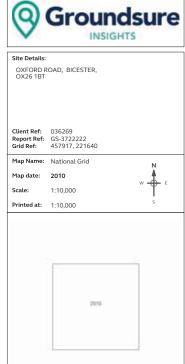




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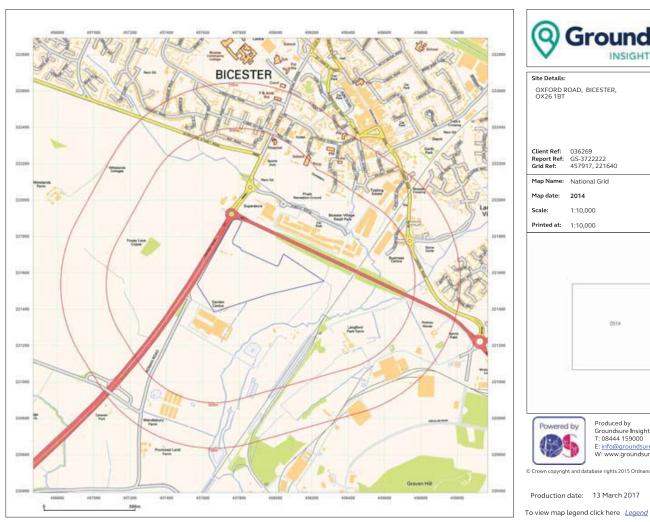
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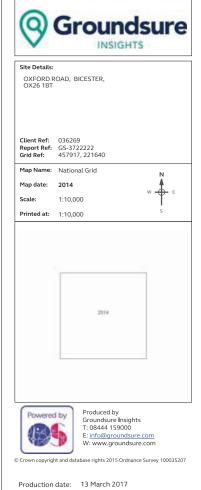


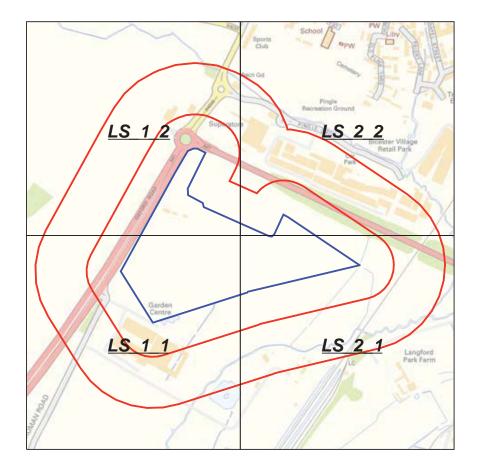




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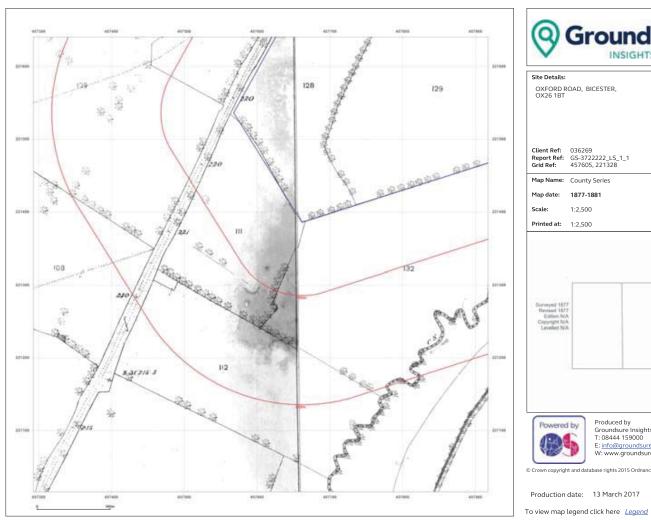


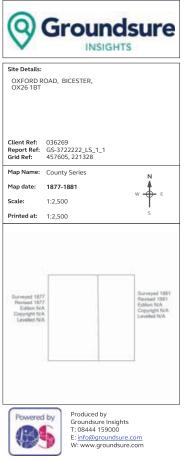


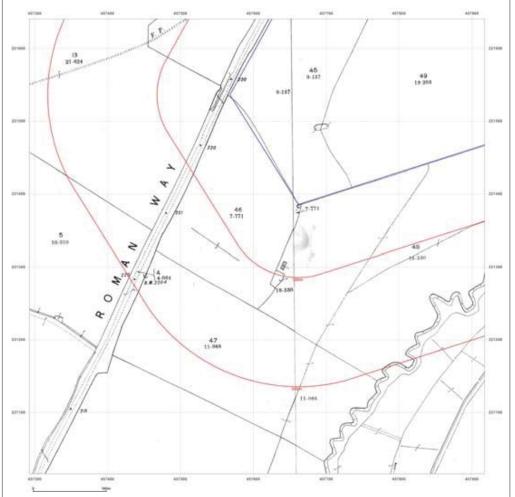


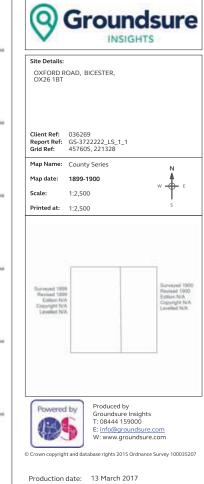


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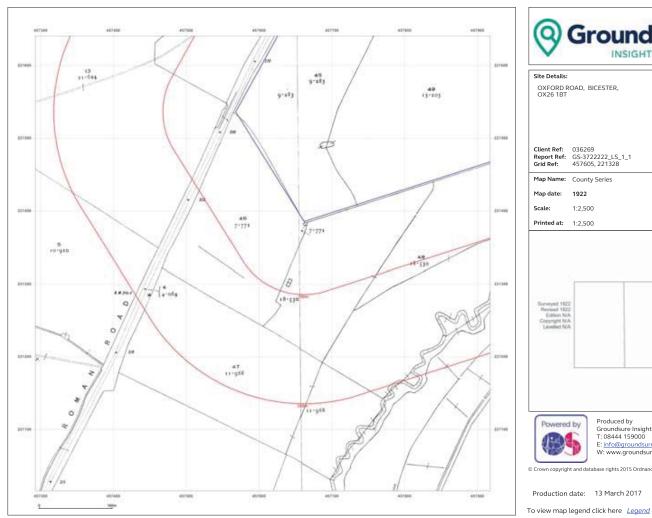


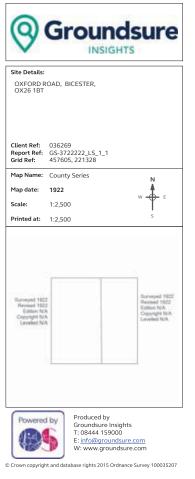


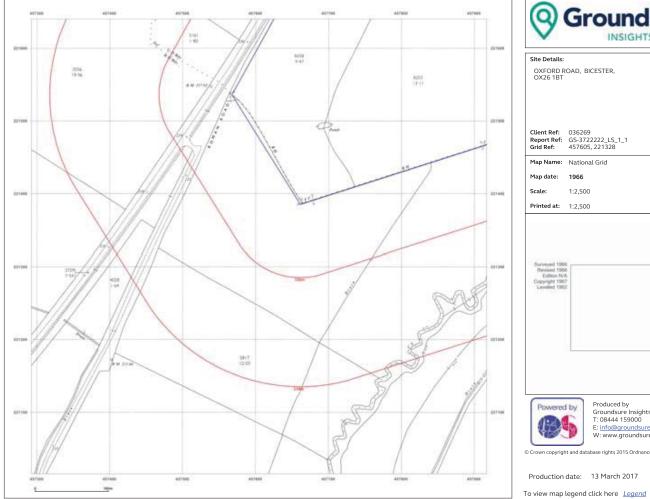


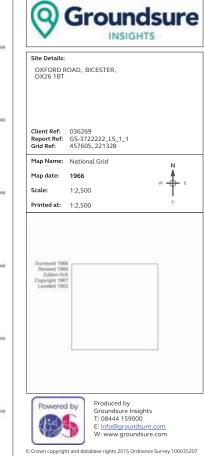


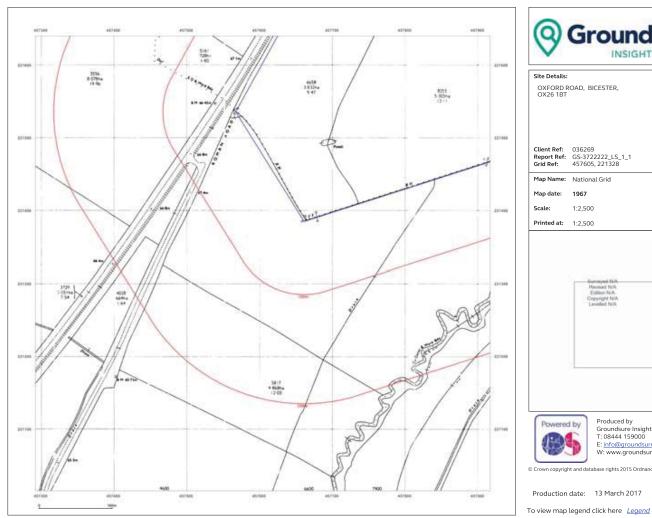
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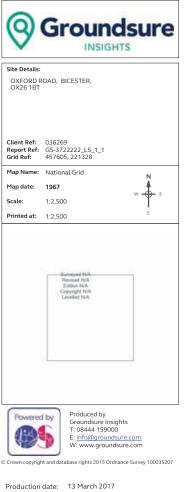


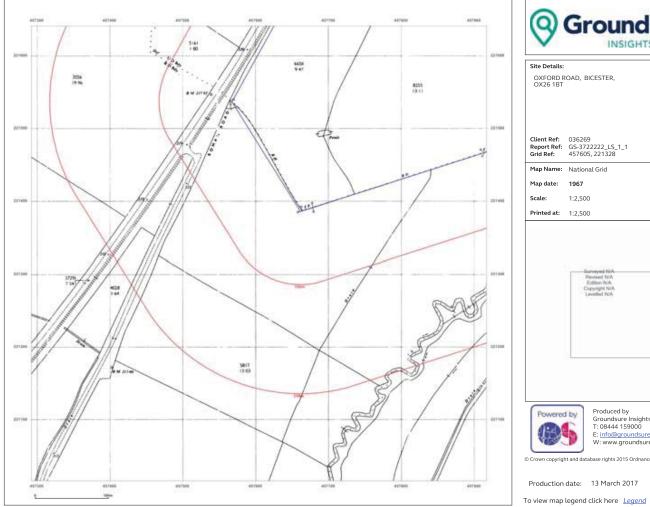


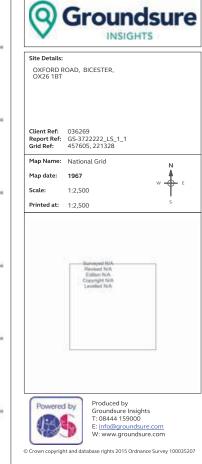


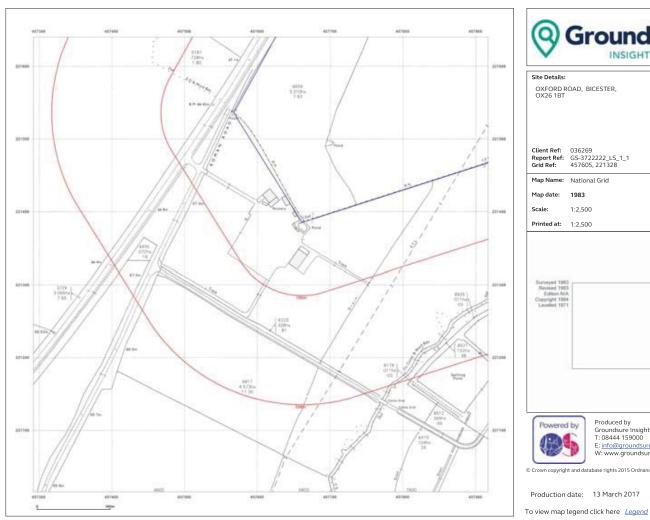


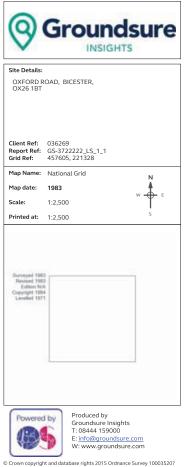


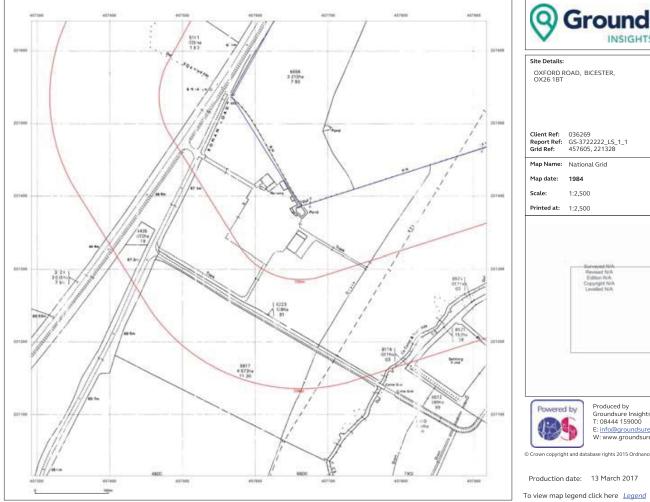


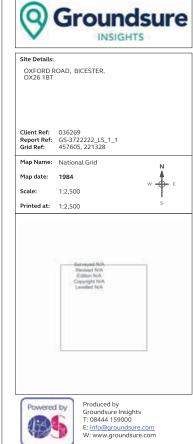


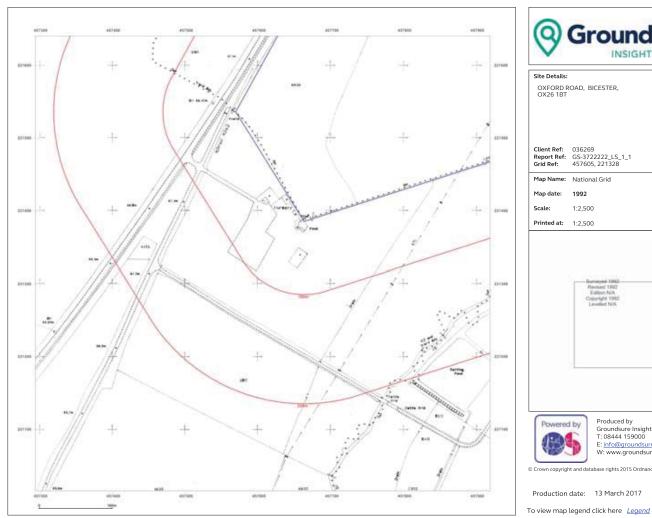


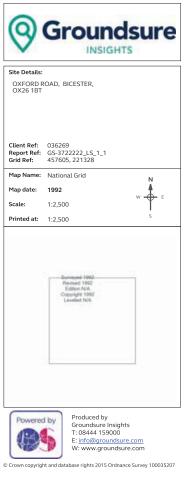


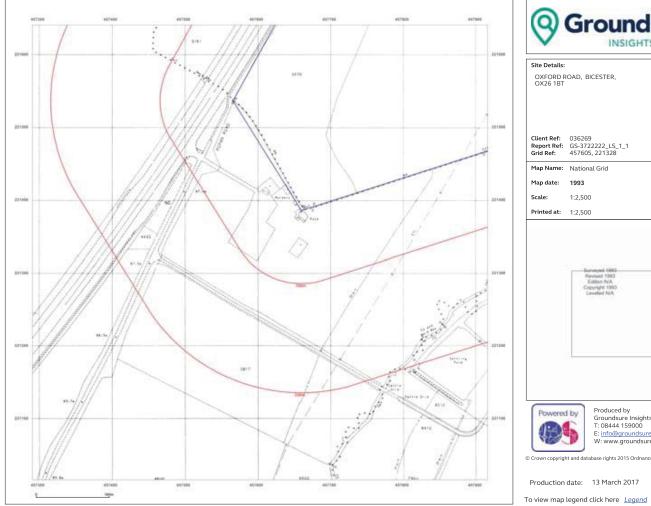


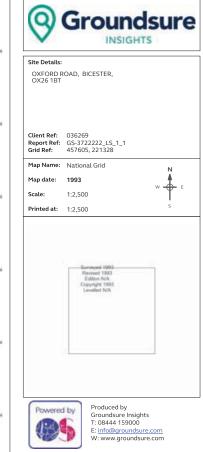


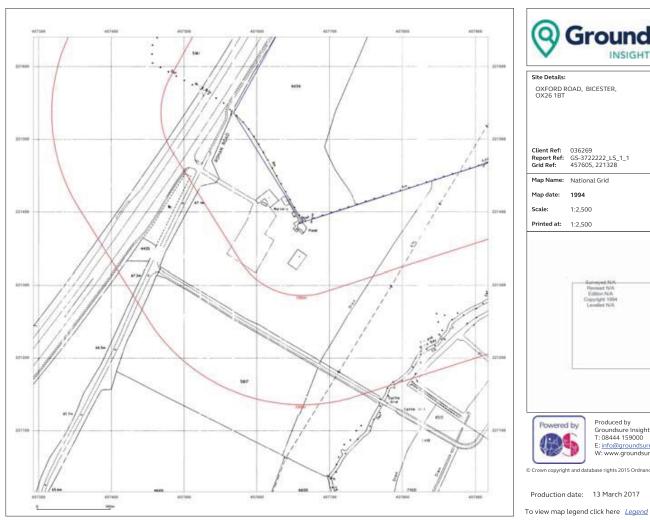


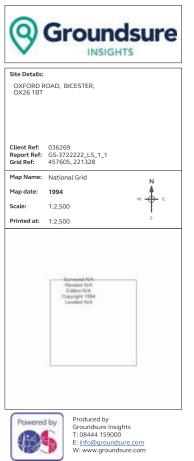


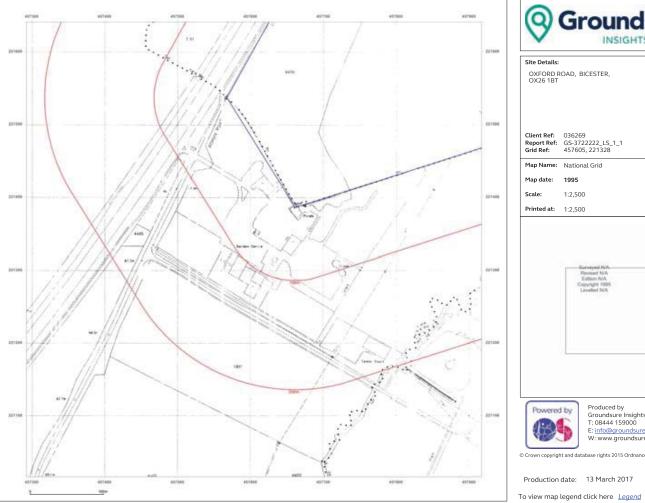


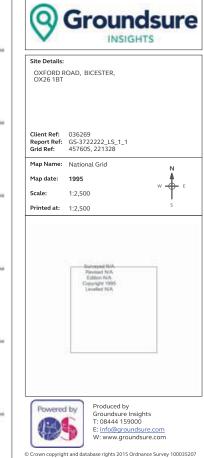


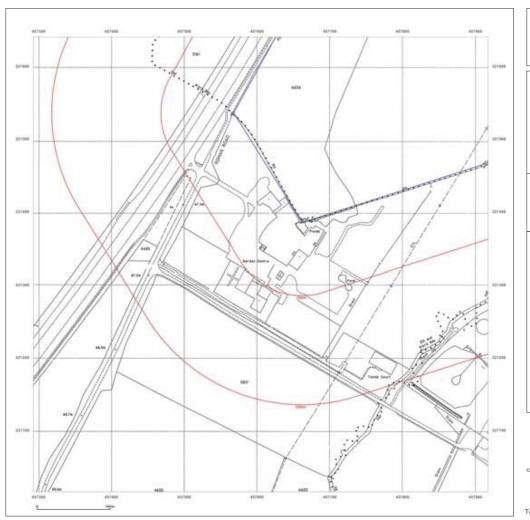


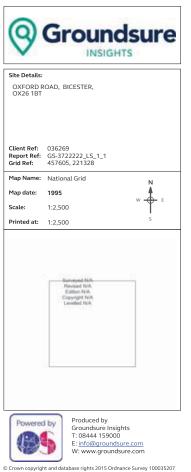












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