



- Contaminated Land Appraisals
- Brownfield Remediation Solutions
- Site Investigation Services
- Earthworks Design and Control
- Flood Risk Assessments

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28th June 2021

Ref C439/02/AS

Dear Simon,

Ref: Shallow Mining Investigation on Land Windmill Hill Quarry, Grimethorpe, Barnsley, South Yorkshire S72 7AJ

1. Introduction

On the instructions of Mr C Gaddes, G&M Consulting have carried out an intrusive mining investigation on land within a disused quarry at Windmill Hill, near Barnsley, South Yorkshire.

The proposed development comprises five detached residential properties with associated access road and parking as shown on the drawing number 20-114 01 prepared by White Agus Partnership a copy of which is presented in Attachment A of this report.

This investigation work was undertaken to provide information on the underlying ground conditions and assess the likelihood of historical shallow mine workings affecting the area of the new dwelling. This report presents the findings of the investigation.

A review of the Coal Authority (CA) Interactive Map (<http://mapaps2.bgs.co.uk/coalauthority/home.html>), shows part of the site to lie in a '*development high risk area*'. The site is on a hill and the crown of the hill appears to be outside the high risk area. The same map also shows '*probable shallow coal mine workings*'. Probable shallow coal mine workings means that there are workable coal seams present at shallow depth that may have been worked but that no records exist for any workings.

The site has been subject to a coal mining risk assessment (CMRA), prepared for the site by Rogers Geotechnical Services Ltd (RGS), as part of a Phase 1 Desk Study, Ref J4708/19/E/EDS May 2019, details of which are summarised in Section 2 of this report and a full copy is presented in Attachment B.

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The site is located on the eastern side of Brierley Road, Windmill Hill, which lies between Grimethorpe and Brierley, near Barnsley in South Yorkshire. The site is approximately 7 km north east of Barnsley. The site is currently an overgrown plot of land that had been a former quarry. The quarry face can still be seen in places along the southern and eastern boundaries. Access to the site is from the east off Brierley Road. The site is roughly triangular in shape with the long axis aligned north south and covers an area of approximately 0.25 hectares.

The comments and opinions presented in this report are based on the findings of a review of available information and ground conditions encountered during the intrusive investigation work. There may be other conditions prevailing on the site which have not been disclosed by this investigation and which have not been taken into account by this report. Responsibility cannot be accepted for conditions not revealed by the investigation. Any diagram or opinion of the possible configuration of ground conditions between exploratory holes is conjectural and given for guidance only and confirmation of intermediate ground conditions should be considered if deemed necessary.

2. Background Information

2.1 Coal Mining Risk Assessment

The site has been subject to a coal mining risk assessment, prepared by RGS, dated May 2019 Ref J4708/19/E/EDS. The CMRA is presented as part of a Phase 1 desk study titled "*Report on a Phase One Desk Study & Coal Mining Risk Assessment*".

In preparing the CMRA RGS reviewed geological records from the British Geological Survey (BGS) and obtained a Consultants Coal Mining report from the Coal Authority (CA)

Salient points raised in their report are as follows:

- *The majority of the site forms part of Windmill Hill Quarry. This is noted to be disused by 1918.*
- *Solid Geology Brierley Rock - Named sandstone member within the Pennine Upper Coal Measures Formation. Thickly bedded brown sandstone.*
- *A review of the relevant geological maps indicates that the Brierley Coal seam outcrops 105m to the south-west of the site. Furthermore, it is apparent that the local geology dips at 2° to the north-east. As such, this seam is anticipated to be present at depths of approximately 12m beneath the site surface.*
- *On the basis of all of the information provided above, one coal seam is anticipated to be present within 30m of the surface at the site. Whilst this seam may be of limited thickness, the possibility of this being worked below the site cannot be ruled out. Historic coal mining activity is evident in the nearby area, and therefore it is considered that if coal was known to be close to ground level it could have been removed illicitly via shallow mining methods with relative ease.*
- *In light of the potential risks of instability at the site from the working of shallow coal, it cannot be recommended that development takes place without further investigation to conclusively determine the presence of such workings. This work should include physical drilling methods to explore the ground conditions.*
- *General practice is to undertake rotary openhole boreholes at three locations across the site to mitigate against the potential for drilling through intact columns associated with pillar and stall workings. Furthermore, it is normal to investigate the ground to 30m below ground level; any workings below this depth are unlikely to result in significant instability. However, in this case, the risk of instability is due to shallow workings, therefore, drilling to these depths may not be necessary and the objective should be to ensure that the shallow seams are un-worked or have sufficient competent cover.*
- *In this instance, having reviewed the geological maps, it is estimated that the Brierley Coal seam may be present at depths of approximately 12m. Further to this, the generalised vertical section on the geological map indicates that the next seam in the sequence, the Elmsall Coal, is present 30m beneath the Brierley Coal. Therefore, it may therefore be possible, in the first instance, to undertake*

one borehole to 20m below the top of the rock head, with the remaining boreholes proving the depth and continuity of the coal seam(s). However, if no coal seams are revealed within 20m of the site surface, it may be prudent to extend at least one borehole to 30m depth. In any event, it is considered that approval should be sought with the Local Authority/Coal Authority as to the efficacy of this approach.

2.2 Geology

G&M have also inspected the British Geological Survey (BGS) 1:50,000 scale geological map for the area (Sheet 87 Barnsley), the BGS on-line maps and relevant geological memoirs for the area to corroborate the information presented in the CMRA.

The geology map Sheet 87 shows the site to be underlain by the Brierley rock, with the outcrop of the Brierley Coal shown to the south west, downhill of the site. The outcrop is aligned north west south east and follows the contours of the hill. The variation in the elevation between the outcrop and the site is 15 m. The dip is to the north east i.e. towards the site, and as such the minimum depth to the coal beneath the site would be 15 m not accounting for any increase in depth due to the dip. Allowing for a dip of 2° the depth to the coal is estimated to be 19 m.

The geological memoir for the area *Geology of the country around Barnsley: Explanation of sheet 87* published 1947 states with regard to the Brierley coal:

- *In the north of the area a persistent seam known as the Brierley Coal occurs about 530ft above the Shafton Coal. Although reaching a thickness of 4ft in the vicinity of Brierley, it is stated to be an inferior coal. There are overgrown tips along its outcrop west of Brierley and at Windmill Hill, but there are no records when the seam was last worked.*

The Brierley Rock is also known as the Dalton Rock. The memoir states:

- *Near Brierley the rock is known by the local name of Brierley Rock, its base lying 50 to 60ft above the Brierley Coal from which it is separated by shale with impersistent coals.*

2.3 Historical Maps

A review of historical Ordnance Survey maps for the area contained in the RGS report, show the site to be a quarry up until 1918 and then as a disused quarry to the present day. No features associated with coal mining are shown in the immediate vicinity of the site. Brierley Colliery is shown 600m north of the site on the 1930 and later maps.

3. Fieldwork

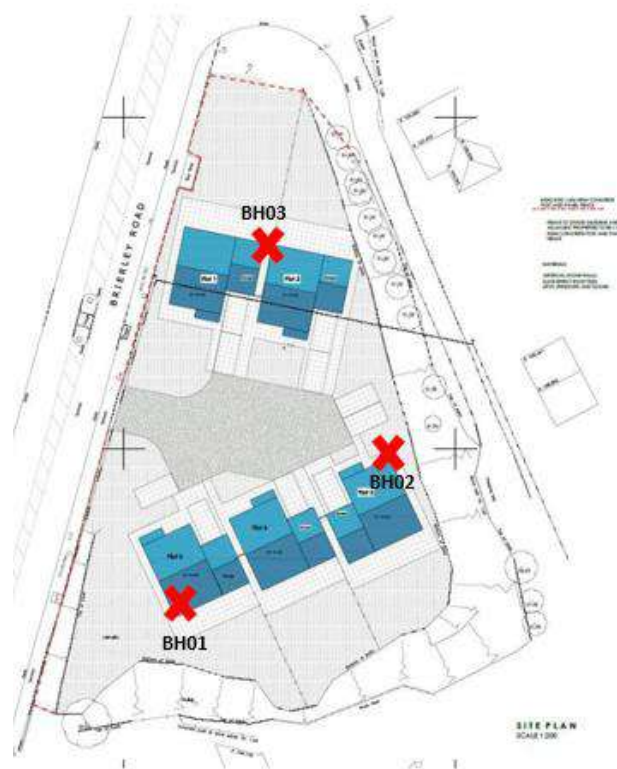
The fieldwork, was carried out on the 17th June 2021 and comprised three rotary open holes, referenced BH1, BH2 and BH3 drilled to a maximum depth of 21.2 m below ground level (bgl). Logging of soil and solid strata was carried out by examination of flush returns and rate of penetration of the drill bit.

The drilling works were undertaken by Cape Site Services Ltd using a Beretta T25 tracked rotary drilling rig and carried out under the Terms and Conditions of the CA Permission No 22167 a copy of which is presented in Attachment C of this report.

Drilling was initially progressed using 150mm diameter augers through the made ground and superficial weathered materials, and where appropriate, cased into the underlying bedrock, to aid flush returns.

Drilling was undertaken using water flush. In accordance with the CA permission, the boreholes were monitored at surface for gases, during their advancement. The boreholes were backfilled on completion.

The locations of the boreholes are shown below:



4. Ground Conditions

Made ground was encountered to depths of between 0.8 m and 2.2 m bgl. This is presumably associated with partial backfill to the quarry.

The made ground in BH3 was underlain by mudstone to a depth of 2.2 m bgl, the mudstone is in turn underlain by sandstone. In BH1 and BH2 the made ground is directly underlain by sandstone. The sandstone was proved to depths of between 7.2 m and 12.5 m bgl. The sandstone presumably represents the remainder of the Brierley Rock which was not quarried. In places the sandstone was noted to be fractured and loss of flush was recorded.

The sandstone is underlain by mudstone, within which two coal seams were recorded. Zones of loss of flush, broken ground and very soft ground were recorded in all three boreholes below the sandstone. A *void possible vertical fracture* (drillers description) was recorded by the driller directly below the sandstone in BH2 from 7.2 m to 7.8 m. This borehole was then abandoned at a depth of 10.0 m bgl due to loss of flush and no returns.

A summary of the depths of coal seams and zones of loss of flush etc is given in the following table:

BH No	Depth (m)		Thickness (mm)	Probable Seam / Drillers Comments
	Top	Bottom		
1	8.5	8.8	300	Coal loss of flush
1	15.5	16.6	-	Loss of flush
1	16.6	20.0	-	Broken ground
2	7.2	7.8	-	Void possible vertical fracture
2	7.8	9.0	-	Very soft no returns

BH No	Depth (m)		Thickness (mm)	Probable Seam / Drillers Comments
	Top	Bottom		
2	9.0	10.0	-	Loss of flush and returns hole abandoned
3	12.5	12.8	300	<u>Coal</u> loss of flush
3	20.0	21.0	1000	<u>Coal</u> (Brierley Coal)

The thin coal encountered almost immediately below the sandstone is thought to be one of the impersistent coals referred to in the geological memoir. The thicker coal proved in BH3 is thought to be the Brierley Coal based on its thickness and separation from the sandstone which are consistent with the records of the geological memoir. It is also at the depth anticipated by G&M.

The broken ground encountered in BH1 at a similar depth to the thicker coal could be indicative of collapsed or stowed (backfilled) workings within the seam. The overall fractured nature of the ground with soft zones etc could also be indicative of the shallow mining, it could also be associated with the deeper more recent mining as detailed in the CA mining report presented in the CMRA.

The exploratory hole records are presented in Attachment D of this report.

During the drilling, monitoring for methane, carbon monoxide, hydrogen sulphide and oxygen was undertaken at the borehole surface. No significant concentrations of these gases were recorded, as detailed on the attached logs.

5. Discussion

It is evident from the boreholes that broken ground within the rock is present at shallow depth beneath the site and which is presumed to be associated with coal workings either within the Brierley Coal or from deeper more recent long wall mining. It could also be associated with valley cambering, where movement occurs due to a more competent rock overlying weaker rocks on a hill side. Cambering could be exacerbated by mining and as such the fractured state of the ground could be due to more than one cause.

The general rule of thumb used to assess the risk from pillar and stall mining is the rule of 10 x the seam thickness for competent rock cover. The seam considered to be the Brierley Coal is at a depth of 20 m bgl, with a proven thickness of 1.0 m. This would require a minimum rock cover of 10.0 m. Even if the maximum recorded thickness of the seam is considered i.e. 1.3 m, rock cover of 13 m would be required. This suggests that the seam or any associated workings are outside the zone of influence for a development at ground level. Also, the presence of sandstone overlying a coal seam is usually assumed to inhibit void migration. However, given the very fractured nature of the overlying strata and the presences of soft zones, which may be associated with void migration or deeper long wall mining, it is suggested that the rule of thumb be treated with caution as the overlying rock may not be competent strata. Also open fractures may be present at or near the surface underlying the made ground.

Based on the above, it is considered that the site could be affected by shallow mine workings in the Brierley Coal. Mitigation measures should therefore be considered. These will, to some extent, be controlled by the proposed development.

6. Conclusions/Recommendations

In accordance with the instructions issued by Mr C Gaddes, an intrusive investigation has been carried out to investigate the possible mining legacy in the area of a proposed development of the site with residential properties. The investigation comprised the drilling of three rotary open-hole boreholes, to a maximum depth of 21.2 m bgl.

The drilling works were carried out in accordance with the CA permission 22167.

The boreholes encountered made ground to depths of up to 2.2 m bgl underlain by fractured sandstone and mudstone with two coal seams. The deeper coal at a depth of 20.0 m bgl is considered to be the Brierley Coal. Based on the fractured state of the ground, loss of flush and soft zones it is thought the seam has been worked with void migration causing the fracturing. The fracturing could also, however, be caused by deeper more recent mining. In theory the Brierley Coal is outside the zone of influence of the ground surface, however, due to the fractured nature of the ground it is suggested that caution is applied to the general rule of thumb of 10 x seam thickness.

It is considered that the site could be adversely affected by historical mining, primarily from the fractured nature of the ground potentially associated with mining. Mitigation measures should be considered. These will, to some extent, be controlled by the proposed development.

There are a number of ways of dealing with old coal workings which could be considered for this site, these options are:

- Drill and grout. The area beneath the proposed properties is drilled and grout pumped in to fill any voids within the broken ground.
- Founding the buildings on a raft foundation capable of spanning any variation in the ground due to shallow mining.

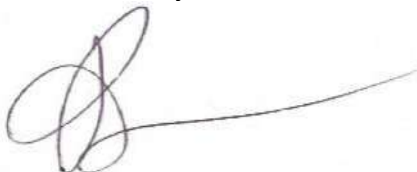
Given the absence of any significant open voids encountered, it is thought that grout take is likely to be low, and therefore it is recommended that a specialist grouting contractor is approached for advice on the viability of drilling and grouting and what improvements could be achieved to the ground.

Again, given the absence of any significant voids, a raft foundation could be considered capable of accommodating any variation in the ground conditions due to the shallow mining. This would need to be designed by a structural engineer. It would also be prudent for this option to be used in conjunction with grouting if it is carried out.

Whilst considered very unlikely given the mining history of the area it is suggested that, following clearance of the site, a site strip is carried out in areas of proposed construction to determine if there is evidence of any mine entries. A site strip could also expose open fissures that may be present. The ground should be examined by a suitably qualified person to assess if any evidence exists. If open fissures are present these can be mass filled with concrete. If mine entries are encountered the Coal Authority should be notified.

We trust this report and the attachments meet with your approval and are sufficient for your present needs. Your client should submit this document to the relevant regulatory bodies for their comment/approval prior to undertaking any development work.

Yours sincerely



Andrew Swinbourne
For and on behalf of **G&M Consulting Ltd**

Attachments



ATTACHMENT A – DRAWINGS



ATTACHMENT B – COAL MINING RISK ASSESSMENT

**Environmental
Geotechnical
Specialists**



PHASE 1 DESK STUDY REPORT

job number	date
site address	
written by	checked by
issued by	

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1. Groundsure Reports
2. Historical Maps
3. Site Plans
4. Photographs
5. Coal Report



Report on a Phase One Desk Study & Coal Mining Risk Assessment

Location: Windmill Hill Quarry
Brierley Road, Grimethorpe S72 7AW

For: Mark Nicholson

Report No. J4708/19/E/EDS

Report date: May 2019

For and on behalf of **Rogers Geotechnical Services Ltd**

Rob Palmer MSc FGS ACIEH
Senior Geo-environmental Engineer

Imran Sakoor BEng FGS
Geo-environmental Engineer

1. Introduction

The site comprises a former quarry, situated off Brierley Road, Grimethorpe. It is approximately 0.32 hectares in size and its National Grid reference is centred around 441061, 410162.

It is understood that the development proposals are currently undecided, as the site is in the process of being sold to a developer. However, it is likely that if developed, a residential scheme will be adopted. As such, in order to gain an understanding of the potential planning and construction aspects of any development, a phase one environmental desk study has been commissioned and is the subject of this report. Furthermore, a coal risk assessment has also been included within this report, given that the site is situated within a high risk development area.

In accordance with issued guidance, a site walkover was conducted on the 14th May 2019 and the following observations were made:

General site description/current site use

The site comprises a disused quarry.

Site boundaries/access

Access can be gained on foot via the south-western boundary, from Brierley Road. Vehicle access is currently not available, as the northern, eastern and western boundaries of the site has been secured with a barbed wire fence and a steep rock face, comprising sandstone forms the southern boundary.

Topography

The site is relatively flat, although locally it is situated at the top of a hill.

Surface cover of site

The majority of the site is covered by vegetation. In some areas the surface is hummocky and there is evidence of tipped demolition materials.



Visible evidence of contamination/ contaminative sources

Demolition material was observed on the site surface. However, there were no other visible signs of contamination present during the time of the walkover.

Presence of vegetation and wildlife

The site was overgrown with vegetation. This will need to be cleared prior to any site investigation. Vegetation seems to be healthy with no evidence of degradation. There were no obvious signs of invasive flora, fauna, nesting birds, burrowing animals or edible plants observed during the time of the site walkover.

Services

The status of underground services is unknown. There were no overhead services present within the site at the time of the walkover.

Site neighbours

The site is located within a residential area, with a neighbour immediately present at the top of the southern rock face.

In order to ensure that the site is fully characterised and to comply with the Environment Act 1995¹, a Phase One Desk Study has been commissioned by Mark Nicholson. The desk study is intended to assess the environmental impact of historical, current and future factors on the development. This report will present the data obtained and provide a conceptual ground model and preliminary risk assessment as well as discussing the scope of any intrusive investigation that may be required. This report does not consider ecological impacts (e.g. bats) or botanical risks (e.g. Japanese Knotweed).

2. Review and Summary of Published Data

As a part of this desk study the following data has been considered.

- | | |
|----------------------|--------------|
| • Groundsure Reports | - Appendix 1 |
| • Historical maps | - Appendix 2 |
| • Site Plan | - Appendix 3 |
| • Photographs | - Appendix 4 |
| • Coal Report | - Appendix 5 |

The data obtained from the above mentioned sources has been summarised below².

¹S57 of the Environment Act 1995 inserted the contaminated land regime into the Environmental Protection Act 1990 (Part 2A). The regime **'provides a risk based approach to the identification and remediation of land where contamination poses an unacceptable risk to human health or the environment'** See <http://www.environment-agency.gov.uk/research/planning/40405.aspx>. This places a duty on local authorities to inspect their areas for contaminated land and require its remediation using the 'suitable for use' approach. Much of this duty is discharged via the planning regime under the Town and Country Planning Act 1990 as historical land contamination is a 'material planning consideration.' The local authorities are required to secure the removal of unacceptable risks via remediation of the land, to therefore ensure the site is suitable for its new use. This is fulfilled via completion of a Phase One Environmental Desk Study, Phase Two Intrusive Investigation, Phase Three Remediation Strategy and Phase Four Validation Report. Therefore, as a minimum, once a site has been developed it should not be capable of being designated as 'contaminated land' under Part 2A of the Environmental Protection Act 1990, as inserted by the Environment Act 1995 (see also PPS 23 Planning and Pollution Control Section 8)

² This report is a summary only and reference must be made in full to the information provided in the Groundsure Report.



2.1 Historical Land Use

Table 1: Historical Land Use³

HISTORICAL MAPPING SUMMARY		
Map Dates	On site	Within 250m
1854 - 1955	The majority of the site forms part of Windmill Hill Quarry. This is noted to be disused by 1918.	Allotment Gardens – Immediately N.
1961 - 2010	The site itself remains unchanged.	Brierley Grimethorpe County Secondary School (later known as Willowgarth High School) – 120m E Piggery – 80m W Residential Housing – within 250m W and S
2014 - 2019	The site remains undeveloped.	

NB. All distances given are approximate only.

2.2 Published Geology and Geological Hazards

Table 2: Geological Data for the Site

BGS MAPPING DATA			
Strata Type	Strata Name ⁴	Previous Name ⁴	Description ⁵
Made Ground/Fill	N/A	N/A	Not indicated on site although large deposit of made ground is shown to be present 25m to the East of the site.
Superficial Geology	N/A	N/A	Not indicated to underlie the site.
Solid Geology	Brierley Rock	-	Named sandstone member within the Pennine Upper Coal Measures Formation. Thickly bedded brown sandstone.
GEOLOGICAL FEATURES			
Type	Location	Features	Comments
Mining Activity	On site	Coal mining.	The study site is located within the specified search distance of an identified mining area.
		Non-coal Mining.	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered.
COAL SEAMS			
Seam Name	Seam thickness ⁶	Outcrop distance from site ⁶	Anticipated depth below site
Brierley Coal	0 to 1.3m	105m SW	12m
NATURAL GROUND SUBSIDENCE & HAZARDS ⁷			
Type		Risk Rating	
Potential for collapsible ground stability hazards		Very low.	
Potential for compressible ground stability		Very low.	

³ See Appendix 2

⁴ Sources: British Geological Survey (NERC) Map Sheets 87; Barnsley; Solid and Drift Edition, and Geology of Britain Viewer [*online resource from www.bgs.ac.uk*]

⁵ Sources: British Geological Survey (NERC) Lexicon of Named Rock Units [*online resource from www.bgs.ac.uk*]

⁶ Sources: British Geological Survey (NERC) Map Sheets 87; Barnsley; Solid and Drift Edition, and Geology of Britain Viewer

⁷ See Groundsure report



Potential for ground dissolution stability	Negligible.
Potential for landslide ground stability	Very low.
Potential for running sand ground stability	Very low.
Potential for shrinking or swelling clay ground stability	Very low.
Radon	The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level. No radon protective measures are necessary.

A review of the relevant geological maps indicates that the Brierley Coal seam outcrops 105m to the south-west of the site. Furthermore, it is apparent that the local geology dips at 2° to the north-east. As such, this seam is anticipated to be present at depths of approximately 12m beneath the site surface.

2.3 Construction Issues

2.3.1 Foundation Construction

On the basis of the prevailing geology and assuming that there are no areas of significantly filled ground, it is anticipated that shallow strip or spread foundations could be utilised at this site. It should be appreciated that an intrusive investigation will be required to validate this opinion. Moreover, it is possible that strata within the Brierley Rock may have weathered to cohesive soils at or near the surface. Such soils could be sensitive to soil moisture variations and thus be susceptible to desiccation as result of tree root action. In light of this, it is possible that footings within the zone of influence of trees (existing or previously removed), may need to be founded at extended depths in excess of 1m.

It should be appreciated that if the quarry has been significantly backfilled, then shallow foundations may not be suitable. In this event, an alternative foundations solution may be more suitable e.g. piles.

2.3.2 Site Won Materials

Where sandstone outcrops it is possible that the resulting soil may provide a suitable bulk granular fill and may prove suitable for re-compaction.

2.3.3 Disposal of Site Materials

If made ground is present then contamination/WAC testing will be required to establish the nature of the underlying soil before disposal to a licensed landfill site. However, it is anticipated that the naturally occurring soils would not be significantly contaminated, thus would probably be accepted by a waste disposal site catering for inert material.

2.4 Mining and Natural Cavities

2.4.1 Coal Mining

The Groundsure Report states that the site is within an area that may be affected by coal mining. A Consultant's Coal Mining Report has therefore been obtained that is included in appendix 5 of this report and may be summarised as follows:



Table 3: Summary of the Consultant’s Coal Mining Report

Has the report highlighted evidence or potential of:			
Ref	Mining Feature	Yes/No	Comments
1	Underground Coal Mining	Yes	The property is in a surface area that could be affected by underground mining in 4 seams of coal between 156m and 866m depth and worked between 1924 and 1991.
2	Probable Unrecorded Shallow Workings	Yes	Possible illicit workings present beneath the site.
3	Spine Roadways at Shallow Depth	No	No spine roadway recorded at shallow depth.
4	Mine Entries	No	None recorded within 100 metres of the site boundary.
5	Abandoned mine plans	Yes	Plans of abandoned mine workings below the site are suggested to be available by the Coal Authority.
6	Outcrops	No	No outcrops recorded.
7	Geological Faults	No	No faults, fissures or breaklines recorded.
8	Opencast Mines	No	None recorded within 500 meters of the enquiry boundary.
9	Coal Authority Managed Tips	No	None recorded within 500 metres of the enquiry boundary.
10	Site Investigations	No	None recorded within 50 metres of the enquiry boundary.
11	Remediated Sites	No	None recorded within 50 metres of the enquiry boundary.
12	Coal Mining Subsidence	Yes	There are 1 claim(s) within 50 metres of the property boundary that do not match the property address. These are shown on the enquiry boundary plot. There is no current Stop Notice delaying the start of remedial works or repairs to the property. The Coal Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.
13	Mine Gas	No	None recorded within 500 metres of the enquiry boundary.
14	Mine Water Treatment Schemes	No	None recorded within 500 metres of the enquiry boundary.
15	Future underground mining	No	None recorded.
16	Coal mining licensing	No	None recorded within 200 metres of the enquiry boundary.
17	Court orders	No	None recorded.
18	Section 46 notices	No	No notices have been given, under section 46 of the Coal Mining Subsidence Act 1991, stating that the land is at risk of subsidence.
19	Withdrawal of support notices	Yes	The property is in an area where a notice to withdraw support was given in 1983. The property is not in an area where a notice has been given under section 41 of the Coal Industry Act 1994, cancelling the entitlement to withdraw support.
20	Payments to owners of former copyhold land	No	The property is not in an area where a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.



2.5 Waste Management and Gas Monitoring

Table 4: Landfill Data and Artificial Ground, Recorded and Anticipated			
ENVIRONMENT AGENCY, LOCAL AUTHORITY, BGS & HISTORIC LANDFILLS			
Waste Type	Location	Comments	Monitoring Requirement
Landfills	Within 250m	None recorded within 250m	N
Other waste sites	Within 250m	None recorded within 250m	N
Environment Agency/Natural Resources Wales licensed waste sites	Within 250m	None recorded within 250m	N
MADE GROUND & INFILLED GROUNDWORKINGS			
Description	Location	Comments	Monitoring Requirement
Records of Potentially Infilled Features	On-site	Infilled quarry	To be determined during site investigation.
	227m NE	Unspecified ground workings	N
Made Ground	100m E	Large deposit of made ground associated with High School	N

2.6 Hydrogeology, Hydrology

Table 5: Ground/Controlled Water Sensitivity and Flooding		
ENVIRONMENT AGENCY AQUIFER DESIGNATION⁸		
Strata	Designation	Description
Solid Geology On Site	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.
GROUNDWATER SENSITIVITY⁹		
Description	Location	Details
Source Protection Zone	-	None recorded within 250m.
Abstraction Licences	-	None recorded within 250m.
Records of Part A(2) and Part B Activities and Enforcements	-	None recorded within 250m.
Records of Licensed Discharge Consents	-	None recorded within 250m.
CONTROLLED WATERS¹⁰		
Description	Location	Details
River Network Entries	95m NW	Inland River
	235m W	Lake

⁸ See Appendix 1

⁹ See Appendix 1

¹⁰ See Appendix 1



POLLUTION INCIDENTS ¹¹			
Pollutant	Receptor	Location	Date
-	-	Within 250m	-
ENVIRONMENT AGENCY FLOOD RISK ¹²			
Description	Location	Details	
Zone 2	-	The site is not situated within a zone 2 flood plain.	
Zone 3	-	The site is not situated within a zone 3 flood plain.	
Flood Defences	-	None recorded within 250m.	
Groundwater Flooding Area	-	Limited potential for groundwater flooding to occur.	

2.7 Sensitive Land Use

Table 6: Sensitive Land Uses within 250m

REGISTERED SENSITIVE LAND USES ¹³		
Description	Location	Details
Nitrate Vulnerable Zone	On site	Existing
Green Belt Land	32m N	Liverpool, Manchester and West Yorkshire Greenbelt

2.8 Industrial Land Use and Potential Sources of Contamination

In order for a conceptual site model and preliminary risk assessment to be completed the historical maps and Groundsure data requires analysis to identify any past or present activities on the site and in the area that may have the potential to cause contamination on the site. Guidance has been issued by the Environment Agency, NHBC and Chartered Institute of Environmental Health.¹⁴ Within this document, annex 3 provides examples of important contaminants that are associated with individual uses of land. This data assists in the formulation of any chemical testing regime.

Those that we consider potentially contaminative according to the guidance are given below:

Table 7: Potentially Contaminative Sources

HISTORICAL		
Land Use	Location	Classification
Quarry	On-site	
Allotment gardens	Immediately N	Unspecified works/factories/features.
High School	120m E	
CURRENT		
Land Use	Location	Classification
-	-	None identified within 250m.

¹¹ See Appendix 1

¹² See Appendix 1

¹³ See Appendix 1

¹⁴ Guidance for the Safe Development of Housing on Land Affected by Contamination, R&D Publication 66: 2008 Volume 1 and 2.



3. Coal Mining Risk Assessment

The risk to the stability of the proposed residential development has been evaluated from the data obtained and with reference to the following ratings and definitions:

- Low - The possibility of instability is unlikely therefore no further action is necessary.
- Moderate - The possibility of instability is likely and further investigation or remedial action may be required.
- High - The possibility of instability is highly likely and further investigation or remedial action will be necessary.

Table 8: Development Specific Risk Assessment

Item	Risk of Instability	Coal Seam(s) Considered	Risk Rating
1	Shallow coal seams	Brierley Coal	Moderate
2	Coal workings at depth	The Coal Authority report indicates that the property is in a surface area that could be affected by underground mining in 4 seams of coal between 156m and 866m depth.	Low

On the basis of all of the information provided above, one coal seam is anticipated to be present within 30m of the surface at the site. Whilst this seam may be of limited thickness, the possibility of this being worked below the site cannot be ruled out. Historic coal mining activity is evident in the nearby area, and therefore it is considered that if coal was known to be close to ground level it could have been removed illicitly via shallow mining methods with relative ease.

It may be noted that guidance available from both the NHBC and the CIRIA publication, SP32 - *construction over abandoned mine workings*, suggests that competent overburden thickness above a coal seam should be greater than 10 times the thickness of a seam plus seam thickness in order that the collapse of workings would pose a low risk to surface structures.

On this basis, assuming a maximum thickness of the coal seam, the table below suggests the thickness of competent overburden required above to mitigate instability at the surface.

Table 9: Required Thickness of Competent Overburden

Seam Name	Seam Thickness	Anticipated Depth Below Site	Required Thickness of Competent Overburden
Brierley Coal	0 to 1.3m	12m	13.2m

Based on the above information, it is considered that there will not be a sufficient thickness of competent overburden above the seam in order to prevent the risk of instability posed by the presence of any illicit workings. Therefore, a moderate risk rating has been placed on this seam, and further investigation is recommended to prove or disprove the presence of illicit mining activity.

In regard to deeper mining which could affect the site, the Coal Authority Consultant's Report indicates that the property is in a surface area that could be affected by underground mining in 4 seams of coal between 156m and 866m depth. However, it is considered that any collapse within these workings should not affect the stability of the site surface given that a significant thickness of competent overburden should be present. As such, a low risk rating has been applied to workings at depth. Notwithstanding this, the Consultant's Report does indicate that there has been one claim for



coal mining subsidence within 50m of the site boundary. This claim has been highlighted on the site plan within Appendix 5.

In light of the potential risks of instability at the site from the working of shallow coal, it cannot be recommended that development takes place without further investigation to conclusively determine the presence of such workings. This work should include physical drilling methods to explore the ground conditions.

General practice is to undertake rotary openhole boreholes at three locations across the site to mitigate against the potential for drilling through intact columns associated with pillar and stall workings. Furthermore, it is normal to investigate the ground to 30m below ground level; any workings below this depth are unlikely to result in significant instability. However, in this case, the risk of instability is due to shallow workings, therefore, drilling to these depths may not be necessary and the objective should be to ensure that the shallow seams are un-worked or have sufficient competent cover.

In this instance, having reviewed the geological maps, it is estimated that the Brierley Coal seam may be present at depths of approximately 12m. Further to this, the generalised vertical section on the geological map indicates that the next seam in the sequence, the Elmsall Coal, is present 30m beneath the Brierley Coal. Therefore, it may therefore be possible, in the first instance, to undertake one borehole to 20m below the top of the rock head, with the remaining boreholes proving the depth and continuity of the coal seam(s). However, if no coal seams are revealed within 20m of the site surface, it may be prudent to extend at least one borehole to 30m depth. In any event, it is considered that approval should be sought with the Local Authority/Coal Authority as to the efficacy of this approach.

4. Preliminary Qualitative Risk Assessment

The potential of contamination hazards on the land has been identified and the risks associated with them are assessed in the following preliminary risk assessment in accordance with industry practice and the 'suitable for use' approach. This has been conducted using the source-pathway-receptor approach. This method dictates that there must be a risk contaminant produced at a 'source' in sufficient concentration to cause harm and there must be a 'pathway' for the contaminant to reach an identifiable 'receptor' for the linkage to be proved and a contamination hazard to be considered present. Not all substances are contaminants and not all contaminants are considered to be a risk. Indeed DEFRA and The Environment Agency state that **'a contaminant is a substance which has the potential to cause harm, while a risk itself is considered to exist if such a substance is present in sufficient concentration to cause harm and a pathway exists for a receptor to be exposed to the substance.'**

R&D Publication 66: 2008 states that the groups at risk of harm (receptors) can be identified by the following categorisation:

1. Humans: site personnel, end users, visitors and adjacent land users.
2. The water environment – receptors: groundwater, surface water, coastal waters and artificial drainage.
3. Ecosystems: plants and animals.
4. Construction/building materials/services



In order to complete a conceptual site model and therefore a preliminary risk assessment, an appraisal of the sources of contamination, potential and actual, on and in the area of the site has therefore been completed with reference to this pollution linkage.¹⁵

4.1 Conceptual Ground Model & Preliminary Qualitative Risk Assessment

It is understood that any future development proposals are likely to comprise the construction of residential housing or flats. In view of the sensitivity of the end users it is considered that either soil screening values (SSVs) for a residential with or without plant uptake end use should be employed, depending on the precise nature of the development once determined. Nevertheless, should a commercial development be preferred, alternative and more appropriate screening levels should be employed.

The preliminary risk assessment has been evaluated with reference to the following ratings and definitions:

- | | |
|-------------------|---|
| N/A - | A source-pathway-receptor linkage is not considered to exist and therefore a risk assessment is not required. |
| Low - | A pollution linkage is unlikely and/or the likelihood of harm occurring is low and of minor consequence. |
| Moderate - | The linkage exists but further field or laboratory data is required to confirm that the contaminant has reached the receptor and the levels of contaminant are harmful. |
| High - | The linkage exists and the available data indicates that significant harm may be caused and remedial action could be necessary. |

¹⁵ This assessment has been based on the information as to the proposed development that has been provided by the client. If the plans should change, the assessment should be re-evaluated.



Table 10: Conceptual Site Model and Preliminary Qualitative Risk Assessment

CONCEPTUAL SITE MODEL			PRELIMINARY RISK ASSESSMENT	
Pathways	Receptor	Linkage Present?	Risk Rating	Notes
Direct contact/dermal absorption/soil ingestion	Operative	Yes – operatives are likely to come in contact with the soil.	Moderate	There are potential on and off site sources of contamination that may have caused contamination of the site.
	End User	Yes – end users are likely to come in contact with the soil.	Moderate	Any on site sources of contamination could migrate to neighbouring properties.
	Neighbours	Yes – possible source on site and immediate neighbours are present.	Moderate	Further testing required to reach a firm conclusion.
Inhalation of Dust/Vapours	Operative	Yes – contact with soil likely during works and vapours may accumulate in enclosed spaces.	Moderate	There are potential on and off site sources of contamination that may have caused contamination of the site. Any on site sources of contamination could migrate to neighbouring properties.
	End User	Yes – vapours may accumulate in enclosed spaces.	Moderate	Construction activities may create dust on and off site, which, if contaminated, could adversely affect operatives, end users and neighbours.
	Neighbours	Yes – neighbouring properties present and possible inhalation of dust during the works.	Moderate	In the event that harmful vapours are present they may accumulate in enclosed spaces, affecting operatives, end users and neighbours Further testing required to reach a firm conclusion.
Ingestion of fruit/vegetables and/or waters	Operative	No – no edible plants or contained water sources were revealed on the site.	N/A	
	End User	Yes – soft landscaping proposed as part of the new development.	Moderate	There are potential on and off site sources of contamination that may have caused contamination of the site. Further testing required to reach a firm conclusion.
	Neighbours	Yes – residential dwellings present within 250m of the proposed development.	Moderate	



Migration of hazardous gases via permeable strata	Operative		Low to Moderate	Possible source on site. If signification thicknesses of made ground are identified, then a programme of monitoring is recommended but is suggested to be limited to 4 readings over one month in the first instance. Further monitoring may then be necessary depending on the gas concentrations recorded.
	End User	Yes – possible on site source associated with quarry backfill.	Low to Moderate	
	Neighbours		Low to Moderate	Further knowledge required to reach a firm conclusion.
Spillage/loss/run off direct to receiving water	Controlled Waters	Yes – possible source on site and controlled waters within 250m.	Moderate	There are potential on site sources of contamination that may have caused contamination of the site.
Migration via permeable unsaturated strata	Controlled Waters	Yes – possible source on site and Secondary A aquifer beneath the site.	Moderate	Controlled waters within 250m. Secondary A aquifer underlies the site. Permeability of underlying geology should be assessed.
Run off via drainage/sewers etc	Controlled Waters	Yes – possible source on site.	Moderate	Further testing required to reach a firm conclusion.
Direct contact with contaminated soils	Plants	Yes – it is likely that some soft landscaping areas may be present once the development is finalised.	Moderate	There are potential on and off site sources of contamination that may have caused contamination of the site.
Uptake via root system			Moderate	Any on site sources of contamination could migrate to neighbouring properties. Further testing required to reach a firm conclusion.
Direct contact with contaminated soils	Building Materials	Yes – possible source on and off site and foundation and service installation materials may be affected by the site soil.	Moderate	There are potential on and off site sources of contamination that may have caused contamination of the site. Further testing required to reach a firm conclusion.
Direct contact with contaminated groundwater				



Migration of mine gas via permeable strata	Operative End User	Yes – in an area affected by coal mining activity and where shallow worked seams may be present.	Low to Moderate	Further knowledge required to reach a firm conclusion.
Exposure to Radon	Operative End User	No – not in a radon affected area.	N/A	The publication BR211 states that no protection measures are necessary.
Unexploded Ordnance (UXO) Risk	Operative	Yes – a preliminary search indicates a low indicative UXO risk.	Low	

Notes:

1. The above data and table is a qualitative assessment of the probable risks identified at this site, based on the information made available to us from the client, third party professional data and walkover survey.
2. Should any additional or new data come to light, the risk assessment should be revisited and any necessary changes made to any recommendations resulting from this study.
3. Where further testing is recommended as part of the risk assessment, this is in order to provide a quantitative assessment of any contamination issues. It should at all times be considered that uncertainties may remain, and therefore any testing regime and ground investigation philosophy should be ready to accommodate any necessary alterations should any data come to light or it become evident that it has not been previously considered.



5. Intrusive Investigation

5.1 Site Investigation Philosophy

The information from the Phase 1 Desk Study shows there are potential sources of contamination on the site and in the surrounding area. In view of the above, any intrusive investigation should be undertaken in accordance with the sampling strategies given in BS10175: 2011 +A2:2017 and CLR4:1994. These two sampling strategies may be classified as:

- Non Targeted – using a defined sampling pattern (BS10175)
- Targeted – based on prior knowledge and professional judgement (CLR4)

These sampling strategies are considered in more detail below. However, it is emphasised that they can be used individually or in combination depending on the depth of site knowledge.

Non Targeted Sampling

If no obvious 'hot spots' of contamination have been identified on a site, it would be recommended that a stratified random pattern of sampling points be considered. This work should be undertaken with reference to BS10175: 2011 +A2: 2017 *Investigation of potentially contaminated sites – Code of practice: 7.6*, and BS5930, *Code of practice for ground investigations, as amended in 2015*.

Targeted Sampling

If a possible 'hot spot' of contamination has been identified on a site, it is recommended that a herringbone pattern of sampling points be considered in the immediate vicinity. If strong evidence of contamination has then been identified, it is recommended that sampling be highly focused to reflect that evidence and the investigator's experience. This work should be undertaken with reference to CLR4, *Sampling Strategies for Contaminated Land, 1994*.

The density of sampling required is defined in BS10175: 2011: +A2: 2017: 7.7.2.2.3, which indicates that an *exploratory* investigation usually requires a lower density sample spacing than does a *main* investigation. The BS goes on to state that *the actual density should depend upon the confidence and robustness required of decisions that will be based on the information obtained. Thus the area and depth of interest will be related to the contaminants present, the pathways and the receptors. Typical densities of sampling grids can vary from 25m to 50m centres for exploratory investigations, and 10m to 25m centres for main investigations.*

5.2 Site Specific Investigation

In view of the information provided above it is considered that an investigation of the site should include the following main elements.



5.2.1 Contamination Assessment

It may be appreciated that BS 10175 clause 7.7.2.2.3 suggests that the number of sampling points at the site should be based on a minimum of three testing locations or the size of the site with respect to the appropriate grid spacing, whichever the greater. On the basis of the site area being 0.32ha, the number of sampling points at the site should be considered with respect to the table below.

Table 11: Summary of Sampling Strategy					
NUMBER OF SAMPLING POINTS					
	Soil	Water	Asbestos	Standpipes	Standpipe Readings
Exploratory Investigation 50m x 50m grid	3	-	3	3*	If required, a minimum of 4 readings over 1 month would be required as per risk assessment, however any regime must take into account the guidance detailed below.
Target Areas	Should be assessed during any investigation.				

*Required if significant made ground is revealed.

Chemical testing should be undertaken on the above grid spacing and the following standard testing regime should be undertaken

- **Metals** – Cd, Cr, Cu, Hg, Ni, Pb, Zn, V.
- **Semi Metals and Non Metals** – As, Se, Free Cyanide and Phenols.
- **Hydrocarbons** – Polycyclic aromatic hydrocarbons (PAH EPA16), Total petroleum hydrocarbons (TPH CWG).
- **Others** – pH, Organic Content.
- **Asbestos.**

Sampling Method

If significant thicknesses of made ground considered capable of producing harmful concentrations of gas is revealed, then site investigation should include the installation of three gas monitoring standpipes for subsequent monitoring. Nevertheless, in any event, soils should be obtained for chemical sampling. The sampling strategy should employ the non-targeted strategy given above in the first instance, i.e. at least three sampling points, if it is anticipated that made ground is significant across the site. However, if the made ground at the site is thought to be localised to specific areas, then the targeted strategy should be used.

It should be possible to carry out the above work with a windowless sampling drilling rig, however, it may be more pragmatic to employ hand-held digging tools for a targeted strategy.

Gas Monitoring

If required, the final gas monitoring regime should be undertaken in accordance with Table 4.2 of CIRIA C665: 2007: *Assessing risks posed by hazardous ground gasses to buildings*. In that document guidance for the frequency of monitoring is provided on tables 5.5a and 5.5b *Typical/idealised frequency and period of monitoring* on page 60. For convenience, these tables have been combined and reproduced below.

**Table 12: Typical/idealised Frequency and Period of Monitoring.**

Sensitivity of development	Generation potential of source				
	Very low	Low	Moderate	High	Very High
Low (commercial)	4/1	6/2	6/3	12/6	12/12
Moderate (flats)	6/2	6/3	9/6	12/12	24/24
High (residential + gardens)	6/3	9/6	12/6	24/12	24/24

Notes:

- a) The first number is the minimum number of readings and the second number is the minimum period in months, for example 4/1 – Four sets of readings over 1 month.
- b) At least two sets of readings must be at low and falling atmospheric pressure (but not restricted to periods below 1000mb) known as worst case conditions.
- c) The frequency and period stated are considered to represent typical minimum requirements. Depending on specific circumstances fewer or additional readings may be required (e.g. any such variation subject to site specific justification). The NHBC guidance is also recommending these periods/frequencies of monitoring.
- d) Historical data can be used as part of the data set.
- e) Not all sites will require gas monitoring. However this would need to be confirmed with demonstrable evidence.
- f) Placing high sensitivity end use on a high hazard site is not normally acceptable unless the source is removed or treated to reduce its gassing potential. Under such circumstances long-term monitoring may not be appropriate or required.
- g) This guidance should be read in conjunction with BS 8576:2013 figure 6 which may justify fewer readings in the first instance, where the generation potential is considered to be very low to low. However, this should be undertaken pragmatically, and further readings obtained according to the above table, where a potentially significant source is identified and initial readings suggest that remedial measures are not necessary.

5.2.2 Geotechnical Assessment

In addition to the above contamination assessment which is likely to be required by planning authorities and insurance providers, the following investigation strategy could be considered:

Sampling Method

It is anticipated that a windowless sampling drilling rig will be able to gain sufficient data in regard to the near surface soils. Moreover, such equipment should be able to undertake Standard Penetration Testing (SPT) and/or Dynamic Probing. However, if significant thicknesses of made ground are revealed, then cable percussive boreholes and rotary coring may be required for foundation design.



Soakaway Design

Should soakaway data be required for drainage design, trial pits could be excavated and infiltration tests conducted. Alternatively these tests could be undertaken within boreholes.

Geotechnical Testing

An allowance for geotechnical testing of the soils should be included in any ground investigation.

Rock Slope Stability

A suitably qualified person should undertake a stability assessment of the back quarry wall which forms the southern boundary of the site.

5.2.3 Reporting

The above data will need to be formulated into a formal assessment that should include the following:

- Geotechnical recommendations, particularly if existing loads are to increase.
- Contamination assessment.
- Contamination remediation strategy.
- Any recommendations for further work, if required and including validation reports where site remediation is necessary.

5.2.4 Shallow Coal Investigation

A Coal Authority Permit should be sought and rotary drilling should be undertaken to prove/disprove the presence of illicit coal workings. A suitable scope of works was outlined within section 3 of this report, although the efficacy of this approach should be discussed with the Coal and Local Authorities.

As soon as is practicable, and prior to the above, this Phase 1 report should be forwarded to the relevant authorities, in order to ensure they have sufficient time to review and discuss any issues.

6. References

- British Standards Institution (2015), BS5930: *Code of practice for site investigations*, B.S.I., London.
- British Standards Institution (2011) +A2:2017, BS 10175: *Investigation of potentially contaminated sites – Code of Practice*, British Standards Institute.
- British Standards Institution (2013), BS 8576 *Guidance on Investigations for Ground Gas – Permanent Gases and Volatile Organic Compounds*.



- Department for Environment, Food and Rural Affairs and the Environment Agency, DEFRA R&D Publications, Environment Agency, Bristol.
- CLR 2, 1994, *Guidance on preliminary site inspection of contaminated land*, Volume 1.
- CLR 4, 1994, *Sampling Strategies for contaminated land*.
- R&D Publication 66: 2008 Guidance for the Safe Development of Housing on Land Affected by Contamination.
- CIRIA Report C665 (2007), *Assessing risks posed by ground gasses in buildings*.
- The Environment Agency: Groundwater source protection.



Appendix 1

Groundsure Reports

Rogers Geotechnical Services
Barncliffe Mills, NEAR BANK,
HUDDERSFIELD, HD8 8LU

Groundsure Reference: GS-6021182
Your Reference: J4708_19_E_PO-0115
Report Date: 13 May 2019
Report Delivery Method: Email - pdf

Geo Insight

Address: WINDMILL HILL QUARRY, BRIERLEY ROAD, GRIMETHORPE, BARNSELY, S72 7AW

Dear Sir/ Madam,

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

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

Yours faithfully,



Managing Director
Groundsure Limited

Enc.
Groundsure Geo Insight

Address: WINDMILL HILL QUARRY, BRIERLEY ROAD, GRIMETHORPE,
BARNSELY, S72 7AW

Date: 13 May 2019

Reference: GS-6021182

Client: Rogers Geotechnical Services

NW N NE

W E



SW S SE

Aerial Photograph Capture date: 26-Mar-2012
Grid Reference: 441061,410162
Site Size: 0.3171ha

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Overview of Findings

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

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

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

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

Section 2: Geology 1:50,000 Scale

2.3 Bedrock, Solid Geology and linear features

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

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

Yes

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

Yes

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

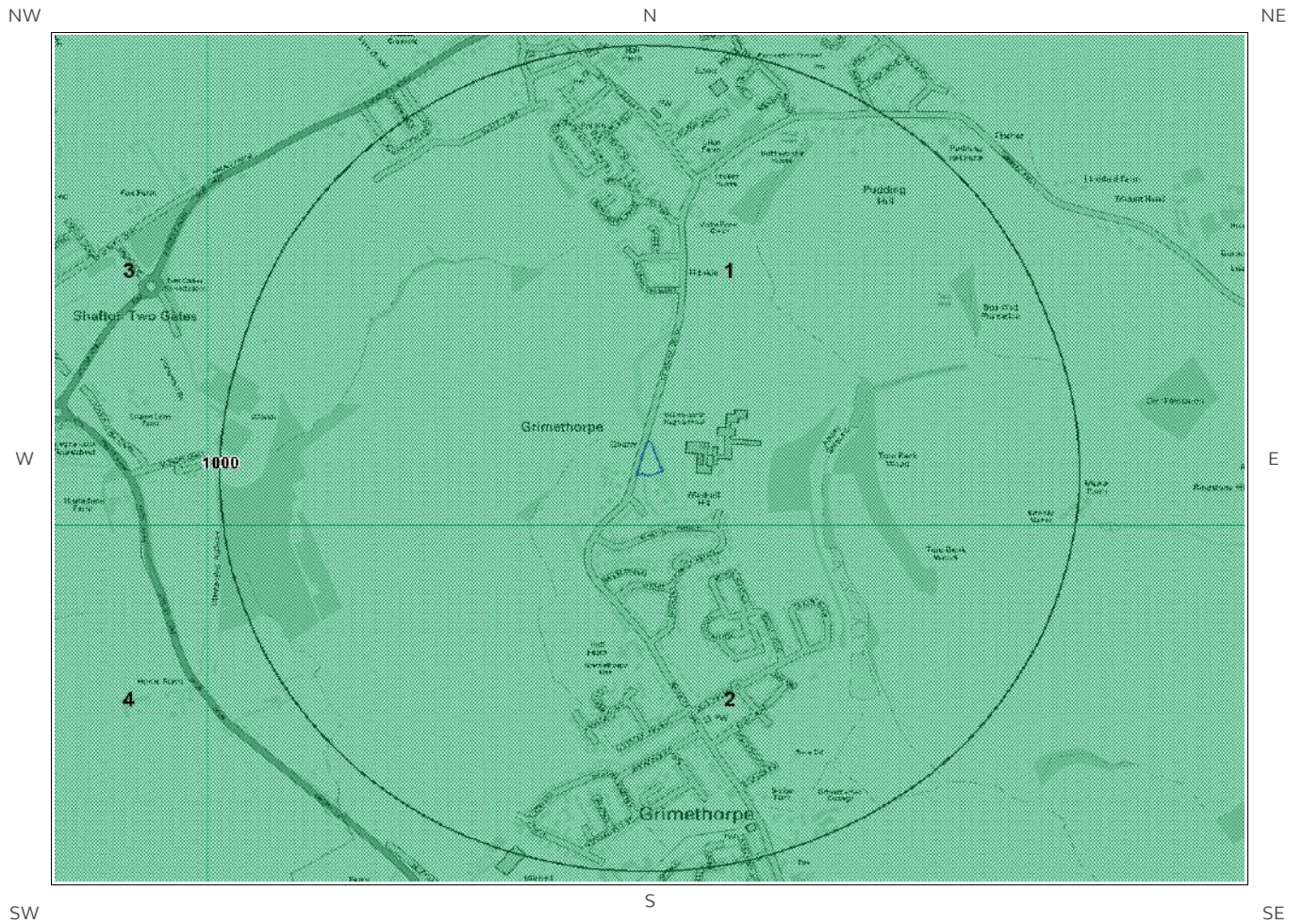
	On-site	0-50m	51-250	251-500	501-1000
4.1 Historical Surface Ground Working Features from Small Scale Mapping	12	0	5	Not Searched	Not Searched
4.2 Historical Underground Workings from Small Scale Mapping	0	0	0	1	1
4.3 Current Ground Workings	1	0	0	0	2

Section 5: Mining, Extraction & Natural Cavities

	On-site	0-50m	51-250	251-500	501-1000
5.1 Historical Mining	0	0	0	1	1
5.2 Coal Mining	1	0	0	0	0
5.3 Johnson Poole and Bloomer Mining Area	0	0	0	0	0
5.4 Non-Coal Mining*	1	0	1	1	4
5.5 Non-Coal Mining Cavities	0	0	0	0	0
5.5 Natural Cavities	0	0	0	0	0

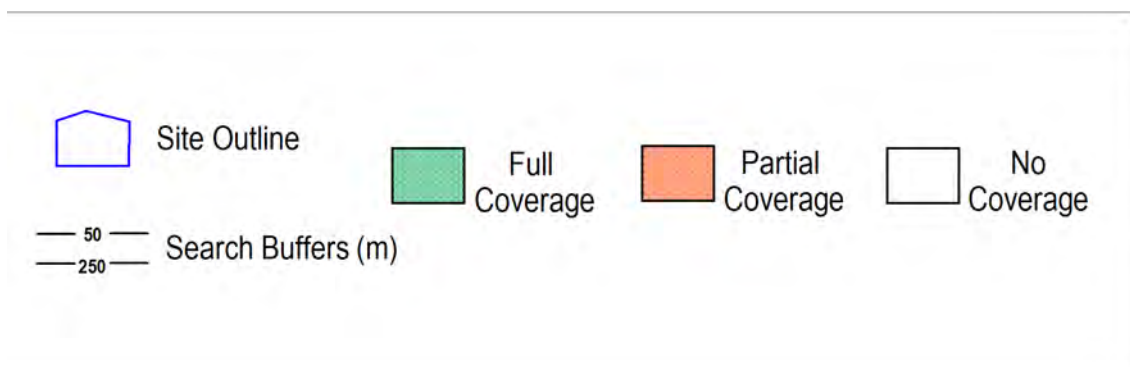
Section 5: Mining, Extraction & Natural Cavities	On-site	0-50m	51-250	251-500	501-1000
5.6 Brine Extraction	0	0	0	0	0
5.7 Gypsum Extraction	0	0	0	0	0
5.8 Tin Mining	0	0	0	0	0
5.9 Clay Mining	0	0	0	0	0
Section 6: Natural Ground Subsidence	On-site				
6.1 Shrink-Swell Clay	Very Low				
6.2 Landslides	Very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

1:10,000 Scale Availability



1_10,000 Availability Legend

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Availability of 1:10,000 Scale Geology Mapping

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

ID	Distance	Artificial Coverage	Superficial Coverage	Bedrock Coverage	Mass Movement Coverage
1	0.0	Some deposits are mapped	Full	Full	Some deposits are mapped
2	123.0	Some deposits are mapped	Full	Full	No coverage
3	1029.0	Some deposits are mapped	Full	Full	No coverage
4	1037.0	Some deposits are mapped	Full	Full	No coverage

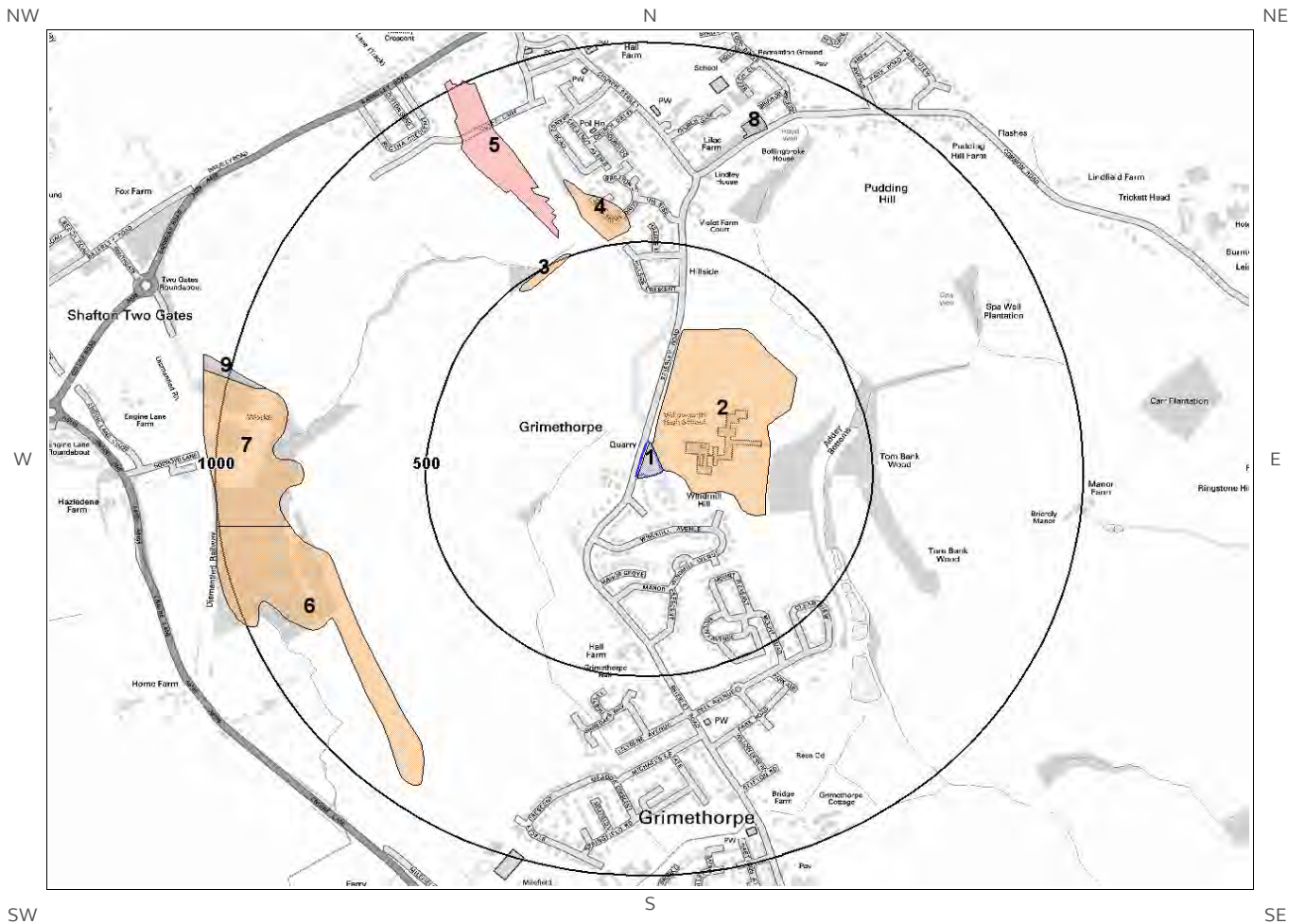
Guidance: The 1:10,000 scale geological interpretation is the most detailed generally available from BGS and is the scale at which most geological surveying is carried out in the field. The database is presented as four types of geology (artificial, mass movement, superficial and bedrock), although not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

The definitions of coverage are as follows:

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

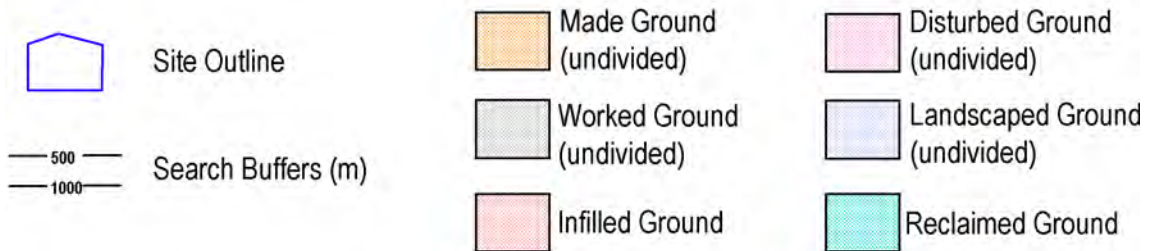
1 Geology (1:10,000 scale).

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



Artificial Ground Legend

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1. Geology 1:10,000 scale

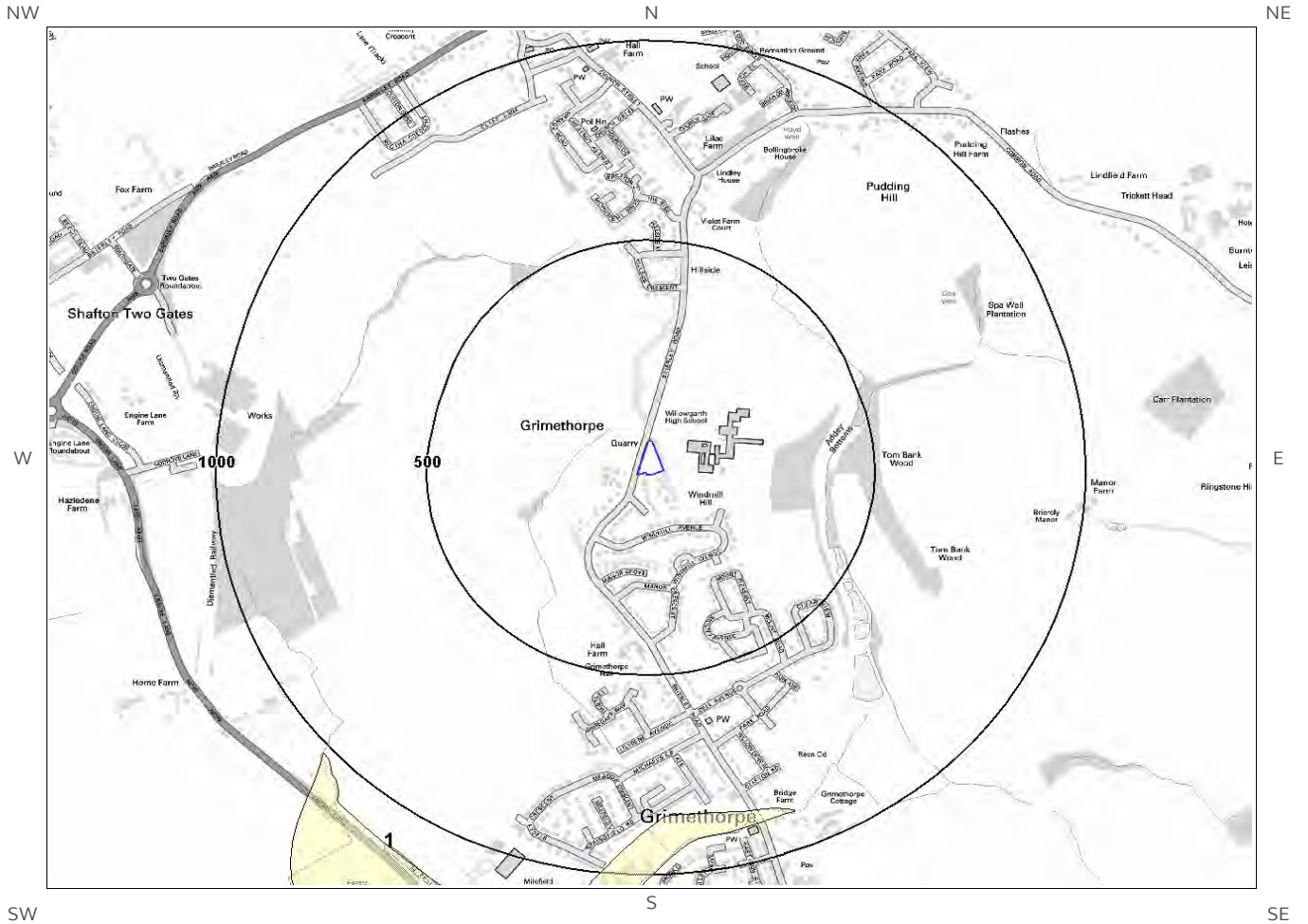
1.1 Artificial Ground

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

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




ID	Distance	Direction	LEX Code	Description	Rock Description
1	0.0	On Site	WGR-VOID	Worked Ground (Undivided)	Void
2	1.0	E	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
3	473.0	NW	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)

1.2 Superficial Deposits and Landslips

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

1.2.1 Superficial Deposits/ Drift Geology

Are there any records of Superficial Deposits/ Drift Geology within 500m of the study site boundary at 1:10,000 scale? No

Database searched and no data found.

1.2.2 Landslip

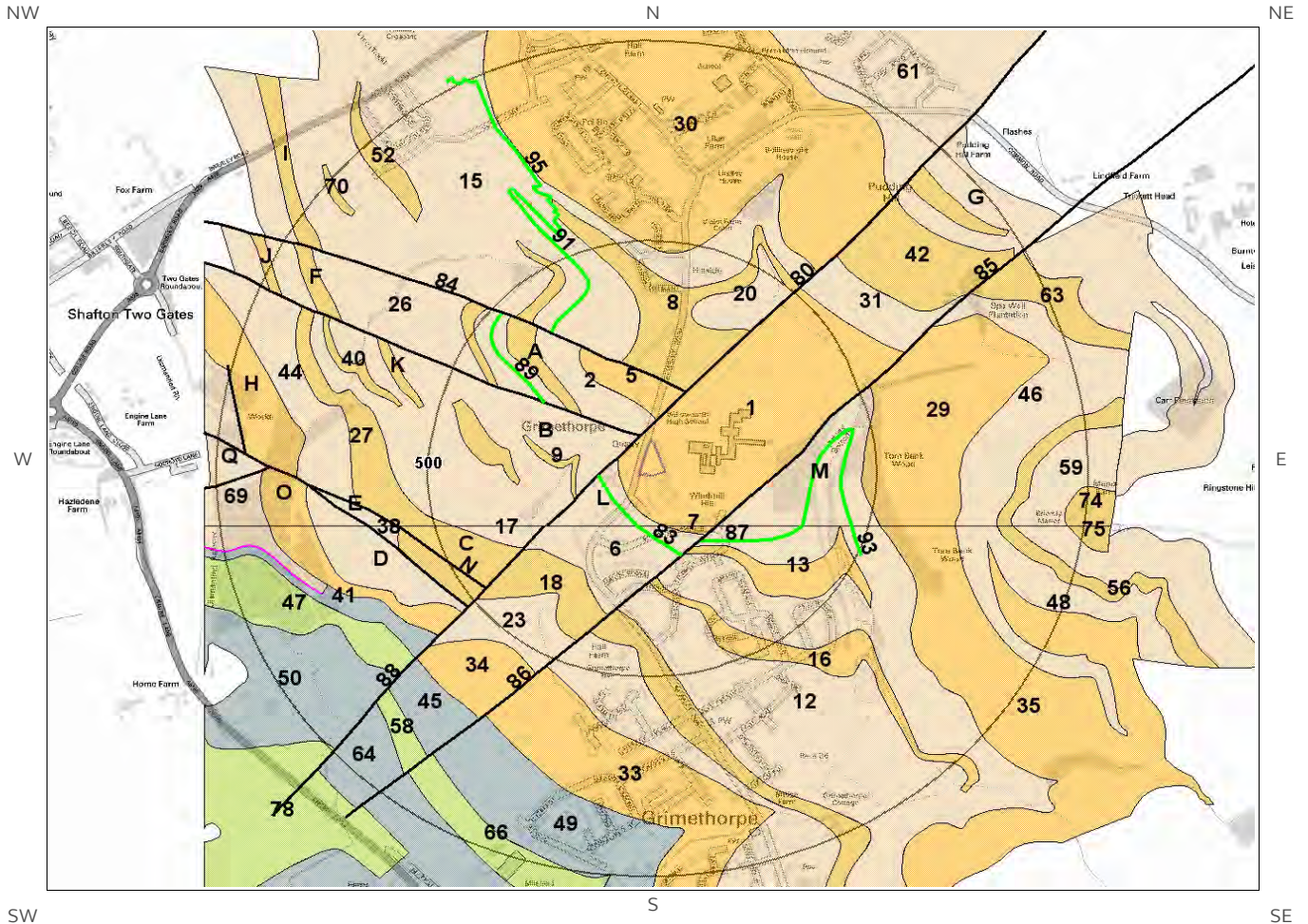
Are there any records of Landslip within 500m of the study site boundary at 1:10,000 scale? No

Database searched and no data found.

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

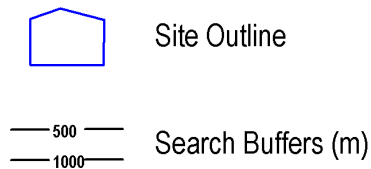
This Geology shows the main components as discrete layers, these are: Artificial / Made Ground, Superficial / Drift Geology and Landslips. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

1.3 Bedrock and linear features map (1:10,000 scale)



Bedrock and linear features Legend

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1.3 Bedrock and linear features

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

1.3.1 Bedrock/ Solid Geology

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

ID	Distance (m)	Direction	LEX Code	Description	Rock Age
1	0.0	On Site	BYR-SDST	Brierley Rock - Sandstone	Bolsovian Sub-age
2	26.0	NW	PUCM-MDSS	Pennine Upper Coal Measures Formation - Mudstone, Siltstone And Sandstone	Westphalian D Sub-age - Bolsovian Sub-age
3B	26.0	NW	PUCM-MDSS	Pennine Upper Coal Measures Formation - Mudstone, Siltstone And Sandstone	Westphalian D Sub-age - Bolsovian Sub-age
4L	45.0	W	PUCM-MDSS	Pennine Upper Coal Measures Formation - Mudstone, Siltstone And Sandstone	Westphalian D Sub-age - Bolsovian Sub-age
5	52.0	N	BYR-SDST	Brierley Rock - Sandstone	Bolsovian Sub-age
6	123.0	S	PUCM-MDSS	Pennine Upper Coal Measures Formation - Mudstone, Siltstone And Sandstone	Westphalian D Sub-age - Bolsovian Sub-age
7	126.0	S	BYR-SDST	Brierley Rock - Sandstone	Bolsovian Sub-age
8	145.0	NE	PUCM-SDST	Pennine Upper Coal Measures Formation - Sandstone	Westphalian D Sub-age - Bolsovian Sub-age
9	147.0	W	PUCM-SDST	Pennine Upper Coal Measures Formation - Sandstone	Westphalian D Sub-age - Bolsovian Sub-age
10A	171.0	NW	PUCM-SDST	Pennine Upper Coal Measures Formation - Sandstone	Westphalian D Sub-age - Bolsovian Sub-age
11M	182.0	SE	PUCM-MDSS	Pennine Upper Coal Measures Formation - Mudstone, Siltstone And Sandstone	Westphalian D Sub-age - Bolsovian Sub-age
12	182.0	SE	PUCM-MDSS	Pennine Upper Coal Measures Formation - Mudstone, Siltstone And Sandstone	Westphalian D Sub-age - Bolsovian Sub-age
13	196.0	S	NEWR-SDST	Newstead Rock - Sandstone	Bolsovian Sub-age
14A	205.0	W	PUCM-MDSS	Pennine Upper Coal Measures Formation - Mudstone, Siltstone And Sandstone	Westphalian D Sub-age - Bolsovian Sub-age
15	207.0	N	PUCM-MDSS	Pennine Upper Coal Measures Formation - Mudstone, Siltstone And Sandstone	Westphalian D Sub-age - Bolsovian Sub-age
16	251.0	S	NEWR-SDST	Newstead Rock - Sandstone	Bolsovian Sub-age
17	256.0	SW	PUCM-MDSS	Pennine Upper Coal Measures Formation - Mudstone, Siltstone And Sandstone	Westphalian D Sub-age - Bolsovian Sub-age
18	269.0	SW	PUCM-SDST	Pennine Upper Coal Measures Formation - Sandstone	Westphalian D Sub-age - Bolsovian Sub-age
19B	282.0	W	PUCM-SDST	Pennine Upper Coal Measures Formation - Sandstone	Westphalian D Sub-age - Bolsovian Sub-age
20	310.0	NE	PUCM-MDSS	Pennine Upper Coal Measures Formation - Mudstone, Siltstone And Sandstone	Westphalian D Sub-age - Bolsovian Sub-age
21C	324.0	SW	PUCM-SDST	Pennine Upper Coal Measures Formation - Sandstone	Westphalian D Sub-age - Bolsovian Sub-age
22	338.0	S	PUCM-SDST	Pennine Upper Coal Measures Formation - Sandstone	Westphalian D Sub-age - Bolsovian Sub-age

ID	Distance (m)	Direction	LEX Code	Description	Rock Age
23	352.0	SW	PUCM-MDSS	Pennine Upper Coal Measures Formation - Mudstone, Siltstone And Sandstone	Westphalian D Sub-age - Bolsovia Sub-age
24	383.0	W	PUCM-SDST	Pennine Upper Coal Measures Formation - Sandstone	Westphalian D Sub-age - Bolsovia Sub-age
25	404.0	NW	PUCM-SDST	Pennine Upper Coal Measures Formation - Sandstone	Westphalian D Sub-age - Bolsovia Sub-age
26	407.0	W	PUCM-MDSS	Pennine Upper Coal Measures Formation - Mudstone, Siltstone And Sandstone	Westphalian D Sub-age - Bolsovia Sub-age
27	458.0	W	PUCM-SDST	Pennine Upper Coal Measures Formation - Sandstone	Westphalian D Sub-age - Bolsovia Sub-age
28C	458.0	SW	PUCM-SDST	Pennine Upper Coal Measures Formation - Sandstone	Westphalian D Sub-age - Bolsovia Sub-age
29	464.0	E	BYR-SDST	Brierley Rock - Sandstone	Bolsovia Sub-age
30	471.0	N	BYR-SDST	Brierley Rock - Sandstone	Bolsovia Sub-age

1.3.2 Linear features

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

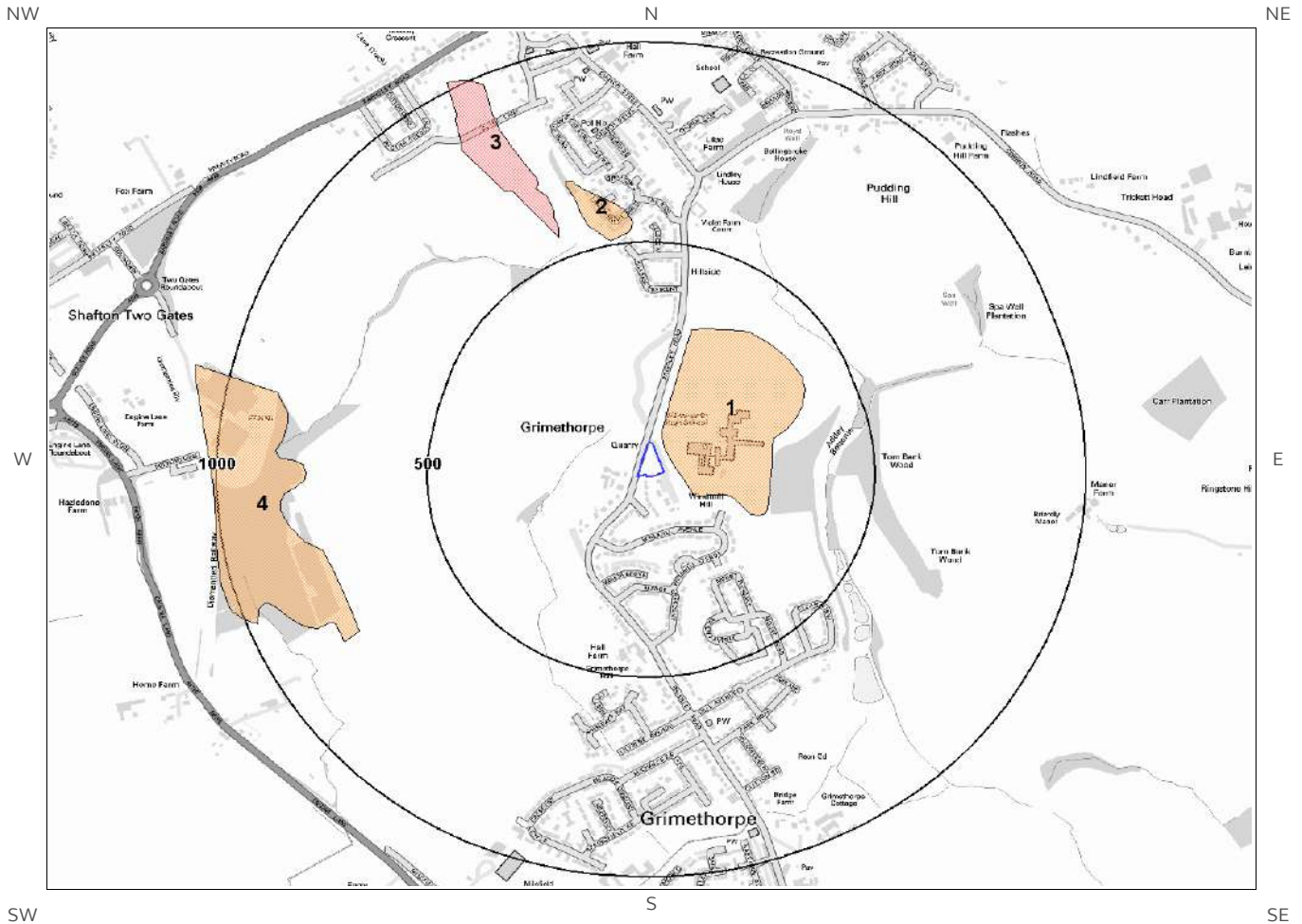
ID	Distance (m)	Direction	Category Description	Feature Description
80	26.0	NW	FAULT	Normal fault, inferred
81K	26.0	NW	FAULT	Normal fault, inferred
82L	84.0	SW	ROCK	Coal seam, inferred
83	125.0	S	ROCK	Coal seam, inferred
84	145.0	NE	FAULT	Normal fault, inferred
85	182.0	SE	FAULT	Normal fault, inferred
86	182.0	SE	FAULT	Normal fault, inferred
87	190.0	SE	ROCK	Coal seam, inferred
88	256.0	SW	FAULT	Normal fault, inferred
89	267.0	W	ROCK	Coal seam, inferred
90M	345.0	E	ROCK	Coal seam, inferred
91	360.0	NW	ROCK	Coal seam, inferred
92N	458.0	SW	FAULT	Normal fault, inferred
93	460.0	E	ROCK	Coal seam, inferred

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.

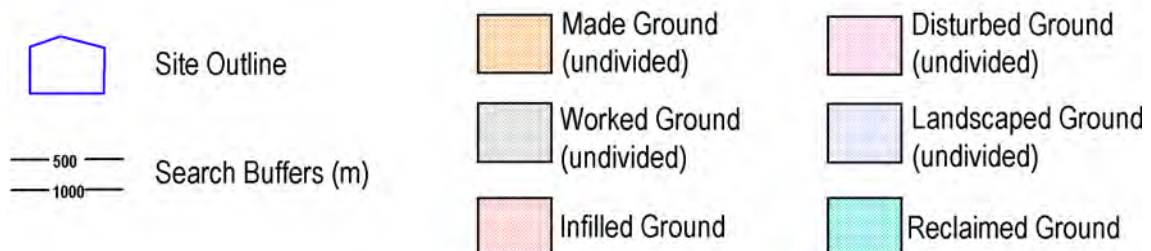
This Geology shows the main components as discrete layers, these are: Bedrock/ Solid Geology and linear features such as faults. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

2 Geology 1:50,000 Scale

2.1 Artificial Ground map



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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: 087

2.1.1 Artificial/ Made Ground

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

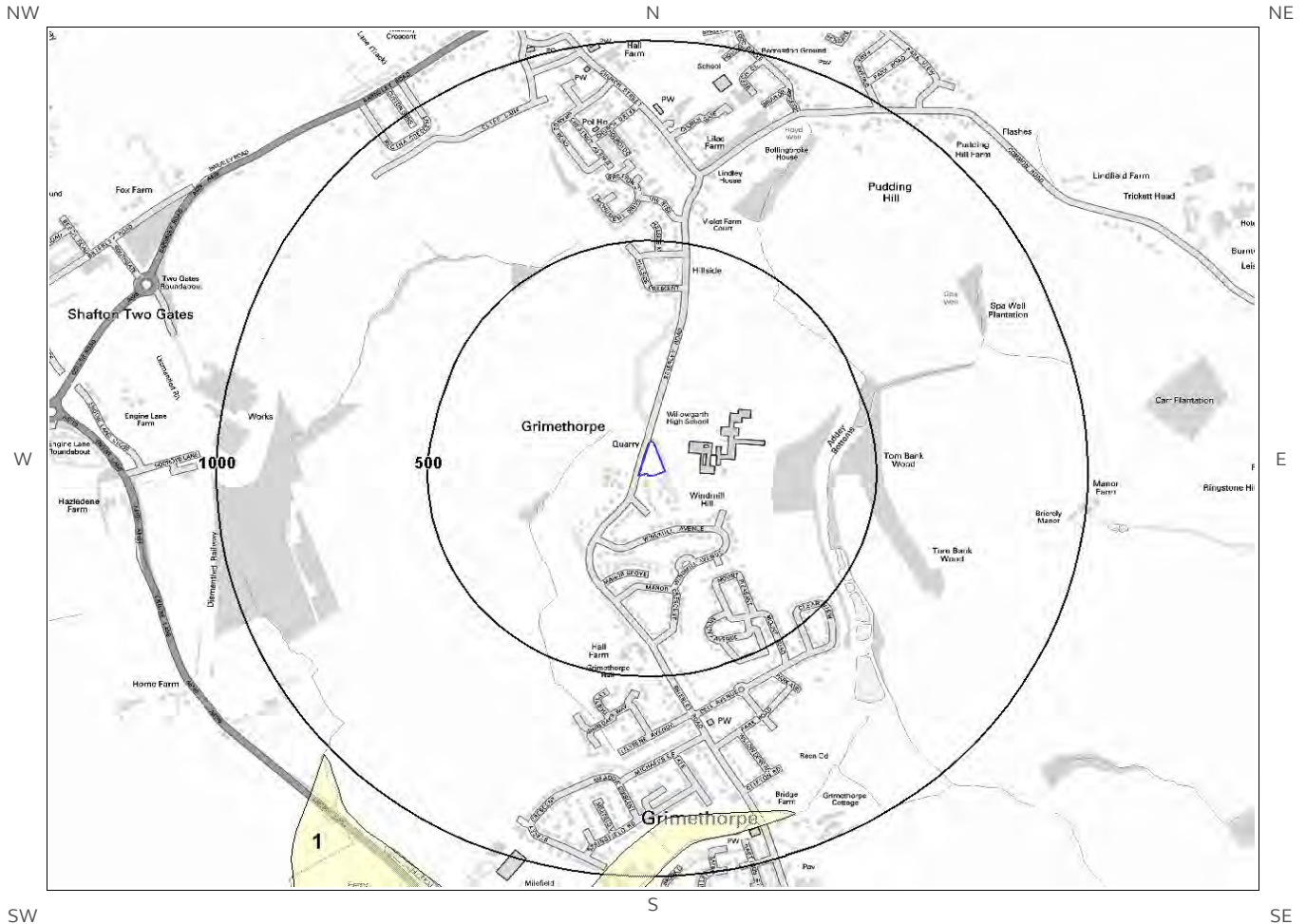
ID	Distance (m)	Direction	LEX Code	Description	Rock Description
1	21.0	E	MGR-ARTDP	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT

2.1.2 Permeability of Artificial Ground

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

Distance (m)	Direction	Flow Type	Maximum Permeability	Minimum Permeability
21.0	E	Mixed	Very High	Low

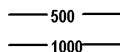
2.2 Superficial Deposits and Landslips map (1:50,000 scale)



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Site Outline



500
1000
Search Buffers (m)

2.2 Superficial Deposits and Landslips

2.2.1 Superficial Deposits/ Drift Geology

Are there any records of Superficial Deposits/ Drift Geology within 500m of the study site boundary? No

Database searched and no data found.

2.2.2 Permeability of Superficial Ground

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

Database searched and no data found.

2.2.3 Landslip

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

Database searched and no data found.

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

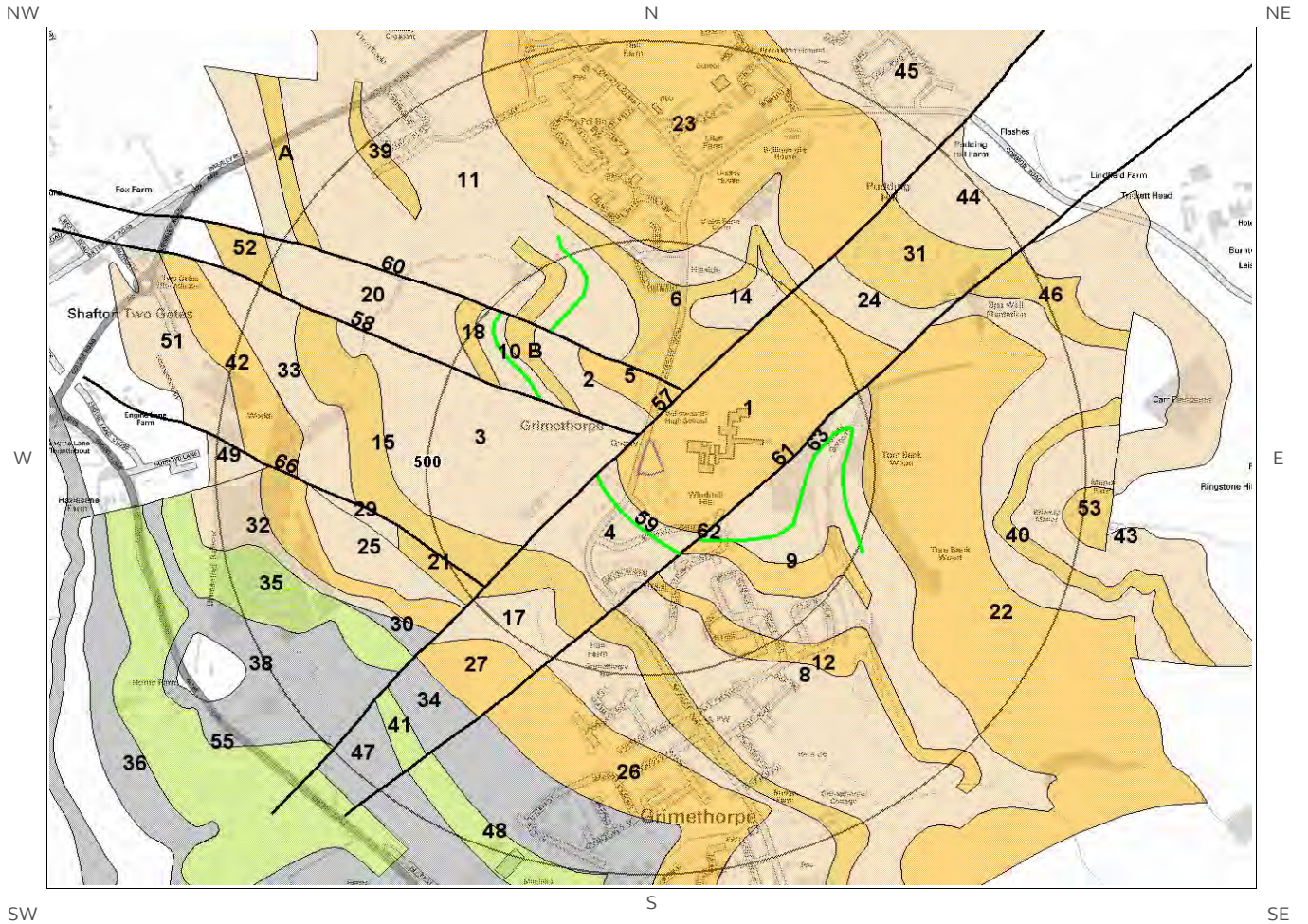
This Geology shows the main components as discrete layers, there are: Artificial/ Made Ground, Superficial/ Drift Geology and Landslips. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

2.2.4 Landslip Permeability

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

Database searched and no data found.

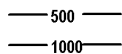
2.3 Bedrock and linear features map (1:50,000 scale)



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Site Outline



Search Buffers (m)

2.3 Bedrock, Solid Geology & linear features

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No: 087

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	BYR-SDST	BRIERLEY ROCK - SANDSTONE	WESTPHALIAN
2	26.0	NW	PUCM-MDSS	PENNINE UPPER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
3	26.0	NW	PUCM-MDSS	PENNINE UPPER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
4	44.0	W	PUCM-MDSS	PENNINE UPPER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
5	52.0	N	BYR-SDST	BRIERLEY ROCK - SANDSTONE	WESTPHALIAN
6	145.0	NE	PUCM-SDST	PENNINE UPPER COAL MEASURES FORMATION - SANDSTONE	WESTPHALIAN
7B	172.0	NW	PUCM-SDST	PENNINE UPPER COAL MEASURES FORMATION - SANDSTONE	WESTPHALIAN
8	182.0	SE	PUCM-MDSS	PENNINE UPPER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
9	190.0	SE	NEWR-SDST	NEWSTEAD ROCK - SANDSTONE	WESTPHALIAN
10	205.0	W	PUCM-MDSS	PENNINE UPPER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
11	207.0	N	PUCM-MDSS	PENNINE UPPER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
12	244.0	S	NEWR-SDST	NEWSTEAD ROCK - SANDSTONE	WESTPHALIAN
13	273.0	SW	PUCM-SDST	PENNINE UPPER COAL MEASURES FORMATION - SANDSTONE	WESTPHALIAN
14	311.0	N	PUCM-MDSS	PENNINE UPPER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
15	324.0	SW	PUCM-SDST	PENNINE UPPER COAL MEASURES FORMATION - SANDSTONE	WESTPHALIAN
16	339.0	S	PUCM-SDST	PENNINE UPPER COAL MEASURES FORMATION - SANDSTONE	WESTPHALIAN
17	352.0	SW	PUCM-MDSS	PENNINE UPPER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
18	372.0	W	PUCM-SDST	PENNINE UPPER COAL MEASURES FORMATION - SANDSTONE	WESTPHALIAN
19C	404.0	NW	PUCM-SDST	PENNINE UPPER COAL MEASURES FORMATION - SANDSTONE	WESTPHALIAN
20	424.0	W	PUCM-MDSS	PENNINE UPPER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN

ID	Distance	Direction	LEX Code	Rock Description	Rock Age
21	458.0	SW	PUCM-SDST	PENNINE UPPER COAL MEASURES FORMATION - SANDSTONE	WESTPHALIAN
22	470.0	E	BYR-SDST	BRIERLEY ROCK - SANDSTONE	WESTPHALIAN
23	472.0	N	BYR-SDST	BRIERLEY ROCK - SANDSTONE	WESTPHALIAN

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	Fracture	High	Moderate
26.0	NW	Fracture	Moderate	Low

2.3.3 Linear features

Are there any records of linear features within 500m of the study site boundary? Yes

ID	Distance	Direction	Category Description	Feature Description
57	26.0	NW	FAULT	Fault, inferred
58	26.0	NW	FAULT	Fault, inferred
59	86.0	SW	ROCK	Coal seam, inferred
60	145.0	NE	FAULT	Fault, inferred
61	182.0	SE	FAULT	Fault, inferred
62	190.0	SE	ROCK	Coal seam, inferred
63	239.0	SE	ROCK	Coal seam, inferred
64B	274.0	W	ROCK	Coal seam, inferred
65C	360.0	NW	ROCK	Coal seam, inferred
66	458.0	SW	FAULT	Fault, inferred

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

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

3 Radon Data

3.1 Radon Affected Areas

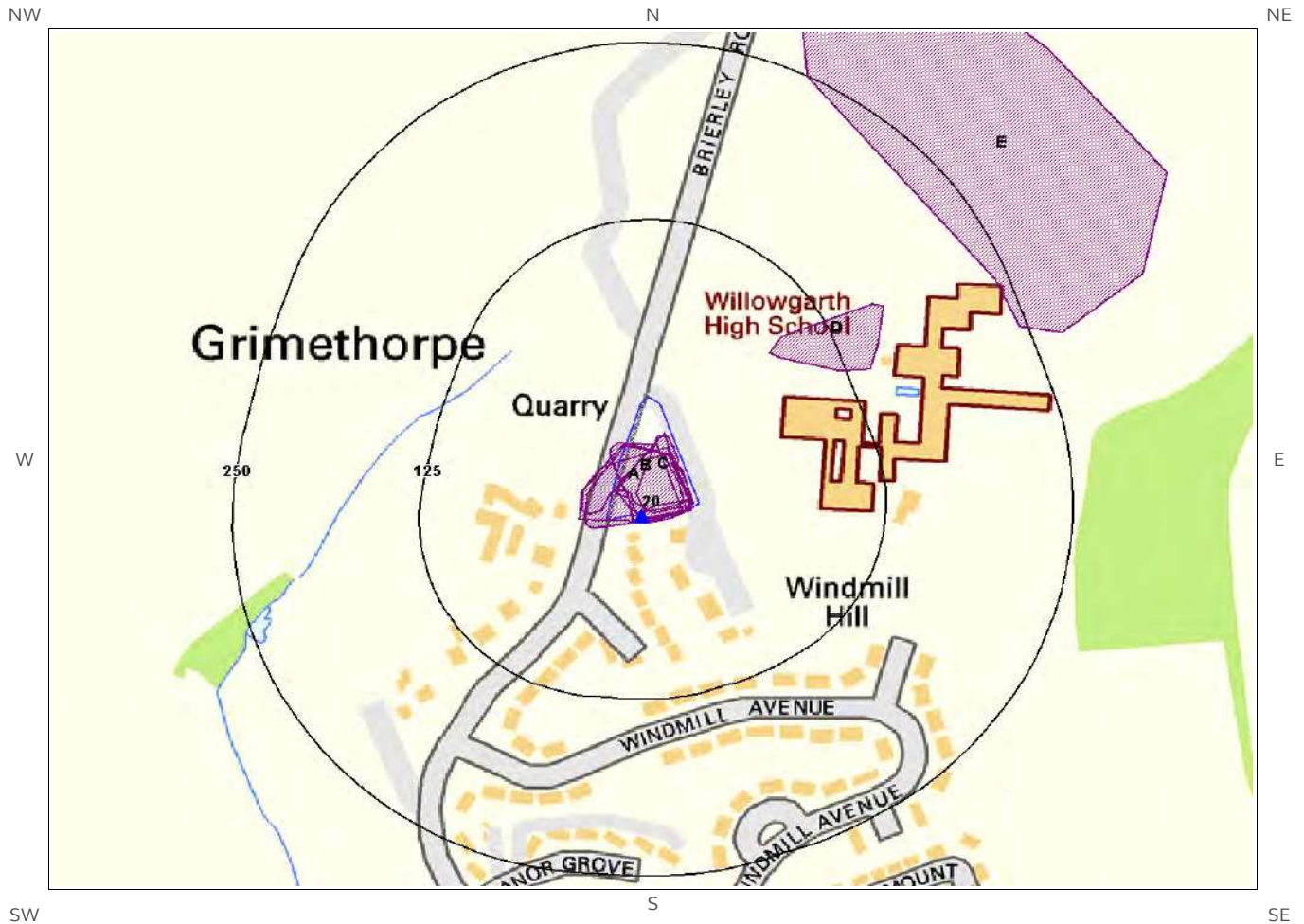
Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level? The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.

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

3.2 Radon Protection



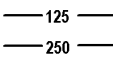


Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment? No radon protective measures are necessary.

4 Ground Workings map



Ground Workings Legend

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

4 Ground Workings

4.1 Historical Surface Ground Working Features derived from Historical Mapping

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

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

ID	Distance (m)	Direction	NGR	Use	Date
1A	0.0	On Site	441057 410147	Unspecified Disused Quarry	1938
2B	0.0	On Site	441056 410152	Sandstone Quarry	1854
3A	0.0	On Site	441050 410152	Unspecified Quarry	1904
4B	0.0	On Site	441062 410157	Unspecified Disused Quarry	1951
5C	0.0	On Site	441068 410170	Unspecified Disused Quarry	1982
6C	0.0	On Site	441068 410170	Unspecified Disused Quarry	1988
7A	0.0	On Site	441051 410148	Unspecified Disused Quarry	1930
8A	0.0	On Site	441051 410148	Unspecified Disused Quarry	1930
9C	0.0	On Site	441061 410148	Unspecified Disused Quarry	1948
10C	0.0	On Site	441056 410152	Sandstone Quarry	1854
11A	0.0	On Site	441051 410148	Unspecified Disused Quarry	1930
12A	0.0	On Site	441051 410148	Unspecified Disused Quarry	1930
13D	82.0	NE	441207 410253	Unspecified Heap	1988
14D	82.0	NE	441207 410253	Unspecified Disused Quarry	1967
15D	82.0	NE	441207 410253	Unspecified Heap	1982
16E	227.0	NE	441282 410379	Unspecified Ground Workings	1982
17E	227.0	NE	441282 410379	Unspecified Ground Workings	1988

4.2 Historical Underground Working Features derived from Historical Mapping

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

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

The following Historical Underground Working Features are provided by Groundsure:

ID	Distance (m)	Direction	NGR	Use	Date
Not shown	499.0	N	441006 410816	Colliery	1948
Not shown	502.0	N	440990 410820	Disused Colliery	1951

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:

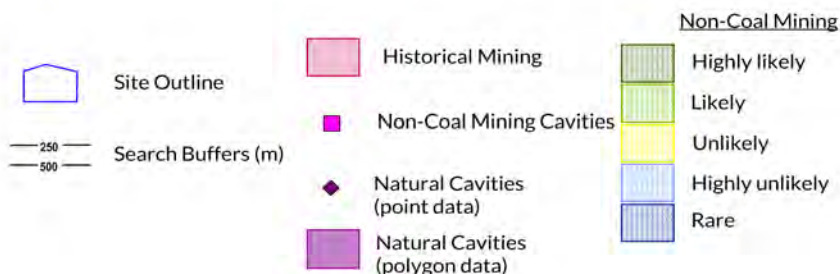
ID	Distance (m)	Direction	NGR	Commodity Produced	Pit Name	Type of working	Status
20	0.0	On Site	441053 410127	Sandstone	Windmill Hill	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	634.0	N	441012 410844	Coal, Deep	Brierley Colliery	Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots)	Ceased
Not shown	686.0	SE	441724 409870	Sandstone	Tom Bank Wood	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? Yes

The following Historical Mining information is provided by Groundsure:

ID	Distance (m)	Direction	NGR	Details	Date
8	499.0	N	441006 410816	Colliery	1948
9	502.0	N	440990 410820	Disused Colliery	1951

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? Yes

The following Coal Mining information provided by the Coal Authority is not represented on Mapping:

Distance (m)	Direction	Details
0.0	On Site	The study site is located within the specified search distance of an identified mining area. Further details concerning this can be obtained from the Coal Authority Helpline on 0845 762 6848.

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? Yes

The following non-coal mining information is provided by the BGS:

ID	Distance (m)	Direction	Name	Commodity	Assessment of likelihood
1	0.0	On Site	Sheffield Area	Iron Ore	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
2	123.0	S	Sheffield Area	Iron Ore	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
3	444.0	E	Sheffield Area	Iron Ore	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
4	774.0	SW	Not available	Iron Ore (Bedded)	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
Not shown	791.0	W	Not available	Iron Ore (Bedded)	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
Not shown	839.0	W	Not available	Iron Ore (Bedded)	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
Not shown	870.0	W	Not available	Iron Ore (Bedded)	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered

5.5 Non-Coal Mining Cavities

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

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

Database searched and no data found.

5.6 Natural Cavities

This dataset provides information based on the Peter Brett Associates natural cavities database. The dataset is made up of points and polygons. Where polygons are used these represent an area in which it is expected the cavities could be found. It does not indicate that cavities are present everywhere within the polygon, and caution should be used in the interpretation of this data.

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

Database searched and no data found.

5.7 Brine Extraction

This data provides information from the Cheshire Brine Subsidence Compensation Board.

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

Database searched and no data found.

5.8 Gypsum Extraction

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

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

Database searched and no data found.

5.9 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

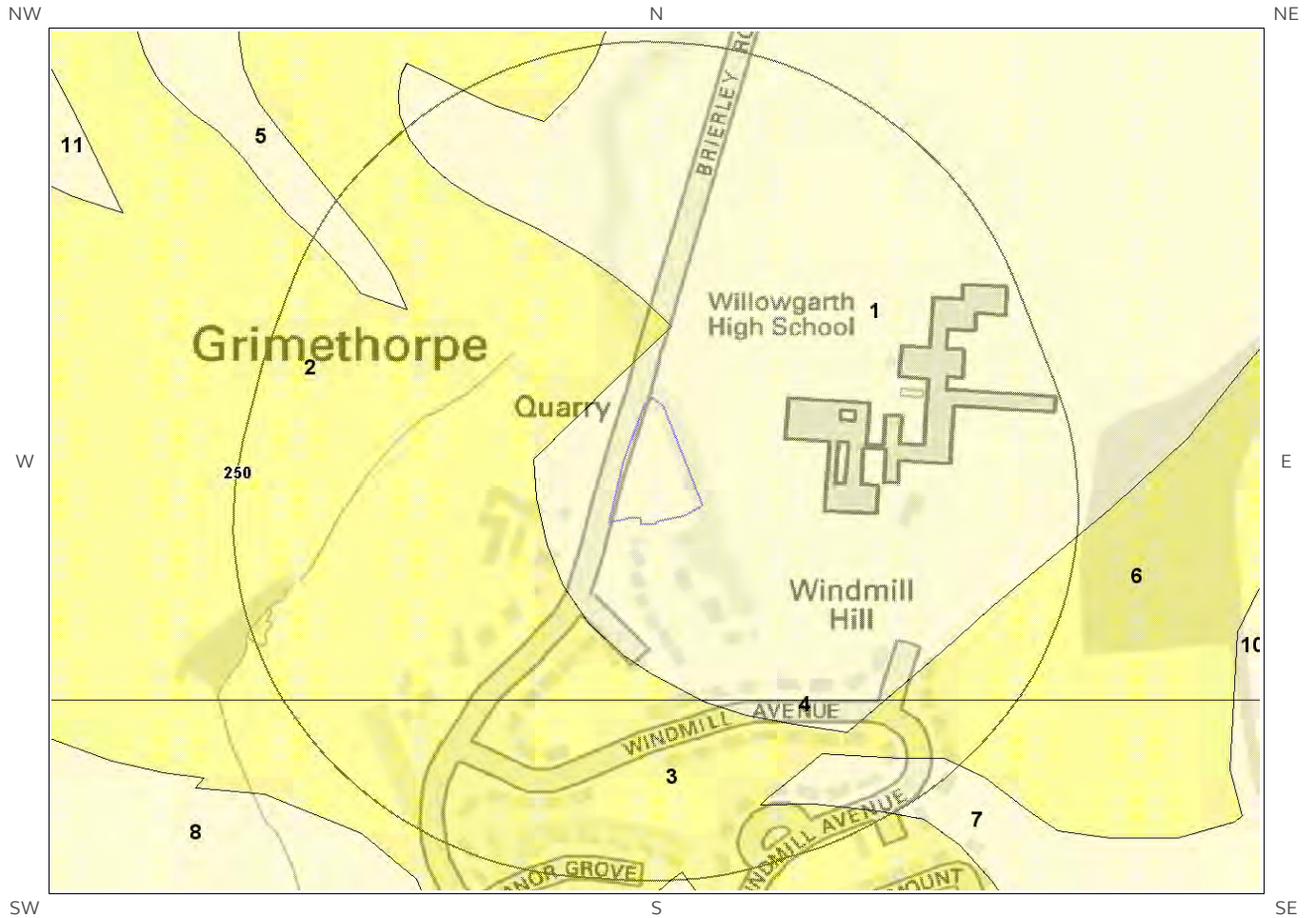
This dataset provides information on Kaolin and Ball Clay mining from relevant mining records.

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

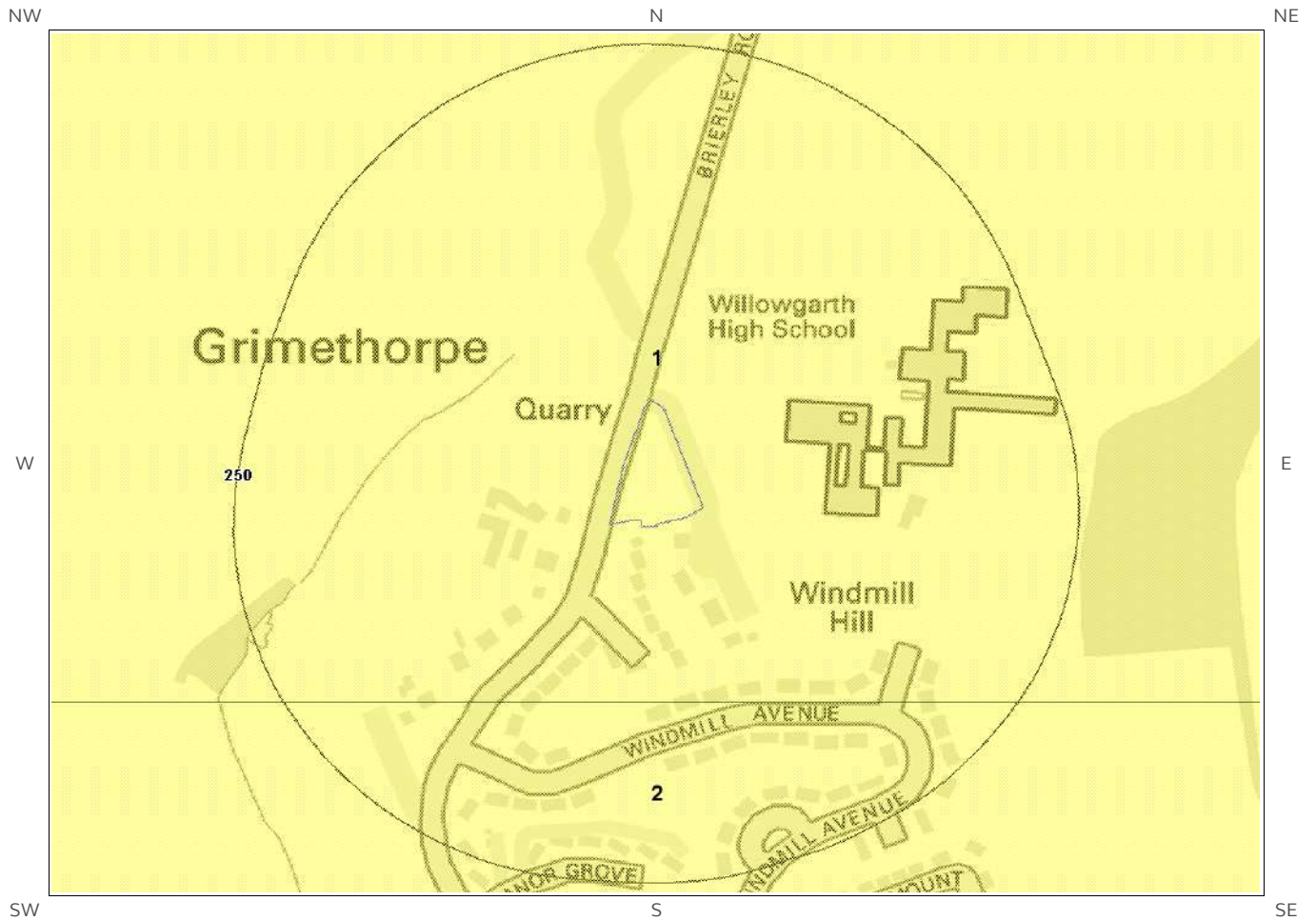


Shrink Swell Clay Legend

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6.2 Landslides map

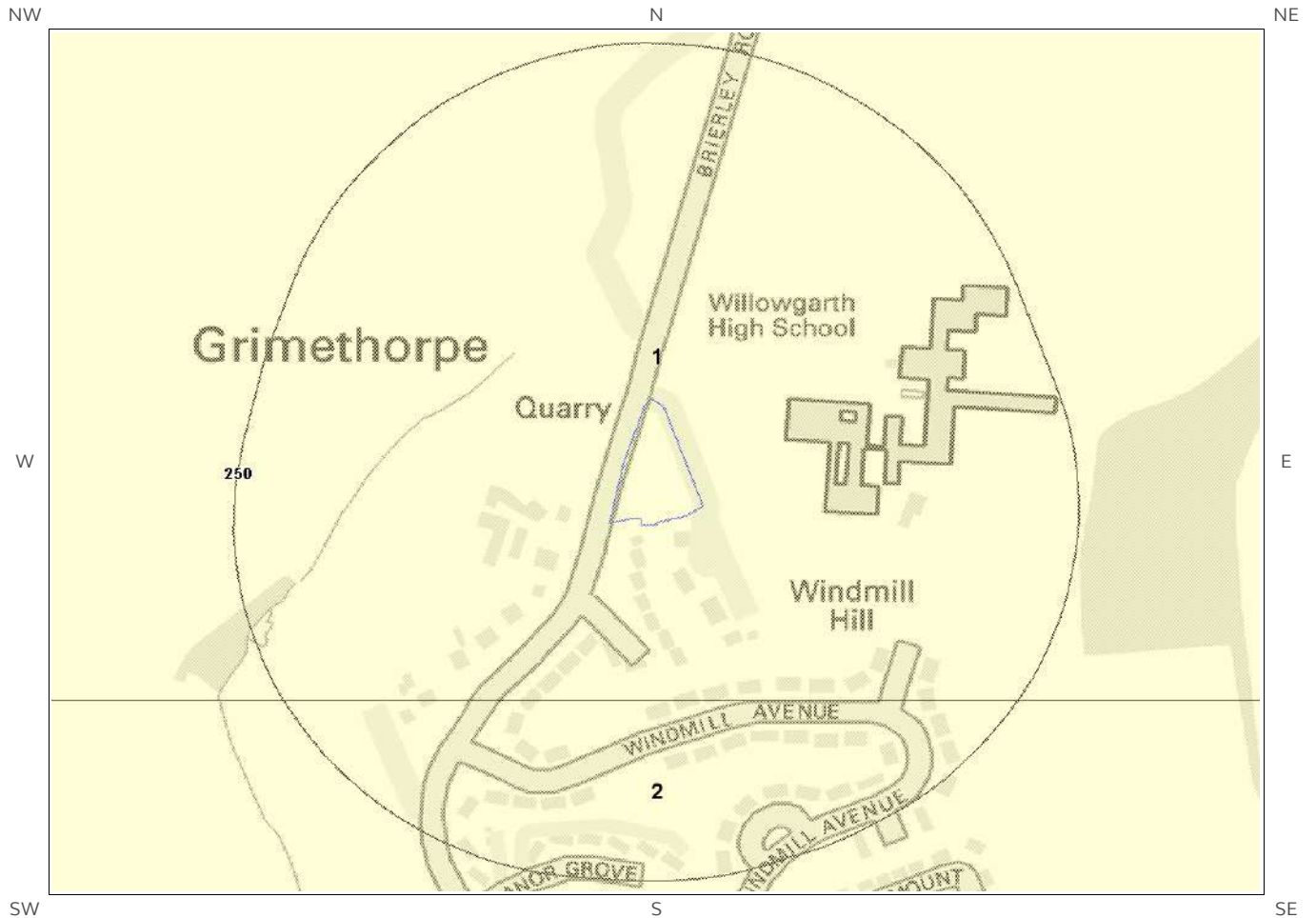


Landslides Legend

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6.3 Ground Dissolution of Soluble Rocks map

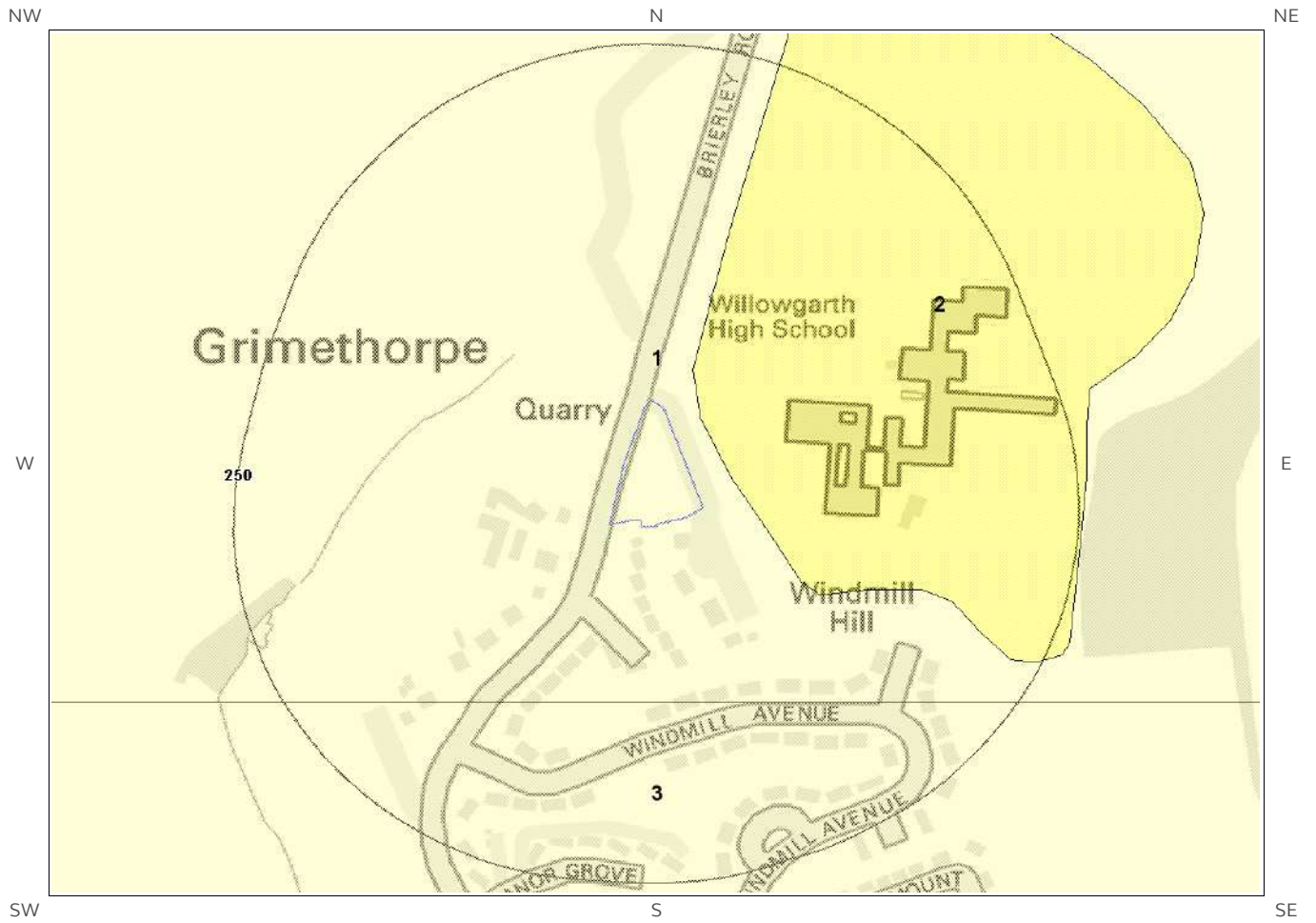


**Ground Dissolution
Soluble Rocks Legend**

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6.4 Compressible Deposits map

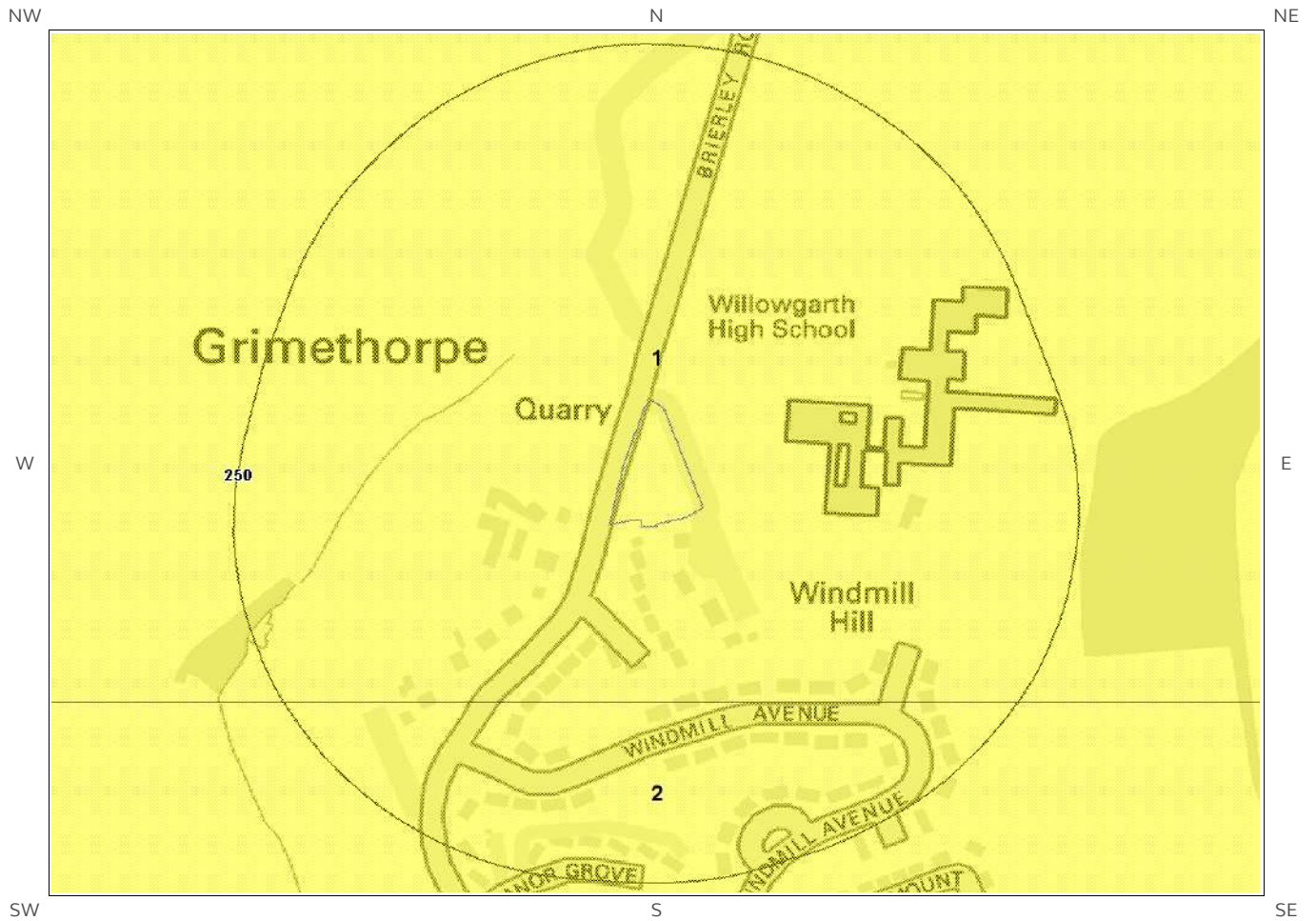


Compressible Deposits Legend

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6.5 Collapsible Deposits map

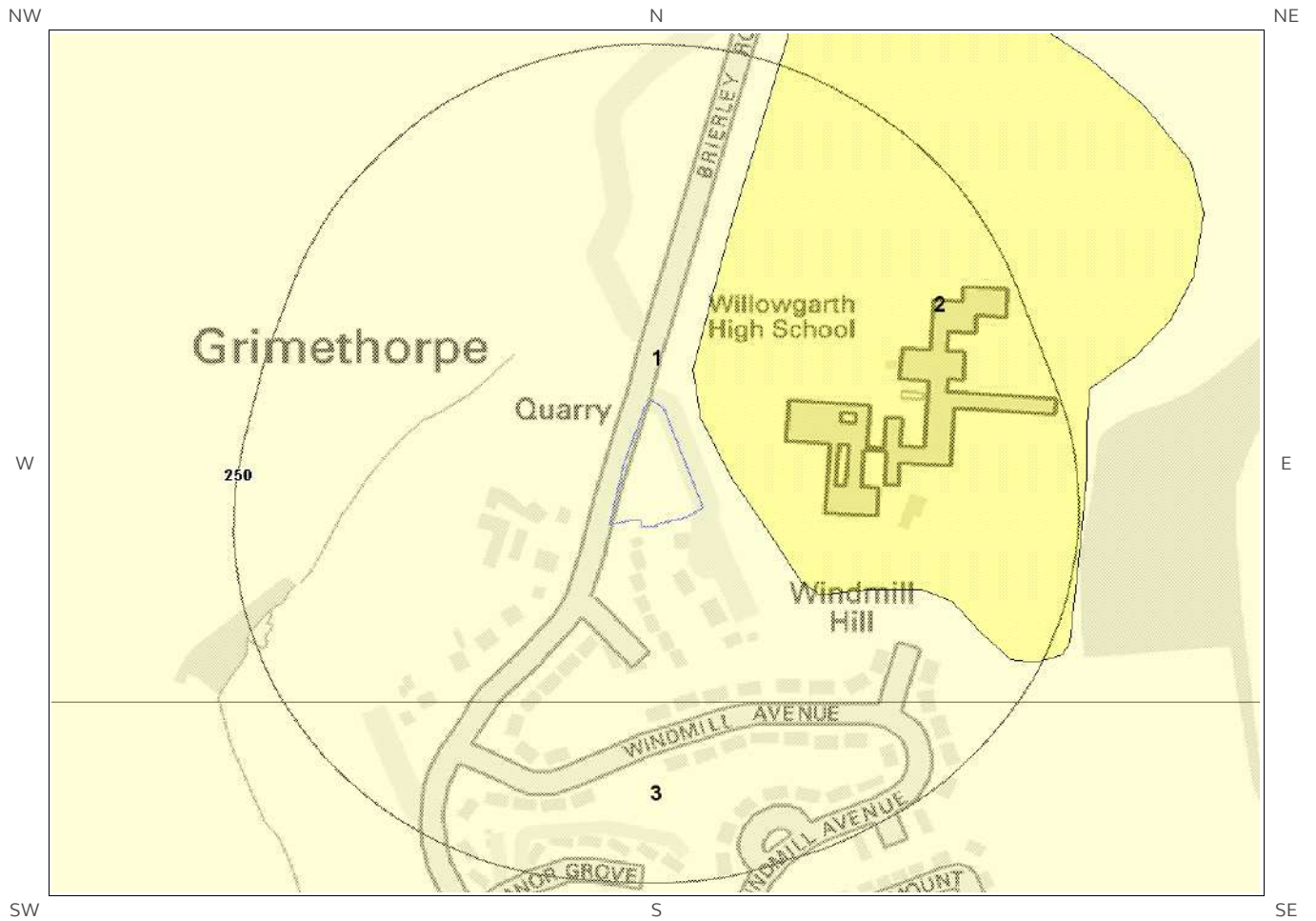


Collapsible Deposits Legend

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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? Very Low

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	26.0	NW	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.

6.2 Landslides

The following Landslides information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.

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

6.3 Ground Dissolution of Soluble Rocks

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

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

6.4 Compressible Deposits

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

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	No indicators for compressible deposits identified. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.
2	21.0	E	Very Low	Very low potential for compressible deposits to be present. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.

6.5 Collapsible Deposits

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

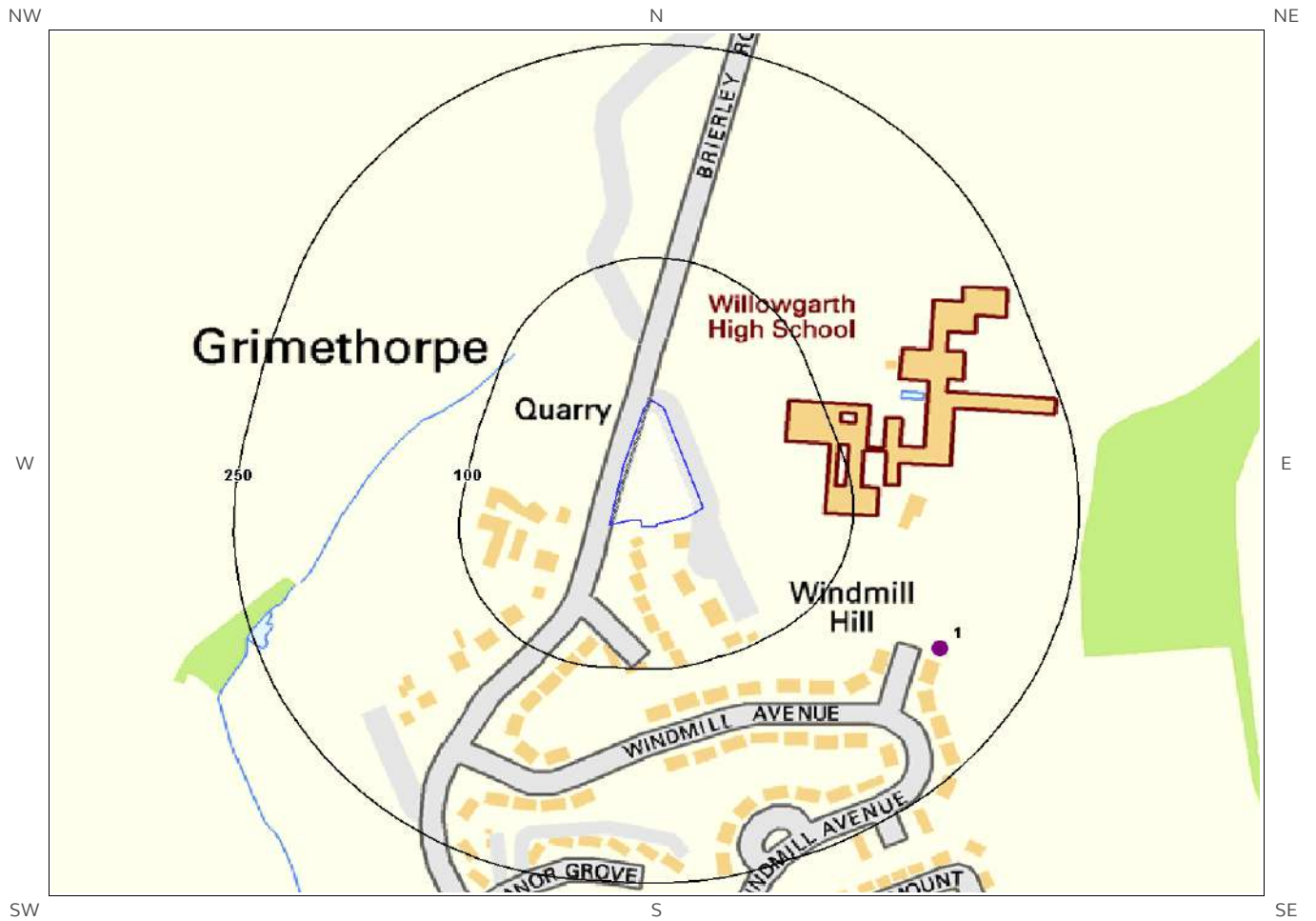
ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible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

6.6 Running Sands

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

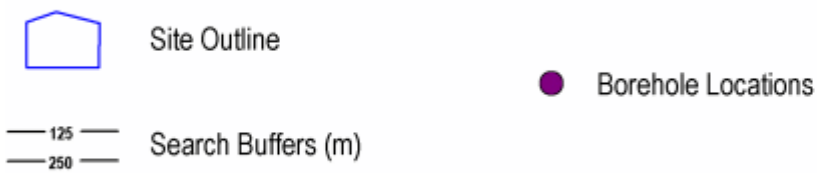
ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	No indicators for running sand identified. No special actions required to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.
2	21.0	E	Very Low	Very low potential for running sand problems if water table rises or if sandy strata are exposed to water. No special actions required, to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.

7 Borehole Records map



Borehole Records Legend

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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: 1

ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length	Borehole Name
1	186.0	SE	441249 410037	SE41SW23	80	GRIMETHORPE COLLIERY 1

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/107425

8 Estimated Background Soil Chemistry

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

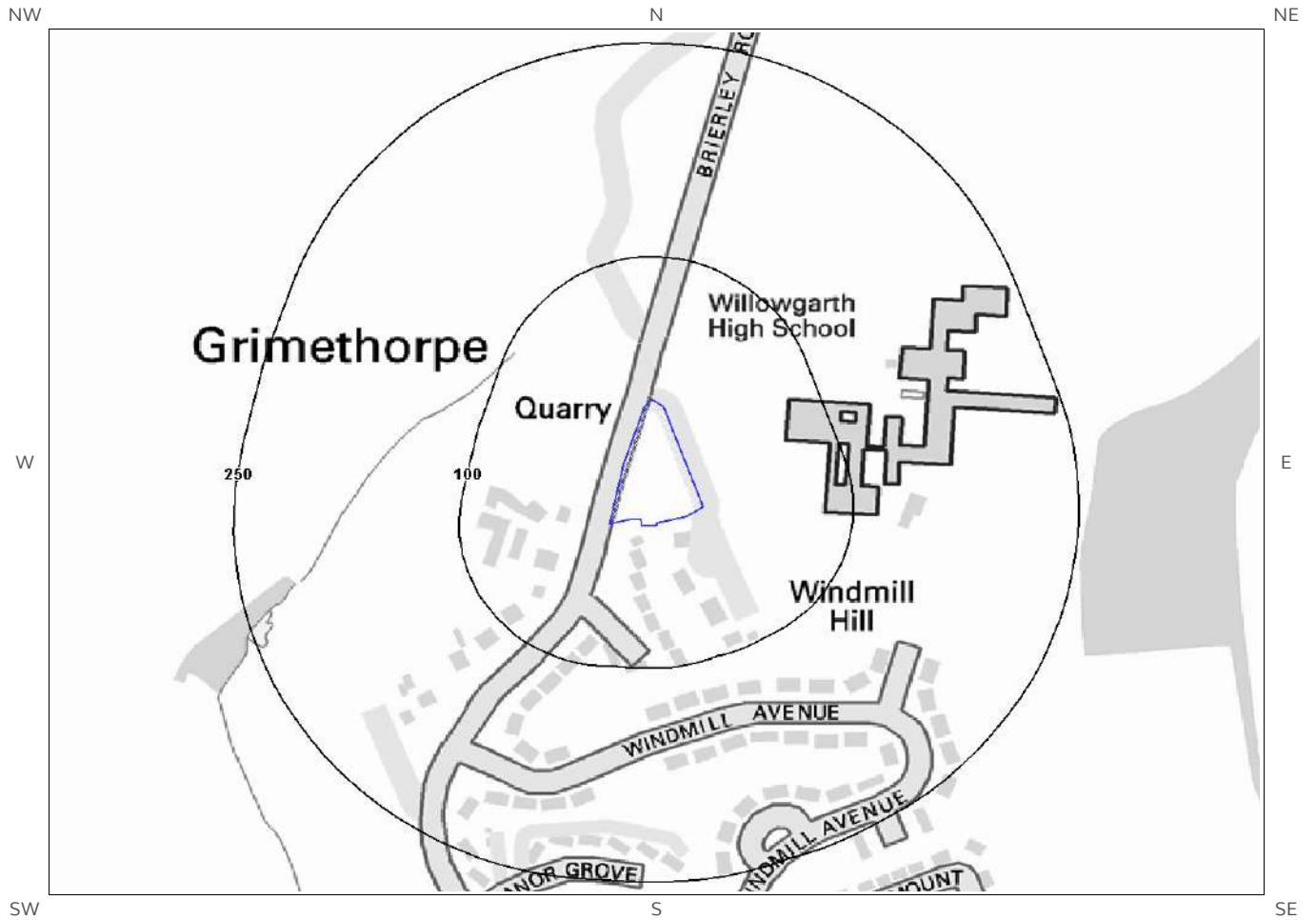
9

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	15 - 30 mg/kg	<100 mg/kg
17.0	NW	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
29.0	W	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
29.0	W	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
31.0	W	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
40.0	W	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
40.0	W	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
48.0	W	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
48.0	W	RuralSoil	15 - 25 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.

9 Railways and Tunnels map



Railways and Tunnels Legend

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9 Railways and Tunnels

9.1 Tunnels

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

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

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

Database searched and no data found.

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

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

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

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

Database searched and no data found.

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

9.2 Historical Railway and Tunnel Features

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

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

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

Database searched and no data found.

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

9.3 Historical Railways

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

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

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

Database searched and no data found.

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

9.4 Active Railways

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

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

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

Database searched and no data found.

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

9.5 Railway Projects

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

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

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

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

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

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

Contact Details

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Telephone: 08444 159 000
info@groundsure.com



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Web: www.bgs.ac.uk



BGS Geological Hazards Reports and general geological enquiries

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The Coal Authority

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Mansfield
Notts NG18 4RG
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Standard Terms and Conditions

Groundsure's Terms and Conditions can be viewed online at this link:
<https://www.groundsure.com/terms-and-conditions-feb11-2019>



Rogers Geotechnical Services
Barncliffe Mills, NEAR BANK,
HUDDERSFIELD, HD8 8LU

Groundsure Reference: GS-6021181
Your Reference: J4708_19_E_PO-0115
Report Date: 13 May 2019
Report Delivery Method: Email - pdf

Enviro Insight

Address: WINDMILL HILL QUARRY, BRIERLEY ROAD, GRIMETHORPE, BARNSELY, S72 7AW

Dear Sir/ Madam,

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

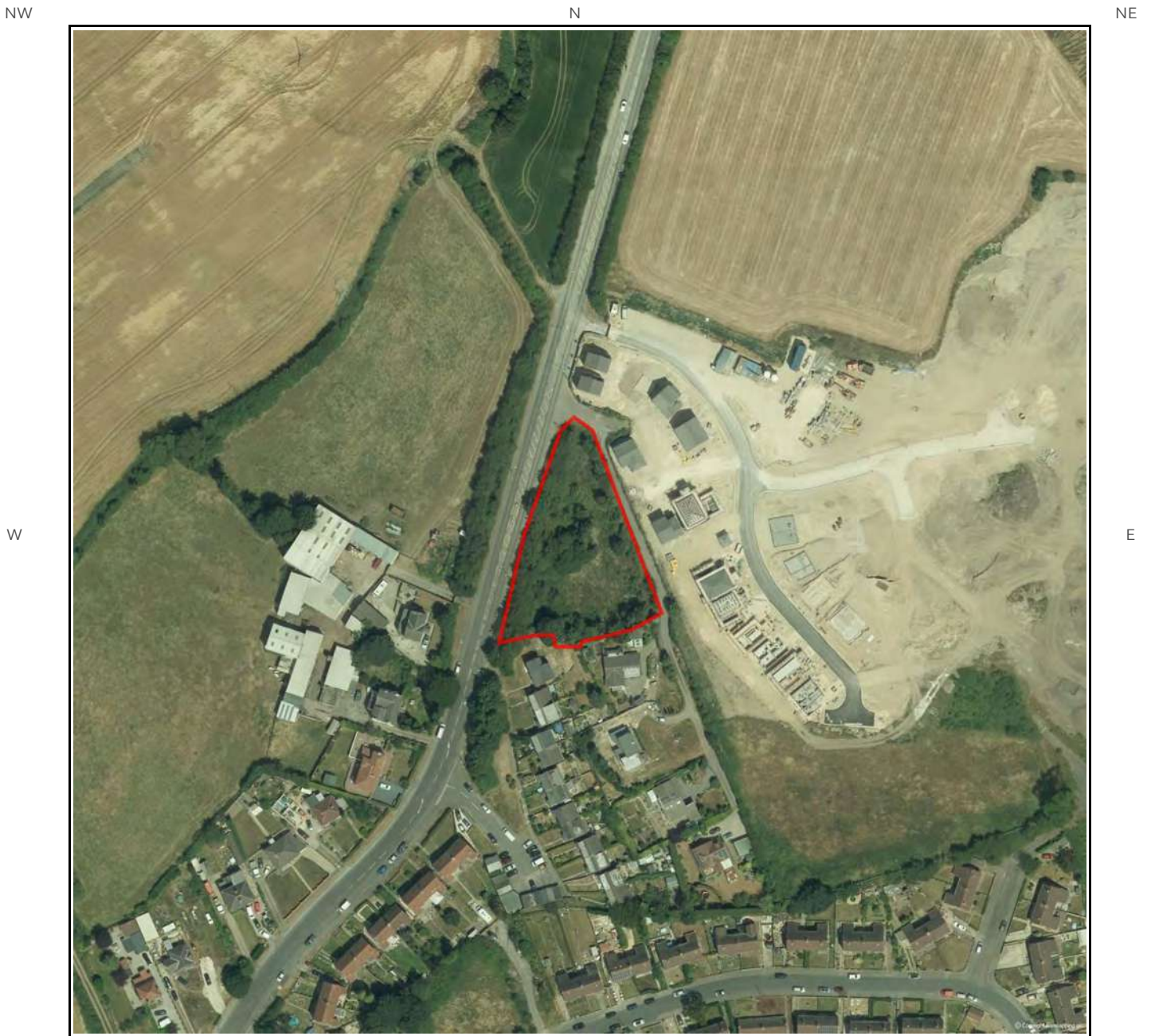
If you need any further assistance, please do not hesitate to contact our helpline on 08444 159000 quoting the above Groundsure reference number.

Yours faithfully,

Managing Director
Groundsure Limited

Enc.
Groundsure Enviroinsight

Address: WINDMILL HILL QUARRY, BRIERLEY ROAD, GRIMETHORPE, BARNSELY, S72 7AW
Date: 13 May 2019
Reference: GS-6021181
Client: Rogers Geotechnical Services



Aerial Photograph Capture date: 26-Mar-2012
Grid Reference: 441061,410162
Site Size: 0.3171ha

Report Reference: GS-6021181
Client Reference: J4708_19_E_PO-0115

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Overview of Findings

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

Section 1: Historical Industrial Sites	On-site	0-50	51-250	251-500
1.1 Potentially Contaminative Uses identified from 1:10,000 scale mapping	13	0	5	36
1.2 Additional Information – Historical Tank Database	0	0	0	4
1.3 Additional Information – Historical Energy Features Database	0	0	3	3
1.4 Additional Information – Historical Petrol and Fuel Site Database	0	0	0	0
1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database	0	0	0	0
1.6 Historical military sites	0	0	0	0
1.7 Potentially Infilled Land	6	0	5	8
Section 2: Environmental Permits, Incidents and Registers	On-site	0-50m	51-250	251-500
2.1 Industrial Sites Holding Environmental Permits and/or Authorisations				
2.1.1 Records of historic IPC Authorisations	0	0	0	0
2.1.2 Records of Part A(1) and IPPC Authorised Activities	0	0	0	0
2.1.3 Records of Red List Discharge Consents	0	0	0	0
2.1.4 Records of List 1 Dangerous Substances Inventory sites	0	0	0	0
2.1.5 Records of List 2 Dangerous Substances Inventory sites	0	0	0	0
2.1.6 Records of Part A(2) and Part B Activities and Enforcements	0	0	0	0
2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations	0	0	0	0
2.1.8 Records of Licensed Discharge Consents	0	0	0	0
2.1.9 Records of Water Industry Referrals	0	0	0	0
2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site	0	0	0	0
2.2 Records of COMAH and NIHHS sites	0	0	0	0
2.3 Environment Agency/Natural Resources Wales Recorded Pollution Incidents				
2.3.1 National Incidents Recording System, List 2	0	0	0	1
2.3.2 National Incidents Recording System, List 1	0	0	0	0
2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990	0	0	0	0

Section 3: Landfill and Other Waste Sites	On-site	0-50m	51-250	251-500	501-1000	1000-1500
3.1 Landfill Sites						
3.1.1 Environment Agency/Natural Resources Wales Registered Landfill Sites	0	0	0	0	0	Not searched
3.1.2 Environment Agency/Natural Resources Wales Historic Landfill Sites	0	0	0	0	0	2
3.1.3 BGS/DoE Landfill Site Survey	0	0	0	0	0	0
3.1.4 Records of Landfills in Local Authority and Historical Mapping Records	0	0	0	0	0	0
3.2 Landfill and Other Waste Sites Findings						
3.2.1 Operational and Non-Operational Waste Treatment, Transfer and Disposal Sites	0	0	0	0	Not searched	Not searched
3.2.2 Environment Agency/Natural Resources Wales Licensed Waste Sites	0	0	0	0	0	7

Section 4: Current Land Use	On-site	0-50m	51-250	251-500
4.1 Current Industrial Sites Data	1	0	1	Not searched
4.2 Records of Petrol and Fuel Sites	0	0	0	0
4.3 National Grid Underground Electricity Cables	0	0	0	0
4.4 National Grid Gas Transmission Pipelines	0	0	0	0

Section 5: Geology	
5.1 Records of Artificial Ground and Made Ground present beneath the study site	Identified
5.2 Records of Superficial Ground and Drift Geology present beneath the study site	None identified
5.3 For records of Bedrock and Solid Geology beneath the study site see the detailed findings section.	

Section 6: Hydrogeology and Hydrology	0-500m					
6.1 Records of Strata Classification in the Superficial Geology within 500m of the study site	None identified					
6.2 Records of Strata Classification in the Bedrock Geology within 500m of the study site	Identified					
	On-site	0-50m	51-250	251-500	501-1000	1000-2000
6.3 Groundwater Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	0
6.4 Surface Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	0
6.5 Potable Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	0
6.6 Source Protection Zones (within 500m of the study site)	0	0	0	0	Not searched	Not searched
6.7 Source Protection Zones within Confined Aquifer	0	0	0	0	Not searched	Not searched
6.8 Groundwater Vulnerability and Soil Leaching Potential (within 500m of the study site)	1	0	3	1	Not searched	Not searched

Section 6: Hydrogeology and Hydrology

0-500m

	On-site	0-50m	51-250	251-500	501-1000	1000-1500
6.9 Environment Agency/Natural Resources Wales information on river quality within 1500m of the study site	No	No	No	No	No	No
6.10 Ordnance Survey MasterMap Water Network entries within 500m of the site	0	0	4	20	Not searched	Not searched
6.11 Surface water features within 250m of the study site	No	No	Yes	Not searched	Not searched	Not searched

Section 7: Flooding

7.1 Environment Agency Zone 2 floodplains within 250m of the study site	None identified					
7.2 Environment Agency/Natural Resources Wales Zone 3 floodplains within 250m of the study site	None identified					
7.3 Risk of flooding from Rivers and the Sea (RoFRaS) rating for the study site	Very Low					
7.4 Flood Defences within 250m of the study site	None identified					
7.5 Areas benefiting from Flood Defences within 250m of the study site	None identified					
7.6 Areas used for Flood Storage within 250m of the study site	None identified					
7.7 Maximum BGS Groundwater Flooding susceptibility within 50m of the study site	Limited potential					
7.8 BGS confidence rating for the Groundwater Flooding susceptibility areas	Low					

Section 8: Designated Environmentally Sensitive Sites

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.1 Records of Sites of Special Scientific Interest (SSSI)	0	0	0	0	0	1
8.2 Records of National Nature Reserves (NNR)	0	0	0	0	0	0
8.3 Records of Special Areas of Conservation (SAC)	0	0	0	0	0	0
8.4 Records of Special Protection Areas (SPA)	0	0	0	0	0	0
8.5 Records of Ramsar sites	0	0	0	0	0	0
8.6 Records of Ancient Woodlands	0	0	0	0	0	2
8.7 Records of Local Nature Reserves (LNR)	0	0	0	0	0	1
8.8 Records of World Heritage Sites	0	0	0	0	0	0
8.9 Records of Environmentally Sensitive Areas	0	0	0	0	0	0

Section 8: Designated Environmentally Sensitive Sites	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.10 Records of Areas of Outstanding Natural Beauty (AONB)	0	0	0	0	0	0
8.11 Records of National Parks	0	0	0	0	0	0
8.12 Records of Nitrate Sensitive Areas	0	0	0	0	0	0
8.13 Records of Nitrate Vulnerable Zones	1	0	1	0	1	3
8.14 Records of Green Belt land	1	0	1	0	0	5

Section 9: Natural Hazards

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

Section 10: Mining

10.1 Coal mining areas within 75m of the study site	Identified
10.2 Non-Coal Mining areas within 50m of the study site boundary	Identified
10.3 Brine affected areas within 75m of the study site	None identified

Using this report

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

1. Historical Industrial Sites

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

2. Environmental Permits, Incidents and Registers

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

3. Landfills and Other Waste Sites

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

4. Current Land Uses

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

5. Geology

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

6. Hydrogeology and Hydrology

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

7. Flooding

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

8. Designated Environmentally Sensitive Sites

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

9. Natural Hazards

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

10. Mining

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

11. Contacts

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

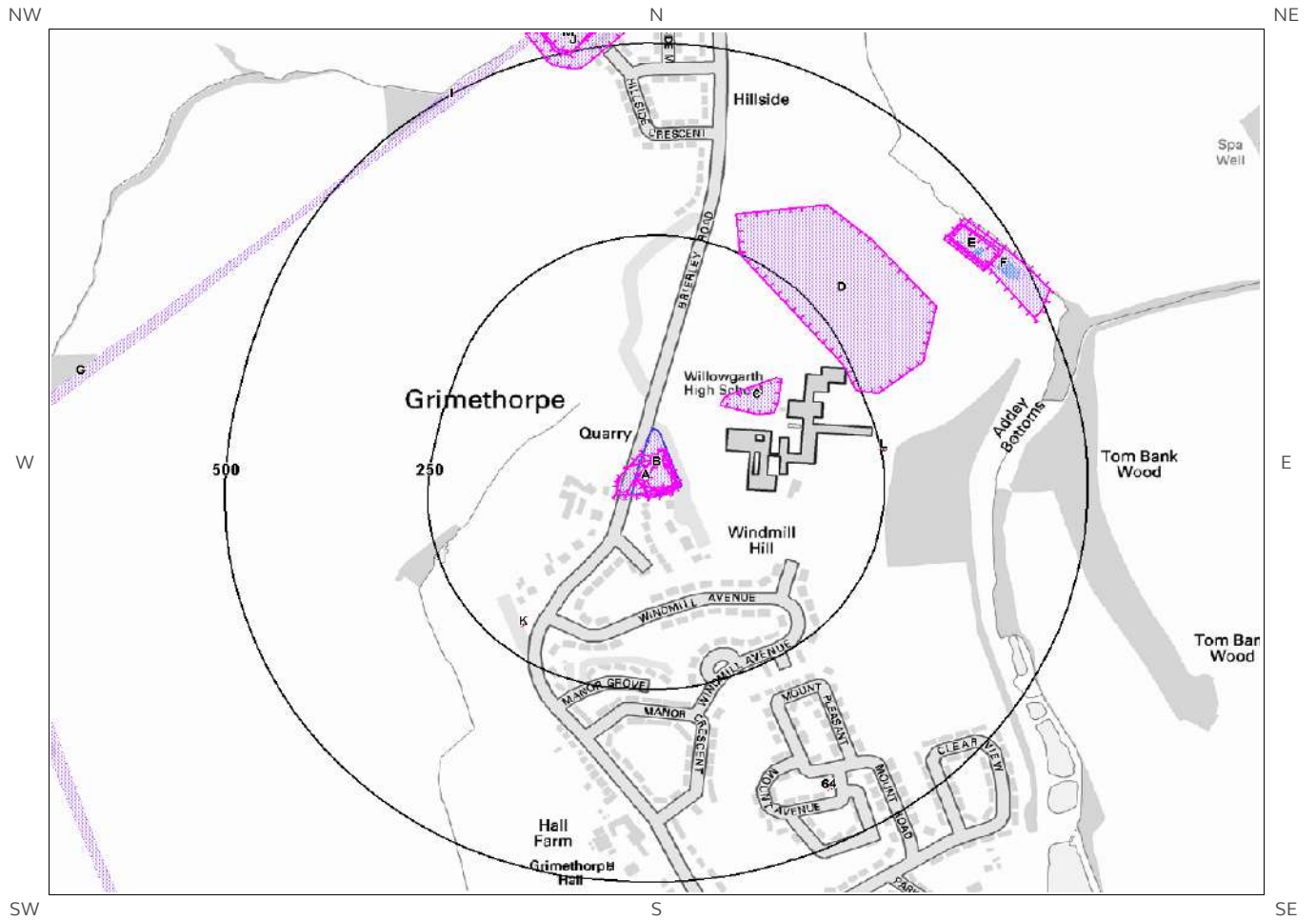
Note: Maps

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

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

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

1. Historical Land Use



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1. Historical Industrial Sites

1.1 Potentially Contaminative Uses identified from 1:10,000 scale Mapping

The systematic analysis of data extracted from standard 1:10,560 and 1:10,000 scale historical maps provides the following information:

Records of sites with a potentially contaminative past land use within 500m of the search boundary: 54

ID	Distance [m]	Direction	Use	Date
1A	0	On Site	Unspecified Disused Quarry	1938
2A	0	On Site	Unspecified Disused Quarry	1930
3A	0	On Site	Unspecified Disused Quarry	1930
4B	0	On Site	Windmill	1891
5A	0	On Site	Unspecified Disused Quarry	1930
6A	0	On Site	Unspecified Disused Quarry	1930
7B	0	On Site	Unspecified Disused Quarry	1988
8B	0	On Site	Unspecified Disused Quarry	1982
9B	0	On Site	Unspecified Disused Quarry	1951
10B	0	On Site	Unspecified Quarry	1904
11B	0	On Site	Unspecified Disused Quarry	1948
12B	0	On Site	Sandstone Quarry	1854
13B	0	On Site	Sandstone Quarry	1854
14C	82	NE	Unspecified Heap	1982
15C	82	NE	Unspecified Disused Quarry	1967
16C	82	NE	Unspecified Heap	1988
17D	227	NE	Unspecified Ground Workings	1988
18D	227	NE	Unspecified Ground Workings	1982
19E	430	NE	Sewage Works	1938
20E	430	NE	Sewage Works	1938
21E	433	NE	Sewage Works	1930
22E	433	NE	Sewage Works	1930
23E	433	NE	Sewage Works	1930
24E	433	NE	Sewage Works	1930
25E	436	NE	Sewage Works	1948
26F	438	NE	Sewage Works	1951

27F	438	NE	Unspecified Works	1967
28E	446	NE	Unspecified Tank	1938
29E	448	NE	Unspecified Tank	1930
30E	448	NE	Unspecified Tank	1930
31E	448	NE	Unspecified Tank	1930
32E	448	NE	Unspecified Tank	1930
33E	449	NE	Unspecified Tank	1948
34E	452	NE	Unspecified Tank	1951
35F	473	NE	Unspecified Tanks	1951
36F	473	NE	Unspecified Tanks	1967
37J	476	N	Unspecified Disused Mine	1967
38G	485	NW	Tramway Sidings	1930
39G	485	NW	Tramway Sidings	1930
40G	485	NW	Tramway Sidings	1930
41G	485	NW	Tramway Sidings	1930
42H	485	S	Unspecified Pump	1854
43H	485	S	Unspecified Pump	1854
44I	486	NW	Cuttings	1930
45I	486	NW	Cuttings	1930
46I	486	NW	Cuttings	1930
47I	486	NW	Cuttings	1930
48J	495	N	Colliery	1938
49J	495	N	Colliery	1938
50J	498	N	Colliery	1930
51J	498	N	Colliery	1930
52J	498	N	Colliery	1930
53J	498	N	Colliery	1930
54M	499	N	Colliery	1948

1.2 Additional Information – Historical Tank Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical tanks within 500m of the search boundary:

4

ID	Distance (m)	Direction	Use	Date
55E	440	NE	Unspecified Tank	1913
56E	448	NE	Unspecified Tank	1913
57E	455	NE	Unspecified Tank	1961
58F	467	NE	Tanks	1961

1.3 Additional Information – Historical Energy Features Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical energy features within 500m of the search boundary: 6

ID	Distance (m)	Direction	Use	Date
59K	212	SW	Gas Governor	1972
60K	214	SW	Gas Governor	1996
61K	214	SW	Gas Governor	1978
62L	251	E	Electricity Substation	1983
63L	253	E	Electricity Substation	1983
64	428	SE	Electricity Substation	1972

1.4 Additional Information – Historical Petrol and Fuel Site Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical petrol stations and fuel sites within 500m of the search boundary: 0

Database searched and no data found.

1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical garage and motor vehicle repair sites within 500m of the search boundary: 0

Database searched and no data found.

1.6 Historical military sites

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

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

0

Database searched and no data found.

1.7 Potentially Infilled Land

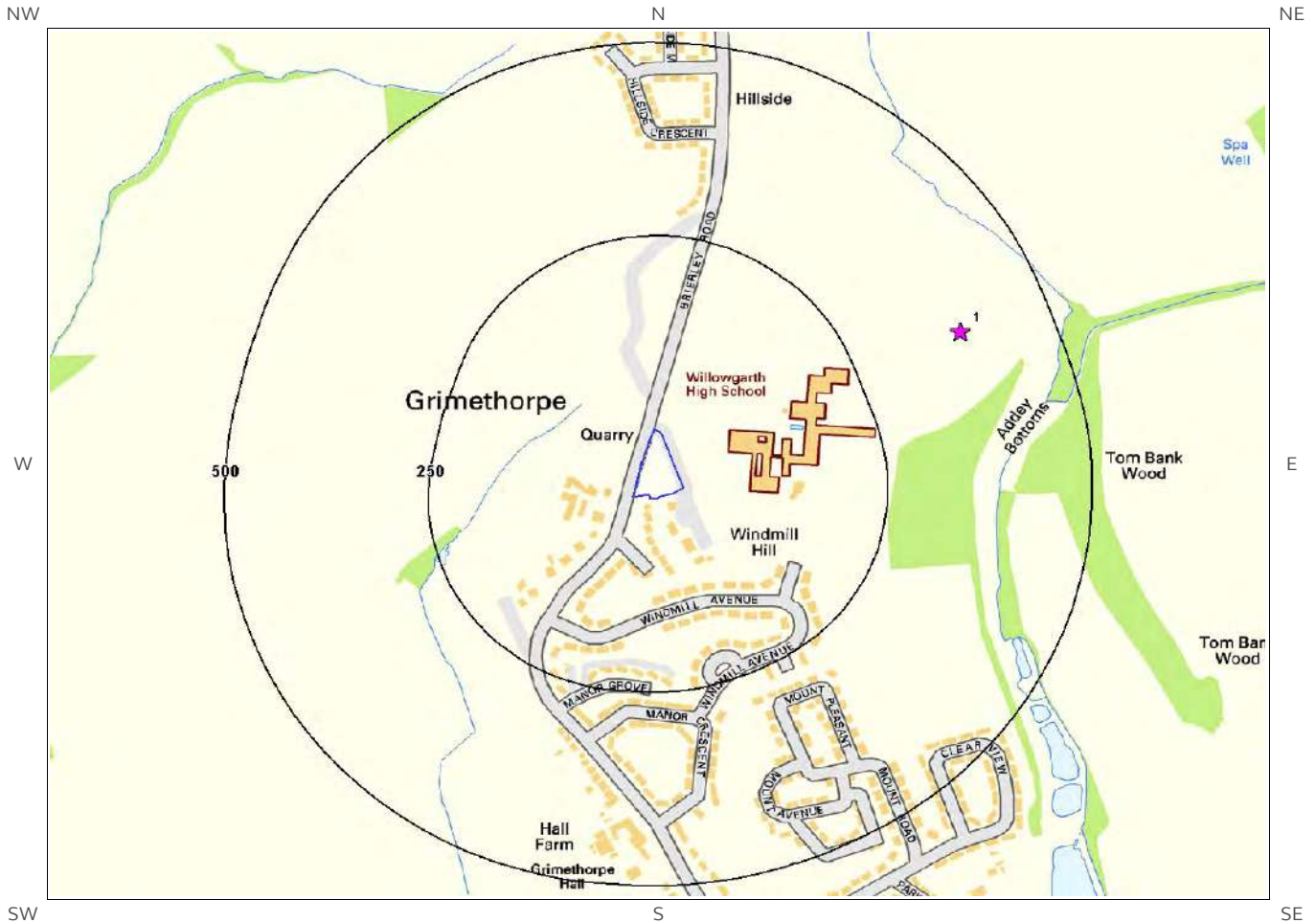
Records of Potentially Infilled Features from 1:10,000 scale mapping within 500m of the study site:

19


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

ID	Distance(m)	Direction	Use	Date
65B	0	On Site	Unspecified Quarry	1904
66B	0	On Site	Unspecified Disused Quarry	1948
67B	0	On Site	Unspecified Disused Quarry	1982
68B	0	On Site	Unspecified Disused Quarry	1988
69B	0	On Site	Unspecified Disused Quarry	1951
70B	0	On Site	Unspecified Disused Quarry	1938
71C	82	NE	Unspecified Heap	1988
72C	82	NE	Unspecified Heap	1982
73C	82	NE	Unspecified Disused Quarry	1967
74D	227	NE	Unspecified Ground Workings	1988
75D	227	NE	Unspecified Ground Workings	1982
76E	430	NE	Sewage Works	1938
77E	430	NE	Sewage Works	1938
78E	436	NE	Sewage Works	1948
79F	438	NE	Sewage Works	1951
80J	476	N	Unspecified Disused Mine	1967
81J	495	N	Colliery	1938
82J	495	N	Colliery	1938
83M	499	N	Colliery	1948

2. Environmental Permits, Incidents and Registers Map



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

2. Environmental Permits, Incidents and Registers

2.1 Industrial Sites Holding Licences and/or Authorisations

Searches of information provided by the Environment Agency/Natural Resources Wales and Local Authorities reveal the following information:

2.1.1 Records of historic IPC Authorisations within 500m of the study site:

0

Database searched and no data found.

2.1.2 Records of Part A(1) and IPPC Authorised Activities within 500m of the study site:

0

Database searched and no data found.

2.1.3 Records of Red List Discharge Consents (potentially harmful discharges to controlled waters) within 500m of the study site:

0

Database searched and no data found.

2.1.4 Records of List 1 Dangerous Substances Inventory Sites within 500m of the study site:

0

Database searched and no data found.

2.1.5 Records of List 2 Dangerous Substance Inventory Sites within 500m of the study site:

0

Database searched and no data found.

2.1.6 Records of Part A(2) and Part B Activities and Enforcements within 500m of the study site:

0

Database searched and no data found.

2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations:

0

Database searched and no data found.

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

0

Database searched and no data found.

2.1.9 Records of Water Industry Referrals (potentially harmful discharges to the public sewer) within 500m of the study site:

0

Database searched and no data found.

2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site:

0

Database searched and no data found.

2.2 Dangerous or Hazardous Sites

Records of COMAH & NIHHS sites within 500m of the study site:

0

Database searched and no data found.

2.3 Environment Agency/Natural Resources Wales Recorded Pollution Incidents

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

1

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

ID	Distance (m)	Direction	NGR	Details	
1	387	E	441429.0 410338.0	Incident Date: 08-May-2003 Incident Identification: 156880.0 Pollutant: Sewage Materials Pollutant Description: Crude Sewage	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)

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

0

Database searched and no data found.

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

Records of sites determined as contaminated land under Section 78R of the Environmental Protection Act 1990 are there within 500m of the study site










0

Database searched and no data found.

3. Landfill and Other Waste Sites Map



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

3. Landfill and Other Waste Sites

3.1 Landfill Sites

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

0

Database searched and no data found.

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

2

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

ID	Distance (m)	Direction	NGR	Details
Not shown	1209	S		Site Address: Acorn Way, Grimethorpe, Barnsley, South Yorkshire Waste Licence: Yes Site Reference: 41B92, 4400/B92 Waste Type: - Environmental Permitting Regulations (Waste) Reference: - Licence Issue: 16-Aug-1996 Licence Surrendered: Licence Holder Address: - Operator: - Licence Holder: Barnsley Metropolitan Borough Council First Recorded: - Last Recorded: -
Not shown	1456	NW		Site Address: Shafton Welfare Playing Fields, High Street, Shafton, Barnsley Waste Licence: Yes Site Reference: WD20 B866, 4400/B866, 20B866 Waste Type: Inert, Commercial Environmental Permitting Regulations (Waste) Reference: - Licence Issue: 21-Jul-1992 Licence Surrendered: 28-Feb-1994 Licence Holder Address: Vicarage Street North, Wakefield Operator: British Gas Plc Licence Holder: British Gas NE Plc First Recorded: 31-Dec-1992 Last Recorded: 31-Dec-1993

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

0

Database searched and no data found.

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

0

Database searched and no data found.

3.2 Other Waste Sites

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

0

Database searched and no data found.

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

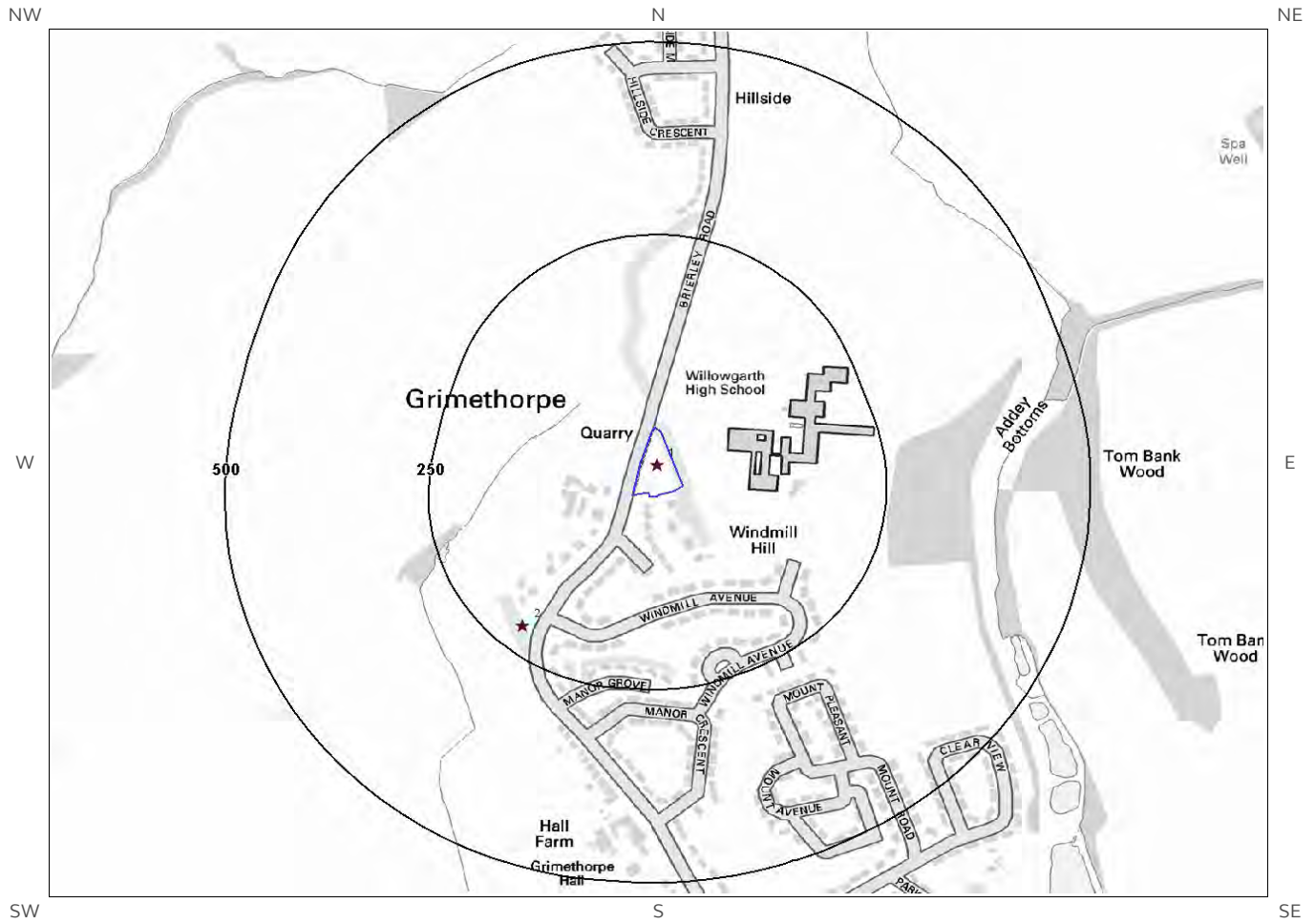
7

The following waste treatment, transfer or disposal sites records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details
Not shown	1220	W	439825 410316	<p>Site Address: Rubber Recovery Ltd, Engine Lane, Shafton, Barnsley, South Yorkshire, S72 8SP</p> <p>Type: 75kte HCl Waste TS + treatment Size: < 25000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: RUB015 EPR reference: EA/EPR/FP3196LD/V002 Operator: Rubber Recovery Limited Waste Management licence No: 65385 Annual Tonnage: 74999.0</p> <p>Issue Date: 28/01/2005 Effective Date: 03/12/2009 Modified: 25/07/2012 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: Rubber Recovery Ltd Correspondence Address: -</p>
Not shown	1220	W	439825 410316	<p>Site Address: Land/premises At, Engine Lane, Shafton, Barnsley, South Yorkshire, S72 8SP</p> <p>Type: Physical Treatment Facility Size: < 25000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: RUB015 EPR reference: EA/EPR/FP3196LD/T001 Operator: Rubber Recovery Ltd Waste Management licence No: 65385 Annual Tonnage: 344.0</p> <p>Issue Date: 28/01/2005 Effective Date: 03/12/2009 Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Transferred Site Name: Rubber Recovery Correspondence Address: -</p>
Not shown	1220	W	439825 410316	<p>Site Address: Rubber Recovery Ltd, Engine Lane, Shafton, Barnsley, South Yorkshire, S72 8SP</p> <p>Type: 75kte HCl Waste TS + treatment Size: < 25000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: RUB015 EPR reference: EA/EPR/FP3196LD/V002 Operator: Rubber Recovery Ltd Waste Management licence No: 65385 Annual Tonnage: 74999.0</p> <p>Issue Date: 28/01/2005 Effective Date: 03/12/2009 Modified: 25/07/2012 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Expired Site Name: Rubber Recovery Ltd Correspondence Address: -</p>

ID	Distance (m)	Direction	NGR	Details	
Not shown	1345	NW	439900 410900	Site Address: 39, Brierley Road, Shafton, Barnsley, South Yorkshire, S72 8QW Type: Metal Recycling Site (mixed MRS's) Size: >= 25000 tonnes < 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: PJP004 EPR reference: EA/EPR/HP3494VH/T001 Operator: P J Plant & Equipment Ltd Waste Management licence No: 60571 Annual Tonnage: 74999.0	Issue Date: 18/03/1993 Effective Date: 16/06/2010 Modified: 11/03/2008 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Transferred Site Name: P J Plant & Equipment Correspondence Address: -
Not shown	1345	NW	439900 410900	Site Address: 39, Brierley Road, Shafton, Barnsley, S Yorks, S72 8QW Type: Metal Recycling Site (mixed MRS's) Size: >= 25000 tonnes < 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: GEO004 EPR reference: - Operator: George Booth & Sons Ltd Waste Management licence No: 60571 Annual Tonnage: 0.0	Issue Date: 18/03/1993 Effective Date: 25/11/2005 Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Transferred Site Name: George Booth & Sons Ltd Correspondence Address: 39, Brierley Road, Shafton, Barnsley, South Yorkshire, S72 8QW
Not shown	1345	NW	439900 410900	Site Address: 39, Brierley Road, Shafton, Barnsley, S Yorks, S72 8QW Type: Metal Recycling Site (mixed MRS's) Size: >= 25000 tonnes < 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: GEO001 EPR reference: - Operator: George Booth & Sons Waste Management licence No: 60571 Annual Tonnage: 0.0	Issue Date: 18/03/1993 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: George Booth & Sons Correspondence Address: 39, Brierley Road, Shafton, Barnsley, S Yorks, S72 8QW
Not shown	1431	S	441210 408700	Site Address: Cudworth View, Grimethorpe, Barnsley, South Yorkshir Type: Household, Commercial & Industrial Waste T Stn Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: BDR012 EPR reference: EA/EPR/JP3290ZM/S002 Operator: B D R Waste Disposal Ltd Waste Management licence No: 60608 Annual Tonnage: 3352.0	Issue Date: 14/06/1993 Effective Date: - Modified: - Surrendered Date: Apr 1 2003 12:00AM Expiry Date: - Cancelled Date: - Status: Surrendered Site Name: Grimethorpe Civic Amenity Site Correspondence Address: -

4. Current Land Use Map



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-  Site Outline
-  Current Industrial Sites
-  Electricity Transmission Cables
-  Search Buffers (m)
-  Petrol & Fuel Sites
-  Gas Transmission Pipelines

4. Current Land Uses

4.1 Current Industrial Data

Records of potentially contaminative industrial sites within 250m of the study site: 2

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

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
1	0	On Site	Windmill Hill Quarry (Disused)	441060 410164	South Yorkshire, S72	Unspecified Quarries Or Mines	Extractive Industries
2	216	SW	Gas Governor Station	440894 409956	South Yorkshire, S72	Gas Features	Infrastructure and Facilities

4.2 Petrol and Fuel Sites

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

Database searched and no data found.

4.3 National Grid High Voltage Underground Electricity Transmission Cables

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

Records of National Grid high voltage underground electricity transmission cables within 500m of the study site: 0

Database searched and no data found.

4.4 National Grid High Pressure Gas Transmission Pipelines

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

Records of National Grid high pressure gas transmission pipelines within 500m of the study site: 0

Database searched and no data found.

5. Geology

5.1 Artificial Ground and Made Ground

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

Lex Code	Description	Rock Type
MGR-ARTDP	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT

5.2 Superficial Ground and Drift Geology

Database searched and no data found.

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

5.3 Bedrock and Solid Geology

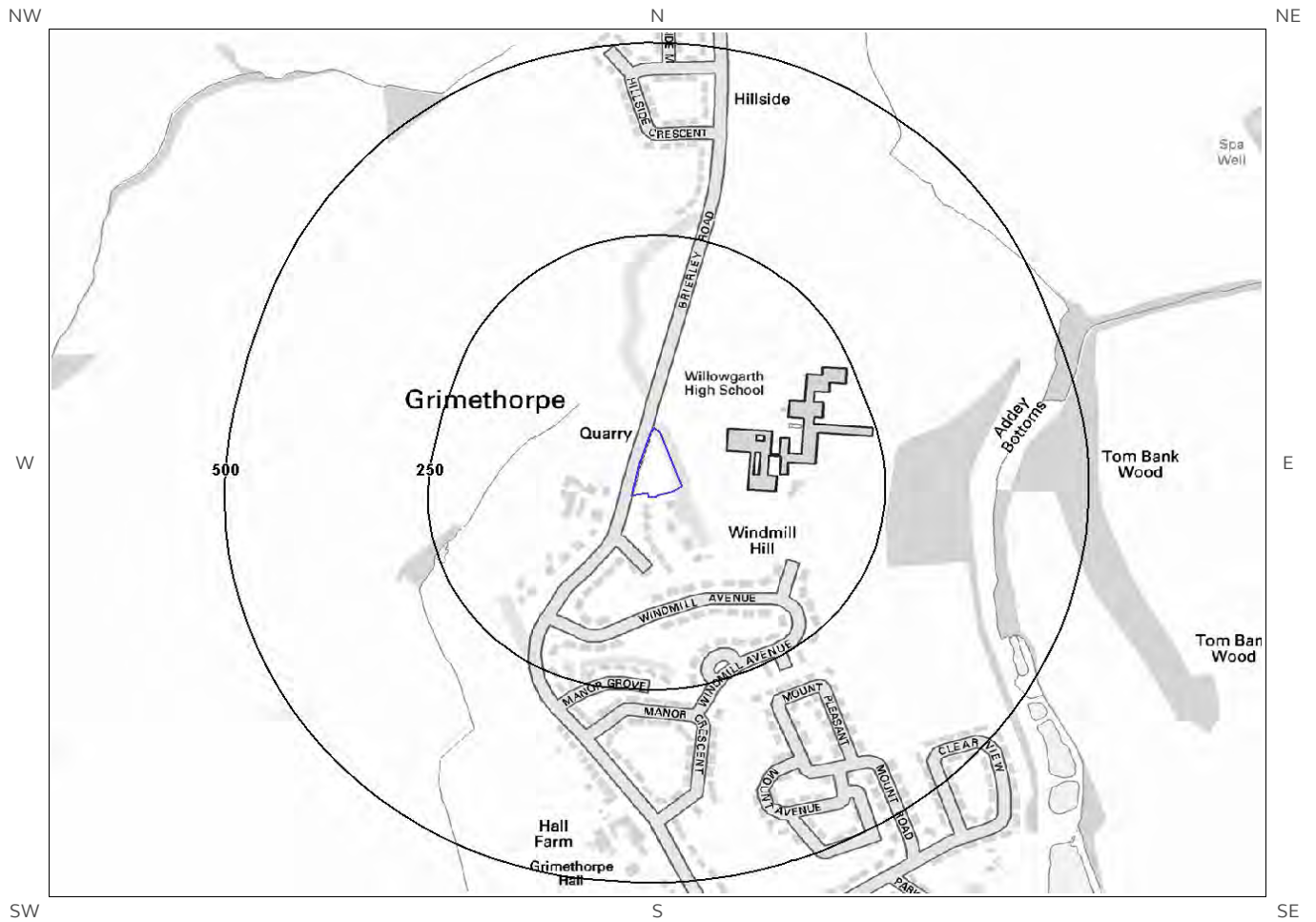
The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
BYR-SDST	BRIERLEY ROCK	SANDSTONE
PUCM-MDSS	PENNINE UPPER COAL MEASURES FORMATION	MUDSTONE, SILTSTONE AND SANDSTONE
PUCM-MDSS	PENNINE UPPER COAL MEASURES FORMATION	MUDSTONE, SILTSTONE AND SANDSTONE
PUCM-MDSS	PENNINE UPPER COAL MEASURES FORMATION	MUDSTONE, SILTSTONE AND SANDSTONE

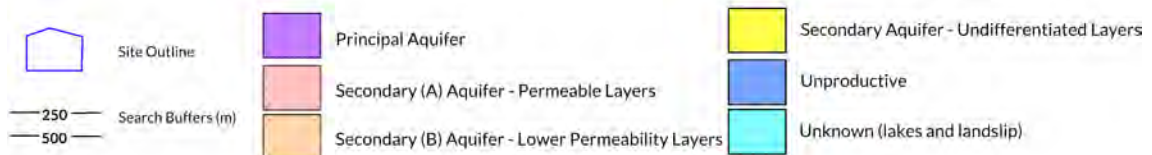
(Derived from the BGS 1:50,000 Digital Geological Map of Great Britain)

6 Hydrogeology and Hydrology

6a. Aquifer Within Superficial Geology



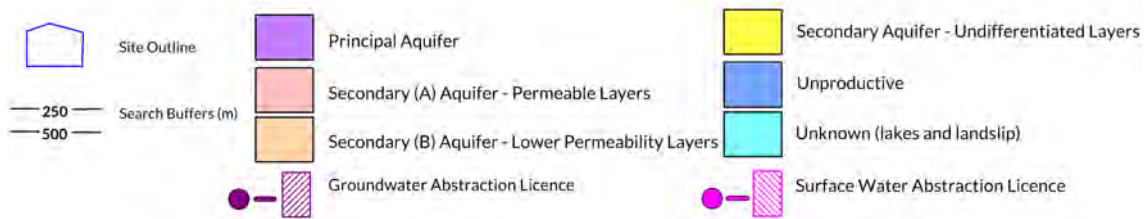
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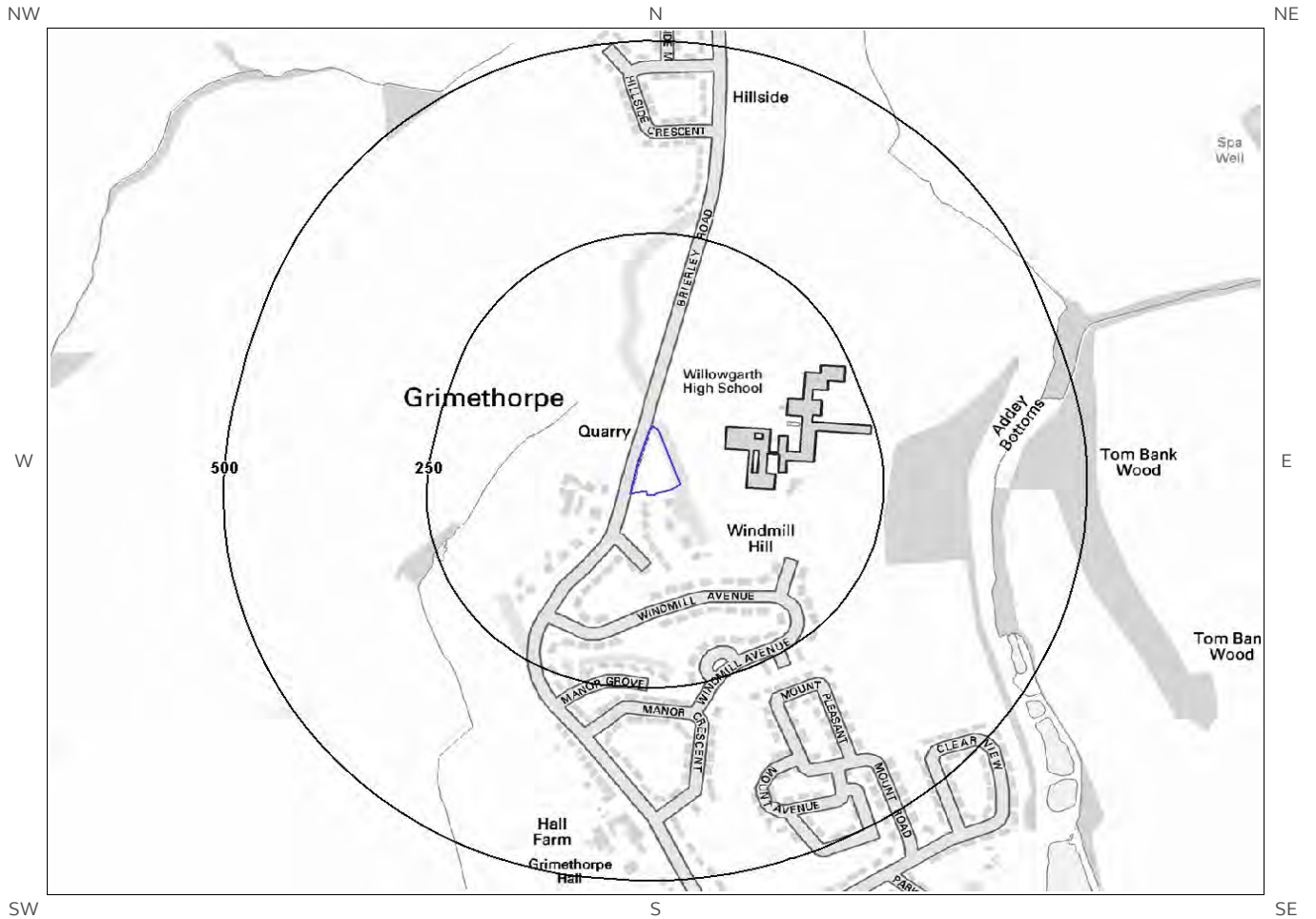
6b. Aquifer Within Bedrock Geology and Abstraction Licences



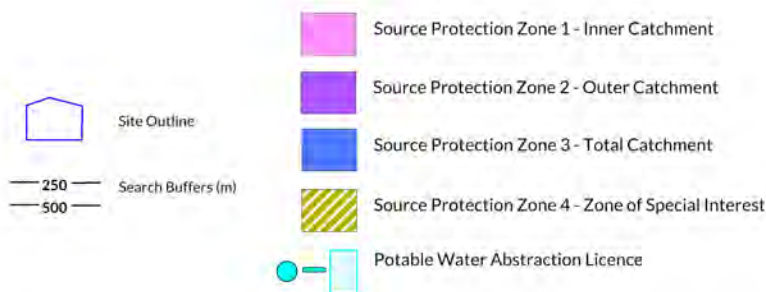
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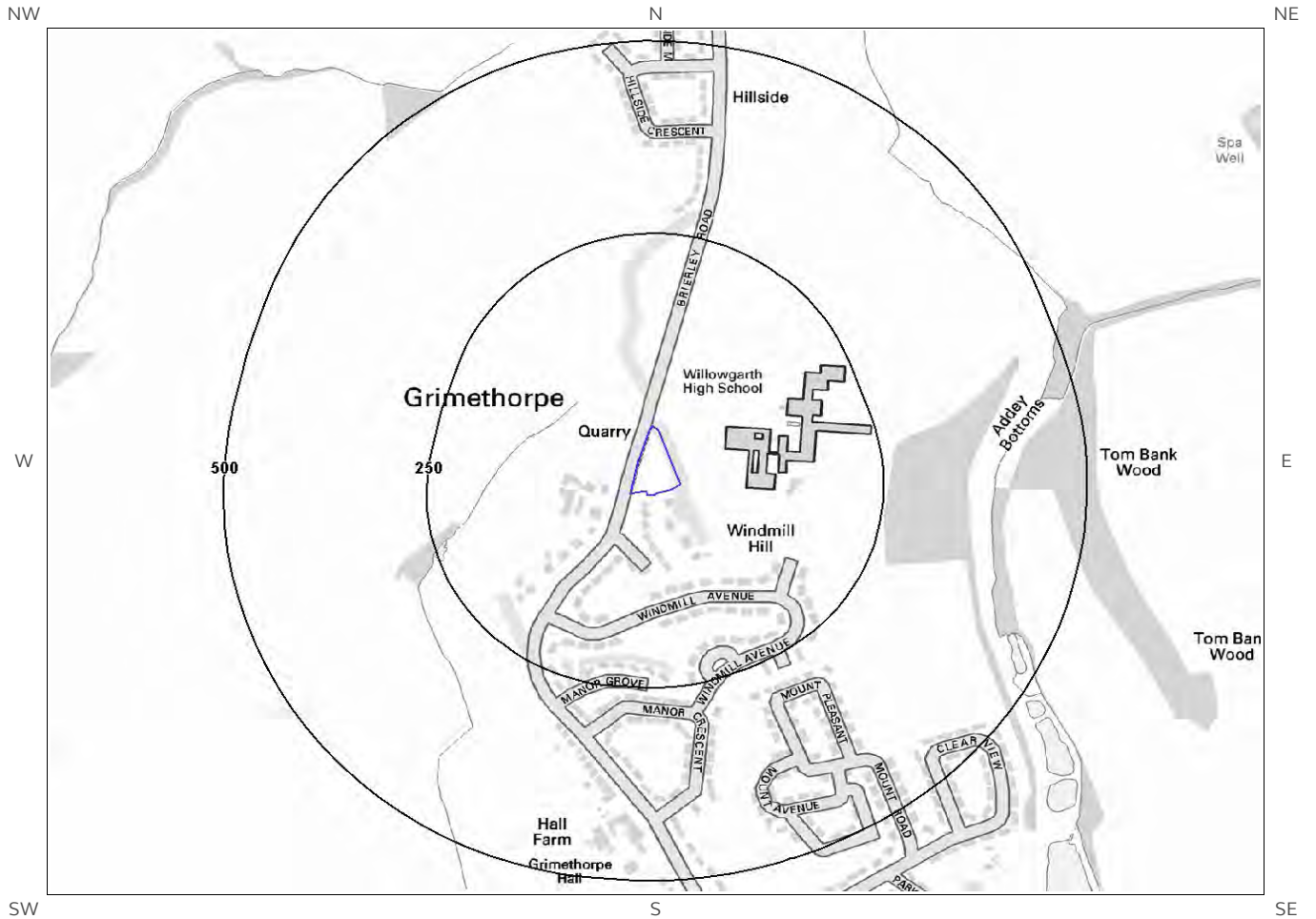
6c. Hydrogeology – Source Protection Zones and Potable Water Abstraction Licences



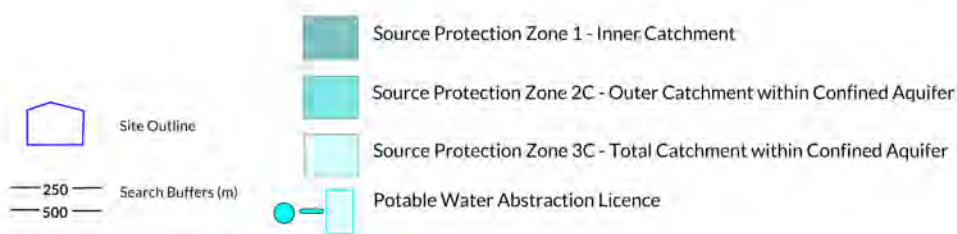
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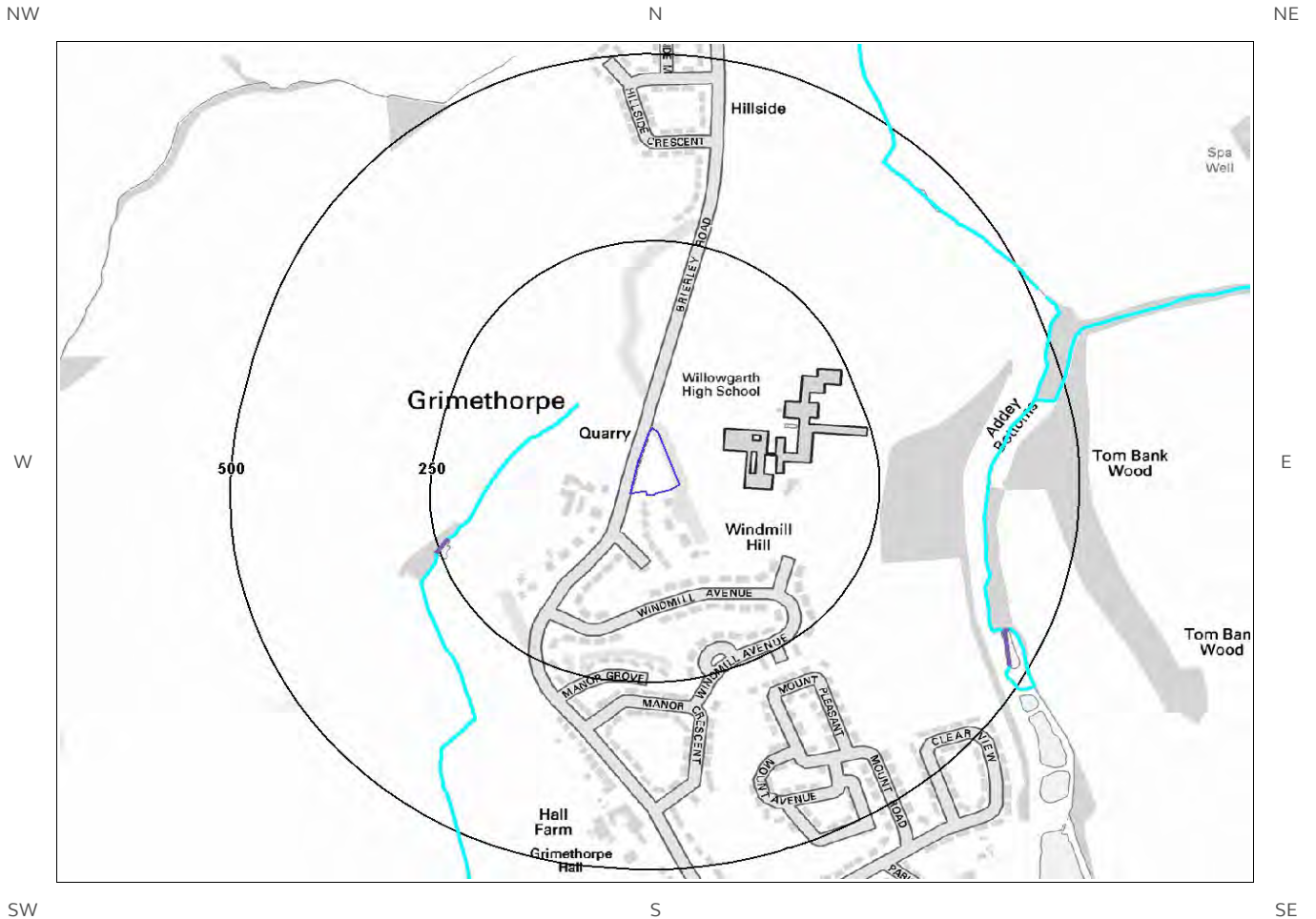
6d. Hydrogeology – Source Protection Zones within confined aquifer



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6e. Hydrology – Watercourse Network and River Quality



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6. Hydrogeology and Hydrology

6.1 Aquifer within Superficial Deposits

Records of strata classification within the superficial geology at or in proximity to the property No

Database searched and no data found.

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

6.2 Aquifer within Bedrock Deposits

Records of strata classification within the bedrock geology at or in proximity to the property Yes

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

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

ID	Distance (m)	Direction	Designation	Description
1	0	On Site	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
2	123	S	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers

6.3 Groundwater Abstraction Licences

Groundwater Abstraction Licences within 2000m of the study site None identified

Database searched and no data found.

6.4 Surface Water Abstraction Licences

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

Database searched and no data found.

6.5 Potable Water Abstraction Licences

Potable Water Abstraction Licences within 2000m of the study site

None identified

Database searched and no data found.

6.6 Source Protection Zones

Source Protection Zones within 500m of the study site

None identified

Database searched and no data found.

6.7 Source Protection Zones within Confined Aquifer

Source Protection Zones within the Confined Aquifer within 500m of the study site

None identified

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

Database searched and no data found.

6.8 Groundwater Vulnerability and Soil Leaching Potential

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

Distance (m)	Direction	Classification	Soil Vulnerability Category	Description
0	On Site	Minor Aquifer/High Leaching Potential	H3	Coarse textured or moderately shallow soils which readily transmit non-adsorbed pollutants and liquid discharges but have some ability to attenuate adsorbed pollutants because of their clay or organic matter content.
79	SW	Minor Aquifer/Low Leaching Potential	L	Soils in which pollutants are unlikely to penetrate the soil layer because either water movement is largely horizontal, or they have the ability to attenuate diffuse pollutants.
128	S	Minor Aquifer/High Leaching Potential	HU	Soil information for urban areas and restored mineral workings. These soils are therefore assumed to be highly permeable in the absence of site-specific information.
130	S	Minor Aquifer/Low Leaching Potential	L	Soils in which pollutants are unlikely to penetrate the soil layer because either water movement is largely horizontal, or they have the ability to attenuate diffuse pollutants.
255	SE	Minor Aquifer/Low Leaching Potential	L	Soils in which pollutants are unlikely to penetrate the soil layer because either water movement is largely horizontal, or they have the ability to attenuate diffuse pollutants.

6.9 River Quality

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

6.9.1 Biological Quality:

Database searched and no data found.

6.9.2 Chemical Quality:

Database searched and no data found.

6.10 Ordnance Survey MasterMap Water Network

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

This watercourse information is provided by Ordnance Survey MasterMap Water Network. The data provides a detailed centre line following the curve of the waterway precisely, so all distances provided in the report should be understood as measurements to the centreline rather than a measurement to the nearest point of the watercourse. Underground watercourses are inferred from entry and exit points so caution is advised in using these to indicate precise locations of underground watercourses when planning site investigation and development.

The following Ordnance Survey MasterMap Water Network records are represented on the Hydrology Map (6e):

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
1	95 NW	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
1	95 NW	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
2	235 W	-	Lake, loch or reservoir.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 5.0
2	235 W	-	Lake, loch or reservoir.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 5.0
3	255 W	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
3	255 W	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
4	383 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
Not shown	383 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
5	447 SE	-	Lake, loch or reservoir.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 0.8

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
Not shown	447 SE	-	Lake, loch or reservoir.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 0.8
6	452 SE	-	Lake, loch or reservoir.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
7	452 SE	-	Lake, loch or reservoir.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 9.9
8	452 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
Not shown	452 SE	-	Lake, loch or reservoir.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
Not shown	452 SE	-	Lake, loch or reservoir.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 9.9
Not shown	452 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
9	456 NE	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
Not shown	456 NE	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
10	457 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
11	457 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
Not shown	457 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
Not shown	457	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
	E			Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
12	478 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
Not shown	478 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided

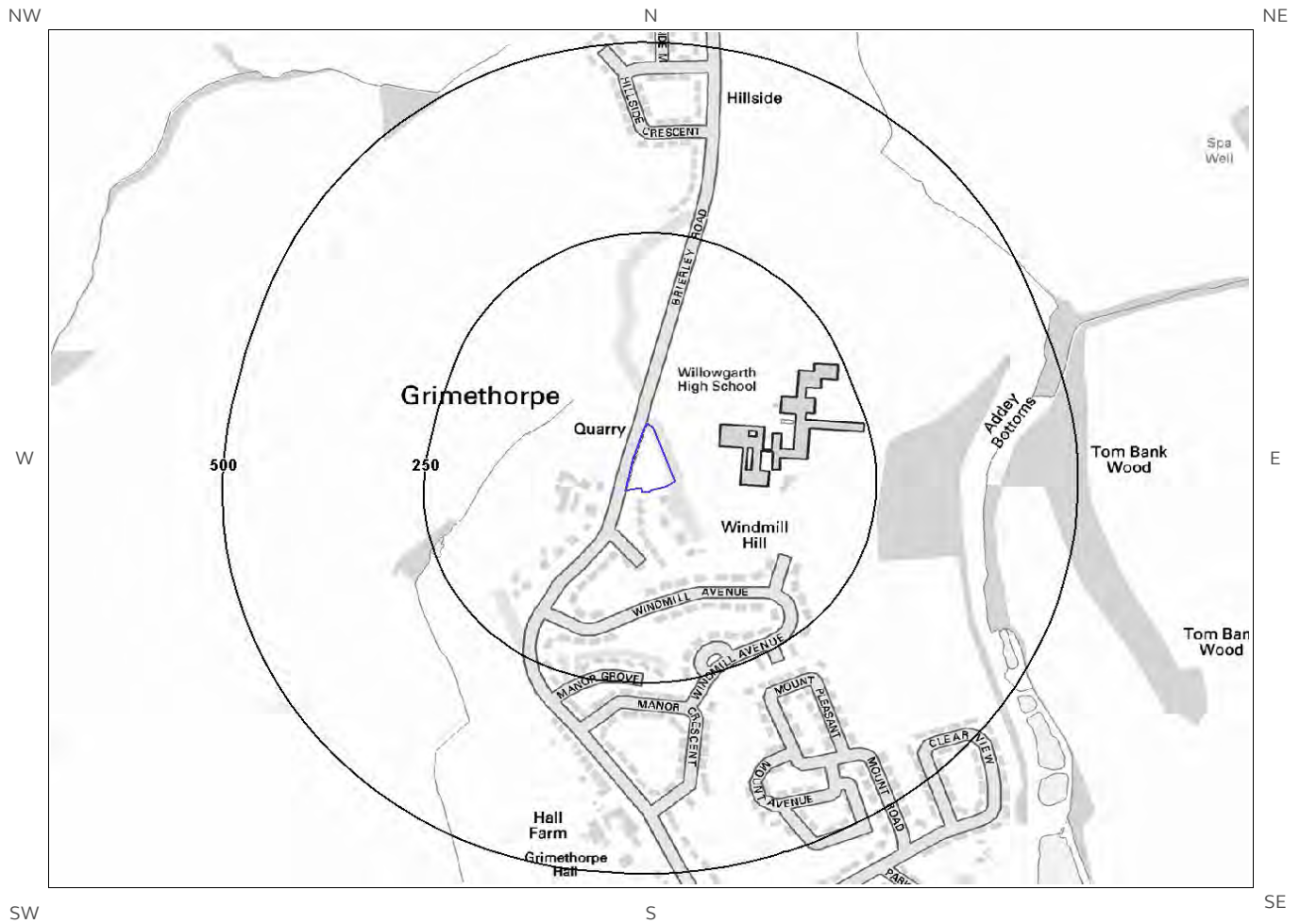
6.11 Surface Water Features

Surface water features within 250m of the study site Identified

The following surface water records are not represented on mapping:

Distance (m)	Direction
95	NW
214	W

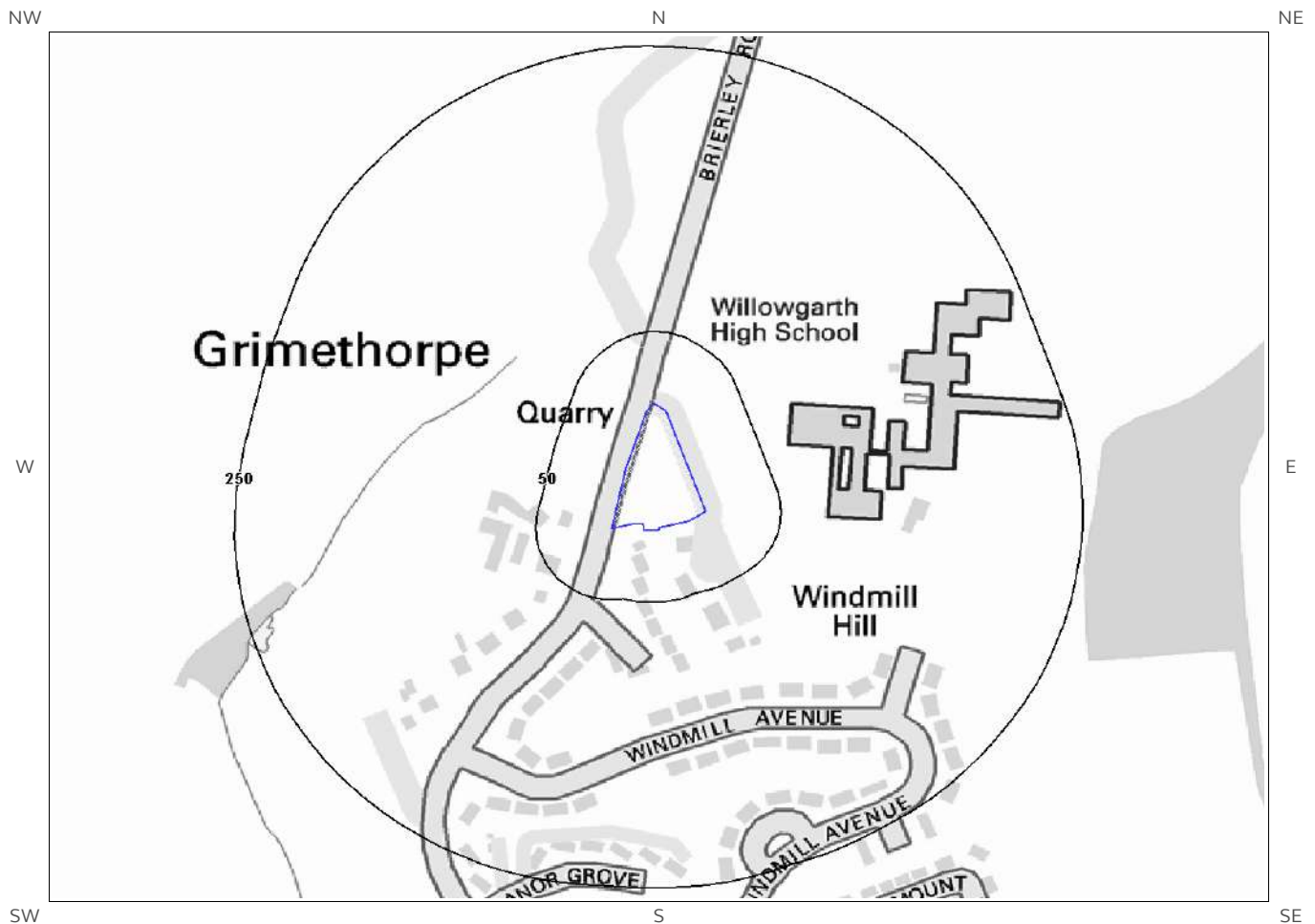
7a. Environment Agency/Natural Resources Wales Flood Map for Planning (from rivers and the sea)



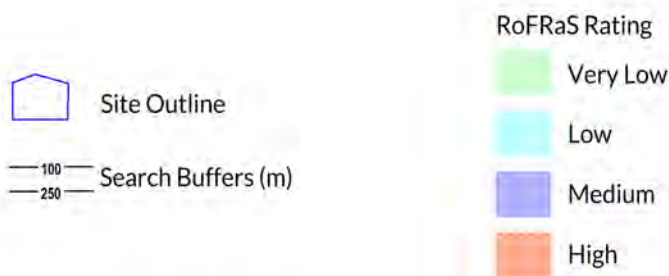
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7b. Environment Agency/Natural Resources Wales Risk of Flooding from Rivers and the Sea (RoFRaS) Map



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7 Flooding

7.1 River and Coastal Zone 2 Flooding

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

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

Database searched and no data found.

7.2 River and Coastal Zone 3 Flooding

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

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

Database searched and no data found.

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

Highest risk of flooding onsite Very Low

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

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

7.4 Flood Defences

Flood Defences within 250m of the study site None identified
Database searched and no data found.

7.5 Areas benefiting from Flood Defences

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

7.6 Areas benefiting from Flood Storage

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

7.7 Groundwater Flooding Susceptibility Areas

7.7.1 British Geological Survey groundwater flooding susceptibility areas within 50m of the boundary of the study site Identified

Clearwater Flooding or Superficial Deposits Flooding Clearwater Flooding

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

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

Limited potential

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

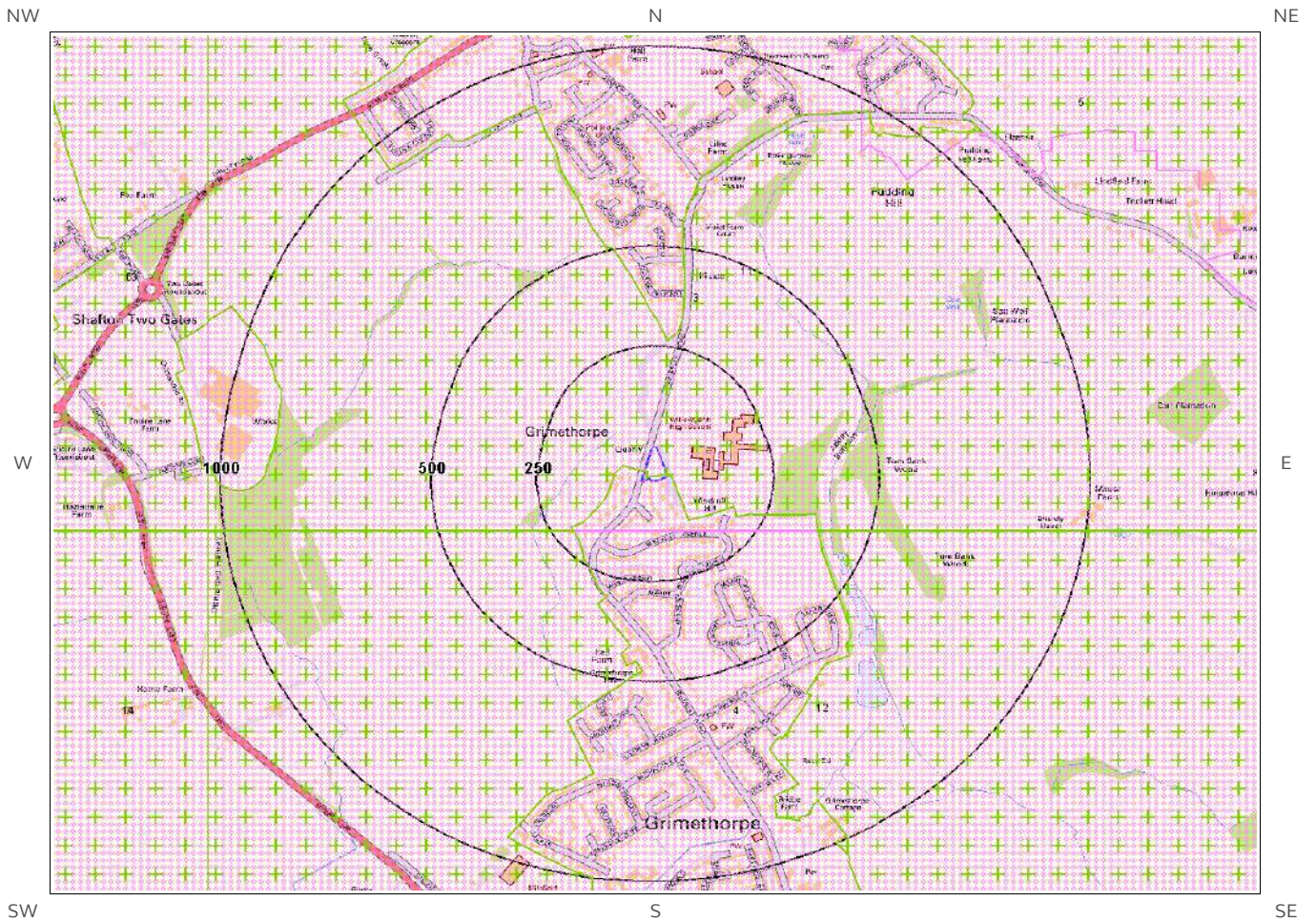
7.8 Groundwater Flooding Confidence Areas

British Geological Survey confidence rating in this result Low

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

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

8. Designated Environmentally Sensitive Sites Map



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8. Designated Environmentally Sensitive Sites

Designated Environmentally Sensitive Sites within 2000m of the study site

Identified

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

1

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

ID	Distance (m)	Direction	SSSI Name	Data Source
Not shown	1736	S	Carlton Main Brickworks	Natural England

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

2

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

ID	Distance (m)	Direction	Ancient Woodland Name	Data Source
Not shown	1505	SE	WEST HAIGH WOOD	Ancient Replanted Woodland
Not shown	1859	SE	WEST HAIGH WOOD	Ancient and Semi-Natural Woodland

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

1

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

ID	Distance (m)	Direction	LNR Name	Data Source
Not shown	1868	SE	West haigh Wood	Natural England

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

6

The following Nitrate Vulnerable Zone records produced by DEFRA are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	NVZ Name	Data Source
3	0	On Site	Existing	DEFRA
4	123	S	Existing	DEFRA
5	887	NE	Existing	DEFRA
6	1029	W	Existing	DEFRA
7	1037	W	Existing	DEFRA
Not shown	1514	E	Existing	DEFRA

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

7

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

ID	Distance	Direction	Green Belt Name	Local Authority Name
11	0	On Site	Liverpool, Manchester and West Yorks Greenbelt	Barnsley District (B)
12	206	SW	Liverpool, Manchester and West Yorks Greenbelt	Barnsley District (B)
13	1029	W	Liverpool, Manchester and West Yorks Greenbelt	Barnsley District (B)
14	1037	W	Liverpool, Manchester and West Yorks Greenbelt	Barnsley District (B)
Not shown	1641	E	Liverpool, Manchester and West Yorks Greenbelt	Wakefield
Not shown	1755	NW	Liverpool, Manchester and West Yorks Greenbelt	Wakefield

Not
shown

1770

E

Liverpool, Manchester and West Yorks
Greenbelt

Wakefield

9. Natural Hazards Findings

9.1 Detailed BGS GeoSure Data

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

9.1.1 Shrink Swell

Maximum Shrink-Swell** hazard rating identified on the study site Very Low

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

Hazard
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.

9.1.2 Landslides

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

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

Hazard
Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.

9.1.3 Soluble Rocks

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

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

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

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

9.1.4 Compressible Ground

Maximum Compressible Ground* hazard rating identified on the study site

Very Low

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

Hazard

Very low potential for compressible deposits to be present. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.

9.1.5 Collapsible Rocks

Maximum Collapsible Rocks* hazard rating identified on the study site

Very Low

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

Hazard

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

9.1.6 Running Sand

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

Very Low

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

Hazard

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

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

9.2 Radon

9.2.1 Radon Affected Areas

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

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

9.2.2 Radon Protection

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

10. Mining

10.1 Coal Mining

Coal mining areas within 75m of the study site

Identified

The following coal mining information provided by the Coal Authority is not represented on Mapping:

Distance (m)	Direction	Details
0	On Site	The study site is located within the specified search distance of an identified mining area. Further details concerning this can be obtained from the Coal Authority Helpline on 0845 762 6848.

10.2 Non-Coal Mining

Non-Coal Mining areas within 50m of the study site boundary

Identified

The following non-coal mining information is provided by the BGS:

Distance (m)	Direction	Name	Commodity	Assessment of likelihood
0.0	On Site	Sheffield Area	Iron Ore	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered

Past underground mine workings may occur. The rock types present in these areas are such that small mineral veins may be present on which it is possible that small scale mining has been undertaken and/or it is possible that limited underground extraction of other materials may have occurred. All such occurrences are likely to be of minor localised extent and infrequent. It should be noted, however, that there is always the possibility of the existence of other sub-surface excavations, such as wells, cess pits, follies, air raid shelters/bunkers and other military structures etc. that could affect surface ground stability but which are outside the scope of this dataset. However, if in a coalfield area you should still consider a Coal Authority mining search for the area of interest.

10.3 Brine Affected Areas

Brine affected areas within 75m of the study site
Guidance: No Guidance Required.

None identified

Contact Details

Groundsure Helpline
Telephone: 08444 159 000
info@groundsure.com

British Geological Survey Enquiries

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

Web: www.bgs.ac.uk

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

Environment Agency

National Customer Contact Centre, PO Box 544
Rotherham, S60 1BY
Tel: 03708 506 506

Web: www.environment-agency.gov.uk

Email: enquiries@environment-agency.gov.uk

Public Health England

Public information access office
Public Health England, Wellington House
133-155 Waterloo Road, London, SE1 8UG
www.gov.uk/phe

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

The Coal Authority

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

Ordnance Survey

Adanac Drive, Southampton
SO16 0AS
Tel: 08456 050505

Local Authority

Authority: Barnsley Metropolitan Borough Council
Phone: 01226 773555

Web: <http://www.barnsley.gov.uk/>

Address: PO Box 634, Barnsley, South Yorkshire, S70 9GG

Gemapping PLC

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



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Appendix 2

Historical Maps

Site Details:

WINDMILL HILL QUARRY,
BRIERLEY ROAD,
GRIMETHORPE, BARNSELY,
S72 7AW

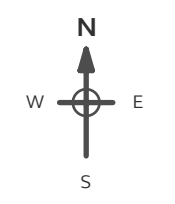
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Report Ref: GS-6021183
Grid Ref: 441061, 410167

Map Name: County Series

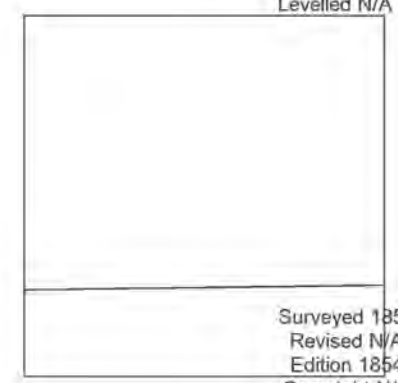
Map date: 1854

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1854
Revised N/A
Edition 1854
Copyright N/A
Levelled N/A



Surveyed 1850
Revised N/A
Edition 1854
Copyright N/A
Levelled N/A

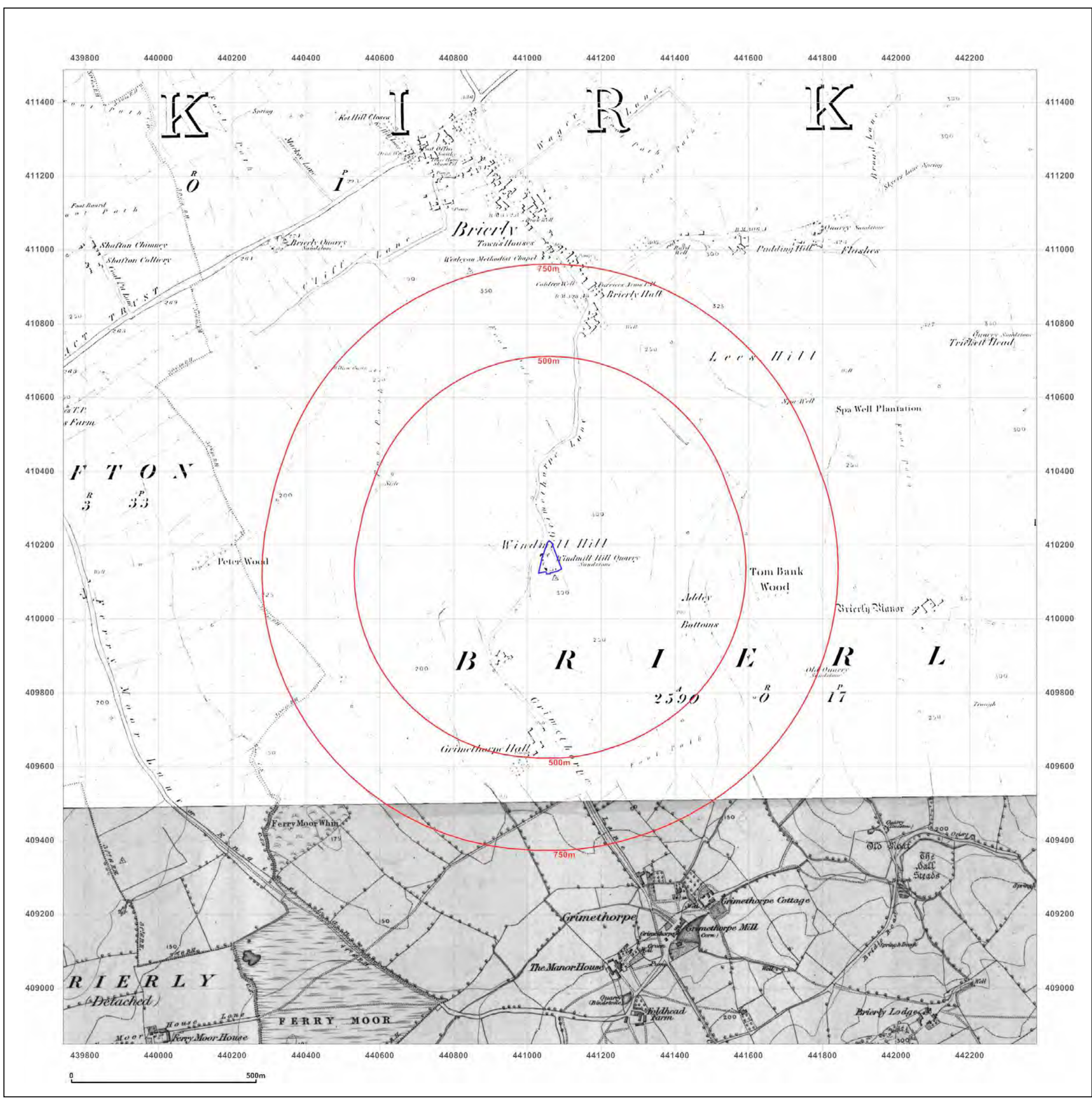


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Map legend available at:
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Site Details:

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BRIERLEY ROAD,
GRIMETHORPE, BARNSELY,
S72 7AW

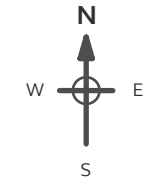
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Report Ref: GS-6021183
Grid Ref: 441061, 410167

Map Name: County Series

Map date: 1891-1894

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1891 Revised 1891 Edition 1891 Copyright N/A Levelled N/A	Surveyed 1891 Revised 1891 Edition 1891 Copyright N/A Levelled N/A
Surveyed 1890 Revised N/A Edition 1894 Copyright N/A Levelled N/A	

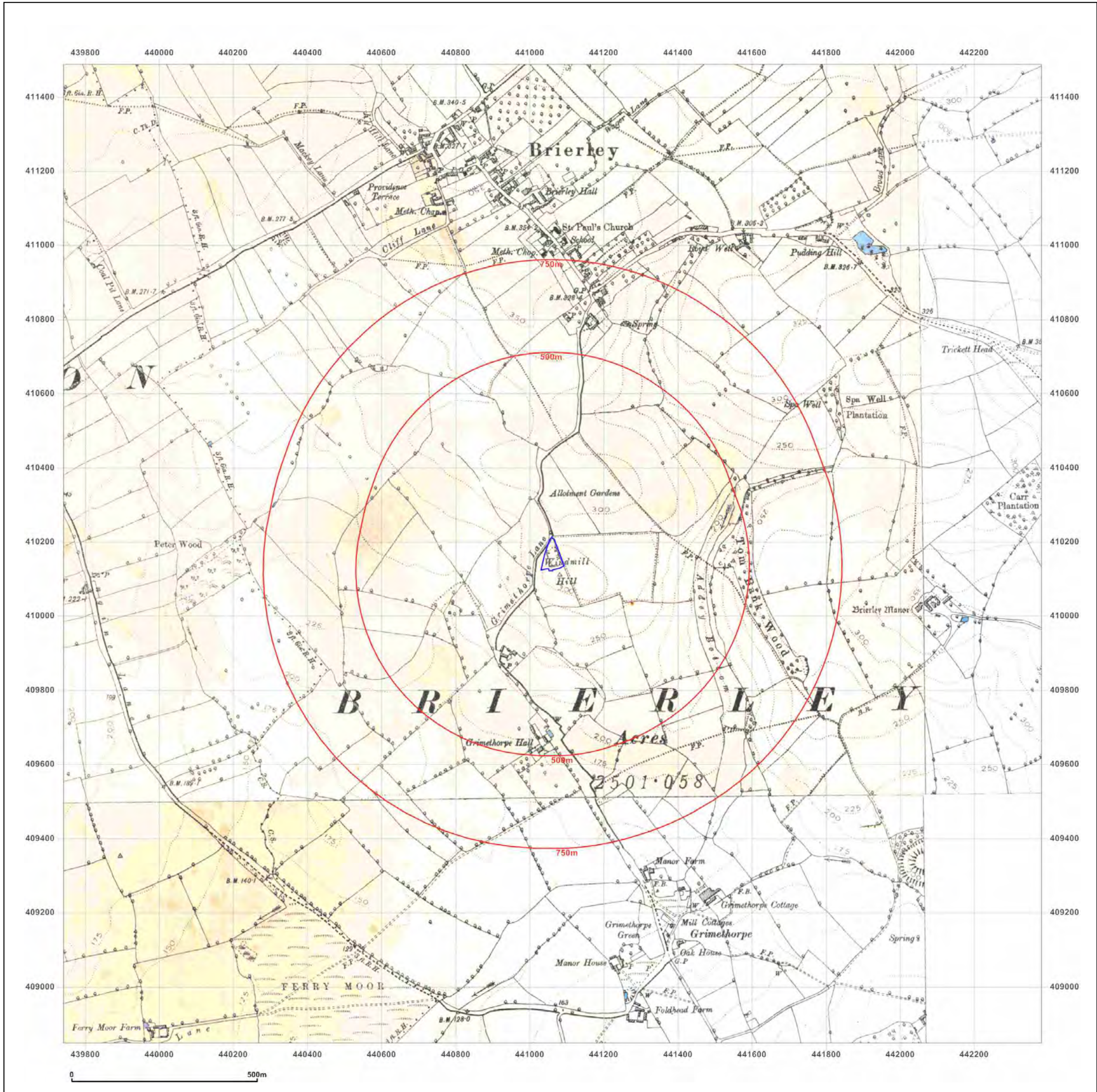


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Site Details:

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S72 7AW

Client Ref: J4708_19_E_PO-0115
Report Ref: GS-6021183
Grid Ref: 441061, 410167

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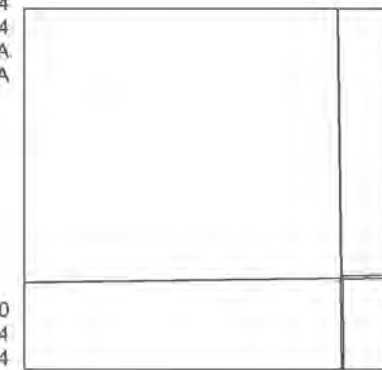
Map date: 1904

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1891
Revised 1904
Edition 1904
Copyright N/A
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Surveyed 1891
Revised 1904
Edition 1904
Copyright N/A
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Surveyed 1890
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Edition 1904
Copyright N/A
Levelled N/A

Surveyed 1891
Revised 1904
Edition 1904
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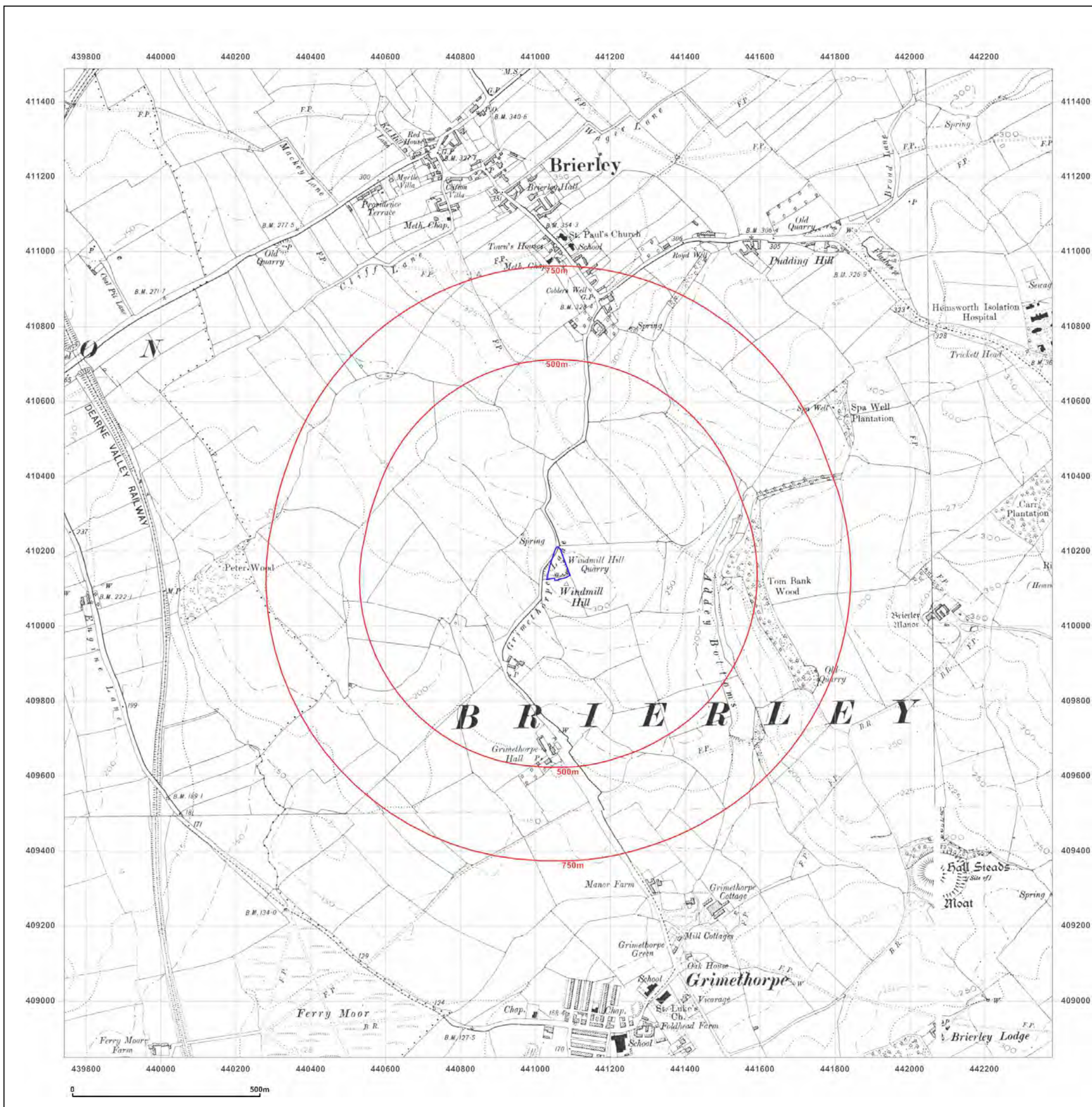


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GRIMETHORPE, BARNSELY,
S72 7AW

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Report Ref: GS-6021183
Grid Ref: 441061, 410167

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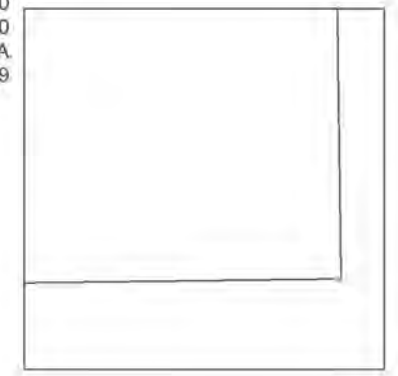
Map date: 1930

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1850
Revised 1930
Edition 1930
Copyright N/A
Levelled 1929

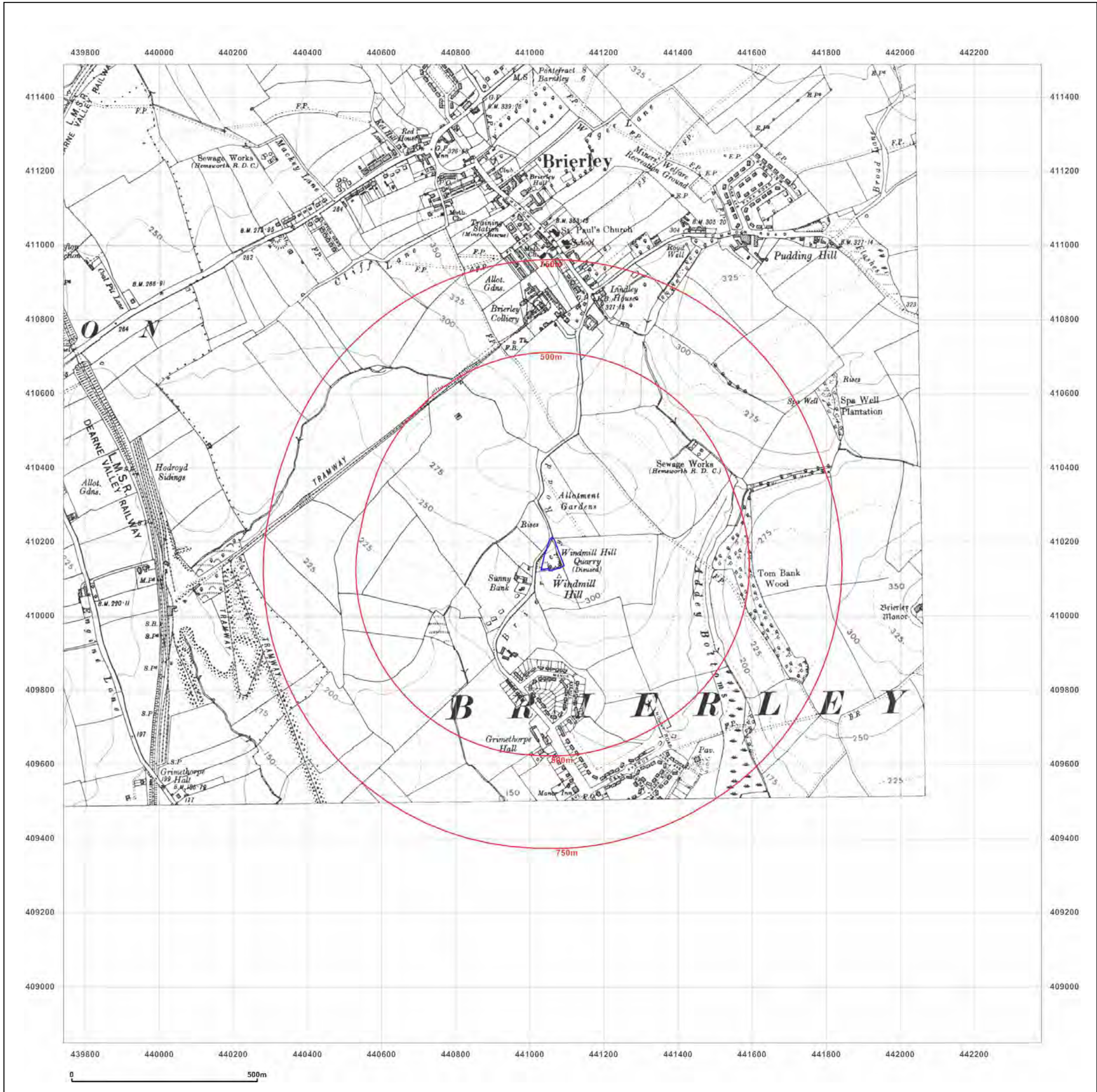


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S72 7AW

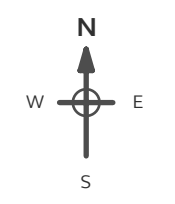
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Map Name: County Series

Map date: 1930-1932

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1850 Revised 1930 Edition 1930 Copyright N/A Levelled 1929	Surveyed 1850 Revised 1930 Edition 1930 Copyright N/A Levelled 1929
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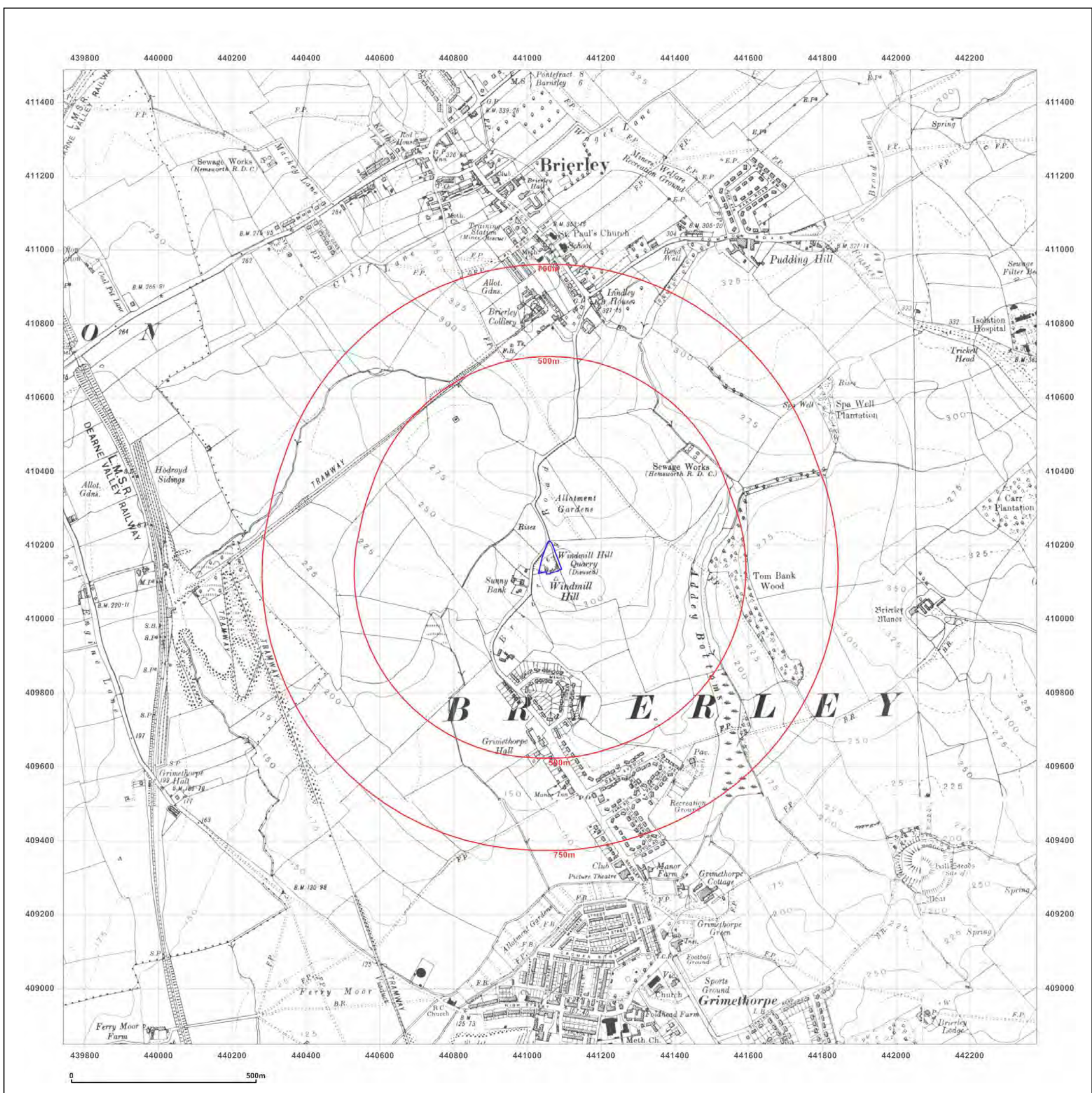


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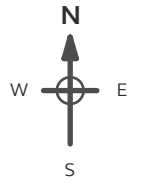
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Grid Ref: 441061, 410167

Map Name: County Series

Map date: 1938

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Printed at: 1:10,560



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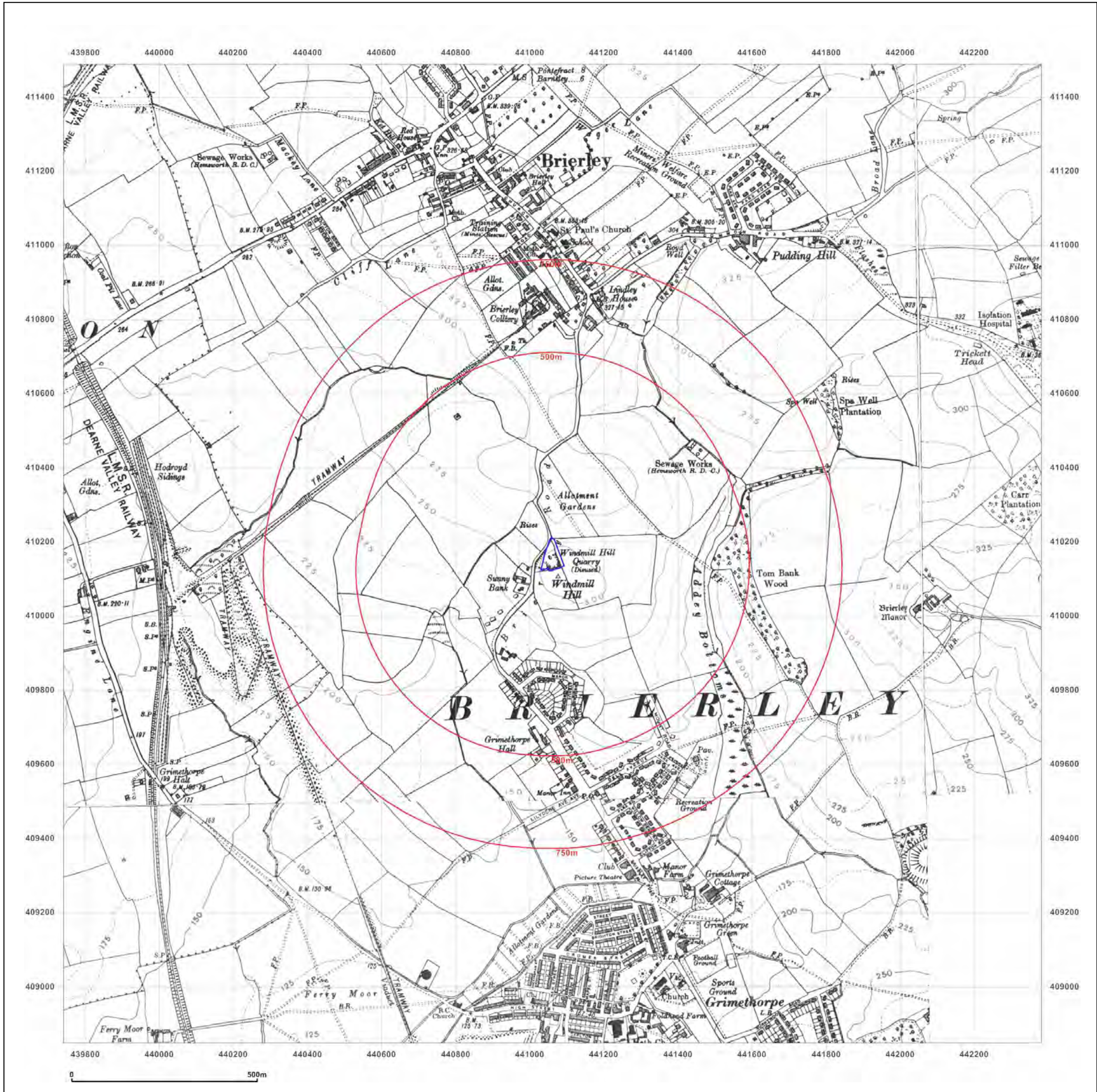


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S72 7AW

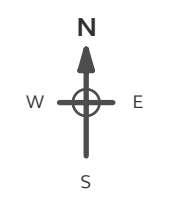
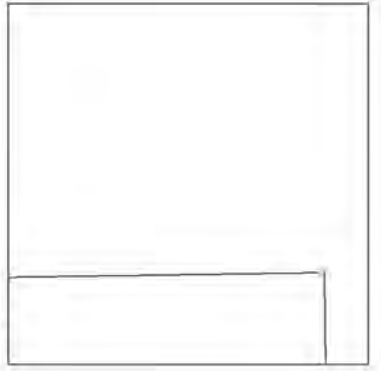
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Scale: 1:10,560

Printed at: 1:10,560

Surveyed 1850
Revised 1938
Edition 1938
Copyright N/A
Levelled 1929

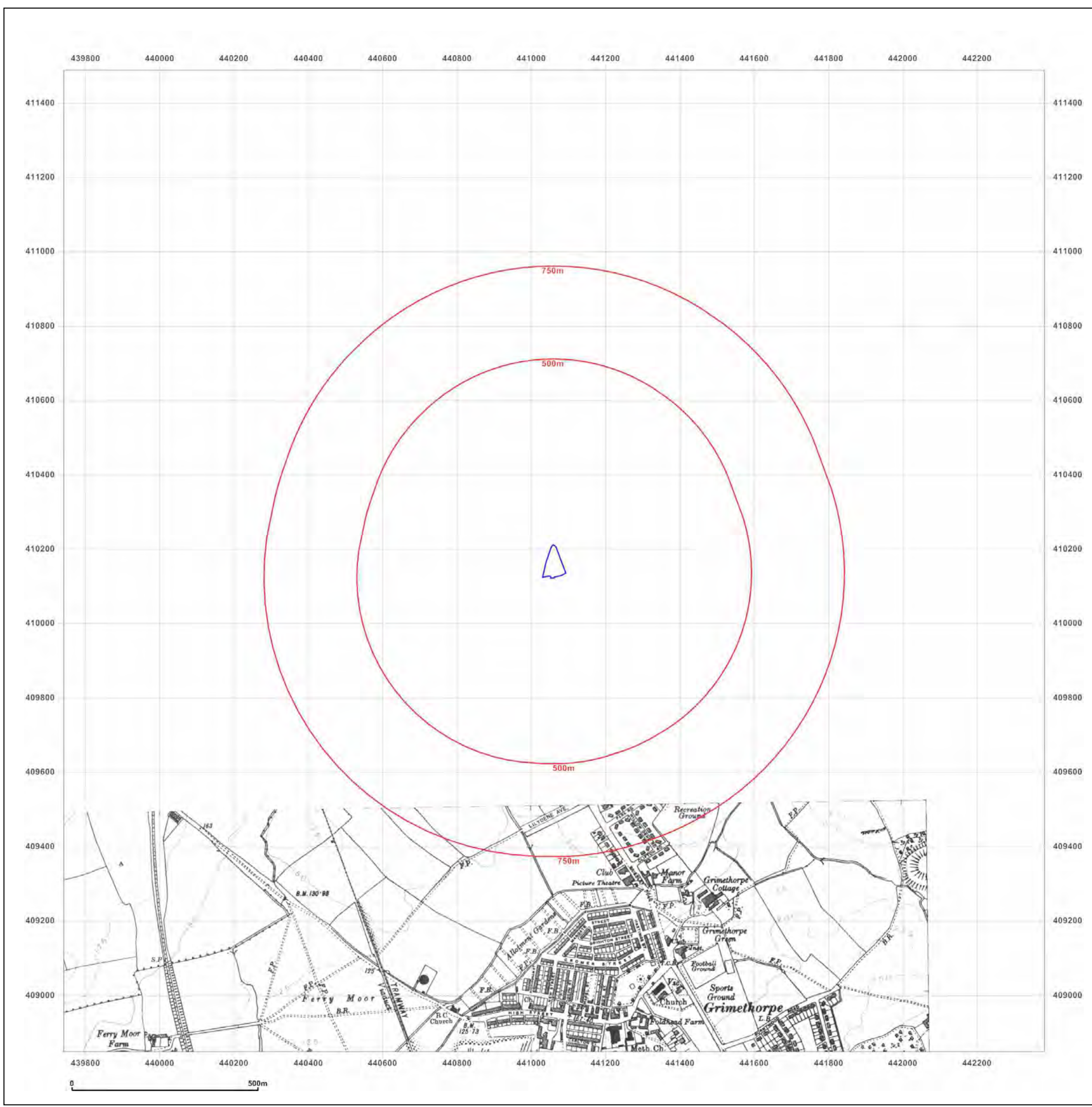


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Map Name: County Series

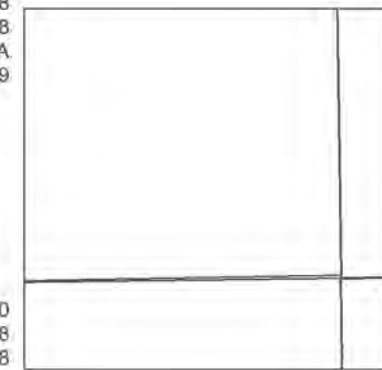
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Scale: 1:10,560

Printed at: 1:10,560



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Revised 1948
Edition 1948
Copyright N/A
Levelled 1929



Surveyed 1850
Revised 1948
Edition 1948
Copyright N/A
Levelled 1929

Surveyed 1850
Revised 1948
Edition 1948
Copyright N/A
Levelled 1929

Surveyed 1850
Revised 1949
Edition 1949
Copyright N/A
Levelled 1929

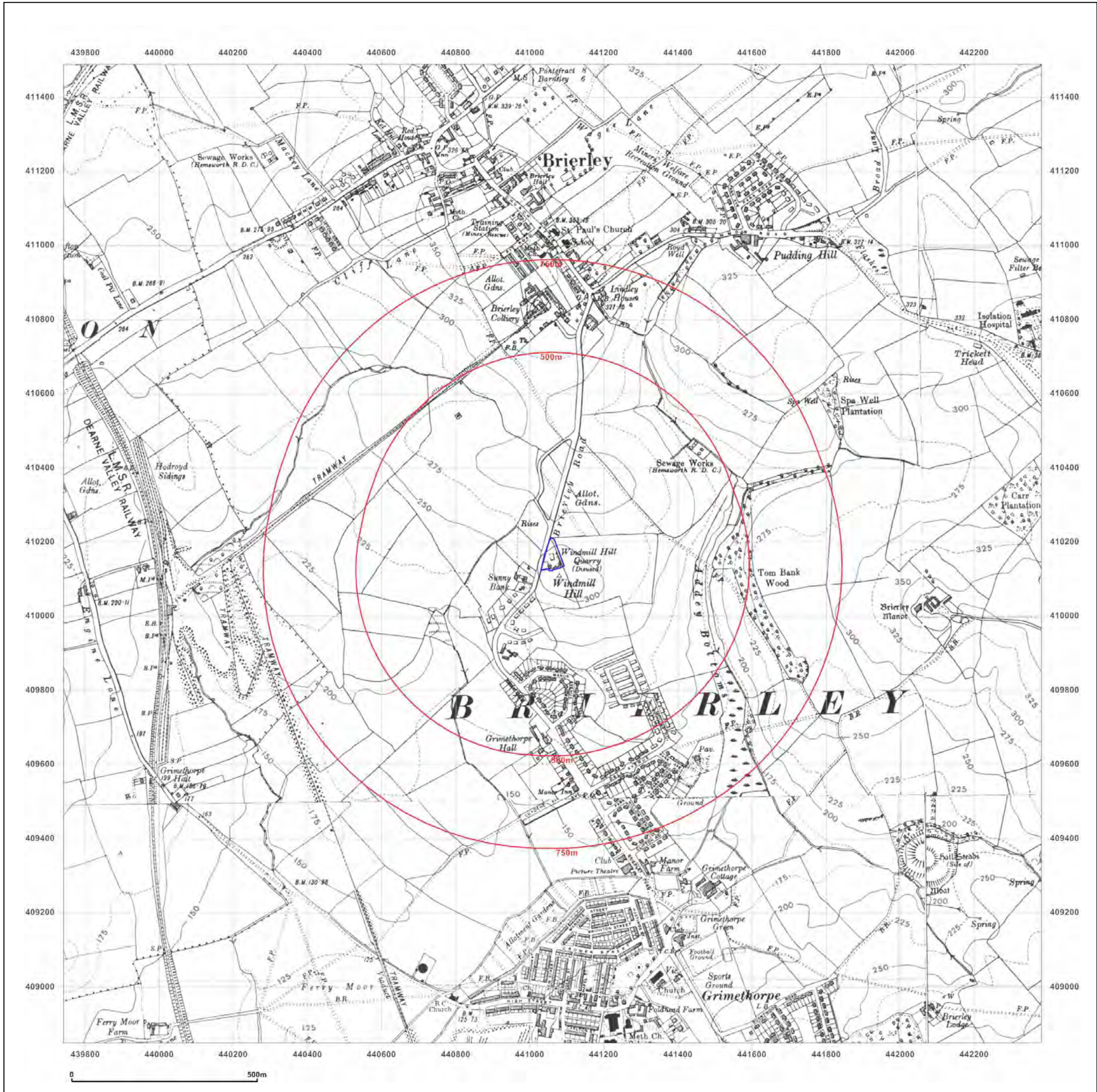


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Report Ref: GS-6021183
Grid Ref: 441061, 410167

Map Name: Provisional

Map date: 1951-1955

Scale: 1:10,560

Printed at: 1:10,560



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

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

Surveyed N/A
Revised 1955
Edition N/A
Copyright 1955
Levelled N/A

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Revised 1955
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Copyright N/A
Levelled N/A

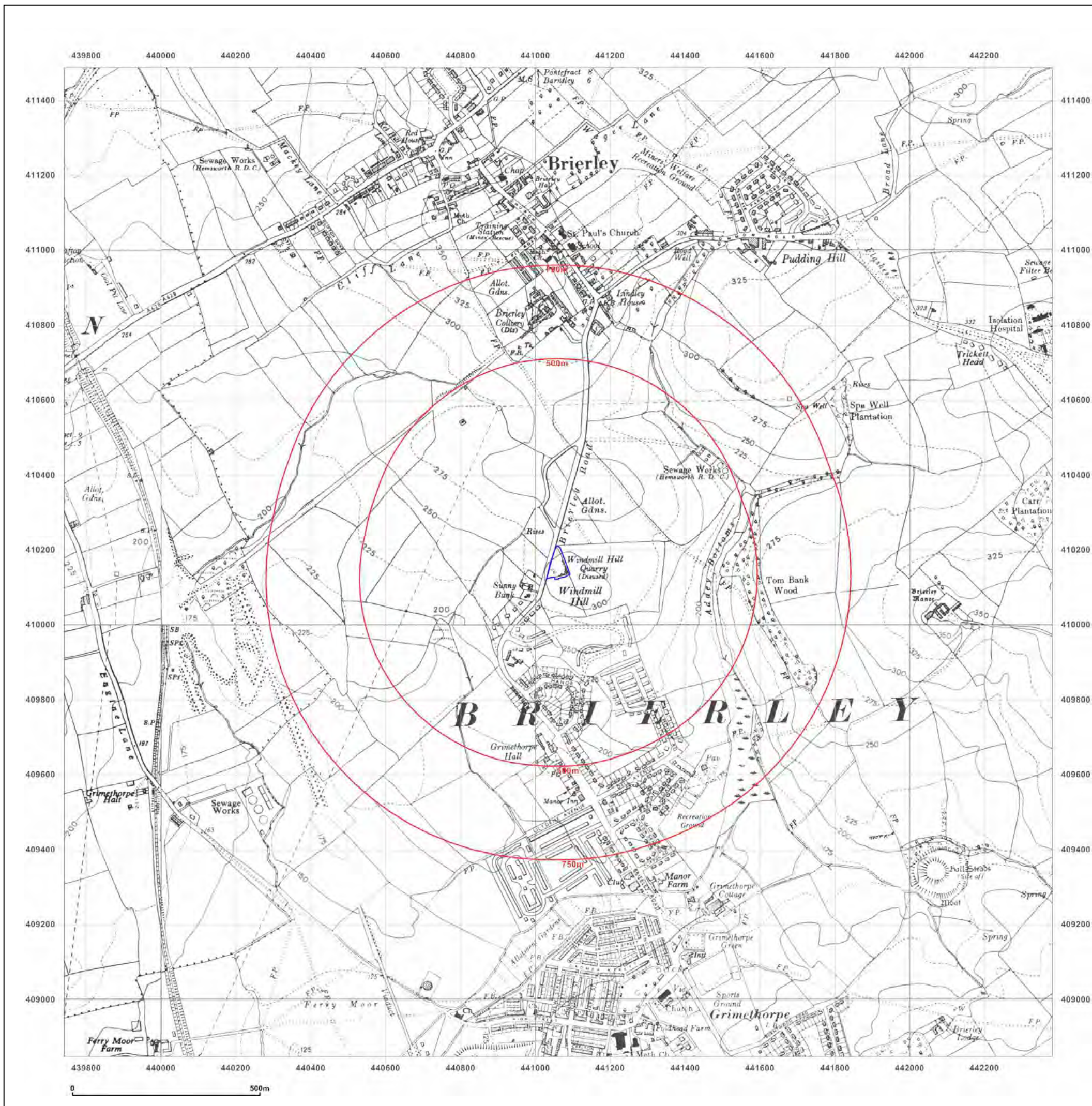


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GRIMETHORPE, BARNSELY,
S72 7AW

Client Ref: J4708_19_E_PO-0115
Report Ref: GS-6021183
Grid Ref: 441061, 410167

Map Name: Provisional

Map date: 1966-1967

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1966
Revised 1966
Edition N/A
Copyright 1966
Levelled N/A

Surveyed 1967
Revised 1967
Edition N/A
Copyright 1967
Levelled N/A

Surveyed 1966
Revised 1966
Edition N/A
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Levelled N/A

Surveyed 1967
Revised 1967
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Copyright 1967
Levelled N/A

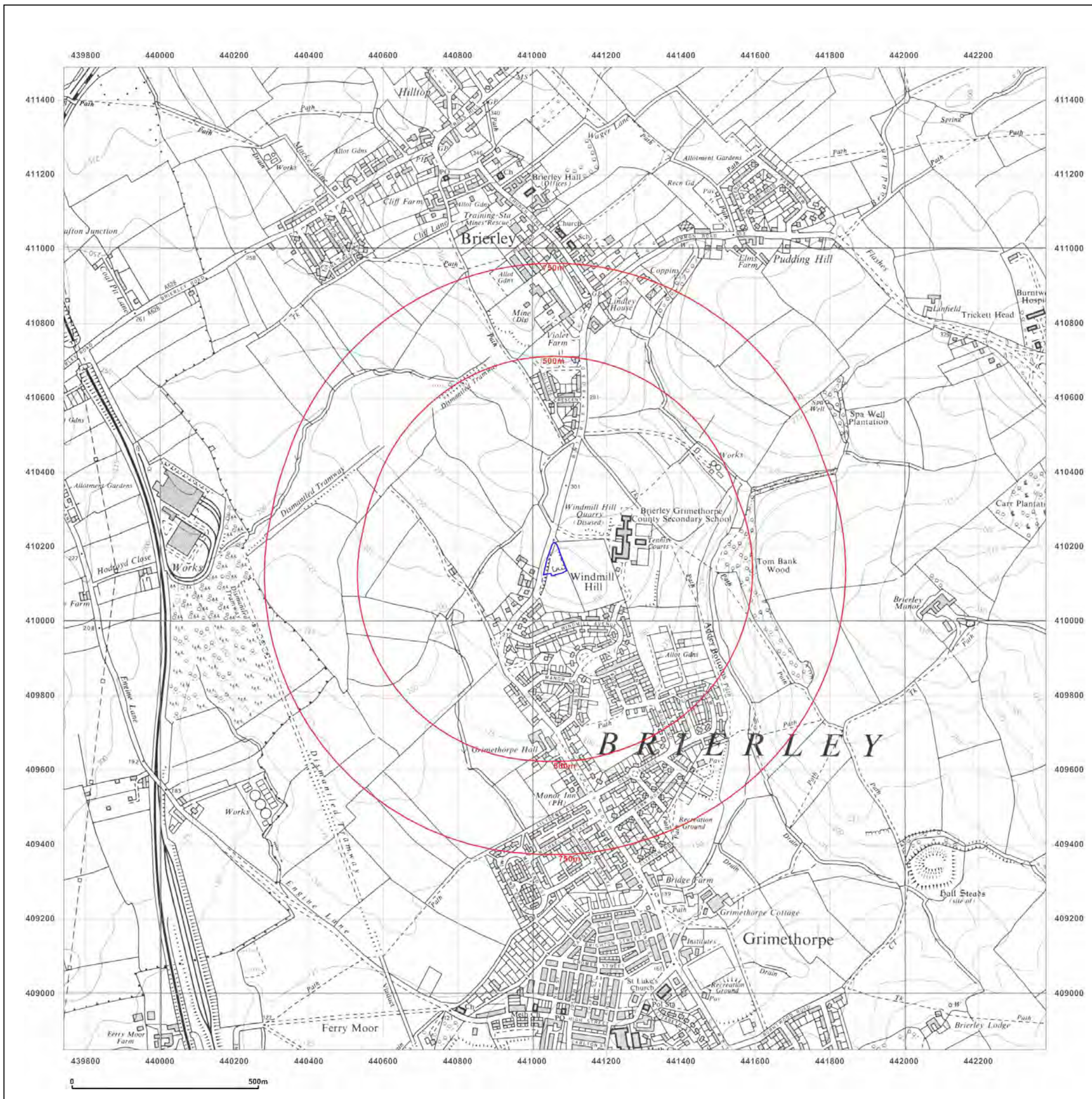


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GRIMETHORPE, BARNESLEY,
S72 7AW

Client Ref: J4708_19_E_PO-0115
Report Ref: GS-6021183
Grid Ref: 441061, 410167

Map Name: National Grid

Map date: 1981-1982

Scale: 1:10,000

Printed at: 1:10,000



Surveyed 1980
Revised 1982
Edition N/A
Copyright 1983
Levelled 1978

Surveyed 1981
Revised 1982
Edition N/A
Copyright 1983
Levelled 1978

Surveyed 1980
Revised 1981
Edition N/A
Copyright 1982
Levelled 1978

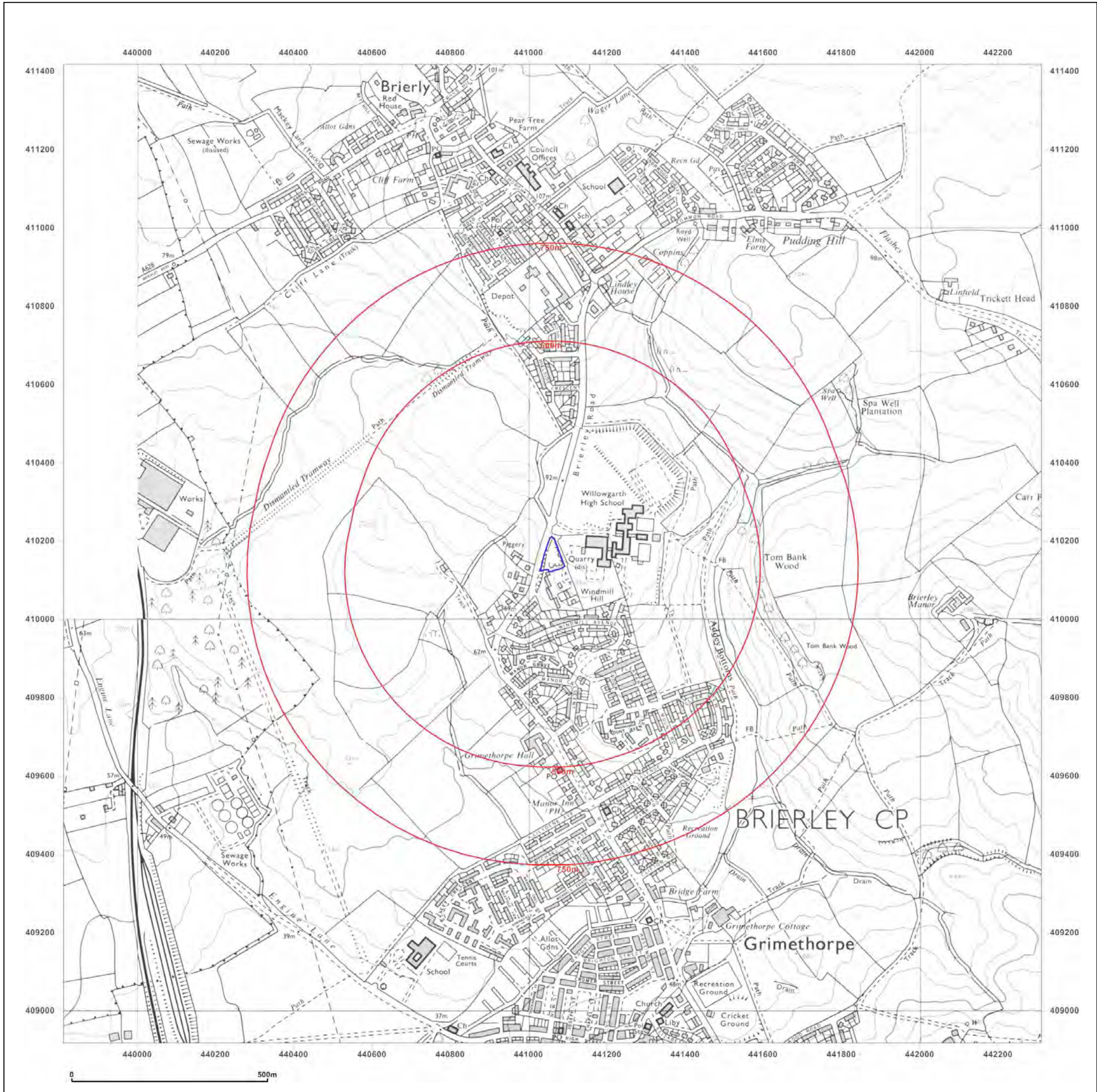


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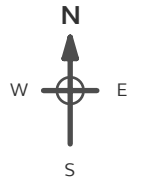
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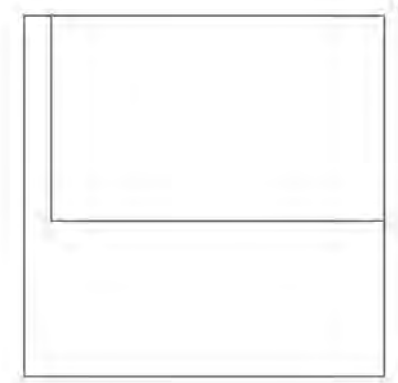
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 WINDMILL HILL QUARRY,
 BRIERLEY ROAD,
 GRIMETHORPE, BARNSELY,
 S72 7AW

Client Ref: J4708_19_E_PO-0115
Report Ref: GS-6021183
Grid Ref: 441061, 410167

Map Name: National Grid
Map date: 1988
Scale: 1:10,000
Printed at: 1:10,000



Surveyed 1985
 Revised 1988
 Edition N/A
 Copyright 1989
 Levelled 1978

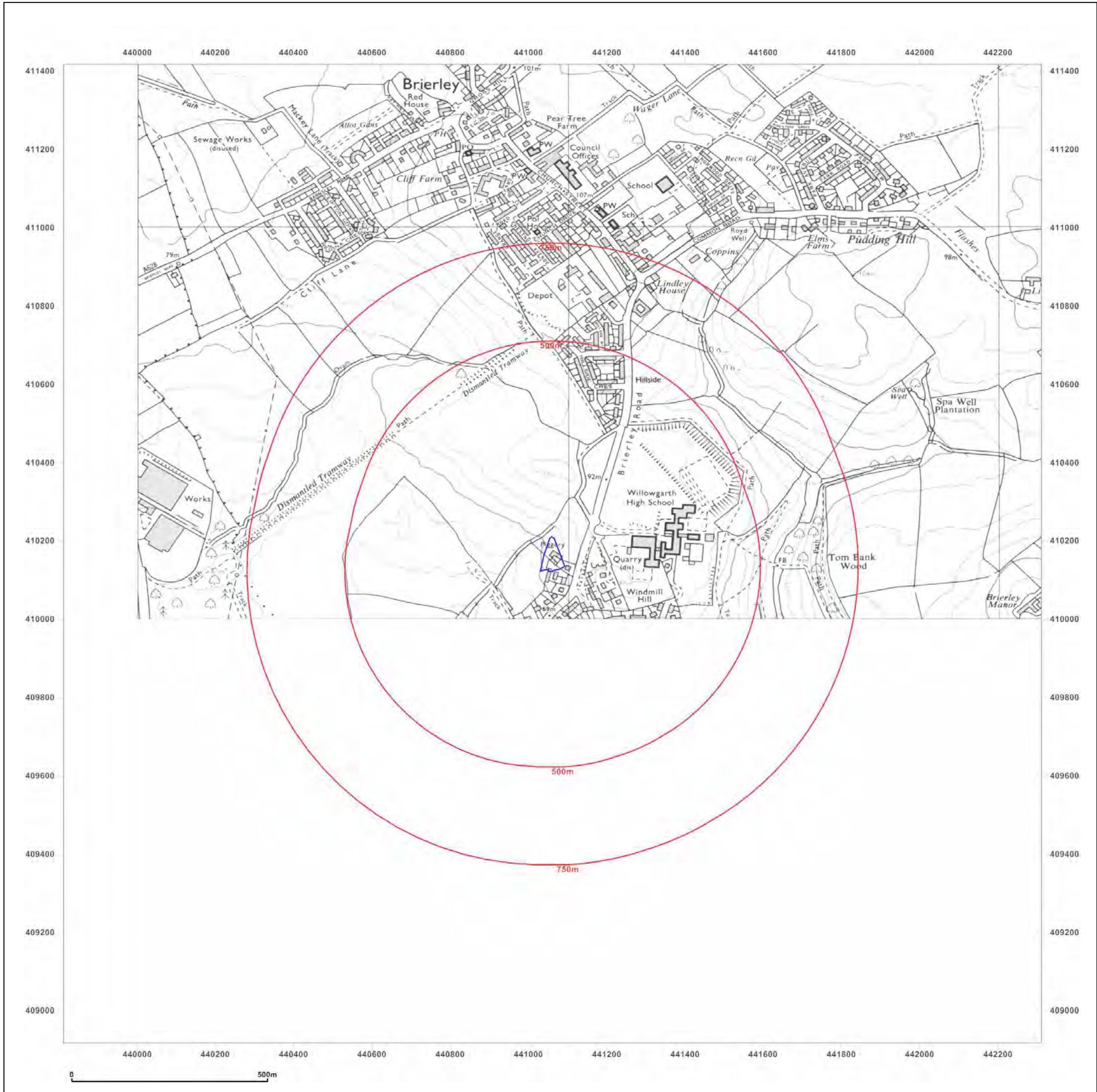


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GRIMETHORPE, BARNSELY,
S72 7AW

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Report Ref: GS-6021183
Grid Ref: 441061, 410167

Map Name: National Grid

Map date: 1988-1992

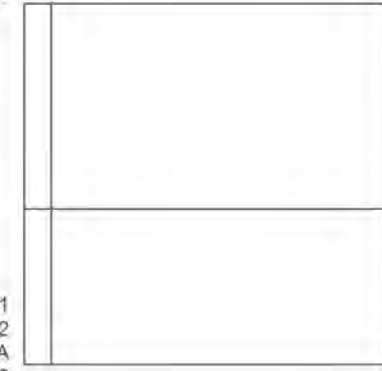
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Printed at: 1:10,000



Surveyed 1984
Revised 1989
Edition N/A
Copyright 1990
Levelled 1978

Surveyed 1985
Revised 1988
Edition N/A
Copyright 1989
Levelled 1978



Surveyed 1981
Revised 1992
Edition N/A
Copyright 1993
Levelled 1978

Surveyed 1987
Revised 1988
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Copyright 1989
Levelled 1978

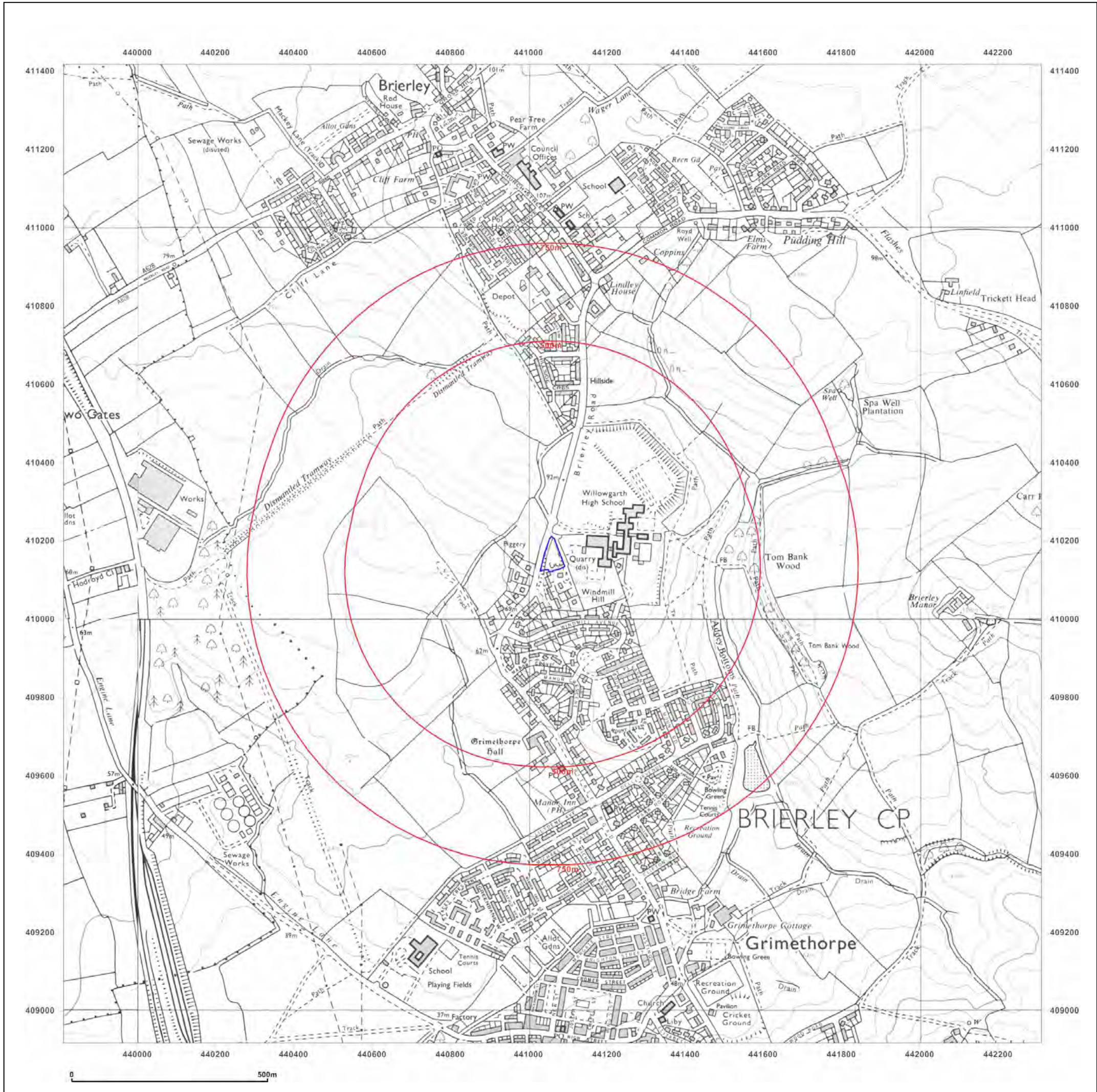


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S72 7AW

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Report Ref: GS-6021183
Grid Ref: 441061, 410167

Map Name: 1:10,000 Raster

Map date: 2002

Scale: 1:10,000

Printed at: 1:10,000

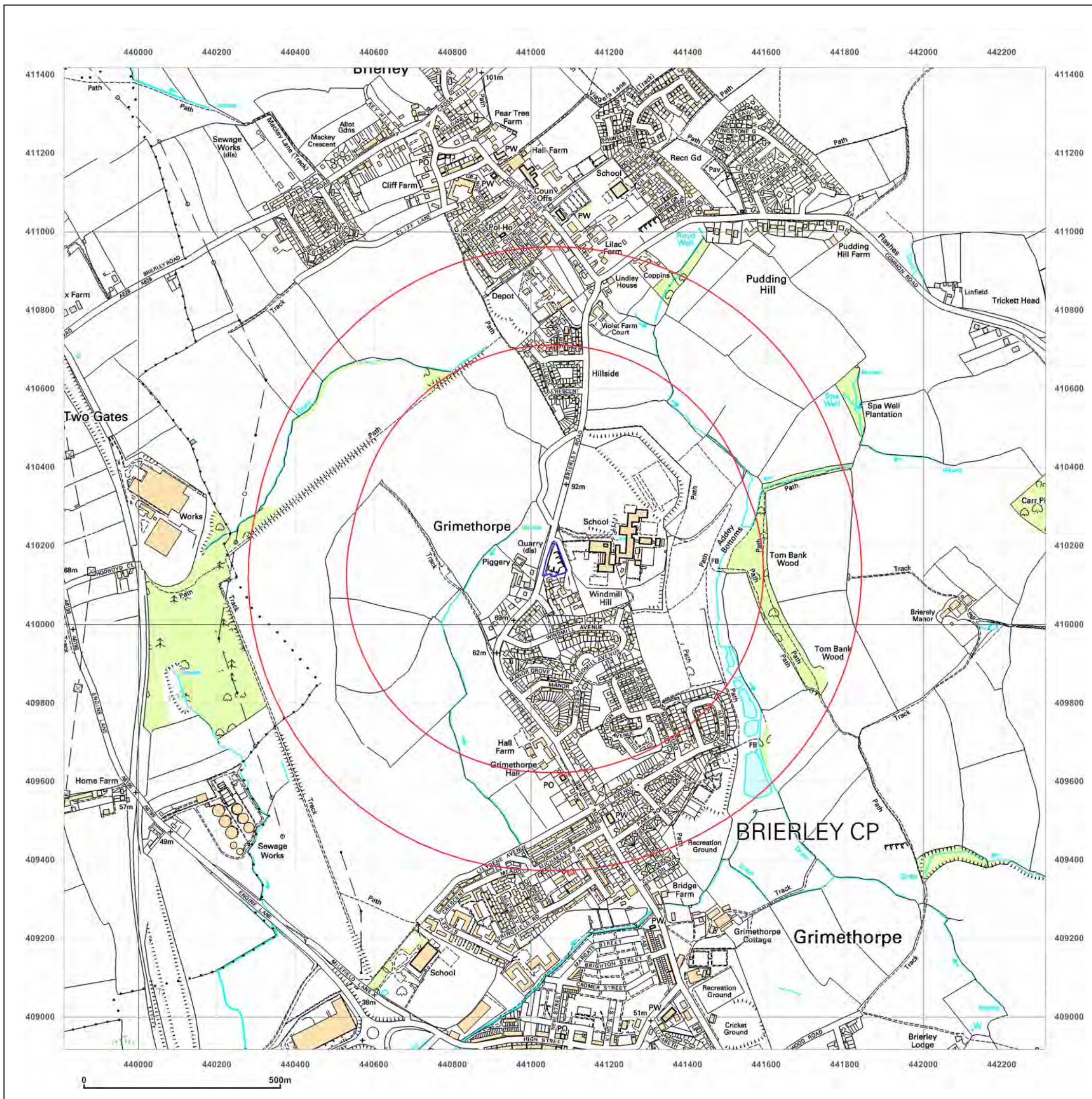


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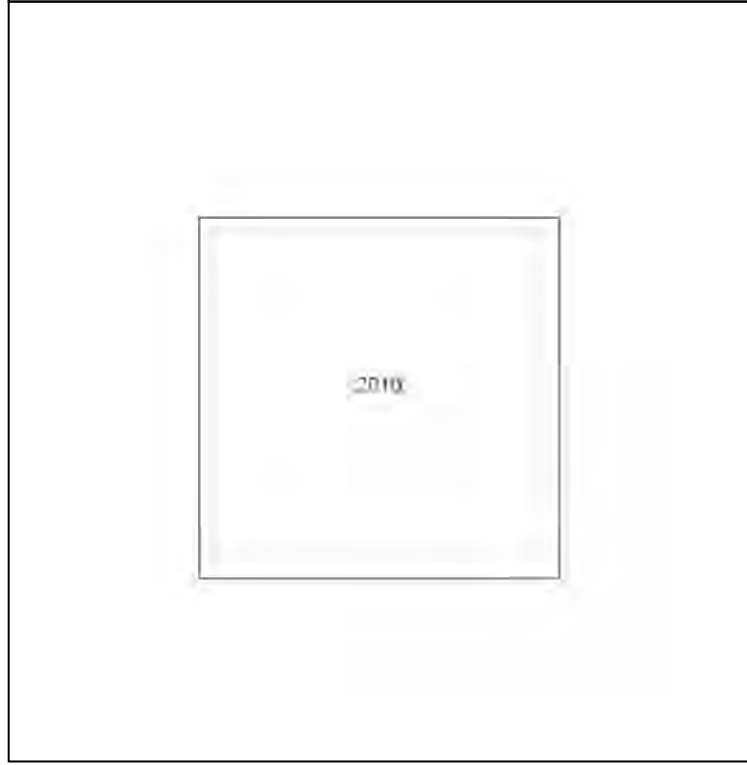
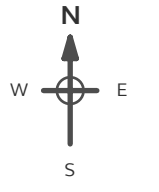
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Site Details:
 WINDMILL HILL QUARRY,
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 S72 7AW

Client Ref: J4708_19_E_PO-0115
Report Ref: GS-6021183
Grid Ref: 441061, 410167

Map Name: National Grid
Map date: 2010
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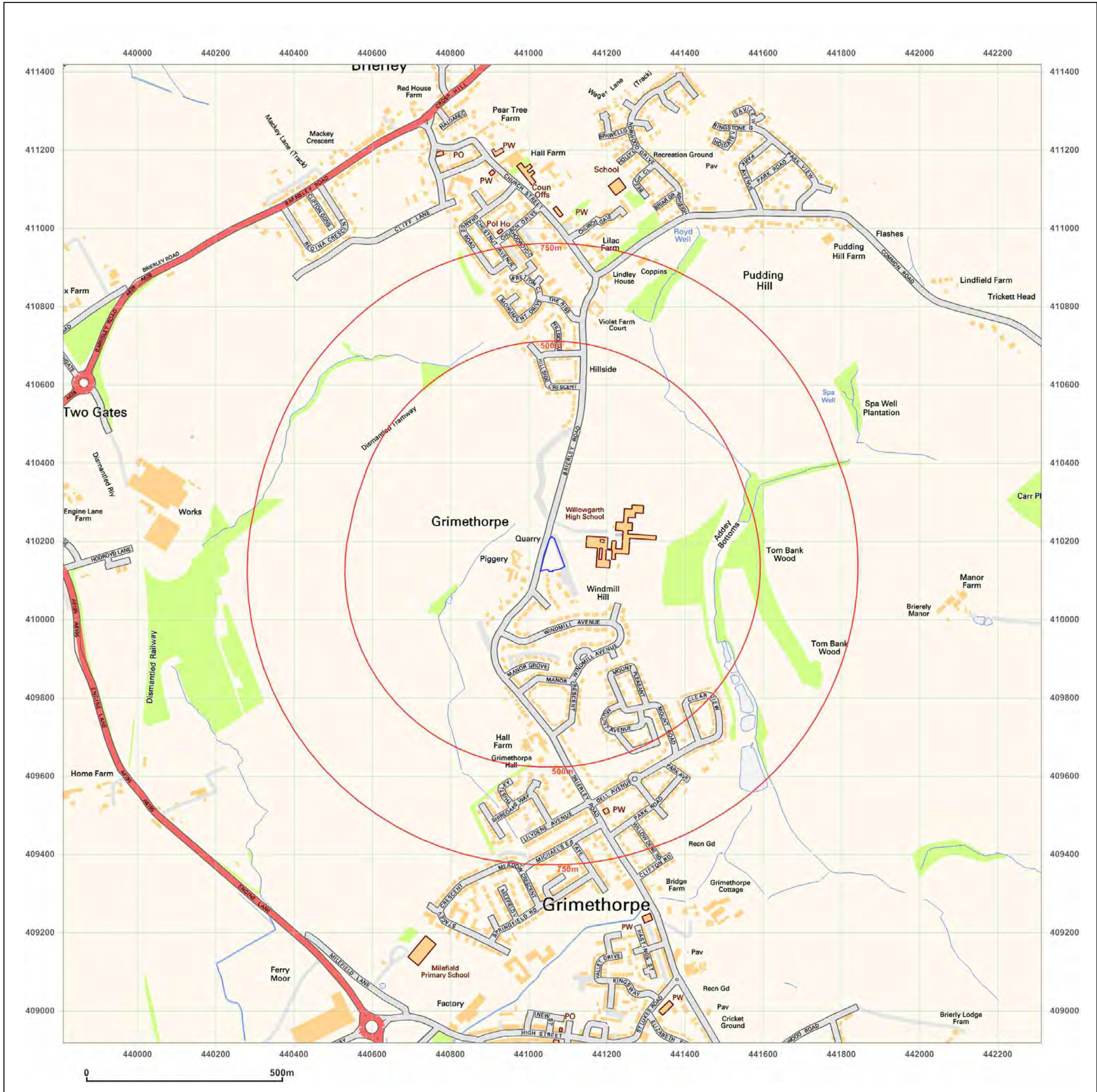


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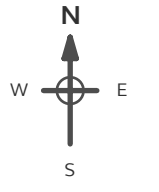
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 S72 7AW

Client Ref: J4708_19_E_PO-0115
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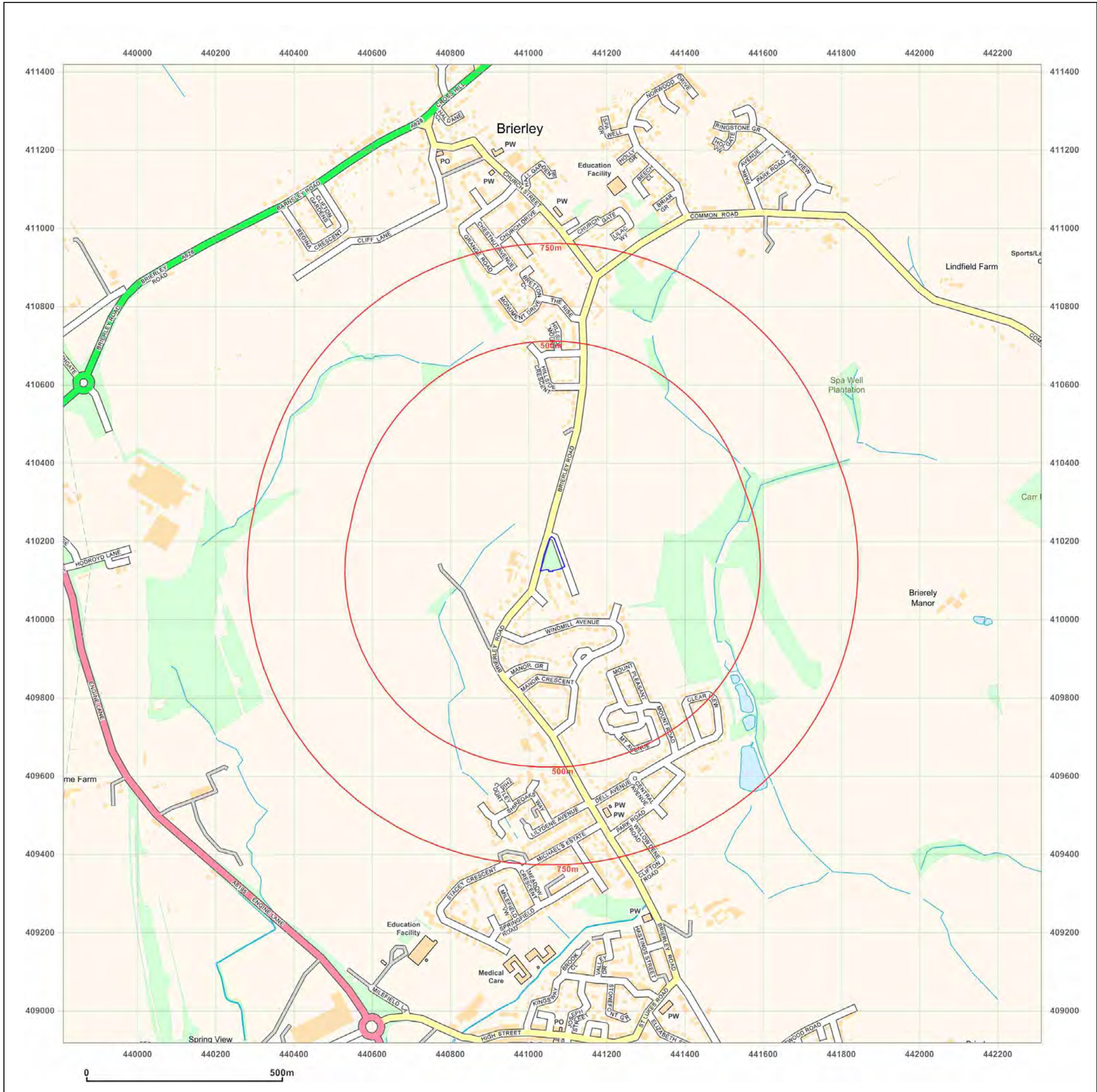
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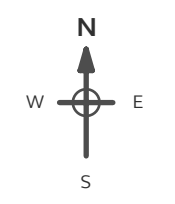
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 Revised N/A
 Edition 1893
 Copyright N/A
 Levelled N/A

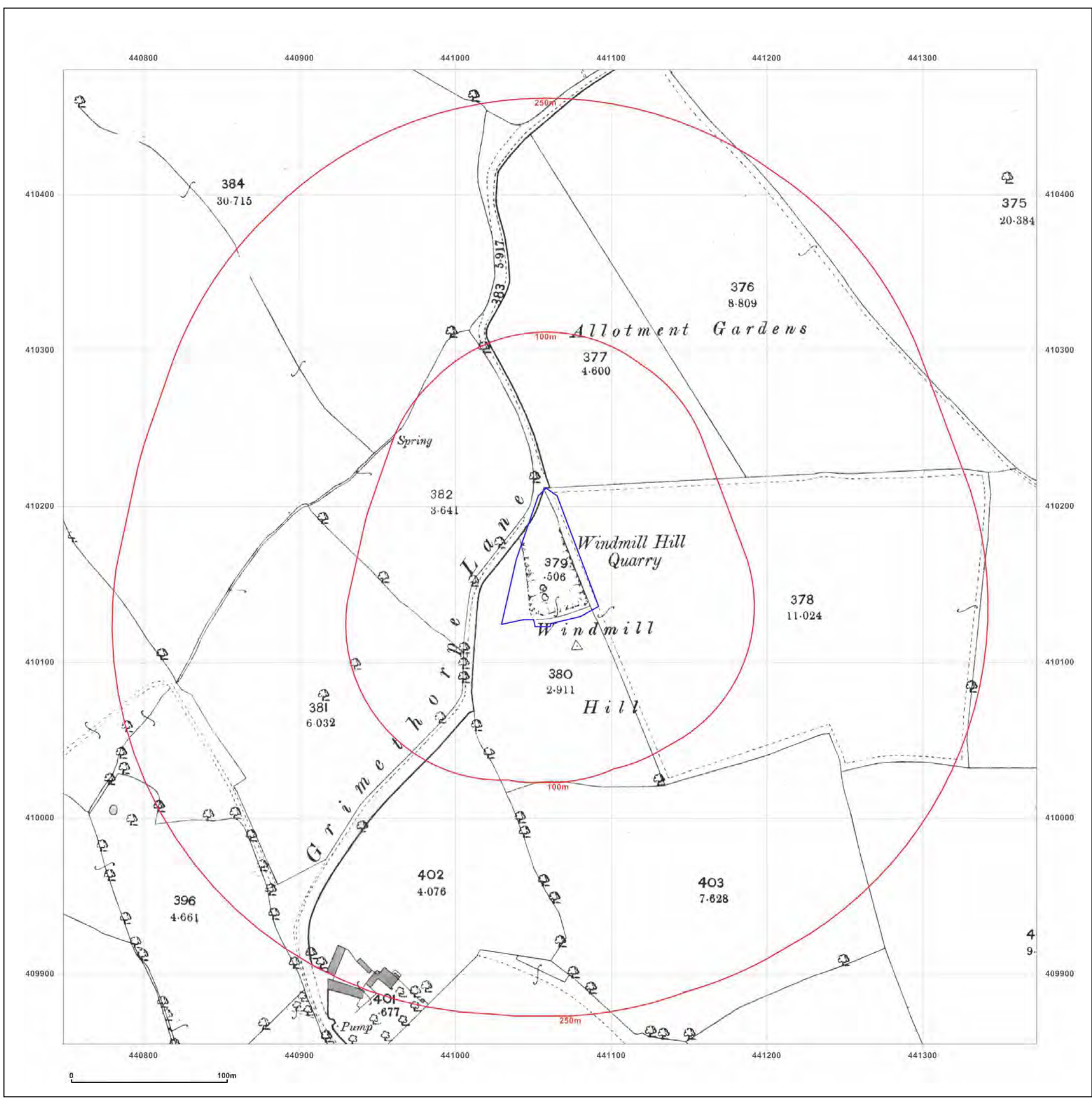


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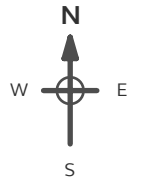
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Surveyed 1890
Revised 1904
Edition N/A
Copyright N/A
Levelled N/A

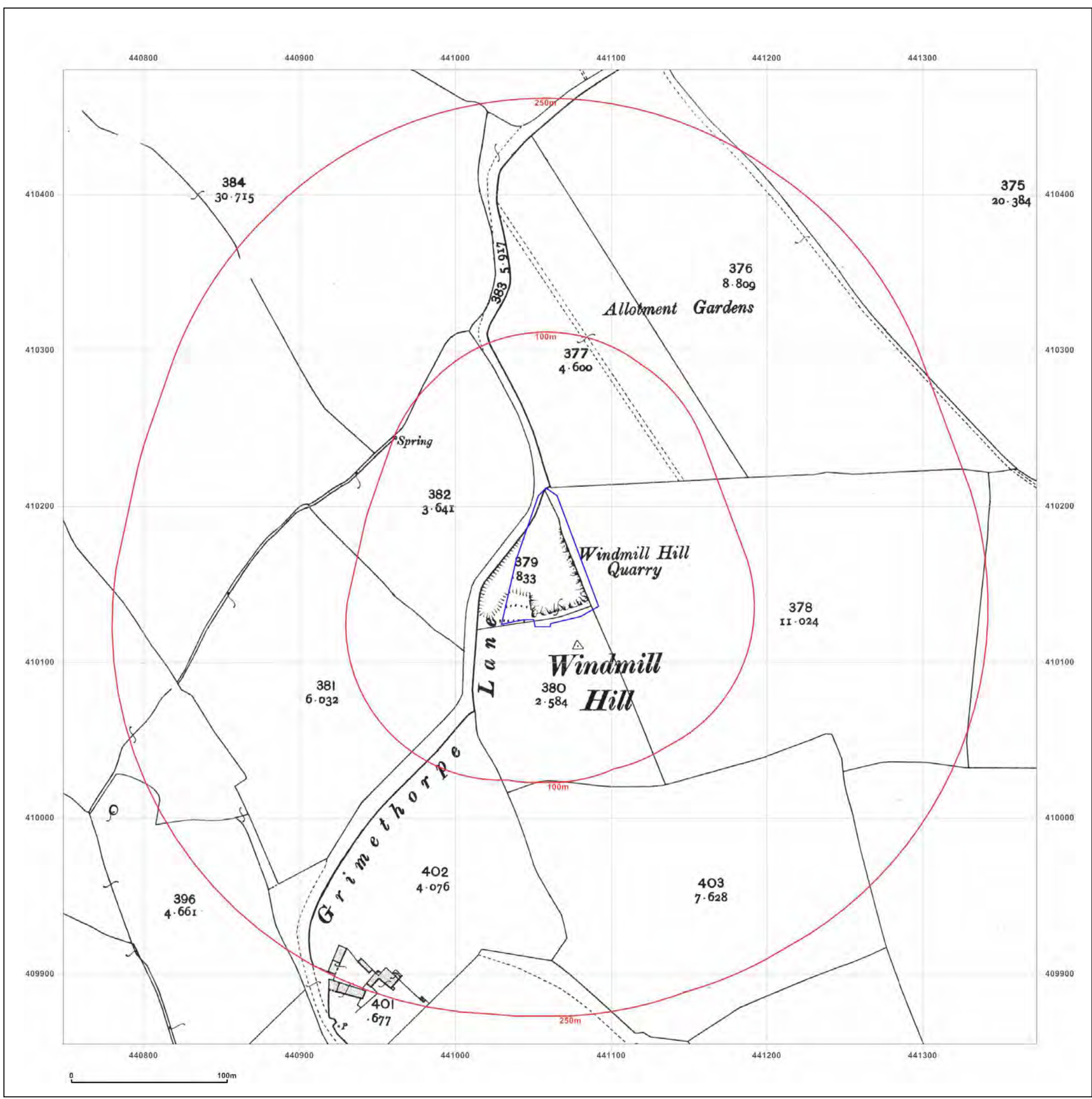


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Site Details:

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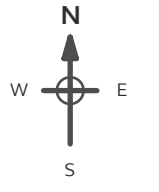
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Surveyed 1891
Revised 1914
Edition 1918
Copyright N/A
Levelled 1915

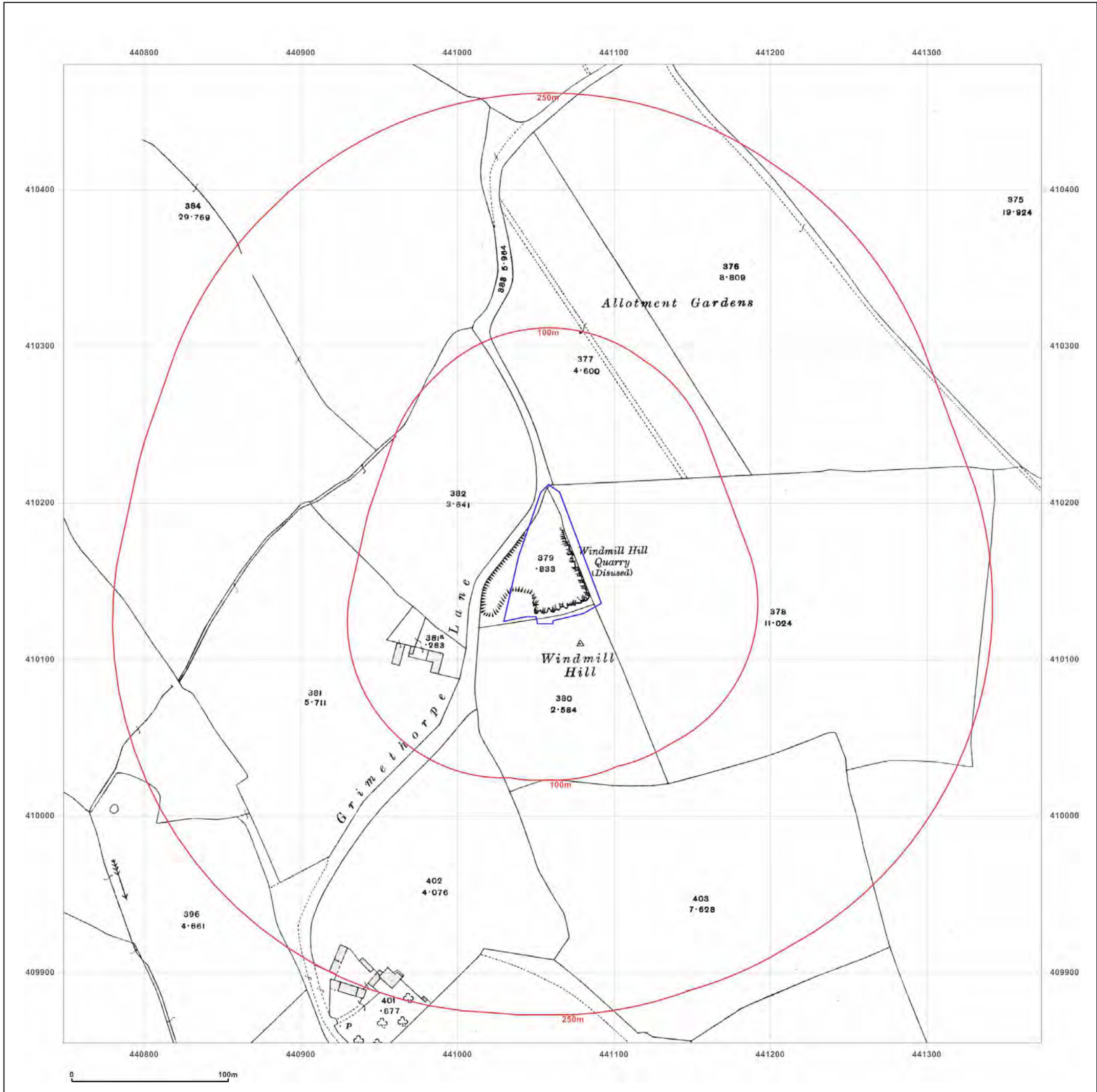


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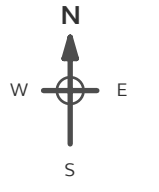
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Scale: 1:2,500
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 Revised 1961
 Edition N/A
 Copyright 1962
 Levelled 1959

Surveyed 1961
 Revised 1961
 Edition N/A
 Copyright 1962
 Levelled 1959

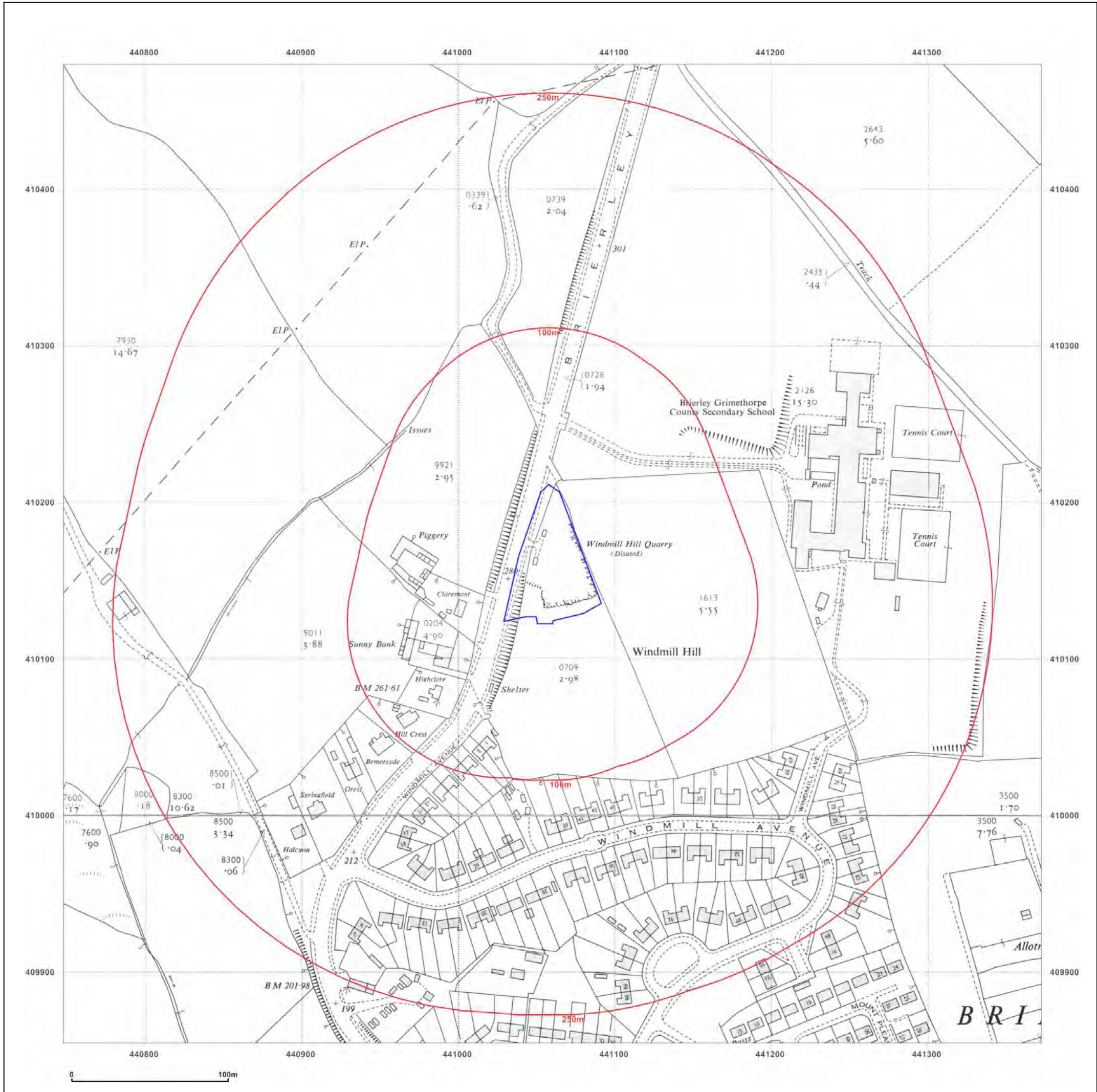
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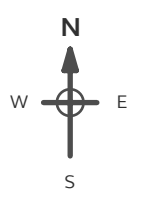


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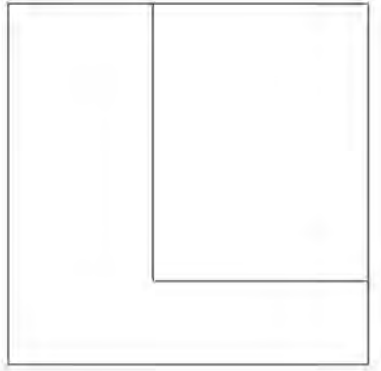
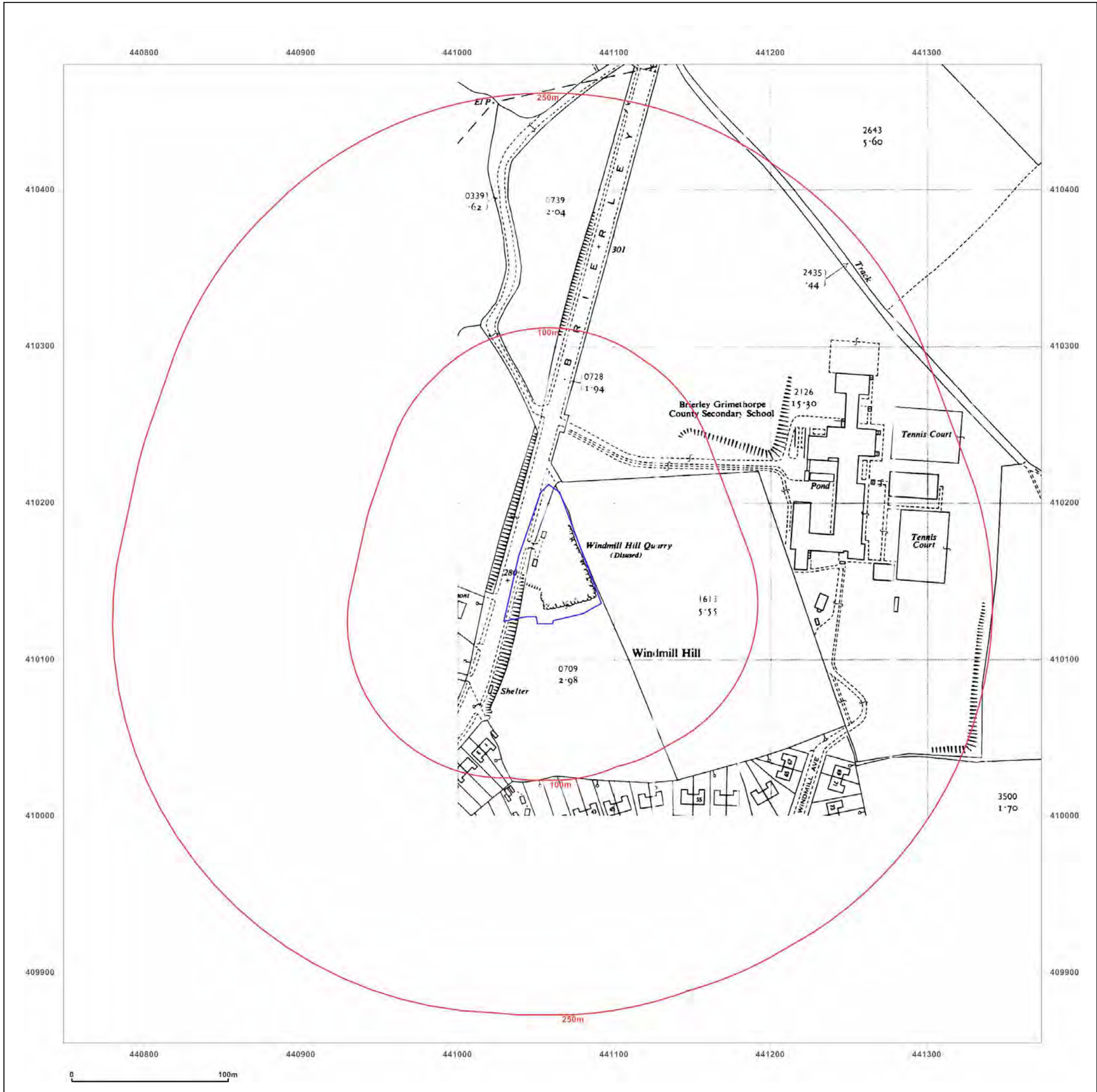
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Scale: 1:2,500
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Surveyed N/A
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 Edition N/A
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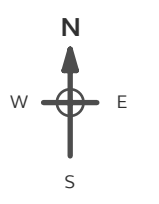
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 Edition N/A
 Copyright N/A
 Levelled N/A



Surveyed 1972
 Revised 1972
 Edition N/A
 Copyright 1973
 Levelled 1964

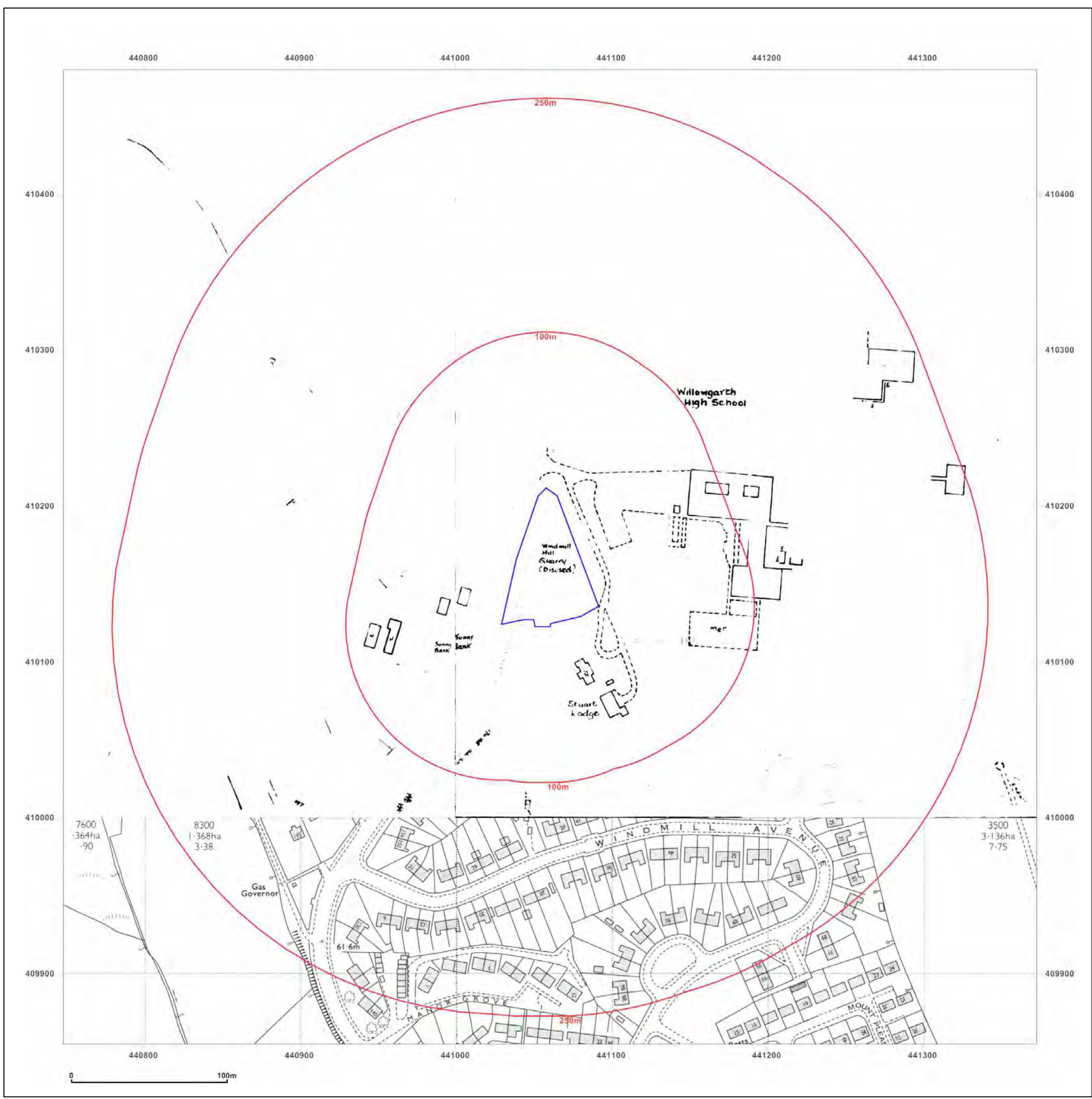


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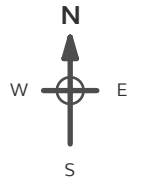
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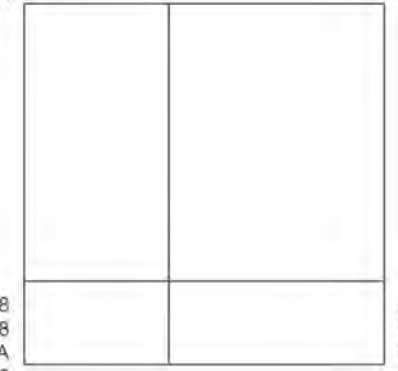
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 Edition N/A
 Copyright 1978
 Levelled N/A



Surveyed 1978
 Revised 1978
 Edition N/A
 Copyright 1978
 Levelled N/A



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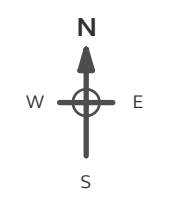
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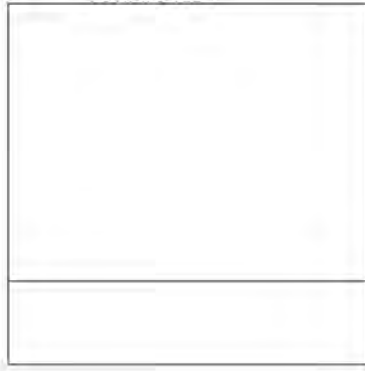
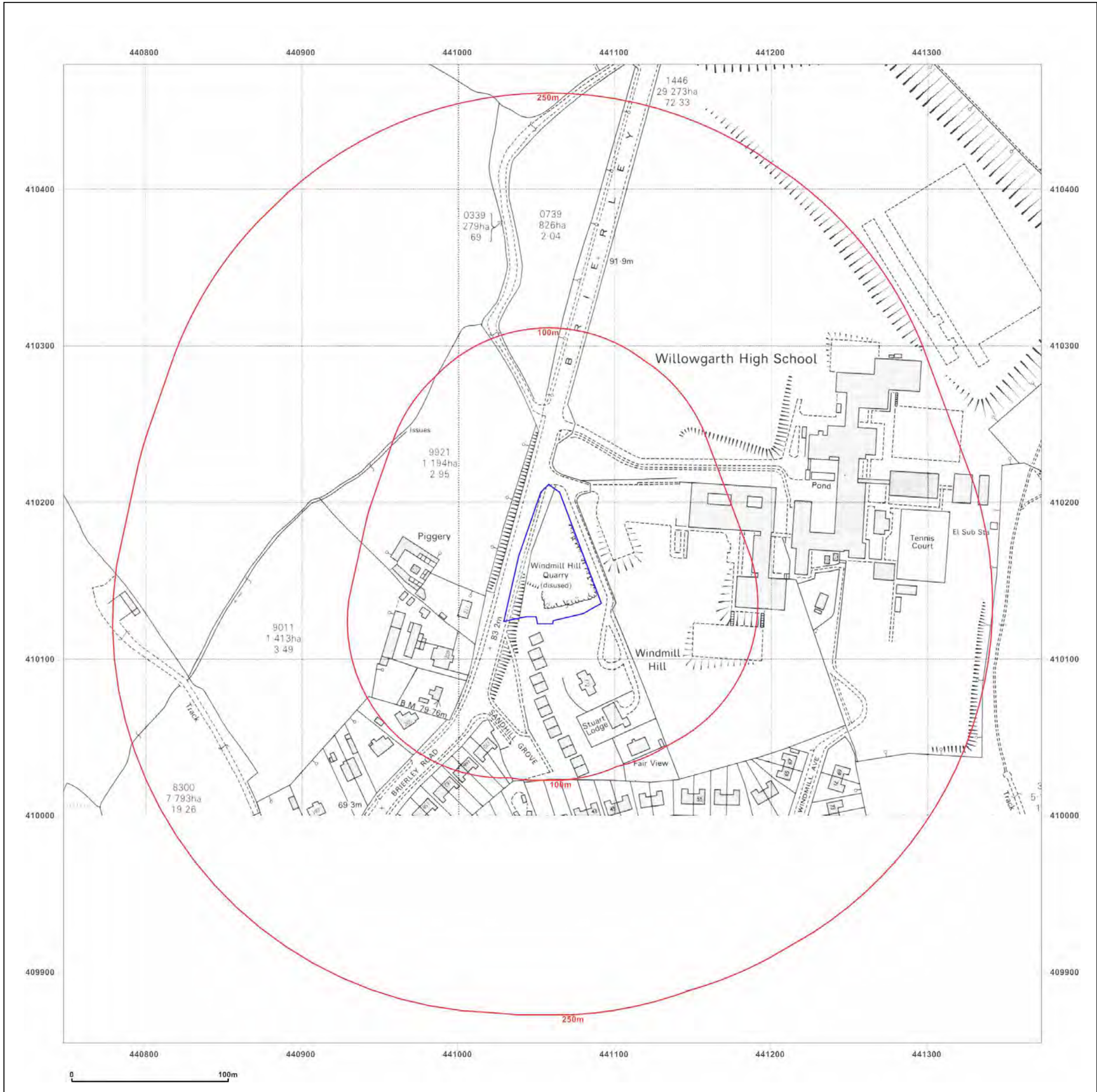
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 Edition N/A
 Copyright 1985
 Levelled 1964

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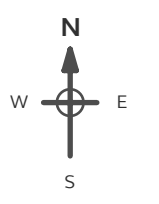
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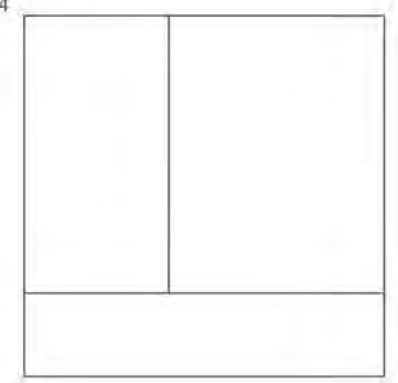
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 Revised 1983
 Edition N/A
 Copyright 1982
 Levelled 1964

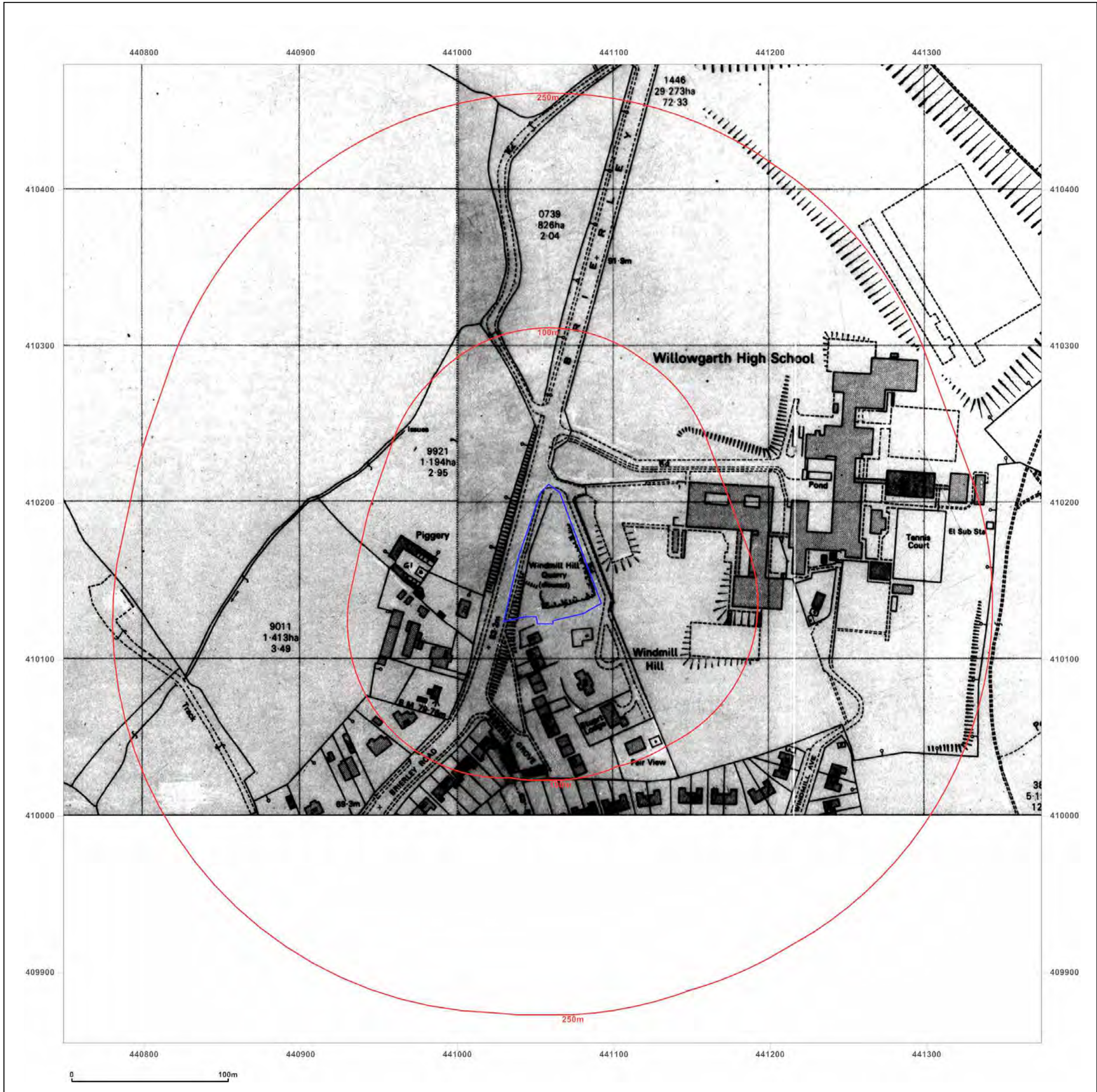


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GRIMETHORPE, BARNSELY,
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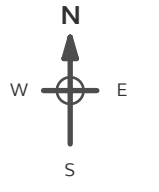
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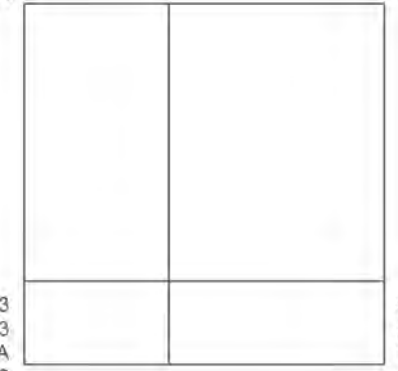
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Revised 1993
Edition N/A
Copyright 1993
Levelled N/A

Surveyed N/A
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Copyright 1993
Levelled N/A



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

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Levelled N/A

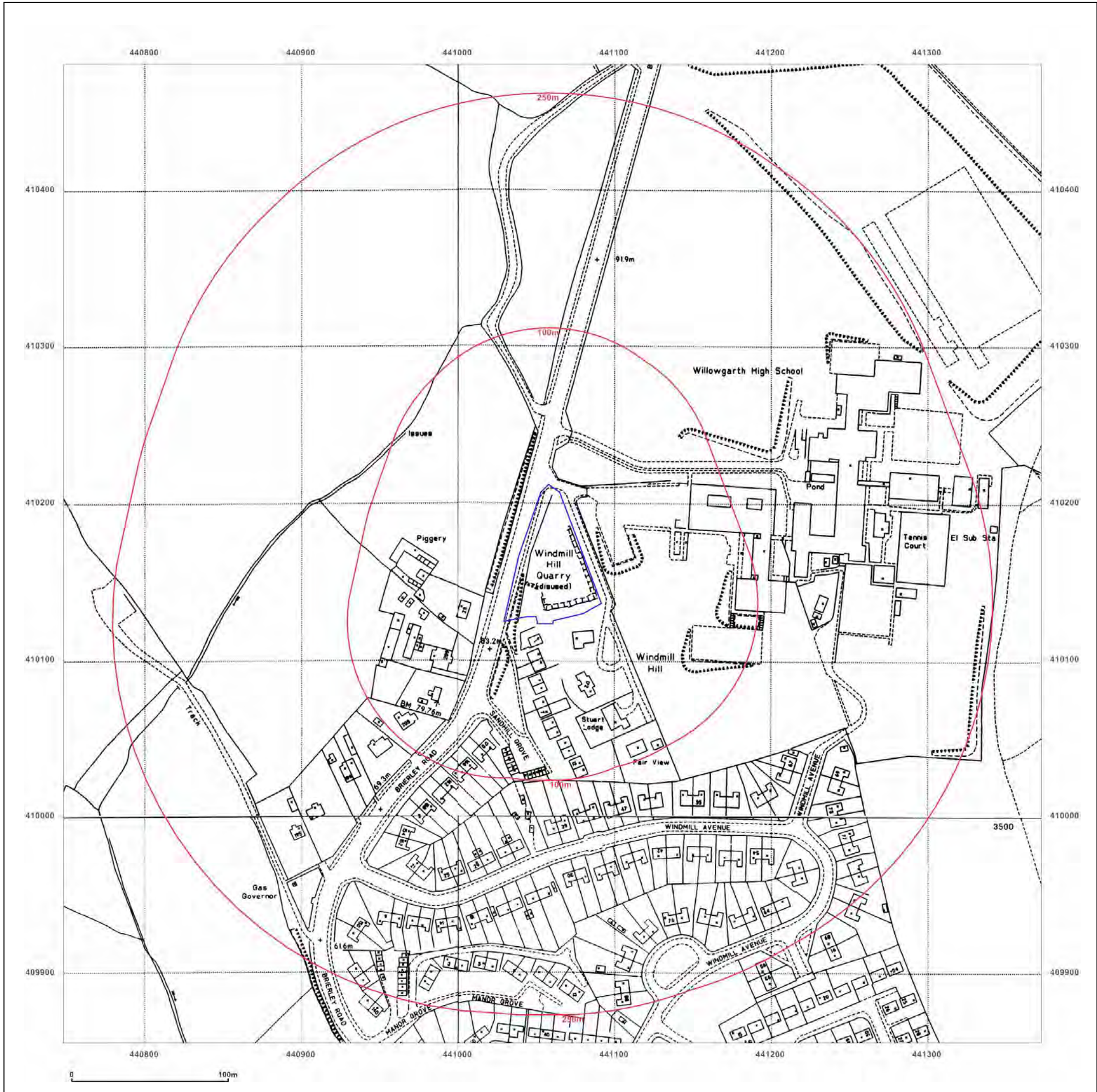


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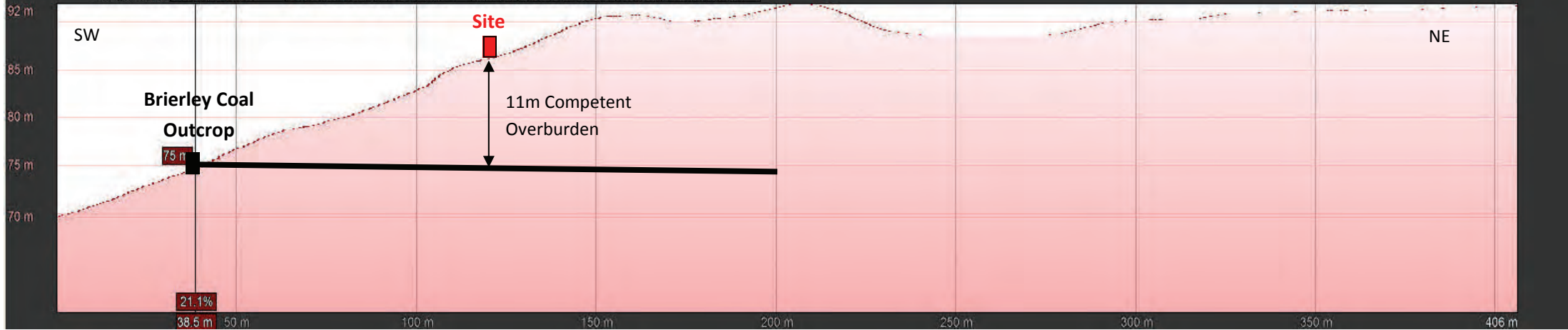
Appendix 3

Site Plans





Graph: Min, Avg, Max Elevation: 70, 87, 92 m
Range Totals: Distance: 406 m Elev Gain/Loss: 27.5 m, -5.39 m Max Slope: 33.4%, -25.5% Avg Slope: 7.8%, -5.5%





Appendix 4

Photographs



Photo 1 : Looking at the northern boundary. Trees recently cut.



Photo 2 : Looking at rock face which forms southern boundary. Loose blocks noted.



Rogers
Geotechnical
Services Ltd

Project Name:
Windmill Hill Quarry

Project Number:
J4708/19/E



Photo 3 : Looking north across the site. Example of hummocky ground, formed by tipped waste.



Photo 4 : Photo looking south demonstrating close proximity of neighbours to the site boundary. Stability would need to be assessed.



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Project Name:
Windmill Hill Quarry

Project Number:
J4708/19/E



Appendix 5

Coal Authority Report



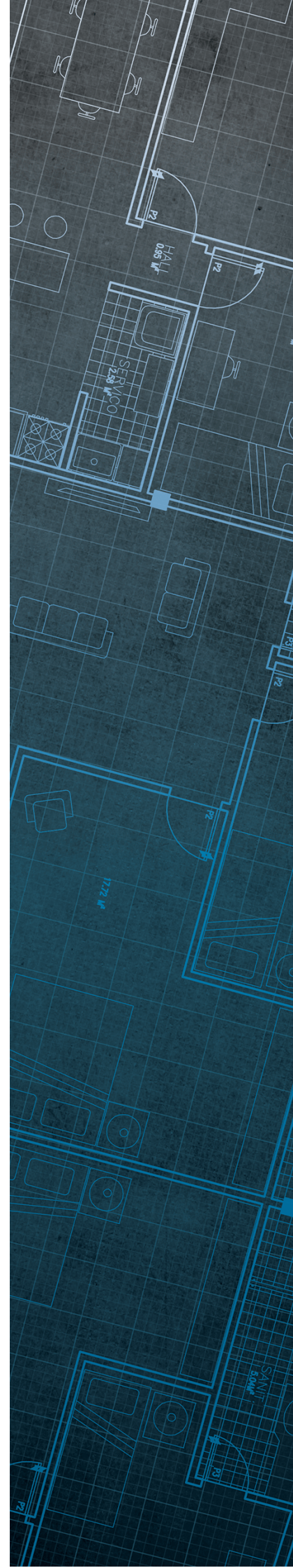
The Coal
Authority

Consultants Coal Mining Report

Windmill Hill Quarry
Brierley Road
Grimethorpe
Barnsley
S72 7AW

Date of enquiry: 13 May 2019
Date enquiry received: 13 May 2019
Issue date: 13 May 2019

Our reference: 51002124991001
Your reference: J4708/19/EDS



Consultants

Coal Mining Report

This report is based on and limited to the records held by the Coal Authority at the time the report was produced.

Client name

ROGERS GEOTECHNICAL SERVICES LTD

Enquiry address

Windmill Hill Quarry
Brierley Road
Grimethorpe
Barnsley
S72 7AW


How to contact us

0345 762 6848 (UK)
+44 (0)1623 637 000 (International)

200 Lichfield Lane
Mansfield
Nottinghamshire
NG18 4RG

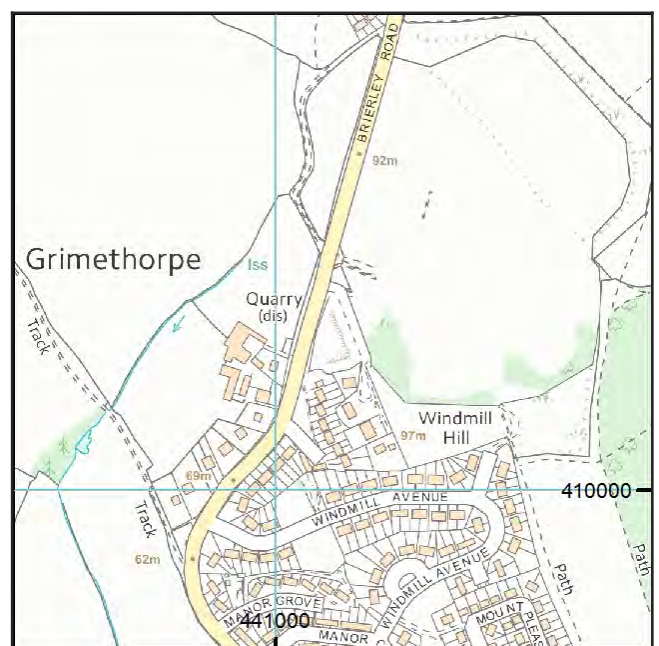
www.groundstability.com

 @coalauthority

 /company/the-coal-authority

 /thecoalauthority

 /thecoalauthority



Approximate position of property



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Section 1 – Mining activity and geology

Past underground mining

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
unnamed	SHAFTON	Coal	6JGP	156	Beneath Property	3.2	East	168	1928
unnamed	SHAFTON	Coal	6JGI	175	North	2.3	East	168	1944
unnamed	SHAFTON	Coal	6JGQ	194	South-East	2.5	North-East	168	1924
unnamed	BARNSLEY	Coal	6JGX	626	Beneath Property	3.5	North-East	210	1930
GRIMETHORPE	BARNSLEY	Coal	6JGB	640	South	3.9	East	170	1929
GRIMETHORPE	BARNSLEY	Coal	6JGA	666	South-East	2.4	North-East	170	1931
GRIMETHORPE	FENTON	Coal	R169	820	West	3.3	East	180	1991
GRIMETHORPE	FENTON	Coal	R168	836	West	2.9	East	200	1991
GRIMETHORPE	PARKGATE	Coal	6JG6	864	South-West	3.3	East	112	1950
unnamed	PARKGATE	Coal	6JGY	866	West	3.1	East	102	1951

Probable unrecorded shallow workings

Yes.

Spine roadways at shallow depth

No spine roadway recorded at shallow depth.

Mine entries

None recorded within 100 metres of the enquiry boundary.

Abandoned mine plan catalogue numbers

The following abandoned mine plan catalogue numbers intersect with some, or all, of the enquiry boundary:

NE411	M135	16053
NE172	M138	M136
NE473		

Please contact us on 0345 762 6848 to determine the exact abandoned mine plans you require based on your needs.

Outcrops

No outcrops recorded.

Geological faults, fissures and breaklines

No faults, fissures or breaklines recorded.

Opencast mines

None recorded within 500 metres of the enquiry boundary.

Coal Authority managed tips

None recorded within 500 metres of the enquiry boundary.

Section 2 – Investigative or remedial activity

Please refer to the 'Summary of findings' map (on separate sheet) for details of any activity within the area of the site boundary.

Site investigations

None recorded within 50 metres of the enquiry boundary.

Remediated sites

None recorded within 50 metres of the enquiry boundary.

Coal mining subsidence

There are 1 claim(s) within 50 metres of the property boundary that do not match the property address. These are shown on the enquiry boundary plot.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

The Coal Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

If further subsidence damage claims information is required, please visit www.groundstability.com.

See Section 4 for further information.

Mine gas

None recorded within 500 metres of the enquiry boundary.

Mine water treatment schemes

None recorded within 500 metres of the enquiry boundary.

Section 3 – Licensing and future mining activity

Future underground mining

None recorded.

Coal mining licensing

None recorded within 200 metres of the enquiry boundary.

Court orders

None recorded.

Section 46 notices

No notices have been given, under section 46 of the Coal Mining Subsidence Act 1991, stating that the land is at risk of subsidence.

Withdrawal of support notices

The property is in an area where a notice to withdraw support was given in 1983.

The property is not in an area where a notice has been given under section 41 of the Coal Industry Act 1994, cancelling the entitlement to withdraw support.

Payments to owners of former copyhold land

The property is not in an area where a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

Section 4 – Further information

The following potential risks have been identified and as part of your risk assessment should be investigated further.

Development advice

The site is within an area of historical coal mining activity. Should you require advice and/or support on understanding the mining legacy, its risks to your development or what next steps you need to take, please contact us.

Coal mining subsidence

The site is within an area of previous interest. It is close to where the Coal Authority or licensed mine operator has investigated and where necessary remediated issues relating to coal mining subsidence.

The site requires further investigation and may influence your risk assessment. We recommend that you order the appropriate **Coal Authority Subsidence Claims Report**, which will include more information about the hazard.

For further information on specific site or ground investigations in relation to any issues raised in Section 4, please call us on 0345 762 6848 or email us at groundstability@coal.gov.uk.

Section 5 – Data definitions

The datasets used in this report have limitations and assumptions within their results. For more guidance on the data and the results specific to the enquiry boundary, please **call us on 0345 762 6848** or **email us at groundstability@coal.gov.uk**.

Past underground coal mining

Details of all recorded underground mining relative to the enquiry boundary. Only past underground workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination, will be included.

Probable unrecorded shallow workings

Areas where the Coal Authority believes there to be unrecorded coal workings that exist at or close to the surface (less than 30 metres deep).

Spine roadways at shallow depth

Connecting roadways either, working to working, or, surface to working, both in-seam and cross measures that exist at or close to the surface (less than 30 metres deep), either within or within 10 metres of the enquiry boundary.

Mine entries

Details of any shaft or adit either within, or within 100 metres of the enquiry boundary including approximate location, brief treatment details where known, the mineral worked from the mine entry and conveyance details where the mine entry has previously been sold by the Authority or its predecessors British Coal or the National Coal Board.

Abandoned mine plan catalogue numbers

Plan numbers extracted from the abandoned mines catalogue containing details of coal and other mineral abandonment plans deposited via the Mines Inspectorate in accordance with the Coal Mines Regulation Act and Metalliferous Mines Regulation Act 1872. A maximum of 9 plan extents that intersect with the enquiry boundary will be included. This does not infer that the workings and/or mine entries shown on the abandonment plan will be relevant to the site/property boundary.

Outcrops

Details of seam outcrops will be included where the enquiry boundary intersects with a conjectured or actual seam outcrop location (derived by either the British Geological Survey or the Coal Authority) or intersects with a defined 50 metres buffer on the coal (dip) side of the outcrop. An indication of whether the Coal Authority believes the seam to be of sufficient thickness and/or quality to have been worked will also be included.

Geological faults, fissures and breaklines

Geological disturbances or fractures in the bedrock. Surface fault lines (British Geological Survey derived data) and fissures and breaklines (Coal Authority derived data) intersecting with the enquiry boundary will be included. In some circumstances faults, fissures or breaklines have been known to contribute to surface subsidence damage as a consequence of underground coal mining.

Opencast mines

Opencast coal sites from which coal has been removed in the past by opencast (surface) methods and where the enquiry boundary is within 500 metres of either the licence area, site boundary, excavation area (high wall) or coaling area.

Coal Authority managed tips

Locations of disused colliery tip sites owned and managed by the Coal Authority, located within 500 metres of the enquiry boundary.

Site investigations

Details of site investigations within 50 metres of the enquiry boundary where the Coal Authority has received information relating to coal mining risk investigation and/or remediation by third parties.

Remediated sites

Sites where the Coal Authority has undertaken remedial works either within or within 50 metres of the enquiry boundary following report of a hazard relating to coal mining under the Coal Authority's Emergency Surface Hazard Call Out procedures.

Coal mining subsidence

Details of alleged coal mining subsidence claims made since 31 October 1994 either within or within 50 metres of the enquiry boundary. Where the claim relates to the enquiry boundary confirmation of whether the claim was accepted, rejected or whether liability is still being determined will be given. Where the claim has been discharged, whether this was by repair, payment of compensation or a combination of both, the value of the claim, where known, will also be given.

Details of any current 'Stop Notice' deferring remedial works or repairs affecting the property/site, and if so the date of the notice.

Details of any request made to execute preventative works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991. If yes, whether any person withheld consent or failed to comply with any request to execute preventative works.

Mine gas

Reports of alleged mine gas emissions received by the Coal Authority, either within or within 500 metres of the enquiry boundary that subsequently required investigation and action by the Coal Authority to mitigate the effects of the mine gas emission.

Mine water treatment schemes

Locations where the Coal Authority has constructed or operates assets that remove pollutants from mine water prior to the treated mine water being discharged into the receiving water body.

These schemes are part of the UK's strategy to meet the requirements of the Water Framework Directive. Schemes fall into 2 basic categories: Remedial – mitigating the impact of existing pollution or Preventative – preventing a future pollution incident.

Mine water treatment schemes generally consist of one or more primary settlement lagoons and one or more reed beds for secondary treatment. A small number are more specialised process treatment plants.

Future underground mining

Details of all planned underground mining relative to the enquiry boundary. Only those future workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination will be included.

Coal mining licensing

Details of all licenses issued by the Coal Authority either within or within 200 metres of the enquiry boundary in relation to the under taking of surface coal mining, underground coal mining or underground coal gasification.

Court orders

Orders in respect of the working of coal under the Mines (Working Facilities and Support) Acts of 1923 and 1966 or any statutory modification or amendment thereof.

Section 46 notices

Notice of proposals relating to underground coal mining operations that have been given under section 46 of the Coal Mining Subsidence Act 1991.

Withdrawal of support notices

Published notices of entitlement to withdraw support and the date of the notice. Details of any revocation notice withdrawing the entitlement to withdraw support given under Section 41 of the Coal Industry Act 1994.

Payment to owners of former copyhold land

Relevant notices which may affect the property and any subsequent notice of retained interests in coal and coal mines, acceptance or rejection notices and whether any compensation has been paid to a claimant.



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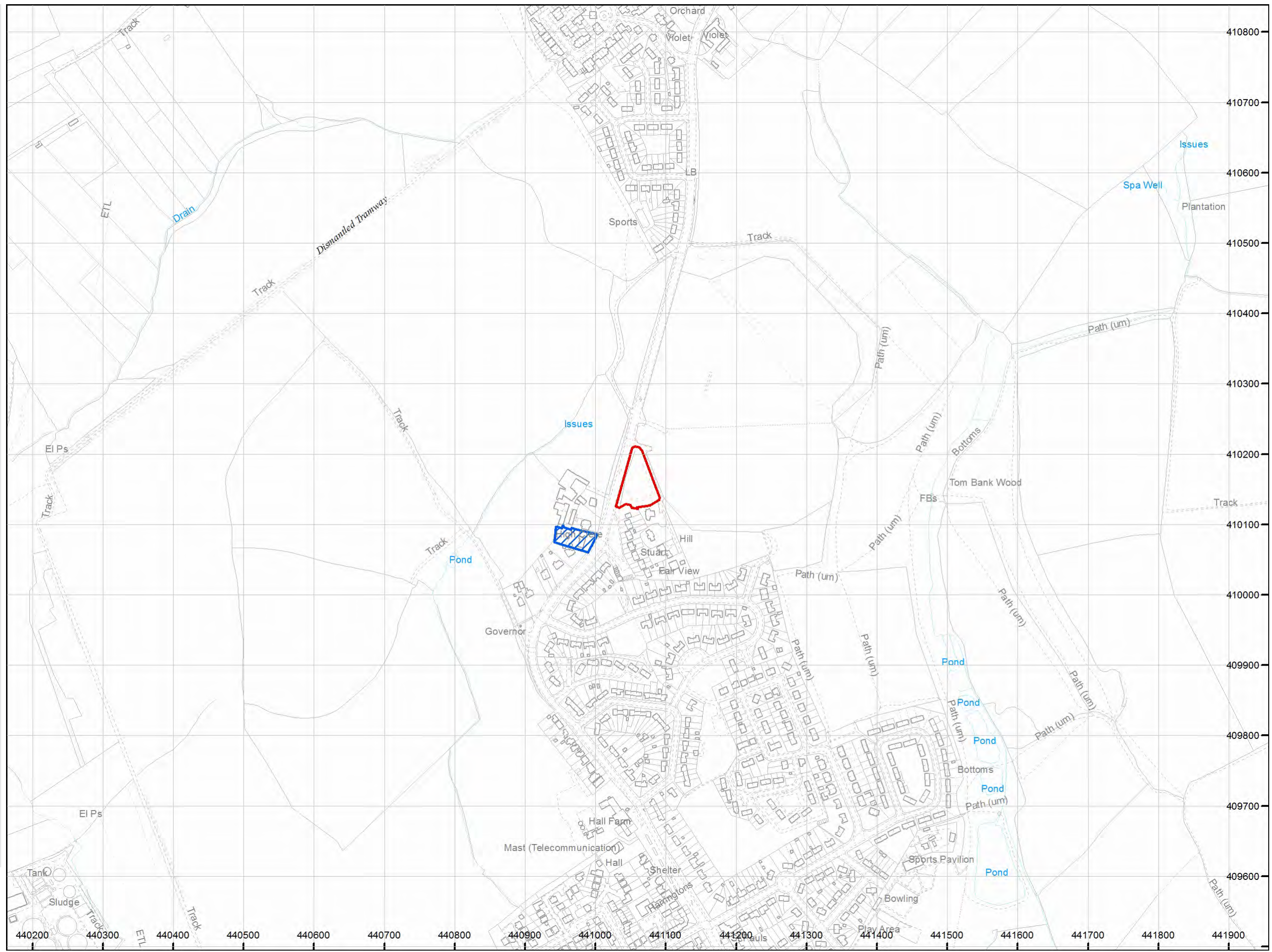
VAT receipt

Issued by	The Coal Authority 200 Lichfield Lane Mansfield Nottinghamshire NG18 4RG
Tax point date	13 May 2019
Issued to	ROGERS GEOTECHNICAL SERVICES LTD BARNCLIFFE MILLS NEAR BANK SHELLEY HUDDERSFIELD KIRKLEES HD8 8LU
Property search for	WINDMILL HILL QUARRY BRIERLEY ROAD GRIMETHORPE BARNESLEY S72 7AW
Reference number	51002124991001
Date of issue	13 May 2019
Cost	£112.13
VAT @ 20%	£22.43
Total received	£134.56
VAT registration	598 5850 68

The map highlights any specific surface or subsurface features within or near to the boundary of the site.

Key

- Approximate position of the enquiry boundary shown 
- Coal claim 





ATTACHMENT C – COAL AUTHORITY PERMIT



The Coal
Authority

Granted Permit Boundary

Permit Ref: 22167


Permit Boundary:



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ATTACHMENT D – EXPLORATORY HOLE RECORDS

Client: G &M	Site: Windmill Hill Quarry Brierley Road, Grimephorpe Barnsley S72 7AW		Cape Site Services unit 2, rear of Castle Buildings Carlton Road, Barnsley, S71 3HX	
Date: 17/06/2020	Method: Rotary water Flush	Permit No: 22167		
Driller: Simon Fish			Driller Assistant: Richard hawkins	
Drillers Signature:			Page No:	

Measurements In Meters

BH No:	FROM	TO	THICKNESS	DESCRIPTION
1				
	0	2.2	2.2	Made Ground
	2.2	4.5	2.3	Sandstone light brown weathered
	4.5	5.5	1	Sandstone brown broken losing flush
	5.5	8.3	2.8	Sandstone Brown
	8.3	8.5	0.2	Mudstone grey losing flush
	8.5	8.8	0.3	Coal loss of flush
	8.8	15.5	6.7	Mudstone grey silty soft bands
	15.5	16.6	1.1	Loss of returns
	16.6	20	3.4	Broken ground
2				
	0	1.8	1.8	Made Ground
	1.8	4	2.2	Sandstone light brown soft bands
	4	7.2	3.2	Sandstone brown broken losing flush
	7.2	7.8	0.6	Void possible verticle fracture
	7.8	9	1.2	Very soft no returns
	9	10	1	loss of flush and returns hole abandoned
3				
	0	0.8	0.8	Made Ground
	0.8	2.2	1.4	Mudstone light brown soft
	2.2	5.5	3.3	Sandstone light brown soft bands
	5.5	6	0.5	Sand stone broken slight loss of flush
	6	12.5	6.5	Sandstone light brown hard bands
	12.5	12.8	0.3	Coal loss of flush
	12.8	16.5	3.7	Mudstone Gray
	16.5	20	3.5	Mudstone gray lossing water and flush in fractures
	20	21	1	Coal
	21	21.2	0.2	Mudstone Gray
	0		0	
	0		0	
	0		0	
	0		0	
	0		0	