



528 Holderness Road
Hull, HU9 3DT
+44 (0)1482 319365
info@griffintoomes.co.uk
www.griffintoomes.co.uk

Drainage Impact Assessment and Strategy

In relation to proposed development at
Manor Farm,
Cross Gates,
Harpham,
East Riding of Yorkshire
YO25 4QS

Client

Smartbuild Harpham Ltd
Manor House
104 Pasture Lane
Seamer
North Yorkshire
YO12 4QR

Our Ref

J4347

**Rev
Date**

22-Jul-22

By Engineer

MH

DIA and Strategy

2

J5038 – Manor Farm

Client: Smartbuild Harpham Ltd

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J5038 – Manor Farm

Client: Smartbuild Harpham Ltd

Introduction

GTCE have been commissioned by Applemont Ltd of 72 Largate, Beverley, HU17 8EU to carry out a drainage impact assessment and strategy in relation to planning permission for alterations and extensions to existing agricultural buildings to form dwellings for their client Smartbuild Harpham Ltd of Manor House, 104 Pasture Lane, Seamer, North Yorkshire, YO12 4QR.

The development more specifically involves the formation of four dwellings with detached garages, erection of a dwelling and garage following demolition of existing agricultural building, conversion and alterations of outbuildings to form part of a dwelling.

Drainage Impact Assessments are required for all major (10 or more dwellings, 1,000sqm of floor-space or where sites are more than 1ha) or equivalent non-residential or mixed development [as defined in Article 2(1) of the Town and Country Planning (Development Management Procedure) (England) Order 2015] which requires surface water to be drained from the site this should be submitted with the first full planning application.

Surface Water Strategy.

The proposed development

The proposed site occupies an area of 0.783 hectares which is currently comprised of a farmhouse, agricultural buildings and associated buildings as well as greenfield land.

The project under consideration is explained within the introduction to the report and plans can be seen in the appendices.

Greenfield run-off currently runs to surrounding lands, the onsite pond and surrounding field drains.

The tractor store and corn store will be adding to the impermeable area. The tractor store's footprint is 360m² and the footprint of the corn store is 335m².

Drainage

The application of sustainable urban drainage techniques (SUDS) are to be considered in relation to the discharge of surface water runoff generated by the proposed development.

Surface water should be managed for maximum benefit, now and in the future. According to East Riding's Combined Planning Note and Standing Advice at paragraph 7, "the drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur on any part of the site for a 1 in 30 year rainfall event" and further at paragraph S8, "the drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur during a 1 in 100 year rainfall event in any part of: a building (including a basement); or in any utility plant susceptible to water (e.g. pumping station or electricity substation) within the development" and finally at S9, "the design of the site must ensure that, so far as is reasonably practicable, flows resulting from rainfall in excess of a 1 in 100 year rainfall event are managed in exceedance [flood flow] routes that minimise the risks to people and property."

Attenuation design on site.

There was no borehole log in close proximity to the site to ascertain soil conditions from.

Information from the National Soil Resource Institute: www.landis.org.uk/soilscapes details the development area as being situated on slightly acid loamy and clayey soils with impeded drainage as shown in figure 1 below.

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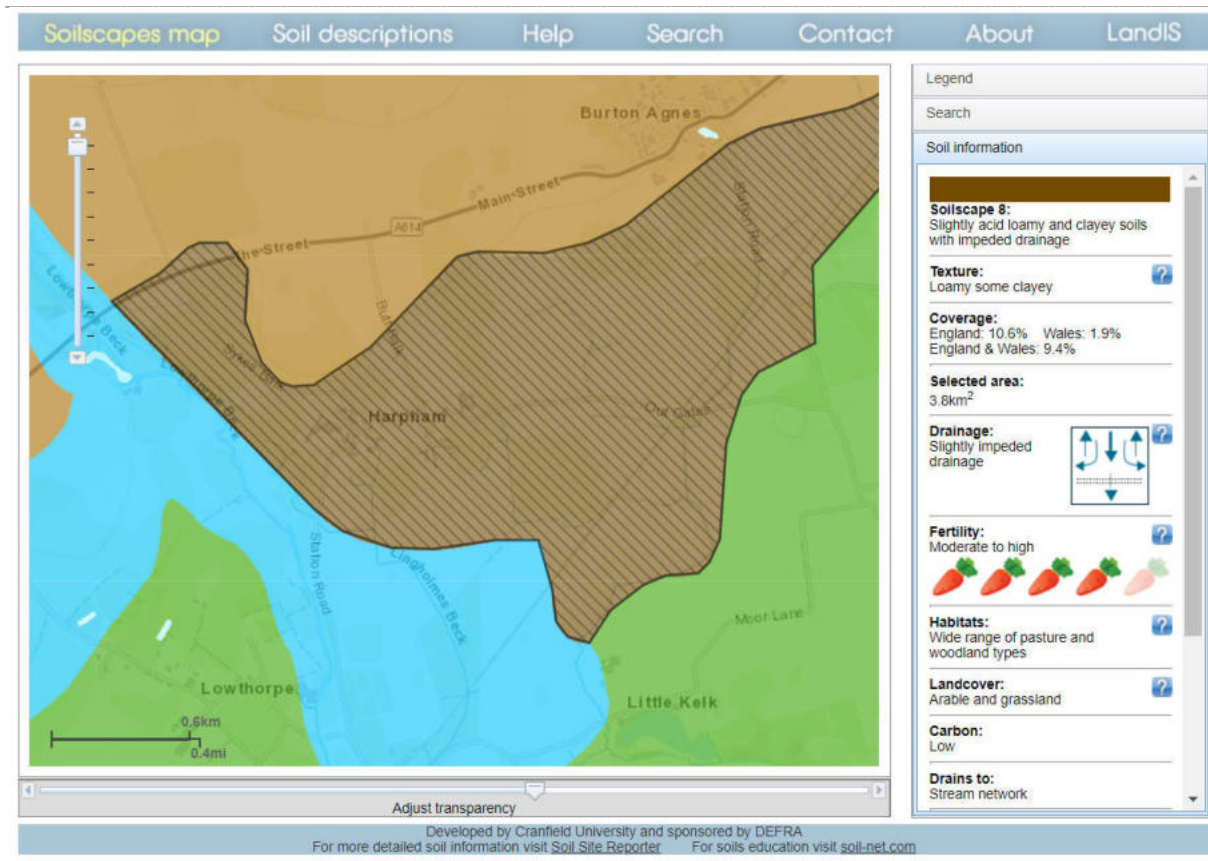


Figure 1: Soilscape Maps

Further analysis of the round conditions was undertaken by Alan Woods and Partners. They compiled a report which was signed off on 31st August 2021. The report indicates a mixture of clayey lomey soils as indicated at figure 1, but also shows there could be some more chalky layers. Please see report in the appendices to this report.

To ascertain what conditions of soils are like on site in terms of their permeability, Steve Vessey-Baitson from Applemont completed a test dig on site on 8th July 2022. The test dig confirmed the soils were very clayey and impermeable which were not conducive to implementation of a soakaway.

It will therefore be necessary to discharge surface water from the development to watercourse. There's a watercourse to the southern boundary of the site that travels west to east that could take surface water from the site.

It is stated at paragraph S4 of the Department for Environment, Food and Rural Affairs document "Non-statutory technical standards for sustainable drainage systems" that, "Where reasonably practicable, for greenfield development, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event should never exceed the greenfield runoff volume for the same event." With the same being stated within East Riding Council's combined planning note and standing advice published in September 2016.

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Using HR Wallingford's Greednfield runoff estimation tool to calculate the greenfield runoff rate from the site shows the runoff rate for the 1 in 30 year rainfall event as being 2.29 l/s and 2.73 l/s for the 1 in 100 year event.

Flow rates will be controlled by a flow control device, such as a hydrobrake which shall be located before the watercourse to the south of the site. A device to clear particulates from the surface water will need to be installed before the flow control device in order to ensure contaminants do not enter the watercourse.

It may be The following is a calculation of the required pipe size to act as a throttle restricting flow to 2.73 litres/second:-

$$d = \sqrt{(4Q / \pi U)}$$

where

d = required pipe diameter for permitted discharge (mm)

Q = permitted discharge rate (ltrs/sec)

U = water velocity (derived from calculated head of water (m/s))

$$U = \sqrt{(2HG)}$$

where

H = head of water (m)

G = force of gravity (m/s/s)

Therefore, using a presumed head of water of 1.0m

$$U = \sqrt{(2 \times 1 \times 10)} = 4.47 \text{ m/s}$$

$$d = \sqrt{(4 \times 0.00273 / \pi \times 4.47)} \times 10^3 = \underline{27.89\text{mm}}$$

Therefore, a throttle restricting the pipe diameter to a maximum of 27.89mm could be used to keep flows at 2.73litres/second. However, a pipe of such small diameter would easily become blocked and would not prove suitable – as such a flow control device shall be used.

With a flow restricted to 6.75 litres/second there will be no extra water ingress to the water body than current and will therefore not increase flood risk.

Storage on site

A managed drainage system of the new development with a discharge rate of 2.73 litres/second will require attenuated water to be stored on site. According to paragraph S7 and S8 of the East Riding Sustainable Drainage Systems (SuDS) & Surface Water Drainage Requirements For New Development, Design and Maintenance, Combined Planning Note and Standing Advice of September 2016, the drainage system needs to be designed so that flooding does not occur on any part of the site for a 1 in 30-year rainfall event, also that flooding does not occur during a 1 in 100- year rainfall event in any part of a building or utility plant susceptible to water within the development.

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Using Copas Formula for a 1 in 30-year rainfall event falling upon the impermeable ground of the development which is approximately 1,500m² of development with 200m² of associated hard standing, we can see (calculations within the appendices) that there is required (for example) an attenuation pond of at least 1.5m in depth, 8.0m in length and 7.0m in width – or equivalent to amount to 76.61m³. This could be accommodated in underground storage, but on a site such as this with plenty of available land it makes sense to utilise a balancing pond that can also take surface water generated during a 1 in 100 year rainfall event. Again using Copas formula and applying a 1 in 100-year rainfall event it is shown that a balancing pond amounting to at least 139.87m³, so for example 1.5m in depth, 10m in length and 10m in width, which would result in a balancing pond of 150m³.

There would need to be a pipe running from the pond to the watercourse to the south of the site with the above mentioned flow control device restricting flows to the watercourse. The filtration device to eliminate particulates would be installed before water reached the balancing pond.

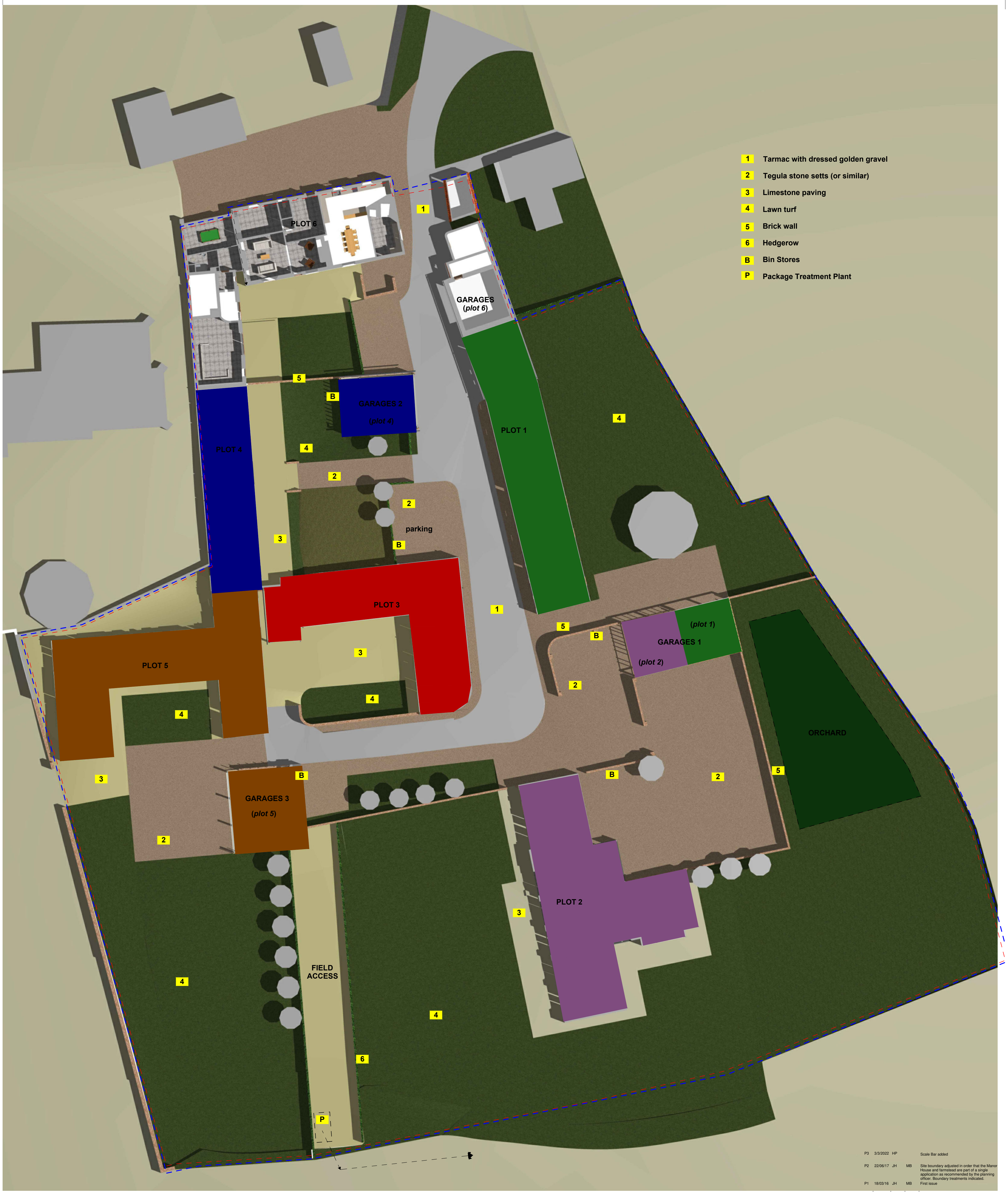
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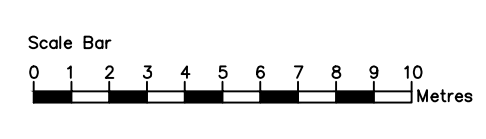
Appendices



- 1 Tarmac with dressed golden gravel
- 2 Tegula stone setts (or similar)
- 3 Limestone paving
- 4 Lawn turf
- 5 Brick wall
- 6 Hedgerow
- B Bin Stores
- P Package Treatment Plant

P3	3/3/2022	HP	Scale Bar added	
P2	22/06/17	JH	MB Site boundary adjusted in order that the Manor House and farmstead are part of a single application as recommended by the planning officer. Boundary treatments indicated.	
P1	18/03/16	JH	MB Final issue	
Rev	Date	Drawn	CHKD	Description

GROUND FLOOR SITE PLAN (1:200)



Project		
Manor Farm		
Address		
Manor Farm, Harpham, E. Riding, YO25 4QS		
Client		
Sir Charles Legard		
Drawing		
PROPOSED GROUND FLOOR SITE PLAN		
Sheet Size	Drawn	First Issue Date DMMY
A1	JH	22/12/2015
Scale	Checked	Rev.
1:200	MB	1116_AR10_05_P3

Engineer/
Manage/
Deliver/



Alan Wood & Partners

Issuing Office

Hallamshire House
Meadow Court
Hayland Street
Sheffield
S9 1BY

Telephone: 01142 440077

Email: eng@alanwood.co.uk

Website: www.alanwood.co.uk

PHASE I GEO-ENVIRONMENTAL APPRAISAL

for

Smartbuild Harpham Ltd

Project Reference: JS/LF/5853-Rp-001

Prepared by: **L. Fonseca**, MEng (Hons)



Signed:

Date: 23rd July 2021

Approved by: **Andy Borthwick** BSc (Hons), FGS, IAEG

Associate
for and on behalf of Alan Wood and Partners



Signed:

Date: 31st August 2021

Issue	Revision	Revised by	Approved by	Revised Date

For the avoidance of doubt, the parties confirm that these conditions of engagement shall not and the parties do not intend that these conditions of engagement shall confer on any party any rights to enforce any term of this Agreement pursuant of the Contracts (Rights of third Parties) Act 1999.

The Appointment of Alan Wood & Partners shall be governed by and construed in all respects in accordance with the laws of England & Wales and each party submits to the exclusive jurisdiction of the Courts of England & Wales

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45853 / 001 SITE LOCATION PLAN

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APPENDIX A: EMAPSITE: GROUNDSURE GEO + ENVIRO INSIGHT REPORT

APPENDIX B: EMAPSITE: HISTORICAL ORDNANCE SURVEY PLANS

EXECUTIVE SUMMARY

Site Location	The site is located off Mill Lane, Walkington, Hull HU17 8RT and is centred at National Grid Reference (NGR) 500215mE, 437735mN.
Site Size and Shape	The site is 0.42 hectares in size and is approximately rectangular in shape.
Current Site Use	The site currently consists of a residential building surrounded by agricultural machinery and building rubble.
Site History	In summary the earliest available Ordnance Survey maps, dating back to c. 1855 have been reviewed. The site originally comprised a parcel of undeveloped agricultural land. Numerous buildings have been constructed and demolished since c. 1947 and the most recent maps indicate a building is present today. The maps also indicated the presence of ponds that were depicted on maps in some years and not in others. It is not currently present.
Geology	Superficial till deposits cover all of the site, below which is bedrock. The till deposit is recorded as comprising of Devensian – Diamicton. The bedrock is recorded as comprising Chalk of the Flamborough Chalk Formation.
Hydrogeology	<u>Aquifer within Superficial Deposits:</u> ‘Secondary Undifferentiated’ Aquifer Has been assigned in cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type. <u>Aquifer within Bedrock:</u> ‘Principal’ ‘Principal’ aquifers are rock or drift deposits with high intergranular and/or fracture permeability and can provide a high level of water storage. These deposits can support water supply and/or base river flow on a strategic scale.
Hydrology	There is one recorded surface water feature within 250m of the site which is recorded as an inland river not influenced by normal tidal action and one of which is recorded as a lake, loch or reservoir.
Mining	<u>Coal Mining</u> Information presented on the Coal Authority website (www.coal.decc.gov.uk) indicates that the site does not lie within a Development High Risk area, nor does it lie within a Coal Mining Reporting area. The site is not in an area that could be affected by present underground coal mining. The site is not in an area where the Coal Authority has received an application for, and is currently considering whether to grant a licence to remove or work coal by underground methods. Based on the available information, risk associated with coal mining subsidence is considered to be negligible .

Anticipated ground conditions	BGS Borehole Log; 501600mE, 437800mN, 1.5km east of the study area. 0.00m to 0.70m: Topsoil 0.70m to 5.50m: Soft sandy CLAY with a little gravel 5.50m to 6.20m: Firm silty CLAY with much chalk gravel 6.20m to 7.00m: Hard chalk
Groundwater	Perched groundwater is anticipated where cohesive superficial deposits are present. At a nearby borehole water was struck at 41.76m bgl.
Unexploded Ordnance (UXO)	The site is recorded to have a low risk associated with unexploded ordnance (UXO).
ENVIRONMENTAL APPRAISAL	
Sources of Potential Contamination	Sources of potential contamination are anticipated to be limited to areas of made ground where the site has been previously developed.
Radon	The site does not lie within an area where radon protective measures are required in construction.
Ground Gases	From the current level of information coal mining has not been undertaken on or near the site and as such there is negligible risk of migrating hazardous gases associated with such activities. There are no recorded landfill sites within 250m of the study area. Risk of hazardous ground gases associated with nearby landfill sites is negligible.
Invasive Plant Species	It would be prudent to undertake an invasive plant species survey prior to site redevelopment.
Risk to End Users and Site Workers	Risk to site end-users associated with elevated contaminants of concern is considered to be 'moderate/low' to 'very low'.
Remediation Requirements	At this stage, it is considered unlikely that remedial works will be required. However, where remedial works are required, these are likely to be limited to capping on gardens and areas of soft landscaping across the majority of site where previous development has been undertaken.
Protection of Potable Water Supplies	The requirement for protection of portable water supply pipes should be confirmed through environmental laboratory analysis of the on-site soils, but is considered unlikely.
GEOTECHNICAL APPRAISAL	
Principal Bearing Strata	At this stage, it is anticipated that the near surface chalk bedrock of the Flamborough Chalk Formation will be suitable as the principal bearing strata.
Estimated Nett Allowable Bearing Pressure	A nearby BGS borehole log has described the undisturbed superficial deposits as 'soft to firm' CLAY. These deposits are anticipated to have an allowable bearing capacity ranging between <math><75\text{kN/m}^2</math> to 120kN/m^2.
Ground Treatment	At this stage no ground treatment is anticipated.

Influence from Trees and Volume Change Potential	There are some trees around the boundaries to the site. As such precautions may be required if structures will lie within influencing distance when in clay. In addition, precautions may be required where trees are to be removed or where new planting is proposed. All foundations should be constructed with accordance with current guidelines (e.g. NHBC Standards, Chapter 4.2). If foundations are built off competent clay, no precautions are likely to be required.
Likely Foundation Types	A nearby BGS borehole log indicates soft sandy CLAY from 0.70m to 5.50m. This would indicate the need for pile foundations. The BGS geology of Britain viewer indicates superficial deposits of Glacial Till where traditional strip or trench-fill foundations may be suitable. This type of foundation will need to be confirmed through a suitable ground investigation.
Likely Foundation Depth Range	The depth of the foundation will depend on the ground conditions discovered through ground investigation.
Likely Ground Slab	<i>In situ</i> ground bearing floor slabs are likely to be the most suitable for use at the site.
Buried Concrete	Sulphate protection is expected to be required in buried structures where made ground is present.
Soakaways	No granular superficial deposits are anticipated locally. Soakaway drainage is not anticipated to be suitable for use at the site. Surface water will therefore need to be disposed of to a suitable drainage system (possibly to any existing drains that cross/exit the site), subject to obtaining approvals from regulatory authorities. However, should favourable ground conditions be encountered during intrusive investigation, permeability testing will be required to confirm whether soakaways could be utilised and likely infiltration rates.
Obstruction & Excavations	As the site has undergone numerous phases of development, the possibility of buried obstructions to excavations cannot be ignored.
Boundary Conditions	The northern and southern boundaries are marked by agricultural land used for growing crops. To the east of the site there is residential building and a building used to store agricultural machinery. The same is true to the east of the site. An access track is shown to connect the northeast corner to Mill Lane.
Roads	If roads or pavements are planned it should be noted that a preliminary CBR value of <2.5% is currently considered for road and pavement design. It is recommended that in-situ CBR testing is carried out when final site levels will be known.

FURTHER WORKS

	<ul style="list-style-type: none"> • Intrusive site investigation works comprising mechanically excavated boreholes. • Chemical testing of soil samples to assess levels of contamination.
--	--

1 INTRODUCTION

1.1 Details of Commission

- 1.1.1 Alan Wood & Partners were appointed by Smartbuild Harpham Ltd (the 'Client') to undertake a Phase I Geo-Environmental Assessment. This report covers the proposed development area only.
- 1.1.2 This report provides geotechnical and environmental information in relation to the proposed redevelopment of the site for a residential development with plant uptake, assuming that the ground levels will remain similar to present. Interpretation and recommendations should not be assumed valid for adjacent areas of land, or for alternative land uses. Should the proposed site usage change, the recommendations and conclusions presented in this report may need to be re-assessed.
- 1.1.3 The assessment undertaken and presented in this report includes potential sources of historical ground contamination, likely impacts on sensitive receptors and, where necessary, the identification of any remediation and/or subsequent investigative works that may be required.
- 1.1.4 The report has been prepared for the sole use and reliance of the Client. No other third party may rely on, reproduce or redistribute any content of this report without the prior written consent of Alan Wood & Partners. Any unauthorised third parties using the information presented in this report do so entirely at their own risk and are duly excluded from any warranty, duty of care or skill.

1.2 Previous Reports

- 1.2.1 Alan Wood & Partners are not aware of any historical assessment or ground investigation reports, with respect to the site or neighbouring property, which may be used to facilitate the assessment presented herein.

1.3 Scope of Works

1.3.1 This report constitutes the findings of the Phase I Geo-Environmental Assessment for the site and is based on a review of available geological, hydrogeological and environmental records. The scope of works undertaken within the context of this report comprised:

- A site walkover;
- A review of environmental site sensitivity and historical mapping data;
- A review of available British Geological Survey (BGS) records and plans;
- A review of BGS on-shore borehole records (where available);
- A review of Environment Agency information; and the
- Review of Coal Authority data.

1.3.2 The principal objectives of the Phase I assessment was to:

- Obtain information from accessible sources about the soil and groundwater conditions within the area of the site;
- Determine the possible ground related geotechnical and environmental hazards within the site boundaries that may affect the proposed development;
- Develop an initial Conceptual Site Model (CSM) of potential *source-pathway-receptor* contaminant linkages and undertake a preliminary Risk Assessment in accordance with the proposed development end use scenario;
- Outline preliminary development recommendations;
- Provide advice on any additional phases of work that need to be completed to satisfy the regulatory authorities.

2 ENVIRONMENTAL SETTING

2.1 Introduction

2.1.1 Published environmental, geological and historical data relating to the site area has been reviewed, in conjunction with a walkover survey undertaken on 6th of July 2021, the findings of which are presented below. The principal considerations of immediate relevance are presented in the following sections.

2.2 Site Location & Description

2.2.1 The site is located off Mill Lane, Walkington, Hull HU17 8RT and is centred at National Grid Reference (NGR) 500215mE, 437735mN. A site location plan is presented as Figure 45853/001.

2.2.2 The site area approximately 0.42 hectares (1.03 acres) in size and its shape in plan is generally rectangular. Roughly half of the land area is covered by grass and the remainder is covered by hardstanding.

2.2.3 On the hardstanding land area there is currently a new residential building as well as agricultural equipment including a tractor, a JCB, Calor gas cannisters, lubricant drums, hydraulic oil drums, vehicle batteries, lorries and a skip.

2.2.4 On the grass there is pile of building rubble and evidence of a septic tank.

2.2.5 There is a heating vent coming from the building adjacent to the site's western boundary, the landowner said it hasn't leaked and is far enough away.

2.2.6 The boundary to the north and south comprises a 2.5m tall hedgerow and to the east there is a 1.5m tall metal fence. There is no distinct boundary to the west.

2.2.7 The northern and southern boundaries are marked by agricultural land used for growing crops. To the east of the site there is residential building and a building used to store agricultural machinery. The same is true to the east of the site. An access track is shown to connect the northeast corner to Mill Lane.

2.2.8 The land is predominantly flat and consistent with the adjacent land.

2.2.9 During the site walkover, no evidence of invasive weed species were found.

3 GEO-ENVIRONMENTAL DATA

3.1 Anticipated Geology, Hydrogeology & Mining

3.1.1 A summary of the available published geological and hydrogeological information is provided in Table 3.1 below and overleaf. A review of the following information was undertaken:

- British Geological Survey 1:50,000 scale series, 72, Beverly, Solid & Drift Edition;
- Coal Authority online ground stability database;
- Environment Agency online aquifer designation database; and
- Emapsite Geo + Enviro Insight Data Report Ref. EMS_705957_923010 (Appendix A), 5th July 2021.

Table 3.1 - Geological Information

<i>Made Ground and Surface Ground Workings</i>	Information presented in the GeolInsight report indicates that there are no areas of artificial/made ground within 500m of the site. Further to this the GeolInsight report indicates no records of surface ground workings within 250m.
<i>Geology</i>	<p>The solid geology underlying the site area is recorded as being chalk of the Flamborough Formation. The superficial deposits are recorded as Glacial Till (Diamicton) of Devensian age.</p> <p>There are localised BGS boreholes to the east of the site, records of which have been reviewed. These indicate chalk bedrock is present at a depth of 7m. It is possible that such bedrock soils may be present on site therefore.</p> <p>BGS Borehole Log; 501600mE, 437800mN.</p> <p>0.00m to 0.70m: Topsoil 0.70m to 5.50m: Soft sandy CLAY with a little gravel 5.50m to 6.20m: Firm silty CLAY with much chalk gravel 6.20m to 7.00m: Hard chalk</p>
<i>Discontinuities</i>	Information presented in the GeolInsight report indicate there are no geological faults within 500m of the site.
<i>Hydrogeology</i>	<p><u>Aquifer within Superficial Deposits:</u> 'Secondary Undifferentiated' Aquifer</p> <p>Has been assigned in cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type.</p> <p><u>Aquifer within Bedrock:</u> 'Principal'. Principal aquifers are rock or drift deposits with high intergranular and/or fracture permeability and can provide a high level of water storage. These deposits are capable of supporting water supply and/or base river flow on a strategic scale.</p> <p><u>Source Protection Zones:</u> There is one source protection zone within 500m of the site. The GeolInsight report indicates it is located on-site and of type 2.</p>

	<p>A type 2 zone is defined by the 400 day travel time from a point below the water table. Additionally this zone has a minimum radius of 250 or 500m, depending on the size of the abstraction. The travel time is derived from consideration of the minimum time required to provide delay, dilution and attenuation of slowly degrading pollutants. In geological settings where a confining layer is present, this is indicated as Zone 2c.</p> <p>Source Protection Zones within Confined Aquifer: There are no source protection zones within 500m of the site.</p> <p>Vulnerability & Leaching Potential:</p> <p>Information presented in the GeoInsight report indicates the soil/surface to have a intermediate leaching class, the superficial geology to have medium and the bedrock to have a low class.</p> <p>This classification is based upon soils in which pollutants are unlikely to penetrate the soil layer because either water movement is largely horizontal, or they can attenuate diffuse pollutants.</p>
<i>Hydrology</i>	<p>There is one reported surface water feature within 250m of the site. It is located 100m east of the site and is an inland river not influenced by normal tidal action.</p> <p>There is also one WFD (Water Framework Directive) surface water body catchments reported onsite. It is the water body catchment for the Beverley and Barmston Drain.</p> <p>The GeoInsight report also indicates a WFD groundwater body on-site with an overall, chemical and quantitative rating of poor.</p>
<i>Mining & Ground Stability</i>	<p><u>Historic Underground Working Features</u></p> <p>Information presented in the GeoInsight report indicates that the nearest historical underground working feature lies 353m north west of the site. These are associated with the former Blackmerdale Bottom Pit.</p> <p><u>Coal Mining</u></p> <p>Information presented on the Coal Authority website (www.coal.decc.gov.uk) indicates that the site does not lie within a Development High Risk area nor does it lie within a Coal Mining Reporting area.</p> <p>On the basis of available information risk associated with shallow coal mining subsidence is considered to be negligible.</p>
<i>Non-coal Mining</i>	<p>Historical information indicates that there are no non-coal mining areas within 1km of the site.</p>
<i>Natural Cavities</i>	<p>The GroundSure data indicates that there are no natural cavities recorded within 500m of the study site.</p>
<i>Radon, Landfill and Mine Gas</i>	<p>The site does not lie within an area where radon protective measures are required in construction.</p> <p>Given the lack of coal mining activities within 250m of the study area there is a low risk of migrating hazardous gases associated with coal mining activities.</p> <p>There are no recorded active or recent landfill sites within 500m of the study area. Risk of hazardous ground gases associated with nearby landfill sites is considered to be negligible.</p>

3.2 Environmental Records

3.2.1 A summary of the available environmental information is presented in Table 3.2.

Table 3.2 - Environmental Data

<i>Potentially Harmful Discharges (Red List) to Controlled Waters</i>	There are no records of red list discharge consents reported to be within 500m of the site.
<i>Licensed Discharge Consents</i>	There are no records of licensed discharge consents reported to be within 500m of the site.
<i>EA Recorded Pollution Incidents to Controlled Waters</i>	There are no records of pollution incidents reported to be within 500m of the site.
<i>Landfill and Other Waste Sites</i>	There are no records of any type of waste or landfill site within 500m of the study area.
<i>Flooding</i>	The highest risk of surface water flooding on site is negligible. The highest risk within 50m of the site is 1 in 30 year, 0.30-1.0m. The highest risk of groundwater flooding on site and within 50m of site is low.
<i>Abstractions</i>	There are no groundwater abstractions located within 500m of the site, the nearest ground water abstraction lies 1625m north of the site, this being for general farming and domestic purposes. There are no surface water or potable abstractions within 2000m of the site.
<i>Invasive Plant Species</i>	Japanese Knotweed was not observed during the site walkover. It would be prudent however to undertake an invasive plant species survey to confirm this prior to redevelopment.
<i>Public Register of Contaminated Land: Part 2A (EPA 1990)</i>	There are no sites designated as contaminated land under, Section 78R of the EPA 1990, within 500m of the site.
<i>Dangerous or Hazardous Sites</i>	There are no NIHHS or COMAH sites or high-pressure underground pipelines within 500m of the site. The nearest active petrol or fuel site lies 466m to the south east this being located on Beverley Road.
<i>Potentially Contaminative Current Land Uses</i>	There are two potentially contaminative industrial sites located within 250m of the site. These are both Pylons. These are unlikely to have affected the site or its intended redevelopment. Due to the site being used for agricultural purposes the possibility of oil spills cannot be ignored.

3.3 Historical Land Use

3.3.1 A study of historical Ordnance Survey maps has been undertaken to identify any potentially contaminative former land-uses at the site. The main historical features of the site and surrounding area are summarised in the following table, whilst a copy of the historical maps is presented in Appendix D.

3.3.2 Ordnance Survey map editions may not however be complete and it is possible, therefore, that additional land uses to those presented in the plans have occurred. Alan Wood & Partners have tried to ascertain the complete record of the site's history, but the possibility that other potentially significant land uses may have taken place cannot be ignored.

3.3.3 A summary of the historical land use and surrounding area is presented in Table 3.3 and Table 3.4.

Table 3.3 - Summary of Principal Historical Features (On Site)

Year	Scale(s)	Principal Features
1855	1:10,560	The site comprised of an area of undeveloped agricultural land.
1889-1892	1:10,560	The site still comprised of an area of undeveloped agricultural land and now has a pond to the south of the site.
1893	1:2,500	No significant alterations.
1908	1:10,560	
1910	1:2,500	
1926	1:10,560	
1927	1:2,500	
1928	1:10,560*	
1938	1:10,560	
1947-1950	1:10,560	
1950-1952	1:10,560	Building no longer shown.
1965	1:2,500	Pond no longer shown.
1965-1967	1:2,500	A long thin building has been built on the southern boundary as well as a path along the northern boundary.
1970	1:10,560	No significant alterations.
1973	1:10,000*	
1972-1977	1:2,500*	The map shows a tennis court to the south of the study area and the building and path are no longer shown.
1981	1:10,000	The map no longer shows the tennis court, but the path

		is now shown.
1978-1984	1:2,500	The path has now moved, and two ponds are shown. One on the southern boundary and one on the western.
1992	1:10,000	The ponds are no longer shown.
1994	1:2,500	Both ponds are back on the map. There is also a new building towards the north east of the site.
2001	1:10,000	No significant alterations.
2003	1:1,250	
2010	1:10,000	The pond on the western boundary is no longer shown on the map.
2021	1:10,000	The building towards the north east of the site is no longer shown and a new building at the centre of the study area is depicted.

* No mapping detail/part mapping detail shown

Table 3.4 - Summary of Principal Historical Features (Off Site)

Year	Scale	Principal Features
1855	1:10,560	The site is located within an area of undeveloped agricultural land. Walkington cottage is situated to the north east of the site and Walkington Mill to the west. There is an old pit 353m NW of the site.
1889-1892	1:10,560	Old pit no longer shown. Walkington cottage changed its name to Mill House.
1893	1:2,500	No significant changes.
1908	1:10,560	A small number of residential houses and a farm have been built roughly 450m south of the study area.
1910	1:2,500	No significant alterations.
1926	1:10,560	
1927	1:2,500	
1928	1:10,560*	
1938	1:10,560	
1947-1950	1:10,560	An electricity pillar and line are shown to the south of the study area.
1950-1952	1:10,560	No significant alterations.
1965	1:2,500	An electricity pillar and line are now shown to the north of the study area.
1965-1967	1:2,500	An electricity pillar and line are now shown to the south of the study area.
1970	1:10,560	No significant alterations.
1973	1:10,000*	
1972-1977	1:2,500*	Tennis court across the southern boundary of the southern area and a residential area between 100m and 250m shown.
1981	1:10,000*	No significant alterations.

1978-1984	1:2,500	An electricity pillar and line are now shown to the north of the study area.
1992	1:10,000	Two electricity pillars and two lines are now shown to the north of the study area.
1994	1:2,500	No significant alterations.
2001	1:10,000	Electricity lines and pillars no longer shown.
2003	1:1,250	An electricity pillar and line are now shown to the north of the study area.
2010	1:10,000	Electricity line and pillar no longer shown.
2021	1:10,000	An electricity pillar and line are now shown to the north of the study area.

* No mapping detail/part mapping detail shown

3.3.4 In summary the earliest Ordnance Survey maps, dating back to c. 1855 have been reviewed. The site originally comprised a parcel of undeveloped agricultural land. Numerous buildings have been constructed and demolished since c. 1947 and the most recent map indicates a building is erect today. The maps also indicated the presence of ponds that were depicted on maps in some years and not in others. It is not there today.

3.3.5 Off site there was an only pit that was no longer shown in c. 1889, presumably having been filled in.

4 PHASE I GEOTECHNICAL APPRAISAL

4.1 Made Ground

- 4.1.1 The site has undergone numerous phases of redevelopment. According to the emapsite maps a building was constructed in c. 1947 and was no longer shown on the maps in c. 1952. A different building was then constructed in c. 1965 and no longer shown in c. 1977. A new building was depicted on the maps in c. 2021. There has also been numerous entries of ponds on site that have been depicted over the years. The same is true for paths.
- 4.1.2 Deposits of made ground are therefore likely to be spread across a large proportion of the site where paths, buildings or pond have existed in the past.
- 4.1.3 The presence, type and extent of any on-site made ground soils will need to be established through ground investigation.

4.2 Natural Strata

- 4.2.1 There are no superficial soils shown to be present on site.
- 4.2.2 The solid geology underlying the site area is recorded as being chalk of the Flamborough Formation. The superficial deposits are recorded as Glacial Till (Diamicton) of Devensian age.
- 4.2.3 There is a localised BGS borehole to the west of the site, records of which have been reviewed. It indicates chalk bedrock is present at a depth of 9.1 m. It is possible that such bedrock may be present at similar depths on site.

4.3 Groundwater

- 4.3.1 Perched groundwater is anticipated where cohesive superficial deposits are present. True groundwater is anticipated within the chalk bedrock.

4.4 Foundations

- 4.4.1 The most appropriate foundation solution will be confirmed following completion of the ground investigation and receipt of finalised construction proposals/development layout.
- 4.4.2 At this stage it is considered, where competent undisturbed natural strata is encountered at founding depth, that for 2-3 storey structures of typical construction traditional strip or trench-fill foundations should be suitable. A minimum footing depth

of around 900-1000mm in this instance will probably be adequate (for cohesive soils outside the zone of influence), although if bedrock exists within the near surface a shallower footing depth could be achieved. Made ground soils of any type are **not** suitable founding stratum.

4.4.3 A nearby BGS borehole log indicates soft sandy clay from 0.70m to 5.50m. This would indicate the need for pile foundations. This type of foundation will need to be confirmed through a suitable ground investigation.

4.4.4 There are some trees around the boundaries to the site, so precautions may be required should structures lie within influencing distance when in clay. In addition, precautions may be required where trees are to be removed or where new planting is proposed. All foundations should be constructed in accordance with current guidelines (e.g. NHBC Standards, Chapter 4.2). If foundations are built off competent bedrock, no precautions are likely to be required.

4.4.5 The widening, strengthening and reinforcement of foundations in accordance with current guidelines would be required where footings are found to straddle strata of different type (e.g. clay and rock) or where soft and/or where locally unstable ground is encountered at founding depth. With respect to buried sub-structures, it is anticipated that these will need to be grubbed-out and backfilled in a controlled manner; site-won made ground materials could possibly be used in this instance if the material is of suitable engineering grade and type (subject to testing and design specification).

4.4.6 A rafted foundation solution may potentially be required if areas of deep fill are present on site, subject to the presence of an even thickness of uniform soil type being provided. Specific information with respect to foundation design and any earthworks required to facilitate construction will need to be given in a remedial strategy.

4.4.7 Where a piled foundation solution is required, a detailed pile design should be carried out by a specialist piling contractor using information obtained by appropriate intrusive investigation and laboratory testing.

4.5 Coal Mining Induced Subsidence

4.5.1 It is considered, on the basis of available information, that foundations will not need to be reinforced / strengthened to accommodate any potential movement associated with historic coal mining activity and any ground instability that may occur post

development. Should further information become available this assessment may need to be revised.

4.6 Floor Slabs

4.6.1 *In situ* suspended floor slabs are likely to be the most suitable for use at the site, particularly where in excess of 600mm of unsuitable material is present below floor slabs following site preparation/regrading. Should ground bearing slabs be suitable however, care must be taken to ensure that shallow strata do not become heavily disturbed by site clearance/construction activities (especially during inclement weather). Where this occurs, this could result in an increased requirement for suspended slabs.

4.6.2 Old substructures should be removed to at least 1.0m below any new floor slabs to prevent the formation of 'hard spots', subject to agreement with your warranty provider.

4.6.3 A suspended floor system incorporating a sub-floor void, such as beam and block, will be required for all properties where the foundations lie within the heave zone of trees as defined by NHBC Standards (Chapter 4.2), or where seasonally desiccated soils are present at the time of construction.

4.7 Non-Coal Mining

4.7.1 There is no evidence to suggest that mineral extraction has occurred on site. Risk associated with non-coal mining activities is therefore considered to be negligible.

4.7.2 Should evidence of quarrying be encountered during redevelopment this should be brought to the attention of Alan Wood and Partners. Where this is found to affect construction, appropriate precautions may need to be incorporated into the design (e.g. deepened foundations, reinforced superstructure).

4.8 Excavation Conditions

4.8.1 Obstructions to excavations should be expected due to historical information indicating buildings once stood across much of the site. Other currently unforeseen obstructions may also be present. The breaking-out of obstructions for either foundations or other construction requirements should be allowed for. Excavation of the materials encountered should be easily achieved using conventional hydraulic excavation techniques.

4.8.2 It is likely that excavations should be relatively stable in the short term. However, some materials such as granular soils and made ground are liable to collapse without warning. This situation is likely to be exacerbated by water ingress. No man entry into unsupported excavations should be allowed without an appropriate risk assessment. Reference to CIRIA report 97 (1983) should be made to establish suitable means of support, or battering of excavation sides.

4.8.3 It is considered unlikely that dewatering will be required for shallow short-term excavations. Anticipated groundwater conditions suggest that simple dewatering techniques (e.g. sump pumping) are likely to be adequate to control water ingress on a routine basis. However, it is recommended that provision for the drainage of surface water is allowed for to prevent surface water ponding or collection both during and post construction, as this may lead to deterioration of the founding stratum.

4.9 Stability Issues & Retaining Structures

4.9.1 The site is relatively flat and level and the area surrounding the site is similar. No particular risk in relation to slope instability should occur on site. Where excavations are proposed close to site boundaries, properties and/or any other existing retaining structures, a risk assessment of the integrity/stability should be undertaken prior to such works being carried out. Designed and engineered temporary/permanent measures should be adopted to ensure their continued stability.

4.9.2 Where changes in gradient exist across the site these will be adjusted by minor earthworks. It is anticipated that future ground profiles are unlikely to require earth retaining structures, other than along the western boundary; if this changes, further advice may be required when more information is available.

4.9.3 With respect to natural ground subsidence, the site has been classified as having a 'Very Low' risk associated with shrink/swell clay, running sands, collapsible deposits, landslides and ground dissolution of soluble rocks and a 'Negligible' risk for compressible deposits

4.10 Surface Water Drainage

4.10.1 It is considered, at this stage, that soakaways are likely to be unsuitable. Surface water will therefore need to be disposed of to a suitable drainage system (possibly to any existing drains that cross/exit the site), subject to obtaining approvals from regulatory authorities. However, should favourable ground conditions be encountered during

intrusive investigation, permeability testing will be required to confirm whether soakaways could be utilised and likely infiltration rates.

4.11 Roads and Pavement

4.11.1 A preliminary CBR value of <2.5% is currently considered for road and pavement design. It is recommended that *in-situ* CBR testing is carried out when final site levels will be known and after construction of the development platform. Highways Agency document HD25 Interim Advice Note 73/06 Revision 1 (2009) states that where a subgrade has a CBR lower than 2.5%, it is considered unsuitable support for a pavement foundation since it would tend to deform under construction traffic and must be improved.

4.11.2 All road design should be discussed with the local authority if highways are to be subject to a Section 38 agreement.

4.12 Concrete

4.12.1 Sulphate protection is expected to be required in buried structures where made ground is present. Sulphate Class DS-2 will probably be suitable; however, this will need to be confirmed through laboratory testing.

5 PHASE I ENVIRONMENTAL APPRAISAL

5.1 Introduction

5.1.1 The following section summaries the Preliminary Phase I Conceptual Site Model (CSM), which has been produced following the review of available pertinent desk study and third party information. The CSM summarises the understanding of surface and sub-surface features, the potential sources of contamination, pathways and receptors in order to support the identification and assessment of plausible contaminant linkages.

5.2 Initial Conceptual Site Model & Risk Assessment

5.2.1 The risk assessment has been carried out to assess the likelihood of risk to human health and the wider environment, on the basis of information reviewed. The risk assessment is a qualitative *source-pathway-receptor* assessment and its function is to assess the likelihood that each possible linkage exists and to decide whether they pose potentially unacceptable risks to identified receptors (i.e. people, structures, water bodies or ecosystems) that may be harmed.

5.2.2 Risk can be defined as the combination of the consequence of a harmful effect and the probability of its occurrence. The existence of a contaminant linkage is dependent on site use, as well as environmental conditions: **if no contaminant linkage(s) can be proven, then the risk(s) may be discounted.**

5.3 Site Summary & Environmental Sensitivity

5.3.1 A review of available desk study information indicates that the proposed development area and the adjacent land was undeveloped agricultural land prior to it being occupied by a residential building. More recently the site is understood to have been used for a new residential building surrounded by hardstanding ground being used for storage of old equipment.

5.3.2 Made ground soils are expected over the majority of the site, although the extent of such material would need to be confirmed through ground investigation.

5.3.3 The underlying geology is indicated to comprise superficial Glacial Till deposits, below which is bedrock. The till deposit is recorded as comprising Diamicton of Devensian. The bedrock is recorded as comprising Chalk of the Flamborough Formation.

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- 5.3.4 Some perched/shallow groundwater may be present within the near surface deposits, but this is likely to be localised.
- 5.3.5 Although the likely sources of significant contamination are expected to be limited, there remains the potential for on-site soils to contain elevated concentrations of metals and metalloids (e.g. arsenic), non-metal inorganics and organic contamination (e.g. PAH). Asbestos containing materials may also be present given the age of the nearby buildings and/or where historic made ground exists which may contain it.
- 5.3.6 The potential leaching of mobile contaminants of concern to the underlying principal aquifer is considered to be negligible given the reported low vulnerability of the bedrock geology within the vicinity to the site.
- 5.3.7 It is considered possible that elevated concentrations of CO₂ and CH₄ may be present as a result of potentially infilled ponds (see BS 8576:2013, 'Guidance on Investigations for Ground Gas - Permanent Gases and Volatile Organic Compounds').
- 5.3.8 In summary, given the site history, the anticipated contaminant load within the on-site soils, its underlying geology, gassing potential and the nature of controlled waters receptors, sensitivity of the site is considered, at this stage, to be **moderate**. The nature and concentration of any contamination will need to be confirmed through testing.

5.4 Potential Sources

5.4.1 A potential source is defined as 'a contaminant which is in, or under the land and has the potential to cause harm to human health or to cause pollution of controlled waters'.

5.4.2 The following potential contaminants that may be associated with the site are summarised in Table 5.1 below.

Table 5.1 - Summary of Potential Contaminant Sources

Potential Sources	Associated Potential Contaminants (<i>not limited to</i>)	
	<i>Metals, inorganics and other contaminants</i>	<i>Organics</i>
Potentially contaminative deposits of made ground	Heavy metals, metalloids, sulphate, asbestos	PAH, BTEX, TPH
Neighbouring building containing asbestos	Asbestos	-
Agricultural workshop	Heavy metals, metalloids, sulphate, asbestos	PAH, BTEX, TPH
Infilled ponds/made ground	-	CO ₂ , CH ₄

* Invasive plant species to be assessed separately if encountered.

5.5 Potential Receptors

5.5.1 A receptor is the potential target of the source pollutant, to which either significant harm or deterioration in quality may be caused.

5.5.2 The potential sensitive receptors with respect to the potential contamination hazards identified above are considered in Table 5.2 below.

Table 5.2 - Summary of Potential Receptors

Potential Receptor	Comment
Human Health	Site end-users Site operatives (during construction phase only)
Construction	Potable water supply pipes Foundations
Underlying natural strata	Near surface soils and/or any perched groundwater

5.6 Plausible Pathways

5.6.1 Migration pathways are routes by which contaminant sources may come into contact with receptors. Potential pathways for different types of contaminants vary depending on the properties of the contaminant, the mechanism of its release and the nature of the receptor. The principal potential pollution pathways by which receptors might become exposed to potential contamination at the site are summarised as follows in Table 5.3 below.

Table 5.3 - Summary of Plausible Pathways

Potential Source	Pathway
Potentially contaminated made ground soils, underlying natural strata / perched groundwater	Direct ingestion, dermal contact, dust and/or vapour inhalation
	Direct ingestion and/or dermal contact with liquid contaminants
	Leaching and direct contact with foundations and potable water supply pipes. Lateral migration of contaminants through preferential pathways
Ground gases	Migration of gases and/or accumulation in void spaces via transport through service conduit, any permeable made ground and/or underlying permeable natural strata

5.7 Risk Assessment

5.7.1 The potential contaminant linkages listed above are based on available data and the features noted during the 'walkover'. Therefore, the linkages identified are tentative in nature and are subject to the following uncertainties (to be followed up through ground investigation):

- Nature and extent of the made ground at the site;
- Nature of the underlying natural strata at the site;
- The actual distribution of contaminants within the made ground and underlying natural soils;
- The hydrogeological regime beneath the site.

5.7.2 The assessment presented herein assumes that the site end-use is to be *residential with gardens*. The assessment is not valid for other land uses. Should the proposed end-use of the site change, the assessment contained herein would need to be revised to accommodate this.

5.7.3 The identified potential contaminants and receptors have been considered in relation to the pathways that may link them. The risk classification has been estimated in accordance with those methods prescribed in CIRIA publication C552 '*Contaminated Land Risk Assessment: A Guide to Good Practice*', 2001.

5.7.4 Risk is regarded as a combination of the likelihood of an 'event' occurring and its severity: both elements must be taken into account when assessing risk. The method for risk assessment, or evaluation, is purely qualitative. As defined in CIRIA C552:2001, the magnitude of the potential 'severity' of risk occurring may be assessed against:

- **Severe:** short term risk to human health likely to result in significant harm as defined under EPA 1990, Part 2A. Short term risk of pollution to sensitive water receptor;
- **Medium:** significant harm to human health, pollution of sensitive water resource or significant change to an ecosystem or specific organism;
- **Mild:** pollution of non-sensitive water resource but significant damage to crops, buildings, structures and services or the environment;
- **Minor:** harm, which may result in financial loss, or expenditure to resolve. Non-permanent effects to human health. Easily repairable effects of damage to buildings, structures and services.

5.7.5 Similarly, the classification of the magnitude of the 'probability' of the risk occurring may be assessed against:

- **High Likelihood:** a contaminant linkage exists and an event appears very likely in the short term, or almost inevitable in the long term, or pollution is causing harm at the receptor;
- **Likely:** a contaminant linkage exists and it is probable that an event will occur. An event may not occur, but it is possible in the short term and likely over the long term;
- **Low Likelihood:** a contaminant linkage exists, and it is possible that an event will

occur. It is not certain that an event will occur over time but it is less likely in the short term;

- **Unlikely:** a contaminant linkage exists but it is not possible to say if an event will occur even over a very long time.

5.7.6 Following completion of the severity and probability assessment, classifications can be compared to indicate the actual risk each contaminant linkage presents: this can only be undertaken where there is a possibility of there being an active contaminant linkage.

5.7.7 The risk categories which can be assigned are presented in Table 5.4 overleaf and range between 'very high risk' to 'very low risk'. *NB - it is not possible to classify an identified risk as 'no-risk'.*

Table 5.4 - Risk Categories

		Consequence			
		Severe	Medium	Mild	Minor
Probability	Highly Likely	Very High	High	Moderate	Moderate / Low
	Likely	High	Moderate	Moderate / Low	Low
	Low Likelihood	Moderate	Moderate / Low	Low	Very Low
	Unlikely	Moderate / Low	Low	Very Low	Very Low

Reproduced from Table 6.5, CIRIA C552/2001.

- **Very High** – severe harm could arise to a designated receptor or that severe harm is occurring. Urgent investigation and remediation is likely to be required;
- **High** – harm could occur to a designated receptor and that urgent investigation and remediation may be needed in the short term, but are likely over the longer term;
- **Moderate** – harm could occur. It is unlikely to be severe, most probably relatively mild. Investigation is normally required to clarify the risk with some remedial works being required in the longer term;
- **Low** – possible that harm could occur, but if it did, at worst it would be mild;
- **Very Low** – low possibility of harm arising, and that if it does it is not likely to be severe.

5.7.8 The identified potential contaminants and receptors have been considered in relation to the pathways that may link them. The resulting contaminant linkages are presented in Table 5.5.

Table 5.5 - Summary of Phase I Conceptual Site Model & Risk Assessment

Potential Source	Potential Receptor	Plausible Pathway	Probability	Severity	Initial Risk Rating	Solution
Potentially contaminated made ground, near surface natural strata / perched groundwater	<u>Human Health</u> Site end-users, inc. maintenance and site workers (short term risk during construction)	Direct ingestion or dermal contact with soil, dust and/or vapour inhalation	Low likelihood	Medium	Moderate/Low	Soil capping or removal of contaminated soils where necessary
		Direct ingestion and/or dermal contact with liquid contaminants	Unlikely	Mild	Very Low	
		Inhalation of asbestos fibres	Low likelihood	Severe	Moderate	
	<u>Construction (Potable Water Supply Pipes)</u>	Direct contact/leaching (tainting)	Low likelihood	Mild	Low	Upgraded water pipes/clean backfill material where necessary
	<u>Construction (Foundations)</u>	Direct contact/leaching	Low likelihood	Mild	Low	Appropriate concrete specification
	Controlled Waters	Surface run-off / lateral migration	Unlikely	Mild	Very Low	No risk anticipated due to low soil leaching potential
Infilled ponds/made ground	<u>Human Health</u> Site end-users, inc. maintenance and site workers (short term risk during construction)	Inhalation (via ingress and accumulation)	Low likelihood	Medium	Moderate/Low	Gas monitoring with necessary precautions appropriate to the proposed site end use.

5.7.9 The preliminary conceptual site model (CSM) presented above has indicated that several contaminant linkages may exist on-site.

5.7.10 In order to investigate any unacceptable risk presented by these, intrusive investigation is required. The intrusive works will provide information on actual contaminants present on-site and plausible pathways to potentially sensitive receptors.

5.7.11 At this stage it is possible that a soil capping layer would be required in soft landscaped areas given the potential for elevated concentrations of inorganic and organic contaminants within any made ground soils (and/or the underlying near surface natural strata). It would be prudent, at this stage, to allow for 600mm capping to gardens, this reducing to 450mm in landscaped areas; 150mm of the capping thickness will comprise topsoil. The need for remedial measures to mitigate risk associated with any contamination will be provided following the completion of laboratory analysis and risk assessment. Soil and/or capping materials brought to site will need to be certified as clean with the EHO/NHBC prior to importation.

5.7.12 Fugitive ground gases associated with the infilled ponds and made ground may present a risk to development on the basis of available information. In accordance with BS8485:2007, BS8576:2013, NHBC (2007) and CIRIA C665 (2007), a period of ground gas monitoring appropriate for the proposed end use of the site should be undertaken. Although it is considered that the likely generation potential for ground gas at the site will be low, the proposed development case indicates that 12 monitoring visits over a period of 6 months should be undertaken to determine the minimum level of protection required. A minimum of 3 boreholes should be installed. It may be prudent, at this stage, to allow for the provision of gas precautions to Characteristic Situation 2 until proven otherwise. The Groundsure Enviro + Geosight report indicates that radon protective measures are not required.

5.7.13 Basic radon precautions are also required in construction.

5.7.14 It is considered, at this stage, that some protective measures may be required where potable water supply pipes are to be laid. Confirmation of the need for protective measures will however be given following completion of the ground investigation and laboratory analysis. Analytical work may need to be carried out in accordance with those guidelines prescribed in UKWIR (2010) (Ref. 10/WM/03/21). If the concentrations of contaminants within the soils are found to be below the acceptable

levels listed in the UKWIR guidelines, standard PE/PVC pipes should be suitable for the development, these being placed in a clean backfill surround where made ground soils are present. The local utility provider should be contacted however to determine its exact requirements in respect of the levels of contamination encountered.

5.7.15 Sulphate protection is expected to be required in buried structures where made ground is present. In accordance with Special Digest 1:2005, Sulphate Design class DS2 will most probably be suitable, although this will need to be confirmed by chemical testing.

5.7.16 Other currently unforeseen areas of contaminated soil may be present.

5.7.17 Any materials to be removed from site should be undertaken in accordance with the Duty of Care Regulations 1991. There will also be a requirement to classify the waste in accordance with the European Waste Catalogue, in which case the waste should be subject to Waste Acceptance Criteria (WAC) testing. In light of the new regulations it is recommended that discussion with landfill operators takes place at an early stage if this is to occur.

6 RATIONALE FOR PHASE II GROUND INVESTIGATION

6.1 Introduction

- 6.1.1 The overall objective of this study is to contribute towards the understanding of the ground conditions underlying the proposed residential development at the site in off Mill Lane, Walkington, Hull HU17 8RT. Research into the history and evolution of the site up to the present day has been undertaken which allows a fair assessment of the risks posed to the development to be made.
- 6.1.2 The study has provided sufficient background data in terms of the land uses of the site and its surroundings together with details of the general geology, mining and hydrogeology.
- 6.1.3 The preliminary risk assessment, when considered within the context of proposed end-use, indicates that some on-site contaminant linkages may present an unacceptable risk to human health and/or the wider environment and need to be assessed further.
- 6.1.4 It is proposed that a Phase II geo-environmental investigation will be required so that site-specific data can be obtained with respect to any potential soil contamination, ground gas (should monitoring be required), sulphate precautions etc, so that risks can be quantified in relation to the *source-pathway-receptor* scenarios and plausible contaminant linkages postulated in the initial conceptual model above.

6.2 Scope of Works

- 6.2.1 The intrusive investigation will provide information to establish the nature, type and condition of the near-surface soils and underlying bedrock, thus obtaining an initial understanding of the contamination status and geotechnical properties of the on-site soil and rock conditions across the site area. As such, the following should be carried out:

- Ground investigation by windowless sampling boreholes to facilitate the collection of samples from within the on-site made ground and the underlying near surface natural strata for chemical and geotechnical laboratory testing;
- Assess the risk to human health from the identified levels of contamination;
- Assessment of the thickness and nature of the made ground soils;

-
- Assessment of the geotechnical properties of the underlying natural strata for foundation design purposes;
 - Report on the presence of likely development abnormalities (e.g. shallow bedrock, buried obstructions, soft ground, deep made ground etc), where encountered;
 - Establish the presence of fugitive ground gases over the period of monitoring as outlined above. A minimum of 3 No. ground gas/groundwater monitoring installations would be required;
 - Invasive plant species survey (to be commissioned under separate agreement if necessary).

6.2.2 All ground investigation works and soil descriptions will be undertaken in general accordance with BS EN ISO 14688-1 'Geotechnical Investigation and Testing – Identification and Classification of Soil' (2002), BS10175 (2011), BS 5930 (2010) and/or BS EN 1997-2/2007 (EC7 Part 2).

6.3 Analytical Strategy

6.3.1 The analytical strategy to be adopted for the investigations shall be designed to provide an overall assessment of potential contaminants thought to be associated with the potential pollutant sources identified, once full and proper access to the site is achievable.

6.3.2 Whilst no specific contaminants of concern are anticipated in significant concentrations, it is anticipated that the following analytes should be tested for:

- Heavy metals suite (including As, Cd, Cr(III), Cr(VI), Cu, Hg, Se, Pb, Ni, Zn);
- Speciated Polycyclic Aromatic Hydrocarbons;
- Speciated Total Petroleum Hydrocarbons;
- BTEX;
- Cyanide (Free and Total);
- Total phenol;
- Sulphates (Total and Water Soluble);
- Sulphide;
- pH;

-
- TOC;
 - Asbestos fibres.

6.3.3 Sampling will be undertaken in accordance with those guidelines prescribed in Sections 8.3.2 and 8.6 of BS 10175:2011, whilst the basic engineering properties of soils encountered will be recorded through visual observation.

7 REGULATORY APPROVAL

- 7.1.1 The conclusions and recommendations presented in this report are considered reasonable on the basis of available information and the assessment of the site as carried out by Alan Wood & Partners.
- 7.1.2 It should be noted however that the works undertaken cannot be guaranteed to gain approval by the Regulatory Authorities and your Warranty Provider, so copies of this report should be made available to the relevant organisations (as appropriate) for their comment and approval, prior to undertaking any irrecoverable works associated with the site.

8 INFORMATION SOURCES

In addition to the specific references cited in the text, the following references have been referred to in the production of this report, where relevant to the defined project objectives.

- 1 Emapsite GroundSure / GeoInsight Report & EnviroInsight Report; EMS_705957_923010; 05/07/2021
- 2 British Geological Survey Sheet 72, Beverley (1:50,000 scale, solid & drift edition and/or 1:10,000 scale);
- 3 BRE BR211 (2015) *Radon: guidance on protective measures for new dwellings*;
- 4 Coal Authority, www.coal.decc.gov.uk;
- 5 CIRIA C665 (2007), *Assessing risks posed by hazardous ground gases to buildings*;
- 6 BS:8576 (2013), *Guidance on Investigations for Ground Gas - Permanent Gases and Volatile Organic Compounds (VOCs)*;
- 7 BSEN 1997-1 (2004), *Geotechnical Design Part 1 – General Rules*;
- 8 BSEN 1997-2 (2007), *Geotechnical Design Part 2 – Ground investigation and testing*;
- 9 BS5930 (1999), *Code of practice for site investigations*;
- 10 CIRIA C552 (2001), *Contaminated Land Risk Assessment, A Guide to Good Practice*;
- 11 CIRIA C758D (2019): *Construction over Abandoned Mine Workings*.
- 12 NHBC Chapter 4.2 (2020), *Building near trees*, NHBC Publication, 2020.
- 13 DETR Circular 02/2000 (2000). *Environmental Protection Act 1990 Part IIA. Contaminated Land*. Department of the Environment, Transport and the Regions, Circular 02/2000, Dated 20th March 2000;

9 LIMITATIONS OF STUDY

9.1.1 This document has been prepared by Alan Wood & Partners for the titled project and should not be relied upon or used for any other project without prior written authorization being obtained. Alan Wood & Partners can accept no responsibility or liability for the consequences of the use of this document, wholly or in part, for any other purpose than that for which it was commissioned.

This report has been prepared for the sole use and reliance of the Client and shall not be relied upon or transferred to any other party without the express written authorisation of Alan Wood & Partners. It may contain material subject to copyright or obtained subject to license. Any persons so using or relying upon this document for such other purpose do so at their own risk.

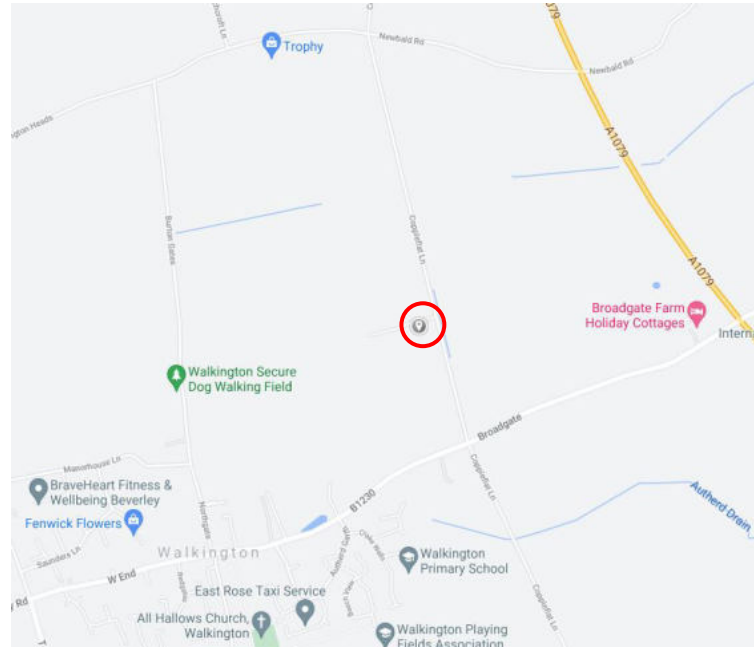
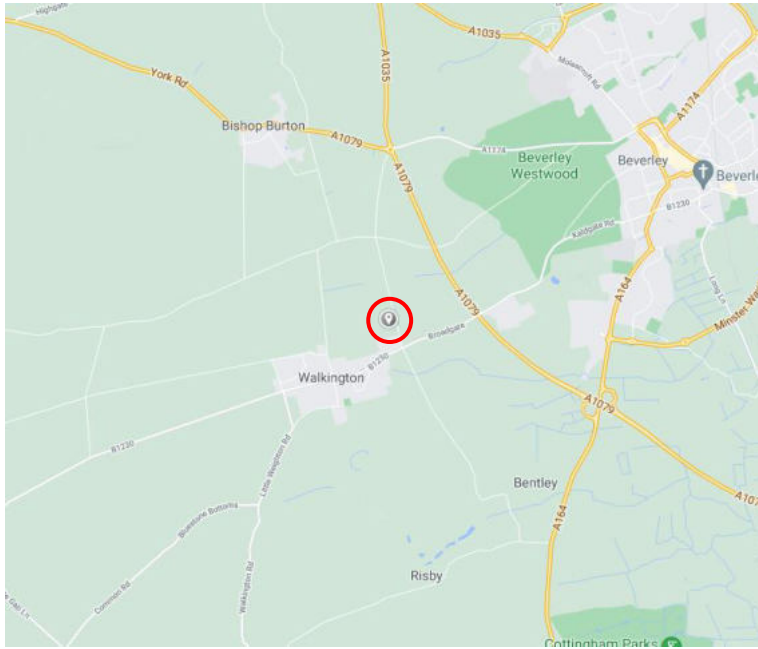
9.1.2 The findings and opinions provided in this document are given in good faith and are subject to the limitations and constraints imposed by the methods and information sources described in this report. Factual information, including, where stated, a visual inspection of the site, has been obtained from a variety of sources. Alan Wood & Partners assumes the third party data to be reliable, but has not independently confirmed this. The validity and accuracy of this information is outside the control of Alan Wood & Partners. No guarantee can therefore be given as to the completeness of the information gathered during the study and no responsibility is accepted for errors or omissions in the third party information used to produce this report. Alan Wood & Partners' professional judgement and experience is however used to ensure that uncertainties are reduced to a level appropriate to the site conditions, the purpose of the investigation and the resources devoted to it by the Client.



9.1.3 The findings and opinions presented in this report are relevant to the dates when the assessment was undertaken, but should not necessarily be relied upon to represent conditions at a substantially later date.

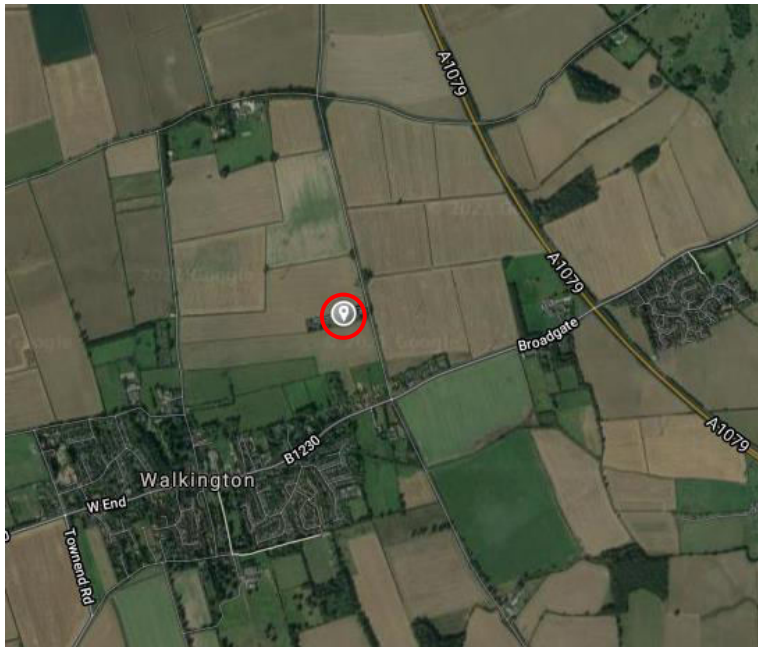
9.1.4 This report provides an assessment of the potential contamination status of the ground below the site, being based only upon information available for review. Where the report refers to the potential presence of invasive plants (such as Japanese Knotweed) or asbestos-containing materials, such observations are for information only and should be verified by a suitably qualified expert.

-
- 9.1.5 Whilst every effort has been made to carry out an assessment that enables a realistic initial characterisation of the geotechnical and environmental parameters to be identified, the possibility of significant variation in actual ground and groundwater conditions existing cannot be discounted. Further information, ground investigation, construction activities, change of site use, or the passage of time may reveal conditions that were not indicated in the data presented and therefore could not have been considered in the preparation of this report. Where such information might impact upon stated opinions, Alan Wood & Partners reserve the right to modify the opinions expressed in this report. Where opinions expressed in this report are based on current available guidelines and legislation, no liability can be accepted by Alan Wood & Partners for the effects of any future changes to such guidelines and legislation. New information of improved practices and changes in legislation may require reinterpretation of the report as a whole, or in part.
- 9.1.6 The conclusions and recommendations presented in this report are based on site-specific information obtained during the desk study. They are however limited to those that could be reasonably made at the time the assessment was undertaken. Alan Wood & Partners reserve the right to retract either conclusions or recommendations in light of any further information that may become available.
- 9.1.7 Interpretation and recommendations should not be assumed valid for adjacent areas of land, or for alternate land uses. Where the proposed site usage changes, the findings of this report should be re-assessed to accommodate the change in proposed end-use.
- 9.1.8 The limitations of liability of Alan Wood & Partners for the contents of this document have been agreed with the Client, as set out in the terms and conditions of offer and related contract documentation.

FIGURES



- DO NOT SCALE
-  Approximate Site Location
 -  Approximate Site Boundary



Client: Smartbuild Harpham Ltd		
Project: Mill Garage, Mill Lane, Walkington		
Drawing: Site Location Plan		
Date: 31/08/21	Scale: NTS	
Drawn by: LAF	Check by: BAD	Approved by: BAD
Status: FINAL		
Job no. 45853	Fig. no. 001	Rev.

APPENDIX A

500215 437735

Order Details

Date: 05/07/2021
Your ref: EMS_705957_923010
Our Ref: EMS-705957_923010
Client: emapsite

Site Details

Location: 500215 437735
Area: 0.42 ha
Authority: [East Riding of Yorkshire Council](#)



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Summary of findings

p. 2

Aerial image

p. 8

OS MasterMap site plan

p.13

groundsure.com/insightuserguide

Contact us with any questions at:

info@groundsure.com

08444 159 000

Summary of findings

Page	Section	Past land use	On site	0-50m	50-250m	250-500m	500-2000m
14	1.1	<u>Historical industrial land uses</u>	0	4	0	1	-
15	1.2	<u>Historical tanks</u>	0	0	0	1	-
15	1.3	Historical energy features	0	0	0	0	-
16	1.4	Historical petrol stations	0	0	0	0	-
16	1.5	<u>Historical garages</u>	0	0	0	2	-
16	1.6	Historical military land	0	0	0	0	-
Page	Section	Past land use - un-grouped	On site	0-50m	50-250m	250-500m	500-2000m
17	2.1	<u>Historical industrial land uses</u>	0	6	1	1	-
18	2.2	<u>Historical tanks</u>	0	0	0	4	-
18	2.3	Historical energy features	0	0	0	0	-
19	2.4	Historical petrol stations	0	0	0	0	-
19	2.5	<u>Historical garages</u>	0	0	0	4	-
Page	Section	Waste and landfill	On site	0-50m	50-250m	250-500m	500-2000m
20	3.1	Active or recent landfill	0	0	0	0	-
20	3.2	Historical landfill (BGS records)	0	0	0	0	-
20	3.3	Historical landfill (LA/mapping records)	0	0	0	0	-
20	3.4	Historical landfill (EA/NRW records)	0	0	0	0	-
20	3.5	Historical waste sites	0	0	0	0	-
21	3.6	Licensed waste sites	0	0	0	0	-
21	3.7	Waste exemptions	0	0	0	0	-
Page	Section	Current industrial land use	On site	0-50m	50-250m	250-500m	500-2000m
22	4.1	<u>Recent industrial land uses</u>	0	0	2	-	-
23	4.2	<u>Current or recent petrol stations</u>	0	0	0	1	-
23	4.3	Electricity cables	0	0	0	0	-
23	4.4	Gas pipelines	0	0	0	0	-
23	4.5	Sites determined as Contaminated Land	0	0	0	0	-



23	4.6	Control of Major Accident Hazards (COMAH)	0	0	0	0	-
24	4.7	Regulated explosive sites	0	0	0	0	-
24	4.8	Hazardous substance storage/usage	0	0	0	0	-
24	4.9	Historical licensed industrial activities (IPC)	0	0	0	0	-
24	4.10	Licensed industrial activities (Part A(1))	0	0	0	0	-
24	4.11	Licensed pollutant release (Part A(2)/B)	0	0	0	0	-
25	4.12	Radioactive Substance Authorisations	0	0	0	0	-
25	4.13	Licensed Discharges to controlled waters	0	0	0	0	-
25	4.14	Pollutant release to surface waters (Red List)	0	0	0	0	-
25	4.15	Pollutant release to public sewer	0	0	0	0	-
25	4.16	List 1 Dangerous Substances	0	0	0	0	-
26	4.17	List 2 Dangerous Substances	0	0	0	0	-
26	4.18	Pollution Incidents (EA/NRW)	0	0	0	0	-
26	4.19	Pollution inventory substances	0	0	0	0	-
26	4.20	Pollution inventory waste transfers	0	0	0	0	-
26	4.21	Pollution inventory radioactive waste	0	0	0	0	-

Page	Section	Hydrogeology	On site	0-50m	50-250m	250-500m	500-2000m
27	5.1	<u>Superficial aquifer</u>	Identified (within 500m)				
29	5.2	<u>Bedrock aquifer</u>	Identified (within 500m)				
31	5.3	<u>Groundwater vulnerability</u>	Identified (within 50m)				
32	5.4	<u>Groundwater vulnerability- soluble rock risk</u>	Identified (within 0m)				
32	5.5	<u>Groundwater vulnerability- local information</u>	Identified (within 0m)				
33	5.6	<u>Groundwater abstractions</u>	0	0	0	0	6
35	5.7	Surface water abstractions	0	0	0	0	0
35	5.8	Potable abstractions	0	0	0	0	0
35	5.9	<u>Source Protection Zones</u>	1	0	0	0	-
36	5.10	Source Protection Zones (confined aquifer)	0	0	0	0	-

Page	Section	Hydrology	On site	0-50m	50-250m	250-500m	500-2000m
37	6.1	<u>Water Network (OS MasterMap)</u>	0	0	1	-	-



38	6.2	<u>Surface water features</u>	0	0	1	-	-
38	6.3	<u>WFD Surface water body catchments</u>	1	-	-	-	-
38	6.4	<u>WFD Surface water bodies</u>	0	0	0	-	-
39	6.5	<u>WFD Groundwater bodies</u>	1	-	-	-	-
Page	Section	River and coastal flooding	On site	0-50m	50-250m	250-500m	500-2000m
40	7.1	Risk of Flooding from Rivers and Sea (RoFRaS)	None (within 50m)				
40	7.2	Historical Flood Events	0	0	0	-	-
40	7.3	Flood Defences	0	0	0	-	-
40	7.4	Areas Benefiting from Flood Defences	0	0	0	-	-
41	7.5	Flood Storage Areas	0	0	0	-	-
42	7.6	Flood Zone 2	None (within 50m)				
42	7.7	Flood Zone 3	None (within 50m)				
Page	Section	Surface water flooding					
43	8.1	<u>Surface water flooding</u>	1 in 30 year, 0.3m - 1.0m (within 50m)				
Page	Section	Groundwater flooding					
45	9.1	<u>Groundwater flooding</u>	Low (within 50m)				
Page	Section	Environmental designations	On site	0-50m	50-250m	250-500m	500-2000m
46	10.1	<u>Sites of Special Scientific Interest (SSSI)</u>	0	0	0	0	1
47	10.2	Conserved wetland sites (Ramsar sites)	0	0	0	0	0
47	10.3	Special Areas of Conservation (SAC)	0	0	0	0	0
47	10.4	Special Protection Areas (SPA)	0	0	0	0	0
47	10.5	National Nature Reserves (NNR)	0	0	0	0	0
48	10.6	Local Nature Reserves (LNR)	0	0	0	0	0
48	10.7	<u>Designated Ancient Woodland</u>	0	0	0	0	1
48	10.8	Biosphere Reserves	0	0	0	0	0
48	10.9	Forest Parks	0	0	0	0	0
49	10.10	Marine Conservation Zones	0	0	0	0	0
49	10.11	Green Belt	0	0	0	0	0
49	10.12	Proposed Ramsar sites	0	0	0	0	0



49	10.13	Possible Special Areas of Conservation (pSAC)	0	0	0	0	0
49	10.14	Potential Special Protection Areas (pSPA)	0	0	0	0	0
50	10.15	Nitrate Sensitive Areas	0	0	0	0	0
50	10.16	<u>Nitrate Vulnerable Zones</u>	2	0	0	0	2
51	10.17	<u>SSSI Impact Risk Zones</u>	1	-	-	-	-
52	10.18	<u>SSSI Units</u>	0	0	0	0	1
Page	Section	Visual and cultural designations	On site	0-50m	50-250m	250-500m	500-2000m
53	11.1	World Heritage Sites	0	0	0	-	-
53	11.2	Area of Outstanding Natural Beauty	0	0	0	-	-
53	11.3	National Parks	0	0	0	-	-
53	11.4	Listed Buildings	0	0	0	-	-
54	11.5	Conservation Areas	0	0	0	-	-
54	11.6	Scheduled Ancient Monuments	0	0	0	-	-
54	11.7	Registered Parks and Gardens	0	0	0	-	-
Page	Section	Agricultural designations	On site	0-50m	50-250m	250-500m	500-2000m
55	12.1	<u>Agricultural Land Classification</u>	Grade 2 (within 250m)				
56	12.2	Open Access Land	0	0	0	-	-
56	12.3	Tree Felling Licences	0	0	0	-	-
56	12.4	Environmental Stewardship Schemes	0	0	0	-	-
57	12.5	Countryside Stewardship Schemes	0	0	0	-	-
Page	Section	Habitat designations	On site	0-50m	50-250m	250-500m	500-2000m
58	13.1	<u>Priority Habitat Inventory</u>	0	0	2	-	-
59	13.2	Habitat Networks	0	0	0	-	-
59	13.3	Open Mosaic Habitat	0	0	0	-	-
59	13.4	Limestone Pavement Orders	0	0	0	-	-
Page	Section	Geology 1:10,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
60	14.1	<u>10k Availability</u>	Identified (within 500m)				
61	14.2	Artificial and made ground (10k)	0	0	0	0	-
62	14.3	Superficial geology (10k)	0	0	0	0	-



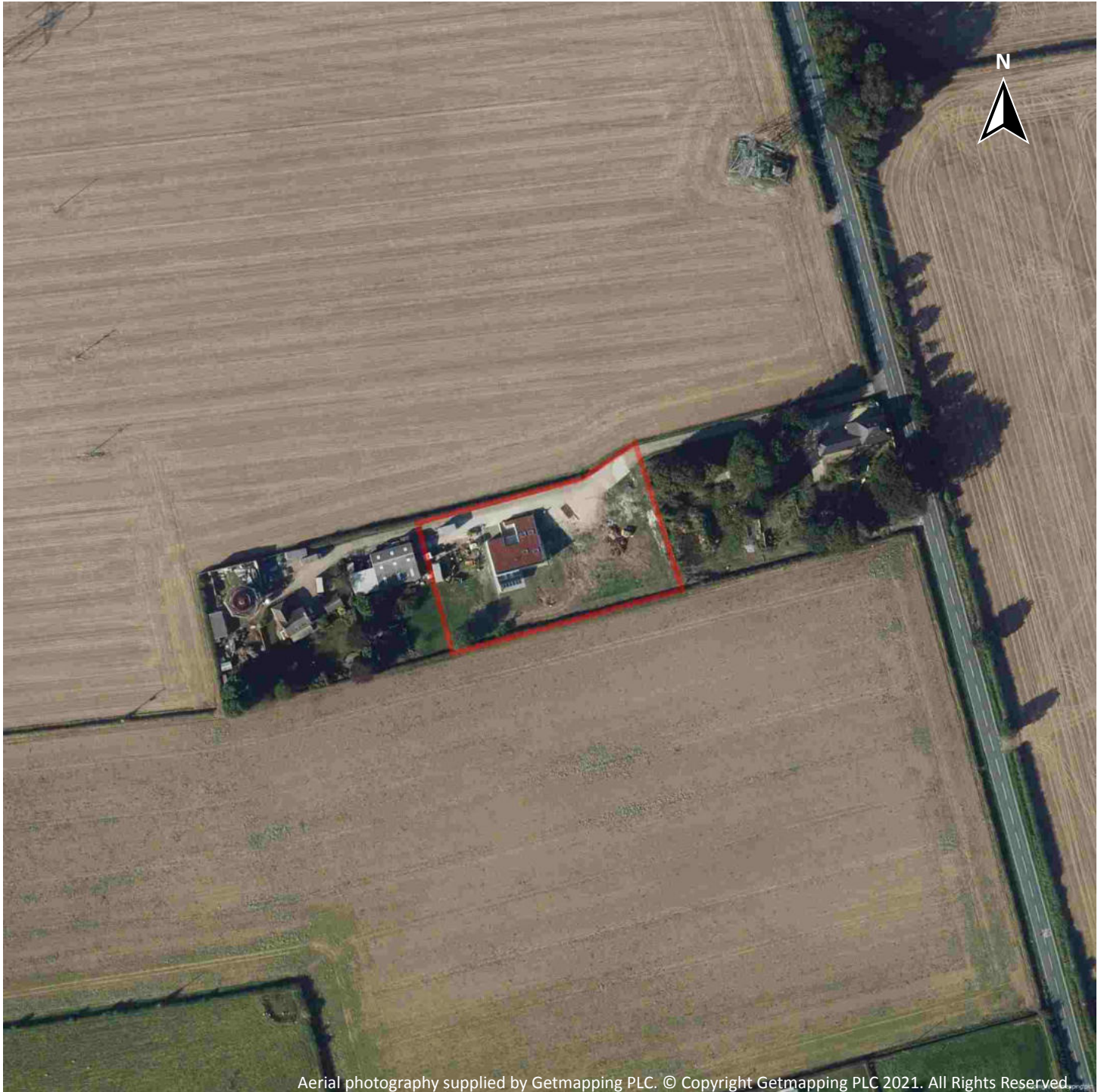
62	14.4	Landslip (10k)	0	0	0	0	-
63	14.5	Bedrock geology (10k)	0	0	0	0	-
63	14.6	Bedrock faults and other linear features (10k)	0	0	0	0	-
Page	Section	Geology 1:50,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
64	15.1	<u>50k Availability</u>	Identified (within 500m)				
65	15.2	Artificial and made ground (50k)	0	0	0	0	-
65	15.3	Artificial ground permeability (50k)	0	0	-	-	-
66	15.4	<u>Superficial geology (50k)</u>	1	0	0	0	-
67	15.5	<u>Superficial permeability (50k)</u>	Identified (within 50m)				
67	15.6	Landslip (50k)	0	0	0	0	-
67	15.7	Landslip permeability (50k)	None (within 50m)				
68	15.8	<u>Bedrock geology (50k)</u>	1	0	0	1	-
69	15.9	<u>Bedrock permeability (50k)</u>	Identified (within 50m)				
69	15.10	Bedrock faults and other linear features (50k)	0	0	0	0	-
Page	Section	Boreholes	On site	0-50m	50-250m	250-500m	500-2000m
70	16.1	<u>BGS Boreholes</u>	0	0	1	-	-
Page	Section	Natural ground subsidence					
71	17.1	<u>Shrink swell clays</u>	Very low (within 50m)				
72	17.2	<u>Running sands</u>	Very low (within 50m)				
73	17.3	<u>Compressible deposits</u>	Negligible (within 50m)				
74	17.4	<u>Collapsible deposits</u>	Very low (within 50m)				
75	17.5	<u>Landslides</u>	Very low (within 50m)				
76	17.6	<u>Ground dissolution of soluble rocks</u>	Very low (within 50m)				
Page	Section	Mining, ground workings and natural cavities	On site	0-50m	50-250m	250-500m	500-2000m
78	18.1	Natural cavities	0	0	0	0	-
79	18.2	<u>BritPits</u>	0	0	0	1	-
79	18.3	Surface ground workings	0	0	0	-	-
79	18.4	Underground workings	0	0	0	0	0
79	18.5	Historical Mineral Planning Areas	0	0	0	0	-



80	18.6	Non-coal mining	0	0	0	0	0
80	18.7	Mining cavities	0	0	0	0	0
80	18.8	JPB mining areas	None (within 0m)				
80	18.9	Coal mining	None (within 0m)				
80	18.10	Brine areas	None (within 0m)				
81	18.11	Gypsum areas	None (within 0m)				
81	18.12	Tin mining	None (within 0m)				
81	18.13	Clay mining	None (within 0m)				
Page	Section	Radon					
82	19.1	Radon	Less than 1% (within 0m)				
Page	Section	Soil chemistry	On site	0-50m	50-250m	250-500m	500-2000m
83	20.1	BGS Estimated Background Soil Chemistry	1	0	-	-	-
83	20.2	BGS Estimated Urban Soil Chemistry	0	0	-	-	-
83	20.3	BGS Measured Urban Soil Chemistry	0	0	-	-	-
Page	Section	Railway infrastructure and projects	On site	0-50m	50-250m	250-500m	500-2000m
84	21.1	Underground railways (London)	0	0	0	-	-
84	21.2	Underground railways (Non-London)	0	0	0	-	-
84	21.3	Railway tunnels	0	0	0	-	-
84	21.4	Historical railway and tunnel features	0	0	0	-	-
84	21.5	Royal Mail tunnels	0	0	0	-	-
85	21.6	Historical railways	0	0	0	-	-
85	21.7	Railways	0	0	0	-	-
85	21.8	Crossrail 1	0	0	0	0	-
85	21.9	Crossrail 2	0	0	0	0	-
85	21.10	HS2	0	0	0	0	-



Recent aerial photograph



Capture Date: 19/09/2019

Site Area: 0.42ha



Recent site history - 2016 aerial photograph



Capture Date: 20/04/2016

Site Area: 0.42ha



Recent site history - 2014 aerial photograph

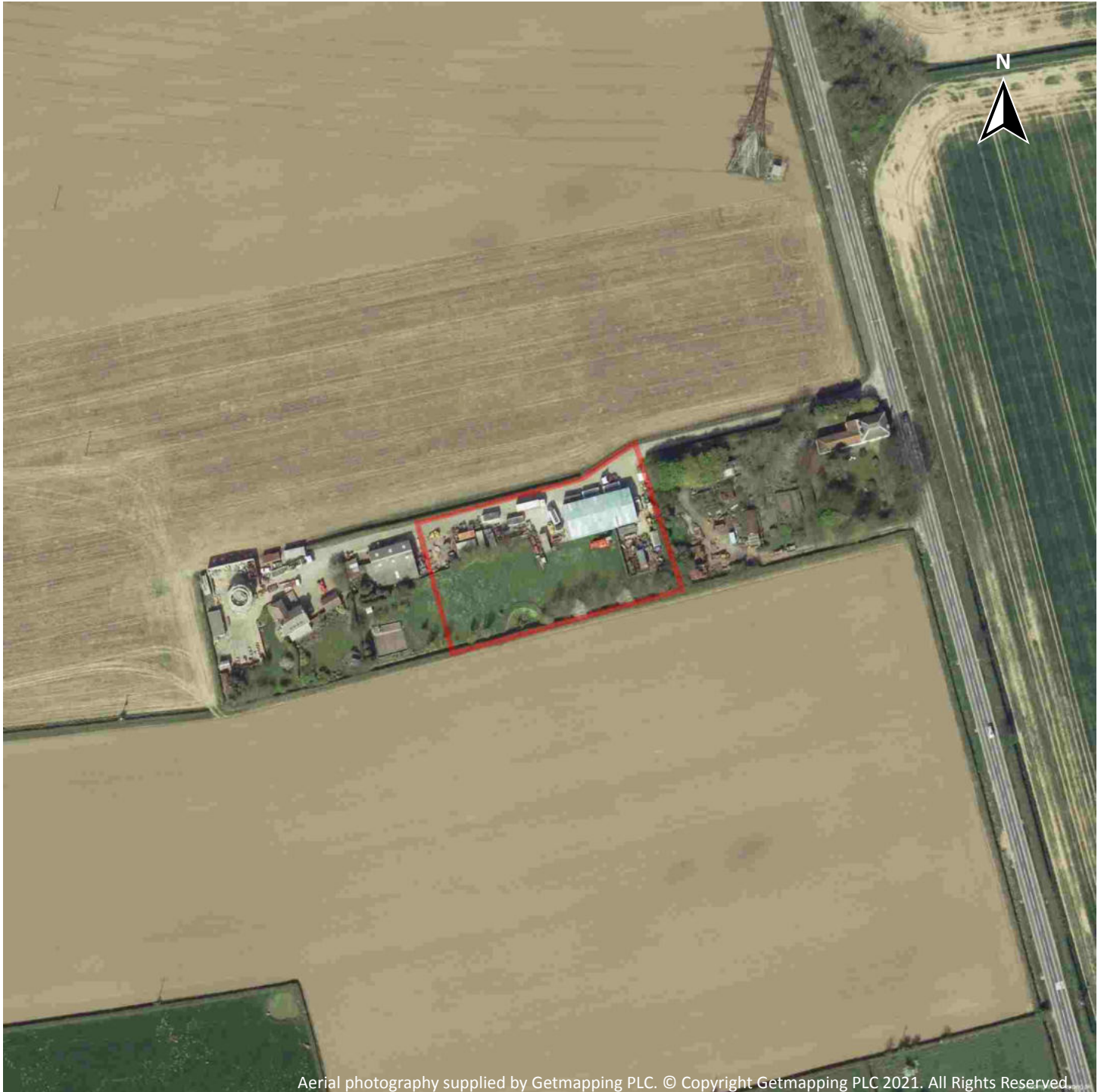


Capture Date: 27/09/2014

Site Area: 0.42ha



Recent site history - 2007 aerial photograph



Capture Date: 15/04/2007

Site Area: 0.42ha



Recent site history - 1999 aerial photograph



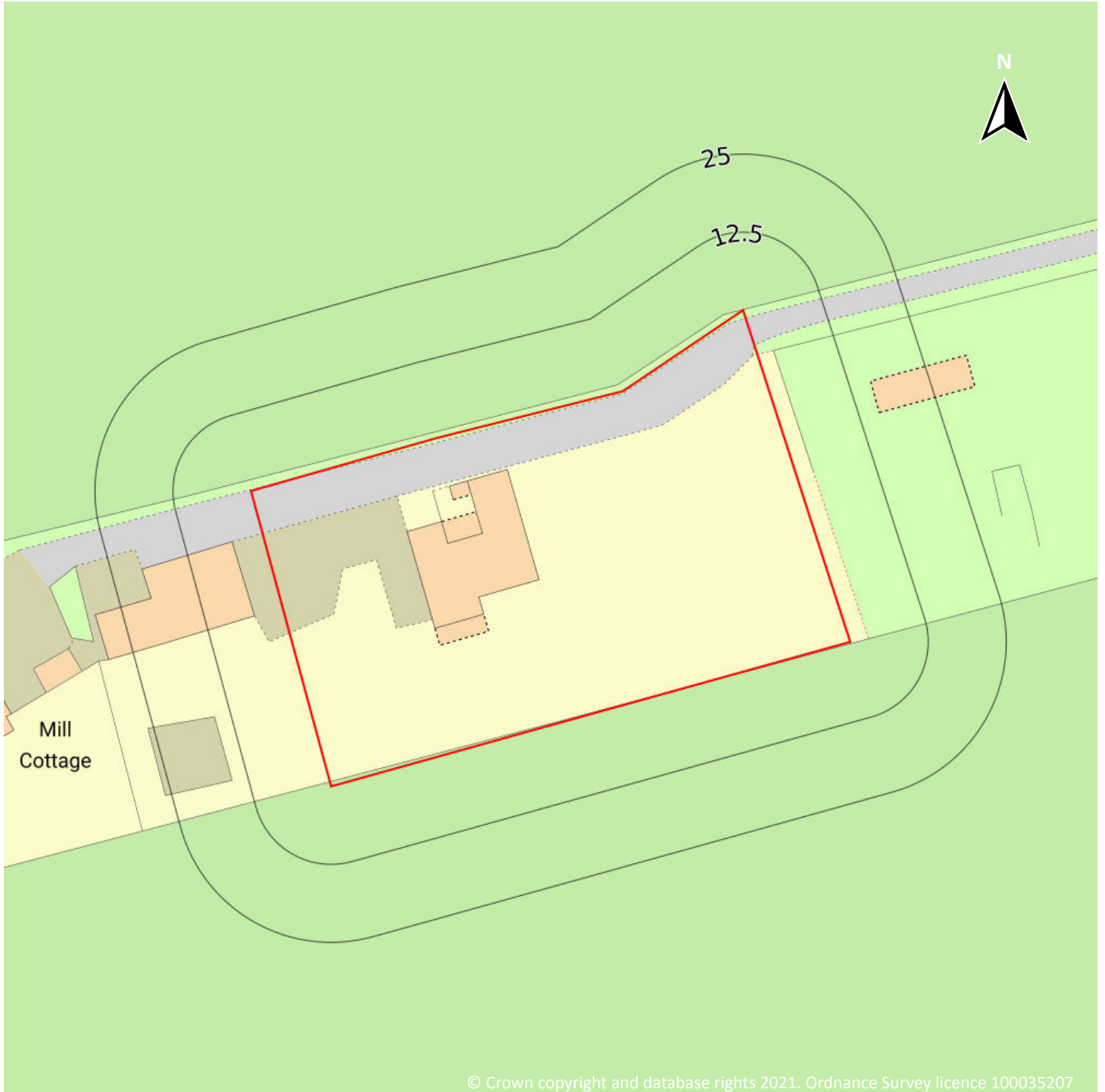
Aerial photography supplied by Getmapping PLC. © Copyright Getmapping PLC 2021. All Rights Reserved.

Capture Date: 28/04/1999

Site Area: 0.42ha



OS MasterMap site plan

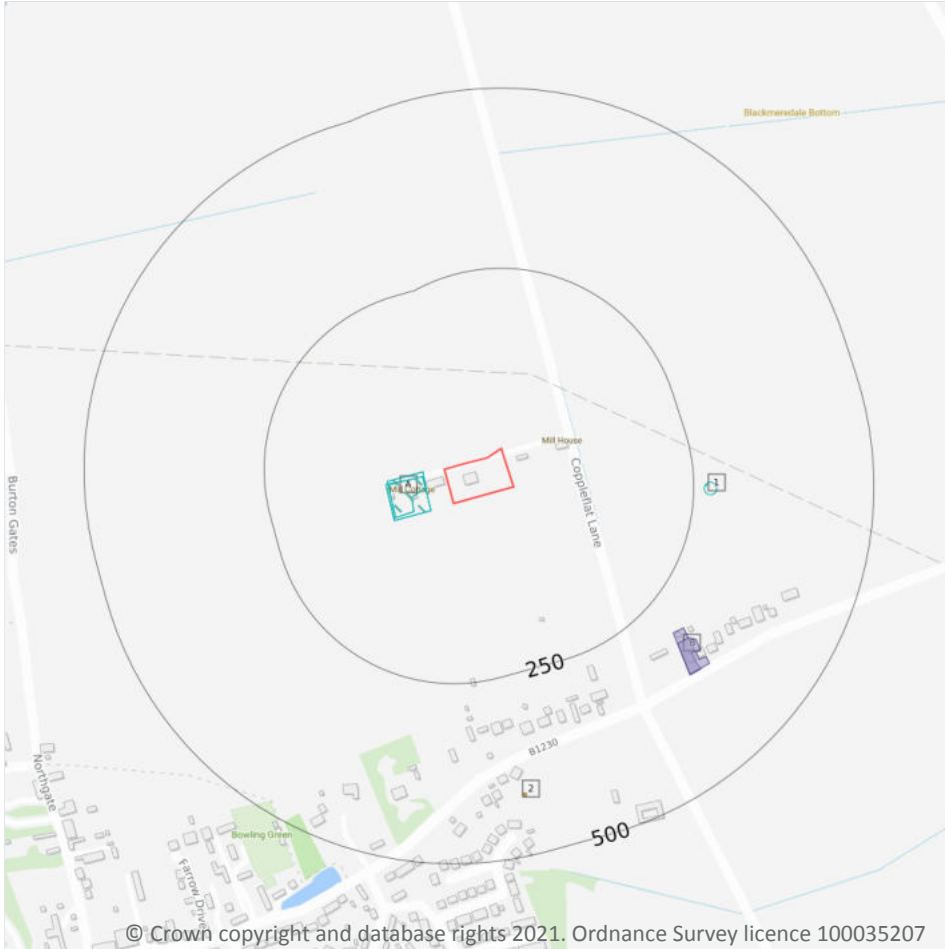


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Site Area: 0.42ha



1 Past land use



- Site Outline
- Search buffers in metres (m)
- Historical industrial land uses
- Historical tanks
- Historical garages

1.1 Historical industrial land uses

Records within 500m **5**

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 1:10,560 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 14**

ID	Location	Land use	Dates present	Group ID
A	30m W	Unspecified Works	1981 - 1992	1999448

ID	Location	Land use	Dates present	Group ID
A	30m W	Disused Windmill	1970	2001943
A	32m W	Disused Windmill	1938 - 1947	1991002
A	32m W	Windmill	1889 - 1908	1997817
1	265m E	Unspecified Pit	1908	1985264

This data is sourced from Ordnance Survey / Groundsure.

1.2 Historical tanks

Records within 500m

1

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 14**

ID	Location	Land use	Dates present	Group ID
2	414m S	Unspecified Tank	1965 - 1994	336883

This data is sourced from Ordnance Survey / Groundsure.

1.3 Historical energy features

Records within 500m

0

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.



1.4 Historical petrol stations

Records within 500m

0

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

1.5 Historical garages

Records within 500m

2

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 14**

ID	Location	Land use	Dates present	Group ID
B	300m SE	Garage	1994	67021
B	315m SE	Garage	1965 - 1984	67462

This data is sourced from Ordnance Survey / Groundsure.

1.6 Historical military land

Records within 500m

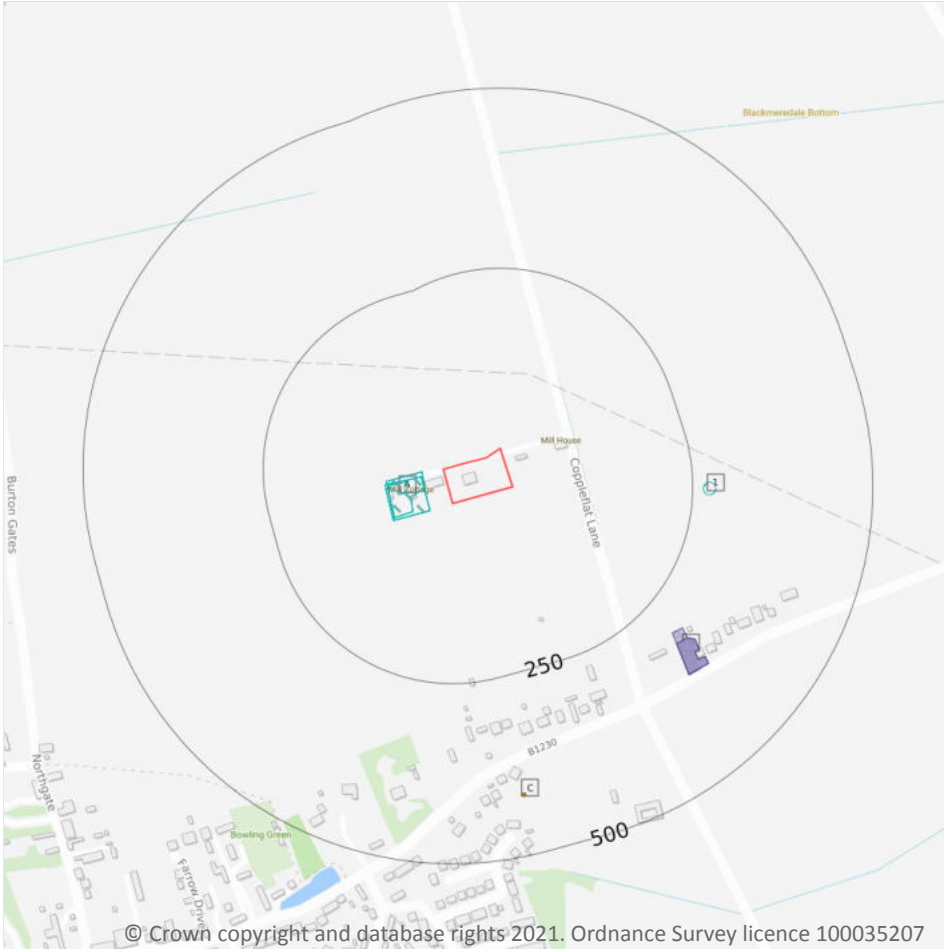
0

Areas of military land digitised from multiple sources including the National Archives, local records, MOD records and verified other sources, intelligently grouped into contiguous features.

This data is sourced from Ordnance Survey / Groundsure / other sources.



2 Past land use - un-grouped



— Site Outline

Search buffers in metres (m)

- Historical industrial land uses
- Historical tanks
- Historical garages

2.1 Historical industrial land uses

Records within 500m

8

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 10,560 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 17**

ID	Location	Land Use	Date	Group ID
A	30m W	Unspecified Works	1992	1999448
A	30m W	Disused Windmill	1970	2001943
A	30m W	Unspecified Works	1981	1999448

ID	Location	Land Use	Date	Group ID
A	32m W	Disused Windmill	1947	1991002
A	32m W	Windmill	1908	1997817
A	33m W	Disused Windmill	1938	1991002
A	54m W	Windmill	1889	1997817
1	265m E	Unspecified Pit	1908	1985264

This data is sourced from Ordnance Survey / Groundsure.

2.2 Historical tanks

Records within 500m

4

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 17**

ID	Location	Land Use	Date	Group ID
C	414m S	Unspecified Tank	1994	336883
C	414m S	Unspecified Tank	1965	336883
C	414m S	Unspecified Tank	1984	336883
C	414m S	Unspecified Tank	1965	336883

This data is sourced from Ordnance Survey / Groundsure.

2.3 Historical energy features

Records within 500m

0

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.



2.4 Historical petrol stations

Records within 500m

0

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

2.5 Historical garages

Records within 500m

4

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 17**

ID	Location	Land Use	Date	Group ID
B	300m SE	Garage	1994	67021
B	315m SE	Garage	1965	67462
B	315m SE	Garage	1984	67462
B	315m SE	Garage	1965	67462

This data is sourced from Ordnance Survey / Groundsure.



3 Waste and landfill

3.1 Active or recent landfill

Records within 500m 0

Active or recently closed landfill sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.2 Historical landfill (BGS records)

Records within 500m 0

Landfill sites identified on a survey carried out on behalf of the DoE in 1973. These sites may have been closed or operational at this time.

This data is sourced from the British Geological Survey.

3.3 Historical landfill (LA/mapping records)

Records within 500m 0

Landfill sites identified from Local Authority records and high detail historical mapping.

This data is sourced from the Ordnance Survey/Groundsure and Local Authority records.

3.4 Historical landfill (EA/NRW records)

Records within 500m 0

Known historical (closed) landfill sites (e.g. sites where there is no PPC permit or waste management licence currently in force). This includes sites that existed before the waste licensing regime and sites that have been licensed in the past but where a licence has been revoked, ceased to exist or surrendered and a certificate of completion has been issued.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.5 Historical waste sites

Records within 500m 0

Waste site records derived from Local Authority planning records and high detail historical mapping.

This data is sourced from Ordnance Survey/Groundsure and Local Authority records.



3.6 Licensed waste sites

Records within 500m

0

Active or recently closed waste sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.7 Waste exemptions

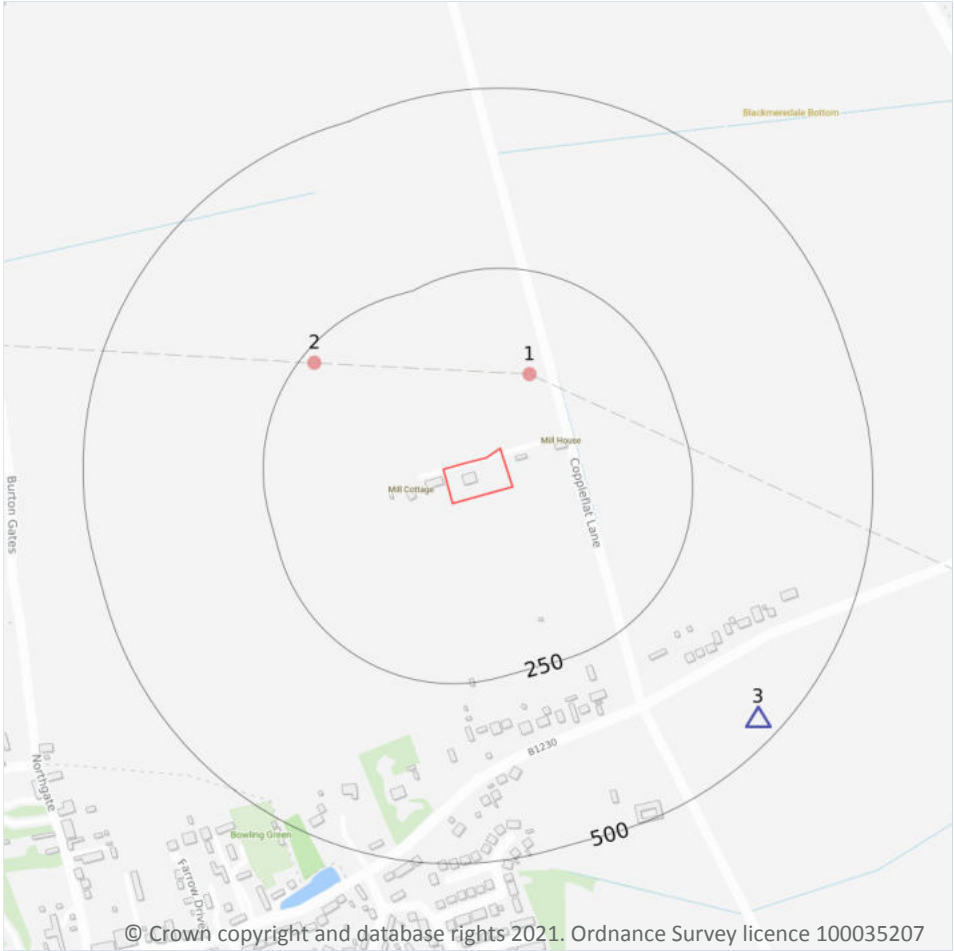
Records within 500m

0

Activities involving the storage, treatment, use or disposal of waste that are exempt from needing a permit. Exemptions have specific limits and conditions that must be adhered to.

This data is sourced from the Environment Agency and Natural Resources Wales.

4 Current industrial land use



- Site Outline
- Search buffers in metres (m)
- Recent industrial land uses
- △ Current or recent petrol stations

4.1 Recent industrial land uses

Records within 250m **2**

Current potentially contaminative industrial sites.

Features are displayed on the Current industrial land use map on **page 22**

ID	Location	Company	Address	Activity	Category
1	111m N	Pylon	East Riding of Yorkshire, HU17	Electrical Features	Infrastructure and Facilities
2	232m NW	Pylon	East Riding of Yorkshire, HU17	Electrical Features	Infrastructure and Facilities

This data is sourced from Ordnance Survey.

4.2 Current or recent petrol stations

Records within 500m

1

Open, closed, under development and obsolete petrol stations.

Features are displayed on the Current industrial land use map on **page 22**

ID	Location	Company	Address	LPG	Status
3	466m SE	OBSOLETE	Beverley Road, Walkington, Beverley, East Riding Of Yorkshire, HU17 8RR	Not Applicable	Obsolete

This data is sourced from Experian.

4.3 Electricity cables

Records within 500m

0

High voltage underground electricity transmission cables.

This data is sourced from National Grid.

4.4 Gas pipelines

Records within 500m

0

High pressure underground gas transmission pipelines.

This data is sourced from National Grid.

4.5 Sites determined as Contaminated Land

Records within 500m

0

Contaminated Land Register of sites designated under Part 2a of the Environmental Protection Act 1990.

This data is sourced from Local Authority records.

4.6 Control of Major Accident Hazards (COMAH)

Records within 500m

0

Control of Major Accident Hazards (COMAH) sites. This data includes upper and lower tier sites, and includes a historical archive of COMAH sites and Notification of Installations Handling Hazardous Substances (NIHHS) records.

This data is sourced from the Health and Safety Executive.



4.7 Regulated explosive sites

Records within 500m

0

Sites registered and licensed by the Health and Safety Executive under the Manufacture and Storage of Explosives Regulations 2005 (MSER). The last update to this data was in April 2011.

This data is sourced from the Health and Safety Executive.

4.8 Hazardous substance storage/usage

Records within 500m

0

Consents granted for a site to hold certain quantities of hazardous substances at or above defined limits in accordance with the Planning (Hazardous Substances) Regulations 2015.

This data is sourced from Local Authority records.

4.9 Historical licensed industrial activities (IPC)

Records within 500m

0

Integrated Pollution Control (IPC) records of substance releases to air, land and water. This data represents a historical archive as the IPC regime has been superseded.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.10 Licensed industrial activities (Part A(1))

Records within 500m

0

Records of Part A(1) installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.11 Licensed pollutant release (Part A(2)/B)

Records within 500m

0

Records of Part A(2) and Part B installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

This data is sourced from Local Authority records.

4.12 Radioactive Substance Authorisations

Records within 500m

0

Records of the storage, use, accumulation and disposal of radioactive substances regulated under the Radioactive Substances Act 1993.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.13 Licensed Discharges to controlled waters

Records within 500m

0

Discharges of treated or untreated effluent to controlled waters under the Water Resources Act 1991.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.14 Pollutant release to surface waters (Red List)

Records within 500m

0

Discharges of specified substances under the Environmental Protection (Prescribed Processes and Substances) Regulations 1991.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.15 Pollutant release to public sewer

Records within 500m

0

Discharges of Special Category Effluents to the public sewer.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.16 List 1 Dangerous Substances

Records within 500m

0

Discharges of substances identified on List I of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

This data is sourced from the Environment Agency and Natural Resources Wales.



4.17 List 2 Dangerous Substances

Records within 500m

0

Discharges of substances identified on List II of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.18 Pollution Incidents (EA/NRW)

Records within 500m

0

Records of substantiated pollution incidents. Since 2006 this data has only included category 1 (major) and 2 (significant) pollution incidents.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.19 Pollution inventory substances

Records within 500m

0

The pollution inventory (substances) includes reporting on annual emissions of certain regulated substances to air, controlled waters and land. A reporting threshold for each substance is also included. Where emissions fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

4.20 Pollution inventory waste transfers

Records within 500m

0

The pollution inventory (waste transfers) includes reporting on annual transfers and recovery/disposal of controlled wastes from a site. A reporting threshold for each waste type is also included. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

4.21 Pollution inventory radioactive waste

Records within 500m

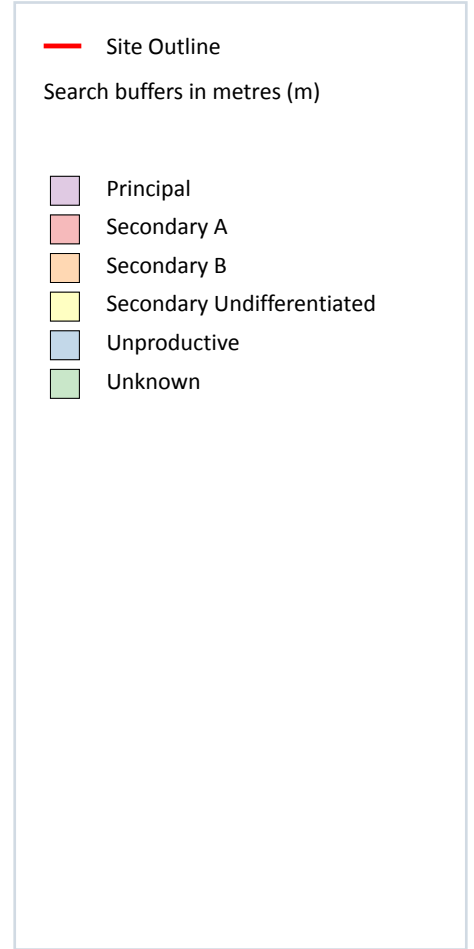
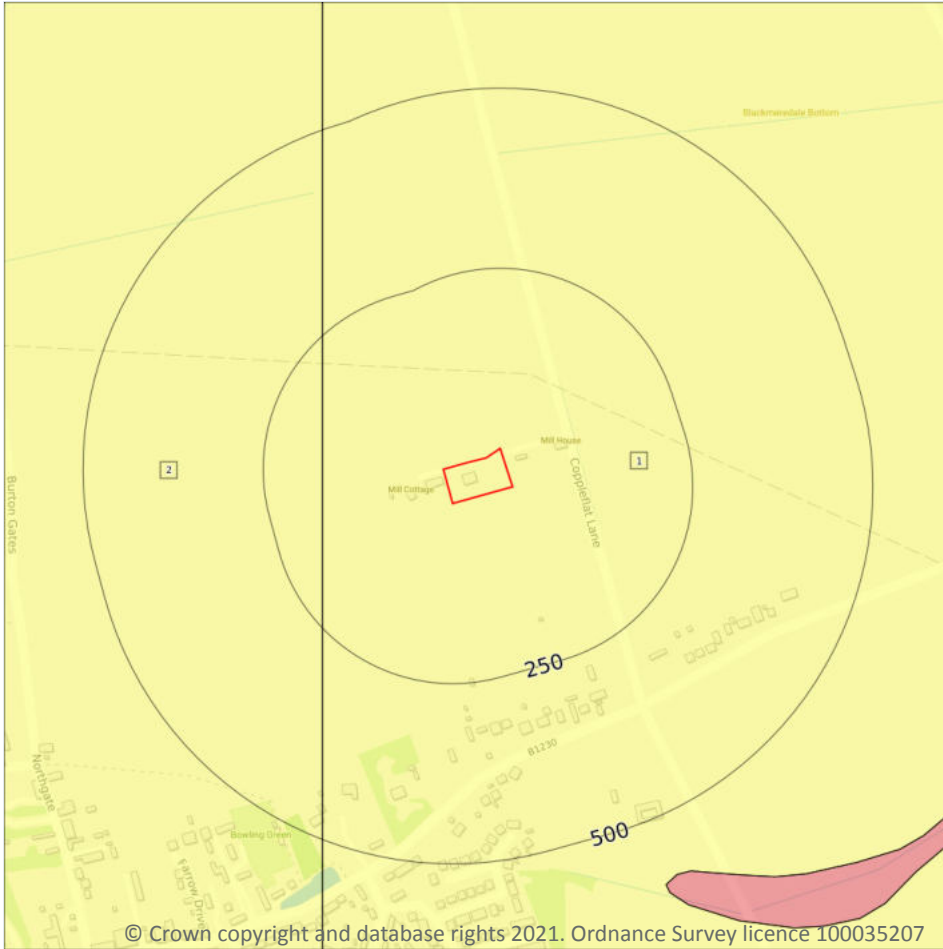
0

The pollution inventory (radioactive wastes) includes reporting on annual releases of radioactive substances from a site, including the means of release. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.



5 Hydrogeology - Superficial aquifer



5.1 Superficial aquifer

Records within 500m

2

Aquifer status of groundwater held within superficial geology.

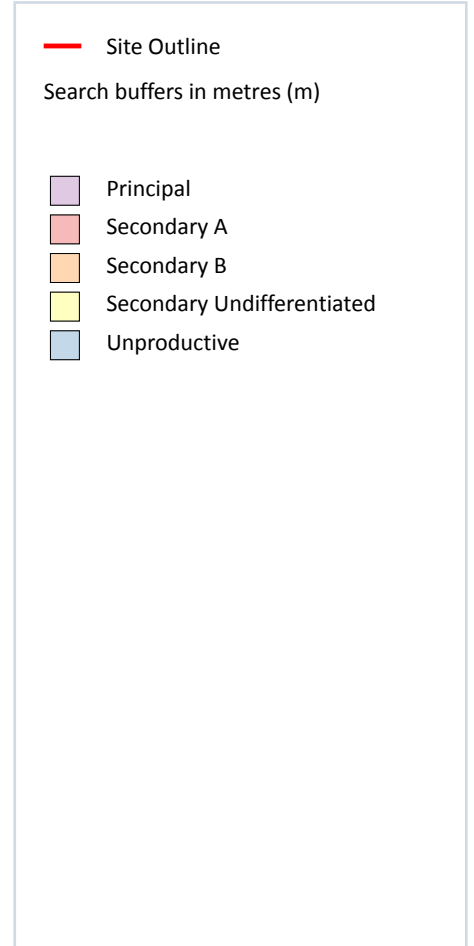
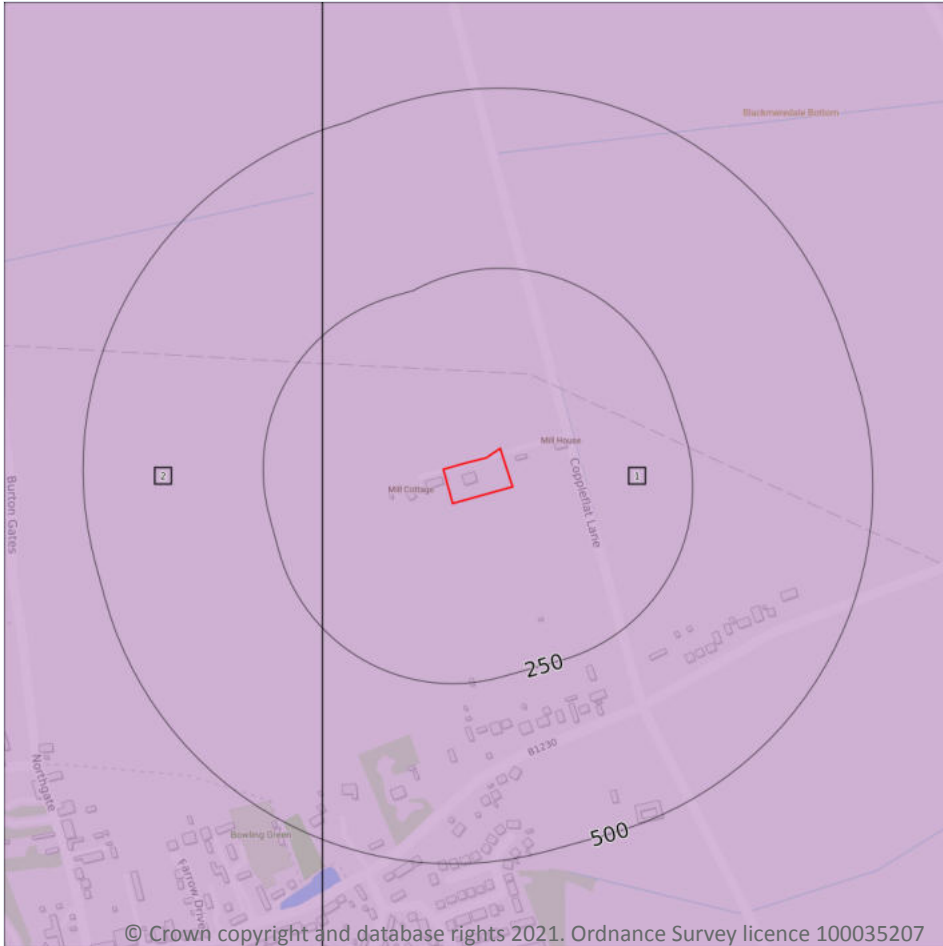
Features are displayed on the Hydrogeology map on **page 27**

ID	Location	Designation	Description
1	On site	Secondary Undifferentiated	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
2	168m W	Secondary Undifferentiated	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.



Bedrock aquifer



5.2 Bedrock aquifer

Records within 500m

2

Aquifer status of groundwater held within bedrock geology.

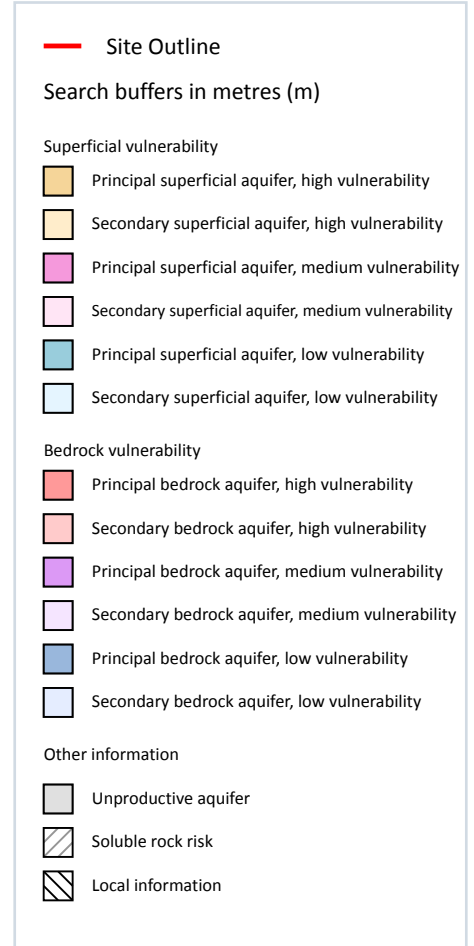
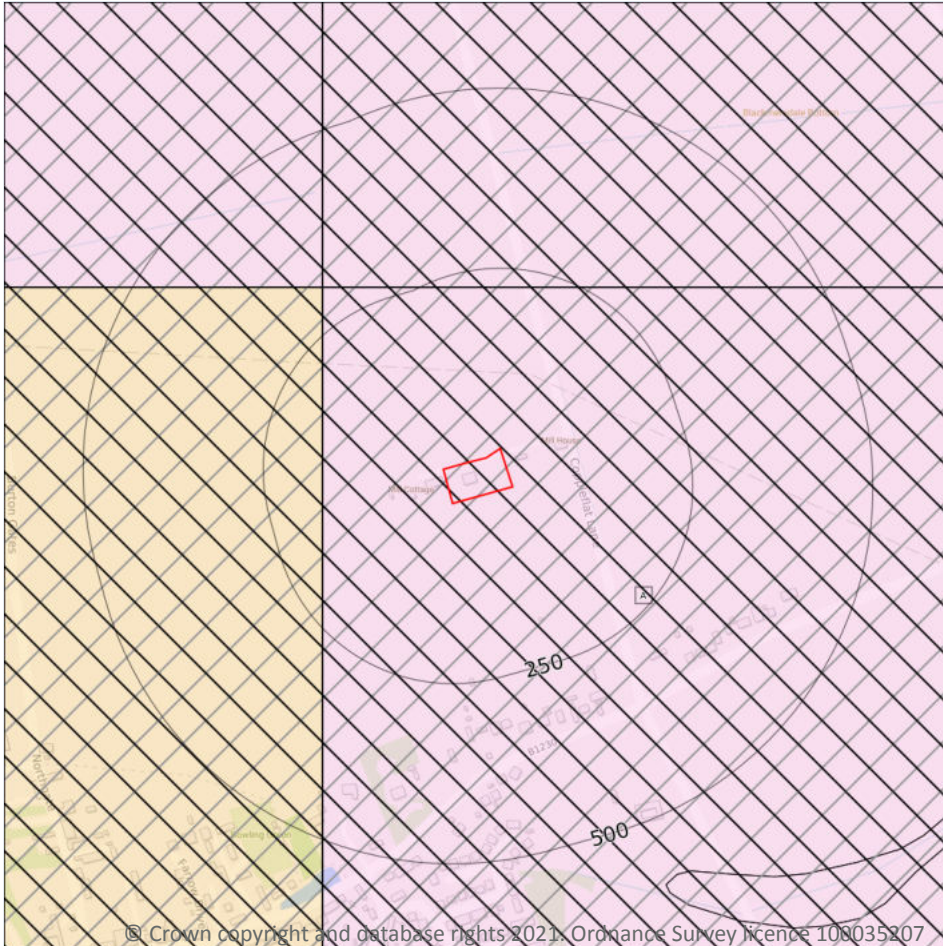
Features are displayed on the Bedrock aquifer map on **page 29**

ID	Location	Designation	Description
1	On site	Principal	Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers
2	168m W	Principal	Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.



Groundwater vulnerability



5.3 Groundwater vulnerability

Records within 50m

1

An assessment of the vulnerability of groundwater to a pollutant discharged at ground level based on the hydrological, geological, hydrogeological and soil properties within a one kilometre square grid.

Groundwater vulnerability is described as High, Medium or Low as follows:

- High - Areas able to easily transmit pollution to groundwater. They are likely to be characterised by high leaching soils and the absence of low permeability superficial deposits.
- Medium - Intermediate between high and low vulnerability.
- Low - Areas that provide the greatest protection from pollution. They are likely to be characterised by low leaching soils and/or the presence of superficial deposits characterised by a low permeability.

Features are displayed on the Groundwater vulnerability map on **page 31**

ID	Location	Summary	Soil / surface	Superficial geology	Bedrock geology
A	On site	Summary Classification: Secondary superficial aquifer - Medium Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer	Leaching class: Intermediate Infiltration value: 40-70% Dilution value: <300mm/year	Vulnerability: Medium Aquifer type: Secondary Thickness: 3-10m Patchiness value: >90% Recharge potential: Low	Vulnerability: Low Aquifer type: Principal Flow mechanism: Well connected fractures

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

5.4 Groundwater vulnerability- soluble rock risk

Records on site	1
------------------------	----------

This dataset identifies areas where solution features that enable rapid movement of a pollutant may be present within a 1km grid square.

ID	Maximum soluble risk category	Percentage of grid square covered by maximum risk
A	Significant soluble rocks are likely to be present. Problems unlikely except with considerable surface or subsurface water flow.	100.0%

This data is sourced from the British Geological Survey and the Environment Agency.

5.5 Groundwater vulnerability- local information

Records on site	1
------------------------	----------

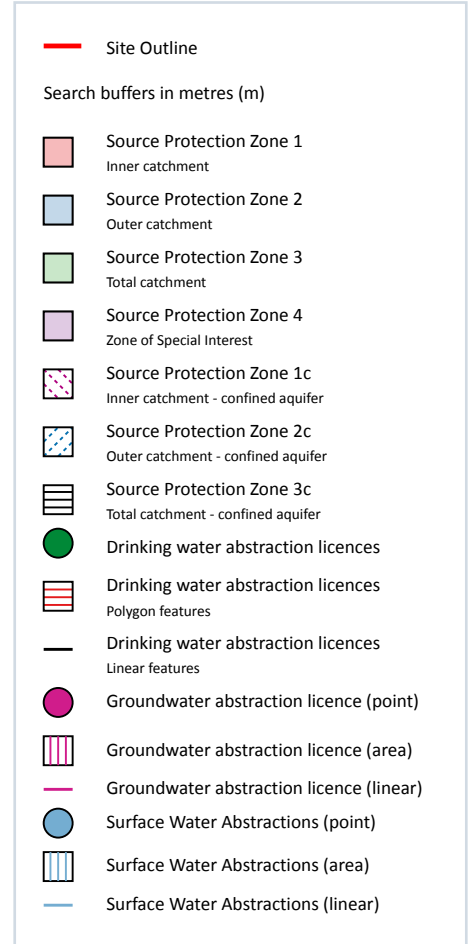
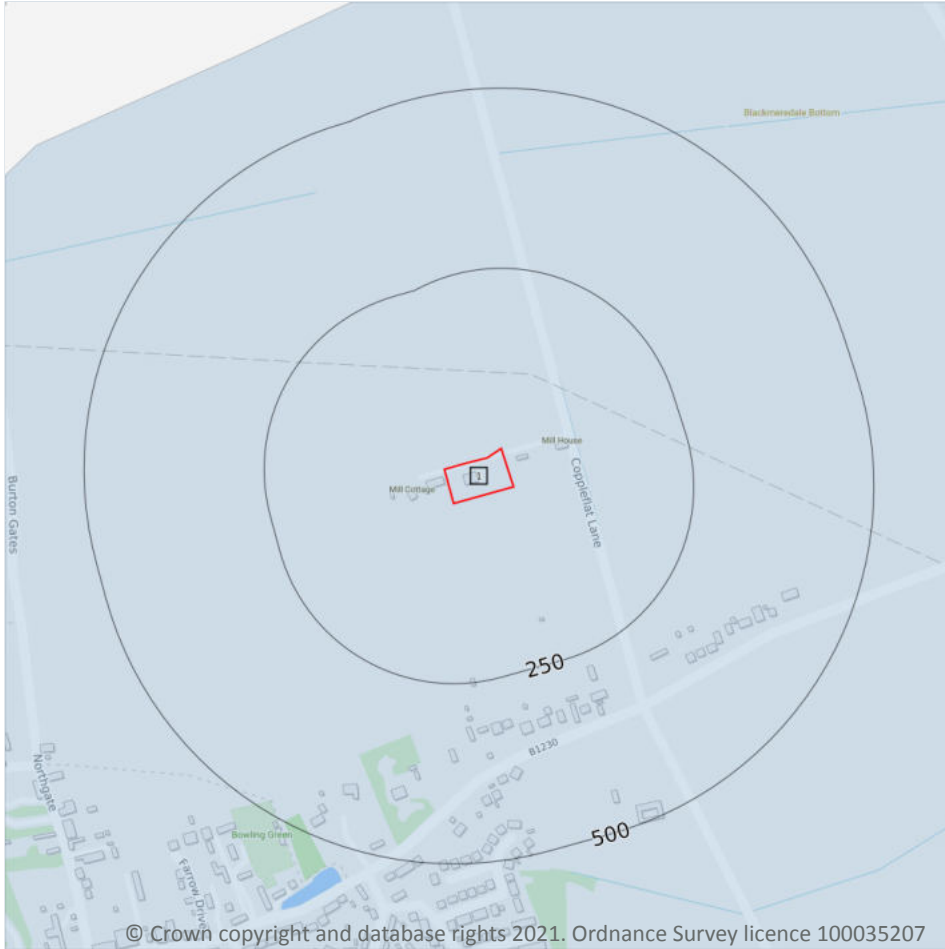
This dataset identifies areas where additional local information affecting vulnerability is held by the Environment Agency. Further information can be obtained by contacting the Environment Agency local Area groundwater team through the Environment Agency National Customer Call Centre on 03798 506 506 or by email on enquiries@environment-agency.gov.uk.

ID	Summary	Additional information
A	Reduced protection of aquifers due to good connectivity between superficial deposits and bedrock in winter	Relatively permeable superficial deposits of variable coverage known to be in connectivity with bedrock in winter

This data is sourced from the British Geological Survey and the Environment Agency.



Abstractions and Source Protection Zones



5.6 Groundwater abstractions

Records within 2000m

6

Licensed groundwater abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, between two points (line data) or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on **page 33**

ID	Location	Details	
-	1625m N	Status: Historical Licence No: 2/26/32/349 Details: General Farming & Domestic Direct Source: GROUNDWATERS Point: AS ABOVE Data Type: Point Name: DIALSLEAVE LTD Easting: 499550 Northing: 439250	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: - Original Start Date: 30/11/1994 Expiry Date: - Issue No: 100 Version Start Date: 30/11/1994 Version End Date: -
-	1625m N	Status: Historical Licence No: 2/26/32/349 Details: General Farming & Domestic Direct Source: GROUNDWATERS Point: BOREHOLE Data Type: Point Name: DIALSLEAVE LTD Easting: 499550 Northing: 439250	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: - Original Start Date: 30/11/1994 Expiry Date: - Issue No: 100 Version Start Date: 30/11/1994 Version End Date: -
-	1625m N	Status: Historical Licence No: 2/26/32/349 Details: General Farming & Domestic Direct Source: GROUNDWATERS Point: BOREHOLE - CHALK - BISHOP BURTON Data Type: Point Name: DIALSLEAVE LTD Easting: 499550 Northing: 439250	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: - Original Start Date: 30/11/1994 Expiry Date: - Issue No: 100 Version Start Date: 30/11/1994 Version End Date: -
-	1625m N	Status: Historical Licence No: 2/26/32/349 Details: General Farming & Domestic Direct Source: GROUNDWATERS Point: BOREHOLE - CHALK - BISHOP BURTON Data Type: Point Name: DIALSLEAVE LTD Easting: 499550 Northing: 439250	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: - Original Start Date: 30/11/1994 Expiry Date: - Issue No: 100 Version Start Date: 30/11/1994 Version End Date: -
-	1878m E	Status: Historical Licence No: 2/26/32/380 Details: General use relating to Secondary Category (Medium Loss) Direct Source: GROUNDWATERS Point: BOREHOLE - CHALK - WESTWOOD, BEVERLEY Data Type: Point Name: IMERYS MINERAL LIMITED Easting: 502100 Northing: 438120	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: - Original Start Date: 12/07/2000 Expiry Date: - Issue No: 1 Version Start Date: 12/07/2000 Version End Date: -



ID	Location	Details	
-	1878m E	Status: Active Licence No: 2/26/32/380 Details: General Use Relating To Secondary Category (Medium Loss) Direct Source: GROUNDWATERS Point: BOREHOLE - CHALK - WESTWOOD - BEVERLEY Data Type: Point Name: IMERYS MINERALS LTD Easting: 502100 Northing: 438120	Annual Volume (m ³): 30,000 Max Daily Volume (m ³): 100 Original Application No: - Original Start Date: 12/07/2000 Expiry Date: - Issue No: 2 Version Start Date: 16/01/2020 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

5.7 Surface water abstractions

Records within 2000m	0
-----------------------------	----------

Licensed surface water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

This data is sourced from the Environment Agency and Natural Resources Wales.

5.8 Potable abstractions

Records within 2000m	0
-----------------------------	----------

Licensed potable water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

This data is sourced from the Environment Agency and Natural Resources Wales.

5.9 Source Protection Zones

Records within 500m	1
----------------------------	----------

Source Protection Zones define the sensitivity of an area around a potable abstraction site to contamination.

Features are displayed on the Abstractions and Source Protection Zones map on **page 33**

ID	Location	Type	Description
1	On site	2	Outer catchment

This data is sourced from the Environment Agency and Natural Resources Wales.



5.10 Source Protection Zones (confined aquifer)

Records within 500m

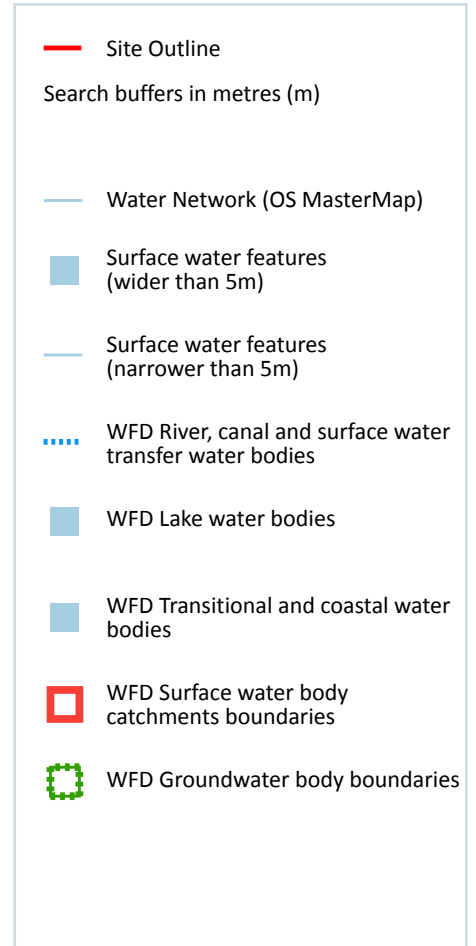
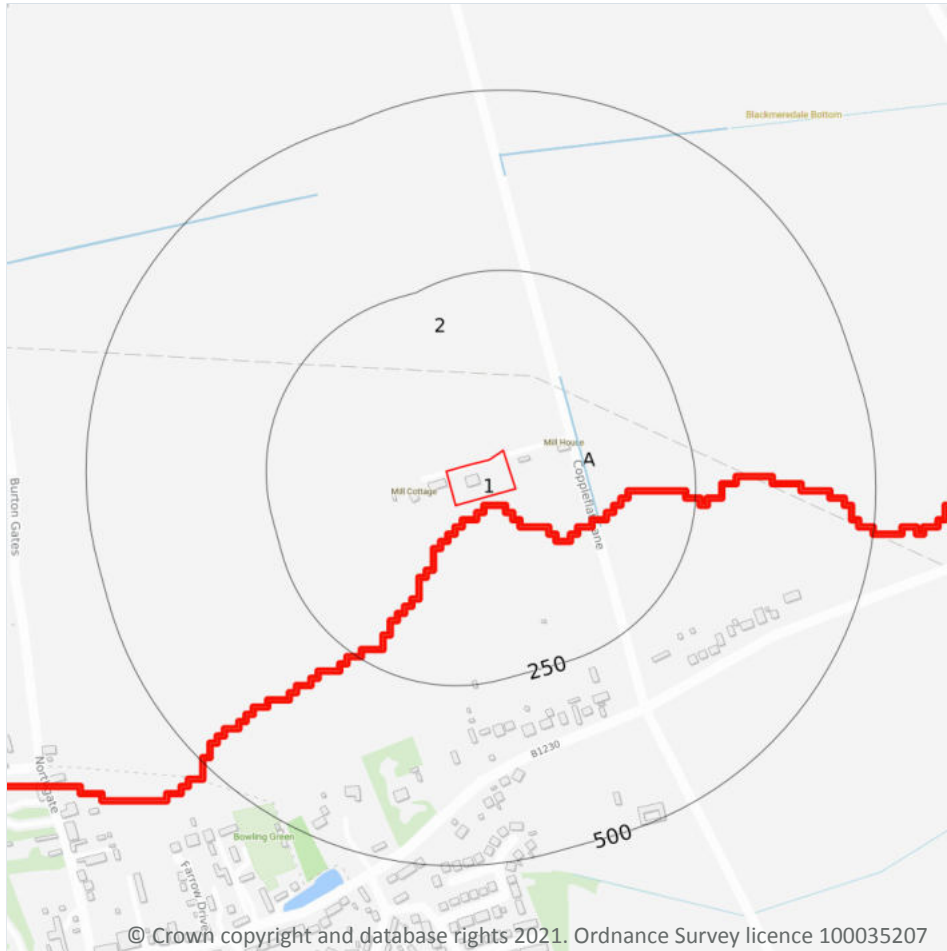
0

Source Protection Zones in the confined aquifer define the sensitivity around a deep groundwater abstraction to contamination. A confined aquifer would normally be protected from contamination by overlying geology and is only considered a sensitive resource if deep excavation/drilling is taking place.

This data is sourced from the Environment Agency and Natural Resources Wales.



6 Hydrology



6.1 Water Network (OS MasterMap)

Records within 250m

1

Detailed water network of Great Britain showing the flow and precise central course of every river, stream, lake and canal.

Features are displayed on the Hydrology map on **page 37**

ID	Location	Type of water feature	Ground level	Permanence	Name
A	100m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-

This data is sourced from the Ordnance Survey.

6.2 Surface water features

Records within 250m

1

Covering rivers, streams and lakes (some overlap with OS MasterMap Water Network data in previous section) but additionally covers smaller features such as ponds. Rivers and streams narrower than 5m are represented as a single line. Lakes, ponds and rivers or streams wider than 5m are represented as polygons.

Features are displayed on the Hydrology map on **page 37**

This data is sourced from the Ordnance Survey.

6.3 WFD Surface water body catchments

Records on site

1

The Water Framework Directive is an EU-led framework for the protection of inland surface waters, estuaries, coastal waters and groundwater through river basin-level management planning. In terms of surface water, these basins are broken down into smaller units known as management, operational and water body catchments.

Features are displayed on the Hydrology map on **page 37**

ID	Location	Type	Water body catchment	Water body ID	Operational catchment	Management catchment
2	On site	River WB catchment	Beverley and Barmston Drain	GB104026067211	Lower Hull	Hull and East Riding

This data is sourced from the Environment Agency and Natural Resources Wales.

6.4 WFD Surface water bodies

Records identified

1

Surface water bodies under the Directive may be rivers, lakes, estuary or coastal. To achieve the purpose of the Directive, environmental objectives have been set and are reported on for each water body. The progress towards delivery of the objectives is then reported on by the relevant competent authorities at the end of each six-year cycle. The river water body directly associated with the catchment listed in the previous section is detailed below, along with any lake, canal, coastal or artificial water body within 250m of the site. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each water body listed.

Features are displayed on the Hydrology map on **page 37**



ID	Location	Type	Name	Water body ID	Overall rating	Chemical rating	Ecological rating	Year
-	4681m SE	River	Beverley and Barmston Drain	GB104026067211	Moderate	Good	Moderate	2016

This data is sourced from the Environment Agency and Natural Resources Wales.

6.5 WFD Groundwater bodies

Records on site

1

Groundwater bodies are also covered by the Directive and the same regime of objectives and reporting detailed in the previous section is in place. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each groundwater body listed.

Features are displayed on the Hydrology map on **page 37**

ID	Location	Name	Water body ID	Overall rating	Chemical rating	Quantitative	Year
1	On site	HUII & East Riding Chalk	GB40401G700700	Poor	Poor	Poor	2015

This data is sourced from the Environment Agency and Natural Resources Wales.



7 River and coastal flooding

7.1 Risk of Flooding from Rivers and Sea (RoFRaS)

Records within 50m

0

The chance of flooding from rivers and/or the sea in any given year, based on cells of 50m. Each cell is allocated one of four flood risk categories, taking into account flood defences and their condition; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 100 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 100 chance) or High (greater than or equal to 1 in 30 chance).

This data is sourced from the Environment Agency and Natural Resources Wales.

7.2 Historical Flood Events

Records within 250m

0

Records of historic flooding from rivers, the sea, groundwater and surface water. Records began in 1946 when predecessor bodies started collecting detailed information about flooding incidents, although limited details may be included on flooding incidents prior to this date. Takes into account the presence of defences, structures, and other infrastructure where they existed at the time of flooding, and includes flood extents that may have been affected by overtopping, breaches or blockages.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.3 Flood Defences

Records within 250m

0

Records of flood defences owned, managed or inspected by the Environment Agency and Natural Resources Wales. Flood defences can be structures, buildings or parts of buildings. Typically these are earth banks, stone and concrete walls, or sheet-piling that is used to prevent or control the extent of flooding.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.4 Areas Benefiting from Flood Defences

Records within 250m

0

Areas that would benefit from the presence of flood defences in a 1 in 100 (1%) chance of flooding each year from rivers or 1 in 200 (0.5%) chance of flooding each year from the sea.

This data is sourced from the Environment Agency and Natural Resources Wales.



7.5 Flood Storage Areas

Records within 250m

0

Areas that act as a balancing reservoir, storage basin or balancing pond to attenuate an incoming flood peak to a flow level that can be accepted by the downstream channel or to delay the timing of a flood peak so that its volume is discharged over a longer period.

This data is sourced from the Environment Agency and Natural Resources Wales.



River and coastal flooding - Flood Zones

7.6 Flood Zone 2

Records within 50m

0

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land between Flood Zone 3 (see next section) and the extent of the flooding from rivers or the sea with a 1 in 1000 (0.1%) chance of flooding each year.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.7 Flood Zone 3

Records within 50m

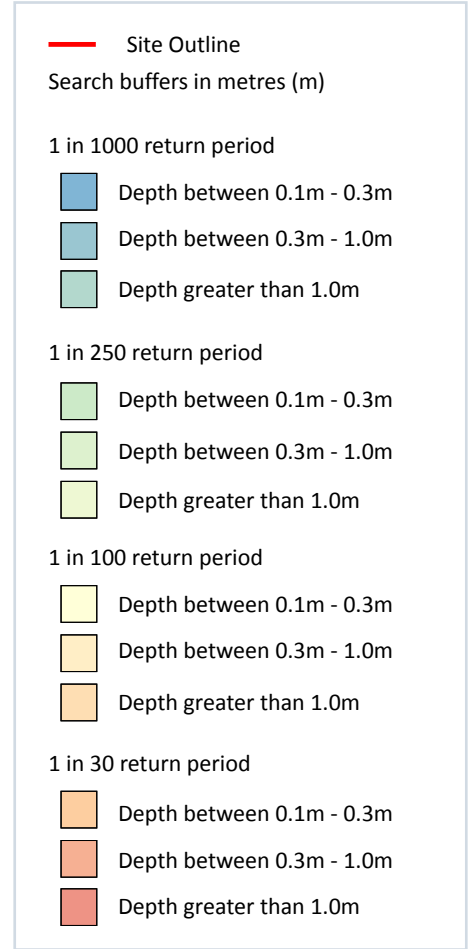
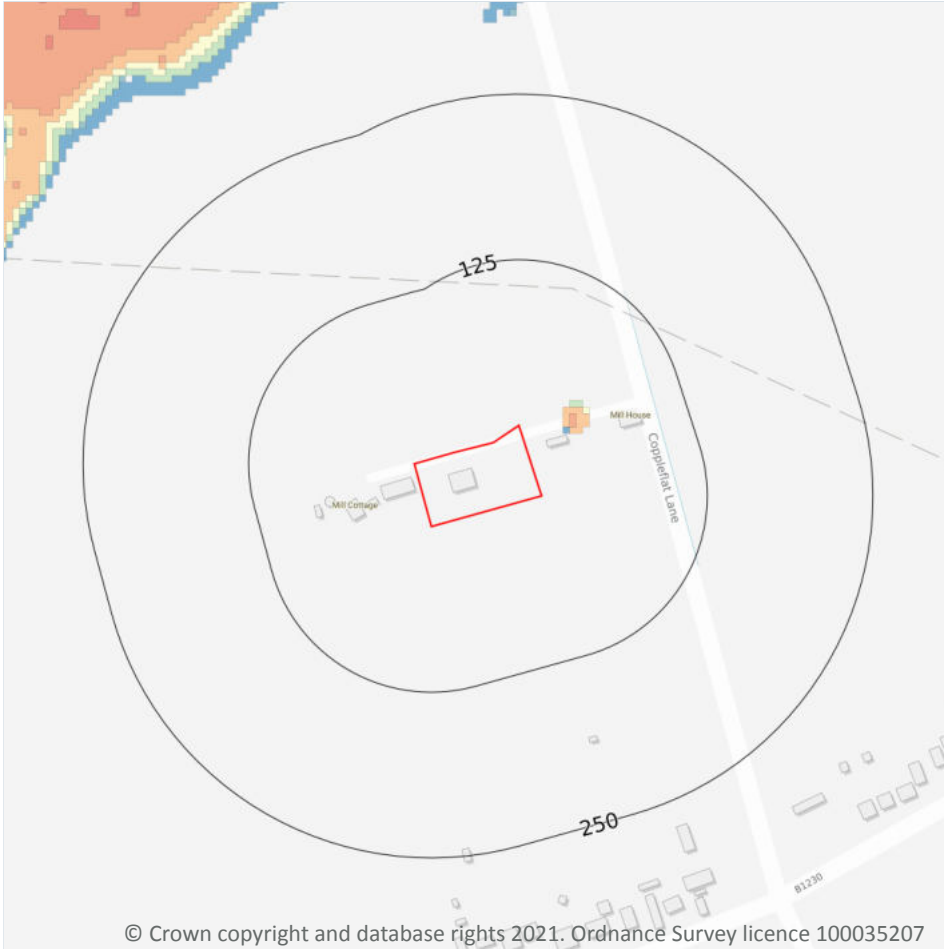
0

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land with a 1 in 100 (1%) or greater chance of flooding each year from rivers or a 1 in 200 (0.5%) or greater chance of flooding each year from the sea.

This data is sourced from the Environment Agency and Natural Resources Wales.



8 Surface water flooding



8.1 Surface water flooding

Highest risk on site

Negligible

Highest risk within 50m

1 in 30 year, 0.3m - 1.0m

Ambiental Risk Analytics surface water (pluvial) FloodMap identifies areas likely to flood as a result of extreme rainfall events, i.e. land naturally vulnerable to surface water ponding or flooding. This data set was produced by simulating 1 in 30 year, 1 in 100 year, 1 in 250 year and 1 in 1,000 year rainfall events. Modern urban drainage systems are typically built to cope with rainfall events between 1 in 20 and 1 in 30 years, though some older ones may flood in a 1 in 5 year rainfall event.

Features are displayed on the Surface water flooding map on **page 43**

The data shown on the map and in the table above shows the highest likelihood of flood events happening at the site. Lower likelihood events may have greater flood depths and hence a greater potential impact on

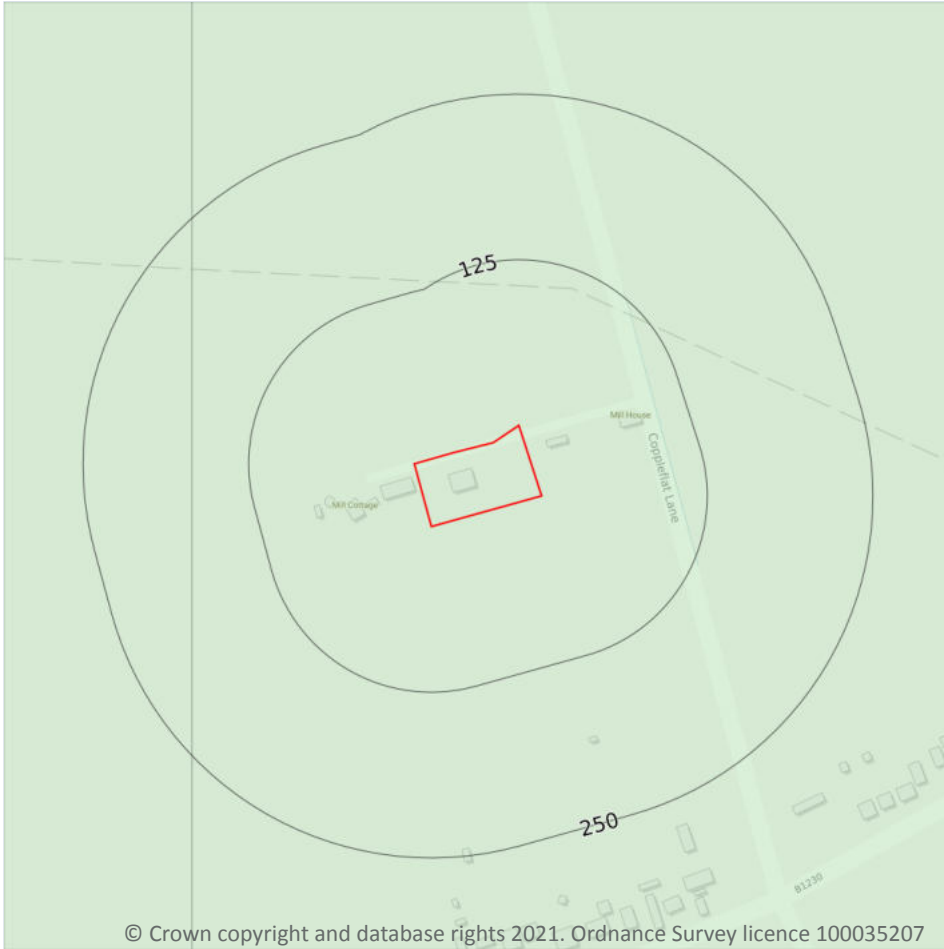
a site. The table below shows the maximum flood depths for a range of return periods for the site.

Return period	Maximum modelled depth
1 in 1000 year	Negligible
1 in 250 year	Negligible
1 in 100 year	Negligible
1 in 30 year	Negligible

This data is sourced from Ambiental Risk Analytics.



9 Groundwater flooding



9.1 Groundwater flooding

Highest risk on site

Low

Highest risk within 50m

Low

Groundwater flooding is caused by unusually high groundwater levels. It occurs when the water table rises above the ground surface or within underground structures such as basements or cellars. Groundwater flooding tends to exhibit a longer duration than surface water flooding, possibly lasting for weeks or months, and as a result it can cause significant damage to property. This risk assessment is based on a 1 in 100 year return period and a 5m Digital Terrain Model (DTM).

Features are displayed on the Groundwater flooding map on **page 45**

This data is sourced from Ambient Risk Analytics.

10 Environmental designations



- Site Outline
- Search buffers in metres (m)
- Sites of Special Scientific Interest (SSSI)
- Designated Ancient Woodland

10.1 Sites of Special Scientific Interest (SSSI)

Records within 2000m

1

Sites providing statutory protection for the best examples of UK flora, fauna, or geological or physiographical features. Originally notified under the National Parks and Access to the Countryside Act 1949, SSSIs were re-notified under the Wildlife and Countryside Act 1981. Improved provisions for the protection and management of SSSIs were introduced by the Countryside and Rights of Way Act 2000 (in England and Wales) and (in Scotland) by the Nature Conservation (Scotland) Act 2004 and the Wildlife and Natural Environment (Scotland) Act 2010.

Features are displayed on the Environmental designations map on **page 46**

ID	Location	Name	Data source
-	1546m NE	Burton Bushes	Natural England

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.2 Conserved wetland sites (Ramsar sites)

Records within 2000m

0

Ramsar sites are designated under the Convention on Wetlands of International Importance, agreed in Ramsar, Iran, in 1971. They cover all aspects of wetland conservation and wise use, recognizing wetlands as ecosystems that are extremely important for biodiversity conservation in general and for the well-being of human communities. These sites cover a broad definition of wetland; marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, and even some marine areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.3 Special Areas of Conservation (SAC)

Records within 2000m

0

Areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.4 Special Protection Areas (SPA)

Records within 2000m

0

Sites classified by the UK Government under the EC Birds Directive, SPAs are areas of the most important habitat for rare (listed on Annex I to the Directive) and migratory birds within the European Union.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.5 National Nature Reserves (NNR)

Records within 2000m

0

Sites containing examples of some of the most important natural and semi-natural terrestrial and coastal ecosystems in Great Britain. They are managed to conserve their habitats, provide special opportunities for scientific study or to provide public recreation compatible with natural heritage interests.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.



10.6 Local Nature Reserves (LNR)

Records within 2000m

0

Sites managed for nature conservation, and to provide opportunities for research and education, or simply enjoying and having contact with nature. They are declared by local authorities under the National Parks and Access to the Countryside Act 1949 after consultation with the relevant statutory nature conservation agency.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.7 Designated Ancient Woodland

Records within 2000m

1

Ancient woodlands are classified as areas which have been wooded continuously since at least 1600 AD. This includes semi-natural woodland and plantations on ancient woodland sites. 'Wooded continuously' does not mean there is or has previously been continuous tree cover across the whole site, and not all trees within the woodland have to be old.

Features are displayed on the Environmental designations map on **page 46**

ID	Location	Name	Woodland Type
-	1553m NE	Burton Bushes	Ancient & Semi-Natural Woodland

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.8 Biosphere Reserves

Records within 2000m

0

Biosphere Reserves are internationally recognised by UNESCO as sites of excellence to balance conservation and socioeconomic development between nature and people. They are recognised under the Man and the Biosphere (MAB) Programme with the aim of promoting sustainable development founded on the work of the local community.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.9 Forest Parks

Records within 2000m

0

These are areas managed by the Forestry Commission designated on the basis of recreational, conservation or scenic interest.

This data is sourced from the Forestry Commission.



10.10 Marine Conservation Zones

Records within 2000m

0

A type of marine nature reserve in UK waters established under the Marine and Coastal Access Act (2009). They are designated with the aim to protect nationally important, rare or threatened habitats and species.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.11 Green Belt

Records within 2000m

0

Areas designated to prevent urban sprawl by keeping land permanently open.

This data is sourced from the Ministry of Housing, Communities and Local Government.

10.12 Proposed Ramsar sites

Records within 2000m

0

Ramsar sites are areas listed as a Wetland of International Importance under the Convention on Wetlands of International Importance especially as Waterfowl Habitat (the Ramsar Convention) 1971. The sites here supplied have a status of 'Proposed' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.13 Possible Special Areas of Conservation (pSAC)

Records within 2000m

0

Special Areas of Conservation are areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive. Those sites supplied here are those with a status of 'Possible' having been identified for potential adoption under the framework.

This data is sourced from Natural England and Natural Resources Wales.

10.14 Potential Special Protection Areas (pSPA)

Records within 2000m

0

Special Protection Areas (SPAs) are areas designated (or 'classified') under the European Union Wild Birds Directive for the protection of nationally and internationally important populations of wild birds. Those sites supplied here are those with a status of 'Potential' having been identified for potential adoption under the framework.

This data is sourced from Natural England.



10.15 Nitrate Sensitive Areas

Records within 2000m

0

Areas where nitrate concentrations in drinking water sources exceeded or was at risk of exceeding the limit of 50 mg/l set by the 1980 EC Drinking Water Directive. Voluntary agricultural measures as a means of reducing the levels of nitrate were introduced by DEFRA as MAFF, with payments being made to farmers who complied. The scheme was started as a pilot in 1990 in ten areas, later implemented within 32 areas. The scheme was closed to further new entrants in 1998, although existing agreements continued for their full term. All Nitrate Sensitive Areas fell within the areas designated as Nitrate Vulnerable Zones (NVZs) in 1996 under the EC Nitrate Directive (91/676/EEC).

This data is sourced from Natural England.

10.16 Nitrate Vulnerable Zones

Records within 2000m

4

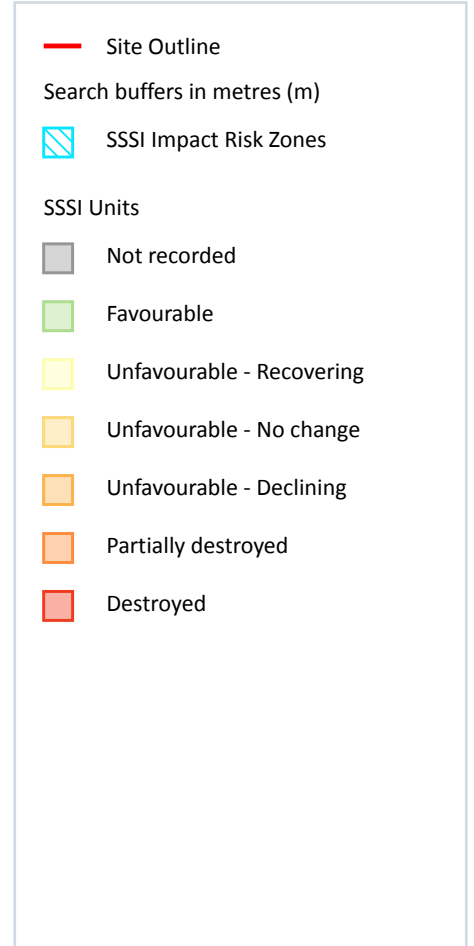
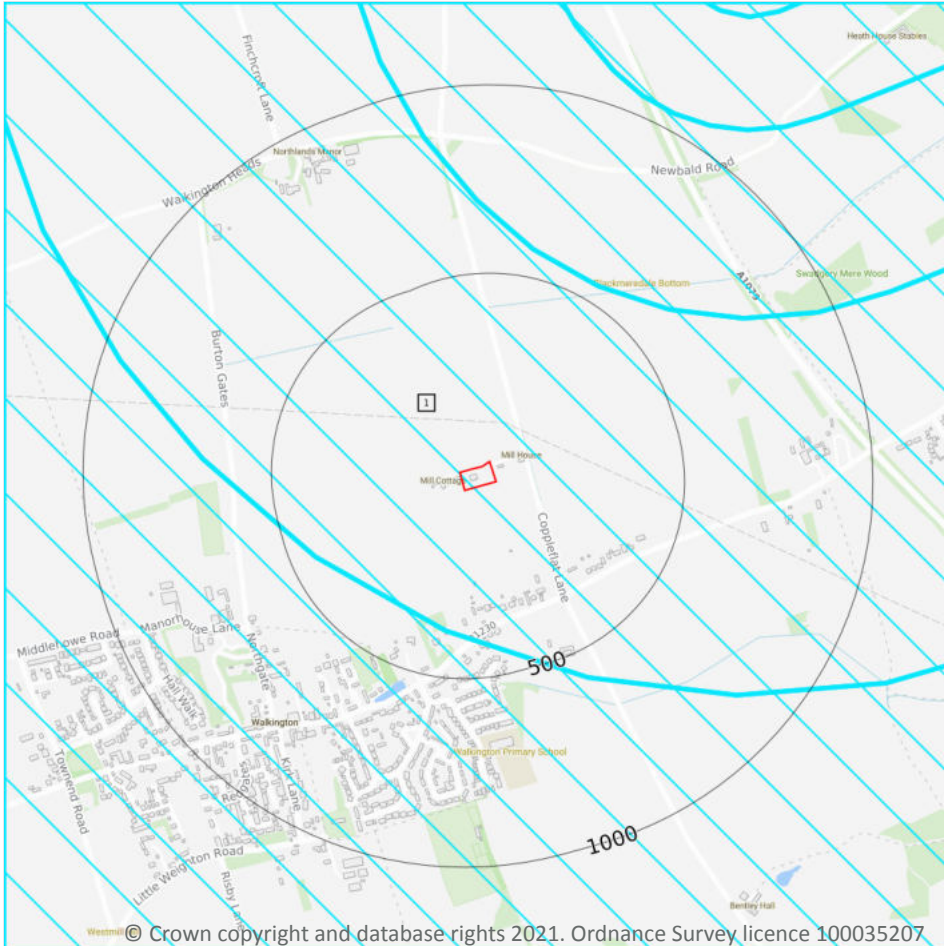
Areas at risk from agricultural nitrate pollution designated under the EC Nitrate Directive (91/676/EEC). These are areas of land that drain into waters polluted by nitrates. Farmers operating within these areas have to follow mandatory rules to tackle nitrate loss from agriculture.

Location	Name	Type	NVZ ID	Status
On site	Yorkshire Chalk	Groundwater	G106	Changed
On site	River Hull from Arram Beck to Humber NVZ	Surface Water	S254	Existing
1717m S	River Hull from Arram Beck to Humber NVZ	Surface Water	S254	Existing
1717m S	Yorkshire Chalk	Groundwater	G106	Changed

This data is sourced from Natural England and Natural Resources Wales.



SSSI Impact Zones and Units



10.17 SSSI Impact Risk Zones

Records on site

1

Developed to allow rapid initial assessment of the potential risks to SSSIs posed by development proposals. They define zones around each SSSI which reflect the particular sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts.

Features are displayed on the SSSI Impact Zones and Units map on **page 51**

ID	Location	Type of developments requiring consultation
1	On site	<p>Infrastructure - Airports, helipads and other aviation proposals.</p> <p>Air pollution - Any industrial/agricultural development that could cause AIR POLLUTION (incl: industrial processes, livestock & poultry units with floorspace > 500m², slurry lagoons > 200m² & manure stores > 250t).</p> <p>Combustion - General combustion processes >20MW energy input. Incl: energy from waste incineration, other incineration, landfill gas generation plant, pyrolysis/gasification, anaerobic digestion, sewage treatment works, other incineration/ combustion</p> <p>Waste - Landfill. Incl: inert landfill, non-hazardous landfill, hazardous landfill.</p> <p>Composting - Any composting proposal with more than 75000 tonnes maximum annual operational throughput. Incl: open windrow composting, in-vessel composting, anaerobic digestion, other waste management</p>

This data is sourced from Natural England.

10.18 SSSI Units

Records within 2000m	1
-----------------------------	----------

Divisions of SSSIs used to record management and condition details. Units are the smallest areas for which Natural England gives a condition assessment, however, the size of units varies greatly depending on the types of management and the conservation interest.

Features are displayed on the SSSI Impact Zones and Units map on **page 51**

ID: -
 Location: 1546m NE
 SSSI name: Burton Bushes
 Unit name: Burton Bushes
 Broad habitat: Broadleaved, Mixed And Yew Woodland - Lowland
 Condition: Favourable
 Reportable features:

Feature name	Feature condition	Date of assessment
Lowland mixed deciduous woodland	Favourable	21/04/2010

This data is sourced from Natural England and Natural Resources Wales.



11 Visual and cultural designations

11.1 World Heritage Sites

Records within 250m

0

Sites designated for their globally important cultural or natural interest requiring appropriate management and protection measures. World Heritage Sites are designated to meet the UK's commitments under the World Heritage Convention.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.2 Area of Outstanding Natural Beauty

Records within 250m

0

Areas of Outstanding Natural Beauty (AONB) are conservation areas, chosen because they represent 18% of the finest countryside. Each AONB has been designated for special attention because of the quality of their flora, fauna, historical and cultural associations, and/or scenic views. The National Parks and Access to the Countryside Act of 1949 created AONBs and the Countryside and Rights of Way Act, 2000 added further regulation and protection. There are likely to be restrictions to some developments within these areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

11.3 National Parks

Records within 250m

0

In England and Wales, the purpose of National Parks is to conserve and enhance landscapes within the countryside whilst promoting public enjoyment of them and having regard for the social and economic well-being of those living within them. In Scotland National Parks have the additional purpose of promoting the sustainable use of the natural resources of the area and the sustainable social and economic development of its communities. The National Parks and Access to the Countryside Act 1949 established the National Park designation in England and Wales, and The National Parks (Scotland) Act 2000 in Scotland.

This data is sourced from Natural England, Natural Resources Wales and the Scottish Government.

11.4 Listed Buildings

Records within 250m

0

Buildings listed for their special architectural or historical interest. Building control in the form of 'listed building consent' is required in order to make any changes to that building which might affect its special interest. Listed buildings are graded to indicate their relative importance, however building controls apply to all buildings equally, irrespective of their grade, and apply to the interior and exterior of the building in its entirety, together with any curtilage structures.



This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.5 Conservation Areas

Records within 250m

0

Local planning authorities are obliged to designate as conservation areas any parts of their own area that are of special architectural or historic interest, the character and appearance of which it is desirable to preserve or enhance. Designation of a conservation area gives broader protection than the listing of individual buildings. All the features within the area, listed or otherwise, are recognised as part of its character. Conservation area designation is the means of recognising the importance of all factors and of ensuring that planning decisions address the quality of the landscape in its broadest sense.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.6 Scheduled Ancient Monuments

Records within 250m

0

A scheduled monument is an historic building or site that is included in the Schedule of Monuments kept by the Secretary of State for Digital, Culture, Media and Sport. The regime is set out in the Ancient Monuments and Archaeological Areas Act 1979. The Schedule of Monuments has c.20,000 entries and includes sites such as Roman remains, burial mounds, castles, bridges, earthworks, the remains of deserted villages and industrial sites. Monuments are not graded, but all are, by definition, considered to be of national importance.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.7 Registered Parks and Gardens

Records within 250m

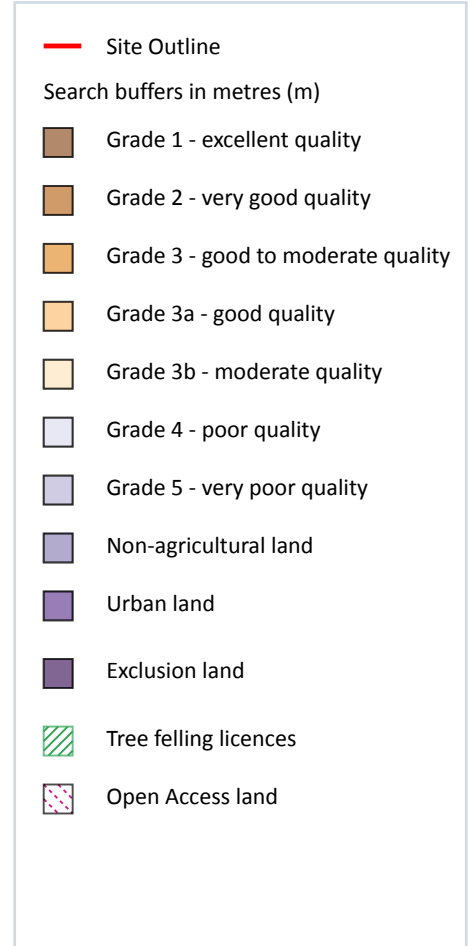
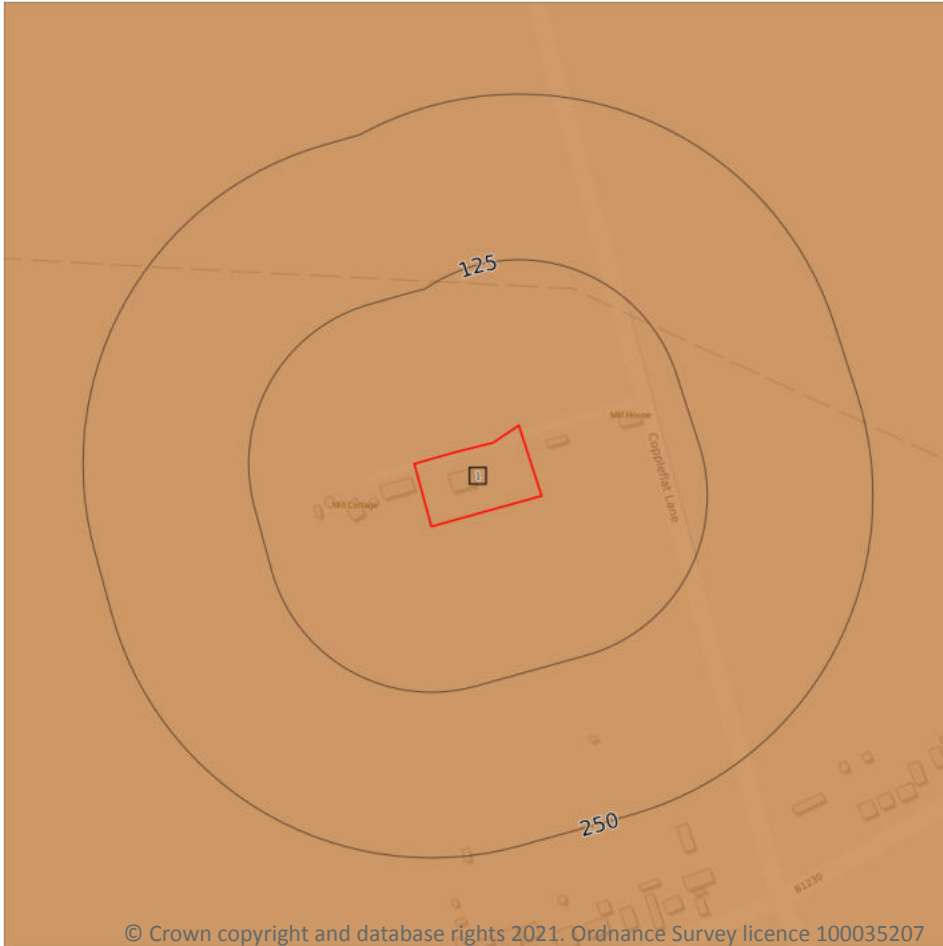
0

Parks and gardens assessed to be of particular interest and of special historic interest. The emphasis being on 'designed' landscapes, rather than on planting or botanical importance. Registration is a 'material consideration' in the planning process, meaning that planning authorities must consider the impact of any proposed development on the special character of the landscape.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.



12 Agricultural designations



12.1 Agricultural Land Classification

Records within 250m

1

Classification of the quality of agricultural land taking into consideration multiple factors including climate, physical geography and soil properties. It should be noted that the categories for the grading of agricultural land are not consistent across England, Wales and Scotland.

Features are displayed on the Agricultural designations map on **page 55**

ID	Location	Classification	Description
1	On site	Grade 2	Very good quality agricultural land. Land with minor limitations which affect crop yield, cultivations or harvesting. A wide range of agricultural and horticultural crops can usually be grown but on some land in the grade there may be reduced flexibility due to difficulties with the production of the more demanding crops such as winter harvested vegetables and arable root crops. The level of yield is generally high but may be lower or more variable than Grade 1.

This data is sourced from Natural England.

12.2 Open Access Land

Records within 250m

0

The Countryside and Rights of Way Act 2000 (CROW Act) gives a public right of access to land without having to use paths. Access land includes mountains, moors, heaths and downs that are privately owned. It also includes common land registered with the local council and some land around the England Coast Path. Generally permitted activities on access land are walking, running, watching wildlife and climbing.

This data is sourced from Natural England and Natural Resources Wales.

12.3 Tree Felling Licences

Records within 250m

0

Felling Licence Application (FLA) areas approved by Forestry Commission England. Anyone wishing to fell trees must ensure that a licence or permission under a grant scheme has been issued by the Forestry Commission before any felling is carried out or that one of the exceptions apply.

This data is sourced from the Forestry Commission.

12.4 Environmental Stewardship Schemes

Records within 250m

0

Environmental Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. The schemes identified may be historical schemes that have now expired, or may still be active.

This data is sourced from Natural England.



12.5 Countryside Stewardship Schemes

Records within 250m

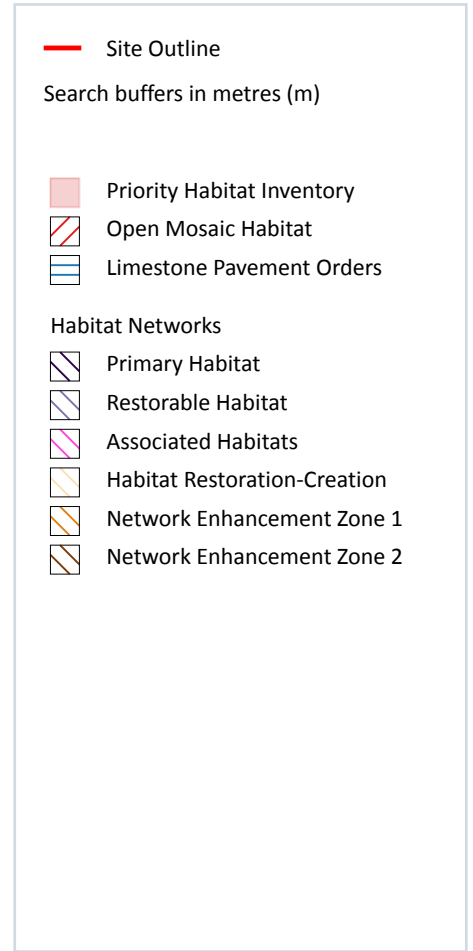
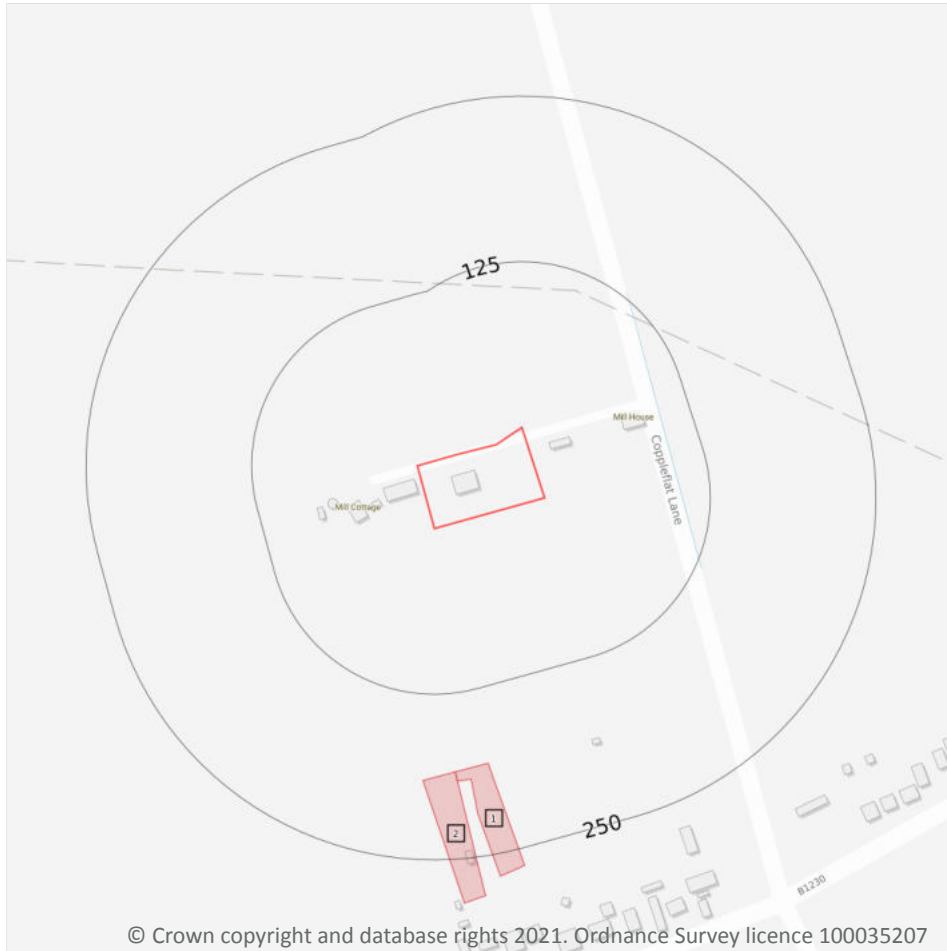
0

Countryside Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. Main objectives are to improve the farmed environment for wildlife and to reduce diffuse water pollution.

This data is sourced from Natural England.



13 Habitat designations



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13.1 Priority Habitat Inventory

Records within 250m

2

Habitats of principal importance as named under Natural Environment and Rural Communities Act (2006) Section 41.

Features are displayed on the Habitat designations map on **page 58**

ID	Location	Main Habitat	Other habitats
1	182m S	Traditional orchard	Main habitat: TORCH (INV > 50%)
2	184m S	No main habitat but additional habitats present	Additional: TORCH (INV 50%)

This data is sourced from Natural England.

13.2 Habitat Networks

Records within 250m

0

Habitat networks for 18 priority habitat networks (based primarily, but not exclusively, on the priority habitat inventory) and areas suitable for the expansion of networks through restoration and habitat creation.

This data is sourced from Natural England.

13.3 Open Mosaic Habitat

Records within 250m

0

Sites verified as Open Mosaic Habitat. Mosaic habitats are brownfield sites that are identified under the UK Biodiversity Action Plan as a priority habitat due to the habitat variation within a single site, supporting an array of invertebrates.

This data is sourced from Natural England.

13.4 Limestone Pavement Orders

Records within 250m

0

Limestone pavements are outcrops of limestone where the surface has been worn away by natural means over millennia. These rocks have the appearance of paving blocks, hence their name. Not only do they have geological interest, they also provide valuable habitats for wildlife. These habitats are threatened due to their removal for use in gardens and water features. Many limestone pavements have been designated as SSSIs which affords them some protection. In addition, Section 34 of the Wildlife and Countryside Act 1981 gave them additional protection via the creation of Limestone Pavement Orders, which made it a criminal offence to remove any part of the outcrop. The associated Limestone Pavement Priority Habitat is part of the UK Biodiversity Action Plan priority habitat in England.

This data is sourced from Natural England.



14 Geology 1:10,000 scale - Availability



Site Outline

Search buffers in metres (m)

- Full coverage
- Partial coverage
- No coverage

14.1 10k Availability

Records within 500m

2

An indication on the coverage of 1:10,000 scale geology data for the site, the most detailed dataset provided by the British Geological Survey. Either 'Full', 'Partial' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:10,000 scale - Availability map on **page 60**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	On site	No coverage	No coverage	No coverage	No coverage	NoCov
2	168m W	No coverage	No coverage	No coverage	No coverage	NoCov

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Artificial and made ground

14.2 Artificial and made ground (10k)

Records within 500m

0

Details of made, worked, infilled, disturbed and landscaped ground at 1:10,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

This data is sourced from the British Geological Survey.



Geology 1:10,000 scale - Superficial

14.3 Superficial geology (10k)

Records within 500m

0

Superficial geological deposits at 1:10,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

This data is sourced from the British Geological Survey.

14.4 Landslip (10k)

Records within 500m

0

Mass movement deposits on BGS geological maps at 1:10,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.



Geology 1:10,000 scale - Bedrock

14.5 Bedrock geology (10k)

Records within 500m

0

Bedrock geology at 1:10,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

This data is sourced from the British Geological Survey.

14.6 Bedrock faults and other linear features (10k)

Records within 500m

0

Linear features at the ground or bedrock surface at 1:10,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

This data is sourced from the British Geological Survey.



15 Geology 1:50,000 scale - Availability



— Site Outline

Search buffers in metres (m)

□ Geological map tile

15.1 50k Availability

Records within 500m

1

An indication on the coverage of 1:50,000 scale geology data for the site. Either 'Full' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:50,000 scale - Availability map on **page 64**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	On site	No coverage	Full	Full	No coverage	EW072_beverley_v4

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Artificial and made ground

15.2 Artificial and made ground (50k)

Records within 500m

0

Details of made, worked, infilled, disturbed and landscaped ground at 1:50,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

This data is sourced from the British Geological Survey.

15.3 Artificial ground permeability (50k)

Records within 50m

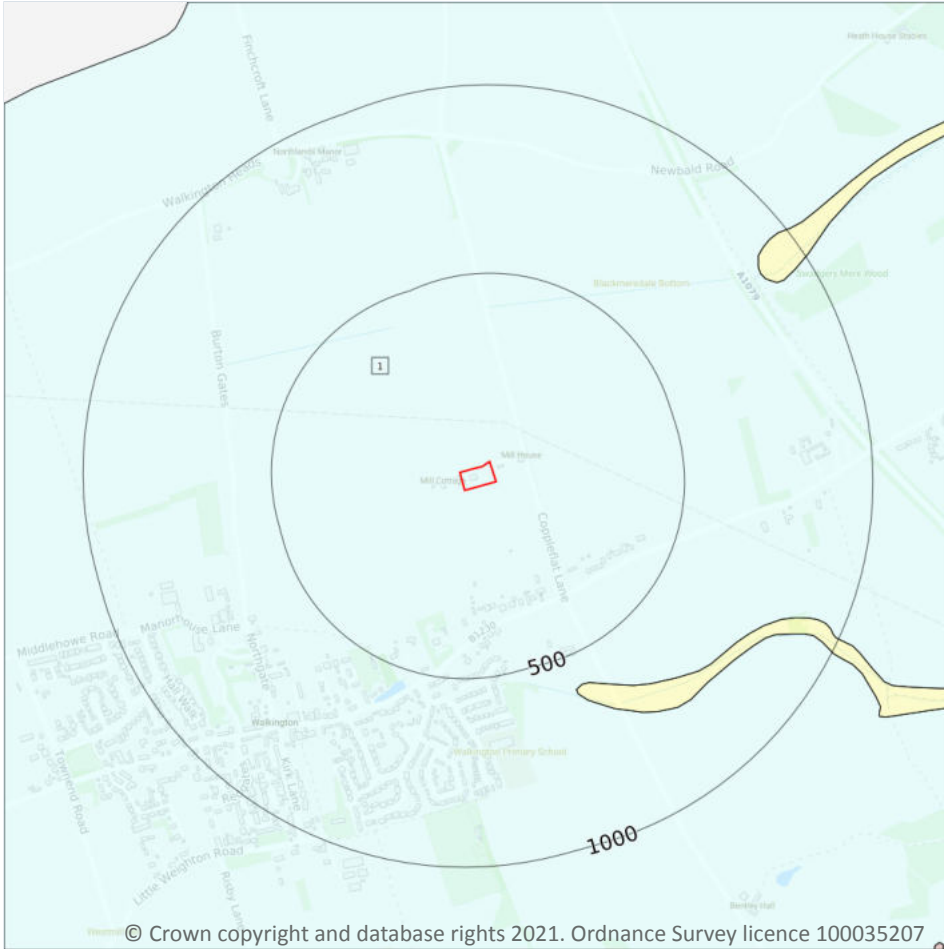
0

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any artificial deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.



Geology 1:50,000 scale - Superficial



- Site Outline
- Search buffers in metres (m)
- Landslip (50k)
- Superficial geology (50k)
Please see table for more details.

15.4 Superficial geology (50k)

Records within 500m

1

Superficial geological deposits at 1:50,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

Features are displayed on the Geology 1:50,000 scale - Superficial map on **page 66**

ID	Location	LEX Code	Description	Rock description
1	On site	TILLD-DMTN	TILL, DEVANSIAN	DIAMICTON

This data is sourced from the British Geological Survey.

15.5 Superficial permeability (50k)

Records within 50m	1
---------------------------	----------

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any superficial deposits (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	Mixed	High	Low

This data is sourced from the British Geological Survey.

15.6 Landslip (50k)

Records within 500m	0
----------------------------	----------

Mass movement deposits on BGS geological maps at 1:50,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.

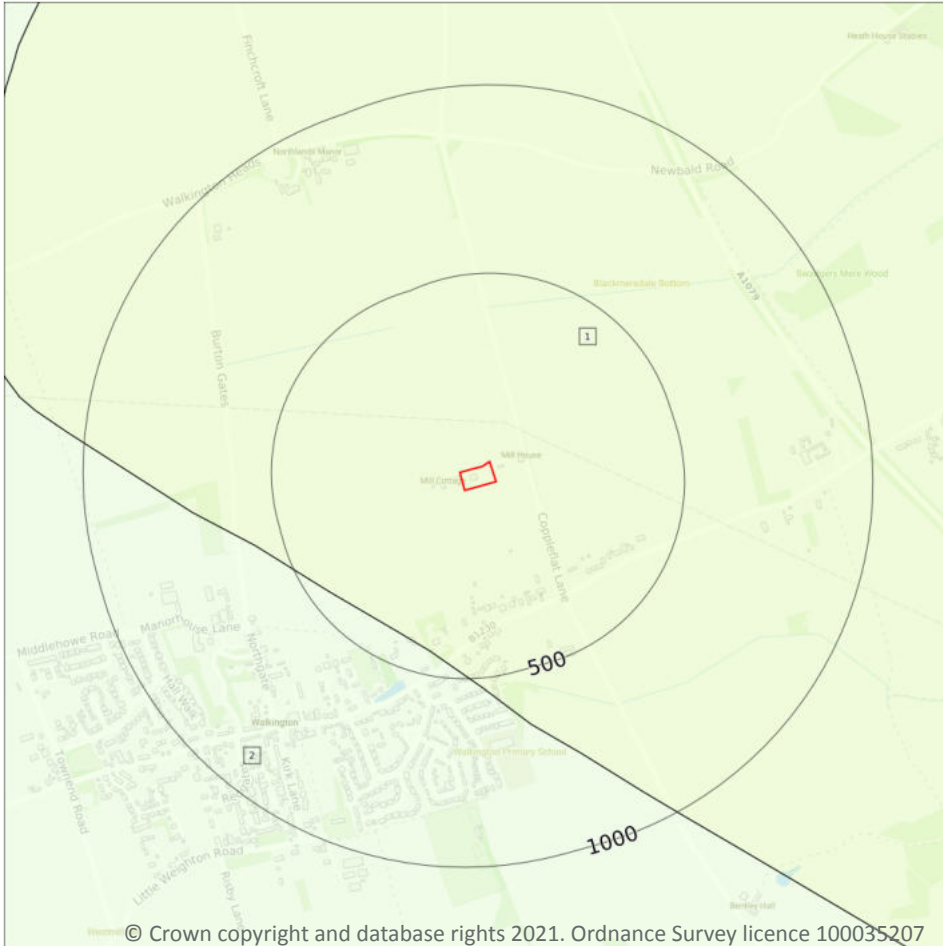
15.7 Landslip permeability (50k)

Records within 50m	0
---------------------------	----------

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any landslip deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Bedrock



- Site Outline
- Search buffers in metres (m)
- Bedrock faults and other linear features (50k)
- Bedrock geology (50k)
Please see table for more details.

15.8 Bedrock geology (50k)

Records within 500m

2

Bedrock geology at 1:50,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 68**

ID	Location	LEX Code	Description	Rock age
1	On site	FCK-CHLK	FLAMBOROUGH CHALK FORMATION - CHALK	SANTONIAN
2	414m SW	BCK-CHLK	BURNHAM CHALK FORMATION - CHALK	TURONIAN

This data is sourced from the British Geological Survey.

15.9 Bedrock permeability (50k)

Records within 50m	1
---------------------------	----------

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of bedrock (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	Fracture	Very High	Very High

This data is sourced from the British Geological Survey.

15.10 Bedrock faults and other linear features (50k)

Records within 500m	0
----------------------------	----------

Linear features at the ground or bedrock surface at 1:50,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

This data is sourced from the British Geological Survey.

16 Boreholes



Site Outline

Search buffers in metres (m)

- Site Outline
- 125
- 250
- 300

- Confidential
- 0 - 10m
- 10 - 30m
- 30m+
- Unknown

16.1 BGS Boreholes

Records within 250m

1

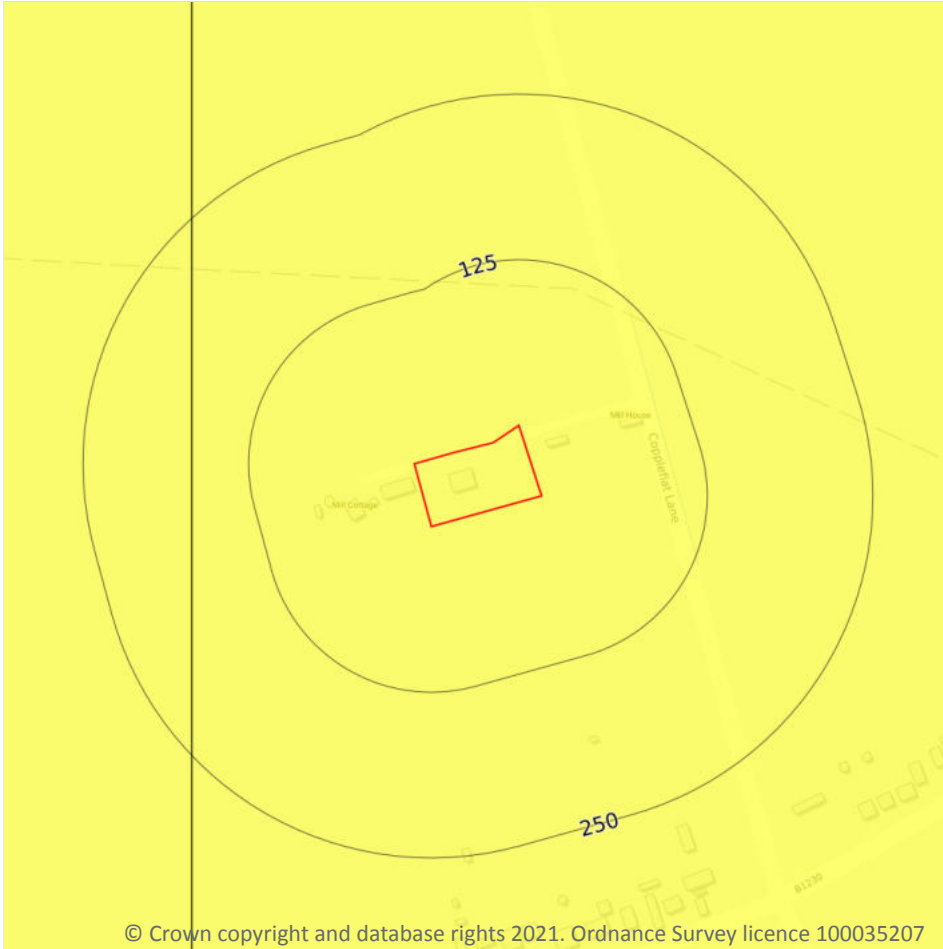
The Single Onshore Boreholes Index (SOBI); an index of over one million records of boreholes, shafts and wells from all forms of drilling and site investigation work held by the British Geological Survey. Covering onshore and nearshore boreholes dating back to at least 1790 and ranging from one to several thousand metres deep.

Features are displayed on the Boreholes map on **page 70**

ID	Location	Grid reference	Name	Length	Confidential	Web link
1	80m W	500092 437722	WALKINGTON WINDMILL WALKINGTON YORKS	58.83	N	458513

This data is sourced from the British Geological Survey.

17 Natural ground subsidence - Shrink swell clays



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.1 Shrink swell clays

Records within 50m

1

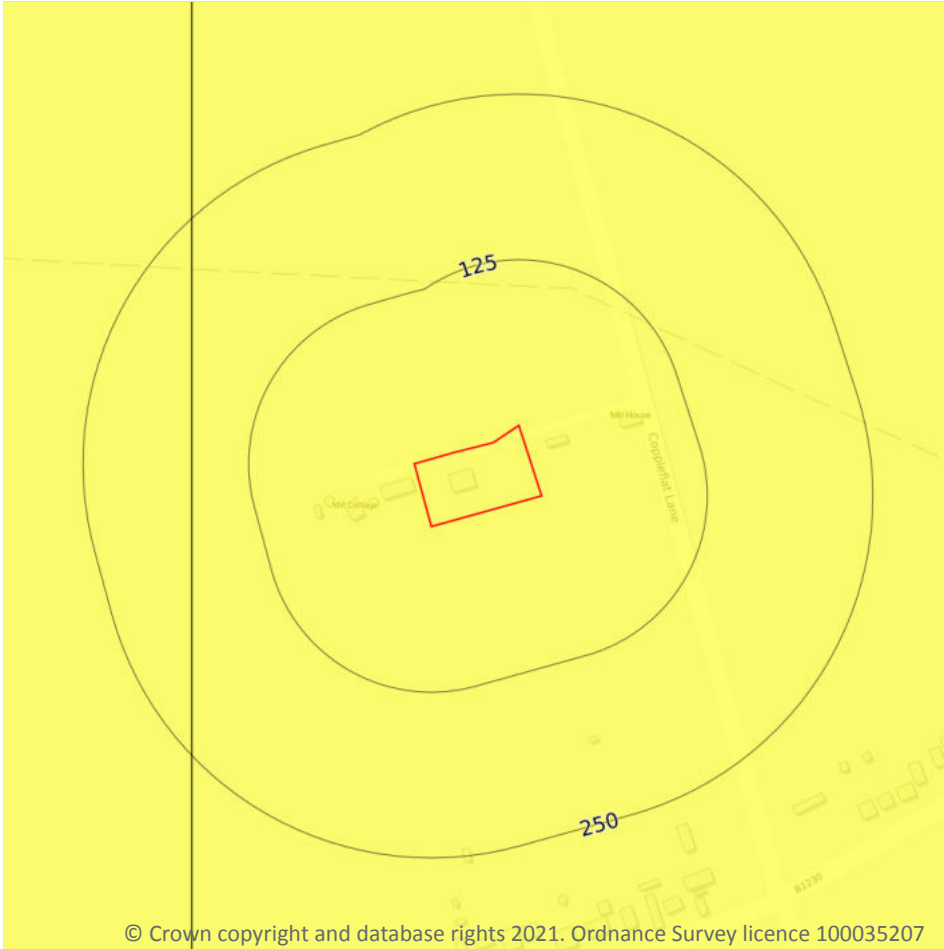
The potential hazard presented by soils that absorb water when wet (making them swell), and lose water as they dry (making them shrink). This shrink-swell behaviour is controlled by the type and amount of clay in the soil, and by seasonal changes in the soil moisture content (related to rainfall and local drainage).

Features are displayed on the Natural ground subsidence - Shrink swell clays map on **page 71**

Location	Hazard rating	Details
On site	Very low	Ground conditions predominantly low plasticity.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Running sands



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.2 Running sands

Records within 50m

1

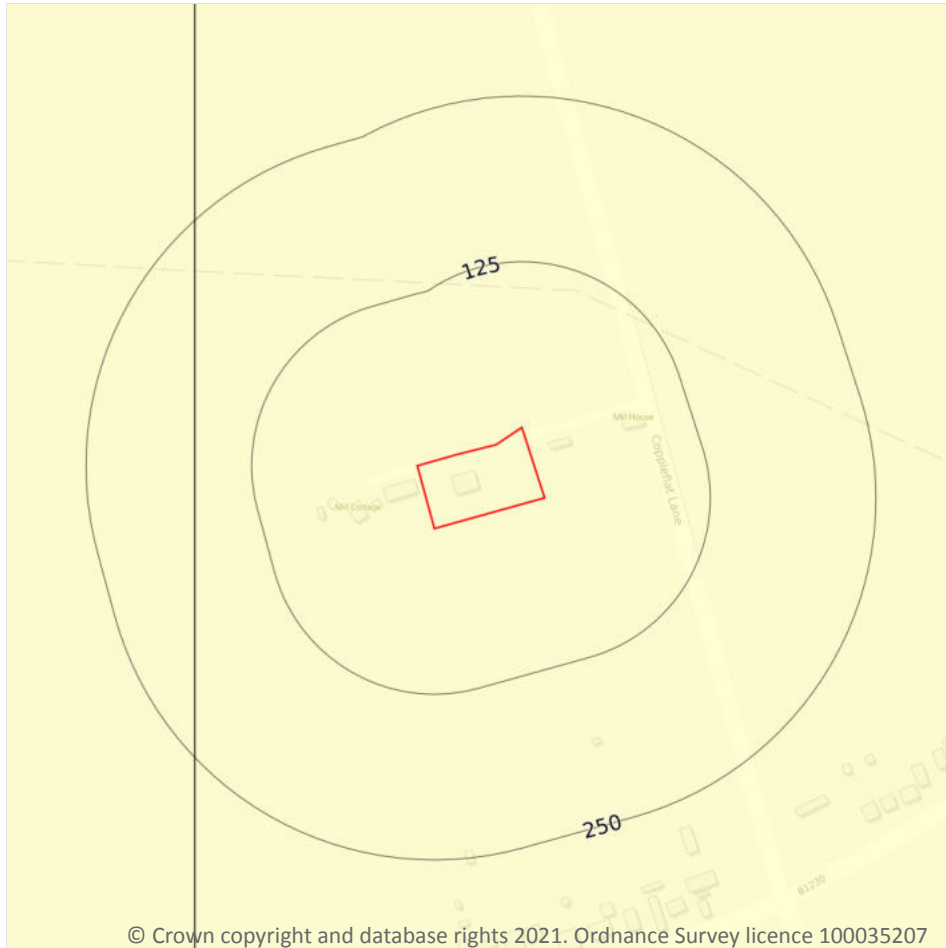
The potential hazard presented by rocks that can contain loosely-packed sandy layers that can become fluidised by water flowing through them. Such sands can 'run', removing support from overlying buildings and causing potential damage.

Features are displayed on the Natural ground subsidence - Running sands map on **page 72**

Location	Hazard rating	Details
On site	Very low	Running sand conditions are unlikely. No identified constraints on land use due to running conditions unless water table rises rapidly.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Compressible deposits



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17.3 Compressible deposits

Records within 50m

1

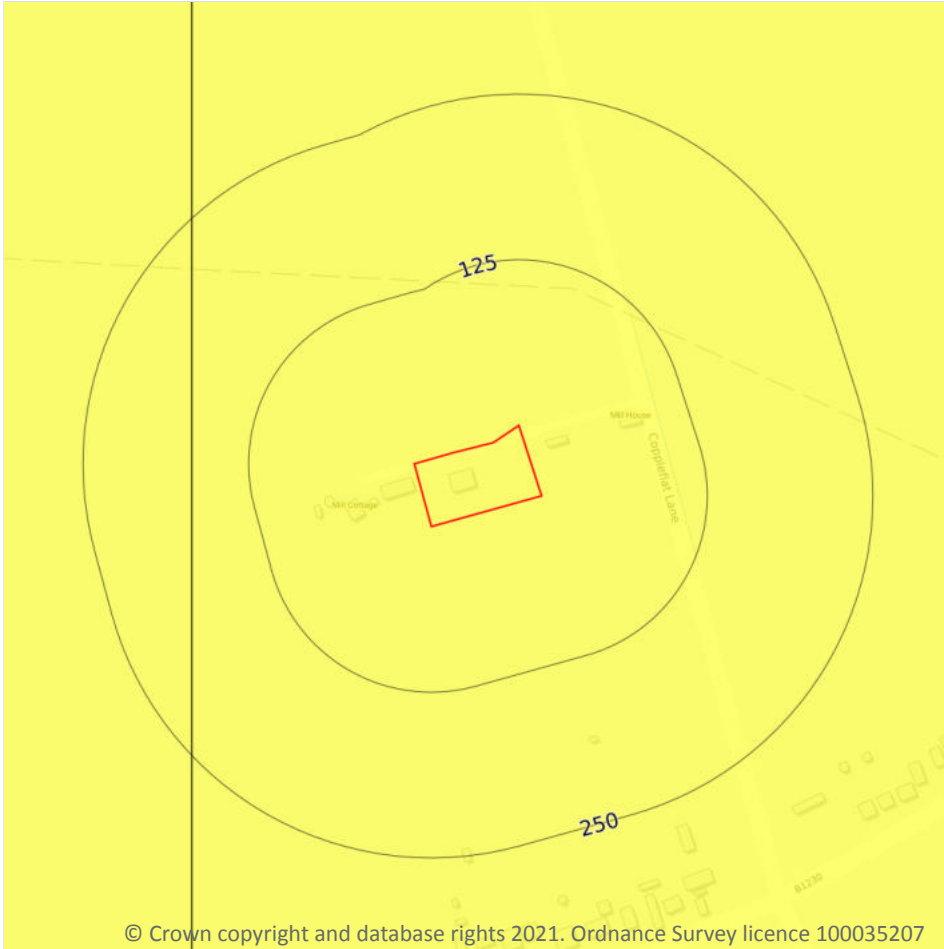
The potential hazard presented by types of ground that may contain layers of very soft materials like clay or peat and may compress if loaded by overlying structures, or if the groundwater level changes, potentially resulting in depression of the ground and disturbance of foundations.

Features are displayed on the Natural ground subsidence - Compressible deposits map on **page 73**

Location	Hazard rating	Details
On site	Negligible	Compressible strata are not thought to occur.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Collapsible deposits



— Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.4 Collapsible deposits

Records within 50m

1

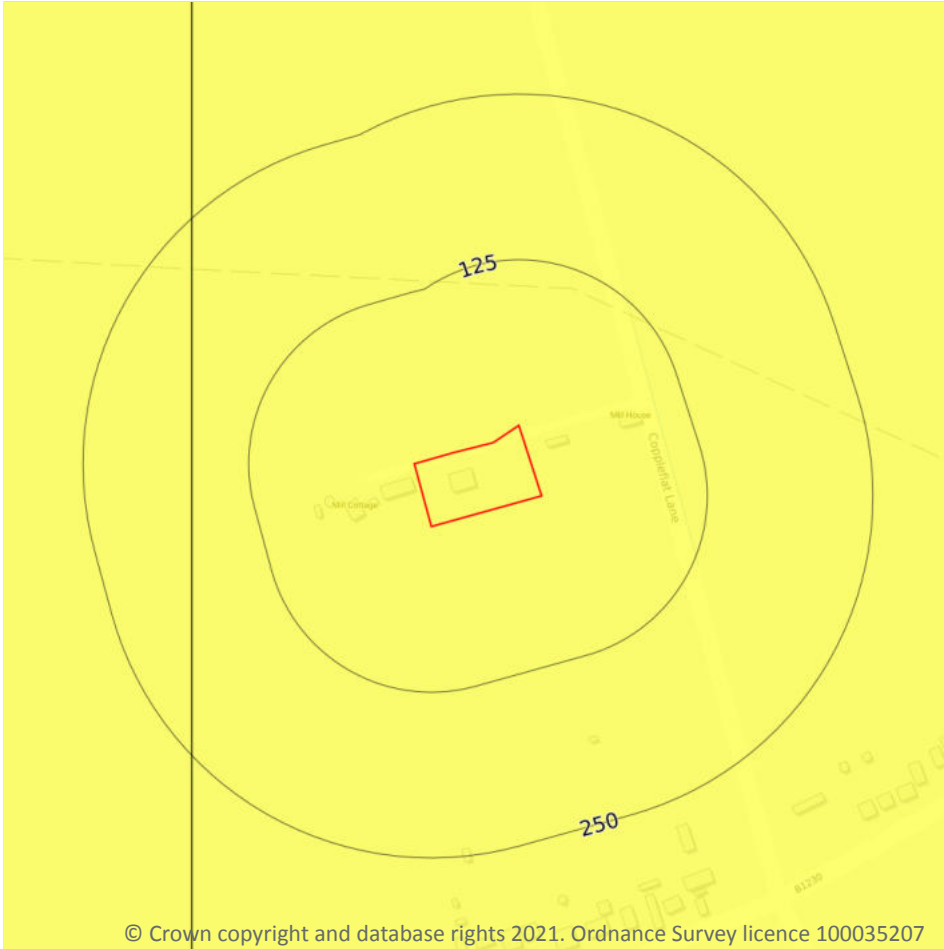
The potential hazard presented by natural deposits that could collapse when a load (such as a building) is placed on them or they become saturated with water.

Features are displayed on the Natural ground subsidence - Collapsible deposits map on **page 74**

Location	Hazard rating	Details
On site	Very low	Deposits with potential to collapse when loaded and saturated are unlikely to be present.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Landslides



— Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.5 Landslides

Records within 50m

1

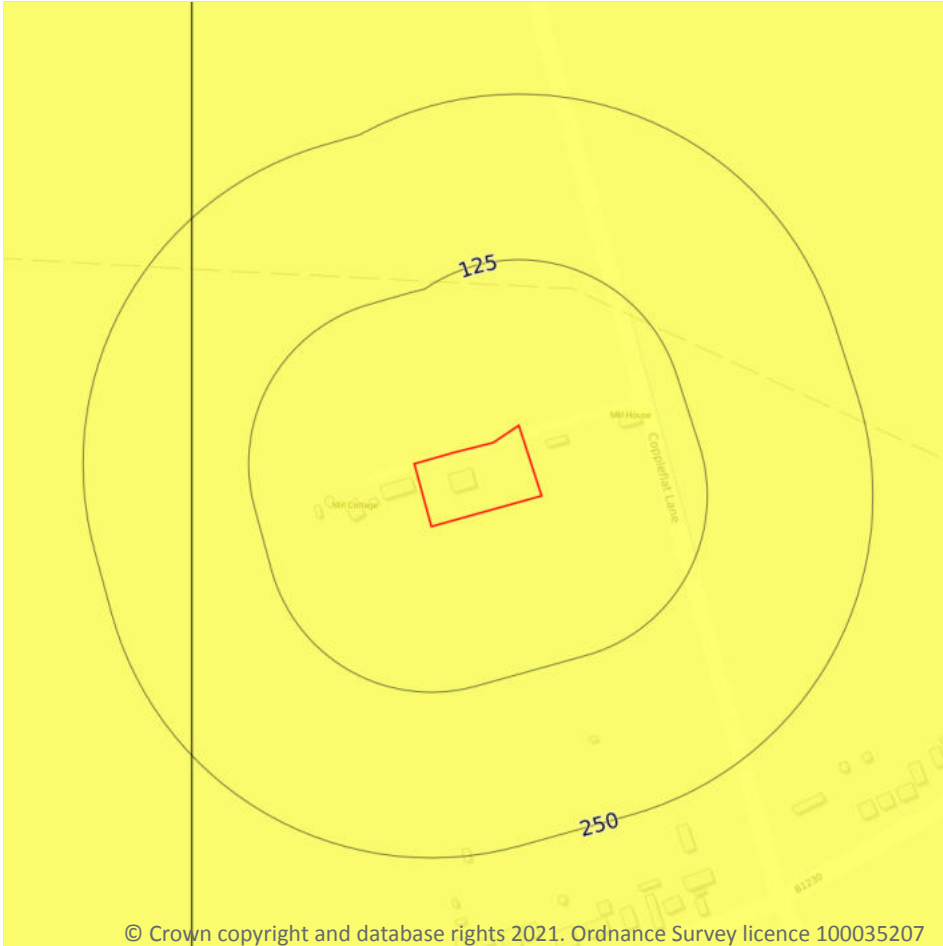
The potential for landsliding (slope instability) to be a hazard assessed using 1:50,000 scale digital maps of superficial and bedrock deposits, combined with information from the BGS National Landslide Database and scientific and engineering reports.

Features are displayed on the Natural ground subsidence - Landslides map on **page 75**

Location	Hazard rating	Details
On site	Very low	Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Ground dissolution of soluble rocks



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.6 Ground dissolution of soluble rocks

Records within 50m

1

The potential hazard presented by ground dissolution, which occurs when water passing through soluble rocks produces underground cavities and cave systems. These cavities reduce support to the ground above and can cause localised collapse of the overlying rocks and deposits.

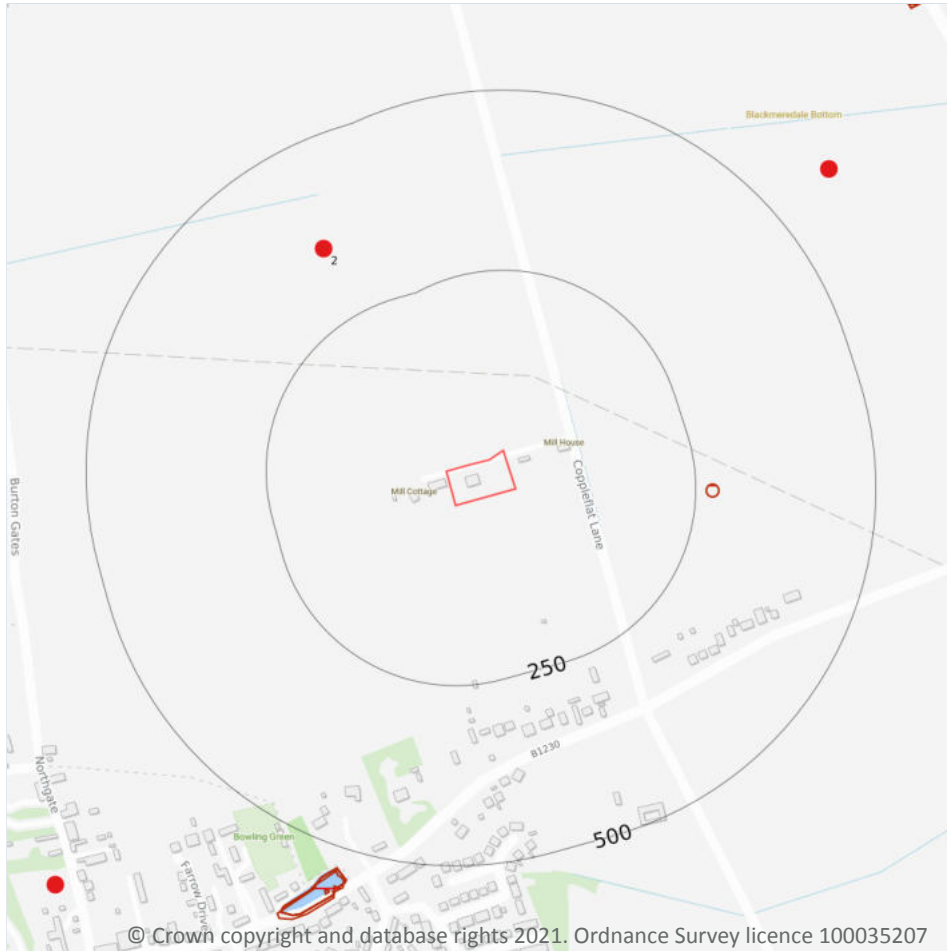
Features are displayed on the Natural ground subsidence - Ground dissolution of soluble rocks map on **page 76**

Location	Hazard rating	Details
On site	Very low	Soluble rocks are present within the ground. Few dissolution features are likely to be present. Potential for difficult ground conditions or localised subsidence are at a level where they need not be considered.

This data is sourced from the British Geological Survey.



18 Mining, ground workings and natural cavities



18.1 Natural cavities

Records within 500m

0

Industry recognised national database of natural cavities. Sinkholes and caves are formed by the dissolution of soluble rock, such as chalk and limestone, gulls and fissures by cambering. Ground instability can result from movement of loose material contained within these cavities, often triggered by water.

This data is sourced from Stantec UK Ltd.

18.2 BritPits

Records within 500m

1

BritPits (an abbreviation of British Pits) is a database maintained by the British Geological Survey of currently active and closed surface and underground mineral workings. Details of major mineral handling sites, such as wharfs and rail depots are also held in the database.

Features are displayed on the Mining, ground workings and natural cavities map on **page 78**

ID	Location	Details	Description
2	353m NW	Name: Blackmerdale Bottom Pit Address: Walkington, BEVERLEY, East Riding of Yorkshire Commodity: Chalk Status: Ceased	Type: A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority

This data is sourced from the British Geological Survey.

18.3 Surface ground workings

Records within 250m

0

Historical land uses identified from Ordnance Survey mapping that involved ground excavation at the surface. These features may or may not have been subsequently backfilled.

This is data is sourced from Ordnance Survey/Groundsure.

18.4 Underground workings

Records within 1000m

0

Historical land uses identified from Ordnance Survey mapping that indicate the presence of underground workings e.g. mine shafts.

This is data is sourced from Ordnance Survey/Groundsure.

18.5 Historical Mineral Planning Areas

Records within 500m

0

Boundaries of mineral planning permissions for England and Wales. This data was collated between the 1940s (and retrospectively to the 1930s) and the mid 1980s. The data includes permitted, withdrawn and refused permissions.

This data is sourced from the British Geological Survey.



18.6 Non-coal mining

Records within 1000m

0

The potential for historical non-coal mining to have affected an area. The assessment is drawn from expert knowledge and literature in addition to the digital geological map of Britain. Mineral commodities may be divided into seven general categories - vein minerals, chalk, oil shale, building stone, bedded ores, evaporites and 'other' commodities (including ball clay, jet, black marble, graphite and chert).

This data is sourced from the British Geological Survey.

18.7 Mining cavities

Records within 1000m

0

Industry recognised national database of mining cavities. Degraded mines may result in hazardous subsidence (crown holes). Climatic conditions and water escape can also trigger subsidence over mine entrances and workings.

This data is sourced from Stantec UK Ltd.

18.8 JPB mining areas

Records on site

0

Areas which could be affected by former coal and other mining. This data includes some mine plans unavailable to the Coal Authority.

This data is sourced from Johnson Poole and Bloomer.

18.9 Coal mining

Records on site

0

Areas which could be affected by past, current or future coal mining.

This data is sourced from the Coal Authority.

18.10 Brine areas

Records on site

0

The Cheshire Brine Compensation District indicates areas that may be affected by salt and brine extraction in Cheshire and where compensation would be available where damage from this mining has occurred. Damage from salt and brine mining can still occur outside this district, but no compensation will be available.

This data is sourced from the Cheshire Brine Subsidence Compensation Board.



18.11 Gypsum areas

Records on site	0
-----------------	---

Generalised areas that may be affected by gypsum extraction.

This data is sourced from British Gypsum.

18.12 Tin mining

Records on site	0
-----------------	---

Generalised areas that may be affected by historical tin mining.

This data is sourced from Mining Searches UK.

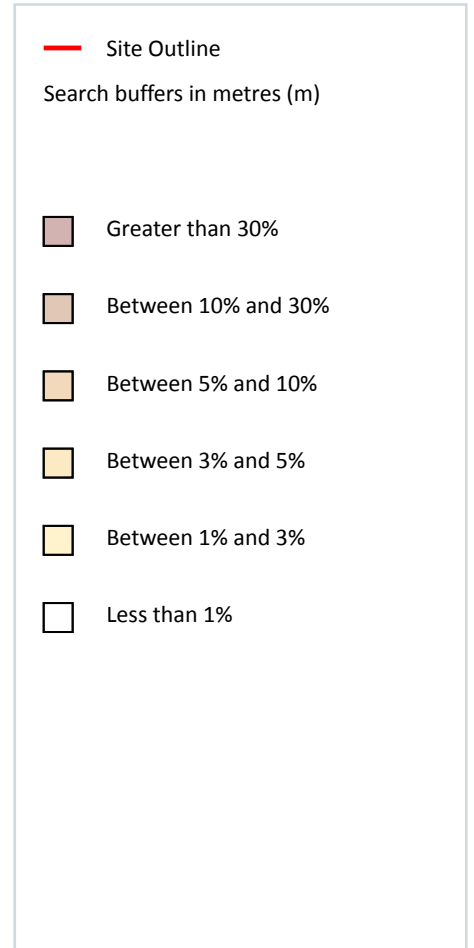
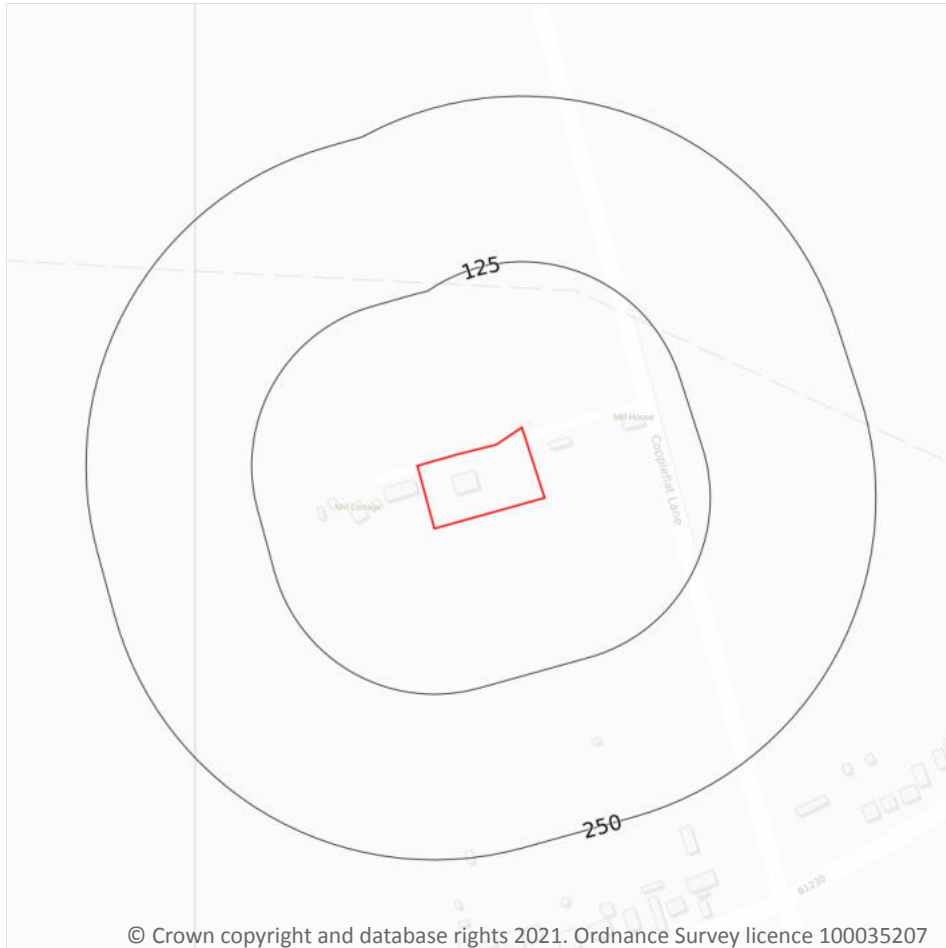
18.13 Clay mining

Records on site	0
-----------------	---

Generalised areas that may be affected by kaolin and ball clay extraction.

This data is sourced from the Kaolin and Ball Clay Association (UK).

19 Radon



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19.1 Radon

Records on site

1

Estimated percentage of dwellings exceeding the Radon Action Level. This data is the highest resolution radon dataset available for the UK and is produced to a 75m level of accuracy to allow for geological data accuracy and a 'residential property' buffer. The findings of this section should supersede any estimations derived from the Indicative Atlas of Radon in Great Britain. The data was derived from both geological assessments and long term measurements of radon in more than 479,000 households.

Features are displayed on the Radon map on **page 82**

Location	Estimated properties affected	Radon Protection Measures required
On site	Less than 1%	None**

This data is sourced from the British Geological Survey and Public Health England.

20 Soil chemistry

20.1 BGS Estimated Background Soil Chemistry

Records within 50m

1

The estimated values provide the likely background concentration of the potentially harmful elements Arsenic, Cadmium, Chromium, Lead and Nickel in topsoil. The values are estimated primarily from rural topsoil data collected at a sample density of approximately 1 per 2 km². In areas where rural soil samples are not available, estimation is based on stream sediment data collected from small streams at a sampling density of 1 per 2.5 km²; this is the case for most of Scotland, Wales and southern England. The stream sediment data are converted to soil-equivalent concentrations prior to the estimation.

Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
On site	15 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg

This data is sourced from the British Geological Survey.

20.2 BGS Estimated Urban Soil Chemistry

Records within 50m

0

Estimated topsoil chemistry of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc and bioaccessible Arsenic and Lead in 23 urban centres across Great Britain. These estimates are derived from interpolation of the measured urban topsoil data referred to above and provide information across each city between the measured sample locations (4 per km²).

This data is sourced from the British Geological Survey.

20.3 BGS Measured Urban Soil Chemistry

Records within 50m

0

The locations and measured total concentrations (mg/kg) of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc in urban topsoil samples from 23 urban centres across Great Britain. These are collected at a sample density of 4 per km².

This data is sourced from the British Geological Survey.



21 Railway infrastructure and projects

21.1 Underground railways (London)

Records within 250m 0

Details of all active London Underground lines, including approximate tunnel roof depth and operational hours.

This data is sourced from publicly available information by Groundsure.

21.2 Underground railways (Non-London)

Records within 250m 0

Details of the Merseyrail system, the Tyne and Wear Metro and the Glasgow Subway. Not all parts of all systems are located underground. The data contains location information only and does not include a depth assessment.

This data is sourced from publicly available information by Groundsure.

21.3 Railway tunnels

Records within 250m 0

Railway tunnels taken from contemporary Ordnance Survey mapping.

This data is sourced from the Ordnance Survey.

21.4 Historical railway and tunnel features

Records within 250m 0

Railways and tunnels digitised from historical Ordnance Survey mapping as scales of 1:1,250, 1:2,500, 1:10,000 and 1:10,560.

This data is sourced from Ordnance Survey/Groundsure.

21.5 Royal Mail tunnels

Records within 250m 0

The Post Office Railway, otherwise known as the Mail Rail, is an underground railway running through Central London from Paddington Head District Sorting Office to Whitechapel Eastern Head Sorting Office. The line is 10.5km long. The data includes details of the full extent of the tunnels, the depth of the tunnel, and the depth to track level.



This data is sourced from Groundsure/the Postal Museum.

21.6 Historical railways

Records within 250m	0
----------------------------	----------

Former railway lines, including dismantled lines, abandoned lines, disused lines, historic railways and razed lines.

This data is sourced from OpenStreetMap.

21.7 Railways

Records within 250m	0
----------------------------	----------

Currently existing railway lines, including standard railways, narrow gauge, funicular, trams and light railways.

This data is sourced from Ordnance Survey and OpenStreetMap.

21.8 Crossrail 1

Records within 500m	0
----------------------------	----------

The Crossrail railway project links 41 stations over 100 kilometres from Reading and Heathrow in the west, through underground sections in central London, to Shenfield and Abbey Wood in the east.

This data is sourced from publicly available information by Groundsure.

21.9 Crossrail 2

Records within 500m	0
----------------------------	----------

Crossrail 2 is a proposed railway linking the national rail networks in Surrey and Hertfordshire via an underground tunnel through London.

This data is sourced from publicly available information by Groundsure.

21.10 HS2

Records within 500m	0
----------------------------	----------

HS2 is a proposed high speed rail network running from London to Manchester and Leeds via Birmingham. Main civils construction on Phase 1 (London to Birmingham) of the project began in 2019, and it is currently anticipated that this phase will be fully operational by 2026. Construction on Phase 2a (Birmingham to Crewe) is anticipated to commence in 2021, with the service fully operational by 2027. Construction on Phase 2b (Crewe to Manchester and Birmingham to Leeds) is scheduled to begin in 2023 and be operational by 2033.



This data is sourced from HS2 Ltd.



Data providers

Groundsure works with respected data providers to bring you the most relevant and accurate information. To find out who they are and their areas of expertise see <https://www.groundsure.com/sources-reference>.

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APPENDIX B



Groundsure

INSIGHTS

HISTORICAL MAP PACK LEGEND

COUNTY SERIES & NATIONAL GRID 1:10,560 & 1:10,000

Information present on these legends is sourced from the same Ordnance Survey mapping as the maps used in this product.

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COUNTY SERIES 1:10,560

VEGETATION

	Fir Wood		Deciduous Wood
	Mixed Wood		Brushwood
	Orchard		Reeds
	Rough Pasture		Furze
	Marsh		Osiers

ROADS

	Railway over Road		Road over Railway
	Road over River or Canal		Level Crossing
	Railway over River		Road over Stream
	Road over Stream		Sunken Road
	Raised Road		

RAILWAYS

	Double Lines of Railway		Single Lines of Railway and Tramway
--	-------------------------	--	-------------------------------------

GENERAL FEATURES

	Gravel Pit		Sand Pit
	Quarry		Shingle
	Other Pits		Antiquities, Site of
			Arrow, showing direction of flow of water
			Trigonometrical Station

BOUNDARIES

	County Boundary		Parliamentary Division Boundary
	Parish Boundary		Union Boundary
	Contours		Rural District Boundary

NATIONAL GRID 1:10,000 & 1:10,560

HEIGHTS (METRES)

Values are given in metres above mean sea level at Newlyn.

Surface heights determined by ground survey (solid line) or air survey (dotted line).

Bench marks and their values are shown on large scale maps, and bench mark lists containing fuller and possibly later levelling information are obtainable from the Director General, Ordnance Survey.

Contours are at 5 metres vertical interval.

ROCK FEATURES

Loose rock, Boulders, Outcrop, Scree

CONVERSION SCALE

Metres - Feet

2000 Metres / 6500 Feet

1500 Metres / 5000 Feet

4000 Metres / 13000 Feet

ABBREVIATIONS

BP, BS	Boundary Post or Stone	PO	Post Office
Ch	Church	PC	Public Convenience
CH	Club House	PH	Public House
F Sta	Fire Station	S	Stone
FB	Foot Bridge	Spr	Spring
Fn	Fountain	TCB	Telephone Call Box
GP	Guide Post	TCP	Telephone Call Post
MP, MS	Mile Post or Stone	TH	Town Hall
P	Pole or Post	W	Well
Pol Sta	Police Station	Y	Youth hostel

ROADS

==== Road == Track --- Path

Where unfenced shown by pecked lines.

RAILWAYS

Cutting, Embankment, Multiple track, Single track, Siding, tramway or mineral line, Narrow gauge

Standard gauge

GENERAL FEATURES

	Antiquity, (site of)		Lake, loch or pond
	Boulders		Sloping masonry
	Building		Chalk pit, clay pit or quarry
	Pylon		Gravel pit
	Pole		Sand pit
	Electricity transmission line		Refuse or slag heap
	Glasshouse		
	Triangulation station		Shingle Sand

Direction of flow of water

VEGETATION

	Bracken, rough grassland		Marsh		Coppice
	Scrub		Saltings		Orchard
	Heath		Reeds		Coniferous trees
					Non-coniferous trees

In some areas bracken (---) and rough grassland (---) are shown separately.



Groundsure

INSIGHTS

HISTORICAL MAP PACK LEGEND

COUNTY SERIES 1:1,2500

NATIONAL GRID 1:1,250 & 1:2,500

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COUNTY SERIES 1:2,500

GENERAL FEATURES

Wood	Moor	Reeds
Fir	Mixed Wood	Brush Wood
Orchard	Bush	Rough Pasture
Ford	Stepping Stones	Ferry
Lock	Waterfall	Quarry
Shingle	Gravel Pit	Slope Masonry
Trigonometrical Station	Sl. Sluice	Flat Rock
507 Altitude at Trigonometrical Station	Tz Trough	Sand Pit
B.M. 325-9 Bench Mark	Sp. Spring	Refuse Heap
342 Surface Level	W Well	Clay Pit
Permanent Traverse Station	M.R. Mooring Ring	
Antiquities (site of)	M.P. Mooring Post	
Arrow denotes flow of water	B.S. Boundary Stone	
	B.P. Boundary Post	

ROADS

Road over single stream	Road crossing railway
Road over River or Canal	

RAILWAYS

Railway crossing River or Canal	Railway crossing Road
Level Crossing	Embankment
Cutting	

ABBREVIATIONS

Trigonometrical Station	Sl. Sluice
507 Altitude at Trigonometrical Station	Tz Trough
B.M. 325-9 Bench Mark	Sp. Spring
342 Surface Level	W Well
Permanent Traverse Station	M.R. Mooring Ring
Antiquities (site of)	M.P. Mooring Post
Arrow denotes flow of water	B.S. Boundary Stone
	B.P. Boundary Post

NATIONAL GRID 1:2,500 & 1:1,250

GENERAL FEATURES

Non-coastal Truss	Slope	Antiquity (site of)
Coastal Truss	Chf Cliff	Culvert
Straggled Trees	Cave Entrance	Direction of water flow
Oakure Truss	Rock	Sloping Masonry
Capstone, Chert	Buildings	Electricity Transmission Line
Scrub	Steep Masonry	Triangulation Station
Bracken	Roofted Building	Traverse Station (permanent)
Heath	Glasshouse	Bench Mark
Rough Ground	Airway	Pit (shallow)
Hemk, Sallows	Change of level (vertical)	Pit (irregularly filled)
Rocks	M.S. ARSAS spot	Revision Point & Bench Mark coincident

Top	Steps	Quarry	Refuse Heap	Sloping Masonry
Flat Rock	Sand	Sand Pit	Culvert	Archway
Shingle	Boulders	Gravel Pit	Cliff Face	Gibbed Roof Building

BOUNDARIES

England & Wales

- County Boundary (geographical)
- County & Civil Parish Boundary coterminous
- Admin County or County Borough Boundary
- London Borough Boundary
- M.B. Bdy, U.D. Bdy, R.D. Bdy, County District Boundaries based on civil parish

England, Wales & Scotland

- Civil Parish Boundary
- Boro (or Burgh) Const & Ward Bdy, Co Const Bdy, Parly & Ward Boundaries based on civil parish
- Boro (or Burgh) Const & Ward Bdy, Co Const Bdy, Parly & Ward Boundaries not based on civil parish

Scotland

- County Boundary (geographical)
- Co Cnl Bdy, County Council Boundary
- Co of City Bdy, County of the City Boundary
- Co of City Bdy, Burgh Boundary
- Burgh Bdy, District Council Boundary
- Disc Bdy, District Council Boundary
- Disc Bdy, District Council Boundary

* Not with parish † Coincident with parish

ABBREVIATIONS

B.H. Beer House	M.P.U. Mail Pick-up
B.M. Bench Mark	M.S. Mile Stone
B.P. Boundary Post	N.T. National Truss
B.S. Boundary Stone	N.T.L. Normal Tidal Limit
C. Crown	N.T.S. National Truss for Scotland
C.N. Club House	P. Pier, Pale or Post
Chy. Chimney	P.C. Public Convenience
Cn. Captain	P.C.B. Police Call Box
D.W. Drinking Fountain	P.H. Public House
Dk. Dock	P.G. Post Office
E.P. Electricity Millar or Post	Pp. Post Office
E.T.L. Electricity Transmission Line	P.T.P. Police Telephone Pillar
F.A. Fire Alarm	R.R. Railway
F.A.P. Fire Alarm Pillar	R.H. Road House
F.B. Filter Bed, Foot Bridge	R.P. Revision Point
F.G.M. Fundamental Bench Mark	S. Stone
F.S. Flagstaff	S.B. Signal Box
F.St. Fire Station	S.L. Signal Light
G.P. Guide Post	Sl. Sluice
G.V.C. Gas Valve Compound	S.P. Signal Post
H. Hydrant or Hydraulic Machine	Sp. Spring
L. Lighthouse	S.S. Signal Station
L.B. Lector Box	T.C.B. Telephone Call Box
L.S. Lighthouse Station	T.C.P. Telephone Call Post
L.C. Level Crossing	Tl. Tank at Track
L.G. Lighthouse Gauge	Tr. Trough
L.H. Lighthouse	Trs. Traverse Station
L.T. Lighthouse Tower	W. Well
M. Masonry	W.B. Weighbridge
M.H.W. Mean High Water	Wd.P. Wind Pump
M.H.W.S. Mean High Water Springs	Wks. Works
M.L.W. Mean Low Water	W.P. Water Post
M.L.W.S. Mean Low Water Springs	W.T. Water Top
M.P. Mile or Mooring Post	

Site Details:

Client Ref: EMS_705957_923009
Report Ref: EMS-705957_923009
Grid Ref: 500216, 437738

Map Name: County Series

Map date: 1893

Scale: 1:2,500

Printed at: 1:2,500



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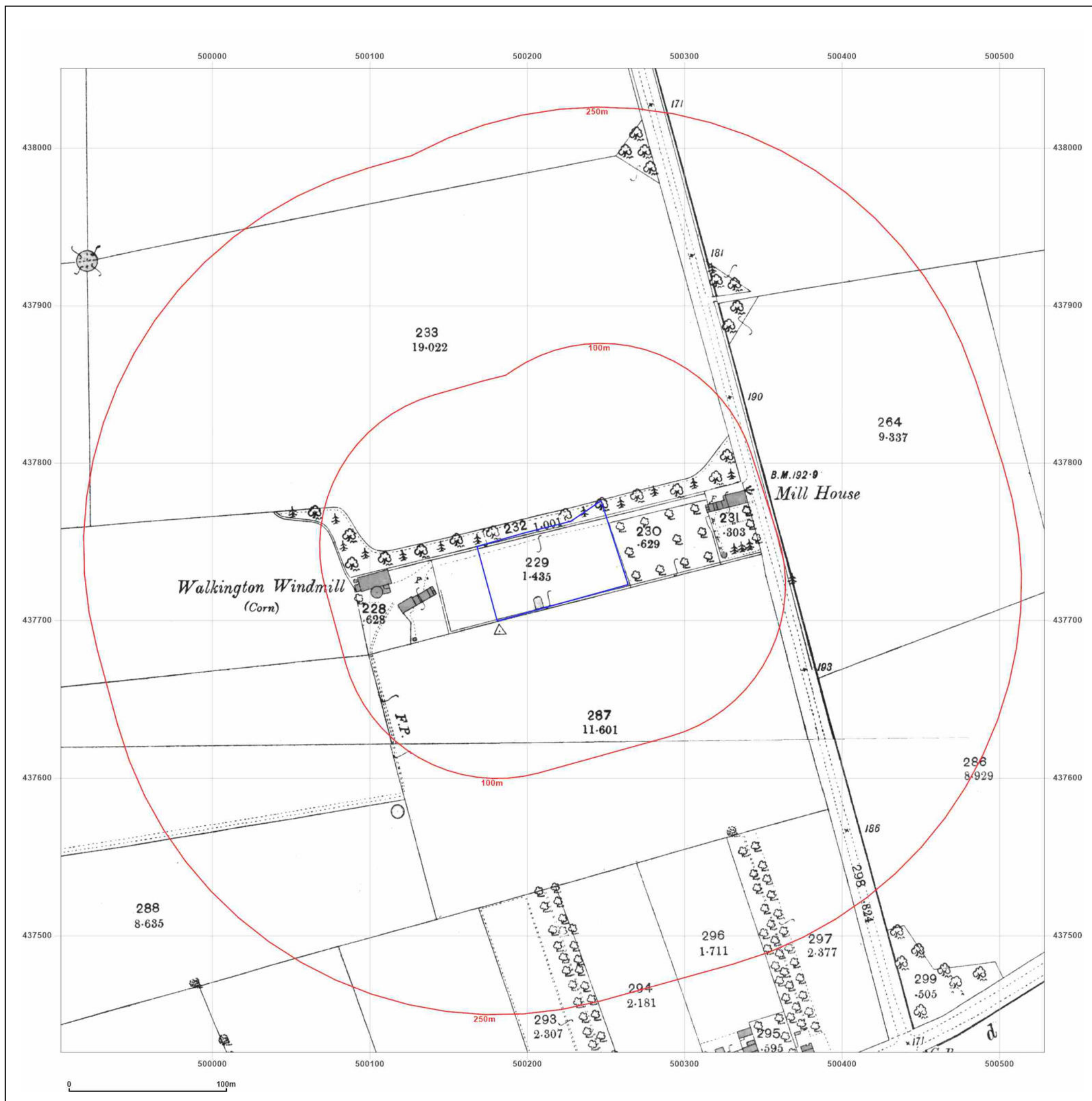


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Site Details:

Client Ref: EMS_705957_923009
Report Ref: EMS-705957_923009
Grid Ref: 500216, 437738

Map Name: County Series

Map date: 1910

Scale: 1:2,500

Printed at: 1:2,500



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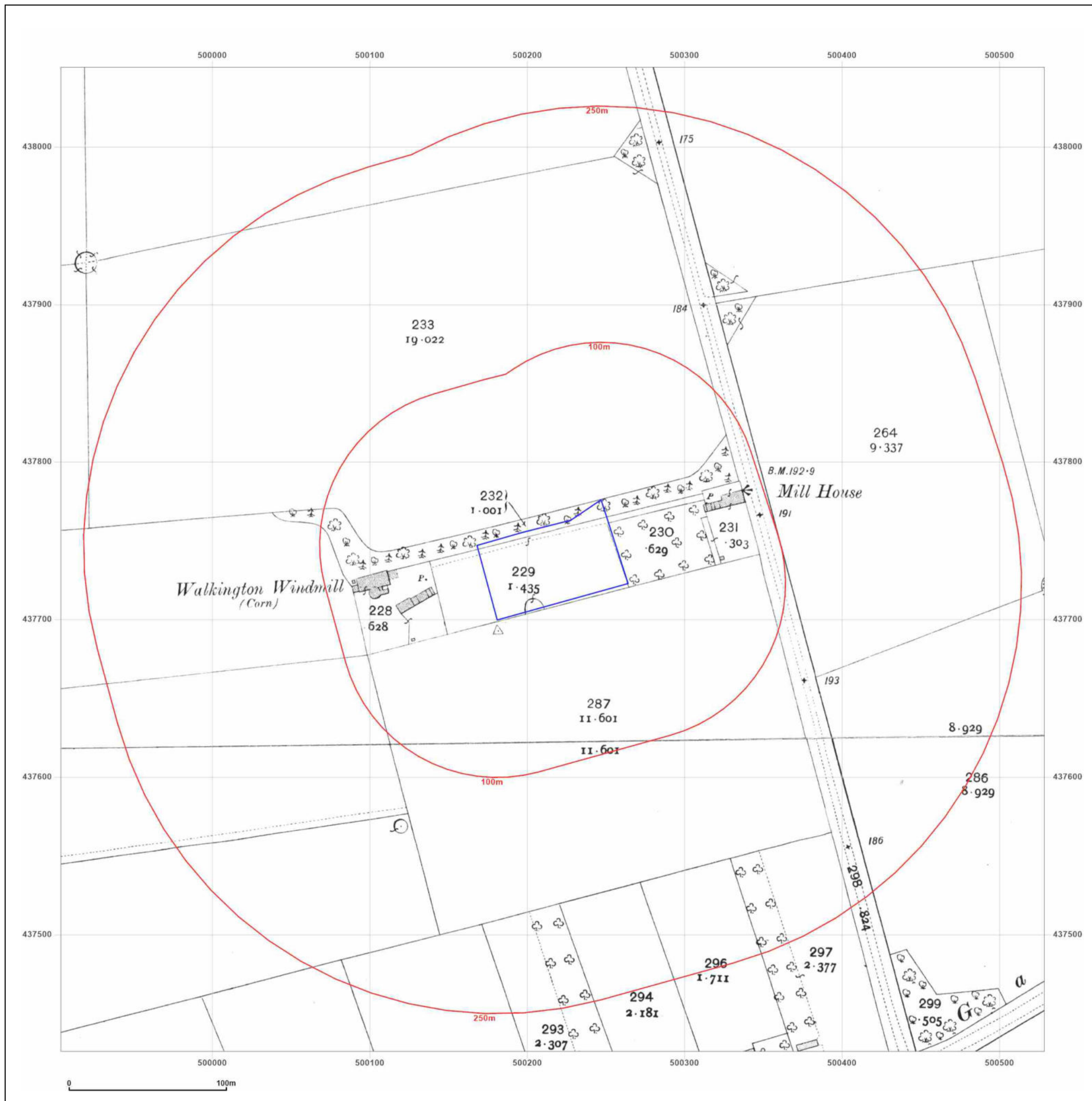


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Report Ref: EMS-705957_923009
Grid Ref: 500216, 437738

Map Name: County Series

Map date: 1927

Scale: 1:2,500

Printed at: 1:2,500



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 Revised 1927
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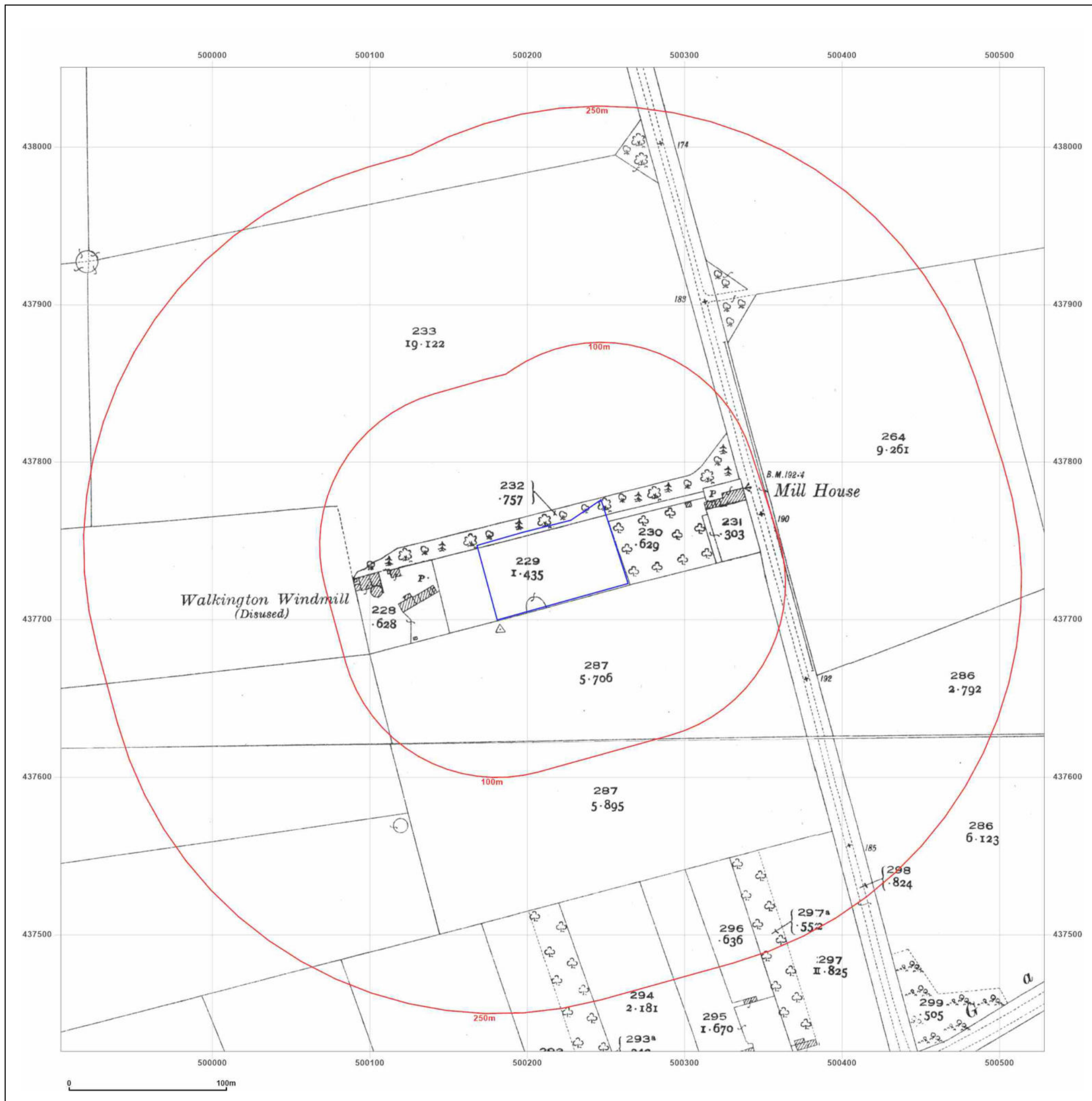


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Report Ref: EMS-705957_923009
Grid Ref: 500216, 437738

Map Name: National Grid

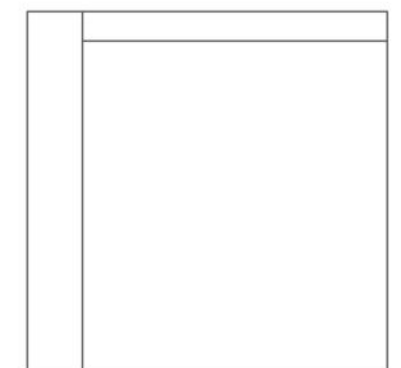
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Scale: 1:2,500

Printed at: 1:2,500



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 Edition N/A
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 Levelled 1946



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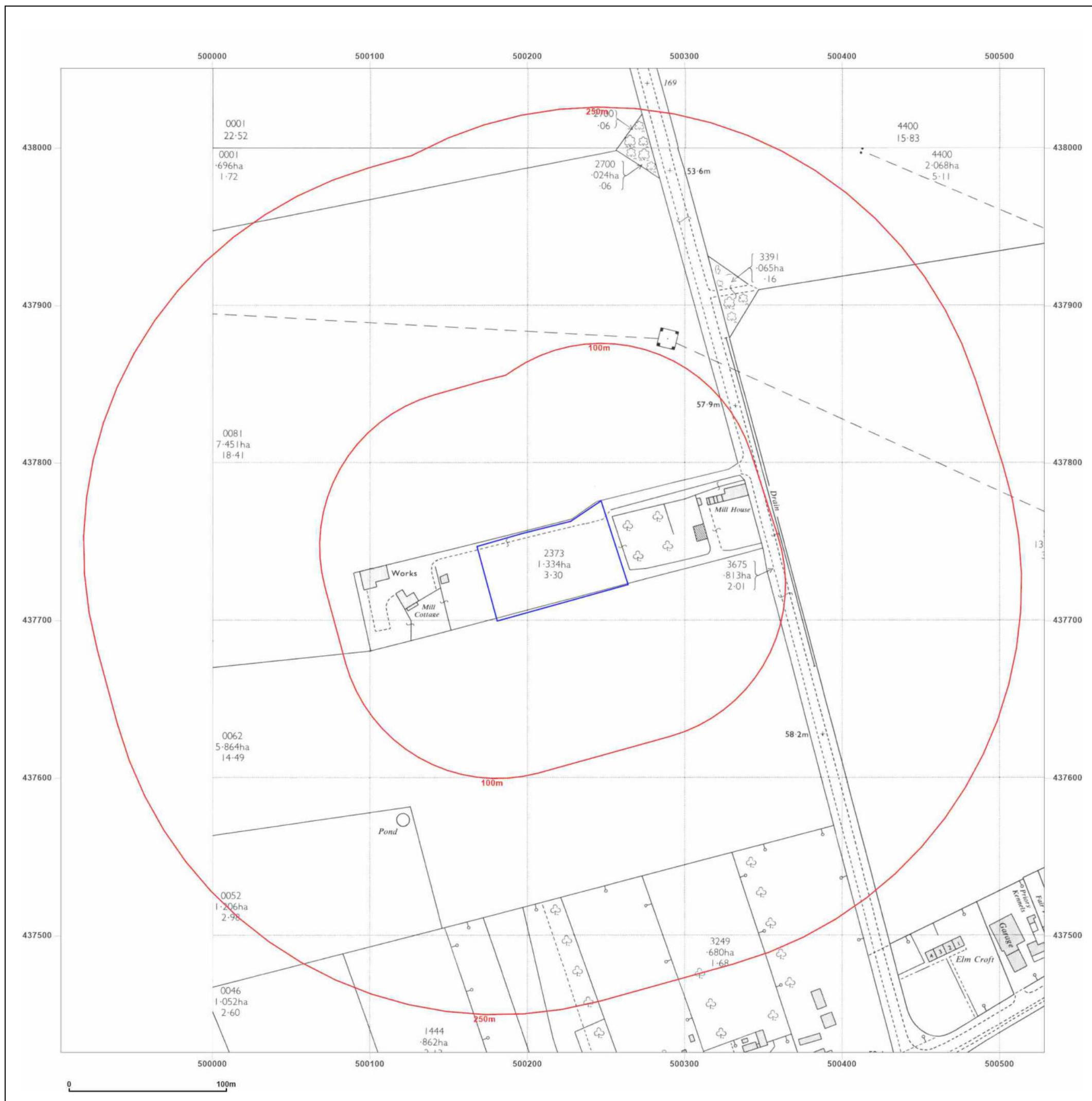


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Production date: 04 July 2021

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Site Details:

Client Ref: EMS_705957_923009
Report Ref: EMS-705957_923009
Grid Ref: 500216, 437738

Map Name: National Grid

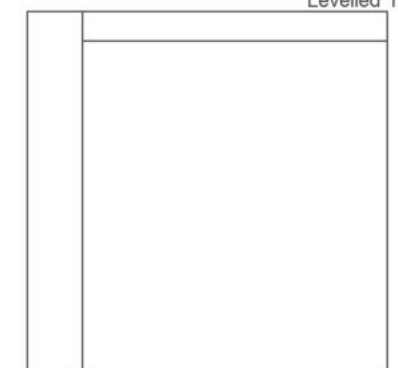
Map date: 1965-1967

Scale: 1:2,500

Printed at: 1:2,500



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



Surveyed 1965
 Revised 1965
 Edition N/A
 Copyright 1966
 Levelled 1946



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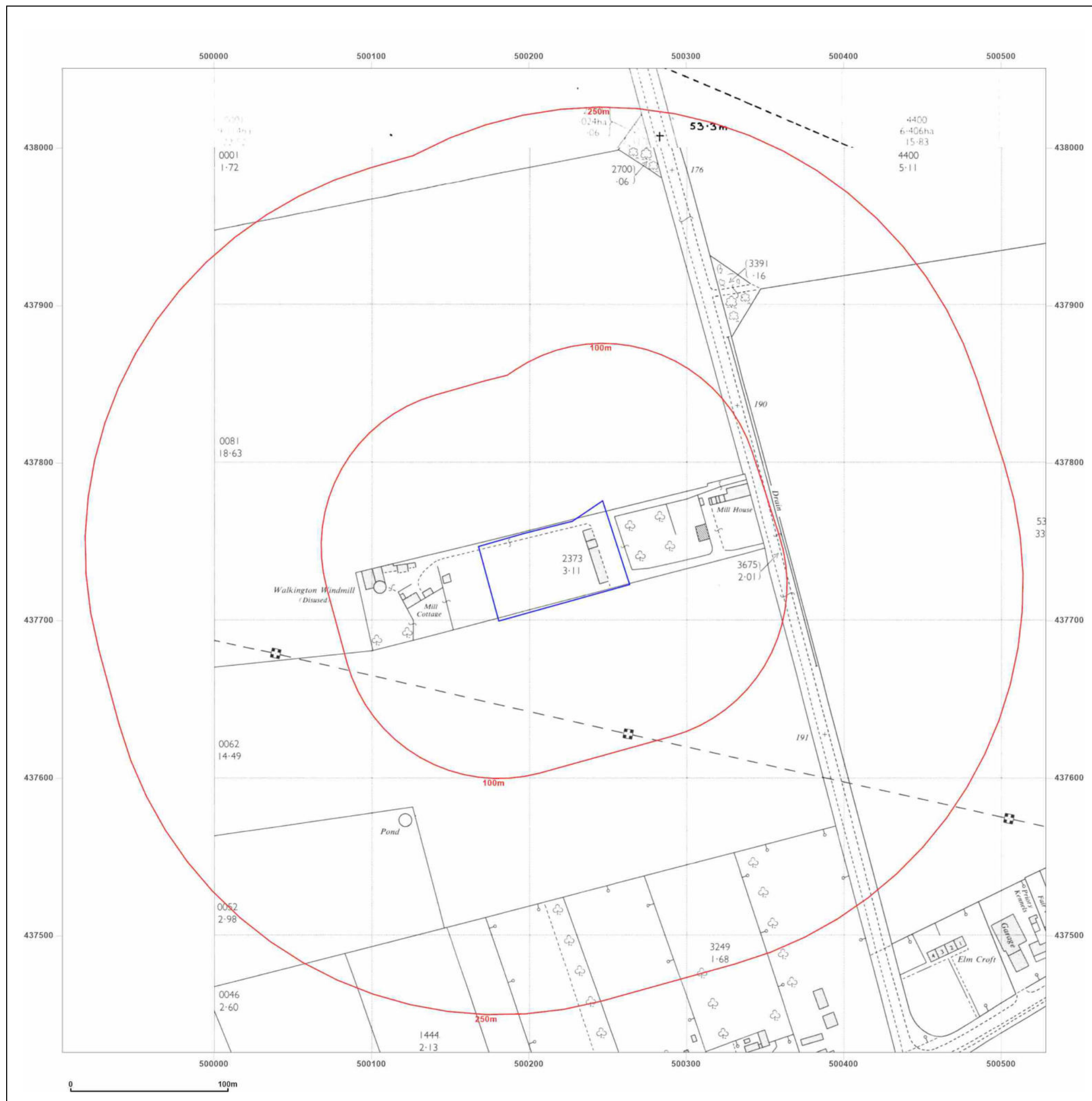


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Site Details:

Client Ref: EMS_705957_923009
Report Ref: EMS-705957_923009
Grid Ref: 500216, 437738

Map Name: National Grid

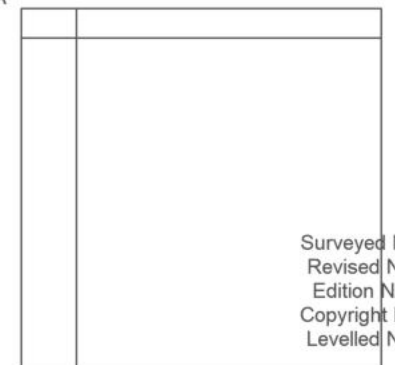
Map date: 1972-1977

Scale: 1:2,500

Printed at: 1:2,500



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



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



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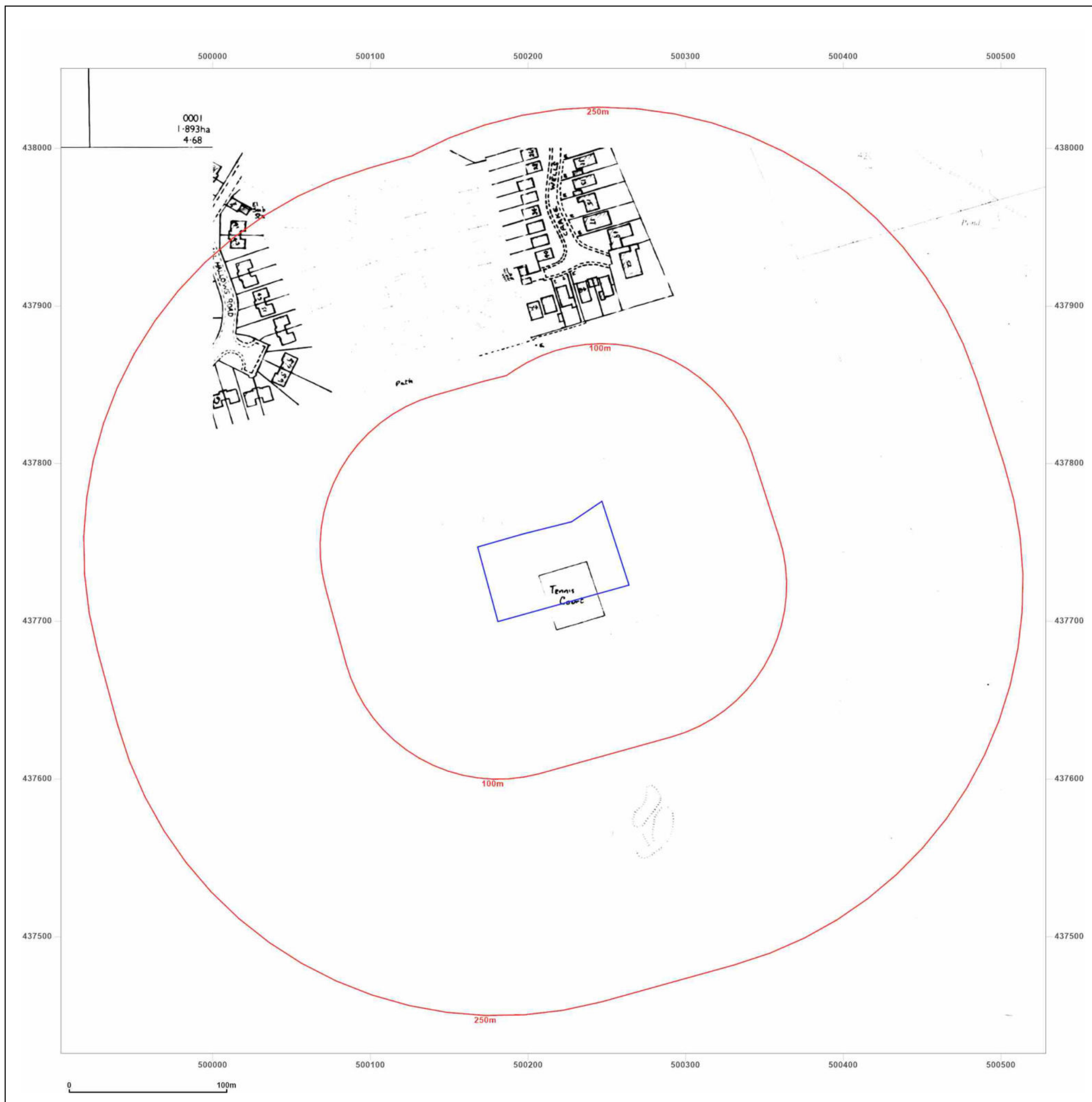


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Site Details:

Client Ref: EMS_705957_923009
Report Ref: EMS-705957_923009
Grid Ref: 500216, 437738

Map Name: National Grid

Map date: 1978-1984

Scale: 1:2,500

Printed at: 1:2,500



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

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

Surveyed 1984
 Revised 1984
 Edition N/A
 Copyright 1985
 Levelled 1967



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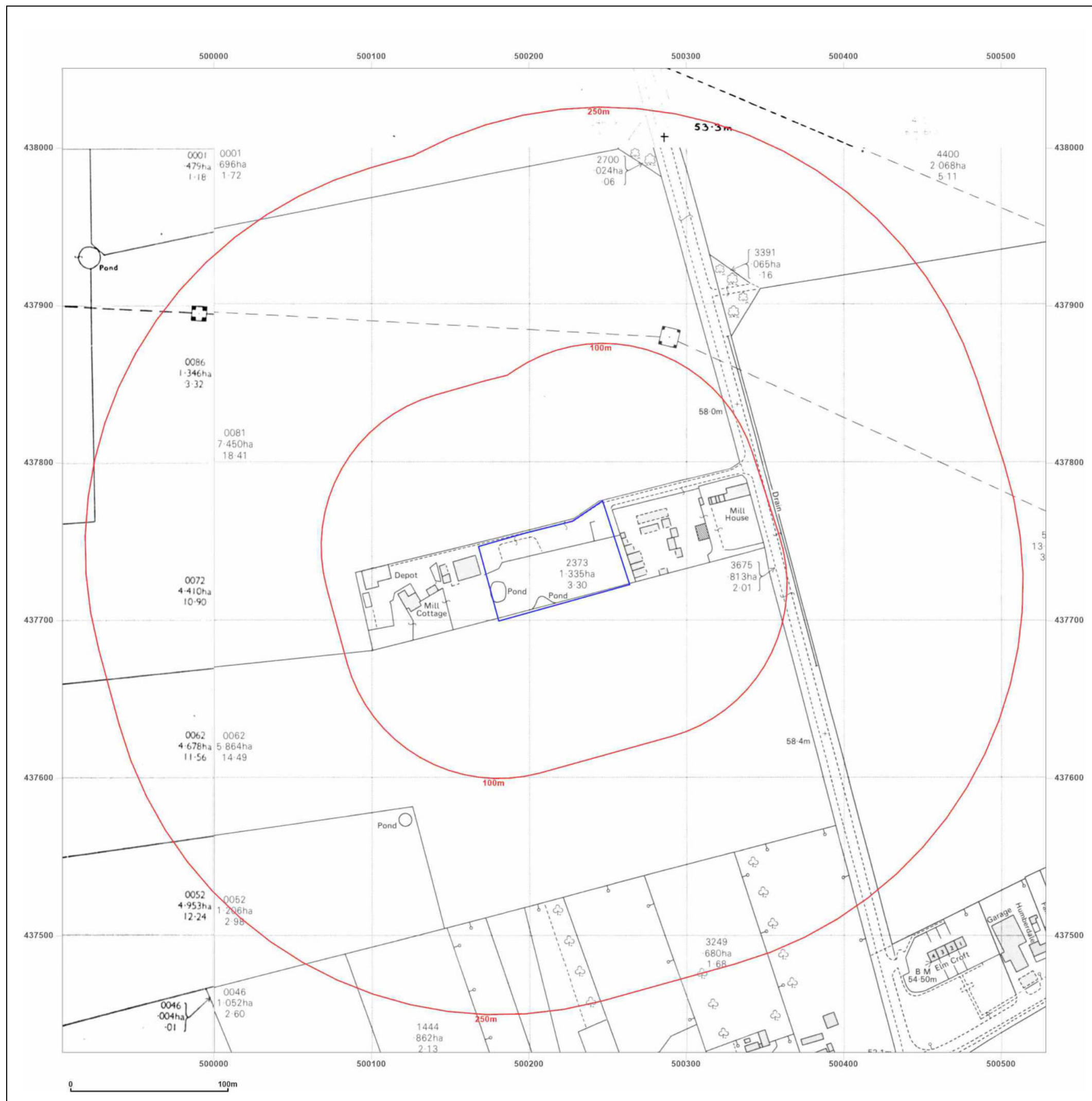


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Site Details:

Client Ref: EMS_705957_923009
Report Ref: EMS-705957_923009
Grid Ref: 500216, 437738

Map Name: National Grid

Map date: 1994

Scale: 1:2,500

Printed at: 1:2,500



Surveyed N/A
 Revised N/A
 Edition N/A
 Copyright 1994
 Levelled N/A

Surveyed 1994
 Revised 1994
 Edition N/A
 Copyright N/A
 Levelled N/A

Surveyed N/A
 Revised N/A
 Edition N/A
 Copyright 1994
 Levelled N/A

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 Revised N/A
 Edition N/A
 Copyright 1994
 Levelled N/A



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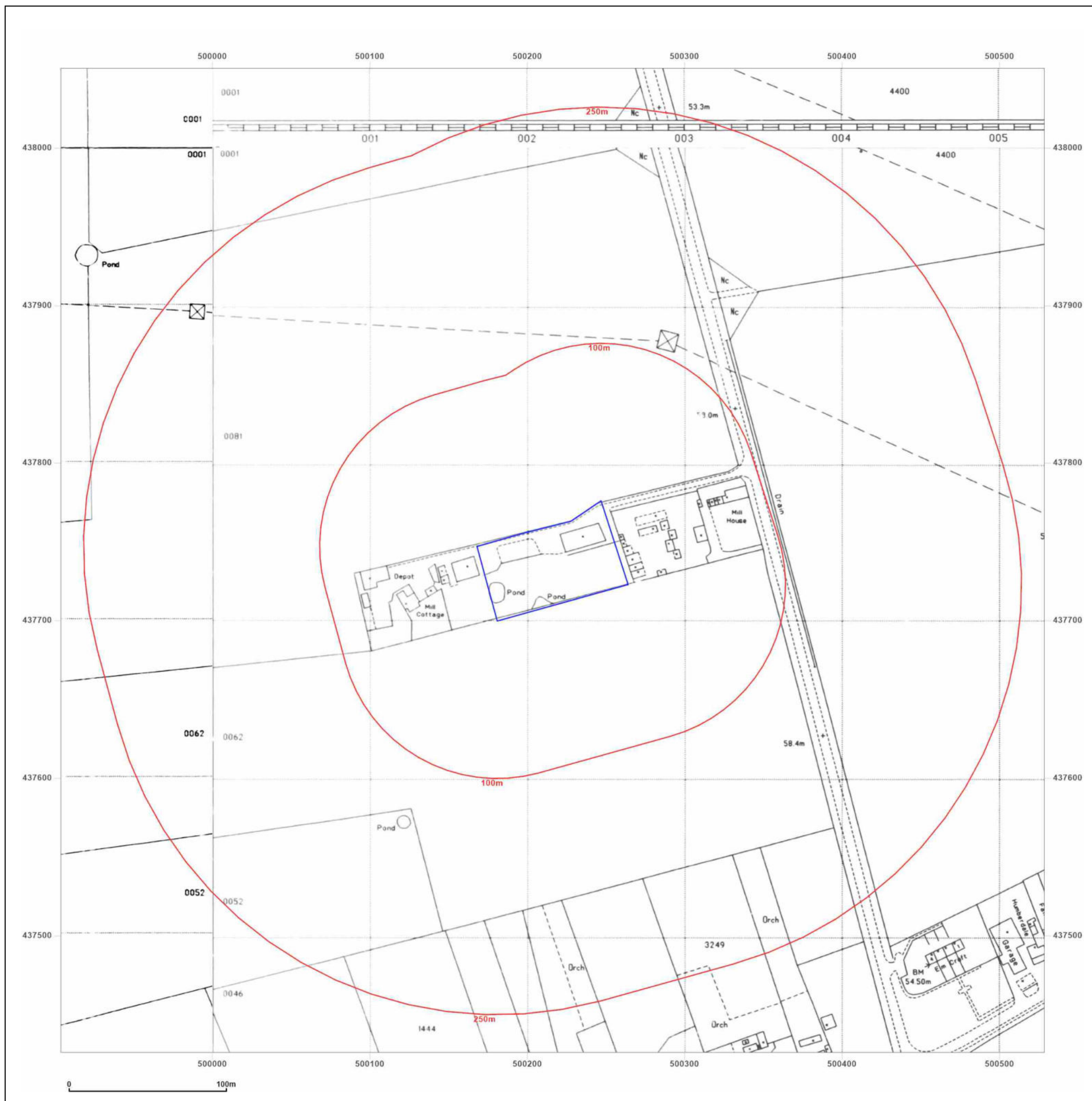


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Site Details:

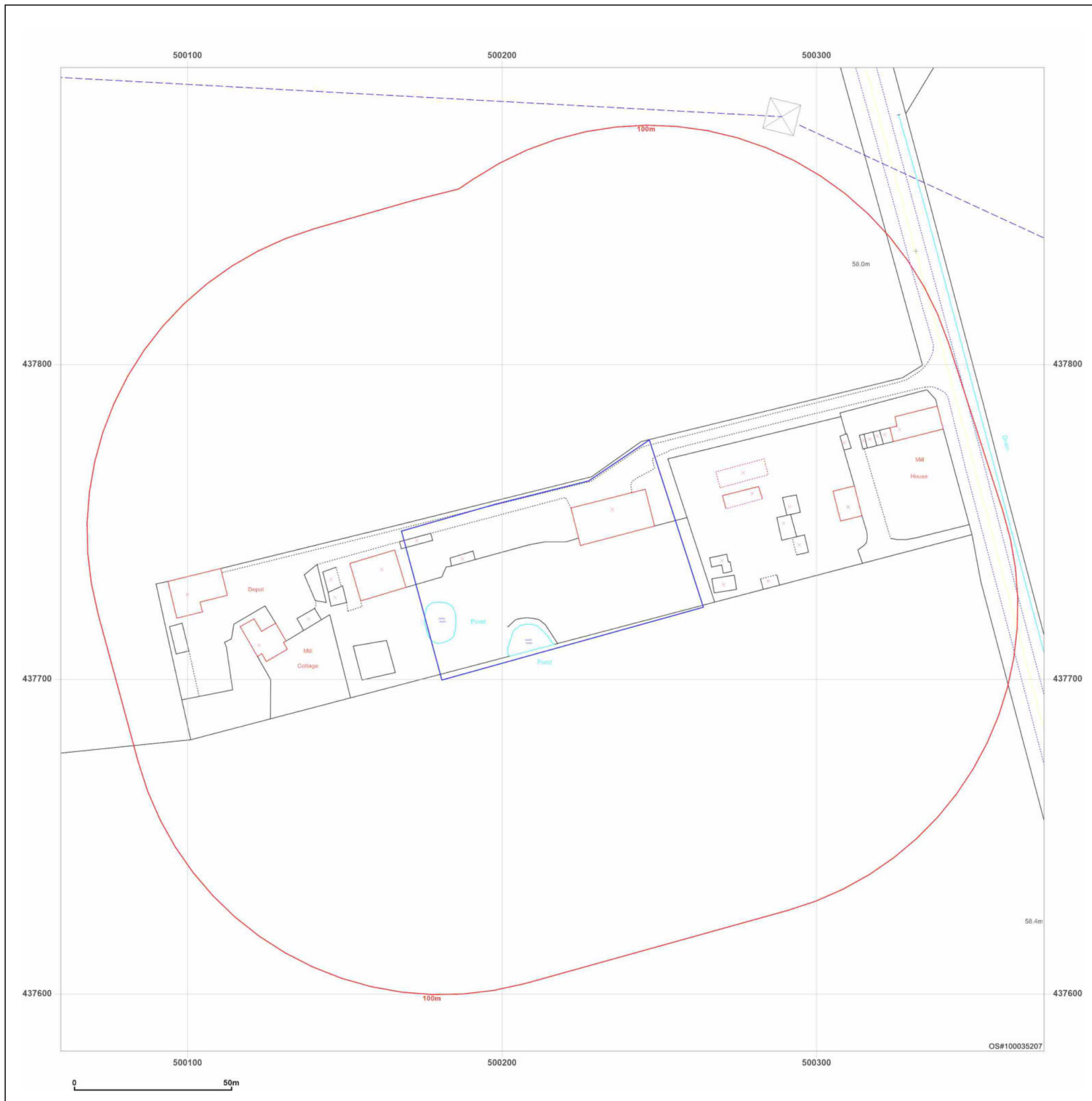
Client Ref: EMS_705957_923009
Report Ref: EMS-705957_923009
Grid Ref: 500216, 437738

Map Name: LandLine

Map date: 2003

Scale: 1:1,250

Printed at: 1:1,250



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Site Details:

Client Ref: EMS_705957_923009
 Report Ref: EMS-705957_923009
 Grid Ref: 500216, 437738

Map Name: County Series

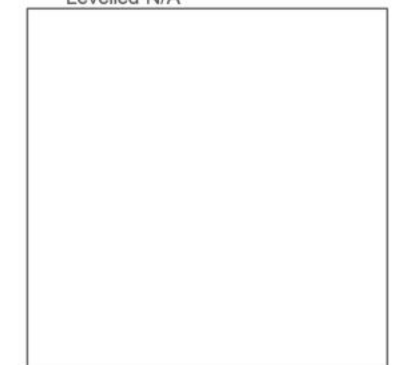
Map date: 1855

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1851
 Revised N/A
 Edition 1855
 Copyright N/A
 Levelled N/A



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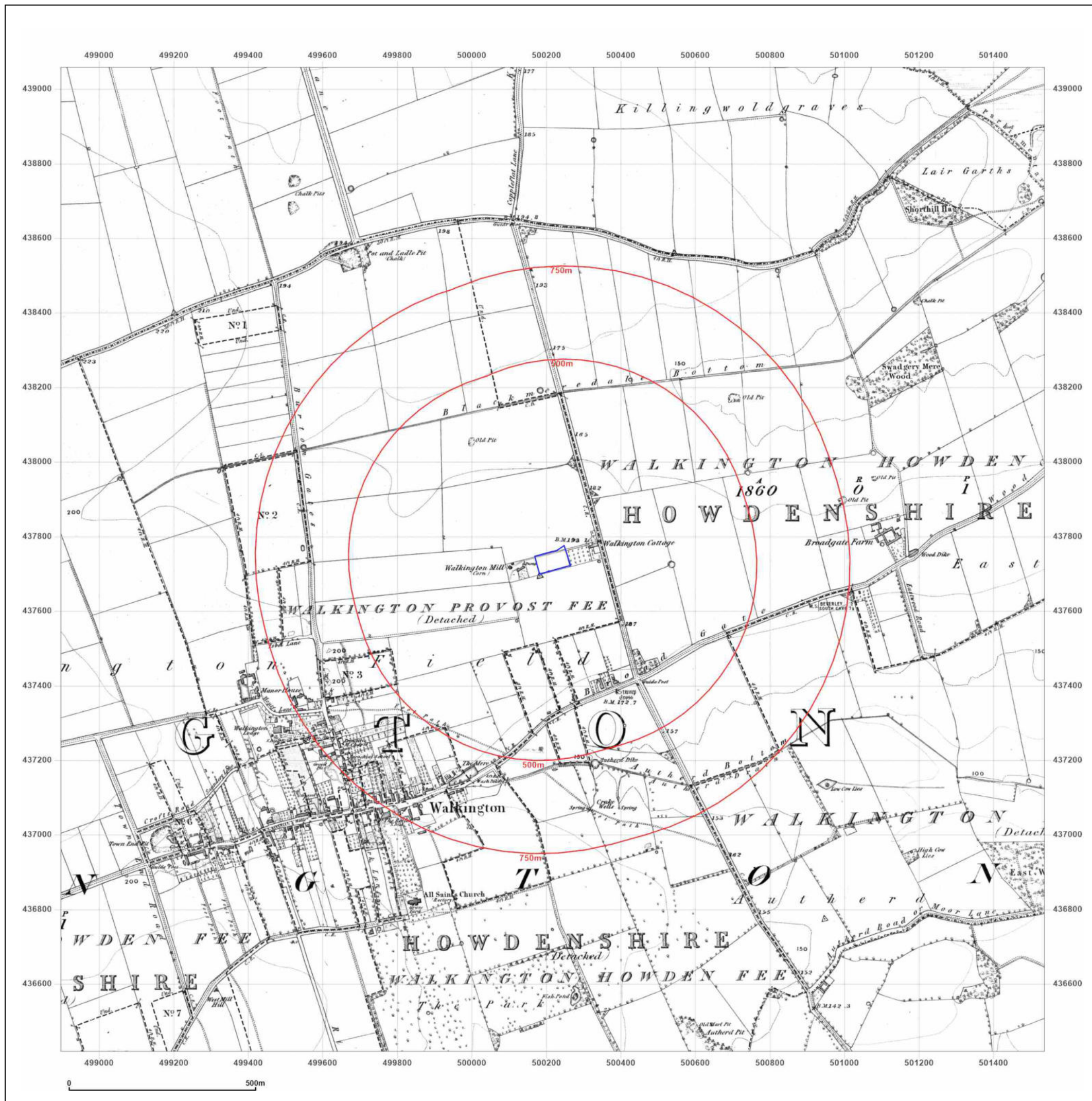


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Production date: 04 July 2021

Map legend available at:
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Site Details:

Client Ref: EMS_705957_923009
Report Ref: EMS-705957_923009
Grid Ref: 500216, 437738

Map Name: County Series

Map date: 1889-1892

Scale: 1:10,560

Printed at: 1:10,560



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

Surveyed 1889
 Revised 1889
 Edition N/A
 Copyright N/A
 Levelled N/A



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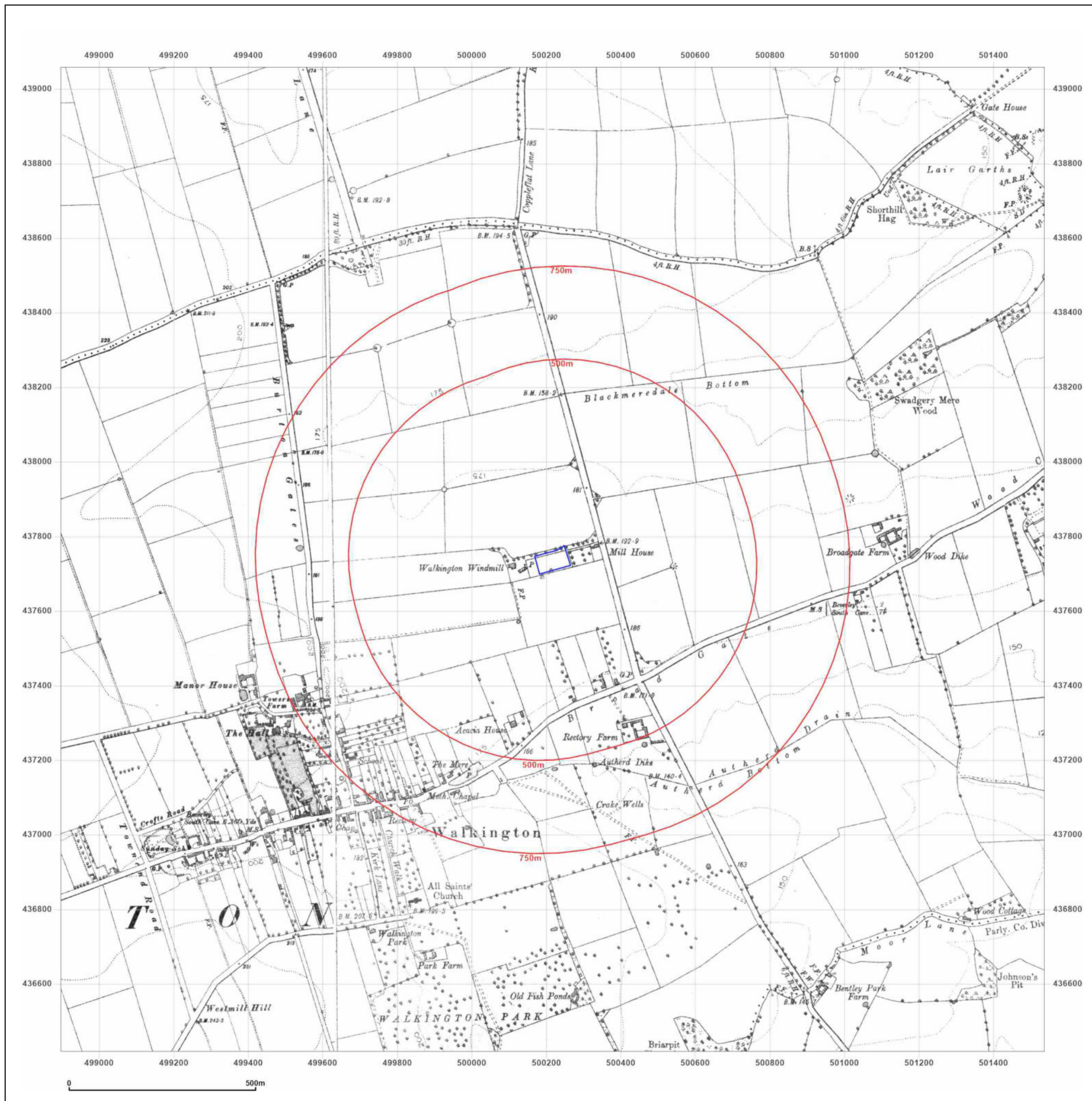


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0 500m

Site Details:

Client Ref: EMS_705957_923009
Report Ref: EMS-705957_923009
Grid Ref: 500216, 437738

Map Name: County Series

Map date: 1908

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1852
 Revised 1908
 Edition N/A
 Copyright N/A
 Levelled N/A

Surveyed 1853
 Revised 1908
 Edition N/A
 Copyright N/A
 Levelled N/A



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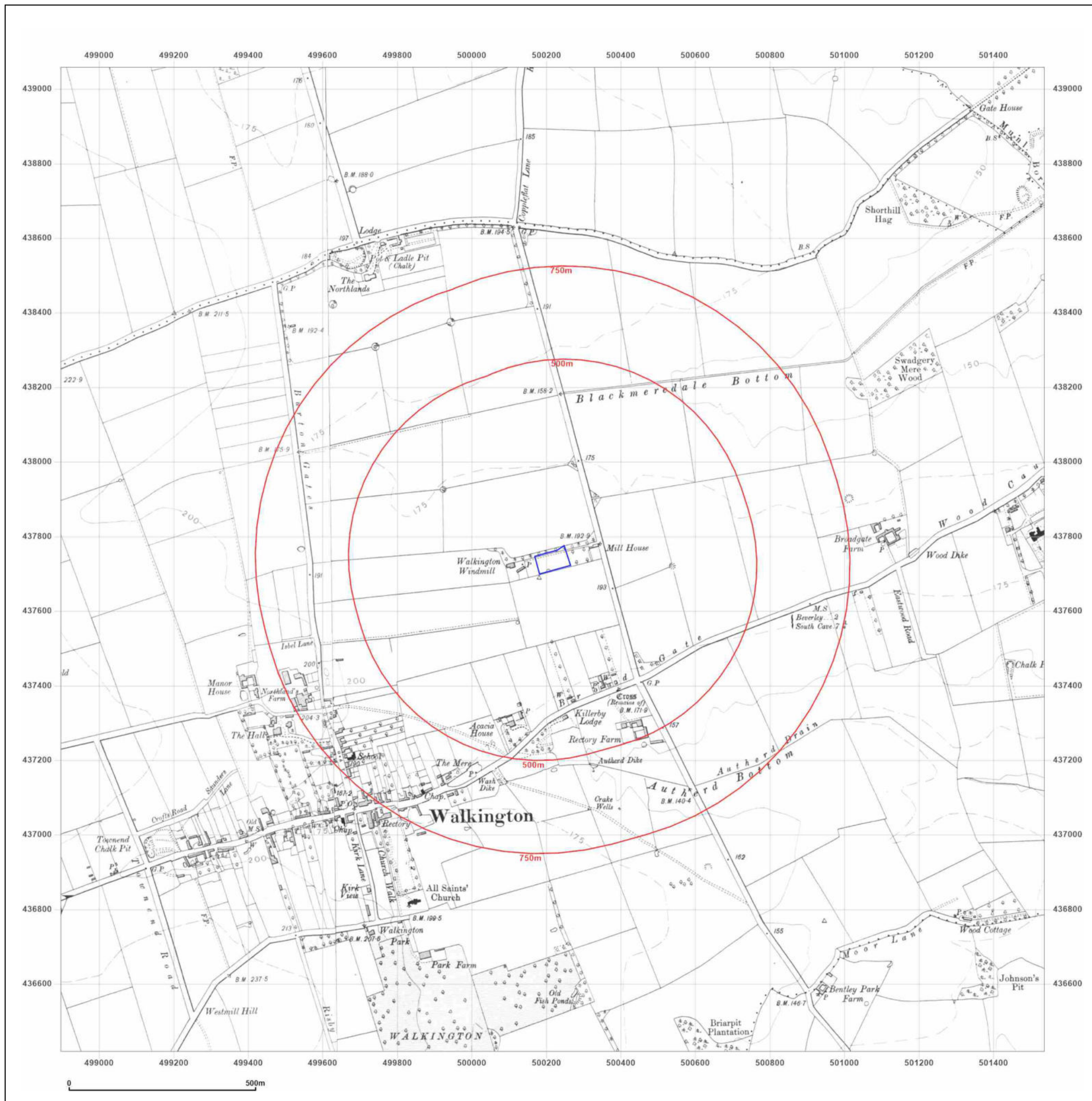


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Site Details:

Client Ref: EMS_705957_923009
Report Ref: EMS-705957_923009
Grid Ref: 500216, 437738

Map Name: County Series

Map date: 1926

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1852
 Revised 1926
 Edition N/A
 Copyright N/A
 Levelled N/A

Surveyed 1853
 Revised 1926
 Edition N/A
 Copyright N/A
 Levelled N/A



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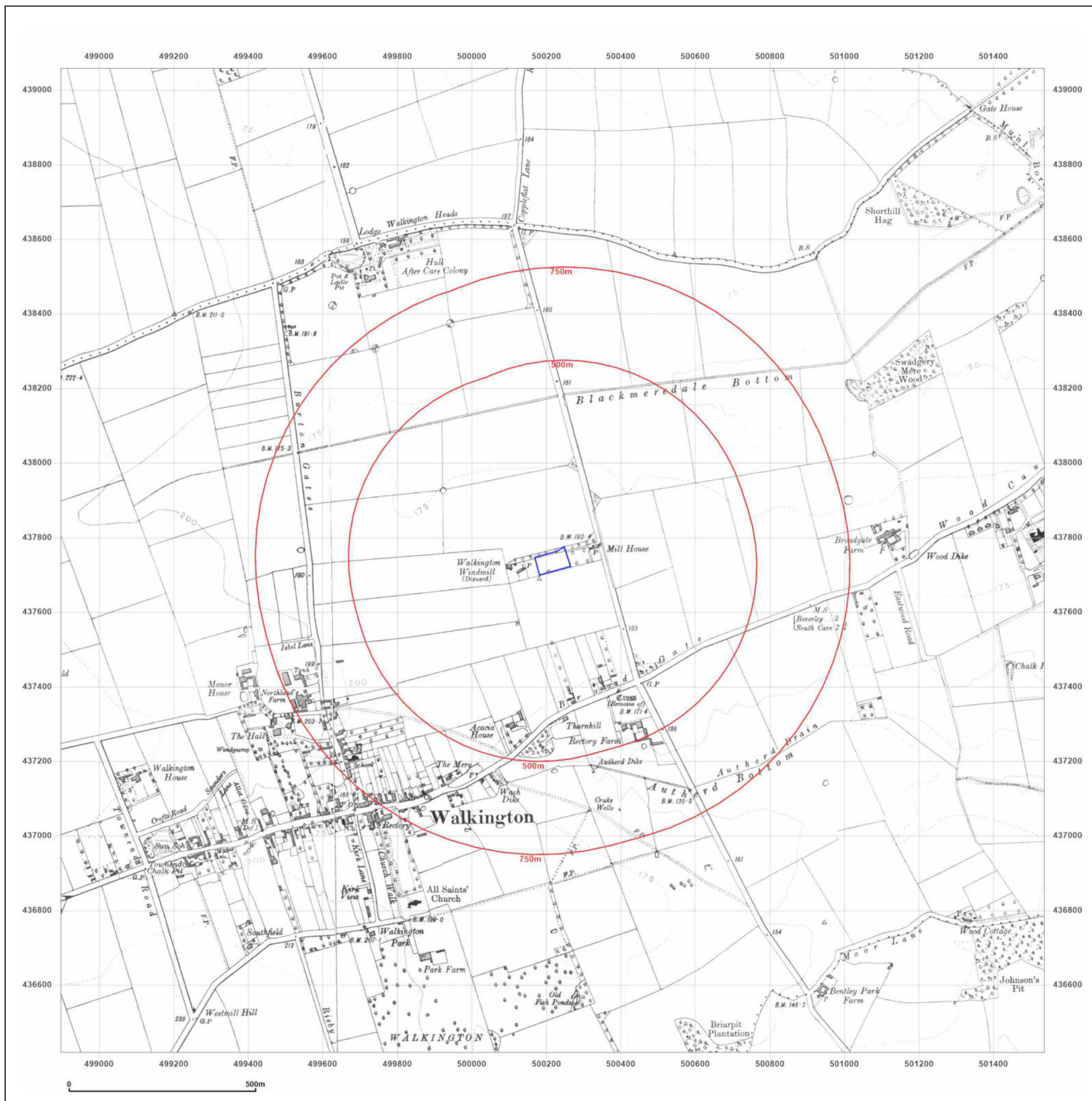


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Site Details:

Client Ref: EMS_705957_923009
Report Ref: EMS-705957_923009
Grid Ref: 500216, 437738

Map Name: County Series

Map date: 1928

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1852
 Revised 1928
 Edition 1928
 Copyright N/A
 Levelled N/A



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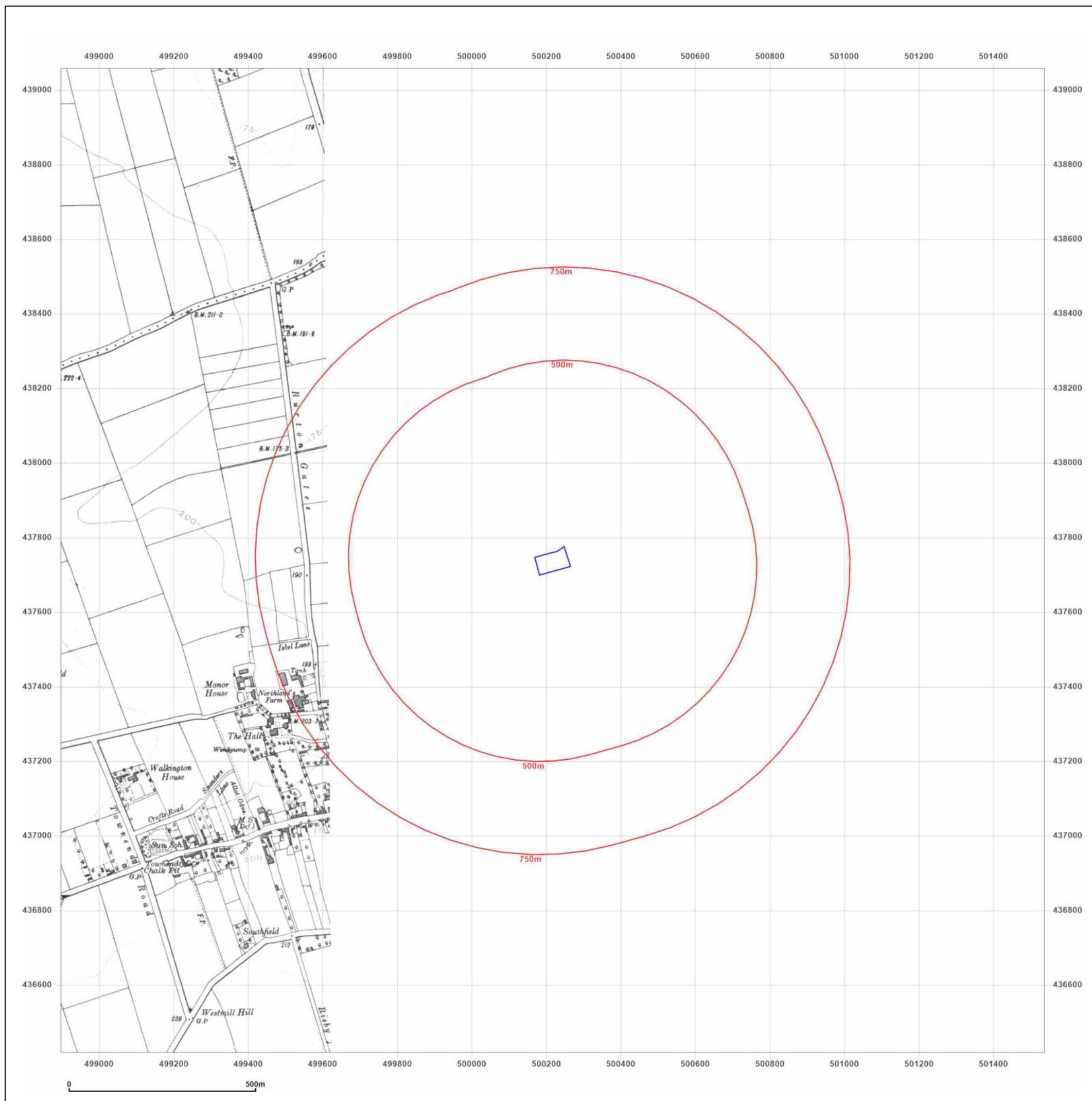


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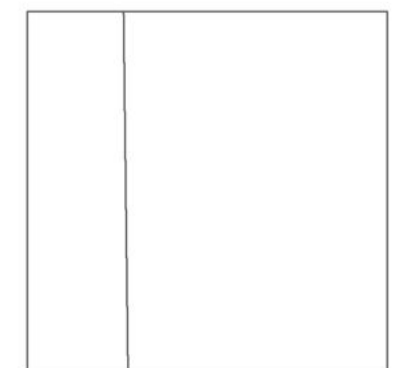
Client Ref: EMS_705957_923009
Report Ref: EMS-705957_923009
Grid Ref: 500216, 437738

Map Name: County Series

Map date: 1938

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1853
 Revised 1938
 Edition 1938
 Copyright N/A
 Levelled N/A



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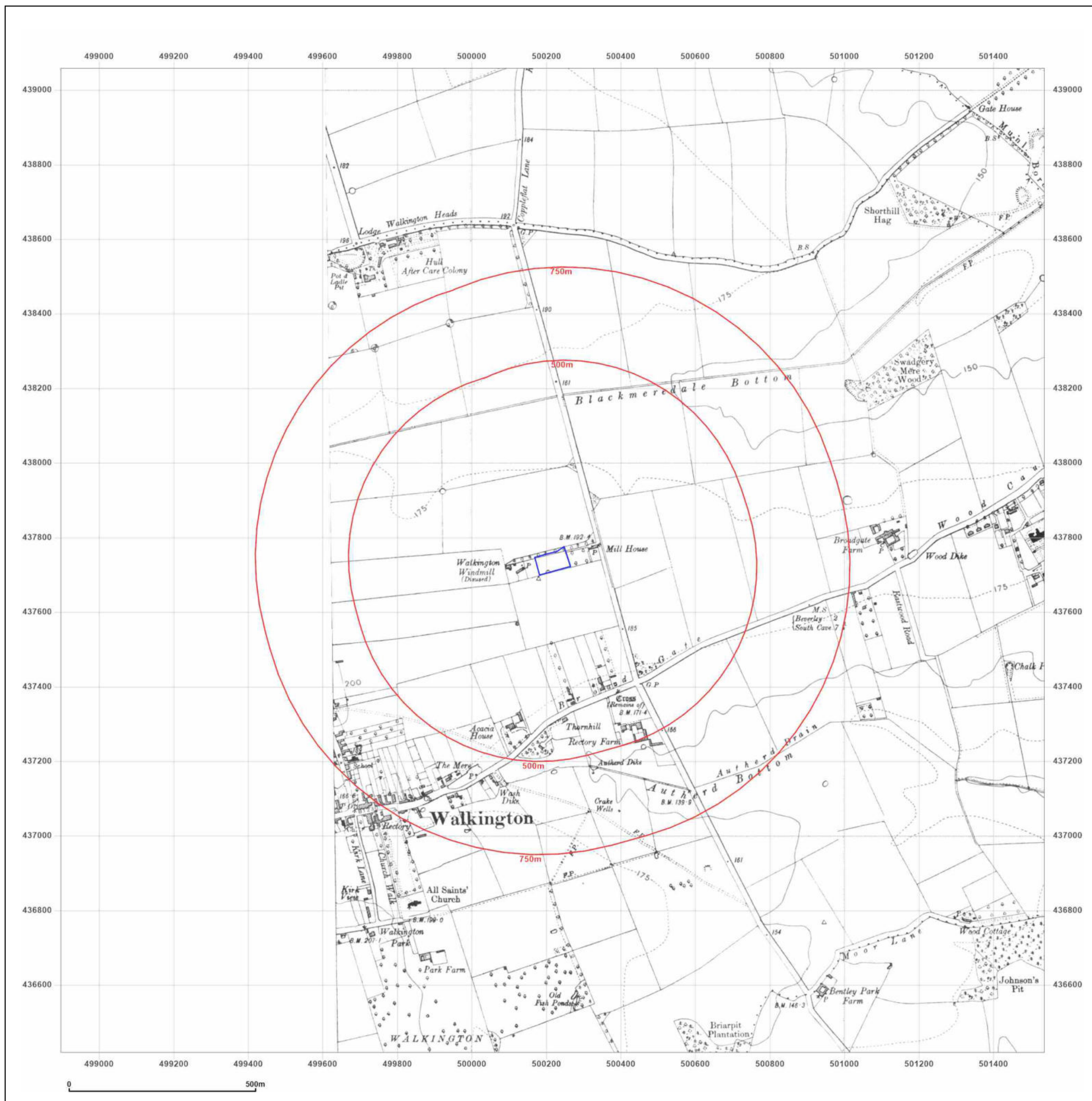


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Site Details:

Client Ref: EMS_705957_923009
Report Ref: EMS-705957_923009
Grid Ref: 500216, 437738

Map Name: County Series

Map date: 1947-1950

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1852
 Revised 1950
 Edition N/A
 Copyright N/A
 Levelled N/A

Surveyed 1853
 Revised 1947
 Edition N/A
 Copyright N/A
 Levelled N/A



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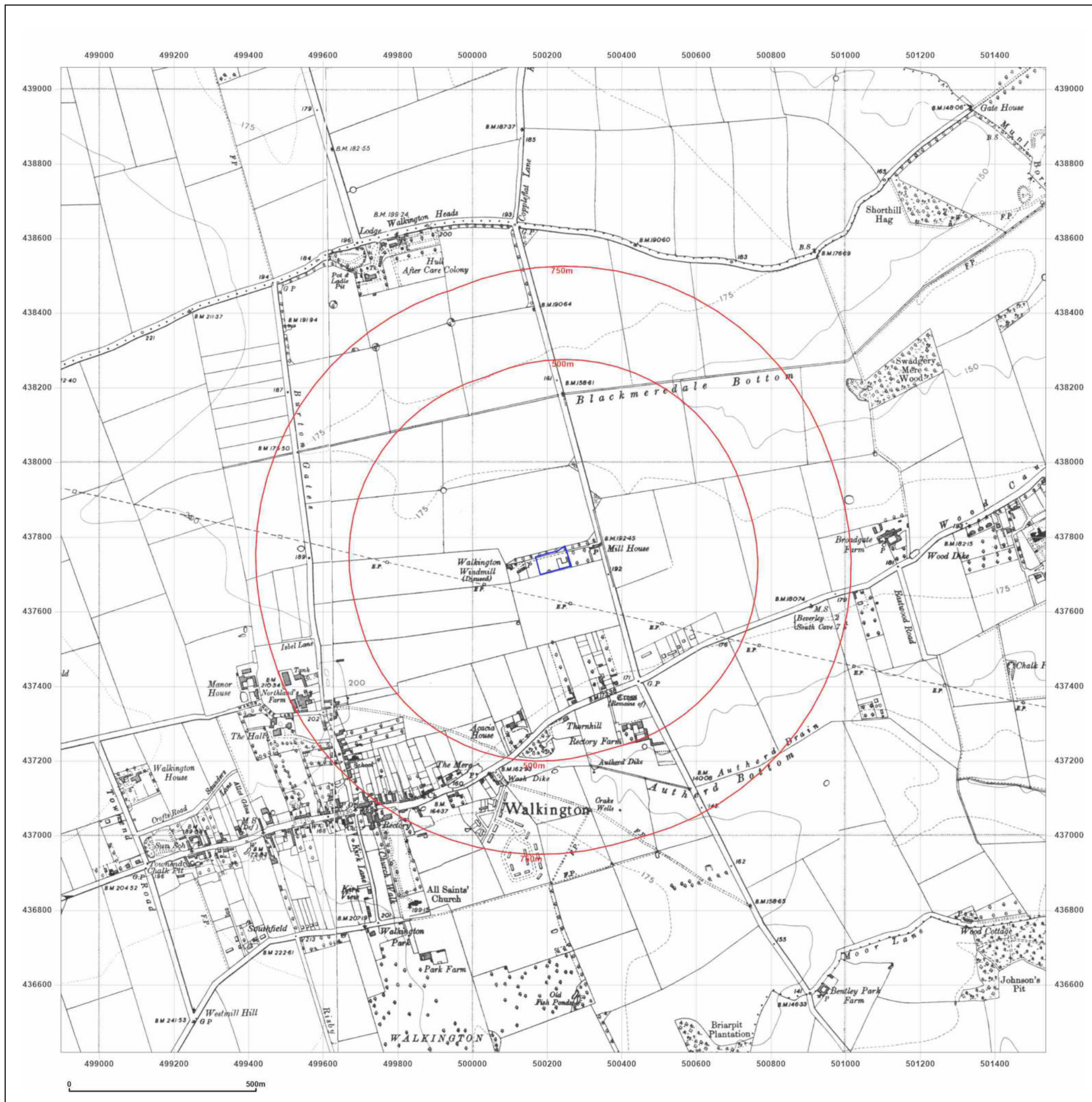


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Site Details:

Client Ref: EMS_705957_923009
Report Ref: EMS-705957_923009
Grid Ref: 500216, 437738

Map Name: Provisional

Map date: 1950-1952

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1950
 Revised 1950
 Edition N/A
 Copyright N/A
 Levelled N/A

Surveyed 1952
 Revised 1952
 Edition N/A
 Copyright N/A
 Levelled N/A



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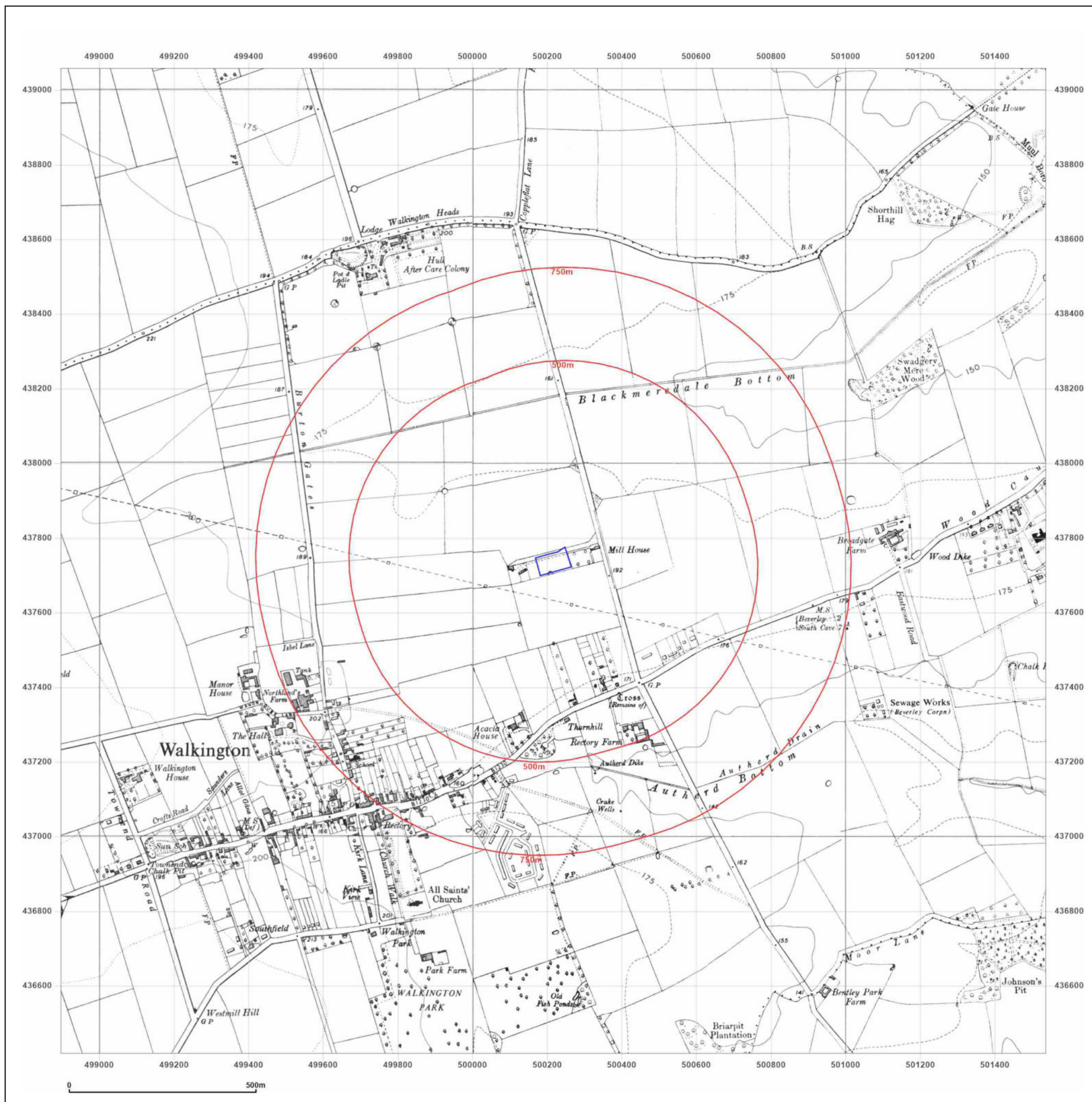


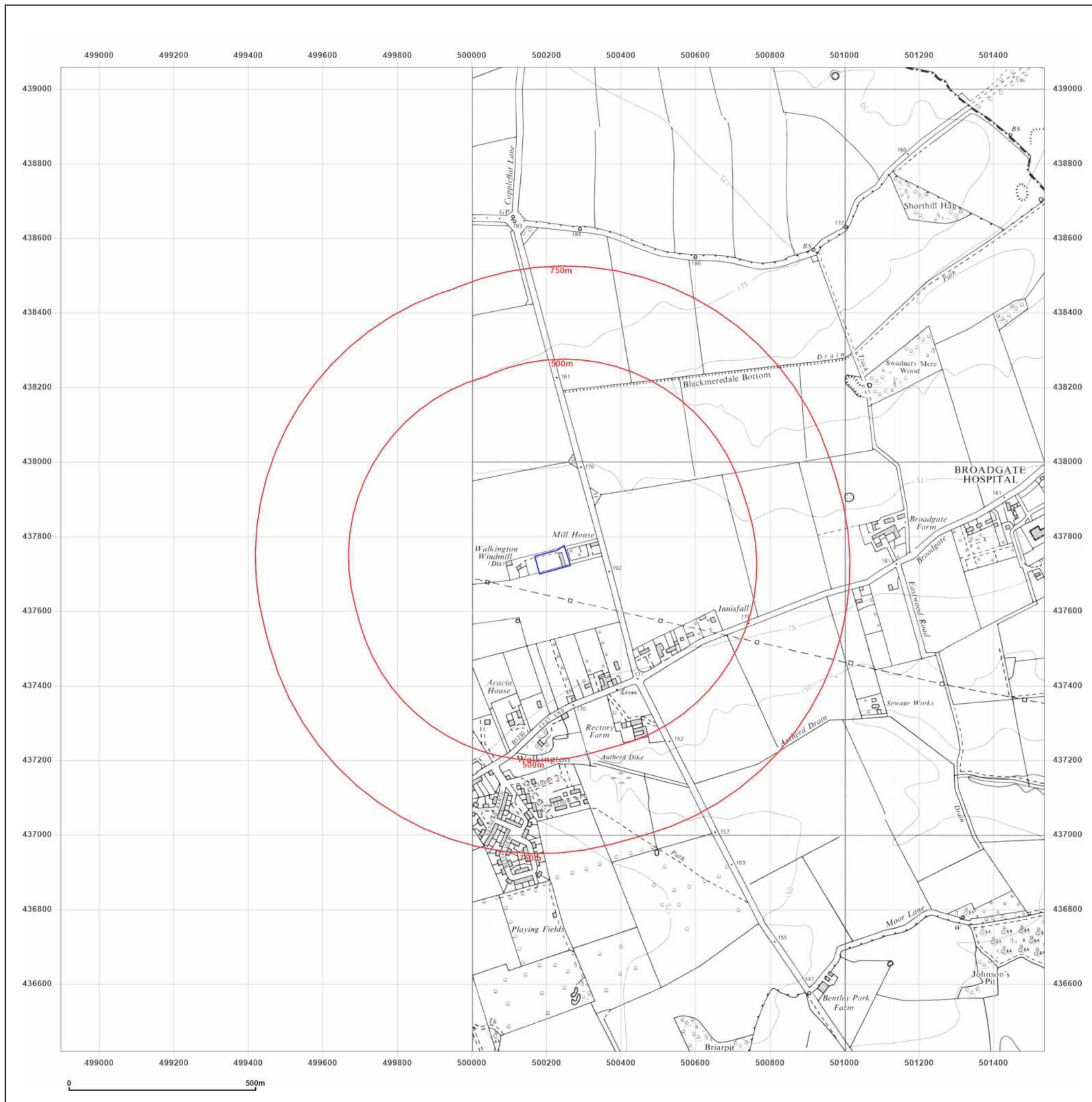
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Site Details:

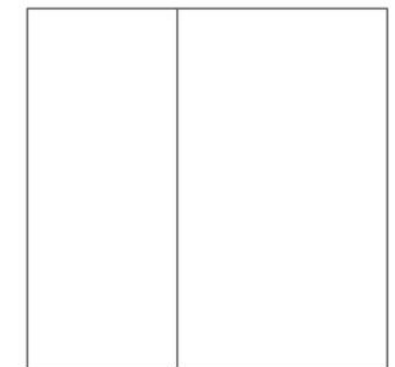
Client Ref: EMS_705957_923009
 Report Ref: EMS-705957_923009
 Grid Ref: 500216, 437738

Map Name: Provisional

Map date: 1970

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1970
 Revised 1970
 Edition N/A
 Copyright N/A
 Levelled N/A



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Site Details:

Client Ref: EMS_705957_923009
Report Ref: EMS-705957_923009
Grid Ref: 500216, 437738

Map Name: National Grid

Map date: 1973

Scale: 1:10,000

Printed at: 1:10,000



Surveyed 1971
 Revised 1973
 Edition N/A
 Copyright N/A
 Levelled N/A



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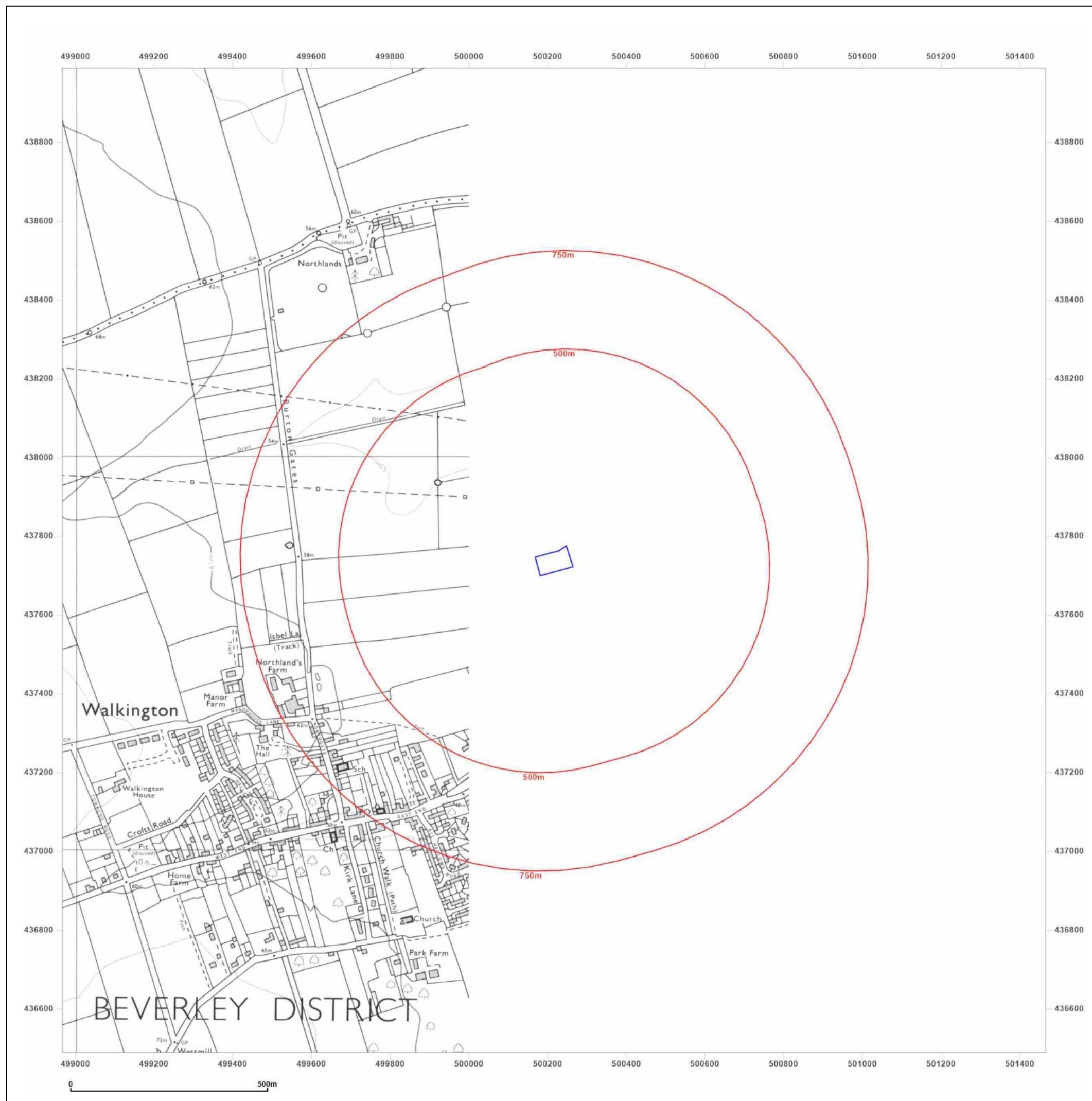


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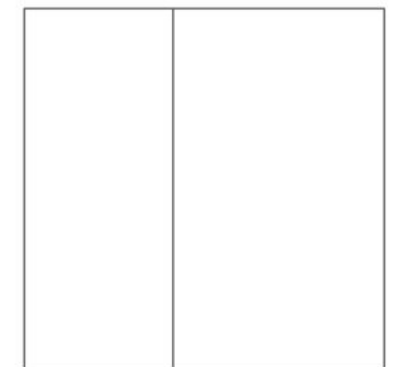
Client Ref: EMS_705957_923009
 Report Ref: EMS-705957_923009
 Grid Ref: 500216, 437738

Map Name: National Grid

Map date: 1981

Scale: 1:10,000

Printed at: 1:10,000



Surveyed 1977
 Revised 1981
 Edition N/A
 Copyright N/A
 Levelled N/A



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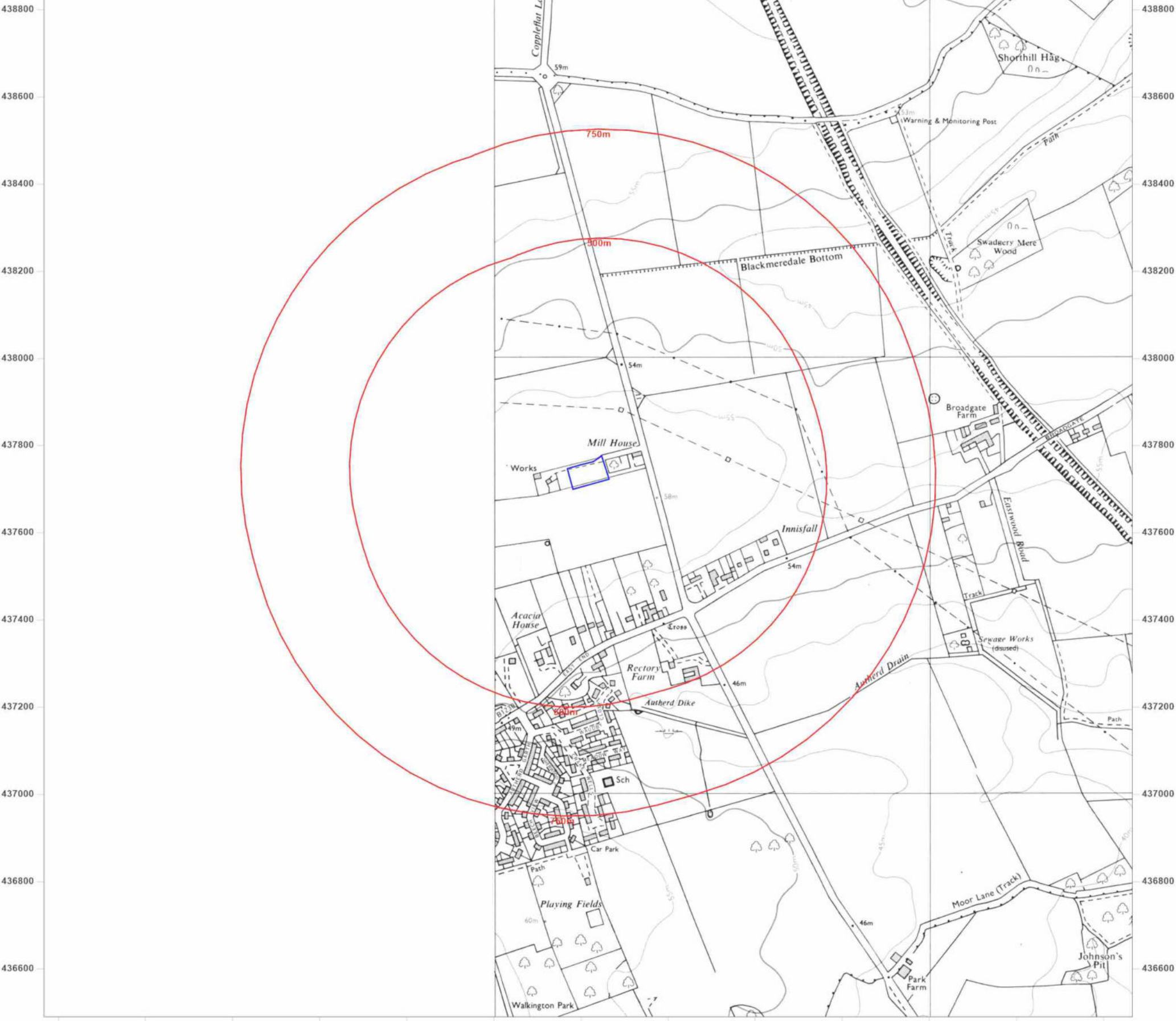
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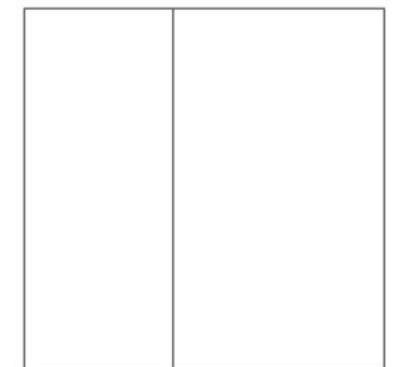
Client Ref: EMS_705957_923009
 Report Ref: EMS-705957_923009
 Grid Ref: 500216, 437738

Map Name: National Grid

Map date: 1992

Scale: 1:10,000

Printed at: 1:10,000



Surveyed 1977
 Revised 1992
 Edition N/A
 Copyright N/A
 Levelled N/A



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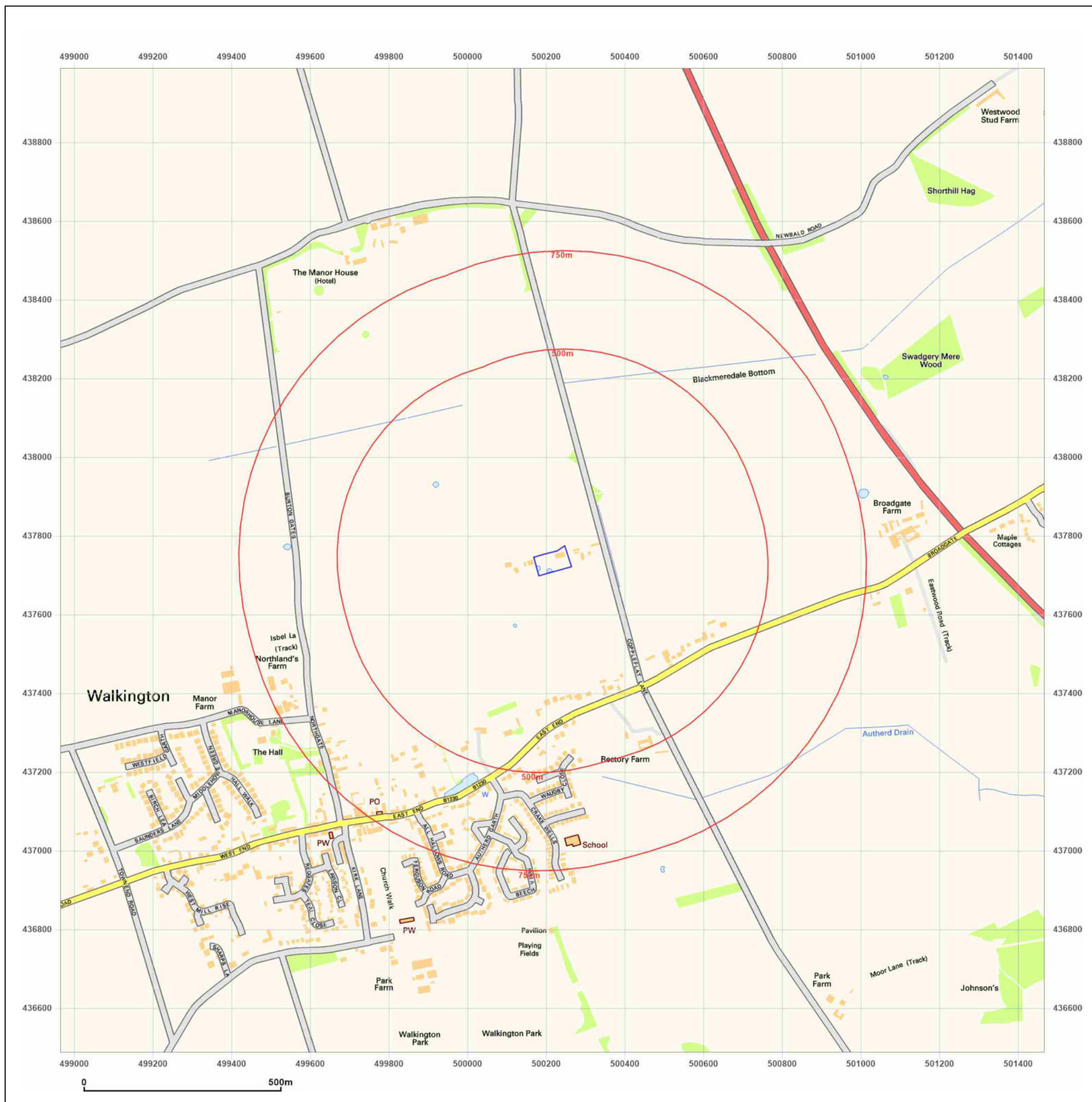
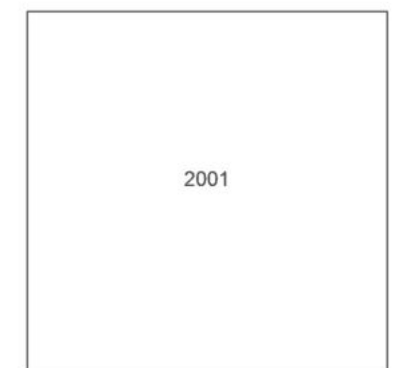
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Report Ref: EMS-705957_923009
Grid Ref: 500216, 437738

Map Name: National Grid

Map date: 2001

Scale: 1:10,000

Printed at: 1:10,000



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Site Details:

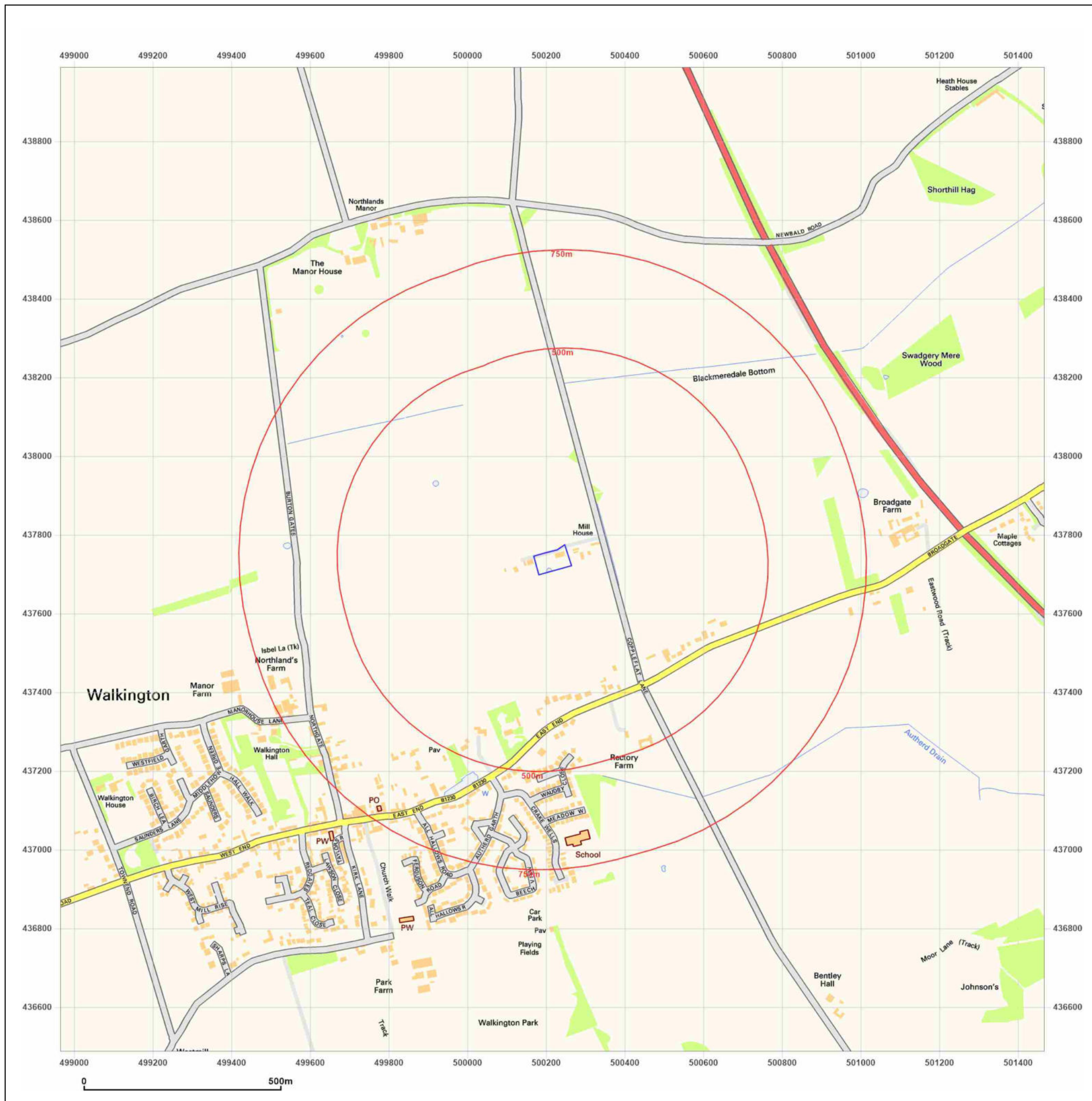
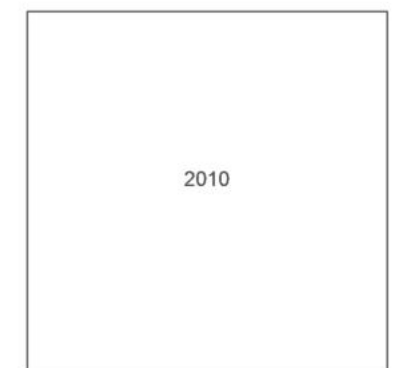
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Report Ref: EMS-705957_923009
Grid Ref: 500216, 437738

Map Name: National Grid

Map date: 2010

Scale: 1:10,000

Printed at: 1:10,000



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Site Details:

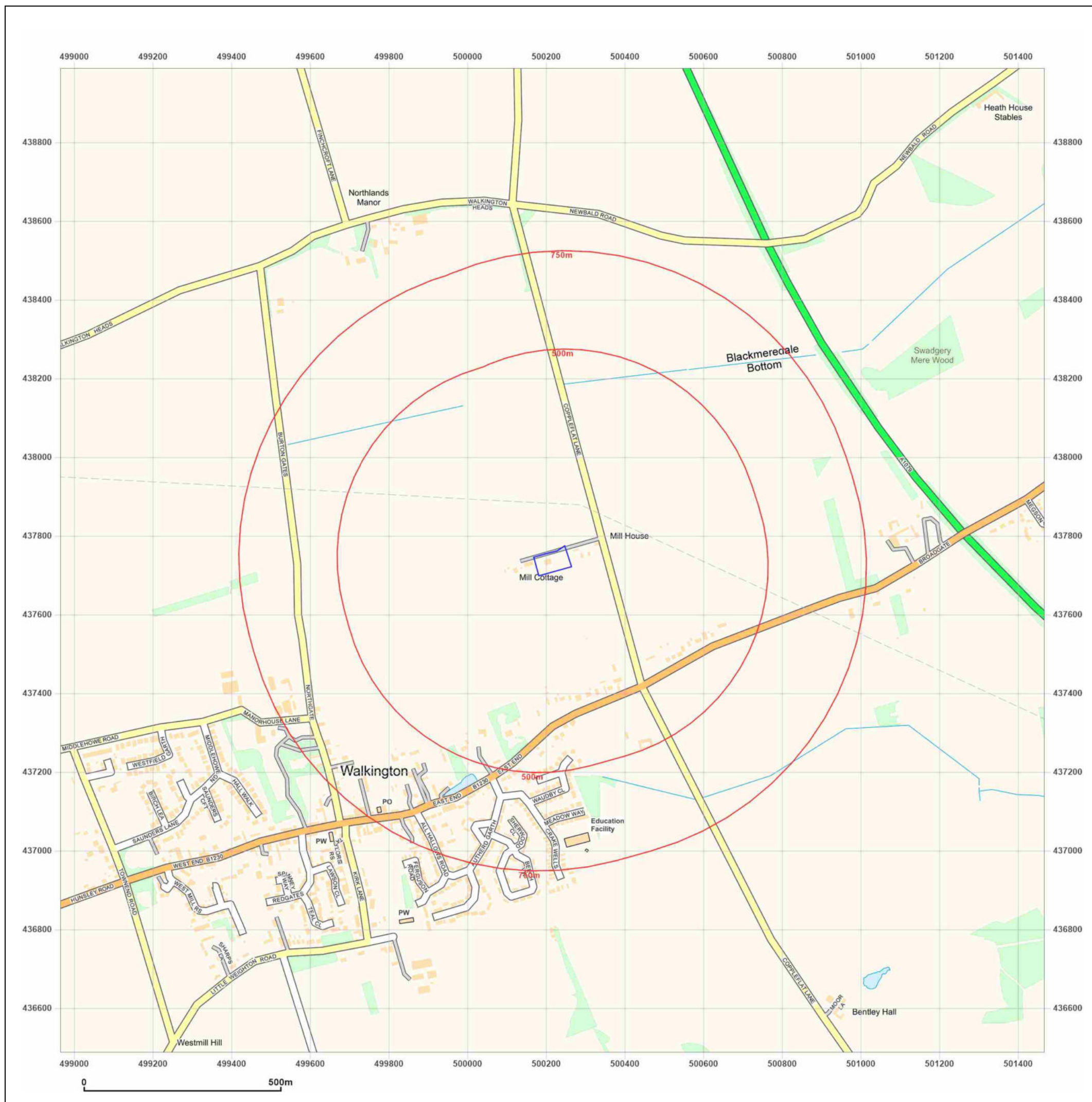
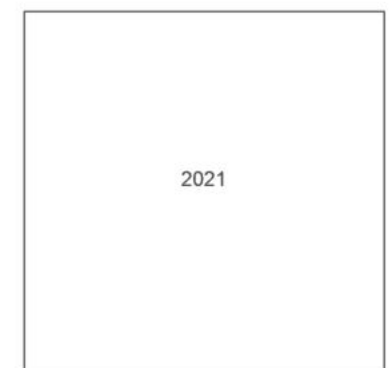
Client Ref: EMS_705957_923009
Report Ref: EMS-705957_923009
Grid Ref: 500216, 437738

Map Name: National Grid

Map date: 2021

Scale: 1:10,000

Printed at: 1:10,000



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Enter the **postcode** where your site is located and then click on the map to extract the site coordinates and related hydrological characteristics.

Alternatively you can directly zoom in the map and click on the exact site location.

Please enter your postcode

e.g. OX4 2JY

Search

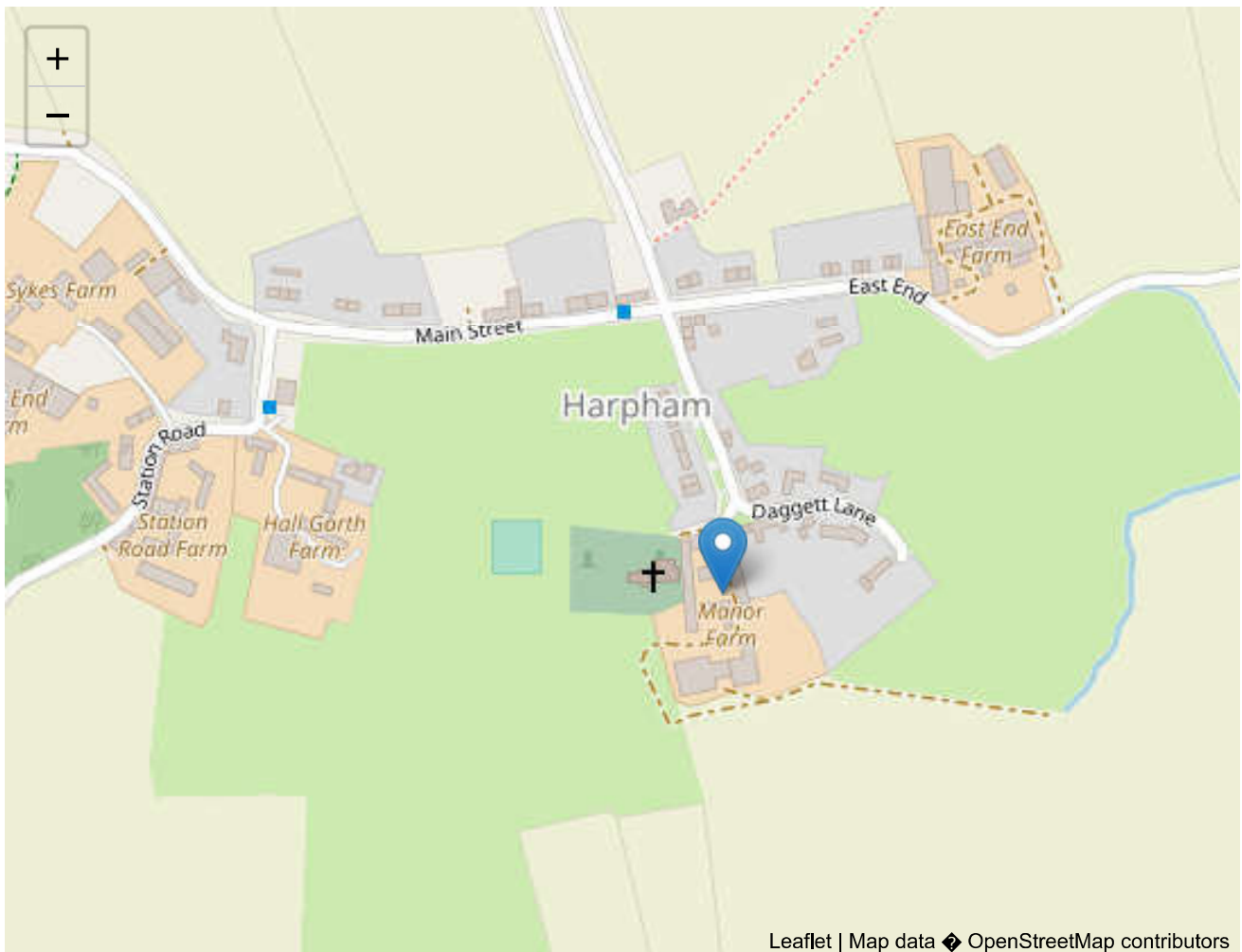
Reset

Site latitude 

54.03854° N

Site longitude 

0.33295° W



Site details

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By clicking the Accept button, you agree to us doing so.

Ok, I agree

More

Site name 

Manor Farm

Site location 

Harpham

Site characteristics

Total site area (ha) 


0.783

Hydrological characteristics

These data come from the click on the map. The values on the left can be edited.

My values

Map values

SAAR (mm) 

651

651

Hydrological region 

3

3

Growth curve factors 

Growth curve factor 1

0.86

0.86

Growth curve factor 30

1.75

1.75

Growth curve factor 100

2.08

2.08

Growth curve factor 200

2.37

2.37

Select method to calculate greenfield runoff rates

IH124

FEH method

IH124 method

IH124 specifically addresses the runoff from small catchments (Institute of Hydrology, 1994). Although shown to be slightly less accurate than more recent FEH based methods, it is still considered to be an acceptable approach for assessing greenfield runoff rates. For more information on the IH124 method, check our FAQ.

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Ok, I agree

More

IH124 By clicking the Accept button, you agree to us doing so.


Derivation of Qbar

The IH124 method estimates Qbar from SPR and SAAR. Alternatively Qbar can be entered manually.

Specify how Qbar should be derived 

Calculate from ξ 

Specify how SPR should be derived 

Calculate from ξ 


Specify SOIL type 

My values	Map values
2 	2
0.3	0.3

SPR 

Results using the IH124 method

Estimated site discharges

Qbar (l/s) 

My values	Map values
1.31	1.3

Greenfield runoff rates

1 in 1 year (l/s)

1.13	1.1
------	-----

1 in 30 years (l/s)

2.29	2.2
------	-----

1 in 100 years (l/s)

2.73	2.7
------	-----

1 in 200 years (l/s)

3.11	3.1
------	-----

Civil Design Calculations

Copas Formula 1 in 30yr Return

22 July 2022

1

1. Copas Formula 1 in 30yr

1.1 Calculate the Required Storage Capacity

Return Rainfall Event (I)	=	30	years	
Restricted Discharge Rate (Q)	=	2.73	litres/ sec	
	=	0.003	m ³ / sec	
Impermeable Area (A _p)	=	1700		
	=	0.170	ha	
Storage Capacity Required (C _{req})	=	58.93	m ³	plus30% 76.61 m ³

1.2 Calculate the Provided Storage Capacity - Option 1: Pipe Network

Pipe Length (L)	=		m	
Pipe Diameter (Ø)	=		mm	
Pipe Capacity (C _{prov})	=	0.00	m ³	(Approx. Pipe)

1.2 Calculate the Provided Storage Capacity - Option 2: Balancing Pond

Storage Depth (d)	=	1500	mm	
Storage Length (L)	=	8	m	
Storage Length (W)	=	7	m	
Capacity (C _{prov})	=	84.00	m ³	(Approx. Pond)

1.3 Design Check

Total Capacity = Option 1 + Option 2

84.00	>	76.61
-------	---	-------

Design OK

∴ Pipe and/or Pond has Sufficient Capacity

Civil Design Calculations

Copas Formula 1 in 100yr Return

22 July 2022

1

1. Copas Formula 1 in 100yr

1.1 Calculate the Required Storage Capacity

Return Rainfall Event (I)	=	100	years
Restricted Discharge Rate (Q)	=	2.73	litres/ sec
	=	0.003	m ³ / sec
Impermeable Area (A _p)	=	1700	
	=	0.170	ha
Storage Capacity Required (C _{req})	=	107.59	m ³ plus 30% 139.87 m ³

1.2 Calculate the Provided Storage Capacity - Option 1: Pipe Network

Pipe Length (L)	=		m
Pipe Diameter (Ø)	=		mm
Pipe Capacity (C _{prov})	=	0.00	m ³ (Approx. Pipe)

1.2 Calculate the Provided Storage Capacity - Option 2: Balancing Pond

Storage Depth (d)	=	1500	mm
Storage Length (L)	=	10	m
Storage Length (W)	=	10	m
Capacity (C _{prov})	=	150.00	m ³ (Approx. Pond)

1.3 Design Check

Total Capacity = Option 1 + Option 2

150.00	>	139.87	Design OK
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∴ Pipe and/or Pond has Sufficient Capacity