



Hamson Barron Smith



HBS

Land off Billingley View, Bolton Upon Dearne Preliminary Land Contamination and Geotechnical Risk Assessment



On behalf of Barnsley Metropolitan Borough Council

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Executive Summary

SITE INFORMATION	
Client	Barnsley Metropolitan Borough Council.
Site	Land off Billingley View.
Location	Billingley View, Bolton Upon Dearne, S63 8BP. NGR 444631, 403001.
Approximate area	0.45Ha
Topography	Slight fall from 44m OD in the south to 40m OD in the north.
Current land use	Grazing land for horses.
Proposed development	Low rise residential.

SITE SETTING	
Geology	Mexborough Rock (sandstone). No superficial deposits shown.
Radon	No radon protective measures are required.
Hydrogeology	Secondary A Aquifer. The site does not lie in a source protection zone.
Hydrology	No surface water within 250m of the site.
Landfill sites	No landfills located within 250m of the site.
History	The site comprises an area of undeveloped land. Originally, it was part of a larger agricultural field. More recently, the site has been partitioned off and is utilised for the grazing of horses.
Previous site investigations	HBS have not been made aware of any previous investigations at this site.
Anticipated ground conditions	Sandstone bedrock at shallow depth. Depth to groundwater is unknown.

GEOTECHNICAL	
Foundations	Shallow spread foundations should be suitable. Bearing capacity to be determined from site investigation, but is likely to be sufficient for conventional low rise structures.
Shrinkable soils	Soils are likely to be non shrinkable.
Buried concrete	Significant concrete protection measures unlikely to be required.
Floor slabs	Ground bearing floor slab may be suitable.
Slope stability	Site falls gently to the north. Current gradients are considered generally stable but careful assessment of changes of elevation or construction near existing slopes would still be needed.
Pavement	CBR values likely to be adequate for road and car park construction.
Soakaways	Underlying geology may be suitable for soakaway drainage, subject to full scale testing to confirm and calculate infiltration rates.
Natural cavities	None expected.
Mining	Shallow coal mining is considered to be unlikely.

CONTAMINATION	
Human health	No significant sources of contamination identified. Risks to human health are low.
Controlled waters	No significant sources of contamination identified. Risks to controlled water are considered low.
Gas protection	No significant sources of ground gas identified. Risks are considered low and gas protection is subject to investigation unlikely to be required. . No radon protective measures are required.
Water supply pipes	No significant risks identified, standard pipework likely to be suitable.

1 Introduction

In July 2019, Hamson Barron Smith (HBS) was commissioned by Barnsley Metropolitan Borough Council to undertake a Preliminary Land Contamination and Geotechnical Risk Assessment at Land off Billingley View, Bolton Upon Dearne for the proposed redevelopment of the site.

The site comprises land currently used for grazing of horses. The location of the site is shown on Figure 1. A site topographic survey is included in Appendix A.

It is understood that the site is being considered for residential redevelopment. A provisional development layout has been provided by NPS Barnsley (reference drawing number 19-01-1080-PL-A-03 dated March 2019) and is presented in Appendix B.

1.1 Project Requirements

The purpose of this Phase 1 assessment is to determine the potential risks from contamination and to identify potential geotechnical risks and constraints.

The objectives of the Phase 1 report are to:

- Establish the environmental setting, including sensitivity in relation to human health, surface water, groundwater and ecological receptors.
- Review historical and recent land uses to assess the potential for contamination to be present from past and current land-use.
- Qualitatively assess the potential nature and extent of contamination from those uses and the environmental risks and liabilities that may be posed to the identified receptors (human health and the environment).
- Assess any potential geotechnical risks including mining risk.

1.2 Information Sources

During the production of this report the following sources have been reviewed:

- An EnviroInsight Report prepared by Groundsure (Report Number GS6173259 dated 16th July 2019).

- A GeoInsight Report prepared by Groundsure (Report Number GS6173260 dated 16th July 2019).
- A CON29M Coal Mining Report prepared by The Coal Authority (Report Number 51002155873001 dated 16th July 2019).
- Historic Ordnance Survey maps.
- British Geological Survey maps.
- British Geological Survey borehole records.
- Environment Agency landfill records.
- Environment Agency groundwater data.

1.3 Previous Investigations

HBS has not been made aware of any previous investigations at this site.

2 Site Location

Address: Land off Billingley View, Bolton Upon Dearne.

Post Code: S63 8BP.

National Grid Reference: 444631, 403001.

The site location is shown on Figure 1 and a more detailed plan on Figure 2.

Full details of the site's features and land use are presented in Section 3.

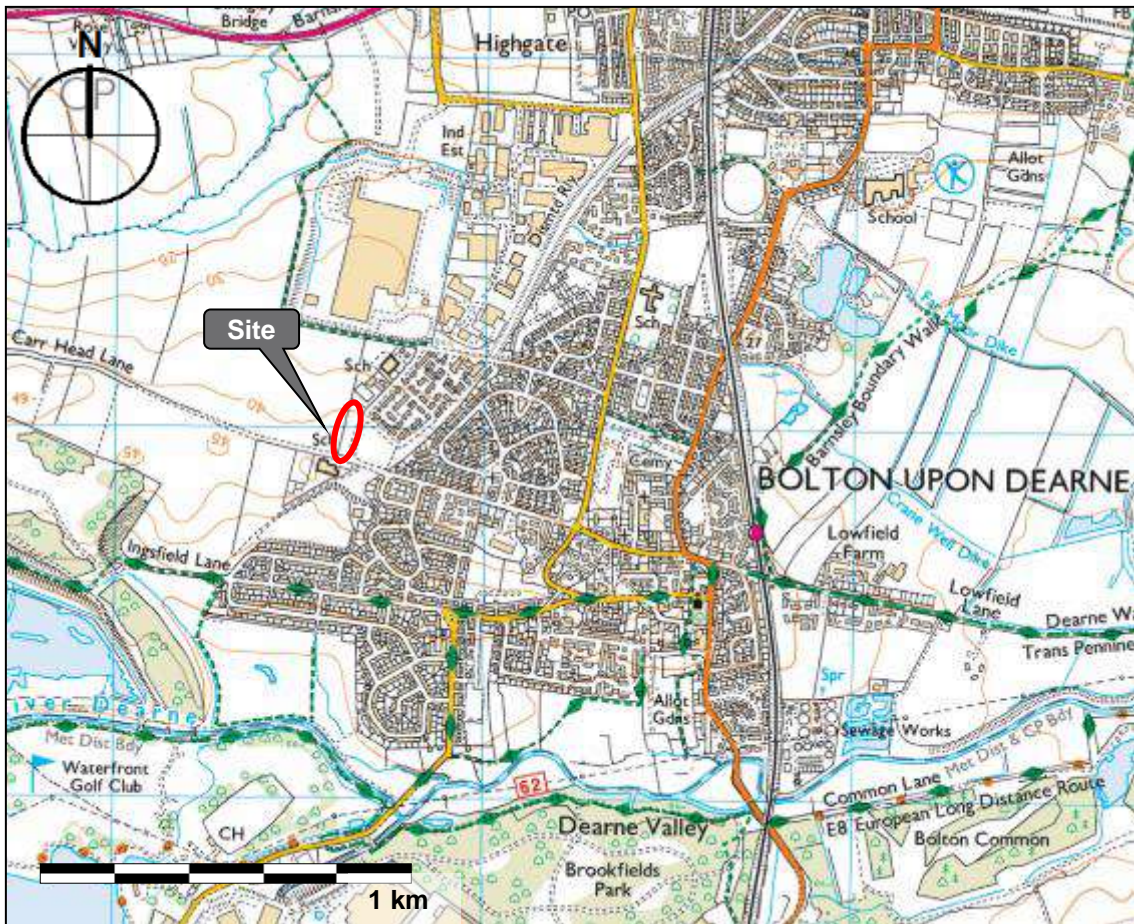


Figure 1 Site location plan

3 Site Description

The site is located to the west of Billingley View located on the western edge of Bolton Upon Dearne. The site occupies an area of 0.45Ha and there is a slight fall in topography from 44.5m in the south to 40.2m in the north.

Access to the site is gained from the north east off Billingley View and to the south off Carr Head Lane. The site comprises an area of rough pasture which is utilised for the grazing of horses. The site has been portioned into a series of small fields. There is a small stable building made of corrugated iron in the north.

There are small ditches running south along the western and eastern boundaries of the site.

3.1 Adjacent land Use

The site is bounded to the north by Heather Garth Primary School, to the west by an agricultural field, to the south by Lacewood primary school and to the east by public open space.

Figure 2 shows the site setting.

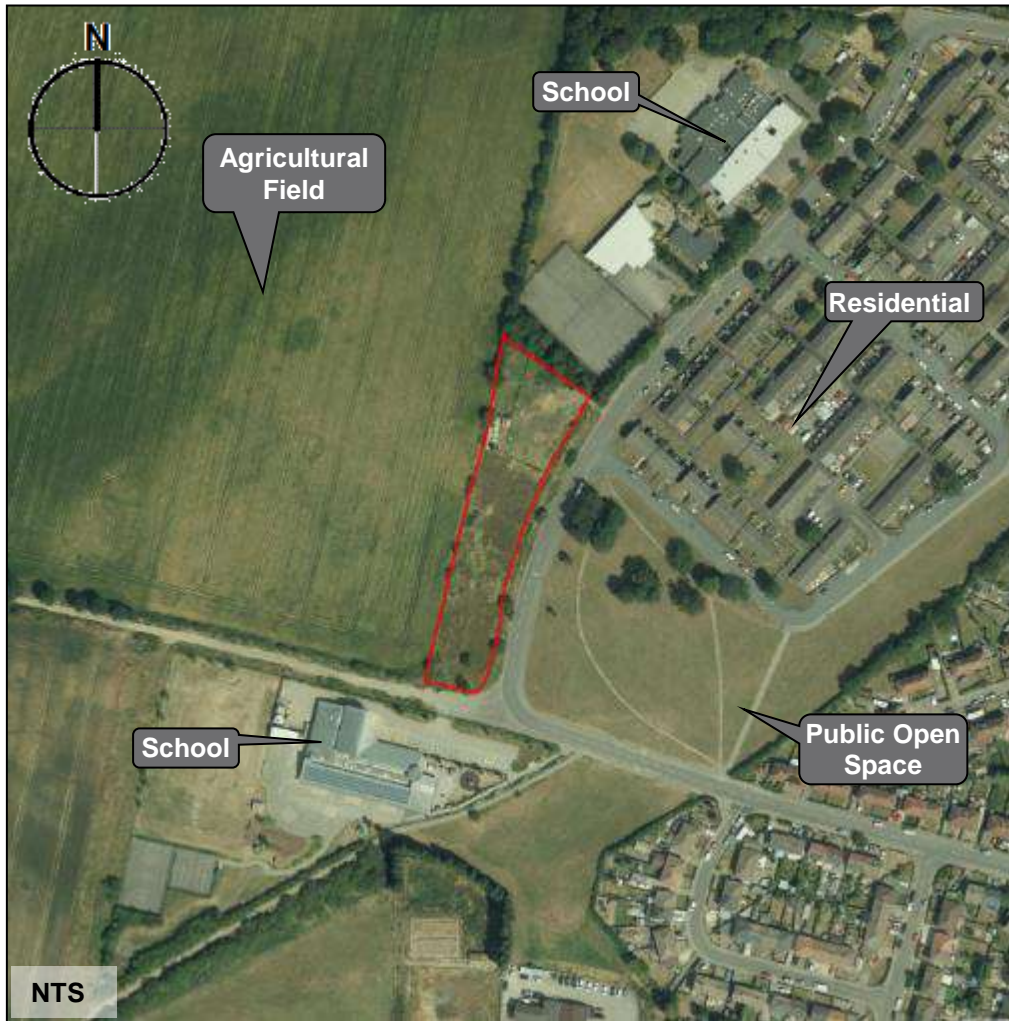


Figure 2 Site layout

3.2 Photographs

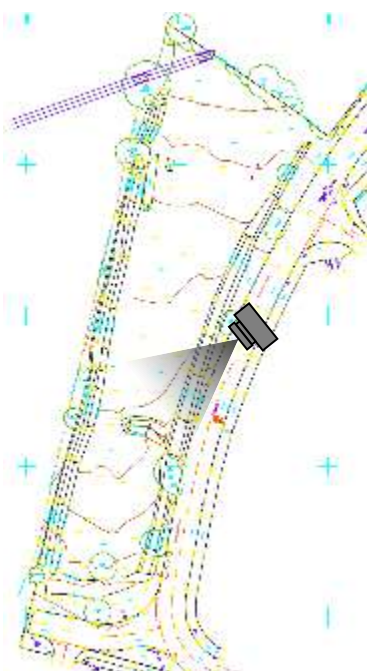


Photograph 1 The southern access into the site from Carr Head Lane, looking north.



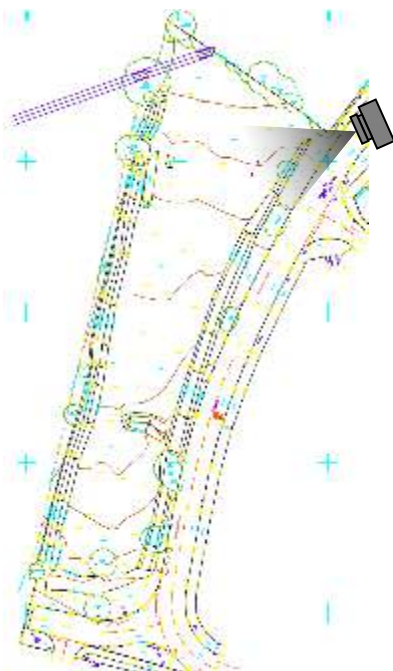


Photograph 2 The central area of the site, looking south west.





Photograph 3 The northern access road into the site from Billingley View, looking south west.



4 Environmental Setting

4.1 Geology

The 1:50,000 scale British Geological Survey (BGS) geological mapping indicates the site to be underlain the bedrock geology of Mexborough Rock, a sandstone flag of the Pennine Middle Coal Measures Formation. No superficial deposits are shown. Infilled ground is marked 60m to the south east.

The Pennine Middle Coal Measures Formation is described by the BGS as “*Interbedded grey mudstone, siltstone, pale grey sandstone and commonly coal seams*”.

There is an east west trending fault (Darfield Fault) present circa 95m south of the site. The site lies in the down thrown side of the fault. There are no coal seams marked on the 1:50,000 mapping. The 1:10,000 mapping shows a localised coal seam outcropping circa 75m south.

The closest borehole record (Ref: SE40SW438) lies approximately 25m to the north of the site (elevation of 37.2m OD) proved the following sequence:

- *Topsoil* to 0.30m bgl (36.90m OD)
- *Firm light yellow brown very sandy stoney clay roots* to 0.50m bgl (36.70m OD)
- *Pale yellow and brown medium grained highly weathered sandstone* to 2.00m bgl (35.206m OD)

The natural strata encountered in this borehole are considered to be the Mexborough Rock. The sequence encountered is expected to be similar to that beneath the site.

4.2 Soil Geochemistry

The BGS “Normal Background Concentrations of Contaminants in English Soils” included as part of the Groundsure GeolInsight report indicates the typical estimated concentrations of each determinant in topsoil in the locality of the site, as summarised in Table 1.

Table 1: Summary of BGS Estimated Soil Geochemistry

Determinant	Concentration Range (mg/kg)
Arsenic	15 – 25
Cadmium	<1.8
Chromium	60 – 90
Lead	<100
Nickel	15 – 30

4.3 Hydrogeology

The Environment Agency classifies the Mexborough Rock at the site to be Secondary A Aquifer. The site does not lie within a Source Protection Zone.

The depth to groundwater is not known. The BGS borehole indicated no groundwater to the base of the hole at 2.00m bgl.

It is considered that groundwater would be of moderate sensitivity to any potential on site sources of contamination.

4.4 Hydrology

No surface water lies within 250m of the site. Surface water is therefore considered to be of low sensitivity to any potential on site sources of contamination.

4.5 Landfill Sites

No recorded current or historical landfills are known to exist within 250m of the site. No organic soils, evidence of buried biodegradable materials or other potential sources of ground gas are anticipated on the site.

4.6 Radon

The Groundsure GeoInsight report states that the site is in an area where the estimated probability of homes being above the action level of 200Bqm⁻³ is between 1% and 5%. Therefore, no radon protective measures are required in the construction of new buildings.

Confirmation of any protection measures should be agreed with the local authority building control and / or warranty provider.

4.7 Statutory Authority Records

A review of public registers contained within the Groundsure EnviroInsight report has been undertaken. These entries relate to trade directories, pollution control registers, hazardous sites, enforcement notices etc. None of the entries are considered to be of relevance to the, for full details of all entries, reference should be made to the EnviroInsight report in Appendix D.

4.8 Sensitive Land Uses and Designated Areas

The sites lies within a Nitrate Vulnerable Zone and within the Liverpool, Manchester and West Yorkshire Greenbelt.

4.9 Land Use History

The historical land uses of the site and its surrounding area have been established from superseded editions of Ordnance Survey maps and are detailed in Table 2.

Copies of the maps are included in Appendix C.

Table 2: Summary of Historical Maps

Date	On Site	Offsite
1850-1854	The site is part of a larger undeveloped agricultural field.	The general surrounding land use agricultural, with Carr Head Lane present immediately south of the site.
1890-1892	No significant changes are evident.	No significant changes are evident.
1901-1906	No significant changes are evident.	A railway line (in cutting) lies c.50m south east
1929-1930	No significant changes are evident.	Wath brickworks lies c.95m+ south of the site.
1938-1939	No significant changes are evident.	No significant changes are evident.
1948-1951	No significant changes are evident.	By 1951, the brickworks is no longer marked.
1961-1967	No significant changes are evident.	The railway line is marked as dismantled. A new residential estate has been constructed to the east of the railway line. The former brickworks is marked as a recreational ground.
1973-1978	No significant changes are evident.	Residential housing has been constructed to the north east. The railway line appears to have been infilled and landscaped. A sports and social club has been constructed on the former brickworks site. By 1978 the school has been constructed to the north,

Date	On Site	Offsite
1988	No significant changes are evident.	No significant changes are evident.
1993-1994	No significant changes are evident.	No significant changes are evident.
2002	No significant changes are evident.	No significant changes are evident.
2010	No significant changes are evident.	A primary school has been constructed to the south.
2014	No significant changes are evident.	No significant changes are evident.

4.9.1 Summary of Development History

On site

The site comprises an area of undeveloped land. Originally, it was part of a larger agricultural field. More recently, the site has been partitioned off and is utilised for the grazing of horses.

Off Site

The surrounding land use was typically undeveloped farmland becoming a mixture of agricultural land. A railway line was present in a cutting circa 50m south east from the early 1900s until the 1960s. The cutting appears to have been infilled in the 1970s; the materials used to infill the cutting are unknown.

A former brickworks, including clay pit was located >95m south of the site from the 1920s until the 1960s when the clay pit was infilled and the land converted to a recreational ground. The material used to infill the clay pit are unknown.

5 Geotechnical Assessment

The 1:50,000 scale British Geological Survey (BGS) geological mapping indicates the site to be underlain by superficial deposits comprising None (clay, silt, sand and gravel) overlying the bedrock geology of Mexborough Rock.

An assessment of potential geotechnical risks based on the information from the Groundsure GeoInsight Report and available geological information is presented in the following sections. The risks are summarised in Table 4. The Groundsure GeoInsight Report is reproduced in Appendix E.

5.1 Deep Made Ground

It is possible that limited Made Ground would be present in the location of the stables. Deep Made Ground resulting from infilling or significant raising of levels is considered unlikely however.

5.2 Buried Structures

Foundations associated with the stables may be present.

5.3 Compressible Soils

The Groundsure GeoInsight report states that the Compressible Ground risk at the site is “negligible”. Based on the expected geology, compressible soils are not anticipated.

5.4 Shrinking / Swelling Clay

The Groundsure GeoInsight report states that the Shrinking or Swelling Clay risk at the site is “negligible”. Based on the expected geology shrinkable clays are not anticipated.

5.5 Collapsible soils

The Groundsure GeoInsight report states that the Collapsible Ground risk at the site is “very low”. Based on the anticipated ground conditions, collapsible soils are not expected.

5.6 Aggressive Ground Conditions for Concrete

Based on the published geology, the anticipated soils are not expected to contain significantly elevated concentrations of soluble sulphates or pyritic materials which may oxidise to form soluble sulphates.

5.7 Running Sands / Excavation Instability

The Groundsure GeoInsight report states that the Running Sand risk at the site is “negligible”. Based on the anticipated ground conditions, running sands are not expected.

5.8 Groundwater

The depth to groundwater is unknown. Historical BGS boreholes located immediately north of the site were recorded as dry to 2.0m bgl.

5.9 Slope Stability

The site slopes very gently to the north with a fall of circa 4m over the length of the site. Provided no significant alterations to the site’s topography are made no issues with stability are anticipated. Any proposed slopes or temporary cutting for retaining systems should be carefully assessed however.

5.10 Solution Features / Natural Cavities

The site is expected to be underlain by sandstone of the Mexborough Rock which is not prone to dissolution.

The Groundsure GeoInsight report states that the Ground Dissolution risk at the site is “negligible” and no solution features are recorded within 1km.

5.11 Underground Mining

The GeoInsight report states that the site is within an area affected by coal mining. A Coal Authority Mining Report was obtained by HBS, this report confirmed:

- The property is in the likely zone of influence from workings in four seams of coal at 220m to 650m depth, and last worked in 1950. Any movement due to coal mining activity associated with these workings should have ceased.
- There are no known mine entries on or within 20m of the site.
- The Authority is not aware of any evidence of damage arising due to geological faults or other lines of weakness that have been affected by coal mining.
- The property is not within the boundary of an opencast site from which coal has been removed by opencast methods.
- There are no coal mining subsidence claims within 50 metres of the property boundary.
- There is no record of a mine gas emission requiring action by the Coal Authority within the boundary of the property.

Published geology indicates that there are no outcropping coal seams in the vicinity of the site.

The Coal Authority interactive mapping indicates the site does not lie within a Development High Risk Area and that no possible or probable shallow coal mine workings are anticipated beneath the site.

Given the presence of the sandstone flag beneath the site and the above review, it is considered that the shallow coal workings are unlikely to be present beneath the site.

The Coal Authority Report is presented in Appendix F.

6 Contamination Risk Assessment

6.1 Legislative Background

The primary legislative mechanism for contaminated land management in the UK is Part 2A of the Environmental Protection Act, 1990 (EPA). Part 2A was introduced into the EPA under Section 57 of the Environment Act 1995 to help deal with the substantial legacy of land contamination. Local authorities are the principal regulator for inspection of land under Part 2A. In England, Part 2A is described fully in DEFRA Circular 01/2006, which also contains the statutory guidance (DEFRA, 2006). Part 2A defines contaminated land as:

‘...any land which appears to the Local Authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land, that

- a. significant harm is being caused or there is a significant possibility of such harm being caused; or*
- b. Pollution of controlled waters is being, or is likely to be, caused.’*

In applying the definition of Contaminated Land, Part 2A states that ‘the Local Authority must:

- Identify a ‘Pollution Linkage’. That is, a linkage between a contaminant and a receptor, by means of a pathway(s).
- Determine if the contaminant is causing significant harm to that receptor, or there is a significant possibility of such harm being caused by that contaminant to that receptor.

If any one element of the pollutant linkage is not present then the land should not be identified as ‘contaminated land’.

Part 2A is designed to ‘enable the identification and remediation of land on which contamination is causing unacceptable risks to human health or the wider environment. It does not necessarily include all land where contamination is present, even though such contamination may be relevant in the context of other regimes’. It is not directed

to assessing risks in relation to a future use of the land that would require a specific grant of planning permission.

The control of development and land use in the future is the responsibility of the planning system. A fundamental principle of sustainable development is that the condition of land, its use and its development should be protected from potential hazards. The National Planning Policy Framework (NPPF) states that *'to prevent unacceptable risks from pollution and land instability, planning policies and decisions should ensure that new development is appropriate for its location.'*

Planning policies and decisions should also ensure that the site is suitable for its new use taking account of ground conditions and land instability, including from natural hazards or former activities such as mining, pollution arising from previous uses and any proposals for mitigation including land remediation or impacts on the natural environment arising from that remediation.

NPPF also states that after any required remediation, the land should not be capable of being determined as contaminated land under Part IIA of the Environmental Protection Act 1990.

6.2 Preliminary Conceptual Site Model (CSM)

Following a review of the desk based geo-environmental information on the site and a site reconnaissance, a preliminary CSM has been formulated to identify potential sources of contamination, likely receptors and potential pathways on and in the immediate vicinity of the site.

It should be noted that some uncertainties exist due to the limited site specific data available. However, potential contaminants and receptors have been identified based on this Phase 1 desk study review. Pathways have been established on reasonable scientific knowledge of the behaviour of the contaminants in the ground.

It should also be noted that because the assessment is based on documentary evidence contaminants may be identified, which in practice are not present and contaminants may be present which have not been identified.

The guidance provided in CLR11 indicates the CSM should identify those contaminants, pathways and receptors which are 'likely' to represent an 'unacceptable' risk either to human health or the surrounding environment.

6.3 Potential Contaminant Sources

6.3.1 Onsite

No significant areas of potential concern were identified from the desk based assessment.

6.3.2 Off site

The surrounding land use was a mixture of undeveloped farmland becoming a mix of farmland and residential properties with only limited historical industrial land.

Historical industrial land uses include the former railway line (cutting) circa 50m south and the former brickworks including clay pit >95m south. The materials used to infill the railway cutting and clay pit are unknown and there are no landfill licences associated with the two sites. If the materials used to backfill the site contain putrescible materials then there is the potential for the filled cutting (circa 300m x30m) and pit (circa 130m x 70m) to act as a source of landfill gas.

Although there is the potential for the landfilling of materials to act as source of gas it is considered that the impermeable nature of the underlying soils (mudstone) are likely to inhibit ground gas movement and therefore they are unlikely to represent significant on-going source of landfill gas. However, it would therefore be prudent to undertake gas monitoring to confirm the risk assessment.

6.3.3 Potential Contaminants of Concern

In the absence of any specific potential sources, a general suite of common contaminants should suffice in assessing actual risks.

6.4 Receptors

It is understood that the site will be redeveloped with low rise residential properties. Future Residents are assumed therefore to occupy the site full time and may be

exposed directly to soils within the site. Construction workers would be directly exposed to soils, however this would only be short term.

- Future Residents
- Construction workers
- Construction materials (including services)
- Groundwater – Secondary A Aquifer.
- Surface Water - none within 250m
- Flora and fauna.

6.5 Preliminary Risk Assessment

A preliminary risk assessment was undertaken based on a qualitative assessment of the likely presence of a pollutant linkage. A pollutant linkage is the relationship between a source (or contaminant), a pathway and a target (or receptor). Unless all three elements of a pollutant linkage are present, a significant risk is not considered to exist. The approach adopted is to screen each site based on assigning a simple low, medium or high category.

The preliminary risk assessment is shown in Table 3 overleaf.

Table 3 Site Conceptual Model

Potential Source and Pollutant	Receptor	Pathway	Potential Pollutant Linkage?	Probability of exposure, consequence and magnitude of risk.
No significant on or off-site sources were identified.	Human Health – future residents.	Direct contact - Dermal contact, soil ingestion and dust inhalation.	Unlikely – no significant sources identified.	Probability: Unlikely Consequence: Medium Magnitude: Low Risk
		Indirect Contact - Vapour inhalation.	Unlikely – no significant sources identified.	Probability: Unlikely Consequence: Medium Magnitude: Low Risk
		Hydrocarbon tainting of potable water supply pipes.	Unlikely – no significant sources identified.	Probability: Unlikely Consequence: Medium Magnitude: Low Risk
	Human Health – Construction workers	Direct contact - Dermal contact, soil ingestion and dust inhalation.	Unlikely – no significant sources identified.	Probability: Unlikely Consequence: Medium Magnitude: Low Risk
		Indirect Contact - Vapour inhalation.	Unlikely – no significant sources identified.	Probability: Unlikely Consequence: Medium Magnitude: Low Risk
	Controlled Waters – groundwater (Secondary A Aquifer)	Leaching and percolation.	Unlikely – no significant sources identified.	Probability: Unlikely Consequence: Low Magnitude: Low Risk
	Controlled Waters – No surface water lies within 250m of the site.	Groundwater migration & run-off to surface waters carrying entrained sediment or diffuse contamination	Unlikely – no significant sources identified.	Probability: Unlikely Consequence: Low Magnitude: Low Risk
	Buried structures – Aggressive ground conditions	Direct contact and/or leaching (sulphate, pH).	Unlikely - underlying geology unlikely to be aggressive.	Probability: Unlikely Consequence: Medium Magnitude: Low Risk

Potential Source and Pollutant	Receptor	Pathway	Potential Pollutant Linkage?	Probability of exposure, consequence and magnitude of risk.
	Ecology - existing trees and landscaping on site.	Plant uptake.	Unlikely – no significant sources identified.	Probability: Unlikely Consequence: Low Magnitude: Low Risk
Ground gases.	Human Health – future residents.	Permeation through ground and intrusion into buildings and structures.	Possible – two potential sources identified. Risk is dependant on composition of fill materials.	Probability: Possible Consequence: High Magnitude: Low Risk
	Flora	Displacement of oxygen from root systems	Possible – two potential sources identified. Risk is dependant on composition of fill materials.	Probability: Possible Consequence: Low Magnitude: Low Risk
Radon.	Human Health – future residents.	Permeation through ground floor.	Unlikely - No protection measures required.	Probability: Unlikely Consequence: Medium Magnitude: Low Risk

7 Conclusions and Recommendations

7.1 Geotechnical Risks

The potential for geotechnical hazards are summarised in Table 4.

Table 4: Summary of Geotechnical Hazards.

Potential Geological Hazard	Impact on proposed development	Likelihood of presence
Deep Made Ground	High	Unlikely
Buried structures	Moderate	Possible
Compressible ground	Moderate	Unlikely
Shrinking / swelling clay	Moderate	Unlikely
Collapsible ground	High	Unlikely
Aggressive ground conditions for concrete	Low	Unlikely
Running sands / excavation instability	Moderate	Unlikely
High water table / groundwater inflows.	High	Unlikely
Slope stability	Moderate	Unlikely
Underground mining	High	Unlikely
Ground dissolution / natural cavities	High	Unlikely

Based on the anticipated ground conditions, conventional spread foundations should be suitable for the proposed development.

The near surface soils are not anticipated to be shrinkable and foundations are therefore unlikely to require deepening in the vicinity of trees. A ground bearing ground floor slab may be suitable.

The soils anticipated to be present may be sufficiently permeable to allow soakaway drainage to be used. The Local Authority are likely to require full scale testing in accordance with BRE 365 (2016) obtain infiltration rates for design.

7.2 Land Contamination

The site appears to have always comprised undeveloped land, with no evidence of potentially contaminative processes or materials within or adjacent to the site.

Therefore, the site is considered to be low risk with regards to contamination.

The assessment has indicated no potential sources of contaminants with the potential to attack plastics and as such standard pipework may be suitable for the site. Confirmation should be sought from the water supply company at the earliest opportunity.

The potential risks are based on the worst case assumption that the sources may have caused contaminants to ingress into the underlying soils. It must be noted that there is no evidence to suggest that this may have occurred.

7.3 Ground Gas

7.3.1 Landfill gas

No recorded current or historical landfills are known to exist within 250m of the site. No organic soils are anticipated to lie beneath the site. It is noted that a former railway cutting and clay pit were located circa 50m and >95m respectively south of the site; the cutting and clay pit appear to have been filled in the 1960s or early 1970s. The materials used to fill the cutting and pit are not known.

Although there is the potential for the landfilling of materials to act as source of gas it is considered that the impermeable nature of the underlying soils (mudstone) are likely to inhibit ground gas movement and therefore they are unlikely to represent significant on-going source of landfill gas.

Consequently the risks to end users from explosive or asphyxiating gases is considered low. However, it would therefore be prudent to undertake gas monitoring to confirm the risk assessment.

7.3.2 Radon

The Groundsure GeolInsight report states that the site is in an area where the estimated probability of homes being above the action level of 200Bqm^{-3} is between 1% and 3%. Therefore, no radon protective measures are required in the construction of new buildings. Confirmation of any protection measures should be agreed with the local authority building control and / or warranty provider.

7.4 Coal Mining

The site lies on the Mexborough Rock, a sandstone flag of the Pennine Middle Coal Measures.

The Coal Authority report indicates that the site is in the likely zone of influence from workings in four seams of coal at 220m to 650m depth, and last worked in 1950. Any movement due to coal mining activity associated with these workings should have ceased.

Published geology indicates that there are no outcropping coal seams in the vicinity of the site.

The Coal Authority interactive mapping indicates the site does not lie within a Development High Risk Area and that no possible or probable shallow coal mine workings are anticipated beneath the site.

Given the presence of the sandstone flag beneath the site and the above review, it is considered that the shallow coal workings are unlikely to be present beneath the site.

7.5 Summary

The aim of this report was to assess the potential geotechnical and geo-environmental issues at the proposed development site. No potential sources of contamination have been identified from the Preliminary Risk Assessment. To enable the knowledge of the contaminating potential and land quality of this site to be developed further a Phase 2 Site Investigation would be required.

8 Notes, Limitations and Uncertainties

This report has been prepared solely for the use of the client, and may not be relied upon by other parties without written consent from HBS. Prior written permission must be obtained to reproduce all or part of the report. Further copies may be obtained with the client's written permission from HBS with whom a master copy of the document will be retained.

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This report has been prepared by HBS with all reasonable skill, care and diligence, and taking account of the manpower and resources devoted to it by agreement with the Client.

The report and /or opinion will be prepared for the specific purpose stated in the document and in relation to the nature and extent of proposals made available to us at the time of your enquiry. The recommendations should not be used for other schemes on or adjacent to the site without further reference to HBS. The assessment of the factual data will be provided to assist the client and his Engineer and/or advisors in the preparation of their designs.

It should be noted that the levels of risk identified in this report are perceived risks based on the information reviewed. No physical investigation or testing has been carried out; actual risks can only be assessed following a physical investigation of the site. Further work, including physical investigation, laboratory testing and ground gas monitoring may be required by the appropriate regulators to confirm actual conditions.

The information reviewed should not be considered exhaustive and has been accepted in good faith as providing true representative data with respect to site conditions. Should additional information become available that may influence the opinions expressed in this report, HBS reserves the right to review such information and, if warranted, to alter the opinions accordingly.

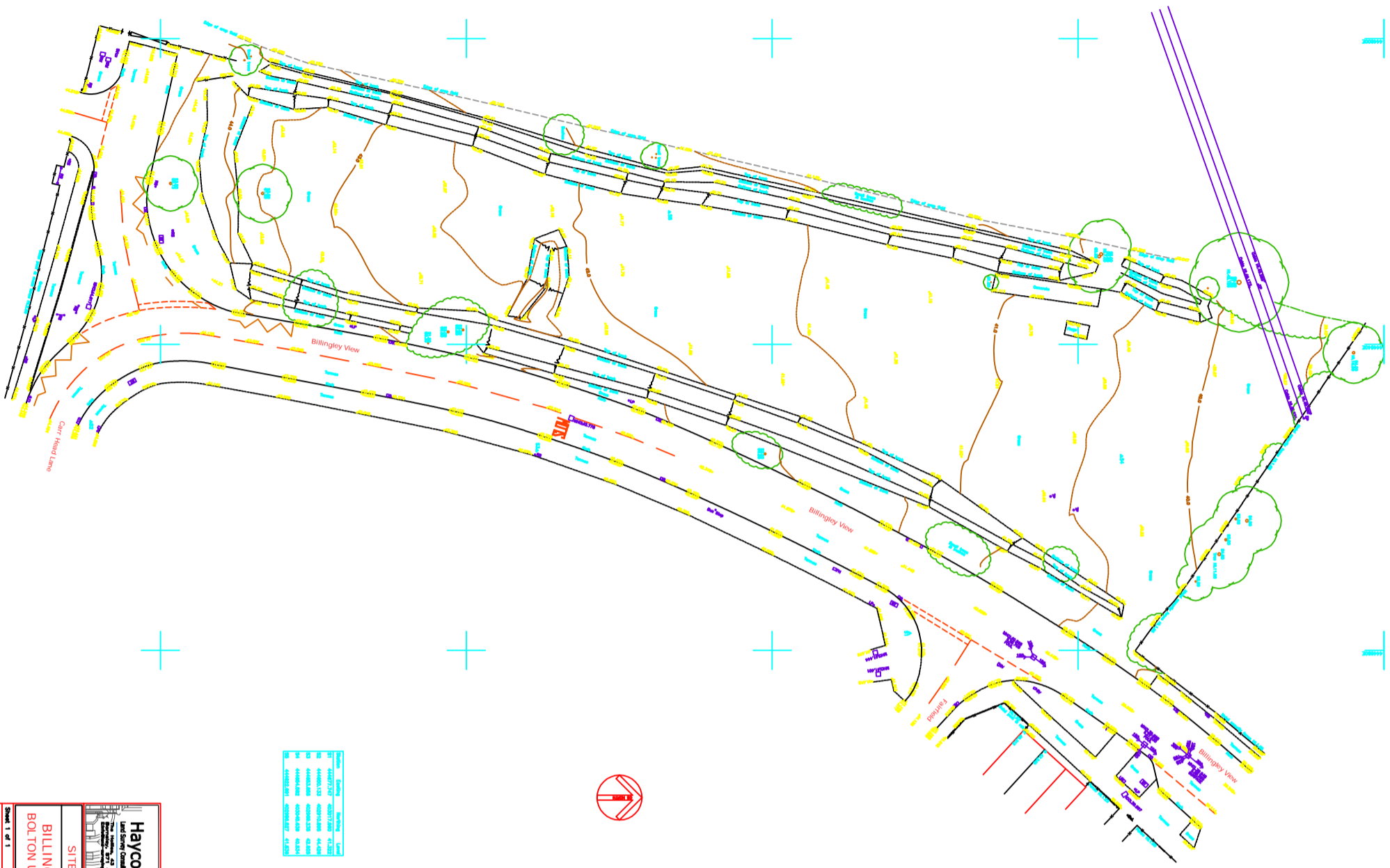
The evaluation and conclusions do not preclude the existence of other site conditions and contamination, which could not reasonably have been revealed by the site

investigation works undertaken at the time of writing. This report should be used for information purposes only and should not be construed as a comprehensive characterisation of all site conditions or potential contaminants.

The economic viability of the proposals referred to in the report, or of the solutions put forward to any problems encountered, will depend on very many factors in addition to geotechnical considerations hence its evaluation will be outside the scope of the report.

Appendix A

Site Topographic Survey



Point	Easting	Northing
1	444607.77	420377.00
2	444608.15	420376.88
3	444608.52	420376.75
4	444608.89	420376.62
5	444609.26	420376.49
6	444609.63	420376.36
7	444610.00	420376.23
8	444610.37	420376.10
9	444610.74	420375.97
10	444611.11	420375.84
11	444611.48	420375.71
12	444611.85	420375.58
13	444612.22	420375.45
14	444612.59	420375.32
15	444612.96	420375.19
16	444613.33	420375.06
17	444613.70	420374.93
18	444614.07	420374.80
19	444614.44	420374.67
20	444614.81	420374.54
21	444615.18	420374.41
22	444615.55	420374.28
23	444615.92	420374.15
24	444616.29	420374.02
25	444616.66	420373.89
26	444617.03	420373.76
27	444617.40	420373.63
28	444617.77	420373.50
29	444618.14	420373.37
30	444618.51	420373.24
31	444618.88	420373.11
32	444619.25	420372.98
33	444619.62	420372.85
34	444620.00	420372.72
35	444620.37	420372.59
36	444620.74	420372.46
37	444621.11	420372.33
38	444621.48	420372.20
39	444621.85	420372.07
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41	444622.59	420371.81
42	444622.96	420371.68
43	444623.33	420371.55
44	444623.70	420371.42
45	444624.07	420371.29
46	444624.44	420371.16
47	444624.81	420371.03
48	444625.18	420370.90
49	444625.55	420370.77
50	444625.92	420370.64
51	444626.29	420370.51
52	444626.66	420370.38
53	444627.03	420370.25
54	444627.40	420370.12
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70	444633.33	420368.04
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97	444643.33	420364.53
98	444643.70	420364.40
99	444644.07	420364.27
100	444644.44	420364.14



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 14th Floor, One Bank, 100 Bank Street, Bolton, Greater Manchester, B4 6JN
 Tel: 01204 616161 Fax: 01204 616162
 Email: info@haycock-todd.co.uk

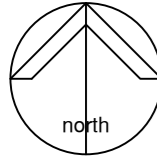
SITE SURVEY
BILLINGLEY VIEW
BOLTON UPON DEARNE

Station	Easting	Northing
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2	444608.15	420376.88
3	444608.52	420376.75
4	444608.89	420376.62
5	444609.26	420376.49
6	444609.63	420376.36
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85	444638.88	420366.09
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96	444642.96	420364.66
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Sheet 1 of 1
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 Date of Survey: June 2018
 Scale: 1/2500
 Survey Job No.: S9435

Appendix B

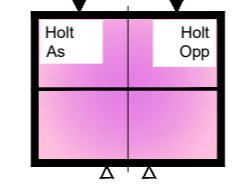
Proposed Development Plan



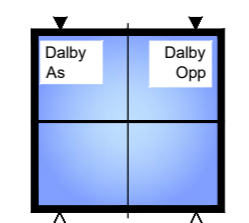
Billingley View, Bolton on Dearne



House Type Legend



Holt - Holt
2 Bedroom Semi
Detached Dwelling
10No (62%)



Holt - Dalby
3 Bedroom Semi
Detached Dwelling
6No (38%)

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Property Design and Management Services
CLIENT
Bernesia Homes

PROJECT
Billingley View
Bolton on Dearne
Housing Development

TITLE
Proposed Site Plan

SCALES	DATE	DRAWN	CHECKED
1:500	25/03/19	IKC	

FILE / DRAWING NAME	ZONE	LEVEL	TYPE	ROLE	UNIQUE NR	REV CODE
PROJECT NR 19-1-1080	-	-	PL	A	03	-

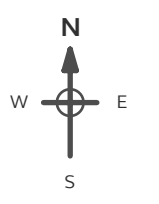
Appendix C

Historic Maps

Site Details:
 BILLINGLEY VIEW, BOLTON
 UPON DEARNE, BARNSELY,
 S63 8BP

Client Ref: 101909_Billingley_View_PO23003918
Report Ref: GS-6173261
Grid Ref: 444638, 403000

Map Name: County Series
Map date: 1890-1892
Scale: 1:2,500
Printed at: 1:2,500



Surveyed 1892 Revised 1892 Edition N/A Copyright N/A Levelled N/A	Surveyed 1892 Revised 1892 Edition N/A Copyright N/A Levelled N/A
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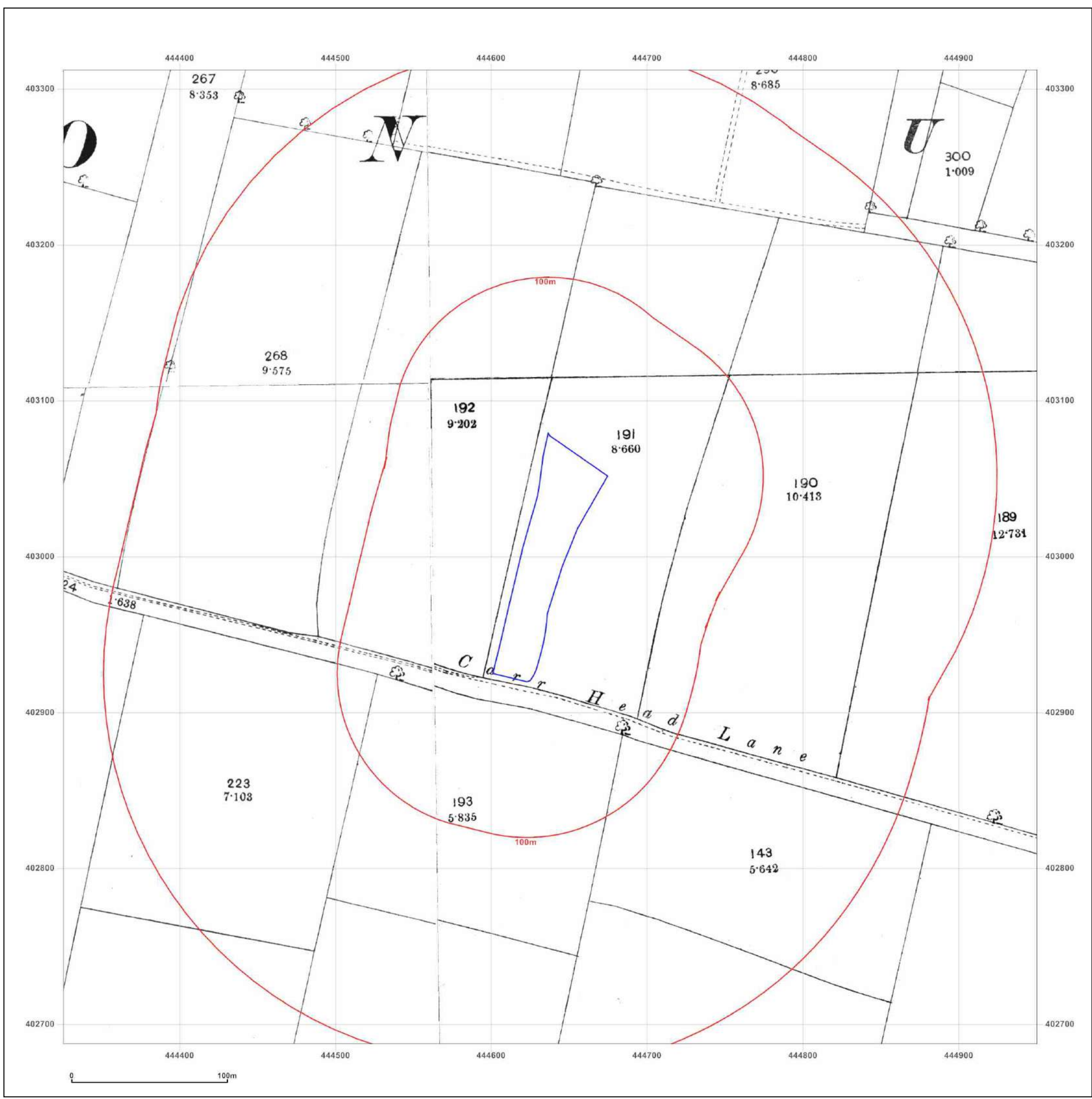


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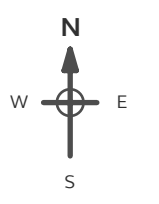
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Site Details:
 BILLINGLEY VIEW, BOLTON
 UPON DEARNE, BARNSELY,
 S63 8BP

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Map Name: County Series
Map date: 1903-1906
Scale: 1:2,500
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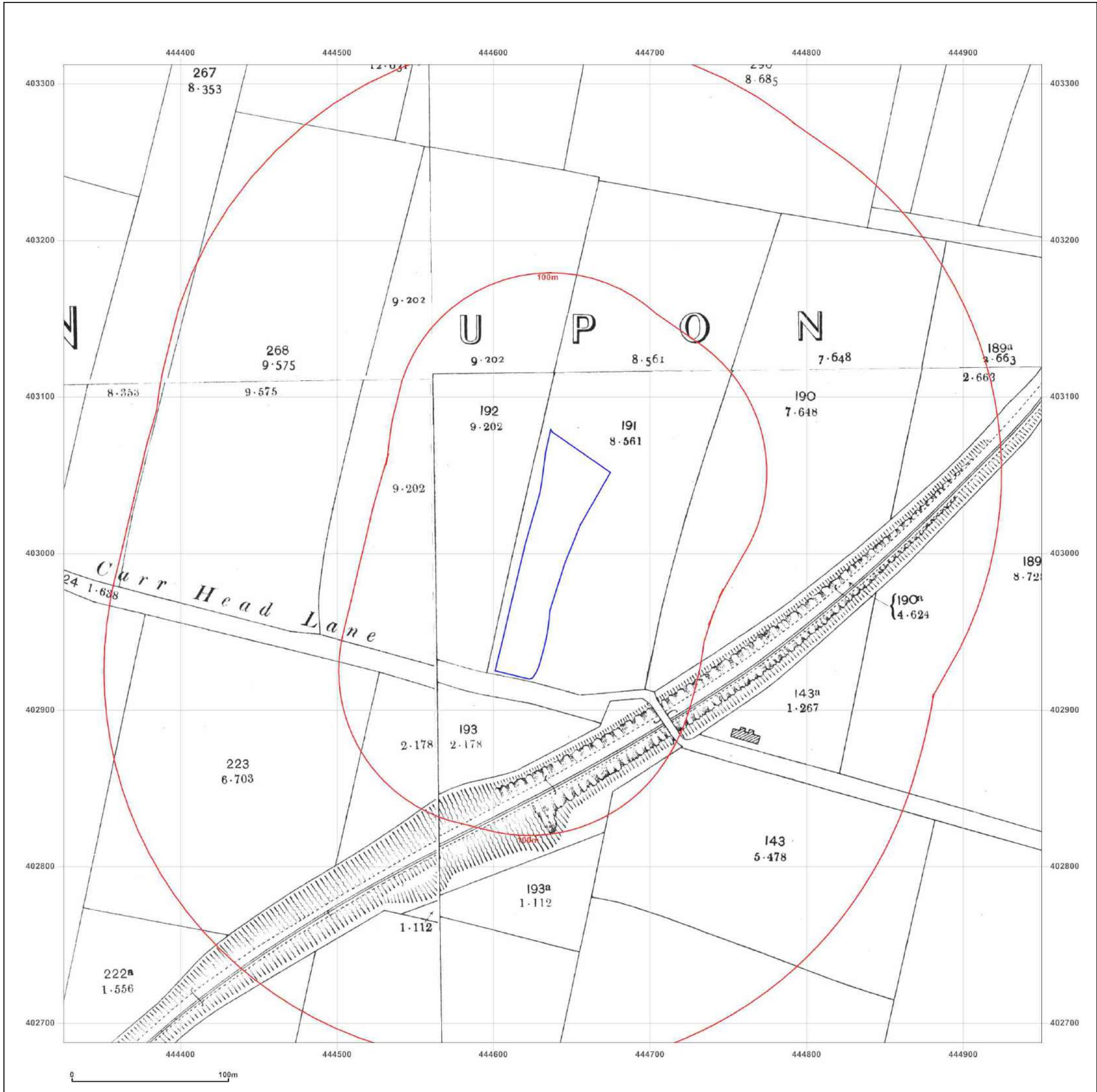


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Site Details:

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UPON DEARNE, BARNSELY,
S63 8BP

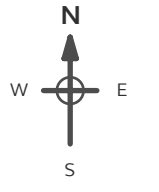
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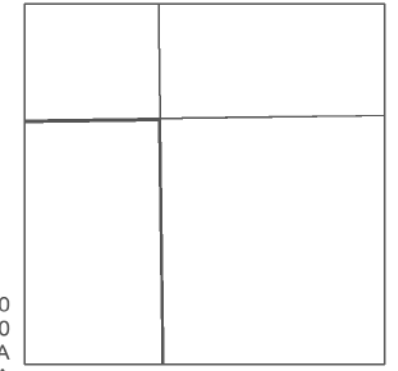
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Surveyed 1930
Revised 1930
Edition N/A
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Revised 1930
Edition N/A
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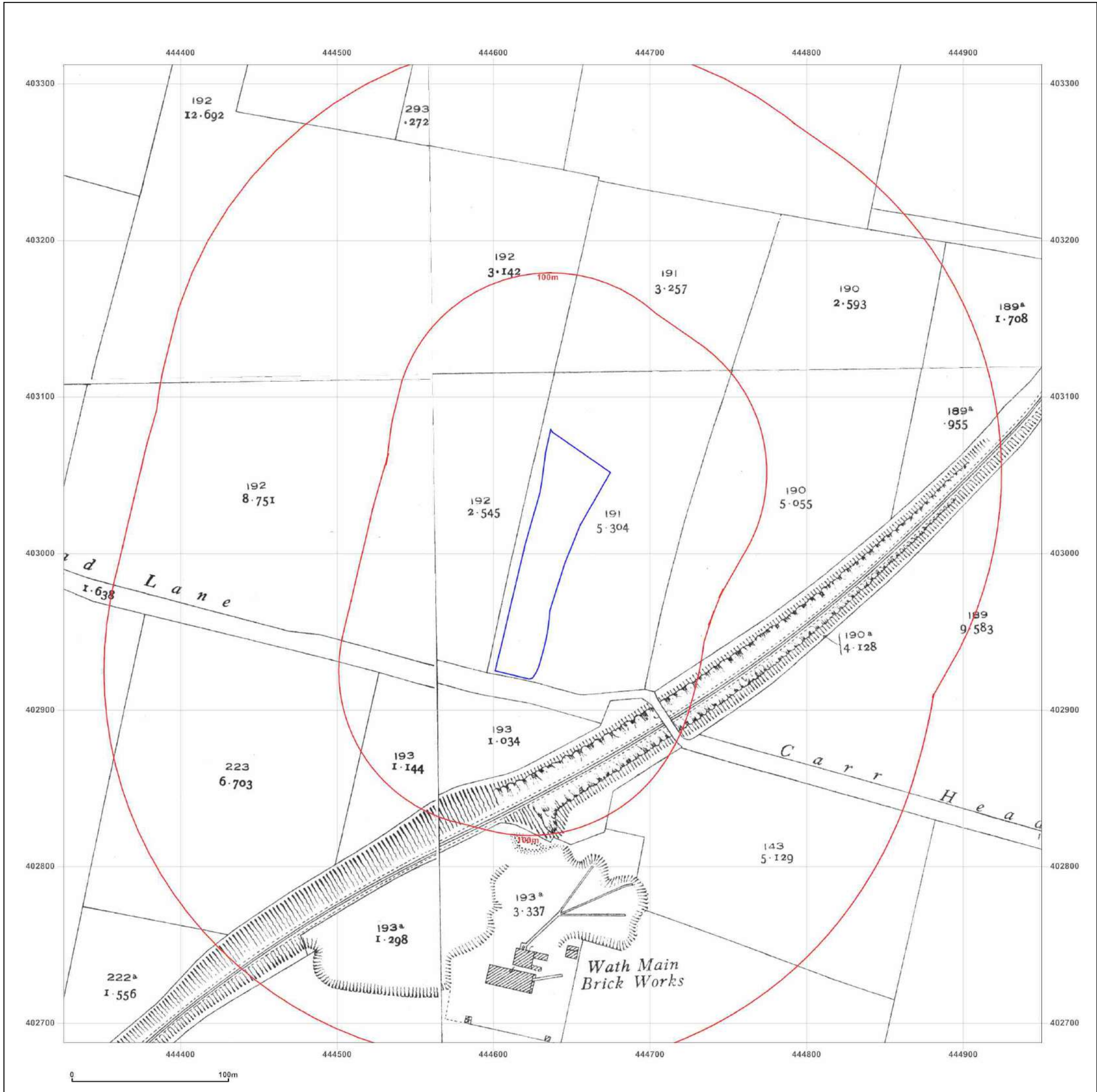


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Site Details:

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UPON DEARNE, BARNSELY,
S63 8BP

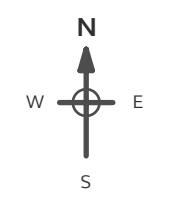
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Map Name: National Grid

Map date: 1961

Scale: 1:1,250

Printed at: 1:2,000



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Surveyed 1960 Revised 1960 Edition N/A Copyright 1961 Levelled 1959	Surveyed N/A Revised N/A Edition N/A Copyright N/A Levelled N/A



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Site Details:

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UPON DEARNE, BARNSELY,
S63 8BP

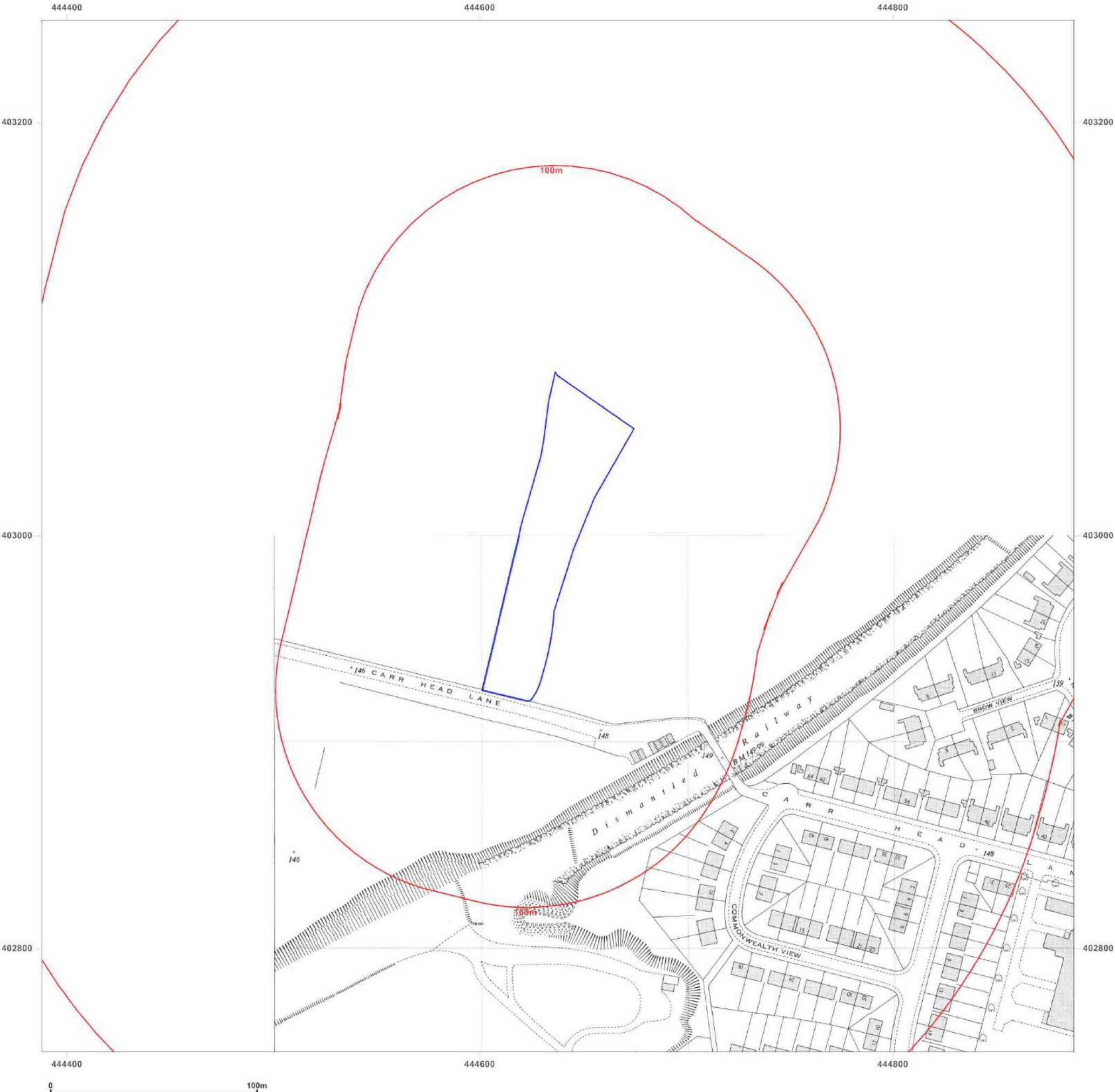
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Map Name: National Grid

Map date: 1962

Scale: 1:1,250

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Site Details:

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S63 8BP

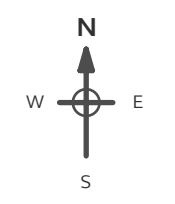
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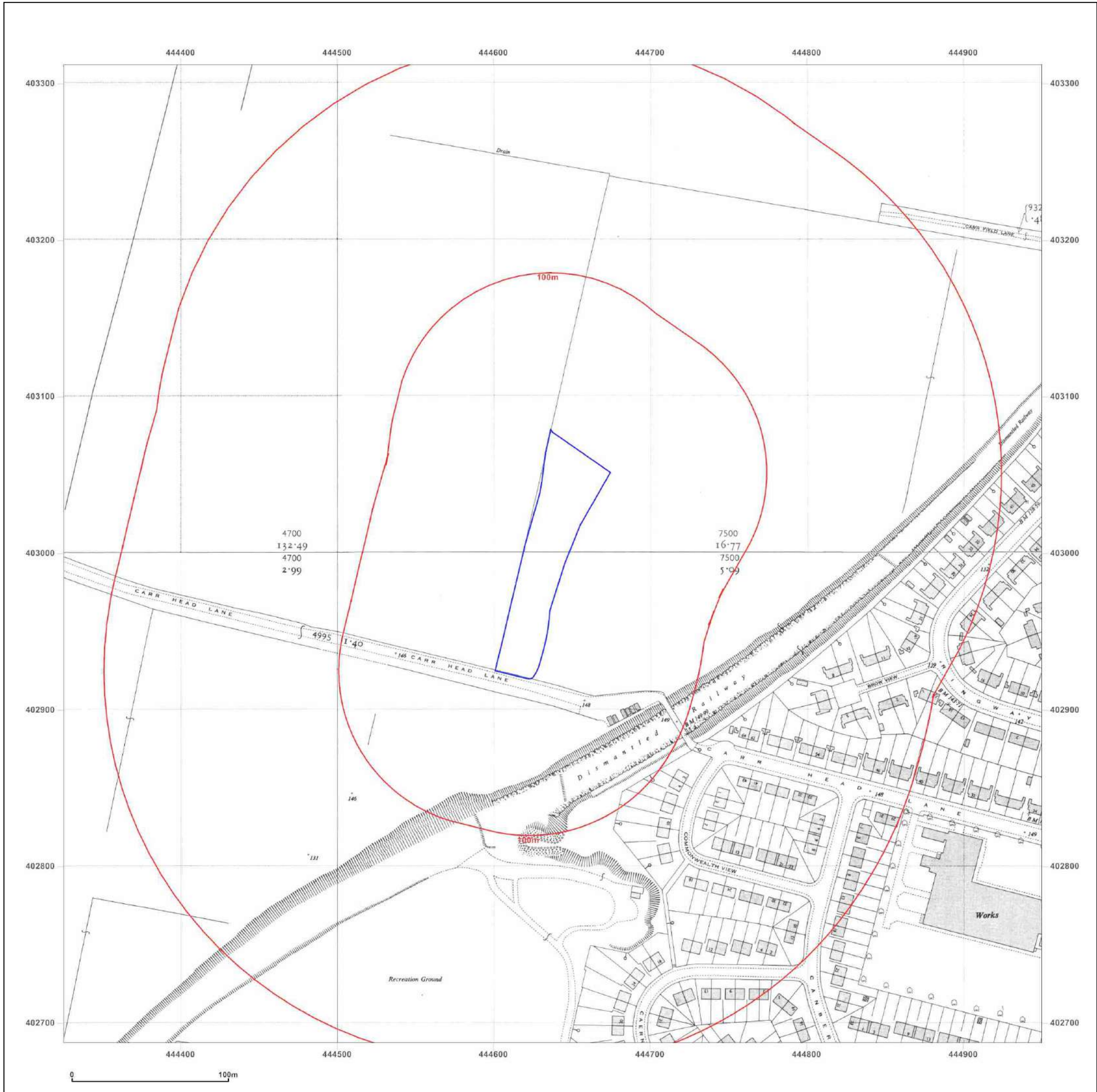
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Revised N/A
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UPON DEARNE, BARNSELY,
S63 8BP

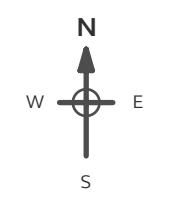
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Map Name: National Grid

Map date: 1973-1977

Scale: 1:1,250

Printed at: 1:2,000



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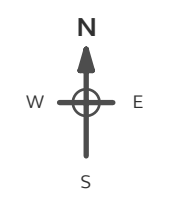
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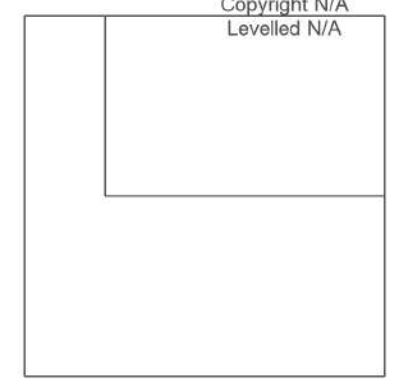
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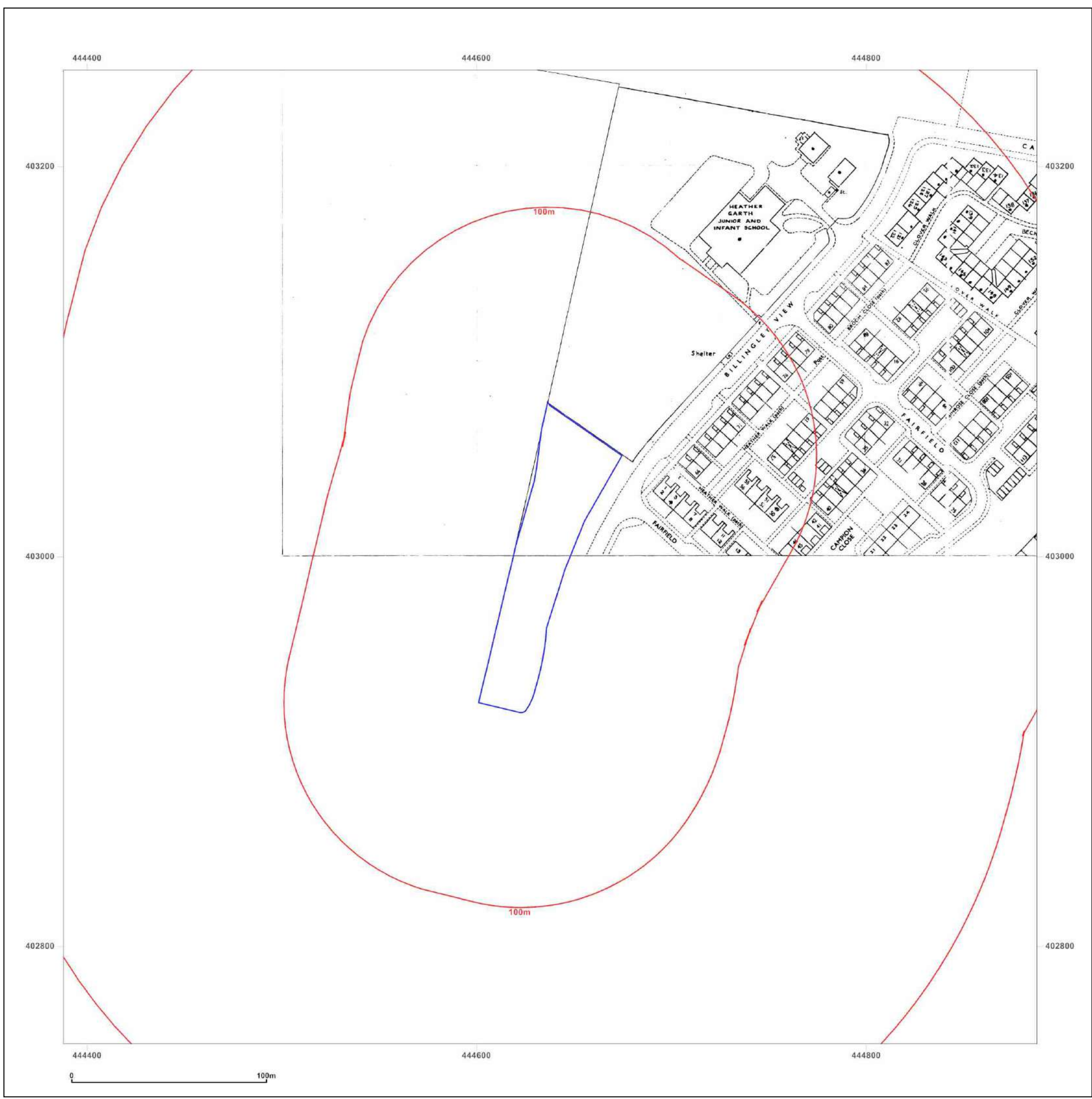


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Site Details:

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UPON DEARNE, BARNSELY,
S63 8BP

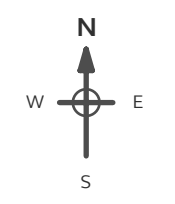
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Map date: 1993

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Site Details:

BILLINGLEY VIEW, BOLTON
UPON DEARNE, BARNSELY,
S63 8BP

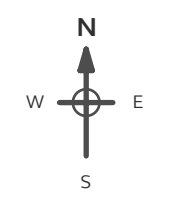
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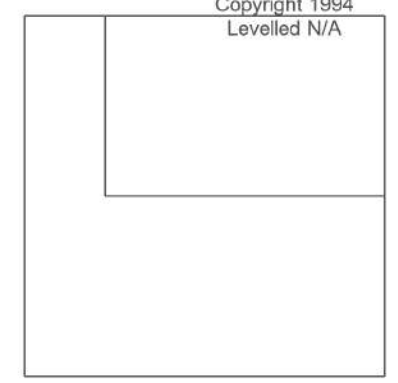
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Revised N/A
Edition N/A
Copyright 1994
Levelled N/A

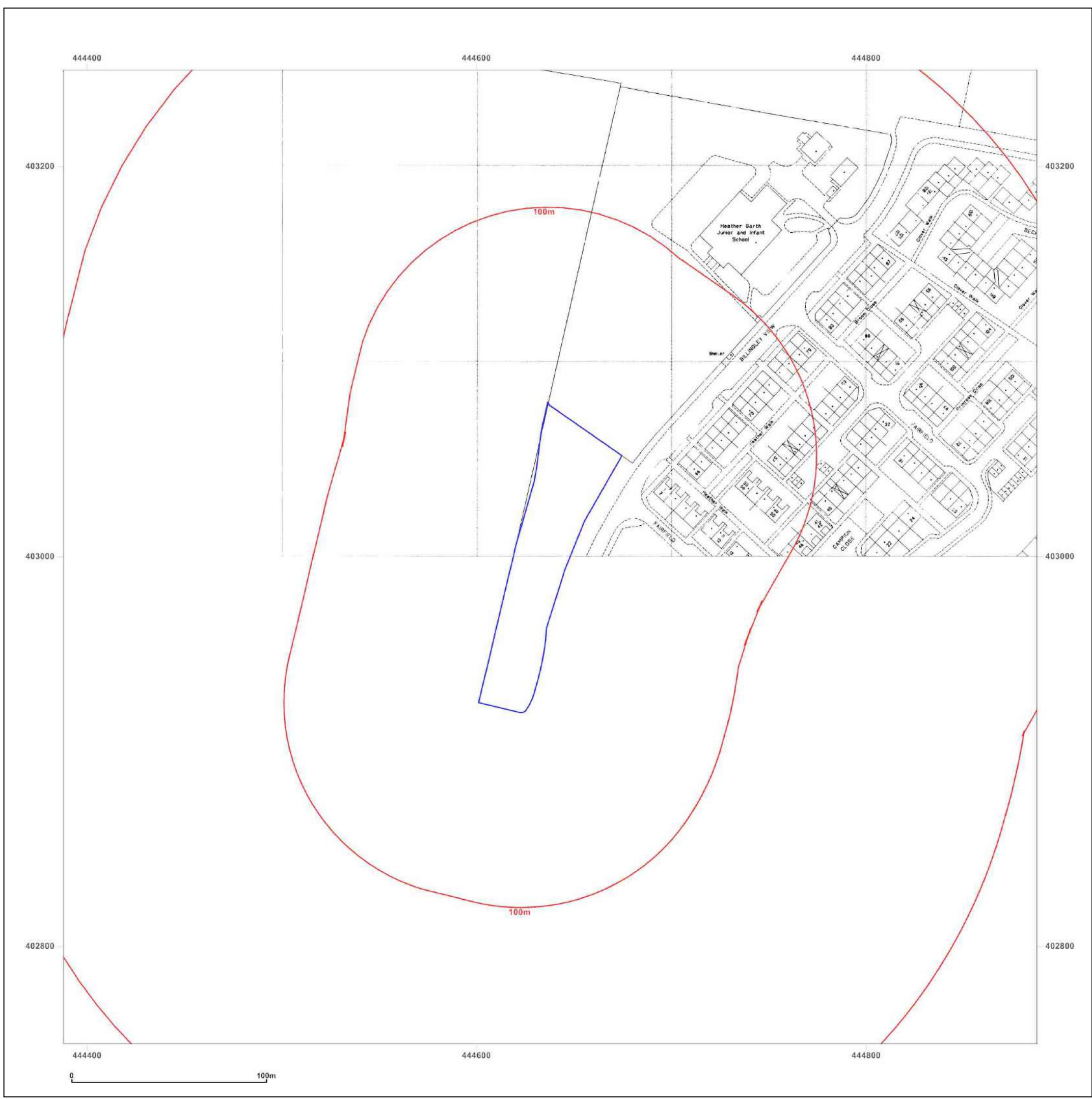


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Production date: 16 July 2019

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Site Details:

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UPON DEARNE, BARNSELY,
S63 8BP

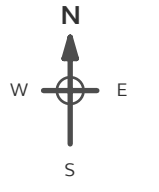
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Report Ref: GS-6173261
Grid Ref: 444638, 403000

Map Name: National Grid

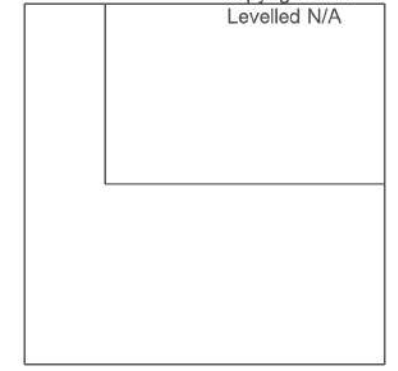
Map date: 1994

Scale: 1:1,250

Printed at: 1:2,000



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

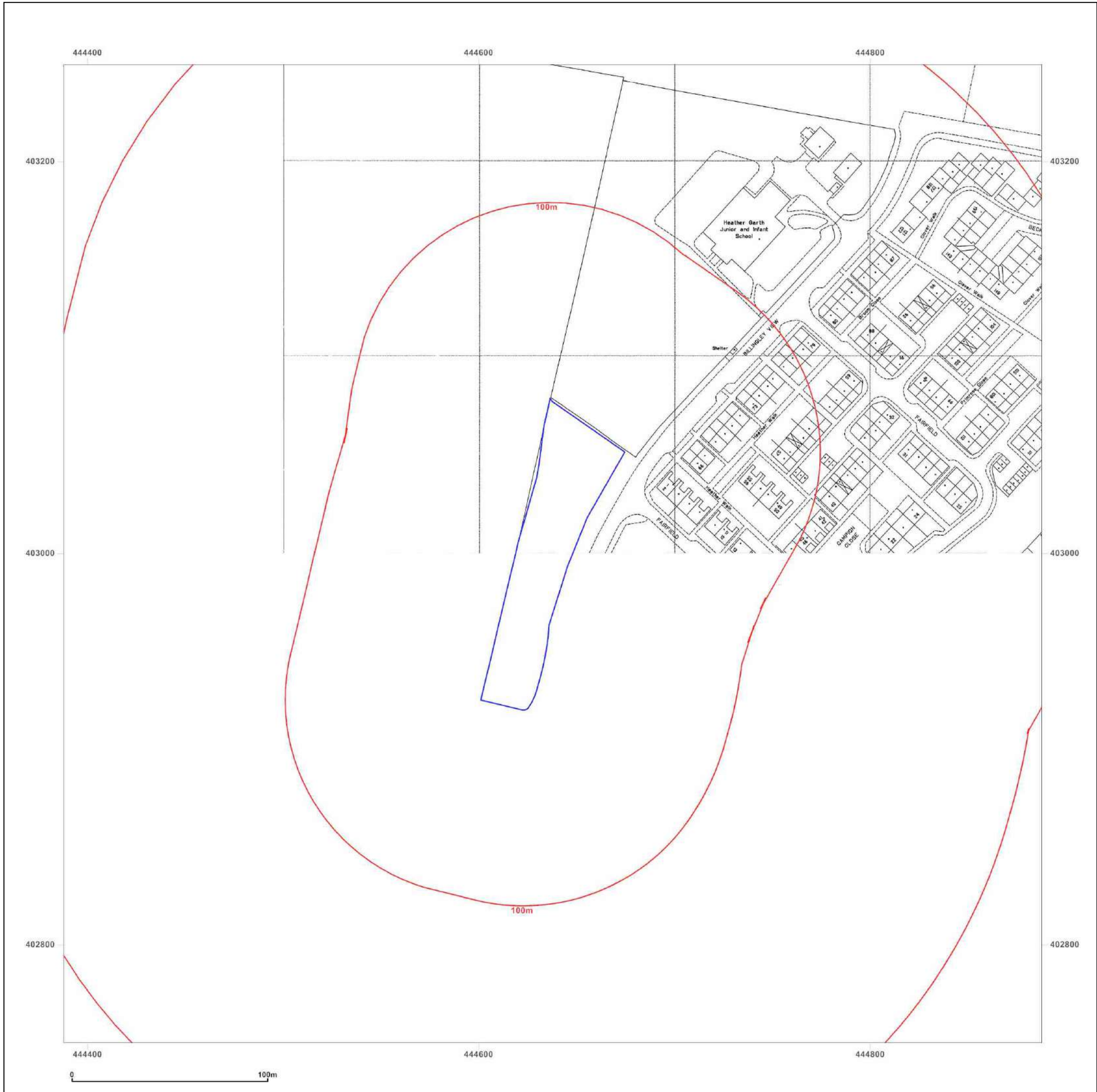


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Site Details:

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UPON DEARNE, BARNSELY,
S63 8BP

Client Ref: 101909_Billingley_View_PO23003918
Report Ref: GS-6173261
Grid Ref: 444638, 403000

Map Name: County Series

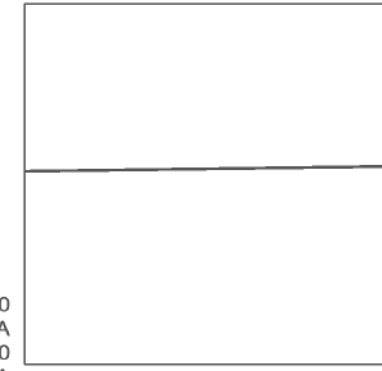
Map date: 1850-1854

Scale: 1:10,560

Printed at: 1:10,560



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



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

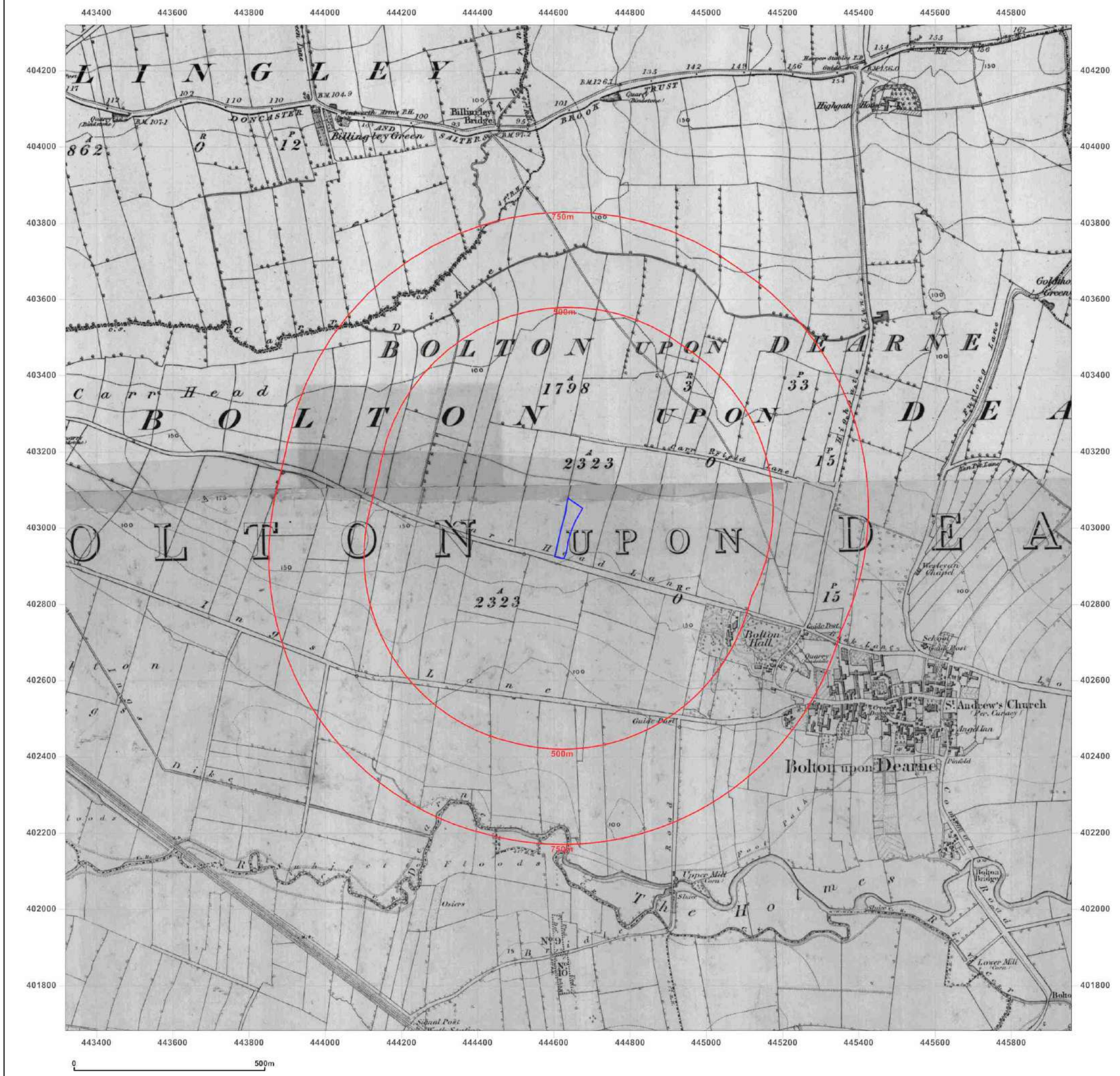


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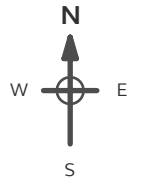
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Report Ref: GS-6173261
Grid Ref: 444638, 403000

Map Name: County Series

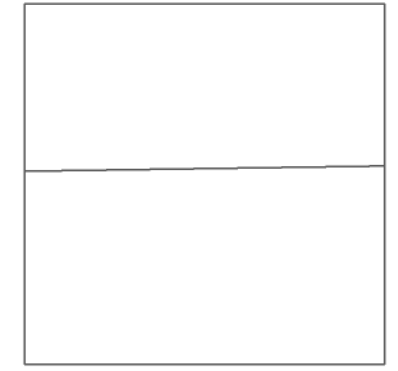
Map date: 1890

Scale: 1:10,560

Printed at: 1:10,560



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

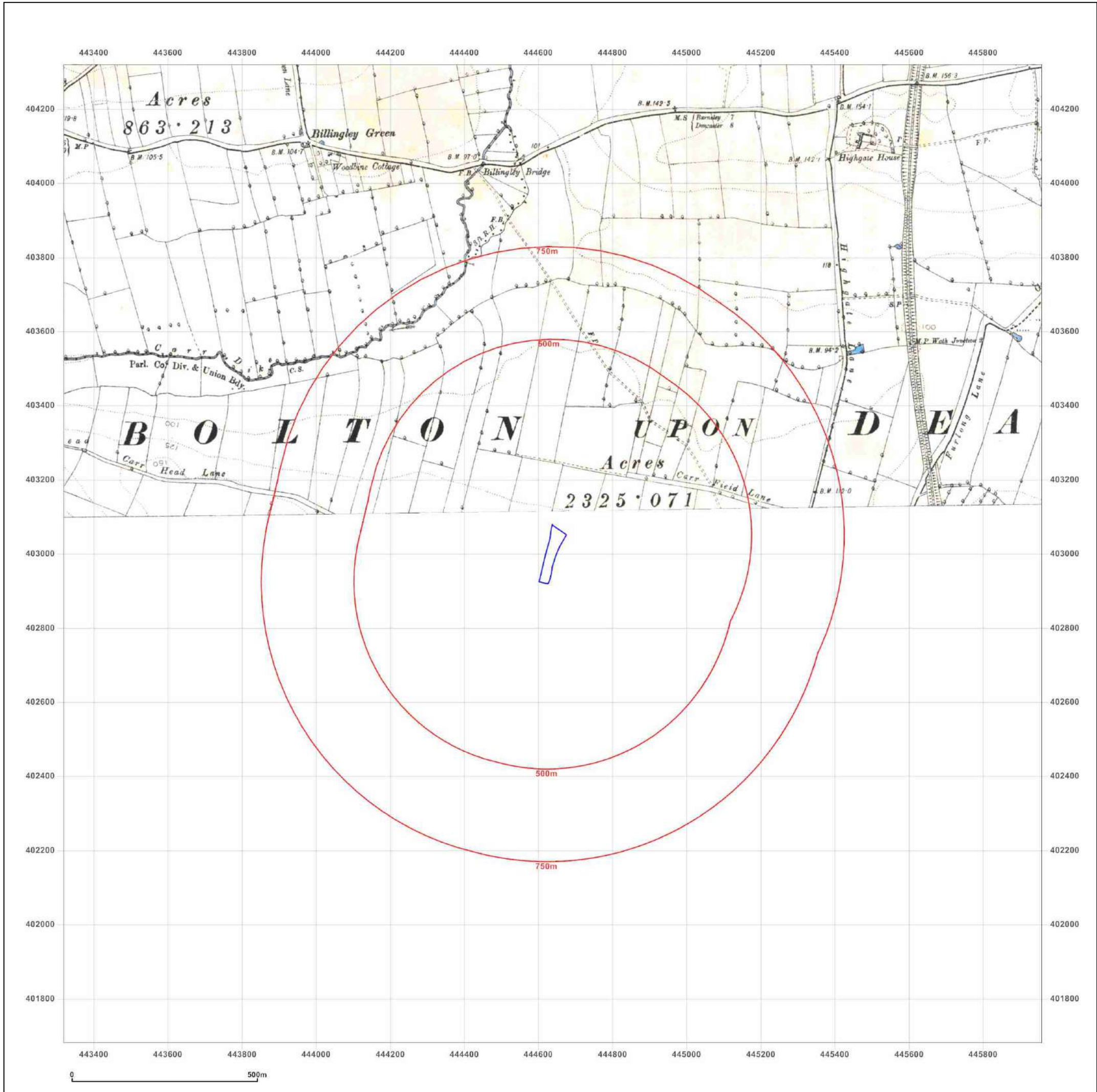


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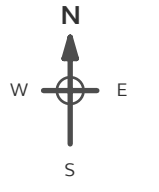
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Report Ref: GS-6173261
Grid Ref: 444638, 403000

Map Name: County Series

Map date: 1893

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1890
Revised N/A
Edition 1893
Copyright N/A
Levelled N/A

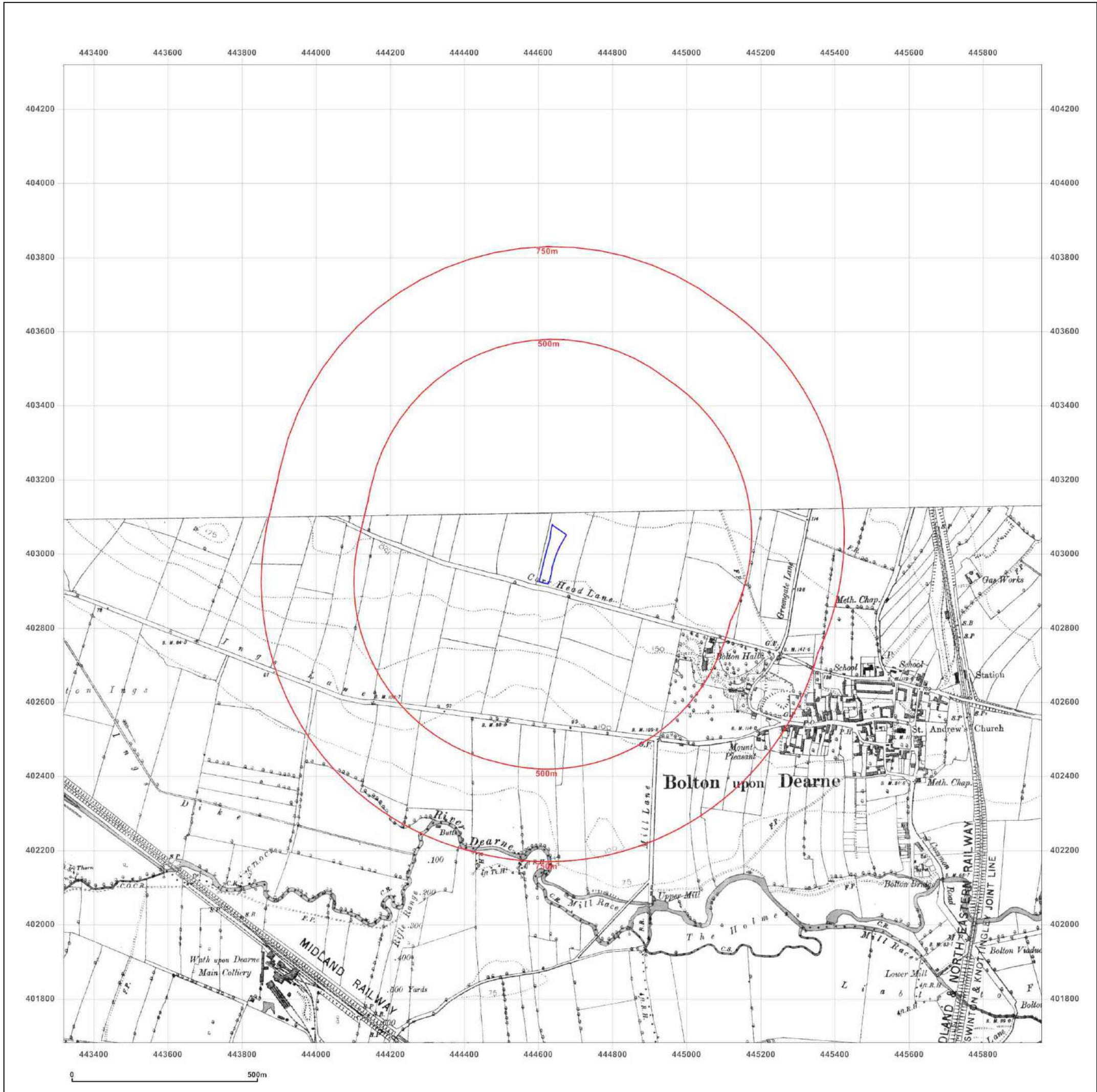


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Client Ref: 101909_Billingley_View_PO23003918
Report Ref: GS-6173261
Grid Ref: 444638, 403000

Map Name: County Series

Map date: 1901-1904

Scale: 1:10,560

Printed at: 1:10,560



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

Surveyed 1890
Revised 1901
Edition N/A
Copyright N/A
Levelled N/A

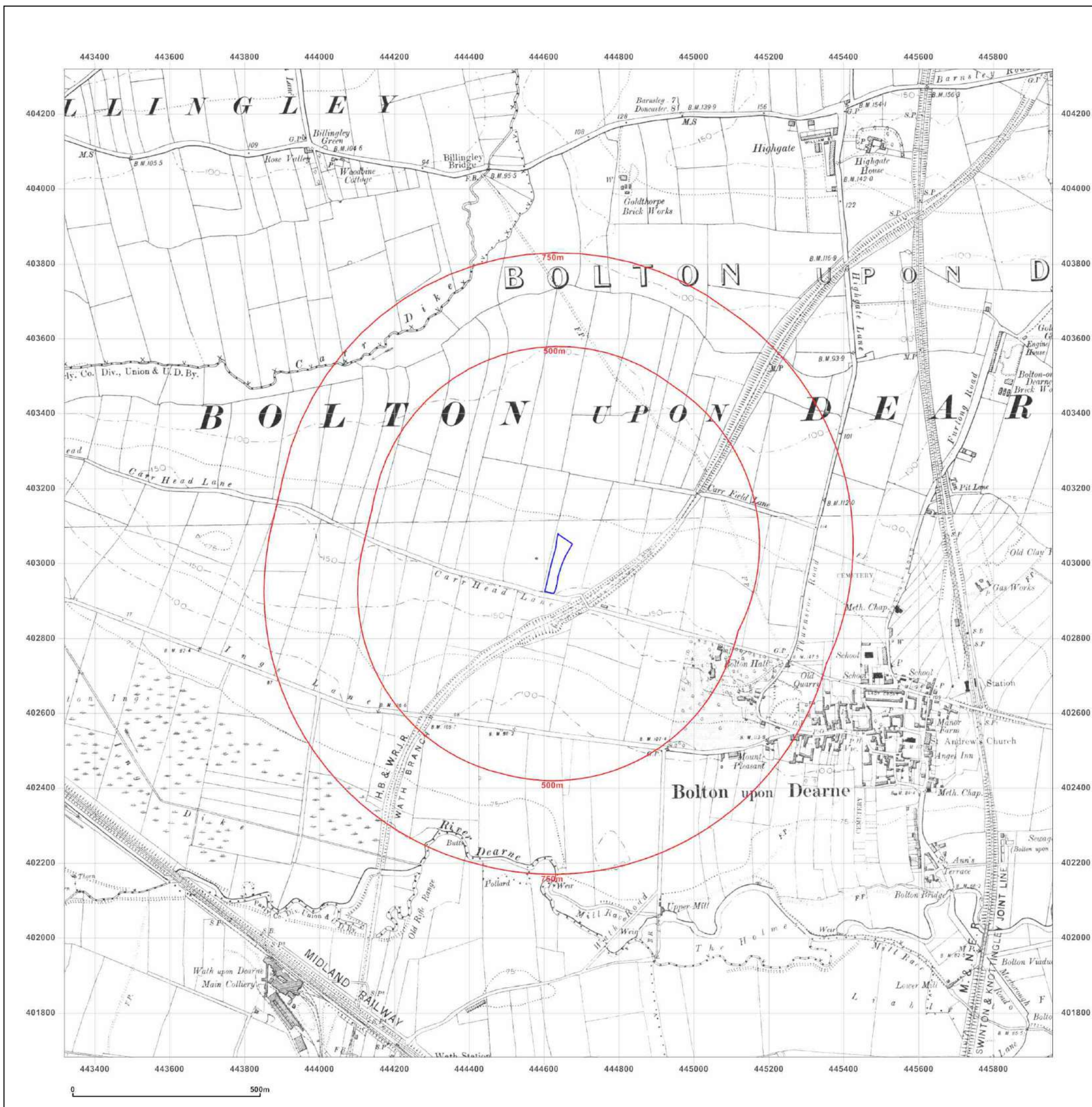


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Client Ref: 101909_Billingley_View_PO23003918
Report Ref: GS-6173261
Grid Ref: 444638, 403000

Map Name: County Series

Map date: 1929

Scale: 1:10,560

Printed at: 1:10,560



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Surveyed 1850
Revised 1929
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S63 8BP

Client Ref: 101909_Billingley_View_PO23003918
Report Ref: GS-6173261
Grid Ref: 444638, 403000

Map Name: County Series

Map date: 1938-1939

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1850
Revised 1939
Edition N/A
Copyright N/A
Levelled N/A

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

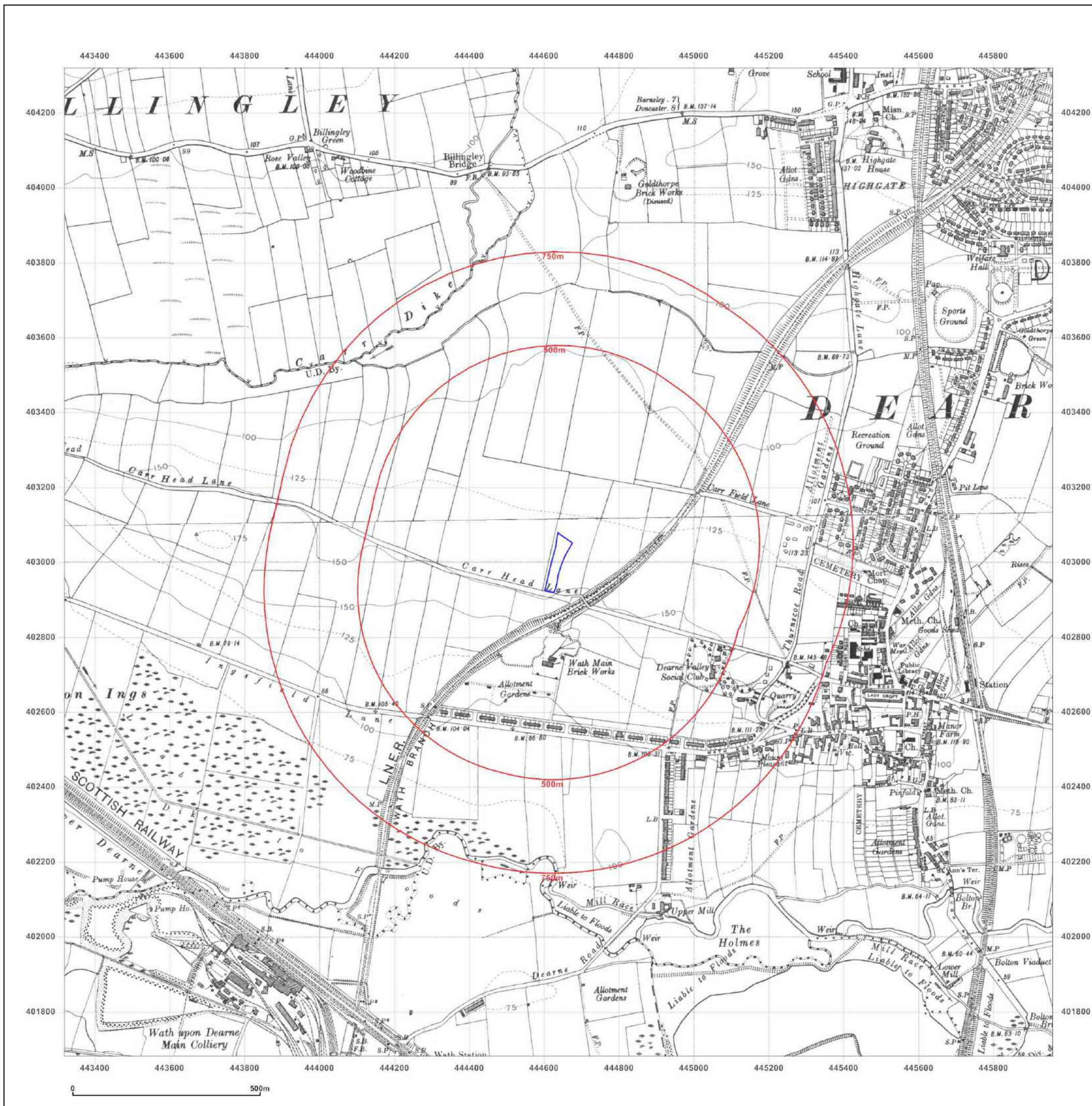


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S63 8BP

Client Ref: 101909_Billingley_View_PO23003918
Report Ref: GS-6173261
Grid Ref: 444638, 403000

Map Name: County Series

Map date: 1948

Scale: 1:10,560

Printed at: 1:10,560



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

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

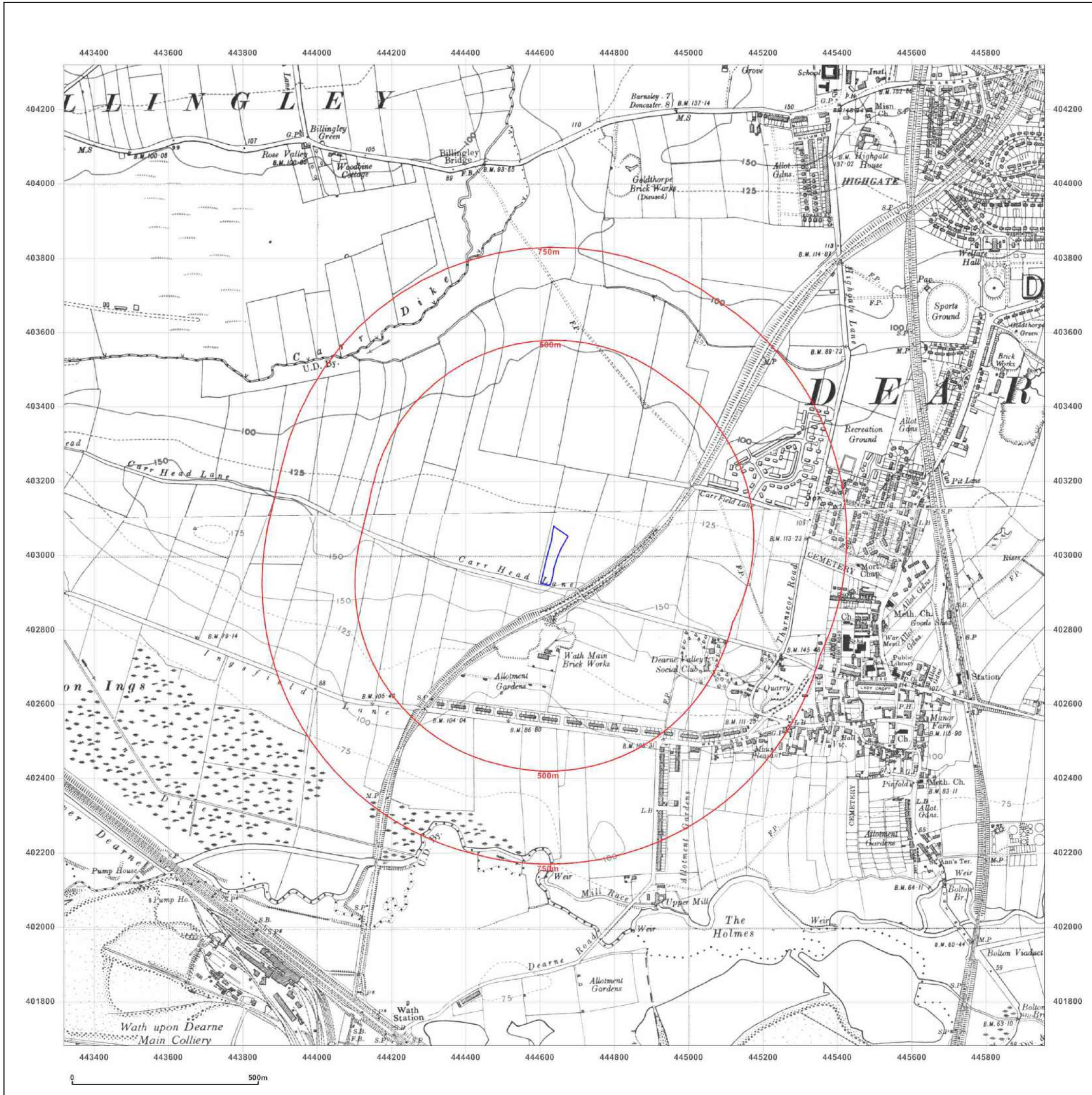


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S63 8BP

Client Ref: 101909_Billingley_View_PO23003918
Report Ref: GS-6173261
Grid Ref: 444638, 403000

Map Name: Provisional

Map date: 1951

Scale: 1:10,560

Printed at: 1:10,560



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

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

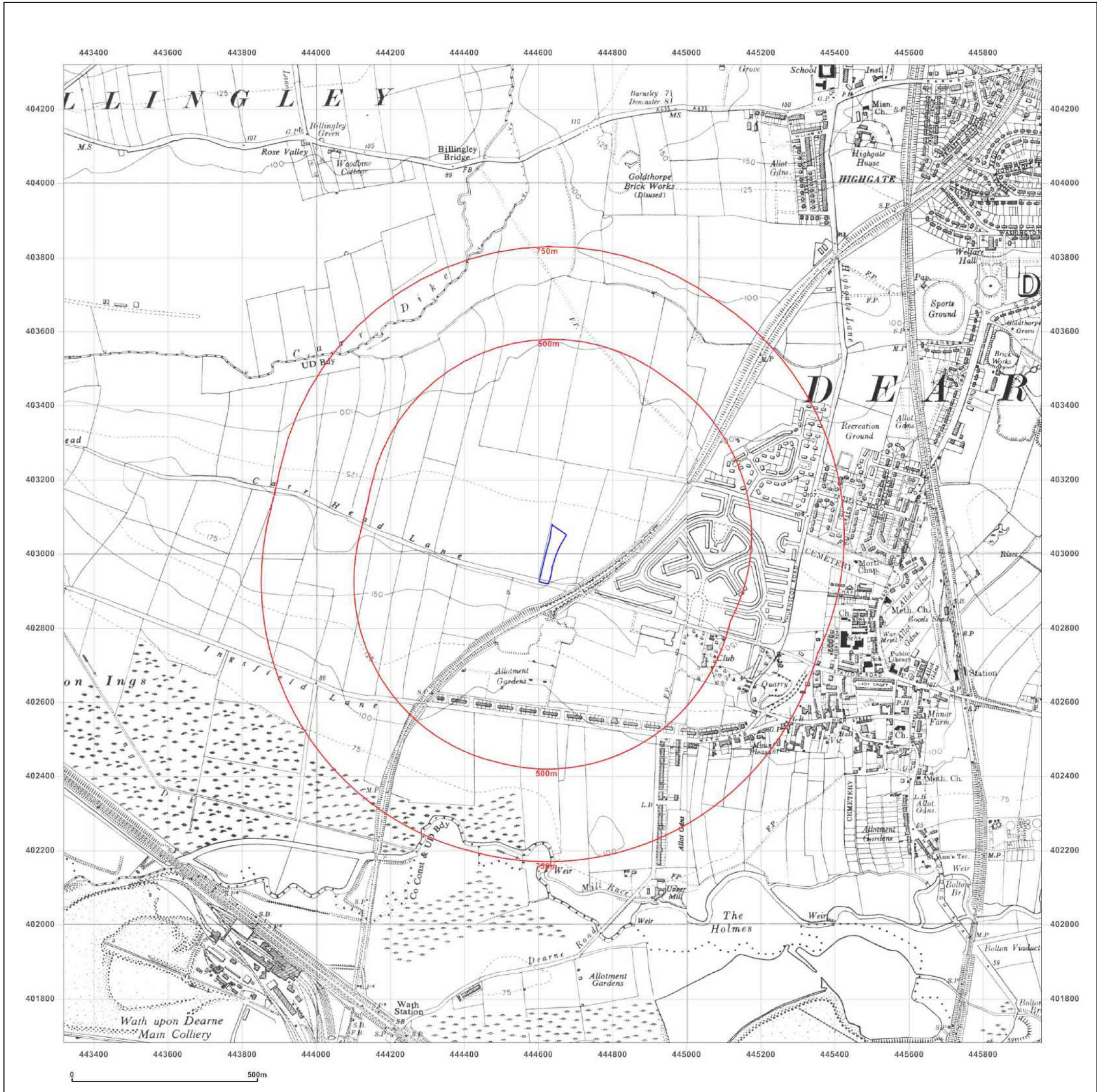


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S63 8BP

Client Ref: 101909_Billingley_View_PO23003918
Report Ref: GS-6173261
Grid Ref: 444638, 403000

Map Name: Provisional

Map date: 1966-1967

Scale: 1:10,560

Printed at: 1:10,560



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

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

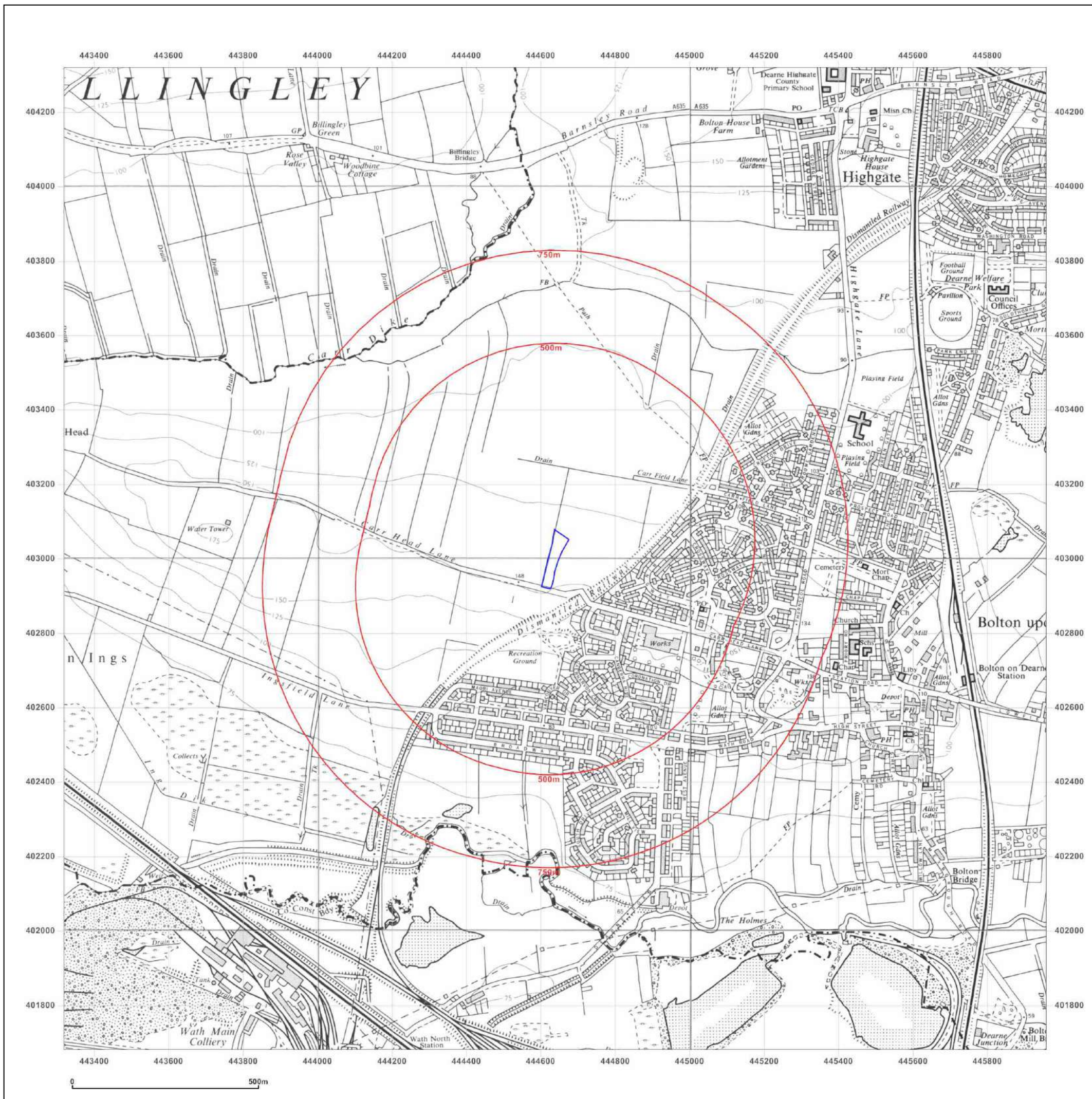


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Client Ref: 101909_Billingley_View_PO23003918
Report Ref: GS-6173261
Grid Ref: 444638, 403000

Map Name: National Grid

Map date: 1976-1977

Scale: 1:10,000

Printed at: 1:10,000



Surveyed 1976
Revised 1977
Edition N/A
Copyright 1978
Levelled 1978

Surveyed 1975
Revised 1974
Edition N/A
Copyright 1976
Levelled N/A

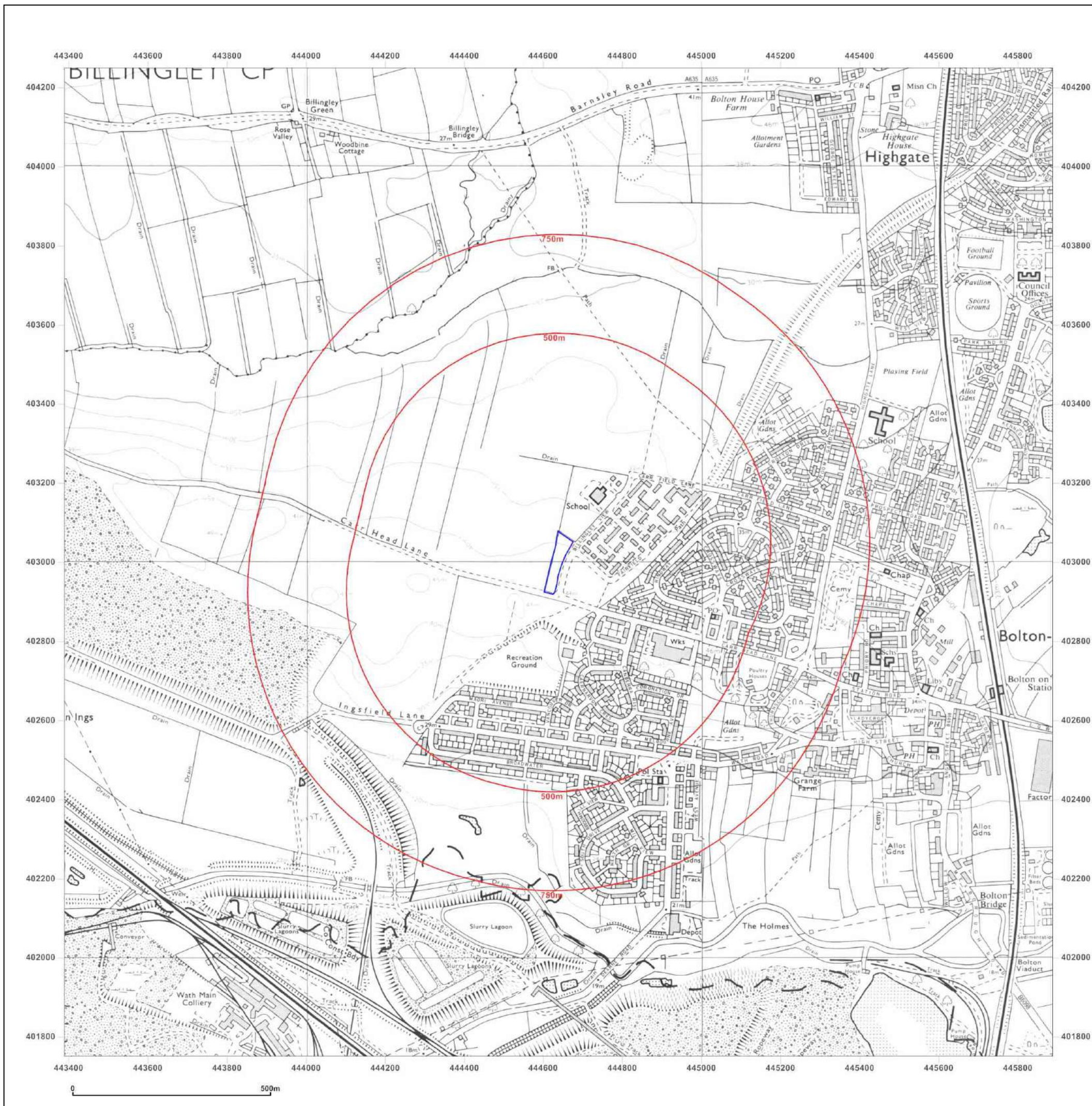


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S63 8BP

Client Ref: 101909_Billingley_View_PO23003918
Report Ref: GS-6173261
Grid Ref: 444638, 403000

Map Name: National Grid

Map date: 1988

Scale: 1:10,000

Printed at: 1:10,000



Surveyed 1983
Revised 1988
Edition N/A
Copyright 1989
Levelled 1978

Surveyed 1985
Revised 1986
Edition N/A
Copyright 1988
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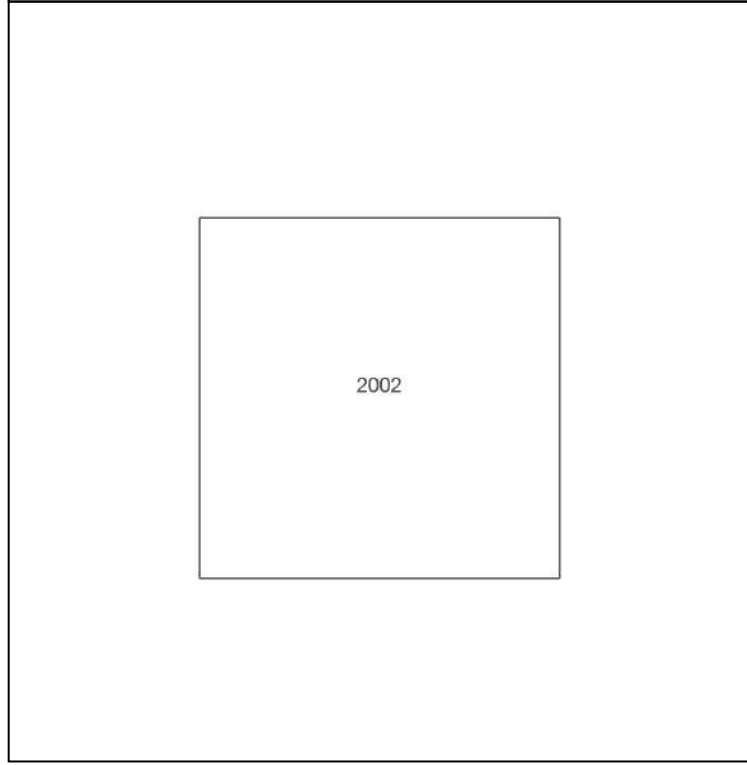
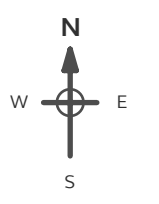


Site Details:

BILLINGLEY VIEW, BOLTON
UPON DEARNE, BARNSELY,
S63 8BP

Client Ref: 101909_Billingley_View_PO23003918
Report Ref: GS-6173261
Grid Ref: 444638, 403000

Map Name: 1:10,000 Raster
Map date: 2002
Scale: 1:10,000
Printed at: 1:10,000



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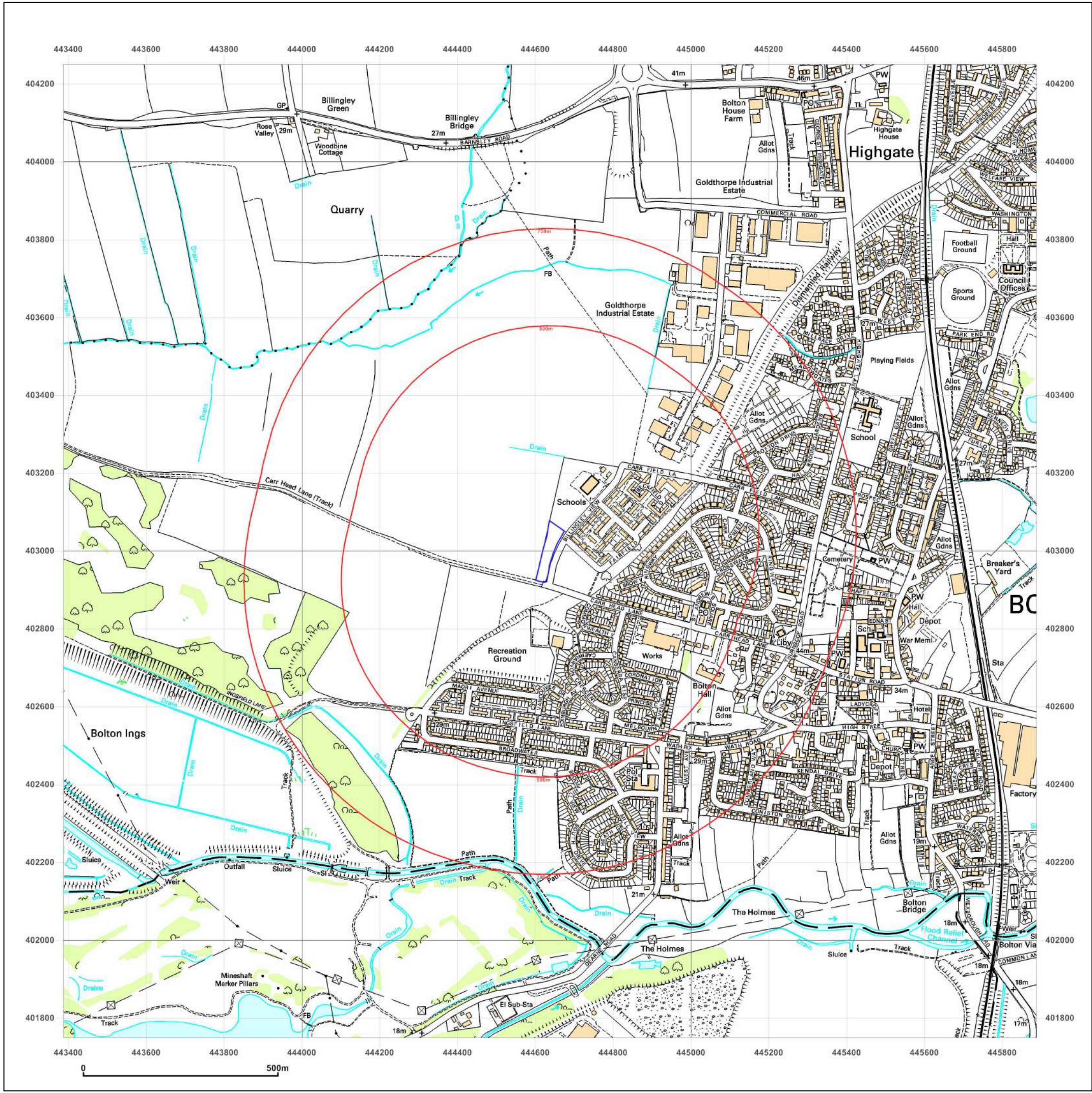


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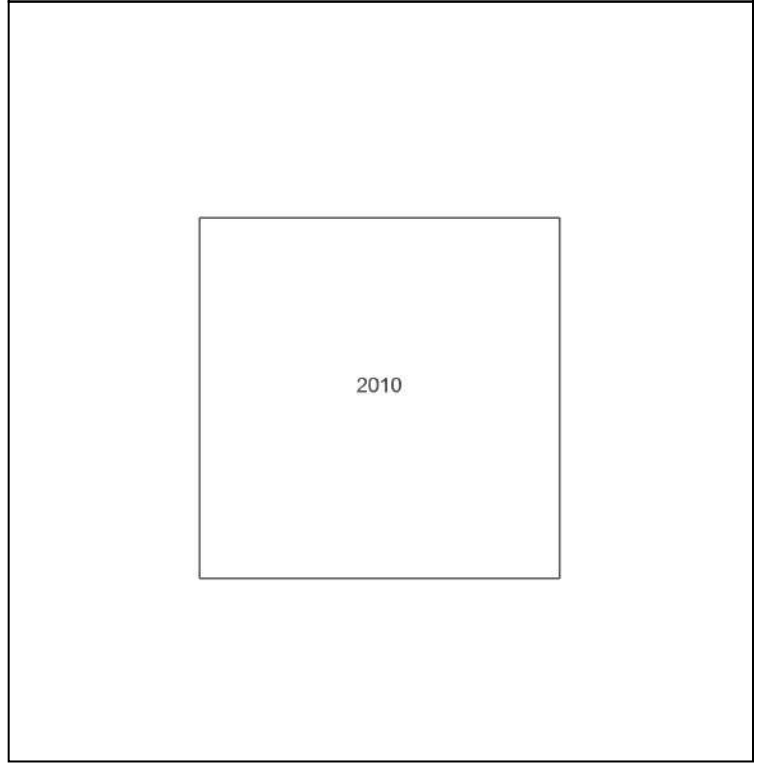
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Report Ref: GS-6173261
Grid Ref: 444638, 403000

Map Name: National Grid

Map date: 2010

Scale: 1:10,000

Printed at: 1:10,000

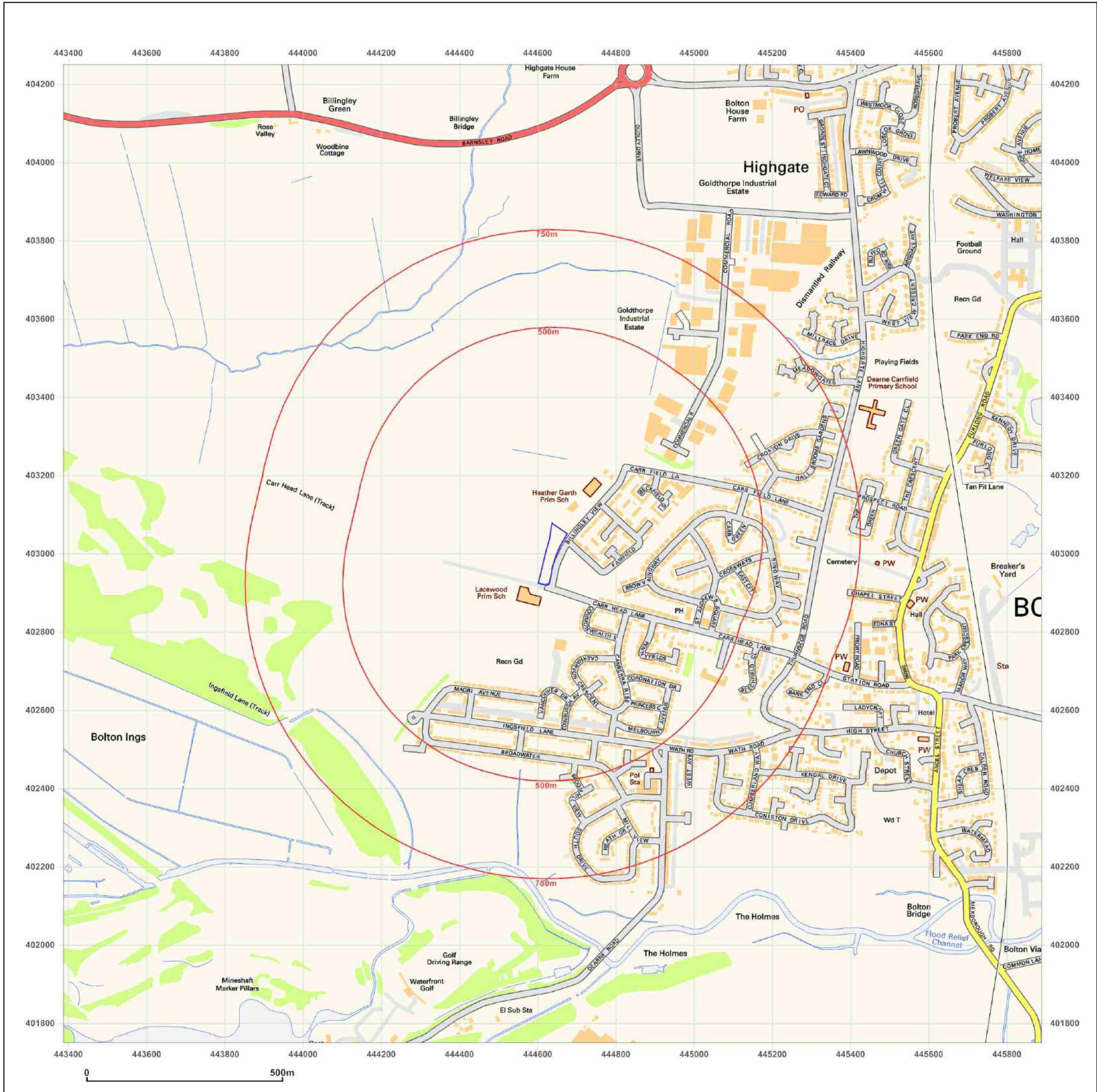


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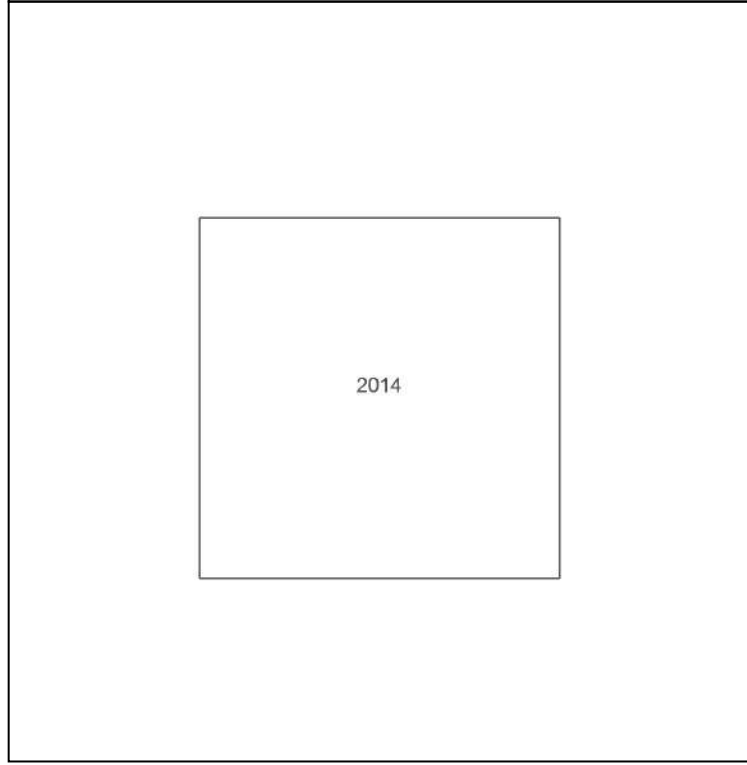
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Report Ref: GS-6173261
Grid Ref: 444638, 403000

Map Name: National Grid

Map date: 2014

Scale: 1:10,000

Printed at: 1:10,000



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