Abbeydale
Building Environment Consultants

MINING RISK ASSESSMENT REPORT

New Roundabout on A635 Barnsley Road

Goldthorpe, Barnsley, South Yorkshire

Report: 151089 MRA-F2

Date: November 2021

Client:
Barnsley Metropolitan Borough Council
1 Westgate,
Western street,
Barnsley,
S70 2DR

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MINING RISK ASSESSMENT REPORT

A635 Barnsley Road, Goldthorpe, Barnsley

DOCUMENT VERIFICATION SHEET

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Qualifications:	MSci FGS	BSc MSc CGeol FGS
Position:	Engineer	Managing Director
Signature:		

SUMMARY

Site Grid Ref:	444290 404020	**Site Level (m AOD):**	28- 30	**Site Area (ha):**	2.0

Anticipated Ground Conditions	**Development proposals:**	New roundabout and supporting embankment.
	Past site development:	A635 Barnsley Road and opencast mine in fields to south of highway.
	Made Ground:	Deep made ground associated with former opencast site, and shallower made ground from existing highway.
	Superficials:	Alluvium removed by former opencast mining operations.
	Bedrock:	Undifferentiated Middle Coal Measures, likely mudstone.
	Groundwater:	Groundwater anticipated in underlying bedrock sequence.
	Shallow mining:	Unrecorded shallow coal workings possible in Shafton Coal seam where outside former opencast area.
	Remediation:	Stabilisation of any unrecorded shallow mine workings may be required. Opencast backfill will be re-engineering; localised use of geogrid to moderate differential settlement where highwall identified.
	Highway Foundation:	At this stage a CBR of less than 2.5% should be assumed at formation level, requiring full construction thickness.
	Drainage:	Soakaways are not considered suitable. Off-site drainage will need to be considered.
	Further Investigation:	Ground Investigation recommended, including shallow mining investigation outside of former opencast area.

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A635 Barnsley Road, Goldthorpe, Barnsley

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MINING RISK ASSESSMENT REPORT

A635 Barnsley Road, Goldthorpe, Barnsley

1. INTRODUCTION

On behalf of Barnsley Metropolitan Borough Council (BMBC) a Mining Risk Assessment was carried out by Abbeydale Building Environment Consultants Ltd (Abbeydale BEC) on a section of the A635, Barnsley Road near Goldthorpe in South Yorkshire. The site is situated to the west of Goldthorpe at National Grid Reference 444290, 404020 with a site area of around 2.0 hectares (ha). See Figure 1.

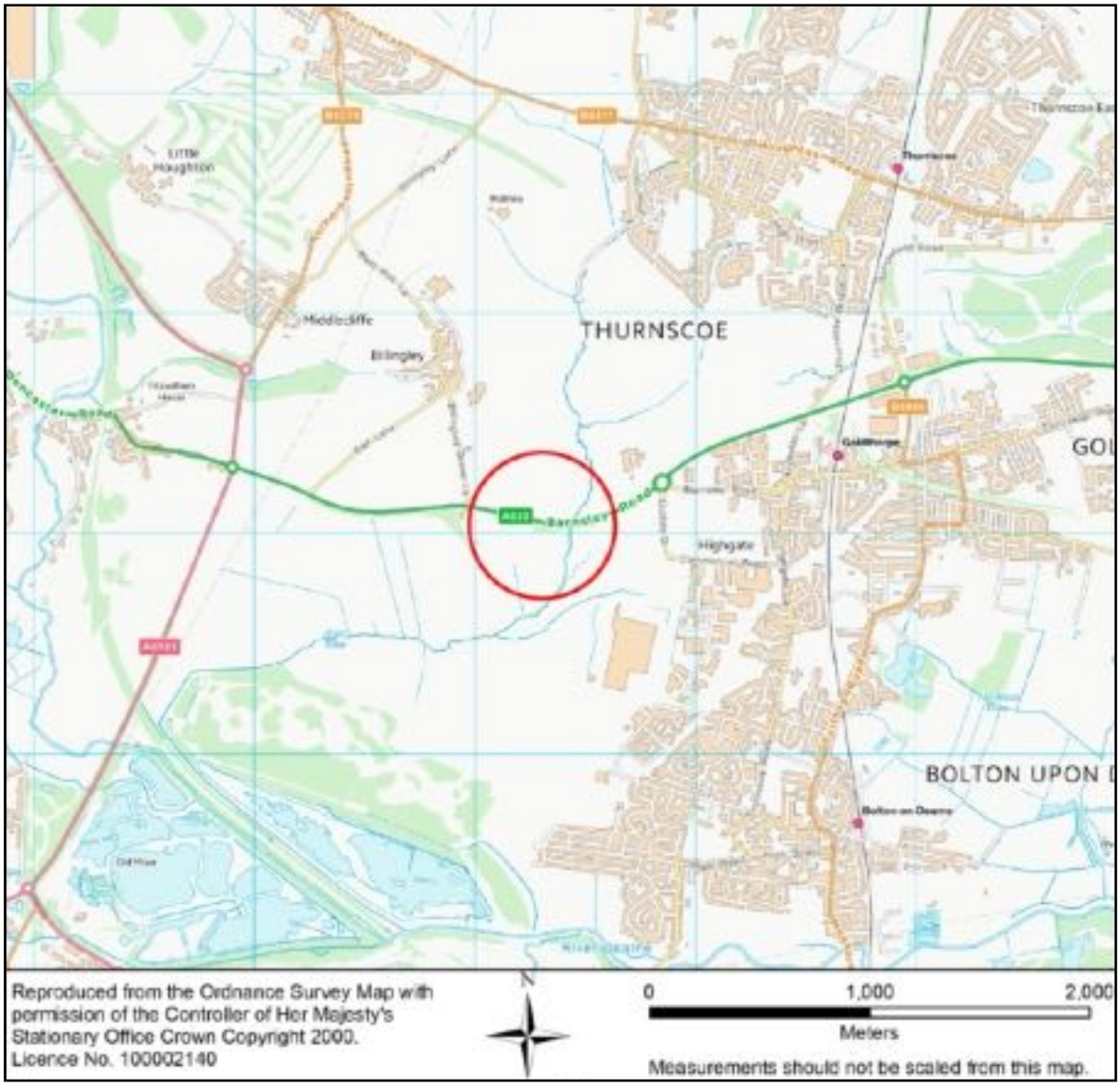

FIGURE 1 - LOCATION PLAN

This report was produced for our client, BMBC and should not be relied upon or transferred to any other parties without the express written authorisation of

Abbeydale BEC and our client. If any other unauthorised third party comes into possession of this report they rely on it at their own risk and the authors owe them no duty of care or skill.

The comments and recommendations presented in this Mining Risk Assessment report are based on the findings of a review of available information. There may be other conditions prevailing on the site which have not been recorded and therefore have not been taken into account by this report. Responsibility cannot be accepted for unrecorded information, or information relied upon that is later found to be inaccurate.

When writing this report the proposed development was for a new roundabout along the route of the existing A635 Barnsley Road near Goldthorpe. If there are changes to these proposals, then some modification to the comments and recommendations given may be required. The currently proposed layout of the new roundabout is shown on the plan in Appendix A.

This report is an updated version of a previous report (Ref:151089 Date: July 2019) following modification of the proposed roundabout location and road alignment.

2. OBJECTIVES

This report has been undertaken to evaluate the potential risk from shallow mining beneath the footprint of the proposed development. The report evaluates the current site proposals with regard to geotechnical and engineering considerations to determine what impact the anticipated ground conditions are likely to have on the integrity of the proposed new highway layout. As part of this evaluation the report gives recommendations on the proposed highway foundation, potential for past shallow mining activities and drainage.

3. THE SITE

As part of the Mining Risk Assessment a site walkover was undertaken on the 18th of June 2019, to visually assess the site for any signs of features that may be indicative of past mining activity or may require further investigation or assessment. The approximate locations of features noted during the walkover survey are shown on Figure 2, as well as any notable features from historical or geological records; discussed in subsequent section of this report. A detailed drawing showing the proposed highway configuration provided by BMBC is provided in Appendix A.

The fields in which the roundabout is proposed on the south side of the existing highway were being used to grow agricultural crops at the time of the walkover survey, and were partitioned using wooden post and metal wire fences. A section of the fencing was noted to have been flattened, allowing vehicular access between the fields. Some metals barbs were noted sticking out from the ground surface.

The field to the north of the existing highway consists of an open field used for growing crops, with a single tree. The ground rises to the north, towards farm buildings associated with a Christmas Tree farm.

The A635 highway runs on a roughly west-north-west to east-south-east in the vicinity of the proposed new roundabout, with an existing roundabout known as Cathill Roundabout around 1.4km to the west and the town of Goldthorpe in the order of 1km to the east. Undeveloped fields bound the highway to the north and south, currently used for agricultural purposes.

Two unsurfaced lay-bys are present to the west, staggered on both sides of the highway to allow access from both the eastbound and westbound carriageways.

The site is bound by open farmland in all directions with Carr Dike running north south to the east of the site. The site slopes gently down to the south.

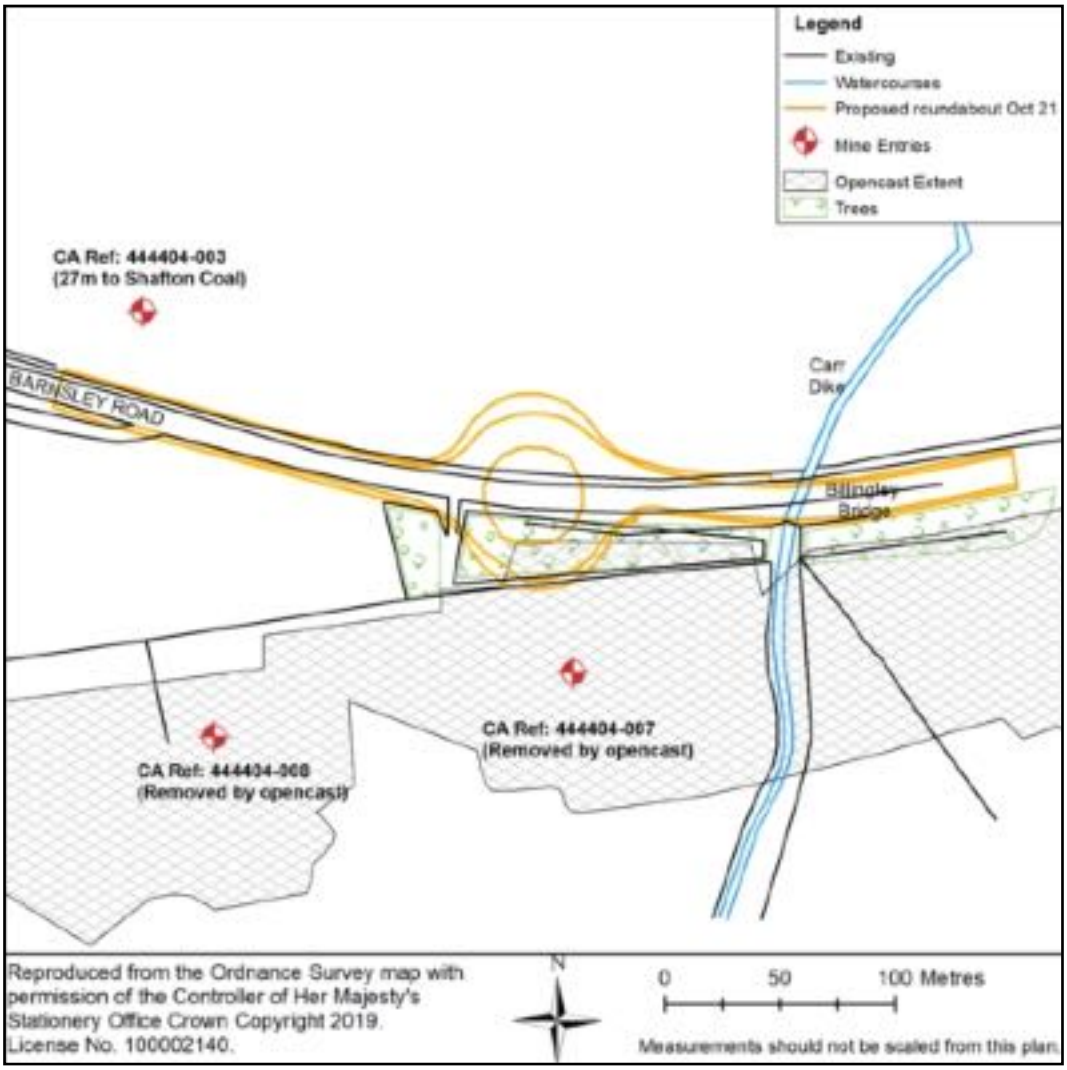

FIGURE 2 - SITE PLAN

Ground levels in the vicinity of the new roundabout have a gentle fall to the east along the existing highway. To the south of the highway ground levels are around 2m

to 2.5m lower than road level in the agricultural fields where the new roundabout is proposed. To the north of the existing highway, ground levels rise gently towards the north.

Access to the lower fields where the roundabout is proposed is currently via a partly tarmac covered track off the westbound carriageway of the A635 Barnsley Road; enclosed between two wooded areas to the east and west. Currently two large concrete troughs prohibit vehicular access down the track, however track marks indicate that this access is used by farm machinery working the fields below. Access to the northern field is gained through Billingley Christmas tree farm to the north.

A surface watercourse named Carr Dike flows under the existing A635 highway at the eastern extent of the scheme, flowing in a southerly direction; the highway crosses the watercourse over Billingley Bridge. Although the proposals are only to tie in to the existing highway in this area, the proposed supporting embankment will be within 5m of the surface watercourse and existing bridge.

4. HISTORY

The historic Ordnance Survey (OS) maps of the site and surrounding area have been obtained from Landmark Information Group, dated 12th June 2019; included as Appendix B. Where stated, measurements stated are approximate distances from the site boundaries to the recorded features.

The site and surrounding area are shown to be predominantly undeveloped on the earliest map of 1854, with the site area partitioned into several different fields. An isolated residential property around the annotation for “Billingley Green” around 70m west of the site. Thurnscoe Dike is shown a short distance beyond the eastern site boundary, which the highway crosses over Billingley Bridge. Another watercourse is shown to the east of Thurnscoe Dike, presumed to be culverted under the highway in this location. A quarry (roadstone) is depicted approximately 250m east of Thurnscoe Dike; the historical maps record this to have been infilled by the subsequent map of 1894.

By the early 1900s Goldthorpe Brick Works is shown on the OS maps in the order of 400m east of the site boundaries, with an associated excavation to the north of the brickworks buildings. The later map of 1931 annotates the brickworks as disused, however the outline of the former clay pit is depicted until the 1990s.

Although not depicted on the historic OS maps, opencasting of underlying coal resources is known to have taken place on the south side of the A635 highway within the vicinity of the site, dating to the early to mid-1990’s.

No further significant changes are understood to have occurred since backfilling of the opencast workings from either the historical maps or anecdotal evidence.

Other than changes to field boundary locations, no change is shown to occur in the field to the north of the highway, from the earliest map of 1854 where the area is a series of agricultural fields.

5. GEOLOGY

The geological survey maps of the area, Sheet SE40SW and Yorkshire County Series Sheet 275SE have been examined. The site is shown to be underlain by undifferentiated Middle Coal Measures, dipping to the north-west at around 3° to 5° from an assessment of outcrop patterns on the geological maps and underground contours on the County Series geological map.

The site is stratigraphically at the top of the Middle Coal Measures, above the Shafton Coal seam which is shown to outcrop just to the south of the site due to past extraction of the seam by opencast methods. The original crop of the seam is conjectured to have been around 120m further south prior to opencast operations.

The nearest surface geological fault is conjectured approximately 400m to the south of the site, trending north-west to south-east and downthrowing strata to the south-west. Numerous underground faults are recorded on the County Series geological sheet, predominantly within the Barnsley Coal seam, however faulting is also recorded in the Parkgate Coal in the south-west of the surrounding area.

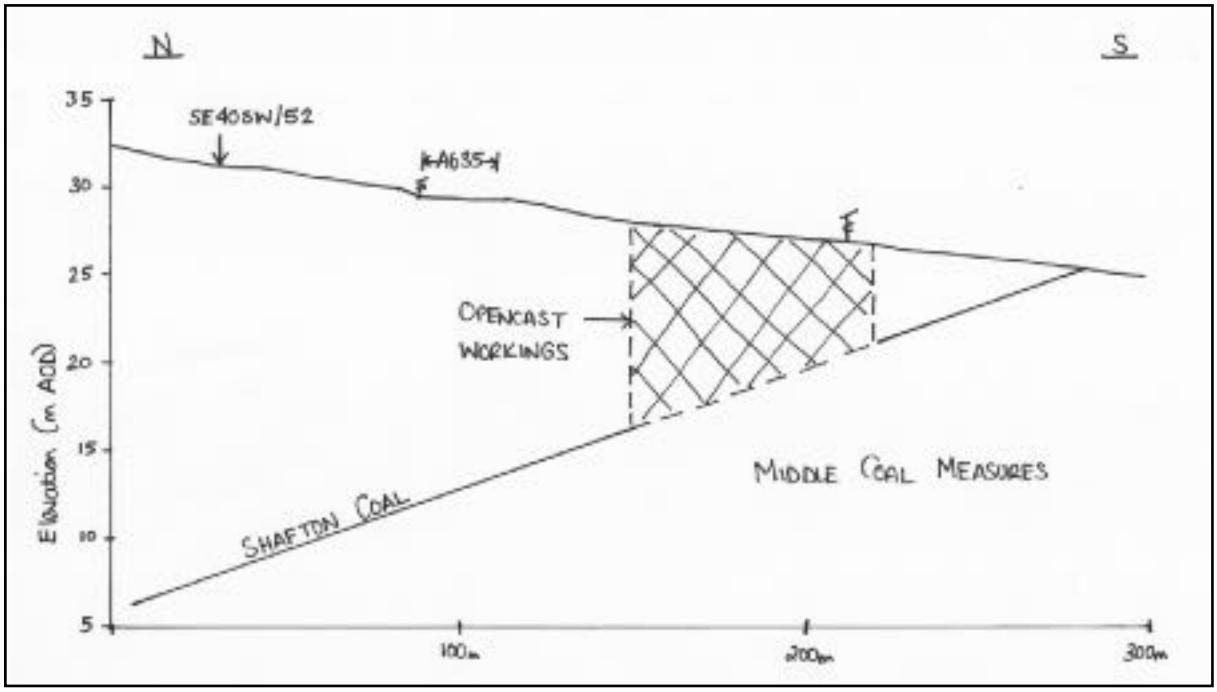

FIGURE 3 - GENERALISED SECTION (VERTICAL EXAGGERATION X 5)

Superficial drift deposits in the form of alluvium are recorded within the vicinity of Carr Dike and the adjacent surface watercourses, however past opencast mining will have removed these from across areas of the site where opencasting has occurred.

As highlighted above, made ground deposits associated with former opencast workings are recorded across the southern portion of the site; geological sheet SE40SW indicates the opencast was undertaken in two phases, with a conjectured line demarcating the different extents of the opencast phases.

The nearest deep BGS borehole located 300m east (Ref. SE40SW33), dated December 1968, however it is sunk up from 261m bgl in the Meltonfield Seam.

A preliminary geological section has been produced using the geological map to summarise the underlying geological sequence under the site; see Figure 3.

6. MINING RISK ASSESSMENT & QUARRYING

The presence of rock and mineral seams, including coal, which may have been mined or quarried in the area has been determined by the published geological maps and memoirs of the area, and the appended South Yorkshire Mining Advisory Service (SYMAS) report included in Appendix C.

Within the underlying geological sequence there are several named coal seams recorded to have been of economic importance, both at shallow depth; less than 30m below ground level (bgl), and a greater depth. As outlined in the following sections the geological records and SYMAS report have records of mining have occurred beneath the proposed roundabout by multiple extraction techniques.

6.1. Opencast Mining

The shallowest coal seam is anticipated to be the Shafton Coal, recorded to be around 1.4m thick in the locality. A shaft around 100m north-west of the site records the Shafton Coal at a depth of around 27.4m (90ft), however with the site up-dip of the seam it would be anticipated at shallower depth under the new roundabout.

The SYMAS report states the Shafton Coal seam is recorded to have been worked by opencast in the vicinity of the proposed roundabout scheme; the approximate extent of the opencast is recorded on the plan provided with the SYMAS report. It is noted that the extents of the opencast are based on the BGS geological map and that SYMAS do not hold any abandonment plan for the former opencast working.

From the available information the opencast highwall is likely to be present just north of the opencasted area, through the southern end of the proposed roundabout.

The opencast workings are recorded to have occurred some time in the early to mid 1990s; SYMAS estimated that the depth of opencast was up to 15m in the north.

6.2. Shallow Mine Workings

The SYMAS report indicates that historic shallow mine workings in the Shafton Coal were identified during the opencast workings, with three bell pits / shafts identified on the plan attached to the SYMAS report. For the two shafts in the southern field, the opencast workings removed any remnant coal and mining voids and the entire excavation was backfilled. The shaft in the northern field is described as disused, but no details relating to the capping of the shaft were given. However, the shaft is located ~150m from the location of the proposed roundabout, with the section of highway closest to the shaft shown to remain along its current route.

Although no historic mine shafts or coal pits are shown on the available geological maps or historical OS maps, there is the potential for the Shafton Coal to have been worked at shallow depth on the north side of the A635 highway in the past. Shallow mine workings may therefore exist to the north of the former opencast area, beneath the proposed roundabout.

No other potentially shallow depth coal seams are recorded to have been worked across the area. However, the risk of unrecorded shallow mine workings affecting the site is deemed to be **high** at this stage.

6.3. Deep Mining

The geological map indicates that the next named coal seam is the Sharlston Top Coal (formerly known as the Double Smuts Coal), around 65m to 70m below the Shafton Coal and beneath the Mexbrough Rock Sandstone unit. The Sharlston Top seam is noted to be split by dirt partings but in places contains up to 1.2m (4ft) of coal.

With underground faulting recorded in the Barnsley and deeper Parkgate Coal seams on the County Series geological map, this would indicate that deep mining of these seams has occurred beneath the site.

Underground contours on the County Series geological map suggest that the Barnsley Coal is likely to be present at an elevation of approximately -420m Below Ordnance Datum (BOD) (-13780ft) below the site. With ground levels of around 30m AOD in the vicinity of the site this would equate to the Barnsley Coal being at an estimated depth of 450m depth.

From the generalised stratigraphic column on the geological map the deeper Parkgate Coal would be anticipated around 250m below the Barnsley seam.

The resultant risk of any mining activities in the deep coal seams is only deemed to be **low**. The seams are sufficiently deep that collapse of any associated mine workings would not be considered to have the potential to affect the surface stability of proposed roundabout.

6.4. Mine Entries

One recorded mine entry (CA Ref: 444404-003) has been identified across the surrounding area, around 150m west of the new roundabout; the shaft is recorded to have extended to 27.43m (90ft) to the Shafton Coal.

In addition, two bell pits / shafts (CA Refs: 444403-008 & 444403-007) were uncovered during the former opencast excavation. It is understood that these were excavated out to their full depth as part of the opencast working, which was then fully backfilled once opencasting had ceased.

At this stage the presence of further unrecorded mine shafts / bell pits cannot be ruled out in areas where opencasting has not been undertaken, with an associated **moderate to high** risk.

The potential for any unrecorded shafts could be reconsidered on completion of an intrusive Ground Investigation.

7. ANTICIPATED GROUND CONDITIONS

The anticipated ground conditions have been interpreted from the geological maps of the area. At this stage the information should be used for guidance purposes only and confirmation of the actual ground conditions should be sought prior to design of the proposed new roundabout and supporting structures.

Some archive BGS borehole records have been identified across the surrounding area, however, these are either marked as being confidential and not freely available, or were bores sunk for nearby colliery shafts which start at a significant distance below ground. One of these to the east does however confirm the depth to the Double Smuts Coal (Sharlston Top Coal) at 67m depth, separated by the Mexborough Rock; in accordance with the generalised stratigraphical column on the geological map of the area.

A small portion of the footprint of the new roundabout is underlain by a recorded opencast site, which SYMAS indicate may be have extended to 15m depth. Although this was backfilled around 20 years ago, and was likely infilled using the arisings from the opencast excavation; it is not known if the backfill was placed to an engineering specification or what material was used to infill the opencast excavation.

The former opencast working will have resulted in the removal of the superficial alluvium from above the solid bedrock sequence.

Groundwater would be anticipated to be confined within the underlying bedrock sequence. However the potential for perched water in the former opencast workings should also be anticipated at shallower depth, particularly as superficial alluvium was originally present across much of the site and surrounding area.

8. GEOTECHNICAL CONSIDERATIONS

8.1. General

An updated proposed layout drawing was provided by BMBC when completing this report. It is proposed to construct a new roundabout along the route of the existing A635 highway to the west of Billingley Bridge. Due to differences in ground levels an embankment is proposed on the south side of the roundabout and existing carriageway. No details or proposed slope angles for the embankment were available at the time of reporting.

If there are changes to these proposals then some modification to the comments and recommendations given may be required.

8.2. Mining Precautions

An area of former opencast working of the Sharlston Coal is recorded through the southern edge of the proposed roundabout footprint. The approximate location of the highwall has been conjectured from the geological map of the area, however intrusive Ground Investigation will be required to better delineate the location and geometry of the highwall to determine the potential implications on the proposed roundabout and associated geotechnical remedial works required to mitigate the increase potential for differential settlement when constructing over the highwall.

Outside of the opencast area there is potential for unrecorded shallow working of the Shafton Coal, which could have the potential to affect the surface stability of the site depending on the depth and thickness of any shallow workings in the seam. Based on the Mining Risk Assessment information the resultant risk of shallow mine workings affecting the site is considered to be **moderate to high**.

It would therefore be recommended to include a shallow mining investigation as part of the scope of intrusive Ground Investigation works to confirm the depth and state of the Shafton Coal, or associated mine workings, beneath the proposed roundabout.

If mine workings are identified with insufficient rock cover then drilling and grouting may be required prior to construction of the roundabout and supporting embankment, to consolidate the workings and negate the potential for any collapse that may propagate to the ground surface.

8.3. Highway Construction

The Mining Risk Assessment has indicated that significant variation in ground conditions are anticipated under the footprint of the proposed roundabout, with an associated increase in the potential for differential settlement and ground movement.

Prior to any highway design work it would be recommended to carry out an intrusive Ground Investigation to confirm the ground conditions present and determine the depth to a suitable founding stratum. As highlighted above this should include investigation to better delineate the location of the opencast highwall and its implications on the proposed roundabout. It is likely that re-engineering of at least some of the opencast backfill will be required, with mechanical stabilisation through the use of geogrids to help mitigate any increased potential for differential movement when building over the highwall.

The full depth of the former opencast should also be confirmed, including a geotechnical assessment of the backfill materials used and geotechnical testing of natural soils outside of the former opencast.

At this stage it would be recommended that an assumed California Bearing Ratio (CBR) of less than 2.5% is assumed, requiring full thickness highway construction. Once the ground conditions are known it may be possible to refine this preliminary assumed CBR of less than 2.5% based on the identified ground conditions and geotechnical assessment of the materials encountered.

8.4. Proposed Embankment

No information has been provided regarding the proposed angle of the proposed embankment on the south side of the roundabout, or the materials proposed to form the embankment.

Any unrecorded shallow mine workings will need to have been stabilised prior to constructing the embankment.

To provide positive drainage of the embankment and provide a uniform regulatory layer it would be recommended to install a granular starter layer at the base of the proposed embankment.

8.5. Drainage

All drainage measures will need to be designed in accordance with Sustainable Urban Drainage Systems (SUDS) requirements.

Based on the anticipated ground conditions soakaway drainage is not considered to be suitable for the proposed roundabout or associated embankment, particularly with the potential for increased inundation settlement of the opencast backfill if discharging water into the subsurface.

With Carr Dike a short distance to the east it may be possible to drain directly into this watercourse, however petrol interceptors and surface water attenuation is likely to be required before discharging into the watercourse, to protect the fluvial environment and control discharge respectively.

Alternatively attenuation and off-site drainage into the existing highway drainage network may be suitable.

8.6. Chemical Precautions

Without undertaking chemical analysis of any made ground and natural soils on the site it should be assumed that sulphate resistant concrete is required at this stage. Water supply pipes should would also need to be resistant to any chemical contamination.

However, due to the potential for salting of the roundabout and adjacent highway during periods of adverse weather, sulphate resistant cement would be recommended for any concrete substructures.

9. FURTHER INVESTIGATION

Based on the findings of the Mining Risk Assessment undertaken it would be recommended to carry out an intrusive Ground Investigation to confirm the ground conditions present and facilitate a geotechnical assessment of the existing soils and weathered bedrock.

Prior to undertaken any investigation works in the wooded areas on either side of the access track into the lower fields some vegetation clearance works would be required to provide access for investigation plant.

This scope of investigation should aim to better delineate the location and geometry of the highwall of the former opencast workings. As a first phase of investigation of the highwall we would recommend mechanically excavating a series of trial trenches over the conjectured position of the highwall, noting where the natural strata fall away, demarcating the highwall location.

Where the highwall drops away beyond the reach of the excavator, and to positively confirm the depth of the opencast backfill, a series of Cable Percussive (Shell & Auger) boreholes should be undertaken. As part of the boring in situ Standard Penetration Tests (SPTs) would be undertaken to provide relative strength information for the backfilled opencast.

Using Cable Percussive techniques would also allow undisturbed samples of the opencast backfill materials to be taken and geotechnical laboratory testing could be undertaken to assess the shear strength and settlement characteristics of the backfill materials.

Where outside of the opencast areas a series of windowless sample holes would provide the most economical and least disruptive means of investigating, and would also allow SPTs to be undertaken, providing in situ relative strength information for geotechnical design purposes.

However, if access across the fields was not sufficient for a windowless sample rig, a series of mechanically excavated trial pits could be undertaken to confirm the shallow ground conditions and allow samples to be collected for subsequent laboratory testing. It would also be recommended to carry out some trial pits within

the former opencast workings to allow bulk disturbed samples of the soils to be obtained.

To confirm the depth and state of the Shafton Coal beneath the site a series of rotary openhole boreholes should be undertaken outside the extents of the former opencast workings. As no other potential shallow depth coal seams are anticipated in the underlying geological sequence, the recommended shallow mining investigation can be limited to at least 1m below the basal depth of the Shafton Coal seam or associated workings. A permit to drill would need to be obtained from the Coal Authority before undertaking the shallow mining investigation works.

To assess the underlying groundwater regime under the site a number of monitoring standpipes should be installed across the site, including both within the extents of former opencast workings and surrounding areas beyond the opencast activities. Whilst on site it would also be prudent to measure ground gas emissions from the monitoring standpipes, particularly if signs of shallow mine workings are identified. Depending on the findings of the post-investigation monitoring a minimum of 4 visits would be proposed.

Report 151089MRA-F2 | November 2021

APPENDIX A - PROPOSED LAYOUT PLAN

DO NOT SCALE

NOTES

GENERAL NOTES

a. THE TOPOGRAPHICAL SURVEY IS BASED ON INFORMATION PRODUCED BY HH SURVEYS, DRAWING NO. BAB/589/GP, DATED 16 SEPTEMBER 2021. THE INFORMATION USED IN PREPARATION OF THIS AND ALL OTHER TOPOGRAPHICAL INFORMATION SHOWN ON DRAWINGS IS NOT WARRANTED TO BE CORRECT. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY ALL SURVEY INFORMATION PROVIDED AND REPORT ANY ANOMALIES TO FORE CONSULTING.

DESIGN NOTES

1. ALL DESIGN AND WORKS TO COMPLY WITH CURRENT VERSION OF THE FOLLOWING DOCUMENTS:
   - DESIGN MANUAL FOR ROADS AND BRIDGES (DMRB);
   - SPECIFICATION FOR HIGHWAY WORKS (SHW);
   - MANUAL FOR STREETS (MFS); AND
   - BARNSLEY METROPOLITAN BOROUGH COUNCIL (BMBC) DESIGN GUIDE AND SPECIFICATION.
2. FOOTPATH GRADIENT AT TACTILE PAVING TO BE A MAXIMUM OF 1:12.
3. EXISTING FENCES, VERGES/SHUBBERY, FOOTWAY, AND OTHER PHYSICAL FEATURES TO BE REMOVED WITHIN THE AREA OF WORKS.
4. ALL KERBS TO BE HB2, EXCEPT DROPPED KERBS AT PEDESTRIAN CROSSING.
5. ALL IRONWORK WITHIN EXTENT OF WORKS TO BE LOWERED / RAISED AS REQUIRED.
6. ALL PROPOSED ROAD MARKINGS TO BE IN ACCORDANCE WITH THE FOLLOWING:
   - TRAFFIC SIGNS REGULATIONS AND GENERAL DIRECTIONS (TSRGD);AND
   - TRAFFIC SIGNS MANUALS CHAPTER 5 - ROAD MARKINGS.
7. A635 DESIGN SPEED: 60mph
8. EARTHWORKS SLOPES TO BE MAXIMUM 1:3.
9. CHANNEL BLOCKS TO BE INSTALLED ALONG ALL THE NEW KERBS.

KEY

- CARRIAGEWAY
- FOOT/CYCLEWAY
- TACTILE PAVING (UNCONTROLLED CROSSING)
- BLOCK PAVING
- GRASS VERGE
- EARTHWORKS/LANDSCAPING

REV	DESCRIPTION	DATE	BY
E	CHANGES FOLLOWING COMMENTS	12.10.21	ML
D	TOPO SURVEY UPDATED	28.09.21	ML
C	CHANGES FOLLOWING COMMENTS	31.08.21	ML
B	CHANGES FOLLOWING COMMENTS	22.07.21	ML
A	CHANGES FOLLOWING COMMENTS	19.07.21	ML

Client:
BARNSLEY METROPOLITAN BOROUGH COUNCIL

Project
PROPOSED ROUNDABOUT A635 GOLDTHORPE

Drawing Title
GENERAL ARRANGEMENT

PRELIMINARY

Fore Consulting Limited
1st Floor, 15 St Paul's Street
Leeds
LS1 2JG
0113 2460204
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Drawn by	Checked by	Issue Date	Scale	Format
ML	PI	01.07.2021	1:500	A0

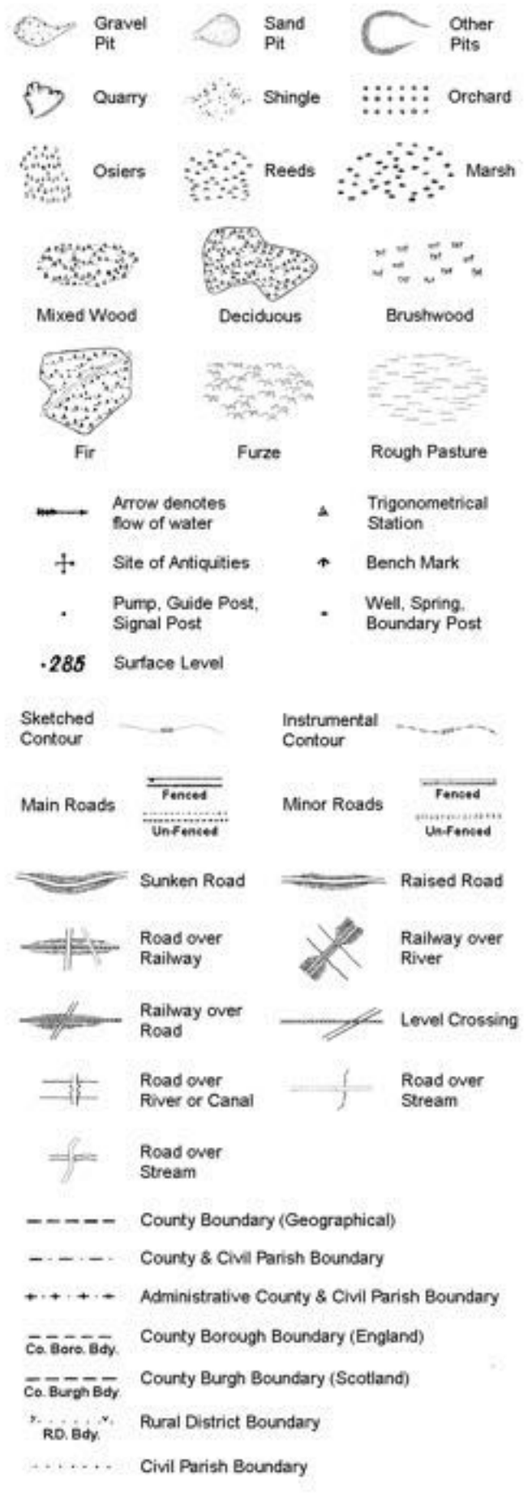
Job Number	Drawing Number	Revision
3465	100-SK-001	E

File name: E:\3465 Goldthorpe\3465-100-SK-001-E GENERAL ARRANGEMENT.dwg Plot date: 18 October 2021 08:42:54

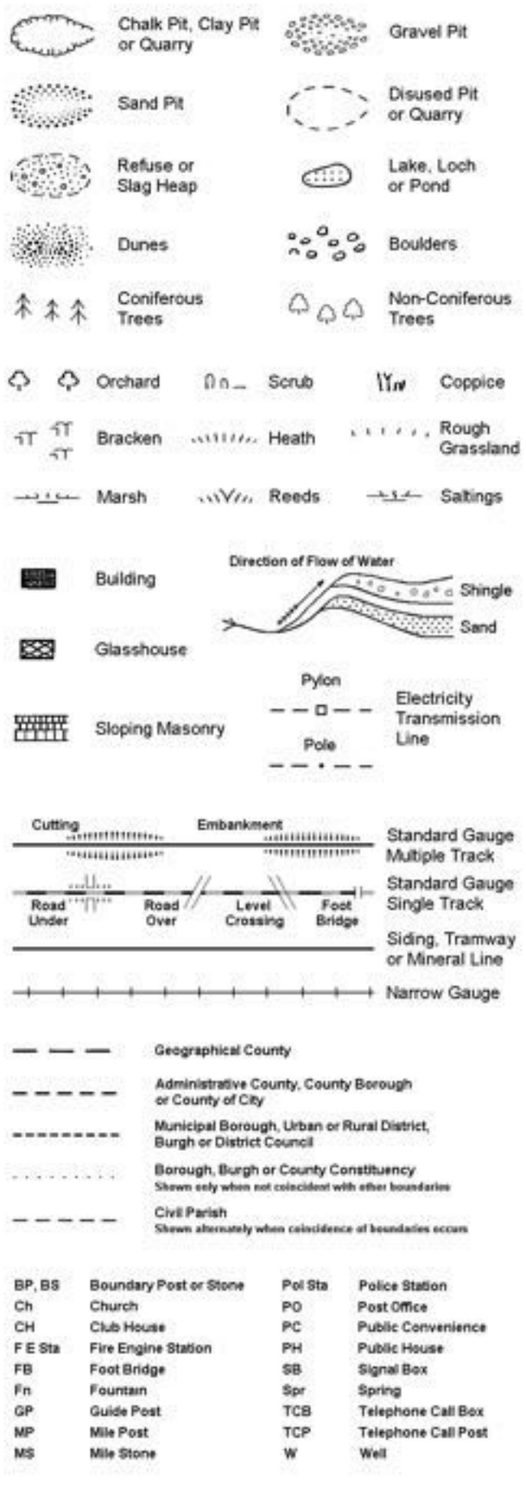
APPENDIX B - HISTORICAL MAPS

Historical Mapping Legends

Ordnance Survey County Series 1:10,560

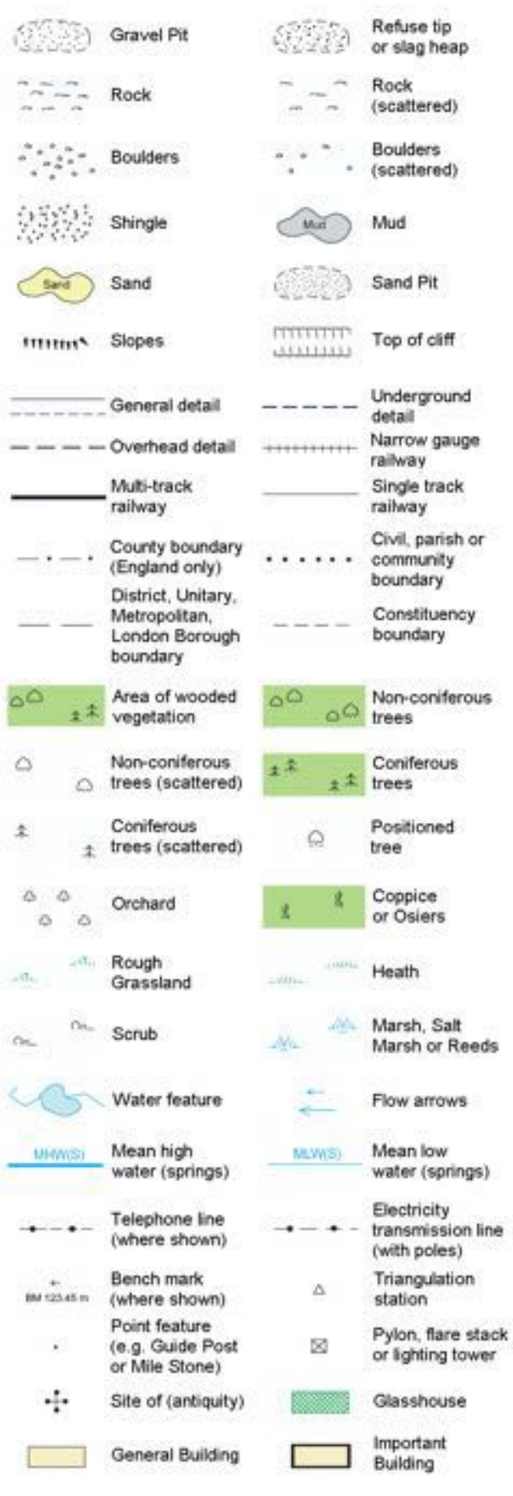


Ordnance Survey Plan 1:10,000



BP, BS	Boundary Post or Stone	Pol Sta	Police Station
Ch	Church	PO	Post Office
CH	Club House	PC	Public Convenience
F E Sta	Fire Engine Station	PH	Public House
FB	Foot Bridge	SB	Signal Box
Fn	Fountain	Spr	Spring
GP	Guide Post	TCB	Telephone Call Box
MP	Mile Post	TCP	Telephone Call Post
MS	Mile Stone	W	Well

1:10,000 Raster Mapping



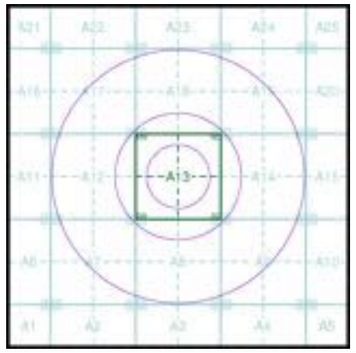
Envirocheck®

LANDMARK INFORMATION GROUP®

Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Yorkshire	1:10,560	1854 - 1855	2
Yorkshire	1:10,560	1893	3
Yorkshire	1:10,560	1894	4
Yorkshire	1:10,560	1905 - 1906	5
Yorkshire	1:10,560	1931 - 1932	6
Yorkshire	1:10,560	1938	7
Yorkshire	1:10,560	1948 - 1950	8
Ordnance Survey Plan	1:10,000	1955 - 1956	9
Ordnance Survey Plan	1:10,000	1966 - 1967	10
Ordnance Survey Plan	1:10,000	1976	11
Ordnance Survey Plan	1:10,000	1980 - 1988	12
Ordnance Survey Plan	1:10,000	1989	13
Ordnance Survey Plan	1:10,000	1991	14
10K Raster Mapping	1:10,000	2000	15
10K Raster Mapping	1:10,000	2006	16
VectorMap Local	1:10,000	2019	17

Historical Map - Slice A



Order Details

Order Number: 207258952_1_1
Customer Ref: 151089
National Grid Reference: 444290, 404020
Slice: A
Site Area (Ha): 0.01
Search Buffer (m): 1000

Site Details

Proposed roundabout off A635 Barnsley Road, Goldthorpe, BARNSLEY

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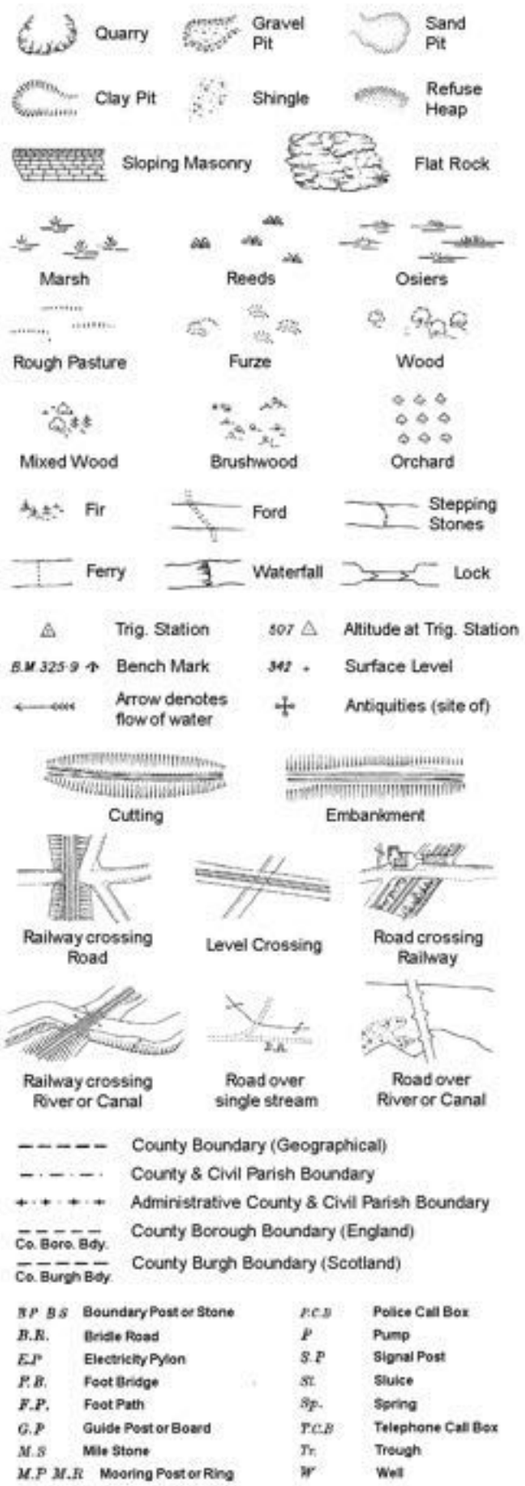
Historical Mapping Legends

Ordnance Survey County Series and Ordnance Survey Plan 1:2,500

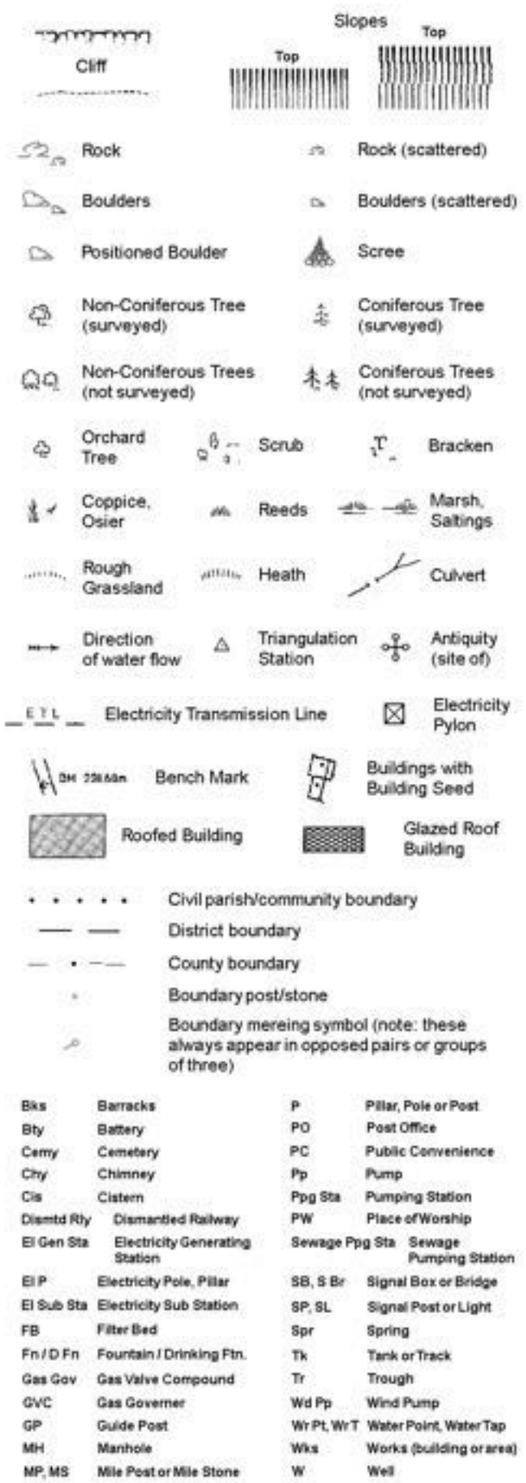


B.P B.S	Boundary Post or Stone	P.C.B	Police Call Box
B.R.	Bridle Road	P	Pump
E.P	Electricity Pylon	S.P	Signal Post
F.B.	Foot Bridge	Sl.	Sluice
F.P.	Foot Path	Sp.	Spring
G.P	Guide Post or Board	T.C.B	Telephone Call Box
M.S	Mile Stone	Tr.	Trough
M.P M.R	Mooring Post or Ring	W	Well

Ordnance Survey Plan, Additional SIMs and Supply of Unpublished Survey Information 1:2,500 and 1:1,250

BH	Beer House	P	Pillar, Pole or Post
BP, BS	Boundary Post or Stone	PO	Post Office
Cn, C	Capstan, Crane	PC	Public Convenience
Chy	Chimney	PH	Public House
D Fn	Drinking Fountain	Pp	Pump
El P	Electricity Pillar or Post	SB, S Br	Signal Box or Bridge
FAP	Fire Alarm Pillar	SP, SL	Signal Post or Light
FB	Foot Bridge	Spr	Spring
GP	Guide Post	Tk	Tank or Track
H	Hydrant or Hydraulic	TCB	Telephone Call Box
LC	Level Crossing	TCP	Telephone Call Post
MH	Manhole	Tr	Trough
MP	Mile Post or Mooring Post	Wr Pt, Wr T	Water Point, Water Tap
MS	Mile Stone	W	Well
NTL	Normal Tidal Limit	Wd Pp	Wind Pump

Large-Scale National Grid Data 1:2,500 and 1:1,250



Bks	Barracks	P	Pillar, Pole or Post
Bty	Battery	PO	Post Office
Cemy	Cemetery	PC	Public Convenience
Chy	Chimney	Pp	Pump
Cis	Cistern	Ppg Sta	Pumping Station
Dismtd Rly	Dismantled Railway	PW	Place of Worship
El Gen Sta	Electricity Generating Station	Sewage Ppg Sta	Sewage Pumping Station
El P	Electricity Pole, Pillar	SB, S Br	Signal Box or Bridge
El Sub Sta	Electricity Sub Station	SP, SL	Signal Post or Light
FB	Filter Bed	Spr	Spring
Fn / D Fn	Fountain / Drinking Ftn.	Tk	Tank or Track
Gas Gov	Gas Valve Compound	Tr	Trough
GVC	Gas Governer	Wd Pp	Wind Pump
GP	Guide Post	Wr Pt, Wr T	Water Point, Water Tap
MH	Manhole	Wks	Works (building or area)
MP, MS	Mile Post or Mile Stone	W	Well

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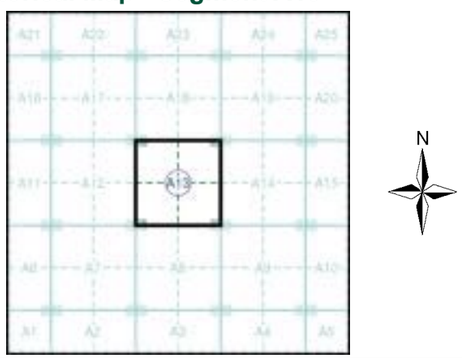
Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Yorkshire	1:2,500	1892	2
Yorkshire	1:2,500	1906	3
Yorkshire	1:2,500	1930	4
Ordnance Survey Plan	1:2,500	1962	5
Additional SIMs	1:2,500	1962	6
Additional SIMs	1:2,500	1978 - 1988	7
Ordnance Survey Plan	1:2,500	1984	8
Additional SIMs	1:2,500	1988	9
Large-Scale National Grid Data	1:2,500	1993	10
Large-Scale National Grid Data	1:1,250	1993	11
Large-Scale National Grid Data	1:2,500	1995	12
Historical Aerial Photography	1:2,500	1999	13

Historical Map - Segment A13



Order Details

Order Number: 207258952_1_1
Customer Ref: 151089
National Grid Reference: 444290, 404020
Slice: A
Site Area (Ha): 0.01
Search Buffer (m): 100

Site Details

Proposed roundabout off A635 Barnsley Road, Goldthorpe, BARNSLEY

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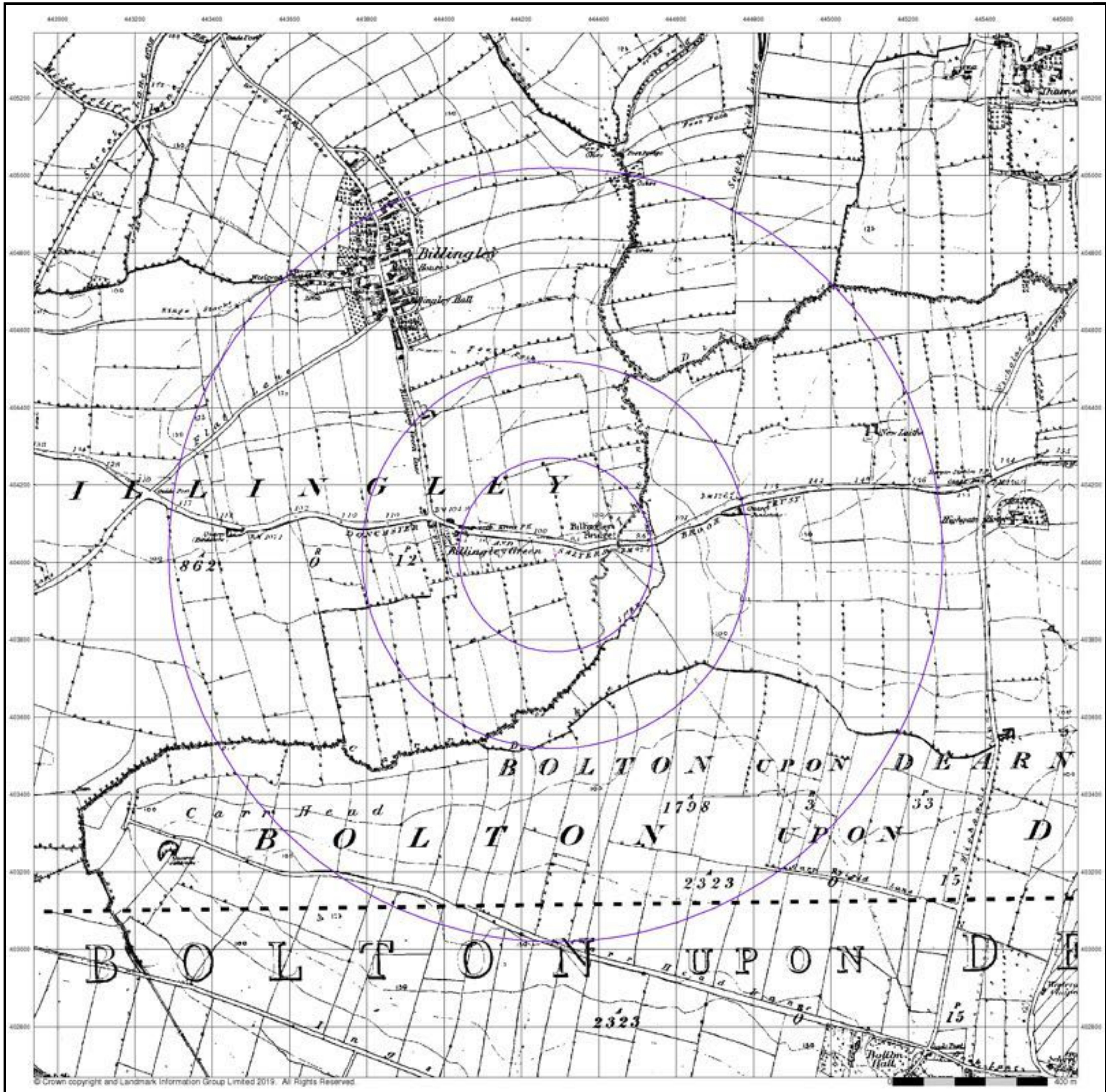

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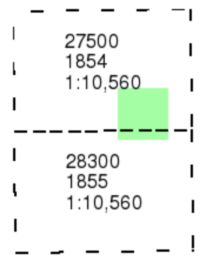
Yorkshire

Published 1854 - 1855

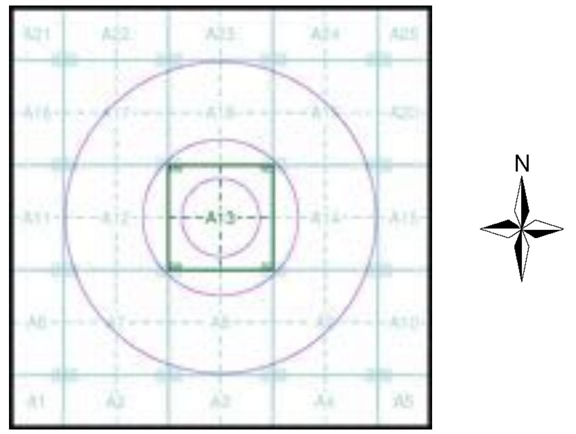
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

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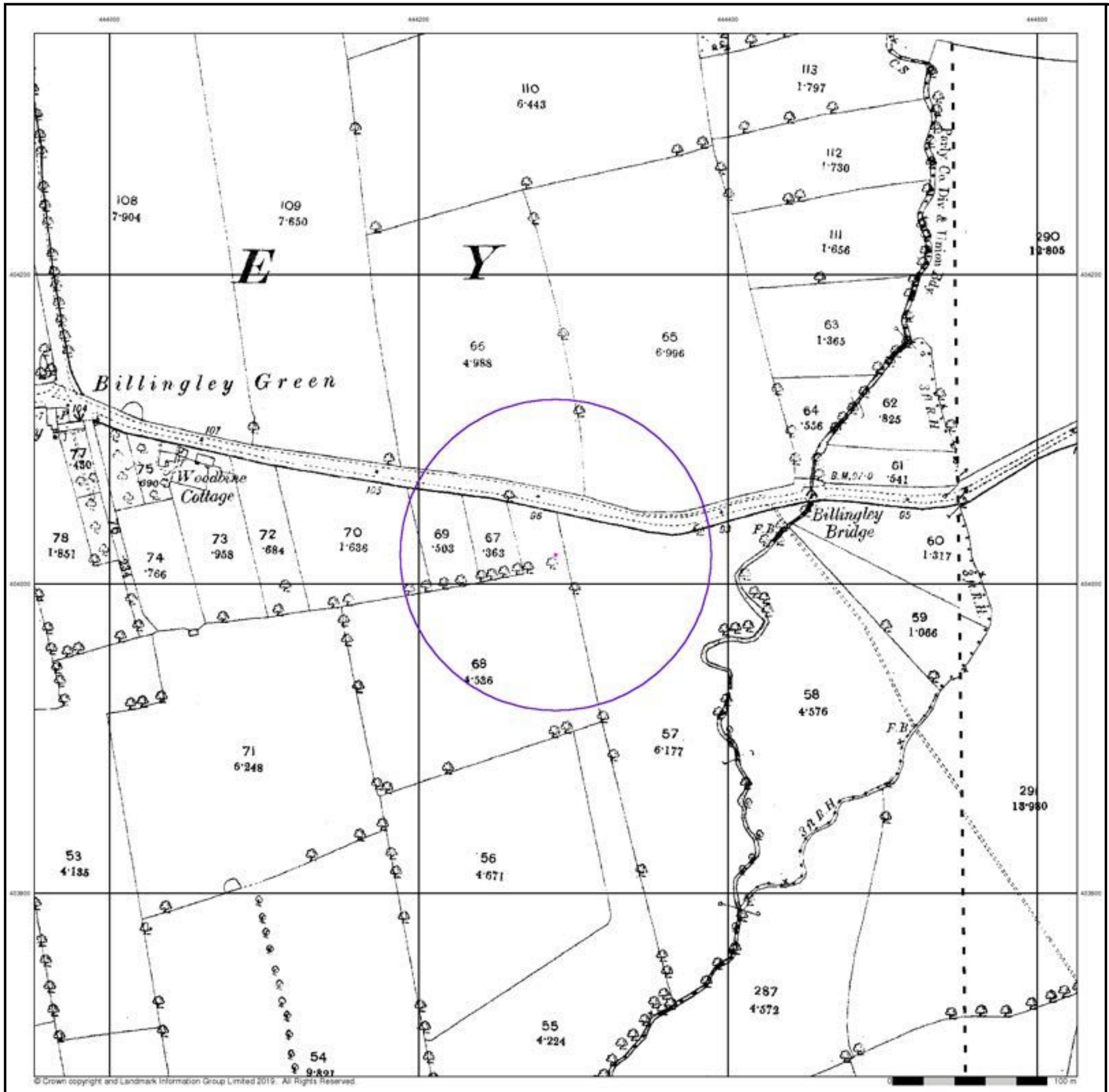

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LANDMARK INFORMATION GROUP

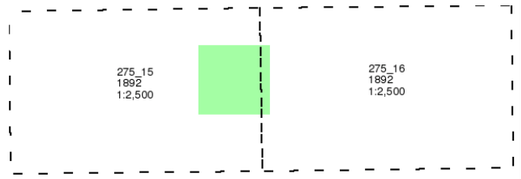
Yorkshire

Published 1892

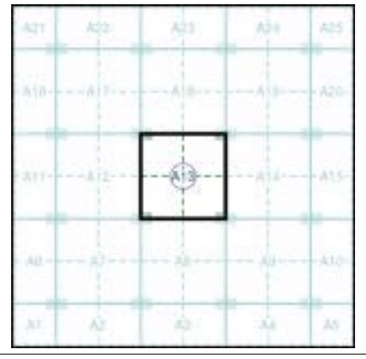
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	207258952_1_1
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Slice:	A
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Search Buffer (m):	100

Site Details

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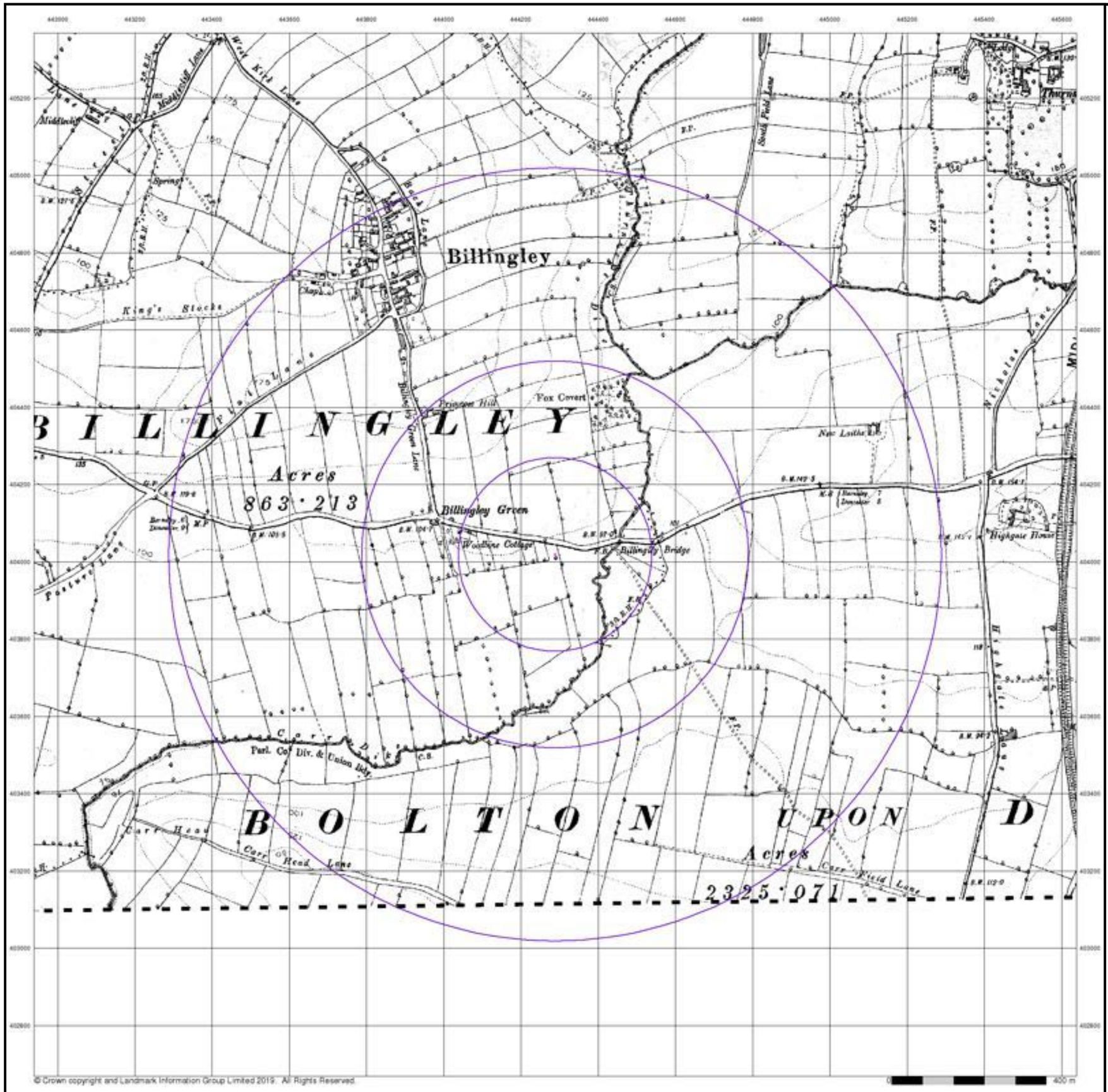

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Yorkshire

Published 1894

Source map scale - 1:10,560

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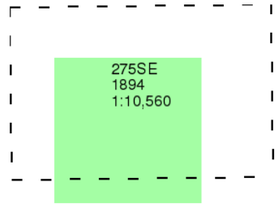
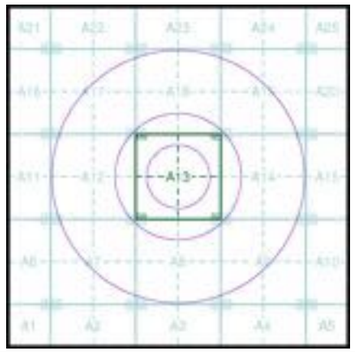
Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

Order Number:	207258952_1_1
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Slice:	A
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Search Buffer (m):	1000

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Yorkshire

Published 1905 - 1906

Source map scale - 1:10,560

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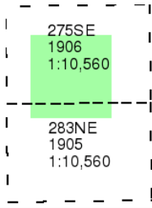
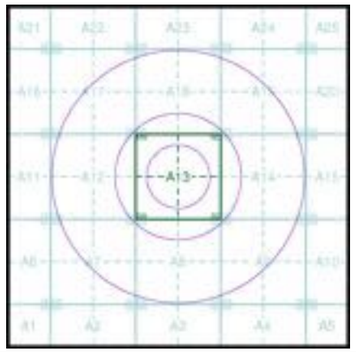
Map Name(s) and Date(s)



Historical Map - Slice A



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Customer Ref:	151089
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Site Details

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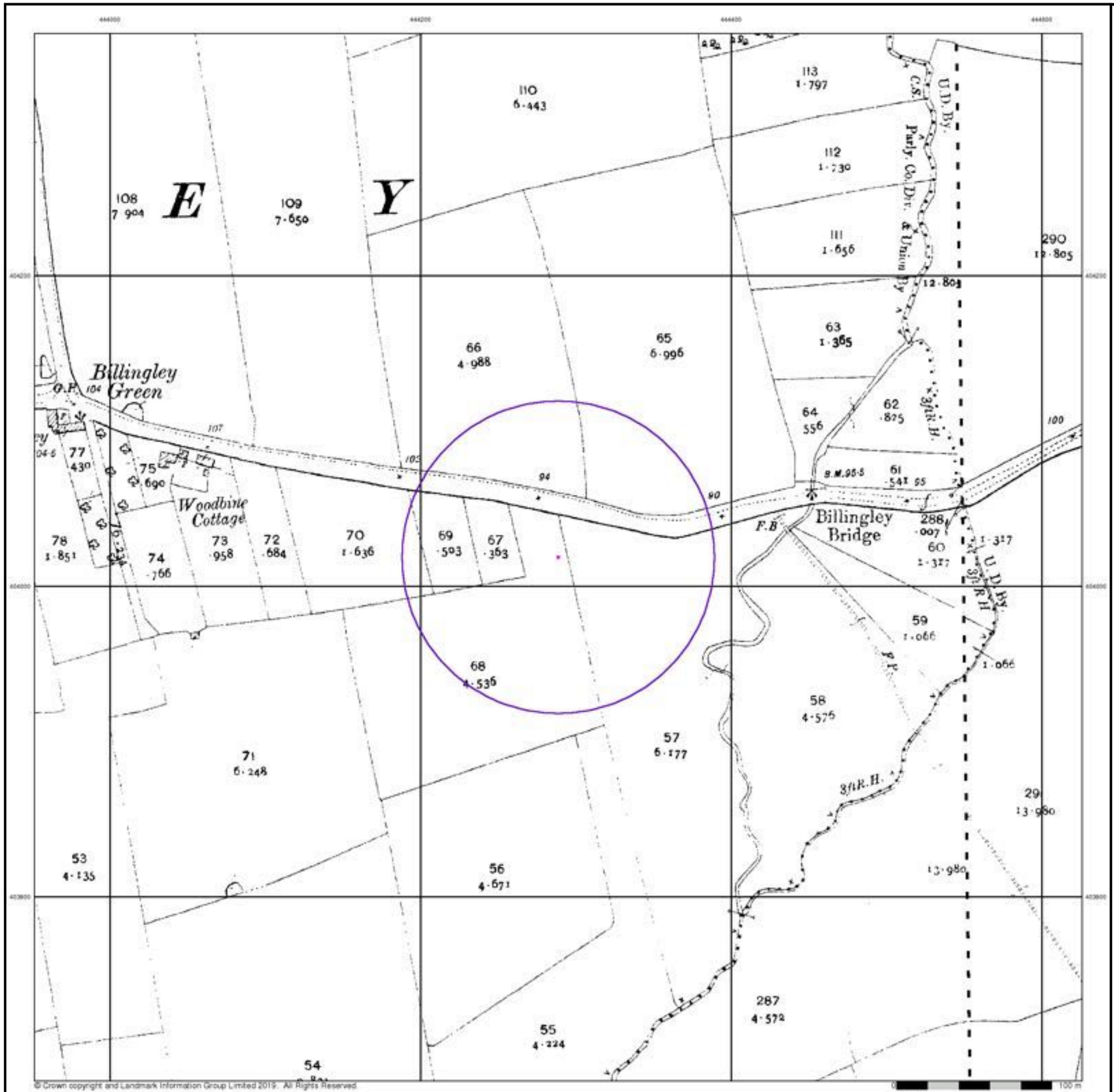

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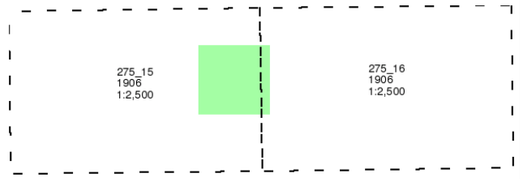
Yorkshire

Published 1906

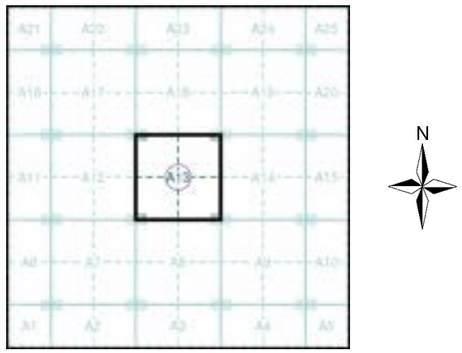
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	207258952_1_1
Customer Ref:	151089
National Grid Reference:	444290, 404020
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	100

Site Details

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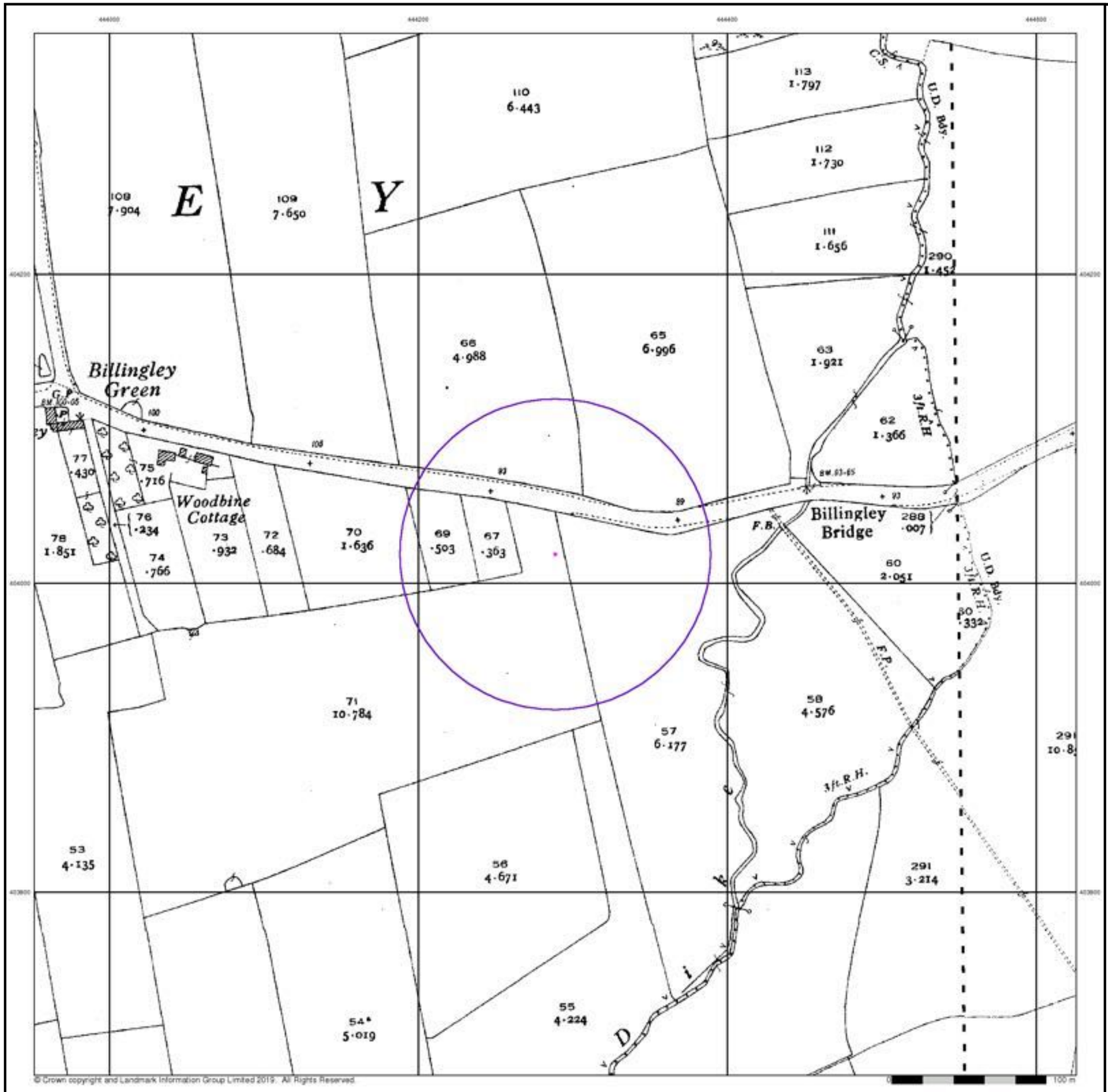

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LANDMARK INFORMATION GROUP®

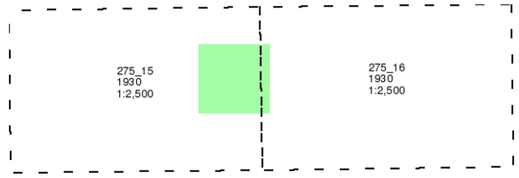
Yorkshire

Published 1930

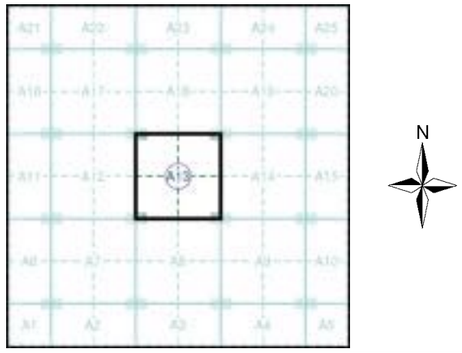
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	207258952_1_1
Customer Ref:	151089
National Grid Reference:	444290, 404020
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	100

Site Details

Proposed roundabout off A635 Barnsley Road, Goldthorpe, BARNSLEY

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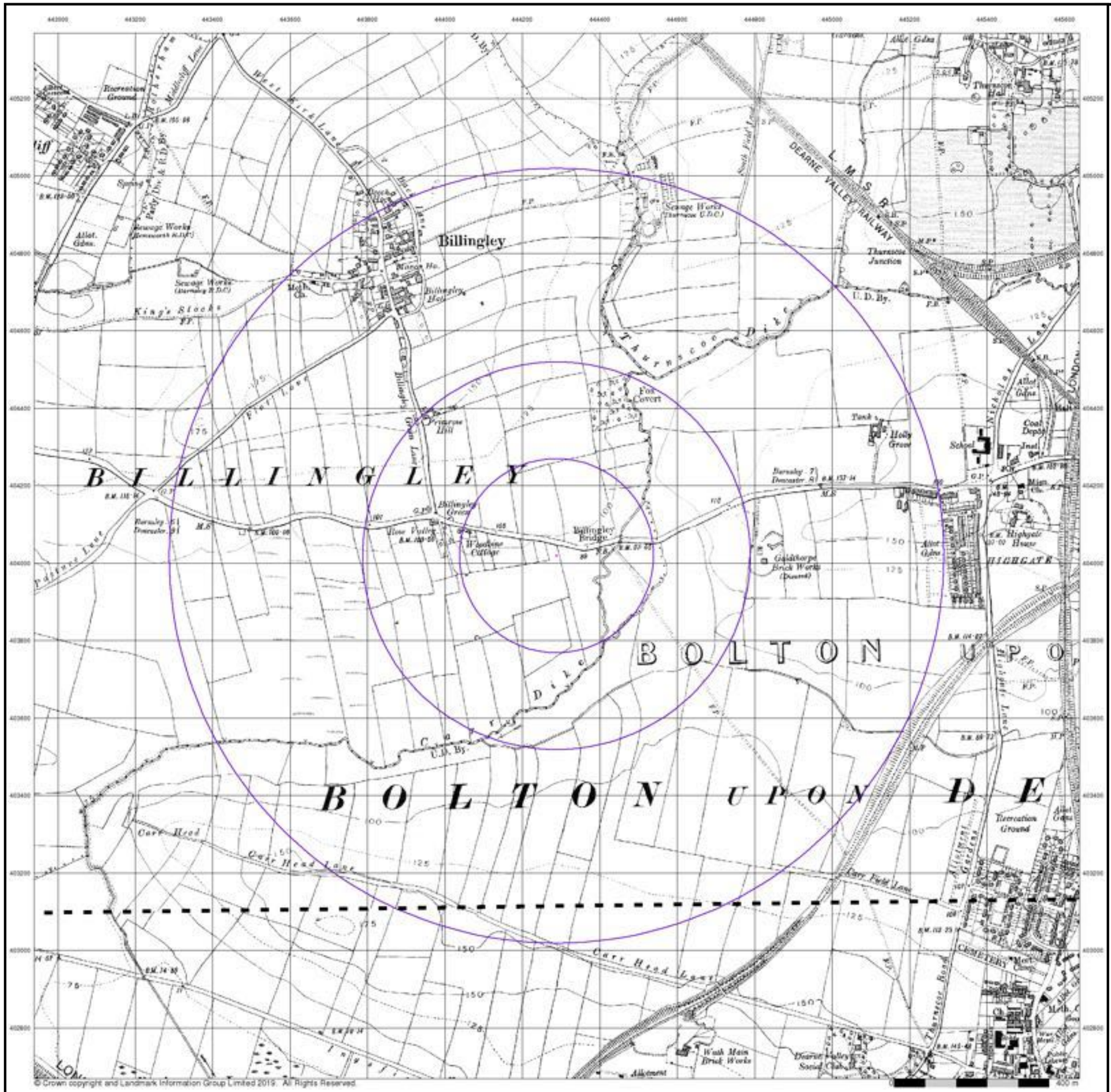


Envirocheck

LANDMARK INFORMATION GROUP®

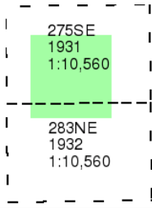
Yorkshire

Published 1931 - 1932

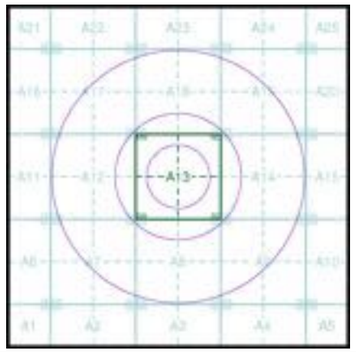
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

Order Number:	207258952_1_1
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Slice:	A
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Site Details

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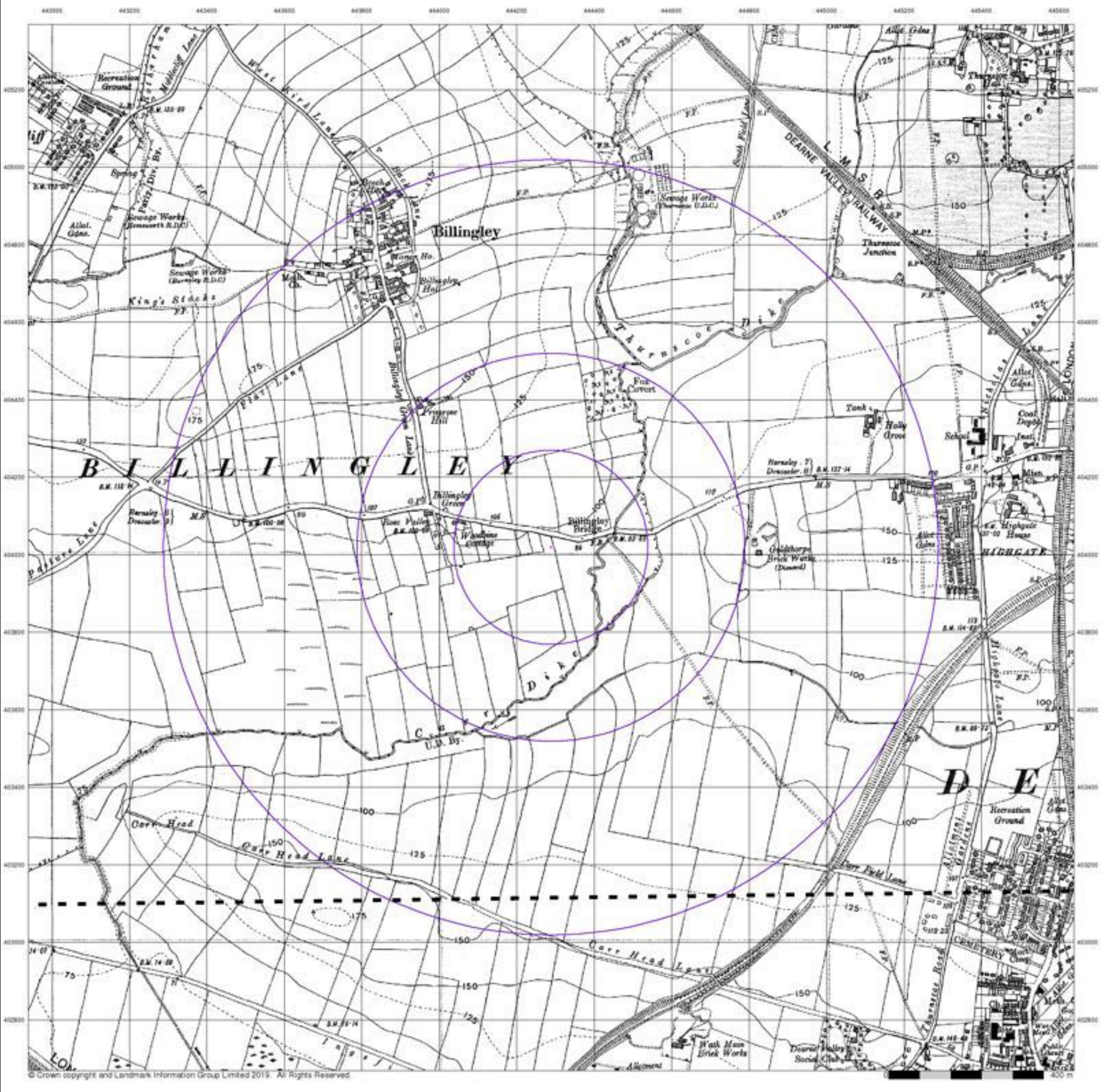

Envirocheck®

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Yorkshire

Published 1938

Source map scale - 1:10,560

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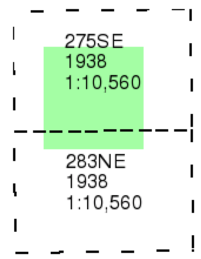
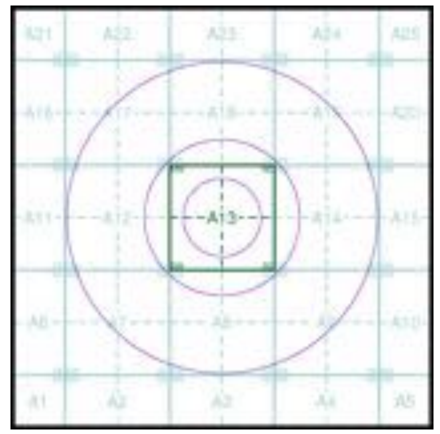
Map Name(s) and Date(s)



Historical Map - Slice A



N

Order Details

Order Number: 207258952_1_1
Customer Ref: 151089
National Grid Reference: 444290, 404020
Slice: A
Site Area (Ha): 0.01
Search Buffer (m): 1000

Site Details

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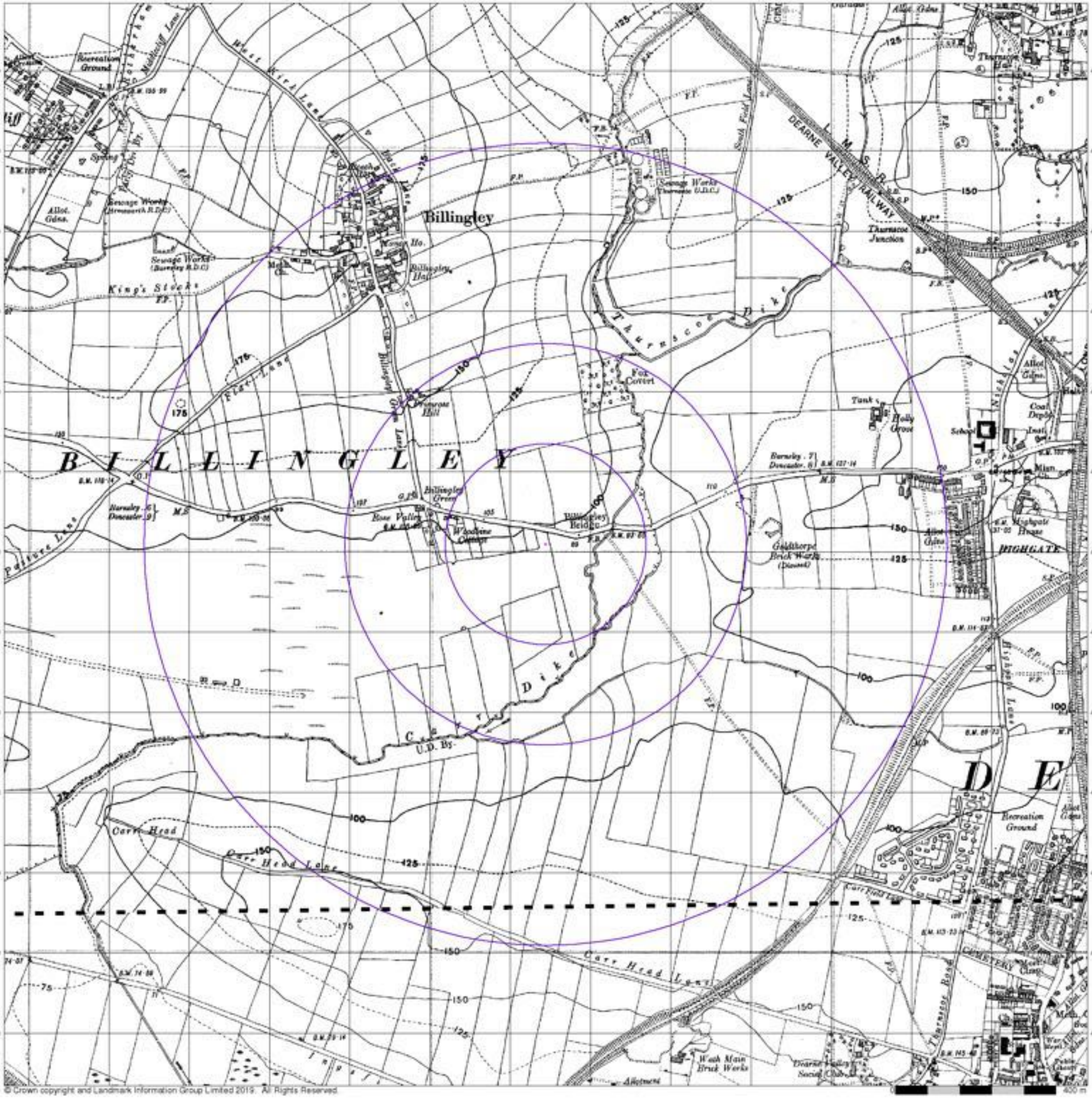

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LANDMARK INFORMATION GROUP®

Yorkshire

Published 1948 - 1950

Source map scale - 1:10,560

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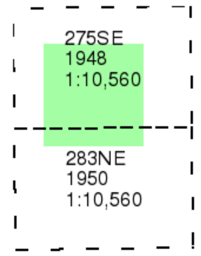
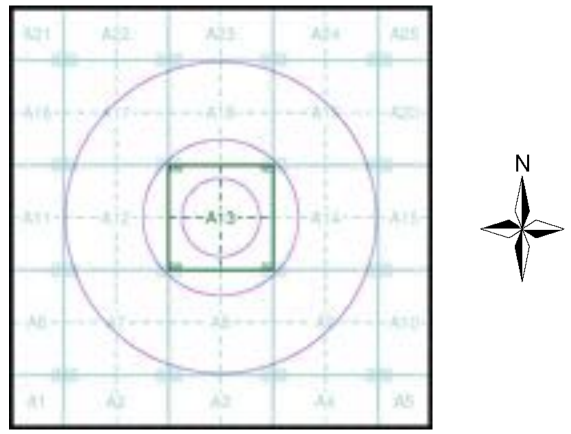
Map Name(s) and Date(s)



Historical Map - Slice A



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Slice: A
Site Area (Ha): 0.01
Search Buffer (m): 1000

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Fax: 0844 844 9951
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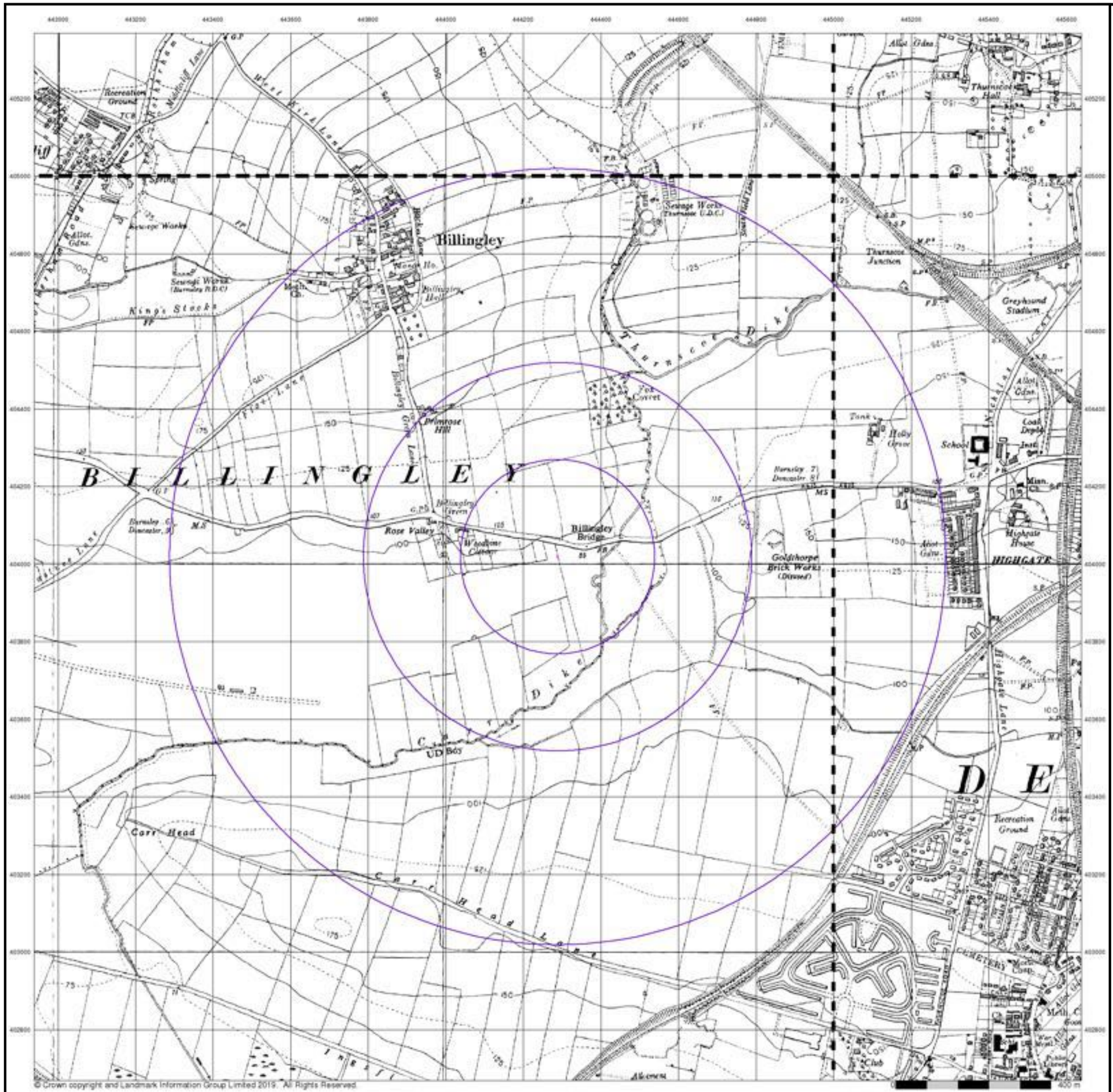

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LANDMARK INFORMATION GROUP

Ordnance Survey Plan

Published 1955 - 1956

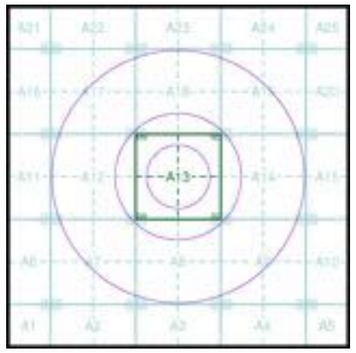
Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)

SE40NW 1955 1:10,560	SE40NE 1956 1:10,560
SE40SW 1956 1:10,560	SE40SE 1956 1:10,560

Historical Map - Slice A



Order Details

Order Number:	207258952_1_1
Customer Ref:	151089
National Grid Reference:	444290, 404020
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	1000

Site Details

Proposed roundabout off A635 Barnsley Road, Goldthorpe, BARNSLEY

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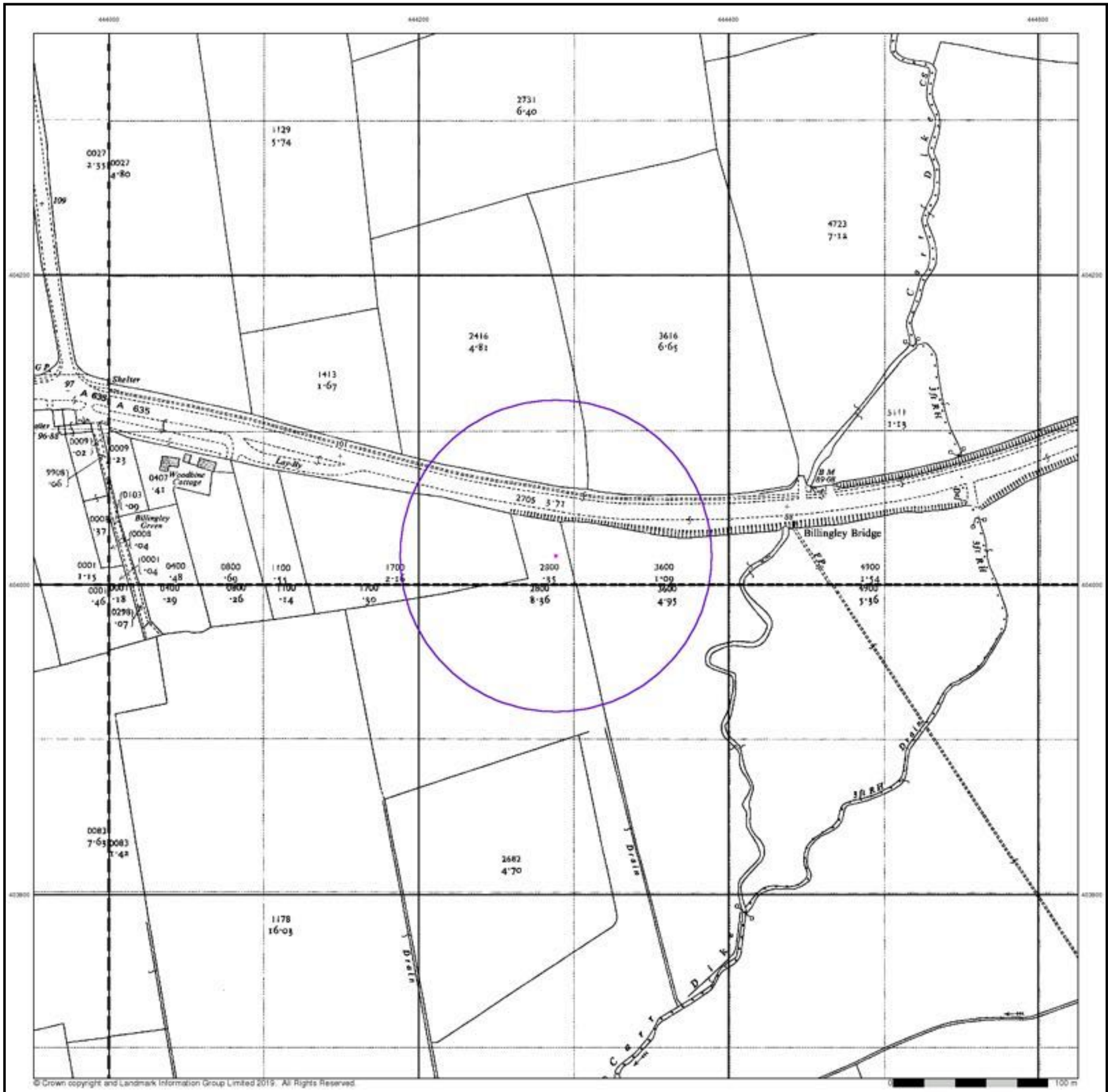

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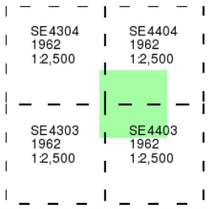
Ordnance Survey Plan

Published 1962

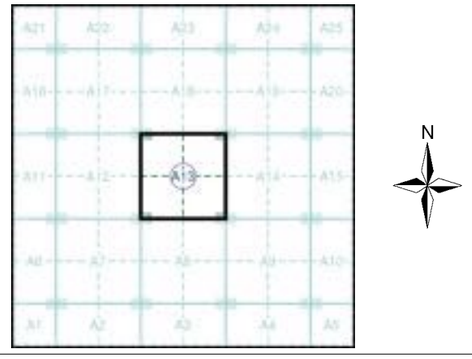
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	207258952_1_1
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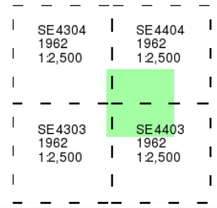
Additional SIMs

Published 1962

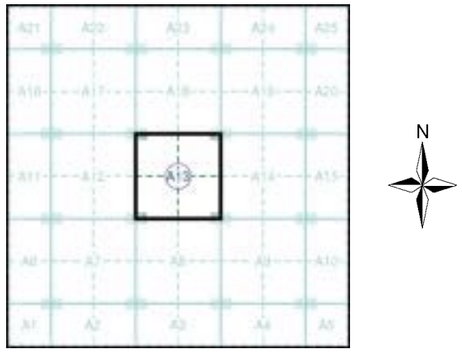
Source map scale - 1:2,500

The SIM cards (Ordnance Survey's `Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	207258952_1_1
Customer Ref:	151089
National Grid Reference:	444290, 404020
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	100

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Ordnance Survey Plan

Published 1966 - 1967

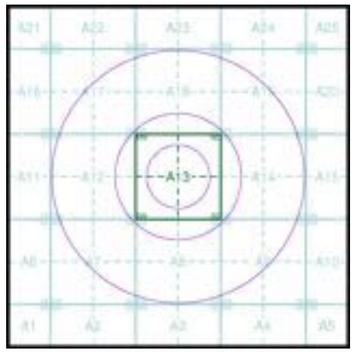
Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)

SE40NW 1967 1:10,560	SE40NE 1966 1:10,560
SE40SW 1967 1:10,560	SE40SE 1966 1:10,560

Historical Map - Slice A



Order Details

Order Number:	207258952_1_1
Customer Ref:	151089
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Slice:	A
Site Area (Ha):	0.01
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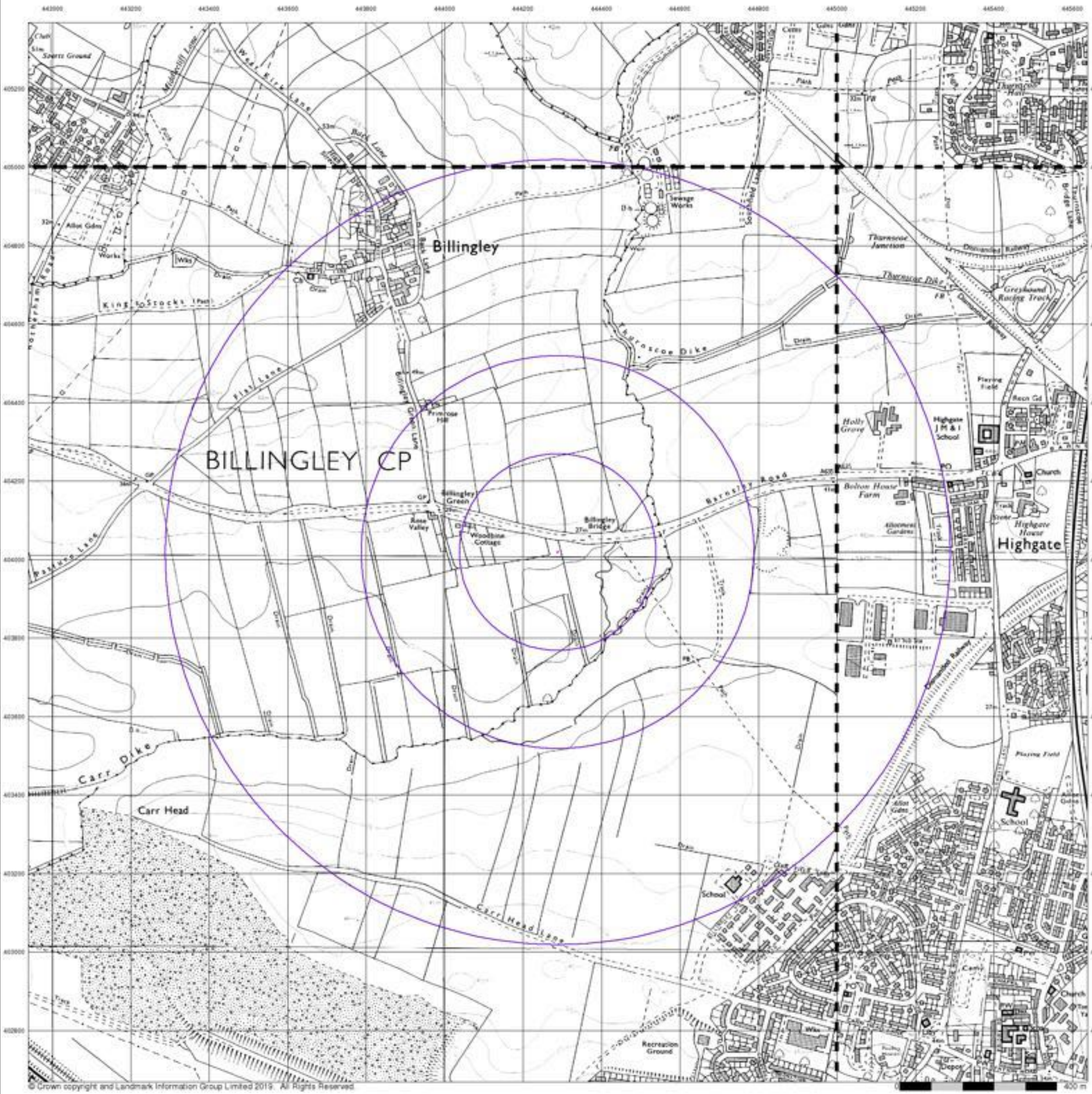

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Ordnance Survey Plan

Published 1980 - 1988

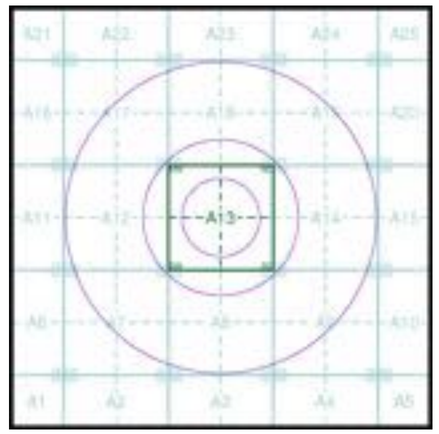
Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)

SE40NW 1983 1:10,000	SE40NE 1983 1:10,000
SE40SW 1980 1:10,000	SE40SE 1988 1:10,000

Historical Map - Slice A



N

Order Details

Order Number: 207258952_1_1
Customer Ref: 151089
National Grid Reference: 444290, 404020
Slice: A
Site Area (Ha): 0.01
Search Buffer (m): 1000

Site Details

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Ordnance Survey Plan

Published 1989

Source map scale - 1:10,000

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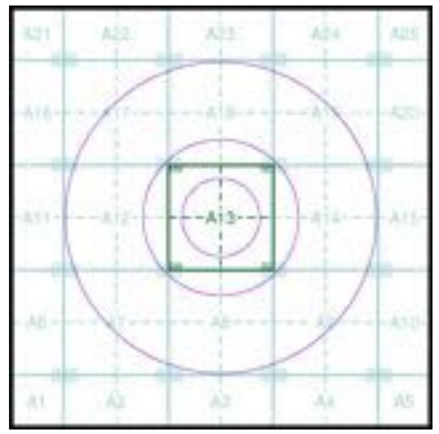
Map Name(s) and Date(s)

SE40NW
1989
1:10,000

SE40SW
1989
1:10,000

Historical Map - Slice A



N

Order Details

Order Number: 207258952_1_1
Customer Ref: 151089
National Grid Reference: 444290, 404020
Slice: A
Site Area (Ha): 0.01
Search Buffer (m): 1000

Site Details

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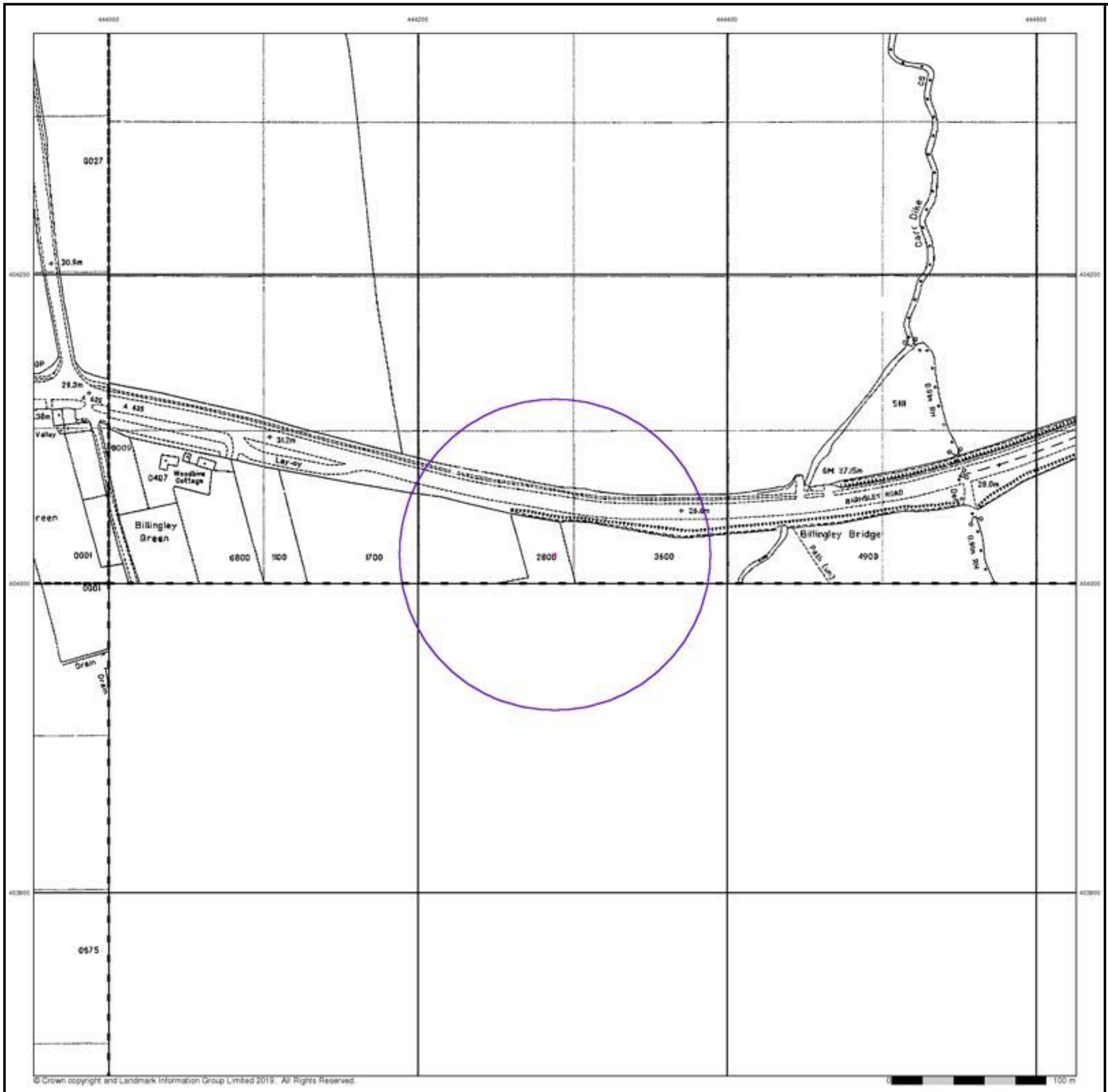

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LANDMARK INFORMATION GROUP®

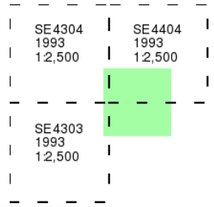
Large-Scale National Grid Data

Published 1993

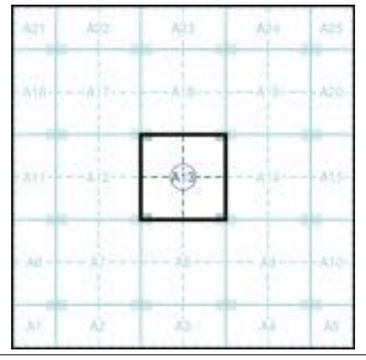
Source map scale - 1:2,500

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	207258952_1_1
Customer Ref:	151089
National Grid Reference:	444290, 404020
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	100

Site Details

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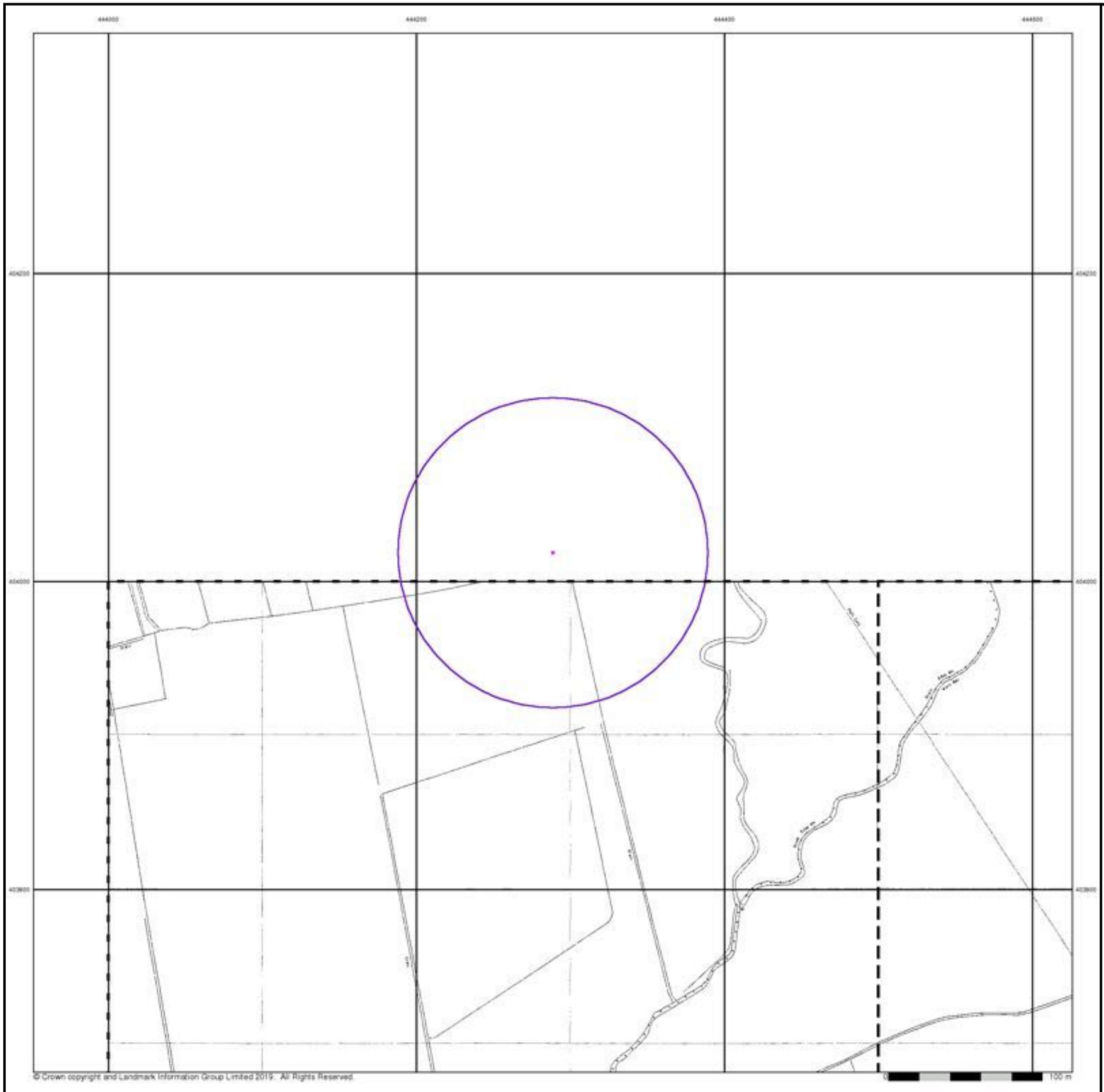

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LANDMARK INFORMATION GROUP

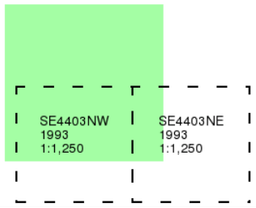
Large-Scale National Grid Data

Published 1993

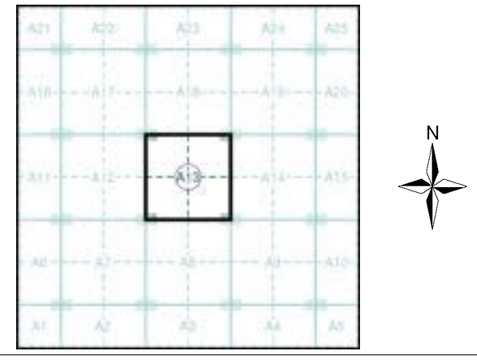
Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	207258952_1_1
Customer Ref:	151089
National Grid Reference:	444290, 404020
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	100

Site Details

Proposed roundabout off A635 Barnsley Road, Goldthorpe, BARNSLEY

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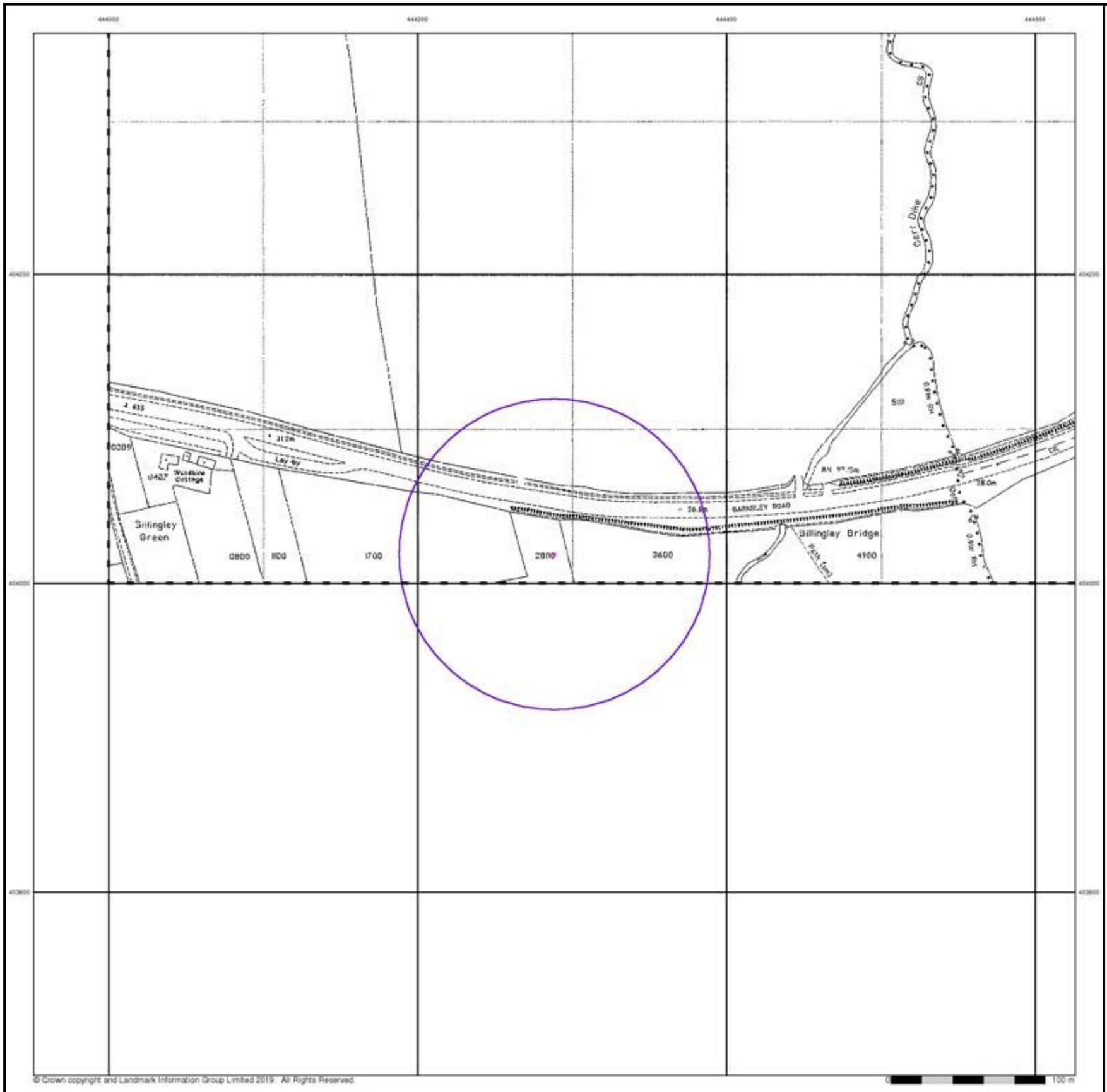

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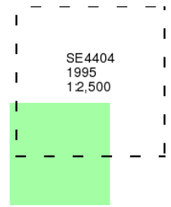
Large-Scale National Grid Data

Published 1995

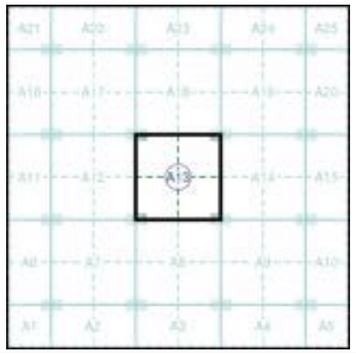
Source map scale - 1:2,500

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

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Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	100

Site Details

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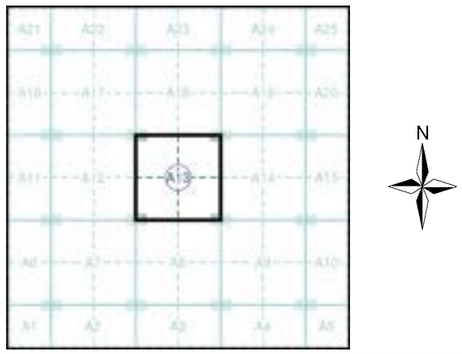
Historical Aerial Photography

Published 1999

This aerial photography was produced by Getmapping, these vertical aerial photographs provide a seamless, full colour survey of the whole of Great Britain

Historical Aerial Photography - Segment A13



Order Details

Order Number:	207258952_1_1
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Site Area (Ha):	0.01
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Site Details

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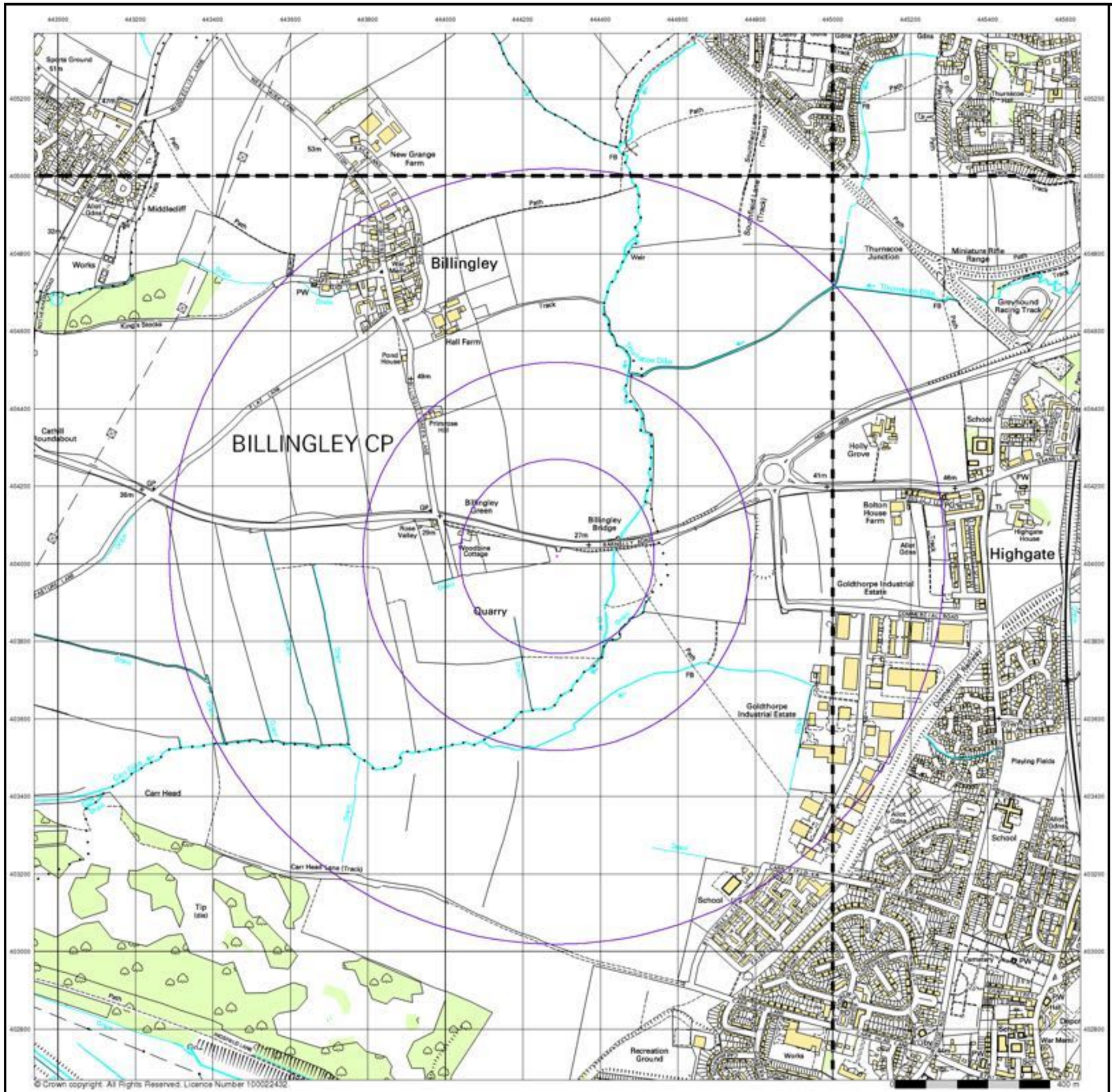

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10k Raster Mapping

Published 2000

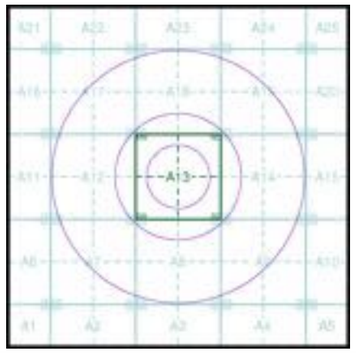
Source map scale - 1:10,000

The historical maps shown were produced from the Ordnance Survey`s 1:10,000 colour raster mapping. These maps are derived from Landplan which replaced the old 1:10,000 maps originally published in 1970. The data is highly detailed showing buildings, fences and field boundaries as well as all roads, tracks and paths. Road names are also included together with the relevant road number and classification. Boundary information depiction includes county, unitary authority, district, civil parish and constituency.

Map Name(s) and Date(s)

SE40NW 2000 1:10,000	SE40NE 2000 1:10,000
SE40SW 2000 1:10,000	SE40SE 2000 1:10,000

Historical Map - Slice A



Order Details

Order Number:	207258952_1_1
Customer Ref:	151089
National Grid Reference:	444290, 404020
Slice:	A
Site Area (Ha):	0.01
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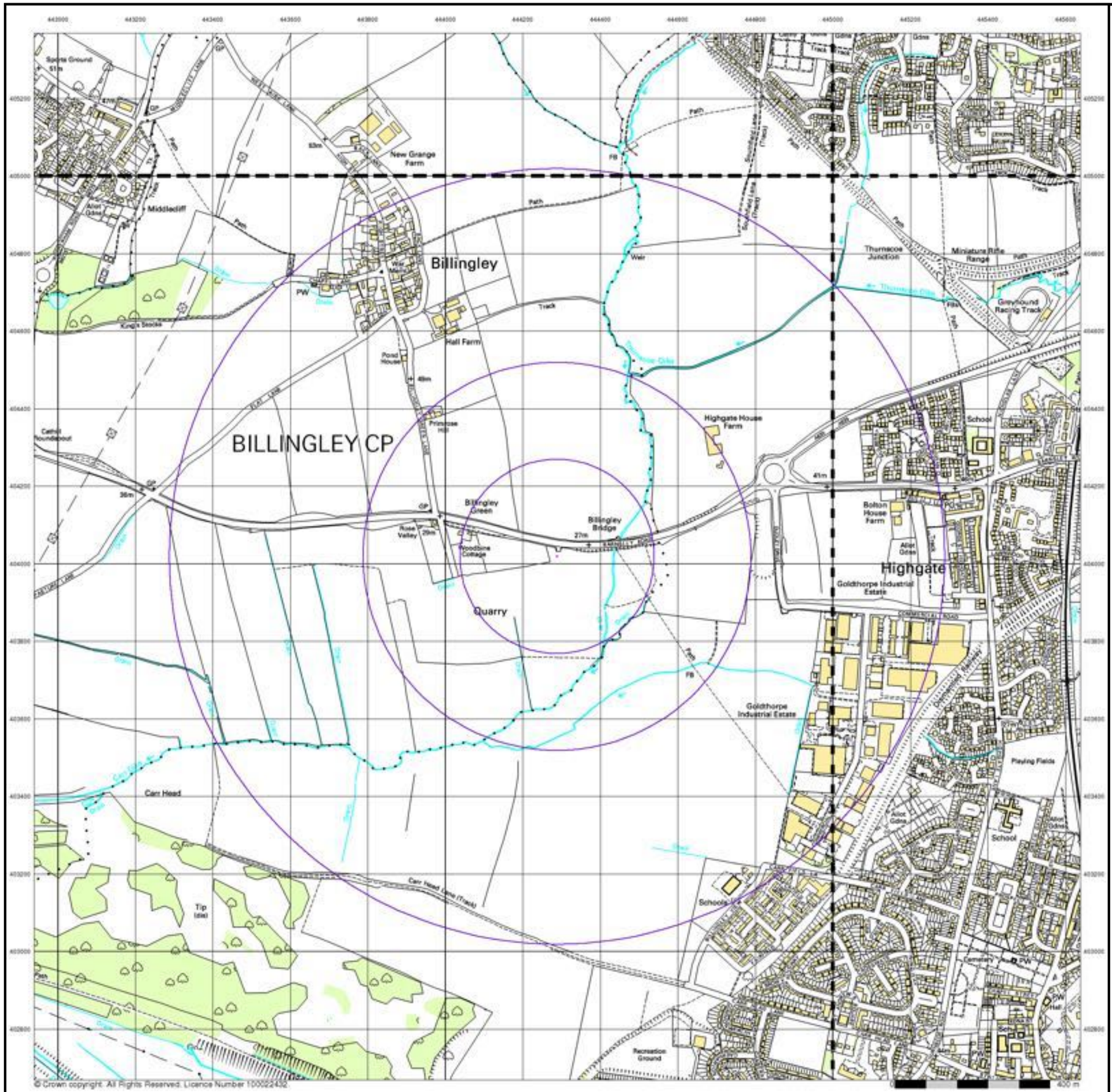

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10k Raster Mapping

Published 2006

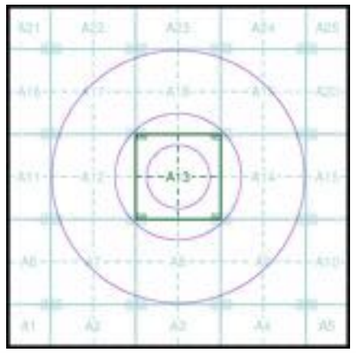
Source map scale - 1:10,000

The historical maps shown were produced from the Ordnance Survey`s 1:10,000 colour raster mapping. These maps are derived from Landplan which replaced the old 1:10,000 maps originally published in 1970. The data is highly detailed showing buildings, fences and field boundaries as well as all roads, tracks and paths. Road names are also included together with the relevant road number and classification. Boundary information depiction includes county, unitary authority, district, civil parish and constituency.

Map Name(s) and Date(s)

SE40NW 2006 1:10,000	SE40NE 2006 1:10,000
SE40SW 2006 1:10,000	SE40SE 2006 1:10,000

Historical Map - Slice A



Order Details

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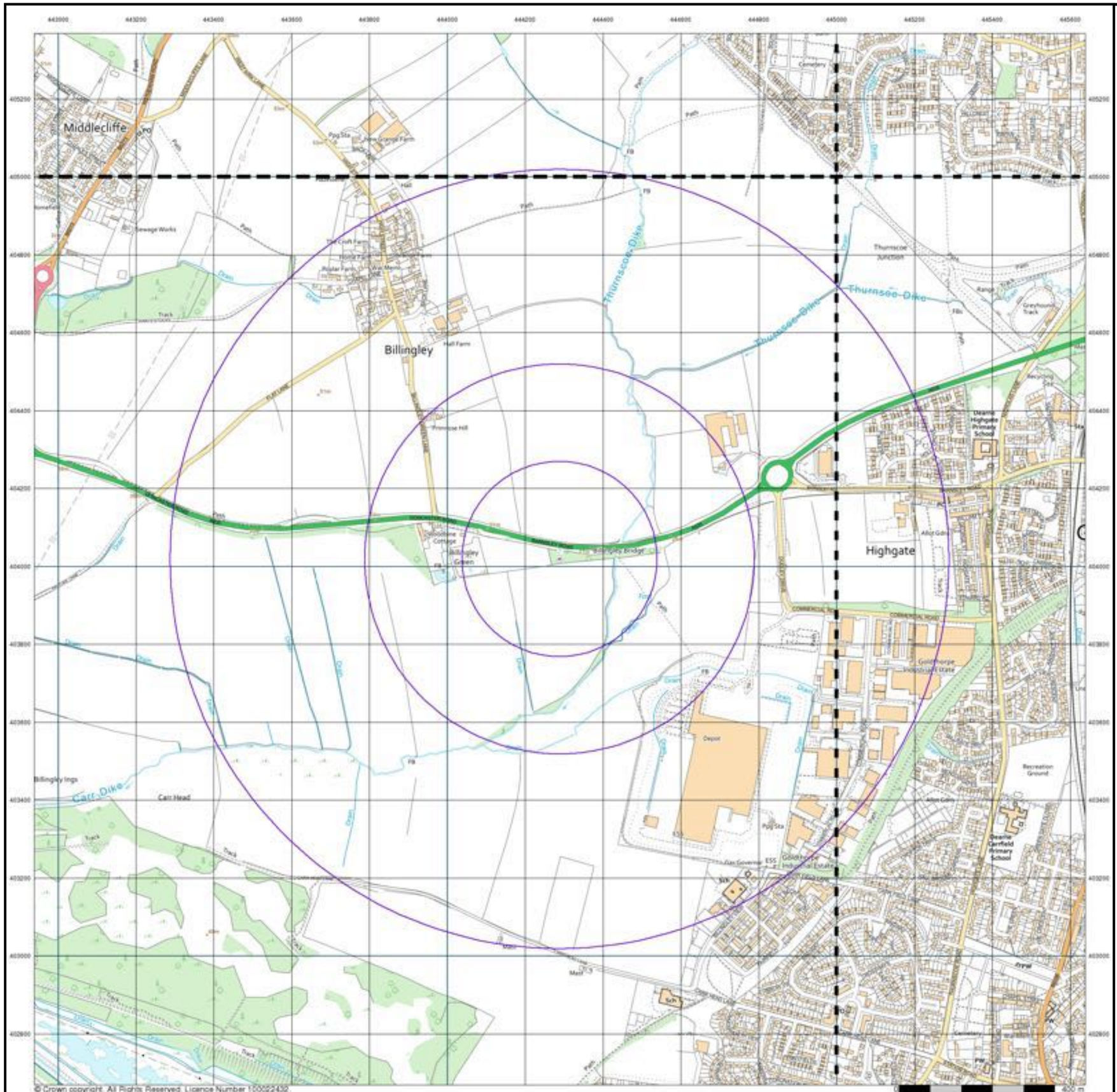

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LANDMARK INFORMATION GROUP®

VectorMap Local

Published 2019

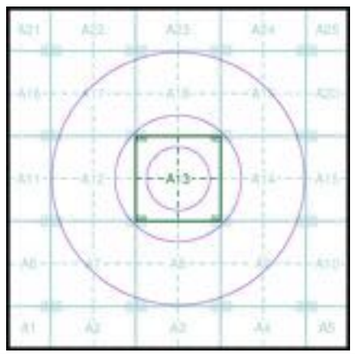
Source map scale - 1:10,000

VectorMap Local (Raster) is Ordnance Survey's highest detailed 'backdrop' mapping product. These maps are produced from OS's VectorMap Local, a simple vector dataset at a nominal scale of 1:10,000, covering the whole of Great Britain, that has been designed for creating graphical mapping. OS VectorMap Local is derived from large-scale information surveyed at 1:1250 scale (covering major towns and cities),1:2500 scale (smaller towns, villages and developed rural areas), and 1:10 000 scale (mountain, moorland and river estuary areas).

Map Name(s) and Date(s)

SE40NW 2019 Variable	SE40NE 2019 Variable
SE40SW 2019 Variable	SE40SE 2019 Variable

Historical Map - Slice A



N

Order Details

Order Number:	207258952_1_1
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National Grid Reference:	444290, 404020
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	1000

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APPENDIX C – SYMAS REPORT

MINERAL REPORT

Date: 28th May 2019

My Ref: M108A/13

CONFIDENTIAL

NEW ROUNDABOUT PROPOSAL- A635 BARNSLEY ROAD GOLDTHORPE APPROACH

SITUATION

A new roundabout is proposed on the A635 in order to access adjacent employment land. The location of the proposed roundabout is illustrated on the attached drawing M108A/13A.
This report provides a review of the mining and geological history of the site and makes recommendations with regard to mining legacy risks the requirement for site investigation and remediation.

GEOLOGY

Geological records show that the site is located on shales, mudstones and sandstones of the Middle Coal Measures.

The Shafton Coal Seam (approx. 1400mm thick) is conjectured to outcrop to the south and dips gently to the north at approximately 3 to 5 degrees.

There are no geological faults or fissuring recorded in the immediate area.

MINING

Opencast

The Shafton Coal Seam was opencast in this vicinity in the early to mid-1990's. The approximate position of the opencast extraction is detailed on the attached drawing M108A/13A as reproduced from British Geological survey sheet SE40SW. SYMAS does not have a copy of the opencast abandonment plan. (if one exists)

It is estimated that the excavation depth ranged from between 0m near the outcrop position to around 15m in the north.

The opencast high wall is likely to be positioned just to the north of the extraction area through the proposed roundabout position.

Shallow Mining

Shallow historic mine workings in the Shafton Coal Seam were encountered during the opencast works. The opencast excavation removed the remnant coal and mining voids and the entire excavation was then backfilled. Two mine entries were encountered and removed in the approximate positions illustrated on the attached drawing. Further unrecorded mine workings may be present beneath the roundabout position to the north of the opencast area.

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Deep Mining

The site has been affected by deep coal mining operations in the past but will not be affected by deep mining subsidence for the foreseeable future.

FORMER LAND USE

Other than the former opencast site there are no other records of any industrial activities within the vicinity of this site.

LANDFILL

According to the Borough Landfill Register the site does not lie within 250 m of a landfill operation.

CONCLUSIONS

1. The site is stable from the deep mining subsidence aspect and it should remain so for the foreseeable future.

2. For planning permission purposes the site is located in a High Risk Coal Authority coal mining referral area due to the presence of opencast backfill, the opencast highwall and the potential for unrecorded shallow coal mine workings to the north of the opencast extraction area.

   The site is therefore at risk from a number of shallow mining legacy risks including creep settlement of opencast backfill, differential settlement across the highwall and ground instability due to the potential presence of shallow coal mine workings.

   A coal mining risk assessment will therefore be required to accompany the planning application.

3. A geotechnical site investigation and appraisal of the site will be required to
   - confirm the position of the opencast highwall
   - investigate the suitability and level of compaction of the opencast backfill
   - confirm the depth and condition of the Shafton Coal seam to the north of the highwall.
   - provide recommendations regarding the need for any ground remediation or design mitigation to ensure the ongoing stability and sustainability of the proposed roundabout and highway.

4. Precautions with regard to potential fugitive gases should be employed during site investigation works and where site operatives are required to work in deep/confined excavations.

THIS REPORT IS BASED ON AND LIMITED TO THE RECORDS IN THE POSSESSION OF SYMAS AT THE TIME THE ENQUIRY IS ANSWERED.

This report was prepared by Paul James on the 28th May, 2019.

P. James,
Principal Mining Engineer.