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A61 Birdwell Junction Improvements
Barnsley
South Yorkshire

Archaeological Desk-based Assessment

Report no. 2603

April 2014

Client: Barnsley Metropolitan Borough Council

REGISTERED IA ORGANISATION

A61 Birdwell Junction Improvements
Barnsley
South Yorkshire

Archaeological Desk-based Assessment

Summary

An archaeological desk-based assessment was undertaken on land to the east of Birdwell Roundabout. The proposed development is to improve the road transport network around the Dearne Towns Link Road. The study found little evidence for prehistoric and Roman activity, with increased settlement of the area linked to post-medieval mineral extraction and industrialisation.

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Report Information

Client:	Barnsley Metropolitan Borough Council
Address:	Design & Transportation Environmental Services, Westgate Plaza One, Westgate, Barnsley, S70 2DR
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Acknowledgements

ASWYAS would like to thank Barnsley Council for providing the modern Ordnance Survey mapping for this project.

1 Introduction

Archaeological Services WYAS (ASWYAS) was commissioned by Barnsley Metropolitan Borough Council, to undertake a desk-based assessment on land around the A61 Birdwell Junction, Barnsley (Fig. 1) in advance of highway improvements.

An assessment of the significance of any recorded heritage assets within a 2-3km buffer zone around the A61 Birdwell Junction has been undertaken (Fig. 2), together with an assessment of any potential impacts, in line with the requirements of National Planning Policy Framework (NPPF; Chapter 12: 'Conserving and enhancing the historic environment', paragraph 128).

Site location and topography

The A61 Birdwell Junction is approximately 5.5 miles to the south of Barnsley and a mile south of the village of Birdwell (centred at SE 3485 0050). The A61 Sheffield Road, passes north-south through the length of Birdwell and at its southern end joins Birdwell Roundabout which is the junction between the M1 motorway at Junction 36 and the A61. This junction also marks the start of the Dearne Valley Parkway.

Geology and soils

The solid geology around Barnsley comprises Pennine Middle Coal Measures formation. No superficial deposits are recorded in the study area (BGS 2014).

The soils in the study area are unclassified (Soil Survey of England and Wales 1983).

2 Information Sources

The following sources of information have been consulted in order to meet the requirements of the desk-based assessment and are in line with guidelines laid down by the Institute for Archaeologists (IfA 2011).

Archaeological archives and databases

Information on recorded heritage assets and archaeological investigations within a 2-3km buffer around the edge of the proposed development site was obtained from the South Yorkshire Archaeology Service and the English Heritage's National Monuments Record (NMR) through PastScape (http://www.pastscape.org.uk/). The holdings of Barnsley Archives and Local Studies Library were consulted for historic maps and plans, antiquarian histories and other relevant documentary sources.

Designated heritage assets

The HER and English Heritage's National Heritage List for England Database were consulted for information on all designated Scheduled Monuments, Listed Buildings, registered Parks and Gardens, registered Battlefields, Conservation Areas and World Heritage Sites within the study area.

Published and unpublished sources

A range of published and unpublished material has been researched and consulted. This includes academic articles together with general sources on the area and its wider archaeological and historical background. These are listed in the bibliography.

Site visit

The areas of the proposed development, readily accessible from public footpaths, were visited on 8th April 2014 (Plates 1-3). Not all areas could be accessed.

3 Assessment Criteria

An assessment of the significance of any recorded heritage assets within a 2-3km radius from the centre of the proposed development area (PDA) has been undertaken, in line with the requirements of the National Planning Policy Framework (NPPF; Chapter 12: 'Conserving and enhancing the historic environment', paragraph 128). Scheduled Monuments, Grade I and II* Listed Buildings, registered Parks and Gardens, registered Battlefields and World Heritage Sites are assessed to be of *high significance*, in line with paragraph 132 of the NPPF.

The significance of other heritage assets has been determined based on the following criteria, and broadly follows levels of national designation.

Significance	Type of Heritage Asset
High	Scheduled Monuments Listed Buildings (Grade I and II*) Registered Parks and Gardens Registered Battlefields World Heritage Sites
Medium	Listed Buildings (Grade II) Conservation Areas Heritage Assets identified as being of regional or local importance on the HER Sites identified within this assessment considered to be of regional of local importance
Low	Non-designated Heritage Assets recorded on the HER Previously unrecorded sites identified in this assessment and not considered to be significant
None	Previously recorded heritage assets or sites recorded in documentary sources now destroyed

Unknown	Potential but previously unrecorded sub-surface archaeological remains Historical sites or features identified through documentary evidence as part of this assessment

The assessed significance of each individual heritage asset identified as part of this assessment has been listed in the catalogue in Section 5. Where there is potential for an impact on a heritage asset, this impact is discussed in Section 6.

4 Archaeological Baseline

Where heritage assets listed in the catalogue are mentioned in the text, the relevant catalogue number is given in bold type.

Study area

A total of 22 recorded heritage assets and archaeological investigations have been identified within the study area. These are discussed below and have been listed in a catalogue in Section 5, and plotted on Figure 2.

Designated heritage assets

There are six Listed Buildings in the study area (**4, 6, 7, 10, 11 and 21**), but no Conservation Areas, Scheduled Monuments, Registered Battlefields, Registered Parks or Gardens or World Heritage Sites.

Previous investigations

A gradiometer survey was undertaken along a stretch of the projected Dearne Towns Link Road between Upper Hoyland and Blacker Hill, Barnsley by Archaeological Services WYAS in 1996. The survey identified linear anomalies which may have been caused by ridge and furrow ploughing (**19**).

An archaeological evaluation (**20**) to investigate the nature of magnetic anomalies identified during a sample gradiometer survey (**19**) was undertaken by Archaeological Services WYAS. Five trenches were excavated in May 1997 and ditches were recorded two trenches. No archaeological finds were recovered.

A 50% gradiometer sample, totalling 1.6 hectares was carried out by Archaeological Services WYAS on land adjacent to Westwood New Road, Tankersley (**5**). The 1998 survey located anomalies indicative of ridge and furrow ploughing. A curvilinear anomaly was also identified.

Archaeological trial trenching took place in 1999 and 2000 on land off Sheffield Road, Birdwell. The trenches, excavated by Archaeological Services WYAS, found features relating to modern drainage. No archaeological finds or features were encountered (**8**).

In 2005 MET surveys undertook a geophysical magnetometer survey on land at Upper Hoyland Road, Barnsley. The results indicated that there were no anomalies of an archaeological nature (**22**).

An archaeological assessment and building appraisal was undertaken by CS Archaeology in 2006 at Glebe Farm, Tankersley, which is believed to have formed part of the medieval moated manor site of Tankersley (**12**).

Archaeological background and heritage assets

Prehistoric Periods (c. 500,000 BC to AD 43)

The earliest human activity within northern Britain probably followed the retreat of the ice sheets around 10,000 BC, as small nomadic groups gradually moved north with the improving climate. Evidence for human activity in the Palaeolithic period is limited in South Yorkshire and no evidence for Palaeolithic activity has been identified in the study area.

The nomadic nature of the Mesolithic groups meant that they left few remains and archaeological evidence for this period is largely limited to finds of flint implements (Manby 2003), although no such evidence is recorded from within the study area.

No evidence for later prehistoric activity is known within the PDA.

Roman period (AD 43 – c. AD 410)

Evidence for Roman activity is sparse in the general vicinity of the PDA. Within the search area two 3rd-century Roman coins were found at Tankersley church in 1881 and 1928 (**14 and 15**).

Medieval period (c. 410 – c. 1600)

Tankersley is recorded in the Domesday Book of 1086 (Smith 1961). Birdwell is not listed in the Domesday records, but would have formed part of the Manor of Worsborough (Hudson 1965).

To the south of Birdwell a deer park was created at Tankersley manor, in 1303-4, after the granting of free warren, or the right to hunt, to the lord of the manor. The northern and eastern old park boundaries are recorded on the first edition OS map of the area (**17**).

To the south of the PDA are the remains of a medieval moated manor, with part of the moat extant (**9**). The square island within the moat is occupied by The Rectory and Glebe Farm (**10**). In 2006 an archaeological assessment and building appraisal of the farm complex was carried out (**12**) identifying structures dating to *c.* 1735.

The Grade II* listed St Peter's Church (**11**) is a part medieval structure with a Victorian north aisle wall.

Post-medieval and modern periods (c. 1600 to present)

Documentary evidence for settlement at Birdwell is sparse but it is recorded in Yorkshire Diaries of 1642 as 'the Birdwell' (Smith 1961). The place-name is traditionally believed to have originated from a large bird seen drinking at a well, thus the Bird Well (Hudson 1965). A well by this name was situated to the south of Pilley Lane near the Cock Public House.

The Battle of Tankersley in 1643 is reputed to have taken place near the PDA, although the exact whereabouts are unknown (**13**). Cannon balls and a musket ball found in a field near Tankersley Lane are held in the parish church.

In the mid-18th century, many of the inhabitants at Birdwell were employed as agricultural labourers or ironworkers (Wilkinson 1872), and evidence for medieval or later ridge and furrow is visible on aerial photographs (**16**). Upper Tankersley Farm House and Barn, both Grade II listed half-timbered structures (**3 and 4**), date from the late medieval period with the earliest phase of building taking place in the early 16th century. Upper Hoyland Hall located to the north-west of the PDA is a building with a late 16th-century timber frame (**18**). This much altered house was probably of a hall and cross wing plan, although nothing survives of the hall range.

Coal was also mined in small quantities in this period, and earlier, within Worsborough Township (Wilkinson 1872). The site of bell pits are recorded in Tankersley (**1 and 2**), but both iron ore and coal were not fully exploited until the end the 18th century (Hudson 1965). The large-scale mineral production led to an increase in the population and rapid housing development at Birdwell by the late 19th century (Hudson 1965; compare Figs 3-5).

Tankersley Park (**17**) was used for both farming and ironstone/coal mining from the 18th century (Hey 1975). Ironstone mining became more prolific from 1793 at Tankersley, and the neighbourhood, with Tankersley supplying the Thorncliffe ironworks and the Elsecarr and Milton ironworks. Much of the ironstone was exploited by means of bell pits. An outcrop of ironstone at Bell Ground to the west of the Sheffield Road was worked between 1824 until the late 1850s. This area is now used as a golf course. Similarly in the 1860s Tankersley Park Colliery worked the seams of coal, with a mineral railway connecting the pits with the Thorncliffe and Elsecarr Railway. The colliery closed in 1927 (Hey 1975).

Lowe Stand Howe (**21**) is a square two-storey folly built for the 1st Marquis of Rockingham in *c.* 1750. Birdwell obelisk, with a pyramidal top, was built for the 2nd earl of Strafford in 1775 (**6**). Both structures are Grade II listed. The first purpose-built mines rescue station (**7**) of early 20th-century date is also Grade II listed.

5 Catalogue of Heritage Assets and Investigations

Catalogue entries for heritage assets recorded by the South Yorkshire Archaeology Service and those identified as part of this assessment have been ordered geographically from west to east and given a numerical identifier. Each entry includes a National Grid Reference (NGR) number and where appropriate the relevant HER, NMR and Listed Building reference numbers.

No	Name	Grid Ref	HER Ref.	LB Ref.	Significance	Description
1	Bell Pits	SK 3410 9990	MSY5424		Low	Medieval/post-medieval bell pits, Tankersley.
2	Bell Pits	SE 3420 0000	MSY5682		Low	Post-medieval to industrial period bell pits in Tankersley Wood.
3	Medieval Timber Framed House	SK 3413 9932	MSY5320		Medium	Upper Tankersley Farm House - late medieval timber-framed house, remodelled in stone in the 17th century (part timber framed). The RCHME conducted a building survey, which concluded that the earliest phase of the building was a timber-framed house, probably of early 16th-century date. Grade II listed.
4	Post-medieval Timber Framed Barn	SK 3422 9930	MSY5321	333941	Medium	Late timber framed barn, pre-rigged truss roof, now stone clad, in Upper Tankersley was possibly built in the 17th century. Grade II listed.
5	Gradiometer Survey	SE 34440 00111	ESY182	333942	Low	In October 1998 a gradiometer survey of 1.6 hectares was conducted by ASWYAS on land adjacent to Westwood New Road (Whittingham 1998). The results indicated the presence of ridge and furrow and two possible areas of industrial activity. A weak positive curvilinear anomaly, possibly pre-dating the ridge and furrow, and possibly of archaeological origin was also identified. An archaeological evaluation was conducted between 9th and 13th of November 1998, which confirmed the presence of medieval ridge and furrow features (Howell 1998).

No	Name	Grid Ref	HER Ref.	LB Ref.	Significance	Description
6	Birdwell Obelisk Folly	SE 3461 0066	MSY6494	333980	Medium	Situated on the south side of the walk, Birdwell obelisk is dated to 1775 and was built for the 2nd Earl of Strafford. This tall obelisk with a pyramidal top is made of deeply coursed dressed sandstone. The stepped plinth has a stone inscribed 'Wentworth Castle 3 miles'. Grade II listed.
7	Tankersley Rescue Station	SE 3470 0050	MSY7033	469990	Medium	Believed to be first purpose-built mines rescue station away from the colliery, consisting of two storeys, brick, and a half-timbered gable. 1902 date-stone. Opposite is the remaining building of Birdwell central workshops. Grade II listed.
8	Archaeological Evaluation	SE 34809 00869	ESY551		Low	In 1999/2000 a programme of trial trenching was undertaken on land off Sheffield Road. A number of features relating to modern field drainage were identified but no features or deposits of archaeological significance were observed (McNaught 2000).
9	Rectory and Medieval Moat	SK 3481 9976	MSY3804		Low	Parts of the north and west arms of the moat retain water in wet weather, with the remainder still traceable. The present rectory was built in 1864. The main enclosure consists of a roughly 90m square island, now divided between the rectory (occupying the western half) and Glebe Farm. The most unusual feature of the site is the manner in which the southern arm, midway along its length, steps a few metres to the south and becomes an outer moat - i.e. at the south-east corner and for the south half of the east side there are two parallel lines of moat a few metres apart. The outer moat then turns away east and divides into a small complex of channels, possibly fishponds, The whole system is shown on Fairbanks 1772 plan, and only a little modified on the 1st edition OS map of 1855.

No	Name	Grid Ref	HER Ref.	LB Ref.	Significance	Description
10	Glebe Farm Medieval to Post-medieval Dovecote	SK 3489 9980	MSY4379	333944	Medium	Square, two-storey dovecote with a cart shed on the ground floor with a large arched entrance. The dovecote is built of coursed sandstone blocks with large blocks of stone for the corners and ashlar dressing for the doorway. The roof is gabled and tiled. Grade II listed. The door into the dovecote is up an external flight of steps and has a date stone: 'KGDD 1735' above it.
11	St Peter's Church	SK 3494 9958	MSY3796	333935	High	Tankersley church is part perpendicular (medieval) and part 19th century. Grade II* listed. Tankersley church contains a variety of medieval sepulchral slabs of various dates. Nine fragments, mostly of small slabs probably of local workmanship, are now built into the internal walls of the south porch.
12	Glebe Farm Archaeological Assessment and Building Appraisal	SE 34919 99799	ESY183		Medium	An archaeological assessment and building appraisal was conducted for Glebe Farm, which is believed to have formed part of the medieval moated manor site of Tankersley (Scurfield 2006). Components of the early 18th-century structures remain such as a barn, cow-house and two detached tall gable buildings dating to *c.* 1735.
13	Putative Battlefield Site	SE 3500 0000	MSY12218		Medium	A battle at Tankersley Moor in 1643 is referred to in the writings of the Duchess of Newcastle. The battle is said to have been a Royalist victory at which 'many were slain and some taken prisoners'. The exact whereabouts of the battle is unknown. Tankersley Moor does not seem to be marked on either the 1st edition OS or Jefferys 18th-century map of Yorkshire. It has been speculated that the site my lie close the Junction 36 on the M1. A Sealed Knot article reports the finding of "cannon balls in a field near Tankersley Lane in 1917, and a musket ball in a tree cut down in 1876. These are still held in the Parish Church".
14	Bronze Roman Coin Find	SK 3495 9959	MSY9591		Low	Bronze coin of Antoninnianus of Victorius was found in 1881 when the north aisle of St Peter's church was added (present

No	Name	Grid Ref	HER Ref.	LB Ref.	Significance	Description
						location Sheffield Museum).
15	Bronze Roman Coin Find	SK 3500 9960	MSY9592		Low	Bronze coin of Antoninianus, probably of Tetrius found in 1928 during the churchyard extension (present location Sheffield Museum).
16	Medieval Ridge and Furrow	SK 35299 99919	MSY12377		Low	Earthwork remains of ridge and furrow are visible on aerial photographs from 1962.
17	Tankersley Deer Park	SK 3539 9875	MSY5804		Low	The charter rolls of 32 Edward I [1303-4] granter Hugh de Elland and then free warren in both Elland and Tankersely. The documentary evidence for Tankersely is meagre. . . some of the boundaries of the park can be still be followed and . . . some of the old names can be picked out on the map. Medieval deer park improved in the 18th century but allowed to decay. The park was then used partly for agriculture and for iron and coal mining. It is now a golf course.
18	Upper Hoyland Hall	SE 3616 0125	MSY5379		Low	Home of the Townend family in the 17/18th century but much altered. There is a date stone that says ?1636 on the south gable. In 1991 a historic building survey was conducted by the RCHME. The earliest phase of building identified was a late 16th-century timber-framed house, probably of hall and cross-wing plan, though nothing survives of the hall range.
19	Gradiometer Survey	SE 36204 01522	ESY1025		Low	A geophysical survey, in advance of the Dearne Towns Link Road, was undertaken to identify areas of archaeological potential (Webb 1996).
20	Archaeological Evaluation	SE 36204 01522	ESY1027		Low	Trial trenching following a gradiometer survey, in advance of the Dearne Towns Link Road, identified geophysical anomalies as linear boundaries. No finds were recovered from these features (Webb 1997).
21	Post-medieval Folly	SE 3633 0098	MSY6493	333884	Medium	Off the northwest side of Hawshaw Lane lies a tower, built *c.* 1750 for the 1st Marquis of Rockingham. It is a square two-storey tower with a taller square stair turret projection. Grade II listed.

No	Name	Grid Ref	HER Ref.	LB Ref.	Significance	Description
22	Geophysical Survey	SE 36450 01087	ESY180		Low	In August 2005 Met Surveys were commissioned by ARCUS to conduct a geophysical (magnetometer) survey at Upper Hoyland Road, Barnsley. The results indicated that there were no anomalies of certain archaeological origin, although archaeological features beneath areas of magnetic disturbance cannot be ruled out.

6 Impact Assessment and Mitigation

Recorded heritage assets

Direct impacts

The proposed development will not have a direct impact on any of the heritage assets identified here, with the possible exception of the battlefield site (given its uncertain location).

Impact on setting

A total of six Listed Buildings lie within the study area (**4, 6, 7, 10, 11 and 21**), but the proposed works are unlikely to have an adverse impact on the settings or the views to and from these heritage assets.

Potential sub-surface remains

There have been few archaeological investigations in the landscape around Birdwell and Tankersley and as such it is difficult to determine the potential for sub-surface remains within the PDA, although Rockingham Opencast Mine (compacted in 1995) is likely to have removed any traces of archaeological features and deposits from the larger northern area (Appendix 1). In addition, archaeological evaluation by trial trenching at land off Sheffield Road (**8**), and prior to the construction of the Dearne Towns Link Road (**20**), failed to identify or recover any significant archaeological features or artefacts.

The land to the south of the PDA has the potential to be the site of the 17th-century battle of Tankersley Moor (**13**), although its precise location is unknown. As the southern area of the PDA lies immediately to the south of Rockingham Opencast Mine and to the west of Tankersley Common Opencast Mine, it is possible that battlefield remains survive here.

Further assessment and mitigation recommendations

It is advised that a scheme of archaeological evaluation should be undertaken to identify and describe the nature and significance of any surviving archaeological remains within the southern area of the PDA only, in order to better understand the impact of the development proposal upon their significance. It is recommended that the evaluation comprise a geophysical survey in the first instance and/or a metal-detector survey following advice from a battlefield expert.

In accordance with the historic environment policies within Section 12 of the National Planning Policy Framework, 2012 (paragraph 128), this evaluation should be undertaken prior to determination of the planning application. This will enable an informed and reasonable planning decision to be taken as to whether the development should be permitted in its proposed form (paragraph 135). If so, the above information will assist in identifying mitigation options for minimising, avoiding damage to, and/or recording any archaeological remains (paragraph 141).

7 Conclusion

This archaeological assessment has established that there is limited potential for archaeological remains from the prehistoric and the Roman periods around Birdwell and Tankersley, although archaeological features and deposits of these dates within the southern area of the PDA cannot be entirely discounted. The PDA is likely to have been used during the medieval and post-medieval periods for agricultural land as indicated by the available mapping, before the northern area of the PDA was disturbed by opencast mining. Given the likely ground disturbance during the construction of the new road structure, some further archaeological evaluation for the southern area of the PDA is recommended.

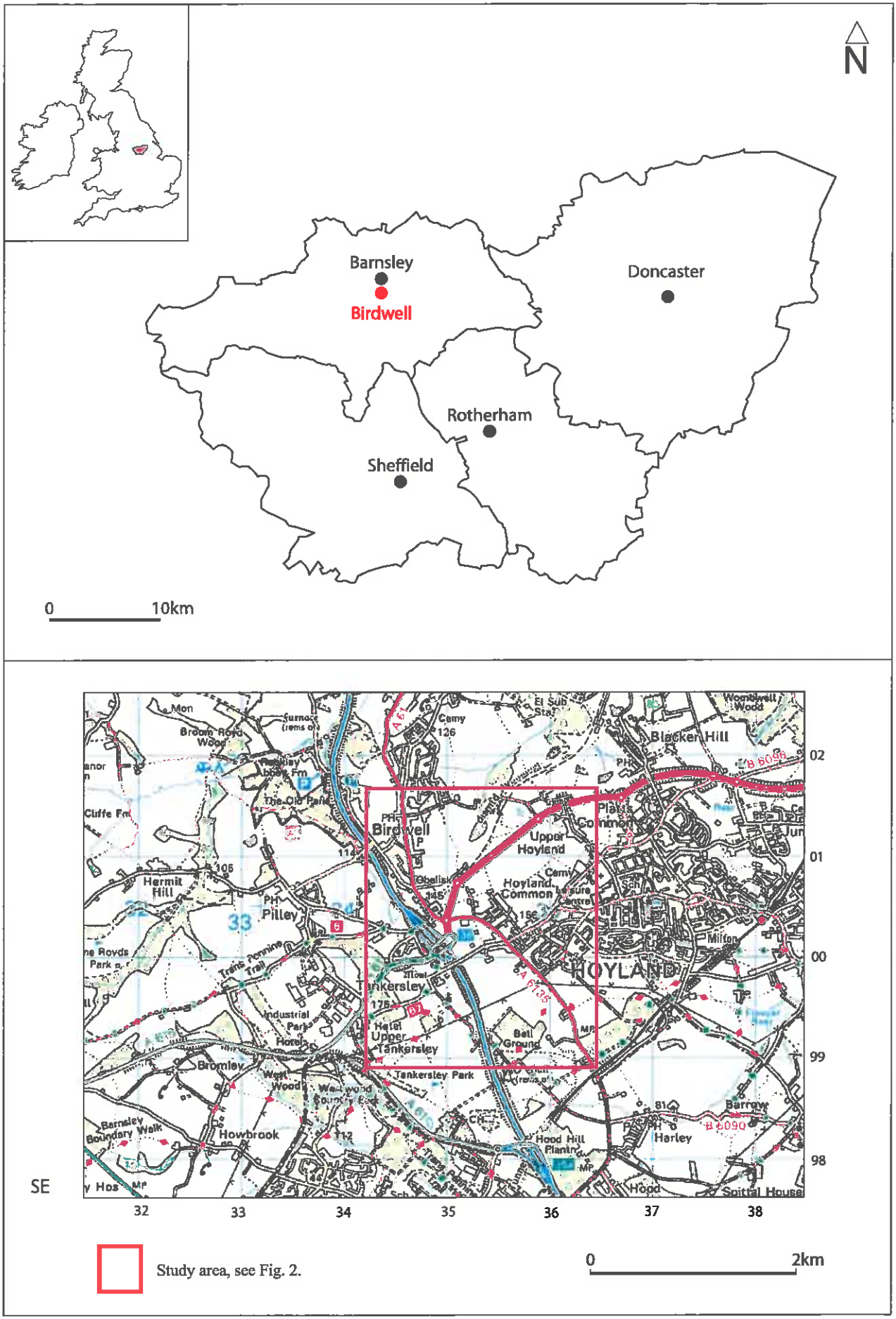


Fig. 1. Site location

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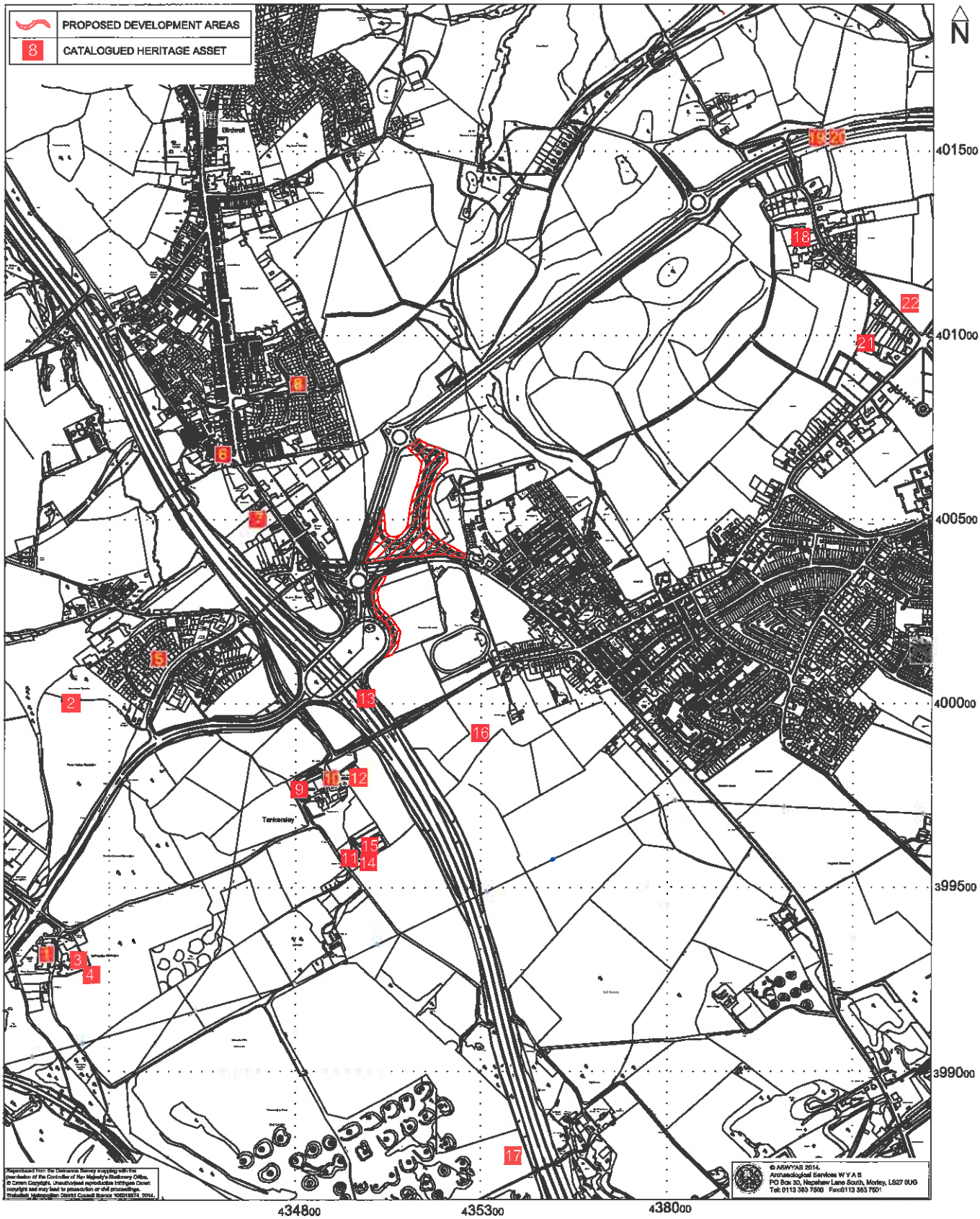


Fig. 2. Plan of the proposed development areas showing the study area and catalogued heritage assets (1:10,000 @ A3)

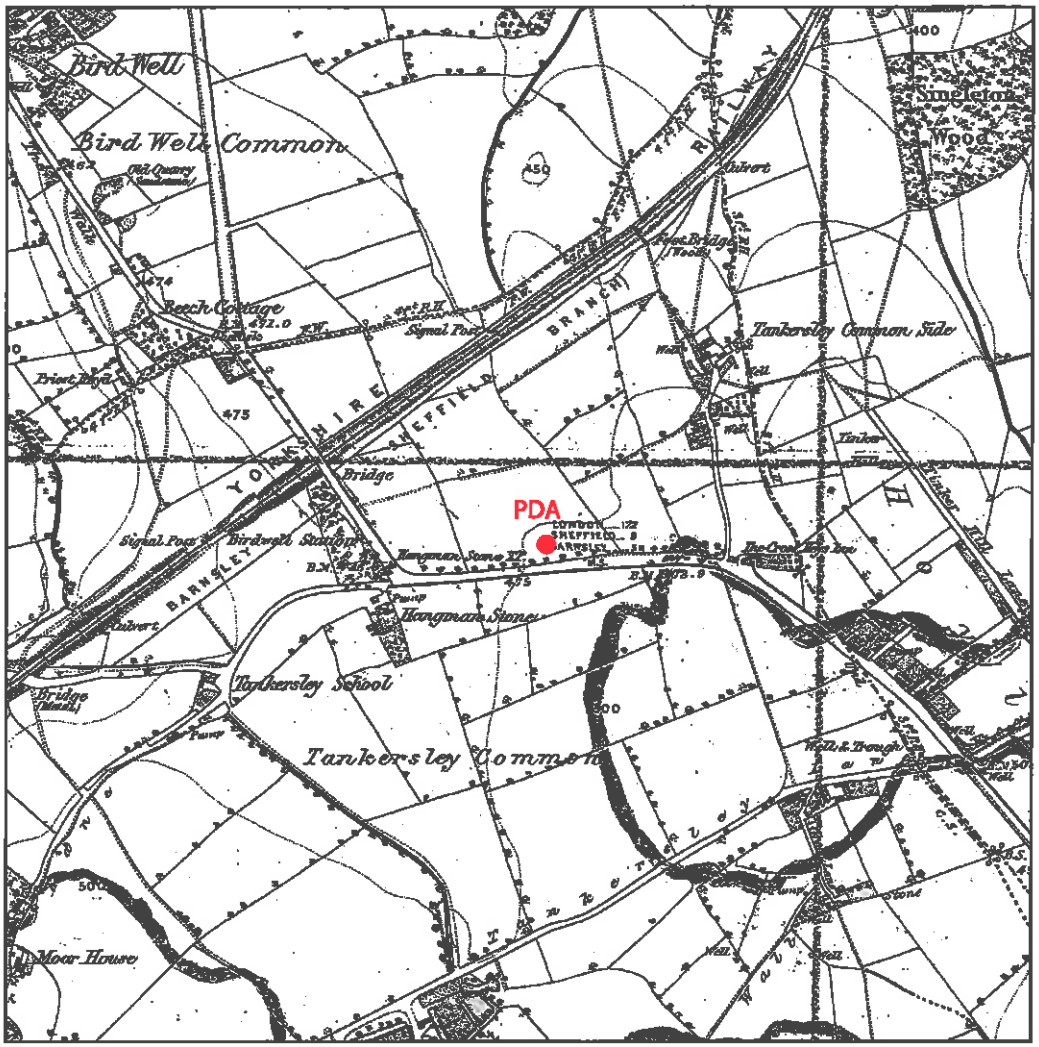


Fig. 3. 1855 first edition OS map (sheet 282, not to scale)

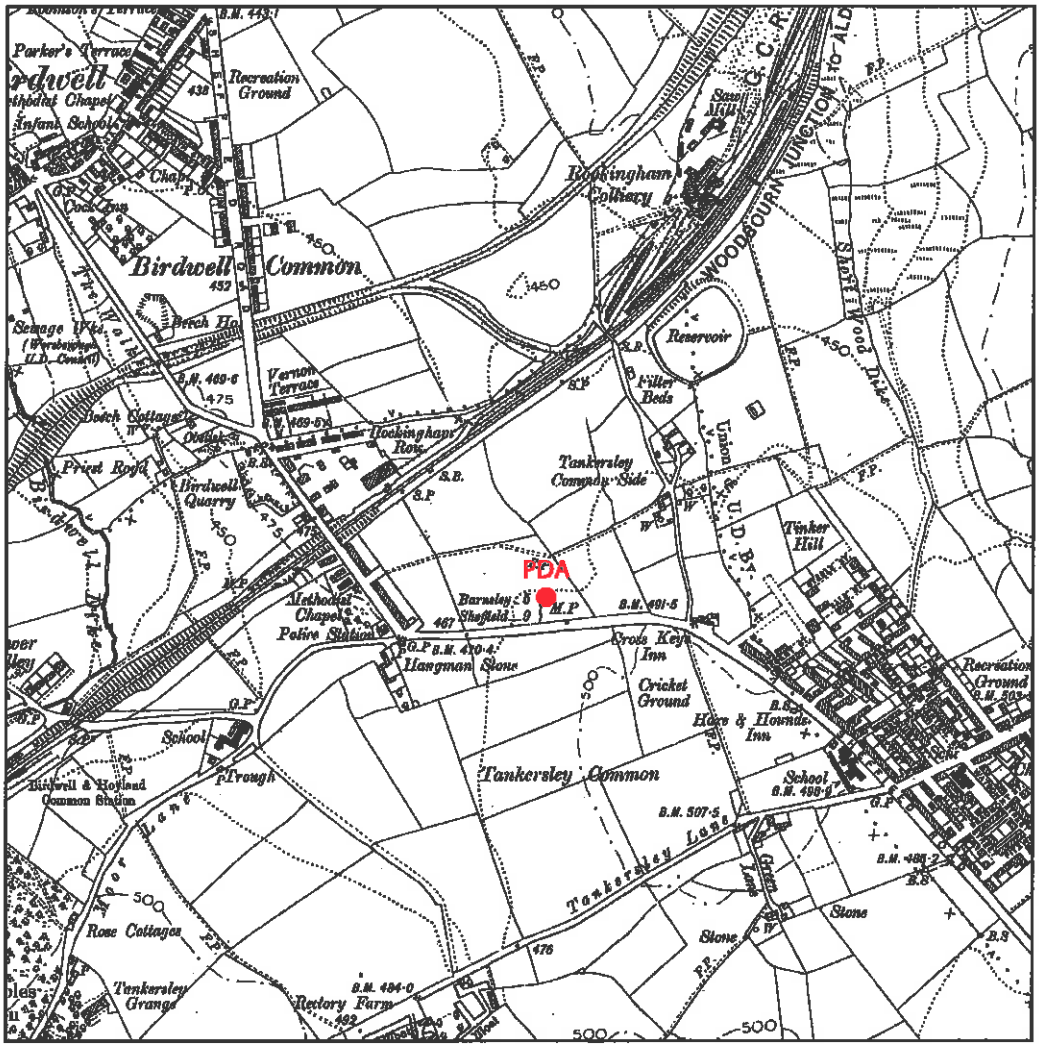


Fig. 4. 1907 OS map (sheet 282, not to scale)

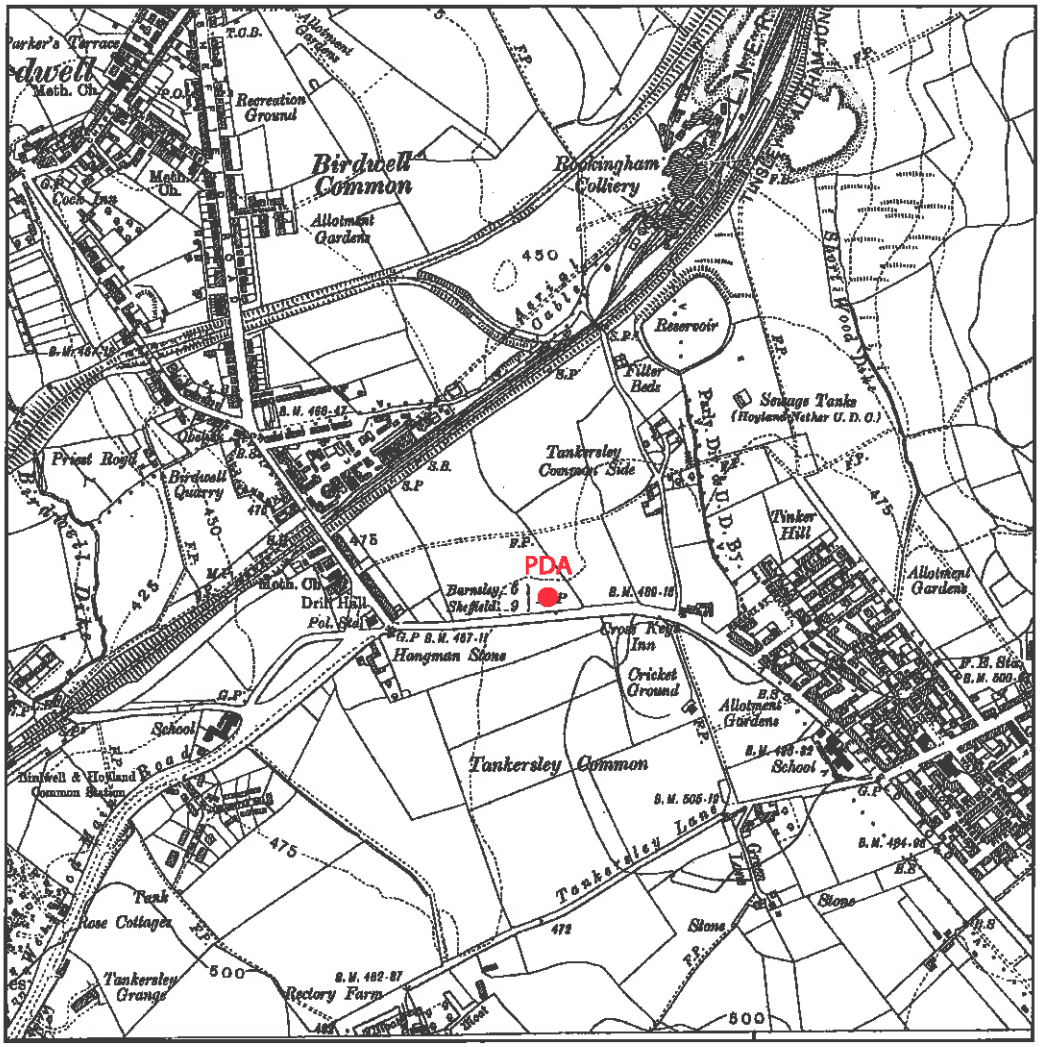


Fig. 5. 1932 OS map (sheet 282, not to scale)



Plate 1. General view of the northern development area, looking south



Plate 2. General view towards the southern development area, looking south



Plate 3. General view of the northern development area, looking east

7 Conclusion

This archaeological assessment has established that there is limited potential for archaeological remains from the prehistoric and the Roman periods around Birdwell and Tankersley, although archaeological features and deposits of these dates within the southern area of the PDA cannot be entirely discounted. The PDA is likely to have been used during the medieval and post-medieval periods for agricultural land as indicated by the available mapping, before the northern area of the PDA was disturbed by opencast mining. Given the likely ground disturbance during the construction of the new road structure, some further archaeological evaluation for the southern area of the PDA is recommended.

Appendix 1: SYMAS mineral report

MINERAL REPORT

Date: 16th August 2013

My Ref: PJ/M3687/5

CONFIDENTIAL

BIRDWELL ROUNDABOUT AND LINK ROAD TO ROCKINGHAM ROUNDABOUT.

SITUATION

A mining report has been requested for the proposed new Birdwell roundabout and link road. This report provides a review of the mining and geological history along the proposal and an assessment for the potential for mining legacy risks. The report makes recommendations for investigation and/or remediation requirements.

GEOLOGICAL INFORMATION

Geological records indicate that the land is underlain by Middle Coal Measures mudstones, siltstones and sandstones. A geological fault is conjectured to cross the proposal as shown coloured blue on drawing M3687/5a.
The proposal is also dominated by two areas of opencast backfill as shown on the attached drawing and detailed below.

MINING

Opencast

The Tankersley Common and Rockingham opencast sites were worked during the 1940's and 1990's respectively as marked red on drawing M3687/5a. The opencast voids were subsequently backfilled with overburden/spoil and the land returned to agricultural use/open space. The backfill varies in thickness from less than 2 metres in the west to in excess of 10m in the east. Consequently the proposed roads will cross backfill and opencast high walls.
The Rockingham opencast site was compacted back to provide a developable platform. Creep and/or differential settlement could still occur across high walls or above the Tankersley common site in particular.

Underground (Deep Mining)

This area has been affected by deep mine workings in the past.
However all affects from deep mine workings should have ceased decades ago and with the site now being remote from the active coalfield it should remain stable for the foreseeable future.

FORMER LAND USES

Historical ordnance survey plans show the route crossing open land with no significant development prior to the opencast working of coal.

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Website: www.barnsley.gov.uk/symas

LANDFILL

The current borough landfill register does not indicate the route to cross any landfill although one landfill sites is recorded within 250m of the proposal as detailed below.

Site No.	Landfill Material	Category
53	Demolition waste	4

Category 4 sites are described "as being licensed to accept material that would not be expected to give rise to landfill gas in substantial quantities"

CONCLUSIONS

1. The route is considered stable from the deep mining subsidence aspect and as it now lies remote from the active coalfield it is likely to remain in this state for the foreseeable future.

2. The Tankersley Common opencast backfill was not compacted to provide a developable platform. Although backfilled over 50 years ago the possibility for creep or differential settlement remains. It would therefore be prudent to undertake near surface soils investigations to adequately assess the ground conditions and compaction over the backfill. The road foundations should be suitably designed particularly across the high walls to prevent damage due to differential settlement.

3. Given the extent of opencast the chances of encountering unworked coal at surface is low. Any coal encountered in foundation excavations should be blinded off with a suitable inert material to reduce the risk of spontaneous combustion occurring. SYMAS can be called upon for on-site inspection if any unusual ground conditions are encountered.

4. Fugitive gases may be present within the opencast fill or landfill. Fugitive gas monitoring and safety procedures should therefore be undertaken where site personnel are required to work in deep or confined excavations.

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Report prepared by P. James 16th August, 2013.

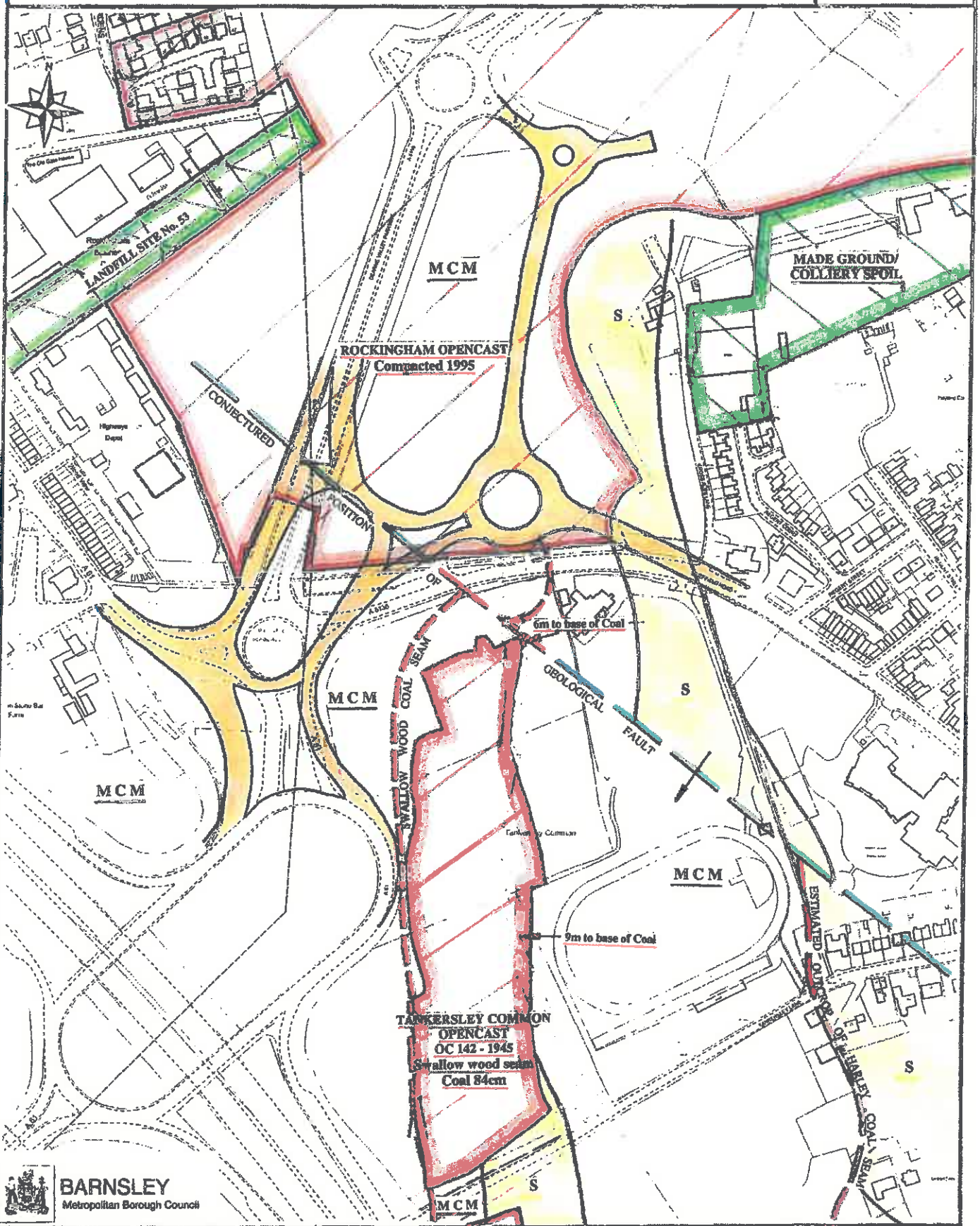
P. James,
Principal Mining Engineer.

DRAWING TITLE

BIRDWELL ROUNDABOUT & LINK ROAD TO ROCKINGHAM ROUNDABOUT

DRAWING NO.

M3687/5A



BARNSLEY
Metropolitan Borough Council

SCALE	DATE		O.S REFERENCE
1:2500 @ A3	12.8.13	SOUTH YORKSHIRE MINING	SE 3400/3500
DRAWN BY: AS	CHECKED BY:	ADVISORY SERVICE	P. JAMES BSc (Hons) PRINCIPAL MINING ENGINEER

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