ENGLISH HERITAGE

Archaeological Research Services Ltd

North York Moors NMP 2

Aerial Survey Mapping Summary Report

National Mapping Programme

Historic Environment Enabling Programme: Project Number 6445

NRHE Parent Collection: EHC01/222

NRHE Event: 1547939

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1 SUMMARY

This aerial survey mapping report forms the completion of the North York Moors National Mapping Programme (NMP) 2 (NYMNMP2) survey funded by English Heritage (EH) through the Historic Environment Enabling Programme (HEEP) (6445 MAIN). The project was undertaken by Archaeological Research Services Ltd (ARS Ltd) in partnership with EH and the North York Moors National Park Authority (NYMNPA). The aerial survey mapping component of the project was undertaken by ARS Ltd Investigators based with EH's Aerial Investigation and Mapping team in York.

The North York Moors NMP 2 survey consists of 325 complete 1km squares, covering approximately 23% of the NYMNP. The project was designed to build on the success of the first North York Moors NMP (NYMNMP; Knight *et al* 2011) and to target specific areas of the National Park where existing survey was deemed insufficient. The mapping area was broken down into three blocks to allow the management of air photos and for an even representation of the National Park without undertaking a complete survey of the Moors. The areas were chosen in line with the strategy for the NMP (Horne 2009), targeting heritage assets in the most vulnerable areas of the North York Moors National Park (NYMNP), with an emphasis on scheduled monuments (Fig 1), as follows.

- The north-east study area abuts the previous NMP projects of the North-East and Yorkshire Coast and Humber Estuary Rapid Coastal Zone Assessments (NERCZA and YHRCZA) (Bacilieri *et al*. 2008; Deegan 2007) as well as providing a link between the two eastern-most blocks of the first NYMNMP, allowing a complete transect of the Moors from north to south to be surveyed. The area consists of 76km^2, extending from Whitby in the east to Loftus in the west, and is concentrated on the lowland coastal arable landscape touching on to the northern-most moorlands of the NP.
- The northern survey block centres on the River Esk and the expanse of moorland to the north, including Gisborough, Commondale and Danby Moors. Covering 107km^2 the focus of this block was on the high concentration of scheduled monuments under threat from erosion and burning, most of which are later prehistoric in date. The southern part of this area incorporates the valley pastures surrounding Castleton and Danby.
- The final area sits in the industrial heartland of the Moors, centred on the dominating valleys of Rosedale, Farndale and Bransdale. With an area of 142km^2, this area was chosen for its industrial heritage, particularly that of ironstone extraction which is so well represented in the vast workings at Rosedale East, Sheriff's Pit and Bank Top. The mixed landscape here

allowed an overview of upland moorland ranging to lowland pasture in the valleys and arable cultivation around Gillamoor.

Transcriptions were produced as digital maps, at a nominal scale of 1:10,000, with supporting records produced to NMP standards for an area covering 325km^2 (5 full OS quarter sheets and 19 part OS quarter sheets). The mapping, recording and quality assurance of archaeological monuments began on 13th December 2011 and was completed on 25th January 2013.

The project mapped and recorded archaeological sites ranging from Neolithic funerary monuments to Second World War defences and 20th century industrial exploitation. The nature of the landscape varies greatly, from lowland cultivation in the extreme south and north, to pastoral valleys divided by uplands of moorland. 451 new records were entered into the National Record for the Historic Environment database (NRHE) with a further 239 existing records being added to or enhanced.

Among the aims of the project and another of the products supplied by the survey is an enhanced database of scheduled monuments (SMs) in the area, producing a spreadsheet of the 202 monuments falling within NMP mapping specifications, and comments on any important factors relating to their latest known condition and the accuracy of the scheduled monument record.

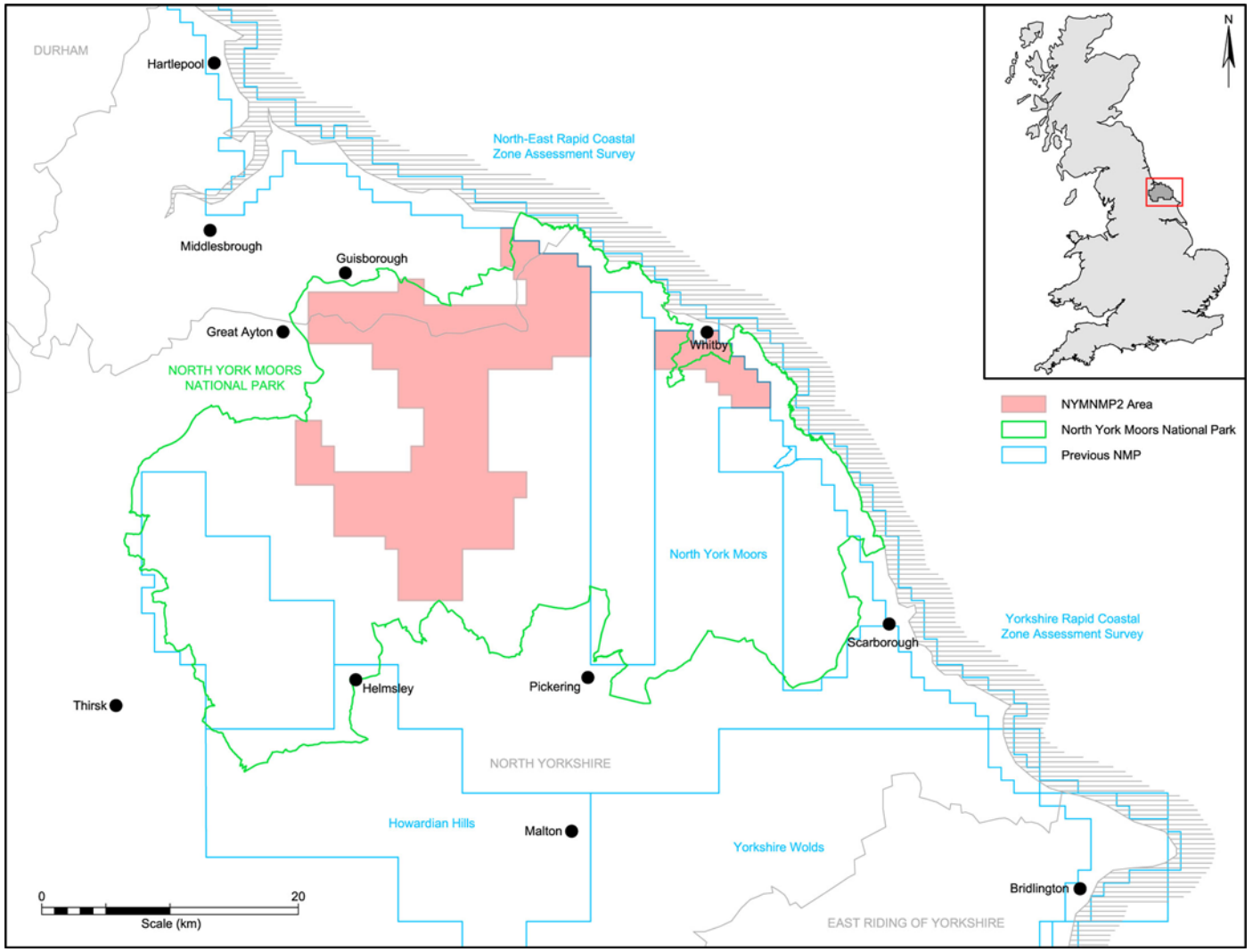

Figure 1. *The North York Moors National Mapping Programme 2 area*

2 ACKNOWLEDGEMENTS

The North York Moors NMP 2 survey was undertaken by Archaeological Research Services Ltd in partnership with the North York Moors National Park Authority, who contributed through access to the Historic Environment Record (HER) data and air photograph collections. Special gratitude is owed to Graham Lee, the Senior Archaeological Conservation Officer for the National Park Authority, for generously sharing his extensive knowledge of the Moors.

Thanks are due also to the English Heritage Archive (EHA) Services Team (formerly the NMR), primarily Luke Griffin, who supplied the EH Archive aerial photography for the project.

Quality Assurance and continual guidance was supplied by members of EH's York-based Aerial Investigation and Mapping team, in particular Dave MacLeod and Yvonne Boutwood.

3 INTRODUCTION

Since the 1970s the North York Moors have been subject to regular archaeological aerial reconnaissance photography. With the exception of a number of site-specific mapping projects no large-scale study had been undertaken to assess the photography for heritage assets until the implementation of the NYMNMP in June 2010. The outcomes of the NYMNMP, which targeted three regions of the National Park, added 937 new records to the National Record for the Historic Environment (NRHE) and contributed towards a further 389 records for updating or amendment. Additionally, the scheduled monument data for the mapping blocks was assessed to ascertain the latest known condition for monuments, and to locate innaccuracies in the, sometimes, out-of-date data.

As a direct consequence the NYMNMP2 was commissioned to further assess differing landscapes in the National Park and to target known areas of dense scheduled monument coverage. Approximately 32% of scheduled monuments in the Yorkshire and Humber region are located in the North York Moors National Park (Waddington 2011, 5) defining the need to bring that monument data up-to-date and to identify potential new sites, where possible.

The standards adopted for the mapping and recording of archaeological monuments within this project are those of the NMP (Winton 2013), which are intended to produce a comprehensive record of the archaeology of England, from prehistory to modern times, through the interpretation, mapping and recording of all archaeological features visible as earthworks, cropmarks and structures on aerial photographs (Horne 2009, 1).

The survey area focuses on three study blocks (see summary above), which were designed through consultation between the NYMNP Authority, EH and ARS Ltd aerial survey staff, to encompass varying geological and archaeological landscapes of the National Park.

4 PROJECT MANAGEMENT

The project was funded by English Heritage and undertaken by Archaeological Research Services Ltd. The Project Assurance Officer was Jonathan Last (EH HEEP), working with a Project Board comprising Graham Lee (NYMNPA), Keith Emerick (EH Regional Inspector) and Dave MacLeod (EH Quality Assurance Officer). The Project Executive was Dr Clive Waddington (ARS Ltd).

The aerial survey team consisted of David Knight, as Aerial Photography Manager, and Tara-Jane Sutcliffe (December 2011 – June 2012) and Samantha Bax (August 2012 – January 2013) as AP Officers.

Internal quality assurance for the AP mapping was provided by David Knight (ARS Ltd). Dave MacLeod, Yvonne Boutwood and Sally Evans undertook EH's NMP quality assurance for approximately 5% of the total mapped area. The EH team also provided advice, training and support where necessary, and ensured the interpretation, mapping and recording was conducted according to NMP standards.

The mapping and recording for the project began on 5th December 2011 and was completed on 25th January 2013.

5 SCOPE OF THE SURVEY

5.1 Geographical Scope

The project focussed on three selected areas within the National Park (see summary above), with the aim of encompassing the varying environs of the Moors, both topographically and historically. Although this report will not attempt to analyse the previous NYMNMP data, comparisons will be drawn where deemed necessary for a wider view. Combined with the previous NYMNMP, the two Rapid Coastal Zone Assessments (mentioned above) and the Howardian Hills Mapping Project (Carter 1995) this project has resulted in over 55% of the North York Moors currently having been mapped to NMP standards.

The project was conducted over 5 full and 19 part 1:10,000 Ordnance Survey map quarter sheets (Appendix 1), covering a total area of 325km^2. This equates to 13 whole quarter sheets.

5.2 Geology (Solid and Superficial)

The North York Moors consists of a varied and complex geological background. The principle river systems within the National Park are the Rivers Rye, Derwent and Esk, the latter being the dominant river in the project area (Fig. 2). Numerous minor rivers and becks also define the narrow valleys, spatially separated by ridges or plateaux of moorland. The predominant solid geology consists of oolites dominating the moorlands and members of the lias group in the valley bottoms. These are overlain by tills in the north and east, and peat in the central regions (BGS 2008: Fig. 3).

The upland oolites consist primarily of ONECOTE (721b) Soil Association over Carboniferous and Jurassic mudstone, resulting in wet moorland habitat with poor grazing value. The outer borders of these areas are predominantly surrounded by MAW (652) Association over sandstone, producing a similar environment. Towards the lower-lying areas the soils change to DALE (712a) and STOW (421a) which allow grassland, woodland and limited cereals (Mackney *et al* 1983).

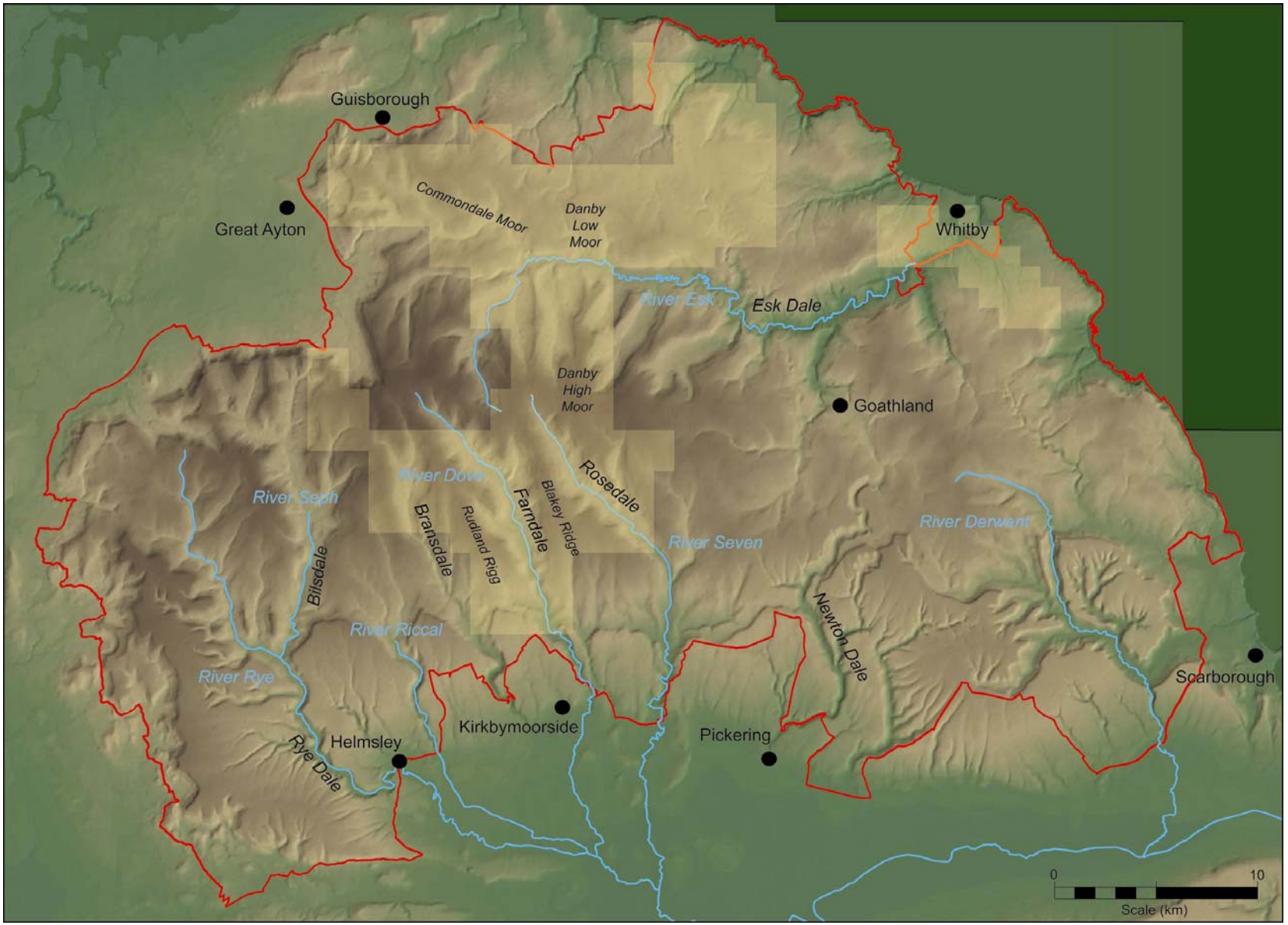

Figure 2. *The North York Moors National Park: geographical scope*

5.3 Land Use

The varied land use within the National Park is predominantly influenced by underlying bedrock and soils. Most of the region is pastoral, with a mix of moorland and varying degrees of improved pasture stretching from the moor-edge to the valley bottom. Elements of cultivation are evident in the valleys, though this is generally confined to the outer lowland edges of the National Park. Forestry is limited in the study area, with small areas located at the head of Bransdale and south of Guisborough.

5.4 Archaeological Scope

The project adheres to the practice adopted for the NMP, which aims to increase our understanding of the historic environment. All probable and possible archaeological features visible on air photographs as cropmarks, soilmarks, parchmarks, earthworks and structures were identified, interpreted, mapped and recorded. The NMP Sphere of Interest (Winton 2011) documents the scope of the NMP. A guideline document was drawn up at the outset of the previous NYMNMP to build upon previous experience to allow consistency within the mapping, and these guidelines were retained for the current project. The main aspects are summarised below.

5.4.1 Earthwork Archaeology

Extant earthworks, identified as archaeological in origin, were mapped. When available RCHME/EH ground survey plans were used to assist and enhance the air photograph interpretation and mapping. If the quality of photography was not sufficient to depict individual earthwork features these were mapped as an extent of area. Braided trackways and hollow ways were not mapped unless they directly impacted upon other archaeological features.

5.4.2 Levelled Archaeology

All cropmarks, soilmarks and parchmarks identified as archaeological in origin and falling within the scope of NMP were mapped.

5.4.3 Post-medieval and Modern Field Boundaries

Features identified as post-medieval field boundaries which are depicted on first edition Ordnance Survey or later edition maps were generally not mapped. However, where they occurred as part of a field system within mapping specification they may be depicted to provide a wider context.

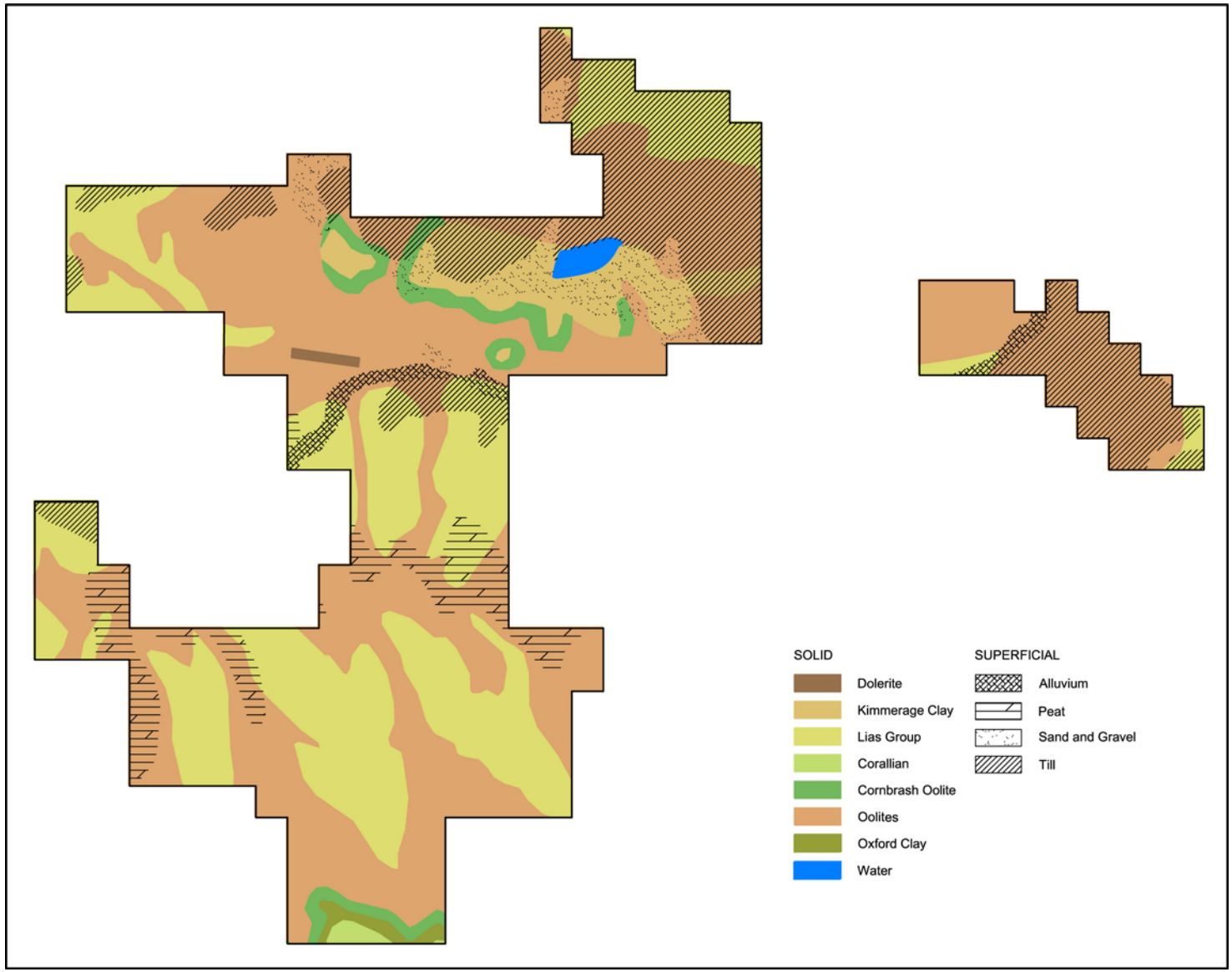

Figure 3. *The solid and superficial geology of the mapping area*

5.4.4 Ridge and Furrow

A simple graphical depiction was used for ridge and furrow, outlining the extent of area and the direction of ploughing. The state of preservation was evaluated from the latest available photography (PGA – see below) and distinguished in the AutoCAD Map layers.

5.4.5 Industrial Features and Extraction

Widespread and common small-scale extraction of stone resources (less than 1ha) were generally not mapped unless the extraction impinged on existing archaeological features, or was visible in conjunction with associated elements such as kilns. Quarries greater than 1ha, collieries or open cast mining complexes were mapped and recorded mostly as an extent of area, irrespective of if they were depicted on any Ordnance Survey map. Features within these complexes, such as spoil heaps, tramways, trackways and extant buildings, were mapped. Dispersed features, such as extractive pits, shafts and shaft mounds, located outside these complexes were also depicted as seen. Urban industrial sites were not mapped.

5.4.6 Twentieth Century Military Features

Second World War and later military sites and installations were mapped in full.

5.4.7 Buildings

The foundations of buildings visible as cropmarks, earthworks or ruined stonework were mapped, except when they were depicted on first edition Ordnance Survey or later edition maps. Medieval ruined castles and monastic sites were also mapped if ruinous in form. Roofed or unroofed standing buildings or structures were generally not recorded unless they had association with industrial or military remains, regardless of whether they were depicted on OS maps.

5.4.8 Previous NMP and Photogrammetric Surveys

The east of the project area abuts the North East (Bacilieri *et al*. 2008; Tolan-Smith 2008) and the Yorkshire Coast and Humber Estuary (Deegan 2007) Rapid Coastal Zone Assessments. As these projects were produced to the same NMP standards it was deemed unnecessary to replicate any overlapping mapping.

5.4.9 Geomorphological Features or Natural Deposits

Geomorphological features, natural deposits, organic sediments and palaeochannel fills were not mapped. This is in line with normal NMP methodology. Where they influenced the nature of the archaeology this was noted in the monument record.

5.5 Sources

Available air photographs were consulted from three main collections with additional orthophotography and lidar supplied digitally. The impact of the quality and coverage of aerial photography is discussed in more detail in the NYMNMP (Knight *et al*. 2011, 22):

- The English Heritage Archive record was the primary source, with three loans consisting of a total of 4,108 vertical and 1,230 oblique photographs. Vertical coverage of the study area consists of a mix of predominantly RAF, Ordnance Survey (OS) and Meridian Airmaps Ltd (MAL), with some specially flown EH photography dating between 1940 and 2005. The oblique photography also came from a wide variety of sources and ranged in date from 1941 to 2010. More recent EHA photography taken by Dave MacLeod (EH), and not yet accessioned, was accessed digitally.

- The air photograph collection of the North York Moors National Park Authority was accessed, resulting in analysis of 125 oblique photographs. Vertical coverage held by the HER was not consulted in detail due to the repetition of flight sorties and the time implication.

- North York Moors County Council archives were also consulted for oblique photography which fell outside the National Park, but all photographs within the study area were discovered to be duplicates of EHA or NYMNPA.

- 105 oblique photographs were analysed from the Cambridge University's Collection of Aerial Photography (CUCAP).

- Orthophotography supplied to English Heritage by Next Perspectives™ through the Pan Government Agreement (PGA), ranging in date from May to July 2009, was used for the mapping and for the latest evidence statement for earthwork and structural sites. Google Earth™ imagery, which originates from the same source, was only periodically consulted to provide additional data, but was rarely used for mapping.

- Lidar tiles in JPEG format at 2m resolution were available from the Environment Agency through English Heritage, which provide partial coverage for the survey area. The low resolution of the data limited its use for mapping archaeological features.

5.6 Monument data

The National Record for the Historic Environment (NRHE) database and National Park Authority's data were frequently consulted during the course of transcription and recording. This process was assisted by the vector-based shape-file (.shp) output from EH's GIS database, which facilitated the graphic representation of the records with attached summary data. Scheduled Monument data was also consulted. Where possible, concordance between HER datasets and NRHE were made. An impact assessment was compiled for elements of the Scheduled Monument data, where the latest evidence was noted to contradict the current scheduling statement.

6 METHODOLOGY AND RECORDING

6.1 Mapping Methods

Mapping methods were conducted in accordance with practices developed for the National Mapping Programme (NMP). All air photographs were examined stereoscopically and under magnification where possible. Oblique and vertical photographs were scanned at a suitable resolution, normally between 300-500dpi, and rectified using appropriate software (AERIAL 5.29). OS MasterMap® 1:2,500 digital maps were used for control and as a base for mapping in AutoCAD Map 3D 2008. Where control was not possible through the OS Mastermap (due to inaccuracies, predominantly in upland environments) PGA ortho-rectified photography was used as the base instead. Height data, used to create Digital Terrain Models to improve the accuracy of the photo rectification, was provided by English Heritage (Licensed to English Heritage for PGA through Next Perspectives™). Accuracy for the OS MasterMap® map is in the order of ±2.5m or higher and rectification of photographs is normally within ±2m. Rectified images were output from AERIAL in uncompressed .TIF format at a resolution of 450dpi and a scale of 1:10,000. A World file (.TFW) was created alongside each TIFF file and the control information was retained in the AERIAL RDA file (RDA).

Mapping conventions and the layer structure used in the AutoCAD Map drawing files is summarised in Appendix 2. The interpretation of mapped features, within the AutoCAD Map drawing files, were recorded in an attached data table (Appendix 3).

6.2 Recording Practice

All mapped features were recorded in the English Heritage National Record for the Historic Environment database (NRHE). This data was downloaded from EH's GIS for import into the AutoCAD working environment for routine consultation. Ordnance Survey first edition and later mapping was also consulted as an aid to interpretation and mapping. Reports of previous archaeological investigations in the project area were consulted, where they were published and readily available. The PGA orthophotography imagery was generally used to record the latest monument evidence for earthworks and structural elements. Where the PGA imagery was not available data from Google Earth™ was used. Cropmark sites required no latest evidence source. Sites which were not visible due to vegetation or tree cover were recorded as such. All the NRHE monument types used for this project are listed in Appendix 4.

6.3 Data Archive and Dissemination

Copyright of the aerial survey mapping and associated NRHE records produced by the project resides with English Heritage. Licence to use the data has been extended to Archaeological Research Services Ltd, North York Moors National Park Authority and North Yorkshire County Council through the ALGAO agreement.

6.4 Project Archive

This project produced 24 AutoCAD Map drawing files, one for each full or part 1:10,000 quarter sheet (Appendix 1). The parent collection number is EHC01/222 and collection numbers for each map are listed in Appendix 1. Copies of the digital drawing files are deposited in the English Heritage Archive. Aerial Survey York and Swindon also retain copies of the digital files, for day-to-day access.

The new and amended monument records form part of the National Record for the Historic Environment database (NRHE), which are downloaded into the English Heritage webGIS. The text can be accessed by the public through PastScape (www.pastscape.org.uk).

6.5 Project Dissemination

Copies of the AutoCAD Map drawing files have been supplied to ARS Ltd. These will be shared with the project partners (English Heritage and the North York Moors National Park Authority).

All NRHE records have been supplied to ARS Ltd in Portable Document Format (.pdf). This project also used Oracle Discoverer Plus Version 9.0.4.45.04 to output the NRHE record data in EXCEL spreadsheet format.

A copy of this aerial survey mapping report will be deposited within the English Heritage Archive in Swindon.

7 SUMMARY OF PROJECT RESULTS

In total, the project mapping produced 451 new NRHE records and contributed towards a further 239. This summary provides an overview of the archaeology of the area as evidenced by the aerial survey record.

The data is discussed chronologically to provide 'period' overviews, spanning the millennia from the Neolithic to the 20th century. In the text, sites are referred to by their English Heritage Unique Identifier Number (UID), which is used in the attached data tables in the AutoCAD Map drawings (Appendix 3) and for the NRHE records. Additionally, site names are used where available, or alternatively the parish location. The monument types recorded by this project in NRHE and in the AutoCAD Map drawing attached data tables, are in accordance with EH's NRHE Monument Recording guidelines and thesaurus, which are listed in Appendix 4.

7.1 Later Prehistoric and Roman

7.1.1 Neolithic

Neolithic activity is sparse, with only three sites being definitive of this period, all being funerary including a long barrow on the northern limit of Newton Mulgrave Moor (29050) and a possible oval barrow on Danby Low Moor (29165).

Standing out is the Great Ayton Moor complex which comprises a chambered cairn (27642) as the focal point for a variety of monuments, the most notable of which are a linear bank extending to the south-west and an oval enclosure abutting the cairn to the north-east (1261509) (Fig. 4). The enclosure and linear are unusual in this moorland context and have been dated as Neolithic by their association to the chambered cairn. Surrounding these features is a rich Bronze Age and Iron Age landscape, with two ring cairns (1261694) and a round cairn (1261697) abutting the Neolithic group to the east: the whole surrounded by small cairns of probable clearance nature. Less than 500m to the east of the chambered cairn complex an Iron Age enclosed settlement dominates the hillside overlooking Lonsdale (27645).

Two further isolated oval enclosures were identified on Moorsholm Moor and Danby Low Moor (28357 and 28351), both being half the size of the Great Ayton example. The Danby enclosure is aligned on four Bronze Age bowl barrows (28348), again on a south-west to north-east alignment, and is consequently considered to be an enclosed cremation cemetery. If the Great Ayton enclosure is considered to be Neolithic through association with the chambered cairn, then perhaps these smaller oval enclosures are also Neolithic in origin with later Bronze Age associations.

Figure 4. *The Great Ayton Moor chambered cairn and bank (27642), oval enclosure (1261509) and ring cairns (1261697 and 1261694)*

NMR 28371/54 09-JAN-2013 © English Heritage

7.1.2 Bronze Age

The Bronze Age is one of the busiest periods mapped for this project, with almost a third of records being attributed to this date. As with the Neolithic this was dominated by funerary activity with 44 burial cairns (round and ring cairns) and 148 round barrows (including bowl barrows) being mapped, of which 7.2% were new records.

The mapped element of funerary activity is almost entirely confined to the uplands, with particular emphasis on the plateau-like moorlands on the north side of Esk Dale. Only two examples were noted to be on the foot-slopes or valley bottoms: at Hutton-le-Hole (59088) and in upper Rosedale (1571557). No specific cemeteries were located, but clusters and alignments were noted along ridges and on the edges of the high land where the monuments are visible from the valley floor. Notable examples were mapped along Danby Rigg, Danby Low Moor and on Loskey Ridge. This bias towards upland later prehistoric survival may be due to subsequent land use in the lower lying valleys where ploughing and agriculture have removed earlier monuments.

Barrows and cairns are often associated with other features, as seen above on Great Ayton Moor. This association of burial cairns with clearance cairns and field systems can also be seen at Danby Rigg (28806) and Gisborough Moor (28629) suggesting a mixed use of the landscape for funerary and agricultural practices.

Another feature found in association with funerary monuments are segmented embanked pit alignments, which only survive as earthworks in the North York Moors, specifically in the uplands of Esk Dale. Three groups of pit alignments were mapped: on Ugthorpe Moor (29111 and 28772); Danby Rigg (28863); and the most extensive on Black Dyke Moor (29129) (Fig. 5). These alignments consist of two rows of pits

measuring up to 252m long in the largest example, which are flanked by segmented banks. The Ugthorpe example consists of two alignments of four pits in close proximity to a cluster of round barrows (29096, 28775 and 29102). The monuments at Danby Rigg are similarly short, one only having two pits and the other six, both of which again lie adjacent to funerary monuments, in this case a ring cairn (28831) and a round cairn (28863). The pit alignments on Black Dyke Moor are considerably more extensive, comprising what appear to be a number of short sections of embanked pit alignments pieced together to form two lengths of alignments measuring 90m and 252m in length. Again we see a funerary association, with barrows located to the immediate east and south of the longer alignment (29144). This association with Bronze Age funerary monuments suggests a similar date for the pit alignments.

Figure 5. *Segmented embanked pit alignment on Black Dyke Moor (29129) with associated round barrows (29144)*

NMR 20954/25 07-OCT-2009 © English Heritage

Dykes are common to the National Park, as illustrated in the first NMP project, ten being mapped during the current assessment. Cross-ridge dykes are the most common, examples occurring on Castleton Rigg (28192 and 28189), Danby Rigg (28827 and 1228469), in Hutton Lowcross Woods (27691) and on Horn Ridge (58881) (Fig. 6). These generally consist of a linear ditch flanked by banks. A single bank and ditch dyke was mapped on Commondale Moor (28498), extending for over 600m from Tidkinhow Slack to the head of Whiteley Beck. The antiquity of this feature is further substantiated by the presence of a standing stone alignment partly incorporated in the bank of the dyke and continuing a further 200m to the south.

An extensive linear feature, which runs along the western edge of Urra Moor (27401), is very similar in appearance and positioning to Cleave Dyke (mapped as part of the NYMNMP: Knight *et al*. 2011), which is thought to have originated in the late Bronze Age or Iron Age (Spratt 1982, 33). The Urra Moor dyke is 4.4km in length and sits on the edge of the upland moor overlooking Bilsdale, much as the Cleave Dyke does on

the western edge of the Hambleton Hills. This may suggest the Urra Moor dyke to be of Bronze Age/Iron Age origin, though it has also been suggested to be medieval in date.

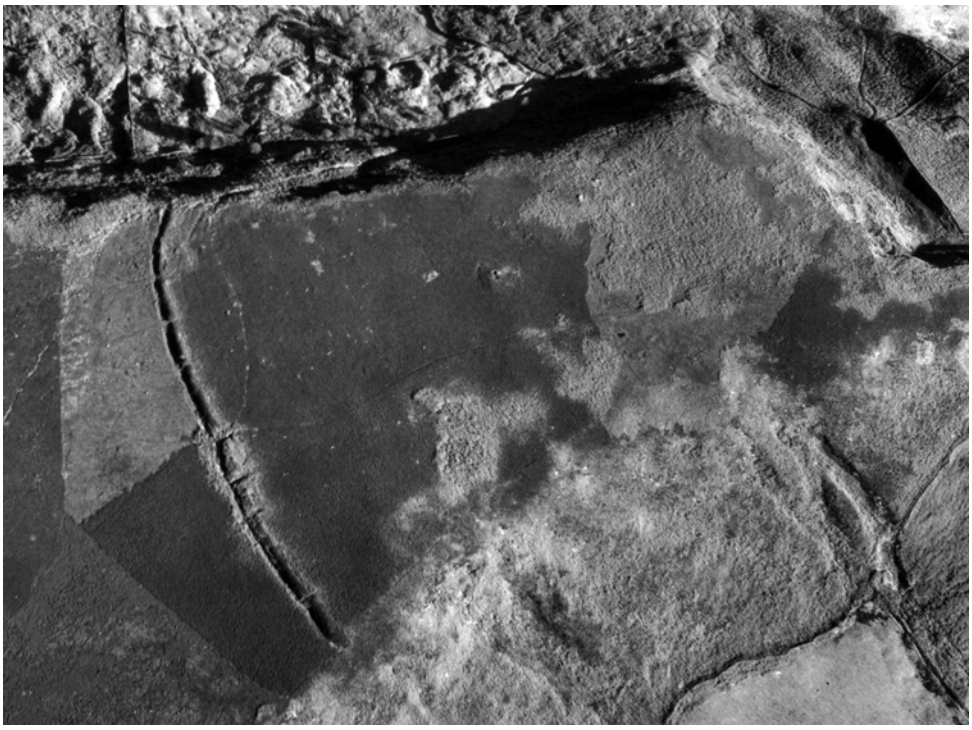

Figure 6. *Horn Ridge cross-ridge dyke (58881)*

NMR 1705/197 02-NOV-1979 © Crown Copyright EH

In addition to the stone alignment mentioned above, two possible stone circles were mapped from the PGA orthophotography. The circle on Harland Moor (59015) is badly truncated by ironstone extraction pits and braided hollow ways. The second, more tentative, example can be found on Commondale Moor, and is visible as a roughly oval layout of stones (28470). A potential stone alignment extends to the east of this feature.

7.1.3 Bronze Age and Iron Age Settlement

Settlement evidence for the Bronze Age and/or Iron Age is remarkably prolific for this area, with the densest concentrations around the sources of the River Esk and Commondale Beck. Settlement can be enclosed or unenclosed, the latter often illustrated by isolated foundations of stone hut circles as on Great Ayton Moor (27680 and 1552995), Kildale Moor (1564041) and Waupley Moor (1212647).

Other examples of unenclosed settlement, usually consisting of nucleated or dispersed groups of hut circles, were mapped on Gerrick Moor (1212688), Roxby Low Moor (29059), Low Moor (1390026), Harland Moor (1571213) and Kildale Moor (28639), the latter of which remains uncovered. Excavation took place on the Kildale site in the

1960s to reveal five adjoining huts with late Iron Age pottery (Close 1972, 31). Roxby Low Moor consists of a more dispersed settlement of at least seven hut circles spread over an area measuring 170m by 280m. Both areas were dated by pottery and C14 dates as late Iron Age extending into the Roman period (Inman *et al* 1985, 209).

Defining the difference between Bronze Age and Iron Age remains difficult without supporting finds evidence, as features of both periods are often morphologically very similar from an aerial perspective. The enclosed forms of settlement are no different, with both periods displaying curvilinear or rectilinear traits. Such examples were mapped on the southern footslopes of Commondale Moor (28021), Soldier's Garth on Borrowby Moor (29056) and Crown End on Westerdale Moor (27838). All three sites display very different characteristics. Soldier's Garth comprises a closely-packed group of enclosures, largely rectilinear in form with abutting trackways or hollow ways. This site lies only 200m to the east of the Roxby Low Moor settlements. Crown End settlement (Fig. 7) is centred on a rectilinear enclosure, surrounding which are sinuous field boundaries and lynchets defining an extensive field system, within which are numerous cairns presumably for clearance. The Commondale example has similar characteristics to both Soldier's Garth and Crown End, with linear field boundaries nucleated around two D-shaped enclosures.

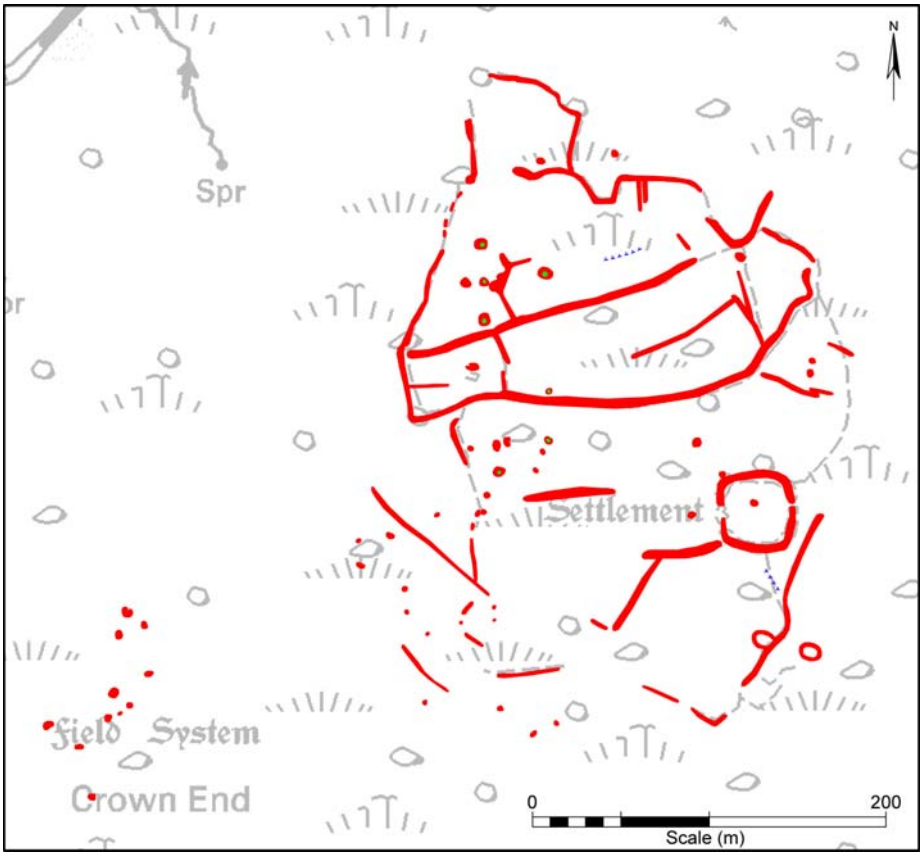

Figure 7. *Crown End Bronze Age/Iron Age settlement*

Three further settlement enclosures were mapped: on Great Ayton Moor (27645) (Fig. 8), Pinnican Hill (27880) and Low Roxby Moor (29059), all of which are univallate, consisting of a ditch flanked by internal and external banks. The Great Ayton Moor enclosure is square in plan and was partly excavated in 1953 to reveal an internal oval hut and Iron Age pottery (Tinkler and Spratt 1978, 53). The Roxby Low Moor settlement is now levelled, but was visible as earthworks on 1946 photography and was constructed in the same fashion, being rectangular in form with a single ditch flanked by banks.

Figure 8. *Iron Age enclosed settlement on Great Ayton Moor*

NMR 28371/43 09-JAN-2013 © English Heritage

Another enclosure was mapped at Round Hill (Fig. 9), to the south of Westerdale (1151276). Defined as a small Iron Age hillfort, Round Hill consists of a single enclosure bank on the hilltop with a multivallate entrance. Much of the east face appears to have been mutilated by later quarrying.

Figure 9. *Round Hill Iron Age hillfort*

ANY 149/4 06-JUN-1984 © North York Moors National Park Authority

Field systems and cairnfields, although often devoid of obvious settlement features such as round houses, can still be considered an indicator of settlement. Of those mentioned above the settlements at Crown End (27838) and Harland Moor (1571213) have associated clearance cairns. A further twelve cairnfields were identified during the project, following the pattern of distribution in Esk Dale and along Rudland Rigg, with notable examples at Danby Rigg (28806) (Fig. 10) and on Commondale Moor (28681, 28595 and 28609).

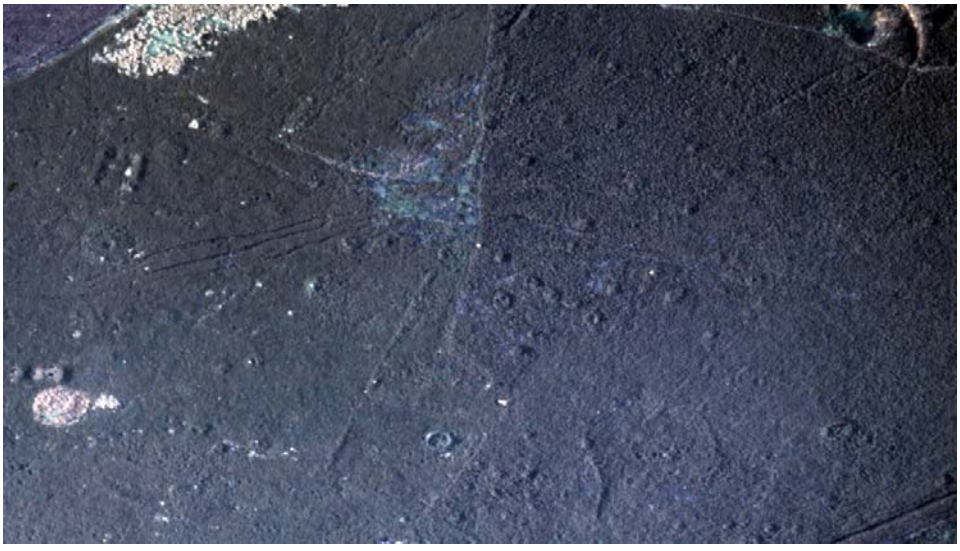

Figure 10. *Danby Rigg cairnfield (28806)*

NMR 17064/31 12-DEC-1997 © Crown Copyright EH

Some cairnfields display increased complexity with the presence of field boundaries, as seen on Kildale Moor (28028), Westerdale Moor (27845) and Nab End Moor (57398). The latter is extremely complex, defined by rectilinear walled plots intermingled with cairns in a manner closely resembling Crown End.

7.2 Medieval

7.2.1 Medieval Land-Use and Settlement

Direct evidence for medieval settlement is sparse in the current project area, with only a handful of mapped examples. Newton Mulgrave (28997) is recorded in the Domesday survey (William and Martin 2003, 870) and earthworks survive to the north-west and east of the present village. The features include the building platform of the former Newton Hall, crofts, a hollow way, ridge and furrow and numerous field boundaries. To the north-west, north of Roxby village, earthworks and building remains indicate the location of Roxby Hall (29022) in an area of terraced ground. In most cases medieval origins can only be determined by associated features such as field systems and ridge and furrow, as noted at Roxby where ridge and furrow (1548670), field boundaries (1548676, 1548678), lynchets (1548674) and hollow ways (1548675) were also mapped. Similar characteristics were recorded on the southern edge of the National Park within and surrounding the village of Gillamoor (1571347).

Isolated examples of medieval land management were also noted in the form of lynchets north of Raw (1548824) and in Danby Dale (1567534). Extensive braided trackways of medieval and post-medieval origin were visible throughout the project area, primarily on moorland, but were not mapped due to time constraints (see 5.4.1). Dispersed ridge and furrow of medieval date or origin has been recorded across the area with small clusters concentrated on the settlements discussed above. Elsewhere the medieval cultivation evidence is patchy and isolated, often comprising a single field.

7.2.2 Deer Parks

Deer parks are a common feature of the North York Moors, with two examples mapped in the study area, the most prominent and well-preserved being north-west of Commondale (28606). The park measures nearly 112ha and the pale consists of a fragmentary bank flanked by an inner and an outer ditch which straddles Whiteley Beck and is divided internally by a number of field divisions (1556036). Some of these divisions appear to be of sod-cast construction while others are formed by remodelling natural water channels, a common feature of land division in the moors.

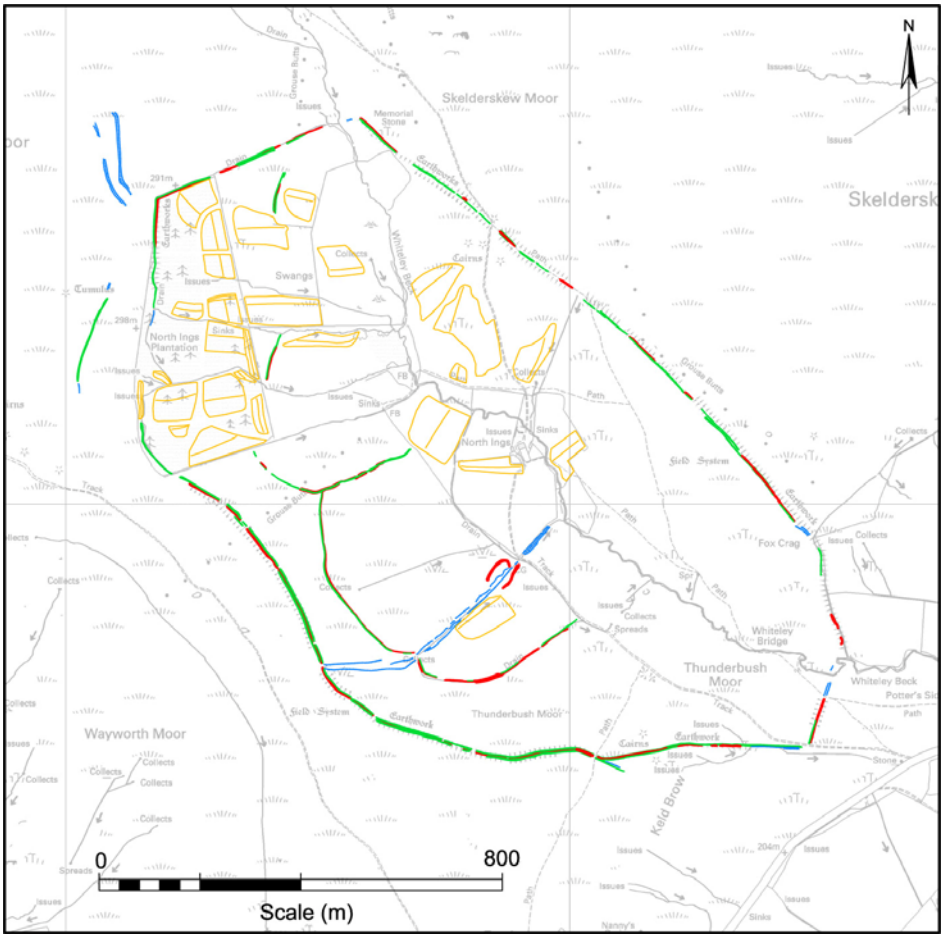

Figure 11. *Commondale deer park pale (28606)*

The suggested wall of a second deer park, Greenhow Park (27437) (Rimington 1975, 12), was recorded, but appears on air photographs to be a post-medieval field boundary. Subsequent field observations failed to identify evidence of the medieval origins of the wall or an underlying earthwork bank, although a nearby linear bank on a similar alignment could potentially be associated with the park pale.

7.2.3 Fortified Sites

South of the River Esk, on Castle Hill in the village of Castleton, the earthworks of a medieval motte and elements of a surrounding ditch were mapped (27885). Small-scale excavation on the site revealed post holes, post pads and a cobbled yard of uncertain date (Gaimster *et al*. 1988, 221). Historical documents refer to the castle as ruined in 1335-6 and it is suggested that it was replaced by Danby Castle (28803), located approximately three kilometres to the south-east (Page 1923, 334). A substantial part of Danby Castle survives as a ruined quadrangular courtyard castle, with diagonally-projecting corner towers incorporated into the modern farmhouse buildings. It is thought to be of probable late fourteenth century date with sixteenth century alterations (Pevsner 1966, 136).

Figure 12. *Castle Hill (27885)*

ANY 291/08 09-DEC-1986 © North York Moors National Park Authority

7.2.4 The Monastic Landscape

In contrast to the previous NMP project, monastic activity was considerably more sparse, with only the ruined remains of the Cistercian nunnery of Rosedale Priory (60492) falling within the project area.

However, a number of potential monastic granges were recorded (Fig. 13), though no conclusive evidence has as yet been identified associating these farming complexes to monastic houses. Only Rudland Close (59043) has been subject to detailed investigation. Located on Spaunton Moor and the largest of the mapped 'grange' sites, Rudland Close is defined by a large irregular enclosure spanning Rudland Beck comprising a bank of possible sod-cast construction with an outer ditch. Internal divisions are formed by natural or modified water channels. A roughly triangular enclosure in the south-west corner of the complex contains the remains of an aisled barn and other structures now scheduled. The site of the barn and adjoining yard were then either remodelled or rebuilt into a house providing dating evidence for the 14th to 15th centuries. The site appears to have then been reused as a probable shieling in the 17th century (Pacitto 1966, 36-42).

Figure 13. *Rudland Rigg possible monastic sheep farm (1569887)*

NMR 17680/10 14-FEB-2002 © English Heritage

A second enclosure complex with building remains is located approximately 6km to the west, on Rudland Rigg (1569887) (Fig. 13). The complex is defined by three conjoined enclosures to the immediate east of Ouse Gill, orientated north to south. At least two buildings and a number of internal divisions are located within the central enclosure. The site is similar in appearance to the monastic farming complex recorded on Levisham Moor (63272), which documentary evidence describes as a predominantly sheep farming site (Hayes 1983, 65-66). A smaller complex (1434018) lies approximately 200m to the north and may be of similar medieval origins, though it has been partly reused in the post-medieval period as a sheepfold. Similarly enclosures at the head of Tripsdale (27396) illustrate post-medieval sheep farming in the centre with the substantial earthworks of outer enclosures pointing towards medieval origins.

7.3 Post-Medieval

7.3.1 Post-medieval Land Use

The most abundant evidence for post-medieval agricultural activities is ridge and furrow, with the densest concentrations found in the coastal lowland regions to the north and north-east of the project area. Being a predominantly upland landscape the environment has undergone less change over recent decades, which is mirrored by a survival rate of the mapped ridge and furrow of 42.7% in 2009.

A number of post-medieval field systems, now abandoned, have also been mapped, such as that west of Commondale (1563839 and 1559055), where the field boundaries and hollow ways divide areas of post-medieval ridge and furrow. A small rectilinear

enclosure adjoining the main enclosure of the southern-most field system (1563839) is suggested to be a possible stock enclosure or building. As with much of this environment both, potentially, may have medieval origins.

Figure 14. *Hutton-le-Hole pillow mounds (59067)*

NMR 12381/12 07-MAY-1993 © *English Heritage*

Reuse of the landscape within the post-medieval period is also evident, as illustrated by two small stock enclosures within a large post-medieval field system west of Lockwood Beck (1567278), which overly post-medieval ridge and furrow suggesting the field system was later reused for grazing and stock management. Further evidence of post-medieval pastoral activity occurs at the monastic farmsteads, such as the 17th century shieling excavated at Rudland Close (59043) and a sheepfold constructed of dressed stone of possible medieval origin (27393) within the Tripsdale enclosure complex (27396).

A well preserved complex of pillow mounds (59067) lies approximately one kilometre north-west of Hutton-le-Hole, and is suggested to have been constructed by the Shepherd family of the nearby Douthwaite Hall in the late 17th or early 18th century (Fig. 14). A total of 31 similar sized rectangular mounds were mapped, each with a shallow external ditch. This rabbit warren is suggested to be one of two owned by the Shepherd family in the area, and was probably in use until the first half of the 19th century (scheduling detail 30106).

A number of stone stores, a feature usually outside the NMP sphere of interest but deemed to be of significant local interest, were recorded. Being post-medieval in date they consist of built 'avenues' of walls with loose stone stored in-between. An extensive previously unrecorded example was surveyed in Bransdale (1569475). Other examples, such as north of Church Houses (1571509), were simply piles of stones often resembling large cairns.

Figure 15. *Post-medieval stone stores in Bransdale (1569475)*

SE6295 24-MAY-2009 Aerial Photography: Licensed to English Heritage for PGA, through Next Perspectives™

Another exception usually outside the mapping parameters was the hamlet or large farmstead of Pry Hills (1570017). Illustrated on the first edition Ordnance Survey map of 1857 (1:10,560) the hamlet grew smaller over successive maps, apparently being abandoned in the early 20th century. The site is now only visible as low earthwork building foundations, field boundaries and hollow ways.

7.3.2 Industrial Activity

The industrial heritage of the North York Moors was specifically targeted during this project, with outcomes demonstrating the extensive nature of extraction which took place in the post-medieval period. Perhaps the most extensive extraction was for coal.

Located on the moor tops, the remains of mining mounds, trackways and occasional buildings, such as the ruined remains of the Sharpening Hut on Rudland Rigg (1137622), have been recorded. The largest concentrations of coal mining were mapped along Rudland Rigg and Harland Moor (1137622, 1137652 and 1571409) (Fig. 16), also spreading along Blakey Ridge (1569242, 1571527 and 1571524) and Rosedale Moor (1568311 and 1569905).

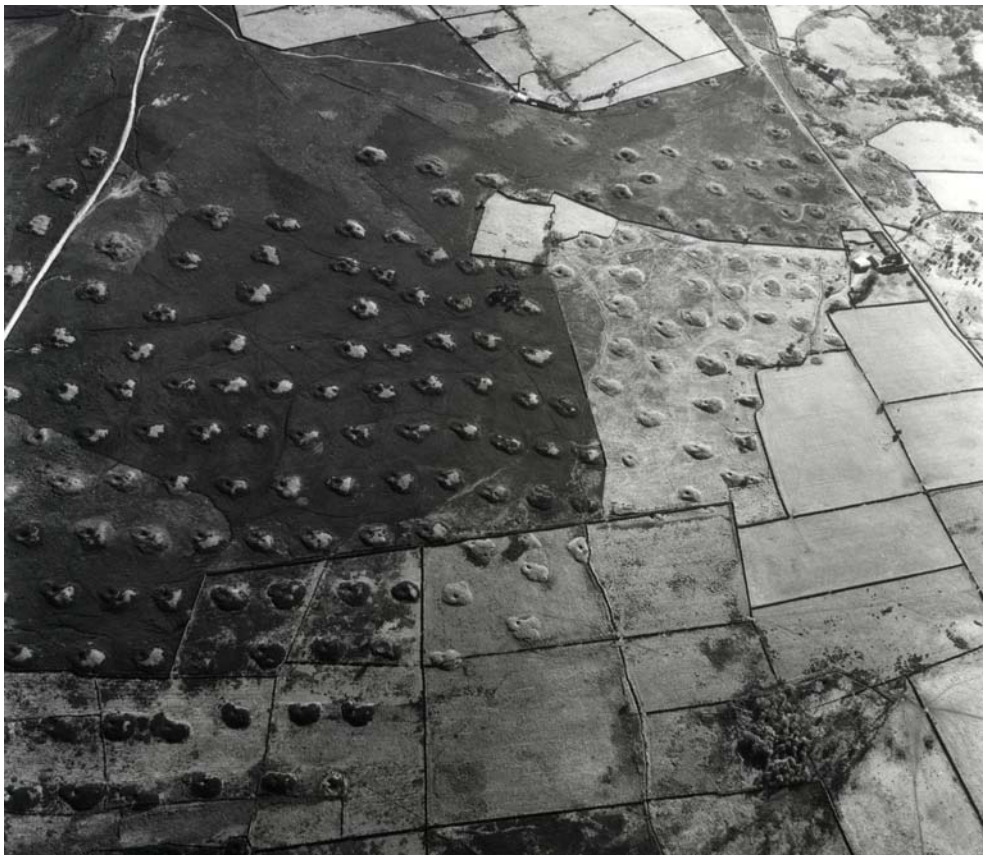

Figure 16. *Coal mining on Rudland Rigg (1137652)*

NMR 1705/181 02-NOV-1979 © Crown Copyright EH

The earliest documentary evidence relating to coal mining in the area dates to 1715 for a colliery at the southern end of Bransdale (Spratt and Harrison 1989, 167), close to the Rudland Colliery on Rudland Rigg (1137652). Most of the National Park collieries probably date from the late 18th and 19th centuries, although some extraction continued on the Rudland and Harland collieries until the 1920s (ibid, 168). The earthwork remains are defined by a central hollow or shaft surrounded by a spoil heap. These shafts are generally arranged in an approximate grid pattern, often being paced out rather than surveyed (ibid, 170). A number of possible prospecting trenches were also identified on Rudland Rigg (1137622) and Harland Moor (1571416).

Ironstone extraction (1472005) of similar shaft and spoil heap form is recorded at Westerdale Head, suggesting ironstone and coal were simultaneously targeted for extraction. The mines were exploited to their full potential, with waste material such as the iron oxide-rich calcine dust, produced during the roasting of ironstone (Fig. 17), being of commercial value and removed for processing in Middlesbrough (Hayes and Rutter 1974, 8, 11).

Figure 17. *Calcining kilns at Top Bank in Rosedale (1300063) resulted in calcine dust which was reused after the closure of the mine*

NMR 20957/40 07-OCT-2009 © English Heritage

The mid to late 19th century saw a well-documented surge in ironstone mining. In the north-west mining occurs south of Guisborough (1559002 and 1558997) and to the east of Great Ayton (1552841 and 146383), often in close association with jet mining. The second, most intensive, area of ironstone workings, is located in Rosedale and Farndale. The Rosedale mines opened in the mid 19th century at Hollins Mines (1300063, 1570035) and along the escarpment of Rosedale East (60502). By 1861 they were linked into the North Yorkshire and Cleveland Railway and the industry boomed (ibid, 7). The mapping of Rosedale East illustrates the gargantuan efforts of the miners, with nearly 4km of hillside sculptured into terraces for tramway and railway access, with the remainder of the hillside covered in extractive pits, spoil heaps, ventilation shafts, calcining kilns, cottages and workshops, some of which are extant on the 2009 photography. Additional ironstone mines were linked into the railway, with remains mapped at Sheriff's Pit (1571536) and Blakey Mines (1571512).

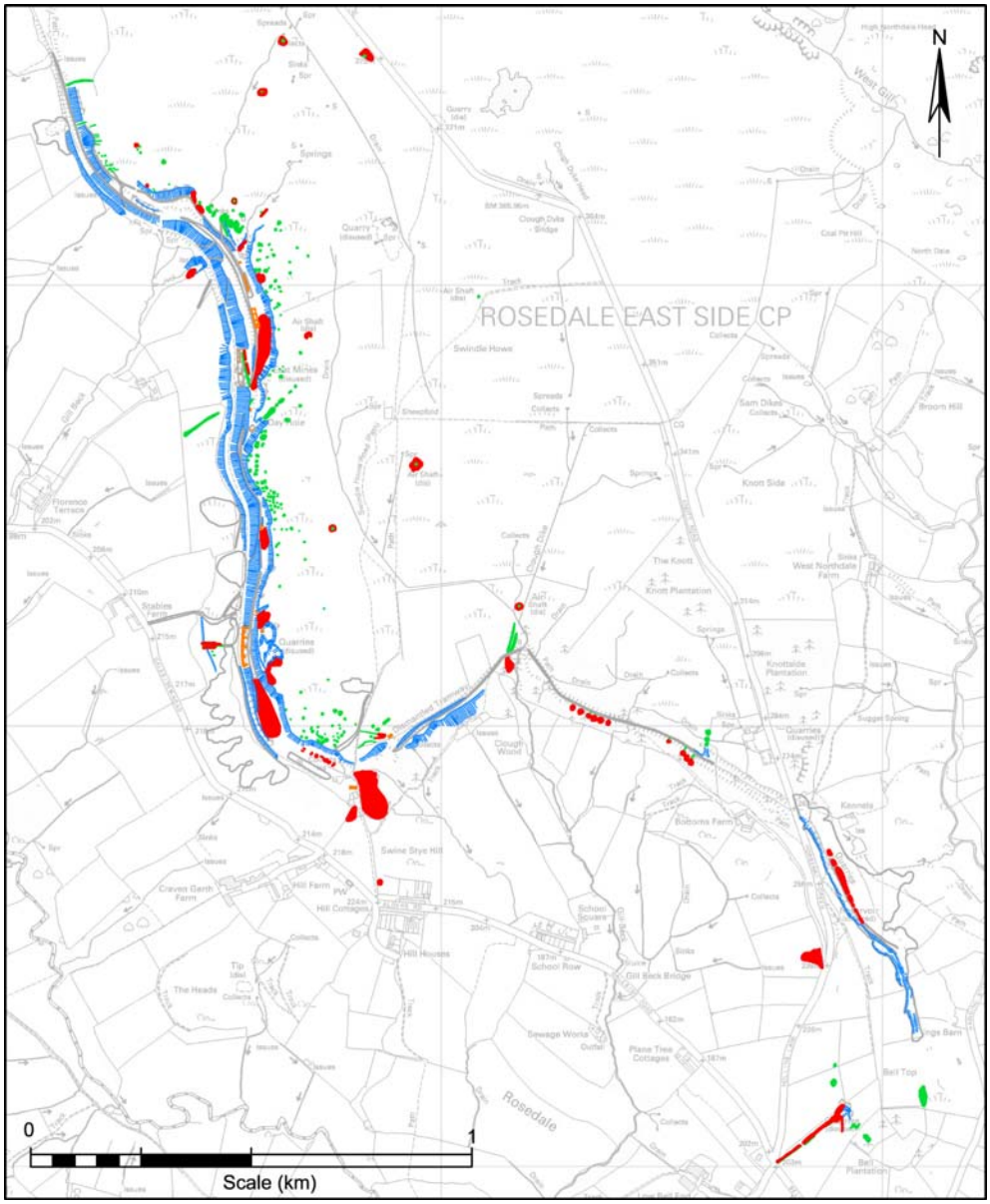

Figure 18. *The Rosedale East ironstone mining complex (60502)*

Jet extraction is visible along many of the valley escarpments in the north-west of the study area, and was mapped in three main concentrations. These occur in the north around Roseberry Topping (1552519) and Hutton Lowcross Woods (1552510); centrally on the escarpment surrounding Urra Moor (1568527) (Fig. 19); and surrounding Westerdale Moor and Swarthy Hill to the east (1569232, 1569157). Jet has a long history in the North York Moors, with worked examples frequently identified from prehistoric burial mounds (Elgee 1930, 108-119). The intensification of jet quarrying is thought to have coincided with that of the ironstone extraction and the completion of the railway (Spratt and Harrison 1989, 175), possibly fuelled by the popularity of the jet from Whitby in the later post-medieval period.

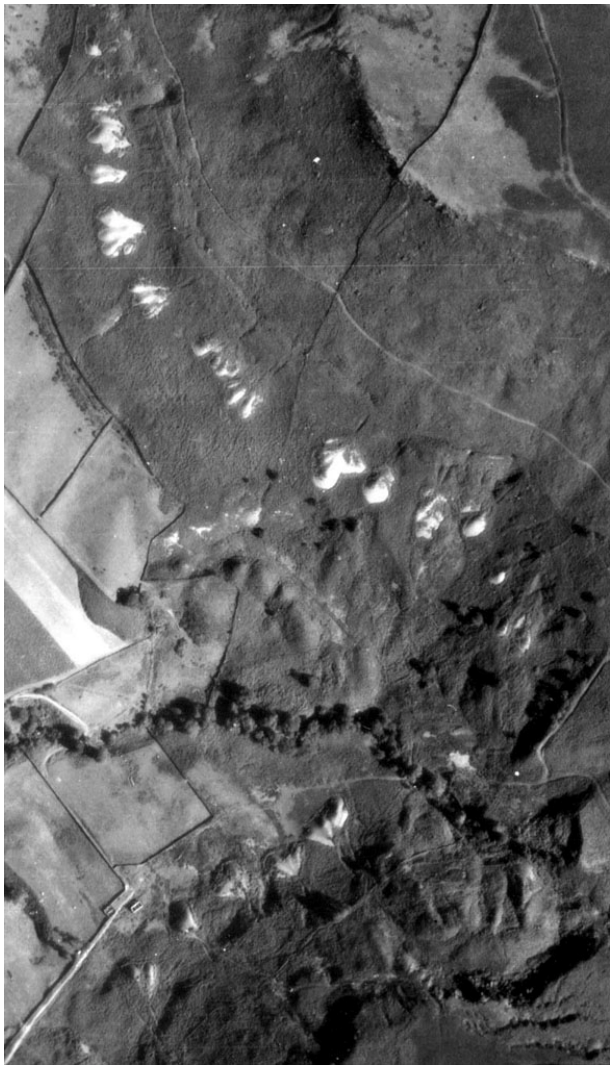

Figure 19. *Urra Moor jet mining (1568527)*

NMR RAF/106G/UK1700 V 3393 27-AUG-1946 English Heritage RAF Photography

The North York Moors was the centre of alum production in England, and quarrying of suitable alum shales began in the early 15th century around Guisborough and Skelton (ibid, 171). The Ayton Banks alum works, consisting of the quarry, processing features and linking trackways, were mapped (1122861). Documentary evidence indicates that the site was only in use from 1765 to 1771 (Lee 2006, 83) and was closed after more profitable alum deposits were opened along the north-east coast (scheduling 31343).

In addition numerous quarries, primarily of sandstone, gravel pits and extractive pits of uncertain type were recorded across the survey area. The moorland was also the target of peat cutting, most noticeably on Danby High Moor (e.g. 1569186 and 1569181), which continued until at least the 1970s. Other isolated examples of extraction include a single limestone quarry (1567387) east of Commondale and an extensive silica quarry (1562815) north of Danby. A suggested potash kiln (1571369), with associated ramp and spoil heap, is visible as a small hollow with surrounding walls to the west of

Hutton-le-Hole. The site may have been positioned for the collection and burning of bracken.

Naturally occurring clays led to a number of brick and tile making sites with associated clay pits being established in the post-medieval period, such as the Danby Brick and Tile Works (1553949) and Normanby Brick and Tile Works (1548822). Similarly the large site of the Commondale Brick and Pipe Works, initially the Fire Brick and Pottery works (534529), was established in the second quarter of the 19th century and continued in use into the 20th century.

7.4 Twentieth Century Military Features

Only a small number of Second World War sites were mapped, mostly bomb craters scattered across the northern moorlands of the study area. The most significant is RAF Danby Beacon radar station (1336422), which was in use by 1939 and was one of twenty East Coast stations forming part of the Chain Home System. Little of the site survives today, but 1940s and 1950s RAF photography provides detail of the site layout including the eight aerial masts, numerous buildings and a number of pillboxes protecting the site perimeter (Fig. 20). Additional defence of the site was afforded by an anti-aircraft battery to the south-west, close to an associated military camp (1336422).

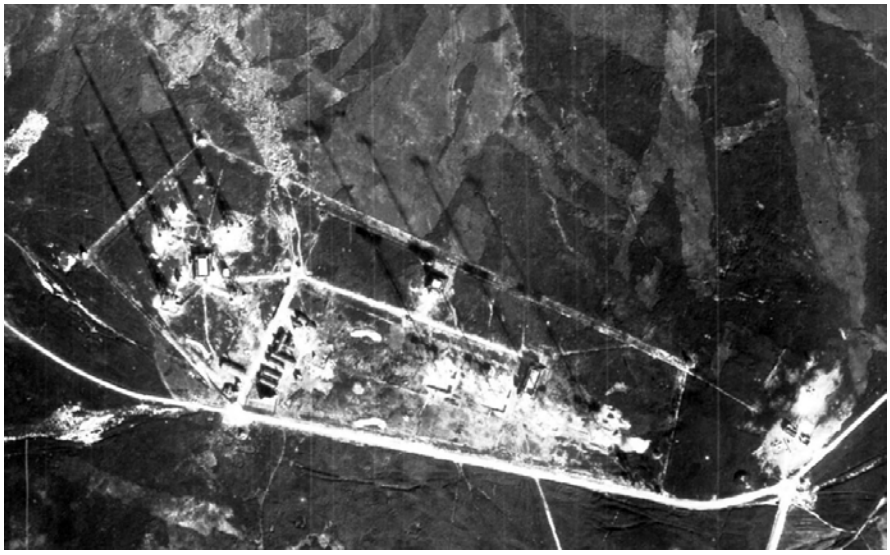

Figure 20. *Danby Beacon radar station (1336422)*

NMR RAF/540/625 V 5015 01-NOV-1951 English Heritage RAF Photography

Discrete features were also identified, such as a searchlight battery west of Commondale (1415762) and a possible training trench at Douthewaite Hall (1571354). A starfish bombing decoy was visible on 1946 photography bordering on Kildale and Great Ayton Moors (1469768), being one of a number constructed in the Moors to

deflect enemy bombing from Middlesbrough. Although the decoy earthworks appear to be no longer extant, the associated control bunker (1415788) is still visible over 600m to the north-west.

Following the Second World War military activity decreased, with Danby Beacon being decommissioned in 1954. The threat of nuclear war did however result in the construction of a Royal Observers Corps monitoring post (1415846) south-west of Castleton in 1959. The bunker was decommissioned in 1991.

7.5 Features of Unknown Date

With the team having worked on the previous North York Moors NMP and having developed a knowledge base for the region, this project resulted in very few sites recorded as uncertain date. When 'Uncertain' was used the features described were usually very nondescript. One site which stands out as a particular anomaly is located just to the south of Stony Gate Slack, outside Sneatonthorpe (1548879). Defined by three curvilinear mounds with central hollows and external ditches these features may be anything from a Second World War searchlight battery to a prehistoric settlement or funerary cemetery (Fig. 21).

Figure 21. *Curvilinear features of uncertain date on Low Moor (1548879)*

NMR 20181/20 04-NOV-2004 © English Heritage

7.6 Discussion

7.6.1 Later Prehistoric

The North York Moors National Park has a unique later prehistoric coverage, with a third of the project records falling into the Neolithic to Roman periods. The concentration of activity is confined to the hilltops, primarily along the moorland to the north of the Esk Valley and around the source of the River Esk and Commondale Beck. As with any prehistoric upland landscape funerary monuments predominate. The prehistoric complex on Great Ayton Moor stands out as one of the more anomalous, comprising the only chambered cairn in the National Park with an associated bank or cairn and oval enclosure, as well as numerous other prehistoric monuments more usual to the uplands (Fig. 22).

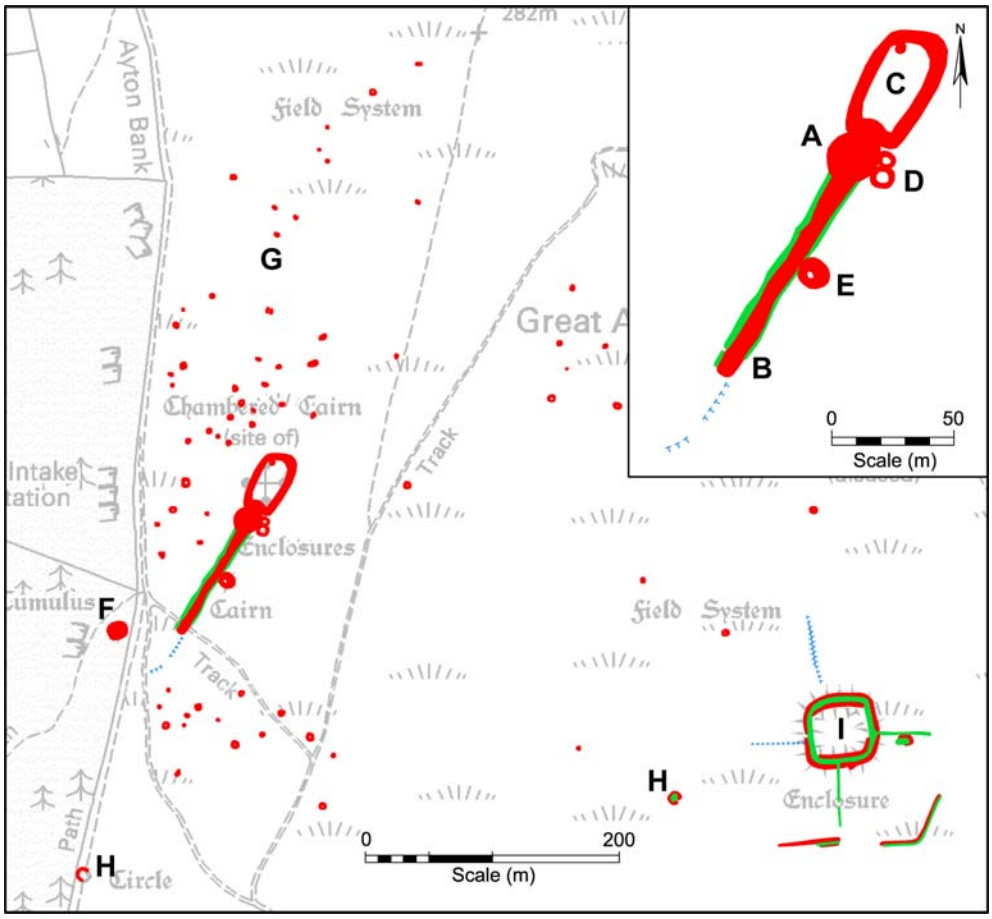

Figure 22. *The Great Ayton Moor later prehistoric complex*

A Neolithic chambered cairn (27642)
B Neolithic bank cairn/long cairn (27642)
C Neolithic/Bronze Age oval enclosure (1261509)
D Bronze Age ring cairns (1261694)
E Bronze Age round cairn (1261697)
F Bronze Age round barrow (27677)
G Bronze Age/Iron Age cairnfield (27723)
H Bronze Age/Iron Age hut circles (27680 and 1552995)
I Iron Age enclosed settlement (27645)

The linear bank provides us with perhaps the most unusual and interesting element of the Great Ayton Moor complex, comprising a low turf-covered bank with a length of 93m and up to 7.6m wide. The bank may be flanked by two narrow and shallow ditches, but it is equally possible that these are simply the scars left by Hayes' excavation of the 1960s. The excavations revealed the bank to consist of large boulders surrounded by a kerb, much of which had been mutilated by robbing for later monuments (Hayes 1967, 22-23). Hayes considered the feature to resemble the bank barrows of Dorset (ibid, 32), all of which are assumed to be Neolithic based on dating evidence from the Maiden Castle example (Bradley 1983, 15). Perhaps the nearest comparison is Long Low in Staffordshire, which consists of a barrow and cairn linked by a long bank barrow. Although considerably longer, wider and taller than the Great Ayton example Long Low is also orientated south-west to north-east. Similarly the round cairn at Long Low was also chambered with the monument considered to be late Neolithic or early Bronze Age in date (McOmish and Tuck 2002, 26). However the predominant use of stone suggests that 'long cairn' or 'bank cairn' may be the most appropriate description for the Great Ayton Moor monument.

Segmented embanked pit alignments are not only anomalous to the National Park, but are the only known earthwork examples of their type known in England (Fig. 23). The earthwork monuments are located on the moorland tops above Esk Dale, though the first NYMNMP did possibly identify another as a cropmark on the extreme west of the National Park, south of Boltby Scar (1032907), again in association with a round barrow. Previous suggestions of functions for the monuments range from settlement, to ironstone workings, to incomplete cross-ridge dykes (Elgee 1930, 152). The first two suggestions can be dismissed immediately: the pit alignments show none of the physical characteristics of mining or settlement. Nor does their form correspond to any known dykes within the National Park. Lofthouse conducted a detailed survey of the three sites and also argued against the incomplete dyke theory and outlined the association with cairns and barrows (1993, 390-391), which is also illustrated here as having clear significance. This leads to the conclusion that the pit alignments may also be funerary in nature or through association.

As well as the Boltby Scar pit alignment mentioned above, a number of comparable examples have also been recorded outside the National Park, most notably at Thornborough and in the Hull Valley. The latter example was recently mapped by the EH Aerial Investigation and Mapping team as part of the Chalk Lowland and Hull Valley NMP and comprises a cropmark double pit alignment of ten pits immediately adjacent to a round barrow and causewayed ring ditch (Evans *et al* 2012, 9). The alignment at Thornborough is even more comparable with the Moorland examples, comprising an avenue of pits 113m long, again displaying evidence of variation in pit size and spacing

possibly suggesting that they were also segmented. This alignment is again in the immediate vicinity of two round barrows (Deegan 2005, 11).

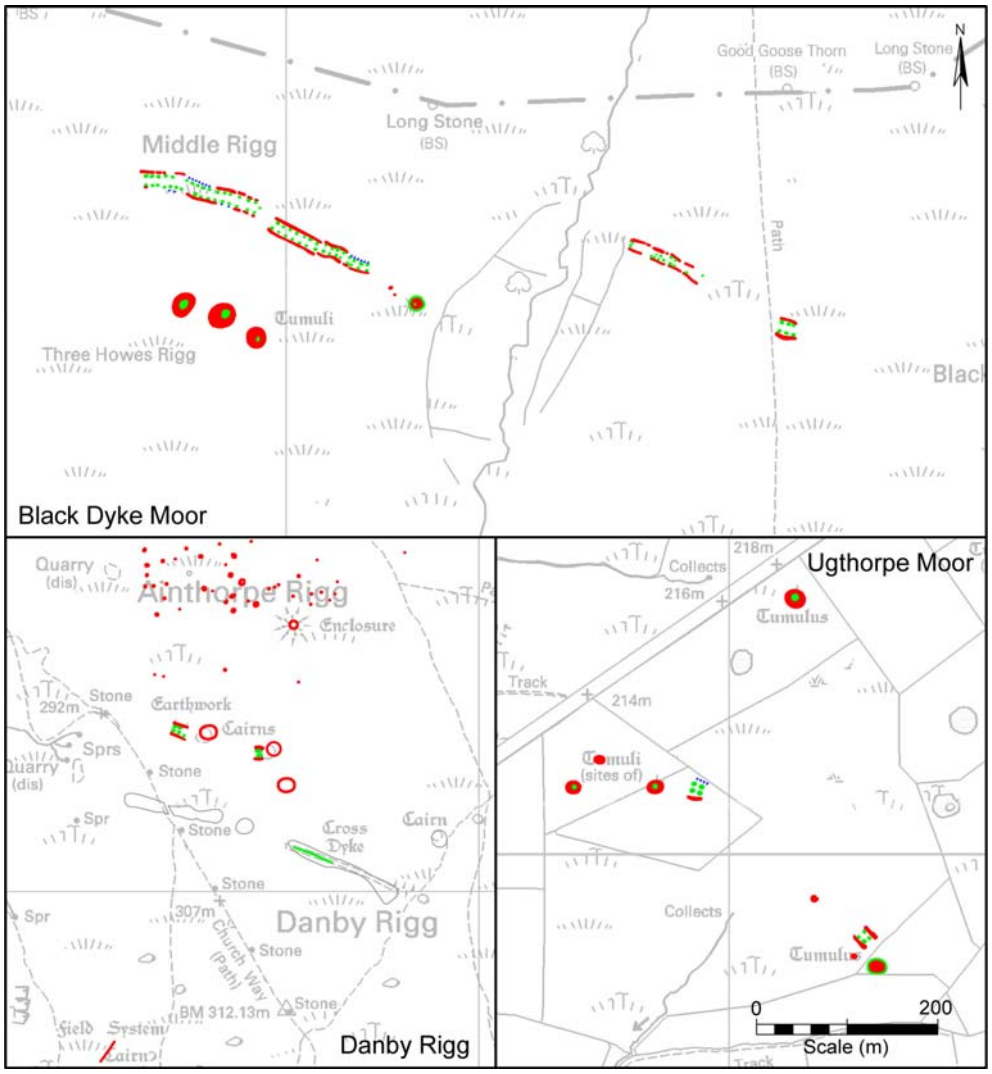

Figure 23. *Segmented embanked pit alignments*

The pit alignments of the National Park follow a trend common to much of the later prehistoric activity of this project, being located on the moorlands to the north of the Esk. The results from this and the previous NYMNMP highlight a significant increase in activity towards the peripheries of the upland, defined by the National Park boundaries. This is particularly apparent in the moorland to the north, on the Hambleton Hills to the south-west and the Tabular Hills in the south-east. Monuments do occur in the more central regions of Blakey and Rudland, but in far less density. Direct settlement evidence is almost entirely confined to the headwater of the Esk and Commondale, with sporadic hints of settlement, through cairnfields, further to the south.

7.6.2 Medieval

Medieval activity in the project area was dominated by moorland farming complexes, thought to be monastic in origin and for the management of sheep (Fig. 24). The sites share a number of characteristics in location and form, suggesting a common function: they are located in isolated positions on the moors, either immediately adjacent to, or straddling a steep-sided beck; they are largely defined by substantial banked enclosures, of probable sod-cast construction, with outer ditches presumably for drainage and often utilise natural run-off water channels as field boundaries. Building foundations are evident at Rudland Rigg and Rudland Close, the latter being dated as medieval. At Tripsdale a post-medieval sheep fold is suggested to be constructed of possible medieval dressed stone.

The aisled barn at Rudland Close (59043) is of a similar layout and size to barns mapped on Levisham Moor (63272) as part of the first NYMNMP. Measuring approximately 34m by 9m the aisled barn is noted to be of similar form to monastic tithe-barns (Pacitto 1966, 42). The building remains of at least two structures were also mapped at the Rudland Rigg complex (1569887); these were smaller than those mentioned above, measuring approximately 9m by 20m and 6m by 15m, but lie within a number of enclosures or folds in a very similar location and of the same nature as those seen at Rudland Close and Levisham.

Medieval sheep farms are known from documentary evidence to have kept the flock housed during the colder months of the year in buildings known as bercaries. This term is sometimes extended to the whole farming complex (Dyer 1995, 136). The initial cost of constructing barns and enclosures indicates a landowner of considerable wealth, whether lay or monastic (Moorhouse 1981, 763), and evidence of a monastic connection is reliant on supporting documentary evidence. Such evidence describes the Levisham complex as owned by Malton Priory with grazing rights for 1000 sheep, and to a lesser extent, cattle and horse (Hayes 1983, 65-66). Evidence for monastic ownership of the current project sites is lacking. Only Rudland Close has been studied in detail with documentary evidence describing extensive rights granted to St Mary's Abbey of York in this area (Pacitto 1966, 35-6).

Another site, on Lealholm Moor (29174), shares many of the same characteristics, being sod-cast and defined by enclosures straddling Bella Dale Slack. This complex is fully illustrated on Ordnance Survey maps and was originally considered to be a post-medieval intake and therefore not mapped. The enclosure was surveyed in 1993 by the RCHME as part of the environs of the embanked pit alignments, but was deemed of uncertain date and function (Lofthouse 1993, 385). This begs the question whether additional sites failed to be recognised during this mapping and previous assessments. The subject would benefit from further research.

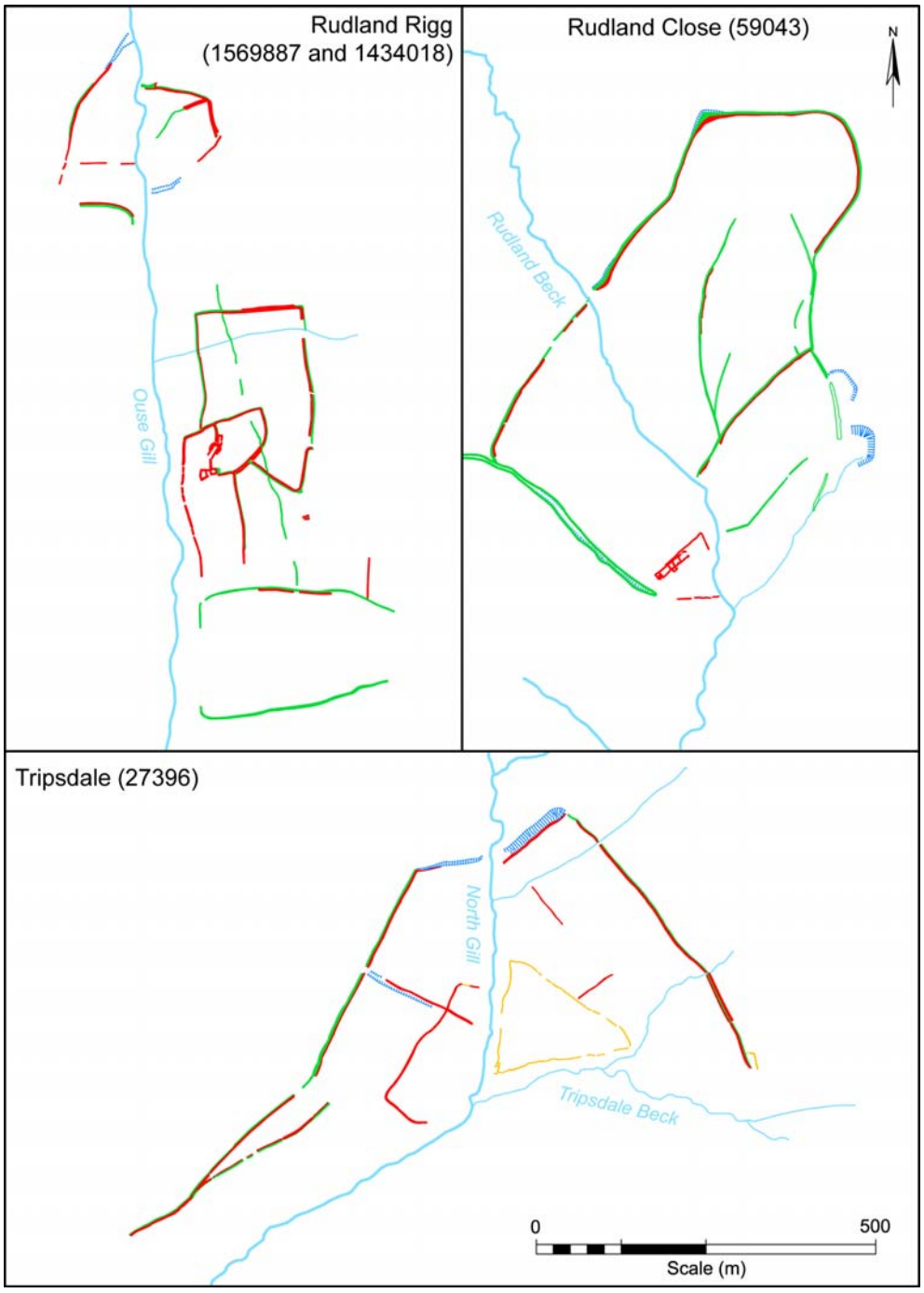

Figure 24. *Monastic moorland sheep farms*

Another possible comparison can be found within the deer park to the west of Commondale (1556036). Internal divisions appear to be of a different construction to the park pale, being narrower and possibly sod-cast. Although internal enclosures and livestock management are known to exist in medieval deer parks (Dennison 2005, 62), this example again lies immediately adjacent to an upland beck and uses water channels as boundaries. Interestingly, land in Commondale is known to have been

owned by Guisborough Priory who established Skelderskew Grange in this area (Page 1923, 356; Waites 2007, 49).

7.6.3 Post-medieval

The post-medieval period sees a highly exploited landscape, for both industrial and agricultural practices. Ridge and furrow demonstrates the expansion of arable agricultural activity during this period, particularly in the lowland coastal regions. Similarly most of the upland valleys have undergone such intense pasture improvement as to remove most traces of earlier occupation or cultivation. We also see a reuse of earlier sites, especially at the monastic farmsteads with the addition of stone walling and the probable re-use of Rudland Close (59043) as a shieling in the seventeenth century (Pacitto 1966, 34).

The mapping is dominated by the remains of several economically important post-medieval and early twentieth century mineral extraction industries. The process of extraction for each mineral displays its own signature. Ironstone extraction was mapped either as small extractive pits, or as vast open-cast and drift mines. The smaller pits were mapped extensively on Harland Moor (59009) and Low Blakey Moor (58898) and are similar to others found in the NYMNMP, most notably the 'Killing Pits' south of Goathland (62823). It is suggested that these sites could represent an earlier phase of ironstone extraction, potentially of medieval date (Elgee 1930, 131-132).

Figure 25. *Rosedale East Mines (60502)*

NMR 12370/24 07-MAY-1993 © Crown Copyright EH

The vast impact of ironstone extraction is nowhere better illustrated than at the Rosedale East Mines (60502), mapped in detail for the first time by this assessment. Much of the detail for the mines was mapped from 1940s RAF vertical photography, the mines having closed only twenty years previously (Hayes and Rutter 1974, 11). Much

of the plan of the East Mines is defined by the rail and tramway access, with large platforms for workers cottages and workshops and incised cuttings for the larger drift entrances. Much of the upper slopes are peppered with extractive pits of various sizes. Some of these appear to be slump-holes, where the drift entrances have collapsed, but the remainder are representative of sporadic small-scale extraction, and may indicate the earliest phase of extraction at the site. The impact of the mines is not confined to the footslopes of Rosedale Moor. On the moor-top itself numerous ventilation shafts illustrate the depth to which the drift mines were excavated. Further down the valley, in North Dale, the mining took the form of large open-cast extraction, all linked to the railway by a network of tramways. With the slump in ironstone production after the Great War there was little need to continue with the mines or the railway, which was declared closed in 1929 (*ibid*, 26).

7.6.4 Project Outcomes

The diversity of archaeological features mapped in this and the preceding project have provided a unique insight into one of the country's greatest National Parks. The level of mapping detail has been consistently high, but difficulties were often encountered. The photography was of varying quality and quantity, as the moorlands have far less coverage than the surrounding lowland. The lack of contrast made many of the early RAF vertical photographs very poor for interpreting the subtle tones of moorland landscapes.

The latest evidence for each site was determined from the 2009 PGA orthophotography. Shadow is minimised on the PGA imagery limiting its usefulness in determining the survival of low relief features. Additionally the use of the .jpg 200dpi Lidar was limited, with the resolution being too low to pick up small monuments. The lidar was, however, particularly useful for mapping extant ridge and furrow and coal mining shaft mounds.

One of the key aims of this project was to assess the scheduled monument data for the National Park and to highlight any issues in the existing data before feeding the results to the English Heritage Designation team. This may pertain to the following:

- The type of monument. The scheduled listing and the NRHE record may vary, for example one using the term 'cairn' and the other using 'barrow'. Where these anomalies occur the monument records have been highlighted and the investigators opinion added to the record.
- The accuracy of the scheduling GIS polygon. The polygon may not encompass the entire site or where new features have been identified which merit inclusion in the schedule description this may require the alteration of the polygon. On occasion confusion between records has resulted in the polygon being in the wrong location, or on the wrong monument.

- The latest condition for the site as evidenced from the PGA ortho-rectified photography. Where a monument has clearly been levelled, as evidenced by the air photographs, but is scheduled as extant, then this was highlighted. Additionally any site disturbances or damage were also noted.

Most of the scheduled monuments (falling within the NMP mapping specifications) were mapped, but a small number were not visible. This does not conclude that the monument has been levelled or destroyed, but that it simply wasn't visible due to vegetation/tree cover or due to poor photography coverage.

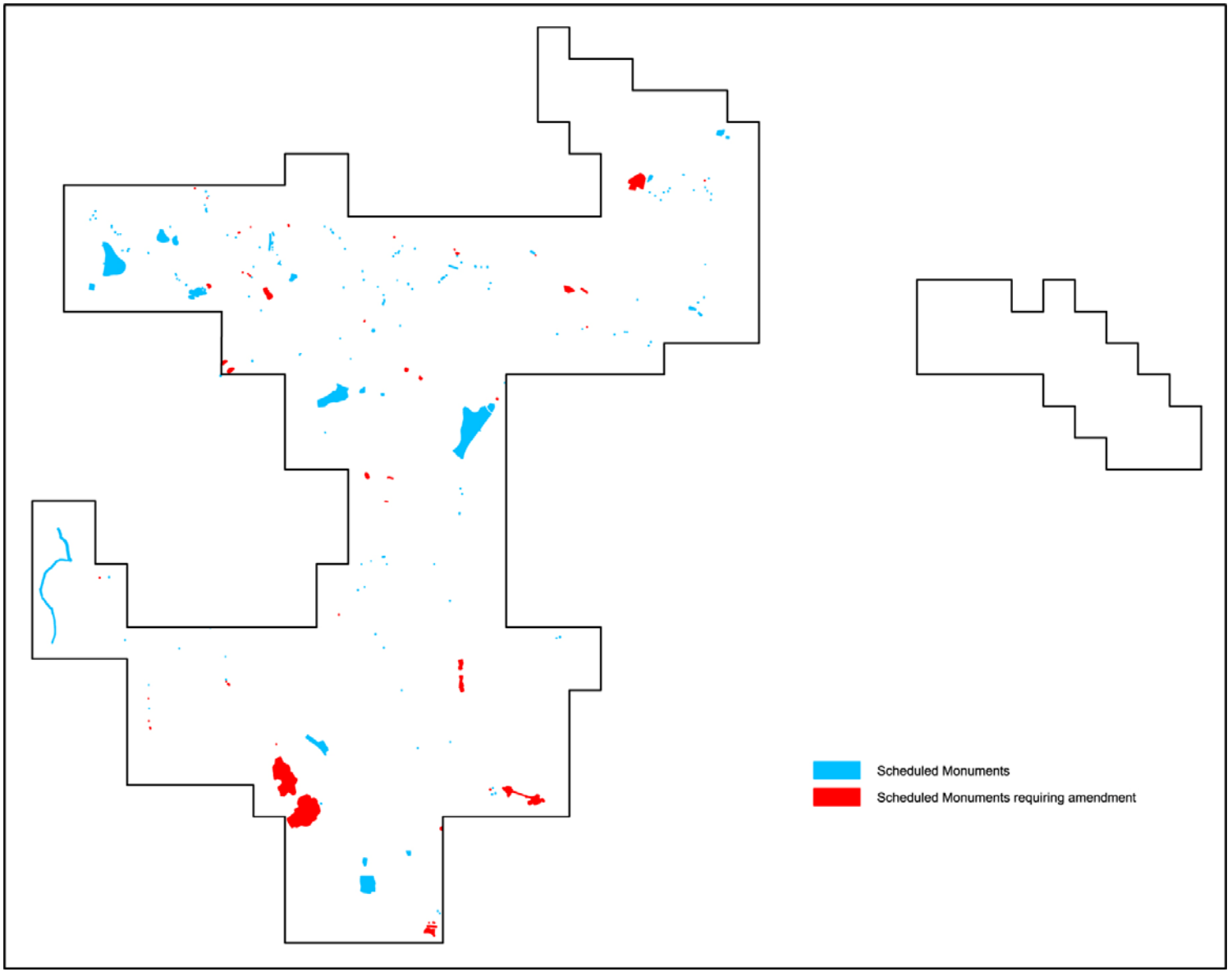

Figure 26. *Scheduled Monuments requiring amendment*

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APPENDIX 1 1:10,000 MAP SHEETS

MAP	BLOCK	AUTHOR	DATE OF COMPLETION	Km Squares	Collection No EHC01/222; AF00369
NZ 90 NW	A	DK	24/02/2012	13	MD003154
NZ 81 SE	A	DK	09/02/2012	4	MD003155
NZ 80 NE	A	DK	31/01/2012	11	MD003156
NZ 71 SE	A	TJS	06/03/2012	25	MD003157
NZ 71 NW	A	TJS	15/12/2011	6	MD003158
NZ 71 NE	A	TJS	05/01/2012	10	MD003159
NZ 70 NE	A	TJS	12/01/2012	7	MD003160
NZ 51 SE	B	DK	13/04/2012	8	MD003161
NZ 60 NE	B	DK/TJS	11/09/2012	25	MD003162
NZ 60 NW	B	DK	03/07/2012	4	MD003163
NZ 61 SE	B	SB	07/09/2012	19	MD003164
NZ 61 SW	B	DK	18/06/2012	20	MD003165
NZ 70 NW	B	TJS	13/09/2012	16	MD003166
NZ 71 SW	B	TJS	17/09/2012	15	MD003167
NZ 50 SE	C	SB	05/10/2012	10	MD003168
SE 59 NE	C	SB	08/10/2012	3	MD003169
NZ 60 SE	C	DK	29/10/2012	17	MD003170
NZ 70 SW	C	DK	02/10/2012	10	MD003171
SE 69 NE	C	DK	16/01/2012	25	MD003172
SE 69 NW	C	SB	15/01/2012	25	MD003173
SE 69 SE	C	SB	25/01/2013	25	MD003174
SE 69 SW	C	SB	15/11/2012	1	MD003175
SE 79 NW	C	DK	26/11/2012	22	MD003176
SE 79 SW	C	SB	21/01/2013	4	MD003177

APPENDIX 2 AUTODESK MAP LAYERS AND DRAWING CONVENTIONS

Layer Name	Layer content	Attached data tables	Layer colour	Line type
0	None (AutoCAD Map 3D 2008 requirement)	none	7 (white)	CONTINUOUS
BANK	Closed polygons for features such as banks, platforms, mounds and spoil heaps	MONUMENT	1 (red)	CONTINUOUS
BANKFILL	Solid fill for BANK layer polygons	MONUMENT	1 (red)	
DITCH	Closed polygons for cut features such as ditches, ponds, pits or hollow-ways	MONUMENT	3 (green)	CONTINUOUS
DITCHFILL	Solid fill for DITCH layer polygons	MONUMENT	3 (green)	
EXTENT_OF_AREA	Closed polygons outlining complex or extensive remains such as mining or military installations	MONUMENT	8 (grey)	DASHEDX2
GRID	Grid lines at 1km intervals	NONE	7 (white)	CONTINUOUS
MONUMENT_ POLYGON	Closed polygons encircling all the features recorded within a single NRHE record	MONUMENT	7 (white)	CONTINUOUS
RIGARREWK	Polyline showing the direction of ploughing of extant ridge and furrow	MONUMENT	4 (cyan)	CONTINUOUS
RIGARRLEVEL	Polyline showing the direction of ploughing of levelled or cropmark ridge and furrow	MONUMENT	6 (magenta)	ACAD_ISO03W100
RIGDOTSEWK	Closed polygon defining the furlongs or extent of area of extant ridge and furrow	MONUMENT	4 (cyan)	DOTX2
RIGDOTSLEVEL	Closed polygon defining the furlongs or extent of area of levelled or cropmark ridge and furrow	MONUMENT	6 (magenta)	DOTX2
STRUCTURE	Closed polygons for built features including concrete, metal and timber constructions such as military installations	MONUMENT	9 (grey)	CONTINUOUS
STRUCTUREFILL	Solid fill for STRUCTURE layer polygons	MONUMENT	9 (grey)	
THACHURE	Polyline T-hachure convention to schematize sloped features indicating the top of slope and direction of slope	MONUMENT	5 (blue)	CONTINUOUS

APPENDIX 3 AUTODESK MAP DATA TABLES

MONUMENT DATA TABLE

The Monument Data table consists of five fields that were input directly through AutoCAD Map 3D 2008. The content of these fields follows those that are entered in the National Monuments Record Database NRHE.

FIELD NAME	FIELD CONTENT	Sample data
MONARCH	NRHE Unique Identifier (UID)	27723
PERIOD	Date of features (EH Thesaurus)	BRONZE AGE
NARROW_TYPE	Monument type (EH Thesaurus)	CAIRN
BROAD_TYPE	Monument type (EH Thesaurus)	CAIRNFIELD
EVIDENCE_1	Form of remains (EH Thesaurus) as mapped	EARTHWORK
PHOTO_1	Reference for the photograph from which the feature was mapped and the date of photography	NMR MAL/67003 214 26-JAN-1967
EVIDENCE_2	Form of latest evidence (EH Thesaurus) as mapped	UNCERTAIN
PHOTO_2	Reference for the photograph from which the latest evidence was taken	Next Perspectives PGA Tile Ref: NZ5911 13-MAY-2009

AISLED BARN
ALUM WORKS
AMMUNITION DUMP
ANTI AIRCRAFT BATTERY
BANK (EARTHWORK)
BOMB CRATER
BOMBING DECOY
BOUNDARY BANK
BOUNDARY DITCH
BOWL BARROW
BRICK AND TILEMAKING SITE
BRICKWORKS
BUILDING
BUILDING PLATFORM
BURIAL CAIRN
CAIRN
CAIRNFIELD
CALCINING KILN
CASTLE
CHAMBERED ROUND CAIRN
CHIMNEY
CIRCULAR ENCLOSURE
CLAY PIT
COAL DEPOT
COAL MINING SITE
CROSS DYKE
CURVILINEAR ENCLOSURE
D SHAPED ENCLOSURE
DAM
DITCH
DRIFT
EMBANKED PIT ALIGNMENT
ENCLOSED CREMATION CEMETARY
ENCLOSURE
ENGINE HOUSE
EXPLOSIVES STORE
EXTRACTIVE PIT
FIELD BOUNDARY
FIELD SYSTEM
FIRE CLAY WORKS
GARDEN TERRACE
GRANGE
GRAVEL PIT
GUN EMPLACEMENT
HOLLOW
HOLLOW WAY
HUT CIRCLE
IRONSTONE MINE
IRONSTONE PIT
IRONSTONE WORKINGS
JET WORKINGS
KILN
LEAT
LIMESTONE QUARRY
LONG BARROW
LYNCHET
MILITARY BUILDING
MILITARY CAMP
MILITARY DEPOT
MILITARY ROAD
MINE
MINE BUILDING
MOUND
MULTIVALLATE HILLFORT
NARROW RIDGE AND FURROW
OVAL BARROW
OVAL ENCLOSURE
PARK PALE
PEAT CUTTING
PILLBOX
PILLOW MOUND
PIT
PLATFORM
POND
POTASH KILN
PROSPECTING PIT
QUADRANGULAR CASTLE
QUARRY
RADAR STATION
RAILWAY WORKERS COTTAGE
RAMP
RECTILINEAR ENCLOSURE
RESERVOIR
RIDGE AND FURROW
RING CAIRN
ROUND BARROW
ROUND CAIRN
ROUND HOUSE (DOMESTIC)
ROYAL OBSERVER CORPS SITE
SAND PIT
SAND WORKINGS
SANDSTONE QUARRY
SEARCHLIGHT BATTERY
SETTLEMENT
SHAFT

SHAFT MOUND
SHEEP FOLD
SILICA QUARRY
SIROCCO FAN HOUSE
SPOIL HEAP
SQUARE ENCLOSURE
STACK STAND
STANDING STONE
STOCK ENCLOSURE
STONE ALIGNMENT
STONE CIRCLE
STONE STORE
TERRACED GROUND
TRACKWAY
TRAMWAY
TRENCH
VENTILATION CHIMNEY
VENTILATION SHAFT
WALL
WEAPONS PIT
WORKERS COTTAGE
WORKSHOP

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