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Archaeological Post Excavation Assessment



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SUMMARY

An archaeological evaluation of the Franklaw to Barnacre water main was undertaken by Oxford Archaeology North (OA North) in February 2003 on behalf of United Utilities Ltd. The results of the evaluation have been presented in a separate report (OA North 2003). One of the sites evaluated, Site 37 Burns Wood (SD 35193 44799), located a number of postholes and stakeholes within Trench 11. These were dated to the Middle Bronze Age by a large vessel sherd of Deverel Rimbury pottery, found within one of the postholes. Following recommendations made by Lancashire County Council Archaeological Services, OA North was commissioned to undertake the archaeological excavation of the pipeline easement in the area of Site 37, prior to the insertion of the pipe, in July 2003. The following report details the assessment of the paper archive, artefacts and ecofacts recovered from that excavation, considers the site in terms of both national and regional research agendas, and supplies an updated project design detailing the post-excavation requirements and costings.

The excavation identified two phases of activity, including the discovery of the corner of a Bronze Age structure, part of which had already been located during the initial evaluation. Also revealed was a complex of pits filled with iron-working waste, and an associated temporary structure, thought to have housed smelting and smithing activity. Although this second phase is presently undated, it is thought most likely to relate to early post-medieval, or possibly medieval, industry.

Bronze Age settlements of any sort are poorly represented in Lancashire, so the site has the potential to contribute to a broad range of research agendas. The discovery of a Bronze Age structure, despite its partial survival, significantly enhances our knowledge of the habitation of the upland part of the region during this period. It is of particular importance that the absolute chronological context of this settlement is established through a programme of radiocarbon dating. Although artefacts were recovered in low frequencies, lipid analysis of the pottery sherd and the analysis of the sampled pollen and macroscopic plant remains may enable the characterisation of the diet and economy of the settlement.

The industrial phase of the site is not yet firmly dated, but a rapid assessment indicated that smithing and possible small-scale smelting had been carried out. Analysis of the iron slag may help to establish its date, as might a programme of radiocarbon dating, for which there is good potential. The potential of the site will only be fully realised once it has been placed within a secure chronological framework, and then these two aspects of the site should be placed in the public domain by means of an appropriate publication.

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Oxford Archaeology North would like to thank United Utilities Ltd for commissioning the work, and Dougal Wilson and George Arnold of Montgomery Watson for their continuing co-operation during the course of the project. Particular thanks are due to Mr Heap of Burns Farm, for allowing access to the site through his farm.

The fieldwork was undertaken by Andy Bates, Carly Douglas, Nicola Gaskell, Peter Schofield, Martin Sowerby and Chris Ridings. The report was compiled by Andy Bates and Fraser Brown, with all drawings completed by Emma Carter. The environmental samples were processed by Nicola Gaskill and Jo Dawson. Assessment of the finds was completed by Ian Miller and Carol Allen, and the environmental samples by Elizabeth Huckerby. Alison Plummer managed the project and Mark Brennand edited the report.

1. INTRODUCTION

1.1 PROJECT BACKGROUND

- 1.1.1 Following a proposal by United Utilities Ltd to lay a new 900mm pipeline between the wastewater treatment works at Franklaw (SD 34936 44206) and Barnacre (SD 35245 44812), as well as a separate, shorter section between Thistleton (SD 34065 43825) and Weeton (SD 33970 43270) (Fig 1), it was requested by the Lancashire County Archaeological Service (LCAS) that a programme of archaeological assessment and evaluation be undertaken. The evaluation excavations undertaken by Oxford Archaeology North (OA North) identified archaeological features at Site 37, Burns Wood (OA North 2003). This site was chosen for evaluation due to the presence of a post-medieval farm, Carter House, indicated on maps dating from 1786 to 1846 (OA North 2002). Although the farm was no longer standing, it was visible as a series of earthworks. However, the pottery recovered from one of the postholes excavated in Trench 11 of the evaluation proved to be of the Deverel Rimbury tradition, a type dating from the Middle Bronze Age (c 1700 BC to 1500 BC).
- 1.1.2 Following a verbal brief issued by Peter Iles and Pete McCrone of the Lancashire County Archaeological Services (LCAS), and subsequent negotiations with United Utilities Ltd, OA North was commissioned to undertake an excavation of the site in July 2003 following the submission and approval of the Project Design (*Appendix 1*). The site covered an area measuring 56m by 13m, centred on the Bronze Age features noted in evaluation Trench 11, and covered the entire width of the pipeline easement. This report presents the assessment of the results of this excavation, and includes an updated project design for further analysis. The assessment is aimed at highlighting the particular site- and assemblage-specific questions that the material is able to address directly.

1.2 LOCATION AND TOPOGRAPHICAL SETTING

- 1.2.1 Burns Wood, SD 35193 44719, identified as Site 37 in the original evaluation of the site (OA North 2003), lies on the lower slopes of the Pennines within the Forest of Bowland, to the east of Calder Fell and the River Calder. The area is devoted to permanent grassland, and populated with rushes where poorly drained, although much of the pasture has been improved by drainage (*op cit*; Countryside Commission 1998, 91). The area comprises an intensively managed landscape, with small- to medium-sized fields enclosed by well-maintained hedgerows with mature trees, and areas of semi-managed woodland, much of which is of some antiquity (*ibid*). The site is on the first area of high ground on the western fringes of the Forest of Bowland, overlooking Pilling Moss, the River Wyre and the Fylde.
- 1.2.2 The underlying solid geology comprises Carboniferous (350 to 280 million years ago) Millstone Grit (Aitkenhead *et al* 1992). The soil cover within the study area is of the Brickfield Association (Soil Survey of England and Wales

1983), which is one within the most extensive soil types in the area, being found on the lower slopes of the Forest of Bowland, and comprising surface-water, gley soils (Hall and Folland 1970, 59). It has formed on Pennine Drift deposited during the last glaciation (70,000 BP to 10,000 BP) and is a medium-textured till which overlies the Millstone Grit and is derived from Millstone Grit, coal measures, sandstone and shales (*ibid*).

1.3 HISTORICAL BACKGROUND

- 1.3.1 **Early Prehistoric periods:** no sites dating to the Palaeolithic, Mesolithic or Neolithic periods have been identified in the area. Sites of these periods are extremely rare in north Lancashire, although they have been identified in coastal areas and to some extent in the mosses to the west (Middleton *et al* 1995). Inland sites of Mesolithic date are also known at Lytham and Halton, to the north, as well as in the Penines (Cowell 1996). Typically, surface flint scatters represent all of these periods, although limited excavations have been carried out, of which the nearest published site is that of the Bleasdale Circle (Dawkins 1900; Varley 1938) to the east. Unstratified flint was also found at land adjacent to Sandhole Wood to the south, including a Neolithic arrowhead (OA North 2003). The nature of the evidence is therefore sparse, but it is clear that by the Neolithic period settlements were more permanent and well-established, with woodland clearance becoming more widespread, although there is a great deal of continuation from earlier periods (Middleton *et al* 1995, 203–4).
- 1.3.2 **Later Prehistoric periods:** several sites of probable Bronze Age date have been identified within the region, typically consisting of single stray finds, such as axe hammers. This too is fairly typical of the general area, many finds of Bronze Age date having been made in the mosses around Pilling to the west, including hoards consisting of bronze axes, spear heads and daggers (Sobee 1997). The Viking-period burial at Sandhole Wood, Claughton, contained a polished axe hammer and urn containing a cremation, suggesting that this early medieval burial was a later re-use of a Bronze Age barrow, although this is not conclusive (Edwards 1969, 114). There was also a large barrow excavated at Weeton, which contained cremations (Thornber 1850; Middleton 1996). No Iron Age remains were identified within the area, which is in keeping with the general lack of archaeological deposits from this period in North Lancashire, although there does seem to be a degree of continuity from the Bronze Age in some aspects, such as the deposition of metalwork (Middleton *et al* 1995, 70).
- 1.3.3 **Roman period:** the only site of Roman date that can be identified within the immediate vicinity is a section of the Roman road, which has been located near to Catterall. This Roman road between Preston and Lancaster is thought roughly to follow the route of the present A6, turning toward Garstang near Catterall (Margary 1957, 108; Shotter 1993). Its presence near Catterall was initially indicated on an aerial photograph, and was recently confirmed by an evaluation excavation of the site (OA North 2003). There is no further evidence, however, to support the suggestion that Fleet Street near Claughton Hall was so named because of the presence of a Roman road (Fishwick 1878,

2). Another possible Roman road, known as 'Dane's Pad', ran on a roughly north-west to south-east orientation, south of Thistleton, although it is unclear exactly when it was constructed (Mawson 1937, 16-17). The area lies between the Roman forts of Kirkham to the south-west, Lancaster to the north, and Ribchester to the south, all of which have mid-first century origins (Shotter 1993), with Lancaster and Ribchester perhaps remaining in use until the fourth century (*ibid*). All of these are some distance from the site however, and it is therefore difficult to assess how much of an impact they would have had on the Romano-British population in the area. Finds and excavations have tended to concentrate around the forts and associated civilian settlements, and only a few stray finds are known within proximity to the site, recovered from the mosses to the north-west (Middleton *et al* 1995, 70).

- 1.3.4 **Early Medieval period:** the immediate post-Roman period is not at all well-represented within the archaeological record in the area, which is typical for the majority of Lancashire (RM Newman 1996). The decline of Roman administration led to the development of several small British kingdoms, each vying for power, all of which eventually became part of the larger kingdom of Northumbria during the seventh century (*op cit*, 93). Its collapse in the ninth century left a power vacuum, which was in part filled by Viking colonists (*ibid*), whose legacy is evident within local place names, Garstang, for example (Wainwright 1946), although the meaning is open to various interpretations. Ekwall (1922) considered it to be a combination of a personal name and the word 'pole', while Hampson (1944, 39) stated that the Domesday Book lists it as 'Cherestanc' meaning 'church stone'. Similarly, Garstang Churchtown was originally named 'Kirkland', the word 'kirk' being another Norse derivation, suggesting the early foundation of the church (Tupling 1948). The remaining place names in the area are a mix of Norse and Old English derivations (Ekwall 1922), demonstrating a mix of origins with a strong Norse influence. The 'Viking' burial at Sandhole Wood, Claughton (concisely summarised in Edwards 1969), gives further evidence to the level of Norse infiltration of the area, although the patchy nature of the results of the 'excavation' leaves an incomplete record (*ibid*). The potential for the existence of further remains in the area is difficult to quantify, but the evidence would suggest that it is possible. A vague reference to a possible Anglo-Saxon moot hill at 'Constable Hillock' on the Wyre near Garstang (Crofton 1887, 127; Baines 1893, 417) suggests that there is the potential for further research to be done.
- 1.3.5 **Medieval period:** the majority of the larger settlements in the vicinity have origins of at least medieval date. At the time of the Norman Conquest the majority of the lands in the area were held as part of the Lordships of Earl Tostig (Farrer and Brownbill 1912), before being split into smaller territories. Before the Norman Conquest, Garstang contained the three manors of Garstang, Catterall and Claughton (*op cit*, 291), while Weeton and Greenhalgh with Thistleton were separate, smaller territories (*op cit*, 176, 179). There are references to all of these settlements, as well as several others, as early as the twelfth to fourteenth centuries (*op cit*,), demonstrating that the majority of the modern settlement pattern was established by at least this time. There is little archaeological evidence for the medieval period in rural Lancashire, however,

and detailed study has yet to begin (R Newman 1996). The majority of the land around Garstang became part of William de Lancaster's estate in the thirteenth century, who granted a large part of it to Cockersands abbey in 1246 (Farrer and Brownbill 1912). Garstang was subsequently granted a market charter in 1310, which may have been what created the separation between Garstang and Garstang Churchtown (*ibid*). The fourteenth century, however, was not a particularly prosperous time, with environmental deterioration, Scottish raids and an outbreak of the plague (Tetlow 2001) leading to economic downturn.

- 1.3.6 The following centuries saw a gradual recovery, and in 1490 Greenhalgh Castle and deer park were created, as the Earl of Derby fortified an existing property after threats were made against his life following the end of the War of the Roses (Collinson 1993, 20). The position of the deer park is not precisely known, although maps of 1610 (Speed) and 1693 (Morden) show an enclosed area around the east side of the castle, and up to the River Wyre. Other sites of possibly late medieval date within the study area include several wayside crosses around Garstang, used as marker points and during funeral processions from the outlying townships of the parish (Taylor 1902). The Dissolution of the Monasteries in 1540 essentially marks the beginning of the end of the medieval period. Most of the land within the survey area reverted to the crown, and the market at Garstang closed for almost 50 years (Tetlow 2001).
- 1.3.7 **Post-Medieval period:** the majority of sites recorded in the area are post-medieval in date, representing the massive expansion in production and construction that signals the Industrial Revolution. Several of the listed sites are farms of late seventeenth-eighteenth-century date, from a time of increased building and prosperity across the country (Platt 1994), when middle class yeoman farmers began to become a powerful social and economic force (Marshall 1991). The major land-owning families, such as the Brockholes of Claughton Hall, were well established by this point, although Greenhalgh Castle was in ruins following the civil war (Collinson 1993). Large areas of land were being enclosed for the first time, parts of Claughton in 1730 for example, while mosses to the west were drained and reclaimed for agriculture (Middleton *et al* 1995). At Oakenclough, a paper mill was established in 1775 (Wilcock 1997), and this was expanded, with a cotton mill and entire village built at Calder Vale (*ibid*). The process of industrialisation was evident, even in such a rural area, with the construction of the Lancaster Canal in 1797 and railways in the mid-nineteenth century (Fletcher 1996, 159) vastly improving communication and trade and allowing further exploitation of the available resources. Large-scale economic factors were an important aspect of this rapid development, which in part led to the attempted sale of the entire Garstang estate in 1867 (Walmsley 1974) and again in 1919 (*ibid*; LRO DDX131/1).
- 1.3.8 Of particular relevance to the current project is a contemporary reference to iron-working in the area during the mid-eighteenth century (Berg and Berg 2001, 293). The reference was provided by Reinhold Angerstein, an industrial spy of Swedish origin, who travelled widely in Europe in the 1750s, supported by the Swedish government, gathering information about trade and emerging

technology. The diary of his trip to Britain has proved to be an invaluable resource to scholars concerned with researching the Industrial Period.

- 1.3.9 In July 1754, Angerstein travelled through Garstang, Lancashire, where he observed several workshops for the forging of iron shovels, axes and spades. He also noted that there were two bloomeries in the vicinity of Garstang, one of which was situated some six miles west of the town. The location of the second bloomery, however, is uncertain, as Angerstein refers to it as 'Mihltarp', which cannot be associated firmly with anywhere in the locale. Angerstein also noted that the two bloomeries together produced 60 tons of iron *per annum* (*ibid*).

1.4 PREVIOUS ARCHAEOLOGICAL WORK

- 1.4.1 The route of the Franklaw to Barnacre pipeline has been the subject of an OA North desk-based assessment in 2002, and an evaluation in 2003. Site 37 (SD 35193 44719), to the east of Garstang and corresponding to Burns Wood, was initially identified in the desk-based assessment as the site of a post-medieval building, referred to as Carter House, Woodacre. This building survived only as a stone gatepost and a series of earthworks, which were subjected to topographic survey. Of the three 10m evaluation trenches placed within a 120m length of pipeline route (Fig 2), archaeological features were identified only within Trench 11, in the centre. Most significantly, these features included a posthole alignment, orientated in an approximate north-east to south-west direction, and dated to the Middle Bronze Age by a large sherd of Deverel Rimbury pottery recovered from one of the postholes. These were thought to comprise part of a Middle Bronze Age structure or fence, and therefore to indicate the site of a settlement of this date. Other, undated, archaeological features included three stakeholes and a pit. On this basis, additional archaeological excavation was recommended, to characterise further the nature of the remains.

2. ORIGINAL RESEARCH AIMS

2.1 ACADEMIC AIMS

2.1.1 The excavation was designed to investigate a length of the proposed easement of the Franklaw to Barnacre water pipeline which had previously demonstrated the survival of *in situ* archaeological deposits (OA North 2003). The area of undisturbed archaeological stratigraphy observed within Trench 11 offered a unique opportunity to excavate a possible domestic site, which had produced Deverel Rimbury pottery of Bronze Age date. The excavation was designed to clarify and enlarge on the results of the 2003 evaluations (*ibid*).

2.1.2 The original academic aims stated prior to the excavation were:

- to excavate the totality of the known site within the area affected by development and to characterise the surviving archaeological remains present;
- to uncover and excavate as much as possible of the Bronze Age feature delineated by the aligned postholes, and to gain an insight into its extent, function, and relationship with any further features;
- to recover further dating evidence and samples for radiocarbon dating to confirm the date for posthole feature;
- to provide a better understanding of the evolving landscape and the development of settlement from the second millennium BC to the present.

2.2 OBJECTIVES

2.2.1 Three objectives were specified for the excavation:

- to excavate as much of the development area as possible given the constraints of health and safety;
- to relate the findings to comparable dated settlement sites within Lancashire and the wider North West Region;
- in addition, to attempt to identify and characterise, if possible, any evidence for other periods of archaeological activity on the site.

3. METHODOLOGY

3.1 PROJECT DESIGN

- 3.1.1 A project design (*Appendix 1*) was submitted by OA North in accordance with a verbal brief by LCAS. Following the acceptance of the project design by LCAS, OA North undertook the excavation in July 2003, monitored by Peter McCrone, of LCAS. The work adhered to the project design and was consistent with the relevant standards and procedures of the Institute of Field Archaeologists, and generally accepted best practice.

3.2 EXCAVATION

- 3.2.1 As a result of the evaluation, LCAS recommended a programme of full excavation covering the entire width of the pipeline easement in the Burns Wood area, in order to mitigate the impact of the proposed pipeline. Working under archaeological supervision, a mechanical excavator fitted with a toothless ditching bucket stripped an area measuring 56.64m by 13.65m (773m²) to the level of the first potentially significant archaeological deposit, or to the upper surface of the natural subsoil, depending on the deposits revealed.
- 3.2.2 The first phase of the fieldwork involved the selective hand cleaning of the excavation area following the removal of the overburden by machine, focusing on those parts with concentrations of archaeological features identified during machining (Plate 1). The features were located with respect to the surrounding landscape features, and recorded using a total station and data-logger. The digital survey was transferred into a CAD system. Subsequently, all features and deposits identified were excavated and recorded stratigraphically. Recording was by means of OA North's standard context recording system, based on that used by the English Heritage Centre for Archaeology, using context record, photographic record, and object record *pro-forma* sheets, with supporting registers and indices. A photographic record in colour transparency (slides), colour print, and monochrome formats was compiled. All features were planned by hand at a scale of 1:20 and sections of individual features were drawn separately at a scale of 1:10. The levels of all features and deposits were established from a temporary bench mark with a value of 41.46m OD, transferred from an Ordnance Survey Bench Mark on Leach House with a value of 30.05m OD.
- 3.2.3 Thirty-six environmental bulk samples, each between 1 litre and 30 litres, were collected from a selection of suitable deposits. The artefactual material was processed in accordance with OA North standard practice, which follows current IFA guidelines. This has been fully catalogued and prepared for deposition with the final archive.

3.3 ARCHIVE

- 3.3.1 A full professional archive has been compiled in accordance with the project design (*Appendix 1*), and in accordance with current IFA and English Heritage

guidelines (1991a). A copy of the paper archive will be deposited with the county Record Office and the complete archive (including artefacts and ecofacts) will be deposited with the Lancashire Museums Service following agreement with the client.

3.4 HEALTH AND SAFETY

- 3.4.1 OA North maintains Safety Policies based on the SCAUM (Standing Conference of Unit Managers) *Health and Safety Manual* (1991). In keeping with current Health and Safety at Work Regulations, prior to commencing on-site work, a risk assessment for each activity was completed. Due regard was given to all Health and Safety considerations during all aspects of the project. Service information was obtained from Jarvis Construction UK Ltd prior to the excavation, and the positions of all trenches were scanned prior to excavation using a U-scan meter to detect for any live services.

3.5 THE POST-EXCAVATION ASSESSMENT

- 3.5.1 The aim of this assessment report is to evaluate all classes of data generated by the OA North excavation, while incorporating the results of the 2002-2003 evaluation, thus enabling an updated project design to be produced, which details a programme of relevant analysis and publication. The assessment process has been designed to correspond to the objectives laid out in the guidance document *Management of Archaeological Projects, 2nd edition* (MAP 2; English Heritage 1991a).

4. SUMMARY OF THE EXCAVATION RESULTS

4.1 INTRODUCTION

4.1.1 The archaeology encountered at Burns Wood falls into two categories:

- I. a putative Bronze Age posthole alignment;
- II. as yet undated features associated with iron working.

4.2 BRONZE AGE FEATURES

4.2.1 The earliest activity of the site seems to be of Bronze Age date, first identified within Trench 11 during the initial evaluation of Site 37 (OA North 2003) and more was revealed when the area was enlarged to cover the entire width of the easement. A group of postholes and stakeholes clustered in the south of the site (56, 67, 70, 73, 75, 78, 223, 225, 231, 233, 239, 261, 264, 266 and 268) are thought to define a rectangular structure (Fig 3), although whether this structure was actually a roofed building, or simply a fenced enclosure, is not clear. Posthole 56 contained a large sherd of Middle Bronze Age Deverel Rimbury pottery which provided the only dating evidence for this activity. No other Bronze Age features were identified in the excavated area, so it remains unclear whether the structure was associated with other elements of a wider settlement.

4.2.2 Although the structure was thought to be rectangular in plan, only the south and east sides were identified, comprising an L-shape, measuring 4m by 6m with the longest, eastern, axis aligned north to south (Fig 3). The other two sides are thought to have been lost as a result of truncation, although elements of the south-west corner may have been beyond the excavation. The diameter, or maximum length, of the postholes, as they were not all circular, ranged from 0.24m to 0.50m. Postholes 67, 56 and 73, along with stakeholes 70 and 75, formed the eastern side of the structure. Posthole 264 lay in its south-east corner, in alignment with postholes 239 and 223 and stakeholes 266 and 268, forming the south side. Posthole 261 lay 0.5m to the south of the structure, and stakehole 78 lay 0.5m to the east. Posthole 225 and stakeholes 231 and 233, were within the structure, and may have been part of an internal division. Although heavily disturbed by later root action, a deposit (203) was thought to have been a hearth, situated 3m north of the south side, and 4m west of the east side of the structure. This could, of course, be a later feature, unconnected with the structure.

4.2.3 There are no identified Bronze Age settlement sites in Lancashire, with well-preserved structures, to act as a comparison with the features recorded at Burns Wood. The only available site for comparison is Bonds Farm, Pilling Moss, where the remains of a settlement were discovered. This comprised a number of postholes and stakeholes, arranged in an irregular pattern, found in association with an artefact scatter. A fragment of what is thought to be a basal loop spearhead (Middleton 1993) was also recovered. A radiocarbon date of

1445-1397 cal BC was obtained (Edwards 1991) from a post recovered from that settlement. Both the spearhead and the radiocarbon date are broadly contemporary with the pottery recovered from Burns Wood. Bonds Farm may have been the site of episodic activity rather than permanent settlement, and it contains no good analogues for the structure at Burns Wood. Many permanent settlements, containing both circular and rectangular structures, have been found in association with Deverel Rimbury pottery in the south of England; these have been summarised by Brück (1999).

4.3 UNDATED FEATURES ASSOCIATED WITH METAL WORKING

- 4.3.1 Approximately 10m to the north of the Bronze Age structure was a series of postholes, and pits containing the waste materials from iron working. There was also one linear feature. It is evident that there was at least one square or rectangular structure present in this phase of activity, represented by the arrangement of postholes **199, 210, 212/214, 227, 229, 246, 249, 251, 253, 270** and **272/273**, forming a probable building measuring *c* 5.5m by *c* 5.5m (Fig 3), and with an open side to the east. It is also clear that this structure had more than one phase, evident from the re-cutting of postholes **214** and **273**. This second phase appears to relate to the collapse of the northern wall, its rebuilding resulting in the creation of postholes **212, 210** and **272** (Fig 3). With this in mind, it is questionable as to whether the smaller postholes (**246, 251** and **249**) were directly related to this structure, or were formed for some other purpose. Similarly, features **272/273** and **229** may represent posts for an internal structure along the back wall, being located slightly east of postholes **199, 227** and **253**. This building may have been a temporary structure associated with the smelting and smithing of iron.
- 4.3.2 Other features (from approximately south to north: **142, 140, 178, 128, 188, 132, 151, 154, 170, 174, 221, 105, 107, 104, 110, 114, 116, 118, 119, 122**), adjacent and *c* 4m to the north and east of this structure, comprised pits containing the waste material from on-site iron working, with which there were also several postholes, **134, 136, 182, 185**. In addition there was a ditch, **217/144**, which, although also containing iron slag, probably related to drainage.
- 4.3.3 A second posthole alignment was discovered approximately 4.5m further to the north, formed by relatively small features **102, 197, 190** and **237**. These postholes are too small to relate to a substantial building, and are thought instead to have formed a fence or enclosure. Although one of these features contained some iron slag, it is possible that the fence alignment post-dated the adjacent industrial features.
- 4.3.4 Although these features are as yet not closely dated, initial interpretation suggests that they were associated with early post-medieval, or possibly even medieval, iron-working activity. It does, however, need to be stressed that there were no chronologically diagnostic finds recovered from these features.

5. ASSESSMENT OF THE RESULTS

5.1 ASSESSMENT AIMS AND OBJECTIVES

5.1.1 The aim of this assessment was to evaluate all classes of data from the excavations undertaken on land adjacent to Burns Wood in 2003, in order to formulate a project design for a programme of further analysis appropriate to the potential demonstrated by the site archive. A statement of the significance of the results from each element of the archive is given below.

5.1.2 The objectives of this assessment correspond to, and are prescribed by, *Appendix 4 of Management of Archaeological Projects 2nd edition* (English Heritage 1991a). They are to:

- assess the quantity, provenance and condition of all classes of material: stratigraphical, artefactual and environmental;
- comment on the range and variety of that material;
- assess the potential of the material to address questions raised in the course of this assessment;
- formulate any further questions arising from the assessment of this material.

5.1.3 This assessment will present:

- a factual summary, characterising the quantity and perceived quality of the data contained within the site archive;
- a statement of the academic potential of the data;
- recommendations on the storage and curation of the data.

5.2 MATERIAL ASSESSED

5.2.1 The entire paper and material archive was examined for the purposes of this assessment. Quantifications are incorporated within the individual assessments.

5.3 PROCEDURES FOR ASSESSMENT

5.3.1 The method of assessment used varied with the class of information examined, although in each case it was undertaken in accordance with guidance provided by English Heritage in *Management of Archaeological Projects* (English Heritage 1991a). All classes of finds were examined in full, with observations supplemented by the finds' records generated during the course of the excavation.

5.4 STRUCTURAL AND STRATIGRAPHIC DATA

5.4.1 The excavation has allowed a complete stratigraphic record to be made of two distinct phases of archaeological activity, one dating from the Middle Bronze Age and a second phase of iron-working activity that is currently not closely dated. The stratigraphic record recovered from the site is not complex in nature. However, the stratigraphic and structural data will provide the framework within which all other analyses will take place.

5.4.2 Broad phasing has been ascribed to all contexts. It will not, however, be possible to refine the phasing further until a close study of the dating of individual contexts has been undertaken, following on from analysis of selected finds' categories.

5.4.3 **Quantification:** there is a total of 298 context records, which may be broadly groups as follows:

Bronze Age	40
Undated features containing, or associated with, features containing iron slag	248
Pit (not closely dated)	2
Bioturbation	8

5.4.4 The excavation site archive comprises the following:

Digital survey plan	1
Section drawings	48
Monochrome prints	230
Colour slides	230

5.4.5 **Potential:** the excavation has allowed as full as possible a stratigraphic record to be made of the archaeology of both phases of activity. The key to understanding the different types of activity, and the development of the site, resides with the integration of its layout and organisation and the artefactual and stratigraphic records. Individual contexts, moreover, offer a potential for understanding the industrial processes that were active on the site.

5.5 BRONZE AGE POTTERY

5.5.1 **Introduction:** a small quantity of prehistoric pottery and unfired clay was found within the excavations (Table 1). The material has been analysed according to the guidelines of the PCRG (1997). All the pottery and clay was found in Trench 11 of the evaluation excavation. The abraded material has more than 50% of the original surface worn.

- 5.5.2 **Fabrics:** the pottery sherds contain a moderate quantity (M=10-19%) of rock, and are likely to be tempered with millstone grit (MG), which also comprises the underlying geology of the site. The tempering is coarse (C = between 1.00mm and 3.00mm in size), very angular, and poorly sorted, indicating that the material was collected and crushed before being added to the clay. A sparse amount (S = 3-9%) of grog (fired pottery or clay) of coarse size had also been added to the clay. The identification of the tempering is tentative, and will need to be confirmed by thin section analysis.

Context	No	Wt (g)	Abrasion Level	Fabric Inclusion, Quantity, Size	Description and Comments
55, postpipe, fill of 56	5	212	Abraded	MGMC GRSC	One large rim sherd, four smaller body sherds, decoration below rim and on upper body of incised horizontal line, Middle Bronze Age Deverel Rimbury bucket urn
60, fill of shallow V-shaped hole 61	11	142	Abraded	QUCF	Small shaped pieces of unfired clay, possibly daub or unfired weights
65, packing of posthole 67	8	10	Abraded	QUCF	Small shaped pieces of unfired clay, possibly daub or unfired weights

Table 1: Quantity and description of the Middle Bronze Age pottery and unfired clay

- 5.5.3 The unfired clay is very sandy and is composed of a common amount (C = 20-30%) of fine (<0.25mm in size) quartz (QU) grains, similar to those which would be found in a river bed. There is also some burnt organic material included, possibly wood or straw.
- 5.5.4 **Type of pottery and clay:** the pottery is of Middle Bronze Age bucket urn type, usually termed Deverel Rimbury ware after cemetery sites in the south of England. However, a more northerly tradition of this type of vessel has been identified (Allen *et al* 1987, 212), which incorporates vessels of this shape with coarse tempering materials. It is generally considered that this tradition began to emerge about 1700-1500 cal BC (Needham 1996, 133), and is known at a number of sites in the Midlands and north of England (Martin and Allen 2001, 10).
- 5.5.5 The shaped pieces of unfired clay may have originated as daub applied to stake and wattle walls, or more likely, due to their rounded and angular shape, may represent parts of weights. Such clay material is highly indicative of a domestic settlement.
- 5.5.6 **Conclusions:** the pottery is quite abraded, but lay within the postpipe of a truncated posthole. One of the sherds is quite large, and shows some horizontal incised decoration for which parallels can be found. However, the pottery of this type which has been found in the Midlands and north of England has mainly been recovered from cremation cemeteries. The pottery from this site, considered alongside the unfired clay material, may suggest the possibility of domestic occupation, which is unusual in the area.

5.6 INDUSTRIAL DEBRIS

5.6.1 **Quantification:** in total, some 47.46kg of industrial debris was recovered from the excavation, all of which represented iron working. The bulk of the assemblage (44.22kg) derived from a total of 34 stratified contexts, and a small component (3.24kg) was recovered as surface finds during the topsoil stripping of the site. There is also hammerscale present within the flots and residues of the processed environmental samples.

5.6.2 **Methodology:** only a visual inspection of the material has been undertaken. This has provided an outline classification of the recovered material, which is summarised in Table 2. The slag was not washed prior to the visual examination in order to allow an assessment of any hammerscale that may survive on the surface of the slag.

Context	Description	Interpretation	Wt (g)	Comments
103	Fill of pit 104		246	
106	Fill of pit 105	Smithing hearth bottom	>2000	
108	Fill of pit 107		7314	
117	Fill of pit 118		137	
119	Fill of pit 120		57	
125	Fill of pit 128		34	
126	Fill of pit 128	Undiagnostic iron-working slag	1559	
127	Fill of pit 128	Smithing hearth bottom	1214	
131	Fill of pit 132	Smithing hearth bottom	>5300	
138/139	Fill of pit 140		2102	
143	Fill of linear feature 144		528	
145	Fill of pit 148		529	Included charcoal fragments
146	Fill of pit 148		485	
147	Fill of pit 148		591	
176/177	Fill of pit 178	Smithing hearth bottom	3563	
179	Fill of linear feature 217	Smithing hearth bottom	2036	
187	Fill of pit 188	Smithing hearth bottom	>2600	
191	Fill of pit 194		7673	
193	Fill of pit 195		149	Included charcoal fragments
198	Fill of posthole 199		658	
200	Fill of pit 201		177	
202	Fill of pit 203		232	
215	Fill of linear feature 217		52	
220	Fill of pit 221		897	
221	Fill of pit 222	Tap/run slag	333	
228	Fill of pit 224		226	
234	Fill of pit 235		216	
242	Fill of pit 241		226	
247	Fill of posthole 249		47	
250	Fill of posthole 251	Tap/run slag	107	
252	Fill of posthole 253	Tap/run slag	368	
254	Fill of pit 255	Tap/run slag	234	
258	Fill of pit 259		105	
269	Fill of pit 270		870	
Unstrat	Unstratified surface finds		3240	

Table 2: Quantity and description of the iron-working debris

5.6.3 The slag has been broadly classified according to perceived iron-working processes, which, in general terms, falls into two categories - primary iron working, or smelting, and secondary iron-working, or smithing. In addition, undiagnostic iron-working slags may be formed during many different high temperature processes involving iron. They are often classified as such because the fragments are too small to be identifiable. The composition of these slags are predominantly fayalitic, but their morphology is irregular and similar materials can be made during several iron-working processes.

- *Smelting*: the assemblage of iron-working slag from Burns Wood contained several examples of tap or run slags. True tap slags occur when a smelt is nearing completion and the slag that has built up within the furnace runs out of a hole in the furnace wall, and away from the iron bloom. This results in substantial flows of slag that solidify in plate form, with a rope-like upper surface. Smaller flows of slag, termed run slags, can derive from smithing or smelting. The few fragments of tap or run slags from the excavation are small and therefore suggest that they may be small run slags resulting from smithing. The small number of fragments makes true identification difficult. The presence of two small tap/run slags cannot provide firm evidence for iron smelting on or nearby the site.
- *Smithing - bulk slags*: the waste produced from smithing may be classified as either bulk slags or micro slags. The only bulk slags diagnostic of smithing are smithing hearth bottoms. These are formed at the base of the hearth as a result of a high temperature reaction between the iron scale and silica from the clay hearth lining or sand, used as flux by the smith. They are recognisable by a rough convex base and smooth vitrified upper surface. This upper surface may be hollowed by the action of air being blown through a tuyere on to the slag. The hearth bottoms usually have a plano-convex form that fits easily into the palm of the hand. Compositionally, hearth bottoms are predominantly fayalitic (made of iron silicate: 2FeOSiO_2). Fayalitic compounds leave a grey mark when scratched across a white ceramic tile, but are present in other slags as well as smithing hearth bottoms.
- *Smithing - micro slags*: in broad terms, two types of micro slags are produced by smithing - flake hammerscale and spheroidal hammerscale. Flake hammerscale is small flat fragments of the oxide and silicate skin of the iron, dislodged as it is worked. Spheroidal hammerscale is formed as small droplets of slag solidify after being expelled during the working of iron. Spheroidal hammerscale occurs particularly when two components are being fire-welded together or when an iron bloom is first consolidated and worked into a bar or billet. Hammerscale is highly diagnostic of smithing and can be used to identify particular areas where smithing has taken place.
- *Undiagnostic iron-working slags*: these types of slag are relatively common in dump deposits, and generally comprise smaller fragments that are difficult to identify. These can be formed during any iron-working procedure that involves high temperatures. The site also yielded fragments of vitrified hearth linings, which form when clay linings react with

components within the furnace or hearth at high temperatures. They often show a transition from the clay to the porous heavily vitrified zone, which often seems glassy in appearance. The degree of vitrification can vary and if the lining falls into the furnace it can often become completely vitrified, leaving no clay zone (these fragments are also known as cinder). Iron-rich cinder is a slag that is unusually rich in iron, generally visible as rust-coloured iron hydroxide or hydrated iron oxide deposits on the surface.

- 5.6.4 **Evaluation:** the assemblage of slag from Burns Wood is of significant size, and undoubtedly the largest to have been recovered from a rural context within this part of Lancashire. Visual examination of the material has indicated that it contained clear evidence of smithing processes, and potential evidence of smelting, together with undiagnostic iron-working slags. The diagnostic components of the assemblage were associated with smithing. Smelting may also have been carried out near the site, but the small quantities of slag related to smelting found, and its undiagnostic nature, makes this impossible to prove conclusively.
- 5.6.5 **Potential:** the ferrous metalworking debris does not warrant further examination. Further identification of the tap/run slags from pit fill 221, posthole fills 250 and 252, and pit fill 254, and examination of the possible hearth bottoms from pit fills 106, 127, 131, 176/177, 179, 187, should be undertaken, using specialist equipment (such as an X-ray fluorescence machine).
- 5.6.6 If further soil samples are to be wet sieved or floated for archaeobotanical remains then the sieve and flotation residues should be checked with a bar magnet for further hammerscale. Before washing, bags containing slag should be similarly checked with a bar magnet, to identify any hammerscale present.

5.7 ENVIRONMENTAL SAMPLES

- 5.7.1 **Introduction:** thirty-six bulk samples, from secure contexts and a variety of feature types, were taken during excavation of the site at Burns Wood, for the assessment of charred plant remains and geotechnology. Fourteen were selected solely for the assessment of charred plant material. The samples, context numbers, and feature types are shown in Table 3.
- 5.7.2 **Methodology:** the samples, which ranged from 1 litre to 30 litres in volume, were processed by manual flotation. The flots were collected on 250 microns mesh, air-dried, and were examined with a binocular microscope. Plant remains were recorded on a scale of 1-4, where 1=rare and 4=abundant. The state of preservation of the plant remains was noted, and the potential of the samples for further analysis of charred plant remains or charcoal, and radiocarbon dating, was assessed.
- 5.7.3 **Results:** all samples contained some charred plant remains (Table 4). Cereal grains were recorded in samples 108, 111 and 134 in relation to the undated metal working, along with sample 118, associated with the possible Bronze Age fire pit. Sample 118 contained abundant charred grains of oat (*Avena*),

with chaff, hazelnut (*Corylus*) fragments and weed seeds. The numbers of cereal grains in the remaining samples, where they were recorded, were very low; occasional wheat and undifferentiated grains were noted in these samples. Hammerscale was present within all of the samples taken from the contexts containing iron-working debris.

Sample number	Context number	Feature type
107	131	Undated, associated with metal working
108	176	Undated, associated with metal working
110	137	Undated, associated with metal working
111	187	Undated, associated with metal working
114	113	Undated, associated with metal working
118	204	Possibly related to Bronze Age fire pit
125	215	Undated, associated with metal working
128/1	238	Undated, associated with metal working
128/2	238	Undated, associated with metal working
134	247	Associated with slag and posthole
135	250	Associated with slag and posthole
139	265	Bronze Age posthole
141	262	Bronze Age posthole
142	263	Bronze Age posthole
143	222	Bronze Age posthole

Table 3: Environmental samples selected for assessment of charred plant remains

- 5.7.4 Significant numbers of charred weed seeds were identified in three samples: sample 111, pit fill **187**; sample 118, pit fill **204**; and sample 141, posthole fill **262**. The taxa recorded included seeds of docks/sorrels (*Rumex*), cleavers/bedstraws (*Galium*) and knotweeds (*Polygonum*). These genera are from broad ecological categories.
- 5.7.5 Charcoal fragments were recorded in all the flots, which were generally very large. Oak (*Quercus*), alder/birch/hazel (*Alnus/Betula/Corylus*), pine (*Pinus*), Pomoideae (hawthorn/sloes) and charcoal from other taxa were provisionally identified. Much of the charcoal was engrained with clay or silt.
- 5.7.6 Material suitable for radiocarbon dating was identified in all but four samples. This included cereal grains, hazelnut fragments, weed seeds, and charcoal from taxa other than oak.
- 5.7.7 Modern contamination in the form of modern roots and invertebrate eggs, possibly from parasites, was recorded in all samples. The quantities of modern material was not significant.
- 5.7.8 **Conclusions:** the assessment of the environmental samples from Burns Wood demonstrated that charred plant remains have been preserved on the site. One, sample 118, pit fill **204**, relating to the possible Bronze Age fire pit, contained abundant charred plant remains including cereal grains, chaff, weed seeds, and charcoal which is unusual for sites in the the north-west of England. The large volume of charcoal in most of the flots may provide important insights concerning the use of timber and of woodland management in the Bronze Age, and also in later periods, particularly in those contexts that are associated with metal working. Cereal grains in the North West are very unusual (Huntley and

Stallibrass 1995, 32-7) and, of the four Bronze Age sites where there was limited archaeobotanical investigations, only two sites, Ewanrigg and Crosby on Eden in Cumbria, yielded significant numbers of cereal grains. The most southerly Bronze Age site with archaeobotanical data was Manor Farm, Borwick, near Carnforth (*ibid*). Therefore cereal grains identified at the Bronze Age site of Burns Wood, some 20km south of Borwick, are of regional significance. In addition, the presence of oats at such an early date is highly unusual, and must call into question whether this feature is firmly associated with the structure.

- 5.7.9 The material within the flots that has a good potential for radiocarbon assay will be instrumental in dating both phases of the site.
- 5.8.1 The assessment of the environmental samples from Burns Wood is of regional importance because sites from this part of North Lancashire (ie south of Lancaster and North of Preston) have rarely provided an opportunity to study charred or waterlogged plant remains from. Records of plant remains in this locality have been restricted to Roman sites at Lancaster (Huntley and Huckerby in prep), Ribchester (Huntley 2000), Walton-le-Dale (LUAU and Gifford and Partners 1997) and more recently to a Romano-British site at Lancaster University (OA North 2004).

5.8 RADIOCARBON DATING

- 5.8.1 Flotation of the 14 samples listed and summarised in Table 4 yielded large amounts of charcoal. Five of these samples derived from features dated to the Bronze Age, while the other nine were from features containing slag or associated with metal-working debris. These samples provide a wide range of well-stratified material from which to choose appropriate and representative samples for radiocarbon dating.

Sample	Context	Feature	Description	Sample vol (litres)	Flot description.	Plant remains	Potential
107	131	Pit 132	Undated, associated with metal working	3	Flot 100ml, charcoal 4, oak+other taxa, engrained, metal working, sand, modern contamination		None
108	176	Pit 178	Undated, associated with metal working	3	Flot 225-250ml, charcoal 4, mixed taxa, engrained, metal working, sand, modern contamination	Cereal 1, wheat	None, possibly dating
110	137	-	Undated, associated with metal working	2	Flot 200ml, charcoal 4, mixed taxa, engrained, metal working, sand, modern contamination		None, possibly dating
111	187	Pit 188	Undated, associated with metal working	10	Flot >500ml, charcoal 4, oak+other taxa, good preservation, some roundwood, metal working, sand, modern contamination	Cereal 1-2, weeds 2, incl <i>Polygonum</i> sp and <i>Chenopodium</i>	None, possibly dating
114	113	Pit 114	Undated, associated with metal working	30	Flot 5x >500ml, charcoal 4, oak+other taxa, engrained orange colour, burnt clay? metal working, sand, modern contamination		Charcoal analysis +dating
118	204	Pit 206	Possibly related to Bronze Age fire pit	30	Flot >500ml, charcoal 4, oak+other taxa, engrained, sand, modern contamination	Cereals 3, oats, chaff awns, hazelnut fragments, weeds 3, bedstraw, possible waterlogged weeds	High + dating
125	215	Linear feature 217	Undated, associated with metal working	2	Flot 50-55ml, charcoal 4, small fragments engrained, metal working, sand/gravel, clay/silt, modern contamination		None
128/1	238	Pit 239	Undated, associated with metal working	10	Flot 500ml, charcoal 4, mixed taxa, engrained, sand/gravel, modern contamination		Charcoal+ dating
128/2	238	Pit 239	Undated, associated with metal working	2	Flot 250-260ml, charcoal 4, oak, hazel/birch/alder+other taxa, engrained, sand/gravel, modern contamination		Charcoal+ dating
134	247	Pit 249	Associated with slag and posthole	2	Flot 100ml, charcoal 4, oak, possible Pomoideae, hazel/birch/alder+other taxa, engrained, sand/gravel, silt/clay, modern contamination	Cereal 1, tar-like, indicating high temperatures, chaff 1, awn	Charcoal+ dating
135	250	Pit 251	Associated with slag and posthole	2	Flot 50-60ml, charcoal 4, mixed taxa, engrained, sand, modern contamination		None
139	265	Pit 266	Bronze Age posthole	1	Flot 50ml, charcoal 4, mixed taxa, engrained, sand, modern contamination		None
141	262	Posthole 264	Bronze Age posthole	9	Flot >450ml, charcoal 4, oak, hazel/birch/alder, pine? +other taxa, engrained, bud, rush stems, sand, invertebrate eggs, modern contamination	Weeds 3, <i>Rumex/Polygonum</i>	Seeds Charcoal+ dating
142	263	Posthole 264	Bronze Age posthole	10	Flot 410ml, charcoal 4, mixed taxa, some large fragments, engrained, silt/clay, sand/clay, modern contamination		Charcoal+ dating
143	222	Posthole 223	Bronze Age posthole	3	Flot 200ml, charcoal 4, mixed taxa, engrained, sand, modern contamination		Charcoal+ dating

Table 4: Assessment of charred plant remains from Burns Wood, Lancashire. Recorded on a scale of 1 to 4 where 1=rare and 4=very abundant.

6. CURATION AND CONSERVATION

6.1 RECIPIENT MUSEUM

- 6.1.1 The Museum of Lancashire has been nominated as the ultimate place of deposition for the finds.

Museum of Lancashire, Stanley Street, Preston, PR1 4YP

Contact: Stephen Bull, Museum Curator

- 6.1.2 Arrangements were made with the Museum prior to the excavations for the deposition of the complete site archive from the excavations, and Stephen Bull has acknowledged his willingness to accept this archive.

6.2 STORAGE

- 6.2.1 The complete project archive, which will include records, plans, both black and white and colour photographs, artefacts, ecofacts and sieved residues, will be prepared following the guidelines set out in *Environmental standards for the permanent storage of excavated material from archaeological sites* (UKIC 1990, Conservation Guidelines 3) and *Guidelines for the preparation of excavation archive for long-term storage* (Walker 1990).
- 6.2.2 All finds will be packaged according to the Museum's specifications, in either acid-free cardboard boxes, or in airtight plastic boxes for unstable material.

6.3 GENERAL CONSERVATION

- 6.3.1 Most of the assemblage is well-preserved and in good condition and thus the conservation requirement is low.

6.4 PACKAGING

- 6.4.1 The assemblage is currently well-packed and will require no further packaging. Box lists are prepared and will be updated from the database when the identification of objects is complete.

6.5 DISCARD POLICY

- 6.5.1 A relatively small finds' assemblage was recovered from the evaluation and the excavation, most of which was from well-stratified deposits, with very little material suitable to be discarded. However, environmental and technological bulk samples were recovered from the site which, upon agreement with the client, may be discarded at a later date, once processing and analysis has been completed.

7. DISCUSSION

7.1 STATEMENT OF POTENTIAL

- 7.1.1 The excavation of the site, within the confines of the pipeline easement, has resulted in the identification and classification of two phases of activity. It should be noted, however, that both phases may represent only a fragment of the archaeology that may exist in the immediate vicinity. This is particularly pertinent to the putative Bronze Age activity where, although one structure has been located, it is highly likely that other associated structures exist outside the pipeline easement. Of particular interest would be the identification of any existing associated field system. There is, however, no visible evidence of such a system or associated structures within the pipeline easement. The possibility remains that some or all of the activity identified may in fact be later, perhaps of early medieval date. If this were to be the case, it would be of major regional significance. It is also possible that, rather than being a single discrete entity, the structure associated with metal working was part of a more extensive complex.

7.2 PRINCIPAL POTENTIAL

- 7.2.1 **Stratigraphic data:** further detailed study of the stratigraphy would not contribute greatly to our understanding of the putative Bronze Age structure, as it is not complex, and because only a single phase is represented. Further consideration of the stratigraphy would only be profitable in so far as it concerned the interpretation of contexts from which material had been sampled for radiocarbon assay. In particular, this would be of benefit for those contexts associated with the possible hearth (203), if dating proves this feature to be unassociated. It would, however, be useful to undertake a search of the literature for any comparators for the Bronze Age structure throughout northern Britain in general. This feature is very unusual, and very few others are known from the North West (Hodgson and Brennand and 2004).
- 7.2.2 Further detailed study of the features associated with metal working will be necessary in order to establish the duration of activity at the site, and to obtain a clear understanding of the chronology of the sequence in relation to the industrial processes that took place. It will be particularly important to analyse the sequence of intercutting pits alongside the different types of metal-working debris that they contained, to see if there was any temporal distinction between the activities undertaken. The metal-working debris found within the structure should be compared and contrasted with that found within the pits, in order to identify any spatial zoning within the site, on the basis of relative differences within the composition of the assemblage. The literature should be surveyed and the features found at Burns Wood compared in terms of site morphology with other regional comparators, in order to determine if there is any formal commonality. It will also be necessary to derive a clear understanding of the contexts from which any material sampled for radiocarbon assay was recovered.

- 7.2.3 **Documentary study:** further detailed examination of the available archive sources would greatly enhance the excavation results. The documentary study undertaken to date has necessarily been quite limited, and it may prove possible to obtain further valuable historical information pertaining to the site during the historical period. Documentary evidence for iron-working on the site should be targeted, as this has a potential to demonstrate that the site is of high local, or even regional, significance. In particular, local leases, estate plans and contemporary accounts, such as that by RR Angerstein (Berg and Berg 2001), would be consulted.
- 7.2.4 **Bronze Age Pottery:** finds of Middle Bronze Age Deverel Rimbury pottery are rare nationally and few are known regionally. The sherds are fragile, having been fired at relatively low temperature, and tempered with coarse materials, such as millstone grit and grog. The tempering tends to follow local traditions (Allen and Hopkins 2000, 309), but often incorporates grog, and there may be special reasons for this. Given that this site does not appear to be funerary in character, the context for the recovery of most pottery of this type, the circumstances deserve further investigation, and comparable material from other sites, regionally and nationally, should be sought. Thin section analysis of the pottery should be undertaken in order to identify the source of component materials used in its manufacture. The sherd should be illustrated and published, as it is a rare and important find, particularly in this locality. The material is also considered suitable for lipid analysis, to identify any residues of the vessel's original contents. It would be of great significance for regional typologies if it proved possible to obtain a radiocarbon date from material associated with the pottery.
- 7.2.5 A report on the material should be published, which should include a full description of the vessel and the results of the lipid analysis. This should place it within the context of comparable material. The fabric of the unfired clay should also be examined, and a note made in the report.
- 7.2.6 **Environmental Samples:** there is potential for the further analysis of charcoal from the samples both from Bronze Age contexts and from the undated metal-working site. This will enhance our very limited dataset from North Lancashire about the use of timber and possibly about woodland management in both the Bronze Age and the late- or post-medieval period, if this proves to the date of the metal-working activity. The potential for further analysis of other charred plant remains from the site is restricted to two putative Bronze Age samples, 118 from **204**, which is related to the possible fire pit, and 141 from **262**, part of the possible posthole alignment. Analysis will be informative about cereal cultivation/usage, crop processing and the local environment.
- 7.2.7 The potential for radiocarbon dating is considerable, and will provide crucial evidence for an understanding of the site. Plant remains suitable for radiocarbon dating were identified in many of the assessed environmental samples, which will enable the site to be placed within a chronological framework. In particular, material from the possible hearth (**203**), should be dated, given the presence of oats in a sample from it.

- 7.2.8 It is recommended that the two putative Bronze Age samples, 118 from pit fill **204** and 141 from posthole fill **262**, should be analysed for charred plant remains. It is also recommended that the charcoal from these two samples, and from three others selected from those that are related to the undated metal working sites, should be analysed.

7.3 NATIONAL PRIORITIES ADDRESSED BY THE SITE'S POTENTIAL

- 7.3.1 In 1991 English Heritage produced a document, *Exploring Our Past*, which included a strategy for dealing with the archaeological problems and opportunities which would be encountered during the following decade (English Heritage 1991b). Many of the ideas first raised in *Exploring our Past* were developed further in a draft *Research Agenda*, circulated to the archaeological profession in 1997. The most recent English Heritage Research Strategy documents are *Exploring our Past Implementation Plan* (2003) and *Discovering the Past, Shaping the Future* (2005), although these are, in effect, strategies for English Heritage itself. The draft *Research Agenda* (1997) is no longer considered current, although the following research objectives remain pertinent for a large part of England:

Process of Change

- to place the putative Bronze Age structure within the context of more marked visibility of settlement and land division during the second millennium BC, alongside the decline in large-scale monumental construction (PC3);
- assuming that the iron working is later medieval or post-medieval in date, to enable archaeology to contribute to important debates and controversies regarding the role and extent of capitalism in the changes during the transition from medieval to post-medieval traditions (PC7);
- to examine the industrial processing of metals, and the relationship between traditional and new industries during the period of industrialisation (PC8);

Chronological Priorities

- to investigate the balance of cereal and animal production in the second millennium BC; although the evidence is scant any information that could be gleaned from the site would significantly add to the current state of knowledge on this topic for this region (P6);

Patterns of Craftsmanship and Industry (T7)

- to examine of the waste and process material associated with iron working to determine craft procedures;
- to examine the contrasts between urban and rural industrial activity, although much depends on the date of the industrial activity represented as the site;

Landscapes

- to consider both phases of activity in the rural landscape appropriate for each period of activity represented, in relation to current perceptions of the temporal landscape;

Themes

- to improve our understanding of single monument forms via site-specific study (T6);
- to contribute to an exposition of the remains of industrial archaeological sites (T6);
- to inform the development of new research frameworks for the management of the industrial archaeological resource (T6);
- to compare the application of new technologies with the historical records of innovation and contemporary technical literature (T7);
- to assist analysis of the contrast between urban and rural industrial sites (T7);
- to study waste and process material from industrial sites to determine craft procedures (T7);
- to inform an exploration of woodland management (T7).

7.4 LOCAL AND REGIONAL RESEARCH PRIORITIES

7.4.1 The draft North West Regional Archaeological Research Framework has outlined a number of regional priorities for the Bronze Age (Hodgson and Brennand 2005) and for the late- and post-medieval periods (Newman and Newman 2005; Newman and McNeil 2005).

7.4.2 Other research agendas have been published by some of the key workers in the region relevant to the earlier phase of archaeology presented here (Middleton *et al* 1995; Middleton 1996).

7.4.3 Examples of excavated Bronze Age structures in the region, particularly in Lancashire, are extremely rare, with site types largely restricted to artefact scatters (*op cit*). The only other settlement excavated of this period in the county is the Bronze Age settlement at Bond's Farm, on the edge of Pilling Moss, which is also associated with the deposition of bronze artefacts into the peat bog (Edwards 1991; Middleton *et al* 1995, 206). Subsequently, stressed within these local research agendas, the following is considered a priority:

Chronologies

- radiocarbon dates and their subsequent publication from archaeological deposits to obtain precise chronologies for activity at the site;

- the establishment of a prehistoric pottery typology based on form and fabric in combination with radiocarbon dating is a research priority, to which the Burns Wood assemblage can contribute;

Settlement Pattern

- to examine the site as an example of Bronze Age settlement within a specific topographical setting and soil type;

7.4.4 The Regional Research Framework has indicated that the North West has potential for illuminating the early post-medieval development of a number of key industries including glass, iron, lead and salt. This is highlighted by the assemblage of metal-working slag recovered from the excavation, although this has yet to be proven to be of this date, which has considerable potential to furnish significant new information pertaining to iron-working in the area. In addition, the following research priorities could be considered (Newman and McNeil 2005; English Heritage 1997):

- there remains a need for detailed studies of methods and techniques of production and an understanding of the technology of industries, in relation to their wider social context and their relationship with and impact upon the environment;
- the examination of industrial processing of metals is vital, as is an understanding the relationship between traditional and new industries during the period of industrialisation (PC8).

7.4.5 Whilst it is debatable whether any data category, or the complete dataset itself, from the investigated elements of Burns Wood could fully address all of these priorities, they should nevertheless all be borne in mind during analysis and report production.

8. UPDATED PROJECT DESIGN

8.1 AIMS AND OBJECTIVES OF THE PROGRAMME OF ANALYSIS

8.1.1 **Aims:** whilst the assessment of the fieldwork has demonstrated potential for some further analysis, the principal aim should be to undertake the work recommended in *Section 9* below, and place these results in the public domain.

8.1.2 **Overall objectives:** the overall objectives of this project are:

- to secure the appropriate analysis and publication of the investigated element of the Burns Wood site;
- to contribute to an understanding of Bronze Age settlement in northern England;
- to contribute to an understanding of rural iron working.

8.1.3 **Specific objectives:** the specific objectives which the data can address are:

1. to characterise and date the sequence of the archaeological features and deposits revealed during the course of the excavation by using selected radiocarbon assay;
2. to inform an understanding of the environment in the vicinity of the site and the human impact on it during the Bronze Age and during the period of iron-working by examining charred plant remains from selected environmental samples;
3. to inform an understanding of the nature of habitation during the Bronze Age and industrial phases of activity, through examination of the archaeological features, artefacts and ecofacts within a tightly dated framework;
4. to determine a closer date for the use of Deverel Rimbury pottery in the region, utilising radiocarbon dating;
5. to identify the source of the material used in the manufacture of the Deverel Rimbury pottery through thin section analysis;
6. to establish the potential use to which the Deverel Rimbury vessel was put through establishing what it may have once contained, by conducting lipid analysis;
7. to inform an understanding of woodland management and the range of timber species and fuel types used at a Lancashire iron-working site, through the analysis of charcoal from selected environmental samples;

8. to determine whether the layout of the iron-working site is similar to that of other known examples in the region, through examination of the archaeological features and documentary research;
9. to document the history of the iron-working site from any existing sources;
10. to determine what stages of the industrial process were undertaken at this site through examination of the slag and of any small slag components recovered from selected bulk samples.

8.2 PRESENTATION OF RESULTS

8.2.1 In accordance with the guidelines outlined in the English Heritage document MAP 2 (English Heritage 1991a), it is proposed that the results of the project should be presented in the following stages:

- 1 **Publication text:** there is no county archaeological journal for Lancashire, and although regionally important, the site probably does not warrant publication in a nation or international journal, or in a single monograph. The dataset generated from the archaeological investigation at Burns Wood is clearly of significance, however, and merits further analysis. Following analysis and the interpretation of the results, a publication-standard text will be prepared, for deposition in the county Sites and Monuments Record. A shorter report will be offered to the local journal *Contrebis*. A proposal for a *Lancaster Imprints* monograph on sites in Rural Lancashire is currently under discussion, and if this were successful then the Burns Wood text will be offered for inclusion.
- 2 **Project archive:** the completion of the project will result in an integrated archive, which will be deposited with the Lancashire Museums Service.

8.3 PROGRAMME STRUCTURE

8.3.1 The post-excavation programme will be divided into the following stages:

- synthesis
- preparation of draft text and illustrative material
- submission of report/publication text
- archive deposition.

9. METHOD STATEMENT

9.1 INTRODUCTION

- 9.1.1 This statement relates the tasks outlined in the task list (*Appendix 2*) to the aims and objectives. The programme of work is tailored to address the specific objectives, which, when achieved, will secure the general objectives outlined in *Section 7.1* above.

9.2 START-UP

- 9.2.1 **Task 1:** to facilitate all objectives.

9.3 STRATIGRAPHIC ANALYSIS

- 9.3.1 **Task 2:** to facilitate all objectives.
- 9.3.2 The stratigraphic sequence will form the contextual framework for an integrated report which, following the incorporation of artefactual and environmental data, will form the framework for the interpretation of the site. Stratigraphic analysis will inform questions of artefactual residuality in addressing objectives more closely identified with artefactual study.
- 9.3.3 Detailed analysis will be undertaken on the two structures identified at the site, and their associated features, such as the rubbish pits identified for industrial waste materials.

9.4 DEVEREL RIMBURY POTTERY

- 9.4.1 **Task 3:** contributes to Objectives 1, 3, 4, 5 and 6.
- 9.4.2 The Middle Bronze Age pottery will be quantified by weight and sherd count, and will be illustrated for publication. An analysis of the fabric from which the pottery was manufactured will hopefully demonstrate its source and whether the vessel was manufactured locally or was brought into the region. The fabric will be compared to other known fabrics used in the manufacture of Deverel Rimbury-type material in the north of Britain, in order to contribute to the characterisation of this ceramic tradition and to determine inter- or intra-regional trends within it. Absorbed residue analysis will potentially reveal the manner in which the vessel was used.

9.5 INDUSTRIAL RESIDUES

- 9.5.1 **Task 4:** contributes to Objectives 1, 3, and 10.
- 9.5.2 The iron-working waste will be quantified by context and in terms of the whole assemblage. The hearth bases, potential slag/tap runs, hammerscale and

a selection of the slag will undergo full chemical analysis to determine the types of activity and technology utilised during the iron-working processes.

9.6 BOTANICAL MATERIAL

9.6.1 **Task 5:** contributes to Objectives 2, 3, 7.

9.6.2 A maximum of five samples should be analysed fully for plant macrofossils and in order to isolate material suitable for radiocarbon assay. These will include two samples from Bronze Age deposits (118, fire pit fill **204** and 141, posthole fill **262**) and three from the features associated with the industrial phase. The selection of material for radiocarbon dating will be undertaken as soon as possible after the project start-up, so the samples can be submitted and the results returned in order to inform later analyses.

9.7 RADIOCARBON DATING

9.7.1 **Task 6:** contributes to Objectives 1 and 3.

9.7.2 Material suitable for radiocarbon assay should be selected for both phases of activity. This could be retrieved from the samples recommended for further analysis and would provide close dating for both the Middle Bronze Age settlement, and by association the Deverel Rimbury vessel, and the industrial activity, providing a chronological context for this.

9.8 DOCUMENTARY RESEARCH

9.8.1 **Task 7:** contributes to Objectives 1, 3, 8, 9 and 10.

9.8.2 A comprehensive programme of historical research consulting both primary and secondary sources would provide further details of the site. This would establish an historical framework that would greatly enhance the value of the archaeological resource.

9.9 PRODUCTION OF THE TEXT

9.9.1 **Tasks 8-11:** the draft text will be produced and edited. Thereafter, the research archive will be finalised and the finds deposited with the Lancashire Museums Service.

10. PUBLICATION SYNOPSIS

10.1 INTRODUCTION

- 10.1.1 Following the analysis and interpretation of the 2003 results, a full and comprehensive text will be prepared for deposition in the Lancashire County Historic Environment Record, and a shorter text will be prepared for publication as an article in a volume on Rural Settlement in Lancashire or in a journal, such as *Contrebis*.

10.2 THE STRUCTURE OF THE REPORT

- 10.2.1 The following section represents a likely breakdown of the proposed text. It should be noted, however, that this synopsis can only be regarded as a draft, based on the current understanding of the archive. The length of the text will depend on the place of publication, but a maximum of 7500 words is expected.
- 10.2.2 The text will be supported by a number of illustrations, comprising drawings and photographs, tables to summarise data and, where appropriate, interpretative phase drawings. The finished article will aim to present a high degree of integration between both finds' categories and the structural/stratigraphical history of the site.

10.3 OUTLINE SYNOPSIS

Background

- 1.1 Location/geology, topography and soils
- 1.2 Previous excavations: summary
- 1.3 The prehistory of the region
- 1.4 Iron working in the region

The Bronze Age Structure

- 2.1 Introduction
- 2.2 Description of those elements of the site pertaining to the period
- 2.3 Discussion of the period

Features associated with the Iron Working Phase

- 3.1 Introduction
- 3.2 Description of those elements of the site pertaining to the period
- 3.3 Discussion of the industrial activity

Finds' overview

- 4.1 Introduction
- 4.2 Brief comment on each significant finds' category
- 4.3 Discussion of spatial distribution

Discussion

- 5.1 Introduction
- 5.2 Chronological discussion
- 5.3 Thematic context

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Acknowledgements

11. RESOURCES AND PROGRAMMING

11.1 PROJECT TEAM

11.1.1 The project team will consist mainly of OA North internal staff, although the radiocarbon dating, thin section analysis and lipid analysis will be undertaken by an external laboratory. The quality assurance for the project will be maintained by OA North Director, Rachel Newman. The project will be managed by Mark Brennand, Senior Project Manager.

11.1.2 The following Oxford Archaeology North and external staff will work on the project:

Name	Role	Organisation	
Carol Allen	Pottery specialist	Independent	CA
Andrew Bates	Project Officer	OA North	AB
Sandra Bonsall	Environmental Technician	OA North	SB
Mark Brennand	Project Manager	OA North	MB
Elizabeth Huckerby	Environmental Archaeologist	OA North	EH
Ian Miller	Senior Project Manager	OA North	IM
Rachel Newman	Director	OA North	RN
Adam Parsons	Finds Illustrator	OA North	AP
David Starley	Iron-working debris	Royal Armouries	DS
Ben Stern	Lipid analyst	Bradford University	BS
Mark Tidmarsh	Illustrator	OA North	MT
Alan Vince	Pottery thin section analysis	Southampton University	DW
	Radiocarbon dating	Kiel	

11.2 MANAGEMENT

11.2.1 OA North places importance on the tight and effective management of the post-excavation stages of projects in order to deliver best value to our clients. An element of time is provided to on-going quality assurance and internal monitoring. This is part of our internal quality assurance system and ensures the prompt delivery of the agreed report on time and budget. Regular meetings are planned into the task list in order that the representatives of the client will be kept fully informed of the progress of the work.

11.2.2 In addition to the internal team structure, quality standards will be maintained by an external referee, who will appraise the quality of the report prior to publication.

11.3 HEALTH AND SAFETY

11.3.1 All OA North post-excavation work will be carried out under relevant Health and Safety Legislation, including Health and Safety at Work Act (1974). A copy of the Oxford Archaeology Health and Safety Policy can be supplied on request. The nature of the work means that the requirements of the following legislation are particularly relevant:

Workplace (Health, Safety and Welfare) Regulations (1992) – offices and finds processing areas;

Manual Handling Operations Regulations (1992) – transport of bulk finds and samples;

Health and Safety (Display Screen Equipment) Regulations (1992) – use of computers for word-processing and database work;

COSSH (1998) - finds conservation and environmental processing/analysis.

11.4 TASK LIST

- 11.4.1 The analysis and production of a text suitable for publication has been broken down into a series of tasks, which are set out in the Task List in *Appendix 2*.

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APPENDIX 1: PROJECT DESIGN

1 BACKGROUND

1.1 CIRCUMSTANCES OF PROJECT

- 1.1.1 United Utilities Ltd. (hereafter the client) are currently installing new pipelines from at Franklaw Water Treatment Works to Barnacre Service Reservoir and Thistleton to Weeton, Lancashire. A desk-top assessment undertaken recently by OA North (2002) has indicated the presence of a potentially significant archaeological site which has been recommended for excavation. The work for the proposed pipelines could potentially disturb archaeological deposits.
- 1.1.2 The site is known as Site 37, Burns Wood at NGR 35193 44719, and is situated on the northeast of the Barnacre section of the pipeline to the east of Garstang.
- 1.1.3 The desk-top assessment identified buildings dating from as early as 1786 and the walk-over survey encountered a series of earthworks in this exact location. Situated to the southeast of Burns Farm the partially earthfast remains of building foundation walls were found. The protruding stone ran for 8m east-west along the current boundary before returning south for the same distance. To the south a second low earthfast foundation wall could be seen to run on an east-west alignment. The building remains correlate well with the OS 1st Edition site for Carter House. The proposed pipeline easement will pass immediately to the east of this site and directly through the extant well associated with Carter House.
- 1.1.4 OA North has considerable experience of the evaluation and excavation of sites of all periods, having undertaken a great number of small and large-scale projects throughout Northern England during the past 20 years. Evaluations, assessments, watching briefs and excavations have taken place within the planning process, to fulfil the requirements of clients and planning authorities, to very rigorous timetables.
- 1.1.5 OA North is an Institute of Field Archaeologists (IFA) **registered organisation, number 17**, and all its members of staff operate subject to the IFA Code of Conduct.
- 1.1.6 OA North has particular experience of the archaeology of the Lune Valley having undertaken the archaeological assessment of the Shell North Western Ethylene Pipeline during 1988.

1.2 ARCHIVE DEPOSITION

- 1.2.1 The results of the excavation will form the basis of a full archive to professional standards, in accordance with current English Heritage guidelines (*The Management of Archaeological Projects*, 2nd edition, 1991a) and the *Guidelines for the Preparation of Excavation Archives for Long Term Storage* (UKIC 1990). The project archive represents the collation and indexing of all the data and material gathered during the course of the project. The deposition of a properly ordered and indexed project archive in an appropriate repository is considered an essential and integral element of all archaeological projects by the IFA in that organisation's code of conduct.
- 1.2.2 The paper archive for the archaeological work undertaken at the site should be deposited with the Lancashire Record Office (Preston) and the finds with the Lancashire County Museum. The county museum meets MGC criteria for the long-term storage of archaeological material. Negotiations with the Lancashire County Museum will be commenced immediately upon award of contract.

- 1.2.3 Except for items subject to the Treasure Act, all artefacts found during the course of the project will be donated to the receiving museum.
- 1.2.4 A synthesis (in the form of the index to the archive and a copy of the publication report) will be deposited with the Lancashire Sites and Monuments Record.

2 AIMS AND OBJECTIVES

2.1 Academic Aims

- 2.1.1 The main research aim of the excavation will be to characterise the survival of the archaeological remains on the site.

2.2 Objective

- 2.2.1 The main objectives are to evaluate the archaeological deposits affected by the proposed developments.

2.3 Post-Excavation and Report Production

- 2.3.1 The site records, finds and any samples from the excavation programme outlined below will form a checked and ordered site archive as outlined in the English Heritage guideline document *Management of Archaeological Projects* (2nd edition, 1991a) (hereafter MAP 2). Following compilation of the project archive a report will be produced assessing the potential of the archive (including the paper archive, the finds archive and any palaeoenvironmental samples that are taken) for further analysis as defined in MAP 2 Appendix 1. This post-excavation assessment report will make recommendations for further analysis and publication of the results, as appropriate.

3 METHODS STATEMENT

- 3.1 The following work programme is submitted in line with the aims and objectives summarised above.

- 3.2 Prior to the fieldwork commencing OA North will contact the client to obtain any information relating to live services on the site.

3.3 Fieldwork

- 3.3.1 The excavation will be undertaken along a 200m section of the pipeline easement. The easement is 10m in width (to the edge of the retained topsoil). The easement has already undergone topsoil stripping, and the topsoil has been deposited along the northern extent of the easement. A trench 4m in width will be excavated by the use of a mechanical excavator, centred on the proposed line of the pipe trench. Spoil will be deposited along the length of the trench in a manner, which will enable it to be distinguished from the topsoil. The excavation will be undertaken by hand and machine in a stratigraphic manner, and the machine will only be utilised to remove overburden or when any archaeological deposits have been fully recorded.
- 3.3.2 The 4m wide strip, centered on the pipe centre line, of the 200m section of pipe corridor will be cleaned by hand. If any features are exposed by this cleaning then the procedures set out in sections 3.3.3 *et seq* will be implemented. If no archaeological features are encountered then 3 to 5 of test pits up to 2m x 2m will be excavated to allow examination of the stratigraphy. Samples from these pits will be sieved on site for artifacts and ecofacts. Overburden will then be carefully removed in two splits using a mechanical excavator fitted with a toothless ditching bucket under strict archaeological supervision. Following excavation of the first spit the exposed soil or subsoil will be examined for archaeological

features and if any are encountered then the procedures set out in sections 3.3.3 *et seq* will be implemented. Following the excavation of the second spit the ground will be cleaned by hand and any archaeological remains present will be suitably recorded as specified below.

- 3.3.3 Pits and postholes will be subject to a 50% by volume controlled stratigraphic excavation, with the remainder of the feature, should it prove necessary to be removed in entirety, excavated quickly keeping only that dating evidence which is securely derived from the feature in question.
- 3.3.4 Linear cut features, such as ditches and gullies, will be subject to a 20% by volume controlled stratigraphic excavation, with the excavation concentrating on any terminals and intersections with other features which would provide important stratigraphic information. As with pits and postholes, should it prove necessary to remove the remainder of the feature to expose underlying features and/or deposits, it will be excavated quickly keeping only that dating evidence which is securely derived from the feature in question.
- 3.3.5 Structural remains will be excavated manually to define their extent, nature, form and, where possible, date. Any hearths and/or internal features will be 100% sample excavated to provide information on their date and function, and the extent of any associated floor surfaces will be determined.
- 3.3.6 It should be noted that no archaeological deposits will be entirely removed from the site unless their excavation is necessary to reveal other features and/or deposits. If the excavation is to proceed below a depth of 1.2m then the sides will be stepped in. Cut features identified against the edges of the excavation will not be excavated below a safe working limit of 1.2m unless it is confirmed by the County Archaeologist that they are of exceptional importance. In such cases, if shoring is required then the costs for this will be derived from the contingency sum outlined below in section 6.
- 3.3.7 Should any particularly deep-cut feature, such as a well pit, be revealed this will be manually excavated to 1.2m. Thereafter, if the County Archaeologist wishes to see the further excavation of any such feature, this could be achieved by reducing the general area of the feature (ie. a 1m 'cordon' around the feature) using a machine to allow further safe manual excavation. It should be noted, however, that recourse to such a methodology would incur additional costs, which would be derived from the contingency sum.
- 3.3.8 All information identified in the course of the site works will be recorded stratigraphically, using a system, adapted from that used by the Centre for Archaeology Service of English Heritage, with sufficient pictorial record (plans, sections and both black and white and colour photographs) to identify and illustrate individual features. Primary records will be available for inspection at all times.
- 3.3.9 Results of all field investigations will be recorded on *pro forma* context sheets. The site archive will include both a photographic record and accurate large-scale plans and sections at an appropriate scale (1:20 and 1:10). All artefacts and ecofacts will be recorded using the same system, and, following on-site processing, will be handled and stored according to standard practice (following current Institute of Field Archaeologists guidelines) in order to minimise deterioration.
- 3.3.10 Environmental samples (bulk samples of 30 litres volume, to be sub-sampled at a later stage) will be collected from suitable deposits (ie. the deposits are reasonably well dated and are from contexts the derivation of which can be understood with a degree of confidence).
- 3.3.11 Samples will also be collected for technological, pedological and chronological analysis as appropriate. If necessary, access to conservation advice and facilities can be made available. OA North maintains close relationships with Ancient Monuments Laboratory staff at the Universities of Durham and York and, in addition, employs artefact and palaeoecology specialists with considerable expertise in the investigation, excavation and finds management of sites of all periods and types, who are readily available for consultation.

3.3.12 The position of the excavation will be recorded using a Total Station. The information will be tied in to OD.

3.3.13 Any human remains encountered will be excavated following the receipt of a Home Office licence. The removal of such remains will be carried out with due care and sensitivity.

3.3.15 Any gold and silver artefacts recovered during the course of the excavation will be removed to a safe place and reported to the local Coroner according to the procedures relating to the Treasure Act, 1996.

3.4 Other Matters

3.4.1 Access to the site will be arranged via the Client.

3.4.2 The trench will be back filled with the material removed during the excavation.

3.4.3 On-site accommodation, in the form of an office space/messing facility and a portaloo will be provided by OA North. These will be located adjacent to the excavation.

3.4.4 The client is asked to provide OA North with information relating to the position of live services on the site. OA North will use a cable detecting tool in advance of any machine excavation.

3.4.5 Normal OA North working hours are between 9.00 am and 5.00 pm, Monday to Friday, though adjustments to hours may be made to maximise daylight working time in winter and to meet travel requirements. It is not normal practice for OA North staff to be asked to work weekends or bank holidays and should the client require such time to be worked during the course of a project a contract variation to cover additional costs will be necessary.

3.5 Health and Safety

3.5.1 OA North provides a Health and Safety Statement for all projects and maintains a Unit Safety policy. All site procedures are in accordance with the guidance set out in the Health and Safety Manual compiled by the Standing Conference of Archaeological Unit Managers (1991). OA North will liaise with the client to ensure all health and safety regulations are met. A risk assessment will be completed in advance of any on-site works.

3.5.2 All OA North staff will attend the United Utilities contractor's safety induction. No excavation will take place within a 5m area of the existing pipelines that are known to cross the easement.

3.6 Post-Excavation Assessment

3.6.1 Following completion of the fieldwork, the results will be collated and the site archive completed in accordance with English Heritage MAP 2, Appendix 3. A post-excavation assessment of the archive and the resource implications of the potential further analysis will be undertaken. The stratigraphic data and the finds assemblage will be quantified and assessed, and the environmental samples processed and a brief assessment of their potential for further analysis made. The assessment results will be presented within a post-excavation assessment report which will make recommendations for a schedule, timescale and programme of analysis in accordance with MAP2 Appendix 4.

3.7 Analysis

3.7.1 A provisional programme of post-excavation analysis is anticipated. The extent of the programme, however, can only be reliably established on completion of the post-excavation-assessment report. Section 6 covers the estimated costs of the analysis. The

proposed programme anticipates both analysis of the site stratigraphy and the artefactual/ecofactual evidence leading to the production of a final report.

3.8 Publication

- 3.8.1 It is anticipated that the results of the excavation will be worthy of publication. If possible, the publication text will be prepared in a suitable form for inclusion as a journal article in the appropriate journal as befits its academic status.

4 RESOURCES AND PROGRAMMING

4.1 Staff Proposals

- 4.1.1 Day to day management of the project will be undertaken by **Alison Plummer BSc (Hons)** (OA North Senior Project Manager) to whom all correspondence should be addressed.
- 4.1.2 The excavation will be directed by an OA North project officer. OA North project officers are experienced field archaeologists who have undertaken supervision of numerous small- and large-scale evaluation and excavation projects.
- 4.1.3 The site director will be assisted by a team of two archaeological assistants.
- 4.1.4 The processing and analysis of any palaeoenvironmental samples will be carried out by **Elizabeth Huckerby BA, MSc** (OA North project officer), who has extensive experience of the palaeoecology of the North West, having been one of the principal palaeoenvironmentalists in the English Heritage-funded North West Wetlands Survey.
- 4.1.5 The flint assemblage will be examined by **Daniel Elsworth MA (Hons), PIFA**, who has experience of prehistoric lithics in north Lancashire and south Cumbria; his undergraduate dissertation was on the Mesolithic Around Morecambe Bay, he recently examined a small collection of flint artefacts from Hornby, and dealt with an assemblage of over 600 pieces of flint from the Isle of Man. He has also worked on a large Bronze Age cremation cemetery, as well as two burnt mounds, all in the North West.
- 4.1.6 Assessment of any general finds from the excavation will be undertaken by **Sean McPhillips BA**. Sean has worked as a finds supervisor for English Heritage and MOLAS on a number of occasions and has extensive knowledge concerning finds.

4.2 Programming

- 4.2.1 A three to four week period is required to carry out the excavation of the 800m² area.
- 4.2.2 Processing and analysis of palaeoenvironmental samples is dependent on the number of samples taken and can not be predicted at this stage, but will be appraised at the assessment stage. A contingency for two Radio Carbon dates has been built into the post-excavation costs.
- 4.2.3 The project archive will be compiled and a MAP 2-style assessment report/updated project design will be produced within six months of the completion of the excavation fieldwork. A copy will be sent to the client and a further two copies to the County Archaeologist. The assessment report/updated project design will outline any requirement for further analysis of the excavation archive, naming all the specialists to be involved in the post-excavation analysis, and will summarise proposals for eventual publication of the excavation results.

5 PROJECT MONITORING

- 5.1 The project will be monitored by a representative of the County Archaeology Service, who will be kept informed of commencement of the work.
- 5.2 A preliminary meeting/discussion will be held with the County Archaeologist at the commencement of the project. Further meetings/discussions will be held during the course of the fieldwork, on completion of the fieldwork and commencement of the assessment, on completion of the assessment, and on completion of the analysis and final publication report detailing the results of the excavation.
- 5.3 OA North will ensure that any significant results are brought to the attention of the Client and the County Archaeologist as soon as is practically possible.

6 BIBLIOGRAPHY

- English Heritage, 1991 *The Management of Archaeological Projects*, 2nd edn, London
- Lambert, J, *et al* 1996 *Transect Through Time, The Archaeological Landscape of the Shell North Western Ethylene Pipeline*, Lancaster
- Middleton, R, 1996 *The Archaeology of Lancashire*, Lancaster
- Museums' and Galleries' Commission, 1992 *Standards in the museum care of archaeological collections*
- United Kingdom Institute for Conservation (UKIC), 1990 *Guidelines for the preparation of archives for long-term storage*

APPENDIX 2: TASK LIST

WBS	Task Name	Duration	Resource Names
1	Project set up		
1.2	Archive familiarisation	0.5	MB and AB
1.3	Contact project team members	0.25	MB
1.4	Team meeting	0.25	AB, MB, EH, IM,
1.5	Brief specialists	0.5	AB
2	Stratigraphic analysis		
2.1	Context database entry	5 days	pa
2.1	Context database checking	2 days	AB
2.2	Interpretation of site stratigraphy	2 days	AB
2.3	Production of phased site matrix	1 days	AB
2.4	Site narrative	4 days	AB
2.5	Phased plans	3 days	MT
2.6	Dissemination of stratigraphic data	1 day	AB
3	Pottery analysis and report		
3.1	Pottery analysis	0.5 days	CA
3.2	Lipid residue analysis	0.25 days	BS
3.3	Thin section analysis	1 day	AV
4	Industrial residues		
4.1	Analysis	1	DS
4.2	Report	0.5	DS
5	Botanical analysis and report		
5.1	Sample sorting	1 day	SB
5.2	Botanical analysis and report	2 days	EH
5.3	Charcoal analysis and report	5 days	EH
6	Radiocarbon Dating		
6.1	Selection and packaging of material	0.5	SB
6.2	Analysis		University of Kiel
6.3	Report	1	EH
7	Documentary research		
7.1	Research	3 days	IM
7.2	Report	3 days	IM
8	Production of text		
8.1	Primary background reading	1 day	AB
8.2	Project background	1 day	AB
8.3	Bronze Age phase	2 days	AB
8.4	Industrial phase	2 days	IM
8.5	Discussion	4 days	AB
8.6	Edit text	3 days	AB
8.7	Edit	2 days	MB
9	Peripherals		
9.1	Illustrate finds	1 day	AP
9.2	Bibliography	0.5 days	AB
9.3	Select photographs	0.5 days	AB
10	Editing		
10.1	Final edit/approval	1 day	RN
10.2	Corrections	1 day	AB and MB
10.3	Illustration corrections	1 days	MT
11	Finalisation of Research archive		
11.1	Discard unwanted material	0.5 days	pa
11.2	Repack/prepare finds for deposition	0.5 days	finds supervisor
11.3	Update archive	0.25 days	Archive manager
12	Management	1	MB

APPENDIX 2: TASK LIST

WBS	Task Name	Duration	Resource Names
1	Project set up		
1.2	Archive familiarisation	0.5	MB and AB
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2	Stratigraphic analysis		
2.1	Context database entry	5 days	pa
2.1	Context database checking	2 days	AB
2.2	Interpretation of site stratigraphy	2 days	AB
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3	Pottery analysis and report		
3.1	Pottery analysis	0.5 days	CA
3.2	Lipid residue analysis	0.25 days	BS
3.3	Thin section analysis	1 day	AV
4	Industrial residues		
4.1	Analysis	1	DS
4.2	Report	0.5	DS
5	Botanical analysis and report		
5.1	Sample sorting	1 day	SB
5.2	Botanical analysis and report	2 days	EH
5.3	Charcoal analysis and report	5 days	EH
6	Radiocarbon Dating		
6.1	Selection and packaging of material	0.5	SB
6.2	Analysis		University of Kiel
6.3	Report	1	EH
7	Documentary research		
7.1	Research	3 days	IM
7.2	Report	3 days	IM
8	Production of text		
8.1	Primary background reading	1 day	AB
8.2	Project background	1 day	AB
8.3	Bronze Age phase	2 days	AB
8.4	Industrial phase	2 days	IM
8.5	Discussion	4 days	AB
8.6	Edit text	3 days	AB
8.7	Edit	2 days	MB
9	Peripherals		
9.1	Illustrate finds	1 day	AP
9.2	Bibliography	0.5 days	AB
9.3	Select photographs	0.5 days	AB
10	Editing		
10.1	Final edit/approval	1 day	RN
10.2	Corrections	1 day	AB and MB
10.3	Illustration corrections	1 days	MT
11	Finalisation of Research archive		
11.1	Discard unwanted material	0.5 days	pa
11.2	Repack/prepare finds for deposition	0.5 days	finds supervisor
11.3	Update archive	0.25 days	Archive manager
12	Management	1	MB

APPENDIX 3: FINDS LIST

Context	Category	Qty	Wt (g)	Description	Date Range
55	Pottery	5	212	Deverel Rimbury Bucket urn	Middle Bronze Age
60	Fired Clay	11	142	Daub/unfired weights	?Bronze Age
65	Fired Clay	8	10	Daub/unfired weights	?Bronze Age
103	Industrial Debris		246	Slag	Unknown
105	Industrial Debris		>2000	Smithing hearth bottom	Unknown
108	Industrial Debris		7314	Slag	Unknown
117	Industrial Debris		137	Slag	Unknown
119	Industrial Debris		57	Slag	Unknown
125	Industrial Debris		34	Slag	Unknown
126	Industrial Debris		1559	Undiagnostic iron-working slag	Unknown
127	Industrial Debris		1214	Smithing hearth bottom	Unknown
131	Industrial Debris		>5300	Smithing hearth bottom	Unknown
138/139	Industrial Debris		2102	Slag	Unknown
143	Industrial Debris		528	Slag	Unknown
145	Industrial Debris		529	Slag and charcoal fragments	Unknown
146	Industrial Debris		485	Slag	Unknown
147	Industrial Debris		591	Slag	Unknown
176/177	Industrial Debris		3563	Smithing hearth bottom	Unknown
179	Industrial Debris		2036	Smithing hearth bottom	Unknown
187	Industrial Debris		>2600	Smithing hearth bottom	Unknown
191	Industrial Debris		7673	Slag	Unknown
193	Industrial Debris		149	Slag and charcoal fragments	Unknown
198	Industrial Debris		658	Slag	Unknown
200	Industrial Debris		177	Slag	Unknown
202	Industrial Debris		232	Slag	Unknown
215	Industrial Debris		52	Slag	Unknown
220	Industrial Debris		897	Slag	Unknown
221	Industrial Debris		333	Tap/run slag	Unknown
228	Industrial Debris		226	Slag	Unknown
234	Industrial Debris		216	Slag	Unknown
242	Industrial Debris		226	Slag	Unknown
247	Industrial Debris		47	Slag	Unknown
250	Industrial Debris		107	Tap/run slag	Unknown
252	Industrial Debris		368	Tap/run slag	Unknown
254	Industrial Debris		234	Tap/run slag	Unknown
258	Industrial Debris		105	Slag	Unknown
269	Industrial Debris		870	Slag	Unknown
Unstrat	Industrial Debris		3240	Slag	Unknown

APPENDIX 4: CONTEXT LIST

Context	Description
55	Fill of 56 - post pipe
56	Posthole
57	Fill of 56 - packing material
58	Fill of 59
59	Bioturbation - root action
60	Fill of 61
61	pit/posthole
65	Fill of 67
66	Fill of 67
67	Posthole
68	Fill of 70
69	Fill of 70
70	Posthole
71	Fill of 73
72	Fill of 73
73	Posthole
74	Fill of 75
75	Stakehole
76	Fill of 77
77	Stakehole
78	Layer - natural geology
79	Fill of 80
80	Root action
81	Fill of 82
82	Pit
83	Fill of 84
84	Root action
85	Fill of 86
86	Field drain
Nos 87 to 99 Not allocated	
100	Fill of 102
101	Fill of 102
102	Pit/posthole
103	Fill of 104
104	Pit
105	Pit
106	Fill of pit 105
107	Slag pit
108	Fill of pit 107
109	Fill of pit 110
110	Slag pit
111	Fill of pit 114
112	Fill of pit 114
113	Fill of pit 114

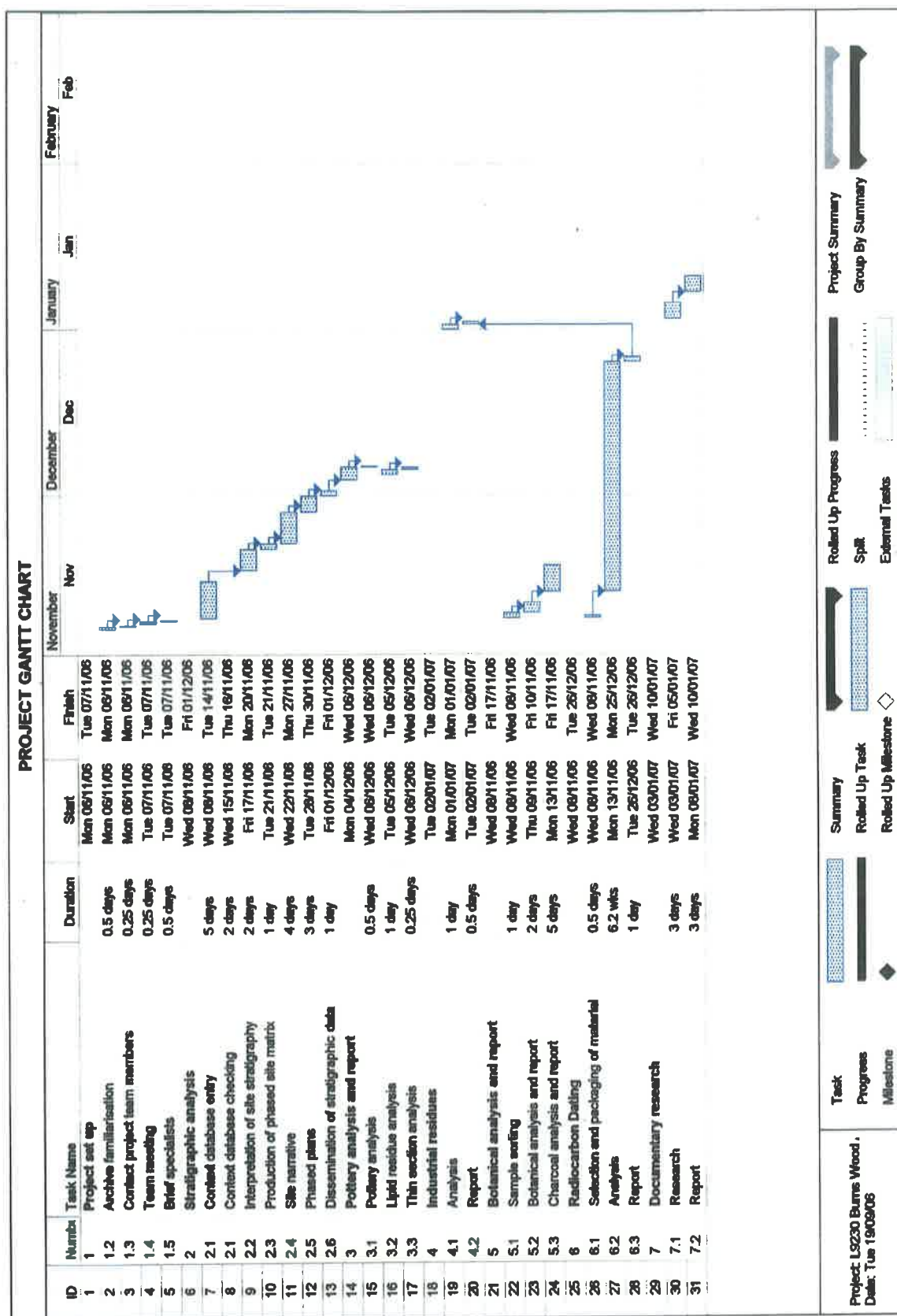
114	Slag pit
115	Fill of pit 116
116	Pit
117	Fill of pit 118
118	Slag pit
119	Fill of pit 120
120	Slag pit
121	Fill of pit 122
122	Slag pit
123	Fill of pit 128
124	Fill of pit 128
125	Fill of pit 128
126	Fill of pit 128
127	Fill of pit 128
128	Slag pit
129	Fill of pit 132
130	Fill of pit 132
131	Fill of pit 132
132	Slag pit
133	Fill of posthole 134
134	Posthole
135	Fill of posthole 136
136	Posthole
137	Fill of pit 140
138	Fill of pit 140
139	Fill of pit 140
140	Slag pit
141	Fill of pit 142
142	Pit
143	Fill of 144
144	Linear feature
145	Fill of pit 148
146	Fill of pit 148
147	Fill of pit 148
148	Slag pit
149	Fill of pit 148
150	Fill of pit 151
151	Slag pit
152	Fill of pit 154
153	Fill of pit 154
154	Slag pit
155	Stakehole
156	Stakehole
157	Stakehole
158	Stakehole
159	Stakehole
160	Stakehole
161	Stakehole
162	Stakehole

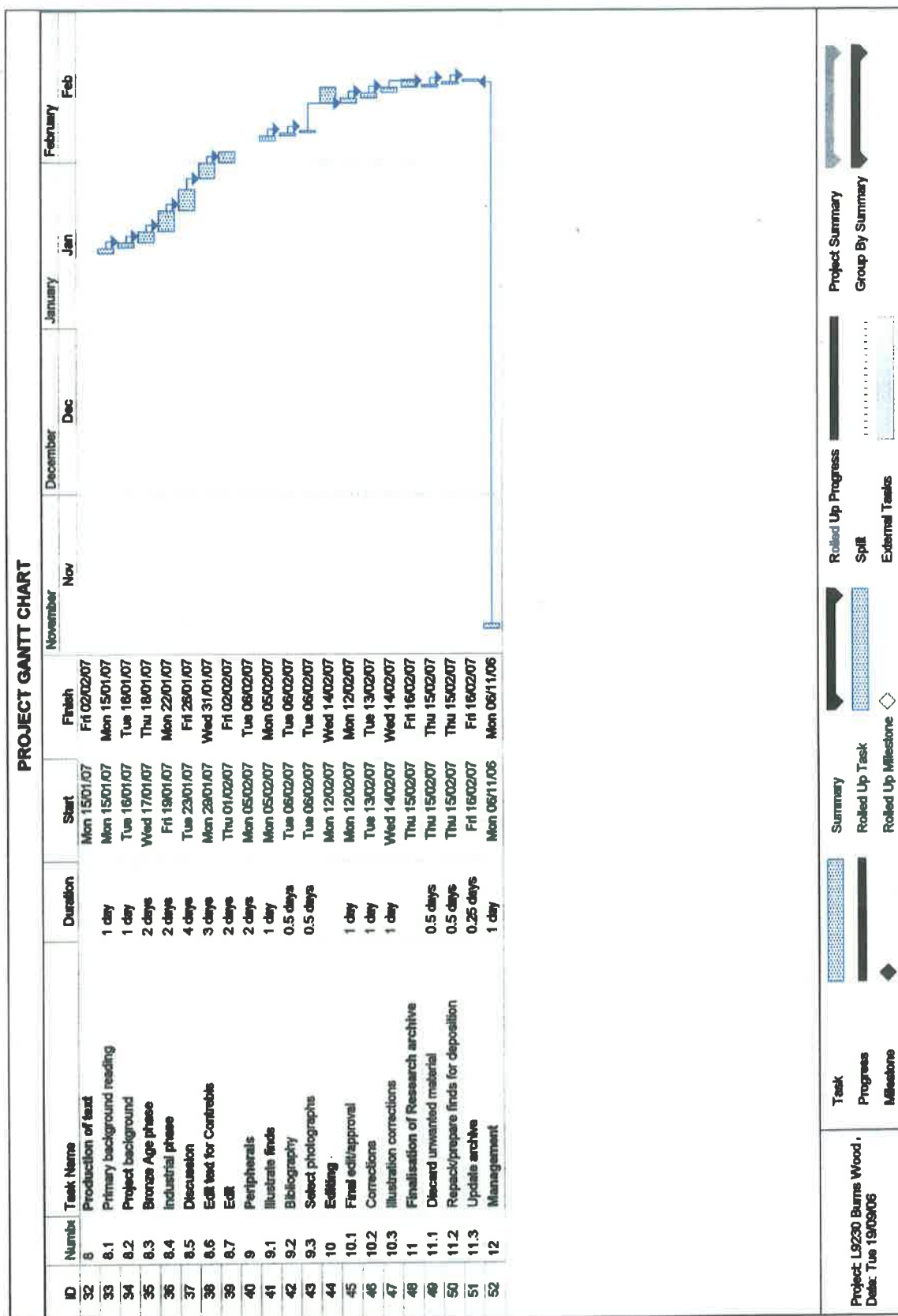
163	Stakehole
164	Stakehole
165	Stakehole
166	Fill of pit 170
167	Fill of pit 170
168	Fill of pit 170
169	Fill of pit 170
170	Pit
171	Primary fill of linear feature 174
172	Fill of linear feature 174
173	Fill of linear feature 174
174	Linear feature
175	Stakehole
176	Fill of pit 178
177	Fill of pit 178
178	Pit
179	Fill of pit 180
180	Pit
181	Fill of 182
182	Shallow pit
183	Fill of stakehole 185
184	Fill of stakehole 185
185	Stakehole
186	Fill of pit 188
187	Fill of pit 188
188	Slag pit
189	Fill of posthole 190
190	Posthole
191	Fill of pit 194
192	Fill of pit 194
193	Fill of pit 195
194	Slag pit
195	Slag pit
196	Fill of posthole 197
197	Posthole
198	Fill of posthole 199
199	Posthole
200	Fill of pit 201
201	Slag pit
202	Fill of pit 203
203	Slag pit
204	Fill of pit 206
205	Fill of pit 206
206	Pit
207	Fill of root disturbance 208
208	Root disturbance
209	Fill of posthole 210
210	Posthole
211	Fill of pit 212

212	Pit
213	Fill of posthole 214
214	Posthole
215	Fill of linear feature 217
216	Fill of linear feature 217
217	Linear feature
218	Fill of pit 212
219	Fill of pit 214
220	Fill of linear feature 217
221	Slag pit
222	Fill of posthole 223
223	Posthole
224	Fill of posthole 225
225	Posthole
226	Fill of pit 227
227	Slag pit
228	Fill of pit 229
229	Slag pit
230	Fill of posthole 231
231	Posthole
232	Fill of posthole 233
233	Posthole
234	Fill of pit 235
235	Slag pit
236	Fill of posthole 237
237	Posthole
238	Fill of pit 239
239	Slag pit
240	Fill of pit 241
241	Slag pit
242	Fill of pit 241
243	Slag pit
244	Fill of posthole 246
245	Fill of posthole 246
246	Posthole
247	Fill of posthole 249
248	Fill of posthole 249
249	Posthole
250	Fill of posthole 251
251	Posthole
252	Fill of posthole 253
253	Posthole
254	Fill of pit 255
255	Slag pit
256	Fill of pit 257
257	Slag pit
258	Fill of pit 259
259	Slag pit
260	Fill of posthole 261

261	Posthole
262	Fill of posthole 264
263	Fill of posthole 264
264	Posthole
265	Fill of pit 266
266	Slag pit
267	Fill of stakehole 268
268	Stakehole
269	Fill of pit 270
270	Slag pit
271	Fill of pit 270
272	Posthole
273	Posthole

APPENDIX 5: GANTT CHART





ILLUSTRATIONS

FIGURES

Figure 1: Site location

Figure 2: Burns Wood: evaluation trenches

Figure 3: Archaeological features discovered within extended excavation area

PLATES

Plate 1: Burns Wood: excavation in progress

Plate 2: Bronze Age structure

Plate 3: Iron-working features

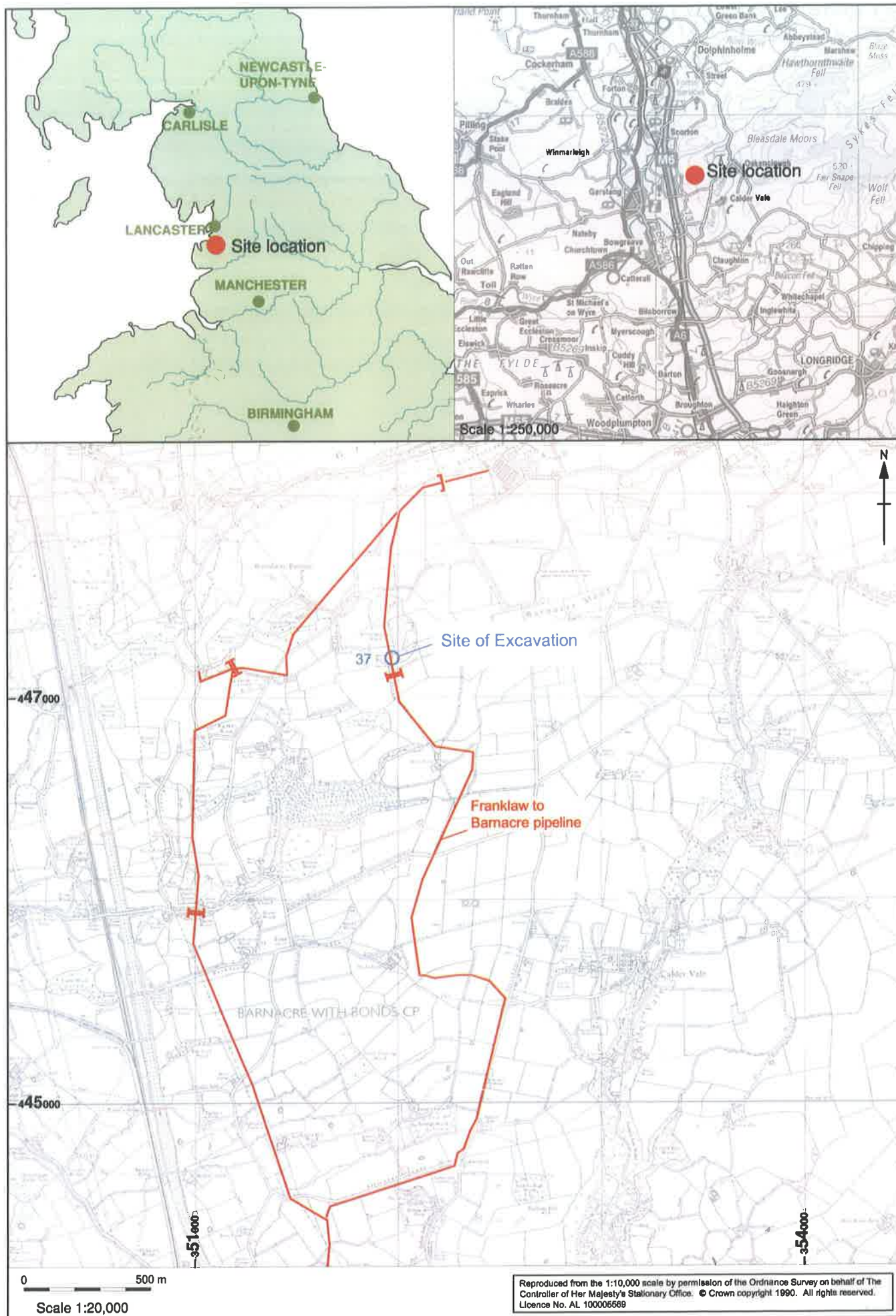


Figure 1: Site Location

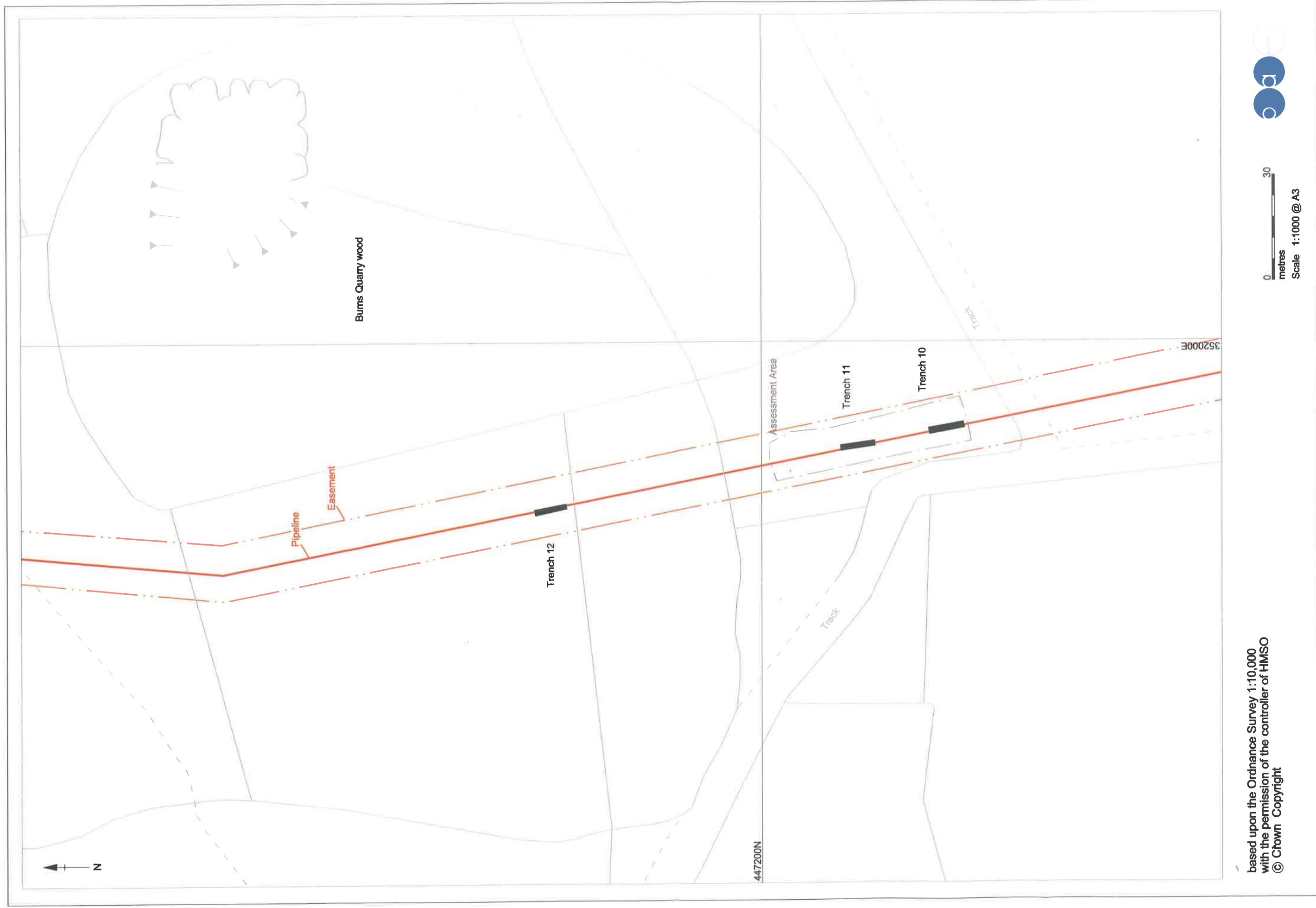


Figure 2: Burns Wood evaluation trenches

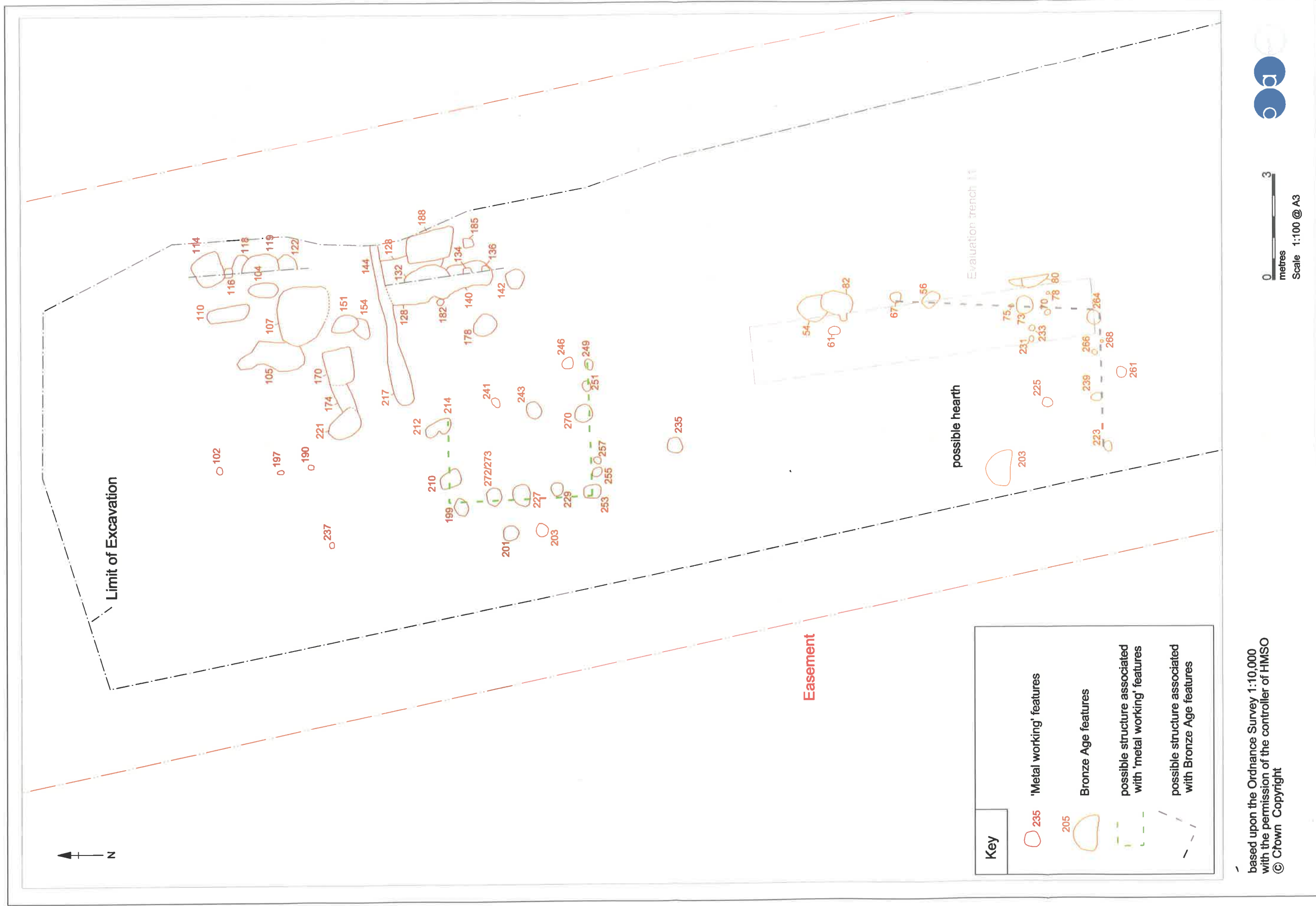


Figure 3: Archaeological features discovered within extended excavation area



Plate 1: Burns Wood: excavation in progress



Plate 2: Bronze Age structure



Plate 3: Iron-working features