



HIGHFIELD SERVICE RESERVOIR TO POAKA BECK WWTW PIPELINE CUMBRIA

Desk-Based Assessment and Walkover Survey



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Prepared by: Daniel Elsworth Neil Wearing
Position: Project Officer
Date: November 2005

Checked by: Alison Plummer Signed.....
Position: Senior Project Manager
Date: November 2005

Approved by: Alan Lupton Signed.....
Position: Operations Manager
Date: November 2005

Oxford Archaeology North

Storey Institute
Meeting House Lane
Lancaster
LA1 1TF
t: (0044) 01524 848666
f: (0044) 01524 848606

w: www.oxfordarch.co.uk
e: info@oxfordarch.co.uk

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Janus House
Osney Mead
Oxford
OX2 0EA
t: (0044) 01865 263800
f: (0044) 01865 793496

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SUMMARY

Following a proposal by United Utilities to construct a new water pipeline between Highfield Service Reservoir and Poaka Beck Wastewater Treatment Works (SD 24347 73926–24139 77821) a programme of archaeological investigation was recommended by the Cumbria County Historic Environment Service (CCHES). This was to consist of a desk-based assessment and walkover survey.

The study area crosses a large part of the Furness Peninsular, now in south-west Cumbria but originally Lancashire ‘north of the sands’. Its south end is close to the town of Dalton-in-Furness, while the north is near to the village of Marton. There is evidence in the local area for activity from at least the Mesolithic period, and although the evidence during the Roman and early medieval periods is less clear, the area is likely to have been inhabited continually from the prehistoric period onwards. Iron mining played an important part in the development of the area from at least the medieval period, although place-name evidence suggests that it was taking place much earlier. During the eighteenth century there was a massive expansion in mining, as a result of the construction of a number of blast furnaces, several extremely large and important mines developed. Many of these were very productive and continued in use throughout the nineteenth and into the twentieth centuries, leaving a landscape scarred by industry as its legacy.

The desk-based assessment identified a total of 58 sites of archaeological interest, of which 37 were previously identified in the Cumbria County Historic Environment Record (HER). The vast majority of these related to the iron industry, although related activities such as quarrying and lime burning were also present. A number of sites of prehistoric date were also present, as were some sites possibly dating to the Roman and medieval periods.

Several of these sites were considered likely to be affected by the proposed development (Sites **04, 13, 18, 27, 30, 31, 35, 41, 43, 46-50**) and of these two were considered to be of some importance due to their association with nationally significant iron mines (Site **04** and **48**). In total, 17 pieces of additional mitigation work were therefore recommended in order to fully assess and record these. This ranged from topographic survey and evaluation of specific sites, to a watching brief of the entire development area during top soil stripping and other work likely to affect archaeological remains. In addition, a watching brief during the excavation of a number of site investigation pits is also recommended.

ACKNOWLEDGEMENTS

Oxford Archaeology North (OA North) would like to thank United Utilities for commissioning the project. Thanks are also due to Jo Mackintosh at the Cumbria Historic Environment Record (HER), and all the staff of the Cumbria County Record Office in Barrow-in-Furness for their assistance with this project.

Daniel Elsworth undertook the desk-based assessment, the walkover survey was carried out by Neil Wearing, and Mark Tidmarsh produced the illustrations. Alison Plummer managed the project and edited the report, together with Alan Lupton.

1. INTRODUCTION

1.1 CIRCUMSTANCES OF PROJECT

- 1.1.1 Following a proposal by United Utilities to create a new transfer pipeline from Highfield Service Reservoir to Poaka Beck Wastewater Treatment Works, Cumbria (SD 24347 73926–4139 77821), a programme of archaeological work was requested by the Cumbria County Council Historic Environment Service (CCCHES). This was to comprise a desk-based assessment and walkover survey of the proposed pipeline route.
- 1.1.2 The desk-based assessment comprised a search of both published and unpublished records held by the HER in Kendal, the Cumbria County Record Office in Barrow-in-Furness, and the archives and library held at OA North. In addition to this, a walkover will be carried out of the route of the proposed development, in order to identify surviving features of archaeological interest. This report sets out the results of the desk-based assessment and walkover survey in the form of a short document, outlining the findings, followed by a statement of the archaeological potential and significance, and an assessment of the impact of the proposed development. The significance criteria detailed in PPG 16 (DoE 1990) was employed during the assessment.

2. METHODOLOGY

2.1 PROJECT DESIGN

- 2.1.1 A project design (*Appendix 1*) was submitted by OA North in response to a brief issued by the CCCHES (*Appendix 2*). The project design was adhered to in full, and the work was consistent with the relevant standards and procedures of the Institute of Field Archaeologists, and generally accepted best practice.

2.2 DESK-BASED ASSESSMENT

- 2.2.1 An area of 0.5km either side of the proposed pipeline route (the study area) was examined in order to identify sites of archaeological interest that were likely to be affected by the proposed development. In addition, any sites of archaeological interest that are unlikely to be affected but are within the study area provide a useful guide to the possibility of further sites being present. The results of the desk-based assessment were collated into a gazetteer and were analysed using the criteria used by the Secretary of State to assess the importance of Scheduled Monuments (DoE 1990).
- 2.2.2 **Historic Environment Record (HER):** this is a record of all of the known sites of archaeological interest within the county, including Listed Buildings and Scheduled Monuments, and is the primary source of information in a study of this kind. Each site has a brief description and an accurate location.
- 2.2.3 **Cumbria County Record Office, Barrow-in-Furness (CRO(B)):** a number of primary documents, principally early maps of the study area were examined in order to identify additional sites of archaeological interest that might be affected by the proposed development. Secondary sources were also examined in order to provide background information about the area.
- 2.2.4 **Lancashire County Record Office, Preston (LRO(P)):** a number of primary sources, particularly enclosure maps, were examined.
- 2.2.5 **Ulverston Library Local Studies Collection:** secondary sources relating to specific sites and the general background were consulted.
- 2.2.6 **Oxford Archaeology North:** OA North has an extensive archive of secondary sources relevant to the study area, as well as numerous unpublished client reports on work carried out both as OA North and in its former guise of Lancaster University Archaeological Unit (LUAU). These were consulted where necessary.
- 2.2.7 **Private Collections:** secondary sources, such as local histories as well as unpublished works, were examined in order to contribute to the historical background and add information regarding specific sites.

2.3 WALKOVER SURVEY

2.3.1 Following the desk-based assessment an enhanced Level I-type survey (*Appendix 1*) was undertaken to relate the existing landscape to research findings. This encompassed a 100m corridor along either side of the pipeline, walked in a systematic fashion. Archaeological features identified within the landscape were recorded using the relevant OA North *pro forma*, and the features accurately located using differential GPS survey, which can achieve an accuracy of +/-0.25m with respect to the OS national grid

2.4 ARCHIVE

2.4.1 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 (English Heritage 1991). The paper and digital archive will be deposited in the Cumbria County Record Office in Barrow-in-Furness on completion of the project.

3. BACKGROUND

3.1 LOCATION, TOPOGRAPHY AND GEOLOGY

3.1.1 The proposed pipeline route is orientated approximately north/south. The south end is situated less than 1km to the east of Dalton-in-Furness, while the north end is approximately 3.5km north-east of Dalton-in-Furness, close to the village of Marton (Ordnance Survey 1981). The landscape rises gradually from between 80-100m above sea level at the south end to 160m at the north (*ibid*). The majority of the area is pastoral in character, with an ‘*undulating or gently rolling topography*’ (Countryside Commission 1998, 27). The solid geology is complex, but is principally comprised of Carboniferous limestone at the south end and Bannisdale slates at the north (Moseley 1978. Plate 1). The north end also contains a patch of Brathay flags and a small mixed area of Stockdale shales, igneous granite and Coniston limestone of the Eycott group (*ibid*). This is overlain by thick deposits of glacially-derived boulder clay till (Countryside Commission 1998, 27), which in turn are overlain by typical brown earths (Soil Survey of England and Wales 1983).

3.2 HISTORICAL AND ARCHAEOLOGICAL BACKGROUND

3.2.1 **Prehistoric Period:** south Cumbria, and Furness in particular, has some of the earliest evidence for prehistoric activity in the north-west of England. Caves within the limestone areas around Morecambe Bay have produced artefacts dating to the Late Upper Palaeolithic (Elsworth 1998), although these remain, as yet, unpublished. Small numbers of finds from the Mesolithic period have been found in association with these and larger collections have been identified in a number of locations along the west coast of Cumbria (Young 2002), suggesting that there was a great deal of activity in the area during this period. More recently pottery dating to the early Neolithic has been found associated with post holes and other features and tools of Mesolithic type near Barrow-in-Furness (Jones 2001; OA North 2002). Examples of one of the most recognisable artefacts of the Neolithic, the stone axe, have been found throughout the local area (Bradley and Edmonds 1999) although settlements and burials belonging to the period are much more rare. During the Bronze Age and Iron Age these begin to appear, although many have not been studied in detail and are difficult to date (Barnes 1968, 7). A number of finds of burials and metalwork are known from across the Furness Peninsular, although these are often not well recorded (*ibid*). Large enclosures, sometimes known as hillforts, and typically thought to belong to the Iron Age are known in the area, such as that at Skelmore Heads near Urswick (Powell *et al* 1963), and may including a recently discovered site on Hoad near Ulverston (Elsworth 2005).

3.2.2 There are several sites of definite or probable prehistoric date within the study area. These include enclosures visible as earthworks in aerial photographs (Sites **15**, **22** and possibly **03**), find spots of prehistoric flint artefacts (Sites **05-06**) and stone tools (Sites **21** and **58**). Human remains found in a mineshaft are

also thought to be of prehistoric date (Site **25**), although there is little evidence to support this claim.

- 3.2.3 **Roman:** it is not clear whether the Romans arrived in force in Furness. The earliest antiquarian records mention the discovery of sections of well-built road thought to be of Roman origin and considered Dalton to be the likely site of a Roman fort (West 1805, 8-11). More recently this idea has been largely dismissed, to the extent that it is doubted that the Romans ever came to Furness at all (Trescaheric 1993, 23). A recent re-examination of the evidence suggests that the original claims may have more validity than has been thought (Elsworth forthcoming), and that Dalton may indeed have been the site of a Roman fort, although more evidence is still needed to demonstrate the proof of this. Similarly, recent work at Urswick has suggested a site with Roman origins, but until good evidence is forthcoming this remains conjecture (Dickinson 2002; 2005). The general area is thought to have been part of a large territory controlled by a native group, known to the Romans as the Brigantes (Shotter 2004, 4), although it has been argued that the area around Morecambe Bay might have been held by the *Setantii*, who are known to have had a port somewhere in the north-west (*op cit*, 6-7). Quite how they might have interacted with the Romans is not clear, although the relatively large number of coins from Furness has led to the suggestion that some form of significant contact must have taken place (Shotter 1989, 44; 1995).
- 3.2.4 There are no known sites of Romano-British date within the study area, although the road (Site **18**) may have Roman origins (Elsworth forthcoming). Some of the enclosures (Sites **15** and **22**, and possibly **03**) may also have been occupied during the Romano-British period.
- 3.2.5 **Early Medieval:** the effect of the collapse of Roman administration in Britain on Furness is unclear, but as the impact of the Roman invasion is also unknown this is perhaps to be expected. Life may have continued much as it had done before (Trescaheric 1993, 23). Cumbria and North Lancashire probably came under the influence of a number of minor kingdoms possibly including Rheged, Strathclyde (Rollinson 1996, 33), and the Northumbrian Angles (Newman 1996, 93). Quite what the effect of these various political and military powers was on the area is also unclear; much of the evidence survives as little more than place-names and brief historical records (*ibid*). Within the study area there are numerous names reflecting an Anglian influence, significant among which is the name Orgrave meaning ‘ore pit’: ‘*the name gives the important information that iron mining must have been carried on in the district since before the Conquest*’ (Ekwall 1922, 207). Recent reinterpretation of one of the most tangible pieces of evidence, a carved cross fragment in Urswick church, has suggested that the site may have housed an early monastery (Dickinson 2002; 2005), although more conclusive evidence is still needed to support this claim. What is more certain is the influence that the Vikings had on the area during the ninth and tenth centuries. They arrived from Ireland and the Isle of Man and their principal legacy has been in place-names, which are found throughout the area (Trescaheric 1993, 27-9). Physical remains have also been discovered, including a sword from Rampside (Barnes 1968, 16), and a possible merchant’s weight (Dennett

- 2005). The Norse influence was to continue to have a strong effect on the area for several centuries (Barnes 1968, 16).
- 3.2.6 There are no known sites of early medieval date within the study area, although the place-name evidence suggests that some of the later sites may have early medieval origins.
- 3.2.7 **Late Medieval:** the majority of the modern settlements in the area certainly had at least medieval origins, although physical remains dating to this period are infrequent. As outlined above the iron ore in the area was already being exploited but it is during the medieval period that the first references to it begin to appear. The mines at Orgrave are referred to in a dispute connected to Furness Abbey in 1235 and in 1400 the Abbey was granted iron ore and 400 acres of land at Dalton, Orgrave and Martin (Collingwood 1928, 121). At this time bloomeries making use of iron mined in Low Furness were present across High Furness, where wood for making charcoal was plentiful (*op cit*, 121-122). This situation continued until the Dissolution of the Monasteries, at which time ‘*Furness Abbey was making no profit on its iron: probably using it all for its own purposes and for its tenants*’ (*op cit*, 122). A small number of bloomsmithies were in operation around this period (Fell 1968, 178-190), which almost certainly used Furness ore, but these were limited in scale compared to previous operations. In 1565 the bloomeries were suppressed in order to preserve the rapidly diminishing woodland of High Furness, and probably also to protect the royal monopoly held by copper miners near Coniston (Collingwood 1928, 122-123).
- 3.2.8 Only two sites thought to be of medieval origin are present within the study area, one of which, a bloomery (site **40**), is connected to the iron industry. The other, an area of ridge and furrow (Site **51**) demonstrates that despite the industrial dominance of the area agricultural practices existed alongside it. The road (Site **18**) may also have medieval origins.
- 3.2.9 **Post-Medieval:** it was not until the late seventeenth century that iron smelting resumed in High Furness, so it is likely that many of the mines had been largely unused in the intervening period (*op cit*, 123). By the beginning of the eighteenth century ‘*the iron industry of Furness suddenly sprang into life*’ (Fell 1968, 32), particularly as a result of the construction of a blast furnace at Backbarrow in 1711, and others following soon after (Bowden 2000, 7). A number of leases to mine were soon granted for areas within the study area; William Matson of Tytup began working land in that area in 1707 (Fell 1968, 32), Thomas Lowther took out a lease on lands at Martin in 1717 (*op cit*, 33) and Richard Postlethwaite mined lands at Lindal from 1746 (*op cit*, 35). The majority of these mines were very productive, and Whitriggs in particular, begun in the early eighteenth century, became famous for the quantity of ore that it produced (*op cit*, 40-42), a fact that was commented on by many visitors at the time (*op cit*, 42). RR Angerstein, visiting in the 1750s described an area of mining ‘*That completely filled a tract of land with a circumference [sic] of half a mile*’ (Berg and Berg 2001, 289). During this time Tytup Hall (situated near the centre of the development area) was home to Father Thomas West, author of *The Antiquities of Furness* in 1774 (Melville 1975).

- 3.2.10 The vast scale of mining operations during the eighteenth century were dwarfed, however, during the nineteenth century as operations continued to grow at a rapid pace. Many of the largest mines were situated within the study area; Crossgates Mine for example were producing 420,000 tons of ore in 1849 and had at least 16 pits operating during its lifetime, which lasted into the early twentieth century (Kelly 1998, 62-65). High Crossgates too was worked sporadically into the early twentieth century until stopped by flooding (*op cit*, 66-67). Eure Pits was worked throughout the nineteenth century and as late as 1920, at which time new boreholes were still being sunk (*op cit*, 68). At Whitriggs, the most productive mine in Furness, working continued until the 1940s, when new seams of ore were still being discovered (*op cit*, 70-75). Similarly, Lindal Moore Mine and Diamond Pit were still operating into the early 1920s (*op cit*, 76-82). Other mines only began life in the nineteenth century; Highfield, for example started some time before 1879 and continued to be operated until 1901 (*op cit*, 105-106), and there are many similar examples in the general area. Ultimately, lower demand for iron and competition from coke-fuelled furnaces brought the iron industry in Furness to an end (Bowden 2000, 79). Some pits evidently lasted much longer than others, however, but ultimately it was their impact on the landscape that was their lasting legacy.
- 3.2.11 The majority of the sites within the study area have post-medieval origins, particularly relating to the Industrial Revolution. These include sites related to mining such as the mines themselves (Sites **02**, **04**, **10-1**, **14**, **23**, **28**, **33**, **36-7**, **45**, **48**, **54** and **56**), associated railways (Sites **01**, **12**, **31** and **44**), an engine house (Site **07**), individual mine shafts (Sites **08**, **16-17** and **29**) and a level (Sites **52**). In addition, there are a number of industrial sites that were probably supplying materials to the iron mines, such as limekilns (Sites **19**, **27** and **34-35**), quarries (Sites **09**, **13**, **26**, **30**, **49** and **57**), and a gunpowder magazine (Site **53**). Several sites of post-medieval date hint at the agricultural character of the landscape and more rural industries, such as those connected to milling (Sites **39**, **41**, **46** and **50**). A variety of other types of activities are also represented in sites as diverse as a dog kennel (Site **42**), a reservoir (Site **24**), a kiln of unknown type (Site **43**) and a sand pit (Site **55**).

3.3 MAP REGRESSION ANALYSIS

- 3.3.1 A full regression of maps from the late eighteenth century until the early twentieth century was examined. This allows changes in the landscape around and including the proposed development area to be observed and shows where areas of activity have been. This is particularly important in trying to understand the various sites within the study area, but is also necessary in this case in order to identify where they have increased and decreased in size.
- 3.3.2 *Tytop Estate Map (BD/BUC/Plan 15 c1780)*: this is an extremely detailed plan that provided considerable information and enabled the identification of several sites. These included, in particular, early mines (Sites **23** and **33**), a limekiln (Site **35**), a millrace (Site **41**) and other buildings (Site **38**). It also showed early mines in the surrounding area that had been swallowed by later expansion (Sites **36**). It is clear from this map that even by this period iron

mining was a dominant factor in the development of the landscape, at least around Tytup Hall, and that workings were present at this time that were considered old.

- 3.3.3 **Yates 1786**: this is the earliest detailed map showing the entire study area, and although not as detailed as its nearest contemporary, the Tytup Estate map, it does provide additional information about some sites. In particular, the former road (Site 31) is shown, as are iron mines corresponding to Sites 36 and 37. The mill at Orgrave (Site 39) is also shown. Although not as detailed as other maps Yates' plan again emphasises the important impact that iron mining was having on the landscape at this time. Although only one area of iron mining is depicted it is very large and was evidently on a considerable scale.
- 3.3.4 **Enclosure Maps 1827 and 1831**: the enclosure maps for Pennington and Swarthmoor (LRO(P) AE/4/12 1827) and Kirkby Ireleth, Lindal and Marton (LRO(P) AE/4/9 1831) depict areas enclosed as part of land improvement carried out in the early nineteenth century. A single site, the quarry on Hare Slack Hill, is shown on the enclosure map of 1827 (Site 56).
- 3.3.5 **Tithe Maps 1839 and 1842**: the tithe maps for the various parts of Dalton (CRO(B) BPR/1/I3/1/2/2 1842; CRO(B) BPR/1/I3/1/2/6 1842) and Urswick (CRO(B) BD/BUC 1839) give an extremely detailed picture of the entire area. They are particularly important because they include field names, which can reveal the location of sites that are not extant at the time. These include an area of iron mining (Site 04), the site of a dog kennel (Site 42) and a kiln of unknown type (Site 43).
- 3.3.6 **Mining Plan 1847**: although a plan showing areas of iron ore veins (CRO(B) BD/BUC/Plan 7 1847) this also depicts another site of interest, the mill dam supplying Orgrave Mill (Site 46).
- 3.3.7 **Ordnance Survey 1850**: while the majority of the iron mines shown in the previous maps are still present and being worked, many have expanded and others are newly developed. These are made up of a number of features (Sites 08, 11, 23, 27, 36-37, 39, 45 and 56-57), the majority of which are recorded in the HER. Other types of site are also shown on this map, including limekilns (Sites 19 and 34), a tithe barn (Site 20), millrace (Site 41), sand pit (Site 55), and quarries (Sites 30 and 49).
- 3.3.8 **Proposed gunpowder magazine plan 1853**: this plan accompanying proposals for construction (LRO(P) QSP 3445/1 1853) identified the position and date of the gunpowder magazine (Site 53), which is also shown on the Ordnance Survey map of 1891.
- 3.3.9 **Ordnance Survey 1891-1913**: by the end of the nineteenth century many of the iron mines established or enlarged by 1850 have become much bigger (compare Plates 1 and 2 with Plates 3 and 4). The infrastructure related to the iron mines has also expanded considerably, with new railways and tracks becoming particularly apparent and many mines increasing dramatically in size (Sites 04, 07, 10-12, 14, 16, 23, 29, 31, 36-37, 44-45, 52). Other sites also appear at this time, such as quarries (Sites 09 and 13). By the beginning of the

twentieth century expansion of the iron mines has perhaps reached its peak, but in some areas there is still expansion (Sites **17** and **28**). An additional quarry (Site **26**) has also developed by this time.

3.4 ARCHAEOLOGICAL INTERVENTIONS

- 3.4.1 Only a single piece of archaeological fieldwork has been carried out within the study area, an assessment of land on Askam Fell prior to the construction of a wind farm (NAA 1998; 1999). The survey identified an area of ridge and furrow with associated field boundaries and post-medieval artefacts (NAA 1999), while the evaluation only revealed drains and former stream channels (NAA 1998).

4. WALKOVER SURVEY

4.1 INTRODUCTION

- 4.1.1 The walkover survey aimed to determine both the survival of above ground remains of sites recorded during the desk-based assessment and also identify previously unrecorded sites along the proposed pipeline route.
- 4.1.2 All fields containing, and adjacent to the pipeline, were walked systematically. The majority of the fields were pasture, which appears to have been subject to relatively recent land improvement. From the northern end of the route, at the filtration plant off Moor Road, the landscape drops to the current dual carriageway (A590) and then once across the embankment the land rises again towards Ulverston Road, falling and rising again to the Highfield reservoir pumping station at the southern end of the route (Fig 2a, Fig 2b).

4.2 RESULTS

- 4.2.1 The walkover survey, identified seven new sites; an area of ridge and furrow (Site **59**), a derelict boundary wall (Site **60**), an area of clearance cairns and banks (Site **61**), a building platform (Site **62**), a large spoil heap (Site **63**) a small unknown earthwork (Site **64**) and a stretch of shrunken trackway (Site **65**). All these are in close proximity to the currently proposed pipeline easement. In addition, several significant sites established by the desk-based assessment, were shown to be both more substantial/extensive than previously identified, and that the same sites were either within or very close to the proposed pipeline easement. This particularly includes, the sites of the former Dalton Iron Mine (Site **04**), Tytup Farm limekilns (Sites **34** and **35**) and Scale Bank Farm mill dam (Site **46**).

4.3 ENHANCEMENT OF DESK-BASED ASSESSMENT ESTABLISHED SITES

- 4.3.1 Dalton Iron Mine and associated trackway (Site **04**) is marked on the current Ordnance Survey map. However, a second stretch of trackway is located in the field immediately north of this. This trackway (Plate 5) is shown on the Ordnance Survey map of 1891. Today it exists as a linear earthwork cross-cutting the slope, running north-east/south-west. In addition to this, an earthwork feature was observed at the centre of the northern boundary of the same field, with a second area of earthworks at the south-west corner of the same field. Both these areas are depicted on the current Ordnance Survey mapping (Fig 2a), but they are not named. Cross-reference to the 1891 Ordnance Survey mapping shows these features and names them as 'Old Shafts'. These features have been appended to the previous record for Site **04**. The proposed pipeline easement will directly effect them.
- 4.3.2 In addition to the two Tytup Farm kiln sites (Sites **34** and **35**), two quarries and a linear earthwork, suggestive of a disused trackway, were observed during the walkover survey. The linear earthwork seems to link the northern of the two

quarry sites (Plate 16) to the kiln site (Site 34, Plate 18, Fig 2a), whilst the southern quarry (Plate 17) is not linked but rather situated close to the kiln site (Site 34). As a result of the proximity of the additional findings and Site 34, the additions have been appended to the previous record for Site 34. This complex shows clearly the working relationship between the four features. The second kiln site, (Site 35) appears to have associated structures, possibly a quarry scoop and/or rampway. The area has been used for modern stone dumping (Plate 19). The proposed pipeline easement will directly effect these features

- 4.3.3 Scale Bank Farm Mill Dam (Site 46) was found to consist of substantial structural remains including a sandstone dam wall with sluice (Plate 9), the *in situ* remains of a waterwheel (Plate 10) and a stone retaining wall to the rear of the current farm buildings (Plate 11). The barn itself, situated adjacent to the wheelpit, has building scars over the wheel which the current owner attributed to the removal of the former threshing floor (R Johnson pers comm). The proposed pipeline easement will pass within 10m of this structure.

4.4 ADDITIONAL SITES ESTABLISHED BY WALKOVER SURVEY

- 4.4.1 At the southern extent of the study area is the previously recorded site of Dalton Iron Mines (Site 04); the proposed pipeline easement passes through the field immediately to the north-east (Fig 2a). Within this field there is wide ridge and furrow running north-south (Site 59); it is clearly visible as a crop mark from the northern side of Ulverston Road, but is less prominent as an extant feature on the ground (Plate 5).
- 4.4.2 Immediately east of this field is a seasonal waterbody named 'Standing Tarn' on the current Ordnance Survey mapping (Fig 2a). Adjoining the eastern edge of this feature is a series of smaller enclosures, also shown on the current mapping and of modern wire fence construction. The northern perimeter, however, is unusual and has been allocated a site number (Site 60). This is possibly a former boundary wall of drystone construction, but has been built in an orthostatic manner (vertically set stone slabs as opposed to more usual drystone construction (Plate 12), which are often found to be Prehistoric, Roman or earlier medieval in date, depending on the construction technique). However, in this case it may be simply a result of the exploitation of quarrying debris from the recorded quarry site immediately north (Site 09), rather than suggesting any significant antiquity for this feature.
- 4.4.3 Located directly south of the former Lindal Tunnel Quarry (Fig 2a) is a complex series of low-lying banks and clearance cairns (Site 61). The banks appear stone-built, having patches of exposed stone (Plate 7), they run both north/south and east/west across the field. The cairns are unevenly distributed across the field and in both cases the stones themselves are not the large debris one would expect if these were spoil from post-medieval industrial-scale quarrying. There is no regularity to these features, as would be found with earthfast post-medieval building foundations, and it is possible that this site at least predates the quarrying activity. The proposed pipeline easement passes directly to the east of this site and is likely to affect the features there.

- 4.4.4 Located within the north-east corner of this same field is the site of a stone-built building (Site **62**). The area is levelled and cleared and the breach in the wall at the point where the current footpath crosses it (Fig 2a), shows evidence of being a former doorway (Plate 14). The corner contains a large rubble pile, which appears to have been there for some time from its weathered and overgrown state.
- 4.4.5 Immediately East of Site **62** is a very substantial spoil heap (Site **63**), presumably associated with the construction of the Lindal Tunnel, and shown on the ordnance survey mapping of 1891, but not shown on the current mapping. The area between the spoil heap and the eastern boundary of the stone-built building (Site **62**) is the proposed route of the pipeline easement (Plate 6).
- 4.4.6 Near the Village of Marton and close to Poaka Beck Quarry (Site **49**) is a small earthwork (Site **64**, Fig 2b). This consists of a low curving bank approximately 18-20m long running east/west, to its south is a levelled platform with a central sunken sub-circular depression (Plate 13.) The function of this is unknown, as is its date; however, it lies directly within the proposed pipeline easement and will be severely affected.
- 4.4.7 In the field north of Walk Mill (Site **50**, Fig 2b), there is a stretch of sunken trackway running north from the current gate into the field (Site **65**, Plate 20). The track has gentle sloping sides, and is a maximum of 0.5m deep, with a maximum width ranging between 2.5m and 3m at its best profile. The track loses its definition after 30 to 40m north into the field. The proposed pipeline easement will pass by to the west of this feature and is unlikely to affect it.

5. GAZETTEER OF SITES

Site number	01
Site name	Dalton-in-Furness
NGR	324520 474560
Site type	Railway
Period	Post-medieval
SMR No	5583
Sources	SMR; Marshall and Davies-Shiel 1969
Description	Dismantled railway, which carried limestone from the quarries at Stainton. The railway was first opened c1866, and the quarries were developed after that date by the Barrow-in-Furness steel industry. It is now partly used as a landfill site near the former Longlands mines. The line of the railway is still very obvious.
Assessment	The site lies outside of the proposed development area and is unlikely to be affected.

Site number	02
Site name	Dalton Iron Mines
NGR	323930 473900
Site type	Iron Mines
Period	Post-medieval
SMR No	16168
Sources	SMR; Martin 1996
Description	The site of Dalton Iron Mines.
Assessment	The site lies outside of the proposed development area and is unlikely to be affected.

Site number	03
Site name	Dalton with Newton
NGR	324000 474000
Site type	Earthworks
Period	Unknown
SMR No	4856
Sources	SMR; Cumbria County Council 1979 SD 2474/A-D
Description	Unclassified earthworks visible in aerial photographs. They show a pattern of flattened earthworks, which are quite intricate with intersecting linear banks and possible enclosures. They may be connected with modern quarrying.
Assessment	The site lies outside of the proposed development area and is unlikely to be affected.

Site number	04
Site name	Dalton Iron Mines
NGR	324324 474053
Site type	Iron Mines
Period	Post-medieval
SMR No	-
Sources	Urswick Tithe Map 1839 (CRO(B) BD/BUC); Ordnance Survey 1891; Walkover survey
Description	Mine workings and quarries with associated spoil heaps and a track connecting them are shown on the Tithe map of 1839. They are still partially present on the Ordnance Survey map of 1891 where they are described as 'old'. A second stretch of trackway was noted immediately north of that previously recorded. The track clearly survives running across the slope of the field north-east to south-west. Two earthworks marked on the current map are old mine shafts, and have been added to the record for this site

Assessment Part of the site will be crossed by the proposed development area and will be affected.

Site number 05
Site name Standing Tarn
NGR 324610 474120
Site type Find spot
Period Prehistoric
SMR No 40431
Sources SMR
Description A single small flint core of Late Mesolithic to Early Neolithic date was discovered in a ploughed field. It is patinated with a single striking platform.
Assessment The site lies outside of the proposed development area and is unlikely to be affected, although it may represent a larger scatter, part of which could be affected.

Site number 06
Site name Dalton
NGR 324800 474500
Site type Find spot
Period Prehistoric
SMR No 3203
Sources SMR; Wymer 1977; Elsworth 1998
Description One Mesolithic core and two blades or flakes were found in an area disturbed by borings for iron mines near Lindale Cote and Standing Tarn. In the JG Jackson collection.
Assessment The site lies outside of the proposed development area and is unlikely to be affected, although it may represent a larger scatter, part of which could be affected.

Site number 07
Site name Urswick Road
NGR 324520 474560
Site type Earthwork/engine house
Period Post-medieval
SMR No 14159
Sources SMR; Ordnance Survey 1891
Description Unclassified earthworks, thought to be connected to mining are present in this area. An engine house is shown on the Ordnance Survey map of 1891, with a mineral railway connecting it to mining to the north-east.
Assessment The site lies outside of the proposed development area and is unlikely to be affected.

Site number 08
Site name Standing Tarn
NGR 324280 474475
Site type Mine shaft
Period Post-medieval
SMR No 16162
Sources SMR; Ordnance Survey 1850; Walkover Survey
Description An 'old shaft' is marked on the Ordnance Survey map of 1850. The walkover survey revealed a small sub-circular depression located by the southern field boundary. A second, larger but similar feature is located further east towards the south-east corner of the field; it is unclear which is the feature identified in the desk based assessment.
Assessment The site lies close to the proposed development area but is unlikely to be affected.

Site number	09
Site name	Standing Tarn
NGR	324278 474398
Site type	Quarry
Period	Post-medieval
SMR No	-
Sources	Ordnance Survey 1891; Walkover survey
Description	An 'old quarry' is shown on the Ordnance Survey map of 1891. The site is presently overgrown; there is a large central spoil heap and recent stone dumping. A trackway can be seen running to the field gate
Assessment	The site lies close to the proposed development area but is unlikely to be affected.

Site number	10
Site name	Standing Tarn
NGR	324047 474429
Site type	Iron Mines
Period	Post-medieval
SMR No	16162
Sources	SMR; Ordnance Survey 1891
Description	An 'old shaft' is shown on the Ordnance Survey map of 1891.
Assessment	The site lies outside of the proposed development area and is unlikely to be affected.

Site number	11
Site name	Crossgate Iron Mines
NGR	323890 474720
Site type	Iron Mines
Period	Post-medieval
SMR No	16175 and 16158
Sources	SMR; Ordnance Survey 1850; 1891; Martin 1996
Description	The location of pit No. 6, Crossgate Iron mines and engine shed for mineral railway. Crossgates Iron Mine was one of the earliest mines operating in this area. The mine was first utilised in 1714 and was worked for differing periods of time until 1914, when the shafts were sealed. Sixteen pits were worked as part of the complex. There are now few signs of the mines and the fields are used for agricultural purposes. Some earthworks are still apparently present. Also the site of Maidenlands quarry and limekiln.
Assessment	The site lies outside of the proposed development area and is unlikely to be affected.

Site number	12
Site name	Maidenlands
NGR	323490 474620
Site type	Tramway
Period	Post-medieval
SMR No	16173
Sources	SMR; Ordnance Survey 1891
Description	The site of a tramway servicing Maidenlands quarry and pit No.6 Crossgate Iron Mines. The tramway is still evident as a substantial earthen bank just east of Maidenlands Farm.
Assessment	The site lies outside of the proposed development area and is unlikely to be affected.

Site number	13
Site name	Tunnel quarry
NGR	324180 474920
Site type	Quarry
Period	Post-medieval
SMR No	16176
Sources	SMR; Ordnance Survey 1891
Description	The site of a quarry marked on the Ordnance Survey map of 1891.
Assessment	The site lies close to the proposed development area and may be affected.

Site number	14
Site name	Lindale Cote Ironstone Mine
NGR	324700 474900
Site type	Iron Mines
Period	Post-medieval
SMR No	2256
Sources	SMR; Ordnance Survey 1850; 1891; Anon 1948; Martin 1996
Description	The site of Lindal Iron Ore Mines. A date stone found in 1947 lying overgrown in the field where the main mines stood read 'LIOM 1722'.
Assessment	The site lies outside of the proposed development area and is unlikely to be affected.

Site number	15
Site name	Lindal
NGR	324800 475200
Site type	Enclosure
Period	Prehistoric
SMR No	4842
Sources	SMR; Cumbria County Council 1979 SD 2475/A-I
Description	A rectilinear enclosure, probably a farmstead, on top of which is fairly broad ridge and furrow, is visible in aerial photograph. The earthworks are still visible but they are in a poor condition due to ploughing. They consist of a roughly rectangular enclosure defined by the remains of a bank and outer ditch, covered by straight and narrow ridge and furrow. There may be a slight platform in the southwest corner. There are also the remains of field boundaries at SD 2427 7525 and SD 2477 7519.
Assessment	The site lies outside of the proposed development area and is unlikely to be affected.

Site number	16
Site name	Lindal Tunnel
NGR	324668 475146
Site type	Iron Mines
Period	Post-medieval
SMR No	-
Sources	Ordnance Survey 1891
Description	Three 'old shafts' and areas of spoil are shown on the Ordnance Survey map of 1891. They probably form part of Site 14 . Site Visit 26/09/05. no remains of the shafts could be seen in this area.
Assessment	The site lies outside of the proposed development area and is unlikely to be affected.

Site number	17
Site name	Melton Terrace
NGR	324398 475197

Site type	Mine shaft
Period	Post-medieval
SMR No	-
Sources	Ordnance Survey 1913; Walkover survey
Description	An 'old shaft' is shown on the Ordnance Survey map of 1913. No visible remains could be seen during walkover survey
Assessment	The site lies outside of the proposed development area and is unlikely to be affected.

Site number	18
Site name	Dalton to Ulverston Road
NGR	324205 475111
Site type	Road
Period	Roman - Post-medieval
SMR No	-
Sources	LRO(P) DDK/1410/1 c1220; West 1774; Ordnance Survey 1850; 1891; Elsworth forthcoming
Description	The line of the original road between Ulverston and Dalton prior to the construction of the Dalton by-pass. This is shown on plans as early as 1745 (West 1774), and is considered to have Roman origins (<i>ibid</i> ; Elsworth forthcoming). A 'way' is recorded as existing between Dalton and Ulverston from as early as c1220 (LRO(P) DDK/1410/1).
Assessment	The site is crossed at this point by the proposed development area and will be affected.

Site number	19
Site name	Melton Terrace
NGR	324313 475342
Site type	Limekiln
Period	Post-medieval
SMR No	18347
Sources	SMR; Ordnance Survey 1850; Walkover survey
Description	The site of a limekiln shown on the Ordnance Survey map of 1850. No remains were found during the walkover survey although access to the immediate field was restricted (private garden) and only a visual examination from a distance of one side of the field was possible.
Assessment	The site lies close to the proposed development area but is unlikely to be affected.

Site number	20
Site name	Lindal Tithe Barn
NGR	324300 475310
Site type	Tithe Barn
Period	Post-medieval
SMR No	18348
Sources	SMR; Ordnance Survey 1850; Walkover survey
Description	The site of Lindal Tithe Barn, now a row of terraced houses. The walkover survey confirmed the results of the desk-based assessment: that the current buildings have replaced the former barn, no suggestion of reuse of earlier building noted in the external structure of the current terrace.
Assessment	The site lies close to the proposed development area but is unlikely to be affected.

Site number	21
Site name	Furness celt finds
NGR	324000 475000
Site type	Find spot
Period	Prehistoric

SMR No	2200
Sources	SMR; Jopling 1846
Description	Two celts or stone hammers 'found in Furness', with perforations for the admission of handles. Described as 'Possibly found at Lindal', present whereabouts unknown.
Assessment	The site lies close to the proposed development area but is unlikely to be affected, although the vague nature of its location makes an accurate assessment difficult.

Site number	22
Site name	Dalton-in-Furness
NGR	323700 475100
Site type	Hillfort and ridge and furrow
Period	Prehistoric?
SMR No	4814
Sources	SMR; Cumbria County Council 1979 SD 2375NW/A-B
Description	A possible hillfort within an area of old mine shafts. There is also ridge and furrow and the remains of a former engine house connected with the mine (Site 23).
Assessment	The site lies outside of the proposed development area and is unlikely to be affected.

Site number	23
Site name	Eure Pits Iron Mines
NGR	323630 475409 (centre)
Site type	Iron Mines
Period	Post-medieval
SMR No	-
Sources	Tytyp Estate Plan (CRO(B) BD/BUC/Plan 15 c1780; Ordnance Survey 1850; 1891; Fell 1908
Description	The site of Eure Pits Iron Mines, one of the earliest mines in Furness. The Tytyp estate plan depicts a number of these workings, which are labelled 'old Iron ore works call'd open works' and 'Old Iron ore works'. A 'rock pit' and other ore pits are also shown on this plan.
Assessment	The site lies outside of the proposed development area and is unlikely to be affected.

Site number	24
Site name	Crossgates Reservoir
NGR	323690 475390
Site type	Reservoir
Period	Post-medieval
SMR No	18357
Sources	SMR
Description	The site of a disused reservoir.
Assessment	The site lies outside of the proposed development area and is unlikely to be affected.

Site number	25
Site name	Eure Pits
NGR	324000 475300
Site type	Find spot
Period	Prehistoric
SMR No	2199
Sources	SMR; Barber 1894
Description	Prior to 1894 a human skull was found 33yds down at the Eure Pits, Lindal, imbedded in iron ore. A cervical vertebra was also found with other bones. Casts

of the skull were sent to London and Paris and it was pronounced to be the skull of an 'Ancient Briton'.
Assessment The site lies outside of the proposed development area and is unlikely to be affected, although the vague nature of its location makes an accurate assessment difficult.

Site number 26
Site name Eure Pits Quarry
NGR 324040 475270
Site type Quarry
Period Post-medieval
SMR No 18355
Sources SMR; Ordnance Survey 1913; Martin 1996
Description Site of Eure Pits Quarry.
Assessment The site lies outside of the proposed development area and is unlikely to be affected.

Site number 27
Site name Eure Pits Limekiln
NGR 324140 475470
Site type Limekiln
Period Post-medieval
SMR No 18346
Sources SMR; Ordnance Survey 1850; Walkover survey
Description The site of a limekiln shown on the Ordnance Survey map of 1850. No structural remains are present in either of the two fields where the site is plotted. However there are low earthfast rubble banks in the south west corner of the northern field which may be the debris from demolition.
Assessment The site lies close to the proposed development area and may be affected.

Site number 28
Site name Crossgates Pit
NGR 324348 475507
Site type Iron Mines
Period Post-medieval
SMR No -
Sources Ordnance Survey 1913
Description An area of workings labelled 'Crossgates Pit' is shown on the Ordnance Survey map of 1913.
Assessment The site lies outside of the proposed development area and is unlikely to be affected.

Site number 29
Site name Crossgates
NGR 324230 475634
Site type Shaft
Period Post-medieval
SMR No -
Sources Ordnance Survey 1891
Description An 'old shaft' is shown on the Ordnance Survey map of 1891. Site Visit 26/09/05 A small sub circular depression was recorded approximately 8-10 m in diameter, evidenced by a low bank to its west and central hollow with slight difference in vegetation cover. it does not appear to be at the exact point of the plotted site, being slightly further north.
Assessment The site lies outside of the proposed development area and is unlikely to be affected.

Site number	30
Site name	Melton Terrace
NGR	324030 475660
Site type	Quarries
Period	Post-medieval
SMR No	18344
Sources	SMR; Ordnance Survey 1850; Walkover survey
Description	<p>The site of six limestone quarries in close proximity to Tytup Farm.</p> <p>The walkover survey revealed linear working outcrop of limestone faces west, with a sub-circular quarry at the northern edge. The area west of the outcrop appears levelled and may be the working platform or building platforms associated with the quarry works.</p>
Assessment	The site lies close to the proposed development area and is likely to be affected.

Site number	31
Site name	Crossgates
NGR	323963 475712
Site type	Road and railway
Period	Post-medieval
SMR No	-
Sources	Tytup Estate Plan (CRO(B) BD/BUC/Plan 15 c1780; Yates 1786; Ordnance Survey 1850; 1891; Walkover survey
Description	<p>A road orientated north-east/south-west between Crossgates and the road leading into Dalton is shown on the Ordnance Survey map of 1850. It has been partially covered by a mineral railway by 1891. It is shown as early as c1780 when it is named Longslack Lane and is depicted on Yates' plan of 1786.</p> <p>The walkover survey revealed that at the point where the pipeline will cross the road is in poor repair and has been resurfaced with concrete. The road is in general poor repair and may contain sub surface features associated with earlier use as a mineral railway or the road prior to that. These would be exposed and removed by topsoil stripping</p>
Assessment	Part of the site is crossed at this point by the proposed development area and will be affected.

Site number	32
Site name	Dalton Horse Engine
NGR	323900 475500
Site type	Earthwork
Period	Post-medieval
SMR No	4829
Sources	SMR; Cumbria County Council 1979 SD 2375NW/C
Description	<p>Earthworks, possibly revealing the site of a horse ginn. A small saucer-shaped, rimmed depression is visible in an area that is badly disturbed by industrial activity. There are also two slight circular features at SD 2396 7550 – a slight irregular circular ditch and a slight circular ring-bank at SD 2396 7548.</p>
Assessment	The site lies outside of the proposed development area and is unlikely to be affected.

Site number	33
Site name	Tytup Farm
NGR	323748 475735
Site type	Iron Mines
Period	Medieval – post-medieval
SMR No	-
Sources	Tytup Estate Map (CRO(B) BD/BUC/Plan 15 c1780)

Description	An area of woodland is shown on an estate plan of c1780, within which is an area labelled 'old iron pits called copy'.
Assessment	The site lies close to the proposed development area but is unlikely to be affected.

Site number	34
Site name	Tytup Farm
NGR	323940 475850
Site type	Limekilns
Period	Post-medieval
SMR No	18345
Sources	SMR; Dalton Tithe Map 1842 (CRO(B) BPR/1/I3/1/2/6); Ordnance Survey 1850; Walkover survey
Description	A field named 'Limekiln field' is shown on the Tithe Map of 1842. Limekilns are shown on the Ordnance Survey map of 1850 at SD 23943 75847 and SD 24031 75611 and these are associated with several quarries. The possible remains of a limekiln structure were noted at the junction of the field boundaries during the walkover survey. They consist of low earthfast mounds of stone and rubble, banks and trackway running north south. A small quarry is located south east of these features, and a further one at the northern end of the trackway
Assessment	Part of the site is crossed at this point by the proposed development area and will be affected.

Site number	35
Site name	Tytup Hall
NGR	323707 475924
Site type	Limekiln
Period	Post-medieval
SMR No	-
Sources	Tytup Estate Map (CRO(B) BD/BUC/Plan 15 c1780); Walkover survey
Description	A limekiln is shown on an estate plan of c1780. An area of earthworks and limestone outcrop can be clearly seen which represent the most extant remains, although ruinous, of the group of kilns formerly in operation in this area. The Features may actually be the remains of two kilns or associated banks and tracks. The pipeline passes directly east of this site and may remove the earthworks.
Assessment	The site lies close to the proposed development area and may be affected.

Site number	36
Site name	High Crossgates Iron Mine
NGR	324140 475800
Site type	Iron mine
Period	Post-medieval
SMR No	18342
Sources	SMR; Tytup Estate Plan (CRO(B) BD/BUC/Plan 15 c1780); Ordnance Survey 1850; 1891; Martin 1996; Walkover survey
Description	A mine shaft is shown on the Ordnance Survey map of 1850, which has expanded to cover a large area by 1891. The field is now pasture, and while there are various earthworks there is nothing obvious remaining of the mining complex although there is evidence of mining activity in the surrounding fields. A number of earlier mines are shown in the area on the Tytup estate plan of c1780 where they are referred to as 'Old iron ore works'. The walkover survey revealed a much-improved area of land with traces of ill-defined earthworks.
Assessment	The site lies outside of the proposed development area and is unlikely to be affected.

Site number	37
Site name	Whitriggs Mine
NGR	324210 476030
Site type	Iron mine
Period	Post-medieval
SMR No	18331
Sources	SMR; Yates 1786; Ordnance Survey 1850; 1891; Walkover survey
Description	A large area of disused mining, much of which still survives as earthworks. These are depicted on Yates' map of 1786 and are shown in more detail on the Ordnance Survey maps of 1850 and 1891 The area still contains extraction sites, which are deep and heavily wooded; the quarry pits are now flooded.
Assessment	The site lies outside of the proposed development area and is unlikely to be affected.

Site number	38
Site name	Tytup Hall
NGR	323620 475970
Site type	Buildings
Period	Post-medieval
SMR No	4877
Sources	SMR; Tytup Estate Plan (CRO(B) BD/BUC/Plan 15 c1780)
Description	The c1780 estate plan of Tytup Hall shows a number of buildings in close proximity to the present hall, which are no longer present and have disappeared by the beginning of the nineteenth century.
Assessment	The site lies close to the proposed development area but is unlikely to be affected.

Site number	39
Site name	Orgrave Mill
NGR	323410 475970
Site type	Mill and iron works
Period	Post-medieval
SMR No	18352
Sources	SMR; Tytup Estate Plan (CRO(B) BD/BUC/Plan 15 c1780); Yates 1786; Ordnance Survey 1850, Martin 1996
Description	Site of Orgrave Mill iron works, which had become Orgrave mill cottages by 1895 and Orgrave villa by 1993. It is described as Orgrave Mill on the Tytup estate plan of c1780, is shown as a mill on Yates' map of 1786, and was evidently a mill prior to becoming an iron works.
Assessment	The site lies outside of the proposed development area and is unlikely to be affected.

Site number	40
Site name	Orgrave Mill
NGR	323300 476010
Site type	Bloomery
Period	Medieval
SMR No	15988
Sources	SMR
Description	Site of a bloomery identified by Mike Davies-Shiel.
Assessment	The site lies outside of the proposed development area and is unlikely to be affected.

Site number	41
Site name	Scale Bank – Orgrave Mill
NGR	323644 475516

Site type	Millrace
Period	Post-medieval
SMR No	-
Sources	Tytop Estate Plan (CRO(B) BD/BUC/Plan 15 c1780); Ordnance Survey 1850; 1891; Walkover survey
Description	The millrace for Orgrave Mill, which has its origins at Scale bank is clearly shown on the Tytop estate plan of c1780. Parts of it are still visible, although not named, as late as 1891. The race can be seen as an earthwork in the field north of Scale bank farm by site 46. It cross cuts the slope of the field, and is not perceptible in the adjacent southern field.
Assessment	Part of the site is crossed at this point by the proposed development area and will be affected.

Site number	42
Site name	Primrose Farm
NGR	323645 476225
Site type	Dog kennel
Period	Post-medieval
SMR No	-
Sources	Tithe Map (CRO(B) BPR/1/I3/1/2/6 1842); Walkover survey
Description	A field named 'Dog Kennel Field' is marked on the Tithe Map of 1842, suggesting that a dog kennel is positioned nearby. No structural remains were observed during the walkover survey
Assessment	The site lies close to the proposed development area and may be affected.

Site number	43
Site name	Scale Bank
NGR	323772 476537
Site type	Kiln
Period	Post-medieval
SMR No	-
Sources	Tithe Map (CRO(B) BPR/1/I3/1/2/6 1842); Walkover survey
Description	A field named 'Low Kiln Close' is marked on the Tithe Map, suggesting that there is a kiln of some description nearby. No structural remains were observed during the walkover survey
Assessment	The site lies outside of the proposed development area and is unlikely to be affected.

Site number	44
Site name	Whitriggs Mineral Railway
NGR	324903 475259
Site type	Railway
Period	Post-medieval
SMR No	18340
Sources	SMR; Ordnance Survey 1891; Martin 1996
Description	The site of a mineral railway connecting the Furness Railway with Whitriggs Iron Mines. Most of the land is now improved pasture, but the railway can still be traced in places, especially on the southern side of the dual carriageway.
Assessment	The site lies outside of the proposed development area and is unlikely to be affected.

Site number	45
Site name	Lindal Moor Iron Mines/Diamond Pit
NGR	325770 476220
Site type	Iron mine

Period	Post-medieval
SMR No	18319
Sources	SMR; Ordnance Survey 1850; 1891; Marshall and Davies-Shiel 1969; Martin 1996
Description	The site and area of Lindal Moor Iron Mines, extending over a large area and including quarries, mine shafts, a reservoir and cave.
Assessment	The site lies outside of the proposed development area and is unlikely to be affected.

Site number	46
Site name	Scale Bank
NGR	323658 476567
Site type	Mill dam
Period	Post-medieval
SMR No	-
Sources	CRO(B) BD/BUC/Plan 7 1847; Ordnance Survey 1891; Walkover survey
Description	A small pond, possibly the milldam for the Orgrave Mill millrace is shown on a plan of 1847. It is still shown on the Ordnance Survey map of 1891, and has an associated sluice and weir, which appear to be regulating water movement along Poaka Beck. The mill race (Site 41) can be seen cross cutting the slope as a low levelled earthwork. At the barn a walled wheel pit survives with a sluice and water wheel in situ. A stone retaining wall extends into the field north east of the barn.
Assessment	The site lies within the proposed development area and will be affected.

Site number	47
Site name	Scale Bank
NGR	323611 476661
Site type	Unknown
Period	Post-medieval
SMR No	-
Sources	Tithe Map (CRO(B) BPR/1/I3/1/2/2 1842)
Description	The field is named 'Blue Field' on the Tithe Map of 1842. It is not clear what this relates to, but may be a reference to dyeing (see Site 50).
Assessment	Part of the site lies within the proposed development area and will be affected.

Site number	48
Site name	Scale Bank
NGR	323572 476805
Site type	Mine workings?
Period	Post-medieval
SMR No	-
Sources	CRO(B) BD/BUC/Plan 7 1847; Walkover survey
Description	The entire field is marked as crossed by mineral veins leased to Messrs Town and Rawlinson on a plan of 1847, which may suggest that mining took place on the site. No visible remains were observed during the walkover survey.
Assessment	Part of the site is crossed by the proposed development area and will be affected.

Site number	49
Site name	Poaka Beck
NGR	323660 476850
Site type	Quarry
Period	Post-medieval
SMR No	18363
Sources	SMR; Ordnance Survey 1850; 1891; Walkover survey

Description The site of a slate quarry marked on the Ordnance Survey maps of 1850 and 1891. A linear series of working faces, now wooded and overgrown. a ramp or tracway leads down from the area of the current gate to a level area in front of the working faces. Low earthfast spoilheaps are still present in the area.

Assessment The site is crossed by the proposed development area and is likely to be affected.

Site number 50
Site name Near Marton
NGR 323648 477037
Site type Mill?
Period Post-medieval
SMR No -
Sources Tithe Map (CRO(B) BPR/1/I3/1/2/2 1842)
Description A field named 'Walk Mill' is marked on the Tithe Map of 1842, which might suggest that there is a mill nearby.
Assessment Part of the site is crossed by the proposed development area and is likely to be affected.

Site number 51
Site name Far Old Park Farm
NGR 323390 477330
Site type Ridge and furrow
Period Medieval
SMR No 17013
Sources SMR; NAA 1998; 1999
Description An area of curving ridge and furrow covering some 205m by 45m, in the very southern corner of the field. The ridges are approximately 8m wide standing to a height of c0.3m, situated on the level ground before the break of slope. There are four visible ridges following the contour of the slope, though they become more indistinct as they approach the road running along the eastern boundary of the field. A medieval origin is suggested by the width of the furrows for this field system.
Assessment The site lies outside of the proposed development area and is unlikely to be affected.

Site number 52
Site name Marton
NGR 323780 477002 – 324150 477085
Site type Level
Period Post-medieval
SMR No -
Sources Ordnance Survey 1891; Holland 1960
Description A 'water level' is marked on the Ordnance Survey map of 1891. According to Holland this was constructed in 1875 and extends towards the front of the New Inn at Marton.
Assessment The site lies outside of the proposed development area and is unlikely to be affected.

Site number 53
Site name Poaka Moor
NGR 324361 477564
Site type Gunpowder Magazine
Period Post-medieval
SMR No -
Sources LRO(P) QSP 3445/1 1853; Ordnance Survey 1891

Description	The site of a gunpowder magazine built some time after 1853 by the Melfort Gunpowder Co. It is still present on the Ordnance Survey map of 1891, but not named.
Assessment	The site lies outside of the proposed development area and is unlikely to be affected.

Site number	54
Site name	Poaka Open Mine
NGR	324400 477200
Site type	Iron mine
Period	Post-medieval
SMR No	40356
Sources	SMR
Description	Extensive area of open works, possibly originating in the eighteenth century, linked to twin inclines now under scrub. Remains of a drum house (marked as a smithy by the Ordnance Survey) also survive. Part of a wider iron mining landscape. Nationally very good example of a developed openwork with inclines and spoil heaps lying within a relatively small area.
Assessment	The site lies outside of the proposed development area and is unlikely to be affected.

Site number	55
Site name	Marion
NGR	323990 477370
Site type	Sand pit
Period	Post-medieval
SMR No	18366
Sources	SMR; Ordnance Survey 1850
Description	The site of a sand pit shown on the Ordnance Survey map of 1850.
Assessment	The site lies outside of the proposed development area and is unlikely to be affected.

Site number	56
Site name	Poaka Iron Works
NGR	323980 477530
Site type	Iron works
Period	Post-medieval
SMR No	18367
Sources	SMR; Ordnance Survey 1850; OA North 2005; Walkover survey
Description	The site of the Poaka Iron Works. These were operated by James Davies as the Davie Company Iron Work, but the site was abandoned when he moved his operation (and much of the machinery) the side of the Ulverston Canal in 1850. No remains observed at this location, but the east side of the current road contains possible spoil heaps and a trackway.
Assessment	The site lies close to the proposed development area but is unlikely to be affected.

Site number	57
Site name	Hare Slack Hill
NGR	323384 477921
Site type	Quarry
Period	Post-medieval
SMR No	-
Sources	LRO(P) AE/4/12 1827; Ordnance Survey 1850; 1891
Description	A public quarry is shown on the enclosure plan of 1827, and it is shown as still in use by 1891.

Assessment The site lies outside of the proposed development area and is unlikely to be affected.

Site number 58
Site name Poaka Beck Reservoir
NGR 324270 478320
Site type Net sinker
Period Prehistoric
SMR No 2191
Sources SMR; Bush 1901; Melville 1946
Description A stone pebble net sinker was found at Poaka Beck Reservoir, 15ft below the ground level in 1896. It was approximately 2½" x 2" x 1¼", with a groove around it and was found at the south-west corner of the reservoir.
Assessment The site lies outside of the proposed development area and is unlikely to be affected, although the vague nature of its location makes an accurate assessment impossible.

Site number 59
Site name Dalton Iron Mines
NGR 324495 474209
Site type Ridge and furrow
Period Unknown
SMR No
Sources Walkover Survey
Description An area of ridge and furrow runs north south with the slope of the field. it is up to 4m wide and rises up to 0.1-0.2 m in height.
Assessment Part of the site is crossed by the proposed development area and is likely to be affected

Site number 60
Site name Standing Tarn
NGR 324301 474319
Site type Boundary Wall
Period Post-medieval
SMR No
Sources Walkover Survey
Description Site Visit 30/09/05 A stretch of walling which has fallen into disrepair, large stones have been set upright in an orthostatic manner. However given the extensive nature of quarrying activity in the area these may simply be the reuse of quarry debris for walling
Assessment Part of the site is crossed by the proposed development area and is likely to be affected

Site number 61
Site name Lindal Tunnel Quarry
NGR 324188 474846
Site type Clearance cairns / banks
Period Unknown
SMR No
Sources Walkover Survey
Description An area of clearance cairns and low-lying banks. The cairns range from 1-2m in diameter, they have clearly protruding small stones. Linear banks and ditches run both north-south and east-west.
Assessment Part of the site is crossed by the proposed development area and is likely to be affected

Site number	62
Site name	Lindal Tunnel Quarry
NGR	324252 474916
Site type	Building Platform?
Period	Post-medieval
SMR No	
Sources	Walkover Survey
Description	A levelled and cleared area, in north east corner of the field which has a large spoil heap next to it. The footpath utilises a break in the wall that appears to be a deliberately constructed doorway.
Assessment	Part of the site is crossed by the proposed development area and is likely to be affected

Site number	63
Site name	Lindal Tunnel Quarry
NGR	324355 474949
Site type	Spoil heap
Period	Post-medieval
SMR No	
Sources	Walkover Survey
Description	A very large spoil heap, left by the construction of the Lindal Tunnel
Assessment	Part of the site is crossed by the proposed development area and is likely to be affected

Site number	64
Site name	Near Marton
NGR	323625 476940
Site type	Earthwork feature
Period	Unknown
SMR No	
Sources	Walkover Survey
Description	Curvilinear bank approximately 20m long with a platform or levelled area its south which has a small sub-circular depression 2m in diameter in it.
Assessment	Part of the site is crossed by the proposed development area and is likely to be affected

Site number	65
Site name	Near Marton
NGR	323681 477103
Site type	Trackway
Period	Post-medieval
SMR No	
Sources	Walkover Survey
Description	A stretch of trackway running north from the current gate. It sinks by up to 0.5m and stands 2.5- 3m wide with a gently sloping profile. At circa 30-40m in the profile becomes much more vague. The field is known to contain three pipelines already so the earthworks further north have been dismissed as a continuation of this feature.
Assessment	Part of the site is crossed by the proposed development area and is likely to be affected

6. SIGNIFICANCE OF THE REMAINS

6.1 INTRODUCTION

6.1.1 A total of 64 sites of archaeological interest were identified within the study area by combined desk-based assessment and walkover survey. Of these, 37 were already recorded in the HER, the remainder were mainly identified through the examination of original sources, particularly maps or established by walkover survey.

6.1.2 There are no recorded Scheduled Monuments or other sites with statutory designations recorded within the study area. A small number of Listed Buildings are present, however, but as these will not be affected by the proposed development they were not included in the gazetteer (*Section 4*). A summary of these is presented in Table 1 below:

<i>HER No</i>	<i>Name</i>	<i>NGR</i>	<i>Listing</i>
26937	Tytup Hall	323579 475976	II*
26938	Tytup Hall gate piers, south entrance	323584 475909	II
26939	Tytup Hall gate piers, north entrance	323618 476041	II
26940	Tytup Hall, retaining wall to front garden	323601 475971	II
26941	Tytup Hall, peat house	323587 475959	II
27056	Gate Farmhouse	324050 477101	II
27057	Marton Hall Farmhouse	324034 477159	II

Table 1: Listed Buildings within the study area

6.1.3 The remaining sites identified within the study area are summarised by period in Table 2, below:

Period	No of sites	Sites
Mesolithic – Neolithic	2	Lithic find spots (Sites 05-06)
Neolithic	1	Net sinker (58)
Bronze Age	1	Axe hammer (Site 21)
Iron Age/ Romano-British	2	Enclosures (Site 15, 22)
Roman	(1)	(Road (Site 18))
Medieval	2 (3)	(Road (Site 18)), bloomery (Site 40), ridge and furrow (Site 51)
Post-medieval	52 (53)	Railways (Sites 01, 12, (31), 44), iron mines (Sites 02, 04, 10-11, 14, 23, 28, 33, 36-37, 45, 48, 54, 56), engine house (Site 07), mine shafts (Sites 08, 16-17, 29), quarries (Sites 09, 13, 26, 30, 49, 57), roads (Sites 18, 31), limekilns (Sites 19, 27, 34-35), tithe barn (Site 20), reservoir (Site 24), horse ginn (Site 32), buildings (Site 38), mill (Site 39, 50), millrace (Site 41), dog kennel (Site 42), kiln (Site 43), milldam (Site 46), dying? (Site 47), level (Site 52), gunpowder magazine (Site 53), sand pit (Site 55), boundary wall (Site 60), building platform (62), Spoil heap (63), trackway (Site 65)
Unknown	5	Earthworks (Sites 03), human remains (Site 25), ridge and furrow (Site 59), clearance cairns (Site 61), earthwork (Site 64),

Table 2: Number of sites by period (figures in brackets indicate sites that may belong to several periods, these are not included in the total number of sites recorded in the whole study area)

6.2 CRITERIA

- 6.2.1 There are a number of different methodologies used to assess the archaeological significance of sites; that to be used here is the ‘Secretary of State’s criteria for scheduling ancient monuments’ which is included as Annex 4 of PPG 16 (DoE 1990). The sites previously listed above (*Section 5*), that were considered may be or were likely to be affected, were each assessed using these criteria, with the results below.
- 6.2.2 **Period:** although dating of some of the sites is uncertain there are potentially several periods represented amongst those that are likely to be affected. In particular, the probable Mesolithic core (Site **05**) is significant for its period, if only because of its early date. The road (Site **18**) would be extremely important if it were demonstrated to be Roman in origin, as a Roman presence has yet to be proven in the area. If it were shown to be of medieval origin

however, this would also be important. The remaining sites are all almost certainly of post-medieval date and, therefore, arguably more common and not hugely significant. Collectively, however, many relate to the iron mining industry (Sites **04**, **31**, **36** and **48**), which was locally very important during this period. Several of the other sites relate to different industries, some of which were probably connected to the iron mines (Sites **13**, **27**, **30**, **34-35** and **49**). Three sites relate to mills (Sites **41**, **46** and **50**), which are also of some interest for the period.

- 6.2.3 **Rarity:** although not particularly rare in the immediate area, the sites relating to iron mining (Sites **04**, **31**, **36** and **48**) are part of a very large-scale area of working, parts of which are recorded at a very early date, which makes them relatively rare nationally. The Mesolithic find spot (Site **05**) is again not particularly rare in the local area, but because of its age it is relatively rare on a wider scale. The road (Site **18**), should it prove to be Roman would be very rare in the local area, but less so nationally or regionally. The remaining sites are not especially rare, although those industries that might be associated with the iron mines (Sites **13**, **27**, **30**, **34-35** and **49**) might be considered slightly more rare by association.
- 6.2.4 **Documentation:** a large number of documents exist relating to the iron mines and so those sites relating to this (Sites **04**, **31**, **36** and **48**) have considerable significance as a result. It is likely that additional documentation can be identified for a number of the other sites of post-medieval date, which would also increase their significance.
- 6.2.5 **Group Value:** the sites relating to the iron mines (Sites **04**, **31**, **36** and **48**) and associated industries (Sites **13**, **27**, **30**, **34-35** and **49**) have an extremely high group value as they form part of a vast area of iron works, which are arguably of national importance. The road (Site **18**), if proved to have Roman origins, would have an increased group value as part of the wider network of Roman roads known across the country. Similarly, the Mesolithic find spot (Site **05**) forms part of a wider distribution of such finds: this includes another only a short distance away (Site **06**), which might indicate some potential for additional remains in the general area.
- 6.2.6 **Survival/Condition:** the survival of many of the sites is, at this stage, uncertain. It is likely that the scale and form of many of the sites related to the iron mines (Sites **04**, **31**, **36** and **48**) and related industries (Sites **13**, **27**, **30**, **34-35** and **49**) would mean that they have survived in a good condition. Similarly, some of the sites relating to mills (Sites **41** and **46**) may have survived in good condition, and so their significance is increased. It is likely that the road (Site **18**) was severely damaged during the construction of the Dalton by-pass, and so may be in a poor condition.
- 6.2.7 **Fragility/Vulnerability:** again, the scale of the sites associated with mining (Sites **04**, **31**, **36** and **48**) and other industries (Sites **13**, **27**, **30**, **34-35** and **49**) would suggest that they are unlikely to be particularly fragile, and so they do not gain any significance in this area. The Mesolithic find spot (Site **05**), although not fragile in itself, may represent a larger scatter of finds, and these are potentially very fragile and therefore more significant.

- 6.2.8 **Diversity:** the sites relating to iron mining (Sites **04**, **31**, **36** and **48**) generally consist of a number of parts and are therefore significant on account of their diversity. Some the other industrial sites (Sites **13**, **27**, **30**, **34-35** and **49**) are also likely to be similarly diverse. The road (Site **18**) may have several periods of use and is therefore potentially significant on account of its diversity. Similarly, the Mesolithic find spot (Site **05**) may represent a larger collection of artefacts and other features with an increased diversity. The other sites are more difficult to assess, but may prove to be more significant on this could following additional work.
- 6.2.9 **Potential:** many of the sites have a high potential. While the sites relating to iron mining (Sites **04**, **31**, **36** and **48**) may reveal details about post-medieval activity, there is also potential for early remains to be present as iron mining is known to have taken place in the general area since the Iron Age (Bowden 2000, 12-13) and in the immediate locality since the early medieval period (Collingwood 1928, 121). The other industrial sites (Sites **13**, **27**, **30**, **34-35** and **49**) also have the potential to provide information about the lime burning and quarrying industries. The sites relating to the mill at Orgrave (Sites **41** and **46**) could provide considerable information about this site (and the mill dam (Site **46**) may contain waterlogged remains). The road (Site **18**) has the potential to reveal an as yet unproven Roman presence in the area and the Mesolithic find spot (Site **05**) has the potential to provide a site of this date for controlled excavation.

6.3 SIGNIFICANCE

- 6.3.1 The iron works in the area form an extensive and nationally important group of monuments, some of which undoubtedly have very early origins and are some of the earliest recorded in Furness. While those sites relating to the iron industry that may be affected (Sites **04**, **31**, **36** and **48**) in general relate to later activity they still form part of this important landscape. A number of the other industries (Sites **13**, **27**, **30**, **34-35** and **49**) were probably also connected to the iron works, providing building materials and lime for flux, and these are therefore significant by association. The Mesolithic find spot (Site **05**) represents evidence for some of the earliest activity in the area, and any additional information recovered regarding the extent of this activity would be very important. The road (Site **18**), represents an opportunity to investigate claims about its Roman and/or medieval origins, as well as examine the construction of the post-medieval road. The sites relating to mills (Sites **41**, **46** and **50** and **64**) are examples of activity in the area apart from iron mining, and may have medieval origins. The unknown earthwork (Site **64**) cannot be positively connected to these other sites, but is in the same area. The clearance cairns (Site **61**), although of unknown date, provide the possibility of extant features that significantly predate the current predominantly post-medieval landscape. The remaining sites (Sites **42**, **47**, **65**) are of less significance or are difficult to assess.

7. IMPACT AND RECOMMENDATIONS

7.1 IMPACT

7.1.1 The route of the proposed pipeline passes through an area containing some of the most extensive, and arguably most important, iron workings in the country. It does not come into close proximity to most of them, however, although there are other sites that are likely to be affected. The area as a whole shows a high potential for archaeological remains from many periods, and this is reflected in the more general recommendations.

7.2 RECOMMENDATIONS

7.2.1 In total, 19 sites are considered to be likely to be affected by the proposed development. Their significance, as discussed in *Section 6* above, and the degree to which they will be affected have been taken into account when considering recommendations for further work. This is outlined in Table 3, below:

Site No	Type	Period	Impact	Recommendations
04	Iron mine / shafts and trackway	Post-medieval Unknown	Severe to part	Topographic survey and watching brief
13	Quarry	Post-medieval	Minimal	Watching brief
18	Road	Roman? – post-medieval	Severe to part	Watching brief
27	Limekiln	Post-medieval	Minimal	Watching brief
30	Quarries	Post-medieval	Minimal	Watching brief
31	Road and railway	Post-medieval	Severe to part	Watching brief
34, 35	Limekilns quarries trackways	Post-medieval	Severe to part	Topographic survey
41	Millrace	Post-medieval	Severe to part	Topographic survey and watching brief
43	Kiln	Post-medieval	Unknown	Watching brief
46	Milldam	Post-medieval	Severe	Photographic survey and watching brief
47	'Blue field'	Post-medieval	Unknown	Watching brief
48	Mine workings?	Post-medieval	Severe	Watching brief

49	Quarry	Post-medieval	Some	Watching brief
50	Mill?	Post-medieval	Unknown	Watching brief
59	Ridge and furrow	Post-medieval?	Severe	Topographic survey and watching brief
61	Clearance cairns	Unknown	Some	Topographic survey watching brief
64	Earthworks	Unknown	Severe	Topographic survey and evaluation
65	Trackway	Post-medieval	Minimal	Topographic Survey and watching brief

Table 3: Sites likely to be affected by the development and recommended future work

7.2.2 In some cases the extent of the impact is unknown, usually because the exact position, or even the presence, of the site is not certain. In these cases it is recommended that a watching brief be maintained during any groundworks in the general area (usually the same field). In those cases where topographic survey is recommended this has been based on visual confirmation of remains by the walkover survey, as only those areas where remains are visible on the ground will be suitable for this type of work. Where evaluation is recommended it should be carried out at the position of the affected site or as close as possible where a site is only nearby.

7.2.3 The high density of sites within the study area and the large areas covered by some of them mean that there is a high likelihood of additional sites being present. There are a number of sites of probable prehistoric date, which would suggest that others might exist, and some of the mines are thought to have very early origins, so there is definite potential for earlier remains to exist in amongst the sites of eighteenth and nineteenth century date. It is therefore recommended that a watching brief be maintained during all the topsoil stripping and below-ground work for the entire pipeline route, with the exception of the northern section where the proposed route will follow the route of previous pipelines.

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Cumbria County Council, 1979 SD2474SW/A-D

Cumbria County Council, 1979 SD2475NW/A-I

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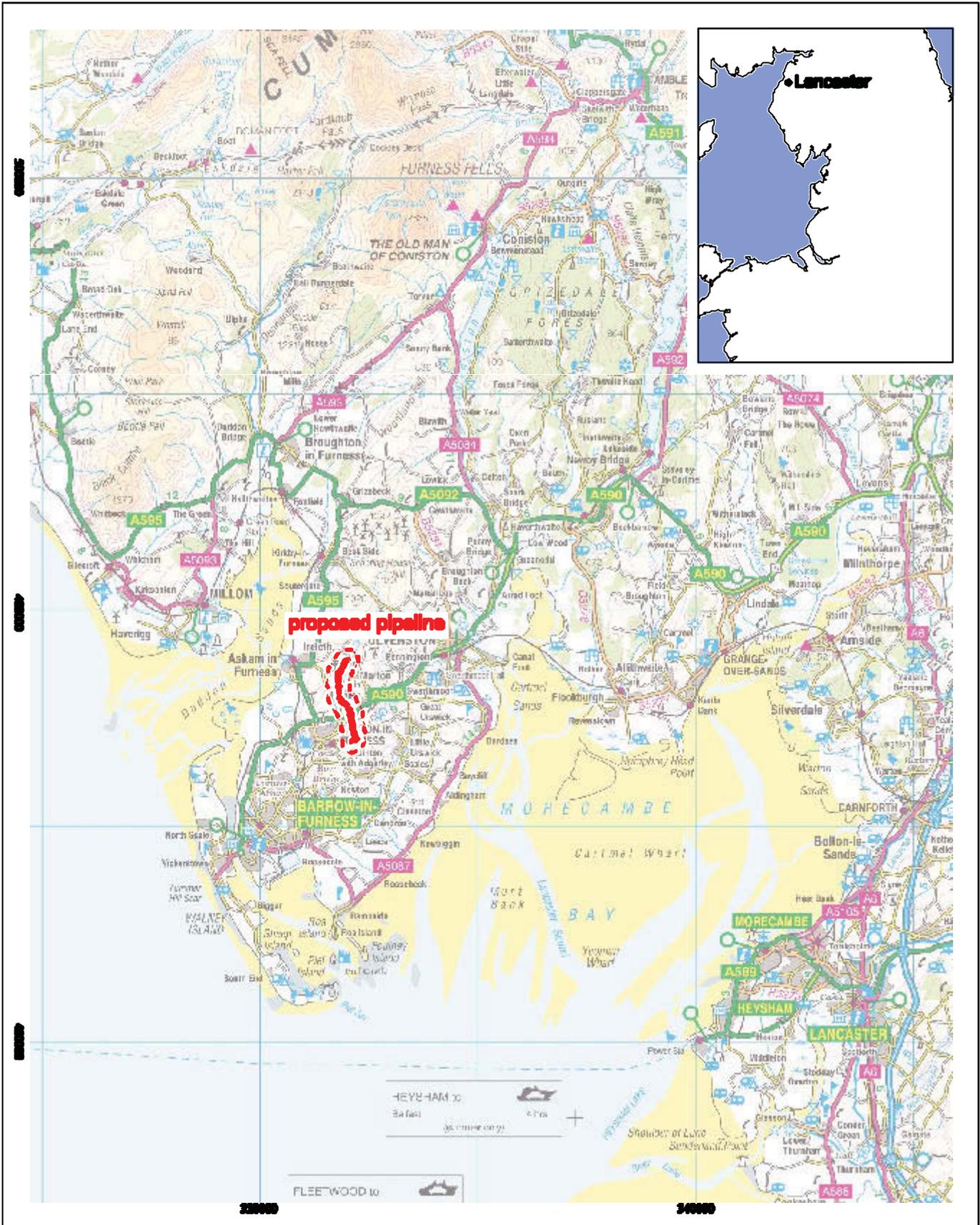
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Figure 1: Location Map

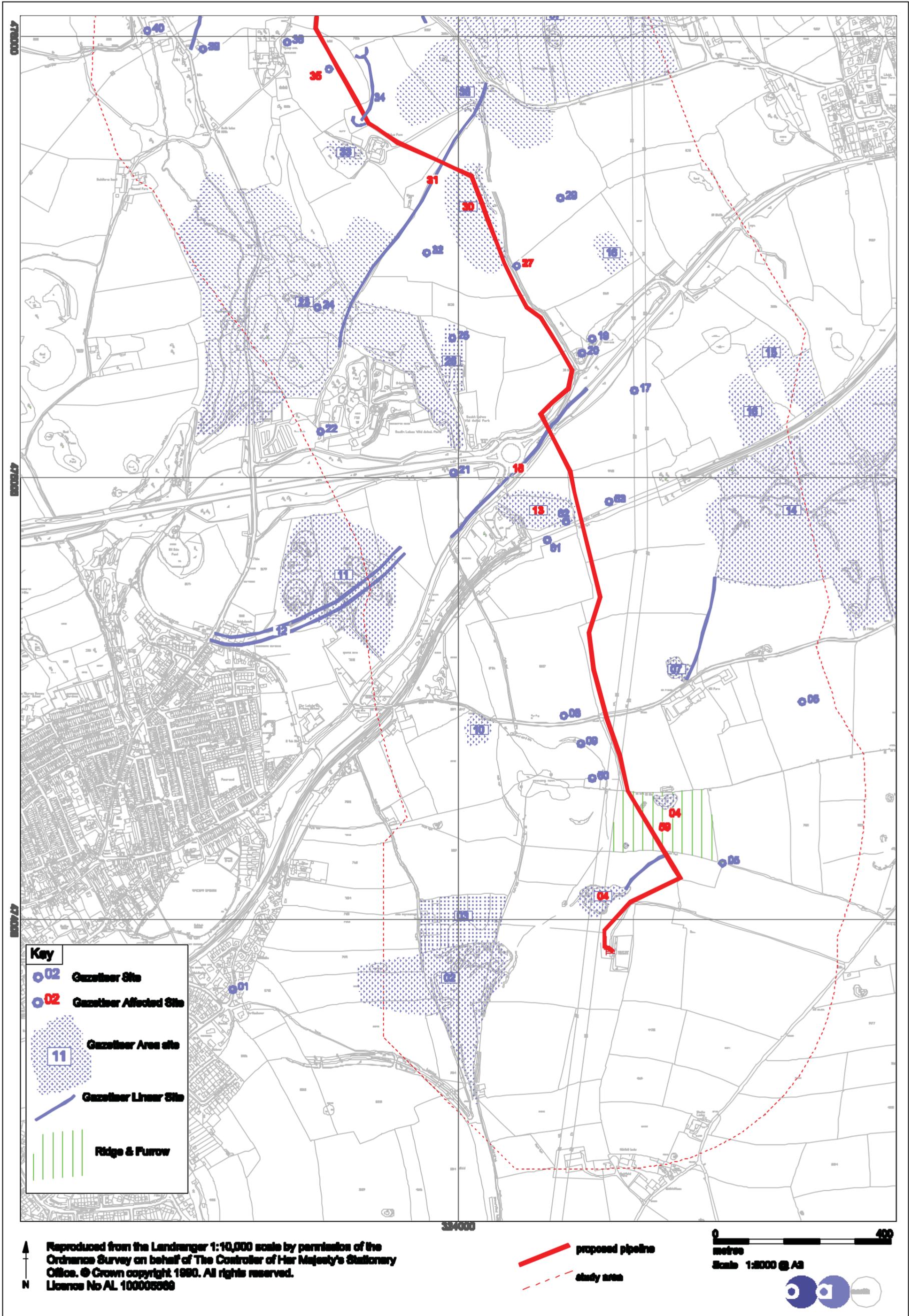


Fig 2a: Gazetiteer sites plan (south)

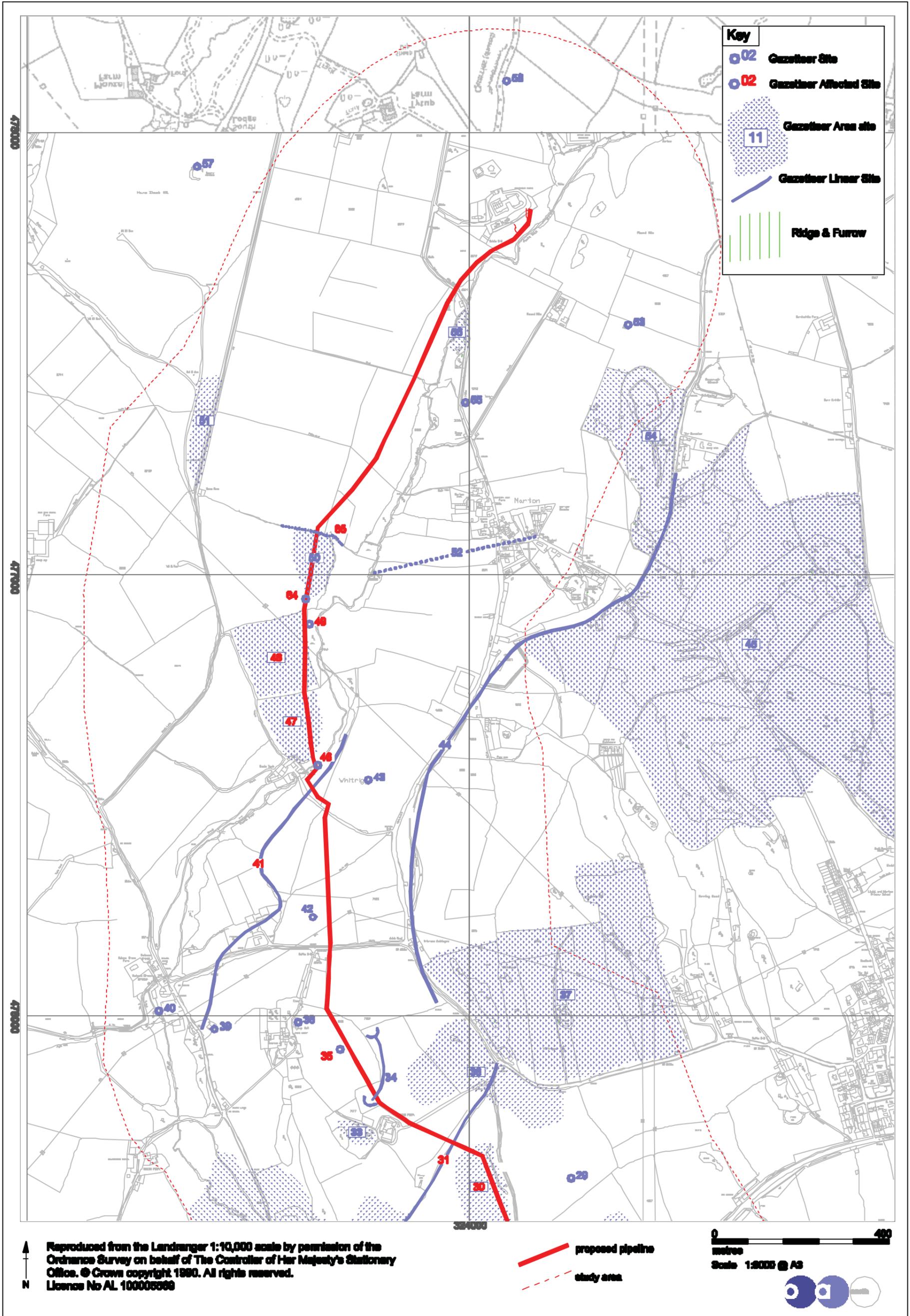


Fig 2b: Gazetteer sites plan (north)

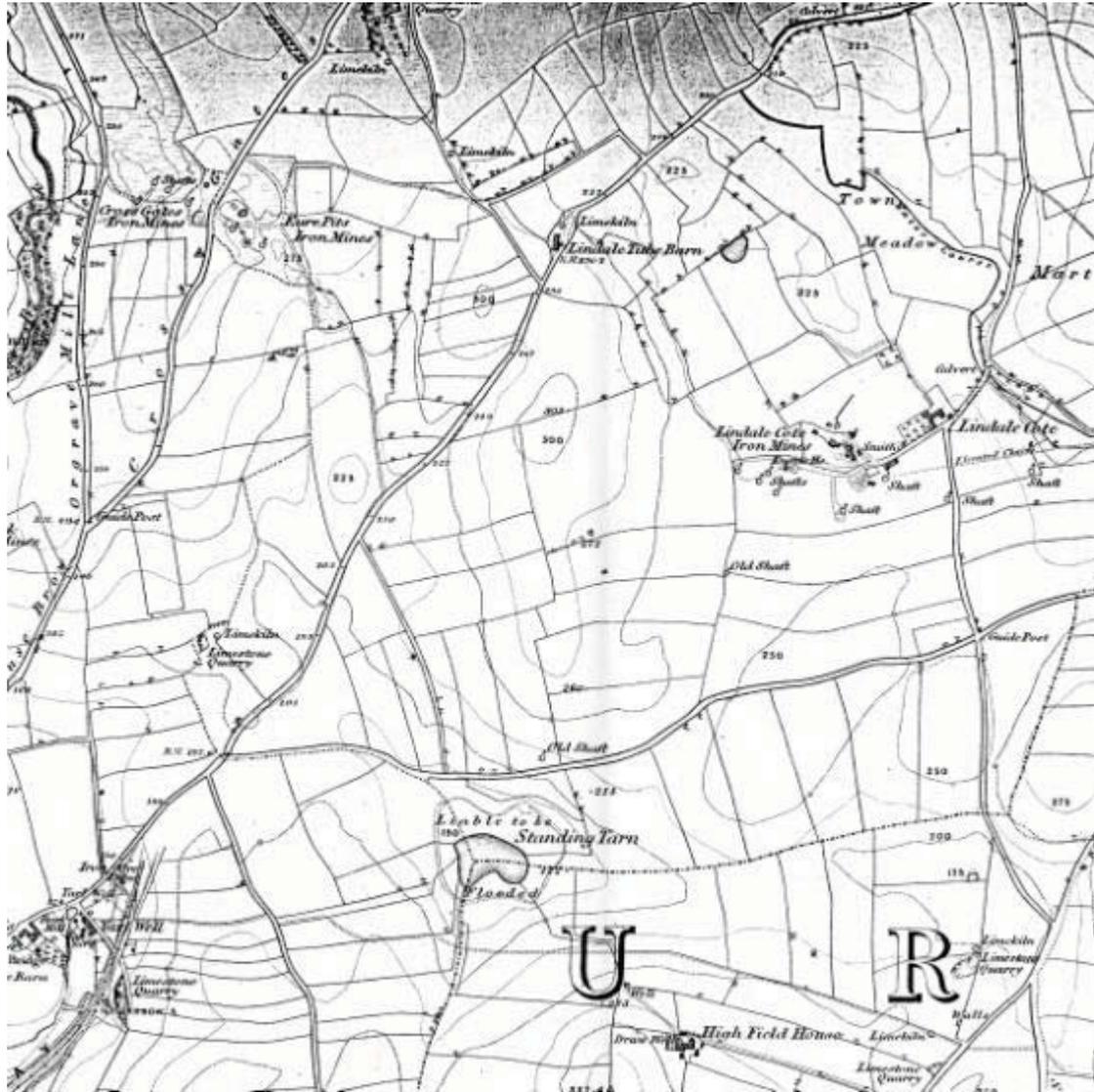


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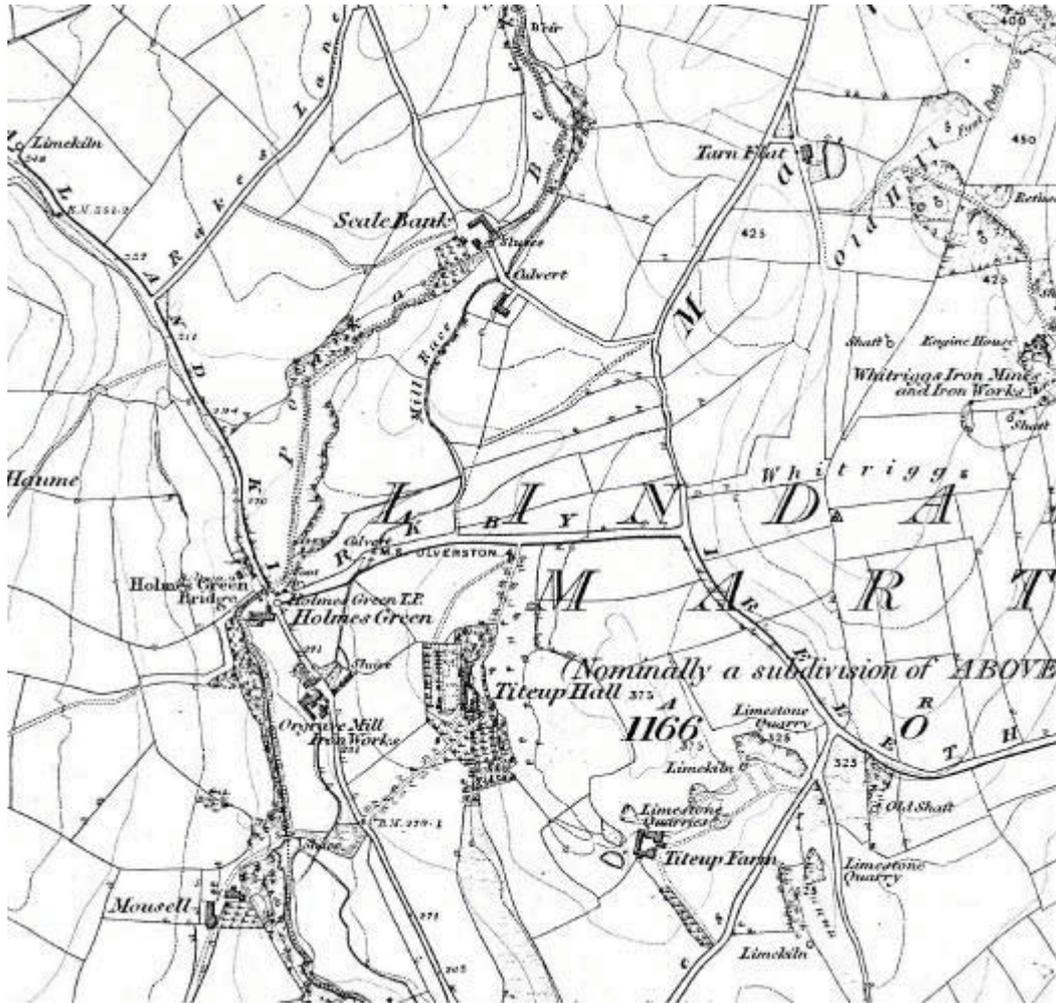


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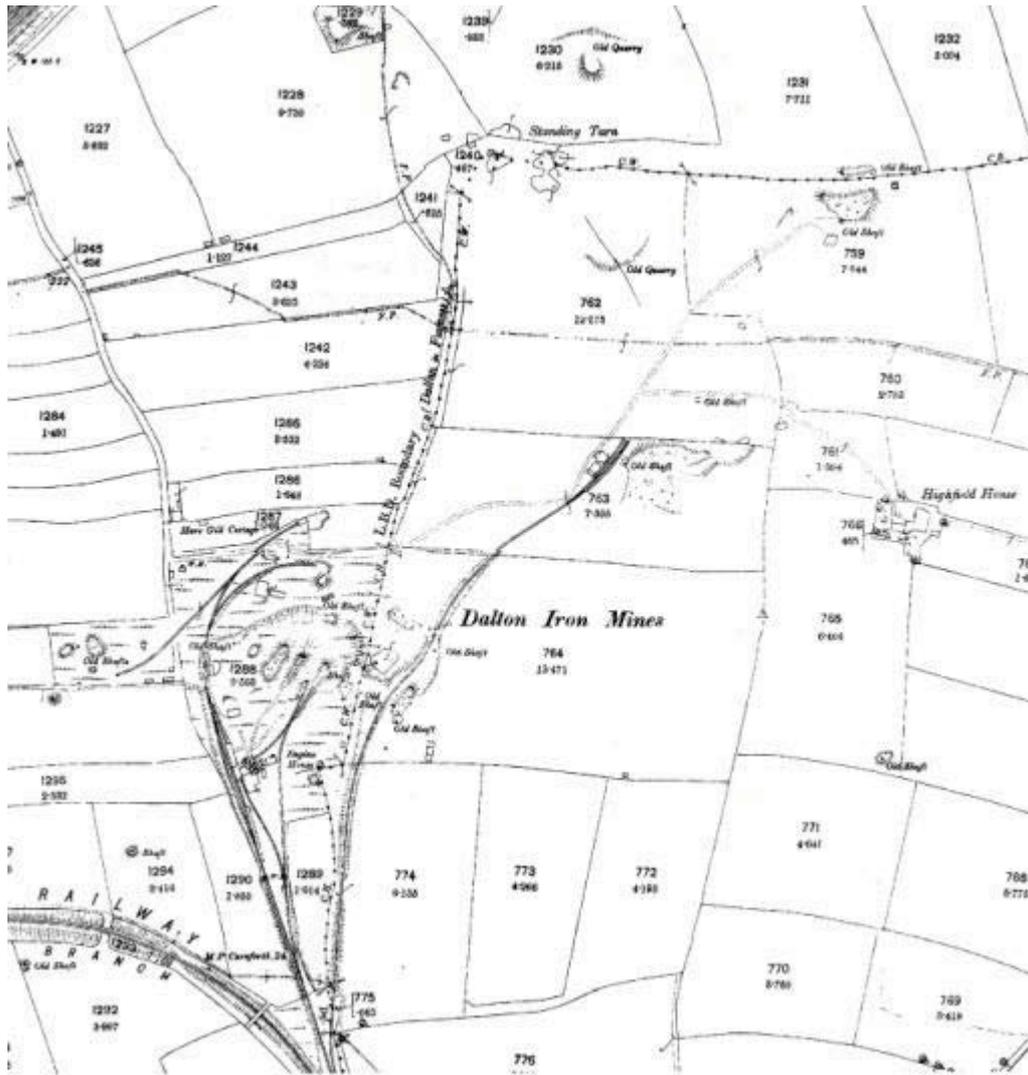


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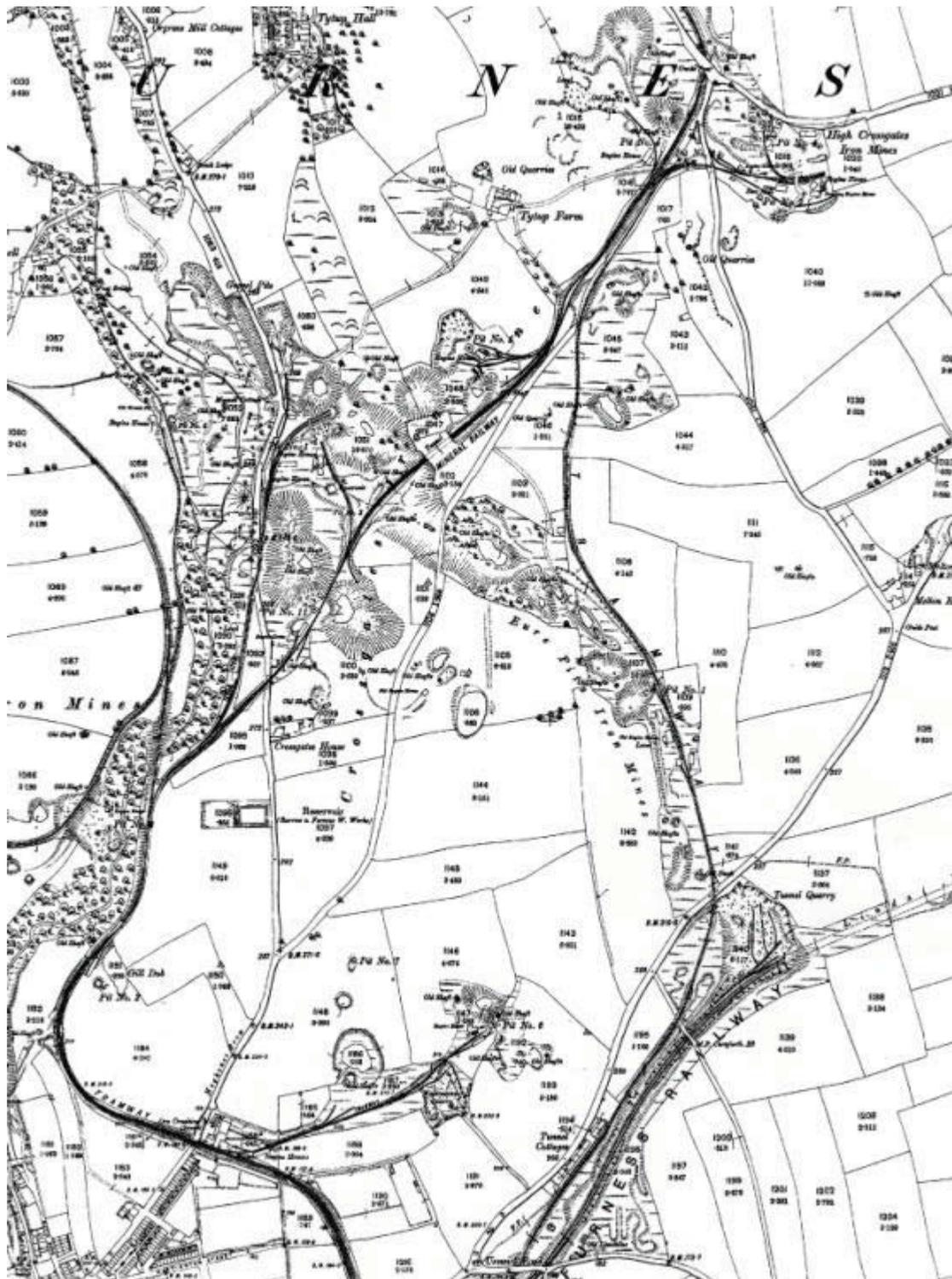


Plate 4: Part of the Ordnance Survey map of 1891 (25": 1 Mile Sheet 16.9) showing the extent of the Eure Pits Iron Mines (Site 23) and the High Crossgates Iron Mines (Site 36)



Plate 11: Scale Bank Farm retaining wall rear of farm (Site 46)



Plate 12: Stone Boundary Wall, Standing Tarn (Site 60)



Plate 13 Earthwork (Site 64)



Plate 14: Possible building platform (Site 62)



Plate 15: Northern quarry added to Tytup Farm Limekiln (Site **34**)



Plate 16: Southern quarry added to Tytup Farm Limekiln (Site **34**)



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Plate 18: Sunken trackway (Site 65)



Plate 5: Site 04 Dalton Iron Mines, trackway and shafts added to site established by desk-based assessment



Plate 6 : Spoil heap (Site 61) looking east, the easement will run north-south in the foreground of this plate



Plate 7: Banks and clearance cairns (Site 61) above Lindal tunnel Quarry (Site 13)



Plate 8: Ruins of The limekiln at Tytup Hall (Site 35)



Plate: 9 Wheel Pit and sluice, Scale Bank Farm (Site 46)



Plate 10: Scale Bank farm wheel pit and building scar (Site 46)

APPENDIX 1: PROJECT DESIGN

1 INTRODUCTION

- 1.1 This project design has been compiled for United Utilities (hereafter the client). It presents proposals for the assessment of a proposed new transfer pipeline from Highfield Service Reservoir to Poaka Beck Wastewater Treatment Works, Cumbria. Section 2 of this document states the objectives of the project, Section 3 deals with OA North's methodology. Section 4 addresses other pertinent issues including details of staff to be involved, and project costs are presented in Section 5.
- 1.2 Cumbria County Council's County Historic Environment Service (CCCHES) has recommended that a desk-based assessment and walkover survey are undertaken of the proposed pipeline route as it appears to have potential for prehistoric activity (human remains HER 2199), and post-medieval industrial sites relating to quarrying and mines (HER nos 4829, 16162, 16176, 18331, 18344, 18355 and 18363). This programme of work will allow a decision to be made as to whether any areas of identified archaeological significance need to be avoided or a programme of mitigation works undertaken.
- 1.3 OA North has the professional expertise and resources to undertake the project detailed below to a high level of quality and efficiency. OA North is an **Institute of Field Archaeologists (IFA) registered organisation, registration number 17**, and all its members of staff operate subject to the IFA Code of Conduct.

2 OBJECTIVES

- 2.1 The following programme has been designed to provide for accurate recording of any archaeological deposits that are disturbed by topsoil stripping activities and trench cutting associated with the pipeline. A desk-based assessment will precede a walkover survey to place any findings that are made in to the context of known archaeological sites and/or artefact discovery sites in the immediate
- 2.2 A written report will assess the significance of the data generated by the desk-based assessment and subsequent fieldwork, within a local and regional context.

3 METHOD STATEMENT

3.1 DESK-BASED ASSESSMENT

- 3.1.1 The following will be undertaken as appropriate, depending on the availability of source material. The level of such work will be dictated by the time scale of the project.
- 3.1.2 **Documentary and Cartographic Material:** this work will comprise an assessment and investigation of the existing resource. It will include an appraisal of appropriate sections of County histories, early maps, and such primary documentation (tithe and estate plans etc.) as may be reasonably available. Particular emphasis will be upon the early cartographic evidence, which has the potential to inform the post-medieval occupation and land-use of the area. Any photographic material lodged in the Historic Environment Record (HER) will also be studied. Published documentary sources will also

be examined and assessed. The study will examine place and field name evidence for the site and its environs.

- 3.1.3 This work will involve visits and or correspondence searches of the following repositories: Cumbria Historic Environment Record and the County Record office (Barrow).
- 3.1.4 **Map Regression Analysis:** available cartographic sources will be consulted in an attempt to trace the development of the landscape back to the earliest available cartographic source. This will provide information on additional sites not included in the HER, as well as ascertaining potentially any areas of more recent development.
- 3.1.5 **Aerial Photography:** in addition to an assessment of aerial photographic evidence, where relevant, a replotting of appropriate archaeological and topographic information will be undertaken.
- 3.1.6 **Physical Environment:** a rapid desk-based compilation of geological (both solid and drift), pedological, topographical and palaeoenvironmental information will be undertaken. It will be based on published geological mapping and any local geological surveys in the possession of the County Council or the Client. This will not only set the archaeological features in context but also serves to provide predictive data, that will increase the efficiency of the field inspection.

3.2 WALKOVER SURVEY

- 3.2.1 **Visual Inspection:** following the desk-based assessment a level I walkover survey (*Appendix 1*) will be undertaken to relate the existing landscape to research findings. This will encompass one-hundred metre corridor along either side of the pipeline, walked in a systematic fashion. Archaeological features identified within the landscape will be recorded using the relevant OA North pro forma, and the features accurately positioned with the use of either a GPS, which can achieve accuracies of $\pm 0.1\text{m}$ with respect to the OS national grid, or by manual survey techniques which will tie in new features to features already shown on the relevant OS map.
- 3.2.2 In addition to the recording of surface features of archaeological interest, hazards and constraints to undertaking further archaeological investigations on site will be identified (eg live services, tree preservation Orders and footpaths). The client will be asked to contribute to this information.
- 3.2.3 **Contingency plan:** in the event of significant archaeological features being identified during the desk-based assessment and walkover survey discussions will take place with the Archaeological Officer, as to the extent of further works to be carried out, and in agreement with the Client. All further works would be subject to a variation to this project design. Further stages of work are likely to include a watching brief during topsoil stripping and trench opening activities.

3.3 REPORT/ ARCHIVE

- 3.3.1 **Interim Statement:** in the event that further work is recommended an interim statement will be issued. In this instance or in the event that the client specifically requests an interim statement it should be noted that all illustrations will be copies of field drawings and not completed CAD drawings.

- 3.3.2 **Final Report:** two copies of the final report will be submitted to the client and a further three to CCHES Both paper and digital copies will be provided on CD-ROM in pdf format. The report will present the following information:
- (i) **Summary:** a summary statement of the findings;
 - (ii) **Introduction:** the background to the project including location details;
 - (iii) **Methodology:** an outline of the methodology of all elements of the programme of work;
 - (iv) **Historical Background:** an historical background to the site;
 - (v) **Results:** an account of the past and present land use of the study area;
An account of known sites identified through the study of documentary sources;
Any evidence for the remains of archaeological sites identified by the walkover;
 - (vi) **Discussion:** a discussion of the relative significance of sites within the study area;
A description of the significance of the study area in its local and regional context;
 - (vii) **Impact/Recommendations:** the identification of areas where further development will impact upon the archaeological resource in addition to the impacts of the current development;
 - (viii) **Illustrations:** maps, plans, sections and copies of the site photographic archive;
 - (ix) **Appendices:** a copy of the brief and this project design;
- 3.3.3 Provision will be made for a summary report to be submitted to a suitable regional or national archaeological journal within one year of completion of fieldwork, if relevant results are obtained.
- 3.3.4 **Confidentiality:** all internal reports to the Client are designed as documents for the specific use of the Client, for the particular purpose as defined in the project brief and project design, and should be treated as such. They are not suitable for publication as academic documents or otherwise without amendment or revision.
- 3.3.5 **Archive:** the results of all archaeological work carried out will form the basis for a full archive to professional standards, in accordance with current English Heritage guidelines (*Management of Archaeological Projects*, 2nd edition, 1991). The project archive represents the collation and indexing of all the data and material gathered during the course of the project. This archive will be provided in the English Heritage Centre for Archaeology format and a synthesis will be submitted to the HER (the index to the archive and a copy of the report). Arrangements for deposition of the full site archive will be made the Cumbria County Record Office (Barrow).

4 OTHER MATTERS

- 4.1 **Project Monitoring:** whilst the work is undertaken for the Client, the Cumbria Archaeological Officer will be kept fully informed of the work. Any proposed changes to the project design will be agreed with the Archaeological Officer and the Client.
- 4.1.1 **Access:** OA North will consult with the Client regarding access to the site.
- 4.1.2 **Health and Safety:** 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 (1997). A written risk assessment will be undertaken in advance of project commencement and copies will be made available on request to all interested parties.
- 4.1.3 **Work Timetable:** the desk-based element is expected to take approximately six days to complete and the walkover in the region of five days. The report will be completed within approximately eight weeks following completion of the fieldwork.
- 4.1.4 **Staffing:** the project will be under the direct management of **Alison Plummer BSc (Hons)** (OA North Senior Project Manager) to whom all correspondence should be addressed.
- 4.1.5 **Daniel Elsworth MA, PIFA** (OA North Project Supervisor) will undertake the desk-based assessment. Daniel has a great deal of experience in documentary research and in particular for the North West. Present timetabling constraints preclude who will be undertaking the walkover survey, although it is likely that this will be undertaken by an OA North supervisor suitably experienced in this field.
- 4.1.6 **Insurance:** OA North has professional indemnity to a value of £2,000,000, employer's liability cover to a value of £10,000,000 and public liability to a value of £15,000,000. Written details of insurance cover can be provided if required.

APPENDIX 2: PROJECT BRIEF

BRIEF FOR A DESK-BASED ASSESSMENT & WALKOVER SURVEY
ON THE PROPOSED PIPELINE ROUTE BETWEEN
HIGHFIELD SERVICE RESERVOIR AND POAKA BECK WTW, DALTON-IN-FURNESS
CUMBRIA

Issued by the

County Historic Environment Service

Environment Unit, Economy, Culture and Environment



Date of Brief: 28 April 2005

This Design Brief is only valid for 1 year after the above date. After this period the County Historic Environment Service should be contacted. Any specification resulting from this Brief will only be considered for the same period.

1. SITE DESCRIPTION AND SUMMARY

Site: Proposed pipeline route between Highfield Service Reservoir and Poaka Beck WTW, Dalton-in-Furness

Grid Reference: SD 2408 7782 to SD 2435 7393

Approximate length of pipeline: 4.5km

Detailed specifications and tenders are invited from appropriately resourced, qualified and experienced archaeological contractors to undertake the archaeological project outlined by this Brief and to produce a report on that work. The work should be under the direct management of either an Associate or Member of the Institute of Field Archaeologists, or equivalent, and any response to this Brief should follow IFA Standard and Guidance for Archaeological Desk-Based Assessments, 1994. The project should not commence until approval of a specification has been issued by the County Historic Environment Service.

2. PLANNING BACKGROUND

- 2.1 Cumbria County Council's County Historic Environment Service (CCCHES) has been consulted by United Utilities regarding a proposed pipeline route between Highfield Service Reservoir and Poaka Beck WTW, Dalton-in-Furness
- 2.2 Further information concerning the location, extent, survival and significance of the known archaeological remains along the route, as well as the potential for unknown archaeological remains to survive, is required. This Design Brief sets out the requirements for an archaeological desk-top assessment.
- 2.3 This advice is given in accordance with the advice of the Code of Practice on Conservation, Access and Recreation 2000.

3. ARCHAEOLOGICAL BACKGROUND

- 3.1 A considerable number of post medieval industrial sites lie on, and in the immediate vicinity of, the pipeline route. The majority of these are related to quarries and mines (Historic Environment Record nos. 4829, 16162, 16176, 18331, 18344, 18355 & 18363). The discovery of human remains (HER 2199) and a flint core (HER 40431) on the proposed route indicate prehistoric activity in the immediate vicinity.

4. SCOPE OF THE PROJECT

4.1 Objectives

- 4.1.1 To collate and assess existing information about the archaeology of the site and to determine as fully as possible from the available evidence the nature, survival, quality, extent and importance of any archaeological remains within the development area.
- 4.1.2 To provide a detailed assessment of areas of archaeological potential and survival based on the above research and assess the potential for the use of particular investigative techniques in order to aid the formulation of any necessary mitigation strategy, including further evaluation and/or preservation of archaeological remains.
- 4.1.3 To assess the potential state of preservation for any archaeological deposits that may exist on the site, and where possible to model those deposits.
- 4.1.4 To assess the extent of any ground disturbance associated with any previous intrusive development and the potential archaeological implications of any potential development proposal.
- 4.1.5 To identify and record the location of any significant archaeological remains that survive above ground along the line of the proposed pipeline.

4.2 Work Required

4.2.1 Desk-based assessment

A reassessment of aerial photographic evidence and, where relevant, a replotting of appropriate archaeological and topographical information by a suitably qualified specialist at a scale of 1:2500.

- ✍ Collation and assessment of any relevant information held in the County Historic Environment Record.
 - to identify important sites
 - to assess the potential of *known* sites
- ✍ Assessment of relevant published sources including articles in national, regional and local journals.
- ✍ Assessment of relevant unpublished documents including, where appropriate, reports compiled by heritage conservation professionals and students theses.
- ✍ Collation and assessment of all cartographic information relevant to the area.
 - to identify historic landuse
 - to examine the siting of old boundaries and trackways
 - to identify any early buildings
 - to provide an assessment of the potential extent of disturbance to the archaeological resource caused by cellars and other intrusive features
- ✍ Assessment of available geotechnical data (e.g. bore holes, test pits): relevant logs must be included as appendices
 - to assess the condition and status of buried deposits
 - to identify local geological conditions
- ✍ Assessment of the topography and landuse of the area through maps and site visits.
 - to assess the **archaeological potential** of areas not identified through the County Historic Environment Record

4.2.2 Walkover survey

A walkover survey of the pipeline route, encompassing the proposed working easement as a minimum. Any surface features of potential archaeological interest should be recorded together with areas of potentially significant disturbance, and hazards and constraints to undertaking further archaeological work on site (including the siting of live services, Tree Preservation Orders and public footpaths). The extent (for sites over 50m in size) and location of the archaeological sites should be recorded at an accuracy of +/- 1m.

5. SPECIFICATION

- 5.1 Before the project commences a project proposal must be submitted to and approved by the County Historic Environment Service.
- 5.2 Proposals to meet this Brief should take the form of a detailed specification prepared in accordance with the recommendations of *The Management of Archaeological Projects*, 2nd ed. 1991, and must include:
 - ✍ A description of the methodology to be employed
 - ✍ A description of the report that will be produced
 - ✍ Details of key project staff, including the names of the project manager, supervisor and any other specialist sub-contractors to be employed
 - ✍ Details of project staffing, expressed in terms of person days
 - ✍ A projected timetable for all work including the production of the report

- 5.3 Any significant variations to the specification must be agreed by the County Historic Environment Service in advance.

6. REPORTING AND PUBLICATION

- 6.1 The archaeological work should result in a report, this should include as a minimum:
- ✍ A site location plan, related to the national grid
 - ✍ A front cover/frontispiece which includes the planning application number and the national grid reference of the site
 - ✍ A concise, non-technical summary of the results
 - ✍ A description of the methodology employed, work undertaken and the results obtained, including maps and other illustrations, as appropriate
 - ✍ A discussion of the archaeological implications of the proposed development, identifying areas of greatest archaeological potential within the development site [and areas where this is at greatest risk in terms of the development proposals]
 - ✍ Clear identification of any hazards to undertaking further archaeological work on site
 - ✍ Recommendations for further archaeological [assessment or mitigation] work.
 - ✍ The dates on which the project was undertaken
- 6.2 Three copies of the report should be deposited with the County Historic Environment Record within two months of completion of fieldwork. This will be on the understanding that the report will be made available as a public document through the County Historic Environment Record.
- 6.3 The involvement of the County Historic Environment Service should be acknowledged in any report or publication generated by this project.
- 6.4 Should further archaeological work result from the desk-based assessment, the results may need to be made available for inclusion in a summary report to a suitable regional or national archaeological publication.
- 6.5 Cumbria HER is taking part in the pilot study for the *Online Access to Index of Archaeological Investigations* (OASIS) project. The online OASIS form at <http://ads.ahds.ac.uk/project/oasis> must therefore also be completed as part of the project. Information on projects undertaken in Cumbria will be made available through the above website, unless otherwise agreed.

7. THE ARCHIVE

- 7.1 An archive must be prepared in accordance with the recommendations of *The Management of Archaeological Projects*, 2nd ed. 1991, and arrangements made for its deposit with an appropriate repository. A copy shall also be offered to the National Monuments Record.
- 7.2 The County Historic Environment Service must be notified of the arrangements made.

8. PROJECT MONITORING

- 8.1 One weeks notice must be given to the County Historic Environment Service prior to the commencement of the project.

9. FURTHER REQUIREMENTS

- 9.1 It is the archaeological contractor's responsibility to establish safe working practices in terms of current health and safety legislation, to ensure site access and to obtain notification of hazards (eg. services, contaminated ground, etc.). **The County Historic Environment Service bears no responsibility for the inclusion or exclusion of such information within this Brief or subsequent specification.**

9.2 The Code of Conduct of the Institute of Field Archaeologists must be followed.

10. FURTHER INFORMATION

For further information regarding this Brief, contact

Jeremy Parsons
Assistant Archaeologist
Cumbria County Council
County Offices
Kendal
Cumbria LA9 4RQ
Tel: 01539 773431
Email: Jeremy.Parsons@cumbriacc.gov.uk

For further information regarding the County Historic Environment Record, contact

Jo Mackintosh
Historic Environment Records Officer
Cumbria County Council
County Offices
Kendal
Cumbria LA9 4RQ
Tel: 01539 773432
Email: jo.mackintosh@cumbriacc.gov.uk

As part of our desire to provide a quality service to all our clients we would welcome any comments you may have on the content or presentation of this Design Brief. Please address them to the Assistant Archaeologist at the above address.