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KNOCK SMELT MILL,
LONG MARTON, CUMBRIA
STATEMENT OF SIGNIFICANCE

prepared for
Natural England

Project No.: 1229
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November 2014

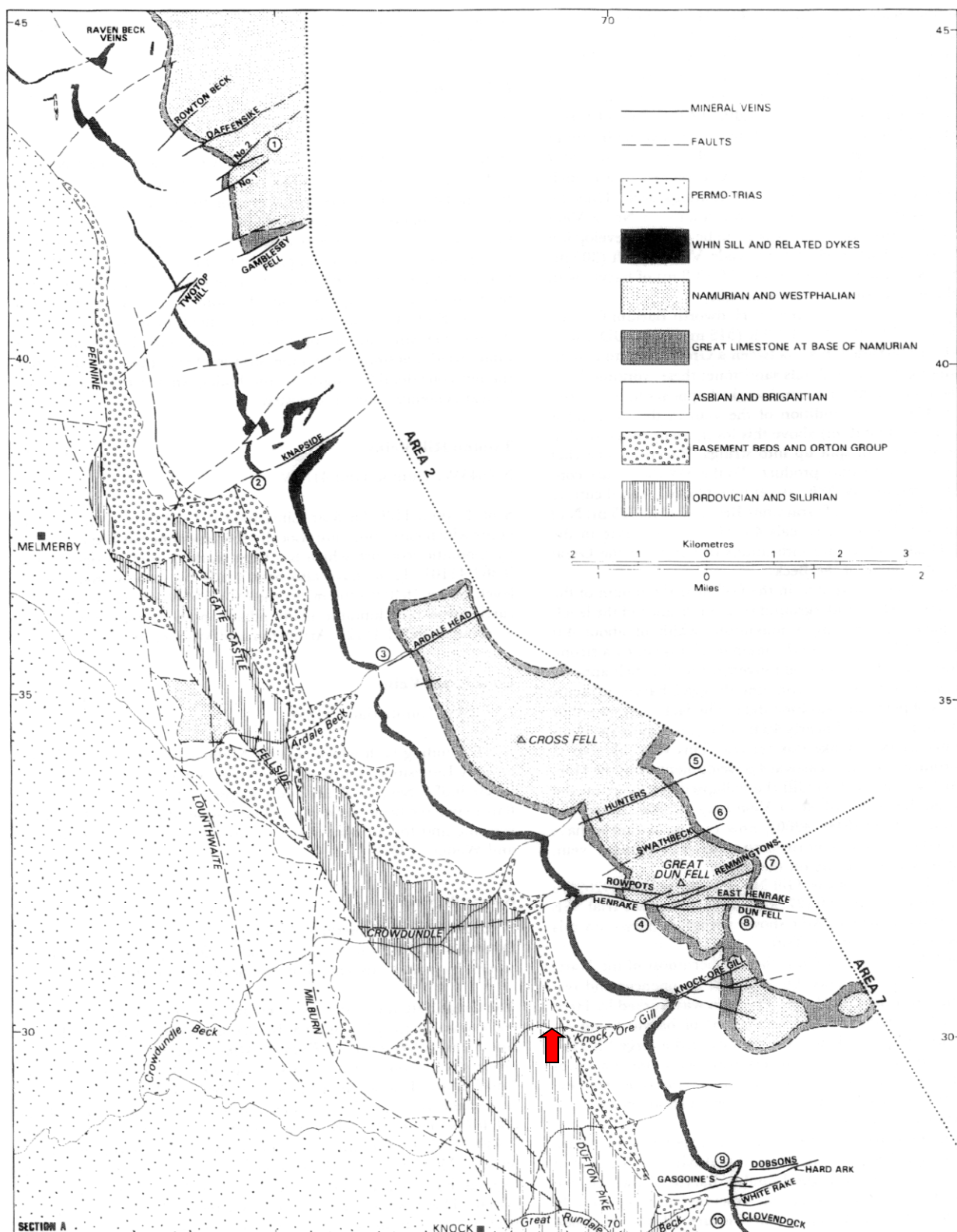


Figure 18 Key map, area 1, The Escarpment

Key to numbered mines 1 Hartside; 2 Knapside; 3 Ardale Head; 4 Silverband; 5 Hunter's Vein; 6 Swathbeck; 7 Loppysike; 8 Dun Fell; 9 Threlkeld Sike; 10 Dufton; 11 White; 12 Murton; 13 Hilton; 14 Amber Hill; 15 Long Fell; 16 Augill; 17 Cabbish.

Plate 1: position of Knock smelt mill, and its association with main ore bodies (after Dunham 1990, 106)

SITE LOCATION

Knock smelt mill lies on the south bank of Knock Ore Gill, at NY 697 299, at an altitude of approximately 365m AOD, within the parish of Long Marton, on the west side of the Pennine ridge. Knock Ore Gill is a fast flowing water course, running broadly from east to west but with several distinct meanders which have cut north and south over the centuries (Plates 1 and 2). This has left a broad river channel, with dumps of water-borne stones in islands around the edges of the old stream courses. The gill's current course is somewhat further north than it has been previously, and it was clear during the survey that the gill had flowed close to the smelt mill in the recent past, undermining parts of the structures (compare water-course positions in Plates 4 and 5).

The smelt mill is set on a broad platform, facing out in a westerly direction. The platform is partly terraced into the hillside, about 2m above the river bed, and is defined on the south and east sides by the steep hill slope rising up to meet the main road. The mill therefore sits in a relatively sheltered position overlooking the river.



Plate 2: Views looking east down the track to Knock smelt mill platform

HISTORICAL CONTEXT

The history of the smelt mill has been extensively covered in Murphy and Smith (1999), and Smith and Murphy (2011), and the information in this section is entirely drawn from those sources, unless otherwise stated.

The parish of Long Marton was held by the Cliffords until around 1629. In that year, the Second Earl of Thanet, Sir John Tufton, married Margaret Sackville, daughter of the Earl of Dorset and Lady Anne Clifford. Their son, the third Earl, gained control of the barony of de Clifford from his maternal grandmother, and it was at this point that the parish came into the control of the Earls of Thanet. Knock manor formed part of this parish, a narrow strip of land running north-east from the village and extending almost to the river Tees; the manor included Knock and Milburn Fells and some of the richest lead mines in the area (Murphy and Smith 1999, 104).

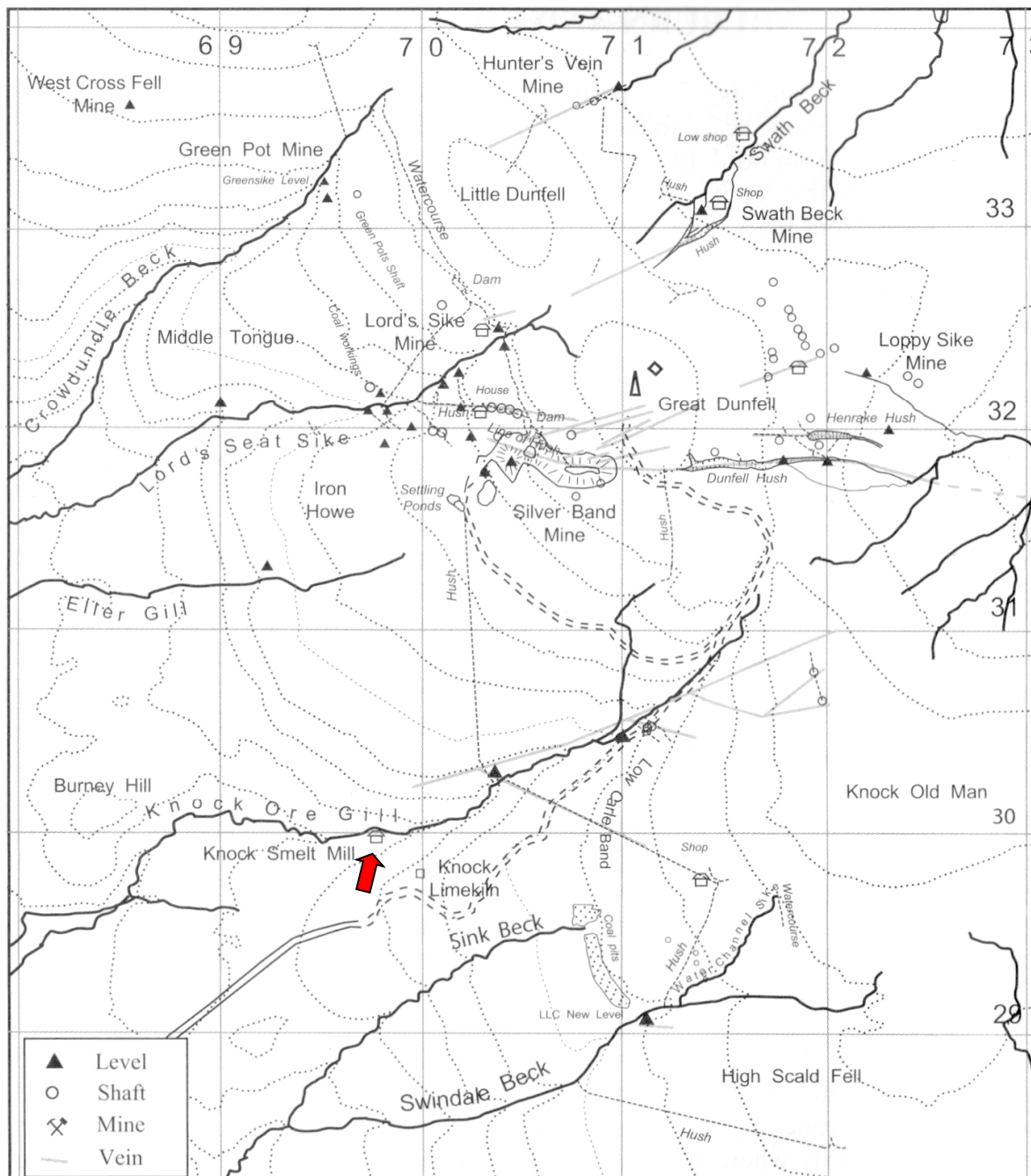


Plate 3: principal mine workings (reproduced from Smith and Murphy 2011, 44)

The mill was presumably built by the sixth Earl, Thomas Tufton (1644-1729), who is noted for having represented Appleby-in-Westmorland in Parliament and was Lord Lieutenant of Cumberland and Westmorland. The mill was built to smelt ore from his mines on Knock Fell (which included Knock Ore Gill and Over Hearth) and Milburn Fell (Silverband Mine and Dun Fell Mine). The mines are depicted in Plate 3. These were being worked from at least 1689, and the Knock mines were sufficiently important at that time to merit the employment of a "*Bayliffe of the Lead Workes at Knock*" (Murphy and Smith 1999, 106). The date of construction for the smelt mill is uncertain, but it was unlikely to have been in existence in 1703, as the Earl's duty ore is recorded being smelted at Bollihope smelt mill (near Frosterley, Weardale, Co. Durham) at this time.

The first mention of the mill was probably in September 1739, when a blacksmith in Dufton, Edmond Ellwood, was charged with stealing '*an iron pot and some other goods out of the House or Smelting Miln at Knock, belonging to the Right Honourable Sackville Earl of Thanet*' (Murphy and Smith 1999, 104 – Sackville was the seventh Earl). Minor repairs are recorded at the mill in 1765, 1767 and 1768, totalling £2 7s 4d (Murphy and Smith 1999, 106).

The use of the mill is little recorded, but Murphy and Smith (1999, 106) suggest it was probably used intermittently. No mining was carried out at Dun Fell mines between 1772 and 1779, but duty lead appears in the accounts in 1780, suggesting mining has resumed. Smelting probably followed the fortunes of the mines, and following this hiatus there seems to have been some investment again at the mill; in 1782 the lead duty was reckoned up '*exclusive of a Road to the Smelt Mill*', indicating the construction of a road within a year or two of that date (Murphy and Smith 1999, 106).

In 1780, the Eighth Earl of Thanet, Sackville Tufton, purchased the manor of Milburn, to the immediate north of Knock, and in 1785, the manor of Dufton, to the immediate south (Murphy and Smith 1999, 104). Dufton Manor included further mines on Dufton Fell, but perhaps more importantly a smelt mill, conveniently located adjacent to the village. The smelt mill was more than capable of managing the output of the mines, and as such Knock smelt mill probably stopped being used after this date; estate accounts show the smelting of duty ore from the mines at the Dufton mill from this date onwards. Knock smelt mill was definitely obsolete by 1791; the Earl of Thanet's accounts record the bellows from the mill being removed to a new smelt mill at Dufton, built by the ninth Earl in 1791/2 (Murphy and Smith 1999, 107).

By the early 19th century, the smelt mill was no longer in use. The smelt mill is depicted on a London Lead Company mine plan, thought to date to 1820, as '*Old Smeltnill*' (Murphy and Smith, 1999, 104). Hodgson's map of Westmorland, 1828, also depicts the '*old smelt mill*' and is also shown on the First (and subsequent editions) of the Ordnance Survey mapping as '*old smelting mill*' (Murphy and Smith, 1999, 104).



Plate 4: view of the smelt mill, facing west, 1998 (after Murphy and Smith 1999, 106)



Plate 5: the same view in 2014; note different position of river channel; the stonework in the foreground is the launder

SUMMARY OF THE ARCHAEOLOGICAL FEATURES

The following section provides a brief summary description of the main structures identified in the survey area; a more detailed survey and gazetteer is recommended, and should form the basis for future works. The discussion follows the annotations and discussions by Murphy and Smith (1999), as shown in Plate 4.

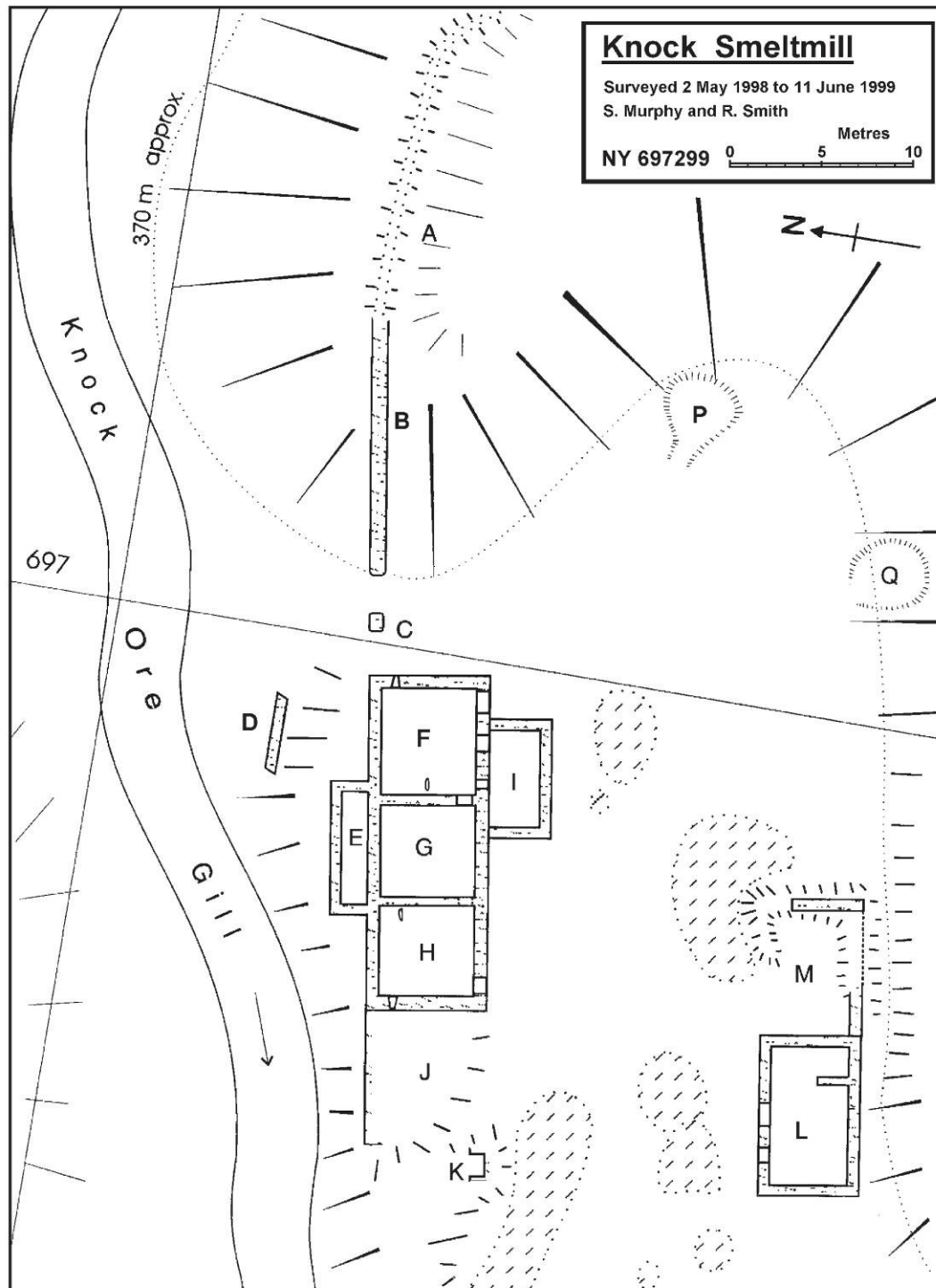
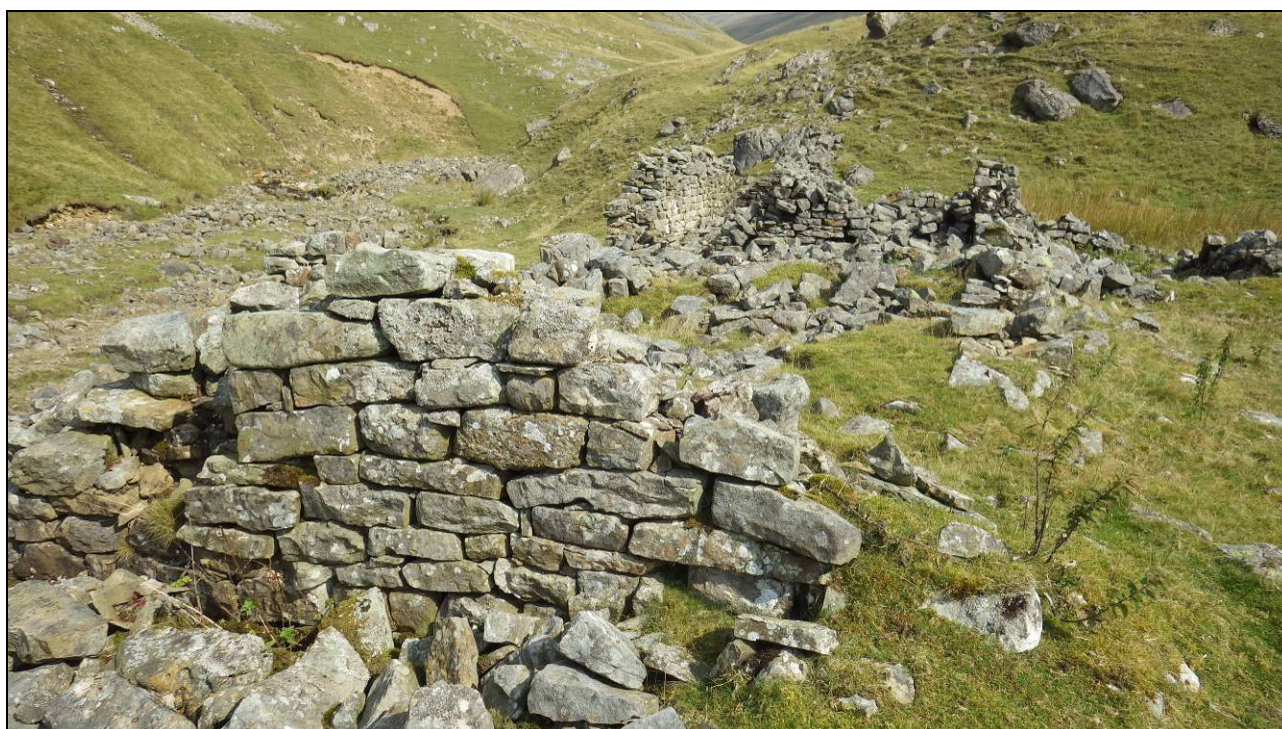


Plate 4: site plan reproduced from Murphy and Smith 1999, 105

Access to the smelt mill was by means of a track, built in 1782 and clearly visible on the First Edition Ordnance Survey mapping. The track runs north-east and straight from the edge of the enclosure wall (built c1815) down to the platform. The track, benched into the hillside, measured 260m in length; its south-western continuation is difficult to follow, and it may have turned south-wards to join the now modern road, or else took a more direct line down to the village through the fields (its course now lost perhaps as a result of agricultural improvements). Murphy and Smith (1999, 108) recorded the road as '*2.4 metres wide, well-metalled with gritstone cobbles and black slag, and in an excellent state of repair*'; this is true today.

There are two ranges of buildings on the platform, the main smelt mill building (marked **E** to **I** on the drawing), on the north side of the platform, and a smaller range of buildings (marked **L** to **M**) on the south side. The buildings are almost entirely of drystone construction, with plugs of lime mortar in places, either as repairs, or perhaps as weather-proofing, where gaps in the walls have allowed the wind to get in. The buildings are mostly quite collapsed now, but some assumptions can be made as to the positions of doorways; however, no windows, nor the positions of any other openings, were visible as walls for the most part do not survive to sufficient height. Murphy and Smith (1999, 108-9) suggest the positions of tapering windows in buildings **F** and **H**, and, whilst these may be present, they were not readily apparent during the current rapid assessment of this building. Only limited evidence of flooring or internal walling was visible in the stone rubble, and this is discussed below.



*Plate 5: looking along the smelt mill from the south-west corner of **H***

The earliest structure, which must be the early 18th century smelt mill, comprises the eastern three cells of the north range (**F** to **H**), with a wheel-pit (**E**) on the north side; Murphy and Smith (1999, 108) describe it as a

'long symmetrical building'. The wheelpit, a long thin east-west aligned structure, was entirely choked with collapsed stonework, but it was possible to just make out the edges of the side walls. No evidence for a wheel survives. A short length of wall to the north-east of the wall, marked as **D**, may have been constructed to divert the water of the gill away from the sides of the wheel-pit, which may have been vulnerable when the gill was in full spate.

The wheel-pit linked to the bellows room (**G**), in the centre of the building, which would have provided the air-blast to the hearths. This room was also entirely choked with rubble, and no evidence for a floor was visible. There appeared to be a centrally set doorway on the south side of this room, allowing access into the bellows room from the courtyard, but it was hard to be certain of this.



Plate 6: smelting room F, facing west

On the east and west sides of the bellows room (**G**) were the smelting rooms themselves. The western room, **H**, included little in the way of visible structural detail, though a small hearth keeper stone was evident protruding from the rubble in the north-eastern corner. There appeared to have been a doorway between the bellows room and room **H**, towards the southern end of the dividing wall, though again this was hard to make out definitively. The eastern smelting room, **F**, was a little less encumbered by fallen stone, and as such some internal structural details were evident. Against the west wall, in the centre of the room, was a further small keeper stone, set upon a flagged surface, which was heavily cracked and distorted from repeated heating, and marked the position of a hearth in this room. The wall to the rear included two openings, roughly equidistant from the keeper stone, both now infilled with stone; these were quite narrow, perhaps 0.60m wide, and may have marked the openings through which air was blasted to the rear of the hearths, or narrow doorways. The

north wall was notable for being the best surviving section of masonry, at approximately 2m in height. The coursing of the stonework comprised broad foundations, onto which were laid approximately four courses of random-coursed and squared rubble. A string course of broadly flat stones, laid onto this surface, provided a stable base onto which was added a further five courses of rubble-work, and so on. The surviving wall shows how well-constructed and substantial the smelt mill must have been.



Plate 7: the north (exterior) side of room F, showing the fine stone work. The smaller wall in the foreground D was used to divert water off the wheel-pit, which lies to the right of the photograph.

Sometime after the construction of the smelt mill, two further cells were added to the structure, marked I and J on the plan; both of these clearly abut the earlier structure. The construction of these cells seems to mark an expansion of the smelt mill, but not necessarily its smelting capacity, which was tied to the position of the bellows in the centre. The purpose of the rooms is not clear, but a storage function could be likely, with the position of J perhaps used as a wood-store for the chop-wood for firing the hearth. Murphy and Smith (1999, 108) suggest that room I was used as a lead store, which in view of its small size is entirely plausible. The north-west corner of J has been badly affected by water action, and has now largely collapsed to foundation level, causing a slump of material from the original floor level downwards. Parts of a possible floor surface were noted during the site visit, buried under substantial post-collapse deposits, and visible protruding from the edge of the bank above the walls. The wall appears to be of different construction to the main smelt mill, being of random-coursed roughly dressed stonework, bonded with lime mortar, and particularly more substantial than the other, earlier, walls. The wall, despite its more substantial construction, has nevertheless started to collapse into the course of the gill.

Immediately west of **J** was a small structure **K**, comprising three walls and an open north-facing section. Murphy and Smith (1999, 109) suggest this as a fragment of wheel-pit or the output for a drain. It may have equally been the base of a small privy, designed to empty out into the beck.



*Plate 8: the smelt mill viewed from the north-west; note the collapsed corner of **J** to the right of the photograph*

On the south side of the platform was a small two celled building, aligned roughly east to west. The building contained two rooms (**L** and **M**), and measured 17.5m by 7m. The western room, **L**, was contained within more substantial walls, and its shape and position suggested a lodging or mine-shop for the workers at the smelt mill. Little internal detail was visible, though a small internal wall may mark the position of a staircase to an upper floor. There was no immediate and obvious evidence for a chimney. The eastern cell, **M**, had a clear and wide opening on the north; Murphy and Smith (1999, 109) imply this was a cart shed or stable, and this is a reasonable assumption, as the walls are much thinner, suggesting they were not required to support an additional floor above, but were open to the rafters. To the east of the building, **P** and **Q** are suggested as hollows for chopwood kilns, and this seems likely (**Q** has some small amounts of walling evident at the mouth of the earthwork). The courtyard inbetween the two building has been surfaced with black slag from the hearths, which lacks vegetation due to its high toxicity. Murphy and Smith (1999, 110) suggest this to have been the product of a slag hearth, and indicated the depth across the platform to be 200-300mm. It would appear from cursory examination that the further dumps head westwards along the south side of the gill, at the interface between the watercourse and the base of the hill. Smaller dumps of slag are evident in places along this. It is suggested that the smelt mill operated one ore hearth and one slag hearth, as is evidenced on other

smelting sites. The ore was smelted normally in the ore-hearth and the resulting grey slags were then run in a slag hearth to lead and black slag, perhaps with the addition of iron to remove antimony (dumps of iron-rich slag are visible around building **L**). The presence of iron pieces in the slag dumps is indicative of fairly high reducing conditions, obtainable only using a slag hearth (Murphy and Smith 1999, 115).



Plate 9: view across the southern range of buildings and courtyard

The wider landscape falls outside the remit of this report, which was mainly concerned with the structures on the platform, but a rapid assessment of these is presented here. The power for the mill was supplied by a long leat which starts 450m further east, where the gill drops out of a narrow V-shaped valley into a wider flatter, river-bed. The leat was not traced fully to its eastern extent, as it lay beyond the scope of this assessment, but Murphy and Smith (1999, 109) suggest this may have been the position of a reservoir, which would have been needed to maintain a constant flow to the wheel. The leat follows a meandering course along a contour westwards to a broad platform immediately above the smelt mill – this looks to have been the position of another broadly rectangular reservoir, measuring 18m by 14m. A large stone at its north-west corner bears a groove which indicates the position of a sluice-gate. The leat then runs downhill and west, where it is carried by a launder base **B**, then a stone pillar **C** across to the wheel-pit.

Elsewhere, within the wider landscape, a sheep-fold (marked on the First Edition Ordnance Survey mapping) was noted 140m west of the smelt mill, at on an artificial platform defined by a mound on its eastern side. There is no immediate evidence of dressing of lead ore anywhere in the stream bed; this is more commonly carried out near the mines in the 18th century, to allow the easier transport of readily-smelttable ore to the

mill. If dressing was occurring at the mill, this area should be investigated as a possible position for a dressing floor.



Plate 10: lead slag

STATEMENT OF SIGNIFICANCE

Overall Significance

Knock smelt mill complex is considered to be of considerable (regional) significance as an example of a well preserved early 18th century lead smelting mill, forming part of the wider North Pennines mining landscape. It is arguably of schedulable quality as it fulfils a number of the criteria as laid out in English Heritages Designation Scheduling Selection Guide for Industrial Sites (http://www.english-heritage.org.uk/publications/dssg-industrial-sites/130430_Industrial_SSG_final.pdf), particularly with regards rarity, period significance, historical significance, survival, condition and its potential to yield future information. The fulfilment of these may make it of national significance; the discussion of this lies outwith this report, which is only making a rapid assessment of the significance of the structures, but future discussions about the site with English Heritage are recommended.

The rapid assessment has established the considerable evidential value of the site which appears to be of an extent and quality of preservation to rival those found on more well known Scheduled lead smelting sites (for example, Augill smelt mill, which is of mid 19th century date). Based on the observations of archaeological remains seen at the smelt mill there is considerable potential for the survival of material relating to all aspects of the smelting process. This could include the motive power (leat, reservoir, wheel-pit), air-blast generation

(bellows room) smelting (ore and slag hearths, associated equipment) and ancillary buildings (storage, accommodation).

Of equal importance are the historic values of the site, in particular the links with the Earl of Thanet, to which the construction and running of the mill must be attributed. Further research is necessary to fully understand the historic development of the site and how it functioned, especially how the smelt mill served the needs of the mines in the wider area between c1700 and 1785. Did it serve other mines besides those on Knock and Milburn Fells? What was its relationship with other smelt mills in the area? When was the mill actually constructed, could it be as early as 17th century, when mining was underway at Silverband and other mines? Within the wider landscape, and in particular on the hillside above the smelt mill, importance evidence of leats and other water management systems appear to survive, and would warrant detailed examination.

The site has a considerable communal value with regards the level of interest inspired in the industrial history of the area, particularly mining. There are a number of local and regional industrial interest groups including the Cumbria Amenity Trust Mining History Society (CATHMS) and other mine exploration groups and local history societies who would be interested in the site and there is the potential to bring these elements together to advance a better understanding of the site and its surroundings. The site also lies adjacent to a popular walking route, and its interpretation would benefit passing tourists, in much the same way as has been recently undertaken at Bolts Law Engine House on the Coast to Coast cycle route above Rookhope.

Site Specific Values

The following table summarises the site specific significance of Knock smelt mill according to four high level themes as set out in Conservation Principles, Policies and Guidance for the Sustainable Management of the Historic Environment (English Heritage, 2008):

Evidential Values - the potential capacity of the smelt mill to yield primary evidence about past human activity (building design, extent of survival, etc).

Historical Values - the potential of the smelt mill to advance the historic narrative – the connection between the present and the past through association with people, events and aspects of life.

Aesthetic Values - the potential for people to derive sensory and intellectual stimulation from a place, through design, art, character and setting.

Communal Values - the potential for the smelt mill to bring people together through collective experience or memory.

Table 1: Summary of heritage significance

Evidential	<p>The degree of preservation of structures related to the smelt mill appears to be good, with standing walls found surviving good condition;</p> <p>The variety of the material preserved within the mill itself, relating to its use (e.g. hearths) was not considerable, but sub-surface remains sealed beneath the demolition rubble could potentially include evidence of lead production and the air-blast generation for the hearths. At least some of this survival is hinted at through the preservation of the keeper stones and the fire-cracked floors. There are also considerable quantities of industrial process residues and waste artefacts (chiefly slag), the analysis of which will further enhance understanding of the smelting process at these early sites;</p> <p>The sequence of deposits which seem to be preserved all relate to the 18th century (and perhaps earlier). The smelt mill appears to evolved and expanded, but not changed in function significantly, and there is no evidence of levelling, and perhaps little robbing, which means a good sequence of material could potentially be preserved. English Heritage argue that sites which have not been significantly altered or reconstructed, but that demonstrate evolution of development, are extremely important;</p> <p>The group value of the site in terms of its 'process flow', the smelting of the lead tied to chopwood production and storage, and its water-management system, for example. There is also considerable group value in its relation with the wider industrial landscape and in the more immediate context of understanding the development of the Knock and Milburn Fell mines which served it.</p>
Historical	<p>The association of the smelt mill with the Earl of Thanet makes this mill of historic importance. It was built and used solely by the Earl, as far as documentary sources can demonstrate, and its link to this important historical figure should not be understated;</p> <p>The association of the smelt mill with mining concerns, paying the</p>

	<p>mill for smelting their ore, is also important and should be explored further. Knock is a rare surviving example of smelt mill in a group which originally extended along the western edges of the Pennines (summarised in Smith and Murphy 2011, 181-200). Of the eight listed in the book, only two survive (this, and Augill smelt mill, of mid 19th century date and Scheduled). There are only 24 Scheduled lead smelting listed by English Heritage in the United Kingdom, of which only 4 are in Cumbria. Most appear later than this example.</p> <p>The wider historic significance of the site in terms of understanding the pattern of settlement and communication across the North Pennines is also important – it had links with a number of villages and was also connected by trans-Pennine routes to mines along the Tees and further to the north-east;</p> <p>The historic importance of the site in terms of understanding the lives of the lead smelters and how they were organised should be explored.</p>
Aesthetic	<p>The industrial remains evoke a strong feeling of the passing of time and the transitory nature of human endeavour: a sense which echoes across some of the country's greatest and most popular archaeological sites.</p> <p>The smelt mill is not visible from the public footpath, and is entirely hidden away in a river valley. The site is intriguing and promotes a sense of discovery and exploration for those who make a detour from the road to investigate.</p> <p>The buildings are very important to the aesthetic significance of the site. They are not substantial, but the preservation of their plan form and layout is easily understandable both physically and intellectually to anyone visiting the site.</p> <p>Views both from and around the site are key to the setting of the smelt mill. In particular the long view west up from the platform across the gill towards the valley beyond, and views across the</p>

	smelt mill from the hillside above.
Communal	There is already considerable interest in the history and archaeology of the site and the potential to bring together groups to explore both the evidential and historic elements of the mines and dressing floors to promote a greater understand and appreciation of the lead mining heritage in the dale.

FURTHER RECOMMENDATIONS

The smelt mill continues to be very vulnerable to erosion from the gill, as well as general weathering of the structures, which places the significance of the site at considerable risk. There are also a number of other issues which threaten the remains of the upstanding buildings, such as destruction by stock, and to a lesser extent stone-robbing. In order to preserve and enhance the significance of the site, a formulation of a management plan is recommended to ascertain the nature and extent of the risks to the asset and determine a workable programme of stabilisation. In the absence of such a plan, and as a short term measure, the following should be considered:

- Further documentary research with the aim of understanding more about the development and history of the site;
- Further recording of the mining landscape - both landscape survey and historic building recording. The former can be undertaken remotely to an extent, as there is sufficient Lidar coverage of the river corridor to allow the production of a basic site plan and contour map. Building survey should be by means of rectified photography and/or hand drawing of the elevations of the smelt mill, before any further destruction takes place;
- A regular programme of condition monitoring. Any future survey can be used as a baseline to inform this work which should be undertaken at least on an annual basis or after episodes of heavy flooding;
- Addition information should be added to the Cumbria County Council Historic Environment Record (HER) regarding details of the smelt mill.

Many of the above elements could be undertaken by volunteers and in the first instance the Nenthead Mines Conservation Society or CATHMS might be approached to see if they would be interested in becoming actively involved in the future conservation and recording of the site. Limited excavation could be carried out as part of the North Pennines AONB *Altogether Archaeology* project, which could provide a greater understanding of the layout and use of the mill.

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